

SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
On Track - Undergraduate Space Education (3)

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A NEW UNDERGRADUATE COURSE ON THE PHYSICS OF SPACE SITUATIONAL AWARENESS

Abstract

The United States Air Force Academy (USAFA) in Colorado Springs, Colorado has the mission to, “Educate, train, and inspire men and women to become officers of character motivated to lead the United States Air Force in service to our nation.” Upon graduation, cadets receive both a Bachelor of Science degree and a commission in the United States Air Force. The Physics Department at USAFA has implemented a Center for Space Situational Awareness Research (CSSAR) with the goal of preparing graduates for the challenges facing today’s space professionals. The vision of the CSSAR is to replicate on a small scale, the process that the Department of Defense (DoD) uses for space operations—from the use of sensors (ground and space), the flow of data into C2 centers, conversion of data into actionable information, to the development of policy and doctrine. The CSSAR has several thrust areas to include:

- Development of a small-aperture telescope network called the Falcon Telescope Network (FTN)
- Implementation of a Cadet Space Operations Center (CSpOC) to task and control the FTN, and analyze collected data
- Development of a new undergraduate course on the physics of space surveillance and control

The goal of the three credit SSA course is to provide a technical foundation for future space professionals to competently address the challenges of space surveillance. The junior-level survey course ties basic physical principles to theoretical, computational, data collection, and process applications of space surveillance and space control. The central viewpoint to the course is that SSA can be viewed in terms of where a space object is and how it got there, what it is and has it changed, and what do the answers to these questions mean about the object. Students complete lessons that are structured around this theme. To provide hands-on experience, there are laboratories where cadets use hardware and software tools to model systems and collect data to enhance their learning. We will cover in more detail the structure of the course, and discuss the laboratories used in the course.