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The Success Story of SWIM Implementation

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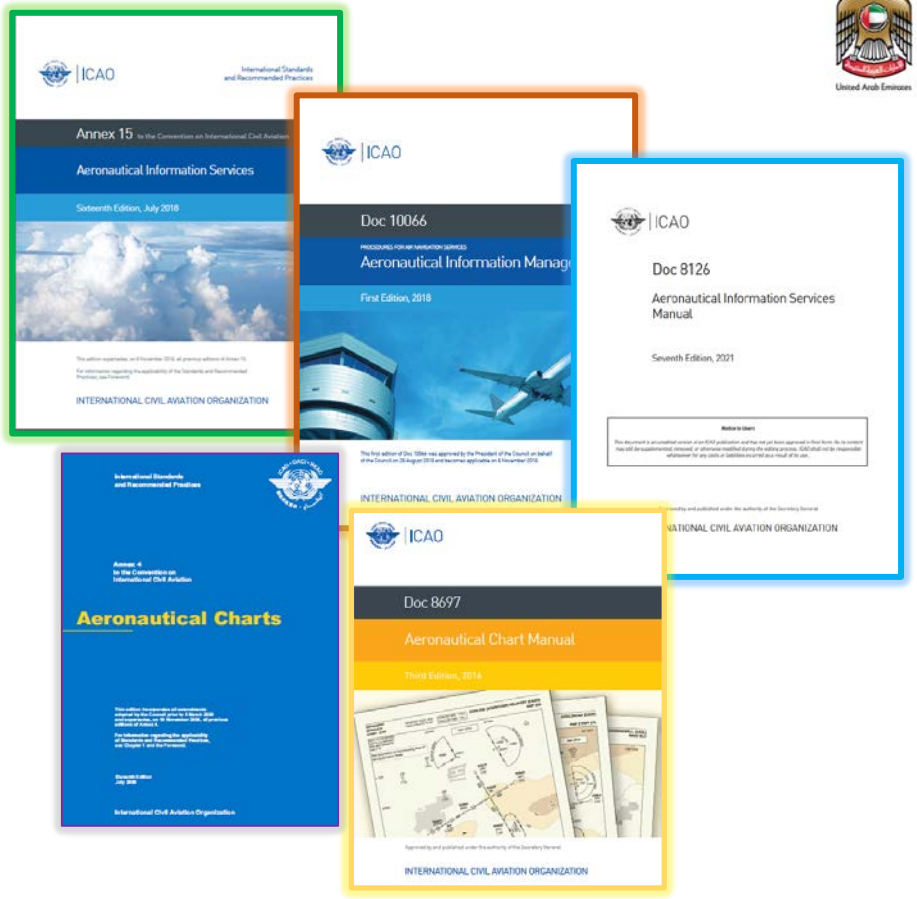
Introduction

The **Aeronautical Information Service (AIS)** is a service, whose objective is to ensure the flow of information necessary for the safety, regularity and efficiency of international air navigation, in accordance with International Civil Aviation Organization (ICAO) guidelines.

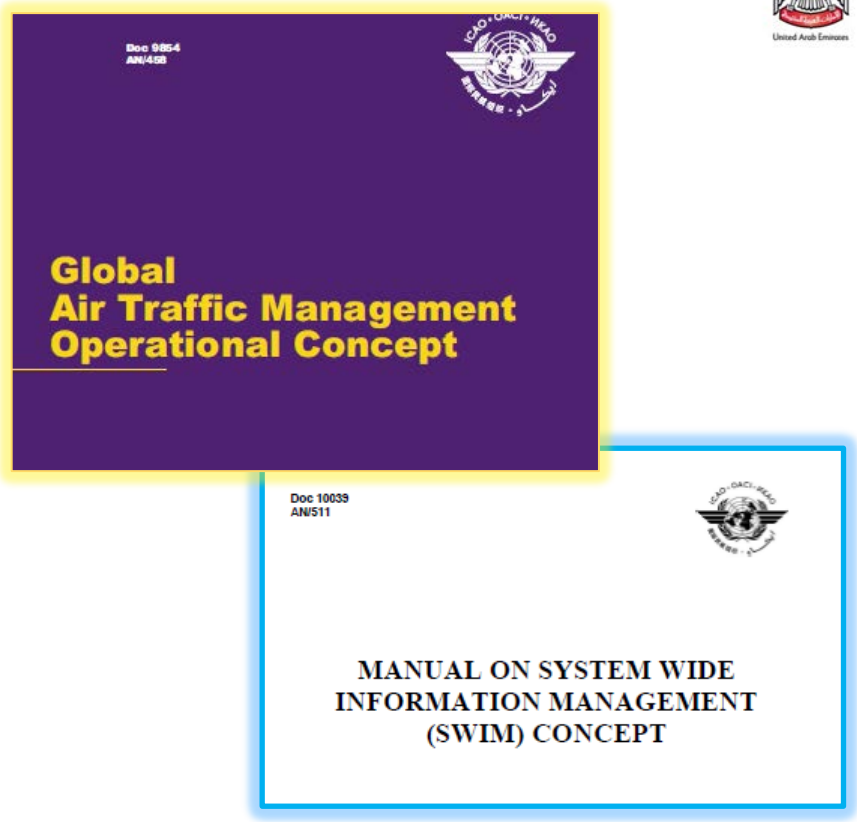
The main product of AIS is Aeronautical Information. In aviation, **Aeronautical Information publication (AIP)** is defined by the ICAO as a publication issued by or with the authority of a state and containing aeronautical information of a lasting character essential to air navigation. It includes regulations, procedures, facilities, charts and other information relevant to flying aircraft in the particular country to which it relates. It is usually issued by or on behalf of the respective civil aviation administration. Countries around the world may provide AIPs either on paper, CD-ROM or on a Web site.



Evolution

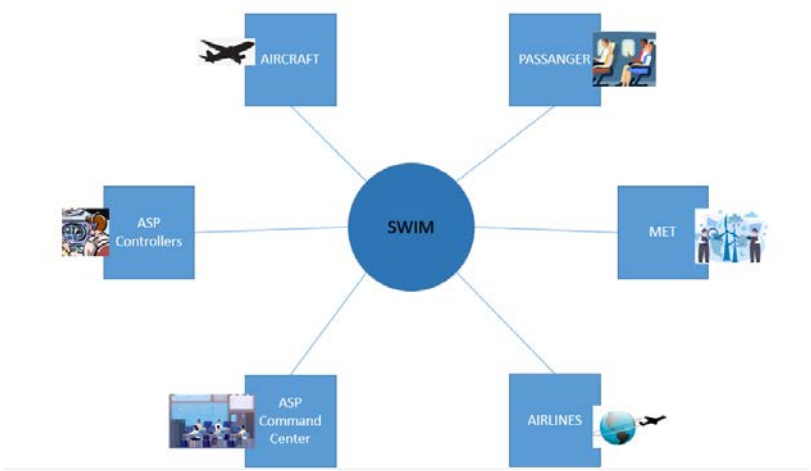
It was seen as necessary to complement human-to-human Aeronautical Information with machine-to-machine communication, and improve data distribution and accessibility in terms of quality of the data exchanged.

Hence ICAO came up with Global Air Traffic Management (ATM) Operational Concept (Doc 9854) which predicted the application of System Wide Information Management (SWIM) to promote information-based ATM integration.



SWIM

System Wide Information Management **(SWIM**) is part of ICAO's Aviation System Block Upgrade (**ASBU**). The aim of SWIM is to provide information to users in relevant and commonly understandable format. It does not refer to a single solution or technology, but rather a global level of interoperability and standardization that enables users and providers to exchange data without having to use different interfaces or protocols. It is based on service-oriented architecture and open standard technologies.



- **Network Centric**

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SWIM Principles

- Information must be shared securely on a system-wide basis.
- Relevant information will be available when and where it is required.
- Information may be personalized, filtered, and accessed, as needed.
- The system will include all terms of cybersecurity.
- Authentication for user access.
- Initial quality of the information will be the responsibility of the originator.
- Subsequent handling will not compromise its quality.
- Information sharing can be adjusted to mitigate any proprietary concerns.
- Information management will use globally harmonized information attributes.

SWIM Benefits

- Business and IT Alignment
  - Systems design is driven by a market forces model (supply and demand)
  - Systems are developed to evolve with the environment rather than designed and built as a fixed structure (a city vs. a building)

- Adaptability
  - Agility: allow for rapid enhancement of services capability
  - Flexibility: enable on-demand composition and restructuring of services to meet business needs

- Interoperability
  - Ability to expose capability for rapid consumption by other systems
  - Flexibility to cater for unanticipated system connectivity demands (emergent behaviors)

- Scalability
  - Distribution of effort: widely distribute the development of capability
  - Distribution of value: enable wide access to capability
  - Maximize utility of the services provided

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SWIM Challenges

- Legal
  - Information ownership and liability aspects in an information sharing environment
- Institutional
  - Regulatory aspects of information sharing (who can act as the regulator for what)
- Financial
  - Aspects of information sharing related to cost efficiency, licensing, cost recovery etc.
- Organisational
  - Mechanisms for managing the rules, roles and responsibilities of the stakeholders participating in information sharing

SWIM Challenges

- System Operational
  - Mechanisms for ensuring timely information availability, anticipating upcoming information needs and managing information acquisition, storage, dissemination, security and quality in line with rules, roles and responsibilities of stakeholders

- Technical
  - Automation concept, strategy and technology selection.

- Security
  - Due to high level of risk associated to cyber attack, SWIM profiles i.e. Yellow, Blue & Purple profile specification needs continuous upgrades.

- Guidance
  - Lack of clear guidelines and standardization.

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SWIM Implementation Challenges and Mitigations

Challenges	Mitigation
Scope Creation	Studied all the available guidelines on internet and created scope
Security	SWIM Yellow Profile was not updated from many years, In order to keep security up to date, the implementation followed the GCAA Minimum Security BASELINE requirements too.
Testing	All AIM Staff was given many test cases to check application is working in perfect condition and performed load test with 50 concurrent users.
Data Updates	Data Import script was created which will update UAE AIP Data on SWIM after every AIRAC update.
Training	SWIM ICD and training manual was created, how to use AIM SWIM Service

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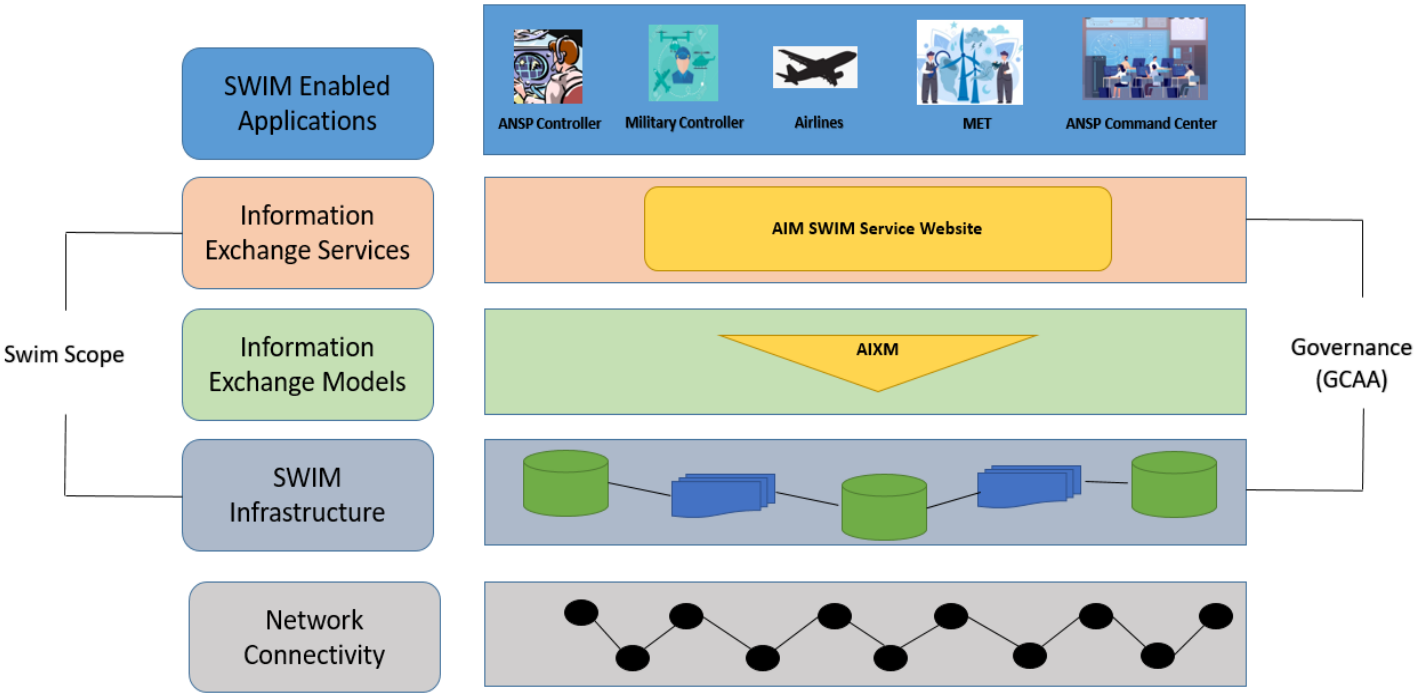
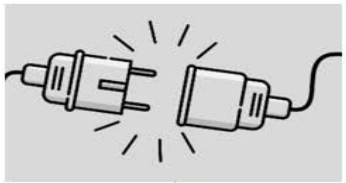
GCAA AIM SWIM Framework



GCAA AIM SWIM Infrastructure

The Technical infrastructure provides the core services for sharing information.



Interface Request/Reply

https://aim.szcgateway.ae/uae-swim-ws/wfs/

Publish/Subscribe Message

amqps://broker.szcgateway.ae

Security Services

EUROCONTROL SWIM Yellow Profile

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GCAA AIM SWIM Information Exchange

1. GCAA AIM SWIM Service

https://aim.szcgateway.ae/uae-swim-ui/

2. GCAA AIM SWIM ICD

Interface Control Document available allowing Aeronautical Stakeholder to understand, develop and implement the necessary counterpart interfaces to connect to AIM SWIM services provided by GCAA .

GCAA AIM SWIM Service Login Page

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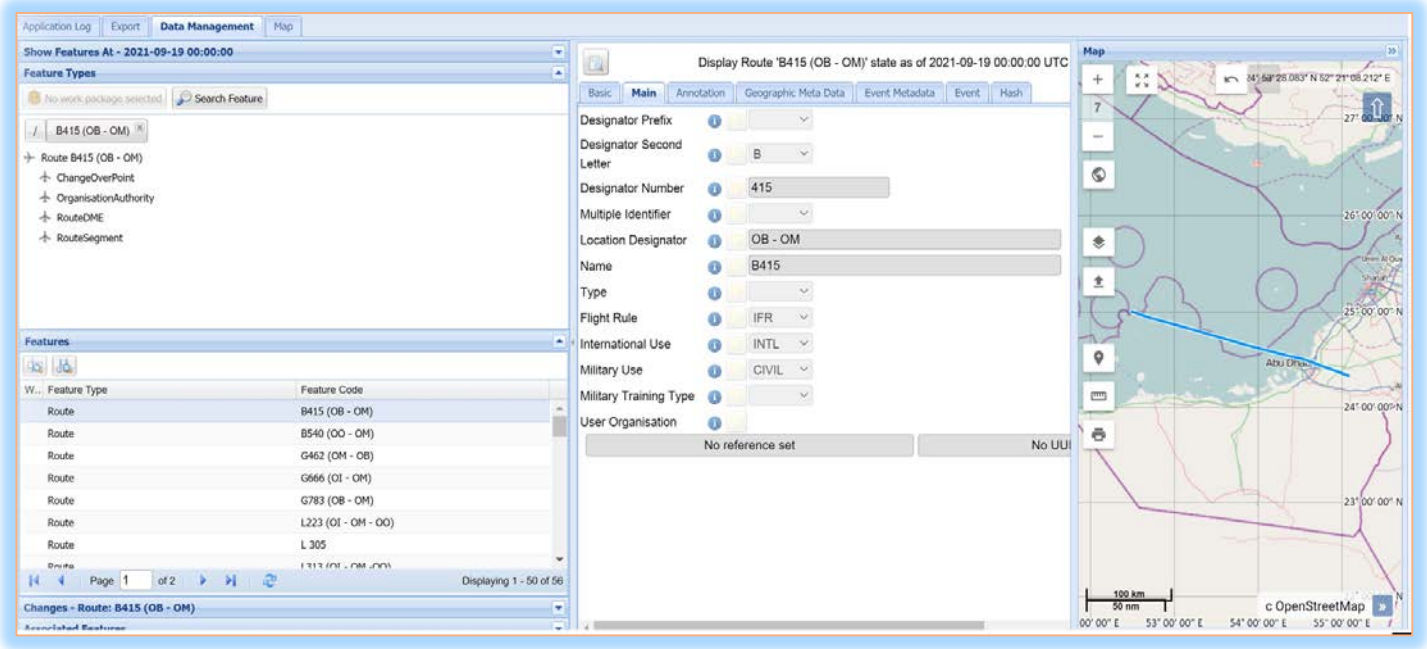
GCAA AIM SWIM Service Human Machine Interface (HMI)



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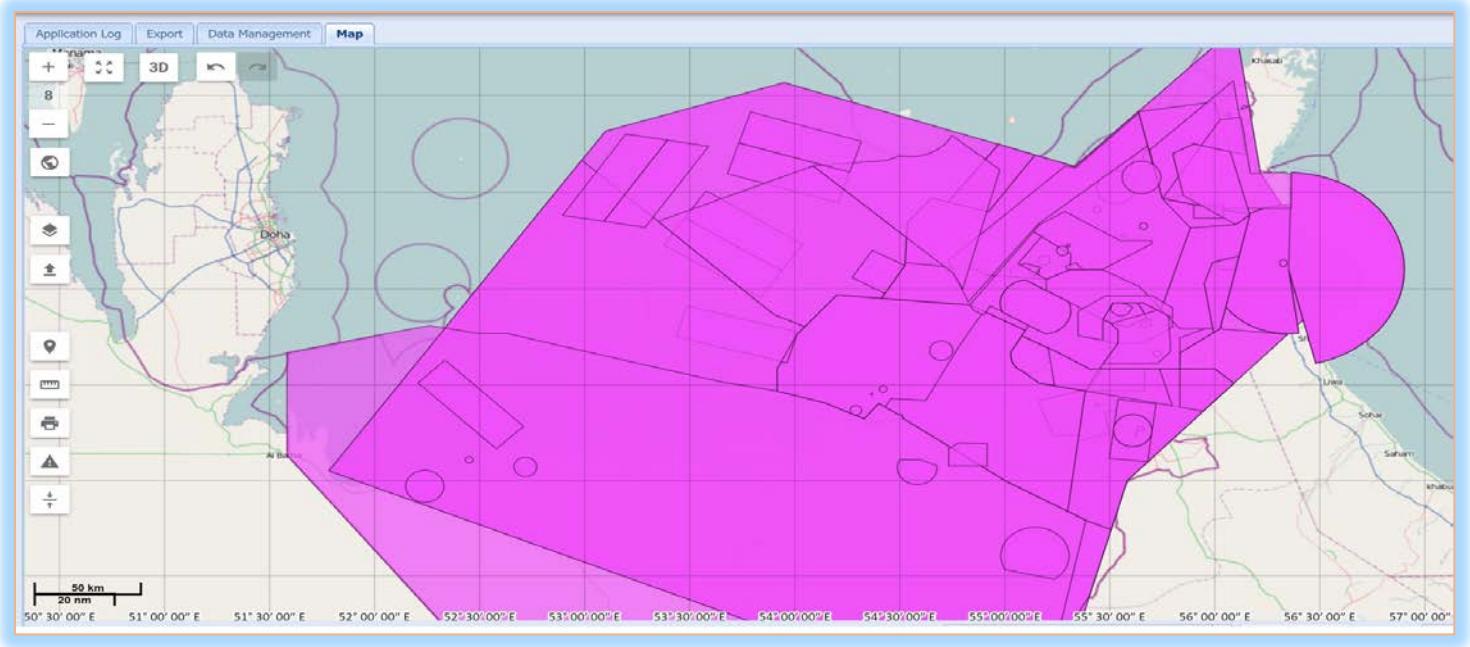
GCAA AIM SWIM Service Graphical Visualization



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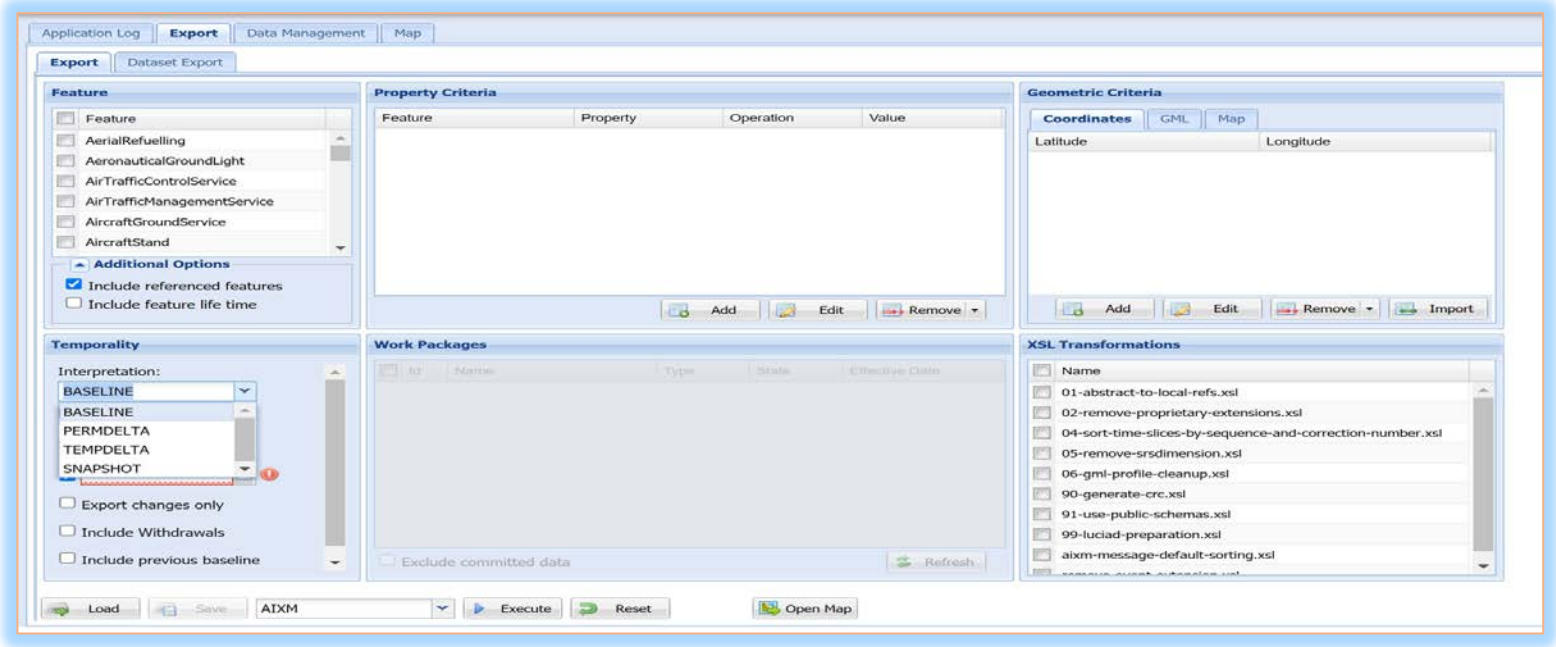
GCAA AIM SWIM Service Data Exchange



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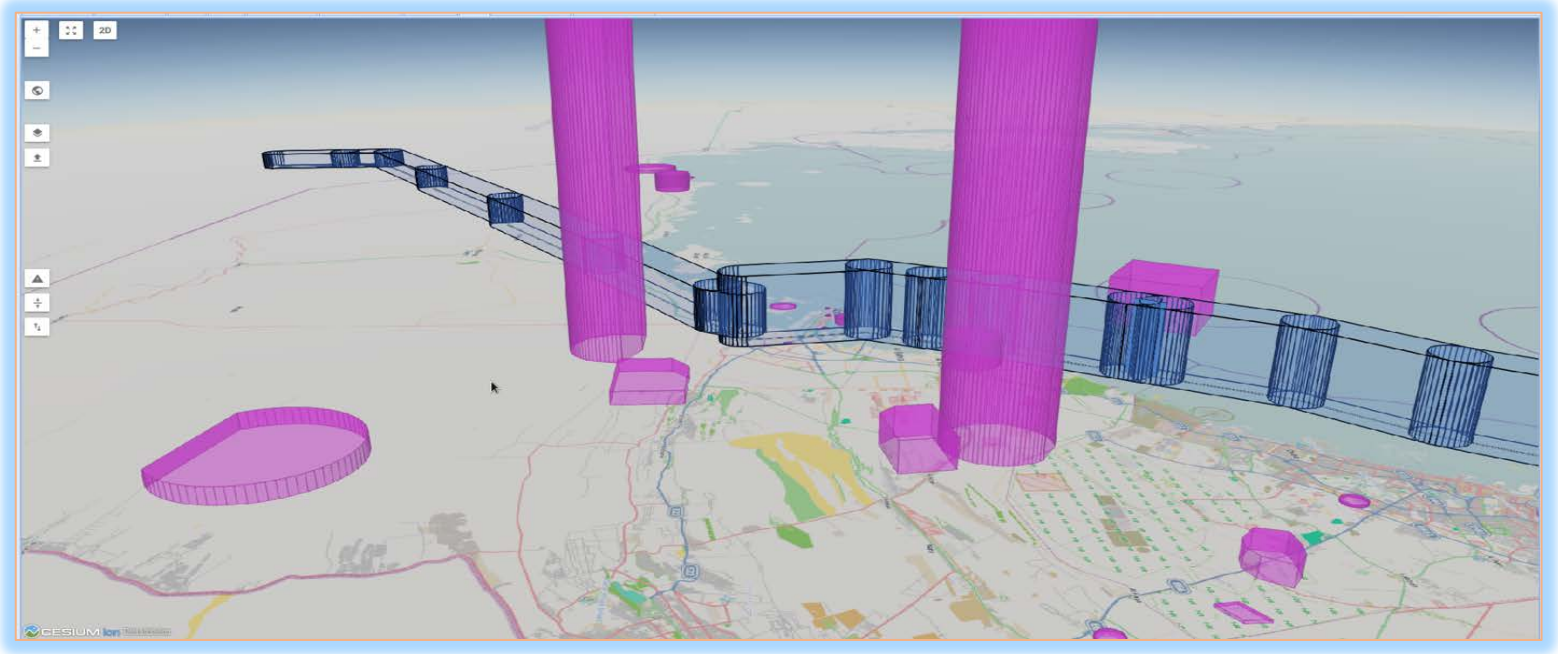
GCAA AIM SWIM Service 3D Visualization



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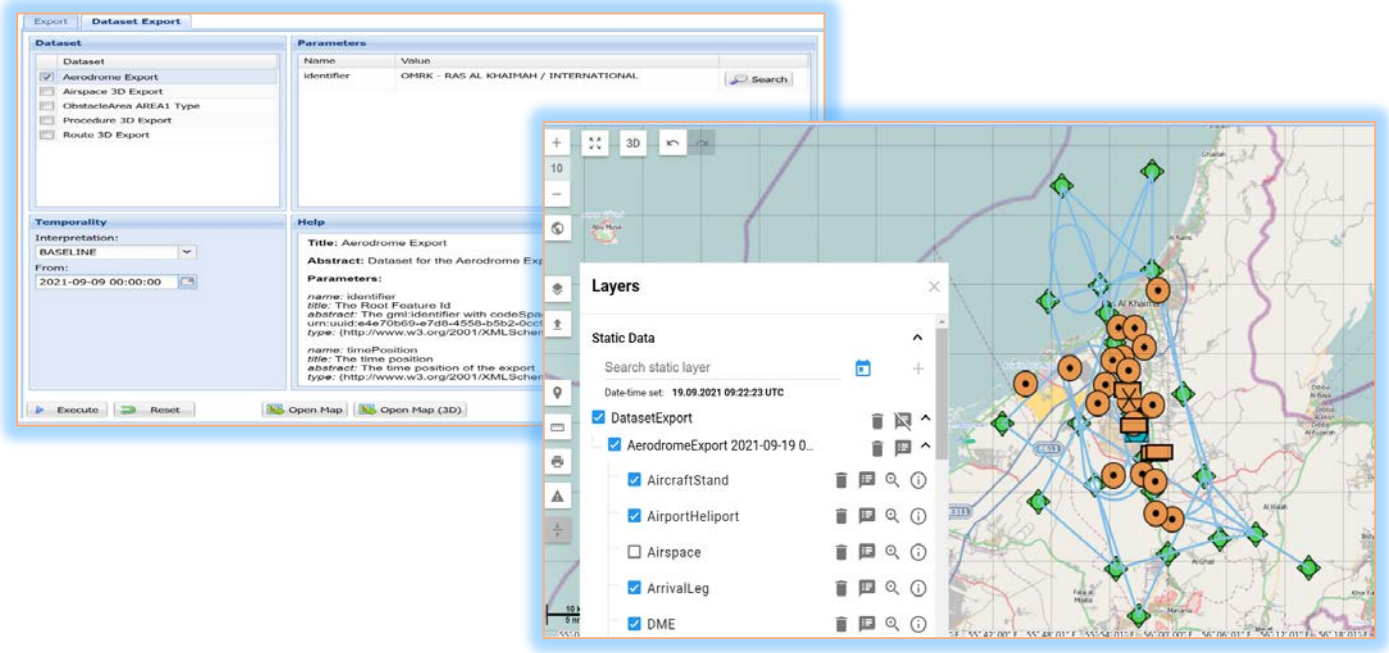
GCAA AIM SWIM Service Aerodrome Based Filtering



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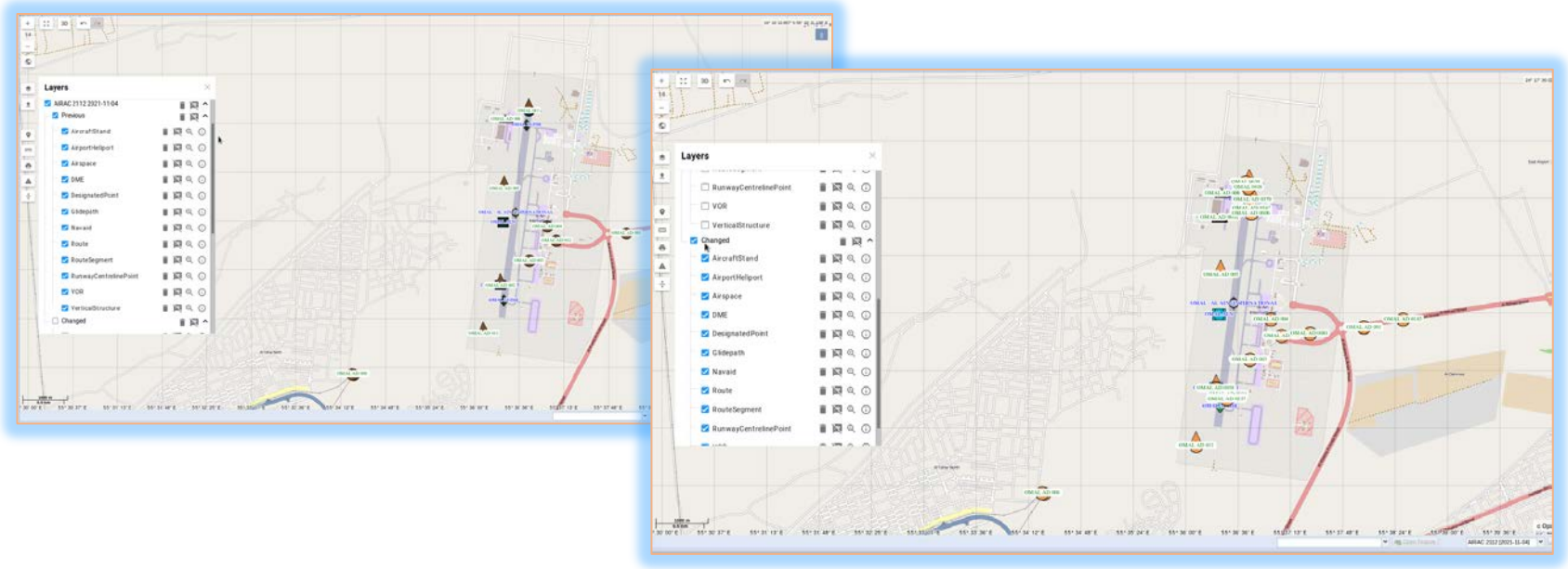
GCAA AIM SWIM Service AIRAC Changes Visualization



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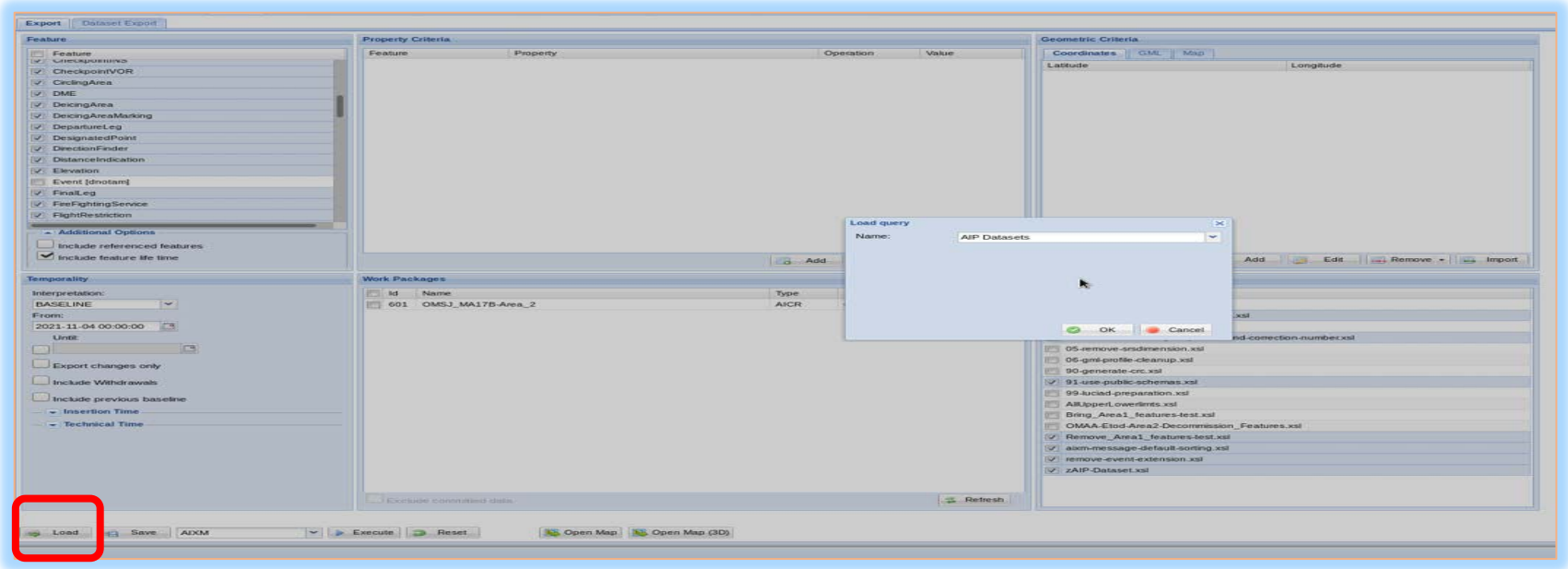
GCAA AIM SWIM Service AIP & ETOD Dataset



Conclusion

GCAA AIM SWIM will facilitate timely provision of accurate UAE Aeronautical Information to the authorized end users/systems.