University of Melbourne, UC San Diego Collaborate on Wildfire Detection, Warning

Aug. 10, 2012 **— Researchers from Australia's University of Melbourne and their partners at the University of California, San Diego, have received an Australian Research Council grant with total funding of $1.5 million to design and build resilient streaming sensor networks for emergency response.**

The project, titled "RISER: Resilient Information Systems for Emergency Response," will incorporate a system of decentralized sensor networks to better withstand temporary or permanent failures within the network during a disaster. The research will be developed hand-in-hand with funding partners including IBM, Victoria Fire Services Commissioner Craig Lapsley, and the Victorian Department of Sustainability and Environment.

The impetus for the research is the ongoing threat of wildfires in both San Diego County and Victoria (the Australian state where the University of Melbourne is located), which are both prone to drought and have dense forests of highly combustible vegetation. Large-scale wildfires devastated San Diego most recently in 2003 and 2007, and Victoria in 2009, when the Black Saturday bushfires resulted in the deaths of 173 people.

This grant leverages expertise and lessons learned by researchers at UC San Diego. In collaboration with San Diego Gas & Electric and San Diego County Supervisor Ron Roberts, the California Institute for Telecommunications and Information Technology (Calit2) and the San Diego Supercomputer Center (SDSC) have been developing technologies to help mitigate wildfires in the County since 2007.

Calit2 has customized its suite of large-scale, high-resolution displays for data visualization and modeling of wildfires, and Calit2 academic participant Hans-Werner Braun, a research scientist with SDSC and Director of the High-Performance Wireless Research and Education Network (HPWREN), has harnessed his existing network of remote sensors in San Diego's backcountry for wildfire identification and response.

The HPWREN system of sensors, originally funded by the National Science Foundation (NSF), is operated by SDSC with financial support from a diverse community of scientific researchers, public safety agencies and industrial partners. The system has supported large-scale firefighting operations by connecting numerous first-responder sites, as well as providing ad-hoc data connectivity and sensor data for eight Incident Command Posts in the region.

"I am glad people (across nations) are talking and investigating the opportunity spaces in this grant," said HPWREN's Hans Werner Braun, "so we actually can get to fire mitigation."

Bill Moran, Research Director of the Defence Science Institute (DSI), in a joint venture between the University of Melbourne and Australia's Defence Science and Technology Organisation (DSTO), noted that the "cross-Pacific funding will enable the research collaboration between our universities to be a much tighter one.

The award comes on the heels of a recent workshop held in the UC San Diego division of Calit2. Faculty from several academic departments at UC San Diego, the University of Melbourne, and the University of León in Spain – including Bill Moran and Calit2 director Larry Smarr – met with representatives of the California Department of Forestry and Fire Protection (CAL FIRE) to discuss the intersection of "ecology and technology" as it pertains to early detection and warning systems for fighting fires.

The grant will allow first responders to access dynamic environmental data that were previously unavailable in real-time. This includes experimenting with algorithms for aggregating the data and developing a distributed cyber infrastructure that delivers the data to those making decisions in the field. The resulting live information system test bed will allow first responders to evaluate the technical, social, institutional and operational components of disaster response.

Although researchers in Australia have contributed their own breakthroughs to early detection and warning measures for fighting fires – particularly in the area of fire modeling – Kevin Tolhurst, an associate professor with Forest and Ecosystem Science at the University of Melbourne, noted that the Victorian Bushfire Royal Commission "has called for more forward-looking research."

The Commission has shown interest in expanding its existing network of sensors to a system as robust as HPWREN, but perhaps with the added advantage of culling data from users of geo-located mobile devices. (HPWREN operates primarily in remote backcountry areas where mobile data coverage is spotty and/or of insufficient bandwidth to be of great utility.)

Calit2's Jessica Block, who organized the workshop, said that the two research groups eventually plan to "co-locate custom sensors in both regions for comparative analysis and will also combine the best of both sensor boxes into one super-sensor box that will collect a variety of meteorological and environmental data."

"The way forward with this collaboration is to look at lessons learned from the strategic planning process and operational implementation," added Smarr. "We can then improve the quality of the input data we're working with, decide how to represent uncertainty when data are not sufficient, and use our increasing opportunities for collaboration and exchange to address critical research needs. "Wildfire modeling is still the bedrock for this type of research, but these dense sensornets and other new techniques are going to enable us to make some significant leaps."

Pacific collaboration…

"Ron, can you come to Australia and speak at our International Perspective Seminar in November?".

Wow! You want me to speak there and who will pay for this trip?

"The University of Melbourne will pick up your expenses."

Wow! that sounds great, can I bring my wife along too?

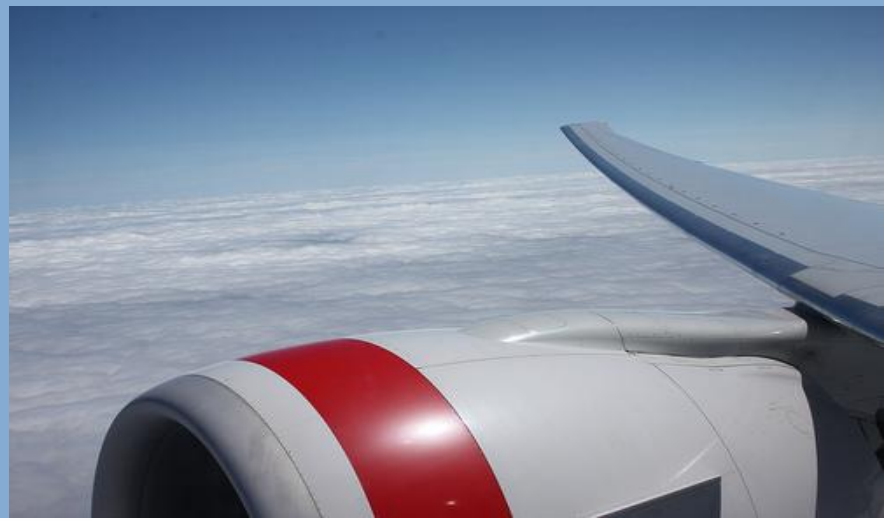
"Sure that would be fine, you just pay for her airfare."

Okay I'll plan out our trip there and thanks .

Great, you know it's a 15 hour non-stop flight?

LOS ANGELES

15 HOUR SCENIC FLIGHT



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SURVEILLANCE STRATEGIES FOR IMPROVED EMERGENCY MANAGEMENT AN INTERNATIONAL PERSPECTIVE SEMINAR

20th November 2012 - 8.30am to 1.00pm

Coles Theatre - Melbourne Business School

University of Melbourne, 200 Leicester Street, Carlton

The Emergency Services Sector has the opportunity to significantly improve the availability of critical information for incident management by exploiting surveillance strategies emerging. Traditional areas which have informed the sector, such as Defence and Environmental Monitoring, are rapidly evolving.

However, other areas such as Social Networking and Logistics, offer significant promise. The Seminar will bring together Emergency Management Practitioners from California and Victoria to discuss state-of-the-art approaches for improving information collection to:

- **Reduce the likelihood of major emergencies (surveillance BEFORE),**
- **Manage to maximize effective response (near real time surveillance DURING)**
- **Mitigate the impacts (surveillance AFTER)**

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Defence Science Institute

The Defence Science Institute (DSI) is a collaborative research initiative of the University of Melbourne and the Defence Science and Technology Organisation in the Department of Defence. DSI aims to build defence research networks between academia, research agencies, industry, and key defence and national security stakeholders.

It also aims to undertake world class research in critical scientific and engineering areas relevant to defence. These aims are achieved by assembling research teams between military end-users, DSTO, academia and industry. DSI is creating a collaborative environment that promotes the application of cross-disciplinary research to solve complex long-term challenges in the defence sciences and national security sector.

DSI has a strategic research program with the following research themes:

- Intelligent Information Systems
- Active and Multifunctional Materials
- Human Protection and Performance
- Propulsion and Energy Systems
- Chemical and Biological Defence
- Sensors

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Professor Bill Moran
DSI-Research Director
wmoran@unimelb.edu.au

Professor Bill Moran, from the Department of Electrical and Electronic Engineering, has been appointed as Research Director of the Defence Science Institute (DSI), a joint venture between the University of Melbourne and the Defence Science and Technology Organisation (DSTO).

Professor Moran is an expert in radar technology, coding and information theory, waveform adaptive sensing, information geometry and compressive sensing, high resolution radar for environmental monitoring, scalable robust video surveillance over constrained networks, mathematics of distributed radar, radar on a chip (ROACH), detection and tracking of targets using distributed antenna, sonar simulation modelling, rapid prototyping, and sensor networks.

"Our collective effort will continue to span data capture, analysis, modeling and visualization," added Moran, "and we're keen to explore and develop further capabilities to help us aid first-responders with their decision-making."

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Dr Allison Kealy
Research Advisor
The University of Melbourne
a.kealy@unimelb.edu.au

Dr Allison Kealy holds a PhD in Geodesy from the University of Newcastle upon Tyne, UK and a Bachelor of Science in Land Surveying from the University of the West Indies, Trinidad. Dr Kealy is a senior lecturer in the Department of Infrastructure Engineering at the University of Melbourne and Assistant Dean (Academic) within the School of Engineering.

Dr Kealy's research interests are in the areas of multi-sensor fusion for positioning, high precision satellite positioning systems, positioning data integrity and wireless sensor networks. More recently Dr Kealy has been involved in multi disciplinary research in the area of disaster planning, management and recovery receiving $400k of funding in 2011.

"It's amazing how much of an overlap there is between California and Victoria, not just in terms of the universities, but in climatologically and in the threat of wildfires," said Dr. Allison Kealy.

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Craig Lapsley
Victoria Fire Comissioneer

In 2010, Craig was appointed as the first Fire Services Commissioner for Victoria. The Fire Services Commissioner has legislative responsibility to provide leadership to the three fire services being CFA, DSE and MFB and is the senior operational firefighter in Victoria who will exercise control over major fires as the State Fire Controller.

Craig Lapsley has enjoyed an impressive career in the Emergency Management sector for nearly 30 years. The majority of this time has been as an employee of Country Fire Authority (CFA), and he served as a volunteer firefighter prior to that. Craig finished his employment with CFA in August 2007 at the rank of Deputy Chief Officer.

The Fire Services Commissioner role includes developing a three year rolling reform program for the three fire services; developing and reviewing performance standards; developing and reviewing incident management training, development and accreditation; developing incident management facilities and systems and manage the state control centre. Craig prides himself on being a dynamic leader in the Emergency Management industry and is a strong believer in the integration of the community into all levels of Emergency Management in an all hazards, all agencies approach.

CFA MFB SES State Government Victoria Department of Sustainability and Environment

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That’s all mate!