

SSCI 401L, Geospatial Intelligence

Syllabus

Units: 4

Term — Day — Time: Fall, 2020; Class: Monday and Friday, 12:30 - 1:50 PM. This course is planned to be delivered in a hybrid format. When Los Angeles County/USC authorizes teaching on campus, one meeting per week will be held hybrid/in person, and the others (to include all labs) will be held online. All meetings will be streamed for remote access for maximum options and accessibility.

Locations:

Classroom: SOS B4 (if/when taught residentially on an announced day of the week) / Online via Zoom when not taught residentially at: <https://usc.zoom.us/j/93177475757?pwd=NIMrTThZVUdZMldEcngOZkN2UENrUT09>. Labs will ALWAYS occur via Zoom at a location and time TBA in class. The lab times (which will be assigned via the USC Registrar) are either Tuesday from 12:00-12:50 PM or Friday from 2:00-2:50 PM.

Instructor: COL [R] Steven D. Fleming, Ph.D.

Office: AHF B55

Office Hours: Tuesdays; 8-9 AM at:

<https://usc.zoom.us/j/92098472585?pwd=L01FbW02Sjh6c2JWZ3A1akpPZnlTz09> and Thursdays; 9-10

AM at:

<https://usc.zoom.us/j/99923951938?pwd=V3VsY0paZlU3U21aajl1eXdibnNvUT09>. I am always available

asynchronously via email. I am also available for synchronous chats via phone, IM text, and audio/video conferences (e.g. Zoom) on most days and times *by prior arrangement* via email.

Contact Info: s.fleming@usc.edu, 213-740-7144

Lab Instructor/Office/Contact Info: Dr. Su Jin Lee

Office: AHF B55

Office Hours: Mondays; 4-5 PM and Wednesday;
3:30-4:30 PM at: <https://usc.zoom.us/j/9807018779>.

I am always available asynchronously via email. I am also available for synchronous chats via phone, IM text, and audio/video conferences (e.g. Zoom) on most days and times *by prior arrangement* via email.

Contact Info: sujinlee@usc.edu, 213-740-2845

Library Help: Andy Rutkowski

Office: VKC 36B

Office Hours: Tuesdays 10am – noon & Thursdays
4:30 – 5:30 (1/2 hour reservable slots)

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 Scope and Purpose

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 (no pre-requisite required) for the undergraduate minor AND major in Human Security and Geospatial Intelligence.

Students may vary in their competency levels on these abilities. You can expect to acquire these abilities only if you honor all course policies, attend classes regularly, complete all assigned work in good faith and on time, and meet all other course expectations of you as a student.

Learning Objectives

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

- Describe the core geospatial intelligence needs related primarily to human security and safety (e.g., disaster response, humanitarian relief efforts, military operations, surveillance, navigation, emergency response, etc...).
- Describe and design implementation 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 using geospatial tools that are tailored to a variety of human security applications.

Prerequisite(s): None

Co-Requisite (s): None

Concurrent Enrollment: None

Recommended Preparation: IR 381: Introduction to International Security
SSCI 301L: Maps and Spatial Reasoning

Class Conduct

Harassment, sexual misconduct, interpersonal violence, and stalking are not tolerated by the university. All faculty and most staff are considered Responsible Employees by the university and must forward all information they receive about these types of situations to the Title IX Coordinator. The Title IX Coordinator is responsible for assisting students with supportive accommodations, including academic accommodations, as well as investigating these incidents if the reporting student wants an investigation. The Title IX office is also responsible for coordinating supportive measures for transgender and nonbinary students such as faculty notifications, and more. If you need supportive accommodations you may contact the Title IX Coordinator directly (titleix@usc.edu or 213-821-8298) without sharing any personal information with me. If you would like to speak with a confidential counselor, Relationship and Sexual Violence Prevention Services (RSVP) provides 24/7 confidential support for students (213-740-9355 (WELL); press 0 after hours).

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 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 exams, so mark the appropriate dates on your calendars. If there is legitimate conflict, speak with the course instructor as soon as possible so alternative arrangements can be made.

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, disaster management concepts, and emergency management operations whereby students will locate and explore various spatial datasets that offer unique and innovative insights into intelligence, security, safety, 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/Georgetown University Press. We encourage you to acquire or purchase these books quickly since you will need these materials from the opening day of class.

- Clark, R. 2020. *Geospatial Intelligence – Origins and Evolution*. Georgetown Washington, DC: University Press (find at: <http://press.georgetown.edu/book/georgetown/geospatial-intelligence>).
- Starr, H. 2013. *On GEOPOLITICS: Space, Place, and International Relations*. Boulder, CO: Paradigm Publishers.
- NGA (National Geospatial-Intelligence Agency, Office of Geospatial-Intelligence Management). 2018. *National System for Geospatial Intelligence: Geospatial Intelligence (GEOINT) Basic Doctrine*. Washington, DC: National Geospatial-Intelligence Agency Publication No. 1-0 (FREE download at <https://www.nga.mil/ProductsServices/Pages/GEOINT-Basic-Doctrine-Publication.aspx>)
- NRC (National Research Council). 2007. *Successful Response Starts with a Map: Improving Geospatial Support for Disaster Management*. Washington, DC: National Academies Press. (provided by instructor via Blackboard)

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. Additional articles may be added to this list:

- 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. 2015. Building Safe Communities: An Executive Summary, An Esri White Paper – July 2015, Redlands, CA: Esri Press.
- Esri. 2015. How to Build Safer Communities: An Executive Summary, An Esri White Paper – July 2015, Redlands, CA: Esri Press.
- Esri. 2012. ArcGIS for Emergency Management, An Esri White Paper – July 2012, Redlands, CA: Esri Press.
- 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.
- Esri. 2007. GIS in Defense Installation and Environmental Management, Redlands, CA: Esri Press.
- Fleming, S., Hendricks, M., and Brockhaus, J. 2009. CHAPTER 57 - The Role of GIS in Military Strategy, Operations and Tactics. *Manual of Geographic Information Systems*, ASPRS Press: 967-985.
- Fleming, S., Jordan, T., Madden, M., Usery, E., and Welch, R. 2009. GIS applications for military operations in coastal zones. *ISPRS Journal of Photogrammetry and Remote Sensing* Volume 64 (2009): 213-222.
- 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. 2005. Operation Iraqi Freedom: A Military Geographic Perspective. *Geographical Review* 95: 373-399.
- USGIF. *Building Resilient Communities Through Geospatial Intelligence*. 2018. Reston, VA: United States Geospatial Intelligence Foundation.
- USGIF. Save and Protect, 2017. *Trajectory Magazine*. Reston, VA: United States Geospatial Intelligence Foundation.
- USGIF. *State and Future of GEOINT: 2015-2019*. Reston, VA: United States Geospatial Intelligence Foundation.
- USGIF. Trajectory 2019 Issue 3, 2019. *Trajectory Magazine*. Reston, VA: United States Geospatial Intelligence Foundation.
- 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 – 5 worth a total of 20 points. 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 intelligence activities, natural hazards, disasters, and emergency management/safety as well as examine the impact these events have for decision makers.

Labs/Report – 5 worth a total of 35 points. In order to demonstrate that you understand the basic concepts and skills learned in the class, you will complete four labs and one report 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 – 1 worth 12 points. 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 – 1 worth 15 points. The final team project will afford you the opportunity to demonstrate your ability to identify and rapidly investigate a real-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 world problem using the 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.

Final Exam – 1 worth 18 points. 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 Assignment (HA)	5	4	20
Lab (4) / Report (1)	5	7	35
Mid-term Exam	1	12	12
Final Project	1	15	15
Final Exam	1	18	18
TOTAL	13		100

Assignment Submission Policy

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

Students are expected to attend and participate in every class session (real-time or via watching a video of class) 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	<u>Readings/Watchings</u> Assignments	Deliverables
BLOCK 1	Week 1 17-21 Aug	Geospatial Intelligence Context: Introduction to the concept of GEOINT, the intelligence community, types of intelligence analysis, the players/their typical roles and responsibilities, and the role of GIS in Human Security.	Videos; Esri (2014); Starr (2013) Ch. 1-2; Clarke (2020) Ch. 1 <hr/> Home Assignment # 1	None
	Week 2 24-28 Aug	Basic Requirements: Role of disaster management, humanitarian assistance, surveillance, and navigation in geospatial intelligence.	Esri (2012, 2015 [x2]), Starr (2013) Ch. 3 and 6 Clarke (2020) TBD <hr/> Lab # 1	HA # 1 28 Aug

BLOCK 2	Week 3 31 Aug – 4 Sep	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 Clarke (2020) TBD <hr/> Home Assignment # 2	Lab # 1 4 Sept	
	Week 4 8-11 Sep (NOTE: 7 Sep is Labor Day)	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 Clarke (2020) TBD <hr/> Lab # 2	HA # 2 11 Sept	
	Week 5 14-18 Sep	Geospatial Building Blocks (cont.): Threats to human security and the geospatial data and workflows that are deployed to address them.	Starr (2013) Ch. 8-9; Palka et al. (2005) Clarke (2020) TBD <hr/> Home Assignment # 3	Lab # 2 18 Sept	
	Week 6 21–25 Sep	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.	USGIF’s State of GEOINT (2015, 2016, 2017, 2018, 2019) Clarke (2020) TBD <hr/> Prep for Midterm	HA # 3 25 Sept	
	BLOCK 3	Week 7 28 Sep – 2 Oct	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.	Slides from previous lectures. <hr/> Report	Midterm Exam (no other work is due) 2 Oct

	Week 8 5-9 Oct	Role of Data Management and Data Mining: Methods and approaches for linking textual information to geographic locations.	NGA (2018) Ch. 1-3 Clarke (2020) TBD <hr/> Home Assignment # 4	Report 9 Oct
	Week 9 12-16 Oct	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 (2018) Ch. 1-3; National Infrastructure Protection Plan Clarke (2020) TBD <hr/> Lab # 3 & Final Project	HA # 4 16 Oct
BLOCK 4	Week 10 19-23 Oct	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 (2018) Ch. 4-5; Esri <i>Emergency Management;</i> Esri, <i>GIS in Defense Installation and Environmental Management</i> Clarke (2020) TBD <hr/> Home Assignment # 5	Lab # 3 23 Oct
	Week 11 26-30 Oct	Data Fusion, Integration, and Geovisualization: The role of data fusion, integration, and geovisualization in the creation and distribution of actionable information.	Esri, <i>GIS in Defense Installation and Environmental Management;</i> Crooks, et al. (2013) Clarke (2020) TBD <hr/> Lab # 4	HA # 5 30 Oct

	Week 12 2-6 Nov	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. 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.	NRC (2007) Ch. 1-4. USGIF (2017) Clarke (2020) TBD	Lab # 4 6 Nov
			Continue work on Final Project	
BLOCK 5	Week 13 9-13 Nov	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.	NRC (2007) Ch. 5-6; Treverton (2008) Clarke (2020) TBD	Final Projects 13 Nov
			Lab # 1	
FINAL	Final 20 Nov 11 AM – 1 PM	Final Exam Students complete in-class final exam		Final Exam 20 Nov

Summary of Deliverable Due Dates:

Major Requirement	Date Due	Date Assigned
Home Assignment # 1	28 Aug	17 Aug
Lab # 1	4 Sept	24 Aug
Home Assignment # 2	11 Sept	31 Aug
Lab # 2	18 Sept	8 Sept
Home Assignment # 3	25 Sept	14 Sept
Midterm Exam	2 Oct	-----
Report	9 Oct	28 Sept
Home Assignment # 4	16 Oct	5 Oct
Lab # 3	23 Oct	12 Oct
Home Assignment # 5	30 Oct	19 Oct
Lab # 4	6 Nov	26 Oct
Final Project	13 Nov	16 Oct
Final Exam	20 Nov	-----

NOTE: All assignments are due for turn-in at **9 AM [PT]** on the assigned date. As currently planned, all out-of-class work (home assignments, reports, and labs) are due on Fridays.

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” 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
engemannshc.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline – 1 (800) 273-8255 – 24/7 on call
www.suicidepreventionlifeline.org

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-4900 – 24/7 on call

engemannshc.usc.edu/rsvp

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086

equity.usc.edu, titleix.usc.edu

Information about how to get help or help a survivor of harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic that may be specified in applicable laws and governmental regulations.

Bias Assessment Response and Support – (213) 740-2421

studentaffairs.usc.edu/bias-assessment-response-support

Avenue to report incidents of bias, hate crimes, and microaggressions for appropriate investigation and response.

The Office of Disability Services and Programs – (213) 740-0776

dsp.usc.edu

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

Student Support and Advocacy – (213) 821-4710

studentaffairs.usc.edu/ssa

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC – (213) 740-2101

diversity.usc.edu

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

dps.usc.edu, emergency.usc.edu

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety – - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call dps.usc.edu Non-emergency assistance or information.