

AVIATION TECHNOLOGY AIR TRAFFIC MANAGEMENT

Comprehensive Technical Guide to Aerodrome Flight Information Service (AFIS) and EUROCONTROL Standards

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The aviation landscape is a complex ecosystem of services designed to ensure the safe and efficient movement of aircraft. While Air Traffic Control (ATC) is the most recognized component of Air Traffic Services (ATS), there is a critical middle ground occupied by the **Aerodrome Flight Information Service (AFIS)**. This service is essential for aerodromes where the volume or complexity of traffic does not justify a full ATC service but where the provision of flight information is necessary for the safety of operations. The **EUROCONTROL Manual for Aerodrome Flight Information Service** serves as the definitive reference for implementing these services within the European context, aligning with ICAO standards while providing localized technical guidance.

Theoretical Framework and Legal Foundation of AFIS

To understand AFIS, one must first look at the hierarchy of Air Traffic Services as defined by the International Civil Aviation Organization (ICAO) in **Annex 11** and **Doc 9426 (Air Traffic Services Planning Manual)**. ATS is broadly divided into three main services: Air Traffic Control Service, Flight Information Service (FIS), and Alerting Service. AFIS is a specific subset of FIS provided at a designated aerodrome.

The primary objective of AFIS is to provide information useful for the safe and efficient conduct of flights in the vicinity of an aerodrome and on the maneuvering area. Unlike an Air Traffic Controller, an **AFIS Officer (AFISO)** does not issue "clearances" that carry legal authority for aircraft separation. Instead, they provide "information," and the ultimate responsibility for separation and collision avoidance rests with the Pilot-in-Command (PIC).

The Role of EUROCONTROL and ICAO Circular 211

The development of AFIS standards has been significantly influenced by **ICAO Circular 211-AN/128**, which provided the early international basis for AFIS. However, as European airspace became more congested, a need arose for more granular guidance. This led to the creation of the **EUROCONTROL AFIS Manual**. According to analysis from EASA and EUROCONTROL, many member states declare that the content of the EUROCONTROL manual is their primary reference point when national regulations are insufficient. This manual bridges the gap between high-level ICAO SARPs (Standards and Recommended Practices) and the practical day-to-day requirements of small-to-medium aerodromes.

Technical Analysis: AFIS vs. Air Traffic Control (ATC)

One of the most critical technical distinctions in aviation is the boundary between advisory information and control instructions. The following table provides a structured comparison of the operational differences between these two service levels.

Feature / Responsibility	Air Traffic Control (ATC)	Aerodrome Flight Information Service (AFIS)
Primary Objective	Prevention of collisions; maintaining orderly flow.	Provision of information for safe and efficient flight.
Authority	Issues mandatory clearances (e.g., "Cleared to Land").	Issues information and suggestions (e.g., "Traffic is...").
Responsibility for Separation	The Controller (for IFR/VFR depending on class).	The Pilot-in-Command (PIC).
Airspace Designation	Control Zone (CTR) / Control Area (CTA).	Traffic Information Zone (TIZ) / Traffic Information Area (TIA).
Phraseology	Prescriptive ("Cleared," "Maintain," "Climb").	Informative ("Information," "Report," "Land at discretion").
Legal Basis	ICAO Annex 11, PANS-ATM (Doc 4444).	ICAO Annex 11, EUROCONTROL AFIS Manual.

The Concept of Traffic Information Zones (TIZ)

A significant recommendation found within the **EUROCONTROL Guidelines** is the establishment of a **Traffic Information Zone (TIZ)** or a **Traffic Information Area (TIA)**. While AFIS can be provided in uncontrolled airspace (Class G), the lack of a defined volume of airspace can lead to safety risks. A TIZ is typically a volume of airspace of defined dimensions surrounding an AFIS aerodrome where the provision of AFIS and alerting service is mandatory. Within a TIZ, all aircraft are generally required to maintain a continuous radio watch and report their positions, allowing the AFISO to build a comprehensive "traffic picture" to share with other pilots.

Operational Workflow and Procedural Execution

The technical execution of AFIS follows a standardized workflow to ensure that pilots receive timely and accurate data. This process is governed by the **Manual of Operations (MATS)** specific to the unit, but it generally follows the EUROCONTROL procedural model.

1. Meteorological Information Provision

The AFISO is responsible for disseminating current weather conditions. This includes wind direction and speed, visibility, cloud ceiling, and altimeter settings (QNH/QFE). In many AFIS units, the officer is also a certified meteorological observer, providing METAR/SPECI reports that feed into the global aeronautical fixed telecommunications network.

2. Aerodrome Status and Facilities

Before any movement, the AFISO must inform pilots of the status of the aerodrome. This includes:

3. Traffic Information and Sequencing Suggestions

This is the core of the AFIS technical task. The AFISO identifies all known traffic in the TIZ through radio reports and, in some cases, surveillance displays (like ADS-B). The officer then provides descriptive information to the pilots. **Example Phraseology:** "G-ABCD, traffic is a Cessna 172 on final, three miles. Report in sight." The AFISO does not tell the pilot to "follow" the Cessna; they provide the information so the pilot can decide the best course of action to maintain separation.

Mathematical Models and Planning: Doc 9426 and IFPS

The planning of AFIS services involves complex traffic density calculations. According to **ICAO Doc 9426**, the decision to implement AFIS vs. ATC is often based on the **V² model**, where V represents the volume of traffic, but modified by factors such as the mix of IFR/VFR traffic and the physical characteristics of the aerodrome.

Integration with IFPS (Integrated Initial Flight Plan Processing System)

As noted in the **IFPS Users Manual**, AFIS units are integral nodes in the flight planning network. Even though they do not provide control, they are responsible for the management of flight plans (FPLs) for aircraft arriving at or departing from their aerodrome. This includes:

Technical Infrastructure and Equipment Requirements

For an AFIS unit to function according to EUROCONTROL standards, a minimum suite of technical equipment is required. This ensures the reliability of the information provided.

System Category	Minimum Requirements	Technical Specification
Communications	VHF Air-Ground Radio	Dual redundancy; 8.33 kHz channel spacing.
Recording	Voice Logging System	Must record all radio and telephone circuits; 30-day retention.
Meteorology	AWOS (Automated Weather Obs System)	Sensors for wind, pressure (QNH), and temperature.
Navigation	Signal Lamp / Flare Gun	Back-up for total radio failure scenarios.

Training, Competency, and Human Factors

The **Aerodrome Flight Information Service training course**, as outlined in the EUROCONTROL guidelines, is rigorous. Because AFISOs operate in an advisory capacity, they must possess high levels of situational awareness and communication skills to influence pilot behavior without having the power of a clearance.

The AFIS Questionnaire and EASA Analysis

Analysis of responses to AFIS questionnaires conducted by EASA reveals that the standardization of training is a primary concern for regulators. Key competency areas include:

Case Study: Addressing Airspace Infringements in AFIS Environments

A common operational challenge identified in the **EUROCONTROL Manual** is the risk of airspace infringements within the TIZ. Since a TIZ is often surrounded by Class G (uncontrolled) airspace, pilots not intending to land at the AFIS aerodrome may inadvertently enter the TIZ without communicating.

Failure Mode: Loss of Situational Awareness

Scenario: An IFR aircraft is on a GPS approach to an AFIS aerodrome. A VFR aircraft enters the TIZ without a radio report (infringement). **Operational Solution:** The AFISO, noticing the unknown target on a surveillance monitor or receiving a visual report, immediately broadcasts a "Blind Transmission" to all aircraft on the frequency. **Procedural Fix:** Implementation of a Letter of Agreement (LoA) with the regional ATC provider to provide "Hand-offs" or "Point-outs" for traffic approaching the TIZ boundaries. This creates a buffer zone of information that compensates for the lack of mandatory control.

Future Trends: Remote AFIS and Digital Towers

The **ICAO AFIS Manual Update** (August 2016 and subsequent working papers) highlights the move toward **Remote AFIS (R-AFIS)**. By using high-definition camera arrays and advanced sensors, a single AFISO can provide services to one or more remote aerodromes from a centralized hub. This technical evolution relies heavily on the principles established in the EUROCONTROL manual, specifically regarding the maintenance of a continuous visual watch through digital means.

Remote AFIS requires high-bandwidth data links and robust cybersecurity protocols, as the "Traffic Picture" is now entirely digital. The technical breakdown of such systems involves latency measurements, where the delay between a real-world event and its display on the remote monitor

must be minimized to less than one second to ensure safety.

Synthesizing the AFIS Operational Environment

The Aerodrome Flight Information Service represents a sophisticated balance between operational necessity and economic viability. By following the standards set forth in the **EUROCONTROL Manual for AFIS** and the broader ICAO framework, aerodromes can maintain a high safety margin without the infrastructure costs of a full ATC suite. The shift toward more structured TIZ/TIA airspace, standardized training through EASA-compliant courses, and the integration of AFIS units into the global IFPS network ensures that these units are not isolated outposts but integrated components of the Global Air Navigation Plan.

As the aviation industry moves toward greater automation and remote operations, the core principles of AFIS—accuracy of information, clarity of communication, and proactive traffic awareness—remain the bedrock of its success. Whether provided from a traditional glass tower or a remote digital center, the technical discipline mandated by EUROCONTROL guidelines ensures that pilots have the data they need to make the most critical decisions in the cockpit.