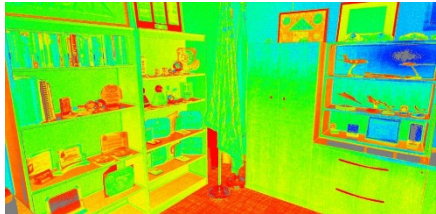


*Wright-Patterson AFB Thermal Imagery Supporting Roofing System Assessments*

## **LiDAR part of digital foundation for installations of future**

By Roger Clarke and David Foster  
AFCEC Planning and Integration Directorate

Airborne imagery and light detecting and ranging (LiDAR) data collected under an Air Force enterprise installations contract began in 2016 continues to build and fortify the digital foundation for installations of the future, including hurricane stricken Tyndall Air Force Base, Florida.



High fidelity and accuracy of these data sources are critical elements for future deployment of autonomous vehicles on installations and for effective placement of sensors powering smart facilities of tomorrow.



*AFCEC Director's Office  
LiDAR Scan Products,  
Geospatial Proof of Concept*

Under the enterprise contract, data is collected at each Air Force installation every three years, and by exception based on mission requirements. Centralized collection allows the Air Force to gather data once and use endlessly for a wide variety of missions, improving context supporting data-driven basing, support and battle-space decisions and investments.

This enterprise approach has resulted in a 40% costs savings over de-centralized execution previously conducted by installations, while simultaneously expanding access to the information by cross-functional and multi-domain users.

Today, following in the footsteps of civil engineer innovators and early adopters, this same data helps built infrastructure and environment management, force protection and flight safety decision making across the enterprise.

Current applications include:

- Bridge and road condition assessments
- Disaster preparedness, response and recovery
- Erosion control
- Endangered plants restoration

- Flood predictive modeling and analysis
- Imaginary surfaces - 3D modeling aircraft approach and departure obstructions
- Irrigation system assessment
- Line of site analysis supporting force protection, communications and flight safety
- Roof condition assessments
- Solar suitability analysis
- Wildland fire management

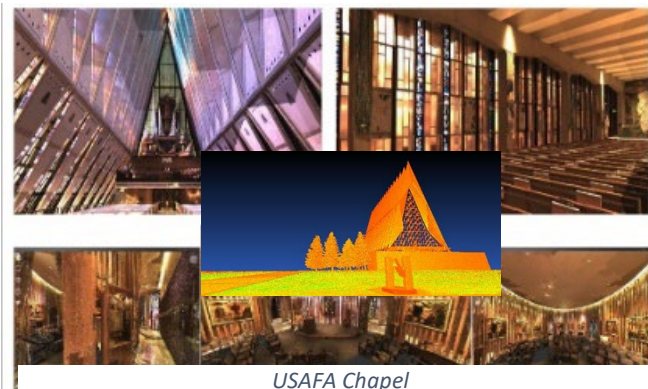
### Timely, relevant, compelling data

For example, a few days following Hurricane Michael striking Tyndall AFB, the Air Force Civil Engineer Center’s digital response included the collection of airborne imagery to support initial facility damage assessments conducted remotely between structural engineers and geospatial analysts. A six-month LiDAR collection, followed by annual imagery and LiDAR collection, continues to be used extensively by civil engineers and private industry partners for base reconstruction and installation of the future pursuits.

“Making sure this data is visible, accessible, understandable, linked and trusted has resulted in significant cost avoidance by collecting it once for use by many, saving time and effort conducting surveys needed to perform engineering and design tasks,” said Lt. Col. Ruben Choi, AFCEC’s Planning and Integration Requirements Identification Branch chief.

Those needing Tyndall data can access it via the AFGIMS Imagery & LiDAR Widget on CAC and government network systems or by requesting it via [Geobasesupport@di2e.net](mailto:Geobasesupport@di2e.net), Choi said.

### Geospatial engineering innovators



USAFA Chapel  
Terrestrial LiDAR Products

Numerous examples of Airmen leading deployment of cutting-edge geospatial technologies include the use of LiDAR to survey and assess roofing systems at Wright-Patterson AFB, Ohio, geographically separated unit radar sites, and the iconic U.S. Air Force Academy Chapel indoor environments, and deploying small unmanned aerial systems and thermal imaging to assess Installation infrastructure.

Limited Air Force deployments of thermal imagery for infrastructure management have proven to be of substantial value for derived data supporting energy reduction objectives. Like LiDAR, *thermal imagery makes the invisible – visible*. Several bases have successfully used airborne and hand-held thermal sensors to identify areas for improving energy management. Its use reduces costs by improving built and natural environment knowledge supporting program management and investments.

Adding airborne thermal imagery to the enterprise installations airborne imagery and LiDAR package is currently under consideration, and is expected to significantly reduce coordination

required and eliminate acquisition costs for installations wanting to apply thermal imaging for assessing exterior building envelopes, conditions of windows, doors and other penetrations located on walls and roof systems.

Increased interest in geospatial technologies has caught the attention of organizations like AFWERX and the Air Force Installation and Mission Support Center's Innovation Office. For example, in the fall of 2019 AFIMSC's Innovation Office began field testing an unmanned aerial system equipped with light detection and ranging, multi-spectral sensors and machine-learning algorithms to map, survey and inventory habitat for the golden-cheeked warbler at Camp Bullis, Texas. For more information on this effort, go to <https://www.afimsc.af.mil/News/Article-Display/Article/2110518/afimsc-innovation-project-receives-3-million-award/>

This incredible initiative is one of many where the Air Force GeoBase Program intends to place more emphasis on collaboration to maximize enterprise investments to achieve greater understanding of the operating environment for strengthening force protection, improving readiness and enabling steps to achieve smart facilities and installations.

"Satellite and airborne imagery, airborne and terrestrial LiDAR and thermal imagery are engineering industry standards," said Scott Ensign, Air Force GeoBase Program Manager. "Their adoption by Air Force civil engineers provides comprehensive data sets enabling high-quality analysis supporting data-driven decisions for installation lifecycle management and *force protection*. Our aim is to expand enterprise awareness and deployment of these capabilities providing the digital foundation for and leading to installations of the future."

For more information on Air Force installation imagery and LiDAR data resources, future collection schedule and related geospatial engineering capabilities, email [roger.clarke@us.af.mil](mailto:roger.clarke@us.af.mil) or [geobasesupport@di2e.net](mailto:geobasesupport@di2e.net). To stay current on the geospatial innovation discussion, join and follow the [USAF GeoBase Program on milSuite](#).

*Editor's note: Clarke is the AFCEC GIO support manager, and Foster is an AFCEC GIO support contractor*