

NPS-DA-15-001



NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

STRATEGIC DESIGN FOR NORSOFT 2025

by

Espen Berg-Knutsen, Editor
Nancy Roberts, Editor

July 2015

Approved for public release; distribution unlimited

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE			<i>Form Approved</i> OMB No. 0704-0188		
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.					
1. REPORT DATE 30-07-2015		2. REPORT TYPE Technical Report		3. DATES COVERED (From-To) September 2014 – June 2015	
4. TITLE AND SUBTITLE STRATEGIC DESIGN FOR NORSOF 2025				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Espen Berg-Knutsen, Editor Nancy Roberts, Editor				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000				8. PERFORMING ORGANIZATION REPORT NUMBER NPS-DA-15-001	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) Norwegian Special Operations Command (NORSOCOM) Oslo, Norway				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.					
14. ABSTRACT In September 2014, a team of Naval Postgraduate School (NPS) Officer Students from Canada, Netherlands, Norway, Sweden, Switzerland and the USA, under the direction of Defense Analysis Department faculty, set out to answer this question: "How might we design a Special Operations Force (SOF) to best serve Norway's security interests in 2025?" The team explored the future of Norwegian Special Operations Forces (NORSOF) through the lens of Design Thinking. As a starting point of Design process, the team began the Discovery Phase with an environmental analysis and in-depth discussions with more than 25 international subject matter experts. This Capstone Report describes the team's findings and prototypes as well as its nine month Design Thinking process. The prototypes were presented in May 2015 to the sponsor, the Norwegian Special Operations Command, as input to its long-term development plan. In brief, the team expects future warfare to move beyond the military domain into the civil domain, challenging traditional organizations and doctrines. To meet future challenges, the team recommends that NORSOF be: transformed to be a truly strategic instrument; configured to be a flexible, adaptable, highly maneuverable, well-connected network with a flat organization structure; re-organized to support interservice, interdepartmental and international cooperation; redesigned to integrate R&D and organizational innovation; reoriented to emphasize Military Assistance and Unconventional Warfare; and renewed to take a life-long perspective on career development with multiple career tracks activated to recruit, select, train, educate and retain the right personnel.					
15. SUBJECT TERMS NORSOF, Arctic, Special Operations, Special Operation Forces, SOF, NATO, EU, NSHQ, SOCOM, Norway, Norwegian Joint Headquarters, Russia, DA, SR, MA, HRO,(M)CT, Hybrid Warfare					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON Dr. Nancy Roberts
a. REPORT	b. ABSTRACT	c. THIS PAGE			
Unclassified	Unclassified	Unclassified	UU	105	

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39.18

THIS PAGE INTENTIONALLY LEFT BLANK

**NAVAL POSTGRADUATE SCHOOL
Monterey, California 93943-5000**

Ronald A. Route
President

James Newman
Interim Provost

The report entitled “*Strategic Design for NORSOF 2025*” was prepared for Norwegian Special Operations Command (NORSOCOM) and funded by NORSOCOM.

Further distribution of all or part of this report is authorized.

This report was prepared by:

Espen Berg-Knutsen, Editor

Dr. Nancy Roberts, Editor

Reviewed by:

Released by:

John Arquilla, Chairman
Defense Analysis

Jeffrey D. Paduan
Dean of Research

THIS PAGE INTENTIONALLY LEFT BLANK

ACKNOWLEDGMENTS

The editors wish to acknowledge the following students who participated in the NORSOF 2025 Strategic Design Project and authored this Technical Report: Morten N. Christiansen, Torbjorn Grimeland, Andreas Hedenstrom, Tom-Erik Kihl, Michael Hector Laplante, Matthew McGraw, Thomas Michael DalPian, Patrick van Rooij, Oscar van der Veen, and Anders Westberg.

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

In September 2014, a team of Naval Postgraduate School (NPS) Officer Students from Canada, Netherlands, Norway, Sweden, Switzerland and the USA, under the direction of Defense Analysis Department faculty, set out to answer this question: “How might we design a Special Operations Force (SOF) to best serve Norway’s security interests in 2025?”

The team explored the future of Norwegian Special Operations Forces (NORSOF) through the lens of Design Thinking. As a starting point of Design process, the team began the Discovery Phase with an environmental analysis and in-depth discussions with more than 25 international subject matter experts. This Technical Report describes the team’s findings and prototypes as well as its nine month Design Thinking process. The prototypes were presented in May 2015 to the sponsor, the Norwegian Special Operations Command, as input to its long-term development plan.

In brief, the team expects future warfare to move beyond the military domain into the civil domain, challenging traditional organizations and doctrines. To meet future challenges, the team recommends that NORSOF be: transformed to be a truly strategic instrument; configured to be a flexible, adaptable, highly maneuverable, well-connected network with a flat organization structure; re-organized to support interservice, interdepartmental and international cooperation; redesigned to integrate R&D and organizational innovation; reoriented to emphasize Military Assistance and Unconventional Warfare; and renewed to take a life-long perspective on career development with multiple career tracks activated to recruit, select, train, educate and retain the right personnel.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

I.	INTRODUCTION.....	1
A.	BACKGROUND	1
B.	THE NORSOFF 2025 STUDY.....	3
C.	SPONSOR GUIDELINES AND DESIGN CHALLENGE	5
D.	METHOD AND PROCESS	6
1.	Design Thinking	6
2.	Strategic Design/Redesign of Organizations	8
3.	Design Thinking combined with Systems Framework	9
4.	Unique Features of NORSOFF 2025 Study Process	10
E.	REPORT STRUCTURE AND LIMITATIONS	12
II.	THE FUTURE ENVIRONMENT.....	14
A.	SOURCES.....	14
B.	RELATIVE CERTAINTIES.....	15
C.	CRITICAL GAME-CHANGERS	16
D.	GEO-POLITICS 2025 AND NORWAY.....	18
E.	RUSSIA AND NORWEGIAN DEFENSE PLANNING	19
III.	DIRECTION SETTING.....	21
A.	IDENTITY STATEMENT.....	21
B.	GUIDING PRINCIPLES	233
1.	Flexibility	23
2.	Integration	24
3.	Innovation.....	24
IV.	NORSOFF TASKS.....	26
A.	CURRENT NORSOFF TASKS	26
B.	TRADE-OFFS / DILEMMAS	29
C.	TRENDS IN FUTURE TASKS AND JOBS.....	30
D.	FUTURE TASKS	31
V.	INNOVATIVE WARFARE.....	34
A.	TECHNOLOGICAL INNOVATION.....	34
1.	Information Technology	35
2.	Unmanned Systems.....	36
3.	Non-Lethal Technology	36
B.	DOCTRINAL INNOVATION.....	37
C.	ORGANIZING TO FIGHT	39
1.	Social Network Innovation.....	39
2.	Research & Development and Innovation.....	40
3.	Flatter NORSOFF Organization	411
D.	INTEGRATION OF TECHNOLOGY, DOCTRINE AND ORGANIZING TO FIGHT	41
VI.	PEOPLE.....	43

A.	THE FUTURE NORSOFF OPERATOR	43
B.	CURRENT COMPETENCIES WITHIN NORSOFF	44
C.	FUTURE COMPETENCIES FOR NORSOFF 2025.....	45
D.	ACHIEVING HIGHER-LEVEL COMPETENCIES	46
E.	RE-SHAPING THE COMPETENCIES PYRAMID	47
F.	NORSOFF FUTURE SELECTION	49
G.	SUMMARY RECOMMENDATIONS	50
VII.	SUB-SYSTEM: HUMAN RESOURCE MANAGEMENT (HRM)	51
A.	CAREER TRACKS AND THEIR PROGRESSION	51
B.	THE WARRIOR-DIPLOMAT.....	52
C.	CAREER TRACK EXAMPLES	53
D.	HIGHER EDUCATION ALTERNATIVES FOR NORSOFF	54
E.	COMMUNITIES OF PRACTICE NETWORKS	55
F.	RECOMMENDATIONS.....	58
VIII.	ORGANIZATIONAL STRUCTURE	59
A.	CURRENT NORSOFF ORGANIZATIONAL STRUCTURE.....	59
B.	RECOMMENDED CHANGES IN NORSOFF STRUCTURE.....	60
1.	NORSOCOM.....	60
2.	Research and Development.....	61
3.	SOF Reserve Unit.....	62
4.	Special Operations Air Group	63
5.	Training Detachment.....	63
C.	TACTICAL UNIT OPTIONS	64
D.	SUMMARY RECOMMENDATIONS	67
IX.	KEY THEMES.....	69
A.	FUTURE WARFARE AND ITS CHALLENGES.....	69
B.	NORSOFF AS A STRATEGIC INSTRUMENT	71
C.	MILITARY ASSISTANCE AND UNCONVENTIONAL WARFARE	72
D.	FUTURE TECHNOLOGY OF WARFARE.....	73
E.	INNOVATION AND RESEARCH & DEVELOPMENT.....	744
X.	CONCLUSION	75
A.	UNIQUENESS OF RESULTS.....	75
B.	UNIQUENESS OF DESIGN THINKING APPROACH	76
C.	LESSONS LEARNED AND RECOMMENDATIONS FOR NEXT STUDY.....	76
	APPENDIX A: HYBRID WARFARE	78
	APPENDIX B: ANTI-ACCESS / AREA DENIAL.....	82
	LIST OF REFERENCES	844
	INITIAL DISTRIBUTION LIST	888

LIST OF FIGURES

Figure 1.	FFI’s Scenario Based Analysis.	2
Figure 2.	The Challenge.	4
Figure 3.	Sponsor Guidelines.	5
Figure 4.	Design Thinking Process.	7
Figure 5.	Organizational Systems Framework (Nancy Roberts).	9
Figure 6.	Design Process combined with Organizational Systems Model.....	10
Figure 7.	Relative Certainties–Global Trends.	15
Figure 8.	Critical Game Changers.	17
Figure 9.	Geo-politics 2025 and Norway.	18
Figure 10.	Russia and Norwegian Defense Planning.	19
Figure 11.	NORSOF 2025 Identity Statement.	21
Figure 12.	NORSOF 2025 Guiding Principles.	23
Figure 13.	SOF Brackets GPF (Simons 2012).	27
Figure 14.	SOF Bridges the Interagency (Simons 2012).	27
Figure 15.	Current NORSOF Tasks and Jobs.	28
Figure 16.	Trade-offs / Dilemmas for NORSOF.....	29
Figure 17.	Future trends (author’s predictions).....	30
Figure 18.	Recommended future tasks and missions.	32
Figure 19.	Technological Innovations.....	35
Figure 20.	Doctrinal Innovation.	38
Figure 21.	The Networked World.	40
Figure 22.	Organizing for Warfare.....	41
Figure 23.	Big Bet Strategy.....	42
Figure 24.	Image of future NORSOF Operator.....	43
Figure 25.	Current Competency Pyramid.....	44
Figure 26.	Future Competency Pyramid.	46
Figure 27.	Shift to a SOF Life-Time Perspective.....	47
Figure 28.	Reshaping the Competency Pyramid.	48
Figure 29.	Whole of Society Selection Process.	49
Figure 30.	Multiple Career Tracks.	51
Figure 31.	The Warrior-Diplomat.	53
Figure 32.	NORSOF Career Management Sub-System.....	54
Figure 33.	Alternatives in Higher Education.....	55
Figure 34.	Example of a CoP Network.	56
Figure 35.	Competency Networks Linked with R & D.....	57
Figure 36.	Current Norwegian Defense Organization and NORSOF Bases.....	59
Figure 37.	NORSOF Reserve Unit and its Direct Ties.	62
Figure 38.	Organizational Structure, Recommendations in Dark Grey.	64
Figure 39.	NORSOF Tactical Unit Structures (Dark Grey).....	65
Figure 40.	Modularized and Networked Option.	66
Figure 41.	Task Organizing Structure Recommendations.	67
Figure 42.	Future Warfare.	69

Figure 43.	NORSOF as a Strategic Instrument.	71
Figure 44.	Military Assistance and Unconventional Warfare.	72
Figure 45.	Future Technology of Warfare.	73
Figure 46.	Innovation and R & D.	74

LIST OF ACRONYMS AND ABBREVIATIONS

AI	Artificial Intelligence
AoI	Area of Interest
C2	Command and Control
CBRN	Chemical Biological Radiological and Nuclear Weapons
CHOD	Chief of Defense
COIN	Counterinsurgency
COA	Course of Action
CT	Counter Terrorism
DA	Direct Action
DIME	Diplomatic, Informational, Military, and Economical
DOTMLPFI	Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities, and interoperability
EEZ	Exclusive Economic Zone
FID	Foreign Internal Defense
FW	Fixed Wing
GOPLAT	Gas and Oil Platform
GPF	General Purpose Force
GSN	Global SOF Network
HRM	Human Resources Management
HRO	hostage rescue operation
HUMINT	Human Intelligence
HQ	Headquarters
ISTAR	Intelligence, Surveillance, Target Acquisition, and Reconnaissance
JIIM	Joint, Interagency, International, and Multinational
LNO	Liaison Officer
MA	Military Assistance
MCT	Maritime Counter Terrorism
NATO	North Atlantic Treaty Organization
NORSOCOM	Norwegian Special Operations Command
NORSOF	Norwegian Special Operations Forces

NSHQ	NATO Special Operations Headquarters
NTM	Notice To Move
R & D	Research and Development
RW	Rotary Wing
SOAG	Special Operations Air Group
SOCC	Special Operations Component Command
SOF	Special Operations Forces
SOLO	Special Operations Liaison Officer
SOTE	Special Operations Task Element
SOTG	Special Operations Task Group
SOTI	Special Operations Task Individual
SOTU	Special Operations Task Unit
SME	Subject Matter Expert
SR	Special Reconnaissance
UW	Unconventional Warfare
WMD	Weapons of Mass Destruction

ACKNOWLEDGMENTS

We would like to acknowledge a vast body of civilian and military professionals who helped us on our quest to generate creative ideas and innovative solutions:

- The 25+ international subject matter experts who willingly shared experiences and provided advice through discussions with the authors.
- Participants at the international NORSOE 2025 seminar at NPS 11th -14th May 2015 who provided valuable feedback to our preliminary findings and thereby helped us improve the quality of this final report.
- Norwegian Special Operations Command (NORSOCOM) and especially the Commander, Rear Admiral Nils J. Holte, who as sponsor for the study provided key guidelines and support throughout our process.
- NPS, and especially Dr. John Arquilla, Professor and Chair at the Defense Analysis Department, for his firm support, assistance and feedback to this study throughout the nine month course. And Col (ret.) Jeffrey Appleget, Senior Lecturer/Army Liaison at the Operational Research Department, and his students who organized a wargame on the challenges facing SOF in a Hybrid War scenario.
- Norwegian Defence Research Establishment (FFI) for funding a Visiting Research Scientist position at NPS to study the future of SOF, which eventually led to the NORSOE 2025 study.

This study thanks all for your generous support.

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

In September 2014, a team of Naval Postgraduate School (NPS) Officer Students from Canada, Netherlands, Norway, Sweden, Switzerland and the USA, under the direction of Defense Analysis Department faculty, set out to answer this question: “How might we design a Special Operations Force (SOF) to best serve Norway’s security interests in 2025?”

Sponsored by the Commander of Norwegian Special Operations Command (NORSOCOM), the team examined the future of Norwegian Special Operations Forces (NORSOF) through the lens of Design Thinking methodology. Environmental analysis and in-depth discussions with more than 25 international subject-matter experts was the starting point for a creative process that produced innovative prototypes for a future NORSOF. The prototypes were presented in May 2015 to NORSOCOM as input to the new, long-term development plan for the Norwegian Armed Forces. This Technical Report describes the group’s findings and prototypes as well as its nine month process.

A. BACKGROUND

In the aftermath of 9/11, Norwegian Special Operations Forces started a journey of radical build-up similar to many other nations’ SOF. After doubling its size in less than 10 years, NORSOF is no longer a marginal activity within the Norwegian Armed Forces. Its earlier strategy of expansion and procurements “under the radar” shifted in 2014 with the establishment of a joint NORSOCOM, an organization with more visible official requirements, guidelines and budgets. Anticipating this shift, NORSOF teamed up with the Norwegian Defence Research Establishment (FFI) in 2012 to strengthen its capacity for strategic research, analysis, and development. FFI subsequently established the “Future SOF” research program to combine and integrate the efforts of FFI scientists and NORSOF officers.

Since the seventies FFI has provided strategic analyses to Norwegian Defense and has refined its method of scenario-based analysis for long-term defense planning. A key element is the use of scenarios to describe future missions and tasks (Glaerum &

Hennum, 2010). The required capabilities to execute these missions and tasks are derived through wargaming with subject matter experts (SME's) where alternative courses of action (CoA's) are discussed and analyzed (Figure 1).

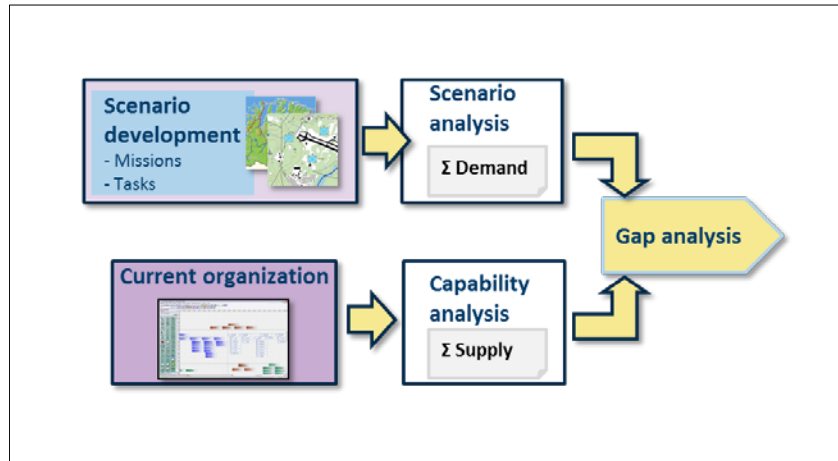


Figure 1. FFI's Scenario Based Analysis.

The required capability and capacity (demand) is then compared to the current organization's capability and capacity (supply) in a gap analysis. The gap may be bridged through either additional funding or adjustments to the organization. If neither of these options is viable, ambitions with respect to missions and tasks need to be reduced in order to balance the system.

In accordance with this methodology, FFI developed 14 scenarios for NORSO, each broken down into a wide range of missions and tasks. Each scenario was wargamed and analyzed in terms of its required capabilities and capacities with assistance from SMEs. This analytical, linear approach to planning ensured traceability and offered clearly identifiable results. However, something important was missing. The analysis captured the *current* threats, missions, tasks, CoA's and capability requirements well, but it was limited in its ability to identify new ideas and game changers to anticipate the *future* threat environment.

A large number of great companies have failed due to their inability to move beyond current successes (Christensen 2000). Left to themselves, they repeat what has made them successful in the past rather than develop new strategies for the future.

Determined not to repeat this mistake, FFI initiated several activities to ensure that good ideas “out there”—technological, doctrinal or organizational—were captured.

One of the places “out there” was the Naval Postgraduate School’s Defense Analysis Department (NPS DA), widely recognized as the world’s premier institution for Special Operations graduate thinking and education. Situated half-way across the globe from Norway, NPS offered independent advice with the benefit of distance. FFI proposed the idea of sending a Visiting Research Scientist from FFI and NPS DA immediately supported and accepted it. By August 2014, FFI established a permanent Norwegian Faculty presence and shortly thereafter, the NORSOE 2025 Study was born.

B. THE NORSOE 2025 STUDY

Professor Nancy Roberts from NPS DA and Visiting Research Scientist Espen Berg-Knutson from FFI launched NORSOE 2025 in September 2014. They organized and supervised ten NPS DA student officers from Canada, Norway, the Netherlands, Switzerland, Sweden and the USA into a three-quarter study team. As military professionals, the students brought to the table a unique and broad background of extensive field experience and knowledge of SOF military affairs. The ten-person team met 2-4 hours weekly for discussions in addition to working on individual assignments and **sub**-group activities. In total, the study accounted for approximately 25 % of the students’ total workload at NPS during these three quarters.

The intent of NORSOE 2025 was to parallel FFI’s strategic planning study for NORSOE. But instead of employing FFI’s more traditional approach to planning using scenario-based analysis, the NPS DA team selected an alternative approach comprised of the following key elements:

- Design Thinking as its methodology to generate creative ideas and prototypes
- Longer-term focus (2025)
- Greater latitude, fewer constraints in problem solving

Its purpose was to challenge traditional thinking, generate new ideas, and formulate a set of innovative recommendations for NORSOFF's consideration. In order to achieve these goals, the NORSOFF 2025 project directors deliberately limited the cooperation and spill-over between the two studies, although the NORSOFF 2025 team did conduct extensive discussions with both Norwegian and International SMEs as well as NPS faculty and students.

NORSOFF is currently a highly regarded elite special operations force. Some may question the wisdom of changing such a well-functioning system. But as we visualize the challenges facing SOF, time and warfare adaptations are important factors in our analysis (see Figure 2). For example, if we view military operations as three different types – special, conventional and outmoded, then what may be deemed “special” at one point in time, can become conventional at another point in time. Ultimately, some operations can become outmoded as exemplified in World War I trench warfare (Gudmundsson 1989). Our point is that Special Operations Forces do not have the franchise for special operations. If unable to fulfill its role as the cutting-edge innovator of the military forces charged with developing new operations, doctrine, tactics, techniques, and procedures, SOF risks stagnation and challenges from general purpose forces that also are adapting to the environmental exigencies. To retain its edge, SOF constantly must explore the future of warfare and ask how it can provide a value-added contribution unique from other more conventional capabilities.

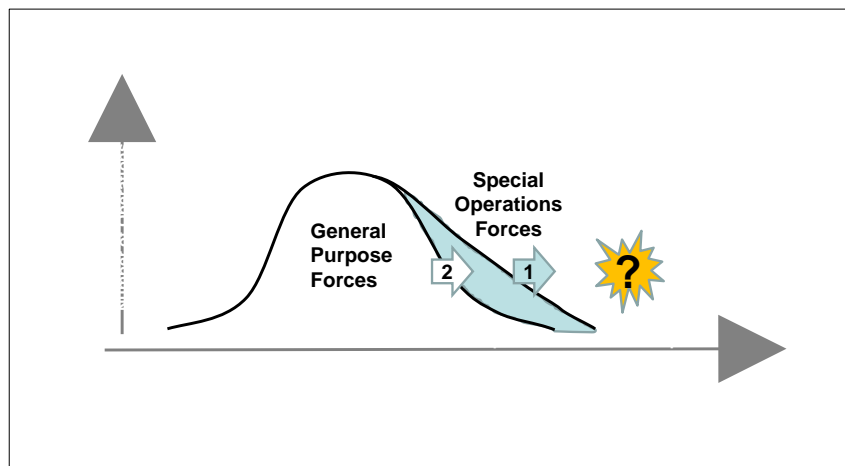


Figure 2. The Challenge.

Hence, some fundamental and important questions launched this study: What is the future of Special Operations? What can SOF expect in 2025? And how should SOF be designed to tackle these potential challenges? The question with which we opened this chapter best captures the design challenge the students were tasked to address: “How might we design a Special Operations force to best serve Norway’s security interests in 2025?”

C. SPONSOR GUIDELINES AND DESIGN CHALLENGE

Good sponsorship is a key success factor in establishing a design challenge. We were fortunate and grateful to have the Commander of NORSOCOM, Rear Admiral Nils J. Holte, the very top of the organization, to be personally involved in our process. NORSOCOM presented four guidelines for the study:

Design the optimal future NORSOF irrespective of historical structures and restrictions

Mission priorities:

1. Homeland Defense
2. Alliance Commitments
3. Homeland Security (military support)

Keep within realistic budgets

Be innovative

*RADM Nils J. Holte
Commander NORSOCOM*

Figure 3. Sponsor Guidelines.

The first guideline was to design the optimal future NORSOF irrespective of historical structures and restrictions. We were at liberty to start from scratch and create a completely new NORSOF. The second guideline gave three future mission priorities. In order of importance, these are: homeland defense, alliance commitments, and military support to homeland security. These priorities were maybe less of a surprise, since Norway is a small country bordering Russia, but nevertheless very important inputs to our process. The third guideline was to keep within reasonable budgets. We chose to

interpret this as an option to consider a modest increase of NORSOFF's structure by 2025. Be innovative was the Commander's final guideline. This point was identical to FFI's main purpose for setting up the NORSOFF 2025 study.

The guidelines offered greater latitude and fewer constraints than in FFI's scenario-based analysis conducted in Norway and provided the ideal starting point for a creative process that we hoped would open up innovative solutions for NORSOFF's future.

D. METHOD AND PROCESS

This section describes the methods used in the study and the process we employed to generate our recommendations.

1. Design Thinking

Design Thinking is a process that generates new ideas for the purpose of developing innovative products, processes, services, and even strategic designs. Developed at Stanford's Hasso Plattner Institute of Design (d.school), founded in 2005 by David Kelley, a Stanford professor of Mechanical Engineering, Design Thinking is the method that informs this study. We find it appropriate for our work because it combines creative and analytical approaches, requires cross-disciplinary collaboration, draws on "methods of engineering and design, and [integrates] them with ideas from the arts, tools from the social sciences, and insights from the business world" (Stanford Graduate School of Business 2015).

Design Thinking begins with a design challenge—usually in the form of a problem, issue, or question facing a company or an organization. Initial discussions with our sponsor enabled us to frame our design challenge as a question: How might we design a special operations force to best serve Norway's security interests in 2025?

To address this question, our design team of ten students launched the five-phase Design Thinking model (shown in Figure 4): Discovery, Define, Ideate, Prototype, and Test.

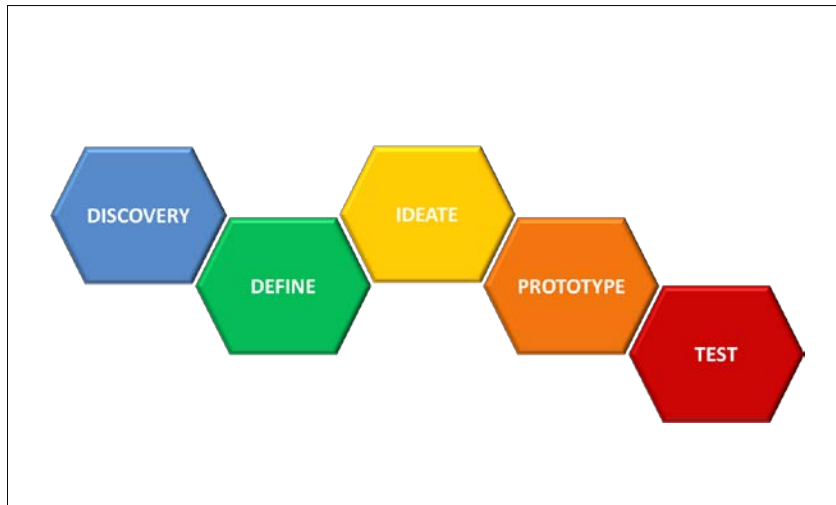


Figure 4. Design Thinking Process.

The Discovery Phase initiates the exploration of the design challenge and its context. The designer’s goal is to observe, listen, and learn from the people who live with the challenge in order to understand their perspectives and fundamental needs. There are many ways to gather information on people’s needs, including examining archival records, observing people in their work, and conducting face-to-face discussions with people about their work environment.

The Problem Definition Phase reframes the design challenge. Often design challenges are not well articulated and represent only the presenting problem and not the underlying problem or issue facing the organization. The design team then may need to reformulate the problem statement after gathering information from the Discovery Phase.

The Ideation Phase generates ideas to address the reframed problem. Using “how might we” (HMW) questions, designers launch a brainstorming session where they encourage a spectrum of ideas, defer judgment, and build on the ideas offered (Brown 2009). When generating new ideas, the goal is to widen the possible solution space for the given problem, which is why designers are encouraged to build on others’ ideas before selecting their preferred solution.

After generating ideas, designers must choose which ideas to carry forward into prototyping. First they establish criteria on which to base their selection, and then select

one or more ideas during the Prototyping Phase. Prototyping transforms ideas into physical representations and prototypes come in many different tangible forms: sketches, models or physical objects, role-plays, skits, and videos. The goal of prototyping is to start with a rough representation of an idea (e.g. napkin drawing) to prompt a design team conversation. Rough representations or low-resolution prototypes are preferred because they are small investments in time and resource. Designers then only move to higher and higher resolution prototypes upon discovering what aspects of their prototypes are viable, learning from their mistakes as they work. “Fail early to succeed sooner” is the designer’s motto (Brown 2009).

Testing is an iterative conversation between designers and those for whom they are designing. The goal is to solicit feedback on the prototype as a solution to the design problem. Testing may result in different outcomes: go forward with the prototype and continue making higher resolutions; go forward but with minor modifications; go back to the drawing board and select other ideas to prototype; or possibly, return to the problem, redefine it, and repeat the design thinking process. Ideally, through this iterative process, a tailored-made solution emerges in response to the sponsor’s design challenge.

2. Strategic Design/Redesign of Organizations

The application of Design Thinking to the strategic design/redesign of large complex business organizations is relatively rare (e.g. Martin 2009), and even more rare in military organizations. However, recent explorations at the Naval Postgraduate School in the Defense Analysis Department led by Dr. Nancy Roberts (Army 2020; Civil Affairs 2025), suggest some modifications when applying Design Thinking at the strategic level. One way to help designers navigate through the complicated terrain of strategic design is to employ a generic organizational systems framework such as the one illustrated in Figure 5.

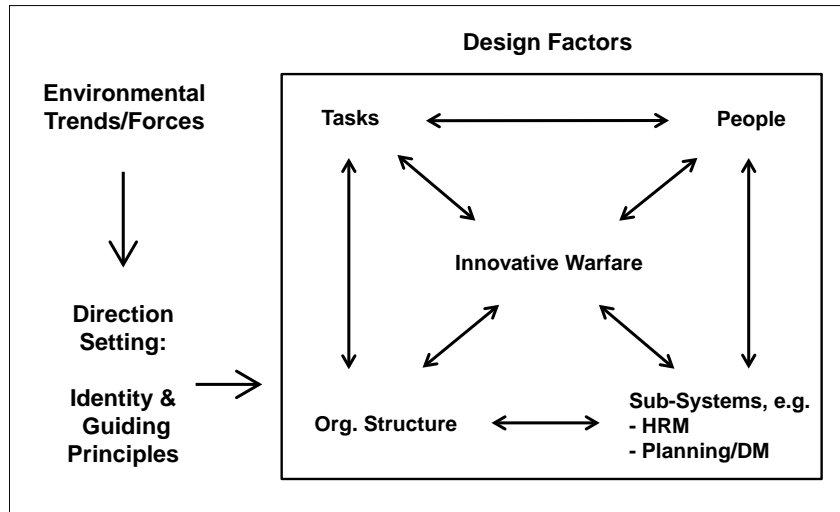


Figure 5. Organizational Systems Framework (Nancy Roberts).

The basic elements of the Organizational Systems Framework include:

- Environmental scanning—an exploration of the organization’s political, economic, social and technological landscape expected in 2025, including its major stakeholders and potential adversaries.
- Direction setting—the course the organization wants to pursue in 2025, which includes its statements of purpose, identity, and values.
- Design Factors—those organizational elements that need to be modified to fit the organization’s direction: tasks; people and their skills; type of warfare they employ; organizational structure; and organizational processes or subsystems (e.g. human resource management, decision making, information management, financing and budgeting etc.).

3. Design Thinking combined with Systems Framework

As illustrated in Figure 6, designers first explore the environmental forces and trends as part of the Design Thinking Discovery Phase. Organizational direction setting becomes their problem definition—given this environment, how are we going to be successful in 2025? What direction should we pursue?

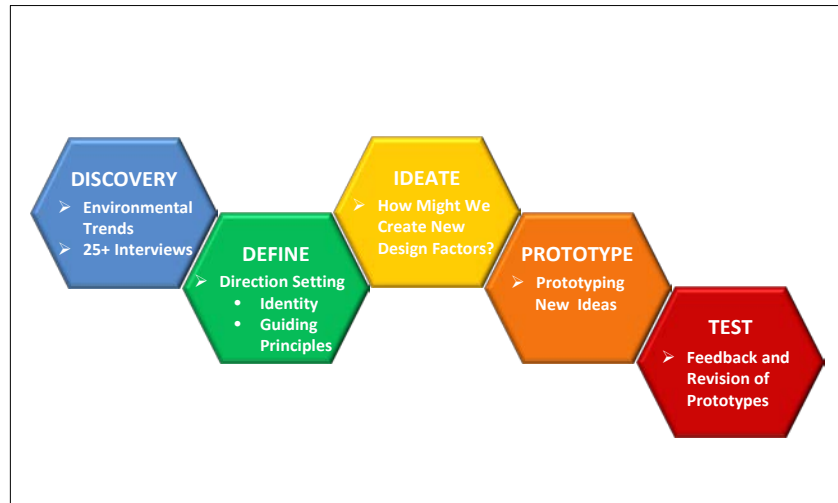


Figure 6. Design Process combined with Organizational Systems Model.

The organizational design factors then become the focal point for ideation, prototyping, and testing:

- What tasks does the organization need to accomplish its direction?
- What people and what kinds of skills are required for these tasks?
- What type of organizational structure is needed?
- What organizational subsystem/processes (e.g. human resource management) does the organization need to ensure its functioning?
- And in the case of military organization, what kind of warfare should the organization pursue (including doctrine and technology employed) to fight its battles and accomplish its missions?

4. Unique Features of NORSOF 2025 Study Process

The application of Design Thinking to the strategic redesign of any organization is a complicated process. There is never enough time to read all the documents and talk to all the people who ideally would inform such a study. In this case, the design team decided that it was important that all members participate in the Discovery Phase in order to build a common understanding of the international, national and SOF environment. In addition, the team agreed that all members should participate in discussions with key

stakeholders to probe their insights about the future and what paths NORSOFF might pursue. To engage the largest number of stakeholders, team members formed two-person groups and each contacted personnel from a list of people the entire team generated for a total of 25+ discussions.

After completing the Discovery Phase, the team was ready for the Problem Definition Phase. Again the whole team was engaged in crafting the NORSOFF 2025 strategic direction and the formulation of its identity statement. However, it used subgroups to flesh out the details for each of the four questions: Who are we? What do we do? How do we do it? And why do we do it? The subgroups then met to combine their answers to these questions and craft an integrated identity statement.

Once the Discovery and the Problem Definition Phases were addressed, the team then turned to the Organizational Systems Framework to identify design elements around which the design team would ideate, prototype, and test. Depending on individual team members' interest and expertise, subgroups formed around:

- NORSOFF *Tasks* that would be required.
- NORSOFF *People and their Skills* that would be required
- NORSOFF *Organizational Structure* that would be needed to support missions
- NORSOFF *Organizational Sub-systems/Processes*, particularly *Human Resource Management* which the team felt was a particularly important organizational process given its analysis in the first two phases
- *Innovative Warfare*—how people would conduct missions with what new technology and doctrine.

Periodically throughout the prototyping process, the whole design team would reconvene to update one another on the prototypes and whether the new ideas they were developing in their sub-groups were mutually compatible. It wasn't just a matter of generating innovative ideas and building prototypes for each design element; it was a matter of finding creative ideas that fit together with the other design elements. The "fit"

among the design elements as a whole was a requirement of the organizational systems framework and one that the design team took very seriously.

The design team tested the sponsor's reaction to the work in progress at four meetings. Sponsor guidelines and the study plan were discussed and decided in October 2014. Preliminary findings in the Discovery and Define Phases were presented in January 2015, while a more thorough status of Design Factors was briefed in Norway by two students in March. Finally, the team organized an international seminar at NPS in May 2015 for feedback from the sponsor and other senior NATO SOF representatives.

E. REPORT STRUCTURE AND LIMITATIONS

The chapters of this report follow the structure of the Organizational Systems Framework described above. Chapter II discusses the Environmental Trends. Chapter III sets the direction for NORSOFF 2025, drawing on the environmental trends and input from more than 25 subject matter experts.

The design factors are described in detail in Chapters IV-VIII. Key themes are summarized in Chapter IX, while Chapter X wraps up and discusses lessons learned from the study. Appendixes A and B present examples of relevant future operational environments for SOF: Hybrid Warfare and Anti-Access/Area Denial (A2/AD) scenarios.

Due to practicalities, the study is unclassified. SOF organizations are typically highly classified and to conduct an unclassified study of the future NORSOFF can be challenging. By necessity, we have left some elements out, which it is fair to say has had an impact on the direction and validity of the study. More specifically, we have been unable to address:

- Details of current size, capability and capacity of NORSOFF
- Budgets, accounts and materiel investments

As a consequence, it has not been possible to conduct cost efficiency calculations. This omission limits consideration of the optimal structure and future garrisons for NORSOFF which are not included in this study. Furthermore, a detailed discussion of the

size of structural elements and their sub-units has not been addressed. Budgetary implications of the proposed recommendations are only superficially assessed.

Apart from these elements, the design team has however, maybe surprisingly, met few unsurmountable challenges with respect to classification. The result is a study which has been able to assess wide-ranging organizational issues, and arguably, address some of the most important challenges facing NORSOF going forward.

II. THE FUTURE ENVIRONMENT

The NORSOF 2025 strategic design process started with a discussion of global trends affecting Norway and subsequent development of a general description of future environments NORSOF might encounter.

A. SOURCES

The NORSOF 2025 design team examined a number of sources on future trends and environments. Most of the written sources are *over the horizon* assessments from the allied intelligence community and other credible academic institutions. The most important sources have been:

- U.S. Office of The Director of National Intelligence (2015)
- Norwegian Intelligence Service (2015)
- Norwegian Ministry of Defense / Norwegian Defense Expert Group (2015)
- U.K Ministry of Defense (2014)

In addition, we approached 25+ subject matter experts (SME's) for their personal view on future trends and challenges and how SOF might deal with them. These SMEs were experienced professionals from various Norwegian governmental offices, Norwegian and International senior ranking military officers, and prominent representatives from academia and the private sector.

Rather than develop possible scenarios based on these sources for future NORSOF operations, the design team opted for an alternative approach. This first chapter captures as concisely as possible, the most important aspects of the future environment as a starting point for the design of NORSOF 2025.

B. RELATIVE CERTAINTIES¹

The Office of The Director of National Intelligence (2015) deems the developments listed in Figure 7 to be “relative certainties” for the future environments:

- **Individual Empowerment**
 - Strengthened religious and ethnic identities
- **Diffusion of Power**
 - Rogue nations and terrorist criminal networks
- **Changing Demographic Patterns**
 - Aging vs youth populations. Increased migration. Urbanization.
- **Increasing Food-Water-Energy Needs**
 - High conflict potential

Figure 7. Relative Certainties–Global Trends.

Poverty will be reduced over the next decades, resulting in an expansion of the global middle classes with better economy, health care and education. Individual empowerment is seen as the most important global trend, as it will both cause and have a huge effect on most other trends. It is likely to shift values, strengthen religious, ethnic and national identities. It also may provide individuals and small groups with the capability to inflict disruptions and harm to large populations through the use of advanced weapons and technology.

Asia, with China and India as the dominant players, will surpass North America and Europe in global economic power. There may not be any global hegemon. The power of other non-Western, middle-tier states (e.g. Indonesia, South Africa, Mexico, and Turkey) will rise. This middle tier as a group will surpass Europe, Japan and Russia. Technology will be a great leveler, shifting the balance of power towards multifaceted networks. New threats will emerge from rogue states and terrorist criminal networks.

¹ This section is a summary of arguments presented by the U.S. Office of The Director of National Intelligence in *Global Trends 2030: Alternative Worlds* (2015).

Libya is an example, with a humanitarian crisis that serves as a hothouse for terror. Fatally undermined by a possible access to WMD technology, highly networked terrorist groups continue to challenge the power of nation-states.

Rapid extensions of life expectancy are likely. Deaths from communicable diseases are projected to drop by more than 40 %. Countries in Sub-Saharan Africa and South Asia will still have youthful populations. Countries with aging populations face the possibility of decline in economic growth. Increased migration will spread to emerging powers. Urbanization is set to grow by almost 60 %.

Demand for resources will increase. The global population will grow from 7.1 billion today to about 8 billion by 2030. Demand for food is set to rise 35 % and energy to increase 50 % over the next 15-20 years. Nearly half of the world's population will live in areas with severe water stress. Fragile states are most at risk, but China and India are also vulnerable due to a lack of key resources. The main uncertainty will be whether there will be more effective management of critical resources, wider technology use, and greater governance mechanisms.

C. CRITICAL GAME-CHANGERS²

What might be the outcome of the “relative certainties” listed in the previous chapter? The Office of The Director of National Intelligence (2015) listed a number of “game-changers” it considers critical for the future global development. We have summarized the key themes in Figure 8.

Potential governance deficits are driven by rapid political and social changes. Countries moving from autocracy to democracy have a proven record of high instability. About 50 states fall into this major risk group.

² Ibid.

- **Governance deficits**
 - 50 states
- **Complicated political landscape**
 - Megacities/ Regional Groupings
 - Global/ Regional Networks
 - ICT: Mobilization for change vs Surveillance
- **Intrastate Conflicts**
 - Resource scarcity + disproportionate levels of young men (MENA)
- **Interstate Conflicts**
 - Nuclear possibility

Figure 8. Critical Game Changers.

The political landscape will be more complicated. Megacities and regional groupings are likely to assume increasing powers. Networks, some of them between rogue states and terrorist movements, will be hard to address directly in the political landscape. Information and communication technology (ICT) will make possible multiple and simultaneous action, near-instantaneous responses, and mass organization across geographical boundaries. This will increase the potential for more frequent change in the international system. On the other hand, ICT will increase government's ability to monitor their citizens.

Resource constraints and a young male population will likely increase the risk of intrastate conflict. We see potential for this in many countries particularly in Sub-Saharan Africa, South Asia, and parts of the Middle East. Most intrastate conflicts will remain in the form of irregular warfare, but the spread of precision weaponry may change the character of some of these conflicts.

A more fragmented international system, spillover from regional conflicts, and resource competition will increase potential for interstate conflict. The Middle East most likely will remain the most volatile region, even as it moves toward greater democratization. Future wars in Asia and the Middle East possibly could include a nuclear element. Many of these conflicts, once begun, would not be easily containable and would have global impacts.

D. GEO-POLITICS 2025 AND NORWAY

In a global perspective, the four geopolitical developments listed in Figure 9 are particularly relevant for Norway:

- **Asia-Pacific global center of gravity**
 - Allied involvement in the high North

- **Revisionist Russia**
 - no credible opposition

- **Middle-East/ North Africa**
 - expansion of militant Islam

- **WMD/Terrorism/Cyber**
 - Few “local” problems



Figure 9. Geo-politics 2025 and Norway.

Asia-Pacific emerges as an important economic and political center of gravity, also for our biggest ally, the United States. The shift might affect the United States’ willingness and ability to maintain a clear and credible commitment in Northern Europe.

Russia under Putin has a goal to restore Russia as a world power. It is aggressively countering Western expansion into its sphere of interest as illustrated by the war in Georgia, the annexation of the Crimea and the current “full spectrum/hybrid war” in Ukraine. At the same time, western intelligence services describe Putin as a moderate alternative in the Russian political elite, which should be of concern to most westerners. A Norwegian contribution to collective NATO defense of former Warsaw pact members is one of the scenarios with the highest probability.

Southwest Asia and North Africa will continue to be characterized by poverty, deep cultural differences and militant Islamism. These factors pose a threat far beyond the region. Even Norway has a small share of foreign fighters illustrating the global proliferation of identities: although having met lower and medium levels in Maslow’s

hierarchy of needs, they decide to fight their Jihad in a militant way, far from their geographical home, or even worse, inside it.

The last geopolitical development is the continuation of current threats: proliferation of weapons of mass destruction, terrorism, and the weaponization of information and cyber warfare. Geographic distance will have less significance. Norway has been struck by terror both at home and overseas. The country is attacked in Cyberspace every day, particularly by Russia and China. All these factors will continue to affect Norwegian security in 2025.

E. RUSSIA AND NORWEGIAN DEFENSE PLANNING

Russia will be the dominating factor in Norwegian Defense planning in the foreseeable future. This assertion is based on both geographic and structural factors.

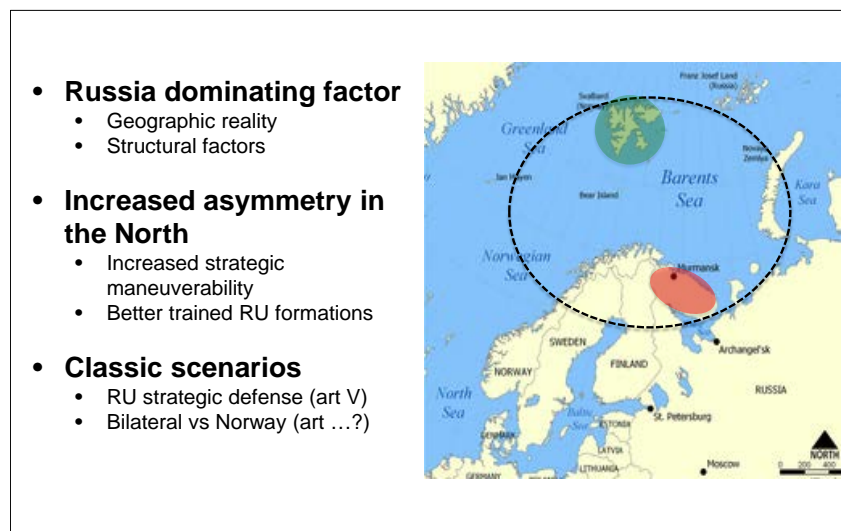


Figure 10. Russia and Norwegian Defense Planning.

Norway borders the Russian Kola peninsula (marked red), which contains 70-80 % of the Russian strategic nuclear capabilities. The peninsula as such can be described as militarized. Russian forces have increased their training level, responsiveness, mobility and range during the last few years. Although Norway and Russia recently settled a 40-year-long dispute about their common border at sea, issues concerning the continental shelf are unresolved. One of the highest differences in GDP per capita in the world runs

along Norway's border with Russia. According to the Research Council of Norway (2006) the differences in GDP and life expectancy are higher than those between the United States and Mexico. The Norwegian archipelago Spitsbergen (marked green) is demilitarized and has a Russian minority. Its strategic geographic position is empirically important to dominate the North Atlantic in a large war.

Structurally, Norway is part of the Western world order and the Western security alliance. Russia is not. Russia's ambition is to challenge the Western-made international system, and it views NATO as a threat to its borders. Norway's strategic response to Russia has been Reassurance. Norway maintains well-developed diplomacy and military channels to Russia and they remain open. This openness is based on some common interests, and the need to avoid misunderstandings. It is Norway's ambition to continue this balancing act between deterrence and reassurance in the future.

In a conflict between Russia and any other NATO power, Russia may want to secure parts of Norwegian territory (land and/or sea) for its defensive purposes. This is the classic Article 5 of the NATO Washington Treaty scenario.

In the case of a purely bilateral crisis, Norway's current ambition is to establish a threshold designed to trigger Article 5. On the other hand, Russia will likely use the full spectrum of its powers to pressure small-state Norway to comply, but stopping just short of triggering NATO's involvement. In the case of a bilateral conflict over such remote Arctic areas, Russia might calculate, as noted deterrence theorist Thomas Schelling (2008) describes it, "some territories are just not worth a war, especially a war that can get out of hand."

III. DIRECTION SETTING

This chapter describes direction setting for the NORSO 2025 strategic design. It is important to note that direction setting in our design process varies from traditional military direction setting. Rather than specifying details on vision, goals, strategies and missions, direction setting in our design approach offers general guidance. In a turbulent environment, time spent on specific details that quickly can become outdated is less useful than concentrating on those enduring issues that will be constant regardless of the context. Thus, our direction setting focuses on NORSO's identity and its guiding principles that are expected to be sustained over time.

A. IDENTITY STATEMENT

Building on the discovery phase, the design team created the identity statement displayed in Figure 11.

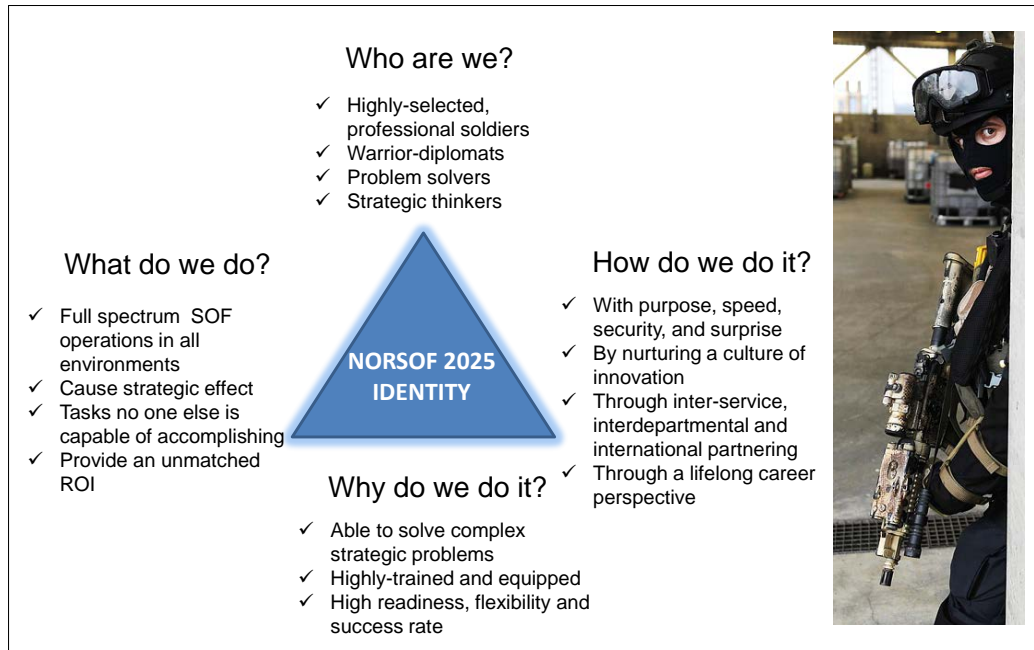


Figure 11. NORSO 2025 Identity Statement.

At first glance, this identity statement may look like a status quo description of any SOF unit in the Global SOF Network (GSN). The true value of the identity statement, however, was going through the analysis and identifying the difference between what we think we do now, and what we actually need to do in the 2025 global security environment. While SOF units often have pre-conceived notions with respect to identity, a critical analysis identifies shortfalls between reality and what is ideal.

For instance, the following examples identify some key differences and questions that were discovered during the direction setting process:

1. *Who are we?* There was a great deal of discussion on what the terms “strategic thinking” and “warrior diplomat” even mean. While these words are commonplace in the military lexicon, there is indeed debate on accurate definitions. Moreover, does NORSOE select and develop strategic thinkers and warrior diplomats? In a similar fashion, are the “highly-selected, professional soldiers” being selected for the proper attributes?
2. *How do we do it?* Does NORSOE truly have a culture of innovation that is accepting of change? Also, how effective is NORSOE at partnering, both within and beyond Norwegian borders? Finally, does NORSOE have a lifelong career perspective?
3. *Why do we do it?* Is NORSOE actually as flexible as it thinks, or needs to be as an organization? Are operators highly trained in the right capabilities?
4. *What do we do?* Is NORSOE optimized for operations in all environments, particularly maritime and arctic, in support of homeland defense? Does NORSOE actually focus on missions no one else is capable of accomplishing? Is the focus on the right mission sets? Does NORSOE leverage other services/departments effectively? Can NORSOE provide a better return on investment (ROI) by focusing more or less on niche capabilities?

Bottom line, the identity statement served as an initial eye opener and was paramount in identifying areas that required more attention. In reality it created more questions than answers, which was actually a huge benefit to the design process.

B. GUIDING PRINCIPLES

The guiding principles for NORSOFF 2025 evolved from the discovery phase, especially the environmental challenges expected in 2025. While many factors were deemed critically important for the future of NORSOFF, three principles stood out: *flexibility*, *integration* and *innovation* (shown in Figure 12).³

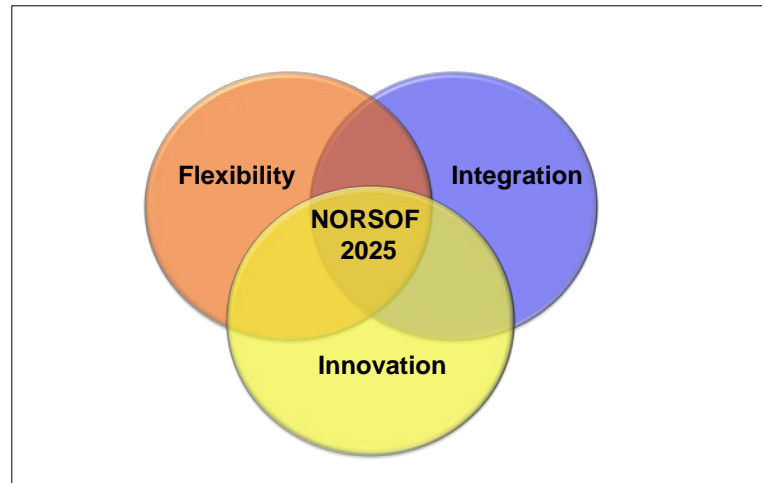


Figure 12. NORSOFF 2025 Guiding Principles.

1. Flexibility

During the Discovery phases and all the SME discussions, the most recurring comment was a need for NORSOFF to be flexible in 2025. The importance of flexibility is highlighted by officer and scholar Meir Finkel in his book “On Flexibility” (2011). Finkel’s main thesis is that modern militaries must maintain a flexible and adaptable doctrine and organizational culture to cope with the inevitable battlefield surprise and the constantly changing operational environment. As described in the environmental overview, the future is expected to be complex and turbulent with dramatic shifts and rapid changes in the social, economic, and political landscape. Thus, Norway’s challenge in balancing homeland defense, alliance commitments far away, and homeland security issues will require a high level of adaptation. Moreover, designing NORSOFF for full-

³ It is important to note that flexibility, integration, and innovation already exist to some extent in NORSOFF. However, the intent of our design process is to optimize them in creating NORSOFF’s strategic design for 2025.

spectrum operations, with a homeland defense emphasis on arctic and maritime arenas, requires adjustments in structure, resource allocations, and capabilities. Vastly different scenarios might occur in rapid succession, leaving SOF without time for organizational learning and adaptation. Thus, flexibility in mindset, culture and organization will be an enduring principle for the future. While planning for the future always involves inherent unknowns, the complex threats expected in the near term require an agility to which NORSOF needs to aspire.

2. Integration

In addition to flexibility, central to the NORSOF organization in 2025 is the ability to work with others which we refer to as cross-boundary coordination and integration. The aforementioned global diffusion of power and the challenges it presents is beyond the ability of one nation to address. Moreover, few threats and challenges will fit within traditional bureaucracies such as the traditional western style state departments. Rather, we envision a whole of government and coalitional approach that involves multiple agencies, organizations, and nations. As argued by author Anne Holohan (2005):

“The UN, NATO, OSCE [Organization for Security and Cooperation in Europe], and other political and military bodies and alliances all have to adapt to a truly interdependent world where borders are no longer sacrosanct and the tasks are not rigidly divided into military, civil, and political.”

Although effective integration may take place between senior national and international personnel, the design team noted that there is a need for increased cooperation and interoperability at all levels. This comprehensive, integrated whole of government and coalitional approach has significant implications for all the design factors, particularly “people” and “structure”. For instance, NORSOF needs an organizational structure that can launch a comprehensive, integrated effort and quickly task organize and reorganize the appropriate people in whatever department, in whatever nation, to respond to the growing number of failed or failing states.

3. Innovation

Another very common theme from discussions with subject matter experts is the importance of innovation for NORSOF 2025. This is supported by Robert Spulak (2010),

who argues rapid technological innovation is crucial to SOF. As interpreted by the design team, innovation means more than advancements in technology and equipment. The design team defines innovation as the introduction of a new idea and its implementation in practice. Thus it includes new technology, new doctrine, and new structures and systems to enliven NORSOFF's strategic design. Most importantly, the people—the users of the technology and doctrine—must be selected and trained to launch the new ideas and NORSOFF's culture must support and protect them through the implementation process. To meet future challenges and counter the myriad of potential threats, the design team thus views innovation as a guiding principle to surface new ideas and solutions that have yet to be invented. Simply put, *if we want something we don't have, we have to do something we have not done—launch an all-out organizational effort to innovate our way into the future.*

In summary, it is important to reiterate that our direction setting is purposely general in nature, a clear departure from conventional military planning. The NORSOFF identity statement we created is not expected to change in the near-to-midterm. We believe it has clear, concise, and sustained relevance to Norwegian defense requirements within the ten-year time period that frames this study.

The following five chapters outline each of the design factors and the key recommendations for NORSOFF 2025. The direction setting outlined in this chapter served as both a starting point and a guide to keep the design team sub-groups aligned throughout the process. While each design factor focuses on a specific aspect of NORSOFF 2025, NORSOFF's identity and guiding principles of flexibility, integration, and innovation inform all sub-group activities. In fact, the guiding principles helped us close the gaps between what currently exists and what we envisioned for the future. They also enabled us to address the questions the identity statement generated. Both the identity statement and the guiding principles thus serve as arcs to guide our entire design process.

IV. NORSOF TASKS

This chapter asks what tasks and jobs NORSOF should conduct in 2025. To answer this question, we describe SOF's general role and current tasks, review the trends and future challenges, and finally identify the tasks and jobs that we believe will be needed in the future.

We began our research looking into the global and national environment as outlined in Chapter II. After the environmental analysis, we examined what NATO SOF, USSOCOM, and NORSOF already have done as a response to today's environment and how they have positioned themselves for the future. We furthermore reviewed our discussions with the international subject matter experts (SME's). From their insights we identified their areas of general agreement on which tasks and jobs NORSOF should focus.

Our next step examined the core SOF tasks currently defined by NATO and US Armed Forces. We chose the two organizations because of Norway's strong relationship and commitment to them and the importance of NORSOF's interoperability with them. These two organizations have, to some extent, gone in two different directions. While NATO has kept its core SOF tasks few and broad, the USSOF community have increased its core tasks but made them more specialized. Our question was then in which direction NORSOF should go—broad or specialized?

A. CURRENT NORSOF TASKS

One way to understand SOF in the current environment is to describe the range of tasks that SOF does in comparison to General Purpose Forces (GPF). An NPS Defense Analysis Seminar Report offers an interesting way to examine the "SOF space" as shown in Figure 13 (Simons 2012):



Figure 13. SOF Brackets GPF (Simons 2012).

In a strictly military sense, SOF brackets GPF. GPF are great for force-on-force engagements, designed as they are for sustained combat operations. In contrast, SOF has units that excel at short duration, high intensity direct-action missions. At the same time they have the opposite capability—to work by, with, and through indigenous forces in more long-term training and assistance missions (Simons 2012).

The complex and interconnected future environment also will demand a higher cooperation and coordination between SOF and GPF. There likely will be small footprint and persistent-presence operations that will consist of both SOF and GPF working together in the same environment.

In a more integrated sense, SOF also fits within the interagency and interdepartmental “space” as a bridge to other agencies. The intelligence agencies develop their assets in a covert manner, while the State Department and other governmental agencies engage in overt diplomacy and development. SOF’s role in contrast, is to deal with armed others, whether foreign militaries or anti-state actors, as shown in Figure 14 (Simons 2012).



Figure 14. SOF Bridges the Interagency (Simons 2012).

Currently NORSOFF's tasks and jobs (see Figure 15) follow traditional SOF tasks and are in-line with NATO doctrine. Today's core tasks are SR, DA, and MA, which have provided SOF with the flexibility and adaptability for today's needs both domestically and abroad.



Figure 15. Current NORSOFF Tasks and Jobs.

NORSOF current core tasks are in-line with the NATO doctrine and satisfy NATO's requirements for a NATO Special Operations Task Force (SOTF). The three broad tasks are also well known within the international SOF community and have created the general understanding within military leadership of how SOF should be utilized.

In addition to the three core tasks, NORSOFF has a national requirement to conduct hostage rescue operations worldwide, and domestic counter-terrorism both maritime and land in support of the police. These tasks are viewed as additional tasks for NATO SOF units, but not a requirement. On a more irregular basis, NORSOFF conducts support to other governmental agencies, and when tasked, conducts close protection for the Norwegian Chief of Defense.

In summary, the current tasks show that NORSOFF has had a traditional mission set, and has prioritized broad preparation rather than specialization. NORSOFF's expertise

is closely linked to the unique Norwegian environment: arctic, winter, littoral, and mountainous terrain, as well as Norway’s large merchant fleet and GOPLATS⁴.

B. TRADE-OFFS / DILEMMAS

NORSOF, with its relative sparse resources, will always be faced with trade-offs and dilemmas when it comes to a discussion of specialization versus broad preparation.

Figure 16 illustrates one set of dilemmas that NORSOF has to balance as part of its preparations for the future. The dilemma is to be constantly ready to conduct the high end important strategic tasks of CT/HRO and National Defense, while at the same time, on a daily basis, conduct low footprint, support missions abroad.

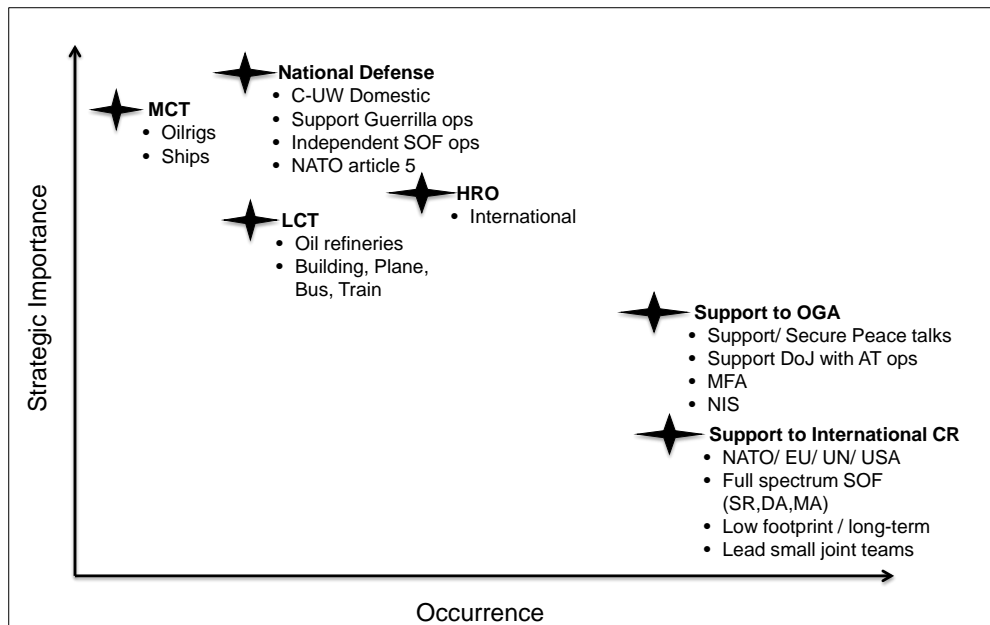


Figure 16. Trade-offs / Dilemmas for NORSOF

On the one hand, the tasks on the upper left side of the graph have high strategic importance and effect if not accomplished successfully due to the public and political attention these types of tasks have both globally and domestically. These tasks are called “no failure missions.” However, their occurrence is few and far between.

⁴ GOPLATS: Gas and Oil Platforms.

On the other hand, the tasks on the lower right side of the graph are more frequent, but they have lower strategic importance because of their small footprint and long-term focus. These tasks are less visible and don't have the same level of publicity.

Norway, with its relatively small SOF community, has decided not to require specialization of its SOF community for either of these mission sets but kept a broad preparation focus—NORSOF as the "Jack of all trades." This stance has enabled NORSOF to be a flexible and adaptable tool for decision-makers.

C. TRENDS IN FUTURE TASKS AND JOBS

The most significant shift in NORSOF tasks and jobs is shown in Figure 17 below. We believe the future points to more MA-type tasks rather than DA type tasks as seen in the large footprint task force deployments in Afghanistan and Iraq during the last decade.

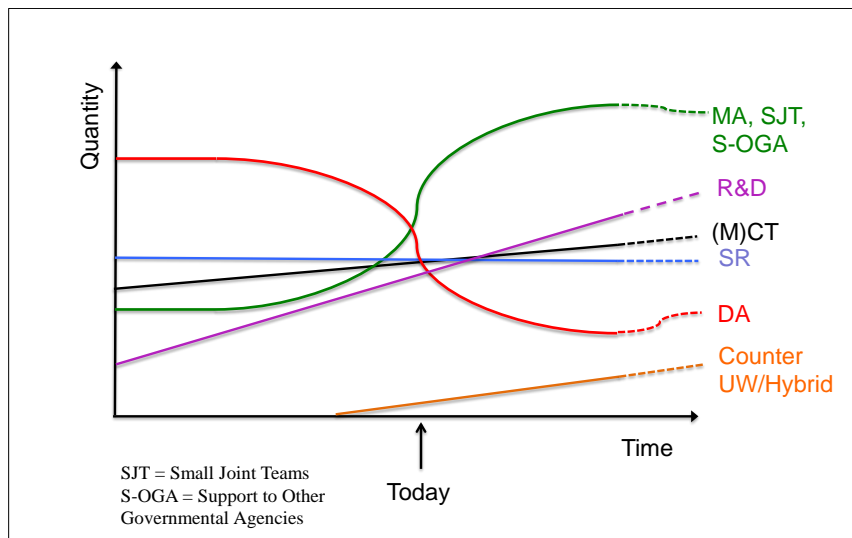


Figure 17. Future trends (author’s predictions).

The notion of doing small cost-efficient, proactive actions, as part of an integrated interagency approach, avoids conducting large-scale reactive operations and is more politically acceptable in an economically and politically constrained environment. As Linda Robinson (2013) notes:

“Special operations forces have played an increasingly prominent role over the past decade in many ways, and that trend is likely to continue in the future for two basic reasons: technology and political preference. A highly skilled, small military force is more cost effective than a large one and less likely to cause attendant political and diplomatic complications—if it is used with care and sophistication.”

Another task we view as becoming even more important in the future high-tech, complex, interconnected environment is research and development (R&D). To survive on the battlefield and to be as cost efficient as possible, a SOF organization needs to stay in front or at a minimum keep up with innovations in both technology and doctrine. With regards to terrorism, CT and SR tasks will continue to play an important role in the future environment. However, we believe the frequency will stay relative constant compared to today, although with a slight upward trajectory.

As a result of Russia’s strategic and political show of force in the last couple of years, the need for counter unconventional/hybrid warfare will likely increase in the future. A nation’s ability to use all aspects of national power in an integrated manner (DIME⁵) will be a necessity for National Defense and SOF will be a critical element in the integration.

D. FUTURE TASKS

Based on the environmental analysis, the insights from the SME’s, our current assessment of NORSOFF’s tasks and jobs, anticipated trends, and Norway’s commitment to NATO, we recommend the following tasks and missions for NORSOFF (see Figure 18).

Drawing on Figure 18, we believe that NORSOFF should keep SR, DA, and MA as its core tasks, broadly defined and in-line with NATO and Norway’s requirements. These tasks are well known within the international SOF community. Their broad definitions will enable NORSOFF to continue to be a flexible and responsive strategic tool in future national defense, national and international crisis response scenarios.

⁵ DIME: Diplomacy, Information, Military, Economics.

TASKS	Additional future focus areas	MISSIONS
SR, DA, MA, HRO, Domestic CT	<ul style="list-style-type: none"> • Interagency coordination <ul style="list-style-type: none"> • Lead small joint interagency teams (NIS, DoD, MFA, DoJ) • National interagency network • International Global SOF network • Domestic Anti-terrorism in support of the Justice Department • National Counter UW/Hybrid Warfare <ul style="list-style-type: none"> • National guerrilla/resistance operations • Political and Economic Warfare • Innovation, Research & Development 	National Defense, Support to National Crisis Response, Support to International Crisis Response

Figure 18. Recommended future tasks and missions.

Because of SOF’s culture and flexibility, it is extremely well suited to lead small joint teams that have the responsibility of finding integrated and whole-of-government solutions to complex challenges. Thus, we see NORSOFF as an important bridge in the interagency, interdepartmental, and international arena. We also see the strategic utility of NORSOFF increasing as the NORSOFF community expands across departmental and national boundaries. SOF’s reach and capability will increase through national and international networking, and its strategic effect will grow as SOF activity moves more towards proactive operations both at home and abroad. SOF’s ability to build and participate in cross-boundary networks and work in combined/joint teams will be a key factor in its future success.

Anti-terrorism is also an area where the SOF community is under-utilized and could bring new domestic solutions and capabilities. However, SOF anti-terrorism involvement would require some changes to current Norwegian laws and political acceptance for using SOF proactively in peacetime, a subject we did not address in this report.

We also see involvement in Counter-UW/hybrid warfare as a NORSOF task. We consider the ability to operate in an environment between peacetime police scenarios and full-blown national defense Article 5 scenarios critical to Norway's defense. As such, we organized a wargame at NPS in May 2015 to better understand what kind of challenges Norway and NORSOF might face in a complex hybrid warfare environment. As summarized in Appendix A, one of the conclusions is that an integrated approach is a key success factor in such a scenario. These game results reinforce our view that NORSOF should be able to assist, facilitate and coordinate a Norwegian whole of government counter/ hybrid approach. At the same time, we recognize that NORSOF should retain its capability to strike a high-tech opponent's key installations in a high intensity scenario, e.g. Anti-Air Missile Defense Systems as demonstrated in Appendix B.

As the innovative laboratory of the Norwegian Armed Forces, NORSOF should continuously consider its future tasks and missions. Consequently, our final point is that SOF needs to strengthen its research and development efforts and to link its organizational and technological innovations to doctrinal innovations, a subject explored in greater depth in the next chapter.

V. INNOVATIVE WARFARE

It is no easy task to anticipate the future of warfare and how it may impact the way NORSOF will organize to fight. How can NORSOF keep the decisive advantage over its adversaries? How does it remain the highly flexible and capable force of choice as it is today? In a rapidly changing world with mind-blowing technological developments, how will NORSOF anticipate and adapt to them by making innovative changes to its technology, doctrine, and fighting organization?

Innovative warfare, as we define it, is an overarching term that applies to people generating and implementing new ideas about technology, military doctrine, and the way they organize to fight with the ultimate goal of gaining the decisive advantage over a future adversary. We allow that being innovative is not a matter of increasing dependency on technology. “Technology is not a silver bullet;” it both “empowers and imperils.” Rather than making a choice between high tech and low tech, we follow the guidance of Dr. John Arquilla and search for the “the right tech.” Depending on the circumstances, NORSOF should always be able to fight degraded, or “low tech” opponents as well as “high tech” ones. We also follow the guidance of Robert Spulak (2010) who notes:

“advanced technology and understanding should no longer be thought of only as products that are supplied to SOF and which SOF use. The alternative is to integrate science and understanding with tools and technology and with missions and users, allowing the early adoption of concepts and technologies.”

Thus, we believe it is important to raise the question of innovative warfare in all of its dimensions—innovations in technology, doctrine, and organizing to fight.

A. TECHNOLOGICAL INNOVATION

Historical cases illustrate whoever is first to recognize, understand, and implement an innovation, can gain a decisive advantage over an opponent. Past examples of technology-driven innovations in military affairs are the invention of the machine gun, the submarine, and the aircraft carrier. All of these developments have changed warfare completely.

Currently, most leading scholars agree that three technological developments of our time are central to the revolution in military affairs as shown in Figure 19: Information technology and the information dominance on the future battlefield; Integration of unmanned systems, robotics and Artificial Intelligence (AI) technology; and Nonlethal technology (Singer 2009).

Technology Innovations:

1. Information technology and the information dominance on the future battlefield;
2. Integration of unmanned systems (air/sea/land), robotics and Artificial Intelligence (AI), technology;
3. Nonlethal technology.


A photograph showing a person's hands holding a small, white, quadcopter drone. The drone has four propellers and a camera mounted on the front. The background is blurred, suggesting an outdoor setting.

Figure 19. Technological Innovations.

1. Information Technology

There are many promising information technology innovations that have the potential to change the future of warfare. Haptic technology, brain wave sensing, and laser-based display eyewear are examples of recent innovations in this field.

Haptic technology is a feedback technology, using computer applications, that takes advantage of the user's sense of touch by applying force, vibrations and/or motions to the user. The technology is spreading rapidly and is used in smartphones, game controllers and joysticks.

Brain wave sensing enables the control of technology functions by the brain. A possible future use of the technology could be to monitor the mental state of the SOF operator through helmet sensors to know if he is fatigued or not.

Laser-based eyewear technology displays images directly onto retinas while not blocking sight. It can be used in eyeglasses and has applications ranging from e-gaming to military defense. In the next 10-20 years experts predict that Internet glasses will replace smartphones. This would enable operators to see building schematics and locations of enemy and friendly forces in the corner of their eyeglasses.

2. Unmanned Systems

It is expected that more and more unmanned systems will replace humans or manned systems at the front of the battlefield. Soldiers and operators will become more “remote controlled,” and will have larger amounts of unmanned systems at their disposal. Unmanned systems will become smaller and will be equipped with more advanced weapon systems. Also, range and lethality of these systems will improve. Since decision makers seem to get more options in the future, this will have implications on when, how and whether to deploy SOF.⁶ The flip side is that a wide range of unmanned systems will also become available to even low-tech opponents, both state and non-state actors.

3. Non-Lethal Technology

The third area of technology-driven innovation is nonlethal technology. It is expected that this could spark a whole new discussion on the *jus in bello* criteria on when, how and why to use deadly force if other alternatives to war are available. For example, laser weapons, frequency interference, gas and drugs can temporarily immobilize rather than do permanent physical damage to the enemy (Figure 23). As the evolution of biometrics exploitation develops, the incentives and opportunities for cooperation between departments of defense and justice/interior around the world may increase further.

Given the new technology innovations under development, it would be safe to assume that technology is major factor in innovative warfare. However, technology is not the only driver of innovative warfare. Next we turn to the topic of doctrine as an important driver of military innovation.

⁶ Colin Gray labels this the “expansion of choice” (Gray 1998).

B. DOCTRINAL INNOVATION

Doctrine, a guide and standard frame of reference for military forces specifying how they conduct operations and accomplish their tasks, also can drive innovation. As exemplified by the “blitzkrieg” of WWII, the Germans used the tank, an “old technology,” in ways to support mobile combined arms formations and maneuver warfare at the operational level.

Military theoretician Edward Luttwak’s spectrum of warfare that ranges from attrition to manoeuver warfare explores some doctrinal options and tradeoffs. He argues that a well-managed, attrition-oriented force cannot be adaptive to the external environment (Luttwak 1983). By contrast, the closer an armed force is to the maneuver end of the spectrum, the more adaptive and externally focused it will be. However, a military with high maneuver content cannot maximize internal efficiencies or set optimal organizational structure and methods. It must continually reconfigure itself for changing situations (Luttwak 1983). Thus, there is a trade-off between efficient international management and the environmental adaptations required in the maneuver model.

Arguably, most SOF are in the maneuver end of the spectrum, although with today’s risk adversity and tendency for excessive use of fire power during operations, some appear to be moving towards the attrition end of the spectrum. In our view, NORSOF currently is operating within the maneuver end of the spectrum and it should move as far to the maneuver end as possible to be successful in the future. With regards to doctrine, this means NORSOF should be comfortable and ready with doctrinal innovations such as swarming and distributed operations. Swarming describes numbers of relatively small, synchronized operators and/or weapons that act faster than their opponents and in so doing defeats them. It can be executed by small teams or even empowered individual operators (see Appendix B). The technical innovations summarized above have the advantage in being able to offset any increased risks of committing limited manpower to swarming operations.

As summarized in Figure 20, NORSOF also needs new doctrine for distributed operations to respond more effectively to a hybrid threat (see Appendix A). In such a

scenario, doctrine needs to be adjusted and developed in this civilian-led terrain. NORSOFF likely will be working more closely with other government agencies (OGAs), as well as civilian partners and enablers. A stronger link between NORSOFF and the Norwegian Home Guard units should be anticipated as well. Other developments not discussed but likely will impact doctrine are: (1) increasing vulnerability of large basecamps like FOBs and, (2) the adversaries' increased use of advanced technology.


<ul style="list-style-type: none"> • Integration of manned & unmanned systems <ul style="list-style-type: none"> – Increase distance to adversaries, less risk to the force; – New meaning and use of deception, discrete and clandestine operations/tactics. • Increase emphasis on the maneuver side (attrition - maneuver - swarming) of the military spectrum <ul style="list-style-type: none"> – Distributed operations – the swarm? – Hybrid response to hybrid threats – external focus and able to task organize; – Integration with the civilian “domain,” - SOF “lead” interagency (CT/AT) teams; 	
---	---

Figure 20. Doctrinal Innovation.

Given the massive number of unmanned systems available, NORSOFF also needs doctrine to guide the integration of manned and unmanned systems. The challenge of integrating multiple systems will only accelerate, and currently no SOF doctrine exists. In addition, unmanned and remote-controlled systems will enable SOF, in some missions, to increase the physical distance from their adversaries and at the same time increase their accuracy. Current tactics, techniques and procedures (TTPs) will need adjustment to benefit from these developments. Unmanned and remote controlled systems also will force SOF to rethink the concept of deception, discrete and clandestine operations. They beg the question: Will the classic SR mission become obsolete or are humans still essential for mission success? Thus, much remains to be done to ensure that SOF doctrinal innovations are a part of innovative warfare.

C. ORGANIZING TO FIGHT

Organizing and preparing for every possible contingency is very difficult in maneuver warfare, but it is a key reason why task organizing remains essential to mission success. To date, NORSOFF has proven to be more than capable in this area. However, we believe three organizing options are central to NORSOFF's success in the future — the ability to develop and function in social networks; the establishment of an organizational unit that integrates research and development for innovation; and the redesign of NORSOFF into a flatter and more flexible organization.

1. Social Network Innovation

Although the term social network is defined in academic disciplines as a connection between two or more entities, military references tend to define it as self-organizing and emergent behavior among social actors in contrast to the controlled and top-down interactions driven by a hierarchical chain of command. More and more we find that social networks offer an alternative organizing principle both for friendly (blue) and opposing (red) forces. And we should note that red is not necessarily a state actor. Today nations are already in war with social networks.

Success in social networks is enabled with networked information and communication technology as illustrated in Figure 21. Together the social network and the ICT network combine to constitute a new way to organize warfare. As Dr. John Arquilla notes “it takes a network in order to fight a network.” Currently, NORSOFF is at the beginning stage of social network evolution and we advocate a greater emphasis on it in the future.

<ol style="list-style-type: none"> 1. Our adversaries more sophisticated in utilizing social networks – building dark networks. 	
<ol style="list-style-type: none"> 2. ICT innovations will enable coordination and span of control in future warfare; 	
<ol style="list-style-type: none"> 3. Future ICT infrastructure and capabilities allow instant access across the globe; 	
<ol style="list-style-type: none"> 4. Virtual meeting places allows better planning and coordination. 	

Figure 21. The Networked World.

2. Research & Development and Innovation

We believe research and its development and coordination should have a central place in the future NORSOFT organization (see Figure 22). We propose the establishment of a well-resourced, connected, and mandated unit that is responsible for finding, developing and implementing new technology, doctrine, and organizations. Furthermore, we recommend that the new entity be closely coordinated and networked with other interservice, interagency and international organizations to encourage the free-flow of ideas and innovations.

Unit culture has to support this change and leadership plays a crucial role. As Lind et al. posited in an article in the Marine Corps Gazette of October 1989, the fourth generation warfare will be “technology driven.” As such, the authors contend that leaders “will have to be masters of both the art of war and technology.” This point is further reinforced by Dr. John Arquilla, who believes that officers need to know what is technologically possible, in order to be effective innovators, a point to which we return to address in greater detail in subsequent chapters.

3. Flatter NORSOF Organization

We anticipate technological innovations will enable NORSOF to become a flatter and more flexible organization (see Figure 22). The acceptable span of control is likely to increase as technological developments allow NORSOF to move away from a bureaucratic and conventional infrastructure. The organization may even question the need for garrisons and barracks to support teams, troops, and squadrons, as the options to work from home and the ability to team up when and where necessary become realistic. Such shifts will no doubt open up questions whether the six-man team continues to be the nucleus of the NORSOF organization or if technology and connectivity will enable teams to become even smaller. We will address these issues in more detail in the subsequent chapters of the report.

- NORSOF 2025 should have a **R&D Unit** centrally placed in the organization
 - Well resourced and well connected;
 - Increase technology awareness;
 - “Everybody is an innovator” mindset.
- NORSOF 2025 should be a **flat, flexible organization** to ensure speed, C2, OPSEC, and be a multi-tool
 - Task organize, NORSOCOM leading operations, increased span of control;
 - Smaller combat units with increased connectivity, range and effectiveness of weapons systems;
 - Smaller teams dedicated to international and national UW/MA tasks.



Figure 22. Organizing for Warfare.

D. INTEGRATION OF TECHNOLOGY, DOCTRINE AND ORGANIZING TO FIGHT

Beyond the separate challenges of technology, doctrine and organizing to fight, the grand challenge of innovative warfare is integrating all three elements into a coherent whole. A range of possibilities exist: we can “hedge our bets” by preparing for a broad range of contingencies; or we can put all efforts on one particular “big bet” that combines

technology, doctrine, and organization in unique and particular way. One example of a big bet option is outlined in Figure 23.

- “Bet” on the integration of manned and unmanned/remote controlled systems
- Equip SOF operators with the latest technology to link into integrated systems
- Institutionalize innovation within the NORSOF organization and the SOF operator




Figure 23. Big Bet Strategy.

A quick reality check tells us that a big bet such as the one outlined above is unlikely to be an option for NORSOF. Policy makers, who employ SOF as a “multi tool problem solver,” are unlikely to approve its technological specialization and integration into high tech systems, at least in the near future.

Although we do not advocate a “big bet” solution, we do see the value for NORSOF in institutionalizing innovation within its organization. Encouraging, developing and implementing new ideas (whether they be technological, doctrinal, or organizational) will be key to NORSOF’s future. Leadership and organizational culture, as noted above, have central roles in this transformation. Although creativity and operational/tactical innovation is a hallmark of SOF, high-level support and encouragement needs to be a core competency of the entire NORSOF system.

VI. PEOPLE

People are central to NORSOFF’s 2025 future. Our aim in this chapter is to answer the following questions: Who are the people of NORSOFF 2025? What knowledge, skills, abilities, and competencies⁷ do they require to perform their future tasks outlined in Chapter IV (Roe 2002)? Is the operator’s future baseline skill-set still based on a warrior-foundation? Whatever answers we generate, they build on a fundamental “SOF truth:” “people are more important than hardware” (USSOCOM 2013).

A. THE FUTURE NORSOFF OPERATOR

The competency requirements for future NORSOFF operators are high based on our assessments of the future environment, NORSOFF’s role as Norway’s strategic problem solvers, and the emerging challenges of innovative warfare (Chapter 5). Synchronizing feedback from the SMEs and the design team’s discussions, we have created a visual image of the future NORSOFF operator as the "Warrior-Diplomat" (Tucker and Lamb 2007) as shown in Figure 24.



Figure 24. Image of future NORSOFF Operator.

⁷ "Knowledge" describes awareness or understanding and is acquired through education or experience. Knowledge is the body of facts, principles, theories and practices that is related to a field of work. "Skills" are proficiencies developed through training or experience to complete discipline-specific tasks. "Abilities" are innate attributes like cognitive abilities and personality traits. These are generally stable over time and half of the variance appears to be attributable to a person’s genetics rather than environment. "Competence" is the capability to apply knowledge, skills, and capabilities to do a job properly (*Wikipedia*, 2015).

The Warrior-Diplomat is a widely used term that typically refers to a thinking warrior with social skills, who is able to work and cooperate with non-military personnel. The design team elaborates on this concept to describe the future NORSOFF Warrior-Diplomat as:

- a warrior with the highest proficiency in military skills and a master of warfare and technology;
- a warrior with excellent political and cultural understanding, highly developed social competencies, empathy, and communication skills that enable him to lead and work with others in an international and interagency environment;
- a well-educated enabler who thinks strategically and is able to creatively develop and integrate SOF capabilities into a comprehensive “whole-of-government” approach.

B. CURRENT COMPETENCIES WITHIN NORSOFF

The current competency levels of operators within NORSOFF are depicted using the pyramid in Figure 25.

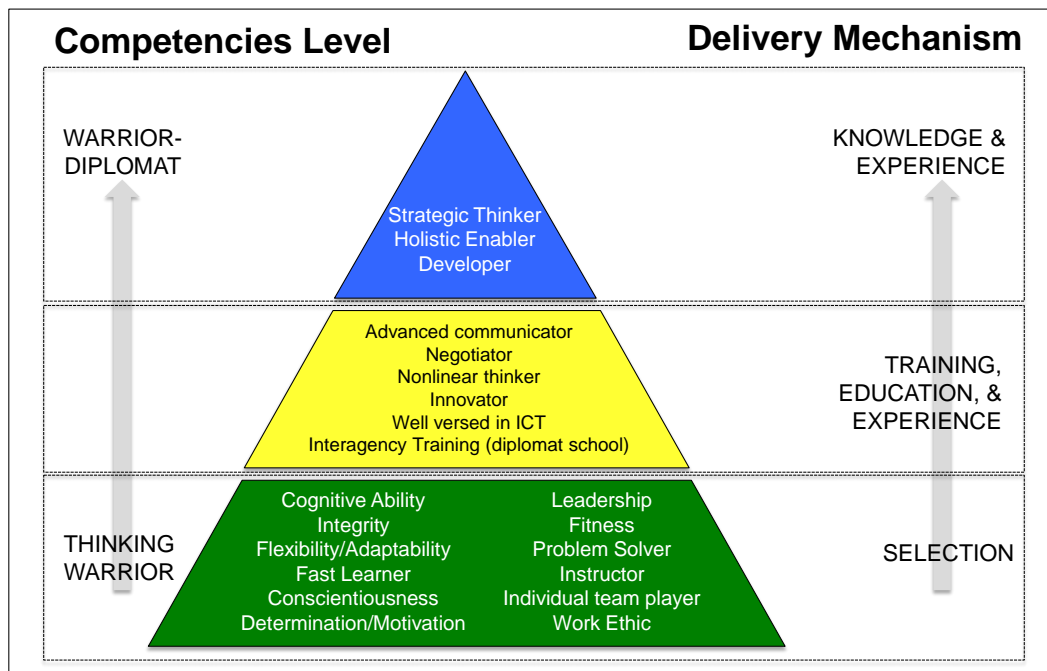


Figure 25. Current Competency Pyramid.

Three assumptions are central to understanding the competency pyramid. First and foremost, we do not limit strategic thinking to the highest levels. The thinking warriors at the bottom of the pyramid, the “strategic corporals,” are expected to think strategically not just tactically (Krulak 1999). Second, the pyramid does not suggest a single career stream for all NORSO operators. Based on the comprehensive set of current knowledge, skills, and competencies required in today’s environment, the pyramid assumes a lifetime career perspective in which multiple career paths are possible. We explore the career paths in greater depth in the following chapter.

Third, shape and colors of the pyramid are important. The broad, green-colored foundation represents the attributes that form the baseline for NORSO selection. These innate abilities are relatively consistent across the Global SOF Network (GSN).

The top portion of the pyramid is relatively narrow since the current system is not configured to select and create a large number of Warrior-Diplomats. We do not mean to imply that Warrior Diplomats don’t exist in today’s NORSO organization; rather, those with the highest aptitudes for these competencies tend to be hand-picked on an add-needed basis.

The middle yellow portion represents a transition zone from the Thinking-Warrior to the Warrior-Diplomat. This band represents skills and competencies that are developed from formal training, education, and operational experience. Currently, the system relies on operators who can quickly adapt and learn these skills. What is also important to note is that NORSO does not have a comprehensive system to transition new operators from the baseline to the Warrior-Diplomat level.

C. FUTURE COMPETENCIES FOR NORSO 2025

We represent the recommended shape of the 2025 competency pyramid in Figure 26. The future pyramid is much wider at the top, meaning we anticipate an increase in operators with the highly developed competencies of a Warrior-Diplomat. The total number of operators for NORSO 2025 does not have to increase to achieve this goal. What is required is the development of a comprehensive educational program and the time to develop the operators from levels 1 and 2.

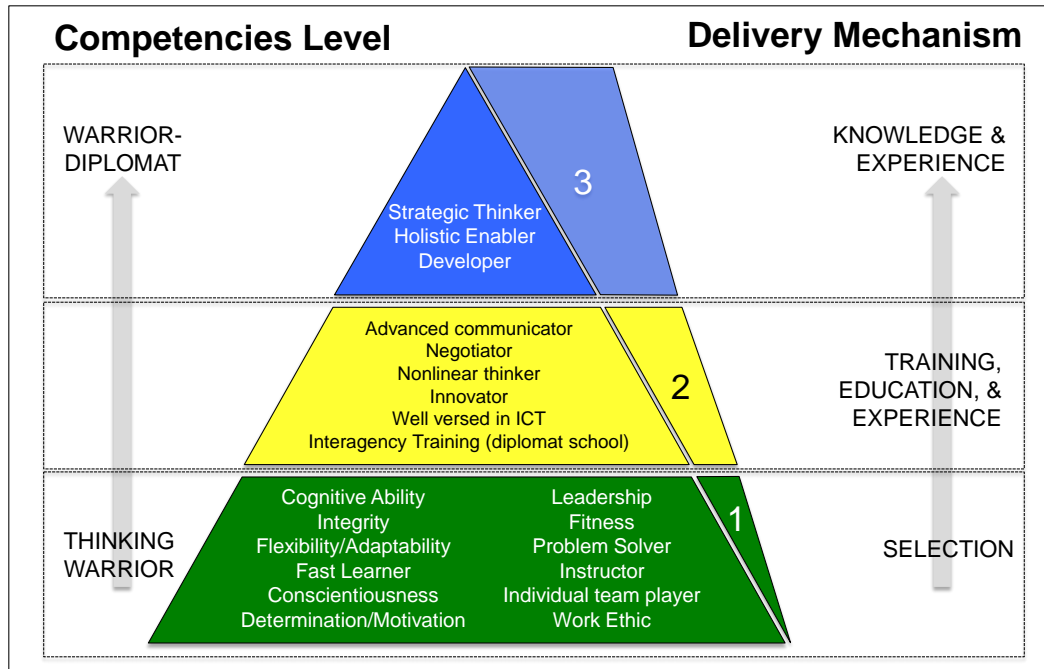


Figure 26. Future Competency Pyramid.

D. ACHIEVING HIGHER-LEVEL COMPETENCIES

Increasing competency levels for operators and the whole organization cannot be achieved by simply increasing the selection standards or education requirements for future SOF candidates. Most of the higher-level competencies we identified are developed over time and on the job through the combination of training, education, and operational experience.

The current timeline for an operator is limited to approximately 15 years (see Figure 27), unless the operator follows a career command track. Consequently, after the SOF-candidate successfully passes selection, NORSOFF has a very limited time (after subtracting basic training, missions abroad, mandatory DoD education time etc.) to assess and exploit the candidate's potential. This time frame limits NORSOFF's ability to develop an increasing number of Warrior-Diplomats.

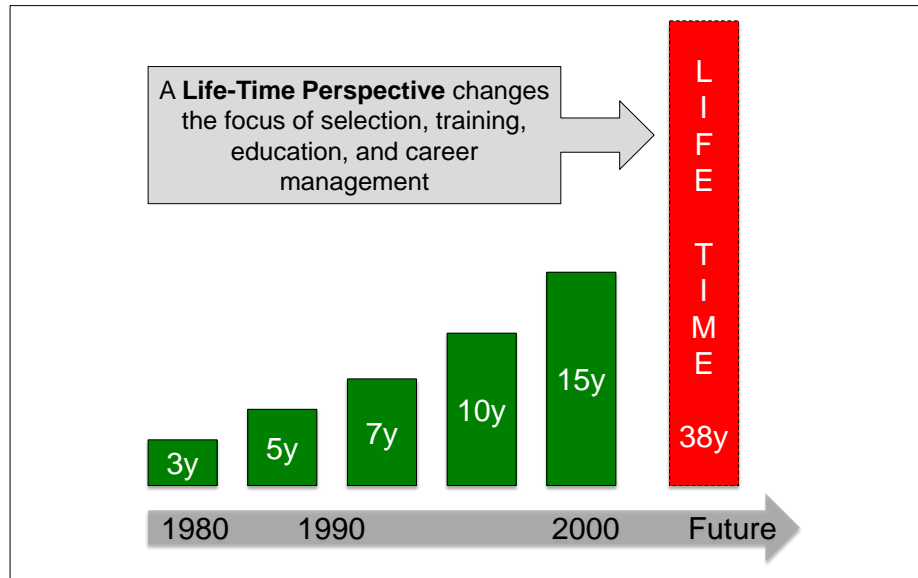


Figure 27. Shift to a SOF Life-Time Perspective.

One alternative to developing higher-level competencies is to change the SOF operator perspective, both on behalf of the organization and the individual. We recommend a career management system with a tailored education and training program that focuses on individual aptitudes to fully exploit the potential of operators. This life-time perspective aims to maximize the output of the operators and their potential over a career that can span up to 38 years.

This shift to a life-time SOF-career perspective implies major changes in the focus of selection, training, education, administration and Human Resources Management, a subject to which we now turn.

E. RE-SHAPING THE COMPETENCIES PYRAMID

There are three new segments to the pyramid that represent the gap between the current situation and 2025. The contents of these segments are presented in the Figure 28.

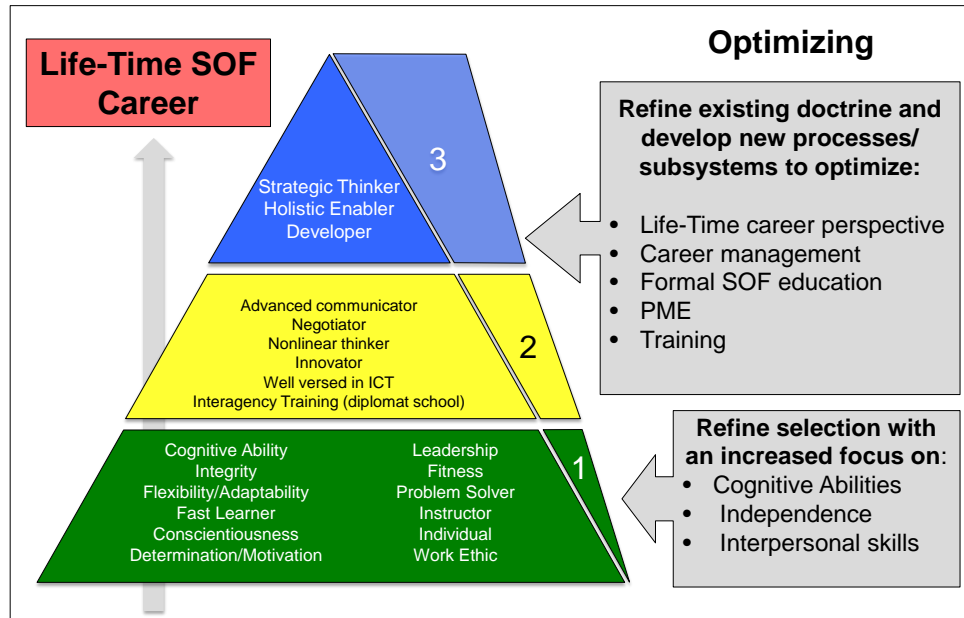


Figure 28. Reshaping the Competency Pyramid.

Starting at the bottom, the major focus of the NORSOF selection process would be on finding the best warriors with the highest potential for future development. Today's NORSOF selection is already very effective, but it could be improved by shifting the focus to attributes that contribute to the development of the Warrior-Diplomat. Specifically, we recommend that selection increase its focus on:

- Cognitive Abilities
- Independence
- Interpersonal skills

Central to this selection are criteria that single out candidates who have the specific psychological attributes, personality traits, and cognitive abilities necessary for successful performance under unusual and demanding conditions (Kennedy et al. 2012). A large number of psychological studies of different high-risk operational personnel document the validity of cognitive ability and personality tests and their combination as best predictors of above-average work performance (Schmitt 2012, 2014).

To increase levels 2 and 3 of the pyramid, a comprehensive and tailorable system for career management, education, PME, and training is required. This system should manage operators' careers based on their aptitudes and interests rather than taking a "one size fits all" approach. In addition, the pyramid requires a shift in the selection criteria away from the physical attributes more towards a cognitive/interpersonal focus that reflects the challenges of future tasks and innovative warfare as described in Chapters IV and V. We do not mean to imply that physical standards should be reduced; rather, we believe that cognition and personality should be emphasized. Finally, we believe NORSOFF's education system should leverage existing Norwegian Defense resources, as well as interagency assets, as we view education a national mission and not just SOF's responsibility.

F. NORSOFF FUTURE SELECTION

Future NORSOFF selection should consist of two channels (see Figure 29). One channel should continue the current arrangement and select operators based on innate attributes, while a second channel should focus on competencies for highly qualified subject matter experts. We envision these experts will serve as "in-house" providers who develop and spread the specialized knowledge and technical expertise needed in future NORSOFF.

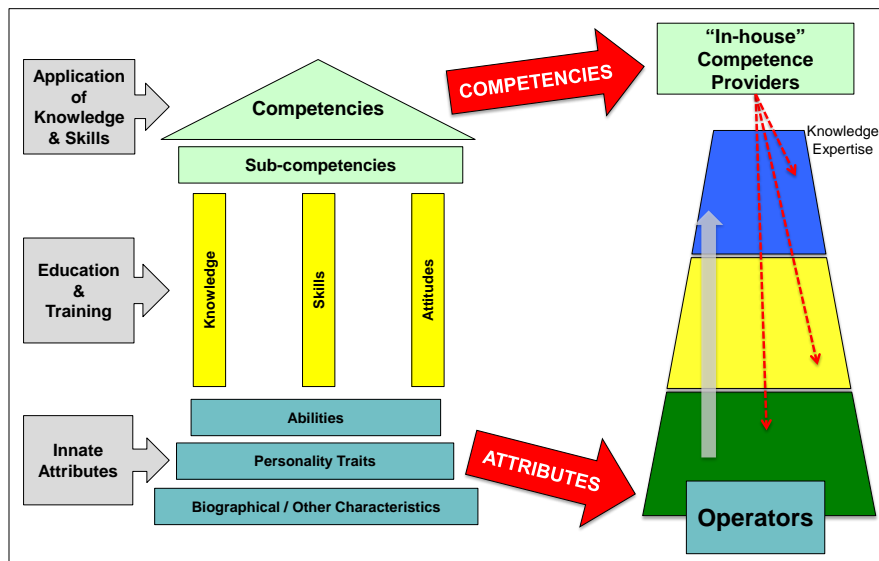


Figure 29. Whole of Society Selection Process.

The current system of recruiting experts is ad-hoc based on "word of mouth." We propose formalizing the process. We recommend recruiting experts at each level of the 2025 pyramid by promoting the SOF brand throughout the Norwegian Defense community. We anticipate the need for all types of experts from the tactical level e.g. EOD dog handlers to the strategic level e.g. negotiators and innovators. Believing that people are central to the success of NORSOF, we recommend selecting and developing them with a two-pronged process based on their individual attributes and competencies.

G. SUMMARY RECOMMENDATIONS

To master the challenges of the future, Norway will need SOF operators with a strong warrior foundation, who have the potential to develop competencies that will meet the Warrior-Diplomat requirements. Consequently, we recommend that NORSOF:

- Maintain a large recruiting pool of conscripts and "off-the-street" candidates in order to attract people from all backgrounds and professions;
- Create a life-time SOF career perspective and career management system as a framework to develop highly skilled people that build a warrior culture;
- Create a tailored education and training system to exploit the potential of the operator, focusing on individual aptitudes rather than a "one size fits all" approach;
- Examine the selection process and criteria for future operators and shift the focus on innate attributes that enable growth into Warrior-Diplomats (cognitive abilities, independence, interpersonal skills);
- Formalize the selection process for high-level experts to ensure the organic integration of competent subject matter experts;
- Promote the SOF brand throughout the Norwegian Defense to recruit SOF-candidates and experts.

VII. SUB-SYSTEM: HUMAN RESOURCE MANAGEMENT (HRM)

Building on the recommendations in Chapter VI, we begin this chapter by taking a life-long perspective on careers to flesh out three options open to operators: Command track, Operator/SME track, and Warrior/Diplomat track. Next we consider alternatives to train and educate these operators, and pay particular attention to the development and management of SOF “communities of practice” (CoPs). We conclude with suggestions on how to increase and sustain innovative CoP networks that span interservice, interdepartmental, and international boundaries.

A. CAREER TRACKS AND THEIR PROGRESSION

A life-long perspective on careers opens up the opportunity for NORSOFF to design several career tracks for various groups within the SOF community in order to build on people’s strengths and interests. We recommend that NORSOFF formalize three distinct career tracks: Command, Operator/Subject Matter Expert (SME), and Warrior-Diplomat. Each track is expected to develop its own program goals to support training and education as illustrated in Figure 30.

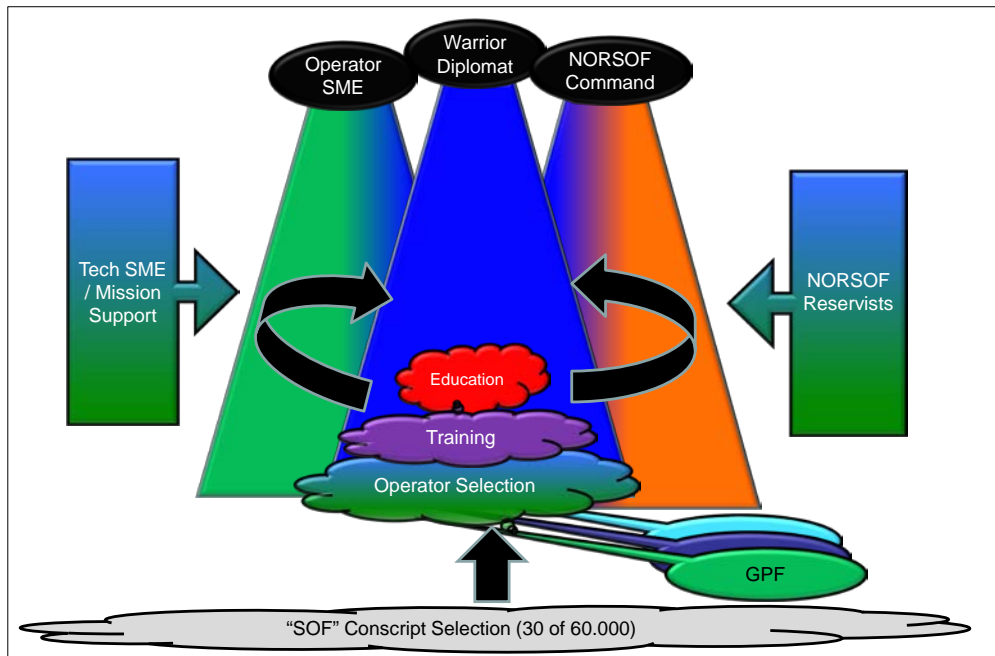


Figure 30. Multiple Career Tracks.

The current conscription selection process, at the base of the figure, creates an excellent pool of service candidates. Ideally, candidates will enter an all-hands selection course before splitting off into specialized units for advanced training.

NORSOF's active recruiting program is also expected to attract top talent from the General Purpose Forces (GPF). The goal will be to bring in more mature candidates (25+ years) so that their basic core skills and education would have been provided by the General Purpose Force. The advantage of candidates over 25 years is that they tend to make better life decisions due to completed brain development. Men's brains are not fully developed until approximately 25 years old (Casey, Jones and Hare 2014). NORSOF also benefits from this arrangement by fostering stronger ties and better understanding with the GPF units.

Once all-hands selection and training are complete the new NORSOF operator starts a career track in his tactical unit. Currently there is a well-structured Command track for those who stay on it and an ad hoc "non-Command track" for those who do not wish to be or should not be in command.

B. THE WARRIOR-DIPLOMAT

Building on the two career tracks, we suggest the creation of a Warrior-Diplomat career track consisting of operators who leave the Operator/SME track and commanders who have left the Command track. Thus, over time, we expect the pyramids of the Operator/SME and Command tracks to narrow, while the Warrior-Diplomat track widens as shown in Figure 31.

There are many reasons for these shifts but the most obvious are that operators and SMEs have shorter "shelf-life" due to the physical demands of their work. On the Command track, as rank increases the number of command positions decreases therefore creating a natural pyramid. The real question lies in what these former operators and commanders do once they come off their earlier career tracks. It is here we see opportunity for NORSOF.

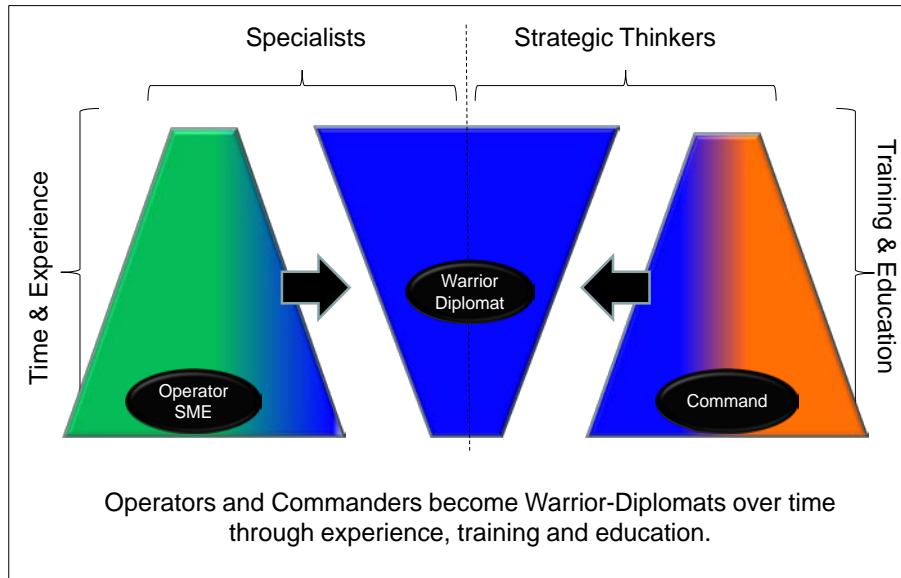


Figure 31. The Warrior-Diplomat.

To harness the power and potential of these seasoned operators and commanders, we recommend that NORSOE formalize a Warrior-Diplomat career track. Just as training and education enhance the skill sets of operators and commanders, training and education can be tailored to meet the requirements of the Warrior-Diplomat.

C. CAREER TRACK EXAMPLES

NORSOE career tracks should not be separate stovepipes but offer opportunity and flexibility to move through them at different career milestones as we illustrate in Figure 32. For example, we show personnel in the Command track moving into the Warrior-Diplomat track, personnel from the Warrior-Diplomat track moving into the Operator/SME track, and personnel from the Operator/SME track moving into the Warrior-Diplomat track.

The milestones are very similar for all three tracks, but the Command track starts earlier and is structured around training and education to prepare an operator for greater responsibilities as a future Commander and decision maker. The Operator/SME track focuses more on operational experience, tactics and training with less influence on education. The Warrior-Diplomat is the hybrid track in which people can migrate to and from both the Command track and the Operator/SME track.

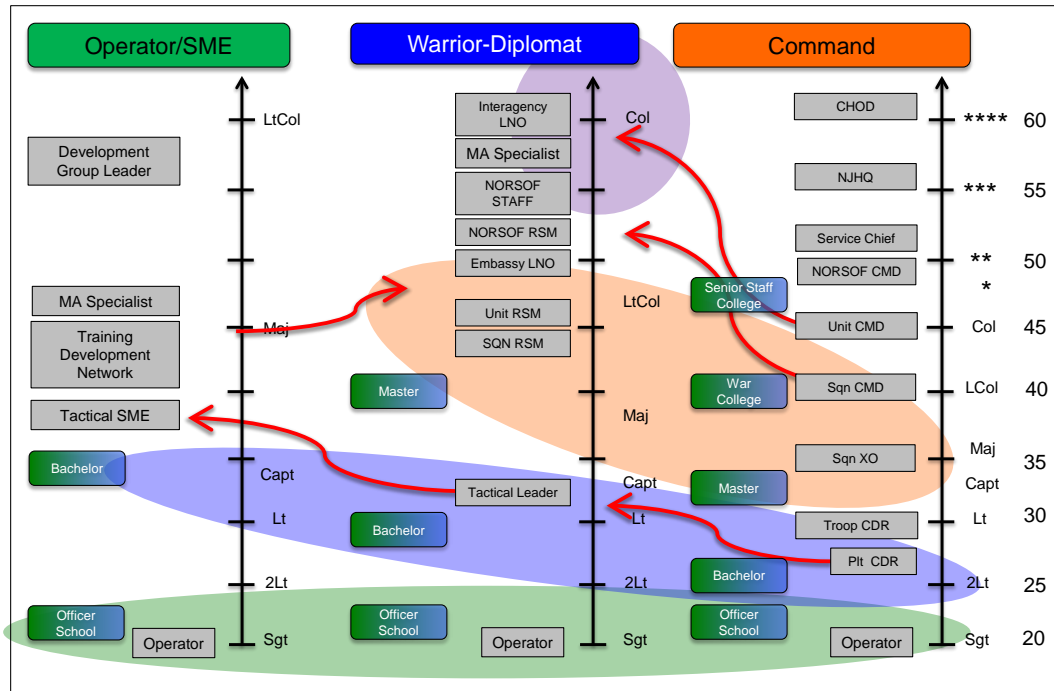


Figure 32. NORSOF Career Management Sub-System.

For visualization purposes the Warrior-Diplomat career track is depicted as spanning an entire career. It contains the majority of the NORSOF members over 40 years old. There are several paths that a Warrior-Diplomat can take. Examples range from a staff officer at an Embassy, a military advisor on an international mission, a liaison officer between units, and a PhD expert in a technical area. Whatever their roles, training and education are essential to keep them active and engaged in their chosen areas of interest.

D. HIGHER EDUCATION ALTERNATIVES FOR NORSOF

The complex and dynamic environment NORSOF faces in the future points to the need for well-educated and well-trained personnel who can use theory to inform practice. In addition to the small numbers of operators who get their bachelor degrees through the Army, Navy, and Air Force Academies, we recommend opening up options for a SOF-specific bachelor degree to increase the numbers of operators who get higher education. Figure 33 shows this SOF degree-program alongside the services' traditional bachelor degree-programs.



Figure 33. Alternatives in Higher Education.

We believe that educating SOF personnel in service institutions will continue to be important. However, we recommend the creation of a tailored program for the SOF operator. Such a program would likely draw from the best of each service programs and introduce SOF-specific courses where appropriate such as the one already established at the Norwegian Naval Academy. In addition, a bachelor-level version of courses offered by the Naval Postgraduate School would be beneficial, as would a flexible program that utilizes relevant courses at various civilian institutions. We further recommend a head of SOF education be appointed to oversee such a program. The timeframe for program completion could extend over several years to be compatible with operational requirements.

E. COMMUNITIES OF PRACTICE NETWORKS

Thus far we have concentrated on the formal training and education individuals. Recent research suggests using communities of practice as an alternative to develop people’s knowledge, skills, and competencies (Cambridge, Kaplan and Suter 2005). A community of practice (CoP) is defined as:

“a group of people who share a common concern, a set of problems, or interest in a topic and who come together to fulfill both individual and group goals. A CoP

often focuses on sharing best practices and creating new knowledge to advance a domain of professional practice and interaction on an ongoing basis is an important part of this” (Cambridge, Kaplan and Suter 2005).

CoPs are important for NORSO for several reasons. SOF expertise challenges personnel to master numerous knowledge fields and a wide ranging set of competencies essential to their tasks and problem sets. Formal training and education programs, while important, can never cover all the required competencies. Continual learning and development through CoPs can fill an important void. Furthermore, they offer a new model of learning that emphasizes knowledge sharing across organizational and national boundaries. Personnel learn to work together and share their knowledge for individual, group, and organizational development. These cross-boundary collaborations are becoming increasingly important in our interdependent world.

A structured way of combining CoPs with a life-long career program is illustrated in Figure 34. In the center of the CoP is an “owner” of a CoP topic e.g. a particular weapon system. The owner and members of the community then build a network of people interested in the topic among users, manufacturers, weapons instructors, SMEs, and academics etc. A range of interactions are possible from informal online connections to more formal meetings and associations.

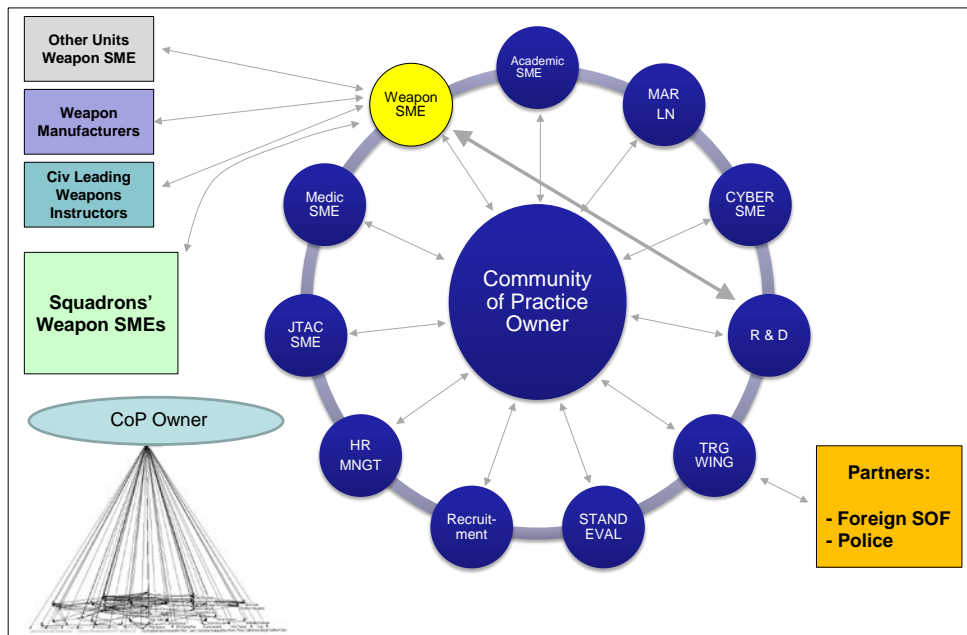


Figure 34. Example of a CoP Network.

According to Etienne Wenger (2015), three elements would be present when a CoP forms around a topic. It would contain a knowledge domain (what the community knows), a community of people (a network of individuals interested in the topic), and practice (interactions and discussion about how to improve what they do).

Knowledge has become the key to success, but it is not just formal classroom knowledge. As McDermott (1999) points out, the knowledge of experts requires the “accumulation of experience—a kind of “residue” of their actions, thinking and conversations—that remains a dynamic part of their ongoing experience. Knowledge resides in the skills, understanding, and relationships of its members as well as in the tools, documents, and processes that embody aspects of this knowledge.”

We concur with McDermott’s assessment and consequently recommend creating multiple CoPs as vehicles to develop and sustain SOF’s unique knowledge domains.

Figure 35 illustrates different CoPs integrated with the proposed R & D and innovation unit. Working in tandem, they can build and sustain CoP networks, or competency networks to advance innovation and the development of SOF “practice.”



Figure 35. Competency Networks Linked with R & D.

F. RECOMMENDATIONS

We recommend that NORSOE establish a lifelong perspective on careers that integrates the selection, education and training of the force. In addition, we recommend three career tracks (Command, Operator/SME/, Warrior-Diplomat) in order to support the SOF community's wide-ranging requirements and people's unique strengths and interests. In our view, education and training should be formal and informal, academic and practical. We have highlighted both formal programs and the importance of strong CoP networks within units, across units, and with external stakeholders in SOF-relevant knowledge and competency domains.

Specific recommendations with respect to HRM are:

- Develop an all-hands selection course before new recruits split off into specialized units for advanced training.
- Exploit experience of the 35+ year old NORSOE operators by creating more Warrior-Diplomats.
- Formalize career tracks for Operators/SMEs & Warrior Diplomats.
- Develop a formal SOF academic pipeline.
- Harness talents and experience of GPF soldiers by recruiting them into SOF.
- Link the proposed Research and Development and Innovation unit with CoP networks to ensure continued knowledge development and innovation within SOF.
- Establish a high-level position for a seasoned operator to design and manage the various CoPs along the lines of network theorists' description of a network administrative organization (see for instance Milward and Provan 2006).

VIII. ORGANIZATIONAL STRUCTURE

This chapter recommends NORSOFF's organizational structure for 2025. As an enabler, organizational structure supports and facilitates NORSOFF's direction, guiding principles and its design factors: Tasks, Innovative Warfare, People, and the HRM Subsystem. Thus, the major question we address is what kind of structure does NORSOFF need in 2025 to ensure a successful execution of its direction and design? We lay the groundwork with a brief overview of NORSOFF's current structure. Next, we outline our major recommendations for structural change. We end with five variations for tactical subunit organization.

A. CURRENT NORSOFF ORGANIZATIONAL STRUCTURE

Figure 36 illustrates a simplified view of Norway's Defense Organization with an overlay of the Norwegian map showing NORSOFF's five base locations: Oslo (NORSOCOM); Rena (FSK); Horten (FSK); Bergen (MJK); and Ramsund (MJK).

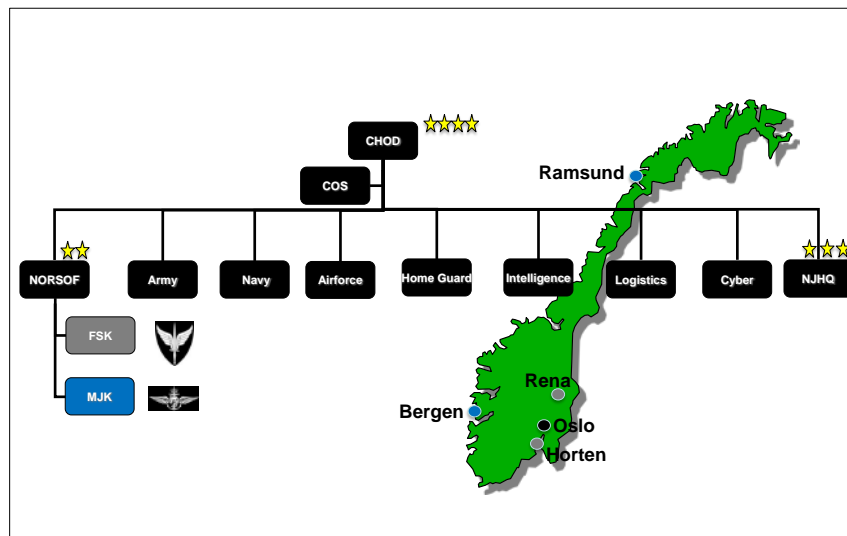


Figure 36. Current Norwegian Defense Organization and NORSOFF Bases.

At the head of the Norwegian Armed Forces is the Chief of Defense (CHOD), a four star position. The CHOD has several Commands reporting to him, one of which is NORSOFF, commanded by a two star who is responsible for force generation. Besides the

Army, Navy, Air Force, Home Guard, Intelligence, Logistics and Cyber Commands, there is a Norwegian Joint Head Quarters (NJHQ), commanded by a three star. NJHQ is responsible for Operational Command of the Norwegian units on deployment.

Currently, COMNORSOF can generate forces from two SOF units: FSK and MJK. Both units are capable of conducting full spectrum SOF operations, although FSK is more land-focused and MJK more maritime-focused. Both units are able to backfill each other in case of extended deployments or campaigns (e.g. OEF/ISAF). For the last 30 years, FSK has assumed primary responsibility for domestic Counter Terrorism (CT), in both maritime and land domains, while MJK entered the domestic CT arena in 2013.

B. RECOMMENDED CHANGES IN NORSOF STRUCTURE

Our recommendations for structural change draw on the framework for organizing Innovative Warfare in Chapter V: the importance of networks in future warfare; the need for a Research & Development unit to coordinate innovation; and the redesign of NORSOF into a flatter and more flexible organization. Building on this foundation, we recommend five changes: NORSOCOM's operational command over its forces; the establishment of a Research and Development cell; the creation of a SOF reserve unit to support active duty SOF; the creation of a SOF air group; and the establishment of a training detachment.

1. NORSOCOM

In addition to his current responsibility of force generation, we recommend that COMNORSOF has operational command over his forces, which will improve the ability to quickly launch a comprehensive, integrated effort across governmental agencies. He should be responsible for coordination and integration for international deployments and domestic operations in support of the Justice Department and other governmental agencies. The additional responsibilities would require three changes to the current NORSOCOM structure:

- (1) NORSOCOM's manning would need to be more robust in all staff sections, especially in Operations and Future Plans. The required personnel to build this robust staff could be taken from the unit level since

some of the responsibilities would shift from that level to COMNORSOF level.

- (2) COMNORSOF would have his own Liaison Officers (LNOs), working at NJHQ but reporting to him.
- (3) NORSOCOM would have a section conducting strategic liaison and interservice, interdepartmental and international coordination on his behalf.

In addition, the recommended changes in Chapter VII require elevation of the HRM function. We therefore recommend the positioning a new group somewhere between COMNORSOF and DCOM to oversee the development and management of the proposed lifetime career program that is essential to future force generation and operations.

2. Research and Development

The design team recommends the establishment of a Research and Development (R & D) cell. Well connected to innovative interservice, interdepartmental, international networks, it would be charged with generating new ideas, developing them and overseeing their field implementation to ensure ongoing innovations in technology, organization, and doctrine. By the nature of its tasks, the Research and Development Cell would require more experienced and mature operators and technical experts drawn from NORSOF (e.g. Operators/SMEs and Warrior-Diplomats), Norwegian Armed Forces, and other governmental agencies.

Given the “advent of Netwar” (Arquilla and Ronfeldt 1996) the cell also should have capabilities in the cyber-domain as well to provide technical support to the tactical units in the event no “off the shelf” ICT solutions are available.

Thus, we see the R & D Cell as responsible for the following:

- Networked research and development activities to generate new ideas about SOF’s technology, ways of organizing, and doctrine.

- Support and oversight of the integration and implementation of the new ideas into the field as innovative practice.
- Custom technical support, including cyber, to the tactical teams.

3. SOF Reserve Unit

We recommend the formation of a NORSOF Reserve Unit to counter the Hybrid War threat and strengthen NORSOF’s capacity. NORSOF currently makes use of reserve SOF operators, but only on a small scale, mainly as backfill for single-position assignments in tactical units and staffs. We propose the establishment of a formal reserve unit managed, commanded and coordinated by NORSOCOM with close links to the Home Guard (Figure 37). Possible tasks of this Reserve Unit could include:

- Support Homeland Defense: Units would be small and dispersed, ideally in the provinces in which the officers already live.
- Establish or support local community operations and intelligence centers in order to provide situational awareness and ensure rapid response to a variety of potential threats.
- Train the Home Guard in guerilla warfare.
- Backfill personnel going on deployments or deploy the SOF reservists if required.

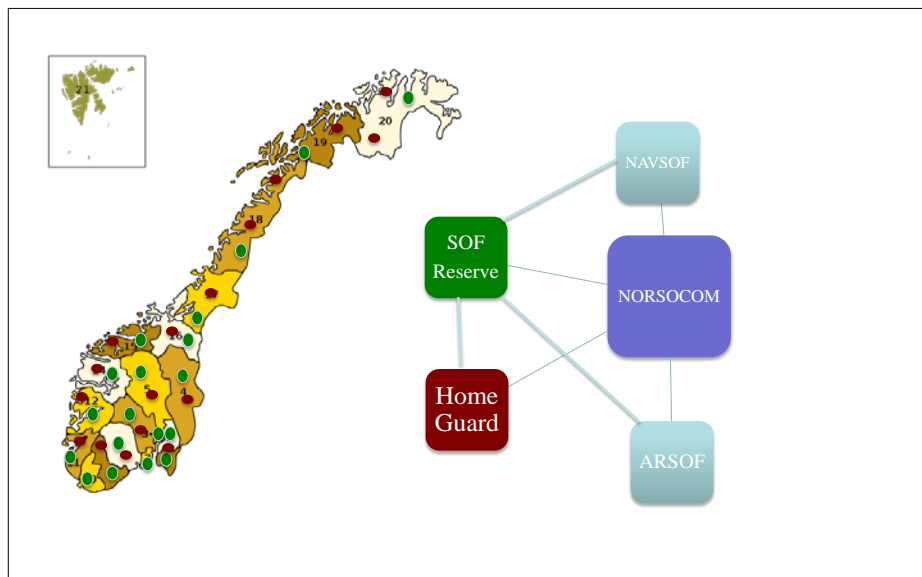


Figure 37. NORSOF Reserve Unit and its Direct Ties.

When attaching a small SOF reserve team to a Home Guard unit, COMNORSOF should have OPCOM over the teams that would train with the Home Guard. Each team also should have geographical responsibility and pre-planned missions and have their military equipment stored at home.

A major advantage of establishing a Reserve SOF unit is its ability to retain the talent and experiences of well-trained personnel. By linking reserve units with active duty personnel NORSOF builds a more robust network of SOF operators.

4. Special Operations Air Group

To improve flexibility and integration of air assets in NORSOF the design team also recommends the formation of a Special Operations Air Group (SOAG) with the following tasks:

- Provide ISR through the use of UAV.
- Provide Rotary Wing (RW) and Fixed Wing (FW) platforms to support NORSOF operations domestic and international.
- Provide Joint Fires to NORSOF units.

Complex NORSOF operations often require the use of RW. In order to fully support NORSOF's missions, the RW pilots require specialized flying skills and a thorough understanding of mission profiles. Also, quick and detailed planning under time-compressed circumstances is often required. Given the above mentioned requirements, we believe NORSOF should have its own organic RW capability.

In addition, we believe strategic airlift should be dedicated to NORSOF. In this case, strict and formalized agreements need to be made with the Air Force, the MoD and NORSOF regarding priorities in missions, notice to move timings and training hours.

5. Training Detachment

The study group believes all-hands selection and the basic operator course will result in an efficient use of instructors and training facilities and will improve interoperability within NORSOF. We therefore recommend the formation of a Training Detachment. It would have the following tasks:

- Recruit from all units within the Armed Forces, including conscripts
- Select new recruits
- Provide a basic operator course after selection

An additional task of the Training Detachment would be to safeguard NORSOF's Arctic and maritime fighting skills. These skills are essential to protect Norway's domestic and international interests identified in Chapter IV (Tasks) and Chapter VI (People). Once the operator finishes the basic operator course, he will receive additional specialized training at the tactical unit to which he is assigned.

Figure 38 below illustrates how all five recommended changes might be combined into one structural design.

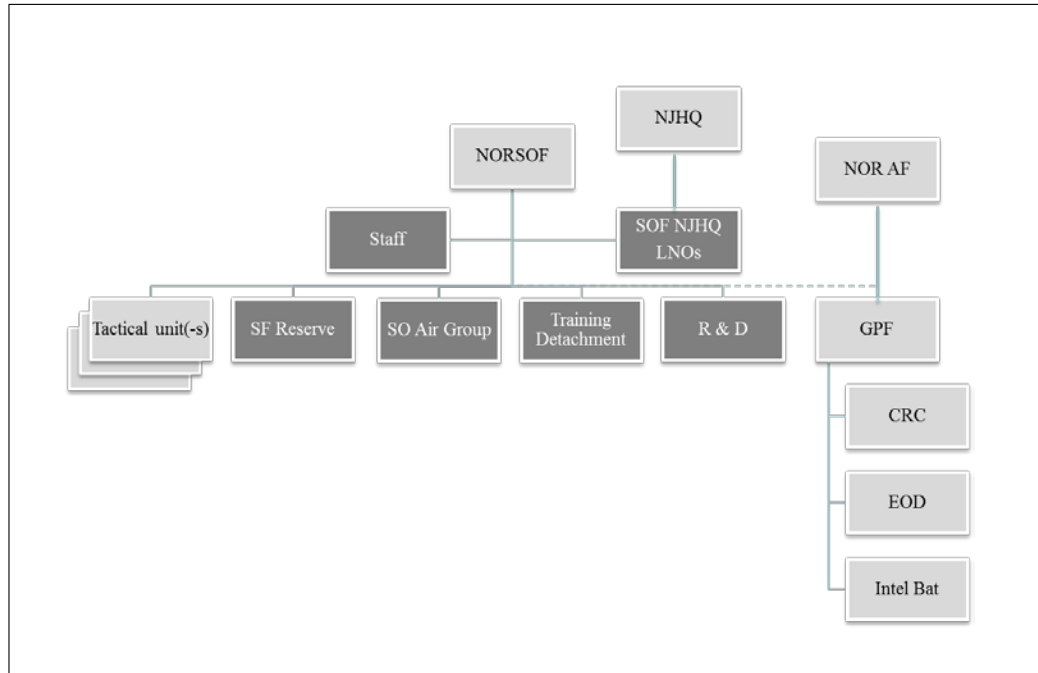


Figure 38. Organizational Structure, Recommendations in Dark Grey.

C. TACTICAL UNIT OPTIONS

The next question the design team tackled is how to structure the tactical units. We identified five options which are illustrated in Figure 39:

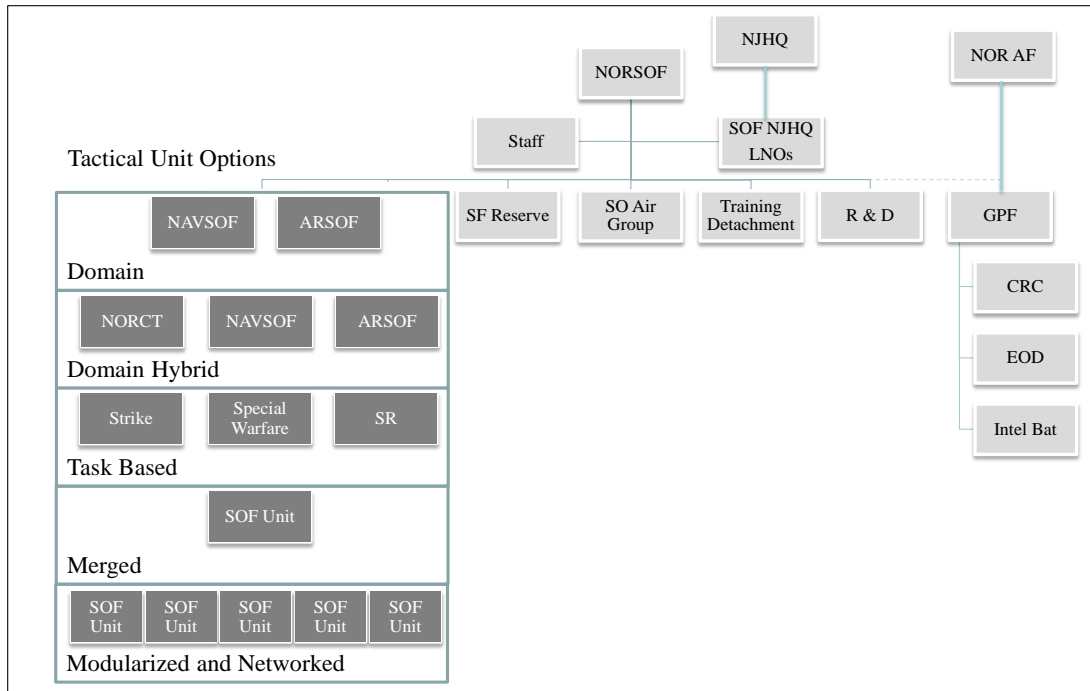


Figure 39. NORAF Tactical Unit Structures (Dark Grey).

(1) *Domain Option:* This option has two tactical units which originate from the Navy and the Army. The units are intended to focus on the maritime and land domains respectively. The distinctions between *land* and *maritime* are more pronounced compared to the current structure. However, they do keep some overlap, although the design team did not specify what the overlaps in tasks and responsibilities should be.

(2) *Domain Hybrid Option:* This option is similar to the domain option, although however, it calls for a separate CT unit dedicated to conducting CT and HRO nationally and internationally. The CT unit would select experienced operators from the Army SOF and Navy SOF units. The goal is to have all CT unit operators older than 25 years to ensure experienced and mature operators across the board.

(3) *Task Based Option:* This option has dedicated units for Strike, Special Warfare and SR tasks. It is built on the assumption that these tasks are unique

enough to require different types of personnel. Operators would be selected for one of those tasks based on their skill sets and personality.

(4) *Merged Option*: This model merges the tactical units into one single SOF-unit responsible for all domains and tasks.

(5) *Modularized and Networked Option*: This model organizes tactical units in small teams and modular units that are either concentrated or dispersed depending on the mission. Their structures are more network-like compared to traditional hierarchical military organizations. They are also reliant on ICT capability to be fully designed and implemented. Figure 44 provides a tactical-level view of a network configuration. Ad hoc tactical modules in the center draw personnel and resources from force providers and enablers and communicate directly with NORSOCOM. Once deployed, depending on the mission, the network could be more complex and include, among others, international partners, local government actors and NGO's.

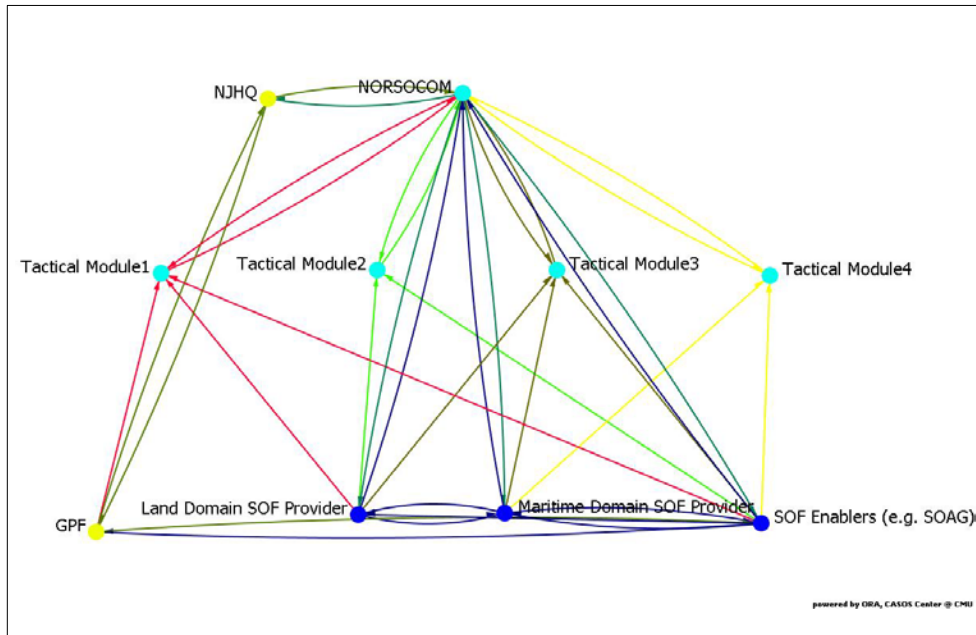


Figure 40. Modularized and Networked Option.

All five options have strengths and weaknesses, advantages and disadvantages. Since the design team did not reach consensus on a recommended tactical unit structure, we offer these five options for future consideration.

Whatever option might be chosen, we want to underscore an important point. On the unit level as well as for NORSOF as a whole, a flat organizational structure is preferable. Flat structures minimize bureaucracy, allow for short and clear communication, and ensure greater flexibility and adaptation to environmental changes. We offer the example in Figure 41 what a tactical unit might look like. Troops are functionally organized (e.g. CT/HRO/DA, SR, MA and land mobility) and supported by a pool of enablers created from staff both inside or outside of NORSOF. A Task Force (TF) is formed drawing on the troops and enablers appropriate to the mission. An on-scene Commander leads the TF.

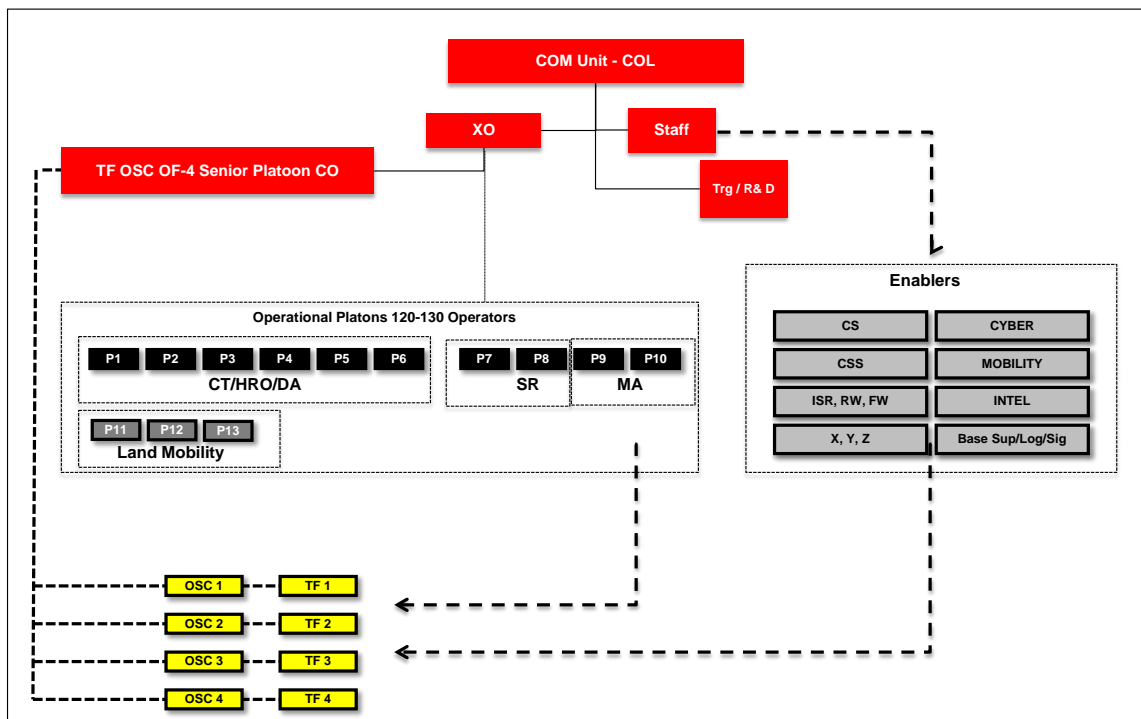


Figure 41. Task Organizing Structure Recommendations.

D. SUMMARY RECOMMENDATIONS

In summary, the design team recommends the following with respect to NORSOF’s future organizational structure:

- A changing role for NORSOCOM that integrates responsibility for force generation and operations.
- The creation of a new Research and Development Cell to keep NORSOF technology, doctrine, and organization at the cutting edge of innovative warfare.
- The development of a SOF Reserve unit that works closely with the Norwegian Home Guard.
- The creation of a new Special Operations Air Group.
- The creation of a new Training Detachment.
- Five options for NORSOF tactical units that need further elaboration and research.


IX. KEY THEMES

The design team finalizes this report with five major themes from the NORSOF 2025 study: the future of warfare and its challenges; NORSOF as a strategic instrument; the growing emphasis on Military Assistance (MA) and Unconventional Warfare (UW); the new technology of warfare; and the importance of innovation.

A. FUTURE WARFARE AND ITS CHALLENGES

Future warfare will go beyond the military domain, challenging traditional organizations and doctrines

- Future conflicts: a hybrid of all types of warfare
- Inter-service, inter-departmental and international cooperation critical for success and a primary task for NORSOF



The figure contains three images. The top image is a cartoon showing a man in a suit at a dinner table with a bottle of wine and a glass, with a speech bubble saying 'TO DIPLOMACY!'. The middle image shows a soldier in a night vision scope. The bottom image shows a soldier in a rubble-filled urban environment.

Figure 42. Future Warfare.

Future conflicts likely will combine high and low tech and high and low intensity warfare and tactics within the same area of operation, often referred to as hybrid warfare. The Ukraine conflict and the last Israel-Lebanese war are recent examples (Metz 2015). This type of modern warfare will require flexibility from operators, staff and commanders (Chapters VII, VI, IV, VIII).

One anticipated consequence of hybrid warfare is the movement of Norway beyond the military domain into the civilian domain. Greater coordination and collaboration among Norway's diplomatic, informational, military and economic (DIME) efforts will be required. Although NORSOF already has demonstrated effective coordination during crises, even higher levels of inter-service, interdepartmental, and

international collaboration between military and civilian organizations at all levels will be needed in the future. Thus, new doctrine will need to be written to govern these interactions and new ways of organizing military units to link up with their counterparts in the civilian sector will have to be devised.

In addition, maintaining strong connections with originating services will be important to maintain continuity and to keep future leaders of NORSOF well integrated with the rest of the Norwegian Armed Forces. Recruiting directly from the other services and rotating personnel in and out of important units and staffs in the conventional military are advisable to improve collaboration. Retaining LNOs within the Navy, Army, Air force and Home Guard Staffs to promote close cooperation within the Norwegian Armed Forces joint operations are also encouraged (Chapters VI, VIII), (Cox 2014), (Fuentes 2015), (Hoehn, Robbert and Harrel 2011), (McLeary 2015).

Norway, a peaceful nation with few military ambitions besides self-protection, needs to maintain its alliances with NATO and Nordic countries. NATO Special Operations Head Quarters (NSHQ) and the Global SOF Network (GSN) are excellent vehicles to develop and sustain these commitments as are NORSOF LNOs who should be sent to close allies to strengthen the NATO-SOF partnership and expand the GSN (Chapters II, IV and VIII). As a small-nation SOF, NORSOF also will be expected to use its arctic, littoral and maritime expertise in these areas and provide training and advice to its allies and partners (Chapter IV). In return, allied partners will be expected to provide access, advice, and training opportunities in areas where NORSOF is less proficient.

B. NORSOF AS A STRATEGIC INSTRUMENT



Figure 43. NORSOF as a Strategic Instrument.

NORSOF should be utilized as a strategic instrument in the protection of Norwegian sovereignty, homeland defense and security, alliance (both Article 5 and expeditionary) and coalition work. For example, it could recommend operations in support of policy and influence policy by identifying opportunities in sync with national interests. Currently, the knowledge of NORSOF's capabilities is limited and needs to be better understood among government officials so that its expertise can better support Norwegian interests (Chapters IV, VI and VII).

People with the Warrior-Diplomat knowledge, skills and abilities necessary to operate on a strategic level are currently a scarce resource in NORSOF. In order to increase the number of personnel in the upper levels of the competencies pyramid, as described in Chapter IV, we recommend a shift at the selection level towards a more cognitive/interpersonal focus. Through increased emphasis on education and lifecycle career planning, highly educated and experienced operators can be developed for the strategic role. By establishing three distinct carrier tracks—SME, Warrior-Diplomat, and Command—NORSOF will ensure that all crucial personnel categories have an education option and can be retained until retirement (Chapters VI, VII and VIII).

C. MILITARY ASSISTANCE AND UNCONVENTIONAL WARFARE

Military Assistance and Unconventional Warfare:

- NORSOFF should focus on building local capabilities
- Utilizing experienced operators ending active duty in reserve for national UW tasks




Figure 44. Military Assistance and Unconventional Warfare.

It is difficult to predict operational demands for SOF in the future. However, enabling allied countries and partner nations by advising or training their security forces (Military Assistance) is likely to be increasingly important and effective. There are many arenas for MA. Eastern Europe, Middle East, Asia and Africa are likely grounds for building capable and lasting local forces. NORSOFF also should attempt to build forces with a similar mindset and positive attitude towards the West which in the future could contribute to mutual security efforts (Chapter IV).

Norwegian Armed Forces will be on the strategic defensive in case of foreign aggression or threats against Norway's sovereignty. NORSOFF should prepare for this mission by creating a distributed SOF Reserve unit to utilize former operators. The unit should report to the NORSOCOM but the operators would train with the Home Guard in guerilla warfare operations in their home province. Their task would be to contribute in a Norwegian UW campaign against an aggressor; and they should also be prepared to conduct unsupported intention-based operations (Chapters IV and VIII).

D. FUTURE TECHNOLOGY OF WARFARE

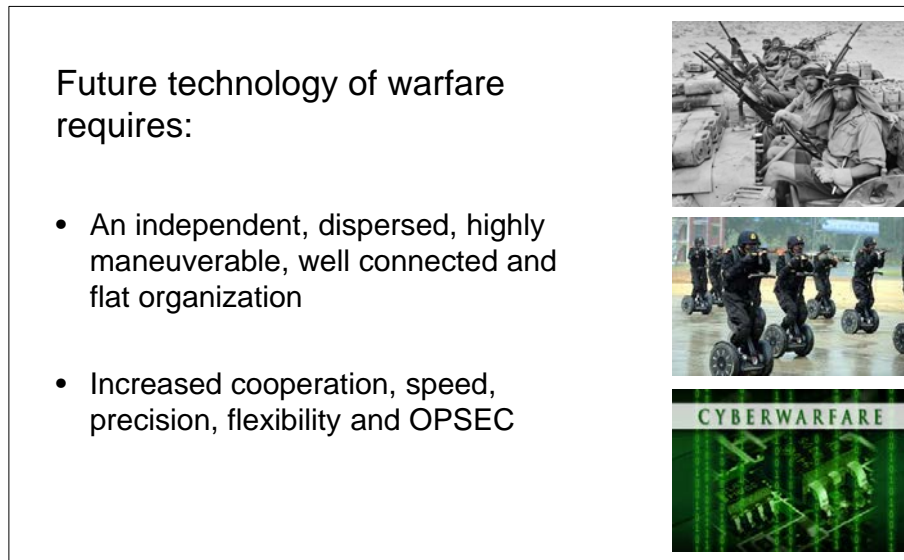


Figure 45. Future Technology of Warfare.

Technology improvements will influence the way NORSOFF organizes and fights in the future. Our analysis in Chapter V on innovative warfare, supported by David Kilcullen (2013), points in the direction of more mobile teams with more lethal technology at their disposal. Troop, patrol, pair and individual operations are more likely scenarios than squadron operations. Squadrons will perhaps mainly be a peacetime organization, as larger units will be more vulnerable to longer-range precision weapons. To succeed, the ability to maneuver quickly to execute missions will be essential (Chapter V). Thus NORSOFF as an organization needs to be flexible, adaptable, and highly maneuverable, suggesting a flatter organizational design.

A flat organization will help establish short feedback loops between the operators, Ground Force Commander, J3 Operations and NORSOFF commanders. Furthermore this type of design will ensure that all key personnel have necessary situational awareness to enable quick and precise responses and decisions (Chapter V and VIII). In addition, an increasingly networked and ICT driven operational environment will enable better coordination among the units, although greater vulnerability to cyber-attacks (Chapter V) should be anticipated and defended against

E. INNOVATION AND RESEARCH & DEVELOPMENT

Innovation and R&D at the center of the organization

- Everybody is a innovator mindset from operator to commander
- Experienced operators blended with research experts in the center of the NORSOF organization to fuel technological, organizational and doctrinal innovation





Figure 46. Innovation and R & D.

Innovation in research and development is central to NORSOF's future success (Chapters V and VII). However, it is difficult to ensure an innovative NORSOF in a strict and hierarchic military bureaucracy. Instead, NORSOF needs to have "safe" places where NORSOF units, commanders and employees have the freedom to try out new ideas, equipment and tactics. They need to work in a supportive culture that allows them to generate and experiment with new ideas, learn from mistakes rather than be punished for their failures. Such a safe space would recruit unconventional and creative thinkers (Chapters V and VIII). The new proposed safe space would be the R & D unit, a hub for technological, organizational and doctrinal innovation. It would integrate experienced Warrior-Diplomat and SME operators with strategic knowledge, and cutting edge researchers and technology experts to coordinate and create new solutions for today's and tomorrow's challenges (Chapter VI, VI, IV, VIII).

X. CONCLUSION

To conclude our NORSOFF 2025 study we turn to the purpose which launched this study: to challenge traditional thinking and create innovative solutions for the future of NORSOFF 2025

A. UNIQUENESS OF RESULTS

There are a number of studies and initiatives looking into the crystal ball to predict the future for Special Operations Forces. To assess the level of uniqueness in the NORSOFF 2025 study the findings should be compared against two lines of previous studies: First, the dominant international view as advocated by USSOCOM in its vision for 2020 and reinforced by and through a number of (mainly U.S.) academic studies, e.g. (Maxwell 2013), (Thomas and Dougherty 2013). Second, the line of studies already conducted for NORSOFF by the Norwegian Defence Research Establishment (FFI).

The NORSOFF 2025 study recommends NORSOFF should be: transformed to be a truly strategic instrument; configured to be a flexible, adaptable, highly maneuverable, well connected network with a flat organization structure; re-organized to support interservice, interdepartmental and international cooperation; redesigned to integrate R&D and organizational innovation; reoriented to increase its emphasis on Military Assistance and Unconventional Warfare; and renewed to take a life-long perspective on career development with multiple career tracks activated to recruit, select, train, educate and retain the right personnel.

It may be argued that few, if any, of these recommendations individually are unique as most have previously been put forward by others in one form or another. However, if you look at the combination of recommendations, dive deeper into the underlying analysis, and apply the Norwegian context, this is a unique set of solutions that have not existed or been proposed in Norway before. If these were fully implemented, NORSOFF in 2025 would be a quite different organization from the current NORSOFF. In this sense, the study has arguably succeeded in adding value to NORSOFF's

long-term planning process. This was also the feedback given by the sponsor to the students after the presentation of the study in May 2015.

B. UNIQUENESS OF DESIGN THINKING APPROACH

There are several ways to produce a unique result. We chose Design Thinking methodology due to its insistence on creativity and its iterative approach to problem solving. Accepting the premise that our study has produced unique results, this seems to have been a good choice of method. The question is, however, to which extent it was the method, the process, the individuals or the group dynamics which contributed the most.

Although not scientifically supported, a quick survey among the study group's members during a wrap-up and lessons learned session indicated that Design Thinking may have encouraged creativity to a greater extent compared to more traditional planning processes. This difference is particularly visible in the later stages of the processes. Whereas traditional linear approaches to problem solving may include an initial creative session, they have, over time, a tendency to become a more programming exercise for the decided course of action. Design Thinking allowed, and even encouraged creativity until the final product was delivered. Although eventually leading to a better result, the flip-side to the creativity was students' impression of a more chaotic, unpredictable, and at times frustrating process than previously experienced in more traditional planning processes.

C. LESSONS LEARNED AND RECOMMENDATIONS FOR NEXT STUDY

Design Thinking methodology was arguably crucial in producing a valuable and unique study for our sponsor, and the methodology should be considered highly relevant and potentially beneficial to complex problem-solving processes where creativity and innovative solutions are sought, both within military and civilian domains. Design Thinking is however not magic, and does not guarantee success. There was a limit to the innovative character of our results, and we did not manage to resolve all issues within our limited timeframe. Some general lessons learned were that to make it work, you need the following:

- Sponsorship for the design challenge
- Time allocated depending on the design challenge
- People trained and practiced with the process
- Skilled designers & facilitators guiding the efforts
- Space to work

An additional lesson learned is that it might be useful to introduce certain elements from more linear processes, e.g. timeline with milestones, decision points etc, to keep track of the process and ensure sufficient progress.

A final recommendation is to carefully point out the characteristics of Design Thinking to the sponsor and other relevant audiences before findings are presented. In order to prepare them for the fact that results and presentations may come in an unconventional and unfamiliar structure, it is important to stress the fact that the design process varies greatly from a traditional military linear planning process.

APPENDIX A: HYBRID WARFARE

1. Introduction

The NORSOE 2025 study group identified Hybrid Warfare as an emerging threat to NATO countries. To explore the wide range of instruments and actions that might go into a hybrid/unconventional attack we organized a wargame with the assistance from other officer students at NPS.⁸ The wargame was executed at NPS in May 2015 and included approximately 20 international subject matter experts with diverse backgrounds from academia and the defense sector.

The wargame was constructed to identify an aggressor's possible order of battle and probable course of action. Insights were later used to analyze key capabilities required to be able to counter the aggressor's operations in such a complex environment. This appendix describes the main findings from the wargame.

2. Scenario

The Scenario is based on the defense of a free and democratic nation (BLUE) against a potent aggressor (RED). BLUE and RED share both a land and maritime border. Both countries are open economies with substantial natural resources. RED's goal is to gain control over a limited geographical part of BLUE (the Area of Interest – AoI), or at least deny BLUE and BLUE's defense alliance, GREEN's, military usage of this area without triggering a war with GREEN. The ultimate purpose of this operation is to strengthen RED's strategic defenses in case of a conflict with GREEN.

3. General overview of the hybrid attack

RED's first aim is to get BLUE to accept a demilitarized zone in the AoI. RED intends to achieve this by generating a situation where BLUE fears it could lose control of the AoI and is willing to negotiate. RED's strategy has three main elements:

⁸ We are grateful to Col (ret.) Jeffrey Appleget and his students LTC (GS) Christoph Hof, German Army, Major Frank Fiebiger, German Army, Major Bilal Sadiq Gondal, Pakistan Army and, Major Jens Peter Hubertus Ruether, German Army for their contributions in planning, executing and documenting the wargame. This appendix is an edited version of a memo written by the four NPS students.

- Establish partnerships and conduct military exercises with other countries, including GREEN, under disguise of a fabricated terrorist threat against RED - this will improve relations and prove the readiness and willingness of RED to act.
- Launch a world-wide media campaign to convince the public opinion that RED is a good and reliable partner, a modern country which respects human rights and supports prosperity for all. Additionally, the goal is to drive a wedge into GREEN by portraying BLUE as a country aggressively violating RED's rights.
- Increase economic collaboration with the BLUE population and tilt the demographic balance in the Area of Interest (AoI) by settling RED migrants – this will affect public opinion in AoI in RED's favor.

RED will launch a synchronized and coordinated whole of government campaign, supported by all its ministries and agencies, to influence and pressure BLUE while simultaneously distracting GREEN from action. The campaign is expected to last at least 12 months, due to long preparation and execution time for subverting initiatives. These include i.a. negotiations to establish new economic collaborations (with friendly nations as well as members of GREEN), to move actors into the right positions and places (politicians, organizations, people), construct facilities (businesses, communications and power grids) and influence people world-wide.

4. Preliminary measures to prepare the battlefield

In the months before the attack, a large media campaign starts to portray RED as a staunch supporter of the United Nations, market economy, freedom rights and fight against international terrorism. Relations to partners are intensified and reassured, military exercises with partner nations are conducted.

RED's industry campaigns to get in closer touch with foreign companies, explore new markets and build new bilateral partnerships. RED's industry secures long term contracts and increases its inventory to be prepared for a long conflict with BLUE and GREEN. Weak points of BLUE and GREEN are identified.

5. Main Courses of Action

RED launches a media campaign to prepare the battlefield. Additionally, it starts a campaign to strengthen the ties to their allies and to gain new partners. This is to build a unified front against the alliance of GREEN. In a next step RED starts an economic campaign to weaken BLUE's economic power, and prepare its own economy for a longer economic war. This is accompanied by an aggressive economic expansion to dispute BLUE's resources and strengthen ties with BLUE's population in the AoI through an "open border and free trade zone" initiative. All this aims to increase RED's influence in the AoI.

RED starts military exercises to prove its ability and willingness to defend itself, and also invites other countries, including GREEN, to anti-terror exercises. The aim is to gain further insight into GREEN's and BLUE's capabilities, alternatively to impeach them internationally if they do not join these exercises.

RED drives a wedge into GREEN by approaching a couple of smaller members of GREEN to make them positive towards RED's interests in the AoI in exchange for economic benefits. RED supports interior uprisings in BLUE and some smaller countries of GREEN (by religious groups, minorities and radical elements) to distract GREEN to focus on internal problems instead of RED's conflict with BLUE.

RED stages incidents and accidents with BLUE civilian and military equipment, which causes great negative impact on the environment and the BLUE population in the AoI. This is used to discredit BLUE internationally and create a sentiment in BLUE's population that military activity should be moved from the AoI.

Cyber-attacks on BLUE hamper and distract the communications and energy network massively, further discredits BLUE's ability to handle problems and leads to loss of credibility both among BLUE's population and in the world community. The whole campaign is supported by a massive media campaign discrediting BLUE's policy and ability to handle all these problems, and praising RED's efforts to assist the population of the AoI.

Through increased economic activity and migration, citizens of RED origin soon become the majority on a remote island in the AoI. Threatening to call a referendum on the separation of the island from BLUE, likely to be lost by BLUE, RED gets the upper hand in negotiations with BLUE. In exchange for a RED promise to call off the referendum, and thereby keeping control of the island, BLUE accepts a demilitarized zone in the whole of the AoI.

6. Conclusion and main outcome of the hybrid attack

After conducting a hybrid war campaign over a time span of a year, with preliminary measures of another half year in advance, RED was able to achieve a new treaty turning the whole AoI into a demilitarized zone. As such, RED reached its first goal.

It is remarkable to note that not a single shot was fired by RED to reach the goal. The key to success for RED was to create a situation of multiple simultaneous threats and challenges for BLUE and GREEN, and then offer to ease these by a relatively modest demand. The demilitarization RED achieved may be seen by GREEN and the rest of the world as not very spectacular, but gave RED a huge strategic advantage in future conflict. The demilitarized zone secures freedom of movement for RED's fleet and hampers the capabilities of BLUE and GREEN for early warning and countering of any RED troop movement into the AoI.

The wargame indicates that hybrid attacks may be a potent way for an aggressor to conduct war. The use of traditional military means is not necessarily the most effective way to achieve the goal. Thoroughly preparation of the "battlefield", a distinct time-phased plan and integrated usage of all possible diplomatic, political, economic and military means may be the key to success.

APPENDIX B: ANTI-ACCESS / AREA DENIAL

1. Introduction

NORSOF should retain its capability to strike a high-tech opponent's key installations in a high intensity scenario. This appendix will demonstrate how SOF can be used targeting an Anti-Air Missile Defense (AAMD) system in a hypothetical high-intensity conflict with a high-tech opponent. The intention is to show a basic example of the use of innovative warfare by a task organized SOF in support of general purpose forces, as earlier discussed in the study.

2. Scenario

The overall purpose for BLUE forces is to degrade and delay the effectiveness of RED's AAMD system in a specific geographical area, in order to set conditions for further air interdiction sorties targeting a military base. It is assessed that only SOF or SOF supported units can infiltrate the area of operation. SOF conduct operations with small and independent units using unconventional tactics and procedures, and may take greater risks (risk to force, risk to mission and risk to third party), than conventional units. A planning team has used the CARVER⁹ analysis methods to identify the AAMD system's point of vulnerability for a strike.

3. Mission Concept

Multiple small teams (2-6 man/team) will be inserted, through a variety of infiltration methods, in the area where it is assessed that the vulnerable component of the AAMD system is operating. The size of the teams is determined by task, training level, experience of the operators, risk and infiltration method, as well as the capabilities needed. SOF will be using small and independent team equipped with sensors and long-range high-caliber weapons as well as high-powered lasers. Also, cyber experts integrated in the teams equipped with computer generated trojans and viruses will be inserted in order to access radio link and/or radar systems for delaying the radar detection

⁹ CARVER stands for *Criticality, Accessibility, Recuperability, Vulnerability, Effect and Recognizability factors* (Federation of American Science 2015).

and creating false targets for the AAMD system. Once the teams have been infiltrated, mini UAV swarms will be used in order to detect the radar system by initiating the target acquisition system. This will allow the ground teams to fix the radar systems in order to either use kinetic, laser or data means to degrade the AAMD system. The UAV swarms will also be equipped with trojan and viruses in order to "overload" the system.

Once the teams have acquired and effected a target, the overall air interdiction operation is triggered when the AAMD system is assessed to be less effective as indicated by damage assessment from the SOF teams as well as other intelligence sources. After the mission, several teams will continue to stay behind in order to report, conduct independent operations including direct action mission as well as unconventional warfare missions and/or prepare for follow-on forces or operations.

LIST OF REFERENCES

- Allee, Verna. 2003. *The Future of Knowledge: Increasing Prosperity Through Value Networks*. Burlington, MA: Butterworth-Heinemann.
- Arquilla, John, and David F. Ronfeldt. 1996. *The Advent of Netwar*. Santa Monica, CA: RAND.
- Brown, Tim. 2009. *Change by design: How design thinking transforms organizations and inspires innovation*. New York: HarperCollins.
- Casey, B.J., R.M. Jones, and T.A. Hare. 2014. *The Adolescent Brain*, New York: Cornell University Press.
- Cambridge, Darren, Soren Kaplan, and Vicky Suter. 2005. *Communities of Practice Design Guide: A Step-by-Step Guide for Design & Cultivating Communities of Practice in Higher Education*. Accessed 28 May, 2015.
<http://www.educause.edu/library/resources/community-practice-design-guide-step-step-guide-designing-cultivating-communities-practice-higher-education>
- Christensen, Clayton M. 2000. *The Innovator's Dilemma*. New York: HarperBusiness.
- Cohen, Don and Laurence Prusak. 2001. *In Good Company: How Social Capital Makes Organizations Work*. Boston: Harvard Business School Press.
- Cox, Matthew. 2014. *Special Operations Chief Wants More Training with Conventional Units*. Military.com, Sept 11. Accessed June 8, 2015.
<http://www.military.com/daily-news/2014/09/11/special-operations-chief-wants-more-training-with-conventional.html>.
- Federation of American Science. 2015. *Fm- 34-36*. Accessed April 20, 2015.
<http://fas.org/irp/doddir/army/fm34-36/appd.htm>.
- Finkel, Meir. 2011. *On Flexibility: Recovery from Technological and Doctrinal Surprise on the Battlefield*. Palo Alto, CA: Stanford Security Studies.
- Fuentes, Gidget. 2015. *Pilot Program Forges Bonds Between Marines and U.S. Special Operations Forces*. USNI News, March 10. Accessed June 8, 2015:
<http://news.usni.org/2015/03/10/pilot-program-forges-bonds-between-marines-and-u-s-special-operations-forces>.
- Glaerum, Sigurd and Alf C. Hennem. 2010. *J-DARTS – An End-to-End Defence planning Tool Set*. Seminar Paper, NATO Science and Technology Organization, RTO-MP-SAS-081 AC/323(SAS-081)TP/329.

- Goldman, Emily and John Arquilla. 2014. *Cyber Analogies*. Monterey: Naval Postgraduate School.
- Gray, Colin S. 1998. *Explorations in Strategy*. London: Praeger.
- Gudmundsson, Bruce I. 1989. *Stormtroop tactics: Innovation in the German Army 1914-1918*. Praeger Publishers.
- Hoehn, Andrew R., Albert A. Robbert, and Margaret C. Harrell. 2011. *Succession Management for Senior Military Positions: The Rumsfeld Model for Secretary of Defense Involvement*. Santa Monica, CA: RAND.
- Holohan, Anne. 2005. *Networks of Democracy: Lessons from Kosovo for Afghanistan, Iraq, and Beyond*. Stanford, California: Stanford University Press.
- Kennedy, Carrie, and Eric Zillmer. 2012. *Military Psychology*. Second Edition: Clinical and Operational Applications. New York: Guilford Press.
- Kilcullen, David. 2013. *Out of the Mountains: The Coming Age of the Urban Guerilla*. New York: Oxford University Press.
- Krulak, Charles C. 1999. *The Strategic Corporal: Leadership in the Three Block War*. Marines Magazine, January.
- Lind, William S, et al. 1989. *The changing face of War: Into the Fourth Generation*. Marine Corps Gazette, October.
- Luttwak, Edward. 1983. *Notes on Low Intensity Conflict*. Parameters, December.
- Martin, Roger. 2009. *The design of business: Why design thinking is the next competitive advantage*. Harvard Business Press.
- Maxwell, David S. 2013. *Thoughts on the future of Special Operations*. Small Wars Journal.
- Metz, Steven. 2015. *Role Reversal: U.S. Special Operations Forces After the Long War*. World Politics Review, March. Accessed June 8, 2015.
<http://www.worldpoliticsreview.com/articles/15209/role-reversal-u-s-special-operations-forces-after-the-long-war>.
- McChrystal, Stanley, Tantom Collins, David Silverman, and Chris Fussell. 2015. *Team of Teams: New Rules of Engagement for a Complex World*. New York: Portfolio Penguin.
- McLeary, Paul. 2015. *Special Ops Must Work With Services, Allies*. Defense News, January. Accessed June 9, 2015.
<http://www.defensenews.com/story/defense/show-daily/solic/2015/01/27/special-forces-islamic-fighters-iraq-syria-army-jihadist-africa/22420107/>.

- Milward, Brinton, and Keith G. Provan. 2006. *A Manager's Guide to Choosing and Using Collaborative Network*. Washington, DC: IBM Center for The Business of Government.
- Norwegian Intelligence Service. 2015. *Fokus 2015 (Focus 2015)*. Accessed June 1, 2015. <https://forsvaret.no/fakta/undersokelser-og-rapporter/fokus>.
- Norwegian Ministry of Defense / Norwegian Defense Expert Group. 2015. *Et felles løft (A joint effort)*. Accessed June 1, 2015. <http://forsvaretavnorge.regjeringen.no/rapporten/>.
- Office of The Director of National Intelligence. 2015. *Global Trends 2030: Alternative Worlds*. Accessed June 1, 2015. <http://www.dni.gov/index.php/about/organization/global-trends-2030>
- Research Council of Norway. 2006. *Large contrasts in living conditions increase immigration pressure from Russia*. Accessed June 1, 2015. http://www.forskningsradet.no/no/Nyheter/_Store_kontraster_i_levekr_gir_innvandringspress_fra_Russland/1236685421821?lang=no.
- Robinson, Linda. 2013. *One Hundred Victories: Special Ops and The Future of American Warfare*. New York: PublicAffairs.
- Roe, Robert. 2002. *Competences - A key towards the integration of theory and practice in work psychology*. *Gedrag en Organisatie*, 15.
- Schelling, Thomas. 2008. *Arms and Influence*. Yale University Press.
- Schmitt, Neal (Edit.). 2012. *The Oxford Handbook of Personnel Assessment and Selection*. Oxford: Oxford University Press.
- Schmitt, Neal. 2014. *Personality and Cognitive Ability as Predictors of Effective Performance at Work*. *Annual Review of Organizational Psychology and Organizational Behavior*. Accessed February 3, 2015. Doi: 10.1146/annurev-orgpsach-031413-091255.
- Simons, Anna (Edit.). 2012. *SOF 2030: An NPS Defense Analysis Seminar Report*. Monterey: Naval Postgraduate School.
- Singer, P. W. 2009 *Wired for War: Advanced Warfare – How we might fight with robots*. New York: The Penguin Press.
- Spulak, Robert, G. Jr. 2010. *Innovate or Die: Innovation and Technology for Special Operations*. Tampa: Joint Special Operations University (JSOU) Report 10-7.

- Stanford Graduate School of Business. 2015. *Executive Leadership Development: Analysis to Action*. Accessed July 28, 2015.
<http://www.gsb.stanford.edu/exed/eld/>.
- Thomas, Jim, and Chris Dougherty. 2013. *Beyond the ramparts – The future of U.S. Special Operations Forces*. Center for Strategic and Budgetary Assessments (CSBA). Accessed June 1, 2015.
<http://csbaonline.org/publications/2013/05/beyond-the-ramparts-the-future-of-u-s-special-operations-forces/>.
- Tucker, David, and Christopher Lamb. 2007. *United States Special Operation Forces*. New York: Columbia University Press.
- U.K. Ministry of Defense. 2014. *Global strategic trends out to 2045*. Accessed June 1, 2015. <https://www.gov.uk/government/publications/global-strategic-trends-out-to-2045>.
- United States Special Operation Command (USSOCOM). 2013. *Factbook 2013*. Accessed January 10, 2015.
http://www.socom.mil/News/Documents/USSOCOM_Fact_Book_2013.pdf.
- Wenger, Etienne, Richard McDermott, and, William M. Snyder. 2002. *Cultivating Communities of Practice: A Guide to Managing Knowledge*, Boston: Harvard Business School Press.
- Wenger-Trayner, Etienne, Mark Fenton-O`Creevy, Steven Hutchinson, Chris Kubiak, and Beverly Wenger-Trayner. 2015. *Learning in Landscapes of Practice*. New York: Routledge.

INITIAL DISTRIBUTION LIST

1. NORSOCOM
Oslo
Norway
2. Dudley Knox Library
Naval Postgraduate School
Monterey, California