

PUBLIC AFFAIRS FORUM

An analysis of public policy issues and how they affect MRS members and the materials community...

FMS Conference Specifies Needs of Policymakers

The Federation of Materials Societies (FMS) held its 14th Biennial Conference on National Materials Policy June 17–20 in Baltimore, Maryland. The theme was "Materials Agenda for the 21st Century: Policies, Priorities, Payoffs." Chaired by Bob Eagan of Sandia National Laboratories, the stated goal of the meeting was "for participants to understand the point of view of Congress and the administration on materials policies..., and the requirements of the government policymakers for information that will help in reaching informed decisions with regard to science policies that are in the best interests of the nation." The Materials Research Society is a member society of FMS.

The first morning featured speakers who imparted the Washington perspective on materials. Representatives Steven H. Schiff (R-NM), and George E. Brown (D-CA), both members of the House Science Committee, gave the view from Capitol Hill. Both congress representatives, as well as many other speakers throughout the meeting, described the profound changes in the world that have affected materials science and engineering and its practitioners. This has been brought about by the end of the Cold War, increasing globalization of the economy, and new resolve on the part of both political parties to attack the federal budget deficit.

The end of the Cold War has changed thinking about national security. Defense has been a boon to science and engineering for 50 years. It had a huge effect on the economy, for example, providing the impetus for the national highway system in the 1950s. This network transformed the United States into a truly national economy instead of a collection of regional ones. The use of early integrated circuits in the Minuteman missile, in which cost was no object, was critical to the development of a technology on which we depend so heavily today.

The new definition of national security includes economic competitiveness, environmental issues, and sustainable development, but the role of the federal government in these endeavors is hotly debated. Balancing the federal budget is destined to affect science budgets, given the magnitude of the deficit, the unwillingness of either political party to wrestle seriously with entitlement programs that consume an increasing share of the budget, and the competition between science and other worthy and popular programs for the shrinking pool of discretionary funds.

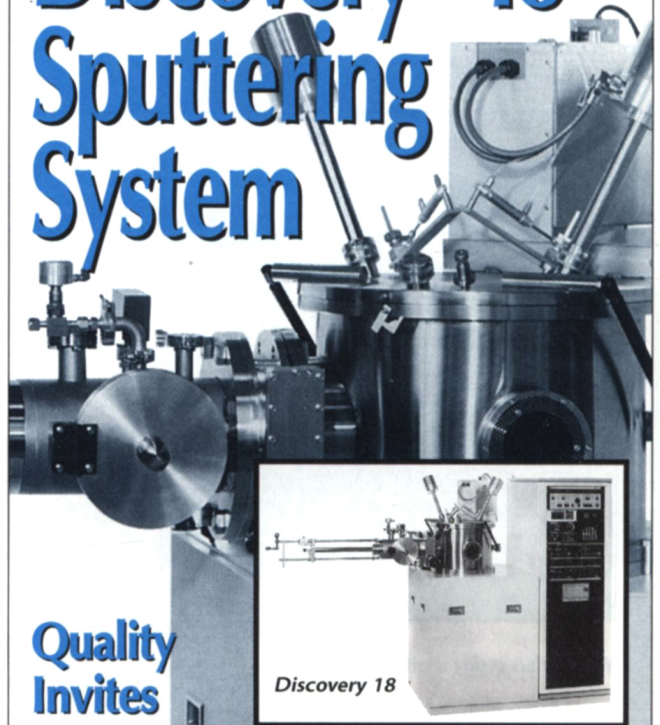
Both Schiff and Brown emphasized the need for the scientific community to educate members of Congress and their staffs about the importance of continued investment in the scientific infrastructure of the nation. While economists disagree on the exact amount of economic growth that is directly related to investment in research and development, all agree that technology and innovation is the single most important cause of growth and our rising standard of living. It is critical that this story be told to members of Congress (especially relatively new ones) by their constituents. This would require a unprecedented level of grassroots political involvement by the scientific community, but both representatives said that such activism is essential to the continued health and prosperity of the nation.

Brown also pointed to the need to educate the public at large about what scientists do and why it is important. He drew an analogy to the "Golden Age" of Greece in which science, philosophy, and other intellectual pursuits flourished. The practice and communication of these endeavors was, however, confined to a few "academies." The public was not educated about the value of such activities, and, lacking broad-based support, the period lasted only about 150 years. The parallel with the level of sophistication of the general population with regard to science and its value to society and our

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Decades of R&D In Thin Film Manufacturing

quality of life is obvious.

Kent H. Hughes, Assistant to the Secretary and Director, Office of Global Competitiveness and Business Advocacy, Department of Commerce, and J. Thomas Ratchford, Director, Center for Science, Trade and Technology Policy at George Mason University, addressed the economic issues surrounding research and development. Ratchford expects the explosion of knowledge to continue. Trade barriers, already very low, will continue to fall as the economy becomes ever more global. Interactions of all kinds will increase across international boundaries. Traditional institutions in all sectors will undergo profound change, and in some cases break down altogether. Broadband communication will be free. The service sector will become increasingly dominant in the United States and all developed nations. The financing of research and development (R&D) has come into question in every sector. In particular, the role of the government in financing R&D is falling all over the world. The U.S. government investment in R&D was \$23B (57% of total investment) in 1960 and \$20B (20% of the

total) in 1994 (in constant dollars).

Peter Bridenbaugh of Alcoa and Don Shaw of Texas Instruments gave an industrial viewpoint that was consistent with the picture provided by the other speakers. While industry investment in R&D has increased substantially over time, it is viewed as just one more cost to control. This is easy to understand in view of the fact that the amount a company spends on R&D is typically about the same as its entire profit! In this climate, consortia and other alliances are seen as saving money and time, lowering acquisition costs for intellectual property and precompetitive know-how. A mix of in-house and external R&D is found to be essential. "Strategic necessities" are those things that are essential to be able to compete in a market. They frequently involve precompetitive knowledge that can be outsourced. "Strategic differentiators" are those aspects of a product that provide a competitive edge. These are not shared with other companies and must be provided in-house.

Academic R&D is just beginning to change. Budget pressures will result in real reduction in R&D expenditures, probably

~30% over five years. The tenure system is being called into question. "Virtual universities" and "just in time" education challenge traditional academic concepts about teaching and the established methods of university operation. Discipline-based departments are starting to give way to interdisciplinary centers. Changes in all sectors are causing academic researchers to become more involved in R&D that used to be the purview of industrial central research laboratories, raising some concern that not enough truly forward-looking work is being done. Interinstitutional cooperation is becoming the norm.

In short, the world in which materials researchers have practiced for several decades has changed quickly and profoundly and this change will continue. This is driven by significant changes in the geopolitical situation, increasing globalization of the world's economies, and the U.S. federal budget deficit. Government, academic, and industrial entities are re-examining the way in which they invest in research and development. Policymakers and the public need to be made aware of the tremendous contributions that the U.S. R&D enterprise has made to our quality of life. The entire materials research community must become involved.

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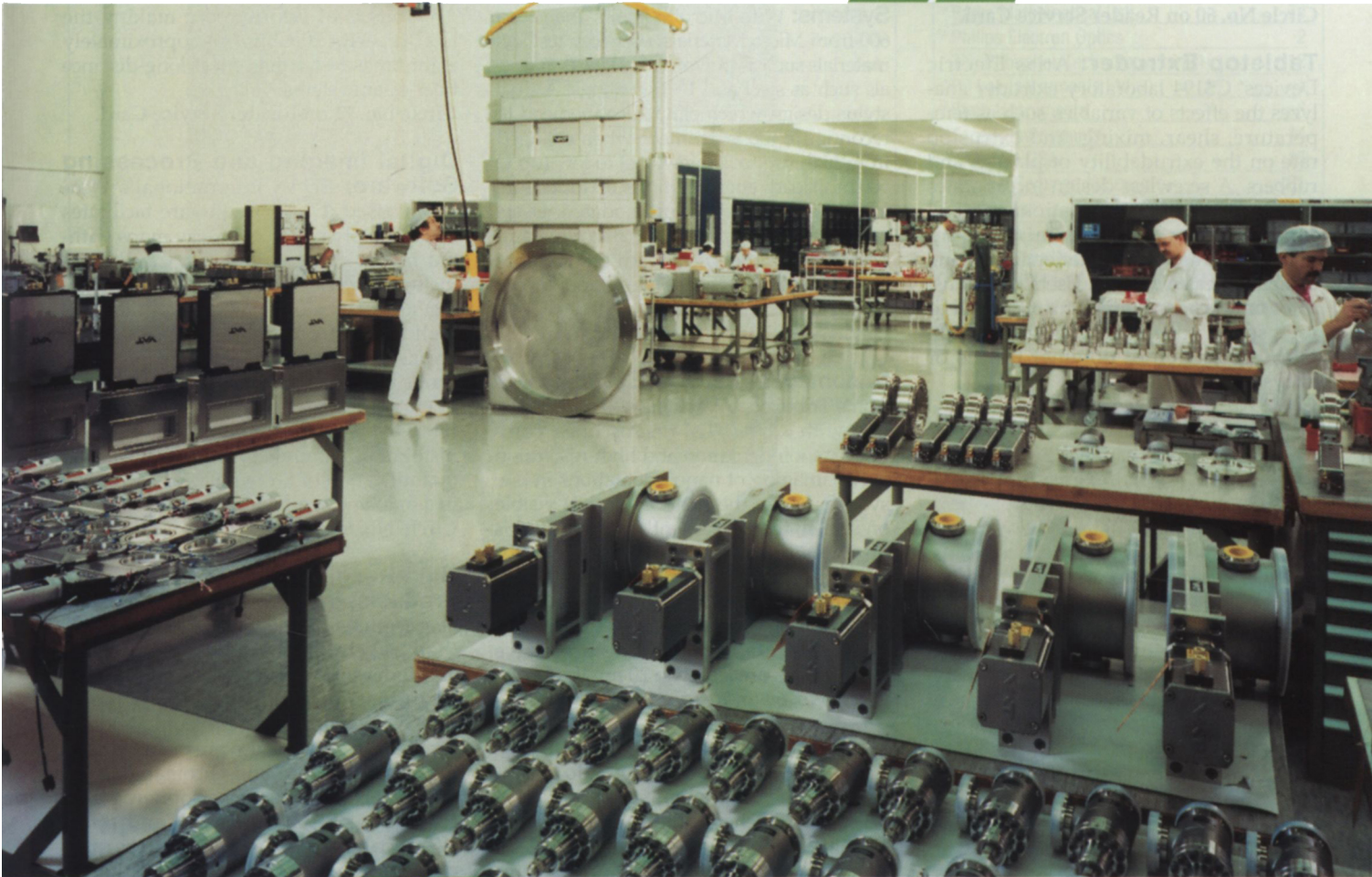
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