

Final project report

<i>Project ID</i>	2002/7.09
<i>Title</i>	The IRAIT Project
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<i>Duration</i>	3 years
<i>Assigned funding</i>	18.000,00 Euro

Activities and results

In this period the project was revised in order to prepare the installation at Dome C. The dome was redesigned in view of a more compact setup. It was based on a new basement, transportable in a standard container. Over it the telescope is mounted and the ensemble is covered by a tent of suitable tissue, which will be opened during operations, letting the telescope operate free from disturbances.

The telescope was redesigned on the basis of a Nasmyth configuration, with two moving mirrors. It will have two foci, at which two instruments will be hosted. In the period considered, agreements were signed with INAF for the procurement of a mid-infrared camera designed for operating in Antarctica. An international collaboration was also established with Spain, represented by the University of Granada, for the construction of the moving mirrors. One of the two (M3) will simply switch between the foci, feeding alternatively the two instruments. The other one will be a computer-controlled wobbling mirror (M2), in order to permit the typical Infrared observations based on the chopping of images for background subtraction.

The telescope construction was committed to Marcon Telescopes (San Donà di Piave). The same company will provide the main mirror (M1), of 80cm diameter, and will also perform the coating of the mirror itself.

The final configuration of the observatory will therefore see a first floor, at snow level, accessible to maintenance, where the electronics and controls will be hosted. In this area also the structure devised for the de-rotation of cables and of cooling pipes will be accessible. Then an upper floor will be accessible through an opening in a staircase. From this second floor the structure of the telescope will be reachable; it will be the floor of the dome, exposed to open air during operations. On the telescope structure, further electronics modules in closed boxes will control various devices and the infrared camera.

The camera, provided by INAF, motivated a new structure of the collaboration itself, based on two research units, one in Perugia for the telescope and one in INAF (Observatory of Teramo) for the camera.

The camera itself will be called AMICA (Antarctic Multi-channel Infrared Camera) and will host two matrix detectors: a 256x256 InSb array for the wavelengths from 1 to 5 mm, and a 128x128 Si:As array for the wavelengths from 8 to 25 mm. The optics of the camera will be designed so that, in both wavelength ranges, the field of view will be of a few squared arc-min, suitable to observe the clusters of Magellanic Clouds.

The camera will be cooled to few Kelvin through a closed-circuit system powered by a compressor sited in a control room (Astronomical shelter). The pipes feeding the cooling fluid (glicole) and those extracting the excess heat will pass through the telescope basement where a de-rotating system will provide their interface to the external compressing unit.

Products

A – papers in scientific magazines

1. Di Rico, G., et al. 2004, *Astronomische Nachrichten*, 325, 664
2. Busso, M., Tosti, G., Persi, P., Ferrari-Toniolo, M., Ciprini, S., Corcione, L., Gasparoni, F., & Dabal' a, M. 2002,
3. *Publications of the Astronomical Society of Australia*, 19, 306

Programma Nazionale di Ricerche in Antartide (PNRA)

B – book chapters

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C - proceedings of international conferences

1. Epchtein, N., Busso, M., & Tosti, G. 2004, SF2A-2004: Semaine de l'Astrophysique Francaise, 153
2. Tosti, G., et al. 2004, Proc. SPIE, 5489, 742
3. Ragazzoni, R., et al. 2004, Proc. SPIE, 5489, 481
4. Tosti, G., & Busso, M. 2003, IAU Special Session, 2,
5. Tosti, G., Busso, M., Straniero, O., & Abia, C. 2004, Memorie della Societa Astronomica Italiana Supplement, 5, 385
6. Ragazzoni, R., et al. 2004, Memorie della Societa Astronomica Italiana Supplement, 5, 374
7. Guandalini, R., Ciprini, S., Busso, M., & Silvestro, G. 2004, Memorie della Societa Astronomica Italiana Supplement, 5, 119
8. Guandalini, R., Ciprini, S., Busso, M., Silvestro, G., & Persi, P. 2004, Memorie della Societa Astronomica Italiana, 75, 617
9. Ciprini, S., & Busso, M. 2003, Memorie della Societa Astronomica Italiana Supplement, 2, 233
10. Fiorucci, M., Persi, P., Busso, M., Ciprini, S., Corcione, L., & Tosti, G. 2003, Memorie della Societa Astronomica Italiana Supplement, 2, 125
11. G. 2003, Memorie della Societa Astronomica Italiana Supplement, 2, 125
12. Riso, S., Corti, G., Busso, M., Silvestro, G., Maffei, P., & Tosti, G. 2003, Memorie della Societa Astronomica Italiana, 74, 209
13. Corti, G., Riso, S., Busso, M., Silvestro, G., & Corcione, L. 2003, Memorie della Societa Astronomica Italiana, 74, 205
14. Ciprini, S., Busso, M., & Tosti, G. 2003, Memorie della Societa Astronomica Italiana, 74, 70
15. Corcione, L., Busso, M., Porcu, F., Ferrari-Toniolo, M., & Persi, P. 2003, Memorie della Societa Astronomica Italiana, 74, 57
16. Tosti, G., Busso, M., Ciprini, S., Persi, P., Ferrari-Toniolo, M., & Corcione, L. 2003, Memorie della Societa Astronomica Italiana, 74, 37
17. Ciprini, S., Busso, M., Tosti, G., & Persi, P. 2003, Memorie della Societa Astronomica Italiana, 74

D – proceedings of national meetings and conferences

1. Ciprini, S., Busso, M., & Tosti, G. (editors) 2003. Memorie della Società Astronomica Italiana, 74

Research units

- 1) DEPARTMENT OF PHYSICS, UNIVERSITY OF PERUGIA
- 2) INAF (C/O OSSERVATORIO DI TERAMO)

Date: March 27, 2010

Notes