



Shared Horizons

U.S. - India Aviation Cooperation Program : "A Partnership that Flies"



Inside



- ✕ Message from Co-chairs
- ✕ India's Airports Are the Future of Aviation - They Deserve Future Proof Security Technology
- ✕ Glimpses of 2015 U.S. - India Aviation Summit, November 3-5, 2015 at Bengaluru
- ✕ Acceptance Testing for Explosives Detection Systems (EDS)
- ✕ Textron Aviation's investments in Cessna and Beechcraft turboprop platforms reap rewards for India's operators
- ✕ Enhancement of India's Aviation Security Capabilities
- ✕ Rockwell Collins bringing innovation solutions to commercial aviation
- ✕ WiFi Connectivity in the Air
- ✕ L-3 Aviation Products Opens New MRO Facility to Serve Indian Aviation Marketplace
- ✕ Firefly Batteries - Powering the Future

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Message from Co-chairs



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We are pleased to present to you the July 2015 - March 2016 issue of "Shared Horizons".

Highlights during this period included signing of grants for ProVision Body Scanner Pilot project with AAI and Aviation Safety Technical Assistance Phase - II project with DGCA.

The fifth U.S. - India Aviation Summit was held in November 2015 in Bengaluru, India and succeeded in strengthening bilateral aviation cooperation between the U.S and India besides creating opportunities for ACP members.

With the U.S. as a Partner Country at India Aviation 2016, we are excited to continue the growth momentum and our relationship building at this important event.

On behalf of the entire ACP membership, we wish you great success and accomplishments in 2016!

(CJ Collins)

(Yash Kansal)

ACP

In Partnership with



Ministry of Civil Aviation
Government Of India



BUREAU OF CIVIL
AVIATION SECURITY

ACP Milestones

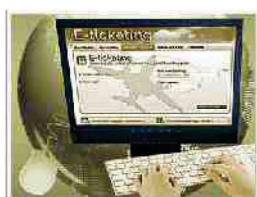
2016	✈ Grant agreement signed for Aviation Safety Technical Assistance Phase - II
2015	<ul style="list-style-type: none">✈ Aero India 2015 of Bengaluru✈ Grant agreement signed for ProVision Body Scanner System Pilot Project✈ US – India Aviation Summit: Bengaluru
2014	<ul style="list-style-type: none">✈ India Aviation 2014 at Hyderabad✈ Grant agreements signed for ASETEP & Aviation Safety Technical Assistance Phase - I
2013	<ul style="list-style-type: none">✈ Grant agreements signed for PBN, DGCA officers' training and Airport GIS✈ US – India Aviation Security Seminar✈ US – India Aviation Summit: Washington D.C.
2012	<ul style="list-style-type: none">✈ Grant agreement signed for Aerospace capacity software simulation project✈ India Aviation 2012 at Hyderabad
2011	<ul style="list-style-type: none">✈ Grant agreement signed for launching GBAS in Chennai✈ US – India Aviation Summit: New Delhi
2010	<ul style="list-style-type: none">✈ Grant agreement signed for Helicopter Safety Technical Assistance✈ Automatic Dependent Surveillance – Broadcast (ADS-B) Seminar✈ Ground Based Augmentation System (GBAS) Seminar✈ India Aviation 2010 at Hyderabad
2009	<ul style="list-style-type: none">✈ Grant agreements signed for DGCA officers' training (Phase-I) and Aviation Standard Technical Training✈ US – India Aviation Partnership Summit: Washington D.C.
2008	<ul style="list-style-type: none">✈ FAA conducts Air Traffic Management Training Program✈ ATCO Manpower Assessment study✈ Air Traffic Flow Management Seminar
2007	<ul style="list-style-type: none">✈ MoU between: US Department of Transportation, US Trade & Development Agency, and Ministry of Civil Aviation✈ US-India ACP Inaugural Session: ACP Formed✈ US – India Aviation Partnership Summit: New Delhi
2006	✈ Groundwork Meeting
2005	✈ ACP Announced by Secretary Mineta and Minister Patel



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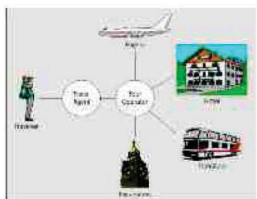
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ACP Mission, Objective & Focus Areas

Mission

The U.S-India Aviation Cooperation Program (ACP) was established in 2007 as a public-private partnership between the U.S. Federal Aviation Administration (FAA), the U.S. Trade and Development Agency (USTDA), other US Government agencies and U.S. Companies.

The ACP supports the growth of the Indian civil aerospace sector by working directly with the Government of India (GOI) to identify and execute projects that encourage collaborations between US and Indian stakeholders, in the area of aerospace technology and best practices.

Objective

- ✈ Promote greater engagement between US and Indian Government agencies and industry to enhance civil aviation in India.
- ✈ Undertake projects that advance Cooperation in domains such as aviation safety, security, regulatory oversight and management.
- ✈ Provide training and technical assistance to accelerate excellence in aviation operations.
- ✈ Within India, increase awareness of, and facilitate access to, US expertise, technology and best practices to assist India's aviation growth.

Focus Areas

- ✈ NextGen/Future Air Navigation System
- ✈ Air Traffic Management Modernization
 - Satellite-based Navigation System
 - Ground –based Navigation System
 - Automatic Dependence Surveillance Broadcast
 - Radar Integration
- ✈ Airspace and Airport analysis, Development and Planning – Using software simulation toolkits and GIS
- ✈ Aviation support Industry Development
- ✈ Aviation Human Resources – Foster partnership between U.S. and Indian training organizations
- ✈ Aviation Safety – Promoting Global Harmonization and sharing of U.S. Best practices
- ✈ Aviation Security – Enhance capacity to facilitate early adoptions of cutting edge technologies

ACP Ongoing Projects

- ✈ Technical, Management, and Operational Development Training (TMODT) – Phase-II
- ✈ GBAS Pilot Project at Chennai Airport
- ✈ Airport Geographical Information System (AGIS) for Indian airports
- ✈ Performance Based Navigation (RNP-AR) at 3 Indian airports
- ✈ Aviation Security Equipment Testing and Evaluation Program (ASETEP)
- ✈ Aviation Safety Technical Assistance Phase - II
- ✈ ProVision Body Scanner System Pilot Project

ACP Past Successes

- ✈ Total Airspace and Airport Modeler (TAAM)
- ✈ Aviation Safety Technical Assistance Phase - I
- ✈ Helicopter Aviation Safety Technical Assistance
- ✈ AAI ATCO Manpower Assessment
- ✈ Technical, Management, and Operational Development Training (TMODT) Program – Phase-I
- ✈ Technical Training for Aerospace Industry



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India's Airports Are the Future of Aviation – They Deserve Future Proof Security Technology

By Jacques Coumans, PhD., Chief Scientific Officer, Analogic Corporation

Even in a country where rapid change has been the rule, the forecast growth for aviation in India is eye-opening. India, the world's 9th largest aviation market, is forecast to become the 3rd largest by 2020. Total passenger traffic is projected to grow from approximately 169 million passengers in 2014 to 450 million passengers in 2020. That reflects a staggering annual growth rate of over 17%.

This growth reflects the pent-up demand for air travel in a country that has experienced decades of rapid growth. It also marks the emergence of India as a global economic power and magnet for future investment.

But with this growth and opportunity come challenges.

India has been the target of terrorist attacks, making aviation security a real concern. India's security agencies face terrorists that are increasingly using homemade explosives or "HMEs". These HMEs use combinations of readily available

explosive precursors that have chemical signatures close to benign materials such as foods or cosmetics. HMEs often use small quantities of threatening materials that make them easy to conceal in cluttered baggage.

At the same time, the rapid growth in passenger traffic will force Indian airports to rapidly increase their capacity to provide security effectively. Aviation checkpoints will have to screen hundreds of millions of additional passengers for a wide range of threats without causing unnecessary delays. And as top Indian airports compete with other global hubs such as Dubai or Istanbul, they will need to offer a high level of passenger satisfaction.

Thus, for India's airport operators and regulators the aviation security screening challenge is significant. They need future proof security technology, not only for threat detection, but also in terms of passenger throughput, reliability, and lower cost of ownership.

Luckily there is a now technology that can meet India's requirements: high-speed rotational computed tomography (CT) technology.

Rotational CT: The Gold Standard for High Quality Imaging Applications

Rotational CT technology (as opposed to "stationary" or "fixed" systems) is the "gold standard" for high quality imaging applications. For example, in the medical industry, while other technologies, such as stationary CT systems were considered and ultimately rejected, rotational CT is the preferred technology due to its high quality, precise 3D images. There are over 60,000 advanced rotational CT systems in use today.

The widespread use of rotational CT in medicine gives it important advantages for aviation customers. Rotational CT is proven, leading edge technology. It is a magnet for research and development. It is supported by high quality



component suppliers, software developers and integration partners. Just as advanced rotational CT is preferred by radiologists for its ability to distinguish a lesion from a tumor, rotational CT is the best technology for differentiating a bottle of water from a potential homemade explosive in a passenger's bag.

Rotational CT: Better Image Quality Means Better Threat Detection

Rotational CT has technical advantages for threat detection over alternative screening approaches, such as fixed or stationary CT. With rotational CT, the x-ray detector and source remain in fixed relationship to each other as they move a full 360 around the bag being screened. This means rotational CT produces a higher resolution 3D image of the bag and collects more precise data about the material being inspected.

These advantages are important given the threats confronting aviation. Terrorists are expanding the range of materials and packaging methods in their efforts to circumvent screening. Rotational CT technology provides the most accurate 3D images to screen for these

threats.

For India's airports, advanced rotational CT is the "future proof" solution they need. They understand threat detection requirements can change and they cannot be stuck with out-of-date technology. Advanced rotational CT technology solves this problem. In fact, advanced rotational CTs are the first systems to meet the new European Union and US TSA requirements for HME threat detection.

Finally, rotational CT technology has a bottom line advantage for India's airports: it is designed for greater reliability and lower cost of ownership.

Given that rotational CT uses a moving part – a high speed bearing – this may not be an obvious advantage. But, as a general engineering principle, system reliability depends not on whether a part is moving, but on the expected life of the system's subcomponents. In this area, rotational CT has benefits over fixed and stationary technologies. Rotational CT uses fewer components and each component has a long lifecycle. Fixed and stationary gantry based technologies depend on multiple custom built subcomponents

that have shorter product lifecycles. As a result, customers can expect more up time and faster repair times with rotational CT.

Advanced Rotational CT: The Best Option for India's Aviation Security Checkpoints

Rotational CT also offers India the opportunity to handle its increasing passenger volumes at the security checkpoint more securely and at lower total cost.

Today, the main technology used for carry-on baggage screening is based on fixed x-ray systems. While this technology was adequate when deployed decades ago, it now has serious limitations. To ensure detection of HME's, passengers must divest themselves of liquids and take laptops out of their bags. This has added delays and costs. And as threats become smaller and harder to distinguish, the limitations of fixed x-ray systems will mean more false alarms, more manual inspections, and longer lines.

But now, new, highly cost effective rotational CT systems are available for airport checkpoints. These systems are unmatched in terms of security:



to date, they are the only ones to meet the EU's Type D regulations, the world's highest standard for threat detection. What is more, they can also dramatically lower airports' overall costs and improve passenger satisfaction.

Rotational CT checkpoint systems can do this, first, because their superior threat detection capabilities allow passengers to keep their liquids and laptops in their bags. Second, they can screen cluttered bags at high

speed with automated threat detection algorithms, with far fewer false alarms than conventional x-ray. And finally, they are more reliable.

The result is better return on investment. In live airport trials, rotational CT increased passenger throughput, rescans and delivered +99% operational availability. Rotational CT technology allows airports to reduce the total number of screening systems they deploy,

while increasing airport screening capacity, which translates to big savings.

India, a leader in technology innovation and a growing force in global aviation can now lead the world in aviation security and passenger satisfaction by adopting advanced Rotational CT technology. The future is approaching and India deserves the best.





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Glimpses of 2015 U.S. - India Aviation Summit



Summit at Bengaluru, November 3-5, 2015



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Hon'ble Amb. Richard Verma delivering remarks at opening reception of Summit



Honeywell's Arijit Ghosh, Boeing's Prat Kumar & Textron's Inderjit Sial with Hon'ble Amb. Richard Verma



MOCA Secretary Rajeev Nayan Choubey delivering remarks in General Session at Summit



Chairman AAI R.K. Srivastava delivering remarks at Summit



Boeing's Prat Kumar shake hands with Chairman AAI R.K. Srivastava



ACP Co- chair (Industry) Yash Kansal delivering remarks at Summit



Air Asia's CEO Mithu Chandilya with USTDA Director Lee Zak at Summit



FAA delegation with CJ Collins, ACP Co-chair (Government) & Sr. Rep. to South Asia, FAA



Harris's Rob Bracewell delivering remarks at Summit



Director General M. Sathiyavathy delivering remarks at Summit



Zeba Reyazuddin, Dept. of State delivering remarks in general session on 'Regional Connectivity'



Oshkosh Leadership Tim Raupp & TE Chian with Hon'ble Minister Gajapathi Raju



USTDA Country Rep. Mehnaz Ansari with Director Shefali Juneja, Secretary R.N. Choubey & V.J. Kurian, MD - CIAL



USTDA Country Rep. Mehnaz Ansari, ACP Program Director Sandeep Bahl with Minister Raju & Secretary Choubey



Dept. of State Zeba Reyazuddin, US - FCS Rachel Duran, USTDA Katherine Michaud at Summit



L-3 Aviation Rajeev Dutta and L&B Debayan Sen with AAI Member - ANS A.K. Dutta



L-3's Patricia Krall delivering remarks in session on 'Airport Security Regulations & Standards'



Harris's Rob Bracewell delivering remarks in session on 'Technologies & Practices for ATC'



Glenn Wicks delivering remarks in general session on 'Aviation Sector Skills Development'



IACC Leadership with TDA Director Lee Zak & Team



Bilateral Meeting in Progress



IACC President Dr. Lalit Kanodia delivering 'Vote of Thanks' at Summit



ACP Program Director Sandeep Bahl delivering 'Vote of Thanks' at Summit



Sessions' Moderators at 2015 U.S- India Aviation Summit



ACP Members with Lee Zak, Director - USTDA at 2015 U.S- India Aviation Summit



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Acceptance Testing for Explosives Detection Systems (EDS)



By Neal Owens, Senior Business and Program Management Representative, Battelle

India's aggressive program to grow its aviation industry is an important element of its overall strategy for economic growth. It is anticipated that this aviation initiative will result in India becoming the world's third largest aviation market by 2020 with an estimated 336 million domestic and 85 million international passengers annually. India's Ministry of Civil Aviation and Bureau of Civil Aviation Security intend to achieve state-of-the-art security consistent with their world class aviation infrastructure in order to secure travelers, protect infrastructure investments, and help conform India's security protocols with those of its major trading partners worldwide.

Screening passengers, carry-on items, hold baggage and cargo for explosive threats is a well-established means to secure civil aviation. Computed Axial Tomography (CT) Explosives Detection Systems (EDS) represent the state of the art for

explosives screening, particularly for hold baggage. CT EDS utilize automated threat detection (ATD) algorithms to analyze screened images and detect improvised explosive devices (IEDs). Automatic detection combined with secondary screening, such as physical search, create a cost-effective, comprehensive means to detect IEDs. The key elements of EDS detection are: 1) the performance and fidelity of the ATD algorithm and associated software and, 2) the quality of the three dimensional (volumetric) CT X-ray images of screened items generated by the EDS which are analyzed by the EDS software. Given the complexity of these systems, unit level acceptance testing is essential to ensure each EDS is performing in accordance with requirements.

ATD algorithms and associated software are typically developed to achieve detection performance requirements as prescribed by a Governmental security authority and are

certified by that authority based on exhaustive testing. Since algorithms and software do not degrade, unit level testing of the ATD algorithm and software is not required. However, algorithms and software versions must be audited during unit testing to ensure the certified versions are resident on the system. This verification is performed as part of a configuration audit conducted by the buyer's independent acceptance testing representative during acceptance testing.

Unlike software, the image quality of an EDS can be affected by numerous system elements including misalignment of hardware or various mechanical or electronic failures within the EDS's subsystems. Even properly configured and certified analysis software can produce substandard analysis results if the analysis is based upon substandard quality X-ray images. Thus, the image quality must be



carefully tested at the unit level during acceptance testing to ensure the image quality meets specifications.

To address the need for a reliable and repeatable means to verify that an EDS X-ray image meets acceptable performance standards the National Institute of Science and Technology (NIST), has adapted and published the American National Standards Institute (ANSI) N42.45 2011 standard for X-ray image quality. Prior to publication, NIST collaborated with the Transportation Security Administration (TSA), the U.S. Department of Homeland Security (DHS), equipment manufacturers and Battelle Memorial Institute (Battelle) in the US and conducted exhaustive testing to ensure the standard's suitability for EDS image quality verification. The ANSI standard relies on test articles (there are two) referred to as phantoms, and a mathematical formula for analyzing key parameters of images produced by the phantoms when scanned by an EDS. The numerical results of the mathematical analysis can be

compared to a baseline of performance parameters to determine if the EDS unit being tested produces X-ray images with a quality that meets the standard.

Given the criticality of EDS and its high cost, which can reach \$1M USD each, it is essential that Governments and airport authorities ensure the operational suitability of EDS whether it is newly acquired or returned to duty following upgrade or service. TSA is by far the world's largest user of EDS for explosives screening and they have developed a comprehensive approach to acceptance testing of its security equipment. TSA will soon be utilizing the ANSI standard for EDS X-ray image quality verification as published by NIST. Since it began acquiring EDS, TSA has utilized Battelle as its independent acceptance tester. Over the years Battelle has consistently worked with TSA to develop testing protocols and procedures, test articles and to conduct acceptance testing on behalf of TSA. Following is a summarized recommended approach for acceptance testing for EDS, including the use of the

ANSI N42.45 2011 standard.

EDS unit-level acceptance testing should be conducted in three phases; Factory Acceptance Testing (FAT), Site Acceptance Testing (SAT), and Integrated Site Acceptance Testing (iSAT). Factory Acceptance Testing is used to confirm that each unit meets specifications before being shipped from the manufacturer's site. Testing at the manufacturer's location is important because it allows any manufacturing defects to be identified and corrected quickly and cost effectively.

SAT testing is very similar to FAT testing and assures that once delivered and installed/integrated, the EDS is still performing according to specification. iSAT is separate testing conducted to ensure that EDS integrated into a baggage handling system (BHS) work properly with the BHS. FAT/SAT testing are summarized below. Procedures for iSAT testing are specific to the actual integrated BHS system and involve considerable detail and exhaustive testing of the integrated EDS and BHS.



FAT/SAT Test Activity	Purpose
Configuration Audit	Verifies system hardware and software components match the configuration baseline ordered by the client.
Safety Testing	Verifies ionizing radiation levels are within acceptable limits for cabinet X-ray systems and that safety interlocks and E-stops are functioning properly.
Functional Testing	Verifies system startup and shutdown, operator console, tools, interface, reporting, and operational test kit are all functioning properly.
False Alarm/Throughput Testing	Verifies system is setup properly to process baggage at desired throughput speed without unacceptable levels of false alarms.
Image Quality Testing	Verifies system's imaging performance is within established acceptance criteria following ANSI N42.45-2011.

Leveraging its extensive acceptance testing experience, Battelle can help Governments and airport authorities develop their acceptance testing requirements and protocols and conduct testing. Battelle's Verif-IQ™ X-ray Image Quality Verification System, based on the ANSI standard, provides both test phantoms and analysis software for conducting acceptance testing for interested security organizations.

For more information, please contact Neal Owens at owensa@battelle.org or 614-571-7765
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Textron Aviation's investments in Cessna and Beechcraft turboprop platforms reap rewards for India's operators

Textron Aviation continues to penetrate the market in India with its class-leading, innovative and broad product line. From the rugged and reliable Cessna Caravan to its recently enhanced Beechcraft King Air products, these platforms dominate the turboprop market in India. Due to the following attributes, both products have proven to be ideally suited to the region's market conditions:

- ample range
- high payload
- low operating costs
- broad range of special mission capabilities, and
- the ability to operate into and out of short, unimproved runways found throughout the region



In the past several years, Textron

Aviation has invested heavily in these platforms to ensure they include the latest technology and performance capabilities in order to meet customers' mission requirements in India and throughout the world.

A favorite among private and commercial operators in the region is the Cessna Caravan. This rugged utility aircraft was designed for use in remote areas with extreme weather changes, mountainous terrain and rough landing conditions. It can be found throughout India in roles such as regional carriers, aircraft charter, cargo services and special mission operations. With the Caravan's high dispatch reliability rate and low operating costs, the commuter option offers a viable and reliable solution to meet the needs of enhanced regional and remote connectivity throughout the region. Also gaining interest is the amphibious Caravan, which is well suited to meet the growing tourism and transport needs along India's coastal locations.



In addition to the popular Caravan series, Textron Aviation's Beechcraft King Air turboprop family is the most widely utilized business aircraft in India with more than 60 aircraft currently in operation throughout the region in roles such as VIP transport, charter operations and air ambulance missions. Known for its reliability, versatility and dependability, the company recently improved on this proven platform by incorporating new, state-of-the-art technology both in the cockpit and cabin. The new Rockwell Collins Pro Line Fusion avionics system is now standard equipment for all three models - bringing commercial aviation's first full touchscreen capability to all three main flight displays. This one-of-a-kind, intuitive flight deck



interface enhances the flight experience while reducing pilot workload. In addition to the avionics, the company made enhancements to the King Air's cabin technologies, which offer an improved and connected passenger experience.

These leading turboprop platforms are all backed by the industry's most capable service network. Textron Aviation's extensive engineering and manufacturing resources provide customers a worldwide network of knowledgeable technical support representatives and the

largest distribution network in the world, offering timely and efficient delivery of high quality factory-owned parts. Textron Aviation offers a robust network of authorized service facilities in the region, and the company is committed to growing and strengthening this service network.

Textron Aviation continues to drive investments into its products based on input from its customers. This purposed product investment strategy allows the company to remain well positioned for future growth



in the market. Learn more about the King Air and Caravan platforms, as well as Textron Aviation's other class-leading products, at this year's India Aviation Exhibition and Conference, March 16-20, in Hyderabad.

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speed passengers through the checkpoint and get checked bags onto the plane faster.

Analogic technology offers the industry's highest level of threat detection, giving airports a security solution that will meet their requirements today and tomorrow.



Enhancement of India's Aviation Security Capabilities

By Dr. Kalpana Jain and Amir Neeman, Hi-Tec Systems, Inc.

India's civil aviation sector is experiencing tremendous growth, and as such, India faces unparalleled regulatory challenges due to a confluence of unique factors, such as, the emergence of low cost carriers, successful modernization of airports, forward-looking policies allowing foreign direct investment in domestic airlines, world class cutting edge information technology industry and its accomplishments and India's growing emphasis on regional connectivity, and the world-wide threat of terrorism. In addition, the Passenger traffic at Indian Airports is expected to increase to 450 million by 2020 compared with India's combined capacity to cater to 220 million passengers and 4.63 million tonnes of cargo per year today. In 2013-14 India handled 169 million passengers and 2.3 million tonnes of cargo. With such growth projections in airline passenger traffic, India needs to urgently address the growing security threats as a result of regional instability and evolving global threat from terrorist organizations, such as, ISIS. Addressing these threats, more than ever, requires development of stringent aviation security

standards, use of state-of-the-art and emerging aviation security systems and technologies, and new and enhanced procedures for screening passengers and cargo for safeguarding civil aviation in India.

The Aviation Security Test and Evaluation Program (ASETEP) is the first security initiative under the U.S-India Aviation Cooperation Program (ACP) funded by the Trade Development Agency (TDA) of the U.S Department of Commerce. This program lead by Hi-Tec Systems with support of other ACP members will address some of the regulatory, technological, infrastructure and human capacity development challenges and issues faced by India today. In the last decade, U.S-India ACP and its industry partners have successfully completed several programs and projects prioritized by the Indian Government to address the emerging needs of the civil aviation sector in India.

Under the ASETEP initiative, Hi-Tec is working collaboratively with the Airport Authority Of India (AAI) and the Bureau of Civil Aviation Security (BCAS) to develop new

standards, which will not only meet the Transportation Security Administration (TSA) and European Union (EU) requirements, but will include requirements that are unique to the country of India. These standards will be complemented with requirements and specification documents, and test facilities requirements and protocols necessary for evaluation and acceptance of internationally available screening systems for airline passengers, carry-on luggage, and checked baggage. The ASETEP initiative lays the foundation for a world class security capability in support of India's vision and plans for a modern aviation infrastructure that would safeguard Indian civil aviation without encumbering the movement of passengers and commerce. The enhanced security standards, procedures, technologies and equipment will complement the successful growth of India's civil aviation sector, for both domestic and international travel, while meeting U.S and European Security requirements for incoming global flights.

The ASETEP, in collaboration with



AAI and BCAS, will build a broader base of knowledge and capabilities that BCAS needs to address national security requirements and emerging threats, and enhance India's capacity to effectively test, certify and procure advanced screening technologies. Specifically, ASETEP will include development of standards for three types of aviation security equipment: checkpoint X-ray machines, Computed Tomography (CT) X-ray explosive detection systems (EDS) and body scanners. ASETEP benefits will further enhance BCAS' capabilities in the developing technical standards and technical specifications for Transportation Security Equipment (TSE), improve operational performance and effectiveness of security equipment, and enhance testing and certification capabilities to evaluate and integrate new technologies into India's existing airport security infrastructure, and encourage competition among TSE manufacturers. This program also involves a visit and tour of the Indian aviation security officials to the TSA's transportation security testing laboratories in the United States.

An indigenous Aviation Security Equipment Test and Evaluation capability has the potential for creating significant economic

development opportunities for India. First and foremost, India will have the ability to ensure that major investments in technologically advanced security systems will meet India's own specifications and requirements for security systems taking into account operational efficiency, passenger service, reliability, maintainability, availability, overall cost of operations, maintenance costs, operational safety, and the like. Overall, India will have the opportunity to realize significant economic and operational benefits as it acquires and deploys the "right kind of security systems and technologies" and avoid procurement of systems that do not meet India's security requirements.

ASETEP provides India with the foundation and the opportunity to foster development of an indigenous, more stable and predictable marketplace for security equipment in India, as it introduces a measure of certainty and assurances to the Original Equipment Manufacturers (OEMs) that the Indian marketplace is ready for their equipment if OEMs can demonstrate that their systems and equipment meet India's requirements as tested and evaluated through ASETEP capabilities. Additional, Indian Government initiatives, incentives and economic development

programs can be instituted to encourage growth of the domestic security systems and technologies industry in India that would create jobs and other economic benefits. This will encourage both domestic and international OEMs and vendors to consider and pursue investments within India for the full range of facilities and infrastructure dedicated to research, development, testing, manufacture, distribution, warehousing and sales of their products. In conclusion, ASETEP will address India's unique requirements, and enhance India's aviation security capabilities above and beyond international security standards established by TSA and EU.





Rockwell Collins bringing innovative solutions to commercial aviation

By Sunil Raina, Managing Director, Rockwell Collins India



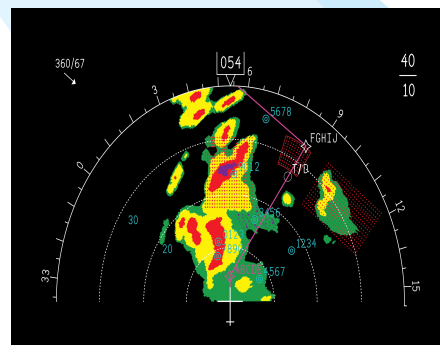
Rockwell Collins is committed to the Asia-Pacific region and continues to expand our presence through key acquisitions, the opening of new facilities and newly formed strategic partnerships and Joint Ventures. Our innovative and reliable solutions, combined with strong customer affinity, continue to drive our company's success in capturing new commercial aviation business and accelerating our growth.

Our Commercial Systems business supplies aviation electronics systems, products and services to customers located throughout the world. Our customer base is comprised of original equipment manufacturers (OEMs) of commercial air transport,

business and regional aircraft, commercial airlines and business aircraft operators. Our systems and products are used in both OEM applications as well as in retrofit and upgrade applications designed to increase the efficiency and enhance the value of existing aircraft.

Our commercial aviation electronics systems, products and services include the latest technology in display systems, head-up guidance systems, pilot controls, communication, navigation and surveillance. In addition, our integrated avionics systems provide advanced capabilities to meet the challenges of operating in the next generation global airspace by enhancing flight crew performance and reducing workload.

We also offer cabin information and in-flight entertainment systems including live, multi-region airborne TV, audio/video-on-demand, moving maps, real-time e-mail and Internet access. By applying our technology expertise and experience across the markets we serve, Rockwell



Collins helps customers advance their goals to reduce costs, gain efficiencies and improve their business performance.

With our acquisition of ARINC two years ago, we also offer a wide range of information management services. From commercial and business aircraft to airports, we provide flexible, proven, highly-reliable information management solutions, giving our customers the most advanced technology and connectivity, enabling seamless and secure information sharing, and optimizing operational efficiency and cost-effectiveness. With the acquisition of ARINC, Rockwell Collins now supports more than 300 airlines and 150 airports. To learn more, visit www.rockwellcollins.com





TECHNOLOGY TO CONNECT,
INFORM AND PROTECT™



YOUR AIR TRAFFIC MANAGEMENT SOLUTION STARTS HERE

A trusted partner to global ANSPs for more than three decades, Harris is delivering advanced communications systems and information services that support critical ATC operations and administrative functions worldwide. Whether it's network infrastructure, information management, or ATM communications—Harris has the best solutions to help connect, inform and protect India's ATC system.

For more information, contact Vikrant Trilokekar at **+(91) 9619865705** or **vtriloke@harris.com**

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WiFi Connectivity in the Air

By Jack Jacobs, Vice President, Honeywell Aerospace

Ever-increasing use of consumer electronic devices such as smartphones, tablets, laptops and wearable technology will see us consume more and more bandwidth, placing greater demand on satellite connectivity and associated infrastructure.

Consumer need for data traffic will continue and in addition to the need for greater bandwidth the sheer number of consumer electronic devices will see explosive growth over the next few years.

A survey carried out by Honeywell Aerospace showed that 86 percent of air travelers expect Wi-Fi on board their flights and almost nine in 10 flyers feel frustrated with the current level of access. While many are willing to pay extra for a flight with guaranteed Wi-Fi. Simply put, the ability to connect with others is no longer a luxury; it's an expectation of both passengers and pilots alike.

With rising passenger expectations, there is no better time for operators to introduce

fast and reliable in-flight connectivity to the cabin. Quite simply, the Ku-band satellite network cannot accommodate this exponential growth and demand. So how do we make sure airlines, and passengers have access to a network that is able to handle the increased demand for bandwidth? By creating a global Ka-band network that has more than a 60 percent faster user experience than alternative systems in the Ku-band network.

In 2012, Honeywell signed an exclusive agreement with satellite operator Inmarsat to provide global in-flight connectivity services to business, commercial, and government aviation customers around the world via Inmarsat's high-speed Global Xpress (GX) network. As the exclusive hardware partner, Honeywell is working with Inmarsat to deliver a global high-speed, in-flight connectivity service to passengers that are capable of delivering up to 50Mb per second of broadband to the aircraft.

Most recently the US' Federal

Aviation Administration granted the first Supplemental Type Certificate (STC) for Honeywell's JetWave satellite communications hardware, approving the in-flight connectivity system to fly on the Boeing 757 airplane. The certification was achieved following more than 180 flight hours and multiple rigorous tests aboard Honeywell's Boeing 757 test aircraft, which showed that the system would stay connected to Inmarsat's GX network at various altitudes, angles and speeds, through several different types of weather, and over land and water.

In late 2015 Inmarsat confirmed the successful launch of its third satellite in the GX constellation. The new satellite joins the Inmarsat-5 F1 and F2, which together provide global coverage. In short, Honeywell and Inmarsat have made leaps and bounds in making truly global high-speed in-flight Wi-Fi a reality.

Honeywell is also the exclusive distributor to the business



aviation market for the high-speedGX Ka-band service. Since entering into this partnership with Inmarsat, Honeywell has distribution agreements with ARINC Direct, OnAir and Satcom Direct, Aircell. Honeywell also recently announced the acquisition of Satcom1 which positions Honeywell to offer operators a seamless experience with an all-in-one connectivity solution spanning routing software, airtime, hardware equipment, avionics, flight support services and applications. These companies will resell GX Ka-band service from Inmarsat and Honeywell to

business aviation operators.

Broader access to onboard connectivity has increased in-flight productivity and completely changed the modern flight experience. With JetWave and the Global Xpress network, passengers and pilots will have access to Wi-Fi speeds that bring the same experience using connected devices aboard aircraft as on the ground.

Jack Jacobs is Vice President & General Manager for Marketing and Product Management with responsibility for the Safety and

Information Management product lines across commercial, business aviation, and defense portfolios at Honeywell Aerospace. Jack is also leading the growth initiative for the “Connected Aircraft” of the future.

<http://aerospace.honeywell.com/>

Honeywell



L-3 Aviation Products Opens New MRO Facility to Serve Indian Aviation Marketplace



Mr. V. Sadagopan (R), CEO (Helicopter) Hindustan Aeronautics Ltd with Mr. Krishen Ganase (Center), President L-3 Aviation Products & Security (AP&S), during the Inaugural function.

L-3 Aviation Products (L-3 AP) opened its new MRO facility in Bengaluru in March 2015. L-3 AP's official theme for its continued expansion plan in India is, "India's Partner—Today, Tomorrow and in the Future." The company is executing a stepped approach in localizing activity which reflects its commitment to customers by expanding its local service reach and advancing its long-term investment in the region.

"Our growing presence in India underscores L-3's pledge to serving the Indian aviation sector," said Krishen Ganase, president of L-3 Aviation Products & Security, during the inaugural function. "Our new MRO facility

places additional personnel in key technical and business roles in Bengaluru, and we're continuing to broaden our reach in other ways to meet the evolving

needs of military and commercial aviation customers in the region."

"We are focused on implementing the next steps in localized sustainment solutions for our growing customer base," added Gp. Capt. (retired) Rajeev Dutta, L-3 AP's director of business development, based in Bengaluru, India. "Our new MRO

office provides an ideal setting to directly engage with our local customers and business partners and helps foster relationships in support of India's dynamic aviation marketplace."

L-3 Aviation Products (L-3 AP) is a leading provider of commercial and military avionics with unsurpassed performance, quality and customer support. L-3 AP manufactures a diverse line of safety- and efficiency-enhancing products that sets the standard for next-generation requirements, including configurable voice and data recorders, collision avoidance systems, navigation products, display systems and processors. L-3 AP also offers aftermarket solutions, including MRO, total avionics support programs and performance-based integrated logistics support for military and commercial systems. To learn more about L-3 Aviation Products, please visit www.L-3.com.com/aviationproducts



Aviation Products

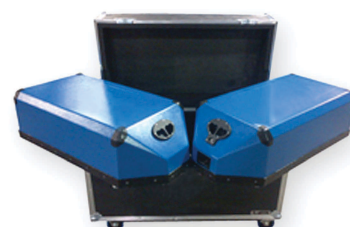


EXPLOSIVES DETECTION SYSTEMS AND SERVICES

We provide expert testing, training and technology for aviation security.

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To solve your most pressing aviation security challenges, **Think Battelle first.**



Verif-IQ™ 2, ANSI based X-ray Image Quality Verification System



LS10 Liquid Threat Detection System



FIREFLY BATTERIES – POWERING THE FUTURE

Firefly Batteries – the only ones manufactured using the patented Microcell Carbon Foam technology – is revolutionizing the lead acid battery industry today. Developed by scientists at Firefly International Energy Co, Peoria, USA, these batteries deliver longer service life, increased energy efficiency and better performance under extreme conditions. These batteries are now being manufactured in India by Firefly Batteries Private Limited under license from Firefly International Energy at their modern plant situated in Ahmedabad, India.

HISTORY OF CARBON FOAM BATTERY TECHNOLOGY

Firefly's revolutionary battery technology was born in the Research and Development laboratory of Caterpillar, Inc., a world-renowned manufacturer of heavy equipment.

Caterpillar has long been a consumer of batteries for its many heavy equipment products.

These equipment, by their very nature, put a severe strain on the batteries. Hot and cold extreme temperatures, severe vibrations and prolonged periods of disuse are standard operating conditions for these heavy equipment. Caterpillar found that normal lead-acid batteries could not withstand this strain and with a new corporate focus on improving the performance and longevity of the batteries turned over this issue to their R&D arm who came up with Microcell Carbon Foam as the solution. This technology has been patented and allows for the exploitation of existing lead-acid chemistry to a much higher level and compete head-on with other advanced battery technologies, including the Lithium batteries. These batteries offer much higher efficiency and cycle life which in turn brings down the cost of ownership to a large degree.

Firefly International Energy, USA, has since then worked closely with Hawker Siddeley, Canada, in developing batteries for ground starting of aircraft and also for fitment inside the aircraft.

CARBON FOAM BATTERY TECHNOLOGY

Firefly's technology is an innovative material science that removes almost all limitations of current lead acid battery products. The materials also hold the promise of major simplification for manufacturing of lead-acid batteries and will potentially deliver more flexible form factors or configurations, which may be the catalyst to change the entire distribution and profitability models of the battery industry.

In the advanced battery architectures that Firefly has perfected, the composite Microcell Carbon Foam, the surface area of which is more than one thousand times in comparison to conventional lead plates, is used as the “grids” for the negative plates.

Structural Advantage of Microcell Carbon Foam

1. Exception Utilization:

The micro-cellular porous structure of the Microcell Carbon foam results in far greater surface



area compared to conventional batteries resulting in a superior active material utilization. Consequently, Firefly batteries provide a higher energy output for the same weight of active material. Hence, for a given application, a lesser capacity Firefly battery will meet the requirement.

2. Higher Charge/Discharge currents:

The carbon foam, being a much superior conductor than any lead alloy due to its reduced resistance, dissipates the heat generated inside the battery much quickly resulting in the battery running at much lower temperatures as can be seen in the images presented here below. This unique feature gives this battery the following advantages over traditional lead acid batteries:

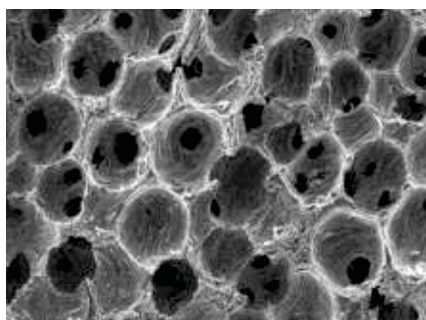
1. The reduced operating temperature results in reduced corrosion levels of the positive grids leading to much **longer life** of the batteries such as those used in **vehicles operating in airports**. At 50% DOD, Firefly batteries will give over 3,000 cycles.

2. These batteries can be discharged and recharged at much higher currents thus reducing the time for recharging.

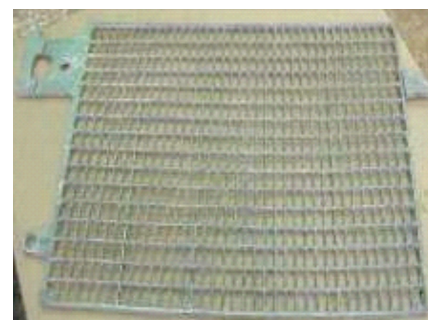
For example, Firefly batteries can be recharged to 90% SOC in less than one hour and to full charge in less than 2 hours. This means that in cycling applications, such as solar, electric vehicles in operation in airports and batteries for ground starting of

aircrafts, the number of charge/discharge cycles that can be obtained in a day is much higher than traditional batteries and therefore the Kilo Watt Hour output from the batteries in terms of cycles is much higher for a given time period.

From decades - long use of lead plates with limited surface areas... **Low Utilization**



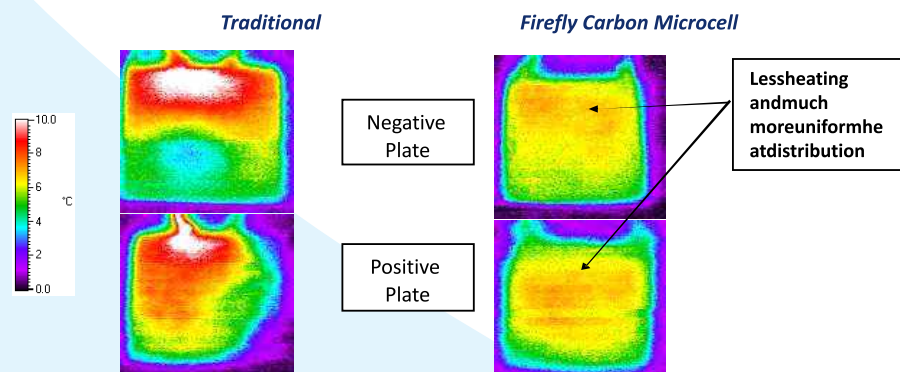
To micro - cellular-based Foam plates with much greater surface areas. **Exceptional Utilization – more than 1,000 times surface area**



Thermal Comparison

The infrared images shown here were taken at the very last second of a 5C (12minute) discharge of both a Firefly 3Dcell and a traditional cell

Less heating and more uniform temperature distribution means better active material utilization and less grid corrosion resulting in long life.





3. Resistant to Sulphation:

Normal lead acid batteries when discharged results in the formation of Lead Sulphate in both the plates. This lead Sulphate, if kept for an extended period, causes the lead Sulphate crystals to harden, called “Sulphation”, which cannot be converted back to active material on charging. This results in a loss of capacity of the battery and also heating up during charge and discharge.

This “Sulphation” occurs under the following conditions:

1. When the battery is kept in an idle condition, such as in vehicles/equipment which are used sparingly in airports.

2. In certain standby applications, such as in radar and telecommunication equipment in defense which are operated with solar energy, where the batteries are not fully charged after each discharge. This type of application is also known as **Partial State Of Charge (PSOC)** application.

However, in the Microcell Carbon foam battery, due to the high porous structure of the carbon foam, this “Sulphation” does not take place and hence these

batteries are ideal for use in the above 2 applications.

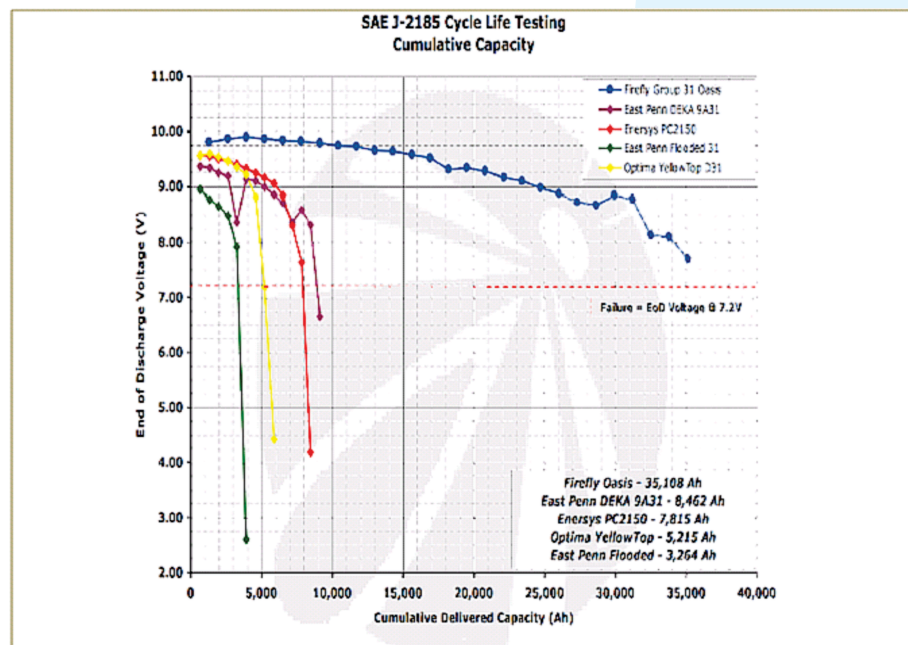
Traditional lead acid batteries need to be recharged to 100% State of Charge (SOC) after every discharge which means that these batteries have to be operated between 70 and 100% SOC. Charging batteries in this range of SOC requires more energy and the efficiency of charging in this range is around 90%. However, Firefly batteries

can be operated between 20 to 90% SOC in which range the energy efficiency is nearly 100%, with a full recharge once in 15 to 20 days.

4. Low Self discharge:

The self-discharge in traditional batteries is around 10% per month whereas in Firefly batteries it is less than 4%. Hence, Firefly batteries can be stored for twice the time of traditional lead acid batteries.

Cycle Life Graph





Limitations of Conventional Lead Acid Batteries

1. Traditional Lead Acid Batteries fail mainly due to Hard Sulphation and Corrosion of the positive grid.
2. Batteries when stored tend to discharge 1-10% per month depending on type of batteries, (Flooded/AGM).
3. In discharged condition, Lead Sulfate crystals cling to each other and harden if not charged in time.
4. Once hardened, to break the larger nonconductive crystals into smaller crystals is not possible and the Ah capacity of the Battery is gradually reduced.
5. Corroded grids are not able to carry the charge/discharge currents and result in reduced Ah capacity.

Advantage of Micro Cell Carbon Foam (MCF)

1. Long Cycle/Service Life – 2 to 3 times life over Lead Acid Battery and comparable to Lithium batteries at much lower cost
2. Deep discharge Batteries
3. Re-Cycling is possible in existing infrastructure

4. These batteries are highly resistant to sulphation which allows MCF Battery to perform for long periods in PSOC (Partial State Of Charge)
5. Fast Charge/Discharge capabilities
6. Wider operating temperature
7. Can be discharged 100% without damage
8. At 50% DOD, "Firefly Batteries" will give over 3,000 Cycles

INNOVATIVE FEATURES OF CARBON FOAM GEL BATTERIES

1. Carbon foam replaces the Lead Grid of negative plates which results in lowest sulphation in the batteries and

reduced corrosion of positive plates. This results in 2-3 times additional cycle life.

2. Limitation of AGM Sealed Maintenance free Lead Acid batteries (VRLA).
 - Acid Stratification to some extent
 - Improper charging results in severe water loss causing early failures.
 - Difficult Assembly
 - Filling acid to all the internal parts of the plates is difficult due to compression in AGM.
 - Formation time is long (it takes 3-4 days)

Comparison of Various Technologies of Li, Carbon Foam, and Lead Acid Batteries

Comparison	Liion	CarbonFoam	Pbacidbatteries(SMF)
Performance	3C	8C	5C
Life(80%DOD)	1000cycles	1000cycles*	300cycles
SpecificEnergy	125Wh/kg.	40Wh/kg.	30Wh/kg.
PowerDensity	750W/ Kg.	225W/ Kg.	180W/ Kg.
Discharging TempRange	-10°C to 60°C	-40°C to 60°C	-20°C to 60°C
Charging TempRange	0°C to 45°C	-20°C to 60°C	-15°C to 50°C
Self-Discharge	Very low	0.15% per day	0.3% per day
PSOC(Partial State of Charge)	No effect on Life	No effect on Life	Affects the battery life
Serviceability	Maintenance free	Maintenance free	Maintenance free
Standards	NA	SAE J2185 & BCI:05 IS15549:2005	IS15549:2005



3. Advantages of Firefly Carbon Foam Batteries using Silica Gel.

- Formation time will be 1-1.5 days
- Tolerance to high temperature variations
- Retains moisture inside the battery resulting in less water-loss
- Faster to manufacture
- Long life cycle because Gel does not allow stratification
- More tolerant to over-charging
- 2-3 times life compared to conventional VRLA Batteries.
- No deterioration with time as in Lithium Batteries.
- Can be charged and discharged at much higher currents without affecting the performance and life of

the batteries

- Deep discharge – up to 20% state of charge
- Short recharge time – can be recharged from 20% to 90% state of charge in around 1 hour

General Applications of Carbon Foam Batteries

- Carbon foam being a superior conductor of heat and being light is ideal for use in manufacture of engine nozzles fitted on rockets and missiles
- Ground starting of aircrafts
- Solar Application due to superior PSOC performance.
- Telecommunication due to

superior PSOC performance and deep discharge capabilities.

- Defense due to long duration of retention of charge & stringent temperature conditions.
- Energy Leveling applications
- Electric Two & Three Wheelers
- Defense application such as radar, remote tele communications, etc.



THE PASTING MACHINE FOR THE MICROCELL CARBON FOAM PLATES



THE MICROCELL CARBON FOAM LAMINATING MACHINE

Batteries using the Microcell Carbon foam technology is now available from Firefly Batteries Private limited who are manufacturing them in their modern unit located near Ahmedabad in the state of Gujarat.

FROM BIG TO SMALL ADS-B FOR ALL



NXTTM
800/600
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LYNX[®]
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SURVEILLANCE SYSTEM

NextGen ADS-B Avionics for All Aircraft

As the aviation industry turns to ADS-B to securely track and monitor air traffic, ADS-B pioneer L-3 is there with a full line of mandate-compliant products for all types of aircraft:

- ACSS was first to certify ADS-B Out, with installations on hundreds of airliners, and has since introduced the NXT-800/NXT-600TM, a new generation of transponders for air transport, regional, corporate and military transport aircraft.
- SafeRoute[®], a suite of certified ADS-B In solutions, brings ADS-B benefits to the cockpit, helping airlines reduce flight times and fuel consumption, while improving situational awareness.
- L-3's new Lynx[®] line of products brings ADS-B In/Out to General Aviation, including ADS-B traffic and weather information.

Whatever aircraft you fly, contact L-3 for the right ADS-B upgrade solution. Visit L-3com.com/AviationProducts for more information.

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Morpho Detection – A global leader in explosives and narcotics detection solutions

A global leader in developing, supplying and servicing advanced explosives, narcotics and contraband detection systems, Morpho Detection works with airports and air cargo facilities, government, military, critical infrastructure and other high-risk organizations to enhance security operations.

For more than 20 years, Morpho Detection has been committed to giving our customers the capability to quickly and accurately detect and identify the presence of explosives, narcotics, and other threats before they materialize. Morpho takes an integrated, multi-technology and layered approach to deliver advanced security screening solutions that meet the most demanding operational standards. As a result, Morpho has developed some of the most widely deployed solutions used today to protect people and

property worldwide.

Trace Detection

Trace detection—the discovery and identification of microscopic particles and vapors emitted by explosives, narcotics and harmful substances—plays a key role in countering the increasingly complex aviation security risks posed by terrorism and other threats. By detecting a wide range of substances with greater accuracy, speed and dependability than ever before, innovative trace technology can help close security loopholes by reliably detecting residue from explosives and narcotics on skin, clothing, parcels, bags, cargo, vehicles and other surfaces.

Morpho's ITMS™ trace technology is incorporated into the Itemiser® and MobileTrace® families of desktop and handheld explosive trace detectors (ETD) currently deployed to screen passengers, cabin and hold

baggage and cargo at leading global airports including in the U.S., Brazil, China, EU, India and Japan.

Throughout India, many airlines including Jet Airways, SpiceJet, IndiGo and Blue Dart use Morpho Detection's ETD systems across various cargo hubs.

Morpho has shipped more than 24,000 ETD systems worldwide.

Hold Baggage Screening

Built on advanced Computed Tomography (CT) explosives detection and certified by the U.S. transportation Security Administration (TSA) and other global regulatory agencies, CTX™ automated explosives detection systems (EDS) screen checked baggage in the most challenging airport environments.

The CTX 9800 DSi™, capable of screening more than 1,000 bags per hour (BPH) in high-speed configuration, was recently



selected by airports in Japan, Canada, France, United Kingdom and the United States to enhance hold baggage screening capabilities. The compact CTX 5800, which combines Morpho's advanced imaging technology into a smaller and lighter solution is currently in-service at leading global aviation hubs.

In India, Indira Gandhi International Airport has deployed Morpho Detection's CTX explosives detection system to screen checked baggage in Terminal 3. Morpho also deployed CTX detection technology at Bangalore International Airport

to screen checked baggage in the recently expanded terminal.

Morpho is approaching 2,000 CTX EDS deployed worldwide –more than any other manufacturer.

A local partner

Morpho Detection has deployed more than 800 explosives, narcotics and chemical trace and bulk detectors, along with X-Ray screening machines, across India to protect people and property in some of the most challenging environments. Beyond aviation, The Ministry of Home Affairs selected MobileTrace to screen materials and people at several high-profile events including the

ICC Cricket World Cup 2011, Commonwealth Games 2010 and IPL Matches. Morpho Detection's explosive detection and X-Ray baggage screening machines are deployed at many critical infrastructure facilities including defence locations, corporate offices, IT Parks, five-star hotels, banks, ports, refineries, embassies, airports and cargo companies across major Indian cities.

For more information, please contact Pravin Surana at pravin.surana@morpho.com or +919845130160. www.morphodetection.com





Moog is a global designer, manufacturer and integrator of precision motion control products and systems, and is a world leader in flight control systems and critical component control applications. Moog has had a local presence in India for more than two decades, and Moog's India Technology Center (MITC) in Bangalore includes a staff of nearly 230 people providing engineering, design, test and certification for mission critical aerospace and defense systems.



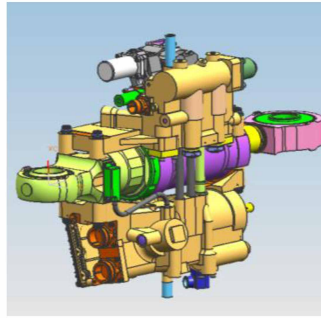
Moog Bangalore Technology Center

MITC Provides Software, Electronics & Mechanical Design Support and Qualification Testing for Commercial and Business Jets



Moog provided lateral control electronics (LCE) for Boeing 747-8, Level A software for flight control systems on the Gulfstream G280 and G650 business jets, system analysis and independent verification and validation (IV&V) to support the overall system certification. MITC was also engaged in supporting Boeing B787-8, Airbus A350-900, A350-1000, Embraer E190, Comac C919, Gulfstream G500 and G600 aircraft programs in mechanical detailed design and electronics system design activities.

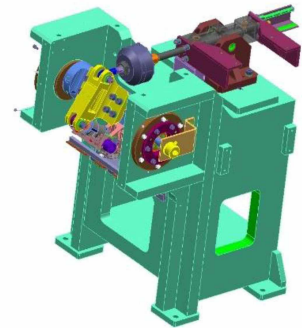
Design of Moog Components for Commercial and Business Jets



Typical Hydraulic Flight Control Actuator Model & Hardware

MITC team extensively supported in design and analysis of commercial flight control actuation system hardware consisting of primary flight surfaces on the airplane, as well as the spoilers and horizontal stabilizer, and includes a mix of electrohydraulic (EH) and electromechanical (EM) servoactuators and all associated control electronics. The secondary flight control high lift system is comprised of discrete assemblies including: power drives, electronic controls, trim controls, geared rotary actuators, rack and pinion roller assemblies, transmission shafts, gearboxes, sensors and accessory components.

Test Equipment Design and Qualification of Moog Components



Typical Test Fixture & Test Rig Model

Over this period, Moog has grown from a high technology component manufacturer to become a leading supplier of integrated flight control systems. We are continuously investing to extend the depth of our product expertise while simultaneously expanding our capabilities to take on the challenges and responsibilities of a changing industry. As a result, we are positioned today on virtually every aircraft in the marketplace, supplying reliable flight control systems and specialized control products that are highly supportable and add significant value for our customers.

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AS DIVERSE AS AVIATION ITSELF



Photo courtesy of the Northrop Grumman Corporation.



Displays



Flight Data
Recorders



Processors



Safety & Situational
Awareness



Aftermarket
Solutions

L-3 Aviation Products has a broad line of next-generation avionics, including ADS-B solutions for all markets. Our aftermarket services provide unrivaled affordability, safety, situational awareness, efficiency and support. Additionally, L-3 Aviation Products provides world-class avionics MRO, including integrated logistics support, technical services, supply chain management and ground support equipment solutions, to ensure operational readiness.

Please visit L-3 Aviation Products online at L-3com.com/AviationProducts.



Keeping Passengers Safe with Advanced Security Screening

As security requirements and concerns continue to evolve and become increasingly complex, airports worldwide need to keep pace by protecting passengers and commerce without impeding their movement. To help address these demands, L-3 Security & Detection Systems (L-3 SDS) ProVision® 2 is a reduced-size personnel screening system that provides safe, image-free threat detection capabilities.

The system is approved by the Transportation Security Administration (TSA) for primary screening at airports across the United States as well as by the European Civil Aviation Conference (ECAC). It is deployed in airports worldwide.

L-3's ProVision 2 automatically detects a broad range of metallic and non-metallic items, both low and high density materials, including guns, knives, liquids,

gels, rubber, wire, powder, plastics and ceramics, as well as sheet and bulk explosives, using safe millimeter-wave technology. The system does not use X-rays or any ionizing radiation. ProVision allows travelers to be screened quickly and conveniently due to its simple operation. It only requires a passenger to assume a single, stationary position during a 1.5-second scan. The system operator views a generic mannequin image that is the same for everyone. Threats or contraband are indicated in colored boxes on the mannequin, facilitating a very directed search and limiting or eliminating time-consuming and intrusive pat-downs.

On the outside, the ProVision 2 conserves space with a small footprint for easy installation in areas with 8 foot (2.4 meter) ceilings. Its modern and attractive exterior is compact to



The ProVision® 2 provides safe, image-free threat detection capabilities

fit into tight aviation checkpoint areas.

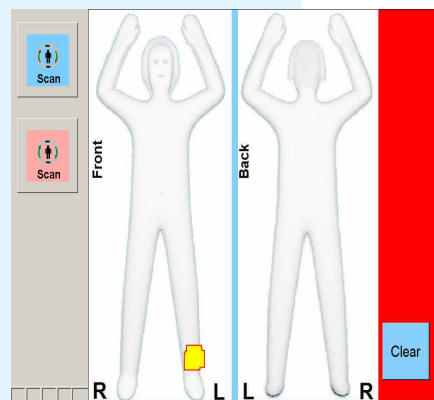
On the inside, the ProVision 2 provides an image-free solution that eliminates privacy concerns. Advanced software processes digital scan data and determines if the individual can be cleared through the checkpoint. The ProVision 2 offers customers an upgradeable technology



platform that can be enhanced through software updates as new threats and requirements emerge.

Enhanced Security

Terrorists constantly search for clever ways to conceal aviation threat substances. The ProVision 2's detection software is optimized for aviation requirements. The system eliminates the ambiguity of hand searches and detects a range of threats metal detectors simply cannot.

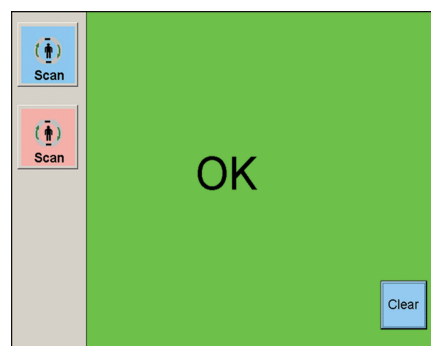


Potential areas of concern are mapped onto a generic mannequin.

Safe Radio Waves

The ProVision 2's sensing mechanism is based on millimeter-wave technology using safe radio waves. These

signals pass through clothing, but do not penetrate the body. The reflected waves are captured by the system's sensors. The ProVision 2 does not use ionizing radiation, such as X-rays, and is less powerful than other commercial radio frequency devices like cell phones, wireless handsets and other standard household devices. The



If no item is detected, a green screen with an "OK" appears and security personnel can clear the individual.

ProVision 2's millimeter wave technology has been extensively evaluated by regulators worldwide including the U.S. Food and Drug Administration, Health Canada and the Dutch Institute of Applied Science (TNO), and found to be safe.

Image-Free Technology

The ProVision 2 boasts similar privacy protocols as walk-through metal detectors since images are not generated. Numeric scan data is analyzed by software without human intervention to determine if any threats are present. Potential areas of concern are mapped onto a generic mannequin, which is identical for everyone, and presented to the operator. Security personnel can then assess the situation. If nothing is detected, a green screen with an "OK" appears and security personnel can clear the individual.

Efficient Operations

When it comes to throughput, there's no match for the rugged, reliable ProVision 2. The system requires less than 1.5 seconds to scan an individual for a complete multidirectional view, and less than six seconds total time for the scan and decision. The ProVision 2 can support processing 200 – 300 people per hour, depending on the application and supporting security protocols. The ProVision



2 reduces the need for time-consuming physical hand searches that can limit throughput levels. In addition to being more invasive and stressful for the individuals being screened, these hand searches place a high degree of physical stress on security personnel. With The ProVision 2 there's no need for the repetitive bending and stretching required for physical inspections.

Future-Proofed Solutions

L-3 SDS manufactures some of the most sophisticated air travel security systems available today. L-3 systems efficiently scan passengers and their carry-on luggage at the checkpoint, while their checked baggage is sent to high-speed scanners located behind the scenes. With commercial passenger air travel

forecasted to increase by four to five percent annually over the next 20 years, these system solutions are meeting the urgent need to effectively and efficiently screen large volumes of passengers and their luggage for dangerous explosives and other threats.

While ProVision 2 has been optimized for aviation applications, it may also be suitable for select non-aviation environments.

Solutions offered by L-3 SDS address current security requirements with a software-based architecture that is upgradable to counter future and emerging threats and meet the most demanding customer expectations and regulator requirements. L-3 delivers

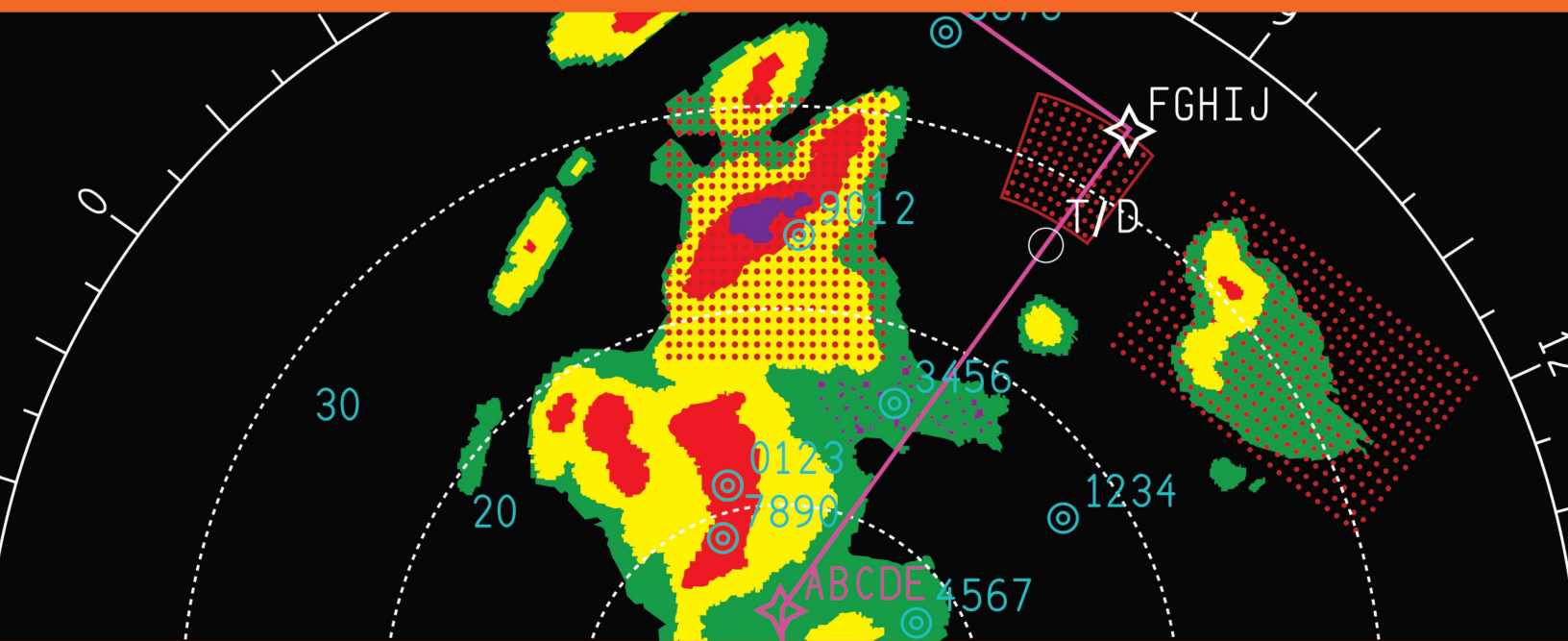
superior detection, high throughput and outstanding reliability – all backed by one of the industry's largest and most experienced global service teams.

For over 30 years, L-3 Security & Detection Systems has developed and manufactured cutting-edge products using advanced technologies that include networking; 3-D computed tomography; automated, conventional and high-energy X-ray; radiation detection; active millimeter wave imaging; metal detection; and energetic trace explosives detection. The company is a leading supplier of checked baggage, personnel, checkpoint, port and cargo screening solutions worldwide.



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