National Network for Manufacturing Innovation

Background

FlexTech Alliance (www.flextech.org) is pleased to respond to the NIST Request for Information (RFI) on the National Network for Manufacturing Innovation (NNMI). We are a R&D consortium and industry trade association whose purpose is to help develop the supply chain for manufacturing flat panel displays (FPDs) and flexible, printed electronics (FPE). Since 1993 FlexTech (and our predecessor organization, U.S. Display Consortium – USDC) has managed an active R&D program, with two (2) federal partners, resulting in 150+ projects initiated with greater that 60% industry cost share. Some of our development partners have gone on to establish significant market share for providing tools for manufacturing FPDs and FPE or supplying innovative materials.

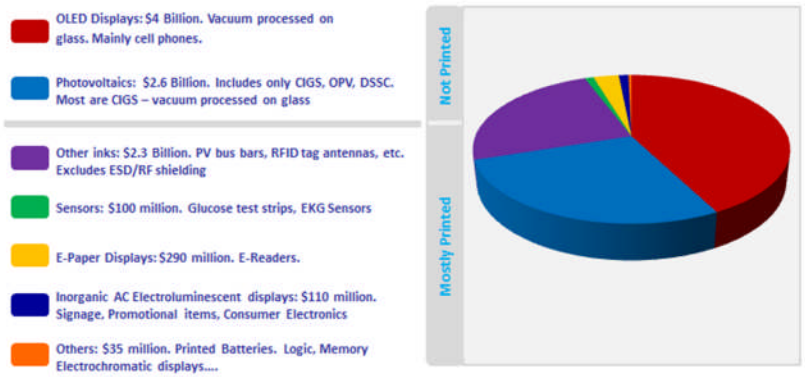
Consequently, we believe that this background qualifies FlexTech to comment on certain, but not all, aspects of the proposed NNMI.

Technology focus areas -- Co-investing -- Assessing performance and impact

There is a wide range of technology focus areas in which to form institutes. Clearly, FlexTech believes that FPE is one such area, as it impacts numerous emerging products such as those in communications (including displays), sensors (human, structural), solid state lighting, and power generation and storage (such as organic photovoltaics).

Analysts predict that the FPE market will grow rapidly, with IDTech Ex estimating a 2012 market of $9.4B (see chart below), while BCC and IPC are more conservative, predicting a $15B-$30B opportunity by 2025. Importantly, FPE is reaching the early stages of fruition as separate developments among several technology fronts (materials, design, processes and manufacturing equipment) are beginning to enable a new class of devices. Consequently, an opportunity exists for the U.S. to drive the FPE industry.

IDTech Ex Data – February 2012



Among the purposes of NNMI are to strengthen the domestic manufacturing base and help produce products for U.S. national security and homeland defense. FPE is demonstrably a dual-use technology as indicated by this table:

Examples of Military Applications	Commercial Equivalents
Mobile E Book training and maintenance manuals	Textbooks
Physiological monitoring patch	Health maintenance patch
Sensors for command posts, cleared structures	Cargo monitoring tape
Off grid and personal power supply	Off grid and personal power supply

Co-investments in our R&D program is something that FlexTech is quite proud of, as we have achieved ~60% cost share in funded projects. Put another way, the government reaps $2 for every $1 of funding provided. Cost share comes in two forms: 1) through actual cash contributions from member dues and, also, from development partners to co-fund a project; and 2) through in-kind contributions from members of the Governing Board and their Technical Council designees. Competition for direct corporate funding is intense, so FlexTech encourages the NNMI planning team to look favorably on in-kind contributions from corporate sources, so as to broaden the funding pool.

Business models -- Governance models -- Financial and intellectual property obligations, access and licensing

FlexTech has formed and managed four (4) electronics industry consortia. Generally, we adopt the architectural guideline of "form follows function" when approaching a new consortium That is, it is our experience that industry collaborates for different reasons at different points in time. Therefore, the structure and governance of a consortium should reflect the "real time" formation. With that said, some elements are often common in consortia:

- Founding partners are drawn from industry's senior officials, who can commit their company's resources. They develop the initial strategy and governance. The U.S. government can be counted as one partner, perhaps in a non-voting role.
- A Governing Board is created to implement governance and a Technical Board (or council or group) to develop and manage the technical program.
- A dues structure is developed that freely permits participation from small, medium and large firms; from academia; and from government agencies and institutions.
- An intellectual property (IP) policy is established that places ownership with the developer, yet protects the interest of members who have supported/contributed to the development of IP. Mutually agreed upon licensing provisions are often part of the IP regime.

Metrics for effectiveness can include, but not be limited to:

- Membership growth
- Institute (or consortium) retention and recruitment
- Results of funded R&D moving into commercial production

- Continuing/increasing industry investment
- Continuing/increasing government (federal, state) investment

Sustainable institute operations – Timing of co-investments – Competitiveness and national security

Financing a consortium on a short term and long term basis requires different strategies. Initial enthusiasm, especially if there are up-front, substantial company investments and a federal contribution, can give way to apathy if market predictions do not develop or if the original challenge is not solved.

Federal R&D investment should be of sufficient size and duration in order to attract the interest of key industry players. Without recognized leaders in the field, the institute could be seen as weak. The corollary is that a strong consortium attracts other strong participants for competitive reasons, if no other.

The funding could be staggered, for example, a five year plan for federal investment could be:

Year 1 = 15% Years 2-3-4 = 25% each Year 5 = 10%

This recognizes that there is a start-up phase, a work phase, and a wind-up or reportorial phase. The presumption is that the institute management will develop a plan to move beyond federal co-investments sometime beginning in Year 3.

A point often overlooked is the impetus of an industry to collaborate. SEMATECH succeeded in no small way because there were established industry players with substantial corporate resources - circa 1994 this included Intel, National Semiconductor and others – and for whom IC manufacturing was the purpose of their existence. Also, U.S.–based multi-national firms, such as AT&T and IBM, had significant interest in internal IC manufacturing capability. Finally, a robust, domestic supply chain could be called on to participate. If the purpose of federal R&D investments in NNMI is to stimulate new industries, then the up-front investment may need to be proportionally higher than re-building or strengthening an existing U.S. industry.

Sustaining the institute will require multiple elements, including on-going recruitment, a viable dues structure, and provision of valued business services.

It's obvious that institute contributions to U.S. national security and competitiveness are desirable. For that reason, FlexTech encourages strong links between the institute and the sponsoring federal agency, e.g., DOD or DOE. To the extent permitted, the institute should help advance the agency's mission and R&D objectives. Operationally, federal program managers assigned to participate in/oversee an institute should be selected using prior performance as criteria: it is vital to assign top-level, results-oriented managers to a private/public enterprise. Finally, having qualified, technical personnel as institute assignees from federal agencies is one method that is under-used, but could foster better relationships between industry and government.

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