

# Positioning More Than Moore Characterization Needs and Methods Within the 2011 ITRS

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## ABSTRACT

The concept “More than Moore” was introduced in the 2005 edition of the International Technology Roadmap for Semiconductors (ITRS)<sup>1</sup>, with the purpose to describe technology features that do not fit the miniaturization trends as implied by Moore’s Law. These features typically enable non-digital functionalities, such as wireless communication, power management, sensing and actuation. As these new functionalities are progressively being incorporated into system-in-package (SiP) and system-on-chip (SoC) formats, the complexity of the resulting microsystems is rapidly increasing (Fig. 1). Consequently, there is a need for new sets of physical parameters and figures of merit for the characterization of emerging technology options in the More than Moore domain. Recently, the International Roadmap Committee (IRC) of the ITRS has proposed a methodology to address this subject<sup>2</sup>.

The paper will discuss the characterization requirements in the More than Moore domain, as they are identified in the 2011 edition of the ITRS. The analysis starts with the system needs emanating from the various application fields, which have to be translated into functional requirements and device characteristics. This enterprise is by nature multi-disciplinary, involving expertise from the industrial as well as the scientific communities. The technological and scientific challenges that have to be explored include heterogeneous process integration, multi-scale device engineering and design for reliability. All these require new approaches in characterization.

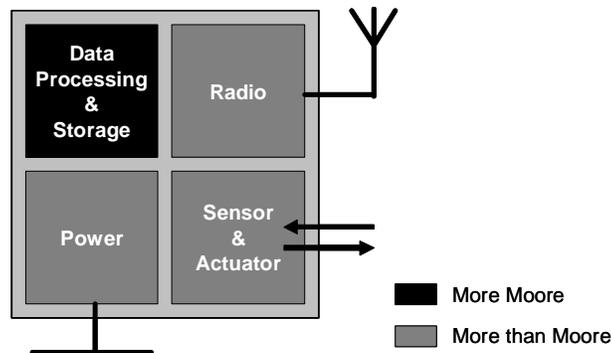


FIGURE 1. A typical microsystem incorporates “More Moore” and “More than Moore” subsystems.

## REFERENCES

1. *International Technology Roadmap for Semiconductors 2005 Edition – Executive Summary*, [www.itrs.net](http://www.itrs.net).
2. “More-than-Moore” White Paper (2010), [www.itrs.net](http://www.itrs.net)