Combining Geomatics Technology for Successful Land Development Projects and Pilots

Stephanie MICHAUD, P.Eng. Canada

Key words: LADM, Fit for Purpose, Multi- Purpose Cadastre, Geomatics, Data, Geospatial

SUMMARY

With the amount of new technology, methodologies, and connectivity available in our profession, it can be a challenging task to select one suite of geomatics technology to support land development projects. However, properly evaluating technology options and considering a multi-faceted approach can lead to significant advantages during execution of multipurpose cadaster, land formalization, and fit for purpose style projects.

Combining Geomatics Technology for Successful Land Development Projects and Pilots

Stephanie MICHAUD, P.Eng. Canada

1. INTRODUCTION

With the amount of new technology, methodologies, and connectivity available in our profession, it can be a challenging task to select one suite of geomatics technology to support land development projects. However, properly evaluating technology options and considering a multi-faceted approach can lead to significant advantages during execution of multipurpose cadaster, land formalization, and fit for purpose style projects.

2. COMBINING TECHNOLOGIES

The majority of projects today require several geomatics technologies to work independently on specific tasks, but ultimately must behave together as a cohesive solution through sharing data, communications, interoperability and final deliverable. Combining technologies can be incredibly valuable and efficient, but cumbersome if not coordinated properly on the correct platforms.

An evident example of this is the combination of RTK surveying technologies with GIS feature coding and editing. Historically, RTK correction methods have been reserved for the highly trained surveyor- but with the introduction of continually operating reference stations (CORS), nationally run geodetic networks, and the capability of handheld devices to receive such corrections- it is now possible for individual efforts to tap into these networks. By implementing a hardware device capable of capturing high accuracy data in real time, and selecting a complementary software solution that is flexible in technical and non-technical workflows, the benefits are immediate: high accuracy when needed by technical staff, yet the same equipment can also be utilized by a different organization for non- technical data capture. Or, the job of two staff in the field can now be done by one.

In order to properly address the situation, and make an equipment recommendation the following questions need to be considered and decided upon:

1. Determine the capability of the user group. Who will be using the equipment, and what level of training will they require to be successful? Will there be multiple types of users?
2. Determine the area and its infrastructure benefits and limitations. Is there cell service, topography challenges, and/or seasonal weather issues?
3. Determine the size of the user group and area combined. How many staff and how many areas need to be covered?
4. Determine the standard of data collection, and required accuracy levels for validity. Will meter level accuracy suffice, or is sub-meter required?
5. Determine the equipment solutions available in the local market

After answering these questions, proper diagnosis and trials of suitable equipment solutions can begin to determine a final route.

2.1 Cadastral Mapping for Land Governance

In a recent project in Sub Saharan Africa, local land governance requested a solution for cadastral mapping utilizing traditional surveying methods, satellite delivered corrections for rural areas, and provide ease of use for collecting mapping and GIS attributes. The purpose of the project was to determine and record parcel boundaries, capture building geometry, and record additional land use, ownership, tenant, and access information in real time. Regardless of collection and correction method used, it was expected that all necessary surveying metadata (raw data, quality information, etc.) would be recorded for complete field jobs.

By selecting a flexible software system for both survey and GIS data capture, the same equipment could be used interchangeably by any staff member, for the task specific to their project area. By choosing a hardware configuration that could be adjusted to different correction modes in the field, equipment capabilities matched their users, and maintenance was also streamlined. The choice and combination of geomatics technologies allowed the staff to effectively execute a fit-for-purpose approach to land projects, and overall, the local team was able to reduce office post processing time by eighty percent.

Other common examples of combined geomatics technologies for efficiency gains include UAV data collection vs traditional aerial imagery techniques, and laser scanning for building valuation reports and metrics.

2.2 Property Valuation for Municipal Use

Land development projects also involve numerous departments and organizations that have different responsibilities and skills to contribute, resulting in a wide range of ability and interest in geomatics technology. Assessing the technological capability of stakeholders, contributors and benefactors to land development projects prior to implementation can affect overall timeline and success. Flexibility and ease of use is key for usability of the final project deliverable.

As an example, municipalities often have both a mapping and cadastre division separate from a building or property valuation division. These divisions frequently create and maintain separate geospatial datasets. Given the appropriate data structure, office platform and collaboration, both groups can utilize the same datasets, but focus on relevant attributes to their respective functions. The mapping and cadastre division would likely focus on the physical parcel boundary and spatial characteristics, where a property valuation group would focus interest on attributes related to the parcel boundary such as physical structures, building conditions, and access. By combining efforts into a common system, each group can have more targeted efforts when managing and extracting information from spatial data.

In a rapidly growing municipality in Mexico, cross-divisional collaboration quickly became essential to staying on top of property valuation and taxation. By importing and leveraging the mapping and cadastre groups parcel dataset, the property valuation municipal division could focus field teams exclusively on building footprints, conditions, materials, additions, and access. In turn, the mapping and cadastre team began capturing additional land information attributes that would factor into the valuation equation. By adding calculated fields to the GIS form on a tablet device, property valuation teams spent less time on site, and could roughly estimate valuation changes before leaving the property. In time, both divisions benefitted from better data and frequent, specific updates. The flexibility of having two staff groupings collecting pertinent data allowed the municipality to begin tackling building updates and modifications, instead of struggling to barely keep up with new building permits.

Other stakeholders often involved at this level of collaboration include: Labor and Statistics, Agriculture, and Health and Safety.

3. CONCLUSION

Overall, combining geomatics technologies can have significant benefits to land pilot projects, including: engaging multiple stakeholders, increasing cross-divisional collaboration, and rapidly improving efficiency of results. It also directly aids in the execution of Fit for Purpose, Multi-Purpose cadaster, and land formalization approaches to land administration by leveraging the right technology for each stage of the project, without sacrificing ease of use, flexibility or limiting participation of key project stakeholders. Carefully assessing geomatics options prior to implementation is essential to land development project success.

BIOGRAPHICAL NOTES

Stephanie Michaud is a professional geomatics engineer responsible for the application of geomatics engineering principles and techniques to coordinate the definition, development, testing, and delivery of custom land development solutions within the Land Administration division and Trimble Inc organization. Mrs. Michaud holds a degree in geomatics engineering from the University of Calgary in Canada.

CONTACTS

Stephanie Michaud, P.Eng.
Trimble Inc
10368 Westmoor Drive
Westminster, Colorado
USA
Tel. +1 (303) 466-3647
Email: stephanie_michaud@trimble.com
Web site: http://landadmin.trimble.com/