

AD-A231 546

②

THIS FILE COPY

## Don't Rock the Boat

Reinforcing Norway in  
Crisis and War

John Lund

DTIC  
ELECTE  
FEB 01 1991  
S B D

DISTRIBUTION STATEMENT A

Approved for public release  
Distribution Unlimited

RAND

91 1 24 015

This research was supported by The RAND Corporation using its own research funds.

ISBN: 0-8330-0960-5

The RAND Publication Series: The Report is the principal publication documenting and transmitting RAND's major research findings and final research results. The RAND Note reports other outputs of sponsored research for general distribution, including RAND Graduate School Dissertations. Publications of the RAND Corporation do not necessarily reflect the opinions or policies of the sponsors of RAND research.

Published by The RAND Corporation  
1700 Main Street, P.O. Box 2138, Santa Monica, CA 90406-2138

R-3725-RC

# **Don't Rock the Boat**

## **Reinforcing Norway in Crisis and War**

John Lund

July 1989

**RAND**

## PREFACE

This analysis of problems associated with the reinforcement of Norway was undertaken as a dissertation in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Policy Analysis from the RAND Graduate School. The committee that supervised and approved the dissertation consisted of Robert Perry (Chairman), Bart Bennett, and James Thomson. This committee approved the dissertation on 15 December 1987. The analysis was subsequently revised based on additional comments and information. The information cut-off date is 31 December 1988.

This analysis will be of interest to individuals and organizations concerned with defense of the northern region and reinforcement of Norway, particularly NATO, Norwegian, American, and other allied military planners.

The study was supported by The RAND Corporation, using its own funds.



Accession For	
NTIS GRA&I	<input checked="checked" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By <i>per letter</i>	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
<i>A-1</i>	

## SUMMARY

For both NATO and the Warsaw Pact, Norway occupies a strategically important position: it borders on the principal Soviet ballistic missile submarine bases; it is key to controlling the Norwegian Sea and Soviet access to the Atlantic Ocean; and it lies under the direct polar routes between American strategic bases and the Soviet heartland. Recognizing the sensitivity of its position, Norway has attempted to reassure the Soviets about its peaceful intentions by limiting its membership in NATO in two ways: prohibiting the peacetime establishment of foreign troops and bases, and prohibiting the deployment of nuclear weapons. This "low tension" policy pervades all Norwegian security considerations.

Thus, a fundamental tension exists in Norwegian security policy: Norway depends absolutely on NATO reinforcements for both the deterrence of Soviet aggression and defense if deterrence fails, yet views the presence of allied forces in and around Norway as potentially antagonistic toward the Soviet Union and therefore destabilizing in a crisis. A review of the roots of this dilemma in recent Norwegian history and elite attitudes indicates that a significant possibility exists that Norway would not permit the deployment of allied forces in a crisis, so as not to "rock the boat" and precipitate a war.

An examination of the military balance in the region surrounding Norway strongly suggests that the Soviet Union could exploit Norwegian delay by attacking airbases, preventing the deployment of allied reinforcements by strategic airlift. If the Soviets could prevent reinforcement, they would stand a strong chance of achieving their main military objectives in North Norway.

For mitigating the effects of delayed reinforcement, military planners in Norway, NATO, and the allied states have several options, including alternative means of deploying units, adopting a less vulnerable basing mode, and switching to sea-based or ground-based weapons. This report considers a variety of options, focusing on air reinforcements, and offers a framework for comparing the policy options. The author concludes that deploying with tactical rather than strategic airlift would significantly improve the chances for timely deployment of critical reinforcements, while improved airbase defenses and the construction of an additional airbase would greatly reduce Soviet ability to exploit delayed reinforcement.

## ACKNOWLEDGMENTS

A great many people have helped me, directly and indirectly, in my work. I wish to thank my committee—Robert Perry, Bart Bennett, and James Thomson—for their advice and support in preparing my dissertation. In particular, I want to express my deep gratitude to Bob Perry who, as my first project leader at RAND and later as my dissertation chairman, provided enormous encouragement of my investigations into Norwegian and Nordic security.

Christopher Bowie offered much project support and advice on all aspects of my dissertation, and was patient in letting me try out seemingly endless ideas on him.

Many officers at Allied Headquarters Northern Europe and in the Royal Norwegian Air Force provided valuable insights on air operations in North Norway for a previous study in 1985. To Lt. Gen. Tønne Huitfeldt (Royal Norwegian Army, retired), I wish to offer sincere thanks for important comments and criticisms.

In 1988, I was able to spend seven fruitful months at Headquarters United States Air Forces in Europe, in the office of "Warfighting, Inc." (DOJW); the officers there provided enormous help in teaching me about the operational aspects of employing tactical airpower. I am especially grateful to Lt. Col. James Hale, director of the office, and Maj. Michael Kaufhold, who offered extensive, no-nonsense comments on an earlier draft. Two RAND fellows, one Air Force and one Navy, also offered comments which were greatly appreciated: Lt. Col. James Terry (USAF) and Capt. Frank LaCroix (USN).

Charles Wolf opened new doors for me to profitably expose my ideas. I appreciate his support, and that of Harry Rowen and Albert Wohlsetter, in involving me in the work of the President's Commission on Integrated Long-Term Strategy. Dr. Wolf was also instrumental in my participation in the Second Harvard Nordic Security Conference in Hvergardi, Iceland, which provided important support for my thesis; I want to thank Samuel Huntington and Alan Henricksen for the invitation to attend, and the Naval Post Graduate School for its financial support.

## CONTENTS

PREFACE .....	iii
SUMMARY .....	v
ACKNOWLEDGMENTS .....	vii
FIGURES .....	xiii
TABLES .....	xv
GLOSSARY .....	xvii
Section	
I. INTRODUCTION .....	1
The Strategic Importance of Norway .....	1
The Dilemma for Norwegian Security .....	3
The Objective of This Study .....	5
<b>PART I. THE POTENTIAL FOR DELAY</b>	
II. THE HISTORICAL ROOTS OF NORWEGIAN	
SECURITY POLICY .....	9
The Rise and Fall of Norwegian Neutrality: 1905-1945 .	9
Abandoning Non-Alignment .....	10
The Base Policy .....	13
Integration into NATO .....	14
The Concept of a Nordic Balance .....	16
The Postwar Consensus Shaken .....	18
III. CRISIS STABILITY AND NATO	
REINFORCEMENTS .....	24
"Don't Rock the Boat:" The Concern with Crisis	
Stability .....	24
Preconceptions and Uncertainty in Crises .....	27
Conclusions .....	29
<b>PART II. THE MILITARY SIGNIFICANCE OF DELAYED REINFORCEMENT</b>	
IV. COMPETING OBJECTIVES AND STRATEGIES IN	
THE NORTHERN REGION .....	33
Soviet Strategy in the Far North .....	33

	NATO's Strategy in the Far North . . . . .	41
	Differences in NATO and Norwegian Objectives . . . . .	41
V.	SOVIET FORCES . . . . .	43
	Organization of Soviet Forces . . . . .	43
	Soviet Strategic Forces on the Kola Peninsula . . . . .	45
	Soviet Conventional Forces . . . . .	48
	Conclusion . . . . .	54
VI.	NATO FORCES . . . . .	56
	NATO's Command Organization . . . . .	56
	Norwegian Forces . . . . .	58
	Allied Reinforcements . . . . .	61
	Summary of Likely Air and Ground Reinforcements for North Norway . . . . .	65
VII.	THE MILITARY BALANCE AND THE ROLE OF ALLIED REINFORCEMENTS . . . . .	68
	The Base Case . . . . .	69
	A Simple Model of Combat . . . . .	72
	The Role of Airpower . . . . .	73
	The Model Applied to North Norway . . . . .	75
	Shortcomings of the Draw-Down Model . . . . .	78
VIII.	SOVIET EXPLOITATION OF DELAY . . . . .	80
	Keeping Reinforcements Out Through Runway Cutting . . . . .	80
	Exploiting the Limited Base Support Infrastructure . . . . .	88
	Exploiting Prepositioning . . . . .	89
	Conclusions . . . . .	90
	<b>PART III. ALTERNATIVE DEPLOYMENT AND     BASING OPTIONS</b>	
IX.	DEPLOYMENT OPTIONS . . . . .	93
	Hold at the Home Base . . . . .	93
	Divert to an Open Base . . . . .	94
	Stage with Tactical Airlifters . . . . .	95
	Stage with Maritime Transport . . . . .	97
X.	BASING OPTIONS . . . . .	98
	Basing in Central Norway . . . . .	98
	Dispersed Basing . . . . .	106
	Build a New Airbase . . . . .	107
	Improve Airbase Defenses . . . . .	108



XI.	REPLACEMENT AND OTHER OPTIONS .....	112
	Use Sea-based Systems .....	112
	Use Ground-based Systems .....	113
	Use Politically More Acceptable Reinforcements .....	114
	Destroy the Airbases .....	115
XII.	COMPARING OPTIONS .....	116
	Measures of Effectiveness .....	116
	Costs .....	121
	Dealing with the Differences .....	123
PART IV. CONCLUSIONS		
XIII.	CONCLUSIONS .....	127
Appendix		
A.	ENVIRONMENTAL FACTORS AFFECTING MILITARY OPERATIONS .....	129
B.	THE NORTH NORWAY AIR-GROUND CAMPAIGN MODEL .....	134
	BIBLIOGRAPHY .....	139

## FIGURES

1.1. Nordic Europe . . . . .	2
4.1. Scenario for Soviet attack of North Norway . . . . .	35
4.2. Soviet plans for operations against Sweden in World War II . . . . .	38
4.3. Soviet benefits from overflying Sweden . . . . .	39
5.1. Theaters of strategic military action surrounding Norway . . . . .	44
5.2. Soviet air and naval bases on the Kola Peninsula . . . . .	46
5.3. Soviet ground force buildup potential . . . . .	53
6.1. NATO commands in and around Norway . . . . .	57
7.1. Norwegian airbases . . . . .	69
7.2. NATO mobilization scenarios . . . . .	71
7.3. A sample draw-down curve . . . . .	72
7.4. Draw-down curves: simple view of the balance . . . . .	73
7.5. Draw-down curves: the effect of airpower . . . . .	74
7.6. Draw-down curves: interdiction of amphibious forces . . . . .	76
7.7. The Norwegian view of the defense of North Norway . . . . .	77
7.8. The effect of not deploying NATO air reinforcements . . . . .	78
9.1. Sorties needed to close NON airbases to tactical airlifters . . . . .	96
10.1. Interceptor curve for Troms area . . . . .	99
10.2. Detection distances and interceptor speeds . . . . .	100
10.3. Distance from base and sorties required for continuous CAP . . . . .	102
10.4. KC-10A refueling operation . . . . .	105
10.5. Proposed site of new airbase at Mo-i-rana . . . . .	107
10.6. Detection distances and interceptor speeds from Mo-i-rana . . . . .	109
A.1. The transportation net of North Norway . . . . .	131
B.1. An illustrative network representation of North Norway . . . . .	136

## TABLES

5.1. Soviet SSBN forces on the Kola Peninsula . . . . .	47
5.2. Soviet air defense forces in the Archangelsk Air Defense District . . . . .	48
5.3. The Soviet northern fleet . . . . .	49
5.4. Soviet naval aviation . . . . .	50
5.5. Soviet ground forces in the Leningrad MD . . . . .	51
5.6. Soviet tactical aviation in the Leningrad MD . . . . .	55
6.1. Major ground combat equipment of the MAB and a Norwegian brigade . . . . .	63
6.2. NATO ground forces likely to be committed to North Norway . . . . .	66
6.3. NATO air forces likely to be committed to North Norway .	67
8.1. Estimated airlift capability at Norwegian airbases . . . . .	81
8.2. Range and payload of selected Soviet aircraft . . . . .	84
8.3. Arriving sorties needed to close Norwegian airbases . . . . .	85
8.4. Distances from Soviet to Norwegian airbases . . . . .	87
8.5. Soviet gains from overflying Sweden . . . . .	87
10.1. Ranges of selected NATO attack aircraft . . . . .	103
12.1. Effectiveness and costs of options . . . . .	118
A.1. Air/road distances between selected points in North Norway . . . . .	132

## GLOSSARY

ACE	Allied Command Europe
AFNORTH	Allied Forces, North Europe
AMF	ACE Mobile Force
AWACS	Airborne Warning and Control System
AWX	All-weather interceptor
BALTAP	Baltic Approaches (NATO command)
CAP	Combat Air Patrol
CAS	Close Air Support
COB	Collocated Operating Base
CONUS	Continental United States
D-Day	First day of hostilities
FOB	Forward Operating Base
FXA	Fighter Interceptor Attack
GIUK	Greenland-Iceland-United Kingdom
MAB	Marine Amphibious Brigade
MAF	Marine Amphibious Force
MD	Military District
MOB	Main Operating Base
MOE	Measure of Effectiveness
MOS	Minimum Operating Surface
MRD	Motorized Rifle Division
NATO	North Atlantic Treaty Organization
NDRE	Norwegian Defense Research Establishment
NON	North Norway (NATO command)
OCA	Offensive Counter Air
OCU	Operational Conversion Unit
RAF	Royal Air Force (British)

RNoAF	Royal Norwegian Air Force
SACEUR	Supreme Allied Command(er), Europe
SACLANT	Supreme Allied Command(er), Atlantic
SAM	Surface-to-Air Missile
SLOC	Sea Line of Communication
SONOR	South Norway (NATO command)
<i>Spetsnaz</i>	<i>Spetsialnaya Razvedka</i> ; Soviet special purpose forces
SSBN	Nuclear powered ballistic missile submarine
TBM	Tactical Ballistic Missile
TSMA	Theater of Strategic Military Action
USAF	United States Air Force
USMC	United States Marine Corps
V/STOL	Vertical/Short Take-Off and Landing

## I. INTRODUCTION

*The defense of the northern region is dependent to a decisive degree on rapid reinforcement from the United States and the rest of NATO; yet increased restrictions on U.S. and NATO activities in Norway limit our ability to bring force to bear quickly in the defense of the region.*<sup>1</sup>

*Discriminate Deterrence*  
Report of the President's Commission  
on Integrated Long-Term Strategy

*By way of a general comment I would like to say that the U.S. report clearly suffers from some distortions, since it pays no attention to the Nordic balance and the considerations of low tension in the northern region.*<sup>2</sup>

Johan Jorgen Holst  
Norwegian Minister of Defense

## THE STRATEGIC IMPORTANCE OF NORWAY

In January 1988, a blue-ribbon panel of American defense experts, established by the President, published a report entitled *Discriminate Deterrence*. The purpose of the report was to provide a long-term view of U.S. security policy, integrating military, political, economic, and technological factors. Surprisingly, the report included a sharp criticism of Norway, quoted above. Surprising because the report generally did not deal in such specifics and because Norway has long been regarded as a close if often unacknowledged ally of the United States. The criticism provoked a sharp response from the Norwegian Defense Minister, but tensions quickly faded and the incident seemed largely forgotten a year later.

The comment in *Discriminate Deterrence* did highlight an important factor of American strategy: after years of relative obscurity, Nordic Europe—Norway, Denmark, Sweden, Finland, and Iceland—now holds a visible position in the military competition between East and West.

---

<sup>1</sup>*Discriminate Deterrence: Report of the President's Commission on Integrated Long-Term Strategy*, January 1988, pp. 67-68.

<sup>2</sup>Holst Sees "Distortions" in U.S. Defense Report, Foreign Broadcast Information Service, West European Report 88-011, January 19, 1988, p. 21. Translated from the Norwegian in *Aftenposten*, January 13, 1988, p. 8.

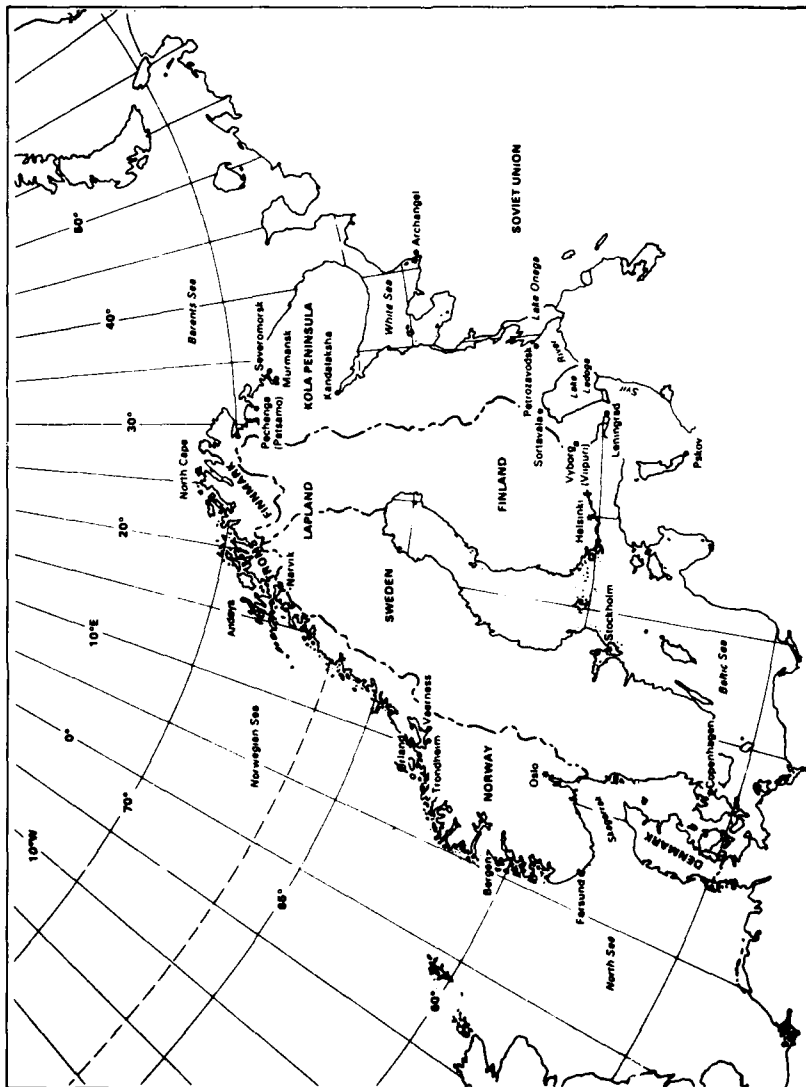


Fig. 1.1—Nordic Europe

Of these states, Norway holds the most prominent position, owing to its proximity to the Soviet Union. Specifically,

- Norway lies under the direct polar routes between American strategic bases and the Soviet European heartland;
- Norway borders on the key Soviet base complexes on the Kola Peninsula, home to two-thirds of the Soviet ballistic missile submarine fleet as well as the Northern Fleet;
- Norwegian territory holds the key to controlling the Norwegian Sea and Soviet access to the Atlantic Ocean, a critical battle-field in the event of war in determining whether the Soviets can interdict NATO's sea lanes of communications between North America and Europe.

Although outside powers have long been interested in the alignments of the Nordic states, the intense concern over the region can be dated to the 1970s. At that time, the Soviet Union began to develop the Kola Peninsula into the largest concentration of maritime military force in the world, primarily in terms of its ballistic missile submarine fleet and as the center of Soviet strategic air defense. By the early 1980s, American strategists, especially in the Navy, began to discuss the possibility of striking at Soviet conventional and strategic military forces on the Kola Peninsula and surrounding waters in the event of war.

The Soviet Union has continued to pursue an active policy, both militarily and politically, aimed at precluding any threat from the Nordic region in the event of war. These measures have included violations of the sovereignty of the Nordic states, most notably in the continuous submarine intrusions into Swedish and Norwegian waters. In military exercises, Soviet forces have simulated amphibious landings hundreds of miles down the Norwegian coast, as well as in the Baltic. At the same time, the Soviets have harshly protested all Norwegian planning for and exercises of allied reinforcement of the country. The Soviets have actively supported the establishment of a nuclear weapon-free zone in Nordic Europe. All in all, it seems that the Soviet Union seeks to give the impression that Nordic Europe has fallen behind the Soviet defense perimeter.

### **THE DILEMMA FOR NORWEGIAN SECURITY**

Today, Norwegian policy makers face a fundamental dilemma in their national security policy. Norway occupies a strategically important position in the struggles between East and West, yet with only



four million people and an enormous territory, Norway cannot defend itself alone. Since World War II, Norwegian governments have all recognized the nation's dependence on external reinforcements for defense. This fact lead Norway to join NATO and to seek agreements for the commitment of forces from its Atlantic allies, especially Canada, the Netherlands, the United Kingdom, and the United States.

At the same time, Norway has actively sought not to antagonize the Soviet Union. Norwegian governments have recognized Soviet strategic interests and sensitivities in the far north and have attempted to reassure the Soviets about Norway's peaceful intentions by prohibiting the establishment of foreign troops and bases, or the deployment of nuclear weapons, in Norway in peacetime. This "low tension" policy pervades Norwegian security considerations. The objective is to deny the Soviet Union any pretext for violating the sovereignty of Norway or any of its Nordic neighbors in the name of self-defense.

Thus, a fundamental tension exists in Norwegian security policy: *Norway depends absolutely on allied reinforcements for both the deterrence of Soviet aggression and defense if deterrence fails, yet views the presence of allied forces in and around Norway as potentially antagonistic toward the Soviet Union and therefore destabilizing in a crisis.*

This basic dilemma of Norwegian security policy has existed since Norway joined the Atlantic Alliance, but recent developments have brought it into sharper focus. In 1980, in response to the Soviet invasion of Afghanistan, Secretary of Defense Harold Brown stated that Soviet aggression in the Persian Gulf could result in an American response "as far north as Norway," raising the specter of Norway being dragged into a conflict against its will. Norwegian fears of the "horizontal escalation" of a Soviet-American conflict have been rekindled with the advent of the U.S. Navy's Forward Maritime Strategy, which foresees the possibility of American aircraft carriers, operating from the Norwegian Sea and perhaps in Norwegian fjords, striking at Soviet strategic targets in the far north in the event of war. The development of cruise missiles has renewed Soviet interest in extending its strategic air defense perimeter over the airspace of North Norway.<sup>3</sup> The debate surrounding the deployment of the Intermediate-range Nuclear Force (INF) and the abortive deployment of enhanced radiation weapons (the "neutron bomb") has lead to greater awareness of nuclear weapon issues within Norway, despite the fact that Norway allows no such weapons in its territory.<sup>4</sup>

<sup>3</sup>"North Norway" refers to the territory of the three northernmost counties of Norway—Finnmark, Troms, and Nordland. The southern boundary of this region lies at 65° North latitude.

<sup>4</sup>Section III will explore these issues in greater detail.

## THE OBJECTIVE OF THIS STUDY

This dilemma in Norwegian security policy poses a serious question for policymakers in NATO: How might concerns for crisis stability adversely affect efforts to reinforce Norway in crisis and war, and what can NATO do about it? This report addresses these questions. Specifically, this report has three objectives:

- To explore the factors which could lead to delay in deploying allied reinforcements in a crisis;
- To determine the effects to NATO of delayed deployment of allied reinforcements to Norway;
- To examine and compare alternative solutions to the problems which would arise for allied reinforcements, particularly as regards airpower.

Part I probes the historical roots of Norwegian security policy and the security dilemma, and describes the view held by some officials in Norway that allied reinforcements could be destabilizing in a crisis. Part II examines opposing strategies and forces in the far north, and the possible effects of delayed deployment of allied reinforcements. Part III considers alternatives for dealing with the problems of delayed reinforcement.

## PART I

### THE POTENTIAL FOR DELAY

*the concern about not rocking the boat is likely to be strong in an ambiguous crisis. . . .*<sup>1</sup>

Johan Holst

A major theme of this report is that, in a crisis, Norwegian leaders would have a strong tendency to hesitate in permitting the deployment of allied reinforcements, especially American reinforcements. The reasons can be found in recent Norwegian history and in the views of the dominant political-military leadership. Section II explores the historical roots of Norwegian security policy. Section III examines the factors which could lead to hesitation in permitting reinforcements.

---

<sup>1</sup>Holst, 1986, p. 8.

## II. THE HISTORICAL ROOTS OF NORWEGIAN SECURITY POLICY

Norwegian foreign and security policies have changed greatly over the course of this century. Once a territory of Sweden, Norway gained its independence early in the century. Once a strong neutral, the country was transformed by the experience of invasion and occupation, leading to the decision to join in alliance with the Atlantic powers. Once a relative backwater of the competition between East and West, Norway has become a focus point of the strategies of both sides. Understanding this history is critical to understanding current Norwegian actions. This section traces the development of Norwegian security policy, with special attention to how the interplay of Nordic, Soviet, and American actions affected Norwegian policy.

### THE RISE AND FALL OF NORWEGIAN NEUTRALITY: 1905-1945

After gaining its independence from Sweden in 1905, Norway pursued a policy of strict neutrality in world affairs. Norway maintained this stance throughout the First World War, despite the loss of half its merchant shipping and 2000 lives from German submarine warfare.<sup>1</sup> After the war, Norway's foreign policy stressed internationalism and active participation in the League of Nations. In 1925, an international convention granted Norway sovereignty over the archipelago of Svalbard.<sup>2</sup> In the 1930s, with the failure of the League to deal effectively with Mussolini in Abyssinia and with the distress of the Depression, Norway turned inward and away from the turmoils of Europe.

With the outbreak of the Second World War, Norway reaffirmed its policy of neutrality. This time, however, Norway's neutrality proved to be more difficult to defend. During the period of the League of Nations, Norway had moved toward complete disarmament and had become weaker relative to the belligerents than she had been in the first war. The geopolitical situation had also changed. Sweden was now Germany's primary supplier of essential high-grade iron ore, and in winter months these supplies could be sent to Germany only by

<sup>1</sup>Norway lost more tonnage than any other combatant save Britain. Derry, 1979.

<sup>2</sup>In the United States, the archipelago is frequently referred to as Spitzbergen, the name of the main island.

shipping it by rail to the Norwegian ice-free port of Narvik in North Norway. The Allies were eager to blockade these supplies. On March 2, 1940 they requested permission from the Norwegian and Swedish governments for transit rights through this region to "aid Finland" in its war with the Soviet Union. In reality, the Allies were probably more concerned to hold the supply route and deny the iron ore to the Germans. The request was firmly rejected by both states, and quickly became moot when the Finns agreed to a truce on March 31. On April 8, 1940, Britain mined the Leads south of Narvik, an act which outraged Norway.

This offense was immediately overshadowed by a far more outrageous violation of Norwegian neutrality: a daring German invasion which had been approved by Hitler a month earlier. On April 9, 1940, German naval transports sailed directly into Norwegian ports while German transport aircraft landed on Norwegian airfields; the British navy had failed to find the invasion force in the poor sea conditions prevailing that day. By mid-morning the Germans had captured Narvik, Trondheim, Bergen, and Stavanger with virtually no loss. Only the occupation of Oslo was delayed, and then only for a few hours, after a German cruiser was sunk by a hastily mobilized coastal fort. Effective reaction was hampered by the activities of the Norwegian Nazi Quisling. Germany had won a stunning victory. British and French forces quickly assembled an expeditionary force in an attempt to aid the incompletely mobilized Norwegian forces, but the effort failed and by June 9 the last Allied forces had to be evacuated from Norway.<sup>3</sup>

Nazi rule in Norway was brutal. Resistance forces were active through the country, and the German reaction was extreme. Germany had 400,000 troops occupying a nation of 3,000,000. A concentration camp was established in the bitter Arctic conditions of the county of Finnmark. When the Germans retreated from their positions in the northern regions of the country, they conducted a scorched earth campaign which devastated these counties. By the end of the war only the county of Finnmark had been liberated, this by a Soviet offensive.

## ABANDONING NON-ALIGNMENT

The experience of the German invasion and occupation forced Norway to reexamine its traditional policy of neutrality. Norway's leaders realized that their country lacked the resources to defend itself

<sup>3</sup>For a detailed account of the Britain's Norwegian campaign, see Buckley, 1951.

against a large, aggressive European power. At the end of the war, Norway did not greatly fear any nation: Germany was thoroughly defeated, the UK had been the home of the government-in-exile and had provided tremendous assistance, and the USSR had liberated northern Norway and withdrew after the war. Yet the balance of power was shifting fundamentally. The British Royal Navy, which had been the *de facto* shield of Norwegian neutrality, clearly was losing its role as protector of the seas. The Soviet Union was becoming the dominant power on the continent. The peace treaty between Finland and the Soviet Union also affected Norway's security position. Finland was forced to cede its northernmost territory bordering the Barents Sea, including the important ice-free port of Petsamo (now Petchanga), thus restoring the pre-1920 borders. Henceforth, Norway would share a common border with the Soviet Union. Norway could no longer be secure behind the barrier of Finland.

Even while in wartime exile in London, the Norwegian government recognized its need for an alliance in the post-war world. The question became: With whom? Norway has always had a split identity. On the one side, Norway is a country of the Atlantic, a nation of seafarers. On the other side, Norway is a Scandinavian nation, sharing a long history and common culture with Sweden and Denmark, and to a lesser extent, Finland.<sup>4</sup> Thus, Norway had to decide whether to seek its security in an Atlantic alliance or in a Scandinavian alliance. The issue was influenced by the experience of 1940. Britain had come to the defense of Norway, but too late and after having threatened Norway's neutrality itself. Denmark had surrendered without a fight. Sweden failed to aid Norway during the invasion, although the Swedish government let the British government know that it would welcome Anglo-French intervention in support of Sweden. After the German victory in Norway, Sweden granted limited transit rights for German troops across Swedish territory.<sup>5</sup> Beyond this, Norwegian officials realized that the Scandinavian nations were probably not large enough as a whole to develop a credible independent regional defense alliance.

<sup>4</sup>Scandinavia generally refers to Norway, Denmark, and Sweden, while Nordic Europe refers to Finland and Iceland as well.

<sup>5</sup>Sweden resisted German demands for transit rights across Sweden during the German invasion, but thereafter, faced with German military domination of the region, allowed German troops "on leave" to cross Sweden by rail; shortly thereafter this concession was extended to weapons as well, allowing the Germans to redeploy troops while avoiding the risk that their transports would be attacked by the British navy. When Germany invaded the Soviet Union on June 22, 1941, the German government demanded that a division stationed in North Norway be allowed to transit Sweden to Finland, a request supported by the Finnish government. Sweden granted the demand, but refused similar demands later in the war. Wahlbaeck, 1986, pp. 46-76.

Thus, in 1941, the government-in-exile foresaw the need for a post-war Atlantic alliance.<sup>6</sup>

In the first few years after the war, Norway attempted to return to its traditional policy of neutrality, hoping that the United Nations would be able to provide the guarantee of peace that Norway needed. Norway, Sweden, and Denmark secretly pursued discussions of possible Nordic military cooperation in 1946 and 1947, but the talks did not produce any agreement.<sup>7</sup> Norway sought military aid and arms from the United States and Britain, but it did not seek alliance. Although the Soviets had been pressuring Norway to annul or revise the treaty granting Norway sovereignty over the Svalbard Archipelago and to cede Bear Island, Norway had no great fear of the Soviet Union. However, this changed rapidly in early 1948. On February 21, of that year, the Soviets staged a coup in Czechoslovakia, bringing that nation into the Soviet orbit. On February 23, Stalin sent a letter to Finnish President Paasikivi proposing a defense treaty and referring explicitly to similar treaties recently signed with two other "former enemies," Romania and Hungary. Over the next several weeks, Norway learned from many sources that it could expect a similar request. Coming at the same time as the Berlin blockade, these Soviet actions deeply troubled the Norwegians. The Norwegian government, having lost faith in the ability of the United Nations to stop Soviet aggression, turned to Britain to inquire about possible assistance if Norway resisted the Soviets.<sup>8</sup>

Sweden, fearing a Soviet backlash from this move, attempted to halt the Norwegian shift toward the West by proposing a Scandinavian Defense Union. Although Sweden was at the time one of the strongest military powers in Europe (having heavily armed itself during the war), the Norwegian government felt that the alliance would not be strong enough to deter or defeat the Soviets, especially in the near term. Norway wanted to rearm quickly to meet the immediate Soviet threat, something which Sweden could not do. Furthermore, Norway wanted to align itself with the West. The hasty and confused Allied expedition of 1940 had taught Norway that advance planning and preparations would be essential if she were to rely on aid from the Atlantic powers. Therefore, during the subsequent talks with Sweden and Denmark over the proposed alliance, Norway insisted on a formal Atlantic connection, a position which Sweden rejected. When the United States informed Norway that American allies would be given first priority in arms sales,

<sup>6</sup>Holst, 1985.

<sup>7</sup>Nevakivi, 1984.

<sup>8</sup>Bjøl, 1983.

Norway finally and firmly rejected the idea of a Nordic defense alliance and moved toward an Atlantic alliance. Soon afterward, Denmark followed Norway and began discussions with the West.<sup>9</sup>

### THE BASE POLICY

The Soviet Union reacted strongly to Norway's decision to consider membership in an Atlantic alliance. On January 29, 1949, the Soviet ambassador to Norway delivered a letter from his government. It warned Norway not to join the Atlantic Alliance, claiming that the Alliance would pursue "aggressive aims" and lead to the establishment of American and British air and naval bases in Norway. The Soviet government requested an explanation, "bearing in mind that Norway has a common frontier with the Soviet Union."<sup>10</sup> On February 1, 1949, Norway responded, rejecting the claim that the proposed Alliance was aggressive, but assuring the Soviet Union that:

Norway will never take part in a policy with aggressive aims. She will never allow Norwegian territory to be used in the service of such a policy. The Norwegian government will not enter in any agreement with other States involving obligations to open bases for the military forces of foreign powers on Norwegian territory as long as Norway is not attacked or exposed to threats of attack.<sup>11</sup>

On February 5, the Soviet Union responded that it found these assurances inadequate and requested a non-aggression pact in lieu of Norway's entry into an alliance with the West. Norway rejected the demands, citing non-aggression provisions of the UN Charter. Thus, Norway had made clear its future course for security policy: membership in the Atlantic Alliance, but with the restrictions imposed by the "Base Policy" stated in the February 1, 1949 letter to the Soviets. During the 1950s, Norway reaffirmed this policy many times, and in 1957 extended the policy to include a prohibition on nuclear weapons.

Over the years, Norway added further restrictions relating to allied exercises in Norway, all closely following the spirit of the original policy, with the specific goal of keeping allied forces away from the Soviet border:

- No allied aircraft may operate east of 24° East longitude.<sup>12</sup>

<sup>9</sup>Denmark was still interested in a Scandinavian Defense Union, but Sweden was not willing to proceed without Norway.

<sup>10</sup>Greve, 1968.

<sup>11</sup>Ibid.

<sup>12</sup>This is a distance of approximately 100 miles from Soviet territory at the closest point.



- No allied naval vessels may operate in Norwegian territorial waters east of 24° East longitude, nor may they enter Norwegian territorial waters if they have been operating east of 24° East longitude in international waters.
- No allied ground exercises are permitted in the northernmost county of Finnmark, which borders on the Soviet Union.
- The number of allied air and naval forces allowed simultaneously in various parts of the country are limited, as are the weapons they can carry; the details of the restrictions are secret but can be seen by the Soviet Union.<sup>13</sup>

Why did Norway impose these restrictions on its membership in the Alliance? The answer lies partly in bilateral Norwegian-Soviet relations and partly in domestic politics. In relation to the Soviet Union, the Norwegian government hoped that its restraint would alleviate Soviet fears, resulting in a lower level of tensions in the region and friendlier relations in the future. Some restrictions resulted directly from actions of American forces exercising in Norway which had been viewed by Oslo as potentially provocative. Within Norway, the Base Policy was a compromise struck by the ruling Labor government between the Atlanticists, who favored membership in NATO, and the neutralists, who sought to maintain Norway's traditional foreign policy.

## **INTEGRATION INTO NATO**

During the 1950s, Norway maintained a steady course in its foreign and security policies. With American military aid, Norway began to rearm. Through NATO infrastructure programs, Norway improved its ability to receive allied reinforcements in the event of war. NATO established a regional command for the Northern region (Allied Forces Northern Europe or AFNORTH), consisting of Norway, Denmark, and the German region of Schleswig-Holstein, and placed its headquarters in the Oslo suburb of Kolsaas. Norwegian and Danish forces were gradually strengthened and allied forces began to hold annual exercises in Norway.

## **BALTAP and the German Problem**

Throughout this period, the Soviet Union protested Norway's growing integration into NATO. The main target of Soviet wrath was the

<sup>13</sup>Dorfer, 1986.

expanding (albeit small) German role in AFNORTH.<sup>14</sup> This became an issue for Norway in 1958 with the establishment of the Baltic Approaches' Command (BALTAP) as part of AFNORTH. BALTAP would be responsible for the defense of the Danish Straits and islands, the Jutland Peninsula, and Schleswig-Holstein, and would be commanded by a Danish general. However, part of BALTAP's naval force would be German, and thus two German liaison officers were added to AFNORTH staff in Norway and emergency supplies for German ships were to be prepositioned in southern Norwegian ports. In March 1959, the Soviet Union lodged a protest, claiming that to allow German officers in Norway would be an affront to the memory of those who fought against the Germans, and that the prepositioning of supplies for German ships would be contrary to the Base Policy. Leftists in Norway made similar arguments in the Storting, the Norwegian parliament. The Norwegian government rejected these protests, noting that no foreign bases were being established in peacetime, that the Germans were merely liaison officers, and that, in any event, Norway alone would interpret the conditions of the Base Policy.

#### **The American Connection: The U-2 and RB-47 Incidents**

Another source of Soviet protests were Soviet claims that Norway was building airbases in northern Norway for American bombers. The Norwegian government repeatedly denied these allegations. However, two events in 1960 led the Soviet Union to strongly reject Norwegian denials. In May, the Soviet Union shot down an American U-2 reconnaissance aircraft over Soviet territory and discovered that the pilot planned to land at Bodø airbase in northern Norway. The Soviet leadership threatened to "obliterate" Norwegian bases with "rockets." The Soviets rejected Norwegian claims that Norway had not authorized the use of its bases for such flights.<sup>15</sup> Norway protested to the United States government, but the Soviets rejected the sincerity of the action. Two months later another American reconnaissance plane, an RB-47, was shot down off the Kola Peninsula, over what the American government said was international waters. The Soviets discovered that the pilots had instructions to land in Norway in case of an emergency. The Soviet Union again protested to Norway, claiming that this proved

<sup>14</sup>German, 1982a, pp. 63-64. German's article thoroughly examines Soviet diplomacy toward Norway in the post-war period; this section relies heavily on his work.

<sup>15</sup>It appears that Norwegian intelligence officials had arranged for the use of Norwegian bases without gaining authorization from Oslo.

"irrefutably that Norwegian territory is still being used by the U.S.A. for carrying out aggressive actions against the Soviet Union."<sup>16</sup>

The Norwegian government rejected all Soviet protests, but was clearly annoyed by the position in which it found itself. In October 1960, Foreign Minister Lange gave a major speech to the Storting providing the government's view on the continued validity of the Base Policy. Lange sent a clear message to the United States that it should respect Norway's fundamental right to "preserve and expand good neighborly relations with the Soviet Union," but at the same time warned the Soviets that NATO membership was fundamental to Norwegian policy. He also hinted that continuing Soviet pressures could force Norway to "reexamine" its Base Policy.

The U-2 and RB-47 incidents led to a subtle change in Norway's attitude toward allied activities on Norwegian territory. Outwardly nothing changed, but henceforth Norway would more closely monitor allied behavior, especially American, in and around Norwegian soil. The Norwegian government never again wanted to be dragged into a conflict with the Soviet Union over American actions which Norway could not control.

## THE CONCEPT OF A NORDIC BALANCE

By the beginning of the 1960s, Norway and the other Nordic states became increasingly aware of the complex pattern of relationships which had developed in their region since 1948:<sup>17</sup>

- The *Soviet Union* had the clear potential to dominate the region militarily, but had not attacked any Nordic state.
- *Finland*, although officially unaligned, was pledged by treaty to repel attacks on itself or on the Soviet Union through Finnish territory, and to "consult" the Soviets in the event of a threat of attack from "Germany or any ally of Germany."
- *Sweden* had reaffirmed its non-alignment in peacetime with an eye to armed neutrality in war.
- *Norway* and *Denmark* had become founding members of NATO, but adopted self-denying policies prohibiting the stationing of foreign troops or nuclear weapons on their territory in peacetime.

<sup>16</sup>Quoted in German, 1982a, p. 65.

<sup>17</sup>For an excellent account of the individual security policies adopted in each country, see Bjøl, 1983.

- *Iceland* joined NATO but never established its own military force, instead being protected by the American Icelandic Defense Force.

Despite the various crises of the Cold War in the 1950s, and contrary to the fears raised in 1948–1949, this pattern had remained remarkably stable. Norwegians began to refer to this status quo as the *Nordic Balance*.<sup>18</sup> Although the term has fallen into disfavor in recent years—there can be no “balance” between Soviet power and the various small Nordic nations—the basic concept helps to explain some aspects of Norwegian behavior. Norway had originally imposed the constraints of the Base Policy upon itself for bilateral Soviet-Norwegian relations combined with domestic political considerations. By the early 1960s, however, Norwegians were seeing this self-restraint as a positive contribution to stability and a low degree of tensions in all of Nordic Europe, permitting lower defense expenditures and greater attention to reconstruction. Furthermore, Norwegians came to believe that they had a lever on Soviet behavior: if the Soviet Union became belligerent toward any Nordic country, Norway could threaten to permit allied bases on its soil.<sup>19</sup>

The Norwegians soon faced a dramatic test. East-West tension had been growing throughout 1960–1961, primarily over the Berlin crisis, but began to lessen in August with the construction of the Berlin Wall. On October 30, 1961, tensions suddenly surged when the Soviet Union for the first time requested consultations with Finland under the treaty of Friendship, Cooperation, and Mutual Assistance. The Soviet note claimed that *revanchiste* forces in Bonn were conspiring to reestablish German domination of Nordic Europe, citing German activity in AFNORTH, and that this threatened Soviet and Finnish security. The Soviets linked the Finnish Socialist-Conservative presidential candidate opposing President Urho Kekkonen, whom the Soviets preferred, to this alleged German conspiracy. Kekkonen attempted to avoid consultations, sending his foreign minister to Moscow rather than going himself, while reaffirming Finland’s neutrality. Kekkonen also proposed holding the presidential elections early to counter Soviet concerns about alleged political instability in Finland. These actions did not satisfy the Soviet government, and on November 17, the Soviets once again asked that consultations begin.

<sup>18</sup>Norren, 1983; Holst, 1981; Holst, 1984b.

<sup>19</sup>The Soviets expressed particular concern about German bases being established in Norway, but lingering bitterness in Norway over the German occupation made this an unlikely prospect.

Meanwhile, the crisis provoked reactions from Denmark and Norway, who attempted to put pressure on the Soviets. Denmark hastened consultations with Germany over the establishment of a joint Danish-German command structure for BALTAP. The Norwegian government warned the Soviet Union that continued pressure on Finland would force Norway deeper into NATO, with possible changes in its prohibition on foreign bases and nuclear weapons. In both cases, the aim was to provide Kekkonen with greater bargaining power when he eventually met Khrushchev. In the end, the crisis passed quietly. Kekkonen met with Khrushchev and argued that consultations could provoke "war preparations" in Norway and Denmark. In addition, the opposition Socialist-Conservative candidate had withdrawn from the presidential race. The two leaders agreed that consultations were not necessary.

The reasons for Soviet change of heart remain unclear. For the purposes of this report, what is important is the Norwegian view of why the Soviets reversed themselves. In Norway and throughout Nordic Europe it was believed that Norway's threat to reexamine its Base Policy was the primary reason for Khrushchev's about-face.<sup>20</sup> By reminding the Soviets that the ban on foreign bases and even nuclear weapons could be reversed unilaterally by Norway, Norway was seen as having applied tremendous pressure on the Soviets. The "lesson" of the Finnish Note Crisis would become an important part of Norwegian security policy. In the future, Norwegian governments would point to this experience as evidence of the validity of the Nordic Balance concept and the contribution that Norwegian restraint makes to NATO's security. The term "Nordic Balance" no longer enjoys wide favor, yet the basic idea still remains: that the actions of any one of the Nordic states can have an important, even decisive, influence on the outcome of a regional crisis involving the Soviet Union.

## THE POSTWAR CONSENSUS SHAKEN

After the adoption of the Base Policy in 1949, a consensus had developed in Norway on the proper course of Norwegian security policy. Although Norway imposed restrictions on its own behavior, it clearly reserved for itself the right to interpret those restrictions. Furthermore, although Norway would not allow nuclear weapons on its soil or allow its soldiers to train to use them, Norway did allow NATO and the United States to contemplate and prepare for their use in the

<sup>20</sup>German, 1982a, p. 68.

event of war. Generally, Norway did not criticize NATO or the United States on nuclear issues.

In the 1970s, that consensus came under severe strain. By the 1980s, significant differences arose between the major parties on defense issues, largely resulting from what one analyst calls the "progressive radicalization" of the Labor party.<sup>21</sup> Part of this can be attributed to the retirement from public life of many who had experienced the German occupation, the negative reaction among Scandinavian youth to American involvement in Viet Nam, and the influence of the ideology of Swedish Prime Minister Olof Palme. Some younger Norwegians felt increasingly estranged from the United States and hostile toward NATO; many of these youths gravitated toward leftist parties or the left-wing of the Labor party. These changes were reinforced by the growing parliamentary strength of extremist parties on the left and right, which hampered the formation of a more centralist consensus. The trends were aggravated by a substantial expansion of Soviet military forces on the Kola Peninsula which undermined the existing Norwegian defenses and required increased commitments of allied reinforcements. The effects of these conflicting trends began to appear under the minority Labor government of Odvar Nordli in 1976 to 1981.<sup>22</sup>

### **The "Turned-Around" Nordic Balance**

Arne Olav Brundtland, who coined the phrase "Nordic Balance," describes the events of the Finnish Note Crisis as an example of the "classic" Nordic Balance: Norway can threaten to change its policy to gain leverage on Soviet behavior toward Finland. However, Brundtland notes that the logic can be "turned around" so that either the Soviet Union or Finland can threaten to alter Finnish neutrality to gain leverage on Norway's NATO policy.<sup>23</sup> The Soviets seem to have learned this lesson. In the period while Nordli was Prime Minister, the Soviets attempted to turn around the Nordic Balance concept, particularly concerning two issues: the introduction of German combat troops into Allied Mobile Force (AMF) reinforcements for Norway,<sup>24</sup> and prepositioning of equipment for a U.S. Marine brigade.

<sup>21</sup>Bjøl, 1983, p. 39.

<sup>22</sup>Labor had led every government in postwar Norway up to that time, but always as part of a majority. This was Norway's first minority government.

<sup>23</sup>Brundtland, 1981.

<sup>24</sup>The AMF is a multinational mobile reserve of NATO under the command of Allied Command Europe (ACE), formed in 1963 to reinforce the northern and southern flanks. Its purpose was both political (to show Alliance cohesion) and military (to bolster the weak flanks).

### **German Participation in the Allied Mobile Force**

Through the 1950s and 1960s, Norway never permitted German forces to participate in exercises on its territory, in part due to domestic attitudes toward Germans since the occupation, and in part to defer to Soviet attitudes. However, the détente which developed in Europe in the early 1970s led Norway to relax this ban in 1974 and to make plans to allow the gradual introduction of four German units into the annual AMF exercises in Norway. Two units would be support units (communications and medical), and two would be combat units (helicopters and infantry). The program began in 1976 with the introduction of 180 German medics in the AMF exercise. In early 1977, the Norwegian government announced that the communications and helicopter units would participate in the next exercise. Thus, it came as a considerable surprise to NATO when Nordli's government announced in January 1978 that German participation had reached an "appropriate level"—before the introduction of the German infantry unit.

What the NATO allies did not know at the time was that Norway's "normalization" of military relations with the Federal Republic of Germany had resulted in strong "criticism" from Finland and the Soviet Union. In September 1976, Finnish president Kekkonen, during an official visit to Norway, told the Norwegian government that "it is not a matter of indifference to Finland who Norway will cooperate with militarily."<sup>25</sup> In February 1977, following the Norwegian announcement of the participation of the German communications and helicopter units, Kekkonen leaked to the press that Norway's normalization with the Federal Republic could provoke reactions which would be "unpleasant for Finland as well as Norway."<sup>26</sup> In December 1977, Nordli received a harsh verbal assault from Soviet President Kosygin during an informal meeting with the Nordic prime ministers in Helsinki. The Labor government denied that these "criticisms" led to the reversal in policy, but no other reason has been advanced to explain the change.

### **The U.S. Marine Prepositioning Debate**

In the 1970s, Soviet naval forces on the Kola Peninsula underwent a substantial expansion and modernization. Attack aircraft on the Kola also became more numerous and capable. AFNORTH and Norway became concerned that allied ground reinforcements, with all their heavy equipment, might not be able to deploy to Norway rapidly

<sup>25</sup>German, 1982a, p. 72; Brundtland, 1981, p. 13.

<sup>26</sup>Brundtland, 1981, p. 13.

enough in a crisis. Therefore, in 1977 the Norwegian government opened negotiations with Norway's Atlantic allies—Britain, Canada, and the United States—for the prepositioning of heavy equipment for possible ground reinforcements. A joint American-Norwegian study group was created to consider the issue and in early 1979 recommended that the equipment for one U.S. Marine Amphibious Brigade (MAB) and its associated aircraft be prepositioned near one of the airfields in North Norway.<sup>27</sup>

The talk of prepositioned equipment provoked another strong response from the Soviet Union. On 9 February, 1979, the Soviet Ambassador in Oslo asked if prepositioning indicated that Norway was preparing to abandon its Base Policy. The Norwegian government said no, that it was essential for the continued viability of the Base Policy. The Soviet Union continued to protest the plan. In December, the Soviet ambassador informally warned the deputy chair of the ruling Labor party, Gro Harland Brundtland, that if prepositioning were approved, "We would know how to react, how to make trouble for you."<sup>28</sup>

In January 1980, the Labor government announced that it was suspending talks with the United States pending the outcome of a new Norwegian study. Several months later, the government announced that equipment for the MAB would be placed in central Norway, near Trondheim, several hundred miles further south; to improve defenses in the north, equipment for a Norwegian Regimental Combat Team would be prepositioned there. In addition, the Norwegian government insisted that the Marine's air element not include the normal deployment of A-6 Intruders, long-range aircraft capable of carrying nuclear weapons. Significantly, equipment for the British, Dutch, and Canadian reinforcements have been allowed to be prepositioned in North Norway. Norwegian officials, or at least important segments of the Labor party, considered the American forces to be fundamentally more provocative.<sup>29</sup> According to one key participant, the debate largely centered on confidence in "American political judgment and objectives."<sup>30</sup> In the end, the outcome satisfied all the major participants. Yet the issues raised during the course of the debate highlight the problems

<sup>27</sup>The chief Norwegian representative for the study group was Johan Holst. The other Atlantic allies also agreed to preposition equipment for possible reinforcements to Norway, the British committing two units of the 3rd Royal Marine Commando Brigade, and the Canadians committing its Air-Sea Transportable (CAST) Brigade.

<sup>28</sup>Quoted in Stark, 1985, p. 120. Brundtland subsequently became the leader of the Labor party, serving as Prime Minister in 1981 and again in February 1986.

<sup>29</sup>Stark, 1985, p. 119.

<sup>30</sup>Holst, 1985, p. 219.



which can arise as Norwegian officials attempt to balance reassurance of their public, their neutral neighbors, and the Soviet Union with the requirements of deterrence, especially when the deterrent involves American forces.

### **Nuclear Weapon Issues**

Perhaps the clearest sign of the strain on the postwar defense policy consensus has been in the area of nuclear weapons.<sup>31</sup> It may seem strange that a country that prohibits nuclear weapons on its territory could become divided over nuclear weapon issues. The conflict arose over the Norwegian government's previous position of tacitly accepting contingency planning for the use of nuclear weapons in Norway in the event of war, and the open acceptance of their use elsewhere in NATO. With the progressive radicalization of the Labor party and the antinuclear attitudes of many Norwegian youths, both of these positions came under attack. Nordli's Labor government openly disapproved of any contingency planning for the use of nuclear weapons in Norway. Public opposition increased regarding neutron bomb, the deployment of INF, and Norwegian participation in research for the Strategic Defense Initiative, while interest grew in a "no first use" policy for NATO and in the nuclear freeze movement. Norwegian support for the INF infrastructure program was passed by a single vote in the *Storting*. In opposition after 1981, the Labor party adopted a more negative platform on nuclear weapon issues, opposing INF and supporting the concept of a Nordic nuclear-free zone (NNFZ).<sup>32</sup>

### **The Emergence of a Modified Consensus**

The events of late-1970s and early-1980s severely tested the Norwegian security consensus. Despite considerable opposition at home and from some neighbors, the Norwegian government succeeded in enacting the essential changes needed in its security policy, particularly the commitment of and preparation for substantial allied reinforcements in a crisis. In time, compromises were reached and the most important steps were taken. Yet the result of these debates has been greater Norwegian sensitivity to issues involving nuclear weapons and American forces. This sensitivity was heightened by the increased

<sup>31</sup>Haagerup, 1986.

<sup>32</sup>The NNFZ concept gained tremendous momentum in 1980 following the publication of a "peace book" by members of the Scandinavian Social Democratic establishment. The Norwegian editor was Arne Treholt, convicted in 1985 of being a Soviet spy. Dorfer, 1986, p. 27.

visibility of American forces in the region. The U.S. Marines began to exercise in North Norway annually. American carriers were allowed to operate in Norwegian fjords during exercises. All these actions were criticized by the left wing of the Labor party. Johan Holst, Norway's leading defense intellectual and Minister of Defense since 1986, began to speak more frequently on the potentially destabilizing effects of American air and naval activity in and around Norway, both during exercises and at other times. At the same time, he attempted to reassure the allies of the Norwegian commitment to NATO, a balancing act difficult to maintain.

The events of the late 1980s have suggested that the Soviets have adopted a more subtle and effective policy toward Nordic Europe—to Norway and Nordic affairs, at least publicly. In 1987, the Soviets offered to unilaterally remove some tactical ballistic missiles, albeit antiquated ones, from the Kola Peninsula. Naval exercises and operations in the Norwegian Sea have become more restrained. In 1988 the Norwegian government was able to announce the participation of German combat forces in the reinforcement of Norway without significant comment from Moscow, a tremendous change from a decade previous. At the same time, the Soviet military build-up on the Kola Peninsula, both of conventional and strategic forces, continues, while Soviet submarine intrusions into Swedish waters persist. The situation is ambiguous, but the trend in Norway suggests that the public views the Soviet Union as less of a threat.

The net effect of these trends points to the emergence of a modified consensus on security policy in Norway. The commitment of allied reinforcements to Norway is now widely accepted, including prepositioning of equipment. However, the level of American activity seems to have reached an "appropriate" level, and a greater American presence in and around Norway is resisted. Instead, Norwegian officials prefer to increase the participation of non-American allied forces in the region. Attitudes toward NATO's nuclear strategy remain more ambiguous, but a consensus seems to be forming to support a gradual reduction of NATO's reliance on nuclear weapons.

### III. CRISIS STABILITY AND NATO REINFORCEMENTS

This section explores the attitude of Norwegian policymaking elites on the relationship between allied reinforcements and crisis stability.<sup>1</sup> It further hypothesizes how these attitudes could result in hesitation in permitting external reinforcements in a crisis.

#### "DON'T ROCK THE BOAT:" THE CONCERN WITH CRISIS STABILITY

As part of the commitment to a "low tension" policy, the Norwegian government has emphasized that it would decide if and when to allow allied reinforcements into Norway. This policy has been clearly stated by governments of both the right and the left. For example, *Main Guidelines for the Defense Establishment During the Period 1984-1988*, written in 1982 under the Conservative government, stated that:

It is up to the Norwegian authorities to determine whether and when allied reinforcements are to be summoned to the country.<sup>2</sup>

Discussing NATO's Rapid Reinforcement Plan, the same document states:

This, together with ratified agreements concerning the pre-stockage of heavy materiel, gives credibility to the possibility of allied forces being quickly and effectively deployed in Norway *at the request of the Norwegian authorities* in the time of crisis or war.<sup>3</sup>

---

<sup>1</sup>This analysis will rely heavily on the writings on Johan Jørgen Holst. Holst is considered to be Norway's leading defense intellectual and has been closely tied to the Labor party, Norway's largest. He is pro-NATO and deeply knowledgeable about the Alliance and about the various allies. He has been Defense Minister since early 1986, and had been Under Secretary of State for Defense and for Foreign Affairs under the Nordli government. He has spoken for the Labor party on issues of national security, both in domestic and foreign forums, since the late 1970s. His writings can thus be considered an authoritative expression of elite views of the dominant Labor party. The extensive use of his writings is not meant to be viewed as a criticism. Instead, the point is to show that the concern with crisis stability is deep-seated within the elite of the defense establishment and the nation's largest party.

<sup>2</sup>Norway, Royal Ministry of Defense, 1983, p. 38.

<sup>3</sup>Ibid., p. 29, emphasis added.

This point is made again in the section dealing with the possibility that Norway could alter its ban on nuclear weapons in a crisis:

Both the deployment of allied reinforcements and the use of nuclear weapons on or from Norwegian soil will require the consent of the Norwegian authorities.<sup>4</sup>

The fact that these statements are repeated so often suggests that this is an important consideration in Norway, for both the right and the left.

However, there does seem to be an important difference in right and left views on prepositioning. Statements from the right concerning the decision to prestock heavy equipment in Norway tend to mention simply their role in deterring a Soviet attack by permitting rapid reinforcement. Statements from the center and left, on the other hand, often emphasize the potential destabilizing effects of allowing allied reinforcements into Norway in a crisis. Holst has stated frankly the ambivalent feeling in the Labor government about the decision to prestock equipment for the U.S. Marine Amphibious Brigade (MAB). In explaining why the stocks were positioned in central<sup>5</sup> rather than North Norway, Holst said:

Since the concern about *not rocking the boat* is likely to be strong in an ambiguous crisis, the Norwegian government wanted to preserve the option of calling reinforcements as a deterrent prior to the outbreak of hostilities without running the risk of precipitating the latter by forward allied reinforcements in the first place. The need to emphasize defensive intentions was strengthened also by the American choice of earmarking Marine Corps units for reinforcement of Norway in view of the accentuation of the offense in its doctrine and posture.<sup>6</sup>

One finds repeated statements of the need to emphasize Norway's defensive intentions when discussing allied, and especially American, reinforcements.

### **Norwegian Concerns with Allied Airpower**

The nature of allied air reinforcements are a particularly strong source of worry for the Norwegians, leading Norwegian authorities to place restrictions on the type and action of such units. The best known case involves Norway's insistence that the U.S. Marines not

<sup>4</sup>Ibid., p. 38.

<sup>5</sup>In this report, "central Norway" refers to the territory of Norway bounded 65° and 63° North latitude, which includes the city of Trondheim and the airbase of Ørland.

<sup>6</sup>Holst, 1986, p. 8.

include the usual A-6 Intruder component in its air element set to deploy to Norway, since these aircraft are nuclear capable.<sup>7</sup> More recently, the Norwegian government refused to allow U.S. Air Force F-111s to land in Norway during NATO exercises.<sup>8</sup> These restrictions on potential reinforcements have been explicitly linked by the Norwegian government to the "low tension" policy.<sup>9</sup>

The concern with allied aircraft is not limited to long-range or nuclear-capable aircraft. In exercises in 1982, American F-15s operating from Bodø participated in the interception of Soviet aircraft south of 72°N, roughly the northern limit of Norwegian territory. In an article written at the time (while Labor was still the opposition party), Holst objected to this action, stating that such "policing" functions should be done by Norwegian forces: "In consonance with the general pattern of restraint direct confrontations between Soviet and American military aircraft should be avoided in the high north."<sup>10</sup> Similarly, the responsibility of maritime surveillance in the Barents Sea has been assumed by Norway as part of the commitment to the "low tension" policy in the far north:

Norwegian P-3 "Orions" substitute in a way for American aircraft which otherwise might feel compelled to operate in areas which would involve the danger of direct contact with Soviet airpower close to Soviet territory.<sup>11</sup>

Furthermore, when joining the NATO Airborne Early Warning (NAEW) system Norway insisted that "operational plans in the northern areas be compatible with the Norwegian policy of safeguarding the state of low tension in those areas" and that Norwegian military authorities have operational control of those missions.<sup>12</sup> In practice, this has meant that NAEW operations are limited to one flight from Norway per week.<sup>13</sup>

<sup>7</sup>See, for example, Holst, 1986, p. 8.

<sup>8</sup>"Minister on Refusal on Use of F-111 in NATO Exercises," *West European Report*, Joint Publication Research Service, September 22, 1986, p. P2.

<sup>9</sup>"DIE WELT Interviews Norway's Brundtland," *West European Report*, Joint Publication Research Service, August 19, 1987, pp. N1-N2.

<sup>10</sup>Holst, 1982, p. 9.

<sup>11</sup>Holst, 1984a.

<sup>12</sup>Ibid.

<sup>13</sup>NATO and Norwegian officials have been able to get beyond this restriction with a little creativity. On the flight to its operating base in Norway (Ørland), the NAEW flies a mission. After arriving in Ørland, it flies its one permitted mission, and on leaving Norway it flies a third. Auslund, 1986, p. 136.

### **The Possibility of Delay**

The pattern of statements and actions by the Norwegian government in recent years suggests a troubling prospect: concern over "not rocking the boat" in a crisis could lead the Norwegian authorities to hesitate in permitting the deployment of allied reinforcements. Conceivably, Norway could find itself in a situation where it is attacked before allied reinforcements arrive.<sup>14</sup> Norwegian authorities are aware of this problem, but they tend to understate it:

However, even with these precautions [i.e., preparations for receiving allied reinforcements], the implementation of reinforcement plans will depend on when a Norwegian request is sent. This entails great demands on the Norwegian decision-making authorities.<sup>15</sup>

Even if Norwegian officials acted swiftly and asked for allied reinforcements, NATO may hesitate. As an alliance of 16 sovereign nations, NATO may be slow to act. Consultations between members or between representatives in Brussels and their home governments could be time-consuming. Other nations may fear "rocking the boat" through general mobilization. The nations providing reinforcements might decide that the forces are required elsewhere.<sup>16</sup> Bilateral agreements between Norway and certain allies are possible, but this could further delay the process.

### **PRECONCEPTIONS AND UNCERTAINTY IN CRISES**

If the Soviet Union could play on the fear that reinforcement of Norway could precipitate an attack, it may be able to induce the Norwegian government, or other governments, to delay. However, one need not presume Soviet manipulation nor Norwegian weakness to develop a plausible case that Norway might hesitate in a crisis. An extremely important element of any crisis is uncertainty. One cannot be certain of the actions and intentions of the other players—not just one's adversary but also one's allies and key neutrals. The problem is magnified by the need to make sense out of the overwhelming number of "signals" being received, to pick out the important information from

<sup>14</sup>It should be emphasized that this could result from bad luck as much as miscalculation. Deploying allied reinforcements to Norway in a crisis may be destabilizing, but war could break out despite Norwegian restraint.

<sup>15</sup>Norway, Ministry of Defense, 1983, pp. 50-51.

<sup>16</sup>One should remember that no external reinforcements are firmly committed to Norway; they all have possible alternative deployments.

the "noise."<sup>17</sup> Crises, by their very nature, are out of the ordinary. Yet one tries to process this information using existing preconceptions of how the world operates. Signals which easily fit one's expectations are more readily received than those which conflict. As Thomas Schelling has said:

[T]here is a tendency to confuse the unfamiliar with the improbable. The contingency we have not considered seriously looks strange; what looks improbable need not be considered seriously.<sup>18</sup>

Thus, one must understand the expectations and preconceptions of decisionmakers to foresee how they might react in a crisis.

In a 1966 article analyzing the Norwegian reaction to the events leading up to April 9, 1940, Johan Holst described a set of conditions which could easily be reflected in a future crisis:

Both the Allies and Germany showed unmistakable interest in Norway's orientation in the war. The signals from England and France were, however, stronger and more frequent than the ones from Berlin. The *political assessment* of Dr. Koht was predicated on the presumption that the main danger stemmed from the policies of the Allies, that the latter would attempt to provoke Norway into entering the war on their side, and that this policy might cause Germany to retaliate against Norway.<sup>19</sup>

Given the ambiguity and "noise" of the crisis, Norwegian decisionmakers were strongly influenced by the strength of the signals from the Allies, whose actions were far more overt than those of Germany. Furthermore, since Norwegian officials believed that the principal danger came from the British and French, they interpreted the ambiguous signals to support this hypothesis.

Today, if a major crisis were to erupt involving Norway, the decisions made by Norwegian authorities would undoubtedly be heavily influenced by the notion of a Nordic Balance. A world view based on the Nordic Balance would lead a decisionmaker to process the signals in a crisis according to certain assumptions:

- An increase in the magnitude and frequency of NATO activity in and around Norway could be seen as threatening by the Soviet Union and thus provoke a Soviet reaction;

<sup>17</sup>For a splendid treatment of a classic case, see Roberta Wohlstetter, *Pearl Harbor: Warning and Decision*, Stanford, CA, 1962

<sup>18</sup>*Ibid.*, p. vii.

<sup>19</sup>Holst, 1966, emphasis in the original. Dr. Koht was the Norwegian Foreign Minister.

- Norwegian self-restraint combined with the *threat* of external reinforcement could provide leverage on Soviet behavior;
- All the players have a basic interest in maintaining the status quo in the far north.

If indeed, a Norwegian decisionmaker went into a crisis with these preconceptions, consciously or unconsciously, the potential for hesitation in calling for reinforcements would be substantial. The possibility of such delay could be greatly strengthened if the signals that Norway receives from the allies are "stronger and more frequent" than from the Soviet Union. In a severe crisis, Norway would likely receive unambiguous requests from certain allies to mobilize and to provide base access for reinforcements, while Soviet intentions would remain ambiguous and Soviet pronouncements would deny any hostile intentions.

## CONCLUSIONS

An analysis of Norwegian security policy, historically and currently, points to conditions which could result in Norway hesitating in permitting the deployment of allied reinforcements in a crisis:

- Past Norwegian statements and actions clearly convey Norwegian concerns that allied reinforcements may be destabilizing;
- An analysis of the dominant world view in Norway's governing elite—the Nordic Balance—strongly suggest that Norwegian authorities would emphasize the negative effects of allied reinforcements in a crisis;

For these reasons, a prudent allied planner should prepare for the prospect of delayed base access. We next address the possible effects of such a delay.



## **PART II**

### **THE MILITARY SIGNIFICANCE OF DELAYED REINFORCEMENT**

The first part of this report argued that decisionmakers might delay in committing allied reinforcements to Norway in a crisis. Does it matter if deployment is delayed until the outbreak of war? Would the course or outcome of a war be significantly different from a case of no delay? How long would the delay need to be before it adversely affected the outcome for NATO? To answer these questions, one must delve into the details of operational plans and capabilities of both NATO and the Soviet Union. One must also consider the important uncertainties which could affect the answer given.

Part II examines the operational military *significance of delayed* deployment of allied reinforcements. The first two sections provide the operational background to the question. Section IV examines Soviet and NATO objectives and strategies in the region. Sections V and VI discuss Soviet and NATO forces, respectively. Section VII synthesizes this information and provides a framework for examining the impact of delay in reinforcing Norway. Section VIII considers various means by which the Soviets could prevent reinforcement in case of delay.

#### **IV. COMPETING OBJECTIVES AND STRATEGIES IN THE NORTHERN REGION**

To assess the operational effects of delayed reinforcement, we must first consider the goals of both the Soviet Union and NATO in the whole northern region, and their military strategies for achieving these goals in war. After exploring Soviet and NATO objectives and strategies, this section examines differences between NATO and Norwegian goals and preferred strategies.

##### **SOVIET STRATEGY IN THE FAR NORTH**

In the event of war, the Soviet Union would have three strategic objectives in northwestern Europe and the surrounding waters:<sup>1</sup>

- Defending the homeland from attack, in particular extending the air defense perimeter of the Soviet European heartland in the event of U.S. strategic-bombers and cruise-missile attacks;
- Protecting Soviet ballistic missile submarines (SSBNs) operating in their bastion in the Arctic Ocean and Barents Sea, to ensure their viability as a survivable retaliatory nuclear force;
- Interdicting NATO's sea lines of communications (SLOCs) between North America and Western Europe, to disrupt the flow of reinforcements.

One can see that Soviet strategy in the northern region is essentially defensive. However, to achieve the strategic objectives the Soviets must launch offensive operations. To provide a secure defense of the air and sea in the far north, Soviet forces would need to deny NATO use of airfields in North Norway; specifically, the Soviets must seize or destroy these airfields and eliminate NATO's ability to recapture them. These objectives might require that the Soviets seize the airfields for their own use, and possibly neutralize airfields in Sweden and southern Norway as well. To defend the SSBN bastions, the Soviet navy would need to move into the Norwegian Sea and eliminate NATO naval forces there. To interdict SLOCs in the Norwegian Sea and North Atlantic would entail even more offensive operations. Thus, even if Soviet strategy is defensive, the importance and extent of the

---

<sup>1</sup>Hines and Petersen, 1986b, p. 516.

objectives pushes the Soviet military toward highly offensive operations from the outset of conflict.

Some analysts reject the hypothesis that the Soviets would place a high priority on attacking North Norway early in the event of war. However, this region involves key Soviet strategic objectives—the defense of the Soviet SSBN force and defense of the Soviet homeland.<sup>2</sup> Furthermore, if the Soviets do not act quickly, before Norwegian forces fully mobilize and NATO reinforcements arrive, success for the Soviets could prove costly if not impossible.

### Likely Soviet Military Operations in the Far North

A survey of the open literature suggests a general consensus on the likely Soviet operations against Norway in war.<sup>3</sup> In operational terms, Soviet forces would launch a multi-division offensive through the Finnmark county of Norway and the northernmost region of Finland toward the Norwegian airbases and ports in the county of Troms, as shown in Fig. 4.1.<sup>4</sup> This operation would be supported by amphibious assaults as far south as Bodø and by airborne and airmobile assaults throughout North Norway. Soviet aircraft would attack NATO airbases, radar facilities, headquarters, prepositioned equipment, and other key targets. Differences of opinion arise over the forces to be committed and the timing and probability of success of the operations.

A Soviet overland advance through the Nordland regions of Norway, Finland, or Sweden would be extremely difficult.<sup>5</sup> Lying above the Arctic Circle, the region offers an inhospitable climate. The terrain in Finland and Sweden is swampy, that of Norway mountainous and intersected by fjords. The road network is extremely limited, and during most months of the year off-road travel is impossible for all but the most specialized vehicles. Thus, a successful Soviet advance would necessarily rely on *desant* forces: the Soviet term for combat forces—airborne, airmobile, and amphibious troops—designed to conduct

<sup>2</sup>The importance of this area is suggested by the fact that command of this area, the Leningrad Military District, has been a major stepping-stone for career advancement, both to the highest rank of Marshal of the Soviet Union and to positions of great responsibility in the Ministry of Defense. (Warner, Bonan, and Packman, 1987.)

<sup>3</sup>Hines and Petersen, 1986b, provide an excellent and detailed discussion of the North Norway "operational direction" in Soviet planning. Ries, 1984, also offers an excellent view of Soviet operational strategy. For comparison, one can examine Soviet contingency planning for the region during World War II in McQuail, 1964.

<sup>4</sup>The Soviets would hope to gain Finnish acquiescence in transitting Finnish territory, but they would probably enter Finland in any event.

<sup>5</sup>The effect of the environment on military operations is discussed in more detail in App. A.

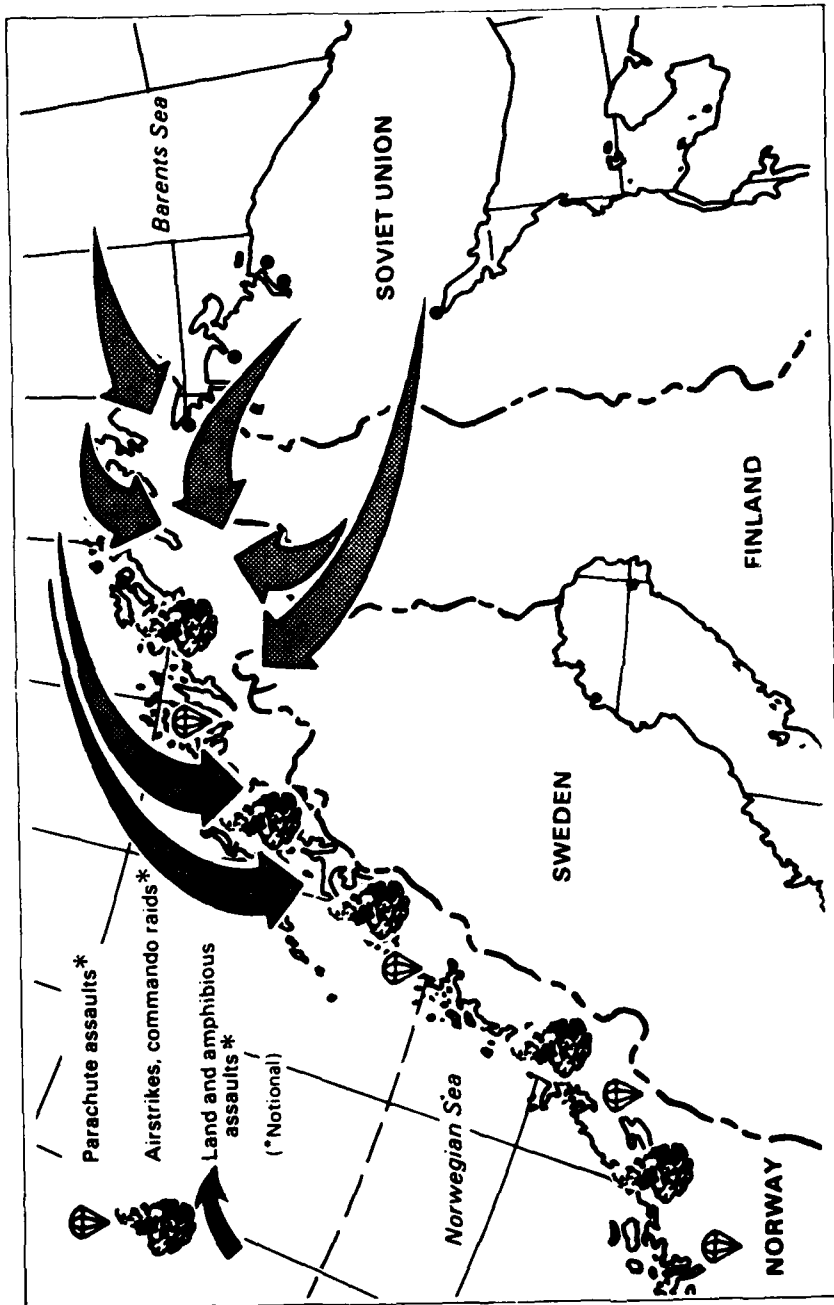


Fig. 4.1—Scenario for Soviet attack of North Norway

combat operations in the enemy's rear areas. *Desant* units can be used to outflank enemy defenses at the tactical, operational, or even strategic level. Significantly, we find *desant* units disproportionately represented in this region, including one airborne division, an air assault brigade, naval special purpose (*Spetsnaz*) forces, and a naval infantry brigade (which includes a parachute regiment).<sup>6</sup>

Amphibious forces would play a major role in any Soviet invasion of Norway, providing the potential to outflank and isolate NATO defenses and to overcome the channelling effects of Norwegian terrain. However, a debate exists over the nature of Soviet amphibious doctrine and capability. On the one hand, a major study conducted at the SHAPE Technical Center found that Soviet doctrine dictates a limited role for amphibious forces.<sup>7</sup> Unlike U.S. Marine Corps doctrine, Soviet amphibious doctrine does not envision strategic assaults, i.e., opening up new fronts or theaters of ground operations. Instead, Soviet amphibious forces would be used either tactically, outflanking defenses by landing immediately to the enemy's rear (up to 50 kilometers from the front lines), aimed at linking with friendly forces in less than 24 hours, or operationally, landing 200 to 300 kilometers behind the front lines in brigade or division strength, aimed at seizing and holding a critical flank for several days. Some analysts suggest that Soviet doctrine points to tactical employment of amphibious troops.<sup>8</sup> On the other hand, Soviet amphibious forces assigned to the Soviet Northern Fleet conducted increasingly ambitious exercises in the early and mid 1980s, suggesting that a major operational-level assault on the Troms/Nordland region is possible.<sup>9</sup> However, similar exercises were not witnessed in 1987 or 1988.

### Alternative Soviet Operational Approaches

Conceivably, the conventional wisdom on likely Soviet operations could be wrong. One important assumption is that the Soviets would not attack Sweden. Most analysts assume that an invasion of Sweden would drain away too many resources and require too much time for rather limited gains. Yet the Soviets have shown increasing operational interest in Sweden in recent years, as shown in the large number of Soviet submarine intrusions and various covert efforts to map out Swedish defenses. Thanks to captured Soviet contingency plans from

<sup>6</sup>Norwegian officials believe that the Soviets may be able to mobilize a second naval infantry brigade in the Leningrad Military District. Huitfeldt, 1986c, p. 7.

<sup>7</sup>Donnelly et al., 1985.

<sup>8</sup>Ibid.

<sup>9</sup>Berg, 1986d.

World War II for an invasion of Scandinavia (captured from Germans by Americans), we have a broad outline of the strategic and operational directions that Soviet planners have identified in Sweden.<sup>10</sup> These are shown in Fig. 4.2. At that time, the Soviets identified the strategic direction as lying across southern Scandinavia, from Stockholm to Oslo, Trondheim, and Bergen. The operation would have relied heavily on amphibious landings in southern Sweden. Disturbingly, Soviet submarine intrusions in recent years have been concentrated in those same areas.<sup>11</sup>

Even if an invasion of Sweden would be impractical for Soviet forces, the Soviet Union might seek to gain overflight routes over Sweden. Overflying Sweden would allow the Soviets to attack much further south into the Norwegian Sea and into central and southern Norway, as shown in Fig. 4.3. This could gravely threaten NATO's efforts to reinforce and resupply North Norway and to defend the SLOCs of the North Atlantic. Sweden would almost certainly deny overflight rights to either Warsaw Pact or NATO aircraft. However, the Soviets may attempt to neutralize Swedish air defenses and force through its own overflight routes. This would not be easy, since the Swedish Air Force disperses upon mobilization, scattering its aircraft to isolated road strips in the forested regions of Sweden. These areas would be difficult to find and destroy. However, a more effective approach for the Soviets would be to kill the pilots before they reach their aircraft. This could explain the bizarre case of the "Polish art dealers" in 1986 who apparently succeeded in identifying the homes of almost every pilot in the Swedish Air Force, along with many important military commanders.<sup>12</sup>

At the other extreme, one cannot rule out the possibility that the Soviets would do nothing at all, content to take a purely defensive posture in the northern region. Soviet planners may find that operations in the far north would be too great a drain on their limited resources. The experience of the Second World War could not be considered encouraging for a Soviet planner. During the 1939-1944 war between the Finns and the Soviets, in what the Finns call the Continuation War, the Soviets suffered one million casualties against a nation of only 3 million people. Yet, despite the enormous Soviet effort, the Soviets never occupied Helsinki, the only enemy capital they failed to take. Still, taking all factors into consideration—the strategic Soviet objectives involved, the enormous naval forces deployed there, the

<sup>10</sup>McQuail, 1964.

<sup>11</sup>Amundsen, 1985, pp. 112-114.

<sup>12</sup>Foreign Broadcast Information Service, "Sweden: 'Picture Sellers' Reportedly Monitoring Military," *Western Europe Daily Report*, August 12, 1986, p. P1.



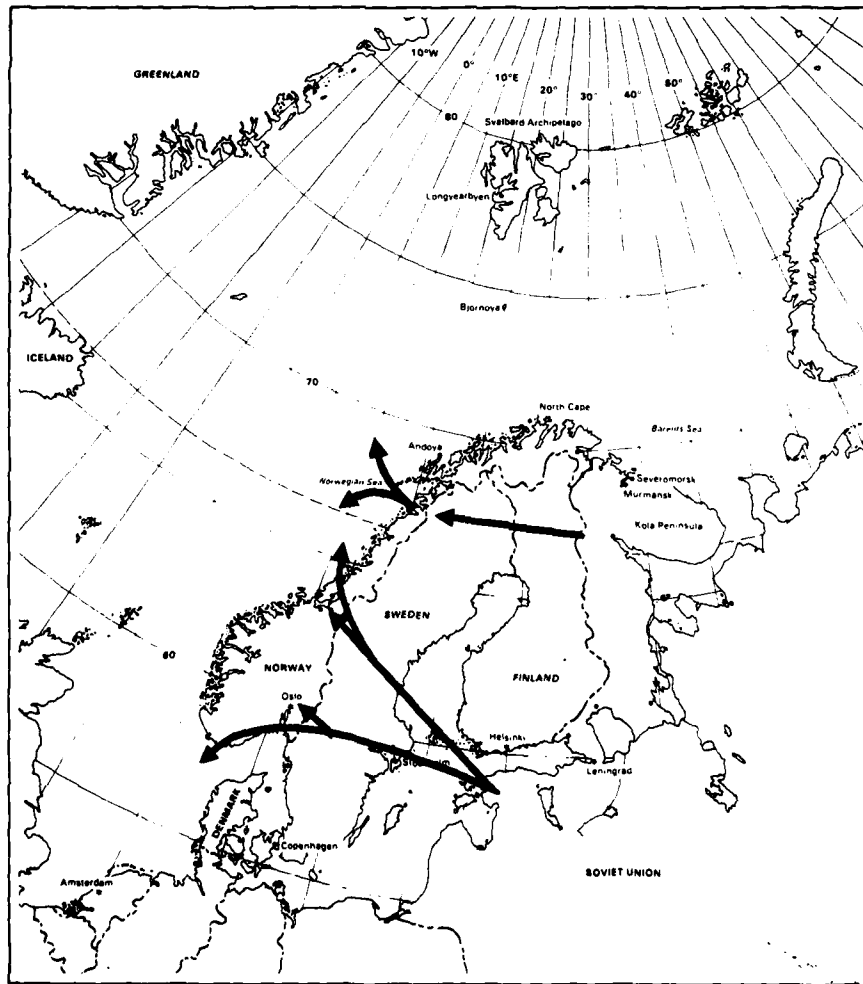


Fig. 4.3—Soviet benefits from overflying Sweden



pattern of Soviet exercises—it seems probable that the Soviets will act against North Norway in the event of war. The strategic importance of the region and the technological capability to conduct Arctic operations have increased dramatically since the war.

In an intermediate option, the Soviets could try to neutralize airfields and ports in North Norway by air and *Spetsnaz* attacks, to prevent an attack against Soviet forces on and around the Kola Peninsula, without actually seizing Norwegian or Finnish territory. Air attacks on airbases will be discussed in more detail later in this report. *Spetsnaz* are Soviet special purpose forces; a naval *Spetsnaz* brigade is assigned to the Soviet Northern Fleet.<sup>13</sup> Naval *Spetsnaz* would almost certainly be used against targets in Norway in the event of war, no matter what the overall Soviet strategy may be. The targets would include military command posts, airbases, ports, lines of communications, and the political and military leadership. Thus, *Spetsnaz* forces would normally support the general military offensive. However, if the Soviets simply wish to deny NATO use of Norwegian facilities for a limited period, *Spetsnaz* may become a prime instrument in implementing that strategy. *Spetsnaz* lacks the strength or logistics to maintain such a strategy for long. The question for the Soviet planner would be: Can this approach defend vital strategic assets on the Kola Peninsula?

Another possible “unconventional” threat to Norway could come from the use of conventionally armed tactical ballistic missiles (TBMs) against airbases and other critical targets in Norway.<sup>14</sup> An attack by TBMs provides little or no warning time, and NATO does not currently field an active defense against TBMs. If such missiles could be deployed in sufficient numbers and with adequate range, they could pose an enormous risk to NATO and greatly facilitate the pursuit of Soviet operational objectives. Since the defense of Norway depends on mobilization and external reinforcement, warning time is essential to NATO. With conventional TBMs, the Soviets would not need to mobilize substantial ground forces or redeploy air forces in order to launch an attack which could deny the critical airfields and ports to NATO. An initial TBM attack, with either chemical or conventional munitions, followed by conventional air strikes, could disrupt NATO air operations long enough for the Soviets to redeploy their forces, launch an offensive, and seize critical objectives.

---

<sup>13</sup>For more information on *Spetsnaz* forces, see Hansen, 1984, and Boyd, 1986.

<sup>14</sup>Gormley, 1985.

## **NATO'S STRATEGY IN THE FAR NORTH**

As a defensive alliance, NATO's wartime objectives emphasize maintaining and restoring the territorial integrity of its members in the event of aggression. Therefore, the primary objective of NATO in the far north is the defense of Norwegian territory, to deter any Soviet aggression and to repel the Soviets if they do invade. Thus, by its nature, NATO must be reactive.

NATO would seek to support the general defense of Europe in any conflict. In the far north, it would place high priority on the defense of the SLOCs in the North Atlantic, North, and Norwegian Seas. NATO must hold Soviet submarine, surface, and air forces north of the Greenland-Iceland-United Kingdom (GIUK) Gap to protect the SLOCs between North America and Europe. The line would have to be held further north to allow the sea reinforcement of Norway.

NATO's strategy in the far north is primarily defensive, as would be most operations to implement that strategy. However, successful defense may rely on offensive military operations. For example, NATO might consider striking back at the Soviet fleet and air forces based on the Kola Peninsula. Such an operation would ease the pressures on Norway and the SLOCs. The Soviets realize this, and therefore would need to deny NATO the use of the airbases and ports necessary to support such an operation. On a more limited scale, NATO may need to launch an offensive to recapture occupied territory, airbases, and ports.

## **DIFFERENCES IN NATO AND NORWEGIAN OBJECTIVES**

A realistic reading of Norwegian official statements suggests that Norwegian objectives diverge from NATO-wide objectives in several important areas. First, NATO places more stress on deterrence than does Norway. Although greatly concerned with deterrence, Norway is also concerned with reassuring the Soviets that Norway has no hostile intentions. As a result, Norwegian officials tend to be uneasy about offensively oriented elements of NATO strategy. Such concerns have arisen over aspects of the Maritime Strategy and over discussions of striking at airbases on the Kola Peninsula. In the name of the "low tension" policy, Norway would prefer to limit NATO's wartime capabilities and increase the level of peacetime reassurance. These differences are reflected in military strategies and force structures.

Since the Norwegian political authorities do not wish to depend on the deployment of allied reinforcements before hostilities begin, they have stressed the need to defend North Norway long enough for the reinforcements to arrive afterward. The Norwegian military refers to

this as the anti-invasion concept. The concept states that Norwegian forces shall be designed and deployed to delay a Soviet invasion; it emphasizes defensive measures. The measure of merit for Norwegian defense is *holding time*, the amount of time which certain critical areas could be held.<sup>15</sup>

Norwegian authorities have made an explicit decision to orient their defense efforts northward. They seek to preclude the successful launching of a surprise attack on North Norway which could succeed before reinforcements arrived from southern Norway and the allies. Norway has established its principal line of defense in the natural fortress of Troms county, deploying its standing forces there and in Finnmark county. Norwegian authorities assume that an attack on southern Norway could only be launched after the Soviets had overcome German and Danish defenses in the Baltic, and perhaps Swedish forces as well. Since it would take time to redeploy units southward if necessary, the Norwegian government clearly believes that overcoming the Baltic defenses would be a prolonged operation.<sup>16</sup>

NATO's strategy follows Norway's as far as it goes. However, NATO's military commanders must be concerned with the defense of the entire Alliance, and that may mean striking back at Soviet naval and air forces attempting to interdict NATO reinforcement efforts. Ideally, from a NATO perspective, allied forces would be deployed in wartime in and around Norway with the capability to suppress airfields and ports on the Kola Peninsula and to interdict air and naval forces attempting to sortie over the Norwegian Sea. The U.S. Navy's Maritime Strategy aims at achieving these results. A similar strategy could theoretically be adopted for land-based forces, using specialized munitions on long-range aircraft and short-range missiles. This is precisely the capability that the Norwegian government wishes to forbid to NATO on Norwegian soil, arguing that it would be too provocative and destabilizing.<sup>17</sup>

Given the political limitations on NATO strategy, we can expect AFNORTH to adopt a generally defensive strategy acceptable to the Norwegians, while quietly attempting to maintain a limited counter-offensive capability with multi-role aircraft. The political incident involving F-111s landing in Norway, described in Sec. III, probably reflects this balancing act. At the same time, AFNORTH will seek to support the Maritime Strategy, which is not politically constrained to the same degree.

<sup>15</sup>Huitfeldt, 1986c; Sohlberg, 1982.

<sup>16</sup>Huitfeldt, 1986c.

<sup>17</sup>Holst, "Norwegian Security Policy: The Strategic Dimension," in Holst, Hunt, and Sjaastad, 1985, p. 125.

## V. SOVIET FORCES

### ORGANIZATION OF SOVIET FORCES

Soviet military planning centers on the *theater of strategic military action* (*teatr voyennykh deystviy* or TVD in Russian), a theater where military action occurs on a strategic scale. Against NATO, Soviet planners have identified three continental TVDs (the Northwestern, Western, and Southwestern) and two oceanic TVDs (Arctic and Atlantic). These regions include the adjacent seas (for continental TVDs) and coasts (for the oceanic ones), and can overlap. North Norway falls within both the Northwestern and Arctic TVDs. Southern Norway lies at the intersection of four TVDs: the Northwestern, Western, Arctic, and Atlantic.<sup>1</sup> Figure 5.1 indicates probable boundaries of Soviet TVDs surrounding Norway.

For administrative purposes, the Soviets divide their territory into military districts (MDs) and assign units to these districts. The northwestern Soviet Union falls under the jurisdiction of the Leningrad Military District, which Western analysts presume to be coterminous with the boundaries of the Northwestern TVD.<sup>2</sup> The forces used against the northern regions of Norway, Finland, and Sweden would come from the Leningrad MD, with possible air and ground reinforcement from the strategic reserves. Forces used against southern Norway or Sweden could come either from the units advancing southward from operations in the northern sector of the Northwestern TVD, or from units making amphibious and airborne approaches across the Baltic Sea operating from the Western TVD. The latter could come from units in the Baltic MD or the northern MDs of Poland and East Germany.

Strategic forces do not come under this command structure; the central authorities of the USSR maintain command and control. However, the TVDs would have the mission of defending these forces from both conventional and nuclear attacks.

The Northwestern TVD does not appear to have a peacetime theater commander, unlike the other TVDs. Some analysts suggest this as evidence of the low priority of the theater. An alternative explanation is that the central authorities keep direct control of the command due to its strategic importance.

<sup>1</sup>Hines and Petersen, 1986a, pp. 282-285; Hines and Petersen, 1986b, p. 512; Sadykiewicz, pp. 1-19.

<sup>2</sup>For example: Hines and Petersen, 1986b, and Donnelly et al., 1985.

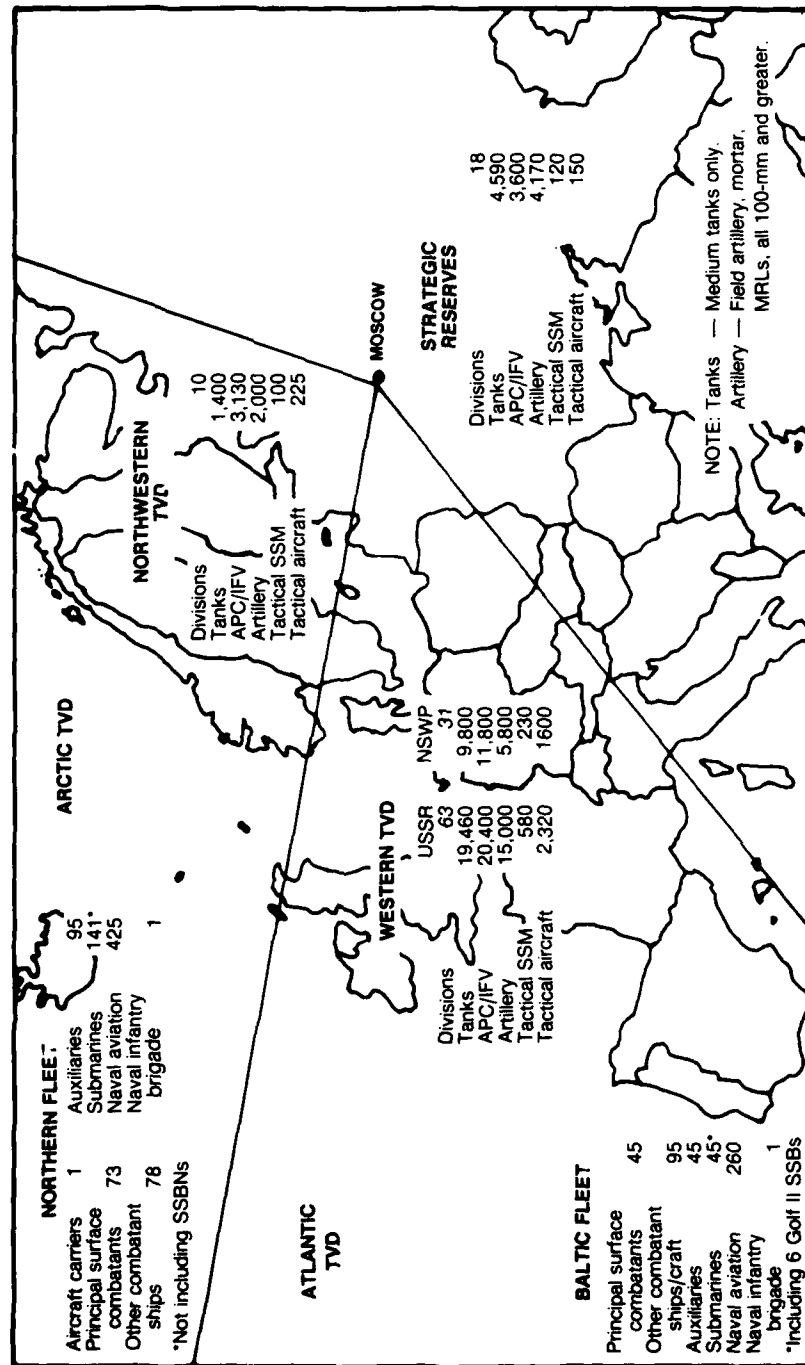


Fig. 5.1—Theaters of strategic military action surrounding Norway

Over the last twenty years, the Soviets have greatly enlarged their facilities and forces on the Kola Peninsula. Between 1965 and 1985, the number of SSBNs increased from 18 (diesel-electric) to 39 (nuclear-powered), major surface ships from 45 to 81, and motorized rifle divisions from eight to ten. The Soviets added an airborne division, an air assault brigade, an artillery division, a *Spetsnaz* brigade, and several helicopter squadrons. Major new airfields and port facilities were built.<sup>3</sup> Figure 5.2 shows known Soviet air and naval bases there. Several factors account for the enormous buildup, including:

- The development of the ballistic missile submarine;
- The desire to assert a global role through a "blue water" navy;
- The desire to interdict NATO sea lanes of communications in wartime; and
- The American strategic bomber threat.

Geography dictated that these interests lie on the Kola Peninsula. Its ports are closest to the continental United States for Soviet missiles and interdiction missions. It offers the only unrestricted access for Soviet fleets to the ocean. The Great Circle routes for bombers would bring them over the region.

The sections below describe in greater detail the Soviet forces which are now deployed on the Kola Peninsula and in the Leningrad Military District and which could be used in operations against North Norway. First, we will examine strategic forces; although they would not be involved in operations against Norway, they do create much of the incentive for possible Soviet actions. Second, we will examine the conventional forces in the region.

## SOVIET STRATEGIC FORCES ON THE KOLA PENINSULA

### The SSBN Fleet

The most important Soviet forces stationed in the far north are the ballistic missile submarines (SSBNs). The Soviets base two-thirds of the Soviet SSBN force on the Kola Peninsula (see Table 5.1). All of the more modern SSBNs (Typhoon and Delta IV) are deployed to the Kola, while the older systems (Yankee I and Delta I) are disproportionately deployed elsewhere. The SSBNs of the Northern Fleet would be the primary source of a survivable retaliatory capability against the United States. With the introduction of longer-range missiles on the SSBNs, the submarines no longer need to venture out into the Atlantic

<sup>3</sup>Cole, 1986; IISS, 1988.



Ocean; they will be able to strike targets throughout the United States from positions in the Barents Sea. This has led to the rise of a new Soviet strategy for defending the SSBN force: the creation of a bastion in the Barents Sea and Arctic Ocean defended by air and naval forces operating out of Kola bases. These units would attempt to protect the SSBN force from attacks by U.S. submarines and carriers operating in the Norwegian Sea.

### The Air Defense Forces

The formidable air defense forces (PVO) constitute another component of the strategic forces stationed on and near the Kola Peninsula, as shown in Table 5.2. Lying under the direct polar routes between the U.S. strategic bomber bases and the Soviet heartland and home of the SSBN fleet, the Kola Peninsula has been given the highest priority for air defense. The air defense force consists of 225 aircraft (of which approximately 100 operate from bases on the Kola Peninsula), over 100 surface-to-air missile complexes, and several airborne early warning aircraft. Although probably intended primarily for defense against strategic bombers and cruise missiles, the force would make conventional air operations against the Kola Peninsula very costly. Elements of the PVO force could also escort aircraft attacking

Table 5.1

#### SOVIET SSBN FORCES ON THE KOLA PENINSULA

Type	Submarines		Missiles	
	Northern	Total	Northern	Total
Typhoon .....	5	5	100	100
Delta IV .....	4	4	64	64
Delta III .....	7	14	112	224
Delta II .....	4	4	64	64
Delta I .....	9	18	108	216
Yankee II .....	1	1	12	12
Yankee I .....	8	16	128	256
Hotel I .....	1	1	6	6
Total	39	62	594	942
Percent of total submarines in Northern Fleet	63%		63%	

SOURCES: IISS, 1988; Norwegian Atlantic Committee, 1986.



North Norway. The introduction of long-range Flanker aircraft significantly increases the threat posed to NATO forces throughout northern and central Norway as well as the Norwegian Sea.

## SOVIET CONVENTIONAL FORCES

### Naval Forces

The Soviet military buildup on the Kola Peninsula in the 1970s and 1980s most significantly affected the Soviet Northern Fleet. Although not the largest of the four Soviet fleets, the Northern Fleet is undoubtedly the most capable. It consistently receives the most modern vessels, both surface and submarine.<sup>4</sup> For example, although the Northern Fleet has slightly less than half of all attack submarines (SSNs and SSs) in the Soviet Navy, it has 63 percent of the nuclear powered ones, and all of the most powerful *Alfa* class submarines. The same conditions hold true for all classes of major combatants. Thus, Table 5.3 understates the relative importance of this fleet.

Table 5.2

#### SOVIET AIR DEFENSE FORCES IN THE ARCHANGELSK AIR DEFENSE DISTRICT

---

##### Fighters<sup>a</sup>

45 MiG-23 Flogger B  
45 MiG-25 Foxbat E  
45 MiG-31 Foxhound  
45 Su-15 Flagon E/F  
45 Su-27 Flanker

##### Airborne early warning

9 Il-76 Mainstay  
6 Tu-126 Moss

##### Surface-to-air missiles

100+ complexes with SA-2, SA-3, SA-5, SA-10

---

SOURCES: IISS, 1988; The Norwegian Atlantic Committee, 1986.

<sup>a</sup>Some of the fighters have a secondary ground attack capability.

---

<sup>4</sup>The Norwegian Atlantic Committee, 1986, provides a detailed listing of fleet deployments by vessel class. The data clearly indicate that the most modern systems are disproportionately assigned to the Northern Fleet.

Table 5.3

## THE SOVIET NORTHERN FLEET

	Northern Fleet	Soviet Total	Percent of total
Submarines			
SSGN .....	28	50	56
SSN .....	49	77	64
SSG .....	7	16	44
SS .....	35	120	29
Principal combatants			
Carriers .....	1	4	25
Cruisers .....	11	36	31
Destroyers .....	18	62	29
Frigates .....	41	166	25
Patrol and coastal .....	55	410	13
Mine/counter-mine .....	65	373	17
Amphibious ships .....	14	80	18
Support and misc. ....	185	600	31
Naval infantry brigades	1 <sup>a</sup>	4	25

SOURCE: IISS, 1988.

<sup>a</sup>The Norwegian government believes that the Soviets have a second naval infantry brigade on mobilization status in Murmansk.

The Northern Fleet also boasts a major naval aviation force, detailed in Table 5.4, whose primary mission would be anti-ship and anti-submarine warfare. However, in support of Soviet maritime objectives, the bombers might be used against land targets affecting the maritime arena: ports, airfields, and radar stations. In addition, the Northern Fleet has a naval infantry brigade (the 63rd or "Kirkenes" Brigade) with 3000 men, 50 light tanks, and 140 amphibious armored personnel carriers, divided among four naval infantry battalions and one tank battalion. The Norwegian government believes that there is a second naval infantry brigade on mobilization status in the Murmansk area.

### Ground Forces

The Soviets station relatively few ground forces in the Northwestern TVD compared with the Central and Southern fronts; Table 5.5 summarizes the forces available. Eleven motorized rifle divisions (MRDs) are stationed in the Leningrad Military District, including two

Table 5.4

## SOVIET NAVAL AVIATION

---

Bombers (maritime strike)
60 Tu-16 Badger
Fighter/fighter ground attack
18 Yak-38 Forger on land
27 Yak-38 Forger on carrier <i>Kiev</i>
Maritime reconnaissance
55 Tu-16 Badger D/F/H/J/K
5 Tu-95 Bear D
Electronic warfare
10 AN-12 Cub B
10 Ka-25 Hormone B (helicopters)
Mine countermeasures
5 Mi-14 Haze B (helicopters)
Tankers
20 Tu-16 Badger
Communications
Tu-142 Bear J
Anti-submarine warfare:
Aircraft:
30 Tu-142 Bear F
20 Il-38 May
30 Be-12 Mail
Helicopters:
20 Ka-25 Hormone (afloat)
25 Ka-27 Helix (afloat)
20 Mi-14 Haze (ashore)

---

SOURCES: IISS, 1988; The Norwegian Atlantic Committee, 1986.

Category 2<sup>5</sup> MRDs on the Kola Peninsula: the 45th MRD in Pechanga and Murmansk and the 54th MRD at Kandalasha. The Soviets have equipped these units with over-snow vehicles and a higher than normal

---

<sup>5</sup>Soviet forces are divided into three readiness categories. Category 1 units are at full strength in peacetime. Category 2 are at 50 to 75 percent strength in peacetime, with full manning in three days and full operational status in 30 days. Category 3 units are essentially cadre units, at 10 to 50 percent strength. Typical estimates state that they would require eight to nine weeks to be fully operational. However, Norwegian authorities claim that Category 3 divisions in the Leningrad Military District have shown a capability to be ready in only one week.

number of amphibious vehicles; their equipment includes 220 tanks, 400 armored personnel carriers (APCs), and self-propelled artillery. In addition, the Soviets have deployed nine lower readiness MRDs stationed elsewhere in the Leningrad MD, some of which may be mobilizable in as little as one week.<sup>6</sup> Estimates suggest that the Soviets could move one MRD per day northward to the Kola Peninsula using existing rail capacity. Figure 5.3 shows the Soviet potential to mobilize MRDs and deploy them to the Kola Peninsula based on Norwegian estimates.

The only Category 1 division in the area is the 76th Guard Airborne division, which is specially trained for arctic conditions and could prove to be a major threat to key NATO facilities. The airborne assault brigade could also provide substantial flexibility and capability in outflanking static defenses or seizing key facilities. The artillery division could be used in operations against fortifications along the Norwegian coast.

Table 5.5

SOVIET GROUND FORCES IN THE  
LENINGRAD MD

---

Order of Battle
11 motorized rifle divisions
1 airborne division
1 artillery division
1 air assault brigade
Mobilization strength
1 front
2 all-arms armies with
1300 main battle tanks
2800 artillery pieces, multiple rocket launchers,
and heavy mortars
Missiles:
40 SS-21 Frog
54 SS-23 Scud
Helicopters
20 Mi-24 Hind attack
20 Mi-8 Hip C assault
10 Mi-8 Hip J electronic warfare
90 Mi-8 Hip, Mi-6 Hook, and M-2 Hoplite
transports

---

SOURCE: IISS, 1988.

<sup>6</sup>Donnelly et al., 1985, p. 155.

Some analysts, including Norwegian Defense Minister Holst, make much of the fact that the Soviets do not station many divisions in the region bordering Norway, and that those that are are not equipped with the most modern tanks, T-72s and T-80s; instead the units are equipped with older T-55s and T-62s. This analysis seems misguided for several reasons. First, the armor threat facing the Soviets in the far north is significantly less than in the Central Region; the tanks in Norwegian brigades are older and fewer in number than typical NATO units in the Central Region. The older Soviet tanks are well-matched to their NATO counterparts. Second, given the severe constraints of the ground transport network in North Norway, a Soviet commander would find heavy tanks to be of limited utility. Even just a few MRDs could saturate the roads, decreasing the effectiveness of the forces committed. The problem would be much worse for a Soviet commander if he had many of the heavier modern tanks which the local roads might not support.<sup>7</sup> Therefore, the composition of Soviet forces in the Northwestern TVD would make sense: a few "light" divisions and a disproportionately high number of special movement forces.

Estimates vary on the number of divisions the Soviets would commit to operations against North Norway. One factor would be the scale of Soviet operations—an invasion of Sweden would require a large number of forces, reducing the number that could be used in Norway. Likewise, active Finnish resistance to Soviet transit could tie down many forces. In either of these cases, the Soviets would undoubtedly need to commit some or all of the units from the Baltic Military District.

Another factor is the offensive/defensive orientation of units. The lower readiness divisions are often described as "defensive" in nature, and therefore unsuited for offensive operations. Presumably, the

<sup>7</sup>Soviet forces in the region appear to be equipped with the armored fighting vehicles which exert the least ground pressure, a more accurate indicator of off-road mobility than simple gross weight. Figures for Norwegian tanks are included for comparison.

Tank Model	Approximate Weight (tons)	Ground Pressure (kg/cm <sup>2</sup> )
T-55	36	0.81
T-62	37	0.72
T-64	38	0.72
T-72	41	0.79
T-80	45	0.83
PT-76	14	0.48
MT-LB	10	0.20
M-48A5 (Norway)	49	0.86
Leopard (Norway)	40	0.83

Figures taken from Isby, 1981. The PT-76 is a light amphibious and air-droppable tank used by Soviet amphibious and airborne forces. The MT-LB is an over-snow vehicle used by several MRDs in the Leningrad MD.

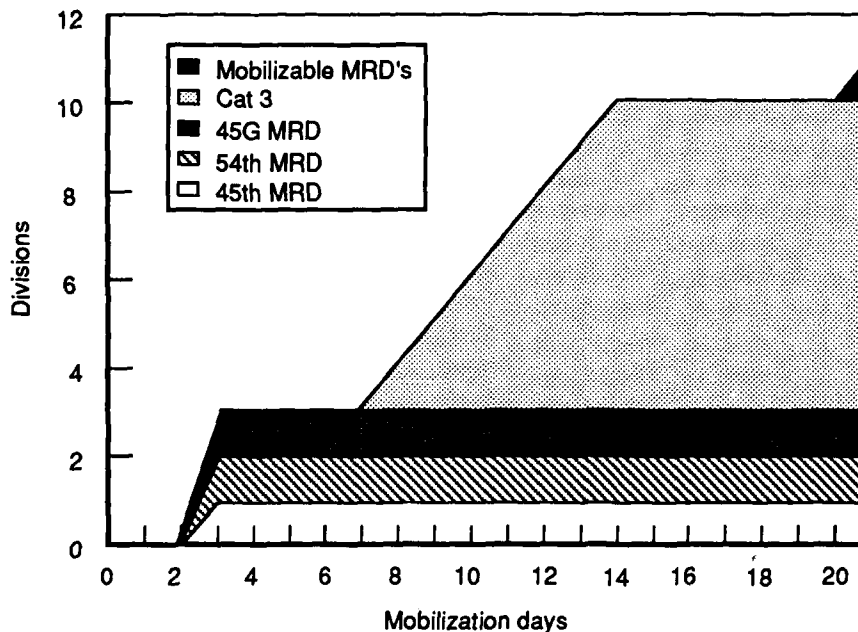


Fig. 5.3—Soviet ground force buildup potential

argument goes, they would simply be used in defending the Kola Peninsula and Leningrad. This argument seems misguided. First, there is no immediate ground threat against the Leningrad Military District. None of the Nordic countries would attempt offensive operations. The only conceivable threat would come from a U.S. Marine amphibious brigade or force. Such an assault force would first have to sail through the Norwegian Sea and into the Barents Sea. The more immediate threat would be air strikes against the base complex on the Kola. Therefore, the best defense would be a good offense: seize the airbases and ports of North Norway, allowing one to interdict any air attack or marine invasion. Second, even if the divisions are essentially defensive in nature, they could still participate in offensive operations. Any operations into North Norway would be vulnerable to interdiction of the lines of communications. Lower readiness divisions could be tasked with occupying and securing the land lines through Finland and Finnmark.

### Tactical Aviation

The Soviets do not permanently station ground attack aircraft on the Kola Peninsula, but they reportedly maintain airfields, including shelters, for some 500 aircraft.<sup>8</sup> Presumably, air regiments would redeploy northward from elsewhere in the Northwestern TVD or from the strategic reserves in the Soviet Union before beginning operations against Norway. For example, the 10 Soviet regiments (450 aircraft) of Su-24 Fencers assigned to the Strategic Aviation Air Armies would be used in the various TVDs in wartime; it seems likely that at least one regiment would be assigned to the Northwestern TVD where the long range of the aircraft (970 n mi) could be put to good use. In fact, the Norwegians rely on such redeployments as a major warning signal. Why don't the Soviets maintain ground attack squadrons on the Kola? Three possible reasons suggest themselves, not mutually exclusive. First, the Soviets may place a low priority on operations in the far north in the event of war; this is the argument advanced by many people in Scandinavia who favor lower military spending. Second, the Soviets may be aware of the potential benefits of self-restraint in light of the Norwegian commitment to maintaining the Nordic Balance: Norway feels less threatened and thus does not allow Allied forces to be stationed in Norway in peacetime. However, in the event of war, Soviet aircraft could presumably deploy to the Kola quickly. Third, the aircraft may be easier to maintain further south rather than in the Arctic conditions of the Kola Peninsula.

### CONCLUSION

Although limited compared to the Western TVD, the Northwestern TVD seems to be equipped with substantial forces, specialized for the environment. The Northern Fleet can project considerable force, at least in the immediate surrounding areas. The ground forces are equipped to launch a credible offensive into North Norway. The tactical air forces are not sizable, but as we shall see, they greatly outnumber the Norwegian forces.

---

<sup>8</sup>Ries, 1984.

Table 5.6

SOVIET TACTICAL AVIATION IN  
THE LENINGRAD MD

---

Fighter ground attack
45 MiG-21 Fishbed
45 MiG-27 Flogger D/J
45 Su-17 Fitter C/D
Fighter
45 MiG-23 Flogger, Su-17 Fitter
Reconnaissance
10 MiG-25 Foxbat B/D
15 Su-17 Fitter H H/K
Transport
30-60 An-12 Cub
20 Mi-6 Hook
40 Mi-8 Hip C/E

---

SOURCES: IISS, 1988; The  
Norwegian Atlantic Committee, 1986.



## VI. NATO FORCES

### NATO'S COMMAND ORGANIZATION

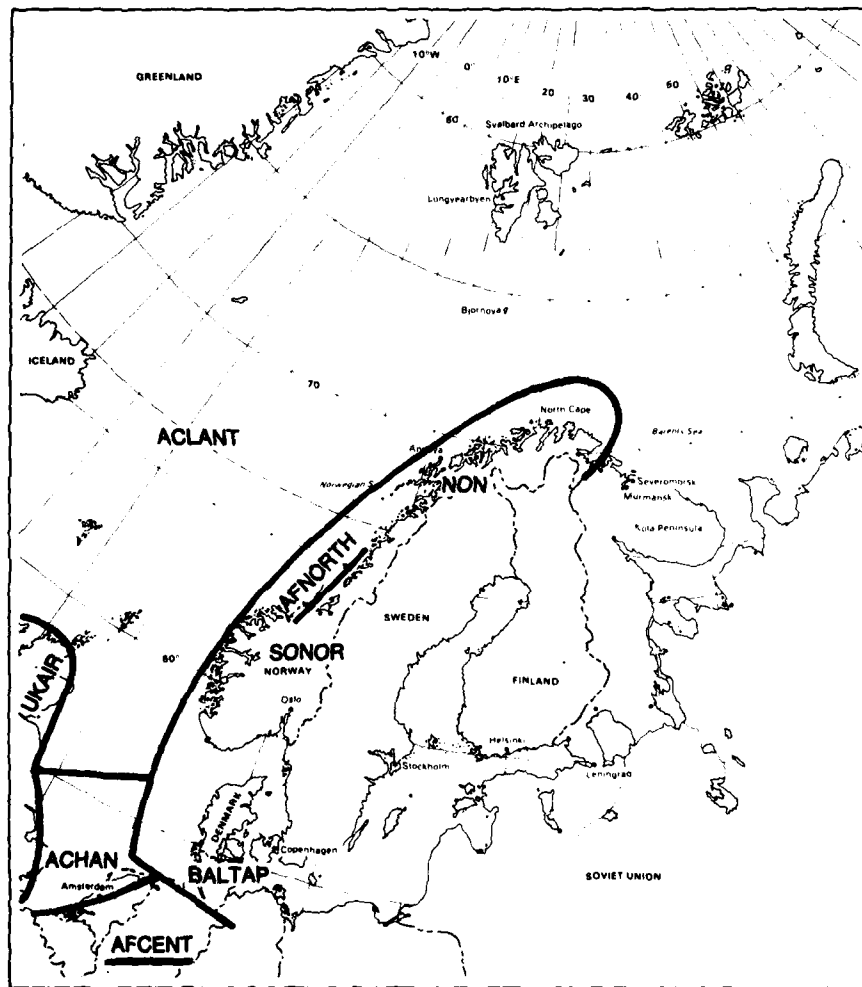
Within NATO, the territory of Norway falls under the command of Allied Forces Northern Europe (AFNORTH), which itself is under the Supreme Allied Command Europe (SACEUR). Because of the region's geographical diversity and expanse, AFNORTH's Northern European Command (NEC) has been divided into three principal subordinate commands: North Norway (NON), South Norway (SONOR), and the Baltic Approaches (BALTAP), consisting of Denmark and the Schleswig-Holstein region of Germany. The national command structure of Norway mirrors that of NATO, and the commanders of NON and SONOR are also the Norwegian national commanders of the corresponding Norwegian territories.<sup>1</sup> Figure 6.1 shows these relationships.

Norway borders on three other major commands: the Supreme Allied Command Atlantic (SACLANT), Commander-in-Chief Channel (CINCCCHAN), and the United Kingdom Air (UKAIR). SACLANT could greatly influence the course of any fighting in Norway. SACLANT will control maritime air reinforcements and amphibious ground reinforcements to Norway, as well as protecting the sea lanes bringing reinforcements to Europe. SACLANT's subordinate eastern Atlantic command has responsibility for the defense of the waters surrounding Norway's coastal waters.

These various commands could create a nightmare for the coordinated defense of Norway. Whereas SACEUR (through AFNORTH) has primary responsibility for the defense of Norway and its coastal waters, SACLANT controls maritime assets based in AFNORTH territory, including shored-based maritime patrol aircraft and any marine forces committed to AFNORTH. Another problem arises because the commands have different conceptions of what a war would look like. For example, some analysts assert that SACEUR plans to fight a short war, whereas SACLANT expects a protracted war. These different conceptions could result in disparities in priorities, capabilities, and schedules, with profound impact on the conduct of the war.<sup>2</sup>

<sup>1</sup>Unlike the Central Region, AFNORTH does not have a theater air command; instead, each of the three principal subordinate commands has a subordinate air command (e.g., Commander Air North Norway or COMAIRNON).

<sup>2</sup>Auslund, 1986, p. 118.



Boundaries are conceptual

Fig. 6.1—NATO commands in and around Norway

In peacetime, AFNORTH's forces in Norway consist entirely of Norwegian units, a result of Norway's Base Policy. In wartime, AFNORTH could be commanding additional units in Norway from the United States, the United Kingdom, Canada, the Netherlands, Luxembourg, Italy, and West Germany. This section surveys the forces that are likely to be deployed to Norway in crisis and war. Since the primary area of operation will be North Norway, attention will be focused on reinforcements likely to go there.

### NORWEGIAN FORCES

Norway has structured its forces along two conceptual lines: the anti-invasion concept (described in Sec. IV) and the total defense concept. The total defense concept calls for the use of all the resources of the Norwegian nation. With only four million people, Norway cannot sustain a large peacetime military to defend its territory. Norway's response has been to rely on a massive, rapid mobilization of manpower and resources in the event of major crisis or hostilities.<sup>3</sup> Approximately one in four Norwegian men between the ages of 18 and 55 would be called to duty. Civilian transport would be requisitioned. In theory, this approach allows Norway to field a relatively large military force in crisis and war, but the massive economic dislocations resulting from full mobilization would make this a difficult and costly decision. The full-time professional element of the Norwegian military is small, consisting of the air force, parts of the navy, and a small part of the army. Otherwise, the military aims at training conscripts and maintaining a large mobilization base. The small standing force would provide the initial defense to allow mobilization; the mobilized force would delay a Soviet invasion until allied reinforcements could arrive.

The Royal Norwegian Army is truly a mobilization army. Its peacetime strength of 19,000 mushrooms to 165,000 upon mobilization. The majority of the standing land forces are stationed in North Norway.<sup>4</sup> Two units comprise the Finnmark Land Defense District: the South Varanger Garrison (about 450 men) and the Porsanger Garrison (about 1000 men), creating the equivalent of an understrength regiment. The Troms Land District is defended in peacetime by the Brigade North (5000 men), with a company as border guard in the Skibotn Valley and a battalion group on the island of Hinnøya near Harstad. Two

<sup>3</sup>Approximately 205,000 men could be mobilized into the regular military forces; of these, roughly half receive regular refresher training of three to four weeks per year.

<sup>4</sup>All information on Norwegian deployments are taken from The Norwegian Atlantic Committee, 1986 and IISS, 1988.

additional "all-arms" battalion groups in South Norway form the remainder of the standing army.

After mobilization, the army can field 13 independent brigades (three armored, five mechanized, and six light infantry, each with 5000 men), 25 independent battalions (5 mechanized, 23 infantry, and 7 artillery), plus many territorial defense units. Of the 13 brigades, three would mobilize in North Norway. Brigade 15 and the remainder of Brigade North mobilize in Troms and Nord-Haalogaland, Brigade 14 in Sør-Haalogaland. In Finnmark, defense forces would increase to over brigade size (i.e., over 5000 men) with the addition of field battalions, local defense companies, and support units. These mobilizations would be completed within 48 hours, increasing the strength of North Norway defenses from roughly 1.5 brigades to 4 brigades in two days.<sup>5</sup> North Norway would be further reinforced with two brigades (Brigades 5 and 6) and a rapid reaction battalion from southern Norway heavy equipment for these units is prepositioned in the north.<sup>6</sup> These units could be deployed to North Norway two to seven days after they are mobilized in the south. Therefore, Norway plans to deploy the equivalent of six brigades to North Norway within a week of mobilization. The brigades would come under the command of the 6th Division. Norwegian officials stress that the successful defense of Norway will depend on the quick and effective implementation of this plan.

The army is lightly equipped, partly in response to the requirements of defense in the mountainous arctic environment of North Norway and partly a result of the F-16 procurement which took most of the national weapon acquisition budget for the 1980s. As of 1988, Norway had 122 main battle tanks (80 Leopard I and 42 old M-48A5s) and 70 light tanks (M-24/90s designated NM-116 in Norway). Because of environmental conditions, the Norwegian army places proportionately greater emphasis on other types of armored fighting vehicles and of over-snow vehicles, including 150 M-113s armored personnel carriers and 200 Bv-206 over-snow vehicles. Some of the M-113s have been modified to carry 20-mm cannons (designated NM-135) or TOW-2 antitank missiles (NM-142). In addition, the Norwegian army places considerable emphasis upon antitank missiles, artillery, and mortars.

In response to the heightened Soviet threat on the Kola Peninsula, the Norwegian government has upgraded several brigades, including Brigade North, to Brigade 90 PF (armor reinforced) standard. The army is acquiring an additional 36 M-48A5s, 16 M-113s, 42 NM-142s,

<sup>5</sup>At the same time, Brigade 13 would mobilize in central Norway.

<sup>6</sup>Prepositioning of equipment for the second brigade was a compensation for the decision to have the MAB preposition its equipment in central Norway.

and 1800 Bv-206s. The added Bv-206s should greatly increase the mobility of the units in North Norway.

The Home Guard forms an important adjunct to Norway's regular forces and would play a key role in the mobilization process.<sup>7</sup> Home Guard members keep their weapons at home and are expected to report to their mobilization point within three hours of the order. Their primary task is to support in their district the mobilization of the regular military: securing lines of communications, manning and defending roadblocks, acting as pathfinders, and antisabotage. In the event the Soviets have arrived, they would conduct sabotage operations themselves.

The Royal Norwegian Navy is structured and equipped to defend the Norwegian coast against Soviet amphibious invasions. The key sea-going components of this force consist of six *Kobben* submarines,<sup>8</sup> five *Oslo* missile-armed frigates, two *Sleipner* antisubmarine corvettes, 38 missile-armed fast attack craft, two minelayers and eight mine-hunters. The submarines, frigates, corvettes, and missile boats form the mobile element of the Norwegian coastal defense, with a large number dedicated to reinforce North Norway within one to four days of mobilization. The Navy also has a formidable land-based defense force: 26 coastal defense fortresses (15 in North Norway) armed with artillery (75-mm to 150-mm guns), torpedoes, and mines. Most of these fortresses are located around the key defensive positions in Troms county, blocking the entrances to Lyngen fjord and Vestfjorden/Ofotfjorden. Roughly half of the forts are manned at all times. The coastal artillery in North Norway and Trondelag are being modernized with new 120-mm guns with greater range and rate of fire.

The Royal Norwegian Air Force (RNoAF) fields 65 F-16s organized into four squadrons, one "operational conversion unit" (OCU)<sup>9</sup> with 16 F-5s, the 333 Maritime Patrol Squadron with seven P-3Bs based at Andøya,<sup>10</sup> and a composite squadron with six C-130s transports and three Mystere-Falcon 20C electronic countermeasures aircraft. The F-16 squadrons form the core of the RNoAF. Two squadrons, the 331 and 334, are based in North Norway at the main base of Bodø; one

<sup>7</sup>Roughly 90 percent of the 95,000 members of the Home Guard are conscripts who have completed three to 18 months of training in the regular military. Refresher training consists of one six-day session each year. The other 10 percent of the members are volunteers, both men and women.

<sup>8</sup>Norway has had 14 submarines, but is currently retiring five and selling three others to Denmark. The remainder are being reconditioned.

<sup>9</sup>OCUs are primarily training units for "converting" pilots to higher performance aircraft, but can also fly some combat missions in the event of war.

<sup>10</sup>The RNoAF is replacing five of the P-3Bs with four P-3Cs. Two of the P-3s are used to patrol Norway's maritime economic zone.

squadron, the 338, has converted from the F-5 and is operating in central Norway at Ørland; and the remaining squadron, the 332, is based in southern Norway at Rygge. The RNoAF has created a unique role for the F-16: Fighter Interceptor Attack or FXA. The FXA role consists of air defense (ground control intercepts in a degraded command and reporting environment) and attacks on sea-borne invasion forces using the Penguin MK3 stand-off antishipping missile.<sup>11</sup> This F-16 role is more limited and specialized than that of F-16s in the United States, and is adapted to the unique conditions of the region. Likewise, the aircraft have been modified for the environment, including drogue chutes to slow down the aircraft for landings on icy runways. The F-5As would provide additional day interceptor capability; the F-5Bs have been modified to provide electronic support (bulk chaff and flare dispensers) in the maritime interdiction mission. The RNoAF also operates six batteries of Norwegian Adapted Hawks (NoAH) surface-to-air missiles deployed to defend six of the main airbases in North and central Norway and some old Nike Hercules deployed in southern Norway.

## ALLIED REINFORCEMENTS

The exact composition of the allied reinforcements for Norway depends on the contingency. Several units have prepositioned equipment and regularly participate in exercises, but no unit is firmly committed to reinforce Norway.<sup>12</sup> In addition, the identity of possible U.S. Air Force reinforcements has not been made public, although it is known that agreements have been signed for the establishment of eight colocated operating bases (COBs) in Norway, each capable of taking one USAF squadron. Within these bounds, the subsections below list the most likely reinforcements for Norway.

### Allied Mobile Force

When Norwegian officials discuss possible reinforcements for Norway, they always mention the Allied Mobile Force (AMF) of the

<sup>11</sup>Aamoth, 1987. Currently, the F-16s are not equipped with radar missiles. However, the RNoAF will be upgrading their F-16s to use the new Advanced Medium Range Air-to-Air Missile (AMRAAM) which should be available to Norway by the mid-1990s.

<sup>12</sup>From 1976 to 1987, Canada was committed to reinforce North Norway with the Canadian Air-Sea Transportable (CAST) Brigade. However, the Canadian Defense White Paper, published in June 1987, announced that Canada was abandoning that commitment. As of late 1988, it appeared that Canada would retain a limited commitment to reinforce Norway: one battalion assigned to the AMF which could be sent to Norway.

Allied Command Europe (ACE). A multi-national force, the AMF was created in 1961 for the combined purpose of providing quick reinforcement to NATO's exposed flanks and showing an Alliance-wide commitment to defend all of NATO. The AMF consists of three brigades and four fighter squadrons.<sup>13</sup> The AMF conducts winter exercises in Norway every other year; participation has included American, British, Canadian, Dutch, Italian, Luxembourg, and West German units. Realistically, Norway is more interested in the political statement made by an AMF deployment than in the military contribution. In a sense, the primary role of the AMF is to "show the flags," in this case as many non-Norwegian NATO flags as possible. In the Norwegian view, the AMF spreads the political risk by exposing other NATO members to the front line in North Norway, improving the deterrence value of the Alliance without the provocative deployment of American forces.

#### **UK/Dutch Royal Marine Commandos**

In 1979, Norway concluded an agreement for the prepositioning of over-snow vehicles for the 42nd and 45th Commando Groups of the United Kingdom Royal Marines; along with Dutch Royal Marine Commandos they form the 3rd Commando Brigade under SACLANT, with a combined strength of 7000 troops. By Norwegian estimates, the unit could deploy to North Norway in about one week using sealift.<sup>14</sup>

Although not earmarked to reinforce Norway, the 3rd Commando conducts annual winter training in North Norway and would likely be sent there by SACLANT in an emergency.<sup>15</sup> This annual training undoubtedly makes this the most prepared unit which might deploy to North Norway. However, the unit depends heavily on the use of requisitioned civilian shipping, which could limit its ability to disembark in rough seas.<sup>16</sup> Furthermore, the unit does not have prepositioned ammunition stocks in Norway, so it must be continually resupplied. In the Falklands War, this requirement for ammunition resupply fully occupied the unit's helicopter force, limiting further combat mobility.<sup>17</sup>

<sup>13</sup>According to Norwegian sources, the AMF(AIR) component consists of one squadron each of British Jaguars, Dutch F-16s, American F-16s, and Canadian CF-18s. The Norwegian Atlantic Committee, 1986.

<sup>14</sup>The Norwegian Atlantic Committee, p. 9.

<sup>15</sup>Holst, 1984a, pp. 10-11; Holst, 1982, p. 32; Robertson, 1987b.

<sup>16</sup>O'Dwyer-Russell, 1983; Robertson, 1987b.

<sup>17</sup>Robertson, 1987b.

### U.S. Marine Amphibious Brigade

Militarily, the most important force likely to deploy into Norway is the 4th American Marine Amphibious Brigade (MAB), part of the 2nd Marine Amphibious Force (MAF). The 2MAF is deployed on the East Coast of the United States and has the Northern European Command as a first priority for deployment; equipment for the 4MAB is prepositioned in Norway. If the MAB is deployed to Norway, it would be the largest and most capable NATO force there; Table 6.1 lists its key ground combat equipment, along with a typical Norwegian brigade for comparison. The strength of the MAB comes from its strong combined arms capability (ground, air, and amphibious) and its professional training. Combined with the British/Dutch Marine Commandos, the MAB would greatly increase the combat potential of NATO in North Norway. SACLANT has the option of deploying the remainder of the 2nd MAF (the "2MAF Residual") as well. According to Norwegian officials, the deployment time for the 4MAB may be about 20 days and the 2MAF Residual about 45 days; however, the deployment time could be reduced substantially if the units were brought into position off the Norwegian coast in advance, or if some personnel were airlifted to Norway when base access was permitted. Subsequent deployment from

Table 6.1

#### MAJOR GROUND COMBAT EQUIPMENT OF THE MAB AND A NORWEGIAN BRIGADE

Equipment	Typical	
	MAB	Norwegian Brigade
Tanks .....	17	17
Assault amphibian vehicles .....	47	—
Light armored vehicles .....	36	—
81-mm mortars .....	24	18
60-mm mortars .....	27	9
Antitank guided missiles .....	96	69
TOW launchers .....	48	24
155-m towed howitzers .....	24	24
155-m self-propelled howitzers .....	6	18
8-in. self-propelled howitzers .....	6	—
Heavy machine guns .....	138	30
Light machine guns .....	255	150
Mk-19 40-mm grenade launchers .....	114	—

SOURCES: United States Marine Corps, 1985; Kamps, 1983.



central Norway to North Norway would require four to six days using a combination of air, sea, and ground transportation.<sup>18</sup>

The likely composition of the tactical air component of the MAB would be:

- 48 F/A-18 Hornet fighter/attack aircraft
- 40 AV-8B Harrier V/STOL (vertical/short takeoff and landing) ground support aircraft
- 4 EA-6 Prowler electronic warfare aircraft
- 4 RF-4B Phantom reconnaissance aircraft
- 6 KC-130 Hercules aerial refueling aircraft
- 6 I-Hawk surface-to-air missile launchers.

In addition, some 12 attack helicopters, 90 troop and cargo carrying helicopters, and 12 observation aircraft would be deployed.<sup>19</sup> Normally, a MAB would deploy 10 A-6 Intruder bombers, but the Norwegians objected to these aircraft (see Sec. II, above). However, if war had started, the Norwegian objections would probably disappear and the Marines may attempt to deploy these aircraft, although the absence of prepositioned equipment for them would make this more difficult.<sup>20</sup>

In 1986, the MAB exercised its deployment plan. Most elements of the MAB were airlifted directly to Evenes in North Norway. The MAB has certain heavy equipment prepositioned (POMCUS) in central Norway; units that needed this equipment were airlifted to Trondheim. Additional equipment was loaded on roll-on/roll-off ships in the United States and sealifted to Bogen Bay, 20 miles from Evenes. Fixed-wing aircraft were deployed to Bodø.<sup>21</sup> Clearly, such deployment would be vulnerable to Soviet interdiction efforts if the MAB had not arrived prior to hostilities, illustrating the problem for all allied reinforcements.

### American and British Air Force Reinforcements

In addition to the AMF and MAB air elements, AFNORTH would likely receive some U.S. and Royal (British) Air Force squadrons. The United States and Norway have signed agreements establishing eight

<sup>18</sup>The Norwegian Atlantic Committee, pp. 9-10.

<sup>19</sup>United States Marine Corps, 1985; Alexander, 1984, p. 190. Normally the composition of the tactical air component of a MAB includes only 24 F/A-18s and 20 AV-8Bs (i.e., one squadron of each), but several credible sources state that the Marine air element includes *two* F-18 squadrons and *two* AV-8B squadrons: The Norwegian Atlantic Committee, 1986, p. 9; Huitfeldt, 1986c, p. 10; and Alexander, 1984, p. 190.

<sup>20</sup>Alexander, 1984, p. 193.

<sup>21</sup>Stephan, 1987, p. 34.

Colocated Operating Bases (COBs) in Norway, each capable of receiving one American squadron; however, the type of units to be deployed has not been declared publicly. In exercises in recent years, squadrons of USAF F-15s, F-16s, F-4s, and A-10s have deployed to Norway, suggesting the possible range of unit types. According to Norwegian officials, USAF reinforcements for Norway could include one squadron each of F-15s, F-4s, and RF-4C (reconnaissance), and four squadrons of F-16s; the RAF could send one AV-8B squadron in addition to a Jaguar squadron in the AMF(A).<sup>22</sup> Norway has also prepared bases in central Norway to receive the squadrons on one American aircraft carrier in the event they need to evacuate.<sup>23</sup>

Although we do not know the air units which would be supplied to Norway in a crisis, we do have an idea of what priorities the Norwegians have. According to Tønne Huitfeldt, a retired lieutenant general in the Norwegian army and former Commander of Allied Forces North Norway from 1977 to 1981, the priority for North Norway would be:

1. "One to two squadrons of all weather (AWX) air defense fighters, within 48 hours."
2. "Suitable allied air defense aircraft to complement Norwegian F-16s, particularly with AWX and beyond-visual-range weapons and the capability of performing missions with degraded ground control."<sup>24</sup>

Huitfeldt goes on to identify the first type of aircraft as "F-15/F-18." Therefore, one could expect a squadron of F-15s, one or two Marine F-18 squadrons, and possibly some American F-16s which would have the all-weather and beyond-visual-range capabilities to "complement" the more limited Norwegian F-16s.

## **SUMMARY OF LIKELY AIR AND GROUND REINFORCEMENTS FOR NORTH NORWAY**

Tables 6.2 and 6.3 summarize NATO ground and air forces, respectively, likely to be committed to North Norway in the event of war.<sup>25</sup> As

<sup>22</sup>The Norwegian Atlantic Committee, p. 11.

<sup>23</sup>Auslund, 1986, p. 138; Kamps, 1983, p. 22.

<sup>24</sup>Huitfeldt, "Planning Reinforcements: A Norwegian Perspective," in Holst, Hunt, and Sjaastad, 1985, p. 185.

<sup>25</sup>In Table 6.2, the term "Available" means combat ready in North Norway. Table 6.3 assumes 24 aircraft per U.S. squadron and 16 aircraft per European squadron—normal strengths. The term "fighter bomber attack" refers to aircraft which can perform both air defense and ground attack missions. One should remember that the types of aircraft for the U.S. squadrons are uncertain. For simplicity, this report has assigned F-16s to the three USAF fighter bomber attack squadrons; however, these units could conceivably have F-4s, A-7s, or A-10s.

Table 6.2

## NATO GROUND FORCES LIKELY TO BE COMMITTED TO NORTH NORWAY

Unit	Status	Available (days)
<i>Norwegian</i>		
Finnmark Infantry Regiment	Local/semi-active	0-1
Brigade North	Active	0-1
Brigade 14	Locally mobilized	1-2
Brigade 15	Locally mobilized	1-2
Brigade 5	Mobilized/airlifted	2-7
Brigade 6	Mobilized/airlifted	2-7
<i>Allied</i>		
Allied Mobile Force (Land)	Air & sealifted	2-6
UK/Dutch Royal Marines	Air & sealifted	7
4 Marine Amphibious Brigade	Air & sealifted	8-12
4 Marine Amphibious Brigade	Deployed by ship from U.S.	24-26

can be seen, as much as half of the ground forces must be deployed into North Norway from elsewhere. NATO may not commit to Norway all the Allied reinforcements listed here, especially the AMF air reinforcements, which have potential commitments elsewhere. Still, the external air reinforcements would probably total 200 to 300 aircraft.

Table 6.3

## NATO AIR FORCES LIKELY TO BE COMMITTED TO NORTH NORWAY

Nation	Squadrons/Type	Number	Role
<i>North Norway</i>			
RNoAF	2 F-16	32	Fighter interceptor attack
USAF	3 F-16	72	Fighter bomber attack
USAF	1 F-15	24	All weather air defense
USAF	1 RF-4	24	Reconnaissance
AMF(US)	1 F-16	24	Fighter bomber attack
AMF(Neth)	1 F-16	16	Fighter bomber attack
AMF(UK)	1 Jaguar	16	Fighter bomber attack
AMF(Can)	1 F-18	16	Fighter bomber attack (all weather)
MAB	2 F-18	48	Fighter bomber attack (all weather)
MAB	2 AV-8B	40	Ground support
MAB	1 RF-4B	4	Reconnaissance
MAB	1 EA-6	4	Electronic warfare
MAB	1 KC-130	6	Tanker
<i>Central Norway</i>			
RNoAF	1 F-16	16	Fighter interceptor attack
USAF	1 F-16	24	Fighter bomber attack

## VII. THE MILITARY BALANCE AND THE ROLE OF ALLIED REINFORCEMENTS

NATO and Norwegian defense officials emphasize that, because of the small size and limited capabilities of the Norwegian military, external reinforcements would be essential if NATO is to defend Norway and protect its northern flank in wartime. Air defense aircraft would be vital in the first days and weeks of mobilization to keep airfields open for transports carrying troops from southern Norway to marry up with their equipment in North Norway. These troops would in turn be essential for the successful ground defense of the northern airbases and ports. Failure to deploy reinforcements before the start of hostilities could be disastrous. Prepositioned equipment would be destroyed or captured. Soviet attacks on the northern airbases would place at risk both scarce strategic airlifters and their critical cargo, yet failure to deploy could jeopardize the successful defense of Norway.

Norwegian leaders do not seem to be deeply concerned about the possibility of the bases being closed before or during the arrival of reinforcements. This appears to rest on two assumptions:<sup>1</sup>

- The Soviet Union could not successfully launch a surprise attack on Norwegian airbases with in-place forces, particularly since the deployment of I-Hawk surface-to-air missiles at the airbases;<sup>2</sup>
- Allied units will begin to deploy to Norway at the first clear sign that the Soviets are mobilizing.

However, as was shown in Part I, the decision to reinforce Norway might be delayed, despite warning signs, so as not to increase tensions in a crisis. In this event, the Soviet Union could attack before or during the arrival of allied reinforcements. A prudent planner must seriously consider this possibility, the effects it would have on the defense of NATO, and options for improving the situation. This section considers the effects of a failure of allied reinforcements to arrive;

<sup>1</sup>See Holst, 1986, pp. 10-12.

<sup>2</sup>Before the mid-1980s, Norway had only antiquated air defense systems (World War II vintage) to defend its airbases. Norwegian and NATO officials became increasingly concerned about the possibility of a surprise air attack on the northern airbases followed by an assault by Soviet airborne forces aimed at seizing the bases. In 1986, Norway began to deploy at each of the major bases a battery of Improved Hawk air defense missiles specially adapted for Norwegian conditions.

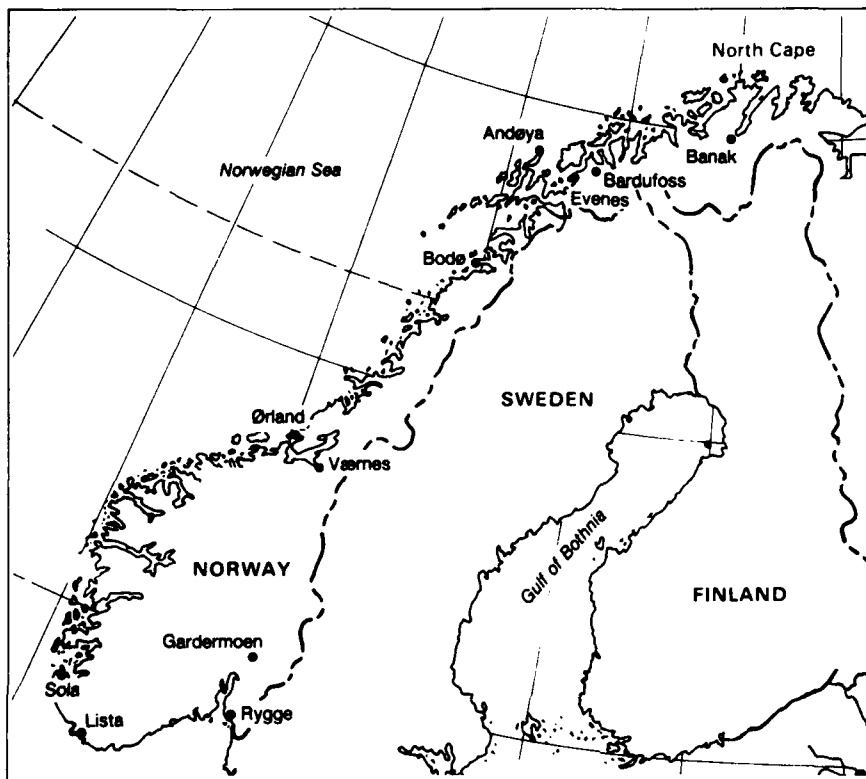


Fig. 7.1—Norwegian airbases

the next section will explore the possibility that the Soviets could in fact keep allied forces out of Norway if deployment is delayed until hostilities begin (D-Day or D+0).

### THE BASE CASE

For the purposes of analysis, a base case must be established describing force strengths, deployment schedules, and objectives. We will assume that war comes after a brief period of mobilization. The Soviets are able to mobilize for one week before NATO responds with its own mobilization on M+7. War commences one week later, on

M+14; thus the Soviets have mobilized for 14 days and NATO for seven.

The Soviets commit nine of their eleven MRDs (motorized rifle divisions) in the Leningrad military district, leaving two divisions in reserve. The attack is supported by the airborne division, the air assault brigade, the naval infantry brigade, and the artillery division. Using the assessments from Sec. V, all nine MRDs are ready and deployed by D-Day. All the tactical aviation listed in Table 5.6 is committed, as well as one regiment of Su-24 Fencers from the strategic reserve. Soviet operations follow the outline described in Sec. IV, "Likely Soviet Military Operations in the Far North."

For NATO, several different mobilization scenarios can be envisioned. In each case, we will assume that the Norwegians themselves mobilize on M+7. Based on the estimates provided in Sec. VI, all the Norwegian units could be deployed by D-Day. NATO is assumed to commit eventually all the reinforcements listed in Tables 6.2 and 6.3. The variation comes with the schedule for allied reinforcements. Several cases will be considered; Fig. 7.2 shows NATO's ground force buildup under each of the following assumptions.

- Crisis warning and no delay in reinforcement. Ground and air forces are fully prepared to move upon the decision to reinforce. Amphibious forces are prepositioned in ships off the Norwegian coast and deployed in a few days. All forces are deployed by D-Day.
- No prior warning but no delayed reinforcement. Ground and air forces must prepare to move upon the decision to reinforce, lengthening deployment times toward the high estimates shown in Sec. VI. Amphibious forces must deploy from home bases.
- Crisis warning but delayed reinforcement ("Delay/fast deployment"). Reinforcement does not begin until D-Day. Ground and air forces are fully prepared to move upon the decision to reinforce. Amphibious forces are prepositioned in ships off the Norwegian coast and deployed in a few days.
- No prior warning, delayed reinforcement, but sufficient airlift ("Delay/slow deployment"). Ground and air forces must prepare to move upon the decision to reinforce, lengthening deployment times toward the high estimates shown in Sec. VI. Amphibious forces must deploy from home bases. Airlifted forces can arrive if the bases are open.
- No prior warning, delayed reinforcement, and inadequate airlift ("No airlift"). Ground and air forces must prepare to move upon the decision to reinforce, lengthening deployment times

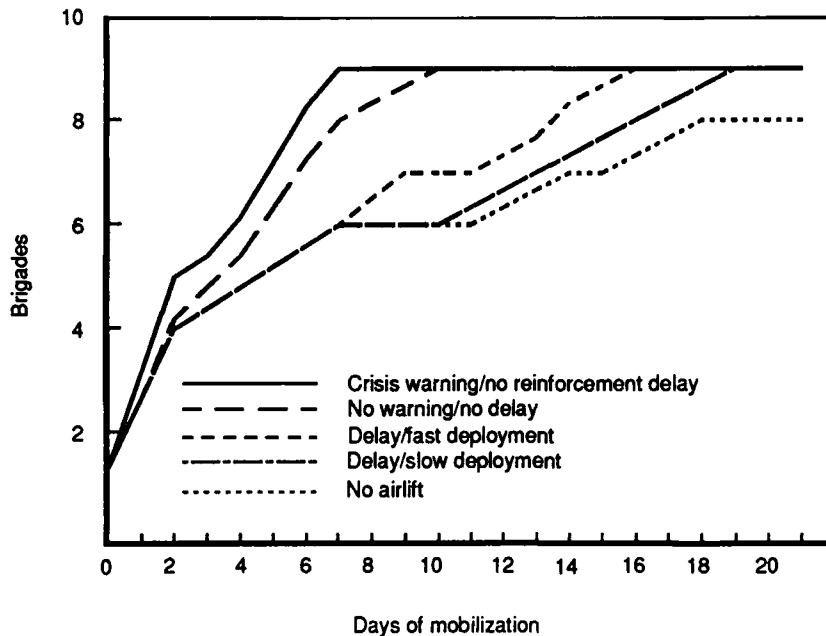


Fig. 7.2—NATO mobilization scenarios

toward the high estimates shown in Sec. VI. Amphibious forces must deploy from home bases. The MAB, UK/Dutch Commandos, and AMF must deploy by ship.

In the first case, NATO forces are fully mobilized and in-place by D-Day. In the second, all but the MAB ground element has been deployed; all the air reinforcements are assumed to have arrived. In the last three cases, all external reinforcements must be deployed after D-Day. In the third case, amphibious reinforcements could deploy quickly from ships off the Norwegian coast, although they would be vulnerable to Soviet attacks. In the fourth, ground forces must be mobilized first, and then be airlifted or sealifted to the deployment areas; the MAB would be airlifted. In the last scenario, airlift is unavailable and all forces must be transported by sea. In each of the last three cases, air reinforcements deploy beginning D-Day. Figure 7.2 assumes that the ground reinforcements do arrive safely: airbases and ports are open and no forces are lost in transit. In reality, all forces arriving after M+7 are vulnerable in this scenario.



### A SIMPLE MODEL OF COMBAT

To illustrate some of the basic issues involved in delayed reinforcement, we will use here a simple graphical model of combat called the "draw-down curve," as shown in Fig. 7.3. Opposing forces are represented on the two axes. Based on separate analysis, one determines the attrition rate of both sides. Figure 7.3, for example, shows opposing forces of 12 Red units and six Blue units. With an attrition rate of three Red units for each Blue unit, the curve crosses the Blue axis at a value of two, meaning that two Blue units survive when all Red units have been defeated. Blue wins, at least in the sense that Blue has surviving units. This analytical device makes many simplifying assumptions. Battles are treated as sequential and linear. Geography plays no role. The treatment of attrition is not modeled dynamically but is simply assumed to be constant.

Despite the limitations of the model, some key points can be illustrated. For example, Holst has argued that Norwegian and NATO

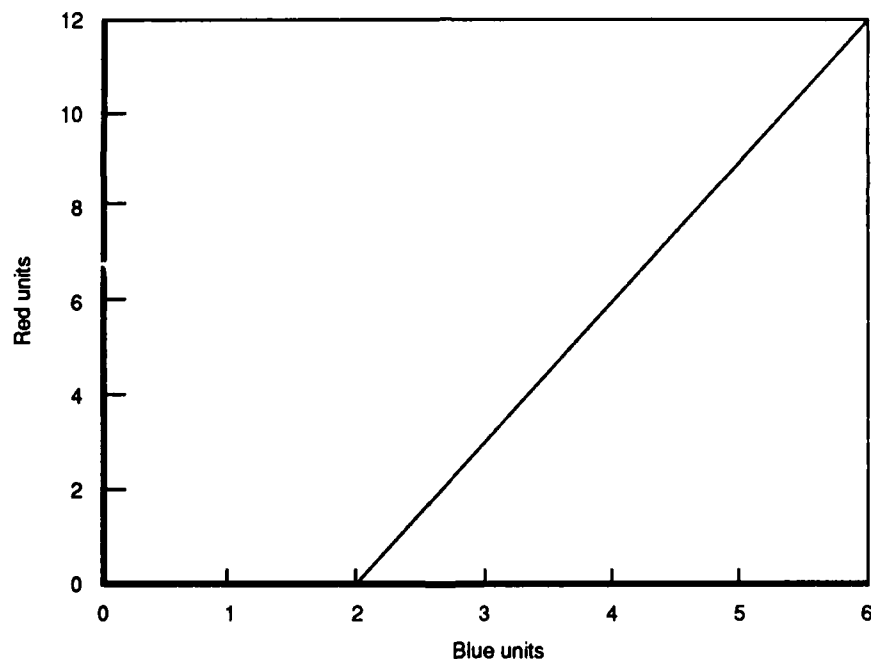


Fig. 7.3—A sample draw-down curve

forces can match Soviet forces at all stages of mobilization.<sup>3</sup> In terms of a draw-down analysis, this means that at any point in the mobilization process, the curve always crosses the NATO axis above zero and thus NATO wins. However, Norwegian and NATO defense experts generally agree that success depends on allied reinforcements. Let us assume that NATO barely wins in this analysis, i.e., that the margin of victory on the ground is less than a brigade. What if a brigade fails to arrive? Then clearly the Soviet forces win. This outcome is illustrated in Fig. 7.4.

### THE ROLE OF AIRPOWER

Air power would play a critical role in determining victory on the ground in North Norway. Air is represented indirectly in this model, since it is the ground forces which must ultimately decide the question

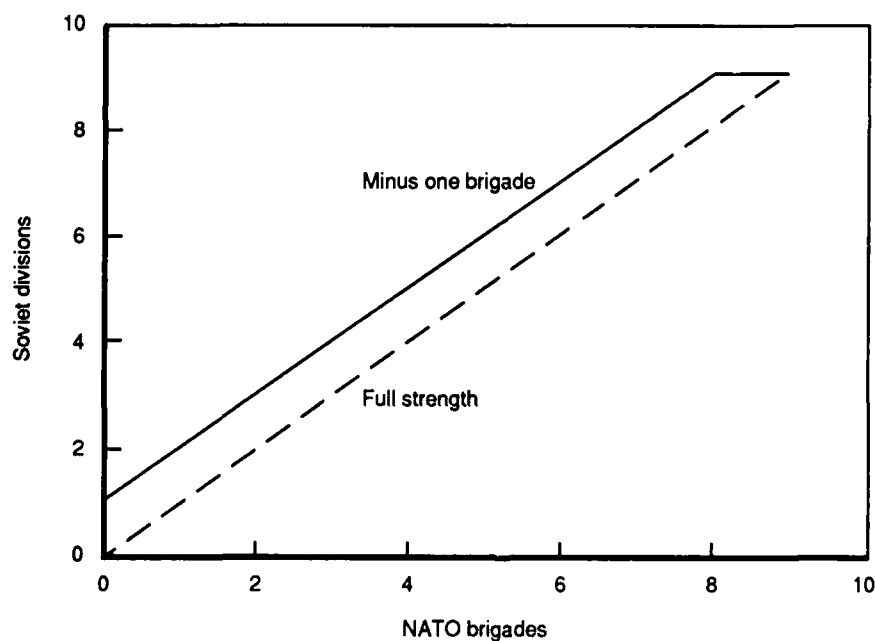


Fig. 7.4—Draw-down curves: simple view of the balance

<sup>3</sup>Holst, 1986, pp. 9-12.

of who occupies North Norway. The most obvious contribution of airpower in this simple model is to the attrition rate of opposing ground forces. Aircraft flying ground support missions (close air support and battlefield air interdiction) increase the rate at which enemy forces are attrited. Soviet military planners believe that about 50 percent of NATO's firepower is delivered by aircraft.<sup>4</sup> Air defense sorties over the battlefield can reduce the contribution of enemy ground support aircraft.

Figure 7.5 illustrates the role of airpower in draw-down analysis. The first case, indicated by line A, shows the outcome of the campaign in the absence of air forces. Blue ground forces destroy Red ground forces at the rate of three to one, and Blue wins with two units remaining. Line B shows the effects of adding Red ground support airpower. The attrition of Blue forces is doubled to a rate of three to two Red

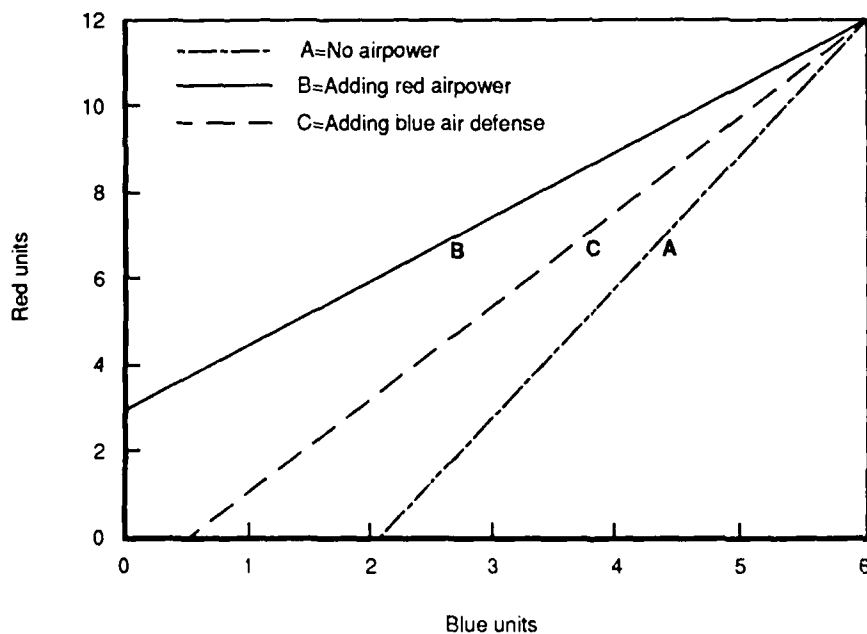


Fig. 7.5—Draw-down curves: the effect of airpower

<sup>4</sup>Hines and Petersen, 1986b, p. 513.

versus Blue losses, resulting in a Red victory.<sup>5</sup> Adding a Blue air defense force capable of countering a portion of the Red ground support effort shifts the curve back down again, as shown in line C.

In the case of NATO, air defense will also play an important role in securing the arrival of allied air and ground reinforcements. If the war has begun before all units have arrived, NATO will need to defend the airbases, ports, and lines of communications. If ground units fail to arrive, then the Soviet forces may succeed, i.e., the draw-down curve may cross the Soviet axis. If air units fail to arrive, then NATO will impose a lower attrition on Soviet forces, also increasing the chances of Soviet success.

Airpower can be used to interdict forces before they arrive at the field of battle. Such an operation would require allocating units into the air interdiction missions rather than the direct ground attack missions. This would reduce the attrition rate at the battle front for the duration of the operation, but would destroy or disrupt forces arriving later.<sup>6</sup> Figure 7.6 illustrates these effects; a nominal time dimension has been added to the curves to indicate the sequence of events. Assume that normally the attrition rate is one Soviet division for one NATO brigade, with each side committing nine units. From period 0 through period 2, NATO and Soviet ground forces are engaged, with NATO aircraft providing direct air support for those units. Both sides are reduced by two units by the end of period two. For period 2 to 3, some NATO aircraft are withheld to prepare for interdiction of amphibious assaults. Temporarily, NATO fares worse against the engaged forces. However, once the interdiction effort is launched (period 3), the Soviets suffer high losses, more than compensating for the lower attrition in the previous period. The net effect in this illustration is that the Soviets lose three divisions in the same period that NATO loses two brigades. Thereafter, the old attrition rate of one division to one brigade is maintained. The final outcome is a successful defense by NATO.

## THE MODEL APPLIED TO NORTH NORWAY

Figure 7.7 shows a hypothetical draw-down curve for the case of North Norway, as suggested by the writings of Holst and other Norwegian defense analysts and officials. It assumes full mobilization

<sup>5</sup>The attrition shown in these frames is merely illustrative; it is not meant to indicate the actual contribution of airpower.

<sup>6</sup>Alternatively, air defense sorties over friendly ground forces could be reduced, increasing the attrition of friendly forces. Analytically, the effect is the same in this analysis.

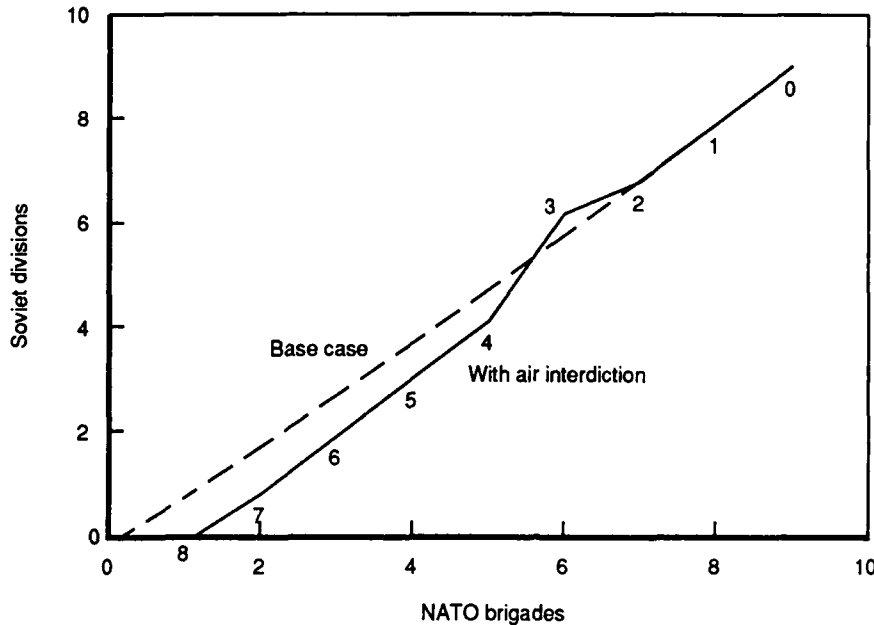


Fig. 7.6—Draw-down curves: interdiction of amphibious forces

and deployment of allied reinforcements before D-Day. Despite the overwhelming numerical superiority of Soviet forces, NATO would be able to impose a high rate of attrition on Soviet forces owing to the natural defensive terrain and the superiority of NATO aircraft. Norwegian naval forces, coastal fortress, and F-16s would interdict Soviet amphibious forces and exact a high toll. One Norwegian general suggests that the Soviets would need one division to overcome each NATO brigade in North Norway.<sup>7</sup> Even if the Soviets used nine divisions from the Leningrad Military District against North Norway, the allied forces would just be able to defeat the Soviets.<sup>8</sup> The end result will be a successful NATO defense.

<sup>7</sup>Major General G. Helset, "Comment," in Alumni Association of the Norwegian National Defence College, 1986, p. 131.

<sup>8</sup>Desant forces (airborne, air assault, and amphibious) are assumed to seize key facilities and transportation nodes and to hold them until the MRDs arrive. Conversely, Home Guard units presumably will try to prevent these operations from succeeding. Therefore, these units are not included in the attrition calculation of this simple draw-down model.

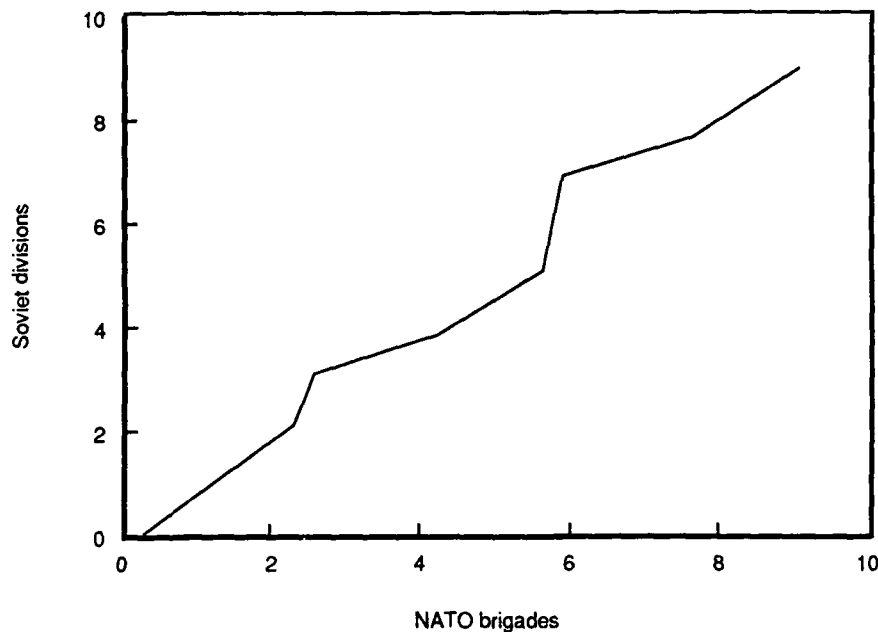


Fig. 7.7—The Norwegian view of the defense of North Norway

As cheery as this view appears, many things could go wrong. For this study, the major problem considered is the failure of allied reinforcements to arrive before the fighting begins (i.e., "D-Day"). If allied air reinforcements have not arrived by D-Day, the Norwegian air force alone would provide air defense of North Norway. The NATO commander will face a serious dilemma on how to use the limited number of aircraft available. The fighter-interceptor attack role of the Norwegian F-16s does not include ground support missions, but is limited to air defense and a special air interdiction mission—the interdiction of amphibious assault ships in the fjords.<sup>9</sup> Choosing between these two missions may be difficult. Failure to defend the arriving ground reinforcements would mean that fewer NATO ground forces would be available, contracting the draw-down space and making it easier for Soviet forces to succeed. Fewer NATO aircraft would mean higher NATO attrition rates (due to the lack of air defense aircraft) and lower Soviet attrition rates (due to a lack of ground support aircraft).

<sup>9</sup>Aamoth, 1987, pp. 87-89.

However, failure to interdict the amphibious invasion fleets will mean forgoing the opportunity to inflict high losses on Soviet forces when they are especially vulnerable and would leave the defensive flanks more exposed. Emphasizing air defense of reinforcements will mean that more NATO forces will arrive, but will also mean that more Soviet forces arrive at the battlefield. Figure 7.8 shows an example of how the draw-down curve might change because of the reduction of ground support and amphibious interdiction sorties.<sup>10</sup>

### SHORTCOMINGS OF THE DRAW-DOWN MODEL

Although useful in illustrating a number of basic issues, the draw-down model's shortcomings limit its utility. Specifically, the model does not treat adequately time and space. For most purposes we cannot be satisfied simply to know who wins at the end; we need to know when Soviet forces overrun a particular area. In fact, the model must

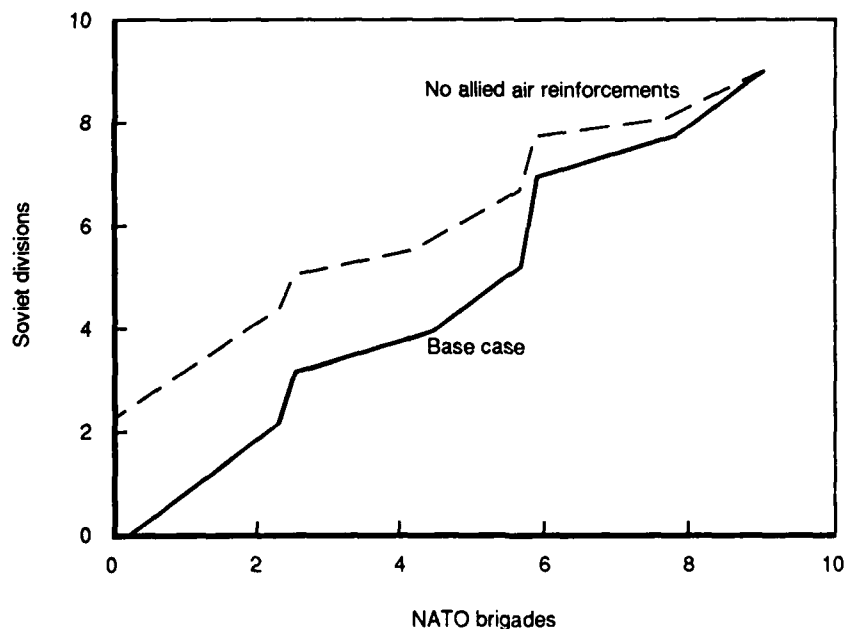


Fig. 7.8—The effect of not deploying NATO air reinforcements

<sup>10</sup>This graph is simply illustrative; the attrition rate for Soviet forces has been arbitrarily reduced.

make some important assumptions on this issue when calculating the attrition rates, such as whether and when a given airbase is overrun. These static assumptions fail to take into account the dynamics of the evolving battle. Closure of NATO airbases would result in a lower relative attrition rate for Soviet forces, which could translate into faster advance rates on the ground. Rearward NATO defensive positions may not be fully prepared when Soviet forces arrive, further decreasing the attrition rate. Thus, these NATO airbases would be at greater risk of overrun because they had been shut down.

Issues of space also play a key role. The draw-down model assumes linear, sequential battles. In fact, several distinct battles may be fought simultaneously. The major significance of Soviet amphibious forces centers on their ability to outflank NATO defenses, thus invalidating the linear, sequential assumption. The dilemma for the NATO commander of choosing between air defense of reinforcements or amphibious interdiction is not simply a matter of draw-down rates. It includes the real possibility that a Soviet force successfully landed on North Norway's flank may face no significant NATO ground opposition if reinforcements have not arrived. However, concentrating limited air assets on that mission may allow the Soviets to prevent or disrupt arrival of those same reinforcements.

Therefore, to adequately analyze the effects of delay and alternatives for dealing with delay, a more detailed and dynamic model of warfare in North Norway is required. The author has written a computer simulation to do just that; the broad outlines of the model are presented in App. B.



## VIII. SOVIET EXPLOITATION OF DELAY

The previous section discussed the effects for NATO if allied forces fail to arrive. The analysis assumed that the Soviets could exploit Norwegian delay to prevent the allied forces from deploying. Could the Soviets in fact prevent the allied reinforcements from arriving? More specifically, could the Soviets prevent air reinforcements from arriving? Success in that operation would permit the Soviets to gain air superiority over North Norway, impose a higher rate of attrition on Norwegian ground forces, and prevent the arrival of ground reinforcements through attacks on airfields and ports. As a result, the Soviets would be better able to achieve their other objectives in the region: defense of the SSE<sup>1</sup> bastion, strategic air defense over the northwestern front, and interdiction of the SLOCs. Thus, the first task would be to keep allied air reinforcements from deploying into North Norway.

### KEEPING REINFORCEMENTS OUT THROUGH RUNWAY CUTTING

The most efficient means for the Soviets to stop the arrival of allied air reinforcements would be to destroy the runways of the airbases of North Norway.<sup>1</sup> Despite the prepositioning programs over the last decade, air reinforcements still need to bring substantial amounts of materiel and personnel. From North America, the materiel would be brought in by strategic airlifters: C-5s, C-141s, and civilian aircraft from the Civil Reserve Air Fleet (CRAF). Roughly 14 C-141B loads are needed for each F-15 squadron.<sup>2</sup> No clear estimates exist for ground reinforcements, but it appears that the MAB would require 250 to 350 sorties by strategic airlifters and CRAF aircraft and the two Norwegian brigades would require 50 to 100 sorties by smaller civilian aircraft.<sup>3</sup> If

<sup>1</sup>This analysis will not consider the Norwegian base at Banak. Although it has one of the longest runways in Norway, Banak would probably not be usable in war. The base is closer to Soviet airbases than to other Norwegian bases, it is not defended by SAM batteries, and it is extremely vulnerable to capture.

<sup>2</sup>This assumes 15 tons of support gear per aircraft, based on an exercise deploying 18 F-15s to Europe. Report on the Coronet Eagle F-15A/B Deployment, Langley: Tactical Air Command Headquarters, 1981, as quoted in Christopher Bowie, *Concepts of Operation and USAF Planning for Southwest Asia*, The RAND Corporation, R-3125-AF, September 1984, p. 41.

<sup>3</sup>Estimate for the MAB based on Michael Leonard, "Options and Constraints in Planning Reinforcements: An American Perspective," in Hoslt, Hunt, and Sjaastad, 1985. Other estimates based on civilian airlift capabilities reported in IISS, 1985, pp. 192-193.

the UK/Dutch Commandos or the AMF needed to be airlifted, roughly 100 to 150 sorties would be needed for each using commercial airliners. Thus, the entire effort to reinforce Norway with air and ground forces would require 600 to 800 sorties by large aircraft in addition to the arriving fighters and helicopters.

Table 8.1 shows the estimated capability of Norwegian airbases to receive airlift sorties, assuming good weather and no disruptions.<sup>4</sup> If several hundred aircraft were available and if there were no disruption of the airlift effort, the entire force could theoretically be deployed in a few days. More realistically, the effort would be constrained by a severe limitation in airlift availability due to requirements elsewhere, with perhaps 50 to 100 aircraft committed to Norway.<sup>5</sup> Furthermore, off-loading the aircraft will undoubtedly take longer than anticipated.

The Soviets would try to disrupt or even prevent the airlift operation. If they could crater the runways sufficiently to prevent airlifters from landing, the Soviets would prevent the reinforcements from

Table 8.1

ESTIMATED AIRLIFT CAPABILITY  
AT NORWEGIAN AIRBASES

Base	Estimated Daily Airlift Sortie Capability
Bardufoss	48
Andøya	48
Evenes	24
Bodø	120
Subtotal	240
Ørland	48
Trondheim	48
Total	336

<sup>4</sup>Leonard.

<sup>5</sup>Ibid.

deploying. This section considers the requirements in aircraft and munitions to conduct a runway-cratering air operation.

### Denying Use of Runways

One way to prevent aircraft from landing at an airbase is to deny the enemy a usable minimum operating surface (MOS) on which to land and take off. Usable surfaces include not only runways, but possibly taxiways and even nearby roads. One reduces the usable operating surface by laying a strip of craters across the runway, thus creating a "cut." For example, we will assume that all tactical aviation requires a minimum surface 3500 ft long and 50 ft wide (abbreviated as "3500 × 50 ft"), the USAF standard for a dry runway. To prevent tactical aviation from operating from a runway less than 7000 ft long, one must lay down a strip of craters across the middle of the runway which does not leave more than 50 ft between craters. If the runway is between 7000 and 10,500 ft, two cuts are required.<sup>6</sup> For strategic airlifters, we will assume that a MOS of 5000 × 100 ft is required.

Runways can not be easily cratered with simple gravity bombs. These bombs tend to skip off the surface of the runway unless the attacking aircraft delivers them at a very steep angle to the runway surface. Damage can be better inflicted by dedicated runway-cratering munitions, like the French *Durandal*, which are first retarded by parachutes until perpendicular to the runway, then are propelled by small rockets to penetrate the runway and explode underneath, creating large craters which undermine the runway. The *Durandal* creates a crater 30 to 35 ft across against 12-in. thick concrete runway.<sup>7</sup> The Soviet Union has reportedly developed a similar albeit smaller weapon, the BETAB-500.<sup>8</sup> These munitions have the advantage that they can be delivered in level flight at relatively low altitude and high speeds, achieving greater damage for a given amount of explosives. Also, since the same amount of damage could be achieved with less payload, Soviet aircraft could increase the range of their aircraft.

An airbase attack faces many uncertainties, which makes calculating requirements quite complex. Bombs miss their aim points; circular error probable (CEP) may be as large or larger than the runway width. Bombs fail to explode or penetrate the runway. One must target not only the main runways, but also any other surfaces which could be

<sup>6</sup>This assumes optimal targeting; the cuts are positioned so that all remaining stretches of the runway are less than 3500 ft.

<sup>7</sup>Wikner, 1983; Braybrook, 1986.

<sup>8</sup>Wikner, 1983. The *Durandal* weighs 430 lb, the BETAB-500 weighs 363 lb. The weight of the explosive in the BETAB-500 is not known.

used for flight operations, such as principal taxiways. The relative locations of these alternative flight surfaces will affect the number of sorties needed.

Not all the data needed to determine the number of sorties required to close an airbase with a given probability of success are available in the open literature. Some parameters can be assumed; others must be known with a reasonable degree of certainty if an accurate assessment is to be made. The principal data are:

- *Number of attacking aircraft.*
- *Weapon-delivery accuracy*, both for range and deflection, in either range and deflection error probable (REP and DEP) or in mils (a measure of the angle of error).
- *Delivery mode*, such as low-level attack with specialized submunitions or a high-angle dive with gravity bombs; angle of attack relative to the flight surface.
- *Explosive weight and weapon type* to determine the size of the crater created.
- *Weapon reliability.*
- *Weapons dropped per aircraft*, or the "stick."
- *Stick length*, or the spread between bombs in a stick.
- *Dimension, location, and hardness of flight surfaces.* This includes not only runways, but taxiways and any other surface which could be used for flight operations.

With these data, one can simulate an airbase attack using Monte Carlo techniques. By running many simulations and varying the number of aircraft, one can derive a curve showing the probability of base closure as a function of sorties over target. RAND analysts have created a detailed computer simulation of airbase attack, called TSAR-INA, which can perform this function.<sup>9</sup>

### **Estimating Soviet Requirements**

To determine the ability of a given number of aircraft to close a base, assumptions have to be made concerning Soviet weapons and aircraft characteristics. These assumptions, reported below, are not reliable without detailed information not in the open literature. An attempt has been made to be conservative in the estimates. However, the numbers should be considered illustrative only.

<sup>9</sup>Emerson and Wegner, 1985. For a methodology for optimal weapon targeting, see Pemberton, 1980.

- *Weapon-delivery accuracy:* REP = 300 ft, DEP = 40 ft.
- *Delivery mode:* low-level attack with BETAB-500, heading at an angle perpendicular to the operating surface, with a heading accuracy of  $\pm 5^\circ$ .
- *Weapon effect:* crater radius = 10 ft.
- *Weapon reliability:* 0.90.
- *Weapons dropped per aircraft:* see Table 8.2.
- *Stick length:* 1000 ft.

Table 8.2 gives the range and payload reported for various Soviet aircraft flying a hi-lo-hi mission profile, based on *Jane's All the World's Aircraft*.<sup>10</sup> Table 8.3 shows the number and size of flight surfaces at each main operating base in North and central Norway.

To determine the number of sorties needed for a particular attack, a decision has to be made about how much damage is to be done. For this analysis, we will assume that a Soviet commander wants to close a base for 12 hours, on average.<sup>11</sup> NATO standards call for a base to be able to repair three craters in four hours. Thus, if the Soviets could

Table 8.2

## RANGE AND PAYLOAD OF SELECTED SOVIET AIRCRAFT

Aircraft	Payload		Number of BETAB-500s	Range (n mi)
	(kg)	(lb)		
MiG-21	1000	2205	6	200
MiG-27	2000	4409	12	323
Su-17	2000	4409	12	370
Su-24	3000	6614	18	700
Tu-16	3750	8355	22	3200

SOURCE: *Jane's All the World's Aircraft*.

<sup>10</sup>The term "hi-lo-hi" means that an aircraft flies at a fuel-efficient high altitude to and from the target area, but drops down close to ground level near the target to deliver its munitions. This mission profile results in greater range than a lo-lo-lo profile, but is more hazardous since the aircraft will be easier to detect and engage with air and ground-based defenses. However, the sparse air defense environment of North Norway would probably make this a feasible option. One problem is that one single range/payload combination is reported for most aircraft. In reality, a mission planner can make tradeoffs between range and payload to achieve optimal mission performance. Lacking better information, we will treat these numbers as absolutes.

<sup>11</sup>The actual closure period for each base would vary; however, attacks of this magnitude would be certain to close the base for at least two hours, and could close it for as long as a day. Repair of the runway could be further lengthened if mines were mixed in with the runway cratering munitions. If weather conditions required longer runways, such as 4000 or 4500 ft, sortie requirements would be reduced by almost 60 percent.

Table 8.3

ARRIVING SORTIES NEEDED TO CLOSE NORWEGIAN AIRBASES<sup>a</sup>  
(Flogger or Fitter sorties)

Airbase	Number of Runways	Runway Length (ft)	Arriving Sorties Needed to Close Base to	
			Tactical Aviation	Strategic Aviation
Bardufoss	1	8005	21	3
Andøya	2	8005	30	6
		5479		
Evenes	1	8720	21	3
Bodø	1	9163	21	3
Subtotal	5	n.a.	93	15
Ørland	1	8858	21	3
Trondheim	1	7759	21	3
Total	7	n.a.	135	21

NOTES: Tactical aviation MOS = 3500 × 50 ft, strategic airlifters MOS = 5000 × 100 ft, all runways are 148 ft wide, and all bases assumed to have one 8000 × 50 ft taxiway.

<sup>a</sup>For 12 hr, on average.

launch an attack sufficient to require, on average, nine craters to be repaired, they would achieve this objective.

Table 8.3 provides estimates of the number of arriving MiG-27 Flogger or Su-17 Fitter sorties needed to close each base for 12 hours on average, assuming optimal targeting and no previous attacks.<sup>12</sup> About half that amount would be needed with the Tu-16 Badger, two-thirds for the Su-24 Fencer, and twice for the MiG-21 Fishbed.

Table 8.3 reports the number of sorties needed to close the airbases for 12 hours to strategic airlifters, which have an estimated MOS requirement of 5000 × 100 ft. If the Soviet objective is to prevent the deployment of allied reinforcements, 21 sorties would be all the Soviets need to deliver at the six colocated operating bases (COBs) in North and central Norway. Forty-two sorties would close the bases for 24 hours on average, whereas sixty-three sorties would close them for 48 hours. By preventing the strategic airlifters from landing, units

<sup>12</sup>Optimal targeting in this case means bombing runs crossing each runway or taxiway at a 90 deg angle and cutting the surface in thirds.

deploying from North America could not be airlifted directly to their reception field.

If the Soviets closed the base to tactical aircraft, the base would be closed to strategic lift as well, and for substantially longer periods. However, the converse is not true. If the base was targeted to close out only strategic airlift, a single cut down the center of an 8000-ft runway would prevent strategic transports from landing, but would leave sufficient space on either side or on the taxiway for tactical operations.

Could the Soviets mount such an attack? By comparing Tables 8.2 and 8.4, we can see that Andøya, Bardufoss, Evenes are within the reported ranges of both the Su-17 and the MiG-27 fighter-bombers. The Leningrad Military District has 45 of each of these aircraft in its tactical aviation force. Su-24 Fencers or Tu-16 Badgers could be used to attack Bodø, Ørland, and Trondheim. In addition, if the Soviets can refuel at a base in Finland, such as Ivalo, or if they can succeed in overflying Sweden (see Table 8.5), the Su-17 might reach Bodø.<sup>13</sup> Not all aircraft would be operationally ready; assuming an operational ready rate of 90 percent, 40 out of 45 aircraft in a regiment would be available. If the Soviets commit a regiment each of Floggers, Fitters, and Fencers, 120 aircraft would be available for the initial raid.

Could the RNoAF alone prevent the Soviets from delivering this number of sorties? The first priority would be to defend the four northern bases, which would be at the greatest risk. The RNoAF deploys 32 F-16s in North Norway in peacetime. The Norwegian aircraft, which lack radar-guided missiles, would need to find their targets and close within a couple of miles to shoot down the attacking aircraft. If we assume that their probability of doing each task is 0.5, the overall probability that an F-16 downs an intruder is 0.25. Given these values, eight aircraft would be lost, leaving 112. Furthermore, some other aircraft "bounced" by the interceptors could be expected to jettison their loads to evade the interceptors. Assuming that two aircraft jettison their loads for each one shot down, 96 aircraft will reach the target area with a bomb load.

Each airbase is defended by a battery of I-Hawk missiles, each with three launchers. Let us say that each launcher finds a target (since the targets will be coming to them) and that each downs one aircraft, but

<sup>13</sup>This analysis assumes that Finland has agreed to cooperate with Soviet operations according to its treaty commitments with the Soviet Union. If Finland does not cooperate, the Soviets would first need to suppress Finnish air defenses. Since Sweden has no such treaty obligation, this analysis assumes that it would defend against Soviet (or NATO) overflight. However, if Soviet *Spetsnaz* forces could kill Swedish pilots before they reached their aircraft (as with the Polish "art dealers"), the Soviets may be able to overfly Sweden unopposed.

Table 8.4

DISTANCES FROM SOVIET TO NORWEGIAN AIRBASES  
(n mi)

Norwegian Airbase	Soviet Airbase		
	Pechanga	Murmansk	Alakurti
Bardufoss	266	312	298
Evenes	316	363	348
Andøya	316	363	348
Bodø	403	450	435
Ørland	645	692	677
Trondheim	639	686	671

NOTE: Distances assume overflight of Finnish territory; Swedish airspace is not violated.

Table 3.5

SOVIET GAINS FROM OVERFLYING SWEDEN  
(n mi)

Norwegian Airbase	Soviet Airbase			
	Pechanga	Murmansk	Alakurti	Tallinn
	Overflight?			
	no/yes	no/yes	no/yes	yes
Bodø	403/389	450/430	435/372	548
Ørland	645/645	692/643	677/552	493

does not have time to reload before the aircraft attack the runway. In this way, three more aircraft would be lost from each force raiding a base; assuming that all four northern bases were struck, 88 aircraft would remain.

Given these favorable assumptions for NATO,<sup>14</sup> the Soviets would

<sup>14</sup>These calculations result in a 16 percent attrition rate for the Soviet attacker, several times higher than historical rates. For a discussion of historical attrition rates and other issues involved in these types of assessments see Alberts, 1984 and Walker, 1987, pp. 117-126.



not have enough sorties in an initial attack to close all four northern COBs to tactical aviation for 12 hours, although they could close three of the four. A second attack could strike the fourth base, if the Soviets used Fencers and Badgers, the central Norwegian bases could be targeted as well. The Soviets could reduce their losses by sending escorts (Flankers for instance). Still, attempting to close all bases to tactical aviation would require the commitment of the majority of Soviet attack aircraft and the willingness to accept high losses. On the other hand, closing the bases to airlifters for as long as two days could be easily accomplished.

After the initial attack, the Soviets would need far fewer sorties to reclose a given base, since a large number of craters could remain. Using the parameters assumed above, each MiG-27 sortie creates on average seven craters on runways or three on taxiways. Thus, after a 20-sortie attack, approximately 100 craters would be left in the various flight surfaces. Although a MOS could be established with eight to ten repairs in 12 hours, some 90 craters would remain. The level of effort to reclose the base would be substantially reduced, especially if the Soviet had post-attack reconnaissance available.

### **EXPLOITING THE LIMITED BASE SUPPORT INFRASTRUCTURE**

The effects of delay and Soviet airbase attacks in North Norway would be greatly magnified by the limited basing infrastructure compared with the need. Tønne Huitfeldt, a former commander of Allied Forces North Norway, notes that North Norwegian airfields might need to accommodate:

- Norwegian air defense and ground attack squadrons permanently based in North Norway, or deployed to North Norway.
- Norwegian maritime patrol aircraft (MPA), and allied MPA deployed to Norwegian airfields under existing agreements.
- Allied air defense and ground attack aircraft included in the ACE Rapid Reinforcement Plan.
- U.S. Marine air defense and ground attack and helicopters in the MAB, if and when this formation is deployed to Norway.
- U.S. Navy aircraft, if a carrier is damaged and needs an airfield for reception of the aircraft, again under existing agreements.<sup>15</sup>

<sup>15</sup>Huitfeldt, "Planning Reinforcements: A Norwegian Perspective," in Holst, Hunt, and Sjaastad, 1985, p. 184.

Under the best of circumstances, with all the bases available and in a benign environment, "bedding down" this force would be extremely difficult if not impossible. If reinforcements cannot arrive until after the Soviets have attacked, and some bases are closed or captured, then the remaining airbases could quickly become overwhelmed. Airlifters would crowd the bases and could interfere with fighter operations.

Sheltering aircraft provides a good illustration of the problem. It has become NATO standard practice to place tactical aircraft, especially air defense aircraft, in hardened shelters at its airbases. Let's assume that NATO has built enough shelters in Norway for all the scheduled reinforcements. For our example, we will say that Norway commits three squadrons of F-16s, the USAF commits a squadron to each of the four COBs in North Norway, and the MAB's F-18s also need to be sheltered.<sup>16</sup> If we assume that these eight squadrons are evenly distributed among the four bases, each base has enough shelters for two squadrons. What if one deployment base is closed by a Soviet attack? The squadron could divert to a base in southern Norway, out of range for Soviet air attacks, but too far away to operate effectively in the north. Alternatively, it could divert to another base, leaving itself or another squadron unsheltered, greatly increasing the vulnerability of the aircraft. This vulnerability could be reduced by parking the aircraft in widely dispersed areas, to the extent possible in the constricting terrain of North Norway. However, as the number of bases closed and squadrons diverting increases, even this option becomes impractical. The commander of North Norway must either accept the vulnerability of these aircraft or place them out of harm's way (and out of action).

## EXPLOITING PREPOSITIONING

If allied reinforcements have not arrived by the start of hostilities, the Soviets may wish to target the prepositioned equipment. Destruction of the equipment would probably be too difficult since it is apparently stored in hardened bunkers.<sup>17</sup> However, the reinforcements might be delayed in breaking out their equipment if the site has been subjected to mining or chemical attacks. If the Soviets were to use chemical weapons, these sites would probably be prime targets. Otherwise, dropping mines around the entrance, set to explode both randomly and on contact, could be very effective in preventing access to the storage sites.

<sup>16</sup>The AV-8Bs presumably could operate from dispersed sites.

<sup>17</sup>Stephan, 1987, p. 34.

## CONCLUSIONS

From what we know about Soviet capabilities, it appears that the Soviets would have a reasonable chance of exploiting any failure of Allied reinforcements to arrive before D-Day. Attacks on airfields sufficient to keep strategic airlifters out of North Norway could easily be mounted by Soviet forces. Attempts to close the base to tactical aviation would be considerably more difficult.

### PART III

## ALTERNATIVE DEPLOYMENT AND BASING OPTIONS

*Every effort should be made to increase the flexibility of the decision-makers to facilitate introduction of Allied reinforcements [into North Norway] before an attack has taken place. But it is also only prudent to consider the worst case and make preparations for the introduction of reinforcements after an attack and in the face of enemy counter-measures.*

Lieutenant General Tønne  
Former Commander Allied Forces<sup>1</sup>

To deal with the potential problems which could arise in attempting to deploy reinforcements into Norway in crisis or war, NATO could pursue three general courses of action: (1) consider alternatives for deploying into North Norway; (2) consider alternative basing modes for the reinforcements; and (3) replace the reinforcements with other types of forces which do not face the same problems. Part III of this report considers various options under each of these approaches.

The biggest problem for NATO will be the deployment of aircraft from the continental United States (CONUS). These aircraft will be the largest component of the air reinforcements to Norway, will require strategic airlifters, and will provide critical capabilities which the RNoAF lacks, especially all-weather air defense. Further, the most likely problems will arise in deployments to the bases of North Norway: Bodø, Andøya, Evenes, and Bardufoss. Therefore, the consideration of alternatives will focus on the problem of American reinforcements to North Norway.

---

<sup>1</sup>Huitfeldt, 1986c, p. 14.

## **IX. DEPLOYMENT OPTIONS**

Perhaps the simplest approach for dealing with Soviet efforts to prevent deployment of allied reinforcements is to consider alternative means of deploying those forces. This section offers several such options. The first simply calls for the deploying unit to deploy if the airbase is open to strategic airlifters, but otherwise to wait. Another option would be to divert to an airbase which is open. Finally, we consider the options of deploying with tactical airlifters and maritime transport.

### **HOLD AT THE HOME BASE**

One possible response to base closure during mobilization would be to hold units at the home base (in the continental United States, the United Kingdom, and elsewhere) until the base has been reopened. However, as shown in Sec. VIII, the Soviets could easily close the bases of North and central Norway to strategic airlifters for two days with its initial air attack, and keep them closed with a relatively small effort. Moreover, NATO may be reluctant to place at risk its very scarce strategic airlifters (C-5s, C-141s, and C-17s), which would be vulnerable both in the air and on the ground. Thus, holding air reinforcements at their home base would result in NATO having substantially fewer aircraft than expected in North Norway. Norwegian F-16s would be defending the airbases alone, and might not be able to prevent substantial damage; furthermore, the F-16s would not be able to rerole to interdict amphibious forces, improving the chances of successful Soviet amphibious invasions.

On the ground, the situation would be much worse for NATO. Opposed by fewer NATO ground support and air defense aircraft, Soviet ground forces would be able to advance more rapidly and with fewer losses. Soviet ground support sorties would face less opposition, leading to higher losses of NATO ground forces and lower losses for Soviet aircraft. The higher rate of advance means that Soviet forces would be able to engage some later-arriving forces before they were able to fully prepare their defensive positions.

The main advantage of holding at the home base would be the greater safety for the strategic airlifters, the deploying aircraft, and the squadron personnel. If base access is denied during general mobilization, but before hostilities, holding may be the simplest solution,

especially if one expects that access will be granted before hostilities. However, as discussed in Sec. III, in an ambiguous crisis base access might be withheld too long; war is likely to begin before officials expect. In this case, the holding option does not offer a satisfactory solution.

### **DIVERT TO AN OPEN BASE**

One option would be to divert the deploying squadron to an open airbase elsewhere in North Norway if the deployment base is closed to strategic airlifters. This option could slightly increase the probability that the aircraft could deploy. However, to the extent that the squadron was dependent on the shelters, prepositioned ammunition, fuel, and spare parts at the planned deployment base, the squadron will suffer a reduction in effectiveness and sortie generation capability. The COB program is meant to provide seven days of sustained warfighting capability.<sup>1</sup> If the squadron diverts to another base, the lost support must be flown in with additional airlifter sorties.

This option would have some advantages over the hold option. North Norway would receive some of the critical air reinforcements needed without the delay imposed by the first option. In particular, additional sorties become available in the critical early days, when other reinforcements are arriving. If the aircraft are air defense capable, their presence may allow later reinforcements to arrive with less opposition and without needing to divert. The Norwegian F-16s would be freer to rerole for amphibious interdiction if needed.

The disadvantage comes from the loss of the COB equipment. Additional strategic airlift sorties will be required to move the equipment from the home base, and extra sorties may not be available during a general mobilization. To the extent that the supplies cannot be replaced, the effectiveness of the force will be reduced. One must also worry about overcrowding at the diversion base. The base may not be able to shelter the additional aircraft, increasing the vulnerability of the squadron. Sortie generation on the entire base would diminish as facilities become crowded and movement restricted.

The disadvantages could be reduced if USAF and NATO planners minimize the variety of aircraft assigned as reinforcements to North Norway. Although the exact composition of allied air reinforcements is not known, one reads in the literature a wide diversity of possible aircraft types: F-4, F-5, F-15, F-16, F-18, A-10, AV-8B, and Jaguars.

<sup>1</sup>Auslund, 1986, p. 139.

Although some items will be common among these aircraft, spare parts and even ammunition will be different. At the extreme, NATO could ask for all F-16s as USAF reinforcements for North Norway. All airbases in North and central Norway could be prepared to support F-16 operations, allowing complete flexibility in deployment, redeployment, diversion, and evacuation. All-weather interceptor capability could be provided by the MAB's F-18 squadron. If additional all-weather capability is required, an F-15 squadron might be assigned.

### STAGE WITH TACTICAL AIRLIFTERS

As a third option, NATO could stage critical air reinforcements into a secure rear area, such as the northern United Kingdom or southern Norway; when the base is opened to tactical airlift, these units could then be deployed into North Norway (NON) using C-130s. This approach could greatly increase the chance of early deployment of critical assets to North Norway after D-Day, since closing all four NON bases to tactical airlifters may be difficult for the Soviets, as suggested in Fig. 9.1, which assumes a MOS of  $3500 \times 50$  ft for the C-130.<sup>2</sup> To close the bases to tactical airlifters for 12 hours, the Soviets would need to deliver 93 Flogger/Fitter sorties on the four North Norway airbases, compared with 15 for closure to strategic airlifters. Andøya alone would require 30 Flogger/Fitter sorties to close, a significant portion of the Soviet air forces in the region. The Soviets could find it difficult to mount the initial effort and then continue to reclose the bases.

The major disadvantage of this option is the requirement for about 26 C-130s per squadron to shuttle the force to North Norway.<sup>3</sup> Because of the distances involved and the low utilization rate per day of the C-130, only one cycle per day per aircraft could be flown. Therefore, to deploy four squadrons to North Norway in one day would require 104

<sup>2</sup>This assessment is fairly sensitive to the true length of the MOS required. If a length of greater than 4000 ft is required, then the Soviets would not need to deliver substantially more sorties than for strategic airlifters. On the other hand, weather conditions forcing a C-130 to use a longer runway would affect larger aircraft even more, perhaps preventing the use of some aircraft types.

<sup>3</sup>This calculation assumes 15 tons of support gear per aircraft, based on an exercise deploying 18 F-15s to Europe [Report on the Coronet Eagle F-15A/B Deployment, Tactical Air Command Headquarters, Langley Air Force Base, 1981, as quoted in Christopher Bowie, *Concepts of Operation and USAF Planning for Southwest Asia*, p. 41]. It is assumed that each squadron has 24 aircraft. The C-130 has a payload of 13.8 tons, resulting in 26 required plane loads  $[(15 \text{ tons/aircraft} \times 24 \text{ aircraft}) \div 13.8 \text{ tons/C-130}]$ . With a squadron of 18 aircraft, 20 C-130 sorties would be required.

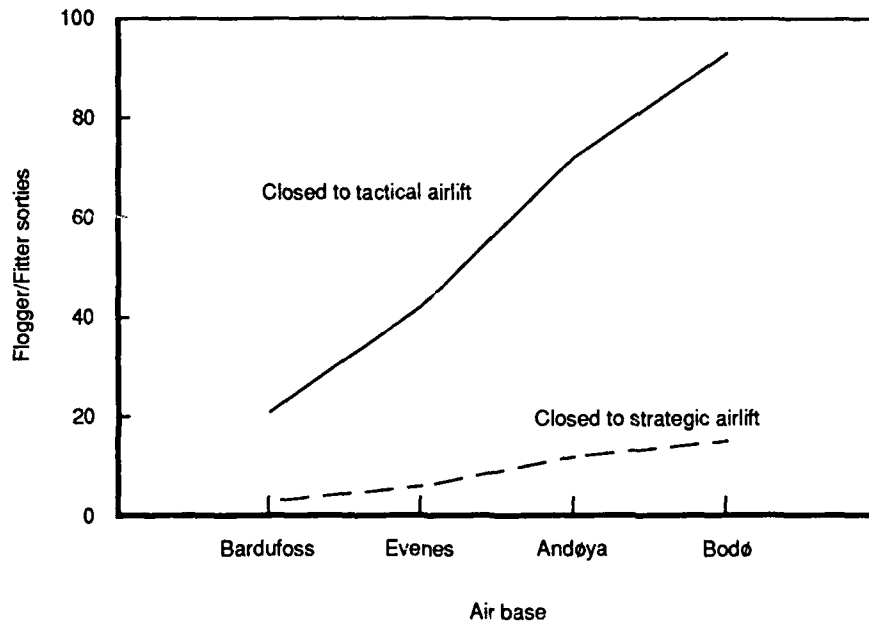


Fig. 9.1—Sorties needed to close NON airbases to tactical airlifters

C-130s.<sup>4</sup> NATO would have to commit these C-130s from another area, since Norway has only six C-130s in its inventory.<sup>5</sup> In addition, the cargo would have to be unloaded from the strategic airlifters and reloaded onto the C-130s, which would require additional time, personnel, and materiel handling equipment. For optimal performance, the cargo pallets would have to be loaded with this process in mind. If any of the fighters suffered malfunctions during the flight from the United States to the staging base, it might be necessary to break open pallets to make repairs.

In the future, the C-17 will provide promising options for reinforcing North Norway from CONUS after D-Day. These aircraft will have the range to deploy directly from CONUS and the short and rough field capability to land directly on damaged airbases which can still support

<sup>4</sup>It may be possible to deploy with fewer initial sorties if the cargo can be arranged so that an initial supply would be sufficient to sustain the squadron for several days.

<sup>5</sup>On the positive side, this approach would not place the valuable strategic airlifters in a vulnerable position, as would the CONUS hold option.



tactical aviation. Until the C-17 is available, staging would appear to be the best course of action. If the C-17 enters the USAF inventory, plans should be drawn up so that any squadrons set to deploy to North Norway will be flown in C-17s.

#### **STAGE WITH MARITIME TRANSPORT**

So far we have only considered airlift for deploying squadrons into North Norway; sealift might also be a possibility. Three of the four bases in North Norway are located near a port (Andenes for Andøya, Bogen Bay for Evenes, and the port at Bodø). One could unload the strategic airlifters at a secure airbase in southern Norway (Bergen or Stavanger) or even central Norway, reload the equipment onto coastal shipping, and deploy the cargo in this way. If the airbases are still open to tactical aviation, the aircraft could deploy directly into the base. The main disadvantage of this option is that it would add several days to the deployment time of a squadron's equipment compared with direct deployment by airlifters. It would also place greater demands on Norwegian coastal shipping, which will be occupied deploying Norwegian and MAB forces, as well as supplies, to North Norway. In general, because of the longer deployment time, this option would be inferior to staging with tactical airlifters. However, if C-130s were not available for staging through airlift, this concept might be the best alternative. It might work well in combination with tactical airlift, with the time-urgent cargo being deployed with C-130s, and the follow-on support by coastal shipping.

## **X. BASING OPTIONS**

Current vulnerabilities in reinforcing Norway might be ameliorated by rethinking the basing structure. The current force could be rebased to reduce the threat to air attacks, the North Norway bases could be better protected, or new bases could be built. This section considers these options.

### **BASING IN CENTRAL NORWAY**

In response to the vulnerability of the bases in North Norway, NATO may consider basing all or a portion of the scheduled reinforcements in the two central Norwegian bases, Ørland and Trondheim (Værnes). These bases are roughly 640 n mi from the closest Soviet airbase, assuming Swedish airspace is not violated. They are beyond the range of the Flogger and Fitter fighter-bomber force; only Badgers, Backfires, or Fencers could attack them. Assuming that some Norwegian F-16s remain in the north, the attacking aircraft would first need to get past the northern air defenses. These factors would make it harder for the Soviets to mount sustained air operations against the central Norway bases. NATO would have a better chance of deploying into these bases without major opposition. Their location makes the bases easier to resupply during wartime, and the reduced threat will allow better operation of support facilities.

One problem with this option is that, due to the small size of the two bases, NATO cannot deploy many squadrons there. The bases receive a large portion of the airlifted MAB due to the location of the prepositioned stocks, and they would also receive any aircraft evacuating a stricken U.S. Navy aircraft carrier in the area. If too many aircraft are deployed on these two bases, the Soviets might find them to be a target lucrative enough to warrant committing some of its limited long-range bomber force. NATO would need to build more shelters if the additional aircraft are to be protected.

Another serious problem with using these bases arises from their distance from North Norway. For air defense purposes, the bases are too far in the rear to allow ground-launched intercepts. Normally, NATO gains a substantial advantage in North Norway because Soviet aircraft must come a long way to reach the target area, providing plenty of time for warning and response. NATO loses this if it shifts to basing its aircraft in central Norway. To illustrate, let us say that

NATO radar sights a Soviet attack force taking off from Pechanga heading towards the Troms area, perhaps Bardufoss, at a rate of 500 knots. Aircraft at Ørland are scrambled and airborne in two minutes. As shown in Fig. 10.1, if the interceptors fly at a average speed of 600 knots, they cannot intercept the attackers at any point in their flight. If the attackers fly further south to Bodø, the interceptors would reach the intruders as they began their attack. Even if the interceptors could maintain an average speed of 1000 knots, they could not intercept attacks on the Troms area until after the attack was launched, if then. If NATO does not detect the attacking aircraft until later, or if it responds more slowly, the problem becomes more severe.

Figure 10.2 presents this problem more generally. The vertical axis shows the ratio of speed between NATO aircraft ("interceptors") taking off from Ørland and the Soviet aircraft ("intruders") which is required for the NATO aircraft to successfully intercept the Soviet intruders. The horizontal axis shows a range of possible distances from Pechanga, the airfield closest to Norwegian territory, when the intruders are first detected. The individual curves indicate, for several

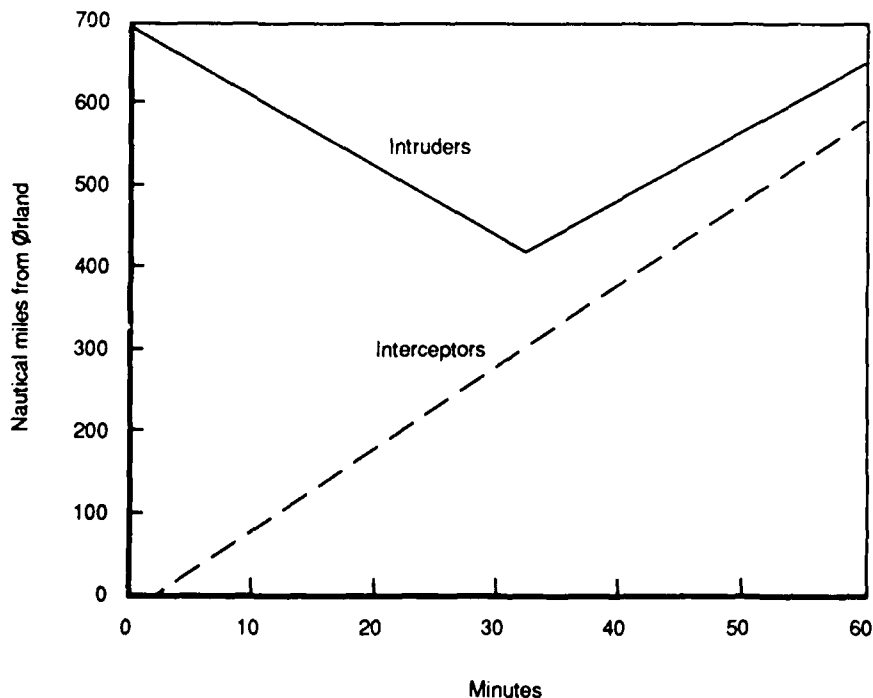


Fig. 10.1—Interceptor curve for Troms area

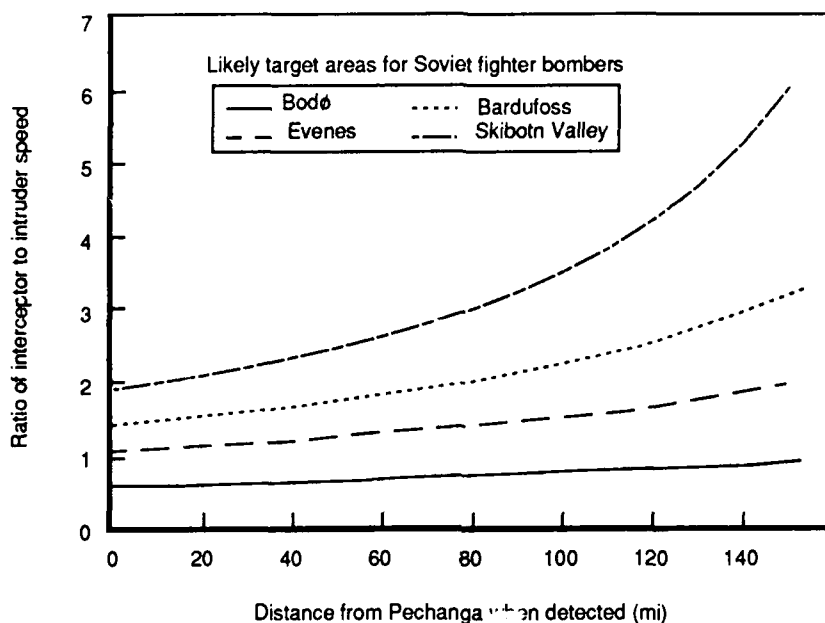


Fig. 10.2—Detection distances and interceptor speeds

likely targets for the Soviet aircraft, the ratio of interceptor to intruder speed required to successfully intercept the aircraft as a function of when the intruders are first detected. For example, to intercept Soviet aircraft which are attempting to attack targets in the Skibotn valley, NATO interceptors from Ørland would need to fly twice as fast as the Soviet aircraft if NATO could detect the Soviet intrusion immediately, but would need to fly three times as fast if they were not detected until they were 80 miles into Norway.

The curves allow us to make some judgments on the feasibility of basing interceptors at Ørland for defense over North Norway. All points below a ratio of 1-to-1 mean that the NATO interceptors could fly slower than the Soviet aircraft and still successfully intercept them. Since the attacking Soviet aircraft would be carrying heavier loads of munitions than the defenders, NATO interceptors could easily match their speed and would probably exceed it. Successful interceptions for points above the 1-to-1 line would depend on the speed of the attacking Soviet aircraft. Assuming that the Soviet aircraft would penetrate at a

speed of approximately 400 knots, a reasonable cruising speed for long-distance attacks, all points above 1.5-to-1 would mean that the NATO interceptors would need to fly at supersonic speeds (roughly 600 knots) for extended periods, something that most aircraft are incapable of. Points between 1-to-1 and 1.5-to-1 would probably allow a successful interception, but with increasing difficulty as the ratio increases. Thus, NATO would have difficulty intercepting Soviet aircraft attacking in the areas of Bardufoss or farther north even if the intruders were detected immediately. If the Soviet aircraft can penetrate 100 miles or more before being detected, then intercepting them over the Evenes area becomes difficult, and impossible for areas farther north than that.

Another possibility would be to fly combat air patrols (CAPs) over North Norway with aircraft based in central Norway. Air defense aircraft could maintain orbits over the most important areas, largely eliminating the time problem. However, NATO's distance problem remains, since the aircraft would spend 1.5 to 2 hours total getting to and from a CAP patrol area over Troms. To illustrate the problem, let us consider an F-15 based in Ørland flying a CAP over the Bardufoss area, a distance of roughly 360 nautical miles. According to *Jane's All the World's Aircraft*, an F-15 without aerial refueling but with conformal fuel tanks could stay aloft for 5.25 hours. If 1.5 hours are used in transit to and from the CAP area, 6.4 sorties must be flown each day to keep one F-15 on CAP continuously; without conformal fuel tanks, even more sorties would be required.<sup>1</sup> Since between sorties the aircraft must be refueled and maintained, a single aircraft could be expected to provide only two or three sorties a day if missions last some five hours. Figure 10.3 shows the relationship between distance from base and sorties required to maintain a continuous CAP using unrefueled F-15s without conformal tanks. As can be seen, to maintain the same amount of air defense over North Norway from central Norway would require several times more fighter aircraft than a force based in Norway on a two-minute alert.<sup>2</sup>

While basing in central Norway may be problematic for air defense operations, it might be a realistic option for long-range ground or maritime support missions which do not require the quick response times of air defense missions. Table 10.1 shows combat ranges of several

<sup>1</sup>This calculation assumes no air-to-air combat. If the CAP aircraft engaged in combat, NATO would need to generate more sorties to compensate for higher fuel consumption and for possible aircraft losses.

<sup>2</sup>Put another way, for the expected number of air defense aircraft available over North Norway to be equal, one would have to assume that there is only a 16 percent (1/6.4) chance that the North Norway base is open to tactical aviation that day.

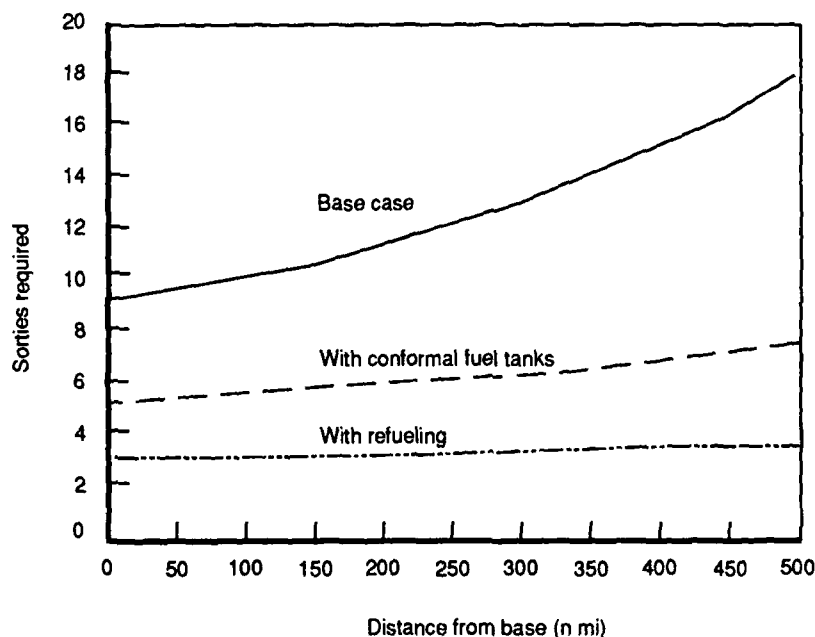


Fig. 10.3—Distance from base and sorties required for continuous CAP

NATO aircraft. For aircraft with limited range, missions could be flown out of Trondheim or Ørland, striking at the target in the north, then refueling at an open base in North Norway before returning to the original base. This would add substantial time to sorties, reducing sortie rates. However, the reduction in sortie potential could be offset if the bases in central Norway had a higher probability of being open than those in North Norway.<sup>3</sup> Also, the longer time spent in flight for each sortie increases the amount of maintenance needed, which could reduce aircraft availability over time. On the other hand, damage to maintenance facilities and aircraft from airbase attacks on northern bases could reduce sortie generation capability there. One would need

<sup>3</sup>To illustrate, let us assume that particular aircraft type has a nominal sortie rate of three per day, but that aircraft in central Norway can average only two per day. If one estimates that there is more than a 33.3 percent chance that a particular base in North Norway would be closed, the central Norway option would be superior [since  $3 \times (1 - 0.333)$  expected northern sorties = 2 central sorties]. If the NATO commander prefers the certainty of two sorties per day to the chance of three sorties per day (i.e., he is risk averse), the central Norway option would be preferred.

to conduct a detailed analysis of these interactions on the expected sortie capability to provide insights for a final decision on the preferred option.

Supporting maritime operations in the Norwegian Sea would be more difficult under this option. Depending on where NATO forces were operating, aircraft based in central Norway may be less capable of providing adequate support in the far northern Norwegian Sea and the Barents Sea. Support for the southern portion of the Norwegian Sea might be available from the United Kingdom. The largest difference could involve NATO land-based aircraft intercepting long-range Soviet Naval Aviation bombers and reconnaissance aircraft. NATO maritime operations could be forced farther south as a result of the reduced air defense assets and response times available in North Norway. Similarly, if NATO wanted to conduct air strikes on targets on the Kola Peninsula, basing in central Norway would make such operations extremely difficult without long-range aircraft.

### Tanker Support

Some of the problems of basing air defense forces in central Norway may be overcome by providing aerial tanker support for the fighter force. For instance, with in-flight refueling, an F-15 can theoretically maintain CAP for 15 hours.<sup>4</sup> In practice, pilot fatigue would require much shorter sorties, but even eight-hour flights would reduce the sortie requirement to four per day. At this level of sorties required, a

Table 10.1

RANGES OF SELECTED NATO ATTACK AIRCRAFT  
(n mi)

Aircraft	Low-Altitude Flight	High-Altitude Flight
F-16	295	499
F/A-18	298	397
A-10	247	—
AV-8B	91	477

SOURCE: IISS, 1988.

<sup>4</sup>*Jane's All the World's Aircraft, 1986-1987.*

squadron based in central Norway may be able to provide as many or even more sorties than would be expected from a force based in the north. The key question would be the expected probability that the northern base is closed.<sup>5</sup> This could apply both for air defense of North Norway proper and over the Norwegian Sea.<sup>6</sup>

Figure 10.4 illustrates a hypothetical refueling operation. Eight F-15s operating out of Ørland establish a CAP orbit in the Bardufoss area. About an hour later a KC-10A tanker takes off from Stavanger for a rendezvous with the flight some distance behind the CAP area. The KC-10A could refuel each F-15 twice with 12,000 lb of fuel each time, allowing the F-15s an additional five hours of flight time at an economical cruising speed. Such an operation would theoretically allow the F-15s to maintain CAP for over six and a half hours, although in practice pilot fatigue would limit this to somewhat shorter periods.<sup>7</sup> If the F-15 can sustain two sorties per day, then a squadron of 24 F-15s in Ørland and two or three KC-10As in Stavanger would be able to maintain a continuous CAP of eight aircraft over Troms.<sup>8</sup> Similar calculations can be made for other types of aircraft.

The open literature does not mention any NATO commitment of aerial tankers to Norway; such a commitment would be necessary. The MAB air element normally includes six KC-130 tankers, which would provide some capability; however, they cannot refuel USAF aircraft since the Marines and the USAF use incompatible refueling systems. To support large-scale tanker operations, Norway would probably need to increase its stockpile of aviation fuel. This need not be a major problem if the tanker force were based at a major civilian airfield such as Stavanger. Because of crowding on the central Norway bases, the tankers might need to be based in Bergen or Stavanger in any event.

<sup>5</sup>If four sorties are needed to maintain one aircraft on CAP, then the tanker + CAP option would be superior if the expected probability of base closure were greater than 75 percent [i.e.,  $1 - P(\text{NON base open})$ ]. This would need to be modified if it were considered possible that the central Norway base might be closed to tactical aviation as well [ $(1 - P(\text{NON base open})) \div P(\text{central base open})$ ].

<sup>6</sup>If F-15s were deployed to Norway, some of the same objectives could be achieved by deploying the aircraft conformal fuel tanks. These tanks strap onto the side of the aircraft, adding 10,000 lb of fuel to the normal load of 17,500 lb while offering much less drag than standard external fuel tanks. This would add roughly two hours on CAP per aircraft.

<sup>7</sup>These operations might also be limited by pilot availability. If a pilot had to fly twice a day, with each sortie lasting eight hours (1.5 in transit and 6.5 over the combat area), total flight time for the day would be 16 hours. Operations of that intensity could not be maintained except in extreme circumstances. A squadron would need to have a pilot-to-aircraft ratio of over 2-to-1 to sustain this option.

<sup>8</sup>As before, these calculations do not consider air-to-air combat. In reality, more sorties are required.



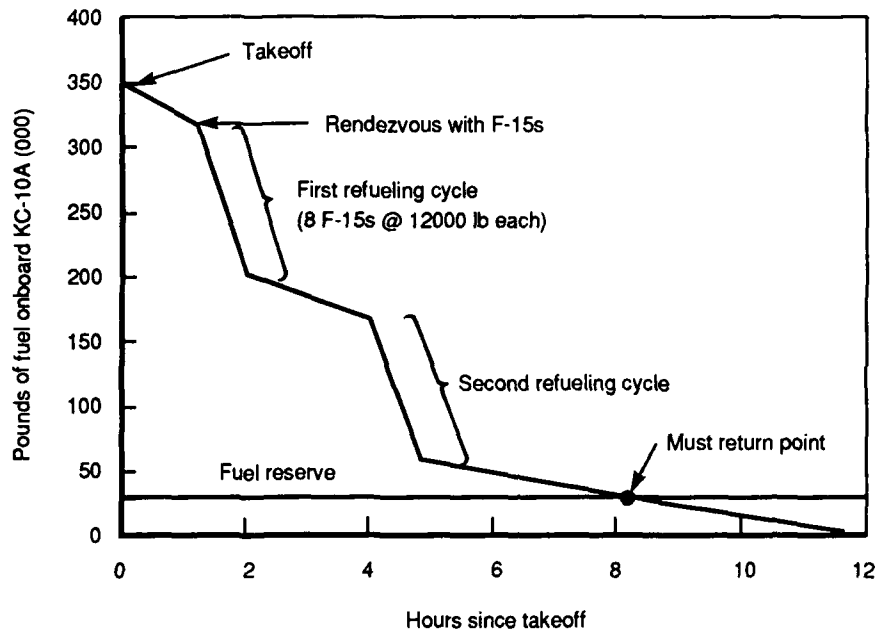


Fig. 10.4—KC-10A refueling operation

### Forward Operating Bases

A different approach would use the North Norway bases as forward operating bases (FOBs). Maintenance facilities and personnel would be kept at the main operating bases (MOBs) in central or southern Norway; some ammunition and fuel would be stored at bases in the north. As long as a minimal operational surface remained, aircraft could fly a limited number of sorties out of the FOBs, returning to the MOB for maintenance or battle damage repair. Maintenance facilities and personnel would be more secure in the rear areas. Although the sortie rate obtainable under a FOB concept would not be as high as under an operational MOB, it would probably be higher than under the central Norway Basing concept.

Problems could arise in battle damage repair if the damaged aircraft could not reach the rearward MOB. Lacking facilities in the northern FOBs, the aircraft may have to be abandoned or left to be repaired

later.<sup>9</sup> Sortie rates will be reduced if regular maintenance is not conducted between sorties.

## DISPERSED BASING

A promising option for basing in North Norway is dispersed operations with vertical/short take-off and landing (V/STOL) aircraft such as the AV-8B Harrier. One squadron of AV-8Bs would be included in a MAB deployed to Norway. V/STOL aircraft largely eliminate the need for main operating bases. Capable of operating from short stretches of straight road or even parking lots, the AV-8B would be difficult to find and even more difficult to suppress. The Soviets could not feasibly conduct a campaign to search out and destroy these aircraft.

Normally considered a ground support aircraft, the AV-8B proved itself to be an effective air defense aircraft in the Falklands/Malvinas War. According to *Jane's All the World's Aircraft*, the AV-8B can maintain a CAP 100 n mi from its takeoff point for three hours, although this estimate seems highly optimistic. The AV-8B could be a viable backup to the dedicated air defense aircraft if the main operating bases were closed. However, the AV-8B lacks the range and all-weather capability to provide significant support to air operations over the Norwegian Sea. One could not expect an AV-8B force to contribute to a campaign to stop Soviet long-range naval bombers.

NATO might consider greater reliance on V/STOL aircraft for reinforcing North Norway. The MAB air element might be enlarged to include an additional AV-8B squadron or the British could be asked to commit one or two squadrons. Such a force would provide substantial air defense and ground support which would be largely immune to Soviet airbase attack operations. Although this force could not provide long-range and all-weather air defense, it could improve the prospects of stopping a Soviet land offensive before it reaches the airbases. F-15s or F-18s could then remain at the available main operating bases to provide an all-weather capability.<sup>10</sup> In the long term, Norway might consider replacing its F-16 force early in the next century with V/STOL aircraft to reduce its dependence on the airbases.

---

<sup>9</sup>At some airbases, one might be able to sea-lift damaged aircraft to the south for repairs; this study did not examine the feasibility of that option.

<sup>10</sup>In this sense, the MAB's air element seems to be an ideal force, providing a good blend of capabilities.

### BUILD A NEW AIRBASE

In the early 1980s, the Norwegian government considered the possibility of developing a new base in North Norway. The program was eventually rejected, but the option remains sound. The proposal was to expand an existing small airfield in the Mo-i-rana/Mosjoen area, south of Bodø (see Fig. 10.5). The main objective seems to have been to provide another base into which ground reinforcements could be airlifted; the troops would then be shuttled northward on small transports (20–30 persons).<sup>11</sup>

Developing a new main operating base in this area would significantly improve NATO's defensive posture in North Norway. South of

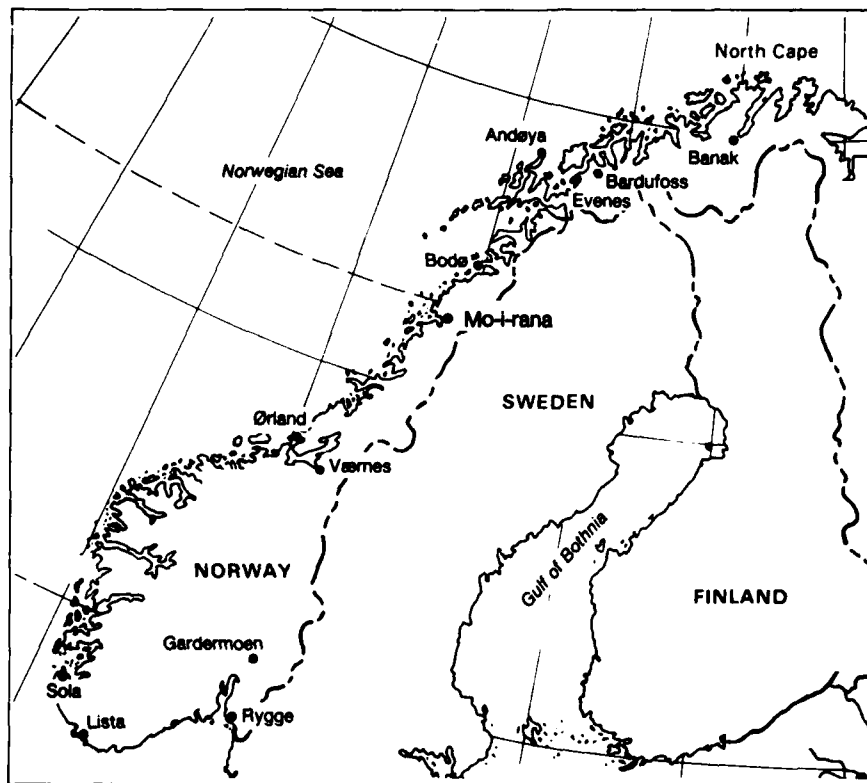


Fig. 10.5—Proposed site of new airbase at Mo-i-rana

<sup>11</sup>Huitfeldt, 1986c.

Bodø, the base would be beyond the range of most Soviet fighter-bombers. Attacking it would require the use of Tu-16 Badger, the Tu-26 Backfire, or the Su-24 Fencer, stretching the demands on these limited forces. Unlike Ørland and Trondhiem, a base in this area could provide air defense over the Troms area without tanker support. Assuming that the base had a single standard 8000 × 148-ft runway, Soviet requirements to suppress all the bases in North Norway to strategic airlifters for 48 hours would increase by five Tu-16 Badger sorties or six Su-24 Fencer sorties; more critically, the requirement to close to tactical aviation for 12 hours would increase by 11 or 14, respectively. The additional base might provide the margin NATO needs to have a reasonable chance of keeping at least one base open to tactical aviation. If NATO can expect that at least one airbase would be open after any initial Soviet attack, air defense reinforcements could be deployed, making subsequent Soviet attacks more difficult.

Another advantage of a base in the Mo-i-rana area would be the ability to provide air defense over Troms with ground intercept missions rather than the more expensive CAP/tanker operations. Figure 10.6 shows the interceptor speeds needed for interception from an airbase in Mo-i-rana. As can be seen, even with late detection, an interceptor could average slower speeds than the intruders and still intercept them anywhere in Troms. Such a base would be particularly well situated to protect the existing airbases.

Despite the apparent merits of this proposal, Norway will probably not reconsider its decision. Construction of a large facility like an airbase in the difficult terrain and climate of North Norway is very expensive. The Norwegian defense budget does not have any slack to cover it, nor does there seem to be sufficient demand for expanded civilian air service in the area.<sup>12</sup> Finally, construction of a new base in North Norway could be viewed as provocative by some Norwegians, despite the Soviet provocation of building a new base for the *Typhoon* SSBN 50 kilometers from Norwegian territory.

## IMPROVE AIRBASE DEFENSES

Whether retaining the current basing structure or adopting a new one, Norway has the option of improving the defenses of its airbases. The objective of this option would be to decrease the probability of the Soviets being able to close the runways and damage support facilities. This can be achieved both actively by attempting to defeat aircraft and

<sup>12</sup>From a conversation with a senior Norwegian military officer.

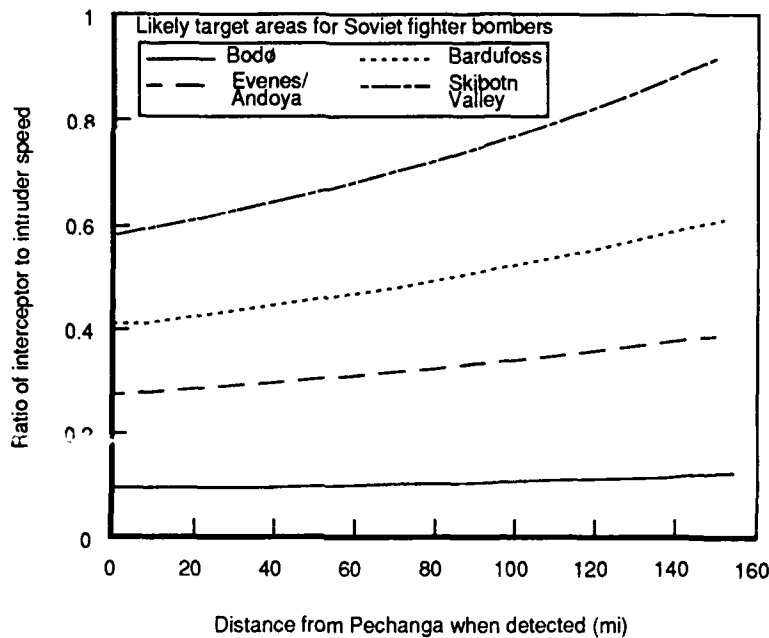


Fig. 10.6—Detection distances and interceptor speeds from Mo-i-rana

weapons and passively by improving the survivability of airbase facilities.

### Active Measures

Norway has already begun a major program to improve airbase defenses by deploying a battery of Norwegian-Adapted Hawks (NoAH) surface-to-air missiles at each of the major airbases in North and central Norway. The other major element of airbase defense is the interceptor force, primarily the Norwegian F-16s. However, the defense of the Norwegian airbases could be further improved by better short-range systems. Currently, the RNoAF has only antiquated (World War II vintage) short-range systems. A combination of Soviet fighter escorts and defense suppression aircraft should be able to neutralize current Norwegian airbase defenses sufficiently to stand a reasonable chance of closing the airbases. A third layer of defenses, less readily suppressed (if less accurate) might be able to improve the chances of

keeping the airbases open. Unfortunately, it seems unlikely that Norway will fund a major airbase defense program in the near future.

NATO could decide to commit ground-based air defense reinforcements to Norway. The MAB already will bring two I-Hawk batteries, which will substantially increase air defense forces. Perhaps other squadrons deploying to Norway could also plan to bring short-range air defenses with them.<sup>13</sup>

### **Passive Measures**

NATO has already adopted many passive measures for the protection of its airbases. Perhaps the most obvious are survival measures. For personnel, protection against chemical attack must be considered a top priority. For aircraft and other equipment, hardening of essential facilities and construction of additional aircraft shelters have been a major program for many years. Elsewhere in NATO, dispersal of aircraft is an important supplement to the expensive shelters; however, in the constricting terrain of North Norway, aircraft dispersal is not as feasible. If terrain permits, extension of runways can significantly increase Soviet sortie requirements if additional cuts are required. Extending an existing 8000-ft runway and parallel taxiway by 2500 ft would increase Soviet sortie requirements for closure to tactical aviation by roughly 10 to 15 sorties per base, or by three to five sorties for strategic airlifters.

Recently, more attention has been paid to camouflage, concealment, and deception,<sup>14</sup> with the goal of lowering the probability that Soviet pilots and their weapon systems can locate their targets. Given the split-second decisions that a pilot must make in the course of a high-speed attack, these measures can be very effective. Camouflage has long been used as a means of concealing targets. Dummy runways or taxiways could confuse a pilot and result in weapon release over the wrong area. Smoke generators can provide a cheap and effective means of obscuring an airbase. All these measures would have the effect of lowering the probability that a given weapon lands on target, thus requiring more Soviet sorties to maintain the same probability of closing an airbase.

Improvements could also be made in Base Recovery After Attack (BRAAT), as illustrated by the problem of runway repair (see Sec. VIII). The USAF standard is for each crew to repair three craters in

<sup>13</sup>The USAF differs from both the MAB and the RNoAF in that ground-based air defenses are not its responsibility. The MAB and the RNoAF tend to take a more integrated approach to considering the whole range of air defenses.

<sup>14</sup>McCoy, 1987, p. 56.

four hours. If NATO could improve the rate of runway repairs, either by faster procedures or (more likely) more repair crews, then NATO could improve the chances of keeping its airbases open. A faster rate of repair would not reduce the number of Soviet sorties needed to close a base in the first instance, but it would increase the number of sorties needed to keep a base closed.

Passive measures offer a number of advantages. First, they tend to be cost effective. Items such as smoke generators are relatively cheap yet can have a large payoff. Second, they can be implemented incrementally, providing flexibility in fiscal planning. Adding camouflage to even a few facilities would help. By comparison, building a new airbase requires an enormous initial investment before any benefit is realized. Finally, passive measures are not provocative. They can affect the Soviet Union only if the Soviets attack; otherwise the measures are harmless.

## **XI. REPLACEMENT AND OTHER OPTIONS**

In the previous two sections we have considered means of continuing to use airpower to achieve NATO's objectives in and around Norway in the face of potential denial of base access. This section suggests means of replacing the current reliance on airpower with sea-based and ground-based systems. It also considers using politically more acceptable reinforcements and the possibility of denying the airbases to the Soviets by having NATO destroy them.

### **USE SEA-BASED SYSTEMS**

The problems for NATO in Norway derive in large part from the small number and vulnerability of airbases. NATO could respond by shifting more of the burden of achieving its military objectives to sea-based weapon systems, such as carriers and submarines. Unlike aircraft, naval systems could deploy to the area of potential hostilities without waiting for base access to be granted.<sup>1</sup> Although base access, both airbases and ports, would help to sustain maritime operations in the Norwegian Sea, it would not be essential. Furthermore, naval systems may be able to deploy into the Norwegian and Barents seas after hostilities have begun even if the airbases in North Norway have been closed.

#### **Aircraft Carriers**

If deployed into the Norwegian Sea, aircraft carriers could greatly improve the air situation for NATO in the Northern Region. A typical aircraft carrier could bring with it two squadrons of the highly capable F-14 as well as squadrons of the multi-role F/A-18. The Soviets would need to use more of their air assets to counter the carriers, easing the burden on NATO's airbases. At the same time, NATO's land-based air could help reduce the threat to the carrier task forces. Carrier-based aircraft could also contribute to the land battle by flying ground support, amphibious, and land interdiction missions.

It seems unlikely, however, that carriers could replace the North Norway airbases. With the heavy concentration of Soviet Naval

---

<sup>1</sup>It is this possibility, that the United States could act unilaterally without Norwegian consent, that concerns many Norwegian officials about the U.S. Maritime Strategy.



Aviation bombers on the Kola Peninsula, the carriers could use the added protection on their eastern flank. If the bombers could freely overfly North Norway, the air situation would greatly deteriorate for NATO naval forces, since the Soviet aircraft could strike farther south and NATO would have less warning.

### **Submarine-Launched Cruise Missiles**

One possible technology for the future may be conventionally armed, submarine-launched cruise missiles (SLCMs) for airbase attack. Currently, attacking Kola airbases would be costly for NATO due to the high concentration of air defense systems. Cruise missiles could overcome this problem. If such systems become practical, they may be an excellent means of disrupting Soviet Naval Aviation. Launched from submarines, they would stand a much better chance of being able to come within range of their targets than would manned aircraft. However, conventional SLCMs could risk unintended escalation of a conflict since they are indistinguishable in flight from nuclear-armed SLCMs.

### **USE GROUND-BASED SYSTEMS**

Possible Norwegian hesitation in granting base access to American forces stems from U.S. perceived offensive capability. To alleviate these concerns, the United States could commit itself to sending more defensively oriented reinforcements. A good example would be SAM missile systems. These units could improve the air defense situation in North Norway without posing a threat to the Kola Peninsula. Norway may be more willing to accept the deployment of SAM batteries than fighter-bombers. If the ground-based air defenses were accepted for deployment before hostilities began, NATO would have a much better chance of keeping the airbases open, permitting the post-D-Day deployment of air reinforcements. Alternatively, the United States could buy several SAM batteries to be deployed in Norway in peacetime but manned by Norwegians; this commitment could replace some commitments to provide aircraft reinforcements.

Unfortunately, improved airbase defense might be seen as the first move in an American attempt to establish a secure area from which to attack the Kola bases. The Soviets would undoubtedly make this argument, which would eventually be picked up by critics of NATO in Norway, defeating the original purpose of finding a politically acceptable alternative. Still, the option is worth exploring with Norwegian

authorities. If presented properly, it might strike a compromise between Norwegian concerns for reassurance and deterrence.

Another possible ground-based system would be some type of surface-to-surface missile, perhaps carrying specialized area anti-armor munitions. Such systems could eliminate much of the need for ground support and interdiction missions flown by aircraft. However, these systems would almost certainly be as objectionable to the Norwegian government as American attack aircraft. Norwegian officials have repeatedly argued that deep-strike weapons of any sort would be unacceptable since the Soviets might view them as offensively oriented. In the words of Holst:

Long range strike systems for the defence of Norway could imply intentions to conduct forward defence against the territories of friendly neighboring states or lack of confidence in the ability of the latter to protect their neutrality against infringement. They could prove incompatible therefore with the Nordic framework of mutual consideration and restraint.<sup>2</sup>

This option appears to be unacceptable.

#### **USE POLITICALLY MORE ACCEPTABLE REINFORCEMENTS**

The possibility of delayed reinforcement of Norway derives from political considerations during times of peace and crisis, i.e., the Norwegian desire for crisis stability and reassurance. The answer may be to find more politically acceptable reinforcements. The most obvious way would be to find more non-American reinforcements. In ending its commitment to reinforce Norway, Canada greatly reduced Norway's options in a crisis. Canadian forces would not have been seen as provocative in a crisis as American forces, and therefore would have been much easier for the Norwegian government to call in. Furthermore, the Canadian brigade was the only unit firmly committed to reinforcing Norway, and therefore would have been a natural unit to call for.

One option may be to strengthen the commitment of NATO to send elements of the AMF to Norway, perhaps designating one brigade to be deployed to North Norway. Some movement may have already been made in this direction: when Canada announced that it was dropping its commitment to send its Air-Sea Transportable Brigade to Norway, it said that the prepositioned equipment would remain for possible use

<sup>2</sup>Holst, 1986, p. 16.

by the Canadian contingent of the AMF. On the negative side, the AMF units are generally less capable than the American forces they would be replacing.

### **DESTROY THE AIRBASES**

A major theme of this report has been that the airbases of North Norway would be the primary objectives of Soviet strategy in the northern region. Another theme has been that these bases would be difficult to defend if Norway delays allied reinforcement. An obvious solution would be for NATO to declare that it will destroy the bases itself if war breaks out. This action removes the primary motivation for a Soviet invasion of North Norway.

Although this may solve the problem of defending North Norway by eliminating the pretext for a Soviet invasion, it does not help NATO's other military objectives. Defending the SLOCs would be more difficult. The Soviet requirement for ground and air forces in the far north might be reduced, allowing the Soviets to redeploy these assets elsewhere, perhaps for operations in the Baltic or against Sweden. It might also send the wrong political signals, both to the Norwegians living in North Norway and to the Soviets, suggesting that Norway would be willing to give up the region if faced with an imminent threat. This approach would seem to weaken deterrence too much for a small gain in reassurance.

## **XII. COMPARING OPTIONS**

The previous three sections have offered numerous options for dealing with the prospects of reinforcing Norway after the start of hostilities against active Soviet countermeasures. The question remains: Which options, if any, should be adopted? The answer depends on the cost-effectiveness and political acceptability of each option. This section examines the issues involved in determining the cost and effectiveness of the options.

### **MEASURES OF EFFECTIVENESS**

It is difficult to quantify parameters for determining military benefits or measures of effectiveness (MOE) from the open literature. MOEs are needed for each of NATO's main goals in the region: defense of Norwegian territory, defense of the SLOCs, and general support of NATO's war effort.

For the goal of defending territory, we need a measure of the amount of territory held. One possible MOE would be the number of bases or key areas held at the end of the campaign or after a set time period. However, this does not distinguish between cases in which the bases are held for significantly different lengths of time. An alternative would be "base days": the summation of the number of days that each base is held. For example, if under a particular option Bardufoss were held for 10 days, Andoya for 12, Evenes for 14, and Bodø for 20, the number of base days would be 56. These numbers could be weighted for the assumed importance of each base or the number of aircraft the base could support.

For the goal of supporting NATO maritime operations in the Norwegian Sea and the defense of the SLOCs against air attacks, the number of air defense sorties over a given area beyond the number required for the defense of North Norway could be generated; the term "excess air defense sorties" is used in this sense. One may wish to further categorize these sorties by aircraft type or time. For example, one could report the number of F-15 sorties available each day of a campaign over a particular point in the Norwegian Sea.

To measure NATO's war-fighting potential to strike back at various Soviet targets on the Kola Peninsula, at sea, or elsewhere, similar MOEs could be used. They could be measured using excess attack sorties over the area being considered. Since air reinforcements for

Norway will not likely have the range to strike at the Kola Peninsula, the targets would likely be naval targets along the Norwegian coast or possibly Soviet controlled facilities in Finland.

Statistics for all the MOEs can be generated by the model reported in App. B. We cannot accurately calculate the MOEs from the open literature; however, impressionistic assessments can be made which allow some limited comparisons, as shown in Table 12.1. To make these comparisons, let us take as our base the case when allied reinforcements are deployed to Norway before the start of hostilities. Then, assuming delayed reinforcement, we can judge how each option compares with the base case in terms of the three MOEs. For the measures of "excess" air defense and ground support sorties, we will further distinguish between "close" sorties (those over North Norway) and "far" sorties (those over the Norwegian Sea and the Kola Peninsula).

### **Deployment Options**

The deployment options presented in Sec. IX all provide for the deployment of existing reinforcements after D-Day; the options do not add any additional capability. The Hold option would result in a major loss of capability across all MOEs. The failure to deploy air reinforcements early in a war greatly reduces NATO's ability to defend North Norway, let alone provide additional air defense and ground support. Diverting to open airbases would be an improvement, but the loss of prepositioned equipment at the COBs would still lead to serious loss in capabilities. Only if common aircraft types were adopted (for example, all F-16s) could NATO hope to do almost as well as in the base case.

Staging, on the other hand, does hold promise as a means of restoring the lost capability. Using tactical airlifters to deploy the key air defense reinforcements allows NATO to achieve the same level of air defense sorties as before. However, since there may not be enough tactical airlifters to deploy ground support aircraft quickly, NATO may lose some capability in that area. Maritime staging would help, but may not be rapid enough to restore conditions to the base case. The best deployment option would be to combine air and maritime staging, which allows *all* squadrons to deploy quickly with their *time-urgent* support, with the follow-on support arriving on maritime transport.

### **Basing Options**

If air reinforcements were rebased in central Norway, the prospects for deploying them after D-Day would be greater than in the base case.

Table 12.1  
EFFECTIVENESS AND COSTS OF OPTIONS

Options	Effectiveness						Cost			Political Acceptability in Norway	
	Base Days	Air Defense Sorties		Ground Support Sorties			\$	Effort	Domestic	Reassurance	
		Close	Far	Close	Far	Close					
Deployment	--	--	--	--	--	--	0	0	+/-	++	
CONUS hold	-	-	-	-	-	-	0	0	0	0	
Divert	-	-	-	-	-	-	0	0	0	0	
- Common types	-/0	-/0	-/0	-/0	-/0	-/0	0/+	0	0	0	
Staging	0	0	0	0	-/0	-/0	0/+	+	+	+	
Air	-/0	-/0	-/0	-/0	-/0	-/0	0/+	+	+	+	
Maritime	0	0	0	0	0	0	0/+	+	+	+	
Combined											
Basing											
Central Norway											
w/o tankers	-	--	--	--	-/0	---	0/+	+	-	++	
w/tankers	-/0	-/0	--/0	0	0	-	+ /++	+	?	+/-	
w/FOBs	-/0	-/0	-/0	0	0	-/0	0/+	+	?	+	
Dispersed	+	+	0	+	+	0/+	0/+	+	+	+	
New airbase	+ /++	+ /++	+ /++	+ /++	+ /++	+ /++	+++	++	--	--	
Improve airbase											
Defense											
Active	+	+	+	+	+	+	+ /++	0/+	?	-	
Passive	+	+	+	+	+	+	+ /++	0/+	0	0/-	

Table 12.1—Continued

Options	Effectiveness					Cost		Political Acceptability in Norway	
	Air Defense		Ground Support			\$	Effort	Domestic	Reassurance
	Base Days	Sorties	Close	Far					
Replacement									
Sea-based									
Carriers	-/+	-/+	-/+	-/+	0	0/++	0	-	-
Submarines	--	--	+/++	+/++	+	0/++	+	-	-
Ground-based									
SAMs (LR)	-/+	-/+	--	--	++	++	++	?	+/-
SAMs (SR)	-/+	-/+	--	--	++	++	++	?	+/-
SSMs	-/+	--	-/+	-/+	++	++	++	--	--
Destroy airbases	--	--	--	--	0/+	0/+	+	-/-	++
Non-U.S. forces	-/0	0	-/0	-/0	?	?	++	+/-	+
LEGEND:									
Effectiveness					Cost		Acceptability		
---	Complete loss of capability						Very negative reaction		
--	Major loss of capability						Negative reaction		
-	Important loss of capability						No effect		
0	No significant change						Positive reaction		
+	Important gain in capability						Very positive reaction		
++	Major gain in capability								
/	Range of values						Range of possible reactions		
?							Uncertain reaction		

Without tanker support, however, these units could not provide the same level of support to defend North Norway; any "excess" air defense or ground support capability would be lost. In particular, NATO would lose the ability to provide support far into the north Norwegian Sea or toward the Kola Peninsula. With tanker support or by using the North Norway bases as FOBs, NATO could approach the base case capability, but at great cost and with the loss of some operational flexibility.

NATO's capabilities might significantly improve if a new airbase were built at Mo-i-rana. The Soviets might have greater difficulty closing all the airbases, especially Mo-i-rana or Bodø. If NATO based some of its air defense aircraft at these bases, the other bases could be better defended and more sorties could be generated. The true worth of this option depends critically on the number of longer range aircraft, principally Fencers, that the Soviet commit to airbase attack operations. If few of these aircraft are available, then this option results in significant gains; if the Soviets can commit a full regiment of even two, then an additional airbase does not offer as much additional capability.

NATO could improve its sortie generation by improving airbase defenses. The large marginal gains would probably be possible from both additional passive measures and from modern short-range air defense systems which the bases currently lack. Since Norway has already deployed longer range air defenses (NoAH) and hardened shelters, the marginal gains from additional procurement in these areas would be fewer.

### **Replacement and Other Options**

Analysis of replacement options is somewhat more difficult since the capabilities are not always directly comparable. The use of aircraft carriers in the Norwegian Sea *in place of* currently programmed reinforcements might be able to match or even exceed base case capability, but more likely it would not. The problem comes in determining the likelihood that carriers would be able to operate in the Norwegian Sea without the support of allied air reinforcements in North Norway. In addition, to compensate for the lost allied reinforcements, NATO would need to commit *more* carriers than are currently committed to operations in this region. If the additional carriers could be found and if they could penetrate Soviet defenses, then NATO capability may increase, especially with the long-range air defense and attack aircraft found on carriers (F-14, F/A-18, and A-6). Submarine-launched cruise missiles have the potential of significantly improving NATO's ability



to strike at the Kola Peninsula,<sup>1</sup> but they could not provide air defense or directly provide ground support for NATO ground forces in North Norway, and their use could be mistaken for an attack with nuclear-armed cruise missiles.

Analysis of ground-based systems as replacements for air forces faces similar uncertainties. Significant additions in short-range and long-range SAM systems might be able to compensate for the loss of air defense aircraft, but they could not provide the flexibility or diversity of a mixed air defense force. In addition, they can not fly ground support missions. Surface-to-surface missiles could improve NATO's ability to strike at targets in and around North Norway, but they probably could not fully replace the capabilities of ground support aircraft.

The idea of destroying the airbases does not have merit in terms of the MOEs used here. In all categories, NATO would completely lose its capability to meet its objectives. This option could be justified only on other grounds.

In terms of effectiveness, replacing American reinforcements with those of other nationalities need not significantly affect capabilities compared with the base case. The only possible decrease would come if the more capable American systems were not replaced with similar systems. For example, Canadian F-18s might be able to perform as well as American F-15s; the use of lesser aircraft would lead to a reduction in capability. However, if one were to assess the *expected* capability of this option compared with the base case (i.e., factoring in the probability of delayed base access), this option may actually increase NATO's expected performance.

## COSTS

The other side of the cost-effectiveness equation involves the cost of each option. Unlike the focus that can be achieved in defining MOEs of effectiveness, costs are multifaceted. The most obvious is monetary cost. Table 12.1 offers an impressionistic estimate of relative monetary costs. These estimates are not based on detailed research, but merely reflect comments made to the author by officers and officials concerning likely costs.

Despite the importance of monetary costs, other types of costs must be considered. One such cost is effort. Difficult to quantify, effort is nevertheless a real consideration. The concept of effort refers to the amount of time and energy that officials would need to spend on

<sup>1</sup>To reflect this capability, Table 12.1 shows plus signs in the "ground support sorties" column.

negotiating and planning the implementation of an option. In the multilateral, multinational setting of NATO, effort is a factor. An option which is inferior in effectiveness, but which could be implemented quickly and with minimal effort, might be far superior overall to another which offers high effectiveness, but would require long negotiations and has little chance of being approved.<sup>2</sup>

Since Norway is at the center of most of these options, the costs to Norway should be particularly considered. The obvious costs would be those involving Norwegian budgetary outlays. Any option which would require expansion of the Norwegian defense budget would undoubtedly face serious political opposition, since this would probably necessitate a reduction in social spending. Some options might face significant resistance for non-monetary reasons as well. For example, a decision to destroy airbases in North Norway in the event of war might be seen as abandoning the inhabitants of this region, and thus be politically unacceptable.

Diplomatic costs could be involved as well, not only in Norwegian relations with the Soviet Union, but also in relations with Finland and Sweden. Norwegian authorities will remain deeply concerned with reassurance of the Soviet Union and how policies affect its Nordic neighbors. Options which threaten to disrupt the perceived pattern of restraint will be viewed negatively in Norway.

Table 12.1 offers the author's judgment on the possible political acceptability of the various options under consideration. For domestic political consideration, I have assumed that increased budgetary outlays or a decreased commitment to North Norway would have a negative effect, whereas improved chances of deploying allied reinforcements after the start of hostilities would have a positive effect. As for reassurance, I have assumed that any action which could be perceived as increasing offensive capability against the Kola Peninsula would have a negative effect, whereas any action decreasing NATO capabilities in North Norway would have a positive effect.

---

<sup>2</sup>Similarly, options will differ depending on who has authority to implement the policy. One would wish to distinguish between options which could be implemented unilaterally by the United States, those which require NATO's cooperation, and those which require Norway's cooperation. Clearly, this is a sensitive issue. One does not wish to deliberately offend an ally by acting without consultation. However, when the issue concerns the possibility that an ally might not grant base access in a crisis, a prudent planner must consider options which can be implemented unilaterally or with the consent of more cooperative allies.

## DEALING WITH THE DIFFERENCES

Realistically, one must admit that there are differences in goals and priorities between Norway, NATO, and the United States. Each actor will see a different combination of costs and benefits for each of the options. For example, let us consider the use of aircraft carriers in the Norwegian Sea as a replacement for airbases in North Norway. The United States and NATO would agree on the effectiveness of this option. However, the United States would perceive a higher cost since the carrier task forces would be primarily or wholly American; the American taxpayer would bear the brunt of the costs. Norway would see another type of cost, in terms of reduced reassurance of the Soviet Union, possibly resulting in greater military tensions and forces deployed in the area. The Norwegian government could perceive reduced Norwegian security, requiring some sort of remedial action.

The differences in objectives and costs will result in different perceptions of which option is preferred. American and NATO policymakers must be sensitive to Norwegian views on issues involving military affairs and its relations with the Soviet Union. However, the Norwegians need to be more sensitive to American and NATO concerns. Despite Norwegian attempts to depict Nordic Europe as an area of low tensions, the region has become an area of increasing military interest to both the Warsaw Pact and NATO.<sup>3</sup> In the event of war, the Nordic area would be a critical arena, significantly affecting the outcome. The United States and other NATO members have made a substantial commitment to reinforce Norway in crisis and war; men and material would be placed at risk in an effort to defend Norway. Apparent Norwegian hesitation in preparing for and accepting the timely deployment of allied reinforcements in crisis might lead Norway's allies to reconsider their commitment. NATO, Norway, and the reinforcing nations must strive to more closely coordinate their efforts to pursue options which are amenable to all.

---

<sup>3</sup>Auslund, 1987, p. 5.

**PART IV**  
**CONCLUSIONS**

### XIII. CONCLUSIONS

This report began with the question: How likely is it that Norway would delay in calling for allied reinforcements in a crisis? Norwegian post-war history and recent statements by leading Norwegian officials all point to a significant possibility of delay. The report then addressed the question: What would be the military effect of delayed reinforcement? An analysis of Soviet capabilities suggests that, if Norway were to delay in permitting reinforcement until D-Day, the Soviets could prevent the timely deployment of those reinforcements by attacking airbases in North Norway. Statements by Norwegian and NATO officials make clear that defense of North Norway depends on the timely arrival of external reinforcements.

Although this report cannot offer any final recommendations on the preferred courses of action, some comments can be made. A prudent planner must take seriously the possibility that Norway would not grant base access to the United States in a crisis. Norwegian reasoning may be sound, but the possibility for miscalculation remains. If the Soviet Union should attack before allied reinforcements arrive, NATO would fare significantly worse in pursuing its objectives in the northern region. However, there are a number of practical options which would allow NATO and the United States to mitigate the effects of delayed reinforcements. The key to any of these options is to prepare contingency plans now.

We have considered several options to deal with the possibility of delayed reinforcement in the face of active Soviet countermeasures. To deploy the currently planned reinforcements to the currently planned bases, tactical airlifters hold promise, especially if combined with maritime lift for follow-on support. The Soviet Union would need to sustain over six times the level of effort to keep tactical airlifters out of North Norway as it would for strategic airlifters. Some aircraft could be based in the relative safety of central Norway; however, effective air defense operations from central Norway require the commitment of aerial tankers. The construction of a new airbase south of Bodø in Mo-i-rana might improve NATO's chances of successfully defending North Norway, but is unlikely to be approved by Norway. Improved active and passive defense of the existing bases offers a useful compromise in terms of cost and effectiveness. Attempts to replace current air reinforcements with other forces (sea-based, land-based, or non-American forces) solve some problems, but none seems to offer a comprehensive solution.

## Appendix A

### ENVIRONMENTAL FACTORS AFFECTING MILITARY OPERATIONS

Any military operation in the arctic region of Fenno-Scandinavia (often referred to as Nordland) will be profoundly affected by the extreme environmental conditions prevalent there, including terrain, temperature, weather, and daylight. These conditions have constrained man's efforts to develop a modern transportation infrastructure in the region. We next briefly survey some of these conditions and suggest how they might affect operations.<sup>1</sup>

#### ENVIRONMENTAL FACTORS

##### Geography

Although the terrain varies markedly in the Finnish, Swedish, and Norwegian areas of Nordland, the effect is consistent—movement is severely limited. Northern Finland consists largely of swamps, lakes, and streams, perhaps as much as 50 to 60 percent of the area.<sup>2</sup> Eastern Finnmark county in Norway offers much flat, open terrain. During the summer, the region becomes a series of lakes and marshes, and motorized units are restricted to the limited road network. In winter, units with over-snow vehicles have ample room to maneuver, although the ground does not freeze sufficiently to support armored vehicles. As one approaches western Finnmark, the terrain becomes increasingly mountainous. In Troms county, the terrain is extremely difficult, marked by narrow valleys between towering mountains, deep fjords, and thousands of islands. The single road along the coast (E-6) from Finnmark to the south is often flanked by a fjord on one side and sheer cliffs on the other, or is dug into the side of the mountain face—making an excellent area for demolition and blocking operations. Offensive operations in Troms would require extensive use of *desant* forces (amphibious, airborne, and airmobile) and light infantry.

---

<sup>1</sup>See also Terry, 1988b.

<sup>2</sup>Hines and Petersen, 1986b, p. 517.

### **Climate and Light Conditions**

The climate of North Norway is harsh. With a combination of arctic and maritime conditions, the climate makes extraordinary demands on both humans and machines. Heavy snow and extreme cold are normal winter weather throughout Norway, especially in the far north. Night reigns over all of North Norway from November through January, with only limited light in October and February. Air operations, especially for fixed-wing aircraft, are severely hampered during winter months. Soldiers would be preoccupied with simply staying alive. The harsh realities of the winter climate were sadly illustrated in the death by avalanche of 17 Norwegian soldiers in winter exercises in 1986. The summer months are fairly mild, and good flying conditions exist from March through October. The midnight sun permits 24-hour "day" operations for aircraft in the summer, significantly increasing the flexibility for employing airpower. This factor would aid the Soviets more than NATO since the Soviet air force has fewer night-capable aircraft.

### **THE TRANSPORTATION PROBLEM**

Distance, geography, climate, and a limited transportation infrastructure all conspire to seriously frustrate transportation in North Norway. Figure A.1 shows the transportation system of North Norway, including all roads of any military significance. Note that only a single railroad serves North Norway, and the line ends in Bodø. The region has only one north-south road (Route E-6). A number of fjords along the route must be crossed by ferry. In addition, the road and railroad could support only half of the logistics needs of the military forces and civilians expected to be in North Norway in the event of war.<sup>3</sup>

Travel distances in Norway are a major military factor. Norwegian officials often note that the distance from Oslo to the North Cape (Nordkapp) is roughly the same as from Oslo to Rome. The country extends as far west as Amsterdam and as far east as Leningrad. Actual distances traveling on the ground are greatly increased by the topography. Table A.1 compares air and road distances between various points in North Norway and the airfields at Bodø, Andøya, and Bardufoss. Bardufoss, which is located by the main highway, is 60 to 90 percent farther away from any point by road than by air. The airbase on Andøya, an island, is often several times farther by road.

<sup>3</sup>Breivik, 1982.

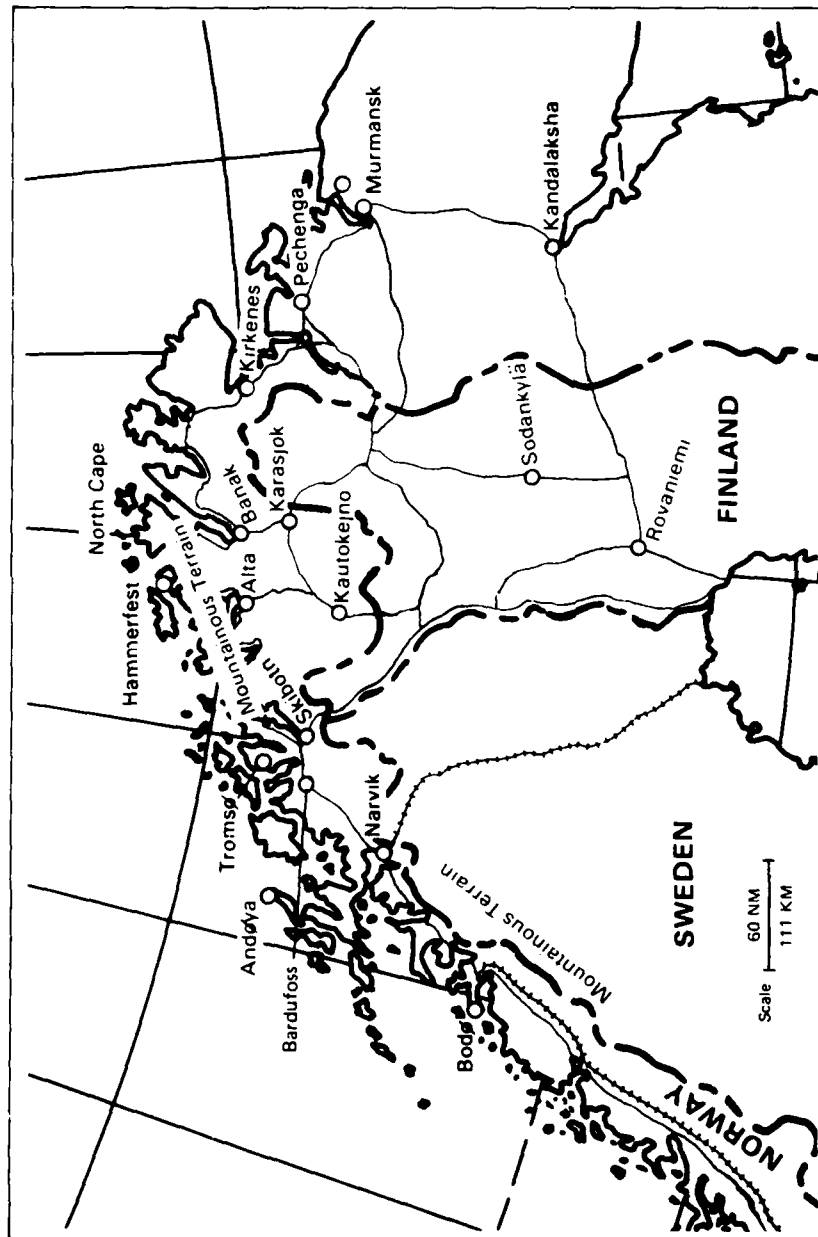


Fig. A.1—The transportation net of North Norway



Table A.1

AIR/ROAD DISTANCES BETWEEN SELECTED POINTS IN NORTH NORWAY  
(Nautical miles)

Point	Bodø Airbase			Andøya Airbase			Bardufoss Airbase		
	Road	Air	Ratio	Road	Air	Ratio	Road	Air	Ratio
Kirkenes	515	371	1.39	659	290	2.27	475	243	1.96
Evenes	163	90	1.81	160	50	3.22	67	53	1.27
Banak	515	286	1.80	472	190	2.49	285	148	1.92
Alta	420	255	1.64	378	157	2.41	190	116	1.64
Tromsø	305	176	1.73	262	63	4.15	75	38	1.94
Bardufoss	230	142	1.62	188	53	3.55	—	—	—
Andøya	202	128	1.58	—	—	—	188	53	3.55
Bodø	—	—	—	202	128	1.58	230	142	1.62
Trondheim	406	245	1.66	540	370	1.46	568	386	1.47

SOURCE: Road distances from Texaco Road Map of Norway, 1983.

The nature of Norway's geography has led its inhabitants to rely heavily on coastal shipping for supplies. Similarly, coastal shipping is often an easier and quicker means of travel, both for bulk transport and for speedy travel between distant points. The limitations of the road and railroad network, as well as the few airfields, makes boat travel the only practical alternative in many instances. Fortunately for NATO, coastal shipping would be mobilized in war, providing a large maritime transport capability.

## DAYLIGHT

North Norway lies above the Arctic Circle. In both winter and summer, the amount of light will greatly influence flight operations. In the depth of winter, only a few hours of twilight exist each day, effectively limiting flight operations.<sup>4</sup> NATO may have a slight advantage in the winter since more of its aircraft can operate in both day and night conditions. In the summer, on the other hand, daylight remains for 24

<sup>4</sup>Conditions improve slightly during full moon. In the winter, the full moon remains above the horizon; combined with the snow-covered landscape, significant amounts of light can be reflected off the ground. However, this is hardly the same as daylight operations.

hours per day. The Soviets may have a slight advantage, since they could use their numerical superiority and attack continuously around the clock, attempting to tire the Norwegian forces.<sup>5</sup>

---

<sup>5</sup>This technique might be very effective due to the pilot shortage in the RNoAF. The RNoAF has not been able to retain enough pilots for all 67 of its F-16s. To maintain high sortie rates would require many flights per day for each pilot. Continuous Soviet attacks could quickly fatigue Norwegian pilots, decreasing any qualitative advantage from flying they may have.

## **Appendix B**

### **THE NORTH NORWAY AIR-GROUND CAMPAIGN MODEL**

As suggested in Sec. VII, an in-depth comparison of alternative deployment and basing options in Norway requires a detailed model of air-ground warfare in North Norway. Such a model was developed at RAND by the author, based in part on ground models developed at the Norwegian Defence Research Establishment (NDRE) and elsewhere.<sup>1</sup> Because not enough information was available in the open literature, the model could not be used effectively in this study. However, the outlines of the model are worth presenting to show the types of considerations which should be elements in comparing alternative postures.

The principal measure of effectiveness (MOE) in the NDRE model is "holding time": the length of time that NATO could hold a particular area or set of areas. The model developed at RAND can use this MOE, supporting others as well. For example, it can report on the number of "excess" air defense sorties (i.e., sorties available but not needed due to insufficient Soviet intrusions); this can be a surrogate for AFNORTH's ability to provide air defense sorties over the Norwegian Sea. The sorties can be categorized by aircraft type, coverable areas, and time available. The MOEs can be used to compare more rigorously the alternatives described in Secs. IX, X, and XI.

#### **THE GROUND MODEL**

The broad outlines of the type of ground model proposed here were first developed at NDRE for analyzing the effect of the (then) future Norwegian fighter force on the defense of North Norway.<sup>1</sup> The key to the model was the network representation of North Norway. The analysts identified the principal roads and sea lanes (fjords, ferries, and the ocean) for transitting the region; these became the axes in the model. The nodes are the key defensive areas, usually road junctions, ferry points, airbases, and ports. Thus, all of North Norway is

---

<sup>1</sup>E. Reine and T. Langsaeter, "The NDRE Land Battle Model," in Huber, Jones, and Reine (eds.), 1974, pp. 199-203.

simplified into a simple network diagram, as shown in Fig. B.1. The time to travel along an axis between two points can be measured and specified in the model. Combat occurs at the nodes. Differences in the defensive nature of the terrain at the nodes could be specified, both in the number of units that could engage at one time (the frontage) and the defense multiplier for protective terrain. Although greatly simplifying the geography of the area, the model captured the essential elements of the military environment.

This model assumes a passive stance by NATO: the Soviet units take the offensive and advance along the network, and NATO attempts to delay the advance at the nodes. The length of battle at the node is a function of the ratio of Soviet-to-NATO combat strength; the higher the ratio, the shorter the battle. Units continue to fight until they reach a specified threshold of losses, at which point they are assumed to be no longer operationally effective. No NATO counter-offensive is modeled (perhaps reflecting Norwegian priorities); as such, the model may underestimate the value of more capable units like the MAB and may overestimate the amount of territory lost to the Soviets. As a result, the model will tend to understate the differences between a no-delay case and a delay case.

## THE AIR MODEL

The role of airpower in NDRE's model was primarily to attrit opposing ground forces. By affecting force ratios on the ground, airpower affects the length of battle. For example, Soviet support sorties would reduce the number of defending NATO units, allowing the Soviet ground forces to defeat the NATO units faster, and thus allowing them to achieve a higher rate of advance. NATO air defense sorties over the battlefield would reduce or negate this Soviet gain.

The model developed at RAND offers a more detailed air model. A major feature is airbase attack, using a methodology similar to the one described in Sec. VIII. Within the model, the primary mission of the Soviet bombers and fighter-bombers is to keep the airbases closed. The fighter-bombers have a secondary mission to interdict NATO forces arriving at ports or moving forward toward the battle areas. Finally, the fighter-bombers provide direct air support (close air support and battlefield air interdiction) for Soviet ground forces. Soviet fighter aircraft provide escort for these aircraft and for amphibious landings, if the mission is within range. NATO's priorities directly mirror those of the Soviet player. Air defense aircraft fly airbase defense, port and road defense, and finally air defense against Soviet

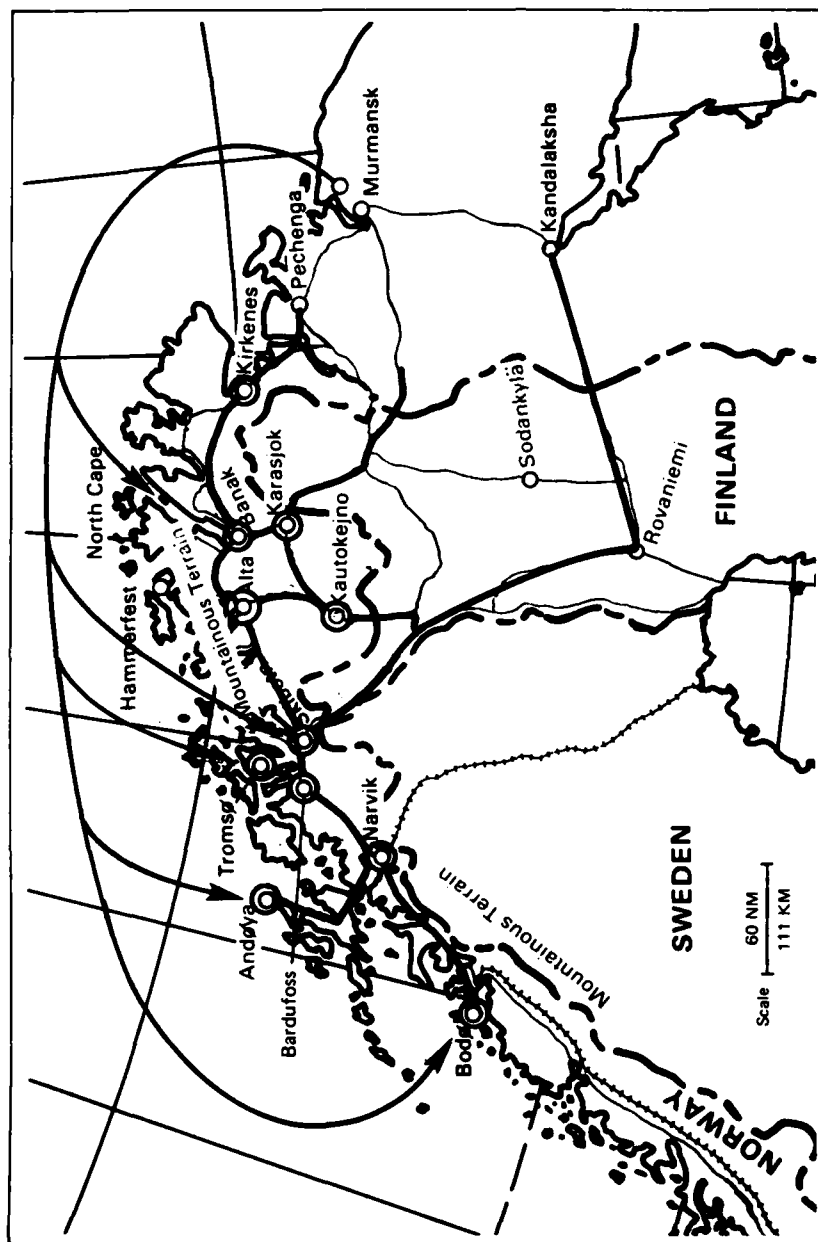


Fig. B.1—An illustrative network representation of North Norway

ground support missions. Norwegian F-16s will interdict amphibious landing forces, unless they are needed for airbase defense. NATO ground support aircraft will interdict Soviet forces moving forward and secondarily will provide direct ground support.

The model integrates the air and land battles. If the Soviets close an airbase to strategic airlifters, scheduled air and ground reinforcements cannot arrive until the base reopens. This assumption can be varied to allow deployment under the staging concept if the base is open to tactical aviation. If Soviet ground forces come within artillery range of an airbase, the base is evacuated. The closest available base is chosen as the evacuation base, within the constraints of available shelter space and support facilities. The model allows the user to declare whether the Soviets can use captured bases, and if so, how long the Soviets require to reopen the base.

## BIBLIOGRAPHY

- Aalbaek-Nielsen, B., "The Royal Norwegian Air Force," *Air Force Magazine*, September 1985, pp. 120-123.
- Aamoth, Major General Olav F. (RNoAF), "The Air Defence of Norway," *NATO's Sixteen Nations*, Vol. 32, No. 1, February/March 1987, pp. 87-89.
- Adshead, Robin, "Exercise 'Anchor Express' 1986," *Armed Forces*, Vol. 5, July 1986, pp. 297-298.
- Alberts, Lt. Col. D. J. (USAF), *Deterrence in the 1980s, Part II: The Role of Conventional Air Power*, Adelphi Paper No. 193, Winter 1984.
- Alexander, Col. Joseph H. (USMC), "The Role of the U.S. Marines in the Defense of North Norway," *Proceedings of the U.S. Naval Institute*, Vol. 110, No. 5, May 1984, pp. 180-193.
- , "Combined Amphibious Operations in Northern Europe," *Proceedings of the U.S. Naval Institute*, Vol. 106, No. 11, November 1980, pp. 26-32.
- Alumni Association of the Norwegian National Defence College, "A Report from a Conference at Sundvollen, Norway, April 25-27, 1985," *Spotlight on the Soviet Union*, Report No. 1/86, 1986.
- Amundsen, Kirsten, *Norway, NATO and the Forgotten Soviet Challenge*, Institute of International Studies, University of California, Berkeley, 1981.
- , "Soviet Submarines in Scandinavian Waters," *The Washington Quarterly*, Vol. 8, No. 3, Summer 1985, pp. 111-122.
- Archer, Clive, "Nordic Security," *Contemporary Review*, Vol. 243, No. 1411, August 1983, pp. 57-63.
- Archer, Clive, and David Scrivener (eds.), *Northern Waters: Security and Resource Issues*, Barnes & Noble Books, Totowa, New Jersey 1986.
- Auslund, John, *Myths of Nordic Security Policies*, The Norwegian Atlantic Committee, Security Policy Library No. 4, Oslo, 1987.
- , *Nordic Security and the Great Powers*, Westview Special Studies in International Security, Westview Press, Boulder, Colorado, 1986.
- , "Norwegian Security Policy," *The Norseman*, No. 1, 1981, pp. 2-6.
- Beatty, Jack, "In Harm's Way," *The Atlantic Monthly*, Vol. 259, No. 5, May 1987, pp. 37-53.

- Beauvis, Simon, "NATO's Cold Shoulder," *Flight International*, May 18, 1985, pp. 31-34.
- Berg, John, "F-16 increases Norway's interception range," *Jane's Defence Weekly*, January 26, 1985a, p. 133.
- , "Norway denies key NATO radar station shutdown," *Jane's Defence Weekly*, July 20, 1985b, p. 107.
- , "Norway modernizes F-5s," *Jane's Defence Weekly*, April 19, 1986a, p. 691.
- , "Norway's Air Force staff level down to 55% of requirement," *Jane's Defence Weekly*, August 24, 1985c, p. 339.
- , "Norway's Chief of Defence attacks budget curbs," *Jane's Defence Weekly*, November 17, 1984, p. 873.
- , "Norway's pilot crisis—bonus scheme rejected," *Jane's Defence Weekly*, February 1, 1986b, p. 147.
- , "Norway's Vital Defense Changes," *Armed Forces Journal International*, December 1980, p. 49-59.
- , "Norwegian Air Force faces severe pilot crisis," *Jane's Defence Weekly*, March 2, 1985d, p. 356.
- , "Norwegian Army 'too weak' on northern flank," *Jane's Defence Weekly*, March 15, 1986c, p. 456.
- , "Soviet landing in exercise by Norwegian border," *Jane's Defence Weekly*, May 10, 1986d, p. 827.
- , "Two options for Norway's future defence structure," *Jane's Defence Weekly*, December 14, 1985e, p. 1982.
- Bildt, Carl, "Sweden and the Soviet Submarines," *Survival*, Vol. 25, No. 4, July-August 1983, pp. 165-169.
- Bitzinger, Richard, *Nordic Nuclear-Weapons-Free Zones: Problems and Prospects*, The RAND Corporation, P-7356, August 1987.
- Bjøl, Erling, *Nordic Security*, Adelphi Paper No.181, Spring 1983.
- Bogie, William, "A Viking's View," *National Defense*, February 1983, pp. 38-39.
- Bowman, Richard C., "Soviet Options on NATO's Northern Flank," *Armed Forces Journal International*, Vol. 121, No. 9, April 1984, pp. 88-98.
- Boyd, Robert S., "SPETSNAZ: Soviet Innovation in Special Forces," *Air University Review*, Vol. 38, No. 1, November-December 1986, pp. 63-69.
- Braybrook, Roy, "Airfield Denial," *Defence*, Vol. 16, No. 5, May 1986, pp. 232-236.
- Breemer, Jan S., "The Soviet Navy's SSBN Bastion: New Questions Raised," *RUSI Journal*, Vol. 132, No. 2, June 1987, pp. 39-44.
- Breivik, Rear Admiral Roy (RNoN), "Assuring the Security of Reinforcements to Norway," *NATO's Fifteen Nations*, Vol. 27, Special 2/1982, pp. 66-69.



- Brenchley, Frank, "Norway and Her Soviet Neighbor: NATO's Arctic Frontier," *Conflict Studies*, No. 134, 1982.
- Brodersen, Lt. Gen. J. (AFNORTH/RNoAF), "Tactical Air Power Considerations in the Northern Region," *NATO's Fifteen Nations*, Special 2, 1979, pp. 24-27.
- Brooks, Linton F., "Naval Power and National Strategy: The Case for the Maritime Strategy," *International Security*, Vol. 11, No. 2, Fall 1986, pp. 58-88.
- Brundtland, Arne Olav, *The Nordic Balance and its Possible Relevance for Europe*, Norsk Utenrikspolitisk Institutt, No. 229, December 1981.
- Buckley, Christopher, *Norway; The Commandos; Dieppe*, His Majesty's Stationery Office, London, 1951.
- Bull-Hansen, General Fredrik (RNA), "Norway: NATO's Strategic Pivot?" *RUSI Journal*, Vol. 132, No. 3, September 1987, pp. 13-18.
- Carmona, Robert, "La Scandinavie—Panorama des pays Nordiques," *Defense Nationale*, March 1986, pp. 55-69.
- Choate, Lt. Col. John S. (USAF), *Implications of Runway Survivability Upon Future Air Force TACAIR Doctrine and Force Structure*, The Air University, Maxwell Air Force Base, Research Report AU-AWC-84-047, Alabama, March 1984.
- Chuter, Andrew, "European Action for AV-8B," *Jane's Defence Weekly*, August 9, 1986, pp. 208-209.
- Cole, Paul M., "The Northern Balance: Changing Realities in Defending Northern Europe," *Defense & Foreign Affairs*, Vol. 14, No. 12, December 1986, pp. 21-23, 27, 30.
- Crocker, F.P.U., "The Defence of Northern Norway," *RUSI Journal*, Vol. 129, No. 4, December 1984, pp. 29-32.
- DeLeon, Peter, *Emerging Security Considerations for NATO's Northern Flank*, The RAND Corporation, P-7041, December 1984.
- Derry, T. K., *A Short History of Norway*, Greenwood Press, 1979, Westport, Connecticut, First edition, 1957.
- Devlin, Daniel Dale, "Soviet-Norwegian Relations: Norwegian Reactions to Soviet Pressures," Masters thesis, Naval Postgraduate School, Monterey, California, December 1979.
- Dick, C. J., "Catching NATO Unawares: Soviet Army Surprise and Deception Techniques," *International Defense Review*, Vol. 19, No. 1, January 1986, pp. 21-26.
- , "Soviet Operational Art: Part 1: The Fruits of Experience," *International Defense Review*, Vol. 21, No. 7, September 1988, pp. 755-761.

- , "Soviet Operational Art: Part 2: The Keys to Victory," *International Defense Review*, Vol. 21, No. 8, October 1988, pp. 901-908.
- Donnelly, C. N., "Operations in the Enemy Rear: Soviet Doctrine and Tactics," *International Defense Review*, Vol. 13, No. 1, January 1980, pp. 35-41.
- Donnelly, C. N., et al., *Soviet Amphibious Operations: Implications for NATO's Northern Flank*, SHAPE Technical Center, STC CR-57, The Hague, September 1985.
- Donnelly, Christopher N., and Phillip A. Petersen, "Soviet Strategists Target Denmark," *International Defense Review*, Vol. 19, No. 8, August 1986, pp. 1047-1051.
- Dorfer, Ingemar, *Arms Deal: The Selling of the F-16*, Praeger Publishers, New York, 1983.
- , "Scandinavia & NATO: a la carte," *The Washington Quarterly*, Vol. 9, Winter 1986, pp. 5-14.
- Emerson, Donald E., and Louis H. Wegner, *TSARINA—A Computer Model for Assessing Conventional and Chemical Attacks on Airbases*, The RAND Corporation, N-2244-AF, August 1985.
- Farrar-Hockley, Sir Anthony, "Defence in the Higher Latitudes," *NATO's Fifteen Nations*, Vol. 26, No. 2, April-May 1981, pp. 18-24.
- , "Dynamic Defence: The Northern Flank," *RUSI Journal*, Vol. 128, No. 4, December 1983, pp. 5-11.
- Flight International*, "World's Air Forces: Norway," November 30, 1985, p. 67.
- Fowler, William, "NATO's Northern Border Guard," *Defence*, Vol. 16, No. 8, August 1986, pp. 402-403.
- Gander, Terry, "Sweden's powerful anti-invasion force," *Jane's Defence Weekly*, Vol. 6, No. 24, December 20, 1986, pp. 1458-1459.
- German, Robert K., "Norway and the Bear: Soviet Coercive Diplomacy and Norwegian Security Policy," *International Security*, Vol. 7, No. 1, Fall 1982a, pp. 55-82.
- , "Nuclear-Free Zones: Norwegian Interest, Soviet Encouragement," *Orbis*, Vol. 26, Summer 1982b, pp. 451-476.
- Gormley, Dennis M., "A New Dimension to Soviet Theater Strategy," *Orbis*, Vol. 29, No. 3, Fall 1985, pp. 537-569.
- Greve, Tim, *Norway and NATO*, Press Department, Royal Ministry of Foreign Affairs, Oslo, 1968.
- Haagerup, Niels J., "Scandinavian NATO Without Nuclear Weapons?" *The Washington Quarterly*, Vol. 9, Winter 1986, pp. 5-14.
- Hansen, Lynn M., *Soviet Spetsnaz Operations on the Northern Flank: Implications for the Defense of Western Europe*, Center for Strategic Technology, STRATECH Studies SS84-2, College Station, Texas, April 1984.

- Haynes, MGen. Fred (USMC. ret.), "The Amphibious Blitzkrieg," *Sea Power*, Vol. 26, No. 12, November 1983, pp. 8-17.
- Hegge, Per Egil, "The Soviet View of the Nordic Balance," *The Washington Quarterly*, Vol. 2, No. 3, Summer 1979, pp. 63-74.
- , "The View from Oslo," *NATO's Sixteen Nations*, Vol. 31, No. 4, July 1986, p. 31.
- Heginbotham, Stanley J, "The Forward Maritime Strategy and Nordic Europe," *Naval War College Review*, Vol. 38, No. 6, November-December 1985, pp. 19-27.
- Hines, John G., and Phillip A. Petersen, "Changing the Soviet System of Control," *International Defense Review*, Vol. 19, March 1986a, pp. 281-289.
- , "Thinking Soviet in Defending Europe," *Defence*, Vol. 16, October 1986b, pp. 511-520.
- Hoffman, Lt. Col. G. R., Jr. (USMC), *Reinforcing North Norway: The Marine Amphibious Brigade's Contribution*, Naval War College, Newport, Rhode Island, June 22, 1984.
- Holcomb, James, and Graham Turbville, "Soviet desant forces: Part 1: Soviet airborne and air-assault capabilities," *International Defense Review*, Vol. 21, No. 8, October 1988, pp. 1077-1082.
- , "Soviet desant forces: Part 2: Broadening the desant concept," *International Defense Review*, Vol. 21, No. 9, November 1988, pp. 1259-1264.
- Holst, Johan Jørgen, *The Military Build-up in the High North. Potential Implications for Regional Stability: A Norwegian Perspective*, Norsk Utenrikspolitisk Institutt, No. 318B, April 1985.
- , *Norway and NATO in the 1980's*, a lecture to the American-Scandinavian Foundation, New York, May 23, 1984, Norsk Utenrikspolitisk Institutt, No. 301B, May 1984a.
- , "Norway's Search for a Nordpolitik," *Foreign Affairs*, Vol. 60, No. 1, Fall 1981, pp. 63-86.
- , *Norwegian Security Policy for the 1980's*, Norsk Utenrikspolitisk Institutt, No. 76, December 1982.
- , "A Nuclear Weapon-Free Zone in the Nordic Area: Conditions and Options—A Norwegian View," *Bulletin of Peace Proposals*, Vol. 14, No. 3, 1983, pp. 227-238.
- , "The Pattern of Nordic Security," *Daedalus*, Spring 1984b, pp. 195-226.
- , *The Security Pattern in Northern Europe: A Norwegian View*, Norsk Utenrikspolitisk Institutt, No. 356, June 1986.
- , "Surprise, Signals and Reaction: The Attack on Norway April 9, 1940—Some Observations," *Cooperation and Conflict*, Vol. 2, No. 1, 1966, pp. 31-45.

- Holst, Johan Jørgen, Kenneth Hunt, and Anders Sjaastad, (eds.), *Deterrence and Defense in the North*, Norwegian University Press, Oslo, 1985.
- Hooton, Edward, "Country Portrait: Norway," *NATO's Sixteen Nations*, December 1984, pp. 53-66.
- , "Penguin: the chick that joined the eagles," *Military Technology*, Vol. 9, No. 10, October 1985, pp. 140-145.
- Howard, Peter, "The Norwegian Home Guard," *Jane's Defence Weekly*, Vol. 6, No. 24, December 20, 1986, p. 1427.
- Huber, Reiner K., Lynn F. Jones, and Egil Reine, (eds.), *Military Strategy and Tactics: Computer Modeling of Land War Problems*, Plenum Press, New York, 1974.
- Hughes, Wayne P. (ed.), *Military Modeling*, The Military Operations Research Society, Alexandria, Virginia, 1984.
- Huitfeldt, Tønne, "Canada may ditch CAST Commitment to Norway," *Jane's Defence Weekly*, Vol. 6, No. 24, December 20, 1986a, pp. 1460-1461.
- , "Defence of Scandinavia," *NATO's Sixteen Nations*, Vol. 31, No. 6, October 1986b, pp. 26-32.
- , "NATO's Northern Security," *Conflict Studies*, No. 191, 1986c.
- , "Soviet Tu-16 Badgers in Norwegian Sea Exercises," *Jane's Defence Weekly*, Vol. 7, No. 25, June 27, 1987, p. 1345.
- Huldt, Bo, "The Strategic North," *The Washington Quarterly*, Vol. 8, No. 3, Summer 1985, pp. 97-110.
- Isby, David C., "Soviet airmobile and air assault brigades," *Jane's Defence Weekly*, Vol. 4, No. 11, September 14, 1985, pp. 561-563.
- Ingraham, Lt. Col. Charles H., Jr. (USMC), "Protecting the Northern Flank," *Proceedings of the U.S. Naval Institute*, Vol. 110, No. 11, November 1984, pp. 70-77.
- International Institute for Strategic Studies [IISS], *The Military Balance: 1988-1989*, London, Autumn 1988.
- Jacobsen, C. G., "Soviet Strategy—the Naval Dimension," *International Defense Review*, Vol. 19, No. 10, October 1986, pp. 1431-1436.
- Jenkins, Chris, Olav Trygge Storvik, and Will Fowler, "Norway—facing the Soviet threat," *Defence*, Vol. 18, No. 7, July 1987, pp. 425-432.
- Johnsen, Col. Lester J., "Linchpins of the North," *Air Force Magazine*, September 1982, pp. 168-173.
- Jordon, John, "Soviet Surface Fleet," *Defence*, Vol. 16, No. 7, July 1986, pp. 331-334.
- Kamps, Charles T. Jr., "Nordkapp: World War III in the Arctic Circle," *Strategy & Tactics*, No. 94, Fall 1983, pp. 16-24.

- Klenberg, Jan, *The Cap and the Straits: Problems of Nordic Security*, The Center for International Affairs, Harvard University, Occasional Papers in International Affairs No. 18, February 1968.
- Liebman, Marc, "Flanker Aircraft Threatens Norwegian Sea," *Armed Forces Journal International*, October 1987, p. 52.
- Lindberg, Steve, "The Illusory Nordic Balance: Threat Scenarios in Nordic Security Planning," *Cooperation and Conflict*, Vol. 16, No. 1, March 1981, pp. 57-70.
- Linnehan, Lt. Cmdr. John J. (USN), *Norwegian Security Determinants: Deterrence and Reassurance*, Naval Post-Graduate School, Monterey, California, March 1984.
- Lofgren, Stig, "Soviet Submarines against Sweden," *Strategic Review*, Vol. 12, No. 1, Winter 1984, pp. 36-42.
- MacCaskill, D.C., "Norway's Strategic Importance," *Marine Corps Gazette*, Vol. 65, February 1981, pp. 28-33.
- McClough, Major M. F. (USMC), "Cold Winter '85: 'Good to Go' Arctic Warriors," *Marine Corps Gazette*, Vol. 69, No. 9, September 1985, pp. 65-70.
- McCoy, Tidal W., "Task One: Airbase Operability," *Armed Forces Journal International*, September 1987, pp. 52-57.
- McQuail, Robert P., "Khrushchev's Right Flank," *Military Review*, Vol. 44, No. 1, January 1964, pp. 7-23.
- Manners, Geoffrey, "MAGTs—NATO's misunderstood asset," *Jane's Defence Weekly*, Vol. 7, No. 17, May 2, 1987, pp. 825-826.
- Marcus, Jonathan, "Britain and NATO's Northern Flank," *Armed Forces Journal International*, October 1987, pp. 66-75.
- Mason, Air Vice Marshall R. A., *Air Power: An Overview of Roles*, Vol. 1 of *Air Power: Aircraft, Weapon Systems and Technology Series*, "Brassey's Defence Publishers, London, 1987.
- Mearsheimer, John J., "A Strategic Misstep: The Maritime Strategy and Deterrence in Europe," *International Security*, Vol. 11, No. 2, Fall 1986, pp. 3-57.
- Mundy, BGen. Carl E. (USMC), "Training in Arctic Warfare," *Marine Corps Gazette*, Vol. 69, No. 9, September 1985, pp. 71-72.
- Mustin, Vice Admiral H.C. (USN;CINC-STRIKELANT), "The Role of the Navy and Marines in the Norwegian Sea," *Naval War College Review*, Vol. 39, No. 2, March-April 1986, pp. 2-6.
- Neu, Carl Richard, *Attacking Hardened Air Bases (AHAB): A Decision Analysis Aid for the Tactical Commander*, The RAND Corporation, R-1422-PR, August 1974.
- Nevakivi, Jukka, "Scandinavian Talks on Military Cooperation in 1946-1947: A Prelude to the Decisions of 1948-1949," *Cooperation and Conflict*, Vol. 19, No. 3, September 1984, pp. 165-175.

- Norren, Erik, "The Nordic Balance: A Security Policy Concept in Theory and Practice," *Cooperation and Conflict*, Vol. 18, No. 1, March 1983, pp. 43-56.
- Norway, Royal Ministry of Defense, Press Information Department, Abstract of *Main Guidelines for the Defense Establishment During the Period 1984-1988*, 1983; unofficial translation based on: St. meld. nr 74 (1982-83), Hovedretningslinjer for Forsvarets virksomhet i tiden (1984-1988).
- Norwegian Atlantic Committee, *The Military Balance in Northern Europe*, Oslo, 1986.
- Nyberg, Rene, "Security Dilemmas in Scandinavia: Evaporated Nuclear Options and Indigenous Conventional Capabilities," *Cooperation and Conflict*, Vol. 19, No. 1, March 1984, pp. 59-82.
- O'Donnell, Major Hugh K., Jr. (USMC), "Northern Flank Maritime Offensive," *Proceedings of the U.S. Naval Institute*, September 1985, pp. 42-57.
- O'Dwyer-Russell, Simon, "UK's Amphibious Dilemma," *Jane's Defence Weekly*, Vol. 5, No. 14, April 12, 1986, pp. 660-662.
- O'Rourke, Major Robert J. (USMCR), "Marine Air Operations in Northern Europe," *Proceedings of the U.S. Naval Institute*, Vol. 106, No. 11, November 1980, pp. 53-59.
- Pemberton Captain John C., (USAF), *A Generalized Model for the Targeting of Conventional Weapons to Destroy a Runway*, Master's thesis in Operations Research, Air Force Institute of Technology, Wright Patterson Air Force Base, School of Engineering, AFIT/GOR/OS/80D-6, December 1980.
- Petersen, Charles C., "Soviet Military Objectives in the Arctic Theater," *Naval War College Review*, Vol. 40, No. 4, October 1987, pp. 3-22.
- Plaice, Ellis, "Shortened NATO Exercises in Norway Long on Lessons for US, UK Marines," *Armed Forces Journal International*, April 1986, p. 24.
- Posen, Barry S., "Inadvertent Nuclear War? Escalation and NATO's Northern Flank," *International Security*, Vol. 7, Fall 1982, pp. 28-54.
- Preston, Anthony, "Norway's light strike forces," *Jane's Defence Weekly*, Vol. 6, No. 20, November 22, 1986, pp. 1238-1239.
- Ries, Tomas, "Defending the Far North," *International Defense Review*, Vol. 17, No. 7, 1984, pp. 870-880.
- Robertson, Myles, "Britain's Contribution to Norwegian Defence 1940-1980," *Center Piece*, No. 11, Center for Defence Studies, University of Aberdeen, Summer 1987a.

- , "Reinforcing North Norway: The United Kingdom's Role," *Center Piece*, No. 12, Center for Defence Studies, University of Aberdeen, Summer 1987b.
- Russell, Major Robert E., "How Secure is NATO's Northern Cap?" *Air University Review*, September-October 1984, pp. 8-68.
- Rustin, Richard, "Norway 1940: The German Invasion of Scandinavia," *Strategy & Tactics*, No. 94, Fall 1983, pp. 41-46.
- Sadykiewicz, Michael, *The Soviet-Warsaw Pact Western Theater of Military Operations: Organization and Missions*, The RAND Corporation, N-2596-A7 August 1987.
- Sevaistre, Olivier, "La Scandinavie—Geostrategie de l'Europe du Nord," *Defense Nationale*, March 1986, pp. 47-54.
- Soderlind, Rolf, "Canada Cancels Commitment to NATO's Northern Flank," *Armed Forces Journal International*, August 1987, pp. 36-37.
- Sohlberg, Ranghild, *Analysis of Ground Force Structures of NATO's Northern Flank*, The RAND Corporation, N-1315-MRAL, February 1980.
- , *Manpower Procurement Policies, Ground Force Structures, and Registration Systems: Denmark, The Federal Republic of Germany, Norway, and the United Kingdom*, Naval Postgraduate School, NPS-64-81-001, Monterey, California, February 1981.
- , *Quantitative Methods in Long-Term Defence Planning: Towards Structural Planning*, The Norwegian Institute of Technology, Report R-31, Trondheim, 1982.
- Sokolsky, Joel J., "Soviet Naval Aviation and the Northern Flank," *Naval War College Review*, Vol. 34, No. 1, January-February 1981, pp. 34-45.
- Sorensen, Maj. Gen. M. T. (RNoAF), "Maritime Operations in the North," *NATO's Sixteen Nations*, Vol. 29, No. 4, Special 4/1984.
- , "Norway," *NATO's Fifteen Nations*, Special 1/1982, p. 36.
- Stark, James, "Norway," in William J. Taylor, and Paul M. Cole, (eds.) *Nordic Defense: Comparative Decision Making*, Lexington, Massachusetts; D. C. Heath & Co., 1985, pp. 91-125.
- Stephan, Harry J., "USMC to Bolster Norwegian Flank; 4th MAB Ready to Deploy in Crisis," *Armed Forces Journal International*, August 1987, pp. 34-36.
- Stockfish, J. A., *Models, Data, and War: A Critique of the Study of Conventional Forces*, The RAND Corporation, R-1526-PR, March 1975.
- Terry, Lt. Col. James G. (USAF), *A-10 Operations and the Battle for North Norway*, The RAND Corporation, R-3439-AF, January 1988a.

- , *Factors Affecting the Military Environment in North Norway: Its History, International Relations, Physical Characteristics, and the Balance of Military Forces*, The RAND Corporation, N-2497-AF, January 1988b.
- United States Air Force, HQ Tactical Air Command, DCS/Plans, Directorate of Mission Planning Concepts Division, *European Northern Region Annex to the Operational Concept for the F-16 Tactical Fighter Aircraft*, "prepared by the USAFE, Norway, and Denmark Members of the F-16 Subcommittee of the Multi-national Fighter Program Steering Committee," Langley Air Force Base, March 24, 1979.
- United States Marine Corps, *Marine Air-Ground Task Forces (MAGTFs)*, Department of the Navy, NAVMC 2710, Washington, D.C., May 28, 1985.
- Vego, Milan, "The Soviet Envelopment Option on the Northern Flank," *Naval War College Review*, Vol. 39, No. 4, Autumn 1986, pp. 26-35.
- Wahlbaack, Krister, *The Roots of Swedish Neutrality*, The Swedish Institute, Stockholm, 1986.
- Walker, Air Vice Marshal J. R., *Air-to-Ground Operations*, Vol. 2 of *Air Power: Aircraft, Weapon Systems and Technology Series*, Brassey's Defence Publishers, London, 1987.
- Wall, Patrick, "NATO's Vulnerable Northern Flank," *The Atlantic Community*, Spring 1986, pp. 57-62.
- Wallin, Lars B. (ed.), *The Northern Flank in a Central European War*, Proceedings of a Symposium, November 4-5, 1980, The Swedish National Defence Research Institute, Stockholm, 1982.
- Warner, Edward L., Josephine J. Bonan, and Erma F. Packman, *Key Personnel and Organizations of the Soviet Military High Command*, The RAND Corporation, N-2567-AF, April 1987.
- Weinland, Robert G., *The Soviet Naval Buildup in the High North—A Reassessment*, Conference on Nordic Security, Center for International Affairs, Harvard University, April 19-20, 1985.
- Wikner, Dr. N. F., "Interdicting Fixed Targets with Conventional Weapons," *Armed Forces Journal International*, March 1983, pp. 77-88.
- Zeiner-Gundersen, H. F., et al., *NATO's Maritime Flanks: Problems and Prospects*, Special Report, Pergamon-Brassey's International Defense Publishers, Washington, D.C., 1987.