

# *Advances in the implementation of the UN Resolution on Global Geodetic Reference Frame in Argentina*

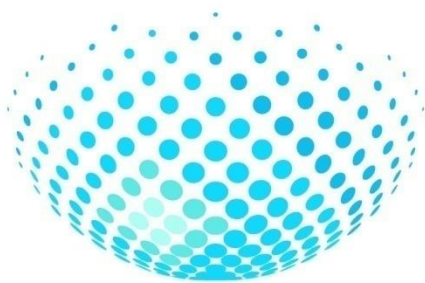
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AGGO



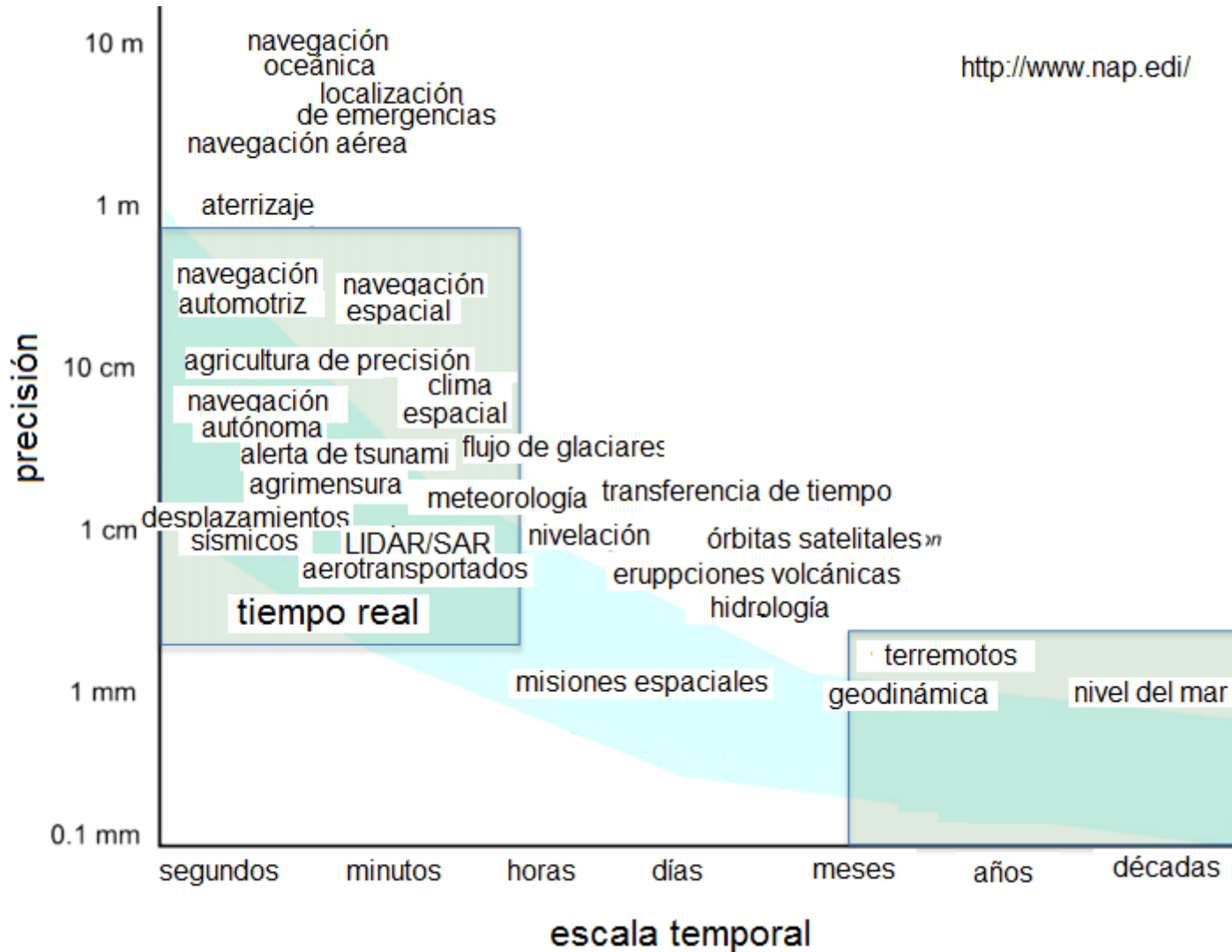
Observatorio Argentino - Alemán de Geodesia

**ARGENTINEAN - GERMAN  
GEODETTIC OBSERVATORY**

Argentinisch – Deutsches Geodätisches Observatorium

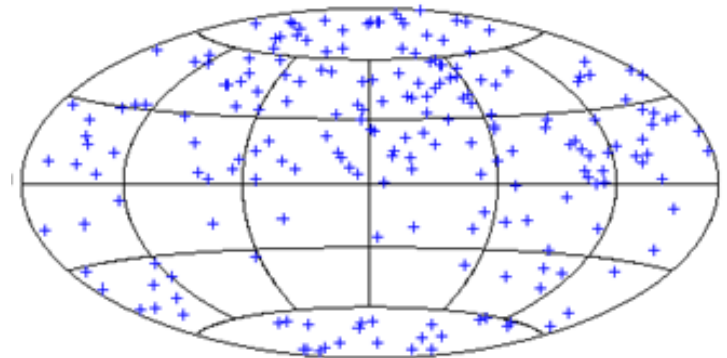
# The role of the GGRF in the GSDI

*But not for all ...*

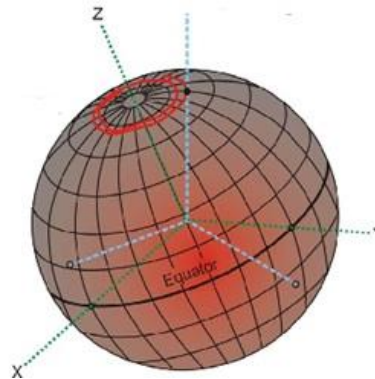


# What does the GGRF imply?

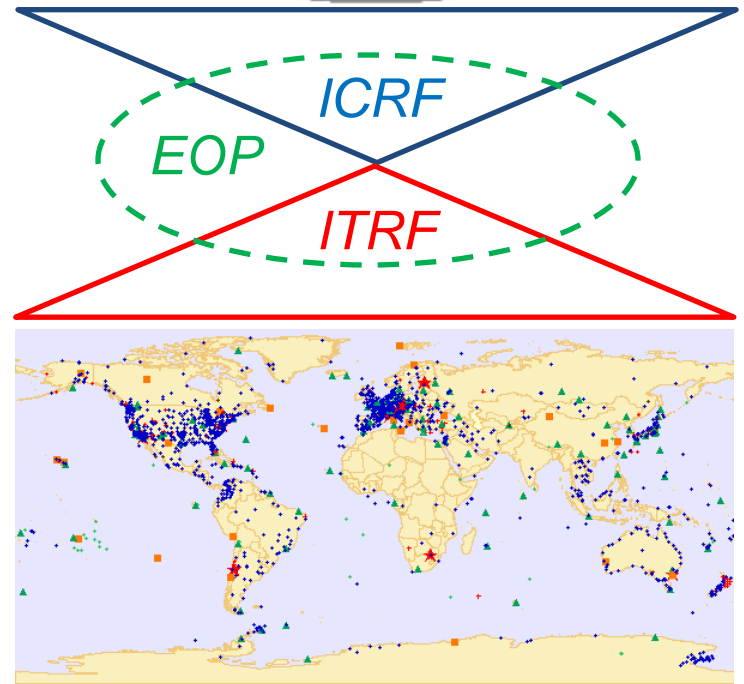
*A geometrical reference frame 'fixed' in the space realized by quasars*



*Parameters to link the celestial and terrestrial frames*



*A geometrical reference frame realized by tracking stations on the 'continuously moving' Earth's crust*



# How the GGRF is realized?



United Nations

A/RES/69/266



General Assembly

Distr.: General  
11 March 2015

Sixty-ninth session  
Agenda item 9

## Resolution adopted by the General Assembly on 26 February 2015

[without reference to a Main Committee (A/69/L.53 and Add.1)]

### 69/266. A global geodetic reference frame for sustainable development

*The General Assembly,*

*Reaffirming* the purposes and principles of the Charter of the United Nations,

*Reaffirming also* its resolution 54/68 of 6 December 1999, in which it endorsed the resolution entitled “The Space Millennium: Vienna Declaration on Space and Human Development”,<sup>1</sup> which included, inter alia, key actions to improve the efficiency and security of transport, search and rescue, geodesy and

*Recognizing the key role played by the GGRF for the sustainable human development and the need of strengthen the global organization in-charged of its realization, in February 2015 the UN promulgated the GGRF Resolution encouraging its member state to consolidate the global infrastructure needed for its realization.*

# The Argentinean – German Geodetic Observatory

*It is one of the most complete geodetic observatory in the world and its strategy location in the Southern Hemisphere makes it a key piece for improving the GGRF world wide and, overall, regionally.*





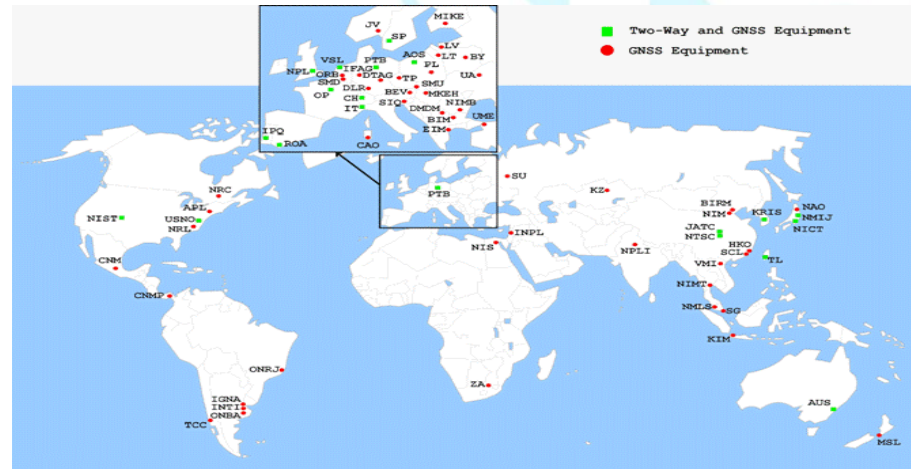
2 H-masers  
 $10^{-15}$  over days

# AGGO's instruments

## Time and frequency laboratory

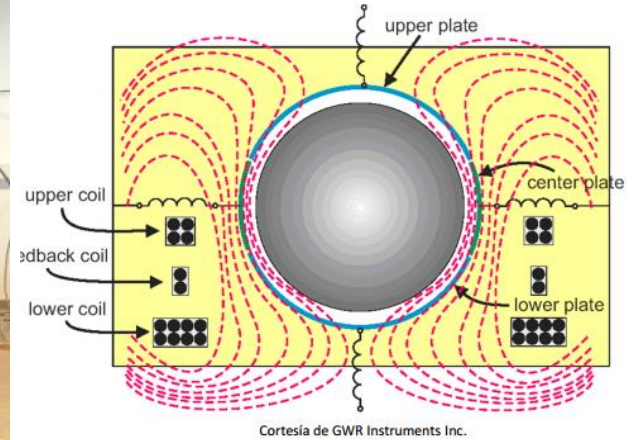


GNSS time synchronization

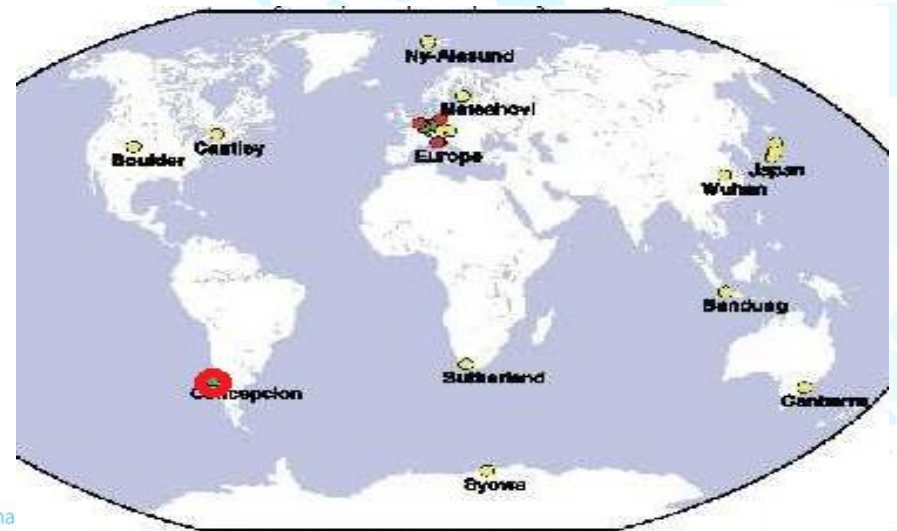


AGGO 3 Cesium beams  
 $10^{-14}$  over months

# AGGO's instruments

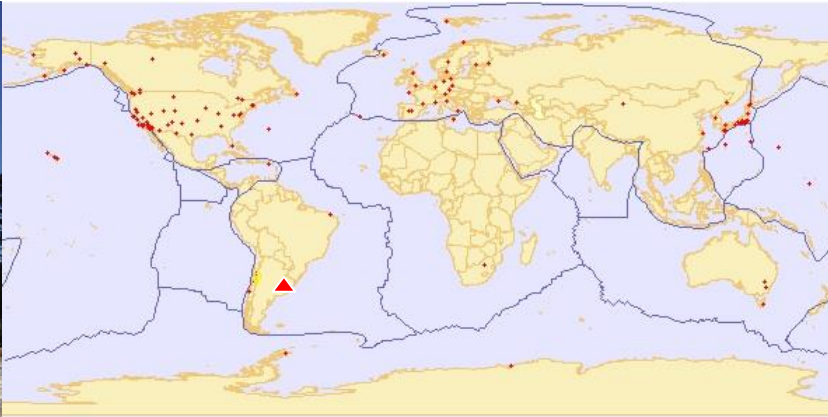


*Absolute and relative (superconducting) gravity meter.  
Both together achieve a sensibility greater than  $0.1 \text{ nm} / \text{s}^2$*

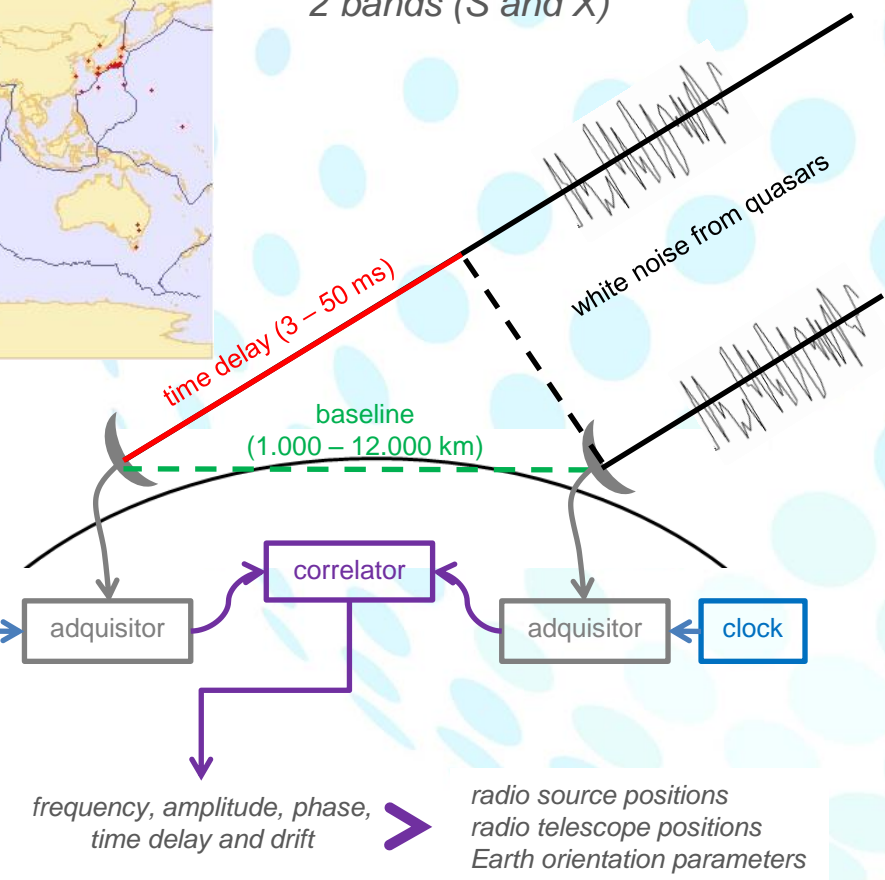
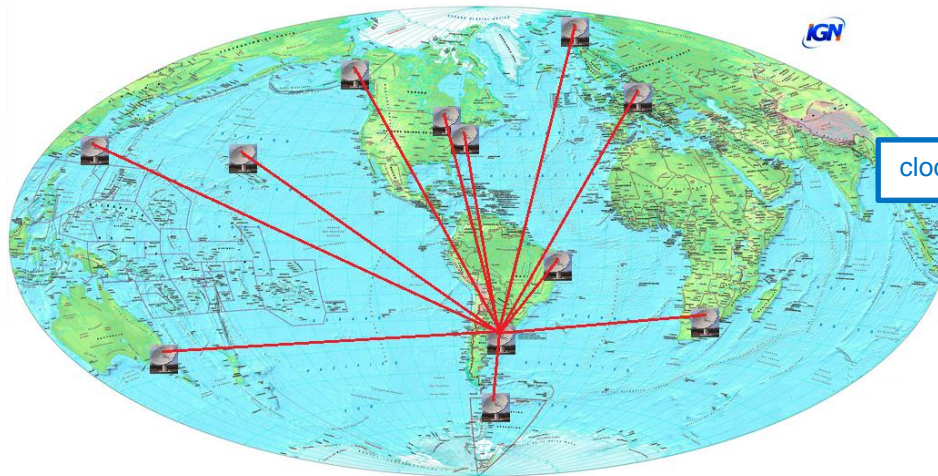


# AGGO's instruments

## Very Long Baseline Interferometry (VLBI)



6 m dish  
2 bands (S and X)





# AGGO's instruments

## Satellite Laser Ranging (SLR)



50 cm telescope  
Sapphire - titanium laser (847 and 423.5 nm)  
Pulses repetition: 100 Hz  
Width: 40 ps  
Energy: 15 mJ

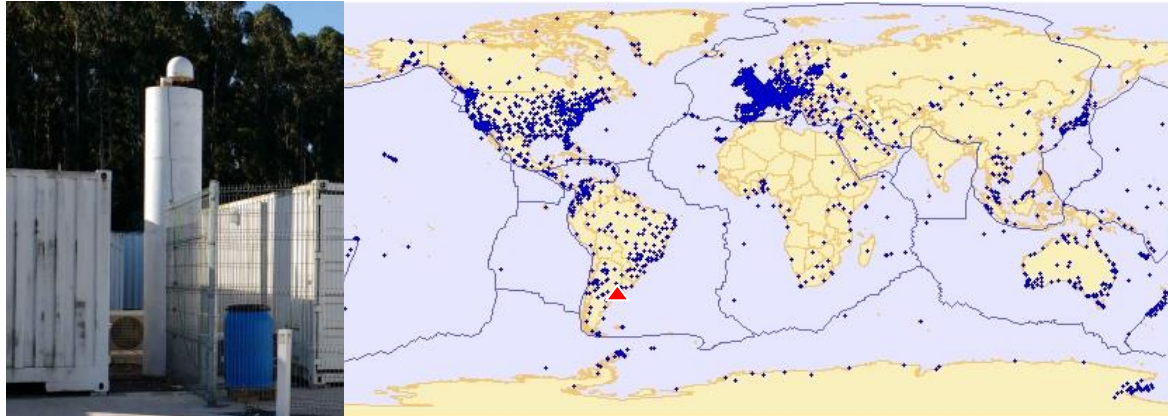


$$\text{range} = \text{speed of light} \times \frac{\text{round trip time}}{2}$$



# AGGO's instruments

*Multi constellation ensemble of GNSS receivers*



*Meteorology, hydrology, sismology and  
a variety of environmental sensors*



## **Closing remarks**

*Observing facilities in Latin America include:*

- *A dense and well organized GNSS network, namely SIRGAS;*
- *Three SLR and one VLBI stations, all co-located with GNSS;*
- *The AGGO station where all geodetic techniques are co-located.*

*For many years, Latin American institutions were mostly involved as data provider.*

*In the last ten years several Latin American countries have developed 'in-house' capabilities for the realization of the GGRF based on GNSS data.*

*The time is coming to extend this capability to the other techniques, i.e., SLR and VLBI.*

*A well coordinate capacity building (with help from the international community) has to be established to guarantee homogenous advances in the region.*

*Could it be a topic for discussion in this workshop?*



*July 2015, Official opening of AGGO with the presence of the Ministers of Argentina and Germany and the Presidents of CONICET and BKG*



*Panorama view of AGGO*

*Many thanks*



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