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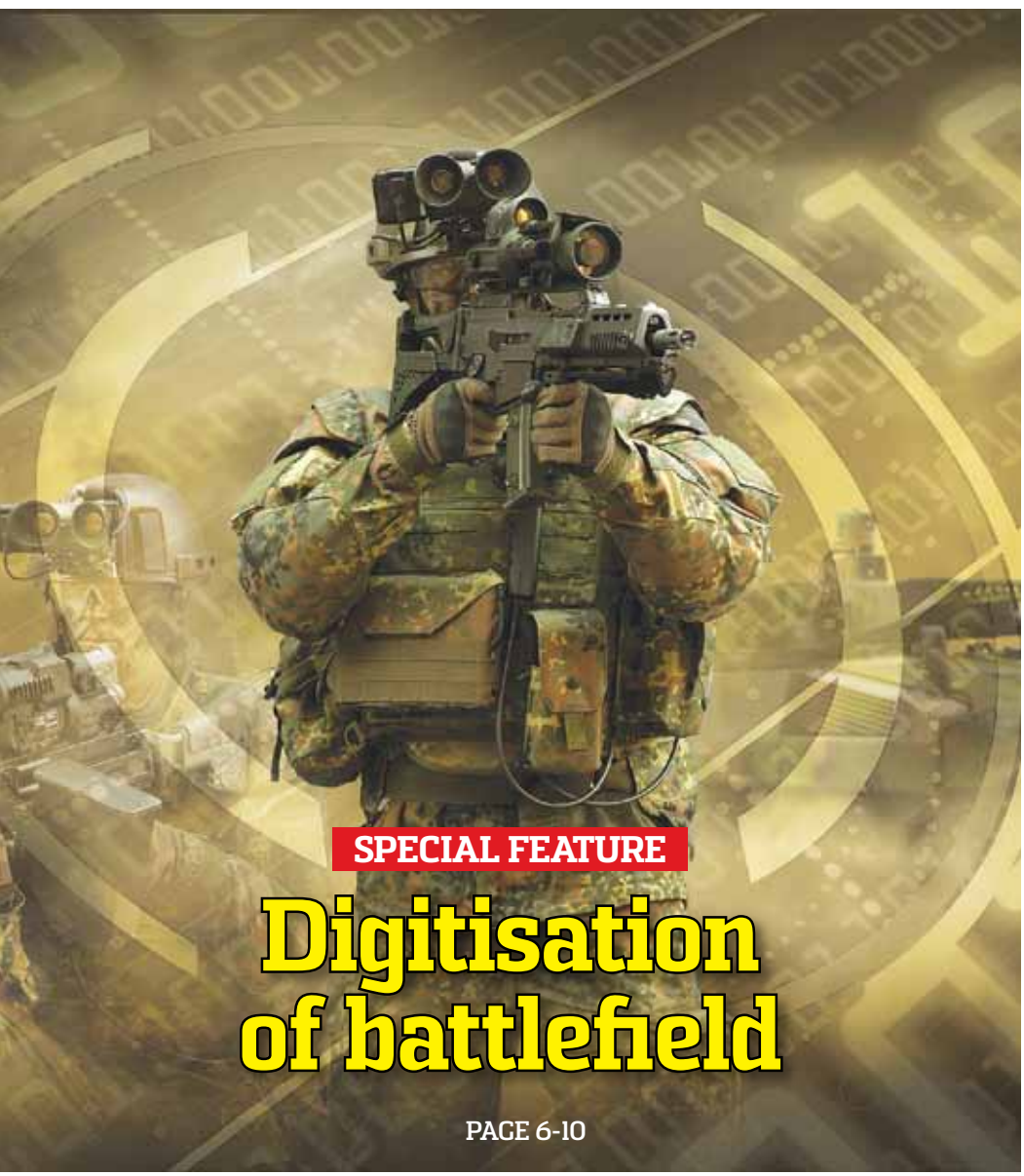

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IAF launches 3G WCDMA cellular network

The Indian Air Force (IAF) has launched its 3G cellular network named Air Force Cellular (AFCEL), becoming first among the services to have commissioned its own captive 3G network. It was inaugurated by Air Chief Marshal N.A.K. Browne, Chairman Chiefs of Staff Committee (COSC) and Chief of the Air Staff, at Air Headquarters.

Launching the pan-India AFCEL project, the Air Chief said, "Today's launch of Phase I of AFCEL in the National Capital Region is yet another milestone in the IAF's transformation into a modern, networked, aerospace with full spectrum dominance. With the IAF's 3G WCDMA project, we are taking a quantum leap forward in our quest to provide mobile and secure 'end-point' connectivity to the air warriors deployed across the length and breadth of our country. AFCEL will facilitate real-time exchange of information in an ever dynamic operational environment that we operate in. Considering the ever increasing relevance of cellular devices in our work space AFCEL will form a crucial component of IAF's network-centric operations delivering timely and accurate information to our air warriors. I am certain that provision of this capability will keep our men and women connected to the information grid and ensure high situational awareness as well as greater synergy in command and control functions.

"While the AFCEL nodes will cover a number of fixed locations, there would also be mobile base transmitting stations (MBTS) which will extend connectivity to remote areas as well. These BTS will provide critical secure communications support for voice, SMS and data exchange and have a force multiplication effect in the conduct of our operations," he added.

Complimenting the systems integrators HCL Infosystems and technology partners Alcatel Lucent India and the IAF's AFCEL project team, he said, "Our team will now take the process forward in realisation of IAF's mission of linking our people so that they always remain plugged into our network as they perform their daily tasks in a more efficient and effective manner."

The IAF through AFCEL aims to bring all its units and stations under the overarching umbrella of 3G connectivity. While Phase I of the project will ensure mobile connectivity to all air warriors in the National Capital Region, Phase II will cover the rest of the bases. AFCEL has been customised for defence requirements and is a full IP network with stringent quality of service, high quality voice and data solutions. SP

Cover:
The battlefield management system (BMS) sought by the Army will perform a variety of operational situational awareness and decision support functions at a battalion and combat group level.

Cover images: Anoop Kamath, Dassault Aviation, Boeing

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Digitisation critical to Army's modernisation programme

The world over, armies are undergoing massive transformation, dictated by new threats, asymmetric warfare and rapidly changing technologies. The transformation is happening at a breakneck speed and a critical component of this radical change is digitisation of the battlefield. The more digitised the army is going to be, the more effective it will be. The Indian Army is no exception in this global transformation and it has rightly embarked upon a modernisation programme which will have the potential to deal with war where boundaries are not outlined.

Understanding the importance of the modernisation programme, we at SP Guide Publications have joined hands with the Centre for Land Warfare Studies (CLAWS) to organise a seminar on 'Digitisation of the Battlefield', in New Delhi on October 31.

Digitisation is a critical component as it is the application of information technologies to acquire, exchange, and employ timely digital information throughout the battle space, tailored to the needs of each decider (commander), shooter, and supporter—allowing each to maintain a clear and accurate vision of his battle space necessary to support both planning and execution.

Ahead of the seminar, *SP's M.A.I.* has lined up articles by Lt General (Retd) P.C. Katoch, highlighting communication for the battlefield management system (BMS); command, control, communications, computers, information and intelligence (C4I2) systems; geographic information systems (GIS) and net-centric warfare (NCW), all of which add up to a lethal combination. While discussing the key points of these systems, Lt General Katoch has underlined the urgency for India to take up digitisation of BMS as any delay would not only escalate costs, but also leave the army in a disadvantageous position.

In his fortnightly viewpoint, Lt General (Retd) P.C. Katoch has welcomed the decision of the United States to list 10 defence technologies for transfer to India, bringing India into a small group of closest allies with which America shares such sensitive details without export control. If cleared, it is estimated that the number of such defence technology transfers could cross 90.

Talking about delays, in *SP's* Exclusive we have outlined how the medium multi-role combat aircraft (MMRCA) deal which was approved 21 months ago is in a limbo, leaving the Indian Air Force (IAF) waiting in the wings, so to say. With elections round the corner, there is not likely to be a decision on sealing the deal. While that is on hold, the good news is that the IAF has received its fourth of 10 Boeing C-17 Globemaster III heavy-lift transport aircraft.

In this issue, we have a show report on AUSA 2013 (Association of United States Army which was held in Washington from October 21-23) wherein there is clamour for technologies which are not only cost-effective but have multi-level of use, all driven by slashed defence expenditure, at least in the West.

We look forward to your participation in the seminar and also to your feedback which will help us sharpen our coverage of news and views.

Happy reading !

Jayant Baranwal
Publisher & Editor-in-Chief

IAF May day for MMRCA

Nearly 21 months since the Rafale aircraft was downselected in the medium multi-role combat aircraft (MMRCA) fighter competition, a measure of despondency has set in over timelines making the Indian Air Force (IAF) nervous for the first time that there's a good chance the deal won't go through in the current financial year. The IAF's Deputy Chief recently claimed he expected the deal to be pushed through before March 2014, but if the reality in negotiations is anything to go by, there remains a mountain of work ahead and very little time. Serious stumbling blocks linger on three principal accounts, slowing progress and all but nixing the possibility of an early contract signature: (a) division of responsibilities between Dassault and the Hindustan Aeronautics Limited (HAL) in terms of workshare and technical collaboration, (b) costing of the 18 flyaway aircraft that will be produced by Dassault for the first MMRCA squadron, and (c) offsets.

But negotiations are only one aspect: the other, of course, is time. In reality, the Indian Air Force is aware that time is even shorter than it seems. Its anxiety is principally based on the unlikelihood of such a large deal being pushed through when the country is in 'election mode'. As India wades into a period of state elections, followed by national polls in summer 2014, the MMRCA deal couldn't have been worse poised in terms of timing. Successive governments have been nervous about calling too much attention with large military contracts ahead of elections. The shadow of the AgustaWestland VVIP helicopter controversy has only intensified the government's paralysis over bold, tough and urgent decisions.

"As the IAF Chief had recently said, there is no Plan B for the MMRCA. It must go through and quickly if we are to benefit from it. Remember that the MMRCA programme, while a large and ambitious contract, is principally a substantive stopgap purchase to bridge the IAF's capabilities into the future. The IAF's fleet is to be bolstered by its Su-30MKIs and LCA Tejas Mk.1/2 fighters, with upgraded Mirages and MiG-29s taking care of the medium capabilities. The MMRCA is therefore crucial since it fills a gap left by rapid retirements of the MiG-21 and delays in the LCA Tejas. But if it does not come on time, the purpose of the programme itself is lost," says a senior IAF officer familiar with the MMRCA programme.

The recent demise of the Ministry of Defence's (MoD) top acquisitions man for the MMRCA contract, A.K. Bal, was a body blow to progress – even IAF Chief Air Chief Marshal N.A.K. Browne recognised this at his annual Air Force Day press interaction, when he said it would take time for his replacement to get up to speed on the details of the programme. However, the MoD, while mourning the loss of the talented and hardworking official, has taken it upon itself now to ensure that precious time is not lost.

"Anyone with the impression that the MMRCA negotiations are simply drifting would have a very different view if they were aware of the complexities of this particular contract. It must be communicated to those interested in such matters that the MMRCA programme has surpassed all previous defence contract negotiations in India in terms of complexity, depth and scale, not just in terms of value and numbers, but in terms of the sheer detail into which each header is being hammered out. When we are talking about such enormous portions of public money, it is a non-negotiable duty to ensure that every rupee is prudently spent, and that each paisa brings us the very best," a senior MoD official informs *SP's*.

Rupee depreciation has brought with it its own set of worries for the government and IAF, though the latter has since been assured that all such eventualities have been accounted for in budgeting. The IAF, however, remains determined to see the light before it begins to celebrate. The alacrity with which the MoD moved on the basic trainer contract has given the IAF reason to be optimistic that crucial deals can be fast-tracked. However, it remains perplexed over why it has taken nearly two years to complete negotiations, no matter how complex.

A top official at Dassault Aviation in France says, "The company remains optimistic. We have a relationship with the Indian MoD and IAF that spans many decades. Delays and negotiations are part of due process and must be completed to the satisfaction of all concerned. While we would very much like to see an early conclusion to the negotiations, we fully respect Indian due process, which we believe is among the best in the world. We would also like to recognise that no fighter competition has gone into the inner complexities of contracting like this one has. It has set down several benchmarks for future purchases, beyond fighter jets too." SP

IAF receives fourth Boeing C-17

The Indian Air Force (IAF) has received its fourth of 10 Boeing C-17 Globemaster III heavy-lift transports, joining the first three already operational at the 81 Squadron 'Skylords' at Hindon airbase on Delhi's outskirts. The C-17 recently performed humanitarian missions during the preparations for cyclone Phailin that struck India's east coast. "Boeing will complete production of the C-17 Globemaster III in the fourth quarter of 2015. In addition to the remaining C-17s for India, the company will build 15 more for other customers outside the United States. Boeing will continue after-delivery support of the worldwide C-17 fleet as part of the C-17 Globemaster III Integrated Sustainment Program Performance-Based Logistics agreement," the company said in a statement. SP

PHOTOGRAPHS: Dassault Aviation, Boeing

TRANSFORMATION OF THE IAF

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Net-centric warfare

[By **Lt General (Retd) P.C. Katoch**]

Network-centric warfare (NCW) relates to behaviour, both human and organisational. Most important is to develop a "network culture" for application in military operations to ensure success. NCW focuses on the combat power that can be generated from the effective linking of maximum war-fighting entities. It is the ability of geographically dispersed forces to create a high level of shared awareness that can be exploited for effective and efficient execution of operations to successfully achieve the intent of the commander. Transparent to geography, mission and size of the force it has the potential to merge tactical, operational and strategic levels of military hierarchy leading to cohesive employment of disparate resources.

NCW is not technology alone but encompasses the gamut of emerging military response to the information age. An NCW capable force is robustly networked with improved information sharing, situational awareness, collaboration, self-synchronisation, sustainability, speed of command and mission effectiveness. The network fighter must simultaneously focus on the physical, information and cognitive domains. For exploiting science and technology and to apply a technology oriented framework, NCW needs a surveillance grid that rapidly generates battle-space awareness and self-synchronisation, an information grid that provides the back plane for computing and communication, a command grid that includes knowledge-based artificial intelligence and software applications, and an engagement grid that exploits the awareness and translates it into increased combat potential.

Net-centricity in the Indian military has mushroomed bottom upwards. Lack of an NCW philosophy/doctrine has resulted in a disjointed architecture. Though we have doctrines for C4I2 and information warfare (IW) these two are only components of NCW. Policies, strategy, concepts, military organisations and adjustments should also form part of NCW. For transformation into an NCW capable force, we need a NCW philosophy/doctrine as the start point. Concepts of individual services should flow from a joint doctrine. This will facilitate a coherent tri-service networked architecture.

Prominent reasons for this void include late establishment of Headquarters Integrated Defence Staff (HQ IDS), non-seamless integration of HQ IDS with the Ministry of Defence (MoD), lack of operational responsibility/authority with HQ IDS and glaring void of a Chief of Defence Staff (CDS). Lack of a top down approach has adversely affected establishment of robust net-centricity. To ensure effective transformation from platform-centric capabilities to the network-centricity, a phased shift in existing technology of the three services and horizontal fusion amongst them at laid down hierarchical structure is necessary.

A cultural change is warranted through aptitude-based selection procedures to influence values, attitudes and beliefs of future military leaders. Development of human resource (HR) is vigorously required. The man behind the machine will continue to be the nerve centre. Information age warriors must have a thorough understanding of system capabilities and the ability, initiative and innovativeness to employ capabilities for best effects. Capability to deal with lethality and accuracy of new technologies and adaptability and flexibility to cope with change are required. Although development of automated operational information system (OIS), management information system (MIS) and GIS is currently under way in the services, managing the actual transition is a major challenge which involves both the technological as well as psychological aspects of change. A project like implementation of NCW is a multidisciplinary process. It is, therefore, imperative that some of the critical issues are addressed at the inception stage. These include evolution of an enterprise architecture, integration and interoperability, communications, bandwidth and latency, new technologies like software defined radios (SDRs), robustness of transmission, message and signal routing, sensor exploitation, management of data-bases, information security, information overload, integrated logistics, dangers of micro management, commercial influences, strategic initiatives and time for implementation.

We urgently need to gear up in cyber warfare. For effective implementation of the transformation process, certain imperatives at the national level are required. First, the political hierarchy should ensure that all security related organisations must work in synergy on various aspects leading to the implementation of net-centricity for achieving the common goal of national security. Second, a joint force networked for NCW must be established and all our future accretions designed as 'net-ready' and interoperable with due emphasis on indigenous research and self-reliance to ensure security and redundancy in our systems. We must develop NCW related concepts and also requisite capabilities through models and simulations. Third, realistic and quantifiable goals should be set, developing an implementation plan to achieve these and measuring the progress made. An immediate goal must be the availability of a networked joint force as a test bed that can experiment with the concepts and capabilities of NCW. Fourth, we should exploit our expertise in information technology to create an interface between the defence forces and industry with profitable payoffs for both to foster self-reliance. SP

For transformation into an NCW capable force, we need a NCW doctrine as the start point. Concepts of individual services should flow from a joint doctrine. This will facilitate a coherent tri-service networked architecture.

ILLUSTRATION: SP Guide Pubns

C4I2SR

[By **Lt General (Retd) P.C. Katoch**]

In the wake of speedy technological advancements, command, control, communications, computers, information and intelligence (C4I2) systems provide sterling opportunities for the defence and security establishment acting as important force multiplier for commanders at all levels. The technological challenge involves in making C4I2 systems interoperable, survivable, inexpensive, reliable, and maintainable on the battlefield. With such system, our forces will have that necessary edge to emerge winners in future conflict situations. Add surveillance and reconnaissance (SR) to C4I2 and you have the acronym C4I2SR implying a group of functionalities and applications of a defence system that integrates multiple command including troops, tanks, weapon platforms, aircraft, surveillance stations and the highest level of tactical and strategic information available to back up military decisions and actions.

We need C4I2SR to create positive asymmetrical capabilities and comprehensive competitive edge over adversaries plus transforming its current perception and thinking. Technology provides numerous options to build automated C4I2 systems for effective leadership in the modern battlefield. Success in combat depends greatly upon fused, tailored intelligence which is communicated securely and rapidly. Speed is a critical component. The critical elements of sensor grids and engagement grids are hosted by a high-quality information backplane. These are supported by value-adding command and control processes many of which need to be automated to achieve speed. This in essence personifies the essential characteristics of a C4I2 system.

An important related issue is the increased role of information warfare (IW) due to the exceptional growth in technology over the past few decades. IW therefore attempts to influence the first three activities of the observe, orient, decide and act (OODA) loop by disrupting enemy's observation and surveillance systems, corrupting enemy's orientation and misguiding his perception, finally inducing him to arrive at a wrong decision. This aspect of IW has significant implications for any C4I2 architecture. Information integrity, information assurance and information superiority therefore are key factors. SR transcends space, air, surface and subsurface means. Satellite and space surveillance apart, smaller and smarter unmanned aircraft are transforming spying and surveillance.

The nature of air power and the notion of air superiority in Iraq and AfPak Region was transformed by massive deployments of unmanned aerial vehicles (UAVs) that are drastically cheaper than fighter jets. The data they gather can then be sent instantly via wireless and satellite links to an operations room halfway around the world and to the hand-held devices of soldiers. C4I2SR enables operators to manipulate battlefield weapons including armed UAVs from control rooms. C4I2SR is the critical path to transformation but depends on how well it can be secured and its reliability. Security, robustness and interoperability will be key factors. The ability to protect our information, systems, programmes, people and facilities in a risk management environment directly impacts our ability to successfully prosecute the military mission. The C4I2SR system must be robust with sufficient connectivity and bandwidth. Access to adequate radio frequency spectrum for data transport like satellite links, wireless networks, and mobile communications systems would be essential for the system to operate effectively. Interoperability is a key parameter in all military operational and systems architectures. Ab initio joint and combined systems, achieved through engineering in interoperability attributes from the start, will provide the needed capabilities.

Our ability to integrate across a number of dimensions will determine how successful we are in bringing all of the available information and all of our available assets to bear in any given situation or circumstance. These dimensions include time, echelons, functions, geography, agencies and coalitions. There is a need to assemble "systems of systems" (SoS) (with co-evolved organisations, doctrines, processes, and information flows) that will enable this integration to occur. We need information superiority, decision superiority, dominant manoeuvre, precision engagement, focused logistics and full dimensional protection, C4I2SR having a direct bearing on the first four. When looking for technological solutions in respect of C4I2SR, we should examine the requirements of collection, exploitation, storage, retrieval, distribution, collaborative environments, presentation, information operations and information assurance, and the technologies that help extract knowledge and understanding from data and information. Our focus should address connectivity, technical interoperability, semantic interoperability, integrated processes, integrated protection and networked battle-space enablers.

PHOTOGRAPH: US Army

The ability to protect our information, systems, programmes, people and facilities in a risk management environment directly impacts our ability to successfully prosecute the military mission

We should understand that the potential value of the defence force is the sum of the potential value of its entities, which in turn is heavily dependent on the nature C4I2SR that connects them. The ultimate goal of the C4I2SR transformation must be to transform into NCW capabilities; the development of a force that provides the commander with the capability to dominate across the spectrum of operations within the context of future security environment. SP

Filling the capability void

[By **Lt General (Retd) P.C. Katoch**]

The manner in which the US raid was conducted for killing of Osama bin Laden symbolises what present-day military operations today are all about. The world witnessed that the actual operation was controlled from an operations room thousands of kilometres away and President Barack Obama and his national security team watched the entire operation live via satellite; an example of battlefield integration as well as battlefield transparency flashed by news channels throughout the world.

Pictures of bin Laden were uploaded to analysts in the US for confirmation of identity and for furthering the operation once it was confirmed that bin Laden had indeed been killed though his body was identified by one of his wives. The Central Intelligence Agency (CIA) was able to confirm this after feeding the photograph to a facial recognition programme and by matching DNA with Osama bin Laden's sister who had died two years earlier. Meanwhile, photographs of destruction of electronic and sensitive parts of the MH-60M Black Hawk helicopter replete with stealth technology that had stalled were also uploaded. Having received due confirmation, SEAL Team 6 continued to wind up this highly successful mission. It was also apparent that the US had catered for the eventuality of any reaction by the Pakistani military – both on ground and in air. This again required battlefield integration of very high degree.

Post this US raid, there were many a debate in India whether Indian Army has similar capabilities for such an operation. The fact is that not only is our battlefield surveillance still functioning on ad hoc basis, we lack an integration tool supporting every level of military users ranging from individual soldier to Battalion Group and Combat Group Commander in the Tactical Battle Area (TBA), which can provide in near real-time an appropriate, common and comprehensive tactical picture by integration of inputs from all elements of the battle group.

What is essentially required at these levels are battlefield transparency through situational awareness and a common operating picture (COP) to pick up the enemy much before he picks you up, see the target and direct fire in quick time using the best weaponry available, as also monitor the after effects. Situational awareness existing in the Indian Army is presently on ad hoc basis whereas the requirement is of an integrated network system. Future military operations will be combined and joint comprising all arms and inter-service elements. These operations will require units and subunits of other arms to operate subordinated or in cooperation with each other. Also, successful execution of fast moving operations will require an accelerated decision-action cycle and an ability to conduct operations simultaneously within an all arms group. The key to success will lie in effective command and control across the force. Therefore, commanders at all levels, more so at the cutting-edge level, require pertinent information in order to enhance their decision-making and command capability. Harnessing information technology here will act as a force multiplier to enhance operational effectiveness of commanders and troops at all levels by enabling exchange, filtering and processing of ever increasing amounts of digital information currently available but not integrated.

PHOTOGRAPH: US Army

The key to success will lie in effective command and control across the force. Therefore, commanders at all levels require pertinent information in order to enhance their decision-making and command capability.

Most foreign armies, including those that were deployed in operations abroad, have situational awareness packages with the essential integration tool of various types — a battlefield management system (BMS). We require a BMS customised to the Indian Army requirements. The understanding of BMS in militaries of foreign armies covers the entire military structure from apex to foot soldier.

In the Indian Army, while plans for operationalising network-centricity were initiated, the cutting edge (battalion, regiment and below) was left out — now being rectified by procuring a BMS, which will be an important facet of capability building in the Army. Currently, the expression of interest (EoI) is to be issued to the industry. Thereafter, it should be possible to shortlist two developing agencies by March 2014. Subsequently, design phase could commence by July 2014, limited prototype tested in laboratory by December 2015 and finally, prototypes developed and fielded for user evaluation by December 2016 (instead of earlier schedule of 2012). The cascading effect has already delayed completion of Phase 2 (Equipping) from initial plan of 2017 to 2021 and Phase 3 (Change Management and Upgradation of System) from 2022 to 2026 as per current status. This schedule is possible only if there are no hurdles. The BMS is a finance intensive project and exact financial implication can only be holistically worked out at the end of Phase 1. The approximate cost of Phase 1 of the system was earlier estimated to be around ₹350 crore, which may now go up exponentially. The overall project of fielding the BMS in complete Army may jump from initial estimates of some ₹23,000 crore to perhaps ₹75,000-85,000 crore or even more. SP

Communication for the BMS

[By **Lt General (Retd) P.C. Katoch**]

The battlefield management system (BMS) sought by the Army will perform a variety of operational situational awareness and decision support functions at a battalion and combat group level. The lowest level to which the system will be connected is individual soldier and individual combat platform and the highest level will be the Battalion and Regiment Commander integrating to the tactical command, control, communications and information (Tac C3I) system through the command information and decision support system (CIDSS), enabling a common operational picture, integrating all sources through integrated use of the geographic information system (GIS) and global positioning system (GPS), will be a highly mobile and with high data rate.

Communications should not interfere with the legacy communication equipment and should easily be retrofitted into combat platform. Communications should optimally utilise the bandwidth available for military communications involving voice, data, imageries and video streaming. It should be scalable to ensure its availability to all elements and range from being man-portable to being fitted in combat vehicles.

When pitted against the future requirements, the legacy communication devices are physically incompatible, follow different link protocols which have issues of addressing, reachability and quality of service (QoS). The legacy of existing combat net radios (CNRs) with fixed frequency (analog), are capable of limited communication and data rates besides the requirement of a modem for data transmission. They are not secure and have no data encryption facility. In effect the present family of radio sets do not meet the requirements of a net-centric warfare (NCW) capable force that would facilitate transmission of voice, video and data simultaneously.

For a BMS to be successful there is a need for a reliable, robust, resilient and efficient communication system that assures that the network is always functional. Net-centricity warrants a paradigm shift from voice-centric to data-centric systems and networks eventually enabling NCW capabilities. For BMS communications the Indian Army would be looking for long ranges, high bandwidth data transmission (live streaming), facilitating messaging including voice mail, quickly deployable, self-configuring and self-healing networks, easy to customise, rolling coverage and interoperability. The focus will have to be on change in network topology, non line of sight communications, spectrum management, network management systems, QoS (including latency, assured delivery, jitter), security of communications, networks and storage, robustness and authentication. Deployment of new technologies like software defined radios (SDRs) that can also communicate with CNRs to offset growth in demand for spectrum needs serious thought. Compression technologies for passage of information must be capitalised. Test bed for the BMS should be at full scale, down to the individual soldier. It is prudent to do this and then think of eliminating a particular piece of equipment than adopting the reverse approach.

There is a need to review the communication philosophy of the Army. While legacy radios have their limitations, the change management towards fielding of latest technology like SDRs and communication infrastructure will need to be fine-tuned. Applications will need to be standardised and adaptable to any communication system including commercial off the shelf (COTS) products. Bandwidth requirements for the BMS need to be viewed keeping in mind the incremental requirements that would be required progressively over the years.

ILLUSTRATION: SP Guide Pubns

Government needs to examine allotment of a dedicated defence band from the spectrum to meet the bandwidth requirement of the Services and keeping in mind threats to national security

A conservative approach by the Army at this stage, which is likely due to the limitations of legacy communication equipment, could limit exploitation of future technology. As an indicator, the US Army catered for one GB bandwidth for a combat team in year 2010 and plans incremental upgrades.

Government needs to examine allotment of a dedicated defence band from the spectrum to meet the bandwidth requirement of the Services and keeping in mind threats to national security. This will also adequately address the communication requirements of the BMS. Robust security algorithms must be speedily developed to ensure security of both stored data as well as transmitted information. The private sector must be fully integrated into development of the BMS. There is also urgent need to formulate a separate Defence Procurement Procedure (DPP) for operational information and communication systems. SP

Geographic information system

[By **Lt General (Retd) P.C. Katoch**]

Rapid advancements in geographic information system (GIS) and global positioning system (GPS) have made it possible to correlate and use diverse map information at the click of a mouse. The integration of all efforts pertaining to geospatial data and intelligence between the three services is a necessary step towards fielding a fully functional C4I2 System, which would be an integral part of our combat capacity building in the years ahead. No automated battlefield management system (BMS) can be fully exploited unless quality data is provided to it as input. Our efforts to enable production of geospatial intelligence would meet most of the data requirements of both C4I2 as well as Tac C3I systems of the military. The capability of any application based on a GIS is limited to the quantity and quality of data provided as the input.

A digitised cartography map needs a huge amount of attribute data before it can become suitable as GIS input. While generally this data has been assumed to pertain to terrain features only, a true GIS ready map should logically cover the complete spectrum of data required by various disciplines of geodetic science. This definitely calls for inputs even from agencies other than those dealing with topographic survey.

The effect of certain type of munitions like incendiary, chemical or biological cannot be calculated purely by use of standard two dimensional models. These area weapons used by the enemy in the tactical battle area (TBA) require detailed knowledge of terrain, for example, in terms of type of forests, condition of shrubs, undergrowth and meteorological conditions. For an operational information system (OIS) like an automated BMS, geospatial data is a vital element of information. Geospatial data plays a crucial role in maintaining the updated situational picture in terms of geographical location of elements of own and enemy forces between all users in the battlefield at all times. At the same time, today's dynamic battlefield having diverse users calls for exchange of positional information between systems using different scales of maps, imagery from different airborne sensors, different map projections and the like.

Additionally, modern-day precision weapons and munitions need much more accuracy for pinpoint targeting in all types of maps, including small and medium scaled ones, than required for majority erstwhile majority area weapons. It is, therefore, essential that the precise location of own and enemy forces/targets down to individual soldier/weapon platform are constantly maintained. Additionally, whether we consider a situation of counter-insurgency, disaster management or communal riots, the disparate information held by different agencies has to be fused to form an intelligence picture before operations can be planned to optimise success.

At the apex level of NCW, the first prerequisite would be the fusion of inputs from the three services pertaining to the defence part of the national security apparatus. While the services may not be able to influence smoother flow of information from other arms of the government (till the political hierarchy enforces it), there is a need to commence the integration of information belonging to the three services under the aegis of HQ IDS, also ensuring integration of topographical data.

In the absence of a dedicated defence space programme, the military is dependent on the NRSA and commercial satellite based imagery for some of the IMIMNT requirements. There is a need to employ other alternate sensors to meet defence requirements not only pertaining to imagery, but also pertaining to data required for cartography. This calls for a well coordinated surveillance effort by airborne sensors of the three services. Similarly, the HUMINT and ELINT data needs to be fused with IMINT and the topographical data. Military survey needs a large amount of data to prepare accurate maps of areas across the IB/LC/LAC. Unless all the available assets are tasked according to the overall vision for geospatial intelligence, agencies and organisations will continue to operate in isolation and required geospatial data will remain in critical short supply. At national level the National Technical Research Organisation (NTRO) and the National Spatial Data Infrastructure (NSDI) have come up but NSDI deals with only 'some' aspects pertaining to creation of metadata from available geospatial data and does not cater for inputs from the intelligence community or for that matter the defence services, which is a major flaw. In the military, the Defence Intelligence Agency (DIA) within HQ IDS is the central repository for all intelligence inputs of military including IMINT and ELINT but aspects of topography are yet to be integrated with DIA. Also, adequate resources in terms of remote sensing, ELINT payloads and cartography are not available to produce high quality fused data. The bottom line is that Indian military today needs an enterprise GIS post-haste. SP

PHOTOGRAPH: USAF

While generally this data has been assumed to pertain to terrain features only, a true GIS ready map should logically cover the complete spectrum of data required by various disciplines of geodetic science.

LT GENERAL (RETD)
P.C. KATOCH

Time to leapfrog technology

The United States has reportedly submitted a list of 10 defence technologies for transfer to India, bringing it into a small group of closest allies with which America shares such sensitive details without export control. Concurrently, the US has sought opinion from its own defence industry to identify next set of technologies which could be shared and transferred to India and it is estimated that the number of such defence technology transfers could cross 90.

The US Deputy Secretary of Defense Ashton Carter has said that under the Bilateral Defence Trade and Technology Initiative, US has submitted a white paper explaining where India falls within US export control system. The US has included India in the list of "Group of Eight" nations that receives the best of the technologies without export control. India is reportedly reviewing these offers. The issue merits serious attention considering the threats that India is facing that are likely to magnify in the future. These not only cover the entire spectrum of conflict (NBC, conventional and sub-conventional) but more importantly we need to bridge the asymmetry with our adversaries, particularly China, in the dimensions of aerospace, cyber and electromagnetic.

If the capability gap has widened exponentially between China's PLA and the Indian military, it is because of our technological voids and the inability of our military-industrial complex and accredited redtapism that has prevented us from bridging it. Therefore we must resort to leapfrogging technology. Global technological transformation is already on the threshold of fully network-centric forces, better PGMs including high energy lasers/plasma/electromagnetic/ultrasonic/directed energy weapons, long-range strategic aerospace platforms, improved ISR and communications systems, stealth and smart technologies, improved compact nukes, optimised artificial intelligence, nano weapons and equipment, micro UAVs, ant robots, cyber warriors/worms/virus/cyBugs, anti-satellite weapons etc. While conflict will be five dimensional (aerospace, land, sea, cyber and electromagnetic) information will be of immense strategic value with information warfare spanning network-centric warfare, C4I2 warfare, electronic warfare, cyber warfare and all other forms of operationalised cyber space. Space combat, cyber space combat, radiation combat, robotic combat, nano-technology combat will add to forms of combat.

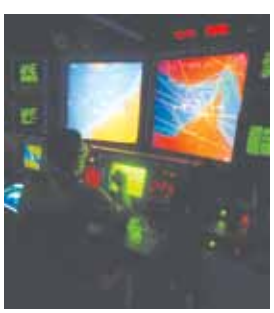
From the very essential engine technology, we need networked elements of national power; information dominance and information assurance; ability to paralyze enemy C4I2 infrastructure; credible deterrence against state-sponsored terrorism that requires optimising technology as well; long-range expeditionary strategic forces; standoff weapons to pre-empt enemy attack; adequate mix of DEWs, PGMs, ASATs etc; ability to disrupt enemy logistics / sustenance; mix of hard and soft kill options; layered strategic air and theatre missile defence; competitive cyber warfare capability; ability to exploit space and cyber space and conventional forces capable of winning high-tech wars.

We need to accelerate: establishment of an integrated C4I2SR system; integrated communications (vertical and horizontal); all platforms network enabled; graduate from cyber security to information assurance and dominance; holistic review of DEWs, standoff PGMs, ASATs; exploit technologies like steerable beam, wide band/software defined radios, network security, common GIS, data, fusion and analysis, alternatives to GPS, dynamic bandwidth management, shooting down UAVs, camouflage. Spying, snooping, reverse engineering has given China designs of the US F-I6, B1 Bomber, US Navy's quiet electric drive, US W-88 miniaturized nuke (used in Trident Missiles) to name a few. China aims parity with the US in science and technology in three decades plus.

The J-20 stealth fighter has been developed in record time. Stealth helicopters and vessels are being worked upon. The indigenous aircraft carrier under development is estimated to be twice as fast with double the capacity of launching and landing capabilities through twin decks. All this has given China a tremendous boost in defence exports aside from a modernised PLA. What India needs to learn from China is optimising technology reconfiguration wherein available technology is integrated in multitude of combinations to attain self-reliance.

Technologies notwithstanding, base level equipping of PLA (Army, Navy, Air Force) is almost completely indigenised. As regards the joint ventures proposed by the US, it is high time India opens the defence sector to the private industry fully considering the existing military-industrial complex is not even meeting the requirement of assault rifles, carbines and light machine guns of the military, paramilitary and central armed police forces. SP

The views expressed herein are the personal views of the author.



PHOTOGRAPH: defenseimagery.mil

What India needs to learn from China is optimising technology reconfiguration wherein available technology is integrated in multitude of combinations to attain self-reliance

1964

Our Journey Starts as Guide Publications was founded by its Founder Publisher & Founder Editor Shri S P Baranwal...

Apart from many publications written, edited and published by the Founder, Military Yearbook is introduced in 1965...

1974

Military Yearbook continues relentlessly with collective support from dignitaries including the Prime Ministers and Presidents of India...

1984

50

JUST 1 STEP SHORT OF

2014

WE SHALL BE 50 THIS YEAR

Guide Publications is rechristened as SP Guide Publications offering tribute and gratitude to its Founder...Also envisioned is the path of introduction of a few magazines...

2013

SP's Airbuz, SP's M.A.I. follows the intensity of magazines introduction...

2004

SP's Aviation, SP's Land Forces, SP's Naval Forces are launched starting from '98 and within a span of a few years...

1994

Military Yearbook is rechristened as SP's Military Yearbook conveying gratitude to Founder Publisher...

50 YEARS

1964 - 2014

50 YEARS

SP GUIDE PUBLICATIONS

Raytheon Excalibur Ib completes qualification flight testing

Raytheon Company fired 84 precision-guided Excalibur Ib all up rounds during qualification flight tests at Yuma Proving Ground, Arizona. During the testing, Excalibur Ib exhibited exceptional accuracy, with the majority of the rounds landing within two meters of the target. The tests also certified stringent performance and safety requirements.

"Excalibur achieved new firsts during qualification testing," said Lt Colonel Josh Walsh, the US Army Excalibur programme manager. "We demonstrated lethal effects at 50.7 km range from the Swedish Archer weapon system while the US gun systems reached 40.54 km – exceeding objective requirements."

The Excalibur Ib is a precision-guided artillery projectile based on Raytheon's combat-proven Excalibur Ia-1 and Ia-2. Excalibur is a 155mm precision-guided, extended-range projectile that uses GPS precision guidance to provide accurate, first round, fire-for-effect capability in any environment.

"Excalibur Ib will provide the warfighter with the most accurate, extended-range artillery option," said Michelle Lohmeier, Vice President of Raytheon Missile Systems' Land Warfare Systems product line. "This updated round will provide the soldier in the field with greater range, increased accuracy and less collateral damage." SP

MBDA's Brimstone missile hits very fast targets

In early October MBDA demonstrated significant progress on the Brimstone 2 development programme with a series of successful firings aimed at proving the performance of the latest guidance system upgrades being added to Brimstone via the UK MoD Brimstone 2 programme.

The trials involved firing five missiles at a series of targets moving at up to and including 70 mph, from a variety of launch conditions including long range and high off-boresight and against targets transiting representative cluttered road environments. Every shot achieved a direct hit on the target.

The Brimstone 2 programme builds on the world class combat proven Dual Mode Brimstone capability, providing significant performance enhancements including:

– A substantial engagement envelope increase (>200 per cent increase in off boresight and maximum range capabilities)

– Enhanced laser and dual mode performance against a range of static, fast moving and manoeuvring targets at very long ranges against significantly lower reflectivity targets in highly cluttered environments

– Increased manoeuvrability both for release from fast moving and manoeuvring platforms and to increase further the performance against highly dynamic targets in the end game

All five missiles were fitted with a telemetry system in lieu of a warhead to provide the necessary performance evidence for the guidance chain.

The telemetry system confirmed that each missile performed perfectly throughout. Each missile flew the optimum trajectory, immediately acquiring the laser returns confirming the enhanced long range laser performance, fused and correlated the laser and MMW RF radar target tracks and then used the MMW radar to ensure no escape and a direct hit.

Brimstone demonstrated its precision and low collateral capability against a range of armoured, non-armoured, static and fast moving and manoeuvring targets in support of RAF operations in Libya and continues to do so in Afghanistan. SP

IAI developing mine and IED detection system

Israel Aerospace Industries' (IAI) Ramta's Division has completed the last phase of engineering testing and has begun building a technology demonstrator of a multi-sensor system called MIDS (Mines and IED detection system) for detecting deep buried and surface-laid mines and improvised explosive devices (IEDs).

The new system was exhibited at the Association of the US Army (AUSA) conference in Washington, DC, October 21-23, 2013.

MIDS will be deployed on a ruggedized, commercial, light tracked or wheeled (manned and/or unmanned) engineering vehicle according to customer requirements. It will carry an advanced ground-penetrating radar (GPR) and metal detector (MD) arrays into high threat environments to identify deep buried and surface laid mines / IEDs in, and next to, the advancing path of the manoeuvring forces. The two main arrays (GPR and metal detector) will produce data which will be combined to analyse readings in real time, minimising false alarms from non-threatening materials such as rocks, wood and other debris.

An onboard IAI-manufactured electro-optic payload with day/night cameras will provide remote operators with situational awareness and enable visual surveillance from a safe distance. SP

PHOTOGRAPHS: Raytheon, MBDA Systems

US budget cuts impact defence programmes

Secretary of the US Army John M. McHugh at AUSA 2013


KMW's Puma military fighting vehicle

[By **R. Chandrakanth**]

The US military has a dominating presence in the world. Having such a mighty army equipped with ultra-modern equipment and fighting battles beyond its shores, obviously costs heck lot of money. And with the US economy in doldrums, slash in defence spending have been announced and there has been a telling effect on many programmes.

This was noticeable at the annual convention and exposition of the Association of United States Army (AUSA) 2013 which was held from October 21 to 23 in Washington DC. While the original equipment manufacturers (OEMs) and solutions providers were aggressive in their marketing, however, at the convention animated conversations revolved around budget cuts. The US Department of Defense has put in place sequestration and the Pentagon has to walk a tightrope financially considering that it has to downsize its projected budgets by nearly $500 billion over the next decade. This will certainly impact defence equipment manufacturers who now will have to increasingly look at other lucrative markets.

While the OEMs look elsewhere, the US Army will have to downsize its manpower from the 4,90,000 soldier threshold to about 4,25,000 as per the US Army Chief of Staff, General Raymond Odierno. Alongside, the US Army Secretary John McHugh described in harsh detail the impact deep funding cuts from sequestration had on the Army in this first year alone and warned that the painful reductions will continue. Sequestration has cost the Army $1.7 billion in just the first year, he said, resulting in hundreds of vehicles and thousands of communications systems out of service for lack of maintenance and soldiers unable to train. McHugh said an early estimate of the financial cost of the shutdown was $150 million and 485 acquisition programmes impacted negatively.

General (Retd) Gordon R. Sullivan, AUSA President, commented, "AUSA and senior Army leaders, with budget challenges at top-of-mind, have crafted another world-class professional development experience that benefits our Army, our industry partners and the American people by keeping key audiences informed about how our Army is truly "globally responsive and regionally engaged." The theme for this year's professional development forum was: "America's Army: Globally Responsive, Regionally Engaged."

Ground combat vehicle programme at risk

One of the programmes that is likely to be hit, according to US media, is the ground combat vehicle (GCV), a replacement to the Bradley, which is being developed by BAE Systems and General Dynamics.

The Puma military fighting vehicle, built by Krauss-Maffei Wegmann (KMW) of Munich, Germany, would be the ideal replacement for the M2 Bradley Fighting Vehicle, KMW spokesman Kurt Braatz who cited credible and official data to back up KMW's claim – provided by the Congressional Budget Office.

The company's display included a cross-section of a Puma hull that had sustained a direct hit by an anti-tank mine during a field test. While the floor of the vehicle was slightly bowed and showed a scar from the explosion, Braatz said, the Puma remained intact and operable.

KMW also displayed the Puma's unmanned turret – equipped nearly completely with US-manufactured gear. The two weapons – a 35mm cannon and .50-calibre machine gun – are made by ATK Inc. A US division of Meggitt Defense Systems built the ammunition-handling system. Moog Inc. built the turret system.

Rotorcraft fleet replacement

Two of the four major players for the possible replacement platform for the Army's fleet of ageing rotor aircraft strove to make their respective cases during AUSA. The impetus for the two companies – Bell Helicopter Textron and Sikorsky Aircraft – came from an October 3 announcement by the Army Aviation and Missile Research, Development and Engineering Center (AMRDEC) which named

PHOTOGRAPHS: US Army, Wikipedia


Bell Helicopter's V-280 Valor tiltrotor aircraft


AM General's BRV-O

them and two other firms – AVX Aircraft and Karem Aircraft – as the four finalists to develop suitable aircraft. (AVX and Karem Aircraft did not participate actively in the annual meeting.)

Under the AMRDEC directive, the four companies will have nine months to refine and develop their designs. Each must produce a demonstrator aircraft by the summer or fall of 2017.

Bell Helicopter Textron strove to demonstrate that the V-280 Valor tiltrotor aircraft, it is developing jointly with Lockheed Martin and other companies, would meet the Army's needs. It can be configured as a high-endurance transport or a high-performance attack platform, with the potential to replace the UH-60 Black Hawk or AH-64 Apache someday.

Sikorsky Aircraft offered a distinctly different aircraft into the contest, unveiling its new name – SB-1 Defiant which it is developing jointly with Boeing and other corporate partners. Defiant closely resembles a conventional helicopter in looks and performance. The stark difference is its coaxial dual-rotor design. Running in counter-rotation to each other, the two large rotors would allow the aircraft to move with twice the manoeuvrability and speed of conventional helicopters, said Sikorsky spokesman Frans Jurgens.

Lighter body armour

With body armour adding between 35 and 40 pounds to the loads soldiers must carry into combat, it stands to reason that Army leadership is pressing its industry partners to develop better systems. While no one really expects to see soldiers sporting camouflaged versions of Tony Stark's 'Iron Man' suit anytime soon, companies believe they are making significant inroads. Saint-Gobain, a long-time provider of ceramic plates used in a wide array of the Army's body-armour packages, believes the future lies in development of non-carbide materials that are lighter in weight than the current carbide-based ones.

Boeing conducts live fire tests of HEL MD laser

Boeing announced that it would conduct live fire tests of its HEL MD (high energy laser mobile demonstrator) tactical laser by the end of 2013. HEL MD is a tactical laser programme designed to defeat rockets, mortars and small unmanned aerial vehicles.

AM General present family of light tactical vehicles

America's most experienced designer and builder of light tactical military vehicles, AM General, presented several offerings from its diverse family of light tactical vehicles and training operations. They included the blast resistant vehicle–off road (BRV-O) joint light tactical vehicle; the ground mobility vehicle 1.1 (GMV); the modernised HMMWV chassis and the on/offroad light tactical vehicle simulator.

UTC Aerospace Systems wide range on display

The company exhibited a wide range of technologies and solutions from laser warning systems applications for land platforms and helicopters to products for guidance and navigation control. Small UAS was presented along with multiple UAS applications, including cloud cap technology TASE gimbals and piccolo autopilots. Sensors Unlimited short-wave infrared (SWIR) cameras were on display, including a hand-held variant, all providing the benefits of being able to see through obscurants such as fog, haze and smoke.

Elbit's cutting-edge solutions

The company presented an array of cutting-edge solutions designed to enhance the capabilities of the US armed forces. Elbit Systems of America's innovative solutions for land vehicle refurbishment and upgrades and aviation services caught the attention of the attendees at AUSA.

Motorola showcases secure mobility innovations

A leading provider of mission-critical communication solutions and services for enterprise and government customers, Motorola showcased its secure mobility innovations. Paul Mueller, Vice President, US Federal Government Markets Division, Motorola Solutions, said "As missions and budgets change, today's Army requires mobile communication and computing solutions that can be used in multiple military operations and environments. Motorola Solutions works closely with the Army to ensure we are developing solutions that meet its needs as they continue to evolve."

That in a way kind of sums up the thinking of the manufacturer and end-user – get bang for the buck. SP

PHOTOGRAPHS: bellv280.com, AM General

MSME Defexpo curtain-raiser

[By **Sucheta Das Mohapatra**]

The National Small Industries Corporation (NSIC) is organising the third MSME Defexpo at Bengaluru from December 12-14, 2013, to provide yet again a platform to the defence original equipment manufacturers (OEMs) across the world to meet the Indian industry who could be their potential offset partners. A curtain-raiser ceremony held at New Delhi on October 23, witnessed many industry experts throwing light on the opportunities lying ahead in the defence and homeland security market in India.

The event aims at giving boost to the Indian Government's indigenisation target as the Ministry of Defence (MoD) has set a goal of sourcing 70 per cent of defence equipment from Indian companies, public, private and micro, small and medium enterprises (MSMEs), by 2020. Further, the new public procurement policy requires all Central Government ministries and public sector undertakings to source at least 20 per cent of their total annual purchases from MSMEs.

An international MSME subcontracting and supply exhibition for defence, aerospace and homeland security, the event is being supported by the Union Ministry of MSME and the Government of Karnataka. While the first MSME was held at Hyderabad in 2011, the second was held at Bangalore which attracted 240 exhibitors and 15,000 business visitors and help facilitate more than 300 buyer-seller meetings. This time too there would be delegates from across the globe, including the US, UK and Israel, and the MSMEs will get a chance to showcase their capabilities, find new buyers, finalise deals and exchange ideas for developing new products. Among the US companies, Honeywell has agreed to be a platinum sponsor.

At the opening address during the curtain raiser ceremony, Colonel (Retd) K.V. Kuber, Adviser of NSIC highlighted on the MSMEs role in nation-building. Strategic affairs expert Maroof Raza gave detailed presentation on the security needs of India stating that India should spend more on homeland security as the possibility of conventional wars are bleak. Only 0.95 per cent of Indian GDP is spent on homeland security, he said and pointed at the need to concentrate on how to curtail insurgency in Kashmir, multiple secessionist movement in the Northeast, left-wing extremism, etc. Protection of industrial infrastructure, construction sites, extortion, employees kidnapping for ransom and militant groups like the National Democratic Front of Bodoland (NDFB) are the other areas to be looked at. He said that both technology and training are important and companies should look at the training aspect too while selling a product. Raza said there is immense scope for OEMs in the homeland security market including weapons and equipment, electronic surveillance and monitoring, chemical, biological, rediological, nuclear explosives (CBRNEs) protection, private security, security of critical infrastructure, railways, civil aviation, intra-city transit activity, maritime, integrated security systems for business protection and a lot more.

Ankur Gupta, Manager, Aerospace and Defence, Ernst & Young, made a lucid presentation on Indian offsets and said despite foreign OEMs should have patience as the Indian defence market is a cake big enough for all to have a pie. He said that there is the need to now look beyond Russia, move to other geographies and at the same time be self-reliant. The Indian Government, he said, is very flexible in its offset policy and advised foreign OEMs to partner with Indian industries as within the defence offset guidelines, a multiplier of 1.5 for sourcing from SMEs has been announced with the aim to incentivise global players to discharge offset obligations. It may be mentioned that the 1.5 multiplier is allowed when an offset investment takes place in the form of a purchase, foreign direct investment (FDI) and investment in 'kind' in these enterprises. He concluded by saying that NSIC will act as an aggregator in bringing together 20 MSMEs to help foreign OEMs strike a partnership deal.

Ankur Gupta of Ernst & Young addressing. Also seen (from left) are Colonel (Retd) K.V. Kuber, Commodore Aseem Anand, Uday Kumar Varma, Commodore (Retd) Sujeet Sammaddar, Ajay Singha and Maroof Raza.

Commodore Aseem Anand, Principal Director, Directorate of Indigenisation, said that indigenisation is not possible without the MSMEs active support. Indian Navy, he said, gets large parts from the MSMEs and the focus now is on long-term relationships. Commodore (Retd) Sujeet Sammaddar, CEO, ShinMaywa Industries India, said that offsets should be seen as an opportunity and not an obligation by the foreign OEMs. Challenges in the form of taxation, industrial licensing and certification are though faced by MSMEs, they are the backbone. He said ShinMaywa has listed out 115 MSMEs and already visited 47. Ajay Singha, Executive Director, American Chamber of Commerce, informed that the US industries will have a good presence at the event in December and requested the organisers to ensure that the Department of Defence Production is present. According to him, the presence of key advance suppliers who have the bandwidth with big players is also important.

Uday Kumar Varma, Secretary, Planning and Marketing, NSIC, proposed the vote of thanks and said that India's target to achieve 70 per cent indigenisation and the offset obligations for foreign OEMs will be achieved by the MSMEs. SP

PHOTOGRAPH: NSIC

IAF focuses on maintenence and training

The second biannual Air Force Commanders' conference 2013 was held at Air Headquarters, Vayu Bhawan, New Delhi. The four-day conference was inaugurated by Air Chief Marshal N.A.K. Browne, Chairman Chiefs of Staff Committee (COSC) and Chief of the Air Staff.

IAF chose "aircraft and systems maintenance and operational and training issues" as its theme for the current Commanders' Conference in the backdrop of IAF's ongoing modernisation drive, challenges of maintaining legacy systems along with new inductions and optimisation of resources.

Complimenting the Commanders' for an outstanding effort in the last one year, Air Chief Marshal Browne said, "While exercise 'Iron Fist' and exercise 'Live Wire' clearly illustrated our professional competence and teamwork, Op Rahat reconfirmed the nation's faith in IAF's capability and resolve of our men and women. These enhanced our collective confidence in employing new capabilities in conformity with our concept of operations. Now, it is all the more important for us to carry forward the lessons learnt from them and continue to refine our methods."

Emphasising on enhancement of operational capability, the

IAF Chief said, "We must consolidate our newly acquired aircraft and equipment towards maintaining a high operational status at all times."

"Since leadership flows from a sense of ownership, we must encourage ownership at all levels. When, Air Warriors, our most important asset, are happy and motivated, it clearly indicates that we are moving in the right direction," he further added. SP

Northrop wins $414 million for J-STARS upgrade

Northrop Grumman Systems Corp., Northrop Grumman Aerospace Systems, Melbourne, Florida, was awarded a $41,45,00,000 firm-fixed-price, fixed-price-incentive-firm, and cost-plus-fixed-fee type indefinite-delivery/indefinite-quantity contract for the joint STARS system improvement programme III.

The JSSIP III contract will support the current Joint STARS programme office and Air Combat Command projections of improvements to increase E-8C performance, capability, reliability and maintainability.

Work will be performed at Melbourne Florida, and is expected to be complete by October 20, 2020. This award is the result of a sole-source acquisition. No funds are being obligated at time of award. SP

Boeing begins assembling third KC-46A tanker aircraft

Boeing is assembling a third KC-46A test aircraft for the US Air Force's next-generation aerial refuelling tanker program at the company's Everett factory, keeping the programme on schedule to complete production of four test aircraft by the third quarter of 2014.

"In addition to the three KC-46A tankers now in production, our System Integration Labs are operational and we're assembling a second boom," said Maureen Dougherty, Boeing Vice President and KC-46 Tanker Program Manager. "We remain on track to deliver the initial 18 KC-46A tankers by 2017."

The KC-46A is based on the Boeing 767 commercial jetliner, a proven airframe in service as an airliner, freighter and tanker. Boeing has delivered more than 1,050 767s worldwide.

"Our teams are maintaining their focus on quality and productivity as we move the first tankers through production," said Scott Campbell, Vice President and General Manager of the 767 programme.

The first test aircraft will roll out early next year. The first test flight of a fully provisioned KC-46A tanker is projected for early 2015, and the first delivery of a production aircraft to the Air Force is planned for early 2016. Boeing expects to build 179 tankers by 2027 if all options under the contract are exercised. SP

Airbus Military A400M development fleet makes 2,000th flight

Airbus Military's five-strong development fleet of A400M new generation airlifters has completed its 2,000th flight. The aircraft that made the milestone flight, a routine flight-test sortie from Manching to Toulouse on October 18, was the fifth aircraft, known as MSN6 and nicknamed Grizzly 5.

Since the first flight of the A400M on December 11, 2009, the development fleet has clocked up 5,665 flight hours. SP

PHOTOGRAPHS: IAF, Airbus Military, USAF

Gray Eagle completes 20,000 automated take-offs and landings

General Atomics Aeronautical Systems Inc. (GA-ASI), a leading manufacturer of remotely piloted aircraft (RPA), tactical reconnaissance radars, and electro-optic surveillance systems, announced that its Gray Eagle unmanned aircraft system (UAS) has reached a record 20,000 successful automatic launch and recoveries with the automatic take-off and landing system (ATLS).

This milestone was achieved on September 25 and comes just 15 months after reaching 10,000 events in June 2012.

ATLS has been deployed at eight sites worldwide, including three overseas, with four additional sites planned by January 2015. Recently, successful ATLS flight testing was performed in support of a reduced take-off and landing pattern for operations in limited air space.

"In addition to providing the Army with significant cost savings through optimised operator workload and training, Gray Eagle's ATLS continues to increase the aircraft's reliability," said Frank W. Pace, President, Aircraft Systems Group, GA-ASI. "These last 10,000 take-offs and landings were achieved without a single event of significant damage."

Currently flying 3,200 flight hours per month, the Army's Gray Eagle Block 1 aircraft has accumulated more than 80,000 flight hours since it was first deployed in 2009. The fleet has grown to 75 aircraft delivered, with another 34 planned within the next 14 months. Within the last year, cumulative flight hours were up 64 per cent as Gray Eagle continues to provide unrivaled and innovative capabilities to the war-fighter. SP

Raytheon delivers 2,000th multi-spectral targeting system

Raytheon achieved a historic first with the delivery of its 2,000th multi-spectral targeting system (MTS) from its factory in McKinney, Texas. As the leading provider of electro-optical, infrared, laser designation and laser illumination capabilities integrated into a single sensor package, Raytheon offers detecting, ranging, tracking and precision fire control capabilities for a wide range of customers.

The MTS product family, which includes the US Army's Common Sensor Payload, has been integrated on 35 different platforms, for every branch of the US military and various international partner countries. MTS platforms include unmanned aerial vehicles, manned fixed-wing aircraft and rotary-wing aircraft.

"This milestone demonstrates that the MTS is the military's system of choice for high performance surveillance and targeting applications that require long-range target identification, reliable tracking, precision geo-location and proven fire control," said Andy Bonnot, Director of Surveillance and Targeting Systems in Raytheon's Space and Airborne Systems business. SP

Northrop Grumman sponsors Australia UAV challenge competition

Northrop Grumman Corporation is sponsoring the 2013 and 2014 UAV Challenge – Outback Rescue, a competition in which students develop unmanned airborne vehicles (UAVs) that locate and deliver an emergency package to a fictitious lost hiker. The competition is aimed at encouraging growth in the Australian civil UAV industry and raising awareness of the potential civilian applications.

"This competition is significant because it introduces high school and university students to UAV technology and shows them how it can help solve real-world problems," said Ian Irving, Northrop Grumman's Chief Executive for Australia. "Given our company's leadership in the field of unmanned aircraft systems, we are pleased to be supporting this important initiative, which will help create the next-generation of aerospace professionals."

The UAV Challenge – Outback Rescue includes two flying categories: the Airborne Delivery Challenge and the Search and Rescue Challenge. Both competitions give students a hands-on opportunity to explore their interests, whether in project management, engineering, mathematics or technology.

This year's Airborne Delivery Challenge took place September 24-25 at Gratton Field in Calvert, Queensland, with 11 teams of Australian high school students participating. Each team was given an emergency package to be delivered to the lost bushwalker, a mannequin called "Outback Joe." Teams used UAVs they built to carry and drop the package as close to Outback Joe as possible. The delivery of the package was controlled by either a human operator or automatically by the systems on the aircraft. This year's Airborne Delivery Challenge was won by the Calamvale Raptors II team from Queensland. SP

PHOTOGRAPHS: GA-ASI, Northrop Grumman, Raytheon

MPs discuss Naxalite issue

The Consultative Committee of Members of Parliament attached to the Ministry of Home Affairs met in New Delhi recently to discuss the menace of naxalites in the country.

The Union Home Minister Sushilkumar Shinde said that the Government has adopted a multi-pronged strategy in partnership with the states affected by left-wing extremism (LWE) through different interventions in the areas related to security, development, rights and entitlement and improvement in governance.

The Home Minister stated that the government has taken a number of steps to improve the capacity building of the State Police Forces through various schemes such as Security Related Expenditure (SRE), Special Infrastructure Scheme (SIS), the Fortified Police Station Scheme, Civic Action Programme, setting up of Counter Insurgency and Anti Terrorism Schools (CIAT) and raising India Reserve Battalions (IRBs).

He informed that the Planning Commission is implementing the integrated action plan (IAP) since 2010 for creation of public infrastructure and services in 82 districts of the country, the majority of which are affected with LWE problem.

He stated that the CPI (Maoist) still has the capacity to launch spectacular strikes in its stronghold areas, especially against soft targets. The security agencies have a lot of ground to cover in neutralising the armed capability of the CPI (Maoist). The role of the Central Armed Police Forces is of great importance in this regard since 90 battalions have been deployed for anti-naxal operations. SP

Acoustic detection identifies IEDs

A new acoustic detection system, consisting of a phased acoustic array that focuses an intense sonic beam at a suspected improvised explosive device, can determine the difference between those that contain low-yield and high-yield explosives.

A remote acoustic detection system designed to identify homemade bombs can determine the difference between those that contain low-yield and high-yield explosives.

That capability, never before reported in a remote bomb detection system, was described in a paper by Vanderbilt engineer Douglas Adams presented at the American Society of Mechanical Engineers Dynamic Systems and Control Conference on October 23, in Stanford, California.

A Vanderbilt University release reports that a number of different tools are currently used for explosives detection. These range from dogs and honeybees to mass spectrometry, gas chromatography, and specially designed X-ray machines.

"Existing methods require you to get quite close to the suspicious object," said Adams, Distinguished Professor of Civil and Environmental Engineering. "The idea behind our project is to develop a system that will work from a distance to provide an additional degree of safety."

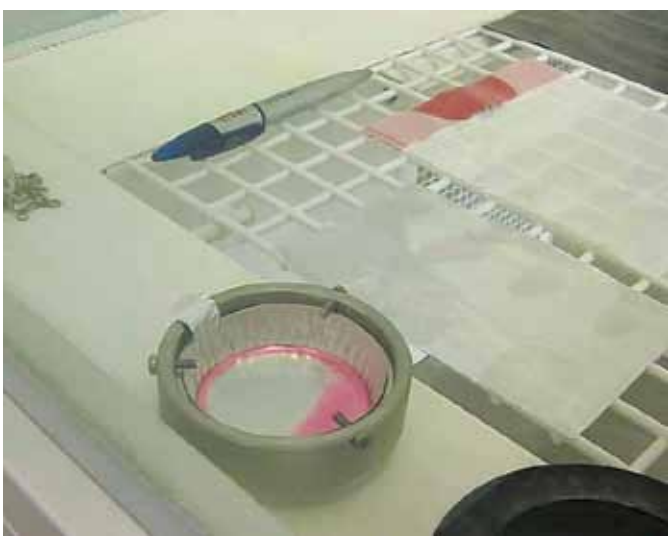
The new system consists of a phased acoustic array that focuses an intense sonic beam at a suspected improvised explosive device. At the same time, an instrument called a laser vibrometer is aimed at the object's casing and records how the casing is vibrating in response. The nature of the vibrations can reveal a great deal about what is inside the container. SP

New technique to detect fingerprints

Researchers have developed an innovative product that uses fluorescence to detect fingerprints. This new product, Lumicyano, will make it possible to highlight fingerprints directly, more rapidly, and at a lower cost, avoiding the cumbersome processes required until now.

An innovative product that uses fluorescence to detect fingerprints has been developed by a team from the Laboratoire de Photophysique et Photochimie Supramoléculaire et Macromoléculaire (CNRS/ENS Cachan) in collaboration with the specialised French firm Crime Scene Technology.

This new product, Lumicyano, will make it possible to highlight fingerprints directly, more rapidly, and at a lower cost, avoiding the cumbersome processes required until now. The product has been successfully put through its paces by the French Police and Gendarmerie as well as by Scotland Yard and the FBI. It has led to a publication in Forensic Science International and a patent has been filed.



PHOTOGRAPH: crimesceneteechnology.fr

ACNRS release reports that scientific police can find it difficult, however, to make use of such fingerprints when they are too light or their contrast is too low. When someone places their finger on an object, they leave behind a trace composed of water, salts, fats, amino acids and, potentially, DNA. To reveal this latent trace, the most widely employed technique is fuming of a cyanoacrylate compound, better known as "Super Glue." This reacts with the elements present in the fingerprint and polymerises, leaving a white deposit that technicians can then photograph and analyse. This technique, however, can at times entail certain difficulties. For example, when the fingerprint support is of light colour, the contrast with the fingerprint is too low to be photographed. Similarly, if the fingerprint is very light, the deposit will be too tenuous to obtain an exploitable image.

The release notes that Lumicyano offers excellent detection performance. In addition, it reduces costs and treatment times. Another advantage is that it does not destroy the DNA that can sometimes be extracted from fingerprints. Its operational efficiency has been successfully tested and validated, not just by the French Police and Gendarmerie but also by several other police forces throughout the world such as Scotland Yard and the FBI. SP

Northrop Grumman's F-35 assembly line bags 'Assembly Plant of the Year' award

Northrop Grumman Corporation's F-35 integrated assembly line (IAL) was named "Assembly Plant of the Year" by *Assembly Magazine* in recognition for the facility's world-class processes to reduce costs, increase productivity and improve quality. Northrop Grumman is the first aerospace company to receive this award.

Inspired by automation systems used by automakers, the IAL was designed and developed by Northrop Grumman, working with Detroit-based KUKA Systems Corporation's Aerospace Division, a commercial automation integrator. The IAL is central to producing the F-35's centre fuselage as well as driving new levels of efficiency into the manufacturing process, reducing process times, increasing precision and quality, and reducing production costs.

"Northrop Grumman has been a leader in designing, developing, and applying automated systems to the complex task of assembling modern fighter aircraft," said Brian Chappel, Vice President of the F-35 programme for Northrop Grumman Aerospace Systems. "The IAL is one example, where Northrop Grumman maximises robotics and automation, providing additional capacity and assembly capability while meeting engineering tolerances that are not easily achieved using manual methods." SP

Saab combines US defence operations

Global defence and security company Saab announced the establishment of Saab Defense and Security USA LLC. This represents the consolidation of several US-based Saab defence companies into a single US defence and homeland security provider.

Shared management structures and security governance will increase synergies and improve efficiency. Saab's goal is to build an agile and responsive US company able to deliver innovative, timely and highly-effective solutions to meet local defence and security needs. Saab Defense and Security USA LLC (SDAS) brings together the operations of the former separate legal entities, Saab Training USA LLC, Saab Barracuda LLC, Saab Support and Services LLC, and the defence elements of the Saab Sensis Corporation, into a single organisational structure.

Jonas Hjelm, Head of Saab's Americas Market Area, states, "even when viewed against the background of the current budget situation, the US defence and security market represents nearly 50 per cent of the total global market. This makes it very important for Saab to solidify its position and grow its presence in the US." SP

Boeing marks 30 years of aerospace electronics fabrication in El Paso

Boeing and the City of El Paso recently marked three decades of advanced electronics manufacturing for products ranging from spacecraft to fighter jets, bombers and missiles.

"For 30 years the men and women working at Boeing El Paso have demonstrated a dedication to quality and employee involvement," said Rosaura Corral-Perez, Boeing El Paso site leader. "The skill sets and track record here will continue to help Boeing meet current and future customer needs."

Boeing El Paso has consistently supported the local and regional community in its first 30 years and will continue to partner with business, government and non-profit organisations to strengthen the El Paso and border region. In addition to high levels of employee volunteering, ongoing Boeing charitable and business investments in the region include scholarships, sponsorships, and college recruiting efforts at University of Texas at El Paso and New Mexico State University, as well as education initiatives related to science, technology, engineering and mathematics. SP

Kaman Aerosystems provides products for Textron AirLand Scorpion programme

Kaman Aerosystems announced that its subsidiary, Kaman Composites – Wichita, Inc., provided a number of components for the recently introduced Textron AirLand Scorpion prototype aircraft. These components included the wing assembly, vertical and horizontal stabilisers, wing fuel access panels, main landing gear doors and several close out panels.

"Kaman is proud to have supported the development effort for the Scorpion programme. This new twin-jet aircraft is a cost-effective solution for lower-threat battlefield and homeland security missions. Our efforts highlight the capabilities of our Wichita composites facility to produce a range of components and assemblies," stated James Larwood, President, Kaman Aerosystems.

The Textron AirLand Scorpion ISR/Strike Aircraft programme and prototype aircraft were unveiled at the Air Force Association Air & Space Conference and Technology Exposition in National Harbor, Maryland, on September 16, 2013. The first flight is anticipated to occur before the end of the year. The aircraft was developed by a joint venture between Textron Inc. and AirLand Enterprises, LLC. The Scorpion is a versatile intelligence, surveillance and reconnaissance (ISR)/strike aircraft platform. SP

PHOTOGRAPHS: Northrop Grumman, Businesswire

PHOTOGRAPH: airportsinternational.com

Man hops on to German Chancellor's aircraft

A 24-year-old man clutching a bag full of marijuana and ecstasy pills managed with relative ease to get on board an empty government jet used frequently by German Chancellor Angela Merkel, while it was parked at a closed military section of the Cologne airport.

The man, a bodybuilder of Turkish descent named as Volkan T., proceeded to stage a raucous, one-man party. Reports said he stripped down to his underpants, sprayed fire extinguisher foam around the elegant cream and beige interior, pushed buttons in the cockpit, released an inflatable emergency slide and danced on the wing of the Airbus 319.

The plane, which is also used by other top state officials including President Joachim Gauck, was delivered three years ago and is one of two medium range A319 jets in the government fleet. It has a private office, a conference room that seats 12 and a main cabin with space for 32.

The incident was initially reported in July 2013, but is now attracting renewed attention after an intriguing eight-page police report was leaked to German newspapers.

According to newspapers including *Welt am Sonntag* and *General-Anzeiger*, the report reveals that the plane was accessible through its emergency exits and the cockpit door was open. It also says that it took police, private security guards and members of the Bundeswehr army almost four hours to get the intruder off the plane. SP

Hoodwinks security at Port Newark

An emotionally disturbed man breached security recently at one of US's busiest ports, boarded a ship and was found in the captain's cabin. Officials are trying to figure out why Eric Carrero went unchallenged. Authorities believe Carrero scaled a barbed-wire-topped six-foot security fence at the Port Newark marine terminal in New Jersey. A Port Authority of New York and New Jersey official says Carrero wandered around before he boarded the cargo ship and was discovered in the captain's bed about four hours later.

Carrero is undergoing a psychiatric evaluation. It was the second recent security breach at a Port Authority facility. Earlier, a man swam to Kennedy Airport after his personal watercraft ran out of gas. Port Newark handles more than 6,00,000 shipping containers annually. SP

Student indicted in security breach

A grand jury has indicted a former University of Nebraska-Lincoln student in connection to a security breach a year ago. Daniel Stratman, 23, already faced a criminal charge—reckless damage to a protected computer during unauthorised access—filed by the US Attorney's Office in December. Now he faces a dozen counts.

According to a news release from US Attorney Deborah Gilg's office, two of the counts allege that between May 23 and 24, 2012, Stratman "knowingly caused the transmission of a programme, information, code and command," causing damage to a protected computer owned by the University of Nebraska and Nebraska State College Systems computer system.

In the nine other counts, which occurred between April 30 and May 23, 2012, he is accused of exceeding his authorised access to a computer and obtaining information from a protected computer. SP

Philippines airport guards face action

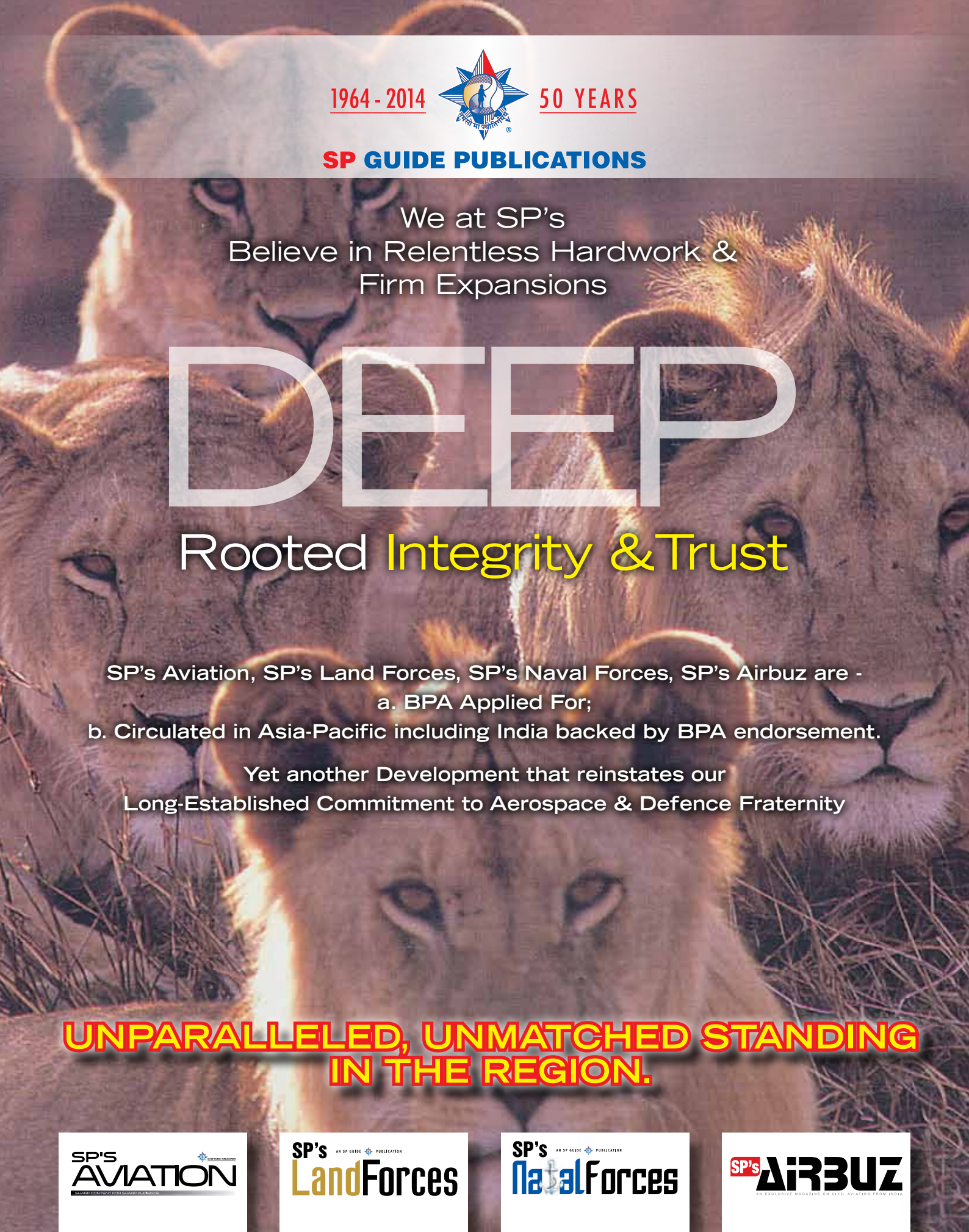
The agency in charge of security at the Ninoy Aquino International Airport may face sanctions for lapses its guards committed during the fracas between showbiz couple Raymart Santiago and Claudine Barretto and *Inquirer* columnist Ramon Tulfo, the Philippine National Police (PNP) said recently.

Chief Superintendent Tomas Rentoy, head of the PNP's Supervisory Office for Security and Investigation Agency, said Lanting Security and Watchman Agency and its security guards clearly committed blunders during the incident.

"Admittedly, there were lapses committed, otherwise, nobody would have come to physical harm, including the ganging up on Mon Tulfo. So we really believe there were lapses," Rentoy said. He identified at least two lapses: "[First], they should have restrained the others from beating up Mon Tulfo and pacified them. [Second], they should have taken the parties to the office for investigation."

Bishop Cruz advised the management of Cebu Pacific to improve their poor customer service, which had sparked the ire of the show-biz couple and eventually led to the commotion.

"The airline should also improve its services...the incident should serve as a big lesson for them too," added the officer. SP



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