



Airmen from the 379th Expeditionary Civil Engineer Squadron at Al Udeid AB, Qatar capture geospatial coordinates and elevation data for storage and shared use through the Air Force's GeoBase program. U.S. AIR FORCE PHOTO BY TECH. SGT. AMY M. LOVGREN

## BUILDING THE GeoBase Program

The foundation is now in place for expanding the benefits of GeoBase—the U.S. Air Force Installation Geospatial Information and Services Program—to missions outside of enduring installations.

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**G**eoBase, the U.S. Air Force Installation Geospatial Information and Services (IGI&S) Program, provides precise location and portrayal of built and natural infrastructure assets to facilitate installation planning, development, operations and protection. Before GeoBase, as many as five different maps needed to be created to accomplish civil engineering, munitions safety, natural resource management, command and control, and security forces missions for a single installation.

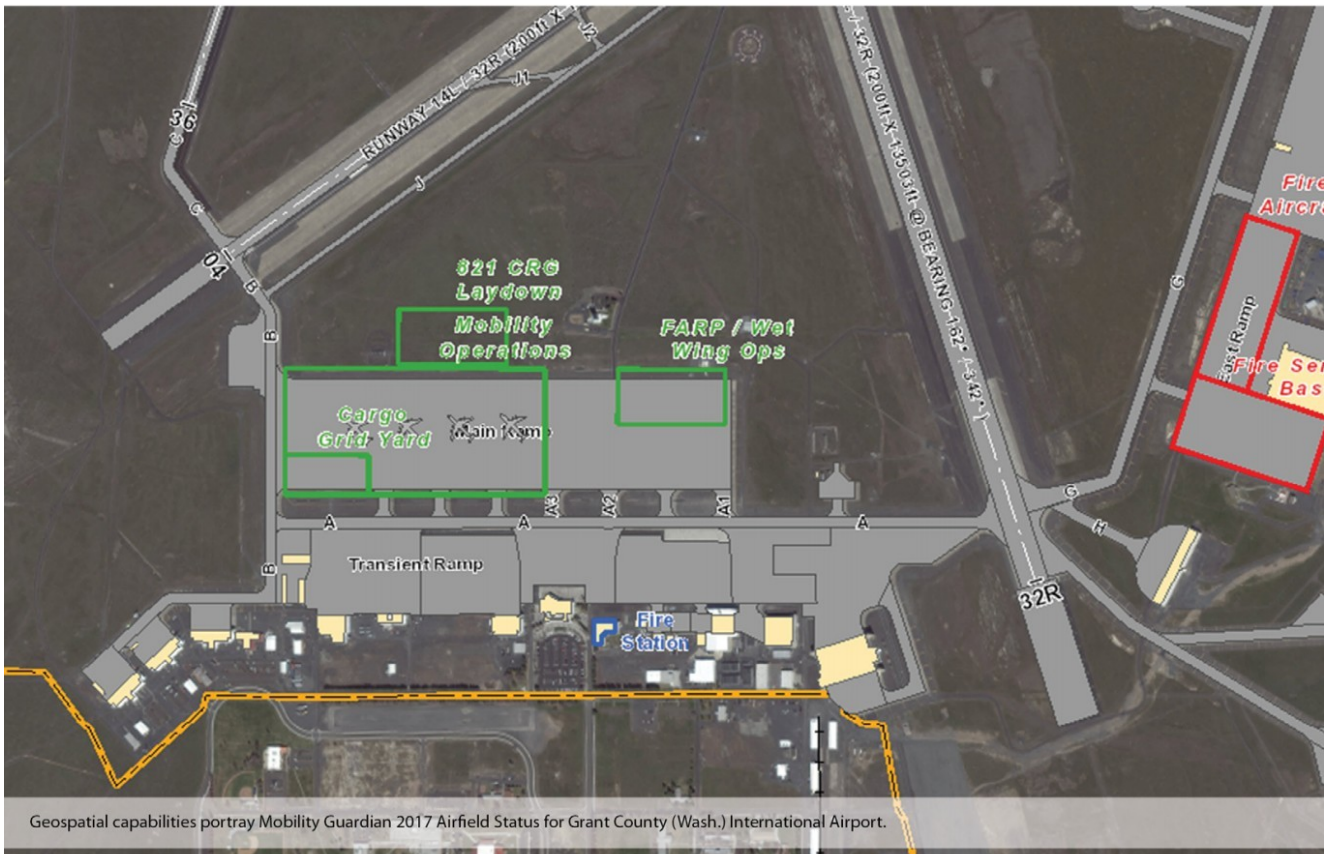
Since 2001, the GeoBase vision of “one base, one map” has provided all base missions with a single source for shared situational awareness. The foundation is now in place for expanding these benefits to missions that occur outside of enduring installations.

### UNLIKELY BEGINNINGS

The GeoBase concept was conceived at the U.S. Air Force Academy in 1998, and was instigated by an unlikely source. For years, vehicles had been striking deer at the academy at an increasing rate, which led to geographic information system (GIS) technology being used to analyze the accumulated data for patterns. Years of paper maps were first converted to a digital format. A spatial analysis of hundreds of vehicle-deer incidents—including place, date, time, slope, tree density and vegetation—quickly led to understanding the contributing factors and steps necessary to mitigate risk to drivers and deer.

This application was followed by a similar geospatial analysis of radon measurements across hundreds of base housing units, which ultimately produced an optimal mitigation schedule to make the best use of available labor and materials.

These two GIS applications sparked an Air Force-wide program and culture of capturing, exploiting, and sharing site and situational awareness of bases around the world.





## VERSATILE TECHNOLOGY

Shortly after the Air Force had started implementing the GeoBase Program, the events of Sept. 11, 2001, introduced new priorities for the capability.

“One base, one map” techniques and tools helped identify optimal sites for airfield operations in Southwest Asia. It was the first time civil engineers had access to imagery and maps in advance to best plan the airfield layout and tailor assets airlifted to the site. The use of GeoBase tools downrange accelerated its mission value across all warfighting commands. However, 2003 brought yet another role for GeoBase, when the quality of its imagery and data convinced the Air Force to apply GeoBase concepts across all Armed Services to assist with Base Realignment and Closure.

The successful application of the technology in these deliberations prompted the Office of the Secretary of Defense to establish a new IGI&S office in 2004 to coordinate efforts across the Armed Services.

## STANDARDS AND POLICIES

New Department of Defense policies are now helping extend the value of geospatial information technology by mandating all IGI&S programs make imagery and geo-referenced built and natural infrastructure data visible, accessible, understandable, trusted and interoperable. This improves design and operations at all defense installations.

Adoption of the Spatial Data Standard for Facilities, Infrastructure and Environment among the services has proven to be the key to effective planning, design and interoperability across all installation missions. Efforts by the Air Force Chief Information Officer to organize all Air Force data investments has helped advance geospatial data's value to the mission by including geospatial data as a distinct data type needing attention within the new Air Force Data Framework.

## VALUE BEYOND BASES

Currently, the Air Force is working on a project to discover how Air Force Civil Engineer Center (AFCEC) and Air Mobility Command elements can help improve Rapid Global Mobility through innovative uses of proven IGI&S tools and techniques.

As the lead for Rapid Global Mobility, Air Materiel Command (AMC) is responsible for Contingency Response Forces and for Opening the Airbase, which includes ensuring suitability of airfields for accommodating Mobility Air Forces aircraft. These aircraft are typically the first to land with assets to build up the airfield. Poor awareness of the physical landscape and elevation contours of airfields has led, at times, to mobility aircraft finding they are unable to use taxiways due to berms that prevented safe

passage. This led to a need for more information that now includes understanding the terrain, infrastructure and logistical resources at potential operating locations.

## SITE AND SITUATION

Geographers use the phrase “site and situation” to describe both the physical terrain and how an area is situated in respect to other features within that same area. For example, that means knowing not only the locations of trees, berms and pavement conditions, but also the availability of parking spaces, ramps for the loading and unloading of cargo, and proximal distances between areas that must be dispersed for safety purposes, such as storing munitions and fuels.

AFCEC and AMC teams, as well as IGI&S analysts supporting Combatant Commanders around the world, are aiming to organize and implement a singular capability that would extend the original GeoBase goal of “one base, one map” to “one operating location, one map.” The goal is to empower all Air Force operational and logistics planners supporting warfighters with immediate access to the best available imagery, elevation and asset information from airfields in all theaters. By combining new airfield surveys with IGI&S capabilities, planners will have rapid access to imagery and data to confidently accommodate concurrent needs for airfield management, civil engineering, logistics and force protection.

In August 2017, AMC made extensive use of installation and logistics GI&S during its Mobility Guardian Exercise that involved forces from the Air Force, the U.S. Army and several Allied nations. Brig. Gen. Brian Robinson, USAF, Mobility Guardian Joint Task Force Commander, said he was duly impressed with the value of GI&S capabilities for the exercise. “Geospatial capabilities are essential for an integrated picture,” he said. “The Airfield Status snapshot proved invaluable as a Joint Staff briefing aid, quickly delivering situational awareness and decision-support capability.”

## GAINING MISSION SYNERGIES

Acquiring situational awareness will always be the first step of effective planning to best execute the assigned mission. Whether at home base or downrange, understanding the capabilities and landscape of each operating location leads to better planning, design, asset management, and execution of the mission. Geospatial information and services can help ensure that the Air Force is constantly monitoring the mission needs for opportunities to improve effectiveness and reduce risk.

Since 2001, GeoBase has delivered both heightened efficiencies and effectiveness for the installation mission with enhanced knowledge of the built and natural infrastructure. Airmen and organizations across the Air Force are now poised to achieve even greater mission synergies by extending the lessons learned and benefits of GI&S from installations to logistics and beyond.

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