EGNOS Extension to Eastern Europe: First Flight Trials in Romania

UN/Croatia Workshop on the Applications of GNSS

Date: 21-25 April 2013

Place: Krk Island, Croatia

What is EGNOS ?

EGNOS – European Geostationary Navigation Overlay Service - SBAS developed by ESA in agreement with the EC and Eurocontrol.

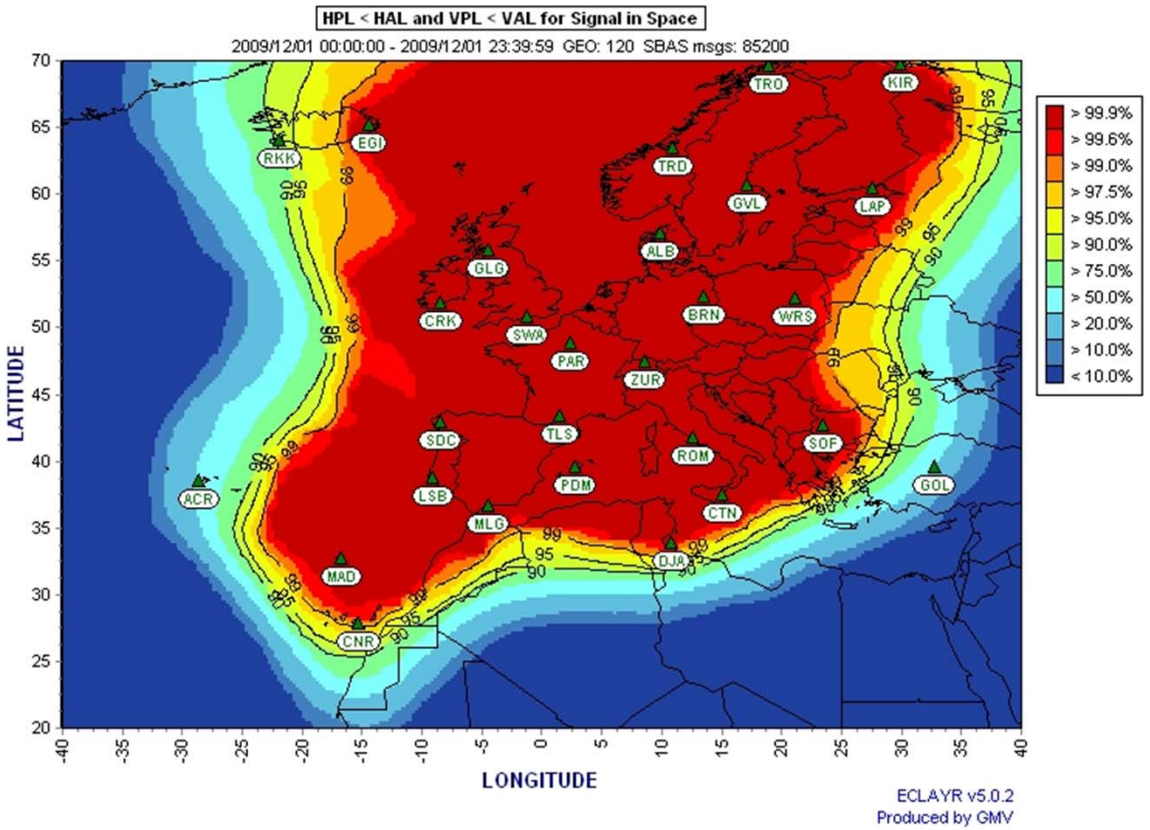
- Ownership transferred to EC since 2009
- Operational since 2009 as an Open Service
- Certified for SoL applications – March 2011

Architecture : - 3 Geostationary satellites

- 4 Mission Control Centres
- 40 Ranging and Integrity Monitoring Stations

Current EGNOS coverage status

Nominal Case – All RIMS OK



EGNOS APV-I Availability for December 1st 2009

EEGS

EGNOS Extension to Eastern Europe

EEGS – Main Objectives

EEGS has 4 main objectives :

- To prove through demonstrations that EGNOS can be “easily” extended to cover all Eastern Europe
- To assess the level of interoperability between EGNOS and SDCM (the Russian SBAS)
- To promote EDAS on the GNSS market in Russia in order to provide a high precision positioning service (PPP)
- To study the impact of Galileo in the scenarios implying EGNOS extension to Eastern Europe and EGNOS/SDCM interoperability.

EEGS – Consortium

GMV (Spain) – Consortium Leader

RSS (Russia)

AENA (Spain)

ROSA (Romania)

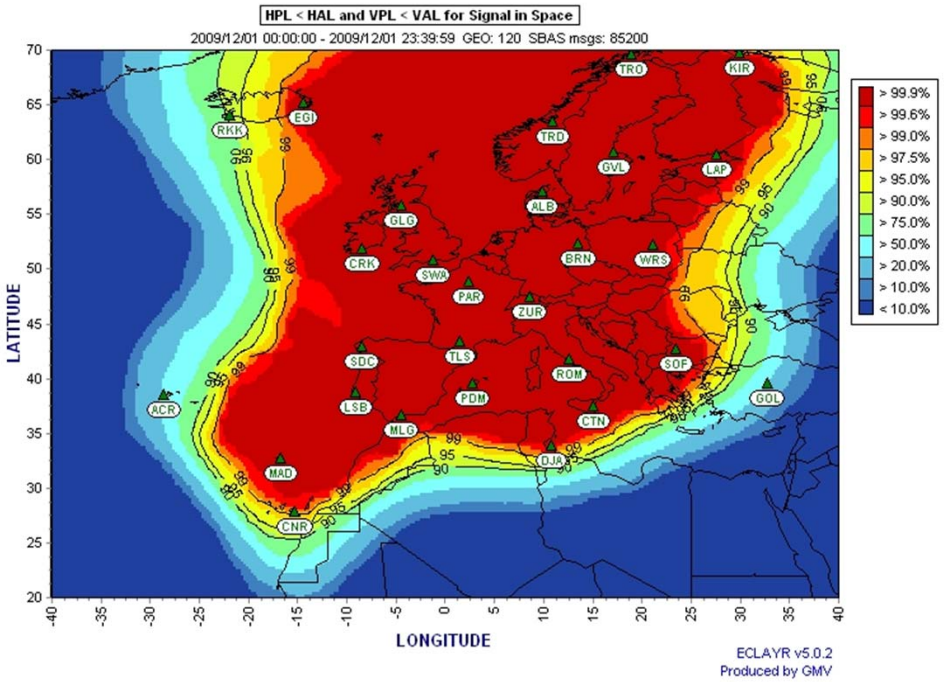
AENI (Spain)

SRC (Poland)

MAO (Ukraine)

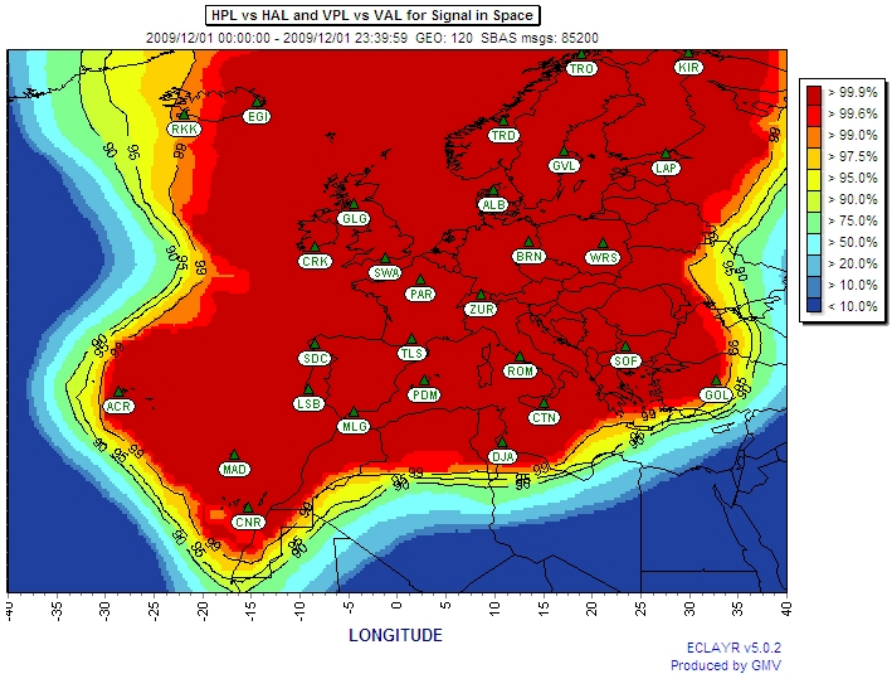
EEGS – Analysis results for nominal case

EGNOS release (V.2.3.1)



EEGS proposed release

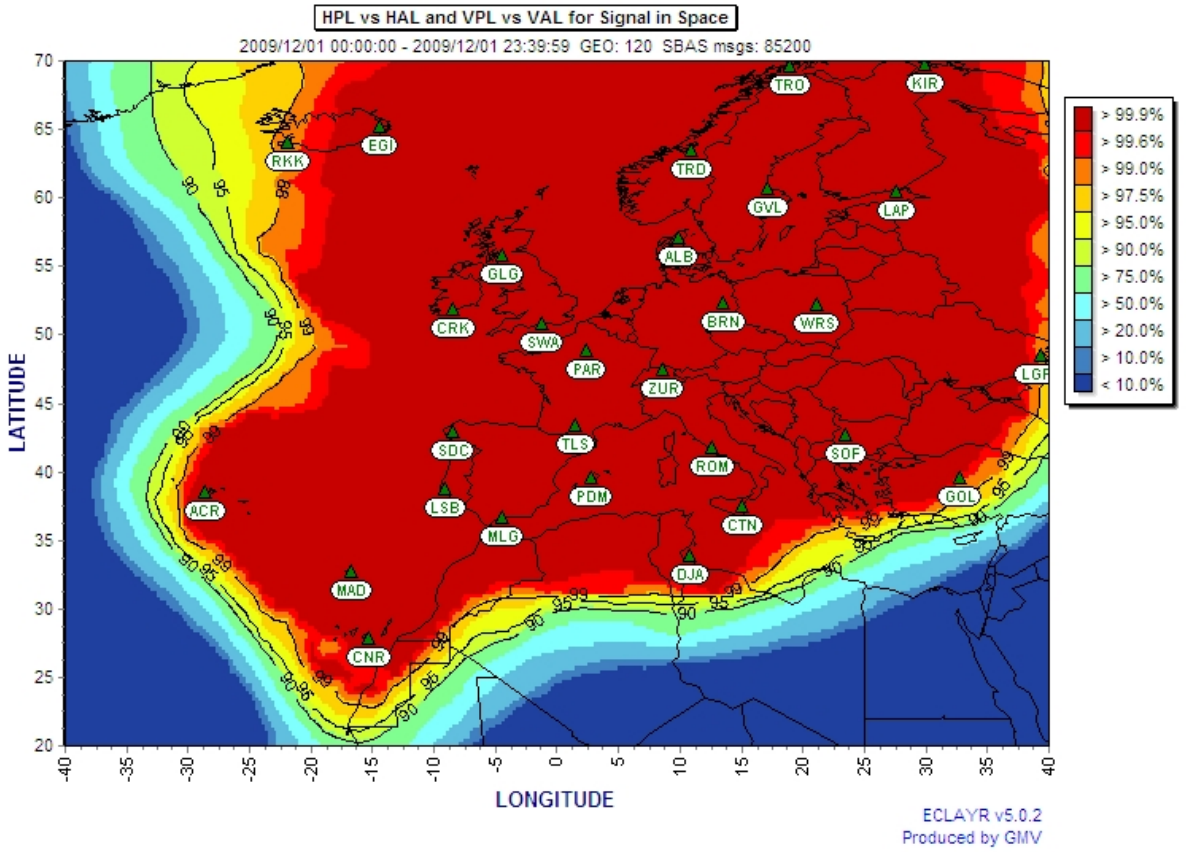
(no additional RIMS)



EEGS – Analysis results for degraded case with RIMS OK

EEGS proposed release

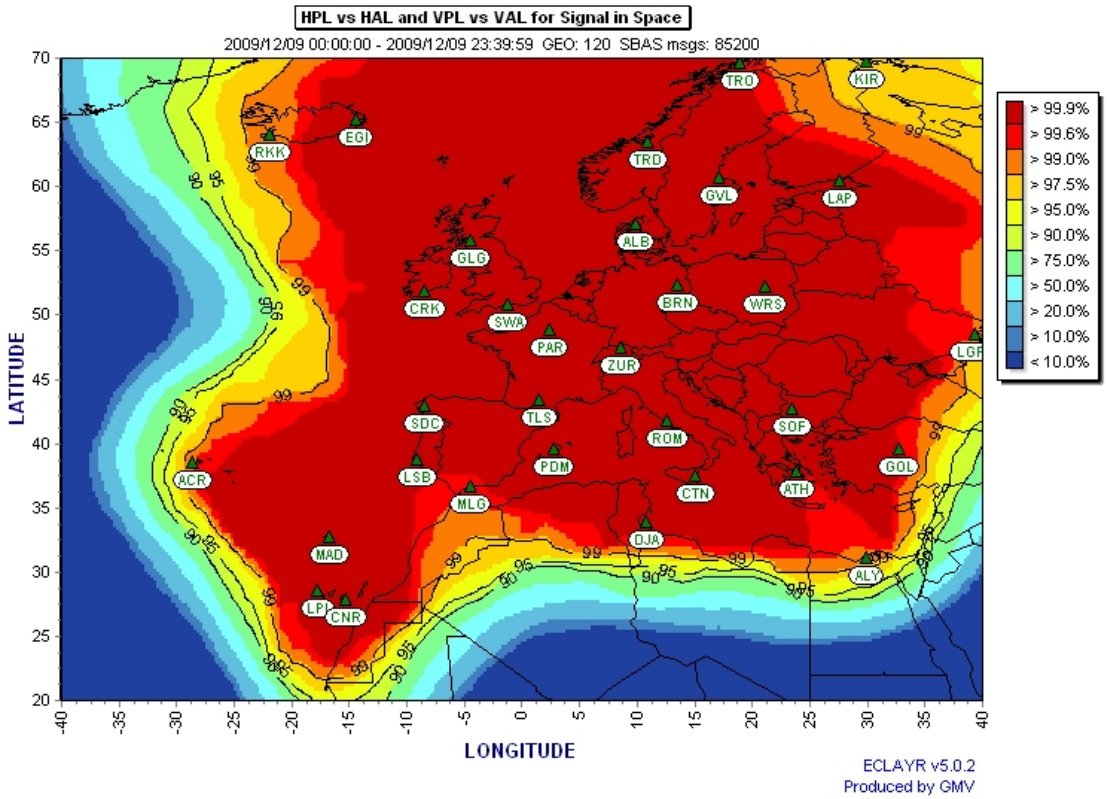
with one additional RIMS in Eastern Ukraine



EEGS – Analysis results for degraded case with RIMS problems

EEGS proposed release

with one additional RIMS in Eastern Ukraine

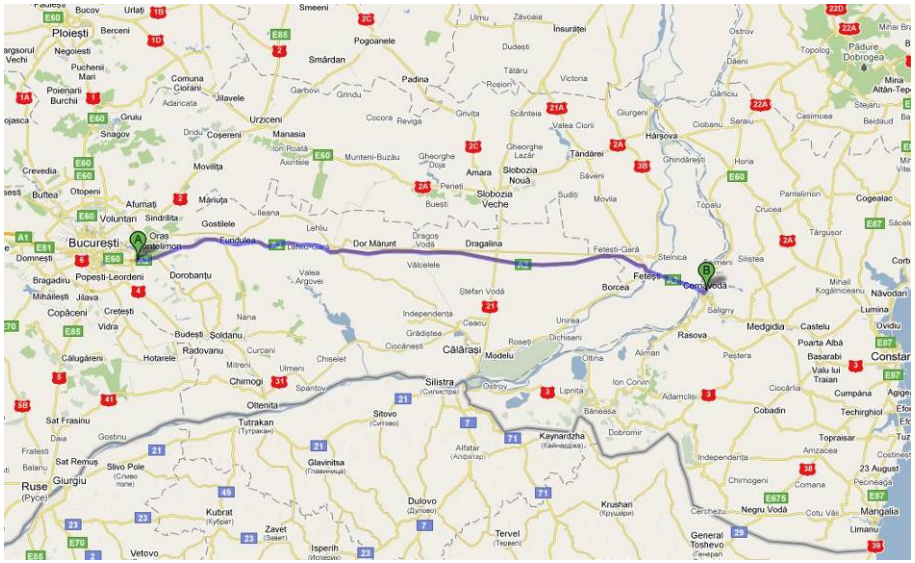


EEGS – Static demonstration

Location of the tests – ROSA premises

EEGS – Dynamic demonstration 1

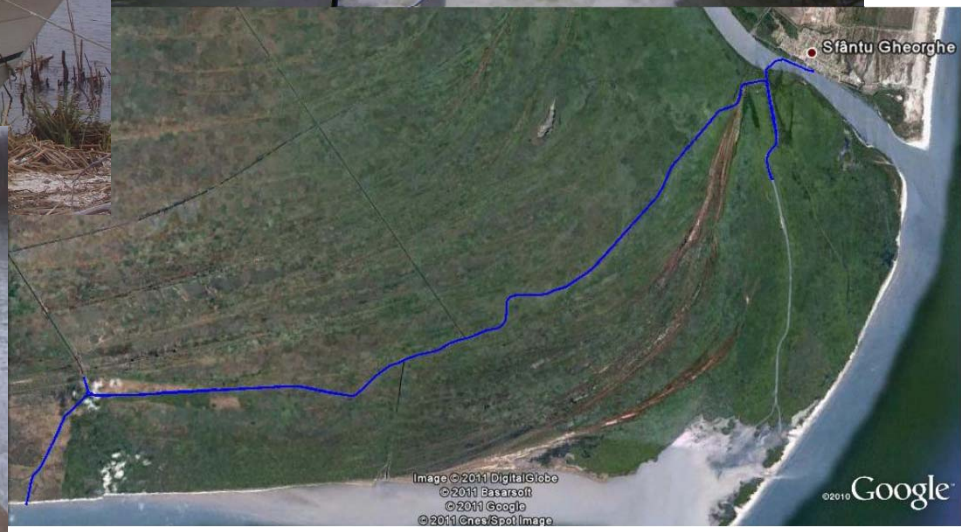
Route and installation



Time	Km	Instruction	Toward
1h 15 min	150 km	1.Head **East** on **A2** toward **Cernavoda**	Cernavoda
1 min	700 m	2.Turn **right** to exit the **A2 Highway**	Cernavoda
2 min	200 m	3.At the roundabout, take the **2nd** exit onto the **A2 Highway**	Bucharest
1h 15 min	150 km	4.Continue on **A2 Highway**	Bucharest
1 min	400 m	5. Exit **A2** Highway	Bucharest
1 min	170 m	6.At the roundabout, take the **3rd** exit onto the **A2 Highway**	Cernavoda
1h 15 min	150 km	7. Head East on **A2 Highway**	Cernavoda
5 min	200 m	8. Exit the Highway	

EEGS – Dynamic demonstration 2

Route and installation



EEGS – Conclusions

- EGNOS Services may easily be extend to fully cover Romania and Poland by algorithm modiffications while fully covering Ukraine needs additional RIMS.

- The demonstrations in Romania proved that an extended EGNOS service may be used for SoL applications

- All the project's outcomes and opinions are belonging to the consortium and are not necessarily endorsed by EC

EEGS2

EGNOS Extension to Eastern Europe: Applications

EEGS2 – Main Objectives

1. To demonstrate, through flight trials, the benefits of EGNOS in Eastern Europe where EGNOS is not yet available and prepare the civil aviation and service providers of those areas for the future usage of EGNOS.

2. To study the impact of SBAS technology in transport management in the scenarios of EGNOS service in Eastern Europe.

3. To promote EDAS, EGNOS and Galileo.

EEGS2 – Consortium

GMV (Spain) – Consortium Leader

RSS (Russia)

TUM (Moldova)

ROSA (Romania)

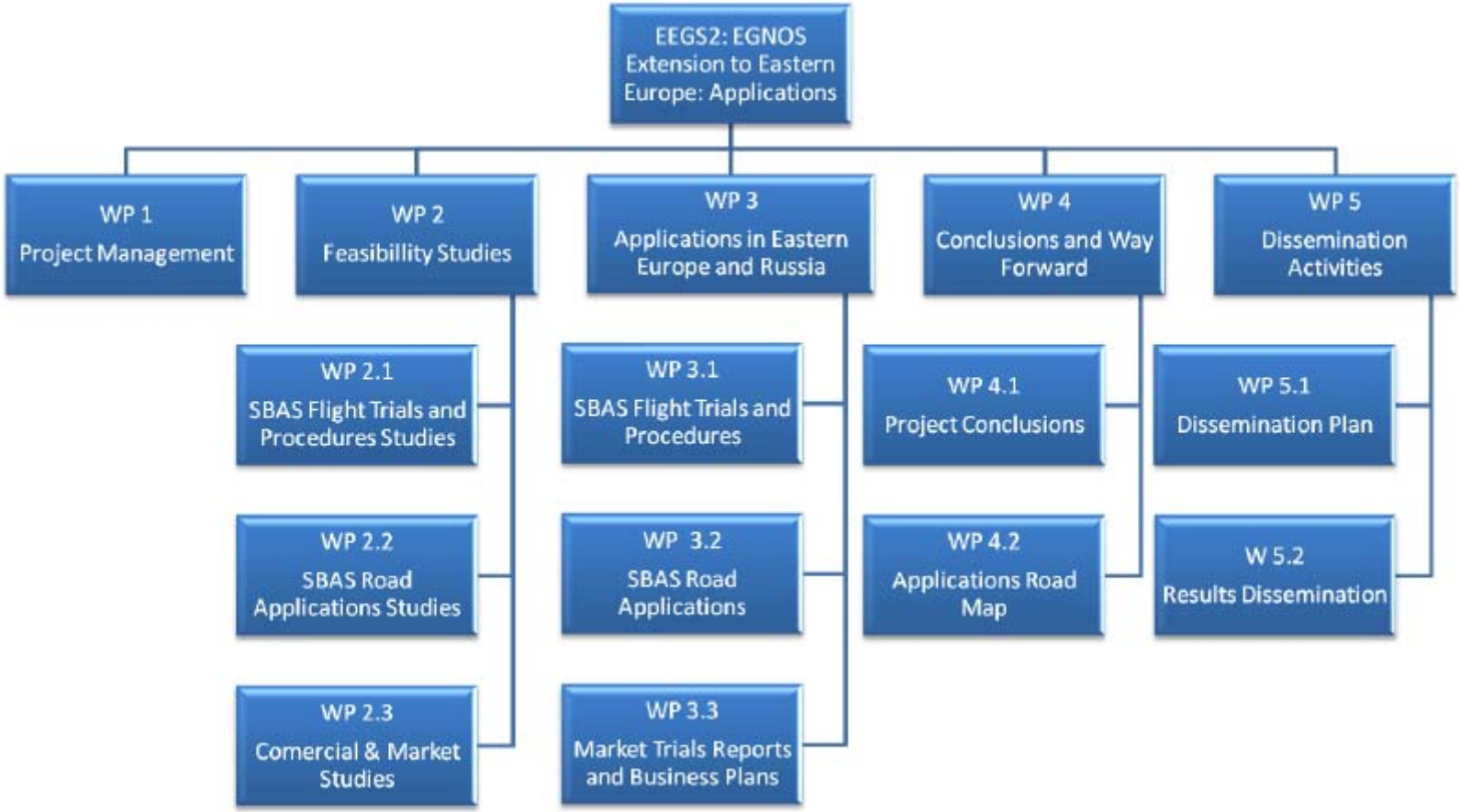
NDConsult (UK)

MAO (Ukraine)

SRC (Poland)

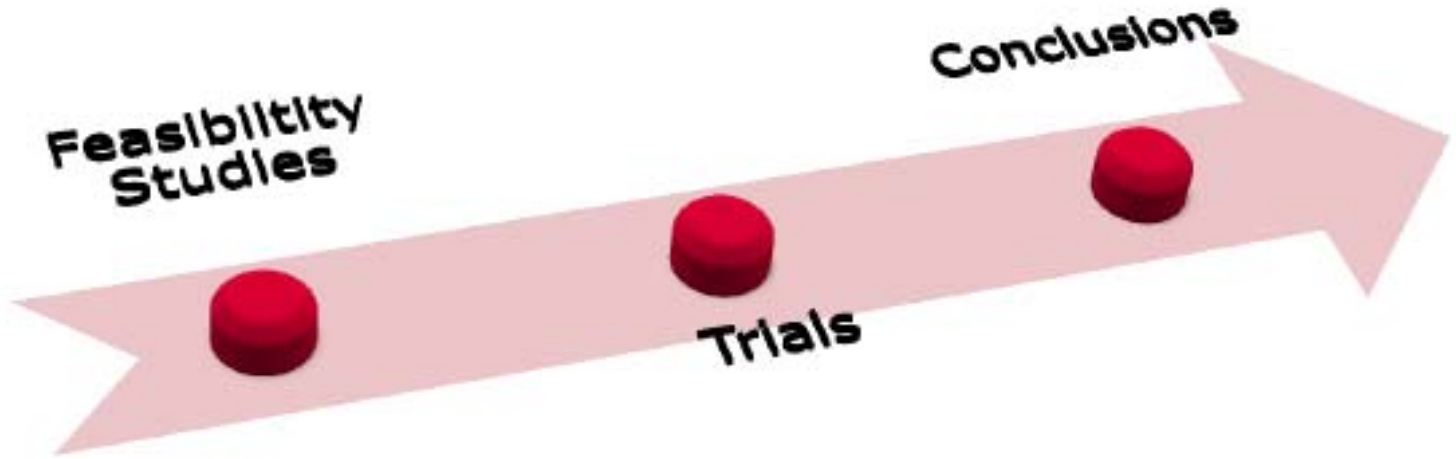
KHU (Ukraine)

EEGS2 – Work Breakdown Structure



EEGS2 – General approach

- The general approach concentrated on 3 major steps:
  - Develop the feasibility and commercial studies
  - Prepare and conduct the flight trials
  - Drawing the conclusions based on the results



EEGS2 ROSA Activities

- ROSA conducted a commercial feasibility study and a market study on SBAS for aviation in Romania

- ROSA prepared the flight trials in Romania together with GMV

- Activities to be undertaken for the Flight Trials

Procuring the necessary infrastructure (receivers, RF modems, etc.)

Providing the aircraft

Develop and review the Safety case assesment

Preparing, installing and testing the equipments

Conducting the flight trials


Navigation errors and performance analysis

EEGS2 – Selected aircraft

Selected aircraft:

- The aircraft selected for the trials is a Hawker Air King C90GTx

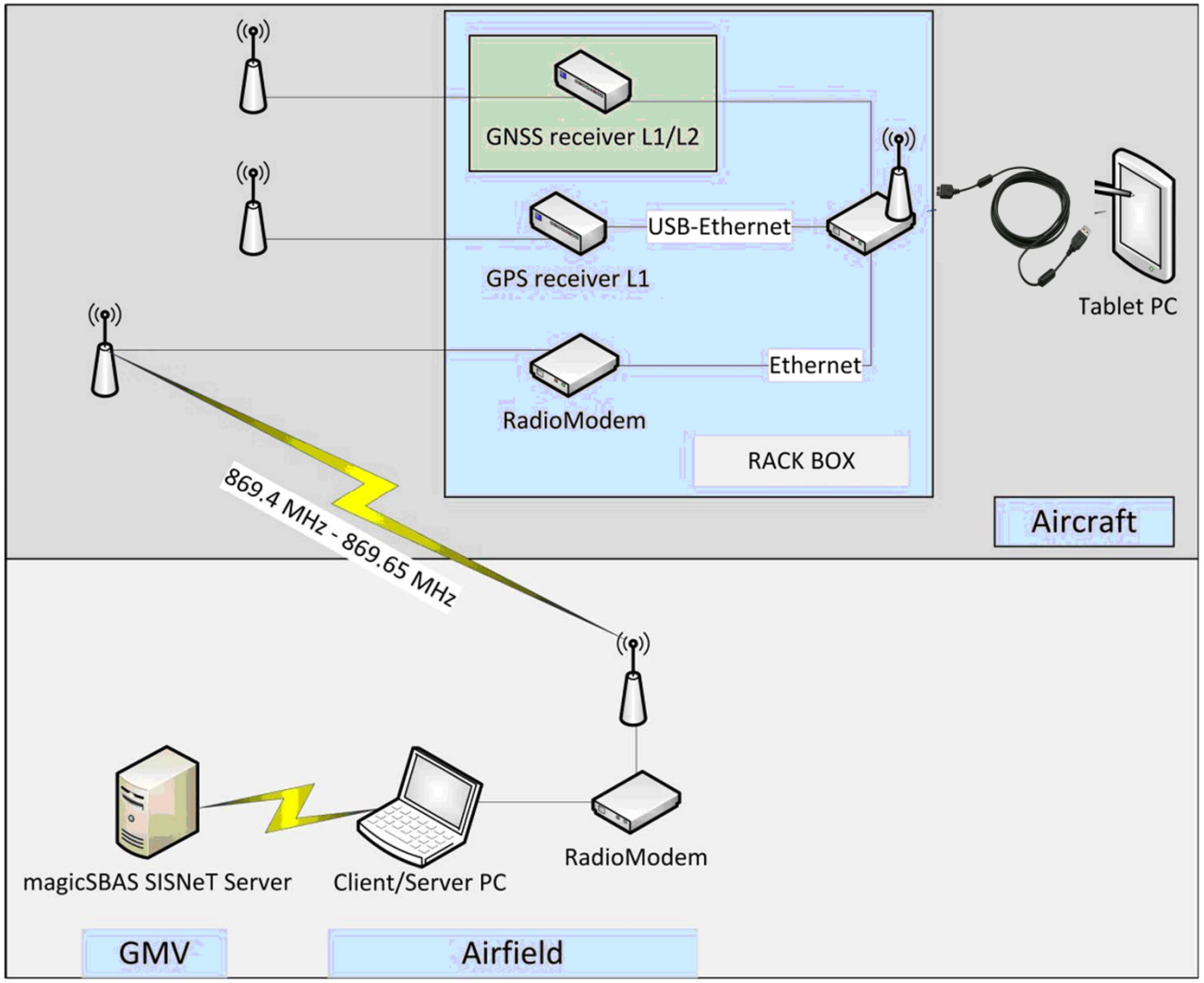
EEGS2 – Selected aircraft

EEGS2 – Selected aircraft

Selected airport:

- The airport selected for the trials is the *International Airport "Delta Dunarii"* in Tulcea (IATA: TCE, ICAO: LRTC)

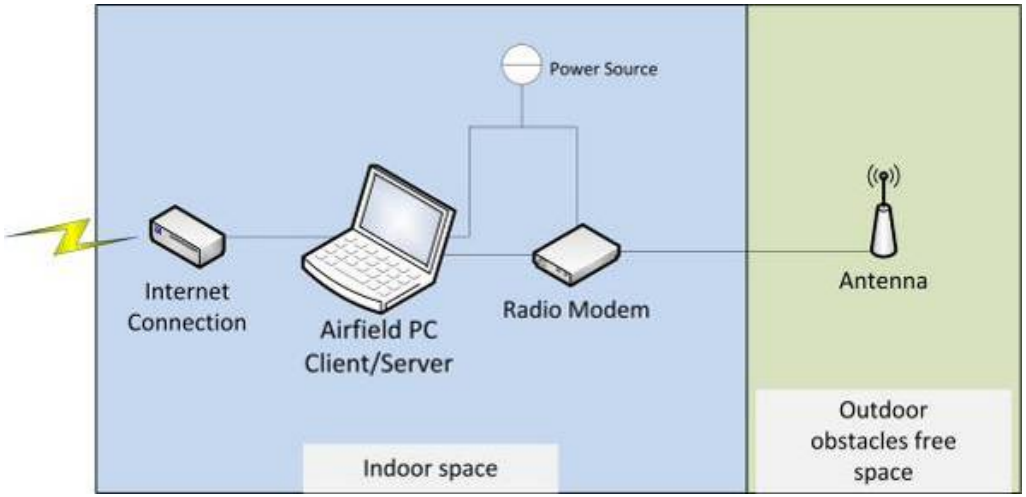
EEGS2 – Installations Architecture



EEGS2 – Aircraft Installation

EEGS2 – Ground installations

- The equipment will be installed in the vicinity of the airport, at the end of the RWY, in a small facility belonging to the airport, in order to have access to a power source and also to have a clear broadcasting area



EEGS2 – Planning of the flights

- In order to have a general positive feedback, ROSA will try to involve the Romanian CAA and ANSP (ROMATSA) both in the flight trials as well as the safety cases
- We had several meetings with the above mentioned organizations
- Unfortunatelly, due to bad weather conditions in Moldova, the flight trials were delayed for several weeks, which delayed also the trials in Romania

- Currently the planned date for the trials is 8th -10th of May

Thank you


EGNOS EXTENSION
EEGS 2
EASTERN EUROPE
gmv
INNOVATING SOLUTIONS
rosa
CBK PAN
NDConsult
KHARKOV NATIONAL
UNIVERSITY of RADIOELECTRONICS