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Editors: A. Mateus, J. Gregorio-Hetem & R. Cid Fernandes

consists essentially in two coded-aperture imaging telescopes equipped with cadmium-zinc-telluride (CZT) solid-state room-temperature semiconductor detectors. One telescope (T1) has been in development at INPE′s Astrophysics Division and will fly in a high altitude (∼43 km) balloon in 2014 for testing and demonstration; this development is called the *protoMIRAX project*. T1 uses an array of 13×13 CZT planar detectors with dimensions 10mm×10mm×2mm and a 1 mm-thick lead coded mask with 20 mm openings in a 13×13 Modified Uniformly Redundant Array (MURA) basic pattern. It will have a 20° × 20° fully-coded field-of-view (FCFOV) and an angular resolution of 1.5°. T1 will be mounted in a balloon gondola with an attitude control and pointing systems as well as a 500 kbps telemetry and command capability for real-time operation and data acquisition. The imaging CZT detectors for the second telescope (T2) are being developed at the Harvard Smithsonian Center for Astrophysics (CfA). The detector plane for T2 will have a 0.6 mm spatial resolution and an area of 250 cm^2. A 0.3mm-thick tungsten mask with a random pattern will provide images with 6′ angular resolution with a 20° × 20° FWHM FOV. In this presentation we will describe the current status of MIRAX and present results of the protoMIRAX detector, telescope and balloon gondola developments.

[1] Astrophysics Department, National Institute for Space Research, Brazil.
[2] Harvard Smithsonian Center for Astrophysics.
[3] NASA Goddard Space Flight Center.
[4] Center for Astrophysics and Space Science, University of California San Diego.

GEMS/GSAOI: FROM COMMISSIONING TO OPERATIONS AND SCIENCE RESULTS

E. R. Carrasco[1], B. Neichel[1], F. Rigaut[2], C. Winge[1], F. Vidal[1], P. Pessev[1], A. Serio[1], G. Arriagada[1], W. Rambold[1], J. Luhrs[1], M. Boccas[2], C. Dorgeville[2], V. Fesquet[1], A. Lopez[1], C. Trujillo[3], R. Galvez[1], G. Gausachs[1], C. Araujo[1], T. Vucina[1], V. Montes[1], C. Urrutia[1], C. Moreno[1], C. Marchant[1], F. Collao[1], S. Diggs[1], F. Collao[1], G. Trancho[4], and M. Bec[4]

The Gemini Multi-conjugate Adaptive Optics System (GeMS) and the Gemini South Adaptive Optics Imager (GSAOI) are unique and complex facility Gemini instruments. GeMS/GSAOI provide a uniform, diffraction limited image quality at near-infrared (NIR) wavelengths over a field of view of 85" x 85" on the sky. The GeMS/GSAOI commissioning started at the beginning of 2011. After ∼2 years of dedicated work and more than 90 nights of on-sky commissioning, at the end of 2012 GeMS/GSAOI started to produce the first science results. In this presentation we describe in details the system performance, on-sky efficiency and present the scientific results produced by GeMS/GSAOI during the system verification process.

[1] Gemini Observatory/AURA, Southern Operations Center.
[2] Research School of Astronomy and Astrophysics, The Australian National University.
[3] Gemini Observatory/AURA, Northern Operations Center.
[4] Giant Magellan Telescope Organization.

MMTRON

T. de Graauw[1]

Millimetron is a 10-meter cooled space observatory that is optimized for the far-infrared and submm wavelength range. The facility has two operating modes: one can operate as a single-dish observatory or as an element of a space-earth VLBI system. It will have scientific capabilities that can address various key problems in astronomy and astrophysics such as the formation and evolution of stars and planetary systems, evolution of galaxies, quasars, etc. The telescope will be deployed in space and the panels of the primary mirror are to be adjustable to achieve an rms accuracy less than 10 micron. The telescope and instrument compartment will be cooled down to 4.5K by passive cooling and mechanical coolers. The instrument package is to include a set of heterodyne receivers operating in several bands between from 500 and 5000 GHz, a submm array camera/spectrometer and a mm array camera/spectrometer covering 50 micron to 3 mm. Millimetron is proposed as a Russian-led mission and is to include a wide international collaboration. Currently, the mission scheduled to be launched in 2020.

[1] ALMA.

SURFACE LAYER TURBULENCE PROFILING WITH THE SL-SLODAR AND LUSCI AT ESO PARANAL OBSERVATORY