

The Arctic Test Bed (ATB)

A European Tool to test EGNOS improvements via alternative transmission means

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IALA ENAV 17 – BREST 26-30 Oct 2015

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Background and Rationale (1)

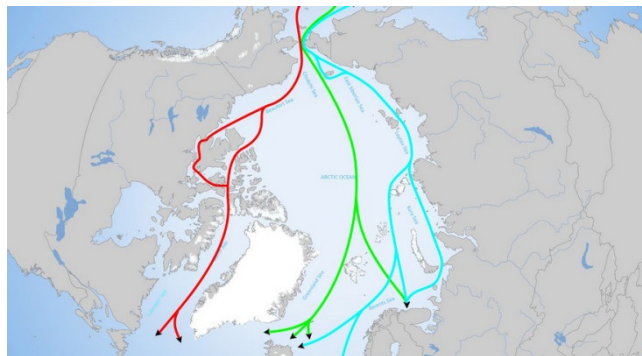


The Arctic cap retreat: new opportunities and threats

- Northern passages are predicted to become a more viable shipping route
- 25% of the world's undiscovered oil and gas resources are expected to be found in the Arctic
- A sustainably activity is needed to minimise the impact on the fragile marine environmental (the Arctic includes breeding grounds for a significant percentage of the world's wild fish population)



GNSS will be a key enabler to ensure responsible and secure operations in the Arctic



Background and Rationale (2)



- However, significant challenges are identified in this region:
 - Specific propagation environment: ionospheric activity (scintillation) difficult to predict. Ionospheric activity has an impact on GNSS correction performance with potential degradation, in particular with low elevation GPS satellites
 - Because of the limited land availability, the options for the deployment of Reference Stations (both EGNOS RIMS and other RSs) providing differential corrections are drastically reduced
 - Geostationary (GEO) satellites are not in view at very high latitudes. Unless other dissemination means are considered, this results in a limited coverage of existing SBAS such as EGNOS or WAAS

- The main objective of the ATB project is to develop a test-bed which will contribute to extend satellite navigation system performance in the Arctic region
- In particular, the ATB will complement EGNOS in the North (targeting coverage up to 85°N latitude)
 - ATB computes differential corrections and compares them to operational available EGNOS corrections
 - ATB analyses EGNOS coverage extension via alternative transmission means

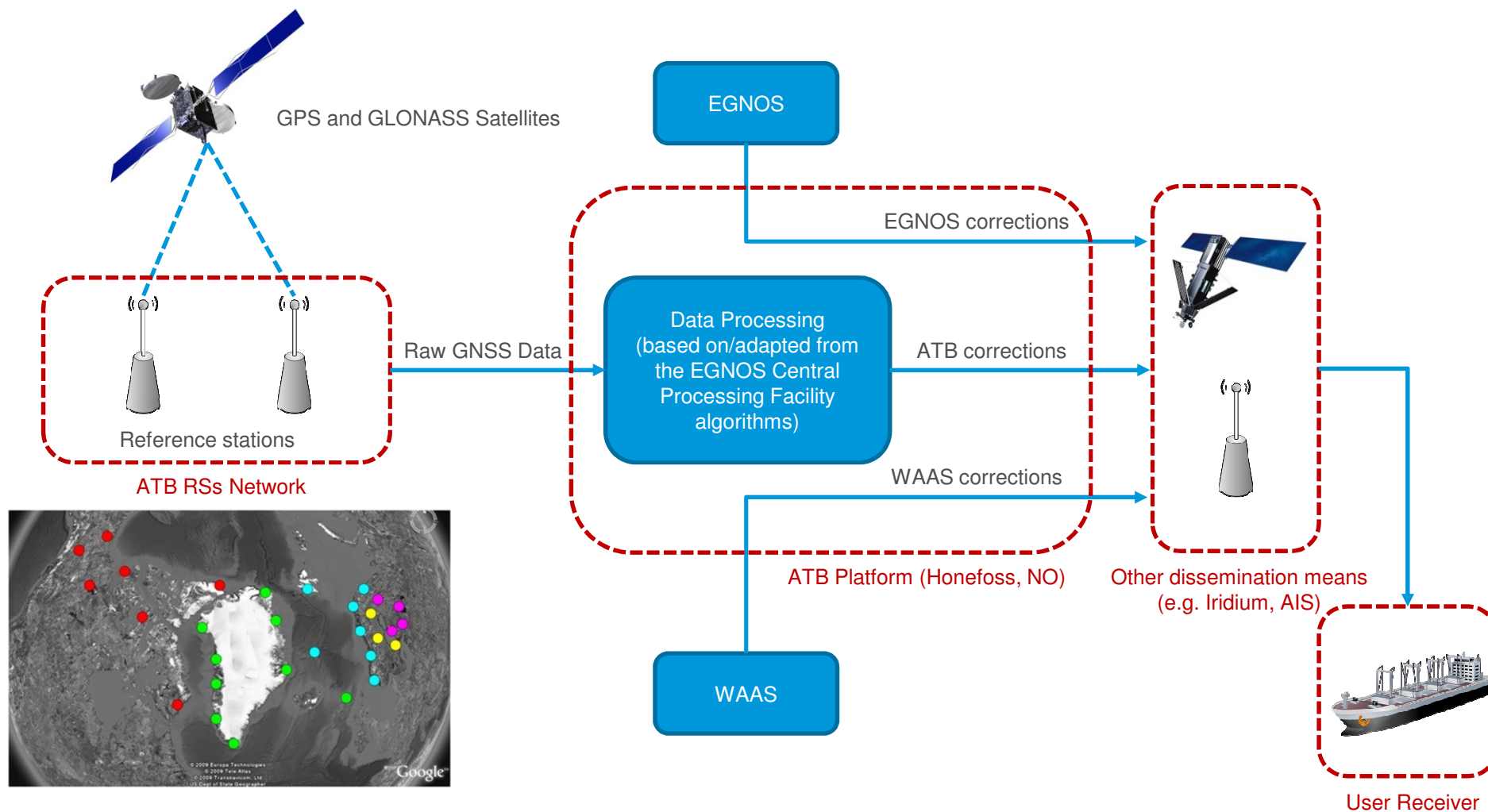
Computing ATB differential corrections



- Differential corrections are computed on the basis of raw observations data collected at the ATB ground network
- Specifically, the network includes:
 - (a) the EGNOS Ranging and Integrity Monitoring Stations (RIMS); and
 - (b) other Reference Stations available in the Arctic from different 'proprietary' networks
- Scintillation events will be also investigated using "ad-hoc" receivers

- In order to overcome possible limitations due to GEO satellites' visibility, the computed ATB differential corrections will be disseminated to test users using alternative radio means. Specifically, these include:
 - Non-GEO satellite systems (Iridium); and/or
 - Terrestrial systems (Automatic Identification System, AIS)
- EGNOS and WAAS corrections are also broadcast by the ATB through Iridium and AIS in order to perform comparative test analyses

ATB – High Level Architecture



- The ATB project is initiated by ESA.
- Kongsberg Seatex (KSX) is assigned as prime contractor, heading a team of eight partners: GMV Aerospace and Defence, Thales Alenia Space France (TAS-F), Logica, Terma, Norwegian Mapping Authority (NMA), Technical University of Denmark (DTU), Septentrio and the University of Calgary.
- The project is now entering the Qualification Review (QR). This will qualify the ATB platform for the Experimental Phase (EP) execution.
- The whole project should be completed in 2016.

Conclusions and way forward



- Available from mid 2016:
 - Comparison of operational EGNOS corrections with ATB corrections
 - Analysis of AIS and Iridium as correction transmission means **at any latitude**
- The ATB platform is very flexible. The algorithms implemented at both the processing centre and the user receiver demonstrator can be tailored to the specific needs of the maritime community.
- ATB could be proposed to support Pilot Projects and IALA test activities to demonstrate EGNOS via alternative transmission means
- Future possible demonstrations:
 - EGNOS via IALA DGPS beacon, EGNOS via VDES system, EDAS VRS demonstration
 - Other actions to be identified

Questions?



- For additional details about the Arctic Test Bed project, please feel free to contact
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