editorial

New strategies for funding academic research facilities

American science and technology face a critical problem that needs solving now: how to develop new financing strategies for funding academic research facilities, that is, the buildings and general-purpose fixed equipment (such as clean rooms or ventilation hoods) required to perform and support research.

The facilities problem has become acute because of the convergence of two important trends. The first is the accumulation of consequences of past underinvestment in facilities. Since the 1960s, we have seen:

- The termination of major programs of Federal support for university facilities
- The difficulties faced by universities in replacing that support from other sources and their reluctance to sacrifice support for faculty to support facilities
- The pressure for university and Federal funds to address a host of other compelling demands, such as the need for modern instrumentation, the need for greater support of mathematics, small physics, and engineering, and the need for much greater attention to precollege education.

The second trend is the increasing capital intensity of scientific and engineering research. Keeping research first rate today means backing up each researcher with far more expensive facilities than was true in even the relatively recent past. At my own laboratory, for example, the share of depreciation expenditures as a percentage of operating costs has increased from 5% in 1978 to 15% in 1985.

I believe that forefront R&D in an academic environment requires a somewhat similar pattern of expenditures. The March 1985 issue of PHYSICS TODAY, devoted to facilities needs in physics, pointed out how increasing facilities costs are affecting not only such traditionally big-science fields as high-energy physics, but also the traditionally small-science fields such as condensed-matter physics. The same trends are evident across forefront science and engineering. Doing research in electronics, for example, requires expensive semiconductor processing laboratories designed to be hundreds of times as clean and vibration free as conventional laboratories; biological research requires laboratories designed to meet increasingly stringent requirements for environmental control, waste disposal and animal care; research of all kinds increasingly requires first-rate computation and information-processing support, with its special demands for controlled environments, local-area networks and the like.

The convergence of the two trends is all the more serious because it is occurring in an era of fiscal stringency when a solution based on Federal action alone is quite unlikely. Yet the problem must be solved whether or not new sources of money become available. There simply cannot be first-rate research without first-rate facilities. In simplest terms, first-rate research either must be supported by more money, or will be done by fewer people.

This dilemma led to a conference held on 22 and 23 July in Washington, entitled "Academic research facilities—Financing strategies" and cosponsored by five leading national science-policy bodies. Participants included representatives of the financial community, Congress, the state governments, Federal agencies, academic institutions and business. They took part in working groups that considered the topics of grants and gifts, alternate sources of finance, partnerships, university policies and practices, the role of the states, and comprehensive merit review for facilities.

The conference was primarily devoted to seeking ideas for solutions to the problem. Several such ideas were discussed. For example, Representative Don Fuqua (D., Fla.) described his bill, now before Congress, that proposes ongoing Federal funding of university facilities needs. David C. Clapp, partner in the financial firm Goldman, Sachs, & Co, proposed a tax-exempt foundation with an initial one-time infusion of Federal funds that might permit it to play a role for academic facilities analogous to the one played for housing by the Federal National Mortgage Administration ("Fannie Mae"). Other proposals included designating a fraction of the Federal R&D budget to facilities, and changing the indirect-cost recovery rules on research contracts to permit faster recovery of facilities costs.

The conference was only the first step in what must be a concerted effort by the academic community, the states, foundations and industry, as well as the Federal government, to tackle the problem. For it is truly a national problem. The Nation's economic competitiveness depends on strength in research. Strength in research in turn depends not only on people, but also on a proper balance among people, facilities and equipment. The problem cannot be avoided. If it is not faced directly and solved explicitly, it will be solved implicitly by a decline in the Nation's ability to remain the world's leader in research.

ROLAND W. SCHMITT
Chairman, National Science Board
Senior Vice-President, Corporate R&D
General Electric Co