

Mapping Real Property

By Matt Schrader, PLS, M.SAME, and David LaBranche, P.E., M.SAME

The U.S. Department of Defense (DOD) has taken a major step toward transforming real property accountability across the DOD enterprise after a successful pilot project that applied geospatial techniques to develop a Real Property Inventory (RPI) process. This process was used to determine and digitally map authoritative parcel boundaries at 70 installations.

Real property data describe land as well as facilities—buildings, structures and linear structures such as utilities, roads and fences—that the federal government owns, and for which DOD is accountable. Real property data are perhaps the most important dataset needed for asset management.

DOD needs real property information to answer six key questions:

- What do we own or use?
- Where is it located?
- How much does it cost?
- Who is occupying the property?
- What is its condition?
- What is its ability to support the mission?

“To properly manage our assets, the DOD needs a better understanding of our legal boundaries,” said Lora Muchmore, Director of Business Enterprise Integration, Office of the Deputy Under Secretary of Defense for Installations and Environment (DUSD(I&E)), who helped champion the RPI pilot project. “This includes what we own, what we lease and what we use or occupy.”

A Missing Link

Crucial for asset accountability is knowing the location of real property—a requirement ideally suited for geospatial visualization. In the past, however, real property information was thought

to be of interest only to the services’ real property communities. The services’ GIS communities developed geospatial maps for different applications, but these maps were not based necessarily on legal boundaries; thus, these maps are incomplete and sometimes inaccurate. Moreover, redundant data often have been maintained in geospatial databases across installations and in each service’s real estate database, creating inconsistencies. Geospatial datasets also have not been linked efficiently to DOD accounting mechanisms.

“Because of the sheer size of the DOD, and because we did not have the tools, mechanisms and culture in place, we were unable to make real property information accessible to organizations throughout the DOD enterprise,” Muchmore said.

That is because DOD’s geospatial and real property missions evolved separately, explained Craig Adams, Installations Management, Business Enterprise Integration, DUSD(I&E). The geospatial mission grew from initial computer-aided design (CAD) efforts to map the locations of facilities, while the real property mission captured changes to DOD assets so they could be managed and reported to Congress and others in the federal government.

“The geospatial community created maps based on where the fence line was,” Adams said. “Historically, there was no perceived need to review a deed to create these maps.”

Sometimes this caused problems. Audrey Ormerod, Army Real Property Officer, Office of the Assistant Chief of Staff for Installation Management, said fences often are set several meters inside an installation’s legal boundary. “This can

DOD has begun transforming real property accountability after a successful pilot project used geospatial techniques to develop a real property inventory process.

The real property and geospatial communities agreed to follow this Real Property Inventory (RPI) data model, which defines and standardizes the elements of real property. Following this data model allows data sharing among organizations in each service and among the services themselves.



Images courtesy U.S. Department of Defense

allow a neighboring landowner to assume he owns these last few meters,” Ormerod said. In other cases, if a fence line is straight but the legal boundary is not, “it’s possible to construct a fence too far onto another property and have reverse encroachment,” she said.

Without an authoritative, geospatial view of parcel boundaries, it’s possible to propose and design a project on land not owned by the federal government. “If you have to demolish a building and build a new one, understanding the legal nature of the parcel below makes a difference,” Muchmore said.

The Pilot Project

DOD’s RPI initiative is described in its Real Property Inventory Requirements (RPIR) document, created in response to the DUSD(I&E) management focus on addressing long-standing deficiencies with real property accountability. This document identifies core business attributes that must be inventoried for all real property and outlines operational definitions and business rules for managing the inventory.

The RPI pilot project, performed by Woolpert Inc. and funded by DUSD(I&E), compared and documented different methods of tract compilation for DOD installations based on the RPIR. This pilot, which used and assessed the Defense Installation Spatial Data Infrastructure RPI-recommended data model, also produced recommendations for future tract compilation based on current workflows and business processes at the services. The pilot project team, which included Towill Inc. and Photo Science, worked with the services’ real property officers and geospatial communities to create baseline digital datasets for 70 installations. By creating parcel boundaries from deed and legal descriptions and viewing parcel boundaries geospatially, surveying and GIS technicians easily identified unreconciled discrepancies, such as parcel overlaps, not evident when viewing tabular real property data alone. The team then applied land survey calculations to resolve approximately 90 percent of these fit discrepancies so that parcel boundaries closed. The remaining discrepancies, such as gaps

between parcels that could not be resolved, were flagged for future resolution by the installations.

Giant Steps

Because of the pilot, new working relationships have been established between the services’ real property officers and geospatial information managers. Both communities now have a lifecycle view of real property that encompasses planning, resourcing, acquisition, management and disposal.

Additionally, a common vocabulary was established among the stakeholders. For example, “boundary” meant different things to different people. Was the reference to a legal or a physical boundary, such as a fence line? The same was true for “installation.” Was the reference to the installation as a whole, based on the management structure, or a subordinate installation site as defined by its separate, cadastral boundary?

The two communities also agreed on an RPI data model that standardized the elements of real property, such as installations, which consist of sites, and real property assets, which consist of land and facilities. Following this data model will allow data sharing among organizations within each service and among the services themselves.

Stakeholders see numerous applications for geospatially-located land parcel boundaries across the enterprise. Parcel boundaries—based on legal descriptions and RPIR guidelines and available in a GIS—can be readily stored, shared and updated. Previously, if U.S. Army real estate personnel were planning for the disposal of a parcel, they had to make “data calls” because real property data and reconciled GIS boundaries were not accessible.

Financial management rules also require that records of environmental lia-

bilities be linked to the assets they affect, whether land or facilities. It is easier to link liabilities to assets if geospatial data exist for both. The real property and geospatial communities now can perform a reliable asset accountability analysis to help the environmental community identify real property encumbered with environmental liabilities.

Going Forward

The pilot demonstrated that GIS boundary data can be produced readily, and that a cross-functional real property/geospatial team is essential to ensure the best data development process. The next step is documenting lessons learned and the to-be business processes that will sustain this effort across DOD and allow parcel boundary maps to be created for other sites.

Process changes need to occur. Historically, real property officers updated records based on transactions such as an acquisition (purchase) or disposal (sale) of land, while the geospatial community typically created and maintained maps project by project. According to Adams, each service needs to establish processes to update real property boundary maps based on internal considerations and the new working relationships between the real property and geospatial communities. TME

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According to the RPI data model, this particular installation includes two sites. The first site consists of two land parcels and the second site consists of six land parcels.

