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SWIM IN AMHS ENVIRONMENT

Topics for Discussion

What is AFTN? AMHS?

AFTN ⟹ AMHS Migration

Potential Use of SWIM in AMHS Environment

AFTN Overview

What is AFTN?

- Aeronautical Fixed Telecommunications Network
- Message system used worldwide to exchange flight plans, weather and other data
- Has been in operation for over half a century
- Not surprisingly, has many limitations in today's Air Traffic environment

AFTN Limitations

- Not all AFTN systems support full IA-5-character set
- Not all AFTN systems support line length greater than 69 characters
- AFTN systems generally have maximum message size limitation of 1800-3700 characters

How to Overcome Limitations?

The International Civil Aviation Organization (ICAO) is moving towards a new global communications network that offers significant improvement over the AFTN legacy network

That network is Air Traffic Services (ATS) Message Handling System (AMHS)

AMHS Overview

What is AMHS?

- Next generation of message switch technology
- Offers numerous benefits in terms of Message content
- Message routing
- Message delivery
- Implemented exclusively for International data flows (no domestic user agents support)

Supporting transmission of legacy Flight Data, Weather, and Aeronautical Information Data

AMHS Benefits

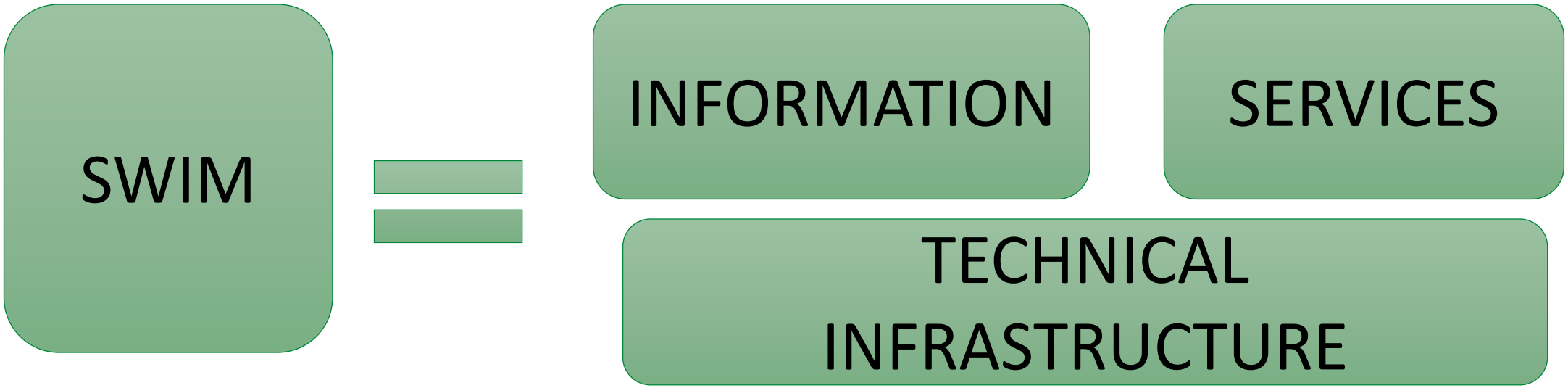
- Practically unlimited message length
- Virtually no limit on number of addressees
- Potential for attachments
- Provision for non-delivery reports
- Routing will evolve from message level to network level -- AFTN routing is static, and requires manual intervention to re-route

  - AMHS routing is dynamic, re-route is automatic

What is SWIM ?

System Wide Information Management (**SWIM**) is a global Air Traffic Management (ATM) industry initiative to harmonize the exchange of Aeronautical, Weather and Flight information for all Airspace Users and Stakeholders. SWIM is an integral part of the International Civil Aviation Organization (ICAO) Global Air Navigation Plan (GANP) . The GANP defines 4 Performance Improvement Areas (PIA), SWIM resides in PIA 2: Globally interoperable systems and data, where its implementation is further defined in Aviation System Block Upgrades (ASBU) B1-SWIM and B2-SWIM. ASBU B1-SWIM defines SWIM as a “a net-centric operation where the air traffic management (ATM) network is considered as a series of nodes, including the aircraft, providing or using information.” it goes on to say “The sharing of information of the required quality and timeliness in a secure environment is an essential enabler to the ATM target concept

Definition



SWIM INFORMATION DOMAINS

Aeronautical Information	Flight	Meteorology
• AIXM	• FIXM	• WXXM
Surveillance	…	…
•	•	•

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SWIM SERVICES

- Manage SWIM Information
- Access SWIM Information
- Publish SWIM Information
- Update SWIM Information
- …

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SWIM TECHNICAL INFRASTRUCTURE

Relies on:

- IP Networks (LANs, WANs, backbones)
- Off-the-shelf middleware technology

But remember:

- The network is only one part of SWIM

SWIM – AMHS Interaction

- SWIM would establish corresponding XML Business Services
- AMHS would publish XML to SWIM
- Foreign ANSP would be able to publish XML directly into Business Services as international SWIM materializes
- Many ANSPs (systems) implement FIXM/WXXM/AIXM, they would be able to consume XML directly from SWIM
- AMHS was identified to be the intended communication means for MET IWXXM data exchanges using FTBP

- Extensible content
- Independently marked data elements
- Comprehensive validation capabilities
- Broad supported and understood (libraries, documentation, developer experience, etc)
- Related standards:
- XSLT for transforming into other forms
- Xpath for selecting portions of XML documents
- …..
- Usable with Web Services (SOAP, REST, HTTP, …)
- Loosely human readable
- Documentation on data elements can be providedschema

- Two parts (jointly referred to as “IWXXM”:
- A UML conceptual model
- An XML format

- Operationally it can be considered as an XML format for representing ICAO Annex 3 TAC products (METAR, SPECI, TAF, SIGMET, AIRMET, TCA, VAA)

- As of November 2020, according to ICAO Annex 3, Meteorological Service for International Air Navigation, States are required use the ICAO Meteorological Information Exchange Model (IWXXM) format as a standard for the international exchange of aeronautical meteorological information.

- Need to define an AMHS profile Information to Support IWXXM Exchange: covered by Appendix A of the Guidelines for the implementation of OPMET Data Exchange using IWXXM in the AFI Region.

Conclusions Thus Far

- AMHS provides a suitable platform for transmission of XML data
- AFTN has limitations, and requires understanding of specific systems involved to support XML: Should support the full IA-5 character set
- Must be capable of line length > 69 chars
- AFTN messages have 1800 character limit
- This raises the issue of needing to know where a message will be traveling prior to issuance
- AMHS was identified to be the intended communication means for MET IWXXM data exchanges using FTBP

Thank You

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