



SUCCESS STORY

From Pixels to Exquisite Situational Awareness

TARGET TRACKING VIA DEEP LEARNING

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SBIR COMPANY NAME: SYSTEMS & TECHNOLOGY RESEARCH

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SPONSORING ORGANIZATION: AFRL/RYA

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THE BASICS

- End-to-end, long term target tracking system
- Maintains effectiveness in changing conditions in the field
- Combines a confuser-aware deep learning method of AI high value target tracking software with a generic multi-target tracking framework
- Air Force Small Business Innovation Research funding was essential



Photo by Senior Airman Daniel Hernandez.

WITH THE SUPPORT OF AIR FORCE SBIR/STTR, MASSACHUSETTS-BASED SYSTEMS AND TECHNOLOGY RESEARCH HAS DEVELOPED A LONG TERM HIGH-VALUE MULTI-TARGET TRACKING SYSTEM.

In cooperation with the Rochester Institute of Technology, Systems and Technology Research in Woburn, Massachusetts was able to adapt state-of-the-art target detection and tracking technologies to develop a fully integrated system that is designed to overcome the traditional challenges to automated tracking systems.

With these developments, the tracking of high value targets may become automated over the current searching system that relies mainly on facial recognition software and backtracking via an analyst's manual efforts.

Due to the success of this project, Systems and Technology Research expects to receive two million dollars in funding and an additional half a million dollars in additional funds per year, which will allow them to grow their current research staff.

With the establishment of the foundational technologies of this project, Systems and Technology Research intends to expand into other image and video exploitation capability development projects.

BEHIND THE TECHNOLOGY

Aerial video analysis is an essential but time-consuming task which requires analysts to manually search through hours of data in order to track high value targets and anticipate their destination or backtrack to their most recent locations.

Automating this tracking was the obvious solution to save on man-hours and difficulty, but it faced challenges. Targets could change their appearance, lighting conditions could be affected by the passage of time or setting, and the viewing angle and zoom variation made it difficult for analyzing software to maintain a lock on the target. Similar looking targets and cluttered objects also confused previous analytical software.

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The Air Force needed an intuitive method of tracking software that could adapt to the conditions it faced in the field, and track both backward to previous destinations or forward to intended destinations.

The tracking system developed by Systems and Technology Research focused specifically on eliminating those operational weaknesses to develop an end-to-end long term target tracking system that maintains effectiveness in all of those field conditions.

Systems and Technology Research teamed up with the Rochester Institute of Technology to adapt target detection and tracking technology, and focused its SBIR effort specifically on eliminating the weaknesses that typically face such systems through experimentation and performance optimization.

It works by combining a confuser-aware deep learning method of artificial intelligence high value target tracking software with a generic multi-target tracking framework. This allows the software to adapt for the challenges that normally confuse a traditional target tracker.

This technology is being explored for user testing and potential implementation at the National Geospatial-Intelligence Agency in 2021.

SBIR FUNDING AND AFRL EXPERTISE WERE CRITICAL

The Air Force Small Business Technology Transfer program funding and AFRL expertise were essential in focusing the development of the project, and attracting the right minds to the ongoing effort.

“The nature of the work performed under this STTR project, as well as the relationships developed with our academic partner, has helped us recruit and hire qualified and interested staff members,” said Gil Ettinger, Vice President of Systems and Technology Research.

The Air Force SBIR program invested just under \$750,000, and earned the company \$470,000 in Phase III contracts so far. 🌐

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