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Indian Astronomical Observatory, Hanle

T.P. Prabhu

Indian Institute of Astrophysics, Bangalore 560 034, India

Abstract. The high-altitude astronomical station of Indian Institute of Astrophysics at Mt. Saraswati, Hanle, will function as a full-fledged observatory with one 2-m and one 50-cm telescopes by the winter of 1999. The telescopes will be operated in robotic or remote operation mode using a dedicated satellite communication link from the control station at Hosakote near Bangalore. The current status and schedule are described here.

Key words : astronomical observatories, astronomical sites.

1. Introduction

The Indian Astronomical Observatory is the high-altitude field station of Indian Institute of Astrophysics (IIA), Bangalore, currently being developed for optical and near-infrared astronomy. The site was selected after a study of meteorological, topographic and satellite imagery data over the entire Indian subcontinent and site reconnaisance trips to several high-altitude sites. Further characterization of Hanle began in 1994 (see Bhatt, Prabhu & Anupama 1999, this issue and references therein). The 2-m telescope was approved in 1997, and Washington University in St Louis made a proposal for 0.5-m telescope in 1998.

Being a remote site, the observatory is being developed as a completely self-contained unit. The J & K Government has transferred 600 acres of land including the entire mountain range of Dikpa-ratsa Ri and some parts of the surrounding Nilamkhul Plain (4250 m above mean sea level) in 1998. The main accommodation and liquid nitrogen plant have been organized in the Nilamkhul Plain. A 62.5 KVA diesel generator set and one 1KWp Solar Power Station have been commissioned here. The road from the Hanle Monastery to the summit (8.5 km) has been laid by the Border Roads Organization on contract. The observatory area is served by two solar power plants of 30 KWp capacity each, and two 62.5 KVA diesel generator sets are operating in a standby mode. Minimal amount of accommodation has been created at the summit for support required during installation and operation. The 128-kbps dedicated communication link using a 3.8-m aperture satellite communication dish antenna, and a slower shared hub communication link, RABMN, are also installed.

A guest house cum coordination centre has been functioning in Leh since 1995. This centre has a shared-hub RABMN communication link fed by 1 KWp Solar Power plant.

2. The Facilities

The 2-m telescope manufactured by EOS Technologies, Inc., Tucson, U.S.A., a subsidiary of EOS Pty Ltd, Australia, is of a new technology design that uses a fast primary (f/1.75) of Corning ULE glass. The main optics is of Ritchey-Chretien design that affords a corrected Cassegrain field of 30 arcmin. The combined Cassegrain focus (f/9) has an image scale of 11.5 arcsec/mm. The telescope is alt-azimuth, and is fully controlled by a computer. The instrument mounting flange will have an autoguider and a provision of 4 instruments that are simultaneously mounted and remotely selectable using a queuing mirror. The telescope is currently being assembled, and is expected to be tested at Works in May 1999. The installation is scheduled for August/September 1999. The telescope pier is already cast at the site and the enclosure and dome are being assembled.

The first light instrument will be a CCD imager with an image scale of 0.17 arcsec per pixel to utilize the excellent seeing at the site. The imager covers most of the 7 arcmin central field without the need for a field flattener. A HgCdTe array will be pressed into service for imaging in the region of 1–3μm shortly thereafter, together with a faint-object spectrograh and camera in the optical region being built at the Copenhagen University Observatory. Further augmentation is planned over a period of 2-3 years.

A 0.5-m telescope will be installed at IAO during the summer of 1999, as one of the pair of telescopes forming Antipodal Transient Observatory operated jointly by the IIA and the University of Washington in St Louis. The second telescope will be installed in Arizona, about 180 degrees apart in longitude. The two telescopes will monitor Active Galactic Nuclei collaboratively using a CCD imager, and operate in a robotic mode. The telescope is being manufactured by Torus Precision Optics Inc., Iowa, and is expected to be delivered in May 1999.

As a part of site characterization programme, the IAO has an automated weather station, a 50-foot microthermal tower and a 0.3 m site survey telescope. IIA is collaborating with the University of Tokyo and Raman Research Institute in characterizing the site for sub-mm and infrared wavelength range.

The presence of IIA in this remote area has also resulted in new initiatives in other paradigms of science. CMMACS, Bangalore, is collaborating with IIA in quantifying the dynamic deformation field in Ladakh using GPS geodesy. The study provides the station coordinates with sub-cm accuracy and also yields strain rates suffered by the region to elucidate the style and extent of continental deformation in the wake of Indo-Eurasean convergence of 55 mm/yr.

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The fast pace of development at IAO, Hanle, has been possible due to the involvement of a large number of individuals in IIA under the leadership of R. Cowsik.