



Air Traffic Management

Defence

Maritime



FREQUENTIS

FOR A SAFER WORLD



GOF USPACE

Interoperable information management validated

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GOF USPACE validation project at a glance

Flight Information Management System (FIMS), based on SWIM principles

- ⇒ Integration of UTM and ATM systems
- ⇒ Cross-agency / country drone (UAV) information management system
- ⇒ Accessibility of a Common operational picture
- ⇒ Enable Joint Operations / authority collaboration
- ⇒ 19 partners (ANSPs, USPs, Operators, Infrastruct.)

Large scale demonstration



UAV use-case demonstrations

Urban drone fleet ops in Helsinki with Police intervention

Model flyers, general aviation and drones sharing same airspace

Maritime SAR exercise with helicopters in Gulf of Finland

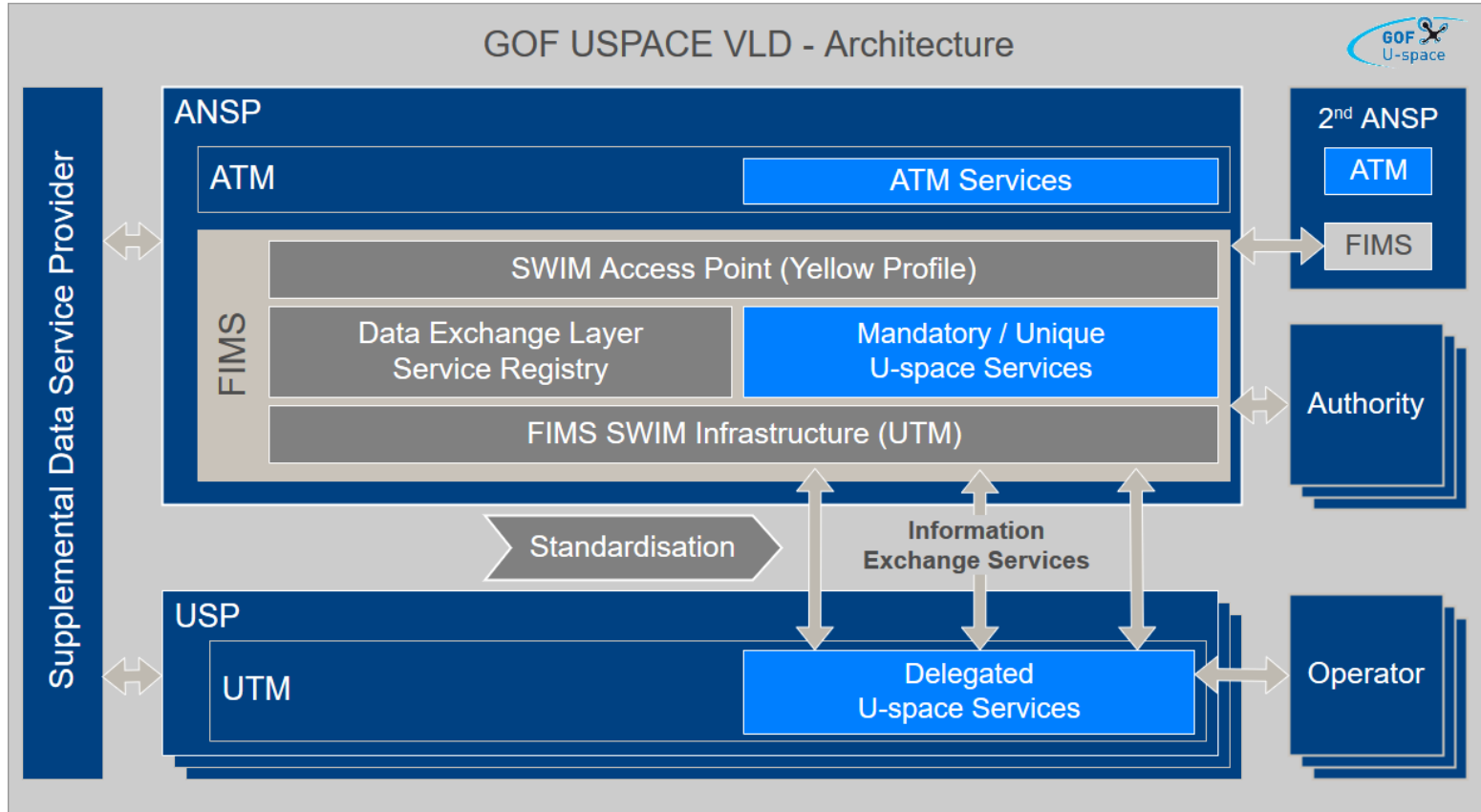
International parcel delivery between Finland and Estonia

Urban drone fleet ops in Tallinn in controlled airspace

100km+ inspection flights in forestry

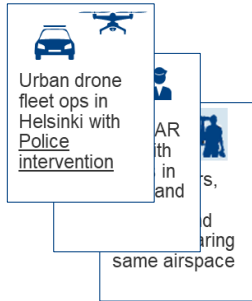
Urban Air Mobility flight at Helsinki-Vantaa airport

GOF High Level Architecture – Based on ICAO 10039 & SESAR principles



Output-driven objectives

Advanced use cases shaped requirements



1. Common Understanding

- Analyse Data Flow
- Identify **Information Exchange Services**
- Describe (without technology)
 - Context
 - Model
 - Interface
 - Behaviour

2. Technical Interfaces & Integration

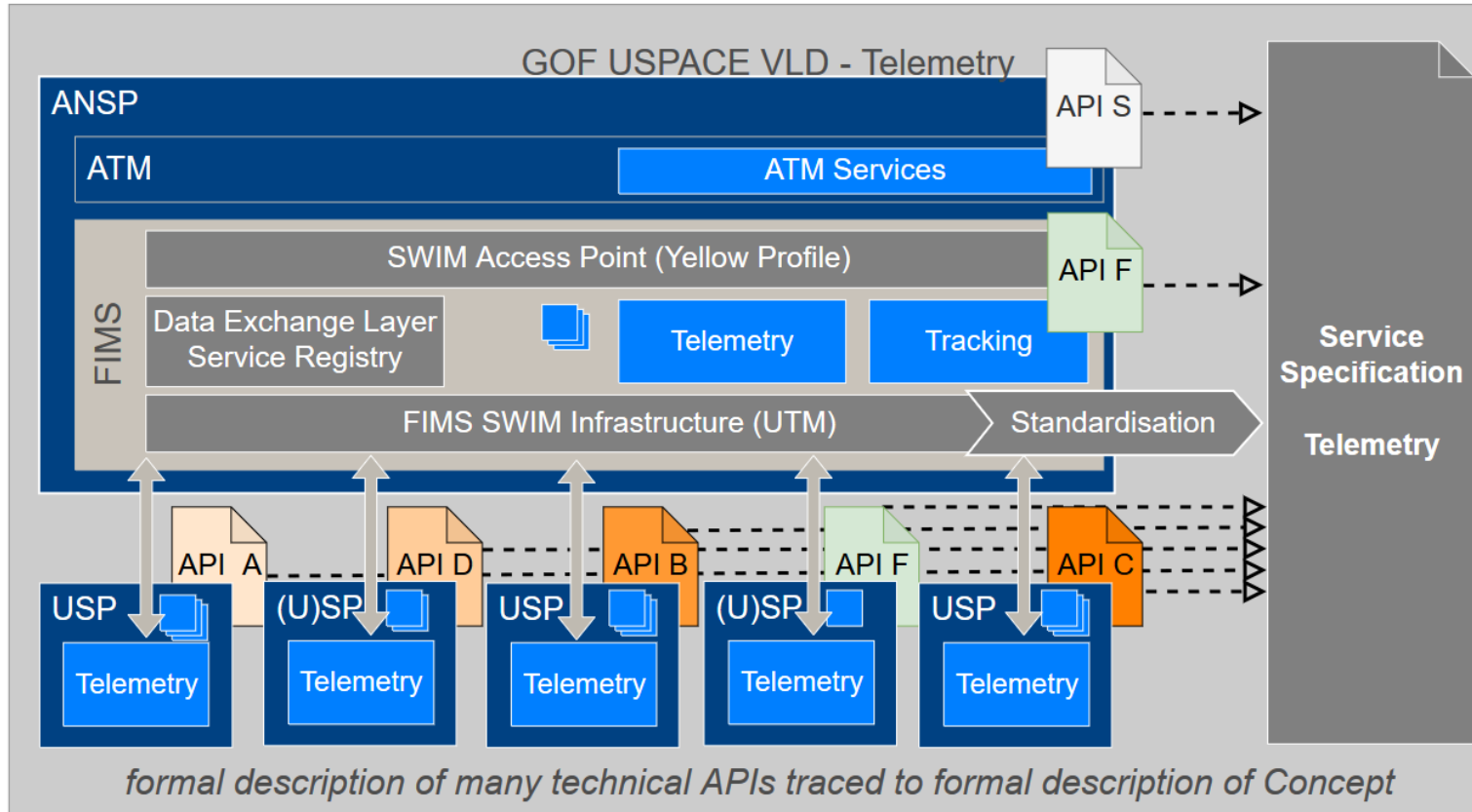
- Map existing technical interfaces
- Test integration

Service Specifications delivered for:

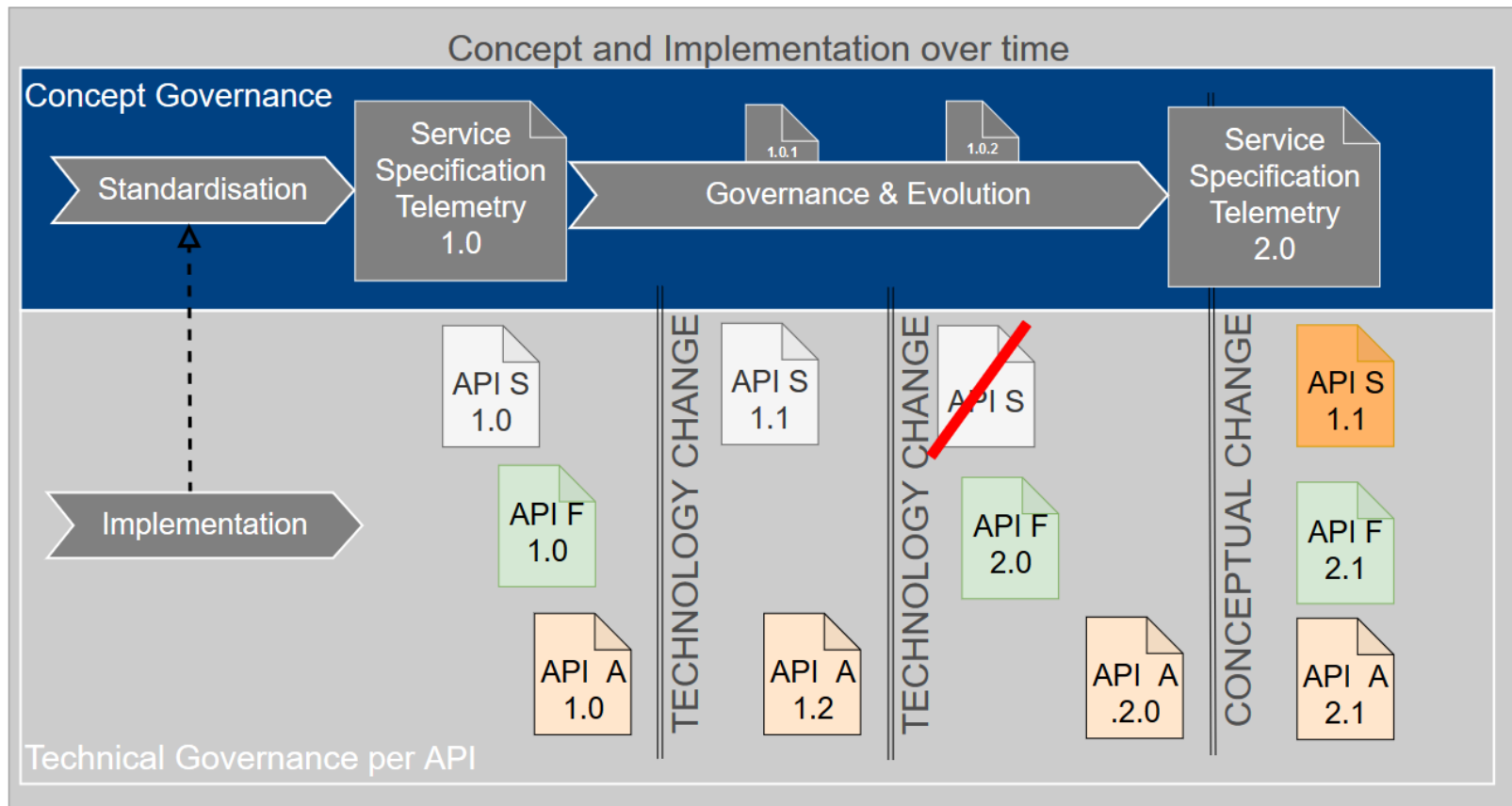
- Telemetry
- Flight plans
- AIM/Geofences
- Alerts
- Registration



Information Exchange & Integration - on the example of telemetry



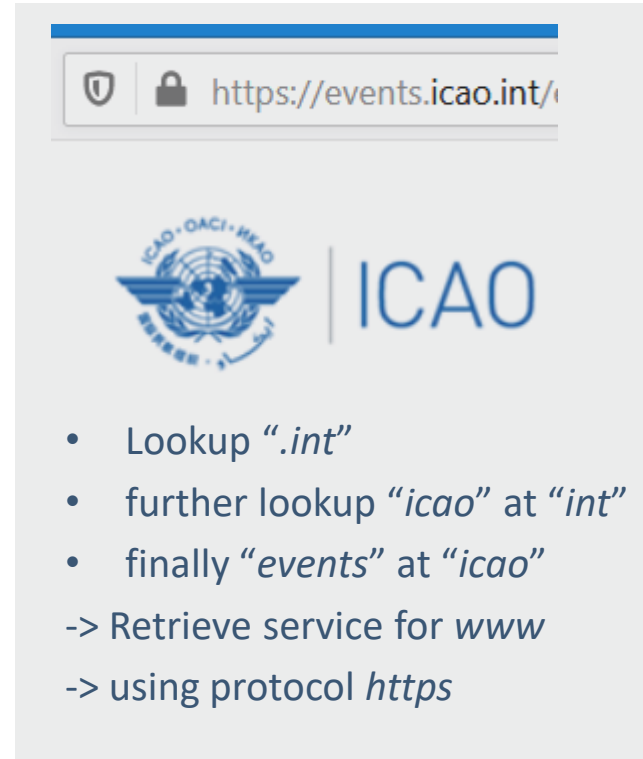
Concepts more stable than technology



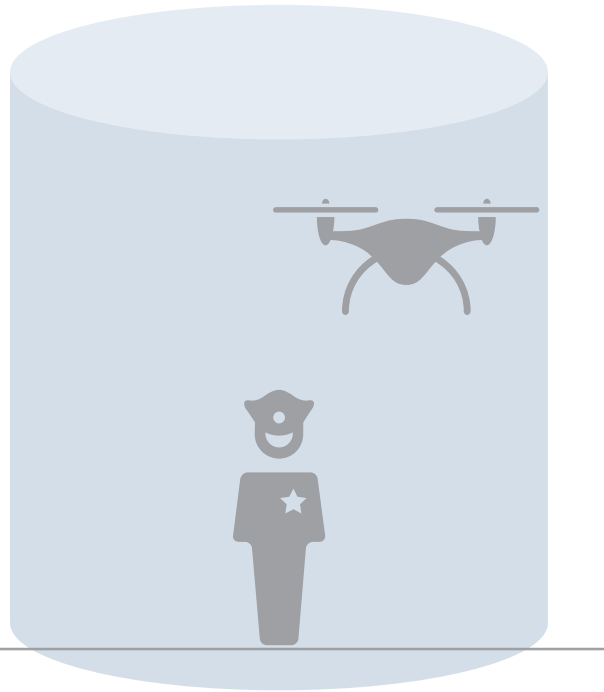
Service Registry at the Core of Scalability

- **Service Registry** provides access to valid services
 - Lookup of authorized services
 - Transparent & clear responsibility / service provision
 - Metainformation
 - Can be used for a huge system of systems - similar approach as in Domain Name Service

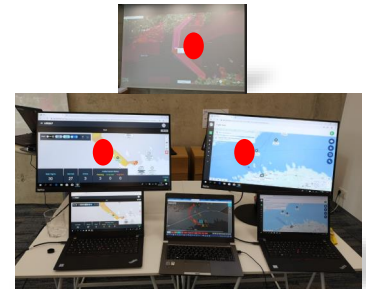
- **Services** provide access to information
 - Single source of truth where required (e.g. tracking, constraints, approvals)
 - Information according to standards



- Lookup “.int”
- further lookup “icao” at “int”
- finally “events” at “icao”
- > Retrieve service for *www*
- > using protocol *https*

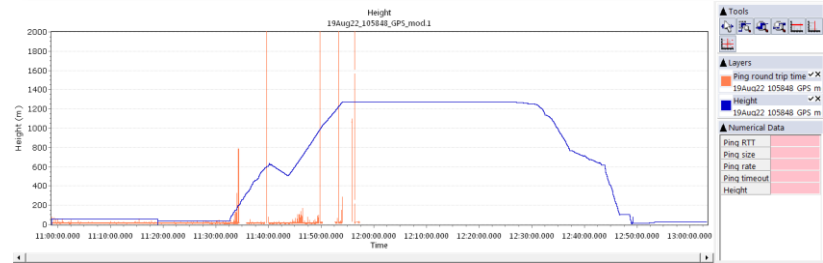


- Dynamic geofencing demonstrated (U3)
 - Without pilot interference
 - Action taken within seconds
- Common situational display achieved
 - ATM and UTM data sharing
- Flight Plans shared
 - Created by one partner
 - approved by a different partner
 - In-flight FPL changes
- Registration updates immediately available



Information is accurate

- Multiple data sources combined and fused
 - Take advantage of different sensors available, e.g. for telemetry
- AIP grade data used and integrated
- Multiple layers of safety & validation in demonstrations
 - Additional ATM grade safety-net for monitoring
 - Risk of one drone leaving planned flight volume identified
 - Action taken successfully – based on a few [m] precision
- Further work recommended on
 - Telemetry data provision („Trackers“)
 - Ensuring accuracy & validity for non AIP grade information



Standard proposals drafted in GOF USPACE for information exchange

A service specification process for information exchange services (incl. templates) was drafted.

It was used to create specifications for Flight Plans, Telemetry, AIM/Geofences, Alerting & Registration

Assuring the (interoperable) provision of

- commonly understood
- quality information delivered
- to the right people
- at the right time

Interface

4.1 Service Interfaces

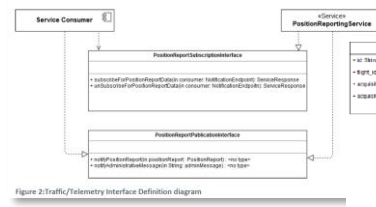


Figure 2: Traffic/Telemetry interface Definition diagram

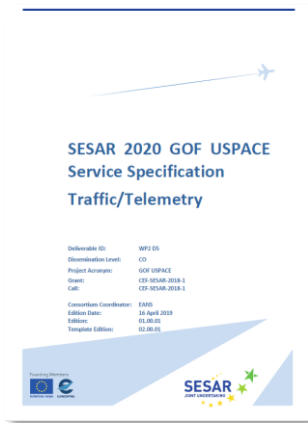
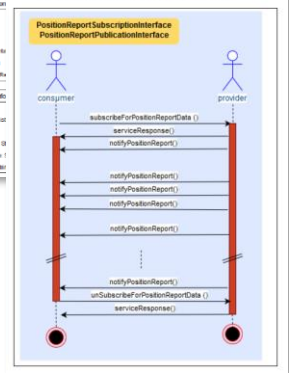
Information Model



Behaviour

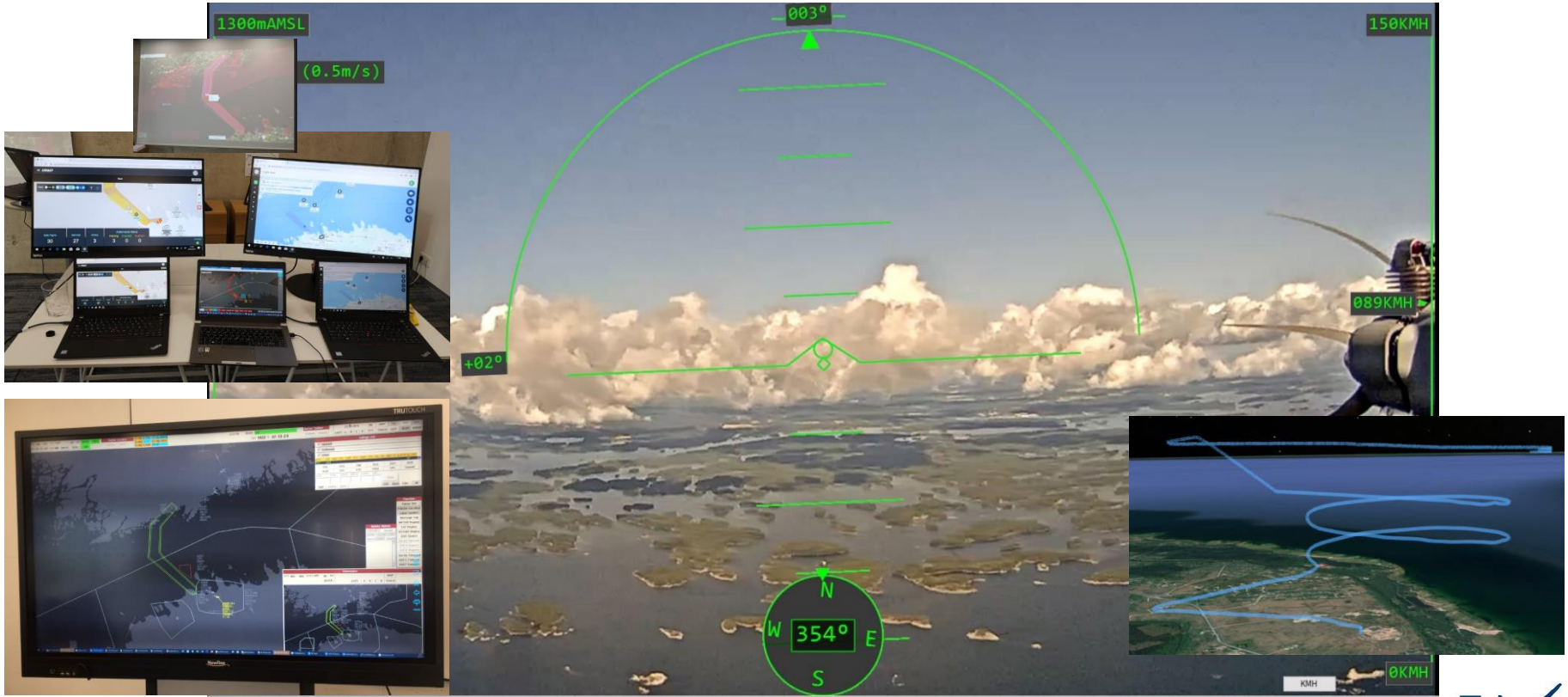
7 Service Dynamic Behaviour

7.1 Service Interfaces PositionReportSubscriber, PositionReportPublicationInterface



Note: The drafted documents are proposals and need further work (e.g. Operation Plan behaviour, minor tweaks on telemetry)

Information Management validated – Approaching Finland, from Estonia



Thank You !



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