
Arecibo Observatory & Internet Connectivity

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Outline

- ◆ **What is Arecibo Observatory?**
- ◆ **Some current projects at Arecibo (*specific*)**
- ◆ **Need for advanced network infrastructure (*general*)**
- ◆ **Internet2 at Arecibo**

What is Arecibo Observatory?

- ◆ **300 m diameter fixed spherical reflecting dish pointing straight up**
- ◆ **Located close to Arecibo, PR**
- ◆ **Movable receivers suspended above dish can track celestial objects within 20° of zenith**
- ◆ **So a given celestial object can be observed for no more than 2.8 hours/day**

What is Arecibo Observatory?

- ◆ Operates in both “passive” mode (reception only) and “active” mode (transmission & reception, *i.e.* radar)
- ◆ *Passive mode* - Study of radio emission from Solar System, Galaxy, external galaxies
- ◆ *Active mode* – Study of Earth’s ionosphere, planets, their satellites, nearby asteroids

Some current projects at Arecibo (*specific*)

- ◆ **Passive reception of radio-frequency radiation from interstellar clouds in our Galaxy**
- ◆ **Estimation of magnetic field strengths in these clouds via Zeeman effect**
- ◆ **Magnetic fields may influence *star formation* if strong enough**

Some current projects at Arecibo (*specific*)

- ◆ **Very high sensitivity required (*i.e.* 100's of hours of telescope time spread over many months)**
- ◆ ***Project status* – About 700 hours of time already used, several 100 hours still to be allocated, data analysis partially complete**
- ◆ ***Collaborators* – R. M. Crutcher (University of Illinois) and C. Heiles (Berkeley)**

Need for advanced network infrastructure (*general*)

- ◆ *Real-time observing from remote location – Location of observatory plus need for observations over many weeks or months makes this capability essential*
- ◆ **Virtual Control Room - Exports displays of telescope parameters to remote user, allows remote pointing of telescope**
- ◆ **Network connection must be very reliable**

Need for advanced network infrastructure (*general*)

- ◆ *Off-line data analysis* – **Often need to export large data sets to remote computer or else analyze data sets on Arecibo computers from a remote location**
- ◆ **High network capacity needed to export large data sets efficiently and to export graphics displays from Arecibo computers**

Need for advanced network infrastructure (*general*)

- ◆ *Collaborative observations - Arecibo* sometimes used for collaborative observations involving other facilities (e.g. very long baseline interferometry)
- ◆ **Reliable network connections essential during collaborative observations**

Internet2 at Arecibo

- ◆ **AMPATH to provide connection to PRISAnet for Internet2 access (Puerto Rican Internet2 Services Association)**
- ◆ **PRISAnet to provide 155 Mbits/s connection among Arecibo and U. of PR campuses, 45 Mbits/s to FIU**
- ◆ **Physical Internet2 connectivity to Arecibo expected as early as October, 2001**