Intelligence Advanced Research Projects Activity

R Creating Advantage through Research and Technology

CORE3D **CREATION OF OPERATIONALLY REALISTIC 3D** ENVIRONMENT

INTELLIGENCE VALUE

CORE3D developed a methodology for the automated creation of dimensionally-accurate, realisticlooking, lightweight 3-D models from satellite imagery to provide situational awareness essential to military, humanitarian, and intelligence mission planning.

Timely, spatially-accurate, and realistic models are essential for mission planning, intelligence analysis, and site familiarization. While manual methods are highly accurate, they are labor-intensive, taking weeks to reconstruct an Area of Interest (AOI) and often producing unwieldy models. Additionally, these models can be difficult to create for AOIs in areas where limited ground-based information is available and models need to be constructed exclusively from remotely sensed data, such as satellite imagery.

CORE3D was a three-year program that began in November of 2017 that targeted improving model accuracy and realism, while also increasing the speed of model creation and minimizing the storage size of the models. The CORE3D pipeline has modelled areas with an accuracy of 2.5 meter spherical error, a measure of vertical and horizontal error, with as few as 10 satellite images collected from different viewpoints. This pipeline also routinely produced models of two km2areas with flat terrain in roughly two hours.



- **Applied Research Associates**
- General Electric Global Research .
- Kitware
- Vision Systems Inc

TESTING AND EVALUATION PARTNER

Johns Hopkins University Applied **Physics Laboratory**

KEYWORDS

- Satellite imagery
- 3-D modeling
- Multiple View Geometry
- **Computer Vision**
- Machine learning
- **Automating Analysis**





models

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