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Strategic interests in the Arctic

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Foreword

After the demise of the Cold War the Arctic has been emerging as a scene for increasing scientific, environmental and economic cooperation between governments. At the same time contacts have been growing among indigeneous peoples, indicating an increased recognition of common interests and appreciation of common efforts.

In the military sphere, though, the Arctic remains in the shadow of the military confrontation and competition of the Cold war. Russia maintains massive nuclear and conventional forces in the region, and the United States and United Kingdom continue to operate their attack submarines beneath the Arctic ice. Polar navigation provides shorter air routes and motivates elaborate air warning and air defence activities on both sides, and Moscow has made the Arctic island of Novaya Zemlya its sole nuclear weapons testing site.

This study is aimed at describing these strategic interests in the High North, focussing on their implications for the states which are located in the High North. It also tries to identify those Arms Control or Confidence Building Measures which might be beneficial to enhance stability in the area.

The term *High North* has been deliberately chosen to denominate the area under scrutiny since this includes all of what is officially designated as the Arctic, but also the adjacent seas and northern regions of the countries which are affected by the strategic interests in the area. Due to the origin of the study its has been natural to concentrate on the strategic implications for Norway and for the nordic region. However the study is

of general value to all readers interested in the overall military strategic importance of the Arctic.

The study has been produced at the time of great and continuing changes in the former Soviet Union, and this has in turn had a profound effect on the development of the European security arrangements as well as their Atlantic connection. The aim of the study has, however, remained to give a presentation of the implications for the Arctic and the circumpolar states if there is continued strategic competition between the United States and the successors of the USSR.

We wish to express our gratitude to Øyvind Grøndahl for his help in doing the final editing of the manuscript.

Oslo, April 1992

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1. The Arctic Area

The Arctic region is, for most of those who live outside it, largely ignored. On the commonly used maps of the world the Arctic constitutes a border to nothingness, fading off the northern periphery of the map and appearing to lead nowhere, while in our daily lives the relative lack of news about the Arctic also tends to let it drift into obscurity.

On the whole this ignorance of the Arctic is understandable, since human activity in the area is relatively marginal compared to other parts of the world. However the Arctic nonetheless merits more general attention than it has received hitherto. This is so for two reasons. In the first place because it does play a vital - if largely overlooked - part in the strategic nuclear relationship between the US and the former USSR. And secondly because the development of human technology, combined with the continuous endeavour to expand our exploitation of the natural resources of the globe, are making the Arctic into a major potential area of human economic activity.

Definition and Geographical Area

The Arctic covers the land- and sea-areas surrounding the North Pole. However there is no commonly accepted definition of its southern border-line. Historically, the Polar circle, at latitude 66° 33' N, has been used as a border-line. In more recent years the Arctic has been defined as the area north of the 10°C isotherm.[1] This area tangents the north coast of Norway, passes over Iceland and sweeps south close to 50° North at Labrador, including the northern coast of Canada, and swings once more south to 50° North covering the Aleutian Islands and the Bering Strait, and finally enclosing the northern coast of Siberia.[2]

The land areas in the Arctic belong to the states which either border on the Arctic directly or else possess areas within the Arctic. The USA and Russia both cover large Arctic land masses, the USA becoming a true Arctic nation in buying Alaska from Russia in 1867.[3] Canada has special economic and sovereignty interests in the Arctic due to her Arctic archipelago and long coast stretching into the Arctic waters. Denmark is involved in the Arctic through her possession of Greenland. Both Norway and Iceland have strong historical links to the Arctic, while today's interests are mainly linked to fisheries in the cold waters. Norway also has sovereignty over the Spitzbergen group of islands, where the 40 partners to the 1925 Treaty have equal rights to potential economic resources.

The Arctic coastal states are Canada, USA, Russia, Denmark (Greenland), Iceland and Norway. The two remaining circum-polar nations, Sweden and Finland, have a part of their mainland located north of Latitude 66° 33' N, but like Norway prefer to consider their northern regions as integral parts of their mainland and not as belonging to the more desolate Arctic.

Large areas of the Arctic are covered by water. The frozen Arctic Polar Basin and the rim seas form the Arctic Ocean. Listed from the Norwegian Sea westwards, these include the Greenland Sea, the Wandel Sea, the Lincoln Sea, the Beaufort Sea, the Chukchi Sea, the East-Siberian Sea, the Laptev Sea, the Kara Sea and finally the Barents Sea. The Polar Basin itself is divided into two main parts (the American-Asian and the Euro-Asian Basin) by a submerged ridge, the Lomonosov ridge, stretching north from Novosibirskije Ostrova towards Greenland.

Climatic Conditions

The temperature over the central parts of the Arctic is relatively stable due to the large masses of water transferring a constant amount of heat. During the winter, the temperature in the air can reach -35°C, while it in the summer can touch 0°C. The temperature further south in the Arctic can reach 10°C during mid-summer. Due to the large masses of water fog is dominant during summer, in particular in costal areas and over open waters. The Arctic does not receive much rain, especially not in the central parts of the area. This is mainly caused by the low temperatures preventing the air from holding moisture, causing small amounts of precipitation. The downwinds can be very hard close to the ground and in areas where the glaciers meet the mountains.

The Arctic is known for its special light conditions, total darkness with occasional Aurora Borealis during winter and 24 hours of daylight during summer, reinforced by reflections from the vast snow- and ice-covered landscape. The special light conditions influence all activities in the Arctic, both civilian and military.

Furthermore, the climatic conditions in the Arctic are to a large degree dominated by the large amount of water flowing to the other oceans. The Gulf-stream carries warm water to the Norwegian coast where it splits into two main streams. One flows along the western coast of Spitsbergen and the other brings warm water into the Barents Sea. The Arctic Ocean also receives warm water through the Bering Strait. These currents of warm water also have another effect, of particular importance for military operations. As the temperature in the water gradually decreases the cold water sinks. These temperature differences combine with the varying levels of salinity to form distinct layers in the water. These layers reflect sound differently, affecting the use of sonar and other passive instruments. This is of major importance in submarine warfare.

The major part of the Arctic Ocean is covered by ice, but the ice-front varies with the season, causing the rim-seas to be free of ice for a period during the summer months. However, large areas of the Arctic Ocean and surrounding seas are covered by floating ice-rafts and icebergs making both surface and sub-surface traffic hazardous. Due to wind and subsurface streams, the rafts can be moved into vertical positions, making surface formations of 20 to 30 meters or more. These obstacles make surface movements difficult. The ice itself affects navigation in two ways. Firstly, the ice can have draughts or keels more than 100 meters deep under the surface of the sea itself, therefore, in shallow waters the ice-conditions are of great importance for both offensive and defensive submarine-operations. The submariner will need accurate and constantly updated maps, including the ice-conditions. In a worst case he could be forced to use active sonar to avoid being trapped in a "death valley" caused by the floating icebergs. Moreover important straits, such as the Bering strait, can be blocked by ice during the winter, making transit impossible.[4] Hence in Arctic submarine-operations, the ice-conditions in itself is an important but variable factor. Secondly, the ice creates special accoustic environments, due to reflection and the above mentioned layers in the water. Furthermore icebergs breaking loose from the ice as well as floating icebergs create noise, hampering accoustic surveillance. Both of these factors are distinct for Arctic operations, and of special importance in Anti-Submarine Warfare (ASW). Moreover the ice makes airborne ASW-operations difficult or impossible.

As regards the transmission of sound, the ice changes the noise background and the behavior of sound in the sea under the ice. In general, the sound will be refracted from its source upwards, but as it reaches the ice-covered surface, it will be reflected downwards again, a process which can be repeated several times. This process can scatter the sound, reducing the detection range of for example a submarine. Furthermore, the condition of the undersurface of the ice (and in shallow waters the seabed) will influence the reflection, a smooth subsurface

reflecting the sound better than a surface made of rough, old ice. In addition, the detection range varies according to the frequency of the sound, and the depth of the waters. In conclusion, detection of noise is possible at greater ranges in deep waters than in ice-covered shallow waters, and shortest in shallow, ice-free waters.[5]

Until now, the major part of the Arctic resources have been protected by the cold climate itself, furthermore, resources have been available in other parts of the world, exploitable at a lower cost and with less technical know-how. The Arctic resources can in general terms be split in the resources available in the sea itself, minerals, oil and gas-resources located both on land and under the Arctic seabed. As for the resources located in the sea, Arctic fisheries and hunting of Arctic species have been going on for centuries. However the efficiency of modern trawler fleets and the use of modern transport in the Arctic have raised a new dimension to these resources; the need for international agreements protecting the future existence of the Arctic species. The need for international agreements and co-operation are important factors with regard to the Arctic resources.

The need for co-operation with regard to the conservation of Arctic resources may be necessary in another area as well, namely in the technological context. Russia needs to accelerate the extraction of oil and gas resources in the Barents Sea and the Russian shelf as the West Siberian oil fields are expected to dry up by the end of the century. However Russian technology is not yet fully capable of deep sea drilling.

Transport and Lines of Communication

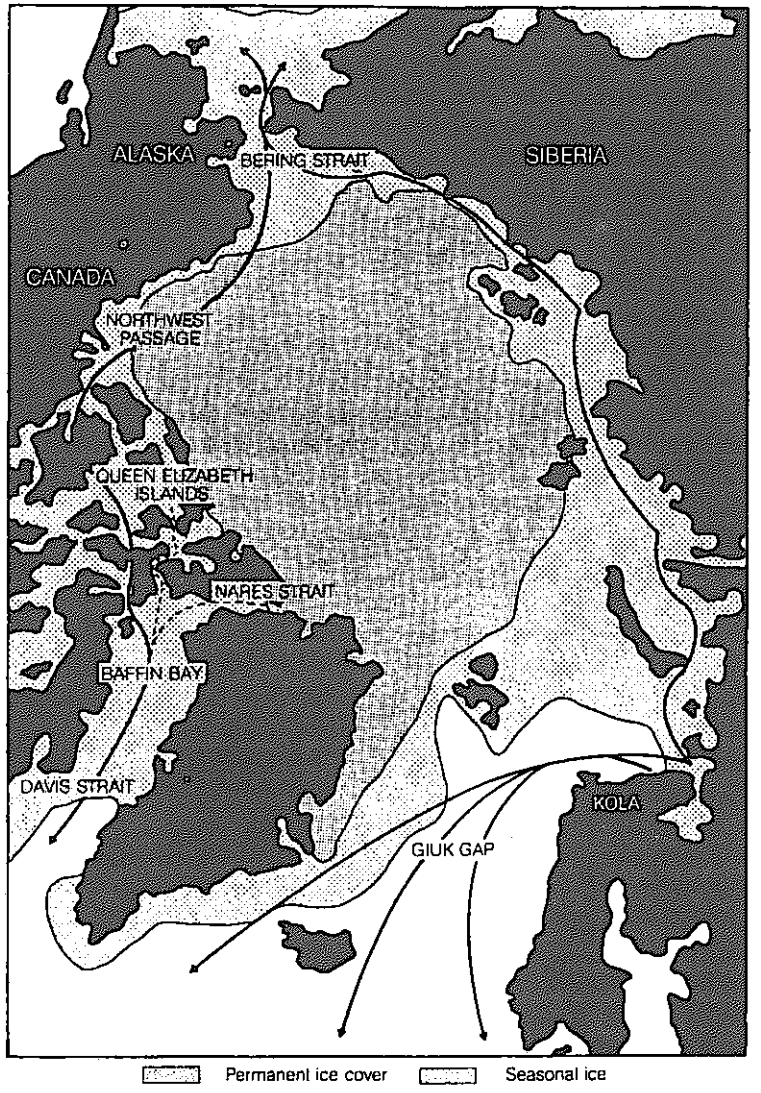
Transport and communication in the Arctic can broadly be divided in communication over land, that is over ice- and snow-covered areas, surface or subsurface traffic in the water

and movement in the air. In a strategic/military context the latter two are of greatest interest.

It is important to note that the Arctic Ocean should be regarded as *one* ocean, even if large parts of it preclude surface traffic by ships due to the extreme ice conditions. However, as for the other oceans, the sea-routes in and out of the Arctic are of special interest, and vital for controlling the traffic in the individual national areas. In this context both military and civilian traffic are important. The main lines of communication into and out of this vast ocean are concentrated to the Bering strait, the Davis Strait and the Greenland-Iceland- and United Kingdom-gap (the GIUK-gap).[6]

The Bering Strait connects the Pacific and Arctic Oceans. At its most narrow point the strait is only 92 km wide, with the two Diomede islands located approximately in the middle. The strait is the only area where Russia and the US share a common border, with Ostrov Ratmanova (Big Diomede) on the Russian side and Little Diomede on the American side. The strait is also a very shallow doorstep (only 60 meters deep) between the two oceans. In the winter the surface is covered by ice, including icebergs which can extend to the sea-bottom. This makes both surface and subsurface transit extremely hazardous. Both great powers have direct access to the strait permitting continuous surveillance of both surface and subsurface traffic. In wartime both powers could block the straits by mines and torpedoes. (Figure 1.)

Figure 1: Arctic Ocean: ice cover and exits



(Adelphi Papers, no. 241, 1989)

The Davis Strait marks the entrance to Baffin Bay between the west coast of Greenland and Baffin Island. Baffin Bay is a very deep basin with the bottom descending over 2,000 meters. However the Arctic access is restricted by two narrow and shallow main axes. The shortest route from Baffin Bay to Murmansk and the Kola Peninsula[7] passes through the Smith Sound between Ellesmere Island and Greenland, through the Kane-basin, further on through the narrow Kennedy and Robson Channels to the Lincoln Sea, and from here into the Arctic Ocean. The other main route goes from the North Atlantic to the Labrador Sea, through Baffin Bay and the Lancaster Sound, the Barrow Strait, the Viscount Melville Sound, the McClure Strait (alternatively further south through the Prince of Wales Strait and the Amundsen Gulf) out into the Beaufort and Chukchi Seas, and finally through the Bering Strait. This axis has been named the North-West (NW) Passage.[8] From Baffin Bay and the NW Passage there are other, shallow outlets into the Arctic Ocean, all of which are blocked by ice, making access for ships and large submarines difficult. The extreme ice-conditions hamper surface-traffic even through the main axis, and modern, specially designed icebreakers are necessary for navigation here. Except from the wide Davis Strait, the NW Passage passes through waters claimed by Canada as national waters, while the shorter route crosses territorial waters claimed by Canada and Denmark (Greenland).

In conclusion, both axes are characterized by their shallow and narrow straits. A major problem is how to exercise national sovereignty under the ice-covered surface. This is a sensitive issue, particularly where the transit and operation of US submarines is concerned, since one of the main access routes to the Arctic passes through the Canadian Arctic archipelago. As for the water-way between Canada and Greenland, a future conflict between the US, Canada and Denmark could arise here.

The GIUK-gap is no strait in the usual meaning of the word, but rather a widely used designation of the very wide passages between the large islands and groups of islands dividing the Arctic Ocean, the Norwegian and the North Sea from the western part of the Atlantic. However, the GIUK-gap can be divided into the Denmark Strait and the seas between Iceland, Faeroe Islands, Shetland, Scotland and Norway. The Denmark Strait between Iceland and Greenland is both deep and wide, and even if the area close to Greenland is dominated by ice, the strait is open for both surface and subsurface traffic all year. Due to the wide and deep waters, the strait is very difficult to block by mines, but the surface activity in the strait could effectively by controlled, while this would be more difficult with regards to subsurface-traffic.

The seabottom between Iceland and the Faeroe Islands contains a submerged mountain-ridge, with valleys descending down to 500 meters. Southwest and northeast of this ridge the seabottom descends down to more than 2,000 meters. Between the Shetland and Færoe islands a narrow, deep waterway leads to the Atlantic, starting from a deep basin west of the Norwegian coast, but south of the relatively shallow Barents Sea. Thus, both the axis between Norway and Iceland and west of Iceland are broad, deep free of ice and difficult to control. These axis into the Arctic leads on to the Northern Sea Route, stretching along the northern coast of the USSR and ending in the Bering Strait.

The Northern Sea Route (also known as the Northeastern Passage) was opened to foreign shipping in 1967, subject to Soviet regulations and payment of fees.[9] Hitherto it has not received much consideration by the west, despite President Gorbachev's reminder of its potential in his Murmansk speech in 1989. The potential importance of the Northern Sea Route is derived from the fact that it provides the shortest maritime link between northern Europe to large parts of the Far East and the US west coast. The distance from London to all Asian coasts north of Hong Kong is shorter via the Northern Sea

Route than via the Suez Canal, and the distance from London to San Francisco is shorter via the Northern Sea Route than via the Panama Canal. This means that the greater part of the west coast of north America and the Far Eastern coasts of the USSR as well as Japan, Korea, much of China and Taiwan are closer to the EC through the Arctic than via the Atlantic and southern oceans. To this must be added potential future difficulties involved in vulnerable passages such as the Suez and Panama Canals and the Straits of Malacca. In this respect the Arctic Ocean constitutes a major potential maritime highway.[10]

Commercial development will have to be based on a route which is not likely to be closed in the short, three-month season and will be largely dependent on the price Russia will charge for passage and ice-breaker services. In addition use of the Northern Sea route would call for the deployment of specially constructed commercial ships, configured for Arctic navigation with reinforced hulls and extra-powerful engines.[11]

In the long term the development of oil and gas resources in the Arctic may increase interest in the Northern Sea Route, as export of scarce energy resources and aquacultural products to Japan and the Far East most likely will demand low-cost transportation. Both Japan and the USA are potential partners with Russia and Norway in developing the Northern Sea Route due to the need to develop the route as such, and as a result of their shared interests in low-cost transportation connecting the west to the increasingly important high-tech Japanese producers and market. However development of Arctic sea lanes is not necessarily entirely positive. From an environmental perspective the Arctic is more vulnerable than most other ecosystems to pollution by shipping and other industrial activity, a factor which will be reinforced in the near future. The potential military use of the Northern Sea Route would primarily be for peace-time transit only, and most likely on a very limited scale.

In theory there exists another maritime entrance to the Arctic Ocean, consisting of the channel connecting the White Sea to the Baltic Sea.[12] However this channel is blocked by ice for half of the year, is only 5 meters deep and cannot be used by ships exceeding 3,000 tons (corresponding to a western frigate). In conclusion, even though the channel connects the Baltic fleet to the Northern fleet, its military and strategic value is limited.

From a historical perspective Arctic airspace has been used for a very short time only, but it has played an important part in the Arctic expeditions since the beginning of this century, starting with the first expeditions using balloons[13] to the first Arctic flights in the early 1920s.[14] The use of the Arctic airspace has also been important in mapping the Arctic, including the recent maps covering Greenland. Developments in civilian aircraft technology has led to the commercial use of the shorter trans-polar flight route. The first civilian flight using the polar route was established in 1954 between Alaska and the UK. As the range of aircraft increased, the Arctic airspace acquired a new military strategic context. In the beginning, this involved bomber aircraft, but it expanded later to also include airborne surveillance systems and intercontinental missiles.

In addition to the their use as a transit route the Arctic is also of strategic military value, since they are dominated by the US and Russia and both have possessed the technology and political will to develop their military presence in the Arctic. (This is dealt with in detail in the following sections.)

Notes

1. The 10° isotherm is the temperature line which can be drawn through the geographical locations where the average temperature in July is 10°C.

2. *Aschehougs og Gyldendals Konversasjonsleksikon*, Oslo 4. ed., 1983: p. 404.

3. Alaska was sold by Russia in 1867 for USD 7,2 million but was not incorporated as the 49th US state until January 3rd, 1959.

4. The Bering strait has a depth of 60 meters only.

5. Lindsey, G.R, *Strategic Stability in the Arctic*, Adelphi Papers No. 241, Summer 1989, p. 28-38.

6. Lindsay, *op.cit.*, pp. 7-9.

7. Lindsay, *op.cit.*, p. 8.

8. Roald Amundsen was the first person who navigated through the Nortwest Passage in his expedition of 1903-06.

9. Shrivener, David, *Gorbachev's Murmansk Speech: The Soviet Initiative and Western Responses*, p.22.

10. Östreng, Willy, *The Northern Sea Route: A new era in Soviet policy?*, The Norwegian Atlantic Committee, No. 9, 1991.

11. Lindsay, *op.cit.*, p.10.

12. 227 km. long, 19 locks, built between 1931-1933.

13. Andrée 1897, using the balloon *Örnen*, and Amundsen 1926, with the airship *Norge*.

14. Byrd-Benett 1926 and Wilkins 1928.

2. United States Strategic Interests in the High North

Developments 1945-1952

The United States had gained a foothold on Greenland, Iceland and on the Norwegian island Jan Mayen during the Second World War, and Greenland and Iceland continued to be important base areas after the war. Otherwise the USA did not show any particular interest in the Northern European region.[1]

In the transition to peace, the USA was none the less interested in military bases in Norway. This came up in connection with the American Joint Chiefs of Staff's analysis in 1943 of requirements for forward air bases after the war, and was primarily aimed at being prepared in case of German revanchism. As part of its "Peripheral Basing Program" to control Germany, the United States Air Force proposed in May 1945 to use Sola airfield as a bomber base. This plan was, however, stopped the same autumn as the USA feared counter-demands from Kreml, and as a result of American demobilization and the vulnerability of the bases. The entire program was abandoned in May 1946.[2]

The political-ideological wishes of USA to contain international communism lead from the autumn 1947 to a cautiously increased interest in Scandinavia. From 1948 Washington became more critical of the Scandinavian efforts to place themselves outside the East-West conflict, and it tried to bring Norway in on the western side in the Cold War.

The most important reason why the United States tried to bring Norway into the Atlantic Pact was political-ideological, as it was for most of the other countries. The Atlantic Pact was negotiated by diplomats who did not dwell much upon the

specifics of military planning. For psychological reasons, and for the sake of western cohesion, the threat of piecemeal aggression was deemed unacceptable. Moreover, Norwegian membership could set an example: If Norway acceeded, it would be easier for Iceland to join; likewise Denmark would bring Greenland along with it. This would make it easier for the United States to gain access to the vital bases on these islands in the North Atlantic. But the Americans also recognised that Norway could play a role , if only limited, in US air strategy.[3]

Scandinavia's place in the geopolitical picture was elaborated by USA's National Security Council (NSC) in september 1948: The National Security Council pointed out that the Scandinavian countries were strategically important for both the United States and the USSR, because they were situated in the flight path between North America and the strategic heart of the USSR, and between London and Moscow, and were also in the position to control the exits from the Baltic and the Barents seas. The region was considered important with respect to both the intercontinental Polar strategy and US requirements for forward operational bases close to Soviet territory (Perimeter strategy).

The idea of a Polar strategy for offensive operations was emphasised more strongly in the early postwar plans. In these tentative plans, bases in Canada, Alaska and on islands in the North Atlantic were to act as "stepping stones" between the continents. Until aircraft could make intercontinental flights, these bases were needed as staging areas for operations against the USSR. Later on, once long-range bombers and intercontinental missiles had become fully operational, the principal value of these islands was to be in the fields of communications and early warning.

The early attempts on the part of the US Air Force to build up an offensive capability in the north in the postwar years were, however, shown to be unrealistic. At a very early stage

they came up against climatic problems. The Air Force had underestimated the problems of operating in the arctic wastes. At the same time tight budgets undermined realistic plans for a Polar strategy. Instead, existing bases along the eurasian border of the the Soviet Union were reactiviated.

In 1947 there was consequently a return to the Peripheral air strategy, with bases encircling Soviet territory as the central element. Greenland and Iceland remained important, but the dominant access routes were now from Great Britain and the Middle East. Plans for the peripheral concept were initiated in 1946 with a program for rotation of strategic air units to forward operational areas and supported by aerial refuelling. The US Joint Chiefs of Staff in May 1947 estimated that 80% of Soviet industry were within the operational radius of action of B-29 bombers operating from the British isles and from the Cairo-Suez area.

The Soviet long-range air force was in early 1950 estimated to have more than 300 Tu-4s in operational units, and this figure was assumed to be rapidly increasing. At this stage, the Tu-4 was not equipped to carry nuclear weapons. In fact, right up to the first Soviet nuclear detonation in the summer of 1949 it was widely held in Washington that it would take five to ten years for the Soviets to achieve a breakthrough in this area. The success of the first Soviet test profoundly altered perceptions within the US policy community, and for the next ten years the fear of a Soviet leap into the future dominated American strategic thinking.

The gradual loss of the security of insularity led the Americans to return to Hemisphere defense. The continental defense of the far north began to take shape in the late forties. The war alliance with Canada continued and was formalized in a new agreement in 1946. Alaska's significance increased both for offensive and defensive purposes. The US build-up was nourished by the European crisis of 1948. Early-warning measures were initiated and air defense was strengthened.[4]

The United States was not interested in bases on Spitsbergen, although the idea was indeed aired on several occasions.Air Force Secretary Stuart W. Symington brought up the question on one occasion, and in the National Security Council's policy document NSC 28/1, approved by President Truman in september 1948 it was suggested that materiel support be given to Norway as a lever to acquire military rights on Svalbard. This particular proposal was later withdrawn. In fact, these initiatives all lacked substance and they would most probably not have survived a more thorough analysis of requirements and possibilities. The islands were of potential interest to the United States, but physical, strategic and political obstacles ruled out serious US initiatives to acquire base rights. From an operational point of view the islands were too close to the USSR and thus extremely vulnerable to Soviet counter-attacks. In practice, US interest boiled down to an interest in early-warning and meteorological installations.[5]

Although the Air Force had given up their arctic base plans for the time being, the vision of a future Polar strategy survived. In 1948 SAC Chief Curtis Le May, who was reluctant to depend on other countries, announced that "the fundamental goal of the Air Force should be the creation of a strategic atomic striking force capable of attacking any target in Eurasia from bases in the United States and returning to the points of take-off". Great efforts were made to develop techniques for refuelling bombers in mid-air, thereby increasing their range. The first air refuelling squadrons were brought into service in the United States in June 1948. That same year the first heavy bomber, the propeller-driven B-36 with a range of 4.000 nm made its first appearance, although it did not become operational until 1951.

The technological innovations and visions for the future were reflected in the defense plans. The long term war plan of December 1949, *Dropshot*, which for planning purposes envisaged an outbreak of war in 1957, stated that bomber

groups would be led to their targets from the United States via Greenland among other places, and over Finnmark.[6]

Transit was, however, only one facet of American interest in Scandinavia. The Norwegian mainland also attracted a certain amount of attention in American Perimeter strategy because of the bombers limited range and the need for forward bases. From a strictly operational and technological point of view the greatest need for operational bases in Norway appears to be at the end of the forties. Although the idea of peacetime bases in Norway was taken up in a revised analysis of base rights in 1948, the military agreed not to pursue the question any further as it was believed that public disclosure would have damaging political repercussions. The idea was not completely abandoned, however, though it did not reach beyond the planning stage. It failed to do so for a number of reasons: political hesitation, vulnerability, limited resources, and institutional weakness on the part of SAC.

Even though the the High North did not figure prominently in Navy plans for offensive nuclear operations in the forties, the region did attract some attention. Admiral Radford foresaw strategic carrier operations against Soviet land targets directly from the North Sea, the Norwegian sea and even from the Barents sea. It was ssumed that the new CVA carriers would dramatically improve the scope for operations in the Arctic. According to these plans, the atomic missions would require forward operations, some of them in the North. *Dropshot*, the long term war plan of December 1949, envisaged the deployment of six aircraft carriers of different types in the Norwegian sea and Barents sea at the outbreak of war, for offensive operations against Soviet territory. The heaviest and most effective vessels, however, were reserved for other areas, a fact which reveals the general priorities of the US Navy in the late forties.[7]

The *North Atlantic Treaty* was signed on April 4th 1949, and, together with the outbreak of the Korean War in June 1950,

was an important turning point in several respects. The new situation was primarily characterized by three factors: 1. Increased fears of war and rearmament in the West; 2. Establishment of a perimeter concept in the Alliance, and 3.Increased American interest in Northern Europe.

American rearmament started with the approval of NSC-68. This strategy document was produced before the outbreak of the Korean conflict in June 1950, but was only approved later in the same year.[8] The ideas in NSC-68 were adopted by NATO in general, and this started the rearmament process which culminated with the very ambitious force goals which were approved by the NATO CounciL meeting in Lisbon in February 1952. Even if these goals were were never met in full, the rearmament produced significant results.

In Europe the strategy in case of war comprised three phases: First: The official doctrine of forward defence implied defence along the outer frontiers of the member countries in case of an attack; Secondly, A sustained defence along the Kiel canal in the South and Lyngen in North Norway: In the last instance everything would be committed to secure a bridgehead in the Stavanger or Trondheim area.

In reality it was only the US which could give substance and credibility to these plans. By the beginning of the 1950s, American support by air and naval forces could be counted on, but USA's assets at that time were limited and it could be feared that help would be too late, and that Norway was overrun and had to be reconquered. From 1951 the situation changed, because of the military measures which were about to be implemented. USA was able to commit more in Northern Europe. USA was also interested in stationing 75 tactical aircraft in the country, an offer which Norway declined. Tactical air units were nonetheless dedicated for deployment in Norway in case of war, and some equipment was prepositioned for this contingency.[9]

The American proposal to station tactical aircraft in Norway in peacetime indicates a significant American interest in the region. From a psychological point of view it was important that the so-called "rim states" did not fall into the hands of the Russians. Even as important was that Norway had become more interesting in connection with strategic nuclear warfare. Early in the 1950s SAC expanded considerably, and was the sole bearer of the USA's and NATO's strategy of nuclear deterrence. This also created a requirement for better foothold in forward areas. In the autumn of 1952 a secret agreement was concluded between Norway and the USA , where Sola and Gardermoen airfields were put at the disposal of SAC in case of war. In addition to staging and refuelling of B-29s, the Americans thought that fighter planes could operate from the airfields and preparations were made for this contingency. This was, as mentioned, not a new idea but implied that the requirement and capability for a forward presence increased.[10]

The US Navy also moved into the nuclear age at the beginning of the 1950s, but it was still envisioned that the aircraft carriers would be used for traditional naval tasks, and against Soviet naval forces. Primary tasks were therefore attack on naval bases and airfields.

The Supreme Allied Commander in Europe at that time, General Dwight D. Eisenhower, placed great emphasis on Norway: since the Central region was weakly defended, particularly as regards air defence, one alternative could be to attack from the flanks and use aircraft from carriers operating in the North Sea to hammer the advancing Soviet divisions. This lead to the requirement for a sustained defence, a "hedgehog defence" in Norway. But, particularly the British were against using carrier-based aircraft in support of ground forces, as they believed that this would be at the expense of protection of the sea lines of communication over the Atlantic. Eisenhowers "continental strategy" was therefore never implemented in its original form, but several elements of the strategy were followed up.

The Northern region also had a certain interest in connection with *intelligence* collection. USAF conducted in the 1940s operations along the periphery of the Soviet Union to take photographs inside Soviet territory in the Baltic and also in the North where it was of particular interest to monitor the activity at the naval bases on the Kola peninsula. After detonation of the first Soviet nuclear device in 1949, there was introduced a a systematic program involving flights along Soviet territory to uncover Soviet nuclear activities in the Arctic.

In addition, USAF and US Navy conducted aerial electronic intelligence to chart Soviet radar and air defense capabilities and to develop electronic countermeasures. In 1950 there was a division of labor in this collection effort: The US Navy was to be responsible for Southern Europe, while the USAF was to take care of the Baltic and Murmansk. CIA and the US Army Special Forces were also active in the early 1950s, trying to establish a clandestine "stay-behind" network in Scandinavia, indicating an interest in preparation for underground warfare in case the area was occupied by the Soviets.[11]

The period 1953-1975

Not being able to fulfill the Lisbon force goals, the NATO members started on the "long haul". NATO defenses became more dependent upon nuclear weapons, which was endorsed by the Alliance in December 1954.[12] This also lead to the European continent becoming the focus at the expense of the flanks.

From a strategic point of view, the USA became primarily interested in various forms of functions which could be performed from Norwegian territory, without the USA having to cling to and hold large areas.

The USAF had already in the 1940s been engaged in plans for a Polar strategy, without much success. In the next decade, the Northern area gained in importance with the development of long range Soviet aircraft and intercontinental ballistic missiles on both sides. The American JCS maintained in May 1956 that the arctic region was important both in offensive and defensive respects in connection with the new technological era.[13]

The technological developments also lead to the forward US bases becoming more vulnerable. Following a study in 1954 lead by Albert Wohlstetter, the number of overseas bases, primarily in North Africa, was reduced.[14] The analysis of the vulnerability of the overseas bases had an indirect effect on the SAC agreement concerning Norway. Even if the USA was primarily concerned with reducing the vulnerability of the peacetime bases including those in Great Britain, the model which was chosen indicated that permanent bases in Norway were not needed and that the SAC arrangement from 1952 could be integrated in the concept for forward operational bases in war. With the introduction of the B-47 bomber from 1953, SAC's strategic fighter escort wings were no longer as needed, and the escort functions which were associated with Sola and Gardermoen airfields seemed to disappear. The SAC-agreement concerning Norway did, however, remain well into the 1960s mainly for tanker and reconnaisance functions.

The main task of the US Navy in the North was containment of the Soviets at sea. This did not raise a requirement for permanent presence in the area.

USA was superior at sea. Still there remained some problems. It was found in 1952 that the Soviets had six times as many submarines as the Germans had in 1939, and the US Chief of Naval Operations advocated more resolute anti-submarine warfare, with attacks on the base complexes.[15] Another danger was connected with the tactical air threat. An analysis by the JCS in October 1952 maintained that Soviet aircraft would be

capable of operating in the North Sea and in Western Sea Areas adjacent to Great Britain. In the mid 1950's, the CIA concluded that the Soviets were building up a formidable submarine capability, which could challenge the sea lines of communication . From 1955, the US Navy gave higher priority to anti-submarine warfare. In this the Soviet bases on Kola were given considerable emphasis. The importance of Kola was documented in a study by the strategic plans division of the Navy in 1953; with the Bosporus and the exits from the Baltic closed, the Soviet submarines would have to operate from northern bases. The analysis drew attention to the danger of forward submarine bases in North Norway, and underlined that American countermeasures against the only important Soviet submarine threat in the Atlantic would have to come through the Barents Sea.[16]

From the middle of the 1950s there appeared an additional significant factor. As a result of Soviet threat perceptions of American aircraft carrier operations in the North, a larger proportion of Soviet attack submarines were deployed to Kola, at the expense of the Black Sea and the Baltic. The total increase and the swing towards Kola implied that the difficulties with establishing Western control in the Norwegian Sea in the initial phase of a war, was assessed as considerable towards the 1960s. The American concepts for naval warfare were dimensioned around three phases: First, an effort to establish a forward defense at sea, which implied forward carrier operations to knock out submarine bases and other installations on Kola; secondly: A barrier defense in the straits between Greenland, Iceland and Great Britain; and thirdly: a certain defense of the sea lines of communication across the Atlantic. Among the new measures which were put into effect from the American side was the establishment of more advanced permanent and mobile submarine detection systems. SOSUS was developed early in the 1950s and became operational around 1957.

The interest of the US Navy in the Northern flank was accentuated as the Navy achieved a role in strategic nuclear warfare. Early in the 1950s the Navy had been build up again. The number of carriers which had been reduced to 18 in 1950, were brought up to 29 before the number was stabilized around 25. At the same time the Navy was allowed to build bigger carriers, and subsequently developed aircraft which were better suited for the carriers, first A-2 Savage in 1951 and A-3 Skywarrior somewhat later. With more and bigger carriers, and with the new aircraft the conditions were provided for the Navy to enter the nuclear age. In February 1951 the Navy got a rudimentary operational nuclear capability, but is was only under Eisenhower in 1953 that the Navy was authorized to have nuclear warheads on board. In 1954 carrier-based bombers were incorporated in the US operational plans for strategic nuclear warfare.[17]

While president Eisenhower insisted that the Navy's carriers and nuclear weapons were used for strategic warfare, the Navy wanted a balanced Fleet to meet a variety of traditional naval tasks, and put great emphasis on use of nuclear weapons for such tasks. The stubbornness of the Navy prevented that Eisenhowers emphasis on strategic nuclear warfare achieved a dramatic breakthrough in priorities.

On this background the Navy planned for the use of nuclear weapons in offensive operations against the Soviet base complexes on Kola, in addition to the tasks included in strategic warfare. Since the aircraft had relatively short combat range it was necessary to operate forward in the Northern areas to carry out these tasks. The Navy envisioned deployment e.g. off the coast of Helgeland in North Norway and in the Barents Sea in the initial stages of the war. This meant transit over Norwegian territory, but the Navy did not need any bases in Norway in peacetime.

The carrier-based bombers represented the backbone of the Navy's nuclear capability through the 1950s. In 1958 when the

Navy presented its views as regards the goals towards the 1970s, it proposed that the carriers should be oriented for limited war, but this was not well received by the Administration.[18] Only in 1963, with Defense Secretary Robert MacNamara were the carriers relieved from the exclusive strategic role. Main effort was again put on traditional maritime tasks, which also included support of ground operations.

The Polaris program got its real start in 1956, after a difficult birth. The first Polaris submarine went on patrol in the Atlantic in 1960, and Polaris was included in the SIOP from the same time. The retirement of the carriers from the nuclear strategic role, and the introduction of the Polaris submarines meant a significant increase in strategic stability, in that USA's nuclear retaliatory capability became less vulnerable to a disarming first strike.

The first generation of Polaris SLBM's (A-1) did, however, have limited range, and this meant that the submarines had to operate in the Eastern Atlantic. When the third generation SLBM's (A-3) became operational in 1964, it was possible to reach central targets in the USSR without entering the gap between Greenland, Iceland and United Kingdom. Polaris also needed forward bases. In 1960 the Bitish agreed that a base for Polaris submarines was established in Holy Loch in Scotland.

In the period leading up to the sixties, US interests in the region were not insignificant and they resulted from a combination of sources. From a military-strategic point of view, Norway was deemed by the Navy and the Air Force to be of significance in the ongoing nuclear arms race with the Soviet Union. The American perspective, therefore, went beyond the somewhat narrower European and Continental approach of SACEUR. This would tend to suggest that Norway was of greater military-strategic importance to the United States than to the Alliance as a whole. Certainly, this is how matters were seen in London and even more clearly so in Paris. Beyond

these purely military-strategic considerations, Washington maintained an interest in Norway for political and ideological reasons: given the perceived vulnerability of Norway as a flank, U.S.military backing, in the broadest sense of the word, was considered crucial.

The American interests, as outlined above, were reflected in US military and economic assistance and enhanced technological cooperation. Nonetheless, the need to strengthen the defence of the Northern Flank as part of the Continental Strategy was not thought to be sufficiently urgent as to warrant more substantial U.S. military commitments. After all, Norway was located in a quiet corner of the world; hence there was no need to place it on the political agenda. Despite the strategic potential of Norway, it was not necessarily assumed that Norway would be immidiately or directly involved in a future conflict; Norway's role in the Continental Strategy was highly peripheral. Moreover, the greater part of the decision-making machinery in Washington was probably never informed of what constituted the nature of the issues that were of particular importance in the bilateral relationship. Of major importance in this respect was the whole issue of intelligence and Norway's position in the air and naval legs of the U.S. strategic triad.[19]

Iceland became in the early 1950s an important supporting base for US strategic air warfare. In 1961 the responsibility for the Keflavik air base in Iceland was transferred from USAF to the US Navy. This reflected the time-change in the Atlantic, the central role of the strategic bombers was phasing out, from now on the Atlantic became more important as operational scene for the strategic submarines, and Iceland also became central for maritime surveillance and anti-submarine warfare.

Requirements to improve maritime surveillance was the background for SACLANT's interest in Andøya and Bodø in North Norway early in the 1950s when new airfields were consstructed at these places. During the 1950s this requirement

became more important because of the Soviet build-up of attack submarines and also because an increasing number of other submarines were deployed to Kola. These developments were also the reason for the Norwegian decision at the end of the 1950s to establish an underwater accoustic detection system from Andøya. The system was under strict national control, and it is evident that it played an important role in detecting and providing early warning of submarine movements in western waters.

In 1959 it became important for USA to confirm whether the USSR had deployed any operational ICBMs. This was after the US authorities has found that there was no "bomber-gap", and before they had been able to locate the existence of any operational ICBM sites in the Soviet Union. The U-2 high-altitude reconnaisance aircraft had since 1956 conducted flights along the Soviet periphery, and sometimes across Soviet territory to collect information about critical developments and activities. In May 1960 a U-2 overflight was conducted from Turkey, primarily to locate possible ICBM sites. The missile test center at Plesetsk on the Eastern side of the White Sea was one of the locations to be covered on this mission when the U-2 aircraft was shot down over Sverdlovsk on May 1st 1960. Later it was confirmed that the first operational liquid-fueled Soviet ICBMs had been located at Plesetsk in 1960.[20]

At the beginning of the 1960s the USA had become considerably overcommitted with 45 formal defense agreements and in addition a number of informal commitments around the world. The commitments were not proportionate to USA's conventional forces, and they could no longer be supported by nuclear deterrence after the Soviet Union had achieved a credible strategic nuclear capability.

This resulted in a change under President John F. Kennedy with the introduction of the doctrine of "flexible response", in which it was sought to reduce the dependence on nuclear weapons by building up greater conventional capabilities. The

doctrine, and the force requirements were strikingly similar to the concept which was launched early in the 1950s based on NSC-68. With MC 14/3 in 1967 "flexible response" became official NATO policy, after having been the source of internal discussions in the Alliance since the new strategic concept was first launched at the NATO council meeting in Athens in 1962.

The Kennedy administration tried to give substanse to the new doctrine by increasing the military capability to meet threats at different levels.[21] In addition to a general build-up of forces the Americans tried to fulfill their various commitments by increased flexibility, by which they could "swing" force from one theater to another. Consequently the USA built up their strategic reserves at home, and their capacity for air and sea transport. To complement this concept, there was also an increase in prepositioning in forward locations.

Even if the main interest was linked to the European continent, there was an effort to fill the holes which existed on the flanks in view of the risks of limited aggression. USA now supported the idea of a mobile force to meet threats on NATO's flanks. Defense Secretary Robert MacNamara told the other NATO ministers in May 1965 that the threat to Europe had changed in character: there was less concern about a massive Soviet attack, than for e.g. "pressure on the flanks". In this was an admission that there was a flank problem, even if it was the situation on the Southern flank which gave cause for most concern in NATO.

At the beginning of the 1970s the flank problem ws given increased attention. At the meeting of the DPC in May 1970, SACLANT oriented about the situation in the North, and the ministers discussed ways to strengthen NATO's situation in the Atlantic. At the ministerial meeting half a year later, it was agreed that it was necessary to strengthen the flanks.

At the end of the 1960's Western attention was caught by a new dimension of the Northern problem: the buildup of a considerable strategic submarine force, and surface naval capability concentrated on Kola. The justification for the buildup was believed to be global, but it cast shadows over Norway and created concerns that the USSR could become able to dominate the seas around Norway, and with the Soviet amphibiuous capability it was also believed that they could gain footholds in Norway to support a more offensive Soviet naval strategy. This danger was clearly demonstrated by the Soviet naval exercises "Sever" in 1968 and "Okean" in 1970 and 1975.[22] In 1981 the long reach of the Northern Fleet Aviation into the Norwegian sea was demonstrated by the first flights of the new Tu-26 Backfire intermediate range naval strike aircraft.

Increased interest in Maritime surveillance and ASW capabilities was clearly demonstrated by the increase in US exercise activities. 1965 was a turning point in that American units participating in army exercises in North Norway were drawn from continental USA and not from US forces in Germany. At the beginning of the 1960s the NATO exercises were given a larger scope, and the activity was gradually formalized. This applies particularly to SACLANT's exercises in the "Teamwork" series from 1964, and in addition there were introduced exercises in Northern waters in the "tween"-years. In 1964, the first of SACEUR's "Express" exercises was conducted in North Norway with the Allied Mobile Force, AMF which had been formed in 1960.[23]

In this period the USA was stuck in the quagmire in Vietnam, and also from the middle of the 1970s constrained by the aftermaths of the Watergate-washup. Less attention was directed at Europe, and the Northern flank was even more peripheral. At the same time the US Navy was reduced by block obsolescence from about 1.000 ships in 1968 to 465 in 1977.

The total number of ships allocated to the US 2d Fleet in the Atlantic was clearly marginal in relation to the tasks which were to be performed. In the extension of the lower priority of the Atlantic, there was a significant reduction in the presence of allied naval ships in the Norwegian Sea in peacetime, and the larger NATO exercises were shifted further South in the Atlantic. In the decade prior to 1985, American aircraft carriers were present in the Norwegian sea a total of 33 days. SACLANT maintained that he needed 2-4 carrier battle groups to enter the Norwegian sea in a wartime situation, and that air support from the Norwegien mainland was highly desireable. With the reduced number of carriers, which sank to 13 at the beginning of the 1980s, it would be difficult to achieve a reasonable degree of sea control north of the GIUK-gap.

Changes in naval doctrine also contribute to that the Norwegian Sea was down-graded. In the mid-1970s Defense Secretary Sclesinger proposed a "high-low" formula, where a smaller number of ships of high quality could be used for special tasks in high-threat waters, whereas the greater part of the fleet was used in less exposed areas. With this, priority was in reality given to protect the sea lines of communication further South in the Atlantic. Under Defense Secretary Harold Brown later in the 1970s the Administration became more concerned with power projection. But since there were now fewer carriers Defense Secretary Brown launched a new operational concept: instead of spreading the remaining carriers to 3-4 operational theaters to meet a complex Soviet offensive in the initial pase of the war, he proposed to concentrate on one theater in the early phase, and then be prepared to "swing" forces in a later phase.

These changes did not mean that the sea lines of communication across the Atlantic could be ignored, but instead of meeting the Soviets in the Norwegian sea, the vital naval link was shifted southwards in the Atlantic, and further away from the threat area. President Carters "Consolidated guidance" in

April 1978 placed emphasis on sea control *south* of the GIUK-gap. CNO, Admiral Watkins expressed in 1983 that for the time being all naval forces woulds have to be concentrated South of the GIUK-gap, to maintain the sea lines of communication: it was no longer possible to send carriers into the Norwegian sea or use them for power projection or support of land operations in the North.

This meant that the USA was on the verge of resigning in the Norwegian Sea, and that there was a danger that even the waters further South were put at risk. A spokesman for SACLANT expressed in 1982 that: "it is now our belief that by 1986 there will be circumstances in which our strategy of forward defense at the choke points may not be possible". On this background the military and geo-political importance of Norway was seen only in relation to the Baltic Straits, and as a flank to the central region, and for early warning and collection of intelligence. The priorities of the US Administration meant that North Norway in particular became exposed. Still, it was politically important for the Administration that Norway held stand. In the same way as for the European continent, the USA was ready to contribute with reinforcements which could be flown in.

Implementation of Flexible Response, which was the most interesting feature of U.S. policy in the north in the seventies, had cautiously started in the sixties. The genesis of this first phase can be traced back to the Kennedy Administration's Flexible Response. In the short term, the most visible expression of these early efforts has been the fact that the United States continued to furnish Norway with weapons and equipment, despite the termination of the MDAP program. The Vietnam War drew energy from these ventures, although NATO's adoption of the doctrine of Flexible Response in 1967 and the withdrawal of France from NATO military cooperation generated some new measures in the early seventies.

However, these first steps were only a prelude to what was to come in the second phase, when Flexible response in the north was made more robust. This phase started cautiously in 1969 as part of a renewed U.S. interest in Europe, which coincided with a growing U.S. concern about Northern Europe. The reappraisal started with a series of intellectual exercises and culminated in important military steps being taken in the late seventies.[24]

The most important American contribution to deterrence and defense of NATO's Northern flank was in the form of dedicated combat aircraft squadrons which could be transferred to designated airfields on the Northern flank if and when it was deemed necessary. The first agreement about so-called "co-located bases" was concluded with Norway in 1974, and in 1975 the Agreement was extended to include airfields in North Norway. Alltogether there are now COB-agreements covering 8 Norwegian airfields.

The other important American contribution to deterrence and defense in the North is the agreement in 1981 to preposition the equipment for a US Marine Amphibious Brigade in Trøndelag. The MAB had been dedicated as reinforcement to Norway in 1977, and in 1978 it was decided that rapid reinforcement of Norway should carried out by air.

The US reinforcements to Norway have been incorporated in NATO's Rapid Reinforcement Plan which was agreed by NATO in 1982. The RRP has meant better coordination of reinforcements, and has clarified the priorities. The plan indicates greater attention to the Northern flank, but main emphasis is still put on the continent.

In the light of the sharpened international climate at the end of the 1970s more attention was directed at the Norwegian Sea. North Norway was again seen in connection with the continent and the broader perspective of European defense. While these two operational arenas in the 1960s were seen

separate and even competed for attention, in the 1980s the linkages and interdependences between the Northern and the Central region were more generally accepted.

Even if American policy at the end of the 1970s was heavily concentrated on the Persian Gulf, and on air and ground defense of the Eureopean continent, the US Navy maintained a desire to retain sufficient capability to operate in the Norwegian sea, at least in the later phase of the war. In this connection the US Navy studied if Norwegian airfields could be used to control the Norwegian sea, but it was found to be more costly and less operationally satisfactory compared to the use of aircraft carriers. In addition, the Norwegian airfields were even as vulnerable as carrier battle groups.[25] On the other hand the US Navy had for many years wanted to preposition equipment for aircraft carriers in Norway. USA maintained that Norway as a reciprocal service for receiving reinforcements for defense of the land territory should accept that the country to a greater degree was used for operations in the Norwegian Sea. At the end of the 1970s Norway gave its consent to this. Plans were drawn up which provided for aircraft from American carriers using Norwegian airfields when the carriers entered the Norwegian Sea. This lead to a change in the "Invictus" agreement in 1980, that gave the aircraft permission to operate from Norwegian airfields if the carriers in an emergency was put out of action.

The Reagan administration's defence program represented the third American effort after the 2d World War to build up a powerful conventional capability to implement and make credible the strategy of flexible response. On the two earlier occasions, with NSC 68 in 1950 after the outbreak of the Korean war, and President John F.Kennedy's "flexible response" from 1962, it was not possible to sustain the programs over time.

The US Navy in the early 1980s formulated a comprehensive maritime strategy. This reflected to a degree the US Navy's

concepts from "Sea Plan 2000". The new maritime strategy was based on the assumption of a conventional war of undetermined duration, and the Navy was a very important instrument to implement forward defense. Secretary of the Navy, John Lehman particularly underlined the importance of the Northern flank for defense of the sea lines of communication, and of the continent. With the plan to build up the US Navy to 600 ships and 15 carriers it was considered that the Navy would have increased capabilities for forward operations. The maritime strategy was not intended as a "game-plan", but underlined the importance and the interrelationship of the three phases: 1. Deterrence or transition to war. 2. Seizing the Initiative, and 3. Bringing the fight to the enemy. The maritime strategy also envisioned the use of maritime forces to create diversions on the Northern flank to relieve pressure against the Central region.

There is some doubt whether the so-called US maritime strategy really represented U.S. National Strategy, approved by the JCS and the President. In any case, the US maritime strategy has not been agreed by NATO, which has its own Concept of Maritime Operations which was approved in 1981. CONMAROPS gives priority to operations in the Norwegian sea, and underlines the tasks of Containment, Defense in depth, and Keeping the initiative.[26]

The developments in the North have indicated a need for the Western Alliance to "Show the Flag" in the Norwegian Sea in peacetime, after having kept a low profile since the beginning of the 1970s. Allied naval exercises since 1985 have reflected this requirement. Occasional US naval presence in the Norwegian Sea is seen as desireable to counter any impressions of Soviet superiority and to invite mutual restraints. It has also been regarded important to increase the allied naval presence in the Norwegian sea to prevent that such presence in a tense situation is interpreted as a crisis warning. The aim has been to return to the level of presence in the 1960s. It has also been stressed that there is no

requirement, and not even desireable with a permanent allied naval presence in the Norwegian sea in peacetime.[27]

The New American Strategy

Following the changes in the Soviet Union and in Eastern Europe since 1989, the US has been through a phase of reconsideration regarding the national strategy. The main points of a new American strategy was first presented by President Bush in an address at the Aspen Institute on 2 August 1991[28]. This address did, however, not get the attention it deserved because of the American reaction to Iraq's invasion of Kuwait, but the new strategy has since been elaborated on in a number of articles and statements by US policymakers. James J. Tritten of the Naval Postgraduate School in Monterey, California has made a special study of the many inputs on the American side, and compiled the New American strategy as one entity in a report: "America Promises to come back. A new National strategy"[29] Tritten describes the new strategy as based upon four main elements:

1. Deterrence.
2. Forward Presence.
3. Crisis Response.
4. Reconstitution.

The point of departure of the new strategy is both that the end of the cold war has created a new international situation and that the American economy no longer allows such large contributions to defence as was the case in the 1980s. It is envisioned that in the 1990s the defence budgets will have to be about 25% lower than at the end of the 1980s. This has clear implications for American defence thinking.

To maintain a defence structure which is a scaled back or shrunken-down version of the present could result in having a defence which is less than what is needed to meet emerging

challenges. What was needed was not merely reductions - but restructuring.

The new structure is therefore considerably reduced compared to the present. It is no concidence that it is designated a "base force". The Army is to be cut down from 18 to 12 active divisions, while the reserve forces will be reduced from 10 to 6. The number of Air Wings are to be reduced from 36 to 25, and the number of aircraft carriers are down to 11-12 from 14 today. In total the Navy will be reduced to 451 ships, while it now has 545. The goal of a 600-ship fleet is no longer within sight. The Marine Corps will have a strength of 150.000 personnel, a reduction from 196.000.

The American forces will be organized into four basic military components:

1. The Strategic Force.
2. The Atlantic Force.
3. The Pacific Force.
4. The Contingency Force.

The first component contains both strategic nuclear offensive and defensive forces. The Atlantic Force will be responsible for Europe, the Middle East and Southwest Asia. The Pacific Force will be responsible for East- and South-East Asia, while the Contingency Force is to be responsible for those areas of the world that would not be covered by the Strategic, Atlantic or Pacific Forces, including Latin America and Africa.

The Atlantic Force is clearly the largest. 4 out of the 12 active divisions and all the 6 reserve divisions will be included in this. The same goes for half of the tactical air force and 4 of the aircraft carriers. In addition two Marine Expeditionary Brigades will also belong to the Atlantic Force.

Whereas the American defence structure up to now has been based upon the threat of a massive Soviet attack in Europe,

the new structure will not in the same way be oriented towards one single scenario. The philosophy is now that the US must be prepared to defend its interests all over the world: the Soviet threat is no longer the dominating one. An important planning pre-condition is therefore that Russia is no longer capable of defeating NATO's defence in Western Europe, if it ever has been able to do this. To have any chance of success in this task, Russia would need a reconstitution time of one to two years. The US would be able to observe such a reconstitution, and there would be time to implement necessary countermeasures in case the international situation should be changed in this direction.

Conclusions

It appears that the United States has no permanent strategic interest in the High North itself, apart from a general ideological-political interest in keeping the Nordic Arctic with its adjacent sea and land territories within the Western sphere, and preventing any increase of Russian control.

It is also evident that American interests in the High North which have been demonstrated so far are not vital or critical to United States security, but are associated with optimimum utilization of relevant American military forces for achieving strategic and operational aims vis a vis the former Soviet Union. For this reason it is also characteristic that the U.S. military interests have varied over time with technological developments and operational requirements of the relevant U.S. forces.It is furthermore evident that the U.S. military interests have not made it necessary with a permanent presence in the area, and that it has been sufficient with planning and preparation of support and facilities and with exercices of shorter duration.

There is consequently little foundation for any belief that the US would have sufficiently strong self-interests to make a

military commitment self-evident or even probable in a conflict in the area. It is probably wise to remember some of the lessons of the Second World War and of the first period of allied cooperation after the war for Norway: Various American and Allied war plans of the late 1940s considered that the Soviets would occupy Scandinavia fairly early on in any war, though perhaps not at the start.[30] The experience of 1940 demonstrated only too well to Norway that, even if the campaign on their territory was going well, the demands of the battle on the continent of Europe would have priority. During the Second World War, there were no major campaigns after 1940 in Scandinavia - it only provided sideshows - and there was little belief that the situation would differ in a Third World War fought between the Atlantic Alliance and the Soviet Union.

The second lesson - or confirmation of existing wisdom - drawn from the war experience in Norway by the Allies was that the Scandinavian region should not be used as a springboard from which to launch a counter-attack on Soviet occupied positions in Europe. The idea of launching an invasion of the continent from Norway was rejected during the Second World War. The same considerations were taken into account in the post-War period as had weighed on the minds of planners during wartime: action in Scandinavia would be a sidetracking of the main effort on the continent of Europe and would spread valuable resources dangerously thin. The wartime lessons for allied post-War strategy - especially as it affected Norway - were perhaps quite simple. They were that Norway should remain peripheral to Continental Europe in their war-planning scenarios: that Norway would not be a suitable place from which to launch the liberation of occupied Western Europe, and that preparation - by Norway and its allies - against hostile action might just deter an attack.[31]

Notes

1. The following overview of US strategic interests in the High North is mainly based upon Rolf Tamnes, *The United States and the Cold War in the High North*, Ad Notam, Oslo 1991. References are made only to more important sources in the text.

2. *Ibid.* p.36.

3. *Ibid.* p.43

4. *Ibid.* p.46

5. *Ibid.* p.47

6. *Ibid.* p.45

7. *Ibid. p.49*

8. *Ibid.* p.63

9. *Ibid.* p.66

10. *Ibid.* p.72-73

11. *Ibid.* p.75-79

12. *Ibid.* p.91-92

13. *Ibid.* p.100

14. *Ibid.* p.97

15. *Ibid.* p.107

16. *Ibid.* p.107, 112.

17. *Ibid.* p.109

18. *Ibid.* p.110

19. *Ibid.* p.137

20. *Ibid.* p.136

21. *Ibid.* p.196-197

22. *Ibid.* p.201

23. *Ibid.* p.208-209

24. *Ibid.* p.233

25. *Ibid.* p.260

26. *Ibid.* p.261

27. Johan Jørgen Holst, *From Arctic to Baltic - The strategic significance of Norway*, NATO's 16 Nations, Brussels, April 1991.

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3. The US Navy and the High North

Developments and Activities 1970-1980

Naval power has long played a central role in the defence of American interests abroad. The oceans bordering North America have been both a barrier and a highway, separating the United States from potential enemies, connecting it to allies, and providing a venue for commerce and trade. Geography dictated a prominent role of naval forces in American foreign policy during the eigtheenth and nineteenth centuries, and with the emergence of the United States as a military and economic superpower, Americans have come to depend even more heavily on naval forces as foreign policy instruments[1].

The Americans currently expect the navy to perform four missions that are vital to maintaining the kind of world order within which American values and institutions can survive and flourish. The missions are: 1) Deter nuclear war, 2) Keep open the sea lanes, 3) Project power ashore and 4) Maintain a military presence in troubled areas abroad[2]. Supporting a navy that is able to perform these missions well is difficult even in periods of increasing budgets, and it is clear that the navy is now having a period of zero growth or even declining budgets which are likely to extend well into the 1990s.

At the end of the 1970s, a decade of lean budgets had not only left the ship numbers at a post-World War II low, but most of the ships still in service had grown old. The Reagan administration, which made a larger navy the cornerstone of its plans to rebuild American military strength, sought to expand and modernize the fleet by providing new classes of ships capable of meeting the challenges posed both by Soviet naval power and by the diffusion of moderne military technology to such countries as Iraq, Iran and Libya. In order to

recruit and retain the kind of personnel needed to operate its new and complex vessels , the navy also attempted during the 1980s to reduce ships time away from home ports. The attempt to simultaneously expand, modernize and reduce the operating tempo led the navy to undertake its most ambitious shipbuilding program since the Second World War.

The fewer number of ships made it more difficult for the navy to support American foreign policy by maintaining the necessary military presence near trouble spots overseas. In November 1979, after the US embassy in Teheran was seized by Iranian radicals, it took the carrier Midway and her escorts roughly ten days to steam from the Western Pacific to the Arabian Sea. The presence of two carrier battle groups near the Persian Gulf throughout 1980 was sustained for the most part by stripping both the Mediterranean and the Western Pacific of one of the two carrier groups normally deployed there. These redeployments occured at a time when the Soviets were expanding both their Mediterranean squadron and the Pacific fleet, thereby contributing to unease among American allies in those regions.

This was manifest also in NATOs Northern region at the time. It had become evident that SACLANT planned to conduct his defence of the Atlantic sea lines of communication *South* of the Greenland-Iceland-United Kingdom Gap. As a result of the increasing threat from the buildup of the Soviet Northern fleet which had begun in the early 1960s, the United States Navy had come to regard the Norwegian Sea as a "high-threat area" and it was openly stated by SACLANT at the time, that he was not gooing to risk sending carriers into the Norwegian Sea unless he had available two or more carriers which could cooperate tactically and mutually support each other. This attitude, in turn, raised concerns among Norwegian senior commanders whether it was realistic to base the defence of North Norway on the assumption that the US Navy was able to protect the introduction of allied reinforcements, and to

provide air support for the defence of the strategically most important areas.

In retrospect, it has been argued that during the 1970s the US navy was caught in a vicious cycle that was at least partly of its own making. As defence spending declined, the navy became increasingly anxious to maintain at least 12 large-deck carriers in operation, and by the mid-1970s about 50% of the naval budget was devoted to building and operating the carrier force. The more money was spent on the carriers, the less there was to support, much less enlarge, the surface fleet. This helps to explain why ship numbers declined steadily during the 1970s. Escorts for carrier battle groups are a high priority, and the decline in fleet size meant that an increasing proportion of the surface fleet had to be dedicated to protecting the carriers. This, in turn, limited the navy's ability to patrol the sea lanes and maintain a presence near trouble spots.

Proponents of continued reliance on large-deck carriers argued that these deficiencies could be offset in part by the carriers ability to project naval air power directly against Soviet ports and airfields[3]. But in order to keep the carriers out of range of Soviet land based aircraft, the planes they carried had to become larger, which meant that the carriers had to become larger too. The larger the carriers, the more expensive they were to build and operate, thereby making it more difficult to buy replacement vessels at a time when defence spending was declining. The fewer the carriers available, the more vital it was that they were the best that could be built, thereby putting even more pressure on budgetory resources.

By the start of the 1980s, the Reagan administration had inherited a fleet stretched almost to the breaking point as a result of expanded responsibilities and declining resources. Navy ship strength in 1980 was 479 battle force ships, an increase of only 13 over the post-Vietnam low in 1977. Acceptance of new responsibilities in the Indian ocean created numerous instances in which carrier battle groups were

required to remain on station longer than scheduled in order to support emergency deployment requirements. The increase in operating tempo came at considerable cost to the navy in terms of morale, recruitement, and retention of skilled personnel.

In order to meet these increased forward deployment requirements, while reducing operating tempo to a more manageable level, the Reagan administration advanced three lines of policy itended to improve the navy's ability to respond to crisis situations. First, it developed a renewed carrier-building program itended to increase the number of readily available carriers from 13 to 15. Because of anticipated retirements and the initiation of the Service Life Extension Program in 1980, a net increase of two in the carrier force pursuaded Congress to authorize *four* new *Nimitz* class carriers (in addition to the two already under construction in 1981), the first of which would not enter the fleet until 1990.

Secondly, the Reagan administration requested the reactivization of the four IOWA-class battleships, each of which was to become the centerpiece of a new surface action group complete with escort vessels. The Navy justified the reactivization cost of 1.74 billion on the grounds that the new surface action groups were integral to its plans to expand to 600 ships and would enhance its ability to project power ashore and maintain presence in troubled areas overseas. It was hoped that battleship action groups could substitute for carrier battle groups in forward deployment areas to reduce the amount of time spent at sea by the latter.

Third, the Reagan administration proposed an increase in both number and quality of the escort and support vessels (cruisers, destroyers, frigates and underway replenishment ships) needed for the additional carriers and battleship task forces that it planned to create. Some of these new escort vessels were also to be made available for independent operation, such as presence in the Caribbean and the Persian Gulf, and port calls

to friendly nations. These new ships were designed for effective operation in the high-threat environment posed by Soviet submarines and land-based aircraft.

The goal of these initiatives was a 600-ship navy that would include at least 19 task forces organized around a carrier or a battleship. A large increase in the size of the fleet was achieved during the 1980s: the number of deployable capital ships increased from 13 to 18, and the fleet as a whole increased from 479 ships in 1980 to 565 in august 1989. The rebuilding of the fleet, however, had taken longer than expected and proven extremely costly, thereby calling into question the navy's ability to achieve the numerical goals set during President Reagans first term.

The principle of a 15-carrier force was accepted by Congress in 1982, when it agreed to include funds in the fiscal 1983 budget for two additional nuclear powered carriers, but it will take the better part of two decades just to achieve a net increase of two in the number of deployable carriers. The delays encountered in reaching the 15-carrier level are indicative of the problems facing the navy now that it has entered the 1990s. Part of the reason for these delays is that it takes about seven years to construct a NIMITZ-class carrier, and only one shipyard the US has facilities to build it, Newport News Shipbuilding.

A second and more troubling problem is the relentless aging of the carrier fleet. In 1980, the number of deployable carriers declined from 13 to 12 with the entry of the SARATOGA in the Service Life Extension Program. The addition of the VINSON in 1982 and the THEODORE ROOSEVELT in 1986 brought that number back to 14, but the delivery of the LINCOLN, and the WASHINGTON in 1990 and 1992 will simply compensate for the long-delayed retirements of the MIDWAY and the CORAL SEA. Completion of the STENNIS in 1996 will raise the number of deployable carriers to 15 but only for a few years, since by 1998 the SARATOGA will

be ready for retirement, having completed the 15 years of additional service made possible by the Service Life Extension Program. Completion of the UNITED STATES (CVN-75) will buy a few more years but probably no more than that, since during the first decade of the Twenty-first century six older carriers will follow the SARATOGA into retirement. How these ships will be replaced is a matter that has barely been discussed in public, much less decided.[4]

The navy has also incurred significant costs as a result of its other programs for modernization and expansion. The Aegis-equipped TICONDEROGA-class cruiser (CG-47) was intended to serve as the principal antiair-warfare escort vessel for both carrier and battlehip task forces. When the last vessel of the program's 27-ship production run is delivered, the average cost per ship will have exceeded $ 900 million. The first five of the ARLEIGH BURKE-class guided missile destroyers (DDG-51), which are to be equipped with a less costly version of the Aegis-ystem, will cost well over $ 800 million each. Thirty-eight of these ships are planned.

The Reagan administration also committed the navy to modernizing and expanding the nuclear attack submarine component of the fleet through the construction of a new class of submarines, led by the SEAWOLF. Advances in Soviet submarine and anti-submarine warfare technology have given this program such a high priority that it is unlikely to be scuttled back much. At an estimated cost of $ 36 billion for 29 submarines, the SEAWOLF program could consume as much as 1/3 of the navy's shipbuilding budget over the life of the program. In addition, the navy continues to modernize the sea-based leg of the strategic forces triad through construction of OHIO-class ballistic missile submarines (SSBN). A single OHIO-class SSBN which in 1978 was estimated to cost approximately $ 1.2 billion, now costs in excess of $ 2 billion. The importance attached to this most survivable of the US strategic weapons systems is likely to make this program virtually untouchable.

Admiral James D. Watkins who became the Chief of Naval Operations when the "Maritime Strategy" was being formulated, set forth that the navy must be able to respond effectively to various forms of conflict on a worldwide basis: "Preparation for global war is the critical element in ensuring deterrence, but our peacetime operations and response in time of crisis are also critical contributions to deterrence and stability .... In fact, the volatility of todays international situation suggests that we must expect to employ these elements of our Maritime Strategy in an expanding set of the worlds troublespots"[5]. As these comments suggest, the Maritime Strategy is based upon the premise that it is better to deter conventional conflicts than to fight them. It also recognizes that this will not be easy to do, because the volatility of the international situation and the wide diffusion of modern military technology suggest an expanding rather than declining list of potential trouble spots.

The navy's ability to contribute to the goals of crisis prevention and crisis management in non-nuclear scenarios is determined principally by the number of independently deployable task forces available, and the speed with which they can reach the scene of trouble. The more task groups that can be maintained on a forward deployed basis during normal peacetime operations, the more visible the fleets operations will be and thus the greater its ability to deter crisis by dissuading hostile states from challenging American interests.

The maritime strategy was intended to clarify the navy's role in supporting broad foreign policy interests, thereby easing the task of allocating scarce resources among competing programs. For a variety of reasons, however, the choices which were facing the navy were becoming more difficult. In spite of the increase in the size of the fleet, the navy's ability to respond quickly to crisis situations was not improved much over that of the 1970s. This is due in part to the increasing demands on

the fleet, but it is also due to unanticipated shortcomings in the fleet configuration called for by the maritime strategy.

The maritime strategy in effect reaffirmed the navy's commitment to an ambitious program for modernization and expansion just as the resources available for the completion of that program were beginning to contract. Faced with chosing between a small number of high-cost vessels and a larger number of lower cost, but also less-capable, vessels, the navy opted for a fleet organized around 19 very expensive capital ships (15 carriers and four battleships) in the hope that 19 task forces would be enough to cover the sea control, power projection, and presence missions while reducing operating tempo to a more comfortable level. The battleship task forces, however, have not demonstrated an ability to operate independently, and even before the recent defense cutbacks the seven-year construction time for NIMITZ-class carriers would have prevented the navy from reaching its goal of 15 deployable carriers until 1996, at the earliest. However, at a cost of $ 7 billion for each of these vessels, including its embarked air wing, the construction of additional NIMITZ-class carriers will very likely be at the expense of the other shipbuilding programs. In view of the projected retirement of seven older carriers between 1998 and 2008 and the long lead time required to build and outfit new ships, crucial decisions on the composition of the fleet in the next century must be made soon. And these decisions will have to be made in a climate of declining rather than expanding resources for defense.

Contribution to deterrence and stability in the North

There has never been a permanent presence of US or other allied surface naval combatants in the Norwegian sea, like e.g. in the Mediterranean, nor has this been seen as necessary or desirable. But is has been regarded as highly desireable, particularly by Norway, with a periodic presence and a "show of flags" by US and other allied ships in the Norwegian sea

and in the waters adjacent to NATO's Northern region. This is in order to enhance the credibility of the guarantee of the alliance to the Northern members and to counter any perceptions of Soviet naval superiority by the build-up of the Northern fleet.

Up to 1976 maritime exercises in the Norwegian sea increased in scope in spite of the gradual build-down of the US and British navies. This is illustrated by the following table:[6]

Exercise	Ships	Countries
Teamwork 64:	125	7
Silver Tower 68:	200	9
Strong Express 72:	300	7
Teamwork 76:	400	10
Teamwork 80:	160	10
Teamwork 84:	130	8

As a result of the technological developments and reduction in number of ships, allied naval presence in the Norwegian sea was reduced up to the middle of the 1980s. Allied ships have since then increased their activities in the Norwegian sea somewhat.

In naval exercises since 1985, one to two carrier battle groups have regularly participated in Norwegian adjacent waters. The total number of days the carrier battle groups have been present in Norwegian waters have increased from around 4 days per year in 1985 to a level between six and eight days on the average.[7]

The change in attitude of the US Navy to forward operations in the Norwegian sea no doubt was connected with formulation of the "Maritime Strategy" and the initiation of the shipbuilding program in the early 1980s. The exercises in Norwegian waters also resulted in new tactical concepts aimed at

increasing the protection of the carriers against attacks by aircraft and submarines by operating close to the Norwegian coastline and also when possible inside the fjords.

In 1981 Norway and the United States signed an agreement to preposition equipment, ammunition and fuel for a Marine Expeditionary Brigade (MEB) in the Trøndelag area in Central Norway. This was a measure which was designed to increase the credibility of allied reinforcements from USA to North Norway, in view of the buildup of the Soviet Northern fleet with its amphibious and air assets since the beginning of the 1960s. The MEB arrangement came about at the recommendation of a bilateral Norwegian-American study group, and was not related to the introduction of the US Maritime strategy.

Another aspect of US carrier operations close to the North-Norwegian coastline in the Ofoten- and Vestfjorden area is that the shorter distance over land to Northern fleet bases and headquarters on the Kola coastline could raise Soviet defensive concerns, and thereby become a destabilizing factor in the situation in the High North. Allied carriers are clearly desirable to achieve sea and air control for introduction of reinforcements, and to provide air support for defence of strategically important areas in North Norway. But it is also evident that carriers should not operate in areas where it raises Soviet defensive concerns and possibly lead to countermeasures which may in the longer term lead to a more unsatisfactory situation.

In 1990 the equipment, ammunition and fuel for the MEB had been prepositioned in rock-protected storage sites specially constructed for the purpose. The reinforcement-concept had been developed further to include air-lifting of the Marine Brigade to the Trøndelag area in crisis or war, and the name was consequently changed to "Norway Air-Landed Marine Expeditionary Brigade", NAL MEB.[8]

Norway's Defence Command and the US Navy in 1971 entered a bilateral agreement about logistical support for American naval units. The arrangement included use of logistical installations which had been financed by NATO's common funded infrastructure program, and support of American naval aircraft during operations from certain Norwegian airfields. The agreement with the US Navy was updated in 1980 to cover logistical upport for aircraft which were no longer able to operate from their carriers. The "Invictus"-agreement regulates support for the US Navy in the same way as the COB-agreements regulates support for reinforcements from United States Air Force in Norway.

As a result of maritime developments in recent years there has been an increased requirement for logistic support from ashore to the Atlantic Fleet when it is operating in Northern waters with long and exposed supply lines back to its home bases. The Chief of Defence in Norway was therefore in 1988 authorized, in cooperation with American military authorities, to establish how Norwegian and Allied requirements for a limited extension of logistical support for the Atlantic Fleet could be met and accommodated within the framework of existing bilateral agreements. The requirements included prepositioning of conventional ammunition and fuel for ships and aircraft in connection with existing and planned installations. It could furthermore become needed to designate airfields which, in case, could receive supplies for onward transport to allied ships in time of war. Lastly, there was a requirement to arrange for repairs of Norwegian and Allied ships in war[9].

The proposed agreement was limited, and did not in its substance represent anything new, and it could be effected by an addendum to the existing "Invictus"- agreement covering logistical support and ship repairs. The proposed agreement to provide logistical support and repairs for US Navy was presented to the Foreign Relations Committee of the Norwegian Storting in August 1990. The committee did not want,

however, at that time to take a decision on the agreement, as it was feared that this would be seen to be "a wrong signal" after the events in Eastern Europe in 1989 and 1990. In the spring of 1991, the extension of the Invictus agreement was however approved by the Norwegian Government.

Naval activities in the post-CFE era

The Teamwork naval and amphibious exercise conducted in September 1990 was originally intended to include only *one* US carrier compared to *two* carriers in Teamwork 1988. The Gulf crisis, however, led to a massive reduction in the participating forces as units were deployed to the Gulf area, including the one US carrier and 5.000 Marines originally scheduled to take part in the exercise. Both the original reduction in US participation and the effect of the Gulf crisis on the exercise seem to indicate what to expect in terms of Western peacetime military activity in the North Atlantic with the changing east-west relationship and an increased readiness for "Out-of-area" contingencies:

	Teamwork 88	**Teamwork 90** Original plan:	**Teamwork 90**[10] Modified plan:
Duration, days	22	18	12
US carriers	2	1	0
Aircraft	500	365	140
Ships	200	195	85
Personel	45.000	39.000	14.000

Teamwork 1988 also reached deeper into the Norwegian sea than Teamwork 90. Amphibious landings took place in the Trøndelag area of Southern Norway, while Teamwork 88 included landings in Northern Norway and carrier operations far into the Norwegian sea. Sources indicate that the emphasis in Teamwork 90 on Southern Norway and the lower region of the Norwegian Sea came about because of changes in the east-west relations and the reduction in Soviet out-of-area

operations. There was also a marked contrast between the way in which Teamwork 88 and Teamwork 90 were presented in news releases.

Exercise *Battle Griffin* 12-26 March 1991 was to have been an exercise were the NAL MEB were to to take out its prepositioned equipment and take part in a field training exercise in North Norway. Because of the US commitment of forces to Persian Gulf, 4th MAB which had been specially trained for the northern contingency was not available and could not take part in the exercise. Instead a Marine Reserve Brigade was called up and sent to Norway to take part in Exercise Battle Griffin.

The experiences during Teamwork 90 and Battle Griffin 91 illustrate several points: It had been clearly foreseeen that allied reinforcements could be diverted to other contingencies as long as they had not been exclusively dedicated to the particular NATO contingency area. Dedication of reinforcements to particular areas has however been hard to get, as the Major NATO Commanders considered that this would reduce their operational flexibility in a crisis. This has been regarded by the receiving members of the alliance as acceptable in view of that the probability of two separate contingencies arriving at the same time was relatively small.

On the other hand it was appreciated that the United States was really making an effort to meeting its commitments in reinforcing NATO by calling in extra personnel at the same time it was engaged in a full scale war in the Persian Gulf.

In the longer term it is evident that in the post-CFE and new east-west relations it is necessary to review the security arrangements also in the North. In this connection there are however some important questions which we do not yet have the answer to:

- Will the CFE agreement and the dismantling of the military confrontation in Central Europe be followed by a corresponding build-down of the strategic competition between the former USSR and the USA?

- Will the removal of the threat of surprise attack and sustained large scale offensive operations in Central Europe be followed by a similar build-down of offensive capabilities in areas which are adjacent to the Nordic region?

It is also evident that the CFE-agreement will have significant impact on NATO's force structure and on the the forces available for reinforcement of exposed areas. The challenge will be to apply the new strategic concepts and reduced force structures to the Northern region.

The experience of the period particularly since the build-up of the former Soviet Northern Fleet in the early 1960s seem to underline the the need to continue to maintain the deterrent effect of the alliance through credible reinforcement and support options, while at the same time increasing reassurance and confidence building through mutual measures.

US Navy projected Circa 2000

There were about 550 "total deployable battle force ships" in FY 1990 and current planning calls for 435 in 1997. The inventory will probably not level off at that point, with some claiming that the JCS envisages 420 ships by the end of the decade. The limited room for growth in federal revenues, aggravated by the decline in US economy, combined with an avalanche of increasing demands on the federal treasury - for example, the need to rebuild the transportation infrastructure, the difficulties in limiting the rising cost of entitlements, the failing of banking and lending institutions, and the need to pay

off the interest on the public debt - all are placing great pressure on affordability.[11]

Whatever happens to ship-building accounts, it is already clear that early retirements will have a far greater impact on the fleet size in the 1990s than new acquisitions. As occured in the early 1970s, ships considered least capable are being paid off, even if though they retain some utility "in order to provide funds for the remainder of the fleet, including new and more capable ships that are being delivered". It was the early retirement of 16 older frigates in 1988 and 1989 which signalled the indefinite postponement of the 600-ship goal.

What will the fleet's make-up be as it reduces? Table 1 lists the last published version of the 600-ship plan, plus the composition of the fleet if it were proportionately reduced by 25% (to about 45O ships) and by 33.3% (to 400 ships). Proportional reductions are consistent with balanced fleet concerns, with internal Navy politics to satisfy the three primary "unions" and with the post-World War II pattern whereby the levels of aircraft cearriers , attack submarines and amphibious lift remained relatively consistent, even as absolute numbers in each category changed. These reductions would result in a fleet of 20 to 23 strategic submarines, 11 to 12 aircraft carriers, three battleships, 80 to 90 cruisers and destroyers, 69 to 78 frigates, 50 to 56 amphibious ships, and 67 to 75 tactical submarines, four to five patrol combatants and 85 to 96 logistics, support and auxiliary vessels.

One can further refine these numbers. Both START and budgetary concerns have already resulted in the decision to produce no more than 18 OHIO-class TRIDENT submarines, the last of which is scheduled for commissioning in 1997, and no new SSBN is expected to appear until the second decade of the next century. Hence the sea-based strategic deterrent, residing in 31 SSBN in 1990, will rest exclusively with the OHIOs after the last of the previous generation BENJAMIN FRANKLIN-class ships pays off in about 1997. The 18

submarines will each be armed with 24 TRIDENT C-4 or newer, more accurate D-5 missiles, and account for 3.456 or 70% of the 4.900 ballistic missile warheads allowed by the START Treaty.

Table 1. Proportional reductions of the 600-ship Navy **a)**

Ship Type	600-ship Navy	450-ship Navy	400-ship Navy
Ballistic missile submarines	20-40	23	20
Aircraft carriers **b)**	16	12	11
Battleships	4	3	3
Cruisers and destroyers	120	90	80
Frigates	104	78	69
General-purpose submarines	100	75	67
Mine countermeasures ships	14	11	9
Amphibious ships	75	56	50
Patrol combatants	6	5	4
Combat logisitcs ships	65	49	43
Support/auxiliaries	60-65	47	42

Notes:

a) For the '600-ship' goal, see 'FY 1990 Report of Secretary of Defense Frank C. Carlucci' (Washington DC: USGPO, 1989), p. 142.

b) In all official references to 600 ships up to 1990, the number of carriers listed was 15, not the 16 in this table. The reason for the difference is that, as a matter of convention, the official references omitted from the count one carrier normally in at two - to three-year overhaul termed the Ship Life Extension Programme. Also excluded was a carrier permanently dedicated to the training of new aviators. The new practice, used in this Paper, is to include all carriers in the count, except for the dedicated training ship.

Because of adamant US government opposition, it would be surprising if negotiated arms control had any impact on the size or make-up of the Navy's general-purpose forces. The Bush administration has concluded with Moscow an agreement (which is politically rather than legally binding) not to place more than 880 nuclear-warhead land-attack cruise missiles on such forces, but that agreement is of little practical consequence since there were no plans to deploy more than 758 in any case. On 27 Septemper 1991 President Bush also announced, as part of a package of initiatives affecting the entire spectrum of US nuclear weapons, that the US will remove all tactical nuclear weapons, including nuclear cruise missiles from its surface ships and attack submarines, and remove nuclear weapons associated with land-based naval aircraft.[12]

In addition to the impact of budgetary factors on general-purpose forces are threat assessments and the tendency of both naval and many national decision makers to favour large, sophisticated ships. With regional contingencies now shaping national and naval assessments, naval leaders have designated power projection (rather than ASW, the major concern in a global Soviet war) as the top priority in the retention and purchase of forces, and they view aircraft carriers as central to that mission.

With great reluctance they have accepted a mandated reduction in carriers from 15 in 1990 to 12 by the mid-1990s; Congressional spokesmen, including the highly influential Senator Nunn, foresee the numbers eventually dropping to between ten and 12. Since President Bush and Defense Secretary Cheyney have themselves admitted a preference for carriers, it seems reasonable to assume that there will be at least ten, and possibly as many as 12, by the year 2000. There will also be two retired carriers maintained in inactive status. It is not clear how long it would take to bring them back on line: possibly 180 days or more.

It should be noted that, whatever the inventory, the overall effectiveness of the carrier force may decrease towards the end of the 1990s. These ships derive their versatility from embarked fighter, attack, electronic warfare, tactical surveillance, refuelling and anti-submarine aircraft, as well as helicopters, but in nearly all of these categories cost, contracting, design and oversight problems have resulted in the cancellation or postponement of programmes to build needed replacements. For example, a workhorse in power projection is the A-6 bomber, whose basic airframe has been in service for 30 years. Nearly half the A-6s in the Atlantic Fleet have sagging wings, barring them from vigerous combat maneuvres. It had been expected that, instead of being repaired, the A-6s could be retired as the follow-on A-12s entered the inventory, but the A-12 has been cancelled and is one of five carrier aviation programmes that has been eliminated or put on hold. The Navy has spent nearly $5 bn in recent years on programmes which have yet to result in operational aircraft or, as in the case of the A-12, a test model. It would not be surprising if the cost of fielding a new aircraft had a negative effect on the number of carriers funded in future budgets.

Battleships also constitute power-projection units. The US Navy had three in 1990, but all are to be retired. Their size, the power of their 16-inch guns, their 32 TOMAHAWK land-attack missiles and their armour make them impressive platforms, and they proved highly useful in *Operation Desert Storm*, but they are viewed as too costly to operate, partly because they are so manpower intensive.

As for amphibious platforms, of which there were 62 in 1990, naval leaders have indicated that they are moving down towards a capability to support two-and-a-half Marine Expeditionary Brigades (MEBs).This translates into a force of around 50 ships, since it takes about 20 to lift the assault echelons of one brigade. With 50 also being within the range arrived at in the proportional reductions, this figure is accepted here as the size of the amphibious inventory projected for the year 2000.

Cruisers and destroyers, numbering 100 in 1990, are sometimes collectively referred to as "battle force combatants," in that they work in consort with and provide anti-air and anti-submarine protection to aircraft carriers, battlehips and amphibious ships. Hence their numbers are dependent upon how many vessels there are to protect. Their numbers will probably also be affected by the fact that all battle force combatants will eventually be armed with the TOMAHAWK land-attack missile, giving them a power-projection capability. As a result, some will be independently assigned to remain ready for or to engage in strike missions.

Before *Operation Desert Storm*, the Navy was estimated to have about 350 TOMAHAWK land-attack missiles on surface ships within striking range of Iraq. One ship alone, the AEGIS cuiser SAN JACINTO, carried 122 missiles. These consisted of its normal complement of 12, plus another 110 placed in launchers usually reserved for SAMs. Possibly also affecting inventory decisions is the potential utilization of ships with the sophisticated AEGIS air defence system in ballistic missile defence. The Strategic Defense Initiative Organization (SDIO) is reported to be "considering using shipboard sensors and weapons in the Global Protection Against Limited Strikes (GPALS), SDIO's restructured program for defending the US and its allies from ballistic missile attack".

In the light of these factors, the numbers already on order, and of the institutional bias in favour of larger ships, it seems reasonable to project that the overall level of cruisers and destroyers will probably be somewhat more than the 80 to 90 predicted strictly through proportional reduction; 90 to 100 is more reasonable.

While the priority accorded to power projection has risen in the last two years, that accorded to wide-area sea control as an immidiate concern has decreased. The wide-area threat was linked to the prospect of a NATO-WARSAW PACT confron-

tation, now accorded little credibility, and currently associated with warning times of approximately two years. It is therefore not surprising that the number of frigates, whose prime purpose is the protection of shipping, will drop below the 69-78 units projected for a proportionally reduced force. Many Europeans value frigates highly, and they constitute the largest percentage of major surface combatants in their fleets, but, from an American perspective, they are the smallest, least capable and least favoured of major surface warships.

The US is not building any frigates at present, nor does it plan to in the foreseeable future. There were 100 frigates in FY 1990, and there should be no more than 50 or so in the active and deployable reserves inventory by the year 2000. The frigates would be used to ensure local sea control (as they did in the Persian Gulf, for example, towards the end of the Iran-Iraq war), augment the protection of carriers, amphibious and underway replenishment ships, and engage in other activities such as drug interdiction. Another 40 units may be in the non-deployable reserves, where eight would serve as training ships and 32 would be mothballed. It would require 180 days to bring them back into service. Crews on the eight training ships would be dispersed among the other 32 to serve as a cadre of experienced personnel around which entire crews would be assembled for each ship.

Of all the Navy's sea-control platforms, the SSNs have long been considered the most effective for dealing with enemy submarines, especially in areas were it would be unsafe for surface ships or aircraft to venture. The size and and capabilities of the former Soviet undersea fleet have almost exclusively constituted the threat which justified the purchase of US submarines, including the highly capable and extremely expensive SSN-21s, which would enter service in the mid-1990s. From a capabilities (as opposed to intentions) standpoint, the former Soviet Union's own submarine-building programme, centred on the highly sophisticted AKULA and SIERRA boats, would seem to justify a robust US equivalent,

but estimates of Soviet intentions are generally having the opposite effect. Consistent with this development is the fact that power projection has now replaced ASW as the Navy's top priority.

Nevertheless, several factors suggest that there will be limits as to how much the submarine force will be cut back. One is that other nations possess submarines which could pose a potential threat to American or allied interests. A second is that US submarines have an assigned role of supporting carrier battle group operations. They are also excellent platforms for warfare against surface ships, covert mine-laying, intelligence-collection, support to special operations, and land-attack with cruise missiles, especially in circumstances where the US does not wish to employ or hazard a surface ship. Another very important factor is that submariners constitute a very powerful "union" in the Navy.

The long-term trend is for submarine numbers to reduce. In 2000 there could be more than 80 if those already approved for construction are built and if none of the existing units are retired before their thirtieth year. Since it has already been decided, however, to retire the oldest submarines originally scheduled for nuclear refuelling , and since production of the new ultra-expensive SEAWOLF class (costing more than $2bn each) will be limited to one as the Navy moves to design a lower-cost option, there will probably be no more than 67-70 submarines in the circa 2000 fleet. That range encompasses the lower end of the 67-75 units projected in proportional reductions, and it is consistent with reports that the JCS are considering a fleet of about 70 submarines in 2000.

Mine countermeasures have never attracted a wide following in the US Navy. An on-going building programme will result in 14 ocean-going units by year 2000, and it is planned to supplement these with 18 coastal boats, of which about 13 should be operational by the end of the century. Incidents during *Operation Desert Storm* in which the AEGIS cruiser,

PRINCETON, and the amphibious ship, TRIPOLI, both suffered severe mine damage may result in additional ships being authorized, but they will not appear before the end of the 1990s.

The number of combat logistics, auxiliary and support ships are largely a function of the size of the remainder of the fleet. Projections reflecting proportional reductions are a valid measure for force levels *circa* 2000; as the overall combatant fleet diminishes, this will reduce the number of logistic and support ships needed. In addition, the Military Sealift Command contains a Naval Fleet Auxiliary Force crewed by civilians, which supplements the Navy's own replenishment ships. These vessels carry food, ammunition, spare parts and fuel and can transfer these to naval ships under way.

Table 2 summarizes the projections of the *circa* 2000 fleet as discussed above. It also lists the fleet as it exists today and specifies how it will change over the next decade, assuming the projections are valid. It projects 416 ships on average, made up of 18 ballistic missile submarines, ten to 12 aircraft carriers, 90 to 100 cruisers and destroyers, 50 frigates, 67 to 70 general-purpose submarines, 27 anti-mine ships, 50 amphibious ships, 40-50 combat logistics ships, 40-50 support and auxiliary ships, and possibly six small patrol combatants.

Table 2: 1990 and circa 2000 fleets

Ship type	1990	*Circa* 2000	Difference
Ballistic missile submarines	31	18	-13
Aircraft carriers	15	10-12 **a)**	-3 to -5
Battleships	3	0	-3
Cruisers and destroyers	100	90-100	0 to -10
Frigates	99	50 **b)**	-49
General purpose submarines	90	67-70	-20 to-23
Mine countermeasures ships	24 **c)**	27	+3
Amphibious ships	62	50	-12
Patrol combatants	6	6?	0?
Combat logistics ships	60	40-50	-10 to-20
Support/auxiliaries	74	40-50	-24 to-34
Totals	**564 d)**	**398-433**	**-121 to -162**

Notes:

a) There will be two carriers in inactive reserve status where it should take at least several months to bring them on line.

b) Present plans call for an additional eight frigates to be retained for training and another 32 to be mothballed. The latter group would require 180 days to be brought on line.

c) This total includes both ocean-going and coastal units, numbering eight and 17 respectively. The designated 600-ship force referenced ocean-going units only.

d) This number is greater than the 550 mentioned at the beginning of this chapter because it includes coastal minehunting vessels not included in the 'total deployable battle forces'.

The seaborne units will be supplemented by land-based aircraft, the most important of which are the P-3 maritime patrol aircraft dedicated to surface surveillance and ASW. There are approximately 330 P-3s today, and they regularly operate in the North Atlantic, the North Pacific and the Mediterranean from bases in North America, Asia and Europe. Their inventory should decline by about a third by 1994, and the force will approach the end of its service life before 2000. As a result of the cancellation of the planned follow-on, the P-7, due to contractor performance problems, the Navy is now considering its alternatives, which could involve purchasing new P-3s or extending the life of the present aircraft.

Finally, as noted earlier, there is a separate US strategic sealift fleet consisting of 296 ships in 1991, with 72 designated as active and 224 in reserve. The active units include eight US-owned fast sealift ships and 25 commercial ships on long-term charter, normally loaded with military equipment and supplies and positioned around the globe in order to provide quick support to Army, Air Force and Marine units deployed in a contingency. The Secretary of Defense's Annual Report published in January 1991 projects no increases in the size of the active force beyond FY 1991, but this may change as the lessons of *Operation Desert Storm* are analysed.

There are 103 ships in the Ready Reserve Force, which are supposed to be available on five to 20 day notice, and 121 ships in the National Defense Reserve Fleet (NDR) with a programmed availability of 60 to 90 days. The Ready Reserve Force is predicted to grow to 142 ships by 1994, while the NDR Fleet should be reduced since many of its ships are of doubtful serviceability and will almost certainly be retired.

Operation Desert Shield revealed major flaws in the ability of the Ready Reserve to meet "surge" needs to transport unit equipment. The issue has attracted great attention in Congress and the Pentagon, and the DoD has commissioned a study of

defence mobility requirements. Numerous proposals have already been made to purchase fast sealift and ro-ro ships and to have them in a higher state of readiness than was the case in August 1990. To fill in the gaps, the US also intends - as it did for the Gulf war - to rely on allies and on chartering; if necessary, it also plans to requisition US flag ships or ships flying foreign flags but owned by American companies. Prior to August 1990, the Military Sealift Command, which has day-to-day operational responsibility for strategic lift assets (including shore equipment), already had about 60 privately-owned cargo ships and tankers under long-term charter. These included 25 prepositioned ships mentioned above.

Conclusions

Donald C.F. Daniel projects a 25-33% reduction of the US Navy's total deployable battle force ships by year 2000. This is based upon the assumption that the priority accorded to power projection has risen in the last two years, while that accorded to wide-area sea control as an immediate concern that was linked with a NATO-Warsaw Pact confrontation is now given little credibility, and currently associated with warning times of approximately two years.

In his conclusions Donald C.F. Daniel states that the possibility of a major confrontation with the Soviet Union in the 1990s is minimal, but should it occur it would raise a vast number of naval and other military issues. Focusing on major concerns raised in the Maritime Strategy debate of the 1980s provides a framework for considering naval employment and needs should there be a contingency in the 1990s.

There are three principal conclusions according to Donald C.F.Daniel. One is that a defensive strategy might suffice to contend with a submarine threat to shipping unless it becomes geographically widespread; an offensive tie-down strategy might then become more attractive. A second is that there is

little strategic leverage to be derived from conventional naval forces independently projecting power against the former Soviet homeland, but they could significantly contribute to bolstering the defences of allied states and helping regain lost territory. Third, there would be no compelling reasons for a dedicated anti-SSBN campaign.

For a post-Soviet regional contingency in particular, the US would do well to provide more escorts for the protection of shipping and submarines in its *circa* 2000 fleet. But at this stage it would be impossible to predict whether planned and proposed additions to the Ready Reserve sealift will be sufficient.[13]

Notes

1. The following is to a great extent based upon: Mark A. Randal and Wallace J. Thies article: *The Opportunity Costs of Large-Deck Carriers: Naval Strategy for the 1990s and Beyond*, Naval College Review, Volume XLIII, Number 3, Newport N.I., Summer 1990.

2. John Lehman, *Aircraft Carriers: The Real Choices*, The Washington Papers, VI,No 52,(Beverly Hills, Calif.: Sage Publications, 1978), p. 16.

3. See, for example, Admiral James L.Holloway III ((Ret.), *Naval Aviation Flies into the Future*, Sea Power , July 1980, p.20.

4. See: *Current and Projected Aircraft Carriers*, in: Randal & Thies, p. 11.

5. *The Maritime Strategy*, Special Supplement, U.S.Institute Proceedings, 1986, p.5.

6. Tønne Huitfeldt, *NATO and the Northern Flank*, Norwegian Institute for Defence Studies, FHFS Notat no 6, 1986, p. 25.

7. *Allied Reinforcements to Norway*, MOD Norway Fact Sheet no 05, June 1989

8. *The Military Balance in Northern Europe, 1990-1991*. Oslo, The Norwegian Atlantic Committee, 1st. ed., 1990: p. 21.

9. *Allied Reinforcements to Norway*, MOD Norway Fact Sheet no 05, June 1989,

10. *Exercise "Teamwork 1990"*, Newsletter published by the Icelandic commission on Security and International Affairs, January 1991.

11. Projection of US Navy to Circa 2000 is mainly based upon Donald F.Daniel, *Beyond the 600-Ship Navy*, Adelphi Papers no 261, Published by Brassey's for IISS, London, autumn 1991

12. President Bush's initiatives on nuclear arms, 27 september, *Documentation*, NATO Review No 5, October 1991, p.11.

13. Donald C. F. Daniel, *Beyond the 600-Ship Navy*, Adelphi Papers No. 261, IISS London, autumn 1991, p.44.

4. Soviet Strategic Forces in the Arctic

The Soviet Union collapsed in December 1991, and in its place are emerging a multitude of new states. In terms of sheer volume the post-Soviet successor states are dominated by Russia, which is also inheriting the bulk of the post-Soviet military arsenal and, in the far north and the Arctic, remains confronted with the same basic geopolitical imperatives as the former Soviet Union. However all of the post-Soviet successor states, including Russia, are still in a process of profound transition. Their internal development, and their mutual relationships, have not yet been determined, and thus the entire post-Soviet area is in a state of deep flux. A situation which is made extremely unstable and dangerous by five factors:

1. The severe poverty and desperation of the people.
2. The continued decline of the economy and of living conditions.
3. The lack of stable political institutions.
4. The animosities between the nations of the former USSR.
5. The mass of nuclear and conventional weapons left in the ruins of the Soviet Empire.

Under these conditions this analysis of 'Soviet' military power in the Arctic takes into account two factors. Firstly the residual interests and forces of the traditional Soviet military organisation affecting the Arctic, and secondly the way in which these forces are mutating in the new post-Soviet world. The first part of this section presents traditional Soviet strategic military interests and forces in the Arctic as they evolved up to 1991. At the date of writing - January 1992 - the underlying Soviet military doctrine and the remaining post-Soviet forces affecting the Arctic are of subordinate importance. Their impact and indeed very existence is overshadowed by the political changes taking place during the transition to a new post-Soviet system. In their wake the authority of the central Soviet leadership has ceased to exist and the Soviet

military organisation - though one of the last holdouts of the old centralised command system - is collapsing.

Nonetheless the classic Soviet Arctic strategic interests and forces remain important for two reasons. In the first place because they reflect the underlying Russian geopolitical interests in the Arctic, and secondly because the associated Arctic-oriented strategic forces still exist today. If Russia continues to exist in some form, and manages to retain some semblance of a large military organisation, then the bulk of the post-Soviet strategic forces will probably remain under Russian command. Hence some knowledge of the composition and rationale of the present Arctic forces is useful as a guide to future Russian military interests and capabilities in the area.

However this presupposes that Russia itself does not collapse totally, and that some type of central Russian authority remains in place and that it manages to maintain and support a large strategic military force. Whether or not this will be the case remains uncertain today. The second part of this section makes a brief overview of the present disintegration of the Soviet armed forces and provides some alternative scenarios of the likely future development of post-Soviet Russian military power and its implications for the nordic Arctic areas.

Soviet Strategic Forces in the Arctic 1955-1991.

The following sections present the traditional Soviet strategic forces and interests in the Arctic as they evolved to 1991. This includes three types of forces (in descending order of importance):

SYS - Strategic Nuclear Forces.
VPVO - Strategic Air Defence Forces.
VMF - Naval General Purpose Forces.

However one should note that the forces and interests presented here belong to the past. The collapse of the USSR also involves her traditional military strategy and force structure. Thus the Soviet arctic forces presented here must be seen as being in the process of a rapid and potentially uncontrolled transition. However for the time being we must nonetheless continue to take them into account. Partly because their remnants still remain in force, and partly because they will form the backbone of the eventual Russian strategic interests and forces in the Arctic, which, at some point in the future, may re-emerge. These may not include a strategic nuclear element, but if they do it will be important to retain an understanding of its roots and legacy.

SYS - Strategic Nuclear Forces

The Strategic Nuclear Forces (SYS) of the Soviet Union consisted of three basic commands:

1. Strategic Missile Forces. (RVSN)
2. Strategic Submarine Forces. (VMF/PLARB)
3. Long Range Bombers. (DA/MAA)

The SYS was the most important command in the Soviet Armed Forces. Two of the SYS forces - the Strategic Submarine Armies and the Long Range Bomber Army - have a major Arctic operational orientation. This obviously does not mean that they are targeted against the Arctic, but it does mean that they need to use the Arctic area in one way or another in their wartime operations against the CONUS.

One of the main problems for the Soviet Union has been how to deliver her nuclear warheads to their strategic targets in the United States. With the exception of Cuba the Soviet Union does not dispose of forward bases near the US from which medium and intermediate range systems can be launched. As

a result the Soviet military has had two options when it came to reaching CONUS targets:

1. To develop long range strategic nuclear delivery vehicles possessing a range permitting them to reach the CONUS on their own.
2. To develop concealed strategic nuclear launch platforms which could reach launch stations within range of shorter-range delivery vehicles.

Both of these types of system have been included in the Soviet arsenal since 1960, and both types have remained in use subsequently, as the two basic means for the Soviet Union to deliver her nuclear warheads to the CONUS. The long range delivery vehicles have consisted of three basic types of strategic nuclear delivery vehicle (SNDV):

1. Intercontinental range nuclear bombers (LRB).
2. Intercontinental range ballistic missiles (ICBM).
3. Intercontinental range submarine launched ballistic missiles (IC SLBM).

Concealed launch platforms equipped with medium- and intermediate range delivery vehicles have consisted of one type of SNDV:

4. Submarines armed with short-, medium- and intermediate-range ballistic missiles (SR/MR/IR SLBM) and nuclear land-attack cruise missiles (SLCM).[1]

Each of these delivery solutions confronts the Soviet Union with different basing and transit requirements, all of which have involved the Arctic in different ways. The long range forces have had to employ the shortest transit route between their launch points in the Soviet Union and their CONUS targets. This means in effect crossing directly over the Arctic. For the LRB this means flying through Arctic airspace, which has a major strategic impact on the area since it involves it

directly in Soviet offensive and US defensive strategic operations. In addition it has meant that the LRB main bases in the early 1960's, and subsequently their Forward Operating Locations (FOL) have been placed in areas of the Soviet Union located as close to the US as possible in order to extend the range and operational freedom of the LRB over the US. This has meant placing these airbases along the Soviet Arctic coastline and islands.

Where the ICBM are concerned their extra-atmospheric ballistic trajectory causes them to pass over the Arctic. At the same time their considerable range (with the exception of the first missile system in use in the early 1960's) have meant that they could be based deep inside the Soviet Union. Thus neither their transit route nor their basing have had an effect on the Arctic. However they have had an indirect Arctic impact, by leading to the deployment of US Ballistic Missile Early Warning (BMEWS) radars in the north American Arctic.

The driving force behind the development and deployment of the IC SLBM has been the need to find as secure maritime concealment areas for these as possible. This has led the Soviet Navy to deploy them to sea areas close to the Soviet coastline and as far from western bases as possible, where she could concentrate her own general purpose forces to defend the SSBN's. As a result the IC SLBM have been deployed to the Arctic waters north of the Kola, protected by the Northern Fleet, and the sub-Arctic Sea of Okhotsk in the Far East, protected by the Pacific Fleet. This has placed the bases and main patrol zones of the majority of the Soviet IC SLBM forces on the Kola and the adjacent Arctic waters, which has had a major impact on the Arctic.

The concealed launch platforms had a different kind of impact on the Arctic. Since the only system which could reach medium-range launch stations within range of the US and remain concealed was the submarine, it meant finding naval basing areas providing maritime access routes to the Atlantic

Ocean, to reach the US eastern coast, and the Pacific, to the reach the US west coast. The only such basing areas in the USSR which are not blocked by narrow choke points under western control are the Kola Peninsula for the Atlantic and the Kamchatka Peninsula for the Pacific. This led to these two becaming the focus of a strong Soviet naval buildup as of the late 1950's, with a particular focus on the Kola Peninsula. This meant that this Arctic area became a major Soviet strategic nuclear base and that the adjacent waters became vital transit routes for the Soviet strategic submarine forces.

The Impact of the Soviet Strategic Nuclear Forces on the Arctic

The Soviet strategic nuclear force has had eleven technological breakthroughs when new or significantly improved delivery means were introduced to the strategic nuclear arsenal between 1955 and 1990. Each has led to the deployment of a distinct new type of Soviet strategic nuclear delivery vehicle. These are listed in Table 1.

Table 1. Technological Phases in the Soviet SNDV Arsenal.

	YEAR	TYPE	DELIVERY VEHICLE
1.	1955	LRB	Mya-4, Tu-95
2.	1960	SLBM	SS-N-4
3.	1962	ICBM	SS-7
4.	1968	IR SLBM	SS-N-6/Yankee
5.	1972	IC SLBM	SS-N-8/Delta
6.	1974	MIRV ICBM	SS-19
7.	1977	MIRV SLBM	SS-N-18
8.	1981	Under-ice SLBM	SS-N-20/Typhoon
9.	1984	IR ALCM	AS-15/Tu-152, Tu-160
10.	1985	Mobile ICBM	SS-25
11.	1987	IR SLCM	SS-N-21

NB: Only includes the initial model of each type of new delivery technology.

Table 2. Arctic Orientation of the Soviet SNDV Arsenal.

YEAR	TYPE	ARCTIC ORIENTATION			
		Basing	Transit to Launch	Launch Area	Transit to Target
1955	LRB	Soviet Arctic coastline*	Arctic airspace	—	—
1960	SLBM	Kola	Barents, Norwegian Sea	—	—
1962	ICBM	—	—	—	—
1968	IR SLBM	Kola	Barents, Norwegian Sea	—	—
1972	IC SLBM	Kola	Barents Sea	Barents, Greenland Kara Seas	—
1974	MIRV ICBM	—	—	—	—
1977	MIRV SLBM	Kola	Barents Sea	Barents, Greenland Kara Seas	—
1981	Under-ice SLBM	Kola	Barents Sea	Arctic Ocean	—
1984	IR ALCM	Soviet Arctic coastline**	Arctic airspace	Canadian Arctic airspace	Canadian Arctic airspace
1985	Mobile ICBM	—	—	—	—
1987	IR SLCM	Kola	Arctic Ocean,*** Barents Sea	Canadian Arctic archipelago	Canadian Arctic airspace

* Main bases up to 1962. After 1962 only FOB/FOL.
** FOB/FOL.
*** If assigned launch areas in the Canadian Arctic archipelago.

NB: Only includes the initial model of each type of new delivery technology.

Each of these breakthroughs has also affected the strategic importance of the Arctic, by introducing a new weapons system which either depended upon the use of the Arctic for one or more stages of its operation, or else did not. This geographic orientation of the strategic nuclear weapons is determined by up to five factors:

1. Basing area.
2. Transit to launch area. (If different from base.)
3. Launch area. (If different.)
4. Transit to target.
5. Target location.

With the exception of US early warning, jet interceptor and forward operating locations for tankers the Arctic has not included major targets for the Soviet strategic nuclear forces. However the Arctic has represented a vital basing, transit and launch area for a number of the Soviet strategic systems types. This Arctic orientation is summarized in Table 2.

There are thus eight out of the eleven Soviet strategic delivery types which have had a partial or major Arctic orientation at one or more stages of their planned operations against the CONUS. This does not mean that all of the forces making up these eight types necessarily included the Arctic in their planned operations. However an important part did. Table 3. gives a rough outline of the percentages which involved the Arctic.

Table 3. Share of Arctic SNDV Operating in the Arctic.

YEAR	TYPE	BASING	ARCTIC BASING/OPERATIONS
1955	LRB	Soviet Arctic coastline	100 %
1960	SLBM	Kola	100 %
1968	IR SLBM	Kola	66 %
1972	IC SLBM	Kola	70 %
1977	MIRV SLBM	Kola	73 %
1981	Under-ice SLBM	Kola	100 %
1984	IR ALCM	Soviet Arctic coastline	100 %
1987	IR SLCM	Kola	70 %

Table 4. Relative Evolution of Soviet Nuclear Delivery Vehicles, 1960-1990.
(In % of total number of SNDV.)

	ARCTIC ORIENTATION	1960	1965	1970	1975	1980	1985	1990
LRB	Yes	56.8	32.8	8.6	6.1	6.0	5.5	5.2
IRB	Yes				1.0	2.9	4.5	5.3
IR ALCM	Yes						6.8	17.9
IR SLCM	Yes							6.4
ICBM (SS-6)	Yes	2.2	0.8					
IC SLBM	Yes			0.3	6.3	17.4	20.6	20.1
SR/MR/IR SLBM*	Yes	41.0	22.0	16.9	23.8	20.6	13.4	5.8
ARCTIC TOTAL:		100.0	55.6	25.8	37.2	46.9	50.8	60.7
ICBM	No	0.0	44.4	74.2	62.8	53.1	49.2	39.3
TOTAL:		100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Including the SS-N-3C SR SLCM for 1960.

This provides an idea of the rough proportion of strategic nuclear forces with a strong Arctic orientation. A more exact estimate, along with the evolution over time, is provided in the following subsection. However virtually the entire LRB force, first-generation SLBM force and latest generation of SSBN's specially configured for under-ice operations have had a major focus on the Arctic, in the sense that the full force has depended upon the use of the Arctic for one or more of the four operations listed above. The remaining SLBM and SLCM forces have only had a partial Arctic orientation, since some 30 % have had their SSBN and SSGN launch platforms based in the Pacific, south of the Arctic, along with their transit routes and launch zones.

The next question is how important these systems were within the overall Soviet arsenal of strategic nuclear forces. This is shown in Table 4. which gives the relative size of the various types of forces in the Soviet strategic nuclear arsenal between 1960 and 1990.

The table shows the percentage of the various strategic nuclear weapons in the Soviet arsenal, measured in terms of the share of delivery vehicles which that weapons type represented. The resulting data can be complemented and modified by measuring and taking into account additional factors, such as numbers of warheads, exposive power, penetrability, survivability, accuracy and so forth. However the above provides a basic outline of the strategic significance of each weapons type over time, and corresponds to the solid lines in Graph 1.1.

The table also distinguishes between the proportion of Soviet strategic delivery vehicles with a potential Arctic operational profile and those without. This provides a rough indication of the evolution of the overall importance of the Arctic in Soviet offensive and US defensive strategic planning. From a high point in the early 1960's when the entire Soviet strategic nuclear force was based in the Soviet Arctic and depended

upon it for their operations the share dropped rapidly to about one-quarter in 1970. This was due to the strong buildup of the ICBM forces, which reduced the strategic importance of the systems operating in the Arctic. However since then the Soviet Arctic systems have grown again. This is primarily due to the increase in the relative importance of the SLBM force, particularly as the intercontinental range SLBM began deployment as of 1970, and the bomber/ALCM force as of the mid-1980's. Thus today the proportion of Soviet strategic nuclear forces with an Arctic profile lies at a little under two-thirds of the full force. These proportions remain roughly the same even if one takes into account the MIRVing of the ICBM force as of 1974, since it is compensated for by the MIRVing of the SLBM force after 1977. (See Graph 1.1., dotted lines.)

If we combine this information with the data for the proportion of the Strategic Nuclear Forces with an Arctic profile which actually had a high likelihood of operating in the Arctic we can get an overall view of the impact on the Arctic of the evolution of the Soviet strategic nuclear force. This data is provided in Table 5.

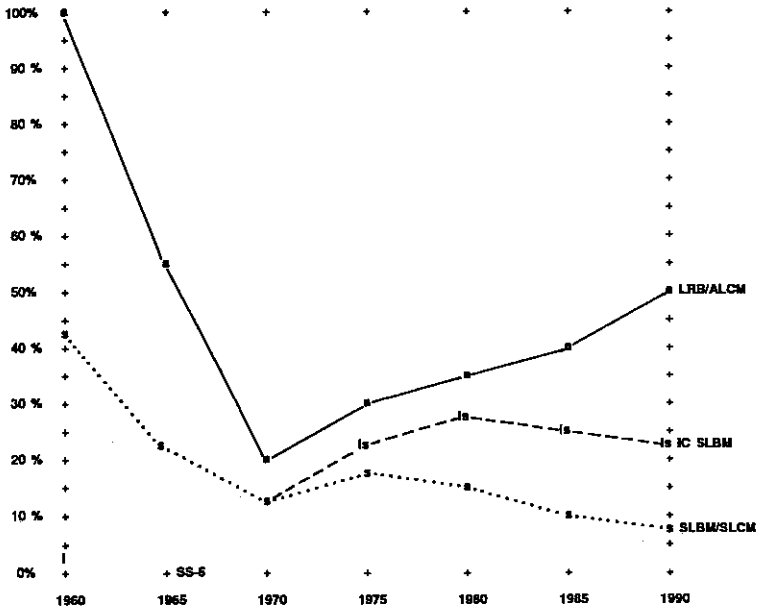
Table 5. Arctic Impact of Soviet Strategic Nuclear Delivery Vehicles.

	LAND	AIR	SEA	Percentage of total with Arctic operations. 1960	1965	1970	1975	1980	1985	1990
Bombers+ALCM*	FOB	Transit		56.8	32.8	8.6	7.1	8.9	16.8	28.4
IC SLBM	Bases		Launch			0.3	6.3	12.2	14.4	14.1
Other SLBM+SLCM**	Bases		Transit	41.0	22.0	11.8	16.7	14.4	9.4	8.5
SS-6	Bases			2.2	0.8	-	-	-	-	-
			TOTALS:	100.0	55.5	20.7	30.1	35.5	40.6	51.0

* LRB, IRB, IR ALCM.
** SR/MR/IR SLBM and IR SLCM.

The figures show the percentage of each type of delivery vehicle with an Arctic operational profile as a part of the total arsenal of Soviet strategic nuclear delivery vehicles in each year. (ie the data from Table 3. combined with Table 4.) The totals therefore show the percentage of the full strategic nuclear arsenal which is estimated as having involved the Arctic for some stage of its operations. The same data is presented on Graph 2.

Graph 2. Evolution of Soviet Nuclear Delivery Vehicles with an Arctic profile.



This indicates the importance of the Arctic sea areas and the recent growth in the importance of the Arctic airspace. The main factor which has reduced the impact on the Arctic has been the ICBM force. In this respect the START Treaty is relevant for the future of the Arctic. Since one of its main consequences will be to cut the number of ballistic missiles in both the US and Soviet arsenals the size of both the Soviet ICBM and SLBM forces will have to be reduced. This will have three consequences for the Arctic:

1. The damping effect of the ICBM will be reduced further, as its relative size in the Soviet strategic arsenal diminishes.

2. The bulk of the remaining Soviet SLBM force will probably be based on the Kola since the reductions will cut the number of older SSBN's sharply, and all of the modern SSBN types delivered since 1980 are based on the Kola. They are also specially designed for Arctic operations, and the Kola remains the only basing area which gives them access to these.

3. The relative size of the air-breathing leg of the triad will increase. Since this is entirely focussed on Arctic transit and the use of Arctic FOL this will probably increase the strategic importance of the Arctic airspace further.

As a result the strategic importance of the Arctic sea areas and airspace for a Soviet military planner has continued to grow. However at present these interests are rapidly being overshadowed by the collapse of the USSR and the chaotic conditions emerging in the post-Soviet area. This is dealt with in the next chapter.

The Evolution of Soviet Strategic Forces and the Arctic, 1955-1990

This section provides an historical outline of the development of Soviet strategic nuclear forces up to the early 1990's. It is divided into the main periods of the technological development of the Soviet strategic nuclear delivery vehicles, analysing the way in which the various weapons systems affected the Arctic.

1955: Intercontinental Bombers (LRB) and improvised SLBM and SLCM submarines

This first phase of the development of the Soviet strategic nuclear arsenal is characterised by the predominant position of the intercontinental bomber, coupled with an almost equal number of short-range SS-N-4 SLBM and SS-N-3C SLCM launchers, both of which had a nuclear land-attack capability. All of these systems had a strong Arctic orientation. The LRB depended upon the Soviet Arctic coastline for their basing, and upon the Arctic airspace for their transit to the US, while the bulk of the SS-N-4 and SS-N-3C submarines operated from the Kola Peninsula and had to transit the Barents Sea to reach their launch positions off the US east coast. Finally this period also saw the deployment of the first Soviet fledgling ICBM, the SS-6 *Sapwood*. This system was primitive and never became an important part of the Soviet strategic nuclear arsenal, but it was interesting in that it's limited range made it the only ICBM to have been based in the Soviet Arctic. In the 1960 the composition of the Soviet strategic nuclear arsenal consisted of:

Type	Number	Percent
LRB	104	56.8 %
SR SLBM	56*	30.9 %
SR SLCM	19*	10.4 %
ICBM	4*	2.2 %
Total	**183**	**100 %**

* Launchers.

Virtually the entire Soviet strategic nuclear force was based in the Arctic, and the most important element, the intercontinental bombers, also depended upon it for their transit to their CONUS targets. This made the Arctic of vital importance to the Soviet offensive nuclear strategy.

Long Range Bombers

The deployment of the first Soviet strategic nuclear forces began in the mid-1950's. The lack of forward bases within short and medium-range of the United States initially limited the number and type of delivery vehicles available to the USSR. The Soviet Union sought to overcome this by developing two types of delivery systems. On the one hand delivery vehicles with an intercontinental range capable of striking directly against the CONUS from bases in the Soviet Union. The first such system to achieve operational status was the intercontinental range manned bomber. These began deployment in 1953 with the Tu-4 *Bull*, but it was not before 1955, when the first Tu-95 *Bear* A and Mya-4 *Bison* A reached operational status, that the LRB began large-scale development.

By 1960 104 *Bear* A and *Bison* A were operational. Representing 57 % of the Soviet strategic delivery vehicles this was the largest force in the arsenal at the time and occupied a primary place in Soviet strategic planning. They also had a very strong Arctic operational profile. To reach the CONUS they had to employ the trans-Arctic flight routes, and their relatively limited operational radius and lack of airborne refuelling

capability made them heavily dependent upon the use of forward runways located as close to North America as possible. As a result a network of strategic heavy bomber bases was built up in the extreme northern fringes of the Soviet Arctic in the late 1950's. By 1959 virtually the entire DA long-range bomber force was based on these airfields along the Arctic coastline.[2]

These Arctic bases consisted of eleven main airfields with long runways, located along the entire Soviet Arctic coastline from the Kola Peninsula in the west to the Chukotskoye Peninsula in the Far East. They are still in use today - though no longer as main peacetime bases - and their military nature is indicated by their isolated location, in most cases far from any human activity, and by their long runways exceeding four kilometers. These are necessary for the take-off of heavy bombers and interceptors when these are charged with a full weapons and fuel load but are not necessary for civilian flights. These DA strategic bomber runways are located at:[3]

Runway	Location
Olenegorsk	Kola Peninsula
Belushya	Novaya Zemlya
Nagurskoye SW	Zemlya Frantsa Iosifa
Greem Bell	" " "
Vorkuta East	Mainland coast of the Kara Sea
Sredniy	Severnaya Zemlya
Chekurovka	Mainland coast of the Laptev Sea
Tiksi West	" " "
Markovo	Anadyr Peninsula
Leninka	" "
Urelik	Chukotskoye Peninsula

This does not include other military runways, such as the long runways operated by the Naval Aviation, nor the shorter civil runways located next to the main civilian centres.

Four of the above bomber airbases were located near or in the nordic area:

Olenogorsk
Belushya
Nagurskoye SW
Greem Bell

Due to the predominant role of the LRB force in the Soviet strategic nuclear arsenal these bases constituted vital strategic assets, and the trans-Arctic flight paths of the bombers were of major importance in Soviet planning. As of the mid-1960's the importance of the LRB force declined considerably, and thus the role of these bases probably also diminished. At the same time the bombers had their main bases withdrawn to the central and southern parts of the USSR. Howevere the bases were retained as Forward Operating Bases (FOB) for the strategic bombers, and have continued to play a vital role for the Soviet air-breathing nuclear forces tasked against the CONUS. The DA LRB force has continued to exercise from them right up to the present.

SLBM

The second main Soviet development effort in the 1950's lay in producing concealed launch platforms which could approach close enough to the CONUS to fire their short- and medium-range missiles. This effort led to the initial deployment as of 1956 of an improvised submarine force carrying the first short-range SLBM's. As of 1957 this force was supported by the deployment of the first of a number of improvised cruise missile submarines, capable of firing short range nuclear cruise missiles with a land-attack capability.

The first Soviet operational SLBM was the short-range SS-N-4, with a range of 480 km. It was deployed aboard modified *Zulu* class diesel attack submarines, with the first converted *Zulu* V beginning operations in 1956, carrying two SS-

N-4. By 1960 a total of seven *Zulu* V had been converted. During this time the first *Golf* I SSB and *Hotel* I SSBN were also deployed, both carrying three SS-N-4. These latter two submarines were the first specially designed to carry SLBM's.

The SS-N-4 SLBM force was rapidly built up, and by 1960 it was the second largest element in the Soviet strategic nuclear arsenal. At that time a total of seven converted *Zulu* V class SSB and fourteen *Golf* I SSB and *Hotel* I SSBN were operational. They carried a total of 56 launch tubes, representing 31 % of the total SNDV force. However the initial strategic submarine force remained primitive, and though important was rapidly overshadowed after 1962 by the massive Soviet deployment of ICBM's. It was not before 1968 that the first effective SLBM/SSBN system began deployment, after which the Soviet SLBM force began a steady growth. (See below.)

Nonetheless this initial SSBN force strongly contributed to the strategic importance of the Arctic, since it laid the foundations for subsequent Arctic basing of the large SSBN forces which were to follow. The first SS-N-4 submarines were concentrated to the Northern Fleet bases on the Kola Peninsula,[4] which probably operated all of the first SS-N-4 submarines. Thus the Soviet sea-based strategic nuclear force had a strong Arctic basing orientation already in 1960, and has continued to do so to the present, making the Kola Peninsula one of the key basing areas for the Soviet nuclear arsenal.

In these early years of Soviet SLBM technology, which lasted to the first half of the 1970's, the basing of the SSBN force was determined by the limited range of their SLBM missile systems. This meant that their submarine launch platforms had to be based in areas providing access to their launch areas. The short-range SS-N-4 and medium-range SS-N-5 placed these launch areas in the coastal waters along the US Atlantic and Pacific shores. Thus the SSBN bases had to be placed in areas providing access to these waters. This need to reach the

Atlantic and Pacific persisted even after the deployment of the intermediate-range SS-N-6 SLBM in 1968, since it too could only cover the CONUS if launched from the western central Atlantic and eastern central Pacific. This range factor thus remained a primary determinant of Soviet SSBN basing up to 1972, when the first intercontinental range SLBM became operational. (See below.)

The Soviet Union possessed only two areas providing access to the above SLBM launch areas. One lay in the extreme northwest, along the 400 km long stretch of ice-free coastline on the Kola Peninsula, bordering on Norway. The other lay in the extreme northeast, on the desolate Kamchatka Peninsula off eastern Siberia. Of the two open coastal areas, the Kamchatka option is burdened by its remote location, far from Soviet demographic, industrial and administrative centres, and by its limited overland links with the rest of the country. There is no rail connection to the base,[5] and by road, which is in poor condition, it is roughly 3,700 km to the nearest railway junction at Nagornyj on the BAM line. And this offshoot of the Trans-Siberian Railway line was only completed in 1984. In addition Nagornyj is roughly 1,600 km from Vladivostock, the nearest large naval resupply area. Thus virtually all logistic supplies have to be brought in by air or sea. Since the necessary quantities involved are large, as not only the base itself but also its entire surrounding infrastructure of defensive support bases need to be supplied, it makes this option uneconomical and impractical.

This is not the case with the Kola basing option. This coast was only some 800 km north of Leningrad, to which it was linked by a double-tracked railway and an asphalted two-lane road.[6] In addition Murmansk itself was already a major port and civilian centre with a population of 381,000[7] and an industrial base. There are 19 large military airfields in the region, and extensive naval dockyards both by Murmansk and further east by Arkhangelsk, where the worlds largest submarine production yard is located, at Severodvinsk.[8]

As a result the Kola emerged as the most viable basing option during the early days of the Soviet SLBM force, both its accessibility to the open seas, and its geologistic convenience, contributing towards making it the major basing area for the Soviet sea-based strategic nuclear forces. And with the growth of the importance of the Soviet strategic submarine fleet, the Kola Peninsula began acquiring a central role in the super-power nuclear relationship.

SLCM

In these early days the Soviet Navy also deployed a number of short-range SLCM with a nuclear land-attack capability and which probably had this as their primary in the early 1960's. This was the short range SS-N-3C *Shaddock* SLCM, with a range of 460 km.[9] Subsequent SS-N-3 versions have had a primary tactical antiship role but this first 'C' version was specifically designed as a strategic land-attack missile.

Deployment of the SS-N-3C began in the late 1950's aboard converted *Whisky* class diesel attack submarines. The first operational SS-N-3C were deployed in 1957 aboard one *Whisky* OC ('One Cylinder') SSG, carrying one missile. The following year the first *Whisky* TC ('Twin Cylinder') SSG with two missiles was deployed, and by 1960 the first of the *Whisky* LB ('Long Bin') SSG with four missiles became operational. That year a total of 19 SS-N-3C launchers were available, aboard two *Whisky* LB, five *Whisky* TC and one *Whisky* OC. At that point they represented the third largest force in the Soviet SNDV arsenal, with 10 % of the total force.[10]

All of these converted *Whisky* class SSG were based with the Northern Fleet in 1960.[11] This could be for the same reasons as noted above for the SLBM, but it could also be because they had a dual role, tasked with attacking USN carrier battle

groups operating in the nuclear strike role against the western USSR fromn the Norwegian and possibly Barents Seas. This anti-carrier task would have been a priority mission for the Soviet Navy in the late 1950's, when the USN carriers represented an important nuclear threat to the USSR. Whatever the reason, the Kola basing of the Soviet nuclear SLCM force increased the strategic importance of this part of the Arctic, and since then a major portion of Soviet SSG/SSGN forces have remained based here.

ICBM

Full scale research and development of the ICBM also took place during the late 1950's, with the first operational model fielded in 1960. However this ICBM - the SS-6 *Sapwood* - was primitive and during its operational lifetime between 1960 and 1968 only four missiles were deployed. In 1960 this represented only 2 % of the total SNDV force, which rapidly shrank to only 0.5 % of the force by 1965, three years before the SS-6 was withdrawn. Thus it was never an important element in the Soviet strategic force.

However from an Arctic perspective it was interesting since it was based in the Arctic,[12] and has been the only Soviet ICBM to have been based here. The limited intercontinental range of this system meant that it had to be launched as close to the CONUS as possible. This led to the deployment of four surface launch facilities for the SS-6 along the Soviet Arctic coastline, on the two island groups of Novaya Zemlya and Zemlya Frantsa Iosifa[13] northeast of the Kola.

1961: Introduction and growth of the ICBM force

This second phase in the development of the Soviet strategic nuclear arsenal is characterised by the introduction of the first effective Soviet ICBM's and the very rapid growth of this

force. By 1964 it had become the largest element of the Soviet strategic arsenal and it has kept this position to the present, both in terms of numbers of missiles and numbers of MIRV. The number of intercontinental bombers grew slightly in the early 1960's, peaking in 1964 with 173 operational aircraft, but in relative terms this force was now overshadowed by the ICBM's. During this period the Soviet SLBM force was reinforced by the introduction of the medium-range SS-N-5 SLBM as of 1963, but the overall SLBM force remained relatively primitive and was probably still considered an uncertain and vulnerable component of the strategic arsenal. Finally the short-range SLCM force continued to grow with the addition of the SS-N-3A as of 1962. However this nuclear missile was primarily intended for tactical anti-ship operations, and it is uncertain to what extent the SR SLCM force was included in Soviet strategic nuclear planning for strikes against the CONUS. It probably still remained part of contingency planning, but it is no longer included in this analysis as it would probably have had a very secondary role. Finally one should also note the introduction of the first Soviet IRBM, the 4,100 km range SS-5 *Skean* as of 1961. With the exception of Alaska this missile did not have the range to reach the CONUS from Soviet launch sites and thus is not included here. However one should note that one of its ten basing areas did lie in the Arctic, on the Kola Peninsula south of Murmansk. The other nine were placed along the western and southern Soviet frontiers. The relative proportion of Soviet strategic nuclear delivery vehicles in the 1965 was:

Type	Number	Percent
LRB	163	32.8 %
MR/SR SLBM	110	22.0 %
ICBM (SS-6)	4	0.8 %
ARCTIC TOTAL	**277**	**55.6 %**
ICBM	221	44.4 %
TOTAL	**498**	**100.0 %**

Of these a little over half had an Arctic orientation. Thus the introduction of the effective Soviet ICBM force was reducing the strategic importance of the Arctic. This effect has continued to the present, though the overall number of delivery vehicles and MIRV has grown dramatically.

ICBM

The Soviet ICBM force began a rapid growth and qualitative development as of 1961 when the first SS-7 *Saddler* were deployed. In the following six years a further four ICBM types were deployed: the SS-8 *Sasin* in 1964, the SS-9 *Scarp* Mk. 1 in 1965 and the SS-11 *Sego* Mk. 1 in 1966. During this time the number of missiles also grew by a factor of 90, from 10 ICBM in 1961 to 909 missiles in 1968.

With the exception of the 4 SS-6 *Sapwood* none of these ICBM had an Arctic orientation. They were based in the southern and central parts of the USSR and their extra-atmospheric ballistic trajectory placed their transit routes far above the Arctic airspace. While they did increase the US early warning requirements in the Arctic, leading to the deployment of the BMEWS radar central on Greenland, they did not affect the Arctic significantly in any other way. Thus their development actually helped reduce the strategic importance of the Arctic to both the USSR and the US, but diminishing the relative importance of those strategic nuclear delivery vehicles which retained an Arctic orientation. This has remained the case up to the present.

LRB

The predominance of the LRB force in the Soviet arsenal rapidly declined following the massive deployment of ICBM's after 1961, and by 1965 the LRB only represented 33 % of the total number of delivery vehicles. However the absolute

number of intercontinental bombers continued to grow into the mid-1960's, peaking in 1964 when 173 bombers were operational (30 Tu-95B, 85 Tu-95A and 58 Mya-4A). At the same time the quality of the LRB force improved, with the deployment of the improved *Bear* B (1962) and C (1963) bombers with an extended operational radius of 5,600 km, giving them a truly intercontinental capability. The absolute size of the LRB force remained constant at roughly this level for the next twenty years, but it's relative size in the arsenal shrank strongly. By 1970 they represented 8 % of the total SNDV force, at which level they remained for the next fourteen years, until the deployment of the first Soviet ALCM forces. It was also to take some 20 years before the LRB force received its first new bomber, consisting of the modified Tu-95G in 1984. As a result the strategic importance of the LRB force rapidly declined after its peak in 1960, and was not to grow again until the deployment of the Soviet ALCM force in 1984.

The Arctic basing of the LRB force was also withdrawn in the early 1960's, when most of the heavy bombers were rebased in the western and southwestern USSR, with only a small force remaining on the Kola and along the Arctic coast.[14] By 1962 these had also been relocated to the central USSR,[15] and since then the bulk of the long range bomber force has been based in western Russia, the Ukraine and the Far East, with four main operating bases in the west and one in the far east.[16]

However though the heavy bombers were rebased to central Russia they retained their dependence upon the trans-Arctic flight paths to reach their CONUS targets as well as the need for final take off from points located as close to the CONUS as possible. Thus the Arctic airfields remained vital for their missions and were kept at an operational status, but now as Forward Operating Bases (FOB), providing dispersal sites for the bombers during alert and forward support for their Arctic transit. Thus the Arctic bases have remained an essential part of the operational capability of the LRB force, and they have

maintained a steady exercise pattern involving these bases up to the present. However the relative importance of this leg of the strategic arsenal declined significantly up to the mid-1980's.

SR/MR SLBM

In absolute terms the size of the Soviet SLBM force doubled between 1960 and 1965, growing from 56 launch tubes in 1960 to 110 launch tubes in 1965. At the same time the new medium range SS-N-5 *Sark* SLBM was introduced in 1964, which with its 1,400 km range improved the capabilities of the SLBM weapons system. However the relatively vulnerable launch platform, the *Hotel* II class SSBN, and limited target coverage of the missile, continued to make this weapons system unsatisfactory, particularly in comparison to the capabilities of the new ICBM force. As a result SLBM development remained slow and did not match the far more rapid growth of the ICBM force. Thus the relative size of the SLBM force fell to 22 % of the strategic delivery vehicles in 1965.

Approximately 80% of this force - or an estimated 89 SR/MR SLBM launchers - were deployed with the Northern Fleet.[17] 1965 marked the beginning of the deployment of SLBM submarines to the Pacific Fleet, which now included an estimated 20% of the SSBN/SSB force. This led to a split of the Soviet SSBN force, with approximately two thirds operating from the Kola and one third from the Kamchatka Peninsula. This division prevailed up to the early 1990's, though as we shall see the Kola SSBN's became far more important as of the early 1980's.

1968: Introduction and growth of the first powerful SLBM force

The third phase in the development of the Soviet strategic delivery force came in 1968 with the deployment of the SS-N-6 *Serb*/Yankee class SLBM/SSBN system. This was the first truly effective Soviet SLBM/SSBN system and marked the beginning of a steady quantitative and qualitative buildup of the Soviet SSBN forces. This continued to the early 1990's, leading to a major increase of the strategic importance of the Arctic waters. At the same time the qualitative and quantitative growth of the ICBM continued, with the force multiplying by a factor of six between 1965 and 1970. In 1970 the relative proportion of Soviet strategic nuclear delivery vehicles was:

Type	Number	Percent
SR/MR/IR SLBM	311	16.9 %
LRB	157	8.6 %
IC SLBM	6	0.3 %
ARCTIC TOTAL	474	25.8 %
RVSN ICBM	1,361	74.2 %
TOTAL	1,835	100.0 %

The share with an Arctic orientation had now dropped to roughly one quarter, indicating a corresponding drop in the importance of the Arctic in Soviet offensive nuclear strategy.

ICBM

The Soviet ICBM force remained the predominant force in the strategic arsenal and continued a strong quantitative and qualitative growth. The number of missiles multiplied six times between 1965 and 1970, and one new type, the SS-13 *Savage* Mk. 1, was deployed in 1969. With roughly three-quarters of all delivery vehicles in 1970 it was now the largest component

of the Soviet strategic arsenal. As before this force did not have an Arctic orientation, reducing the strategic significance of the Arctic further.

SLBM

The Soviet SLBM force began a rapid growth in numbers and status following the deployment in 1968 of the intermediate range SS-N-6 *Serb* SLBM and its specially configured *Yankee* class SSBN. The SS-N-6/*Yankee* system provided a major boost over the limited capability and considerable vulnerability of the first and second generation SS-N-4 and SS-N-4 SLBM/SSBN force. The *Yankee* I class SSBN had an advanced capability for accurate navigation and missile launch, while its survivability was increased with enhanced silencing techniques and electronic systems. Secondly the SS-N-6 missile itself had a far greater range than its predecessors, with the first version (SS-N-6 Mk. 1) capable of reaching targets 2,400 km away, and the Mk. 2 and 3 versions deployed in 1973 and 1974 respectively, with ranges of 3,000 km. The patrol zones of the *Yankee* class still lay in the Atlantic and Pacific off the US east and west coasts,[18] but now the Soviet SSBN force could cover the entire CONUS for the first time. It also meant that their launch areas were now both further removed from the US coasts and could encompass a far greater expanse of ocean, thereby increasing the chances of the *Yankee* escaping detection and localisation.

The first 48 SS-N-6 were deployed aboard three *Yankee* SSBN's in 1968. Within four years, by 1972, 26 *Yankee* class SSBN's with 416 SS-N-6 launchers were operational, and the full force of 34 *Yankee* SSBN's with 544 launchers was deployed by 1976. During this time the SS-N-5 force grew at a slower pace, as the SS-N-4 was phased out and its SSB/-SSBN reconfigured to carry the SS-N-5. In 1970 the seaborne force thus consisted of 311 launch tubes for short, medium and intermediate SLBM:

Type	Number	Range (km)
SS-N-6 Serb M1	224	2,400
SS-N-5 Sark	45	1,400
SS-N-4	42	480

229 SLBM launchers are estimated as deployed with the Northern Fleet, or 74 % of the full force.[19] Thus roughly three quarters of the SSBN force operated from the Arctic bases on the Kola and would have had to transit the Barents Sea enroute to their launch stations off the east coast of the US.

The SS-N-6/*Yankee* system represented a major advance in Soviet SLBM/SSBN technology and noticeably boosted the status and role of the SLBM forces in Soviet strategic planning. This is both indicated by Soviet statements and by command changes. As of the late 1960's the senior Soviet leadership began referring to the SSBN force in the same context as the RSVN ICBM forces, and as an integral part of the long range striking power of the Soviet Union. And in 1969 or 1970 - once the SS-N-6/*Yankee* programme was well underway - the Commander of the Northern Fleet S.M. Lobov was promoted to Admiral of the Fleet. This was the first time a Soviet officer reached this rank while serving in an operational command, and provides a strong indication of both the high ranking of the SLBM force in Soviet strategic planning as of this date, and of the primary role played by the Northern Fleet. One should also note that in 1972 or 1973 Admiral Lobov was promoted further when he was appointed to the General Staff as the highest ranking naval officer ever to be assigned to that body, with the same rank as the Chief of the General Staff, General of the Army Kulikov.[20]

In 1970 the Soviet Navy also began trials of its first intercontinental range SLBM. This was the 7,800 km range SS-N-8 Mk. 1 mounted aboard a modified *Hotel* III class trials SSBN with six launchers.[21] The *Hotel* III was deployed with the Northern Fleet[22] operating from the Kola and Severodvinsk

facilities. These missiles were probably not yet operational but formed part of the evaluation and trials programme for the SS-N-8. They heralded the beginning of a surge in the number and importance of the Soviet SLBM forces which was to take place in the following years and continue steadily to the 1990's.

LRB

The size of the heavy bomber force fell slightly, as no new systems were constructed and the existing aircraft were lost to attrition and the missiles were tested. As a result the intercontinental bomber force was now the smallest, and its relative strength was to continue to decline until the early 1980's. In 1970 the force consisted of 157 aircraft:

Type	Number	Radius (km)
Tu-95 Bear B/C	75	5,600
Tu-95 Bear A	30	
Mya-4 Bison A	52	

During this period the DA heavy bomber basing, transit routes and Arctic forward support requirements remained basically unchanged, but the relative importance of this force declined strongly.

1972: Introduction of the intercontinental-range SLBM

The fourth technological breakthrough in the development of the Soviet strategic nuclear force was the operational deployment of the intercontinental range SLBM as of 1972. This was the SS-N-8 *Sawfly* Mk. 1, mounted in twelve launchers aboard the new *Delta* I class SSBN. It led to a very rapid additional buildup of the SLBM force, boosting the growth of the SLBM force already underway as part of the SS-N-6/*Yankee* programme. As a result the size of the SLBM force doubled from

311 launch tubes in 1970 to 771 launch tubes in 1975, of which 162 were intercontinental range SS-N-8 deployed aboard twelve *Delta* I and II SSBN's.[23] All of the modern SS-N-8 force was operating with the Northern Fleet from the Kola basing complex:[24]

Total	Class	Year	Northern Fleet SSBN	Northern Fleet Lnchr	Northern Fleet Launchers
3	Delta II	1975	3	48	100 %
9	Delta I	1972	9	108	100 %
1	Hotel III	1969	1	6	100 %
12			12	162	100 %

At the same time the intermediate-range SS-N-6 force had continued to grow, increasing the size of the transit-oriented SR/MR/IR SLBM force to 609 launch tubes aboard 60 SSBN/SSB. 66 % of this force, or 406 launchers, were deployed with the Northern Fleet:[25]

Total	Class	Year	Northern Fleet SSBN	Northern Fleet Lnchr	Pacific Fleet SSBN	Pacific Fleet Lnchr	Northern Fleet Launchers
33	Yankee I	1967	22	352	11	176	66 %
7	Hotel II	1963	5	15	2	6	71 %
13	Golf II	1964	8	24	5	15	61 %
7	Golf I	1960	5	15	2	6	71 %
60			40	406	20	203	66 %

As a result a total of 568 SLBM launchers were based on the Kola, representing three quarters of the full force (74 %). However one should note that since the Soviet Navy had now built up a sizeable and modern intercontinental and intermediate range SLBM force it is likely that the older *Hotel* and *Golf* class SSBN's armed with medium and short range SLBM were reallocated a theatre role for Europe and the Far East.

The development of the intercontinental SLBM system was of major importance for the Arctic for two reasons. In the first

place it boosted the viability of the SSBN force in Soviet strategic planning since it increased the security of the SLBM's by eliminating the need to transit to launch stations off the US east and west coasts. Instead SSBN patrol and launch stations could now be placed in the Soviet inner waters near their main bases, increasing both security and readiness. Since a major part of the Soviet SLBM force was already operating from the Arctic bases on the Kola this meant that the increase in the strategic significance of the SLBM force in general also boosted the importance of the Arctic.

Secondly, the new Soviet intercontinental range SLBM force became specially focussed on the Arctic, since one of its principal new patrol and launch zones came to lie in the Arctic waters, in the ice-free areas of the Barents and Greenland seas.[26] This led to an initial concentration of all Soviet *Delta* class IC SLBM carriers to the Kola bases, which provided the only access to the Arctic patrol zones. Subsequently a part of the *Delta* force was also assigned to the Pacific Fleet, with roughly one-third operating in the Sea of Okhotsk from the Kamchatka bases.

According to the US Navy no *Delta* class SSBN were detected passing south of the GIFUK gap since 1975.[27] This need to protect the Soviet SSBN force was reinforced during the 1970's by the growing USN and RN ASW capabilities. In this extremely high technology field the US has made considerable advances since the war, making those parts of the oceans where the US and allied forces can maintain sea control increasingly dangerous to Soviet submarines.[28] With the development of the SOSUS system in the late 1950's[29] and the regular improvements on the system since then, access into the Atlantic and Pacific became increasingly hazardous for Soviet submarines. SOSUS arrays were reportedly concentrated in two areas off the Soviet strategic submarine bases; along the Aleutian Islands covering the Talinskaia Bay base, and in the GIFUK gap,[30] covering access from the Kola basing complex to the Atlantic. The hydrophone belts, which are linked to

sophisticated computer systems at local shore stations which in turn are integrated into computer systems on the continental US, are capable both of identifying individual submarines by their accoustic signature and of narrowing down their location to an area within a radius of some 50 nautical miles.[31] According to Rear Admiral John Grove, RN, who was chief *Polaris* executive in the British Ministry of Defence, the NATO detection capabilities in the north Atlantic are highly effective: "As far as is known Britain detects every Soviet submarine in the area and the Soviets detect no British submarines."[32] Another report states that the US SOSUS array between Greenland and Scotland is able to detect every Soviet submarine that enters the Atlantic from Murmansk.[33]

The development of the IC SLBM had four major consequences for the Arctic area. Firstly it increased the overall importance of the SSBN force. Secondly it made the SSBN bases on the Kola more important. Thirdly it added a new element to the Arctic strategic environment by making the nordic Arctic waters a primary Soviet SSBN patrol zone, and fourthly, as result of this, it boosted the development of the Northern Fleet general purpose forces, since the Soviet Navy now could argue that they were needed to protect the vital SSBN patrols in the Arctic waters. This was probably one of the main arguments which permitted Admiral Gorshkov to continue his strong buildup of the Soviet Navy and the Northern Fleet in particular.

1974: Introduction and growth of the MIRVed ICBM

The next major technological breakthrough in the Soviet strategic arsenal was the deployment of the SS-19 *Stiletto* Mk 1. as of 1974. This was the first Soviet MIRVed ICBM, leading to a virtual exponential growth in the number of independently targetable ICBM warheads between 1974 and 1980. During this period three MIRVed ICBM systems were deployed:

1974	SS-19 *Stiletto* Mk. 1	6 MIRV
1975	SS-17 *Spanker* Mk. 1	4 MIRV
1977	SS-18 *Satan* Mk. 2	8 MIRV

The number of independently targetable ICBM warheads tripled, surging from 1,587 in 1974 to 5,002 in 1980. From then on the quantitative growth steadied down, growing to 6,545 in the next ten-year period up to 1990. (See Graph 1.1.) However the strong qualitative development continued, with an additional four MIRVed ICBM systems deployed between 1980 and 1987:

1982	SS-17 *Spanker* Mk. 3	4 MIRV
1982	SS-18 *Satan* Mk. 4	10 MIRV
1982	SS-19 *Stiletto* Mk. 3	6 MIRV
1987	SS-24 *Scalpel* Mk. 1	10 MIRV

This development would have led to a reduction in the relative size of the other elements of the strategic nuclear forces had it not been accompanied after 1977 by the MIRVing of the SLBM force. A comparable development took place for the LRB force fter 1984, when the intercontinental bombers were boosted with their own 'MIRV', the AS-15 ALCM, which permitted each ALCM bomber (*Bear* H and *Blackjack*) to strike eight separate targets. (See below.) As it was it temporarily boosted the predominant position of the ICBM force. Thus the relative size of the components of the Soviet strategic nuclear force in the following years was (measured in terms of independently targetable warheads):[34]

	1974	1977	1980	1984	1987	1990
ICBM	65.6 %	61.7 %	70.8 %	69.6 %	64.0 %	59.5 %
SLBM	27.9 %	34.2 %	27.0 %	28.7 %	31.0 %	33.1 %
LRB	6.5 %	4.1 %	2.2 %	1.7 %	5.0 %*	7.4%*

* Including ALCM load of 8 ALCM per Bear H and Blackjack.

Intermediate-range bombers

A second new development in the Soviet nuclear forces in 1974 was the deployment of the Tu-26 *Backfire* B with the Long Range Aviation Armies. This was an intermediate-range bomber with a primary theatre role, but which it is argued could have operated against strategic targets in the northern CONUS.[35] The *Backfire* B has an unrefuelled operational radius of 4,430 km, which permits it to reach New Foundland on two way missions from forward airbases in the Soviet northwestern Arctic, and brings it all the way to Washington State from bases on the Anadyr Peninsula in eastern Siberia. The *Backfire* B deployed with the DA were also fitted with an aerial refuelling probe which made air-to-air tanking possible, further extending their reach. According to one US expert the Tu-26 has a two-way range to cover almost all of the CONUS, if staged via Arctic bases, uses inflight refuelling and maintains a subsonic limited low-level flight profile.[36] This theme is repeated in the *Soviet Military Power* series, which indicates that the unrefuelled operational combat radius of the *Backfire* from Soviet Arctic staging bases covered Newfoundland in Canada over the eastern US and the northern Midwest and most of the Northwest of the CONUS itself. With inflight refuelling the *Backfire* radius extended to cover all of the US except Florida.[37] This US concern over the possible strategic role of the *Backfire* is also indicated by the US desire to include it in the SALT II strategic arms limitations talks. While this could have been a negotiating tactic there is no doubt that there also was a degree of genuine concern involved.

As a result this intermediate range bomber can also be included as a potential strategic nuclear weapon against the northern parts of the CONUS, though its primary role was no doubt as a theatre bomber. The *Backfire* B force deployed in 1975 was still relatively small, consisting of some 25 bombers - less than one regiment - and its basing is not clear. The regiment was probably still in an initial shakedown stage,

outfitting in the western USSR, but under all circumstances would have had to transit the Arctic to reach the CONUS. To do so it could have dispersed to one or more of the eleven Arctic DA FOB, though it is unclear whether these had been equipped at this stage to support the *Backfire.*

Intercontinental-range bombers

During this time the LRB force remained basically unchanged in terms of size and with few qualitative improvements. One development involved the gradual introduction of a strategic airborne tanker force in the early 1970's, when some 50 older Tu-95 *Bear* A and Mya-4 *Bison* A were converted into airborne tankers[38] for the DA heavy bombers. During this time the LRB force probably retained a strategic nuclear role, but there are indications that the faith placed in this system as a strategic weapon was declining, and that they may have been increasingly oriented towards theatre missions.[39]

1977: Introduction and growth of the MIRVed SLBM

The next major breakthrough came in 1977 with the introduction of the first MIRVed SLBM. This was the SS-N-18 *Stingray* Mk. 1, with a 6,500 km range and 3 MIRV, deployed aboard the new *Delta* III class SSBN. Following the usual pattern the new systems were first deployed to the Kola, after which a smaller number were based in the Pacific. By 1980 ten *Delta* III armed with 16 SS-N-18 each had been deployed, of which 80 % were based on the Kola. At the same time the deployment of the older non-MIRVed intercontinental range SS-N-8 continued, actually tripling the number of SLBM launchers since 1974. In all there were 453 IC SLBM launch tubes aboard 35 SSBN in 1980. Of these, 307 launchers were deployed with the Northern Fleet, representing 68 % of the full SLBM force:[40]

Total	Class	Year	Northern Fleet SSBN	Northern Fleet Lnchr	Pacific Fleet SSBN	Pacific Fleet Lnchr	Northern Fleet Launchers
1	Golf V	1980	1	1	-	-	100 %
10	Delta III	1975	8	128	2	32	80 %
4	Delta II	1975	4	64	-	-	100 %
18	Delta I	1972	9	108	9	108	50 %
1	Hotel III	19	1	6	-	-	100 %
1	Golf III	19	-	-	1	6	0 %
35			23	307	12	146	68 %

On the basis of their strong numerical and qualitiative growth the IC SLBM probably had a major priority in Soviet strategic planning, on par with that accorded to the ICBM force. As noted above the deployment of the MIRVed SLBM also marked the beginning of a surge in the number of SLBM warheads, which kept this force the second largest in the Soviet SNDV arsenal, and maintained its strategic importance. With 80% of the *Delta* III force operating with the Northern

Fleet, and 68 % of the all *Delta* classes in the same fleet, the Northern Fleet constituted one of the key elements in the Soviet strategic arsenal and made the associated Arctic area of similar importance in the US-Soviet nuclear relationship.

During this time the development and deployment of medium- and intermediate range SLBM's ceased. The last *Yankee* class SSBN armed with 16 SS-N-6 Mk 3 was delivered in 1976, and after this the size of this force steadily diminished. One new IR SLBM was fielded in 1977, but it was never series produced. This was the SS-N-17 *Snipe*, of which twelve were deployed aboard a modified *Yankee* II class SSBN. However the overall MR/IR SLBM force now began a steady decline as they were replaced by the IC SLBM. The short range SS-N-4 were phased out by 1979, and the SS-N-5 and SS-N-6 SLBM's began a slow decline as their platforms reached the limit of their operational life and were not replaced. By 1980 there were 533 launch tubes on 49 SSBN/SSB. 350 launchers were deployed with the Northern Fleet, representing 66 % of the full force.[41]

DA IRB

Finally the force DA *Backfire* intermediate range bombers which first emerged in the mid-1970's continued to grow. In 1980 75 *Backfire* were operating with the long range Aviation Armies, probably organised in two full regiments and one which was still fitting out, located at three main airbases. On the basis of open sources two of these were located in the western central USSR and one in the Far East. In addition the *Backfire* regiments also employed five Arctic FOB, of which two - Olenegorsk and Vorkuta East - were located in the vicinity of the nordic area:[42]

Main Bases	Area
Sol Tsy	200 km south of Leningrad
Kozelskh	west of Moscow
Belaya*	by Lake Baikal

* Estimate, based on Map.

A further three *Backfire* main bases were also in use but these were operated by the Naval Aviation and hence are not included here.

Forward Bases	Area	
Olenogorsk	Kola Peninsula	Western Arctic
Vorkuta East	Arctic coast, by Kara Sea	Western Arctic
Tiksi West	Arctic coast, by Laptev Sea	Central Arctic
Mys Schmidta	Arctic coast, by Chukchi Sea	Eastern Arctic
Leninka	Anadyr Peninsula, by Bering Sea	Eastern Arctic

If we assume a roughly even dispersal of *Backfire* to the five Arctic FOB then roughly 40% of the force would have staged via bases in the vicinity of the nordic area. It is interesting to note that all the DA *Backfire* FOB listed in *Soviet Military Power 1985* were located along the Arctic, facing the US.

By 1980 the first MA naval strike *Backfire* had also been deployed, but they are not included here. Though these aircraft can carry out nuclear land-attack missions they have not been fitted with aerial refuelling probes and hence could only reach the CONUS on one-way missions. While this option cannot be excluded it nonetheless seems unlikely given the large number of alternative Soviet nuclear delivery vehicles which have a far better capacity for striking at CONUS targets, and hence this system is not included here.

1981: Introduction of under-ice MIRVed SLBM

The next major breakthrough came with the deployment of the first SLBM/SSBN system specially designed for under-ice operations. This was the SS-N-20 *Sturgeon*, armed with up to 10 MIRV, deployed aboard the radically new *Typhoon* SSBN class. It was followed in 1985 with the similarly ice-strengthened *Delta* IV with the SS-N-23 *Skiff* SLBM. These were very large and very expensive weapons systems, and indicative of a major development (and investment) effort.

This led to a continued rapid growth of the size of the IC SLBM force, and an even greater increase in the number of independently targetable warheads carried on the SSBN's. By 1985 a total of 592 IC SLBM launchers were deployed in all, of which 382 operated with the Northern Fleet, representing 64 % of the full SLBM force:[43]

			Northern Fleet		Pacific Fleet		Northern Fleet
Total	**Class**	**Year**	**SSBN**	**Lnchr**	**SSBN**	**Lnchr**	**Launchers**
1	Delta IV	1985	1	16	-	-	100 %
3	Typhoon	1983	3	60	-	-	100 %
14	Delta III	1975	8	128	6	96	57 %
4	Delta II	1975	4	64	-	-	100 %
18	Delta I	1972	9	108	9	108	50 %
1	Hotel III	1969	1	6	-	-	100 %
1	Golf III	1977	-	-	1	6	0 %
42			26	382	16	210	64 %

The deployment of the *Typhoon* and *Delta* IV SSBN's had particularly strong consequences for the Arctic region. These two SSBN types are specially constructed for operations under the Arctic ice and particularly for operations in the marginal ice zone. This capability has been developed partly in order to exploit the vast space in the Arctic Ocean for dispersal, and partly to help concealment from accoustic and other sensors by hiding in the Arctic marginal ice zone. (See Section 2. for details.)

The Arctic Ocean provides important additional security to the Soviet SSBN force, which probably is the reason for the emphasis upon Arctic under-ice SSBN operations. This may have begun with *Delta* III class SSBN already in the 1970's,[44] but has been strongly boosted with the deployment of the special under-ice *Typhoon* and *Delta* IV SSBN's in the early 1980's. The *Typhoon* is the first submarine in the world which appears to have been constructed specifically for under-ice operations,[45] notably with a specially constructed and reinforced conning tower and superstructure. In addition, since its deployment it has not left the arctic region north of the Kola, and there are reports from the US Navy that it has developed a special 'ice-pick' tactic, drifting beneath the ice-pack for prolonged tours of under-ice duty.[46]

This new Arctic concealment mode was considered necessary because of perceived advances in US and British forward ASW, particularly from SSN's, which it was thought posed a significant threat to the older *Delta* I-III classes operating in the open water SSBN 'Bastions' in the Sea of Okhotsk in the Far East and the Greenland and Barents Seas north of the nordic region. The hunter-killer SSN is generally evaluated as constituting the ideal ASW platform.[47] Both British and US SSN's regularly operate in the immediate proximity of Soviet naval bases, including in the Barents Sea, the White Sea and the Sea of Okhotsk with one of their primary missions being the tracking of Soviet SSBN's.[48] While the Soviet Navy has tried to neutralise this danger through the deployment of considerable conventional naval forces for strategic defensive ASW in the Barents and northern Norwegian Seas and for sea denial missions further south, they have apparently been unable to establish a sufficiently secure filter against SSN's. Since ASW is a high-technology field par excellence, and particularly dependent upon sophisticated computers, the Soviets are at a disadvantage in this area and have trouble preventing USN and RN strategic ASW operations even in their inner home waters.[49]

The second danger to the Soviet IC SSBN's operating in the Sea of Okhotsk and in the Barents and Kara Seas stems from western ASW mine systems, notably the CAPTOR deepsea mine. The Barents Sea and Sea of Okhotsk are both located over the continental shelf, and are thus shallow, with an average depth of between 200-300 metres and 200 metres respectively. This makes them suitable for mining with the advanced CAPTOR ASW mine, which can be deployed from aircraft (notably the B-52G has been modified for this task).[50] This mine sinks to the sea bottom after deployment where it lies in inert mode and is extremely difficult to detect. Its advanced hydroaccoustic sensors permit it to be programmed to attack specific types of submarines, and thus for instance only SSBN's, or even only one particular category of SSBN, possibly right down to just one particular ship.[51]

The shift in the patrol profile of the Soviet SSBN force from the central Atlantic and Pacific to the Arctic was of major significance for the nordic area since the Soviet naval bases on the Kola were the only facilities providing access to the new patrol zones in the Arctic Ocean. Access to the Arctic Ocean for the Pacific Fleet - from the SSBN bases on the Kamchatka Peninsula or in Vladivostock is extremely difficult and dangerous because of the need to transit the Bering straits. Submerged SSBN passage - or even surfaced passage - is hazardous due to the shallow waters (the route would involve ca 1,500 km during which bottom depth is between 70-80 metres)[52] and shifting surface ice ridges, and partly because transit would run paralel to the US SOSUS stations on the Aleutians, and subsequently along the US controlled Alaskan coast. Finally, the distance between Alaska and Siberia at the narrowest stretch of the straits is only 90 km,[53] making it an easily mined choke point.

This has hitherto led to the deployment of every one of the new *Typhoon* and *Delta* IV SSBN's to the Kola bases, considerably boosting their strategic importance. It has also

boosted the strategic importance of the nordic Arctic waters, which has increased the focus of USN and RN offensive hunter-killer SSN's on the area. Thus a new USN emphasis upon major under-ice training for the SSN force was announced in 1982 by the then Chief of Naval Operations, Admiral James Watkins.[54] This has in turn reinvigorated the development and deployment of VMF general purpose forces to the same areas in a defensive mode, seeking to support the security of the new SSBN 'Bastions'.

As a result the Soviet use of waters adjacent to the nordic area as SSBN patrol zones has gradually increased since the early 1970's, and today all the most modern SSBN are exclusively focussed on this area. This development is shown in the table below:

Deployment	Gen.	SLBM	SSBN	Patrol Area	Arctic force
1958-1967	1st	SS-N-4/5	Golf I/II	US coastal waters	80 %
			Hotel I/II	US coastal waters	80 %
1968-1975	2nd	SS-N-6/17	Yankee I/II	US offshore	66 %
1972-1982	3rd	SS-N-8	Delta I/II	Barents,Greenland Seas Sea of Okhotsk	66 %
1973-1983	4th	SS-N-18	Delta III	Barents, Greenland Seas Sea of Okhotsk	80 %
1983-...	5th	SS-N-20/23	Typhoon	Arctic Ocean	100%
			Delta IV	Arctic Ocean	100%

For the moment this leaves only the Kola as a suitable basing area. However the emergence of the Arctic Ocean as a deployment area could, in future years, also reduce its importance in this respect. The Kola as a primary basing area for the strategic nuclear submarine force was chosen primarily on the basis of considerations which antedate the 'Arctic Age'. Thus accessibility to the open seas, which the SSBN's initially needed due to limited SLBM ranges, and subsequently (in the Barents) due to difficulties in operating and especially launching their missiles from under the ice, no longer apply to the latest generations of SSBN. With a new priority and capability emerging for under-ice operations there is no reason why a

new base could not be built in an area chosen for its optimal submarine transit routes to the ice-covered arctic, and its maximal distance from US access routes to the Arctic and to the surveillance stations beginning some 100 km from the present SSBN bases at Zaïda Guba, Olenya Guba and Gremikha. Potential SSBN basing areas in the inner Soviet Arctic coastline east of the Kola are available, and the economic development of the area has improved logistic overland links. In addition, from a geomilitary perspective, such a location would be far more secure than the Kola or Kamchatka, and might even, were the submarine pens (and adjacent submarine construction yards) to be built underground, be kept undetected from the west for some time. Such a base may even already exist. What is certain is that the arguments in favour of such a base are sufficient to make its future construction possible. Should it take place it would reduce the strategic importance of the Kola, and thereby reduce the strategic heat by the nordic region. But for the time being open sources do not indicate that such an alternative Arctic base has been established.

During this period the Soviet intermediate and medium range SLBM force continued its gradual decline. In 1985 there were 387 launch tubes on 35 SSBN/SSB.[55] 188 of these launchers were deployed with the Northern Fleet, representing 49 % of the full medium and intermediate-range SLBM force.[56]

They thus continued to contribute to the strategic importance of their Arctic basing and transit areas, though their role was steadily diminishing. The diminishing Arctic share also reflects how older equipment was transferred to secondary deployment areas, while the most modern IC SLBM's were concentrated to the Kola.

1984: Intermediate-Range ALCM

The next major breakthrough in the Soviet SNDV arsenal came with the deployment of the 3,000 km intermediate-range AS-15 ALCM as of 1984. This strongly boosted the capability and status of the strategic intercontinental bomber force, and marked its resurgence after over twenty years of stagnation. It also led to the increased strategic importance of the Arctic airspace. The AS-15 was the first new air to ground system deployed with the heavy bombers since 1961, when the short range AS-3 *Kangaroo* first saw service. The AS-15 strongly boosted the capability of the heavy bombers by permitting the standoff delivery of the ALCM at some 2,500 - 3,000 range from the target. This both increased the bombers survivability and complicating the US defence against the air-breathing threat considerably. These developments marked the beginning of a new era for the Soviet heavy bomber forces, and though still small in 1985 they were to grow rapidly in size quality in the last half of the 1980's. This development was also to involve the nordic region, since the forward support and transit routes of the invigorated heavy bomber force partly involved this area.

The first Soviet intermediate range ALCM began deployment in 1984 and by 1985 200 of the AS-15 *Kent* ALCM had been deployed with the DA heavy bombers. The AS-15 is a dedicated strategic weapons system, specially designed for standoff operations from the Tu-142 *Bear* H. They have an independent flight profile in their final approach to the target, and both this flight, and their transit aboard the *Bear* H would take place over the Arctic.

The deployment of the AS-15 coincided with the fielding of two new variants of the Tu-95 *Bear*. Though still modest in size the heavy bomber force was boosted by the introduction of the Tu-95 *Bear* G as of 1983 and particularly the Tu-142 *Bear* H in 1985. While not new aircraft types but modified

versions of the original Tu-95 *Bear* B/C bombers from the early 1960's they were strongly modernised. The *Bear* H was also specially designed to carry the new AS-15 *Kent* intermediate range ALCM. By 1985 the number of bombers was only increased marginally to 160, since the old *Bear* A were retired, but it improved the capability of the DA LRB considerably:

Type	Number	Radius (km)
Tu-142 Bear H	25	8,200
Tu-95 Bear G	20	8,240
Tu-95 Bear B/C	55	5,600
Tu-95 Bear A	30	
Mya-4 Bison A	30	

The increase in the size of the DA LRB force was marginal but the improved capability, especially when the associated introduction of the AS-15 ALCM is taken into account, was noticeable. The new bombers also permitted the phaseout of the obsolescent Mya-4 *Bison* and Tu-95 *Bear* A (both 30 years in service).

During this period the DA heavy bomber basing, transit routes and Arctic forward support requirements remained basically unchanged, and the former estimate of roughly 40% of the bombers operating near the nordic area in wartime is considered to remain unchanged.

According to various open sources the Moscow Air Army, which controls all strategic intercontinental nuclear bombers, operated from five main bases in the inner USSR in the mid-1980's. Four of these were located in the western part and one in Central Asia:[57]

Aircraft	Airfield	Location
Tu-142 Bear H	Dolon	Kazhakstan, northeast of Sary Shagan
Tu-95 Bear	Vladimirovka	Russia, northwest of the Caspian Sea
Tu-95 Bear	Chernovoye	Ukraine, between Kiev and Moscow
Tu-95 Bear	Palmira	Ukraine, by Kiev
Tu-95 Bear	Lukhovitsy	Russia, by Moscow

The above only provides specific aircraft types were these have been indicated in the sources. In 1985 all *Bear* H were probably based at Dolon, fitting out as one regiment.

According to one open source the Moscow Air Army also controlled five Arctic FOB,[58] of which three were located close to the nordic area:[59]

Aircraft	Airfield	Location
Tu-95 Bear B/C	Olenogorsk	Kola Peninsula
Tu-95 Bear	Belushya	Novaya Zemlya
Tu-95 Bear	Vorkuta East	Coastline by Kara Sea
Tu-95 Bear	Mys Schmidta	Chukotskoye Peninsula, eastern Siberia
Tu-95 Bear	Urelik	" "

The airfield at Olenogorsk is a major DA FOB,[60] to which Tu-95 *Bear* B/C bombers regularly deploy for training purposes.[61] The same applies to the long runway at Belushya on Novaya Zemlya wich also is a FOB for DA heavy bombers.[62] These FOB are kept at a high level of readiness, and the Moscow Air Army heavy bombers routinely deploy units for regular training at the Arctic airfields, which are kept continuously cleared of snow.[63] This indicates that they continue to play an operational role, and in wartime they would probably be used as forward operating locations for those aircraft tasked for crossing the Arctic against north American targets. One should note that Dolon is located just west of the exact centre of the USSR. From this location all Arctic staging airfields can be reached. The closest is Vorkuta East, followed by those on Novaya Zemlya and on the Kola.

Finally the DA intermediate range *Backfire* force maintained a steady growth, almost doubling in size from 75 aircraft in 1980 to 130 in 1985. The quality of the force was also

improved with the deployment of the improved *Backfire* C version as of 1983. These bombers remained primarily theatre systems, but retained a capability to strike strategic targets in the CONUS.

1985: Mobile ICBM

An important development in the Soviet SNDV arsenal took place in 1985, when the first land-mobile ICBM was fielded. This was the road-mobile SS-25 *Sickle*, followed in 1987 by the rail-mobile SS-24 *Scalpel*, carrying 10 MIRV. This development was important since it reinforced the credibility of the Soviet ICBM force. For some time the fixed silo-based ICBM's had become vulnerable to the growing accuracy of the US ICBM force, and hence the survivability of the land-based element of the Soviet nuclear triad had come into doubt. This was particularly disturbing since this was the largest element of the Soviet strategic nuclear arsenal, and could have been one of the factors behind the investment in the Arctic oriented SSBN force.

However the deployment of the ICBM on mobile platforms made it harder to find and hence increased its survivability. During the 1980's the fixed Soviet ICBM silos had become increasingly vulnerable to US ICBM and later SLBM strike despite their hardening, because of the improvements in the US missile accuracy. The development of the mobile ICBM's were designed to counter this, reinforcing the security of the ICBM leg of the triad. By boosting the viability of the ICBM force the relative growth in the importance of the nuclear forces with an Arctic orientation was partially arrested.

1987: Intermediate-Range SLCM

Another important development in the late 1980's was the deployment of the first intermediate range SLCM, the SS-N-

21. This was probably primarily intended as a theatre weapon, but with its 3,000 km range could have been used for strategic strikes against the CONUS. Most of these SLCM submarines were deployed with the Northern Fleet on the Kola, and their transit routes could have involved the Arctic Ocean if they were assigned launch positions against the CONUS in the Canadian Arctic archipelago. (This is dealt with below.)

1990: Status of the Soviet SNDV force and its Arctic orientation

By 1990 the Soviet Union operated seven nuclear weapons types with a strategic capability. Eight of these had a potential Arctic orientation, representing 66 % of the total Soviet Strategic Nuclear Delivery Vehicle (SNDV) force. This is shown on Table 6.

Table 6.

Type	Number	Percent	Nordic %	Nordic % of Total	Land	Air	Waters
					Bases		Launch
VMF IC SLBM	720	17.4 %	72 %	12.5 %	FOB	Transit	
DA IR ALCM	640	15.5 %	40 %	6.2 %	Bases		Transit
VMF IR SLCM	230	5.5 %	81 %	4.4 %	Bases		Transit
VMF IR/MR SLBM	210	5.1 %	51 %	2.6 %	FOB	Transit	
DA IRB	190	4.6 %	40 %	1.8 %	FOB	Transit	
DA LRB	185	4.5 %	40 %	1.8 %			
TOTAL	2,725	65.9 %		36.2 %			
RVSN ICBM	1,408	34.1 %					

The evolution of the Soviet strategic nuclear arsenal which began in the 1970's continued through to the 1990's. The ICBM force remained the largest but with the steady cuts in missiles it now only held a little over a third of the total SNDV inventory. However its role in Soviet planning remained strong, as indicated by the deployment of a second land-mobile ICBM as of 1987.

The intercontinental SLBM force remained in second place, having grown by some 20 %, from 592 SLBM in 1985 to 720 in 1990. It was now followed by the intermediate range ALCM force, which with 640 delivery vehicles was the third largest in the arsenal. This number should be taken in conjunction with the heavy bomber forces, which still only held 5 % of the total SNDV's, but was boosted qualitatively by the continued deployment of the *Bear* H and the brand new supersonic Tu-160 *Blackjack* as of 1988. Taken together the DA LRB/IR ALCM force now had the second largest number of SNDV. As noted above the development of both the IC SLBM and the DA LRB/ALCM force strongly involved the Arctic.

An important new deployment in the late 1980's was the intermediate range SLCM submarines. These first became operational as of 1987 with the SS-N-21 *Sampson* SLCM, which was a dedicated nuclear land-attack SLCM. It was deployed very rapidly and by 1990 there were an estimated 218 launchers on at least four different SSGN/SSN classes. It was accompanied by the testing of the SS-NX-24 SLCM as of 1988. This was a supersonic intermediate-range land attack SLCM, but it remained limited to its testbed SSGN and was not depoyed en masse. Nonetheless this IR SLCM force had an estimated 6 % of the full SNDV arsenal. They had a major impact on the Arctic since the majority were based on the Kola and partly because the Arctic Ocean may have become a major transit route to launch stations in the Canadian Arctic archipelago.

The three smallest weapons types consisted of the intermediate/medium range SLBM force, which had been steadily shrinking since the deployment of the IC SLBM, and the DA IRB and RVSN IRBM forces. The latter two only had a secondary strategic nuclear role. The intermediate range *Backfire* force continued to grow, but the SS-20 IRBM was rapidly withdrawn as a result of the INF Treaty, which stipulated that all SS-20's were to be eliminated by June 1991.

Intercontinental-range SLBM

In 1990 the USSR deployed 720 launch tubes for intercontinental SLBM aboard 48 SSBN.[64] 516 launchers were deployed with the Northern Fleet, representing 72 % of the full force:[65]

Total	Class	Year	Northern Fleet SSBN	Northern Fleet Lnchr	Pacific Fleet SSBN	Pacific Fleet Lnchr	Northern Fleet Launchers
6	Delta IV	1985	6	96	-	-	100 %
6	Typhoon	1983	6	120	-	-	100 %
14	Delta III	1975	8	128	6	96	57 %
4	Delta II	1975	4	64	-	-	100 %
18	Delta I	1972	9	108	9	108	50 %
48			33	516	15	204	72 %

One should also note the qualitative priority assigned to the Northern Fleet SSBN force, which still operated all of the most modern *Delta* IV and *Typhoon* SSBN classes constructed since 1980, and which therefore had an even greater proportion of SLBM warheads. Thus the importance of the Kola SSBN bases continued to grow, as did the Arctic waters in which they patrolled.

Intermediate-range ALCM

The 640 intermediate range ALCM were the third largest force in the Soviet SNDV arsenal in 1990, with 16 % of all delivery vehicles. Their Arctic orientation remained unchanged, and thus the growth of this force increased the strategic importance of the Arctic airspace.

Intermediate-range SLCM

The introduction of the intermediate range SLCM has strongly involved the Arctic through the basing, transit and launch zones of the majority of the associated submarine launch platforms. In 1990 the VMF deployed 220 launch tubes for intermediate range SLCM with a primary nuclear land-attack capability, aboard 35 submarines.[66] 178 launchers were deployed with the Northern Fleet, representing 81 % of the full force:[67]

Total	Class	Year	Northern Fleet SSGN	Northern Fleet Lnchr	Other Fleets SSGN	Other Fleets Lnchr	Northern Fleet Launchers
1	Yankee Trials	1983	1	12	-	-	100 %
2	Yankee Notch	1988	2	40	-	-	100 %
5	Akula	1985	2	12	3	18	40 %
3	Sierra	1984	3	18	-	-	100 %
24	Victor III mod.		16	96	4	24	
35			28	178	7	42	81 %

The SS-NX-24 has been deployed aboard one modified *Yankee* class SSGN, from which it has been undergoing trials since 1988.[68] However its operational status is uncertain as it has not been deployed further and there are reports that it has involved considerable technical difficulties, not least involving the fact that its considerable size requires the construction of a special SSGN for it if it is to be deployed.

Intermediate- and medium-range SLBM

By 1990 the the number of medium and intermediate SLBM launchers had fallen to 210, aboard 15 SSBN/SSB.[69] 108 launchers were deployed with the Northern Fleet, representing 51 % of the full force.[70]

The six Northern Fleet *Yankee* I were withdrawn from their strategic role and assigned a European theatre role in 1990. This has also been indicated by their patrol pattern, since they have not transitted the GIFUK gap since and hence appear to have dropped their former patrol zones off the US east coast. This may mean that they also patrol in the Arctic sea areas north of the Kola.

Intermediate-range Bombers

The growth of the DA intermediate range *Backfire* bombers continued. With 190 in service in 1990 it was a relatively small but modern force, representing 5 % of the strategic arsenal. The basing and FOB network for the DA *Backfire* force had not changed since 1985, and thus its potential Arctic role remained unchanged.

Intercontinental range-bombers

The size of the DA intercontinental bomber force had only grown slightly by 1990, to 185 bombers, but its quality was improved through the introduction of new bombers and particularly with the deployment of the AS-15 *Kent* IR ALCM. With 5 % of the total SNDV force it was one of the smallest elements in the Soviet strategic arsenal, but this is misleading. If numbers of bombers are added to numbers of ALCM it was the second largest. It operated six different types of heavy bombers, as the three oldest systems were being phased out

and replaced by the two modern *Bear* H and *Blackjack* bombers:

Type	Number	Radius (km)
Tu-160 Blackjack	20	7,300
Tu-142 Bear H	80	8,200
Tu-95 Bear C/G	60	8,240
Tu-95 Bear A/B	25	5,600

The basic basing infrastructure of the Moscow Air Army had not changed significantly since 1985 and its strong Arctic orientation continued. The *Bear* H had begun routine excercises from the Kola FOB alongside the older heavy bomber types which trained here. However no DA heavy bombers were permanently based on the Kola by 1990. The *Bear* H began staging through Kola FOB for refuelling during Arctic training flights as of 1987. The Kola runways are also routinely used by the DA strategic tankers, operating modified Mya-4 *Bison* tankers in 1987 and modern Il-78 *Midas* tankers from the Kola in 1990 for inflight refuelling of the *Bear* H on Arctic training missions against the CONUS.[71]

Notes

1. Nuclear land-attack cruise missiles are normally classified as theatre nuclear forces, however if they were used against the CONUS they would have a marked strategic role. Since they clearly could be used for this purpose they are included as potential strategic nuclear forces in this study. In should also note that certain land-attack SLCM probably were specifically designed for use against the CONUS. This is for instance the case with the SS-N-3C in the early 1960's, possibly remaining tasked for this role up to the 1980's. (POLMAR, 1976: pp. 51-52, 91, and COCHRAN, ARKIN, NORRIS & SANDS: pp. 171-172.) While the relative strategic importance of follow-on SLCM with a primary or secondary nuclear land-attack capability probably declined, they remain a powerful potential strategic nuclear threat against the CONUS.

2. *The Military Balance 1959*: p. 4.

3. *Global Navigation and Planning Chart*: GNC-1. Edition 6. Defence Mapping Agency, June 1972.

4. Data for Soviet SSBN/SSB deployment for 1960 is difficult to find thus this table is based on estimates by the author. The deployment of the *Zulu* V is extrapolated from: BREEMER: *Estimating the Soviet...*, 1987: pp. 40-43. which mentions that the *Zulu* V firing trials were held at Severodvinsk (by Arkhangelsk) and Severomorsk (just north of Murmansk) and that the USN observed *Zulu* V SSB's returning from patrol in the northeastern Atlantic as of 1959. Deployment of the *Golf* I class is also extrapolated from Breemer, p. 42, who cites a former member of the Northern Fleet missile testing and evaluation centre, Mikhail Turetsky who served in the centre from the mid-1950's to 1962, and who refers to missile test with both the *Zulu* V and the *Golf* I. The assumption that all *Golf* I and *Hotel* I operated with the Northern Fleet is made onthe basis of: 'Utvikling av de sovjetiske styrker i vårt interesseområde de siste 20 år.' *Aktuelle Forsvarsspørsmål*, Nr. 0185, Januar 1985: Vedlegg 5. This publication gives data for the Northern Fleet SSBN/SSB force in 1966. The very large percentage of *Golf* and *Hotel* submarines in the Northern Fleet that year, coupled with the fact that the Northern Fleet has continuously received the latest

strategic submarines first, indicates that all submarines in these two classes were probably deployed with the Northern Fleet in 1960.

5. *Asian Security 1979*. Tokyo, Research institute for Peace and Security, September 1979: p. 55.

6. Brodin, Katarina: *Säkerhetspolitisk Utveckling i Norden*. Stockholm, SSLP, 1st ed., 1982: p.9.

7. Brodin, Katarina: *Säkerhetsolitisk Utveckling i Norden*. Stockholm, SSLP, 1st. ed., 1982: p.9.

8. *Soviet Military Power*: 1984. Washington, Dept. of Defense, 3rd. ed., April 1984: p. 92.

9. COCHRAN, ARKIN, NORRIS & SANDS: pp. 171-172.

10. COCHRAN, ARKIN, NORRIS & SANDS: pp. 171-172.

11. Data for the deployment of Soviet SS-N-3C SSG in 1960 is difficult to find. The figures in this table are extrapolated from: 'Utvikling av...', 1985: Vedlegg 6, which provides data for the situation in 1966, and from which one can work backwards. In 1966 all *Whisky* Long Bin are given as being deployed with the Northern Fleet, and hence it is likely that the first two of this conversion type went to the Northern Fleet in 1960. Deployument data for the *Whisky* Twin Cylinder and One Cylinder are not available, but it is likely that they were deployed to a Fleet providing potential transit access to strategic targets in the CONUS since they were converted to carry a strategic land-attack SLCM, and by 1960 were carrying the SS-N-3C. BREEMER (pp. 52-53) also cites references by TURETSKY which indicate that the missile was under testing with the Northern Fleet.

12. One of the major Soviet ICBM testing centres is located at Plesetsk, some 200 km. due south of Arkhangelsk. However since this is not an operational ICBM launch field it is not included here.

13. POLMAR: p. 44.

14. *The Military Balance 1960*: p. 3. *The Military Balance 1962-1963*: p. 55.

15. *The Military Balance 1962-1963*: p. 4.

16. URBAN, Mark L.: "Major re-organisation of Soviet Air Forces." *International Defense Review*, Vol. 16, No. 6, June 1983: p. 756. 'Soviet Air Force re-equipment.' *Jane's Defence Review*. Vol. 4, No. 3, 1984: pp. 249-251. *Militærbalansen 1984-1985*: p. 98. *Soviet Military Power: 1984*. Washington, Dept. of Defense, 3rd ed., April 1984: pp. 21, 27-29.

17. 'Utvikling av de sovjetiske styrker i vårt interesseområde de siste 20 år.' *Aktuelle Forsvarsspørsmål*, Nr. 0185, Januar 1985: Vedlegg 5. *Zulu* V deployment is extrapolated from: BREEMER: *Estimating the Soviet...*, 1987: pp. 40-43.

18. *Soviet Military Power*. September 1981: Map on pp. 84-85.

19. Detailed data for Soviet submarine deployment in 1970 is not available from open sources. The force distribution in this table is extrapolated from *Militærbalansen 1977-1978*: p. 79. and Utvikling av... 1985: Vedlegg 6. and on estimates based on their deployment in 1965 and 1975.

20. POLMAR: p. 90.

21. COCHRAN, ARKIN, NORRIS & SANDS: pp. 106-107, 136-151. McGWIRE: "The Rationale...": pp. McGWIRE: "The Evolution...": pp. McGWIRE: "Comparative Naval...": pp.
The Military Balance, editions from 1959 to 1990-1991. ROHWER: 'Strategische Konzepte...' pp. 220, 232.

22. *Militærbalansen 1985-1986*, 1985: p. 144.

23. COCHRAN, ARKIN, NORRIS & SANDS: pp. 106-107, 136-151. McGWIRE: "The Rationale...": pp. McGWIRE: "The Evolution...": pp. McGWIRE: "Comparative Naval...": pp.
The Military Balance, editions from 1959 to 1990-1991. ROHWER: 'Strategische Konzepte...' pp. 220, 232.

24. *Militærbalansen 1977-1978*. p. 79.

25. The Y, H and GII deployment is extrapolated from Mærbal 77-78: p. 79. and from 'Utvikling av...': 1985: Vedlegg 5.

26. *Soviet Military Power 1987*. Map on pp. 128-129.

27. *International Herald Tribune*, 15 January 1979.

28. *Evaluation of Fiscal Year 1979 Arms Control Impact Statements: Toward More Informed Congressional Participation in National Security Policymaking*. Y4.In 8/16:Ar 5/7. Report prepared for the Subcommittee on International Security and Scientific Affairs, of the Committee on International Relations, US House of Representatives. Foreign Affairs and National Defense Division, Congressional Research Service, Library of Congress. Washington, D.C., Jan. 3, 1979: pp. 103-119. Wilkes, Owen: "Strategic anti-submarine warfare and its implications for a counterforce first strike." *SIPRI Yearbook of World Armaments and Disarmament 1979*, Stockholm, Almqvist and Wiksell, 1st. ed., 1979: pp. 427-448.

29. Villar, G.R.: "Weapons Development at Sea". *RUSI and Brassey's Defence Yearbook 1983*. Ed. by RUSI, London, Brassey's Publishers Ltd., 1st ed., 1983: p.214.

30. Wit, Joel S.: "Advances in Antisubmarine Warfare". *Scientific American*, Vol. 244, No. 2, February 1981: pp. 32-33, 37. Wilkes: "Strategic anti-submarine warfare...", 1979: pp. 428-440.

31. Colvin, Robert: "Review of US ASW Capabilities, Requirements, and Doctrine". *Workshop on anti-Submarine Warfare*, Program for Science and International Affairs, Harvard University, April 11, 1974: p. 6.

32. Baltimore Sun, 31/12-80.

33. *Evaluation of Fiscal Year 1979 Arms Control Impact Statements...*, 1979: p. 110.

34.

	1974	1977	1980	1984	1987	1990	
ICBM		1,587	2,363	5,002	6,420	6,452	6,545
SLBM		675	1,311	1,910	2,646	3,130	3,636
LRB		157	157	157	160	500*	815*
	Sum:	2,419	3,831	7,069	9,226	10,082	10,996

* Including 8 ALCM per Bear H and Blackjack.

Source: Table 1.2.
COCHRAN, ARKIN, NORRIS & SANDS: *Soviet Nuclear Weapons*, 1989: pp. 102-103, 106-107.
The Military Balance 1987-1988: p. 207.
The Military Balance 1990-1991: p. 213.

35. This was a recurrent theme in the annual US Dept. of Defense publications *Soviet Military Power* during the 1980's.

36. POLMAR: p. 131.

37. *Soviet Military Power 1984*. Map on p. 28.

38. POLMAR: pp. 49, 80.

39. POLMAR: pp. 80-81.

40. *Militærbalansen 1980-1981*: pp. 10, 92.

41. *Militærbalansen 1980-1981*: pp. 10, 92.

42. *Soviet Military Power 1984*: April 1984: Map, p. 28. *Soviet Military Power 1986*: March 1986: Map, p. 23. Global Navigation and Planning Chart, GNC-1. Edition 6, Defence Mapping Agency, June 1972. COCHRAN, ARKIN, NORRIS & SANDS: pp. 60-61.

43. *Militærbalansen 1985-1986*: pp. 22, 28, 144.

44. Østreng, Willy,: "The Strategic balance and the Arctic Ocean." *Cooperation and Conflict*, Vol. XII, No. 1, 1977: pp. 41-62. Østreng, willy: *Polhavet i Internasjonal Politikk*. Studie AA:H012. Oslo, Fridtjof Nansen Stiftelsen pa Polhøgda, 1st ed., 1979: pp. 445.

45. See chapter 4.

46. See chapter 4.

47. See chapter 8.

48. See chapter 8.

49. See chapter 8.

50. Cooper, Bert H.: *Maritime Roles for Land-Based Aviation.* Report No. 83-151 F. Washington D.C., Congressional Research Service, August 1, 1983: pp. 27-28.

51. IT: "Strategic anti-submarine warfare...", 1979: p. 444.

52. TORÉN, Ragnar: *Picture Atlas of the Arctic.* Amsterdam/London/New York, Elsevier Publishing Company, 1st ed., 1969: pp. 1-5.

53. *Polar Regions Atlas*, GC 78-10040. Langley, Central Intelligence Agency, May 1978: 67.

54. See chapter 8.

55. COCHRAN, ARKIN, NORRIS & SANDS: pp. 106-107, 136-151. McGWIRE: "The Rationale...": pp. McGWIRE: "The Evolution...": pp. McGWIRE: "Comparative Naval...": pp. *The Military Balance*, editions from 1959 to 1990-1991. ROHWER: 'Strategische Konzepte...' pp. 220, 232.

56. *Militærbalansen 1985-1986*: pp. 22, 28, 144.

57. COCHRAN, ARKIN, NORRIS & SANDS: p. 60. Pringle, Peter and William Arkin: *SIOP: Nuclear War from the Inside.* London, Sphere Books, 1st ed., 1983: pp. 225. JNC-10. *Jet Navigation Chart.* Defence Mapping Agency, June 1983. Map Supplement to *Soviet Military Power 1990.*

58. COCHRAN, ARKIN, NORRIS & SANDS: p. 60. This may include some of the five Arctic *Backfire* FOB. However presumably the Moscow Air Army could also disperse to more of the long Arctic runways listed earlier.

59. JNC-10. *Jet Navigation Chart.* Defence Mapping Agency, June 1983. Map Supplement to *Soviet Military Power 1990.* COCHRAN, ARKIN, NORRIS & SANDS: p. 60.

60. Holst, Johan Jorgen: "Norwegian Security Policy for the 1980's". *Cooperation and Conflict*, Vol. XVII, No. 4, December 1982: p. 212.

61. Ries, Tomas: *Norwegian military perspective of the Nordkalotten area.* Norge Rapport V-B/84, Unpublished personal research material of the author), February 1984: p. 58. (Interview with senior Norwegian military personnel.)

62. Ries, Tomas: *Norwegian military...*, p 59.

63. Ries, Tomas: *Norwegian military perspective of the Nordkalotten area.* Norge Rapport V-8/84, Unpublished personal research material of the author), February 1984: p. 57. (Interview with senior Norwegian military personnel.)

64. COCHRAN, ARKIN, NORRIS & SANDS: pp. 106-107, 136-151. McGWIRE: "The Rationale...": pp. McGWIRE: "The Evolution...": pp. McGWIRE: "Comparative Naval...": pp. *The Military Balance*, editions from 1959 to 1990-1991. ROHWER: 'Strategische Konzepte...' pp. 220, 232.

65. *Militærbalansen 1990-1991*: pp. 40, 46, 193.

66. RIES: *Strategic Implications...*, 1990: pp. 40-41,45-46, 81, 85-86. *Militærbalansen* for the years 1987-1988 to 1990-1991.

67. *Militærbalansen 1990-1991*: pp. 40, 46, 191, 193.

68. RIES: *Strategic Implications...*, 1990: pp. 40-41.

69. COCHRAN, ARKIN, NORRIS & SANDS: pp. 106-107, 136-151. McGWIRE: "The Rationale...": pp. McGWIRE: "The Evolution...": pp. McGWIRE: "Comparative Naval...": pp.
The Military Balance, editions from 1959 to 1990-1991. ROHWER: 'Strategische Konzepte...' pp. 220, 232.

70. *Militærbalansen 1990-1991*. Oslo, DNAK, 1990: pp. 40, 46, 193. 'Utvikling av de Sovjetiske Styrker...', 1985: Vedlegg 5. WATSON & WATSON: 1989: pp.

71. *Militærbalansen 1987-1988*: p. *Militærbalansen 1990-1991*: p. 168.

5. Soviet Strategic Air Defence Forces in the Arctic

The Troops of the National Air Defence (Voyska Protivovozdushnoy Oborony Strany - VPVO) are the second most important service in the Soviet Armed Forces, charged with defending the state against destruction by attack from the air and space.[1] In 1990 the VPVO was divided into five main components:[2]

IAPVO	Fighter Aviation of Air Defence	1948
ZRV	Zenith Rocket Troops	1954
RTV	Radio Technical Troops	1955
PRO	Antirocket Defence	1958
PKO	Antispace Defence	196?

The service has been organised along these basic lines since the mid-1950's. The first three branches have generally been the most important and those which have had an impact on the Arctic through their bases and operations, though some of the PRO EW and battle-management radars have also been deployed to the Soviet Arctic coastline. Today the VPVO is both a major element in Soviet strategic planning and has a major Arctic and nordic focus.

In the period between 1979 and 1981 a major reorganisation of all the Soviet Air Forces took place, as part of the shift to the new TVD command structure. This also affected the VPVO. The VPVO national command structure was partially decentralised and the regional VPVO Headquarters directing the IAPVO, ZRV and RTV forces partly integrated with the newly established regional TVD commands. As a result the former ten IAPVO Armies under centralised VPVO control were reduced to five, each corresponding to one of the new TVD commands:[3]

1.	PVO Army	Western TVD
2.	PVO Army	Northwestern TVD
3.	PVO Army	Southwestern TVD
4.	PVO Army	Central Strategic TVD
10.	PVO Army	Far Eastern TVD

Each PVO Army was further broken down into Air Defence Districts, corresponding geographically to the Military Districts of the Front forces. The Air Defence Districts are provided with administrative and logistic support by the Military District in which they are located,[4] but are under the direct operational command of their respective PVO Air Army,[5] which in wartime is linked to the local TVD HQ.[6] At the same time the IAPVO and ZRV were reinforced by the transfer of fighter aircraft and SAM systems from the Front Air Forces and the Ground Forces to the VPVO.

The new organisation was intended to integrate all Soviet military forces beneath the strategic nuclear level into the new regional TVD command system, thus providing the capability for massive coordinated combined arms operations in the new Theatres of Strategic Military Operation. However the new organisation proved incapable of meeting the needs of the VPVO strategic air defence mission, and with the increase in the US nuclear bomber/ALCM threat the VPVO was partially released from the TVD command system. The integration between the regional VPVO headquarters and the TVD commands were relaxed and the by the mid-1980's the centralised VPVO national command system was re-established in a slightly modified form.[7] However the regional organisation consisting of five PVO Armies was retained.[8]

The table on the next page shows the evolution of VPVO weapons technology and numbers between 1960 and 1990. In the early 1960's the US air-breathing threat shifted from the deployment of medium-range bombers deployed around the Soviet perimeter to the deployment of mainly intercontinental

B-52 strategic bombers, which had their main readiness stations on the CONUS and which had the Arctic as one of their main transit areas. This also shifted a major part of the Soviet air intercept effort to forward defence over the Arctic, which led to a major deployment of VPVO interceptors to the Soviet far north.

During the 1980's the VPVO held a high priority in Soviet defence planning, as indicated by the renewed investment in the development and deployment of advanced interceptors, AEW/AWACS aircraft and SAM systems for the VPVO. (See table on next page.) However in the late 1980's the VPVO came under increasing political pressure from the new Soviet régime under Gorbachev, notably when the light plane piloted by Mathias Rust managed to penetrate Soviet air defences and land on the Red Square in Moscow in May 1987.

This development was largely linked to the apparent increase in the US emphasis upon air-breathing strategic nuclear delivery systems, including both bombers but also and particularly the ALCM, which was fully deployed by the mid-1980's. However the immediacy of the US strategic nuclear threat was reduced in September 1991, when President Bush announced the unilateral reductin in the state of readiness of US strategic nuclear forces. This included the removal of all US strategic nuclear bombers from day-to-day alert status and the removal of their weapons to storage areas.

Evolution of the VPVO, 1960 - 1990 [9]

	GENERATION	SYSTEM	1960	1970	1975	1980	1985	1990
IAPVO	1st	MiG-15 *Fresco*	3,700	1,000	150	50	-	-
		MiG-17					-	-
		MiG-19 *Farmer*		350	200	-	-	-
	2nd	Su-9 *Fishpot* B	100	750	700	300	-	-
		Su-11 *Fishpot* C					-	-
		Yak-25 *Flashlight*	150	200	n.a.	n.a.	-	
		Su-15 *Flagon*		400	850	800	200	500
		Yak-28P *Firebar*		350	350	300	90	-
		Tu-28P *Fiddler* B		150	150	150	90	-
	3rd	MiG-23 *Flogger* B				650	430	850
		MiG-25 *Foxbat* E			200	300	300	350
	4th	MiG-31 *Foxhound* A					75	350
		Su-27 *Flanker*						210
		TOTAL	4,000	3,200	2,600	2,550	1,200+	2,315
		Tu-126 *Moss*			9	9	9	
		Il-76 *Mainstay*					4	10
ZRV*	1st	SA-1 *Guild*	3,200	3,200	3,200	3,200	2,875	1,900
		SA-2 *Guideline*	1,000	4,600	3,500	2,800	2,800	2,400
	2nd	SA-3 *Goa*		1,800	1,200	1,400	1,250	1,000
		SA-5 *Gammon*		1,100	1,600	1,900	2,000+	1,950
	3rd	SA-10 *Grumble*				30	520	1,700
		SA-12 *Gladiator*						n.a.
		TOTAL	4,200	10,700	11,800	12,520	9,500	8,650

* Launchers counted.

Table 1. Organisation of the 2. PVO Army in the northwestern USSR, 1990

2. PVO Army

Arkhangelsk ADD HQ Arkhangelsk		**Baltic ADD** HQ Riga	
IAPVO:[10]	270 interceptors 13 active bases	IAPVO[11]	170 interceptors 5 active bases
2 regt	60 Su-27 *Flanker* B	n.a.	Su-27 *Flanker* B
3 regt	90 MiG-31 *Foxhound* A	n.a.	MiG-31 *Foxhound* A
2 regt	60 MiG-25 *Foxbat* E	1 regt	30 MiG-25 *Foxbat* E
2 regt	60 Su-15 *Flagon* E/F	2 regt	50 Su-13 *Flagon* F
ZRV:[12]	75 SAM groups	ZRV[13]	200 SAM groups
	SA-2 *Guideline*		SA-2 *Guideline*
	SA-3 *Goa*		SA-3 *Goa*
	SA-5 *Gammon*		SA-5 *Gammon*
	SA-10 *Grumble*		SA-10 *Grumble*

The 2. PVO Army 1990-1991

The 2. PVO Army is responsible for the strategic air defence of the Soviet Union in the Northwestern TVD. It consists of two Air Defence Districts, the Arkhangelsk ADD with headquarters in Arkhangelsk and the Baltic ADD headquartered in Riga. The Arkhangelsk ADD covers the same area as the Leningrad MD and the Baltic ADD covers the Baltic MD. Table 1. on the next page shows the organisation and ORBAT of the 2. PVO Army in the northwestern USSR.[9]

The Arkhangelsk ADD faces the most important Arctic transit routes for the US strategic nuclear bomber forces, and thus has a major responsibility for the VPVO Arctic air defence operations. It is thus of major importance to the Soviet strategic air defence effort as well as a major military factor in the Arctic.

The Arkhangelsk Air Defence District

In 1990 the Arkhangelsk ADD operated nine IAPVO regiments with 270 interceptors:[10]

2 regt60 Su-27 *Flanker* B
3 regt90 MiG-31 *Foxhound* A
2 regt60 MiG-25 *Foxbat* E
2 regt60 Su-15 *Flagon* E/F

These aircraft operated from twelve active airbases in the Arkhangelsk ADD:[11]

LOCATION	BASE	INTERCEPTORS
Yamal Peninsula	Kamennyy	n.a.
Novaja Zemlya	Belushya	n.a.
By Plesetsk	Kotlas South	1 regt MiG-25 Foxbat[12]
Kola	Koshkajaur	1 regt Su-27 Flanker B
Kola	Maljaur	1 regt MiG-31 Foxhound A
Kola	Monchegorsk	1 regt Su-15 Flagon F
By Arkhangelsk	Andozero	n.a.
By Arkhangelsk	Yagodnik	1 regt MiG-31 Foxhound A[13]
Karelian ASSR	Engozero	n.a.
Karelian ASSR	Girvas	n.a.
Lake Ladoga	Nurmalitsy	n.a.
N of Leningrad	Gromovo	n.a.

In addition two very long Soviet runways are also located on the Arctic island archipelago of Zemlya Frantsa Iosifa, east of Svalbard. They are not listed as IAPVO bases but are optimally located for far forward Arctic air intercept missions:[14]

Zemlya Frantsa Iosifa	Greem Bell
Zemlya Frantsa Iosifa	Nagurskoye Southwest

Three of the Arkhangelsk ADD IAPVO airbases are located just north of Leningrad, probably intended for the medium range air defence of this strategic target. Two airbases are located by Arkhangelsk. One of these bases one regiment of long range MiG-31 *Foxhound* A interceptors, almost certainly for long-range Arctic air intercept missions. During alert or in wartime it probably deploys north to one of the Kola bases and/or to one of the three Arctic island bases of Belushya, Greem Bell or Nagurskoye Southwest. The second airbase by Arkhangelsk could operate medium-range interceptors for the area defence of the vital strategic targets at and around Severodvinsk. A further two airbases are located in the northeastern end of the Air Defence District, at Belushya and

Kamennyy, probably intended for long range air defence covering the central Arctic.

One should also note that there is a particularly heavy concentration of additional airbases on the Kola Peninsula. All in all there are 17 large military airfields and 1 civilian airfield on the Kola, of which only 50% are in use in peacetime.[15] Three of them are the active IAPVO bases, (Koshkajaur, Maljaur and Monchegorsk); three are Naval Aviation airbases (Severomorsk, Olenegorsk and Luostari); and two are Frontal Aviation airbases. The Moscow Air Army also stages Tu-142 *Bear* H training exercises through Olenegorsk on a routine bases.

This means that there are another nine military airfields on the Kola which are not in use in peacetime. They are however kept at a continuous state of very high operational readiness, with permanent maintenance personnel keeping them swept from snow, etc. This means that in an alert or in wartime the Soviet Union could very rapidly at the least double the number of combat aircraft based on the Kola. A part of this reinforcement could also involve IAPVO units flown up from further south.

Materiel

The Arkhangelsk ADD has consistently had a high priority for receiving the latest air defence equipment. This is reflected in its present ORBAT which includes the most modern interceptors, SAM systems and AWACS in the Soviet forces. Since 1980 it operates two regiments with MiG-25 *Foxbat* E, designed for long-range, high-altitude, high-speed operations and with a partial look-down/shoot-down capability.[16] Since 1982 three interceptor regiments have converted to the MiG-31 *Foxhound* A,[17] also a very long-range interceptor with a full look-down/shoot-down capability.[18] The most modern IAPVO interceptor, the Su-27 *Flanker* B, began deployment to

the Arkhangelsk ADD in 1986 and since then two regiments have completed conversion.[19] This interceptor is also specifically designed for the VPVO and optimised for long range operations with a full look-down/shoot-down capability.[20] The table below provides an overview of the modernisation of the Arkhangelsk ADD since 1980:[21]

Arkhangelsk ADD materiel 1980-1990.

YEAR	LOCATION	SIZE	SYSTEM	COMMENT
1988	Kola		Il-76 *Mainstay*	operational
1988	Kola	1 regt	Su-27 *Flanker* B	deployment underway
1986	Kola	1 regt	Su-27 *Flanker* B	deployment began
1985	Kola		SA-10 *Grumble*	deployment began
1984	Kola		Il-76 *Mainstay*	test flights begin
1984	Kola		GCI	New command and radar system
1982	Kola	1 regt	MiG-31 *Foxhound* A	deployment began
1982	Arkhangelsk	1 regt	MiG-31 *Foxhound* A	deployment began
1980	n.a.	1 regt	MiG-25 *Foxbat* E	deployment began

The new Su-27 and MiG-31 interceptors are supported in their long range operations by airborne command and surveillance systems. During the late 1970's these initially consisted of the relatively ineffective Tu-126 *Moss* AEW aircraft, of which a number operated from the Kola. In the 1980's they have been supplemented by the second-generation Il-76 *Mainstay* AWACS, with a far superior aribome command and surveillance capability. Four Il-76 prototypes began trials in the early 1980's.[22] Il-76 trials on the Kola began in 1984,[23] and by 1987 two to four Tu-126 *Moss* AEW or Il-76 AWACS periodically operated from the Kola.[24] Production of operational Il-76 models began in the late 1980's,[25] coinciding with an increase in Il-76 *Mainstay* operations from the Kola. They were now providing forward command and surveillance support for long range air defence operations beyond the range of the ground based C3I centres.[26] By 1990 the Il-76 *Mainstay* AWACS was fully operational with the 2. PVO Army, which operated ten *Mainstay* in the Arkhangelsk ADD,[27] of which a number routinely operated on the Kola.[28] They were supported by 5 Il-20 ELINT aircraft based in the Arkhangelsk ADD.[29]

The introduction of these systems enhanced the capability of the IAPVO to carry out strategic and tactical low-level intercept, and the forward airborne C31 capability of the Il-76 for the first time permitted effective IAPVO long range tactical air superiority missions. The AWACS/interceptor teams for strategic and tactical missions involve the MiG-31 and Su-27 interceptors operating with the Il-76.[30] It is again significant that all of these latest systems have been allocated to the Arkhangelsk Air Defence Sector almost immediately upon coming into service.[31]

During the 1980's a new ground-based air defence control and warning system was also installed on the Kola. Work on the new system began in 1984 and was completed in the late 1980's.[32] it is probably linked to the new emphasis on low-level point defence, combined with the introduction of the SA-10 SAM battalions as of 1985.

ZRV (SAM Troops.)

The Arkhangelsk ADD also operates an extensive SAM network, designed for point defence of key targets in the Air Defence District as well interception of low-level aircraft and ALCM. In 1990 the Arkhangelsk ADD ZRV controlled some 75 SAM groups, operating:[33]

SA-2 *Guideline*
SA-3 *Goa*
SA-5 *Gammon*
SA-10 *Grumble*

The SA-10 *Grumble* is an advanced Soviet SAM system, reportedly effective against cruise missiles.[34] The SA-10 began deployment to the Kola in 1985,[35] replacing the old SA-2 *Guideline* missiles. By 1990 several SA-10 battalions were operational on the Kola, deployed for the defence of the main naval bases.[36] Finally one should note there are reports that the

2. PVO Army is presently being reinforced by air defence systems being withdrawn from Central Europe, of which a part are being redeployed to the northwestern USSR.[37]

RTV (Radio-technical Forces.)

Because of its location the Arkhangelsk ADD also contains a number of important Ballistic Missile Early Warning (BMEWS) facilities as well as elements of the ABM defence system of the PRO. These include one older first generation *Hen House* BMEWS radar against ICBM and SLBM attack, located at Olenegorsk, (the 2. PVO Army operates a second *Hen House* radar at Novgorod in the Baltic ADD).[38] The Arkhangelsk ADD also operates two of the nine Soviet second-generation modern phased-array BMEWS radars, which also are used as part of the ABM battle management system. They are located at:[39]

Olenegorsk[40]	BMEWS/ABM
Pechora[41]	BMEWS/ABM

The Kola *Hen House* and both phased array BMEWS stations are directed towards the Arctic, to provide early warning of ballistic missile attack and to track incoming bombers.

Forces on the Kola

Approximately 100 IAPVO interceptors are based on the Kola,[42] operating in three regiments from three airbases:

1 regt	30 Su-27 *Flanker* B	1986
1 regt	30 MiG-31 *Foxhound* A	1982
1 regt	30 Su-15 *Flagon* E/F	early 1970's

The oldest IAPVO interceptors on the Kola are the medium range Su-15 *Flagon* F. They are designed for medium-range

intercept missions in the inner air defence zone, operating under very tight control from ground-based command centres. The Su-15 have been based on the Kola for some time, and in 1978 it was an Su-15 *Flagon* which intercepted and shot down the civilian airliner KAL 007 over the central Kola.[43]

The next most modern IAPVO interceptor based on the Kola is the MiG-31 *Foxhound* A. This is a fourth generation long-range interceptor with a true look-down/shoot-down capability. It is designed for very long range intercept missions in the outer air defence zone over the Arctic, operating against B-52G/H ALCM carriers prior to launch and against low-level ALCM. The MiG-31 *Foxhound* A regiment deployed to the Kola between 1982 and 1983,[44] replacing the older second generation Tu-28P *Fiddler* B long-range interceptors on the Kola.

The MiG-31 was followed by the Su-27 *Flanker* B, which began deployment to the Kola in 1986,[45] and was operational by 1988.[46] The Su-27 *Flanker* B is the most advanced interceptor in service with the IAPVO. It has a true look-down/shoot-down capability and is also designed for very long range intercept missions and against cruise missiles. In the Arkhangelsk ADD it would operate primarily in the outer air defence zone over the Arctic against B-52G/H and ALCM.

ARKHANGELSK AIR DEFENCE DISTRICT FORCES 1980-1990

	1980[52]	1985[53]	1990[54]
Interceptors	340	275 / 9 regt	270 / 9 regt
Modern (Su-27/MiG-31)	-	60 / 2 regt	150 / 5 regt
Su-27 *Flanker* B	n.a.	-	60 / 2 regt
MiG-31 *Foxhound* A	n.a.	60 / 2 regt	90 / 3 regt
MiG-25 *Foxbat* E	n.a.	30 / 1 regt	60 / 2 regt
Mig-23 *Flogger* B/G	n.a.	30 / 1 regt	-
Su-15 *Flagon* E/F	n.a.	95 / 3 regt	60 / 2 regt
Yak-28P *Firebar*	n.a.	30 / 1 regt	-
Tu-28P *Fiddler B*	n.a.	30 / 1 regt	-
AWACS			
Il-76 *Mainstay* AWACS	-	trials	several
Tu-126 *Moss* AEW	1-2	1-2	1-2
SAM	**1980**	**1985**	**1990**
SAM groups	n.a.	@ 70	@ 75
SA-10 *Grumble*	-	deploying	yes
SA-5 *Gammon*	-	yes	yes
SA-3 *Goa*	yes	yes	yes
SA-2 *Guideline*	yes	yes	phasing out
KOLA	**1980**	**1985**	**1990**
Su-27 *Flanker* B	-	-	30 / 1 regt
MiG-31 *Foxhound* A	-	30 / 1 regt	30 / 1 regt
MiG-25 *Foxbat* E	-	-	-
Mig-23 *Flogger* B/G	30 / 1 regt	-	-
Su-15 *Flagon* E/F	30 / 1 regt	30 / 1 regt	30 / 1 regt
Yak-28P *Firebar*	-	-	-
Tu-28P *Fiddler B*	30 / 1 regt	-	-
Total:	100 / 3 regt	100 / 3 regt	100 / regts

Arkhangelsk Air Defence District Arctic Missions 1991

The VPVO status and development sank during the 1970's, with the VPVO stagnating operationally and technologically. This changed drastically as of the early 1980's as a result of two factors:

1. The strategic nuclear threat from US air breathing systems (heavy bombers and ALCM) began a sharp increase as of the early 1980's, making this a relatively more important service in the overall US strategic arsenal as well as increasing the importance of the Arctic airspace.

2. Soviet technological advances in key areas vital for the development of the air defence systems needed by the IAPVLO. This notably included the development of effective defence systems against low-level systems, such as fighter-borne look-down/shoot-down radars, airborne command, control and surveillance systems and advanced SAM technology capable of intercepting cruise missiles.

These two factors led to a rapid resurgence of the general importance of the VPVO in Soviet strategy, as well as a renewed focus on Arctic air defence and hence on the Arkhangelsk Air Defence District. As a result the missions and forces assigned to the 2. PVO Army steadily increased during the 1980's.

Strategic Air Defence (IAPVO+ZRV+RTV)

Defence against SAC intercontinental range nuclear bombers attacking across the Arctic and the Norwegian Sea is the primary mission of the Arkhangelsk ADD, with an absolute

priority over all other tasks. This classic VPVO mission dates from late 1950's when the USSR faced a massive nuclear bomber threat. The mission was downgraded in the late 1960's and during the 1970's when the relative nuclear threat from SAC bombers fell and the VPVO was unable to develop the necessary new low-level air defence technology.

However as of the early 1980's the US nuclear threat from air-breathing systems increased considerably with the introduction of the SAC AGM-86B ALCM as of 1982,[47] and the deployment of 100 B-1B low-level supersonic penetrating intercontinental heavy bombers as of 1986.[48] In addition the USAF *Stealth* programme, with flight trials of the new stealthy aircraft underway since at least the late 1970's[49] and which the GRU must have been following very closely, would have boosted the Soviet perception of a growing strategic air threat.

Since the mid-1980's the strategic air defence mission has been focussed on two areas:

1. The ALCM threat.
2. The Stealth bomber threat.

There are also indications that defence against carrier-borne aircraft operating in a conventional role is becoming a major VPVO mission. However this is a theatre mission and dealt with in the next subsection.

Cruise Missile Defence

The air defence effort against the ALCM threat is the main VPVO task today. Operationally it involves the establishment of an Arctic defence-in-depth system, involving three main defence zones:

1. Outer Air Defence Zone. (IAPVO)
2. Central Air Defence Zone. (IAPVO+VMF)

3. Inner Air Defence Zone. (IAPVO+ZRV)

These operations are outlined below.

Far forward air intercept (IAPVO)

The nature of the IAVPO modernisation drive and deployment of the Il-76 indicate an increased emphasis upon forward air defence operations against cruise missiles. At the same time the technological development of the IAPVO also increased the capability for forward air superiority operations.[50] This included the deployment of very long range interceptors (Su-12 and MiG-31), the deployment of the new airborne control and surveillance systems (Il-76) and the efforts to develop aerial tankers for the IAPVO interceptors. By the late 1980's the IAPVO exercise pattern also revealed a greater emphasis upon far forward air defence operations over the Arctic at great distances from the Soviet coastline.[51]

Forward air intercept (IAPVO+VMF)

IAPVO cooperation with the Northern Fleet also grew in the late 1980's. The IAPVO increased the number of exercises involving coordinated VPVO/VMF air defence operations. These focussed upon low-level interception and air defence missions in forward sea areas, with the apparent objective of strengthening the defence of key areas on the Kola against low-level aircaft and cruise missiles. This also improved the IAPVO capability for providing forward air defence for the Northern Fleet operations.[52]

This was also indicated by the IAPVO exercises in the late 1980's which began involving integrated strategic air defence operations involving the close co-operation between IAPVO and Northern Fleet surface units.[53] These exercises were

located in the Arctic sea areas in the Barents Sea and the Greenland Sea.

Inner air defence (ZRF+VMF+SV)

The Arkhangelsk ADD exercises in the late 1980's reflected this mission for the defence of parts of Kola against aircraft and cruise missile attack.[54] These inner air defence operations primarily involve the SAM units of the ZRV, and by 1990 several SA-10 battalions were operational on the Kola, deployed for the defence of the main naval bases.[55] It was notably during one such exercise in 1985 that a target drone fired from the Barents and simulating an attacking SLCM penetrated the exercise area and flew on to crash in northern Finland.

Soviet analysis of the Gulf War have reconfirmed the importance of the cruise missile defence mission. There are reports that a special VPVO air-defence element to counter cruise missiles is to be introduced to cover at least the most probably threat areas.[56] This will involve the 2. PVO Army heavily since both the Arkhangelsk and Baltic Air Defence Districts are primary cruise missile transit zones.

Support for the Nuclear Offensive Forces

The VPVO received a new mission as of the mid-1980's with the resurgence of the role of the heavy bombers in Soviet nuclear strategy. The new mission involves providing long range fighter escort for the strategic bombers of the Moscow Air Army. This role has also been made possible by the new advanced Soviet interceptors with their long unrefuelled range. By 1987 the most modern IAPVO Su-27 *Flanker* B and MiG-31 *Foxhound* A interceptors had begun integrated exercises with the Moscow Air Army, providing escort for Tu-95 *Bear* H with AS-15 *Kent* ALCM on training missions against the

CONUS.[57] This mission has very strong - in fact exclusive - Arctic orientation.

Theatre Air Support

The conventional Theatre Air Defence mission was strongly boosted with the organisation of the TVD command structure in the late 1970's and the reorientation of Soviet military strategy. This was also one of the main reasons why the VPVO regional command structure was partially integrated in the new TVD command system. It involves two main missions for the VPVO:

1. Theatre Air Defence.
2. Support for TVD Front and Fleet operations.

Theatre Air Defence

The TVD air defence mission is focussed on supporting massive conventional all-arms operations on the TVD level. The primary air defence role of the Arkhangelsk ADD on the TVD level is directed against tactical medium- and intermediate-range bombers attacking targets in the Arkhangelsk ADD or transitting its airspace. It includes defence against both conventional and nuclear theatre cruise missiles, from which the threat has increased considerably since the USN deployment of the *Tomahawk* family of theatre SLCM began.

The importance of the TVD air defence role has been strongly boosted by the Soviet analysis of the Gulf War in 1991 and the massive US demonstration of conventional air power. This has confirmed Marshal Ogarkov's thesis of 1979 that a Military-Technological Revolution was taking place, and it has strongly reinforced the importance of theatre air defence.

Recently there are also indications that a new VPVO maritime anti-carrier defence mission is being established. This based on the performance of the USN carrier aviation during the Gulf War, which has led to a Soviet requirement for the VPVO operating against carrier-launched aircraft. This will reportedly lead to the establishment of new VPVO units in regions where carrier-launched operations are likely.[58] The location of the Arkhangelsk ADD facing the North Atlantic clearly makes it a major candidate for the deployment of these units.

Air Support for the Northern Fleet

The Arkhangelsk ADD IAPVO forces also train to provide air cover for the Northern Fleet general purpose forces operating in the Norwegian Sea and Arctic waters. This task is strictly subordinate to the strategic air defence task but has recently received more emphasis, partly because of the growth of Northern Fleet missions during early the 1980's, and partly as a spinoff of the combined Northern Fleet/2. PVO Army strategic air defence operations described above.

IAPVO training for longer range maritime air support role began in the late 1970's when the limited over-water AEW capabilities of the Tu-126 *Moss* could by combined with the emerging long range fighters such as the MiG-23B.[59] In the early 1980's the VPVO missions were expanded to include the task of providing air cover for the Navy.[60] By 1985 the IAPVO was regularly exercising support operations for the Northern Fleet.[61] These involved protecting Soviet naval units from air attack, providing long range CAP and recce, and denying the airspace north of the GIFUK barrier and especially in the Arctic waters to enemy air units, notably ASW aircraft. At this time these tasks were vital for the Northern Fleet surface forces, since they were being assigned missions in the central Norwegian Sea at the same time as they lacked effective sea-based air support.[62]

In the late 1980's IAPVO long range flights from the Kola to western sea areas were gradually cut back. This was probably linked to the simultaneous reduction in Northern Fleet surface activity in the Norwegian Sea following Gorbachev's accession to power. However the IAPVO air units on the Kola maintained the same level of training.[63]

Combined IAPVO - Northern Fleet air defence operations in Arctic waters in the Barents Sea and the Greenland Sea have continued and even intensified since 1985,[64] but these appear to have a primary strategic air defence role, with the Northern Fleet supporting the 2. PVO Army and not vice versa. (See above.)

Air Support for the Northern Front

Finally one should note that the Arkhangelsk ADD IAPVO interceptors may also be assigned to provide tactical air support for theatre level combined arms operations. This emerged after the Air Force reorganisation in the late 1970's and the establishment of the integrated TVD commands as of the fall of 1981. In the early 1980's the VPVO missions were expanded to include the task of providing air cover for the ground forces.[65] The increased range of the IAPVO fighters combined with the Il-76 forward air control systems which emerged in the mid-1980's made this technically possible. However the drastic reorientation of Soviet theatre planning following Gorbachev's accession to power in 1985 - and particularly after the loss of eastern Europe in 1989 - has probably relegated this mission to a very low level.

Strategic Early Warning (RTV)

The RTV Early Warning mission emerged in the late fifties with the imminent US ICBM deployment, leading to the first of the Soviet *Hen House* BMEW radars being deployed to the

Arctic coastline in 1959. As noted above, these remain in place today, and have recently been augmented by the new phased array radars. This mission is likely to remain of high priority as it is also closely linked to the long-range air intercept role of the IAPVO and the the ABM mission of the PRO.

Strategic Ballistic Missile Defence (PRO+RTV)

The Soviet Ballistic Missile Defence effort dates from the early 1960's and was boosted by the Soviet deployment of the *Galosh* ABM system around Moscow. The Moscow ABM system was linked to the *Hen House* and today is linked to the modern phased-array radars of the RTV, which provide the ABM sites with long-range target tracking and acquisition data.

While the technological difficulties involved in establishing a viable ABM defence probably kept this mission at a lower priority up to the late 1980's the partial replacement of the *Galosh* ABM system by the SH-04 and SH-08[66] indicates that efforts in this field have continued. In all likelihood they have been spurred by the US SDI programme. Should the Soviet BMD effort intensify in coming years the Arctic coastline radar sites could grow in importance.

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6. The Northern Fleet in the Arctic

Soviet naval developments over the last few years present us with a paradox. The new Military Doctrine advertised by President Gorbachev in 1987 has been followed by noticeable reforms in almost all services of the Soviet Armed Forces on the theatre level and below. These have been dramatic, notably including the large-scale withdrawal of forces from Central Europe, Afghanistan and the Far Eastern border areas, the drastic reduction of the size of the continental theatre forces and the beginnings of a profound restructuring of the theatre force posture and strategy.

The exception to this trend appears to be the Soviet Navy, whose general force structure and construction programmes have appeared to remain unaffected by the general cuts in theatre forces. The main naval changes so far have involved excercises, which have been cut sharply since 1985, and the scrapping of the first of a large number of obsolescent combatants left over from the 1950's and early 1960's. In the Northern Fleet this has led to the loss of 39 large combatants (above frigate) in the last four years. At the same time however the Navy has maintained her ambitious pre-Gorbachev ship-building programmes, providing a smaller number of larger and far more capable combatants to replace the old ships. Thus in the same period the Northern Fleet has received 32 new large combatants - that is to say over eight new large ships per year. This has offset the cuts resulting from block obsolescence, partly by softening the quantitative decline, but mainly by compensating for it with a significant increase in quality. The aggregate result has been a steady growth in combat power to the present. This trend is particularly strong in the North Atlantic, since the Northern Fleet has a priority for receiving the most modern large combatants in the Navy. This study outlines this development from 1987, when the Gorbachev military reforms and the CFE negotiations began, to the present.

Soviet naval forces can be divided between the SSBN's assigned to the High Command of the Strategic Nuclear Forces and the General Purpose Ships and Amphibious Forces assigned to Theatre and Front Commands. The present SSBN force is dealt with in detail in section 1.1. and it's possible future development in the section analysing the impact of START on the Soviet strategic nuclear posture. This section only deals with the General Purpose forces of the VMF.

General Purpose Forces

Soviet naval general purpose forces include most of the remaining combatants of the Soviet Navy. Their development in the Northern Fleet since 1987 is outlined in Table 3. in the appendix and summarised in the following table.

SUBMARINES	PLUS	MINUS	NET
Theatre Nuclear:	+ 6 new SSGN + 6 old SSBN	- 1 new SSGN*	+ 11 SSGN/SSBN
Long Range Antiship:	+ 2 new SSGN + 1 old SSGN		+ 3 SSGN
Attack Submarines:	+ 2 new SSN		+ 2 SSN
Diesel Submarines:	+ 1 new SS	- 15 old SS	- 14 SS
SUM SUBMARINES:	+ 18	- 16	+ 2
	* Lost in accident.		

SURFACE SHIPS	PLUS	MINUS	NET
Aviation Ships:	+ 1 new ship		+ 1 ship
Large Surface Ships:	+ 4 new ships	- 5 old ships	- 1 ship
Large ASW ships:	+ 3 new ships	- 7 old ships	- 4 ships
Amphibious:	+ 1 new ship	- 1 old ship	± 0
SUM SURFACE SHIPS:	+ 9	- 13	- 4 ships

Thus in the last four years the Northern Fleet general purpose forces have lost 29 old ships and received 27 new ships. Of the latter 19 consist of new ships delivered after 1980, while the average year in which the scrapped ship classes first saw service is 1959. Thus while the size of the force has remained almost the same, the quality has improved considerably, resulting in a far more powerful fighting force. The breakdown

of forces also provides a rough indication of which areas have been prioritised in the development of the Northern Fleet. This is the case for the general purpose submarines, whose number has actually grown, with a strong focus on those with a theatre nuclear and antiship capability. At the same time the diesel submarine force (consisting of very old ships with a limited range) has been cut sharply. The number of surface ships has also dropped slightly, particularly in the category of large ASW ships, while the number of aviation ships has increased. However the considerable improvement in the quality of the new vessels in all likelihood outweighs the limited loss in numbers.

All in all the above development indicates that the Northern Fleet general purpose forces capability has increased steadily, and secondly that it - and the Soviet Navy in general - has received a generous allocation of resources. This is paradoxical for three principal reasons:

1. In Gorbachev's first five-year period in power there appears to have been a genuine attempt to cut the size of Soviet theatre forces. However this does not seem to have affected the Soviet Navy's theatre forces and especially not the Northern Fleet.

2. This is particularly curious since the Soviet Navy traditionally has occupied the lowest rank in the hierarchy of Soviet theatre forces. Thus the interests of the Soviet Navy's general purpose forces have been strictly subordinated to those of the Ground Forces, with a correspondingly subordinate allocation of resources. The exception has been when the Navy has been able to argue that its general purpose forces could provide support for Soviet strategic nuclear interests.

3. Not only has Soviet naval construction continued on a large scale, but the Navy is actually expanding its shipbuilding programme significantly with the development of the two new classes of large CTOL carriers, a type of vessel traditionally derided as 'floating coffins' by the Soviet military. These costly projects not only represent a considerable boost to the allocation of resources to the Soviet Navy, but also places it on the verge of a new era in its history. This is all the more remarkable since the large new carriers are exhorbitantly expensive and appear - at first glance - to be of marginal importance to Soviet vital security interests.

Various explanations for the continued development of the Soviet Navy have been offered, but many of these are not entirely satisfactory. They include:

1. The notion that since the USSR has been unable to engage the US in naval arms control negotiations she may wish to maintain her naval development as a source of pressure and potential bargaining chip. However this does not take into account the range and depth of the initial Gorbachev reform drive, which included the announcement in December 1988 of significant unilateral cuts of Soviet conventional forces in Central Europe, before the CFE negotiations had been opened and contrary to all 'bargaining chip' logic.

2. A second explanation which has been forwarded is that it is uneconomical to make abrupt cancellations of partly completed vessels and hence the effects of cuts in naval programmes only become apparent in the longer term, when the ongoing production pipeline is completed. The problem with this argument is partly that it ignores the depth of the Gorbachev's initial reform attempts, and partly that it goes contrary to historical evidence of previous Soviet behaviour in similar situations. In the mid-1950's and early 1960's the political leadership stopped major naval construction programmes virtually overnight, either melting down partially completed hulls or improvising their conversion for makeshift civilian use. And under Gorbachev the military ship construction programmes offer as good candidates for *konvertsiya* as most of the other improbable projects which have been attempted.

The most plausible explanation for the continued development of the Northern Fleet general purpose forces and particularly for the development of the carriers is that they are perceived as supporting Soviet vital strategic interests - primarily nuclear. As noted earlier Soviet global nuclear strategy has not been affected by the military reforms which have emerged under Gorbachev, and is actually of increasing importance to the military security of the USSR under the new conditions. Thus a role in this field probably provides the only military rationale for the continued allocation of large resources to the Navy in a time of drastic and increasing economic hardship.

This hypothesis is also borne out by the evolution of the Soviet-US strategic nuclear relationship and the force structure of the Soviet Navy. There are four primary ways in which the

Soviet Navy can support Soviet strategic nuclear efforts in the 1990's:

1. By supporting the Soviet strategic air defence system (VPVO) against the growing US strategic bomber threat, by extending the intercept capability against bombers and ALCM further north and west in the Norwegian, Barents and Greenland Seas. This is particularly important in the 1990's due to the growing role of the US strategic bombers. This mission would include the new carriers presently being constructed and the large surface ships deployed to the Northern Fleet in the 1980's. This argument is supported by recent trends in the Northern Fleet exercise pattern, which includes a growing number of integrated air defence operations carried out in close cooperation with the VPVO.

2. Defending the Arctic SSBN Bastions against US and British hunter-killer submarines. This task has probably been a major Northern Fleet priority since the 1970's but has probably been boosted in the 1980's when it became apparent that strategic ASW in the Arctic had become an important USN mission. The special configuration of the *Typhoon* and *Delta* IV classes for Arctic under-ice operations will also have contributed to this, and as noted earlier the smaller number of SSBN's remaining after START will make their defence of even greater importance. The forces directly involved in this mission would primarily consist of the Northern Fleet attack submarines with a particular ASW configuration operating in a forward posture, backed up by the Large Antisubmarine Ships, operating in the western passages to the Arctic Ocean in the northern Norwegian Sea.

3. Defending against USN SLCM carriers. For the submarine-borne threat this would involve the same ASW forces as would be defending the Arctic SSBN bastions, while the surface-borne threat would also involve the long-range anti-ship combatants from the Naval Aviation and the Nuclear Cruise Missile Submarines.

4. Carrying out strategic ASW against western SSBN forces. This mission, which was a major priority during the 1960's and 1970's, has probabaly not been dropped entirely though the US *Trident* system in the 1980's made it extremely difficult. Nonetheless there are indications that Soviet strategic ASW efforts persist, including the surveillance of US SSBN bases and attempts to trail the SSBN's from there. In addition one should note that a diminishing number of US, British and French SSBN's still are armed with intermediate-range SLBM's which make the North Atlantic an important potential launch area.

Here it is also important to note that the first two missions - which probably are the most important - almost exclusively concern the Arctic and Norwegian Sea, and hence make the

Northern Fleet the key instrument. The last two missions primarily affect the Northern, Baltic and Black Sea Fleets and the Mediterranean Eskadra, but here too the North Atlantic and Northern Fleet play a key role. This would help explain why the Northern Fleet has received such a marked priority for new large combatants during the 1980's.

However one should also note that while these missions in support of Soviet strategic nuclear interests probably constitute the main rationale for why the Soviet political leadership has maintained - and expanded - the investment in the general purpose forces, they also permit the execution of a number of secondary conventional missions. These include the use of the Navy for political or theatre support missions in the North Atlantic at a future stage. This leads us to a potential fifth mission, on the Eurostrategic level:

5. Cutting the Atlantic SLOC between the US and Europe. For the Soviet General Staff the importance of this mission has probably increased significantly after the Revolution in Military-Technical Affairs which they perceived in the 1980's, and which has been strongly emphasised by the Gulf War. Under the new conditions the capability for Force Generation is decisive. A key element in NATO's force generation capacity are the Atlantic SLOC's. Hence cutting these would be a vital objective in any future European confrontation. Here one should also note that the importance of the SLOC's to the General Staff grew following the unexpected loss of the WAPA states in 1989, however in today's post-Soviet world this mission is probably no longer feasible.

However this last mission has probably been bypassed by events. The collapse of the Soviet Union in December 1991 has made any Soviet or Russian all-European multitheatre operation virtually unthinkable. As is examined closer in section 2. Russia today remains in a state of internal collapse, and is thus virtually paralysed on the international level. However one should note that this domestic state could also lead to the return of an authoritarian régime exploiting foreign crises and conflicts as a means of maintaining domestic power. In this case an aggressive Russian foreign policy, including the use of military force on the regional level, cannot be excluded.

Under these circumstances the post-Soviet strategic nuclear arsenal would constitute a vital deterrent force, shielding Russia's regional policy, while the post-Soviet Navy would emerge as one of the main instruments for preventing foreign conventional forces from getting within striking range of Russia's coasts. This last factor is particularly important in view of the US operations in the Gulf War.

Future development of Northern Fleet general purpose forces

The future development of the Northern Fleet general purpose forces obviously depends first and foremost on the political development of the Soviet Union and/or Russia. A change in political leadership of the centre or the fragmentation of the Union could have major consequences for military policy, while a major domestic upheaval or collapse could dissolve the present Soviet military organisation, including the Navy. Apart from a general observation that the conditions in the USSR are steadily getting worse it is difficult to predict the course of future events. Hence this study will limit itself to the military rationale, based on a general continuation of present trends. On this basis two factors will probably determine the future development of the Navy general forces: their role in Soviet vital strategic interests; and the relationship between block obsolescence and new construction.

In the first case it seems unlikely that the importance of any of the Navy's strategic support missions outlined above will decline in the foreseeable future. Barring a major change in US nuclear strategy the General Staff - regardless of whether it is Soviet or Russian - will be faced with a strategic nuclear equation evolving along today lines. This means that the need for the Navy general purpose forces to perform the strategic support missions outlined above will persist or perhaps grow. This in turn implies that the basic rationale for allocating resources to these forces will remain in force. However

whether the economic resources will continue to be available, and indeed whether or not Russia can avoid descending into a level of anarchic chaos which precludes all higher forms of organised military activity, is uncertain. If this is the case we may assume that the main elements of the post-Soviet Navy will rapidly become unusable. This is becoming increasingly possible. In this case the Russian military presence in the Arctic will be strongly reduced.

Assuming that this does not happen, and that present construction trends are maintained, the next question then becomes how heavily block obsolescence will affect the Soviet Navy. Table 4. provides a rough indication of the number and type of ships in the Northern Fleet which have reached an age where economic and safety considerations call for their scrapping. On the table this includes those ship classes which were introduced in the 1950's and 1960's. However this is actually a rather conservative estimate since, as noted earlier, a number of the ships in the classes introduced in the 1960's will actually have been delivered at a far more recent date. Nonetheless the table provides a rough overview of how the overall block obsolescence facing the Soviet Navy affects the Northern Fleet.

	Pre-1970	Post-1970	Percentage Pre-1970
Theatre SSGN/SSBN:*	6	8	43 %
Antiship SSGN/SSG:	20	11	65 %
Attack SSN:	8	32	20 %
Diesel submarines:	12	16	43 %
SUM SUBMARINES:	46	67	41 %
Aviation ships:	-	3	0 %
Large surface ships:	2	10	17 %
Large ASW ships:	9	6	60 %
Amphibious ships:	9	5	64 %
SUM SURFACE SHIPS:	20	24	45 %
SUM LARGE VESSELS:	66	91	42 %

* Including *Yankee* I class.

Thus 42 % of the Northern Fleet general purpose forces (66 out of 157 of the large combatants) belong to classes first taken into service before 1970. If these constitute prime candidates for scrapping on the basis of their age we may expect corresponding cuts in the Northern Fleet general purpose forces during the 1990's. On this basis three types of combatant could be particularly hard hit since they contain 60 % or more of ship-classes predating 1970. They include the Antiship SSGN/SSG, the Large ASW Ships and the Amphibious Ships.

However here it is important to note that this estimate may be conservative. In the first place the classes being scrapped today are roughly ten years older than those listed above. Secondly, a ship class first taken into service during the 1960's could have a production run extending into the 1970's. This is for instance the case for the following classes:

CLASS	DELIVERIES
YANKEE I	1967-1974
VICTOR I	1967-1974
FOXTROT	1957-1974
CHARLIE I	1968-1972
KRESTA II	1967-1976
KASHIN MOD	1963-1972
KASHIN	1963-1972
ALLIGATOR	1964-1977
POLNOCNY	1961-1973

Those ships delivered last might not be immediate candidates for scrapping on the basis of age. Thus the state of the Northern Fleet block obsolescence would partly depend upon how many of the latest deliveries of the older classes it has received. On the basis of the general priority of this Fleet for receiving the most modern equipment the actual number of obsolescent vessels could therefore be smaller than indicated in the table.

Nonetheless it is clear that a considerable number of ships are reaching retirable age and are likely to be scrapped. The key question then becomes how many and how good ships the Soviet (or Russian) Navy will be permitted to construct to replace them with. This is clearly difficult to foresee, since it depends to a large extent on the political development of the USSR. However if we assume that the Soviet naval production pattern of Gorbachev's first five year period continues then we may expect that most of the scrapped ships will continue to be replaced with new and far higher quality combatants. This trend is also indicated in the latest report by the US Director of Naval Intelligence to the House Armed Services Committee, of March 7, 1991.

Of course block obsolescence and ship construction are not be the only factors determining the state of the Northern Fleet in the coming years. Modern vessels might be decommissioned or placed in storage for reasons of economy or politics, Arms Control agreements could come into play, or the Soviet Navy

could suffer from manpower and other shortages. Nor should one forget that the internal collapse of the Soviet Union could also lead to the dissolution of the large-scale Soviet military organisation as we know it today, which also would affect the Fleet. However it is almost impossible today to predict how these two latter factors will evolve.

If the trend in the last four years development of the Soviet Navy continues we may expect the quantity of the general purposes forces to diminish slightly, while the quality of the new ships increases considerably over the old ships they replace. This could mean that the increase in the Northern Fleet general purpose forces overall combat power will also continue during the 1990's. Here it also important to note that block obsolescence in the Soviet Fleet as a whole will probably only have a marginal effect on the Northern Fleet, since it has a high priority for receiving the most modern naval vessels and the strategic rationale for its continuing to do so remains in force.

However as noted earlier, this is today emerging as one of the least likely scenarios. The continued economic decline of Russia will cut the resources available to the Navy, and could, at its most extreme, lead to a general political collapse of Russia, precluding all higher military organisation.

Conclusion, Northern Fleet

Today the future of Russia is becoming increasingly uncertain. Because of the potential scale of the changes on this level this factor of course constitutes the primary determinant of the future of the post-Soviet Navy and the Northern Fleet. The most dramatic change involves the breakdown of Russia into anarchic chaos. This would obviously also impact on the Navy, in all likelihood reducing the general forces capability significantly. However this scenario at present only constitutes one amongst several future possibilities, all of which are

exceedingly difficult to foresee with any certainty. It is also possible, and perhaps more likely, that Russia will continue to muddle on, at least insofar as the military organisation is concerned. In this case the most prudent course is to plan on a continuation of Soviet naval developments roughly along the lines of the last five years, but at a strongly reduced economic level.

If this is the case then we may expect the overall combat power of the Northern Fleet general purpose forces to continue to decline gradually. At the same time the Northern Fleet strategic nuclear force will be reduced in size but remains of vital importance to Russian security. Here it is particularly important to note that Russia still remains a large state, facing the same geostrategic imperatives in the Arctic as the USSR did, and retaining most of the post-Soviet military assets. Under these conditions the role of the Kola, and the Northern Fleet, for Russian military interests will remain high and possibly grow. Should in fact the above scenario prove too cautious it will be easier - and safer - to reduce our investments post-facto than to catch up with an anticipated but mistaken reduction in Soviet naval capabilities.

TABLE 1. GENERAL PURPOSE FORCES.

SUBMARINES AND NAVAL AVIATION.

		CLASS	IN SERVICE	1987		1991		Change
THEATRE NUCLEAR FORCES (SS-N-21/24).								
PLARK	*Nuclear Cruise Missile Submarine* [1]	YANKEE NOTCH	1988	1	100 %	2	100 %	+ 1
PLARK	"	AKULA	1985	-	0 %	2	40 %	+ 2
PLARK	"	SIERRA	1984	1	100 %	3	100 %	+ 2
PLARK	"	MIKE	1984	1	100 %	-	-	- 1 *
PLARK	"	YANKEE TRIAL	1983	-	-	1	100 %	+ 1
			1990					
PLARB	*Nuclear Ballistic Missile Submarine*	YANKEE I	1967	-	-	6	50 %	+ 6
		Total:		3	75 %	14	61 %	+ 11
		Total post-1980:		3	75 %	8	73 %	+ 5

* Involuntary loss, due to accident in 1989.
(The *Victor* III mod. class is listed under the Attack Submarines but can probably also carry the SS-N-21 nuclear land-attack SLCM.)

LONG RANGE ANTISHIP								
PLARK	*Nuclear Cruise Missile Submarine*	OSCAR II/I	1982	4	100 %	6	100 %	+ 2
MA	*Naval Aviation*	Tu-26 Backfire C	1982	-	0 %	60	100 %	+ 60
			1990					
MA	"	Tu-26 Backfire B	1974	-	0 %	-	0 %	0
PLARK	*Nuclear Cruise Missile Submarine*	PAPA	1970	1	100 %	1	100 %	0
PLARK	"	CHARLIE II/I	1968	7	47 %	6	40 %	- 1
PLRK	*Cruise Missile Submarine*	JULIETT	1961	5	33 %	5	46 %	0
PLARK	*Nuclear Cruise Missile Submarine*	ECHO II mod/II	1960	11	48 %	13	56 %	+ 2
MA	*Naval Aviation*	Tu-16 Badger C/G	1960	80	35 %	30	21 %	- 50
		Total ships:		28	48 %	31	52 %	+ 3
		Total ships post-1980:		4	100 %	6	100 %	+ 2
ATTACK SUBMARINES								
PLA	*Nuclear Submarine*	YANKEE MOD	1985	1	100 %	1	100 %	0
			1990					
PLA	"	ALFA	1979	6	100 %	5	100 %	- 1
PLA	"	VICTOR III/II	1972	23	82 %	26	84 %	+ 3
PLA	"	VICTOR I	1966	8	50 %	8	50 %	0
		Total ships:		38	75 %	40	75 %	+ 2
		Total ships post-1980:		1	100 %	1	100 %	0
DIESEL SUBMARINES								
PL	*Diesel Submarine*	KILO	1990	2	18 %	3	21 %	+ 1
			1990					
PL	"	TANGO	1972	13	81 %	13	72 %	0
PL	"	ROMEO	1958	3	60 %	-	-	- 3
PL	"	FOXTROT	1957	21	48 %	12	37 %	- 9
PL	"	ZULU IV	1952	-	0 %	-	-	0
PL	"	WHISKEY	1949	3	8 %	-	0 %	- 3
		Total ships:		42	36 %	28	30 %	- 14
		Total ships post-1980:		2	18 %	3	21 %	+ 1

TABLE 1. GENERAL PURPOSE FORCES. (cont.)

SURFACE SHIPS AND NAVAL AVIATION

		CLASS	IN SERVICE	1987		1991		Change
AVIATION SHIPS								
TAK	*Heavy Aircraft Carrying Cruiser* [1]	(KUZNETSOV [2]	1991	-	-	1	100 %	+ 1)
MA	*Naval Aviation*	MiG-29 Fulcrum A	1990	-	-	n.a.	n.a.	
AKR	*Aviation Cruiser*	BAKU	1988	-	-	1	100 %	+ 1
MA	*Naval Aviation*	Su-27 Flanker B mod	1987	-	-	n.a.	n.a.	
			1990					
AKR	"	KIEV	1975	1	33 %	1	33 %	0
MA	*Naval Aviation*	Yak-38 Forger A	1976	30	37 %	25	31 %	- 5
		Total ships:		1	33 %	2	50 %	+ 1
		Total ships post-1980:		0	-	1	100 %	+ 1
LARGE SURFACE SHIPS								
RKR	*Missile Cruiser*	SLAVA	1982	1	50 %	1	33 %	0
EM	*Destroyer*	SOVREMENNYY	1981	4	50 %	7	57 %	+ 3
RKR	*Missile Cruiser*	KIROV	1980	1	50 %	2	67 %	+ 1
			1980					
BRK	*Large Missile Ship*	KILDIN MOD	1973	-	0 %	-	0 %	
RKR	*Missile Cruiser*	KRESTA I	1967	2	50 %	2	50 %	0
RKR	"	KYNDA	1962	-	0 %	-	0 %	0
EM	*Destroyer*	KOTLIN MOD	1961	2	25 %	-	-	- 2
BRK	*Large Missile Ship*	KILDIN	1957	-	0 %	-	-	0
EM	*Destroyer*	KOTLIN	1954	2	22 %	-	-	- 2
EM	"	SKORY	1949	1	9 %	-	-	- 1
		Total ships:		13	25 %	12	44 %	- 1
		Total ships post-1980:		8	50 %	10	56 %	+ 4
LARGE ASW SHIPS AND ASW AIRCRAFT								
BPK	*Large Antisubmarine Ship*	UDALOY	1981	3	37 %	6	54 %	+ 3
			1990					
		KARA	1973	-	0 %	-	0 %	0
MA	*Naval Aviation*	Tu-142 Bear F	1970	30	46 %	30	46 %	0
BPK	*Large Antisubmarine Ship*	KRESTA II	1969	7	70 %	7	70 %	0
PMA	*Naval Aviation*	Il-38 May	1968	20	44 %	20	44 %	0
BPK	*Large Antisubmarine Ship*	KANIN	1968	5	62 %	-	-	- 5
PKR	*Antisubmarine Cruiser*	MOSKVA	1967	-	0 %	-	0 %	0
PMA	*Naval Aviation*	Be-12 Mail	1966	30	33 %	30	33 %	0
BPK	*Large Antisubmarine Ship*	KASHIN mod	1966	3	60 %	1	33 %	- 2
BPK	"	KASHIN	1962	1	8 %	1	9 %	0
		Total ships:		19	36 %	15	34 %	- 4
		Total ships post-1980:		3	37 %	6	54 %	+ 3
AMPHIBIOUS FORCES								
BDK	*Large Landing Ship*	IVAN ROGOV	1978	-	0 %	1	33 %	+ 1
BDK	"	ROPUCHA	1975	5	23 %	4	17 %	- 1
BDK	"	ALLIGATOR	1964	2	14 %	2	14 %	0
SDK	*Medium Landing Ship*	POLNOCNY	1961	7	15 %	7	15 %	0
MA	*Naval Aviation*	MiG-27 Flogger	1990	-	-	40	100 %	+ 40
	"	Su-24 Fencer	1989	-	-	-	0 %	(90 in Baltic Fl)
	"	Su-17 Fitter C/D	1989			-	0 %	(100 in Baltic Fl)
	"	MiG-23 Flogger K	1986	-	0 %	n.a.	n.a.	(10 in all)
	"	Su-17 Fitter C/D	1976	(35	50 %	35	50 %	(35 in Baltic Fl)
		Total ships:		14	18 %	14	19 %	0

TABLE 2. BLOCK OBSOLESCENCE AND THE NORTHERN FLEET. [3]

THEATRE NUCLEAR SSGN/SSBN		CLASS	IN SERVICE	1991	
PLARK	*Nuclear Cruise Missile Submarine*	YANKEE NOTCH	1988	2	100 %
PLARK	"	AKULA	1985	2	40 %
PLARK	"	SIERRA	1984	3	100 %
PLARK	"	YANKEE TRIAL	1983	1	100 %
			1970		
PLARB	*Nuclear Ballistic Missile Submarine*	YANKEE I	1967	6	50 %
		Total post-1970:		8	
		Total pre-1970:		6	
ANTISHIP SSGN/SSG					
PLARK	*Nuclear Cruise Missile Submarine*	OSCAR II/I	1992	6	100 %
PLARK	*Nuclear Cruise Missile Submarine*	PAPA	1970	1	100 %
PLARK	"	CHARLIE II	1973	4	67 %
			1970		
PLARK	"	CHARLIE I	1968	2	22 %
PLRK	*Cruise Missile Submarine*	JULIETT	1961	5	46 %
PLARK	*Nuclear Cruise Missile Submarine*	ECHO II mod/II	1960	13	56 %
		Total post-1970:		11	
		Total pre-1970:		20	
ATTACK SSN					
PLA	*Nuclear Submarine*	YANKEE MOD	1985	1	100 %
PLA	"	ALFA	1979	5	100 %
PLA	"	VICTOR III/II	1972	26	84 %
			1970		
PLA	"	VICTOR I	1968	8	50 %
		Total post-1970:		32	
		Total pre-1970:		8	
DIESEL SUBMARINES					
PL	*Diesel Submarine*	KILO	1990	3	21 %
PL	"	TANGO	1972	13	72 %
			1970		
PL	"	FOXTROT	1957	12	37 %
		Total post-1970:		18	
		Total pre-1970:		12	

TABLE 2. BLOCK OBSOLESCENCE AND THE NORTHERN FLEET (cont.).

AVIATION SHIPS					
TAK	*Heavy Aircraft Carrying Cruiser*	(KUZNETSOV	1991	1	100 %
AKR	*Aviation Cruiser*	BAKU	1988	1	100 %
AKR	"	KIEV	1975	1	33 %
			1970		
		Total post 1970:		3	
		Total pre-1970:		0	
LARGE SURFACE SHIPS					
RKR	*Missile Cruiser*	SLAVA	1982	1	33 %
EM	*Destroyer*	SOVREMENNYY	1981	7	57 %
RKR	*Missile Cruiser*	KIROV	1980	2	67 %
			1970		
RKR	"	KRESTA I	1967	2	50 %
		Total post 1970:		10	
		Total pre-1970:		2	
LARGE ASW SHIPS					
BPK	*Large Antisubmarine Ship*	UDALOY	1981	6	54 %
			1970		
BPK	*Large Antisubmarine Ship*	KRESTA II	1969	7	70 %
BPK	*Large Antisubmarine Ship*	KASHIN mod	1966	1	33 %
BPK	"	KASHIN	1962	1	9 %
		Total post 1970:		6	
		Total pre-1970:		9	
AMPHIBIOUS SHIPS.					
BDK	*Large Landing Ship*	IVAN ROGOV	1978	1	33 %
BDK	"	ROPUCHA	1975	4	17 %
			1970		
BDK	"	ALLIGATOR	1964	2	14 %
SDK	*Medium Landing Ship*	POLNOCNY	1961	7	15 %
		Total post 1970:		5	
		Total pre-1970:		9	

Notes

1. Soviet designations.

2. Estimated to enter service in 1991 or 1992. Soviet sources claim it will be assigned to the Northern Fleet. If so then the Naval Aviation MiG-29A and Su-27B mod. will probably accompany it.

3. This includes all submarine and surface ship classes above the size of frigate whose first class type was taken into service before 1965. This provides a rough indication of the scale of the block obsolescence in the Soviet Navy, but one should note that obviously age alone is not at sufficient criteria, as the condition of a ship will depend on a variety of additional factors, such as maintenance, operational history and so forth. The tables are also rather conservative in the sense that classes in which a large number of ships have been constructed over an extended period will include a number of ships which still are relatively new.

7. Post-Soviet Military Forces in the Arctic

The future of Soviet military power is a function of the collapse of the Soviet Union and the political and economic development of the states emerging in its ruins. The exact course which this will take, and the extent to which parts of the post-Soviet area will descend into chaos, cannot be predicted precisely. However it is possible to identify the main trends presently underway. From these the main alternative future scenarios can also be sketched. This section does this, with the focus on the consequences for the post-Soviet military presence in the Arctic.

Political Development of the Post-Soviet Area and its Military Consequences

Three main alternative scenarios are envisageable for the political and economic development of the post-Soviet area. Each will have a specific impact on the future of the ex-Soviet military organisation:

1. The Confederation of Sovereign States remains in force and the key slavic states retain sufficiently harmonious relations to maintain a coordinated security policy and military organisation of which key elements remain under joint Confederate control. This now appears unlikely.

2. The Confederation of Sovereign States is unable to pursue a common security policy and integrated military organisation and the ex-Soviet military arsenal is divided among the post-Soviet states, each of which develops an independent national military organisation. In this case Russia will inherit the bulk of the Soviet military force and also remains the only post-Soviet state with access to the Arctic.

3. Key parts of the former USSR - including Russia - descend to a level of chaos which precludes all forms of higher organised activity, including military.

These three alternative scenarios and their military implications are examined below.

Scenario 1: The Confederation of Independent States survives

Scenario 1., based on a continued integrated post-Soviet military under joint CIS command appears unlikely. On the one hand two of the key participants, Russia, with 140 million inhabitants and the Ukraine with 50 million, have ever since the failed coup attempt in August 1991 been unable to agree on the integration of the military forces. Russia has sought their coordination under the CIS, while the Ukraine has sought to develop independent Armed Forces. The rift emerged in public since October 1991 and has gradually intensified, receiving most publicity when the Ukraine demanded control of the Black Sea fleet. At the CIS meeting in Minsk on 14 February 1992 the Ukraine and Russia could not agree on a settlement of the dispute, and the Ukraine, along with Moldova and Azerbaijan, refused to participate in the integration of CIS forces. Instead the Ukrainian leadership, backed up by the Ukrainian Parliament, has voted in favour of establishing an independet 250,000 man force by 1995, incorporating the Army, Air Force and Navy. Thus it appears unlikely that the Ukraine will join the integrated CIS military organisation. This will leave a major gap in the CIS.

Secondly the continued economic decline of the key state in the Confederation - Russia - makes the future political development of this state very unstable and increases the likelihood of a regression to an authoritarian and probably nationalist leadership. Should such an authoritarian régime emerge then the likelihood that it could maintain an integrated

CIS military organisation is reduced, since the fear for the independence of all of Russia's neighbours will increase.

Scenario 2: The key post-Soviet states pursue independent military policies

Under Scenario 2. key post-Soviet successor states are unable to agree on a joint security policy and military organisation under the aegis of CIS. At the same time the main post-Soviet successor states remain in being and preserve a functioning central political leadership able to maintain some form of state-oriented higher organised activity. This is a more likely development than that the Confederation remains in being, but one should note that it would not markedly affect the post-Soviet Arctic military presence. This is so for three reasons:

- Because Russia under all circumstances is the only post-Soviet successor state with geographic access to the Arctic.
- Because Russia under all circumstances will inherit the bulk of the ex-Soviet military forces with an Arctic orientation.
- Because the likelihood of Russia reverting to a hostile authoritarian régime employing the threat or use of military force as a tool of policy is growing.

On the other hand the economic decline will leave Russia with far fewer resources to be used for the military, which will probably also affect Russia's military presence in the Arctic.

However under all circumstances a split of ex-Soviet military assets among the successor states would still leave Russia as the only Arctic state in a geographic sense, and would leave most of the Arctic forces under Russian control. Regardless of whether the Confederation remains in force the key to the post-Soviet military posture in the Arctic under all circumstances hinges on the development of Russia, and specifically of

the Russian military interests and posture. Here three factors are decisive.

In the first place Russia will only inherit a part of the post-Soviet military organisation and forces, since she will have to share the assets to varying degrees with the other post-Soviet states. Hence Russia's overall military capability will be weaker than that of the former Soviet Union. However in certain areas - and notably in those military Services and Branches of Service which involve the Arctic - Russia will inherit the bulk of the personnel and materiel. Thus Russia will under all circumstances be the only post-Soviet successor state with Arctic military forces. (This is examined in greater detail below.)

Secondly, the extent to which the Russian leadership will maintain or develop an Arctic military presence will be a function of two factors:

- Russia's domestic economic and political development,
- the state of Russia's internal and regional inter-state relations.

The state of the economy will determine how many resources are available in general, including for the military, while the political situation will determine how much is allocated to the military and to which parts of the military it will go. Here the present situation provides enough information to permit us to predict the general trend with a fair amount of certainty. The key factor here is Russia's irrevocable continued economic decline for the next few years no matter what the west does or what any Russian régime does. This is in turn increasing the hardship of the population which makes the political climate increasingly tense, chaotic and violent. This will impact on Russia's military capability in two basic ways:

- In the first place it will reduce the basic pool of resources available to the Russian leadership in all sectors, and

making their distribution and interaction even more ineffective than it is at present. This will include a reduced capability to maintain and develop the military infrastructure which Russia inherits from the USSR, regardless of the type of régime which takes power.

- Secondly it will affect Russia's political development, which will either be forced back to an authoritarian régime using force to stay in power and maintain order, or will break down into anarchy (Scenario 3, below.). The military consequences of an authoritarian régime maintaining power would depend upon the nature of the régime. If it consists of a 'benign dictatorship' along the lines of Gorbachev or Yeltsin, which places a premium on finding a realistic solution to the economic crisis and in maintaining a cooperative policy vis a vis the outside world, we may expect a continued reduction in the resources allocated to military forces with an anti-western profile. This would include the strategic and global forces which have an Arctic orientation.

However such a political decision to reduce military expenditure will probably not take place if Russia reverts to a 'hostile dictatorship', which exploits international crises and anti-foreign sentiments to maintain power and uses military and nuclear force as an instrument of foreign-policy. In this case we could expect an attempt to maintain a greater number of the strategic and global forces, part of which would retain their Arctic orientation.

Whether or not such a 'hostile dictatorship' will emerge is uncertain. However three factors indicate that it is the most likely development in the coming year. In the first place the deepening misery of the population is making Yeltsin increasingly unpopular. The desperate living conditions of the people, which include not only a lack of food but also a massive growth in crime and the collapse of the public sector, are also

increasing the calls for a return to an authoritarian leadership which can restore order in the growing chaos.

Secondly, the professional military ranks, numbering over 1,400,000 officers and NCO's, are becoming an increasingly active political force. They see the breakup of the Soviet Armed Forces as a direct threat to the safety and well-being of themselves and their families, since it is leading to increasing unemployment among the military. While it is unlikely that the military would stage a coup in isolation, the discontent and fear among their ranks could lead to a significant part supporting an authoritarian political movement which promised them job security.

Finally the likelihood of regression to a hostile authoritarian leadership must also be taken into account because such political figures are already active in Russia. The most prominent of them is the leader of the Liberal Democratic Party, Andrei Zhirinovsky, who received over 6,200,000 votes in the Russian Presidential elections. His political stance is authoritarian with a strong appeal to Russian national chauvinism. He also made direct appeals to the military to place him in power. Thus in August 1991 Zhirinovsky stated that Russia could use its nuclear weapons to obtain food from the west (without specifying how this would be done), and in both August and October he noted that Finland and the Baltic states were historically a part of Russia and should be reintegrated as part of Russia. In October he also noted that if negotiations in such a case had no effect then it was fully possible for Russia to use military force to destroy the area.

Should this form of national-chauvinistic régime come to power in Russia the situation would become extremely dangerous for all neighbouring states. Especially since this type of leadership has a tendency to exploit ethnic hatreds and foreign conflicts for domestic purposes, as one of several means of staying in power. The temptation to do so would be large, considering the massive domestic problems any Russian

leader faces and will face. A Zhirinovsky style régime could also lead to a general increase in the powers and resources allocated to the military. Thus on Monday, 9 December 1991, Zhirinovsky strongly criticised the creation of the Confederation of Slavic States and publicly appealed to the Soviet Army to help him get to power. In return he promised that his first priority as President would be to increase the readiness of the Armed Forces. He also promised that he would guarantee that the military received special privileges, such as cars, servants, cheap housing and plots of land for all retired officers. While Zhirinovsky and his ilk do not yet represent an acute political threat, their appeal among the military and the Russian people is certain to increase as conditions for the consumer and career military worsen further.

This development is strongly reinforced by the severe hardship facing most of the career officers and NCO's of the ex-Soviet Armed Forces. They and their families have no social security net, and the fate of those which have been forcibly retired from service so far is dire. They receive no pension, often no housing and with little or no prospect of abtaining alternative employment in the collapsed economy. Even for those military which still remained in service conditions were worsening. Thus according to one report the personnel of the Northern Fleet had in October 1991 not been paid for two months.

As a result there are reports that units from the former Soviet Armed Forces are pledging their loyalty to whoever promises them a decent life. This is particularly the case for élite units, but the most dangerous units are those which are being brought back home from abroad and face imminent demobilisation. They number 300,000 troops in all and are seriously concerned for their future. The officers are returning with their families to intolerable conditions, often without housing and with a great fear of being unemployed. This is making large parts of the junior officer corps desperate.

The accession to power of a Russian national-chauvinistic régime could thus preserve a Russian strategic interest in the Arctic, though such a policy could also be maintained with a 'minimalist strategic nuclear stance' mentioned earlier. Because of the deepening crisis it is almost certain that Russia will have to revert to an authoritarian régime if a collapse to anarchic chaos is to be avoided. What is less certain is if this can be managed at all, and if so, what the chances are for the maintenance of a benevolent dictatorship. If a hostile dictatorship acquires power we will be faced with the most dangerous scenario envisageable, both on a global and regional level.

Finally one should also note that the state of Russia's internal and regional relations will also impact on her Arctic military profile since it could detract from the resources available for strategic and global military forces. This would be so if Russia's leadership had to concentrate her military efforts very heavily towards maintaining domestic order and control, or to manage tense and possibly violent relations with her neighbouring states. In this case the relative importance and immediacy of the traditional strategic nuclear and global military interests and forces would decline relative to the need for domestic and regional military forces. Combined with the continued deterioration of the economic situation this would choke the assets available for the Arctic forces. In this context one should note that the likelihood of serious Russian domestic turmoil and military confrontations between Russia and her post-Soviet neighbours is very high.

Thus if Russia manages to survive as an organised state with a modicum of centralised control over at least the main western areas we can draw two main conclusions with a fair amount of certainty:

- Russia will inherit the main ex-Soviet Arctic military forces, but will have less economic assets available to maintain them.

- Russia will probably be forced to concentrate whatever economic remaining assets are allocated to the military on forces for maintaining domestic order and managing regional military campaigns along her land frontiers. This will leave very little for maintaining the strategic nuclear and global forces which have an Arctic operational profile.

Finally one should note that the more precise division of ex-Soviet military assets will be a function of three factors. Firstly, the military planning of the individual states and the political decisions regarding their future military posture and funding. Secondly the relations between the different states establishing their independent armed forces, which will determine whether the assets can be alloted through a negotiated compromise agreement or whether they will be divided up competitively. In this last case the physical location of the military assets and the national affiliation and loyalties of their personnel may play an important part. (See below.)

Conclusion

On the basis of the above analysis Russia will inherit the vast majority of the personnel and assets of the Strategic Nuclear Forces, Strategic Air Defence Forces and the Navy, but will probably have to share part of the Theatre and a greater part of the Front-level forces for ground operations with the other post-Soviet states. This means that the overall size of the Russian military will be smaller than that of the USSR, particularly regarding her Theatre and Front level forces.

On the other hand this development alone does not affect the military situation in the Arctic, since most of the Soviet forces which operated in this part of the world belong to the category of higher level strategic and theatre commands which Russia is inheriting almost exclusively. These Soviet forces which had an Arctic orientation are shown on Table 1.

Table 1. Soviet Forces with an Arctic Orientation.

Command	Forces	Regional Command	Bases
SYS:	SSBN forces	Northern Fleet SSBN Flotilla	Kola Peninsula
		Pacific Fleet SSBN Flotilla	Kamchatka Peninsula/Vladivostock
	LRB forces	Moscow Air Army	Russia, Kazhakstan, Ukraine
VPVO:	2. PVO Army	Arkhangelsk ADD	Kola/Arkhangelsk
	10. PVO Army	Anadyr ADD	Anadyr
	Northern Fleet	Arctic/Atlantic/NW TVD	Kola Peninsula

As noted above virtually all these forces are based deep inside Russia, which means that the danger of sharing them with the other Soviet Republics is small. And those which do have units based outside Russia - the MAA and VPVO - consist of air-mobile forces of which elements could be flown to Russia if their crews and support staffs decided to do so. Thus Russia will inherit almost the entire Soviet Arctic military forces.

However when this is said one should note that Russia may still split up further within its present boundaries. Several Autonomous Republics and other national regions inside Russia have already declared their intent to become independent. None of these presently encompass territory which includes the bases of the above forces, but several lie in or next to the Arctic (Karelia, the Yakhut Republic), and it is possible that some areas which do contain strategic military forces could in the future proclaim their desire for independence.

Scenario 3: The post-Soviet area breaks up into chaos

The third broad scenario consists of the possibility that major parts of the former USSR, specifically the western parts of Russia and Russia's main urban centres, collapse into a state of chaos. In this case the implications for the present post-Soviet military presence in the Arctic are considerable, since

the continuation of all organised activity at a higher level would probably break down. This would include the Russian global foreign policy and military doctrine as well as the associated military forces, including the complex Strategic Nuclear Forces, Strategic Air Defence Forces and Northern Fleet. The demise of these Services would also signal the collapse of the organised Soviet military presence in the Arctic.

Should the key western parts of Russia collapse into anarchic chaos the ex-Soviet (and ex-Russian) military could develop in three main ways, depending upon which of three basic driving forces predominate in an individual or unit:

1. Nationalism: The transfer of the allegiance of officers, NCO's and even entire units to their national authorities outside Russia (if they had not already done so) or towards their individual ethnic group, or that particular local authority towards which they felt a sense of belonging (for instance a city, such as St. Petersburg). Under these circumstances parts of the post-Russian military would form the backbone of small sub-national or ethnic armies. These could range from potentially large formations, such as in the St. Petersburg area to smaller formations on a very local level. This process is already underway in the southern parts of the ex-USSR.

2. Survival: Former professional officers and NCO's of the Red Army abandoned in the various regions of the USSR would use their armed might to barter or steal the goods necessary to survive. This 'mercenary' scenario could involve selling armed or other support to local political or mafia leaders, or operating independent bandit groups, stealing goods directly. These post-military groups could operate under three main types of employer:

   - Local political authorities who offer the local military housing and food in return for getting armed support for their régime.

   - Local mafia organisations which offer the local military housing and food in return for getting armed support or other assistance (transportation, storage, etc.) for their business.

   - Local military commanders supported by their units who physically take power in the area they live and acquire their needs through the use of force.

   The size and endurance of these military forces would depend upon the motivation of the constituent parts and on how much logistical support the employer could provide. Thus the several large organised crime families could probably maintain fairly sizeable military formations, should they choose to do so, while local political groups or ex-military groups operating as bandits probably could only exist as small forces.

3. Entropy: The present tendency towards the breakup of the old system could dissolve existing military formations as the officers and troops followed a natural urge to leave their military formations and go home. This would be the likeliest course for most conscripts, but not necessarily for many of the 1.2 million professional officers and NCO's of the Red Army. Most of these military men have no home to go to and no alternative means to earn their living. Thus they would have to improvise their continued survival as best they could, which leaves one of the two main options described above.

The three scenarious outlined above are not mutually exclusive but could take place simultaneously, as each individual and unit adapted to different circumstances in its own way. Thus we can have both the development of regional nationalist

armies, mercenary formations operating for organised crime and others, and smaller bandit formations.

This is creating a new and more regionally flavoured military threat within and along the edges of ex-USSR. It will reach its strongest development in the southern and eastern parts of the empire but can also emerge in the northwest. If so nordic defence preparations would have to include a capability to handle four new types of regional threat:

1. The breakout of civil war involving combat in areas close to the nordic states. The task of the nordic defence forces would be prevent the combat operations of the warring parties from spilling over to nordic territory and to support the police and other national authorities in handling refugee movements.

2. The threat or use of tactical nuclear weapons. This could be either indirect, stemming from the local use of tactical nuclear weapons between warring groups within ex-USSR, or direct, should Russia or a regional leader threaten the west directly with the use of nuclear weapons. The task of the nordic defence forces in this case would be to support efforts to dissuade the threatening party from using nuclear forces or to prevent those forces from being deployed or launched against nordic territory.

3. The threat of conventional military forces being used directly against a neighbouring nordic state. The task of a nordic defence force in this case is to defend the country against such an invasion.

4. The threat from ex-military bandit formations operating in the frontier areas along the former USSR. Their activity could extend to include operations against tempting targets in adjacent nordic territory. If these armed bands are large enough the

nordic military would have to assist the police in protecting the nordic assets and if necessary in hunting down the bandit formations.

This anarchic scenario would also be terribly dangerous, since the number, dispersion and relative ease of operation of tactical nuclear forces could lead to their use in a regional or local conflict. This would be catastrophic for the states within range of the tactical nuclear systems and could have widespread global ecological consequences.

In this case the post-Soviet military scenario which we would face in the Arctic would be the danger of the anarchic use of military violence among small-scale rogue forces. This would not present a classical 'strategic' military threat, but since this could involve the use of tactical nuclear weapons, or the destruction of oil wells and other industrial facilities which could cause significant environmental damage, this scenario is very serious for the states located along Russia's borders and for the Arctic ecology.

8. Strategic Stability in the Arctic

This study was produced during the time of great upheavals in the former USSR and its military establishment, and it may seem less relevant now to discuss stability in the Arctic in terms of the former East-West confrontation and the situation prior to December 1991 when the USSR ceased to exist. Nonetheless it remains important to understand the motivations behind the military build-up of forces with an Arctic inclination and the interaction between measures taken on either side, if it is found that the successor leadership in Russia, or the US administration are adopting policies which may result in continued strategic competition in the High North.

It is evident that great circle navigation and the special advantages of underwater operations in the adjacent Polar seas have made important elements of the US and former USSR strategic forces dependent upon the High North for their operations in case of a conflict between them, and that this is also influencing their activities in the High North in peacetime.

It is, as has been outlined in Chapter 7, not easy to foresee what will succeed the USSR, and what will be the security and defence policy of the new Russia. There are, however sufficient reasons to believe that the new state, whether a loose confederation of independent states, or one large Russian republic, will continue to maintain strategic forces, nuclear as well as conventional.[1] It is also realistic to assume that the High North will continue to provide bases and areas for transit and patrol of those forces.

It is, however, to be hoped that the new state will have a favourable attitude to arms control and confidence building measures which may enhance strategic stability in the High North.

With regard to strategic stability it is important to note that

this applies both to dynamic stability of strategic forces over time, avoiding structural or qualitative developments which could result in one side achieving a decisive advantage over the other, and crisis stability to reduce the risks of inadvertant or accidental conflict.

A number of suggestion have been made for arms-control measures to be applied to the High North. Some have sought comprehensive "demilitarization", others have concentrated on banning nuclear weapons or specified activities.

If "demilitarization" or "naval exclusion zones" prevented Russian naval ships from sailing from the Kola to the Atlantic in peacetime, or Russian SSBNs patrolling in the Polar seas, then Russia would have to move its most important fleet away from its largest base complex, and would have a strong motive to secure other outlets to the Atlantic for its navy.

The weakness of arguments for a Nuclear Weapons Free Zone in the Arctic stem from the fact that the Arctic is the natural transit zone for nuclear weapons of intercontinental range , which can be, and are, based and launched in locations to the South of the Arctic but must cross Arctic regions on the way to their targets. Moreover, although all ICBM and probably all SLBM would make their Arctic transit through space, they would only be launched in wartime; Soviet SSBN would have to operate in the zone whether in peace or in war. If "demilitarization" means undertakings never to launch weapons across Arctic territory, it would be a declaratory measure only, useless without removal of the weapons from sites south of the Arctic.

The only suggestions of arms control in the Arctic that have any prospects of acceptance by the nuclear powers with legitimate security concerns in the region are partial measures designed to regulate specific systems or activities in designated areas. It is also necessary that the measures are seen to be of mutual benefit of the legitimate security interests of the two

nuclear powers.

Strategic Arms Control

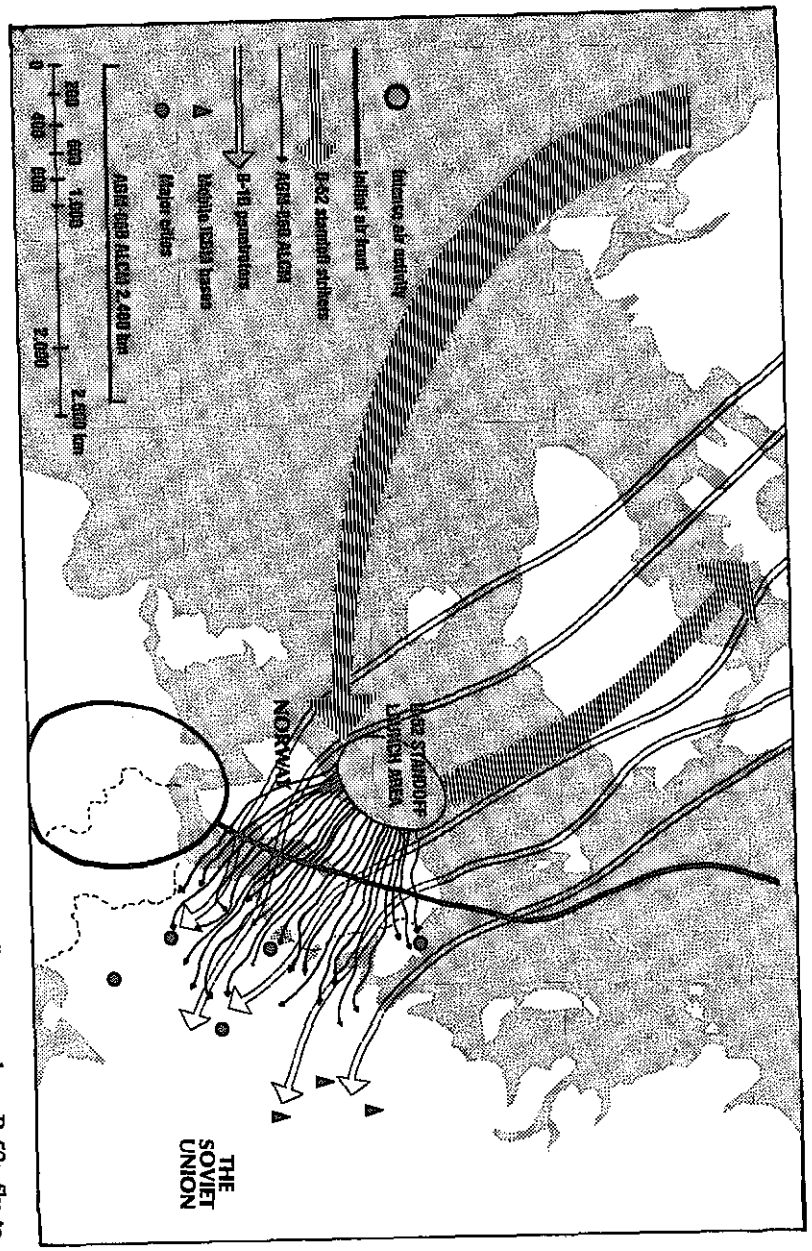
It appears from Appendix A. that the Strategic Arms Reduction Treaty signed 31 July 1991 by President Bush and President Gorbachev may result in:

- The relative number of nuclear warheads on the US heavy bomber leg of the strategic nuclear triad will probably constitute the largest launch platform in the strategic arsenal, and that this increases the significance of this weapon system in the US-Russian strategic nuclear relationship. Since the long-range bomber weapon system has a strong potential Arctic operational profile this could in turn increase the importance of Arctic air space.

- The Russian SLBM force will be cut substantially, leaving Typhhon and Delta IV the only SSBNs likely to remain, increasing the relative importance of the Kola bases and the adjacent Arctic patrol areas.

The air-breathing threat

While SAC bombers are able to attack Russian territory from almost any direction using overseas bases like Guam in the Pacific, and Diego Garcia in the Indian Ocean, when supported by an efficient system for aerial refuelling, the shortest route is over the Polar regions. It must also be taken into consideration that the main part of the former Soviet strategic nuclear forces are concentrated west of the Urals, including all the most modern ICBM and SSBN bases, and the main part of the Moscow Air Army. In addition to these, some of the primary targets for US penetrating bombers: the mobile SS-25 *Sickle* ICBM are located at three main bases between the Urals and the Nordic area, see map 1.



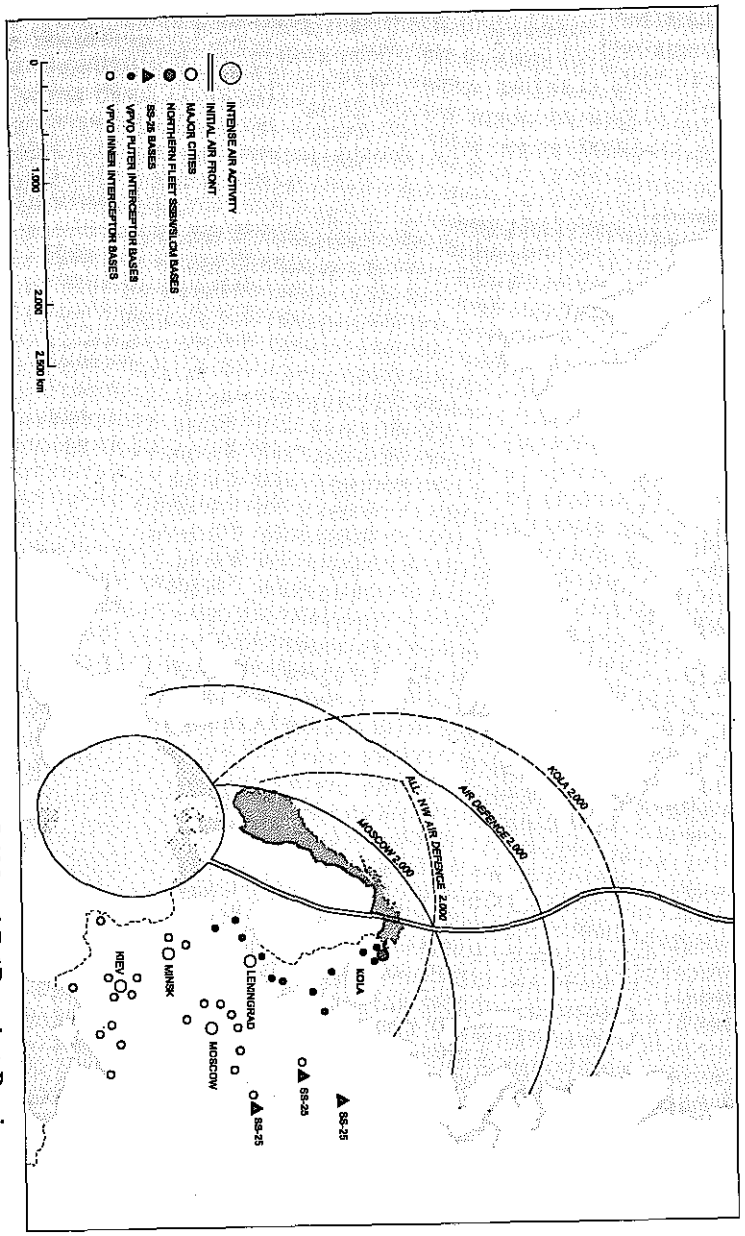
Map 1: A coordinated attack by strategic bombers against primary Russian "counterforce" targets, where B-52s fly to their ALCM launch area off the Norwegian coast, and B-1Bs continue towards Russia after the first ALCM attacks against VPVO-defences, accompanied by a large number of additional ALCM and other supporting UAVs such as BGM-34 A/B/C and AQM-34M drones for deception, electronic warfare and suppression of air defences.
(Tomas Ries: Cruice Missiles: Concequences for the Northern Region, *Forsvarsstudier*, No. 9, Oslo, 1990).

It is important to note that one of the most important elements in the current tactic of US penetrating bombers is a massiv concentarion of all available penetration aids (ALCM) and penetrating bombers (B-1B) to one specific geographic area in order to saturate the air defences and not to spread out the attacking forces in such a way that each single sortie becomes vulnerable.

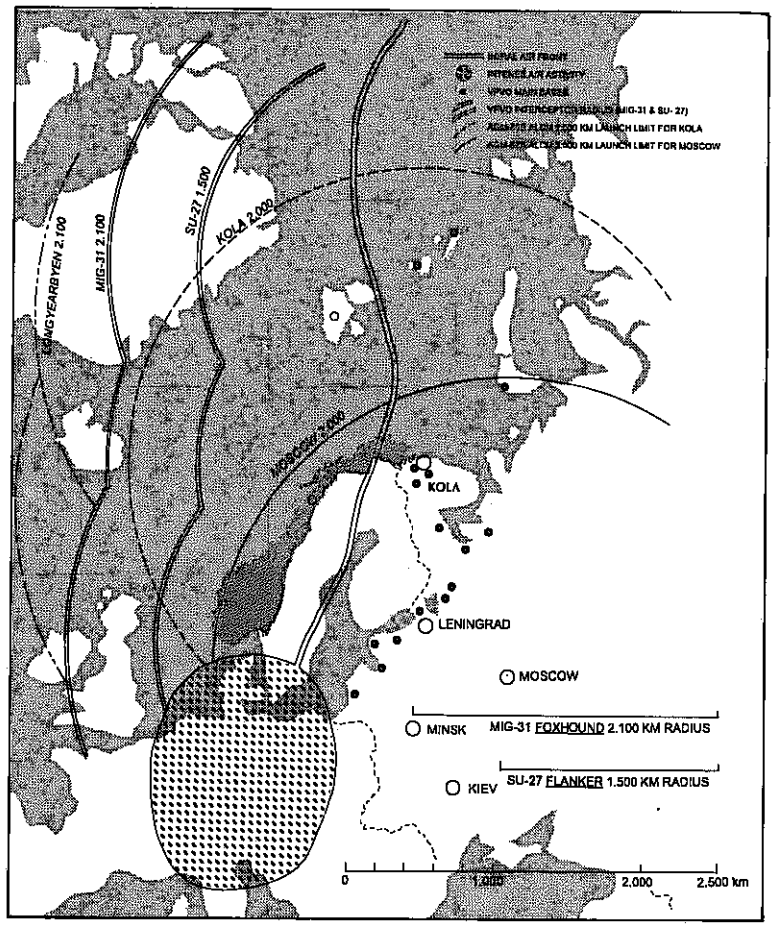
This makes the western part of Russia a high priority target area for a possible US counterforce attack. This is reflected in the location of former Soviet strategic air defence bases shown on the Map 2. If a line is drawn based upon the maximum operational interception range without aerial refuelling for the most modern VPVO air defence fighter aircraft , MiG-31 *Foxhound*, and Su-27 *Flanker* which are deployed to the forward IAPVPO bases, and note is taken of the localization and capabilities of US and allied forward air defence bases, it is possible to indicate a rough picture of an initial air "front line" at the opening of possible hostilities, see Map 3.

It is obvious that the probability of a US air attack on Russia is very low, if not non-existent, in the present situation. It is also likely that President Bush announcement of 27 September 1991 of the decision that all US strategic bombers will be removed from day-to-day alert status and their weapons returned to storage areas[2], must have reduced Russian threat perceptions of bomber attacks.

It is also evident that a bomber attack would not be likely to take place in isolation, but in combination with attacks by other US strategic forces, and that this contingency is only concievable in a situation where there is little hope of resolving the crisis by political means. Still, it is difficult to conceive of any scenario which would make it probable with a US first strike with nuclear or conventional weapons as long as the Russia retains the capability to retaliate in kind.



Map 2: The Norwegian Sea in a coordinated SAC bomber attack with B-52/ALCM and B-1B against Russia.



Map 3: Russian strategic air defence: Maximum operational range of Su-27 and MiG-31 fighters, and range of US ALCM's.

All the same, it is evident that the former USSR has found it in its interest to maintain a robust air defense system against a "worst case" contingency of air attacks, and it is also a fact that in the 1980s great efforts where made to improve the effectivness of this system against long range bombers and low-flying cruise missiles:

- This has particularly taken place in the north-western part of Russia by deployment of substantial numbers of the latest generations of air-defence fighter aircraft with "look-down/shoot-down" capability, combined with the use of modern AWACS aircraft, and by the deployment of the latest models of surface-to-air missiles at important points to be defended.

- It is furthermore evidenced by the increase in joint exercises in which air-, ground- and naval units are trained in coordinated defence against attacks by aircraft and cruise missiles.

- Lastly it is apparent from Russian sources that the recent deployment of the new CTOL aircraft carrier *Admiral Kuznetsov* with high-performance air defence fighters to the Northern Fleet is in order to strengthen the air defence of Russia itself, although the aircraft carrier also will be able to provide air cover for Russian surface action groups in western sea areas.[3]

One of the side-effects of the former Soviet build-up and extension of their air defence on Kola and in adjacent sea areas is that it may create the impression in Norway that the country is becoming situated behind the Russian first line of defence, and that this will make it more difficult to bring in allied reinforcements to Norway in case of a conflict in the area.

Another consequence of the former Soviet air defence build-

up in the North is that the two neutral countries, Sweden and Finland, are becoming increasingly concerned about the consequences of a posible long-range bomber and cruise missile threat to Russia passing through their national air space. This concern is strengthened by occasional former Soviet reminders of the importance that Sweden and Finland are able capable of meeting the challenge of cruise misssiles, and that the former USSR in case of an attack would not wait to defend against the missiles at its borders.[4]

Finnish and Swedish authorities are apparantly considering seriously how they can include capabilities against cruise misssiles in their own air defence. The ideal is, according to a Finnish commentator that the Swedish air defence is "clearly superior to a forward Russian air defence". If this is not achieved by Sweden, and by Finland as well, then this is believed to be clearly destabilizing in the region[5].

Politically it is significant that the extension of Russian air defence to include the air space of the two neutral countries, and the adjacent western sea areas is seen as defensively justified and therefore as more legitimate. Another and somewhat surprising aspect is that the finnish and swedish commentators on this question do not seem to have considered the implications as regards international law and the status of neutrality of the two countries if they are deliberately contributing to the air defence of Russia.

It is furthermore to be expected that the requirements of Russian air defence with respect to a growing US long range bomber and ALCM threat will have an impact on the situation of the Baltic states. It is likely that Russian threat perceptions are going to have an influence on the settlement of the future Russian military presence in the Baltic states, and that this might lead to demands for Russian early warning and air defence installations on the territory of the Baltic states. And it is likely since these demands may appear well justified and legitimate, that the new Baltic states will have to accept this

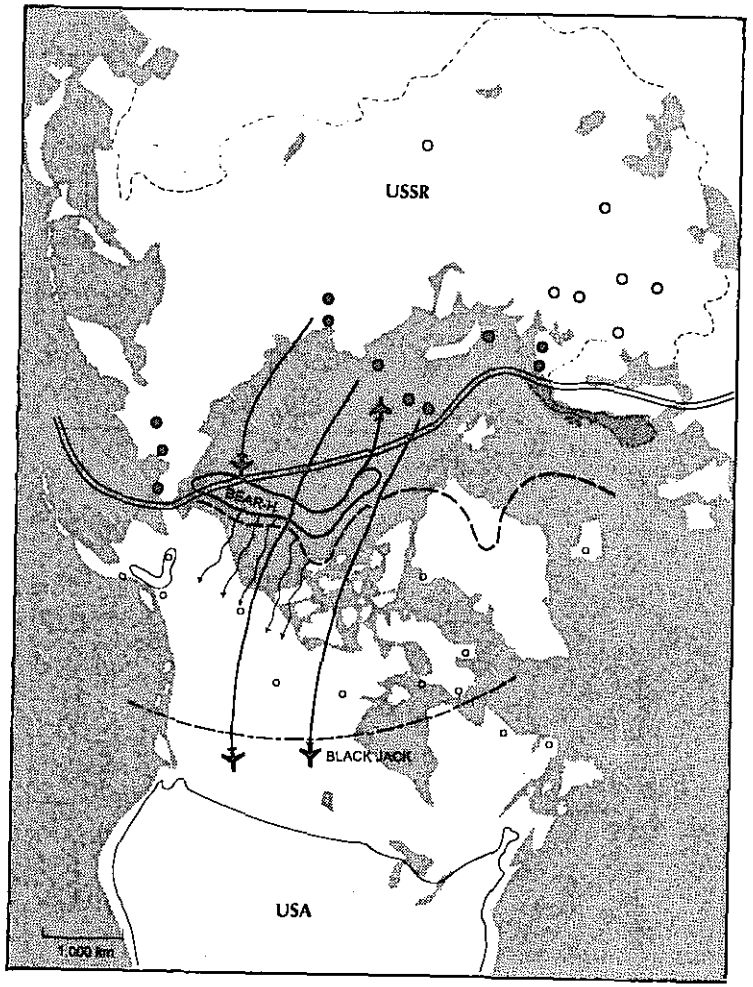
infringement on their sovereignty on a more permanent basis.

North American Air Defence

It is evident that the role of long range bombers and ALCM are increasing in the Russian strategic forces. In connection with the reduction of soviet sea- and land-based ICBMs under START, it is likely that *Bear H* and *Blackjack* long range bombers will be developed as cruise missile carriers. According to the US Arms Control and Disarmament Agency, Russia which currently has about 90 ALCM-carrying bombers, could due to the START bomber counting rules deploy 180 or more such bombers. And Russian ALCM could increase from the present 720 to over 1.300 under START[6].

At the same time it is evident that President Gorbachev's response to President Bush initiatives of 27 Sep 1991, in promising to eliminate sea-launched cruise missiles, will reduce the air-breathing threat against the north-american continent. Still, it appears that the Russian emphasis on the long range bomber element of their strategic nuclear forces have been increasing after the 1987 announcement of the former Soviet military doctrine based upon "reasonable sufficiency."

Map 4 indicates Moscow Air Army's most important peacetime intercontinental bomber bases, forward operating localities (FOL) in the Arctic, and the most probable target areas in North America. The shortest air route, which the Russian bombers will be dependent upon because of lack of alternative forward bases and limited aerial refuelling capacity, crosses over the Arctic. For this reason Russian plans for delivery of ALCM against north American targets are focused on the Arctic. The stand-off *Bear H*/AS-15 ALCMs could be accompanied by Tu-160 *Blackjack* on penetration missions flying at supersonic speed at low level and using short-range missiles to suppress air defences.



Map 4: Moscow Air Army's main bases, forward operating localities and transit routes towards North American targets.

When considering the location of forward US air defence assets of Alaskan Air Command, NORAD's interceptor FOLs in Canada, and possibly additional air defence assets at Thule and Keflavik, and combining these with Russian interceptor bases in the Arctic it is possible to get an indication of the initial air "front line" between USA and Russia. This also takes into consideration the aerial refuelling capability on the American side. The most probable Russian bomber route passes over the central and eastern Arctic.

The Arctic air space, and to some extent the adjacent Nordic air space has become more important for the total Russian strategic nuclear forces. This also increases the importance of the air space over the Barents sea, and the strategic bomber FOLs on the Kola peninsula. But the main Russian bomber routes, and the main American air defence effort will probably be concentrated in the central and eastern Arctic.

Canada has in 1991 agreed to extend the NORAD arrangement for another 5 years. What is yet to be decided is how to keep the system up to date in face of the increasing threat of long range bombers and low flying ALCMs. Future air defence technologies are currently being explored by the US with some Canadian participation in the Air Defence Initiative, ADI - a parallel programme to the Strategic Defence Initiative. A significant increase in cost of "thickened" continental air defences would have serious implications for Canada's already strained Defence planning and budgeting[7].

Aerospace surveillance and air defence

The net result of START will be more modern strategic offensive forces on both sides, including a more capable Russian bomber and ALCM threat. In fact, under START, Moscow and Washington will deploy as many strategic warheads as they had at the beginning of the negotiations. This, while representing a welcome and long- overdue

beginning to the process of strategic arms reduction, START will encourage a build-up of Soviet air-breathing weapons and thereby increase the complexity of and cost of North American aerospace surveillance and defence.

The US Department of Defense is considering a Base Force Plan as part of its efforts to weed out repetitious and costly command layers. This envisages merging US Air Force and Navy nuclear forces into a single unified command responsible for planning, deterring and implementing nuclear war-fighting. The new Base Force Plan calls for consolidating within a new Strategic Command, command authority for all SIOP planning and execution. In other words, the new command will locate within one headquarters all assets for nuclear deterrence/war fighting missions. Logically the new US Strategic Command would seek to amalgamate both early warning and nuclear war-fighting missions.

The Canadian Arms Control Centre has raised the point that since prospective structural changes in the US command system are as yet poorly understood, and since the new US Strategic Command envisages combining under its aegis responsibility for early warning, strategic defences, space-based systems, and nuclear war-fighting, Canada needs to better understand how these changes could affect NORAD.[8]

The latest configuration of SDI, as outlined by President Bush in January 1991, called Global Protection Against Limited Strikes (GPALS) is oriented towards defence against limited ballistic missile attacks whatever their source, not just from the USSR.

The US Air Defence Initiative (ADI), designed to defend against attacking strategic bombers and cruise missiles using space-based radar, continues to draw funds in the US defence budget. The apparent success in the Gulf War of the Patriot and Hawk air-defence missiles seems destined to improve future funding for ADI.

It is, according to the Canadian Arms Control Centre, inevitable that ADI will be linked to SDI, since it makes no sense to defend against ballistic missiles but not against bombers and cruise misssiles. How NORAD will relate to these programmes, and its future role together with ADI and SDI in the new US Strategic Command are open-ended questions.

Created to meet Cold War demands, NORAD functions must, according to the Canadian Arms Control Centre be re-examined in the Post-Cold War world. It is no longer considered plausible with an intentional Russian attack on North America. In order to continue serving Canadian national security interests fully, it is recommended that North American aerospace surveillance requirements be adjusted to new demands in a post Cold War world, and the need to pursue new ideas, such as, multilateral circumpolar surveillance, limits on Russian strategic air defences and links between US and Russian early warning systems are underlined.

Specifically, limits could be negotiated for any or all of the major components of modern strategic air defences: strategic radars, interceptors, air defence missiles, and battle management systems. The former USSR has deployed the world's largest network of air defences, and negotiated limits would hit it hardest or assymmetrically. Conceivably, though, the Russians might consider cuts in their area, were they linked to corresponding restrictions on the advanced technology bombers and cruise missiles to counter which the air defence system is being modernized. Given the huge resources consumed by the air defence system, and Russia's interest in relieving the burden of its defence, could make this measure negotiable.

It appears that the increasing air-breathing threat is causing a number of problems of a military as well as a political nature for the circumpolar countries on both sides of the Atlantic. In

order to stabilize the situation, if possible at a lower level of military forces, there are som measures which could be beneficial:

- The first could be to get the nuclear superpowers to revise the START bomber counting rules in such a way that they do not favour the build-up of long range bombers, and increasing the nuclear warhead inventories above the agreed central limits.

  This would be in harmony with the START aim to strengthen strategic stability at lower levels and to encourage the restructuring of strategic forces in ways that make them more stable and less threatening.

- Secondly, it is desireable to renegotiate the START Treaty in such a way that it limits heavy bombers in the same way as it limits other strategic nuclear delivery means, ICBMs and SLBMs.

In the text of paragraph of the START Treaty dealing with heavy bombers it is stated that: "heavy bombers are stabilizing strategic systems (for example, they are less capable of a short warning attack than ballistic missiles...)" This is no longer believed to be correct. Advanced bombers and cruise missiles incorporating stealth technology are now capable of delivering short warning attack , and they are not only destabilizing at the central strategic level, they also have a destabilizing effect at the regional level. Perceptions of cruise missile threats raise defence requirements which transgress national borders of adjacent states, and provide motives for forward air defences which infringes on the sovereignty and independence of neighbouring states.

The SLBM threat

The START Treaty of 31 July 1991 will, if and when it is ratified and implemented by both sides, reduce the number of Ballistic Missile carrying submarines, SSBNs. How much the SSBN force will be cut by each side is dependent upon how each side decides to distribute the allowable ceilings between ICBMs and SLBMs For the purpose of this study it is assumed that the Russian SSBN force may be cut down to 10-16 boats, and the US SSBN force to 18-20 boats.

The SSBNs are designed to constitute the assured second strike or reserve nuclear capability of the nuclear superpowers. It is likely that the reduced number of SSBNs after START will make the remaining more important to each of the powers. Another question is whether the fewer number will make the remaining boats more vulnerable.

The vulnerability of the strategic second strike or reserve force is a vital concern for the nuclear powers, and they will probably do everything which is technologically and economically feasible to reduce the vulnerability of their SSBN's. The USA and former USSR have apparently arrived at different solutions to preserve the invulnerability of their SSBNs:

- US: Exploiting advanced technology for silencing, and sufficient range to use the deep waters of the Worlds oceans for patrols.

- Russia: Improving the silencing of their SSBN's, and developing techniques to operate in shallow open or ice covered waters in the adjacent Polar seas.

In each of the two solutions it appears that the nuclear powers have achieved a very high degree of security for their SSBN

force. What remains are some concern that there might exist intentions on either side to conduct strategic ASW against the other sides SSBNs in case of a conflict.Such concerns were particularly fuzed by the article by the then US Chief of Naval Operations, Admiral J. Watkins on "The Maritime Strategy" in 1986, where he stated that in time of war, the US should seek to tilt the strategic nuclear balance in its favour, and that it should do so by having its SSNs seek out and destroy Soviet SSBNs with conventional warhead torpedoes[9].

The reasons for pursuing such a campaign was said to be that the destruction of Soviet strategic submarines would limit the USSR's ability to inflict nuclear damage on the United States should a conventional war escalate to the nuclear level, and that this would provide an opportunity for war termination.

These reasons have been challenged by acknowledged experts on naval strategy as "nonsensical". Even in the more constrained post-START world, the former USSR could still deliver more than 7.000 warheads, 1.000 of which would be on mobile ballistic missile systems. The only way to limit damage would be to eliminate these effectively as well, but this would necessitate a disarming first strike. At no stage in the coming decade can Washington be confident of reducing the former USSR's retaliatory capability to acceptable levels according to Donald C.F. Daniel.

Another reason for maintaining a capability to conduct strategic ASW is that it ties up Russian forces in defensive roles, preventing them from operating offensively against NATO's lines of communication in the Atlantic.

In order to maintain strategic stability it is important that both the US and Russia feel that they retain a secure second strike capability.

This is probably going to be even more important if the increasing accuracy of US intercontinental nuclear weapons

begins to threaten the security of Russia's land-based systems, and ICBM vulnerability could become even more significant as START reduces the number of land-based counter-force targets. This increased vulnerability may be offset by making ICBM mobile, but the surveillance and targeting systems are becoming more capable too, and one of the roles of the US B-2 bomber is to seek and destroy mobile targets deep in hostile territory.

It appears that the present deployment of Russian SBBN's are beneficial for strategic stability, and may become even more so in the years to come. It has therefore been suggested that if threats to this security by NATO SSNs carry some risk of escalation to nuclear war, and if the Russian SSBN's are likely to be able to conceal themselves securely from NATO SSNs in their "bastions" without much support from their own SSNs or other naval units, then there may be merit in an agreement to recognize these "bastions" as legitimate sanctuaries, which should be free of the threat of harassment in peacetime.[10]

In a "sanctuary" it would be necessary to exclude all NATO submarines and warships, since it is not possible to identify which have ASW capabilities. This would have the side-effect of reducing the vulnerability of ports and other installations flanking the "bastion" to attacks by conventional SLCM, and of coastal shipping to torpedo or mine attack. Although aircraft can not operate against submarines under ice, under such a regime military aircraft should also be banned from flying over the "bastions", because parts of these would often be free of ice, and the presence of military aircraft close to the coast would be an irritant.

The principal objections against such an arrangement are that it would prevent NATO from tying up Russian forces in defensive roles, relasing them for offensive use, and that NATO would receive no comparable advantage in return. Other objections are that it would restrict the freedom of the seas, and that it could make it difficult for Russia to develop

the Northern Sea Route as a substantially shorter route for western shipping to the far East. Lastly, it would be difficult to verify the compliance with an agreement about SSBN sanctuaries.

Given the fact that the US would most likely oppose any arms control measure which limits the operational flexibility or freedom of movement of its naval forces to protect american and allied interests, there seems to be mutual benefits of limiting the number of general-purpose, nuclear powered attack submarines. Of all the platforms of the US Navy's inventory these are the cause of greatest concern as regards strategic stability in the High North. By their numbers and technical sophistication, Russian, NATO and US nuclear powered attack submarines are rationalized almost entirely in East-West terms, and the two submarine superpowers might find it in their common interest to negotiate agreed limits on iventories as long as the negotiations deal with submarines only[11].This would effectively reduce Russian threat perceptions against their SSBN's, and NATO threat perceptions against their Atlantic lines of communication and thereby contribute to strategic arms stability.

Naval Arms Control

The former Soviet Union tried to get NATO and the US to agree to negotiations on naval arms control since the initiation of the Soviet unilateral withdrawals and reductions in Eastern Europe which were announced in president Gorbachev's speech in the United Nations on 7 December 1988. It is evident that the Soviet proposals for Naval Arms control were aimed at reducing the Wests superiority in naval forces, and particularly as regards American aircraft carriers, in response to Soviet reductions in conventional ground forces. "The Soviet Union is prepared to negotiate the elimination of the imbalances and assymmetry taking guidance from the principle of cutting the "surplus" from those who have it".[12]

NATO and USA have so far been opposed to the Soviet demands for negotiations about naval arms control. The aim of the CFE negotiations were to remove the capability to launch a surprise attack and to sustain large scale offensive operations, and to establish a stable balance at a lower level of military forces in Europe. It was also believed that the geostrategic realities of the Atlantic Alliance justified maintenance of adequate naval forces by NATO members, and naval arms control could imply limitations on the capability to protect sea lines of communication which are far more important to NATO than to the former Soviet Union.

It is evident that the naval forces of both the US and Russia will be reduced in the coming years as a result of the new international situation, changes in national priorities, block obsolescense and economic necessity, (cf Chapter 3 and 4.) It does, however, seem totally unrealistic to believe that it will be possible for the post-Soviet Union to negotiate a reduction of US aircraft carriers in exchange for the reductions which the former Soviet Union accepted in theatre ground and air forces since 1989, considering the global tasks and comitments of the US Navy.

At the nordic regional level it seems even more far-fetched to believe that it will be possible to improve the situation for Norway by a reduction of the Russian Northern Fleet through naval arms control negotiations[13]. Nor is it easy to see how it would be possible to balance the regional geographical advantages in the Norwegian Sea which the Russian Northern Fleet enjoys with its bases on the Kola peninsula, compaired with the US Navy with its nearest home bases on the eastern seaboard of the United States in an equitable naval arms control arrangement.

Since 1989, there has, however, been a gradual change in attitudes to naval arms control among prominent personalities in the Alliance. Norway's Defence Minister of Norway, Johan

Jørgen Holst, has on several occasions stated that it would be in Norways national interest to have negotiations about appropriate confidence building and arms control measures at sea. Holst's concern is that while the land forces in Europe are being reduced and regulated, an unregulated situation in Northern sea areas could decouple Norway from the new cooperative arrangements in Europe, and draw the country into a field of tension where the country's freedom of action will be restricted. According to Holst, this makes it in the national interest that negotiations about appropriate confidence building and arms control measures at sea are implemented.

Holst, however, also lays down the preconditions that 1. the confidence building and arms control measures must contribute to protection of the Atlantic sea lines of communication and 2. the principle of the freedom of the seas must be maintained. Holst believes that confidence building measures can be based upon the International rules of navigation and the existing bilateral agreements to prevent incidents at sea. Holst envisions that naval arms control measures may include reductions of weapons systems which particularly threaten the sea lines of communication (e.g. ocean-going, attack submarines) and the coastal states (nuclear sea-launched cruise missiles)[14].

The US opposes, however, measures which would limit its flexibility to conduct independent operations on the high seas. Official US spokesmen have acknowledged that the American position leaves little scope to support arms-control initiatives, but they have also pointed out that the US readily accedes to and abides by "sound agreements that result in an increased measure of stability, but do not impinge on any nations free use of the high seas". They consistently single out three such agreements: the 1972 accord with the former USSR to prevent incidents at sea; the 1986 Stockholm Accord dealing with prior notification and observation of military activities; and the recent US-Soviet Agreement to Prevent Dangerous Military Incidents. Beyond these agreements the US has also raised the possibility of negotiating naval controls in the European area

in the aftermath of CFE ground and air reductions[15].

President Bush arms control initiatives of 27 september 1991 stated that "The US will remove all tactical nuclear weapons, including nuclear cruise missiles from its surface ships and attack submarines. It will also remove nuclear weapons associated with land-based naval aircraft. Many of these weapons will be dismantled and destroyed with the remainder placed in secure central storage areas."[16] According to press reports, President Gorbachev accepted this challenge and announced that the USSR will "remove all tactical nuclear weapons from ships and from submarines."[17] These announcements are in effect far reaching naval arms control measures, and they will have a profound impact on the naval situation and on stability in the High North, if and when they are implemented.

It is for instance likely that the removal of tactical nuclear weapons from surface ships and submarines will be stabilizing in that it will remove much of the advantage of "the battle of the first salvoe" which has been emphasised by Soviet naval authorities.[18] On the other hand, it is also possible that removal of the tactical nuclear weapons from surface ships and submarines may lower the threshold for conventional conflict because the risk of escalation by initiating a conventional conflict would be less, particularly if it was believed that the conflict could be confined to naval ships at sea only. It is therefore possible that removal of tactical nuclear weapons from surface ships and submarines may increase the need for adequate naval CSBMs.

One area of naval forces which has been pointed out by Defence Minister Holst and others as worthy of investigation as to its suitability for negotiations, is limiting the number of nuclear powered attack submarines. SSBNs belonging to the US, NATO and the former USSR are justified almost entirely in the terms of the East-West confrontation, and the two submarine superpowers might find it in their interest to

negotiate agreed limits on inventories as long as the negotiations deal with submarines only. This would, in case, reduce the perceived threat against Soviet SSBNs operating in the northern Seas, and it would relieve the concerns in NATO for maintaining the lines of communication across the Atlantic in a conflict. It alo appears that limiting the number of nuclear powered attack submarines will not infringe of the freedom of the seas or on any of the other reasons which have been advanced as arguments against naval arms control. One disadvantage of an agreement to limit the number of SSNs would, however, be that it would provide less operational opportunity for NATO and the US to put pressure to confine the Northern fleet to its home waters in the Barents Sea in a conflict.

Another area for possible investigation are Naval Confidence and Security Building Measures (CSBM). In the Special Report of the Norwegian Defence Research Establishment in 1988 on "Confidence Building Measures at Sea"[19] it is pointed out that the Rules of Engagement (RoEs) which naval forces actually operate under will have great significance for the development of a tense crisis situation at sea when acts of war may appear imminent since it is evident that assumptions and expectations about the other side's Rules of Engagement will have implications for own reactions in such situations. It is therefore suggested by the Norwegian Defence Research Establishment that communication about the principles of development of RoEs are considered a suitable confidence building measure. The authors of this study suggest that this should be extended to include mutual exchange of information about the substance of the most critical elements of RoE's concerning the captain's rights of "self defence" of his ship, and the criterias for assessment of "hostile intent". This would most likely reduce the risks of inadvertant conflict and escalation in tense or unforeseen situations, particularly in areas where both sides often conduct naval exercises or transit of naval forces.

Nuclear testing in the Arctic

In March 1990, the former USSR announced that beginning in 1993, all underground nuclear weapons tests would be conducted on the Arctic island of Novaya Zemlya. Since 1963, the USSR has carried out forty-two underground nuclear tests at Novaya Zemlya, eleven since 1980. The most recent tests known to be conducted were two in 1988 and one in October 1990.

Nuclear testing is not in itself a strategic activity, but it is closely related to the maintenance and modernization of existing nuclear weapons. And testing on the island of Novaya Zemlya in the Arctic has special implications because of the proximity to the Nordic circumpolar countries, and because of the sensitivity of the Arctic environment.

A comparison of US and Russian testing sites have confirmed what was already known: that the current US testing site is located in a geographical area which lends itself to the containment of radiation more readily than the Russian site at Novaya Zemlya. The US test site in Nevada was originally chosen for atmospheric tests. It has turned out that the dry alluvium in the area, together with strict US containment practices, is well suited to prevent the accidental release into the atmosphere of radioactive debris from underground nuclear explosions.

Russia in contrast, is confronted with a more difficult containment problem because the special geological and environmental features at Novaya Zemlya. Although Novaya Zemlya is quite stable from a seismological point of view, the hard rock in which the nuclear explosions are carried out has a higher propensity to fracture, creating potential outlets for radioactive products.

One of the concerns of the circumpolar states is whether

permafrost present special problems, and whether it is affected by underground nuclear tests. Russian scientists have explained that at Novaya Zemlya the permafrost is generally 400 to 500 metres deep. All larger tests are conducted at a depth that takes them below the permafrost, i.e. - at depths of 600 m or more. Smaller tests, in the one-kiloton range are placed at a minimum depth of 150- to 180 metres. The US also detonates its nuclear devices at a minimum depth of 180 metres (600 feet) at its Nevada test site.

Although there are basic similarities in many of the design safety features and detonation authorization procedures used by the US and the USSR, there remain sharp differences in their respective acceptable standards for the venting of radioactive gases and other by-products.

A joint symposium in Canada 23-24 April 1991, revealed that the containment standards employed by the former Soviet Union are not as rigerous as those of the US. US scientists, however, acknowledged that they would be unable to achieve current US containment standards if they were to test in the same difficult conditions Soviet scientists face at Novaya Zemlya[20].

While the information provided by the Soviet scientists went a long way toward filling many gaps in knowledge, it does not ease the concerns about the potential for a disastrous accident, or about the effects of venting on the Arctic environment. If the Soviets are doing the best they possibly can given the limitations of the Arctic region, the question is whether they should they be testing there at all?

In this regard it must be noted that although US standards for venting are stricter, both in theory and practice, than those employed at Novaya Zemlya, the former Soviet Union has, for six years, advocated a complete ban on nuclear testing. Furthermore, the Soviets in the late 1980s maintained an eighteen-month long unilateral moratorium on nuclear testing.

The US, in contrast, remains opposed to a complete ban, and to beginning any negotiations, and to discussing nuclear testing issues.

Agenda for Arms Control in the High North

A study of the interests and factors influencing strategic stability in the High North makes it apparent that the following measures would be of particular benefit to increase stability, and should therefore be given high priority by the concerned states:

1. . Encourage both signatory powers of the START Treaty to revise the counting rules for heavy bombers in such a way that they do not favour the build-up of long-range bombers, and increasing the nuclear warhead inventories above the agreed central limits.

2. Encourage the START signatory powers to renegotiate the Treaty in such a way that it limits heavy bombers in the same way as it limits other strategic delivery means, ICBMs and SLBMs.

3. Limitations on Russian Strategic Air Defence, particularly as regards forward air defence beyond Russia's own borders, in balance with reduction of the long-range bomber and cruise missile threat.

4. Mutual limits on nuclear powered attack submarines to increase the security of Russian SSBN's, and of the NATO sea lines of communications.

5. Widening of the Naval Confidence Building Measures by exchange of information about the content of Naval Rules of Engagement to reduce the risk of inadvertent conflict at sea.

6. Seek agreement to a comprehensive ban on nuclear testing, and if this is not possible, to get the United States to provide Russia with assistance for establishment of an underground nuclear testing site with acceptable containment standards located outside the High North.

It is clearly in the mutual interest of the two nuclear superpowers to implement the above mentioned measures, and this would also meet the global interests for increased stability at a lower level of military forces. At the regional level, there should be a common interest among the non-nuclear circumpolar states to join their efforts to achieve the mentioned aims.

Notes

1. President B. Yeltsin has explained to Minister of State James Baker on 16 december 1991 that all the republics in the new confederation of independent states will enter a defence alliance subordinated to a joint strategic command. The joint command will comprise Air Force, Navy, Air Defence, strategic and tactical nuclear weapons as well as military intelligence in foreign countries. In a crisis situation, the supreme Commander of the Alliance, together with the presidents of the four nuclear weapons republics, will in common decide if and when nuclear weapons are to be used. Only the joint command of the alliance, and it alone, will have the authority to decide this question (Aftenposten, 17 Dec 1991).

2. President George Bush's Initiatives on nuclear arms, Documentation, NATO review, no 5, October 1991.

3. A.Kortunov, I.Malasjenko, "Tbilisi","Riga" and the rest?", *New Times*, A Soviet Weekly of World Affairs, nr 51, December 19-25 1989.

4. Tomas Ries, *Cold Will, The Defence of Finland*, Brassey's, London 1988, p.374.

5. Steve Lindberg, *Gemensam sakerhet i Norden*, Forsvarets Forskningsanstalt, Stockholm 190, p.50,54-56.

6. Canadian Centre for Arms Control and Disarmament, *Barometer*, Fall 1991.

7. Canadian Centre for Arms Control and Disarmament, *Barometer*, Fall 1991, p. 7.

8. Canadian Centre for Arms Control and Disarmament, *Barometer*, Fall 1991, p. 3. It is not clear whether the new US Strategic Command will imply a delegation of authority to release nuclear weapons from the President of the US. If this is not so, it does not seem that the new command will increase the risk of premature use of nuclear weapons.

9. Admiral J.D.Watkins, USN, The Maritime Strategy, *United States Naval Institute Proceedings*, Supplement, January 1986.

10. George Lindsey, *Strategic Stability in the Arctic*, Brassey's London, Summer 1989, p. 67.

11. Donald C.F.Daniel, *Beyond the 600-ship Navy*, Brassey's, London Autumn 1991, p.48.

12. Lecture by Colonel General V. Karpov, Chief of the strategic section at the General Staff Academy of the Soviet Armed Forces at a seminar at the Norwegian Institute of Foreign Affairs, 13 April 1988.

13. Captain, RNoN Jacob Børresen, De nordlige havområder i en ny dimensjon, The Norwegian Atlantic Committee Series No 141, Oslo 1991, p. 13.

14. Johan Jørgen Holst, From Arctic to Baltic - The strategic significance of Norway, *NATO's 16 Nations*, Brussels, April 1991.

15. Donald C.F. Daniel, Beyond the 600-Ship Navy, *Adelphi Papers no 261*, IISS, London, Autumn 1991, p. 48.

16. *President Bush's initiatives on nuclear arms 27 september*, NATO Review No 5, Brussels october 1991.

17. AP, FNB-Reuter-DPA-AFP reports quoting Tass, Dagens Nyheter, Stockholm 6 October 1991.

18. ZIMM, LtCom Alan D.: "The First Salvo." *United States Naval Institute Proceedings*, February 1986.

19. *Confidence-Building measures at Sea*, Norwegian Defence Research Establishment Report - 88/5002, September 1988.

20. Canadian Centre for Arms Control and Disarmament, *Barometer*, Summer 1991, p. 1.

Appendix A. The START Treaty and the Arctic

The START Agreement signed in Moscow on 31 July 1991 will have consequences for the Arctic if it is implemented. On the political level the Treaty is a reflection of the cooperation between the former Soviet and present US leadership. For the time being the post-Soviet Russian régime under Boris Yeltsin appears to be pursuing the same basic foreign policy line as the former Soviet leadership. Since the tone of this relationship also is a key factor determining the overall security-political climate this is fundamentally positive. However with the collapse of the Soviet Union in December 1991 the future status of the treaties signed by the USSR are in doubt. In the first place the former single Treaty partner is now replaced by at least 14 new and more or less independent states. The extent to which they will honour Soviet agreements remains uncertain, while the multitude of new actors makes the situation more complex. To some extent this is offset by the fact that Russia will inherit the bulk of the ex-Soviet strategic nuclear command system and arsenal. Thus the consequences of the breakup of the Soviet Union are less dramatic for the START Treaty than for instance for the CFE Treaty. In the second place however the future development of Russia still remains highly uncertain. On the one hand it is uncertain to what extent Russia's present and future leadership will continue to honour the Soviet agreements and continue the present cooperative foreign policy line. On the other hand Russia herself may split up into a further number of smaller entities, which could also split the strategic nuclear forces further. The following section is based on the assumption that Russia remains intact, that Russia preserves a global strategic nuclear policy and that the START Treaty provisions are honoured. However as noted above the future of Russia remains highly uncertain.

Assuming the START Treaty is honoured it will have direct military consequences for the Arctic strategic environment. This is because part of the nuclear forces regulated by the Treaty have a partial Arctic orientation. That is to say that their basing, transit or launch involves the use of areas close to or in the Arctic. This makes the affected regions of vital importance for US and Russian national security, which in turn draws their political and military interest to these areas. Since the START Treaty alters the number and significance of these forces it will also affect their impact on the Arctic region. This will not have immediate or direct consequences but will modify the Russian and US strategic interests in the north, including the way in which they perceive the importance of the region and their Arctic military posture. Hence the changes inaugurated by the START Treaty have long-term consequences for the regional security equation. These consequences are outlined below. However once again one should note that these strategic considerations are today heavily overshadowed by the degeneration and crises of the Russian internal collapse.

Before START

The US and Russian strategic nuclear forces which are part of the START Agreement consist of a triad of Strategic Nuclear Delivery Vehicles (SNDV). They are:

Submarine Launched Ballistic Missiles (SLBM),
Heavy Bombers (LRB - Long Range Bombers),
Intercontinental Ballistic Missiles (ICBM).

These strategic nuclear forces are part of the central nuclear relationship between the US and Russia. Their primary function hitherto has been nuclear deterrence, and they have thus made a deliberate direct confrontation between the two great powers unthinkable. These weapons are thus not directed against the Arctic region specifically, but their operation has involved the use of the Arctic to varying degrees. This 'Arctic impact' is outlined below, giving the situation in the late

1980's. This also means that the Soviet forces are referred to as 'Soviet' and not as 'CIS' or - as in the rest of this section - as 'Russian'.

US Strategic Forces in the North Before START

The breakdown of the pre-START US strategic nuclear warhead arsenal[1] is provided in the table below and its Arctic consequences analysed in the following subsections:

System	Warheads	Percent
SLBM	5,376	40.1 %
LRB	5,572	41.6 %
ICBM	2,450	18.3 %
Totals:	13,398	100.0 %

Two of the three weapons systems in the triad have involved planned or actual operations in or near the Arctic. They are the SLBM forces, whose Arctic orientation gradually declined during the 1980's, and the LRB forces, whose Arctic orientation increased during the 1980's. US ICBM forces have no Arctic operational profile.

US SLBM forces

40% of the US arsenal of strategic nuclear warheads is deployed on submarine launched ballistic missiles (SLBM). 36% of these warheads consist of the *Poseidon* C-3 intermediate range SLBM. Its 4,600 km range means that it must be launched from patrol areas in the north Atlantic, Mediterranean or possibly northern Indian Ocean if it is to reach targets in the Russian strategic heartland west of the Urals. Most of these SLBM are probably assigned patrol zones in the north Atlantic, where their main forward operating base lies (Holy Loch in Scotland) from which a reported ten SSBN operate.

On the other hand 64% of the US strategic submarine force is now equipped with the intercontinental range *Trident* C-4 and D-5 SLBM which is replacing the *Poseidon*. The 7,400 and 12,000 km range of these missiles permit them to reach strategic targets in Russia from most of the worlds oceans. Since the Russian capability to track and attack US submarines increases the closer to the Russian main naval bases one operates it is unlikely that the *Trident* submarines would approach the relatively dangerous waters in the Arctic. Thus the development of this SLBM system as of 1980 actually reduced the strategic importance of the north since it reduced the number and significance of those SLBM's deployed to the northern waters.

US LRB forces

42% of US strategic nuclear warheads are deployed aboard intercontinental range bombers (LRB). These bombers are all home-based in the United States and their shortest transit route to targets in Russia passes directly over the Arctic. For those bombers assigned targets in the Russian heartland the shortest flight route passes over the 'European Arctic' - that is to say over Greenland, the northern part of the Norwegian Sea and then directly over Norway, Sweden and Finland. This makes this airspace of vital importance for the US offensive nuclear forces and for the Russian strategic air defence efforts.

How many US LRB actually would employ the shortest flight route to their targets is uncertain and would vary according to the scenario. These aircraft could approach their Russian targets from a variety of directions, using their aerial refuelling capability and/or operating via forward air facilities on Guam in the Pacific, Diego Garcia in the Indian Ocean or other locations. However most would probably use the direct Arctic flight routes. This is so for three reasons:

In the first place it reduces the LRB dependence upon vulnerable support facilities. In the event of a nuclear war forward air bases would be destroyed in minutes and vulnerable airborne tanker operations could be interfered with or prevented. This makes the use of direct flight routes with a minimum of support dependence desirable or unavoidable.

Secondly the desolation of the Arctic airspace means that there is less likelihood of the LRB's being detected or interfered with by third parties, as could be the case if for instance the People's Republic of China, India, the Middle East or central Europe were used as transit routes.

Finally the Arctic, and particularly nordic Arctic, offers the greatest security for the LRB forces. This is the only part of the world where they can approach the immediate vicinity of the Russian frontiers behind the shield of an allied state (Norway) and with immediately available forward based air support (in the UK and Iceland). It is also the point where the Russian strategic air defences are the thinnest since the bordering states of Norway, Finland and Sweden make it difficult for them to extend outwards beyond the Russian frontiers, and the Russian heartland begins immediately inside the frontiers.

Thus an important part of the US LRB force would probably transit Arctic airspace in the event of a war with the USSR. This possibility has increased since the deployment of the ALCM after 1982. This is a standoff weapon with a 2,400 km range, designed to be launched from relatively secure airspace beyond the reach of the Russian air defences by the vulnerable B-52G/H bombers. One of the few areas in the world which both lies within 2,400 km range of the bulk of Russian strategic targets and is relatively sheltered from the Russian air defence system is the Norwegian Sea. Since the ALCM is also designed to be used en masse - overwhelming the air defences - and in concert with the penetrating bombers - blasting a path

through the defences - the ALCM has boosted the strategic importance of the Arctic and particularly nordic airspace considerably.[2]

US ICBM forces

18% of US strategic nuclear warheads are deployed aboard intercontinental ballistic missiles (ICBM's). This force has virtually no Arctic impact at all. It is entirely based in the US and its extra-atmospheric ballistic trajectory to its targets in the USSR passes far above Arctic airspace. It has had a marginal impact on the Arctic area by leading to the deployment of Russian early warning EW radars to her Arctic coastline (Pechora and the Kola) and to the Baltic area but the security political consequences of these facilities are marginal. Thus this force has helped reduce the strategic importance of the Arctic.

Soviet Strategic Forces in the North before START

The breakdown of the Soviet pre-START strategic nuclear warhead arsenal is provided in the table below and its Arctic consequences analysed in the following subsections:

System	Warheads	Percent
SLBM	3,636	31.2 %
LRB	1,460	12.6 %
ICBM	6,545	56.2 %
Totals:	11,641	100.0 %

Two of the three Soviet strategic nuclear weapons systems have involved planned or actual operations in the Arctic. They are the SLBM force, of which two-thirds has traditionally been based on the Kola and whose Arctic orientation has increased strongly during the 1980's. The second force with an Arctic orientation are the Soviet strategic bombers, whose estimated

wartime use of the Arctic for forward basing and transit has remained roughly stable. On the other hand Soviet ICBM forces have had virtually no Arctic operational profile whatsoever.

Soviet SLBM forces

31% of Soviet strategic nuclear warheads were deployed on her SLBM's, which have a strong Arctic orientation. In 1990 61% of all Soviet strategic submarines (38 SSBN) were based on the Kola and 39% on the Kamchatka Peninsula in the Far East (24 SSBN), which has also been the rough SSBN distribution for the last two decades. However since 1980 the importance of the Kola bases has increased. During the 1980's the Arctic sea areas north of the Kola - the Barents, Kara and Greenland Seas and the Arctic Ocean - became the patrol and launch zones for the modern Soviet SSBN's. This led to the deployment of all Soviet SSBN classes constructed since 1980 - the *Typhoon* and *Delta* IV types - to the Kola. They are armed with the advanced SS-N-20 and SS-N-23 SLBM with 10 and 4 warheads respectively. As a result 72% of the Soviet SLBM warheads are based on Kola and only 28% on Kamchatka:

SSBN	Total	Northern Fleet	SLBM/ SLBM	SSBN	Whds	NorFlt	Whds PacFlt
DELTA IV	6	6 (100 %)	SS-N-23	16	4	384	-
TYPHOON	6	6 (100 %)	SS-N-20	20	10	1,200	-
DELTA III	14	7 (50 %)	SS-N-18	16	7	784	784
YANKEE II	1	1 (100 %)	SS-N-17	12	1	12	-
DELTA II	4	4 (100 %)	SS-N-8	16	1	64	-
DELTA I	18	8 (44 %)	SS-N-8	12	1	96	120
YANKEE I	12	6 (50 %)	SS-N-6	16	1	96	96
Totals:	61	38				2,636 (72%)	1,000 (28%)

This made the Arctic important both for the basing and operation of some three quarters of the Soviet SLBM warhead arsenal, leaving it a key element in the US-Soviet strategic nuclear relationship. This SSBN deployment is one of the primary factors behind the buildup of the Soviet Northern Fleet general purpose forces over the last three decades, as well having helped draw considerable US (and British) naval interest to the northern waters.

Soviet LRB forces

13% of Soviet strategic nuclear warheads were deployed on her intercontinental bomber force. These aircraft had their main peacetime bases deep in the central USSR and were not home-based near the Arctic. However all of these bombers are strongly dependent upon using the shortest transit route from the Soviet Union to their targets in the US, since they did not dispose of secure forward basing areas outside the USSR and their aerial refuelling capability is limited. This means that most if not all would transit the Arctic in the event of war. 71% of the Soviet LRB main bases (five out of seven) were located west of the Urals. From here the shortest flight path to the US passes directly over or northeast of the nordic states. While the Russian LRB forces would disperse in the event of war and would probably not operate en masse, a significant proportion would in all likelihood transit the airspace in the immediate vicinity of the nordic states. This is also borne out by the fact that 40% (five out of twelve) of their estimated forward staging bases along the Soviet Arctic coastline are located near the nordic area on the Kola (2) on Novaja Zemlya (1) and on Zemlya Frantsa Iosifa (2). Thus the airspace around the nordic region probably remains of major importance as a forward staging and transit route for the Russian strategic bomber force.

Soviet ICBM forces

56% of Soviet strategic nuclear warheads were deployed on ICBM's. For the same reasons as for the US ICBM's these have had limited Arctic implications. Since the mid-1960's they have all been based in the central USSR relatively far from the Arctic and their extra-atmospheric ballistic trajectory places their transit route above Arctic airspace. Hence their deployment reduced the strategic importance of the Arctic by diminishing the relative size and significance of those nuclear forces with an Arctic orientation.

Conclusion

On the basis of the above it is possible to establish a rough picture of the role of the Arctic in the US and Soviet strategic nuclear relationship at the signing of the START Treaty. The table below provides an overview of the pre-START proportion of US and Soviet strategic nuclear forces based in the Arctic and/or estimated as having it as a primary operational zone in wartime:[3]

		Warheads	Arctic	Arctic % of total
US	SLBM	40 %	30 %	12 %
	LRB	42 %	90 %	38 %
	ICBM	18 %	-	-
	Sum:	100 %		50 %
USSR	SLBM	31 %	72 %	22 %
	LRB	13 %	100 %	13 %
	ICBM	56 %	-	-
	Sum:	100 %		35 %

It is also possible to provide a slightly more precise picture of which parts of the Arctic were affected by the Soviet-US strategic nuclear relationship and - very roughly - to what extent:

	% of SNDV	Airspace	Sea	Land	% of Arsenal
US	30 % SLBM	-	Patrol	-	12 %
	90 % LRB	Transit/launch	-	-	38 %
	0 % ICBM	-	-	-	-
USSR	72 % SLBM	-	Patrol	Bases	22 %
	100 % LRB	Transit	-	FOB	13 %
	0 % ICBM	-	-	-	-

It is interesting to note that roughly half of the US strategic forces have a potential Arctic operational profile. This is largely due to the important role played by the US strategic bombers, which carry the largest number of warheads in the US strategic nuclear arsenal and which have a strong Arctic orientation. On the other hand the Soviet strategic nuclear forces have a relatively lower Arctic profile, with an estimated one third likely to involve the Arctic in their operations. This is primarily due to the predominant role played by their ICBM force.

After START

The exact consequences of the START Treaty for the US and Russian strategic nuclear arsenal are not possible to foresee since the Treaty leaves considerable latitude for each side to decide how it will make the cuts within the overall limits. However it is possible to draw some general conclusions and estimate the broad range of alternatives open to both sides.

The proportion of US and Russian strategic nuclear forces with a potential Arctic orientation is thus likely to increase after START. This is so for three reasons:

Firstly because the START reductions impose the strongest cuts on those forces with a non-Arctic profile, that is to say US and Russian ICBM forces. This means that the relative importance of the remaining forces increases.

Secondly because the cuts imposed on the Russian SLBM force will in all likelihood eliminate all Russian strategic submarines based in the Far East, leaving all or almost all remaining SSBN's based on the Kola.

Thirdly because the START counting rules (and US policy) strongly favour the strengthening of the heavy bomber forces, which will increase the importance of Arctic airspace further.

One should note that the START Treaty imposes strong cuts on the US and Russian ballistic warheads (ICBM and SLBM). The Treaty leaves no latitude in this area, obliging the US to cut ballistic warheads by a minimum of 38% and the USSR to cut them by at least 45%. This will reduce the ballistic warheads, but will also make the remaining ballistic warheads more important, since there are less reserves and the smaller forces will be more vulnerable. This increases the importance of whatever forces are left or moved up to the Arctic area. This point is particularly important where the Russian SSBN force is concerned.

Finally one should note that the above warhead cuts (38% and 45%) only apply to both sides ballistic warheads, and that the counting rules for the bombers are far more flexible. This is dealt with below.

US Strategic Forces in the North after START

Tables 1. and 2. outline the present number of warheads in the US strategic arsenal included in the START Treaty, the warhead limits under the Treaty and the resulting cuts which the US must make if it is to comply with the Treaty. On the basis of the data presented in the table the US must - technically - cut her overall number of warheads by 38% and her

Strategic Nuclear Delivery Vehicles (SNDV) by 17% if she is to meet the Treaty limits:

	Warheads	SNDV
US total	9,724*	1,930
START limit	- 6,000	- 1,600
	3,724 (38 %)	330 (17%)

* Using START counting rules.

The SNDV limits are precise and cannot be circumvented, but the warhead limits are flexible and strongly favour the heavy bomber. In practice - as we shall see - the actual US warhead arsenal can be more than doubled by exploiting the special counting rules governing heavy bomber warheads. Secondly the Treaty permits considerable latitude as to the way in which the different SNDV types are reduced to meet the overall counting limits. The most likely options for the US are examined below.

US SLBM and ICBM forces

One of the few precise predictions which can be made on the basis of the START regulations is that the US will have to cut her ballistic missile warheads (ICBM and SLBM) by at least 37%:

US total	7,826
START limit	- 4,900
	2,926 (37%)

This is one of the few areas where the START Treaty leaves little room for manoeuvre, as the limits and the counting rules are clear. However from here on the going gets less clear. Within the above overall ceiling governing the ballistic warheads the US is free to choose how the ballistic cuts are to be made and hence what share of ICBM and SLBM will be eliminated. The size and composition of the remaining

ICBM and SLBM force is therefore difficult to foresee. However one should note that the SLBM remains the only secure second strike system in the US nuclear arsenal, and as such it occupies a position of special importance. Thus it is likely that a significant number of warheads will remain deployed on the SLBM's.

On the other hand it seems likely that the remaining SLBM force will only include the most modern *Trident* SLBM's and will lose its last intermediate range *Poseidon* forces. These ageing SLBM's (first deployed in 1971) have already been phasing out gradually in favour of the new *Trident* C-4 and D-5 systems and today only 12 *Poseidon* SSBN remain in operation. Their retirement is likely to be accelerated by the START Treaty partly because the total SLBM force must now be cut, and partly since each *Poseidon* SLBM is counted as carrying 10 warheads and hence substantial warhead savings (1,920) can be made by removing this SLBM type. This would cover 66% of the US ballistic missile warhead reductions:

Minimum ballistic cut:	2,926
Poseidon warheads:	- 1,920 (66%)
	1,006

Such a cut in the *Poseidon* force is important for the northern waters since it removes the last US SSBN type which had a clear north Atlantic orientation and of which part or all of the force could have involved the nordic waters. Their removal will help reduce the strategic significance of these waters, and in this respect reduce the involvement of the nordic area in the US-Russian nuclear relationship.

Reductions of the remaining US ICBM and SLBM forces are difficult to predict. On the other hand the exact composition of the remaining ballistic missile force does not matter as far as the Arctic is concerned. Neither of these systems involves the Arctic in their operation. The ICBM force has no Arctic orientation, while the *Trident* SLBM force is unlikely to

involve Arctic waters. Thus what really matters is not their future mix but their relative importance in the overall US strategic nuclear arsenal. The greater this is the less important will be those systems which do have an Arctic orientation, and hence the less involved will the Arctic be in the great power nuclear relationship.

In this respect the relative importance of the US ICBM and SLBM force will decline after START, as the proportion of warheads deployed aboard the ballistic systems falls markedly. At a minimum level - assuming the full 4,900 ballistic missile force is retained - the drop will be from the present 58% of the total force down to 45%. As we shall see below it could be even greater, as there are reasons why the US ICBM/-SLBM force may drop even lower than the 4,900 warhead limit.

Thus START is in fact imposing cuts on the two nuclear systems which have detracted from the strategic importance of the Arctic area. This will make the remaining US SNDV system - the heavy bombers - relatively more important in the overall US nuclear arsenal. Since this system also has a marked Arctic orientation this could also increase the strategic importance of the Arctic.

US LRB forces

Superficially the START Treaty indicates that the US will have to make significant cuts in her heavy bomber force. Assuming that the US desires to retain her full complement of 4,900 ICBM and SLBM warheads then the heavy bomber warheads will have to be cut by 42%, since there are 1,764 bomber warheads and the limit is 1,100. This will in theory reduce the US bomber force, but in practice the effect can be the opposite. The reasons for this are twofold: firstly because of the general drift of US national security strategy and specifically nuclear strategy, and secondly because of the

special counting rules which apply to heavy bombers under START, and which favour these systems.

The evolving US National Security Strategy and nuclear strategy are presented elsewhere and will not be dealt with here,[4] other than to note that it favours the development of heavy bomber forces over and above ballistic missile systems and that the essence of US START strategy was based on favouring the bomber. Thus the trend is towards strengthening the US heavy bomber force, and particularly the penetrating bombers.

This is evident if we look closer at the START counting rules which in fact permit both sides to increase the actual number of warheads dramatically over the 6,000 limit, if the warheads are placed on heavy bombers, and particularly if they are placed on non-ALCM heavy bombers. Thus having more bombers permits the US to have more warheads. This is so for two reasons:

1. ALCM heavy bomber counting rules.

The START Treaty distinguishes between ALCM bombers (which can carry ALCM) and non-ALCM bombers (which can carry bombs and SRAM). The US is permitted to have up to 150 ALCM heavy bombers which are counted as carrying 10 ALCM each though they actually are permitted to carry 20 ALCM:

Actual ALCM:	150 x 20	=	3,000
START count:	150 x 10	=	1,500
Net gain:			+ 1,500

Thus by deploying the full 150 ALCM bomber force the US can increase its authorised nuclear warhead arsenal from 6,000 to 7,500, which is a strong incentive to retain the full 150 ALCM bomber force. The US can also deploy more ALCM bombers, but in this case all those exceeding the 150 level are counted for the actual number of ALCM which they carry.

The US presently exceeds the number of limited-count ALCM bombers by 22 aircraft:

B-52G:	77
B-52H:	95
	172
START:	150
Excess:	22

Thus we can expect the US to reduce the present B-52G force to 55 aircraft, which reduces the ALCM bomber force by 13%. From this perspective the size of this Arctic-oriented weapons system will probably be cut marginally. One should also note that the 77 B-52G are only able to carry 12 ALCM. Thus if the ALCM bomber force is trimmed to fit the START ALCM counting limit and optimised for maximum ALCM loads (-22 B-52G) then it would only carry 2,560 ALCM:

B-52G	55 x 12	=	660
B-52H	95 x 20	=	1,900
			2,560

Thus using the present B-52G/H ALCM carriers the US will only gain 1,060 warheads over the START limit of 6,000. (2,560 - 1,500 = 1,060.) However this can be increased to 1,500 when the B-52G are replaced with another ALCM bomber (eg the B-1B) in the years to come. This role conversion is already foreseen for the B-1B for when it is no longer perceived as capable of penetrating Russian strategic air defences. USAF analysts estimate that this will be the case in the latter half of the 1990's.

Non-ALCM heavy bomber counting rules

However the real warhead boost will probably come through the deployment of non-ALCM heavy bombers. Here the START Treaty permits truly remarkable warhead gains. All non-ALCM heavy bombers are counted as carrying only 1

warhead under the START rules, though they in fact are allowed to carry their full weapons load. The US B-52G version which is not fitted for carrying the ALCM can carry up to 12 bombs/SRAM and the B-1B can carry up to 24 bombs/SRAM. Thus the present US non-ALCM heavy bomber force is already permitted to carry 2,614 warheads over the 6,000 warhead START limit:

Bomber	Number		Warheads		
B-52G	39	x	12	=	468
B-1B	95	x	24	=	2,280
Sum:	134				2,748

By subtracting the START warhead count for these bombers from the real maximum load which they can carry we get the number of warheads over the START limit which these bombers provide the US:

Actual warheads:	2,748
START count:	134
Difference:	2,614

If we add up the existing extra ALCM and non-ALCM heavy bomber warheads which are permitted but not counted under START we thus get the actual authorised US warhead level:

Extra ALCM warheads:	1,060
Extra non-ALCM warheads:	2,614
Sum extra warheads:	3,674

Thus with the present heavy bomber ORBAT the actual number of warheads permitted to the US after START is 9,674 (6,000 + 3,674). This means that the US really only needs to cut her warhead arsenal by 28% to meet the START requirements, provided she retains her full heavy bomber force along the lines indicated above:

Real US warhead total:	13,398	
Real START limit:	9,674	
Cuts:	- 3,724	(27.8 %)

However under these conditions 55 % of the US strategic warhead arsenal is carried by the heavy bombers:

ALCM warheads:	2,560
Non-ALCM warheads:	+2,748
Total bomber warheads:	5,308
Real START limit:	9,647
LRB warheads:	- 5,308 (55 %)
Ballistic warheads:	4,339

This represents an increase of heavy bomber share of the US strategic warhead arsenal of 13%, from the present 42% of warheads carried by the LRB up to 55%. This will make the LRB force the single strongest element in the nuclear triad. This is important if we take into account that this force has the Arctic area as one of its primary operational zones, both for standoff ALCM launch and for transit of penetration bombers.

Finally one should also note one important point. All the above calculations are based on the assumption that the US wishes to retain her full force of 4,900 warheads on the ballistic missiles (ICBM and SLBM) permitted under START. However this is by no means certain. It is quite possible that the US will reduce the number of her ballistic warheads below the 4,900 limit in order to deploy more bombers.

There are two key arguments in favour of this option. Firstly it fits in with US strategy which is heavily in favour of an increase in the strategic bomber force, and particularly of dual-capable nuclear/conventional penetration bombers with a global range. This is favoured for several reasons.[5] On the nuclear strategic level because the manned penetration bomber provides the best means of delivering the type of discriminating strategic counterforce attack which appears to be a primary

objective in US nuclear strategy in the 1990's. Secondly because the manned bomber can - unlike the ICBM and SLBM - also be used for conventional operations. Thus it is not limited exclusively to the frozen stalemate of nuclear deterrence but can be used to support US global interests and for regional contingencies. This is an argument which is equally attractive to Congress as it is to the Air Force, and in fact the move towards an increased emphasis upon dual capable heavy penetration bombers has been one of the key - if not the key -elements in the US START strategy.

Secondly, an increase in heavy non-ALCM bombers would also permit an increase in warheads under the START counting rules. Thus replacing one *Minuteman* III ICBM attributed with 3 warheads for three non-ALCM bombers which are also attributed with 3 warheads but which are permitted to carry 72 warheads would increase the number of US warheads by a factor of 24:

Number	Weapons System	Warheads: START count	Warheads: Real count
1	Minuteman III	3	3
3	Non-ALCM bombers	3	72

In fact if the US so desired she could double her number of strategic warheads after START and still remain fully within the formal START warhead limits. An example of this is shown below:

SNDV	Number	Warheads per SNDV: START count	Total Warheads: START count	Total Warheads: Real count
Trident	500	8	4,000	4,000
MX	120	10	1,200	1,200
B-1B	800	1	800	19,200
Totals:	**1,420**		**6,000**	**24,200**

Such a force would leave the number of delivery vehicles (SNDV) well within the START limit (1,600) and exactly

match the START warhead limit (6,000) while providing the US with a real warhead total of 24,200. This is of course strictly hypothetical and will not happen for many reasons, but serves to illustrate the way in which the heavy bombers can be used to exploit the START counting rules. However the extreme development given above is neither necessary nor economically justifiable (given the cost of modern heavy bombers). Nor is it likely that the heavy bombers would be fully loaded with warheads in an operational context, since it limits their flight performance and because multiple bombing missions on such a scale overtaxes the flight crew. However what is likely is that the non-ALCM heavy bomber force may be prioritised over the other systems. Since these also have the Arctic or nordic airspace as a primary transit zone in wartime such a development would increase the strategic importance of these areas.

Russian Strategic Forces in the North after START

Tables 3. and 4. outline the present number of warheads in the Russian strategic arsenal and included in the START Treaty, the warhead limits under the Treaty and the resulting cuts which Russia must make if it is to comply with the Treaty. The USSR has a similar latitude in determining the exact form of the cuts within the overall START limits and thus the exact consequences cannot be foreseen. However as for the US it is possible to identify the likely general trend.

The USSR must techncially cut her overall number of warheads by 45% and her SNDV by 46% if she is to meet the Treaty limits:

	Warheads	**SNDV**
Russian total	10,996*	2,947
START limit	- 6,000	- 1,600
	4,996 (45%)	1,347 (46%)

* Using START counting rules.

The launcher limits are clear but the the warhead limits are as flexible for the USSR as for the US, as is the latitude for determining how the cuts will be distributed within the overall limits. The likely options are outlined below.

Russian ballistic forces

The START counting rules include specific limits on the two most modern Russian ICBM types: the Heavy ICBM (SS-18) and the Mobile ICBM (SS-24 and SS-25). Here the ceiling is set at 1,540 warheads for the heavy ICBM and 1,100 warheads for the mobile ICBM:

Heavy ICBM warheads:	3,080	Mobile ICBM warheads:	825
START limit:	- 1,540	START limit:	1,100
	1,540 (50%)		+ 275 (+33%)

These counting rules are clear. This means that heavy ICBM warheads must be cut by at least 50% but that the mobile ICBM can still be increased by 33% since the upper limit has not yet been reached. Thus the aggregate heavy and mobile ICBM cuts are actually 32%:

Modern ICBM:	3,905
START limit:	- 2,640
	1,265 (32%)

These ICBM are the most modern in the Russian arsenal and a vital part of her nuclear planning. Thus it is likely that their full quota will be retained. If this is so, and assuming the USSR wishes to keep her full 4,900 ballistic warhead complement, there will be 2,260 warheads left to be split between the remaining older ICBM and the SLBM force:

START ballistic limit:	4,900
Hvy & Mob limit:	- 2,640
	2,260

Of course more warheads could be allocated by cutting the heavy and mobile ICBM warheads below the upper START limits, but this appears unlikely for the reasons given above. This means that major cuts will have to be made in the large arsenal of older ICBM and SLBM warheads:

Older ICBM warheads:	2,640
SLBM warheads:	+ 3,636
Sum:	6,276

These 6,276 warheads must be cut by 64% if they are to reach the 2,260 warhead level:

Old ICBM/SLBM wrhds:	6,276
Available:	- 2,260
	4,016 (64%)

The distribution of these cuts betweeen the older ICBM and the SLBM forces is up to the USSR and thus difficult to foresee. However probably most cuts will be made in the older ICBM force. On the one hand the ICBM leg of the triad is already partly covered by the modern heavy and mobile ICBM warheads, and on the other hand since the Russian SLBM force represents their only relatively secure strategic nuclear reserve. Since the Russian SLBM force is of particular importance for the Arctic its development is examined in detail below.

Russian SLBM forces

While the exact cuts to the Russian SLBM force cannot be foreseen they will probably have to be cut considerably, even if they are prioritised over the older ICBM. On a minimum level - assuming that the Russian leadership scrapped all older ICBM systems in favour of the SLBM's - the SLBM force would still have to be cut by 10%. Such limited cuts are unlikely however. More probable is that at least some of the

older ICBM are retained and that somewhere between 40% to 60 % of the SLBM warheads are cut. The exact size of the SLBM reductions within these two extremes depends upon how many of the older ICBM's the Russian leadership chooses to preserve.

However from an Arctic perspective a precise prediction is not necessary since the strategic consequences are essentially the same at both ends of the scale. This is because even minimum SSBN cuts of 40% of the current force will force the USSR to eliminate virtually all older SSBN's. This would leave only the most modern SSBN's, all of which are based on the Kola at present. This is illustrated in the table below, which shows how many SSBN's the USSR will have to cut if she is to reduce her SLBM warhead arsenal by 40 and 60 % respectively, and assuming that the Russian Navy tries to retain as many modern SSBN as possible:

	40% SLBM Warhead Cut		60% SLBM Warhead Cut	
SSBN	**SSBN cuts**	**Warhead cuts**	**SSBN cuts**	**Warhead cuts**
Yankee I	12 (100 %)	192	12 (100 %)	192
Delta I	18 (100 %)	216	18 (100 %)	216
Delta II	4 (100 %)	64	4 (100 %)	64
Yankee II	1 (100 %)	12	1 (100 %)	12
Delta III	8 (57 %)	896	14 (100 %)	1,568
SUM	43 SSBN	1,380 (38%)	49 SSBN	2,052 (56%)

These cuts can partly be offset by downloading - reducing the number of warheads on a missile. The START Treaty permits the downloading of up to a total of 1,250 re-entry vehicles on up to three different types of ballistic missile. This would permit a greater number of SNDV (and hence SSBN launch platforms) to be retained if desired. However with this option the Russian SSBN fleet will have to be cut substantially. At a minimum this would involve the removal of 43 SSBN's - or roughly 70 % of the present force. If so, and if the Russians try to keep their most modern systems, then virtually all SSBN's with the exception of the *Typhoon* and *Delta* IV

classes will have to be eliminated. This would have two key consequences for the Northern Fleet:

1. On the basis of present deployments the bulk of the Russian Navy's remaining SSBN's will probably be based with the Northern Fleet and operate in Arctic waters. All *Typhoon* and *Delta* IV SSBN's deployed so far operate with the Northern Fleet, whose Kola bases provide the only good access to the Arctic Ocean, for which the *Typhoon* and *Delta* IV classes are specially designed. As a result the role of the Northern Fleet in global nuclear strategy is likely to increase.

2. An overall reduction of the number of strategic nuclear launchers will make the remaining systems even more important. Because of the size of the likely SSBN cuts this applies particularly to this force. At the same time the remaining Russian SSBN force would also - because it would be far smaller - become far more vulnerable to US strategic ASW. Hence we may expect US efforts to improve her strategic ASW capability - and Russian efforts to defend her SSBN's - to increase as well and to be focussed to a considerable degree to the North Atlantic and Arctic.

The aggregate result is that the importance of the Northern Fleet in global nuclear strategy will probably increase during the 1990's. This fleet will contain the lions share - if not all - of the Russian SSBN forces, whose smaller number will constitute a primary strategic asset and target for the USSR and the US respectively. This will probably maintain - and possibly increase - both great powers strategic interests in the associated Arctic and North Atlantic waters.

Russian LRB forces

Finally the same warhead counting rules apply to the Russian heavy bomber warheads as for the US, which again makes the exact outcome of the START Treaty uncertain. However it is not certain that the USSR will seek to exploit the bomber option as fully as the US might. This is because the air breathing leg of the triad has not - yet - emerged as such an important element in Russian strategic planning as it has in US planning. However this could change.

Under any event the Russian Union can still increase her heavy bomber warheads without breaking the START limits, since she has not yet matched them. If we assume that the USSR wishes to retain her full ballistic warhead quota of 4,900, then she will have 1,100 left for the heavy bombers. However the USSR presently only deploys 815 bomber warheads (according to the START counting rules) which means that this force can under all circumstances still be increased by 35% before it reaches the START bomber warhead limit.

It seems likely that the USSR will seek to fill this gap, which cannot be filled by ballistic warheads, and thus there will probably be an increase in the Russian LRB leg of the triad. As noted earlier this weapons system has a major Arctic orientation which in turn means that the strategic significance of Arctic airspace may also grow along with the increase in the role of the Russian LRB force.

It is also possible that the USSR will choose to boost her bomber forces above the 1,100 warhead limit, by cutting the number of ballistic warheads below the maximum level of 4,900. However this seems unlikely, given the Russian penchant for ICBM and the already large cuts which she will have to inflict on her SSBN forces. One should also note that the US has a large technological advantage of the USSR in the manned bomber field, and hence it is not sure to what

extent the USSR would want to focus on this area of comparative disadvantage.

Conclusion

The following general conclusions can be drawn regarding the consequences of the START Treaty for the Arctic area:

1. The relative number of warheads on the US heavy bomber leg of the strategic triad will increase and the heavy bombers will probably constitute the largest launch platform in the strategic arsenal. This increases the significance of this weapons system in the US-Russian strategic nuclear relationship. Since this weapons system also has a strong potential Arctic operational profile this could in turn increase the strategic importance of Arctic airspace and of Russian strategic air defence in this area.

2. The *Poseidon* SLBM force will probably be eliminated, removing the last of the US SLBM systems with a clear north Atlantic patrol profile. This will remove this link between the nordic waters and the US-Russian strategic nuclear relationship.

3. The remaining SLBM and ICBM force will be cut, reducing their relative importance in the strategic arsenal marginally.

4. The Russian SLBM force will be cut substantially, leaving only the modern *Delta* IV and *Typhoon* SSBN classes and possibly a few of the *Delta* III class. At present all Russian *Delta* IV and *Typhoon* SSBN's are based on the Kola and they are likely to remain based there since this is the only area which presently provides access to their Arctic patrol zones. As a result all or virtually Russian remaining SSBN's

will be based here, increasing the relative importance of these bases and the adjacent sea areas.

5. The overall Russian ICBM force will be cut substantially, reducing its strategic importance in the Russian arsenal marginally.

The aggregate result is that the significance of the systems which have an Arctic operational profile will increase after START. This will also increase the strategic importance of the Arctic area marginally, and particularly in two areas:

The importance of the Arctic waters as a Russian SSBN basing and patrol zone will increase considerably.

The importance of Arctic airspace for the US strategic forces will increase, as will the need for Russian strategic air defence in this area.

The probable develoment is outlined in the table below:

	Pre-START % of SNDV	Airspace	Sea	Land	% of Arsenal	Trend
US	30 % SLBM	-	Patrol	-	12 %	Decl.
	90 % LRB	Transit/launch	-	-	38 %	Incr.
	0 % ICBM	-	-	-	-	Decl.
CIS	72 % SLBM	-	Patrol	Bases	22 %	Incr.
	100 % LRB	Transit	-	FOB	13 %	Incr.
	0 % ICBM	-	-	-	-	Decl.

Notes

1. Unless otherwise specified all percentage are based on the number of warheads of the different weapons system in the US and Soviet strategic nuclear arsenal in June 1990, using the START counting rules for the maximum permitted real warheads loadings. The source for the data is: *The Military Balance 1990-1991*, London, IISS, October 1990: pp. 212-213, 216-223.

2. cf: RIES, Tomas: *Strategic Implications of Unmanned Airborne Vehicles for the Nordic Region.* Oslo, IFS, 1st. ed., April 1990: pp. 39-44.

3. Obviously this only provides a rough estimate of the strategic role of the nordic area in the US - Soviet strategic nuclear relationship. It is impossible to determine exactly how many strategic bombers would operate in a given area since this will fluctuate depending upon the scenario. However on the basis of available information it is possible to make a rough estimate of the general proportion of bombers which would have the nordic and adjacent airspace as a major operational area, and this is what the table provides. The percentages for the Soviet and US SLBM forces on the other hand are fairly reliable since these are actually based in the area.

4. See for instance (and particulary TRITTEN): *1991 Joint Military Net Assessment.* Joint Chiefs of Staff, Washington, D.C., DOD, March 1991: pp. 12-7. RIES, Tomas: 'US National Security Strategy in the 1990's.' in: *Strategic Implications of Unmanned Airborne Vehicles for the Nordic Region.* Oslo, IFS, 1st. ed., April 1990: pp. 30-35. SNIDER, Don M.: *Evolution of a New U.S. Military Strategi.* Washington, D.C., CSIS, 1st. ed., September 1990: p. 45. TRITTEN, James J.: *America Promises to Come Back: A New National Security Strategi.* (NPS-NS-91003A), Monterey, Ca., Naval Postgraduate School, 1st. ed., May 1991: p. 153.

5. cf. RIES, op.cit., pp. 39-44.

APPENDIX B. The Russian Military Inheritance

Russia will remain the only Arctic power among the post-Soviet states, regardless of whether the Confederation manages to survive or if the successor states split and divide the ex-Soviet military apparatus between them. Thus it is important to take a closer look at what the Russian military inheritance is likely to be.

The future division of the ex-Soviet military assets among the post-Soviet states is presently unclear. The most orderly perspective would be their joint integration under the CIS, or, failing that, their negotiated division among the post-Soviet states in accordance with each of these states plans. With the failure of the CIS Minsk meeting on 14 February 1992 it appears unlikely that at least the Ukraine will integrate her forces under the aegis of the CIS. This indicates that at least one major rift has already emerged, and two smaller states - Moldova and Azerbaijan - also refused to integrate their military with the CIS. Whether or not this stance will spread further is not yet certain, but one must note that on 12 February 1992 - two days before the Minsk CIS meeting on the future of the joint military was to be held - the Russian military leadership warned that Russia is prepared to establish a separate Armed Force if the CIS states cannot agree on terms of joint military forces. With the partial failure of that meeting this threat is becoming more acute.

In the event that these rifts persist the division of the military assets can either take place through negotiated compromise agreements or else by each party physically seeking to gain control of those assets which it desires. Which of these alternatives will emerge will vary from state to state. The clearest confrontation has emerged between the two largest post-Soviet states, Russia and the Ukraine, both of whom lay

claim to some of the miitary assets located in the Ukraine. This notably involves the Black Sea Fleet. How this and other disputes will be settled is not yet clear, but at present it appears unlikely that the Ukraine will voluntarily relinquish the military assets on her territory, with the exception of nuclear weapons. If this attitude persists - and it is by no means certain that it will - we may assume that the distribution of the military assets will take place on a competitive basis, with acquisitions decided by two main factors:

1. The national affiliation of military personnel.
2. The geographic location of military facilities and materiel.

On a general level we may assume that national affiliation combined with a desire to maximise living conditions will be the deciding factor for the allegiance of military personnel in the post-Soviet states. On the one hand a major concern of the professional military will be to safeguard the welfare of themselves and their families. This will probably lead a number to seek employment where it is offered, and could lead to a certain flow in military personnel between the post-Soviet states and out of the area of the former USSR. However this option will on the whole be limited to persons with specialised skills which are in demand. It would probably not extend to the average NCO and officer. The affiliation of this majority group would probably be determined by national and ethnic factors, with individuals pledging allegiance to their national military organisations, and - possibly - individuals from other nations being denied positions in the Armed Forces of a given nation.

On the other hand geographic location will be a major deciding factor for the distribution of military facilities (command centres, bases, depots, etc.) and - with some exceptions - equipment. This is because in most cases it is difficult to remove fixed military installations or ground combat equipment from the territory of the particular nation on

which they are located, if they have to be transported overland and if the host nation or other nations enroute oppose such a move. Exceptions are air units, air mobile units and naval units with a blue water capability, which possess a form of mobility which makes them independent of overland transit. Here the determining factor will be the allegiance of their crews and support personnel (which in the case of most units, but not all, will be mixed) and the ability to secure their local base and logistic requirements until departure.

National affiliations

In mid-1991 the personnel of the Soviet Armed Forces consisted of an estimated:[1]

Generals/Admirals:	4,000
Officers on active duty:	400,000
Career NCO's:	1,000,000
Conscripts:	2,000,000
Total:	3,400,000

NB: This excludes the large number of officers and career NCO's already dismissed between 1985-1991.

Of these the most important are the 1,400,000 remaining career military personnel, consisting of active duty officers and career warrant officers and NCO's. This is so for two reasons. The first consists of the dangerous social and political impact which the demobilisation of this large body of men and their families will cause. All 1,400,000 men and their families depend upon the Soviet Armed Forces for their welfare and security. While the conscripts in most cases have a home someplace to return to - and to which they want to return - the professional military have nowhere to go outside the Armed Forces. They are acutely aware of the fact that without any existing social security net the plight of their families and themselves will be grave. Thus the unemployment of the professional military will have a serious political

impact, made particularly dangerous by the fact they have military training, have access to weapons and, in most cases, tend to support traditional authoritarian values.

The second reason why the career officers and NCO's are important is military, and consists of the fact that their training and skills make them the key human element which most of the post-Soviet states need in order to construct their new national Armies.[2] However the economic collapse probably will dictate that the sum of the post-Soviet national Armies will be smaller than that of the Soviet Armed Forces. Thus the large number of lower-level career officers and NCO's probably will not be particularly sought after. However the higher ranking officers and specialists, particularly in key management or technological fields, will be vital for the national military programmes of the main successor states.[3]

The key factors determining the affiliation of these career military personnel and their families will probably be twofold: national roots and/or material welfare - based on the desire to maximise their security and living conditions in a society of increasing violence and hardship. The determining factors will not always be in that order however, since material welfare is becoming an increasingly scarce commodity in the former USSR. Thus officers and their families could seek to gain employment in a foreign nation if they perceive that this nation has better living conditions and offers greater security of employment. Thus Russian officers have for instance shown an extreme reluctance - including strikes and outright mutiny - to being transferred from relatively comfortable non-Russian areas, such as the Baltic states, eastwards. On the other hand national affiliations play a major part in deciding where an individual and his family are welcome. Thus anti-Russian pressure (including extreme violence in the southern and central Asian states) in most non-Slavic states is pressing several hundreds of thousands of Russians to migrate back to Russia. As a result it could be difficult for the average ex-Soviet officer to be accepted in the Armed Forces of another

nation than his own. Exceptions to this rule could in some cases be specialists with advanced training in certain key areas, such as senior General Staff officers or individuals with knowledge in advanced technology, particularly nuclear weapons. However they would constitute a minority of the approximately 1,400,000 active duty officers and career NCO's in the former Soviet Armed Forces in 1991.

Hence the distribution of nationalities in the former Soviet military organisation is an important indicator of the future distribution of human resources among the Armies of the post-Soviet nations. On this basis the three Slavic states - primarily Russia and secondly the Ukraine and Byelorussia - are particularly well-positioned to receive the bulk of the officers and most of the personnel with advanced military training:

1. Over 95% of the top echelon of Soviet officers are Russians, backed up by a small number of Ukrainians and Belorussions. This includes:

   - the Stavka of the Supreme High Command,
   - the Supreme High Command,
   - the General Staff,
   - the TVD Commands,
   - the Ministry of Defence,
   - the Military District Commands.

2. 75% of the full Soviet officer corps on all levels consists of Russians or other Slavs.[4]

3. All key strategic facilities and forces are manned by Russians backed up by a smaller number of Ukrainians and Belorussians. This includes:[5]

   - High Command C3I facilities,
   - Strategic Nuclear Forces (RVSN, PLARB and MAA),
   - VPVO C3I and interceptor forces,
   - Spetsnaz,
   - Special security forces guarding High Command and Strategic Nuclear assets.

   Recently the slavic élite orientation has been expanded to include other key military assets, such as the most advanced vessels of the Soviet Navy, which exclude non-Slav nationals from their crews.[6]

4. In addition all the professional units of the special forces of the MVD (OMON) are Slavs,[7] while the Ukrainians are specially numerous among professional NCO's and in paratroop units.[8]

Among the combat and support troops at NCO level and below the distribution of slavic and other nationals is more mixed:

1. Among ground combat forces on the divisional level and below most officers and NCO's are Slavs, while the troops generally consist of a majority of Slavs with a mix of other nationals. A deliberate effort was made to avoid having units composed entirely of non-Slavic nationals. The bulk of the non-slavs also had to serve in remote areas at a considerable distance from their national homeland.

2. Non-combat support arms generally contain a slight majority of non-Slavic nationals which normally are mixed to avoid national units.

On this basis we may assume that the distribution of officers from the former Soviet Armed Forces to the military of the post-Soviet states will be as follows:

	High Command, General Staff	Other Officers	SYS + VPVO	Specialised Personell
Russia	Most	Most	Most	Most
Ukraine	Some	Many	Some	Many
Belorussia	Some	Many	Some	Many
Others	Few	Few	Few/None	Few

In this case Russia will receive the bulk of the former Soviet High Command and General Staff officers and the Ukraine and Byelorussia most or all of the remainder. Remaining officers will be more evenly distributed among the three Slavic states, but with most going to Russia, while the remaining states would receive proportionately less. Russia would also acquire the bulk of the specialist officers and troops of the Strategic Nuclear Forces and Strategic Air Defence Forces,

while the Ukraine and Byelorussia would acquire some and the remaining states few or none. The same applies to other military personnel with advanced or specialised training, though the distribution among the Slavic states might be more even. Finally the three slavic states would receive the bulk of the élite troops, while the other states would receive some.

The slavic and particularly Russian affiliation of all the higher levels of the former Soviet Armed Forces is reinforced by the fact that living conditions in western Russia, the Ukraine and Byelorussia are generally better than in the other parts of the former USSR. Thus there have been mutinies and strikes among officers in units with orders reassigning them to the eastern and central Asian parts of the former USSR. Thus the lack of facilities for officers and their families being transferred or demobilised from the western parts of the USSR eastwards constitutes one of the main obstacles to the reduction of the Soviet Armed Forces. The exception to this are the three Baltic states, which are considered very attractive by the non-Baltic officer corps assigned there. But with these states doing everything in their power to expel the Soviet Army from their territories it is very difficult to imagine a slavic officer obtaining military employment there other than by the use of force.

One factor which could partly offset the predominance of officers and military specialists among the three Slavic states is the paradoxically precisely the large numbers of officers from these states which are available. This means that the uncertainty and growing unemployment among national officers in these states could continue. This could induce officers and technical specialists to hire out their services to the armed forces of other nations or organisations on a mercenary basis. Such a development is particularly dangerous where nuclear technology is concerned. It is estimated that there are some 4,000 nuclear specialists in the Soviet military. However such élite groups would be comparatively small, and most of

the 1,400,000 ex-Soviet career military would have to seek to fend for themselves in their own nations.

Overall the above data indicate that Russia will be able to call upon adequate numbers of nationals trained to manage the High Command and all Services of the Armed Forces, including all services with an Arctic orientation. This does not mean that Russia will do this. That will be a function of her political leadership and economic situation. However the basic manpower resources will probably be available.

Geographic distribution of assets

The next question is how the Soviet military facilities and materiel will be divided among the post-Soviet states. As noted above this will probably be determined by the geographic location of the assets, with the exception of those systems which do not depend upon overland transportation.

Assuming that forces would be divided according to their geographic location - which is by no means certain but for many forces a likely option - then the Russian inheritance would consist of the forces shown on Table 2.

As this table indicates Russia would, on the basis of their geographic location, receive the bulk of the Strategic Nuclear Forces, the Strategic Air Defence Forces and the Navy. In summary the Russian share would be:

Strategic Nuclear Forces:	90 %
Strategic Air Defence Forces:	85 %
Tactical Nuclear Weapons:	58 %
Ground Forces:	50 - 58 %
Navy:	85 %

With respect to the Arctic the key point to note is that Russia inherits practically all Arctic- oriented military forces, while the general purpose forces designed for ground operations -

including most of the tactical nuclear weapons - are far more dispersed. The geographical location of these forces is examined closer below.

SYS - Strategic Nuclear Forces

There are an estimated 11,400-12,200 strategic nuclear warheads in the territories of the former Soviet Union.[9] They are presently located in four of the successor states. Their distribution is shown on Table 3.[10]

Table 2. Geographic location of post-Soviet military.

Type of Force	Service	Branch/Force	Arctic	Russia
Strategic Nuclear Weapons	SYS	ICBM	-	80 %
		SSBN	yes	100 %
		LRB	yes	90 %
Strategic Air Defence	VPVO	IAPVO	yes	85 %
Tactical Nuclear Weapons	VVS	DA	partly	35 %
		FA	-	55 %
	VMF	SS-N-21/24	yes	100 %
		SSM/ASM	partly	75 %
	SV	SCUD bdes	-	35 %
		SS-21/FROG-7 bns	-	50 %
Ground Forces: general purpose	VDV	AB divs	-	45-70 %
	SV	Army forces	-	60 %
	VVS	FA	-	45 %
Naval Forces: general purpose	VMF	Subs/surface/MA	partly	85 %

Table 3. Location of post-Soviet strategic nuclear forces.

	Silo-ICBM	Mobile ICBM	LRB	SSBN	Warheads[11]
Russia	13 bases	10 bases	5 bases	6 bases	9,650
Ukraine	2 bases	-	2 bases	-	1,300
Kazhakstan	2 bases	-	1 base	-	1,150
Belorussia	-	2 bases	-	-	100
Warheads *	5,420	1,260	807	3,672	

* According to START counting rules.

At the time of writing it is reported that these SYS forces remain under the centralised command and control of the former Soviet High Command.[11] There are also possiblities that they will continue to do so under the aegies of the Confederation of Sovereign States - if the Confederation survives. President Yeltsin informed President Bush on 8/12-91 that the nuclear weapons would be handed 'responsibly',[12] and President Kravchuk stated on 09/12-91 that the Ukraine wanted to share control of the post-Soviet nuclear arsenal with Russia and the Ukraine in a 'three-button' system.[13] Since then the Ukraine has also repeated that it does not intend to become a nuclear power, and that it plans to expell all nuclear warheads by 1995. However the situation remains uncertain.

On the basis of geographic location Russia will retain the vast bulk of the SYS assets:

ICBM: 79 %
SSBN: 100 %
LRB: 62 % (90%)

Russia would also retain the vital central strategic nuclear C3I system. In addition to this the long range bombers of the MAA can be flown to bases in Russia. This would depend upon the affiliation of their crews and support personnel which, as noted earlier, are predominantly Slavic, with a majority of Russians. Thus we may assume that the bulk of the LRB would end up in Russia, possibly with a small part of the force remaining in the Ukraine. In addition, and this is vital, Russia would also retain control of the SYS C3I system and its central command network and personnel, without which it would be extremely difficult or impossible to target and launch the SYS forces, but with which Russia would retain a functioning global nuclear capability.

This is not the case for the silo-based and land-mobile ICBM's however, which cannot easily be transported from the

other states to Russia, especially if such an effort were opposed. Present indications are that neither Kazhakstan, the Ukraine nor Byelorussia automatically will relinquish control of these weapons. However here one should note that this in itself would not detract from Russia's military presence in the Arctic, since the ICBM never had an Arctic operational profile.

On this basis, and assuming all other factors are equal, Russia would still retain the SYS C3I network and the bulk of the SYS forces, and all of those which have an Arctic orientation (SSBN's and LRB). This means that under scenarios 1. and 2. (maintaining a Conferedate Military System or the creation of an independent Russian Military Force) the basic military elements necessary to maintain the Soviet military presence in the Arctic will remain in place.

Under scenario 3. - the chaotic breakup of Russia - the centralised command structure and specialised support system could permit part of the system to remain operational as long as sufficient personnel remained committed and the remaining launch platforms could be serviced. However depending upon the state of chaos such a vestigial system would have to collapse at some point. From then on it is unlikely that anyone not part of the SYS system actually could do anything with the missiles or bombs even if they did obtain physical control over them. They cannot be launched in isolation, dismantling them would be extremely difficult, and it is estimated that without maintenance the ICBM/SLBM systems would be unusable after two weeks.[14]

VPVO - Strategic Air Defence Forces

The geographic distribution of the IAPVO strategic interceptor airbases is heavily concentrated in Russia, but with smaller numbers of bases split among most post-Soviet states:

IAVPO Bases[15]

Russia	46
Ukraine	8
Belorussia	3
Estonia	3
Latvia	1
Lithuania	-
Moldavia	-
Georgia	2
Armenia	-
Azerbaijan	1
Kazhakstan	1
Uzbekistan	1
Turkmenistan	2
Tadjikistan	-
Kirghizistan	-

However as noted earlier the geographic location of the air units is unlikely to determine their national affiliation due to their ability rapidly for rapid unopposed redeployment. Thus the key factor here will probably be the national affiliation of their crews and support personnel. As noted earlier these élite units are primarily manned with slavic nationals, and it would be extremely unlikely that crews or units would transfer their allegiance to any of the smaller southern or central Asian nations. This reluctance would be reinforced by the extreme poverty and violent anti-slavic sentiments of the local population. However some units could well declare themselves under Ukrainian or Byelorussian command, while most would probably place themselves under Russia and/or the central military authorities in Moscow. Thus Russia is likely to maintain the largest post-Soviet IAPVO force.

Assuming the Ukraine and Byelorussia retained the IAPVO units based on their soil and that Russia retained all the remaining forces, the distribution would be as follows:

Russia:	84 %
Ukraine:	12 %
Byelorussia:	4 %

In this respect it is important to note that the Kola Peninsula and the Russian Arctic coastline in general possesses a number of reserve airbases and forward operating facilities to which IAPVO aircraft - and possibly crews and their families - could be transferred. These bases are also located in politically tranquil areas, which would also increase their attractiveness as basing or storage areas. This could lead to a boost of IAPVO materiel and possibly active units along the Russian Arctic coastline. One should also note that an undetermined number of nuclear warheads exist for part of the approximately 8,000 VPVO SAM missiles.

Whether or not the IAPVO interceptors would still be directed towards Arctic operations - and could maintain an effective Arctic operational capability - is a function of Russia's political and economic development. Under a régime which prioritised the economic reconstruction of Russia and which sought to cooperate with the US and the west in this effort, the costly - and in this case absurd - Arctic IAPVO orientation could be cut back sharply. However if the Russian régime held a basically hostile attitude towards the outside world then the IAPVO Arctic profile could be maintained, even if at a lower level due to economic limitations. This would particularly be the case if the Russian régime used her global nuclear capability as an instrument of domestic and foreign policy.

Tactical Nuclear Weapons

There are an estimated 15,000 tactical nuclear warheads in the territories of the former Soviet Union.[16] They are presently dispersed over all of the fifteen post-Soviet successor states:

	Warheads[17]
Russia	8,525
Ukraine	2,605
Belorussia	1,120
Estonia	270
Latvia	185
Lithuania	325
Moldavia	90
Georgia	320
Armenia	195
Azerbaijan	295
Kazhakstan	650
Uzbekistan	105
Turkmenistan	125
Tadjikistan	75
Kirghizistan	75
Total:	14,960

On this basis 57 % of the post-Soviet tactical nuclear warheads are located in Russia. These warheads are operated by three Services of the ex-Soviet military:

Service	Branch/weapons type
Air Force	Theatre Bomber Armies ASM and bombs Frontal Aviation units ASM and bombs
Navy	Submarine and surface ship SSM and torpedoes MA ASM, Coastal Defence SSM battalions Mines, depth charges, etc.
Ground forces	SCUD brigades SS-21/FROG-7 bdes/bns Artillery rounds Mines, etc.

The VVS DA medium-range and FA short-range bomber units possess the same airborne mobility as the strategic bombers,

and hence could relatively easily be transferred between successor states. Their choice would depend upon the allegiance of their crews. In the DA these are primarily slavic, and hence would probably support one of the three slavic states and/or the central military authorities. At present all DA medium-range bomber bases are also located in one of the three slavic states:[18]

Russia	6	(35 %)
Ukraine	6	(35 %)
Byelorussia	5	(30 %)

The future allegiance of these units amongst these three states is unclear, but considering their élite nature we may assume a high level of loyalty to the central military authorities - for the time being. However this may weaken if there arises a split between the three slavic states.

The FA short-range bomber units are dispersed over a far greater number of successor states with personnel from a greater number of nationalities:

State	FA nuclear capable aircraft
Russia	850
Ukraine	385
Belorussia	180
Estonia + Latvia + Lithuania	180
Georgia + Azerbaijan	120
Kazhakstan	220

The allegiance of these units is less certain, except that they contain a predominant number of slavic nationals. Thus the bulk of the crews would probably support Russia, the Ukraine or Byelorussia, though it is not impossible that some units, and particularly individual pilots within units, would deliver their aircraft to the military forces of other nations if it came to a split. However this would probably only involve a smaller

number of pilots. An estimated post-split distribution of FA nuclear capable aircraft is:

Russia:	1,070	55 %
Ukraine:	565	29 %
Byelorussia:	300	15 %

Here one should note however that it is possible that the nuclear weapons depots for these aircraft are more centralised and guarded by troops with a stronger allegiance to the central authorities. However if they are dispersed among the successor states it could be difficult to prevent their weapons from falling into the hands of the national authorities or, if the situation became sufficiently chaotic, into the hands of organised crime or terrorists. Whether these could acquire the know-how, maintenance and delivery vehicles to use them is less certain. However given the relatively large number of personnel trained for these tactical nuclear systems, and given the desperate need for money, it is by no means impossible.

The VMF theatre and tactical nuclear weapons constitute the second major category of non-strategic nuclear weapons. Their basing is examined in more detail in Appendix 1., but basically they are located in the only two successor states with access to the oceans, Russia and the Ukraine. However three of the ex-Soviet Navy's four fleets are based in Russia, and she retains the vast majority of nuclear capable naval units:

State	Nuclear capable units *	
Russia	375	73 % **
Ukraine	136	27 %

* Submarines, surface ships, MA aircraft, Coastal Defence GLCM battalions.

** This percentage is based on the number of units listed above. It would be even higher if launch ramps were counted, since the Russian Northern Fleet and Pacific Fleet are supplied with virtually all of the modern submarines, surface ships and strike aircraft.

The final main category of tactical nuclear weapons consist of the ex-Soviet Army ground-launched missiles and artillery rounds with a nuclear capability. These are the most widely dispersed nuclear forces in the post-Soviet area:

State	SCUD bdes	SS-21/FROG-7 bns
Russia	13	57
Ukraine	12	19
Belorussia	5	9
Moldavia	-	2
Estonia + Latvia + Lithuania	3	7
Georgia + Armenia + Azerbaijan	4	10
Kazhakstan	1	12

These ground-launched tactical nuclear weapons are the most prone to proliferation among the post-Soviet successor states. This is so for two basic reasons:

1. In the first place because they are the most readily available. Open sources provide little information about the security of the ex-Soviet theatre and tactical nuclear warheads. However four factors indicate that they would be relatively less well-guarded than the strategic nuclear forces:

   - the large number and variety of tactical warheads,
   - the dispersed distribution of units with the weapons systems for which these warheads are designed,

- the general laxity and carelessness of Soviet procedures, which has increased dramatically since the Soviet collapse began in the late 1980's,
- the greater mix of nationalities in units with tactical nuclear weapons and in their surrounding units.

In addition to this the ground launched weapons are difficult to transport from one area to another, especially if the transit is opposed.

2. Secondly because they are the most attractive to the users. They are among the few nuclear weapons which could actually be used on a local level, either for blackmail, deterrence, terror or in practice:

    - They are robust and relatively easy to maintain and use since they have been designed for tactical operations on a decentralised basis.
    - A relatively greater number of individuals have been trained on these weapons, increasing the chance of recruiting personnel which can maintain and use them.
    - Their limited range and yield make them usable in regional or local politics or conflicts. These are the most likely issues which will preoccupy the successor states leadership in the coming years.

As a result it is likely that proliferation of tactical nuclear weapons will take place amongst the various groupings in the former Soviet Union. Recipients of these weapons would primarily consist of the new successor states but coud also, because of the dispersion and large number of tactical nuclear weapons combined with the increasing chaos and poverty, include the large criminal organisations or small ethnic, terrorist or criminal groups.

The future of the ground-launched tactical nuclear forces presents the single greatest danger arising out of the breakup of the Soviet Union, far overshadowing the problem presented by the strategic nuclear weapons.

Notes

1. These figures are based on a combination of the following two sources. The IISS estimated a total force of 3,400,000 in mid-1991 (excluding 570,000 KGB and MVD troops and 424,000 railway and construction troops), of which some 2,000,000 were conscripts. *The Military Balance 1990-1991*. London, IISS, 1991: p. 36. The DIA reported some 500,000 officers on active duty in 1978 with an additional unspecified number of career warrant officers and NCO's. The figures in the table assume that the active duty officer corps has been reduced by some 100,000 since then. Of the 500,000 officers some 3-5,000 were estimated as being at or above the rank of General or Admiral. *Handbook on the Soviet Armed Forces*, Washington DC, DIA, February 1978: p. 5-6.

2. This does not apply to some of the post-Soviet states - notably Estonia and Latvia - which are turning to the west to obtain training and technical assistance to build up their national military forces. However most of the post-Soviet states, and particularly the largest states which inherit the bulk of the Soviet military infrastructure and equipment, will have to acquire the expertise and know-how of the ex-Soviet officers and specialists if they are to maintain and develop their military inheritance. The same applies on a lower level to the poorer post-Soviet states, which also will have to aquire the technical know-how of lower ranking ex-Soviet military personnel to maintain basic combat equipment, such as APC's, tanks, aircraft and so on.

3. In this context one should also note that the highest levels of the ex-Soviet military establishment, particularly the scientific community working on military, space and nuclear technology, will be in considerable demand by a number of outside states, such as China, India, Brazil, the Middle East and some states in South East Asia.

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9. 11,409: *The Military Balance 1991-1992*. London, IISS, 1991: p. 220. NB: This is a conservative estimate based on the START counting rules. Thus it does not include warheads held in storage nor does it take into account the full number of nuclear weapons which the 177 bombers could carry. 12,200: "Where the Weapons Are." *Bulletin of the Atomic Scientists*, November 1991: pp. 48-49.

10. *Soviet Military Power 1990*. Washington DC, DoD, 1990: Map supplement.

11. Condeleezza Rice, quoted in: TYLER, Patrick E.: "In Soviet Military, Visible Fault Lines." *International Herald Tribune*, 11/12-91: p. 1.

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