

# **International Assessment of Research and Development in Robotics**

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July 21, 2004

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# Robotics R&D in the United States

- WTEC mission – Purpose and impact of international technology assessments
- About the Overall Study on Worldwide Robotics R&D
- Where the U.S. Robotics Workshop fits in the Big Picture

# WTEC Mission and History

- Provide international assessments of research and development in a wide variety of fields
- WTEC has done 50 international technology assessments using on-site peer review, far more than any other organization
- Results of study provide comparative analyses of strengths overseas with those of the U.S. and make recommendations for future strategic investment for program management and research communities
- Sponsorship from most of the Federal agencies with R&D programs

## **Why do International Assessments?**

- Guide U. S. research investments
- Look for good ideas abroad (tech transfer)
- Look for opportunities for cooperation
- Justify a reasonable investment in research
- Compare U.S. R&D status abroad (GPRA)
- Avoid unpleasant surprises

# Methodology

- Base support thru NSF peer reviewed grants
- Participation of other agencies
- Panel of experts to conduct U.S. and overseas site visits
- Public workshop to report on preliminary results of findings
- Delivery of formal report on comparative strengths of field, analysis of findings, and recommendations to government and research communities

# Sample studies: 1990 – present

- Machine translation (1992)
- Display technologies (1992)
- Knowledge-based systems (1993)
- Space robotics (1993)
- Digital Libraries (1994)
- Optoelectronics (1996)
- Human-computer interaction (1996)
- Rapid prototyping (1997)
- Wireless technologies and information networks (2000)
- Tissue Engineering (2002)
- Molecular and materials modeling (2002)
- MEMS research (2003)
- Biosensing systems (2003)
- High end computing in Japan (In progress)

# International Assessment of R&D in Robotics Context

- Previous WTEC study ten years ago on Space Robotics in Japan
  - NSF and NASA sponsorship; Chair: Red Whitaker of CMU
- Need for a revisit and worldwide assessment
  - Recent advances in robotics core and related research areas
  - External “disruptive” technologies and infrastructures impacting robotics
  - Trends in emerging applications addressing human and societal problems
  - Aggressive R&D investments in Asian and European countries aimed at creating new robotics markets
  - Strategic planning for robotics programs at the agency level within the U.S. government
  - New opportunities for international collaboration in pre-competitive research to advance the field in ways not possible otherwise

# Status Update

- Sponsorship: Contributions from several NSF programs in Engineering Directorate, CISE (RCV), and Office of International Programs; NASA/HQ; Other interested agencies include NIST, NIH/NIBIB, DARPA, ONR, USDA, and possibly others
- Study Panel: George Bekey (USC, Chair), Rob Ambrose (NASA JSC), Art Sanderson (RPI), Manuela Veloso (CMU), Brian Wilcox (JPL), Yuan Zhang (OSU)

# Main Tasks and Milestones

- Main Tasks
  - Task 1 - U.S. Baseline (workshop 7/21-22, at NSF)
  - Task 2 - Assessment of East Asia Activities – mainly Japan and Korea (October 3-13, 2004)
  - Task 3 - Assessment of activities in Europe (dates to be determined)
- Reporting:
  - Briefing/Workshop in DC: Panel to report on findings (~6 weeks after completion of overseas visits)
  - Final written report: Summer/Fall of 2005

# U.S. Baseline Study

- **Significance**
  - Benchmarking for a comparative assessment
  - Improving coordination among all U.S. programs
  - Serving as a starting point for developing strategic plans for program or agency initiatives
- **Key Components**
  - Survey domestic R&D activities funded by all agencies
  - Determine strengths and gaps of research areas/applications
  - Make recommendations for agencies and research community
- **Approach, Methodology**
  - Hold a U.S. Baseline Workshop to review status of robotics
  - Study panel (+Steering group) to synthesize workshop results and arrive at conclusions and recommendations
  - Results to be used in overall assessment and serve as basis to form an alliance or consortium for collaborative research in robotics