American Continent

36 countries
Diverse resources and knowledge

Geodetic Infrastructure

<table>
<thead>
<tr>
<th>GLOBAL</th>
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</thead>
<tbody>
<tr>
<td>Reference Frame – CORS Network</td>
<td>Passive Networks</td>
</tr>
<tr>
<td>Geoid Model</td>
<td>-</td>
</tr>
<tr>
<td>Dynamic Datum</td>
<td>Static Datum</td>
</tr>
<tr>
<td>Coordinates, Velocities Data, Model, Products and Services</td>
<td>Coordinates</td>
</tr>
</tbody>
</table>
A The Geodetic Reference System for the Americas (SIRGAS) is a 28 year-old voluntary country collaborative project focused on obtaining regional geodetic infrastructure based on the International Association of Geodesy (IAG) standards, recommendations, products, and services.

Main objectives:
- Establish and maintain a continental geocentric reference frame (a network of stations with geocentric coordinates [X, Y, Z] of high precision and their variation over time [Vx, Vy, Vz]);
- Define and maintain a unified vertical reference system by means of physical and geometric heights that are consistent at the global level;
- Develop and update a gravimetric geoid model for continental coverage;
- Establish and maintain a continental absolute gravity network;
✓ 22 Members States from South, Central, North America and Caribbean region;
✓ Adopted SIRGAS or ITRF realizations;
✓ Promote, among the Member States, homogeneity in the scientific and technical knowledge, bringing professionals up to date and training human resources;

SIRGAS Workshops: 14 (436 students - 10 countries on average)
SIRGAS Schools: 7 Total (603 students - 17 countries on average)

The International Workshop for the Implementation of the Global Geodetic Reference Frame in Latin America, IGN, Buenos Aires, Argentina, from Sep 16 to 20, 2019
130 participants from 20 countries
SIRGAS Reference - SIRGAS WG I : Reference System (IAG SC 1.3b)
Densify ITRF in the American Continent and Caribbean region

Geodetic Infrastructure

<table>
<thead>
<tr>
<th></th>
<th>GNSS CORS Networks</th>
<th>GNSS Data Centers</th>
<th>GNSS Analysis Centers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>RAMSAC</td>
<td></td>
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<tr>
<td>Bolivia</td>
<td>MARGEN</td>
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<tr>
<td>Brasil</td>
<td>RBMC</td>
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<tr>
<td>Canadá</td>
<td>CACS</td>
<td></td>
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<tr>
<td>Chile</td>
<td>IGS, CSN, CAPES</td>
<td></td>
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<tr>
<td>Colombia</td>
<td>MAGNA-ECO</td>
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<tr>
<td>Costa Rica</td>
<td>RGNA-CR</td>
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<tr>
<td>Ecuador</td>
<td>REGME</td>
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<tr>
<td>Estados Unidos</td>
<td>NGS-CORS</td>
<td></td>
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<tr>
<td>México</td>
<td>RGNA</td>
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<tr>
<td>Panamá</td>
<td>Panama-CORS</td>
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<tr>
<td>Perú</td>
<td>REGPMOC</td>
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<tr>
<td>Uruguay</td>
<td>REGNA-ROU</td>
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</tbody>
</table>
~ 440 continuous operating GNSS Network

✓ To maintain and ensure the long-term stability of the SIRGAS reference frame;
✓ accessibility to the global reference system at regional, and national;
✓ **Products**: weekly station positions, multi-year solutions, surface deformation models, and tropospheric parameters in hourly intervals.
### SIRGAS Velocity Models

<table>
<thead>
<tr>
<th>Modelo</th>
<th>Realizaciones</th>
<th>Región</th>
<th>Estaciones</th>
<th>Validez</th>
</tr>
</thead>
<tbody>
<tr>
<td>VEMOS2009</td>
<td>SIR09P01</td>
<td>56°S to 20°N</td>
<td>96 stations (400 aditional velocities)</td>
<td>January 2, 2000 to June 30, 2009</td>
</tr>
<tr>
<td>VEMOS2015</td>
<td>SIR15P01</td>
<td>55°S, 110°W to 32°N, 35°W</td>
<td>456 stations</td>
<td>March 14, 2010 to Abril 11 2015</td>
</tr>
<tr>
<td>VEMOS2017</td>
<td>SIR17P01</td>
<td>55°S, 120°W to 32°N, 35°W</td>
<td>515 stations</td>
<td>January 1, 2014 to January 28, 2017</td>
</tr>
</tbody>
</table>

SIRGAS Products

Multi-year solutions
SIRGAS reference frame realization
DGFI-TUM, IGS RNAAC SIRGAS

SIR17P01
Aligned to IGS14, epoch 2015.0
Time span: 2011 - 2017
345 stations

SIR2020
Aligned to IGS14/IGb14, epoch 2010.0
Time span: 2000 - 2020
723 stations
Included global IGS stations co-located with VLBI and SLR
Today's scenario in the Americas and Caribbean

Technology pushes Geodesy towards "Global Sense!"
Heterogeneous knowledge, experience, resources and infrastructure

We need to build on...

 ✓ Capacity building and training under a strong cooperation & collaboration between countries and SIRGAS;
 ✓ Clear and simple communication/outreach about geodesy and the importance of geospatial information interoperability – ITRF-WGS84;
 ✓ Better geodetic infrastructures: Geodetic Observatories, National CORS Networks;
 ✓ Geodetic Data Sharing for reliable models, products and services,
 ✓ Participate through IGS station, etc...

Respond and Implement the UN GGRF Resolution for Sustainable Development
Motivation of the GRFA WG

- Interface with the United Nations SubCommittee on Geodesy (UN-SCoG);
- Coordinate and assist the efforts of SIRGAS and member countries in the implementation of the GGRF in the Americas;
- National representation of the Geodetic agencies in the region, the same as in SIRGAS Directing Council as a better coordination between these groups;
- Cooperation and exchange of dialogue on issues relating to the maintenance, sustainability and enhancement of, and access to, the Global Geodetic Reference Frame (GGRF);
Future Steps

The future steps in order to advocate for and implement the Global Geodetic Reference Frame (GGRF) in the Americas for sustainable development.

**Strategic decision-makers**

- **GRFA WG UN:GGIM-Americas**
  - promote and provide mechanisms for capacity development and knowledge transfer in the field of geodesy among the Nations of the Americas

**Science**

- **SIRGAS**
  - global geodetic infrastructure following and applying International Association of Geodesy (IAG) standards, recommendations, products, and services
¡Gracias!

Thank you!

https://sirgas.ipgh.org/

@SirgasAmericas