Design business perspective on the EPSRC Microelectronics Design portfolio and strategic direction

Source of business input

This document results from consultation with the UK design industry through surveys and 1-1 interviews. This information was then considered by an R&D-focussed group of the NMI Microelectronics Design Advisory Board (MDAB) with a view to delivering a 'macro-level' view about topics of industrial interest and methods to build effective links.

The MDAB welcomes this opportunity to provide input to EPSRC, and wishes to both continue and develop this relationship in a systematic way.

The UK Design Business - Capability

The UK Microelectronics Design industry is broad and varied covering a wide range of technologies, business models, core competencies and end markets. It includes businesses that design chips, discrete circuits, embedded software, opto-electronic devices, modules and components; as well as those who offer services in support of design. Although difficult to quantify in exact terms it employs tens of thousands of people in the UK, in many hundreds of businesses. It includes:

- World-leading UK-centred fabless and chipless businesses such as CSR, ARM, Imagination Technologies and Wolfson Microelectronics.
- Major world leading semiconductor OEM, design and design-services companies have significant operations in the UK including Analog Devices, Broadcom, Cadence, NVidia, Xilinx, Dialog, Altera, ST Ericsson, Infineon, Renesas and TI.
- Crucially, there is also a vibrant base of rapidly growing companies targeting specific IP opportunities and markets within the sector, including Cam Semi, Sondrel, Cascoda, Nujira, PicoChip, Neul and DisplayLink.

The businesses have specialisms in almost every aspect of microelectronics design, simulation, software modelling, test and verification. Key markets and applications include Automotive, Communications, Imaging, Security, Consumer, Energy, Sensors, and Industrial etc.

UK Design Industry – Interaction with University Research and the EPSRC portfolio

Current Status

Perhaps more than the identification of specific technologies and tools, the broad view of the UK design industry is that the development of value-added links, relationships and projects between Academia and Industry is seen as important within the future EPSRC portfolio.

Currently, the extent of activities and relationships between companies and Universities is widely varied. Some large developed companies such as ARM and Imagination Technologies have a number of established links to Universities, whereas others, even at multinational level have found it difficult to engage in a meaningful way. Common feedback is that it is often very difficult to see a 'fit' between a company's development needs and what University researchers are interested in. This is usually because of the fundamental gap between the business need for an immediately applicable

trustworthy 'solution' to an imminent business issue; whilst the researcher is usually offering a technology or methodology proof of concept. Secondments can be useful as vehicles for both parties to understand the disparity, but it can be difficult to grow initial relationships such as these into longer-term strategic collaborations, because good research outcomes are usually applicable/valuable in different ways to different businesses.

In addition, even with the proposed broad areas of focus of the EPSRC portfolio, it is difficult for industry to understand why specific activity is being undertaken or proposed. A vision of success from an industrial viewpoint would be a mechanism for proposed topics and areas to be reviewed by industry for input and relevance.

Recommendations

- **A workshop (and subsequent tutorial series) aimed at clarifying to the other community, the difference between Research and Business; roles, needs and expectations.**
- **That when shaping of the Microelectronics Design Portfolio, topics and activities have a more systematic element of industrial input.**
- **Increased development of direct research relationships between companies and Universities, building on secondments, CASE portfolios and KTPs.**
- **Establish technical forums where UK Academia and Industry could meet to discuss potential research collaborations on specific topics (1 per forum)**

Technology Areas of Focus within the proposed EPSRC Strategy

Whereas we prefer the term Electronic Systems which has a broader involvement and a simpler alignment with societal challenges and business opportunities, the proposed scope of the microelectronics design area within the EPSRC portfolio has strong resonance with the UK industry, and is a good framework for future activity.

Specific areas of concern for industry building on this include but are not confined to:

- **Design on/of 'More than Moore' systems of increased functionality and complexity.**
- **The challenge of delivering growing functional expectations within constrained energy budgets.**
- **Multicore design and verification for quality and safety.**
- **Use of standards and re-use of methods, tools, circuits and software, for productivity, quality and safety.**
- **Electronic System design and integration.**
- **Next generation wireless and telecoms design.**

Equally as important is the understanding that most 'design' companies specialise in areas as well, areas covered by different portfolios within the wider EPSRC ICT remit**. It is crucial therefore that cross-cutting activity is encouraged where to do so gives a better prospect of Industrial Exploitation.** Example areas include:

CMOS, Non-CMOS devices, Verification & Correctness, Embedded Software Engineering, DSP, Graphics and visualisation, Opto-Electronics, Nanotechnology.