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Global Collaborations - Prospects and Problems

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International collaboration has long been a feature of science. Collaborative investments in joint facilities and projects have grown considerably over the past 20-40 years, and many projects have been multinational from the start. This has been particularly true in Europe, where intergovernmental organizations such as CERN, ESA, and ESO have enabled European countries to carry out forefront science with state-of-art facilites which would have been beyond the capabilities of any one country. A brief survey of these organizations, their structure, and the possible reasons behind their success is given. The transition from regional to global creates new problems. Global scale projects face a range of generic issues which must be addressed and overcome if the project is to be a success. Each project has its own specific boundary conditions and each adopts an approach best fitted to its own objectives and constraints. Experience with billion dollar projects such as the SSC, LHC, and ITER shows the key problem areas and demonstrates the importance of preparatory work in the early stages to settle issues such as schedule, funding, location, legal and managerial structure, and oversight. A range of current and proposed intercontinental or global projects - so- called "Megascience Projects" - is reviewed. Such projects, originally a feature of space and particle physics, are now becoming more common, and very large projects in astronomy, for example ALMA and 50 - 100m telescopes, and other areas of physics now fall into the 'global' category. These projects are on such a large scale, from any scientific, managerial, financial or political perspective, and have such global importance, that they have necessarily been conceived as international from the outset. Increasing financial pressures on governments and funding agencies in the developed countries place additional demands on the project planning. The contrasting approaches, problems faced, and progress made in various projects will be analyzed and possible lessions drawn out. The role which can be played in the early stages by bodies such as the OECD Global Science Forum and G-8 Carnegie Meetings, where science policy makers meet, is examined. Experience shows that these valuable 'scene setting' discussions have to be informed by coordinated input from the scientific community and must be followed up by more detailed discussions between funding agencies or their equivalent, because decision making requires the development of a consensus amongst the participants. This process can be illustrated most effectively by the care with which the ideas for the International Linear Collider have been and are being developed. Agreement on building and operating a facility is not the end of the story. The legitimate desire of scientists in all other countries to be able to participate in exploiting a major new facility has to be taken into account, and that introduces a range of proprietary and sociological issues over data access and rights, and now, with the explosion in computing and storage powers, in data archiving support. These are issues which can be addressed within the scientific community and taken to the political arena via such bodies as the OECD Global Science Forum.