



Research Spotlight Forum

SAND2019-6250PE

6.4.19 Quantum Information Sciences

2019 QUANTUM MISSION CAMPAIGN

PRESENTED BY:

Mike Descour,

Advanced Microsystems Group,

mrdesco@sandia.gov, (505) 844 9598

Sandia National Laboratories is a multi-mission laboratory managed and operated by National Technology and Engineering Solutions of Sandia LLC, a wholly owned subsidiary of Honeywell International Inc. for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.

SAND2019-xxxx



Georgia Institute
of Technology

THE UNIVERSITY OF
NEW MEXICO

ILLINOIS

NM
STATE
UNIVERSITY

PURDUE
UNIVERSITY

THE UNIVERSITY OF
TEXAS
AT AUSTIN

NEW MEXICO TECH
SCIENCE • ENGINEERING • RESEARCH UNIVERSITY

SAND2018-14303 D

WHAT IS A MISSION CAMPAIGN?

Sandia Perspective

- A Mission Campaign is a focused, **5-7 year** internal R&D funding vehicle
 - **Essential:** MC includes selected partnerships with external institutions
 - Research
 - Workforce development
- **MC Intent:** Accelerate progress from the **idea stage to program benefit** in a technical area whose theme is relevant to Sandia's missions.

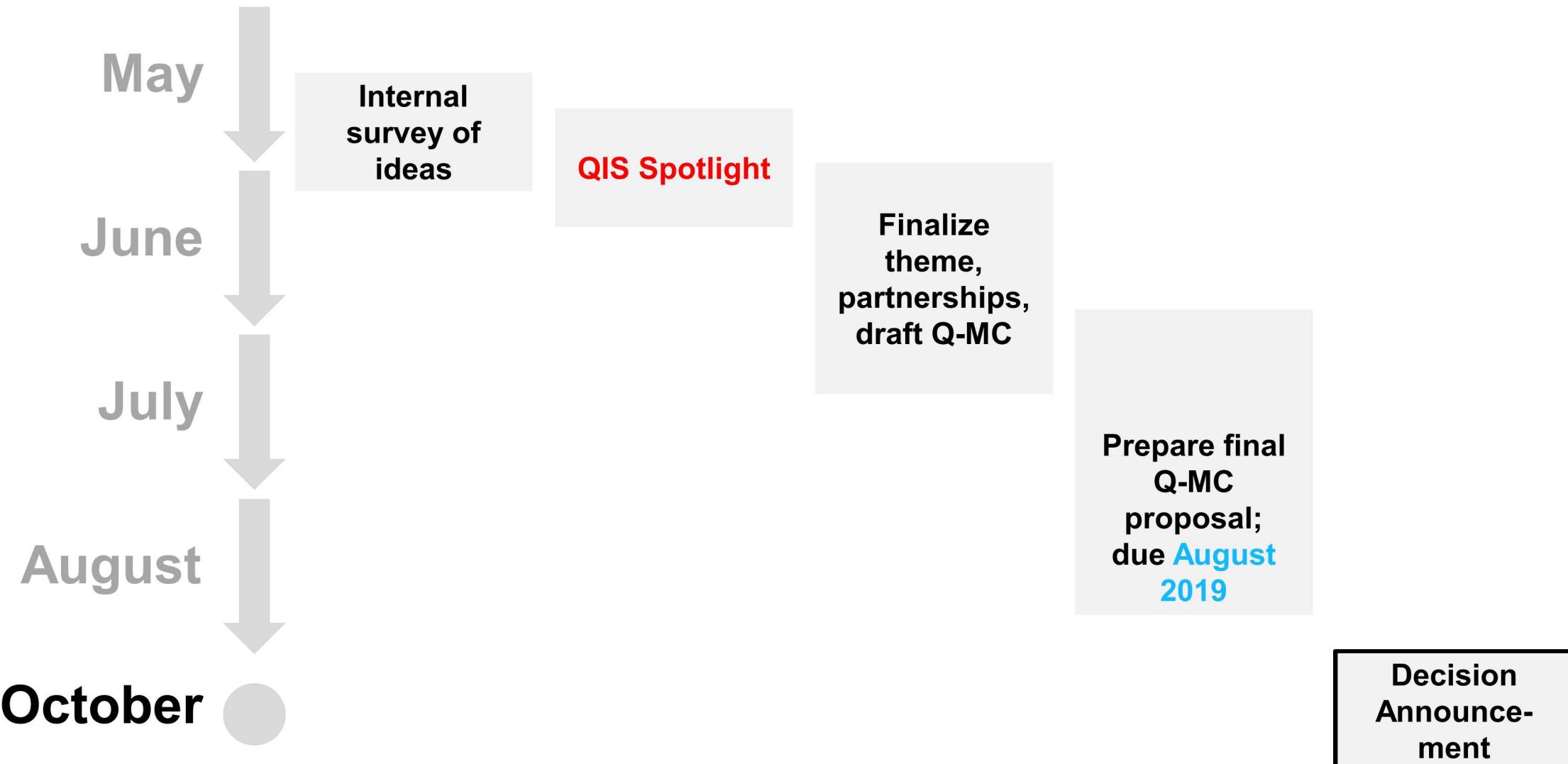


Partner Perspective

- A Mission Campaign is an opportunity to **continue or establish long-term collaborations** with Sandia
 - Access to expert personnel and unique resources dedicated to R&D (e.g., MESA)
 - Placement of students & graduates
- Work related to a Mission Campaign can take place **on site or at Sandia**
- Work related to a Mission Campaign likely to span:
 - **Fundamental scientific investigations**
 - Development of **enabling technologies**

Sandia's Quantum Mission Campaign is envisioned as complementary to a National Quantum Initiative hub

MISSION CAMPAIGN KEY EVENTS



INITIAL THOUGHTS ABOUT A QUANTUM MISSION CAMPAIGN

- Work on "traditional" quantum systems. Improve current qubits and make them more robust to support near-term applications in sensing or QIP.
- **Likely emphasis:** More technology development, engineering; less basic research
- **Keywords:** NISQ, sensing, foundry, materials, advanced QCVV

Trapped ions

Photonics,
Optomechanics,
Heterogeneous
Integration (HI)

Semiconductor
qubits

Photonics,
Optomechanics,
HI

Rydberg atoms

- Develop technologies with combined quantum hardware platforms that enable coherent transfer of quantum information.
- **Likely emphasis:** more basic research, less engineering
- **Keywords:** hybrid quantum systems, quantum networks, secure communications

Thanks to D. Luhman

MISSION-CAMPAIGN RELATED OBJECTIVES FOR QIS SPOTLIGHT

- All: Sandia/Academic Alliance discussions re: a 5-7 year quantum related strategy
 - Identify compelling opportunities
- Academic Alliance representatives: share your own quantum related interests and forecasts
- All: Initial ideas for pairing of Academic Alliance investigators with Sandia SMEs
- All: Quantum “incubator” ideas; focus on exploration of novel ideas that pose high(er) technical risks
- All: Best practices for collaboration and interaction among all Q-MC participants

We are still finalizing the Quantum Mission Campaign theme: *Your ideas can influence the final outcome*

