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2014-03

## CRUSER News / Issue 37 / March 2014

Monterey, California: Naval Postgraduate School

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# CRUSER · NEWS

Consortium for Robotics and Unmanned Systems Education and Research

## From Technical to Ethical...From Concept Generation to Experimentation

### CONTENTS

#### ROBO-ETHICS

LYLA ENGLEHORN

#### CRUSER TECHCON

STEVE IATROU

#### MINE WARFARE SYMPOSIUM

LAURIE SHEEHAN

#### STUDENT CORNER

DOUG HORNER

#### ROBOTS IN THE ROSES

LYLA ENGLEHORN

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<http://CRUSER.nps.edu>



### Robo-Ethics Continuing Education Series 2014

by Lyla Englehorn, CRUSER Director of Concept Generation, [laengleh@nps.edu](mailto:laengleh@nps.edu)



A panel of leading thinkers with diverse perspectives in military operations, robotics, law and ethics will address decision making situations associated with the employment of humans, remote and robotic systems. Panelists include a future commander, an operator, a roboticist, an industry expert, a lawyer, and an ethicist. They will be asked for their guidance on ethical dilemmas embedded in a South China Sea scenario in the year 20YY involving regional unrest and a diverse set of stakeholders. In this scenario, unmanned and manned systems will be deployed in response to escalating political tensions, and fictional warfighters will be faced with challenging and sometimes ambiguous situations and decisions associated with these new technologies. The panelists each will be given an opportunity to respond to the scenario and the moderator will facilitate discussion of their responses. DoD stakeholders throughout the San Diego region are invited to attend the event and the session is available remotely to an audience on the NPS campus in Monterey and other potential sites. The moderator will take audience questions for incorporation into the discussion. This event will be UNCLASSIFIED.

Additional details available on our website: <http://CRUSER.nps.edu>

**CRUSER TechCon**  
**8-9 April 2014 at NPS**  
See page 2 for details



<http://CRUSER.nps.edu>

## Director's Corner

Dr Ray Buettner, CRUSER Director



We are wrapping up the Winter quarter here in Monterey and heading into an intensive period of CRUSER related activities. First up is the 3rd Robo-Ethics event which will be taking place in sunny San Diego next week. Dr. Bradley Strawser (Killing by Remote Control: The Ethics of an Unmanned Military) returns to guide our panelist as they advise a Naval Commander preparing to commit her forces to combat in the year 20YY. VTC participation is available for US government folks and telecom participation is available for the entire community.

In early April the NPS campus will host the NPS CRUSER Technical Continuum for two days followed immediately by our 4th Annual Robots in the Roses event on Campus. The TechCon features concepts from both two of Warfare Innovation Workshops so that subjects from undersea warfare to distributed naval surface and air forces are all covered. Robots in the Roses not only showcases the many exciting things happening on campus but this is also our main STEM event with local high school and middle school children participating as well.

In May CRUSER will be supporting the 11th International Mine Warfare Technology Symposium in nearby (walking distance) Seaside, California. The combination of high explosives, an undersea environment and increasingly "smart" munitions makes mine warfare one of the most challenging – and important – applications for robotics and unmanned systems. This is the ONLY official US Navy sponsored mine warfare symposium and it is only held once every two years so be sure to get this on your calendar!

At this point you will have noticed that I have left out important details regarding each event. However this edition of CRUSER News has everything you need to know to participate in each event, and more, so read on!

## CRUSER TechCon 2014

by Steve Iatrou, CRUSER Director of Strategic Communication, sjiatrou@nps.edu

In conjunction with National Robotics Week, NPS Consortium for Robotics and Unmanned Systems Education and Research (CRUSER) will hold its 3rd annual Technical Continuum (TechCon) Tuesday and Wednesday, April 8th and 9th on NPS's Academic Quad from 9am to 2pm each day.

TechCon is designed for all NPS students and faculty interested in education, experimentation and research related to employing unmanned systems in operational environments.

Our intent with TechCon is to:

- Showcase last year's NPS student and faculty work in advancing undersea operations capabilities and distributing surface and air capabilities as developed during the March and September 2013 Warfare Innovation Workshops.
- Highlight currently funded CRUSER research projects
- Offer a venue for NPS Faculty to present potential FY15 research proposals to CRUSER.

NPS CRUSER TechCon presentations are scheduled in 20 minute blocks and are designed to provide a venue for presenting the highlights and significant contributions of current or proposed research.

[http://www.nps.edu/Academics/Centers/CRUSER/events/IndividualEvents/TechCon\\_2014\\_04.html](http://www.nps.edu/Academics/Centers/CRUSER/events/IndividualEvents/TechCon_2014_04.html)

**Short articles of 500 words for CRUSER News are always welcome - [cruser@nps.edu](mailto:cruser@nps.edu)**

- Unmanned Systems/Robotics research
- New Program/Systems/Projects
- Other aspect of Unmanned Systems/Robotics

## CRUSER Monthly Meetings

Mon 12 May, 1200-1250 (PST)

Mon 23 June, 1200-1250 (PST)

Root 242, VTC, or dial-in 831-656-6681  
*contact us at [cruser@nps.edu](mailto:cruser@nps.edu) for the passcode*

## ELEVENTH International Mine Warfare Technology Symposium

by Laurie Sheehan, Executive Assistant Undersea Warfare Academic Group, [lasheeha@nps.edu](mailto:lasheeha@nps.edu)

The INTERNATIONAL MINE WARFARE TECHNOLOGY SYMPOSIUM SERIES began shortly after Gulf War I and the USS Princeton and USS Tripoli mine strikes (and the USS Samuel B Roberts mine strike in the late 1980's). This Symposium is the ONLY, SOLELY NAVY SPONSORED MINE WARFARE SYMPOSIUM. It is sponsored by OPNAV N95, ONR, PEO, LCS, and NPS. It is organized by a small group within NPS without any commercial agency involvement. It is only held every two years, not annually or twice annually as some of the commercially run conferences are scheduled.



*U.S. Navy photo by Ron Newsome/Released*

We look to have 14-16 plenary sessions of approximately 30 minutes each over the 2 and one half days of the Symposium, one (maybe two) panel Q&A periods and about 55 - 30 minute technical and other presentations in 5 parallel sessions each day (25 per day). Topics are focused on Mine Warfare (both mining and counter mine warfare) and unmanned systems, primarily with Undersea Warfare applications. Attendees and presenters represent a full spectrum of folks engaged with these topics – operators, S&T, R&D, industry, laboratories, and academia. The Symposium is unclassified as we routinely have 25-35 international attendees.

The Web Site contains a link to the copy of the Navy approval letter, procedures for proposing Symposium presentations, registration instructions for the Symposium (with form to download, complete and return), and a link to the Hotel Registration Portal for lodging.

<https://cle.nps.edu/access/content/group/a5496906-1571-47a9-8370-03a73fbb246a/public/index.html#Start>

CRUSER will have a dedicated session with a variety of presentations from NPS Faculty and NPS students on their research as related to unmanned systems/robotics and Mine Warfare.

**STUDENT CORNER****STUDENT: DOUGLAS HORNER****TITLE: A Data-Driven Framework for Rapid Modeling of Wireless Communication Channels****CURRICULUM: DOCTOR OF PHILOSOPHY IN COMPUTER SCIENCE****LINK TO COMPLETED DISSERTATION: [HTTP://CALHOUN.NPS.EDU/PUBLIC/HANDLE/10945/38947](http://calhoun.nps.edu/public/handle/10945/38947)****ABSTRACT:**

Accurate estimation and prediction of wireless signal strength holds the promise to improve a wide variety of applications in network-ing and unmanned systems. Current estimation approaches use either simplistic attenuation equations or detailed physical models that provide limited accuracy and may require a lengthy period of environmental assessment and computation. This dissertation presents a new, data-driven, stochastic framework for rapidly building accurate wireless connectivity maps. The framework advances the state of the art in three aspects. First, it augments the classic spatial interpolation procedure known as Kriging with a complementary additive approach to capture the typical anisotropic nature of wireless channels in cluttered environments. Second, it includes a technique for rapidly creating and maintaining a connectivity map in near real-time through the use of a spatial Bayesian recursive filter. Third, it introduces a novel methodology to adapt the resolution of a connectivity map based on the spatial characteristics and the quantity of available sample measurements. Detailed analyses, using several datasets collected recently in the Monterey Harbor, have confirmed the power and agility of the proposed approach.

## 4th Annual Robots in the Roses Research Fair



10 April 2014

1400-1700

The Quad & Spruance Plaza  
Naval Postgraduate School



Plan to showcase your current and future work whether you are a senior researcher or in the thick of your thesis work. Posters, robots, vehicles, videos, and even just plain humans welcome!

### Why Sign-up for a display?

- Display current unmanned systems research
- Showcase new unmanned systems technologies
- Recruit NPS students to complete thesis research in support of your project

### Why Attend?

- A great opportunity to see multiple displays and unmanned systems/robots in action
- Local high school FIRST Robotics teams will be demonstrating their competition robots
- It's a family event with a STEM Activity for K-12 Students

**POC: Lyla Englehorn, Research Associate, [laengleh@nps.edu](mailto:laengleh@nps.edu)**

CRUSER Director of Concept Generation