

THE CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES (CSIS)

Event Overview

Maintaining America's Technological Edge – Semiconductors, Security and International Competition

On June 23, 2006 CSIS' Technology and Public Policy Program hosted Dr. William Howard, Chairman of the 2005 Defense Science Board Task Force on High Performance Microchip Supply and George Scalise, President of the Semiconductor Industry Association (SIA) who spoke on the challenges the U.S. semiconductor industry faces and steps the U.S. could take to keep it internationally competitive and fulfill the defense and national security needs of the U.S.

Dr. Howard highlighted the restructuring of the microelectronic industry towards offshore manufacturing as "fabless" firms who contract out, rather than produce, chipsets. This restructuring poses a challenge for the U.S. Department of Defense because it requires a trusted and assured source for IC components. The risks DoD faces when procuring semiconductors are similar to those faced in software (e.g., viruses, back doors, Trojan horses) and such malicious components in military equipment present a potentially serious national security issue. The Pentagon thus requires a source for chips that is located in the U.S. and given international and industry trends, its options are shrinking.

DoD has established a "Trusted Foundry" program and attempted to find partners to work with in the U.S. who are capable of providing for defense needs. However, DoD's responses have not been adequate to address future challenge of obtaining IC components, and DoD lacks a clear vision of the kinds of technologies and the volume of orders it will require.

Dr. Howard recommended that the government look at the SEMATECH (Semiconductor Manufacturing Technology) example as a possible policy response to the changing landscape of the microelectronic industry. SEMATECH, a non-profit consortium that performs basic research into semiconductor manufacturing, was formed in 1987 as a partnership between the federal government and a number of U.S. semiconductor manufacturers to collaborate on common manufacturing issues and regain global competitiveness.

Mr. Scalise, president of SIA, discussed how the U.S. semiconductor industry could remain competitive globally. He urged more R&D investment in physical sciences, removal of barriers to visas for skilled workers, and a tax investment climate that would encourage fabs to locate in the

United States.

He noted that the traditional semiconductor industry would be experiencing the end of an era within 15 years, as the industry reaches the limits of CMOS (complementary metal oxide semiconductor) technology and enters into a new, nano-scale era. In the new era, the U.S. will not have a head start as it did following the Second World War. Thus, the U.S. will have to decide how it will compete.

Mr. Scalise agreed that the U.S. government will need some secure foundries, but mostly commercial-off-the-shelf (COTS) technology would be the core of the market. For a healthy semiconductor industry to flourish, the U.S. needs to maintain a "critical mass" of global semiconductor manufacturing capacity. Currently, the U.S. share of leading-edge capacity (< 90nm) is less than 15 percent. Mr. Scalise argues that a level closer to 30 percent of capacity is necessary for a healthy industry in the U.S. to remain competitive.

Mr. Scalise emphasized that foreign countries, particularly China, are thinking more critically about global competition and investment in semiconductor technology. The U.S., Mr. Scalise argued, must therefore focus more seriously on this kind of competition. On a recent visit to China, Mr. Scalise observed that the Chinese government is making substantial investments in microelectronics. Shanghai's Fudan University, for example, recently opened a facility that will host 5,000 microelectronics graduate students. China's regional governments are also making significant investments. In one case, a local government is independently funding the construction of a fabrication plant and will lease the facility at very favorable rate.

In the question and answer period, both Dr. Howard and Mr. Scalise reiterated the serious nature of the challenges facing the semiconductor industry, but also stated their optimism that national policy measures could successfully address both the security and competitiveness issues.

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