**Precision Indoor Personnel Location and Tracking for Emergency Responders**

Technology Workshop, August 2-3, 2010
Worcester Polytechnic Institute,
Odeum, Campus Center,
Worcester, MA

**Workshop Focus**

This Workshop will provide a forum for researchers and developers working in the important area of indoor location and tracking of emergency response personnel to share technical knowledge and to define the state of the art. The focus of this workshop is zero pre-installed infrastructure tracking, that is systems that do not require any previously installed wiring or equipment in the target building, such as is required by RFID-type systems. Further, the focus is on systems which provide complete tracking and position information on all equipped personnel to the incident command post. This year we will have a special session by NIST looking at standards development for location and tracking systems. We will also be holding another ‘live’ test of systems by the Worcester Fire Department.

**Workshop Organization and Results**

Working sessions are organized around the major technical challenges. It is expected that all participants will contribute from their own experience and will share knowledge and best practices. DHS S&T will participate in a user focus group meeting. WPI is sponsoring this workshop with support from a FEMA Fire Prevention and Safety grant.

A Report will be published shortly after the conclusion of the Workshop, including the submitted abstracts from the participants and synopses of the discussions and conclusions of the Workshop itself. This report will be available on the website listed below.

**2010 PPL Workshop**
~ Agenda ~

Monday, August 2nd, 2010

7:30 **Registration and Continental Breakfast** (Odeum, Campus Center)

8:15 **Welcome** - Dr. Eric Overstrom (WPI Provost)

8:25 **Workshop Overview** - Dr. R. James Duckworth

8:30 **The Real World of the First Responder**  
Moderator: William Haskell, Program Director, NIOSH-NPPTL

*Fireground Injury and Death: Not EVERYONE Goes Home!!!*  
Chief Billy Goldfeder, EFO, Deputy Chief, Loveland-Symmes FD, Ohio

*First Responder Location - The Real World*  
Ric Plummer, Fire Engineer, Firefighter, Berlin Fire Department, Berlin MA  
Jeff Lenti, STOP Team, Mass. State Police Academy

10:00 Break

10:20 **Government and User Perspectives**  
Moderator: Casey Grant, Program Director, Fire Protection Research Foundation

*Pilot Project for the Deployment of Officer Safety Tracking Equipment*  
Michael Eckert, Deputy Sheriff, LA County Sheriff’s Department / Comms. & Fleet Mgmt.

*Overview of the GPS-denied funding program within OSD*  
Thomas MacDonald, Systems Engineer, OSD / MacroVision / TRMC

*US Army NSRDEC Future Soldier Initiative (FSI)*  
Scott Ullery, Engineer, US Army NSRDEC

11:20 **Inertial and Integrated Navigation Systems, Part I**  
Moderator: Casey Grant, Program Director, Fire Protection Research Foundation

*Technology Advances and Performance Evaluation of the NavShoe Personal Dead-reckoning System*  
Eric Foxlin, CTO, Intersense Inc.

*Personal Dead-reckoning (PDR) System for Firefighters*  
Johann Borenstein, Research Professor, Mechanical Engineering Dept. Univ. of Michigan

Noon **Lunch**
12:30  **Keynote Speaker:**  
*Title to be determined….*  
Jalal Mapar, Program Manager (GLANSER and PHASER), DHS S&T Directorate

1:30  **Inertial and Integrated Navigation Systems, Part II**  
Moderator: Nader Moayeri, Senior Technical Advisor, Advanced Technologies Division, NIST

**DTRA for GPS-Denied Navigation and Mapping**  
Kenneth Graves, C2 Product Manager, Harris Corporation / RF Communications

**Development of a hybrid multi-functional personnel location system for the Department of Homeland Security’s GLANSER program**  
Lin Haas, Senior Program Manager, Argon ST

**TRX System Developments Including a New User Interface**  
Carole Teolis, CFO, TRX Systems

**Honeywell’s Emergency Responder Locator System**  
Steve Huseth, Research Fellow, Honeywell ACS Labs

**Integrated Pedestrian Tracking System**  
Todd Faulkner, Staff Scientist, ENSCO, Inc.

**NAVISEER-Inertial Navigation-based System**  
Kent Garland, NAVISEER Product Manager, SEER Technology, Inc.

3:30  **Break**

3:30  **Demonstrations, Exhibits and Posters** *(Odeum C, Hagglund and Mid-Century)*  
Coordinators: Mary Centrella and Colleen Sweeney, WPI

**Intelligent Radiation Sensor System (IRSS) Advanced Technology Demonstrator (ATD)**  
Daniel Cooper, President and CEO, Passport Systems, Inc.

**The Global Positioning System (GPS)**  
Kenneth Fisher, Asst. Professor, Engineering Department, AFIT

**The Geodetics Personal Navigator (GPN)**  
Shahram Moafipoor, Navigation Scientist, Geodetics, Inc.

**The DARPA MINT Program**  
Alonzo Kelly, Associate Professor, Carnegie Mellon University/Robotics Institute
RA Tracker User Interface  
Ted Steinbrecher, VP, Business Development, Group 1 Solutions

Standards Relative to Design, Selection, Care and Maintenance of Personal Protective Equipment for the American Fire Service  
Kenneth Willette, Division Manager, NFPA

John-Olof Nilsson, PhD Student, Signal Processing Dept./Royal Institute of Technology (KTH)

Accurate 3-D Navigation Information to First Responder Personnel for Safe Ingress and Egress  
Timofey Spiridonov, Graduate Student, Dept. of Aerospace Engineering/University of Maryland

Combining the Results of Several Low Quality Position Results to Get Higher Quality Results  
Michael Newman, Principal Engineer, Dragonnorth Group

DARPA’s LANdroids Program  
Eric van Doorn, Chief Scientist, Intelligent Automation, Inc.

Research on Different Techniques for Indoor Positioning  
Jouni Rantakokko, Deputy Research Director, Swedish Defence Research Agency, FOI

History of Personal Navigation System Development  
Han Park, Manager, Advanced Navigation Solutions, Northrop Grumman Corporation

No Title - awaiting clearance  
Tamal Mukherjee, Professor, Carnegie Mellon University

Field Study of First Responders to Acquire Physiological Monitoring Data During On and Off Duty Hours  
David Kao, Researcher, NASA Ames Research Center

RFID Tracking System Using RFID Tags  
Daniel Moran, Deputy Fire Coordinator Hazardous Materials, Rockland County Fire and Emergency Services, Suffern, NY (newly added)
Hagglund  
(Demonstrations and Exhibits I)

**Technology Advances and Performance Evaluation of the NavShoe Personal Dead-reckoning System**  
Eric Foxlin, CTO, Intersense Inc.

**Remote Casualty Location Assessment Device (RCLAD)**  
Frank Morese, CEO, Alcyone systems, LLC

**Near-Field Electromagnetic Ranging (NFER®) Technology for Emergency Responders**  
Stephen Werner, Chief Operating Officer, Q-Track

**Version 2 PSM system**  
Jonathan Woodward, CTO, Zephyr Technology/Brian Russell, CEO, Zephyr Technology

**Exhibit of GLANSER Hardware**  
Randy Hartman, Navigation Technology Manager, Honeywell Advanced Technology Dept.

**Wireless Mesh Networking System That Will Enable Remote Monitoring and Tracking of Sensors**  
David Siu, Engineer, Oceanit

**NAVISEER-Inertial Navigation-based System**  
Kent Garland, NAVISEER Product Manager, SEER Technology, Inc.

Mid-Century  
(Demonstrations and Exhibits II)

**Personal Dead-reckoning (PDR) System for Firefighters**  
Johann Borenstein, Research Professor, Mechanical Engineering Dept. Univ. of Michigan

**P400 Ranging and Communications Module**  
Brandon Dewberry, Senior Principal Engineer, Time Domain Corporation

**The Responder Knowledge Base** ([https://www.rkb.us](https://www.rkb.us))  
Sharon Ranftle, Content Lead, FEMA Responder Knowledge Base (Contract Support)

5:30  **Adjourn**

6:00  **Reception and Barbeque** (Higgins House)

Reception (cash bar) 6:00pm  
Dinner 7:00pm
Tuesday August 3rd, 2010

7:30  Continental Breakfast

8:00  **Keynote Speaker:**
     **Title to be determined....**
     Dr. Nancy Merritt, Senior Policy Advisor, National Institute of Justice

8:30  **RF and other Technologies**
     Moderator: Paul Olson, Chief Engineer, Battle Command Division, CERDEC

     *Remote Casualty Location Assessment Device (RCLAD)*
     Frank Morese, CEO, Alcyone systems, LLC

     *Near-Field Electromagnetic Ranging (NFER®) Technology for Emergency Responders*
     Stephen Werner, Chief Operating Officer, Q-Track

     *WPI PPL System*
     David Cyganski, Professor, ECE Department, WPI

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**Standards**
Moderator: Camillo Gentile, Electronics Engineer, NIST Information Technology Lab

*Developing New NFPA Standards on "New to the Industry" Fire Service Products*
Larry Konsin, Manager Customer Development, MSA

*Standards and Test Methods for Equipment that is Utilized by Firefighters and First Responders in the Hazardous Environment*
Bruce Varner, Fire Chief / NFPA Technical Committee Chair, Santa Rosa Fire Department

*Smart Communications Infrastructure for First Responder Applications*
Francine Amon, Leader, Firefighting Technology Group, NIST

10:30  Break

10:30  **Parallel Working Sessions on the State of the Art**

**PETESON ROOM:**  **User Community Feedback**
Moderator: TBD

**MID-CENTURY ROOM:**  **Standards Development for Location and Tracking Systems**
Moderator: Francine Amon, Leader, Firefighting Technology Group, NIST

**HAGGLUND ROOM:**  **Location and Tracking Technology**
Moderator: TBD
12:00  **Lunch**

1:00  **Keynote Speaker:**
*Adaptable Location Systems for Any Environment*
Dr. Stefanie Tompkins, Program Manager, Strategic Technology Office, DARPA

1:30  **Plenary Working Session**
Moderator Dr. R. James Duckworth, WPI:

- 15 min presentations from each group
- State of the art and primary unsolved problems
- Progress from last year
- Answers to Specific Questions

2:30  **System Demonstrations - Worcester Fire Department**
Moderator/Organizer: Ric Plummer, Fire Engineer, Firefighter, Berlin, MA Fire Department
John Sullivan, Deputy Fire Chief, Worcester Fire Department

4:30  **Wrap-Up and Plans for the Future**
John Orr, Research Professor, ECE Department, WPI

*Evaluation Sheets filled out and returned*

5:00  **Adjourn**
Internet Access:

Attendees for the workshop can access the internet using the following log in and password:

**Log In:** ppl

**Password:** workshop

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**2010 Workshop Steering Committee Members:**

Donna Andrews  Director of Corporate Services, CTC, Inc.
Mary Centrella  Admin. Assist. To Linda Looft
Dr. David Cyganski  Professor, ECE Department, WPI
Dr. R. James Duckworth  Associate Professor, ECE Department, WPI
Thomas J. Kennedy  CEO, CTC, Inc. Public Safety Technology Center
Linda Carre Looft  AVP, Gov & Comm Relations, WPI
Dr. John Orr  Professor, ECE Department, WPI
Ric Plummer  Fire Engineer/Consultant, Volunteer, Berlin, MA Fire Dept.
Colleen Sweeney  Graduate Admin. Assistant, ECE Department, WPI