Transforming Joint Air Power
The Journal of the JAPCC

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Editorial

'I estimate that, without Air & Space (A&S) Power, 500,000 to 600,000 troops would be needed in Afghanistan to achieve the same effects as the 40,000 soldiers, sailors, marines and airmen we have there today. A&S Power provides the asymmetric advantage over the Taliban such that no matter where they choose to fight, coalition forces can bring to bear overwhelming firepower in a matter of minutes.'
Lieutenant General EIKENBERRY U.S. Army, 2008

Whilst the numbers in the above quote may warrant re-visiting, the basic tenet does not – A&S Power judicially applied can have a profound effect and provides western powers with their very own asymmetric advantage. Indeed, it might be argued that we have contributed to the complex character of contemporary operations by driving competitors from the skies. Against that backdrop, and with our 2010 Conference in mind, we have dedicated this edition to the 'Roles and Challenges of A&S Power in Contemporary Operations' and I have been delighted with the contributions that have explored a challenging theme from many angles.

Sadly, one of our leading articles is an interview with the late-Polish Air Chief, General Blasik – I would like to thank Poland for its permission to print this article despite the tragic circumstances and take this opportunity to pass on our heartfelt sympathy to our Polish colleagues everywhere as they work through this most trying of times.

Elsewhere, I would like to thank General Abrial, Supreme Allied Commander Transformation for his fascinating insight into the challenges he faces taking forward NATO's transformation. Moreover, having set the scene at the highest level, we have also been fortunate enough to get first-hand inputs from high profile contemporary operations. Fresh from ACCE duties in ISAF, Air Cdre Teakle provides a candid view on how A&S is contributing to Afghan operations, an effort that is likely to significantly shape NATO's expeditionary future. The author replaces me at the JAPCC in May and we are most grateful for this opening gambit.

Afghanistan should not, however, be our sole focus and I am pleased that other contemporary and emerging operations – some closer to home – also get a good airing. We are particularly keen to encourage further debate on Missile Defence, which along with the continued development of Air Policing is sure to feature more and more prominently on the A&S radar. Similarly, I am grateful for the exploration of the benefits that A&S could bring to Counter Piracy. I note from the article that NATO force generation provided no MPA contributions for Counter Piracy – this should not perhaps be unexpected, given the seemingly relentless reduction in Alliance MPA over the past decade. In this vein, I also plead guilty to 'editorial privilege' in choosing the front cover – I hope you will all forgive me marking the retirement of the aircraft on which I spent my entire flying career!

All in all, then, a wide selection of articles to whet your appetite for our upcoming 2010 Conference (see page 66). I hope you all enjoy this edition and the JAPCC looks forward to seeing you in Kleve in Oct.

I have enjoyed immensely editing the JAPCC Journal over the past 3 years, but all good things must come to an end.

Over and Out.

Garfield Porter, Air Commodore, GBR AF
Assistant Director Transformation

The Journal of the JAPCC welcomes unsolicited manuscripts of 1500 in length. Please e-mail your manuscript as an electronic file in either MS or WordPerfect to: articles@japcc.de

We encourage comments on the articles in order to promote discussion concerning Air and Space Power inside NATO's Joint Air community. All comments should be sent to articles@japcc.de

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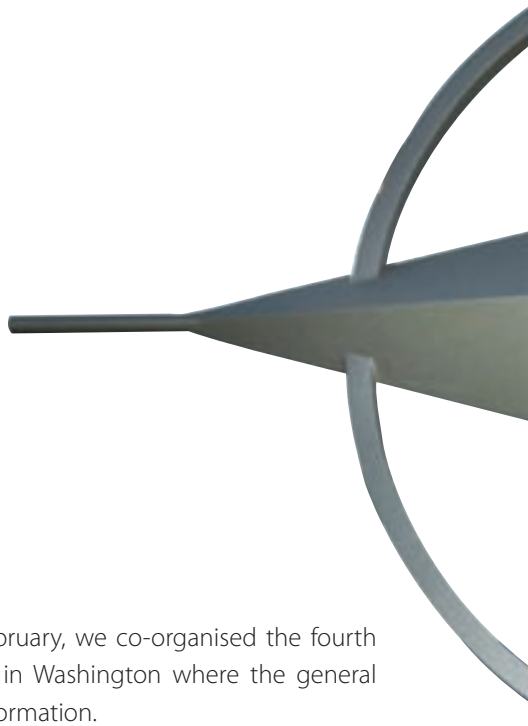
ACT View On NATO Transformation



An interview with General Stéphane Abrial, Supreme Allied Commander Transformation

General Abrial received his appointment by the North Atlantic Council as Supreme Allied Commander Transformation (SACT) on 29 July 2009. He is the first European to be appointed permanently as head of a NATO strategic command.

Can you give us insight into the Allied Command Transformation (ACT) views on, and inputs into, the debate over NATO's new strategic concept?

It is clearly one of my current priorities. The Strategic Concept is the core NATO document that establishes and reflects the transatlantic consensus on the Alliance's role, mission and strategy to deal with security challenges.

The new Strategic Concept has to account for the way in which security challenges have evolved, and how NATO has adapted and transformed in the last decade to be able to better tackle them now and in the future. It must provide the public in Allied countries and beyond, a clear sense of why NATO matters, and the many ways it is helping to make them more secure. But it mustn't only be an analytical document. It needs to give specific guidance to NATO governments on how they need to further transform the Alliance and their own National defense structures and capabilities to be successful in meeting our core tasks in the 21st century.

We at ACT are fully engaged to offer our best military advice to the drafting process of this document. We are in very close contact with Madeleine Albright and her group of experts. We have a key role in this process. In advance of every seminar, we have produced papers on the different subjects that they are tackling. At the end of February, we co-organised the fourth and last seminar in Washington where the general theme was Transformation.

We will also be present at the subsequent debates, which will breakdown the concept into military terms. Finally, after Nations have agreed to it at the Lisbon summit, we will have a key role in the way the new Strategic Concept will be implemented in military terms.

Against this backdrop, what do you consider the main issues in transforming NATO Joint Air Power?

I was invited to express my impressions on this subject last January at the Air Power Conference in Washington. Based on my past experience, I strongly believe that Air Power, with its evolving innovations in technology, offers a great example of transformation. Over the last 60 years, NATO air forces have never stopped training in a very close and coordinated environment. Training is an essential element of Transformation. And indeed, in today's operations, NATO is reaping the benefits from years of collective efforts.

Collaboration between different nations, such as the NATO E-3A Airborne Warning and Control System (AWACS) component or the policing of Baltic airspace, is the best way to help transform national air forces, notably by helping new members to reach the NATO standard in record time. Another impetus is provided by the NATO Response Force (NRF). I experienced NRF myself as Commander of the Air Component when the NRF was engaged in two relief air bridges in 2005: after Hurricane Katrina struck U.S. soil, and then immediately following the earthquake in Pakistan. Now, as a military Strategic Commander of the Alliance, my

'... as a military Strategic Commander of the Alliance, my more specific concern is how to improve the use of Air Power in the Alliance, especially with regard to a coalition, such as Afghanistan.'

more specific concern is how to improve the use of Air Power in the Alliance, especially with regard to a coalition, such as Afghanistan. Multi-national situations, which are the rule rather than the exception, make this even trickier. These include: How to continue to improve airspace management and control with added complications. For example, integrating Unmanned Aerial Vehicles (UAVs) controlled by different forces or agencies;

How to avoid collateral damage, something that impacts both the local population and popular support to the Alliance, and how to manage the kinetic use of air that often raises the question of the difficult balance between a necessary restraint and risk to friendly forces; and

How to better share intelligence that remains mostly at a national level.

Interoperability is a key and integral part of NATO transformation, and enhancing it among NATO air forces remains a top priority. This is not because the degree of interoperability previously enjoyed by NATO has diminished, nor that interoperability has been ignored, but rather that the requirement for it has grown exponentially in recent years due to significant changes in the NATO structure and the nature of operational commitments. Common doctrine, standards, and procedures are all, more than ever, key to successful interoperability and effective NATO joint air power.

Access to Space is among the current top issues. What is ACT's approach towards exploiting this last frontier?

Space, with all of its components (telecommunications, imagery, global positioning system, weather forecast), is a vital dimension of all military operations. Without space assets, our operations would basically grind to a halt. However, the Alliance is an organisation, which cannot maintain assured access to Space by itself. Rather, its role is to watch over the interests of the Nations.

In this perspective, and especially in view of the current budgetary pressure that requires most Nations to share the burden of cost, I believe it is time for NATO to reinvest in a space policy. This policy should allow NATO to have an agreed vision on future needs, efficiently manage future possible expeditionary deployments and reduce the risk to vital capabilities from state and terrorist organisations. Cooperation is important; the policy also needs to enhance the likelihood of cooperation between NATO and emerging countries or organisations. Key to success will be a policy that also encourages NATO to intelligently follow industrial developments and improvements in Space. I expect to contribute to initiatives to this end in the coming months.

A more multi-dimensional Comprehensive Approach to NATO operations, aimed at better coordination and cooperation between the military and all relevant civilian actors (IO, NGOs…) is a stated goal. How do you envisage ACT's part in taking this process forward?

The Comprehensive Approach is one of my main topics. I sense a strong consensus in making NATO's contribution to a comprehensive approach a reality, to a much higher degree than it is today. As SACT, I will direct my efforts to provide support in making a flexible comprehensive approach, in a word, operational. It is a characteristic of modern crises and conflicts that they cannot be dealt with by military means alone. But they cannot exclude the military either.

We don't have to invent something new. It is all about mobilising existing capabilities. Currently, capabilities are insufficiently synergised because they belong to players, who are inadequately networked: Nations outside of NATO, as well as national, international, or non-governmental organisations.

I think that, in a flexible comprehensive approach framework, the military can be, depending on the situation, a coordinating or facilitating force. Essentially, what I wish to foster is a deeply ingrained culture of cooperation, both on our part and on the part of other stakeholders. I believe rapid progress is possible as many obstacles to efficiency are not substantive barriers, but can occur due to a lack of mutual awareness.

'If I were to summarise my vision for Transformation, it would be a collective effort of innovation, rooted in the Nations, focused on building upon what already exists.'

Having been charged with transforming the French Air Force after the publication of the French White Paper on defence and national security, can you see some common issues with the transformation process in NATO?

When I was the Chief of the French Air Force, my responsibility was to implement the changes to our military strategy reflected in the release of the 17 June 2008 White Paper. We started this vast process that we call transformation. This touched on all aspects of our

Air Force and was intended to transform our capabilities to fulfil our missions in exhaustive and coherent ways while under permanent budget constraints. Transformation is not an end in itself. It is a mindset through which we travel collectively and that allows us to apply new strategic givens, technological advances, and new processes.

On another scale, the issues are quite the same for the Alliance. As Secretary General Rasmussen described it, Transformation is: 'making sure we have the kinds of forces that we can deploy, where and when we need them, with the equipment and training they need, and at a price we can afford.'

Transformation takes place within real-world constraints. The budgetary pressure is with us to stay, and we must respond to it by being even more innovative, astute and realistic. In this challenge lies an opportunity for continued, and indeed reinvigorated, transformation.

If I were to summarise my vision for Transformation, it would be a collective effort of innovation, rooted in the Nations, focused on building upon what already exists.

As the senior French Commander in the NATO Command Structure, what are the challenges and opportunities faced by the French Armed Forces following France's decision to take full part in NATO's Integrated Military Command?

For the troops in the field, it will not make much of a difference. This is just a continuation of a long-standing history of a successful coalition partnership supporting the greater good. The reality is that France has been an active Alliance member for many years; she has assured her fair share of responsibility for peace and stability, participating in all NATO operations such as Bosnia, Kosovo and Afghanistan.

Nevertheless, France's decision to return to NATO demonstrates an important new stage in her approach to security.

It is the implementation of President Sarkozy's vision that being a full member of the Alliance and working for a stronger European Defence are not mutually incompatible; to the contrary, they are complementary. And both organisations, being strong, reinforce each other. Moreover, if you want an institution to transform, you are better placed to construct it as a full member, than as an outsider.

Finally, I want to stress that my appointment as SACT is a strong symbol of the transatlantic link. For the first time, a European is serving as SACT here in the United States, while in parallel there is an American Commander as Supreme Allied Commander Europe (SACEUR). In Europe it is a strong signal of the Alliance vitality.

Sir, thank you for your time and your comments.

General Stéphane Abrial

received his appointment to the North Atlantic Council as Supreme Allied Commander Transformation on 29 July 2009. He began his military career as a fighter pilot and has a wide-ranging background that includes operations in coalition environments, at the tactical, operational and strategic levels. During Operation Desert Storm, he took part in the liberation of Kuwait as commander of the French Air Force's 5th Fighter Wing. He served at the NATO International Military Staff in Brussels and acquired broad experience in political-military matters through several appointments to the private offices of the French Prime Minister and President. He served as head of French air defense and air operations, and finally as Air Force Chief of Staff from 2006 to 2009.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Land Operations in the 3rd Dimension

Italian Army Aviation

By Lt Gen Enzo Stefanini, ITA A, Commander, Italian Army Aviation

Air Power has long proved to be a key factor in the successful conduct of military operations, both terrestrial and maritime. Since WWII, all operations, strategic, operational or tactical, stood little chance of success unless air superiority (partial or total) was acquired. From the early 1960s, Western Armies recognised the utility of helicopters for transport and fire-support, especially from their use by the U.S. in Vietnam.

For a long time, the Italian Army considered helicopters solely as assets in support of ground operations, whether for tactical and logistical transport, or for ground fire support. In spite of their versatility and operational capabilities, helicopters were underemployed. At the beginning of Army Aviation constitution, the helicopter was thought of as an airborne truck – an asset to guarantee the deployment of ground forces in a way faster than ordinary means. Only the U.S. had developed, since the 1960s, a comprehensive doctrine aimed at ensuring synergy between aviation, infantry and tank units, as shown for the first time in the Battle of Ia Drang in 1965.

During the 1970s, the introduction of the anti-tank missile drove the development of the anti-tank helicopter. Its role in a mechanised conventional battle, when used in a Central European scenario, would quickly counteract opposing armoured formations and contribute to slowing the advance of the Warsaw Pact armies.

Air Mobility

In 2000, Italian Army Aviation was completely restructured and reorganised into two main units: the Airmobile Brigade 'FRIULI' and the 'Army Aviation' Brigade. A doctrinal innovation took place due to this reorganisation. The concept of air mobility was introduced, characterised as a series of actions initiated from the air, and

conducted both on the ground and in the air; these actions were then planned and accomplished by dedicated units for the first time.

'The Air Mobility Concept is based on three pillars: attack helicopters, tactical transport helicopters, and airborne infantry ...'

This important innovation enabled a substantial change in Italian Army Aviation capabilities, from simple combat support operations, to major actions utilising aircraft support operations during attack, defensive combat and crisis response operations (CRO).

The Air Mobility Concept is based on three pillars: attack helicopters, tactical transport helicopters, and airborne infantry - and their characteristics of volume of fire, mobility and manoeuvre. These pillars do not necessarily guarantee effectiveness in Air Mobility, unless they are supported by effective doctrine. In Italian Army Aviation, the Air Mobility Concept refers to actions starting from the air, and prosecuted both on the ground and in the air. These actions are then carried out by specially trained units under a single commander.

The operations are either defined as 'aeromeccanizzate,' (air-mechanised when attack helicopters are preponderant in the composition of the Task Force) or 'aeromobili' (Air Mobile when other Task Force assets are equally represented). This difference is based on general infantry doctrine, which defines army units as 'tank' or 'armoured,' depending on the percentage of tanks in their formation.

The Attack Helicopter

The Italian Attack Helicopter (AH) project started during the Cold War because of a need to equip the Army with a weapon system for the anti-tank mission. The A-129 Mangusta, equipped with a 20 mm cannon and different under-wing loads that include two kinds of rockets and guided missiles, is the result of that project and can lay down a devastating volume of accurate fire against armoured targets or other objectives. The Mangusta is also equipped with sophisticated day and night vision systems, which could also lead to its consideration as an ISTAR platform.

Recently, deployments of Italian Armed forces demonstrated the Mangusta's utility during Quick Reaction Alert (QRA) responses to Troops In Contact (TIC) situations. During TIC missions in Afghanistan, the AH have proved their worth. Helicopters have sustained hits, but without serious damage due to machine vital ballistic protection. Moreover, the use of the Mangusta against land targets has matched well with ISAF rules of engagement. The extremely accurate cannon, together with full day and night vision capability, have mitigated the risks of blue-on-blue and collateral damage.

NATO doctrine (ATP-49E - Use of Helicopters in Land Operations) stresses a distinction between Close Air Support, usually carried out by fixed-wing air assets, and Close Combat Attack, which is carried out by helicopters. Helicopters are advantageous in the battle space because they guarantee radio contact with

Italian Army Aviation utilises the UH-1 for tactical transport.

ground troops, and their support can be requested by any ground unit, even if a Forward Air Controller (FAC) is not available. In many cases, this allows a faster response. The Mangusta plays an invaluable escort role, both for land convoys and other aircraft and is the perfect machine to employ with tactical transport helicopters during Air Mobile Operations.

Target Point

The characteristics of NATO's current conflict in Afghanistan have driven change within the Italian Army. These changes have included technological advancement, but the more important changes have been doctrinal in nature. These developments have contributed to the synergistic integration of Italian Army Aviation forces, which better exploits the capabilities required to successfully conduct land operations.

The Tactical Transport Helicopter

Currently, Italian Army aviation utilises different versions of the UH-1 helicopter for combat support missions, but in the near future, this function will be taken over by the NH-90 European helicopter. After entering service in February 2008, the NH-90 will be deployed into operational theatres. The NH-90 deployment will see a huge leap in performance over the ageing UH-1 family. The NH-90 has Instrument Meteorological Conditions flight capability in bad weather or icing conditions, with a load almost triple that of most other single rotor helicopters in theatre. Both airmobile infantry and Special Forces will benefit from the deployment of this remarkable helicopter.

Air Mobile Infantry

The 66th Air Mobile Regiment 'TRIESTE' is the 'FRIULI' Airmobile Brigade land manoeuvre unit. The Regiment's Air Mobile infantry has the VTLM Lynx (tactical vehicle) and VM-90 tactical vehicles, and is armed with MINIMI, MG-42/59 machine guns, the MILAN anti-armour rocket launcher and the formidable 120 mm mortar, a fully-fledged artillery device. All 66th Regiment soldiers complete a special air mobility course to learn how to work on (and in the vicinity of) helicopters, particularly in the sensitive stages of landing, boarding and the handling of underslung loads.

Air Mobile officers receive in-depth training under the command of a task force consisting of Air Mobile infantry, tactical, transport and attack helicopters. They need to be familiar with the characteristics of the aircraft and

'The air mobility concept has proved its worth during combat operations ...'

aware of how operations within the third dimension can develop. In Air Mobile operations, the chain of command extends across the three dimensions and there is no distinction between airmobile soldiers and the flight crew. Mutual trust is built through training and exercises. This means that Air Mobile soldiers can be employed by the flight crew, and vice versa.

Other Operational Functions Performed by Army Aviation

The air mobility concept has proved its worth during combat operations, but Italian Army Aviation also fulfils many other operational functions, some of which are quite new. During combat support operations, helicopters can carry out tactical helicopter lift, assault, boarding (for personnel or materials), and fire support missions. The lion's share of flight hours, however, is provided by combat service support, supporting units not directly involved in fighting. The Italian Army's CH-47 is the main workhorse here, whilst Dornier 228 and Piaggio 180 aircraft are also used, primarily for the movement of personnel and spare parts.

Whilst still a part of the Air Mobile concept, the 26th Helicopter Department (REOS – Reparto, Elicotteri, Operazioni, Speciali – Special Operations Helicopter Unit), created in 2002, is a unit dedicated to the support of special operations. The REOS employs two types of helicopters – the AB-412 (Griffon) and CH-47. The NH-90 will be soon delivered to the Unit. REOS

An A-129 Mangusta can lay down a devastating volume of fire against armoured targets.

crews receive specialist training, increasing their combat survival skills should they be forced down in hostile territory. This training also helps REOS crews to better understand the perils facing the Special Forces soldiers, with whom they operate. The REOS crews training and selection is carried out jointly with the Special Forces based in Livorno, under the supervision of the 9th Regiment INCURSORI, whilst Special Forces flight training is conducted at Viterbo. Crews regularly deploy to Afghanistan in support of special operations within the Italian Provincial Reconstruction Team. In addition to the Mangusta ISR capability, all aircraft can provide some level of ISR.

Final Considerations

Modern operational scenarios are characterised by an enemy without operational capability in the third dimension, little capability in counter air, but with a great ability to interdict surface movement. This has led to the proliferation of helicopter supported land operations in the third dimension. For those reasons, the amount of flight hours has increased and Italian Army Aviation has developed the capability to be a main actor in land operations and keep its original support role for land operations. The technological developments and maturation of Air Mobile doctrine have contributed to the synergistic integration of forces. Today, Italian Army Aviation has 30 machines deployed in many different operational theatres, supporting all types of operations. It can, thus, be considered one of the pillars of the national expeditionary capability. ●

'The technological developments and maturation of Air Mobile doctrine have contributed to the synergistic integration of forces.'

Lieutenant General Enzo Stefanini

is the Commander of the Italian Army Aviation. He joined the Army in 1972 and attended pilot training at the IT Air Force helicopter school in Frosinone and the IT Army flight School in Viterbo. General Stefanini has completed several appointments at Army HQ and commanded the 19th Artillery Group 'Rialto', the 7th Attack Helicopters Regiment 'Vega' and the Air Mobile Brigade 'Friuli'. As Regiment Commander, he deployed his unit on Operation 'Alba' within Italy and Albania. He also commanded the Italian Joint Task Force Iraq in Nasiriya. He has more than 4000 flying hours, and qualifications on 12 different rotary and fixed wing aircraft. General STEFANINI has a degree in Strategy Science and is a Knight military order of Italy.

A Time for Choices

Securing NATO's Space Capabilities

By Mr. Brian Weeden, USA, Technical Advisor for Secure World Foundation

There is no longer any doubt that space plays a vital role in NATO's military operations and in international security as a whole.

Whether it involves peacekeeping, disaster response and relief, stability operations, counter-insurgency, or conventional warfare, space provides NATO military operations with critical core infrastructure, force multipliers, intelligence, and Command and Control. This increased dependence also makes space security - protecting space assets and ensuring access to space capabilities - all the more important for NATO's consideration.

A United Launch Alliance Atlas V rocket, carrying the USAF's second WGS-2, lifts off from Florida.

Space Security Regimes and Challenges

Since the dawn of the Space Age, the space security regime has transitioned through three paradigms. During the Cold War, it was a bipolar regime dominated by the United States and Soviet Union. The period, following the collapse of the USSR in 1991, was considered by many space security experts as being a unipolar regime dominated solely by the United States. In recent years, however, it has become apparent that space security is actually a regime where all actors share risks. This is due mainly to the rapid increase in the number of states that possess an indigenous launch capability (nine), the number of states or international entities that operate at least one satellite (60), and the massive growth in the number of objects being tracked in Earth orbit (over 21,000). It is also due to the realisation that the actions of any one space actor, either intentional or unintentional, can have dramatic, unforeseen consequences for all.

One such intentional action occurred in January 2007, when a Chinese anti-satellite test was conducted. A defunct Chinese weather satellite located in Sun-synchronous orbit (arguably the most crowded and important region of space) was destroyed by a Chinese ground-based ballistic missile interceptor. This single incident created over 2,300 pieces of trackable debris that quickly spread out from the original orbit, into a shell from 300 to 2,000 kilometers in altitude, and which will remain in orbit for centuries.

'In recent years, it has become apparent that space security is actually a regime where all actors share risks.'

The February 2009 collision between the American Iridium 33 and Russian Cosmos 2251 satellites was an even more dramatic example of unintentional actions with dramatic consequences that have yet to be fully realised. While both the U.S. and Russian military conducted daily screenings for potential collisions, the two satellites were not on either country's protected satellite list. Fortunately, the more than 1500 pieces of trackable debris created by the collision were not an immediate threat to other satellites. However, they did increase the long term risk of additional collisions.

Neither of these incidents was the result of a hostile wartime action in space, nor did they occur during a conflict on Earth that spilled over into space. Yet both of these examples have had meaningful negative impacts on all space actors, including NATO, simply due to the creation of space debris that will remain in orbit for centuries to come. These incidents directly involved states, which currently have the most advanced knowledge and experience with space; this fact does not bode well for the dozens of other states operating in space with only a fraction of their information and experience.

Target Point

An evolution has taken place within the Space community, presenting NATO with an opportunity to develop a multi-national space strategy. As Nations develop innovative capabilities to advance their own space programs, NATO must lead the way in the development of policy and doctrine, which will ultimately light the path toward integrated data-sharing and collective security.

The challenge now facing states that rely on space capabilities for national and international security under this new regime is how to protect those capabilities, in both peacetime and war, despite a diverse range of threats. Compounding this challenge are the inherent strategic vulnerabilities of most existing space capabilities, stemming from physics and choices in satellite architecture, and the aforementioned growing number of space actors.

Lessons from Schriever V and NORAD

As NATO considers how best to integrate space into its operations and determines what space capabilities it needs in the future, tackling these space security challenges should be part of the process. Whether NATO's future space capabilities are derived from NATO-owned and operated space assets, satellites owned by member states, commercial satellites, or

any mix thereof, protection of core space capabilities and services is critical. In this regard, there are potential lessons that could be derived from the American experience in this area.

For the last decade, the preeminent forum in which the U.S. military has examined this challenge has been the biennial Schriever Wargame. The fifth installment was held in the spring of 2009 and allowed U.S. policymakers and military planners to examine policy and strategy in regard to space operations under future scenarios. Schriever V was unique in that it marked the first time that non-U.S. military personnel, commercial satellite operators, and industry participated in a substantial way.

The primary conclusion from Schriever V was that decisions regarding the assessment of any space attacks and protection of all space assets cannot be made by the U. S. military alone. Protecting space capabilities is going to require a 'whole of government' approach that combines military, economic, political, and diplomatic measures and involves coalition partners, as well as the commercial space industry. Additionally, strategic communications with all space actors, and even between adversaries, will be critical to success.

'Protecting space capabilities is going to require a "whole of government" approach that combines military, economic, political, and diplomatic measures ...'

In 2005, the U.S. military stood up the Joint Space Operations Center (JSpOC) at Vandenberg Air Force base in California, in large part because it realised that operational Command and Control of space assets was most effective when performed as a Joint function. Schriever V took this a step further and created a notional 'Cooperative Security Space Defense Agreement' (CSSDA), which assumed a high level of information sharing between coalition partners. During the wargame, a hypothetical 'Combined Joint Task Force-like organisation' was supported by a Combined Space Operations Center (CSpOC). The CSpOC consisted of representatives from the scenario's coalition partners - the United States, Canada, the United Kingdom, and Australia – and served as the operational arm of the CSSDA. All wargame players recognised the benefits of integrating data-sharing and elements of decision making, and included commercial space industry in that process.

There are historical examples of states sharing data and analysis with critical national security implications along the same lines as envisioned in the CSSDA. The most notable is that of North American Aerospace Defense Command (NORAD), an American and Canadian bi-national command created in 1958. Although the details of its mission have changed over the decades, one of its primary missions has been to provide warning of nuclear attacks on North America from air and space through an integrated network of trusted sensors. Information is then sent from analysis centres to national decision makers in both Canada and the United States.

A soon-to-be published academic study from the Space Policy Institute at the George Washington University examined the creation and operations of NORAD in the context of future space data-sharing agreements and entities. The study presents a number of lessons learned from the NORAD experience applicable to Space Situational Awareness (SSA). One such lesson is that one of the keys to the success of NORAD was the original imprecision and minimalist nature of its charter, which allowed the organisation to adapt to changing threats and political environments. Another lesson is that the planning for NORAD far outran the political will and motivation for implementation, and that action only followed specific precipitating incidents. A third lesson is the separation of data collection and analysis from decision making over what actions to take, which has helped reduce political controversy and friction.

Current Policy Issues and Actions

In light of these lessons and experiences, steps are already underway in the U.S. to address the challenges raised by the new space security paradigm. In 2008, Congress directed a Space Posture Review (SPR) as part of the FY09 Defense Authorisation Bill. The SPR is attempting to define and create policy and require-

ments within a number of critical space areas, including SSA and space control. It will also analyse space acquisition programs, future technology development, and relationships between key national policies affecting space.

In May 2009, President Barack Obama issued Presidential Study Directive-3 (PSD-3), which called for a broad review of U.S. National Space Policy (NSP). Ever since it was first formulated during President Eisenhower's tenure during the 1950s, the themes and priorities of the NSP have largely remained the same. However, in October 2006, President George W. Bush issued a NSP that contained language emphasising a more unilateral approach to space security and explicitly opposed new legal regimes in space. This change in tone had a chilling effect on space security cooperation. The SPR and PSD-3 together will feed into the standard interagency process, which will result in a new National Space Policy.

Although not likely to be published until summer 2010 at the earliest, President Obama's NSP will likely adopt a more multi-lateral and cooperative approach to space security. Evidence for this is provided by the fact that the U.S. has solicited input on its NSP from friends and allies. The U.S. has also commenced discussions on space data-sharing with European entities, beginning in the fall of 2009 with France, and with plans to include Germany soon. Military officers from Australia, Great Britain, and Canada are now part of the JSpOC. Finally, the U.S. is currently in talks with Australia to potentially base a new S-Band radar fence tracking station in a critical Southern Hemisphere location.

Europe is also examining ways of tackling the space security issue. In 2008, Europe announced the beginning of a European SSA program, which would use ground and space-based sensors to provide information about activities in space. The civilian aspects of this program would be managed by the European Space Agency, while the defence aspects would be managed by the European Defence Agency. Roles for existing European SSA sensors, such as the French GRAVES and German FGAN radars, are being examined.

NATO's Role in Space Security?

As these steps in both the U.S. and Europe are taken and the current space paradigm continues to evolve, NATO needs to be aware of how it will be affected by these changes and what the opportunities are for NATO to potentially contribute. NATO is perhaps even better suited than NORAD to tackle the problem of integrated data-sharing and shared decision making. As a successful collective security organisation, NATO is a living example of the value of many states working together in the face of shared security threats.

In many ways, space is the ultimate regime for shared decision making on risks, as all space actors face a broad array of shared threats, both hostile and non-hostile, intentional and un-intentional. In such an environment, the ability to build organisations and structures that can reflect the status quo is even more relevant. NATO, as both a successful collective security organisation and a user of space, should play a role in space security to ensure NATO has the space capabilities for mission success.

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Bringing NATO's Future into Focus

Multiple Futures Project

By Cdr Richard Perks, CAN N, HQ ACT; Mr. Jeffrey Reynolds, CAN, Analyst, HQ ACT

We cannot predict the future. How then can we plan for it? NATO's Allied Command Transformation (ACT) Multiple Futures Project (MFP) describes four possible views of the World in 2030, each constructed to reflect an underlying logic and reasoning. These futures provide a common ground for structured dialogue on the risks and vulnerabilities that may endanger populations, territorial integrity, values and ideas.

None of these futures will develop exactly as described – of that we can be certain. However, it is important to engage in this fundamental work in order to prepare the Alliance for the 'real' future. The value of efforts like MFP comes not just from the scenarios it imagines, but from the discussions it stimulates and the common understandings it helps to create.

Despite potential interstate conflicts in Africa, the Middle East, the Caucasus and East and South Asia, large-scale conventional confrontation involving NATO and a peer competitor in the next 15 - 20 years is unlikely, but not impossible. The Alliance will need to respond to a wide variety of security challenges that are mainly a consequence of destabilisation and the absence of good governance. The MFP suggests that these challenges will result from unbridled extremism, uncontrolled and illegal migration, and friction caused by resource scarcity.

Rapidly developing technology will increase both the breadth of Alliance vulnerabilities and the ease with which those who oppose us will be able to use those developments to disrupt society. The use of technology, especially Weapons of Mass Destruction (WMD)

or Effect, will require increasing vigilance, positive control, and close Alliance consultation with partners.

Adversaries will focus less on external attack and more on a subversive undermining of the fundamental principles that bind the Alliance. Specifically, adversaries will attack the pact we have with governments, our solidarity and the values we hold dear – the sanctity of life, individual liberty, and liberal democracy based on the rule of law. These attacks will use both physical and psychological means to weaken the Alliance.

Whether the motives of our adversaries are based on religious extremism, envy of or aversion to our accumulated wealth and resources, or an assertion of power, hybrid attacks will target our fundamental principles. These hybrid attacks will be both interconnected and unpredictable, combining both traditional and irregular warfare, terrorism, and organised crime. Psychologically, adversaries will use the instantaneous connectivity of an increasingly effective mass media to reshape, or summarily reject, the liberal values, ideas, and free markets that characterise the Alliance. They will attempt to gain relative advantage in the world by using our civil norms, legal frameworks and freedom of the media against us, as they manipulate and convince others to reject our way of life. Our adversaries will attack our populations, our centres of commerce, and our integrated global economy, including our social networks and the facilitating, but vulnerable, global commons that we use to connect and prosper. Adversaries will take the initiative and exploit vulnerabilities both in the virtual and physical domains of the global commons, including the realms of sea, land, air, space, cyberspace, information and media.

Advocating the values and ideas upon which the Alliance is founded and engaging in the 'battle of the narrative' may be the most effective tools to counter our adversaries. In this more optimistic vein, the future presents NATO with unprecedented opportunities to positively influence ideas, values and events in a globalised world, as the Alliance maintains and improves its ability to respond to unpredictable and complex challenges. We must work tirelessly together to build support for an Alliance that continues to espouse the values and ideas upon which it was founded.

The Alliance needs to reach agreement on the nature of the principal risks and threats that it faces. Only with a clear vision of the role and core tasks of the Alliance will it be in a position to take the necessary political decisions, to prioritise the tasks and identify the military resources to fulfil them and gather the necessary political will to do so. While we cannot eliminate the element of surprise, we can identify critical challenges and transform with less risk, and adapt with less difficulty, when threats and surprises arise. Preceding this, however, is a common Alliance vision of its future core tasks and roles, and the necessary political decisions to prioritise these and identify the military and other resources to fulfil them. Futures are a lens to stimulate new insight. They are a means, not the product, of the Multiple Futures Project. As such, they are a tool to help shift our focus from the urgent issues of today to the important issues of tomorrow.

The first future is called the **Dark Side of Exclusivity.** It describes how globalisation, climate change and resource scarcity significantly affect the capacity of states outside the globalised world to function effectively and meet the needs of their populations. Weak and failed states are sources of instability, and the states of the globalised world are faced with strategic choices on how to react.

The second future, called **Deceptive Stability,** refers to a world where advanced nations are preoccupied with societal change and how to manage the coming demographic shift as native populations' age and young migrants fill the void. States in this world of relative benign stability are preoccupied. They focus inward on social cohesion, legal and illegal migration, and transnational issues related to Diasporas. This leaves them ill-prepared to deal with geopolitical risk.

Clash of Modernities, the third future, sketches a world where a strong belief in rationalism, coupled with ingenuity and technological innovation, fuels and promotes horizontal connections between advanced networked societies across the globe. This network is challenged from the outside by authoritarian regimes of the hinterlands, and from within by a precarious balance between civil liberties and oversight by the state.

Ohio National Guard soldiers from the CBRNE Enhanced Response Force search for trapped victims.

In the fourth future, **New Power Politics,** growing absolute wealth and the proliferation of WMD has increased the number of major powers, between whom there is now a tenuous balance. Globalisation through trade integration and internationally-agreed standards is undermined as these powers compete for and impede global access to resources and spheres of influence.

The four futures are not mutually exclusive – the actual future may have some elements from each of the four futures. Understanding and preparing for the risk conditions from all Futures should minimise transformation risk. Why these four futures? How were they deduced? More than 500 experts from the political, civil, economic and military domains, representing 60 institutions and 45 Nations, came together to try and make sense of the future security environment and what it may mean for the Alliance.

The project started with a fundamental analysis of the drivers of change that will affect the Alliance over the next 20 years. Nine drivers, all of which are significant in terms of their relevance and potential impact on the Alliance, are the building blocks of the project. Three of the drivers; **Friction** in international level decision making, economic **Integration** of globalised actors, and **Asymmetry** of wealth and power, are referred to as structural drivers, reflecting the historical fabric of the international system. These are used as a backdrop to consider the long-term drivers and their relationships. Several of these long-term drivers were considered prominent in terms of their potential impact:

- **Demographics,** changes of which are relatively certain, will define the character of the future world;
- **Competing Ideologies and Worldviews,** and the enduring competition and confrontation over values, religion, social/moral and ethical norms, culture, customs and geopolitical historic perspectives will be significant;
- **Use of Technology** and its transformative ability will continue to capture the imagination, but its exponential advancement will also facilitate its disruptive use.

Finally, the increasing scarcity, value and allocation of **Resources,** impacted by **State Capacity** and **Climate Change,** will continue to be at the heart of conflict and civil strife. These drivers intersect in different ways within a framework based on the structural drivers and with varying weights to create the four plausible futures.

The futures provide an effective means to assess the potential impact of 'strategic surprise' – a significant non-linear development that radically changes the future. Two such surprises, (a WMD or Effect event, and a Global Pandemic) were systematically applied to each of the four futures to determine the risk conditions and implications that may result. This threat analysis was used to identify risk conditions and these, in turn, were used to determine security implications. Security implications represent broad areas of concern or vulnerabilities and lead to possible military implications. A total of thirty-three security implications and twenty-six military implications were considered, from which four broad insights and seven military focus areas were developed.

The first insight touches upon the cornerstone of Alliance defence structures by discussing why and how the evolving nature of threats will challenge efforts to reach a consensus on what may trigger an Article V response. The second insight reflects on the need for the Alliance to examine its responsibility to act outside the traditional areas of engagement, in order to preclude or minimise conflict with pro-active, integrated and comprehensive approaches. The third insight centres on the understanding that readily available advanced technology will enable determined adversaries to attack Alliance vulnerabilities in new and unexpected ways, thus requiring NATO to consider changes in its operating concepts, capabilities, and future force structure. The fourth insight suggests that enhanced communications and increased interaction with international partners will be required to positively influence and shape values, ideas, and events in an increasingly globalised world.

Five of the military focus areas identify potential roles that NATO could consider emphasising for 2030:

- **Adapting to the Demands of Hybrid Threats,** which demands a maneuverist stance against (or out-thinking of) modern adversaries;
- **Operating with Others and Building Institutions,** where the Alliance needs to be more proactive and seek greater cooperation and partnerships;
- **Expeditionary and Combat Capability in Austere Environments,** where the Alliance needs to consider adaptable Command Structures and ensuring full access to the global commons.

The remaining two focus areas, **Strategic Communications and Winning the Battle of the Narrative,** and **Organisational and Force Development Issues,** represent the essential enablers associated with the roles envisioned for the Alliance.

'... the Alliance must strive to achieve a common understanding of perceived risks and threats in order to anticipate and sense important trend, developments and events.'

MFP accepts that the security environment will continue to evolve and be subject to a variety of unforeseeable and dynamic political, social, technological and military developments. Accordingly, the Alliance must strive to achieve a common understanding of perceived risks and threats in order to anticipate and sense important trends, developments and events. By doing so, the Alliance will be better positioned to positively shape and react to the security environment of the future. ●

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Bridging the Intel Gap

Standardising Unmanned Aircraft Motion Imagery and the Implications for NATO

By Lt Col Ray Bernier, USA AF, JUAS CoE; Maj Pat Filbert, USA A, JUAS CoE;
Mr. Dennis Steed, USA, Engineer, BOSH Global Services

The 21st Century has brought increased challenges for intelligence gathering with new adversaries and dramatically changed battlegrounds, like those faced by NATO in Afghanistan and by the U.S.-led Coalition in Iraq. New and innovative approaches to intelligence collection processes are now being employed that are driving novel tactics and even affecting high-level doctrine. A large part of this new intelligence collection process involves the use of motion imagery.

This contrasts with the 20th Century, when exploitation of still imagery was brought to new levels to provide military leaders with accurate orders of battle, and occasionally, adversary intent. An example of the use of still imagery by reconnaissance aircraft occurred during the Cuban Missile Crisis (October 1962) when the U.S. detected and protested the installation of Soviet missiles in Cuba with U2 still imagery.

This article will provide a summary of the U.S. Joint Forces Command's Joint Unmanned Aircraft Systems Center of Excellence's (JUAS CoE) report, Motion Imagery Exploitation Product and Training Requirements: Report of Findings (June 2009) and, additionally, examines its implications for NATO. While the focus of this article is on the use of motion imagery and Full Motion Video (FMV) carried on UAS, it should be noted that the JUAS CoE did not discount manned FMV.

Motion Imagery in Counter Insurgency Operations

In today's Counter Insurgency (COIN) operations, where the enemy has not yet displayed an ability to conduct large-scale conventional or chemical, biological, radiological, nuclear, and explosive (CBRNE) warfare, motion imagery has now replaced still imagery as the crucial element in intelligence support. While still imagery analysis focuses on information, such as the location of large maneuvering forces and strategic centers of gravity, motion imagery has demonstrated its utility to develop the understanding of cultural norms and provide pattern-of-life information.

Individuals and inconspicuous structures/vehicles/objects are primary targets during COIN and require near-real-time intelligence, especially to support a dramatically shortened kill-chain. Unmanned Aircraft Systems (UAS), with longer endurance and lower maintenance and production costs, compared to manned aircraft, have become very significant providers of motion imagery. This is best illustrated by events during the April 2008 Battle of Sadr City, where the Predator UAS helped provide a decisive advantage and, arguably, led to combat success.

'Unmanned Aircraft Systems, with longer endurance and lower maintenance and production costs, compared to manned aircraft, have become very significant providers of motion imagery.'

Observing this compelling and dramatic success, the JUAS CoE embarked on 2 six-month studies researching UAS motion imagery, and identified numerous gaps in motion imagery training, usage, archiving, and retrieval. The focus of the two JUAS CoE studies was to address the qualitative problem (lack of standards) rather than the quantitative problem (lack of trained analysts).

These standards would provide the baseline foundation for the development of joint doctrine. Use of common standards would ensure analyst training leads to more effective utilisation in a joint environment and provide a large step forward to support an ever-growing requirement. The end result of the two studies was to lay the foundation for a more focused study effort by the JUAS CoE on motion imagery exploitation and the lack of standards, software capabilities, and training throughput within U.S. uniformed Service Training Activities.

Target Point

New and innovative intelligence collection processes are being deployed via Unmanned Aircraft Systems to provide motion imagery of enemy threats in Afghanistan and Iraq to military leaders. This information is a crucial element in intelligence support and NATO will only be able to truly exploit this capability through the development of training standards and improved interoperability.

Focusing the Effort

The JUAS CoE report (information as of summer, 2009) highlighted six areas for improvement focused on:

· A lack of clearly defined phases of motion imagery exploitation;

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The U-2 collected still imagery over Cuba during the Cuban Missile Crisis.

· A lack of common motion imagery exploitation software capability requirements across the U.S. intelligence community;
· An absence of standardisation for access to intelligence products;
· An absence of identified requirements for training motion imagery analysts;
· U.S. Services' requirements not being met by the only formal training course available for uniformed motion imagery exploiters;
· An absence of a common list of competencies to qualify motion imagery analysts to support a Joint Task Force Intelligence Directorate.

These areas can be divided into two basic categories, with all of the shortfalls directly or indirectly related to:

· The lack of common definitions of exploitation phases and the products associated with each phase;
· The lack of joint standards for analyst training.

In short, the lack of joint motion imagery exploitation standards ultimately reduces the value of motion imagery information to the warfighter. In turn, this impedes taking full advantage of technological superiority over the adversary.

In spring 2009, the U.S. National Geospatial-Intelligence Agency's (NGA) Motion Imagery Working Group (MIWG) presented measures to standardise motion imagery analyst training requirements.[1] The reasons for this were:

· To develop an acceptable minimum level of ability for all motion imagery analysts;
· To develop commonality among processes and products for all its forces;
· To enhance cost-effectiveness;
· To help lay the foundation for future interoperability in the U.S. and with Allied Partner Nations.

Based on lessons learned in Afghanistan and Iraq, the emerging standards were developed in conjunction with, and primarily by, the U.S. military.

Effects on NATO

Given the above background, highlighted shortfalls, and significant implications to the U.S. military, what does this mean for NATO? Specifically, how does it affect interoperability between member Nations? How does it affect conventional strategy and irregular warfare? What are the future implications?

While the U.S. has endorsed the tenets of the NATO Standardisation Agreements (STANAG) focused on motion imagery, a gap still exists between training and the standards supporting that training. There are currently no NATO standards for motion imagery analyst training; however, this gap could be filled by the MIWG developed products.

Developing NATO Training Standards

If NATO is to function effectively and exchange critical, timely motion imagery information that has been processed into intelligence, it requires motion imagery product and training standards. To train properly requires a common standard. Supporting the development of standards requires focus on several underpinning factors: training competencies, definitions of the phases of exploitation, and a common template for mission specific areas for the analysts to utilise as a format for exploitation.

'If NATO is to function effectively and exchange critical, timely motion imagery information that has been processed into intelligence, it requires motion imagery product and training standards.'

To this end, the MIWG continues to build upon the work of the basic motion imagery analyst competencies. In January 2010, they took the next steps to move the competencies forward and convened to develop full performance aspects of the competencies to support the advancement of skill development for the analysts. Furthermore, the MIWG began to address integration of areas that supervisors must be aware of to gauge the success of their analysts.

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An MQ-1B Predator from the 361st Expeditionary Recon Squadron takes off in support of OIF.

To further impress the need for training standard development, the JUAS CoE developed proposed motion imagery analyst worksheets (Figure 1 depicts the common header of the worksheet) for use during training and operations. These worksheets are designed to focus motion imagery analysts onto a standardized format for analysis purposes. This format can then be easily transferred between units entering and departing a theater of operations, as well as meeting defined archival standards such as those set out in STANAG 4609 (NATO Digital Motion Imagery Standard).

GENERAL INFORMATION WORKSHEET			
MISSION INFORMATION			
Mission Number		Mission Date	
Call Sign			
TARGET / OBJECTIVE INFORMATION			
Target Name			
All Target name			
GEO		MGRS	
TOT (Zulu)		TOT (Local)	
Weather		Sensor	

Figure 1. General Information Worksheet Example

Conventional vs. Irregular

The second question, 'How does motion imagery affect conventional strategy and irregular warfare?' will now be briefly discussed. In full-scale conventional warfare or nuclear warfare, where nations use a slow, precise, deliberate, and in-depth intelligence collection process, still imagery is arguably more precise and thorough; the consequences of inaccurate or incomplete intelligence could prove catastrophic. Conversely, in COIN, motion imagery has proven an indispensable enabler.

If a picture is worth a thousand words, motion imagery in COIN operations is worth a million. When viewed by a trained analyst, it can answer many questions about patterns of life and whether there is a threat in the area being observed. When viewed by the untrained observer, however, it can create either a false sense of assurance or uncertainty. Misinterpretation of a person's actions can make all the difference in understanding 'what is normal and what is not'.

For example, consider an analyst viewing a man who appears to be stringing wire for an explosive device. The untrained observer sees a possible insurgent preparing an attack on an approaching friendly convoy, while the trained analyst sees someone setting up a way to dry clothes. Thus, the targeting of a non-combatant is prevented.[2] This is why motion imagery analysts require a common standard, not only when being trained, but during actual exploitation and dissemination processes.

Motion imagery provides support to operations and intelligence customers simultaneously. These dual roles and/or mission sets for exploiting UAS motion imagery are driven by current COIN operations that require speed and agility of action to defeat fleeting

> *'If a picture is worth a thousand words, motion imagery in COIN operations is worth a million.'*

adversaries. Tactical-level combat elements make decisions based on actionable information provided by near-real-time motion imagery. At the same time, the intelligence customer can analyse and exploit UAS motion imagery for trends, pattern of life, or other supporting efforts.

Looking Ahead

A last question, 'What are the future implications of motion imagery?' is broad in scope. As technology continues to improve, the issues addressed here will become even more prominent. An additional issue will become blatantly clear, effectively filtering through the monolithic amounts of data. This is very relevant to motion imagery, where a term such as persistent Intelligence, Surveillance, and Reconnaissance (ISR) is replaced by Constant ISR. Ultimately, this will be the biggest, most intricate, issue to be solved.

If universal motion imagery standards are not developed, uniformed Services within all member nations of NATO may find it increasingly difficult not to become overwhelmed with motion imagery information. This could decrease effective operations, despite advances in sensors and platforms associated with motion imagery.

In conclusion, this article has discussed several of the contemporary motion imagery issues facing the NATO military intelligence community, and related implications. Standardisation among agencies in the processes, products, and training of analysts can support some of the current and emerging urgent needs to continue modernisation within NATO. Meeting the requirements of today's militaries to share and use motion imagery and motion imagery derived intelligence products must occur to effectively support the operator in current and future operations. ●

1. The MIWG is a U.S. uniformed military, NGA, and Coalition member (United Kingdom, Canada) body brought together in September 2008.
2. Shachtman, Noah. 'Robot Planes, Life-and-Death Choices over Gaza." Wired Magazine, 22 January 09, accessed 21 April 09; available at http://www.wired.com/dangerroom/2009/01/inside-israels-2/comment-page-2/; Internet. This article details a real-world example of what a trained analyst can do. Event occurred during the 2009 Israeli-Hamas conflict in Gaza.

No Photo Available

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Six intensive care patients can be treated simultaneously onboard the A310 MRTT.

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Intensive Care in the Air

A German Air Force Perspective

By Lt Col Ulrich Werner, DEU AF, Office of the Surgeon General

Caring for sick or wounded personnel forms part of the moral component of warfare and is a major consideration for military leaders in conducting operations. Expeditionary operations impose additional complications in the provision of this care, with further complexity added when it is conducted in austere locations or the hazardous situations that often typify military activities. To offer the full spectrum of medical support considered necessary – indeed essential – in today's society, a substantial medical footprint would be required in theatre. However, this is often not feasible for a plethora of reasons, including the prevailing threat, the availability of resources and, not least, cost. Therefore, the timely transport of patients to higher echelons of medical care remote from theatre is standard practice in today's operations. Aeromedical evacuation, in particular strategic aeromedical evacuation, is routinely utilised to facilitate this. In order to minimise the deployed medical footprint, patients need to be evacuated in a timely manner and this often means that patients are still in a critical condition with ongoing intensive care. Transport assets must, therefore, be equipped to provide intensive medical care throughout the evacuation process. Within the scope of strategic aeromedical evacuation, this period may last for 20 hours or even more. For all these reasons, airborne intensive care units are required.

NATO doctrine defines the responsibility for medical evacuation as National, though multi-National cooperation is energetically pursued, and it remains the case that some member Nations do not have the capability to act independently in this field. The ability to allocate nationally owned assets to conduct aeromedical evacuation operations requires the support of a comprehensive organisational effort. The system employed by the German Armed Forces is used as an example.

The German Armed Forces Approach

Discounting earlier humanitarian relief activities, the participation of troops from the Federal Republic of Germany on expeditionary operations began in the early 1990s with the Somali operation. Within the German Air Force, this sparked the development of an aeromedical evacuation system far beyond the existing capability of a bare stretcher (or 'litter') transport capability. The available fixed wing aircraft, specifically the A310 MRTT, C 160 Transall and Bombardier CL 601 Challenger needed to be equipped with the means to transport intensive care patients. Following some development to allow operation of the C 160 and the CL 601 in an improved aeromedical evacuation role, a system in use by Lufthansa German airlines was

'The ability to allocate nationally owned assets to conduct aeromedical evacuation operations require the support of a comprehensive organisational effort.'

further developed and introduced in all of the aircraft mentioned. The Patient Transport Unit was thus born, capable of providing all the medical support required by an intensive care patient. This includes monitoring vital data, continuous and controlled application of drugs, and performing artificial respiration, which includes the application of oxygen. Within the A 310 MRTT, 6 intensive care patients can be treated simultaneously, whilst a further 38 litter patients can be provided with monitoring capabilities and controlled drug application. The medical crew consists of up to 30 aeromedical personnel, including a flight surgeon, anaesthesiologists, intensive care nurses and paramedics.

In parallel to this technical development, the organisation to run such a system had to be formed and originated from the existing medical branch within air transport command. This also included establishing training capabilities for medical personnel.

Target Point

Expeditionary operations often impose complications in the provision of medical care for sick or wounded personnel. The aeromedical evacuation of personnel is necessary due to complexities faced in austere locations and hazardous situations. To effectively meet these challenges, NATO must foster cooperation between Nations to utilise transport assets with the capability to provide ongoing intensive care.

Today, within a 12-hour notice to move, an aeromedical evacuation aircraft can be launched to recover and treat patients worldwide. In actual fact, a response in even shorter time is regularly executed. Considering those situations where a flight was solely conducted for aeromedical purposes, approximately 50 sorties are flown per year, treating some 85 patients. In addition to this figure, a significant number of patients considered 'routine' according to NATO Standardisation Agreement, where transport can usually be scheduled with routine aircraft, were also evacuated. Whereas CL 601 and C 160 aircraft are taken out of their routine tasking and converted to aeromedical evacuation fit as required, one A 310 airframe is ring fenced and pre-equipped in aeromedical evacuation configuration to ensure the required reaction times. The reorganisation of the German Armed Forces in 2002, building a Central Medical Service as an independent service besides Army, Air Force and Navy, split the organisational responsibilities within the armed forces. A major part of the organisation of an actual sortie today is conducted by the Patient Evacuation Control Centre of the Central Medical Service, particularly dealing with the whereabouts of ground transport and patient distribution – a major consideration when moving over 40 patients at a time. The Air Force holds key aeromedical personnel, provides the airframe and conducts the actual flight, as well as running the medical equipment in the aviation environment.

The standardisation of medical equipment and aviation requirements is an ongoing process. To give an example of the implications of this, consider something as simple as a military litter or stretcher. The Patient Transport Unit is used in civil licensed airframes and must fulfil civil aviation regulations. It is designed to hold all standardised NATO litters. When a litter is attached to the airframe, as with the Patient Transport Unit, it falls under current aviation regulations. Thus, the litter belt becomes an aviation restraint device. Those devices have a lifetime limit, which necessitates a data sheet for each individual belt. Because litters never had such data provided before, Patient Transport Units have to be equipped with aviation compatible litters.

Personal Experience

The complexity and demanding circumstances of strategic medical evacuation operations can be demonstrated via an example as experienced by the author. A Swedish soldier assigned to ISAF suffered a combat injury in Afghanistan, which required immediate airlift to a Role 4 medical facility. The German Government was approached by Swedish officials,

and scrambled an immediate CL 601 sortie, flying direct from Cologne to Termez in Uzbekistan and rendezvousing with the respirated patient. The aircraft then took off immediately and flew to Goteborg, Sweden, where the aircraft and crew remained overnight. Just before its departure back to Germany from Goteborg the following morning, there was a new scramble and, after checking the remaining available medical supplies, the aircraft flew to Pristina in Kosovo instead, picking up a German soldier with a non-battle injury and flying back to Cologne. Within a week, the next scramble led the same strategic medical evacuation team to Pristina again, this time to recover a Georgian soldier of the Kosovo Force (KFOR) contingent with a disease who was flown to Tiflis in Georgia. The team had to remain overnight there and headed back to Germany the next morning. Flying over the Black Sea, just abeam the Crimean peninsula, the crew was contacted by radio to establish whether it was possible to divert to Cyprus, to pick up a German soldier of the United Nations Interim Force in Lebanon (UNIFIL) contingent. After checking with the flight crew and the medical team if they had the capability to comply with the request, the flight was diverted to Cyprus, picking up the patient to be flown to Hamburg, Germany. Still within crew duty time regulations after dropping the patient there, the flight finally returned to its home base Cologne, 35 hours after it original departure.

Potential Enhancements

This, along with many other examples, invites consideration of ways to optimise the use of military assets in combined operations. While the national responsibility for strategic medical evacuation has already been mentioned, there is clear potential benefit in making use of any available airborne asset for aeromedical purposes. Similarly, there is great utility in assuring the interoperability of systems. In an ideal world, what would such a system look like?

In expeditionary operations, there is a continuous flow of aircraft in and out of theatre. An organisation that has oversight of all those flights is needed. Secondly, if all the aeromedical equipment available in theatre could be used in any available aircraft, much better utilisation could be achieved. Finally, medical personnel capable of dealing with the combination of patient, equipment and airborne assets from all participating nations would offer maximum flexibility.

Unfortunately, there is no structure that currently fulfils this aspiration, and only within national systems or small groups of nations does something like this exist already. So what is the solution?

Standardisation would be an answer. It would, however, be a huge effort. A step to gain aviation approval for operating medical equipment aboard an aircraft would involve a commitment to the development of a single type of equipment for use by everyone. The different aviation licensing authorities could then focus on the same equipment, and the medical personnel could all train on the same equipment. Tangible benefits would be achieved from this interoperability. However, can such a dream be realised?

Current experience, sometimes within the service branches of a single nation, does not bode well for this wish for standardisation to be fulfilled. Nevertheless, by definition this is not impossible, and if it can be shown that a multinational approach (compared to a national approach) could result in reduced costs for all, this may provide just the catalyst needed for the development of a combined solution. ●

Lieutenant Colonel Dr. Ulrich Werner

is a flight surgeon with the German Air Force. He received his medical degree and PhD from Cologne University and immediately served at Bad Zwischenahn Armed Forces Hospital. He then became a GP and flight surgeon for a helicopter squadron and later for fighter wing 71 'Richthofen'. Since 2002, he has been a medical director for Airmedevac flights for the German Air Force. He served in Somalia in 1993, SFOR in 1998 and 2001, Mozambique in 2000 and ISAF in 2005. Dr Werner was the medical advisor to the JAPCC from 2007 to early 2010. In March 2010, Dr. Werner was posted to the office of the surgeon general German Air Force at Siegburg, Germany.

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Counter Piracy

Encouraging Air & Space Synergy

By Gp Capt Tom Bennington, GBR AF, Chief of Staff to COM MAR AIR Northwood

On 17 Aug 2009, the North Atlantic Council (NAC) approved an enhanced Counter Piracy (CP) mission for NATO under the banner of Operation OCEAN SHIELD. The operation was to build on the success of previous NATO CP missions: ALLIED PROVIDER (October to December 2008) and ALLIED PROTECTOR (March to August 2009), the former of which, had arisen from a request by UN Secretary-General Ban Ki-moon for NATO to increase protection to World Food Programme (WFP) shipments transiting the dangerous Somali waters. Although the NAC decision signalled a stronger commitment to the international effort to contain piracy, a long term solution was widely recognised as being beyond the scope of action at sea and would ultimately depend on increased governance ashore. The NAC mandate did, however, widen the scope of the operation from suppression, to encompass a more comprehensive approach to the piracy problem, including regional capacity building initiatives and a specific focus on 'integration' of NATO activities within the wider international CP effort. Despite Nations' apparent support to the enhanced CP mission within the NAC, subsequent force generation proved disappointing and activities of late have centred on a plan of alternating the Standing NATO Maritime Groups 1 and 2 to achieve some of the desired effects. Disappointingly, no air ISR platforms were committed to OCEAN SHIELD and recent initiatives to generate NATO AWACS have struggled to overcome funding issues and the ability to find political consensus.

Target Point

In order to counter the effects of piracy off the Somali coast, NATO must promote cooperation amongst affected nations to share capabilities and provide a unified effort. Air and Space Power could greatly enhance these capabilities, raising situational awareness through the use of ISR and providing a real time maritime picture to ships, which would provide increased speed of response.

Even if one takes account of the many contributions from individual nations and the support of NATO, EU and the Combined Maritime Force (CMF) to the CP effort, the scale of the task remains daunting. The Gulf of Aden (GoA) and Somali Basin ocean areas total some 1.1 million square miles, an area equivalent to the Mediterranean and Red seas combined! Pirate Action Groups (PAGs) operate from the shore to the deep ocean and offer little in the way of combat indicators to distinguish themselves from legitimate maritime traffic. Given the diluting effect of the area size, combined with the paucity of actionable intelligence, maritime units have rightly focussed their efforts on the key trade route through the GoA and the enforcement of an Internationally Recognised Transit Corridor (IRTC) to increase confidence and provide a high degree of protection to merchant vessels. The strategy proved quite successful and delivered a significant reduction in pirate activity within the GoA for the latter part of 2009. The pirates, however, have been quick to shift their sights and, of late, have conducted several bold attacks within the IRTC and as far out as 1100 miles from shore into the Somali Basin. They also appear to have found a new hunting ground in the dense shipping areas around the Seychelles.

With CP force levels unlikely to rise and an emboldened opposition, who seems likely to increase their efforts and widen their operating areas in this lucrative trade, where to next? What can NATO do to deliver improved CP capability? The remainder of this article will offer some thoughts on how Air and Space power might be brought to bear on this maritime specific problem and discuss both the pros and cons of joint air operations in the region. In closing, it will offer some specific 'lessons learned' from current operations and identify some emergent trends that may challenge our current air doctrine.

NATO warships offer much to the CP effort. Their inherent flexibility, endurance and reach, especially in this remote region of the globe, are key components of a true end-to-end CP capability. Their effect, however, can be greatly enhanced by the synergistic use of Air and Space power to raise situational awareness and provide increased speed of response, ubiquity and the unique benefits of elevation – the 'bird's eye' view. A multi-layered ISR Concept of Operations (CONOPS) to deliver actionable intelligence to ships at sea should be adopted and could be integrated with platforms from non-aligned nations (Australia, Japan and Russia, et al) and coalitions (EU and CMF). The differing mandates of the EU (WFP protection) and CMF (Counter Terrorism) have tended to duplicate similar capabilities for slightly different ends. Although some positive interdependency is now evident, air operations in the region have been regularly fragmented. This is compounded by a preference of naval force commanders to tie limited air assets to specific task forces at sea rather than letting them operate with ubiquity as theatre assets. The Centralised Command – Decentralised Execution Model is significantly strained without a truly 'unified' command, although within the limited CP air community, progress has been made of late to provide a single 'coordinating' function to improve both air safety and mission effectiveness.

'Space-based communications and commercial satellite services such as Automatic Identification System (AIS) can provide the basis of a real time, high resolution recognised maritime picture of cooperating maritime shipping.'

Space-based communications and commercial satellite services such as Automatic Identification System (AIS) can provide the basis of a real time, high resolution recognised maritime picture of cooperating maritime shipping. This basic picture can be further enhanced for military use by the employment of both manned and unmanned aerial vehicles, providing raw contact data of non-cooperating vessels to command nodes, both ashore and at sea. NATO AWACS are key enablers in this role and can merge commercial AIS data with their own organic picture onboard to give a complete 'contact' plot of all vessels at sea in specifically designated regions. Digital LINK networks can disseminate the picture, providing a common operat-

ing picture to CP units. The U.S. Broad Area Maritime Surveillance (BAMS) offers a similar capability and can be mounted on REAPER, providing an endurance of 30 hours.

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An EA-6B Prowler launches from a U.S. aircraft carrier.

However, given the lack of combat indicators (primarily boarding ladders and towed skiffs), PAGs are notoriously difficult to detect and an additional ISR layer is required to provide target identification, track correlation and shadowing of suspect vessels. Conventional Maritime Patrol Aircraft (MPA) or UAS equipped with Full Motion Video (FMV) can provide this capability and reduce the patrol burden on surface ships, allowing them to pre-position to areas of interest, which enhances deterrence and increases the probability of successful intercept. That said, the relatively non-permissive nature of Somalia and, to a lesser degree, Yemen and the associated Force Protection overheads offer significant challenges when selecting operating bases for both manned and unmanned aircraft. Djibouti in the GoA, and either Seychelles or Kenya in the Somali Basin, offer viable basing options, however, they also require long transit flights to the deep ocean operating areas with correspondingly short on-station times. Air-to-air refuelling (AAR) would improve AWACS patrol times, and therefore, offer better resolution to planning and execution of associated MPA support missions, in most cases eliminating the need for additional AAR support. Organic helicopters, although limited in range and tactical endurance, can provide rapid response and high quality surveillance products in specific areas of interest. They also provide a crucial link in the chain, from intelligence cueing (AWACS/UAS BAMS), Target identification and shadowing (MPA/UAS FMV), to end-game activities, such as opposed boarding operations and, ultimately, hostage rescue.

'With Russian, Chinese and Iranian aircraft operating alongside NATO, how can the Centralised Control Model be implemented successfully?'

Complex, coordinated Joint operations are the bedrock of NATO capability and are already well codified within the doctrinal spectrum of maritime air operations. The NATO doctrine, however, assumes that all participants will be familiar with, and follow, the guidance offered. With limited resources and the growing complexity of multiple coalitions and nations operating without unified command within the same battle space but towards similar ends, our current doctrine needs to be refreshed and expanded to cover less ordered environments. As a professional airman, it is difficult to critique the Centralised Control model. How are we to conduct safe and efficient air operations when many of the practitioners are unwill-

ing to represent themselves at the Combined Air Operations Centre and, even if they did, would not receive an Air Tasking Order due to classification restrictions? With Russian, Chinese and Iranian aircraft operating alongside NATO, how can the Centralised Control Model be implemented successfully?

The EU has adopted an unclassified process for deconfliction, situational awareness and basic tactical coordination for surface units, which uses an internet-based website (MERCURY) as its backbone. The website is unclassified, but uses security protocols similar to internet banking to identify the user's identity and restricts access to only those with a proven need. Capabilities include Chat and a rudimentary RMP, but is accessible to all CP practitioners. Without unified command, they operate as a community of shared interest, working together when interests are aligned and alone when national interests prevail. Such a system is worthy of consideration within the air community, as the future battlespace is liable to be more cluttered than less, and a multi-layered approach to information sharing is almost certainly a hard requirement.

CP operations in the waters around Somalia will continue for some time and may indeed grow in prominence as the effects of piracy become more profound in a shrinking world economy. With limited air assets available for CP duties, NATO must encourage member Nations to share National capabilities for the benefit of all, play to its proven strengths of coordinated operations and take a strong stance against duplication. ●

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Group Captain Bennington

has been a maritime patrol pilot since 1988, operating both the Nimrod MR2 (206 and 42(TB) Sqns, RAF Kinloss) and the Orion P-3C (VX-1, NAS Patuxent River). He has flown operationally in support of OEF, TELIC, HERRICK and served as an Air operations officer with CTF 320 at Northwood in the UK and JIATF(S) at Key West in the U.S. More recently, he commanded the Nimrod Operational Conversion Unit and was Chief of Staff to the Air Wing in Basrah, Iraq. He took up his appointment as Chief of Staff to COM MAR AIR Northwood in April 2009. Away from work, he enjoys technical scuba diving and skiing. He is married to Yvonne and they have 3 teenage boys.


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Reflecting on Poland's Accession to NATO and its Impact on the Air Force

An interview with the Late Polish Air Force Commander – Lieutenant General Andrzej Blasik

Editor's Note

This interview was conducted before the tragic accident on 10 April 2010, which took the lives of Lt Gen Blasik and many other leading lights in the Polish Government. We wish to extend our deepest condolences to the Polish Air Force and Nation during this difficult time.

The transcript of the interview has been published posthumously and unaltered with the approval of the Polish Air Force Headquarters.

General Błasik, your first term of office as the Commander of the Polish Air Force is nearing its end, and your superiors have already proposed that you post this position for a second term. How would you summarise your last 3 years as Commander of the Polish Air Force and what objectives do you seek to accomplish in the future?

Our Nation's Air Force has undergone very dynamic changes. This is the outcome of technological advancements and the procurement of new arms – which not only means the introduction of modern equipment, but also a change in the way we think of and organise command. Modernisation and professionalism are the two main processes that are aimed at creating modern and effective command structures, which will not only allow for successful accomplishment of national objectives, but also for cooperation within Allied initiatives.

Recently, the Polish Armed Forces have become fully professional. Even during the times of conscrip-

tion, the Polish Air Force maintained a high percentage of professional staff because of our Force's specific character and the need to possess highly qualified personnel. However, the shift from this state to a fully professional service was a milestone in the Air Force's transformation.

Guiding the Air Force through this structural change, while implementing modernisation, was a very demanding and dynamic task. I am most pleased that my superiors proposed that I perform my tasks as the Polish Air Force Commander for a second term. I will therefore be able to complete many projects that had been initiated along with Poland's accession to NATO, such as the implementation process of the multi-role F-16.

How did the 10 year period of Poland's accession to NATO influence the Polish Air Force? Since you were a witness as well as a participant in this process, could you please explain the most significant changes that have occurred in that time?

Our accession to NATO has created many new opportunities and tasks in the fields of interoperability and deployability. The most visible aspect of our participation in the Alliance is the procurement of western technology. Poland purchased 48 multi-role F-16 Block 52+ (36 F-16/C and 12 F-16/D) aircraft that have been distributed to two airbases: Poznań and Łask. We had to prepare the proper infrastructure to house this equipment, as well as train ground and technical personnel – not to mention the pilots. This training process is still at hand and will be completed in the next couple of years. By 2013, Poland will possess 72 fully-trained F-16 pilots. In 2010, the aerial component of 4 F-16s – declared by Poland to meet Allied operational needs will undergo the preliminary NATO Forces assessment procedure: STARTASSESS. A positive result from this assessment is one of the most crucial tasks set for the Air Force in 2010.

The F-16 program is not the only program enhancement for the Polish Air Force. The C-130E Hercules program is equally important. Thanks to the Foreign Military Financing Program, our nation will possess a fleet of 5 C-130E Hercules aircraft. In order to successfully manage this project, we had to prepare the proper infrastructure at Powidz Air Base, and train the aircrew, ground personnel and technical personnel. The Polish Air Force has recently received 2 of these aircraft, and the rest of them will be delivered to Poland this year. The Hercules aircraft will strengthen our airlift capability, which had been successfully augmented by the Spanish C-295M CASA over the past few years. Increasing our airlift capacity comes at a perfect time with the high activity of Poland's Armed Forces in several Allied missions around the world i.e. Iraq, Afghanistan, Chad, the Balkans and the Middle East.

Technological changes will also take place in the training branch. The 4th Air Training Wing will acquire LIFT (Lead-In Fighter Trainer) aircraft suitable for advanced air training. We plan for the first aircraft of this type to land on Polish soil around 2013. This is a tremendous effort that will result in great change to our aerial training process.

All of these examples are directly related to the flying units; however, significant changes are also being adopted in the other branches of our Air Force. The Radar Forces utilise several types of radar stations – including the modern long-range NUR-12M radar outposts, which were implemented in 2007, and the mobile medium-range TRS-15 ODRA radar stations. By 2011, the long-range radar outposts will be equipped with 3 Italian-produced RAT-31 DL devices acquired through the Allied CP 5A0044 investment package, which calls for the 'Delivery and installation of long-range air defence radars for new NATO members.' Most of the equipment used today shall be replaced with next-generation systems by 2018, enabling us to provide radar surveillance and detection of a broad array of aerial objects, as well as tactical ballistic missile threats. Performing in full cooperation with National and Allied command & control systems will allow the air force and air defence force to reach the required operational capabilities and effectively support combat situations.

Additionally, the Ground Based Air Defence Forces (GBAD) will undergo a complete restructuring and modernisation process in the upcoming years. By 2018, our GBAD systems will provide full coverage of National airspace in compliance with NATO and EU requirements. The successful realisation is based on

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'The Hercules aircraft will strengthen our airlift capability...' – Lt Gen Andrzej BLASIK

acquiring modern missile defence systems capable of: providing operations within the NATO Integrated Air Defence System (NATINADS); counteracting hostile aircraft, UAV, cruise missile and stand-off weapon threats; establishing a network-centred command & control air defence system that will allow autonomous operations of individual missile defence units; and providing a high mobility factor.

Over the last few years, the Polish Air Force has been increasingly active in NATO missions. Could you please highlight these missions and the experiences gained?

According to the policy of the North Atlantic Alliance, its member Nations are obliged to provide collective integrity of NATO's airspace. The Polish Air Force has provided airspace support for the Baltic Nations twice through MiG-29 Polish Military Detachments – in 2006 during the first PMC ORLIK mission and in 2008 during PMC ORLIK II. We have also declared readiness to fulfil the PMC ORLIK III Air Policing mission beginning in May this year and are prepared to take over these duties from the French Air Force, currently stationed at Siauliai Air Base, Lithuania.

In 2009, the Polish Air Force faced a completely new challenge – taking command of the Kabul Afghanistan International Airport (KAIA). The detachment consisted of 70 Polish airmen, primarily in the airspace control and logistics career fields. Their mission involved: managing aircraft traffic at the airport and in its vicinity; managing air control procedures; providing navigation instructions; providing technical service; protecting the airport; and detecting drugs and explosives. On October 1st 2009, the detachment's mission came to an end and command of the airport was handed over. When all was 'said and done,' the detachment managed and supervised more than 56,000 aerial operations.

Both the Air Policing and KAIA missions are excellent opportunities for Polish Air Force personnel to gain

experience in real operations. Every mission broadens our knowledge and competency – the assets demanded most for successful realisation of combined Allied operations. Troops, who have gained this experience, use it later in their home units to act as catalysts for changes and modernisation.

Polish Air Force participation in NATO is not limited to active missions; we try to actively participate in every Allied project – firstly, to guarantee our full engagement in NATO affairs, and secondly, to benefit from these undertakings by gaining experience. I would like to highlight two very important projects in which the Polish currently participate: NAPMO (NATO Airborne Early Warning & Control Programme Management Organisation) and the SAC (Strategic Airlift Capability).

For a few years now, exercises involving units allocated from the Polish Air Force, Land Forces and Navy have been organised to train participants in accomplishing Allied Air Defence objectives. These exercises – codenamed FRUIT FLY (in 2010 renamed to EAGLE TALON) – are organised every month, and the Polish Air Force actively participates in them by providing combat, transport and SAR (Search and Rescue) aircraft. All of these aircraft operate under the guidance of the E-3A Sentry AWACS System. Composite Air Operations, dogfights and SAR operations are realised simultaneously with air defence actions performed from the land and sea by GBAD units within their areas of responsibility. We feel that these operations have prepared our Polish Forces to effectively perform its duties on a daily basis, during international exercises or missions abroad.

The second project I mentioned is the SAC (Strategic Airlift Capability) – an initiative adopted quite recently. Ten NATO nations (Bulgaria, Estonia, Hungary, Lithuania, the Netherlands, Norway, Poland, Romania, Slovenia, and the United States) and two Partnership for Peace Nations (Finland and Sweden) initialised the SAC program to effectively secure the Allied need of heavy airlift operations. This project is comprised of 3 Boeing C-17 Globemaster aircraft operating from Papa Airbase in Hungary. Poland's investment in this program equals 5% of its total funding budget. Six Polish Air Force soldiers are currently based at the SAC base in Hungary.

Apart from these projects, the Polish Air Force realises several other initiatives and international exercises. Polish aircraft could be seen this year in Belgium, Sweden, Denmark, Greece and Spain, participating in exercises, training courses, and squadron exchange programs (i.e. BOLD AVENGER '09, the Tactical Leadership Program (TLP), NEWFIP 2009, LOYAL ARROW 2009, and BAST-E 2009).

Thanks to the participation in all these projects, Polish Air Force personnel are able to constantly broaden their experiences in a multi-national, Allied environment and increase our interoperability capabilities to actively perform within NATO initiatives. This tightens our bond with the Alliance and guarantees that our common sky becomes safer with each passing day.

Sir, thank you for your time and your comments.

1962 – 2010

Lieutenant General Andrzej BŁASIK

The late Lt Gen Andrzej BŁASIK was the Commander of the Polish Air Force and responsible for all her Air Forces, Air Defence Forces and Radar Forces. Gen BŁASIK held degrees from the Air Force Academy, Polish National Defence Academy and U.S. Air War College and had participated in many educational courses in-country and abroad. In 2005, he assumed command of the F-16 Block 52+ equipped 2nd Tactical Air Brigade. In 2007, he was appointed Commandant-Dean of the Air Force Academy. In April 2007, the President of the Republic of Poland appointed him Commander of the Polish Air Force. Gen BLASIK was a first-class pilot with 1300+ flight hours in various types of aircraft, including the Lim-6, the Su-22 Fitter and the TS-11 "Iskra".

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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.

'Several European countries have Patriot PAC-3 systems and contribute to missile-defence capability.'

NATO Defence Shield

Developing a Missile Defence Capability

By Lt Col Dick C. Van Ingen, NLD AF, Ministry of Defence

Ballistic missiles, and defence against them, have received prominent attention over the past few years. Missile tests in Teheran or Pyongyang are accompanied with a great deal of belligerent posturing and successes are openly celebrated in their media. The tests have also resulted in expressions of concern and the International Community is seized to once again discuss Missile Defence. This brings me to the topic of this paper, 'What is Missile Defence and how can NATO develop a Missile Defence capability?'

Missile Defence is not new. Work has been on-going on defence against ballistic missiles since the first ones were developed by Germany during WWII. In a report entitled 'Airpower and the future' published in November 1945, General Hap Arnold, Commanding General of the U.S. Army Air Forces wrote: 'Although there now appear to be insurmountable difficulties in an active defence against future ballistic projectiles similar to the German V-2, but armed with atomic explosives, this condition should only intensify our efforts to discover an effective means of defence.'

Threat

General Arnold's comment contains an important element. In spite of the fact that approximately 1,400 V-2 rockets came down on Great Britain, they did not have a decisive impact on the outcome of WWII. The V-2 was inaccurate and carried a small payload. If an opponent were able to arm his missile with a Weapon of Mass Destruction (WMD), on the other hand, this weapon could take on strategic significance. Simply threatening to use a ballistic missile with a WMD payload is enough to make it an instrument of force with a coercive effect.

Both North Korea and Iran are working on ballistic missile and nuclear programmes. It is difficult to determine whether those two countries' nuclear ambitions are for peaceful purposes only or whether military use is also being pursued. On 3 April 2008, NATO issued the Bucharest Summit Declaration, which included a joint statement regarding the threat: 'Ballistic missile proliferation poses an increasing threat to Allies' forces, territory and populations.'

In April 2009, that statement was affirmed yet again in the Strasbourg/Kehl Summit Declaration. NATO clearly looks upon ballistic missiles as a serious and steadily increasing threat.

Countering the Threat

Responding to the threat posed by ballistic missiles and WMD begins with diplomatic and political-economic measures consisting of negotiations and political and economic pressure. Those measures are referred to collectively as 'counter-proliferation'. The fact that counter-proliferation can be successful is demonstrated by the case of Libya. Strong political pressure and economic sanctions from the Western World led Libyan leader Muammar Khadafi to announce in December 2003 that Libya was dismantling its WMDs and cancelling ballistic missile development programmes. Libya now allows inspectors into the country to supervise compliance with the agreements made.

Counter-proliferation does not always lead to success. With respect to Iran and North Korea in particular, decisive successes have not yet been attained. On occasion, modest and temporary successes have been achieved, but those countries still have nuclear aspirations and the will to build and deploy ballistic missiles.

Target Point

After the recent missile tests by North Korea and Iran, there has been renewed pressure on NATO to mitigate missile threats. Counter-proliferation, deterrence, pre-emptive offensive actions and missile defence are options available to NATO to 'counter the threat.' A layered Missile Defence system, used in conjunction with counter-proliferation and deterrence, offers the most viable protection.

If counter-proliferation cannot prevent a country from acquiring WMDs and ballistic missiles, deterrence can ensure that they are not employed. A system of mutual deterrence operated successfully for years during the Cold War. That success, however, is no guarantee for future effectiveness of the deterrence principle. In the article entitled, 'Waging Deterrence in the Twenty-First Century', General Kevin Chilton (USAF) and Greg Weaver state unequivocally that the basis for deterrence has changed: 'How can one successfully deter attackers who see their own death as the ultimate (spiritual) gain, who have little they hold dear that we can threaten retaliation against, and who perceive continued restraint as the violation of what they see as a religious duty to alter an unacceptable status quo through violence?' With the different parties being asymmetric, deterrence has become much more complex and success cannot be guaranteed.

The Israeli air attack (Operation Opera) on the nuclear installation in Osirak, Iraq in 1981, showed that a pre-emptive strike was also an option for obstructing the development of missiles or WMD. Pre-emptive operations are considered illegal under international law and are, therefore, not an obvious course of action.[1] Anticipatory self defence is only justifiable in exceptional cases and when it is beyond a doubt that an attack is imminent and there are no other options.[2] A loaded missile on a launch pad is not necessarily sufficient justification. Pre-emptive offensive actions do not, therefore, offer a credible solution to the missile threat.

An attack using ballistic missiles carrying WMD can cause a high casualty rate and major materiel and economic damage. With the previously mentioned measures not providing a sufficient answer to the growing threat, an additional Missile Defence system may be needed. Indeed, in the Bucharest and Strasbourg/Kehl Summit Declarations, the NATO heads of government stated. 'Missile Defence forms part of a broader response to counter the threat.' Missile Defence is therefore seen as supplementing the other measures, and not as an isolated measure that supersedes the others. Missile Defence is a way to buy more time and, therefore, more freedom of action for politicians in the diplomatic process of counter-proliferation, by serving as a last safety net in the event of a ballistic missile attack.

What is Missile Defence?

A Missile Defence system is made up of sensors, weapon systems and interceptors linked together in a com-

mand-and-control network for the purpose of intercepting ballistic missiles in flight and to prevent or reduce the damage caused by a ballistic missile attack.

A Missile Defence system and sub-systems are capable of intercepting ballistic missiles during their ascent, midcourse or decent. Examples of such sub-systems include: The Kinetic-Energy Interceptor for Boost-Phase Intercepts, the Standard Missile 3 (SM-3) carried on AEGIS destroyers and cruisers for the midcourse defence segment, and a THAAD and Patriot PAC-3 in the terminal phase.

Most of those systems are American, however, several European countries also have Patriot PAC-3 systems and thereby contribute to Missile Defence capability. Beyond that, Israel and Russia are also active in this area with the Arrow II and the S-400 systems respectively.

NATO and Missile Defence

NATO makes a distinction between expeditionary Missile Defence and territorial Missile Defence, which are known as Theatre Missile Defence (TMD) and, simply, Missile Defence, respectively.

TMD is the defence of deployed troops and critical military installations in the theatre of operations against short and medium range ballistic missiles.

Missile Defence is the defence and protection of NATO Territory and population centres against the full range of ballistic missile threats.

In 1998, NATO decided on the development of a TMD capability, however, it could not reach an agreement on the development of a Missile Defence system. There was no common understanding of the threat against NATO territory and the risk of creating a strategic disbalance between Russia and NATO was a concern. In 2002, NATO initiated a Missile Defence feasibility study to answer these and other technical questions.

NATO is currently developing a command and control system for TMD operations in a programme known as Active-Layered Theatre Ballistic Missile Defence (ALTBMD). It is expected to be operational by 2015.

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A NATO Sea Sparrow Missile is launched from the carrier.

Although today there is a common understanding that the missile threat is developing, NATO has not yet made a decision with respect to Missile Defence. Results on a Missile Defence feasibility study were presented at the Riga Summit as long ago as 2006. That study showed that a Missile Defence system would be technically feasible, but left some questions unanswered. Currently, additional research is underway at NATO on the threats, legal consequences of Missile Defence, consequences of intercept, command and control arrangements, architecture options and costs.

Missile Defence at the NATO Summit

Although NATO has not yet taken a Missile Defence decision, a step forward was taken at the NATO Strasbourg/Kehl summit in late 2009, where the Council was tasked to present recommendations comprising architecture alternatives and to identify and undertake the policy, military and technical work related to a possible expanded role of the ALTBMD programme beyond the protection of NATO deployed forces to include territorial Missile Defence.

U.S. Missile Defence Plans

In September 2009, President Obama announced the Phased Adaptive Approach (PAA) for Missile Defence in Europe. The PAA is the development of a Missile Defence system proportionately based on the developing threat. It leads to the accelerated construction of

Missile Defence systems against medium-range missiles and a slow-down in the construction of Missile Defence systems to counter long-range missiles because that threat is developing less rapidly than had been expected. Also, the PAA is based on proven technology (like the SM-3) rather than starting up new technology-development programmes. This will save cost and reduce development uncertainties. President Obama has offered to make the U.S. Missile Defence system available as the backbone for a NATO Missile Defence capability.

What Now?

All good intentions of the past few years notwithstanding, NATO has not come much further than talk about and study Missile Defence. Technical feasibility remains a significant issue. We know how much difficulty NATO is having with the development of the much-delayed Air Command and Control System. If the path that President Obama has started on with the use of proven technology is taken, however, the concerns could be reduced significantly in this area. The SM-3 has been tested successfully and has already been used in a real-world situation to bring down a satellite that had gone out of control.

Arguably, only one major hurdle remains: cost. Member States are still coping with an economic recession and NATO itself is involved in an expensive operation in Afghanistan. The time is not really ripe for major new investments. Countries may, therefore, be expected to be slow to make a real choice for a NATO-owned and operated Missile Defence system.

The development of the threat will not be held back by the current financial economic situation, however, and developing effective protection is becoming increasingly necessary. In order to be acceptable, such protection must be implemented as cost-effectively as possible. That could be done by taking the U.S. up on its offer of integrating its Missile Defence system into the NATO ALTBMD system. Where the U.S. does not provide complete coverage for Europe, the European countries would have to augment it. That would require the deployment of the TMD assets, such as the Patriot PAC 3. In the future, those could be complemented with new European systems, such as the French SAM P/T and the Italian-German-American Medium Extended Air Defence System.

'The development of the threat will not be held back by the current financial economic situation, however, and developing effective protection is becoming increasingly necessary.'

This could lead to an efficient creation of a European layered ballistic Missile Defence system. It would not be a NATO-owned and operated Missile Defence system, but an integrated 'system of systems' using European and American sub-systems, over which NATO could exercise command-and-control via ALTBMD.

Before that stage is reached, NATO Members will have to make a decision. The next possibility to do so will be the coming NATO summit in Lisbon. That decision will require political will and commitment from all NATO countries. ●

1. Use of Force is prohibited (UN Charter article 2(4)) unless in case of Self Defence (UN Charter article 51) or mandated by the UN Security Council (chapter 7).
2. The legal basis is established by the Caroline Affair of 1837. British forces in Canada crossed the U.S. border and killed several Canadian rebels and one American citizen who were preparing an offensive against the British in Canada. The necessity for forcible reaction must be 'instant, overwhelming, leaving no choice of means, and no moment for deliberation.'

Lieutenant Colonel Dick C. van Ingen

began his career as a Tactical Control Officer Patriot in 1989. After an operational deployment to Israel during the 1991 Gulf War, he was posted to several operational and staff assignments in the Netherlands Missile Group, the Control and Reporting Centre Nieuw Milligen and the Staff of the Royal Netherlands Air Force. From 2004 to 2006, he attended the German Staff College in Hamburg. Thereafter, he was the Allied Command Transformation staff officer for Theatre Missile Defence and Missile Defence. In Oct 2007, Lt Col van Ingen was transferred to the Ministry of Defence as staff officer in the Operational Policy Directorate.

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NATO Secretary General Jaap de Hoop Scheffer and Estonian president Toomas Hendrik Ilves engaged in contract procurement of two medium range radar systems.

Baltic Air Policing Viability

NATO Requirement or Distraction?

By Maj Daniel Manning, USA AF, USAFE

The sovereignty of the skies above NATO member nations is protected by the collective capabilities and the will of Alliance members.

In most states, this capability is provided by indigenous air forces prepared to respond to potential airspace violations. Some NATO members, however, do not maintain air forces capable of performing this mission without assistance from other Allied nations. In these states, NATO Allies provide personnel and aircraft to ensure an equality of sovereignty across NATO's skies. The Air Policing solution in the Baltic states of Estonia, Latvia, and Lithuania is currently in its twentieth deployment of Allied aircraft, and its success depends on contributions from across the Alliance.

Both Sides of the Argument

The continued deployment of air forces is a topic discussed in military and political corridors of the Baltic States, as well as in those Nations contributing forces

to the mission. The arguments concerning the need for Air Policing generally take one of two paths, neither of which leads Nations to a solution supporting NATO's transformation goals. The advocates of Air Policing in the Baltic States, contend that the substantial numbers of Russian aircraft within reach of the only borders shared by NATO and Russia present a real threat. This threat, they argue, can only be mitigated by Allied aircraft ready to respond to violations. They use incidents such as the 2005 crash of a Russian Su-27 in Lithuania to bolster their argument. The critics of the current Air Policing arrangement, on the other hand, argue that NATO can divest itself of this Air Policing requirement because peace and cooperation with Russia has replaced Cold War brinksmanship. This argument is, in turn, bolstered in an era of economic recession and tightening defence budgets when most Allied Ministries of Defence would prefer to spend scarce resources on domestic military requirements rather than in helping foreign countries confront what they believe to be a specious threat. NATO's airmen must work to move beyond the current debates and begin addressing the difficult decisions, which will shape the future of the Air Policing mission.

Target Point

A number of NATO Nations face the daunting challenge of protecting the sovereignty of their skies from enemy aircraft and procuring air capability to achieve this goal. The Baltic Air Policing solution raises an argument, both politically and militarily, of whether NATO should continue its deployment of air forces to this mission, or whether those involved should develop capabilities to protect themselves.

NATO's Air Policing Policy

Even if one were to accept the strategic argument that Allied fighters need to be ready to respond to suspected violations, the efficacy of this force in the face of even a single rogue aircraft is questionable. The current NATO Air Policing policy is a peacetime mission allowing aircraft to identify, assist, and escort wayward aircraft. Absent from this list of tactical tasks are provisions to engage an aircraft posing a potential danger to a NATO Member. NATO's website,[1] somewhat confusingly, traces the roots of the modern Air Policing mission to the Royal Air Force's (RAF) actions in the 1920s over Afghanistan and present day Iraq. The website lauds the historical Air Policing mission as being 'deemed highly successful,' but the modern Air Policing mission bears little resemblance to the RAF mission, which used bombers and bombing campaigns to replace costly ground forces.[2] Connecting today's peacetime mission to the 'highly successful' Air Policing missions of the early days of air power is a tenuous link and not a relevant justification for continued Air Policing.

A Political Debate

Other advocates of Air Policing, including those who do not use the presence of a threat as their basis for argument, point to the political currency that the citizens of the Baltic States attach to NATO membership and the security guarantee that membership provides. An abiding distrust of Russian motives in the Baltic States continues to permeate the collective memory of these Nations who, it must be remembered, regained their independence less than 20 years ago. With Alliance membership a cornerstone of these Nations' defence strategies, the visible presence of NATO aircraft provides a tangible reminder of the protections afforded by Article V.

'With Alliance membership a cornerstone of these Nations' defence strategies, the visible presence of NATO aircraft provides a tangible reminder of the protections afforded by Article V.'

While the political benefits of the Air Policing mission are difficult to quantify, the political costs of another SU-27 incident are clearly untenable. But, as argued earlier, Air Policing is no guarantee that something similar cannot occur in the future. Engaging and de-

stroying an aircraft in the airspace of any nation in peacetime is a decision with substantial political considerations. This decision becomes especially difficult when the weapons are mounted on a foreign aircraft. During combat operations, command and control networks and rules of engagement allow military leadership to make rapid decisions concerning the use of deadly force. In peacetime operations, however, this streamlined, process-oriented decision making is replaced by a political leadership who, whilst well-versed in deliberate strategic planning, may have little experience in crisis leadership. Receiving timely political authorisation from each of the responsible National governments, with a rogue aircraft transiting several small countries at high speeds, is unlikely. Ironically, the very political establishment advocating the Air Policing mission is the same establishment which, through slow decision responsiveness, may render Air Policing impotent when confronted by an aircraft on a flight path to destruction.

'I do not know Baltic air space. I know NATO air space. There is Air Policing, there will be Air Policing, even long after [I leave] my present job.' [3]

Secretary General Jaap de Hoop Scheffer

NATO's Commitment

While neither the military argument nor the political expediency argument leads to any satisfying conclusion, these sorts of debates are the salutary trammels of healthy democracy. In a very Clauswitzian sense, all of NATO's military activities, Air Policing included, are political instruments. While NATO's Airmen must continue to provide prudent military advice, it will be the civilian leadership, informed by constituents' perceived fears, which decides the future of the Air Policing mission. If Secretary General Jaap de Hoop Scheffer's February 2008 comments are any indication, the Air Policing mission will endure. Speaking with the Estonian president, Scheffer said, 'I do not know Baltic air space. I know NATO air space. There is Air Policing, there will be Air Policing, even long after [I leave] my present job.'[3]

Political infatuation with the relatively limited capability offered by Air Policing can be a distraction, which threatens to overshadow the multitude of robust air defence capabilities provided by a proficient, well trained, and well resourced air arm. The Air Policing mission is not, and should never be, the raison d'être for a nation's air force. The ability to react to suspected air space violations, whether intentional or accidental, is but one capability provided by a healthy air compo-

German Euro fighters prepare to take off.

nent supporting a joint staff in the defence of a nation and its allies. It is the responsibility of air-minded leaders to enlarge their political leadership's vision beyond a myopic desire to establish an Air Policing capability into the commitment required to provide robust airpower for national defence.

Way Ahead

Even in the Baltic nations, where resources preclude fourth-generation fighter procurement, substantial financial commitments are being made to provide support for those Nations that contribute aircraft to the Air Policing mission. While certainly laudable, these commitments risk diverting resources, which could otherwise be invested in building enduring, capable air defence. Developing airbase infrastructure, search and rescue capabilities, and increased training opportunities for foreign aircraft deployed for Air Policing are worthwhile investments in a Nation's air power capabilities only if they increase the state's capacity to defend itself. Recent radar acquisitions in the Baltic Nations are significant steps towards building National defence capabilities that also enable the Air Policing mission.[4]

The challenge for air-minded leaders in Allied countries with nascent air forces is the same one to face military aviation pioneers for decades. NATO airmen must be able to eloquently communicate airpower's unique ability to achieve political objectives with the minimum amount of both political and military risk. One well-trained pilot, guided by professional weapons controllers and enabled by competent maintenance and support personnel, can leave the safety of an airbase to confront an aircraft violating a nation's sovereign airspace, before it becomes a hazard to population centers. Neither land nor maritime forces possess the flexibility and speed required to respond to this challenge. While Allies continue to provide this capability for the Baltic States, political and military leaders in the Baltic States will never be able to exercise the full range of sovereign options without an indigenous air defence capability that includes Air Policing.

Conclusion

The road to achieving this air defence capability is neither short nor without hazards, but it is well paved with the experience of Allied airmen. Employing fighter aircraft in defence of a nation is no small feat. The transition from legacy fighters to modern fourth generation capabilities has proven to be challenging for even well-established Allied air forces. Several Allies have no recent history of operating a substantial flying force, and more still are without a history of fighter aircraft operations. Building air power capacity can only be done in incremental steps. These steps reduce risk and provide an opportunity to develop dependable supply chains, competent maintenance professionals, and seasoned aircrew. Without such a solution, the nations without air defence or Air Policing capabilities now, will find themselves in no better position after five, ten, or fifteen years of the current Air Policing regime. Only deliberate, purposeful action and a careful balancing of political desires with prudent, air-minded military advice will bring progress that strengthens both the indigenous capabilities of individual Nations and the Alliance as a whole. ●

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The final moments of the Battle of Waterloo on June 18, 1815.

Archiv Preussischer Kulturbesitz (BPK)

Mission Command in a Network Enabled Enviroment

By Sqn Ldr Bruce Hargrave, GBR AF, JAPCC

A recent increase in local insurgent activity calls for a show of presence (fast-jet, low-level, noisy flypast) in a particular area. Through the shared situational awareness (SSA) that network enabling brings, this task is scheduled by local subordinate commanders to happen at night, just before an ISR satellite pass. A Forward Operating Base (FOB) commander, 20 km away from the show of presence, but with SSA, makes adjustments to that day's scheduled patrols. At the same time, the local rotary-wing commander brings forward a helicopter resupply to the FOB so that any possible detection of insurgent movements, following the show of presence, can be countered by a rapid air insertion of ground forces from the FOB.' A Forward Operating Base (FOB) commander, 20 km away from the show of presence, but with Shared Situational Awareness (SSA), makes adjustments to that day's scheduled patrols. At the same time, the local rotary-wing commander brings forward a helicopter resupply to the FOB so that any possible detection of insurgent movements, following the show of presence, can be countered by a rapid air insertion of ground forces from the FOB.

This article aims to show how a 19th Century concept, developed to overcome communications degraded by battle, can be of use in a network enabled 21st Century, when SSA of the battlespace is expected to become the norm, rather than the exception.

Mission Command (MC) was borne out of necessity in the 19th Century. It was, arguably, first practised by General von Moltke as 'Auftragstaktik' in the Prussian Army. Prior to the start of a battle, the Army Commander would have chosen a piece of high ground from which to oversee – entirely visually – the disposition of his own and his opponent's armies. At this point, he had good SA. Once battle was joined however, his SA swiftly became degraded. This was due to a very real effect – the 'fog of war' – caused by the smoke from gunpowder and the paucity of information flowing to the Commander from the points where battle was joined. The Commander could not, therefore, hope to know what was going on everywhere on the battlefield.

To overcome this, prior to the battle, a good Commander would make sure that his intent was comprehensively communicated to, and understood by, his subordinates. His subordinates, due to their vicinity to

the close battle, would be less hindered by the fog of war and would maintain some localised SA. Because the subordinates had been empowered to make tactical decisions, the battle could be fought in broad accordance with the Commander's intent.

Target Point

The development of information networks provides an opportunity to revisit the C2 of air assets. The 'centralised control and decentralised execution' model has served the air component well. If a robust network can enable shared situational awareness and network users can build shared situational understanding, the air component could take advantage of mission command to improve the use of A&S Power.

The same was true in the maritime. A wise Admiral might summon the individual Captains of his ships to dinner on the flagship on the eve of battle. Over the course of the evening, he would share his intent for the coming battle with them and also, one hopes, take their counsel. Once battle was joined the following day, the Admiral's ability to communicate with his Captains would be quickly diminished, but he could remain confident that they would continue to act in broad accordance with his intent.

While MC is instantly recognisable to the Land and Maritime components, this article will specifically consider the relevance of MC to Air and Space (A&S) Power.

Shared Situational Awareness and Situational Understanding

If reducing a commander's SA increases the need for MC, it may well seem that the converse also applies – as a Commander's SA increases, the need for MC decreases.

Indeed, early experiences of the wide availability of full motion video (FMV) feeds (often from Unmanned Aircraft Systems) to Command formations sometimes gave rise to examples of the 'long screwdriver' approach to tactical command. Senior officers, believing that FMV had given them enhanced SA, would attempt to direct a tactical engagement that was already being ably managed by subordinates.

This example illustrates both an inappropriate use of FMV and brings into question what SA actually is. Does FMV of a portion of the battlespace give SA to the observer, or does it merely show one point of view of that battlespace? Furthermore, if two observers share the same view of the battlespace, do they have SSA?

The 2008 JAPCC Conference included a panel discussion entitled 'Command, Control and Shared Situational Awareness'. Panel members pointed out that Command and Control were not the same thing and that, whilst a commander would have a requirement for long-term SSA, a controller may only need short-term SSA.

The terms 'Command' and 'Control' are often used almost interchangeably and this, inevitably, leads to confusion. Clearly, the two words have different meanings and, in the military context, they are well defined by Pigeau and McCann (2002).[1]

Command: the creative expression of human will necessary to accomplish the mission.

Control: those structures and processes devised by command to enable it and to manage risk.

By these definitions, control is the instrument of command, and command can be exercised by everyone in the enterprise. Command could, therefore, be widely distributed.

'... early experiences of the wide availability of full motion video feeds to Command formations sometimes gave rise to examples of the "long screwdriver" approach to tactical command.'

MC, at least initially, seems to be a tool with great utility at the tactical level of warfare, but little relevance at operational or strategic levels. It may be that Networked

Enabled Capabilities (NEC) will act as an enabler that allows a form (or forms) of MC to be applicable at these levels. For instance, if NEC allows collaborative planning and self-synchronisation of actions, this could herald a new era of MC. The assumption that those towards the top of a military hierarchy have a better knowledge of what is going on in the battlespace, or a better view of the 'big picture', will cease to be true. The hierarchy could instead be based on experience and talent in 'military art'.

Having explained, in practical terms, how MC came about and how it has been used, it may be a good time to attempt a working definition of the phrase, particularly for A&S power in a network enabled future. We might say: Mission Command in the context of A&S is a means to achieve the full range of environmental agility. Assuming network enabling provides near real time actionable knowledge, along with full understanding of the Command intent and direction, assigned elements are able to collaboratively plan. With the reduction (or elimination) of procedural constraints, the visibility of all aspects of the battlespace and the ability to self-synchronise, assigned elements have the freedom to decide how to best achieve the effect(s) required. Thereafter, with freedom, speed of action and initiative, A&S elements can fully exploit their potential.

What then would this look like and how would it change what Air does? To answer my second question first, it would mean that ideas on the application of Air Power in an operation would not just come from the personnel in the Joint Force Air Component Command Strat Cell, but could also come from the personnel from the wings and squadrons. This might be the basis of collaborative planning. If NEC also allowed shared situational understanding of what was going on in the battlespace, then the 'control' part of C2 would not have to spend so much time on the deconfliction of what the elements of A&S power do. Freed of procedural constraints, the opportunities to express 'operational art' in the application of A&S power might allow the self-synchronisation of effects and this could lead to more rapid achievement of desired objectives. For some, it may be a step too far to then expand this to the Joint arena, but why not dream?

If this future vision sounds like some universal solution, then it is also right to sound a note of caution. This version of MC will not be appropriate in all cases and there are some criteria that need to be satisfied for it to work at all. For instance, would we want to collaboratively plan or attempt to self-synchronise with elements we had not worked with before? Education, training and exercises would still have as big a part to play as they do today – arguably, a bigger part to play. In an operation where all those in the coalition have not had the chance to practice 'singing from the same hymn sheet', MC could be a recipe for disaster.

It may be, therefore, that 'Situational Understanding' (as opposed to SA), facilitates this new form of MC and this can perhaps be explained via the model below:

In the model, 'Empowerment' encompasses delegation, education, training and exercise, together with the will to act. Technological advances, e.g. NEC, can only give a route from the bottom left quadrant – 'Blissful Ignorance' - to the top left quadrant – 'Paralysis of the Wise'. 'Controlled Empowerment' is needed to give a route to the top right quadrant – Coherent Efficiency.

Whereas SA can come from a multiplicity of levels (almost everyone concerned with the battlespace can have some level of SA), Shared Situational Understanding must be command led. NEC therefore becomes the means by which, through frequent updates, command structures share their Situational Understanding. By this means, everyone on the network can exercise the 'coherent efficiency' version of MC.

Controllers in the CAOC monitor missions supporting Operation Iraqi Freedom.

Too Much Information?

One of the concerns raised about any form of NEC is that the sheer amount of information available will overwhelm the user. Everyday use of the internet does not always support this concern. Perhaps humans are good at determining what information is relevant and rejecting the spurious?

One danger is that, as extra information becomes available, confidence grows in the accuracy of the decisions made. Experiments have been conducted in the business world with stock market fund managers predicting which shares would do well. In these cases, experts were given forty categories of information to choose from. The experiment showed that as more pieces of information became available to the managers, their confidence in picking the most profitable shares increased, but the accuracy in their decision-making decreased.

'The terms 'Command' and 'Control' are often used almost interchangeably and this, inevitably, leads to confusion.'

The experiment demonstrates that decision makers given access to more and more information can become overconfident regarding the accuracy of the decisions they make, whilst, ironically, making less accurate decisions.

Extrapolated to a military scenario, a military commander may underestimate the risk of a decision to those personnel involved. The lesson to be drawn from this is that information management (which includes prioritising information according to its importance) is increasingly vital. It may even be seen as a vital command function. Where the military commander has an advantage, however, is that he is part of a capable team and may delegate MC to others. By doing this, he will avoid information overload. His 'mission commanders' could then use a subset of the information to arrive at an optimal decision.

What has been briefly described in this short article is not something that is likely to happen next year or even in the next five years. However, the increasing pace of technological innovation, when combined with a command-led willingness to grasp the opportunities offered by network enabling, may offer NATO's A&S Power practitioners a competitive advantage over future potential aggressors. ●

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Reference:

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Stryker lies on its side after surviving a buried IED blast.

Air's Toughest Challenge Yet?

Air & Space's Role in Counter Insurgency

By Air Cdre Paddy Teakle, GBR AF, Director of Air Ops, ACE, HQ ISAF

Every conflict brings a unique set of lessons, albeit some are common across the spectrum of warfare. Over the last twenty years, Air lessons from the previous conflict have shaped the entry position for the next. After the 1991 Gulf War, the success of strategic targeting and deep interdiction focused development and conceptual activity on these aspects at the expense of areas where weakness was exposed. Therefore, it is unsurprising that the entering position for Allied Force in 1999 exhibited an over-reliance on depth targeting. This approach failed to account for the different nature of conflicts or predict the crippling effect of political constraints on targeting. Furthermore, Air, as the dominant component, was ill-equipped, physically or mentally, to change direction. When the 2003 Gulf War loomed, air planners applied lessons from both conflicts to achieve a more balanced entry position, with predictable results. Yet, in preparing for that war, insufficient consideration was given to the post-conflict environment and the resulting insurgency presented a very different set of problems. The basic question for Airmen was; how is Air Power best leveraged for counter insurgency operations? This article will explore, in broad terms, some of the challenges we must face before we find the answer.

Airmen could be seduced into thinking that Air Power, which prides itself on its flexibility, would be unchallenged by the shift from a conventional to an irregular campaign, but that is not the case. Whilst at the tactical level, it is relatively straightforward to switch between tasks. At higher levels, it is considerably more difficult to change from one mission to another, particularly when this requires the adoption of a completely different mindset and approach. Furthermore, despite the multi-role nature of many air platforms, the composition of a

force tailored for conventional war fighting is unlikely to be well-matched to a counter insurgency.

First, we must understand the campaign context; fortuitously, certain characteristics are common to all insurgencies and it is possible to develop general counter-insurgency themes. However, each insurgency will be framed against a different set of causal and influential factors; some are ideologically driven, while others are founded on social injustice and grievance. Whatever the motivation, those charged with developing the counter insurgency strategy must understand it in detail. It is futile to roll a 'one size fits all' template from one insurgency to another and expect success. Ultimately, it is the nature of the insurgency that will determine the operational approach and resource requirements of the counter insurgent.

Contrary to current NATO doctrine, we must accept that it is inconceivable that Air will find itself in anything but a supporting role. We will need to be strong, impartial, and unselfish supporters, for it is against these criteria that we will be judged. Inevitably, there will be bias and misunderstanding and we must remain dispassionate and take time to explain ourselves. For example, some will question the necessity for control of the Air. We must explain that, unless we control our operating environment, we cannot manoeuvre within it and they cannot manoeuvre beneath it. True, we may not have to fight for it using missiles or bombs, but we still need an arsenal of effectors to achieve it. Understandably, few host nation governments will cede airspace control across the country, as air traffic revenue will likely be an important income stream for the state. Therefore, it is incumbent upon us to develop capabilities which can deliver a coherent, interwoven civilian and operational airspace. Our 'weapons' will be experts who can negotiate access, specialists who can design airspace structures which accommodate competing requirements without limiting freedoms, and software which allows dynamic airspace control. Crucially, we must be able to deliver these with exactly the same precision as our 'hard' weaponry.

'Few campaigns will be more voracious in their appetite for intelligence than counter insurgency [...] It is here that Air Power, and the perspective it provides through use of the third dimension, will be indispensible.'

Few campaigns will be more voracious in their appetite for intelligence than counter insurgency; the operational level requires huge amounts of tactical intelligence to feed its decision making processes. It is here that Air Power, and the perspective it provides through use of the third dimension, will be indispensible. Yet, with perspective comes a degree of detachment that means, perception is not the equivalent of comprehension. To gain understanding, we must fuse Air-derived intelligence with awareness of the cultural landscape, best gained through human intelligence.

To complicate matters further, we will confront the same supply and demand conundrum that afflicts every counter insurgency. We will face a paucity of collection assets, trained analysts and intelligence specialists. Any imbalance between these resources will retard a system, which must be rapid and responsive. On the demand side, the problem stems from the dispersion of an adversary whose *modus operandi* is to work in small discreet groups, employ asymmetric tactics and hide amongst the population. No longer are we seeking the first or second echelons of the enemy, nor his air defence system or his sub-surface force. We find ourselves, rather, searching for the proverbial 'needle in a haystack.'

Target Point

Air Power does not have a 'one-size-fits-all' template. Whilst air planning for conventional campaigns is well documented and practiced, air planning for counter insurgency conflicts is less distinct and understood. The Strategic Plan for Air must change, when the nature of conflict changes, because forces designed for conventional war are not necessarily suited to counter insurgency operations.

In facing this dilemma, we must build an ISR architecture that matches capability to each stage of the Find, Fix, Finish, Exploit, Analyse and Disseminate construct. We will not have the luxury of overlapping similar capability to provide redundancy, thus we must fill from the bottom up, only apportioning theatre level assets when organic capability is lacking or exhausted. Thereafter, we should exploit every opportunity to maximise the effectiveness of our limited resources. By layering ISR capabilities, we can simultaneously apply different techniques and systems to a target, thus providing almost instantaneous corroboration and a speed and depth to the product,

The 751st Electronic Systems Group's E-8C Joint STARS test aircraft, T-3, flies from Edwards AFB, CA.

which enhances understanding and greatly improves information reliability. A less resource intensive, but also less timely, alternative is to approach the problem sequentially and use one system to cue a different, more suitable system to the target.

'... by layering ISR capabilities, we can simultaneously apply different techniques and systems to a target, thus providing almost instantaneous corroboration and a speed and depth to the product,'

A counter insurgency strategy must focus on treating the causes whilst simultaneously tackling the symptoms. The latter will involve the use of rapid, precise and decisive force, often delivered in close proximity to friendly forces and civilians. The speed, responsiveness and accuracy of air weapon systems make them suited to this task and a mix of fast aircraft and combat armed UAV provides optimum utility and flexibility. Whilst the ability to deliver ordnance will underpin the rationale for Combat Air, it would be foolhardy to ignore the concomitant powerful non-kinetic effects that this capability brings.

In addition to extensive sensor suites, contemporary combat armed UAV are equipped with an offensive payload and offer a true multi-role capability. However, the very characteristics that enable persistence, limit the speed and timeliness of response. Conversely, fast air generally lacks persistence, but is impressively responsive. It is also a very powerful messaging tool and through intelligent profiling, posturing and positioning, it can send different messages to different target audiences. For instance, a visible, low audible air presence can be reassuring to a nervous population whereas an aggressive noisy profile can be used to coerce an aggressor. Cultural understanding of target audiences is of critical importance to ensure that the message intended, is the message received. Recent operations have refined such tactics and provide compelling evidence on the effectiveness of such techniques.

Whilst we must educate others on the non-kinetic effect of Air, we must be careful not to over-sell it and we are in danger of doing so with non-traditional ISR. The rudimentary processing, exploitation and dissemination of fast air targeting pod product contributes very little to the theatre intelligence architecture. In many ways, these are little more than enhanced situational awareness aids, similar to the small organic UAV that ground manoeuvre units employ to provide real time raw information. Whilst they are valuable in this respect, they should never be considered a substitute for ISR assets.

In terms of non kinetic effect, few air capabilities are better suited to counter insurgency than EW. For years, however, investment in this area has concentrated on aircraft self-defence rather than use of the electromagnetic spectrum as a war-fighting capability. Dominance here will forever elude the in-

© USAF / MSgt Lance Cheung

RAF Tornado GR-4 returns to the fight.

surgent and our ability to deliver localised decisive non-kinetic effect, in a campaign where kinetics will have strategic attention, is elemental.

Counter insurgency is fundamentally a battle for support of the population, thus information operations naturally become one of the most important lines of operation. Whilst there will generally be a main theme which is applicable nationwide and centrally controlled, the ability to broadcast discreet focused messaging is vital. Airborne EW platforms, which can range widely, can provide the delivery precision necessary to avoid negative spill-over of message from one target audience to another.

The technological advantage is that these platforms can also be effective employed in the Communications Electronic Attack (Comms EA) area. Using unique applications, we can target insurgent communication systems, including cellular and satellite phones and press-to-talk networks, thereby defeating early warning networks and kill chain communications. Working in conjunction with electronic surveillance, Comms EA assets can be used to force insurgent groups onto back-up frequencies or areas of the spectrum optimised for collection, exploitation and dissemination. This allows better mapping of their C2 network, whilst also conditioning their behaviour and preventing other friendly force techniques from becoming indicators and warnings of impending action.

Freedom of movement is essential to the counter insurgency; without it, friendly forces will be unable to engage with the local population. Consequently, insurgents have always targeted friendly forces through attacks on the ground lines of communication. Air mobility is an important counter measure, and movement of personnel and materiel by fixed and rotary wing assets allows friendly forces to circumvent ground choke-points and other vulnerable areas. The ability to rapidly deploy, sustain, reinforce and redeploy ground forces via airland or airdrop is a significant advantage for the commander. Also, by limiting the amount of military traffic on the nation's road network, capacity for commercial traffic, so necessary for economic development, will be sustained. Additionally, the ability to deliver humanitarian assistance, rapidly and accurately to the point of need, will extend the reach of governance to some of the more remote areas of the country.

This article illustrates that we cannot yet answer the question we set ourselves. Fortunately, experience begets knowledge and we have adapted our mindset and capabilities to better meet the challenge of contemporary operations. But the quest goes on, along the way we will again encounter situations where our credo is challenged. If we cannot respond convincingly, we may find our reputation irrevocably damaged. ●

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More than a Technological Challenge

Ballistic Missile Defence

By Mr. Peter Doup, NLD, TNO Defence, Security and Safety

Ever since the first concepts were developed for a missile defence architecture to defend NATO territory and population centres, a number of countries have started to investigate the possible consequences should a ballistic missile be intercepted over Europe. A successful intercept is no guarantee that resulting debris, including the payload, would not impact the ground. Since intercepts will take place at relatively high altitudes, the possible consequences could be spread over a large area, potentially crossing national borders. Even where casualties due to debris are minimal, the political consequences might be considerable, especially when the remaining pieces fall on nations that were not involved in the conflict. A start has been made to see what measures could be taken to mitigate the effects of these consequences. This article presents an overview of the possible consequences of an intercept (COI) and mitigation measures that might be taken.

What are the possible consequences of intercepting a ballistic missile?

The COI fall into three broad categories of ground hazard:

Physical Debris

A successful intercept will produce physical debris from both the interceptor and threat missile structures. The intercept results in pieces from both the intercepting vehicle and the threat payload landing on the ground in the direction of the intended attack. This occurs because the threat is following a ballistic trajectory and physics demands that the debris, even when pulverised into small pieces, complete that trajectory. Depending on the intercept conditions (e.g. altitude, relative velocity, geometry) debris pieces can travel up to hundreds of kilometres before hitting the ground. In the worst case, a few hundred pieces are

generated that could possibly cause a fatality if one struck an unsheltered person on the ground. Nevertheless, the average probability of a fatality due to intercept debris is approximately 1% or less, depending on the population density of the region where the debris lands.

Target Point

A ballistic missile intercept over a NATO Nation could result in significant political consequences, especially if the fallen debris impacts the ground and causes damage or casualties. A nuclear detonation could magnify these effects and impact critical infrastructure. This article presents the possible measures taken to mitigate these risks, including reduction of emergency response time through the development of technology and cooperation of NATO agencies.

If the interceptor is a multi-stage type, the stages will fall back to earth in the direction the interceptor was launched, while travelling hundreds to thousands of kilometres before reaching the ground, depending on the type of interceptor and number of stages. Nevertheless, the average probability of a fatality due to stage impact is less than 0.5%, again depending on the population density of the region where the debris will land. A special case of physical debris occurs when the interceptor fails to hit the threat. It will follow a ballistic trajectory for hundreds to thousands of kilometres before hitting the ground, depending on the type of interceptor. Although physical debris causes low probabilities of fatalities, the distances travelled before hitting the ground may result in debris falling on countries that are not involved in the conflict.

Exo- and Endo-atmospheric Nuclear Weapon Detonation

It is possible that the intercept of a threat payload carrying a nuclear weapon could result in full nuclear yield. While having this detonation take place at altitude is, of course, a more favourable outcome to having the detonation on or near the ground, an understanding of the possible effects of the resultant Electromagnetic Pulse (EMP) on the ground is important to ensure controlled second order effects. Intercepts of long range, intermediate range and medium range threats are likely to be above 150 km and may result in High Altitude EMP (HEMP) effects. Depending on the altitude of intercept and the yield of the nuclear payload, the consequences due to HEMP can vary from no effect at all to temporary disruption of electronic equipment, and in the worst case, to permanent damage of electronic components stretching out over areas of hundreds to thousands of square kilometres. Critical infrastructure such as power plants, hospitals, and communications, which depends heavily on electronic equipment, may shut down.

Furthermore, detonation of a nuclear payload at high altitudes may result in highly energised radiation causing damage to satellites or charged particles, which could be trapped in the earth's magnetic field. The effects from radiation can result in damage or even destruction of electronics on board satellites, thus preventing the satellite from performing its intended functions. In the case of trapped particles, the satellite will pass this region during each orbit, which will result in a reduction of its lifetime. Here again, possible effects on satellites depend on the altitude of intercept and the yield of the nuclear payload.

For intercepts that occur at very low altitudes, the ground effect from the blast, fire, and radiation is realised within the nation over which the intercept occurs. If the intercept occurs near the boundary to another nation, the effect can also be felt in the neighbouring nation.

Biological, Radiological, or Chemical Ground Contamination

The intercept of threat payloads that contain chemical or biological agents represents another category of concern, especially when the agents are stored within sub-munitions. While intercepts are quite robust and impart substantial momentum and kinetic energy into the destruction of sub-munitions within the aero-shell of the threat payload, complete destruction of all sub-munitions is not guaranteed. Sub-munitions that survive intercept must also survive atmospheric re-entry. The area over which surviving sub munitions can land can be substantially larger than

the intended target area. If the targeted region is near a national border, sub-munitions can land on a country that is not involved in the conflict. Release of the agents from surviving sub- munitions that land on the ground may result in causality numbers of tens to thousands. These values strongly depend on factors like: number of surviving sub-munitions, type of agents, population density of the area where the sub-munitions land, and weather conditions.

What can be Done to Mitigate Missile Intercept Consequences?

A ballistic missile attack differs from a terrorist attack in that there can be a few minutes to tens of minutes of warning time between knowledge of the attack and the onset of consequences. Furthermore, technologies in development today may be able to pinpoint the location, extent and magnitude of the expected consequences of intercept, even prior to its occurrence. In addition, some factors related to the time, location, and nature of intercept consequences are under the control of the defender. The same command and control authority that detects and responds to the attack with a defensive counter-launch may also use information concerning the intercept solution it executes to rapidly predict characteristics of the intercept consequences, such as the time and place of their arrival.

'Rapid cueing of information to first responders would enable them to take appropriate mitigation steps and respond accordingly to alert hospitals, shelter civilians and send rescuers immediately in the direction of the accident. '

For low altitude intercepts (< 30 km), NATO is developing procedures, documented in ATP-45, for predicting hazard areas if a nuclear, biological, or chemical payload has been intercepted. Extending these procedures for higher altitude intercepts and sharing information about possible consequences with civilian authorities may result in reducing loss of life.

Rapid cueing of information to first responders would enable them to take appropriate mitigation steps and respond accordingly to alert hospitals, shelter civilians and send rescuers immediately in the direction of the accident. The NATO Consequences of Intercept Analysis Team (COIAT), under the Missile Defence Planning Group (MD-PG), is working with the Senior Civil Emergency Planning Committee (SCEPC) to identify constructive mitigation concepts and specific information available from the military missile defence authorities

A French Air Force Crotale launching a missile.

that could support execution of such measures. At this moment, mitigation concepts and measures to be taken are in a definition phase. The goal is to test the first concepts during a table top exercise in 2011, at which both missile defence planners and civil emergency planners will participate.

The SCEPC develops collective plans for the systematic and effective use of civil resources at NATO and national levels in support of Alliance strategy and is responsible for the protection of populations within NATO territory. It provides civil support for crisis response operations and supports national authorities in civil emergencies, including protection of populations against effects of Weapons of Mass Destruction. In addition, it is, in coordination with the COIAT, identifying the associated research and analysis needs required to fill knowledge gaps concerning consequences of a ballistic missile intercept.

'Within NATO, studies are ongoing to determine which tools are available, or should be developed, to predict the consequences of an intercept and which measures should be taken to reduce loss of life ... '

What are the Political Implications?

A special case concerning COI arises when the consequences fall on the territory of states not involved in the conflict. It is important to start diplomacy and consultations with those states well before the conflict has started. When the attack occurs, it is too late to send out information about possible consequences within their borders.

Next Steps

Ballistic missile defence is not only a technological challenge (the equivalent of hitting a bullet with a bullet). If the intercept is successful, there are still issues to be resolved in order to reduce loss of life. Within NATO, studies are ongoing to determine which tools are available, or should be developed, to predict the consequences of an intercept and which measures should be taken to reduce loss of life as a result of these consequences. Also, outside NATO, various countries are collaborating to get a better understanding of the consequences of an intercept. War games like Nimble Titan and exercises such as Joint Project Optical Windmill (JPOW) are excellent opportunities to test the consequence prediction and consequence management concepts under development. In April 2010, the third edition of Nimble Titan took place. As a preparation for that war game, a two-day senior leadership seminar took place in 2009, at which military general and flag officers participated, as well as civilian senior authorities. The various issues related to the consequences of intercept, including the political consequences, were discussed at a strategic level. At the tactical and operational level, the eleventh iteration of the air and missile defence exercise JPOW will take place later this year. During this three-week event, part of the time will be used to test (near) real-time simulation tools, which predict locations and sizes of areas that may get contaminated after an intercept of a ballistic missile with a biological or chemical payload. ●

Mr. Peter Doup

holds a Masters Degree in Aerospace Engineering and works at TNO Defence, Security and Safety in the Netherlands. He has over 30 years of experience in studies on flight dynamics and flight trajectories of missiles, based on modeling and simulations and sometimes supported by live-fire experiments. Most of the work was done to give the Dutch Armed Forces technical advice during procurement of new materiel. In other cases, the studies were used to define new military doctrines.

For the past 10 years, Mr. Doup has acted as a principal task leader for various ballistic Missile Defence studies, both at the national and international level. He currently represents the Dutch MoD within the NATO Consequence of Intercept Analysis Team.

A U.S. military cargo truck bypasses a charred vehicle destroyed by an IED near Kandahar Airfield.

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Countering the IED Threat

Challenges for Air & Space Power

By Gp Capt Dai John, GBR AF, JAPCC

Even the most cursory review of global mass media confirms the near-ubiquity of Improvised Explosive Devices (IEDs)[1] as the weapon of choice for insurgents worldwide. In recent years, IED use has come to characterise modern asymmetric conflict in such places as Iraq and Afghanistan.

Their employment exemplifies asymmetry as practiced by adversaries unable to compete on equal terms with armed forces whose greatly superior mass, technology, training, and overall military effectiveness would otherwise underwrite their decisive success. However, the achievements of such armed forces become a secondary issue when media reports focus on lives and limbs lost in the IED fight; media coverage can sway public opinion, and imposes enormous pressure on politicians and other decision makers. In Afghanistan, IEDs continue to inflict significant numbers of casualties on coalition and national security forces, as well as among civilians. As a result, insurgents succeed in limiting coalition forces' Freedom of Manoeuvre (FoM) and reducing the level of engagement with local populations regarded by senior commanders as critical to the success of Counter-Insurgency (COIN) operations. IEDs thus offer insurgents a lethally effective capability that is both inexpensive and, although tactical in its immediate effect, has the potential to impact significantly on the operational and strategic environment.

Countering the Threat

Countering the IED threat resembles a perpetual game of cat and mouse, where advances made in C-IED Tactics, Techniques and Procedures (TTPs) are swiftly assimilated and countered by those using IEDs. This process need not involve increasing the sophistication or destructive power of IEDs, but may instead result in simpler devices, which are potentially harder to detect, and no less effective. It may also be evident in insurgents' TTPs, which are similarly enmeshed in an iterative cycle; while the devices may be relatively

simple, methods of employment by insurgents react quickly to advances in countering IEDs and supporting networks. Responding effectively to the threat, therefore, requires both physical and intellectual agility and constant innovation. Current NATO C-IED doctrine[2] advocates a comprehensive, multi-faceted approach that aims to defeat the device itself, to defeat the IED network and to provide C-IED training and education. Crucially, to be effective, the C-IED effort must be truly Joint, with Air and Space (A&S) Power fully engaged in counter-device and counter-network operations, contributing to, and benefitting from, properly configured and robust training and education.

The Contribution of Air & Space Power

At first sight, it may appear that A&S Power is, in C-IED terms, predominantly focused on the delivery of effective Intelligence, Surveillance and Reconnaissance (ISR) capability, using space-based and airborne platforms and sensors designed for that purpose. Indeed, traditional ISR platforms and sensors do have a key role to play in detecting emplaced IEDs and in identifying the elements - or nodes - of IED networks, including stockpiles, smuggling routes, production facilities and training resources. At the same time, the increasing sophistication and availability of sensors mounted on other platforms, together with well-trained aircrew and analysts, allows a variety of 'non-traditional' A&S capabilities[3] to be brought to bear. As well as the use of A&S Power to detect devices and network nodes, it also demonstrates its inherent speed, flexibility and responsiveness in neutralising or mitigating the effects of IEDs through the use of Electronic Warfare (EW) capability to disrupt radio-controlled IEDs and the communications on which those seeking to use them depend. That same speed, flexibility and responsiveness allows more direct action to

The MQ-1B Predator provides ISR through the use of advanced capabilities and detailed training.

be taken where necessary: in Afghanistan, fast jets regularly conduct Shows of Force and Shows of Presence in an effort to deter IED emplacers and to reassure local civilians; various other air platforms, including helicopters, are able to identify and engage or detain IED emplacers; and lastly, Air Mobility provides the ability to circumvent IEDs altogether, moving personnel and equipment – including specialist IED Combined Explosive Exploitation Cell (CEXC) teams and exploitable material - around theatre, and offering an Aerial Delivery capability to Forward Operating Bases (FOBs) and other locations that would otherwise have to rely on surface resupply.

'Indeed, traditional ISR platforms and sensors do have a key role to play in detecting emplaced IEDs and in identifying the elements – or nodes – of IED networks ... '

Challenges

The successful employment of A&S Power in C-IED operations is, nevertheless, subject to a variety of limiting factors that, unless acknowledged and addressed individually and together, risk undermining its overall effectiveness. Most fundamentally, in an operational environment routinely defined by finite resources and almost infinite demand, Measures of Effectiveness (MoE) for A&S Power being used in C-IED, have proven remarkably elusive; it is indeed difficult to prove a negative. When airborne assets detect a potential embedded IED, a report is submitted and the necessary action taken. This may involve, for example, confirmation, neutralisation and exploitation, or simply the demarcation of a 'mark and avoid' area. From the point of view of the airman submitting the initial report, the analyst producing the Imagery Intelligence (IMINT), or the air commander making decisions on apportionment, the likelihood is that no response or feedback will be provided. In the absence of feedback, there is little chance of refining the skills of those involved, or in weeding out spurious initial reports, which tend to slow down the whole process. With no feedback loop, no clear MoE are forthcoming, and those providing A&S capability assume, in the absence of evidence to the contrary, that they are doing a good job. The needs and expectations of those on the ground meanwhile remain unfulfilled. A possible solution would be to order the investigation of a percentage – perhaps 10% - of IED reports originating from A&S assets that could, over time, provide sufficient feedback to refine the necessary skills in this critical area. Although it seems probable that closing the feedback loop would provide the anticipated benefits, in a complex, dynamic and fast-evolving operational environment, the challenges that this presents cannot be overstated.

Similarly, the vastness of operational theatres, such as Afghanistan, requires ISR assets to be focussed on specific areas of interest, whether in anticipation of future requirements, in advance of planned deliberate operations or for route clearance purposes. While this significantly shortens the otherwise 'needle-in-haystack' odds of identifying emplaced devices or network nodes, to be successful it demands cross-cueing of different assets, ready access to, and fusing of, different sources of intelligence (whether from Human Intelligence experts on the ground, airborne Signals Intelligence or elsewhere), access to relevant imagery databases and, vitally, swift and accurate processes. All too often, such processes are complex, slow and poorly understood by those required to use them, or conspicuous by their absence. While it is unrealistic to suppose that all the necessary C-IED expertise could be collocated in one place, it is difficult to escape the conclusion that clearer interfaces and better fusion of capability between agencies - fewer 'air gaps' separat-

Target Point

IEDs remain the weapon of choice for insurgencies. A&S power brings a variety of capabilities, but the full potential of A&S in countering IEDs is constrained by such factors as a dearth of robust MoE and limitations of processes supporting A&S capabilities. In order to maximise its contribution, A&S power must rely on its inherent characteristics of flexibility, speed and responsiveness.

ing IT systems - would create greater awareness of what is available and how to get it (Nationally as well as Coalition-wide)[4]. In general, a fuller understanding of the systems involved would certainly help. Perhaps 'Make a Network to Break a Network', could sum this up and, as with the feedback issue, while numerous agencies are working to improve their shared situational understanding, stating the issues is inevitably easier than resolving them.

Elsewhere, the success of the A&S contribution to current C-IED operations is heavily reliant on those seeking support having an understanding – and where necessary being assisted in gaining one - of what is potentially available. When ground commanders request, for example, EW support for an operation, or a Full Motion Video feed from an Unmanned Aerial System to provide real time overwatch for a combat logistic patrol, or even Aerial Delivery into their FOB, it is the responsibility of relevant A&S power specialists to elicit the effect being sought, rather than what assets are needed. Stated briefly, A&S Power must provide what ground commanders need, not simply what they are asking for. It is, accordingly, essential that the potential A&S contribution to specific activities is planned from the earliest possible moment, allowing A&S expertise to be brought to bear and applied to best effect. Achieving this requires the practical application of the training and education emphasised in current doctrine. Those seeking to provide specialist advice, and those receiving it, may both require training. The commander on the ground needs to know what is potentially available to support his planned operation, at what point to seek that support, the characteristics and limitations of the available capabilities and the likelihood of the request for support succeeding. The A&S adviser, for their part, must understand the C-IED support requirement from the point of view of the ground commander, the process through which this requirement is incorporated into the planning process within the land component, and the degree of urgency with which the request needs to be actioned. Most importantly, they both need to work together in preparing requests for C-IED A&S support. Recent initiatives, such as the establishment of Space specialists, ISR-trained Qualified Weapons Instructors and C-IED IMINT specialists, especially within theatre command structures, will all help in addressing this issue. The turbulence caused by the posting in and out of theatre of individuals will necessitate continuing effort in this area.

Members of a force protection team assess damage from a vehicle-born IED.

Finally, there is a tendency to seek technological solutions to military challenges, whereas in reality, resource constraints often thwart the unfettered pursuit of the technological - and elusive – silver bullet. Whatever technology is available, it can only ever provide part of the solution, and the focus needs to be on the integration of existing capabilities to produce networks to diminish the IED threat. By reverting to first principles and linking networks in a systems approach to the challenge, ways can be found to improve current capability. Gaps will of course remain that demand a technology fill, but in many cases they can adequately be filled by trained individuals with appropriate means of communication and a good contacts list.

Conclusions

The IED threat presents the armed forces of Alliance partners with serious challenges and, in current efforts to bring security and stability to Afghanistan, raises the spectre of a strategic impasse or worse. A&S Power has a pivotal role to play in confronting and

© Courtesy USAF/MSgt Lance Cheung

An RAF Tornado GR-4 from the 617th Sq at RAF Lossiemouth on a mission.

overcoming these challenges. It does so in ways that are both self-evident, for example via its ISR contribution, and less obvious, including the rapid intra-theatre deployment of CEXC teams. Nevertheless, the utility of A&S Power is currently constrained by a variety of factors, including limited feedback and awareness of current tools and processes, a predisposition towards technological solutions, and the fault-lines present in current C-IED networks. For A&S Power in all its manifestations and with all its technological prowess and punch to truly deliver optimal support to the C-IED fight, the structures and processes upon which it depends must evolve to reflect precisely the same characteristics – of flexibility, speed and responsiveness – that define A&S Power's unique contribution to the joint battlespace.●

1. NATO defines IEDs as devices placed or fabricated in an improvised manner, incorporating destructive lethal, noxious, pyrotechnic or incendiary chemicals and designed to destroy, incapacitate, harass or distract. They are not necessarily complex in design or difficult to make: at the most basic level their construction is simple and unsophisticated, employing skills readily acquired and for the most part using widely available materials. While all IEDs share a number of similarities, a key distinction is the mode of detonation used, falling into one of 3 generic types. Specifically, they are initiated either through a time switch, remote command operation (via a command wire or radio controlled) and victim operated, including via pressure plates and tripwires.
2. AJP 3.15 'Allied Doctrine for Countering Improvised Explosive Devices (C-IED)', Nov 08.
3. These are sometimes referred to as Armed Overwatch capabilities.
4. The releasability of classified material continues to present challenges between coalition allies

Group Captain Dai John

is the JAPCC's Combat Service Support Branch Head. Commissioned into the RAF in 1986, he has completed flight commander tours in Germany and the Falkland Islands, has undertaken a variety of logistics and training-related HQ appointments, and has commanded the operations squadron of the Tactical Supply Wing. He has also completed staff tours in HQ Air and the UK PJHQ, and has commanded 85 (Expeditionary Logistics) Wing. He has served on operations in Northern Ireland, the Balkans, Iraq and Afghanistan, latterly as COS in the UK NSC HQ. He is a graduate of King's College London, (MA in Defence Studies) the Open University (MA in History, BA in Philosophy), and Leicester University (LLB).

'Lt Gen Ploeger welcomed high level representatives from all seventeen participating MoU Nations to the first JAPCC EWG meeting in Kalkar, Germany.'

JAPCC Hosts Inaugural Executive Working Group Meeting

On 23 February 2010, Lieutenant General Ploeger, JAPCC's Executive Director, welcomed high level representatives from all seventeen participating MoU Nations to the first JAPCC Executive Working Group (EWG) meeting in Kalkar, Germany.

The aim of the meeting was to provide the sponsoring nations with the opportunity to review and discuss the JAPCC's Program of Work (POW) for 2010.

The EWG agenda also included an update on some of the current JAPCC projects, such as the JAPCC Space Assessment, Air & Space Power's Role in Counter Improvised Explosive Device (C-IED) in Afghanistan and the Force Protection for Kabul International Airport (KAIA). This formed a useful introduction to a detailed discussion of the 2010 POW, which will include:

- Air/Land Integration Study
- Joint Integrated Air and Missile Defence Study (JIAMDS)
- UAS Flight Plan Edition 3
- Enhancing NATO's Space Capability
- Mission Command in a Network Enabled Air Environment
- The Governance of Common A&S Power Assets
- A&S Power's Contribution to C-IED
- Realities of Non-Kinetic Air Effects in Afghanistan
- Logistics Contribution to Expeditionary Operations
- Airbase Laydown Strategy
- Joint Personnel Recovery
- Air-to-Air Refuelling Flight Plan

In his summary, Lieutenant General Ploeger thanked the participants for the open and constructive discussion and declared the EWG a major step towards developing further transparency and visibility of the work of the JAPCC. He underlined that the meeting had reinforced the decision of the seventeen MoU nations to set up the JAPCC five years ago as a centre for independent Air & Space Power advice. ●

2009 JAPCC Conference

The purpose of the annual JAPCC Conference is to provide an opportunity to debate Air &Space (A&S) issues; consequently, its focus is on areas of specific and timely interest. Each year, a different capstone theme is selected and studied. Papers, reports and articles prepared on that subject are then published. The theme of the 2009 Conference was 'NATO at 60 – the Evolving Air & Space Power Challenges for the 21st Century.' Panellists and participants discussed training and exercising NATO A&S Power, leveraging NATO's common A&S assets, assuring a favourable air environment in operations short of war and assuring the space domain. More than 40 General Officers and over 240 senior Air Power experts from 22 countries assembled in Kleve, Germany on 14 and 15 October 2009. Among them for the first time were officers from Morocco, Jordan, and the United Arab Emirates.

In his Keynote Address, Admiral Luciano Zappata, the Deputy Supreme Allied Commander Transformation, emphasised that new threats, such as cyber attack and interference with space assets, would require a renewed interpretation of our understanding of the principles underpinning the NATO Alliance and that any future military operations would need to be conducted in harmony with non-military and non-NATO organisations. Subsequently, four expert panels engaged in lively discussions, resulting in a common understanding that transformation is not only important for NATO forces, but also for developing ideas and doctrines to meet the challenges of the new security environment. The 2010 Conference is scheduled for 12 – 14 October and will focus on the Role and Challenges for NATO A&S Power in Contemporary Operations. ●

2009 Maritime Air Coordination Conference

In November 2009, delegates from around NATO gathered at MC Northwood 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 Maritime Air Community realised two important achievements in 2009. First, the community established a forum on SHAPE's NATO Standardisation Agency (NSA) website, where day-to-day Maritime Air business is now being conducted. Second, the community negotiated improvements in flight safety, employment of air assets, and intelligence gathering in Counter Piracy missions off the Horn of Africa through the Combined Air Coordination Element in Bahrain.

The theme for the MACC '09 was, 'NATO Maritime Air Transformation – With Counter Piracy as a Case Study.' The agenda was designed to challenge the Maritime Air Community into considering how the world might look in the future, including the financial, environmental and political challenges that NATO could face. Topics covered were: the transformational steps taken to allow NATO to participate in Counter Piracy Operations, compared with the transformational capabilities of other coalitions; Air technology and the creative use of current equipment as agents of future change; and how network enabled capabilities and IT system architectures provide commanders with machine-speed situational awareness, challenging current C2 models.

The MACC '10 will be hosted by the JAPCC in Kalkar, Germany at the end of November. ●

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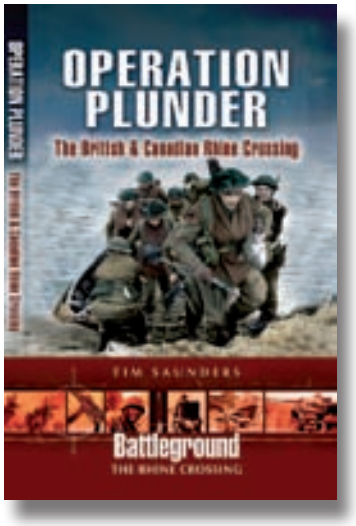
‘Operation Plunder – The British & Canadian Rhine Crossing’



By Tim Saunders
Published by Pen & Sword Books
Reviewed by:
Lt Col Thomas Single, USA AF

Much has been written on Operation MARKET GARDEN and the battles around Arnhem during World War II. Lesser known, but just as important were the operations in the vicinity of the JAPCC. As part of the British and Canadian battles to cross the Rhine, Operation VERITABLE started in February 1945 to clear the Reichswald near Kleve. The operations continued as Operation BLOCKBUSTER to clear towards the towns of Goch, Weeze and Xanten. These battles resulted in some of the highest casualty rates of WWII. After the Allies secured the area west of the Rhine, Operation PLUNDER guided the British and Canadian crossing of the river in March 1945. Part of this attack was Operation VARSITY, an American and British Airborne drop involving over 16,000 paratroopers – the largest one-day airborne operation for a single location.

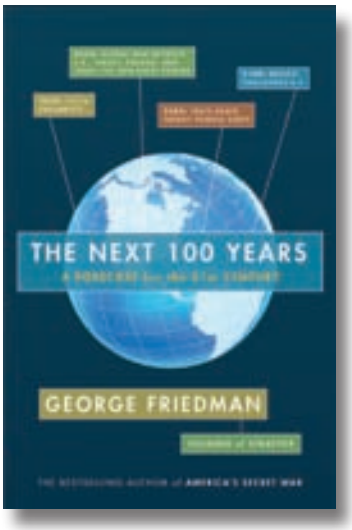
‘Operation Plunder’ is a thoroughly researched account of the planning and preparations that went into the crossing of the Rhine. It provides an in-depth description of the battles involved in crossing the Rhine and securing the areas between Rees and Wesel. This well-illustrated book includes many photos of the forces involved, maps and aerial images. The book ends with directions and descriptions for a tour of the battlefields. Whilst visiting the JAPCC, I encourage you to delve into the important military history of the local area and explore the battlefields. ●

‘The Next 100 Years: A Forecast for the 21st Century’

George Friedman turns his eye to the future by drawing on a fascinating explanation of history and geopolitical patterns dating back hundreds of years. He offers a lucid, highly understandable forecast of the global changes we can expect in the twenty-first century, which include the following scenarios:

The U.S.-Jihadist war concludes and is replaced by a second full-blown cold war with Russia; China undergoes a major extended internal crisis while Mexico emerges as an important world power; technology will focus on space – both for major military uses and for a dramatic new energy resource that will have radical environmental implications; and the U.S. will experience a Golden Age in the second half of the century.

The most interesting part of the book is the technological advancements that are forecasted – especially the military technologies such as unmanned hypersonic jets and missiles that can fly from California to Istanbul in under 30 minutes, armored infantry who can control a squad of robots, and space-based command centers that can monitor any movement on the ground. While the predictions may seem incomprehensible to the casual reader, the predictions are rationally based. The theories presented are not like the predictions of Nostradamus. There are no vague details; the author goes into great depth and bases his forecasts on real data. ●



By George Friedman
Published by
Random House/Doubleday
Reviewed by:
Maj Gennaro Barbarisi, ITA AF

The C-17 Globemaster III is the world's most capable airlifter, able to perform the full range of both tactical and strategic airlift requirements. Whether it's transporting out-sized cargo and personnel or delivering humanitarian relief into virtually any environment, the C-17 provides one-of-a-kind mission flexibility. A world of capability and value, ready now.

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