

Strengthening Collaborations: An Industrial View

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Industrial Accelerator Collaborative Experience

- 45 year career working as an accelerator physicist, with the last 34 years on the industrial side of the “collaborations”.
- Numerous “collaborations” with universities, laboratories, government agencies and large companies on SBIRs, CRADAs, tech transfers, and as a contactor and turn-key vendor.
 - Labs – LANL, FNAL, BNL, ANL, LLNL, LBNL, ORNL, SNL, INEL, DESY, ENEA
 - Universities – MIT, Caltech, UCSD, ISU, UCLA
 - Large companies – Boeing, MDAC, Lockheed, Grumman, L3 Communications, Hitachi, Mitsubishi, and several other medical accelerator companies
 - SBIRs – DOE, DOD, NIH, DOT, NSF
- Remarks represent my past experience with “the good, the bad & the ugly”, as well as input from current U.S. accelerator company CEOs.
- Mostly apply to U.S. – European & Asian views presented by previous speakers and both have government support for accelerator industry.

The Beam Business



- More than 70 commercial accelerator vendors worldwide, with about 30 in the U.S.
- Others primarily in Europe and Japan, but increasing in China, Russia, Korea and India



Mix of U.S. accelerator companies

- Mature manufacturing – R&D collaborations
- Emerging manufacturing – SBIR & contract mfg.
- Small R&D – mainly SBIR work
- Contract manufacturing – mainly build-to-print
- Foreign-owned – mainly turn-key vendors or contract manufacturing



Collaborations in Accelerator Technology

- Types of partnerships
 - Research partners – true joint development (e.g., DOE CRADA)
 - Sub-contractor – usually R&D or build to specification
 - Tech Transfer – licensing agreements
 - Vendor – contracts for turn-key systems or components
- Industrial partners – (U.S. examples)
 - University departments or labs
 - Government agencies – DOD & DHS
 - Government labs – National labs
 - Large companies – defense contractors
- Industrial partner motivation
 - Universities & DOE labs – usually looking for lowest-cost solution for one-time project or have IP and are seeking licensing opportunities.
 - Government agencies – looking for development partners that can become long-term vendors on new programs.
 - SBIR program – mostly programmatic R&D that benefits both parties.

Industry's View of Accelerator Technology Collaborations

- Most have been successful and very beneficial for many smaller accelerator companies.
- The most successful collaborations are based on “person-to-person” relationships formed before or during the work.
- Government labs – Reduced funding has resulted in labs seeking work that could be done by industry; has also resulted in staff leaving to start new companies.
- U.S. companies – Want access to new technology at “reasonable” cost, especially startup companies.
- SBIR program – Highly successful program for starting up high technology companies, but “commercialization” is harsh for accelerator companies.
- Life is “tough” as a DOE “partner” but good as a DOD partner.

Suggested improvements in the U.S.

- Better understanding of type of “collaboration” by all parties and more emphasis on relationship building.
- Government lab procurements – offer some preference to U.S. suppliers, as is the case in other countries.
- CRADAs and WFOs – need better mutual financial and technical reporting and “standard” agreements for all laboratories.
- SBIR – Agencies need better understanding that multiple awards needed to develop final accelerator systems for commercial sale.
- Tech transfer – need better control of “reduction to practice” of the IP offered for license (or better “caveat emptor” warnings).
- Better understanding of the technology development cycle.

Crossing the Technology Chasms

- Researchers are trying to bridge the first gap to get their inventions into the commercial sector.
- Entrepreneurs are trying to bridge the second gap – it stands between them and a successful business. “Early adopters” represent a small percentage of customers; in order to grow, the business must cross the “Valley of “Death”.

