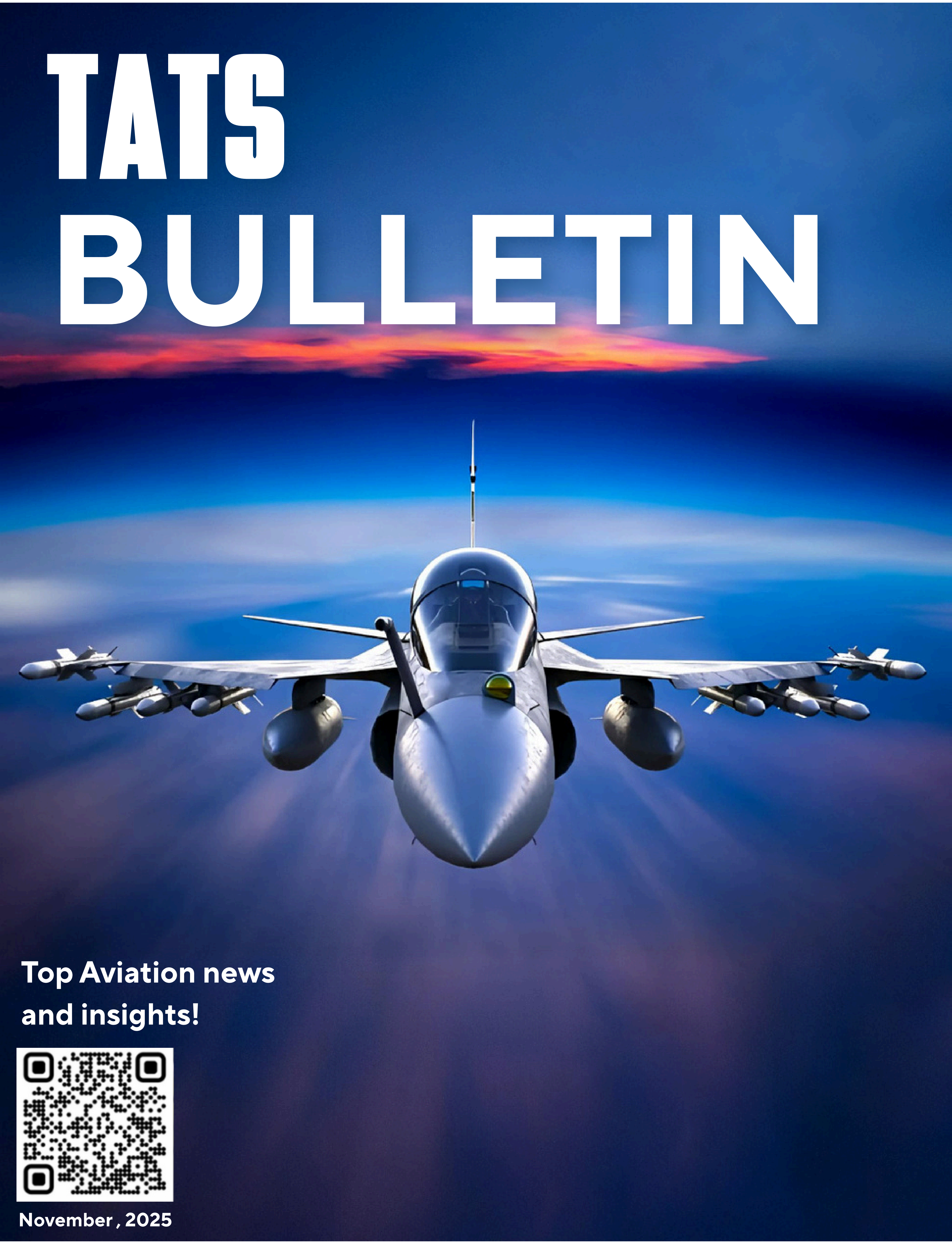

TATS BULLETIN

Top Aviation news and insights!

November , 2025

IN HONOUR OF

WING COMMANDER NAMASH SAYAL

DISTINGUISHED TEST PILOT – LCA TEJAS PROGRAM

On the day of the Dubai Airshow 2025, Wing Commander Namash Sayal made the ultimate sacrifice while serving the nation with courage, discipline, and unmatched mastery in the air.His dedication to advancing India's aviation strength, his passion for flying, and his unwavering commitment to excellence will continue to inspire generations of aviators.

A HERO OF THE SKIES
A LEGACY THAT WILL FOREVER RISE

FOREVER REMEMBERED

FOREVER RESPECTED

FOREVER OUR HERO

"Some heroes leave footprints in the clouds."

THE DIGITAL MAGAZINE

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About Us

The Aviator Training School (TATS), a premier aviation academy in Kerala under Aerokrat Global Pvt Ltd. We believe pilots are made through expert training, not born.

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LETTER FROM

CAPT TARESH RAMESAN
Ex Deputy Commandant (Indian Coast Guard) , Dornier-228 and Senior Captain Airbus A320.

It gives me immense joy, pride, and honor to be given the opportunity to contribute to the TATS Bulletin. This initiative by the young aviators of The Aviator Training School is truly commendable and reflects a forward-thinking approach to fostering knowledge, experience, and technological awareness within the aviation community.

I am reminded of a profound quote by Leonardo da Vinci that greatly influenced me during my formative years:
"Once you have tasted flight, you will forever walk the earth with your eyes turned skyward, for there you have been, and there you will always long to return."
These words resonate deeply with me. Over the past eighteen years of my career as a pilot, this longing for the skies has remained constant and unwavering.

In this context, it becomes imperative for young aviators to maintain momentum in their professional development—by pursuing continuous learning, staying informed about the latest advancements in aviation, and nurturing a spirit of enthusiasm and excellence. This remains crucial despite the inherent demands of the profession, which can be strenuous both physically and mentally.

I would also like to emphasise the importance of health and wellness. In today's operational environment, where flying often involves extended working hours and transitions across time zones that impact both sleep and nutrition, pilots must deliberately adopt a well-structured fitness regimen for both body and mind. Even simple activities such as jogging, swimming, or light strength training can significantly enhance efficiency and effectiveness in the cockpit.

As young aviators of India, you carry the honour and responsibility of representing our nation with professionalism and integrity wherever your wings take you.

Wishing you safe flights and smooth landings.

Jai Hind!

THE EXPERT

BY CAPTAIN PREJIN ANUPAMA PREJUSH

AIR FRANCE 447

The Crash AIRFRANCE And AIRBUS Plead Not Guilty

"We've lost the speed readings." — ***First Officer***
"What's happening? I don't understand what's happening." — ***Captain*** *(seconds before impact)*

The CVR and FDR were recovered in 2011 after extensive underwater searches.

AIR FRANCE 447 - What Really Happened?

Air France Flight 447 was a scheduled international passenger flight from Rio de Janeiro, Brazil, to Paris, France.
On **1 June 2009**, inconsistent airspeed indications and miscommunication led to the pilots inadvertently stalling the Airbus A330. They failed to recover the plane from the stall, and the plane crashed into the mid-Atlantic Ocean at **02:14 UTC, killing all 228 passengers and crew on board.**

The Bureau of Enquiry and Analysis for Civil Aviation Safety's (BEA) final report, released at a press conference on 5 July 2012, concluded that the aircraft suffered temporary inconsistencies between the airspeed measurements—likely resulting from ice crystals obstructing the aircraft's pitot tubes—which caused the autopilot to disconnect. The crew reacted incorrectly to this, causing the aircraft to enter an aerodynamic stall which the pilots failed to correct.

The accident is the deadliest in the history of Air France, as well as the deadliest aviation accident involving the Airbus A330.

SEQUENCE OF EVENTS:

Approximately **03 hours and 30 minutes** into the flight, while cruising at **FL350 (35,000 feet)** over the Atlantic Ocean, the aircraft encountered adverse weather conditions associated with the Intertropical Convergence Zone (ITCZ).

00:55 UTC: The crew received a message from the Aircraft Communications Addressing and Reporting System **(ACARS)** indicating the presence of convective activity ahead. They discussed potential deviations to avoid turbulence.

00:55 UTC: The crew received a message from the Aircraft Communications Addressing and Reporting System **(ACARS)** indicating the presence of convective activity ahead. They discussed potential deviations to avoid turbulence.

01:35 UTC: The aircraft entered an area of turbulence. The captain briefed the two co-pilots on the situation and took a scheduled rest break, leaving the cockpit.

02:10:05 UTC: The autopilot and autothrust systems disengaged due to inconsistent airspeed readings, likely
caused by the obstruction of the pitot tubes by ice crystals. The aircraft transitioned to alternate law, a degraded mode of flight control.

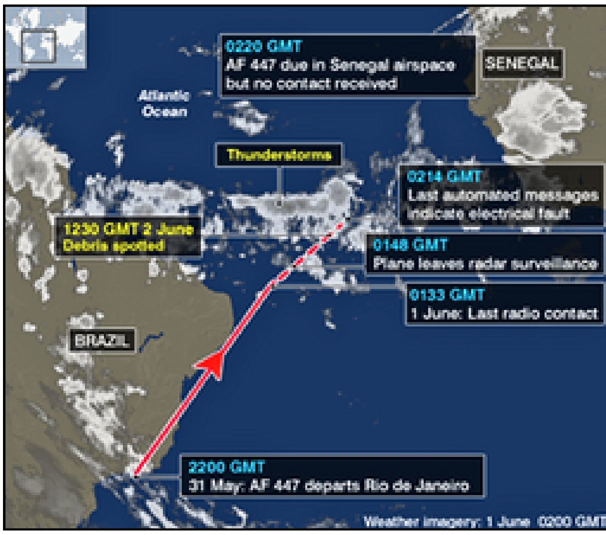
02:10:16 UTC: The pilot flying (PF) made a nose-up input, causing the aircraft to climb. This action was inappropriate, as it led to a reduction in airspeed and
increased the angle of attack.

02:10:51 UTC: The aircraft's stall warning sounded, indicating an imminent aerodynamic stall. Despite this, the PF continued to apply nose-up inputs.

02:11:40 UTC: The captain returned to the cockpit but did not take control. The aircraft had reached an altitude of 38,000 feet and began descending rapidly
.

02:14:28 UTC: The aircraft impacted the Atlantic Ocean, resulting in the tragic loss of all 228 occupants.

Crew Resource Management (CRM) Analysis:



The crash of Air France 447 highlights several CRM failures that contributed to the accident.

1. COMMUNICATION BREAKDOWN

The BEA's final report highlighted that the crew's actions were inappropriate, leading to the destabilization of the flight path.

Analysis:

· Lack of Verbalization of Actions: The pilot flying (PF) did not verbalize his control inputs after the autopilot disengaged. This lack of communication prevented the pilot monitoring (PM) from understanding the PF's intentions and actions.

· Ineffective Communication: The crew failed to effectively communicate the loss of airspeed information and did not apply the appropriate procedure for such a situation.

Lesson Learned:

Clear and assertive communication is essential in a crisis. Crew members must announce and explain their actions clearly, and the pilot monitoring must actively question and challenge incorrect inputs.

2. LOSS OF SITUATIONAL AWARENESS

The crew failed to recognize that the aircraft had stalled and consequently did not make inputs that would have made recovering from the stall possible.

Analysis:

· Misinterpretation of Stall Warning: The crew did not respond appropriately to the stall warnings, indicating a lack of understanding of the approach to stall.

Cognitive Overload:

The crew's incomprehension of the situation during the autopilot disconnection and poor management of the **"startle effect"** left them in an emotionally charged state, impairing their situational awareness.

Lesson Learned:

Situational awareness must be maintained through continuous monitoring of flight parameters. Pilots must always cross-check attitude, power settings, and altitude trends rather than relying solely on automated systems.

3. AUTHORITY GRADIENT AND LEADERSHIP ISSUES

The weakening of the two First Officers' task sharing, both by incomprehension of the situation at the time of autopilot disconnection and by poor management of the "startle effect", left them in an **emotionally charged state.**

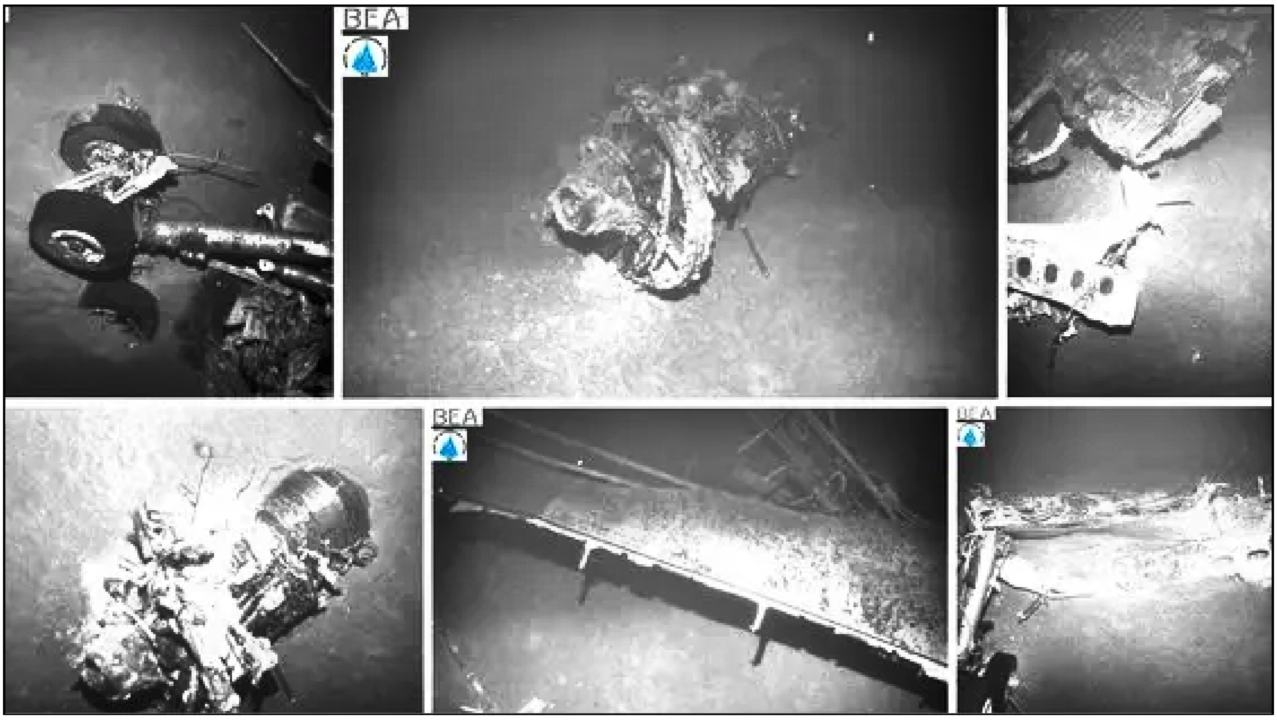
Analysis:

· First Officers Did Not Take Initiative: The first officers did not take decisive corrective action, even as the situation deteriorated.

· Captain Did Not Assume Command Promptly: Upon returning to the cockpit, the captain did not immediately take control or issue clear commands, further exacerbating the confusion.

Lesson Learned:

Strong leadership is critical in emergencies. The captain should quickly assess the situation, assume command if necessary and issue clear instructions. First officers must also feel empowered to challenge poor decisions.



The aircraft was carrying 216 passengers, 3 aircrew, and 9 cabin crew in two cabins of service. Among the 216 passengers were 126 men, 82 women and 8 children (including 1 infant).

STALLED OVER THE ATLANTIC

4. POOR DECISION-MAKING UNDER STRESS

The crew made inappropriate control inputs that destabilized the flight path.

Analysis:

• Emotional and Cognitive Overload: The unexpected autopilot disengagement caused a high-stress reaction in the PF, leading to inappropriate control inputs.

•Failure to Follow **Standard Operating Procedures(SOPs)**: The crew did not apply the appropriate procedure for the loss of displayed airspeed information, indicating a deviation from SOPs.

Lesson Learned:

Decision-making under stress must follow structured problem-solving methods. Pilots should rely on pre-trained procedures and checklists rather than reacting impulsively.

OUTCOME:

The crash of Air France Flight 447 serves as a tragic but invaluable lesson in aviation CRM. The accident was preventable, and better crew coordination could have saved 228 lives. Since this incident, airlines worldwide have improved stall recovery training, communication protocols, and CRM programs to ensure that crews are better equipped to handle similar emergencies.

DR. SHIJU STANLEY

The Essential Skill for Emergency Response

BLS TRAINING

In aviation, safety extends far beyond the cockpit, aircraft systems, and navigation. It includes the ability of aviation professionals to respond quickly and effectively during medical emergencies.

Basic Life Support (BLS) training has become an essential requirement across airlines, flight schools, and airport operations because it empowers personnel with lifesaving skills that can make the difference between life and death at 35,000 feet. A medical emergency during flight presents unique challenges—limited equipment, confined space, restricted access to advanced medical care, and possible time delays before landing. Common in-flight health events include ***cardiac arrest, strokes, fainting, asthma attacks, and severe allergic reactions***. The pilots are trained extensively to handle technical emergencies, but medical emergencies in the air are just as critical—and often unpredictable. Recently I had the opportunity to take the BLS session for student pilots of TATS at Ananthapuri Hospital, Thiruvananthapuram,

KEY COMPONENTS OF AVIATION-SPECIFIC BLS TRAINING

1. Scene Safety and Initial Assessment: Aviation BLS begins with ensuring cabin and crew safety. Professionals learn to assess:

- Environmental risks
- Passenger surroundings
- Turbulence or aircraft movement
- Communication with cockpit and senior crew

This ensures safe and coordinated CPR administration.

2. Check for Responsiveness
Tap the person's shoulder and shout, "Are you okay?" to see if they respond.

3. Call for help: If there is no response, shout for help. If someone is nearby, tell them to call emergency services and get an AED. If you are alone, call emergency services and put your phone on speakerphone before starting CPR.(**call 108 for Ambulance)**

4. Check for breathing and pulse:

Check for normal breathing and a pulse for no more than 10 seconds. If the person is not breathing or only gasping, they need CPR

5. CPR

Start chest compressions:
Place the heel of one hand on the, center of the chest, interlock your fingers with the other hand, and push downatarateof100-120 compressions per minute.
Make sure the compressions are at least 2 inches deep and allow the chest to fully recoil after each one.
Give rescue breaths: Open the airway, pinch the nose shut, and give two rescue breaths, making sure the chest rises with each breath.
Continue cycles: Continue with cycles of 30 compressions and two breaths, minimizing any interruptions.
Use the AED: As soon as an AED is available, turn it on and follow the voice prompts to attach the pads and deliver a shock if recommended.
Resume CPR immediately after the shock is delivered Continue the process until hand overing the person to medical professionals

CHOKING– THE DOCTOR'S SCENARIO
One of the most striking sessions was on choking

A CRITICAL LIFESAVING SKILL IN THE SKIES

The doctor explained how passengers—especially children and elderly individuals—may choke on food during turbulence or due to pre-existing conditions. •

Recognizing partial vs. complete airway obstruction

• Performing back blows
• Doing abdominal thrusts ***(Heimlich maneuver)***
• Handling choking in seated passengers, which is common in flight.

The doctor also shared an aviation-related scenario of a passenger choking during meal service and how quick action saved the person even before a diversion was considered. It made me realize how crucial immediate recognition and intervention are in cramped cabin spaces.

FITS / SEIZURES–

What to Do and What Not to Do ?

Another important case discussed was fits (seizures). The seizures can occur due to stress, hypoglycemia, dehydration, or medical history—conditions that can easily be triggered during flights.

Key takeaways included:

• Never restrain a seizing person
• Clear the space around them to prevent injury
• Time the seizure
• Place them in the recovery position once the seizure stops
• Monitor breathing and prepare for CPR if necessary

Many people mistakenly try to insert objects into the patient's mouth—something that should never be done. Aircraft systems and checklists help us handle technical issues, but BLS training equips them to handle the most human of emergencies. This training at Ananthapuri Hospital, Thiruvananthapuram reminded me that:
• A pilot is not only a flight operator but also a first responder
• Quick, informed action can save precious minutes before landing
• Medical preparedness is a crucial part of aviation safety

The experience was a poignant reminder that medical emergencies can arise anywhere, and being equipped with the right skills can make all the difference. I'm grateful for the chance to have contributed to their training and look forward to seeing them apply these skills in real-life scenarios.

"HAL TEJAS: INDIA'S LIGHT COMBAT THUNDERBOLT"

AIR CHEIF MARSHEL A.P. SINGH
CHIEF OF AIR STAFF

> ***"I was promised that when I come here in February, 11 Tejas Mk1As would be ready. And not a single one is ready... I find that HAL is just not in mission mode"***

The HAL Tejas is India's home-grown fighter jet—a scrappy, single-engine marvel that took decades of sweat, setbacks, and sheer stubbornness to get into the sky. Born out of necessity in the 1980s when India realized it could no longer depend on foreign suppliers for cutting-edge combat aircraft, the **Tejas (Sanskrit for "radiant")** is the first fighter jet designed and built almost entirely on Indian soil. Conceived by the Aeronautical Development Agency (ADA) and manufactured by **Hindustan Aeronautics Limited (HAL)** in Bangalore, it first flew on 4 January 2001, and after one of the longest and most frustrating development sagas in aviation history, it finally entered operational service with the Indian Air Force in July 2016.Only about 40 **Tejas Mk-1** and **Mk-1A** aircraft are in service or on order as of late 2025, with production slowly ramping up. The current Mk-1A variant is a sleek, delta-winged lightweight fighter powered by a single General Electric F404-IN20 afterburning turbofan delivering around **19,000 pounds of thrust.** It can pull **8.5 g,** tops out above **Mach 1.6** (roughly 1,350 mph at altitude), and flies to 50,000 feet. Armed with an internal 23 mm cannon, beyond-visual-range missiles like the Astra and Derby, close-combat **Python-5** or **ASRAAM**, and a wide range of precision bombs and rockets, it's built for air-to-air dogfights and ground attack. Its fly-by-wire controls, glass cockpit, and composite-heavy airframe make it genuinely modern, while the indigenous **Uttam AESA radar** in the Mk-1A finally gives it a sensor suite that can stand toe-to-toe with regional rivals.

The Tejas story is one of triumphs wrapped in delays. Conceived under the **Light Combat Aircraft (LCA)** program in 1983, it suffered from sanctions after India's 1998 nuclear tests, engine troubles, weight creep, and bureaucratic tangles. Critics mocked it as the "40-year fighter" that would never arrive.

Yet it kept inching forward. Naval pilots landed a prototype on the aircraft carrier INS Vikrant in 2020 and 2023, proving the naval **Tejas NP-1 and NP-2** could operate from a deck—something only a handful of nations can do. In exercises, Tejas squadrons have regularly out-turned and out-climbed Su-30MKIs in mock combat, earning respect from pilots who once doubted the little jet.

Real combat experience is still limited, but the Tejas got its first taste of tension in 2019 when No. 45 ***"Flying Daggers"*** squadron deployed to forward bases during the Balakot crisis after the Indian Air Force's strike on terror camps in Pakistan. Though it didn't fire a shot in anger, it flew armed patrols along the border, proving it could be surged into a hot zone. In 2025, the improved Mk-1A started reaching squadrons, bringing a more powerful radar, better electronic warfare suite, and easier maintenance—fixes that pilots had begged for.

The price of ambition was steep. Dozens of prototypes and test aircraft were built, two were lost in crashes (one in 1993 during early taxi trials, another in 2016 when a pilot ejected safely after an oxygen system failure), and countless careers were spent chasing an ever-moving target of "full operational capability." Yet every setback taught lessons that are now baked into the jet. Production is finally accelerating, with HAL targeting 16–18 aircraft per year, and export interest is flickering from countries like Argentina, Egypt, and Malaysia.

The Tejas may never match the raw power of a Rafale or the stealth of an F-35, but it represents something bigger for India: the ability to design, build, and fly a supersonic fighter without begging for foreign approval. It's a symbol of a nation that refused to stay a buyer forever and decided to become a builder—even if it took forty years and more gray hairs than anyone wants to count.

The Road Ahead:

Tejas Mk2 and AMCA

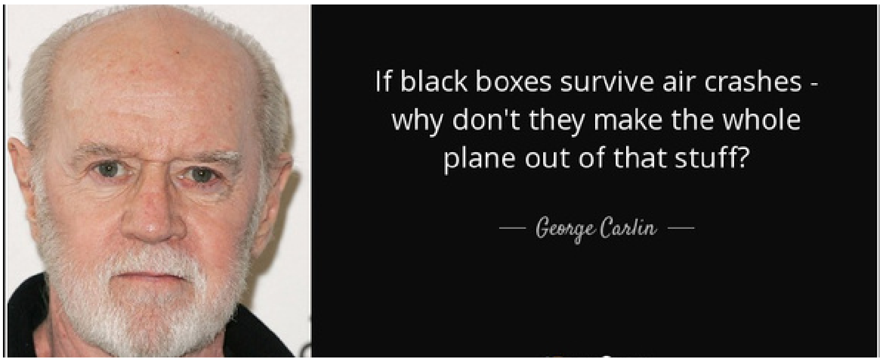
The Tejas family isn't done evolving. The larger, more powerful **Tejas Mk2** (formerly called Medium Weight Fighter) is under active development with a new **GE F414 engine** (22,000 lb thrust), canards, closer-care intakes, and space for 6.5 tons of weapons. First flight is expected around 2028–29, with service entry in the mid-2030s. Beyond that looms the twin-engine **Advanced Medium Combat Aircraft (AMCA),** India's stealth fighter project **aimed at Mach 1.8+** speeds and genuine fifth-generation features. If the Tejas taught India how to walk in fighter design, the Mk2 and AMCA are the sprint and the marathon that could finally put Indian wings among the world's elite.

"Successfully completed a sortie on the Tejas. The experience was incredibly enriching, significantly bolstering my confidence in our country's indigenous capabilities, and leaving me with a renewed sense of pride and optimism about our national potential." - Narendra Modi

FDR & CVR

AMRUTHA

You'll have heard about black box. The black box is one of the most important devices used in modern airplanes. Despite its name, the black box is orange in color. This helps investigators easily locate it after an accident. It is a strong, durable device designed to record flight information and cockpit conversations, helping experts find out what happened during a flight. The black box can survive high temperature, high pressure of deep waters. And it has a underwater locator beacon that helps us find it if the aircraft crashes into a sea



THE BLACK BOX IN AIRCRAFT

This is mainly a device designed to capture and store important data during flight. Inside, there are different electronic components, recording systems and sensors that register all kind of technical information about the aircraft's performance such as speed, altitude, position, control settings, vibrations as well as cockpit conversations and sounds. There are two main parts of a black box—

- **Flight Data Recorder** (FDR)
- **Cockpit Voice Recorder** (CVR)

The FDR collects technical details such as the aircraft' s altitude, speed, engine performance, and direction. The CVR records the pilots' voices, radio messages, and any sounds in the cockpit. Together, these recorders give a complete picture of what occurred during the flight. It is placed at the tail part of the aircraft because this part is less likely to be damaged if something happens. This helps us to investigate the accidents more effectively and efficiently.

The main purpose of black box is to identify what went wrong, understanding pilots actions and aircraft performances.

JERIL P S

COLOR CODING ON AIRCRAFT INSTRUMENTS

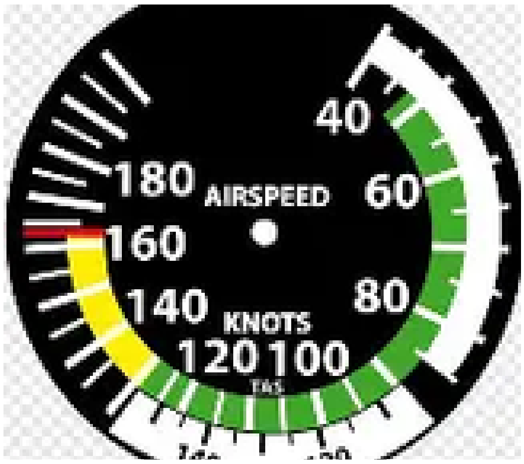
Color coding on aircraft instruments is a universal and critical aspect of aviation safety, enabling pilots to interpret vital information at a glance. This system of colored arcs, lines, and text is standardized across the industry, ensuring consistent meaning regardless of the aircraft model. *It provides pilots with immediate situational awareness regarding operating limits, warnings, and normal parameters for various systems.*

ARSPEED INDICATOR COLOR CODES

The airspeed indicator (ASI) is a prime example of effective color coding. It is marked with different colored arcs and a red line to indicate crucial speed ranges.

White arc: Indicates the flap operating range. Speeds within this range are safe for flap extension and retraction.
Lower limit: Stall speed with flaps extended (Vs0).
Upper limit: Maximum speed with flaps extended (VFE).

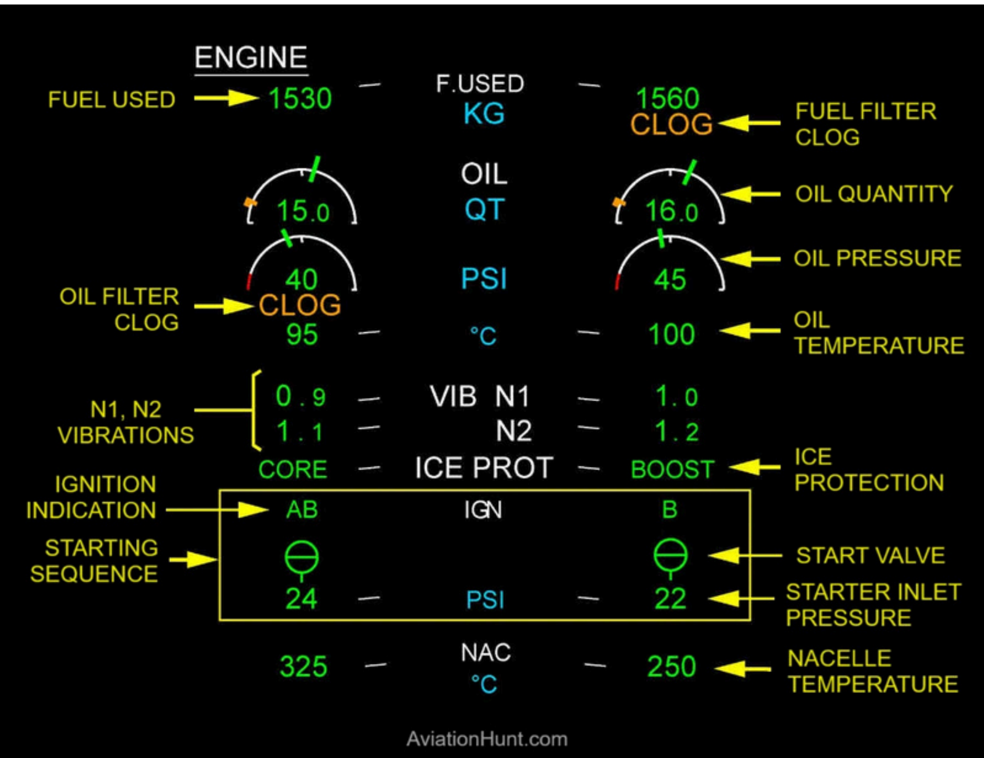
Green arc: Represents the normal operating speed range, which is used for most flight operations.
Lower limit: Stall speed with flaps retracted (Vs1).



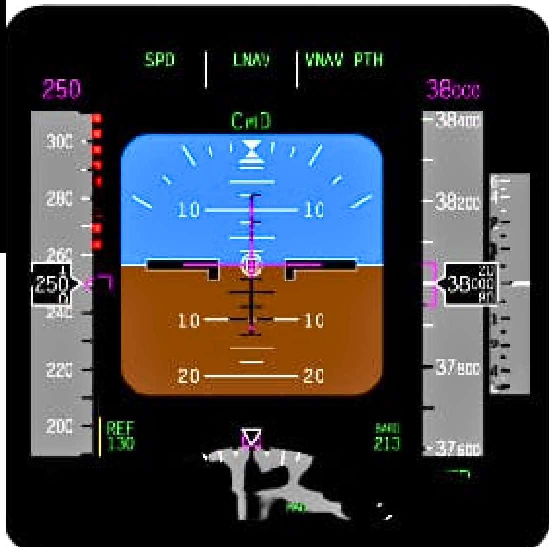
Upper limit: Maximum structural cruising speed, which should not be exceeded except in smooth air (VNO).

Yellow arc: A caution range for operation only in smooth air. Manoeuvres should be performed with extra care within this range.

Red radial line: The "Never Exceed" speed, the maximum speed at which the aircraft can be flown. Exceeding this speed can cause structural damage or failure (VNE).



AIRBUS A320: ECAM ENG SD PAGE



ENGINE INSTRUMENTS

Engine instruments, such as those for oil temperature and pressure, also feature standardized color coding.

Green arc: Represents the normal operating range, where the engine is functioning within safe parameters.

Yellow arc or mark: A cautionary range indicating a parameter is approaching a limit and requires monitoring.

Red line or arc: Signifies a critical operating limit, warning of a potential failure or unsafe condition. A red radial line on an oil pressure gauge, for example, marks the minimum safe operating limit.

ELECTRONIC FLIGHT INSTRUMENTS

Modern electronic flight instrument systems **(EFIS)**, found in glass cockpits, use color coding dynamically to convey system status. These systems uphold the traditional color standards while adding more detail and context.

Red: Used for Level 3 failures or warnings, indicating a critical situation that requires immediate pilot action.

Amber/Yellow: Represents Level 2 failures or cautions, which require the flight crew's attention but not immediate action.

Green: Confirms a system is operating normally. Text or parameters that are within safe limits are shown in green.

Blue: Often indicates advisory information or system selections. For example, a blue needle can indicate GPS navigation is being used.

Magenta: Used to denote information related to a pilot's flight plan, such as a selected speed or altitude.

WHEN IN DOUBT, HOLD ON TO YOUR ALTITUDE. NO-ONE HAS EVER COLLIDED WITH THE SKY

MULTI-ENGINE AIRCRAFT INDICATORS

Twin-engine aircraft have additional markings on their airspeed indicators to account for engine failure scenarios.

Red radial line: Represents the minimum control speed, which is the minimum airspeed at which the aircraft remains controllable with one engine inoperative.

Blue radial line: Indicates the best single-engine rate-of-climb speed. Flying at or above this speed can provide the best climb performance after an engine failure.

THE PURPOSE OF COLOR CODING

The implementation of color coding on aircraft instruments serves several vital purposes:

Enhances safety: By providing a clear and immediate visual representation of an aircraft's operational status, color coding helps pilots make fast, accurate decisions, especially during high-stress situations.

Reduces pilot workload: Pilots can assess instrument readings at a glance without having to refer to flight manuals or cross-reference numbers, which reduces cognitive load.

Improves situational awareness: Color coding helps pilots recognize deviations from normal parameters, allowing for earlier detection and response to potential issues.

Ensures consistency: Standardized color conventions across the industry ensure that pilots can transition between different aircraft types with confidence, as the meaning of the markings remains consistent.

DO U KNOW

In aviation, simplicity = reliability

01 FEELS FLIMSY BUT COULD HOLD A SMALL CAR

Fewer moving parts = fewer failure points

- ***The thin little fabric strap on your seat looks like it would snap if you sneeze too hard?*** It's a masterpiece of engineering!
- The webbing is made of super-strong fibers like nylon, woven to withstand over **6000 pounds** of force.
- The buckle uses a **cam-locking mechanism** that tightens under pressure.
- It's designed to save your life in a **16G** crash test, withstanding extreme temperature from **-55C to +70C** ,corrosion, and abrasion of **20+years** of passenger use.

Unlike car seatbelts, aircraft belts don't need pretensioners or retractors.

Simple, yet brutally effective and absolute consistency during deceleration and turbulence.

NEXT TIME YOU BUCKLE UP, REMEMBER: THIS STRAP'S GOT YOU, EVEN IN FORCES YOUR BODY CAN'T HANDLE!

02 THE TUG

- Airlines can reverse their jets, but it's not exactly gate-friendly.
- Thrust reversers near terminals = potential disaster!
- Debris flies, windows shatter, and harm ground crew.
- Engines sit low to the ground, so they'd suck up everything, leading to costly repairs.
- Plus, the noise is a major **NO** .

THINK OF IT LIKE HANDLING A LOADED WEAPON POINTED THE WRONG WAY – AIRPORTS PREFER THE TUG TO DO THE DRIVING, NOT THE ENGINES!

AVIATION FACTS

03 BLAND AIRLINE FOOD

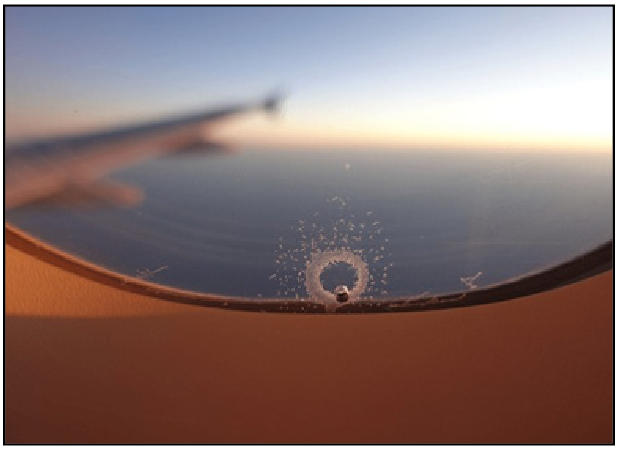
It's not the food, it's you

- **Low humidity + reduced cabin pressure** = your taste buds are like numb.
- You lose like **30%** of your ability to taste sweet and salty flavours!
- Your **nose dries out** too, which kills half of your flavour perception.
- Meals taste duller unless they're, like, super seasoned. Airlines know this, so they load up on herbs, and spices.

REMEMBER YOUR MOUTH IS BASICALLY FLYING AT 35,000 FEET!

The meh tomato juice on the ground?
OMG, it's like a party in the air!
It's one of the few flavors that stays strong at altitude.

NEXT TIME YOUR IN-FLIGHT MEAL FEELS OFF, BLAME THE ALTITUDE, NOT THE CHEF!



04 THE TINY HOLE

"Bleed holes", The Tiny Feature That Keeps You Safe at 30,000 Feet

1. The **outer pane** carries the full cabin pressure.
2. The **middle pane** has the tiny hole.
3. The **inner pane** is just a protective shield for passengers.

The hole helps equalize pressure between the cabin and the panes, so the outer pane absorbs the load exactly the way engineers designed it. If the hole wasn't there, the pressure would build up in the wrong place, and... boom! 💥

BUT THANKS TO THIS CLEVER DESIGN, THE SYSTEM BECOMES FAIL-SAFE.

05 SQUAWK ***7601***

TRANSPONDER CODE UPDATE:

A NEW EUROPEAN UPDATE ON LOST COMM PROCEDURES

- *7601*: Use if lost communication under IFR, in VMC, and **diverting to nearest suitable airport.**
- ***7600***: Use if continuing flight as originally planned despite lost communication.

- 7601: "Lost COMM, diverting to nearest airport"
- 7600: "Lost COMM, continuing as planned"

THE ONLY MYSTERY IN LIFE IS WHY THE KAMIKAZE PILOTS WORE HELMETS."
– AL MCGUIRE

THE MIND BEHIND THE MACHINE

The Human Touch: Aircraft Engineers Who Bring Planes to Life

By Fayaz Rahman

The Overlooked Force in Modern Flight

When people think of aviation, they picture powerful engines, sophisticated avionics, and sleek airframes slicing through the clouds. Yet, beneath all the technology and precision engineering, there lies the true pilot of every journey — the human mind. Aviation has reached a point where machines can almost fly themselves, but no autopilot or algorithm can replicate the decision-making, intuition, and calm focus that define a good pilot. The modern cockpit is a partnership between man and machine — and it's the mind behind the machine that determines safety, efficiency, and excellence.

Understanding Human Factors

The term Human Factors refers to the study of how humans interact with machines, systems, and each other within an operational environment. In aviation, this includes psychology, physiology, communication, decision-making, and teamwork — all crucial to ensuring that advanced aircraft remain under human control.

Research has shown that over 70% of aviation incidents have some link to human performance. These aren't necessarily cases of carelessness, but moments when stress, fatigue, distraction, or communication breakdowns interfere with judgement. Understanding these patterns allows pilots to anticipate, prevent, and manage potential errors before they escalate.

Situational Awareness —

The Pilot's Inner Compass Situational awareness (SA) is the pilot's ability to perceive, understand, and predict what is happening around the aircraft. It is a continuous loop — sensing, interpreting, and projecting. A pilot with strong situational awareness is always mentally one step ahead: checking weather trends, anticipating ATC instructions, and monitoring the aircraft's energy state. Losing SA, even momentarily, can create confusion that snowballs into error.
Modern cockpits provide abundant data — but it's the human mind that filters, prioritizes, and translates that data into meaningful action.

SA is not just about seeing; it's about understanding what you see.

> *Aircraft are built by engineers, but safety is built by the minds that command them.*

Decision-Making Under Pressure

In aviation, decisions must often be made in seconds. Whether it's handling an engine anomaly or rerouting due to weather, the pilot's thought process determines the outcome. Good decision-making blends logic with intuition — analyzing available data while trusting experience and instinct. The best pilots make decisions proactively, not reactively. They evaluate risks, prepare alternatives, and never let emotion cloud judgment.
Training plays a huge role here. Every simulator session, every emergency drill, is designed to condition the pilot's brain to make the right call even when adrenaline spikes. Calm minds save lives.

> ***"In aviation, clarity isn't a luxury — it's a lifeline."***

"A great pilot doesn't just control the aircraft — he commands his mind."

The Power of Communication

If aviation were a language, communication would be its grammar. Clear and concise radio telephony, cockpit conversation, and crew coordination form the backbone of safe flight.

Crew Resource Management (CRM) emphasizes assertive communication and mutual respect in the cockpit. A good pilot listens as much as he speaks. Misheard or unacknowledged instructions can turn routine flights into emergencies — so precision in words is as vital as precision in flying.

Fatigue and Stress: The Silent Threats

Pilots operate in a physically demanding and mentally intense environment. Long duty hours, time-zone changes, and constant vigilance create cumulative fatigue that can degrade performance. Stress, too, is unavoidable — from training evaluations to real-world decision-making.
The key isn't eliminating stress but managing it. Professional pilots cultivate routines, discipline, and mental resets that help them maintain composure.

Technology and the Human Partnership

Automation has transformed aviation — reducing workload, improving precision, and eliminating repetitive errors. Yet, excessive dependence on technology can dull situational awareness and slow human response when manual intervention is needed.
Incidents where pilots failed to monitor automation or misinterpreted automated behavior underline this danger. The solution isn't rejecting technology but mastering it.
The pilot of the future must be both a systems manager and a manual flyer — ready to intervene intelligently when the unexpected occurs. Technology is a partner, not a replacement.

The Future of Human Factors

With AI and augmented reality entering cockpits, Human Factors is expanding beyond psychology into human-machine symbiosis.

Future pilots will manage not just aircraft systems, but intelligent digital copilots that process vast data in seconds. Yet, no matter how advanced technology becomes, the essence remains — human judgement, emotional intelligence, and moral responsibility. The flight deck of tomorrow will still depend on the mind behind the machine.

Conclusion – The Pilot's True Instrument In the end, every instrument, every checklist, every autopilot mode serves one purpose— to extend the awareness and control of the human pilot.

What separates professionals from amateurs isn't just flying skill;
It's mental discipline, emotional stability, and cognitive sharpness. Human Factors remind us that aviation, at its heart, is not about machines reaching the-sky, but about minds learning to rise above pressure, uncertainty, and limits.

MIDHUN SHIV SUNDER

Aerial Firefighting:

Wings Against Wildfire

Wildfires have always been a part of nature's cycle, but in recent decades they have grown in frequency, intensity, and destructiveness. From the forests of California and Australia to the Mediterranean landscapes of Greece and Portugal, uncontrolled wildfires threaten lives, homes, ecosystems, and economies. As climate change drives hotter and drier conditions, the challenge of wildfire management is becoming one of humanity's greatest environmental battles.

On the frontlines of this fight stand not only firefighters on the ground, but also an airborne fleet of aircraft—helicopters, water bombers, drones, and advanced surveillance systems—that form the backbone of modern wildfire response. Known collectively as aerial firefighting, these airborne operations provide speed, reach, and precision, often making the difference between containment and catastrophe.

This article explores the critical role of aircraft in wildfire management, from history to cutting-edge technologies shaping the future of firefighting.

1. THE BIRTH OF AERIAL FIREFIGHTING

The idea of using aircraft to fight fires dates back nearly a century. In the 1920s and 1930s, pilots experimented with dropping water-filled containers from small planes to suppress flames. By the 1950s, surplus military aircraft like the PBY Catalina flying boat and the DC-6 were converted into firefighting planes, marking the true birth of aerial firefighting.

2. THE ROLE OF AIRCRAFT IN WILDFIRE MANAGEMENT

Aircraft support wildfire suppression in three main ways:

• **Water and Retardant Drops:**
Air tankers and helicopters carry thousands of liters of water or fire-retardant chemicals, releasing them directly onto flames or creating protective barriers.

• **Surveillance and Coordination:**
Aircraft act as "***Eyes in the sky,***" spotting new fires, mapping their spread, and coordinating ground teams.

• **Logistics and Evacuation:** Helicopters transport firefighters, equipment, and sometimes even evacuees out of danger zones.

Together, these roles create a layered defense system, allowing firefighting agencies to attack fires from both air and ground.

3. TYPES OF AIRCRAFT USED

Aerial firefighting uses a diverse fleet, each suited to different tasks:

• **Helicopters:**
Agile and versatile, helicopters like the ***Sikorsky S-64 Skycrane or Bell 412*** carry large water buckets (Bambi buckets) or internal tanks. They can refill from lakes, rivers, or portable reservoirs, making them ideal for precision drops.


Sikorsky S-64

• **Fixed-Wing Air Tankers:**
Large planes such as the Lockheed C-130 Hercules, Canadair CL-415 "Super Scooper", and converted Boeing 747 Supertanker can carry massive payloads of water or retardant—up to 74,000 liters in some cases.

•**Single-Engine Air Tankers (SEATs):**
Smaller, more economical planes like the Air Tractor AT-802 provide rapid response, especially for smaller fires or initial attacks.

•**Drones (UAVs):** Increasingly vital, drones provide real-time surveillance, thermal imaging, and even experimental mini water drops without risking human lives.

> "We don't fly from danger; we fly towards those in danger."

4. THE SCIENCE OF WATER AND RETARDANT DROPS

Dropping water onto a wildfire is not as simple as emptying a tank. Success depends on altitude, wind speed, fire behavior, and drop pattern.

• **Water:** Useful for immediate cooling, though it evaporates quickly in intense heat.

• **Fire Retardant:** A chemical slurry (often dyed red for visibility) that slows fire spread by coating vegetation and removing fuel from flames. Retardant is most often used to build containment lines rather than extinguish flames directly.

Advanced guidance systems and GPS targeting now allow pilots to deliver payloads with surgical precision, maximizing effectiveness while minimizing waste.


Bell 412

C-130 Hercules

5. LATEST TECHNOLOGIES IN AERIAL FIREFIGHTING

Aerial firefighting is evolving rapidly, driven by innovation and necessity. Key advancements include:

• **Satellite and AI Fire Detection**:
Satellites equipped with thermal sensors can spot new wildfires within minutes, automatically alerting firefighting agencies. AI helps predict fire behavior and spread.

• **Night Vision and Infrared Systems:**
Traditionally, aerial firefighting stopped at dusk for safety reasons. With night-vision goggles and infrared imaging, helicopters can now operate safely after dark, extending firefighting hours.

• **Modular Airborne Firefighting Systems (MAFFS):**
These portable units convert military cargo planes (like C-130s) into instant air tankers, greatly expanding available capacity during peak fire season.


MAFFS

• **Next-Generation Aircraft:**
Electric and hybrid aerial firefighting prototypes are in development, promising reduced carbon emissions and quieter operations.

• **Unmanned Aircraft (Drones):**
Beyond surveillance, experimental drones are being tested for autonomous fire suppression in dangerous or hard-to-reach areas.

Electra's nine-passenger US Army


AT-802


CL-415


B747 Tanker

"In the face of fire, fear is fuel for bravery"

ATC PHRASES

that make u sound like a pro pilot

c

CONFIDENCE COMES WITH CLARITY

- SPEAK SLOW
- SPEAK CALM
- SOUND CLEAR NOT FANCY
- CUT FLUFF

1

SAY AGAIN

Avoid : Repeat

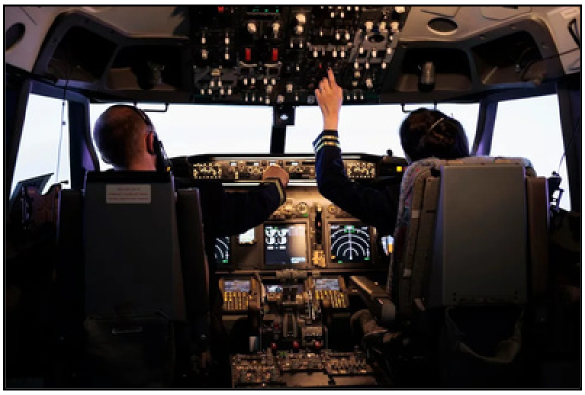
A clean way to request a repeat when instruction wasn't clear . You weren't ready to copy or radio is noisy

2

STANDBY

Buying time

Perfect when you need a moment to analyze



3

UNABLE

Professional powerfull and short

Dont over explain .

Say why only if needed

4

NEGATIVE CONTACT

Example- ATC: Traffic 3 o'clock, 2 miles

You : Negative contact

5

REQUEST VECTORS

Use in low visibility/ situational overload/navigating unfamiliar terrain

Sounds pro because it is

Aviation and Space Convergence: Shaping the Future of Human Mobility and Exploration

For over a century, aviation has revolutionized how humanity travels, connects, and conducts global trade. Airplanes shrank continents, brought cultures closer, and created a truly interconnected world.

Meanwhile, space exploration—once considered the domain of science fiction—has transformed into a tangible reality, with satellites orbiting Earth, space stations hosting astronauts, and private companies planning commercial spaceflights. Today, the lines between aviation and space are beginning to blur. We stand at the dawn of a new era where the skies above and the cosmos beyond are no longer separate domains, but part of a continuous frontier. This convergence is shaping not only the way we think about travel but also communications, defense, climate monitoring, and the global economy. This article explores the growing intersection of aviation and space, highlighting space tourism, satellite technology, and the emerging innovations that are set to redefine human mobility and exploration.

1. HISTORICAL CONTEXT: FROM RUNWAYS TO ROCKETS

Aviation and space exploration share the same origin: humanity's eternal dream to fly. The Wright brothers' first powered flight in 1903 was the spark that eventually led to supersonic jets, jumbo airliners, and stealth fighters. Just six decades later, Yuri Gagarin orbited Earth in 1961, marking humanity's leap beyond the atmosphere.While aviation developed around the principles of aerodynamics, commercial efficiency, and global connectivity, spaceflight focused on escaping Earth's gravity, scientific research, and strategic dominance. Despite these different goals, both fields relied on similar engineering challenges: lightweight materials, propulsion systems, navigation, and human safety in hostile environments.

Today, the same innovations that drive aviation—automation, fuel efficiency, artificial intelligence—are transforming space exploration, while advancements in rocket technology are influencing high-speed aviation.

Perhaps the most exciting concept in this convergence is suborbital point-to-point travel. Imagine boarding a rocket-powered craft in London and landing in Sydney in under 90 minutes.

The fusion of aviation and space is more than technology—it represents a shift in how humanity perceives mobility, exploration, and its place in the universe. From space-based navigation systems guiding aircraft, to rockets doubling as global transport vehicles, the boundary between air and space is dissolving.

2. THE RISE OF SPACE TOURISM: AVIATION MEETS THE COSMOS

One of the most visible signs of aviation and space convergence is space tourism. What was once the privilege of government astronauts is now opening to private citizens, thanks to companies like SpaceX, Blue Origin, and Virgin Galactic.

- **Suborbital Flights:** Virgin Galactic's spacecraft carries passengers briefly beyond the Kármán line (100 km above Earth), allowing a few minutes of weightlessness before gliding back like an airplane.
- **Orbital Missions:** SpaceX's Crew Dragon has carried private citizens into orbit, offering a true astronaut-like experience.
- **Future Prospects:** Companies are planning space hotels, lunar flybys, and even point-to-point travel using rockets (imagine flying from New York to Sydney in under an hour).

This blending of aviation-style commercial operations with space technology is reshaping the travel industry. Airports may one day function as "spaceports," handling both conventional airliners and orbital spacecraft.

3. SATELLITE TECHNOLOGY: THE BACKBONE OF MODERN AVIATION

Another key intersection is satellite technology. While satellites belong to the domain of space, they have become inseparable from aviation:

- **Navigation**: GPS and similar systems enable precise aircraft routing, reducing fuel consumption and ensuring safety.
- **Weather Forecasting:** Meteorological satellites track storms, turbulence, and volcanic ash, crucial for flight safety and planning.
- Air Traffic Management: New satellite-based
- communication systems like ADS-B (Automatic Dependent Surveillance–Broadcast) provide real-time aircraft tracking across oceans and remote regions.

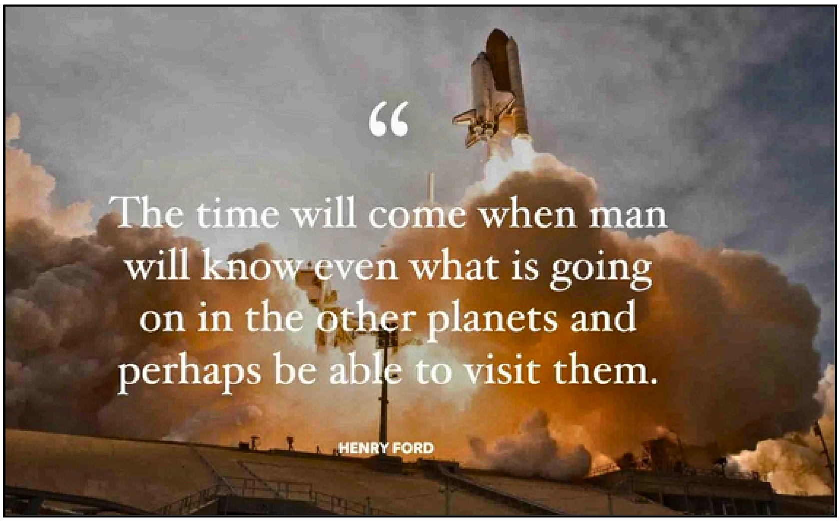
Passenger Experience: Satellite broadband has enabled in-flight Wi-Fi, connecting passengers even in mid-air.

4. TECHNOLOGICAL CONVERGENCE: SHARED CHALLENGES AND INNOVATIONS

Aviation and space exploration are merging not only in applications but also in technology and innovation.

- **Propulsion Systems:** Hybrid engines being developed for hypersonic aircraft are also relevant for space launch systems.
- **Materials Science:** Lightweight composites and heat-resistant alloys benefit both airliners and spacecraft re-entry capsules.
- **Autonomous Systems:** AI-driven autopilot systems in aviation mirror autonomous docking systems in spacecraft.
- **Sustainability**: Both industries are seeking greener fuels—biofuels for aviation and sustainable propellants for rockets—to reduce environmental impact.

Companies like Boeing, Airbus, and Lockheed Martin straddle both worlds, contributing equally to advanced aircraft and next-generation space vehicles.



5. THE FUTURE: POINT-TO-POINT SPACE TRAVEL

- SpaceX's Starship envisions such intercontinental flights, using space launch techniques to dramatically reduce travel times.
- Unlike conventional airliners limited by atmospheric drag and sonic booms, spacecraft traveling briefly into space could skip across continents at orbital speeds.
- For aviation, this would mark a radical redefinition: airlines might become "space lines."

While challenges remain—cost, safety, passenger comfort, and infrastructure—this concept embodies the ultimate blending of aviation and space.

6. ECONOMIC AND STRATEGIC IMPLICATIONS

The convergence of aviation and space has far-reaching implications beyond travel.

- *Global Economy: Space tourism, satellite internet, and high-speed travel represent multi-trillion-dollar industries in the making.*
- *National Security: Countries are investing in space-based aviation systems for defense, surveillance, and strategic dominance.*
- *Employment and Skills: Pilots, engineers, and technicians will require cross-disciplinary expertise spanning both aviation and spaceflight.*
- *Global Accessibility: Just as commercial aviation made air travel accessible to the masses, private space companies aim to make space experiences affordable within a few decades.*

7. CHALLENGES AHEAD

Despite the promise, convergence comes with significant hurdles:

- Regulation: Air travel is highly regulated; space travel requires new international laws on safety, liability, and traffic management.
- Environmental Impact: Rockets release black carbon into the upper atmosphere, raising concerns about climate effects.
- Safety: Spaceflight carries far higher risks than commercial aviation; ensuring reliability is crucial for public adoption.
- Cost: While prices are falling, space travel is still accessible only to the wealthy elite. Bridging this gap will take time.

CONCLUSION: TOWARD A UNIFIED SKY

Aviation gave humanity the sky. Space exploration gave us the stars. Today, these two domains are converging into a unified frontier where the atmosphere and outer space are no longer distinct, but parts of one continuous journey.

In the decades to come, a new generation of travelers may board a vehicle that takes off from a runway, soars into orbit, and lands halfway across the world—all in the span of an afternoon. Aviation and space, once separate dreams, are now merging into a single reality: a future where the Earth and cosmos are equally within reach.

The Kandahar Hijacking:

ARJUN SRENIVASAN

A SEVEN-DAY CRISIS THAT REDEFINED AVIATION SECURITY

THE FLIGHT AND THE SEIZURE

On 24 December 1999, what began as a routine two-hour journey from Kathmandu to New Delhi transformed into one of India's darkest aviation crises. Indian Airlines Flight IC-814, an Airbus A300 carrying 176 passengers and 15 crew members, was seized by five armed militants just 40 minutes after takeoff.

The hijackers, later identified as members of the Pakistan-based Harkat-ul-Mujahideen, had smuggled grenades and weapons aboard at Kathmandu's Tribhuvan International Airport, exploiting weak security. Armed and determined, they stormed the cockpit, ordering Captain Devi Sharan to divert the plane westward

THE AMRITSAR STANDOFF

Denied permission to land in Pakistan, Captain Sharan diverted the aircraft to Amritsar, where it touched down with dangerously low fuel. For nearly an hour, passengers sat in terror as the hijackers demanded refueling and threatened executions.

Tragically, 25-year-old passenger Rupin Katyal was fatally stabbed, becoming the sole casualty of the ordeal.

Despite the presence of security forces on the ground, the opportunity to storm the aircraft was lost. The decision to let the plane depart—just minutes before an elite National Security Guard team arrived—remains one of the most debated aspects of the crisis.

ACROSS BORDERS TO KANDAHAR

The plane flew next to Lahore, then onward to Dubai, where 27 passengers, including women, children, and the injured, were released. On Christmas morning, the hijacked Airbus finally landed in Kandahar, Afghanistan—then under Taliban control. Surrounded by Taliban fighters and armoured vehicles, the crisis entered an international dimension, as Indian negotiators now had to bargain not only with the hijackers but also under the Taliban's watchful eye.

I told them that I cannot take off because I am in the middle of the runway. They asked me to crash the aircraft. I had no choice but to take a calculated risk," -
Captain Devi Sharan

Negotiations and the Human Cost Over six tense days, negotiations dragged on. The hijackers' initial demands for dozens of prisoners and millions of dollars were eventually narrowed to three jailed militants: Masood Azhar, Ahmed Omar Saeed Sheikh, and Mushtaq Ahmed Zargar. Inside the aircraft, passengers endured inhumane conditions: little food, freezing nights, mock executions, and constant psychological pressure. Despite this, the crew showed remarkable courage. Captain Sharan kept calm under duress, even engaging the hijackers in small talk to reduce tensions, while flight attendants worked tirelessly to comfort terrified passengers.

THE RESOLUTION

On 31 December 1999, the Indian government reluctantly agreed to release the three militants in exchange for the hostages' freedom. While the deal ended the crisis, its consequences were long-lasting. Masood Azhar later founded the terror group Jaish-e-Mohammed, responsible for several deadly attacks in India, including the 2019 Pulwama bombing.

AVIATION SECURITY TRANSFORMED

The Kandahar hijacking became a turning point for aviation security in India. Airport screening and baggage checks were overhauled, sky marshals were introduced on sensitive routes, and crisis management protocols were tightened.

Globally, the IC-814 incident was studied alongside other major hijackings, contributing to stricter international standards—later reinforced in the aftermath of 9/11.
When you've decided on your cover story, come up with a list of topics for your feature articles. This can range from interviews, product reviews, human interest pieces, and even lists. Think about what your audience would be interested in and get writing! Again, choose engaging photos and graphics to accompany your words, as these also help catch your audience's eye.

After writing all your articles and adding them to your layout, list down all the titles to set up your table of contents. You can add a brief description for each article or keep it simple and paste the feature titles on the page. Don't forget your page numbers too!

Finally, design your back page. Most magazines feature a full-page advertisement.

Twenty-five years later, the IC-814 hijacking remains one of the most infamous crises in South Asian aviation history. For aviation professionals, it stands as a stark reminder of the importance of preparedness, decisive action, and international cooperation in handling airborne emergencies.

It was more than just a hijacking; it was a test of leadership, diplomacy, and resilience—one that reshaped the trajectory of aviation security in India and beyond.

INDUSTRIAL VISIT

VISIT ATC

We recently had the opportunity to visit the Trivandrum airport, and was thrilled to learn about the inner workings of air traffic control. It begins with providing a temporary pass by **Bureau of Civil Aviation BCAS)** followed by a familiarization session in the tower building and it start with,

AERODROME BRIEFING

The officer explained that Trivandrum airport is a Class D airspace, with two runways: 14 and 32, vertical measuring 4600 feet long. I learn that the airport doesn't have a ground control, and the tower handles these responsibilities.

TOWER VISIT

We observed the flight plans of departing and arriving aircraft, and the officers demonstrated how ground clearance is given to pilots and how they respond. We also saw the hold shot, and go-around procedures, as well as the primary radar and secondary surveillance radar systems.

MET OFFICE

In the met office, the officers explained how they track cyclones and other weather patterns using computer systems. They also briefed us on runway checks, which are conducted every two months, and involve monitoring the number of takeoffs and landings.

NAVIGATION SERVER ROOM

Next, we visited the navigation server room, where we learned about the systems that support air traffic control operations. The officers explained the working principles of DME (Distance Measuring Equipment), VOR (VHF Omnidirectional Range), and ILS (Instrument Landing System). These systems provide critical navigation data to pilots, enabling safe and efficient flight operations.

The server room is the heart of the airport's communication and navigation infrastructure. We saw the network systems that support the airport's operations, including the ATC systems, flight information systems, and weather forecasting systems.

A PEAK INTO THE EVENING SHIFT

TRIVANDRUM DOMESTIC AIRPORT

The officers explained that the server room is equipped with redundant systems and backup power supplies to ensure continuous operation, even in the event of a power failure.

The navigation systems team is responsible for maintaining and upgrading the airport's navigation infrastructure, including the **DME, VOR**, and **ILS** systems. They work closely with the ATC team to ensure seamless integration of navigation and communication systems.

Overall, the visit to Trivandrum Domestic airport was an eye-opening experience, and gained a deeper understanding of the complexities involved in air traffic control.

The Aviation Ace

26/05/2026

GROOMING SESSION

A Man of Many Wings-The Multi-Talent Maestro of Aviation

Licensed to Excel

> ***"A Profile of Joey Joseph"***

Our institution was privileged to host renowned aviation specialist Joey Joseph, who shared his wealth of knowledge and experience with us. With an impressive array of licenses and certifications, Joey is a true master of his craft.

A holder of the prestigious Airline Transport Pilot License (AMELIR) and Commercial Pilot License (ASELIR), Joey's expertise extends to being a certified Flight Instructor (CFI, CFII, and MEI) and Ground Instructor (IGI). His repertoire also includes a Flight Engineer License, with type ratings on turbo jet-powered Boeing 747-100-200-300 SP Rated Airframe and Power Plant Mechanic License.

Joey's impressive list of aircraft type ratings includes the ATR 42, ATR 72, Boeing 737, B-747-400, B-757, B-767, BE 300, BE 1900, CE 560, ERJ 170, and ERJ 190. He also holds the license of G-IV.

During his engaging session with us, he shared insights into the world of aviation, delving into the intricacies of aircraft engines and sharing fascinating anecdotes from his childhood that sparked his passion for flying. He spoke about the driving forces behind his remarkable achievements, emphasizing the importance of consistency and reliability.

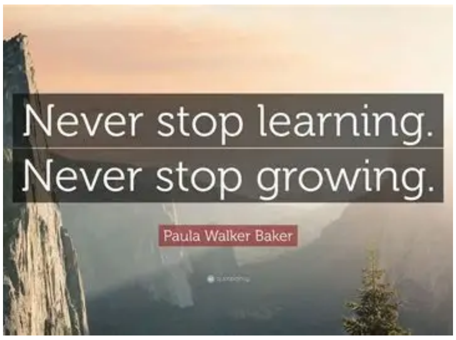
NANDANA SUNDARESH

WHY PILOTS NEVER STOP LEARNING

In aviation, learning is never a stage — it's an ongoing process that characterizes all phases of a pilot's career. From the initial flight lesson through flying sophisticated aircraft, there's always something new to learn, something to comprehend, or something to master.

The aviation atmosphere is forever dynamic — new protocols, new avionics, changing weather, and developing air traffic systems all require pilots to remain vigilant and responsive at all times. Each flight is a lesson. It may be a technical nuance in the performance of aircraft, an improved technique in communicating with ATC, or the learning experience of coping with adverse weather. Even seasoned captains invest hours in simulator training, reading about actual incidents and improving their technique. Complacency is risky in aviation — that's why discipline, accuracy, and practice are always in a pilot's thought process

Aviation has been transformed by modern technology. Glass cockpits, GPS, and automated systems increase efficiency, but at the cost of needing pilots to comprehend intricate systems in depth and react immediately in case of automation failure. An authentic aviator tempers faith in technology with self assurance to intervene manually when necessary. In addition to technical skills, aviation also involves human factors — collaboration, communication, and making decisions under stress. A pilot has to be able to think clearly, remain calm, and direct well, even in difficult circumstances



It isn't just flying. Ground school, simulator training, recurrent inspections, and emergency procedures are all part of a pilot's training. Every exercise has the goal of preparing aviators for unusual but life-critical situations so they can react appropriately even in extreme conditions. These exercises condition judgment, toughness, and the capacity for making decisions in an instant — the hallmarks of professionalism in flight

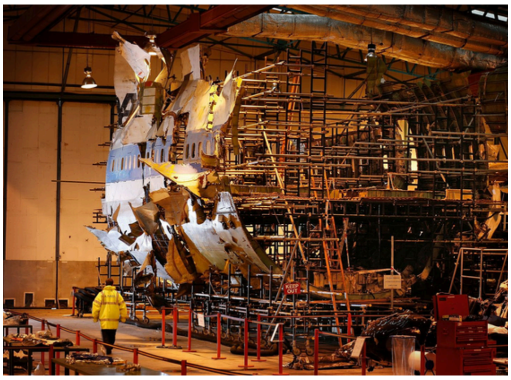
Challenges are an integral part of every pilot's career. Night flights, long-distance operations, and tricky weather conditions push mental as well as physical endurance to the limits. Pilots learn to adjust to fatigue, cope with stress, and have a keen sense of detail. Overcoming challenges is part of what makes the job so fulfilling, and why lifelong learning is mandatory. Looking to the future, the aviation sector is changing fast. New technologies such as electric airplanes, AI-driven flight management, and green fuel alternatives will reshape flying. Pilots need to be lifelong learners in order to stay ahead, merging old skills with new technology. Adapting to change while holding core values of safety and discipline is the key to success in this dynamic profession.

The finest pilots are also students for life. They remain curious, humble, and dedicated to development. Each flight, each debriefing, and each challenge builds their professionalism. Ultimately, flying an aircraft has nothing to do with being a pilot — it's about getting better at yourself, learning every day, and becoming better with each departure

"REMEMBER, YOU FLY AN AIRPLANE WITH YOUR HEAD, NOT YOUR HANDS AND FEET." - BEVO HOWARD

The Lockerbie Disaster

A Change in Aviation Security



Pan Am Flight 103"

On December 21, 1988, Pan Am flight 103 (a Boeing 747-121), which operated from London Heathrow to New York JFK, exploded over Lockerbie, Scotland.

The plane was destroyed by an explosive device that had been put inside the cargo hold of the plane. All 259 people onboard the aircraft (including passengers and crew) died, as well as 11 people on the ground. The event led to vast changes in aviation security across the world.

CHRONOLOGY OF EVENTS

At about 19:03 GMT, while at cruising altitude of 31,000 feet, an explosion occurred in the forward cargo compartment of the aircraft. This caused the cabin to depressurize, and the aircraft broke apart in the sky.The wreckage was distributed widely, with large pieces landing in and around Lockerbie. The aircraft was lost from radar at that point and shortly thereafter, emergency services began arriving to assist with the incident

INVESTIGATION AND FINDINGS

The investigation was carried out by the Air Accidents Investigation Branch (AAIB) cooperating with the Scottish authorities and United States Federal Agencies. It was established that the aircraft was destroyed by a terrorist bomb.

THE MAIN FINDINGS WERE:

- The explosive device had been concealed within a Toshiba cassette player.
- The device was implanted in an unaccompanied suitcase that originated in Malta, was transferred through Frankfurt, and was loaded on the flight at London Heathrow.
- There was extensive forensic examination evidence linking the attack to individuals involved with the Libyan intelligence service.
- In 2001, Abdelbaset al-Megrahi, a former Libyan intelligence service officer, was convicted of the bombing in a Scottish court sitting in the Netherlands. Libya subsequently accepted responsibility for the bombing and paid compensation to the victims' familie

BLACKMAIL WON LOCKERBIE RELEASE.

TERROR ATTACKS THAT SHOCKED BRITAIN

In December 1988 a bomb exploded on a Pam Am plane over Lockerbie in Scotland. Almost immediately investigators and journalists pointed the finger at Syria. The bombing had been done, they said, in *revenge for the Americans shooting down an Iranian airliner in the Gulf* a few months before
- Adam Curtis, Hypernormalisation, BBC 2016

The Lockerbie bombing: Jim Swire's pursuit of justice

The one man refused to let the victims – including his daughter Flora – go without justice.

In order to demonstrate the weakness of airport security, and the lack of improvement following the disaster, Jim created a fake bomb and took it with him on a flight.
The bomb he made was created with confectionary marzipan – substituting Semtex – and a Toshiba radio cassette player. He took this fake bomb on a British Airways flight that travelled from Heathrow airport in London to JFK airport in New York. After this initial flight, he then brought his fake bomb with him on a flight from JFK to Boston, successfully showing just how lax airport security still was at the time.

IMPACT ON AVIATION SECURITY

The Lockerbie disaster prompted major changes to the international protocols for aviation security. The measures that were introduced post-Lockerbie include: Passenger-baggage reconciliation: verifying that there is no unaccompanied baggage loaded. Improved detection and screening technologies for explosives carried out at airports. Enhanced cooperation in aviation intelligence and counter-terrorism both between countries and specific government agencies. These measures laid the groundwork for many of the security standards that ICAO and national aviation authorities are currently implementing across nearly all countries.

CONCLUSION

The Lockerbie disaster underscored the critical importance of vigilance, intelligence, and due diligence in today's aviation security operations.Although the cause of the incident was the intentional actions of terrorists, rather than a failure of operations, it brought about reform that informs, and in some cases shapes, practices to improve the safety and security of passengers today.It serves as a legacy that aviation safety does not depend solely on regulations pertaining to aircraft design and operation, but also on efficiency of the security systems in place that span internationally

Oman behinds work on advanced air mobility master plan

JEBIN GEORGY KOSHY

Oman's Ministry of Transport, Communications and Information Technology (MTCIT) has issued a tender for a consultancy study to develop the national Advanced Air Mobility (AAM) Master Plan. The selected consultancy will support the MTCIT and the National Steering Committee in formulating and implementing Oman's AAM Strategy, addressing eight integrated components across regulatory, institutional, infrastructure, economic, and social dimensions. The deadline for bid registration is November 23, 2025, with final bid submissions due December 15, 2025.

This initiative aligns with the National Aviation Strategy 2040, which aims to modernize the aviation sector, promote innovation, and advance sustainability through the adoption of emerging technologies. Oman's momentum in AAM development is further reflected in the recent MoU between the CAA, MTCIT, and Odys Aviation to establish an AAM Proof of Concept Program. The program will showcase Odys Aviation's "Laila" hybrid-electric VTOL aircraft, with pilot operations scheduled to begin in early 2026.

WHAT IS AAM?

Advanced Air Mobility refers to a new generation of air transportation systems using electric or hybrid-electric aircraft, including autonomous or remotely piloted eVTOL platforms. These systems offer efficient, flexible, and potentially more sustainable mobility solutions for urban and regional travel, ranging from air-taxi services to critical deliveries in remote locations.

T S GHANASYAM NARAYANAN

WHY INDIA STRUGGLES Flight Training Organizations

Despite Rapid Aviation Growth, Systemic Challenges Hinder Pilot Production

India stands as one of the world's fastest-growing aviation markets, with passenger traffic soaring and airlines placing record orders for thousands of new aircraft. The nation's commercial aviation sector requires an estimated 35,000 to 40,000 new pilots over the next decade to sustain this remarkable expansion. Yet behind the optimism lies a troubling reality: India's Flight Training Organizations struggle to meet this surging demand, forcing thousands of aspiring pilots to seek training abroad and threatening the industry's long-term sustainability. The recent rankings released by the Directorate General of Civil Aviation in October 2025 delivered a stark wake-up call—not a single Indian FTO achieved an A+ or A rating, with 22 institutions receiving C grades (below 50%) and only 13 earning B rankings.

Even the government's flagship Indira Gandhi Rashtriya Uran Akademi landed in Category C, exposing systemic weaknesses that extend far beyond individual institutions.

LIMITED TRAINING CAPACITY AND INFRASTRUCTURE GAPS

India operates approximately 35 to 40 DGCA-approved Flying Training Organizations—a number woefully inadequate for a nation requiring 1,000 to 1,200 new pilots annually. This capacity constraint creates extensive waiting lists, with students often experiencing training delays stretching into years rather than months. Many FTOs operate with just three to four training aircraft while managing over a hundred students simultaneously, leading to severe bottlenecks in flight hour accumulation.

The infrastructure challenge extends beyond aircraft numbers. Training facilities across India suffer from outdated equipment, with many schools still relying on Cessna 152 aircraft —the last of which rolled off production lines in the 1980s.

The DGCA rankings emphasized that operational aspects, including student-to aircraft ratios, student-to-instructor ratios, fleet size, and availability of ground schools and simulators, account for 40% of the evaluation criteria.

Indian FTOs consistently underperform in these critical areas, with inadequate simulator access and aging training fleets hampering both efficiency and safety.

CHRONIC INSTRUCTOR SHORTAGE

Flight instructor retention represents one of the aviation training sector's most persistent challenges.

Experienced instructors routinely leave FTOs for airline positions offering significantly better compensation and career advancement opportunities. This exodus creates a vicious cycle: remaining instructors face heavier workloads, training quality deteriorates, and student progression slows dramatically. The shortage has become so acute that the Royal Air Force recently announced plans to utilize Indian Air Force instructors to train British pilots—a historic reversal highlighting both the caliber of India's military aviation training and the severe instructor shortages plaguing Western air forces. Yet ironically, India's civilian FTO sector cannot retain sufficient qualified instructors despite this demonstrated expertise. The DGCA rankings assign a 20% weighting to safety standards, including accident and incident rates over the preceding 12 months. Several FTOs have experienced fatal crashes and serious incidents attributed to inadequate maintenance and potential instructor oversight issues, prompting the aviation regulator to suspend operational approvals for non-compliant organizations

WEATHER, AIRSPACE, AND OPERATIONAL CONSTRAINTS

Geographic and meteorological factors significantly impact training efficiency across India. Monsoon seasons render large portions of the country unsuitable for training flights for extended periods, with poor visibility and adverse weather grounding student pilots for weeks at a stretch. Unlike countries such as the United States or Australia, where favorable year-round weather enables consistent training schedules, Indian FTOs must compress their training windows into enables consistent training schedules, Indian FTOs must compress their training windows into limited seasonal periods. Heavy air traffic congestion around major metropolitan airports further restricts available training airspace.

Student pilots require extensive practice time for circuit training, navigation exercises, and emergency procedures, yet growing commercial traffic increasingly limits access to practice areas. This congestion forces training aircraft to operate from smaller, more remote airfields— adding travel time and logistical complexity to already stretched training program

MAINTENANCE CHALLENGES AND SPARE PARTS SCARCITY

Aircraft maintenance represents a critical vulnerability for Indian FTOs. India lacks domestic aircraft manufacturers for training aircraft, requiring every component and spare part to be imported. Until recently, even aviation gasoline had to be imported, significantly driving up operational costs. When maintenance issues arise, the absence of readily available spare parts can ground training fleets for weeks or months. Recent regulatory action underscores these maintenance concerns. In October 2025, the DGCA fined IndiGo Airlines ₹40 lakh for using uncertified flight simulators to train approximately 1,700 pilots for critical airports like Calicut, Leh, and Kathmandu. The investigation revealed that maintenance training organizations themselves face quality control challenges, with one Bhopal based aircraft maintenance organization suspended after critical maintenance deficiencies were discovered in an engine overhaul that preceded a fatal crash. The DGCA audit of Alchemist Aviation following a tragic Cessna 152 crash in August 2024 found "several serious deficiencies and non-compliances of regulatory provisions," resulting in the suspension of the FTO's operational approval. These incidents highlight systemic maintenance and oversight failures that compromise both training efficiency and safety.

HIGH COSTS AND EXTENDED TRAINING DURATION

Flight training in India costs between ₹40 lakh and ₹60 lakh for a Commercial Pilot License, with type rating adding another ₹15 lakh to ₹20 lakh. Airline-sponsored cadet programs can exceed ₹1 crore. These substantial costs become even more burdensome when training extends beyond projected timelines due to aircraft availability, weather delays, instructor shortages, and maintenance groundings. By contrast, training in countries like the United States, Canada, the Philippines, or Serbia often proves faster and .

sometimes more cost-effective despite international travel and accommodation expenses. Better weather conditions, higher aircraft availability, more instructors, and streamlined regulatory processes enable students to complete training more efficiently Consequently, thousands of Indian students opt for overseas training annually, representing a significant loss of revenue and talent development for the domestic aviation representing a significant loss of revenue and talent development for the domestic aviation sector

REGULATORY BOTTLENECKS AND BUREAUCRATIC DELAYS

The DGCA's five-phase certification process for new FTOs creates substantial entry barriers for organizations seeking to expand training capacity. Applications can languish for years in various approval stages, with bureaucratic requirements and slow processing times hindering rapid capacity expansion. As of August 2024, parliamentary questions revealed that Jharkhand Flying Institute's application, submitted in April 2023, remained stuck in Phase 3 of the certification process more than a year later. Beyond initial approvals, ongoing regulatory compliance demands create operational burdens for existing FTOs. The DGCA's ranking system, while intended to improve transparency and accountability, has drawn criticism from industry operators who argue that the regulatory body responsible for compliance enforcement should not simultaneously

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evaluate and rank the institutions it oversees. This dual role potentially creates conflicts of interest and unequal treatment. Compounding these regulatory challenges, the DGCA itself faces severe staffing shortages. A Parliamentary Standing Committee report in August 2025 highlighted that nearly 50% of the DGCA's 1,063 sanctioned posts remain vacant—only 553 positions are currently filled. This staffing crisis hampers the regulator's ability to provide timely approvals, conduct thorough oversight, and support the industry's rapid expansion. The committee described this deficit as "a critical vulnerability that exists at the very heart of India's safety oversight system."

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THE PATH FORWARD:

Modernization and Reform Addressing India's FTO challenges requires comprehensive, coordinated action across multiple fronts. The aviation industry must prioritize infrastructure investment,

expanding training fleets with modern aircraft and simulators while developing additional training facilities in weather favorable regions. Government support for domestic aircraft manufacturing or assembly could reduce dependence on imported training aircraft and spare parts, lowering costs and improving maintenance turnaround times. Instructor retention demands urgent attention through competitive compensation packages, professional development opportunities, and career pathways that make teaching roles attractive long-term options rather than brief stepping stones to airline positions. The introduction of airline-sponsored cadet programs, while potentially diverting students from independent FTOs, also presents partnership opportunities where airlines invest in upgrading existing facilities rather than building entirely new infrastructure. Regulatory reform must streamline the FTO approval process without compromising safety standards. Creating a dedicated DGCA cadre, as proposed following recent aviation incidents, would address staffing shortages and improve regulatory efficiency. Simplifying compliance requirements while maintaining rigorous safety oversight could enable faster capacity expansion to meet growing demand.The recent DGCA rankings, despite their controversial aspects, provide valuable transparency for prospective students and create accountability pressure for underperforming institutions. Category C FTOs face formal notices for self-analysis and improvement, with stricter monitoring and potential suspension for continued non-compliance. This accountability framework, if implemented consistently, could drive meaningful quality improvements across the sector. India's aviation sector stands at a crossroads The nation possesses enormous potential—a vast pool of motivated youth .growing economic prosperity, expanding airline fleets, and increasing connectivity needs. Yet without immediate, sustained improvements in flight training infrastructure, instructor availability, maintenance capabilities, and regulatory efficiency,

India will continue losing talent and revenue to overseas training programs while struggling to produce the pilots its airlines desperately need. The challenge is clear, and the solutions are known. What remains uncertain is whether India's aviation ecosystem—encompassing government regulators, training organizations, airlines, and educational institutions—can summon the collective will and coordination necessary to transform these struggling Flight Training Organizations into world-class institutions capable of supporting the nation's aviation ambitions