A United European Astronomy

AT A TIME WHEN THE POLITICAL VISION OF EUROPE IS STRUGGLING TO REGAIN FOCUS AND momentum, European astronomers are working together more than ever on new projects. Despite the fact that modern astronomy emerged from the European Renaissance, the continent’s lead crumbled in the 20th century. At that time, visionary minds in the United States exploited large economic fortunes to construct great observatories that opened a new window onto the distant universe. Europe, recovering from the world wars, was unable to compete when the United States launched its overwhelmingly comprehensive space program in the 1950s and 1960s. But today, the American and European situations in astronomy are more balanced, and European astronomers look toward the future with renewed optimism, even though they are well aware that, given the cost of projects and the available funds, hard choices will have to be made.

One important reason for the European resurgence is that farsighted scientific and political leaders created the European Southern Observatory (ESO) in 1962 to develop observatories in the Southern Hemisphere. Somewhat later, the European Space Agency (ESA) embarked on a well-planned program of space missions. An important advantage of these intergovernmental organizations is that they can rely on a stable budget, year after year. Despite a budget less than one-fifth that of the U.S. National Aeronautics and Space Administration (NASA), ESA has launched successful missions with well-chosen goals, such as the Hipparcos satellite and the Infrared Space Observatory. On the ground, ESO’s flagship, the Very Large Telescope in Chile, has achieved recognition as the world’s most powerful optical telescope, providing a wealth of data on objects ranging from the solar system to the farthest reaches of the universe. As a result, ESO has attracted new member states, with consequential increases in the budget and in collaborating institutions. Considerable human exchange and networking, often fostered by the European Union (EU), have resulted in several bilateral or multilateral undertakings within and beyond Europe. The result has been an equalizing of competition that has enhanced, rather than hindered, ties across the Atlantic. ESA has long worked in partnership with NASA (although the relationship was not always easy). On the ground, Europe, North America, and East Asia are now involved in constructing ALMA, a world-class array of telescopes to explore the cold universe. ESO is leading the European efforts, putting its expertise in managing large-infrastructure projects at the disposal of submillimeter radio astronomy.

European astronomy is now considering its future. ESA’s community has established an ambitious inventory of scientific opportunities in space astronomy and planetology in the 2015–2025 time frame, called “Cosmic Vision.” ESA has just issued a call for proposals for the program’s first space exploratory missions. ESO and its community are conducting studies on the European Extremely Large Telescope, a novel design for the world’s largest optical/infrared telescope, which will revolutionize ground-based astronomy. Its target for construction is 2010. European radio astronomers, boosted by Europe’s Low Frequency Array project, are heavily involved in forging a future worldwide project, the Square Kilometer Array (to be sited in Australia or South Africa). The high cost of such new projects, and the universality of science, have encouraged astronomers from both sides of the Atlantic to form partnerships with astronomers from other continents of the world, an effort that is further supported by the International Astronomical Union.

To achieve even greater unity, the funding agencies of various European countries have come together with ESO and ESA in an EU-sponsored network, ASTRONET, to establish a road map for the next 20 years that will encompass ESO and ESA programs and foster collaborations among European countries in other endeavors. Major organizations such as ESA and ESO are able to pool and retain critical mass, with respect to both human and financial resources, over long periods of time. Of equal importance is that, as public bodies, they must serve the community. This provides a powerful impetus for excellence in the ways in which they operate. It also ensures constant upgrading of facilities to remain competitive. If Europe’s global agenda includes keeping astronomy at the forefront, maintaining the unity of European organizations and their missions will be vital.

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