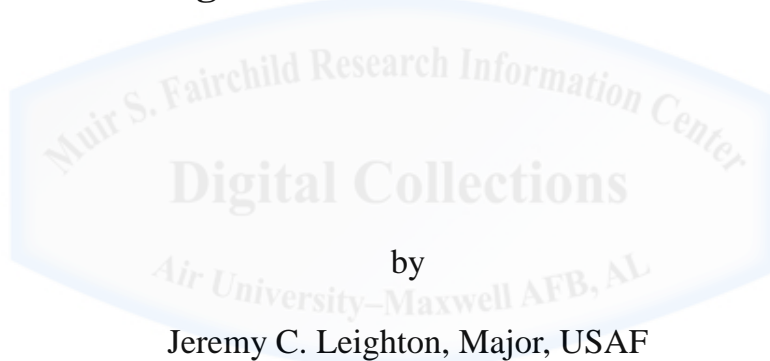AIR COMMAND AND STAFF COLLEGE

AIR UNIVERSITY

Aerial Refueling for NATO's Smart Defence Initiative

by

Jeremy C. Leighton, Major, USAF

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Advisor: Edwina Campbell, PhD

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ABSTRACT

Nations pooling resources together to obtain a military capability is a method to reduce national costs. The NATO Secretary General's Smart Defence initiative is a program for NATO to invest resources and share military capabilities. NATO operations over the last 20 years have indicated a reliance on aerial refueling to conduct operations for Article 4 out-of-area missions. Aerial refueling would also benefit operations under Article 5 given the vast distances of the Alliance's territory.

Aerial refueling aircraft should be a future investment for NATO. The United States has the preponderance of aerial refueling capability in the Alliance. With the U.S. strategic pivot to the Asia-Pacific region, there is a need to ensure that NATO has aerial refueling capability amongst the European partners. NATO should acquire more aerial refueling assets to optimize defense funding during austerity to ensure the Alliance continues to invest in capability it needs to support operations set forth by the Alliance's political leadership. NATO has previously implemented programs to acquire airframes to improve capability with the acquisition of the E-3A for the command and control mission and the C-17A for strategic airlift missions.

INTRODUCTION

Article 3: In order more effectively to achieve the objectives of this Treaty, the Parties, separately and jointly, by means of continuous and effective self-help and mutual aid, will maintain and develop their individual and collective capacity to resist armed attack.

- Washington Treaty, 1949 [1]

The establishment of the North Atlantic Treaty created a common and collective defense between partners in Europe and North America. The Washington Treaty had provisions within it to establish the organizations deemed necessary to develop the defensive capabilities and eventually the organization that would later become NATO.[2] Since the end of the Cold War NATO has had to redefine its role in the world without the threat of the Soviet Union. The core belief since its founding remains: collective defense, interoperability, and the integration of capabilities. This is to ensure that Alliance members are able to work together to support collective defense under Article 5 and to support out-of-area operations against security threats under Article 4 (see footnote for Article 4 discussion).[3] Whether called out-of-area or Article 4 operations, NATO has conducted multiple operations outside of its territory since the end of the Cold War in the Balkans, Afghanistan, and Libya. Capabilities that support Article 4 operations would also support Article 5 operations. The quote from Article 3 is a reminder that investing in individual and collective capabilities is a continual process for the Alliance so it can support Article 5 and Article 4 operations.

Within the NATO air forces, NATO needs to invest resources. Ambassador Ivo Daalder, the U.S. Ambassador to NATO, and Admiral James Stavridis, Supreme Allied Commander Europe, recently wrote that, "NATO has also neglected to cultivate the essential tools for military campaigns, such as intelligence, surveillance, reconnaissance, precision targeting, and aerial refueling—despite nearly two decades of experience that have demonstrated their value."[4]

Charles Barry, a Distinguished Research Fellow at the Center for Transatlantic Security Studies at National Defense University, also points out that, "…multinational operations are the centerpiece of every western nation's military strategy, including to a significant degree the doctrine of the United States, it is wise to assess…the enduring value of transatlantic interoperability and political cooperation."[5]

NATO needs the ability to deploy and operate from extended distances over Alliance territory or during out-of-area operations. This has been the case for Canada and the U.S. to mobilize and deploy forces to Europe. NATO and its members are becoming more reliant on air mobility to execute long-range or power projection operations. Aerial refueling is a key enabler to support those operations.

The United States possesses the preponderance of aerial refueling aircraft within the Alliance. The U.S., however, is not the only nation that understands the value of aerial refueling. Canada, France, Germany, Italy, the Netherlands, Spain, Turkey, and the United Kingdom possess aerial refueling capability.[6] NATO nations with aerial refuelers support those Alliance members that own aerial refuelable aircraft, but do not own tankers. Poland is an example. The Polish Air Force understood the value of aerial refueling and sought to purchase tanker aircraft to support its F-16s. However, in 2008, fiscal constraints forced the Polish Air Force to cancel its acquisition plans.[7] Poland must now continue to rely on other NATO members for aerial refueling training and operational support. The United Kingdom on the other hand is trying to maintain its aerial refueling capability and is delaying the retirement of its older aerial refuelers to avoid a gap in capability while it awaits the production of its A330 MRTT replacements.[8]

Modern air fleets are expensive to acquire, maintain, and operate. Upgrading and adding new aircraft during times of austerity is a challenge. NATO's Smart Defence initiative is

attempting to use the current fiscal constraints as an impetus to pursue efficiencies within the Alliance while making NATO more effective by pooling resources together to collectively acquire capabilities. Smart Defence is an initiative to sustain and invest in collective defense capabilities for air, land, and sea.

Why should NATO consider adding aerial refueling? According to Lieutenant General John Sams, a former USAF commander of USAF's 15th Air Force, "Without air mobility, we would have the best continental defense in the world. Air mobility allows us to move beyond our borders and conduct US national security policy anywhere in the world."[9] Aerial refueling has been critical for the United States' ability to project global airpower and for NATO it has become a critical enabler of air power to support out-of-area operations. Aerial refueling would also be critical to support Article 5 operations. Tankers permit other aircraft to loiter longer while supporting ground forces, permit long-range combat operations, act as an air bridge to deploy aircraft rapidly, and can augment strategic airlift when aerial refueling support is not required. NATO's missions have expanded beyond Alliance territory since the end of the Cold War. The recent operations over Libya highlighted the dependency of strike and Intelligence, Surveillance, Reconnaissance (ISR) aircraft on tanker aircraft to execute extended range operations.[10] The recent operational experience highlight capabilities that Alliance members could seek to invest individually, bilaterally, or multi-nationally to improve NATO's overall aerial refueling capability.

This would not be the first time NATO has considered pooled resources to invest in air force capacities. NATO has previously procured aircraft and subsequently created multinational units to operate the airframes. NATO's first aircraft purchase, the E-3A Airborne Warning and Control System (AWACS), began in the late 1970s to fill the gap on airborne command and

control capability. In the 2000s, strategic airlift was also a shortfall, especially amongst the European partners, which led the acquisition of the C-17A.

Using the Smart Defence initiative, NATO should expand its aerial refueling capability. This would optimize the limited defense funds available during fiscal austerity. An aerial refueling unit acquired and operated in a fashion similar to the E-3As or the C-17s would add additional airlift capacity, force extension, and force projection capability within the Alliance. It would better enable the NATO's capacity to support Article 5 and Article 4 missions set forth by the Alliance's political leadership.

NATO AIR FORCES'S CURRENT TANKER CAPABILITY

"Air forces must be capable of maintaining control of the air whilst operating at a distance…Air to Air Refueling has also extended the on station time for combat aircraft in Libya meaning that combat platforms can perform extended sorties and act as intelligence platforms while they loiter. There therefore needs to be a balance struck between combat and support platforms to maximize the output of the overall package."[11] This balance between combat and combat support capability is important for NATO when conducting air operations. Unfortunately, the balance of aerial refueling capability is not equal across the Alliance air forces and requires support from just a few nations.[12] This section will examine the refueling capability and the requirements within NATO air forces to describe the aerial refueling capability imbalance. NATO Naval, Marine, Army aviation assets are not included, but it is noted that the number of receiver aircraft would increase, thereby putting a greater demand on the limited aerial refueling aircraft within the Alliance.

As mentioned earlier, only nine NATO air forces have aerial refueling aircraft. There are 535 tanker airframes owned by these NATO nations. The USAF provides 89% of the aerial

refueling capability. The remaining 11% of aerial refueling capability, or 59 total airframes, resides the other eight air forces. Of the boom capable aircraft, 78% are in the USAF with 4% residing in the rest of NATO. Within NATO, 6% or 34 airframes are drogue only tankers. The USAF does not own any drogue only tankers, unlike the United Kingdom's, which are exclusively drogue only tankers. Some tankers in NATO air forces are capable of conducting both drogue and boom refueling while airborne without having to change equipment between missions when the aircraft is on the ground. The USAF has 11% of this dual capability while Italy and the Netherlands combined contribute less than one percent of Alliance capacity. All nations that currently use the KC-135 aerial tanker are able to attach a boom-drogue adapter to the end of the boom, so the aircraft so is able to support drogue only refueling. The KC-135 lacks the flexibility of the dual capable tankers to switch between drogue and boom refueling once airborne.[13] Table 1 provides a snapshot of the tanker capability allocation within NATO.

	Drogue	Boom	Dual	Total	%
USAF	0 (0.0%)	417 (78%)	59 (11%)	476	89%
Other NATO	34 (6%)	21 (4%)	4 (1%)	59	11%
Totals	34 (6%)	438 (82%)	63 (12%)	535	100%

Table 1: NATO Air Forces Tanker Equipment Capability Allocation [14]

Seventeen NATO air forces have aircraft that are aerial refuelable. Only nine of those nations with refuelable aircraft have tankers. Those nations without tankers would require tanker support from another nation's tankers if supporting "out-of-area" operations or for extended range operations over Alliance territory. An example would be the Belgian and Polish Air Forces, which both own F-16s. If either of these nations were executing long-range NATO operations, they would require tanker assistance from a boom capable tanker from France, Italy, the Netherlands, Turkey, or the USAF.

The 2011 operation over Libya is a recent example of an out-of-area operation requiring tanker support in order to execute successfully. Another example of refueling support over Alliance territory is the combat air patrols over the 2006 NATO Summit Riga Summit. Aircraft for this event operated from multiple NATO airbases and conducted air patrols over the Baltic States during the summit. U.K.-based U.S. tankers provided fuel to enable combat aircraft to fly to the operating area, loiter in the patrol area, and then return to home bases.[15]

Compiling the date from *Jane's World Air Forces 2011*-2012, there are 5,062 receiver aircraft within NATO air forces. Table 2 below provides a summary of the receiver aircraft breakdown with required equipment. The USAF has 54% of the receivers, while the other NATO air forces contribute 46% of the receivers. In reality, not all USAF aircraft would be committed to a European operation, since aircraft would also be engaged in homeland defense, Asia-Pacific support, and other global operations.

To complicate the pairing of tankers to receivers, compatible refueling equipment is important in order to transfer fuel. Each NATO member, when acquiring refuelable aircraft, has a preferred method for conducting aerial refueling operations. European air forces typically build receiver aircraft to use the probe-and-drogue refueling system. Aircraft for the USAF, or those same USAF aircraft types sold under U.S. Foreign Military sales, refuel via the boom system.[16]

Over 70% of NATO aircraft are boom refuelable, but the USAF assets skew the numbers. In Europe and Canada, only 19% of NATO refuelable aircraft require boom capable tankers. The probe-and-drogue refueling is on 27% of NATO refuelable aircraft, while the USAF has none. There is, however, a unique receiver capability specific to the seven Royal Air Force E-3D aircraft. These aircraft are capable to refuel with either a boom or a probe-and drogue refueling

system. The E-3Ds are only receiver aircraft-type within NATO air forces capable to refuel with either type of tanker refueling equipment.[17]

	Probe	Boom	Dual	Total	%
USAF	0 (0%)	2722 (54%)	0 (0%)	2722	54%
Other NATO	1376 (27%)	957 (19%)	7 (0.1%)	2340	46%
Total Aircraft	1376 (27%)	3679 (73%)	7(0.1%)	5062	100.0%

Table 2: NATO Air Forces Receiver Aircraft with Equipment type breakdown [18]

The ability to interoperate is an important part of the Alliance. This is especially important when capabilities are not within a country, but require assistance from another nation to support operations. With so few boom tankers within the European side of the alliance, there is an over-reliance on the USAF to provide the air refueling capability. Even with all the drogue tankers in the European and Canadian air forces, there are simply not enough to support all of NATO's probe-and-drogue receivers. Because of this limitation, NATO operations require USAF tankers to provide a preponderance of aerial refueling support during air operations. If tankers are unavailable, it may mean a change in operational planning to execute a mission. This could mean fewer combat aircraft sorties because of insufficient aerial refueling capability. The latter choice may not be militarily possible depending on the assigned mission and the end-state desired by the political leadership.

NATO'S FUTURE: SMART DEFENCE

The economic slump the world has been experiencing since 2008 is forcing governments to curtail budgets. Defense budgets are not exempt from austerity measures. This means NATO also needs to make adjustments with the overall coordination of the Alliance's capabilities to avoid a hollow force and is able to invest long-term to meet future defense and security requirements. The approach to meeting these challenges NATO Secretary General Anders Fogh Rasmussen calls "Smart Defence." Smart Defence encompasses three distinct areas of focus:

Prioritization, Specialization, and Cooperation. The long-term goal of Smart Defence is to spread the overall defense burden more equally between NATO member capabilities, modernize capabilities, and reduce reliance on certain capabilities from the United States.[19] The question that Secretary General Rasmussen asks when discussing Smart Defence is, "Do we want to do more with less or do we want to do less with less?"[20]

Prioritization and specialization are always a challenge. Each member nation makes spending decisions as a sovereign entity for its own defense first and then provides those capabilities to the Alliance. Prioritization and specialization as focus areas work to ensure a "transparent, cooperative and cost-effective approach to meet essential capability requirements," as set by the Heads of State at the 2010 NATO Lisbon Summit. [21] How each nation prioritizes defense spending may cause a specialization of capabilities to occur intentionally or accidently. This can have ramifications for NATO if a nation decides it will no longer fund a weapon system or program and there is no other similar capability within the Alliance. Smart Defence's specialization focus is to coordinate budget cuts within the Alliance to achieve "specialization by design" rather than "specialization by default." [22] The goal is to mitigate the risks when NATO partners make unilateral defense cuts that have Alliance-wide ramifications by having more communication and coordination between NATO members to enable balanced defense cuts to preserve critical Alliance capabilities.

Cooperation is another focus item of Smart Defence for the Alliance to acquire or preserve capabilities and to spread the financial burden as well between NATO members. NATO is not the only organization looking to pool resources; the European Union Defense Agency is also pursuing shared capabilities between EU members and is seeking to complement NATO's Smart Defence with a NATO-EU partnership.[23] NATO's Secretary General

Rasmussen, stated at the February 2012 Defense Ministerial meeting, "Today, we will look at some specific multinational projects, on which I hope we can get a political commitment at Chicago. But that is only one part of the picture. We will also address the longer term development of our critical capabilities. So in this respect Chicago should be seen as a starting point rather than an end point."[24]

Smart Defence is not necessarily a new initiative to improve air, land, and sea capabilities. Since the Prague Summit in 2002, NATO's Heads of State in the last decade have pushed for more cooperation to improve the capability of the Alliance to conduct both out-of-theater operations and to have better self-sustainment during long-range operations. Nations may have concerns with Smart Defence in terms of committing to deeper cooperation or specializing military capability, because it may impact the ability for a nation to make sovereign decisions.

> Cooperation and specialisation are likely to yield benefits in financial and capability terms, but these will come at the price of reduced national autonomy. Striking an acceptable balance – one that can be tolerated by governments worried about national security – poses large political challenges. Many possible areas for closer cooperation fall into the fields of education and training, maintenance and logistics. Given that these are mostly not front-line capabilities, the political and military impact of increasing dependency on partners is limited and hence more acceptable politically.[25]

Another political challenge for Smart Defence to overcome will be ensuring pooled military resources will be available when a nation needs it to conduct operations, since pooled resources are no longer sovereign resources.[26] This was an issue highlighted during Libya operations when Germany did not authorize its aircrew to fly on NATO's E-3A missions. To compensate, Germany shifted additional aircrew to support operations in Afghanistan to mitigate impact to the Alliance's Libya operations.[27] NATO governments will need to resolve these issues as a collective and will also need to make the case to their citizens that it is in the best interests to pool assets for each nation's national defense and not just for fiscal interests only.[28]

The idea of cooperation is an area previously used in the past to improve NATO's capability. NATO pursued this in the 1980s by procuring the E-3A Airborne Warning and Control System (AWACS). More recently, there has been a deficit of strategic airlift capability. NATO added this capability by pooling resources to procure C-17As. In 2009, the C-17As arrived to the Heavy Airlift Wing to begin operations[29]. The F-35 Joint Strike Fighter is a multinational acquisition and development program of the U.S. and eight other nations, of which seven are NATO members (Canada, Denmark, Italy, Netherlands, Norway, Turkey, and United Kingdom).[30]

During the NATO Prague Summit in 2002, Alliance members identified the requirement to improve mobility capabilities for airlift, sealift, and aerial refueling to meet strategic security requirements.[31] The NATO Riga Summit in 2006 reinforced the mobility requirement again through the statements by the NATO Heads of State. The Riga Summit emphasized a force structure to "improve our ability to conduct and support multinational joint expeditionary operations far from home territory with little or no host nation support and to sustain them for extended periods. This requires forces that are fully deployable, sustainable, and interoperable and the means to deploy them."[32] The Riga Summit also identified NATO transformation for air mobility and included: the creation of the Strategic Airlift Interim Solution; the intent to create a consortium to acquire C-17s; and the need to develop mechanisms to coordinate A-400Ms and nationally owned C-17s.[33] The Riga Summit identified progress with sealift since the Prague Summit, but there was no mention of aerial refueling in the final summit declaration.[34]

NATO depends primarily on the United States for the bulk of aerial refueling to support deployment and sustainment of air operations. For short notice operations, having more aerial refueling capability within European side of NATO, whether nationally owned or as a

multinational unit, will enable a faster response time for NATO operations originating from Europe. Additionally, with the shift of U.S. posture towards the Asia-Pacific region of the world, there will be a need across the Alliance to distribute the defense burden better to ensure NATO's ability to respond to a crisis.[35]

The addition of new members since the end of the Cold War means NATO's geography is much larger than it was during the Cold War. NATO now requires different capabilities to provide mutual defense support. The Alliance needs aerial refueling to project NATO airpower across Europe, North America, and the Atlantic Ocean to ensure persistence and reach of combat airpower to defend territory under Article 5. Additionally, aerial refueling could support other distant operations deemed a threat that requires Alliance action under Article 4.

The expansion of NATO operations beyond the Alliance territory has created a split regarding the strategic vision for NATO. This difference in vision between Alliance members is over territorial defense (Article 5) and expeditionary operations (Article 4). This difference in strategic vision needs bridging to achieve the political consensus within the Alliance to enable Smart Defence to succeed. There are two camps within the Alliance: the "old" members of the Cold War era and the "new" post-Cold War members. According to Dr. Karl-Heinz Kamp, the Director of the Research Division at the NATO Defense College, "Most of the "old" members recognize NATO's role as a global stability provider, engaged in missions far beyond the geographical borders of the member states. In contrast, most of the "new" members joined the Alliance because of the security commitment in accordance with Article V [*sic*] of the Washington Treaty. In consequence, they highlight the mission of territorial defense."[36] Dr. Rob de Wijk, Director of the Hague Center for Strategic studies has a similar opinion and also writes that, "A new transatlantic bargain should bridge the two visions. There must be an

understanding that there is no contradiction between capabilities needed for collective defense and expeditionary means for cooperative security."[37] NATO's 2010 Strategic Concept attempts to bridge this divide of "new" and "old" members by reconfirming Article 5 as a commitment that is "firm and binding," but also says that NATO will maintain expeditionary capabilities to "deter and defeat" aggression and emerging security threats against members. [38] This means that investing in capabilities such as aerial refueling to project power across the territory of the Alliance would benefit the "new" members to enhance Article 5 operations and would provide the flexibility the "old" members when seeking to execute out-of-area security operations under Article 4. The Secretary General should attempt to use the Smart Defence initiative to span the divide, because "…all member states must recognize that expeditionary capabilities can be used for classical Article 5 operations as well as for 'away operations'."[39]

BACK TO THE FUTURE?

As mentioned earlier, aerial refueling may be the next area to develop additional capability within NATO, but this is not the first time the Alliance has considered improving tanker capability. The first time was in 1986 when the NATO AWACs program was approaching full operating capability and the idea to acquire aerial refuelers surfaced.[40] In 1986, foreseeing the end of the Cold War within the next few years would have been a fantasy. Had the Cold War not ended a few years later, it is unknown if this idea about an aerial refueling unit would have come to fruition. What is apparent is the end of the Cold War meant the end of the possibility to pursue such a project at that moment in time since there was no longer an existential threat to the Alliance.[41]

Alliance operations after the collapse of the Soviet Union, however, indicate that NATO does indeed have a need for tankers to execute operations. The USAF has traditionally provided

the aerial refueling capabilities to the Alliance along with the other members with tanker aircraft. General Stephane Abrial, the Supreme Allied Commander-Transformation and the lead military representative appointed by NATO's Secretary General Rasmussen for the Smart Defence initiative, highlights the need for aerial refueling within Europe based on the results from the operations over Libya.[42]. According to General Abrial, "The U.S. provided 31 of 43 refuelers in Libya," and furthermore, "It could be good to expand that into a multinational framework."[43] With the push for the Smart Defence initiative, the experience in Libya and Afghanistan and shrinking defense budgets may give Smart Defence more impetus to pool resources for aerial refuelers.

NATO has used two different approaches to procure an airframe and a specific capability desired by the Alliance. The political climate of the era defined how the Alliance incorporated each aircraft acquisition into a multinational unit. In the late 1970s-early 1980s, the threat of the Soviet Union defined the structure of E-3A program. For the shape of the C-17A program, it was post-Cold War Europe with operations in the Balkan, Iraq, and Afghanistan, along with more nations becoming NATO members. Both acquisitions incorporated as many NATO members as possible to share the financial burden to improve capability.

Either method may be a baseline for negotiation between NATO members to obtain aerial refueling. The E-3A approach may be for a NATO-owned, operated, and commanded asset. Unlike the E-3A program, the C-17A program has the flexibility of NATO ownership and support with aircraft operations conducted with PfP and NATO members in a multinational unit not aligned under the NATO military command structure. The C-17A approach may leave the door open for non-NATO European Union nations to increase NATO-EU defense cooperation. In order to create a multinational aerial refueling unit, NATO Heads of State and Defense

Ministers will need to continue the dialog regarding the strategic direction of the Alliance. Additionally, these political leaders will need to lay the foundation for future sharing of funds, personnel, equipment and ensure access to those resources by the Alliance.

The E-3A Program

The E-3 program was announced by the NATO Heads of State and Government in May 1978 as a way to improve command and control in NATO's Long Term Defence Programme.[44] The Final Communiqué from the Defence Planning Committee from 5-6 December 1978, said that the E-3A program was the "largest single commonly funded programme ever undertaken by the Alliance."[45] It took ten years to reach full operating capability.[46]

From December 1978 until June 1982, 12 NATO nations (Belgium, Canada, Denmark, Germany, Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Turkey, and the United States) created the infrastructure needed to establish the E-3A program's initial operating capability; flight operations commenced in February 1982. Full operating capability with the 17 aircraft was complete in 1988 at NATO Air Base Geilenkirchen, Germany.[47] From 1998 to 2011, 5 more NATO nations (Spain, Hungary, Poland, Romania, and the Czech Republic) joined the E-3A program.[48] Command and Control of this integrated multinational NATO unit is through NATO's military command structure as shown in Figure 1.

Figure 1: NATO Airborne Early Warning & Control Force Organization[49]

The C-17A Strategic Airlift Capability (SAC) Program

In 2002, the Prague summit highlighted the need to improve NATO's airlift capability. NATO established the Strategic Airlift Interim Solution (SALIS) to fill the deficit with contracted AN-124s from Volga-Dnepr and ADB to support the participating 18 nations.[50] A permanent solution to improve strategic airlift capacity occurred in 2006 when 13 nations signed a Letter of Intent agreeing to participate in the acquisition of C-17As for a multinational unit to replace SALIS. [51] By 2008, a Memorandum of Understanding (MOU) signed by 15 nations formalized the agreement to acquire and operate the C-17s. Thirteen of the 15 nations were NATO members (Bulgaria, Czech Republic, Estonia, Hungary, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Romania, Slovenia, and United States) and two were Partnership for Peace Members (Sweden and Finland).[52] The Czech Republic, Italy, and Latvia dropped out of the SAC program before the first aircraft delivery to the airbase at Papá, Hungary.

NATO's SAC program and its relationship to the Heavy Airlift Wing (HAW) is unique. The program uses a fractional ownership concept similar to that used by Flexjet or Netjet or

timeshared condominiums. Fractional ownership divides costs between clients for the use of the aircraft without anyone of them having to buy a whole aircraft and the associated infrastructure to support it. Fractional ownership allocates a certain percentage of availability for use.

NATO owns and supports the airframes, with contracted support from Boeing.[53] Participants in SAC program purchase flying hours to execute missions. Flying hours equate to the money needed to operate and maintain an aircraft for each hour of use. Each nation has hours allotted to it to execute missions for its nation or to support NATO or EU missions based its fiscal contribution to the pool.[54] Table 3 provides a breakdown by nation from 2009 of the 3,165 flying hours allocated for all three C-17s.

Nation	Flying Hours	Program %
Bulgaria	65	2%
Estonia	45	1%
Finland (PfP)	100	3%
Hungary	50	2%
Lithuania	45	1%
Netherlands	500	16%
Norway	400	13%
Poland	150	5%
Romania	200	6%
Slovenia	60	2%
Sweden (PfP)	550	17%
United States	1000	32%
Total Hours	3,165	100%

Table 3: 2009 Flying Hour Breakdown within SAC[55]

The U.S. purchased the largest share of flying hours at 1,000 hours, which is essentially the use of one aircraft for the year. Sweden and the Netherlands are the next highest with 550 and 500 hours respectively. When combined, this is roughly the equivalent of one aircraft's flying hours for the year. The other nine nations' hours, when combined provide access to essentially one heavy airlift aircraft to conduct cargo and passenger movements.

Another unique aspect to this NATO program is the fact that NATO owns the aircraft, but the multinational unit is not in the NATO military chain of command as described by the SAC MOU.[56] The program splits into two halves: the NATO structure and the Multinational structure. Each half has two organizations within it to coordinate and execute the C-17A program. Figure 2 below from NATO's website depicts the relationship. The following paragraph will briefly describe from the SAC MOU the organizations that oversee and execute the SAC program. The SAC program is a relationship between four organizations to provide flexibility for coordination between partners from NATO and PfP to execute flying hours and to provide oversight to NATO leadership, since a NATO organization owns and supports the aircraft.

The structure's four elements are: the SAC Steering Board (SAC SB); the HAW; the NATO Airlift Management Organization (NAMO) Board of Directors; and the NATO Airlift Management Agency (NAMA). Each organization has representatives from all participating nations. The SAC SB is the overall executive body that oversees the SAC program. It provides oversight of the HAW and coordinates requirements with the NAMO Board of Directors. NAMO is primarily responsible for acquisition, maintenance, and sustainment of the C-17s. NAMO owns the equipment. The NAMO Board of Directors reports to the North Atlantic Council on the program and oversight of NAMA, which is responsible to execute the day-to-day actions of NAMO. NAMA provides support to the HAW. The HAW operates the C-17As and has operational control over the aircraft and personnel from each participating nation. Within the HAW is the military chain of command. Each participant flies missions using its flying hours for each nation's needs.[57]
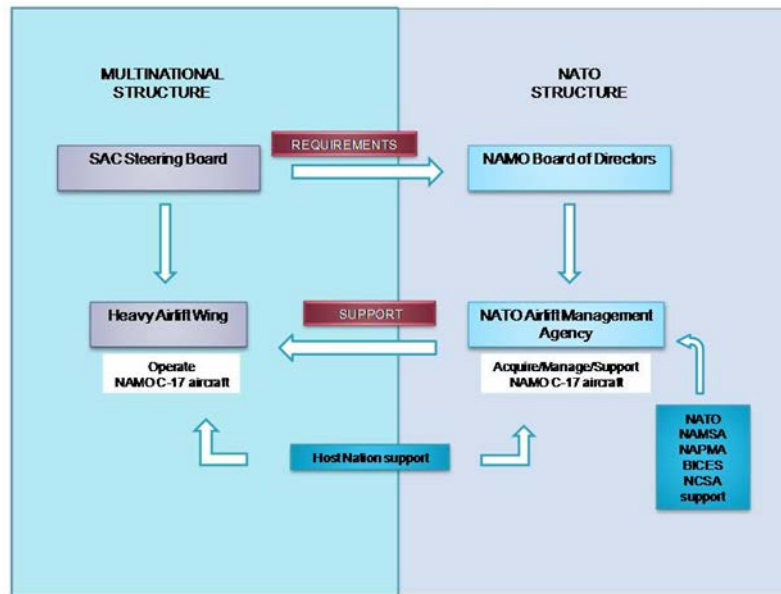
Figure 2: Structure of the SAC Program Governing Body [58]

RECOMMENDATIONS

If NATO pursues a plan to acquire aerial refueling aircraft it must bridge the view between the member states that see the Alliance as primarily for Article 5 operations and those states that are prepared to execute Article 4 operations "out-of-area" against security threats. Then, NATO will need to determine to acquire, maintain, and operate the aircraft that is acceptable to nations that agree to participate. Lastly, once a signed agreement between program participants for a program structure, the participants must determine the airframe requirements to meet the desired capabilities.

For the first part, NATO members need to decide on a strategic outlook and to prioritize the future role of the Alliance. Smart Defence could be the vessel to help guide the discussion, but will it succeed? Is Smart Defence just another in a series of calls for burden sharing that has "cyclical highs and lows [which] frequently mirror the economic cycle" for more resource sharing?[59] Resource sharing will require a shift in NATO's political landscape and may be difficult without some type of threat to galvanize member nations to act together. Additionally,

the political leadership will need to convey to their citizens that the investment in aerial refueling is in their national self-interest for defense planning.

The U.S. pivot to the Asia-Pacific region, along with the financial crisis, may indeed be a starting point to open dialog regarding cooperation to increase aerial refueling capability within the Alliance. As Charles Barry observed, "Arguably, when the United States operates in the Pacific there is a stabilizing and security benefit to many countries, including NATO allies and partners. Yet that may mean that NATO will have to turn to other members for critical assets such as aerial refueling, sophisticated surveillance, and targeting intelligence, should another Libya crisis unfold."[60] This new reality could lead to a NATO led program to build a multinational aerial refueling unit. Idealistically, it would be a multinational unit with all 28 nations participating. Realistically, however, a multinational aerial refueling unit would be a smaller consortium of NATO partners. If a multinational consortium cannot gain traction, then another option would be to facilitate a bilateral approach like the recent 2010 Franco-British Treaty for defense cooperation.[61]

The second part, determining an approach to acquire and operate a multinational aviation unit, may be slightly easier than the first. NATO has proven twice that it has been able to obtain and operate a multinational unit to improve Alliance capabilities with the E-3A and C-17A programs. The devil, as usual, will be in the details, but whatever structure is developed it will need to ensure the Alliance has access to this combat enabling capability when needed. In addition, NATO will have to decide if non-Alliance countries interested in participating in an aerial refueling program would be encouraged or allowed to do so, much like the two PfP nations involved in SAC.

In defining requirements, a NATO aerial refueling unit should be able to support both probe-and-drogue receiver aircraft as well as boom receiver aircraft and should be able to on-load fuel as well. These capabilities are important to provide operational flexibility for air planners during complex operations and enables aerial refueling aircraft to shift to new taskings once airborne with the correct equipment to support any type of receiver aircraft. When not being used as an aerial refueler, the aircraft should have cargo transport capability to assist other NATO missions. The program could buy new aircraft or refurbish older aircraft. Compatibility with other NATO members' national air forces' aerial refueling aircraft would be a benefit in order to share logistical support and maintenance. These questions will need to be resolved through a thorough requirements analysis to ascertain the right airframe to meet the desired capability, which is a challenge for a single national air force to complete; it will be a bit more daunting to find the right balance to achieve a consensus for a multinational organization.

Boeing and EADS produce aerial refueling aircraft derived from their commercial airframes. Three airframe types converted to military use for aerial refueling are the Boing 767, Airbus 310, and Airbus 330. The A310 MRTTs is in the Canadian and German Air Forces are smaller than A330s and are only capable of conducting probe-and drogue aerial refueling.[62]

The Italian Air Force has KC-767s, which is a Boeing 767 airframe.[63] The USAF's replacement for the aging KC-135 is the KC-46, also a Boeing 767 derivative.[64] The Boeing 767 variants are air refuelable and can conduct both boom and probe-and-drogue aerial refuelings. Currently, in the United Kingdom, the Royal Air Force is acquiring Airbus A330 MRTTs to replace its aging VC10 and Tristar fleet, but it is only capable of probe-and-drogue aerial refueling.[65] EADS does make a version of the Airbus A330 MRTT for the Royal Australian Air Force that may be better suited to support NATO's diversity of receiver aircraft. This is because

the Australian A330 MRTT, like the KC-46/KC-767, has a boom system and hoses for probe-and-drogue aerial refueling; it also has an aerial refueling receptacle to receive in-flight fuel.[66] The Boeing 767 or Airbus A330 variants may be good choices for NATO, since these are already on the market or about to enter production for other NATO members as a national air force purchase. This decision will not be easy, as seen with the multi-year clash between Boeing and EADS during the USAF's acquisition competition process to replace the KC-135 fleet.[67]

Another option for NATO would be to obtain retired KC-135s and refurbish the aircraft.[68] During the refurbishment, the installation of wingtip pods would permit the airframe to be capable of boom refueling and probe-and-drogue refueling by providing operational flexibility with all NATO countries on a single mission. These older airframes may be able to increase NATO's capability sooner than purchasing a new airframe, but remaining service life and logistic support will be a concern as the USAF phases the KC-135 out of its inventory. In addition, if Turkey and France decide in the next few years to replace their KC-135s, the opportunity to share logistics with those two nations disappears as well. This may be a good near term fix, but may have more issues in the long-term for Alliance force structure.

CONCLUSION

Aerial refueling as a Smart Defence initiative could improve NATO's capability to conduct extended range multinational operations. Establishing a multinational aerial refueling unit would be an ambitious investment for the Alliance. It would support both Article 5 operations to defend Allied territory and enable Alliance members to conduct Article 4 out-of-area operations against security threats.

Hopefully, NATOs political and military leadership, along with the political leaders of each member state, will formulate priorities for capability investment during NATO's 2012

Chicago Summit. The Smart Defence initiative should continue to focus on the lessons learned

in the operations over Libya and Afghanistan and deal with the realities of fiscal austerity for

further collaboration and coordination to pool limited resources and ensure that NATO is capable

of meeting future defense and security challenges.

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this interpretation. Article 4, more recently seems to mean operations outside of NATO territories, like
the Balkans, Libya, and Afghanistan. The 2010 Strategic Concept reiterated Article 5, but elevated the
mandate to take action against security threats without specifically identifying Article 4 in the document. The
2012 Strategic Concept states, "NATO members will always assist each other against attack, in accordance with
Article 5 of the Washington Treaty. That commitment remains firm and binding. NATO will deter and defend
against any threat of aggression, and against emerging security challenges where they threaten the fundamental
security of individual Allies or the Alliance as a whole." According to Stanley Sloan and Sean Kay, this broader
interpretation of the treaty to enables the Alliance to deal with emerging or far away threats. This, however,
is not a new idea. Escott Reid included in a *Time of Fear and* Hope the agreed interpretations by the
Washington Treaty's. The intent was that "Article 4 is applicable in the event of a threat in any part of
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[13] Exception: There are a very limited number of KC-135s in the U.S. and French inventory modified to have wingtip pods called Multi-Point Refueling System (MRPS) attached to the aircraft. These pods contain refueling hoses to conduct probe-and-drogue refueling. This would enable a KC-135 to conduct probe-and-drogue and boom refueling on the same mission.

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[15] Author supported operations for the 2006 NATO Riga Summit while stationed at RAF Mildenhall from 2004-2008.

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GLOSSARY

AWACS	Airborne Warning and Control System
BDA	Boom-Drogue Adapter
HAW	Heavy Airlift Wing
MPRS	Multi-Point Refueling System
MRTT	Multi-Role Tanker Aircraft
NAMA	NATO Airlift Management Agency
NAMO	NATO Airlift Management Organization
NAMO BOD	NATO Airlift Management Organization Board of Directors
NATO	North Atlantic Treaty Organization
PfP	Partnership for Peace
SAC	Strategic Airlift Capability
SAC SB	Strategic Airlift Capability Steering Board

APPENDIX A

The North Atlantic Treaty[1]

Washington D.C., 4 April 1949

The Parties to this Treaty reaffirm their faith in the purposes and principles of the Charter of the United Nations and their desire to live in peace with all peoples and all governments. They are determined to safeguard the freedom, common heritage and civilisation of their peoples, founded on the principles of democracy, individual liberty and the rule of law. They seek to promote stability and well-being in the North Atlantic area. They are resolved to unite their efforts for collective defence and for the preservation of peace and security. They therefore agree to this North Atlantic Treaty:

Article 1: The Parties undertake, as set forth in the Charter of the United Nations, to settle any international dispute in which they may be involved by peaceful means in such a manner that international peace and security and justice are not endangered, and to refrain in their international relations from the threat or use of force in any manner inconsistent with the purposes of the United Nations.

Article 2: The Parties will contribute toward the further development of peaceful and friendly international relations by strengthening their free institutions, by bringing about a better understanding of the principles upon which these institutions are founded, and by promoting conditions of stability and well-being. They will seek to eliminate conflict in their international economic policies and will encourage economic collaboration between any or all of them.

Article 3: In order more effectively to achieve the objectives of this Treaty, the Parties, separately and jointly, by means of continuous and effective self-help and mutual aid, will maintain and develop their individual and collective capacity to resist armed attack.

Article 4: The Parties will consult together whenever, in the opinion of any of them, the territorial integrity, political independence or security of any of the Parties is threatened.

Article 5: The Parties agree that an armed attack against one or more of them in Europe or North America shall be considered an attack against them all and consequently they agree that, if such an armed attack occurs, each of them, in exercise of the right of individual or collective self-defence recognised by Article 51 of the Charter of the United Nations, will assist the Party or Parties so attacked by taking forthwith, individually and in concert with the other Parties, such action as it deems necessary, including the use of armed force, to restore and maintain the security of the North Atlantic area.
Any such armed attack and all measures taken as a result thereof shall immediately be reported to the Security Council. Such measures shall be terminated when the Security Council has taken the measures necessary to restore and maintain international peace and security.

Article 6[2]: For the purpose of Article 5, an armed attack on one or more of the Parties is deemed to include an armed attack:

- on the territory of any of the Parties in Europe or North America, on the Algerian Departments of France[3], on the territory of or on the Islands under the jurisdiction of any of the Parties in the North Atlantic area north of the Tropic of Cancer;
- on the forces, vessels, or aircraft of any of the Parties, when in or over these territories or any other area in Europe in which occupation forces of any of the Parties were stationed on the date when the Treaty entered into force or the Mediterranean Sea or the North Atlantic area north of the Tropic of Cancer.

Article 7: This Treaty does not affect, and shall not be interpreted as affecting in any way the rights and obligations under the Charter of the Parties which are members of the United Nations, or the primary responsibility of the Security Council for the maintenance of international peace and security.

Article 8: Each Party declares that none of the international engagements now in force between it and any other of the Parties or any third State is in conflict with the provisions of this Treaty, and undertakes not to enter into any international engagement in conflict with this Treaty.

Article 9: The Parties hereby establish a Council, on which each of them shall be represented, to consider matters concerning the implementation of this Treaty. The Council shall be so organised as to be able to meet promptly at any time. The Council shall set up such subsidiary bodies as may be necessary; in particular it shall establish immediately a defence committee which shall recommend measures for the implementation of Articles 3 and 5.

Article 10: The Parties may, by unanimous agreement, invite any other European State in a position to further the principles of this Treaty and to contribute to the security of the North Atlantic area to accede to this Treaty. Any State so invited may become a Party to the Treaty by depositing its instrument of accession with the Government of the United States of America. The Government of the United States of America will inform each of the Parties of the deposit of each such instrument of accession.

Article 11: This Treaty shall be ratified and its provisions carried out by the Parties in accordance with their respective constitutional processes. The instruments of ratification shall be deposited as soon as possible with the Government of the United States of America, which will notify all the other signatories of each deposit. The Treaty shall enter into force between the States which have ratified it as soon as the ratifications of the majority of the signatories, including the ratifications of Belgium, Canada, France, Luxembourg, the Netherlands, the United Kingdom and the United States, have been deposited and shall come into effect with respect to other States on the date of the deposit of their ratifications.[4]

Article 12: After the Treaty has been in force for ten years, or at any time thereafter, the Parties shall, if any of them so requests, consult together for the purpose of reviewing the Treaty, having regard for the factors then affecting peace and security in the North Atlantic area, including the development of universal as well as regional arrangements under the Charter of the United Nations for the maintenance of international peace and security.

Article 13: After the Treaty has been in force for twenty years, any Party may cease to be a Party one year after its notice of denunciation has been given to the Government of the United States of America, which will inform the Governments of the other Parties of the deposit of each notice of denunciation.

Article 14: This Treaty, of which the English and French texts are equally authentic, shall be deposited in the archives of the Government of the United States of America. Duly certified copies will be transmitted by that Government to the Governments of other signatories.

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[1] North Atlantic Treaty Organization (NATO), *The North Atlantic Treaty,* April 4, 1949, http://www.nato.int/cps/en/natolive/official_texts_17120.htm. NATO's website contained additional notes clarifying the the original treaty and are included in the subsequent footnotes.

[2] The definition of the territories to which Article 5 applies was revised by Article 2 of the Protocol to the North Atlantic Treaty on the accession of Greece and Turkey signed on 22 October 1951.

[3] On January 16, 1963, the North Atlantic Council noted that insofar as the former Algerian Departments of France were concerned, the relevant clauses of this Treaty had become inapplicable as from July 3, 1962.

[4] The Treaty came into force on 24 August 1949, after the deposition of the ratifications of all signatory states.

APPENDIX B

NATO Air Force Component Tanker and Receiver Capability by Nation

Nation	Tanker Capability			Receiver Capability		
	Drogue	Boom	Dual	Probe	Boom	Dual
Albania	0	0	0	0	0	0
Belgium	0	0	0	0	54	0
Bulgaria	0	0	0	0	0	0
Canada	5	0	0	79	4	0
Croatia	0	0	0	0	0	0
Czech Republic	0	0	0	12	0	0
Denmark	0	0	0	0	30	0
Estonia	0	0	0	0	0	0
France*	0	14	0	387	4	0
Germany	4	0	0	239	48	0
Greece	0	0	0	68	206	0
Hungary	0	0	0	14	0	0
Iceland	0	0	0	0	0	0
Italy	0	0	2	192	29	0
Latvia	0	0	0	0	0	0
Lithuania	0	0	0	0	0	0
Luxembourg	0	0	0	0	0	0
NATO	0	0	0	0	20	0
Netherlands	0	0	2	0	87	0
Norway	0	0	0	0	57	0
Poland	0	0	0	0	48	0
Portugal	0	0	0	0	42	0
Romania	0	0	0	0	0	0
Slovakia	0	0	0	0	0	0
Slovenia	0	0	0	0	0	0
Spain	6	0	0	153	0	0
Turkey*	0	7	0	0	321	0
United Kingdom	19	0	0	232	7	7
United States*	0	417	59	0	2,722	0
Equipment Totals	34	438	63	1,376	3,679	7
USAF Aircraft	0	417	59	0	2,722	0
Other NATO Country Aircraft	34	21	4	1,376	957	7
Total Airframes	535			5,062		

* French/US/Turkish KC-135 variants can attach a Boom-Drogue Adapter to conduct probe and drogue only operations during refueling missions

1. NATO air forces only. Table does not include aircraft assigned to a nation's navy, marine, or army components.

2. Since there are very limited KC-135s variants modified with the Multi-point Refueling System wingtip pods, these variants in the U.S. and French inventories are not from differentiated basic airframes.

3. Tankers that are capable of on-loading fuel for force extension are not included in the receiver capability column

Data Derived From:
Jane's All the Worlds Air Forces 2011-2012
Jane's All the World's Aircraft 2011-2012
NATO ATP-56B

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