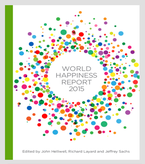
Humanitarian Robotics & Automation Technologies:
Improving the Quality of Life for Humanity

Raj Madhavan, Ph.D.

30 THIRTY YEARS OF SYSTEMS RESEARCH EXCELLENCE

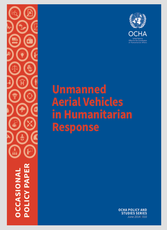
INSTITUTE FOR SYSTEMS RESEARCH
A. JAMES CLARK SCHOOL OF ENGINEERING
UNIVERSITY OF MARYLAND

Humanitarian Robotics & Automation?



- Robotics & Automation (R&A) Technologies for
  - ➡ Benefit of humanity
  - ➡ Use in under-served and under-developed communities in collaboration with local governments and NGOs/NPOs
  - ➡ Improving the Quality of Life
- Applied Systems Engineering vs Fundamental Research
- Quality of Life (QoL) vs Standard of Living (SoL)
- Sustainability of R&A Solutions
  - ➡ Bottom-up Vs Top-down
  - ➡ Economically Viable/Financially Sustaining

Ongoing & Future Work



Research & Development Challenges

- UAV Navigation, Control, and Mission Management
- UGV/UAV Collaboration
- Integration of other models (Information Systems)
- Deployment of Teams

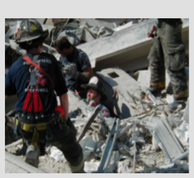
Outreach & Funding Challenges

- How to connect (get invited) to disaster areas?
- Coordination with State/Federal Agencies & UN/Red Cross (Disaster Management Requirements)
- Working with NGOs/NPOs
- Connecting with Foundations & Funding Agencies

UAVs for Search & Rescue, Disaster Mitigation, Response, and Recovery

- Urban Search and Rescue
- Disaster Prevention, Response, and Recovery
  - ➡ Terrain Mapping
  - ➡ Airborne Environmental Monitoring/Surveillance
- Humanitarian Demining

- *Animal Anti-poaching*
- *Healthcare/Medical Robotics*
- *Agriculture*
- *Education*
- …



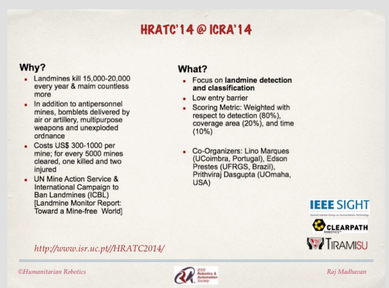
- Southern Brazil Coastal Plain
  - ➡ Sea level changes and Patos Lagoon Coastal Flooding
  - ➡ Damage to natural resources and population displacement

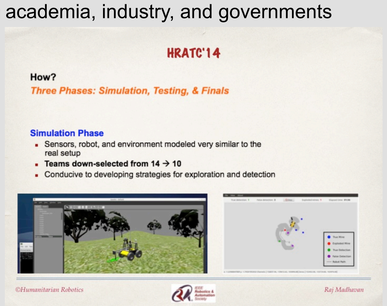
- UAVs for Monitoring & Assessment
  - ➡ Hydrological Modeling: Prediction of water levels
  - ➡ Assistance to local government and federal agencies for recovery and response efforts
  - ➡ Infrastructure monitoring & damage assessment
  - ➡ Relocation monitoring

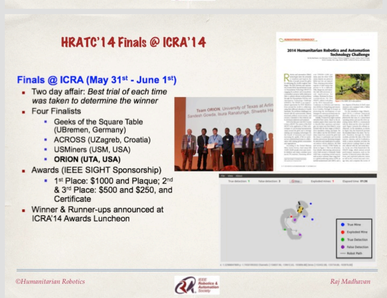
Joint work with Profs. Tatiana Silva and Flavia Farina, UFRGS, Brazil

Humanitarian Robotics and Automation Technology Challenges (HRATCs)

- HRATCs are an unprecedented opportunity for technologists from around the world to collaborate using their skills and education to benefit humanity
- Problems (challenges) framed with the environmental, cultural, structural, political, socio-economic, and resource constraints so that solutions can be developed, deployed, and sustained
- Viable solutions using R&A technologies by engaging the academic and non-academic communities to address relevant world problems through several initiatives including:
  - ➡ challenges/competitions
  - ➡ funding projects
  - ➡ establishment of collaboration networks with academia, industry, and governments







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