



**NISSSC**  
NATIONAL INSTITUTE OF  
SCIENCE, SPACE & SECURITY CENTERS

## Annual Progress Summary

**To:** [technicalreports@afosr.af.mil](mailto:technicalreports@afosr.af.mil) and Dr. Robert Herklotz, Program Manager

**Subject:** Annual Progress Statement to Dr. Robert Herklotz, Program Manager

**Contract/Grant Title:** Institute for Science, Space and Security (ISSS), now known as National Institute for Science, Space, and Security Centers (NISSSC)

**Contract/Grant #:** FA-9550-06-1-0477

**Reporting Period:** 1 August 2008 to 31 July 2009

**Annual accomplishments:** The AFOSR grant, residing on the University of Colorado at Colorado Springs (UCCS) campus, continues to support the NISSSC Centers, and continues to work toward fulfilling the award objectives. Each Center successes and the NISSSC as an umbrella organization for all the Centers are during the past year will be discussed below.

### Selected highlights of successes in the 3<sup>rd</sup> grant year

- Daily operations and collaborations of the Institute and Centers. Conducted weekly NISSSC Staff Meetings and hosted NISSSC Board of Advisors meeting in July 2009.
- Developed NISSSC 2009-2013 Strategic Plan in Aug 2009.
- Successfully renewed a gift sponsorship from Northrop Grumman for \$5,000.
- Developed an Institute Communication Strategy, which included media products (e.g., new website “<http://nisssc.org>”, developed poster display, media materials, educational materials, NISSSC postcard) to be used for all for internal and external distribution.
- Developed a strategy for Center Directors, NISSSC Executive Director, and principal investigator (PI) to engage with federal agencies.
- Held an NISSSC Advisory Board meeting in July 2008 and subsequently met with each board member individually to discuss, educate, and ask for support in educating stakeholders regarding Institute research and educational programs.

- Held discussions with the former USNORTHCOM Staff Judge Advocate to identify and seek out potential collaborations in course development in homeland security.
- Provided the UCCS Chancellor with a proposal to replicate the STEM education program developed for K-12 children by Center for Science, Technology, Engineering and Math (CSTEM).
- Co-hosted the 1<sup>st</sup> Sally Ride Festival with UCCS and NISSSC/CSTEME. The highly successful event was designed to encourage young women (5<sup>th</sup> to 8<sup>th</sup> grade) to come together for a day of science. Attendance was approximately 400 students, parents, and teachers.
- September 2008, attended the quarterly UCCS-AF Space Command Steering Committee Meeting.
- September 2008, presented “Crisis Communication: Katrina” to 150 senior level public affairs officials in government and private sector hosted by the International Association of Business Communicators.
- Center Director participated as panel expert for *Colorado Springs Small Business Journal* on the topic of “Homeland Defense and the Front Range”. Publication appeared in December 2009.
- Met with UCCS Deans and Department Chairs regarding NISSC mission and potential opportunities to partner in research and educational services.
- Held discussions with the USNORTHCOM Surgeon General to seek potential collaboration in course development in the area of homeland security and use of the military.
- October 2008 represented NISSSC at the “Honor Troops Dinner”. Audience included senior military, community and private sector (attendance approximately 500).
- October 2008, presented “NISSSC 101” to senior State of Colorado Homeland Security official, Mason Whitney looking to increase collaboration between his office and NISSSC.
- 27 October 2008, Panel Chair for Emerging Technology Day. Introduced four academic papers and established relationships with technology and homeland defense leaders for future collaboration (attendance approximately 700).
- 29 October 2008, presented “NISSSC Now and Into the Future” to 300 attendees at first Career Summit at National Homeland Defense Symposium. Established NISSSC as a leader in the field.
- 29 October 2008, presented “State of NISSSC” to 1,000 local, regional, national and international stakeholders at *National Homeland Defense Symposium*. Only Institute to be invited to address the conference audience. Results: Selection for membership in two US Colorado Congressional Task Forces.
- 30-31 October 2008, represented NISSSC at the USNORTHCOM International Civil Support Forum (attendance approximately 75). Discussions focused on cooperation and collaboration cross-border in the homeland security field.
- 4 November 2008, presented “NISSSC 101” to High School Counselors breakfast (attendance approximately 50).

- 6 November 2008, presented “NISSSC 101” to Congressman Lamborn’s Task Force on Global Strike Command (attendance approximately 12).
- 10 December 2008, presented “NISSSC 101” to Congressman Lamborn’s Task Force on Cyber (attendance approximately 10).
- NISSSC representative to UCCS “Smart Grid” project to provide potential research resourcing from the Institute in a Colorado collaboration of academia, private sector and government. Participated in numerous meetings to share Institute expertise and capabilities.
- Hired two new post-doc candidates to increase Institute research capability in the fields of terrorism and trauma psychology. Start date in summer 2009.
- Invited to participate in development of a local research park within the abandoned Intel Plant with potential use by the Institute in our research activities. Project is still in development with possible fall 09 occupation by various community partners.
- 5-8 Jan 09, Dr Nelson, (Principal Investigator) and Mr Mike Perini (Executive Director) traveled to Wash, DC to meet with Dr Herklotz (AFOSR) (Program Manager) to discuss NISSSC and review grant objectives. Also met with staff from DHS, DOD, NSF and FEMA to discuss value of the Institute and potential partnering.
- 21 Jan 09, represented NISSSC at USNORTHCOM graduation ceremony for HD Certificate program managed by NISSSC/CHS.
- 24 Jan 09, completed College of Education seminar on CRTLC.
- 30 Jan 09, conducted National Public Radio, Colorado, interview on NISSSC and cyber research and educational services role. Interview to air in Feb 09 and be available in archives.
- 3 Feb 09. Held NISSSC Board Meeting.
- Established relationship with Director of THE CELL, the Nation’s first terrorism museum located in Denver. Opportunities for collaboration and education being pursued.
- NISSSC Director Mike Perini selected member of Colorado Congressman Lamborn’s Cyber Task Force.
- Met with *The Gazette* reporter, Ms Pam Zubeck to discuss potential article on NISSSC. Article developed then published July 2009.
- Met with CU Foundation officials to develop brochure to educate and inform UCCS friends on NISSSC activities and value of partnering. Brochure planned for summer 2009.
- 17-19 March 09, attended the Department of Homeland Security (DHS) University Summit to discuss potential research and educational services by the Institute with DHS-affiliated universities. New leads for collaboration were developed.
- Held discussions with the AFSPC educational lead official to discuss syllabus updates to meet USAF needs in space and cyber-related mission areas.
- Met with ISS and BoCore senior officials to discuss potential, research, educational services and intern program. Discussions resulted in collaboration/interns with EAS.

- Created the Cyber and Information Security Initiative (CISI) to integrate the efforts (many of which are currently “stove piped”) across the Colleges and the Institute in this important endeavor. The new informal group will share information regarding potential grants, contracts and sponsorships as they relate to the cyber-infrastructure; review current and future curriculum to stay competitive and meet changing customer needs; be more visible in informing and educating others on the cyber expertise at UCCS and NISSSC; expand use for research and teaching use of our new Blade Server and Labs once operational; develop an overarching campus strategy with regard to Cyber to meet the needs of our community (i.e., local, state, regional, federal); address research questions and review research assistant needs.
- NISSSC Director accepted nomination to be board member for the National Space Science & Technology Institute (NSSTI).
- Held various meetings during the quarter with USNORTHCOM and community partners to discuss an International Center for the Homelands and Support of Civil Authorities (ICOE). Expect the ICOE to be a virtual concept and first with possible staff and building later.
- Participated in National Space Symposium, March 2009 with educational booth and information presentations to a national and international audience of stakeholders in the space field. Audience included senior military, industry, community and private sector (attendance approximately 7,000). Used the opportunity to create awareness about the Institute for future partnerships.
- Continued to work a short and long term funding strategy for the Institute by exploring new ways to collaborate.
- 3 April, NISSSC Center representatives participated in UCCS “Mountain Lion Research Day” showcasing research funded by Institute to campus community, military and private sectors, and business audience.
- 8 April 09, presented “NISSSC 101” to Terrance McWilliams, El Pomar with goal of seeking further support in the trauma area with the local military community. THHC’s “Support Net” program was highlighted.
- 23 April 09, presented “NISSSC 101” to David Streat, AFOSR, along with CSTEME director.
- 24 April 09, presented “NISSC and Space” to Colorado Space Coalition a non-profit organization with more than 200 space professionals. Highlighted the Institute’s research and educational services in the space field and outlined concept for future statewide collaboration.
- 30 April 09, conducted interview with “Colorado Springs Style Magazine” on cyber. Article published in Jul/Aug issue with national distribution.
- 7 May 09, presented “NISSSC 101” to MOAA, largest chapter in the nation of retired military officers (attendance approximately 100).
- 11 May, attended the AFSPC/UCCS Steering Committee Meeting as the Institute representative along with the PI and CSS director.
- 14 May, represented NISSSC and UCCS at Mizel Museum Dinner. NISSSC was highlighted on informational materials provided at the dinner.
- 2 Jun, part of UCCS delegation, to include the UCCS Chancellor meeting with USNORTHCOM commander to discuss future research and educational

cooperation. Verbal agreements to continue to build on our strong history of partnering.

- 24 Jun, part of UCCS delegation, to include the UCCS Chancellor to meet with AFSPC commander to discuss future research and educational cooperation. Verbal agreements continue to foster our strong history of partnering.
- 22 Jun, moved NISSSC staff into new SCI-ENG building allowing for the first ever central location of the entire Institute within a single on campus facility.
- 3 Jun 09, presented a second presentation this quarter to the Colorado Space Coalition on educational needs and solutions in Colorado.
- 5 Jun 09, presented “NISSSC 101” to Colorado Congressman Bennet’s staff visiting UCCS.
- 27 Jun 09, speaker at annual Phil Long “Consummate Team Player” dinner. Auto dealers from throughout the region attended. Remarks highlighted NISSSC through several case examples where team work was vital to success.
- Began the “National Conversation Series” and “Senior Management Seminars” initiatives to further expand the Institute’s role in educating a national audience and enhancing educational opportunities. Both ideas have potential sustainability benefits.

The **Center for Homeland Security** (CHS) advanced its reputation as a nationally recognized leader in homeland security and homeland defense education programs. Below are the successes accomplished during the reporting period.

### **Successes this 3<sup>rd</sup> year**

- Met with British and Dutch colleagues to plan a new international study on the effect of thoughts related to 9/11, Iraq war, 7/7 UK attacks, and one’s own death on support for terrorism and military interventions in the Middle East, among American, British, Dutch, Turkish, and Iranian people. Data collection completed for first wave of this study.
- Continued progress toward an USAF-wide Incident Command / Emergency Operations Management project. White paper submitted and well-received by Pentagon-level (Air Staff).
- Developed and delivered 1<sup>st</sup> and 2<sup>nd</sup> iterations of Seminar in Transatlantic Civil Security to the George C. Marshall Center for European Security Studies in Garmisch-Partenkirchen, Germany. The 17-day course included approximately 43 participants from over 20 nations. The course content provided “best practice” information in the areas of Homeland Defense and Defense Support of Civil Authorities.
- Continuing work with NORAD-USNORTHCOM to develop two new homeland security-related certification programs in Intelligence and Disaster Medicine. The certificates are targeted to be offered in fall 2009.
- Submitted \$150K grant proposal to Department of Interior to build and test prototype for rapidly deployable and ecologically safe method for fighting wild land fires.
- Supported development of \$150K grant proposal to National Science Foundation to conduct workshops on Systems Approach to Security. Award Pending.

- Submitted Grant to the National Science Foundation MINERVA Program: Development, Globalization and Environment: A Systems Approach to Security, Conflict and Cooperation. \$148,722.
- Contract developed with Air Force Space Command via Booz-Allen-Hamilton: Incident Management Evaluation Program. Funding secured (\$30,000); however, the legal agreement between program partners is pending.
- 9/25 and 9/26. Delivered presentation for NORAD-USNORTHCOM Joint Professional Military Education, “Homeland Security: Building Community Resilience.”
- Research Presentation: The relationship between psychology, socio-economic development and terrorism. 7th Biennial Society for the Psychological Study of Social Issues conference.
- Initiated study on effects of thoughts of different aspects of US foreign policy on attitudes toward US and support for our policies in the Middle East among French citizens. (Pending)
- Contract negotiations to facilitate UCCS ability to engage in directly funded research for AFSPC GeoIntegration Office. Potential research contract follows from pilot-study (in 2007-08). (Pending)
- Emergency Response Systems needs analysis for the Air National Guard. Meetings between Dr. Sambrook, Mr. Robillard and Mark Barner at USAFA to create partnered research effort (UCCS – USAFA).
- Developed MOU between AFSPC and UCCS for Incident Management & Emergency Response, to parallel the existing MOU with the UCCS Space Professionals Program. MOU completion to be finalized in FY09) (Pending)
- Emergency Response Operations, Systems Integration (EROSI) concept paper submitted to USAFSPC A7 (approved by sponsoring office). (Pending)
- Supported development of “Capabilities-Based Planning Process Study State of Colorado Key Stakeholder Survey”, on behalf of the Colorado Office of Homeland Security. Article submitted.
- Internal White Paper. Research in Homeland Defense & Incident Management (along with its follow-on. Resulted in \$70k AFOSR sub-award through the CSS). Project funding is to continue pilot study in Emergency Response Operations Systems Integration (EROSI) for Air Force Space Command.
- Conducted/completed Senior Seminar: *Psychology of Terrorism*. Seminar drew on published research, ongoing book research and work for Department of Homeland Security (terrorist profiling) in examining areas such as domestic & international terrorism, terrorist profiling, red-teaming. The senior seminar facilitated the completion of several papers ready for publication in the following areas: domestic religious terrorism, post-traumatic stress disorder, psychological first aid, the rising involvement of women in terrorism.
- Delivered Seminar on Issues in Critical Infrastructure Protection to the Air War College Senior Leaders Course. Continue discussions with AWC to support development of a separate homeland defense and security program.
- Delivered lecture to Albanian Defense College Senior Course on Comparative Approaches to Homeland Security for the Albanian Ministry of Defense. CHS

- proposal to deliver graduate certificate courses in support of the Defense College masters program. (Pending).
- Joint Fire Science Program partnership with U.S. Air Force Academy and Fort Carson Fire Department, Funded through Bureau of Land Management. Performance Period: Upon Award. Valued at \$150K.
  - Completed 2008 National Homeland Defense Foundation Symposium & Career Summit Survey and report in March, 2009. Poster presented at UCCS Mountain Lion Research Day, April 2009.
  - Completion of Certificate Program Review Survey for undergraduate and graduate courses in homeland security and homeland defense Analysis completed.
  - Co-hosted 1<sup>st</sup> award ceremony to present Graduate Certificates in Homeland Defense to NORAD/NORTHCOM, 21 January 2009.
  - Promoted PILLAR Lecture Series, “Yugoslavia, A Case Study on Why and How America Goes to War,” January, 2009.
  - Participated in Ft. Carson Town Hall Meeting, *Preparing our Community for 40,000+ New Soldiers & Family Members*, February, 2009.
  - Co-hosted US-Korean Relations Panel, March 13, 2009 with UCCS College of Education, Daegu English Village.
  - Engaged as a founding partner with the Homeland Security and Defense Education Consortium Association to develop national academic standards for homeland security education in March, 2009.
  - Engaged with South Central All-Hazards Region, El Paso County Sheriff’s Office, and Pikes Peak Community College to co-facilitate a HSEEP compliant table-top exercise in May, 2009.
  - Compared and evaluated the CHS Homeland Defense Graduate Certificate Program and Homeland Security Undergraduate Certificate Program to similar programs throughout the United States. Revisions noted in new renewal contract proposal with US Northern Command.
  - Completed a short article entitled: *State of Colorado Governor’s Office of Homeland Security: “Freshman Year” in Perspective*. Submitted for publication to *Homeland Security Today*, March 2009.
  - Conducted new collaborative research with Gilad Hirschberger, University of Bialan, Israel, on effects of thoughts of the Holocaust on attitudes to Palestinian-Israeli Conflict among Israelis.
  - Initiated Joint Homeland Security Studies program between UCCS and University of Zagreb, Croatia (City of Zagreb funding). Conducted three days of meetings with City/University of Zagreb, Croatia officials to structure terms for a partnership with UCCS. In the short-term, UCCS will develop and deliver several courses in homeland security and assist the University of Zagreb in establishing a regional (Eastern Europe) Center of Excellence in Homeland Security. In the long-term, UCCS will assist the University of Zagreb in maturing the Center of Excellence and designing, developing and delivering masters and doctoral degrees in homeland security. May 2009.
  - Local Education Authority Emergency Management Grant with Air Academy District 20 schools to conduct periodic emergency management table-top exercises.

- Co-facilitated Alpha Point, a Table-top emergency preparedness exercise with Pikes Peak Community College, May 2009.
- Security & Sustainability course completed (Pending: Scheduled for summer 2009. Cancelled for low enrollment).
- Graduate Certificate in Homeland Security Intelligence Completed the curriculum development with the School of Public Affairs and it was approved by the UCCS Graduate Executive Committee. 1st class to be scheduled fall 2009.
- April 2009 – Delivered lesson plans for 4-course cyber security program to National Space Security Institute.
- 13 May 09 – Concluded terms to add a career support component to all CHS courses via HSHDCareers.com
- Front Range Training & Consulting MOU established to provide CEUs for training courses. Funding is \$200 per student estimated at 20 students per month.
- Submitted \$328K Letter of Intent to The Robert Wood Johnson Foundation to develop a definition of “special needs” populations and propose model legislation for nationwide disaster planning. May 2009. There were 235 letters of intent submitted. Unfortunately, our proposal was not selected to submit a full proposal.
- Conducted new research with Matt Motyl to assess impact of support for war on compensatory commitment to unrelated moral values.
- Hired Dr. Pelin Kesebir as post-doctoral research associate to assist Dr. Tom Pyszczynski build the Center research on terrorism.

The **Trauma, Health and Hazards Center** (THHC) performs research on social science related to terrorism and disaster. This research has focused on issues related to prevention, response and recovery associated with traumatic exposure including working on disaster warning systems, first responder trauma prevention, and scientist/practitioner collaborations in post-disaster recovery. The Center has been active in developing grants, developing and hosting two national conferences for scientists and practitioners on disaster behavioral health, and publishing a number of research articles.

➤ **Successes this 3<sup>rd</sup> year**

- Completed negotiations between UCCS and BlueSun, Inc. for the *Journey to Disaster Recovery<sup>TM</sup>* website research project funded with an NIMH STTR grant. Research projects are now underway with students at Virginia Tech University who were present during the shootings in May 2007, and with victims of the Weld County tornados of May 2008.
- Ongoing discussion throughout the year regarding the development of an online research network for disaster behavioral health researchers and practitioners to collaborate on research projects. Currently, there are 20 subscribers to the network.
- Held the 2008 Continental Divide Disaster Behavioral Health Conference July 7-10, 2008. More than 200 people attended the three day conference and preconference sessions.
- Began discussions with TESSA (The local Domestic Violence Prevention Center) in October 2008 with a submission of a draft proposal to initiate a peer support program for their staff.

- BlueSun, Inc. (formerly TraumTech, Inc.) received the Colorado Bioscience Discovery Evaluation Grant to develop a commercialization plan for *Journey to Disaster Recovery<sup>TM</sup>*. This \$92,000 grant is in the award phase now and the work was initiated in July 2009 and concluded in June 2010. The granting agency is the Colorado Office of Economic Development and International Trade, which contracts with the CU Technology Transfer Office to manage the award.
- Received the U.S. Department of Health and Human Services' Substance Abuse Mental Health Services Administration (SAMHSA) Jail Diversion and Trauma Recovery-Priority to Veterans program evaluation grant. The THHC will be the program evaluator for Colorado five-year program. Colorado is one of only five states to receive this federal grant. Substance Abuse and Mental Health Services Administration is the program sponsor; our contract will be with the Colorado Department of Human Services (grantee). Grant amount is \$374,000 for five-year evaluation project; (project period began 30 Sep-08 and ended 29 Dec 09).
- Submitted a proposal as a subcontractor to Colorado State University (CSU). The CSU proposal was submitted to the National Science Foundation (NSF) Infrastructure Management & Extreme Events program. The proposal, entitled "Dynamics of hurricane risk perception." was funded at \$40,000 and contract negotiations are underway between UCCS and CSU. It is expected that the award period will begin September 1, 2009 through August 2012. Our subcontract allows Dr. Eve Gruntfest to serve as a consultant on this project to discuss technical aspects of the project design, collaborate on the development and execution of the phone interviews and the analysis of resulting data; and participate as co-author on articles resulting from the project.
- Re-coded data from Colorado Springs Fire Department peer support research study (first funded by NISSC in 2005). Data will be analyzed using more sophisticated statistical analysis to assess critical longitudinal predictors of psychological functioning.
- Completed Virginia Tech research focus groups for NIH STTR grant subcontract to UCCS. Weld County tornado research continues and we are in contact with officials conducting research post-Hurricane Ike to determine if it is a feasible site for a randomized control trial of the *Journey to Disaster Recovery<sup>TM</sup>* website.
- Dr. Eve Gruntfest presented a session sponsored by the Office of Sponsored Programs regarding ways to find funding for sponsored research projects. More than 50 faculty and staff from UCCS attended this program. December 2009.
- Dr. Benight presented results of THHC focused research projects at the 2009 International Society for Traumatic Stress Studies (ISTSS) annual meeting in Chicago November 2008. He presented sessions on the mediating role of coping self-efficacy on posttraumatic distress, the psychological effects on HIV disease progression among AIDS clinic patients affected by Hurricane Katrina. In addition, he supervised UCCS psychology students and faculty presenting posters at the conference regarding the psychometric properties of a self-efficacy scale to be used following trauma (with recent graduate Eddie Waldrep) and predicting PTSD, quality of life and disease progression among cancer and HIV survivors (with visiting faculty member Aleksandra Luszczynska).

- Received a grant from the University of Massachusetts Amherst to conduct social science research regarding emergency managers' responses to new weather technology employed during short fuse weather events that occur this spring and summer in Colorado, Oklahoma, and Massachusetts (e.g., tornados, flash floods, hurricanes). Dr. Eve Gruntfest is managing this grant. She will hire a Professional Research Assistant to help with the work. Grant amount is expected to be approximately \$68,000 for the period November 1, 2008 through August 31, 2009. In April 2009, our contract with the CASA was extended for an additional four years due to our excellent performance on the project to date. This additional funding brings the total project award to \$303,000 and the award period is now extended to August 31, 2013. Conducted new research with Drs Aleksandra Luszczynska and Chip Benight on role of breakdown of anxiety-buffering processes in PTSD among Polish domestic violence victims.
- Completed Windsor recruitment for website NIMH study.
- Secured sponsors for the 2009 Continental Divide Disaster Behavioral Health Conference. Conference collaborators include the Colorado Medical Society, the State Division of Mental Health and the Hospital Association of America. THHC's 3<sup>rd</sup> Conference will be held July 30-August 1<sup>st</sup>, 2009.
- Hired a post-doctoral research associate Dr. Jessica Lambert to assist Dr. Chip Benight build the Center research on trauma.

The **Center for Space Studies** (CSS) operates under a partnership agreement with AFSPC to promote space education and collaborative research. AFSPC has committed to continued support of the CSS space professional education program. The CSS Center also works closely with AFSPC/A9 staff to identify potential research questions of interest to the Command and which are amenable to sponsorship under the existing grant.

### Successes this 3<sup>rd</sup> year

- CSS awarded two research sub-grants to UCCS researchers in support of Air Force Space Command.
  - Tethered Satellite Orbit Determination. Sub-Grant PI: Dr. Steve Tragesser, UCCS Department of Mechanical and Aerospace Engineering. The objective of this research is to investigate methods for accurate determination of orbital parameters for space objects connected by tethers. Successful research will enable quick and accurate identification of tethered orbital objects whose observed behavior differ markedly from untethered objects and could be confused with suborbital motion. This study will assess the robustness of the estimation software developed in Tragesser, S. and Faulstich, M. "Tethered Satellite Identification with Mixed Observation Data," *Journal of Spacecraft and Rockets*, Vol. 44, No. 1, 2007, pp. 240-246. All relevant parameters of the tethered system will be varied in order to determine the convergence boundaries of the estimator. These parameters will include: tether length, orbit altitude, pass geometry, pass duration, tether libration, tether vibrations (axial and transverse), drag, and gravity harmonics. Simulated radar observations will be generated using an in-house tether dynamics simulation. The

result of this parametric study will be an n-dimensional map of the region of convergence for the current estimation algorithm. This map will provide 1) operational limitations of this software 2) information on which effects should be incorporated into the filter dynamics and 3) a baseline by which future improvements to the filter can be evaluated. Funded amount: \$37,000.

- Emergency Response Operations for AF Space Command. Sub-Grant PI: Dr. Roger Sambrook, UCCS Department of Psychology. This research will identify key requirements for AF Space Command proposed Incident Management System, and key assets that the Command can provide to local, national and international emergency and disaster management agencies. It will identify technological, organizational and psychological methodologies for investigating incident management decision-making, data fusion and information sharing. It will also address the obstacles faced by incident managers and suggest potential ways of overcoming them. The high-level goal of the study is to enhance scientific understanding of the incident management process and help AF Space Command to become a more effective user and provider of information during emergencies. Funded amount: \$65,000.
- The CSS Director conducted meetings on 15 Jul 08, 5 Sep 08 and 3 Jun 09 with AF Space Command Studies & Analysis staff to explore research questions of interest to the Command that could benefit from CSS funded sub-grant support. Projects identified focused on those showing highest potential for follow-on AF funding.
- The CSS Director attended the 22<sup>nd</sup> Annual PACA-AFRL Briefing for Industry in Albuquerque, NM from 18-20 Aug 08, and gained insight into the funding forecast for upcoming research opportunities sponsored by AFRL (including AFOSR) and NRO. Individual directorates outlined research thrusts and highlighted upcoming BAA, and SBIR/STTR contract opportunities. Representatives from contracting discussed details of the AFRL solicitation process. Engaged in discussions with Deputy Director of the AFRL Space Vehicles Directorate; outlined UCCS capabilities and the role of CSS. Engaged in discussions with representatives of Utah State University Space Dynamics Lab; proposed possible collaboration via Space Education Consortium and involvement in small satellite research.
- AF Space Command has committed to funding a 2<sup>nd</sup> cohort of AF Space Professionals in the CSS Space Professional Development certificate program. Command staff began developing selection criteria and methodology during Sep2008. AF Space Command completed student selection. At end of 4<sup>th</sup> Quarter, 17 students were identified and enrolled in this program. CSS has developed an alternative “Technical Track” for the program, which will enable some students to use several certificate courses if they choose to enroll into Masters in Space Studies, a technical masters degree offered by the College of Engineering and Applied Sciences at UCCS.
- The CSS Director together with co-investigator Dr. Gregory Plett (UCCS Department of Electrical and Computer Engineering) submitted a Small Business

- Innovation Research (SBIR) grant proposal with small business PatchPlus, Inc. to investigate employment of mathematical filtering algorithms for Space Situational Awareness (SSA). This work is sponsored by AF Research Lab (Rome Research Site) and if awarded would be performed between Jan – Sep 2009. The Proposal was very highly graded but not funded at this time.
- In September 2008, CSS Director co-chaired quarterly UCCS-AF Space Command Steering Committee Meeting. During the meeting, CSS Director presented an overview of the governing MOU and summarized education and research accomplishments since last meeting.
  - CSS approved funding for UCCS graduate research supporting US Air Force Academy's FalconSat V, a small satellite research program. UCCS PI: Dr. Andrew Ketstever, Department of Mechanical and Aerospace Engineering. Project Title: "Advanced Heat Transfer Model for FalconSat V." Tasks include development of a high fidelity heat transfer model of the FalconSat V satellite and payloads, development of a high fidelity orbital and sun-pointing model for satellite parameters, investigation of the satellite thermal environment in sun and in eclipse, investigation of the effects of a higher power central processing unit (CPU) on FalconSat V, investigation of the effect of high power operation of battery pack on satellite systems, and recommendations to USAFA on thermal control strategies. Funded amount: \$7,000.
  - In December 2008, the CSS Director attended a Design Review for FalconSat 5 at the US Air Force Academy.
  - In December 2008, the CSS Director attended a special research Open House hosted for industry and education leaders by the USAFA. Areas visited included aeronautics laboratory, astronautics laboratory as well as plasma physics and laser optics facilities.
  - On 22 October 2008, the CSS Director participated on a panel for the Rocky Mountain Technology Alliance Space Education Workshop, hosted by Congressman Doug Lamborn in Colorado Springs. Congressman Lamborn emphasized the importance of growing expertise in the sciences related to our most vital missions and industries within the Rocky Mountain region and affirmed his support for STEM education initiatives along the front range. The various panels addressed space education needs, space education available today, and followed with recommendations for the future. Full minutes are available on request. The group arranged to convene a small committee in early January 2009 to draft a letter on behalf of the Congressman, targeting the Colorado, Wyoming and New Mexico state legislatures addressing the workshop's findings and recommendations.
  - On 23 October 2008, the CSS Director convened a meeting of faculty and staff to assess and revise the existing Master of Engineering in Space Operations degree. It was deemed that the program had become highly math intensive and as a result less available to the wider educational demographic characteristic of today's space professionals. The group devised a proposed revision to the program to widen its applicability and refresh and expand its content. The revised program will also dovetail more tightly with the AF Space Command Space Professional Development Certificate program. Currently, CSS is assessing proposals for

development of two new courses for the space operations program: 1) space systems health management; and 2) space systems engineering.

- CSS in conjunction with the Eisenhower Center for Space and Defense Studies submitted a proposal to the Coors Foundation requesting \$50,000 to fund a Colorado Space Education and Workforce Development Forum for 2009. This proposal was not awarded funding.
- On 21 January 2009, NISSSC Executive Director, NISSSC Grant Principal Investigator, and CSS Director attended quarterly meeting of the AF Space Command – UCCS Steering Committee in Colorado Springs. CSS Director presented status on new Space Professional Certificate cohort group, which started the program in January 2009. The plan to offer a new technical certificate track and the outline of an updated Master of Engineering in Space Operations academic program was discussed. Also, the Committee discussed the scope of graduate level courses in cyber and information security available to AF and industry professionals from UCCS.
- On 15 January 2009, CSS Director attended a one-day symposium at the USAF Academy on the “One Lightbulb” project, an initiative to develop a demonstration satellite with the goal of collecting and beaming energy from orbit to earth. Conference participants discussed the architectural elements -- technical, logistical, legal, and political -- to design, build, launch, and test a small satellite capable of collecting solar power in low earth orbit and transmitting sufficient power back to Earth to light a single lightbulb. Individual panel sessions addressed the significant capabilities, limitations, and alternatives of space-based solar power generation concepts and worked to identify challenges that must be overcome.
- On 11 March 2009, CSS Director convened a meeting at UCCS of representatives of Charles River Analytics (Boston, MA) and Patchplus Consulting (Colorado Springs) to discuss a joint initiative to submit proposals for R&D to develop enhanced tools for the effective conduct of space situational awareness. Meeting resulted in the subsequent production of three white papers that were submitted by Center faculty (specifically identified in Center area successes).
- On 30-31 March 2009, CSS was represented via a booth at the 2009 National Space Symposium held in Colorado Springs. CSS presented summaries of on-going research and current space educational programs.
- Following up on the 22 October 2008 Rocky Mountain Technology Alliance Space Education Workshop, hosted by Congressman Doug Lamborn in Colorado Springs, the CSS Director participated in a letter-writing meeting on 6 Jan 09. The letter, prepared for the Congressman’s signature, summarized the discussions of the October event and targeted the Colorado State Legislature calling for specific action to address science and technology education and workforce issues affecting the state. The letter is currently in its 3<sup>rd</sup> revision.
- On 22 January 2009, CSS Director held a telecom with Col Sean McClung of Air University to discuss inclusion of AU in the Space Education Consortium and other potential collaborative opportunities with respect to our complementary space education and research programs.

- The CSS Director, working closely with the UCCS ME Space Operations Program Director, developed a full proposal for the realignment of the UCCS ME Space Operations degree. In order to support the MAE Department's renewed emphasis on student research, the applied ME program in Space Operations was moved under the Office of the Dean of College of Engineering and placed under administration of the Center for Space Studies. The revised program reflects greater application of space technology (versus theory) and includes updated content representing the current state of technology as well as emerging space-related issues (e.g., space policy and space situational awareness). The program was approved by the UCCS Graduate Executive Committee on 8 May 2009.
- US Air Force Academy awarded an Academic Services and Support contract for UCCS graduate research supporting USAFA FalconSat V, a small satellite research program. UCCS PI: Dr. Andrew Ketsdever, Department of Mechanical and Aerospace Engineering (MAE). Tasks include continued development of a high fidelity heat transfer model of the FalconSat V satellite and payloads. CSS provided bridge funding for this work during the previous quarter in the amount of \$7,000. USAFA follow-on funding amount is also \$7,000.
- On 27 January 2009, CSS Director presented a lunch-time seminar at the National Security Space Institute in Colorado Springs. The subject of the talk was "Activities of the Center for Space Studies and Space Educations Programs at UCCS".
- In March 2009, CSS funded a third sub-grant in the amount of \$36K to fund graduate research on Terahertz Technology for Multi-Phase Flow Applications. This research has implications for development of advanced micro-propulsion techniques. Work began on this project on 1 July 2009.
- On 10 Apr 09, CSS Director met with president and CEO of NAVSYS Corporation of Colorado Springs to discuss research collaboration potential in the area of Global Positioning System technologies.
- On 24 Apr 09, CSS Director participated in a technical interchange meeting with representatives of the USAF Space Innovation Development Center (SIDC) to discuss a joint white paper with Charles River Analytics and PatchPlus Consulting proposing research and development of new applications for space situational awareness data fusion and visualization.
- CSS Director presented a proposal for re-aligned Master of Engineering program in Space Operations to the university Graduate Executive Committee (GEC) on 8 May 09. The re-alignment of the MAE Space Operation proposal was approved by the GEC and will be implemented in academic year 2009-10.
- On 17 Jun 09, CSS Director participated in a workshop at the USAF National Space Security Institute (NSSI) to review the new curriculum on "Space as a Contested Environment".
- June 2009, Drs Scott Trimboli and Jenenne Nelson presented at the Annual AFOSR PIs conference on "Building a Research Trajectory"

The Center for **Science, Technology, Engineering and Mathematics Education (CSTEME)** continuing its primary efforts performing and managing the Partnership in Innovative Preparation for Educators and Students program (PIPES), sponsored by

AFOSR (FA-9550-07-1-0188), researching, evaluating, and applying a systemic and replicable elementary through high school STEM program to ultimately increase the number of students majoring in STEM disciplines. The following are the successes in this Center over the past year.

➤ **Successes this 3<sup>rd</sup> year**

- Completed consolidation of all student perception surveys of PIPES programming.
- Collaborated with Cool Science to develop an elementary grade outreach program by finalizing the outcomes and expectations. Also, expanded the partnership with the UCCS Pre Collegiate Development program to work with 150 students per grade level.
- Pikes Peak Math Teacher Circle and PIPES Science Educator Academy started in June 2009.
- Developed the FLITE \* model for 9<sup>th</sup> grade PIPES students, which started in June 2009.
- Begin contacts and planning to implement the PIPES replication program in Pueblo, CO and La Junta, CO.
- Hire a Professional Research Assistant (PRA) for PIPES research.
- Hired a graduate student research assistant to collect data.
- Finalize the PIPES research methodology to begin an evaluation study of existing programs by identifying three test school sites and one control school.
- Co-authored STEM proposal submitted to be submitted for additional PIPES funding to NSF FALL 2009.

**Archival publications (published) during reporting period:**

**THHC**

**Articles published during the reporting period:**

- Abdollahi, A., Pyszczynski, T., Maxfield, M., & Lusyszczynska, A. (2009). Anxiety buffer disruption theory: The relationship between dissociation, anxiety-buffer functioning and severity of post-traumatic symptoms. Manuscript submitted for publication, Islamic Azad University-Zarand Branch, Iran. Submitted for publication March 2009.
- Chatard, A, Pyszczynski, T., Arndt, J., Selimbegović, L., N’Dri Konan, P., & Van der Linden, M. (2009). Extent of Trauma Exposure and PTSD Symptom Severity as Predictors of Anxiety-Buffer Functioning. University of Geneva, Geneva, Switzerland. Submitted for publication, April, 2009.
- Gruntfest E., Showalter, P., and Ruin, I. 2008 “Flash Flood Research—Past, Present, and Future.” Natural Hazards Observer.
- Lis-Turlejska, Maja; Luszczyńska, Aleksandra; Plichta, Anna; Benight, Charles C (2008). Jewish and non-Jewish World War II child and adolescent

survivors at 60 years after war: Effects of parental loss and age at exposure on well-being. *American Journal of Orthopsychiatry*. 78(3), 369-377.

**Other articles in press or published out of the THHC:**

- Benight, C. C., Cieslak, R., & Waldrep, E. (in press). Theoretical Frameworks for Understanding Mental Health Consequences of Disasters. In Y. Neria, S. Galea and F. Norris Mental Health Consequences of Disasters, Cambridge University Press.
- Benight, C. C., Ruzek, J., & Waldrep, E. (in press). Internet Interventions for Traumatic Stress: A Review and Theoretically-Based Example. *Journal of Traumatic Stress*.
- Cieslak, R., Benight, C. C., Curtin, E., Luszczynska, A., Schmidt, N., Clark, R., & Kissinger, P. (in press). Predicting Posttraumatic Growth Among Hurricane Katrina Survivors Living With HIV: The Role of Self-Efficacy, Social Support, and PTSD Symptoms. *Anxiety, Stress, and Coping*.
- Luszczynska, A., Benight, C. C., & Cieslak, R. (in press) Self-efficacy, psychological, and somatic health-related outcomes of collective trauma: A systematic review. *European Psychologist*.
- Luszczynska, A., Benight, C. C., Cieslak, R., Kissinger, P., Reilly, K. H., Clark, R.A. (in press). Self-efficacy mediates effects of exposure, loss of resources, and life stress on posttraumatic distress among trauma survivors. *Applied Psychology: Health and Well-Being*.
- Reilly K., Clark R. A., Benight C. C., Schmidt N., & Kissinger P. (in press). The effect of Post Traumatic Stress Disorder on HIV disease progression following Hurricane Katrina. *AIDS Care*.

**CHS (Formerly NISSC)**

**Articles published during the reporting period:**

- Anson, J., Pyszczynski, T., Solomon, S., & Greenberg, J. (2009). Political ideology in the 21st century: A terror management perspective on maintenance and change of the status quo. In J. Jost, A. Kay, & H. Thorisdottir (Eds.), *Social and Psychological Bases of Ideology and System-Justification*. New York: Oxford University Press.
- Hirschberger, G., Pyszczynski, T., & Ein-Dor, B. (in press). Vulnerability and vigilance: Threat awareness and perceived adversary intent moderate the impact of mortality salience on intergroup violence. *Personality and Social Psychology Bulletin*.

- Pyszczynski, T., Motyl, M., & Abdollahi, A. (in press). Righteous violence: Killing for God, country, freedom, and justice. *Behavioral Sciences of Terrorism and Political Aggression*.
- Pyszczynski, T., Rothschild, Z., & Abdollahi, A. (2008). Terrorism, violence, and hope for peace: A terror management perspective. *Current Directions in Psychological Science*, 17, 318-322.
- Scott, Jr. R. A. (2009). The Science of Muddling Through: From Classic Liberal Philosophy to the Science of Muddling Through and No Child Left Behind: Exploring the Interpretation of Complexity. Leading Edge Research Institute.

**Other articles in press or published out of the Center:**

- Abdollahi, A., Henthorn, C., & Pyszczynski, T. (in press). Experimental peace psychology: Priming consensus mitigates aggression against out-groups under mortality salience. *Behavioral Sciences of Terrorism and Political Aggression*.
- Chatard, A., Arndt, J., & Pyszczynski, T. (in press). Loss shapes political views: Terror management, political ideology, and the death of close others. *Basic and Applied Social Psychology*.
- Hirschberger, G., Pyszczynski, T., & Ein-Dor, B. (in press). Vulnerability and vigilance: Threat awareness and perceived adversary intent moderate the impact of mortality salience on intergroup violence. *Personality and Social Psychology Bulletin* (studies of Israeli's support for war with Iran).
- Johnson, K. & Cain, W. A. Adaptation and Application of Federal Capabilities-Based Planning Models to Individual States, (to be published spring 2009).
- Johnson, K. & Cain, W.A. State of Colorado Governor's Office of Homeland Security: "Freshman Year" in Perspective, (to be published spring 2009).
- Motyl, M., Pyszczynski, T., & Hart, J. (Submitted for publication). When animals attack: The effects of mortality salience, infrahumanization of violence, and authoritarianism on support for war.
- Motyl, M., Pyszczynski, T., Hart, J., & Goldenberg, J. The effects of infrahumanizing violence, mortality threat, and right-wing authoritarianism on support for military action. Manuscript submitted for publication. University of Colorado at Colorado Springs. Submitted for publication May 2009.
- Pyszczynski, T., Vail, K., & Motyl, M. (in press). The cycle of righteous killing: Psychological forces in its prevention and the promotion of peace. In T. Pick, A. Speckard (eds.). *Homegrown terrorism: Proceedings from the NATO conference on Indigenous terrorism*.

Rothschild, Z. K., Abdollahi, A., & Pyszczynski, T. (in press). Does peace have a prayer? The effect of mortality salience, compassionate values, and religious fundamentalism on hostility toward our groups. *Journal of Experimental Social Psychology*.

### **White Papers and Presentations out of the Center:**

White Paper (2009). USAF Emergency and Incident Management Systems: A Systematic Analysis of Functional Requirements. Currently being circulated within USAF. Paper is being developed so as to be suitable for submission to the International Journal of Emergency Management.

White Paper to AFSPC : Robillard, J., & Sambrook, R. (2008) USAF Emergency and Incident Management Systems: A Systematic Analysis of Functional Requirements. Currently being circulated within USAF.

White Paper to USAF (2009). Regional Training Facility. Currently being circulated within USAF

White Paper for AFOSR Faculty Research Fellowship program (1st step of application process).

*U.S. Homeland Security and Resilience Model*; Carleton University; Public Safety Canada (Ottawa); 25 participants. Funded by Public Safety Canada.

*Integrating Intelligence into New Security Structures*; Norwegian Institute for Defense Studies (Oslo); 100 participants. Funded by the Institute for Defense Studies.

*U.S. Homeland Security and Resilience Model*; Resilience in Australia Conference (Adelaide, SA); 35 participants. Funded by Cranfield University.

*Sustainable Career Development in Emerging Homeland Security Disciplines*; National Homeland Defense Foundation Annual Symposium Career Summit (Colorado Springs); 130 participants.

*Comparative Homeland Security and Defense*; Albanian Defense College (Tirana); 15 participants.

Cain, William A., *Homeland Security/Homeland Defense and future Intelligence Courses at UCCS*, Terrorism III Course, Governor's Office of Emergency Services, San Diego, CA. 100 participants.

Keilbach, Patricia, *International Civil Support*. International Studies Association (ISA) Annual Conference participants (academia, government, private sector), New York, NY.

White, Richard, *Applying Counterinsurgency Doctrine to Cyber Warfare*. George Washington University, HSDECA Summit. 30 participants.

Hughbank, Richard, Panelist, Bicoastal Counterterrorism Seminar, San Diego State University.

Markowski, T. M. & Sambrook, R. Perception of Workforce Requirements in Homeland Security and Homeland Defense, Presentation of Career Summit data at the UCCS Mountain Lion Research Day.

White, R & Perini, M. CHS Support to Northcom. Presentation to Lt. General Blum, US NORTHCOM. NISSSC at University of Colorado at Colorado Springs.

**Books in process out of the Center:**

Chapter. Motyl, M., Vail, K., & Pyszczynski, T. (in press). Waging Terror: Psychological Motivations in Cultural Violence and Peacemaking. In M. Morgan (Ed.), *The Day that Changed Everything? The Impact of 9-11*. New York: Greenwood-Praeger.

Book. "Psychology and Terrorism" in development for Blackwell Publishing (under contract). Deadline summer 09.

**Changes in research objectives, if any:**

None.

**Change in AFOSR program manager, if any:**

None.

**Extensions granted or milestones slipped, if any:**

None