Asia Pacific Security Conference

Pushing Frontiers, Shaping Paradigms

Global Air Power Conference

Singapore 2008

CONFERENCE REPORT

4th Conference in the APSEC Series
18th February 2008
Singapore

PONDER THE IMPROBABLE

GLOBAL AIR POWER CONFERENCE SINGAPORE 2008

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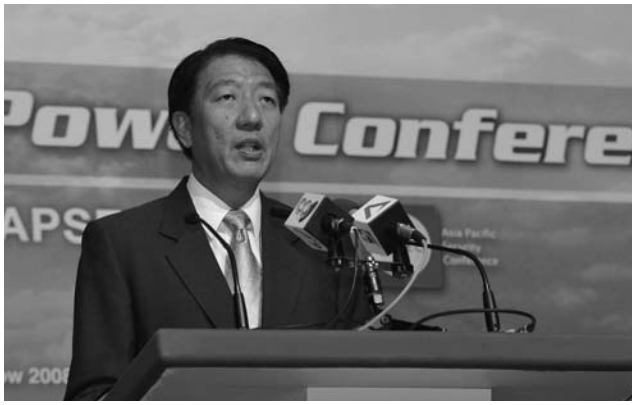


Minister for Defence, Mr Teo Chee Hean.

The Minister for Defence, **Mr. Teo Chee Hean**, opened his address by noting the uncertainness brought on by the security challenges of today. The wide and varied spectrum of threats arising from a variety of sources—state and non-state actors, natural disasters and new diseases—is evidence of the impending challenge. Given the current security landscape, the need to address a broad range of non-conventional threats that include terrorism, piracy, low-intensity conflicts, natural disasters and pandemics has increased. He added that, aided by globalization, trans-national threats affect the security of not just a single country or region but also affect the entire international community. As such, deeper and broader cooperation is imperative and needed to protect the shared interests of peace and stability.

Focusing on the developments of air power, Minister Teo noted that air power is well-suited to meet today's expanding and varied challenges. Air power too has evolved to encompass new concepts and capabilities brought about by advancements in technology. For instance, some missions that could previously be performed only by manned aircraft can now be carried out by unmanned systems. Apart from the rising significance of UAVs in air operations, surface-launched weapon systems such as rockets and missiles with medium and long ranges can increasingly be used as an alternative or complement to what we normally consider to be air power.

Advancements in technology have allowed air power to be used to deliver a massive blow or a precise, calculated strike on a pinpointed target. As technology has changed the nature of air power to a great extent, the concepts behind the employment of air power also need to evolve. Minister Teo acknowledged that while air power can influence the outcome of a battle, air power alone is often not sufficient to resolve a conflict or bring a war to its desired conclusion or outcome. Air forces need to be more joint and networked. Tighter integration with intelligence, surveillance, strike and ground elements is needed to execute missions in a compressed time frame, and with greater precision. It is the very orchestration of air power that requires the integration of all these elements in order to maximize their effect and contribution to the battle.

Turning to the importance of collaboration and cooperation, Minister Teo noted that, given the threat landscape, it is no surprise that the international community finds it even more important to collaborate and work together to face common challenges. Countries are increasingly dependent on each other for peace and stability.

The peace and prosperity that Singapore enjoys is underpinned by a peaceful and secure region and world. It is necessary, as such, to build a defence force to safeguard Singapore's sovereignty as well as to work closely with defence forces in our region and beyond to enhance collective security. Minister Teo noted the numerous contributions made by Singapore through a number of cooperative security arrangements, including the Five Power Defence Arrangements (FPDA), the oldest defence arrangement that was established, in 1971 with Malaysia, Singapore, Australia, New Zealand and the United Kingdom. These countries agreed to consult each other should a threat to the security of Malaysia and Singapore arise. The FPDA conducts two annual exercises, focused on exercising air defence and air operations in a joint environment.

In addition, Minister Teo noted the active regional cooperation in the area of maritime security. Drawing the example of the "Eyes in the Sky" between

Malaysia, Indonesia and Singapore, he noted how these three countries have worked together to maintain security in the Malacca Straits. Since the inception of "Eyes in the Sky" in 2005, the incidence of sea robberies in the Malacca Straits has declined sharply. This contributed to the removal of the Malacca Straits from Lloyd's list of war-risk areas in 2006.

In conclusion, Minister Teo put forth that the inherent characteristics of air power, when coupled with new operational concepts that harness available technological advances, is well suited to meet the expanding and varied trans-national security challenges. Only through practical cooperation between air forces can these challenges be translated into enhanced collective security.

Minister Teo then expressed his hope that the conference and the Singapore Airshow 2008 would provide an excellent opportunity and a platform for the leadership of international air forces and militaries and other defence professionals to exchange ideas and build networks of cooperation so as to develop the capabilities needed to meet the common security challenges of today.

CONFERENCE ADDRESS

AIR POWER – PUSHING FRONTIERS, SHAPING PARADIGMS

MG Ng Chee Khern
Chief of Air Force, Republic of Singapore Air Force.

In his conference address, **MG Ng Chee Khern**, Chief of Air Force, Republic of Singapore Air Force, noted that Minister Teo had shared his views on the security challenges and the recent advancements of air power. He acknowledged that, as practitioners of air power, it is imperative that air power is used to overcome security challenges and exploit the advancements in technology. MG Ng focused on four primary frontiers that air forces must push in order to remain effective.

The first frontier is to play a more decisive role in shaping surface battles. Traditionally, air forces provide air superiority to facilitate freedom of movement for ground and naval forces. Air forces also dominate the surface forces where they have air superiority. Assessing the use of massive and indiscriminate action to dominate surface forces, MG Ng noted that until the two Gulf Wars and in Kosovo, the amount of collateral damage and civilian casualties was considerable.

Since the 1980s, with the proliferation of technologies in precision strike, unmanned warfare, sensors and C4-ISTAR, air power has been applied not only decisively to the ground and maritime domains but also with a far higher probability of delivering the intended and planned effects. Precision weapons can accurately pick off small targets even when launched from aircraft flying at high speeds and altitudes. In addition, the capability of sensors to discriminate ground targets from clutter in all kinds of weather conditions has increased dramatically. One of the greatest handicaps of air power—the lack of persistence over the battlefield—has been overcome by the development of long-endurance UAVs and loitering air-to-ground weapons.

The second frontier is information superiority. MG Ng noted the relevance of John Boyd's Observe, Orient, Decide and Act (OODA) loop. Radar and wireless communications have dramatically quickened the OODA loop through empowering combatants with a

heightened awareness of the airspace. In addition, the proliferation of communications, sensors, information and network technologies has provided a further leap in capabilities. Surveillance and long-range UAVs have also afforded greater persistence. Furthermore, MG Ng noted that advanced sensor technologies such as the laser radar, hyper-spectral imaging and foliage penetrating radar have promised further breakthroughs. The air force will continue to be a crucial element in the information war, providing the third dimension without which sensors and intelligence collection would be almost completely crippled. The difficulty constantly lies in translating an information advantage to a superior war-fighting edge.

The third frontier that MG Ng highlighted is Operations Other Than War, or OOTW. Technological advancements in the realm of unmanned systems allow air power to be employed beyond its traditional roles of airlift and logistics support to intelligence-acquisition and surveillance roles, even in OOTW. UAVs would be able to conduct persistent and wide-area surveillance over disaster or insurgent areas. In addition, miniature UAVs would provide counter-terrorist forces with a tactical "over-the-hill" or "round-the-corner" surveillance capability that, when employed, would have minimal risk to human lives. Furthermore, combat UAVs would potentially be employed for low-intensity conflicts or peace-time missions like maritime patrol and anti-piracy operations.

The fourth frontier MG Ng focused on was international cooperation. Air power can provide a useful and effective range of capabilities to answer to the wide range of contingencies that the widened security challenges present. Such flexibility may require a balanced force structure, which is expensive to build. As such, it is imperative to work with international partners to tackle threats that do not respect national boundaries. Furthermore, working effectively with international partners allows interoperability at both the operational and technical levels. With the advent of network-centric warfare, technical interoperability will be advanced by sharing technologies, software and source codes.

Turning to focus on the pre-conditions of the third-generation RSAF, MG Ng noted three pre-conditions. The first is the organizational and command-and-control structure. To play a more decisive role in the surface and information battles, the RSAF has embarked on, and is close to completing, its most fundamental organizational restructuring in the last 30 years.

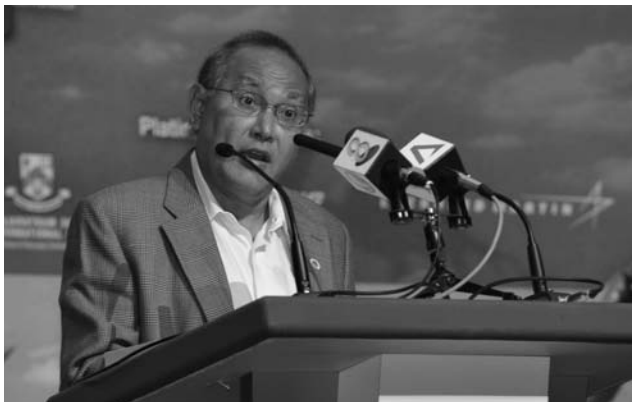
The second pre-condition that MG Ng highlighted is people. Sophisticated technologies such as network-centricity and advanced platforms can be harnessed to push the first two frontiers of shaping the surface and information battles only if people have the skills and expertise to operate these complex systems. He noted that the RSAF had begun to stretch its people horizontally to look beyond the air force in order to understand the operations and complexities of the rest of the services.

The third pre-condition noted is the political environment. As the military is an instrument of policy, it will not be able to successfully transform in a strategic or political vacuum. In addition, if organizational structure and people are the pre-conditions that enable us to exploit new technologies, a conducive political environment will be essential to deliver the new weapons and systems to an air force. MG Ng noted that the RSAF has been fortunate due to a stable political environment and Singapore's rapid socio-economic progress over the years.

As an outcome of the pre-conditions, the RSAF had been successfully transforming and pushing the frontiers to decisively shape the surface battle, win the information battle, deliver in peace and in war, and be capable of interoperating effectively with partners internationally.

In conclusion, MG Ng thanked all participants from the 41 countries for their presence and for the guest speakers for graciously accepting the invitation to address the conference.

TRENDS IN AIR POWER MODERNIZATION IN THE ASIA PACIFIC REGION



Ambassador Barry Desker
Dean of S. Rajaratnam School of International Studies.

Ambassador Barry Desker, Dean of S. Rajaratnam School of Inter national Studies, discussed and explored the trends in air-power modernization in the Asia-Pacific region. Ambassador Desker noted that the question that has continued to challenge strategic thinking is the manner thr ough which the trends in air power would play out.

The Growth of Airpower in the Asia Pacific was noted as the key feature of air power modernization in the Asia Pacific. Unevenness exists in the development of air power from China and India, which have placed great emphasis on modernizing air-combat platforms and systems, to Japan, which has not. In Southeast Asia, the patterns are even more uneven. Singapore, Thailand and Malaysia—and to a lesser extent Indonesia and V ietnam—are focusing on the modernization of air-combat platforms with aircraft that are at the cutting edge of air power technologies. Other countries in the r egion—Myanmar and the Philippines, in particular—are quiet and focusing on air power in support of counter-insurgency operations.

Universal inter est is pr esent in the use of UA V technologies. For small states with limited resources, UAV technologies are a cost-effective alternative to expensive manned air platforms. UAV technologies can be applied across a spectrum of activities, from ISR missions, urban operations and special operations missions, to homeland security operations. Current technological challenges such as bandwidth requirements and systems integration can be overcome.

Ambassador Desker highlighted that the respective acquisition programmes of the various Asia-Pacific countries have been focused on cutting-edge beyond-visual-range air-to-air missiles. In addition, much attention has been placed on the acquisition of increasingly sophisticated air -defence systems, ranging from SAM (surface-to-air missiles) to early warning and fire-control systems that are needed.

Turning to the global defence industry since the end of the Cold W ar, Ambassador Desker noted that modernization has occurred in the wider context of the global arms market. The impact on the global arms industry was dramatic and, in some cases, devastating. Firstly, throughout the 1990s, hundreds of thousands of defence workers wer e made redundant and untold numbers of communities were adversely affected. There was also an unprecedented restructuring of the arms industry. Secondly, defence mergers and acquisitions have begun to cr oss national boundaries. Thir dly, the concentration of arms suppliers and armaments production has also been global. SIPRI estimates that from 1990 to 2000, the top 10 arms producers increased their share of the global market from 37 per cent to 57 per cent.

While the 1990s was a time of tumult and change for the largest arms-producing countries and the larger defence firms, the first decade of the twenty-first century has been one of relative stability. Nevertheless, the current situation, as Ambassador Desker , noted cannot last forever. The global defence industry is dynamic, and as defence budgets begin to fall again or as curr ent arms-manufacturing programmes wind down, the defence business could easily find itself facing crisis br ought on by over-capacity and under-investment.

On implications for the Asia-Pacific defence industry, the turbulence experienced in the 1990s notwithstanding, the long-term viability of the global defence industry has never been in doubt. For "second-tier" arms-producing countries—especially South Korea, Taiwan, Indonesia and Singapore—the issue would not only be about dealing with reduced demand

and excess defence industrial capacity. Increasingly, but in addition, it will be about survival. Despite growing technological hurdles, programme delays and cost overruns, other factors—particularly perceived national security imperatives, sunk investment costs and national pride—continue to be very strong impulses acting on most smaller arms-producing states. Furthermore, since most of these countries' defence industries are monopoly suppliers, consolidation and rationalization are difficult to implement.

Nevertheless, most small arms-producing states in the Asia Pacific understand that they must deal directly and purposefully with the problems of excess manufacturing capacity, preserving defence jobs and finding new sources of revenue. Defence industries in the region that have developed niche capabilities have responded better to the challenging environment.

Finally, the globalization process that has transformed the Western defence industry appears to be affecting the Asia-Pacific defence industry through the creation of an emerging international division of labour in the global arms industry. For the smaller arms producers, an alternative approach to developing niche capabilities would be to reposition oneself to play a subordinate role in such a globalized division of labour. However, it represents a major departure from self-reliance, which has long been the purpose of the indigenous arms industries.

In conclusion, even if Asia-Pacific economies remain committed to possessing broad-based capabilities in arms manufacturing—as seen in India, China, South Korea, Japan and Taiwan—these economies still face the enduring challenges of efficiency and effectiveness. Ambassador Desker argued that two broad scenarios could surface. The first is that there are few practical, cost-effective alternatives to the further rationalization and globalization of their national defence industries. Second, an alternative scenario is one that the outward-looking growth of Asia-Pacific economies and their increasing capability and skill in manufacturing for global markets will lead the defence industries in these economies increasingly to manufacturing for global markets and to be increasingly influential as global defence manufacturers challenging the current dominance of established defence manufacturers. It is this second scenario that deserves attention as it reflects the economic and political rise of Asia in the twenty-first century.

FUTURE OF AIR POWER: AN INDONESIAN PERSPECTIVE

AM Subandrio
Chief of Staff, Indonesian Air Force.

AM Subandrio, Chief of Staff, Indonesian Air Force, provided an Indonesian perspective on the future of air power, its role for an archipelago the size of Indonesia, and its ability to directly and indirectly influence the interests of the wider region. Subandrio noted the various technological advances that have boosted the abilities of air power. Furthermore, the technology applied for the interests of air power are not drawn from just one or two technological fields but is a blend and application of several scientific and technological fields, such as aerodynamics, physics, electronics and information and communications technology.

Subandrio highlighted air power's characteristics. First, backed by substantial technology and material, air power needs capital-intensive support because the increased sophistication of desired abilities carries higher price tags. Second, technological advances and the ability to support air power have to be supported by human resources of high calibre. Third, air power can reach out to wider interests besides defence and security, and can support social interests and public welfare.

Air power will play a dominant role in the twenty-first century. The use of precision strike will dominate the role of air power through technological advances and increased sophistication of information.

Indonesia's geopolitical location places it in the face of several threats, including air threats. Therefore air power has become vital for maintaining security. The security of Indonesia's airspace, land and maritime territory is vital for both Indonesia as well as the entire region, indeed for the world. If Indonesian security can be guaranteed, it will have an impact on regional security. The role of the Indonesian Air Force hence is pertinent in guaranteeing regional security, through such coordinated efforts as Eyes in the Sky. Noting that the role of air power in Indonesia is essentially a defensive tool, the air force conducts war, upholds a nation's sovereignty, manages international crises, maintains peace and implements social support. The development of a strong national air power has become a desired path, requirement and an obligation.

The Indonesian Air Force has taken the initiative to support various national sectors that can support aerospace activities: (i) the use of the Air Power Club through a series of articles by aviation analysts, experts and technocrats, and through seminars and activities that support the empowerment of air power; (ii) through cooperation with the science and technology sectors, especially through training and educational programmes with academia and industry; and (iii) by increasing the national aviation industry capacity to make products that synergize with air power.

Subandrio argued that from the framework of maintaining regional stability, defence cooperation would be a priority within bilateral cooperation efforts in Southeast Asia and among nations in the Asia Pacific. The ASEAN Regional Forum and the Asia-Pacific Dialogue Forum are important fora for regional cooperation, and must be further developed in the future. Through these fora, regional issues will be resolved in the spirit of moving forward together, and the balance of interests that emerge will be based on the principle of equality and mutual respect, not mutual intervention. Bilateral cooperation in the area of defence will aim to develop feelings of mutual trust and problem solving. Urgent security problems will be handled together to resolve airspace violations, incidents of illegal border entry and other border issues with neighbouring countries.

In conclusion, air power in the future will be more complex than today. However, future air power will still be based on four important priorities: (i) the understanding that air power is an asset that possesses the ability to get information superiority; (ii) that it has the ability to narrow the battlefield in either low- or high-intensity conflict; (iii) that an effective air force will still be versatile and balanced; and (iv) air power will be a strength that has the ability to react quickly to situations and simultaneous threats, through attacks that can be distant and precise against the enemy's centre of gravity. Air power will remain relevant.

AIR POWER: THE NEXT GENERATION AND BEYOND

Mr Ralph D. Heath
President, Lockheed Martin Aeronautics Company.

Mr. Ralph Heath, President, Lockheed Martin Aeronautics Company, commended the wisdom and vision of the leadership of Singapore for recognizing the importance of air power and the need to move to 4th-generation aircraft even though there are some challenges to be overcome. Like the speakers before him, Heath argued that air power is more than aircraft. It includes weapons, basic doctrine and tactics, command and control, and training. The critical factor is in the combination of the pilot and the technical support crew in maximising the potential of aircraft.

Heath pointed to eight fundamental elements that shape the strategic effectiveness of any air power system, regardless of the technological generation of the aircraft. It is a constant balancing act that must be carried out to optimize any one or several of these capabilities and criteria. For instance, the manner in which lethality and survivability are thought about negates the importance of the other factors.

The concept of energy manoeuvrability has changed the way the air force thinks about aircraft, such that some capabilities are no longer relevant today. It was derived from a step-function change in capability with the advent of fly-by-wire flight control like the one that the F-16 possesses, with its ability to automatically achieve a profound improvement in performance that previously was not possible. The advent of the 4th generation has seen the introduction of multi-mission sensors and precision weapons. Fifth-generation aircraft, beginning circa 2005, have witnessed the advanced stealth capability with fighter performance.

Drawing a comparison between the fourth and fifth generations, Heath noted the opportunity for continued enhancement. The fifth generation of air power represents a step-function change in capability and functionality towards net-enabled operations, as a a result of integrating stealth with sensor and communications technologies. Fifth-generation air power will be characterised by see-first-shoot-first capabilities, giving these aircraft significantly improved survivability against air defence systems.

Turning to the final point on the area of "stand-in" intelligence, surveillance and reconnaissance, there have been numerous discussions about unmanned platforms. The reality will be a combination of both manned and unmanned platforms, which is probably the most powerful combination in any case. The employment of unmanned systems to a particular mission is more a matter of judgement, policy and doctrine rather than a technological challenge that needs to be met.

Looking to the future, Heath pointed to two discriminators: (i) the Mach three to hypersonic speed, wherein very high speeds would achieve both the responsiveness that is expected and the survivability that is required in the continually emerging threat environment; (ii) multi-spectral stealth—that is, the full frequency range up through and including the visual spectrum.

In conclusion, Heath reiterated that air power is fundamental to all military forces and that threats will continue to evolve to counter any capability. It becomes incumbent upon both the military and the industry to be in a position to react and respond to such changes in threats over time. An asymmetric air-combat advantage only comes when there is a step-function gain in capability over the current generation. In sum, it is fundamental for all free nations to possess the ability to maintain sovereignty and security. It is also critical to maintain safety through strength.

AIR POWER: PUSHING FRONTIERS, SHAPING PARADIGMS

AM Geoffrey Shepherd
Chief of Air Force, Royal Australian Air Force.

AM Geoffrey Shepherd, Chief of Air Force, Royal Australian Air Force (RAAF), put forth that the notion of pushing frontiers and shaping paradigms is not new or strange. As a smaller but capable air force, the RAAF, like many air forces, is increasingly an innovative, adaptive and learning organization. Shepherd suggested that innovative boundary-pushing organizations, in both a technological and operational sense, are essential, the action of which may be attributed to difficult birthing experiences to service independence, the connection with advanced technologies, and willingness and ability to think creatively regarding the application of air power in ever-changing political and security circumstances. The ability to push frontiers and shape beliefs has become central to what the air force has become as an organization.

Shepherd acknowledged the ever changing and increasingly complex security environment, with greater interdependence and more subject to global influences. As a result, joint responsibility has to be undertaken to shape and influence peaceful ends. Shepherd asserted that there is a vital role in this for air forces in this regard.

The RAAF's vision is to be a balanced expeditionary networked Air Force capable of achieving the Government's objectives through the swift and decisive application of air and space power in joint operations or as part of a larger coalition force. The application of air power would remain a minimum requirement but increasingly "superior" air forces would need to dominate the decision-space as well as the battle-space. Dominating the decision-space will not only allow military forces to act and react more quickly than an adversary, it can also direct the pace and direction of decision making, thus maintaining the initiative and the edge. Shepherd notes that it is this sort of decisive application of power that only "decisive organizations" would be able to attain.

Shepherd recognized the desire to build the RAAF into one of the best strataegic air forces in the world must begin from solid tactical foundations. While kinetic effect still matters, the traditional view is restrictive in the modern effects-based environment. New strategic air forces will be instruments of influence in both the physical and cognitive domains. In addition, they will punch above their combat weight. In concert with others, they will deliberately and positively shape and influence their environment by design, using the authority of their combat weight as a foundation. These air forces will not merely react to, nor be defined by, an agenda set by others. Strategic air forces will not only be technically proficient in the application of air power but will also exhibit professional mastery and intelligently synthesize the human and technological dimensions to achieve highly effective systems capable of strategic effect. A strategic air force, although potentially quantitatively identical to a tactical air force, is qualitatively superior and unique. This is the type of air force the RAAF aspires towards.

According to Shepherd, the fundamental difference between a strategic and a tactical air force is the ability of strategic forces to shape its environment, thereby facilitating a degree of self-determination and control. Shepherd asserted that while quantity has a quality of its own, without such quantity there would be a need to look to intelligent means of prevailing. Decision superiority has become both an outcome and a process in which an organization is structured, trained and designed to make superior decisions in a time and fashion of its choosing, at every level throughout the organization.

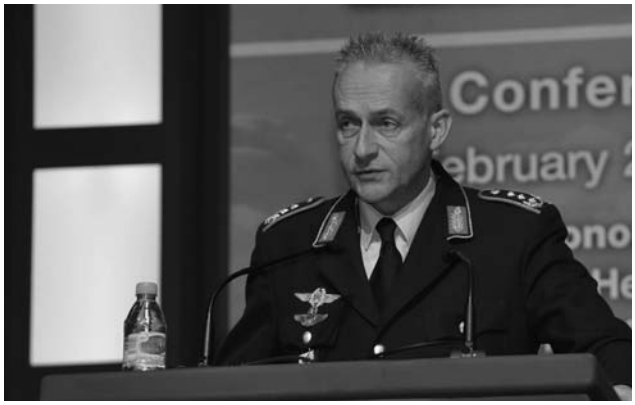
The consequence of not becoming a strategic force is the risk of becoming less relevant to changing security circumstances. Shepherd noted that the RAAF has been enhancing itself in four key areas: (i) transformation of organizational design to be a force "designed to decide"; (ii) the air force structure will be designed from a systemic approach in which all capability—human and technological—will be synergistically linked in a whole-of-system approach; (iii) education of the people towards a strategic way of thinking; and (iv) increased focus on decision superiority as both a process and an outcome.

While the operational tempo is unlikely to change in the short term, given the numerous commitments both in combat and in humanitarian affairs, the RAAF has reconfigured a substantial portion of the organization. As a result of a recent reorganization of the ADF's command-and-control structure, the RAAF's air operations centre, its operational command-and-control function, now operates through the ADF Joint Operations Command headquarters. The reorganization involved more than just a bureaucratic reshuffle. In addition to the organizational and capability improvements, the success on operations has proved that the RAAF has been an excellent tactical air force capable of delivering swift and appropriate air power in expeditionary contexts.

Turning to the need to re-engineer, re-balance and reshape the air force, the programme, according to Shepherd, is the RAAF's response to the recognized design need. It has three objectives: (i) to rebalance the current force to meet immediate priority needs through a timely redistribution of personnel; (ii) to aid the regeneration of the air force through enhanced recruiting activities; and (iii) to reengineer the air force through organizational and workforce design. This reengineering is coupled with an evaluation of its processes to ensure that they are optimized, as well as a realignment to a culture that ensures greater effectiveness.

In conclusion Shepherd noted that as air forces, they possess the ability to contribute to governments' efforts to fashion a stable and secure region. Clever and adaptive organizations are accustomed to pushing frontiers. In the coming decades, as a strategic air force, it will be necessary to positively shape the paradigms of the Australian security environment. Failure to do so is to become irrelevant.

RELEVANCE OF AIR POWER IN THE LIGHT OF TRANSFORMATION: A LUFTWAFFE PERSPECTIVE



LG Klaus-Peter Stieglitz
Chief of Staff, German Air Force.

LG Klaus-Peter Stieglitz, Chief of Staff, German Air Force, began his talk by providing the historical and political frame for German military engagement. During the Cold War era, the focus was strictly on a defence posture along the Iron Curtain. But since the fall of the Berlin Wall, national security interests have necessitated responding to emerging crises at their point of origin, which usually means "out of area" military operations.

For this, the Luftwaffe had to evolve into an expeditionary force—from its first combat engagement in Operation Allied Force in 1999 to the NATO-tasked air policing effort in the Baltic States in 2005 and currently with the Reconnaissance TORNADO operations as part of ISAF in Afghanistan.

Germany's involvement in the civilian reconstruction and development of Afghanistan has been limited to airlift and medical evacuation capabilities. This air supremacy operations in Afghanistan that allow unhindered land operations to be carried out hvae gone unnoticed in Germany mainly because the Luftwaffe is not actively involved in the effort. However, the successful RECCE operations in Afghanistan are changing that. These are the various aspects that must be considered when assessing the relevance of air power from a German perspective as it will continue to provide the framework for the transformation of German forces in light of future security challenges. Touching on security challenges and military capabilities, Stieglitz regarded Afghanistan as a sort of blueprint for military operations of the future. In his analysis, it is in Afghanistan that they are confronted with the "Three-Block-War": from full-scale military action to peacekeeping operations and humanitarian relief efforts.

In this context, air power's role has shifted from attacking large formations of enemy forces to supporting counter-insurgency raids with precision strike capabilities and overwhelming firepower when needed. The protracted commitments, public scrutiny and budgetary restraints compel them to use small sets of forces, which are often very stretched, in their effort to control those non-linear battlefields. Military capability profiles thus must be adapted to ensure a relevant contribution to stabilization operations. The forces must be rapidly deployable with global reach in order to achieve their political and military objectives. They need tailored logistics to create credible and sustainable postures, and to minimize the forward footprints. They must be able to provide multi-dimensional protection for themselves and others, and therefore need a stand-off capability to achieve flexible effects from a distance. They need the ability to work in a network-centric environment, which is the basis for joint, combined and concerted interagency operations. Finally, German forces need the ability for scalable precision engagements to achieve politically mandated military effects beyond pure attrition.

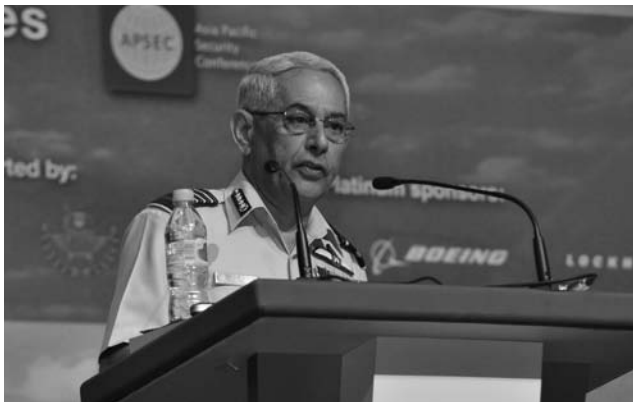
Pointing out air power's unique contributions, Stieglitz said that its application is a prerequisite for any form of ground-based action. When properly integrated with other military and civil efforts, air power consistently delivers effects critical for the overarching military and political objectives.

In light of relatively small numbers of coalition ground-forces in the vast area of operations in Afghanistan, air power brings to bear a full spectrum of effects—kinetic, non-kinetic and psychological—and thus enhances their organic capabilities. By its mere presence, air power can create psychological effects such as deterrence, coercion and reassurance. Air power can also influence the behaviour of insurgent opponents by reducing their freedom of movement and denying them sanctuaries from which to launch their attacks.

In assessing air power's contributions to current and future operations, Stieglitz stressed the need to keep in mind space-based assets, which are commonly included in the air and space domain. Vital intelligence, communications, weather forecast and navigation capabilities rely heavily on assured access to space. These space-based force multipliers are critical to every military operation. Time-sensitive targeting or combat search-and-rescue is unthinkable without precision navigation. Accurate and timely ISR provided by air and space platforms is critical in distinguishing the enemy and desired targets in an insurgent environment in order to prevent unintended collateral damage. While the military use of space is still fairly new for Germany, the Luftwaffe has recently taken up the role as primary agent for the use of space in the Bundeswehr. This is another area of prime focus in Germany's efforts to improve the Luftwaffe´s unique capabilities by wittingly exploiting new technology.

Stieglitz concluded his talk by stating that air power would certainly continue to play a key role in determining the success of future military operations. It is the main enabler in gathering intelligence, shaping the battlefield, and providing freedom of action and initiative—while at the same time denying these freedoms to the enemy. However, the vast array of unique contributions that only air power can provide is often not portrayed by the press and therefore not publicly recognized. In view of this, he felt the need to put greater effort into communicating the relevance of air power among the crucial instruments needed to reach political objectives. There is a need here for a truly joint understanding in promoting air power's relevance because, in an era of intense competition for scarce resources, all services must avoid unnecessary duplication of capabilities and strive to generate joint synergies in all domains. Only this approach will ensure the continued relevance of air power as a decisive instrument to be used by Germany's political leadership in a comprehensive approach to the security challenges of the twenty-first century.

AEROSPACE POWER DEVELOPMENT IN THE INDIAN AIR FORCE



ACM Fali Homi Major
Chief of Air Staff, Indian Air Force.

ACM Fali Homi Major, Chief of Air Staff, Indian Air Force, started his talk by giving a historical perspective of the Indian Air Force (IAF). A long historical neglect of air power meant that India was not well placed to develop an indigenous aerospace industry. Its stand on non-alignment added to the difficulty of finding suppliers for aircraft, equipment or infrastructure willing to accept this. All these taught India to be self-reliant and innovative. It also means that India had to get aircraft and equipment from either side of the Iron Curtain. This has diversified India's equipment profile.

Its long-standing poor economy made it difficult for India to build a true aerospace power. However, the vision of its civil and military leadership then ensured that the security of the nation was not compromised at any stage. After 1991, the Indian economy moved from autarky to open trade. The key architect of this turnaround is the current Prime Minister, Dr. Manmohan Singh. As a result, better performance on the economic front opened the leeway for India to better address its security concern.

From the human security angle, India today continues to face a fair amount of traditional security challenges like border disputes, religious and cultural issues, population pressures and resource scarcity. In addition to that, there are also global security challenges—among which are energy security, arms smuggling, WMD proliferation, environmental security, human trafficking, illegal migration, terrorism and drug trafficking—that India faces.

Furthermore, the nature of warfare has changed, as a result of new military capabilities and new military objectives. The spectrum of challenges has acquired width, depth, complexity and technological sophistication. The trans-national character of many of these threats has made international cooperation imperative, which has led to a re-defining of collective security. The management of non-traditional challenges also has a military dimension and calls for the institution of international mechanisms. "Keeping the peace" remains another important commitment of the armed forces.

Projecting into the future, the world in 2050 will be far more dynamic, interdependent and fluid. Future conflict in this regard will be more challenging and unpredictable. What is required is a capability for assured, clean, swift, calibrated, varied and flexible responses as well as a transportability of national power in all its forms. Aerospace power is therefore ideally suited to this kind of response and will play a dominant role. It has the potential to positively influence both traditional as well as non-traditional security challenges.

As for the modernization of the IAF, Major made the point that it is axiomatic that militaries must prepare for capabilities and not intentions. In line with this, India must have strong, comprehensive and contemporary military aerospace capabilities in order to: (i) pose a credible deterrent; (ii) have the power to protect and punish, or project national power when needed; and (iii) provide, most importantly, peace-time assistance at home, or in the immediate and distant neighbourhood. The gradual but transformational modernization, he said, would have a three-pronged approach: preserve, upgrade and acquire. Major said that the fleets that include transport and helicopters, and other weapons systems with residual life, are being upgraded to contemporary standards. The same is

also being done to the operational and maintenance infrastructure as well as logistic tools. As a whole, the planned acquisitions will be implemented across the board and include platforms, weapons, sensors and other equipment. This, of course, is spread over the next 10 to 15 years.

In the long term, Major said the IAF would acquire a comprehensive capability and its future would largely mirror the future of aerospace power. The path would invariably be influenced by the trails blazed by leading nations. The IAF, therefore, will be selective and seek creative variations, both in hardware and doctrine. Major predicted greater specialization and the need for appropriate capability tailored for each occasion, an increased dependence on unmanned vehicles, greater accent on force enhancers, networking and, most importantly, assimilation of space into the system. He also expects it to permeate the national security apparatus more completely, including perhaps the homeland security.

Major concluded by saying that aerospace power is futuristic and is therefore increasingly utilitarian. Acquiring the latest technology to build a military aerospace power will be very costly and will remain a national endeavour. This will require the commitment of the government, civil society, industry, the scientific community and, of course, users and operators. The employment of aerospace power in ensuring peace and stability, as well as the imperatives integral to its development, will encourage international cooperation and push nation states towards meaningful partnerships. He is confident that India has the strength and resolve to meet these challenges and forecasted an exciting and challenging ride for the IAF in ensuring a more peaceful future.

TRANSFORMATION OF THE FRENCH ARMED FORCES, FOCUSING ON THE FRENCH AIR FORCE

GEN Stephane Abrial
Chief of Staff, French Air Force.

GEN Stephane Abrial, Chief of Staff, French Air Force, said that France, like many other Western countries, was left after the fall of the Berlin Wall with a large defence system based on universal conscription. The system was very well designed to confront the Cold War threats, but it also had heavy constraints, especially when it came to dealing with operations overseas, since conscripts could not be deployed without Parliamentary approval. A "quick reaction force" was thus created in 1983, which included only professional regiments and a couple of fighter squadrons. No armoured divisions belonged to this force because speed was preferred to fire power.

The most significant result of the reforms that followed the ending of the Cold War was the dismantling of conscription. By 2002, France's armed forces had been reduced by 155,000 personnel. Another consequence was the redefinition of the relationship between French citizens and the military. The third result was the growth of the number of civilians working for the Ministry of Defence, especially for administrative matters. In his assessment, the huge reform was well accomplished and succeeded in enhancing the operational readiness, allowing every unit to be deployed and fight at short notice.

For a second round of reforms, a general review of public policies that aims at reducing the number of civil and military servants is in progress. A programme of audits has been elaborated to avoid duplication in the French administration. A committee is also scrutinizing all the missions of the armed forces.

In trying to make its voice heard in this strategic debate, the French Air Force (FAF) had to explain its contribution to national security and convince decision-makers of the importance of investing in its transformation. This involved underlining the unique capabilities that the FAF can offer to decision-makers or joint commanders in the form of height, speed and reach, which was demonstrated in the FAF presence in N'Djamena, Chad. With a reduced footprint of six fighters, one tanker and a couple of transport aircraft, and using fewer than 400 people, the FAF can cover within minutes all its areas of interest in Central Africa and consider these potential battlespaces as a single unit. The FAF can also monitor the area and intervene on the whole spectrum of missions, from humanitarian to high intensity combat against an organized state. In other words, the job can be done with probably one of the best ratios of effectiveness versus money spent.

Abrial observed that the FAF's potential adversaries have adapted to this dominance, either by purchasing new fighter aircraft with cutting-edge technologies in order to fill the gap between their capabilities and the FAF, or resort to asymmetrical means of action. That is why technology matters, especially in air warfare. The FAF must not be outclassed by countries in the world that do not hesitate to flex their military muscle. To maintain the advantage offered by the exploitation of the third dimension and to keep giving France's armed forces the edge over the enemy, the FAF has no choice but to recapitalize its equipment and buy better aircraft than its potential opponents. The FAF needed the best planes to beat the new generation of advanced fighter aircraft and missiles.

Elaborating on the kind of aircraft that the FAF should purchase, Abrial set four priorities: tankers, transport, fighters and UAVs. The first concerns strategic mobility and the best solution would be to invest in a multi-role platform also nicknamed the Multi Role Tanker Transport (MRTT) to replace the FAF's three oldest tankers by 2011. Second, the long-reach capabilities of the MRTT will be used to soften the burden of the tactical transport fleet. This fleet should be made up of 50 European Airbus 400M to avoid any shortage of transport aircraft to support military missions. Third, as far as fighters are concerned, there is no surprise that Rafale is the FAF's choice. It has entered service since June 2006 and immediately proved its potential in different NATO meetings and exercises. Fourth, UAVs will allow the FAF to conquer new realms, allowing airmen to be present in the sky as long as a crisis exists on the ground. Occupying the sky will permit the FAF to carefully monitor a city or specific area and determine whether it requires attention. This helps to create a kind of Big Brother in the sky and, in addition, to traditional means of intelligence, enhances the ability to react. Automation, UAVs and UCAVs are the best answers to such a task, and where it is applicable, it will help lessen the power of the adversary.

Concluding his presentation, Abrial expressed optimism in the future of the FAF, which will probably be more compact and capable than it is today. He attributed this to the recapitalizing of the FAF fleet to confront and defeat any kind of threat, or to impinge on the freedom of the action of insurgents. In this, the FAF is more eager than ever to cooperate with every air force in the world to share experiences or discover new processes that could help FAF deal with its future challenges.

MILITARY-INDUSTRY PARTNERSHIP AND INTEGRATION

Mr Tan Pheng Hock,
President & CEO, Singapore Technologies Engineering Ltd.

In his presentation, **Mr. Tan Pheng Hock**, President & CEO, Singapore Technologies Engineering Ltd, discussed the various aspects of ST Engineering's relationship with the RSAF through the various partnership programmes and integration initiatives. He gave a description of how ST Aerospace has built up capabilities to support the RSAF's operational needs through innovative, responsive and cost-effective initiatives. This symbiotic relationship has helped ST Aerospace to grow and develop its technical competencies. Some of the programmes that ST Aerospace has successfully contracted with other international defence forces have leveraged on the experience gained on RSAF programmes.

ST Aerospace's initial involvement, Tan recalled, was in depot-level maintenance for the RSAF's fleet. Later, these evolved into long-term maintenance contracts involving Total Logistics Support for the RSAF fleet of SIAI-Marchetti SF260 basic training aircraft. Over the years, this working model was fine-tuned and eventually extended to the fleet involving the S211 trainer, C130, KC135, Fokker 50 and even to UAVs operating in Singapore today.

Another initiative is the EC120 Colibri Training Helicopter Programme, a public-private partnership (PPP) seeking to create a long-term partnership between the public and private sectors to deliver services. Through PPP, the public sector seeks to bring together the expertise and resources of the public and private sectors to provide services at the best value for public money.

In this programme, ST Aerospace purchased the fleet of training helicopters and upgraded the basic cockpit to a digital and modernized configuration for the RSAF's pilot training requirements. ST Aerospace also built infrastructure and training facilities for the training squadron in addition to being responsible for engineering and logistics.

With this arrangement, the RSAF focuses only on the training of future military helicopter pilots in Singapore while ST Aerospace takes care of the rest. Besides maintenance support programmes, ST Aerospace has always engaged in various areas to support RSAF operations and missions such as Operation Blue Orchid (OBO). In this operation, ST Aerospace deployed technical crew of different trades to support RSAF airmen in the Arabian Gulf area to make sure that its aircraft is always 100-per-cent ready for each assigned mission.

ST Aerospace, Tan said, takes pride in every Aircraft System Upgrading Programme with the RSAF. With over two decades of engineering experience since the early days of the A4 SkyHawk Re-engine programme, the small engineering core team at that time has evolved into a strong technical pool with more than 350 engineers in its Engineering & Development Centre (EDC) today. With more sophisticated structural upgrading work involving the F5 Tiger in the 1990s, EDC engineers have also diversified themselves to be more proficient in the integration of advanced avionics and aircraft software systems.

Training is another channel that ST Aerospace has helped to meet the RSAF's operational needs. ST Aerospace technicians and engineers are able to gain specific domain knowledge through the various aircraft-type training. These training opportunities are made available to ST Aerospace when there are new aircraft

or systems acquisitions. Most of the time, these training courses are attended by selected staff from the RSAF, the Defence Science Technology Agency (DSTA) and ST Aerospace. Besides gaining technical knowledge through these training sessions, good rapport between the agencies who work together through the life cycle of the programme is further developed.

Research and development (R&D) efforts were also initiated to develop new aviation systems and products. Fantail and Skyblade are some of the unmanned aerial vehicles that have been developed by ST Aerospace engineers working closely with their counterparts in MINDEF. Other than the structural-related work, EDC engineers also look into advanced hardware development. The Multi-Mission Computer, a system applicable for today's fixed-wing and helicopter modernization programmes, is the brainchild of EDC avionics engineers.

To date, ST Aerospace has six commercial aviation facilities outside Singapore dealing with businesses involving airframe maintenance, component repair and overhaul, and logistics management.

As for the military aviation support, ST Aerospace is located in two RSAF detachments outside Singapore—in Perth and Cazaux—with the sole focus of supporting the RSAF in its flying training operations in those locations.

On the military aviation front, ST Aerospace is a One-stop Integrated Service provider. Ranging from nose to tail services, ST Aerospace is able to provide cost-effective, customized and value-added product offerings involving fleet modernization programmes, components repair and overhaul work, including materials management, engines support and airframe maintenance, and engineering services. Like the military aviation business, ST Aerospace is also a Total Service Provider to all its commercial aviation customers.

Speaking on development efforts, Tan gave the example of the Multi-Mission Processor unit. This idea was first mooted when ST Aerospace anticipated its customer's (RSAF) need when there were plans for fleet modernization in the 1990s. Taking this opportunity, development funds were invested and engineers began to harness the latest and best technologies to conceptualize the product architecture. In-house effort was put in to develop the high-performance cards, testing procedures as well as the environmental qualification testing of the system. The unit was later commissioned and installed in the Super Puma upgrade programme and other programmes.

In 1990 ST Aerospace decided to venture into the commercial aviation business. As a result, ST Aerospace today has six commercial aviation facilities outside Singapore. The commercial aviation programmes has also brought value to the RSAF programmes. For example, the commercial activities involving airframe maintenance, components, engines repair and overhaul work have helped improve ST Aerospace's workforce efficiencies through work process streamlining and improvement.

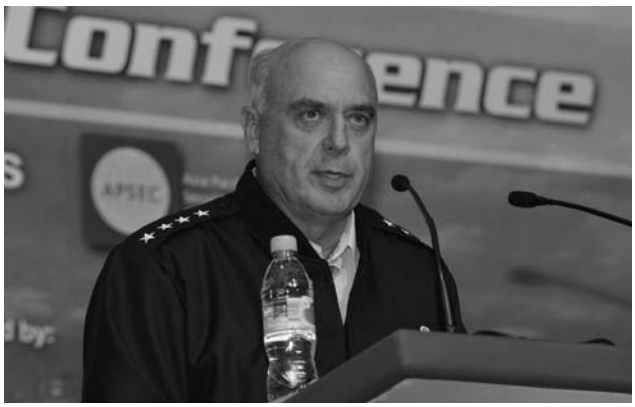
Future RSAF-related projects can expect a more efficient ST Aerospace workforce. ST Aerospace involvement in the commercial aviation business has also given the RSAF programmes access to industry best practices.

On the technology front, Tan made known ST Aerospace's commitment to harness the latest technologies in providing state-of the art and innovative engineering solutions to the RSAF and its other customers. ST Aerospace, he added, would always look into the possibilities of providing cost-effective proposals and services not only in aircraft upgrades but also in maintenance programmes. ST Aerospace will always be ready to take on mission-centric support tasks and put the RSAF's missions on its top priority list.

With this support, Tan believed that the RSAF would be able to focus on its mission objectives while ST Aerospace takes care of the technical and logistics part. The involvement with the RSAF over the years has contributed significantly to the success of ST Aerospace today. As the company continues to grow internationally, it will still remain an essential partner of the RSAF.

Tan concluded his presentation by sharing some key learning lessons in doing well as a service provider. To be a trusted partner of the operator, he said, the service provider must be able to integrate service offerings to meet challenging operating demands. Being able to deliver, he added, is important for a service provider to be a good industry partner. These is what it takes for ST Aerospace to be successful over the years, earning the trust and remaining worthy of that trust placed on it by the RSAF.

BUILDING PARTNERSHIPS FOR PEACE AND STABILITY



GEN Carrol Chandler
Commander, Pacific Air Forces, United States Air Force

GEN Carrol Chandler, Commander, Pacific Air Forces, United States Air Force, started his presentation by stating the role that all air power play in solving the nations' security challenges. The shared collective economic and security interests, many of which transcend national boundaries, including the freedom of movement of commence, he said, has made nations increasingly interdependent. Therefore, there is a driving need for air forces to work more closely together to ensure security and stability and guarantee freedom of movement.

As the new Commander of the Pacific Air Forces, Chandler said that in order to address the security challenges in the Pacific, PACAF focuses on four priorities: posturing their forces, preparing and providing responsive capabilities, promoting regional security and stability, and developing airmen and caring for them and their families. However, he only spoke on the first three.

In posturing the forces, Chandler said it includes having bases, organizations and personnel properly organized, trained and equipped to meet challenges across the spectrum of operations, from humanitarian assistance to major regional contingencies. Among the things he mentioned in his elaboration is that PACAF is repositioning and reorganizing people, training and equipment throughout the Pacific. They are also consolidating Commando Warrior and Silver Flag warfighter training courses at Andersen AFB. Commando Warrior, Chandler said, is PACAF's training for Security Forces Airmen, preparing air base defence forces to be deployed for operations in the Pacific and around the world. PACAF's Silver Flag course provides civil engineers, services and personnel management airmen a simulated wartime environment to learn how to build and maintain bases at forward-deployed locations.

To prepare and provide immediate and responsive capability, Chandler informed the conference that the United States Air Force has long articulated a vision of Global Vigilance, Global Reach and Global Power. Global Vigilance, he explained, provides persistent and worldwide capability to maintain an unblinking eye—to provide not only warning but also to assess and understand. Global Reach, on the other hand,

describes the ability to move anything—with velocity and precision—anywhere on the planet. As for Global Power, it provides swift, decisive and precise effects across the range of military operations.

A critical aspect of Global Vigilance, Reach and Power is their ability to command and control air power from their Air Operations Centers, or AOCs. Perhaps the most well-known is the AOC at Osan AB in the Republic of Korea, which has become his air force's model for conducting combined operations.

Explaining PACAF's third priority of promoting regional security and stability through partnership opportunities, Chandler pointed out the air force's part of the larger Pacific Command Theater Security Program, which is conducted in many venues. In his discussion of it, he highlighted the unified engagement and the global hawk capabilities forum.

For two years, PACAF has implemented the Chief of Staff's Unified Engagement Event and Seminar programme to focus on diverse themes and provide a wealth of partnership opportunities. The Unified Engagement scenarios are set 10–20 years in the future and provide an opportunity to discuss how to better work with partner nations across the full spectrum of conflict. Previous seminar topics included counter-terrorism; humanitarian assistance and disaster relief; intelligence, surveillance and reconnaissance; and irregular warfare.

As for the Global Hawk Capabilities Forum that PACAF will be hosting in April, there will be a discussion on how high-altitude, long-endurance capability may work together. For this, PACAF is planning to take interested regional partners to Beale AFB, CA, to observe launch and recovery operations, and to Hawaii to observe how the information is moved off-broad Global Hawk and into the Air Operations Center. PACAF will also conduct a Unified Engagement vignette to facilitate discussions concerning the collective use of Global Hawk in order to provide information in the aftermath of a typhoon or tsunami.

Two more examples that Chandler mentioned focused on partnership opportunities during combined live-fly exercise such as COPE TIGER and Red Flag. The 13th annual COPE TIGER Exercise had just been concluded with Singapore and Thailand at Korat and Udon Royal Thai Air Bases, where 400 U.S. airmen, along with A-10s, KC-135s, AWACS and C-17s, participated in the tactical training exercise. COPE TIGER, Chandler said, provides an excellent opportunity to operate as combined and joint forces in a multilateral environment. As for Red Flag, it provides training in air, space and cyberspace capabilities, and serves as the PACAF Commander's primary flying training exercise, which Chandler promised would continue to be improved to meet the participants' training objectives.

As for the Red Flag Alaska Executive Observer Program, it is a special opportunity for senior officers to observe Red Flag activities first-hand and discuss coalition operations with their counterparts from around the world. Eighteen different nations attended the Executive Observer Program in 2007 and overall the programme offers an outstanding opportunity to exchange information and establish relationships between senior airmen while junior officers do the same at the tactical level.

Chandler concluded by saying that while PACAF is smaller today in numbers of people and aircraft than it was when he was first assigned in the early 1980s, it is much more capable. By partnering together during peace time, he is confident that PACAF can better prepare for contingencies across the full spectrum of operations, from humanitarian relief to full-scale combat. As airmen sharing many common goals, a difference can be made by collaborating to enhance security and stability in the Pacific.

CLOSING ADDRESS

MG Ng Chee Khern
Chief of Air Force, Republic of Singapore Air Force.

In his closing address, **MG Ng Chee Khern**, Chief of Air Force, Republic of Singapore Air Force, thanked all the guest speakers for their refreshing analyses of the opportunities and challenges for air power. He concluded from the presentations that air power matters and, with its multi-dimensional capabilities and wide spectrum of applications, is critical in the current and future security paradigms.

Giving a summary of the four main conclusions of the conference, he said that advancements in hardware and technology would continue to push the frontiers in aerospace developments. In the Millennium Air Power Conference eight years ago, MG Ng recalled, the guest speakers gave a glimpse of the revolutionary capabilities in C4I, unmanned, precision and space technologies. Today, Ambassador Desker's presentation on the recent trends in air-power modernization in this conference confirmed that many of these advances have since become a reality. Heath spoke of the asymmetric advantage of next-generation fighters with stealth, network and sensor fusion capabilities, while Tan stressed the role of military-industry partnerships in maximizing the potential of technologies. All these, MG Ng said, points to the fact that technology does create possibilities and offer exciting possibilities for air forces in the years ahead.

Second, MG Ng said that exploiting technology requires us to broaden our mental horizons to apply air power in new and innovative ways and purposes. In this regard, Subandrio in his opinion had rightly pointed out that air power could be used not only for defence and security but also in wider social and humanitarian interests. This was further strengthen by Stieglitz's presentation on the continued relevance of air power for stability operations and demonstrated by Shkedy, illuminating the conference with accounts of fighting terror and guerrillas using air power. But as we expand frontiers in operations-other-than-war, MG Ng felt the need to push the envelope into conventional air-power applications. This, he pointed out, was best illustrated by Shepherd's excellent thesis about a strategic air force, built to achieve decision superiority, giving the political leadership freedom to dictate the pace and direction of decision making.

Third, pushing frontiers and exploiting technologies, MG Ng reiterated, require fundamental changes within the air forces. Among others, Major and Abrial's presentations, in his assessment, provided insightful and instructive accounts of the challenges and opportunities of transformation. Every air force has its unique history, constraints and challenges, but what is common across all transformation is the need for a bold and far-sighted leadership willing to accept short-term risks to capitalize on long-term opportunities.

Fourth, drawing conclusion from the importance of partnerships, MG Ng agreed with Chandler in his call for continuously building partnerships for peace and stability. It is through partnerships at the policy, operational, tactical and technical levels that collective capabilities to overcome the security threats of today and the future will be possible.

With that, MG Ng brought the Global Air Power Conference to a close and thanked all present for their attendance.

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ABOUT RSIS

The S. Rajaratnam School of International Studies (RSIS) was established in January 2007 as an autonomous School within the Nanyang Technological University. RSIS's mission is to be a leading research and graduate teaching institution in strategic and international affairs in the Asia Pacific. To accomplish this mission, it will:

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