SSCI 401L, Geospatial Intelligence

Syllabus (Updated 16 October 2017)

Units: 4

Term — Day — Time: Fall, 2017
Class: Tuesday/Thursday, 2:00-3:20 PM
Lab: Friday, 10:00-10:50 AM

Locations:
Classroom: WPH 206
Lab: AHF 145A

Instructor: COL [R] Steven D. Fleming, Ph.D.
Office: AHF B55
Office Hours: Monday (9:00-10:00 AM) and Tuesday (10:00-11:00 AM) PST, and by appointment at other times. I am always available asynchronously via email. I am also available for synchronous chats via phone, IM text, and audio/video conferences on most days and times *by prior arrangement* via email.
Contact Info: s.fleming@usc.edu**,** 213-740-7144

Lab Instructor: Ran Tao. Ph.D.
Office: AHF B55
Office Hours: By appointment
Contact Info: rant@usc.edu, 213-740-0739 (office)

Library Help: Andy Rutkowski
Office: VKC 36B
Office Hours: Tue 10 am-noon, Thu 4:30-5:30 pm PT
Contact Info: arutkows@usc.edu, 213-740-6390, http://bit.ly/andyhangout

IT Help: Richard Tsung
Office: AHF 146
Office Hours: By appointment
Contact Info: ctsung@usc.edu, 213-821-4415 (office)

Course Description
Threats to human security come in many forms – natural disasters, humanitarian crises, environmental risks, public health issues, military operations, terrorist attacks, genocide, political violence, and food/resource accessibility challenges, among others. This class leverages a variety of geospatial technologies with intelligence tools to develop intelligence products that support disaster response, humanitarian relief efforts, and national security. It provides students with the basic geospatial intelligence knowledge and practical skills to assist in informing decision-making in a variety of human security settings. This is a required, standalone course for the undergraduate minor in Human Security and Geospatial Intelligence.

Learning Objectives

When you have completed this course, you will be able to:

- Describe the core geospatial intelligence needs related primarily to disaster response, and humanitarian relief efforts, military operations, surveillance, and navigation.
- Design and implement strategies for collecting or sourcing geospatial data and any accompanying metadata.
- Critically evaluate the potential impacts of data quality on spatial analysis and decision-making.
- Apply critical thinking, collaboration, and communication skills.
- Prepare and present intelligence reports tailored to a variety of the human security applications.

Prerequisite(s): None
Co-Requisite (s): None
Concurrent Enrollment: None
Recommended Preparation: IR381: Introduction to International Security
                                      SSCI 301L: Maps and Spatial Reasoning

Course Notes
In addition to the lectures, there are a series of online weekly discussions designed to reinforce course concepts and to provide students a forum to share and explore intelligence processes underlying the responses to and human impacts associated with various disaster events (both natural and manmade). All classroom discussions are linked to the lectures and class assignments, but do not duplicate the lecture experience.

No make-up dates will be offered for missed quizzes or exams, so mark the appropriate dates on your calendars. If there is legitimate conflict, speak with a course instructor as soon as possible so we can make alternative arrangements.

Technological Proficiency and Hardware/Software Required

Students will be introduced to geospatial technologies by utilizing Esri services and products. This course will use ArcGIS Online (AGOL) and ArcGIS Pro (AGP) to investigate intelligence concerns, homeland security issues, and disaster management concepts whereby students will locate and explore various spatial datasets that offer unique and innovative insights in intelligence and disaster response solutions.

The modeling software and geospatial data required for course assignments will be accessed using computing resources provided by the Spatial Sciences Institute.

Required Readings and Supplementary Materials

Textbooks – There are four required texts for this course. Some are available online and some are available from the USC Bookstore or online outlets such as Amazon. We encourage you to acquire or purchase these books quickly since you will need these materials from the opening day of class.

- Starr, H. 2013. *On GEOPOLITICS: Space, Place, and International Relations*. Boulder, CO, Paradigm Publishers.

- Kataoka, M. 2007. *GIS for Homeland Security*. Redlands, CA, ESRI Press.

- NGA (National Geospatial-Intelligence Agency, Office of Geospatial-Intelligence Management). 2006. *National System for Geospatial Intelligence: Geospatial Intelligence (GEOINT) Basic Doctrine.* Washington, DC, National Geospatial-Intelligence Agency Publication No. 1-0 (available at https://www.fas.org/irp/agency/nga/doctrine.pdf).

- NRC (National Research Council). 2007. *Successful Response Starts with a Map: Improving Geospatial Support for Disaster Management.* Washington, DC, National Academies Press.

These textbooks will be supplemented with Course Notes and a mixture of readings from academic journals, professional reports, and authoritative websites.

Readings – The following book chapters and journal articles are tentatively planned for use and will be posted to Blackboard under Course Documents:

- Anderson, E. 2000. The Geography of Hazard Analysis: Disaster Management and the Military. *The Scope of Military Geography*. 219-232.

- Corson, M.W. and Palka, E.J. 2004. Geotechnology, the US military, and war. In Bruun, S.D., Cutter, S.L., and Harrington, J.W. (eds.) *Geography and Technology.* Dordrecht, The Netherlands, Kluwer: 401-427.

- Esri. 2014. GIS Platform for National Security, An Esri White Paper – July 2014, Redlands, CA, Esri Press.

- Esri. 2007. GIS Supporting the Homeland Security Mission, An Esri White Paper – May 2007, Redlands, CA, Esri Press.

- Klein, G., Moon, B., and Hoffman, R. 2006. Making sense of sense making: 1, Alternative perspectives. *IEEE Intelligent Systems* 21(4): 70-73.
- Palka, E. 2000. A Decade of Instability and Uncertainty: Mission Diversity in the MOOTW Environment. *The Scope of Military Geography*. 167-196.
- Palka, E.J., Galgano, F.A., and Corson, M.W. 2006. Operation Iraqi Freedom: A military geographic perspective. *Geographical Review* 95: 373-399.
- Radke, S. and Hanebuth, E. 2008. GIS Tutorial for Homeland Security, Redlands, CA, Esri Press.
- Treverton, G. and Gabbard, B. 2008. Assessing the Tradecraft of Intelligence Analysis, RAND (National Security Research Division).

Description and Assessment of Assignments

Your grade in this class will be determined on the basis of several different assessments:

Homework Assignments (10%): Students will be required to complete five homework assignments comprised of quantitative and/or qualitative analysis to gain insight on the physical and human processes underlying natural hazards, disasters and intelligence as well as examine the impact these events have for decision makers.

Weekly Class Participation Discussions (10%): Students will complete ten in-class and on-line discussion assignments to strengthen their understanding of course concepts.

Labs/Exercises (30%) – In order to demonstrate that you understand the basic concepts and skills learned in the class, you will complete five labs and one exercise that will leverage GIST software and the key components of a typical geospatial intelligence workflow while integrating key concepts and ideas. These labs and exercise reinforce independent thought and application.

Mid-term Exam (16%): The mid-term exam will consist of multiple choice, short answer, and simple problem questions. Students will be expected to take the exam at the indicated time.

Final Project (14%) – The final team project will afford you the opportunity to demonstrate your ability to identify and rapidly investigate a real-world problem using the coursework you have completed thus far. You will all make extensive use of geospatial data sources and analysis tools and will be required to define possible scenarios, identify key challenges, explore possible solutions and deliver a preferred and an effective solution for an important human security need or challenge in your final project. The layout and contents of these various components will be tailored to the threat at hand. These human security threats could easily include one or more of the following – natural disasters, humanitarian crises, environmental risks, public health issues, military operations, terrorist attacks, genocide, political violence, and food/resource accessibility challenges – and the various tasks and products would be tailored to the subset chosen for each final project.

<u>Final Exam</u> (20%): The cumulative final exam will consist of multiple choice, short answer, and simple problem questions. Students will be expected to take the final exam at the indicated time.

Grading Breakdown

Careful planning and a serious, consistent commitment will be required for you to successfully navigate the various deliverables in this and other GIST courses. The table below summarizes the SSCI 401L course assignments and their point distribution:

Assignment	Number	Points each	% of Grade
Home Assignments	5	2	10
Discussions	10	1	10
Labs (5) & Exercise (1)	6	5	30
Mid-term Exam	1	16	16
Final Project	1	14	14
Final Exam	1	20	20
TOTAL	**17**	**100**	**100**

Assignment Submission Policy

Assignments will be submitted for grading via Blackboard using the due dates specified in the Course Schedule below.

Additional Policies

Students are expected to attend and participate in every class session and to complete and upload all assignments before the deadlines detailed in the Course Schedule. Late work will be assessed a penalty of 10% per day and zero grades will be assigned for work that is more than seven days late.

Course Schedule: A Weekly Breakdown

	Topics/Daily Activities	Readings and Homework	Deliverables/ Due Dates
Week 1 8/21	**Geospatial Intelligence Context:** Introduction to the intelligence community, the players and their typical roles and responsibilities.	Videos; Esri (2014); Starr (2013) Ch. 1-2	

Week 2 8/28	**Basic Requirements:** Role of disaster management, humanitarian assistance, surveillance, and navigation in geospatial intelligence.	Esri (2012, 2015 [x2]), Starr (2013) Ch. 3 and 6	Home Assignment #1 *Due 9/5* Lab #1 *Due 9/12*
Week 3 9/5* * Monday, 9/4 is a university holiday	**Importance of Physical and Human Geography:** Introduction to the ways in which physical and human geography can be used to situate geospatial intelligence work within an appropriate context.	Klein et al. (2006); Starr (2013) Ch. 4-5; NGA and USGIF additional assigned readings	Lab #1 (cont.) *Due 9/12*
Week 4 9/11	**Geospatial Building Blocks:** Introduction to the ways in which fundamental geographic information science principles and the accompanying geospatial technologies (GIS, GPS, photogrammetry, remote sensing, and sensor networks) have been used for disaster management, humanitarian assistance, and intelligence problem-solving.	Corson & Palka (2004); Starr (2013) Ch. 6-7; Palka (2000)	Home Assignment #2 *Due 9/19* Lab #2 *Due 9/26*
Week 5 9/18	**Geospatial Building Blocks (cont.):** Threats to human security and the geospatial data and workflows that have been deployed to address them.	Starr (2013) Ch. 8-9; Palka et al. (2006); Radke (2008) Ch. 3	Lab #2 (cont.) *Due 9/26*
Week 6 9/25	**Foundations of Intelligence Analysis:** Introduction to the information exploitation process and the ways in which standard intelligence methodologies can be utilized to respond to a variety of human security challenges.	Kataoka (2007) Ch. 1-2; Anderson (2000); Treverton (2008)	Begin preparation for Midterm Exam on *10/3*
Week 7 10/2	**Gathering Intelligence from Legacy Geospatial Data Products:** Methods and approaches for linking legacy geospatial datasets with other kinds of information to yield useful spatial intelligence.	NRC (2007) Ch. 1-6	Midterm Exam on *10/3* (no labs or home assignment due on this week)

			Home Assignment #3 *Due 10/10*
			Lab #3 *Due 10/17*
Week 8 10/9	**Role of Data Management and Data Mining:** Methods and approaches for linking textual information to geographic locations.	NGA (2006) Ch. 1	Lab #3 (cont.) *Due 10/17*
Week 9 10/16	**Gathering Geospatial Data from Airborne Sensors, Satellites and other RS Platforms:** The ways in which the capabilities and characteristics of various satellite and sensor systems, full motion video, and unmanned aerial vehicles can be used for feature extraction and linked to specific disaster management, humanitarian assistance, and intelligence problem-solving tasks.	NGA (2006) Ch. 2; Kataoka (2007) Ch. 2; Radke (2008) Ch. 4	Home Assignment #4 *Due 10/24* Lab #4 *Due 10/31*
Week 10 10/23	**Gathering Geospatial Data from Social Media Feeds:** Methods and approaches for extracting and analyzing large quantities of geosocial data from a variety of social media feeds.	NGA (2006) Ch. 3	Lab #4 (cont.) *Due 10/31*
Week 11 10/30	**Data Fusion, Integration, and Geovisualization:** The role of data fusion, integration, and geovisualization in the creation and distribution of actionable information.	Radke (2008) Ch. 5	Exercise (Story Map) Assignment *Due 11/7*
Week 12 11/6	**Geospatial Intelligence Products and Communication:** The role and character of disaster management, humanitarian assistance, and intelligence briefs, imagery and area reports in human security applications.	Kataoka (2007) Ch. 3	Home Assignment #5 *Due 11/14* Lab #5 *Due 11/21*

Week 13 11/13	**Geospatial Intelligence Products and Communication (cont.):** The rapidly evolving number and variety of interactive and dynamic products that can used along with threat and hazard evaluation, the preparation and presentation of predictive analytic conclusions, and the role of situational awareness and the common operating picture in human security applications.	NGA (2006) Ch. 4-5; Radke (2008) Ch. 6	Lab #5 (cont.) *Due 11/21*
Week 14 11/20* *11/22-11/26 is a university holiday	**Emerging Geospatial Intelligence Technologies and Techniques:** Exploration of how some of the new mobile devices and applications, virtual and augmented reality opportunities, and cartographic representations and visualization techniques might be used to acquire or extract meaning from rich and multi-dimensional datasets in a variety of human security settings.	Kataoka (2007) Ch. 4-6	Thanksgiving Week Lab #5 *Due 11/21* No other labs or home assignments assigned this week.
Week 15 11/27	**Emerging Geospatial Intelligence Technologies and Techniques (cont.):** Continuation of exploration of how some of the new mobile devices and applications, virtual and augmented reality opportunities, and cartographic representations and visualization techniques might be used to acquire or extract meaning from rich and multi-dimensional datasets in a variety of human security settings.	Preparation and presentation of final projects	Final Team Project Reports *Due 12/1 (5 PM)*
Final Exam week (7 Dec)	**Final Exam** Students complete in-class final exam		*7 Dec (TH) 2-4 PM*

Summary of Deliverable Due Dates:

Requirement	Date Assigned	Date Due
Home Assignment #1	8/29/2017	9/5/2017
Lab #1	9/1/2017	9/12/2017
Home Assignment #2	9/12/2017	9/19/2017
Lab #2	9/15/2017	9/26/2017
Home Assignment #3	9/26/2017	10/10/2017
Lab #3	9/29/2017	10/17/2017
Midterm Exam	10/3/2017	10/3/2017
Home Assignment #4	10/17/2017	10/24/2017
Lab #4	10/20/2017	10/31/2017
Exercise	10/31/2017	11/7/2017
Home Assignment #5	11/7/2017	11/14/2017
Lab #5	11/10/2017	11/21/2017
Final Project	11/2/2017	12/1/2017
Final Exam	12/7/2017	12/7/2017

NOTE: All assignments are due for turn-in at the ***beginning*** of class. As currently planned, all out-of-class work (home assignments and labs) are due on Tuesdays.

Statement on Academic Conduct and Support Systems

Academic Conduct

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, "Behavior Violating University Standards" https://policy.usc.edu/scampus-part-b/. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, http://policy.usc.edu/scientific-misconduct.

Support Systems

Student Counseling Services (SCS) - (213) 740-7711 – 24/7 on call
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.
https://engemannshc.usc.edu/counseling/

National Suicide Prevention Lifeline - 1-800-273-8255
Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. http://www.suicidepreventionlifeline.org

Relationship & Sexual Violence Prevention Services (RSVP) - (213) 740-4900 - 24/7 on call
Free and confidential therapy services, workshops, and training for situations related to gender-based harm. https://engemannshc.usc.edu/rsvp/

Sexual Assault Resource Center
For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: http://sarc.usc.edu/

Office of Equity and Diversity (OED)/Title IX compliance – (213) 740-5086
Works with faculty, staff, visitors, applicants, and students around issues of protected class. https://equity.usc.edu/

Bias Assessment Response and Support
Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. https://studentaffairs.usc.edu/bias-assessment-response-support/

Student Support & Advocacy – (213) 821-4710
Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. https://studentaffairs.usc.edu/ssa/

Diversity at USC – https://diversity.usc.edu/
Tabs for Events, Programs and Training, Task Force (including representatives for each school), Chronology, Participate, Resources for Students

Support Systems

A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* http://dornsife.usc.edu/ali, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* http://emergency.usc.edu will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.