

Final project report

<i>Project ID</i>	2004/7.08
<i>Title</i>	<i>The Italian Antarctic Infrared Telescope</i>
<i>Principal investigator</i>	M. Busso
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<i>Duration</i>	3years
<i>Assigned funding</i>	200.000,00 Euro

Activities and results

A) ANTARCTIC ACTIVITIES

In the periods covered by the three original PEA's and in the following years, up to now (February 2011), we have participated to various campaigns in Dome C.

- 1) Summer campaign 2005-2006 (Runa Briguglio)
- 2) Summer campaign 2006-2007 (Runa Briguglio)
- 3) Winter campaign 2007 (Runa Bruguglio)
- 4) Summer campaign 2007-2008 (Lucia Sabbatini), in collaboration with the Cochise experiment
- 5) Winter campaign 2008, (Lucia Sabbatini), in collaboration with the Cochise experiment
- 6) Summer campaign 2008-2009 (Alberto Mancini and Antonfranco Piluso)
- 7) Summer campaign 2009-2010 (Alberto Mancini and Antonfranco Piluso)
- 8) Recently: summer campaign 2010-2011 (Antonfranco Piluso and Jean Marc Christille)

B) RESULTS

In the first phase (up to 2007) we completed the IRAIT telescope and sent it to DDU, where it was stocked till the campaign 2007-2008, when it was transported to Dome C.

In this first phase activities at Dome C have concerned the installation and operation of the mock-up telescope Small-IRAIT (25cm reflector, CCD camera). It observed variable objects in the southern sky and measured the atmospheric extinction. All the results have been published.

In the mean time, logistic preparatory operations were carried out by PNRA personnel.

In the second phase (2008-2011) we mounted the telescope at Dome C, in collaboration with CEA personnel. IRAIT is now installed in the astronomical area, near COCHISE, and the Astrophysics laboratory has been built close to the two experiments. The mounting has concerned first mechanical parts and the pipelines for cryocooling, then (this summer just ended) the optics and various service systems for the dome. All preparatory works for the AMICA camera have been also done.

In this last campaign most of the materials for the AMICA camera have been transported to Dome C and several tests of operation of electronics in Antarctic conditions have been done.

C) COMPLETION OF THE TELESCOPE

IN JANUARY, 2011, BEFORE THE CLOSURE OF THE CAMPAIGN, IRAIT (EQUIPPED WITH A CCD CAMERA) HAS OBSERVED SUCCESSFULLY ITS FIRST STAR, CANOPUS.

The development phase is thus completed. Next year will see the beginning of the scientific programs, with the deployment of the last components of the AMICA camera, its mounting and its start of operations.

Programma Nazionale di Ricerche in Antartide (PNRA)

Products

A – papers in scientific magazines

1. Dolci, M. et al. 2010, AMICA: the NIR/MIR camera for automatic astronomical observations from Dome C, Antarctica SPIE 7735, 121
2. Briguglio et al. 2008, Small IRAIT: telescope operations during the polar night, SPIE 7016, 15
3. Moore, A. et al. 2008, Gattini: a multisite campaign for the measurement of sky brightness in Antarctica. SPIE 7012, 76
4. Durand, G. et al. 2008, Toward a large telescope facility for submm/FIR astronomy at Dome C, SPIE 7012, 85
5. Lawrence, J.S....., Busso, M. et al. 2009, The Science Case for PILOT I: Summary and Overview PASA 26, 379
6. Strassmeier, K. Et al. 2007, Telescope and instrument robotization at Dome C, A.N. 328, 452
7. Tothill, N.F.H. et al. 2007, Does your robot need a flamethrower? Automated astronomical Instrumentation in Antarctica, A.N. 329, 326
8. Strassmeier, K. G.; Briguglio, R. et al. 2008, First time-series optical photometry from Antarctica. sIRAIT monitoring of the RS CVn binary V841 Centauri and the δ -Scuti star V1034 Centauri, A&A 490, 287
9. Guandalini, R. and Busso, M. 2008, Infrared photometry and evolution of mass-losing AGB stars. II. Luminosity and colors of MS and S stars, A&A 488, 675
10. Busso, M. et al. 2007, Mid-Infrared Photometry of Mass-losing Asymptotic Giant Branch Stars, AJ 133, 2310
11. Guandalini et al. 2006, Infrared photometry and evolution of mass-losing AGB stars. I. Carbon stars revisited, A&A 445, 1069
12. di Rico, G. et al. 2004, The Antarctic Mid-Ir Camera (AMICA) for the IRAIT telescope, A.N. 325, 664

B – book chapters

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C - proceedings of international conferences

1. Guandalini, R., Palmerini, S., Busso, M. 2007, AIPC 1001 (editors)
2. Guandalini, R., 2007 MS, S and C Stars in the Infrared. Luminosities and Mass Loss Rates. AIPC1001, 339
3. Guandalini, R., Briguglio, R. 2007 Why observe AGB stars at mid-IR wavelengths from Dome C, EAS 33, 243
4. Guandalini, R.; Tosti, G.; Busso, M. 2007, IRAIT (Science to be done with...)
5. Abia, C. et al. 2008, Infrared Observations of Supernovae with IRAIT at Dome C, EAS 33, 239
6. Colomé, J. et al. 2007, Design and construction of the moving optical systems of IRAIT. Hi of A 14, 702
7. Riva, A. et al. 2007, AMICA the infrared eye at Dome C, Hi of A. 14, 700
8. Colomé, J. et al. 2007, Moving Optical Systems of IRAIT: Design and Construction, EAS 25, 221
9. Straniero, O. et al. 2007, AMICA: The First camera for Near- and Mid-Infrared Astronomical Imaging at Dome C, EAS 25, 215
10. Riva, A. et al. 2006, AMICA - The Infrared Eye At Dome C, IAUS 7, 9
11. Dolci, M. et al., 2007, AMICA (Antarctic Multiband Infrared Camera) project, SPIE 6267, 48
12. Tosti, G. et al. 2006, The International Robotic Antarctic Infrared Telescope (IRAIT), SPIE 6267, 471
13. Valentini, G. et al. 2006, New filters for NIR-MIR astronomy from Dome C: the case of AMICA, SPIE 6267, 40
14. di Rico, G. et al. 2006, Infrared Observations from Antarctica: the AMICA Project, ASPC 351, 7391
15. Dolci, M. 2005, AMICA: the Antarctic Mid-Infrared CAmera for the IRAIT telescope, EAS 14, 337
16. Busso, M. et al. 2005, The IRAIT Project Infrared Astronomy from Antarctica, EAS 14, 181
17. Tosti, G. et al. 2004, The IRAIT Project: infrared astronomy from Antarctica, SPIE 5489, 742
18. Moore, A. et al. 2006, The Gattini cameras for optical sky brightness measurements in Antarctica, SPIE 6267, 53
19. Moore, A. et al. 2006, The Gattini cameras for optical sky brightness measurements in Antarctica, IAU SS 7, 28
20. Moore, A. 2007, The Gattini Cameras for Optical Sky Brightness Measurements at Dome C, Antarctica, EAS 25, 35
21. Moore, A. et al. 2007, The Dome C Gattini sky brightness cameras: results from the first year of operation, EAS 33, 13
22. Guandalini, R., Tosti, G. and Busso, M. 2008, IRAIT (Science to be done with...) EAS 33, 243
23. di Varano et al. 2008, Main tasks for IRAIT installation at Dome C, EAS33, 279
24. Tremblin, P. et al. 2010, Dome C: the best accessible site on Earth for submillimetre astronomy, EAS 40, 333
25. Le Bertre, T. et al. 2010, AIFU: An Antarctic Integral Field Unit for Near-Infrared spectro-imaging, EAS 40, 232
26. Guandalini, R. et al. 2010, A Spectrophotometric Study of the Evolutionary Properties of AGB stars at Infrared Wavelengths, EAS 40, 197
27. Dolci, M. et al. 2010, Status of the amica project: ready for the antarctic adventure. EAS 40, 197

D – proceedings of national meetings and conferences

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E – thematic maps

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F – patents, prototypes and data bases

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G – exhibits, organization of conferences, editing and similar

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H - formation (PhD thesis, research fellowships, etc.)

1. 2 years of research fellowship (Alberto Mancini)
2. 2 PHD dissertations (Alberto Mancini and Runa Briguglio)
3. 1 Master thesis (Jean Marc Christille)

Research units

In Italy:

1. (For the Telescope). Department of Physics, University of Perugia
2. (For the IR Camera). INAF, Observatory of Teramo

Abroad:

1. (For the external moving optics) University of Granada (P.I. C. Abia)
(This is a technological & scientific collaboration, based on a MoU, in which Granada has the commitment to represent the whole Spanish Astronomical Community)
2. For the de-rotation of cables and other technical issues, and for a test in sub-mm with the CAMISTIC bolometer): CEA Saclay (PI Gilles Durand)

Date: February 14, 2011

Notes