

Imaging Dim Space Objects with Laser-adaptive Optics

Technology Area: Battlespace Environment

Background: The nation needed the ability to find and characterize dim space objects, like microsatellites. These dim objects could pose a threat, intentionally or unintentionally, to our valuable satellites and degrade our national space capability.

Success: AFRL's Starfire Optical Range successfully demonstrated the use of a world-record power 50-watt laser, tuned to excite sodium atoms 90 kilometers above the earth's surface, to correct for the atmospheric aberration. The laser created an artificial star in the sodium and allowed AFRL researchers to take pictures of objects 100 times too dim for conventional adaptive optics. To take a picture of a space object, ground-based imaging telescopes use light from the object to measure and correct the deleterious effects of earth's turbulent atmosphere; a process called adaptive optics. But if the object is too dim, there is not enough light to do the corrections and take the picture. The use of a guidestar laser to supply the light to measure and correct for the atmosphere can allow all the light from the object to be used in forming the image, and give the U.S. the ability to image very dim objects with very high resolution.

Year: FY 2006

Service/Agency: U.S. Air Force



1. Sodium Guidestar Laser on 3.5 meter telescope
2. View of Guidestar through Telescope