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Sandia Wind Energy Dept 6121 Technology Roadmap - Where do we go from here?

Dave Minster

Manager, Dept 6121

dgminst@sandia.gov

505-284-3082

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SNL Wind Energy Dept Vision

Vision: The SNL Wind Energy Dept is the world's premiere R&D facility for all aspects of wind turbine blade and rotor research, development, test, evaluation and manufacturing

- **Objective #1: Meet or exceed all current customer needs and requirements**
- **Objective #2: Continue to develop and maintain a world class team of blade and rotor RDT&E experts**
- **Objective #3: Diversify and balance our funding portfolio to include more varied government and industry customers**

Wind Energy Goals

SNL core competencies match opportunities

- **Reduce the Levelized Cost of Wind Energy (LCOE)**
- **Wind Power Plant Optimization**
- **Advanced Components / High Risk Innovation**
- **DOE Advanced Manufacturing Initiatives**
- **Support DOD's Search for Affordable/Deployable RE**

Sandia's Wind Program

Projects

CREW Reliability Database

SWiFT Testing Facility

Grid Control & Modeling

Wake Measurement & Modeling

RADAR Impact Mitigation

Smart rotors controls

Composite Materials Database

Rotor PHM

Blade Reliability Collaborative

Rotor Performance & Innovation

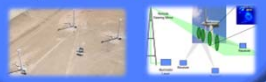
Large Offshore Rotor

National Rotor Testbed

Core Competencies

Reliability

Wind farm performance



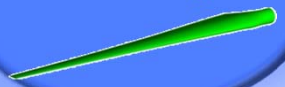
Innovative Energy Capture Technology

Wind plant Integration

Sensors and Actuation

Materials & Manufacturing

Innovative rotor design



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Example Projects

Scaled Wind Farm Technology Facility

- Wind farm underperformance presents a game-changing opportunity for reductions in LCOE
- SWiFT has been constructed to rapidly develop wind farm and advanced rotor technology
- Partners: Vestas & Texas Tech Univ

Continuous Reliability Enhancement for Wind Power Plants

- Proprietary data collection from US plants to assess fleet reliability
- SNL predictive analytics supports industry O&M progress and DOE national fleet risk assessment
- Partners: SPS, EDF, Shell, Xcel

Imaging LIDAR (laser wind sensor)

- For progress in wind, new wind farm new sensing technology is required
- Leverage broader SNL capabilities has led to a system x10^4 improved
- Partners: SNL 1118, 1515, 1532, 1830, 5444, 5712, 5717

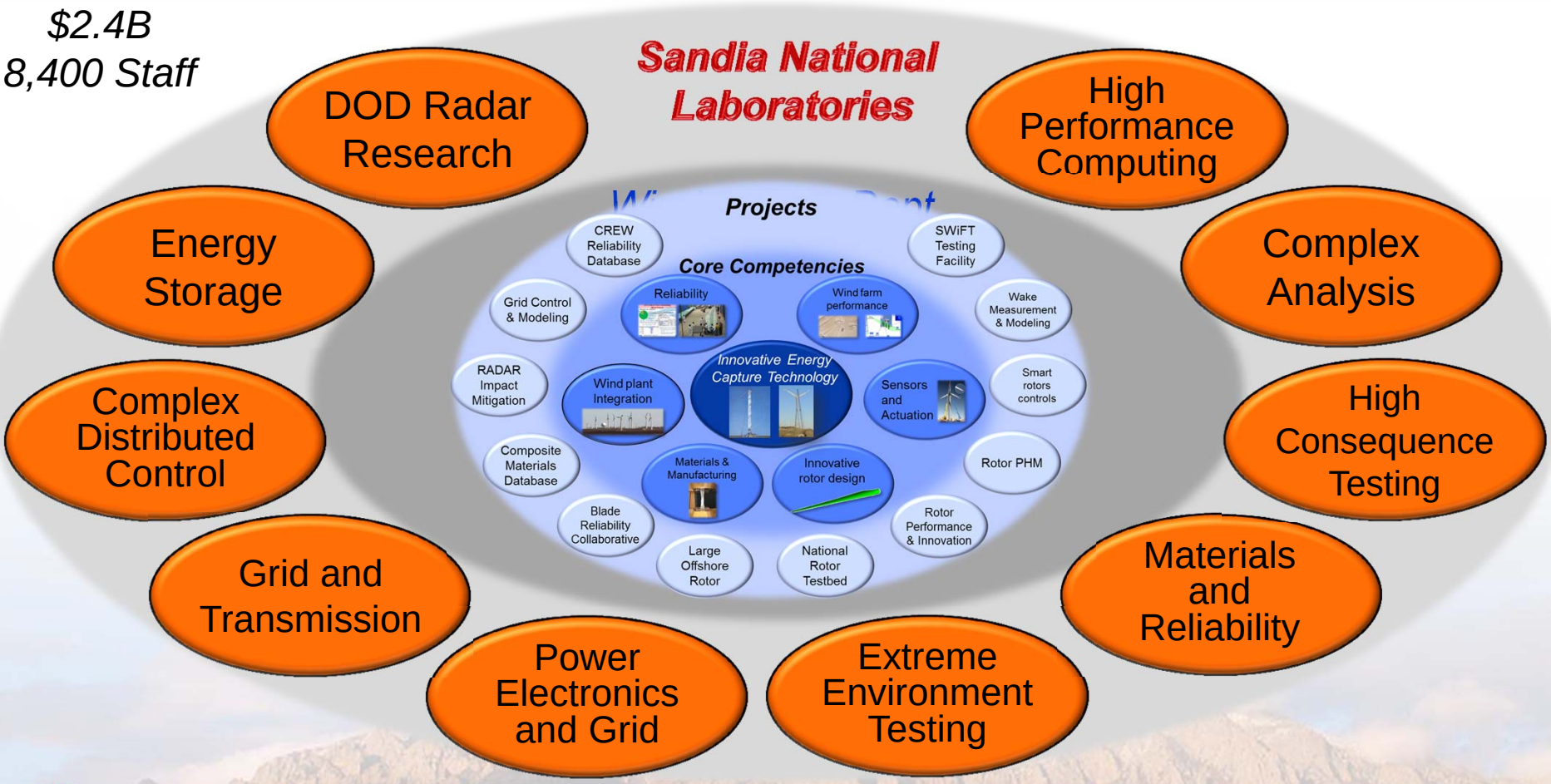
RADAR

- 10 GW of wind developments have been denied due to radar interaction
- SNL is co-leading testing of improved radars and radar-friendly rotors
- Partners: DOE, DOD, DHS, FAA, MIT-Lincoln Lab

Future SNL opportunities

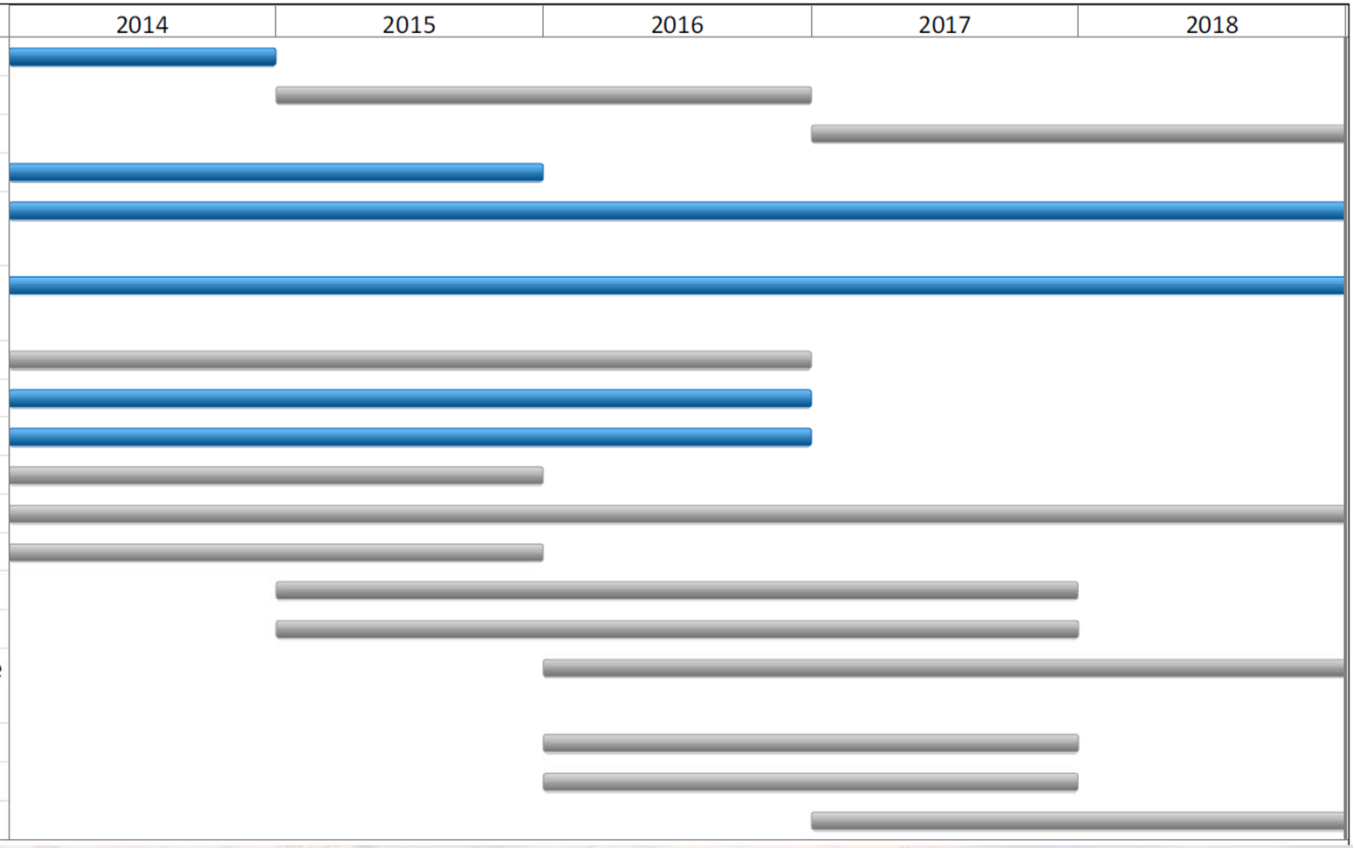
Leveraging SNL strength and a growing wind program

Sandia
$2.4B
8,400 Staff



Potential Sandia Roadmap

ID	Task Name
1	SWiFT Shake-Down
2	SWiFT Phase II Construction
3	SWiFT Phase III Construction
4	National Rotor Testbed
5	Windplant Performance and Improvement (CREW / TTU Radar)
6	SWiFT Wake Measurements and Public Dissemination
7	Smart Rotor II
8	Blade Reliability Collaborative
9	Vertical Axis Wind Turbine
10	Ultra Large Rotor
11	Wind Plant Controls
12	Radar Friendly Blade
13	Wind Farm Tailored Rotor
14	Quiet Rotor
15	High Performance High Mobility Turbine (DOE/DOD/DHS/FEMA)
16	Structural Health Monitoring Rotor
17	Land-Based Offshore Platform V27
18	Ultra Flexible Rotor



Anticipated

Proposed

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Thank You

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