

FINDINGS AND RECOMMENDATIONS  
OF THE PROGRAM REVIEW PANEL  
FOR C.I.R.E.S

I. Introduction

The findings, analyses and recommendations reported here are based on reports from the CIRES Self-Study Committee chaired by Carl Kisslinger, the Internal Review Team chaired by Judah Levine, and the External Review Team composed of William Brace, Jack Calvert and Colin Ramage. These documents provided a thorough assessment of the management and operation of CIRES, a clear analysis of its productivity level and a sharp focus on issues requiring attention. The committees involved in the various aspects of the study have developed similar views about the strengths and weaknesses of the Institute. This organization is composed of individuals with exemplary research credentials. They have developed and maintained a variety of successful projects of immediate relevance to the environmental science community. The growing levels of research funding and publication attest to the significance and recognition of the work in progress. These accomplishments have permitted the Institute to develop a national and international reputation for excellence. The contributions of the original director, Carl Kisslinger, and his successor, Robert Sievers, to this successful endeavor should be recognized.

II. Findings

A. General

CIRES was created in 1967 as a cooperative venture between the University and the Environmental Science Service Administration, the predecessor of NOAA. A Memorandum of Understanding defined, in a broad manner, the contributions to be made by each of the organizations. Commitments of facilities and personnel were included in these agreements. More substantial plans were formulated in 1972. The early scientific emphases were on solid-earth geophysics and atmospheric dynamics. Planning in the former area was altered when NOAA was required to phase out all such activity over a three-year period. The latter program was reduced in size when key NOAA personnel left CIRES in the late 70's. In the mid 70's the Aeronomy laboratory of NOAA encouraged the development of an atmospheric chemistry program within CIRES which is now a major component of the organization. The climate program in CIRES was also facilitated by key personnel in ERL, NOAA who recognized the importance of a national program on climate studies. The major growth in the roster of CIRES Fellows since 1980 has occurred in environmental chemistry. There have been smaller increments in the rosters of the geophysics and climate program. The latter has enjoyed an enormous increase in research personnel. Recently (1984) the Fellows voted to combine the diminished atmospheric dynamics program with that for climate studies.

vation provided by NOAA's interests and the cooperation of the Chemistry Department. In contrast, the Atmospheric Dynamics program languished in the early 80's even after the addition of a second Fellow. The four NOAA positions previously held by CIRES Fellows were not refilled. In the operational sense, the Director did not give this program a high priority. The Fellows agreed. Formal action was taken in the Spring of 1984 when the program was combined with Climate Dynamics. This decision to downgrade a program that was a major component of CIRES was affected in part by the lack of longrange Institute goals and by the lack of a clearly defined role for the Institute in terms of NOAA and University interests.

### C. Personnel and Programs

The scientific program in CIRES is composed currently of four distinct disciplines: environmental chemistry, solid-earth geophysics, climate dynamics and atmospheric dynamics.

#### (1) Environmental Chemistry

This program began with one Fellow (no longer here) in 1975 and now has a roster of seven. Five fellows are rostered in the Chemistry Department, one in NOAA and one in Electrical Engineering. In addition to the Fellows, there are two Associates, numerous post-docs, 25 graduate students and five visitors. This is a strong and vigorous group, active in areas of direct importance to NOAA missions. During the period 1978-83 the research budget was \$3.6M and approximately 100 publications have appeared in major chemistry-related journals. This group is truly interdisciplinary, bringing together a broad spectrum of expertise to study chemistry-based problems in the atmosphere and in the earth.

The number of Fellows in this group has grown more rapidly than in the others. This raises questions about adequate space and institute balance. In terms of the former consideration, this group requires immediate access to chemistry facilities as well as to faculty and student colleagues. The balance issue arises because the University and NOAA have not developed a coordinated effort to define the purpose of CIRES relative to the needs and resources of each organization.

#### (2) Solid-Earth Geophysics

During the early years of CIRES solid-earth geophysics was pre-eminent. Although many of the original members have departed, this group, composed now of nine Fellows and four equally distinguished Associates, has continued to flourish. Three Fellows and one Associate are rostered in Geological Sciences and one Fellow each is found in APAS, Mechanical Engineering and Physics. The remaining Fellows are self-supporting. An additional Fellow, to

gram. Additionally 57 papers were generated by Visiting Fellows and Research Associates of CIRES working in NOAA labs.

Unlike other components of CIRES, the Climate group would prefer to remain in its present location rather than move to a main campus central facility. Proximity to NOAA facilities and personnel is critical to the effective functioning of the group.

(4) Atmospheric Dynamics

This program was originally a major component of CIRES involving four Fellows who were employees of NOAA. These individuals left CIRES, one moving to NCAR, two to academic employment elsewhere and one to take on a management role in NOAA. At present the program, now merged with Climate Dynamics, consists of two Fellows, one of whom is a Professor of Chemical Engineering (but not budgeted for in that Department). The other has a soft-money faculty position in Electrical Engineering. In addition there are four graduate students. Funding between 1979-83 has totaled about \$500,000. It should be noted that one Fellow has been active for only a short period. In its original form this program had close ties with the Wave Propagation Laboratory of NOAA of which the original Fellows were members. When they left, the positions were not refilled. At present this area does not appear to enjoy a high priority in NOAA. To make matters worse, Atmospheric Dynamics is not a major area of activity in any University department. None shows an interest in sharing a new rostered faculty member with CIRES. In this sense neither the University nor NOAA provides any real motivation for program continuation.

The IRT found it difficult to determine whether this program is essential to CIRES. They suggested that the University provide a variety of resources to rebuild the program. In contrast the ERT thought the present conditions would prevail and that the program should be phased out. It was suggested that such a program could not compete effectively with similar activities in NCAR carried out by a much larger staff.

D. Space and Facilities

The Self-Study report stated that, "An adequate building on the main campus in which to house all of CIRES is perceived by the research staff as the greatest single need of the Institute." There is a definite perception that opportunities for interaction between research groups in CIRES are diminished by the physical separation of the individuals involved. In addition, the solid-earth and environmental chemistry groups are now separated from the Geological Sciences Department and the main reference Library, respectively. On the other hand the Climate Program, located on 30th St., has immediate access to the appropriate offices of NOAA, including the library and data acquisition system.

4. PRP is unable to evaluate the request by CIRES, and the recommendation by the IRT, for a consolidated main campus facility for the Institute.
5. Inadequate opportunities exist for the development of interdisciplinary courses taught by CIRES researchers under department auspices. Similarly, graduate students in the several CIRES programs have little opportunity to take courses oriented specifically toward their research program requirements.

#### IV. Recommendations

1. The 1967 Memorandum of Understanding, by which CIRES was created, is out of date. A contemporary document, defining the purpose of CIRES, should be developed and formalized by the University, NOAA and the Institute. The long-term interests of the University should be given major consideration. A statement of this type is absolutely essential to the future evolution of the Institute.
2. Major decisions about program evolution or termination must reflect long-term interests of the University as well as NOAA requirements. The Fellows and the Director should formulate specific procedures for creating, nurturing and discontinuing programs. We agree with the IRT that a permanent advisory group, consisting of distinguished scholars from other institutions, should be appointed to assist the Fellows and the Director in their decision-making process.
3. The responsibility of the Director to facilitate the development of designated technical areas of the Institute must be defined more carefully. The recent creation of Associate Directors for each of the programs will be helpful for providing the Director with important technical information about activities in each area.
4. CIRES should demonstrate, in a clear way, the need for a consolidated main campus facility. As part of this effort the activities of CIRES, including its relationship with main campus units, should be compared with those of other institutes located off the main campus.
5. CIRES should emphasize the development of mutually beneficial relationships with appropriate University departments in order to facilitate improved interdisciplinary course offerings and programs, and opportunities for acquiring additional CIRES Fellows through normal hiring practices.
6. The Institute should report each semester to the Dean of the Graduate School, Boulder on its progress in carrying out these recommendations.