

Aviation: Space and Air Traffic Integration



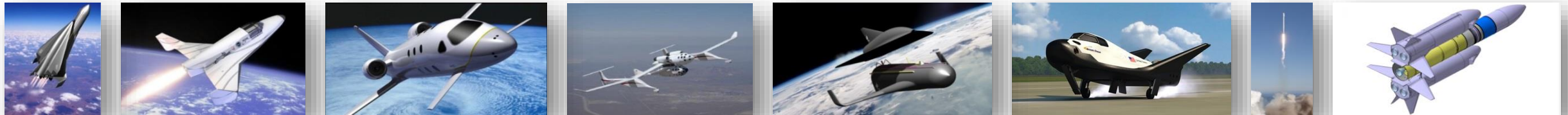
Spaceplanes and Spaceports



What is it all about?

Spaceplanes are a new combination of Air- & Spacecraft, which fly with supersonic speed into space and glide back to earth

Spaceports are special airports for take-off and landing of spaceplanes

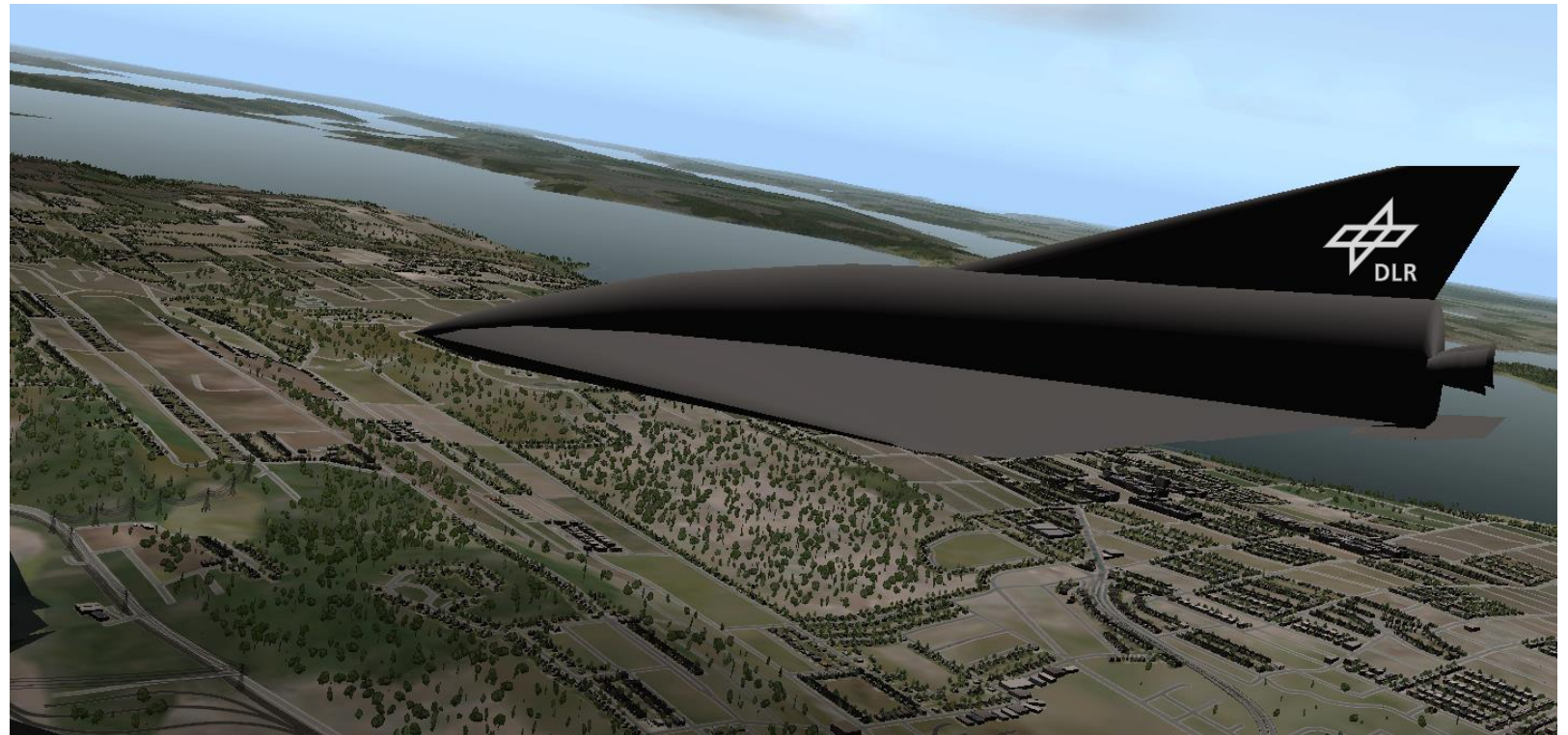


Enabling Spaceplane Operations



Spaceplanes offer interesting opportunities, but are a challenging regarding German and European airspace integration

DLR investigates how to integrate spaceplanes into the European and German airspace



Integration of Spaceplanes into the Airspace



Objectives of Research

How to adapt Air Traffic Management?

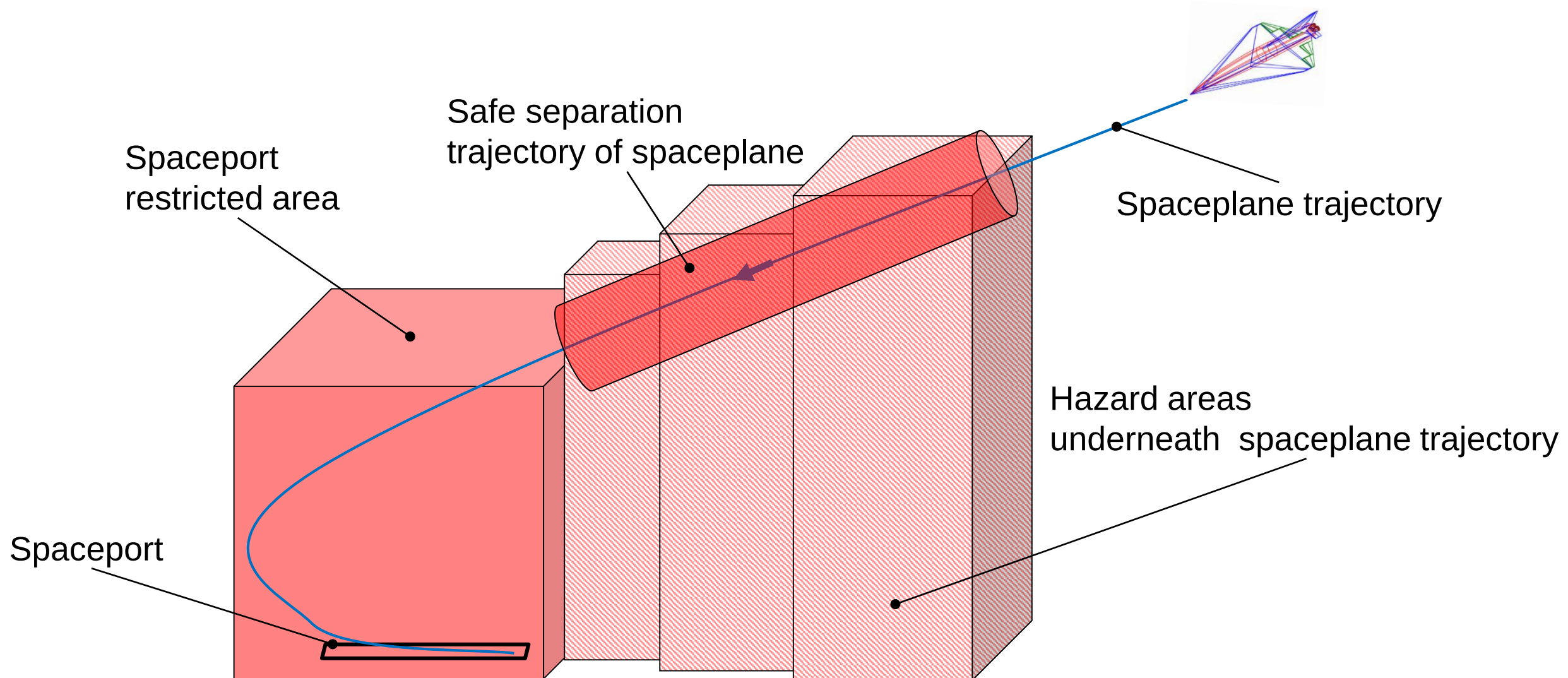
Need of special safety areas/zones in
the airspace?

How to design efficient Spaceports?

How to validate new operational
procedures?



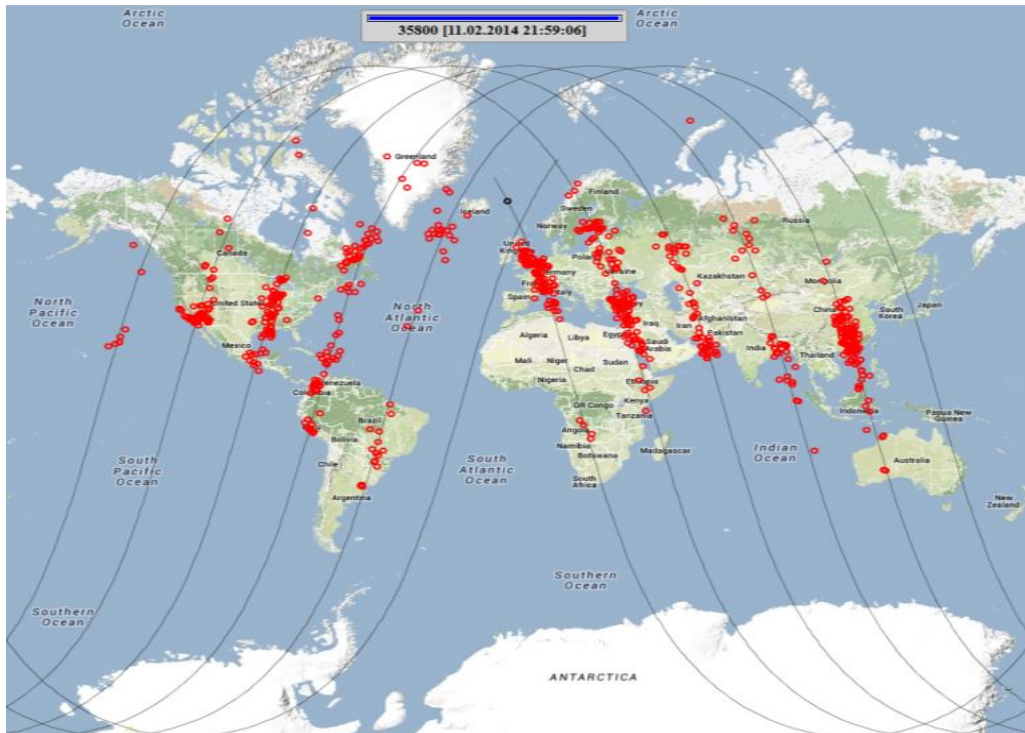
Safety bubbles for safe spaceplane operation



Air Traffic Surveillance from Space



Integration of Spaceplanes by new space systems



SAT ADS-B



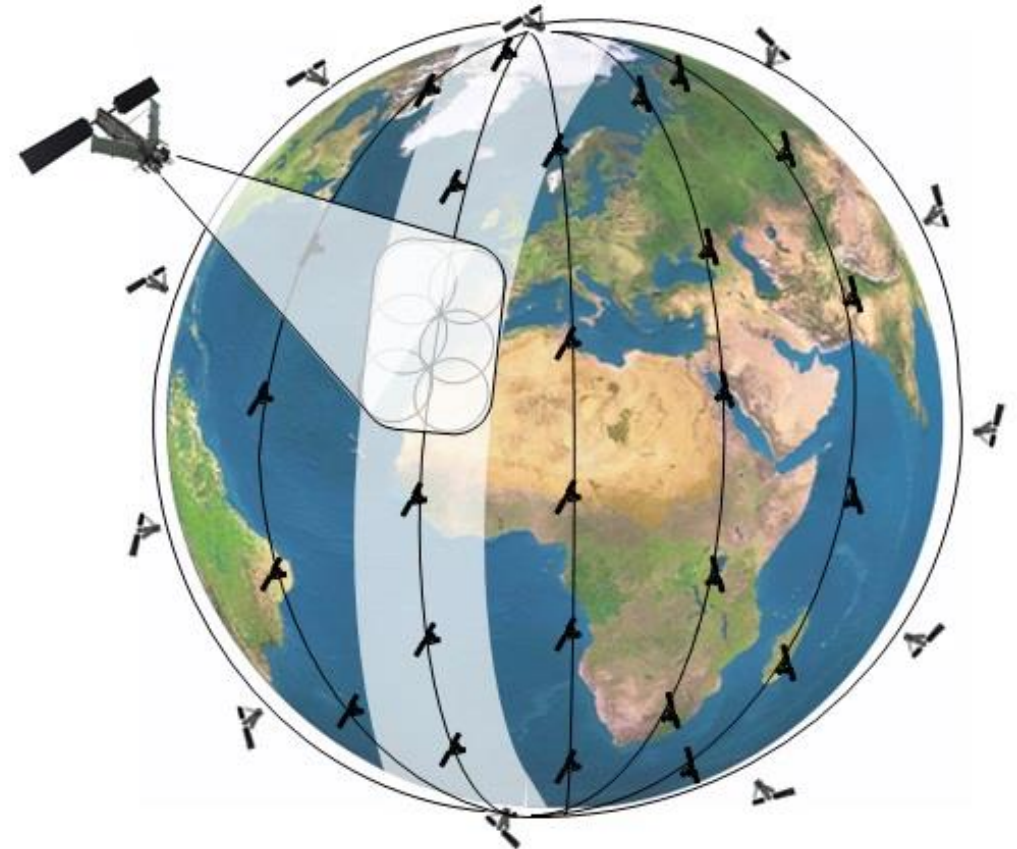
Surveillance of aircraft from space

ADS-B receiver on satellites

Special designed antennas

Dedicated communication network

New procedures



DLR's "ADS-B Satellite"



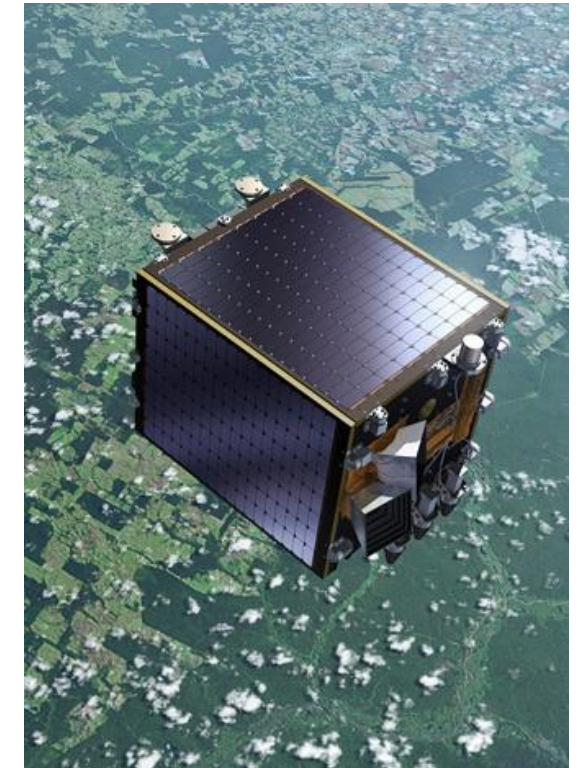
World's first ADS-B receiver in space on ESA's Proba-V-Satellite

DLR development

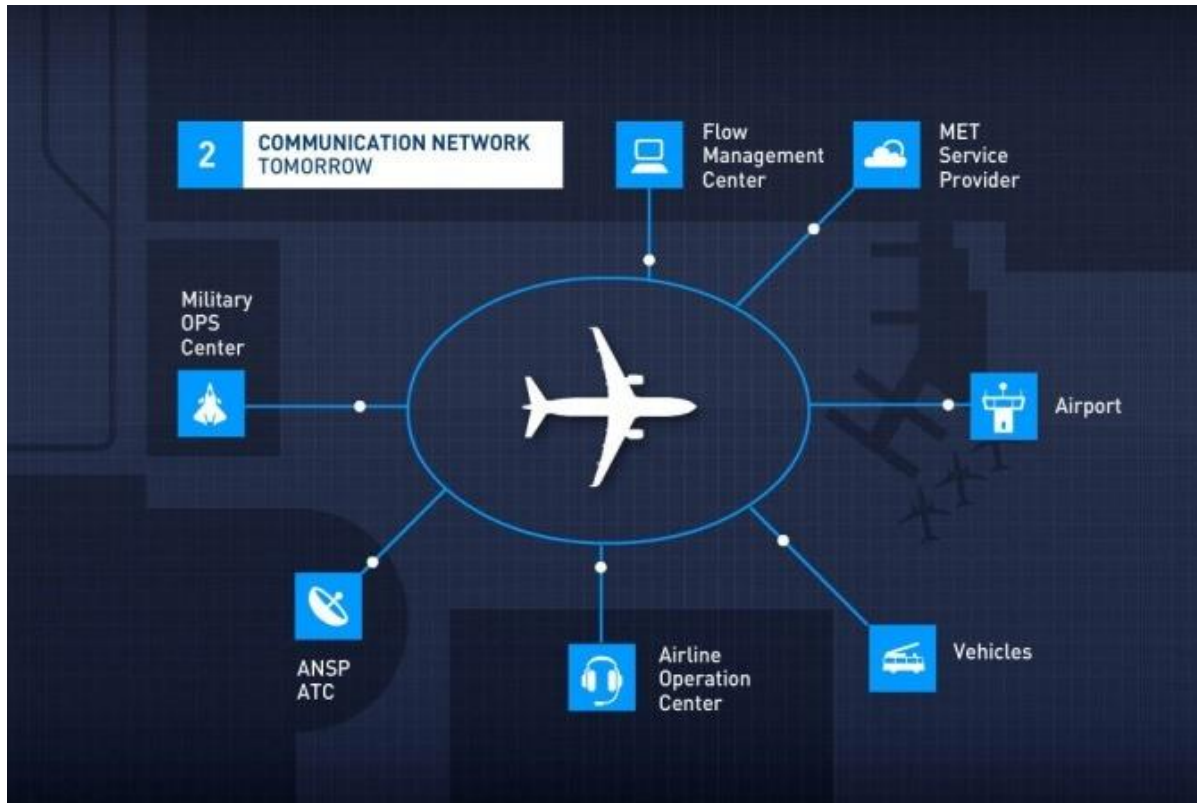
Operational since 2013

Operational investigations

Technology development



Intranet for the air transport system



Global information sharing and planning of trajectories of the spaceplanes

System Wide Information Management (SWIM) as enabler: Global „Intranet for the air transport system“

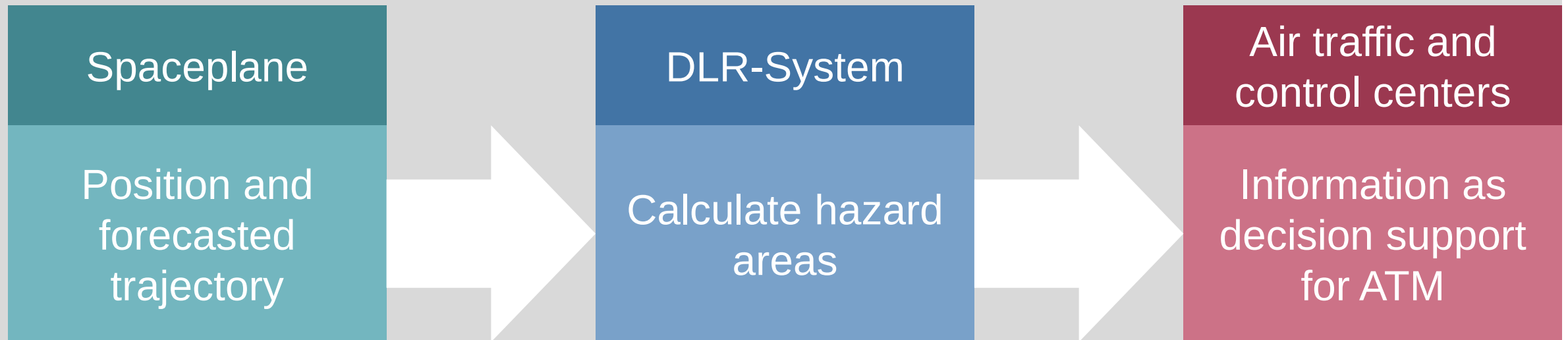
Joint communication system for all stakeholders

Identify Hazard Areas for Maintaining Safety



Via SWIM, all air traffic control centers and airspace users are informed online about the actual flight and status of the spaceplane

Information exchange in the SWIM system



Spaceplane Integration in Germany and Europe



DLR researches for the seamless, efficient and safe integration of spaceplanes into the air traffic of today.



Maintain the efficiency of the air transport system

Improved procedures for air traffic control

Testing in the air transport validation center of DLR

DLR Aviation Branch supports the use of SAT ADS-B technology world wide

The project leading to this application has received funding from the SESAR Joint Undertaking under grant agreement No 699337 under European Union's Horizon 2020 research and innovation programme

DLR Aviation Branch is committed to
the operation of spaceplanes in
Germany and Europe.



