

The logo for TechnoSky S.r.l. features a stylized 'TS' monogram to the left of the company name. The 'S' in 'TechnoSky' is uniquely designed with a horizontal line that extends to the right and then curves upwards, ending in an arrowhead. The text 'S.r.l.' is positioned to the right of 'TechnoSky' in a smaller, sans-serif font.

TechnoSky S.r.l.

The ENAV Company logo consists of a circular emblem containing a stylized 'V' shape with an upward-pointing arrow. To the right of the emblem, the text 'an ENAV Company' is written in a sans-serif font.

an **ENAV** Company

A large, solid blue arrow graphic pointing to the right, which serves as a background for the text below it.

Your Partner in Reliability & Safety

S²BAS

Space Services Benefits in Aviation Systems

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Project Partners



System Engineering
System Deployment



GNSS Signal Integrity
Satellite Communications



Concept and Operation
System Engineering



Management
System Engineering
Demonstration



Earth Observation



Concept of Operation
Demonstration



Navigation
Communications



Legal Aspects



Business Aspects

External Supporters



Sponsors



The Problem

Current trends in air transportation show that the General Aviation traffic will expand in the future. The development of regional and small airports is expected to become a priority in the near future.



New National and European transport policies aim at increasing people's mobility while reducing transportation time, costs, and environmental impact by transferring air traffic towards areas/sites served by small airports.

A considerable number of aircraft used for business and/or private tourism would utilize small airports in Europe if these airports were properly equipped with adequate support services.

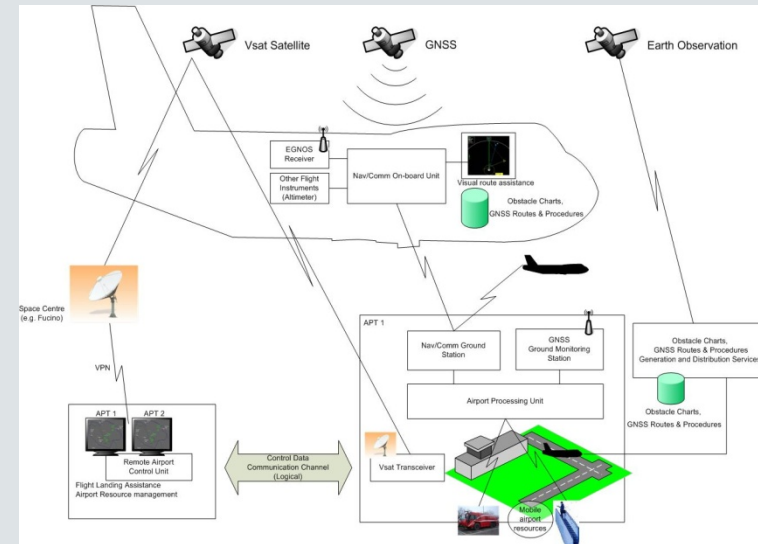


At the moment, small airports capabilities are restricted, due to the absence of traditional surveillance and air navigation services, such as Instrument Landing System, and control tower services, which are typically too expensive for small facilities with limited and sparse.

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The Solution: Overview

The S²BAS (Space Services Benefits in Aviation System) Demonstration project aims to develop, deploy and demonstrate the provision of an integrated set of satellite-based cost-effective services targeted to small and regional airports. The set of integrated satellite-based services includes:



- i) the provision of GNSS (Global Navigation Satellite System) based navigation assistance in the terminal area to assist flight approaches
- ii) an advanced way for the production and distribution of up-to-date Obstacle Charts by means of satellite based Earth Observation data
- iii) the management of remote airports through satellite communications, including the monitoring of real-time air traffic in the vicinity.

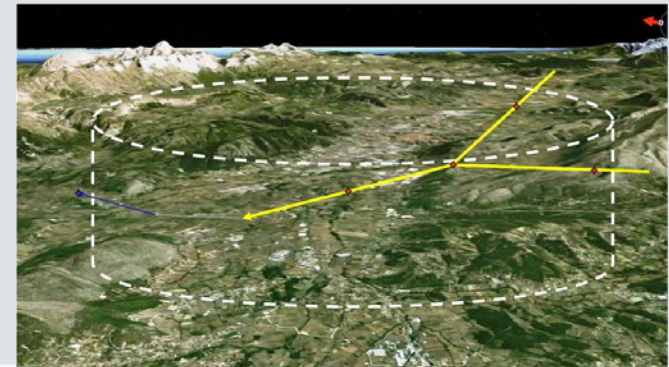
The Solution: S²BAS Concept of Operations

Focus: improving the underutilization of many of the European small airports and airfields, moving them into a customized Airspace Concept with tailored services, reducing procurement and maintenance costs, making them “low cost” and “highly safe”.

S²BAS Airspace Concept: establishment of an area of flight operations called SCA (Self Contained Area), which is a cylindrical volume surrounding one small airport containing entry and exit operations to or from the ground surface. This volume shall be defined for each specific airport or group of small airports, and shall take into account aspects like terrain, obstacles, traffic density, and noise abatement procedures.

Aircraft within the SCA will be provided with the following real-time information:

- Surrounding air\ground traffic information
- Aerodrome Information
- Ground services information
- Meteorological Information
- Aeronautical Information
- Environment (e.g. Tourist information).

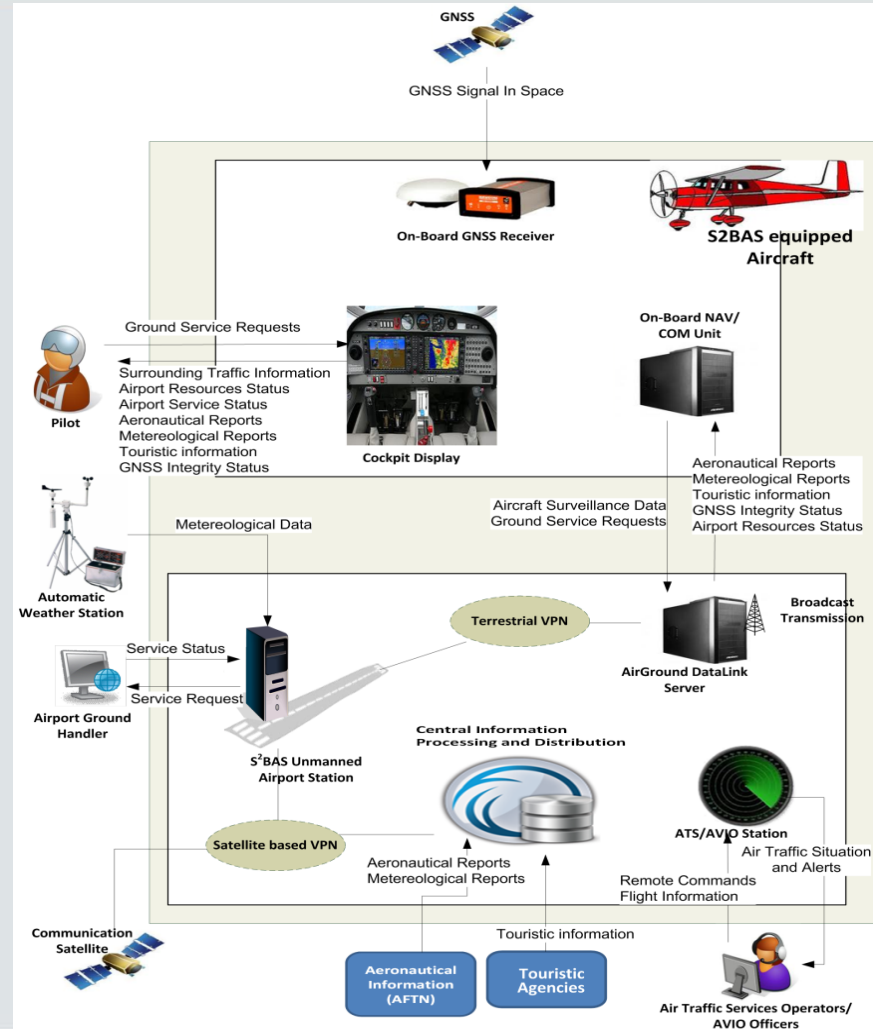


The Solution: Architecture

S²BAS is composed of an *airborne segment* and a *ground segment*.

The *On-Board segment* is composed of an On-Board NAV/COM Unit and a Cockpit Display.

The *Ground segment* is composed of Unmanned Airport Stations, Air/Ground Data-Link Servers, a Central Information Processing and Distribution system and ATS/AVIO Stations.



Possible Applications: Stakeholders

The project consortium has identified a set of stakeholders that would directly or indirectly benefit from the S²BAS service:

STAKEHOLDERS

General Aviation (GA) Pilots

ANSP (Air Navigation Service Providers)

NCAA (National Civil Aviation Authorities)

Aircraft Operators, Heli-Assistance, Aeroclubs

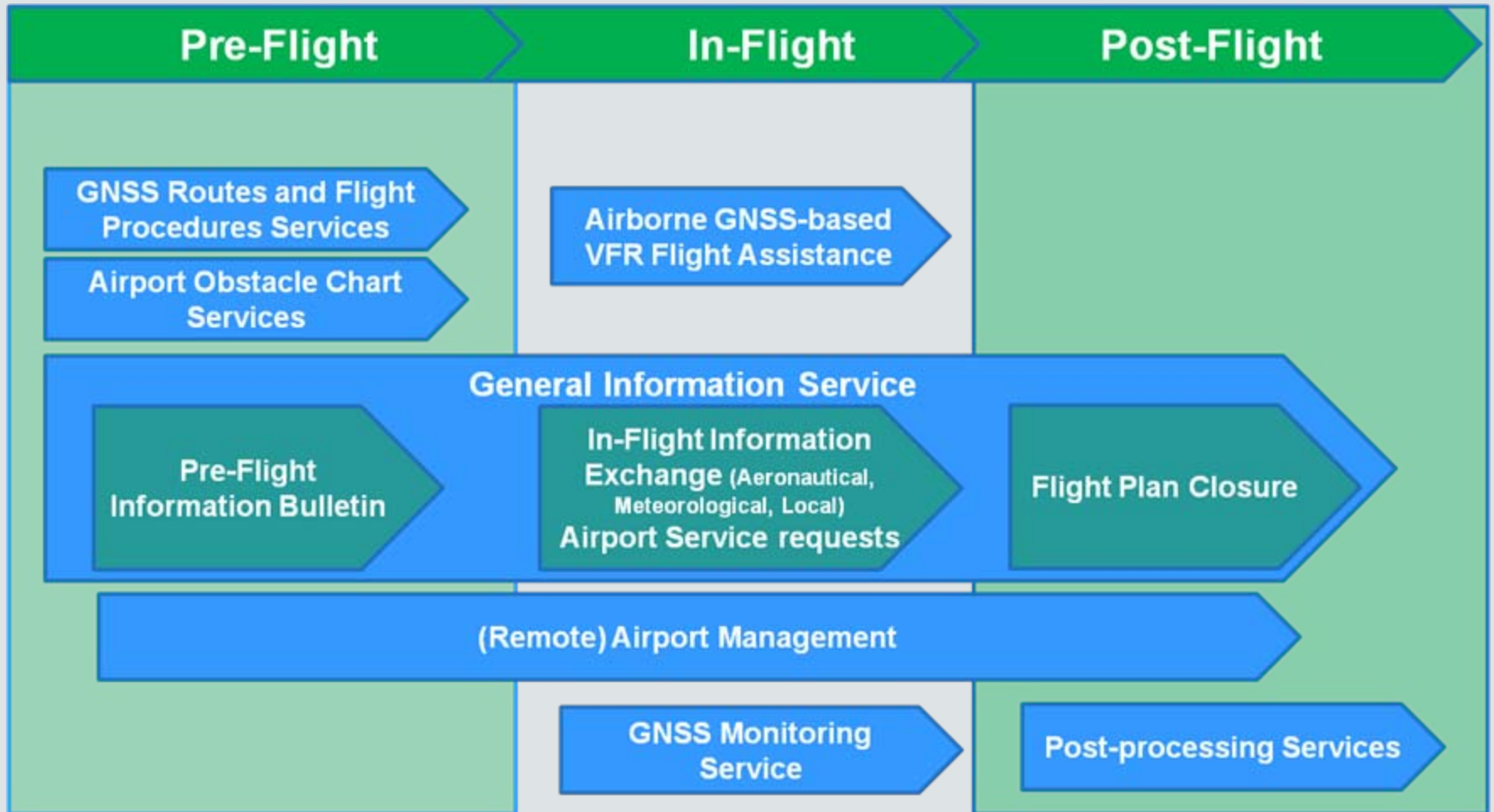
Civil Protection

Airport Operators, Airport Ground Handlers

Regions, Provinces, Municipalities

Considering the panel of stakeholders and the expressed User Needs, the S²BAS system provides its users with the integrated set of services listed in the next slide.

Possible Applications: Flight Phases services



Possible Applications: Services (1/2)

GNSS routes and flight procedure definition

This service is responsible for the generation and distribution of the GNSS flight procedures.

Airport Obstacle Chart Services

This service is responsible for the generation and distribution of Airport Obstacle Charts using images from the COSMO-SkyMed satellite constellation.

General Information Service

This service is responsible for the provision of General Information to S²BAS equipped aircraft. General Information encompasses aeronautical, meteorological and environment (e.g. tourist) information, air/ground traffic information, aerodrome information, ground services information. This service extends the concept of the traditional Flight Information Service.



Possible Applications: Services (2/2)

Airborne GNSS-based VFR Flight Assistance Services

This service is responsible for the provision of flight support to pilots using a satellite-based navigation system capable of visual assistance (2D, 3D) regarding the position, the attitude, the route, the air traffic, the terrain and the obstacles charts of the interested airports.

(Remote) Airport Management Services

This service is responsible for the management of S²BAS equipped airports resources and allows the operator to visualize the position and identification approaching/leaving aircraft as well as the position and status of the airports resources on a dedicated HMI.

GNSS Monitoring and Post-processing Services

The GNSS Monitoring service is responsible for both real-time and off-line monitoring of the GNSS signals received in the SCA with the aim of verifying their integrity. The Post-processing service shall allow a S²BAS operator to consult and query data to assess performances of the S²BAS (by the use of proper analysis tools).

Conclusion: Benefits

The *key benefits* that S²BAS system will deliver are:

- Increase of the traffic volume served
- Increase of the accessibility to the territory
- Extend the surveillance coverage beyond the limits of NRC (Non Radar Coverage)
- Increase aircraft categories allowed to fly in severe weather conditions and during night on small airports
- Improve the on board navigation aids
- Optimize of the airport resources



Conclusion: Impacts

S²BAS will have the following *impacts* on the General Aviation sector:

- Improvement of regularity, fluency and economy of the air traffic
- Assurance of safety standards for small airports
- Assurance of the aircraft safety
- Improvement of the airport capacity
- Increase of the business, thanks to the increase of the traffic volume served
- Assurance of a high level assistance in an emergency scenario
- Increase of the value of the territory and possibility to creation of employment in the local area due the socio and economical impact.

