



Concrete GGOS Internal “Projects”

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**GGOS Retreat and 8th GGOS Steering Committee Meeting
Oxnard, California
February 19-21, 2007**

GGOS Internal „Project“ Proposals

Possible GGOS internal “Projects”:

- Periodic Jour-fixe of the Chairs and Analysis Coordinators
- GGOS Unified Workshop on Analysis of Space Geodetic Data
- IERS Combination Pilot Project (resume activities)
- IERS Rapid EOP Product Pilot Project
- GGOS Troposphere Combination Project
- GGOS Low Degree Harmonics Project (much later)
- GGOS Portal Meta Data Project

Jour Fixe

Periodic Meetings (or telecons) of:

- Chairs of the IAG Services (IGS, IVS, ILRS, IDS, GGOS)
- IAG Service Analysis Coordinators

Topics to be discussed:

- Progress in the coordination/integration of the Services
- Identify points with synergies or that need better coordination
- Initiate common pilot projects, workshops, ...
- Discuss day-to-day business

Joint Analysis Workshop

- GGOS, IERS, IGS, IVS, ILRS, IDS, IGFS
- Focus on both, problems of the individual techniques and problems common to more than one technique
- Increase the common understanding of all techniques for each individual technique as they contribute to a GGOS

- Ca. 2.5 days
- Before the AGU 2007 Meeting ???
- San Francisco area ???

PROPOSAL:
**Combination of VLBI Intensive Sessions and
IGS Rapid Solutions on the SINEX Level
for Improved Rapid EOP Products**

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IGS Analysis Center Meeting

December 12, 2006

AGU 2006 in San Francisco

Daily Rapid IERS EOP Product

Idea: Combination of VLBI Intensive Sessions (e-VLBI) with GPS rapid products to obtain highly precise rapid ERP solutions

IGS:

4. Generation of SINEX files by the ACs on a daily basis including station coordinates and EOPs (rapid product)
5. Generation of combined intra-technique SINEX files by the IGS AC on a daily basis

IVS:

8. Generation of daily SINEX files by the ACs for the VLBI Intensives (1hour) using e-VLBI
9. Generation of daily combined intra-technique SINEX files by the IVS AC

IERS:

12. Combination of the VLBI and GPS SINEX files (including local ties) to generate rapid daily ERPs

Daily Rapid Product: Parameter Space

Parameter space for the rapid IERS combination;
ideal complementarity of VLBI and GPS:

- GPS: Stable reference frame and polar motion
- VLBI: UT1
- SLR: ???

Parameter Type	VLBI	GPS/ GLON.	DORIS/ PRARE	SLR	
Nutation	X				Rotation Earth
Polar Motion	S	X	S	S	
UT1	X				
Length of Day (LOD)		S	S	S	
Coord.+Veloc.(ITRF)	S	X	S	S	ITRF
Geocenter		S	X	X	

X: Essential Contribution

S: Parameter Setup

Daily Rapid IERS EOP Product

Questions to the IGS ACs:

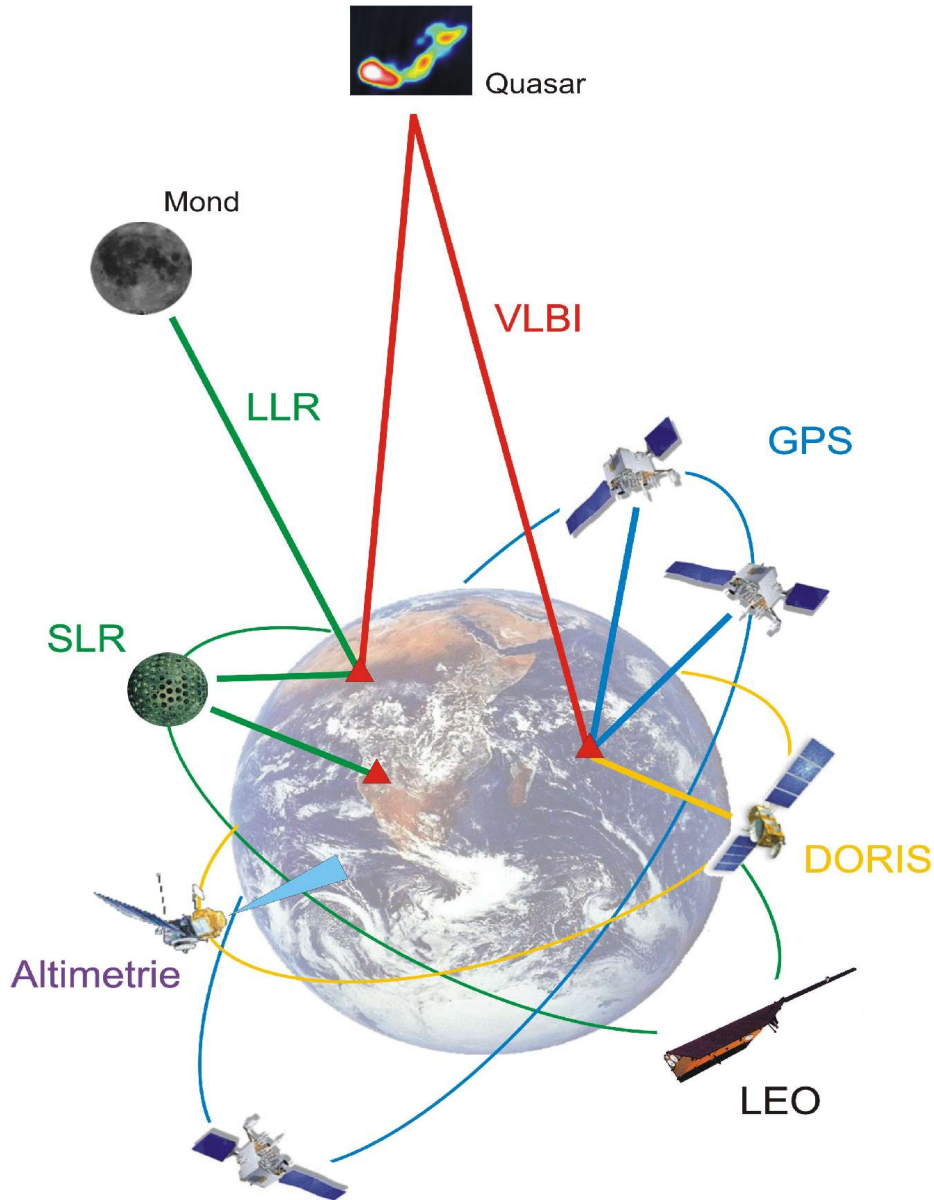
- Would you be ready to submit daily SINEX files from your rapid solutions containing site coordinates and EOPs ?
- When could a routine submission of such rapid SINEX files to an IGS data center start at your AC ?

Questions to the IGS Analysis Coordinator:

- What would be the effort needed to implement the generation daily SINEX files based on the rapid SINEX files from the individual AC SINEX files mentioned above ?
- When could a routine generation of such a daily combination start ?

Remark: A first test combination of VLBI intensives and GPS rapid solutions into a combined product (for polar motion and UT1) could be done based on only one IGS AC and one IVS AC ...

GGOS-D Project



Integration of Space Geodetic Techniques as the Basis for a Global Geodetic-Geophysical Observing System (GGOS-D)

Partners:

GFZ, DGFI, GIUB, BKG

GGOS-D: Innovative Guidelines

- Application of **unified/common standards** and **parameterizations** for all participating software packages
- **Enlargement of the parameter space** leading to the interesting combination of geometry, Earth rotation, gravity, and possibly sea level
- Inclusion of **SLR, VLBI, GPS, altimetry and LEOs**. Additional parameters are quasar coordinates, nutation offsets and rates, troposphere zenith delays and gradients, low-degree harmonics coefficients of the gravity field
- **Higher temporal resolution**, with not only weekly, but daily solutions and subdaily resolution of Earth rotation parameter
- **SINEX as the standard** for the exchange of all parameter types and solution types

GGOS-D: Generation of Homogeneous Time Series

Technique	Work Package	Institution	Software Package	Time Period
SLR	WP3200	DGFI	DOGS	1984-2005
SLR	WP3200	GFZ	EPOS	1984-2005
VLBI	WP3300	DGFI	OCCAM	1984-2005
VLBI	WP3300	GIUB/BKG	CALC/SOLVE	1984-2005
GPS	WP3400	GFZ	EPOS	1994-2005
GPS	WP3400	GFZ	Bernese V5.0	1994-2005
LEOs	WP3500	GFZ	EPOS	2000-2005
Altimetry	WP3600	DGFI	DGFI Software	1992-2005

2nd Iteration of SINEX Solution Generation:

- Higher-order ionospheric corrections (GPS)
- Absolute antenna phase center variations (GPS)
- New troposphere mapping functions (VMF1; using ECMWF data; GPS and VLBI)
- Hydrostatic a priori delay from ECMWF data (GPS and VLBI)
- IERS 2003 Standards and the same models for site motion (e.g. ocean loading, ...), troposphere, ...

GGOS-D: Parameterization

2nd Iteration of SINEX Solution Generation:

- Site coordinates (piece-wise constant; 1-day)
- Troposphere zenith delays and gradients (piece-wise linear; 2-h and 1-day, resp.; same mapping functions; GPS and VLBI)
- Polar motion and UT1-UTC (piece-wise linear; 1-h)
- Nutation offsets and rates (1-day; VLBI and GPS, resp.)
- Low-degree harmonics coefficients of Earth's gravity field (piece-wise constant; 1-day; SLR, GPS, and LEOs; tests to include altimetry)
- Quasar coordinates (1-day; VLBI)

GGOS-D: Parameter Combination Space

		Parameter Type	VLBI	GPS/ GLON.	DORIS/ PRARE	SLR	LLR	Alti- metry		
ICRF	{	Quasar Coord. (ICRF)	X						Rotation	Earth
		Nutation	X	(X)		(X)	X			
		Polar Motion	X	X	X	X	X			
		UT1	X							
		Length of Day (LOD)		X	X	X	X			
ITRF	{	Coord.+Veloc.(ITRF)	X	X	X	X	X	(X)	Gravity Field	
		Geocenter		X	X	X		X		
		Gravity Field		X	X	X	(X)	X		
		Orbits		X	X	X	X			
Atmosphere	{	LEO Orbits		X	X	X		X		
		Troposphere	X	X	X			X		
		Ionosphere	X	X	X			X		
		Time/Freq.; Clocks	(X)	X		(X)				

GGOS Troposphere Combination Project

Goal: Rigorous Combination of troposphere zenith delays from GPS, VLBI, and DORIS

IGS, IVS, IDS:

- Generation of daily (session) SINEX files containing:
 - Site coordinates: daily resolution
 - Troposphere zenith delays (and gradients): 2-h and 1-day, piece-wise linear (?)
 - Polar motion and UT1-UTC and their rates: daily
- Implement the same troposphere modeling standards:
 - Use the same mapping function (e.g. NMF or GMF)
 - Use the same a priori troposphere model for the dry delay
- Problem: VLBI not observing from 00:00 to 24:00 UT

GGOS Portal Meta Data Project

Goal: Get a first, very simple meta data flow for the individual products of the IAG Services

- Define a simple meta data standard
- Encourage IAG Services to deliver meta data in this format for all their (routine) products
- Develop a first simple database of meta data (portal) and meta data search tools etc.