NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

OUT OF THE BLUE: NATO SOF AIR WING

by

Andrew M. Jett

March 2012

Thesis Advisor:	Kalev I. Sepp
Second Reader:	Brian H. Greenshields

Approved for public release; distribution is unlimited

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE			*Form Approved OMB No. 0704-0188*

1. AGENCY USE ONLY *(Leave blank)*	**2. REPORT DATE** March 2012	**3. REPORT TYPE AND DATES COVERED** Master's Thesis

4. TITLE AND SUBTITLE Out of the Blue: NATO SOF Air Wing

5. FUNDING NUMBERS

6. AUTHOR Andrew M. Jett

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Naval Postgraduate School
Monterey, CA 93943-5000

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES)
N/A

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. 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. IRB Protocol number NPS.2012.0006-IR-EP7-A.

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited

12b. DISTRIBUTION CODE
A

13. ABSTRACT

There is a critical shortfall in dedicated special operations aviation support for the North Atlantic Treaty Organization's (NATO) special operations forces (SOF). One way this shortfall can be addressed is through the procurement and sustainment of an organic NATO SOF Air Wing. In 2006, NATO's Heads of State and Governments endorsed the NATO Special Operations Forces Transformation Initiative, creating what would eventually become the NATO Special Operations Headquarters (NSHQ). NSHQ coordinates, trains, and employs NATO's special operations forces. These forces have proven invaluable in fighting asymmetric threats due to their light, lean, and agile construct, and their versatile projection of high-impact tactics, techniques, and procedures that create strategic effects.

The research in this study examines NSHQ's requirement for an organic Air Wing and proposes the optimal mix of aviation platforms to support NATO SOF. This optimal mix contains rotary-wing and fixed-wing aviation platforms, as well as intelligence, surveillance, targeting, and reconnaissance aircraft. This research also examines NSHQ's training and readiness organizational structure, and proposes changes based on the development of an organic Air Wing. Dedicated special operations aviation support to NATO special operations forces will greatly enhance the capabilities and mission success of NATO SOF in addressing emerging security challenges.

14. SUBJECT TERMS NATO SOF, NATO SOF Air Wing, AFSOTC, NSHQ, NSHQ Training and Readiness, NATO SOF Training and Education Program, ISTAR, Principal Tasks, NATO Special Operations Headquarters

15. NUMBER OF PAGES 101

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	**18. SECURITY CLASSIFICATION OF THIS PAGE**	**19. SECURITY CLASSIFICATION OF ABSTRACT**	**20. LIMITATION OF ABSTRACT**
Unclassified	Unclassified	Unclassified	UU

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

THIS PAGE INTENTIONALLY LEFT BLANK

OUT OF THE BLUE: NATO SOF AIR WING

Andrew M. Jett
Major, United States Air Force
B.S., United States Air Force Academy, 1997

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN DEFENSE ANALYSIS

from the

NAVAL POSTGRADUATE SCHOOL
March 2012

Author: Andrew M. Jett

Approved by: Kalev I. Sepp
Thesis Advisor

Brian H. Greenshields
Second Reader

John Arquilla
Chair, Department of Defense Analysis

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

There is a critical shortfall in dedicated special operations aviation support for the North Atlantic Treaty Organization's (NATO) special operations forces (SOF). One way this shortfall can be addressed is through the procurement and sustainment of an organic NATO SOF Air Wing. In 2006, NATO Heads of State and Governments endorsed the NATO Special Operations Forces Transformation Initiative, creating what would eventually become the NATO Special Operations Headquarters (NSHQ). NSHQ coordinates, trains, and employs NATO's special operations forces. These forces have proven invaluable in fighting asymmetric threats due to their light, lean, and agile construct, and their versatile projection of high-impact tactics, techniques, and procedures that create strategic effects.

The research in this study examines NSHQ's requirement for an organic Air Wing and proposes the optimal mix of aviation platforms to support NATO SOF. This optimal mix contains rotary-wing and fixed-wing aviation platforms, as well as intelligence, surveillance, targeting, and reconnaissance aircraft. This research also examines NSHQ's training and readiness organizational structure, and proposes changes based on the development of an organic Air Wing. Dedicated special operations aviation support to NATO special operations forces will greatly enhance the capabilities and mission success of NATO SOF in addressing emerging security challenges.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

LIST OF FIGURES

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF TABLES

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF ACRONYMS AND ABBREVIATIONS

AFSOC	Air Force Special Operations Command
AFSOTC	Air Force Special Operations Training Center
ALI	Air-Land Integration
AT	Air Transport
DA	Direct Action
FAA	Federal Aviation Administration
ICAO	International Civil Aviation Organization
ISR	Intelligence, Surveillance, and Reconnaissance
ISTAR	Intelligence, Surveillance, Targeting, and Reconnaissance
JFC	Joint Force Command
MA	Military Assistance
NATO	North Atlantic Treaty Organization
NSAWS	NATO Special Air Warfare School
NSHQ	NATO Special Operations Headquarters
NSOS	NATO Special Operations School
NSTEP	NATO SOF Training and Education Program
NSTI	NATO SOF Transformation Initiative
NSWC	NATO Special Warfare Center
SACEUR	Supreme Allied Commander, Europe
SOATG	Special Operations Air Task Group
SOATU	Special Operations Air Task Unit
SOF	Special Operations Forces
SOTG	Special Operations Task Group
SOTU	Special Operations Task Unit
SR	Special Reconnaissance and Surveillance
USSOCOM	United States Special Operations Command

THIS PAGE INTENTIONALLY LEFT BLANK

EXECUTIVE SUMMARY

A shortfall exists in the North Atlantic Treaty Organization's (NATO) special operations forces (SOF) aviation support that has potential to be detrimental to mission success. In particular, the requirements of NATO SOF's three principal tasks—direct action, special reconnaissance and surveillance, and military assistance—are not being fulfilled. The analysis in this study resulted in a recommendation for the optimal mix of rotary-wing and fixed-wing aircraft to be procured, operated, and maintained by the NATO SOF Headquarters, and is termed the NATO SOF Air Wing. This study also recommends the most effective organizational structure with which to build the Air Wing's training and maintain readiness.

The NATO SOF Air Wing is composed of multiple Special Operations Air Task Units (SOATU). This study focuses on constructing the SOATU, which would form a Special Operations Air Task Group when necessary. The requirements for the SOATU are developed through an examination of key documents and the statistical analysis of the NATO SOF Air Wing survey. The survey was administered to NATO Special Operations Headquarters personnel, multinational special operations forces who have conducted special operations in support of NATO, and international students at the Naval Postgraduate School who have NATO special operations experience. The combination of key documents and survey results indicated that a nearly three-to-one mix (71.4% to 28.6%) of rotary-wing to fixed-wing aircraft would meet the requirements of the NATO SOF Air Wing. Both manned and unmanned ISTAR platforms are also required. These results can be seen in Chapter III, Sections B and C.

Determining which types of rotary-wing and fixed-wing assets should comprise the SOATU required an examination of recent conflicts in which NATO took part. The conflicts were categorized as large-scale or small-scale. This study concluded that NATO engages in one large-scale and up to four small-scale conflicts at any one time, and that large conflicts require up to four Special Operations Air Task Units, while small conflicts require one SOATU. Additionally, a single SOATU is required to be permanently

assigned to garrison for initial and continuation training. In total, a requirement exists for nine SOATUs to comprise the Air Wing. This can be seen in Chapter IV, Section A. Sections B and C of Chapter IV determine the optimal mix of airframes and ISTAR aircraft that should comprise the SOATU. The optimal mix is four medium-lift rotary-wing aircraft, two heavy-lift rotary-wing aircraft, two medium fixed-wing aircraft, three unmanned ISTAR platforms, and two manned ISTAR platforms. Nine SOATUs—the NATO SOF Air Wing—equate to thirty-six medium-lift, eighteen heavy-lift, eighteen medium fixed-wing, twenty-seven unmanned ISTAR, and eighteen manned ISTAR platforms.

Chapter V examined the training and readiness organizational structure changes required to meet the demands of a SOF Air Wing. The Air Force Special Operations Training Center (AFSOTC) at Hurlburt Field, Florida was selected as a potential model. Through AFSOTC organizational analysis and interviews with key personnel, this study determined that a new entity should be established under NSHQ—the NATO Special Warfare Center (NSWC) that is commanded by an OF-6. The NSWC would consist of the NATO Special Operations School and the NATO Special Air Warfare School, both commanded by an OF-5 and on par with the Deputy Chiefs of Staff for Support, Operations, and Readiness. These proposed changes can be seen in Chapter V, Section D.

The strategic utility of NATO special operations forces is instrumental in achieving and maintaining security not only for the Alliance members, but in each region of the globe. An organic NATO special operations aviation capability will increase the effectiveness of NATO SOF and enable mission success as the Alliance tackles complex global security challenges. The NATO SOF Air Wing recommended in this study provides a construct to assist NSHQ meet its special operations aviation goals, better enabling NATO SOF to meet the threats of the twenty-first century.

ACKNOWLEDGMENTS

First and foremost, I would like to extend my gratitude and love to my family, whose patience and encouragement helped me succeed.

I offer my sincerest thanks to the faculty of the Naval Postgraduate School's Department of Defense Analysis. Whether through classroom instruction or personal discussion, your inputs have helped steer me through the outstanding curriculum, and you have fostered a learning environment unlike any other of which I have been a part. I extend a very special thank you to Professor Kalev Sepp, Colonel Brian Greenshields, and Professor Bill Fox. Your thoughtful guidance and mentorship encouraged me to obtain goals that were not even imagined prior to coming to Monterey.

I would also like to thank the staff and associated personnel at both the NATO Special Operations Headquarters and the Air Force Special Operations Training Center. Your insights and support were the key portions of this study. I would like to specifically thank Cory Peterson, Manny Diwa, and Mike Maksimowicz, all of whom found time in their hectic schedules to help guide me through crucial areas of an organization that was unfamiliar to me when I began this project.

Finally, I wish to offer my gratitude to all the special operations aviators that have cleared the path before me, accept the AFSOC challenge today, and who will hit the zone, kick out the bundle, and keep "eyes on" for years to come—anyplace, anytime, anywhere.

This study is dedicated to the memory of the Air Commandos who perished aboard Ratchet 33 on February 18, 2012, while supporting multinational special operations forces during Operation ENDURING FREEDOM. Your immense contributions to special operations forces everywhere will not be forgotten.

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

> *One of the key lessons learned from [Operation EAGLE CLAW] is that the operational packaging of SOF requires organic, dedicated, or habitually-associated air assets and capabilities specifically tailored and embedded in the force structure to perform or support special air operations.*[1]
>
> —Lt Gen Frank J. Kisner, Commander, NSHQ, 2011

A. OVERVIEW

The North Atlantic Treaty Organization (NATO) was formed in 1949 in response to the growing threat of the Soviet Union following World War II. It is both a political and a military alliance that, according to its website, "promotes democratic values and encourages consultation and cooperation on defense and security issues … and is committed to the peaceful resolution of disputes," but will utilize its military power when necessary.[2] There are twenty eight members of the Alliance, and many others associated with the Alliance through different programs, such as Partnership for Peace.

The Alliance, effective enough to outlast the Soviet Union, faces different threats in the current global landscape. Many of these threats originate from non-state actors employing asymmetric means, including terrorism, to carry out their agendas. Security is paramount, and its importance is punctuated by successful terrorist actions; unsuccessful terrorist actions serve as reminders that the Alliance, and all who oppose such aggression, must be proactive in its defense. Special operations forces (SOF) have proven invaluable in fighting asymmetric threats due to their light, lean, and agile construct, and their versatile projection of high-impact tactics, techniques, and procedures that create strategic effects. However, prior to 2006, NATO lacked an organization that could coordinate, train, and employ SOF. At the 2006 Riga Summit, NATO's Heads of State and Governments endorsed the NATO SOF Transformation Initiative (NSTI) that, in the words of then-NATO Secretary General Jaap de Hoop Scheffer, "aim[ed] to increase the ability

---

[1] Frank J. Kisner, "Kindelan Speech," delivered November 18, 2011, author's collection. Operation EAGLE CLAW was the aborted hostage rescue mission in Iran in 1980.

[2] "What is NATO?" accessed January 2012, http://www.NATO.int/cps/en/NATOlive/what_is_NATO.htm.

of Special Operations Forces to train and operate together" and "has already proven to be a tremendous success."[3] The Transformation Initiative created the NATO SOF Coordination Center, which reorganized into the NATO SOF Headquarters (NSHQ) in 2010. The current commander of all NATO military forces, U.S. Navy Admiral James Stavridis, states that "the emergence of NSHQ comes at an opportune moment as NATO looks to the horizon at emerging security challenges in which the agility of Special Operations Forces will proved enormously advantageous to the Alliance."[4]

B. PURPOSE AND SCOPE

A shortfall exists in the North Atlantic Treaty Organization's special operations forces aviation support that has potential to be detrimental to mission success. In particular, the requirements of NATO SOF's three principal tasks—direct action, special reconnaissance and surveillance, and military assistance—are not being fulfilled. The analysis in this study resulted in a recommendation for the optimal mix of fixed-wing and rotary-wing aircraft to be procured, operated, and maintained by the NATO SOF Headquarters, along with the most effective organizational structure with which to build its associated training and maintain readiness. Tilt-rotor aircraft are not considered in this study due to the aircraft's limited availability. Should tilt-rotor aircraft become widely available in the future, additional research should include this type of aircraft. This optimal aircraft mix and associated training and readiness organizational structure will satisfy the requirements of the principal tasks and will assist NSHQ in reducing current shortfalls in NATO SOF aviation, better enabling NATO SOF to meet the threats of the Twenty-First Century.

The scope of this research includes analysis of special operations aviation capabilities, NATO SOF aviation desires based on NATO principal tasks and NATO leadership and ground force inputs, and U.S. Air Force special operations aviation

3 NATO Special Operations Headquarters, "NATO Special Operations Forces: Key to Mission Success at Strategic Level," (2009): 2.

4 NATO Special Operations Headquarters, "NATO Special Operations Forces: The Future Has Begun," (2011): 3.

training and readiness organizational structure. The analysis in this study can be exported to any nation or international organization that desires to procure, operate, and maintain its own fleet of SOF aircraft.

C. BACKGROUND

The 2010 NSHQ Biennial Review highlights the deficiency in NATO SOF aviation support, and states:

> The lack of air support significantly degrades the capability to conduct Special Operations, restricting SOF units in range, stealth, and speed…. [A] recurring loss of critical assets and subsequent mission cancelation often translates to significant opportunity costs.[5]

The importance placed on NATO SOF demands that they be equipped accordingly. NATO SOF Headquarters does not own and operate its own aircraft, and NATO SOF are at the mercy of partner nations that are not necessarily able to commit air support.

According to its mission statement, NSHQ "is the primary point of development, direction and coordination for all NATO Special Operations-related activities in order to optimize employment of Special Operations Forces to include providing an operational command capability when directed by SACEUR."[6] Since September 11, 2001, the United States and its allies have been engaged in combat and non-combat operations in an effort to disrupt, dismantle, and defeat extremist organizations. The complexity with which these organizations operate requires integrated, multifaceted military efforts from all nations that place importance on preserving their way of living. Special operations forces have been, and will continue to be, integral in the fight against extremist organizations and their supporters; the importance of international SOF is highlighted by the creation of NSHQ.

Twenty-six of the twenty-eight NATO member nations have a SOF capability, but only six have a special operations aviation capability. These SOF units are responsible

---

5 NATO Special Operations Headquarters, "Biennial Review," (2010): 52.

6 NATO, "Campaign Design Framework," accessed July 10, 2011, http://www.NSHQ.NATO.int/NSHQ/NSHQ_Campaign_Design_Framework.pdf.

not only for NATO security, but also for that of their home nation. The lack of dedicated NATO SOF aviation causes intermittent contact and training, creating *ad hoc* SOF organizations in time of conflict; mission degradation, cancelations, and overall ineffectiveness are trademark results of SOF organizations without habitual training relationships.[7] The NSTI has made considerable progress in building lasting, cohesive relationships among member nation SOF, but more must be done to create an effective force.

D. LITERATURE

The literature review is divided into two categories: (1) relevance to a NATO SOF Air Wing concept, and (2) relevance to a NATO SOF Air Wing organizational construct. Each piece of literature analyzed has been looked at through one, or both, of these two lenses.

Many of the references contain supportive information regarding the formation and expansion of NATO SOF into its own entity, whether in its initial form of the NATO SOF Coordination Center, or its current form as the NATO SOF Headquarters. There is mutual agreement among many of the authors that it is imperative SOF become its own organization within NATO. Many of the references' authors—among them Admiral James Stavridis, Supreme Allied Commander, Europe, Admiral William H. McRaven, Commander, U.S. Special Operations Command, and Lieutenant General Frank J. Kisner, Commander, NSHQ—also agree that dedicated airmen and airlift, and the habitual training relationships that develop are essential to SOF reducing its documented mission degradation and failures due to lack of aviation support. Several documents outline aviation support in relation to the NATO SOF principal tasks, and only one attempts to argue in favor of particular aircraft and unit size. Although this one document provides an outline for specific aviation capabilities and assets, it does so only on a minimal scale and does not meet the larger needs of NATO SOF, nor does it provide a robust organizational structure under which the aviation program can mature.

[7] NATO, "Narrative—The Story of NATO SOF," accessed July 10, 2011, http://www.NSHQ.NATO.int/NSHQ/page/APCN/.

A critical void in the literature is that the extended requirements of NATO SOF aviation are not addressed. The research in this study examines all of the activities within the principal tasks to determine NATO SOF aviation requirements, as well as produces descriptive statistics on ground and maritime operator desires, in order to provide a thorough breakdown of each type of aircraft needed to satisfy NATO SOF aviation requirements. The research also yields an organizational structure that will optimize NATO SOF aviation training and doctrine implementation. To the best of my knowledge, no document exists that has accomplished the full intent of this research.

Table 1 contains a stoplight chart for each piece of literature relative to the two lenses through which it was examined. Each reference contains a short description of the material. If the reference contains strong relation to a particular lens, it is colored green and contains a "G" to the right of its description; if the material is somewhat relative and might be of use, it is colored yellow and contains a "Y" to the right of its description. If the reference does not provide useful material, it is colored red and contains a "R" to the right of its description. The "Reference" column contains only the title of the literature—a full bibliography is located at the end of this study.

Reference	Relevance to NATO SOF Air Wing		Relevance to Organizational Construct	
NATO Special Operations Forces: Key to Mission Success at Strategic Level	Outlines principal tasks and discusses associated aviation requirements	G	Relative to NSHQ as a whole	Y
NSHQ Special Operations Air Group	Very specific discussion on requirements and platforms	G	Very specific discussion on organizational structure	G
Special Operations Aviation in NATO: A Vector to the Future	Discusses air wing concept and aviation requirements	G	Discusses need for dedicated airmen and aircraft	G
USAF Irregular Warfare Concept White Paper (AFSOC)	Outlines activities associated with IW and their aviation requirement (heavy on AvFID)	G	Discusses need for wing, not how the wing should be administratively structured	Y
Creating a NATO Special Operations Force	Does not address aviation requirements	R	Discusses organizational breakdown of NATO SOF, to include U.S. coordination	G
Transforming NATO Special Operations	Does not address aviation requirements	R	Discusses organization only at the NSCC level	Y
North Atlantic Treaty Organization Special Operations Forces Study	Annex A discusses air mobility requirements	G	Section V—relative to NSHQ as a whole. Annex A—need for SOF air component	G
NSHQ Biennial Review, 2010	Discusses need for air mobility and ISTAR support	G	Discusses organization only at the NSHQ level	Y
NSHQ Manual 80-004, Special Air Warfare Manual	Chapter 1 outlines fundamentals of Special Air Warfare	G	Chapter 2/4—C2 and Organization	G
The 21st Century Air Force Irregular Warfare White Paper	Discusses requirement for irregular warfare aviation capability	G	Discusses organization only within purview of current USAF alignment	Y
Spec Ops: Case Studies in Special Operations Warfare Theory and Practice	Principle of REPETITION applies, particularly in the examples using glider aircraft	G	McRaven's theory validates the need, through case study analysis, for standing SOF	G
In the Devil's Shadow: UN Special Operations During the Korean War	Offers examples of various spec ops ad-hockery with respect to aviation	Y	Conclusion outlines drawbacks of not having dedicated C2 structure for spec ops, with some emphasis on aviation	G
United States Air Force Warfare Center Air Advisor Handbook	Provides background, requirements, and TTPs for military air advisors (MA)	G	Discusses organizational structure for air advisor units and ops in Partner Nations	G
Airpower in Small Wars: Fighting Insurgents and Terrorists	Provides history of airpower in low-intensity conflicts	G	Discusses command and control of air assets in low-intensity conflicts	Y
Kindelan Speech by Lt Gen Kisner	Provides vision and support for NATO SOF Air Wing	G	Addresses current efforts to develop guidance for NATO SOF Air Wing way ahead	Y

Table 1. Relevant Literature.

E. THEORETICAL FRAMEWORK

NATO's special operations forces can operate in hostile, denied, and politically sensitive areas in all portions of the globe, although oftentimes the operating environment is dynamic and uncertain. NATO SOF's broad scope of responsibility is outlined by its three principal tasks: direct action (DA), special reconnaissance and surveillance (SR), and military assistance (MA). Direct action missions are often used against "well defined targets of strategic and operational significance," and employ a host of tactics including, but not limited to, raid, ambush, direct assault, munitions placement, and acting as liaison and terminal guidance for ground, air, and naval weapons delivery.[8] SR involves the collection of high-value, often time-sensitive, information when traditional collection methods are deficient, and may include the use of techniques, equipment, and collection methods from host-nation or indigenous forces.[9] Military assistance is similar to USSOF's Foreign Internal Defense activities, and includes support to other nations or indigenous forces in peace, crisis, and conflict, through training, material assistance, or direct employment.[10] A future NATO SOF Air Wing must be able to support these three principal tasks. The author investigated three hypotheses to develop an optimized air wing.

1. Rotary-Wing Versus Fixed-Wing

Due to the wide range of required capabilities, a more varied mix of fixed-wing aircraft types than rotary-wing aircraft types will be necessary. It is clear that NATO SOF's responsibilities cover an immense spectrum. Dedicated special operations aviation support is necessary to enable ground and maritime SOF to successfully accomplish their missions in support of NATO SOF's principal tasks. While rotary-wing assets find optimal employment at the terminal point of most SOF missions, such as infiltration and exfiltration of forces, most rotary-wing requirements can be filled by a single type of light lift and a single type of medium-lift asset. Fixed-wing assets, on the other hand,

[8] NATO, "NATO Special Operations Forces: Key to Mission Success at Strategic Level," (2009): 12.

[9] NATO, "Key to Mission Success," 11–12.

[10] NATO, "Key to Mission Success," 12.

will require a heavy-lift capability in addition to a light and medium-lift capability, as well as Intelligence, Surveillance, Targeting, and Reconnaissance (ISTAR) assets.

2. Manned and Unmanned Aerial Systems

The optimized mix of ISTAR assets will include both manned and unmanned aerial systems. According to the 2010 NSHQ Biennial Review, SOF are restricted by the deficiency of ISTAR assets; indeed, a "recurring loss of [ISTAR] assets and subsequent mission cancelation often translates to significant opportunity costs."[11] Rotary wing assets are capable of performing this mission, but are limited by duration. Fixed-wing assets may provide greater longevity, contributing to improved capabilities over a longer period of collection development. Currently there are a multitude of examples with fixed-wing ISTAR capabilities, to include manned and unmanned aerial systems. While more publicity exposes the capabilities of unmanned systems more than manned systems, such as ongoing drone strikes in Pakistan, manned systems have proved extremely valuable in many current operations.

3. Training and Readiness Organizational Structure

Assuming NSHQ is given the ability to procure, operate, and maintain an organic SOF aviation fleet, NATO SOF's training and readiness section will need to overhaul its organizational structure to account for a wide range of aircraft capabilities and aircrew skill. Their current structure is insufficient to meet the demands of an organic air wing. NSHQ's current training and doctrine is administered through an organization called NSTEP—the NATO SOF Training and Education Program. NSTEP offers a variety of programs with the aim of "[advancing] the integration, synchronization, and interoperability of all SOF."[12] Aviation support to NATO SOF has been a limiting factor, as "Nations are reluctant to release [aviation] assets not only for NATO operations, but also for inclusion in deliberate planning and response force rotations."[13] The right mix of

---

11 NSHQ, "Biennial Review," 52.

12 NATO Special Operations Headquarters, "NSTEP Overview," accessed August 21, 2011, http://www.NSHQ.NATO.int/NSTEP/page/overview/.

13 NSHQ, "Biennial Review," 51.

aircraft, and an effective training and readiness organizational structure, will permit NATO SOF to remain efficient and flexible, and reduce or eliminate mission degradation.

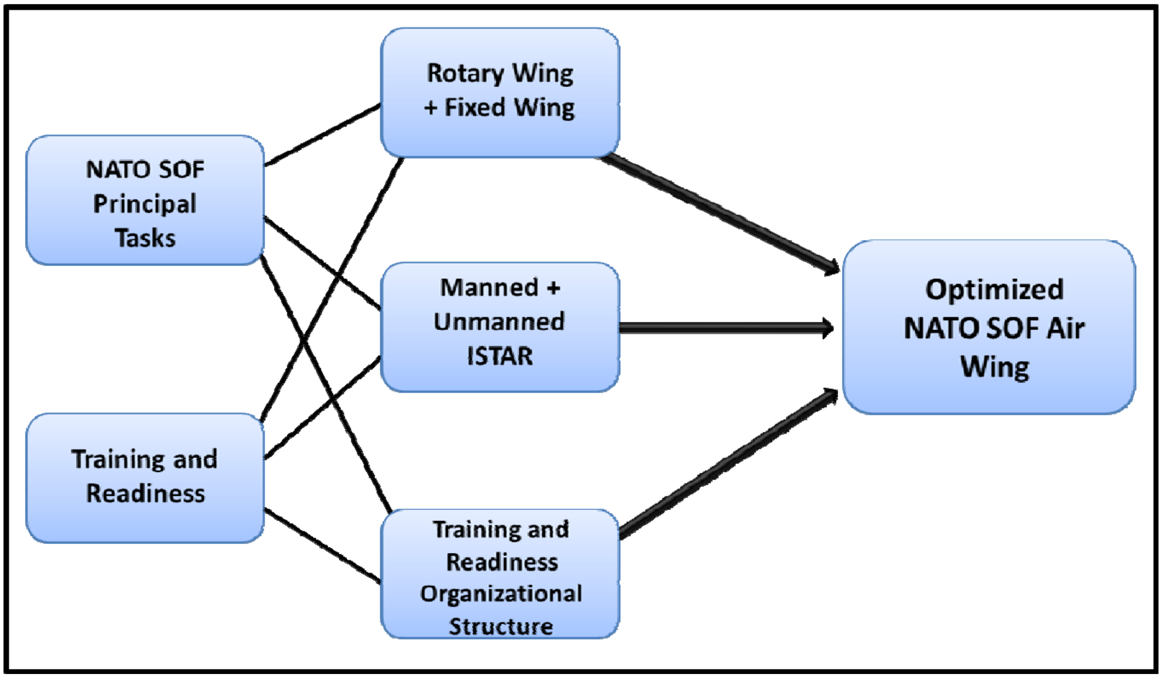

Figure 1. Developmental Framework.

F. METHODOLOGY

The research topic is addressed using three avenues: (1) categorization of aircraft through defining and highlighting special operations aviation characteristics and capabilities, (2) combining pertinent NATO documents with interview and survey research conducted with NATO SOF personnel, and (3) analysis of U.S. Air Force special operations aviation training organizational structure using AFSOC's Air Force Special Operations Training Center (AFSOTC) as a model.

Historical examples of special operations aviation demonstrate the inherent flexibility and versatility of both aircraft and aircrew. The proposed optimal NATO SOF Air Wing consists of aircraft categorized by type and capability. This research uses historical special operations aviation examples and current aviation authoritative guidance to develop definitions and categories of aircraft that comprise the proposed NATO SOF Air Wing.

Additionally, this study uses survey research and interviews to gain additional insight which was not readily available in published data. Written endorsement from NSHQ and AFSOC was obtained prior to conducting the surveys and interviews. The survey population consisted of NSHQ personnel, students and cadre from the NATO SOF Training and Education Program (NSTEP), NATO SOF-affiliated international students enrolled in the Naval Postgraduate School's Department of Defense Analysis, and international SOF personnel that have performed deployed combat actions with NATO SOF at the Special Operations Task Group (SOTG) and Special Operations Task Unit (SOTU) levels. Face-to-face interviews were conducted at NATO Special Operations Headquarters in Mons, Belgium, at NSTEP's facilities at Chièvres Air Base, Belgium, and at U.S. Air Force Special Operations Command at Hurlburt Field, FL with senior officers in key positions. Surveys and interviews provided additional insight into the strengths and weaknesses of NATO SOF air support over the previous two decades, as well as vision for a more robust NATO SOF aviation capability.

Finally, most organizations cannot function successfully without an effective structure. USSOF has been highlighted by NATO's Training and Readiness Division as a model upon which to build—"The habitual relationships of the ground and air components of U.S. Special Operations Forces during training and operations produced unprecedented effects in a short period of time and should be a model for NATO SOF operations."[14] Therefore, this research included an organizational analysis of USSOF aviation using the AFSOTC model, and compared that organization to current NATO SOF training and readiness structure. A training and readiness organizational model for the proposed NATO SOF Air Wing is recommended based on that analysis.

---

14 NATO, "Key to Mission Success," 14.

II. AIRCRAFT CATEGORIZATION

A. SPECIAL OPERATIONS AIRCRAFT CAPABILITIES—A BRIEF HISTORY

Ten feet and 6.8 miles per hour—these numbers describe the maximum altitude and top speed of the first manned powered flight made by Orville Wright in the Wright Flyer more than a century ago in Kitty Hawk, North Carolina.[15] Eighty-five thousand sixty-eight feet and 2,193.167 miles per hour—these numbers describe the altitude and speed records set by men flying the military reconnaissance airframe SR-71 Blackbird in 1976.[16] Seventy-three years, 85,058 feet, and 2,186.367 miles per hour separate these two aerial achievements, and over thirty-five years have passed since the Blackbird records were set. Many aviation companies, airframes, concepts, and capabilities have been developed since Orville's flight. The Lockheed C-130 Hercules, for example, has been modified to provide tactical airlift, close air support in the form of a gunship, airborne firefighting, search and rescue, electronic warfare, aerial refueling, psychological operations, land on snow and ice with skis, and fly into hurricanes for weather reconnaissance—and this list is not all-inclusive.

Historical examples of aircraft used in special operations offer a broad array of types and capabilities. The U.S. special operations aviation community is rooted in the World War II-era top secret operation, Project 9. Project 9 was established to assist British General Orde Wingate's long-range penetration missions performed by the Chindits in the China-Burma-India theater of operations. The all-volunteer Project 9 force consisted of 348 aircraft and 523 men, and was assembled in less than thirty days.[17] Embarking on what came to be known as Operation THURSDAY, the airmen performed low-level infiltration, extraction, glider operations, short takeoff and landing operations

[15] National Park Service, "The First Flight—1903," accessed January 25, 2012, http://www.nps.gov/wrbr/historyculture/thefirstflight.htm.

[16] "Blackbird Records," accessed January 25, 2012, http://www.sr-71.org/blackbird/records.php.

[17] Herbert A. Mason, Jr., *Operation Thursday: The Birth of the Air Commandos* (Honolulu, HI: University Press of the Pacific, 1994), 15.

from unimproved surfaces, aerial resupply, observation, close air support, and casualty and medical evacuation. Following Operation THURSDAY, General Hap Arnold, Chief of the U.S. Army Air Corps, officially named the aviation unit the 1st Air Commando Group. A comprehensive list of aircraft used during Project 9's activities can be seen in Table 2.

PROJECT 9 AIRCRAFT	
Troop Gliders (CG-4A)	150
Light Planes (L-1/L-5)	100
Fighters (P-51A)	30
Training Gliders (TG-5)	25
Large Transports (C-47)	13
Small Transports (UC-64)	12
Bombers (B-25H)	12
Helicopters (YR-4)	6
Total	**348**

Table 2. Project 9 Aircraft.[18]

The Korean War provided another example of the broad and unique abilities of special operations aviation. Unit 4, later called the Special Air Mission detachment, was carved out of the 21st Troop Carrier Squadron and began performing tasks for Operation AVIARY.[19] These tasks, crucial to the United Nations efforts in Korea, included Korean agent parachute drops behind enemy lines, psychological warfare in the form of leaflet drops and loudspeaker broadcasts, cargo hauling, casualty evacuation, and strike missions. Some of these strike missions were the result of special operations ingenuity—Unit 4 commander, Captain Heinie Aderholt, slung napalm drop tanks to the bottom of C-47 transports and unleashed his crews to "attack targets of opportunity with the very

[18] Mason, Operation Thursday, 15.

[19] Michael E. Haas, *In the Devil's* Shadow*: UN Special Operations During the Korean War* (Annapolis, MD: Naval Institute Press, 2000), 92.

unauthorized 'C-47 low-level bombers.'"[20] The final two years of the Korean War saw B Flight, 6167th Operations Squadron perform special operations air missions with its B-26, C-47, and C-47 aircraft—these missions included more agents insertions and psychological operations, as well as "Firefly" missions that utilized flares to light up enemy positions at night.[21]

The 1960s era contains several examples of special operations aviation in both southwest and southeast Asia. As Kurds began to establish their own autonomous region in the northern portion of Iran in 1963, the Shah of Iran requested help for the United States. Help came in the form of a large Green Beret team and just two special operations pilots. The pilots modified T-6 aircraft with machine guns, rockets, and bombs to perform close air support missions, and C-47s with special gear to perform psychological warfare missions.[22] The two pilots acted in an advisory role as Iranian pilots effectively flew the modified aircraft, nullifying the Kurdish threat. Well-chronicled are the special operations aviation efforts in southeast Asia during the same time period. Aviators flying C-123 defoliation missions over Vietnam for Project RANCH HAND, AC-47 "Puff the Magic Dragon" Gunships in close air support missions for ground special operations teams, and training, advising, and assisting Vietnamese, Laotian, and Thai pilots in the Farm Gate Detachment highlights potential roles and missions for special operations aviation, and articulates the flexibility and versatility of both the aircraft and the airmen who crew them.

B. DEFINITIONS

This study does not focus on specific aircraft, such as the Hercules or Sikorsky CH-47 helicopter. Rather, it proposes the NATO SOF air wing consistency in terms of groups and numbers of light, medium, and heavy aircraft. These numbers are based on stated and desired capabilities, which will be analyzed in Chapter III. Three groups of

---

[20] Haas, *In the Devil's Shadow*, 96.

[21] Michael E. Haas, *Apollo's Warriors: U.S. Air Force Special Operations During the Cold War* (Maxwell Air Force Base, AL: Air University Press, 1997), 40–49.

[22] Michael E. Haas, *Air Commando! 1950-1975: Twenty-Five Years at the Tip of the Spear* (Hurlburt Field, FL: Air Force Special Operations Command, 1994), 39.

aircraft are examined. The first two groups are fixed-wing and rotary-wing aircraft. Fixed-wing and rotary-wing aircraft are further categorized into light, medium, and heavy. The third group of aircraft is intelligence, surveillance, targeting, and reconnaissance (ISTAR) aircraft, which can be either fixed-wing or rotary-wing. The identification of specific airframes within each group is intended solely to provide examples of those respective types of aircraft, and is not intended to be a recommendation of specific aircraft for NATO SOF procurement. Aircraft specifications for the fixed-wing and rotary-wing examples listed in the following sections can be viewed in Tables 3 and 4, respectively.

1. Fixed-Wing

Definitions for light, medium, and heavy fixed-wing aircraft must be developed. One might naturally look to the two formal authorities that govern most global aviation activity, the Federal Aviation Administration, or FAA (the United States' aviation authority), and the International Civil Aviation Organization, or ICAO (a United Nations agency that sets aviation standards and regulations for all of its 191 Member States), for assistance.[23] The FAA offers definitions for "small aircraft" as equal to or less than 12,500 pounds maximum certificated takeoff weight, with "large aircraft" being those that weigh more than 12,500 pounds.[24] There are also FAA definitions for small (maximum certificated takeoff weight of 41,000 pounds or less), large (between 41,000 pounds and 300,000 pounds), and heavy (300,000 pounds or more) aircraft with regard to wake turbulence minimum distance separation requirements.[25] Interestingly enough, the ICAO offers different weight delineations for their wake turbulence criteria. To round out the discussion, neither "light," nor "medium," nor "heavy" fixed-wing aircraft definitions can be found in United States military publications or regulations.

---

[23] International Civil Aviation Organization, "ICAO in Brief," accessed January 26, 2012, http://www.icao.int/Pages/icao-in-brief.aspx.

[24] Federal Aviation Administration, "Small Airplanes," accessed January 26, 2012. http://www.faa.gov/aircraft/air_cert/design_approvals/small_airplanes/faq/.

[25] Federal Aviation Administration, "Pilot Controller Glossary," accessed January 26, 2012, http://www.faa.gov/air_traffic/publications/ATPubs/PCG/A.HTM.

Though concrete definitions do not exist, one will still find these terms in key government documents. For example, the United States Forestry Service documents the use of light fixed-wing aircraft in firefighting roles, but fails to provide a definition. They do, however, attempt to identify "Heavy" aircraft as those weighing more than 12,500 pounds, although there is no FAA or ICAO basis for this delineation.[26] The 2010 Department of Defense Quadrennial Defense Review references the purchase of "light fixed-wing aircraft" with regard to aviation foreign internal defense, yet offers no solid definition of "light fixed-wing."[27]

To clarify the apparent gray area of identifying just what light, medium, and heavy aircraft are, this study developed definitions of each, informed by both FAA definitions and more than a decade of flying fixed-wing turboprop aircraft. For the purposes of this study, the following definitions apply:

<u>Light Fixed-Wing</u>: Aircraft that weigh 12,500 pounds or less. A "type rating" is a certificate that a pilot must possess to fly certain types of aircraft—those types, as defined in Federal Aviation Regulation Part 61, weigh more than 12,500 pounds or are powered by a turbojet. In almost all cases, the FAA does not require a type rating for aircraft that weigh 12,500 pounds or less. Aircraft of this size can typically carry up to 20 passengers. Examples of light fixed-wing aircraft are the Cessna 208 Caravan, the Pilatus PC-12, and the De Havilland DHC-6 Twin Otter.

<u>Medium Fixed-Wing</u>: Aircraft that weigh more than 12,500 pounds, but less than 150,000 pounds. Aircraft of this size will typically carry between twenty and 100 passengers, and in many cases can fly higher, farther, and faster than light fixed-wing aircraft. Examples of medium fixed-wing aircraft are the CASA CN-235, the Alenia C-27J Spartan, and the Transall C-160.

---

[26] United States Forestry Service, *Region 5 Light Fixed-Wing Aircraft Program,* accessed January 26, 2012, www.fs.fed.us/r5/fire/aviation/light_fixed_wing.doc, 77.

[27] Department of Defense, *2010 Quadrennial Defense Review* (Washington, D.C.: GPO, 2010), 30.

Heavy Fixed-Wing: Aircraft that weigh 150,000 pounds or more. Examples of heavy fixed-wing aircraft are the Lockheed C-130 Hercules, the Boeing C-17 Globemaster III, and the Airbus A400M. Aircraft of this size can typically carry more than 100 passengers and large volumes of cargo. The nature of NATO SOF suggests that they operate in small teams, and would not require all the services that heavy fixed-wing aircraft can provide as they move to and from objective areas. Deployments to and from a theater of operations, however, do require heavy fixed-wing aircraft due to the amount of equipment that accompany SOF teams—in these cases, existing NATO C-17 aircraft can be utilized. For these reasons, heavy fixed-wing aircraft are not examined in this study.

Light Fixed Wing Aircraft

	MTOW	PAX	MAX PAYLOAD	SPEED
C-208B	8,731 lbs	12	4,202 lbs	186 kts
PC-12/47	10,450 lbs	9	3,108 lbs	270 kts
DHC-6-300	12,500 lbs	20	2,500 lbs	182 kts

Medium Fixed Wing Aircraft

	MTOW	PAX (TROOPS)	MAX PAYLOAD	SPEED
CN-235	36,380 lbs	44	13,120 lbs	245 kts
C-27J	70,107 lbs	68 (46)	25,353 lbs	315 kts
C-160	112,435 lbs	93 (61)	35,275 lbs	277 kts

Heavy Fixed Wing Aircraft

	MTOW	PAX (TROOPS)	MAX PAYLOAD	SPEED
A400M	310,851 lbs	(116)	81,571 lbs	463 kts
C-130J-30	162,000 lbs	128 (92)	44,000 lbs	362 kts
C-17	585,000 lbs	144 (102)	169,000 lbs	450 kts

Table 3. Fixed-Wing Aircraft Specifications.

2. Rotary-Wing

The FAA does not differentiate between fixed-wing or rotary-wing aircraft in terms of type rating—helicopters weighing above 12,500 pounds also require one. When categorizing rotary-wing aircraft, however, the type rating standard is not adequate. Since NATO SOF is concerned with getting troops to and from the objective, the lift capability, specifically in terms of passengers and equipment, is the most effective way to categorize rotary-wing aircraft.

Light Lift Rotary-Wing: Rotary wing aircraft that can accommodate up to ten passengers or carry a payload up to 5,000 pounds. Examples of light lift helicopters are the McDonnell Douglas MD500 Defender, the Eurocopter EC 635, and the AugustaWestland AW159 Lynx Wildcat.

Medium Lift Rotary-Wing: Rotary wing aircraft that can accommodate eleven to twenty five passengers or carry a payload between 5,000 and 15,000 pounds. Examples of medium-lift helicopters are the Aéropastiale SA330 Puma, the Sikorsky UH-60, and the NH Industries NH90.

Heavy-Lift Rotary-Wing: Rotary wing aircraft that can accommodate more than twenty five passengers or carry a payload over 15,000 pounds. Examples of heavy-lift helicopters are the Boeing CH-47 Chinook and the Sikorsky CH-53E Super Stallion.

Light Lift Rotary Wing Aircraft

	MTOW	PAX	MAX PAYLOAD	SPEED
MD500E	3,550 lbs	5	2,069 lbs	152 kts
EC635	6,400 lbs	7	3,042 lbs	140 kts
AW159	13,228 lbs	7	Not Available	157 kts

Medium Lift Rotary Wing Aircraft

	MTOW	PAX	MAX PAYLOAD	SPEED
SA330	15,430 lbs	16	Not Available	138 kts
UH-60	22,000 lbs	11	9,000 lbs	150 kts
NH90	23,369 lbs	20	10,141 lbs	161 kts

Heavy Lift Rotary Wing Aircraft

	MTOW	PAX	MAX PAYLOAD	SPEED
CH-47D	50,000 lbs	33	26,000 lbs	143 kts
CH-53E	73,500 lbs	55	36,000 lbs	170 kts

Table 4. Rotary-Wing Aircraft Specifications.

3. ISTAR

Intelligence, surveillance, targeting, and reconnaissance, or ISTAR is quickly becoming one of the most sought-after capabilities requested by special operations forces at every level of command.[28] ISTAR aircraft contain a multitude of sensors for data collection, ranging from electro-optical and infrared cameras to communication and signals intelligence equipment. Most current systems can provide high definition video feeds, as well as laser range finding data and laser designation of targets for weapons delivery and other sensor acquisition. It is also possible to weaponize ISTAR aircraft, as evidenced by recent drone strikes in Pakistan.[29]

---

28 "ISTAR" is the NATO term for ISR (intelligence, surveillance, and reconnaissance).

29 Scott Shane, "Drone Strike Kills Qaeda Operative in Pakistan, U.S. Says," *New York Times*, January 19, 2012, accessed January 28, 2012, http://www.nytimes.com/2012/01/20/world/asia/us-says-qaeda-operative-killed-in-drone-strike.html.

Two types of ISTAR exist: manned and unmanned. Both types of systems provide many of the same services, as the intelligence collection sensors are similar among most platforms. While a definition is not required to differentiate between manned and unmanned systems, several differences exist that are worth mentioning. Manned ISTAR systems provide the advantages of better communication gear and transit time between multiple objectives, and can fly in degraded weather conditions. Most importantly, the aircrew is engaged overhead the objective with increased situational awareness, and can quickly adapt to changing operational conditions. Examples of manned ISTAR aircraft are the MC-12W Liberty, which uses a Beechcraft King Air platform, and the Diamond Industries DA42.[30] Unmanned ISTAR systems, on the other hand, can provide longer loiter times than manned aircraft, and they eliminate human exposure to surface-to-air threats. Examples of unmanned ISTAR aircraft are the General Atomics MQ-1 Predator and the AAI Corporation RQ-7 Shadow.[31]

[30] Aurora Flight Science, "Centaur: The Ultimate in Airborne Intelligence, Surveillance, and Reconnaissance," accessed January 29, 2012, http://www.aurora.aero/Products/Centaur.aspx.

[31] AAI Corporation, "Shadow Tactical Unmanned Aircraft Systems," accessed January 29, 2012, http://www.aaicorp.com/products/uas/shadow_family.html.

THIS PAGE INTENTIONALLY LEFT BLANK

III. ANALYSIS OF AIR WING REQUIREMENTS

A. OVERVIEW

If NATO SOF is to procure and operate its own fleet of aircraft, a starting point must be established to narrow down the scope of airframes from which to choose. As stated in Chapter II, the airframes will be divided into three categories—fixed-wing, rotary-wing, and ISTAR. Fixed-wing and rotary-wing aircraft will be subdivided into light, medium, and heavy, and ISTAR aircraft will be subdivided into manned and unmanned. Narrowing the scope into these categories can be done by analyzing NATO SOF documents, as well as requirements resulting from survey research of NATO SOF personnel.

B. KEY DOCUMENTS

There are numerous documents that describe aviation capabilities required of NATO special operations forces. In particular, the NSHQ Special Air Warfare Manual, the 2010 NSHQ Special Operations Air Group Concept for Development and Organization, and the NATO Industrial Advisory Group Study stipulate several requirements. The Special Air Warfare Manual defines special air warfare as "those activities conducted by air/aviation forces using tactics, techniques, and modes of employment not standard to conventional forces," and describes the special air warfare airmen as exhibiting the ability to employ any equipment they have in unconventional and innovative methods.[32] If this definition seems broad, that is the intent. While many SOF missions tend have limited objectives and thus limited flexibility at the tactical level, the ability of SOF to perform a wide array of missions at the strategic level demands a broad set of parameters. For NATO SOF, these parameters are defined by the capabilities needed to accomplish NATO SOF's principal tasks of direct action (DA), special reconnaissance and surveillance (SR), and military assistance (MA). As the NSHQ Commander adequately stated, the

[32] NATO Special Operations Headquarters, "NSHQ Manual 80-004, Special Air Warfare Manual," March 10, 2010: 3.

NATO SOF special air warfare capability "must be able to conduct special air operations in support of SOF SR, DA, and MA missions across the entire spectrum of conflict and across the entire spectrum of alternate operating environments."[33]

The Special Air Warfare Manual lists the aviation requirements of the principal tasks, and can be found in Figure 2. Two common threads among these requirements are specialized air transport (AT) and intelligence, surveillance, targeting, and reconnaissance (ISTAR) aircraft. AT, identified in the manual as the primary mission of special operations air forces, can be provided by fixed-wing and rotary-wing aircraft, and include infiltration, exfiltration, and resupply capabilities.[34] The Special Air Warfare Manual suggests that the minimum requirements for certification as a NATO Special Operations Air Task Unit, or SOATU (a tactical-level group of special operations aviation elements capable of supporting or conduction special operations), are: (1) support at least one of the NATO SOF principal tasks, and be able to do so in multiple environments, (2) insert or extract up to sixteen special operations personnel and their equipment 100 nautical miles away from a starting point, day or night, using night vision devices, with a time-on-target of less than one minute accuracy, and (3) fixed-wing aircraft must be able to perform takeoff and landing operations from short, unimproved airfields at night, using night vision devices.[35]

ISTAR support to ground and maritime forces is crucial, as special operations forces rely on timely and accurate intelligence not only in the planning phase of an operation, but in the execution phase as well. The Special Air Warfare Manual cites ISTAR as a key enabler for direct action and special reconnaissance and surveillance missions, as well as a key additional capability that meets the needs of the NATO special operations task units and groups.[36] ISTAR aircraft can be manned or unmanned, and the gained information can be fused with other forms of intelligence to create enhanced situational awareness at all levels of conflict.

---

33 Kisner, "Kindelan Speech."

34 NSHQ, "Special Air Warfare Manual," 6.

35 NSHQ, "Special Air Warfare Manual," 11.

36 NSHQ, "Special Air Warfare Manual," 6, 7, 10.

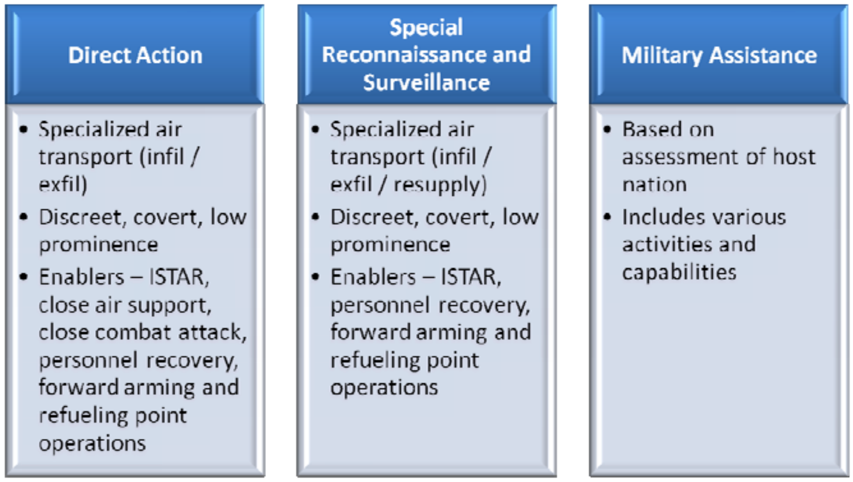

Figure 2. NATO SOF Principal Task Aviation Requirements.[37]

The NSHQ Special Operations Air Group Concept, completed in 2010, echoes the need for AT and ISTAR capabilities. This document examines the requirements for AT and ISTAR and proposes a solid course of action for establishing an initial rotary-wing capability for NSHQ. Though this concept document does not provide a fully capable NATO SOF aviation capability, it is incredibly valuable for its research and detailed findings, much of which can be applied to the analysis of NATO SOF principal task requirements. To support DA, SR, and MA missions, the Air Group Concept identifies three capabilities that should be resident in a NATO SOF aviation entity—air-land integration, air mobility, and ISTAR.[38] While air-land integration, which contains such capabilities as forward air control, terminal attack control, and combat control, is vital, it is beyond the scope of this research and should be examined in a separate study. Air mobility and ISTAR, on the other hand, are two components that do fit into this research.

Citing interviews with NATO SOF personnel returning from deployments in Afghanistan, lack of proper special operations airlift was identified as a key factor in

37 NSHQ, "Special Air Warfare Manual," 5–9.

38 NATO Special Operations Headquarters, "Special Operations Air Group: Concept for Development and Organization," April 22, 2010: 7.

mission alteration or cancellation.[39] Dedicated special operations air mobility assets are desired to increase timeliness and reliability for infiltration, exfiltration, and resupply, as well as to build the habitual working relationship between air and ground forces that leads to flexibility and mission success.[40] The document recognizes ISTAR, as a "critical combat multiplier."[41] ISTAR provides a multitude of intelligence gathering capabilities, to include full motion video in multi-spectral ranges and signals intelligence, and can provide these capabilities during all phases of an operation. Not only does this allow for enhanced mission planning and execution, it provides crucial intelligence for the overall strategic-level picture.

A NATO Industrial Advisory Group was formed in 2008 to examine the requirements associated with infiltration, exfiltration, and resupply of NATO SOF teams. The year-long study produced four capability categories for special operations aircraft. Each category, beginning with Category I, demands increasing capacity to perform specific capabilities. For example, Category I aircraft must assist the pilot in navigating to an objective within three minutes of a pre-planned time. Category II increases the timing requirement to less than two minutes, Category III requires less than one minute, and Category IV requires less than thirty seconds. These categories can be seen in Figure 3 and provide guidance for those capabilities required of special operations aviation forces, both fixed-wing and rotary-wing.

---

[39] NSHQ, "Special Operations Air Group," 8.

[40] NSHQ, "Special Operations Air Group," 9.

[41] NSHQ, "Special Operations Air Group," 10.

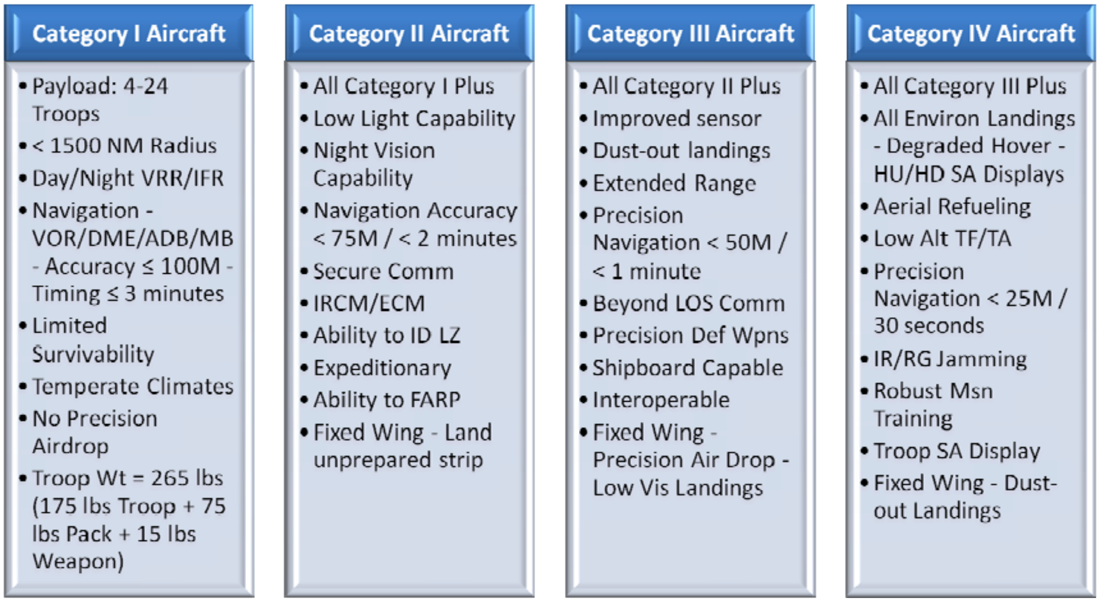

Figure 3. NATO SOF Aviation Capability Categories.[42]

Requirements for special operations aviation capabilities are varied and numerous, setting them apart from most conventional aviation forces. Several of the categorical capabilities in Figure 3 speak more to aviator capabilities than to aircraft type. Most current aircraft possess an array of enhanced navigational instruments, such as global positioning system and gauges that help identify aircraft attitudes in poor visibility. These instruments give pilots the opportunity for precision navigation and time control, and increase situational awareness during dust-out landings—with enough training most pilots will be able to meet even the Category IV performance standards in these areas. Aircraft selection narrows when identifying aircraft that must meet several other requirements identified in Figure 3, such as troop capacity, landing on unprepared strips, and precision airdrop capability.

C. SURVEY RESULTS

The author conducted survey research over three months using both electronic and paper surveys, and acquired sixty-three total responses. The survey sample consisted

42 Kisner, "Kindelan Speech," slide 12.

of NATO Special Operations Headquarters personnel, multinational special operations forces who have conducted special operations in support of NATO, and international students at the Naval Postgraduate School who have NATO special operations experience. The survey was designed to capture demographic information to establish a baseline level of experience among respondents, and to investigate (1) the aviation preferences of the respondents informed by their NATO SOF experience, and (2) the approximate number of troops for a given of special operations missions performed by the respondents. Personnel experience, and identification of ideal aircraft based on that experience, will yield the aircraft type and capability requirements. The special operations missions are categorized by the NATO SOF principal tasks.

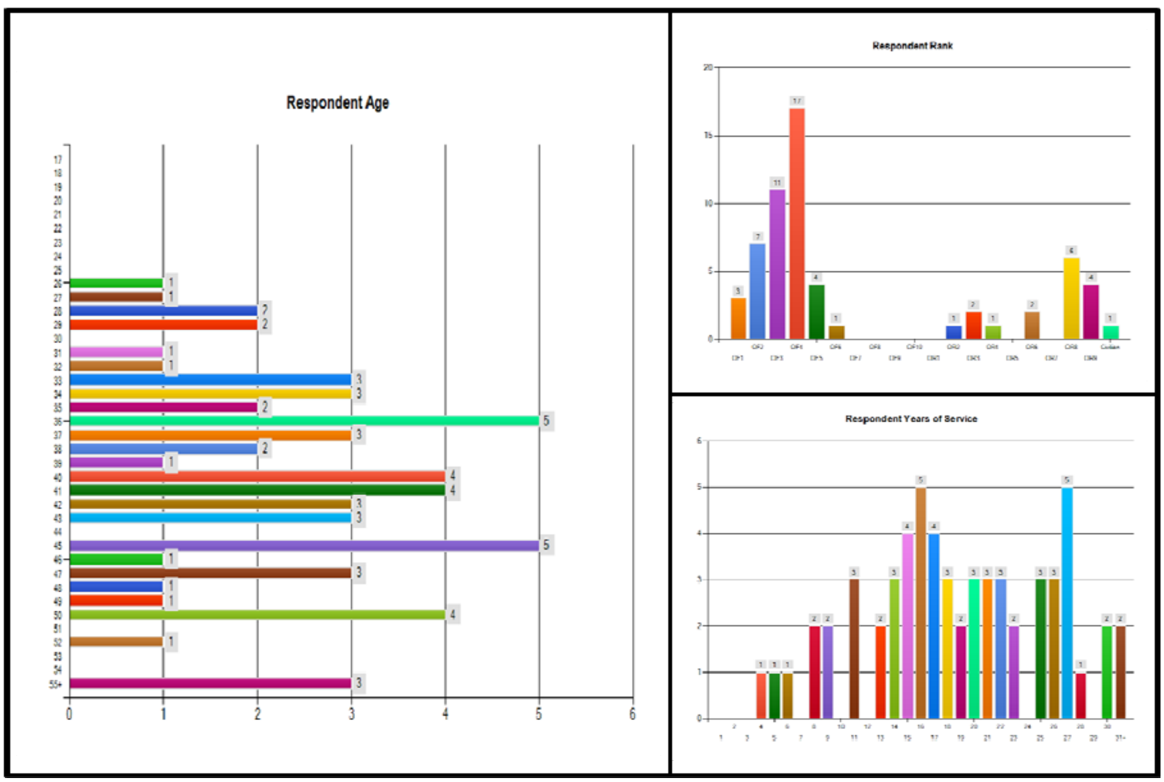

Figure 4. Basic Demographics.

NATO Officer Ranks	U.S. Officer Ranks	NATO Enlisted Ranks	U.S. Enlisted Ranks
OF-1	O-1 / O-2	OR-1	E-1
OF-2	O-3	OR-2	E-2
OF-3	O-4	OR-3	E-3
OF-4	O-5	OR-4	E-4
OF-5	O-6	OR-5	E-5
OF-6	O-7	OR-6	E-6
OF-7	O-8	OR-7	E-7
OF-8	O-9	OR-8	E-8
OF-9	O-10	OR-9	E-9
OF-10	No Equivalent		

Table 5. NATO and U.S. Equivalent Ranks.

A high level of experience among the respondents is considered by the author as an indicator of well-informed responses, as determined by military rank, years of service, military specialty, and whether or not the respondents had performed the NATO SOF principal tasks. Under these criteria, the respondent sample consisted of a wide range of experience. The officer ranks ranged from OF-1 to OF-6, and enlisted ranks ranged from OR-2 to OR-9; NATO ranks and their U.S. military equivalent can be seen in Table 5. Most officer respondents held the rank of OF-3 or OF-4 (65.1% of all officer ranks), with the average officer rank being OF-3, while most enlisted respondents held the rank of OR-8 (37.5% of all enlisted ranks), with the average enlisted rank being OR-7. Respondent years of service ranged from four to more than thirty, and had an average of 19.33 years of service (18.65 for the officers, 21.27 for the enlisted). The respondents ranged in age from 26 years old to over 55 years old, with an approximate average age of at least 40 years old (the average age value is approximated because three of the respondents answered "55+," with no further indication of their exact age—the value of 55 was used in the average, which yielded a value of 40.2 years of age). Demographic results of the survey can be seen in Figure 4.

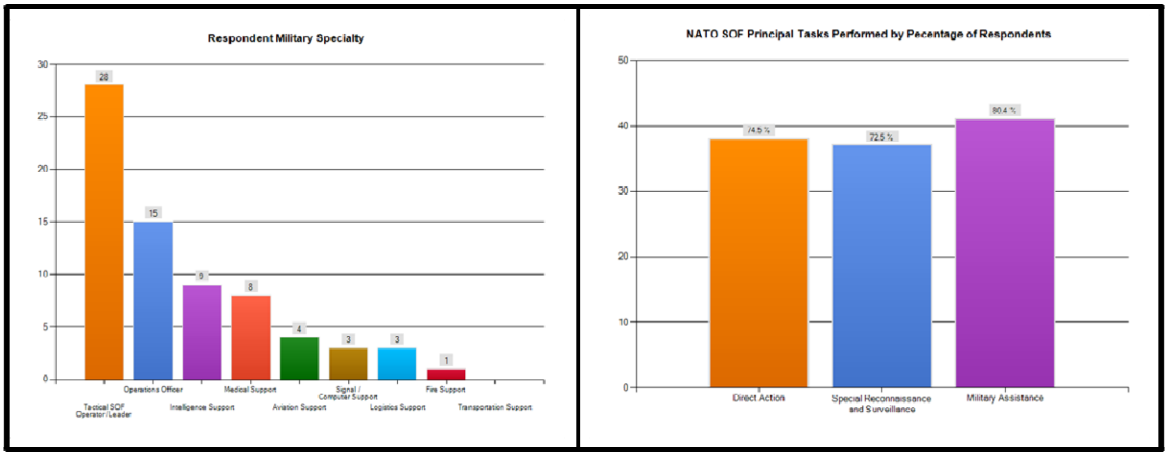

Figure 5. Specialties and NATO SOF Principal Tasks.

Respondent military specialties and experience with NATO SOF principal tasks are depicted in Figure 5. Many of the respondents served as a Tactical SOF Operator/Leader or Operations Officer (47.5%). An overwhelming majority of the respondents had performed one or more of the principal tasks: 74.5% had performed direct action, 72.5% had performed special reconnaissance and surveillance, and 80.4% had performed military assistance. One civilian respondent had five years of service in training and education. In the author's opinion, the overall experience level of the respondent sample appears to be high, indicating the survey responses to be well-informed.

Following the capture of demographic information, the respondents were asked how many missions of each principal task they had performed, and then to prioritize rotary-wing, fixed-wing, and ISTAR aviation platforms within each principal task. ISTAR platforms were further scrutinized to provide preferences of manned or unmanned assets. The survey also asked respondents to recall personnel numbers and aircraft types that were associated with those missions. The responses permitted this study to first identify which principal tasks were performed the most by the respondents, then whether or not rotary-wing was desired over fixed-wing, and finally what size of airframe would be required to support each type of mission. In sum, the types and number of airframes contributed to the optimal mix of a NATO SOF Air Wing that could successfully execute the assigned NATO SOF principal tasks.

1. Principal Task Experience

Survey questions regarding the number of missions completed and the number of troops performing those missions asked the respondents to categorize their data by numerical groups, with the choices being 1–5, 6–10, 11–15, 16–20, 21–25, 26–30, 31–35, 36–40, 41–45, 46–50, and 51+ (more than 51). Figure 6 indicates the approximate number of missions performed by the respondents for each principal task. Direct action and special reconnaissance and surveillance had the highest average, with approximately 16–20 missions completed, followed by military assistance with approximately 11–15 missions completed. As one can see in Figure 6, several respondents performed more than 51 missions in each of the principal tasks, indicating a very high level of experience.

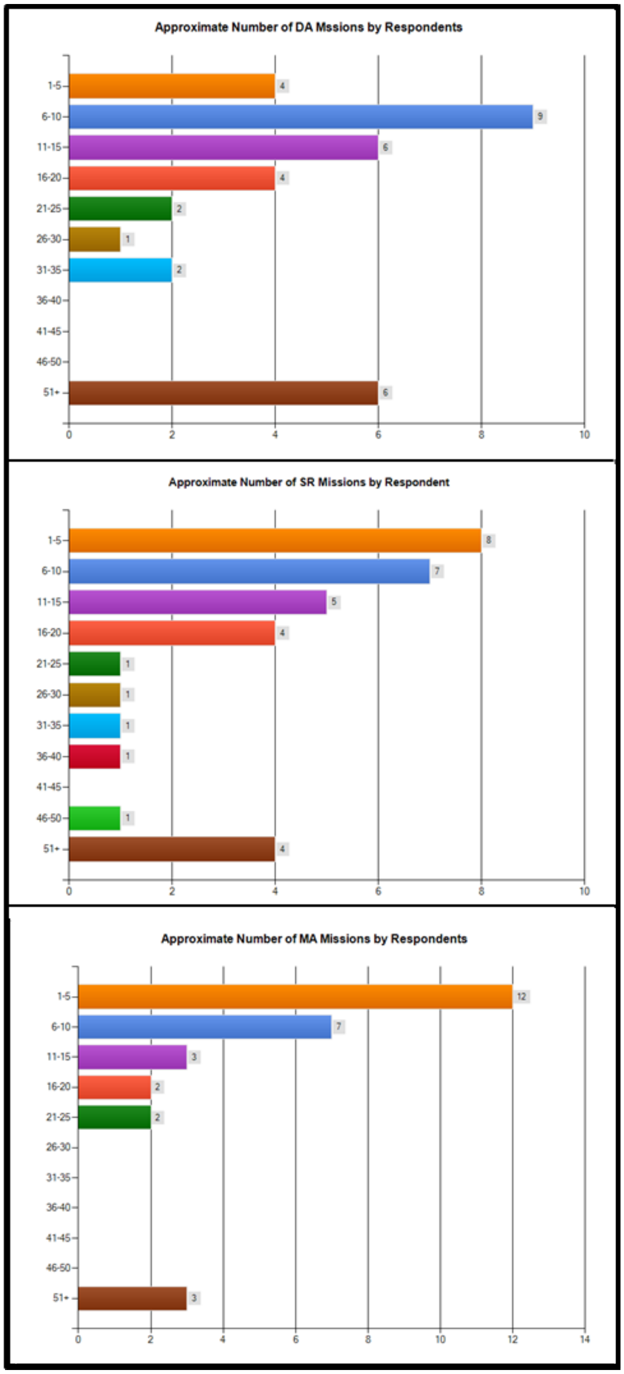

Figure 6. Approximate Number of Missions Performed for each Principal Task.

2. Preferred and Ideal Aircraft

For each of the three principal tasks, the respondents were asked to rank aviation platform types—rotary-wing, light and medium fixed-wing, and ISTAR—relative to their perceived importance during the mission. The ranks were 1 through 4, with 1 being the most important, and 4 being the least important. The results are shown in Table 6. In all three principal task categories, rotary-wing aircraft were overwhelmingly perceived to be the most important platform. ISTAR ranked second in all three, while medium and light fixed-wing aircraft were ranked third and fourth, respectively.

	1			2			3			4		
	DA	SR	MA	DA	SR	MA	DA	SR	MA	DA	SR	MA
Rotary Wing	80.5%	62.2%	83.9%	17.1%	27.0%	12.9%	2.4%	5.4%	3.2%	0%	5.4%	0%
ISTAR	24.4%	40.5%	16.1%	63.4%	45.9%	38.7%	7.3%	10.8%	22.6%	4.9%	2.7%	22.6%
Medium Fixed Wing	0%	0%	3.2%	15%	16.2%	29%	57.5%	64.9%	48.4%	27.5%	18.9%	19.4%
Light Fixed Wing	2.6%	2.8%	3.2%	7.7%	16.7%	19.4%	30.8%	19.4%	29%	59%	61.1%	48.4%

Table 6. Perceived Aviation Platform Importance Relative to Principal Task.

Survey respondents were also asked to respond to a statement regarding their preference for rotary-wing or fixed-wing aviation support during NATO SOF missions; this statement instituted a Likert response scale of 1 to 7, with 1 being "Strongly Disagree," 4 being "Neutral," and 7 being "Strongly Agree." The results are shown in Table 7. This study found that respondents desired rotary-wing aviation support over fixed-wing aviation support when performing missions during each of the three principal tasks, with values of 6.22, 5.44, and 6.00 for DA, SR, and MA, respectively. In fact, of all the responses combined for each of the principal tasks, only three total respondents (2.9%) disagreed with the statement "I prefer rotary-wing over fixed-wing aircraft for [these] missions;" all of the other responses were "Neutral" or some form of agreement, with 42.6% choosing the response "Strongly Agree."

	DA	SR	MA
I prefer rotary wing more than fixed wing aircraft for [these] missions:	6.22	5.44	6.00

Table 7. Preferred Aviation Platform Preference Relative to Principal Task.

Survey respondents were then asked to list their ideal aircraft for DA, SR, and MA missions. These results were categorized as “rotary-wing,” “fixed-wing,” or “both”; “both” meant the respondent perceived both rotary-wing and fixed-wing aircraft to be ideal for the mission. The responses for MA were not included in the final results because, as several respondents pointed out, a military assistance mission’s ideal aircraft depends on the nation to which the assistance is being provided, and the aircraft are tailored to that nation’s requirements. Ideal aircraft for DA and SR missions would be suitable to most environments. A single proportion test for significance ($\alpha = .05$) was performed to determine the percentage of time respondents felt both rotary-wing and fixed-wing aircraft were ideal for the mission. Statistical analysis leads to the conclusion that respondents felt both aircraft were ideal 23.58% of the time; this significance value solidifies the need for both rotary-wing and fixed-wing aircraft. Full statistical analysis calculations can be seen in the Appendix.

Further examination of the data showed that 62% of respondents felt only rotary-wing aircraft were ideal, 5.17% felt only fixed-wing aircraft were ideal, and 32.7% felt that both were ideal. Figure 7 shows the intersection of these categorized responses. When the raw data is combined, the results reveal the mix of airframes to be 71.4% rotary-wing and 28.6% fixed-wing. It should be noted that of the sixty three total survey respondents, there were fifty eight responses to this portion of the survey. Although not all respondents participated in this section, the high experience level of the participating respondents underpins these results.

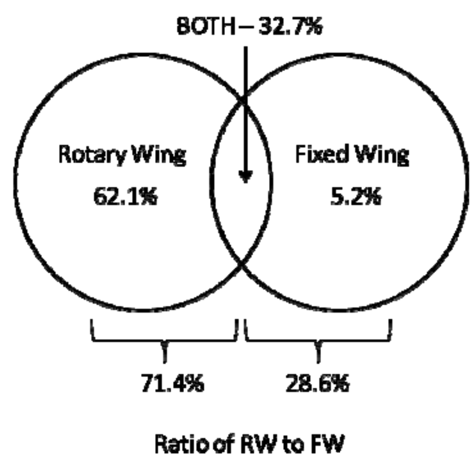

Figure 7. Ratio of Aircraft.

3. Troop Capacity

To accurately determine the size of platform needed to support NATO SOF, the respondents were asked to approximate the average number of troops on missions supporting each of the principal tasks. These results are depicted in Figure 8. Direct action required the highest number of average troops per mission at 26–30, followed by military assistance at 21–25 troops, and then special reconnaissance and surveillance at 6–10 troops per mission.

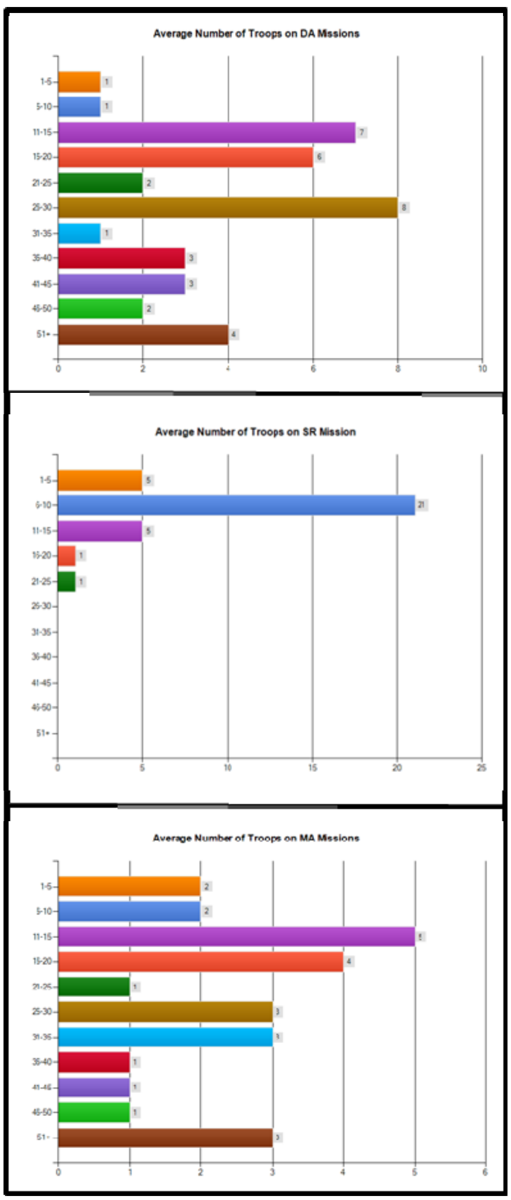

Figure 8. Average Number of Troops per Mission.

4. Intelligence, Surveillance, Targeting, and Reconnaissance

The survey respondents were asked to respond to a set of three statements regarding their perceptions of ISTAR support for NATO SOF missions. This set of statements used a Likert response scale of 1 to 7, with 1 being "Strongly Disagree," 4 being "Neutral," and 7 being "Strongly Agree." The left side of Figure 9 shows the results of these preferences. The respondents indicated very strongly (6.82) that ISTAR is, indeed, important in supporting NATO SOF principal tasks. They also indicated very strongly (6.23) that additional ISTAR support is needed for their missions. Finally, the respondents indicated a slight preference (4.46) for unmanned ISTAR assets over manned ISTAR assets.

When asked to list ideal aircraft for the DA and SR principal tasks (MA was excluded in these calculations for the reasons stated previously), the respondents indicated a heavy preference for unmanned aerial systems over manned aerial systems. Of the thirty-four respondents, twenty-four (70.6%) indicated the desire for unmanned and ten indicated their preference for manned (29.4%); of those, four respondents indicated the desire for both unmanned and manned platforms.

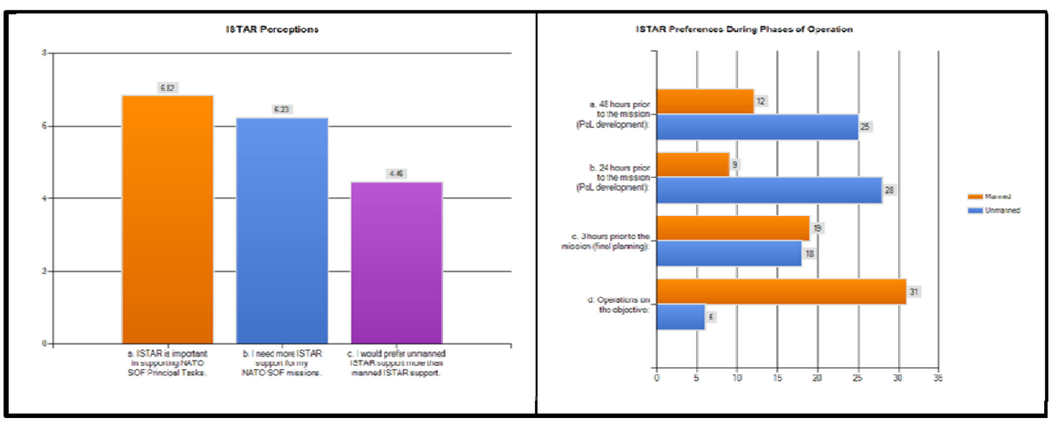

Figure 9. ISTAR Preferences.

The right side of Figure 9 shows the results when survey respondents were asked about their preferences of regarding manned and unmanned ISTAR during four phases of a planned objective; an objective in this case is a mission utilizing the direct action principal task. The phases of the objective were categorized as forty eight hours prior to the mission, twenty four hours prior to the mission, three hours prior to the mission, and during the mission itself. "PoL," or Pattern of Life, describes personnel actions observed by ISTAR aviation platforms at the objective. The right side of Figure 9 indicates a need for both manned and unmanned ISTAR support, although it is clear that unmanned ISTAR is desired up to three hours prior to direct action, and manned is highly desired while on the objective. The preference for manned ISTAR while performing the mission at the objective indicates the need for the flexibility and situational awareness inherent in manned ISTAR platforms at a critical phase of the mission. Respondents were split between manned and unmanned ISTAR three hours prior to the mission.

D. CONCLUSION

Three key documents provided insight to NATO SOF Air Wing requirements: (1) the NSHQ Special Warfare Manual, (2) the 2010 NSHQ Special Operations Air Group Concept for Development and Organization, and (3) the NATO Industrial Advisory Group Study. Between them, the documents provided guidelines for aviation platform requirements; the two common themes among all were Air Transport and Intelligence, Surveillance, Targeting, and Reconnaissance capabilities. Air Transport capabilities were identified as infiltration, exfiltration, and resupply, and required the ability to move between four and twenty four troops.

The survey administered to NATO special operations forces yielded key statistics in further determining Air Wing requirements. The respondents were determined to be highly experienced with the survey content. Among the respondents, the NATO SOF principal tasks of direct action and special reconnaissance and surveillance were performed more often than military assistance, and a large majority perceives rotary-wing aircraft to be more ideal than fixed-wing aircraft. However, the overwhelming preference for rotary-wing aircraft does not suggest that a rotary-wing-only fleet of aircraft should be procured and maintained; statistical evidence through a test for significance led to the conclusion that at times, both rotary-wing and fixed-wing platforms are required. The results of multiple survey questions indicated that the mix of aircraft should be 71.4% rotary-wing and 28.6% fixed-wing.

The survey results also yielded information regarding ISTAR platforms. The respondents indicated that ISTAR is extremely important to the success of their missions, and that additional ISTAR capabilities are needed. The data showed that unmanned aerial systems were desired more than manned aerial systems, and that the majority of target development leading up to actions on the objective would be performed by unmanned assets; however, the requirement for both unmanned and manned aerial systems exists. The results indicated the heaviest demand for manned ISTAR platforms is during actions on the objective.

IV. AIR FLEET OPTIMIZATION

A. OVERVIEW

NATO SOF defines Special Operations Air Task Unit as a "tactical-level group of special operations forces air and aviation elements capable of supporting or conducting special operations."[43] One or more SOATUs comprise the Special Operations Air Task Group (SOATG), which in turn, make up the NATO SOF Air Wing. NATO's current level of ambition is to conduct simultaneous joint military operations, which would require the use of SOATUs and SOATGs in large-scale and small-scale contingency operations.[44] It is important to determine the differences in requirements between large-scale and small-scale contingencies, as well as a reasonable expectation of how many contingencies NATO can expect to conduct simultaneously. NATO's military operations over the past decade provide a guideline for a reasonable ratio of large-scale to small-scale contingencies, and in turn, SOATU and SOATG employment.

Determining the difference between large-scale contingencies and small-scale contingencies is a difficult task because of all the different aspects that comprise any contingency. A Cornwallis Group's study of NATO's small-scale contingency operations echoes this assessment by saying that, during the study, their group "[argued] that the scope is so broad that any definition would be hopelessly unsatisfactory."[45] The geographic size and scope of operations, as well as the number of troops committed, and by whom, all play a part in determining the scale of an operation. NATO operations in Afghanistan, for example, cover a large geographic area. The scale of operations spans both direct and indirect methods, contains several objectives, and uses a wide range of resources to accomplish missions. Many NATO troops are involved, as well as non-NATO

[43] Allied Joint Publication 3.5, "Allied Joint Doctrine for Special Operations," January (2009): LEX-5.

[44] W. Bruce Weinrod and Charles L. Barry, "NATO Command Structure: Considerations for the Future," *Center for Technology and National Security Policy,* National Defense University, September (2010): 3.

[45] David W. Watson, "Analysis of Small-Scale Contingency Operations: NATO Study SAS-027," accessed March 9, 2012, http://www.thecornwallisgroup.org/pdf/CVI_2001_Mason.pdf.

troops, and the largest troop contingent is supplied by the United States. This study classifies the operations in Afghanistan as a large-scale contingency. By contrast, the scale of NATO operations in Libya in 2011 was small. When compared to Afghanistan, the number of committed troops was minor, the geographic area of the conflict was small, and the scope of operations and their objectives were limited. This study classifies this type of operation as small scale.

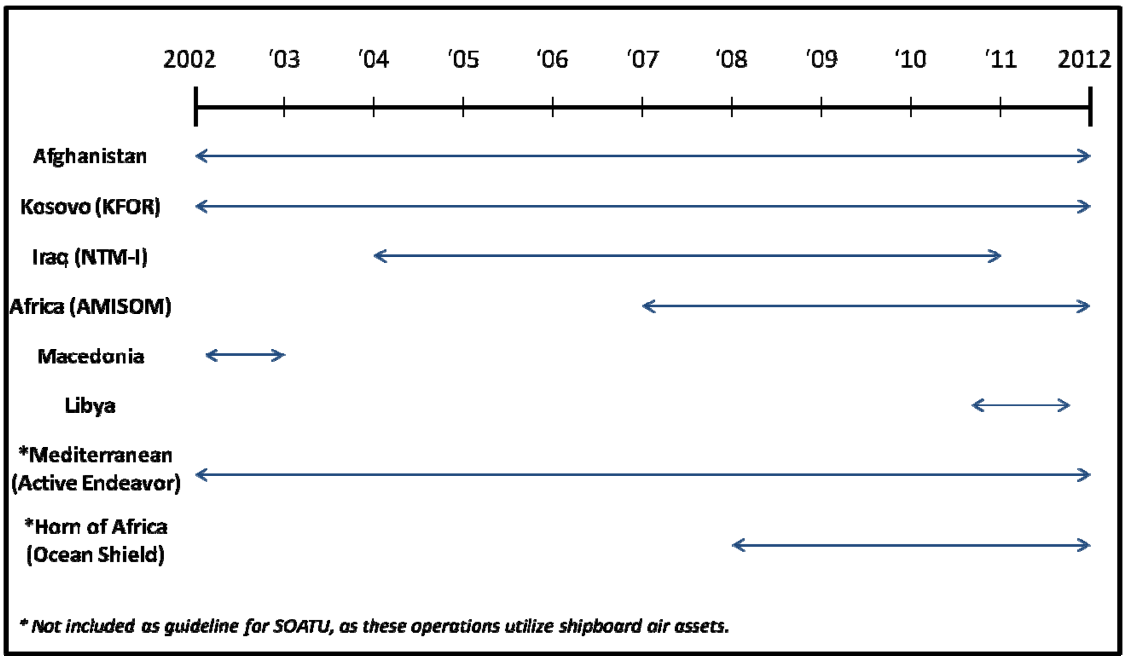

Figure 10. NATO Military Operations 2002–2012.

Figure 10 shows a timeline of NATO military operations, 2002–2012. Of these operations, this study classifies only Afghanistan as a major conflict, due to the geographic size and the scope of the operations conducted. The rest of the operations are classified by this study as small scale. Operations Active En-eavor and Ocean Shield, while considered small scale and are still ongoing, will not be included as part of the guideline—these operations utilize ship-based air assets vice air assets that will be associated with the NATO SOF Air Wing. One can see that at any time over the previous decade of military operations, NATO has been involved in one large-scale contingency and up to four small-scale contingencies at any given time. The total number of NATO SOATGs and SOATUs will be based on this observation.

After discussion with several members of the NATO SOF community that have served multiple tours in Afghanistan, this study came to the conclusion that two SOATUs may be required to support operations in the southern portion of the country, and one SOATU may be required in the eastern portion.[46] An additional SOATU can shift between operations in the north and west as necessary, for a total of four SOATUs for this large-scale contingency. Large-scale contingencies, as previously stated, often have troops committed from other nations; while the United States commits troops to Afghanistan under NATO's International Security Assistance Force, it conducts many unilateral operations, and has a robust special operations aviation force within the region. In the event additional air assets are needed during large-scale contingencies, NATO SOF may be able to garner support from non-NATO forces on a case-by-case basis until a more permanent solution is found. Small-scale contingencies do not require as many SOATUs to support NATO special operations forces—a single SOATU would be able to provide adequate special operations aviation capability.

One large-scale and four small-scale contingencies, then, would require eight Special Operations Air Task Units. The SOATUs would constitute several Special Operations Air Task Groups, which are inherently scalable and will be tailored to meet the requirements of the conflict. Including a SOATU permanently dedicated to training at the NSHQ, the NATO SOF Air Wing is composed of nine SOATUs.

B. SOATU COMPLEMENT—ROTARY WING AND FIXED-WING

The number of required troops for each mission in support of the principal tasks drives the air support requirement. Key NATO documents indicate the required number of troops for its missions is between four and twenty-four, with sixteen troops stated in multiple documents. Survey data indicated that, of the three NATO SOF principal tasks,

[46] NATO Special Operations Forces officers, in discussion with the author, March 9, 2012.

direct action had the highest approximate average of 26–30 troops; the survey data also indicated that the number at the high end of the direct action troop requirement spectrum holds an average of 36–40. The limiting factor from the troop requirement analysis is forty troops; this number will be used as the troop planning requirement. While forty troops is a significant number for planning, one must also take into account the accompanying equipment. Equipment such as communications gear, rucksacks, and weapons require space and must be considered.

Chapter II of this study stated parameters for different variants of rotary-wing and fixed-wing aircraft based on size and lift capability. Table 8 has combined both sets of airframes.

Light Lift Rotary Wing Aircraft

	MTOW	PAX	MAX PAYLOAD	SPEED
MD500E	3,550 lbs	5	2,069 lbs	152 kts
EC 635	6,400 lbs	7	3,042 lbs	140 kts
AW159	13,228 lbs	7	Not Available	157 kts

Medium Lift Rotary Wing Aircraft

	MTOW	PAX	MAX PAYLOAD	SPEED
SA330	15,430 lbs	16	Not Available	138 kts
UH-60	22,000 lbs	11	9,000 lbs	150 kts
NH90	23,369 lbs	20	10,141 lbs	161 kts

Heavy Lift Rotary Wing Aircraft

	MTOW	PAX	MAX PAYLOAD	SPEED
CH-47D	50,000 lbs	33	26,000 lbs	143 kts
CH-53E	73,500 lbs	55	36,000 lbs	170 kts

Light Fixed Wing Aircraft

	MTOW	PAX	MAX PAYLOAD	SPEED
C-208B	8,731 lbs	12	4,202 lbs	186 kts
PC-12/47	10,450 lbs	9	3,108 lbs	270 kts
DHC-6-300	12,500 lbs	20	2,500 lbs	182 kts

Medium Fixed Wing Aircraft

	MTOW	PAX (TROOPS)	MAX PAYLOAD	SPEED
CN-235	36,380 lbs	44	13,120 lbs	245 kts
C-27J	70,107 lbs	68 (46)	25,353 lbs	315 kts
C-160	112,435 lbs	93 (61)	35,275 lbs	277 kts

Heavy Fixed Wing Aircraft

	MTOW	PAX (TROOPS)	MAX PAYLOAD	SPEED
A400M	310,851 lbs	(116)	81,571 lbs	463 kts
C-130J-30	162,000 lbs	128 (92)	44,000 lbs	362 kts
C-17	585,000 lbs	144 (102)	169,000 lbs	450 kts

Table 8. Rotary-Wing and Fixed-Wing Variants.

The troop and payload capacities of the medium-lift and heavy-lift rotary-wing airframes make them the best selection for the stated requirements of infiltration, exfiltration, and resupply. Based on the span of examples provided in Table 8, forty troops and their equipment will require an average of three medium-lift rotary-wing assets or two heavy-lift assets. A single medium fixed-wing asset would be able to account for the entire DA force and their equipment in the event the infiltration or exfiltration site meets minimum landing surface requirements. Light fixed-wing assets can be considered, but would require more than four aircraft based on their limited payload capacity; for this reason, it is not advantageous to select light fixed-wing aircraft.

In the author's experience with aviation, maintenance issues periodically arise with many aircraft, causing mission change, delay, or cancellation. This study recommends that one additional medium-lift rotary-wing asset and one additional fixed-wing asset are added to the SOATU to hedge against the loss of a platform due to maintenance requirements. These additional aircraft bring the total to four medium-lift rotary-wing platforms, two heavy-lift rotary-wing platforms, and two medium fixed-wing platforms. Six total rotary-wing and two fixed-wing aircraft yield a 75% to 25% split; these percentages are very close to the survey results of 71.4% to 28.6% ratio of ideal aircraft identified in Chapter III. ISTAR platforms will be identified in the next section.

Multiple types of airframes will give the Special Operations Task Unit the added ability to conduct simultaneous operations. For example, one or two (depending on equipment requirements) heavy-lift assets can support the forty troops needed for a large direct action mission. Of the four remaining medium-lift assets, several can be used to conduct another direct action mission at the same time, or conduct infiltration/exfiltration of special reconnaissance and surveillance team. The fixed-wing assets can also provide infiltration capabilities, as well as aerial resupply to teams already in the field. When not being utilized in direct support of the principal tasks, the medium fixed-wing assets can provide general air transport, day or night, to unimproved runways in adverse weather conditions.

The NSHQ will require aircraft on which to train their aircrews, as well as support exercises and other events which develop habitual training relationships between NATO SOF aviation and NATO SOF ground and maritime personnel. The most advantageous method of training and developing habitual relationships among Alliance members is to create scenarios in garrison that mimic those at operational locations. An operational direct action mission requiring the use of four medium-lift rotary-wing platforms flying in formation demands that aircrews train to that capability in garrison, either in learning the task or maintaining proficiency in the task. In order to foster the optimal training environment, this study recommends a full Special Operations Air Task Unit complement of four medium-lift rotary-wing, two heavy-lift rotary-wing, and two medium fixed-wing aircraft remain permanently in garrison under NSHQ command and control.

C. SOATU COMPLEMENT—ISTAR PLATFORMS

NATO documents state a clear desire for increased ISTAR capabilities organic to NATO SOF. The NATO SOF Air Wing survey results echoed that desire, and indicated that both unmanned and manned platforms are required; unmanned platforms for target development and manned platforms during operational execution. Persistent target development requires uninterrupted ISTAR capabilities.

1. Unmanned ISTAR Platforms

As stated in Chapter II, unmanned ISTAR platforms have the capability of long loiter times. Loiter time is dependent upon the type of unmanned platform. For example, platforms like General Atomics' MQ-1 Predator or the Boeing Scan Eagle can provide persistent coverage overhead a designated target twenty four hours a day by alternating between just two platforms, while other, smaller platforms have a loiter time of just a few hours. The larger platforms, due to their size, also have the ability to carry heavier weapons in the event they are needed for a strike mission. Loiter time and weaponization are two factors that should heavily influence the type of unmanned ISTAR platforms being considered. Like rotary-wing and fixed-wing aircraft, unmanned aerial systems are subject to periodic maintenance issues that can degrade the chances for mission success.

Assuming increased loiter time, the ability to weaponize the platform, this study recommends a minimum of three unmanned ISTAR platforms per Special Operations Air Task Group; this allows for two alternating platforms for persistent ISTAR coverage over an objective, and one additional platform to hedge against maintenance issues

2. Manned ISTAR Platforms

Manned ISTAR systems provide the advantages of better communication gear and faster transit time between multiple objectives, and can fly in degraded weather conditions. They also have increased situational awareness while overhead the objective, and can quickly adapt to changing operational conditions. However, unlike unmanned platforms, manned ISTAR aircraft will only be able to stay overhead the objective for just several hours, depending on the distance from its base of origin. For example, the MC-12W manned ISR aircraft advertises an eight-hour endurance time.[47] If the transit time to and from the target is an hour each way, the aircraft will only be able to remain overhead the objective between four and four and a half hours, as the aircraft must land with required fuel reserves. If the direct action mission lasts longer than the manned platform can remain overhead, the ground force must accept an unmanned platform for the remainder of the mission, increasing risk of mission success.

This study recommends two manned platforms per SOATG due to the overwhelming desire to have manned ISTAR assets overhead when on the objective. This will permit a greater chance of manned coverage if the mission lasts longer than expected, and it permits one backup aircraft in the event the other one is inoperative due to maintenance issues. To maintain consistency with the SOATG operational complement, the NSHQ training unit also requires two manned ISTAR platforms and three unmanned platforms.

[47] "MC-12W Liberty, "United States of America," accessed March 2, 2012, http://www.airforce-technology.com/projects /mc-liberty/.

D. CONCLUSION

Whether an operational NATO Special Operations Air Task Unit or its training complement at the NATO Special Operations Headquarters, the consistency remains the same, and is depicted in Table 9.

AIRCRAFT TYPE	EXAMPLE	QUANTITY
Rotary – Medium Lift		4
Rotary – Heavy Lift		2
Fixed - Medium		2
ISTAR - Unmanned		3
ISTAR - Manned		2

Table 9. Recommended Special Operations Air Task Unit.

As previously stated, the NATO SOF Air Wing will require nine SOATUs based on meeting the study-defined requirements of one large-scale contingency, four small-scale contingencies, and the training unit. The full complement of the NATO SOF Air Wing is depicted in Table 10.

AIRCRAFT TYPE	EXAMPLE	QUANTITY
Rotary – Medium Lift		36
Rotary – Heavy Lift		18
Fixed - Medium		18
ISTAR - Unmanned		27
ISTAR - Manned		18

Table 10. Recommended NATO SOF Air Wing.

Should NATO define its simultaneous conflict level of ambition as greater or fewer, the number of SOATUs can be scaled accordingly. In addition, it should be noted that the NSCC Special Operations Task Group Manual defines a SOATG as a “national grouping of special air operations capabilities;” a NATO SOF Air Wing may consist of aircrew from several NATO members, making the SOATGs a multinational grouping vice national grouping.[48]

48 NATO Special Operations Coordination Centre, “SOTG Manual,” December (2009): 1–7.

THIS PAGE INTENTIONALLY LEFT BLANK

V. TRAINING AND READINESS ORGANIZATIONAL STRUCTURE

A. OVERVIEW

An optimized NATO Special Operations Air Wing requires a commensurate training and readiness organizational structure. Much of the literature addressing the organizational construct of NATO SOF aviation does so in the sense of command and control of deployed units—very operations-centric analyses. However, there appears to be a lack of literature that addresses an organizational construct within NATO SOF Headquarters that is able to maintain the training and readiness functions that are integral to successful employment of an aviation wing. This chapter addresses that shortfall by first analyzing the NSHQ organizational structure, followed by an analysis of Air Force Special Operations Command's primary training organization, the Air Force Special Operations Training Center, and the characteristics that have led it to be an effective organization. Finally, a recommendation will be made that will enable NSHQ to train its aircrew members so that a habitual and effective relationship can be maintained between NATO SOF aviation forces and its ground and maritime forces, thereby increasing chances for operational mission success.

B. NATO SPECIAL OPERATIONS HEADQUARTERS STRUCTURE

NATO SOF Headquarters mission and vision statements project the importance of "optimizing" special operations forces—efficient and effective use of SOF.[49] The vision statement conveys the sense that collaboration and quick, self-sufficient employment across a full range of activities are the most important facets of the organization as it moves forward and matures.

[49] NATO Special Operations Headquarters, "NATO Special Operations Headquarters," delivered August 11, 2011, by NSHQ personnel.

NSHQ Mission

The NSHQ is the primary point of development, direction and coordination for all NATO Special Operations related activities in order to optimize employment of Special Operations_Forces to include providing an operational command capability when directed by SACEUR.

NSHQ Vision

An Allied and Partner Collaborative Network, connected via a global secure communications system, able to rapidly generate multiple interoperable scaled force packages with organic command, control, communications, and intelligence assets, and capable of performing full spectrum special operations across the range of military operations to achieve strategic and operational effects in support of SACEUR and Alliance politico-military objectives.

The NATO SOF Headquarters is organized to support the Supreme Allied Commander, Europe (SACEUR), U.S. Admiral James Stavridis. As SACEUR, ADM Stavridis is in charge of NATO's military arm which is divided into two distinct commands—the Allied Command Transformation, based in Norfolk, VA, and the Allied Command Operations, based in Brussels, Belgium. ACO is further divided into four separate headquarters—Joint Force Headquarters Brunssom, Joint Force Headquarters Lisbon, Joint Force Headquarters Naples, and NATO Special Operations Headquarters. NSHQ is a force provider to the three Joint Force Headquarters upon the direction of SACEUR. The SACEUR and NSHQ organizations are shown in Figures 11 and 12—the solid black line indicates Operational Command, and the dashed black line indicates coordination.

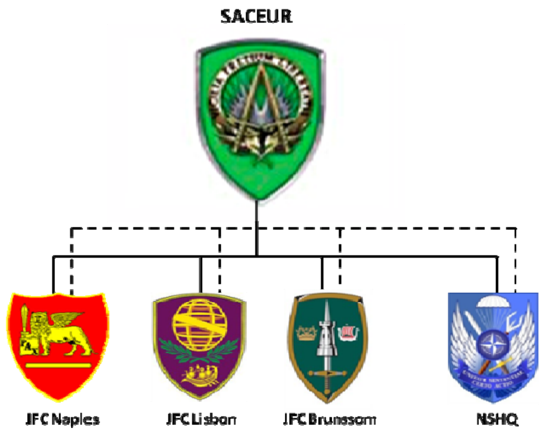

Figure 11. NATO Allied Command Operations.

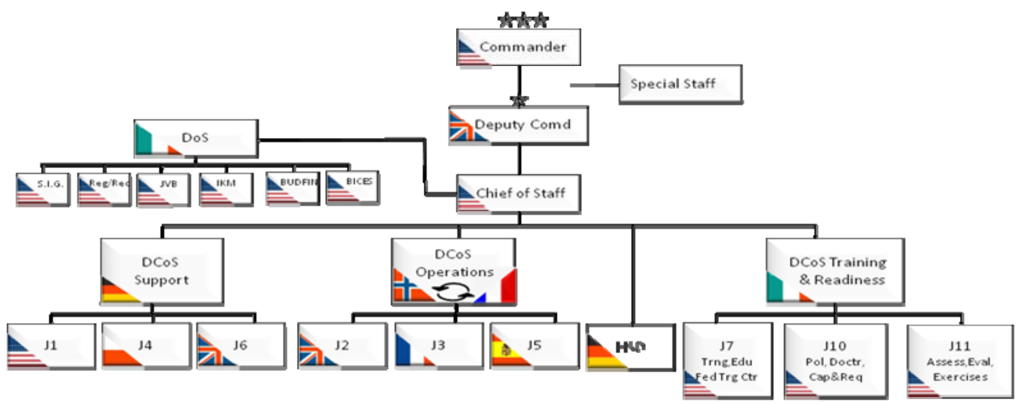

Figure 12. NATO Special Operations Headquarters.

NSHQ, like many organizations, has an open system of inputs, transformation processes, and outputs. In fact, each of the three divisions within NSHQ are systems themselves. Specifically, the Training and Readiness Division uses all three of its directorates as its own internal transformation system to deliver a product; this directorate is shown as a system in Figure 13. The inputs consist of people, equipment, financial and material resources, and the NATO SOF principal tasks. NATO SOF's three principal tasks, direct action, special reconnaissance and surveillance, and military assistance, outline its broad scope of responsibility.

The middle arrow in Figure 13 is the virtual location where inputs are transformed to outputs. This transformation process occurs at three different levels.[50] The highest, or largest, of these exists at the group level, and is called NSTEP—the NATO SOF Training and Education Program, located on the NATO SOF Campus at Chièvres Air Base, Belgium. This program runs several courses for NATO SOF personnel that develop professionals in various areas, among which are operations, technical exploitation, joint operating centers, intelligence, and planning. NSTEP uses its cadre of instructors at the individual level, who, in turn, use training modules with specific tasks, conditions, and standards as measures of performance at the task level.

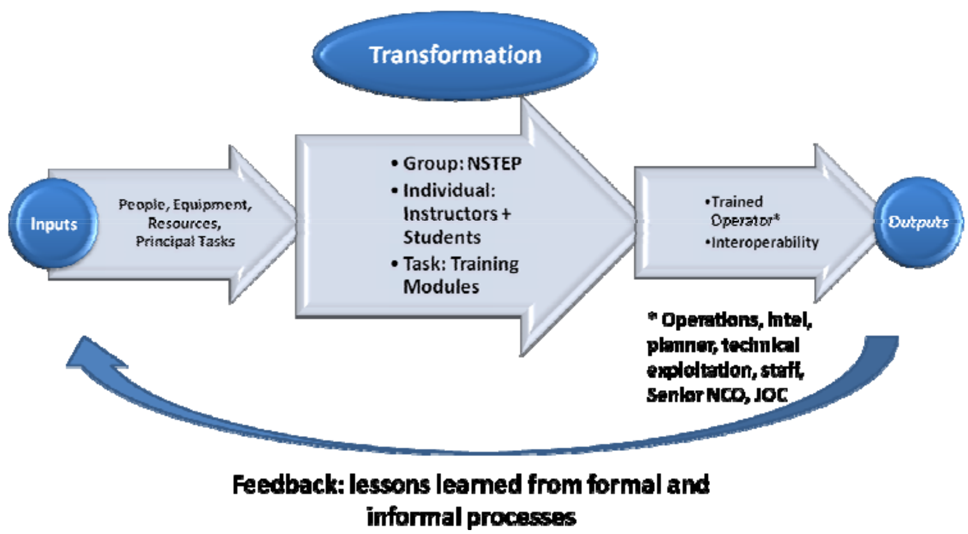

Figure 13. NSHQ Training and Readiness System.[51]

The final product from the transformation is a body of fully trained personnel, able to serve in NATO SOF in his or her respective area of expertise, with other trained professionals from other NATO SOF nations. The experience gained from operating in real world conditions serves as another input—this time through a feedback loop. The intent is to alter, or reinforce, the transformation process based on the lessons learned

[50] David P. Hanna, *Designing Organizations for High Performance* (Reading, MA: Addison-Wesley, 1988), 12.

[51] Hanna, *Designing Organizations*, 19.

from experience. This professional will also return to his or her own country, and apply the knowledge within that nation's military forces.

C. AIR FORCE SPECIAL OPERATIONS TRAINING CENTER

1. Overview

The Air Force Special Operations Training Center (AFSOTC) is located at Hurlburt Field, Florida. AFSOTC's mission and vision statements were obtained from AFSOC's official website, and are shown below.[52] The underlying theme of AFSOTC is that it uses its training and education programs to develop elite Air Force special operations personnel—Air Commandos and their enablers—from conventional Air Force airmen.

AFSOTC Mission

Recruit, assess, select, indoctrinate, educate, and train Air Commandos, other special operations forces, and SOF enablers.

AFSOTC Vision

Transforming airmen into Air Commandos who possess the specialized skills and warrior ethos to fight and win anytime, anywhere.

2. Organizational Structure

AFSOTC is organized to support the Commander of Air Force Special Operations Command. The AFSOC Commander is in charge of the 23rd Air Force, four Special Operations Wings, four Special Operations Groups, and AFSOTC. In turn, the Numbered Air Force, Wings, Groups, and AFSOTC each consist of numerous squadrons and detachments. AFSOC is the Air Force component of U.S. Special Operations Command (USSOCOM). Like NSHQ to the Joint Force Commands, USSOCOM is a force provider to the U.S. Geographic Combatant Commands upon direction of the Chairman, Joint Chiefs of Staff. The major organizational units of USSOCOM and AFSOC can be seen in Figures 14 and 15, respectively.

[52] Air Force Special Operations Command, accessed February 12, 2012, http://www.afsoc.af.mil/afsotc.

Figure 14. United States Special Operations Command Components.

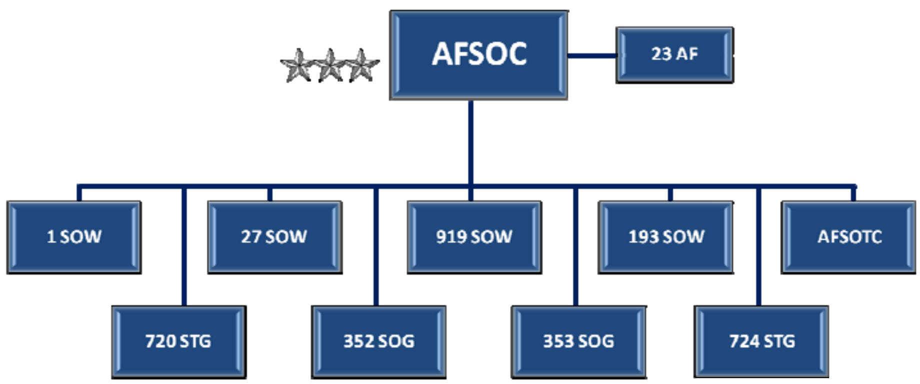

Figure 15. Air Force Special Operations Command.

AFSOTC was established on October 6, 2008, in an effort to separate training from operations. Prior to AFSOTC, the execution of a majority of training fell to the individual operational flying squadrons. Necessarily, operational demands took priority over training demands, leaving fewer and fewer resources to conduct training—this degraded state of training resulted in inadequate aircrew member production. Considering the elevated operations tempo experienced by AFSOC over the past decade, the impact of this inadequate production was felt throughout the entire Command. Then-AFSOC Commander Lieutenant General Donald C. Wurster envisioned an environment where "trainers train, and warfighters fight."[53] By separating training and operations, training would receive its due share of dedicated aircrew members, aircraft, and other resources with which to conduct efficient, effective training. AFSOTC was established with Colonel Paul E. Harmon as its first Commander, and immediately began realizing its vision: "Transforming airmen into Air Commandos."

Like NSHQ, AFSOTC has an open system of inputs, transformation processes, and outputs, which is shown in Figure 16. The inputs consist of people, equipment, resources, and AFSOC mission requirements. Mission requirements are driven by the operational needs of the entire U.S special operations community; these operational needs are necessary to conduct "special operations activities," as defined by Section 167 of United States Code, Title 10. These activities include direct action, strategic reconnaissance, counterproliferation of weapons of mass destruction, counterterrorism, unconventional warfare, foreign internal defense, security force assistance, counterinsurgency, information operations, military information support operations, and civil affairs.[54] For instance, if a mission requires a special operations team to be inserted by high altitude airdrop, AFSOC needs to develop the supporting capability—that requirement is an input to the transformation process. Other mission requirements include takeoff and landing to and from unimproved fields (e.g., a dirt landing strip), night vision goggle flying, and operating a door gun on specific aircraft; this list is not all-inclusive.

[53] Michael A. McNerney (Deputy Commander, Air Force Special Operations Training Center), interview with the author, February 8, 2012.

[54] Joint Chiefs of Staff, "Joint Publication 3-05: Special Operations," Washington, D.C. (2011), II-6.

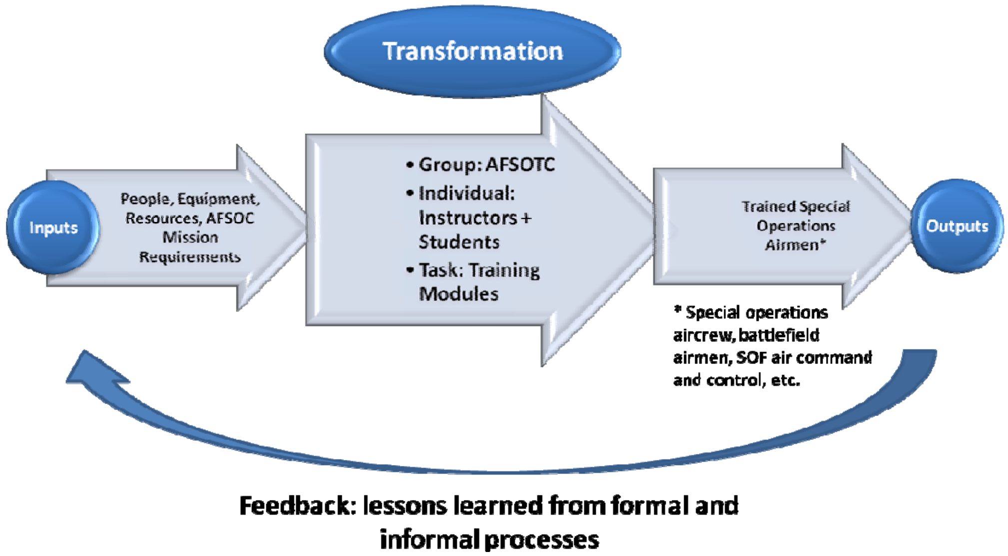

Figure 16. AFSOTC Transformation Process.

The middle arrow in Figure 16 is the transformation process, which occurs at three different levels. The highest level is the entire AFSOTC organization—all of the squadrons and detachments working toward a common goal. For example, AFSOTC's Combat Aviation Advisor (CAA) curriculum transforms an aircrew member through four phases of education and training, taking approximately seven months to complete. Using Figure 17 as a reference, Phase I includes introductory education, which occurs at the United States Special Operations School. Phase II is practical training that builds on Phase I, and is conducted by the 371st Special Operations Combat Training Squadron. Phase III is language training conducted at the Language Center, and Phase IV is flying training on fixed and rotary-wing aircraft, conducted by the 19th Special Operations Squadron. The final product is a special operations airman—an Air Commando. CAA is just one example of how AFSOTC transforms its inputs to outputs.

AFSOTC continually updates its transformation process through formal and informal feedback loops. The formal feedback loops include periodic critiques as students progress throughout courses, supervisor inputs regarding student progress, post-course critiques, and a biannual formal course review. The formal course review focuses on the effectiveness of the syllabi of instruction, which can be reorganized in order to meet any changes in demand.[55] Informal feedback occurs at the individual level, mostly through squadron commanders, and through the use of operational squadron instructors on periodic flights. Discussion of student progress during these informal forums results in candid feedback that contributes to tweaking the transformation process when needed.

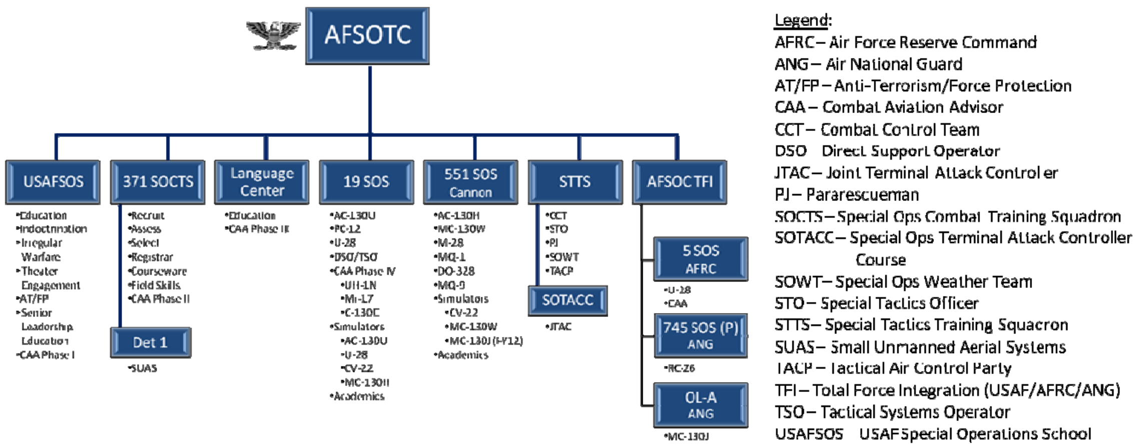

Figure 17. AFSOTC Organizational Chart.

3. Professionalization and Efficiencies

Since its organizational standup in 2008, AFSOTC has alleviated some of the training issues that previously plagued AFSOC—not enough training resources, inadequate dedicated instruction, and degraded training outputs. Several years into its existence, particular aspects of AFSOTC should be highlighted, as much to identify areas that appear to be a benchmark for any Major Command's training organization—the professionalization of the cadre—as well as those that indicate areas for improvement—efficiencies.

Perhaps the most important activity of the AFSOTC organization is the development of its cadre of instructors. In fact, Colonel McNerney cites this as one of AFSOTC's best attributes.[56] Consistent with the vision for its existence—"trainers train,

[55] McNerney, interview with the author, February 8, 2012.

[56] McNerney, interview with the author, February 8, 2012.

warfighters fight"—is the fact that personnel come to AFSOTC and become professional trainers. Aircrew members that are instructors in a typical special operations flying squadron must balance instruction with various additional duties, dividing attention between teaching and myriad other tasks. AFSOTC instructors, however, are able to maintain focus solely on instruction—dedicating all their time to students, becoming expert trainers in the process, and producing the best product possible. Dr. Julia Crutchfield, AFSOTC Director of Curriculum and Faculty Development, cites the AFSOTC Methods of Instruction Course (which is recognized by the Community College of the Air Force and the American Council on Education) as the foundation for instructor development, and outlines the professionalization process:

> Once the instructor has completed [the] methodology course, he or she is entered into a 180 hour supervised teaching internship…followed by annual subject matter testing, an annual evaluation and at least 15 clock hours of professional development per year.[57]

Professional development are those activities that help the instructor maintain proficiency in a particular subject matter expert skill set or enhancement of instructor methods and skills, and include, but are not limited to, professional military education, occupational instructor certification, and instructional systems development certification.[58]

On the other hand, one of the most difficult challenges AFSOTC faces is a result of the "resource neutral" manner in which it was stood up. "Resource neutral" means that the organization had to build itself up from existing billets and personnel—spaces and faces—from within AFSOC. Colonel Harmon notes that the biggest issue was manpower—"We started out with one person as the AFSOTC staff. I finally got spaces, but then had to wait for the faces."[59] Those faces finally came by shrinking the personnel

---

[57] Dr. Julia I. Crutchfield (Director, Curriculum and Faculty Development, Air Force Special Operations Training Center), electronic mail interview with the author, February 15, 2012.

[58] Air Force Special Operations Training Center, "AFSOTC Instruction 36-8: Instructor Qualification, Certification, and Evaluation," October (2010), 8.

[59] Paul E. Harmon (first Commander, Air Force Special Operations Training Center), interview with the author, February 9, 2012.

requirements of other units, forcing those units to do more with less. Eventually, AFSOTC gained enough personnel to begin performing the training functions for which it was designed.

This concept of "resource neutrality" leads to another issue, that of efficiencies versus effectiveness. The organization consists of people that are very focused on its effectiveness in terms of the products delivered throughout AFSOC. Sometimes, however, this focus can lead the organization to overlook its efficiencies.[60] Efficiencies, in this case, refers to the backside support that is so crucial to organizational function. Backside support includes everything from curriculum development, to software development, to syllabus of instruction development. Though there have been improvements in backside support since October, 2008, more work still needs to be done to completely alleviate the shortfall in efficiencies.

D. PROPOSED CHANGES TO NSHQ

1. Organizational Structure

Much of the success of a NATO SOF Air Wing will depend on the capability of NSHQ to initiate, grow, and maintain the training pipeline that will produce SOF airmen. To do so, NSHQ's current structure will need to change in a manner that will enable its transformation processes to meet the demands of the air wing. As one can see through the analysis of AFSOTC, training airmen requires a robust organization that not only trains aircrew members for particular tasks, but underpins that training with backside support and other resources. According to the Military Assistant to the NSHQ Commander, Colonel John Cline, and echoed by NSHQ's Chief of Staff, Colonel Darin Conkright, the type of organization needed to mature NATO SOF aviation to its full operational capability should be established as a separate entity—an "Air Warfare Center" that is a separate

60 McNerney, interview with the author, February 8, 2012.

command under NSHQ.[61] A separate Air Warfare Center under NSHQ is a mirror image of the AFSOTC command relationship within AFSOC, and reflects the importance being given to a SOF air capability.

The Training and Readiness portion of NSHQ contains the J7 (Training and Education), J10 (Policy, Doctrine, Capabilities, and Requirements), and J11 (Assessments, Evaluations, and Exercises) Directorates. A new "Air Warfare Center" requires elements of each of these directorates to contribute to the transformation processes, with J7 having the largest responsibility. J7 contains the Training Branch, the Education Branch, and the NATO SOF Training and Education Program Branch. With the initiation of a NATO SOF aviation program, each section of J7 requires resources to meet the associated training and education demands. Because J7's scope of responsibility grows immensely under an air wing construct, it warrants an upgrade in the chain of command to ensure appropriate advocacy at higher levels of NSHQ. Currently supervised by an OF-4 (U.S. equivalent rank of O-5), the expanded J7 Director billet would require an OF-5; an OF-5 rank would effectively put J7 command responsibility on par with the Deputy Chiefs of Staff for Support, Operations, and Training and Readiness.

These two entities—an Air Warfare Center and an expanded J7—would work closely together as the NATO SOF Air Wing takes shape. The current J7 Director, Lieutenant Colonel Cory Peterson, envisions an organizational change such that an Air Warfare Center and J7 fall under a new umbrella command—the NATO Special Warfare Center (NSWC), headed by an OF-6 (U.S. equivalent of O-7, or Brigadier General).[62] The J7 would become the NATO Special Operations School (NSOS), and the Air Warfare Center would be the NATO Special Air Warfare School (NSAWS); this organizational structure can be seen on the left side of the diagram in Figure 18. J10 and J11 Directorates are included in Figure 18 to highlight that they have not migrated; also note that since J7 has moved to the NSWC, the Training and Readiness Division has been

[61] John Cline (Military Assistant to the Commander, NSHQ) and Colonel Darin Conkright (NSHQ Chief of Staff), interview with the author, November 9, 2011.

[62] Cory Peterson (Director, J-7, NSHQ), interview and subsequent electronic mail exchange with the author, November 9, 2011 through February 17, 2012.

renamed "Readiness." There are no nationalities associated with the NSWC and its divisions because these are notional organizations.

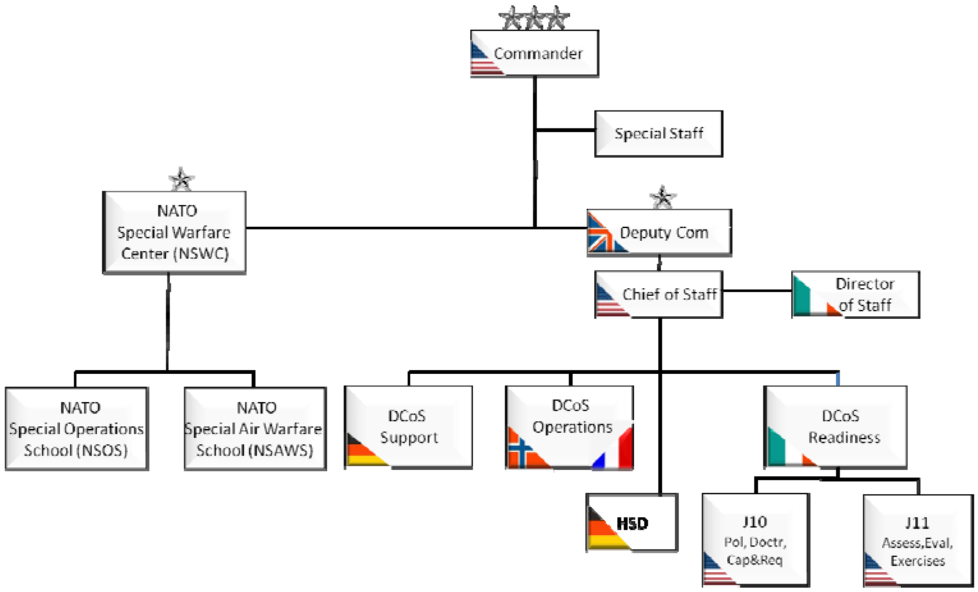

Figure 18. New NSHQ Organizational Structure.

The Readiness division of NSHQ will have J10 and J11 responsibilities to the NSWC. Current NATO SOF air policy and doctrine is being written in an *ad hoc* manner because there is no established organizational requirement. This policy and doctrine will need to be revised and updated as the air wing takes shape and the Center begins to provide direction for its operational air capability. The Center will also require assessments, evaluations, and exercises from J11 in order to validate its processes and ensure the output is of the desired capability. I recommend that specific liaisons be identified within both J10 and J11 to focus on the readiness of the output produced by NSWC.

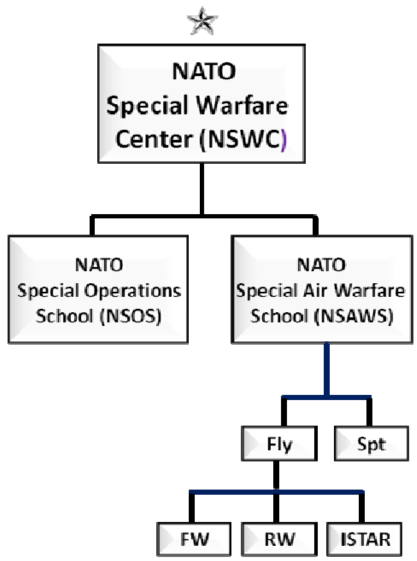

Figure 19. NATO Special Warfare Center.

Figure 19, a detailed view of the proposed NATO Special Air Warfare School, indicates the organizational relationship of the optimized fleet of NATO SOF aviation platforms. Under this structure, NSAWS has all fixed-wing, rotary-wing, and ISTAR assets at its disposal. A percentage of the aircraft will always remain in garrison to ensure continuity of instruction and training—this percentage will vary with the operational requirements of NATO SOF. Only the flying and support sections of NSAWS are shown in this diagram. NSAWS has the potential for growth, such as the addition of an aircraft maintenance squadron. The type of maintenance available for the aircraft—organic to NATO or Contracted Logistics Support—has yet to be determined, and will require further research.

2. Roadmaps and Leadership

Lessons learned from the standup of the Air Force Special Operations Training Center can be transferred to the standup of a similar organization within NSHQ. Key personnel involved in AFSOTC's standup and growth cite two areas that require detailed attention in order for an organization like the NSWC to be successful—these areas are growth roadmaps and commander qualities.

The resource neutrality with which AFSOTC was initially configured created problems with growth. Only when AFSOTC had gained enough "spaces and faces" was it able to carry out its mission effectively. Both the current and former AFSOTC commanders, as well as the deputy commander, advocate defining and identifying early growth requirements which can be resourced appropriately. "Formulate a [Unit Manning Document] and stick to it" and "have a roadmap that anticipates future growth and get out in front of it" are two pieces of advice that highlight the need for identifying personnel requirements and finding a way to resource those requirements before the organization takes root.[63] These personnel requirements include everything from Commander and staff, to backside support, to instructor cadre. An effective organization needs the right number of personnel with the right types of skills to ensure the organization's mission can be effectively carried out.

Identifying a commander with the right qualities is also paramount for mission success. A new organization with heavy resource requirements will need a person not only with vision for the unit, but with the ability to realize that vision. "Tenacious" and "politically savvy" are two terms that Colonel Harmon uses to describe the type of commander needed for an AFSOTC-like organization; the commander must be tenacious enough to fight for and obtain the necessary resources of the organization and at the same time balance that tenacity with political awareness to ensure appropriate top cover.[64] Lieutenant Colonel John Trube, 371 Special Operations Combat Training Squadron Commander, feels that a strong background in both operations and programmatics enhances a commander's ability to articulate the organization's requirements to those higher up in the command structure—"constant and proactive engagement [with senior officers] helps to ensure that [the unit's] needs are being assessed and resourced. Otherwise, you put trainers and students at risk."[65]

---

[63] Alsid and McNerney, interview with the author, February, 2012.

[64] Harmon, interview with the author, February 9, 2012.

[65] John S. Trube (Commander, 371 Special Operations Combat Training Squadron), interview with the author, February 8, 2012.

3. Aircrew Force Structure

One of the most important parts of the transformation process in the NSWC will be the cadre of aircrew instructors. These instructors are responsible for ensuring that each of the NATO SOF aircrew students are performing tasks to a particular level and standardizing the output. As one anonymous survey respondent noted, "SOF aircrew skills are too diverse among NATO members," indicating the need for an effective training pipeline that results in a standardized set of aviation skills. Whether performing NVG landings to unlit runways in austere environments, airdropping supplies to isolated NATO special operations teams, or teaching partner nation aircrew members best methods of employment for their own aircraft, the quality of the aircrew members—of which the foundation is built by the instructors—will have a direct impact on mission success in the operational environment.

Aircrew instructors should be assigned to the NSWC for a minimum of three years—this allows NSWC to professionalize the instructor cadre, much the same way AFSOTC professionalizes theirs. The initial period of the assignment allows instructors to build teaching and flying skill sets to a level that would permit expert instruction of students for the rest of their tenure. Methods of instruction courses and tactics, techniques, and procedures development are just two examples of activities that help to build a successful instructor. Instructors should also complete one operational deployment per year. The survey to NATO SOF personnel discussed in Chapter III of this study contained one section for Aircrew Force Structure. Survey respondents were asked to respond to a statement regarding instructor deployments. On a scale of one to seven, with 1 being "Strongly Disagree," 4 being "Neutral," and 7 being "Strongly Agree," NATO SOF personnel indicated, with a score of 6.14, that at least one operational deployment per year would give the instructor cadre the necessary operational expertise to maintain relevant knowledge and skill sets. Not only would a three-year tour at NSWC contribute to a solid foundation for all NATO SOF aircrew members, but the instructor would provide his or her national Air Force with the same teaching and flying skill set upon return following NSWC tour completion.

Aircrew members should also be assigned to NATO for a minimum of three years. The habitual training relationship within U.S. SOF breeds mission success, and is a highly desirable characteristic for NATO SOF.[66] The habitual training relationship between NATO SOF aviation and NATO special operations ground and maritime forces can only be formed through consistent and dedicated interaction; this interaction will not translate into success if the turnover of aircrew is frequent. Three years allows time for aircrew members to be transformed through the NSOS and NSAWS training pipelines and to then build the necessary habitual relationship with the rest of NATO SOF. The NATO SOF Air Wing survey asked respondents their opinion on permanent aircrew assignments (three years or greater) to NATO. On a scale of 1 to 7, with 1 being "Strongly Disagree," 4 being "Neutral," and 7 being "Strongly Agree," NATO SOF personnel indicated with a score of 6.22, that a tour of at least three years would be highly beneficial to the NATO SOF Air Wing. As with instructors, aircrew members bring valuable SOF aviation skills back to their nation's Air Force following a tour at the NATO Special Warfare Center.

It is important to note that upon completion of an assigned tour at NSWC, instructors and aircrew bring SOF aviation skills back to their home nations. Not only do Alliance nations benefit from having these individuals return with SOF aviation skills, but the returning members, if needed, can help develop their national special operations aviation units to a level commensurate with NATO SOF aviation. This development is particularly beneficial for those nations that may only have a fledgling SOF aviation capability.

---

[66] North Atlantic Treaty Organization, "NATO Special Operations Forces: Key to Mission Success at Strategic Level," NATO SOF Coordination Center (2009) 14.

THIS PAGE INTENTIONALLY LEFT BLANK

VI. CONCLUSION

A. OVERVIEW

This study makes the following recommendations regarding a proposed NATO SOF Air Wing:

1. The optimal composition of a Special Operations Air Task Unit is four medium-lift rotary-wing aircraft, two heavy-lift rotary-wing aircraft, two medium fixed-wing aircraft, three unmanned ISTAR aircraft, and two manned ISTAR aircraft. Nine Special Operations Air Task Units are required to comprise a NATO SOF Air Wing.

2. The training and readiness organizational structure of NSHQ should change to meet the demands of nine Special Operations Air Task Units. A NATO Special Warfare Center should be created, commanded by an OF-6, and should consist of the NATO Special Operations School and the NATO Special Air Warfare School. The NATO Special Air Warfare School should contain the necessary flying and support components of the proposed NATO SOF Air Wing.

3. Further research should be conducted in the following areas: (a) those topics already under scrutiny by the Naval Postgraduate School's NATO Special Operations Headquarters Air Capability Study, (b) expansion of the proposed NATO Special Air Warfare School, (c) development of an organization that can address subsequent shortfalls or urgent requirements in special operations aviation capabilities, and (d) past NATO SOF operations that could have benefitted from a dedicated aviation capability.

1. Optimized Mix of Aircraft

Chapter II addressed special operations aviation categories by looking at historical examples of capabilities, and then defining the different types of airframes within rotary-wing (light, medium, and heavy-lift), fixed-wing (light, medium, and heavy), and ISTAR (unmanned and manned) platforms. Chapter III addressed NATO SOF Air Wing requirements by examining key NATO documents and results of a NATO SOF Air Wing

Survey administered by the researcher in person at NSHQ, and electronically to NATO Special Operations Headquarters personnel, multinational special operations forces that have conducted special operations in support of NATO special operations, and international students at the Naval Postgraduate School who have NATO special operations experience. Once the requirements for the Air Wing were determined, this study developed the optimal mix of aviation platforms in Chapter IV. This optimal mix of platforms was put into a Special Operations Air Task Unit construct, and consisted of four medium-lift rotary-wing aircraft, two heavy-lift rotary-wing aircraft, two medium fixed-wing aircraft, and five ISTAR aircraft—three unmanned, and two manned. This study also found that NATO, over the past decade, has conducted one large-scale contingency and four small-scale contingencies at any given time, with the large-scale contingencies requiring four SOATUs and the small-scale contingencies each requiring one SOATU. Combing these operational SOATUs with the training SOATU permanently assigned to the NATO Special Air Warfare School resulted in a total of nine SOATUs for the NATO SOF Air Wing.

2. Organizational Structure

Chapter V examined the NATO Special Operations Headquarters as an organization, focusing primarily on the Training component. An air wing organic to NSHQ will require changes in the NSHQ organization to initiate and mature the air wing to full operational capability. This study proposes the standup of a NATO Special Warfare Center, which will house two organizations—the NATO Special Operations School and the NATO Special Air Warfare School. The NSWC will be commanded by an OF-6 and the NSOS and NSAWS will each be commanded by an OF-5. These schools will absorb the current NSHQ J7 Directorate, which is composed of Training, Education, and the NATO SOF Training and Education Program branches. Additionally, NSAWS will develop, initially, two units—a flying unit that will contain all the flying instruction and associated personnel, and a support unit that will develop and maintain the support required to run the flying unit. This organizational structure is based on the United States Air Force Special Operations Training Center, located at Hurlburt Field, Florida.

3. Further Research

This study presents a macro-level recommendation for an organic NATO SOF Air Wing. Additional research is required to produce micro-level recommendations as NATO SOF aviation begins to take shape. Already in progress is a team of military faculty and students at the Naval Postgraduate School engaging in a project entitled "NATO Special Operations Headquarters Air Capability Study." This study is receiving support from NSHQ, as well as from USSOCOM through its operational planning teams and the Joint Special Operations University; initial research will be complete by June 2012. Submitted areas for research are: (a) comparison between conventional and special air warfare enablers, (b) optimal organization at the group and wing level, (c) cost-benefit analysis of procuring, developing, and employing a multi-mission/multi-use medium sized aircraft, (d) cost-benefit analysis of light-to-medium, manned and unmanned fixed-wing ISTAR/strike assets, (e) acquisition and sustainment of excess defense article rotary-wing assets, (f) basing options for both rotary-wing and fixed-wing assets, and (g) specific training requirements for NSHQ aircrew to support NATO SOF.[67] Each of these areas should be researched by looking through the lens of what NATO considers "Smart Defense." Smart Defense has been described by NATO Secretary General Anders Fogh Rasmussen as not spending more money, but getting more value for the money spent, and that Alliance nations must "prioritize, … specialize, and must seek multinational solutions."[68] Smart Defense is not just an initiative presented by NATO—it is one fully supported by President Obama, and is referenced in the Department of Defense strategic guidance found in the recently released "Sustaining U.S. Global Leadership: Priorities for 21st Century Defense."[69]

67 Naval Postgraduate School, "NATO Special Operations Headquarters Air Capability Study," Department of Defense Analysis, January (2012), 3–4.

68 Anders Fogh Rasmussen, "Towards NATO's Chicago Summit," delivered at the European Policy Center, Brussels, Belgium, on September 30, 2011, accessed January 11, 2012, http://www.NATO.int/cps/en/NATOlive/opinions_78600.htm.

69 Department of Defense, "Sustaining U.S. Global Leadership: Priorities for 21st Century Defense," January 2012, accessed January 7, 2012, http://www.defense.gov/news/Defense_Strategic_Guidance.pdf.

This study proposes the establishment of the NATO Special Air Warfare School, and flying and support organizations within that school. Further research should be conducted that will not only expand the flying and support organizations, but also investigate the expansion of the school itself. For example, the draft NSHQ Special Operations Air Group Concept for Development and Organization document and the NATO Special Air Warfare Manual address the need for air-land integration (ALI). Research should be conducted that will yield an ALI construct that inputs lessons learned from existing ALI programs (for instance, the Air Force Special Operations Training Center's 371 Special Operations Combat Training Squadron and Special Operations Terminal Attack Controller Course), as well as incorporate applicable guidance from NATO Standardized Agreements (such as that found in 3797, "Minimum Qualifications for Forward Air Controllers").

Once the NSAWS flying organization has matured to full operational capability, research should be conducted for the requirement and feasibility of a flying unit or support unit that can address subsequent shortfalls or urgent requirements in special operations aviation capabilities. For example, USSOCOM utilizes a Combat Mission Need Statement (C-MNS) process to address urgent new or existing materiel requirements as they relate to special operations forces; this process "supports expeditious acquisition of new or existing materials, normally fielded within 180 days of a C-MNS approval…[and] must be sustainable through duration of combat or contingency operations."[70] When a NATO SOF aviation-related urgent operational need arises, there should be a comparable organization within the NATO Special Air Warfare School that can address it, and develop associated aviation tactics, techniques, and procedures to ensure the need is met successfully.

This study also recommends further research of previous NATO SOF activities, including the analysis of classified information, to determine the effectiveness dedicated special operations aviation might have had. For example, NATO special operations forces

70 Department of Defense, "CJCSI 3470.01—Rapid Validation and Resourcing of Joint Urgent Operations Needs (JUONS) in the Year of Execution," Chairman, Joint Chiefs of Staff, July (2005): A-2.

were involved in missions in Bosnia to capture "persons indicted for war crimes."[71] It has also been suggested that NATO special operations forces played a part in the military success of the 2011 operation in Libya.[72] Upon availability, details of NATO SOF employment in these operations should be analyzed to determine how a dedicated unit of special operations aircraft could have further benefitted NATO SOF as they accomplished their missions.

B. CONCLUSION

The strategic utility of NATO special operations forces is instrumental in achieving and maintaining security not only for the Alliance members, but in regions around the globe; an organic NATO special operations aviation capability will increase the effectiveness of NATO SOF and enable mission success. This study, and others like it, provide inputs to key leaders in the decision making process. However, successful military capabilities are not established and matured by reading study results—these capabilities can only come to fruition through dedication of all the elements that make up an organization, be it through providing financial support or manpower, or other resources such as aircraft and logistic support. Indeed, Admiral Stavridis and United States Ambassador to NATO Ivo H. Daalder state, "the intervention in Libya … demonstrated that a politically cohesive NATO can tackle increasingly complex, and increasingly global, security challenges."[73] NATO SOF is a crucial element in tackling these complex global security challenges. The vision of a NATO SOF Air Wing can be realized, but only if the collective will of the Alliance members make it so.

[71] Kevin Whitelaw, Richard J. Newman, and David E. Kaplan, "Time is Running Out for Mr. Ethnic Cleansing," accessed March 16, 2012, http://www.usnews.com/usnews/news/articles/980413/archive_003687.htm.

[72] Sean Rayment, "How the Special Forces Helped Bring Gaddafi to His Knees," accessed March 16, 2012, http://www.telegraph.co.uk/news/worldnews/africaandindianocean/libya/8727076/How-the-special-forces-helped-bring-Gaddafi-to-his-knees.html

[73] Ivo H. Daalder and James G. Stavridis, "NATO's Victory in Libya: The Right Way to Run an Intervention," *Foreign Affairs* 91 (2012): 5.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX. HYPOTHESIS TESTING

The following table reflects the data from the survey question, "If you could have the ideal aircraft for support during [DA and SR] missions, what would it (they) be?" This data was used in hypothesis testing to determine whether or not both types of aircraft—rotary-wing and fixed-wing—were needed to support the NATO SOF principal tasks.

	DA	SR	COMBINED
Only Rotary-Wing	22	14	**36**
Only Fixed-Wing	1	2	**3**
Both RW and FW	9	10	**19**
		TOTAL:	**58**

Table 11. Survey Responses—Ideal Aircraft for Mission Type.

Single proportion tests for significance were conducted to determine the need for both rotary-wing and fixed-wing aircraft in support of the NATO SOF principal tasks. The tests started proposed a null hypothesis that respondents claim that there is a need for both type of aircraft on at least 10% of the missions, and were conducted in ten-percent increments until enough statistical evidence led to the conclusion that both types were not needed at that percent. The tests were conducted at 95% significance ($\alpha = .05$), and the following equation was used:

$$z = \frac{p - p_0}{\sqrt{p_0(1 - p_o)/n}}$$

where z is the test statistic, p is the percentage of the sample that chose both rotary-wing and fixed-wing, p_0 is the null hypothesis, and n is the number of respondents in the sample. A null hypothesis of $p \le .1$ resulted in the following value:

$$z = \frac{.3276 - .1}{\sqrt{.1(.9)/58}} = 5.77$$

Since 5.77 is greater than the constant significance value of 1.6445, the null hypothesis is rejected—that is, respondents requested both types of aircraft on at least 10% of the missions. A significance test using the null hypothesis that respondents claim there is a need for both type of aircraft on at least 20% of the missions yielded a value of 2.429, which is still greater than 1.6445, so again the null hypothesis was rejected. This implies that respondents requested both type aircrafts at least 20% of the time.

A significance test with a null hypothesis of at least 30% yielded a value of 0.4589. This value is less than the constant significance value of 1.6445; the research data failed to reject the null hypothesis. In this case, there is not enough statistical evidence to conclude that both rotary-wing and fixed-wing aircraft were requested more than 30% of the time. Combined with the results of the previous significance tests, it appears the respondents requested both types of aircraft on at least 20% of the missions but less than 30%. Using the Microsoft Excel Solver program, the results showed that the maximum percentage that is significant is 23.58%; this indicates that the respondents requested both aircraft 23.58% of the time.

Since statistical evidence confirmed the need for both rotary-wing and fixed-wing aircraft, it became necessary to find a ratio of rotary-wing to fixed-wing aircraft that would inform the aircraft consistency of a Special Operations Air Task Group. The data from Table 11 was applied to the following probability of intersection equation,

$$RW \cap FW$$

where RW is rotary-wing aircraft and FW is fixed-wing aircraft. The intersection graphic containing data from Table 11 is shown in Figure 20,

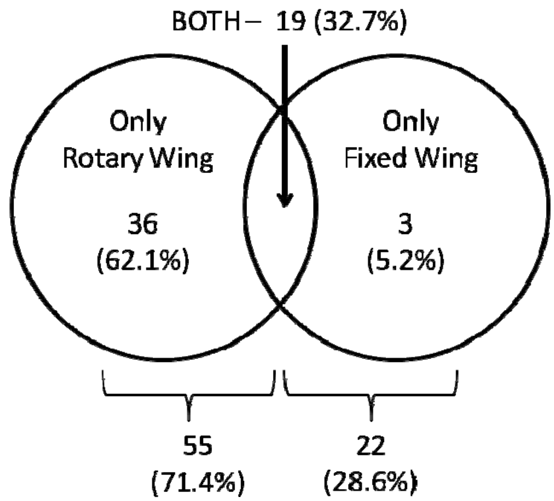

Figure 20. Ratio of Rotary-Wing to Fixed-Wing.

Figure 20 indicates respondents chose only rotary-wing thirty six times, only fixed-wing three times, and both rotary and fixed-wing nineteen times; these responses are combined to reveal fifty five total responses (71.4%) that contained rotary-wing and twenty two total responses (28.6%) that contained fixed-wing. Seventy-one point four percent (71.4%) to 28.6% is significant, as it defines the ratio of aviation platforms in each Special Operations Air Task Group.

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF REFERENCES

Articles in Periodicals

Daalder, Ivo H. and James G. Stavridis. "NATO's Victory in Libya: The Right Way to Run an Intervention." *Foreign Affairs* 91 (2012): 2–7.

Goldgeier, James. "The Future of NATO." New York: Council on Foreign Relations Press, 2010.

Gompert, David C. and Raymond C. Smith. "Creating a NATO Special Operations Force." *Defense Horizons* 52 (2006).

Hamilton, Daniel, Charles Barry, Hans Binnendijk, Stephen Flanagan, Julianne Smith, and James Townsend. "Alliance Reborn: An Atlantic Compact for the 21st Century." Washington, D.C.: Atlantic Council of the United States, February, 2009.

Jones, Adrian H., and Andrew R. Molnar. "Internal Defense Against Insurgency: Six Cases." Washington, D.C.: Center for Research in Social Systems, 1966.

Jones, James L. "Transforming NATO Special Operations." *Joint Forces Quarterly* 45 (2007): 36–40.

Rayment, Sean. "How the Special Forces Helped Bring Gaddafi to His Knees." *The Telegraph,* August 28, 2011, accessed March 16, 2012, http://www.telegraph.co.uk/news/worldnews/africaandindianocean/libya/8727076/How-the-special-forces-helped-bring-Gaddafi-to-his-knees.html.

Shane, Scott. "Drone Strike Kills Qaeda Operative in Pakistan, U.S. Says." *The New York Times*, January 19, 2012, accessed January 28, 2012, http://www.nytimes.com/2012/01/20/world/asia/us-says-qaeda-operative-killed-in-drone-strike.html.

Shea, Jaime. "A NATO for the 21st Century: Toward a New Strategic Concept." *The Fletcher Forum of World Affairs* 31 (2007): 43–55.

Weinrod, W. Bruce and Charles L. Barry. "NATO Command Structure: Considerations for the Future." *Center for Technology and National Security Policy,* National Defense University, September, 2010.

Whitelaw, Kevin, Richard J. Newman, and David E. Kaplan. "Time is Running Out for Mr. Ethnic Cleansing," *U.S. News and World Report,* April 5, 1998, accessed March 16, 2012, http://www.usnews.com/usnews/news/articles/980413/archive_003687.htm.

Books

Corum, James S. and Wray R. Johnson. *Airpower in Small Wars: Fighting Insurgents and Terrorists*. Lawrence, KS: University Press of Kansas, 2003.

Haas, Michael E. *Apollo's Warriors: U.S. Air Force Special Operations During the Cold War*. Maxwell Air Force Base, AL: Air University Press, 1997.

Haas, Michael E. *Air Commando! 1950-1975: Twenty-Five Years at the Tip of the Spear*. Hurlburt Field, FL: Air Force Special Operations Command, 1994.

Haas, Michael E. *In the Devil's Shadow: UN Special Operations During the Korean War*. Annapolis, MD: Naval Institute Press, 2000.

George, Alexander and Andrew Bennett. *Case Studies and Theory Development in the Social Sciences*. The MIT Press, 2005.

Hanna, David P. *Designing Organizations for High Performance*. Reading, MA: Addison Wesley, 1988.

Kyle, James H. *The Guts to Try: The Untold Story of the Iran Hostage Rescue Mission by the On-Scene Commander*. New York: Orion Books, 1990.

Mason Jr., Herbert A., Randy A. Bergeron, and James A. Renfrow, Jr. *Operation Thursday: The Birth of the Air Commandos*. Honolulu, HI: University Press of the Pacific, 1994.

McRaven, William H. *Spec Ops: Case Studies in Special Operations Theory and Practice.* New York: Presidio Press, 1995.

Mrazek, James E. *The Fall of Eben Emael*. Washington, D.C.: Luce, 1970.

Newton, Richard D. *Special Operations Aviation in NATO: A Vector to the Future.* Hurlburt Field, FL: JSOU Press, September, 2006.

Van Evra, Stephen. *Guide to Methods for Students of Political Science.* Ithaca: Cornell University Press.

Interviews

Alsid, Mark B (Commander, Air Force Special Operations Training Center). Interview with the author, February 9, 2012. Air Force Special Operations Training Center, Hurlburt Field, FL.

Cline, John D (Military Assistant to the Commander, NSHQ). Interview with the author, November 9, 2012. NATO SOF Training and Education Program facility, Chièvres Air Base, Belgium.

Conkright, Darin (NSHQ Chief of Staff). Interview with the author, November 9, 2012. NATO SOF Training and Education Program facility, Chièvres Air Base, Belgium.

Crutchfield, Julia I (Director, Curriculum and Faculty Development, Air Force Special Operations Training Center). Electronic mail interview with author, February 15, 2012.

Harmon, Paul R (first Commander, Air Force Special Operations Training Center). Interview with the author, February 9, 2012. Air Force Special Operations Headquarters building. Hurlburt Field, FL.

McNerney, Michael A (Deputy Commander, Air Force Special Operations Training Center). Interview with the author, Febraury 8, 2012. Air Force Special Operations Training Center, Hurlburt Field, FL.

NATO Special Operations Forces. Interview with the author, March 9, 2012, Naval Postgraduate School.

Peterson, Cory (Director, J-7, NSHQ). Interview with the author, November 9, 2012. NATO SOF Training and Education Program facility, Chièvres Air Base, Belgium.

Trube, John S (Commander, 371st Special Operations Combat Training Squadron). Interview with the author, Febraury 8, 2012. 371st Special Operations Combat Training Squadron, Hurlburt Field, FL.

NATO Documents

Allied Joint Publication 3.5. "Allied Joint Doctrine for Special Operations." January, 2009.

Kisner, Frank J. "Kindelan Speech." Delivered at the 21st Kindelan Chair Seminar, Spanish Air Force Headquarters, Madrid, Spain. November 18, 2011.

NATO Special Operations Coordination Centre. "SOTG Manual." Version 1.0, December, 2009.

NATO Special Operations Headquarters. "Biennial Review." 2010.

NATO Special Operations Headquarters. "NSHQ Manual 80-004, Special Air Warfare Manual." March 10, 2010.

NATO Special Operations Headquarters. " Special Operations Air Group: Concept for Development and Organization." April 22, 2010.

North Atlantic Treaty Organization. "Active Engagement, Modern Defence: Strategic Concept for the Defence and Security of the Members of the North Atlantic Treaty Organization." November, 2010.

North Atlantic Treaty Organization. "NATO Special Operations Forces: Key to Mission Success at Strategic Level." NATO SOF Coordination Center, 2009.

North Atlantic Treaty Organization. "North Atlantic Treaty Organization Special Operations Forces Study." NATO SOF Coordination Center, 2008.

Rasmussen, Anders Fogh. "Towards NATO's Chicago Summit." Delivered at the European Policy Center, Brussels, Belgium, on September 30, 2011. Accessed January 11, 2012. http://www.NATO.int/cps/en/NATOlive/opinions_78600.htm

U.S. Government Documents

Air Force Special Operations Training Center. "AFSOTC Instruction 36-8: Instructor Qualification, Certification, and Evaluation." Hurlburt Field, FL, October 8, 2010.

Department of Defense. "CJCSI 3470.10—Rapid Validation and Resourcing of Joint Urgent Operational Needs (JUONS) in the Year of Execution." Chairman, Joint Chiefs of Staff, July 15, 2005.

Department of Defense. "2010 Quadrennial Defense Review Report." Secretary of Defense, February, 2010.

Department of Defense. "Sustaining U.S. Global Leadership: Priorities for 21st Century Defense." January 2012, accessed January 7, 2012, http://www.defense.gov/news/Defense_Strategic_Guidance.pdf.

Joint Chiefs of Staff. "Joint Publication 3-05: Special Operations." Washington, D.C. April 18, 2011.

United States Air Force. "The 21st Century Air Force Irregular Warfare White Paper." January, 2009.

United States Air Force Special Operations Command. "USAF Irregular Warfare Concept White Paper." May 2007.

United States Air Force Warfare Center. "Air Advisor Handbook." Coalition and Irregular Warfare Center of Excellence, April, 2009.

Websites

Airbus Military. "A400M Technical Specifications." Accessed January 28, 2012, http://www.a400m.com/Specifications.aspx

AugustaWestland. "AW159." Accessed January 29, 2012, http://www.agustawestland.com/product/aw159-0

"Boeing CH-47D." Accessed January 29, 2012, http://www.chinook-helicopter.com/model_comparison/CH-47D_specifications.html

"CH-53 Sea Stallion." accessed January 29, 2012, http://www.globalsecurity.org/military/systems/aircraft/h-53-specs.htm

"EC 635—Light Utility Helicopter (LUH)." Accessed January 29, 2012, http://www.globalsecurity.org/military/world/europe/ec635-specs.htm

EUROCONTROL. "Revising Wake Turbulence Categories to Gain Capacity." Accessed January 26, 2012, http://www.eurocontrol.int/eec/public/standard_page/EEC_News_2008_3_RECAT.html.

Federal Aviation Administration. *FAA Glossary*. Accessed January 26, 2012, http://faaglossary.com/large-aircraft-faa-regulatory-definition-from-14-cfr-1-1/.

Federal Aviation Administration. *Pilot/Controller Glossary*. Accessed January 26, 2012, http://www.faa.gov/air_traffic/publications/ATPubs/PCG/A.HTM.

Federal Aviation Administration. "Small Airplanes: Questions and Answers about Small Airplanes." Accessed January 26, 2012, http://www.faa.gov/aircraft/air_cert/design_approvals/small_airplanes/faq/.

Flight Aid. "PC-12 Performance Specifications." Accessed January 29, 2012, http://www.flight-aid.org/en/downloads/PC12_grn_EN.pdf

"De Havilland DHC-6 Twin Otter." Accessed January 29, 2012, http://www.airliners.net/aircraft-data/stats.main?id=181

International Civil Aviation Organization. "International Civil Aviation In Brief." Accessed January 26, 2012, uhttp://www.icao.int/Pages/icao-in-brief.aspx.

"MC-12W Liberty, United States of America." Accessed March 2, 2012, http://www.airforce-technology.com/projects /mc-liberty/.

"McDonnell Douglas (now Boeing) C-17 Globemaster III Heavy Transport." Accessed January 29, 2012, http://www.aerospaceweb.org/aircraft/transport-m/c17/

"MD500E Performance Specifications." Accessed January 29, 2012, http://www.mdhelicopters.com/helicopters/pdf/500E/performance_specifications.pdf

"Mi-17 Hip Specifications." Accessed January 29, 2012, http://www.sinodefence.com/airforce/helicopter/mi17-specifications.asp

National Park Service. "1903—The First Flight." Accessed January 25, 2012, http://www.nps.gov/wrbr/historyculture/thefirstflight.htm -

"NH90." Accessed January 29, 2012, http://www.globalsecurity.org/military/world/europe/nh90-specs.htm

North Atlantic Treaty Organization. "NATO Operations and Missions." Accessed March 9, 2012, http://www.NATO.int/cps/en/NATOlive/topics_52060.htm.

"SA330 Puma: Medium Transport Helicopter." Accessed January 29, 2012, http://www.flugzeuginfo.net/acdata_php/acdata_puma_en.php

Skyline Aviation. "Cessna Caravan 208B." Accessed January 29, 2012, http://www.skylineaviation.co.uk/downloads/MicroSOFtWord-Caravan.pdf

SR-71 Online. "Blackbird Records." Accessed January 25, 2012, http://www.sr-71.org/blackbird/records.php

United States Forestry Service. "Light Fixed Wing Aircraft Program." *USFS Region* 5, accessed January 26, 2012, www.fs.fed.us/r5/fire/aviation/**light_fixed**_wing.doc.

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
   Ft. Belvoir, Virginia

2. Dudley Knox Library
   Naval Postgraduate School
   Monterey, California

3. Commander
   NATO Special Operations Headquarters
   Mons, Belgium

4. "Taking SOF Global" Operational Planning Team
   Attn: Colonel Stuart W. Bradin
   Attn: Commander Marvin H. McGuire
   U.S. Special Operations Command
   MacDill Air Force Base, Florida

5. Colonel Michael A. McNerney
   Air Force Special Operations Training Center
   Hurlburt Field, Florida