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THE AIR ERA

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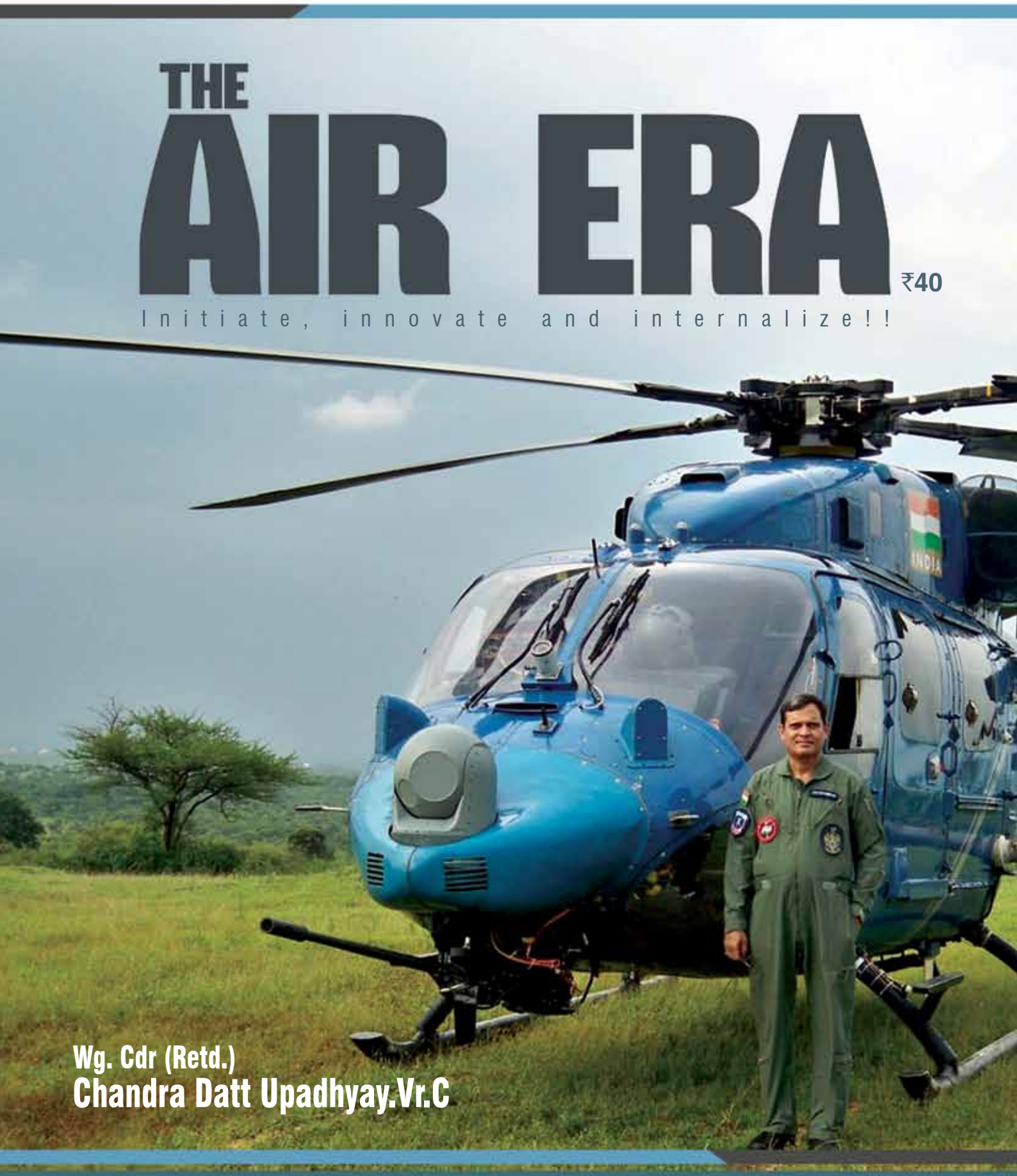
Initiate, innovate and internalize!!



Wg. Cdr (Retd.)
Chandra Datt Upadhyay.Vr.C

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Agragami Applied Aeronautics

is a branch of Agragami Group of Institutions. It is separate department for providing Aerospace services and its solutions. This department is fully dedicated to the students who are interested in UAVs and small flying objects including fixed wing aircrafts and multi-copters.
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Contents

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EDITORIAL

Dear reader,

You are holding a new issue of the Air Era Magazine, a first of its kind Aviation Magazine aimed at acting as a media for all Aviation related activities as well as to enlighten students and Aviation enthusiasts with the latest trends.

It is our endeavor to bring out stories of our own heroes who have contributed to the Indian Aviation as well as the local industries and R & D institutions.

In this issue, we have an exclusive article on Rotary wing test pilot Wg. Cdr (retd.) Chandra Datt Upadhyay.Vr.C. Who was instrumental in setting up of HATOFF and Rotary wing academy at HAL.

We urge you to support us in our endeavor by following every edition of our magazine and providing us with constant feedback and help us to fill the void of an Indian Aviation magazine aimed at the student community and the general Aviation enthusiasts.

Joffin Jose
Editor in-Chief

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GREEN RUNWAY: INDIAN AIRPORTS GOING SOLAR IN NEAR FUTURE

India's commitment towards climate change is not just verbal or literal, but practical. Recently, the Cochin International Airport became the world's first completely solar-powered airport. The 46,000 solar panels installed at the airport make it an absolutely power neutral facility.

The idea of powering entire airports through solar energy was ridiculed a few years back. But various advancements and achievements in the field of solar energy have made it possible.

But India Inc. is not willing to stop at Kochi. More airports across the country are taking the greener route. The Netaji Subhash Chandra Bose airport in Kolkata is set to have a 15 to 20 MW solar energy capacity unit soon. The project will take care of 60% of the airport's power needs. The funding for the same has been approved and allocated.

In addition to this, the Airports Authority of India (AAI) has announced that major airports in the state of Rajasthan will also set up solar power plants which will account for a part of their daily power needs. The Jaipur airport, where a 100kW rooftop solar project is already up and running, is planning to install a 1.8 MW ground-based power project. Similarly, airports at Bikaner, Jaisalmer, and Jodhpur are also mulling over the idea of switching to solar energy.

Delhi's Indira Gandhi International (IGI) Airport is also home to a solar power project. Moreover, commercial and industrial giants across the country are also focusing on renewable sources of energy. With solar projects at several Indian airports ready to take off, the country's seriousness towards climate change cannot be questioned any longer.

(Featured Image Credit: theplaidzebra.com)

PSLV-C29 successfully launched six satellites

In its thirty second flight conducted from Satish Dhawan Space Centre (SDSC), SHAR, Sriharikota ,ISRO's Polar Satellite Launch Vehicle PSLV-C29 successfully launched six satellites from Singapore, including the 400 kg TeLEOS-1, the primary satellite. The other five satellites were co. passenger payloads. PSLV-C29 launched all the six payloads into an orbit of 549 km height inclined at an angle of 15 deg to the equator.

These six satellites were launched as part of the agreement entered into between ST Electronics (Satcom & Sensor Systems), Singapore and Antrix Corporation Limited, the commercial arm of the Indian Space Research Organisation (ISRO), a government of India Company under the Department of Space (DOS).

This is the eleventh flight of PSLV in 'core-alone' configuration (without the use of solid strap-on motors). PSLV has successfully launched 57 satellites for customers from abroad including the six Singapore satellites launched till date.

The 'AWWA SKY WHALE' Concept 3 Decker aircraft

Image Source: asrfindia.in

How the technology is being used

Professor Wass's team at the University of Bristol has been focusing on the creation of self-healing versions of carbon fibre composite materials, which are used widely in the aerospace industry but also have many other applications.

- The BMW i8 electric sports car has a carbon fibre passenger compartment to make up for the weight of its heavy battery. The material is already attractive to car manufacturers as it is 30 per cent lighter than aluminium - and self-healing technology would make it safer too.
- The Airbus A380 passenger jet has a carbon fibre reinforced plastic fuselage for a lower fuel consumption. The researchers claim the new technology would allow wings to fix themselves in mid-flight, and allow engineers to spot cracks more easily.
- Offshore wind turbines could also benefit from self-healing technology, as they are often damaged by bird strikes. The carbon composite blades are 100 feet in the air, so maintaining them is notoriously expensive and difficult.
* Carbon fibre bicycle frames are popular with cyclists as they are so light, but they are also liable to crack. If they could self heal, their durability could be massively increased and the technology could also be applied to crash helmets.
- Sports equipment such as tennis racquets, fishing rods and golf clubs are often made from carbon fibre composites for the same reasons.

Dr. APJ Abdul Kalam

A humble salute to our distinguished Aerospace Scientist & beloved Ex-President of India.

Gayathri. N

The whole country was left in shock when India's missile man left us with his last words of wisdom at Shillong. It would be unjust to him, if we all didn't take a moment to acknowledge and celebrate his contributions to humanity's growth. He always urged young people to have the courage to think differently, courage to invent, to take the path unexplored, and to conquer the problems and succeed. With his indomitable spirit, this gentleman has served and contributed immensely to everything from academia to aviation. Even at the age of 83 he was thinking about finding solutions to the country's energy requirements. He had a 'Vision 2020 for passenger aircraft', which focused on fulfilling the needs of the Indian civil aviation industry by indigenous design of a passenger transport aircraft. The brain behind India's missile technology, Dr. Kalam started his career by designing a small helicopter for the Indian Army, but remained unsatisfied with the choice of his job at DRDO. He drew inspiration for the massive satellite programmes from the paper planes he used to make as a kid. His humble beginnings combined with his modest achievements add up to the greatness that he has left us with.

Kalam considers joining ISRO as one of his biggest achievements in life as he is said to have found himself when he started to work on the SLV project. He was the Project Director to develop India's first indigenous Satellite Launch Vehicle successfully injected the Rohini satellite in the near earth orbit in July 1980 and made India an exclusive member of the space club. The former president's contributions to India's satellite programs, guided and ballistic missiles project, nuclear weapons program and the Light Combat Aircraft (LCA) project made him a household name and people acknowledged him as the driving force behind India's quest for cutting – edge defence technologies. He also gave thrust to self-reliance in defence systems by progressing multiple development tasks and mission projects such as the LCA.

Kalam was also behind the evolution of ISRO's launch vehicle program, particularly the PSLV configuration. After working for almost two decades in ISRO and mastering launch vehicle technologies, he took up the responsibility of developing Indigenous Guided Missiles at DRDO as the Chief Executive of Integrated Guided Missile Development Programme (IGMDP). During the period between the 1970s and 1990s, Kalam made an effort to develop the Polar SLV and SLV-III projects, both of which proved to be success. In the 1970s, Kalam also directed two projects, namely, Project Devil and Project Valiant, which sought to develop ballistic missiles from the technology of the successful SLV programme. Despite the disapproval of Union Cabinet, Prime Minister Indira Gandhi allotted secret funds for these aerospace projects through her discretionary powers under Kalam's directorship. He played an integral role convincing the Union Cabinet to conceal the true nature of these classified aerospace projects.

"I chose Aeronautical Engineering because of my fascination for flying. I had nurtured the hope of being able to fly, to handle a machine as it rose higher and higher in the stratosphere was my dearest dream."

Dr. APJ Abdul Kalam was one of the key figures who inspired the ISRO into taking up its missions to Moon and Mars. He was also part of the INCOSPAR committee working under Vikram Sarabhai, the renowned space scientist. He first started work on an expendable rocket project independently at DRDO in 1965. In 1969, Kalam received the government's approval and expanded the program to include more engineers. In 1963–64, he visited NASA's Langley Research Center in Hampton Virginia, Goddard Space Flight Center in Greenbelt, Maryland and Wallops Flight Facility situated at Eastern Shore of Virginia. His research and educational leadership brought him great laurels and prestige in 1980s, which prompted the government to initiate an advanced missile program under his directorship. He played a major part in developing many missiles under the mission including Agni, an intermediate range ballistic missile and Prithvi, the tactical surface-to-surface missile, although the projects have been criticised for mismanagement and cost and time overruns. He was the Chief Scientific Adviser to the Prime Minister and the Secretary of Defence Research and Development Organisation from July 1992 to December 1999. The Pokhran-II nuclear tests were conducted during this period where he played an intensive political and technological role. He served as the Chief Project Coordinator, along with R. Chidambaram during the testing phase and photos of him taken by the media elevated him as the country's top nuclear scientist.

It was his dearest dream to become a fighter pilot but he missed it by an inch as he bagged the ninth position out of 25 candidates when only eight slots were left in the Indian Air Force. However, if it weren't for this, India wouldn't have witnessed the missile man in action or the greatest President we've ever had. He always emphasized on the power of sacrifice and virtue because no invention or discovery is possible without that. Dr.Kalam who graduated with a degree in aeronautical engineering from Madras Institute of Technology always desired a career in flying, he discusses more about this unfulfilled dream in his recent book "My Journey: Transforming Dreams into Actions." Aviation had always been his one true passion and he claims to have failed in his dreams of becoming a pilot. Even when his office shifted from South block to the Rastrapati Bhavan, he still was the humble man with the curly white locks of hair and an enlightened mind. Dr. Kalam always said, "For most people, the sky is the limit. To those who love aviation, the sky is home." So to all those people out there, with dreams to be fulfilled in aviation or any other field, 'your wings already exist all you have to do is fly.'

BLUE ORIGIN MAKES HISTORY WITH SUCCESSFUL LAUNCH AND LANDING OF REUSABLE ROCKET

Ison. N

HOUSTON —Blue Origin has become the first space organization to achieve a successful launch and landing of the world's first reusable rocket.

The rocket is named New Shepard in honour of Alan Shepard, the first American in space.

Blue Origin's New Shepard suborbital rocket will fly again after achieving a succesful vertical landing of the launch vehicle and parachute recovery of the unpiloted crew capsule to conclude a test flight.

During the test flight,the rocket climbed to 329,839 ft. or 100.5 km, the internationally recognized space boundary, company founder Jeff Bezos said.

The fully reusable space vehicle comprises of two sections - A pressurized crew capsule that

is large enough to comfortably accommodate six astronauts and a booster fitted with a BE-3 engine that provides the rocket with 110,000 pounds (over a million horsepower) of thrust. Similar to any other rocket, both the capsule and booster launch simultaneously and accelerate for about two and a half minutes before the engine cuts off and the two vehicles separate. However, instead of haphazardly falling back to Earth and landing in the ocean like most rockets, New Shepard's booster autonomously deploys its drag brakes and the engine re-ignites allowing it to make a perfect vertical landing.

The successful 8-min. test flight unfolded on Nov. 23, with a 12:21 p.m. EST liftoff of the single-stage, liquid-hydrogen and oxygen-fueled suborbital launch vehicle near the remote community of Van Horn.

Bezos hailed the test flight of the future six-passenger launch vehicle as a success in a Nov. 24 telephone news conference. He also pledged a reflight of the same rocket after a thorough examination and testing of the components, a future milestone in Blue Origin's bid to begin scheduled launchings of space tourists and a reusable orbital rocket.

"As far as we can tell this was a nominal flight. I'm sure we will learn things," he told reporters. "We will do the most thorough test program over the next couple of years that we can possibly do. Hopefully, in a couple of years from now we will be putting humans on New Shepard and taking them into space."

The achievement quickly captured the attention of rival SpaceX, which this year twice unsuccessfully attempted to vertically land the first stages of Falcon 9 launch vehicles carrying supplies to the International Space Station on a drone ship stationed in the Atlantic Ocean east of Jacksonville, Florida.

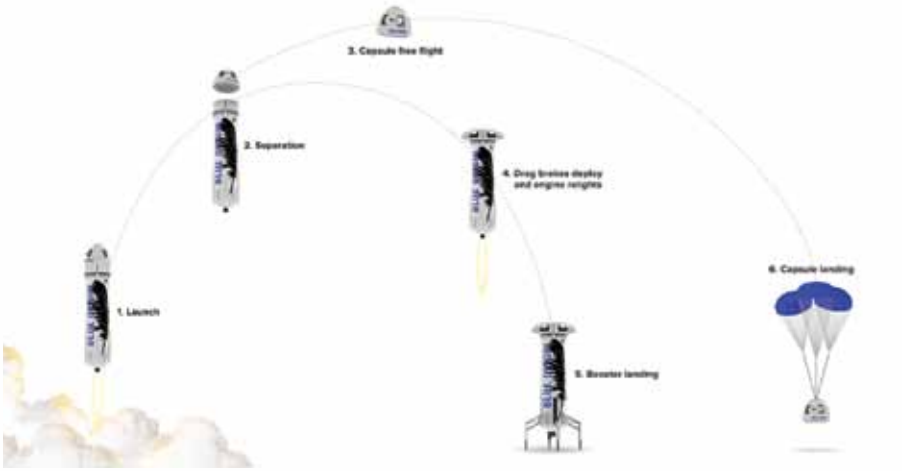
"Congrats to Jeff Bezos and the BO (Blue Origin) team for achieving VTOL (Vertical Take Off and Landing) on their booster," SpaceX founder Elon Musk commented on Twitter.

Musk then offered a distinction between the difficulty of achieving vertical landings with suborbital rockets and those designed with enough propulsion to reach geosynchronous orbit. He also singled out the X-15 rocket plane as the first suborbital rocket to land intact, albeit on a runway.

Blue Origin's capsule, designed to one day carry passengers to suborbital altitudes, separated as the New Shepard climbed toward its apogee after reaching a velocity of Mach 3.72 and landed under three parachutes, whose deployments got under way at 20,045 ft. The capsule touch down occurred 11 minutes after liftoff.

The New Shepard rocket stage descended with guidance from forward and aft steering fins. As it dropped to 4,896 feet , the single BE-3 engine reignited, slowing the launch vehicle. At just more than 50 ft. from the ground, four landing legs deployed. New Shepard settled to the ground at a velocity of 4.4 mph.

"We will have to wait and see. It will be some number of weeks before we can fly that hardware again," said Bezos, when pressed about the timing of a reflight and future flight testing.



"As we examine all the data closely and inspect all the hardware, we may find some subsystems we want to improve, make more robust, modify in some way," he said. "If we find that, we will do it. Our approach to this is to be very step by step, very patient and very methodical. If we find a subsystem that we want to modify, we will take the time to do that. As much as I would like to put humans on that vehicle and fly it as soon as possible, the reality is that we will enter commercial operations with that vehicle when we are ready and not before."

Future testing will include an abort of the uncrewed passenger capsule while New Shepard flies through a stressful regime, most likely at MaxQ, or maximum flight dynamic pressure, as New Shepard goes transonic, Bezos says.

The flight was the first since the inaugural New Shepard developmental launch on April 29. After reaching 307,000 ft. and scoring a successful capsule separation, the suborbital rocket lost control because of a hydraulic system failure and crashed.

The Nov. 24 test featured a new redundant hydraulic system that functioned without problems, Bezos said.

SpaceX's efforts to land its Falcon 9 first stage on a drone ship have been suspended since June 29, when the rocket's second stage exploded shortly after lifting off on the company's seventh NASA-contracted ISS resupply mission. SpaceX plans to resume Falcon 9 operations in December with the launch of Orbcom communications satellites from Cape Canaveral. The January SpaceX first-stage recovery attempt failed as the descending Falcon 9 first stage prematurely exhausted its supply of hydraulic fluid used for steering.

During the April attempt, the first stage toppled as it reached the drone ship. A valve that controls the thrust became unresponsive a few seconds before the intended touchdown.

Bezos took issue with Musk's contention that the suborbital recovery is less challenging than attempting to land the first stage of an orbital rocket. In either case, the first stage descends from a suborbital environment, he said.

The New Shepard testing will contribute to a scalable recovery architecture that Blue Origin intends to integrate into the orbital vehicle it is developing to launch from Cape Canaveral in competition with other commercial launch services providers.

Blue Origin's launch vehicle will return to a ship in the Atlantic as well.

"We are on two paths," Bezos said. "We will continue to develop New Shepard through its flight test program over the next couple of years so we can fly tourists into space. We will take the same exact architecture we just demonstrated and use it on the booster stage of our orbital vehicle."

Photo Credits: Blue Origin

Wg. Cdr (Retd.) Chandra Datt Upadhyay.Vr.C

The father of Helicopters, Igor Sikorsky once said "If you are in trouble anywhere in the world, an airplane can fly over and drop flowers, but a helicopter can land and save your life." As we all know, helicopters can do things which normal airplanes cannot. They takeoff vertically, hover at a place and move backwards. Compared to conventional airplanes, testing helicopters is more demanding, more so if it is a new machine.

At National Defense Academy Jan 1963 to Dec 1965

Wg.Cdr.(retd.) Chandra Datt Upadhyay. Vr.C is an accomplished rotary wing test pilot with an international standing. He has flown over 33 different types of aircrafts & helicopters. He has over 9000 hours of operational, prototype testing and Instructional flying experience. He has contributed to Indian aviation for nearly five decades, three decades out of which were as a test pilot.

Born on Jan 29, 1947 at Ajmer, Upadhyay studied at the King George's Military School in Ajmer. After completing his Senior Cambridge, he joined the prestigious National Defense Academy (NDA) Khadakvasla, Pune in Jan 1963. He was commissioned in Indian Air Force in 1967 and was sent to Flying Instructor's School, at Tambaram, Tamil Nadu. After graduating from Tambaram, he went to the Air Force Academy Dundigal, Hyderabad for training pilots on Kiran jet trainers.

He commanded Mi-8 helicopter Squadron and was awarded the Gallantry Award of VIR CHARKA by the President of India. In 1977, he was commended by the AOC-in-C Eastern Air Command IAF for selfless commitment to duty and professional capabilities. He was selected by the IAF for a deputation to Iraq for instructional duties to give ab-initio helicopter training to Iraqi pilots.

In Nov. 1977, he was posted to the Aircraft and Systems Testing Establishment (ASTE). At ASTE, he was selected to undergo Rotary Wing Experimental test pilots' course at the prestigious Empire Test Pilots School (ETPS), Boscomdown, UK. After graduating from ETPS in 1978, he was reposted to ASTE, Bangalore.

During his tenure at ASTE, Wg.Cdr. Upadhyay carried out extensive flight tests on helicopters. As part of the team formed to evaluate helicopters for ONGC (later Pawan Hans), in a short period of about three weeks he evaluated five helicopters - Dauphin 365C, 365N, Sikorsky S76, Bell212 and Bell 412 in France and USA. The evaluation team recommended Dauphin 365N for the Pawan Hans, which has been their back bone in off shore operations.

During 1982-83, he was associated with the Gyrocopter project of the Department of Aerospace Engineering, Indian Institute of Science (IISc), Bangalore. This project initiated in 1977 had been shelved after some progress. However, Prof.Rustom.B.Damania on his return from USA revived the project in 1980 with the assistance of Sqn.Ldr. Upadhyay and Mr.V.Subramaniam of IISc. Gyrocopter is an aircraft which looks much like a Helicopter with a rotor on top, but unlike a Helicopter the rotor is not powered. The engine drives a propeller to give thrust and as the vehicle picks up speed, the rotor starts rotating and generates the upward lift required to raise the vehicle. To facilitate the initial rotor rotation a pre-rotator motor is provided. This also enables a jump takeoff in favorable weather conditions. Following initial tow trials, Sqn.Ldr.C.D.Upadhyay successfully test flew this Gyrocopter on May 16, 1983 at the HAL airport.

In March 1989, Wg.Cdr.C.D.Upadhyay joined Hindustan Aeronautics Ltd (HAL), as an Experimental rotary wing test pilot and served for two decades. At that time, HAL was developing DHRUV- the Advanced Light helicopter (ALH). Wg.Cdr.C.D.Upadhyay was very closely associated with this project and contributed immensely. He has over 1000 hours of Prototype testing on ALH. DHRUV, the multi-role, multi-mission helicopter with a wide range of military and civil applications is under series production at HAL.

At Joshimath with MI-4 Helicopter, Jan 1970

He actively participated in the promotion of DHRUV globally. From 2001 to 2008 he demonstrated DHRUV helicopter in various air shows, world over and in India. In 2004, he led a team of Test pilots from HAL and IAF along with technical personnel and took four DHRUV helicopters to Chile for demonstration to their Armed forces. The team successfully demonstrated the Dhruv capabilities by performing all the required tasks.

He initiated a process of converting Dhruv and Chetak helicopters to air ambulance role. These modifications were certified by DGCA. Chetak helicopters with air ambulance capabilities have carried out many air evacuation flights. He was instrumental in Cheetah helicopter re-engine program to improve high altitude operational capability.

While he was the Chief Test Pilot (RW), he set up the first Rotary Wing Academy in HAL, the only functional institution of this kind in India and served the Academy as Chief Instructor of this Rotary Wing Academy of HAL which is.

On Nov.1, 2004, Wg.Cdr.(retd.) C.D.Upadhyay along with Wg.Cdr. (retd.) U.K.Pillai and Wg.Cdr.(retd.) M.U.Khan VSM, flew DHRUV to an altitude of 25,000 ft AMSL and set a world record for highest altitude flown by a middle weight class helicopter. This feat was achieved on Saichen Glacier. They were the first crew to put DHRUV through the glacier.

Dec.1, 1973-Z392 Aloutte III at Kohima. Prime Minister Mrs. Indira Gandhi during her trip from Jorhat to Kohima and back.

On Nov.2, 2004, Cheetal, the re-engined Cheetah helicopter, flown by Gp.Capt.A.S.Butola VM, HAL test pilot, and Sqn Ldr. Sharma, an IAF pilot, landed at a height of 23,220 ft AMSL, creating a world record for landing at the highest altitude for a light weight helicopter.

Both the records were all the more impressive as the density altitude, which is a major factor governing the altitude at which helicopter can fly, was significantly higher at 27,500 ft for Dhruv and 25150 for Cheetal. Talking about the risk, this is what Wg.Cdr.C.D.Upadhyay said –" We did not have time to think. So there was no worrying. In any case, flying is part of our life. We have done it before and we will keep doing it in future. If you love what you do, you don't think of what turns out for you. You learn to expect that in a pilot's life."

Human error in Helicopter accidents is an order of magnitude more compared to that of fixed wing aircraft. Training in ground based flight simulator facilities helps pilots in coping up adverse conditions encountered in real life situations and reduces human error. Recurrent training in these facilities will improve the professional efficiency of helicopter pilots. Such facility was not available in India. As per DGCA, such training was mandatory for civilian

Receiving the Veer Chakra from the president of India

helicopter pilots and they were going abroad for the same. As the Chief Test Pilot (RW), Wg.Cdr.C.D.Upadhyay took upon this task which culminated in HAL jointly setting up this Rotary wing academy with simulation giant CAE of Canada. Named HATSOFF – the acronym for Helicopter Academy to Train by Simulation OF Flying, this unique facility, first of its kind in India, trains both civilian and military helicopter pilots. Wg.Cdr.C.D.Upadhyay was the Chief Instructor of this Rotary Wing Academy of HAL.

Such was his contribution to the Helicopter programs of HAL, when he had to superannuate in Feb2007, for the first time in the history of HAL, he was granted an extension of two years in the same post and he retired on Jan 31 2009. At the time of retirement, he was General Manager & Chief Test Pilot (Rotary Wing) Flight Operations. After retirement, he joined HATSOFF as Chief Executive Officer and was instrumental in promoting business activities of HATSOFF in India and abroad. He left HATSOFF in Feb 2012.

When asked to share any incidence he had encountered during his test flying career that had an impact on him, Wg.Cdr. Upadhyay had this to say - "An experimental test pilot, when he is carrying out proto type testing, has to have all his senses tuned to the machine. Noise, vibrations, unusual feeling, smell, practically the whole self has to be part of the machine. I remember during early stages of Dhruv proto type testing, I was to carry out some tests on the second Proto type. It looked like a normal to start up and take off. As I got air borne and started climbing and turning, I smelt, not felt but actually my sense of smell told me 'there is something unusual'. So I immediately turned towards the helipad and landed across the length. As I touched down, the whole of rear portion, behind the engines was in flames. Crash tenders rushed and took the action and along with my test crew I evacuated the helicopter. A few seconds

Prof.Rustom Damania, Sqn.Ldr.Upadhyay and Mr.V.Subramaniam with the Gyrocopter developed by IISc Aero Engg. dept. 1983

Indian and Chilean Dhruv evaluation team

With Test Crew of Dhruv and Cheetal after the world records

delay in decision making would have had very serious results. Off course later the cause was established and action taken."

Wg. Cdr (retd.)Upadhyay is a graduate of the Defense Services Staff College, Wellington. He holds a degree of Master of Science in Defense Studies, and a Post Graduate Diploma in Marketing & Operational Research. He is a life member of the Rotary Wing Society of India, and a member of the American Helicopter Society (AHS) International – the Vertical Flight Technical Society: world's only international technical society for engineers. He is also a life member of the Aeronautical Society of India. He is a recipient of Dr.Biren Roy trust award given by the Aeronautical Society of India for outstanding contribution in the field of Aeronautics, Design & Development. In 2003-04, he was awarded the 'Raksha Mantri's Award for Excellence for Innovation category" for commitment to quality, professional competence, dedication, creativity, and excellent team effort for innovation in re-engineering Cheetah helicopter with TM333-2M2 engine. In 2007, he was nominated by the Ministry Of Defense Production for the award of "PadmaShree' to be given on Jan.26, 2008.

In 2014, he along with others founded "Mission Aerospace Foundation of India" (Mission Aerofi), a unique 'not for profit company' whose a goal is to promote research, development, production and manufacturing of aerospace products in India for Indian and foreign markets. This company was successfully launched on 29 Nov 2014. He is currently a member of its Governing Board. Through this, he would like to inspire young innovative minds and give them a forum to reveal their capabilities.

It is heartening to note that Wg.Cdr. (retd.)C.D.Upadhyay is very active even after serving the country for nearly five decades. Air Era looks forward to another dynamic contribution from this very active personality and wishes him all the very best.

Wg.Cdr.(retd.) C.D.Upadhyay with wife Venu Upadhyay

DR.M.S.Rajamurthy
Scientist G (retd.) NAL

Dr.Rajamurthy was associated with many flight test programs. This started with the flight testing of DO-28D1 skyservant in Germany. His latest was with the flight testing of SARAS prototype as Associate Project Director (flight testing).

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JOB HUNTING

TAKE OFF
Aviation Career Take Off ...

The strong economy is rubbing off on the aviation industry: pilot starts and airline hires are on the upswing. And with half the current pilot roster at major airlines set to retire by 2010, career opportunities are tremendous! Making the most of them is what the Professional Pilot Career Guide is all about.

Airplane and Helicopter

As with any career, there is a specific culture and lifestyle that comes with it. Airline Pilots, especially those flying international routes, shouldn't mind being away from home often and sometimes for extended periods of time. Medical transport pilots need to be able to handle emergencies well and be ready on standby. Instructor Pilots should be able to deal with various types of people and adjust their teaching style to benefit the student. Each branch of aviation has specific needs and the pilots should be aware of the differences in each before committing to a certain field to ensure that the job does not become an issue. Always remember that the career you choose should be fun, should have a future, and should be able to provide enough money for you to enjoy life.

Plan Your Career

Don't leave your dream to chance, make it happen. Begin by planning what you want to do and more importantly, how you want to do it. Consider all angles and research enough to get a good image of the field you wish to enter. Look at how the career fits into your current situation and how it can still be a desirable occupation in the future.

Certain aviation jobs consider age as a huge factor. Airlines are very strict when it comes to age, other fields may be more lenient.

As mentioned in the Student Pilot Service, health can be a deciding factor in your choice to pursue a career in aviation. If a health issue arises, your training, and money could end up being wasted.

Now, consider the fun, future and financial side of a career in aviation more closely before you embark on your journey to becoming a pilot.

Fun

Let's face it, fun is a deciding factor when choosing a job. If your job causes you frustration and trouble you will not be as successful as you could be and

your health could suffer as a result. If the environment in which you are working is friendly, encouraging and helpful you will be more likely to improve your own skills as well as help others to improve theirs. You should choose a field in which growth is fostered and promoted otherwise you may top out quickly and work in stagnation for the rest of your career.

How does this apply to flying? Well, it is good to have a job in which you have a certain degree of variety in flying. Tour pilots fly the same area over and over and need to be able to deal with this. They also need to be able to deal well with people since not all passengers are always easygoing. Airline pilots, especially on international routes should make sure they are able to be in an aircraft for hours on end and must also be able to deal with the responsibility of transporting many people each time. A flight instructor needs to be able to handle students with different needs and adjust his/her teaching to help them succeed. All these things, if they are not your strengths can become an issue in your career. Look at all the aspects of the job before you go for it. Pilots must be organized, must fill out paperwork and most importantly must be able to make good aeronautical decisions in the most stressful situations. So if you can handle these things, then you can be successful.

Future

One of the worst things that can happen is losing your job. Make sure that the career you choose has job security. Also make sure that the position you choose has opportunities to grow. It is great to learn something new and advance in the company you are working for; this provides variation and gives you the extra push to keep you motivated and happy.

Finance

No matter how much you love your job, if you don't make enough money to enjoy life, you have a problem. Take a look into the industry to see what starting salaries are and what the highest in the business earn. This gives you a rough estimate as to the possibilities you have to increase your paycheck.

Flight Training

Apart from learning the basics, as to how an aircraft operates and what the procedures are to fly, the priority is to become a safe pilot. It is important that the atmosphere in which you learn is comfortable. This ensures that you can absorb the knowledge the instructor is presenting more easily.

Make sure you are comfortable with your flight instructor. Is he/she friendly, professional and skilled? You may pick up habits from your instructor, which can be either good or bad. Remember, your flight instructor should be a good role model whose example you should want to follow. Professional appearance, demeanor, knowledge, skill and motivation matter, there is no substitute for any one of these.

Try to maintain a constant schedule in your training. This way you will be finished sooner and costs may be lower as well. Plus, if all your training is done in sequence, you can build up experience logically and without interference, so you have less of a possibility to forget information along the way.

Log all your flight hours neatly in a logbook. You can either use an electronic or actual logbook. Personally, I prefer the actual book since then you are not dependent on an electronic device and you can easily flip the pages to refer back to a previous date. The more flight hours you have the better! Fly as much as you can, especially with your instructor. They can pass the knowledge they have to you, allowing you to broaden your understanding and ability.

Make sure your training is of high quality! Do not entirely rely on simulations of procedures, try to be able to do the real thing. For example, some of the instrument flying should take place in actual instrument conditions. Also for emergency training, simulations can only get you so far.

Job Hunting

You can go pretty far on your own, but after a certain point it is all about contacts. Make sure you establish relationships and contacts early in your

career. This will open doors that you may have never expected. Always do your best and work hard; someone may recognize that and recommend you to someone higher up in the aviation field. Impress people with your knowledge, skill, and integrity.

Like any good problem solver, always have a Plan B in case something does not turn out as you had hoped. Spend your time well and try not to waste it! Always double check any information with a reliable source before taking it for true. This is especially important when browsing the web. If something you read sounds too good to be true, it may be. Be smart in managing your time, money and training goals.

You may get your first job as a pilot or flight instructor at the location where you received your training. Your qualifications, character and contacts will carry you far. When applying for jobs emphasize your strengths and show enthusiasm; between two pilots of equal qualification, the one that seems more eager is more likely to get the job.

Schools offer Job Placement Programs that can help you get started. If you have established good relations with those at your school you will be a step ahead. Most flight schools hire their own graduates first, especially if their instructor recommends them. The instructor you work with will be the one to look to when you need references, so keep them impressed with your abilities.

Attitude can make or break a deal. Be assertive in leadership situations and be cooperative in team situations. If you are able to work with others as well as on your own, employers will be more likely to see you as a valuable asset to their organization.

Marketing is paramount. Always have a good answer ready as to why an employer should hire you. What makes you better than some other new graduate? Keep your resume professional and complete at all times; don't fall behind with updates; these can add that extra push that may make an employer hire you.

Don't give an unimpressive first impression. Be professional, always. Especially when going in for interviews: dress appropriately, be on time, and have all the information they may ask for. Show that you have an interest in the company you are applying for. Do you know anything about their background and history? What sort of things is the company known for? Do they have any well-known pilots on their team? Do your work and they will see that you are a determined individual that always does his/her best.

Don't give up! Even if a few employers decide not to hire you right away, keep trying. Look for other employers and send updated resumes to those that may have turned you down the first time. Maybe they just wanted more experience, if you keep them updated you show that you don't give up easily which can be a deciding factor in getting you a job down the road. Keep a positive attitude and stay determined! That is how you will land your dream career.

Good luck and have fun!

Shekhar is a Professional Pilot with more then 8 years experience of Flying on 14 different types of Aircrafts in 15 different countries with Accident Free Flying Record. Shekhar is good in Flying Training as well as in Ground Class for Pilots. Shekhar started his flying career from Skycabs [Colombo] and worked for many Airlines Training Companies from different part of the World. He has trained more then 350 Pilots who are flying world wide. He is an Active Member of Aircraft Owners & Pilots Association [USA], Royal Society of Aeronautics [UK], Delhi Flying Club, Aeronautical Society of India, MP Flying Club Indore, Aeronautical Research Society. He is a Frequent Flyer on AA, Air India, British Airways, Cathey Pacific, Delta Airlines, Emerites, Ethihad, Jet Airways and many more. Shekhar is an Active Team Member of www.MissionToCanada.com set up by Govt. of Canada and Air Transport Association of Canada.

His recent passion is Aviation SEO & Blogs for which he takes classes for IIT & IIM Students in India and others in abroad. And http://aerosoftseo.com/airaviator a new proposed virtual Air Charter Services. Shekhar has wrote many Books on Aviation and Managemnt viz P - Productivity S - Speed R - Relevancy, Be an Aviator Not a Pilot, Pilot's Career Guide, Cabin Crew Career Guide they are available onwww.aerosoft.co.in/book

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HUMOUR IN AIR

Aircraft is a complicated machine and its operations are a serious business. To operate and maintain aircraft involves a large body of personnel. As per a conservative estimate a large aircraft like an Airbus A-300 or Boeing 737 requires 8-10 pilots, 20-25 cabin crew, about 80 technical personnel and almost an equal number of other personnel for its operation. All of them work for the most important personnel in this business; the passengers. For every flight to be on time resulting in utmost comfort for all the passengers requires a close coordination between all of them and that involves some kind of communications.

Though all these personnel interact with each other, and that too under severe pressure most of the time, yet it does not mean that the atmosphere in and around aircraft operations is always serious. The fact is; it is hardly ever so, primarily because of the basic tenant of life that humour has no particular place to begin. Fun, jovial moments and raw humor, can and does happen at all conceivable and even in-conceivable places. In fact it is all around us, almost all the time, and aircraft operations are no exceptions. All that is required to notice and enjoy humour, is to keep eyes and ears open.'

Involving Passengers

Let us start our journey of tracing humorous moments with the moment someone enters the airport terminal building and finish with the landing of aircraft. Each step has its lighter and funny moments. Savour these.

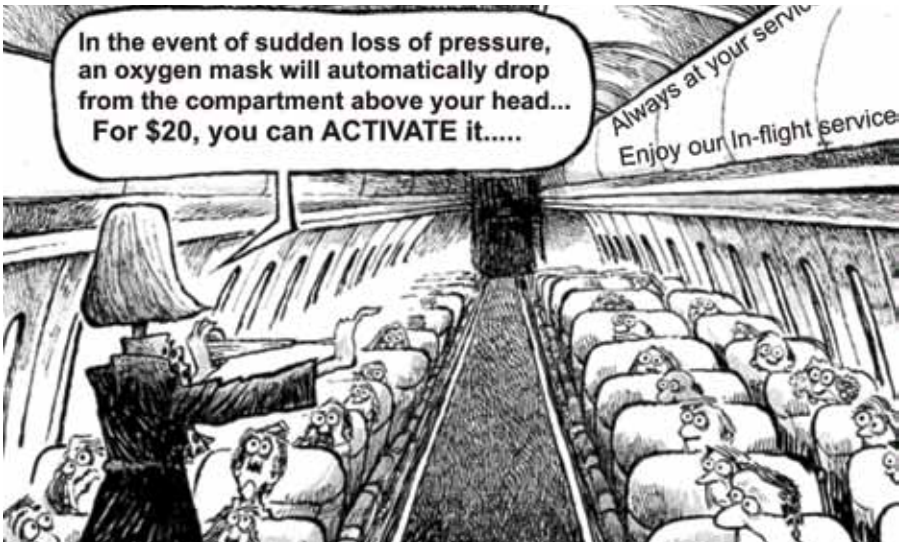
Check-in counter: A passenger entered the airport terminal and walked to the check-in counter pushing the luggage trolley. It was one of the low-cost airlines and had recently introduced extra charges almost everything including additional charges for extra-ordinarily fat people. Though this particular passenger did not seem to be over-weight, yet the counter-clerk asked in a routine manner as to how much he weighed. Being a regular traveler by air and not accustomed to this type of question, he thought of playing smart and asked, 'with clothes or without?' An equally smart counter clerk replied, 'whichever way you intend to travel, sir!'

Tighten your Seat-belt: As soon as the aircraft doors closed, the cabin-crew started moving down the aisle looking at the passengers and telling them to bring the seat in an up-right position

and tighten the seat-belt. However one passenger remained un-concerned and when the flight steward requested him to tighten the seat-belt, he replied, 'How can I, so far you have not demonstrated how to do it!'

Taxiing for Take-off: After receiving the check-in ticket from the counter, customary security check and the perennial wait for the call to proceed towards the ready aircraft, the passengers finally boarded the aircraft. Soon the doors were closed, the ladders removed and the aircraft rolled for take-off. Halfway through the tarmac, the aircraft abruptly stopped, turned around and returned to the parking slot. There was a routine announcement saying that it was an unavoidable situation and passengers were requested to kindly bear the inconvenience. After an hour-long wait, aircraft finally took off. A really concerned passenger asked the air-hostess as to what the problem was? The cool air-hostess replied, 'the pilot was bothered by a noise he heard in the engine.' Seeing an inquisitive and perplexed look on the face of the passenger, she added, 'it took us a while to find a new pilot.'

The first timer: There are always first timers in any scenario and this particular flight was no different. There was a passenger who belonged to the first-timer category and was quite apprehensive about almost everything. The air hostess attending to him however was an experienced one and was handling all questions, genuine as well as bordering on stupidity with great care and concern. It carried on for quite some time and sensing that air hostess was getting a bit impatient since she had to attend to other passengers as well, the still nervous passenger said, 'one final question Miss. How often do aircraft of this type crash?' The air hostess suppressed her smile and answered with all seriousness, 'Only once, sir!'



Please do something: The long-distance flight from Mumbai to London had been un-eventful for many hours but then the aircraft encountered bad weather and entered clouds. There was a lot of tossing-up and down of the aircraft. Most of the passengers accepted the fait accompli except one who called for the senior-most flight attendant and asked, 'Why can't you or the pilot do something about it?' When replied that the pilot was doing everything possible at his command to make the flight comfortable, the lady was not comforted and asked, 'Is there no one who can do something about this turbulence?' In a very cool and composed voice the air hostess replied, 'Mr Know-all, the owner of this airlines does have a lot of contacts and influence with some very high important people in the government, but unfortunately, Mother Nature is not one of them…not as yet Madam!'

Oh the noise!: Even after two drinks and a sumptuous meal, an elderly passenger in the upper class was unable to sleep. He asked for additional pillow and a blanket, yet the sleep eluded him. He then asked for a sleeping pill, but even that did not help. Concluding that it was the engine's noise that probably was the reason for his discomfort, he told the flight steward, 'please tell the captain to turn-off the plane's engine.' Promising that he would convey the request to the pilot, the flight steward proceeded to attend to other tasks. After a few minutes the passenger called the flight steward and asked if he had complied with the request and wanted to know as to what was pilot's reply. In all seriousness he answered, 'sir, the pilot says he is presently busy with other important tasks involved with flying but has promised to switch-off the engine after landing when he would be relatively free from the arduous task of flying the aircraft!'

The Landing: After a smooth flight, the landing was really rough. The pilot banged his aircraft into the runway really hard and it bounced many times before it came to a screeching halt at the parking lot. As the door opened for the passengers to alight, the pilot was standing at the door with a smile on his face, as per airlines policy to give them a 'thanks for flying our airline' look. However in light of his bad landing, he had a hard time looking the passengers in the eye, thinking that someone would have a smart comment to make. Everyone had gotten off without any

comment except for a little old lady who was the last one to get-off. Walking with a cane she came up to the pilot and said, 'Sir, do you mind if I ask you a question?' The pilot with extra sweetness said, 'Not at all Madam, you are welcome.' "What was it?' The little old lady inquired, 'did we land, or were we shot down?'

In-flight Announcements

As you are aware all the Airlines are required to make in-flight announcements as a part of government regulations about safety procedures or the weather en-route. However most of the airlines, in addition, make announcements at regular intervals to breaks the monotony of any flight, more so a long distance flight. Such announcements are made either by the cabin-crew or the pilot. Normally such announcements are so well rehearsed that other than breaking the silence, they do nothing else. Yet there are times when really original and out of-this-world announcements have been made that would make any 'dead person come alive' as the saying goes.' Read the following interesting announcements and I am sure you would get a smile on your face if not a giggling laughter.

Welcome Message: The pilot was going through his customary message welcoming the passengers on board adding that the airlines was honoured to have them on board. After stating that the cabin-crew would look after them and all their needs, he added, 'I am pleased to inform you that our airline has some of the best flight attendants in the industry.' Then after a pause he added, 'unfortunately, none of them are on this flight!'

Matter of Fact: The aircraft had been flying for almost one hour and the refreshments had been served out. Suddenly the public address system came alive and the pilot announced, 'ladies and gentlemen, the weather is fine and we have reached cruising altitude. Now we shall be turning down the cabin lights. This is for your comfort and to enhance the appearance of your flight attendants.' It is worth mentioning that on this particular flight, two out of five flight crew-members were very 'senior and hence aged' air hostesses.

What a Way to Say: Cabin crew was giving the customary in-flight briefing. After having explained the procedure of tightening and opening the seat belt, the announcement went like this. 'In the event of a sudden loss of cabin pressure, masks will descend from the overhead luggage compartment. Do not panic. Just grab the mask, and pull it over your face. If you have a small child traveling with you, secure your mask first before putting one on your child's face. However in case you are traveling with more than one small child, decide before hand who is your favourite.'

Generosity: During flight, one of the two engines developed trouble and had to be switched-off. After some time even the second engine started coughing. It was at that moment that the pilot decided to inform the passengers. In a very cool voice he said, 'We are trying to retrieve the situation and hopefully we shall succeed. Yet I would like to inform you that your seats cushions can be used for flotation. In the event of an emergency water landing, please paddle to shore. And do not worry. You won't be asked to return them; you are permitted to take them home with our compliments.'

Sense of Humour: A particular Airline decided to be different from others and introduced intentional humour in their routine briefing. Before the take-off while giving instructions, the cabin-crew announced, 'Ladies and Gentlemen, there may be 50 ways to leave your lover, but there are only 4 ways out of this airplane...' And on arrival-at-destination flight attendant announced, 'We would like to thank you folks for flying with us today. And, the next time you get the insane urge to go blasting through the skies in a pressurized metal tube, we hope you will surely think of us, the XXX Airways.'

Leaving the Plane: The customary announcement made after the aircraft has landed and is proceeding towards the parking bay is thanking the passengers for having chosen that particular airlines and expressing hope that their journey was comfortable and they would choose the same airlines the next time as well. The announcement in one particular case was entirely different and it was thus: 'As you exit the plane, make sure to gather all of your belongings. Anything left behind will be distributed evenly among the flight attendants. One additional request, please do not leave children or spouses.'

The Passengers Speak

The passengers constitute the bulk of man-power around the aircraft. In fact the passengers who are the back-bone of every airline are no less in contributing to the endless humour and generating lighter moments. However in their case, it does not generally get recorded and hence the books and magazines have less of these. Yet, whatever is available is really classy.

- A passenger seeing the cabin crew using intercom handset said, 'May I use it to speak to my son please.'
- An elderly lady asked the flight steward, 'Where is the ladies' toilet, please?
- A person chewing tobacco wanted to spit so asked the air hostess, 'Please help me to open the window.'
- A young boy pressed the over-head bell and when flight steward arrived, asked, 'oxygen mask has not fallen as yet, when it will happen?'

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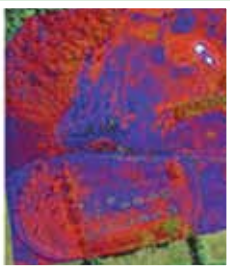

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AIRBUS make in India

Bernhard Gerwert, chief executive officer of Airbus Defence and Space, called on Prime Minister Narendra Modi to apprise him of the company's plans for the 'Make in India' initiative.

Gerwert told the PM that Airbus is keenly interested in becoming a partner in 'Make in India' through a cluster approach with regional partners, according to a statement issued by the Prime Minister's Office.

Modi welcomed the interest shown by Airbus in India, it added. Airbus Defence and Space is the division of the Airbus Group that handles defence and aerospace products and services. During the meeting, Modi discussed with Gerwert various projects in India in the aerospace, defence and civil aviation sectors.

Gerwert recalled the PM's visit to the Airbus manufacturing facility in Toulouse in France in April and said that it had generated a "positive atmosphere and interest". During that visit, Airbus had announced that it would increase its Indian outsourcing to $2 billion. In India, the Airbus Group already operates two separate engineering centres for civil aviation and defence apart from a research and technology centre which together employ more than 400 engineers and high-skilled staff.

As part of its new strategy, the Airbus Group had earlier this month brought all its Indian operations under one entity Airbus Group India Private Limited. India is the first international market where local operations are being brought under a single company as part of the Group's one roof policy, the Airbus Group had said.

Pierre de Bausset, a veteran at the company and its former corporate secretary, has been appointed as the head of the new entity. The 60.7-billion euros Group comprises Airbus, Airbus Defence and Space and Airbus Helicopters. The new organisational structure with Bausset in charge is aimed at ensuring more internal coordination, pooling of resources and a more efficient engagement with local stakeholders.

Bausset had said that the company aims "to firmly embed Indian industry, public and private, in our global value chain and achieve $2 billion in cumulative sourcing from India by 2020. "There is plenty of potential to make India a hub for engineering and innovation for the Group," he had added.

NEW DELHI: On 9th November 2015, Boeing and Tata Advanced Systems on Monday announced a joint venture (JV) that will manufacture aerostructures for aircraft and collaborate on integrated systems development opportunities in India.

According to the Boeing press release, "The JV will initially create a manufacturing center of excellence to produce aerostructures for the AH-64 Apache helicopter and to compete for additional manufacturing work package. Boeing and Tata Advanced Systems intend to grow the JV partnership in the future with a focus on opportunities to collaborate on development and selling of integrated systems.

"This partnership will capitalize on India's industrial capability, innovation and talent to contribute to Boeing's long-term competitiveness and position us for future growth in the global marketplace," said Chris Chadwick, president and CEO of Boeing Defense, Space & Security. "It is a demonstration of our c .. Boeing and Tata Advanced Systems intend to grow the JV partnership in the future with a focus on opportunities to collaborate on development and selling of integrated systems. "This partnership will capitalize on India's industrial capability, innovation and talent to contribute to Boeing's long-term competitiveness and position us for future growth in the global marketplace," said Chris Chadwick, president and CEO of Boeing Defense, Space & Security. "It is a demonstration of our commitment to further accelerate our partnership with one of the world's fastest growing economies." "This agreement to establish a JV will propel the growth of the Indian aerospace sector by leveraging the world-class competencies of TASL and its supplier eco-system, as well as provide access to India's world-class manufacturing capability, skilled talent and competitive cost structures," said S. Ramadorai, chairman, Tata Advanced Systems. "Over the last 12 months, we have doubled our sourcing from India and are committed to continue that journey," said Pratyush Kumar, president, Boeing India. "Our commitment was demonstrated by Boeing Chairman Jim McNerney's presence at the recently concluded aerospace Innovation Summit in New Delhi and this JV is a clear example of Boeing's long-term commitment to Make in India." "TASL is one of the select few in the private sector in India undertaking manufacturing and assembly of both aircraft and helicopters. The resulting scale and expertise at which the company now operates makes it well-positioned for large-scale systems integration work in India's aerospace and defense sector," said Sukaran Singh, MD & CEO, Tata Advanced Systems.

Seaking pictures – courtesy Ratish Nair.

SCALE MODELLING
A PASSION THAT LASTS A LIFE TIME

Dr. M.S. Rajamurthy

A scale model of an aircraft is its physical representation to a chosen sub-scale, maintaining accurate relationships between all important aspects of the aircraft that is modeled. These models are not necessarily built of metal, and it could be wood or plastic. These models are scratch built from the basic materials or built using kits where the model parts are already fabricated in parts. These have to be meticulously assembled, painted and various markings made and even the weathering effects are created. It all depends on what level one would like to take it. This hobby, though looks simple at the outset, consumes lot of time and is highly infatuating. When it comes to plastic model kits, there is a huge choice, not only in terms of scale but also the range.

Plastic aircraft kits come typically in scales of 1:48, 1:72, and 1:144. Generally, the bigger aircrafts like transport planes and bombers are in

1:144 scale and most of the smaller combat and other aircrafts come in the scale 1:72 which are quite detailed. The bigger scale 1:48 models have features like movable control surfaces etc. The companies making these plastic kits also make authentic large scale models which are very detailed and are also meant for museums. Hasegawa of Japan had made authentic museum models to a scale of 1:8 and 1:16.

Display space is a factor that drives the scale to choose. 1:72 is a popular scale to choose as these are well detailed and occupy relatively less space. The plastic models are available online. Quite a bit of information is available on the net on building these models, painting them, display diaroma etc. These days, there are models which are easy to build, meant for children. Unlike in mid – seventies when I built and painted my first collection, it is lot better now.

There is a Facebook group called Indian scaled modellers(ISM), which has amazing modelers, who are inspiring and more than willing to guide those who want to take up scale modeling. Join them, and you will be amazed at their models. In the following Mr.Ratish Nair, a member of ISM, shares his experience in making a beautiful Indian Navy Seaking.

FROM THE MODELLER'S DESK - RATISH NAIR

The Indian Navy has been a prolific user of arguably the most versatile naval helicopter ever - the Seaking. The Navy started operating Seakings just before war broke out in late 1971. Over the years, it acquired several different types to fulfill a range of roles from ASW to Special Ops. The model I built is of the rather unique Mk.42A variant that IN acquired in the late 1970s to complement the ASW capabilities of the last two 'Leander'-class frigates then being built locally. These were analogs of Royal Navy's HAS.Mk.2s with six-bladed tail rotors unlike all the other variants we have had. The Seaking Alphas were specially equipped with RAST (Recovery Assist, Secure and Traverse) systems for easier shipboard handling.

The base kit for the build is Revell AG's superb Seaking Mk.41 in 1/72. This is by most accounts the best rendition of a British Seaking you can buy in this scale, though it look a bit of work to be made relevant as a 42A. The changes needed were - Back-dating the composite rotor blades to be the older metal type, sanding off chaff/flare dispensers in the rear without hurting the riveted surface, sanding down fairings on the nose panel, re-arranging antennae placement and then scratch building some and plugging some windows to match pictures. The instructions are almost pointless beyond the first few steps. In addition to the changes required, I made some fairly drastic (for me!) modifications to stow away the rotor blades. The model has some additional surface details added in terms of cables and external wiring.

The model is finished in the dark sea blue and gloss white finish of the original Seakings. The biggest challenge was getting the (white) decals right, most of which are home-made"

SIMULATORS, THE NEW TRAINING WEAPON

The roman philosopher cicero may have been the first to record the much- quoted phrase "to err is human." Since that time, for nearly 2000 years, the malady of human error has played out in triumph and tragedy. It has been the subject of countless doctoral dissertations books, and, more recently television documentaries such as "history`s greatest military blunders." Human error in aviation has not been exempt from this scrutiny. Indeed, human error has been so prevalent throughout aviation history that our flaws have become associated with our very being, hence the phrase the human condition.

One of the ways to address the so called human condition, and improve safety in aviation, and in so doing save a few lives, is to understand the why and what of human errors, and how to avoid and control error in aviation.

New insights into the causes of aircraft accidents which followed from the introduction of flight recorders and cockpit voice recorders, and information gathered from these devices has suggested that many accidents result not from a technical malfunction of the aircraft or its systems, nor from a failure of aircraft handling skills or a lack of technical knowledge on the part of the crew : it appears instead that they are caused by inability of crews to respond appropriately to the situation in which they find themselves.

One of the challenges posed by the ever increasing automation seen in flying machines in how to relieve the pilots of their workload of monitoring and control without compromising safety in unusual, unforeseen circumstances. We all know that automated systems can monitor a large number of system variables better than a human can monitor a large number of system variables better than a human can, but flight deck automated do not have much provision for automate decision making when faced with unpredictable, rapidly unfolding events requiring upset recovery, for example, or that could result in landing accidents, CFIT, etc. the only option is to train and train repeatedly and regularly, so that the decision making and handling become second nature to aircrew.

However, Pilot training, both for the fixed and rotary wing aircraft is a time consuming and capital intensive exercise with many variables (weather, availability of serviceable aircraft, instructor etc.) which may be unfavorable for its timely completion. Aviation industry is aware of the training that has evolved over the years and it's time to look as to how it may evolve over the next decade, keeping pace with the advancement of technology that promises to improve the quality of human training in terms of safety , cost and time.

Towards this end flight simulators as training devices were introduced as early as in the post first world war period

but the best known model was built by Edwin Link in 1927 and commercially available by 1930 and were called LINK TRAINERS. Gradually the visuals and motion systems were introduced in simulators. Over the years, simulation technology has progressed in leaps and bounds, so that cues such as authentic sounds in the cockpit, vibrations, visuals, handling qualities, performance etc as required to make training realistic are now common features in the simulators. The realism has increased to the extend that in higher end level D full flight simulators, trainees often forget that they are in a simulator, and appear to exhibit the same increase in adrenaline when faced with adverse weather or malfunctions.

A spate of helicopter accidents in the recent past in India has dented the image of helicopters as a safe and efficient way of communication between small cities/ in the hills where airfield infrastructure does not exist. Most of the accidents could be attributed to inappropriate decisions made by the aircrew when faced with adverse weather or critical malfunctions.

The necessity for a simulator was felt by the helicopter fraternity in India, and due to its non-availability in India most of the helicopter operators sent their pilots for training on simulators which were available only in UAE, Europe and USA at enormous costs.

> Many accidents result not from a technical malfunction of the aircraft or its systems, nor from a failure of aircraft handling skills or a lack of technical knowledge on the part of the crew: it appears instead that they are caused by inability of crews to respond appropriately to the situation in which they find themselves.

The urgent need for a simulator in India was recognized early and setting up a state of art helicopters simulator training facility was initiated. Soon, Helicopter Academy to Train by Simulation of Flying(HATSOFF) a joint Venture of HAL(India) and CAE (Canada) became a reality and was set up in Bangalore, in Karnataka India in 2010.

The initial investment for a level D FFS is fairly high, and the facility required to house such a device is also expensive to set up. Level D FFS have to be type specific, and the number of each type of the major helicopters flying in India did not justify setting up a Level D FFS for each type. Therefore the only economically viable option was the 'roll on roll off'(RO RO) type of FFS. A RORO means that mother ship remains the same but the cockpits can be interchanged. The mother-ship acts as FFS and the cockpit outside the mother-ship acts as a Flying Training Device (FTD) where all other facilities are available except motion, and exercises like IF, Route flying /Electronic warfare procedures can be practiced.

HATSOFF is only the third helicopter simulator with Roll On Roll Off (RORO) technology, and the first in Asia. Presently Bell 412 EP, Dauphin AS 365 and Dhruv level D FFS are operational. While the Bell 412 EP and Dauphin FFS has been qualified as level D by both EASA and DGCA(India), the Dhruv FFS has been approved as level D by DGCA, India.

As per DGCA requirements, all pilots have to mandatorily undergo recurrent training in Instrument Procedures and critical emergencies on a regular

basis. The cost of training in the actual helicopter and the inherent risk factor involved during, sessions of certain critical emergencies like both engine failure and tail rotor failure, necessitate the use of simulator over the helicopter Also, some emergencies such as OEI (one engine inoperative) before TDP(Take Off Decision Point) can rarely, if ever, be practiced, the instructor on board cannot afford to allow the trainee to make mistakes and see the consequences of his mistakes, as in a simulator. Besides repeating an exercise involved /emergency, one can review and analyse the errors and make amends in subsequent practices. Crew Resources Management (CRM) a vital, and , an all important topic in all airline training schedule is also monitored and crew briefed accordingly on its good and bad practices. Some facilities, like HATSOFF, have the capability to record simulator sessions, and replay them during debrief, thus increasing the effectiveness of debrief by an order of magnitude.

The ability of pilots to fly is never in doubt but it is under pressure of adverse weather like poor visibility, and , or in clouds combined with an emergency that the real mettle of a pilot is gauged. Once again the inherent risk associated with actual weather is well known. In the simulators the instructor can create adverse weather like low visibility, clouds, thunder, rain and sleet depending on the pilot's ability to cope. Night flying and Instrument let downs procedures in IM Conditions can be practiced on a regular basis. Instrument flying and instrument approaches/departures can be practiced with very high degree of realism, without overcoming the near impossibility of having the helicopter, instructor, airspace, and bad weather available together for training.

A high end level D FFS, such as the FFS at HATSOFF, offers ultra realistic simulation of flying over terrain as well as excellent long range detail and provides outstanding image quality for fine details of objects such as fences, trees and wires. It is important to accurately simulate the visual effects on the sand of the rotor downwash as well as the visibility difficulties for the pilot such as brown out caused by sand and mud and white out caused by snow. Offshore operation is another area where realistic training can be carried out accompanied with emergencies which can never be practiced in the actual helicopter with the required degree of safety.

The helicopter community needs to embrace this opportunity to improve its safety record through a professional and effective way of training its pilots to meet the challenges of modern day aviation.

Air Cmde Ali

AIR CMDE(RETD) M.M. ALI

Air Cmde (Retd) M.M. Ali did his schooling in Baldwin Boys High School Bangalore and having an adventure streak in him he decided to join the Indian Air Force to become a pilot. He was commissioned as a helicopter pilot in Dec 1967 and saw active service in various sectors of India from the deserts of Rajasthan to the jungles of North East India and the dizzy heights of the Himalayas in Leh in Jammu and Kashmir. He also has experience in off shore flying. He was actively involved with the Indo-Pak war of 1971 which saw the birth of new nation Bangladesh. War is a great teacher and he saw death at very close quarters and knew what fear was when shells fell very close. He was awarded the VayuSena Medal for meritorious service by the Chief of Air Staff in 1979.

He is a qualified A2 flying instructor with more than 8000 accident free hours to his credit. He commanded a helicopter unit and was the Chief Operations Officer of a flying base. The Air Officer was qualified as a VVIP/VIP pilot and he has flown many national leaders like Presidents and Prime Ministers along with many International Heads of Governments. The Air officer has commanded two bases one in Nagpur and the other as Air Officer Commanding in Leh in J & K state.

He was Air Force Examiner on helicopters and awarded categories and ratings to pilots as per their performance.

Before he superannuated the Air Commodore was the Deputy Director General of NCC for Karnataka and Goa in Bangalore. He was responsible for the safe conduct of training of more than 16000 cadets of both Karnataka and Goa states.

After his retirement Air Cmde Ali was employed as a senior flying instructor in HAL Rotary Wing Academy where he instructed young budding civilian pilots in the intricacies of helicopter flying. Most of these pilots have since been gainfully employed in the civil corporate companies which own helicopters.

On attaining the age of 65 the officer had to forgo his love for flying as DGCA does not permit pilots over 65 to fly. He has since joined a Helicopter Simulator Company where he is currently employed.

The officer has sober habits and is very health conscious and is regular with his daily walks and exercise. He enjoys listening to music and reading.

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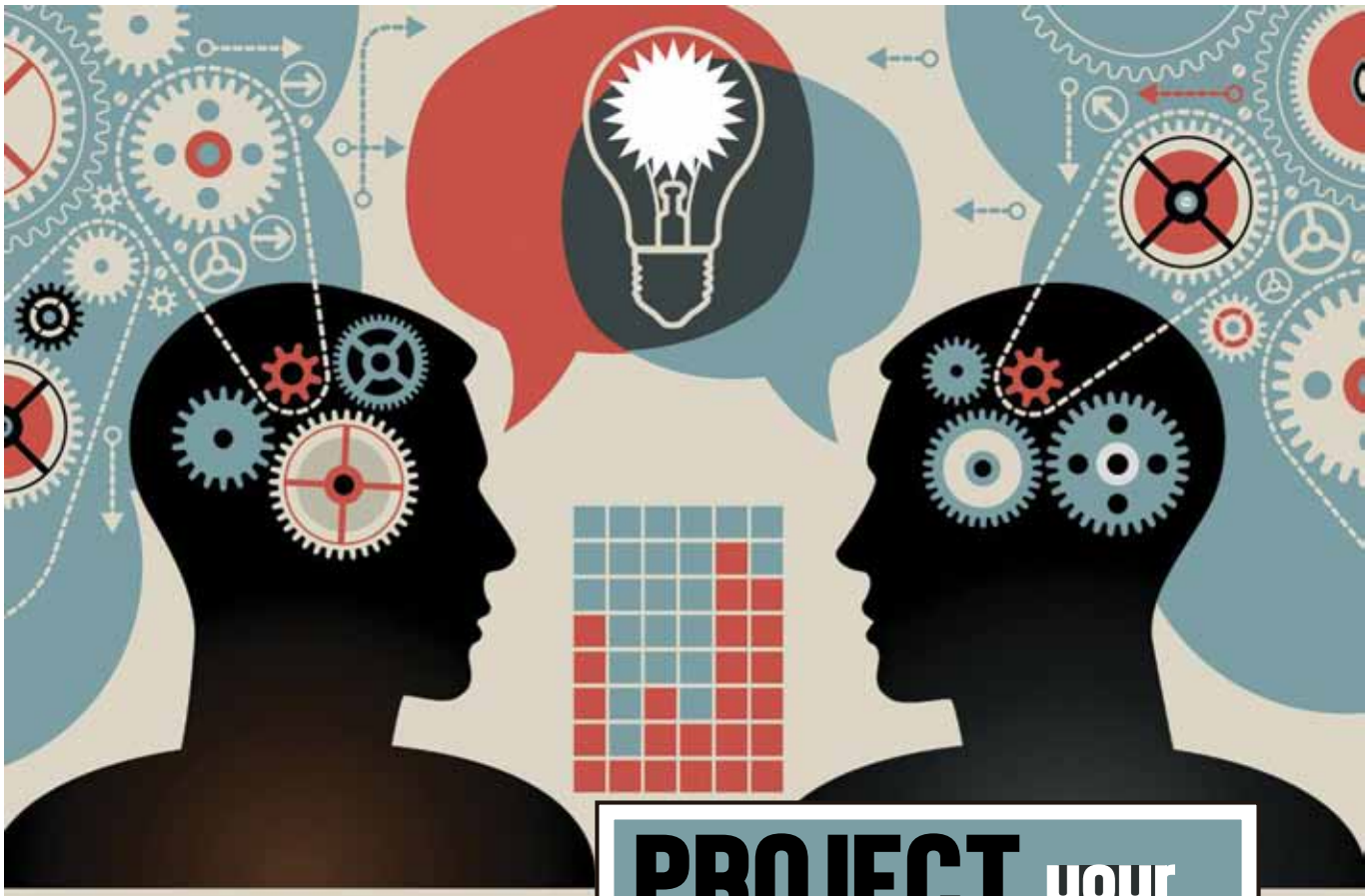

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