Transforming Joint Air Power
The Journal of the JAPCC

© Italian Air Force

MDA

MDA IS PROUD TO SUPPORT DAILY NATO-ISAF MISSIONS IN AFGHANISTAN

MDA's proven turnkey UAV services have more than 15,000 flight hours in Afghanistan, providing high-availability, long-endurance ISR missions in a rugged operating environment.

MDA delivers flexible staffing solutions to minimize deployed personnel and is able to provide persistent surveillance solutions on demand, or as part of a long-term program.

Find out more at **www.mdacorporation.com/uavs**

"The Heron definitely has played a major role in the elimination of IEDs in this area of operations. ... The Heron feed is one of the best, if not the best, feed that we can have."

– Capt Nicholas Barber, Forward Observation Officer, Canada

"Air Force Project NANKEEN now provides consistent, reliable ISR support for Australian, Afghan and ISAF combat and mentoring missions. ISR missions for the Heron include IED search, overwatch, and battle damage assessment."

– Senator John Faulkner, Minister for Defence, Australia

www.mdacorporation.com

"... after 30-plus years of serving in many different organizations, both parochial and multinational, I personally can say unequivocally that there is no organization who could have accomplished what we have been able to achieve except for NATO."
Lt Gen William Caldwell, commander NATO Training Mission – Afghanistan in a press briefing on Afghan National Security Force development – 23 Feb 2011

We begin the thirteenth edition of the JAPCC Journal with two contrasting articles. The first looks at one of the world's oldest Air Forces and the second at its youngest. Few need reminding of the genesis of Air Warfare during the Italo-Turkish War in 1911, where reconnaissance and bombing sorties by the Servizio Aeronautico represented the first ever use of heavier-than-air aircraft in armed conflict. Air Power has come a very long way since then and we are indebted to the Chief of the Italian Air Force for his insights into today's challenges.

We then turn to Afghanistan. As a first principle of counter-insurgency, those who help must appreciate that they cannot ultimately win another nation's internal war for them. The threatened nation must eventually field its own forces, develop its own strategy, and find its own political solution to defeat the insurgency. Thus the central focus of any COIN strategy should be on the development of capable indigenous forces; yet we prefer to view operations as the main effort and the training and equipping of such forces as a secondary mission. One need only look to the American experience in Greece in the 1940s, The Philippines in the '50s, Laos in the '60s and El Salvador in the '80s to understand the importance of developing indigenous forces as a strand of COIN strategy. Recent experience from Iraq and Afghanistan indicates that we may not be applying this lesson with sufficient rigour. In his article Gp Capt Adrian Hill describes how the growth of a professional, fully independent, operationally capable and sustainable Afghan Air Force is key to successful transition in Afghanistan.

I am particularly grateful to MDA and Astrium for their fascinating articles on Contracted UAS in Afghanistan and Spatial GEO information. Partnership with industry is crucial to JAPCC success and these articles are further evidence of this strong relationship.

Elsewhere in this edition we take a look at the challenges of using Space effectively in contemporary operations and at the wider issue of the Global Space Commons. We learn about the SACT post-Lisbon Action Plan, cover Air-Land Integration, examine Canadian Air Power in Afghanistan, explore Airlift initiatives and take a fresh look at Air-to-Air Refuelling. We also have the second part of Wg Cdr Tony Stansby's analysis of Military History.

Finally, I urge you to complete our on-line questionnaire which is covered in detail on page 62 and in the enclosed flyer. **Your** feedback is vitally important to ensure that the Journal continues to evolve to meet **your** requirements. The address for the questionnaire is:
https://www.surveymonkey.com/s/JAPCC

Paddy Teakle, Air Commodore, GBR AF
Assistant Director Transformation

The Journal of the JAPCC welcomes unsolicited manuscripts.
Please e-mail your manuscript as an electronic file to: articles@japcc.de

We encourage comments on the articles in order to promote discussion concerning Air and Space Power.

All comments should be sent to: articles@japcc.de

Current and past JAPCC Journal issues can be downloaded from www.japcc.org

The Journal of the JAPCC Roemerstrasse 140 | D-47546 Kalkar | Germany

Table of Contents

Inside the JAPCC

Book Reviews

Imprint:

Transforming Joint Air Power: The Journal of the JAPCC

Director
Joint Air Power Competence Centre
Gen Mark Welsh III

Executive Director
Joint Air Power Competence Centre
Lt Gen Dieter Naskrent

Editor
Air Cdre Paddy Teakle

Project Leader
Col Roberto Sardo

Deputy Editors
LCDR Dave Ehredt
Maj Chris Clements

Production Manager/ Promotion Manager
Mr. Simon Ingram

Sponsor Manager
Lt Col Lothar Pichler

Editorial Review Team
Lt Col Mike Delorey
Wg Cdr Anthony Stansby
Sqn Ldr Bruce Hargrave
Maj Ron Glovach
Maj Phil Verroco
Maj Roger Efraimsen
Maj Jason Hunt
Sgt1 Lilian Brandon

Releasable to the Public
This Journal is the professional publication of the JAPCC and aims to serve as a forum for the presentation and stimulation of innovative thinking on Air and Space Power related issues such as doctrine, strategy, force structure and readiness. To find out more, access the JAPCC website at www.japcc.org.

© Italian Air Force

Transformation of the Italian Air Force

An Interview with the Chief of Staff of the Italian Air Force, Lieutenant General Giuseppe Bernardis

Lt. Gen. Bernardis has been Chief of Staff of the Italian Air Force since 20 February 2010. His tenure has been marked by a significant rationalisation and reorganisation of the Italian Air Force in order to meet the changing environment and the budget constraints imposed by the financial crisis.

The Journal of the JAPCC was pleased to receive his views on the following important topics.

The security scenario has changed significantly during the last twenty years: while the risk of a global confrontation has scaled down, other threats have taken over. Has this led to any change to the Air Force's tasks?

Although the nature of conflict has been moving towards hybrid, asymmetric and low intensity models, it has not changed the core missions of the Italian Air Force, which remains committed to contribute, together with the other Services, in ensuring national defence, defending the Euro-Atlantic area, contributing to peace and international security, and providing military support to other national agencies. In particular, the Air Force is responsible for building up and maintaining the necessary capabilities to guarantee the defence of national airspace, and to conduct joint as well as combined offensive, defensive and air support operations. Having said that, it cannot be denied that there has been a shift in the relative attention given to the four missions mentioned above, with Air Defence and international operations receiving considerable attention.

You have just mentioned Air Defence. Why does this task deserve specific consideration?

The protection of national territory is a Constitutional imperative, which comes first and foremost. The terrorist attack on the Twin Towers renewed and consolidated

© Italian Air Force

the Italian Air Force unprepared. At the time we were already running a number of programmes to maintain and strengthen this capability in the years to come. And, not least important, throughout this period our airmen and assets, while exercising a continuous surveillance of the national air space, were ready to intervene and defend it if necessary.

You also underlined the importance of contributing to international security through participation in crisis response operations. What is the Air Force doing in this regard?

the need for an effective Air Defence capability, ready to also face the threats represented by hijacked, possibly slow-moving aircraft. In Italy the reinforced awareness of the Air Defence role led to the creation of a dedicated capacity to counter slow-moving aircraft, and accompanied the transition, now completed, from the obsolete F-104 Starfighters to the Eurofighters. Additionally Italy committed to complement the manned air platforms component with a powerful new generation missile system, topped by a reliable NATO integrated command and control system.

Let me continue by saying that the dramatic events of September 11, although forcing some internal reorganisation and policy adjustments, raised the general attention for Air Defence, but did not catch

Instability and crisis situations have been increasing since the end of the Cold War confrontation, requiring the international community to intervene and manage them by employing the whole range of civilian and military tools available. This required the Armed Forces to become more and more expeditionary, ready to respond quickly to the decisions of the political authorities. This applied also to the Italian Air Force, which developed and transformed itself into a structure able to effectively participate in a multi-dimension, multinational and joint effort by providing fundamental capabilities like Air Mobility, Network-Centric Command and Control, air and space-based Intelligence Surveillance Target Acquisition and Reconnaissance (ISTAR), as well as Combat, Combat Support (CS) and Combat Service Support (CSS). It was a

challenging process, which also led to the development of dedicated Force Protection and Special Forces units, the latter for Combat Search and Rescue (CSAR) operations and for defending air strips in hostile areas, while exercising air traffic control for aircraft. The process is still ongoing, adjusting itself to new threats by taking into account the lessons learned from overseas commitments.

The Italian contribution to ISAF includes a significant air component. What is the added value of the Air Force in conflicts like Afghanistan where the opponent does not have any flying assets?

Since the military first began exploiting the third dimension, the air component has been appreciated for its quick response and range of intervention. These characteristics apply even when air supremacy is granted by the absence of challengers. Even when there is no counter-aviation operation to conduct, air capabilities still have a critical role in the combined and joint effort. In particular, beside inter- and intra-theatre airlift, the Italian Air Force provides the ground forces in Afghanistan with large reconnaissance coverage and rapid close air support, through a combination of manned and unmanned assets. The lack of these capabilities might delay, if not endanger, the achievement of objectives. Moreover, if political approval were granted, the aforementioned platforms could be equipped to deliver other combat capabilities like precise engagement of enemy targets.

You have just provided a picture of the Italian Air Force missions and commitments. More in general, how do you conceive Air Power in the new international scenario?

Air Power is an inherently strategic force. It has become a determinant, both as a deterrent to war, and – in the eventuality of conflict – as a force that can influence enemy behaviour and fatally undermine his will to wage war. I believe that Air and Space Power can be expressed through three fundamental factors: human beings, the environment and technology. Using these three components the Armed Forces have the capacity to effectively express themselves in all their potential.

The essential adhesive needed to combine these ingredients and to produce the desired results is 'Competence'. Competence must extend equally and be linked to the four operating environments of interest: land, sea, air and space.

Regarding the specific subject of our conversation, the very essence of Air and Space Power must base itself on the 'competent' use, in this environment, of military technology.

What is the Italian Air Force's strategic plan to transform its structure and its capabilities in order to apply itself efficiently and effectively according to the concept of Air and Space Power?

I believe that to adapt to new challenges the Air Force must be an agile, organic, well-integrated and balanced armed force as a whole, capable of putting in place all the operational capabilities that an effective and efficient air component must ensure.

For this reason we recently launched a structural refinement procedure to ensure, in line with the strategic direction of the Chief of Defence, a balanced and sustainable Aerospace component in the National Armed Forces. One of the priorities we have set is harmonisation and rationalisation of the structure of the Air Force. The aim is to ensure sustainability of the air component through the reduction of available resources and the contextual need to increase the relevance of the Armed Forces in the operational and functional context.

For the future we intend to continue the process to consolidate the Armed Forces' operational capacity development plan over a medium to long term period (2010–2025) while maintaining as the main priority the Defence Capabilities Framework (Command, Inform, Operate, Prepare, Protect, Project, Sustain) and the associated processes and output on which the review underway has been based.

The Italian Defence is developing a Network Enabled Capability (NEC), which will inevitably increase exposure to cyber threats. How is the Italian Air Force getting ready to face and counter such a threat?

There are many initiatives on this subject. While we are reshaping under the net-centric paradigm, implementing Network Centric Warfare (NCW) principles enabled by robust digital networks, we are well aware of the risks involved in such an evolution. In fact, we have already started to improve our cyber defence and resilience capabilities, particularly by creating an Air Force Computer Emergency Readiness Team (CERT), which is linked with all the other national CERTs.

We consider cyberspace a key operational dimension where the Air Force shall be able to operate in the near future to fully accomplish its mission. Therefore we are dedicating resources to further develop the Air Force's capability to conduct Computer Network Operations (CNO) including deterrence and prompt response as key elements, along with defence and resilience.

Space is now becoming a strategic arena enabling an effective superiority, and space-based services are considered an essential component within the operational architecture. What is your view regarding future NATO space capabilities?

NATO is still looking for a new architecture to be able to face future challenges in a more effective way. The NATO Summit in Lisbon has identified the need to implement brand new capabilities, such as Missile Defence and Air Ground Surveillance. In this perspective, the 'space issue' needs to be addressed in the very near future. In fact, space-based products and services have already become essential pillars within NATO operations, like for instance in ISAF. Several applications such as Earth observation, satellite communications, early warning and navigation and positioning, are enablers to perform missions and achieve assigned goals. This is the reason why NATO cannot delay a deep discussion about how to integrate space capabilities into its framework.

From the Italian Air Force perspective, we believe that it is necessary right now to follow a top-down approach. Starting from the definition of a Vision and pointing out clear aims, it will be possible to proceed further in defining a streamlined strategy, optimising the few resources available to satisfy operational needs. We need a serious commitment to develop this matter as soon as possible, to enable NATO to face future challenges.

You have just marked your first year in office as Chief of Staff. Could you share with us your perspectives about the Italian Air Force?

I like to summarise my outlook on the Italian Air Force with the following words: continuity, flexibility and, as I mentioned before, competence.

What I mean is that past, present and future activities of the Air Force should be seen as a *continuum*, a characteristic that implies stability, and a certain level of correspondence between preventative planning and achieved results. At the same time, the evolution of the operational environment requires the development of state-of-the-art military capabilities, while financial limitations force the whole establishment to mature new, elastic, pragmatic solutions. Finally, in an operational environment which is getting more and more combined and joint, the specific knowledge that Air Forces have about the air and space dimensions needs to be reinforced and preserved.

Sir, thank you for your time and your comments.

Lieutenant General Giuseppe Bernardis

attended the Italian Air Force Academy and has totalled more than 3800 flying hours in 19 different aircraft, including time as commander of the National Aerobatic Team 'Frecce Tricolori' and as Commander, 6th Fighter Bomber Wing. As a General he held many senior staff positions including Chief of the Italian Air Force 4th Department (Acquisition), General Secretariat for Defence and National Armaments Directorate as Chief of the 4th Department (Armament Programs), and Deputy Chief of Staff of the Air Force, prior to taking his current position in February 2010 as Chief of Staff of the Italian Air Force.

An AAF Mi-35 executes a Close Escort mission in the skies over Eastern Afghanistan.

Advance of the Afghan Air Force

By Group Captain Adrian Hill, GBR AF, Deputy Commander,
NATO Air Training Command – Afghanistan

NATC-A Mission Statement

"To build an Afghan Air Force that is professional, fully independent and operationally capable."

Introduction

Afghanistan is a nation in transition. It will either modernise with improvements in human rights, government transparency, rule of law, and internal stability, or it will transgress into a fractured and chaotic country, with increased instability, organised crime, terrorism and a resurgence of the Taliban. A key enabler to successful transition and modernisation is the growth of a professional, fully independent, operationally capable and sustainable Afghan Air Force (AAF)[1], able to contribute meaningfully to Afghanistan's national security goals. Air Power is exceptionally well suited to provide effects to defeat insurgency and terrorism, whether this be through the traditional view of Air Power as a 'kinetic effect', or through other less obvious, but equally important means such as: intra-theatre airlift and battlefield mobility, preventing the flow of illegal narcotics, or by demonstrating government support for their population and demonstrating an ability to respond to natural or man-made disasters. Naturally, there are many challenges in building a successful and capable AAF, not least of which are literacy, development of capable and effective leaders, and professionalisation of the Force.

Notwithstanding these challenges, the AAF has made good progress towards becoming a capable and sustainable force by the target date of 2016. Supported by NATO Air Training Command – Afghanistan[2] (NATC-A), the AAF has established two Air Wings at Kabul and Kandahar, with a further Air Wing and Training Centre planned at Shindand. AAF manpower has grown by an impressive 35% in just one year while the number of AAF aircraft has experienced similar growth, from 42 in November 2009 to 57 in February 2011 and an expected 80 aircraft by the end of 2011. Furthermore, key training and educational institutions have been established, expanding AAF training capacity from 50 students to 800. There are currently over 500 NATC-A Coalition Forces personnel in Afghanistan, many engaged

as trainers and advisors in the delivery of training, mentoring, and advice to AAF personnel, officials in the Ministry of Defence (MoD) and Ministry of Interior (MoI), and Ministers of the Government of the Islamic Republic of Afghanistan (GIRoA). Currently, thirteen nations[3] contribute personnel to the NATC-A mission, with a further five nations[4] scheduled to deploy forces in 2011. To date, the AAF has provided a broad range of support to GIRoA and the wider population of Afghanistan, from the provision of Presidential and Ministerial flights, Non-Combatant Evacuation Operations and Casualty Evacuation (CASEVAC) to Humanitarian Assistance and Disaster Relief. Of note, the AAF also conducted a 27-day Humanitarian Assistance and Disaster Relief Operation in Pakistan in August and early September 2010. Led by Kabul Air Wing, the Mi-17s flew over 400 missions, transporting 1,904 passengers, rescuing 120 people and delivering 188 tons of humanitarian aid. These operations are vital in promoting the AAF as a force for good and critical to promoting government legitimacy. Further, AAF operations showcase the government's ability to support the Afghan population as well as provide security and stability within Afghanistan and throughout the wider region.

In October 2010, the Afghan Chief of General Staff issued a Command and Control Directive that heralded the introduction of centralised control of AAF assets by the AAF Commander; establishment of robust C2 structures and processes at all levels from Afghan MoD to fielded military forces will be the key to the successful roll-out of this Directive. NATC-A also train, mentor and advise the Air Interdiction Unit (AIU), an Afghan MoI unit overseen by the Deputy Minister for Counter-Narcotics. The AIU is a key organisation for Afghan counternarcotics efforts and has increased its Mi-17 helicopter fleet from 7 to 20 aircraft in the past year. Although primarily a counternarcotics force, the AIU retains a limited capability to support counter-terrorism and general support missions within the MoI.

A Plan for the Future

The overarching AAF Development Plan has four main lines of effort: Aircraft Build; Airmen Build; Infrastructure Build; Operational Capability Build. Each line of effort is described below.

Aircraft Build. AAF current aircraft strength stands at 57. The fleet comprises: 35 Mi-17 Hip (including 3 Presidential Airlift); 9 Mi-35 Hind; 10 C-27 (including 2 Presidential Airlift); and 3 An-32. The AAF fleet will modernise and expand over the next five years to reach a planned total of approximately 146 aircraft by 2016. Planned acquisitions include: a further 10 C-27s to make a total of 20 by 2012 (including 2 Presidential Airlift aircraft); 12–18 Fixed-Wing and 6 Rotary-Wing (RW) Training aircraft by 2012; 20 Light Lift aircraft; 20–32 Fixed-Wing Close Air Support (CAS) aircraft of which 4 will be assigned a permanent training role at Shindand; as well as expansion of the Mi-17 fleet to a total of 56 aircraft (including 3 Presidential Airlift). The current An-32 fleet will be phased out by mid-2011. A Service Life Extension Programme to extend the life of the 9 Mi-35s to 2018 and beyond is currently under negotiation.

Airmen Build. AAF manpower has grown from 2,797 in Nov 2009 to over 4,100 by February 2011. This figure comprises: 1,350+ Officers; 1,250+ NCOs; 1,350+ Airmen; and 75+ Civilians. Although impressive, recruiting levels lag behind planned growth targets with current officer strength standing at only 78% and NCO strength at 64% of authorised levels. This is due to a variety of recruiting challenges including the low literacy levels of the general population of Afghanistan, the requirement to teach pilot candidates English prior to commencement of pilot training, and the limited number of places at Officer Candidate School (OCS) and in the 'One Uniform' (1U)

Target Point

A key enabler to successful modernisation is the growth of a professional Afghan Air Force (AAF) which is able to contribute meaningfully to Afghanistan's national security goals. Naturally there are many challenges in building an AAF, not least of which are literacy, development of capable and effective leaders, and professionalisation of the Force. Notwithstanding these challenges, the AAF has made good progress towards becoming a capable and sustainable force by the target date of 2016.

Programme[5] due to prioritised Afghan National Army (ANA) and Afghan National Police (ANP) growth requirements. The final planned AAF manpower growth target is 8,017 by March 2017, which is still achievable through the introduction of a number of corrective measures such as increased places at National Military Academy of Afghanistan (NMAA) and OCS for AAF officers and increased 1U Programme allocations for NCOs. In January 2011, there was another extremely positive step forward when the Afghan MoD approved the AAF Direct Recruitment Initiative, enabling Afghans to request recruitment directly into the AAF as long as they meet all of the entry requirements. Prior to the introduction of this initiative, all Afghans wishing to join the AAF were recruited into the ANA from where selection for service in the Air Force was not guaranteed.

"The AAF has come an exceptionally long way in a very short time, but still has much of the journey to go."

Infrastructure Build. Over $700M of U.S. funding will have been invested in new AAF infrastructure by the end of 2013; by March 2011, approximately one third will have been built, with Kabul Air Wing (AW) construction (priced at $218M) at 87% completion, Kandahar AW construction ($130M) at 58% complete, and Shindand ($175M plus $40M for a new training runway) in the embryonic stages of construction at just 4% complete.

In October 2010, a project to build a 7500' x 100' training runway at Shindand was approved; work will begin in the second half of 2011 with completion estimated for mid-2012. Work on building infrastructure at Mazar-e-Sharif, Herat, Gardez and Jalalabad Air Detachments (total $82.9M) and on Air Units ($67.9M) is currently in the planning stages and is forecast to be complete by 2013.

Operational Capability Build. NATC-A is working to develop a complete set of AAF air capabilities relevant to Counter-Insurgency Operations. Soviet-to-Western transition remains the major challenge for Afghanistan in developing a professional, fully independent and operationally capable AAF. As of February 2011, the AAF achieved Full Operational Capability in Humanitarian Assistance, Disaster Relief and Non-Combatant Evacuation Operations, Initial Operational Capability in RW Presidential Airlift, C-27 Diplomatic Ops and RW Underslung Load, and a limited capability in Mi-17 Battlefield Mobility, CASEVAC/MEDEVAC, RW CAS (Mi-17/35), Forward Observers, Instrument and Night Ops, NVG Ops, Air Assault and C-27 Air Drop.

NATC-A training and advising of the AAF will continue in RW CAS with Forward Observers (Mi-17/35). Training on how to conduct tactical training detachments will also be introduced.

Pohantoon-e-Hawayee (PeH) – 'Big Air School'

PeH is the cornerstone of AAF training development and provides air-orientated 'top-up' training to recruits after ANA basic military training. PeH also offers professional development courses and military education for all AAF trades and skill-sets. PeH teaches the basic skills required of an Afghan airman. Skills such as

© UK Royal Air Force/Sgt Corrine Buxton

reading, writing, language skills, math, sciences, social sciences, management and leadership are all essential to an airman operating in a modern and technologically advancing Air Force.

Currently, there are 48 Coalition NATC-A subject matter experts developing approximately 100 courses, of which just over 50 are certified and currently being delivered. The training syllabi cover all AAF Branches and Trades, and will include 25+ aviation orientated courses, 17 maintenance, 10 Professional Military Education, and 40+ Mission Support courses, including Force Protection, Intelligence, Personnel Support, Ground Engineering, Finance, Logistics, and Fire and Emergency Services.

'Thunder Lab'
English Language Immersion

The aim of the Thunder Lab is to reduce out-of-country training times by improving English language proficiency whilst candidates are awaiting pilot training. Afghan pilot candidates live and learn alongside USAF and UK RAF advisors in a purpose built facility at Kabul AW. The AAF candidates' activities include tuition in operational 'aviation' English and immersion with the Fixed-Wing and Rotary-Wing squadrons at Kabul AW. Candidates undertake 'air experience' flights on AAF aircraft and receive computer-based flight simulator training and access to the Mi-17 simulator. They also complete professional, technical and cultural training and participate in group Physical Training with their English speaking advisors. The average candidate spends between four to five months in English immersion at the Thunder Lab prior to progressing overseas for pilot training.

The Thunder Lab has proved to be an unequivocal success. Prior to the establishment of the Thunder Lab in May 2010, the average Afghan pilot candidate took 405 days (or nearly 14 months) to complete language training at the Defense Language Institute (DLI) in San Antonio, a pre-requisite of U.S. Undergraduate Pilot Training. For Thunder Lab graduates, the average time taken to complete DLI is now two to three months. This is a significant reduction of the overall time spent in pilot training, saves money (in the region of $100K per student as the cost per student at DLI is $62,000 for every 6 months), reduces AWOL rates and leads to a quicker entry into the pilot training pipeline and a much earlier return to Afghanistan. October 2010 saw the arrival of the first female lieutenants in the Thunder

An AAF Mi-17 V5 on the tarmac in Afghanistan.

Students outside the English immersion Thunder Lab in Afghanistan.

Lab. All graduated from the AAF '101' course in the Kabul English Language Training Centre (KELTC) in early November and are currently undergoing continuing English immersion in the Thunder Lab. On graduation, it is planned that four AAF females will undergo pilot training in the United States.

NATO Combined Joint Statement Of Requirement (CJSOR)

Currently, NATC-A manpower is one of the most critical challenges to address in the build and development of the AAF. Not only is it a challenge to recruit the right number and quality of recruits into the AAF, the requirement to fill the CJSOR with high quality trainers, instructors, mentors and advisors is of equally vital importance to NATC-A mission success. As of February 2011, NATC-A had a shortfall of 56 'must fill' CJSOR posts out of a total requirement of 222. The 56 posts comprise seven personnel for the Mi-17 Air Advisor Team (AAT) in Kandahar, nine personnel for the Mi-17 AAT in Jalalabad, six personnel for the Mi-17 AAT in Shindand, seven personnel for the AIU Mi-17 AAT in Kabul, 17 personnel for the C-27 AAT in Kandahar, and 10 personnel for the C-27 AAT in Kabul.

To ensure continued progress in AAF 'train the trainer' programmes and development of AAF operational capability, these CJSOR billets must be filled by NATO or Partner nations as soon as possible.

Summary

The ongoing effort to build AAF capability is a key component of NATO's strategy to stabilise Afghanistan. The AAF has come an exceptionally long way in a very short time, but still has much of the journey to go. Over 500 NATC-A personnel are working daily in Afghanistan, many 'Shohna ba Shohna' (Shoulder to Shoulder) with their Afghan counterparts to deliver highly effective training, education, mentorship, advice and tactical support. The AAF, with NATC-A's support, has accomplished much despite the many challenges. NATC-A and the AAF are involved in the fight in Afghanistan right now, but must not let this fact compromise the essential training and ongoing build and development of the Force. The situation that NATC-A and the AAF currently find themselves in has been likened to flying an aircraft whilst still trying to build it and whilst being shot at; a careful balance must be maintained to ensure development and future capability is not sacrificed for short term gain.

1. Name changed from Afghan National Army Air Corps (ANAAC) to Afghan Air Force (AAF) on 16 June 2010.
2. Formerly Combined Air Power Transition Force (CAPTF).
3. Belgium, Canada, Croatia, Czech Rep, Hungary, Italy, Jordan, Latvia, Lithuania, Portugal, Mongolia, UK and U.S..
4. Columbia, El Salvador, Greece, Spain and Ukraine.
5. The One Uniform Programme enables direct accession into the NCO corps.

Group Captain Adrian Hill

is a UK Royal Air Force pilot with over 3300 flight hours on the Jaguar and Hawk aircraft. He flew 100+ operational missions over Northern Iraq and Bosnia and is a qualified flying instructor and weapons instructor. As an OF-4 he completed tours as Head of the Operations Division in the UK JFACHQ and as Officer Commanding 19 (Fighter) Squadron, the UK's sole Fast Jet Tactics and Weapons Training Squadron. Promoted to OF-5 in Jan 2009, he served as Chief of Staff to Air Officer Commanding 22 (Training) Group at HQ AIR, RAF High Wycombe until selection for his current duties as Deputy Commander, NATO Air Training Command – Afghanistan in Oct 10.

Impact of a Combat Air Wing

Canadian Air Power in ISAF

By Major Bill March, CAN AF, Canadian Forces Aerospace Warfare Centre

Afghanistan is the fourth time since the end of World War II that Canada's airmen and airwomen have gone into harm's way in significant numbers. In Korea, the Persian Gulf and in the skies over the former Yugoslavia, the Canadian Air Force (CAF) operated as part of a broader coalition. The number of personnel and material resources dedicated to these conflicts varied significantly, however, the makeup and focus of the aerospace forces which were committed remained relatively constant. Organic maritime air assets aside, when the CAF went to war after 1945 it did so by providing a small number of specialists to augment broader coalition requirements, making available an air transport capability to support both national and coalition forces and, with respect to force application, relying primarily on its fighter force. However, after the events of 11 September 2001, the world entered into a new type of conflict; what had been the CAF's traditional approach to war underwent a fundamental shift. As the Canadian government continued providing forces to the growing campaign against international terror, it became apparent that it would no longer be business as usual.

Initial Canadian Air Force Support to Afghanistan

The CAF has been engaged in South-West Asia (SWA) since October 2001. The first Canadians involved in operations over Afghanistan were part of the Canadian Contingent with the United States Air Force's 552nd Air Control Wing out of Tinker Air Force Base, Oklahoma. The pilots, flight engineers, navigators, aerospace controllers and technicians who served as crew members aboard the U.S. Airborne Warning and Control System (AWACS) aircraft supported the opening moves of *Operation Enduring*

Freedom (OEF). A more robust role in OEF followed when the Canadian Forces (CF) commenced *Operation Apollo* (2001–2003), Canada's initial contribution to the international campaign against terrorism.

Despite a relatively large commitment of forces they were not placed under the direction of a Canadian Air Component Commander (C-ACC).[1] There were many reasons for this course of action, not the least of which was the dispersed nature of the various commitments and the uncertainty, at least initially, surrounding the duration of APOLLO. Nor was there a perceived change in circumstances when the original mission evolved into *Operation Athena* in 2003.

Operation Athena was, and continues to be, the overarching mission that governs the Canadian contribution to the NATO-led International Security and Assistance Force (ISAF) in Afghanistan. Canada increased its level of ground forces and committed them to combat operations. Despite a growing number of casualties, Canadian Army accomplishments throughout Afghanistan resulted in an unprecedented level of public and government support at home. This wave of pro-CF sentiment helped 'pave the way' for the acquisition of new transport aircraft, the C-17 and C-130J, significantly improving CAF's ability to support the CF in theatre and spurring the Air Force to 'take the leap' into unfamiliar areas of technology such as Unmanned Aerial Vehicles (UAVs). The 2003 deployment of a CU-161 Sperwer UAV in support of the Canadian battle group and ISAF forces brought a new level of intelligence, surveillance and reconnaissance (ISR) capability to the CAF, permitting it to take a more direct role in the Counter-Insurgency (COIN) campaign being conducted by its Army colleagues. The Sperwer detachment, a truly joint unit comprised of air force and army personnel, never numbered more than 40 members at its peak, but its contribution to the fight was well received. And when this unit was combined with a Tactical Airlift Unit (TAU), consisting of Hercules aircraft and personnel located at Kandahar conducting aerial resupply operations, the CAF direct contribution to ground operations was substantial.

Discussion resumed amongst higher headquarters in Canada about bringing together all of the Canadian air assets in Afghanistan under the command of a C-ACC, but there was reluctance to incur the resulting administrative and personnel cost. Then in 2007, the government of Canada established an independent panel to examine Canada's involvement in Afghanistan. The subsequent report, which reaffirmed Canada's commitment to the area, noted:

"… that the safety and effectiveness of Canadian Forces in Kandahar would be markedly increased by the acquisition and deployment of new equipment. In particular, added helicopter airlift capacity and advanced unmanned aerial surveillance vehicles are needed now."[2]

This key finding had a profound effect on the CAF.

© Canadian DND

CF personnel board the CC-177 Globemaster III at Kandahar Airfield, Afghanistan, having completed their tour of duty.

Ramping up Canadian Air Force Support to Afghanistan

Acquisition of new equipment and the implementation of new capabilities is a long, expensive process governed by stringent bureaucratic requirements. To accomplish this task not once, but twice, in little more than a year could only occur under the urgency of war and was, for Canada, virtually unprecedented since the Second World War. Canadian soldiers were being killed in combat, and the government, people and military were determined to do what needed to be done.

Perhaps the most daunting challenge was the re-creation of a medium-lift helicopter capability within the CAF. Fiscal restraint had caused this capability to disappear from the CAF's order of battle in the 1990s. Therefore, it was necessary not only to purchase aircraft, but also to train a new cadre of aircrew and maintainers. An agreement was quickly reached with the U.S. Army to buy six 'used' Boeing Chinook D-model helicopters already located in Afghanistan. Necessary training was provided by various agencies in the U.S. The first, newly designated CH-147 Chinook was delivered to its Canadian aircrew in Afghanistan in December 2008 and flew its first operational mission early in 2009.[3]

The Chinooks were partnered with eight CH-146 Griffon helicopters, a Bell 412 derivative which has long been used by the CF in the utility, reconnaissance and search and rescue roles. Adapted to escort and protect the CH-147s, the Griffons were equipped with an enhanced weapons system, new sensors, and lightened by the removal of non-essential equipment. For the initial deployment in December 2008, the majority of the personnel came from 408 Squadron in Edmonton, Alberta, fresh from intensive training with the ground units they would support. Rounding out the helicopter support to Canadian operations, six Mi-8 medium-lift helicopters were leased to augment re-supply requirements.[4]

The other capability identified was for advanced UAVs. The Sperwer had been operating in Afghanistan since 2003, but was limited by its rapidly aging technology. Canada's next generation Joint Unmanned Surveillance and Target Acquisition System (JUSTAS) project was underway, but it would be years to reach fruition, so to field an advanced UAV capability quickly, a contract was signed with MacDonald Dettwiler and Associates (MDA) of Vancouver, British Columbia, to lease four Heron systems.[5] Operations commenced in early 2009 with the capability to provide 550 surveillance hours per month. The Heron has been a welcome addition to the fight.

Target Point

The current conflict in Afghanistan marks the fourth time since the end of World War II that the Canadian Air Force (CAF) has gone to war. Because of CAF's eventual decision to stand-up a combat air wing and because of the resolve of the Canadian Aerospace Warfare Centre to collect the lessons learned from that air wing, the capabilities and lessons gained from its engagement in this conflict will positively impact the CAF out of proportion to the level of forces employed.

Establishment of Canada's Combat Air Wing in Kandahar

The deployment of a large tactical helicopter element and a new UAV system, plus ongoing Sperwer and C-130 operations, delivered a significant level of aerospace capability to the CF and NATO. Discussions resumed on the need to group these assets together under the command of a senior air officer. Although doing so would place an additional administrative burden on the taxed infrastructure in Kandahar, the benefits would be substantial. An air wing would provide an opportunity to examine and test many of the tenets underpinning the CAF's Air Expeditionary Wing (AEW) concept. Additionally, a centralised air force organisation would facilitate the capturing of lessons learned for Canada's long term benefit given that many of the capabilities acquired or created to support operations in Afghanistan are intended to become permanent additions to the CAF. There have

been few opportunities for senior air officers to command a formation in a conflict (the last was during the Kosovo air campaign in 1999) and none that involved a composite unit that included a mix of helicopters, UAVs, transport aircraft and specialist personnel.

Notwithstanding all the potential benefits listed above, the most important rationale for standing up an air wing is that it made for the more efficient provision of aerospace support. The majority of the capabilities described in preceding paragraphs were new to, or re-developed within the CAF. The additional logistic, administrative, engineering, flight safety, and air worthiness requirements could have overwhelmed the Joint Task Force Commander (JTFC). There was also the requirement to ensure these scarce air resources were employed to achieve maximum effect. To this end, the senior air officer would serve as both an ACC and, in effect, the Chief of Staff-Air for the JTFC.

On 6 December 2008 the Joint Task Force Afghanistan-Air Wing (JTFA-AW) stood up at Kandahar airfield under Colonel Christopher Coates, Commander of 1 Wing (Canada's tactical helicopter wing), Kingston, Ontario. Colonel Coates was selected due to his vast experience dealing with helicopters and the Army; experience that would be put to test by implementing new capabilities and procedures in a combat zone.

Much has been accomplished since the JTFA-AW achieved Initial Operational Capability (IOC) on 3 March 2009. Four days later, during *Operation Sanga Fist,* for the first time in history, Canadian helicopters took Canadian soldiers into battle and brought them back again. The TAU conducted its first combat airdrop, experimented with guided parachute delivery systems and undertook the successful deployment of a new C-130J. The Heron UAV has provided sterling service and in April 2010 stayed aloft on an ISR mission for almost 25 hours. The acquisition of new strategic lift aircraft meant that the loss of the regional support base in the UAE in 2010 brought barely a ripple of disruption to operations in Afghanistan. All in all, the Wing provided a much-appreciated level of support to the CF, our NATO Allies, and Afghan forces.

None of this occurred without cost. For the first time since World War II, CAF personnel, either due to accident in pursuance of their duties or to enemy action, lost their lives in a theatre of war. For the first time since Korea a Canadian aircraft was shot down when a CH-147 was brought down by enemy action in August 2010, fortunately without loss of life or serious injury. Further, the CAF dealt with the need to transport fallen Canadian service men and women, with care and dignity, back to their loved ones in Canada. These were hard lessons learned during a hard war.

Having completed their tour of duty, CF personnel await their departure at Kandahar Airfield, Afghanistan.

The JTFA-AW Legacy

The current complement of the JTFA-AW stands at approximately 450 personnel. The sub-capabilities have been grouped together and re-named as Task Force (TF) FAUCON (the Chinooks and Griffons), TF EREBUS (the Heron) and TF CANUCK (TAU and Theatre Support Element). Canada's decision to withdraw from its combat role around Kandahar, downsize its military commitment, and refocus its remaining forces to a training and mentoring role will necessitate changes to the Air Wing. Details on its final disposition have yet to be settled, but after four rotations the AW will, for all practical purposes, cease to exist.

Its legacy, however, will endure. The CF Aerospace Warfare Centre is implementing a lessons learned project based on the information and knowledge gleaned from the Air Force's time in Afghanistan. This project will capture the experience of key personnel, including specialists augmenting coalition air operations in a variety of posts, with a view to incorporating the lessons learned into doctrine, concept development, and future training. The strides the CAF and Army have made in air-land integration will be studied and honed, from both a fast air and helicopter perspective, through a newly established Air-Land Integration Cell. New capabilities, procedures and fleets will be incorporated into the CAF. The first F-model Chinook has yet to arrive, but plans to incorporate this aircraft into the CF are underway. Exercises, such as Winged Warrior in Wainwright, Alberta, will build upon lessons learned from Afghanistan. The JUSTAS project will continue, using the Heron experience to ensure that Canada acquires a permanent UAV capability. There is no doubt that the Joint Task Force Afghanistan Air Wing will, out of all proportion to its size, have a significant impact on the future of the CAF. ●

Three fallen CF soldiers await repatriation back to Canada.

1. During the first three months, CAF involvement included maritime rotary and fixed wing assets, plus a strategic airlift component consisting of one aircraft, three crews and an air-cargo handling team. In January 2002, the Canadian government contributed an infantry battle group to ground operations in Afghanistan and a Tactical Airlift Detachment of three C-130 Hercules was deployed in support. The steady growth of CAF resources in the area led to the establishment of a local support base in the United Arab Emirates (UAE) christened Camp Mirage, and the stand up of a National Support Element (NSE). At its peak, and not counting individual augmentees sent to various billets throughout SWA and the U.S., the CAF committed over four hundred airmen and airwomen, plus ship borne, patrol and transport aircraft to the operation.
2. Government of Canada, 'Independent Panel on Canada's Future Role in Afghanistan' (Ottawa: Queen's Printer, 2008), 38. The independent panel was chaired by the Honourable John Manley and is often referred to as 'The Manley Report'.
3. A Medium-to-Heavy Lift Helicopter Project was launched in Canada around the same time period for up to 16 CH-47F Chinooks; however, when a contact was signed On 10 August 2009, the number had been reduced to 16. For a brief summary see 'The CH-147 Chinook: Canada's 'Future' Medium-Lift Helicopter', www.cdnmilitary.ca/index.php?p=15, accessed 9 Feb 11.
4. In November 2008, six Mi-8 medium-lift helicopters were chartered for one year from SkyLink, a Canadian company located in Toronto, Ontario, for resupply and troop-transport missions.
5. For additional reading on Canada's use of leased UAVs in Afghanistan, see the article by author Dave Neil titled, 'Project Noctua', which is also printed in this edition of the JAPCC Journal.

Major Bill March

is from Cornwall, Ontario, and joined the Air Force in 1977. After graduating from the Royal Military College in 1982 and completing navigation training he then flew on CP-140 Auroras. After Staff College in 1998 he filled a series of staff appointments at NDHQ which culminated in working on UAVs and ISR for the Air Force. Beginning in 2003 he worked for the NATO Response Force of the Land Component Command HQ, Heidelberg, Germany. Returning to Canada in 2006, he served as the Concepts and Doctrine Development expert for UAVs and Space at the Canadian Forces Aerospace Warfare Centre (CFAWC), where he currently remains as the Academic Liaison Officer and as the Senior Editor of the Canadian Air Force Journal.

A Risky Assumption – NATO's Access to the Space Commons

By Major Phil Verroco, USA AF, JAPCC

Two linked perspectives form the foundation of the Allied Command Transformation (ACT) Global Commons initiative. The first is that "the architecture of the modern international system rests on a foundation of free and fair access to a vibrant global economy that requires stability in the global commons".[1] The second is that "We are likely entering an era in which a series of strategic trends will make it more difficult for NATO to sustain stability within the global commons".[2] With those two thoughts at the core of the issue, ACT began the global commons initiative to, "identify vulnerabilities and challenges affecting assured access to the global commons for NATO and to make recommendations for NATO's way ahead".[3] In support of this initiative, ACT requested the JAPCC to host a space commons workshop in October, 2010.

The purpose of this article is to explore the idea of the 'commons' as a reliable concept to address NATO's use of space for operations and to provide key points of discussion and considerations for exploiting and defending space-based capabilities.

The Challenge of the Space Commons in Context

The concept that space is open to all for peaceful purposes is widely accepted and publicly stated in policy documents such as the Draft European Union Code of Conduct for space activities and the National Space Policy of the United States of America. Despite this point, policy makers in both the EU and U.S. felt compelled to document rights of self-defence and protection as well.[4] For example, the U.S. National Space policy reads, "The United States will employ a variety of measures to help assure the use of space for all responsible parties, and, consistent with the inherent right of self-defense, deter others from interference and attack, defend our space systems and contribute to the defense of allied space systems, and, if deterrence fails, defeat efforts to attack them".[5] The evident unease with assuming assured access to space capabilities as a national right, expressed above, also helped energise ACT to include space as one of the global commons to address in its larger initiative.

Making 'Space' Finite

One of the defining aspects of commons management for space that immediately requires attention is 'finiteness'. As written by Garrett Hardin, a tragedy of the commons occurs when users seek to maximise their own gain by exploiting a common area.[6] They do so at the expense of others who would also seek to benefit from the common area. When multiple users seek to maximise their gain, they eventually exhaust the resource faster than it can replenish, ultimately destroying the commons

to the detriment of all. But space extends to infinity. By definition it is impossible to exhaust an infinite resource. With that in mind workshop organisers, and therefore this article, use the term 'space' to refer only to areas that directly impact NATO operations or may involve a member nation in a dispute leading to Alliance involvement in the near-term. As such, the term 'space' is limited to: (1) Earth orbital operations starting at about 150 Km to slightly beyond geosynchronous orbit (to account for disposal of geosynchronous vehicles); (2) lunar orbits and (3) areas of special value, such as Lagrange points.[7]

Defined in this way 'space' becomes finite; without management it is possible to exhaust the commons of near-Earth space. Therefore, limitations exist which need to be managed. For example, there are limits to the number of currently used orbits providing known operational utility. There is an operational cost associated with the amount of pollution (debris) in the space environment under the direct influence of Earth's gravity. There is a limit to the usable radio frequency spectrum without causing interference and without which today's space operations would be impossible.

Assuring Access to the Space Commons

Protecting space as a commons first requires a mechanism that recognises it as a finite resource and institutes enforceable sanctions. The United Nations recognised this void, stating in 2009, "The United Nations has up to now pursued a highly decentralised approach to space amongst its agencies and organisations. This is not considered a tenable option for the future … Too much is at stake for the global community for the United Nations to watch from the sidelines and be only passive and reactive".[8] As of this writing, however, the UN has not published additional guidance.

Successfully managed commons have attributes which do not exist for space.[9] For example, space 'boundaries' have deliberately been left open. There is no internationally accepted definition of where space begins; although most would agree that space extends to infinity. Rules governing the use of space are sparse and enforceable sanctions preventing orbital debris or mandating removal of objects past their operational usefulness from desirable orbits are non-existent. Critically, there is no shared system for monitoring and attributing misbehaviour.

Global Commons Air and Space Workshop

The Air and Space Workshop aim was to "identify vulnerabilities and challenges affecting assured access to space for NATO and to make recommendations for NATO's way ahead". The workshop concerned itself with five questions from ACT.[10] Taken as a whole, at the core of the questions is a recognition of the need to preserve access to space capabilities for NATO operations and a desire to figure out how best to achieve this. The questions relate to space as a commons, but also as an independent domain with unique characteristics.

What are NATO's Stakes in the Space Commons?

The Alliance's use of space capabilities for operations has gained significant attention over the last two years, particularly after the publication of JAPCC's NATO Space Operations Assessment, which was revised in January 2009.[11] NATO's stakes in space will not simply grow and contract with NATO's level of ambition. Its stakes can only increase as space capabilities underpin more of the national economies that ultimately enable the Alliance to function. In his book, *Ten Propositions Regarding Spacepower,* M.V. Smith

argues that, "Spacepower Assets Form a National Center of Gravity".[12] He goes on to write, "In *On War,* Clausewitz describes a center of gravity as 'the hub of all power and movement, on which everything depends'. It is therefore a source of strength and at the same time a vulnerability requiring protection".[13] If Smith is correct, national contributions to NATO operations would falter with the loss of space capabilities, translating into increased burden on less space-dependent nations and NATO mission degradation.

Target Point

No Global Commons is a sanctuary. Each requires a framework to maintain access, ensure proper behaviour and correct wrong doing. Space is no exception. As NATO nations rely more heavily on space capabilities, the risk of assuming instead of assuring access to those capabilities increases. NATO must decide whether that risk can be safely ignored or requires positive action.

How does NATO Assure its Access to Space Systems, and What are the Current Challenges to that Access?

NATO does not assure access to space capabilities; it is assumed. NATO doctrine acknowledges that space capabilities may be subject to destruction, degradation or disruption.[14] The UK Military Space Primer provides a succinct overview of the threats that an adversary could use against NATO space capabilities.[15] However, current challenges to access are not the result of intentional adversary interference. Today's challenges to access are knowledge, releasability, and unintentional radio frequency interference. One way to overcome these challenges is by exercising the Joint Force Commander's (JFC) existing Space Coordinating Authority (SCA) as documented in AJP 3-3.[16] The function of SCA is "to coordinate joint space operations and integrate space capabilities".[17] This mirrors U.S. doctrine from Joint Publication 3–14, Joint Space Operations. For U.S. operations in Central Command, SCA is delegated to the Combined Force Air Component Commander (CFACC) and accomplished by an OF-5 Director of Space Forces (DIRSPACEFOR) assigned to his staff. However, there is no enduring mechanism to match specific ISAF or NATO-nation mission requirements with available national capabilities.

How can NATO's Operational Access to Space-Based Systems be Strengthened in the Future?

First, the Alliance must recognise the possibility that access to space capabilities could be threatened. Then, NATO must decide whether the advantages of space-based capabilities and the risk of their denial are worth the investment of personnel capable of employing them effectively and defending their use. These personnel must then accomplish key tactical and operational tasks. Namely, they must develop Space Situational Awareness (SSA) as the foundation of all space activities. This can be accomplished through the use of hardware, software and tactics, techniques and procedures. The developed level of SSA must include the ability to properly attribute events in space to natural, man-made, hostile and unintentional sources. Personnel must also prioritise space-based capabilities for defence. This prioritisation can only be accurately accomplished when the impact to end users is well understood. Personnel must develop and exercise pre-planned response options. They must develop an effective command and control system to enact routine and pre-planned response options. Finally, they must develop assessment mechanisms to determine the effectiveness of their actions and shape future operations.

At a Strategy and Policy Level, What could NATO do to Strengthen its Future Ability to Secure Access to Space-Based Systems?

NATO has no stated space policy or strategy. That is a good place to start. Recommended tenets for NATO space policy and strategy were published in the aforementioned Space Operations Assessment. Even without a policy, the Alliance could take simple steps to

assure future access to space-based systems by publicly defining its position regarding intentional interference with space-based systems and recognising space as a contested domain.

How can a Comprehensive Approach Help the Alliance Assure Access to Space Systems?

NATO receives its space capabilities through contributing nations and via commercial providers. A Comprehensive Approach is the only feasible solution. The biggest question the Alliance must grapple with is whether collective defence and security extends into space. Can NATO gain deterrent value and a measure of space protection by explicitly stating Alliance intent to defend contributing nation space capabilities? Arguments for this line of reasoning exist. For example, *Deterrence and First-Strike Stability in Space: A Preliminary Assessment* argues that dispersing, "U.S. national security payloads across satellites owned by a range of other nations and business consortia friendly to the United States … would confront prospective attackers with serious risks of horizontal escalation in that attacking a shared international security space infrastructure might bring more states into the conflict".[18] Though clearly written from a U.S.-centric point of view, the risk of inadvertently involving NATO might complicate a potential adversary's decision to attack.

Conclusion

Garrett Hardin rooted the tragedy of the commons to evolutionary forces, not necessarily a deliberate, malevolent intent, but the rational pursuit of increased prosperity. For Hardin, the tragedy ensues through lack of foresight and early action. NATO's task is doubly complicated for it must not only reject complacency but also prepare for active measures taken to prevent it from meeting objectives. In the Maritime commons, rights of ships to traverse the seas are enforced not only by international law but by the world's navies. Similar protection for the space commons is also required. ●

1. www.act.nato.int/globalcommons. The ACT report on the Air and Space workshop, along with the reports from other workshops and the interim report, is available on the internet at: http://www.act.nato.int/globalcommons-reports.
2. IBID.
3. IBID.
4. Council Conclusions on the draft Code of Conduct for outer space activities as approved by the Council on 8–9 December 2008, page 4. Available on the Internet at: http://register.consilium.europa.eu/pdf/en/08/st17/st17175.en08.pdf.
5. National Space Policy of the United States of America, page 3. Available on the Internet at: http://www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf.
6. Hardin, Garrettt, The Tragedy of the Commons, 1968.
7. Seller, Jerry Jon et all, Understanding Space: An Introduction to Astronautics, McGraw-Hill, 2005. Geosynchronous orbit is approximately 42.000 Km above the equator of the Earth. Lagrange points, also known as libration points, are points which are under the gravitational influence of more than one orbital body. Therefore, objects at Lagrange points maintain relative position to those bodies. There are five Lagrange points for the Earth.
8. Towards a UN Space Policy: An Initiative of the Chairman of United Nations Committee on the Peaceful Uses of Outer Space, June 2009. Available on the Internet at: http://www.oosa.unvienna.org/pdf/limited/l/AC105_2009_CRP12E.pdf.
9. Ostrom, Elinor; Governing the Commons: The Evolution of Institutions for Collective Action; Cambridge University Press, 1990. This line of reasoning was suggested by Mr. Brian Weeden of the Secure World Foundation. This work is cited from the Internet: http://www.cooperationcommons.com/node/361.
10. The JAPCC provided discussion starter briefings for each question. These are available on the Internet at: http://www.act.nato.int/air-and-space.
11. The original version was published in May 2008. A revised version with minor updates was released in Jan 2009. The document is available at: http://japcc.de/108.html.
12. Smith, MV, Ten Propositions Regarding Spacepower, AU Press, 2002.
13. IBID.
14. AJP-3.3(A) Allied Joint Doctrine for Air and Space Operations, Nov 2009.
15. The UK Military Space Primer, Development, Concepts and Doctrine Centre, June 2010, pages 3–69 to 3–71. Available on the internet at: http://www.mod.uk/DefenceInternet/MicroSite/DCDC/OurPublications/Concepts/UkMilitarySpacePrimer.htm.
16. AJP-3.3(A) Allied Joint Doctrine for Air and Space Operations, Nov 2009, Sections 0606–0608.
17. IBID, Section 0607.
18. Morgan, Forrest E., Deterrence and First-Strike Stability in Space: A Preliminary Assessment, The RAND Corporation, 2010. Available from RAND at: http://www.rand.org/pubs/monographs/MG916.html.

Major Phil Verroco

entered the Air Force in 1999. He began his career as an Intercontinental Ballistic Missile operator before attending the U.S. Air Force Weapons School in 2004. Following graduation he was posted to Schriever AF Base, Colorado, as the Chief of Weapons and Tactics and subsequently became the Headquarters Air Force Space Command Chief of Tactics. He has deployed as the AF Central Command Chief of the Combined Air Operations Centre Combat Operations Division space cell and participated in an array of exercises in many strategic and combatant commands. Major Verroco is currently the Chief of Space Policy, Joint NATO Strategist at the Joint Air Power Competence Centre.

© Canadian DND

A CU-170 Heron UAV on the flightline at Kandahar Airfield, Afghanistan.

Project Noctua

A Model for Enhancing NATO UAV Capability

By Colonel (Retired) David Neil, UAV Team, MDA Corporation

Situational awareness is a fundamental element in the success of any military operation whether it involves the effective delivery of humanitarian assistance and disaster relief, peace support or combat. The ability of UAVs to provide commanders at all levels with persistent, day/night, high resolution imagery has made them indispensible to modern western forces engaged in contemporary military operations. This has never been more evident than in the ongoing operation being led by ISAF in Afghanistan. On a daily basis UAVs perform and contribute to a wide variety of critical tasks essential to conducting successful operations and protecting allied troops and civilian aid workers. Persistent, stealthy and able to operate over the Afghanistan battlespace with relative impunity, UAVs are major contributors to traditional surveillance and reconnaissance missions as well as helping to shape new techniques such as patterns-of-life and collateral damage analysis.

Canada's Early UAV Experience

Canada first deployed UAVs to an operational theatre in 2003 when it acquired Sperwer Tactical UAVs for service in Afghanistan. While a tremendous amount of knowledge was gained, the high altitude and hot operating conditions proved extremely challenging for this UAV, and limited its ability to contribute to the mission. This issue became increasingly acute when Canadian Forces (CF) moved from Kabul to Kandahar. In Kandahar, the CF became much more reliant on Intelligence, Surveillance and Reconnaissance (ISR) to support combat operations and to minimise casualties due to the growing use of the insurgent's weapon of choice – the Improvised Explosive Device (IED).

By 2006 all CF troops in Afghanistan had redeployed to Kandahar. After two years of fighting and with the security situation in Southern and Eastern Afghanistan continuing to deteriorate, Canada's role in Afghanistan was foremost in the minds of Canadians. To provide advice to parliament and instruct the debate on Canada's future there, an independent review panel was commissioned by the Prime Minister in October 2007. The panel, comprised of former government ministers, diplomats and senior public servants, submitted their report in January 2008. Included among their recommendations was a call for the

Government to secure for its troops "high-performance Unmanned Aerial Vehicles (UAVs) for ISR before February 2009".[1]

Project Noctua

To comply with the UAV recommendation of the Independent Panel, Canada's Department of National Defence (DND) had to adopt both an innovative strategy and a very aggressive implementation schedule. DND turned to industry to provide a turnkey solution that could be deployed within months, as opposed to the years normally associated with fielding a new capability of such complexity. The desired solution was to be delivered via a service lease whereby the selected contractor would provide the systems, maintenance, supply chain and training while DND would provide the operators.

A competitive tender was issued in February 2008 and on 1 August 2008 a contract was awarded to MDA Canada and its partner Israel Aerospace Industries (IAI) based on the IAI Heron UAV platform. In January 2009, a mere five months after contract award, the CF was conducting operational ISR missions in Afghanistan with the Heron.

The Heron is a Medium Altitude Long Endurance (MALE) platform with an all-up weight of 1,150 kg, a wingspan of 16.6 m and a payload capacity of 250 kg. It has a service ceiling of 30,000 feet and an endurance in excess of 24 hrs. Payloads include an Electro-optic/Infrared (EO/IR) turret, various Electronic Warfare systems and overland or maritime Synthetic Aperture Radar (SAR). While both satellite relay and line of sight control systems are available, the CF variant utilises a line of sight system that supports operations out to 200 km. Extended ranges can be achieved by using another air vehicle as an airborne datalink relay station. The system is highly reliable with redundancy built into virtually every sub-system.

Extremely tight timelines and the complexity and level of effort required to field this capability in a very dynamic theatre of operations located half way around the world was a remarkable accomplishment. It was also an example of what can be achieved by a truly integrated government/industry team with shared goals and a high level of motivation. In addition to the establishment of all infrastructure at the Main Operating Base (MOB) in Afghanistan, individual and collective training had to be conducted in Canada and a training pipeline assembled to sustain the capability. Airworthiness clearances, flight permits and frequency allocations had to be obtained, and the MDA maintenance organisation had to be accredited by DND's Technical Airworthiness Authority.

Another key element in minimising fielding time was to establish requirements based on existing technologies available in the marketplace. Modifications to the Heron system were mostly limited to conversion of sensor data to standard NATO formats, and the addition of a second shelter where sensor data was sent for interpretation by EW experts and intelligence analysts.

Target Point

Due to the growing use of IEDs by insurgents in Afghanistan, Canadian Forces became much more reliant on ISR to support combat operations and minimise casualties. In response to Government calls to secure Unmanned Aerial Vehicles for ISR by February 2009, Canada's Department of National Defence was forced to find innovative strategies to meet a very aggressive implementation schedule. By January 2009 CF was conducting operational ISR missions in Afghanistan with the Heron turnkey solution provided by MDA Canada.

The use of experienced aircrew and former military technicians enabled individual training times to be greatly reduced. Another critical factor in minimising the training schedule was the Heron's highly reliable Automatic Take-Off and Landing (ATOL) system. The skills required to manually land a UAV take a significant period of time to acquire and are perishable.

Great importance was attached to collective training in Canada for the entire deploying Battle Group. It allowed the joint force to gain familiarity with the UAV capability and an appreciation for how to employ it prior to arriving in theatre. This applied to commanders from Brigade

A CU-170 Heron UAV landing after a mission at Kandahar Airfield, Afghanistan.

down to Section level as live streaming video from the UAV could be directly received by troops on the ground using the man portable Rover system.

Once in theatre, Noctua was quickly recognised as a significant advancement from the Sperwer tactical UAV project. According to the Canadian Air Force's unclassified website, "The Heron's primary functions are to gather imagery and data for use in surveillance, reconnaissance, intelligence analysis and target acquisition. It can scout out convoy routes and other ground operations areas, scan for insurgents, or observe suspicious activity, such as planting improvised explosive devices. Its capabilities will help reduce insurgent attacks, and save lives – Canadian and Afghan alike".[2]

"The importance of Operational-level ISR to the success of multinational operations may demand a re-examination of how less expensive but equally critical capabilities are fielded by NATO."

Whereas previously UAVs were routinely almost an afterthought in mission planning and an adjunct to the conduct of operations, the Heron has now become one of the cornerstone capabilities around which CF operations in Afghanistan are planned and executed. Commanders at all levels have praised the system for its capability and its availability. Many have indicated they never want to conduct operations again without this type of asset.

Lessons for NATO

Although the Heron was deployed as part of the Canadian Battle Group, it was not meant to support the CF exclusively and was provided as an asset available to support ISAF as a whole. However, Canada has announced its intention to end combat operations in Afghanistan in 2011. Canada will maintain a presence in Afghanistan but will reduce its military footprint from approximately 3,000 personnel to about 950. This reduced contingent will be centered in and around Kabul where they will support training of Afghan national forces. With no requirement to support combat operations, the Heron capability will be withdrawn from Afghanistan.

NATO and Canadian leaders at the operational level have indicated to MDA that only a small fraction of the airborne ISR demand in Afghanistan is currently being met. The departure of Canadian Herons will represent a significant reduction in this chronically under-resourced capability. As long as NATO contributions are provided on a national basis, the presence of assets will remain subject to the policies and decisions of the contributing nations. While this is appropriate, it does make the availability to NATO of High Demand/Low Density assets such as MALE UAVs somewhat fragile, particularly in non-Article V situations.

It is highly likely that assured access to such assets was a major consideration in the establishment of the NATO Airborne Early Warning (NAEW) Force. Similarly, NATO has continued to move forward on the Alliance Ground Surveillance (AGS) project based on the Global Hawk, a High Altitude Long Endurance UAV. While burden sharing is clearly the principal driver behind such major programs, the importance of Operational-level ISR to the success of multinational operations may demand a re-examination of how less expensive but equally critical capabilities are fielded by NATO.

One approach to ensuring the availability of MALE UAVs would be to acquire systems under a multinational MOU as per NAEW and AGS. However, this

approach can be very lengthy. The requirement for AGS was issued by the NATO Defence Planning Committee in 1992 but the system is not yet in contract; this does not appear to be a process that is agile enough to address a deficiency that is impacting operations today.

In Edition 10 of the JAPCC Journal, Lieutenant-Colonel Duman's article, 'Governance of NATO Common Air and Space Assets', introduced 'Tiers' of commonality, a model that bears further examination in this context. NATO could apply the Tier–V (Contracting/Outsourcing) concept to follow Canada's lead and establish a leased service under a common funded approach. As with Project Noctua, the service provider would deliver a turnkey solution except for the operators who would be drawn from troop contributing nations. An unarmed system would be less controversial for potential contributing nations, and the nature of the operation would not expose operators to significant risk. By using experienced aircrew, Canada found that operators could be trained in about eight weeks, split evenly between ground school and the flight line.

Not only would a MALE UAV equipped with EO/IR, EW and radar, complement Global Hawk, but it could also ease the introduction of the AGS program. Provided funding could be identified, a service lease could be established quickly. This would allow the leased system to serve as a lead-in capability that would help NATO prepare for the arrival of AGS. It would permit the AGS organisation and establishment to be ramped up while refining and exercising command and control, developing operational procedures and accumulating UAV experience, perhaps under actual operational conditions. This would also assist in resolving a myriad of outstanding issues associated with the fielding of a multinational UAV system. These include establishing procedures for registration/flight permits, identifying technical authorities, airworthiness responsibilities, obtaining frequency spectrum allocation, and more.

Conclusion

The MALE UAV has proven its worth as an ISR asset in contemporary operations, and access to this capabiwlity must be assured to NATO commanders at the Operational level. Such assets are too valuable to be withdrawn as part of a national contribution. Therefore, a common funding approach and the service lease model as demonstrated by Canada's Noctua Project should be investigated as an expeditious means of fielding such a capability. MALE UAVs would not only complement the planned AGS capability but could also provide NATO with valuable insights to pave the way for the introduction of AGS to service. ●

1. The Honourable John Manley, P.C. (Chair), 'Independent Panel on Canada's Future Role in Afghanistan Final Report', January 2008, p 38. For additional reading on Canadian Air Force support to Afghanistan, see the article by author Major March titled, 'Impact of a Combat Air Wing', in this edition of the JAPCC Journal.
2. http://www.airforce.forces.gc.ca/v2/equip/cu170/index-eng.asp.

Colonel (Retired) David Neil

is a former maritime helicopter aviator who served 35 years in Canada's Air Force. Following four flying tours, including command of a Maritime Helicopter Squadron, he served as Director of Strategic Planning for the Air Force and Director General Joint Force Development. He was responsible for the Canadian Forces' UAV and C4ISR Campaign Plans, and Canada's military space portfolio. He also served as Chairman of NATO Naval Group 4 and Chairman of the MAJIIC Management Team. He is a graduate of the Royal Military College of Canada and the Canadian Forces Command and Staff College. He has been a member of MDA Corporation's UAV team since August 2007.

Rheinmetall Defence: a dependable partner to the world's air forces

One of Europe's foremost defence technology companies, Rheinmetall supplies the air forces of Germany, its allies and other like-minded nations with an extensive array of aircraft armament and munitions, countermeasure capabilities, reconnaissance and air defence systems as well as simulation and training technology. The current German SAATEG project, moreover, underscores Rheinmetall's status as a competent partner for innovative operator solutions and financing models. More information at: **www.rheinmetall-defence.com**

Rheinmetall AG · **Corporate Sector Defence** · Rheinmetall Platz 1 · 40476 Düsseldorf Germany

RHEINMETALL DEFENCE

Headquarters Supreme Allied Commander Transformation.

The SACT Post-Lisbon Action Plan – A JAPCC Perspective

By Colonel Konrad Wassmann, DEU AF, JAPCC

The Lisbon Summit

The Lisbon Summit concluded on 20 November 2010 with decisions that will mean profound changes for the way NATO does business. During the Summit, NATO leaders adopted a new Strategic Concept that will serve as the Alliance's roadmap for the next ten years. NATO leaders also reiterated their commitment to ensure that the Euro-Atlantic Alliance has the full range of capabilities necessary to deter and defend against any threat to the safety and security of the populations of member nations.

Implications for the Supreme Allied Commander Transformation (SACT)

SACT, as the leading agent of transformation in NATO, has developed an ACT 'Action Plan' with the intention of supporting the implementation of the results from the Lisbon Summit. The Action Plan is primarily an internal management tool but also serves as a high level external engagement plan.

"National guarantees that ensure the availability of interoperable, network enabled capabilities to the Alliance are essential to an effective C2 structure."

Initially the Action Plan focuses on strands of work derived mainly from the results of the Lisbon Summit. The intent is to enable SACT to support NATO in a fast, progressive and timely implementation of the aspirations and intent expressed by the Alliance. Inclusion of the full scope of ACT's activities will follow at a later stage. The end state will be a comprehensive Action Plan in which all strands of work are described and prioritised (see Figure 1).

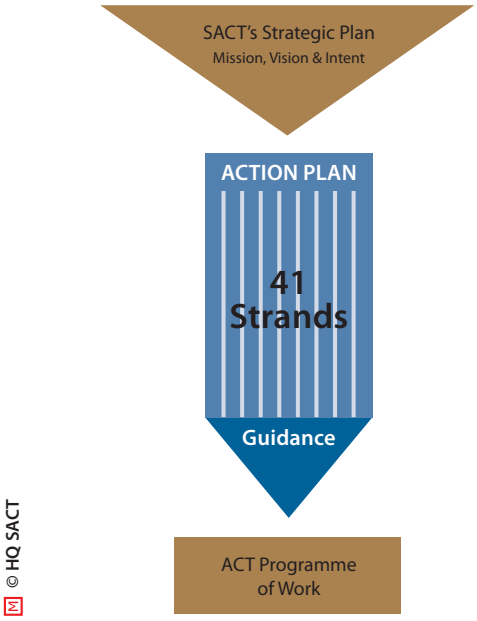


Figure 1: SACT Action Plan

The Action Plan will be used in different ways at various levels from desk officer to Command Group, but it will be used for the same purposes, namely: Guidance, Coherence, Engagement/Communication, Visibility, and Progress. Internally, SACT will use the Action Plan to understand the status of any given strand and to guide his staff as necessary so that his vision and intent are being met while ensuring that the resources are distributed according to his priorities. Externally, SACT will use the Action Plan and Progress Reporting as the basis for his engagements with the Military Committee, North Atlantic Council, Nations and other relevant actors.

"'The Strategic Concept of Employment for Unmanned Aircraft Systems in NATO', published by the JAPCC in January 2010, was accepted by ACT and ACO."

The SACT Action Plan

SACT's Action Plan presently comprises 41 Strands. They are grouped in coherence with the headlines within the New Strategic Concept and cover five subject areas. The first Group is called 'NATO's Core Task and Principle'. It contains only one item: the Strategic Concept. It is NATO's aspiration to assure its relevance in the 21st century. The new Strategic Concept lays out the vision for the Alliance for the next decade: able to defend its members against the full range of threats; capable of managing even the most challenging crises; and better able to work with other organisations and nations to promote international stability. NATO needs to continuously evolve and transform in order to maintain relevance and flexibility in the modern security environment. SACT will support this aim by considering the implications of the new Strategic Concept for other high level documents, and by reviewing the Alliance's Defence and Deterrence Posture, which is seen as a vehicle for further transformation towards a continuously viable deterrence in all domains in the 21st century. ACT supports the fast follow-up to the Strategic Concept to keep up the pace of NATO transformation and reform.

The second group 'Defence and Deterrence' is by far the biggest group of strands. It comprises issues like Defence Review, Cyber Defence, Assured Access to the Global Commons and a list of the Most Pressing Capability Needs. Other examples are the Counter Improvised Explosive Devices Action Plan, Airlift, Ballistic Missile Defence and Alliance Ground Surveillance. These strands are very much linked to Air and Space Power questions.

In a third group, SACT's Action Plan focuses on 'Security through Crisis Management'. Again Air and Space Power plays an important role. Facets like Intelligence Sharing or NATO Response Forces are impossible without Air and Space Power. It is about being prepared, and Air and Space Power's well-known capabilities of fast reaction, reach and persistence are ideally suited to this purpose.

The fourth group that HQ SACT addresses in its Action Plan is 'Partnership'. The idea is to promote partnership between NATO, Partner Nations, European Union, United Nations, Russia, International Organisations, and Non-Governmental Organisations. These discussions will happen mostly on a political level. Within the Alliance, pressure on national defence budgets will increasingly act as an incentive to explore new and innovative opportunities for cooperation, collaboration and partnering arrangements to include NATO Air and Space Power.

The fifth and last group of strands is named 'Reform and Transformation'. The current NATO reform plan can be significantly influenced by Air and Space Power considerations. It is clear that a new NATO Command Structure needs to take into account the necessities of commanding Air and Space Power assets, including those necessary for Missile Defence and other operations beyond NATO's traditional boundaries.

SACT Action Plan – The Way Ahead

In support of the Action Plan, an ACT internal reporting mechanism will be developed. This mechanism will provide SACT with visibility of his Command's position with respect to each strand of work. Running simultaneously with the continued development of the Action Plan is a project aimed at integrating SACT's management mechanisms in a software based tool. It is intended that this will enable illustration and analysis of cascading tasks and resources more easily, to facilitate more effective prioritisation, resource allocation and progress reporting.

JAPCC's Air and Space Power Perspective

Nearly all of the 41 ACT Action Plan strands have direct implications for Air and Space Power (see Figure 2). Let's talk about some of them in more detail.

Figure 2: Lisbon Summit Declaration

Two of the 'Global Commons Domains', access to International Airspace and access to Space, are directly related to the JAPCC's work. Access to international airspace is a fundamental right of nations. NATO should give nations guidance to allow them to organise, train, and equip forces to support security and access to international airspace.

Space is a key enabler for the application of Air Power. JAPCC conducted a 'NATO Space Operations Assessment' two years ago, long before NATO officially discussed its position and role in the Space domain. The JAPCC paper concluded: "NATO must make better use of, and assure access to, the Space domain." That's exactly what NATO now intends with the Global Access to Space initiative. The JAPCC will focus its efforts on continuing to promote an agreed Alliance position on Space, emphasising both the ubiquity and the inherent opportunities and vulnerabilities that the Space domain presents.

Air and Space Power even has an impact in the mission area of Counter-Improvised Explosive Device (C-IED) operations, with airborne and space-based systems making a significant contribution to both defeating IEDs once emplaced and in attacking the networks that support their production and use. Among a number of workstreams currently being pursued in this area, including the delivery of Education and Training and the production of a C-IED Primer, the JAPCC has since 2010 been contributing as a member of the NATO C-IED Task Force (TF) to the TF's evolving Action Plan.

Missile Defence is another part of the Action Plan where JAPCC's support is essential. The development of a defence capability against the growing threat of ballistic missiles as carriers of weapons of mass destruction gained high priority in Lisbon. To allow for further decisions on these matters, several issues must be examined in a relatively short period of time by NATO staff elements, including policy making, development of operational concepts, and studies on the integration

Target Point

The Lisbon Summit concluded with decisions that will mean profound changes for the way NATO does business. Supreme Allied Commander Transformation, as the leading agent of transformation in NATO, has developed an ACT 'Action Plan' with the intention of supporting the implementation of the New Strategic Concept from the Lisbon Summit. It is time for Action. The results from the Lisbon Summit must be implemented!

of ballistic missile defense in NATO's Integrated Air Defense (NATINAD). HQ SACT determines the strategic perspective and JAPCC with its Subject Matter Experts supports NATO and Nations in achieving the steps of the Action Plan. JAPCC's perspective considers ballistic missile defense as an integral part of the NATINAD structure in which Consultation, Command and Control processes and interaction between political and military authorities play an important role.

"The development of a defence capability against the growing threat of ballistic missiles as carriers of weapons of mass destruction gained high priority in Lisbon."

NATO decided to acquire Alliance Ground Surveillance Systems in order to give commanders a picture of the situation on the ground in areas of interest. It is based on Unmanned Aircraft Systems (UAS), a subject area in which the JAPCC has considerable experience. The JAPCC was the first NATO accredited Centre of Excellence to deal in depth with UAS, producing in 2006 the 'Flight Plan for UAS', and more recently publishing 'The Strategic Concept of Employment for Unmanned Aircraft Systems in NATO' in January 2010, a document which has recently been accepted by ACT and ACO. In NATO's transformational process UAS play a very important role that has not yet reached its full potential. Future Joint Air and Space operations will be more efficient by concentrating efforts on UAS and Information, Surveillance and Reconnaissance capabilities.

The time-critical nature of the threats that utilise the Air and Space domains requires a Command and Control (C2) structure that guarantees a swift decision making process. National guarantees that ensure the availability of interoperable, network enabled capabilities to the Alliance are essential to an effective C2 structure which must ensure the timely and flexible application of Air and Space Power across the full spectrum of warfare. In the joint battlespace, control of the air will always be a requirement for future operations. The JAPCC will concentrate on giving the best military advice for this important step into the future.

With the new Strategic Concept and the decisions taken in Lisbon, NATO has paved the way to put in place a renewed Euro-Atlantic Alliance, ready to meet the threats of the 21st century. JAPCC will support HQ SACT, driven by the belief that in a joint context, Air and Space Power is an essential means to safeguard our freedom and security in an unpredictable world. ●

Colonel Konrad Wassmann

started his career as an Air Defence radar controller. After completing the General Staff Officer Course he worked as a section chief at the German Air Force Command and later was appointed to the Operations Branch of the German Air Force Staff. He served as Military Assistant to CINCNORTH, Brunssum, and thereafter commanded a Tactical Air Control Battalion. He was appointed to the Air Armament Division, German Air Force Office and served as Branch Chief in the German Air Force Transformation Centre. After being posted to the Joint Air Power Competence Centre in 2006 he took over the position of the JAPCC Liaison Officer to HQ SACT, Norfolk, VA, USA in July 2009.

© U.S. Air Force/SSgt Jeremy T. Lock

U.S. Air Force Special Operations Command combat controllers give take off clearance to a C-130 Hercules at a forward deployed location in support of Operation Enduring Freedom.

Air-Land Integration

A Challenge for NATO

By Lieutenant Colonel Metello Pilati, ITA AF, JAPCC

As a result of the strategic environment, the current world economic climate, and the inevitable reduction in defence budgets, NATO nations have been forced to make their forces more deployable and agile. One way they have done this is by reducing the army's organic fire support, and relying more heavily on airpower to support ground operations. As such it has become necessary for components to add weight of effort to the joint scheme of manoeuvre in order to maintain the same level of capability. All components operating in this joint arena must have a thorough understanding of each other's doctrine if agility (both in command and execution), tactical synergy, and exponential capability are to be achieved. This is true for large scale operations such as in Iraq as well as for asymmetric operations such as in Afghanistan. It is therefore imperative to identify ways to capitalise on existing capabilities and bring them to bear on the enemy.

Based on the Director's task, the JAPCC addressed this challenge in a study by performing a broad evaluation of Air-Land Integration (ALI) from a strategic perspective. As a result of this study, seams and leverage points to improve the overall process of coordinated effort were found. The study identified ways in which land and air capabilities can work together better to meet national and international objectives.

Joint Doctrine and Tactics Techniques and Procedures (TTPs)

One of the keys to success is gaining a common understanding of joint doctrine and the doctrine of other components which are used by integrated staffs throughout the entire process, from planning to evaluation. The purpose of ALI is to coordinate the use of air capabilities with ground forces to meet the commander's intent. This coordination must happen within each component, across component boundaries, and regardless of which component 'owns' the asset.

The Lisbon Summit of November 2010 marked a significant change in the focus of NATO for its defence and security, directing NATO to be able to intervene in out-of-area (OOA) locations where a crisis has an impact on the security of the Alliance. As NATO expands and becomes more engaged in OOA missions, its doctrine must change to conform to new realities. For example, smaller expeditionary forces must be able to operate worldwide in different types of terrain and confronting different types of enemies. Deployable Forces doctrine, therefore, should support these types of operations, and be focused on joint operations.

Within NATO today, a lot of doctrine and Tactics Techniques and Procedures (TTPs) are written on joint operations. The question, however, is if they are kept up to date and are read and understood by all involved. Although doctrine should be managed by components, it should also be coordinated at the Joint level. Therefore the need exists to reorganise the Allied Joint Doctrine Hierarchy. In fact NATO does not have an organised electronic library at all, and the ALI study recommends that one be created.

In addition to the creation of a Joint unified electronic library, a common lexicon must be agreed upon across Alliance doctrine. For example, no NATO ALI definition exists in the AAP-6, and the ALI study proposes the following definition be inserted:

Air Land Integration (ALI) is the focused orchestration and application of the full range of Air and Land capabilities within a joint force to realise and enhance effects. ALI considers all elements in a given battlespace, regardless of the component to which they belong, operating together to achieve a common aim.

Command Structures: The Right Man in the Right Place

The type of operation and who is the leading component drives the Command and Control (C2) structure that will be used. Keywords that can be used to describe such an adjustable C2 structure are 'scaling' and 'tailoring'. Several Military Committee (MC) documents explain the current NATO C2 structure and, regardless of whether a new C2 model will be adopted, some processes within the current Air C2 cycle must be revised to make them faster and more responsive to contingencies.[1]

Due to the fact that most often component headquarters are not collocated, the Component Commanders rely heavily on Liaison Officers (LOs) for coordination, de-confliction and especially integration of missions and assets. The use of LOs is crucial to the effectiveness of Joint Operations. However, commanders only listen to their LOs when they demonstrate sound knowledge

and can provide useful advice and information. LOs therefore need to be experts in their field who are properly educated and trained in order to provide the necessary cross-component advice and support.

Understanding Air/Land Planning Processes

Another fundamental element to ALI success is to understand the planning processes of the other components. The output of the Air Planning process at the tactical level is the Air Tasking Order (ATO) which is a command, control and coordination order to subordinated units to direct assets to be in the right place at the right time.

The Air Planning Process in the perception of the Land Component is slow, inflexible and largely kinetic in nature. It does not permit flexible response beyond the current mission unless re-tasked to do so by the Combined Air Operations Centre (CAOC). From the Air Component perspective, however, when enough air assets are available, the apportionment process provides for dedicated platforms to be assigned to critical mission areas, such as Close Air Support (CAS), in order to facilitate a flexible response.

"NATO nations have been forced to make their forces more deployable and agile. One way they have done this is by reducing the army's organic fire support, and relying more heavily on airpower to support ground operations."

The same can be said about the flexibility and reactiveness of army assets in Time Sensitive Targeting (TST) situations. TST is coordinated at the operational level and when direct army Rocket/Artillery/Mortar (RAM) support is assigned to an area, requests for fire support will be answered swiftly. However, if RAM is not assigned the approval process for getting RAM support takes a very long time, in which case Air Support is more flexible and reactive.

This example shows that the Land and Air components still do not fully understand the capabilities and limitations of the other. This friction can only be solved by education between components, which leads to the next leverage point for improving ALI.

© Courtesy photo/David Drais

Two F-35A Lightning II Joint Strike Fighters complete a formation test flight in May 2010.

Education and Training

Another important aspect of integration is the education and training of all joint personnel (including commanders); proper education will assure an enhanced mutual understanding of each component. Education and training further enables the use of joint doctrine by all components with trust and respect, so that it is followed instead of being used only as a guideline. For this purpose, proper courses must be established. The Tactical Leadership Programme (TLP) has established a course that is built around the key elements of ALI. However, at the operational level similar courses don't exist.

Target Point

Land and Air components still do not fully understand the capabilities and limitations of the other. The ALI study aims to find seams and leverage points to improve the overall process of coordinated Air-Land effort. In the broadest sense it identifies ways in which land and air capabilities can better work together to meet national as well as international objectives, and to pave the way forward for future NATO joint operations.

It is generally acknowledged that there is a need for more joint training (and evaluation).

NATO Nations suffering from budget restraints can still obtain adequate training for their military through simulation. Simulated training, however, has its limitations. The ALI study maintains that not all live exercises can be substituted with simulation; a certain number of live training and exercise opportunities must be retained.

Connecting different NATO simulators may cause some technical and security related challenges, which often hamper effective integration, and this needs to be resolved. As an example, linking fast jet simulators into a distributed training exercise with other simulators can pose difficult crypto procedures. These issues need to be tackled before training can be fully integrated at the combined and joint level.

Conclusion

We cannot predict the future or the precise nature of operations that forces will be asked to contend with, but the trend makes one think that the battlespace will continue to become more complex. Soldiers are expected to be increasingly spread out in the field or in an urban environment, thus placing even greater emphasis on coordinated Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR) and integrated fires/effects. NATO is facing huge challenges now and in the future, and a key element of the solution has been to address more strongly the concept of ALI.

This article was intended to provide a summary of the study in which JAPCC has taken the opportunity to set the conditions to improve ALI standards and performance in our current operations and for future challenges. I encourage readers to examine the full study once it is distributed by the JAPCC to help improve ALI even further with recommendations. ●

1. JAPCC new air and space C2 model draft.

Lieutenant Colonel Metello Pilati

was born in Italy and attended the Air Force Academy in Naples, graduating in 1994. He operated the Tornado as Weapon System Officer (WSO) for almost 13 years covering various responsibilities up to the level of Package Leader. As WSO he participated in several operations including Joint Endeavour in Bosnia (1996), Allied Force in Kosovo (1999), and as Chief of the Air Cell in the Multinational Task Force West in Kosovo for KFOR during the 'Kosovo Independence Declaration'. In August 2008 he was assigned to the Combat Air Branch at the Joint Air Power Competence Centre in Kalkar, Germany.

Fighting Pirates from Space

Using Space Resources in the Fight Against Piracy

By Nina-Louisa Remuss, Associate Fellow, European Space Policy Institute[1]

In recent decades the threats to security both internally and externally have changed drastically and now include indirect threats such as terrorism, organised crime and piracy, as well as resource and energy scarcity, climate change and natural catastrophes. To find solutions and mitigate these threats, science, research and technology thus increasingly complement politics, policy and economics. For technologies to continue to provide answers to current and future threat scenarios, the continuous pursuit of security research, and space applications in particular, is of utmost importance.

The Emergence of Piracy and Why It Matters

Somali Piracy matters to the international community for four primary reasons: the effect on Somalia, the impact on international trade, the danger to the environment, and lastly, the potential connection with the terrorist threat.

The RAND Corporation, a U.S. think tank, has identified seven Causative Factors (CF) accounting for the current emergence of piracy.[2] Accordingly, removal or interruption of any one of these CFs would disrupt or reduce piracy. These CFs are:

- Massive Increase in Commercial Maritime Traffic (CF 1)
- Narrow and Congested Maritime Chokepoints (CF 2)
- Lingering Effects of the Asian Financial Crisis/Profit as a Motivation (CF 3)
- Difficulties with Maritime Surveillance as a result of the events of 9/11 and the concomitant pressure that has been exerted on many governments to invest in expensive, land-based homeland security initiatives (CF 4)
- Lax Coastal and Port-Side Security (CF 5)
- Corruption/Safe Havens (CF 6)
- Global Proliferation of Small Arms and Light Weapons (SALW) (CF 7)

The Role of Space Applications in Counter-Piracy Operations and Policy

Clearly, space applications cannot counter the massive increase in maritime traffic (CF 1), decentralise narrow and congested maritime choke points (CF 2),

© NASA

provide the Somali population with money to overcome the lingering effects of the Asian financial crisis (CF 3), or counter corruption (CF 6). Space applications can, however, improve maritime surveillance (CF 4) as well as coastal and port-side security (CF 5) and provide supportive tools to combat illegal trafficking of, for example, SALW (CF 7). In short, space applications can have an impact on the effectiveness of counter-piracy operations and policy.

Space applications offer the possibility of monitoring specific large geographic areas in a non-intrusive manner that is legally valid over otherwise denied territories. Given their multipurpose characteristics, satellites can deal with the thematic diversity of maritime security threats in an optimal manner. Covering larger zones in one shot satellites allow for an optimal use of available resources and offer a shared resource by fostering intra- and inter-national cooperation. On the downside, the satellites currently used for maritime surveillance were not originally designed for this purpose.[3] Technical capabilities depend on the area of application and are elaborated upon in greater detail in the subsequent sections.

Target Point

Satellite observation works especially well with the large geography and thematic diversity of maritime activities requiring monitoring and surveillance. Satellites are multipurpose, non-intrusive, and not limited by national boundaries. Although some limitations exist and improvement must be made, space applications in the fight against piracy are resulting in a tremendous positive impact.

One of the main examples of the contributions of space applications to the fight against piracy is the European Union Satellite Centre's (EUSC) support of ATALANTA NAVFOR. Relying on space applications, EUSC continuously monitors pirate operating bases and skiff activity, Somalia's borders (for Ethiopian military activity) and possible terrorist training camps. It identifies potential pirate camps on the Somali coastline and offshore islands and provides battle damage assessments of Somali towns. Findings are issued in the form of imagery intelligence reports or digital geographic information products (DGI).

Causative Factor 4: Difficulties with Maritime Surveillance

Space applications fulfil a threefold role in improving maritime surveillance through three types of applications: Earth and signal monitoring, Satellite Communications, and Satellite Navigation. Space applications mainly contribute to 'observe' and 'detect' functions and are complementary to other surveillance systems, such as coastal RADAR, Automated Identification System (AIS), patrol vessels and aircraft or helicopters, by extending their surveillance range. Space applications are already present on many vessels for communication, thus presenting the possibility of low-cost data collection or positioning. Usually it is the combination of cooperative and non-cooperative signals which allows for the detection of a potentially dangerous vessel.

Space applications have proven valuable in finding pirate bases, but pure satellite imagery is of limited use and needs to be placed into context with all other possible sources of information (GEOINT). In addition, change extraction techniques (change detection, categorisation and classification) are used to identify pirate bases or to analyse changes in their structures.

Space-based imagery is also used for tracking pirate skiffs and locating hijacked vessels. This is done by relying on satellite imagery. Easy detection with the human eye in optical imagery of 2.5 meter resolution or better is possible for larger ships such as container ships, oil tankers and bulk carriers. Optical imagery also allows for ship size estimation. Difficulties in vessel-type-identification in optical imagery, however, persist for small (<10 m) vessels, which are still detected but their classification is impossible. Joint Research Centre (JRC) benchmarking tests of radar imagery capabilities, which analysed almost 900 known fishing ship positions in 100 images, further indicate an 80% detectability rate for larger fishing vessels (45 m average)[4] and >90% for smaller ones (35 m average)[5,6].

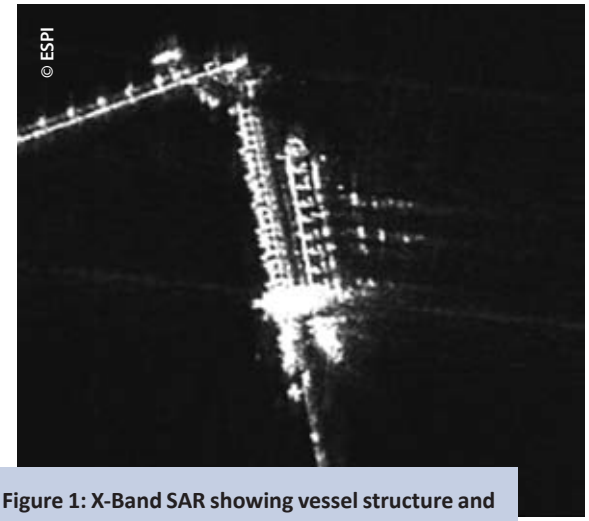


Figure 1: X-Band SAR showing vessel structure and enabling identification.

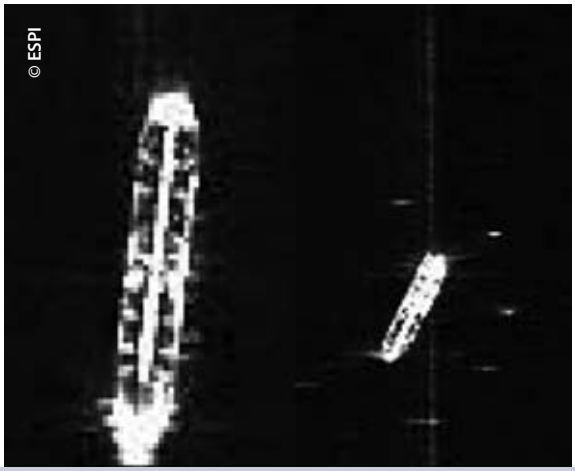


Figure 2: High resolution X-band enabling detection of small vessels close to larger vessel for monitoring of illegal transfer activities.[7]

Radar imagery also allows for a length estimate. Few satellites currently provide speed and target estimation. No vessel type identification is possible so far. Through space-based collection such as AIS signals, non-cooperative (pirate) vessels or the position of hijacked ships can also be identified.

Causative Factor 5: Coastal and Port-Side Security

There is a growing interest in the use of Synthetic Aperture RADAR (SAR) imagery for maritime border control. Optical imagery and change detection techniques indicate illegal activities, and space-based collection of signals can help identify vessels involved in illegal, unreported and unregulated (IUU) fishery. Satellite imagery further allows for mapping of ports for emergency planning.

Causative Factor 7: Global Proliferation of Small Arms and Light Weapons (SALW)

Space applications can also be used to monitor illegal transportation, such as container security (tracking of containers through Satellite Navigation) and sea border/sea transport monitoring. There is currently still the need for intelligence sources to identify something as suspicious before a certain container is tracked.

Large vessels used for smuggling often anchor off the coast to transfer the load to smaller vessels. The challenge is to detect small boats that may be on the water for a very short time in a crowded area, and to recognise their hostile intent (see Figures 1 and 2).

Conclusions and Recommendations

Satellite observation fits particularly well with the geographic and thematic diversity of maritime activities requiring monitoring and surveillance. The global characteristic of monitoring from space makes space systems particularly attractive for long-term monitoring of a very large geographic area. Satellite observation systems are multipurpose and non-intrusive. Satellite data is not limited to borders (legally valid over foreign territories) and is continuously available, allowing for continuous and frequent observation of large areas in order to aid early detection of potential threats.

Further, space assets are complementary to ground, sea and air assets. They indicate 'where to look'. Users can then activate other systems to identify and confirm the threat. Space applications complement existing coastal surveillance systems such as coastal RADAR, AIS, patrol vessels and aircraft. In doing so, they extend the surveillance range (to better anticipate threats), cover larger zones in one shot (optimisation of resources and money) and offer a shared resource by fostering intra and inter-national cooperation.

Satellites that can support counter piracy missions are already in place. There is no need to wait for new technology to develop; the challenge is to better use what already exists. The current data situation in Europe often results in the absence of necessary information due to a lack of coordination across borders

and between levels of government, and a lack of common standards for their use. There is compartmentalisation and a lack of interoperability of different information systems for monitoring the position of ships at sea. The result is incompatible information and information systems, fragmentation of information and redundancy. A comprehensive approach to the sharing of maritime surveillance data is required.

As has been explained, the satellites which are currently used for maritime surveillance, have not been designed for this purpose. Thus, a dedicated maritime surveillance mission is needed (see endnote).[8] Additionally, wake detection must be improved. The continuity of information at all times needs to be ensured and real time availability and reactiveness in case of unplanned events and emergencies increased. The availability of space systems and their capacity to be replaced or augmented for operational purposes remains weak and barely reactive. Space systems have to become more responsive[9] and should be treated as critical infrastructures as information dependence increases.[10] At the same time, light, flexible and cost effective applications for all actors concerned (developing countries, private sector, and industry) are needed.[11] Europe should continue to work on a European AIS-S. A more integrated approach, fusing satellite data with all other available data, is recommended to ensure that surveillance may be conducted anywhere at any time to detect suspicious activity. The European Commission's Draft Roadmap towards establishing the Common Information Sharing Environment for the surveillance of the EU maritime domain[12], presented in October 2010, is a first step to achieve these aims.

As with any ISR system, there are limitations and a need for improvements in the key areas listed above. This should not detract, however, from the important and successful work that space systems are adding to counter-piracy operations off the coast of Somalia, nor should it inhibit the application of space systems in the maritime domain. For a complete copy of the study on the use of space resources in the fight against piracy, including additional recommendations on technical capabilities, regional capacity building, and coordinative issues, please contact the author directly at: nina-louisa.remuss@espi.or.at ●

1. This article strongly draws on the findings of Remuss, Nina-Louisa. 'Space Applications as a Supporting Tool for Counter Piracy – Outline for a European Approach.' ESPI Report 29. Vienna: ESPI. 2010. For a copy of the full report download it directly from the institute's website: www.espi.or.at.
2. Chalk, Peter. 'The Maritime Dimension of International Security – Terrorism, Piracy and Challenges for the United States'. Pittsburgh: RAND Corporation, 2008. Xi.
3. Koppe, Rüdiger. 'Industrial Approaches to Piracy – Securing Maritime Transportation from Piracy.' Presentation. Space and Maritime Security – Strategies and Capabilities to Counter Piracy. Wirtschaftskammer Österreich, Vienna, Austria. 30 November 2009.
4. In RADARSAT ScanSAR Narrow B images (50 m resolution).
5. In RADARSAT Standard images (25 m resolution).
6. It is due to the higher resolution of 25 m in the Standard images, compared to the 50 m in the ScanSAR images that resulted in a better performance. In detail this means, for the ScanSAR measurements, the ratio target size/image resolution = 45 m/50 m = 0.9 while for the Standard measurements, target size/image resolution = 35 m/25 m = 1.4, which led to the small improvement from 80 % to 90 %. For more information on detectability cf. Harm Greidanus, and Naouma Kourti. 'Findings of the Declimes Project – Detection and Classification of Marine Traffic from Space.' Proceedings of SEASAR 2006, 23–26 January 2006, Frascati, Italy, ESA 14 Feb. 2011.
7. Joint Research Centre. 'Maritime Surveillance ConTraffic: Monitoring Container Traffic.' Joint Research Centre, 2008. Available from <http://ipsc.jrc.ec.europa.eu/showdoc.php?doc=promotional_material/JRC42970_contraffic_leaflet.pdf&mime=application/pdf>.
8. Recommend the dedicated maritime surveillance mission be composed of: radar and optical satellites: (1) high resolution radar satellite (continuity with ERS and ENVISAT class radars); (2) an optical imaging satellite at two spatial resolutions: (a) high resolution for local and regional operational monitoring applications (continuity of SPOT and Landsat class) and (b) medium resolution for global applications (continuity of ENVISAT).
9. For more information on how to make European space assets more reactive refer to Remuss, Nina-Louisa. 'Responsive Space for Europe – Elements for a Roadmap for Europe based on a comparative analysis with the U.S. Operational Responsive Space Concept.' ESPI Report 22. Vienna: European Space Policy Institute, 2010. < http://www.espi.or.at/index.php?option=com_content&task=view&id=469&Itemid=1>.
10. cf. Remuss, Nina-Louisa. 'The Need to Counter Space Terrorism – A European Perspective.' ESPI Perspectives 17. Vienna: ESPI.
11. Ibid.
12. COM(2010) 584 final.

Nina-Louisa Remuss

is Associate Fellow of the European Space Policy Institute (ESPI), Vienna, Austria. She recently published a study on space applications in the fight against piracy. Since July 2008 she has been contributing to ESPI's Research Programme, Space and Security. She has co-authored a study on Europe's role in the peaceful-uses of outer space, and led a study and a related workshop on the contribution of space applications to homeland security. She also published a short policy paper on the vulnerability of space assets in the context of terrorist intended harmful interferences. She holds a Master's Degree in International Security Studies from the University of St. Andrews (United Kingdom).

© Photo by: Shirley Karnowski

The Hindenburg explodes at Lakehurst, New Jersey in 1936.

Military History – Handle with Care (Part 2)

By Wing Commander Anthony Stansby, GBR AF, JAPCC

"Our deeper hope from experience is that it should make us, not shrewder (for next time), but wiser (for ever)."[1]

In the last edition of the JAPCC Journal, I took a deliberately critical look at the pitfalls which await the unwary student of military history. In particular, I drew attention to the risks of viewing history as an unimpeachable source of evidence to prove linkages between cause and effect from which lessons can be drawn to determine future actions. Such an approach tries to confer on history the characteristics of scientific experimentation when it should be all too obvious that the number of uncontrollable variables renders such an approach quite inappropriate. However, if we are prepared to limit our expectations and accept history simply as a record of past events (albeit incomplete and error-strewn) then there is much to commend its study. Such an attempt to consider where the benefits lie and to redress the balance from the previous Journal is the aim of this article.

History as an Element of Context

Perhaps the least contentious and most important benefit of history is in providing an element of context within which to place the military operations that we are called upon to undertake. Colin Gray could not be clearer: *"The historical context must guide the application of airpower."*[2] At the time of writing, NATO's Doctrine for Operational Planning (AJP-5) remains in Study Draft format, some way from ratification. Nevertheless, the latest version touches only lightly on history as a factor for consideration when analysing a crisis.[3] By way of contrast, the UK's Joint Doctrine Publication on Campaign Planning suggests that the following aspects should be assessed:

- *"Significant events and relationships, perceived by one or more parties as fundamental to their identity or as pivotal moments in their history.*
- *Re-alignment of borders and boundaries, both formal and informal, that may have contributed to tensions or previous conflicts.*
- *Recent events that initiated the current crisis."*[4]

In most cases the military planner is unlikely to have either the detailed background knowledge to undertake an analysis of the first two factors or the time to conduct the necessary research. Here the ability to draw on support from academia may prove crucial, but the planner needs sufficient acumen both to ensure that the right questions are asked and to appreciate the limitations of the data provided. Historical facts are rarely the 'gospel truth'. The third area presents an altogether different challenge. While the data required may be more readily available, those conducting the analysis must beware the temptation to focus on this aspect at the expense of the broader historical perspective simply because the information comes easily to hand. One's own familiarity with the recent past may also hinder the need to view events from the perspective of others. As the USJFCOM Joint Futures Group writes: *"Individuals invariably remain the prisoners of their cultural and historical frame of reference, which makes the ability to understand, still less to predict, the actions of other states and other leaders difficult."*[5] But this is another area where familiarity with the discipline of history may prove beneficial. The very act of historical enquiry demands that events are viewed from the perspective of those who were involved. Their culture may be familiar or entirely alien to us but in either case we must discard our own prejudices and values for those of an earlier age. Experience with such an approach can only help when it comes to considering a current crisis through the eyes of our allies and enemies alike. As Williamson Murray and Richard Hart Sinnreich acknowledge in their introduction, *"History … demolishes preferred theories. It often forces leaders to recognize unpalatable truths. Perhaps most important, it compels them to think dispassionately about potential opponents."*[6]

© U.S. Army/Pfc. Joshua Kruger

Pakistanis unload relief supplies from a CH-47 Chinook helicopter in Pakistan, October 2010.

A Healthy Scepticism

Those same prejudices and values can also be brought into sharp relief when viewed from a historical context. *"Slavery once had its defenders. Think of the arguments over the position of the earth and the sun, of the conviction, apparently supported by science, that so many Victorians had that there were superior and inferior races …"*[7] NATO's new Strategic Concept[8] lists the values of: individual liberty; democracy; human rights; and the rule of law. Will all of these stand the ultimate test of time or are they simply a set of principles that happen to suit the Western World at this particular point in our cultural evolution? An appreciation

of history helps to ensure a healthy scepticism about the enduring nature of our present morality and values, making us question more critically the siren voices that call for their defence (or imposition on others) by force of arms. Closer to home, the history of Air Power, although shorter than our sister Services, still provides many examples of concepts that have come in and out of fashion as the strategic landscape has shifted over time, perhaps none more pertinent than the fall and rise in Expeditionary Air Operations. Deployed operations were the 'bread and butter' of early Air Forces whose members would surely have been staggered at the difficulty of shifting back to this mind-set after the end of the Cold War. A similar cycle is evident at the platform level. By way of example, the airship appeared to be fatally wounded by the accidents of the 1930s and modest achievements during the 2nd World War yet has been staging an unexpected comeback over the past decade or so.

The Importance of Shared Histories

A very different perspective on the use of history is provided by those involved in post-stabilisation reconciliation efforts. Perhaps the leading actor in this field is the Institute for Historical Justice and Reconciliation (IHJR). As the IHJR recognises: *"Many ethnic and nationalist conflicts today are rooted in unresolved historical disputes and injustices. These events are frequently misunderstood and manipulated to serve partisan political ends …"*[9] Consequently the IHJR seeks to dispel myths about historical legacies. One of their methods of doing so involves the creation of 'shared histories' that seeks to bring both parties to a common understanding about their mutual past. Particular emphasis is placed on the creation of texts that can be used in education – clearly acknowledging the generational nature of the task. Such an approach has gained considerable momentum in recent years with examples ranging (geographically) from The Joint Polish-German Commission for the Revision of School Textbooks (set up in 1972) to the incorporation of aboriginal perspectives into mainstream Australian education following the Royal Commission into Aboriginal Deaths in Custody which reported in 1991. Indeed, there has been so much activity in this area that UNESCO has created a dedicated guidebook on the topic.[10]

Studying History as a Replacement for Practical Experience?

In terms of the practical use of history, there is a school of thought that recommends the study of military history as a key means of preparing for war during times of peace. The argument goes that, for most of history, military forces play a deterrent role but are not actively engaged in warfighting. Consequently, members of the Armed Forces may have little practical experience of their profession other than that achieved through training and exercises. Supporters of this argument propose that the study of military history can fill in some of the gaps and therefore better prepare the forces for action. For me, this argument strays dangerously close to the broader search for 'cause and effect' lessons from history which I have already discounted. Colin Gray makes a similar point when he warns that the *"theory of strategic airpower should not be wedded to a rigid template, a doctrinal credo, of bombing priorities"*.[11] However, such study may lead to the better appreciation of some generic and more enduring principles such as the friction of war, the role of chance and acknowledgement that military questions rarely offer the luxury of definitively right or wrong solutions. Whether such insights actually rise much above the level of good common sense, I will leave it to the reader to judge.

Target Point

When it comes to understanding conflict, context is everything. The belligerents' history provides one key element of contextual understanding but do we pay enough attention to this aspect of cultural awareness? In today's conflicts, the 'Battle of the Narrative' is critical but success demands that we use historical knowledge to frame our message and rebut distorted versions peddled by our adversaries.

The Battle of the Narrative

One area where history is undoubtedly underemphasised is within the realm of Information Operations or

the Battle of the Narrative. The rallying cry of radical Muslims is often that 'western governments are waging a relentless war against Islam'; are we doing enough to counter this message by drawing on the wide range of recent historical examples where NATO and western governments have actively intervened to support the Muslim population? Examples range from NATO's Operation Deliberate Force in 1995 and subsequent stabilisation activities in Bosnia to regular humanitarian relief efforts such as in the wake of the devastating earthquake in Pakistan in 2005. Not only do such actions draw heavily on the capabilities that only Air Power can provide, in the great majority of cases, they do so by utilising non-kinetic air effects – another key message that deserves wider publicity particularly when our adversaries try to link Air Power to collateral damage. We are unlikely to succeed in this line of operations without the historical knowledge to frame our own messages while refuting attempts by our opponents to employ distortions of the past in their own favour.

"The most important benefit of history is in providing an element of context within which to place the military operations that we are called upon to undertake."

Conclusion

So, to return to the opening quote, can history allow us to gain wisdom by examining the experiences of others? For me, the answer is undoubtedly yes – not as a source of formulaic solutions but rather for an understanding of recurring patterns of strategic behaviour. Liddell Hart provides a classic example: *"History should have taught the statesman that there is no practical halfway house between a peace of complete subjugation and a peace of true moderation. History also shows that the former is apt to involve the victor in endless difficulties, unless it is carried so far as to amount to extermination, which is not practicable. The latter requires a settlement so reasonable that the losers will not only accept it but see the advantages of maintaining it in their own interests."*[12]

I will leave the final word to Professor Sir Michael Howard: *"Like the statesman, the soldier has to steer between the danger of repeating the errors of the past because he is ignorant that they have been made, and the danger of remaining bound by theories deduced from past history although changes in conditions have rendered these theories obsolete."*[13]

Happy studying!

1. B. H. Liddell Hart (quoting Jacob Burckhardt) in: Why don't we learn from history? Foreword.
2. Understanding Airpower – Bonfire of the Fallacies – Colin S Gray, Strategic Studies Quarterly, Winter 2008, page 64.
3. AJP-5 Study Draft 1 para 0421a1: 'Circumstances: history of the conflict, geo-strategic position, physical environment (climate, geography, hydrography and oceanography), national and regional infrastructure.'
4. JDP 5-00 Second Edition, December 2008, para 1A2.
5. The Joint Operating Environment 2010, USJFCOM Joint Futures Group, 18 Feb 10.
6. Williamson Murray and Richard Hart Sinnreich, The Past as Prologue – The Importance of History to the Military Profession, Introduction, page 4.
7. Margaret MacMillan, History – Handle with Care, Oxford Today, Hilary Issue 2010.
8. Strategic Concept for the Defence and Security of the Members of the North Atlantic Treaty Organisation, Lisbon, November 2010.
9. IHRJ Vision, http://www.historyandreconciliation.org/about/mission.php, accessed 24 Nov 10.
10. UNESCO Guidebook on Textbook Research and Textbook Revision, Second Edition, Paris/Braunschweig 2010.
11. Understanding Airpower – Bonfire of the Fallacies – Colin S Gray, Strategic Studies Quarterly, Winter 2008, page 64.
12. B. H. Liddell Hart. Why don't we learn from history? Part III, The Importance of Moderation.
13. Professor Sir Michael Howard. The Use and Abuse of Military History. RUSI Journal 107, February 1962.

Wing Commander Anthony Stansby

started his military career in 1980 as a Seaman Officer with the Royal Navy. After qualifying as a Bridge Watchkeeper, he sub-specialised as a Fighter Controller in 1987 and gained his first operational experience with HMS Gloucester on Armilla Patrol in the Persian Gulf. In 1993 he transferred to the Royal Air Force and has since been deployed to the Falkland Islands (twice) and Iraq. Within the UK he has undertaken a number of operational, command and staff appointments, including as a Master Controller and XO at CRC Boulmer. He is a graduate of St Catherine's College, Oxford with a BA in Metallurgy and Materials Science.

The ISAF Joint Command in Kabul, Afghanistan, is responsible for ensuring space support to ISAF.

Coalition Space Operations

Improving Space Support to ISAF

By Lieutenant Colonel Tom Single, USA AF, USAF Space Command

ISAF has three main mission areas: security, reconstruction and development, and governance. Space assets aid all three ISAF mission areas, but not to their full potential. Besides combat operations, space-based products are used for flood and drought predictions, civil planning and agriculture, counter-drug operations, and counter-smuggling operations. Furthermore, minerals and resources can be located and managed with satellite imagery. Even more can be done, however, the user must first be educated on the capabilities available.

Of the 28 NATO nations, 15 have space capabilities, with more than 30 ISR satellites on orbit from European nations alone. This is in addition to available commercial space products. Deep, persistent and operationally relevant coverage can be achieved by synthetic aperture radar, optical and infrared systems. Despite being technically feasible, as of this writing (February 2011) multinational space capabilities have not been integrated or synchronised into coalition operations. If integration and synchronisation were achieved, the capabilities would astound operational commanders.

Organising Space Forces in ISAF

The ISAF Joint Command (IJC) is responsible for space in the ISAF joint command structure. The U.S. began providing a space Liaison Officer (LO) to ISAF HQ in early 2007, and since then the position has moved to the IJC and become the Chief of ISAF Space Operations. This is ISAF's senior space position and marks the first time a NATO operation has had a senior space

A Satellite Communications Station in Regional Command West.

officer as part of its force structure. The mission of this senior space position is to integrate and synchronise space effects for ISAF operations, which includes: advising ISAF leaders on space issues; ensuring optimal use of NATO and coalition space capabilities; and responsibility for C2 of assigned space forces in the ISAF Area Of Operations (AOO). At the Joint level, this position can perform force management, establish requirements, provide guidance and reach-back support for Regional Commands (RCs), and prioritise and de-conflict space requirements between the RCs. Supporting this position is the ISAF Senior Space Planner who provides planning and integration expertise. All joint task force components, or in the case of ISAF, the RCs, require space support and someone responsible for space in their AOO. While this C2 structure is fairly normalised for air, land and sea forces, there is little understanding or awareness of space capabilities by most coalition forces.

Determining ISAF's Space Requirements

As the Chief of ISAF Space Operations at IJC[1], it was necessary to analyse the mission and determine how space could better support COMISAF's objectives. To do this I travelled to each RC and met with intelligence, planning and operations personnel from the task force to joint headquarters level. Additionally I received feedback from collection managers in the intelligence fusion centers. It became clear that there were operational requirements going unfilled due to a lack of assets or capability type. In many instances, if the full space capabilities of NATO nations were brought to bear, many of those needs would have been met.

While there was significant space support to operations in Afghanistan already, there was also much to improve upon. The ISAF staff needed to be educated on what space capabilities were available and how to integrate them into the operational planning process. Better enabling space-based effects for the counter-IED mission continued to be a top priority. Space C2 and support relationships needed to be matured, and in some cases, established. Strategic partnerships and reach-back support needed to be developed. To support the reconstruction and governance missions, civil use of space had to be expanded. While the level of threat from ballistic missiles can be argued, a force protection alerting system was needed along with improvement of the current system. Additionally, force management and training of space personnel assigned to ISAF had to be addressed. These areas and more continue to be developed.

The most important issue which needed to be addressed was the requirement for space-based capabilities. The existing Commander's Critical Information Requirements (CCIRs) and Friendly Force Information (FFI) requirements did not address space. Every commander determines their need for information and intelligence, and this should include information requirements for space. Operationally relevant information to make decisions about space might include: changes to friendly force space capabilities and systems; changes to enemy space capabilities and systems; and changes to commercial services that are being used for operations. Space events likely to impact operations or cause media attention should also be reported, as well as changes in threats or vulnerabilities.

How Many Satellites Are Needed Overhead?

Commanders and warfighters need actionable intelligence and information. The source of the information is irrelevant to the soldier in the field. There are many good examples of fused intelligence sent directly to the field, but the process of including space-based information into fused intelligence is minimal. Integrating space-based information into fused intelligence is useful for military operations as well as crisis management, reconstruction and governance development. It requires the producers of the information to find a way to present the relevant information in a new way. However, due to the lack of operational requests for space capabilities, and sensitivities in NATO to address space issues, ISAF (and NATO) forces are plagued by challenges to request, process, task, conduct data management of, exploit, and disseminate space-based information and intelligence. Security classification and releasability concerns have also limited space support to the warfighter. Technology does not seem to be the main obstacle, it is the strength of will required by the coalition nations to address these issues.

Once space capabilities are assigned, integration is an issue that can be solved by military professionals at the operational level. Military planners can determine what space CCIRs and FFI requirements are needed, and determine how space can support operations. Planners will ask and answer several questions before using any ISR asset. For example, what products, information, or effect is needed? If assets in theatre aren't available, is space an option (or the best option)? How will it be requested? Who collects and disseminates the information? Over what means will the information be disseminated? What are the timelines and planning factors? Who will use the information and how will it be used? How will feedback be provided? What will the classification be?

The IJC approached the capability question by first addressing ISAF's requirements for space capabilities. Once the information requirements were established, the capability requirements could be developed. An Overhead (satellite) ISR Capabilities Requirements letter was generated which defined the space ISR capabilities required according to mission area and included such things as revisit rate and resolution requirements. This required analysis of ISR requirements, current and planned ISR capabilities, and determining what (if any) shortfalls could be met by space-based assets. ISAF is now better-able to integrate national, commercial and civil space capabilities, but the optimal balance of capabilities has yet to be developed. A critical area to be addressed in the future is the tasking, processing, exploitation and dissemination process. However, existing intelligence channels and procedures should be adequate to be used by space ISR capabilities.

Target Point

Space capabilities are neither integrated nor synchronised in ISAF. To achieve this the coalition must determine what effects are needed, how space assets could be utilised, develop information requirements for space situational awareness, and then integrate the many available multi-national systems.

In addition to the tasks mentioned above, another important area to address is to assure the space services and effects vital to operations. In current coalition operations, there is very little situational awareness of what's going on in space, how coalition forces are dependent on and vulnerable to disruption, or what the threats are to space systems. Coalition forces need to understand the potential impacts of loss and

develop mitigation options. As an example, satellite links are used by remotely piloted aircraft as well as most C2 systems; therefore, ISAF will need to determine what links are important to protect. Because there are threats to space systems, in early 2010 the IJC began to develop a prioritised defended space asset list.

As a final note on areas for improvement, space activities should be integrated throughout the ISAF Operations Plan and it should also include a separate space annex.

Are Coalition Space Operations Possible?

Coalition space operations require an international effort of sharing, cooperation and partnership. Space is a critical joint enabler and supports all of the components and mission areas. Space support to NATO operations, and in particular ISAF, can be greatly improved. Space systems enable decision making, C2, support to the warfighter, and are vital to international stability. Satellites are 'global assets', as they travel through areas of interest over many nations. They can be used during all phases of a crisis. No one nation can provide all of the required capabilities; therefore, it will require a coalition of the willing to provide the desired effects. Many space systems are dual-use, meaning they can be used for civil as well as military applications. Another large set of space assets providing military utility are operated by international consortiums, primarily for economic reasons. These attributes mean space requires a comprehensive approach. Commanders must be prepared to compete with multiple nations and organisations to get the services they require. The bottom line is that space is complex, coalition operations are complex and there are no easy solutions. A culture of mutual understanding and cooperation to address space issues must be developed.

There are some areas NATO and ISAF should address today. There isn't a common operating picture for space assets, nor is there adequate oversight of the mission area. Senior leaders must become better informed on key space security issues. Lessons from ISAF operations need to be captured and fed back into training and education. NATO and the Nations need to develop a small cadre of personnel that can integrate space capabilities. Integrating space personnel into exercises is an important step to providing trained personnel for combat operations. There are existing processes in place; but space must be included and not just talked about.

Are coalition space operations possible? Yes. It's not a technical issue or lack of available capabilities. There are significant space capabilities available to ISAF from the nations and from the commercial marketplace. The challenge is to integrate these capabilities. The lack of a NATO Space Policy and Space Strategy will continue to hamper progress to better use space and integrate it into ISAF operations. NATO has not yet realised the full implications of space and until the Nations accept that they must discuss these challenges, ISAF will continue to operate at risk and deny our commanders and warfighters the space capabilities they need. ●

1. Starting in the winter of 2007, the U.S. Air Force provided a Space Liaison Officer, and later a Space Planner to HQ ISAF as a Voluntary National Contribution. Later these positions were made part of the ISAF Crisis Employment manning structure. With the creation of the IJC in 2009, the scope and responsibilities of the position changed, and the title of the position was changed to Chief, ISAF Space Operations.

Lieutenant Colonel Tom Single

currently serves at the HQ Air Force Space Command Space Protection Program as the Chief of the Strategy Division. His operational experience includes ICBM, Space, and Air and Space operations centre weapon systems. In his previous posting, he served at the JAPCC and deployed to the ISAF Joint Command in Kabul as the Chief of Space Operations. He has participated in Joint and combined operations and exercises in the U.S. Central Command, U.S. European Command, and U.S. Pacific Command and has served in an array of Space officer capacities. An internationally recognised expert, Lt Col Single has served as an invited guest speaker at numerous international events and has authored several articles on NATO and coalition Space operations.

Struggling to Meet Demand

The Need for European Airlift

By Major Roger Efraimsen, USA AF, JAPCC

European strategic (inter-theatre) airlift is becoming ever more vital in today's changing global security environment. The requirements of modern military forces, combined with increasing NATO, EU, and UN expeditionary operations and peace support operations, put strategic airlift resources in high demand. EU Battlegroup and NATO Response Force (NRF) commitments further increase strategic airlift requirements. The problem is that current European airlift capability struggles to meet these demands. Several potential solutions to this problem are in various stages of development, to include national acquisition, multinational coordination, pooling of resources and leasing of aircraft. The aim of this article is to summarise the major complementary efforts and provide a few suggestions for the way ahead.

Purpose of Airlift

Airlift, an integral element of air power, enables the global, regional and local movement of personnel and materiel, both military and civilian, across the entire spectrum of operations. With acknowledged limitations in payload compared with sealift, it is a fast and versatile way to deploy, sustain and redeploy forces. In fact, quick and decisive responses

© U.S. Air Force

Thirteen C-17 Globemaster III aircraft fly over the Blue Ridge Mountains in Virginia during low level tactical training.

can defuse crises before they escalate, deter aggression and in some cases defeat an enemy before he can solidify his gains. Whether participating in humanitarian operations or full scale combat, airlift is necessary to project military power.

C-17 Strategic Airlift Capability (SAC)

Though still maturing, the C-17 SAC programme's multinational operational unit, the Heavy Airlift Wing (HAW) based at Pápa Airbase (AB), Hungary has already logged over 3,000 flight hours as of December 2010 in the three Boeing C-17 aircraft it has operated since taking first delivery in July 2009.[1] It is a successful multinational effort that has helped 12 member nations[2] meet, at least partially, their strategic airlift needs. NATO policy makes individual nations ultimately responsible for the deployment of their forces to and from an area of operation[3] and, in the end, the nation's define their own airlift requirements, be they national, NATO, EU, UN, or other. Through this pooled arrangement, small nations are better able to afford a strategic capability to participate in out-of-area operations. As the HAW reaches Full Operational Capability (expected in late 2011 or early 2012) and with extensive infrastructure improvements to Pápa AB to make it a true airlift hub, it could be ideal for expansion both in terms of nations and aircraft. The addition of more C-17s and/or other air mobility aircraft (for example, the A400M, C-130J, or even air-to-air refueling tankers such as the KC-767 or A330 MRTT) would further increase a much-needed capability for NATO, EU, UN and national requirements. Though SAC expansion would be a huge challenge politically, economically, and logistically, it is one that may be overcome in the long term. The unique organisational setup of the C-17 SAC programme has proven itself and now represents a model multinational solution for both strategic and tactical (intra-theater) airlift capability.

Strategic Airlift Interim Solution (SALIS)

The other major parallel solution to the shortage of strategic airlift is the SALIS initiative. In all, 16 nations[4] participate in this initiative (including five A400M nations). Originally created as a temporary solution, as the name implies, the 2,000 hour per year SALIS contract, which guarantees access to six Antonov An-124-100's, has arguably proven to be a cost effective, dependable capability and a possible long-term solution for many smaller nations outside the core A400M consortium. The contract has been extended through the end of 2011[5] with the option to renew for 2012. With approximately twice the load carrying capability of the C-17, the An-124 assured access SALIS contract is a vital one for NATO and should continue to be renewed to meet European airlift demands for the foreseeable future.

Airbus A400M

The A400M will undoubtedly increase both strategic and tactical airlift capability for the seven participating NATO nations[6] once it is brought into service. But with first delivery not planned until the first quarter of 2013[7], it will take many years before it is available in

sufficient numbers to help meet national airlift obligations. The A400M project, at least three years behind schedule and billions of euros over budget, has seen its NATO customer orders reduced from the original 212 aircraft to the current 170 orders.[8] Additionally, Germany recently announced that it would take delivery of only 40 of the 53 planes it has ordered and sell the surplus aircraft.[9]

This recent setback, however, could be an opportunity for other NATO nations to join the consortium and purchase the excess A400M orders. With the optional hose and drogue tanker kit, these nations could also acquire an air-to-air refueling capability at the same time. Another unique cost-saving solution could be for a group of nations to partner together to purchase the excess A400Ms and either form a new multinational A400M unit or perhaps join the current C-17 SAC program. Four of the five European Air Transport Command (EATC) member nations have orders for the A400M and have announced they will form a multinational A400M unit, which could also be a model for other interested nations to follow or join. Cooperation on in-service support of the A400M is already underway, which will help reduce long term costs. Collaboration by all nations involved would certainly help to make such an idea a reality.

Allied Movement Coordination Centre (AMCC)

For a long time the AMCC, part of the Supreme Headquarters Allied Powers Europe (SHAPE), the headquartes of NATO's Allied Command for Operations (ACO), was the sole movement coordination entity within NATO. Its task is to initiate, plan, prioritise, coordinate and deconflict strategic movements, including deployments, transportation for sustainment and redeployments. Of these, the most prominent AMCC task focuses on the deconfliction and prioritisation of strategic movements into and out of a theatre of operation in order to satisfy the commander's required date and order of arrival of units and their equipment. Though the AMCC has considerable experience and knowledge managing multinational efforts in support of NATO operations, their focus is primarily on effectiveness rather than efficiency.

Target Point

Despite several successful solutions, a shortage of European strategic airlift capability persists. A400M delays and reductions in orders due to budgetary pressures further impact Europe's ability to meet future demands. Continued investment into strategic airlift capability must be placed high on the national priorities of European nations if they are to fulfil their ambition to be credible security actors.

Movement Coordination Centre Europe (MCCE)

The MCCE, located in Eindhoven Air Base, Netherlands, has grown since its creation in 2007 and now comprises 25[10] member nations that have agreed to coordinate and optimise the use of air, sea and road transport and air-to-air refueling capabilities, thereby improving their overall efficiency and effectiveness. At minimum cost these services are being provided to its participants, while also supporting NATO and EU operations. To enable a flexible and non-bureaucratic exchange of flying hours, those MCCE members that deal with airlift and air-to-air refueling can apply the Air Transport and AAR Exchange Services (ATARES) Technical Arrangement[11], thereby avoiding any financial payments.

An AN-124 long-range heavy transport aircraft takes off from Moffett Federal Airfield, California.


© Italian Air Force

The MCCE's flexibility has proven very successful in enhancing operational movements, resulting in millions of euros being saved for its many participating nations. Its effectiveness, however, can be limited by the provision of information to the MCCE by its participating nations, which is entirely voluntarily and therefore not always complete. The introduction of the C-17 SAC/HAW and the EATC has introduced other levels of complexity to the effectiveness of the MCCE, but cooperation is ongoing. An eventual merger with the newly-established EATC is a distinct possibility since the EATC represents about 50% of MCCE's historic Air Transport (AT) coordination effort.[12] Despite the many challenges, this would be the next logical step in improving long-term European airlift pooling, coordination and command. For the time being, however, the MCCE has a proven track record and is an important multi-modal coordination centre.

European Air Transport Command (EATC)

The EATC, also located in Eindhoven, represents an unprecedented level of European defence cooperation where the member nations[13] have agreed to transfer parts of their national authority over most of their AT and air-to-air refueling aircraft (approximately 170 aircraft in all) to a single, unified, multinational command structure. In November 2010 alone the EATC received 1,100 AT requests from which 593 missions were planned and tasked.[14] The bundling of capabilities has led to more efficient use of existing capacity, which is especially important in today's fiscally constrained environment.

For the MCCE, the EATC represents one airlift planning entity, embodying all AT and air-to-air refueling requests and the capabilities of the five nations. EATC activities "will cover all aspects, from planning to mission execution, as well as ensuring more efficient ways in force generation, including training and exercises and flight safety".[15] The EATC represents a model organisation that is already setting the standard for Airlift in Europe, which will undoubtedly lead to future expansion.

European Air Transport Fleet (EATF)

The European Defence Agency's EATF was formed as a Project Team (PT) in Feb 2008 to study viable models for a European AT fleet, which was initially based upon the A400M but has since expanded to include other airframes. The main objective of the EATF (which includes 15 member states[16]) is to "improve the airlift provision within the EU" and to "develop solutions to better use military airlift assets to meet national, EU, NATO and other frameworks requirements". The EATF uses various workstrands and ad hoc working groups to study areas such as training, pooled operations, future AT solutions and harmonised rules, regulations and documents. The EATF outsources major studies to help the EATF conduct their business and to provide them with a starting point for further work.

One of those studies, called the Landscaping Study, was completed in Oct 2010. The Landscaping Study achieved its aim of providing a complete picture of the military transport system in Europe and is the latest, most comprehensive study to capture the 'landscape' of both fixed wing and rotary wing transport aircraft in Europe in 2010. It accurately describes a complex picture of the various AT assets, their operating environments, roles and functions, interactions of the organisations and nations involved, various information systems involved and the myriad rules and regulations that encompass it all. Not surprisingly the Landscaping Study confirmed that, until

widespread introduction of the A400M, there is currently a distinct shortage of strategic AT within the EU.[17] The PT at EATF is currently analysing the specific recommendations it made to determine their future work. The Long Term (2020) vision for the EATF is a networked fleet of multinational transport units and pooled acquisition of transport aircraft. With continued partner member support and active NATO involvement, the EATF can be the framework that is needed to bring focus to all the AT initiatives, projects and ideas.

Summary

Strategic airlift is absolutely vital to sustain ongoing expeditionary operations and to enable the peace support operations taken on by many European nations today. The shortage of European strategic airlift assets is not a new problem, and during the past decade it has been identified as a critical capability that must be addressed.[18] The stand-up of the C-17 SAC-HAW and the continuation of the SALIS contract are two solutions that have partially met this shortfall. The eventual introduction of the A400M will help narrow the gap further. The MCCE coordination centre and the unprecedented stand-up of the EATC unified command are helping utilise existing assets more efficiently. The EATC in particular is a huge step forward for European airlift collaboration and cost saving and is a model organisation that will undoubtedly grow in the future or be duplicated elsewhere. Despite these complementary efforts, however, even more must be done. Continued investment into strategic airlift capability must be placed high on the national priorities of European nations if they are to fulfill their ambition to be credible security actors. Regarding the A400M, launch nations must remain committed to their orders and avoid any further cuts in deliveries. At the same time, any surplus A400M orders represent a unique opportunity for smaller nations to acquire, individually or jointly, and to operate a new strategic and tactical capability. Despite financial and political obstacles, nations must not forget that strategic airlift represents a vital national asset and a diplomatic and military instrument of power. ●

1. http://www.heavyairliftwing.org/news.
2. C-17 SAC/HAW nations: Bulgaria, Estonia, Finland, Hungary, Lithuania, the Netherlands, Norway, Poland, Romania, Slovenia, Sweden, and the United States.
3. According to AJP 4.4 deploy, sustain and redeploy forces is a National responsibility.
4. SALIS nations: Belgium, the Czech Republic, Finland, France, Germany, Greece, Hungary, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Sweden, and the United Kingdom. (Canada and Denmark withdrew at the end of 2010).
5. NAMSA, 2011.
6. A400M nations: Belgium (7), France (50), Germany (53, but will sell 13 leaving 40), Luxembourg (1), Spain (27), Turkey (10), and the United Kingdom (22). (South Africa order for 8 cancelled in 2009; Malaysia has ordered 4 aircraft.)
7. http://www.defensenews.com/story.php?i=5449578.
8. http://en.wikipedia.org/wiki/Airbus_A400M.
9. http://www.defencetalk.com/germany-to-cut-a400m-transport-planes-31665/.
10. MCCE nations: Austria, Belgium, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Latvia, Luxembourg, The Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Spain, Sweden, Turkey, the United Kingdom and the United States (Lithuania showed interest).
11. The ATARES Technical Arrangement provides a compensation system to achieve a balance of exchanged services in such a way as to avoid compensatory financial payments. It enables the exchange of flying hours, based on the C130 Flying Hour as an agreed equivalent value unit of exchange. Currently 13 nations participate: Belgium, Denmark, Estonia, France, Germany, Hungary, Italy, the Netherlands, Norway, Poland, Spain, Sweden, the United Kingdom. (Turkey, Slovenia, Finland are in the process of signing ATARES agreement).
12. MCCE briefing, 26 Jan 2011 taken from: https://www.mcce-mil.com/default.asp?Level1ID=1.
13. EATC nations: Belgium, France, Germany, the Netherlands and Luxembourg (Spain is an observer); EATC was formally stood up on 1 Sep 2010.
14. EATC, 2010.
15. EATC, 2010.
16. EATF members: Belgium, Czech Republic, Finland, France, Germany, Greece, Italy, Luxembourg, the Netherlands, Poland, Portugal, Romania, Slovakia, Spain and Sweden.
17. European Defence Agency, Landscaping Study for the European Air Transport Fleet Initiative – Final Report (by Marshall Solutions), EDA 09-CAP-022, 15 October 2010.
18. Examples are the various NATO Summits where NATO launched multiple initiatives, many of them concentrating on enhancing the deployability and mobility of forces. Also the EU launched comparable initiatives like the European Headline Goal and the Air Rapid Response Concept.

Major Roger Efraimsen

is a member of the JAPCC Combat Support Branch. He is a senior pilot with over 4,000 total flying hours in the C-17A. He is an experienced instructor and evaluator airdrop pilot who has flown extensively for Operations ENDURING and IRAQI FREEDOM. He has a BS in Aeronautical Engineering and Masters Degree in Aeronautical Science. In his previous assignment at Altus AFB, Oklahoma he served as the C-17 Wing Flight Safety Officer and later as an Assistant Director of Operations at the 58th Airlift Squadron, the only C-17 Formal Training Unit worldwide. He arrived in Kalkar in April 2010 and serves as the JAPCC subject matter expert on airlift.

TanDEM-X: A New Era of Global Accuracy

By Diplom Ingenieur, Lieutenant Colonel (Retired) Wolfgang Duerr,
Vice President Security & Defence Germany, Astrium GmbH

Spatial GEO Information is Vital to Tackle Global Security Challenges

Space-based Earth observation, providing reconnaissance data of any place in the world at any time and without any territorial restrictions, is of strategic relevance for national security and defence. A variety of space-based sensors, both military and commercial, provide geospatial information data vital for decision makers to face current global security challenges. Military operations, like ISAF in Afghanistan, require both strategic reconnaissance data as well as sufficient data for the joint operations targeting cycle (find, fix, track, target, engage and assess). Data is provided by a mix of sensors and platforms at the Strategic, Operational and Tactical levels in order to satisfy users´ needs of information meeting the required accuracy, resolution and timeliness. In addition to purely military-owned capabilities, commercial GEO-information services have become of increasing interest for intelligence and monitoring tasks. Capabilities of commercial Earth observation spacecraft and satellite constellations are continuously improving and nowadays satisfy global reconnaissance needs. This includes short development cycles and innovative financing models.

Germany´s SAR Capability is on the Leading Edge in the World

Over the last decades Germany has established a globally unique Synthetic Aperture Radar (SAR) technology line, supported by the national high-tech

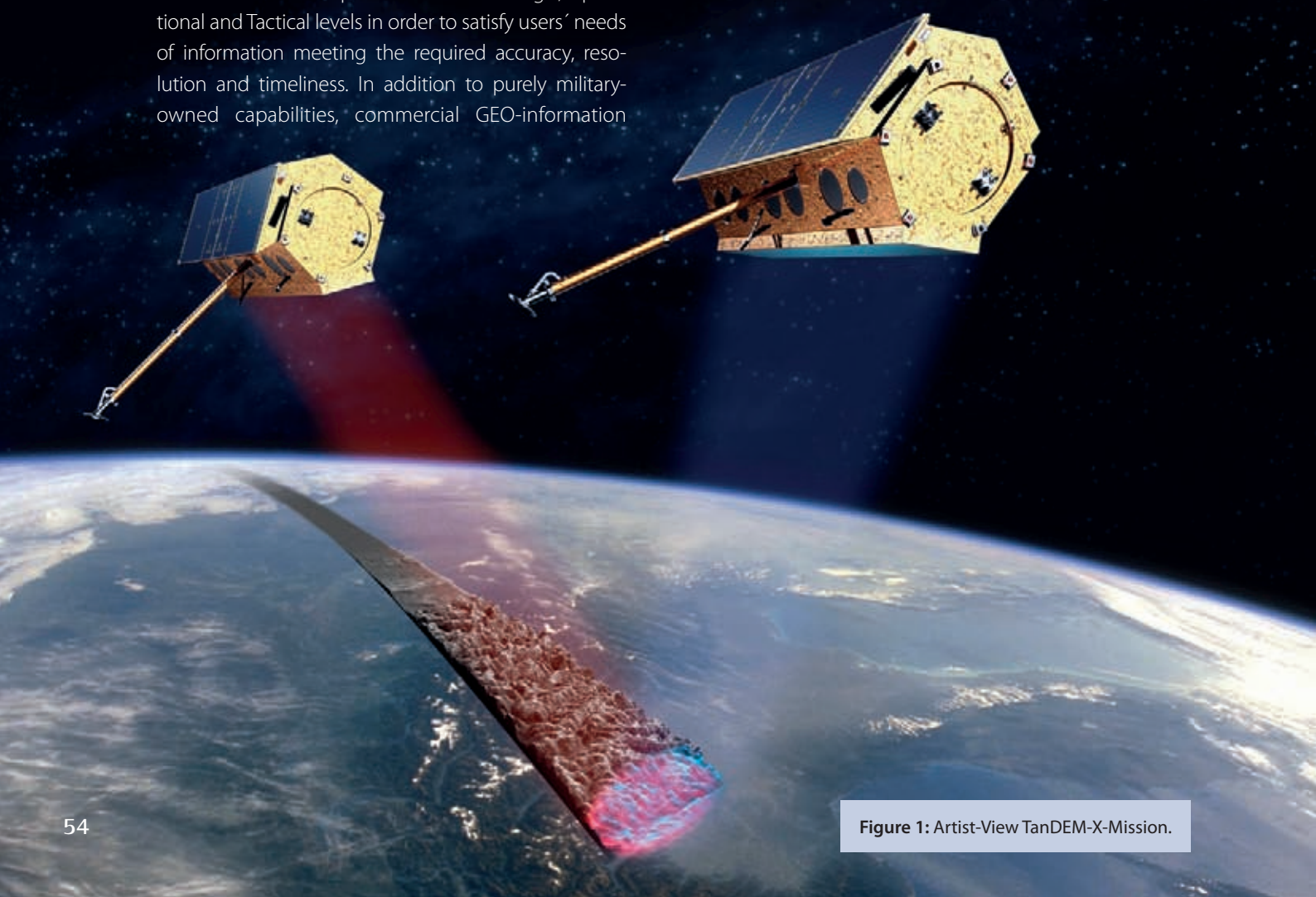


Figure 1: Artist-View TanDEM-X-Mission.

strategy, and developed by Astrium GmbH in Friedrichshafen in close cooperation with the German Aerospace Center (DLR). The most recent member of this SAR family is the TanDEM-X mission, which consists of two satellites, TerraSAR-X and TanDEM-X, both developed in Public Private Partnerships (PPP) between DLR and Astrium GmbH (see figure 1). The TerraSAR-X satellite was launched in June 2007 and commercial services, conducted by Infoterra GmbH (the German part of Astrium's GEO-Information Services Division), started in January 2008. An X-band SAR sensor provides a spatial resolution of 1 m or better, while image data distribution is in compliance with German Law, the so-called Satellite Data Security Law ('SatDSiG').[1] TerraSAR-X offers weather independent, extremely reliable and precise image acquisitions, as well as elevation measurements, change detection and surface motion monitoring capabilities. In 2009,

"Satellites now fly in close formation with each other at distances of only a few hundred meters, allowing stereoscopic views."

the U.S. National Geospatial-Intelligence Agency (NGA) confirmed the outstanding geo-location accuracy of the data.[2] Direct reception services can be implemented for customers around the globe. Currently ground stations in Germany, Japan and in the U.S. (including the mobile Eagle Vision System) receive TerraSAR-X data.

Almost identical to TerraSAR-X, TanDEM-X (**T**erraSAR-X **a**dd-o**n** for **D**igital **E**levation **M**easurement) was successfully launched in June 2010 and marked the beginning of a new era of global digital elevation data provision. Both satellites now fly in close formation with each other at distances of only a few hundred meters, allowing stereoscopic views. This unique satellite formation will permit collection of interferometric data pairs over the Earth, required to establish a globally homogeneous Digital Elevation Model (DEM). Multiple coverages and a sophisticated editing workflow will eventually ensure an almost void-free and reliable elevation model. Delivery of regional DEMs will start by 2013 with full global coverage available from 2014 onwards. During the three years of DEM data collection the formation will remain available for regular radar imaging thanks to an optimised acquisition plan. Key features of this DEM are its relative vertical accuracy of better than 2 m within a horizontal raster of ~12 x 12 square meters, covering the entire land surface of the Earth (150 Million km^2).

Unclassified Satellite Data for Reconnaissance Observations

SAR is unique in that it allows observation of the Earth from Space in all weather conditions, day and night. In addition to the pure SAR imagery, SAR data contains phase information that can be used to detect subtle changes below the spatial resolution of the SAR sensor (called 'Coherence Change Detection' – CCD), as well as intensity information within the range of the spatial resolution (called 'Amplitude Change Detection' – ACD). It is CCD and ACD data which forms the basis of current change analysis technology, for example, the precise identification and accurate current change information about a remote area of interest. Astrium GEO-Information Services offers such an analysis capability with its web-based change detection platform, 'SPOT monitoring', where the user can take advantage of information derived from multi-source and multi-resolution satellite imagery (see figure 2 a/b). Today, change detection information is

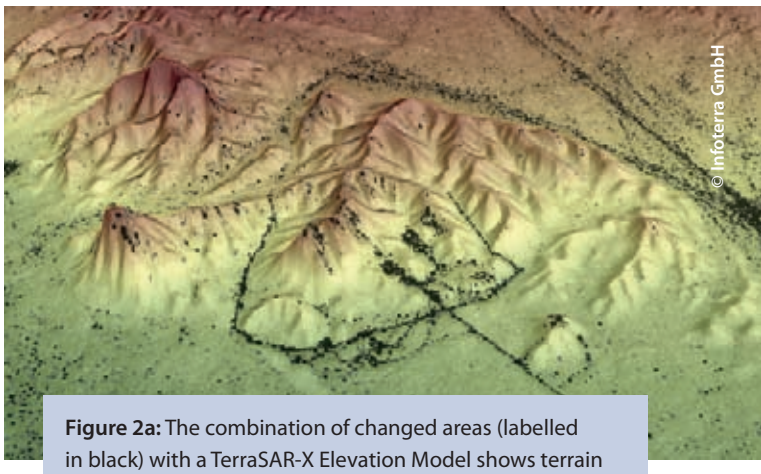


Figure 2a: The combination of changed areas (labelled in black) with a TerraSAR-X Elevation Model shows terrain conditions and recent activities – in this case, traffic towards the entrances of underground facilities located inside the mountain.

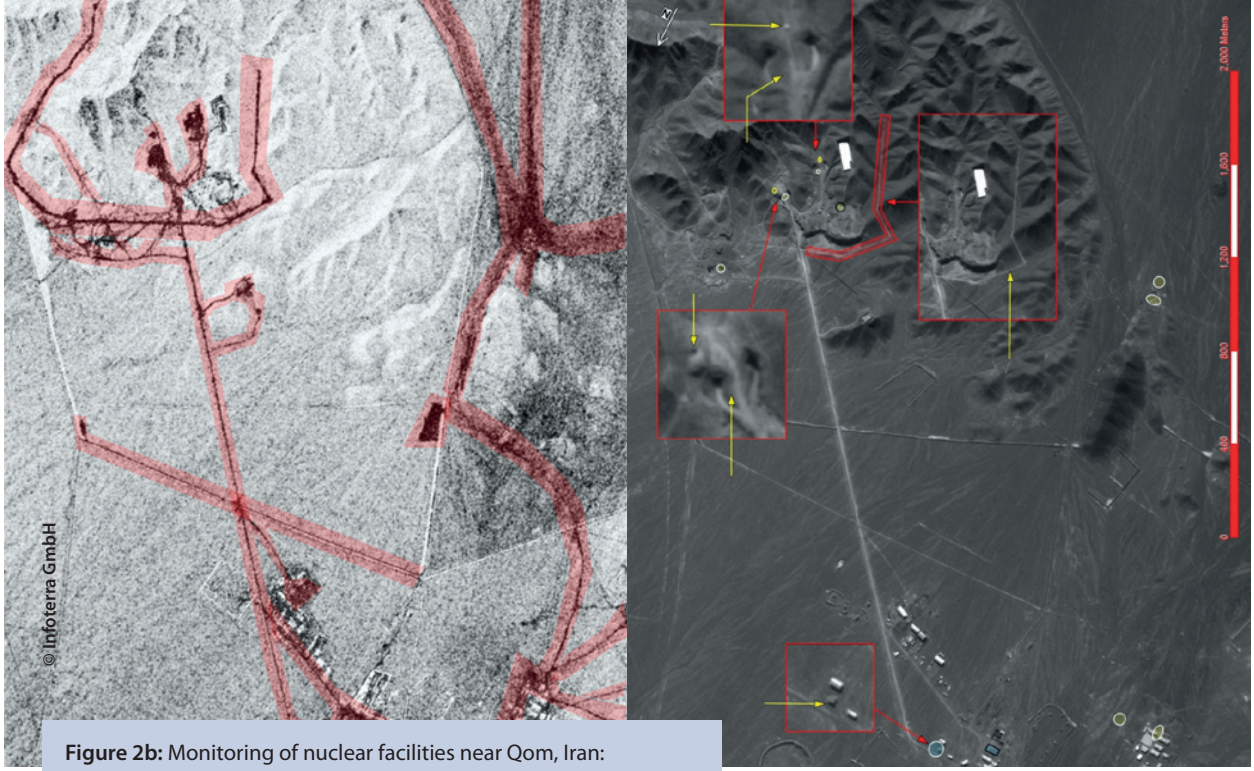


Figure 2b: Monitoring of nuclear facilities near Qom, Iran: TerraSAR-X radar data unveils activities around the site.

being provided to approximately 60 defence and security agencies, large corporations and international organisations. Additionally, GEO-information experts offer individual, site-specific automated change detection based on radar imagery.

Precise elevation data is the initial foundation of any accurate geospatial product, particularly when the integration of multi-source imagery and data is desired. Topographic mapping, communications net-

"TanDEM-X was successfully launched in June 2010 and marked the beginning of a new era of global digital elevation data provision."

work planning, hydrologic modeling, air traffic security and, last but not least, the reliable orthorectification of high-resolution satellite imagery are only examples of the wide range of applications that benefit from precise, reliable elevation data. The addition of elevation models to SAR and optical imagery also allows a deeper insight into the actual terrain conditions of a point of interest, often supporting a sound interpretation of items that may be unclear when viewed in pure 2D imagery.

In addition to monitoring the Earth's surface, innovative methodologies also enable the detection of sub-surface activities. TerraSAR-X radar satellite data is ideally suitable to detect movement of the Earth's surface with sub-centimetre precision. These precise monitoring applications can be utilised in construction site monitoring of, for example, tunnels, subways, or bunkers, for supervising effects of sub-surface mining or underground gas storage. However, such slight disturbances of the surface can also give an indication of an ongoing underground expansion of existing facilities or the excavations of tunnels and caves. The uniquely precise geo-location accuracy of TerraSAR-X data and the derived information assures that the extracted details can easily be integrated into existing monitoring systems. Such radar-based evaluations are significantly enhanced when they are supported by additional satellite data and/or information such as DEMs.

The Evolution of TerraSAR-X – The Next Generation TerraSAR-X-2

With a design lifetime of about 5.5 years and consumables for more than 7 years on orbit, TerraSAR-X Services should remain available until at least 2017, when the second generation is expected to be deployed. The TerraSAR-X-2 system will benefit from

an advanced SAR sensor technology utilising the 600 MHz bandwidth in X-band expected to provide a resolution of 50 cm and better. Commercial distribution of image data will, as for the first generation, be conducted by Astrium GEO Information Services, in strict compliance with the German SatDSiG. TerraSAR-X-2 will support heritage modes and products from the first generation TerraSAR-X as well as enhanced products and services such as full Polarimetric images, wider swaths, very high resolution images and Automatic Identification System information for ship identification. The data dissemination concept of the upcoming radar spacecraft would continue to support previously registered receiving stations. For the second generation of TerraSAR-X, the operational experience of the first missions, valuable customer feedback, as well as a harmonisation in terms of data and ordering standards between the commercial SAR data providers will all be taken into account and will benefit TerraSAR-X Services customers worldwide. The implementation of TerraSAR-X-2 is envisaged to occur within the successful framework of PPP with DLR. Extension options to the first TerraSAR-X-2 satellite include an inclined satellite to facilitate formation flight resulting in height accuracies of better than 1 m, and the buildup of a constellation with the goal of enabling revisits within 10 hours.

Feasibility studies are currently being conducted for the TerraSAR-X-2 program with technology developments running in parallel, and the first satellite launch is envisaged for 2015.

With the most recent and upcoming high resolution radar and optical spatial sensors and missions in Europe, the potential for commercial GEO-Information Services to meet warfighter needs in future operations looks very promising. Very high resolution commercial geospatial products and services meeting requirements across the ISR-value chain will soon become reality, providing a world in 3D with a void-free and reliable elevation model and a relative vertical accuracy of better than 2 m.

Target Point

Summary

The future is promising with many new high resolution radar and optical spatial sensors and missions planned within Europe, such as, TanDEM-X, Pléiades, SPOT 6/7, and TerraSAR-X 2. The new Astrium GEO-Information Services business division will bring together teams and assets of Spot Image and Infoterra, offering a unique one-stop-shop for a portfolio of multi-source and multi-resolution optical and radar satellite imagery. The expertise available across the entire geo-information value chain will benefit the worldwide user community, reliably meeting warfighter needs in operations. NATO can benefit from innovative GEO information services provided by commercial constellations and missions.

1. SatDSiG: 'Gesetz zum Schutz vor Gefaehrdung der Sicherheit der Bundesrepublik Deutschland durch das Verarbeiten von hochwertigen Erdfernerkundungsdaten (Satellitendatensicherheitsgesetz)', published 23. November 2007, BGBl. I S. 2590.
2. NGA, 'An Evaluation of New Foreign Commercial Radar Satellites, COSMO-SkyMed, RADARSAT-2, TerraSAR-X', Final Report, dated 19. February 2009.

Lieutenant Colonel (Retired) Wolfgang Duerr

is the Vice President Security & Defence Germany at EADS Astrium and a graduate electrical engineer. He retired from the GAF in 2008 and is still an Officer of the Reserve Corps. In his military career, he had several operational and staff assignments in the Fighter Control/Air Battle Management and C4ISR branch, and served as the responsible General Staff Officer for Space Operations and Information/Knowledge Management at the GAF Development Centre/Air Power Center. He is a distinguished graduate of the Air University/ACSC and received a Master Degree of Military Operational Art and Science (wolfgang.duerr@astrium.eads.net).

Credit is owed to Joerg Herrmann of Astrium Satellites, and Lars Petersen and Dr. Gertrud Riegler, both of Astrium GEO Information Services, who supported this article.

Rwandan soldiers march onto a U.S. Air Force C-17 on their way to Darfur in support of the African Union effort in that region.

Out of Africa

Multirole Tankers in Support of International Aid

By Major Andrei Mitran, USA AF, U.S. Air Forces Africa

How can tanker aircraft be utilised in a way that can directly benefit multinational aid efforts on the African continent? This paper focuses on two basic elements of the thread for such an endeavour: cooperation and synergy. Cooperative interaction among groups in the effort to synergise regional work towards a greater good is the story of United States Africa Command (AFRICOM), the U.S. military organisation dedicated to supporting regional interests in Africa. NATO is another organisation which depends on cooperation and synergy to operate. Participation by the Alliance in operations on the African continent would: (1) provide ample training opportunities for NATO member nations while conducting real-world missions; (2) benefit African regional security, which would have a resultant stabilising effect on the European continent, and (3) offer an opportunity to help African partners in their regional development efforts.

Establishment and Structure of U.S. Africa Command and Air Forces Africa

Why was U.S. Africa Command established, and what is the purpose of the current set-up which includes 17th Air Force (U.S. Air Forces Africa) and other components? "AFRICOM offers a fresh, promising way ahead on a most challenging continent."[1] The U.S. military works with other U.S. government agencies like the State Department and USAID to consolidate various

Department of Defense efforts as an interagency team, and it works with regional organisations like the African Union, NGOs, and other nations to support African solutions to African problems. AFRICOM is about synergy. With more than $9 billion a year in humanitarian assistance from U.S. sources and $250 million a year in military assistance, there is potential for a lot of synergy, and these efforts need to be managed and coordinated for the sake of effectiveness and efficiency.

17th AF, the air component of AFRICOM, primarily supports the goal stated above through security engagements with host nation Air Forces. It also produces a comprehensive air picture for certain regions of the continent that lack internal capabilities, and it controls U.S. military airlift operations in support of the U.S. Government and host nations. In all, it seeks to achieve synergy between limited allocated resources, other combatant commands, and host nation forces in order to support regional requirements on the continent. As far as air assets go, the bulk of this effort rests on airlift aircraft such as the C-130 Hercules. But despite its basic air asset, the organisation has limited assigned resources, and depends on synergy and cooperation with other organisations for mission success.

An Alternative Tanker Mission

What role can Air-to-Air Refuelling (AAR) play? How can NATO members support this function? Historically, most African nations were not in desperate need for AAR capabilities. In the context of cooperative security actions, a large conflict requiring tankers, fighters, and other air assets is perhaps the last step in a volatile situation where cooperation has failed. As such, the need for the traditional missions of an Air Refuelling Control Team (ARCT) in 17th AF is minimal, and usually only expressed through simulations and exercises. The presence of AAR forces from other nations would strengthen the exercises, however, as with any multinational exercise, capability limitations must be considered. The main obstacle in the face of such cooperation rests in the fact that many African nations are just beginning to build aeronautical capacity (mostly airlift). Perhaps the flexibility and reach of NATO tankers can be used in an additional capacity.

The ARCT contribution to 17th AF efforts is largely due to the size of the continent. Tankers can increase the efficiency and speed of an air delivery, and that synergistic effort acts as a counterbalance to the size and limited resources on the continent. By design, a tanker aircraft is faster than many of its airlift counterparts. It can extend the range of airlift aircraft such as the C-17 and can also be used for deliveries aside from, or in concurrence with, a scheduled refuelling. Based on the size of the African continent, speed and range do matter. An additional advantage to using tankers for airlift operations rests in the interoperability of such assets. NATO members that operate tankers already use or plan to use such assets for multiple purposes. Africa offers a great opportunity to execute a variety of missions from Aeromedical Evacuations to delivery of cargo such as medical supplies. What better way to train for such competencies than to execute real world missions? We must acknowledge, however, that tanker aircraft are in demand within the Alliance. As such, the framework for tanker resource utilisation must have certain characteristics.

Target Point

17th AF supports the U.S. AFRICOM mission by providing airlift in the form of C-130s, but these assets are constrained due to their size, cruising speed, and the massive size of the African continent. Tankers can also support the airlift mission by providing an alternative when C-130s cannot meet the mission requirements. With a sound process and some Lean management techniques, this can make a huge difference in efforts to help Africans through airlift.

A Framework for Tanker Utilisation in Airlift

Beyond a nominal consideration, utilisation of tankers in an African assistance function requires flexibility and restraint. Flexibility enables a limited asset to be utilised without impacting core functions like AAR. Restraint enables the use of assets only when needed.

After all, AFRICOM was established with economy of force in mind, providing synergistic support to prevent large scale conflicts while avoiding waste. In order to respect the two goals above, 17th AF ARCT seeks to engage a basic management philosophy and several guiding principles, including the application of the Theory of Constraints (TOC).

TOC is based on the premise that the rate of goal achievement is limited by at least one constraining process. Only by increasing flow through the constraint can overall throughput be increased. It starts with identifying the constraint, deciding how to exploit it, and allocating the required resources (also called elevating the constraint) to obtain maximum throughput.

In the case of 17th AF's core mobility product (airlift), the constraint is the transport platform (quantity and speed). The C-130 is the work horse of the Command's airlift efforts. It is a reliable platform, but has limitations including range and speed. A schedule variation, such as unexpected last minute cargo, can throw waves in an already packed schedule. A sudden medical evacuation request in Ethiopia is difficult to support in a timely manner without a direct in and out mission. A large scale humanitarian assistance may require the whole gamut of airlift support, including AAR. Identifying the constraint also means enumerating the potential missions to be supported. In AFRICOM, there are four: basic airlift, Aeromedical Evacuations, distinguished visitors and other personnel transport, and humanitarian assistance.

Deciding how to exploit the constraint is where tanker aircraft come into play. As a limited resource with a dedicated mission, tankers are an important resource in their own right. However, tanker utilisation comes in waves. Augmenting airlift missions with tankers must take this into consideration. First, we must identify where the resource comes from and if the schedule is flexible enough that tanker aircraft can be spared in a given time period. For example, if the tanker is tasked to the point where its allocation for an airlift mission would be delayed by more than a week, its effectiveness is considerably reduced.

Achieving buy-in from organisations involved can't be overestimated. Without buy-in, the process will eventually fall apart. "What's in it for me?" is a very valid question when considering cross-organisational or cross-national cooperation. In the tanker case, a focus on win-win is essential. No organisation or ally (especially the one owning the resource) should feel that it loses necessary assets to another tasking unit. In the case of cooperative AAR assets, pre-established utilisation conditions can alleviate such worries. The goal of the buy-in will be to establish a sourcing process that is convenient, fair, and binding to the parties involved. It should include a flexible authorisation path, direct lines of communication and avoid waste in both planning and executing.

Once buy-in from all stakeholders is achieved, the process for task allocation is developed. In the spirit of economy of force and synergy, several Rules of Engagement (RoE) are followed when crafting the allocation of resources. The RoE are:

- **Specific work, sequence, timing.** The 617th Air Mobility Division (AMD) team will identify in-excess requirements that the regular airlift force can't support in a timely manner.
- **Direct Customer-Supplier line of communication & binary request.** Direct communication will be established with the tasking unit for a tanker resource. A binary request (yes/no) is simply to identify if a resource exists within a desired time period. Such a pull system prevents over-allocation of a resource.
- **Simple and direct Command and Control of air asset.** Tactical control of an asset by 17th AF while the aircraft operates in the African airspace is desired. Planning, diplomatic clearance, on-site logistical requirements and flight monitoring will be a 17th AF responsibility. Maintenance problems would be coordinated by 17th AF with the host command/nation.
- **Post-mission review and improvement at lowest level.** Specifically, key performance indicators such as monthly utilisation rates, prominent support levels per region and mission type, and impact in the overall airlift effort will be tracked. The resultant metrics provide feedback and further focus such efforts. Such metrics are already in effect for traditional airlift assets in 17th AF, and tanker utilisation would be similarly tracked.

Perhaps nothing explains this better than a hypothetical example. In this case, let's presume a remote location in Tanzania requires medical help and the evacuation of several Malaria patients. The request, as it usually does, arrives at short notice with AFRICOM. Through a flexible sourcing process, 17th AF personnel locate a tanker through its NATO communication lines, and dispatch it to the airport in Tanzania with pallets of medical supplies. The aircraft arrives there 24 hours later. Prepositioned 17th AF C-130s take the medical supply pallets to the remote location, and return to the main hub with the patients. Finally, the NATO tanker delivers the medical evacuees to Ramstein AB for treatment. Such synergetic efforts would get this mission done in 48 hours, while C-130's alone would need seven to ten days. The key to this process is flexible resource-to-task allocation.

Summary

The RoE above describe a framework for further development with NATO, should this plan become reality. These same RoE are currently utilised in collaborative actions with 100 Air Refueling Wing (ARW). In fact, as of this writing (February, 2011), the plan outlined in this article will be implemented for the first time in March 2011 when tankers from 100 ARW in Mildenhall, UK, will support AFRICOM airlift missions. Feedback from this effort will be used to solidify plans for future engagements. This example of our ability to maintain flexibility is not just a good thing to have, but rather the key to sustainable operations. Multi-utilisation of assets is one strength; cross-utilisation of assets among geographically separated organisations is another. Utilisation of AAR assets for diverse missions is only one example of how effective coordination and execution can achieve synergy. NATO is about synergy and cooperation, and in a world where cost and resources count ever more, synergy and cooperation are essential survival tools. ●

1. http://www.africom.mil.

Major Andrei Mitran

serves as Chief of the Air Refueling Control Team, 617 AOC, AF AFRICA. He is responsible for the planning and control of Air-to-Air Refueling assets as required in the AFRICOM Area of Responsibility. Previously he has served as Aircraft Commander and Instructor Pilot in the KC-10 Extender, accumulating over 2500 flying hours to include 110 combat hours in Operation Iraqi Freedom. He also served as Instructor Pilot and Evaluator to the Pilot Instructor Training school-house at Randolph AFB prior to his assignment to the newly formed 17th Air Force (U.S. Air Forces Africa).

Win All the Books Reviewed in this Journal!

The JAPCC constantly strives to improve the quality of its products. The Journal is no exception to this. We would like to know if we are reaching all our potential readership and to hear your views on the Journal. If you are able to complete a short online survey, your responses will be very useful to us. The survey contains eight questions and should take no more than about five minutes to complete. Everyone who completes the survey will be entered into a draw to win the books that are reviewed in this edition. You can be assured that all information gathered will be handled in the strictest of confidence and will only be used to improve the Journal – and to send the books to you if you win!

Articles in the Journal do not necessarily represent the views of the JAPCC, but have been chosen to inform our readership and to provoke questions and debate about Air and Space Power. The aim of the JAPCC Journal is to discuss all aspects of Joint Air and Space Power. It does this via a number of short articles, up to 2000 words in length. You may ask why we only publish short articles. This method has been chosen deliberately because a short article is something that can be read during the course of a short coffee break, stand easy or sit down in the crew room. We know you all lead busy lives, but we do hope that you find time to complete the survey at:
https://www.surveymonkey.com/s/JAPCC ●

Joint Air and Space Power Conference 2010

More than 60 Flag Officers and over 200 senior Air and Space Power experts from 21 countries, including Switzerland, Austria and Sweden, assembled in Kleve, Germany on 13 and 14 October for the 2010 Annual JAPCC Conference. Under the theme, 'Roles and Challenges for NATO Air and Space Power in Contemporary Operations', the Conference aimed to provide a communications vehicle to socialise JAPCC ideas and receive expert feedback. In his Keynote Video-Address, General Stéphane Abrial, the Supreme Allied Commander Transformation, highlighted the value of Air Power for NATO: "Air issues have always been central to NATO. Today, one of the most concrete testimonies of our commitment to Article V of the Washington Treaty and our collective defence is our common air policing, in which we jointly and collectively preserve the integrity of NATO airspace." In his operational views, Air Marshal Christopher Harper, DCOM Joint Force Command Brunssum, stressed that there will continue to be the need for independent air forces. This does not mean that air forces are to develop themselves into an isolationist unified body. Rather, they must be linked shoulder-to-shoulder with all the other services while retaining their independence. Subsequently, four expert panels engaged in lively discussions on relevant topics including: Air and Space Power in Expeditionary Operations, Air C2 in a network enabled environment, Air-Surface Integration, and Joint Integrated Air and Missile Defence. The outcome of these discussions was a better understanding that there is an urgent need for a comprehensive look at the crucial role Air Power plays now and in the future. To further develop this understanding, the Conference 2011 is titled 'Understanding Air Power – A Joint Appraisal' and will be conducted on 11–13 October 2011 in Kleve. ●

Participants of the Second Annual Executive Working Group Meeting which was held at the JAPCC in Kalkar, Germany, 14–15 March 2011.

JAPCC Hosts Second Annual Executive Working Group Meeting

Senior representatives from each of the JAPCC's 17 sponsoring nations attended the second annual meeting of the JAPCC Executive Working Group (EWG), held in Kalkar on 14–15 March 2011. Agenda items included a review of on-going projects. Resulting from its internal improvement campaign, JAPCC also gave an overview of its involvement in Air and Space Power education and training and the outreach opportunities that the JAPCC provides. These include tailored presentations on NATO Air Power, Personnel Recovery, Air-to-Air Refuelling and Air Transport. A recent innovation is a leadership training initiative using non-computer based combat simulation. Developed from an internal JAPCC study and delivered by JAPCC subject matter experts, the initiative has recently been successfully incorporated in the German Air Force Officer School training programme. The EWG approved the JAPCC Programme of Work for the coming year. Sponsoring nations gave a summary of recent changes and developments within their air forces and provided substantial input to the JAPCC's 2011/2012 work. In the current environment, where air forces are undergoing significant reductions in personnel and streamlining of capability areas, it was stressed that this would drive the need for continued multinational cooperation in defence, especially in the fields of maintaining sustainability. Nations emphasised that shrinking defence budgets and financial constraints across NATO would only serve to increase the importance placed on the work that could be done by centres of excellence.

Summing up the meeting JAPCC's Executive Director, Lt Gen Naskrent, stated that there is clear evidence of the overall contribution made by the JAPCC in the twelve months since the first EWG meeting and that this has served to underline its relevance. The Executive Director sought the sponsoring nations' continuing engagement with the JAPCC. Nations were urged to continue to support and encourage the JAPCC's efforts and to exploit as fully as possible the unique resource that it represents. ●

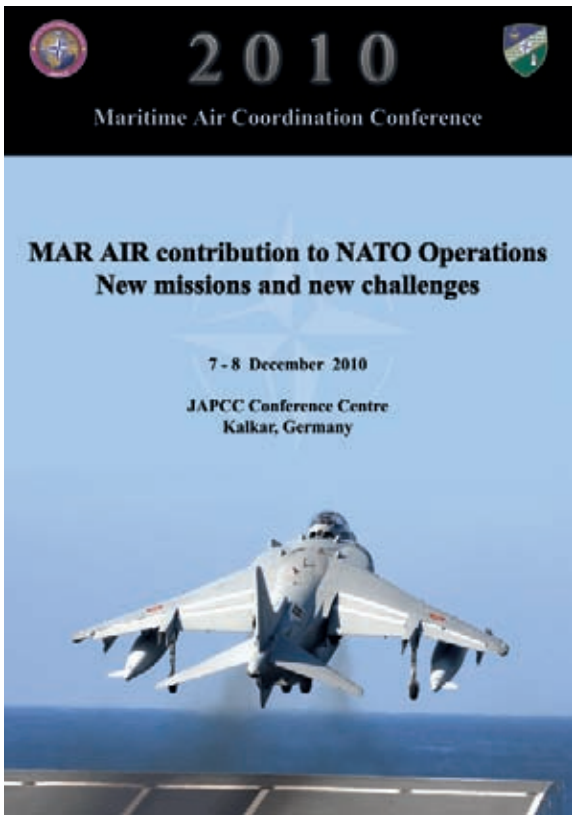
20th 'Alfredo Kindelan' International Seminar 2010

Created by the Spanish Air Force in 1988 as a forum for the study and debate of military air strategy and doctrine, Kindelan Chair has among its outstanding activities an international seminar where representatives from allied and friendly air forces meet at the Spanish Air Force Headquarters in Madrid to exchange their points of view on specific air topics. The topic chosen for this occasion was: 'Air and Space Power Contribution to Peace Support Operations'.

JAPCC Assistant Director of Transformation Air Commodore Paddy Teakle delivered a presentation titled, 'Understanding Non-Kinetic Air-Effects', with the aim of demonstrating that Air Power is much more than the application of force. Instead Air Power must use a mixture of kinetic and non-kinetic means to exert influence.

Guest speaker briefings were the basis for ensuing discussions in the working group which was made up of EURAC (European Air Chiefs' Conference) and other EU and NATO Member States' representatives. The working group was involved in two areas: air power contribution to CAS missions and air and space contribution to reconnaissance missions and IED detection. ●

2010 Maritime Air Coordination Conference



© JAPCC

In early December 2010, delegates from around NATO gathered at the JAPCC Conference Center for the annual Bi-SC Maritime Air Coordination Conference (MACC). The MACC's aim is to promote the development of Maritime Air through focused discussion and debate under the Co-Chairmanship of the JAPCC, representing ACT, and Com Mar Air Northwood (CMAN), representing ACO. The theme of the conference was, 'MAR AIR Contribution to NATO Operations: New Missions and New Challenges'. The agenda was designed to set the conference focus on the transformation that the Alliance is going through in terms of organisation and mindset in the conduct of contemporary operations. The main discussion area of the first day concerned the current organic gaps in the management of MAR AIR assets and the future NATO Command Structure (NCS). As a consequence of the NCS review, which envisions one Unified Air Command (UAC) and one Unified Maritime Command (UMC) under the

responsibility of ACO, the MACC participants discussed the possible implications for the MAR AIR community and identified the need for a strong UMC-UAC linkage. The second day was dedicated to an in-depth look at satellites, UAS and AWACS. Although non-traditional for the employment in the maritime domain, these assets can provide essential ISR capabilities to achieve Maritime Situational Awareness in complex scenarios such as Counter-Piracy, and in a time of scarce availability of traditional Maritime Air resources. ●

U.S. National Security Space Strategy Released in February

The United States released its National Security Space Strategy (NSSS) this February. NSSS objectives are: (1) strengthen safety, stability, and security in space; (2) maintain and enhance the strategic national security advantages afforded to the United States by space; and (3) energise the space industrial base that supports U.S. national security. The desired end state of the NSSS is continued use of space for U.S. national security and benefit to the world through creation of a sustainable and peaceful space environment by a community of Nations.

The NSSS characterises the current status of space as increasingly congested, contested and competitive. Space is congested in terms of the numbers of objects on orbit, including active payloads and space debris, the number of entities seeking to use space capabilities and the radiofrequency spectrum. Space is contested by, "potential adversaries … seeking to exploit perceived space vulnerabilities". Space is competitive, commercially, through international advances in space technology and the associated availability of spacecraft components.

The NSSS seeks to ease congestion by, "establishing norms, enhancing space situational awareness, and fostering greater transparency and information sharing". The U.S. means to reassure allies and the larger world of its intent to "act peacefully and responsibly in space" while encouraging others to behave similarly. The NSSS confronts the contested environment in depth, applying layered deterrence including: (1) support to establishing international norms and transparency and confidence-building measures; (2) improving and protecting U.S. capabilities while creating coalitions and alliances of "responsible space-faring nations"; (3) improved capability to attribute attacks; (4) denial of benefits from attack; and (5) retention of the right and capabilities to respond in self-defense, should deterrence fail. Competition is addressed by enhancing U.S. capabilities, improving acquisitions processes, nurturing the U.S. industrial base, and strengthening collaboration and cooperation.

The NSSS invites nations to engage with the U.S. in the space domain, but the question remains of whether or not they will accept. ●

© NASA

Joint Air & Space Power

Conference

11th – 13th October 2011

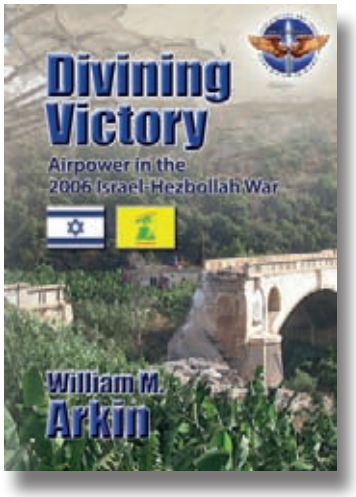
Understanding Air Power

A Joint Appraisal

Registration form available online at www.japcc.org

Joint Air Power Competence Centre

‘Divining Victory: Airpower in the 2006 Israel-Hezbollah War’



By William M. Arkin
Air University Press, Maxwell
Reviewed by:
Air Cdre Paddy Teakle

Basil Liddell-Hart stated that: ‘paralysis, rather than destruction, is the true aim in war, and the most far-reaching in its effects’. The 2006 Israel-Hezbollah war provides an interesting case study of Liddell-Hart’s premise because it saw a nation state using kinetic air power in an attempt to cause strategic paralysis of a non-state organisation. Israel used air strikes to mount an intensive parallel attack on a diverse set of targets, but instead of achieving paralysis, Israel found that Hezbollah defied the standards of conventional war making.

Arkin’s book covers the conflict in considerable detail, but his is not the only book to do so. What sets it apart from other tomes is its incisive analysis of the psychological and informational aspects of the conflict and how these played large in the failure of the Israeli strategy. The book provides a much needed balance between the actual effect of Israeli Defence Force’s action in Lebanon and that portrayed by the world media. This highlights the key nature of the ‘Battle of the Narrative’ which is central to 21st Century warfare and must be at the forefront of contemporary operational thinking.

Arkin’s book gives many pointers towards countering hybrid threats and is an essential read for Air Power strategists. It acknowledges that Air Power has a central role to play in hybrid and small scale warfare but that extreme care must be taken in its application if we are to capitalise on the asymmetry it provides, rather than become a hostage to fortune.

‘The Role of Airpower in the Iran-Iraq War’

This short work seeks to understand why air power was used as it was during the Iran-Iraq war. It attempts to identify whether similar factors might influence other less-developed Nations and, perceptively, assesses how both the Iraqi and Iranian Air Forces might oppose any future application of American air power in the region. In particular, the author questions to what extent the western world’s analytical view of airpower is universally accepted or applicable.

A number of key themes emerge: an Arabic predisposition to favour defensive rather than offensive military strategies with a consequent emphasis on GBAD, particularly when facing a stronger opponent; the importance of attrition, especially where an indigenous regeneration capability is lacking and outside support cannot be guaranteed; and the damaging effects of political instability on the development of a professional military leadership.

With our continued interest in the region, the conclusions remain relevant, none more so than that of the Syrian officer quoted from 1973 *“… war is no longer a struggle between 2 armed forces but between peoples moved by strong ideological belief … (they) may prolong the war until the enemy is tired of fighting and is convinced of the futility of settling the conflict by force of arms.”*

By Maj Ronald E Bergquist,
Air University Press 1988
Reviewed by:
Wg Cdr Anthony Stansby

NORTHROP GRUMMAN

Photos courtesy of U.S. Army without endorsement.

The vision every NATO commander needs.

www.northropgrumman.com/natoags

NATO AGS

NATO is acquiring an airborne ground surveillance capability to provide a clear picture of ground activities essential to both deployed forces and decision-makers. Regardless of where NATO operates, NATO AGS will be vital to the full range of Alliance missions—from force protection and counter-piracy to border security and humanitarian relief. Relying on Global Hawk's proven capabilities, NATO is working with Northrop Grumman and its transatlantic industrial team to provide a truly transatlantic solution and the earliest possible capability to NATO forces. Northrop Grumman NATO AGS—the height of ISR knowledge.