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The Cebrowski Institute

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The Cebrowski Institute

Peter J. Denning
December 1, 2016



Mission

Incubate innovations for conducting military affairs in the age of digital technologies



“Information” and “Innovation”
are our middle names



Keys to Incubation Success

- Surfing for Emergences
- Interdisciplinary Networks
- Serendipity
- Design
- Innovation



Incubations

- Energy
- Cross Sector Operations
- Civil-Military Affairs
- JIEDDO
- VIRT
- Technology Transfer
- Natural Language Processing
- World Wide Consortium for the Grid
- STEM internships
- Cyber Adventurers
- Hastily Formed Networks
- Mobile devices
- Mobile Wireless Comms
- Navy Tactical Cloud
- Information Dominance
- Design Thinking
- Innovation Adoption
- Data Science
- Next Generation Leaders
- Climate Change
- Big Ideas



Energy

- Sue Higgins (IS), Mitzi Wertheim, started 2005
- Helping USN significantly reduce energy footprint
- Adoption focus: technology, policy, culture
- Seeded by energy web community development and speakers – e.g., Amory Lovins (now on staff as PoP)
- Facilitated “The Energy Conversation” 2008 in DC (Mitzi Wertheim, an early advisor to institute, now on staff as PoP)
- Van Bibber attended 1st Navy Energy Summit at ONR and got NPS involved, leading to EAG today
- Led design & development of Navy Executive Ed (now in CEE)
- Designing Navy-wide energy culture change initiatives



Cross Sector Operations

- Scot Miller (IS) started 2007
 - Helped USN & DoD design coordination and collaboration as Navy increasingly engages in multi-agency, multi-partner operations
 - Example: DoD Directive 3000.05 (2009) delineates DoD support of Stability, Security, Transition and Reconstruction (SSTR)
 - Includes Phase 0 (pre-conflict) work
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Civil-Military Affairs

- Karen Guttieri (GSBPP), started 2008
 - Helped USN/DOD think through public policy and civil-military issues in military ops
 - Developed early multi-disciplinary course; now Masters curriculum for Civil Affairs community
 - Now part of GSBPP; Guttieri recently received award from Civil Affairs community
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JIEDDO

- COL Andy Hernandez USA, (OR), started in 2009
 - Detecting and destroying IEDs and the networks that built them
 - Launched an interdisciplinary cross campus IED study initiative
 - Transitioned into National Security Institute until the initiative was complete
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Valued Information at the Right Time (VIRT)

- Rick Hayes-Roth (IS), started 2008
- Reducing cognitive overload from information glut associated with big data
- Dan Boger continues the project in IS Dept: the concern is growing
- Initial sponsor USMC, now Intel Community



Technology Transfer

- Peter Denning (CS), started in 2011
- Helped DARPA evaluate its effectiveness at transferring its new technology to military customers
- Nick Dew, Dan Nussbaum, and students from CS, IS, OR, GSBPP
- DARPA had 30% success rate (industry 4%)
- GSBPP faculty continue technology transfer research with other sponsors



Natural Language Processing

- Craig Martell (CS), started 2007
- Identifying authors and intentions from captured chat texts
- Big issue in data mining
- Detect terror networks from chat
- Measure learning in MOOCs



World Wide Consortium for the Grid (W2COG)

- Chris Gunderson (IS), started 2006
- Confederation of DOD units to promote working standards and test ranges for the next generation of defense Internets
- Cooperation with NCOIC, Network Centric Operations Industry Consortium, with similar aims for defense contractors
- Transitioned to W2COG.ORG, a 501(c)(3)
- Network Centric Operations topic continues in several NPS departments



STEM Internships

- Alison Kerr (CI), started 2005
 - Launched summer intern program with Hartnell CC Salinas, Hispanic students, 1st generation Americans
 - Navy encourages outreach to develop young people who might later engage with Navy
 - Wide participation across campus
 - Grew from 2 interns (2005) to > 100 (2013)
 - Top Navy STEM Intern Lab
 - Transition to DOR in 2013
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Cyber Adventurers

- Off shoot of STEM -- Peter Denning and Sue Higgins – assisted by 2 NSF grants 2006 and 2009
- Excite K-12 students about CS, addressing Navy CS & STEM concerns
 - After school and summer programs
 - Mentors: CSUMB undergrads, high school students
 - Cyber security games – Peterson and Gondree
- Became part of mission of Military Cyber Professionals Association (MAJ Joe Billingsley, USA)
- Transitioned to NPS Cyber Club and local non-profit, Lyceum
- NPS students starting to grow Cyber Adventurer models at follow-on duty stations



Hastily Formed Networks (HFN)

- Brian Steckler (IS), started 2004
- Suitcase Internet comms for HA/DR
- HA/DR now a Navy strategic objective
- Student teams to Tsunami, Katrina, Haiti, Philippines, CA wildfires, and exercises
- Visible “trademark” of NPS
- Ongoing Cebrowski Institute project



Mobile Devices

- Gurminder Singh (CS), started 2004
- Move important computations from mainframes and desktops to portable devices
- Grown from early curiosity to major theme today
- Partnership with CORE lab
- Ongoing Cebrowski Institute project



Mobile Wireless Communications

- Geoffrey Xie (CS), started 2010
- Initiated by student Capt Josh Dixon (USMC) who had dual major CS-Business
- Make MWC a seamless part of USMC & Army field ops
- CS, IS, SE, DA, ECE, GSBPP, TRADOC
- Ongoing Cebrowski Institute project



Navy Tactical Cloud

- Warren Yu (CI), started 2011
 - Helping Navy transition to cloud services and cloud operations
 - Grew strong partnership with Fleet Numerical Meteorology & Oceanography Command (FNMOC), Monterey, Navy's largest supercomputing faculty
 - Involvement by faculty in IS, CS, OR, DA, ITACS
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Information Dominance

- N2/N6 OPNAV studies, started 2013
 - Partner with NPS Information Dominance Center for Excellence (IDCFE, CAPT Tim Unrein, USN) to spur faculty participation in N2/N6 part of OPNAV studies program
 - Over 100 faculty proposals in the first round
 - Ongoing Cebrowski Institute collaboration
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Design Thinking

- Nancy Roberts and John Arquilla (DA), 2012
- Developed first NPS design studio in CI, modeled after Silicon Valley IDEO and Stanford D-Center
- Especially useful for finding solutions to wicked problems
- Initial project: Army 2020 (GEN Odierno)
- Design approach increasing in classes and projects across campus
- Ongoing Cebrowski Institute collaboration



Innovation Adoption

- Peter Denning (CS) and Nick Dew (GSBPP), 2009
- Adoption is the real challenge of innovation – design is the “easy” part
- Big challenge in Navy to overcome bureaucratic inertia and maintain leadership in use of technologies
- E-week workshops “innovation by design” since 2009
- Ongoing Cebrowski Institute project



Data Science

- Emerging wave, 2013
 - The science behind big data
 - Driven by accelerating trend of digitization of almost everything
 - Generate, collect, search, analyze, mine exabytes of data
 - Navy must master this digital world for operational superiority
 - Cooperation of data analysts, system architects, and application specialists
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Climate Change

- Emerging Wave, 2014
- Increasingly impacting military affairs
 - Arctic ice melt
 - Sea level rise, land loss
 - Extreme weather events
 - Droughts leading to famine leading to migrations of refugees
 - Spread of infectious disease
 - energy



Next Generation Leaders

- Emerging wave, 2014
 - Grow senior officers capable of thinking strategically in the world that will exist in 20 or more years
 - Digital technologies everywhere
 - Most operations are digital
 - Adversaries operate by swarming in small networks hidden in Internet
 - Full of uncertainties, surprises, disruptions
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Big Ideas

- Helping Navy leadership think and position for what is coming
 - Surfing emerging waves of technologies and possibilities, in search of new ideas that may change the world and military operations
 - Avoiding technology surprises
 - Setting future education requirements
 - Positioning for emerging technologies
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