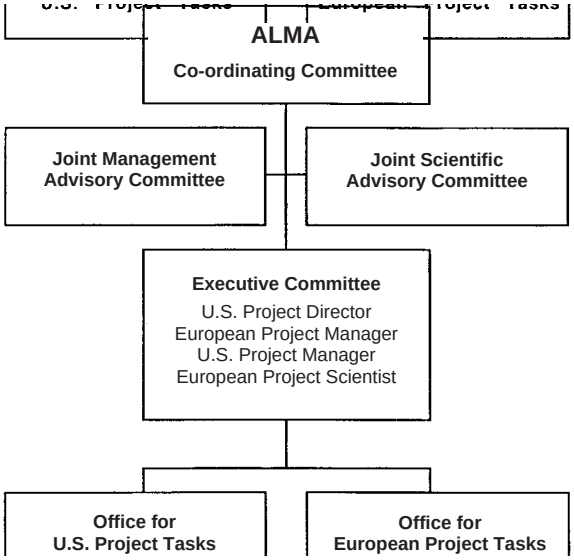

Figure 6: Joint U.S./European Phase 1 Management Structure.

signing an advanced (second-generation) correlator that would exploit the latest in microelectronics capability. The decision to proceed with either a scaled-up U.S. design or the European advanced correlator will be made early in Phase 2.

Software, Controls, and Communications. Joint definition of the software, controls, and communications requirements based on the concept of operations generated by the Science & System team will be the first task. Following this, a joint top-level software, controls, and communications subsystem design plus joint definition of the software development environment will be performed. ESO will lead the effort on software engineering to define the standards and processes to implement the software and control subsystems. Once this framework and the overall subsystem is specified and designed, responsibility for development of the various subsystems will be distributed amongst the participating institutions. In Phase 1 this will include development of the first increment of common software in Europe. The U.S. will take the lead in development of the sofware needed for evaluation and testing of the prototype antennas, both singly and as an interferometer.

Site. Europe, the U.S. and Japan have all been collaborating on site testing in Chile for several years, and there is now complete agreement on the Chajnantor site. The equipment from all groups is now located there and co-ordinated in a common test campaign. Europe is responsible for operation and first-line maintenance of the characterisation equipment at Chajnantor. Analysis and interpretation of the site characterisation data is a joint task. Negotiations with Chile to gain the necessary rights of access to the site will be conducted jointly. Geotechnical and environmental studies will also be part of Phase 1, with Europe administering the study contracts. NRAO has already done a significant amount of site development planning and produced a first comprehensive cost estimate. This will continue as a joint activity, leading to the bid packages that are expected to be one of the first major contracting activities of Phase 2.

Management. Overall Phase 1 management and co-ordination will be a joint activity (see Figure 6) with each side managing their respective project tasks. The major task in the management area, in addition to managing the Phase 1 work, will be the complete programmatic definition of Phase 2, including the management structure, the detailed definition and division of work between the U.S. and Europe, and estimation of the cost to complete the full array. We will work with NRAO to build a complete parametric cost model in accordance with the work breakdown structure. This model will be built in parallel with the scientific end-to-end performance model based on the same parameters. Operational analysis to determine the most cost-effective approach to developing the facilities in Chile and to assembling and operating the array will be an essential part of fully defining Phase 2.

4. The Major Milestones Ahead

Phase 1 of this project has moved into high gear, and the timescales are tight. The upcoming major milestones are as follows:

- October 1999: award of the prototype antenna contracts
- November 1999: completion of joint Europe/US management plan
- May 2000: completion of Phase 2 proposal
- December 2000: approval of Phase 2 by ESO Council
- December 2000: signing of international agreement for Phase 2
- July 2001: prototype antenna delivery, system PDR

Phase 2 begins in 2001. A joint array preliminary design review will take place in the middle of that year, and the site development will start. By 2005 there should be sufficient antennas on site for a subarray to begin operation. The complete array should be available by 2009.

More information on the project can be found at the ALMA web site,

http://www.eso.org/projects/alma/

A FIRST FOR THE VLT

OBSERVATIONS OF THE GAMMA RAY BURST GRB990510, AND DISCOVERY OF LINEAR POLARISATION

International teams of astronomers are now busy working on new and exciting data obtained in May with telescopes at the European Southern Observatory (ESO).

Their object of study is the remnant of a mysterious cosmic explosion far out in space, first detected as a gigantic outburst of gamma rays on May 10, GRB990510.

Gamma-Ray Bursters (GRBs) are brief flashes of very energetic radiation – they represent by far the most powerful type of explosion known in the Universe and their afterglow in optical light can be 10 million times brighter than the brightest supernovae. The May 10 event ranks among the brightest one hundred of the over 2500 GRBs detected in the last decade.

The new observations include detailed images and spectra from the VLT 8.2-m ANTU (UT1) telescope at Paranal, obtained at short notice during a special Target of Opportunity programme. This happened just over one month after that telescope entered into regular service and demonstrates its great potential for exciting science.

In particular, in an observational first, the VLT measured linear polarisation of the light from the optical counterpart, confirming that synchrotron radiation is involved. It also determined the redshift of the host galaxy of GRB990510, z = 1.619, corresponding to a distance of more than 7,000 million light-years to this GRB (assuming a Hubble Constant H_0 = 70 kms^{-1} Mpc^{-1}, a mean density $Omega_0$ = 0.3 and a Cosmological Constant Lambda = 0).

This is an excerpt of the ESO press release of 18 May 1999 where more information on the science and organisation of this collaboration can be found including the name of the astronomers who participated in this investigation and the web site address of their institutes.

The full text and 7 pictures are at: www.eso.org/outreach/press-rel/pr-1999/pr-08-99.html