Re-Addressing Eielson Air Force Base

Authors

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Abstract

GeoBase, the United States Air Force's information management initiative, was tasked with re-addressing Eielson Air Force Base in order to improve their illogical addressing system. The previous system, based on facility id numbers, made orientation difficult; GIS-based queries, efficient routing, and geo-coding were not possible. The new addressing system was developed in cooperation with the US Postal Service and several key military organizations at Eielson. This paper presents the methodology by which a new, logical addressing system was developed, how it was implemented, and describes the benefits and applications made possible by the new system.

Body

From roads to revetments, surface water to sewer lines, mapping to planning, the Air Force GeoBase program has become an integral part of the way the 354th Fighter Wing at Eielson Air Force Base does business. Not just a set of maps or a GPS program; the GeoBase vision is "One Installation…One Map", meaning one geospatial infostructure supporting all installation requirements. The GeoBase mission is to "attain, maintain, and sustain" this infostructure to include personnel, processes, and resources used in the collection, integration, storage, retrieval and analysis of all spatial data in support of the higher installation mission.

A large component of GeoBase is the Common Installation Picture (CIP), which, at Eielson, consists of an SDSFIE compliant geodatabase containing roughly 60

layers of spatial data and associated attribute tables. These layers are defined by the Pacific Air Forces Command (PACAF) and are absolutely necessary for the PACAF Command Staff to make informed decisions about its subordinate installations. One of the data layers in the CIP is the installation building footprints, or structure_existing_area, which is the SDSFIE compliant layer name. There are about 800 buildings on Eielson. Much of the base housing is made up of multi-tenant facilities. Base housing currently consists of approximately 1500 housing units.

Traditionally, a unique Facility ID number identified all buildings. As new construction occurred, the new building would be assigned the next available sequential Facility ID number (Figure 1). The Facility ID number had no relation to the location of the building on the base. The road network was also illogical (Figure 2), with several discontinuous roads and no consistent naming conventions. As such, newcomers, contractors, off-base personnel, suppliers, and others lacked a logical system to navigate on base. This also impaired the ability of GeoBase to fully utilize the technology available within the GIS (i.e. geo-coding and transportation network analyses were simply not possible). Of greatest concern, emergency response was based on learned familiarity or by painstakingly referring to a map of facilities. The decision was made to re-address Eielson Air Force Base and GeoBase was the obvious choice for taking on this HUGE task.

First of all, a re-addressing working-group was established to guide the effort from start to finish. Members of the working-group included representatives from Civil Engineering, Firefighting, Medical, Communications, Security Forces, and Public Affairs from the 354th, as well representatives from the United States Postal Service (USPS) and Alaska Communication Systems (ACS, a local telephone company). This group met weekly to share their expertise and discuss plans, progress, and concerns as the project developed.

Next, GeoBase was tasked with the creation of a master timeline (Figure 3). This entailed the definition milestones and deadlines. Coordination was made with each member of the working-group to ensure that enough time was allotted for the completion of each phase of the project. This timeline was updated weekly, plotted as a poster and used during weekly meetings to track the accomplishment of benchmarks and overall project status.

As a part of the planning process, research was done on the successes and lessons learned from other re-addressing attempts. Hickam Air Force Base, Hawaii, was successful with their equal interval scheme, United States Postal Service (USPS) Proportional Addressing. The USPS and the city of Honolulu were involved in the integration team, and the addressing system was fully integrated into the surrounding community. Elmendorf Air Force Base, Alaska was unsuccessful in their re-addressing attempt in 1999. The problem was that they replaced the Real Property ID numbers in the Automated Civil Engineering System (ACES; a database that tracks all real property assets Air Force wide) with numbers of the new logical addressing system. Changing Real Property ID numbers created many problems, as many databases and references use ACES and these ID numbers for tracking construction, money spent and historical information. Elmendorf is currently in the process of reverting back to their original Real Property ID numbers. Anderson, Misawa, and Yakota Air Force Bases attempted to improve their addressing systems, with no real change occurring.

The working-group considered several different addressing scheme possibilities. The “City Block Scheme” is based on a grid created by the intersections of streets. Where no intersections exist, a defined distance is used. The origin is typically a square or center point, however, this point is flexible. South and east define the even numbered sides of the streets. The range of numbers per block can vary; however, 100 numbers per block is most common. This was not a good scheme for Eielson due to the number of buildings in such a small radius.

The “Equal Interval Scheme” is based on a hierarchy of roads; the origin was defined at Eielson as the main gate. All roads are defined from where they originate. For example, Central Avenue (a secondary road) starts where it joins Flightline Avenue (a primary road). Again, south and east define the even numbered sides of the streets. In the model Eielson considered, 100 addresses were located per half mile. Eielson is also too small for this scheme. The third option was the “Grid Scheme” which sets the origin at a location decided upon by the community. Based on input from the USPS, the working-group chose the “Grid Scheme” as most suitable and GeoBase created a custom-addressing grid for assignment of new addresses to existing buildings (Figure 4).

The grid was developed with most of its lines following primary and secondary roads, separated by increments of 100. North and south routes have four digit addresses, beginning with the 1800 block at the north end of the base. East and west routes have three digit addresses, beginning with the 200 block at the west end of the base. The addresses increase as you drive south and east. Even addresses are on the south and east sides of the roads, with odd addresses on the north and west sides of the roads. To avoid USPS mail conflicts, care was taken that no new street names on Eielson duplicated street names in the Fairbanks North Star Borough. GeoBase created the grid with expansion in mind. The grid leaves enough space between addresses to accommodate new buildings on base. New gridlines can be added to cope with future development outside of the current base boundaries.

During the course of re-addressing, GeoBase encountered several challenges and issues. The primary issue was to decide which facilities to address and which facilities did not need addresses. At one initial meeting it was stated, “Un-manned buildings will not be given mailing addresses.” However, the definition of manned vs. unmanned was not quite clear; for example, a pump house may be unmanned for most of the time, but if an accident occurred while servicing the pump house, then emergency services must still be able to locate this pump

house quickly and efficiently. Quick and efficient location of facilities was a primary goal of Eielson re-addressing. It was suggested that even utilidor vaults, fuel tanks, and manholes be given addresses. Based on input from the utilities maintenance personnel and emergency services, however, it was decided that the closest building in the vicinity could identify a manhole or utilidor. Additionally, emergency services would plug both facility ID numbers and addresses into their database to facilitate quick response to incidents.

Implementation of this new addressing system required a change of mindset: thinking full street addresses instead of single building numbers. Implementation also required action. The GeoBase staff was tasked with assigning new addresses to buildings and renaming roads where necessary. The post office needed one month to reconfigure routes with the new addresses. Mail delivery to the old addresses could continue for one year thereafter. The Communications Squadron needed one month to reconfigure emergency routing switches and to match phone numbers to addresses in the 911 phone system. The Civil Engineering Squadron was tasked with creating and replacing signs, painting over building numbers, and making a variety of new maps. Paint and signage cost was approximately one hundred dollars per building.

Public announcements played a vital part in re-addressing. Notices of re-addressing were broadcast via Eielson Community Television and the weekly base newspaper. Flyers were also posted on all housing units signed by the Civil Engineering Squadron Commander. The Public Affairs office set up a link on the main Eielson Intranet that contained a new addressing cross-reference sheet, re-addressing slide show with maps, frequently asked questions, and a contact phone number.

The new addressing scheme allows for several geo-enabled applications. A geometric network was created based on the road_centerline data. Both the shape_length field and a field containing speed limit values were weighted so

that network analyses can be accomplished on either shortest road distance or fastest route (Figure 5). A geo-coding service was created to allow for the rapid identification of address locations using the Find tool in ArcMap (Figure 6). Maps were created in ArcReader format for the Fire Department that also take advantage of the Find tool for use in emergency dispatch and in their mobile command van (Figures 7 and 8). Work is currently underway to create custom ArcMap network analysis tool that will provide the user a drop-down list of predefined starting flags, a choice between shortest road distance or fastest route, and an input box for an address. Once an address is input, the tool will use the geo-coding service to place the ending flag and launch the Find Path solver. All of these accomplishments greatly increase the ability of the entire installation community to better leverage its spatial data investments and, in turn, allows the GeoBase program to better serve the installation community.

An unforeseen benefit of the project was the unearthing of discrepancies between Real Property records, the ACES database, and the CIP data. GeoBase and Real Property conducted a series of extensive review processes where facility ID's and new addresses were mapped and cross-referenced. These reviews ultimately lead to a greatly increased level of accuracy in both the CIP and ACES data, something that would otherwise have gone on unnoticed for the indefinite future.

In summary, re-addressing even a relatively small community such as Eielson Air Force Base was, and continues to be, a tremendous effort. As in so many other endeavors, the better and more thorough the planning and coordination, the easier it is to facilitate change. Thus far, there have been very minimal undesirable affects at Eielson AFB as a result of our re-addressing. As compensation for our efforts, we have opened numerous opportunities for the base to take advantage of the power of GIS, and better use the GeoBase service.

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