

Mobile GIS Proven to Transform Land Administration



It is well understood that secure land tenure is a fundamental precondition for progress in developing economies. Typically, this is expressed with a map, but the hurdles to successful mapping and mobile data collection workflows have been difficult to overcome. Many projects have been attempted, but few have proven to be secure, easy to use, low cost, and able to evolve with changing requirements.

(By Brent Jones, PE, PLS, Esri Global Manager, Land Records/Cadastre)

Last year, a rigorous test of GIS proved that Esri technology can greatly assist in building a sustainable land administration system that is incredibly easy to implement and put into use. By combining technologies and leveraging standards, geospatial mobile apps can be

rapidly deployed, eliminating the obstacles that typically impede land administration progress in developing economies.

Barrier-free model

Those barriers are many and daunting: unreliable power supplies, intermittent or no internet connectivity, incompatibility issues, poor cell coverage, lack of trained workers – the list goes on. Realistically overcoming them requires a new model that exploits cloud services and ubiquitous low-cost technology. Esri ArcGIS Online, a platform of cloud-based map and data services, is at the center of this paradigm. It assembles the standards, devices and map services that drive efficient land administration, and it does it in simple familiar workflows that require only minimal training.

A modern land administration platform must make best use of smartphones, tablets, GNSS/GPS devices, satellite imagery, global basemaps and the cloud. When used well, all these pieces are sufficient to solve the major hardware capacity issues that many governments face. Leveraging standards, both hardware (smartphones and GPS) and software (data models), is crucial to the success of the model.

Starting with standards

Standard technologies like iOS, Android and Bluetooth are part of GIS platform because Esri created simple applications that concurrently exploit the cloud while also innovating offline work. Consider the Land Administration Domain Model (LADM), now the global standard for collecting and managing land tenure data. LADM was configured and deployed on ArcGIS Online (and is also freely available on GitHub). In ArcGIS Online, the standard connects seamlessly to Android smartphones and tablets for a smooth and productive LADM field workflow.

ArcGIS Online and hundreds of preconfigured apps and resources work on these relatively inexpensive devices. They provide access to global imagery and other authoritative basemap data in ArcGIS Online. Being consumer grade, they do have challenges where higher accuracy is required, but they also have the benefit of extensibility. Standards like Bluetooth and NEMA allow users to connect a wide variety of more accurate GPS devices to Android phones and tablets and choose what accuracy fits their purpose. In the aggregate, all these standards ensure quality and ease of use in data collection workflows.

Proof of concept

In a recent proof of concept performed by IGAC, Colombia's national mapping agency and GPS technology company Trimble, led by Kadaster International, this lightweight GIS-based approach met all critical needs: it had to be fast to implement; based on standards; inexpensive; accurate; configurable (not needing customisation); secure; able to access external data, incorporate many devices, and scale to future demands; work efficiently in disconnected mode; and be easily replicable as a standard model. Mobile tools fed by ArcGIS Online data and map services met all those requirements and more, proving ArcGIS as the standard as the robust land administration platform. Read more about the pilot [here](#).

A standardised lightweight GIS platform has a key advantage over other approaches: it meets all the land administration needs of the developing world, not just some. That is the essential differentiator that delivers hope for land administration worldwide.

For more information on how to modernise with lightweight GIS, visit www.esri.com/landadministration.