

Improving AF situational awareness with smart satellite imagery

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Basic research funding from the Air Force Office of Scientific Research (AFOSR) has led to the development of software for aligning maps with satellite imagery called MapStrata. Pictured above, Cyrus Shahabi (left), Jason Chen (center), and Craig Knoblock (right) from Geosemble Technologies review the latest version. Credit: Image courtesy of Dr. Craig Knoblock, University of Southern California, Information Sciences Institute

Researchers from the University of Southern California (USC) and small business Geosemble Technologies are improving Air Force situational awareness with software that presents vast amounts of map data in a more manageable format for its commanders in theater.

Using basic research funding from the [Air Force](#) Office of Scientific Research (AFOSR), Dr. Craig Knoblock and his team developed a computerized method for aligning maps with satellite imagery. The resulting format combined the visual appeal of photographs with the attribution information found on maps.

While the idea was not new, the old method required a person to identify a set of control points manually for registering a map with an image. This process, though tedious, was able to account for a variety of map designs and their inherent differences.

The key to Knoblock's AFOSR-funded work was finding an automated method that could also account for these differences. First, he and his team looked for the most comprehensive way to process maps for gathering needed data. Next, they investigated how to relate that extracted data to [satellite images](#). The resulting solution uses road vector data as the metaphorical glue binding the two formats together.

"The idea is to automatically extract the road intersections on a map and use the layout of those intersections to find the corresponding area on the satellite imagery," Knoblock explained. "We chose to pursue this topic because there is so much valuable information contained in maps and it seems like a great opportunity to be able to make that information more easily available."

The success of this basic research led Knoblock and his team at USC to create a spin-off company called Geosemble Technologies. Under this company, they were able to apply for additional funding through the Small Business Technology Transfer (STTR) program at AFOSR and license the technology for commercial use.

Air Force planners now have the ability to integrate maps quickly and automatically with the latest aerial and satellite imagery for a given area,

thereby creating context and situational awareness for better and faster decision-making.

Currently, Geosemble is developing a partnership with an unnamed, major defense contractor that will allow them to integrate their capability -- called MapStrata -- as a plug-in with an existing software suite used by the Air Force.

With the STTR and future funding, Geosemble plans to continue adding new capabilities to the existing software, including an export to database feature.

Dr. Knoblock's research is yet another example of the successful transfer of basic research findings to industry, the supplier of Air Force acquisitions. By funding research programs like this, AFOSR continues to expand the horizon of scientific knowledge through its leadership and management of the Air Force's basic research program. As a vital component of the Air Force Research Laboratory, AFOSR supports the Air Force mission of control and maximum utilization of air and space.

Source: Air Force Office of Scientific Research

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