# Collaborative Research Detecting Space Objects

As space has become more congested and rival nations develop weapons to target U.S. satellites, MITRE is partnering with innovative solutions to improve the U.S. space domain awareness by identifying, characterizing, and understanding any factor, passive or active, that could affect space operations and impact the economy, security, or safety of our nation. MITRE's Bridging Innovation team guided researchers from MITRE's Colorado Springs site and Areté Associates, a defense small business, headquartered near Los Angeles, with several offices nationwide including Colorado and Northern Virginia, into a collaborative research effort.

The MITRE team provided raw image data of the night sky taken over several months with a wide 10°x10° field of view camera. Areté applied their weak target detection techniques and were able to find much dimmer satellites within the images than current processes allowed.

**The telescope system used to collect the data: an Andor NEO camera, 85 mm F1.4 Nikon lens**

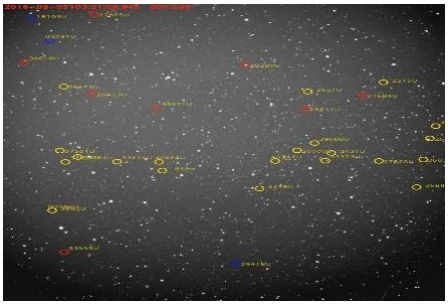
MITRE's deep technical and domain knowledge along with its unique resources allowed for image processing technology being used by one sector of the government to be applied to another sector's problem. While the government is acquiring Wide Field of View systems, MITRE provided wide 10°x10° field of view image data for Areté to demonstrate added value.

"Possibly the best example of a relatively small amount of collaboration and IRAD having significant payoff and contribution to the Space Domain Awareness needs of today's contested space environment," commented John Moberly, Areté's space and intelligence director.

MITRE's expansive government and industry network provided valuable resources while incubating this innovative image processing technology. "MITRE's Optical Telescope Network attracts collaborators across small business and government," noted Chris Randell, a principal space enterprise systems analyst at MITRE.

MITRE Sponsors recently contracted with Areté to implement their image processing algorithms for a future system. Leveraging the results of this collaboration, Areté won an Air Force Space Pitch Day Award and a special invitation to apply to increase award to $3M, which is currently pending.

MITRE's Bridging Innovation team is building new pathways to discover, accelerate, and deliver innovation to solve national problems.  These collaborative partnerships with the innovation ecosystem provide great value to MITRE, small businesses, and our government sponsors. The small businesses benefit from MITRE's technical expertise and domain knowledge while our sponsors gain novel solutions to their hardest problems.



**Image's with MITRE's directions, which were sent to Areté**