

Fortaleza Station Report for 2007

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Abstract

This is a brief report about the activities carried out at Fortaleza geodetic VLBI Station (ROEN: Rádio Observatório Espacial do Nordeste), located in Eusébio, CE, Brazil, in 2007. The observing activities consisted of 90 VLBI sessions and continuous GPS monitoring recordings. The installation of optical fiber was completed, and the station switched to a 1 Gbit/s high speed network, to be used in e-VLBI operations.

1. General Information

The Rádio Observatório Espacial do Nordeste, ROEN, located at INPE facilities in Eusébio, nearly 30 km east of Fortaleza, Ceará State, Brazil, began operations in 1993. Geodetic VLBI and GPS observations are carried out regularly, as contributions to international programs and networks. ROEN is part of the Brazilian space geodesy program, which was initially conducted by CRAAE (a consortium of the Brazilian institutions Mackenzie, INPE, USP, and UNICAMP) in the early 1990s. During that time the antenna and instrumental facilities were erected, and it was the beginning of the activities sponsored by the U.S. agency NOAA and the Brazilian Ministry of Science and Technology's FINEP agency. ROEN is currently coordinated by CRAAM, Center of Radio Astronomy and Astrophysics, Mackenzie Presbyterian University, São Paulo, in agreement with the Brazilian National Space Research Institute, INPE. A new contract was signed in May 2004 between NASA and CRAAM, Mackenzie Presbyterian Institute and University to partially support the activities at ROEN until 2009. This contract is a consequence of the Agreement of Cooperation signed between NASA—representing research interests of NOAA and USNO—and the Brazilian Space Agency, AEB, in 2002. The counterpart of the operational costs, staff, and support of infrastructure are provided by INPE and by Mackenzie.

2. Component Description

The largest instrument of ROEN is the 14.2 m radio telescope, an alt-azimuth positioner. It is operated at S- and X-bands, using cryogenic radiometers. The system is controlled by the Field System, Version 9.9.2. Observations are recorded with a Mark 5 system. One Sigma-Tau hydrogen maser clock standard is operated at ROEN.

GPS monitoring is performed within a cooperative program with NOAA (USA). There is a Leica System 1200 installed at the station that operates continuously. The collected data are provided to the NOAA/IGS center and to the Brazilian IBGE center. ROEN has all basic infrastructures for mechanical, electrical, and electronic maintenance of the facilities.

3. Staff

The Brazilian space geodesy program is coordinated by Prof. Pierre Kaufmann, from the São Paulo main office at CRAAM (CRAAE)/Instituto and Universidade Presbiteriana Mackenzie,



Figure 1. Fortaleza's 14.2 m antenna.

receiving scientific assistance from Dr. Claudio E. Tateyama and partial administrative support from Valdomiro S. Pereira and Neide Gea Escolano. Partial technical assistance is given by staff from the Itapetinga Radio Observatory near São Paulo, also operated by INPE/Mackenzie.

The Fortaleza Station facilities and geodetic VLBI and GPS operations are managed on site by Dr. A. M. P. de Lucena (CRAAE/INPE), assisted by Eng. Adeildo Sombra da Silva (CRAAE/Mackenzie), the technicians Avicena Filho (CRAAE/INPE) and Carlos Fabiano B. Moreira (CRAAE/Mackenzie).

4. Current Status and Activities

4.1. VLBI Observations

Fortaleza participated in the following geodetic VLBI experiments, as detailed in the table below for the year 2007.

Table 1. 2007 session participation.

Experiment	Number of Sessions
IVS-R1	28
IVS-R4	45
IVS-T2	03
IVS-CRF	03
IVS-OHIG	07
IVS-R&D	02
IVS-CRMS	03



Figure 2. Fortaleza's station team

4.2. Development and Maintenance Activities in 2007

Considerable attention was given to technical maintenance, especially to the following activities: 1) installation of a new cryogenic system, 2) replacement of video converters for the new Mark IV VC modules, 3) repairs of the following circuits, modules or systems: Mark III video converters, Mark III power supplies, and the Mark III IF Distributor module, 4) repairing the UPS system, 5) maintenance of the Web site (<http://www.roen.inpe.br>) and the local server computer, and 6) painting the steel structure of the 14.2 m antenna.

4.3. GPS Operations

The IGS network GPS receiver operated regularly at all times during 2007. Data were collected and uploaded to an IGS/NOAA computer.

4.4. High Speed Network

The installation of fiber and the switch to a high speed 1 Gbits/s network, to be used in e-VLBI operations, was completed in December 2007. Figure 3 shows details of the connection switch.

Figure 4 illustrates the network fiber path in the Fortaleza metropolitan area. The Fortaleza VLBI Station is labeled INPE-ROEN.

The Brazilian Research Network (RNP) circuit across the country is shown in Figure 5. There



Figure 3. Switch rack for connection to the high speed fiber network.



Figure 4. Fortaleza metropolitan area showing the high speed optical fiber network.

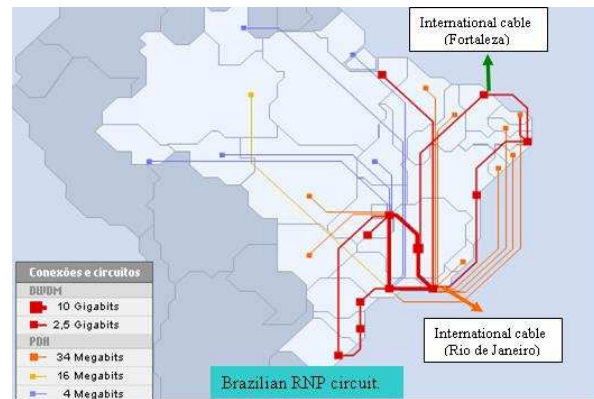


Figure 5. National RNP fiber optic circuits.

are two options available for connecting to the international optical cables: via Rio de Janeiro or via Fortaleza.

5. Future Plans

The completed high speed optical network connection will allow ROEN to participate in e-VLBI experiments. The network is currently being tested.

6. Acknowledgements

These activities have received partial support from NASA, within an agreement with the Brazilian Space Agency (AEB) and a contract with Mackenzie, as part of an agreement between Mackenzie INPE.