NPS Showcases Latest in High-Tech Digital Cinema at CineGrid

By Joan Ackerman

A demonstration of “Project 8K” – the world’s first dual synchronized 4K streaming video – was a highlight of the fourth annual CineGrid International Workshop held at the California Institute for Telecommunication and Information Technology (Calit2) in December, and experts at NPS helped make it happen.

Using two of the only three JVC prototype 4K cameras in the world, two 8K’s of 2160 pixel images were streamed live during a 45-minute remote observation from the Monterey Bay Aquarium (MBA) via NPS to Calit2 at the University of California San Diego, and from there to Nippon Telegraph and Telephone (NTT) Network Innovations Laboratory in Yokosuka, Japan.

“Every year, we set out to impress Hollywood with what we’re doing in the research community,” says Calit2 research scientist and a founding member of CineGrid, Tom DeFanti. CineGrid is a non-profit international consortium that seeks to build an interdisciplinary community focused on the research, development and demonstration of networked collaborative tools, enabling the production, use and exchange of very high-quality digital media over high-speed photonic networks. “This year, we showed our fully-evolved capabilities in distance collaboration for 4K editing and sound,” Lautin Here, President of CineGrid, was instrumental in arranging the event and providing the technical guidance. Jeff Weekley, Research Associate at the MOVES Institute supervised the special demonstration.

To produce the streamed images, NTT lent their JVC cameras, Mark I and Mark II, high-quality video recorders and a variety of Nikon F-mount style lenses to NPS to stream and record the underwater habitat. With the support of Fred Colm of the City of Monterey, Doug Weismann of ITACS and the NPS “Project 8K” team prepared and tested the network which required upgrades at the Aquarium and an accelerated timetable for planned upgrades to the city’s network infrastructure. Alignment of the dual 4K images was rehearsed in the Dark Mirror Lab in Halligan Hall, so that the field recordings and the live streams could be aligned in real-time.

Field experiments included images of Anoosom Beach at sunset, and marine life at Moss Landing, where focus and aperture challenges were resolved. Additionally, a large contingent of the NPS Cycling Club rode out to Aulomaon on the first day of field tests to provide drama and fast action. At CineGrid, the 8K images streamed from the MBA involved synchronizing two JPEG2000-compressed images from the Vertiv Dwellers exhibit over the network at 400-450 megabits per second per stream viewed simultaneously in San Diego and Japan. The scientific and interpretative narration was delivered by James Cove, head of Interpretative Programs at the MBA.

The CineGrid event demonstrated not only the use of cutting-edge technology but also “the depth in networking at NPS, factors which can be used to strengthen partnerships with peers and to forge new partnerships around the globe,” said Weekley.

4K video is both spatially and temporally higher quality than high definition (HD) video. In fact, dual 4K streams have 18 times as many pixels as HD. At 60 frames per second, images are projected at 2.5 times the rate of films or IMAX movies.

NPS President Dan Oliver and Director of Media, Marketing and Community Relations Alan Richardson prepare for an interview for “Inside NPS,” a half-hour monthly television program set to debut on the Pentagon Channel on March 5.
In support of the NPS mission, the Graduate School of Operational and Information Sciences (GSOIS) strives to prepare future military leaders to succeed in an uncertain and rapidly changing information intensive environment. Here are some examples of what we are doing today.

Vice Adm. David ‘Jack’ Dorssett, the Deputy Chief of Naval Operations for Information Dominance (N2/N6) and leader of the newly created Information Dominance Corps (IDC) noted that the CNO has directed the Navy to be preeminent in the fields of Intelligence, Cyber Warfare, Command and Control, and Information & Knowledge Management (KM). This is very good news for GSOIS since our departments are heavily involved in all of these areas.

We are also cooperating with GSEAS to establish educational and research programs that support the IDC, and give us an asymmetric advantage in cyber defense and warfare. Additionally, the Center for Edge Power is sponsored primarily by the Office of the Assistant Secretary of Defense for Networks and Information Integration to foster, coordinate, and promote multidisciplinary research on all elements of network-centric operations. KM represents another acrimonious focus of research and research at GSOIS, and includes a master’s degree curriculum track and certificate program on Knowledge Superiority. The Operations Research (OR) department’s work on critical infrastructure systems strives to improve resilience under attacks from intelligent terrorists.

GSOIS prides itself in its direct support to the warfighter. Defense Analysis department projects include faculty trips to Iraq to support the development of their counter-terrorism force, reach back support for Combined Joint Special Operations Task Force-Afghanistan information operations, the completion of a Special Operations Forces counter-insurgency study that informed DoD’s Guidance for the Development of the Force process, and recent sponsored research on a wide range of operational-related issue areas, including the insurgency in Iraq, mass shootings, unconventional warfare, information operations and military transformation.

A group of computer science faculty and students are spearheading a multidisciplinary and potentially multi-million dollar research program that aims to transform the data communications of our frontline troops by leveraging commercial-off-the-shell cellular technologies. The OR department continues to provide analytic reach-back to our forces in Iraq and Afghanistan.

The Distributed Information Systems Experimentation (DISE) research group within the Information Sciences department focuses on collaborating with operational commanders to develop objectives for complex field experimentation. DISE develops understanding of complex systems, methodologies and tools with the goals of optimizing decision-making effectiveness and creating theory from joint field experiments such as Trident Warrior and Empire Challenge (EC). DISE uses a consistent framework for analysis developed over the last 11 years to collaborate with all stakeholders in planning. Future efforts include providing network analysis for EC 10; combining multiple technologies – both real and synthetic – to demonstrate the usefulness of these technologies (e.g., Joint Multi-Mission Electro-optic System [JMMS]).

On the teaching technology front, the OR department teamed with ITACS on the Technology Enhanced Active Learning (TEAL) classroom project outlined below. TEAL is a new type of classroom design to promote active learning through small group student collaboration using integrated IT assets that provide multiple presentation options, not just lecture-style presentations. I invite you to contact GSOIS’ departments directly for further information on these projects.

**Announcements**

Prof. Clark Robertson was appointed Chair, Department of Electrical and Computer Engineering, effective January 4, 2010. He will replace Prof. Jeffrey Knorr, who, after serving as Chair for 8 1/2 years, is now leading the standup of the ECE Department’s new Center for Cyber Warfare.

**Ops Research Unveils Future Classroom Design**

By Joan Ackerman

Thanks to leadership and faculty in the Operations Research department, room 128 in Glasgow Hall has been transformed into a Technology Enhanced Active Learning (TEAL) classroom, an environment that facilitates active collaborative learning in a studio-like setting where students are situated in a circular tables with laptop and wireless capabilities. The TEAL classroom houses specially built interactive tables with laptop and wireless capabilities for teams of 3-9 students, two projectors and four flat-screens; each group/pod has its own display and whiteboard.

OR Chair Rob Dell and Associate Professor Ron Fricker learned about TEAL’s pioneering design and visited the Web site (http://scaleup.ncsu.edu/) outlining the MIT-inspired design and research results using the TEAL concept. They identified the space and used FY09 funds from the nine-month model and additional research support to partner with ITACS to make the TEAL classroom a reality at NPS.

"Seeing this room really shows how far we’ve come since I joined NPS in 1990. Twenty years ago, when I began teaching, there was only one option ... blackboard and chalk. Once we saw TEAL, we felt we owed it to our students to find the space and resources to adopt the design at NPS,” said Dell. “This really is a beautiful classroom ... I think this will be a wonderful facility for our students.”

Graduate School of Operational and Information Sciences Dean Peter Purdue echoed Dell’s sentiments at the TEAL ribbon-cutting ceremony on January 6, adding, “TEAL will only enhance what we’re doing with our students.”

Purdue, Fricker and Dell all hope that the new classroom serves not only for the benefit of their students, but also as an example that can be replicated for the “common good” of all NPS students.

“Not only is this of great value to the OR department, but it’s also something we can demonstrate to the rest of the institution and [show] there are other ways to putting together a classroom, there are other ways of getting your students involved,” said Purdue.

“I hope this room will serve as an example that will soon be replicated at NPS for the benefit of students in other departments” agreed Dell.

Jonathan Russell, Director of Academic and Media Systems at NPS and his team of ITACS staff brought the classroom to reality, facilitating the design and construction of the futuristic learning facility. When describing the advanced facility, Russell referenced an old proverb that essentially sums up the thought behind the room’s potential.

“On the main presentation display, we have an old Chinese proverb that basically sums up the thought behind the room’s potential. ‘Tell me and I may remember; but involve me and I will understand,’ Russell said.

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Associate Professor Ron Fricker teaches a class in the new Operations Research Technology Enhanced Active Learning (TEAL) classroom. By taking advantage of modern technologies and collaborative learning dynamics, the new classroom could very well set the standard for future learning environments.

**Calendar**

- **February 1**
  - Adm. James G. Stavridis
  - Supreme Allied Commander, Europe

- **February 3**
  - Rear Adm. Devin P. Carr, Jr.
  - Chief of Naval Research

- **February 7-10**
  - Polish Ministry of National Defense Delegation

- **February 8**
  - Lt. Gen. Michael A. Vane
  - Director, Army Capabilities Integration Center, U.S. Army Training and Doctrine Command

- **February 11**
  - Del Monte Club Luncheon

- **February 15**
  - President’s Day Observed

- **February 17**
  - Israeli Delegation

- **February 18**
  - Senator Saxby Chambliss (R-GA)
  - Senator Lindsey Graham (R-SC)

- **February 20**
  - Polish Ministry of National Defense Delegation

- **February 24**
  - Special Operations Forces Counter-Insurgency Symposium

- **February 25-26**
  - Army Communication Conference

- **February 26**
  - Polish Ministry of National Defense Delegation

- **February 28**
  - Lt. Gen. Michael A. Vane
  - Director, Army Capabilities Integration Center, U.S. Army Training and Doctrine Command