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## Application of Remotely Sensed Satellite Imagery for Village Boundary Mapping in Indonesia: Case study in Hulu Sungai Tengah Regency, South Kalimantan, Indonesia

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## INTRODUCTION

- Indonesia: 250 million people, 34 provinces, 416 districts, 98 cities, 7160 subdistricts and 83,184 villages.
- President Joko Widodo: Indonesia's development strategy starts from the village and from the border region of the country. Consequently, village area is very important as the basis of development.



**INDONESIA IS LARGE COUNTRY:**  
 West (Sabang) – East (Merauke) = London – Bagdad  
 North (Kep. Satal) – South (P. Rote) = Germany – Algeria

Geospatial Information is compulsory for managing and developing the country

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## INTRODUCTION

- The village map is increasingly important -->the policy of president Jokowi to provide financial aid to every village in Indonesia
- One indicator of village allocation fund --> the size of village.
- In current condition, most of the villages has a village map but such maps are obey the cartographic rules.
- This is due to several facts: there are no detailed topographical maps (scale 1: 5000), the existing village boundary map has no coordinates and so the geographic position could not be known and the delineation of the village boundary is only a sketch.
- In other, lack of human resources in the field of geospatial information, as well as limited availability of high resolution satellite imagery ortho-rectified.

## INTRODUCTION

- As a result, the existing village map cannot be used for analyzing the size of village, the distance, as well as a real position against other areas. The existing village map also cannot help to solve the disputes of the village conflicts.
- BIG is Indonesian government institution --> responsible for providing topographical map for Indonesia territory
- BIG has made village boundary maps at scale of 1:5000 about 12,159 villages from total of 83,184 villages (or about 15%)
- The remaining of 85% still up to now do not have a village boundary map at the scale appropriate (1: 5,000).

**The purpose--> mapping village boundary using high resolution upright satellite images in Hulu Sungai Tengah, South Kalimantan, Indonesia**





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## METHODS

Combination of High Resolution Upright Satellite Imagery, cartometry method and Focus Group Discussion among the village stakeholders.

### Materials:

- High Resolution Upright Satellite Imagery (Pleiades and WorldView-2)
- Topographical Map of scale 1:25.000
- Administration Boundary Map



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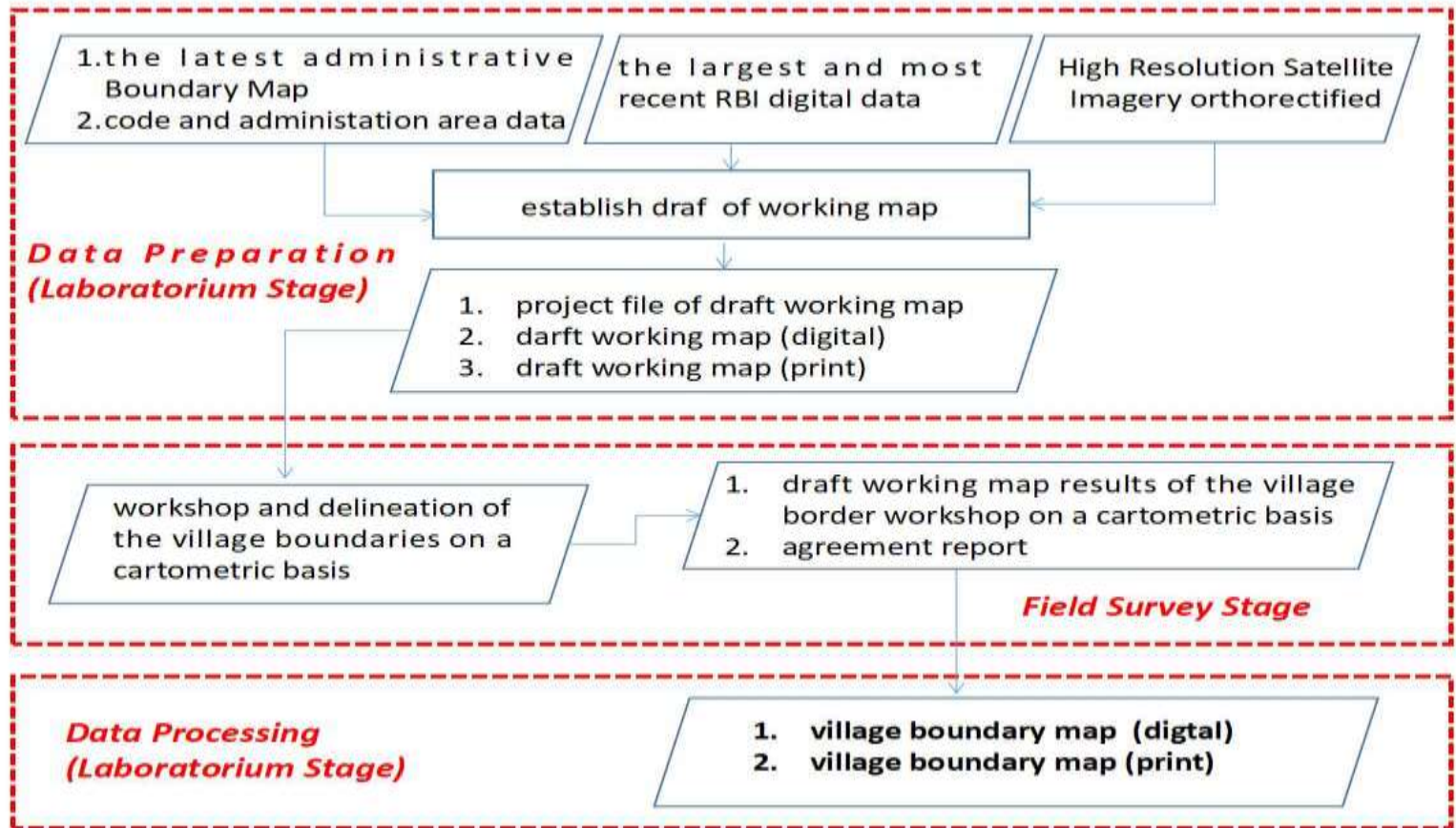
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## METHODS



The flow diagram of village boundary mapping



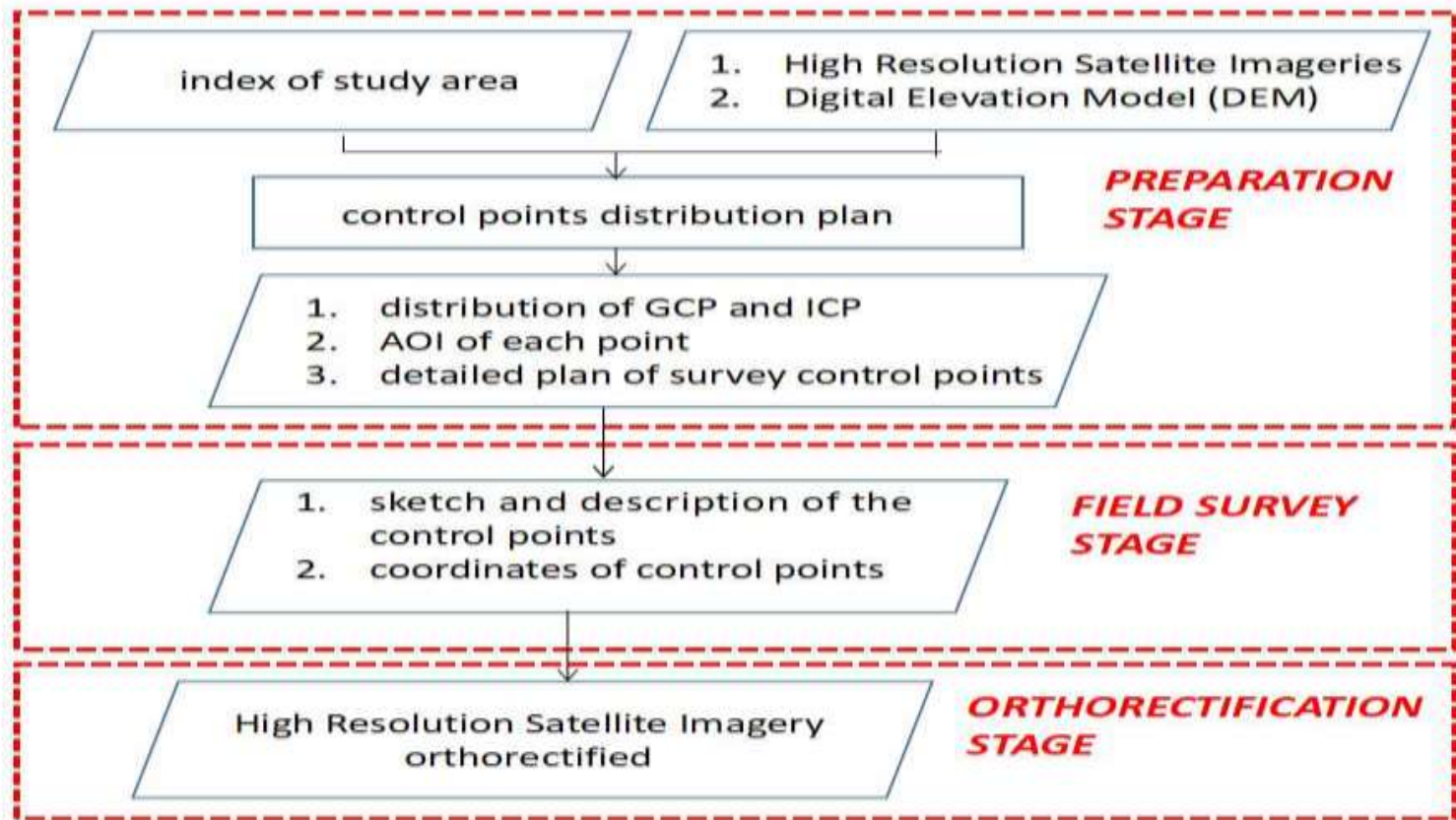
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## METHODS



The Flow diagram of ortho-rectification processes

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## STUDY AREA



- The study was conducted in Hulu Sungai Tengah Regency, South Kalimantan Province
- Administratively, the region consists of 11 districts and 169 villages.

## RESULTS AND DISCUSSION

- Mapping of village boundaries using high resolution upright satellite imagery and cartometric method has resulted in an accurate map, quickly and inexpensive.
- The accuracy of village boundary map -->depends on the quality of high resolution satellite imagery data used and the ortho-rectification process.
- The study indicated Pleiades and WorldView-2 have allowed an accurate estimate of the village boundary map with average horizontal accuracy was 1.62 meters.
- The accuracy of the boundary deliniation also depend on the result of image interpretation that have done in the verification process on the workshop.

## RESULTS AND DISCUSSION

- The tentative village map produced on laboratory stage was validated by stakeholders in the villages by interpreting the satellite imagery using keys interpretation.
- The unmached between tentative map (working map) and the satellite imagery as well as the final village map were due to the difference scale of data input and the satellite imagery resolution. Which is, the administration boundary map as an input data has less scale compare to the existing satellite imagery.
- The workshop were held in the 9 district offices by presenting all the stakeholders on each village.



## RESULTS AND DISCUSSION

- At the FGD, the work maps are corrected and clarifying by stakeholders.
- This process also will determine the successfull of the village boundary map.
- If the village stakeholders were not present then there will be no agreement on deliniation village boundaries.
- In this workshop (FGD) also implemented agreement on the determination of coordinate points on the bordering and mutually agreed areas.
- At the end of each workshop, stakeholders sign village boundary agreements and coordinate points marked by signatures and seals as proof of agreement.
- The output of this study is a village boundary map and coordinate point formalized by formal hand signing and stemp.

## RESULTS AND DISCUSSION



The workshop activities in the district office for discussing and verifying the boundary map (left) and The overlay between boundary of tentative village map within the boundary of final village and satellite imagery as a background.







## CONCLUSION

1. Cartometric method is successfully apply in Hulu Sungai Tengah Regency as an alternative model to accelerate village boundary map.
2. The high resolution satellite imagery ortho-rectified such as Pleiades and WorldView-2 are very powerfull in mapping the village boundary especially on the area no available topographical map sclae 1:5,000.
3. The study was sucessful established 127 village boundary map from total 169 villages of Hulu Sungai Tengah Regency
4. The success of village boundary mapping is highly dependent on data sources as well as by the willingness and support of local governments, especially village, sub-district and district officials.



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THANK YOU  
TERIMA KASIH

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