TIMMI2 at the 3.6-m, or The Return of MIR

V. DOUBLIER, La Silla

In October 2002, after only 12 weeks of forced retirement, TIMMI2 (Thermal Infrared Multimode Instrument) underwent a major upgrade and was successfully remounted at the Cassegrain focus of the 3.6-m telescope at La Silla.

TIMMI2 had a difficult start to 2000, when the tragic and untimely death of PI Hans-Georg Reimann overshadowed the success of the project. The instrument was first commissioned in late 2000, with TNT control software and the Wallace acquisition system. However, after almost two years of continuous operation, it became apparent that an upgrade of the control and acquisition system could improve the reliability of the instrument and reduce the operational load for the staff.

In February 2002, TIMMI2 suffered from a severe problem which took some time to locate inside the detector mount: the thermal contact of the array with the cooling support had deteriorated. Operation was resumed after three months of investigation and tests, and finally, in August 2002, the upgrade project was started at La Silla (M. Sterzik, Project Scientist; J. Valenzuela, IRACE-SW; P. Le Saux. Templates; J.-C. Guzman, ICS, OS; and U. Weilenmann, Control System and Project Leader) with active help from the IR group in Garching (H.-U. Käufl. R. Siebenmorgen, J. Stegmeier and H. Mehrgan). Thanks to the efforts of this team and many others, TIMMI2 is back on-sky and available to the MIR community.

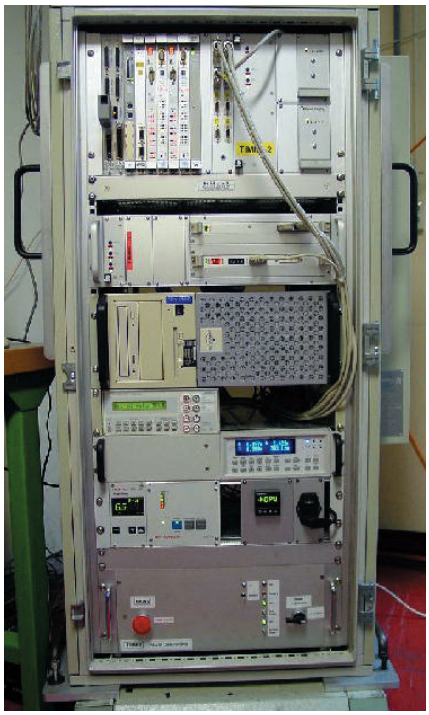

Figure 1: New Control rack: tiiracq LCU on top, the Sparc and IRACE backend in the middle and the temperature and vacuum control at the bottom.

Not only was the 2nd commissioning used to refurbish TIMMI2 with up-to-date electronics and software, we also took the opportunity to simplify observational procedures. Experienced MIR observers will not have a problem adjusting to the new procedures, and newcomers to the MIR community will find the instrument user-friendly. The TIMMI2 system can now be compared to those of ISAAC and NACO for 2.5–5 micron observations. For example, the exposure time set-up requires only one entry: the amount of time the user desires to spend on source. Optimum values for each set-up are defined in a configuration file – a concept developed in the first phase of TIMMI2 operations – which is read at set-up time by the Observing Software (OS). There is no more interaction between the observer and the individual parts of TIMMI2, and the data of TIMMI2 are now routinely injected into the ESO archive.

How Was This Possible?

• Above all: with great team spirit.

• The old TIMMI2 acquisition system (Wallace electronics), which handles acquisition tasks as well as clocking and biasing of the array, was replaced by the ESO IRACE system. The versatility of the IRACE system allows easy development of new timing patterns and will further increase the performance of the Raytheon array.

• The instrument control system has been refurbished with VLT standard modules and controllers for the stepper motors, enhancing functionality and increasing reliability at the same time.

• Temperature and vacuum control has been modified, allowing important system parameters to be monitored continuously and the handling of alarms.

• The system is entirely controlled by VLT SW, and communications are handled via the licence-free CCS Environment rather than RTAP. The handling of the observations is managed by "boss" which is, at high level, interfacing BOB, ICS, DCS, TCS and the OS. A series of configuration files "preset" the instrument and detector depending on the instrument mode required by the user.

• Data handling is now under the control of the DMD SW. The raw data are transferred via the data subscriber to the DHS WS which then redirects the data to an offline machine for the convenience of the user.

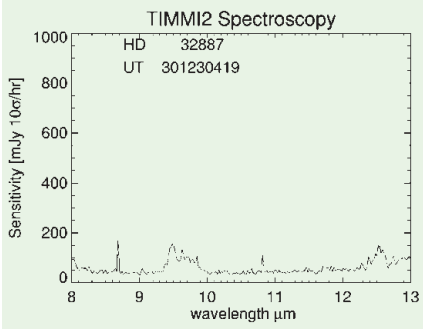

Figure 2: HD32887 8–13μ spectrum: N band sensitivity plot shows a factor 2 better than with the Wallace acquisition system at 10 microns.

• The pipeline software has been modified to accept the new format of the raw data stored in cubes. It is available upon request. During the two commissionings of November and December 2002, the transfer of data was done directly from the instrument WS within the templates; however this dramatically increased the overheads. To keep overheads low, the transfer of data from the DHS WS is currently handled by a shell script from the pipeline machine.

• Observations preparation: "p2pp" is on the job and proved to be well accepted by the TIMMI2 community.

What did we achieve?

(1) Imaging: TIMMI2 shows an improvement of 40% in sensitivity in all bands, allowing us to finally offer L- and M-band observations.

A "Raster" mode (or jitter) is being implemented and tested for extended sources.

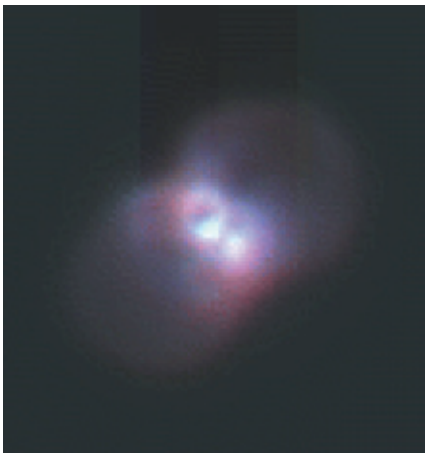

Figure 3: Eta-Carinae three-colour image: NB10.4 (Blue) NeII (Green) Q1 band (Red).

IRACE gives more freedom in programming read-out sequences. The TIMMI2 detector (Raytheon CRC774) has a rather complex architecture, and especially "long" detector integration times (exceeding 100 ms; this is long for the mid-infrared!) could only be done in very compromised form with the old system.

(2) Spectroscopy: The sensitivity improved by a factor of 2: 50mJy/10sigma/1hr at 10 micron.

(3) Polarimetry: This has been extensively tested. A new Instrument Package is available on the web and is already installed at the telescope.

Developments

In April, TIMMI2 will undergo regular maintenance. We plan to reinstall the science grade array, together with new cryo cabling and detector board.

The Lunar Occultation mode will be implemented soon. It is not yet operational at a template level: we hope to offer it in visitor mode during Period 71, and in full operation mode for Period 72.

The possibility to chop at different PA angles is under investigation. This will be a major improvement for extended source observations.

The new, more compact control rack leaves more space in the Cassegrain cage. The implementation of a rotator function is under study.

OTHER ASTRONOMICAL NEWS

NEWS FROM SANTIAGO

International Workshop on

STRUCTURE EVOLUTION AND COSMOLOGY: NEW SYNERGY BETWEEN GROUND-BASED OBSERVATIONS, SPACE OBSERVATIONS AND THEORY

D. ALLOIN (ESO/Chile),
M. PIERRE (CEA/SAp/France) and
A. REFREGIER (CEA/SAp/France)

An international Workshop, "Structure Evolution and Cosmology: New Synergy between Ground-based Observations, Space Observations and Theory", was organized jointly by the European Southern Observatory (ESO/Chile), the Centre National d'Etudes Spatiales (CNES/France) and the Commissariat pour l'Energie (CEA/France), at ESO/Santiago from October 28 to 31, 2002.

The ESO facilities in Santiago were hosting such a large meeting for the first time: according to the attendees it was a very successful trial and, on our side, we were very happy to share with them our renewed environment, as well as the coffee-breaks on the lawn!

A total of 144 astronomers and students attended the Workshop, which was opened by the ESO Director General, Catherine Cesarsky. After the usual welcome words given in the name of the Scientific Organizing Committee (Danielle Alloin, Marguerite Pierre and Alex Refregier), we started a half-day tutorial about Cosmology. This was an excellent way to refresh and update our ideas in the field and we recommend the superb tutorial presentations to be found on the Workshop webpage (see below)!

The unfortunate overbooking problems of some flights prevented a few of our reviewers to arrive on time for their presentation, or arrive at all! Thanks to the friendly attitude of all speakers, we did some re-shuffling of the programme and, among others, exchanged weak-lensing against strong-lensing (still lensing anyway!). This gave a touch of "impromptu" to the Workshop, creating the nice feeling that we were all involved in the Workshop organization...

A rather complete panel of topics related to Cosmology were covered: from the description of the early universe by particle physicists, to the birth and evolution of large-scale structures (simulations and observations), to various aspects of galaxy clusters, to the numerous lensing effects one encounters when probing the high-z universe... Vivid and interesting discussions followed the presentations, continued at the posters display and at the coffee-breaks/lunches. The need for a good interplay between space-based and ground-based observations (to accomplish a multi-wavelength coverage), but also with simulations and theoretical approaches, was highlighted throughout the Workshop. And this is indeed what is giving rise to the great achievements of modern astrophysics!

The dense programme of the Workshop was interrupted for half a day to visit La Sebastiana, the house of Pablo Neruda in Valparaíso: an attempt to join the dreams of the poet with our more arid research activities?

"La luz bajo los árboles,
la luz del alto cielo.
La luz verde enramada
que fulgura en la hoja
y cae como fresca arena blanca.
Una cigarra eleva
su son de aserradero
sobre la transparencia.
Es una copa llena de agua,
el mundo."

Then, walking down through Valparaíso's stairs and paths, we reached the restaurant at the top of a tower in the port, where the Workshop dinner was held, and from there we could enjoy the magnificent view to the bay and the hills of Valparaíso, all twinkling in the night. On our way back to Santiago, the bus was stopped for a while because of an excess of weight (!) and during this unexpected pause, some of our skilled theoreticians were desperately trying to see the Magellanic Clouds, in spite of an intense light background. The happy ones who went to