LETTERS

THE INTERNATIONAL ROADMAP FOR DEVICES AND SYSTEMS: A BEACON FOR THE ELECTRONICS INDUSTRY

To the Editor:

The semiconductor industry moves at a frantic pace, introducing new technologies every two years. The electronics industry announces a new product every six to nine months. It would be impossible for this to happen without a well-thought-out, long-range roadmap, so let us introduce to you what makes all of this possible: meet the IEEE International Roadmap for Devices and Systems (IRDS).

The IRDS is the third generation of the road map methodology first empirically outlined by Gordon Moore as far back as 1965, when he predicted an annual doubling of transistors every year for the subsequent 10 years. This prediction, much to the surprise of many, turned out to be correct, and, in 1975, Moore revised his prediction to a doubling of transistors every two years for the foreseeable future.

In 1991, universities, industry, and government organizations in the United States decided to formalize a comprehensive document sponsored by the Semiconductor Industry Association mapping all of the technological parameters required by semiconductor devices with a 15-year outlook. The National Technology Roadmap for Semiconductors was published in 1992, 1994, and 1997.

By 1997, it became clear that major roadblocks were going to be encountered by the beginning of the next decade in transistor structure and materials. It was plainly clear, at the time, that these problems could not be solved by either a single company or even a single nation due to the complexity and cost of the tasks.

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To efficiently tackle these problems, the International Technology Roadmap for Semiconductors (ITRS) was formed in 1998 with the participation of organizations from Europe, Japan, Korea, Taiwan, and the United States. All of the experts around the world joined forces and synchronized research efforts at a cooperative scale never seen before. Between 2003 and 2011, the CMOS transistor structure and materials were completely and successfully refurbished and restructured, and fin field-effect transistors replaced the previous ones.

In 2016, the ITRS morphed into a much broader outlook inclusive of technologies, devices, and systems called the *IRDS*. This is hosted by the IEEE Computer Society as part of the Task Force on Rebooting Computing, which is supported by eight IEEE Societies, corroborated internationally with the roadmap societies: SiNANO (EU) and SDRJ (JP).

With this revised foundation, the semiconductor industry has formulated a clear road map, taking it well beyond the year 2030. More information for *Computer*'s readers can be found at https://irds.ieee.org/.

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GET INVOLVED

Interested volunteers may participate in the IRDS project through focus teams. Contact irds_info@ieee.org for more information.

2021 REPORT

IEEE Computer Society members and other interested contributors can learn more about the IRDS project's progress through its 2021 report at https://irds.ieee.org/editions/2021.

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