Outcomes of the feasibility study

AirTracks

ESA digital sky and beyond workshop - future downstream services
Topic: ADS-B based applications

ESTEC Noordwijk, 18.05.2018

OHB LUXSPACE

DLR

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère du Développement durable
et des Infrastructures
Administration de la navigation aérienne

tekever

Challenges facing the aviation sector

AirTracks

- **Increasing use of airspace**
- **New airspace users: e.g. UAVs**
- **Remote areas**
- **Environmental responsibility**
- **Digital transformation**
- **Cost-efficiency**
- **Safety & security demands:**
  - Global flight tracking (FRA - JNB)
  - Earlier detection of off-track errors
  - Improved weather avoidance
  - Etc.

Some benefits of ADS-B

AirTracks

Safety & Security

- Improve weather avoidance
- Reduced activation time for SAR teams
- Possibility to significantly narrow down the search area
- Provide higher aircraft position updates compared to current satellite-based communication technologies

Surveillance

- Enhance aircraft surveillance and situational awareness in currently non- or partially controlled airspace
- Support of unmanned aircraft systems
- Detect earlier anomalies in flight behaviour
- Enable future air to air surveillance and information application

Efficiency

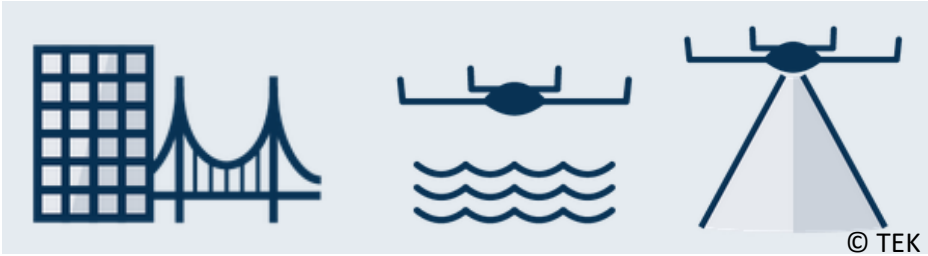
- Reduce separation standards, optimize routing and efficient usage of airspace
- stakeholders benefit from reduced flight times, fuel burns and delays

Partners for the ESA IAP feasibility study (1/2)

AirTracks

TEKEVER

- UAV provider
- technology development for unmanned systems
- Manifold UAV applications (e.g. infrastructure monitoring & maritime missions)



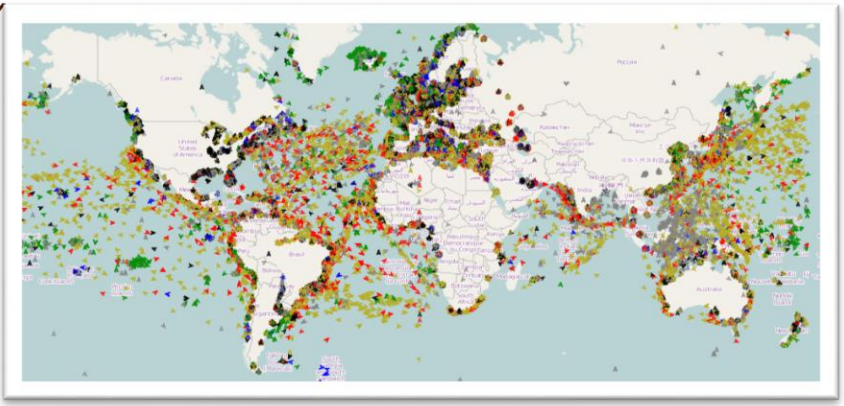
Administration de la navigation aérienne Luxembourg (ANA)

- Luxembourgish ANSP
- ATM perspective
- Advisor for regulatory aspects, user requirement assessment and technological implementation scenarios

Partners for the ESA IAP feasibility study (2/2)

AirTracks

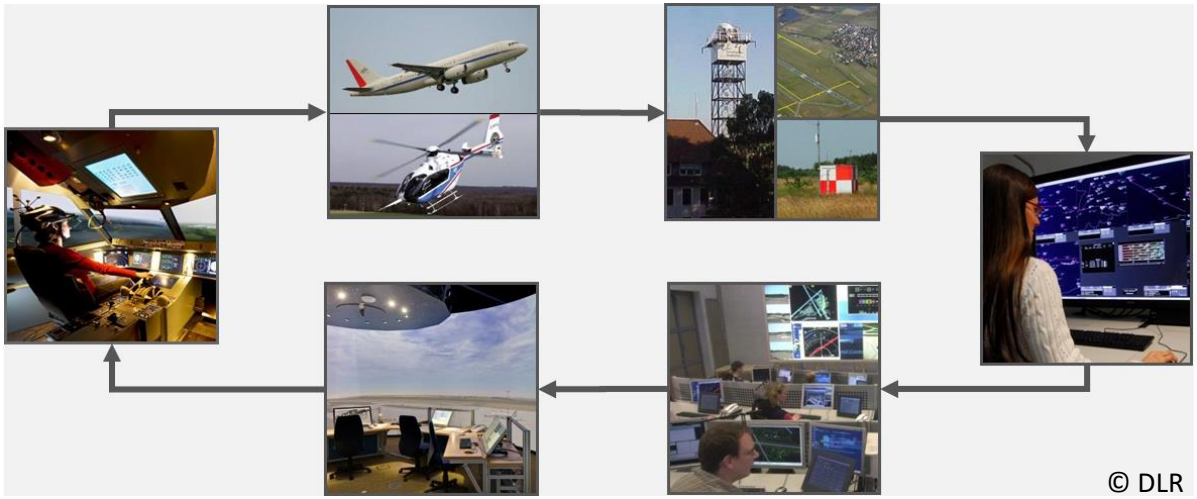
LuxSpace

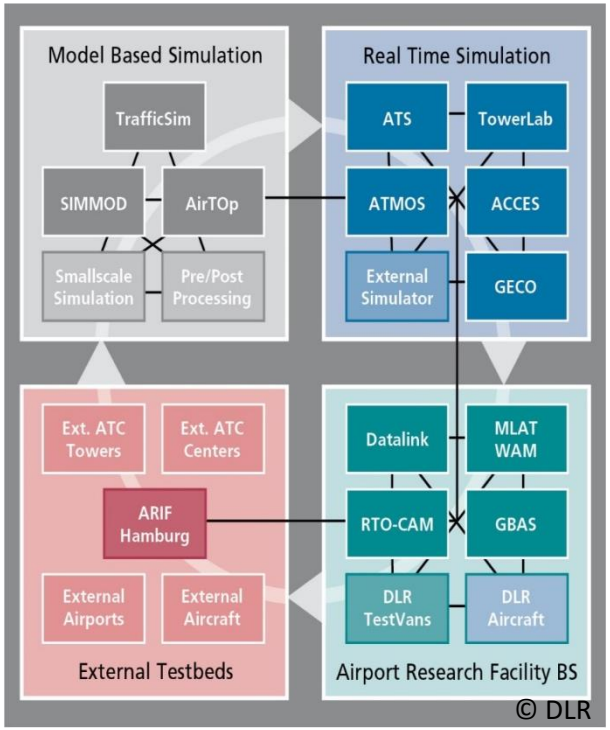


- **Microsatellite integrator**
- **Terrestrial & satellite-based AIS data provider, data processing center**
- **AIS based added value services for maritime domain awareness**

DLR

- **Air Traffic Validation Center**
  Facilities for validation of concepts, technologies & procedures in ATM





Proba V: First demonstration of ADS-B from space

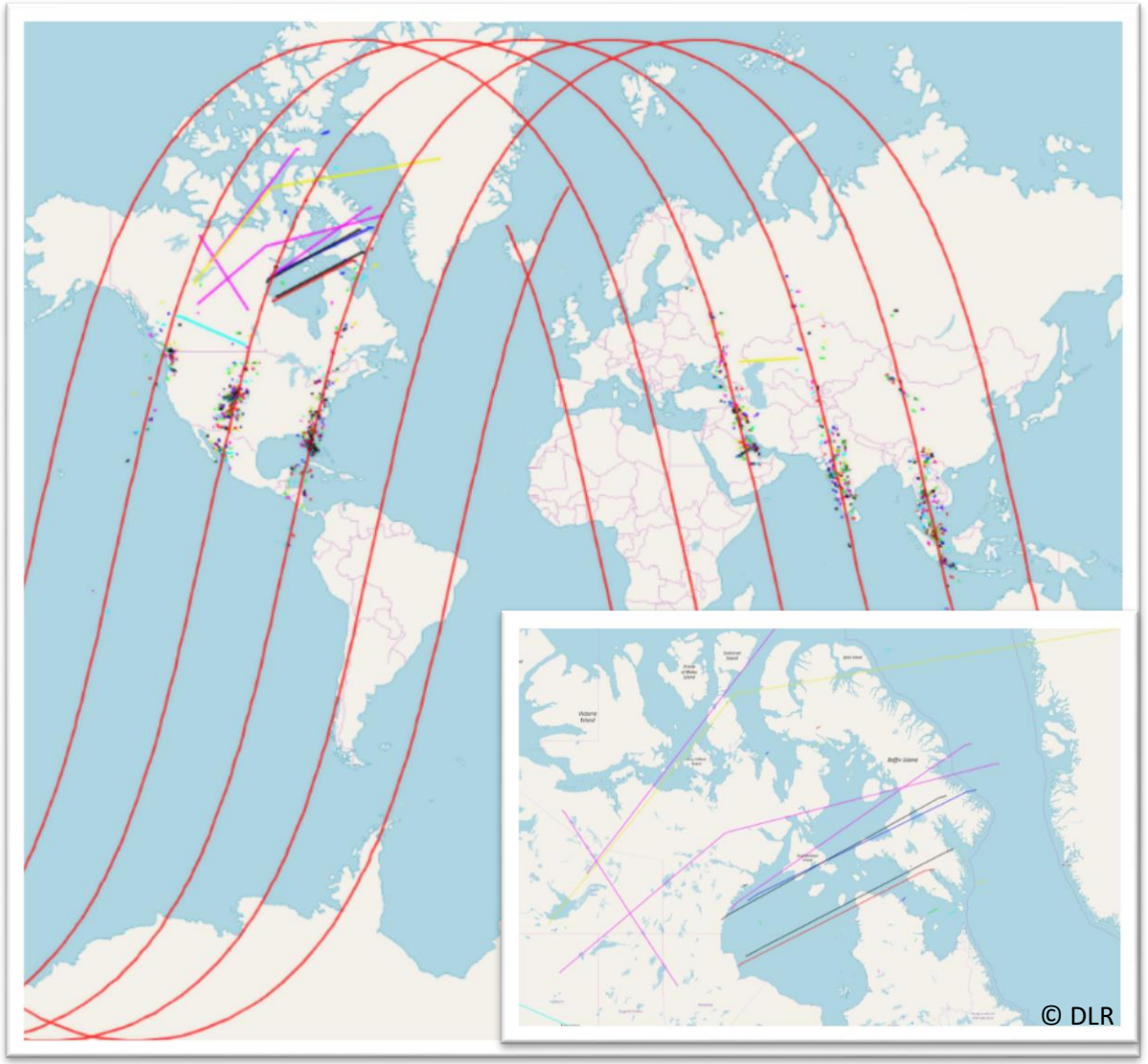
AirTracks

- **Launch: May 2013, still operating, 1 Sat**
- **Primary mission goal: vegetation monitoring (daily overview of global vegetation growth)**
- **Secondary mission goal: Technology demonstration**

Aircraft detected	Aircraft expected	Aircraft identified	PTA [%]	PTI [%]
15.106	17.235	9.538	87.6	55.3

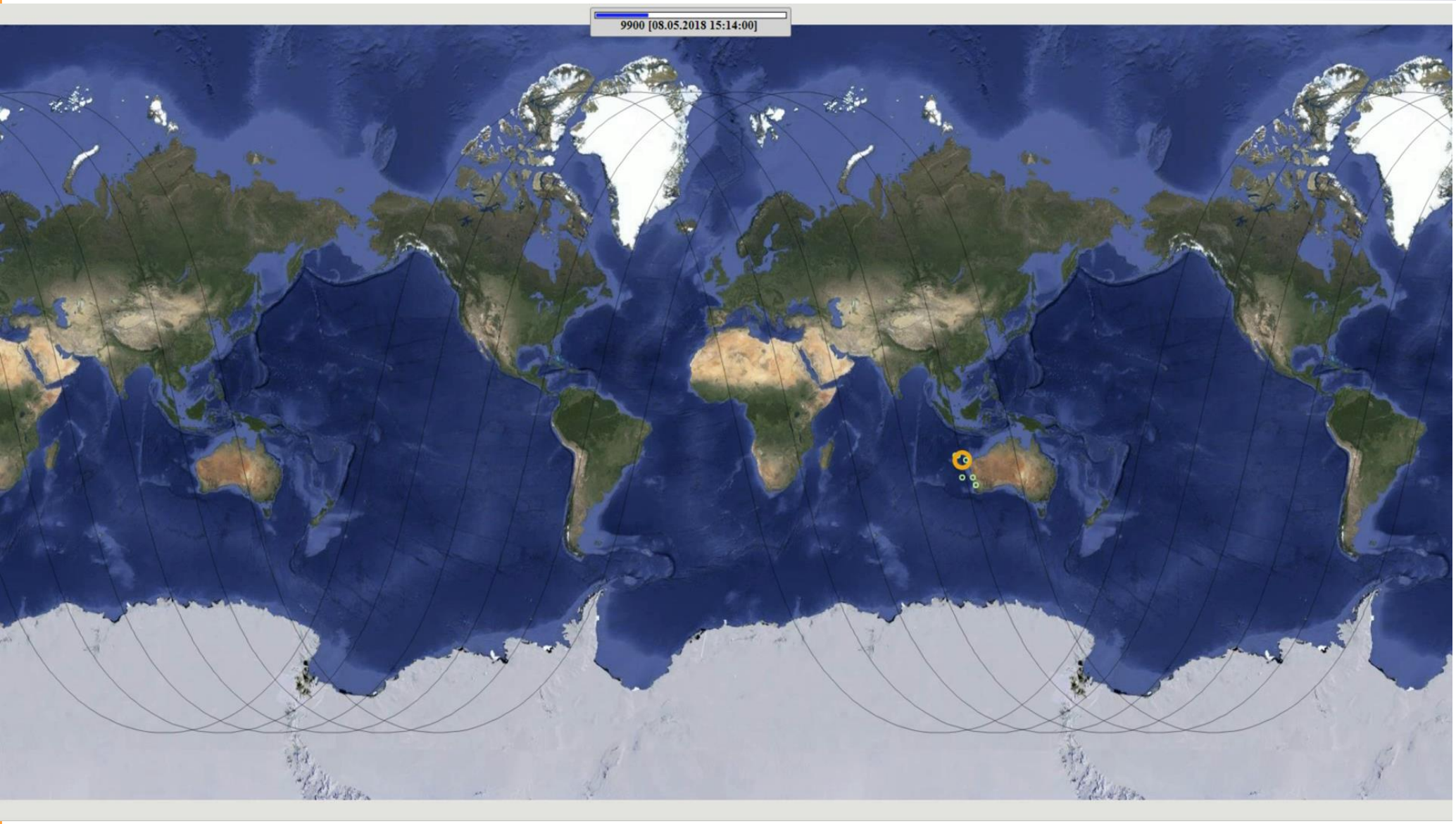
Source: T. Delovski et al (2014)

Source: www.esa.int



Proba V: First demonstration of ADS-B from space

AirTracks



© DLR

Service value proposition

AirTracks

- Shrink the information gap in uncontrolled airspace for users within the aviation sector to increase situational awareness, safety and monitoring, and operations management
- We want to provide those users easy access to the missing information
- We want to give those users the information they really need, tailor-made to their business environment

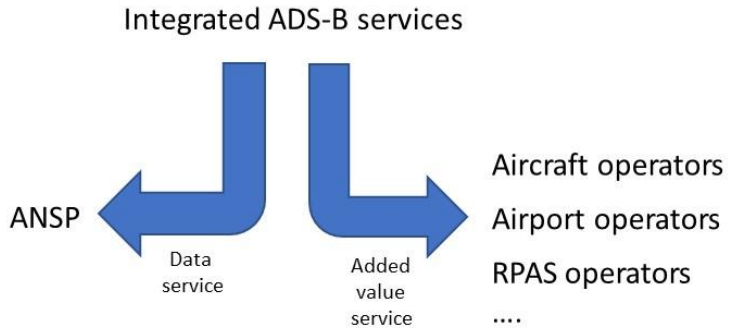
→ Modular service concept allowing the customer to subscribe to the building block he really needs

→ No additional infrastructure investment

→ provide a SWIM compliant "information only" service

→ Increased airspace awareness

→ Increased monitoring capabilities

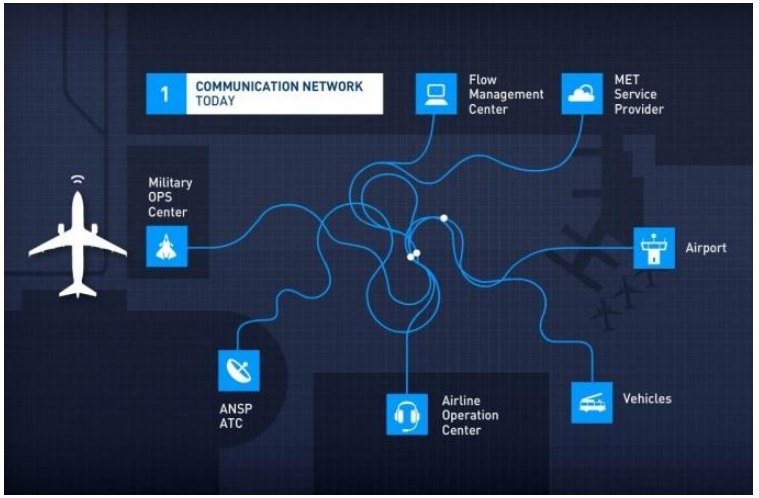


Service value proposition

AirTracks

Benefits of acting SWIM compliant

- SWIM = System wide information management
- Access to real-time, relevant aeronautical, flight, and weather information → faster dedicated response possibilities
- Reduced implementation, operating and extension costs because of SWIM's standardized character
- SWIM = requested fundament of the future for info based collaboration in ATM (Air Traffic Management) → being prepared for the future



Source: www.eurocontrol.int/swim

ADS-B constraints/ user concerns

AirTracks

Garbling	➓Several messages arriving at the ADS-B antenna at the same time overlap and thus cannot be decoded by the ADS-B receiver
Jamming	➓Jamming of GNSS signal
Spoofing	➓Easy reception and recording + replay with own broadcast (no encryption)
Standardization	➓Introduction of Standards concerning functionality and performance ➓Standardization and for low power ADS-B transponders for GA mandate
Regulation	➓Establishment of Regulations for certification and application ➓Regulation of ADS-B data ownership and access rights

Lessons learned

- **Aircraft ADS-B deployment rate is still unsatisfying (ADS-B out) from a user point of view**
- **ADS-B not a single source solution, additional data from Radar, MLAT and others needed to provide a meaningful airspace traffic picture**
- **Strong demand on customer side for more surveillance means in uncontrolled airspace**
- **Customer expects solutions with generic preparedness towards future information sharing needs/possibilities**
- **Integration of new airspace users e.g. UAVs, into ATC and ATM is seen as necessary but conventional ATM operations cannot be applied, since e.g.**
  - No voice communication between UAV pilot and air traffic controller
  - Non existing capacities for conventional air traffic management to handle drone traffic
- **Multiple usage potential: from ATM to supply chain management**


Thank you for your time!
Questions?
Please contact: simone.moser@luxspace.lu