

## 1. EXECUTIVE SUMMARY

Our Earth's interior remains one of man's major scientific frontiers. Inaccessible for direct observation beneath a 10-15 km drilling range, Earth's lower crust, mantle and core are seen primarily through illumination by seismic waves.

In a major departure from the traditional single investigator approach to research support, the seismological community has, in 1984, created a consortium of research institutions for the purpose of implementing critically needed national facilities necessary to support seismological research on Earth's interior in the coming decades. IRIS, the Incorporated Research Institutions for Seismology, a non-profit Delaware corporation, was founded May 8, 1984. By the first meeting of the Board of Directors on May 13 there were twenty-six members of the Corporation. As this proposal is submitted, membership includes forty universities, a representation of nearly all U.S. universities with seismological research programs.

A universities consortium of such size and degree of participation represents a unique and remarkably unified commitment to the common research goals addressed by IRIS. A list of member institutions and representatives is given in the Foreword.

This proposal is for support of the ten-year IRIS program for the implementation of four major national facilities for seismology,

- A Global Digital Seismic Array, featuring real-time satellite telemetry from one hundred modern seismographic observatories
- A Mobile Array comprised of one thousand portable digital seismographs to be used for studies of the continental lithosphere
- Central Data Management and Distribution Facilities to provide rapid and convenient access to the data sets for the entire research community
- A Major Computational Facility, capable of supporting the analyses of these new data

The IRIS program is set out in Table 1.1 in a ten-year plan, with budget estimates assuming major capital equipment acquisition in the initial five years. Steady-state operation of the four IRIS elements is estimated to require a minimum of some \$17M per year in facilities maintenance and operation, plus \$7M annually in equipment acquisition, and a \$8M yearly increment in funds for associated research support to individual investigators. The estimated ten-year cumulative cost to bring the IRIS initiative into full operation is \$281M, of which nearly 30% represents capital equipment.

Actual expenditures may well exceed this estimate. For example, a fully supported computational facility with Class VI or greater capabilities can alone cost \$15M per year. Other NSF programs and other agencies will very likely support major enhancements to the basic IRIS plan.

The IRIS plan offers an NSF response to two of the five research areas identified by the Foundation's Research Briefing Panel on the Solid Earth Sciences initiatives, "...in which significant dividends can be expected as a result of incremental federal investment in FY1985." IRIS represents a consortium made up of an overwhelming majority of the research universities in seismology supporting new initiatives in these areas.

IRIS was created to implement major new national facilities which will provide the tools of earth scientists into the next century, and to develop an effective management for their collective use by the research community. This proposal represents the positive response of the seismological community to clearly-defined needs, and it offers NSF an action plan to develop these exciting areas of the solid earth sciences.

Table 1.1  
Tentative Implementation Schedule and Budget for IRIS (\$M, 1984)

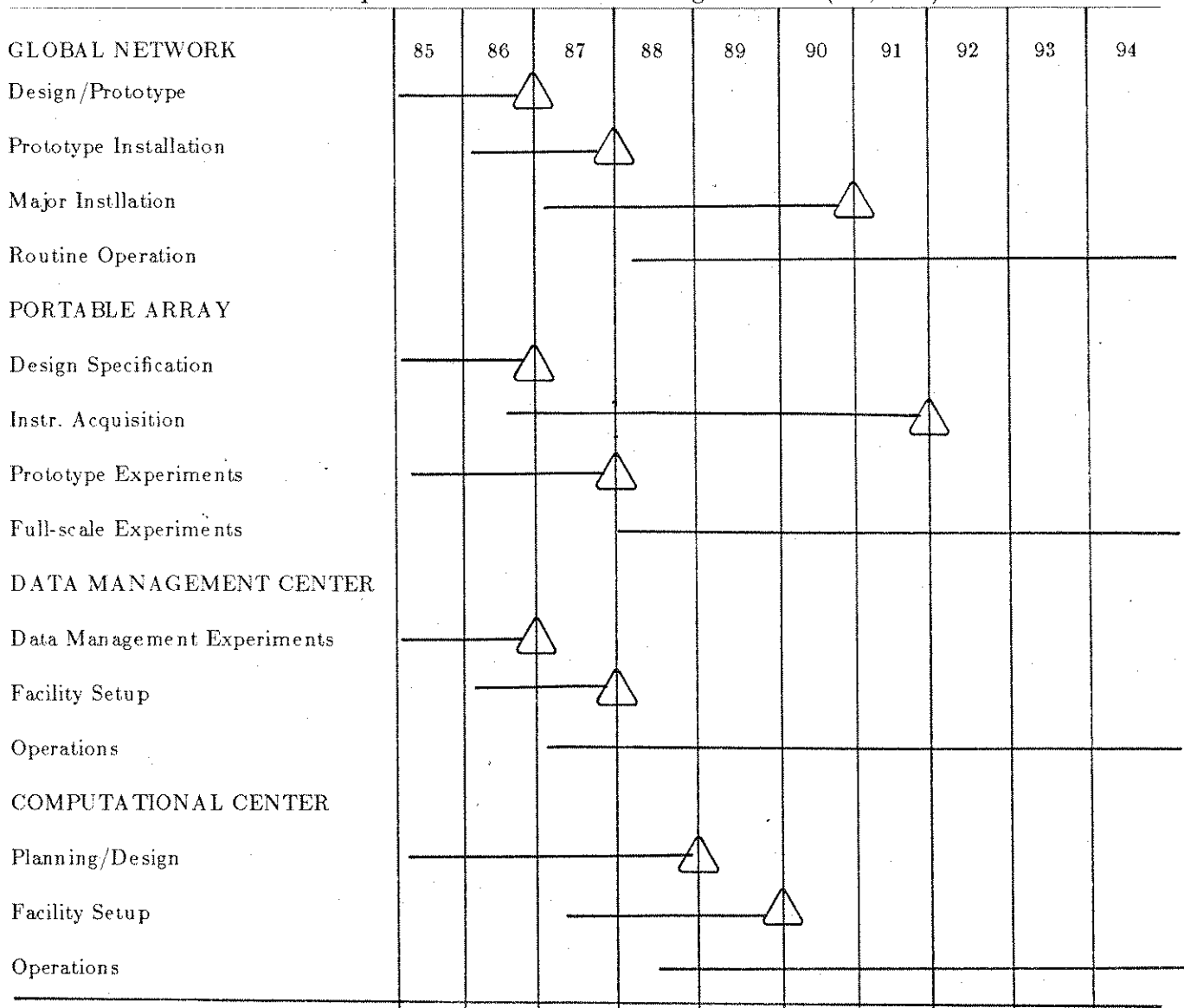


Table 1.2

	BUDGET (\$M)									
	85	86	87	88	89	90	91	92	93	94
Global Seismic Network	1.9	4.5	8.7	10.6	11.5	11.8	12.5	6.4	6.0	6.0
Array Seismic Studies	1.6	4.9	8.5	10.2	12.4	13.9	14.1	13.0	13.3	13.8
Data Management Center	1.3	1.8	8.6	8.4	7.6	7.7	7.7	7.7	7.7	7.7
Computational Facility	.1	.2	.3	1.0	3.0	5.0	5.0	5.0	5.0	5.0
Yearly Totals	4.9	11.4	26.1	30.2	34.5	38.4	39.2	32.1	32.0	32.5
5-Year Total	107.1									
10-Year Total	281.3									

## IRIS Budget by Category

Research & Development	1.5	1.8	1.7	1.6	1.8	1.9	2.0	2.0	2.0	2.0
Programmatic Research	2.0	2.8	5.0	5.9	6.6	6.9	7.4	6.3	6.4	6.4
Capital Equipment	.6	5.1	13.3	13.0	13.1	13.0	12.5	6.4	6.7	7.2
Operations & Maintenance	.8	1.7	6.1	9.7	13.0	16.6	17.3	17.4	16.9	16.9
Yearly Totals	4.9	11.4	26.1	30.2	34.5	38.4	39.2	32.1	32.0	32.5
5-Year Total	107.1									
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