



DEFENCE AND SPACE  
Intelligence

# Cadastral Surveying with Airbus Ground Control Points

Case Study

## Challenge

The Indonesian Government needed to complete 40 million land certificates over a five-year period. To meet its objective, it required accurate cadastral mapping at a 1:5,000 map scale of the entire country.

## Solution and Results

A combined solution of aerial radar and high resolution optical data with Airbus Ground Control Points (GCPs) to deliver the required scale for cadaster maps of Indonesia. The resulting GCP database will significantly reduce the boundary disputes.

## Benefits

Within three years, a reliable cadastre database, accurate to 1–1.5 metres and covering 1,9 million square kilometres, will be available. Overall, the project will have a time saving of seven years, which will substantially minimise project risks.

“ We are amazed with the accuracy of the Airbus GCPs and that we can harmonise them so well with other data sources. Without the GCPs, we would not be able to complete this huge project in the allotted time frame. ”

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*High resolution drone imagery  
ortho-rectified with Airbus Ground  
Control Points. Bogor, Indonesia.*



## Challenge

The Indonesian Government needed to complete 40 million land certificates over a five-year period. To meet this objective, it required homogenous cadastral mapping at a 1:5,000 map scale of the entire country. The president of the Republic of Indonesia, Joko Widodo, instructed Badan Pertanahan Nasional (BPN), a government agency, to develop the necessary geospatial intelligence.

To fulfill the requirement in terms of resolution, Badan Informasi Geospasial (BIG), the leading authority for mapping in Indonesia, was to produce 1:5,000 scale homogenous maps for cadastral surveying, finished within a three-year period for approximately 1.9 million square kilometers.

Usually, a Medium Format Metric Digital Aerial Photo, combined with LIDAR, could be used, but the resources for the equipment are limited and capable aircraft are even more scarce. Terrestrial mapping was taking too much time and money, with a shortage of qualified and trained surveyors. Complicating matters further, heavy cloud cover in parts of Kalimantan, Papua and Sumatra means that using optical satellite data is nearly impossible.

## Solution and Results

Most feasible would be a combined solution using aerial radar (e.g. of Intermap, Orbisat or Fugro) and high resolution optical data (e.g. Pléiades Neo) with Airbus Ground Control Points (GCPs) to meet the required 1:5,000 scale for cadaster maps in Indonesia.

Airbus Ground Control Points are calculated from space and are essential for accurate ortho-rectification of aerial, optical satellite images and drone data to increase the location accuracy of imagery. By building up a national GCP database, the utilisation of high-resolution satellite imagery could be pushed to its optimum usage.

This GCP database will significantly reduce the boundaries dispute resulting from different data sources and will support BPN to build up a homogenous cadastre map for Indonesia.

With the GCP database, cadastral recordings can be updated and regularly renewed with fresh and new images.

## Solution Description

Creating a homogenous cadastre map with a map scale of 1:1.500m by using aerial and satellite imagery, combined with Airbus Ground Control Points, to meet the accuracy requirements of 1-1.5m.

## Organisations Involved



**BADAN INFORMASI  
GEOSPASIAL**



## Benefits

- A reliable cadastre database covering 1,9 million square kilometres will be available within three years
- Orthorectify maps based on the High Resolution Optical Satellite Imagery can be immediately used in the field
- Using aerial and satellite imagery instead of terrestrial measurements will give a time saving of seven years
- Aided by the GCPs database, accuracy will be within 1–1.5 metres
- Reduce the time required to measure land parcels measuring more than two hectares
- Project risks will be minimised as a result of the substantial time saving

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