



ARENA: Antarctic Research, a European Network for Astrophysics

Astronomy is often referred to as the world's oldest science. Yet it is still evolving at breathtaking speed in the early 21st century, as improved telescope technologies are bringing new discoveries to the outer reaches of the solar system. Another round of intergalactic reorganisation is inevitable, and with the construction of a new astrophysical observatory in Antarctica, it may not even be that far off. The ARENA project is already carrying out the prospective studies, networking towards new frontiers. Antarctic Research, a European Network for Astrophysics - a Coordination Action funded by the EU's Research Infrastructures programme - unites astronomers from 21 research laboratories, institutes and industrial partners in seven European countries (Belgium, France, Germany, Italy, Portugal, Spain, and the UK) and Australia under a common objective: investigating the formation and evolution of planets, stars and galaxies from a prime position.

● SOUTH POLE STARGAZING

Astronomers in the Antarctic are really seeing stars. As cold as -50°C and -80°C in winter and between -25°C and -50°C in summer, local temperatures may be better suited to polar bears, but the wide open skies of the Antarctic Plateau provide perfect conditions for astronomical observations.

Several European laboratories interested in Antarctic astronomical investigations have joined forces to set up state-of-the-art instruments and focal plane equipment on the plateau and benefit from the polar region's unique potential for studying global-scale natural processes.

The Antarctic observatory at Dome C (known as Dome Circé by the French and Dome Charlie by the Americans) will enable astronomers to investigate extra-solar planets, stars and galaxies, and cosmology through infrared and high-angular resolution observations.

EU funding is helping to form specialised teams of European astronomers who are interested in the development of an Antarctic site. In special workshops, operators, users and industrial partners



are discussing issues of common interest face-to-face, and big international conferences are helping to expand the network and generate interest. These networking activities are crucial to the development of an Antarctic observatory; an undertaking of such magnitude has to be a joint effort that unites partners across Europe.

● PREPARING THE GROUND TO WATCH THE GALAXY

ARENA focuses on important preparatory questions and brings experts together to achieve the ultimate goal of a unique Antarctic astrophysical observatory. Importantly, the network fosters collaboration between operators of existing stations

in the Antarctic and potential new users. France and Italy have completed the construction of the "Concordia" station at Dome C, at an altitude of 3,260 metres in the heart of the South Pole, which operates all year round. A thirteen-strong expedition completed

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successfully the first winter-stay at the station in November 2005. And an Italian group has been constructing a 0.8m infrared telescope called IRAIT.

The Concordia station could become part of a larger initiative involving many partners across the EU. The networking activities supported by ARENA also aim to identify technical constraints to the design of large astronomical instruments for polar environments.

Other expert teams have focused on the selection of appropriate scientific programmes, and will complement the work of other ground-based observatories or of space missions. An essential point of discussion has been the site qualification. The logistics and operations networking activity is working on establishment, operations and maintenance of the future astronomical observatory at Dome C, carrying out preliminary infrastructure studies to improve Concordia for astronomical purposes and

looking at basic supplies like power, transport and maintenance. The station is also being used for carrying out maintenance and scientific work in a situation analogous to what could be an exploration stay on Mars.

The networks are drawing up detailed reports on where to develop this new site for astronomical observations, and are reporting extensively on problems that could arise in building large instruments like giant infrared telescopes at Dome C. In addition, the teams are compiling a book of key scientific programmes and recommendations on the timeline for the development of new astronomical instruments.

In the years ahead, these networking activities could result in groundbreaking new discoveries in astronomy. ARENA can provide scientists with the most advanced resources and infrastructure, helping them to unveil the mysteries of outer space.

● ANTARCTIC RESEARCH, A EUROPEAN NETWORK FOR ASTROPHYSICS IN SUMMARY

Project acronym: ARENA

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EU project officer: Elena Righi-Steele

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Project webpage: <http://arena.unice.fr>

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