Concept for a Low-background Materials Consortium

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NEED: A community driven low-background materials and assay capability for next generation experiments (dark matter, $0\nu\beta\beta$ decay, others)

- A suite of measurement capabilities
  - Radiometric assays
    - γ-ray assay, β counters, α spectroscopy
    - Radon emanation, Neutron activation analysis (NAA)
  - Mass spectroscopy methods
    - Inductively Coupled Plasma-MS, Laser Ablation-MS, Glow Discharge-MS
- A suite of characterized materials
  - Expectations for commercial (or "selected commercial") materials:
    - Copper, steel, PTFE, etc.
  - An "Evaluated database of low-background materials" or a "PDG of low-background materials methods"
    - Like the ILIAS and SNOLAB databases with evaluation; AARM's work
- Production methods for a short list of key materials
  - Electroformed copper, others?

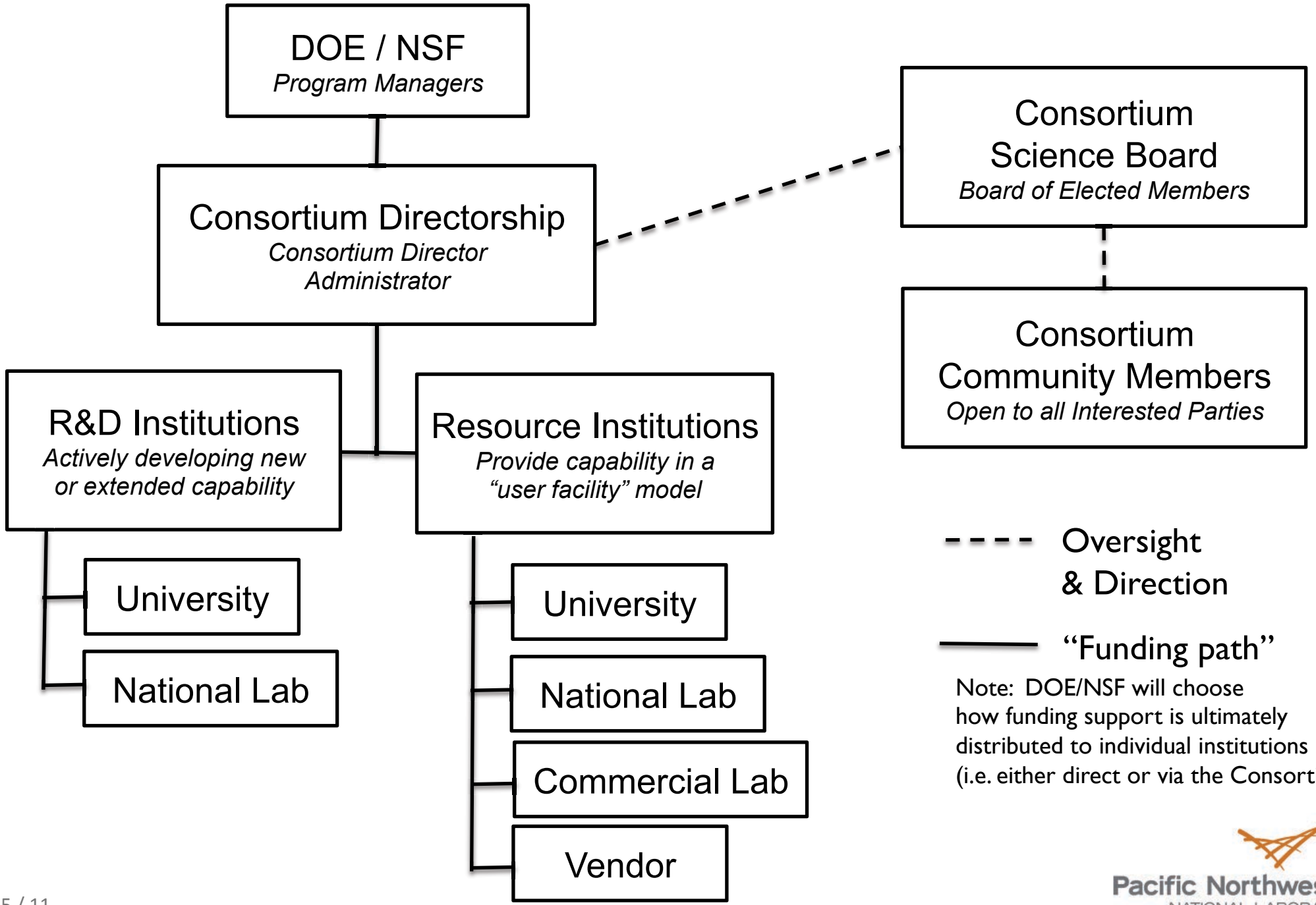
CHALLENGE: Distributed expertise

- Expertise resides across many institutions
- Experiments ‘re-invent’ the low-background material search
  - Either out of lack of knowledge of other institutions
  - Or there is no readily available way to access those capabilities
- R&D associated with ‘re-invention’ inefficient and potentially ineffective
- An umbrella organization could act as a clearing house for a capability distributed across the community

GOAL: Organize a community guided suite of low-background material assay and/or production techniques

- An organization focused on identifying and organizing available low-background materials knowledge and techniques
- Through MOUs and Agreements, provide a ready structure for experiments to obtain the desired material assay during the R&D phase of any experimental effort
- The Consortium will reduce or eliminate the project's risk associated with:
  - "Can the material background requirement be satisfied?"
- Large-scale material assay and/or production during experiment construction supported by the experiment

A Possible Structural Organization: *The Consortium*



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ROLE: Consortium Director

- Located at University or National Lab
- Responsible to the DOE/NSF Program Managers
- Provides organization *for* oversight of the Consortium
  - Organizes the activities of the Science Board (meetings, reviews, etc.)
  - Runs elections to the Science Board
  - Maintains the lists of Community Members in the Consortium
  - Receives proposals for Science Board review
- Has no individual funding authority within the Consortium
- Executes or communicates the decisions of the Science Board

ROLE: Science Board

- Elected from the Community Members
- Sets direction of the Consortium activities via:
  - Review and selection of proposals from the Community
  - Prepares proposals to DOE/NSF for continuation of the Consortium

ROLE: Community Members

- Potential users
- Anyone interested in low-background materials development
- Submit proposals:
  - Requests for assays during R&D phases of experimental development
  - Requests for new or expanded capability:
    - New assay techniques
    - Better assay techniques
    - Pure materials production methods
- Identify Institutions with capability (either R&D or Resource)

ROLE: R&D Institutions

- Actively engaged in an R&D effort to develop new or improved low-background materials assay or production
  - Examples:
    - Developing more sensitive U/Th mass spec techniques
    - Building a new ultra-low-background γ-ray assay counter
    - Plastic purification and thermoforming
- Funded as a Task with the Consortium
  (either directly by DOE/NSF or through the Consortium; DOE/NSF shall choose funding structure)
- Results available to all Consortium members
  - Individuals/institutions performing R&D publish on methods and results

ROLE: Resource Institutions

- Have resident capability – Examples:
  - Standard “easy” ICP-MS for ppm levels
  - Routine γ-assay
  - Routine NAA methods
- Funded only on a “per unit” basis
- Maintains connection with Consortium to rapidly receive and respond to requests for measurements
  - For example, pre-define cost tables for measurements, services, etc.

Proposals to the Consortium

- Any individual may submit a proposal to the Consortium
- Types of proposals could include (but not limited to):
  - Requests for routine assays with specified sensitivity levels
  - Request for new or species-specific assay measurements
  - Request for lines of R&D development for low-background materials
    - Performed either at a current “R&D Institution” or for initiating a new R&D Institution within the Consortium

Thank You

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