



Research Spotlight Forum

SAND2019-6250PE

6.4.19 Quantum Information Sciences

2019 QUANTUM MISSION CAMPAIGN

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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.



Quantum Mission Campaign

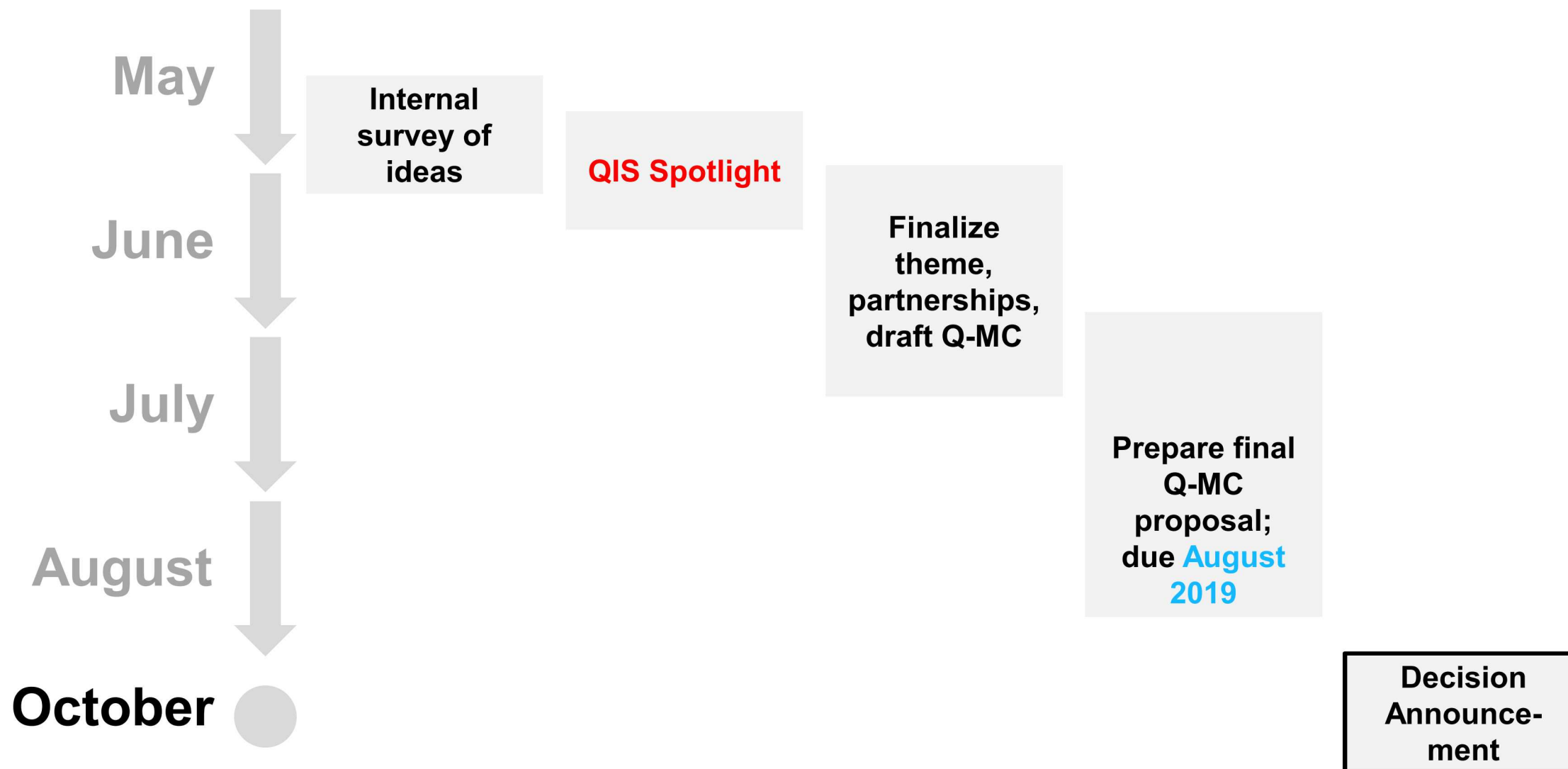
Partner Perspective

- 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*

