



Joint Ground Robotics Enterprise Update

September 18, 2008

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Agenda



- **Robotics Technology Consortium Update**
- **Unmanned Systems Integrated Roadmap Status**



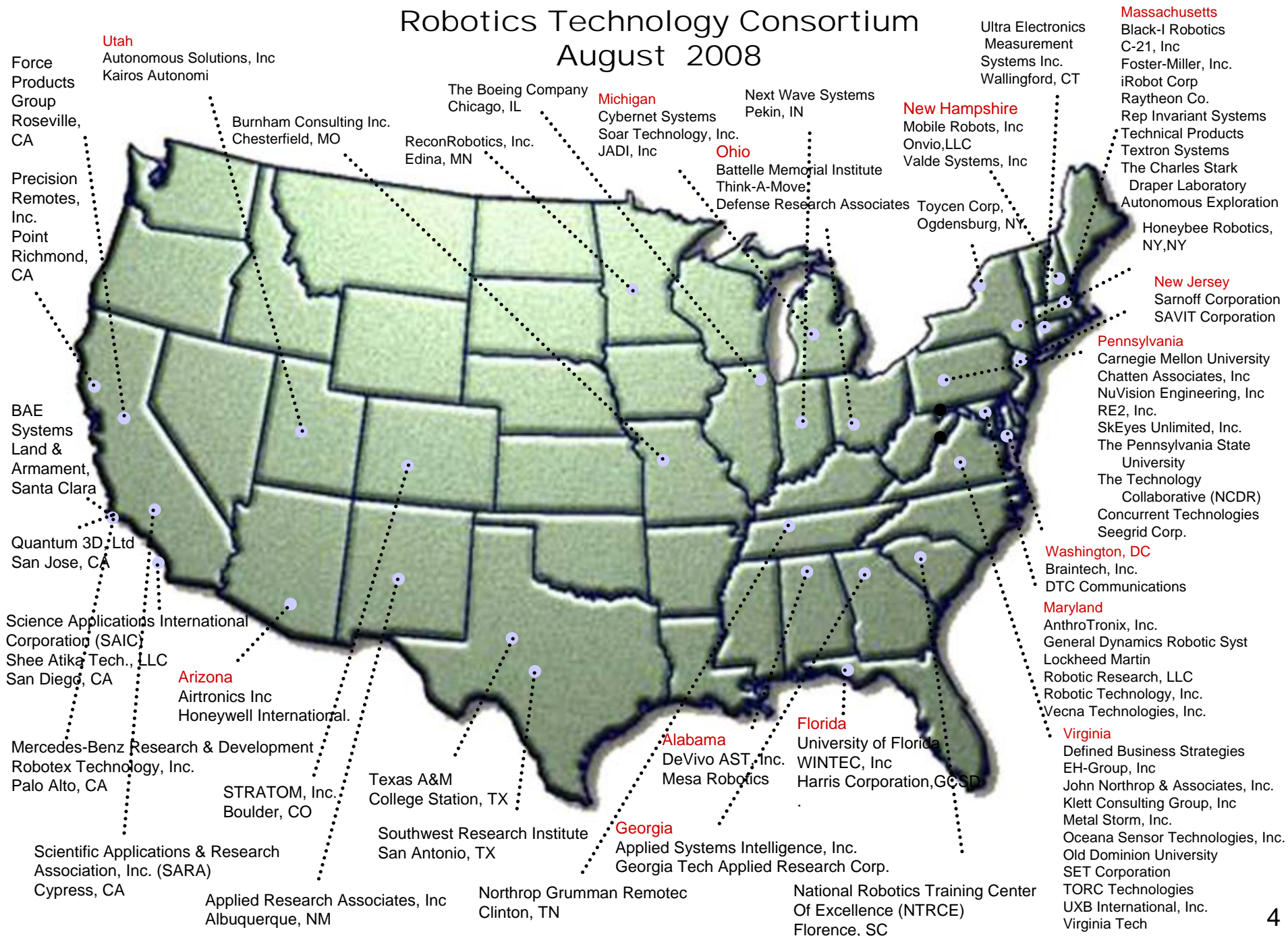
OTA Terms & Conditions



- Period of Performance 7 years
- OTA Price Ceiling \$175M
- Phase I authorized: Participation in TAB Process
- Phase II locally authorized to \$5M: Research & Development based on funding allocation
- Phase II authorized to \$175M upon pending signature from DUSD(AT&L)

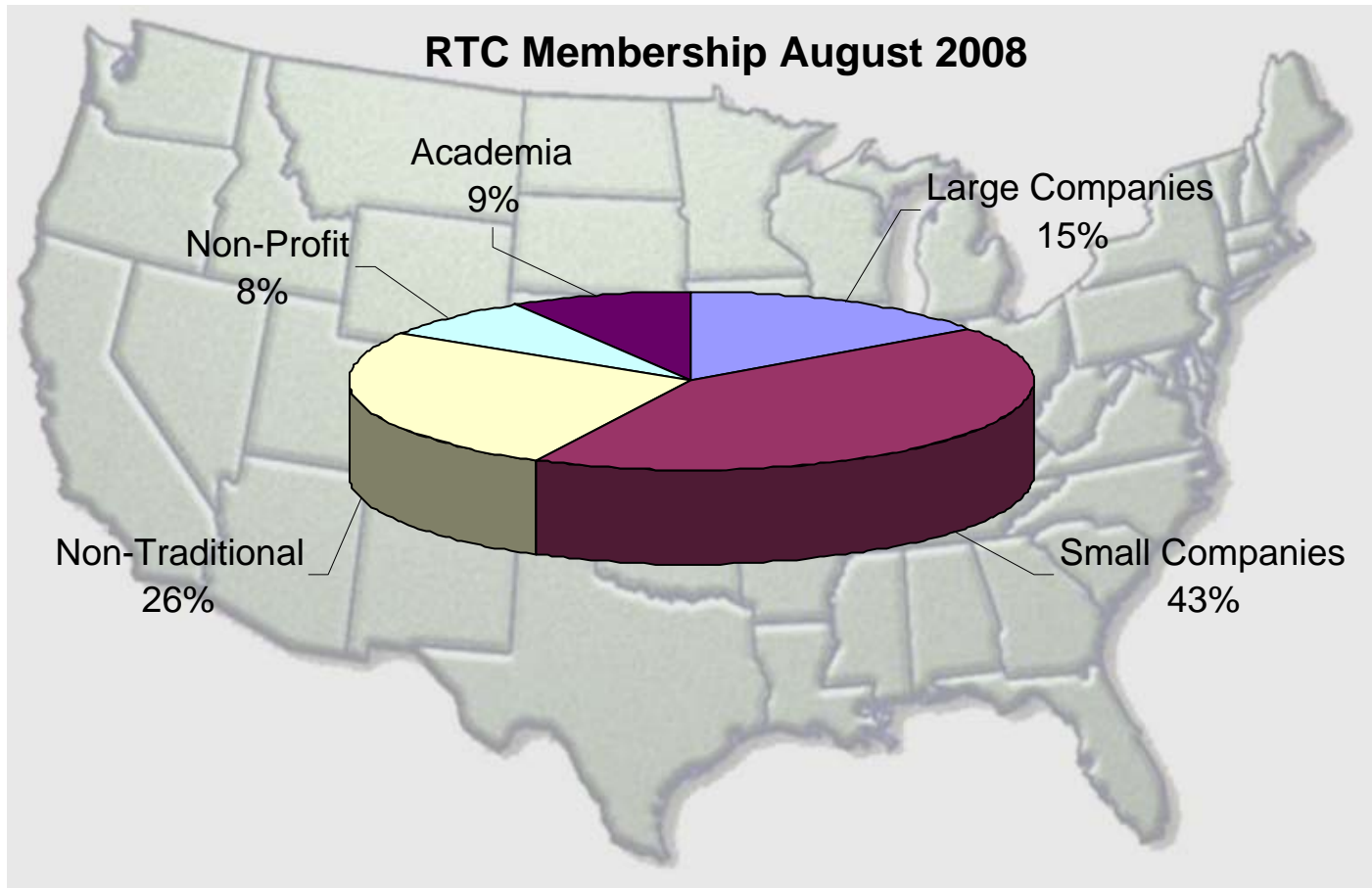
Robotics Technology Consortium

August 2008





Robotics Technology Consortium





TAB Structure

Consortium Members will participate in TAB activities with their Government counterparts through these four Working Groups.

JCA 1
Battlespace
Awareness
Govt Co-Chair
RTC Co-Chair

JCA 4
Force
Application
Govt Co-Chair
RTC Co-Chair

JCA 5
Protection
Govt Co-Chair
RTC Co-Chair

JCA 6
Logistics
Govt Co-Chair
RTC Co-Chair



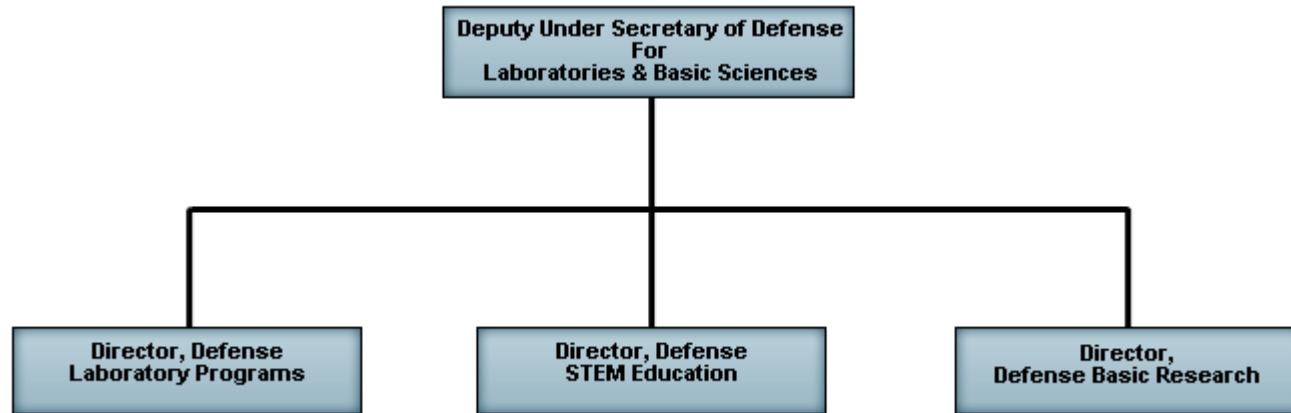
Lessons Learned from Initial Collaboration



- **FY09 TAB process should ensure the following:**
 - Technologies are assessed without bias...e.g. “does not matter who has the good idea”
 - “Service and Corporate identities” are not brought to the WG...only subject matter expertise
 - Technologies should be submitted for consideration across a planning horizon of POM plus 2 years...do not focus on next year to exclusion of remaining years
 - Technologies can range from sub-system “enabling technologies” to TRL 5 prototypes. Technologies at TRL6 and above will not be considered for funding
- **RTC submitted technologies clearly state value to the warfighter**
 - While technical approach is important, if government can not ascertain the contribution of the technology to a war fighter capability, it will not be forwarded to the Joint Staff for prioritization
- **RTC members need to understand that there will be more technologies assessed as having high criticality and high user priority than there will likely be available budget to fund**



Science, Technology, Engineering and Mathematics



DDRE has mission for “ promoting science, technology, engineering, and mathematics education to benefit the DoD’s science and engineering workforce”

JGRE looking to partner with RTC and coordinate with DDRE to support STEM...what is the best way to accomplish?



Path Forward



- Broad announcement stating intent to request proposals from consortium to provide time for potential new members to join and respond to request
- Support RTC “Outreach” effort to inform RTC members best way to convey proposed technologies and assessments to facilitate review by Joint Staff
- Partnership with DoD via RTC to support STEM – TBD...any good ideas?



Agenda



- **Robotics Technology Consortium Update**
- **Unmanned Systems Integrated Roadmap Status**



Public Law 109-364 SEC 941



REPORT. – Not later than 120 days after the date of the enactment of this Act, the Secretary shall submit to the congressional defense committees a report containing –

- the policy required by subsection (a); and *an implementation plan* for the policy that includes –
 - *a strategy and schedules for the replacement of manned systems with unmanned systems in the performance of the mission identified in the policy pursuant to subsection (b)(1);*
 - *establishment of programs to address technical, operational, and production challenges, and gaps in capabilities, with respect to unmanned systems; and*
 - an assessment of progress towards the goals identified for the subset of unmanned air and ground systems established in section 220 of the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (as enacted into law by Public Law 106-398; 114 Stat. 1654A-38).

UNMANNED SYSTEMS DEFINED. – In this section, the term “unmanned systems” consists of unmanned aerial systems, unmanned ground systems, and unmanned maritime systems.



Scope



The Scope of the Draft Roadmap currently addresses:

- the 3 Product Line Portfolios:
 - Unmanned Aircraft Systems
 - Unmanned Ground Vehicles
 - Unmanned Maritime Systems (Surface and Undersea)
- a timeline from 2009 – 2034
- mission areas, technology development, standardization, & interoperability

The Draft Roadmap currently does not address:

- detailed operational concepts for employing unmanned systems
- operational requirements for unmanned systems



Roadmapping Methodology



- **Craft Potential Future Vision**

- **Joint Capability Area Mapping (strategy & schedule per PL109-364)**
 - Depicts programmed Systems & projects systems beyond POM thru 2034
- **System Performance Envelope Evolution (challenges & gaps per PL 109-364)**
 - Depicts the evolution of increased performance to achieve mission accomplishment
- **Identify Technology Enablers (challenges & gaps per PL 109-364)**
 - Depicts key technologies leading to mission accomplishment and performance increases
- **Goals & Objectives (strategy per PL109-364)**
 - Depicts recommendations that if pursued will implement strategy of development & employment of unmanned systems across Capability Areas



Roadmapping Methodology



- **Conduct Strengths, Opportunities, Challenges & Risks Analysis (challenges & gaps per PL 109-364)**
 - Assessment of what DoD can leverage to achieve vision
 - Assessment of challenges & risks to be mitigated in achieving vision
- **Recommend Actions Leading to Vision Achievement (strategy, schedule, challenges & gaps per PL 109-364)**
 - Based on vision, goals & objectives, and analysis, recommends actions DoD can pursue to achieve development and employment of UMS across next 25 years
- **Capture Planning Document in integrated narrative (implementation plan per PL 109-364)**
 - Transcribes planning products into integrated narrative document
- **Coordinate Document for Signature**



Proposed Table of Contents



- **Executive Summary**
- **Table of Contents**
- **Chapter 1 - Introduction**
 - **Purpose** (analogous to Chap 1, 2007 Roadmap)
 - **Scope** (analogous to Chap 1, 2007)
 - **Background** (analogous to Chap 2, 2007 Roadmap)
 - i. **Current State of Unmanned Systems**
 - ii. **POM Funding** (analogous to Chap 2, 2007 Roadmap)
 - iii. **Congressional Direction** (analogous to Chap 2, 2007 Roadmap)
- **Chapter 2: Vision for the Future Development and Employment of Unmanned Systems Within the Department of Defense**
 - **Unmanned Systems in Joint Capability Areas** (analogous to Chap 4, 2007 Roadmap)
 - **Unmanned Systems Performance Envelope**
 - **Goals and Objectives** (analogous to Chap 1, 2007 Roadmap)



Proposed Table of Contents (cont.)



- **Chapter 3 – Unmanned Systems Path Forward**
 - **Methodology for Analysis**
 - **Strengths & Opportunities**
 - **Challenges & Risks**
 - **Recommended Unmanned Systems Overarching Actions**
 - **Policy** (analogous to Chap 2, 2007 Roadmap)
 - **Interoperability and Standards** (analogous to Chap 3, 2007 Roadmap)
 - **Technology Transfer** (analogous to Chap 6, 2007 Roadmap)
 - **Joint Experimentation**

- **Chapter 4 – Advancing Unmanned Systems Technologies** (analogous to Chap 6, 2007 Roadmap)
 - **Unmanned Systems Technology Enablers**
 - **Aligning Common Technologies**
 - **Key/Pacing Technologies**
 - **Air**
 - **Ground**
 - **Sea**



Proposed Table of Contents (cont.)



- **Appendix A – Unmanned Aircraft Systems** (analogous to App A, 2007 Roadmap)
- **Appendix B – Unmanned Ground Vehicles** (analogous to App B, 2007 Roadmap)
- **Appendix C – Unmanned Maritime Systems** (analogous to App C, 2007 Roadmap)
- **Appendix D – Unmanned Systems Description Data Sheets**
- **Appendix E – Unmanned Systems Enabling Technology Data Sheets**
- **Appendix F – JCA Definitions** (analogous to App E, 2007 Roadmap)
- **Appendix G – UMS Standards** (analogous to Chap 3, 2007 Roadmap)
- **Appendix H – UMS Points of Contact** (analogous to App D, 2007 Roadmap)



CCC/NSF Roadmap



“In a world where significant changes are expected in terms of competitiveness and aging it is essential that society has access to key technologies for automated manufacturing, assistive healthcare and domestic services for independent living. Consequently there is a need to carefully consider how the USA can ensure availability of these technologies in a 5-15 year perspective”.

- **University Membership:**

**Georgia Institute of Technology
Un. of California Berkeley
Un. of Illinois Urbana
CMU
Stanford**

**Un. of Massachusetts
Un. of Utah
MIT
Un. of Southern California
Rensselaer Polytechnic Inst**

- **4 Working Groups:**

**Manufacturing & Automation
Service Robotics**

**Healthcare & Medical
Emerging Technologies**



Wrap Up



- **Consortium has already shown benefits**
- **Will initiate full TAB process early next month**
- **Roadmap on track for release by the end of the year**
- **DoD partnering to support STEM...need a path forward**

DoD committed to continuing collaboration with industry & academia to advance the state of ground robotics and support warfighter needs.