

# Quantum Economic Development Consortium (QED-C)

NIST VCAT Meeting  
October 16, 2018  
Joe Broz, SRI

**SRI International<sup>®</sup>**



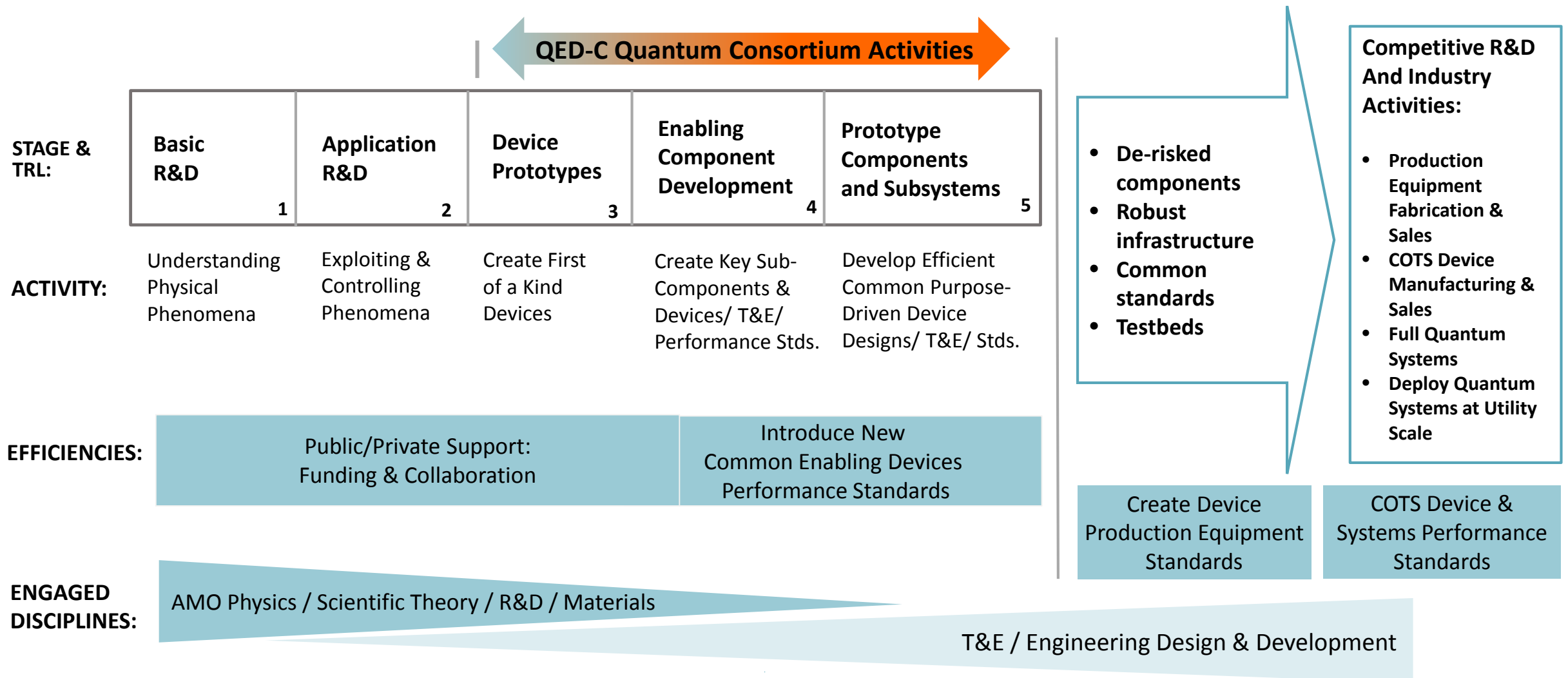
# Quantum Economic Development Consortium (QED-C)

.... Will help accelerate the Quantum Industry by fostering a robust Supply Chain.

- Definition of a Consortium: an agreement, combination, or group of companies formed to undertake an enterprise beyond the resources of any one member
- SRI has been contracted to establish a Quantum Economic Development Consortium for the emerging Quantum Industry

The “QED-C”

# Quantum Enabling Device Development Continuum



# The Purpose of the QED-C is:

1. To support enabling technology R&D: e.g. quantum device components, instrumentation, and performance standards
2. To facilitate industry coordination and interaction with government agencies
3. To provide the government with a collective industry voice in guiding R&D investment priorities and quantum workforce issues

# The Objectives of the QED-C

- Determine workforce needs essential to the development of quantum technologies;
- Provide efficient public-private sector coordination;
- Identify technology solutions for filling gaps in research or infrastructure;
- Highlight use cases and grand challenges to accelerate development efforts; and
- Foster sharing of intellectual property, efficient supply chains, technology forecasting and quantum literacy.

# The Value Proposition of the QED-C: *Output / Input* $\gg 1$

- Competitive Benefits: The US Quantum Industry is nascent and fragmented (along transition, technical, organizational, sector and funding dimensions), and is  $\leq$ , or  $\ll$ , Near-Peer: EU, UK, China... *The QED-C will help foster industry collaboration and coordination.*
- Close Enabling Technology Gaps: *The QED-C will help build a stronger supply chain for research and industrial productivity.*
- *The QED-C offers efficiency over “standard” RFP processes:*
  - Coordinated public/ private funding, and coordinated funding among multiple Federal agencies
  - Encourages non-traditional industry partners
- It's not about spending more... *The QED-C will spend smarter!*
- The US Quantum Industry will benefit from performance and evaluation standards... *The QED-C will facilitate SDO participation.*

# Proposed Membership

The QED-C is primarily “by and for US Industry” (at all sizes and stages) to support US Economic Growth.

- Includes Members that would self-identify as “members of the quantum industry community”, or “participating in the emerging quantum industry”.
- Also includes equipment suppliers, instrumentation OEM’s, materials companies, service providers, End-Users, etc.

QED-C will also engage:

- Academic Community
- Standards Development Organizations
- Professional Societies
- Investment Community
- International Partnerships



# Proposed QED-C Deliverables

## Years 1 &2:

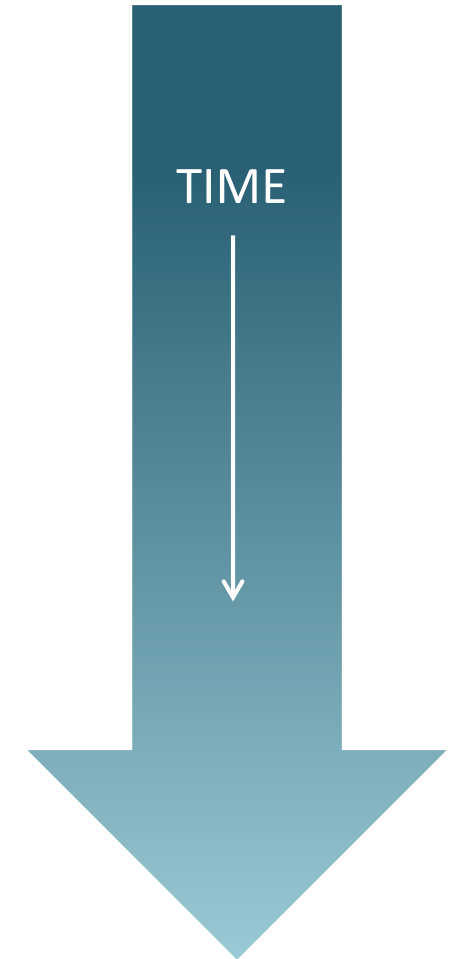
- Workforce Requirements Analysis and Actions
- Gap Identification and Needed Enabling Technology and Infrastructure
- Needs Assessments for Instruments and Tools
- Input to USG for R&D Programs

## Year 2+

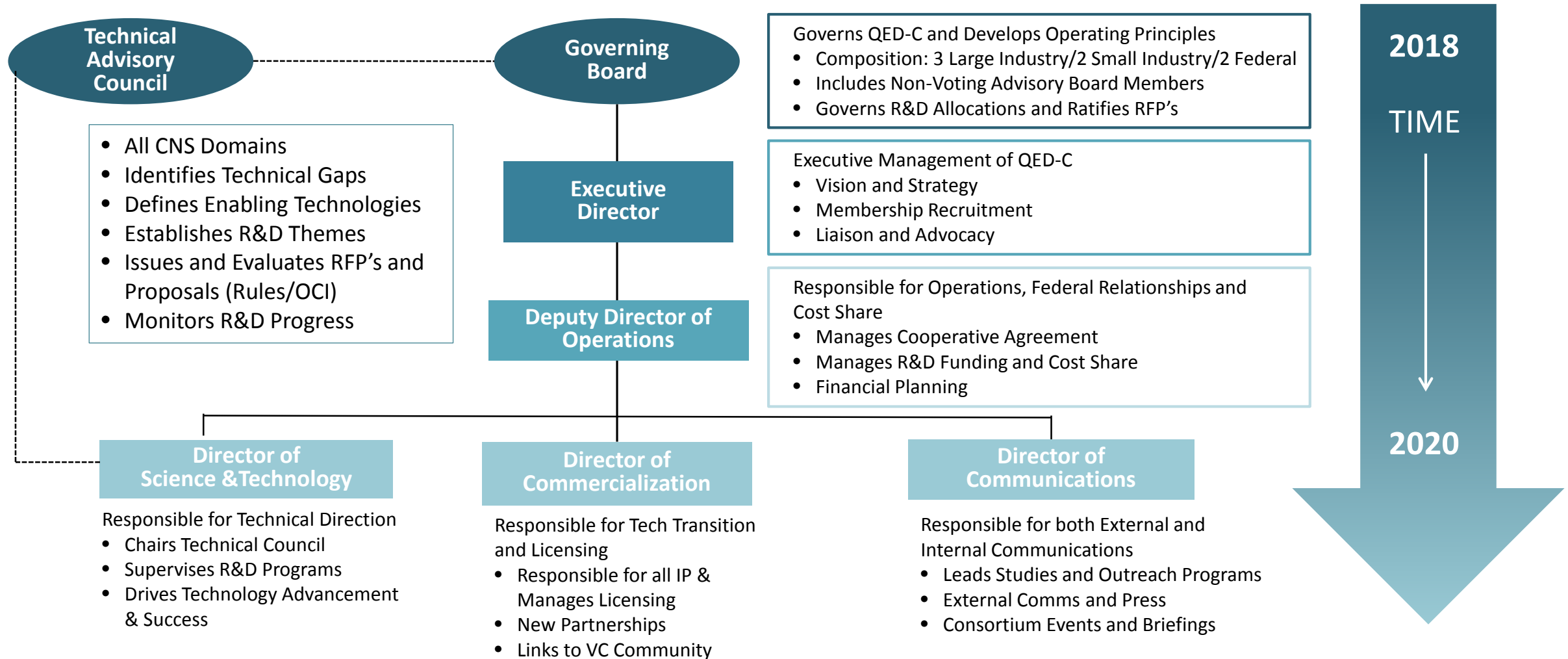
- Cost-Shared Funding of Enabling Technology R&D Programs in the Consortium

## Potential Out-Year Activities:

- Facilitate Quantum Standards and Metrics
- Use Cases and Studies of Q-Advantage
- Q-Community Representation
- Scientific and Market Forecasts



# DRAFT Proposed Phased QED-C Organizational Structure



# Governing Board

- Board Composition (3-2-2)
  - Large Industrial members at highest dues levels (3)
  - Representatives of medium and small-size companies (2)
  - Federal Partners (2)
  - (Possibly) non-voting state or regional economic development representatives
  - Others as approved by GB

# Simple IP Policy:

## IP Ownership

“Ownership follows Invention” rule so that Development Partners:

- Retain full ownership rights to the IP that the Development Partner conceives pursuant to a QED-C Development Agreement using QED-C Funding
- Retain full ownership rights to its own background IP, if any

# Consortium and IP Owner Rights:

- USG License: Grant to the USG a non-exclusive, nontransferable, paid-up, worldwide perpetual license to use the Consortium IP for any Government purpose
- Evaluation License: Grant to each QED-C Member a non-exclusive, royalty-free, non-transferable license for the duration of Member's membership to use the Consortium IP (without the right to sublicense) for the limited purposes of further evaluation and R&D
- Commercial License: On request, grant to any QED-C Member a non-exclusive, transferable worldwide license (with the right to sublicense) on commercially reasonable, nondiscriminatory ("RAND") terms
- Third-Party Licenses: On terms negotiated by the Development Partner.

# Proposed Phased-Dues Structure

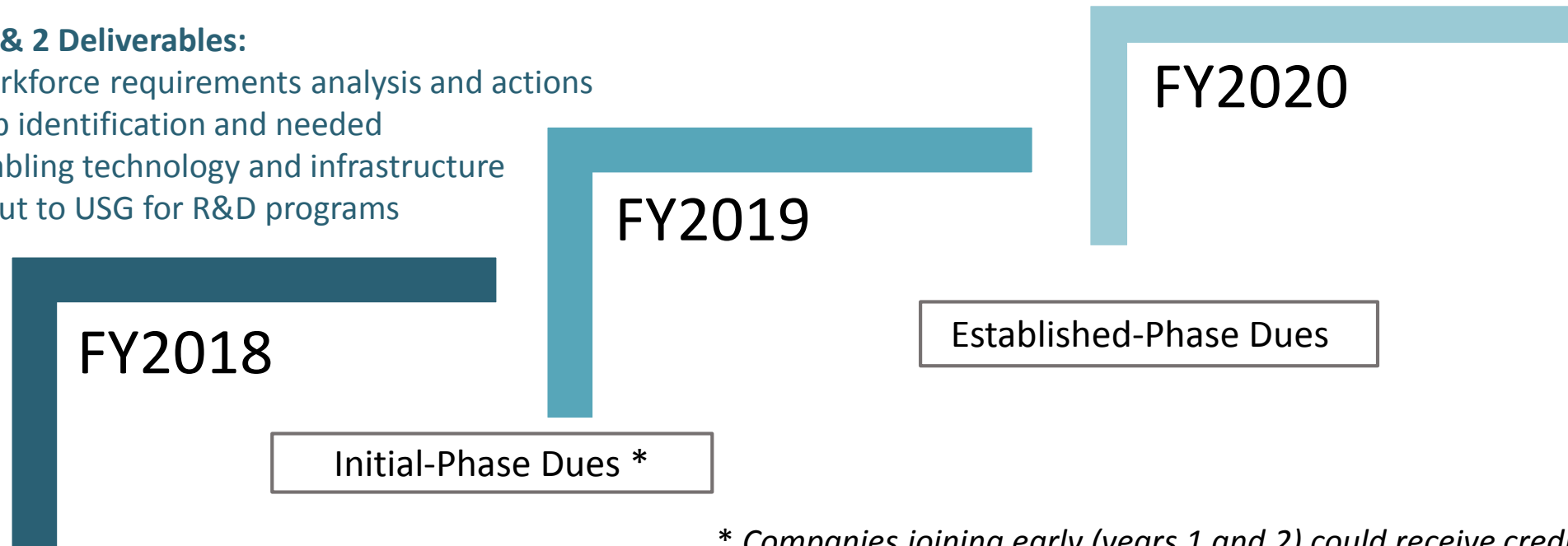
- Phased-in dues structure
- In-kind commitments possible for governance and technical programs
- Cost-share anticipated for leveraged USG R&D

## Year 2+ Deliverables:

- Cost-shared funding of enabling technology R&D programs in the Consortium + year 1 and 2 + out-year deliverables
- Use cases and studies of Q-Advantage
- Quantum standards and metrics
- Q-Community representation/unified voice
- Scientific and market forecasts

## Year 1 & 2 Deliverables:

- Workforce requirements analysis and actions
- Gap identification and needed enabling technology and infrastructure
- Input to USG for R&D programs



\* Companies joining early (years 1 and 2) could receive credit in year 3.

# Companies with signed LOI's (as of 10/10/18)

- AO Sense
- AT&T
- Boeing
- BraKet
- Cold Quanta
- Corning
- Entanglement Institute
- GE Global Research
- Google
- Harris
- IBM
- Intel
- IonQ
- Janis Research
- Keysight
- KLA-Tencor
- Montana Instruments
- Psi Quantum
- QC Ware
- Quantum Circuits, Inc.
- Raytheon/ Raytheon-BBN
- Rigetti
- SRI
- Toptica
- Zyvex

# Next Steps

- 25 Signed Letters of Intent (LOI), plus waiting on several additional
- Initiating Year 1 Tasks (@NIST Boulder Meeting– October 29<sup>th</sup> & 30<sup>th</sup>, 2018):
  - Form Governing Board and Technical Advisory Council
  - Form TAC Sub-committees (e.g. Workforce, Enabling Technologies, End Use, R&D Thrusts, Standards, etc.)
  - Participation Agreements (PA)
  - Determine final Governance, IP Rules, Dues, Membership
  - Executive Search to Hire Director
  - Prepare for Funding (Vehicles, RFP's, Proposal Selection, etc.)
  - Set Timetable for Initial Operating Years
  - Kick-Off Workforce Analysis and R&D Initiatives