Enhancing National Laboratory Partnership and Commercialization Opportunities

National Academies GUIRR

Diane Palmintera
President, Innovation Associates
dpalmintera@innovationassoc.com
www.InnovationAssociates.us

Based on work sponsored by Argonne National Laboratory, U.S. Department of Energy

Statements presented here are solely those of the presenter.

www.InnovationAssociates.us
DOE National Labs – An Innovation Force

- 17 DOE national labs, all but one are managed by private or non-profit organizations (GoCos).

- More than $11 billion/yr. budget, and employing 55,000 researchers and staff; they are a major force for U.S. tech discovery and innovation.

- Too few technologies are commercialized.

- Several reasons and barriers involved in commercialization.
Commercialization Issues

- STPI, GAO, Brookings, ITIF and others have identified issues and barriers. IA and ITIF with the House Tech Transfer Task Force held briefings. SEAB and CRENEL reports outline barriers and successes.

- National labs are not universities and while we can adapt some acceleration methods, benchmarking and expectations should be put into context.

- Major differences among DOE offices – EERE and OS, for example, have different missions and priorities.
Barriers to Commercialization

- DOE over-centralization
- Inconsistency and mixed messages regarding the importance of technology transfer, and what is permitted
- Aversion to risk
- Lack of flexibility
- Lack of researcher commercialization knowledge, capacity and incentives
- Underfunded support for technology transfer and commercialization
Overcoming Commercialization Barriers: DOE Responses

1) DOE Office of Tech Transitions ramping up; first Strategic Plan (Nov. 2016)
2) EERE and Advanced Manufacturing Office support for several innovative programs including Cyclotron Road
3) Lab-Corp
4) Small Business Vouchers
5) Agreement for Commercializing Technology (ACT)
6) Fast Track CRADAs
Innovative Programs at National Labs

- CalCharge and VOLTA -- Linking corporate members to national laboratory R&D
- Cyclotron Road, Chain Reaction Innovation and Innovation Crossroads -- Accelerating entrepreneurial innovations through laboratory partnerships
- New Mexico Consortium – Leveraging university-laboratory collaboration
Innovative Programs at National Labs (cont.’d)

- ORNL’s Manufacturing Demonstration Facility – Promoting industry and university partnerships for advanced manufacturing
- NREL’s Innovation Incubator (IN2) – Demonstrating technologies through private sector partnerships
Innovative Programs at National Labs (cont.’d)

- PNNL’s VOLTTRON related initiatives
- Sandia’s (future) Center for Collaboration and Commercialization (C3)
**CalCharge**

- In 2012, Berkeley Lab and the California Clean Energy Fund (CalCEF) partnered to create CalCharge as a public-private partnership.

- Focused on commercializing California’s battery and energy storage technology companies.

- Master Services Agreement (an umbrella CRADA) with Berkeley Lab that permits CalCharge members access to Berkeley Lab without negotiating individual contracts.
CalCharge (cont.’d)

- Master services agreement now with 3 labs: Berkeley Lab, LLNL and SLAC.

- To date, 8 companies have conducted 13 CRADAs at 2 national labs. Currently, 4 active projects.

- 28 members; 10 of which are small; two universities (SJSU and UCSD); multi-nat. corps.; and a few organizations.
CalCharge (cont.’d)

- CalCharge is an LLC, wholly owned by CALCEF.

- Approaching self-sufficiency through membership dues and CALCEF administrative support.

- CalCharge is a model that is being replicated by Argonne (VOLTA) and is being considered by other labs.
VOLTA

- VOLTA Energy Technologies LLC is a spin-off of Argonne National Lab.

- Started 2016 by Jeff Chamberlain, on entrepreneurial leave from Argonne. Former Director of Argonne Collaborative Center for Energy Storage Science.

- Provides bridge between private sector, Argonne and other labs and universities, in area of energy storage.

- Will work closely with energy-related public utilities.
Cyclotron Road

- Launched by Berkeley Lab in July 2014 as a pilot and supported later by EERE, Advanced Mfg. Office

- Competitively selects national cohort of innovators with pre-competitive research to develop and commercialize clean energy technologies.

- Embeds them in Berkeley Lab, providing a home and two years support including living stipend, access to Berkeley Lab facilities, expertise, business mentoring, and connections to investors.
Cyclotron Road (cont.’d)

- Innovators must form legal entity prior to entering program. Specific short form CRADA developed for program.

- Innovators retain IP that they bring to program; IP developed jointly with Lab researchers is shared with option to license.

- Innovators are expected to have prototype or funding to complete prototype at end of two years.
Cyclotron Road (cont.’d)

- Tremendous response: 400+ applicants; last call from 28 states.

- By Dec. 2016, two cohorts of six teams (one-two innovators/team); first cohort will graduate in 2017; third call announced in Oct.

- Activation Energy developed as a non-profit by external consultant to provide Cyclotron Road with business and financial mentors and advisors.
Cyclotron Road (cont.’d)

- Fills a gap in the R&D process. An embedded, applied R&D program (Lab-Embedded Entrepreneurship Program) with commercialization goals.

- A win-win: Entrepreneur—advances and adds value to ideas, gives credibility with investors; Lab—brings fresh ideas and perspective; pathway to market.

- Early demonstrated success: attracted $10 million in federal and state grants, additional $5 million in private sector funding.
Cyclotron Road (cont.’d)

- In 2016, Cyclotron Road has been adapted by two laboratories:
  - Argonne National Lab: Chain Reaction Innovations
  - Oak Ridge National Lab: Innovation Crossroads
Chain Reaction Innovations

- 100 applicants in first round.
- UC’s Polksy Center likely will help entrepreneurs develop business plans and provide mentoring. The Center’s innovation fund could be applied later for commercialization funding as well as other investors.
- Some scientists will be developing SBIRs with the innovators.
New Mexico Consortium

- A non-profit organization established by 3 New Mexico universities: UNM, NMSU, and NM Tech; fostered by and affiliated with Los Alamos Nat. Lab.

- Created to facilitate cross-institutional and interdisciplinary research, and outreach to private sector with goal of enhancing econ. dev. outcomes.

- NMC Campus consists of 2 buildings: a Biological Laboratory; LANL subcontracts for access to Lab., and Los Alamos “Research Park” owned by a comm. organization and leased to Lab and others.
New Mexico Consortium (cont.’d)

- NMC gives “academic standing” to researchers, allowing them to receive grants from a variety of federal agencies and philanthropic foundations.

- Staffing agreements between NMC and LANL can be structured as “outside activity” (two-paycheck model) or a “joint appointment” (single paycheck model).

- “Joint Appointments” are used for interactions with NMC and academic partners; researchers remain LANL employees, are “lent” to NMC, and reimbursed for specific projects. Based on ORNL model.
New Mexico Consortium (cont.’d)

- Conducts $10 million research annually. Grants from NSF, DARPA, NIH, USDA and other agencies; about $2.5 million comes from philanthropic foundations.

- LANL provides base funding from overhead for NMC admin., education, workshops, internships, etc.

- The research funding pays for about 150 full-time and part-time researchers.
New Mexico Consortium (cont.’d)

- Advantage for the Lab is that NMC is non-profit organization “outside the Lab fence”, facilitating a broader range and more applied R&D than would be possible within the Lab.

- It leverages and extends the Lab’s research, providing greater flexibility that facilitates academic, private sector and philanthropic partnerships.
ORNL’s Manufacturing Demonstration Facility

- DOE EERE’s Advanced Manufacturing Office (AMO) established MDF to develop and accelerate advanced manufacturing innovations to rapidly deploy in marketplace.

- Composed of a main facility located on the ORNL campus, and two nearby offsite locations.

- MDF received national acclaim for its work private sector in producing a 3-D printed automobile. It is now working with Local Motors to produce a 3-D car, and working with supply chain on production.
ORNL’s MDF (cont.’d)

- MDF at ORNL directly involves industry on almost all of its R&D, and industry representatives work alongside ORNL researchers. Industry funding at times has exceeded that provided by DOE.

- An EERE AMO special project provides MDF with $2 million per year for three years. Involves open calls and operates in two phases that is matched by industry funds. Non-negotiable CRADA.
ORNL’s MDF (cont.’d)

- “Research for Additive Manufacturing Program - University Partnerships” (RAMP-UP): In 2015, EERE’s AMO developed a $1.5 million program involving 10 teams of a university professor and 1-2 students to engage in additive manufacturing research at MDF.

- MDF participates in two Manufacturing USAs (formerly NMIIIs): American Makes and the Institute for Advanced Composites Manufacturing Innovation (IACMI).
ORNL’s MDF (cont.’d)

- IACMI is a public-private partnership developing low-cost, high-speed manufacturing technologies promoting fiber-reinforced polymer composites.

- Synergistic relationship between IACMI and MDF.
NREL’s Innovation Incubator (IN2)

- IN2 is a joint NREL-Wells Fargo program combining external entrepreneurial talent with NREL’s R&D to develop, test and apply clean tech innovations to commercial buildings.

- Wells Fargo funded NREL $10 million/5 years. Entrepreneurial companies receive up to $250,000 to work with experts in research and testing at NREL, business development at universities and regional accelerators, and coaching/mentorship from Wells Fargo.
NREL’s IN2 (cont.’d)

- In Dec. 2016 IN2 was in its third round.

- This program could be duplicated for other types of R&D.
PNNL’s VOLTTRON Initiatives

- VOLTTRON user community: PNNL “office hours” to answer questions and help users.

- 3 user meetings to date including 16 universities, 5 national labs and companies building solutions.

- DOE Building Technology Office (BTO) in FY16 provided “innovator grants” to universities, funding grad students; researchers from PNNL and ORNL mentored students.
PNNL’s VOLTTRON Initiatives (cont.’d)

- BTO funded PNNL in 2016 to run “connected building challenge”. Six teams of grad students and others presented solutions they developed before judging panel of PNNL and major corps.; goal to encourage entrepreneurial outcomes.

- In 2016 PNNL partnered with WSU and UW to develop and test campus-scale control strategies. In 2017 partnership expanding to Ohio univs – CWRU and U. Toledo.
Sandia’s Future Center for Collaboration and Commercialization (C3)

- C3 2 nodes: locations in downtown Albuquerque and at the Sandia Science and Tech Park.

- Albuquerque C3 is an accelerator that will co-locate tech transfer arms of UNM and AF Research Lab, and some of Sandia’s T2.

- Will focus on commercialization through startups and entrepreneurs and help build regional entrepreneurial ecosystem.
Sandia’s Future (C3) (cont.’d)

- Will facilitate linkages with NM Tech Council, software and IT business incubators, investors and others.

- Node 2 at Sandia Science & Tech Park (SSTP) is intended as one of the “front doors” to help corporations connect with SNL.

- Node 1 (Albuquerque) expected to be operational in FY17; Node 2 (SSTP) in FY18.
University and Private Practices with Potential Application to National Labs

- MIT’s Industry Liaison Program
- University accelerators
- Fraunhofer style practices
- Coulter, Deshpande and other philanthropic programs aimed at maturing/accelerating R&D to market ready (increasing TRLs)
Continuing Challenges and Opportunities

- Culture change within the Labs
- Aligning, leveraging and connecting programs within national labs
- Adapting and connecting programs between labs
- Integrating national labs as part of regional and national innovation and entrepreneurial ecosystems
Call for a National Office of Innovation

Joe Allen and I co-chaired the White House Lab-to-Market Inter-Agency Summit that gathered national experts in commercialization. Summit recommendations called for:

Creation of a High-Level Office of Innovation and Federal Technology Partnerships.
Call for a National Office of Innovation (cont.’d)

This Office would:

- Leverage cross-agency synergies and increase efficiencies regarding agency R&D and commercialization.

- Strengthen public-private partnerships, promoting increased dialogue with the private sector on current and emerging markets and appropriate alignment with federal R&D.
Call for a National Office of Innovation (cont.’d)

- Create innovative public-private partnership initiatives and investment vehicles to accelerate commercialization.

- Assess value of innovation efforts and promote proven practices.
Enhancing National Laboratory Partnership and Commercialization Opportunities

Sponsored by Argonne National Laboratory, U.S. Department of Energy
Other IA reports relevant to this discussion:

**Technology Transfer & Commercialization Partnerships:** Sponsored by the National Science Foundation, focuses on emerging university institutions.

**Accelerating Economic Development through University Technology Transfer:** Sponsored by the (former) Connecticut Governor’s Office, focuses on U.S. top performing institutions in technology transfer.
Diane Palmintera  
President, Innovation Associates  
dpalmintera@innovationassoc.com  
+1.703.925.9402 (o)  

www.InnovationAssociates.us