

Vision for the IGS: The Strategic Plan 2008-2012

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Preamble:

- **Believe it or not: the year 2008 is coming soon ... four years are a short time period ...**
- **And today's generation of GNSS satellites will „(actively) hang around“ for 20+ years.**
- **Strategic plans should look into the future, but not be (strictly) time-limited.**
- **In principle one should have a long-term strategic plan (10y+) and a n-year *realistic* implementation plan (n>5 years)**
- **Many elements of the „old“ IGS strategic plan are therefore still valid.**
- **The IGS does not have an implementation plan ...**

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The years 2008-2012 will see:

- two operational navigation satellite systems available
- One system gearing up
- Receiver manufacturers supporting all three systems



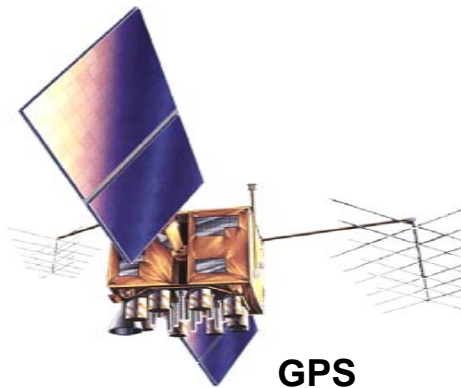
- Study of effects (LC/AR, orbits, atmosphere), which so far could not be seen.
- Study alternative processing strategies with new generation of satellite clocks
- Let us not make the **Doppler → GPS transition mistake** by underestimating the development effort!

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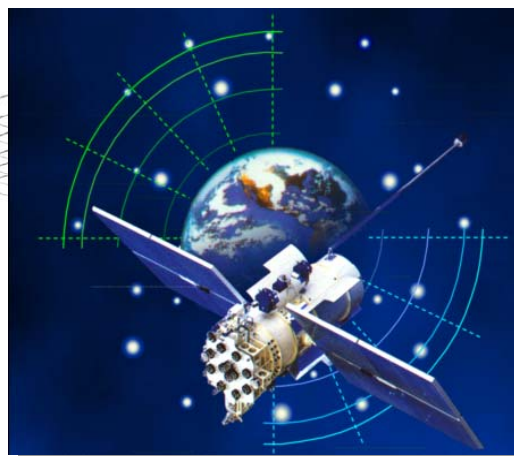
GPS: USA , about 30 satellites in 6 planes

GLONASS: about 12 satellites in 3 planes

GALILEO: today one test satellite in orbit



GPS



GLONASS



GALILEO

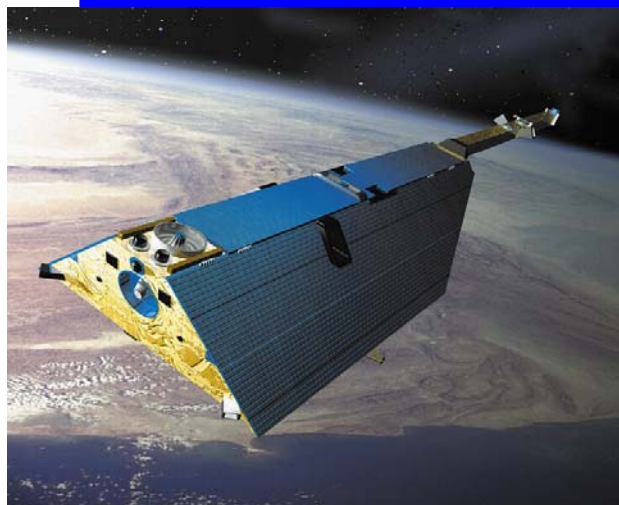
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The IGS must be the agency:

- Materializing the one and only GNSS reference system, which in turn is a special realization of the ITRF.
- Perfectioning the scientific analysis of the three systems
- Offering in particular the perfect combination
- Making use of the latest and greatest developments in all systems.

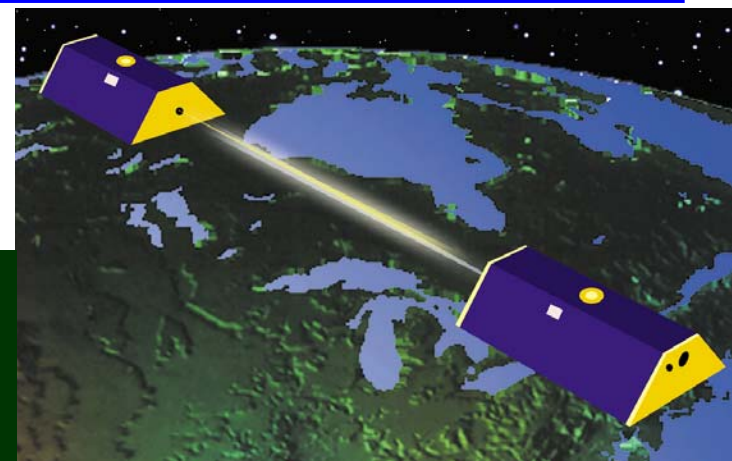
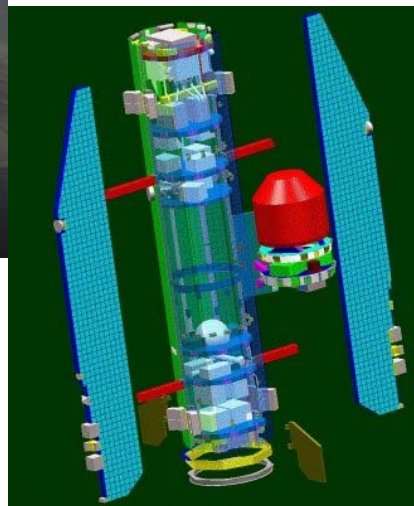
Example: Today, we should have the self-confidence (?) today to develop and make available „perfect“ system/satellite specific radiation pressure models

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CHAMP

GOCE



GRACE A and B

The new **age of gravity field determination** was initiated with the launch of **CHAMP** in July 2000. **GRACE**, launched in 2002, explores the use of inter-satellite measurements (1-d-gradiometer) to study the time variability of the gravity field, **GOCE** will make use (starting 2007) of the 3-d-gradiometer to derive the „best possible stationary gravity field.

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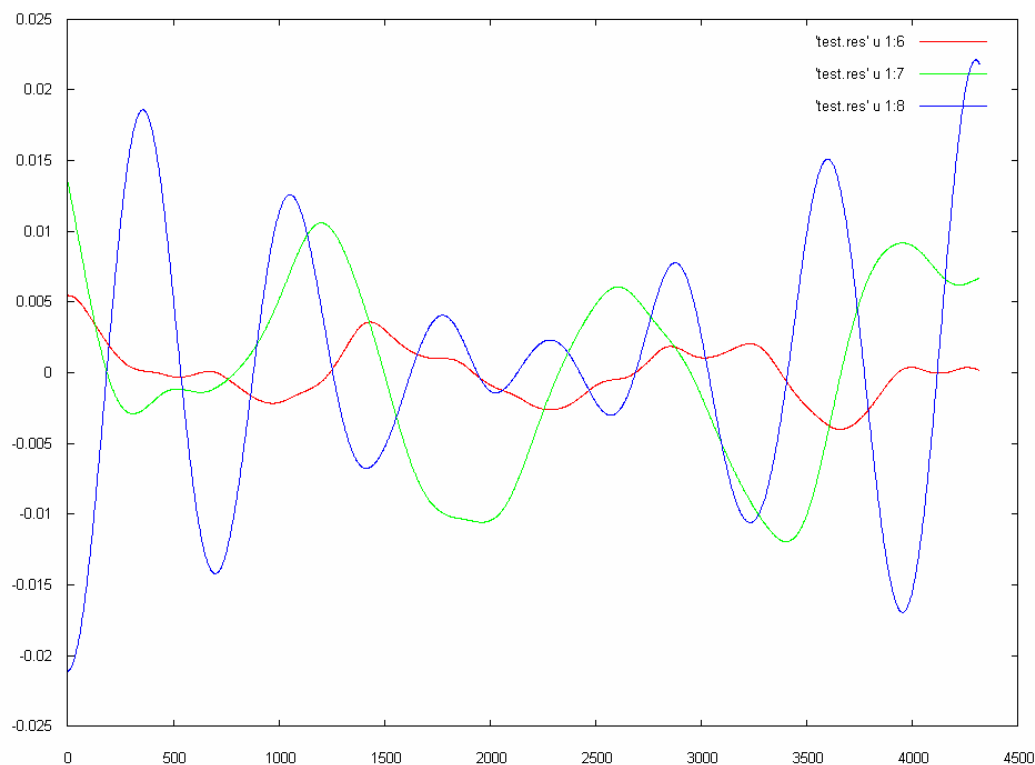
The years 2008-2012 will see

- Many active LEO satellites with (hopefully) excellent GPS receivers on board (CHAMP, GRACE, GOCE, COSMIC, ...)



- The IGS has to build up the interface with the scientific communities of these LEO families.
- This may (should) pave the way for making use of the LEO space segment for the IGS.

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Residuals (m, radial, along, out of plane) of a GPS-like orbit (2-min-spacing between „observations“) using positions as „observations“, generated in EIGEN2 up to $n=m=60$, estimated with JGM3.

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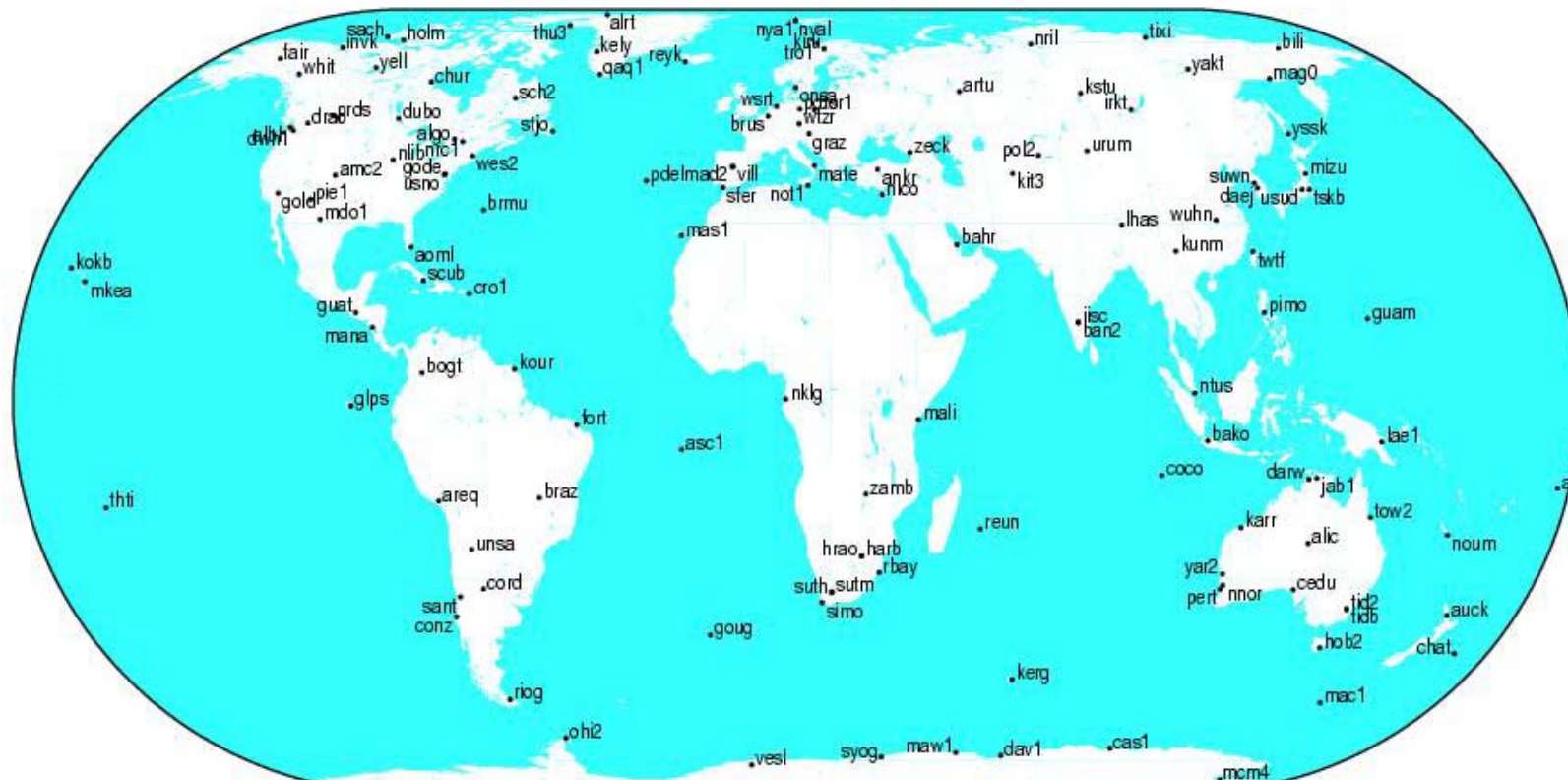
In order to be consistent with gravity field determination, we need to have the capability in GPS processing to **make use of the latest/greatest gravity fields.**

This implies that the coefficients for the low degree & order terms have to be available in IGS processing as parameters in the NEQ systems.

With reprocessing tools available, an absolute necessity in the IGS, for operational and *not* only for geodynamical reasons, it is possible to switch easily from one gravity field model to the next.

Contribution of low degree/order terms to gravity fields?

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The global IGS Network has 500+ but only about 20 „combined“ GPS/GLONASS receivers today! In 2011 we will have an IGS 500+ network with combined receivers – **let us make use of it!**

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I am convinced that a 100 GNSS satellite / 1000 receiver software (correct correlations, no single point processing) is feasible.

By not developing such tools – what undoubtedly will be the case till 2011 – **we are ignoring the full scientific potential of GNSS systems.**

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In **1991** the **IGS became feasible** (among other facts like the availability of more and more GPS satellites) **thanks to the development of the internet.**

The development in this sector today allows for very efficient real-time data transmission.

Redesigning the IGS processing (from real-time to reprocessing) seems to be unavoidable.

Many user communities would benefit from an IGS real-time „branch“.

The development costs are, however, considerable.

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The years 2008-2012 will see

- **The implementation of GGOS,**
- **Which only will be successful, if the IAG services, the IGS in particular, will be the architects and „builders“ of this ambitious project.**