

Progress at ROEN - Fortaleza Geodetic Station

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Abstract

This report presents the works developed at ROEN: Rádio-Observatório Espacial do Nordeste, Eusébio near Fortaleza, CE, Brazil, in 1998. Activities were related to observing sessions, major maintenance items, and scientific results obtained.

1. ROEN General Information

The North-East Spatial Radio Observatory, ROEN, located at INPE facilities in Eusébio, nearly 30 km east from 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 coordinated by CRAAE, the Center for Radio Astronomy and Space Applications, which is a consortium between Brazilian institutions Mackenzie, INPE, USP and UNICAMP. Construction and activities at ROEN were sponsored at the beginning by U.S. agency NOAA and Brazilian Ministry of Science and Technology's FINEP agency. Presently the operational staff and part of infra-structure is maintained by INPE and by Mackenzie, the other costs of technical maintenance, part of infra-structure, are sponsored by US agencies NASA, USNO and NOAA.

2. Technical Parameters of ROEN Facilities

The largest instrument of ROEN is the 14.2 m radio telescope, on one alt-azimuth positioner. It is operated at S- and X-bands, using cryogenic radiometers. The system is controlled by Field System, Version 8.27. Observations are recorded with a Mark III data acquisition system. One Sigma-Tau hydrogen maser clock standard is operated at ROEN. One dual frequency GPS Rogue receiver is operated continuously. The collected data are provided to the IGS center, as well to Brazilian IBGE center. ROEN has all basic infrastructure for mechanical, electrical and electronic maintenance of the facilities.

3. CRAAE and ROEN Staff Dedicated to Space Geodesy

The Brazilian space geodesy program, conducted by CRAAE, is coordinated by Prof. Pierre Kaufmann, from the São Paulo main office, receiving scientific assistance from Dr. Claudio E. Tateyama, and partial administrative support from Valdomiro S. Pereira and Neide Gea. Partial technical assistance might be given by Itapetinga Radio Observatory staff, near São Paulo.

The ROEN station facilities and geodetic VLBI and GPS operations are managed by Eng. A. M. P. de Lucena (CRAAE/INPE), assisted by Eng. Adeildo Sombra da Silva (CRAAE/Mackenzie), and technicians Avicena Filho (CRAAE/INPE) and Clairvânia Maria Anastácio da Silva (CRAAE/Mackenzie). Partial administrative assistance is given by Onivaldo Assunção de Freitas (CRAAE/INPE).



Figure 1. The 14.2-m antenna located in Eusébio near Fortaleza

4. Status for 1998/1999

- Geodetic VLBI observations. ROEN has participated in 91 VLBI observational runs until March 1999 on experiments NEOS-A (52), IRIS-S (12), CORE-B (11), CRF (3) and CORE-OHIG (3).
- Development and major maintenance. (1) Antenna positioner: replacement and repair of large elevation gear box, mechanical alignment of elevation axis, electrical alignment including controller card, high power amplifier, DC motors and tachometers for both axes, new pointing model was implemented. (2) Repairing jobs on four Mark III video converters, current monitoring of power conversion station, controller of power motor-generator group, 14 bit tracking converter card of shaft encoder, display controller of the UPS, and spectrum analyser unit. (3) Installed internet connection, with server, router, 64 kbs radio link via INPE at Natal. (4) New thermal dissipation system done, in order to prevent corrosion in the inductosyns.
- Scientific papers using ROEN:
 1. Tateyama, C.E., Kingham, K.A., Kaufmann, P., Piner, B.G., de Lucena, A.M.P., Botti, L.C.L., "Observations of BL Lacertae from the Geodetic VLBI Archive of the Washington Correlator", ApJ 500, 810, 1998.

2. Tateyama, C.E., Kingham, K.A., Kaufmann, P., Piner, B.G., Botti, L.C.L., de Lucena, A.M.P., "Observations of OJ287 from the Geodetic-VLBI Archive of the Washington Correlator", ApJ 520, scheduled for August 1, 1999.
3. Almeida, A.A., Vilas-Boas, J.E.S., Lucena, A.M.P., Huebner, W.F., "On an Upper Limit to the Continuum Microwave Radiation from Comet C/Hale-Bopp(1995 O1)", Icarus, submitted, 1999.

5. Plans for 1999/2000

Plans are for keeping ROEN regular operations along the following year, with a number of essential improvements needed. Prospects for obtaining funds to upgrade data acquisition system to Mark IV are expected to improve.