ION GNSS 2008

magicGNSS: PRECISE GNSS PRODUCTS OUT OF THE BOX

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SESSION C3: NEW PRODUCT ANNOUNCEMENTS

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MOTIVATION

- To develop a **suite of software and data products** covering a wide range of GNSS user needs

- Including GNSS like **GPS**, **Galileo**, or **Glonass**, as well as their local augmentation systems, both space-based (**SBAS**) and ground-based (GBAS)

- Supporting all the phases of GNSS projects and objectives, including service volume **simulations**, core **operational** functions, such as **orbit**, **clock** and **ionosphere** determination and prediction, added-value services like **integrity**, local **augmentation** developments, and all related performance and accuracy **analyses**

QUALITY DATA, ALGORITHMS AND PRODUCTS
FOR THE GNSS USER COMMUNITY

magic
GNSS

INTRODUCING magicGNSS BETA

magic GNSS BETA

- A **free-of-charge online** service for registered users
- You can **apply for an account** online!
- Provides current and past data from a predefined set of **36 core stations**
- Features a fully-functional demo version of the **ODTS algorithm** to generate precise orbits, clocks, tropo and station coordinates

magicgnss.gmv.com

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magicGNSS BETA

OUTPUT PRODUCTS

Product	Format (see IGS Formats)
Estimated satellite orbits	SP3
Predicted satellite orbits	SP3
Estimated satellite clocks	clock RINEX
Predicted satellite clocks	clock RINEX
Estimated station clocks	clock RINEX
Estimated Zenith Tropo Delay	txt
Estimated Station Coordinates	SINEX
Estimated Solar Radiation Parameters	txt
Estimated Earth Rotation Parameters	erp

ODTS vs IGS Products
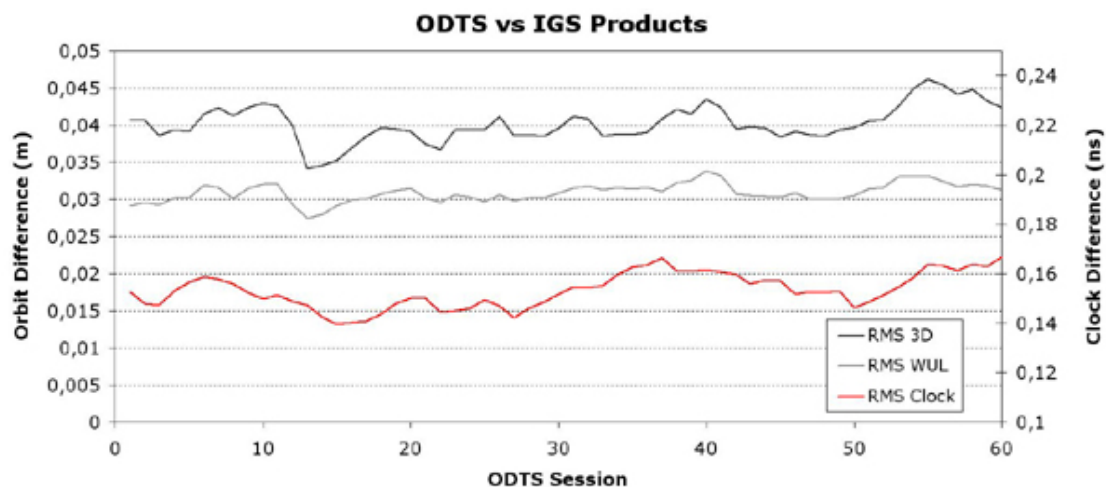
- Comparison with IGS *final* products (orbits and clocks)
- One week of data using 30 IGS stations
- Orbits: **4 cm** RMS
- Clocks: **0.15 ns** RMS

INPUT DATA
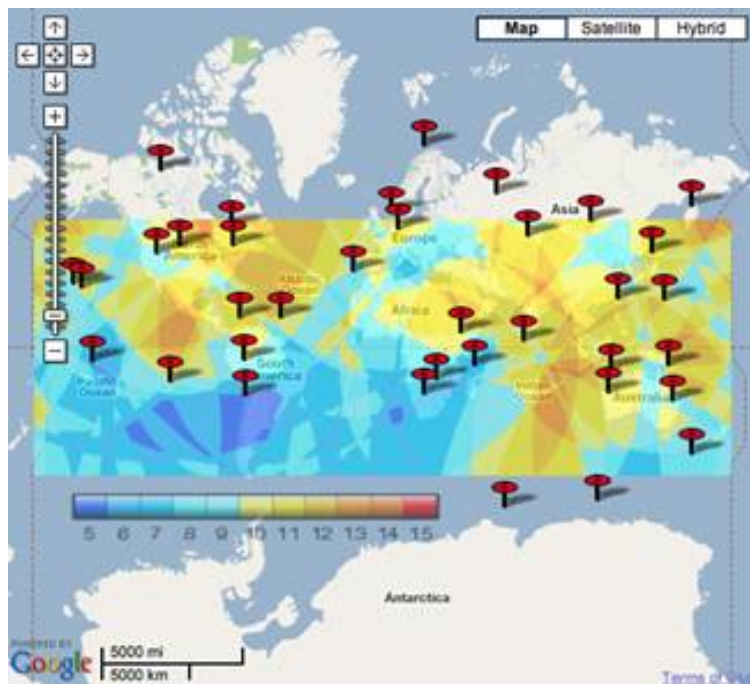
- **36 *core stations*** currently available
- Data shared with **IGS Real Time** project in which GMV participates
- Data available starting from **July 1st, 2008**
- Until current time with a typical latency of 1 hour
- The colour map indicates the number of stations in view of the satellite at the sub-satellite point and at the GPS height (Depth-of-Coverage or DOC)
- Core stations guarantee at least DOC=5 everywhere

- Automatic processing of **NANUs** and rejection of *bad* (unhealthy) satellites
- Earth Rotation Parameters (ERPs) from IERS
- A priori station coordinates from ITRF or IGS solutions
- All key input data **downloaded automatically** at the magicGNSS server and kept in a **database**

THE ODTS ALGORITHM

- **ODTS** stands for *Orbit Determination & Time Synchronization*
- The basic ODTS input measurements are pseudorange (**code**) and **phase L1-L2** dual-frequency **iono-free** combinations
- Based on a **batch least-squares** algorithm that minimizes measurement residuals solving for **orbits**, satellite and station **clock** offsets, phase ambiguities, station tropospheric zenith delays, and station coordinates
- The satellite and Earth dynamics are based on **high-fidelity models** including a full Earth gravity model, Sun, Moon and planetary attractions, solid Earth tides, and solar radiation pressure, including eclipses
- The orbit fit is based on the estimation of the initial state vector (position and velocity) and **5** *empirical* **parameters** *for* Solar Radiation Pressure (SRP)
- Satellite and station clock offsets are estimated with respect to one **reference clock**, provided by one of the core stations (as selected by the user)
- Satellite **orbits and clocks** can be **predicted** into future time (clocks use a simple linear model)

VIDEO TOUR

CONCLUSIONS

- *magicGNSS Beta* available now at **magicgnss.gmv.com** featuring ODTS algorithm (Orbit Determination & Time Synchronization) using **GPS** data
- Galileo (**GIOVE**-A and –B) already implemented, data usage subject to ESA approval (13 ground stations available)
- **Glonass** coming soon (intended before end of 2008)
- User data uploading coming soon (RINEX format)

Try it **online** or visit us at **booth 210/212** for a demonstration!

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Thank you!

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