



LightMAT: A Multi-Lab Consortium for Accelerated Lightweight Materials Development



U.S. DEPARTMENT OF
ENERGY

National Laboratory
Impact Initiative



EMN Energy
Materials
Network

February 9, 2017

Agenda

- 8:30 Registration
- 9:00 Introductions
- 9:30 Welcome & Meeting Objectives
- 9:45 EMN / LightMAT Perspective & Vision
- 10:15 Overview of LightMAT & Capability Network
- 11:00 Networking break
- 11:15 Contracting Agreements & Technology Transfer
- 12:00 Lunch: LightMAT Capability Highlights
- 1:00 DataHUB Development & Vision
- 1:45 Shaping LightMAT Framework & Critical Capabilities
- 2:00 Opportunities to Leverage LightMAT
- 2:30 Questions & Answer / Open Discussion
- 3:30 Closing Comments / Adjourn

Meeting Objectives

1. Industry briefing of LightMAT and the capability network
2. Solicit feedback about LightMAT structure and value proposition
3. Highlight opportunities to leverage LightMAT resources

Interactive Feedback

- › Poll Everywhere: Real-time audience participation
- › Web browser: pollev.com/LightMAT
- › Text: lightmat to 223-33
- › Hotel WiFi: Crown Plaza Detroit Downtown
password: CPDetroit

Outline

- Objectives of LightMAT
 - What is LightMAT
 - Who are the members
 - How is it funded
- Four Pillars of LightMat
 - Capabilities Network
 - Clear Point of Engagement
 - Data and Tool Collaboration
 - Streamlined Access
- How to Engage and Leverage LightMAT
 - Funding mechanisms
 - Web portal access
 - Contact information
- Questions and Comments

LightMAT Purpose



Energy Materials Network

U.S. Department of Energy

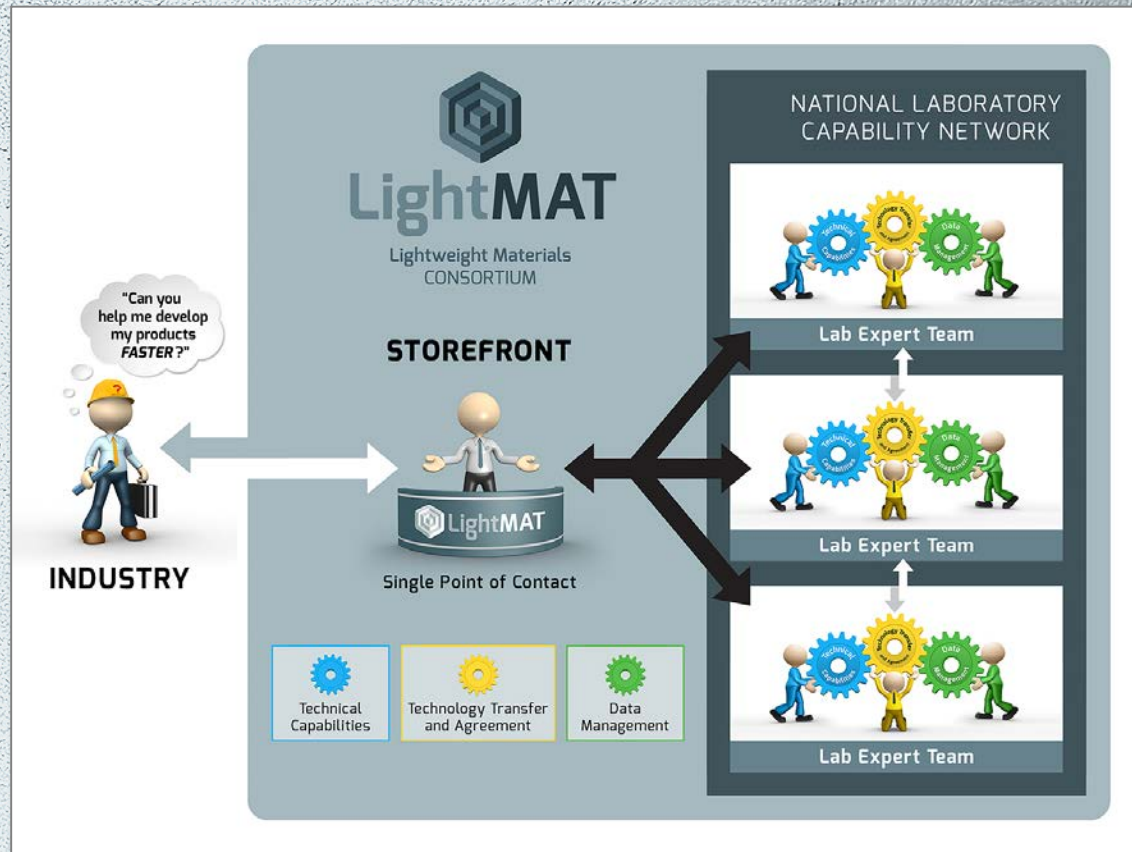
Established as part of the Energy Materials Network, under the U.S. Department of Energy's Clean Energy Manufacturing Initiative, the mission of the Lightweight Materials National Lab Consortium is to create an enduring national lab-based network, enabling industry to utilize the national labs' unique capabilities related to lightweight materials.

Conduct workshops, industry outreach, and network assessments to identify capability gaps, accessibility gaps, and necessary upgrades

LightMAT – Lightweight Materials Consortium

Program Objectives:

- Facilitate connection between industry needs & National Lab capabilities
- Create an enduring, coordinated national capability network
- Accelerate lightweight materials development & deployment in the U.S.



Who is LightMAT

National Laboratory Capability Network



LightMAT Funding Mechanisms

› Funding Opportunity Announcement (FOA)

- FY16 VTO DE-FOA-0001384
- FY17 VTO DE-FOA-0001629
- Flexibility to allow other federal programs/entities to co-sponsor LightMAT

› DOE Direct Funding

- VTO provides guidance on the characteristics of appropriate direct funded projects
- Industry users approach LightMAT and develop project plan with the concierge
- Pending HQ approval, LightMAT funds support activity at the National Labs while at least 50% cost-share supports industry activity

› Industry (with multiple labs)

Four Pillars of LightMat

➤ **WORLD CLASS MATERIALS CAPABILITY NETWORK**

- Create and manage a resource network comprised of capabilities from across the DOE National Laboratory system.

➤ **CLEAR POINT OF ENGAGEMENT**

- Provide a single point-of-contact and concierge to connect industry research teams engaged in lightweight materials R&D to the resource network.

➤ **DATA AND TOOL COLLABORATION FRAMEWORK**

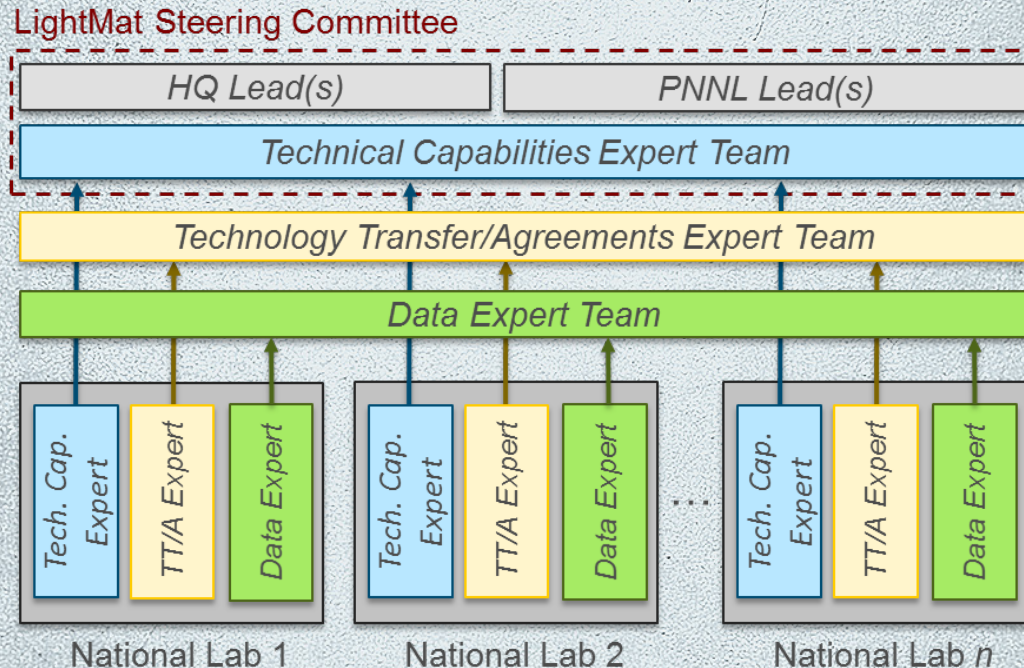
- Capture, share, and leverage expertise, data, and tools developed for application across the network and partners. Established as a data repository to aid in accelerated learning and development through data-driven analytics.

➤ **STREAMLINED ACCESS**

- Facilitate rapid completion of agreements for external partners, such as intellectual property (IP) and non-disclosure agreements, and aggressively pursue approaches to reduce non-technical burden to partners.

World Class Materials Network

- Each participating National Lab forms a three person “Lab Expert Team”
 - Technical Capabilities Expert
 - Tech Transfer and Agreements Expert
 - Data Expert
- These teams matrix across the labs to provide quick response to partner needs

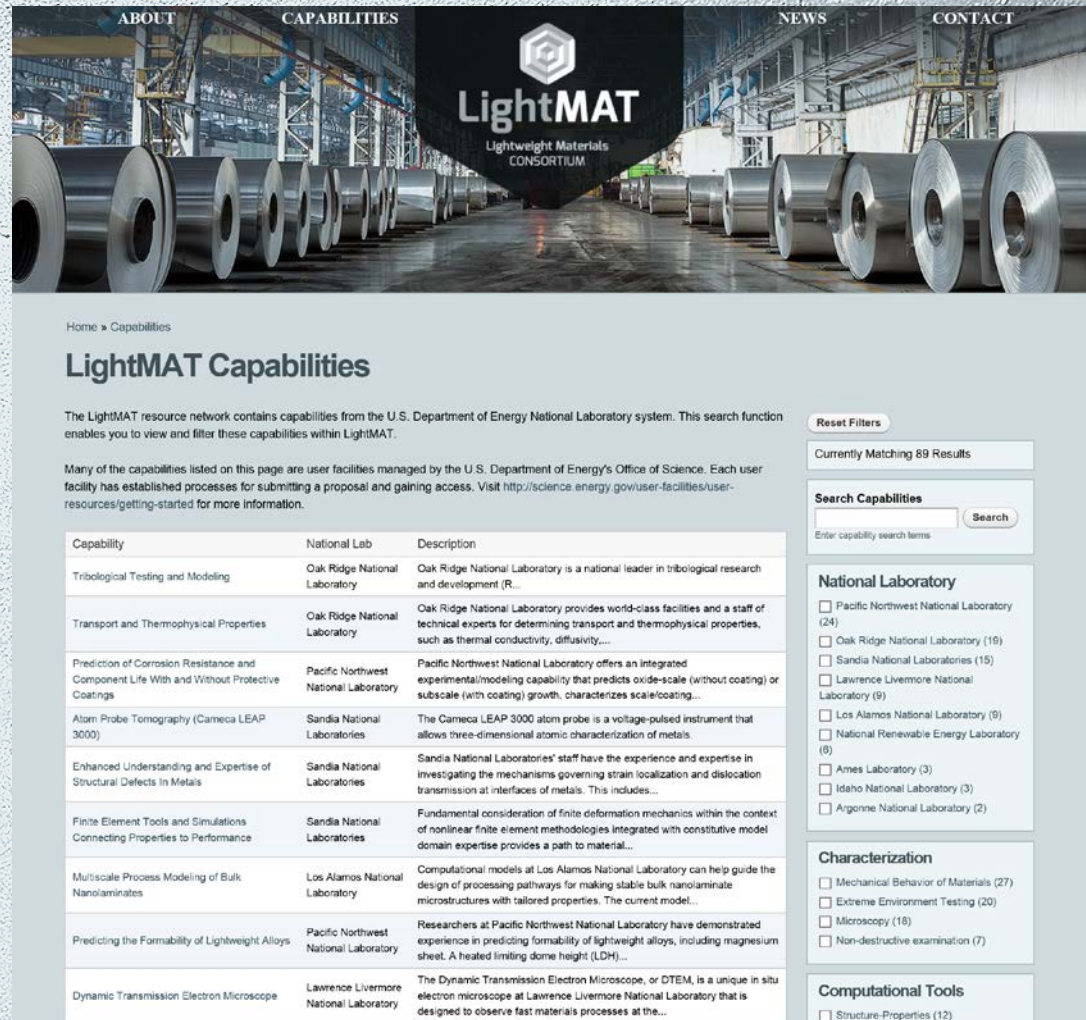


World Class Materials Network

- Initial capability catalog listing of lightweight metals and composites in place at:

<https://lightmat.org>

- Network is continuously expanded to support a broader selection of LW materials capabilities



Home » Capabilities

LightMAT Capabilities

The LightMAT resource network contains capabilities from the U.S. Department of Energy National Laboratory system. This search function enables you to view and filter these capabilities within LightMAT.

Many of the capabilities listed on this page are user facilities managed by the U.S. Department of Energy's Office of Science. Each user facility has established processes for submitting a proposal and gaining access. Visit <http://science.energy.gov/user-facilities/user-resources/getting-started> for more information.

Capability	National Lab	Description
Tribological Testing and Modeling	Oak Ridge National Laboratory	Oak Ridge National Laboratory is a national leader in tribological research and development (R...
Transport and Thermophysical Properties	Oak Ridge National Laboratory	Oak Ridge National Laboratory provides world-class facilities and a staff of technical experts for determining transport and thermophysical properties, such as thermal conductivity, diffusivity,...
Prediction of Corrosion Resistance and Component Life With and Without Protective Coatings	Pacific Northwest National Laboratory	Pacific Northwest National Laboratory offers an integrated experimental/modeling capability that predicts oxide-scale (without coating) or subscale (with coating) growth, characterizes scale/coating...
Atom Probe Tomography (Cameca LEAP 3000)	Sandia National Laboratories	The Cameca LEAP 3000 atom probe is a voltage-pulsed instrument that allows three-dimensional atomic characterization of metals
Enhanced Understanding and Expertise of Structural Defects In Metals	Sandia National Laboratories	Sandia National Laboratories' staff have the experience and expertise in investigating the mechanisms governing strain localization and dislocation transmission at interfaces of metals. This includes...
Finite Element Tools and Simulations Connecting Properties to Performance	Sandia National Laboratories	Fundamental consideration of finite deformation mechanics within the context of nonlinear finite element methodologies integrated with constitutive model domain expertise provides a path to material...
Multiscale Process Modeling of Bulk Nanolaminates	Los Alamos National Laboratory	Computational models at Los Alamos National Laboratory can help guide the design of processing pathways for making stable bulk nanolaminate microstructures with tailored properties. The current model...
Predicting the Formability of Lightweight Alloys	Pacific Northwest National Laboratory	Researchers at Pacific Northwest National Laboratory have demonstrated experience in predicting formability of lightweight alloys, including magnesium sheet. A heated limiting dome height (LDH)...
Dynamic Transmission Electron Microscope	Lawrence Livermore National Laboratory	The Dynamic Transmission Electron Microscope, or DTEM, is a unique in situ electron microscope at Lawrence Livermore National Laboratory that is designed to observe fast materials processes at the...

Reset Filters

Currently Matching 89 Results

Search Capabilities

Enter capability search terms

National Laboratory

- Pacific Northwest National Laboratory (24)
- Oak Ridge National Laboratory (19)
- Sandia National Laboratories (15)
- Lawrence Livermore National Laboratory (9)
- Los Alamos National Laboratory (9)
- National Renewable Energy Laboratory (8)
- Ames Laboratory (3)
- Idaho National Laboratory (3)
- Argonne National Laboratory (2)

Characterization

- Mechanical Behavior of Materials (27)
- Extreme Environment Testing (20)
- Microscopy (18)
- Non-destructive examination (7)

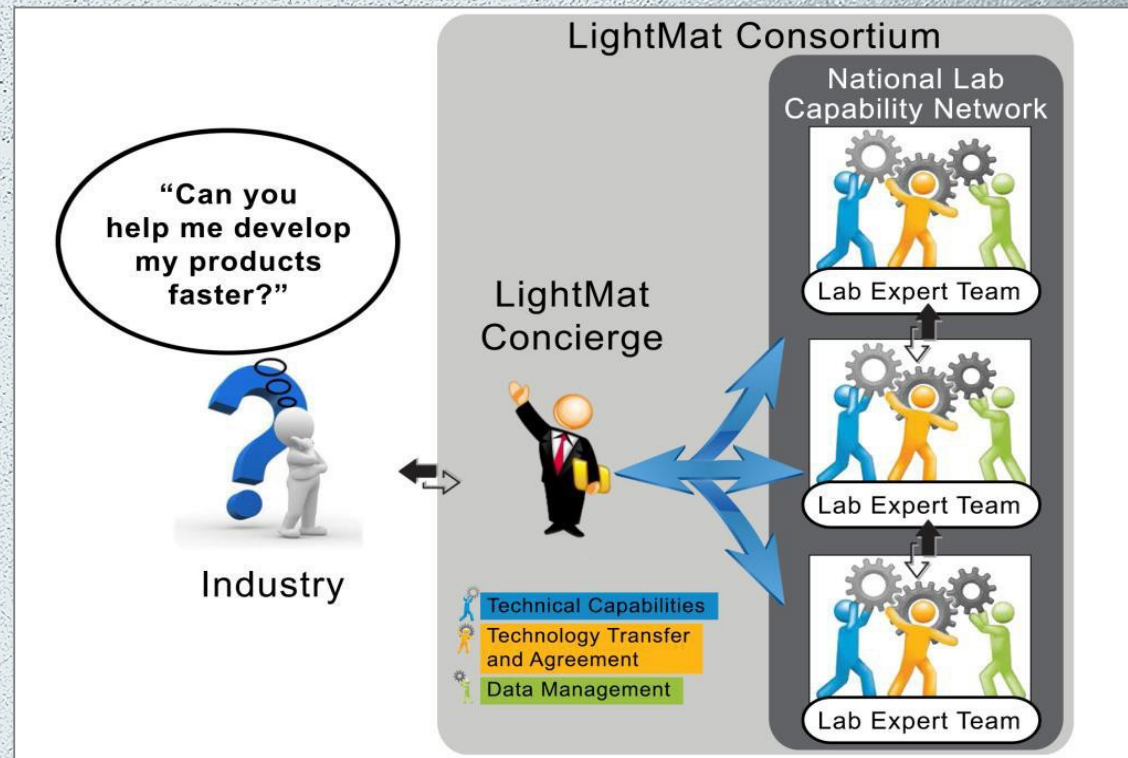
Computational Tools

- Structure-Properties (12)

Clear Point of Engagement

LightMAT Concierge:

- Match-making industry with resources across network
- Facilitate rapid contract agreements
- Coordinate data storage & analysis
- Conduct outreach activities
- Operate virtual portal as LightMAT storefront

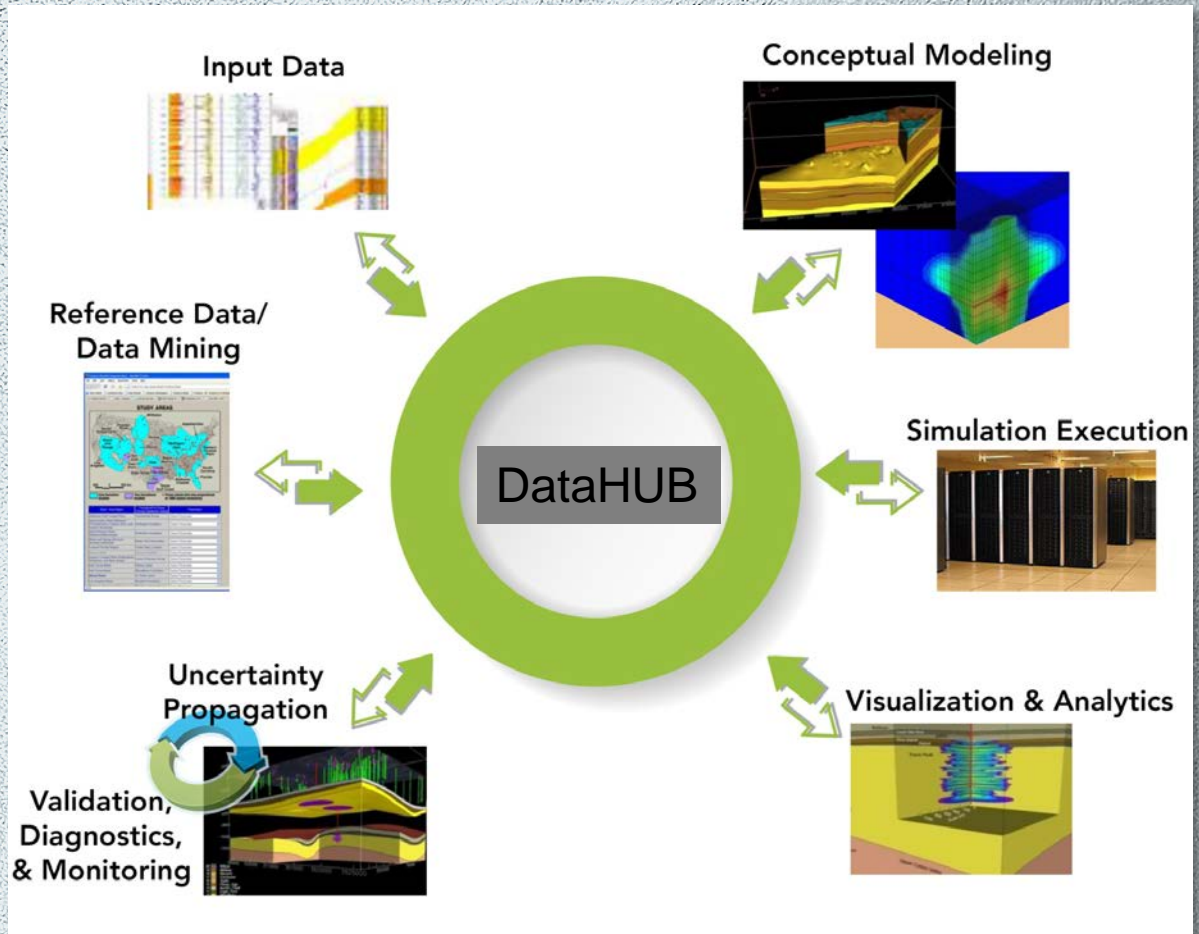


Data and Tool Collaboration

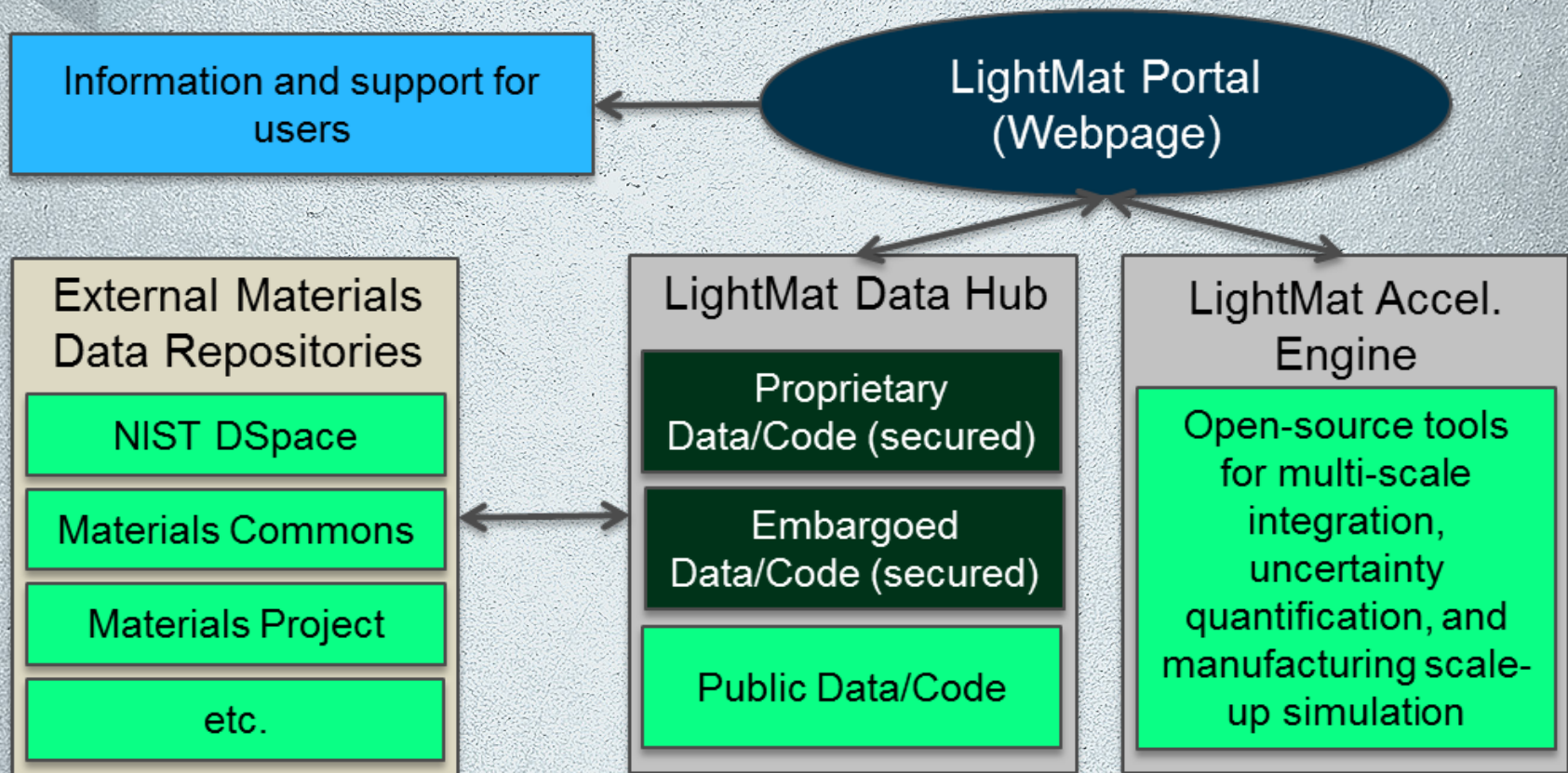
LightMAT
Portal

DataHUB

Acceleration
Engine



Capture and Leverage Data



Streamlined Access

Simplify agreement process to the greatest extent possible

- Maintain rapid response agreements
- Engage with strategic partnership projects
- Develop a single, pre-approved, mutual NDA between all consortium partners
- Use exploratory licenses whenever possible

Facilitate agreement process when complexity is unavoidable

**Intellectual
Property
Management**

NDA

Agreements

LightMAT Metrics

Success will depend on building strong partnerships

- Create new projects & annual opportunities
- Outreach and host workshops
- Streamline agreements with execution within 6-weeks
- Data gathering & dissemination



Direct Funded Project Purpose

To incentivize and catalyze the accelerated adoption of new lightweighting technologies by providing industry partners with direct access to the LightMAT network of resources

Industry identifies a specific, non-powertrain, application for an on-highway vehicle where an advanced material or manufacturing process would enable significant weight reduction.

Project Requirements

- Industry identified technical challenges & capability needs
- Duration: Less than or equal to 2-years
- LightMAT funds: Less than or equal to \$300,000 per project
 - Federal funding allocated to providing LightMAT resources only
- Industry cost share: Greater than or equal to 50%
- Qualifying scope: Lightweighting of the vehicle structures through materials or processing technologies

Note: Funding of selected projects dependent on available LightMAT budget

Application & Selection Process

1. Industry partner approaches LightMAT concierge
2. Industry develops project concept white paper
3. LightMAT reviews qualifications and scores criteria
4. DOE approval decision and authorizes funds
5. LightMAT notifies industry partner and initiates CRADA and NDA agreements
6. LightMAT distributes allocated funds
7. Partners begin work

Note: Projects are subject to DOE review and reporting requests

New LightMAT Opportunity

Open opportunity: February 9, 2017

Anticipated # of projects: 3-5 @ \$150k-\$300k each

White papers due: March 31, 2017

Selection decisions by: April 21, 2017

Projects kick-off: June 1, 2017

Note: project concept white paper template and criteria available at <http://LightMAT.org> or by contacting the LightMAT Concierge

Project Success Metrics

1. By accessing LightMAT resources, the industry team is able to dramatically accelerate (2x or greater) the development cycle to deployment, or dramatically improve the material or manufacturing process, when compared to a comparable project without access to LightMAT capabilities.
2. Following the project completion, the material or manufacturing process stands a significant chance of being moved into commercial production within 5-years

Note: The 5-year horizon ensures that LightMAT is not applied as a core technology development mechanism, but rather a way to address targeted challenges in industry in a fairly quick fashion.

Contact Information:

email:

contact@LightMAT.org

phone: (509)375-3822

web: <http://LightMAT.org>



ABOUT CAPABILITIES NEWS CONTACT

LightMAT

Lightweight Materials CONSORTIUM

LightMAT is a federal consortium providing industry with one-stop access to the lightweight materials capabilities and resources of the national laboratory network.

U.S. DEPARTMENT OF ENERGY **Energy Materials Network**
U.S. Department of Energy

Established as part of the Energy Materials Network, under the U.S. Department of Energy's National Laboratory Impact Initiative, the mission of the Lightweight Materials Consortium is to create an enduring capability network for the national labs enabling industry to utilize the unique capabilities related to lightweight metals within the national lab network.

CAPABILITIES

CHARACTERIZATION	COMPUTATIONAL TOOLS	PROCESSING/MANUFACTURING
Extreme Environment Testing Evaluation of materials in environmental, chemical, electrical and mechanical combined conditions	Data Tools Materials data mining, discovery, information management, and analysis tools	Fabrication & Synthesis Material development across scales from synthesis to scalable production
Mechanical Behavior of Materials Evaluation of mechanical performance across strain rates, surface conditions, and geometric constraints	Materials Processing Predictive simulation capabilities for deformation, joining, solidification	Joining Advanced joining development including multi-material, solid-state, fusion and fastening
Microscopy Visualization & characterization techniques ranging from advanced optical to x-ray and beam specific equipment	Process-Structure Mechanism based process to structure prediction	Shaping & Forming Evaluation of materials formability limitations, rate sensitivity, tool life, and effects of shaping
Non-destructive Examination Methodologies for evaluation of properties, processes, and materials without destructive testing	Structure-Properties Continuum or discrete prediction of effective properties	Thermo-mechanical Processing Development of heat treatments, thermo-mechanical processing, and microstructural modification techniques

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CONTACT LightMAT