



High-Level Data Processing Facility for ESA's GOCE Gravity Mission

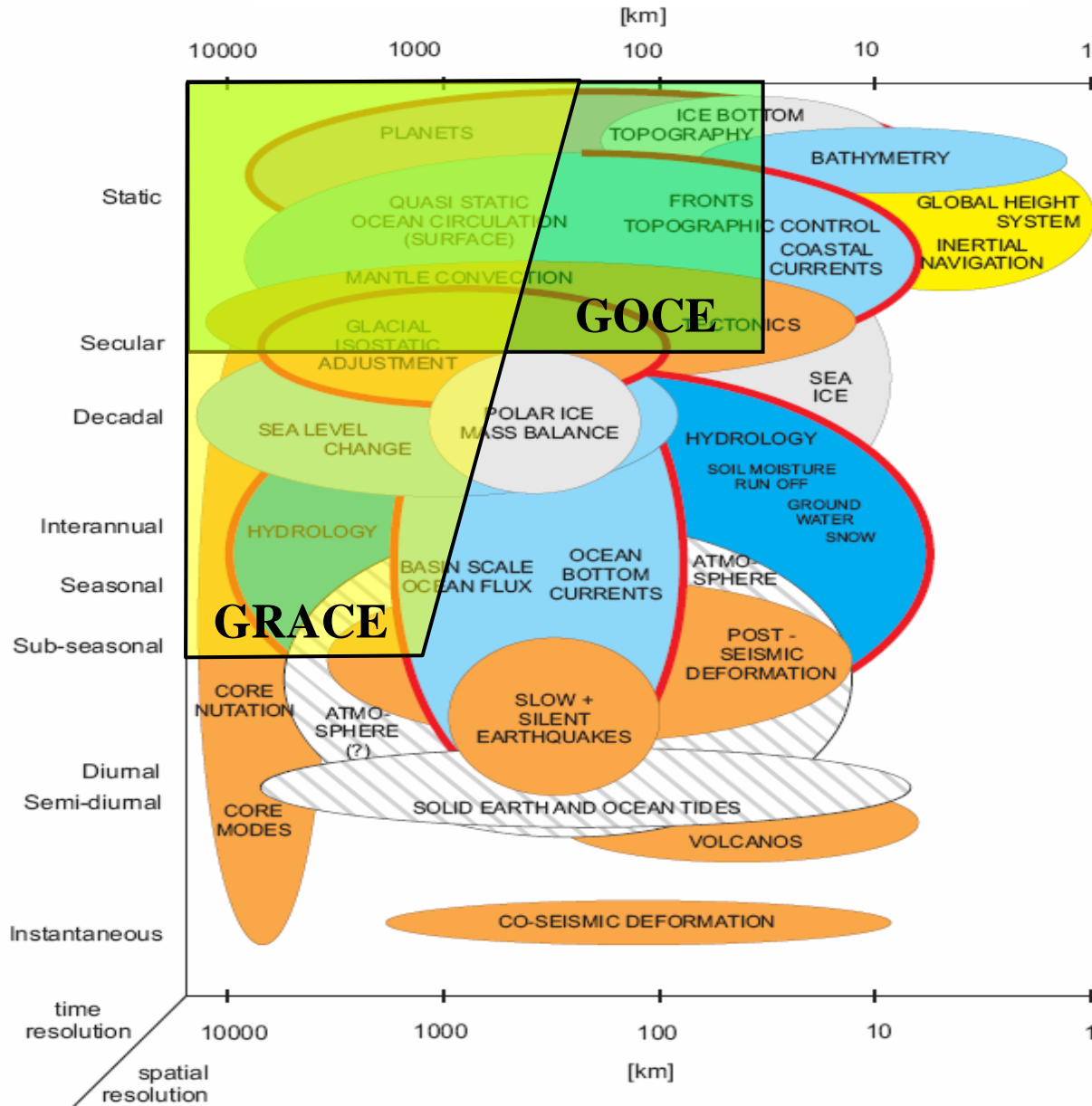
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²Institute of Astronomical and Physical Geodesy, Technical University Munich

European Geophysical Union, General Assembly, Vienna, 3.-7. April 2006

Goals of GOCE Mission



From ESA-Study:
*„Scientific Objectives
 for Future Geopotential
 Missions“*

GO

- E
- M
- L
- P

Degree RMS

10^{-8}

10^{-9}

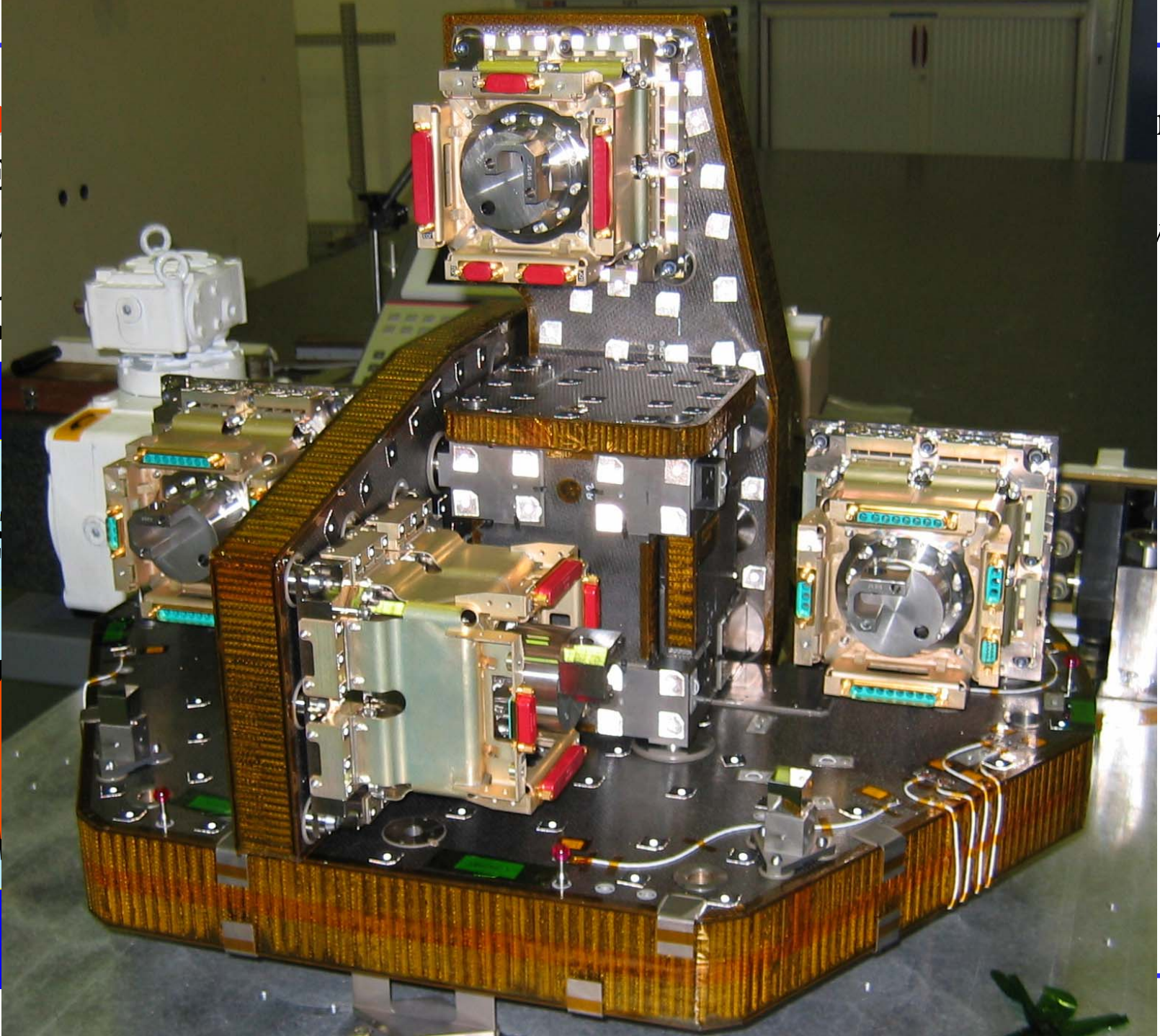
10^{-10}

10^{-11}

10^{-12}

10^{-13}

10^{-14}



erst
ver

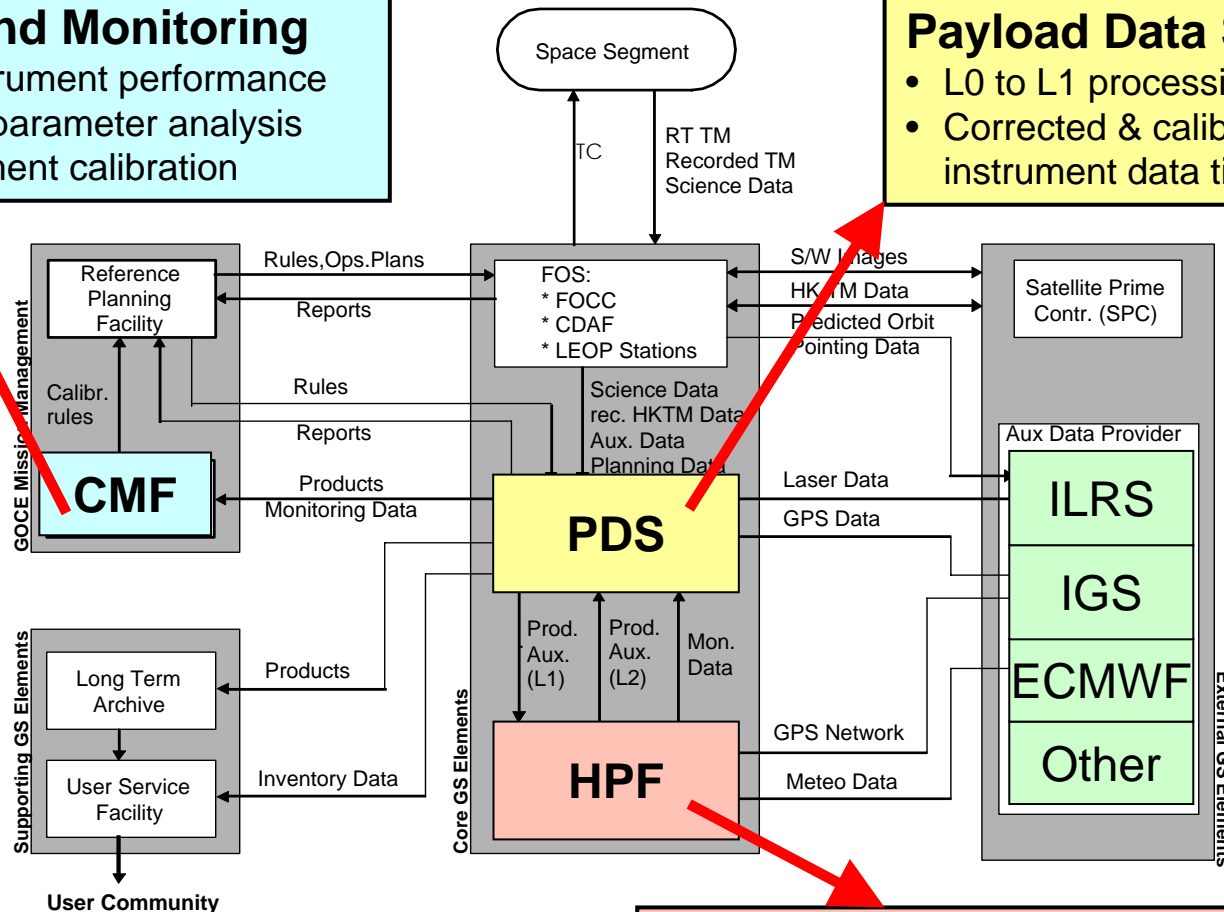
GOCE Ground Segment

Calibration and Monitoring

- Continuous instrument performance and calibration parameter analysis
- Initiating instrument calibration

Payload Data System

- L0 to L1 processing
- Corrected & calibrated instrument data time series



High-Level Processing Facility = Science Data Processing System

- L1 to L2 processing (gravity Fields & orbits)
- Continuous quick-look gravity field performance analysis
- Developed and operated by EGG-C

All ground system elements are close to completion !

The European GOCE Gravity Consortium

**Institute of
Astrodynamics and
Satellite Systems, Techn.
University Delft, The
Netherlands (FAE/A&S)**

**Institute of Theoretical
Geodesy, University
Bonn, Germany (ITG)**

**Astronomical Institute,
University Berne,
Switzerland (AIUB)**

**Centre Nationale
d'Etudes Spatiales,
Toulouse, France
(CNES)**

**Politechnico di Milano,
Italy (POLIMI)**

**National Space Research
Center of the
Netherlands (SRON)**

**Institute of Geophysics,
University Copenhagen,
Denmark (UCPH)**

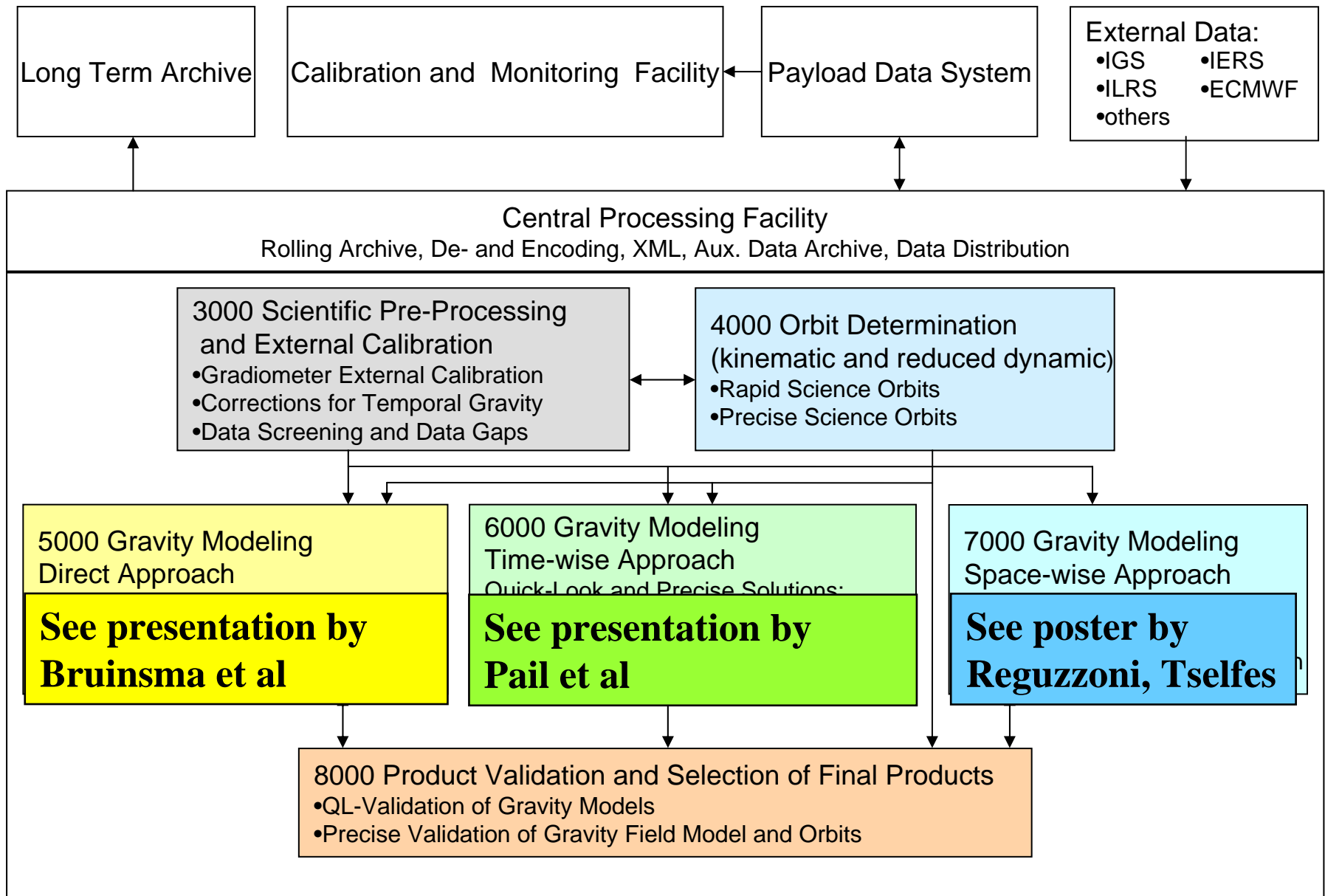
**GeoForschungsZentrum
Potsdam, Dept. 1 Geodesy
and Remote Sensing,
Germany (GFZ)**

**PI & Project Management:
Institute of Astronomical
and Physical Geodesy,
Techn. Univ. Munich,
Germany (IAPG)**

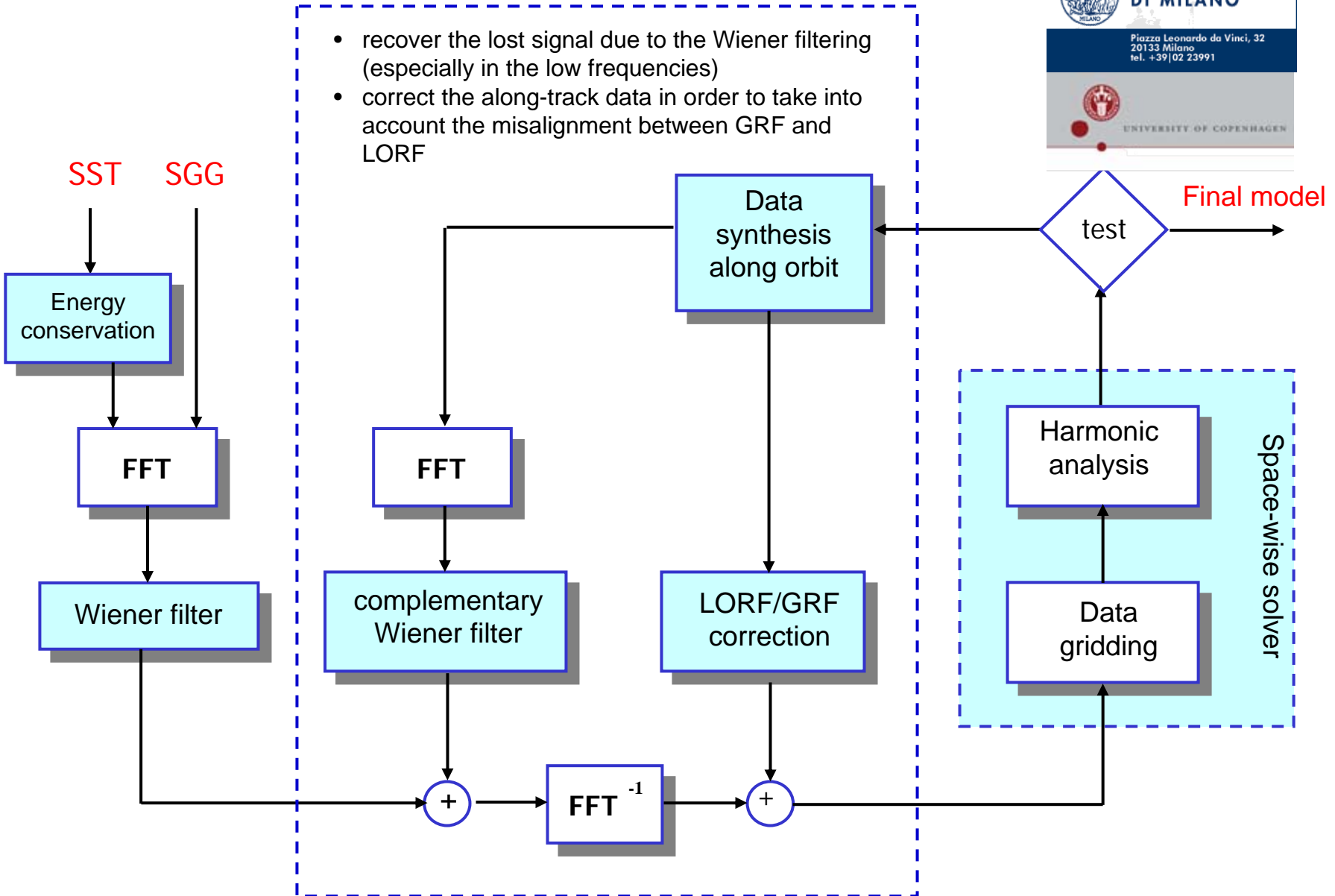
**Institute for Navigation and
Satellite Geodesy, Graz University
of Techn., Austria (TUG)**



Science Data Processing System

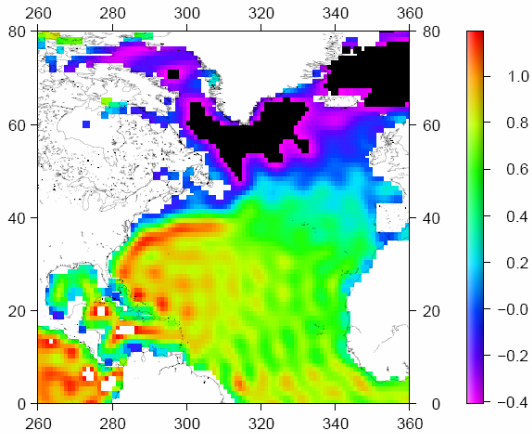


Space-Wise Approach

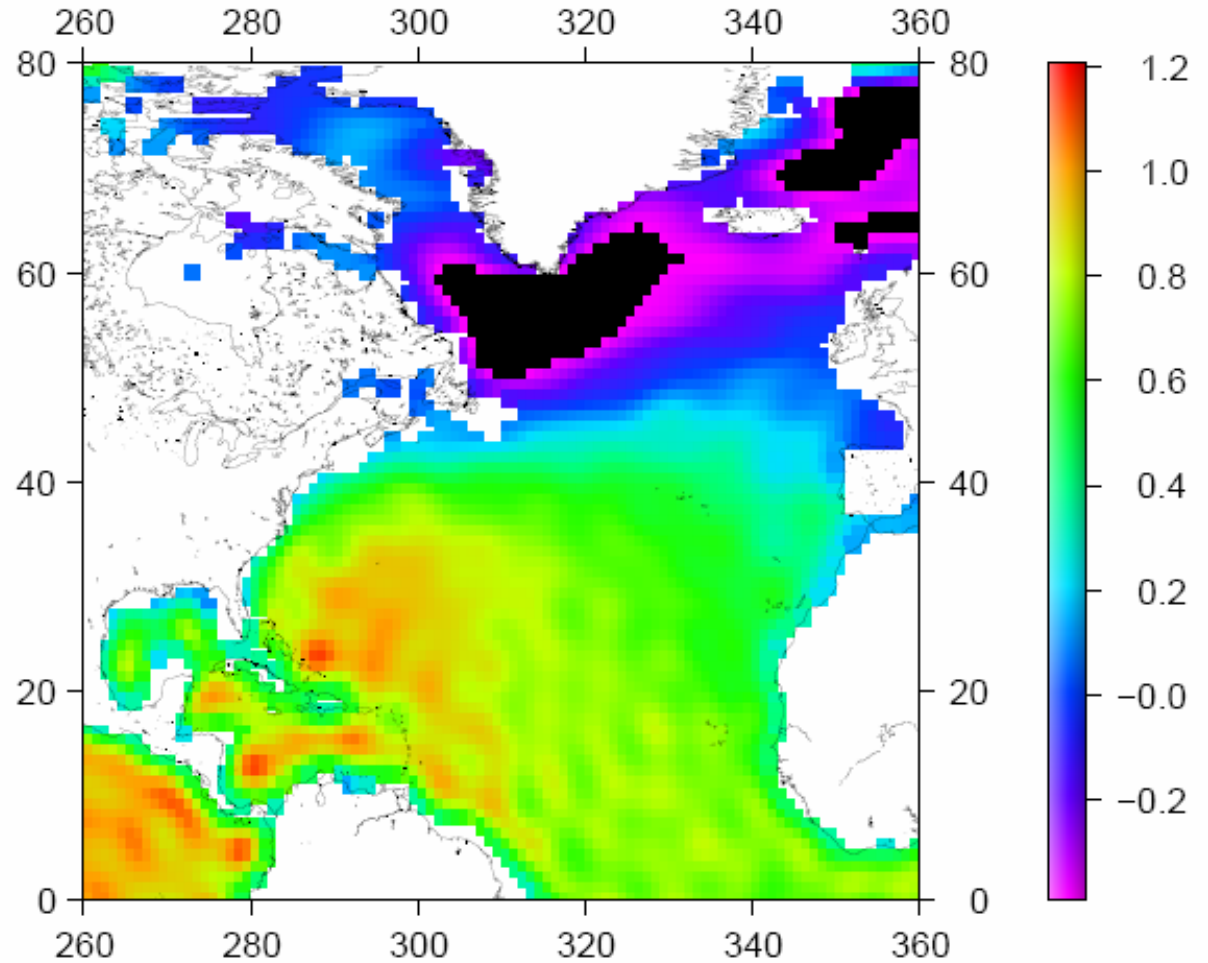


Test Result

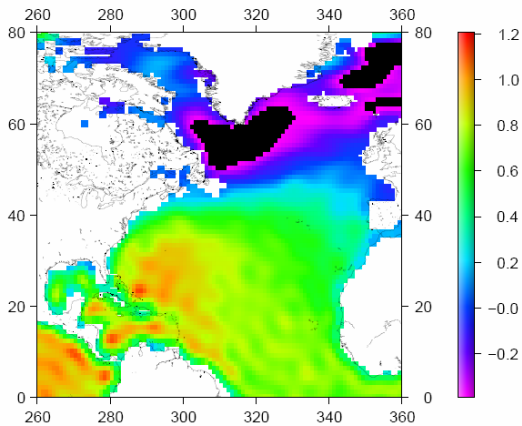
EIGEN-GRACE02S



GOCE Test Model



EGM96



Sea Surface Topography Solutions (d/o 60)

GOCE Level 2 Products

Identifier	Description
EGG_NOM_2	<ul style="list-style-type: none">• Externally calibrated and corrected gravity gradients in GRF (2 weeks latency)• Corrections to gravity gradients for temporal gravity variations• Flags for outliers, fill-in gravity gradients for data gaps with flags• Statistical information
EGG_TRF_2	<ul style="list-style-type: none">• Externally calibrated gravity gradients in Earth fixed reference frame including error estimates for transformed gradients• Transformation parameters to Earth fixed reference frame
SST_PSO_2	<ul style="list-style-type: none">• GOCE precise science orbits final product• Quality report for precise orbits
EGM_GOC_2	<ul style="list-style-type: none">• Final GOCE Earth gravity field model as spherical harmonic series including error estimates. Target: 1-2 cm / 1 mGal up to degree and order 200 corresponding to 100 km spatial resolution.• Variance-covariance matrix of final GOCE Earth gravity field model• Grids of geoid heights, gravity anomalies and geoid slopes computed from final GOCE Earth gravity field model including propagated error estimates• Quality report for final GOCE gravity field model

Summary High-Level Processing Facility

- **Processing system development close to finalization.**
- **Integration at operational sites ongoing.**
- **First test sequence successfully completed end of 2005.**
- **Complete end-to-end test of operational version from May to October 2006 based on 2 months of realistic simulated GOCE data (gradiometry, GPS and supporting instruments)**