

AMHS

Air Traffic Services Message Handling System

PRESENTS

Mayda Alicia Ávila

Regional Communications, Navigation and Surveillance (CNS) Specialist

Regional Office for North America, Central America and Caribbean

What is AMHS?

The messaging system that replaces AFTN for the secure, high-capacity exchange of aeronautical messages between States.

The **AMHS** is the messaging system of the **Aeronautical Fixed Service (AFS)** that replaces **AFTN** and enables the exchange of aeronautical messages between States, ANSPs and AIM, MET, NOTAM and ATS offices.

01

Secure

Protected exchange of critical operational messages.

02

Reliable

Delivery confirmation and managed routing.

03

Greater capacity

Larger messages and modern encoding than AFTN.

Basic AMHS vs. Extended AMHS

AMHS offers two levels. The **extended** is a **functional superset** of the **basic one**: it includes all its capabilities, adds new functions and maintains compatibility.

BASIC AMHS

ATS text messaging inherited from AFTN

Flight plans and ATS messages
Departure, arrival and delay
Traditional NOTAM
METAR, SPECI, TAF and SIGMET in TAC
Content: IA5 Text Body Part

EXTENDED AMHS

Everything from basic + FTBP to transport files

Binary or structured attachments (FTBP)
XML and IWXXM files
Images, maps, PDF and compressed files
Extended headers
Directory and security (depending on implementation)

What changes between one level and another?

Feature	Basic AMHS	Extended AMHS
ATS text messages	Yes	Yes
File attachments	Generally, no	Yes, via FTBP
XML files	Not as a file	Yes
IWXXM exchange	Not suitable	Yes, via FTBP
Binary information	No	Yes
Directory services	Limited	Possible
Advanced security	Limited	Depending on implementation

In one sentence: basic AMHS transports text; extended, text and files. For IWXXM, at minimum, extended AMHS with FTBP is required.

How far the extended level reaches

Practical rule: the common capability is the LOWER of the originator and the recipient.

Originator	Recipient	Possible exchange
Basic	Basic	Text
Extended	Basic	Text
Basic	Extended	Text
Extended	Extended	Text and FTBP

THE ENTIRE CHAIN

The central server is not enough: originating UA, MTA, link, receiving MTA and UA must support FTBP.

EXTENDED ≠ OPERATIONAL IWXXM

The extended level solves file transport; generating, validating and interpreting the IWXXM still requires MET software.

Why AMHS for IWXXM?

For the exchange of digital meteorology (IWXXM), **AFTN is no longer sufficient**: XML messages are large and require Unicode encoding.

ICAO Solution

The international exchange of IWXXM must use **AMHS Extended with File Transfer Body Part (FTBP)**.

XML

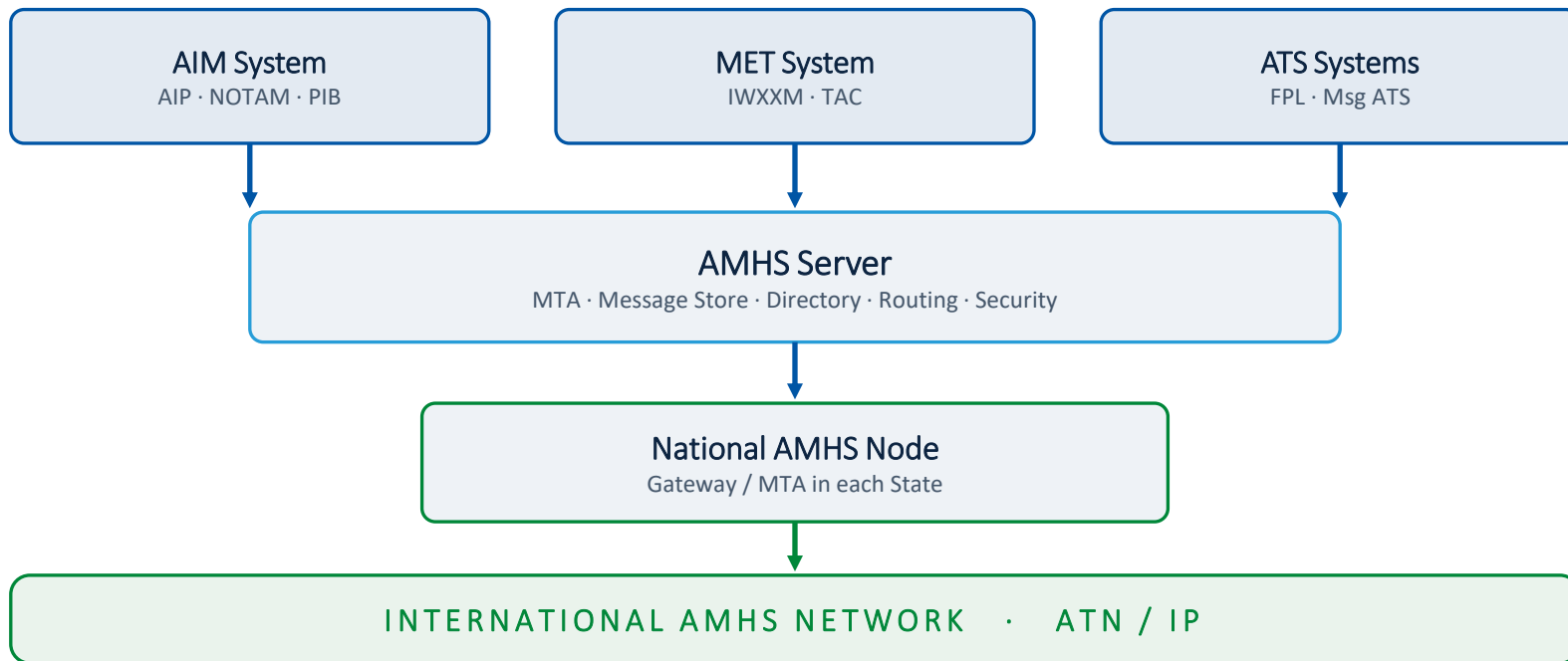
Unicode / UTF-8

AMHS Extended

FTBP

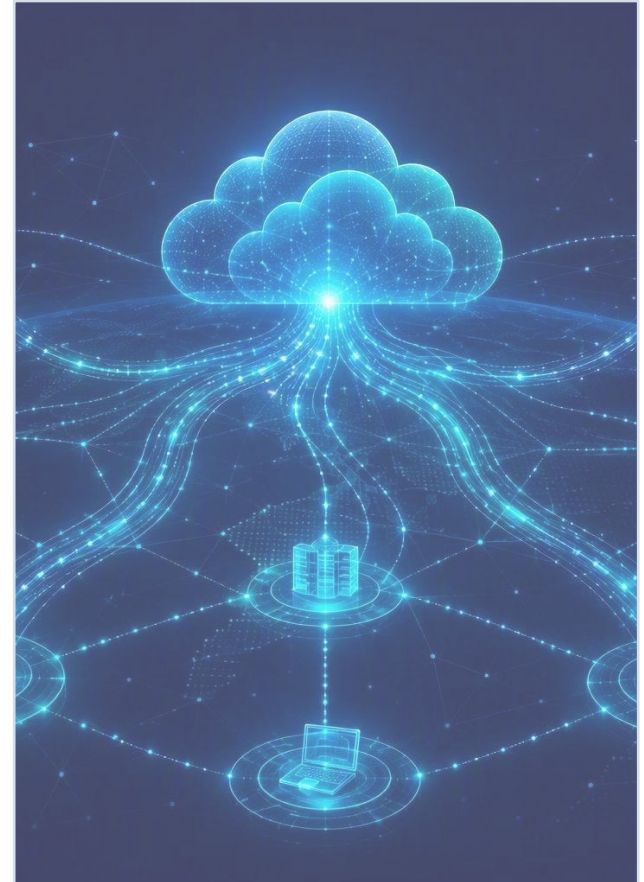
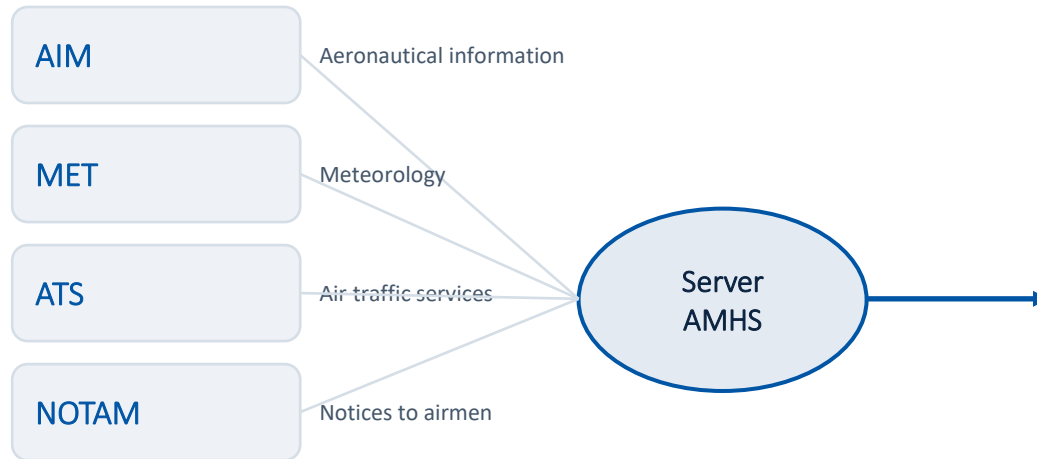


General AMHS architecture



Who uses AMHS?

Users do not connect directly to one another: they all connect to the national AMHS server.



Required components

01 MET System

Generates METAR, SPECI, TAF, SIGMET, AIRMET, SWX and VAA in TAC and IWXXM (XML) formats.

02 AIM System

Produces NOTAM, Digital NOTAM, AIP, eAIP and PIB for aeronautical information.

03 AMHS Server

Integrates MTA, Message Store, Directory, Routing Tables, Security and Address Book.

04 AMHS Network

ATN, ATN/IPS, MPLS, VPN, CANSNET, MEVA or REDDIG depending on the region.

AMHS addressing

Each user has a **unique eight-letter address**. It does not represent an email address; the format depends on the national addressing plan.

ADDRESS EXAMPLE

M M M X Y M Y X

The exact format depends on the national addressing plan.

Office	AMHS address
AIM Mexico	MMMMYNYX
MET Mexico	MMMMYMYX
ATS Mexico	MMMMYZQX

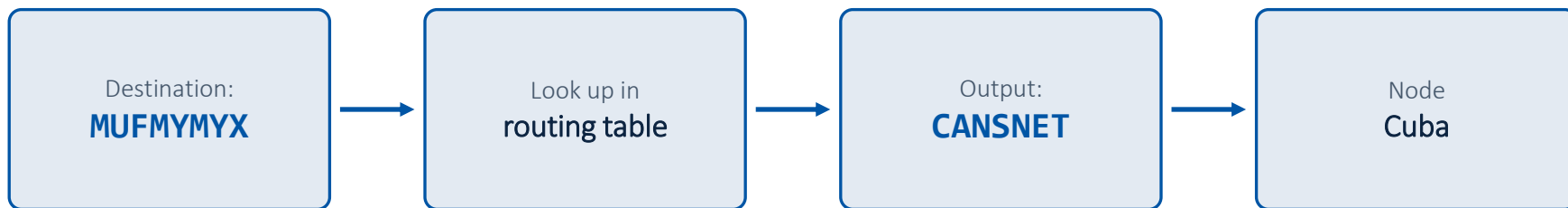
Exchange example: Jamaica → Cuba



The user never dials an IP address. The entire exchange is carried out using eight-letter AMHS addresses that uniquely identify each originating and destination office.

How does AMHS know where to send?

The server maintains **routing tables**. It works just like an IP router, but for ATS messages.



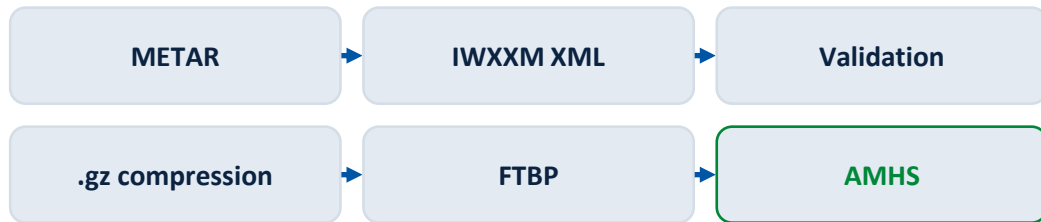
It works exactly like an IP router — but for air traffic services messages.

FTBP and the exchange of IWXXM

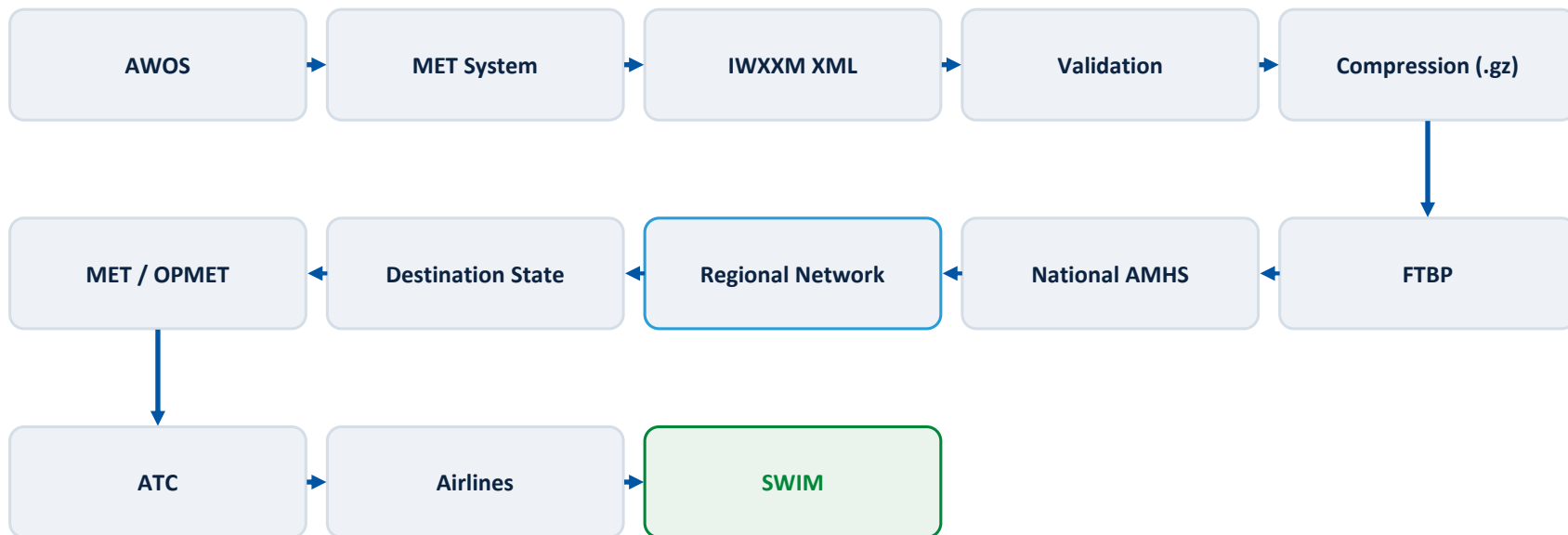
What is FTBP?

File Transfer Body Part allows an AMHS message to carry a file (e.g. a ~250 KB IWXXM XML). Without FTBP, only text messages could be sent.

FLOW OF A METAR IN IWXXM



International flow recommended by ICAO



From the weather sensor to the SWIM environment: a continuous, traceable path across the AMHS international network.

What does a State need to exchange IWXXM?

Infrastructure

AMHS Extended, FTBP support, ATN/IPS, international links and cybersecurity.

MET system

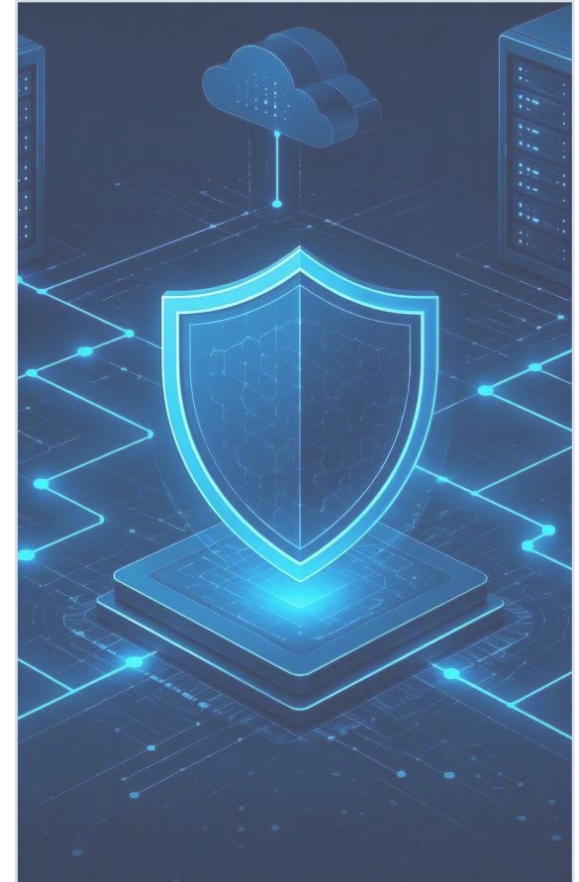
Generate and validate IWXXM XML, apply the WMO Codes Registry and compress (.gz).

AMHS

Extended, FTBP, ~4 MB messages, Unicode/UTF-8 and delivery confirmation.

Addressing

AMHS addresses per office and distribution tables per product (ROC / NOC).



AMHS transports, it does not interpret

AMHS acts like a **postal service**: it carries the **envelope**, it does not read the **letter**. It separates transport from the meteorological content.

LEVEL 1 · THE ENVELOPE (TRANSPORT)

Originator and recipient

Message priority and identifier

Time and routing path

Delivery notification

LEVEL 2 · THE CONTENT (PAYLOAD)

The IWXXM (XML) meteorological message that travels inside the envelope, intact end to end.

```
<iwxxm:METAR>  
... observation ...  
</iwxxm:METAR>
```

The IWXXM software chain

The same message passes through a software chain at the origin and a mirrored one at reception.

ORIGIN — production and sending

MET system



IWXXM generator



Validator



User Agent / Gateway



AMHS

RECEPTION — reception and use

AMHS



UA / Gateway



Extractor



Validator



Parser



Database /
Application

Layered validation

1 **AMHS transport** The envelope arrives intact at its destination

2 **Well-formed XML** The message syntax is correct

3 **XSD schema** The structure conforms to the IWXXM model

4 **Schematron rules** The semantic constraints are met

5 **Code lists** Values use official vocabularies

6 **Business rules** Operational consistency of the message

7 **Meteorological quality** The information is valid and plausible

PRINCIPLE

Validate before
sending and validate
again upon receiving.

Each layer that fails stops: an invalid
message must never propagate
across the network.

Who validates what?

Component

Originating MET system

IWXXM generator

Local validator

MET-AMHS gateway

AMHS

ROC / RODB

Receiving system

Operational user

Responsibility

Produces the source observation or forecast

Encodes the message in XML according to the IWXXM model

Verifies schema and rules before sending

Encapsulates the message for AMHS transport

Transports and routes the message between States

Manages addressing and routing tables

Extracts, validates and decodes the received IWXXM

Interprets and uses the meteorological information

AMHS is not equivalent to SWIM

Feature	AMHS	SWIM
Unit	Message (messaging)	Data / information service
Model	Store and forward	Publish–subscribe / on demand
Location	Routing by address	Service registration and discovery
Content	Transports the IWXXM message	Shares information as a service
Consumption	Directed point-to-point delivery	Open access to multiple consumers

They are complementary: AMHS moves messages; SWIM shares information as interoperable services.

Relationship with SWIM

Exchange via AMHS is a transitional stage toward a SWIM environment.

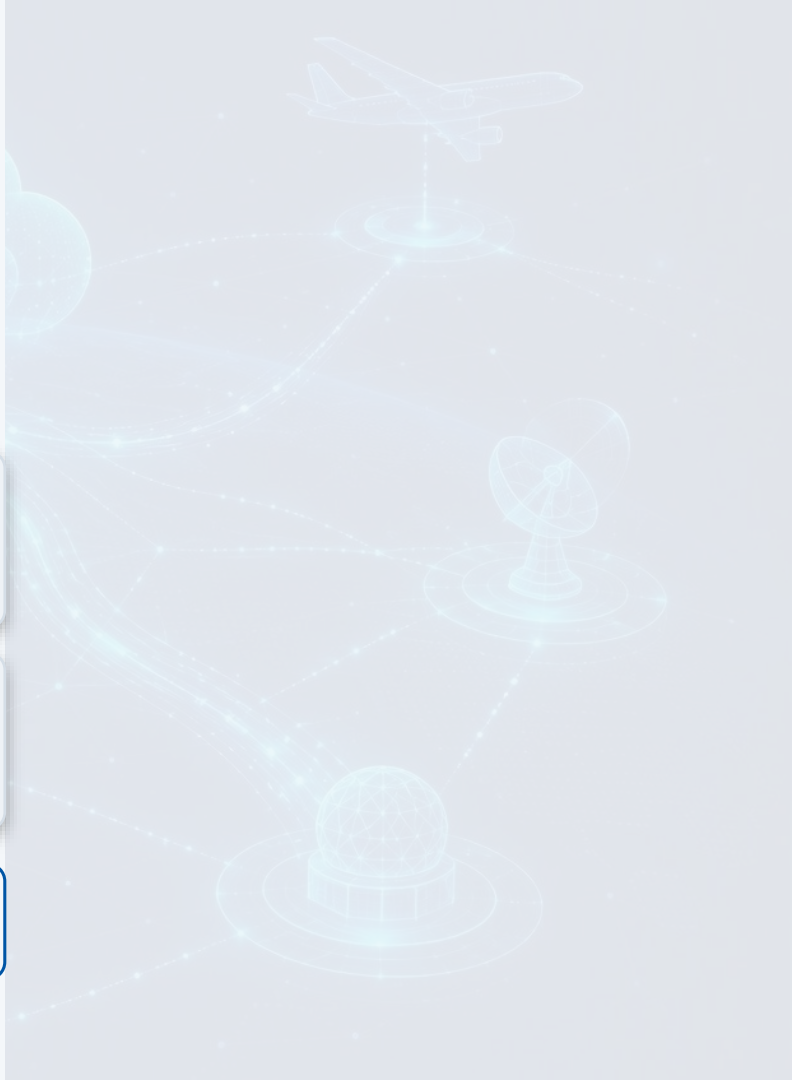
AMHS — today

Official means for the international operational exchange of IWXXM between States.

SWIM — tomorrow

Distribution via IP services (Web Services, REST, SOAP, Pub/Sub) integrating MET, AIM and ATM.

MET → IWXXM → AMHS (FTBP) → Receiving State → SWIM → Consumers



Thank You

