Fortaleza Station Report for 2006

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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 2006. The observing activities consisted of 72 VLBI sessions and continuous GPS monitoring recordings.

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 U.S. agency NOAA, 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 counter-part 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 Field System, Version 9.9.2 program. Observations are recorded with a Mark 5 system. One Sigma-Tau hydrogen maser clock standard is operated at ROEN.

GPS monitoring is performed in a cooperation 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 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 São Paulo main office at CRAAM (CRAAE)/Instituto and Universidade Presbiteriana Mackenzie, receiving scientific assistance from Dr. Claudio E. Tateyama, and partial administrative support from Val-

Figure 1. Fortaleza's 14.2 m antenna.

domiro S. Pereira and Neide Gea Escolano. Partial technical assistance is given by Itapetinga Radio Observatory staff, 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).

Figure 2. Fortaleza's station team

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 2006.

Fortaleza also participated in tracking of the European sonde SMART-01 before its impact on

Table 1. 2006 session participation.

Experiment	Number of Sessions
IVS-R1	13
IVS-R4	46
IVS-T2	05
IVS-CRF	03
IVS-OHIG	05

the lunar surface.

4.2. Development and Maintenance Activities in 2006

Considerable attention was given to technical maintenance problems, specially to the following ones:

1. Repair of the cryogenic system.
2. Replacement of Mark 5 recorder power supply.
3. Repairs of the following circuits, modules or systems: Mark III video converters, Mark III power supplies, Mark III IF Distributor module.
4. Repair in UPS system.
5. Maintenance of web site (http://www.roen.inpe.br) and the local server computer.
6. Updating Field System to version 9.9.2.

4.3. GPS Operation

The IGS network GPS receiver operated regularly at all times during 2006. Data were collected and uploaded to IGS/NOAA computer.

5. Agreement

An Agreement between Mackenzie and Ceara State University (UECE), Fortaleza, has been implemented, intended to explore GPS and VLBI meteorology in connection with the regional weather and climate in the North-East of Brazil.

6. Future Plans

In 2007, it will be completed the high speed optical network that will allow ROEN to participate in e-VLBI experiments. The updating of Mark III system will be also completed with the installation of Mark IV video converters during this year. Antenna painting was contracted in 2006 and will be concluded by April, 2007.

7. Acknowledgements

These activities have received partial supports from NASA, within a contract with Mackenzie, from Mackenzie and from INPE.

8. Publications

Diniz, S.I.F., Tateyama, C.E., "Precessão de Jato de BL Lac", Annual Meeting of the Brazilian Astronomical Society, 30 July - 3 de August 2006, Atibaia, SP, Boletim da SAB, vol. 26, n. 1,p. 150, 2006.

Kaufmann, P., "Radio Astronomy and VLBI in Brazil". 4th IVS General Meeting, January 9-11, 2006, Concepción, Chile. IVS 2006 General Meeting Proceedings, edited by D. Behrend and K. D. Baver, NASA/CP-2006-214140, p.137-141, 2006.

Namba, C.Y., Tateyama, C.E. "Precessão de Jato de 3C273" Annual Meeting of the Brazilian Astronomical Society, 30 July - 3 de August 2006, Atibaia, SP, Boletim da SAB, vol. 26, n. 1,p. 156, 2006.

Steimberg, D., Tateyama, C.E., "Precessão de jato de OJ287", XXXIIa. Annual Meeting of the Brazilian Astronomical Society, 30 July - 3 de August 2006, Atibaia, SP. Boletim da SAB, vol. 26, no 1, 167, 2006.