# IFALPA Positions on Implementation of the Future of Air Traffic Operations

5th Edition
26POS11
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*Note: This paper supersedes 21POS06*

## 1. Overview

The IFALPA Future Air Traffic Operations (IFATO) document is guidance material for its representatives and member associations to help bridge the current work program of the committees with projected future topics that will affect our technical work. It should reside between the current work in ICAO working groups and panels and the very high-level 18POS03 June 2018 IFALPA Vision for the Future of Air Navigation and Weather Information document. Where possible, the IFATO will refer to policies and positions of the various committees already approved or under discussion. If no discussion or guidance is available, it will state that as well and serve as a placeholder for potential further development. It is asked that the affected IFALPA committees review this for currency and make edits as needed. A secondary purpose of this is for new committee members and representatives to have an overview reference of the ongoing work and a baseline to gain familiarity with their topics. It will serve as a compendium of our corporate knowledge to share amongst ourselves.

Any statements in **bold font** are IFALPA positions for this document. This means that, as yet, there is no current official IFALPA policy statement in IFALPA Annexes or other IFALPA Documents, but it should be accepted as the current IFALPA position regarding the applicable subject in this document.

*Note: IFALPA policy relates to the IFALPA Annexes and PANS documents.*

### 1.1 IFALPA supports global harmonization of technologies and procedures.

### 1.2 There is a need for the IFALPA representatives to continue working in the various relevant Panels and Working Groups, for the Federation to receive guidance on the individual performance requirements required to achieve a total system level.

## 2. Enabling Technologies

The proposed applications will combine the emerging current technologies in Communications, Navigation and Surveillance (CNS) with speed and altitude modifications to perform time-based operations (TBO). Before that step is implemented the CNS technologies must be validated for actual performance criterion. This requires exponentially higher performance levels of all three components of this triad plus the improvement of aircraft operational performance. The development of technology for future changes to the airspace and management is now in the process of being validated and implemented.

The relationship of the CNS-ATM performance requirements and performance is a matrix that must be viewed in a total system basis and how that will affect the various flight operation procedures.

- One region, the North Atlantic (NAT) is leading the way in trialing how these new technologies may affect ~~f~~future flight operations as it seeks to safely increase capacity and services.

- An example of this was the NAT trials that were conducted for the use of Space-Based ADS-B for separation. This project was called Advanced Surveillance-Enhanced Procedural Separation (ASEPS). With the improvements in communications performance and current deployment of ADS-C, SATVOICE, and CPDLC, the trials focused on separation changes and provision of direct control by the Air Navigation Service Provider (ANSP) ATC controllers.

While these technologies are an improvement over previous performance values, there are concerns with some of the implementation proposals as to how the results may be interpreted, affecting the future changes in the Air Traffic Management (ATM) equation.

### 2.1 ATM Change Proposals

**IFALPA has supported the concept of focusing future ATM change proposals based on the performance of Communications, Navigation, Surveillance (CNS) and ATM systems individually as part of a Required Total System Performance (RTSP)**.

Refer to 18POS03 IFALPA Future Vision Document - 2.1.2 One set of Common Procedures Worldwide.

### 2.2 Communications Requirements

Communications performance requirements will need to be faster than the current defined RCP240.

Regarding the question of whether RCP240 is sufficient for all current and planned implementations of data link, the consensus is generally “NO”.

This is because various ANSPs indicated existing implementations or plans for the implementation of data link operations where RCP240 would not be sufficient.

As an example, RCP 240 would not be sufficient for ensuring an acceptable level of CPDLC service as is currently being used/planned to be used in continental airspace.

Due to this deficiency there will be development of a new standard, RCP130.

RCP130 would possibly be used for “ATC Comm” functions i.e. frequency changes, beacon code assignment, vertical clearances, crossing restrictions, route alteration.

IFALPA supports that “time-critical” CPDLC messages should not make use of RCP240 or RCP130 due to the risk of losing separation without ATC intervention. IFALPA should work with authorities to define clear performance standards on the use of where and when CONTINENTAL CPDLC is not acceptable.

#### 2.2.1 Terrestrial (Ground-based) Radios

No specific policy or position has been developed.

### 2.2.2 Space-Based Communications

Satellite Voice Communications (SATVOICE) has been proposed as a primary means of direct controller pilot communications (DCPC), but it does not meet the current required performance requirements.

### 2.2.3 Communications Between The Flight Crew and the Operator

Related Positions:

18POS03 Two-way Communications between the Flight Crew and the Operator and their Operations Centre

**IFALPA does not support SATVOICE as the primary means for DCPC at present**. For SATVOICE communications to replace or augment the current DCPC, the system requires future development of the Human-Machine Interface (HMI) to ensure transparency between flight crews and controllers.

Related Positions:

20POS07 The Use of Satellite Voice Communications (SATVOICE) for Air Traffic Control Operations

## 2.3 Navigation Requirements

Satellite and terrestrial navigation aids continue to proliferate globally. *The European ATM Master Plan post-2020 calls for no ADFs, only a minimum operational network of VORs, and DME networks to be used as a backup for GNSS. New methods to improve satellite performance and reliability are being deployed.*

*For example, the Multi-Constellation Dual Frequency system is under development. SBAS and GBAS are now available. The most common combination remains GPS + GLONASS, followed by GPS + Galileo.*

*Many aircraft receivers also include SBAS, either for higher accuracy or integrity.*

*Regional systems, such as Japan's Quasi-Zenith Satellite System (QZSS) and India's Indian Regional Navigation Satellite System (IRNSS), are also becoming more common.*

- *The new GNSS constellations like Galileo and BeiDou have supported open multi-frequency signals from their inception, thus helping drive the introduction of dual and triple-frequency commercial receivers.*

Related Positions/Bulletins/Briefing Leaflets:

23ADOBL01 Effects of Manipulated GNSS Signals on Aircraft and Mitigation Measures

23SAB08 GPS Spoofing

25POS07 Disruption of GNSS Signals

### 2.3.1 IRS/GNSS “Tight” integration

IFALPA supports IRS/GNSS “tight” integration.

In Loose Integration, the position and velocity are blended with the INS (Inertial Navigation System) navigation solution. In Tight Integration, GNSS raw measurements are processed along with inertial sensor measurements to estimate Position, Velocity & Time (PVT). The main advantage of tight integration is the ability to continue updating the Hybrid Navigation Solution, even in areas with poor GNSS coverage.

### 2.3.2 Assured Position, Navigation and Timing (A-PNT)

These systems help eliminate a “corrupt” GNSS system signal. Multiple system options are available.

2.3.2.1 IFALPA supports multi-constellation avionics and encourages further developments of systems such as Assured Position, Navigation and Timing (A-PNT).

## 2.4 Development of security systems

2.4.1 IFALPA supports the continued development of security systems that prevent jamming and spoofing of GNSS and other critical NAVAIDs and Avionics.

## 2.5 Surveillance Requirements

There is a global requirement to equip aircraft with ADS-B transponders, however, currently there are Regional exceptions. ADS-B technology enables any equipped receiver to know the position and intent of the sending aircraft.

### 2.5.1 Multilateration (MLAT)

No specific policy or position has been developed.

### 2.5.2 Advanced Surface Movement Guidance and Control (A-SMGCS)

No specific policy or position has been developed.

## 2.6 Enabling Technologies Equipment Requirements

### 2.6.1 System Wide Information Management (SWIM)

No specific policy or position has been developed.

### 2.6.2 Automatic Dependent Surveillance- Contract (ADS-C)

No specific policy or position has been developed.

## 3. Aircraft Equipage and Performance

Future flight operations require both new equipage and software changes to safely implement the changes. This includes the introduction of new aircraft, new cockpit displays, modifications to aircraft, and new procedures.

Related Positions:

16POS05 Runway Overrun Awareness and Alerting System (ROAAS)

16POS06 Automated V1

17POS09 Head-Up Display (HUD) & Vision Systems

18POS10 Electronic Flight Bags

### 3.1 Onboard Flight Management Systems

- Enhancements to the weather model in the Flight Management System;

- Improvements to the FMS to improve the ability to meet time constraints;

> **IFALPA supports the upload of route and route amendments directly into the FMS (provided the security of the data link is secured), particularly regarding half-degree waypoints.**
>
> Related Positions/Briefing Leaflets:
>
> 17SECBL01 Cyber Threats
>
> 16POS08 Cyber Threats

### 3.2 Controller Pilot Data Link Communications (CPDLC)

Related Policy/Bulletins:

IFALPA PANS-ATM, Chapter 14 Controller Pilot Data Link Communications (CPDLC)

11SAB11 Clarification of CPDLC clearances

17SAB12 Potential CPDLC Message Delivery Latency

08SAB19 Eurocontrol warn of CPDLC logon errors

25POS15 Phraseology Related to the Transfer of Control and Communication

### 3.3 Human Machine Interface

No specific policy or position has been developed.

## 3.4 Human in the Loop

### 3.4.1 Single Pilot/Augmented Operations

Related Positions:

20POS04 The Dangers of Reduced Crew Operations

## 3.5 Qualifications, Certification and Training

No specific policy or position has been developed.

# 4. ATM System Requirements

## 4.1 Air Traffic Control (ATC) Requirements

"In the future, the demand for air traffic services will not only increase but also will likely shift from scheduled operations towards more unscheduled operations for air taxi, charter, fractional ownership, and on-demand small low-cost aircraft. As the metropolitan areas continue to grow, the satellite airports around major hubs will provide a wide range of flight options for people to fly between their homes and places of business or pleasure" .[1]

## 4.2 Airspace Requirements

### 4.2.1 System Wide Information Management (SWIM), Airport Collaborative Decision Making (A-CDM)

No specific policy or position has been developed.

### 4.2.2 Constant Climb Operations (CCO)

No specific policy or position has been developed.

### 4.2.3 Constant Descent Operations (CDO).

CDO allow ATC and pilots to plan and perform a descent, approach and landing, according to set performance standards. Implementing CDO should include airspace design to cater for an optimized descent and transparency between ATC sectors on the actual traffic situation. A name

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[1] https://www.mitre.org/sites/default/files/pdf/mohleji_2020.pdf

change from CDO to “Optimised Descent Operations” (ODO) has been proposed, which IFALPA does not oppose provided the performance requirements remain unchanged.

No specific policy or position has been developed.

#### 4.2.4 ATS Interfacility Data Communication (AIDC)

No specific policy or position has been developed.

#### 4.2.5 Airspace Changes

No specific policy or position has been developed.

#### 4.2.6 Remote Towers

Related Policy:

IFALPA PANS-ATM, Chapter 7.1.X Remote Aerodrome and Virtual Control

#### 4.2.7 Sectorless ATM

Present ATM principles in area control are based on a controller being responsible for a given airspace. Once the aircraft passes the sector boundary, it is handed over to the next controller. Sectorless ATM aims to remove the boundaries within a bigger volume of airspace (e.g. the whole area of responsibility of one ANSP) and assigns a certain number of aircraft to one controller. Consequently, the controller has to separate these aircraft from traffic, which can be under another controller’s responsibility and the knowledge required about particularities of certain areas is increased. Automation and controller tools are essential for this.

This concept is researched e.g. by the German Aerospace Centre (DLR), the developments should be closely monitored by IFALPA.

No specific policy or position has been developed.

### 4.3 Separation Requirement Changes

"Uncleared Weather Deviation Contingency Procedures"

Currently proposed contingency procedures requires the affected aircraft to vary its altitude by 300’. Current data on Height Monitoring Systems reveals that aircraft altimetry isn't as accurate as we once assumed. In that airspace, every flight is self-directing and without ACAS/TCAS for situational awareness, lateral separation drifts further away from the minimum collision risk standard of 10x-9. Even with ADS-B surveillance, ground control cannot provide "vectors" for traffic separation.

**IFALPA's opposes vectoring of traffic in procedural/oceanic airspace unless communication meets DCPC (direct controller pilot communication) standards.**

Related policy:

IFALPA PANS-ATM Chapter 5.4.1 Lateral Separation

IFALPA PANS-ATM Chapter 5.4.2 Longitudinal Separation

IFALPA PANS-ATM Chapter 5.11 Reduction in Separation Minima

## 4.4 Wake Turbulence Requirement Changes

Wake turbulence separation standards should ensure that aircraft are not exposed to known wake turbulence caused by preceding aircraft (i.e. “No Encounter” Policy).

Present wake turbulence separation standards are only published for limited phases of flight (take off, departure, arrival and landing). However, recent incidents and accidents, especially with heavier aircraft (i.e. stronger wakes), reveal that wake encounters in cruise flight can cause serious problems. Standards must be established to prevent known wake turbulence penetration in cruise flight taking into account the environmental and physical effects of wakes not only in the lower (near ground) environment but also in the cruise phases of the atmosphere. A clear difference must be developed between naturally occurring turbulences, that are also hazardous to airplanes, and artificial occurring turbulence, which are often more intense.

Related policy:

IFALPA PANS-ATM Chapter 7.4.1.5.2 Wake Turbulence and Jet Blast Hazards

IFALPA PANS-ATM Chapter 8.3 Reduced Wake Turbulence Separation Minima

## 4.5 Safety Nets

### 4.5.1 Airborne Collision Avoidance System- X (ACAS-X)

ACAS-X is a new approach to airborne collision avoidance and consists of at least three versions: ACAS-Xa is supposed to succeed and act like TCAS II which has demonstrated its value in preventing mid-air collisions on numerous occasions. ACAS-Xo is developed for particular operations, like closely spaced parallel approaches and ACAS-Xu is designed for UAS. Although the ACAS-X indications and types of resolution advisories will be the same as for TCAS II, a different logic is used to determine the activation and selection of any avoidance manoeuvre. This leads to several changes, e.g. in the predicted miss-distance, the chance for reversal or crossing RAs. Because of these differences, IFALPA has commented to ICAO that there should be training requirements stipulated when pilots transition to ACAS-X, including training on the new options such as ACAS-Xo.

No specific policy or position has been developed on ACAS-X but a position exists for “Auto ACAS” (14POS29).

#### 4.5.2 Conflict Alerts (such as STCA) and conflict detection tools

Conflict Alerts, e.g. Short-Term Conflict Alert (STCA), are ground-based safety nets intended to alert the controller of a potential or actual infringement of normal separation minima. While these systems represent a last line of defence, other conflict prediction tools exist to assist controllers in the detection of conflicts or potential airspace infringement. Depending on the look ahead time and whether the system continuously monitors traffic or is used to probe a clearance, different systems are available: Medium Term Conflict Detection (MTCD), Probe (What-If) Controller Tool or Tactical Controller Tool. All these tools are to be considered as supporting means rather than a safety net and are subject to the same Human Factor issues as flight deck automation (over-reliance, complacency, etc.).

No specific policy or position has been developed.

#### 4.5.3 Area Proximity Warning (APW)

This is a ground based safety net which uses surveillance data and flight path prediction to alert the controller when an aircraft is predicted to or actually infringes a notified airspace, such as controlled airspace, danger areas, prohibited areas or restricted areas.

No specific policy or position has been developed.

#### 4.5.4 Compliance Monitoring Aids

These are ground based tools monitoring for compliance between planned and executed flight trajectory and providing alerts to the controller in case of discrepancy. Such alerts may be triggered through Route Adherence Monitoring (RAM), Cleared Level Adherence Monitoring (CLAM) or Approach/Departure Path Monitoring (refer to 4.5.6).

No specific policy or position has been developed.

#### 4.5.5 Minimum Safe Altitude Warning (MSAW)

A ground-based Safety Net intended to warn the controller about increased risk of controlled flight into terrain accidents by generating, in a timely manner, an alert of aircraft proximity to terrain or obstacles.

No specific policy or position has been developed.

#### 4.5.6 Approach/Departure Path Monitoring

Approach Path Monitor (APM) is a ground-based system intended to warn the controller about aircraft proximity to terrain or obstacles during final approach by generating a timely alert. The same principle is developed for departure monitoring to warn about insufficient climb performance.

No specific policy or position has been developed.

#### 4.5.7 Barometric Pressure Setting Advisory Tool (BAT)

This is a tool developed by UK ANSP NATS to identify significant QNH setting errors based on downlinked Mode S Barometric Pressure Setting (BPS) data.

No specific policy or position has been developed.

### 4.5.8 Runway Incursion Monitoring and Conflict Alert System (RIMCAS)

This term describes different functions based on an Advanced Surface Movement Guidance & Control System (A-SMGCS). A Runway Incursion Monitoring and Conflict Alert System (RIMCAS) can monitor the conformance of procedures and clearances (e.g. correct taxi route or approach to parallel runways), detect conflicts on runways or taxiways (e.g. simultaneous clearances for the same runway) and unauthorized crossings of stop bars or holding points.

No specific policy or position has been developed.

### *4.5.9 Runway Overrun Awareness and Alerting Systems (ROAAS)*

IFALPA supports the development and installation of a Runway Overrun Awareness and Alerting System (ROAAS).

Related Positions:

25POS20 Runway Overrun Awareness and Alerting Systems (ROAAS)

### 4.5.10 Lost Track Warning

Such a warning is intended to alert a controller of an aircraft track which has disappeared from the radar screen. As more and more ANSPs rely solely on secondary radar or ADS-B, a failed, falsely operated or deliberately disabled transponder can render an aircraft untraceable.

No specific policy or position has been developed.

### 4.5.11 Similar Call sign Advisory

IFALPA supports alpha-numerical flight identifications and callsign similarity software tools to reduce the likelihood of callsign confusion.

Related Positions:

16POS07 Similar Call Signs

#### 4.5.12 Safety Nets Phraseology

Safety Nets are designed as a last line of defense and often require a quick reaction. The necessary manoeuvres can be challenging for the flight crew and contradict the controller's intentions. Therefore, it is mutually important to understand the severity and implications of a situation which triggered a Safety Net. Unambiguous and easy phraseology combined with guidance for a given contingency is required but not yet available, except for TCAS.

Related Policy:

IFALPA PANS-ATM, Chapter 15.7 Other ATC Contingency Procedures

## 4.6 Aerodrome Requirements

### 4.6.1 SOLAR Panels

Related Positions:

18POS08 Solar Panel Installations at Airports

### 4.6.2 5G Interference

Related Bulletins:

22SAB01 Maintaining Safe Operations with Radar Altimeter Interference from 5G

### 4.6.3 Frequency Spectrum congestion

No specific policy or position has been developed.

### 4.6.4 GBAS/SBAS capability

No specific policy or position has been developed.

### 4.6.5 Autonomous Runway Incursion Warning System (ARIWS)

An Autonomous Runway Incursion Warning System (ARIWS) is a system which provides autonomous detection of a potential incursion or the occupancy of an active runway and a direct warning to a flight crew or a vehicle operator (ICAO). Runway Status Lights (RWSL) are part of such a system. No specific policy or position has been developed for ARIWS yet.

Related Briefing Leaflets:

16AGEBL01 Runway Status Lights (RWSL)

## 4.7 MET requirements

**4.7.1** MET is a key enabler in the ICAO Global Air Navigation Plan (GANP). A multitude of services are needed, as described in the Basic Building Block Document (https://www4.icao.int/ganpportal/BBB) and in, more detail, in the documents describing key elements of the Aviation System Block Upgrade (ASBU) under the AMET, Aviation Meteorology, header. (*https://www4.icao.int/ganpportal/ASBU*)

Practical aspects of MET are, by arrangement, handled by the WMO. The WMO Long Term Plan for Aeronautical Meteorology (*https://library.wmo.int/doc_num.php?explnum_id=9809*) contains key statements:

> Within ICAO's GANP it is emphasized that it is not the case that all States will need to implement every module within its ASBU methodology.

> There will be a need for alignment between the aeronautical requirements and the meteorological capabilities and a consistent application by all stakeholders.

> Despite the certainty and uncertainty, a common situational awareness of all the meteorological hazards, on all the required spatial and temporal scales that users require, demands a seamless approach to service delivery, thereby ensuring that all the available information (including meteorological information) can be integrated into the safety risk assessments and collaborative decision-making processes of concerned aeronautical users.

An ICAO Meteorology Panel ´White Paper´ of 2018 titles ´Future Aeronautical Meteorological Information Service Delivery´ provides focus areas:

enhanced meteorological information with global coverage for flight planning and enroute operations;

enhanced 4-dimensional information for meteorological hazards of any type; and

enhanced high-resolution 4-dimensional meteorological information for airport and terminal area operations.

The following areas are highlighted:

High Altitude Ice Crystals (HAIC) and airframe icing;

All forms of turbulence;

Significant convection;

Detection and prediction of low-level wind shear and wake vortex;

Low visibility including fog;

Space weather;

Atmospheric aerosols including volcanic ash and potentially other gases;

Observing methods (in-situ and remote sensing) and use of observations, including those from aircraft, other airborne platforms and from space;

Nowcasting and probabilistic forecasts; and

Seasonal (3-6 months ahead) forecasting, plus the consideration of the effects of climate change, mitigating both the influence of aviation on climate change as well as the influence of climate change on aviation.

Numerous research and development programs are being conducted in all fields, around the world.

### 4.7.2 Convective Weather avoidance and contingencies

Weather systems containing convective clouds can pose a danger to aviation. As precise forecasting of the position, strength and temporal development of these systems is beyond the state of the art, provision of real-time information with nowcasts on direction of movement and development trends to the cockpit is a requirement.

An increasing number of aircraft offer such capability, and commercial vendors provide convection info on the EFB. A test campaign by the FAA, and several US airlines has had a positive outcome; details are available in this recorded presentation: https://bit.ly/3bKwPLV

No specific policy or position has been developed.

### 4.7.3 Space Weather monitoring and contingencies

Refer to policy in IFALPA Annex 3, and the article below for more detailed information.

https://www.eurocockpit.be/news/space-wx-icao-radar-screen

### 4.7.4 Contrails

Related Positions:

22POS04 Operational Opportunities to reduce the impact of Contrails and Aircraft-induced Cirrus

## 5. Information Management

### 5.1 Data collection

No specific policy or position has been developed.

### 5.2 Information dissemination

No specific policy or position has been developed.

## 5.3 Data Security, Collection, Protection, and Disposition

Related Positions/Briefing Leaflets:

21POS11 Airborne Image Recorders

18POS19 Closed-Circuit Television (CCTV)

16POS08 Cyber Threats

17SECBL01 Cyber Threats

22POS01 Streaming of Flight Data

23POS27 Use of Flight Recorders

23POS28 Protection of all Cockpit Recordings

## 5.4 Lack of automated data gathering requiring resource-intensive manual manipulation of data

No specific policy or position has been developed.

### 5.5 Safety Data Collection and Sharing

#### 5.5.1 Collection of safety data, its analysis, and its reporting.

Flight operations data downlinked from aircraft and ATC data have expanded exponentially and should be defined for what determines actual “Safety Data” inherent to safety analysis for the various related programs. The affected data should likewise be in a usable format for its analysis for the prevention of safety-related incidents, as well as following the occurrence of one.

**IFALPA advocates a comprehensive and objective collection of safety data, its analysis, and its reporting.**

Related IFALPA Policy and Positions:

Refer to IFALPA policy (Annex 6, 2011): "Until such time that the aviation industry is able to guarantee the protection of flight recorders' data, IFALPA will remain opposed to the transmission of real-time information from the flight recorders to the ground via data-link or other means".

Related Positions:

23POS10 Removal of “causes” in final reports

23AAPBL01 Template Agreement for a Flight Data Analysis Programme (FDAP)

#### 5.5.2 Transparency and sharing in safety case data

**IFALPA advocates transparency in safety case data, as well as the sharing of safety case data with all stakeholders, as defined in ICAO Annex 19. Safety should always be regarded independently of other interests.**

## 6. Flight Operations

### 6.1 Low Visibility operations and limits

Related policy:

IFALPA PANS-ATM Chapter 7.12 Procedures for Low Visibility Operations

## 6.2 RNP Operations

Related Positions/Briefing Leaflets:

*IFALPA PANS-OPS Volume I, Part II Chapter 5 Final Approach*

17POS11 Performance-Based Navigation

15POS13 RNAV Visual Approaches

15ATSBL03 The RNAV Visual

15ADOBL01 Ground Based Augmentation System (GBAS) and GBAS Landing System (GLS)

23ADOBL01 Effects of Manipulated GNSS Signals on Aircraft and Mitigation Measures

## 6.3 GBAS/SBAS Geometric Approaches

Currently, Baro V-Nav Approaches are subject to temperature and pressure errors, which increase the risk.

**IFALPA supports GBAS/SBAS Geometric Approaches as a replacement for Baro V-Nav Approaches.**

Related Policy:

*IFALPA PANS-OPS Volume I, Part II Chapter 5 Final Approach*

## 6.4 Geometric Altitude

IFALPA supports research into a possible future transition from Barometric Altitude to using Geometric Altitude for sub-transition level en-route, and approach operations.

Related Positions:

20POS06 Geometric Altitude

## 6.5 ADS-B-Out

The accuracy, reliability and operating costs of ADS-B-Out enable augmentation or replacement of RADAR in surveillance airspace and allow a higher surveillance value and ATM functionality in non-surveillance airspace.

Related Positions:

19POS17 Use of Transponder-Derived Data

### 6.5.1 IFALPA supports the use of ADS-B-OUT for all aircraft to enhance situational awareness.

6.5.2 IFALPA further support the use of ADS-B by state aircraft in areas where ADS-B-IN will be used.

6.5.3 IFALPA supports the improvement of search-and-rescue operations benefit from accurate ADS-B tracking.

## 6.6 ADS-B-IN Applications

ADS-B-IN refers to air to air data reception of the ADS-B signals and the use of it for other applications in the aircraft. These would require the use of Cockpit Display of Traffic Information (CDTI) technology in the applicable aircraft.

**IFALPA does not support the use of ADS-B-IN applications such as those mentioned in 6.6.4, 6.6.5 and 6.6.9, unless all participating aircraft have approved Cockpit Display of Traffic Information (CDTI) showing all traffic in the area.**

Related Positions:

21POS03 CAVS-CDTI Assisted Visual Separation

### 6.6.1 Participating Aircraft Avionics

### 6.6.2 Traffic Information Services – Broadcast (TIS-B)

TIS-B information is available to aircraft that utilize 978 MHz (UAT), 1090MHz (1090ES) or both. The aircraft must be within coverage of an ADS-B ground station and an FAA radar or multilateration system to receive the target information.

No specific policy or position has been developed.

### 6.6.3 Flight Information Services – Broadcast (FIS-B)

FIS-B is only available to aircraft that can receive data over 978 MHz (UAT). FIS-B automatically transmits a wide range of weather products with a national and regional focus to all equipped aircraft.

No specific policy or position has been developed.

### 6.6.4 Interval Management (IM) Applications

Interval Management uses ADS-B-IN capabilities to precisely manage spacing between aircraft. Interval Management is a component of the future Trajectory Based Operations (TBO) vision, where air traffic controllers may opt to provide IM clearances to flights to have crews manage their spacing intervals relative to other aircraft.

The first phase, Ground-based Interval Management-Spacing (GIM-S), is enabled by automation at air traffic facilities and used as a tool by air traffic controllers for the cruise and arrival phases of flight.

Related Positions:

21POS04 Interval Management

### 6.6.5 In-Trail Procedures (ITP)

The avionics will include cockpit displays, which will show surrounding traffic for situational awareness and provide speed guidance to help flight crews achieve and maintain an interval from a target aircraft and can be used in enroute or terminal airspace.

ITP is an advanced ADS-B-IN application that allows ITP-equipped aircraft to fly more often at optimal or less turbulent flight levels during oceanic flights.

No specific policy or position has been developed.

### 6.6.6 ADS-B-IN Traffic Awareness System (ATAS)

ATAS uses ADS-B-IN to detect and alert pilots to potential traffic conflicts.

The data and processing must be done in an isolated process to ensure the independence of the data and the ACAS functionality must be able to override the ADS-B-IN application use.

**IFALPA would only support the use of ATAS as a separate function from ADS-B-IN spacing functions.**

### 6.6.7 Four-Dimensional Trajectory (4D TRAD)

One of the eventual goals of air traffic management in the future is a concept referred to as 4-Dimensional Trajectory Management (4DTrad). The 4D trajectory of an aircraft consists of the three spatial dimensions plus time as a fourth dimension. This means that any delay is in fact a distortion of the trajectory as much as a level change or a change of the horizontal position. Tactical interventions by air traffic controllers rarely take into account the effect on the trajectory as a whole due to the relatively short look-ahead time.

The implementation of 4D trajectory management is being researched by SESAR (Single European Sky ATM Research) in the EU and NextGen in the US.

The fourth dimension, time (t), is provided either as: a time (HHMMSS) for the aircraft to cross a given point, controlled time over (CTO) which the aircraft and flight crew then meet by using required time of arrival (RTA) function, to reach the point at the instructed time, or a speed instruction (Mach, indicated air speed (IAS), or Mach/IAS combination), which the ground system determines will deliver the aircraft to the point at the desired time.

No specific policy or position has been developed.

### 6.6.8 Time Based Operations (TBO)

TBO is an Air Traffic Management (ATM) method for strategically planning, managing, and optimizing flights throughout the operation by using time-based management, information exchange between air and ground systems, and the aircraft's ability to fly precise paths in time and space.

TBO leverages significant NextGen investments already made in Performance-Based Navigation (PBN), surveillance, communications, and automation systems for decision support, flight data management, and information sharing.

No specific policy or position has been developed

### 6.6.9 CDTI Assisted Visual Separation (CAVS)

CDTI (Cockpit Display of Traffic Information) Assisted Visual Separation is a procedure in which controllers assign, and pilots accept, separation responsibility from another aircraft on a visual approach supported by the identification and tracking of the leading aircraft on a traffic display using ADS-B-IN. Enhanced Visual Approach (EVApp) and/or Visual Separation on Approach (VSA) were earlier projects that developed into CAVS.

Related Positions:

21POS03 CAVS-CDTI Assisted Visual Separation

## 7. Non- Traditional Users

### 7.1 Unmanned Aviation including UAS/RPAS/Drones, etc.

"A Drone is a term that can be used as a non-technical catch-all for both UAV and UAS. Unmanned Aerial Vehicle (UAV) narrows down the definition of a drone only to aircraft that can fly autonomously or remotely. A UAS is the totality of everything that makes a UAV work, including its GPS module, ground control module, transmission systems, camera, all the software, and the person on the ground controlling the drone." [2]

The International Civil Aviation Organization (ICAO) further refines these affected aircraft under their interests under the acronym RPAS (Remotely Piloted Aircraft System). Each of these terms has specific meanings, nuances, and regulations by the member states.

Unmanned ground vehicles operating on an airport may likewise be implemented and pose a hazard to aircraft ground operations.

Related Positions/Briefing Leaflets:

19PGABL01 Remote Pilots

18POS21 UAS security

17POS08 Unmanned Aircraft Systems

20POS05 Safe Small Commercial Unmanned Aircraft Operating Rules

20POS04 The Dangers of Reduced Crew Operations

23POS08 Unauthorized Flying of Drones near Airports

23POS22 Dangerous Goods on RPAS and UAS

25POS10 Introduction of Emerging Technology Aircraft in Civil Airspace

### 7.2 Commercial Space Operations

Related Positions:

21POS17 Commercial Space Operations

[2] https://pilotinstitute.com/drones-vs-uav-vs-uas/

## 7.3 Moored Balloons, Kites, Amateur Rockets, Unmanned Free Balloons, and Certain Model Aircraft

Related Positions:

20POS05 Safe Small Commercial Unmanned Aircraft Operating Rules

17POS08 Unmanned Aircraft Systems

25POS10 Introduction of Emerging Technology Aircraft in Civil Airspace

18POS21 UAS Security

23POS22 Dangerous Goods on RPAS and UAS