

A Spatial Digital Document to Improve the Process of Land Administration

Hasnim KAULANI, Virgo ERESTAJAYA, and Reza ABDULLAH, Indonesia

ABSTRACT

Rapid change in technology especially in mobile is affecting almost every aspect in our life. Land surveying activity and spatial document are also touched by mobile technology. Every country has a different way to create the spatial document in land surveying, but Indonesia is still using a manual documentation, therefore the process to create the document becomes very complicated and takes a long time. Normally it takes 3 days to create a spatial document in Indonesia. But if we have a technology to digitize spatial document so that the process will become easier and faster. In 2018, land surveyor in Indonesia already used a mobile application to collect data, the mobile app called smartPTS. The application is an android based application which has several useful features that helps surveyor in the field. smartPTS also has spatial digital document feature to process land administration, but there is no rule to run this process.

The common way to create spatial document begins with sketching a parcel of land, processing the data in land software, checking the result (quality control), and then approving the data by the government authorities/National Land Agency and all of this process are done manually with paper based. This paper offers a solution by digitizing spatial document business process through smartPTS. It makes the land administration become more effective and efficient because of paperless process, accurate result, and can be done in the short period of time.

Key Words: *Application SmartPTS, Digital Spatial Document,*

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1. INTRODUCTION

1.1 Background

Register land is activity massive have been doing an Indonesia. Started with measurement parcel land by surveyor and also collect data about land administration and land tenure. The programme that have been walked currently is Complete Systematic Land Registration (CSLR). This program useful to collect data from all people belonging parcel land that give information to government, and then investment an Indonesian be easier. The government/ministry of agrarian affairs and spatial planning have target about this programme, where in 2017 have to register as much as five (5) million, in 2018 have to register as much as 7 million, and 2019 have to register as much as 9 million.

Make data Complete Systematic Land Registration (CSLR) have to do measurement to find out shape from parcel land, After that the collector data have to get information parcel land like a data land tenure and also data information parcel land belonging. The activity CSLR very complex which all of data have to taken.

To do measurement still use system sketching parcel land previously, and then moved to application GIS like an Auto cad and then printed for look result data from a parcel land. This activity like that is a paper base activity which will be spend very long time. Because of this make author to look for solution for easier in collect data parcel land.

In order to activity programme CSLR get the way be better so that have to needed a technology digital to collect data spatial and da administrate ta, and we have created a application digital with based android to purpose give easier in collect data measurement parcel land, that application is SmartPTSLS.

SmartPTSLS is application to get collect data parcel land and also to give information from parcel land it. Application SmartPTSLS got to connect GNSS

RTK into take it spatial data. One of feature the best in application SmartPTSL is digitise document spatial.

1.2 Formulation of Problem

The Directorate General of Agrarian Infrastructure of the Ministry of ATR/BPN has provided measuring equipment to support PTSL. So, far there are 7,000 units in the form of GNSS RTK. Along with the progress of the GNSS RTK measurement tool (Ministry of ATR / BPN, 2019), it is time for the Ministry of ATR/BPN to apply the electronic archive for Image Measurement (GU) in the Industrial Revolution 4.0. The formulations of the problem raised in this paper are:

- 1) How is the implementation of Application mobile in the field of measurement and mapping of the Ministry of ATR/BPN in welcoming the Industrial Revolution 4.0?
- 2) How is the concept of A Spatial Digital Document to Improve The Process of Land Administration?

1.3 Purpose

- 1) To implement application mobile in the field of measurement and mapping of the Ministry of ATR BPN in welcoming the Industrial Revolution 4.0
- 2) To describe of a Spatial Digital Document to Improve The Process of Land Administration

1.4 Benefits

- 1) Assist the development of measurement technology and mapping of land parcels in the Ministry of ATR / BPN in welcoming the 4.0 Industrial Revolution
- 2) As a material consideration for the concept of a Spatial Digital Document to Improve The Process of Land Administration.

1.5 Review of literature

- 1) Industrial Revolution 4.0

The Industrial Revolution is marked by connecting between objects (the Internet of Things) with storage on a server or what is known as the cloud. Internet of Things and cloud: A key component of Industry 4.0 is the Internet of Things, which is characterized by connected devices. This not only helps with

internal operations, but through the use of a cloud environment where data is stored (Green, 2017).



*Figure 1. concept Internet of Thing
Source: Forbes*

2) Measurement Image in Measurement and Mapping of Land Parcels at the Ministry of Agrarian Affairs and Spatial Planning

Measuring image is a document to place a picture of a plot of land or more and the surrounding situation as well as measurement results data in the form of distance, angle, azimuth or majors (PMNA / KaBPN No. 3, 1997). The measurement image is an authentic document as a form of measurement of land in the Ministry of ATR/BPN. Every measurement of a land for first time land registration and data maintenance activities must be made. Article 30 of the Regulation of the Minister of Agrarian Number 3 of 1997 explains that, Every Measurement image data must be able to be used to return the boundaries of the relevant land if needed later.

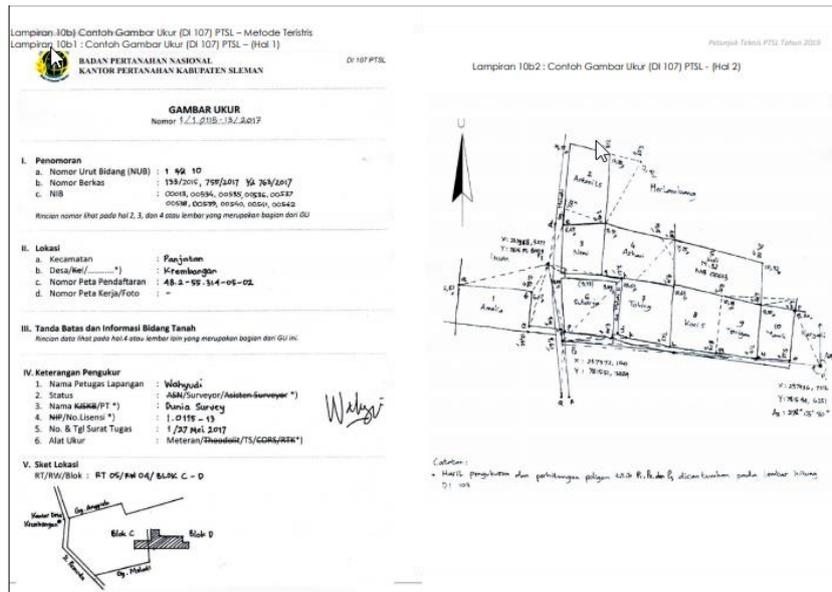


Figure 2. Example of Image Measure Page 1 and 2
source: PTSL Technical Guidance 2019

3) GNSS RTK

GNSS (Global Navigation Satellite System) refers to satellite constellations that provide signals from space that transmit position and time determination data to GNSS receivers. The recipient uses this data to determine the location (www.gsa.europa.eu, 2017). RTK (Real Time Kinematic) is a method of observation on satellites using GNSS with accuracy can be produced in the order of millimeters to centimeters (Petrus, 2016).



Figure 3. Figure GNSS RTK

source: SmartTB5

4) Electronic Documents

Electronic Documents are any electronic information created, forwarded, sent, received or stored in analog, digital, electromagnetic, optical, or the like, which can be seen, displayed and / or heard through a Computer or Electronic System, including but unlimited in writing, sound, pictures, maps, plans, photographs or the like, letters, signs, numbers, access codes, symbols or perforation that have meaning or significance or can be understood by people who are able to understand it (PMNA / Ka BPN 9, 2019).



Figure 4. Example of HT-Electronic Documents

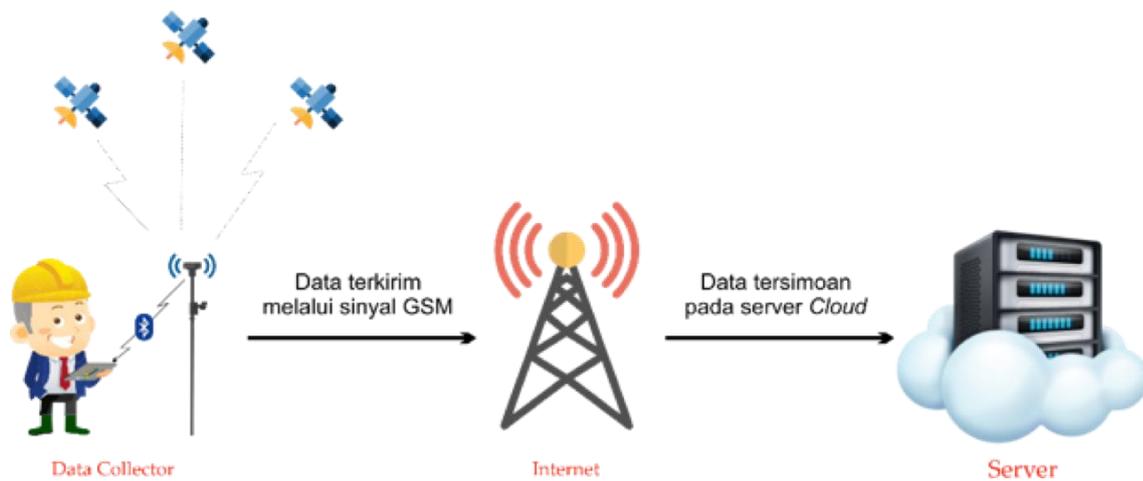
source: material presented by the Ministry of ATR/BPN, August 2019

2. RESULTS AND DISCUSSION

2.1 The concept of the Internet of Things/ IoT on Application Mobile

The concept of the internet of things to collect data measurement use android system and also to send the data this measurement via autocad to quality control it. For example one of application mobile that used is SmartPTSL.

Smartptsl is an application to collect data, and step to use this application is have to connecting with the GNSS RTK using bluetooth. The SmartPTSL application broadcasts a variety of data captured by GNSS receivers. The results of the data are sent to the server via internet monitoring. This work flow secures metadata from start to finish. Thus, data security can be avoided against unwanted data

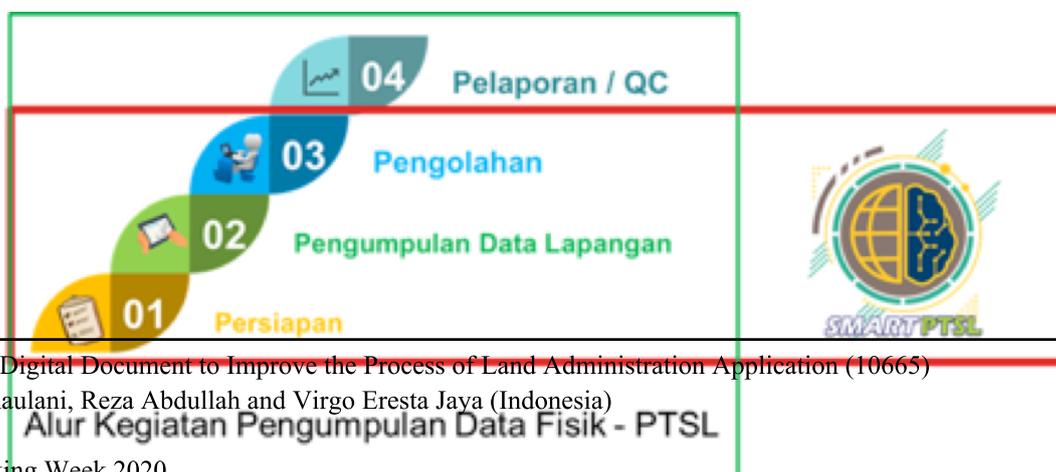


manipulation. This flow can be seen in Figure 6:

*Figure 5. IoT on the SmartPTSL Application
source: Author*

Position of SmartPTSL Application in Land Measurement and Mapping Activities. The SmartPTSL application is used starting from the following stages:

- 1) Preparation of the Work Map
- 2) Field Data Collection/ Land Survey
- 3) Processing of Plots of Land



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Figure 6. Position of SmartPTSL Application in measurement and mapping of land
 source: author

Figure 7 explains the application SmartPTSL take a role during the process of preparation, data collection, processing in the field and processing the whole series of works that can be completed at the same time.

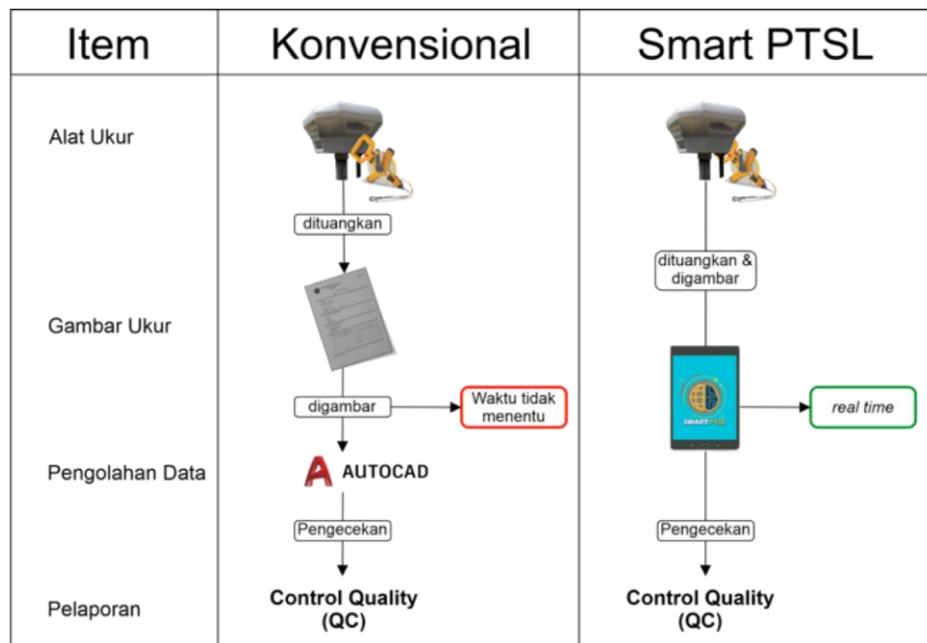


Figure 7. preparation stages of measurements before going to the field
 source: Author

The SmartPTSL application in Figure 8, shows the ease in the preparation stages of data collection/field survey. Without printing work maps, work maps are digitally available in digital form in the Android application.

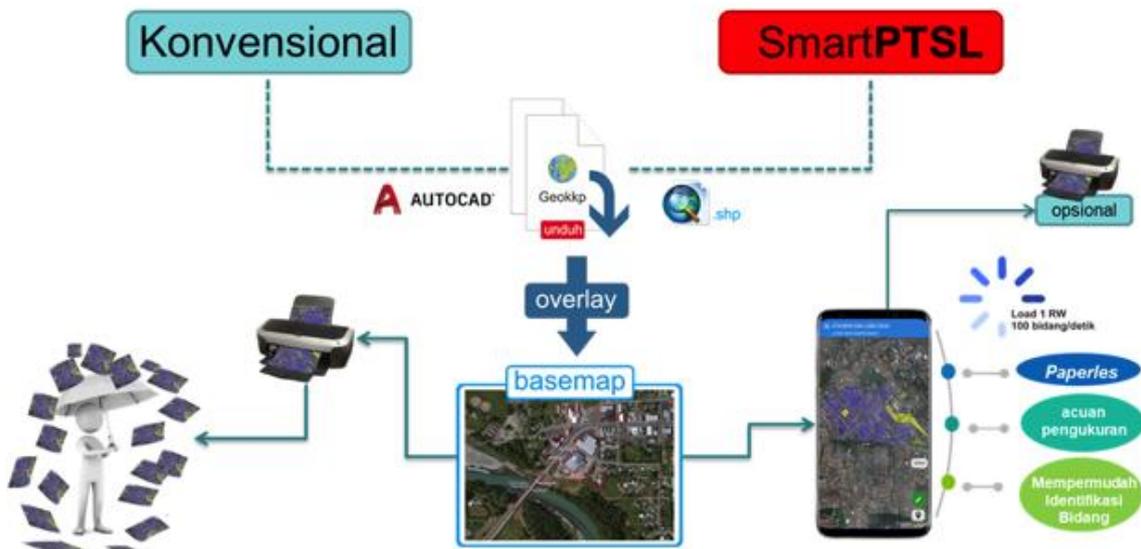
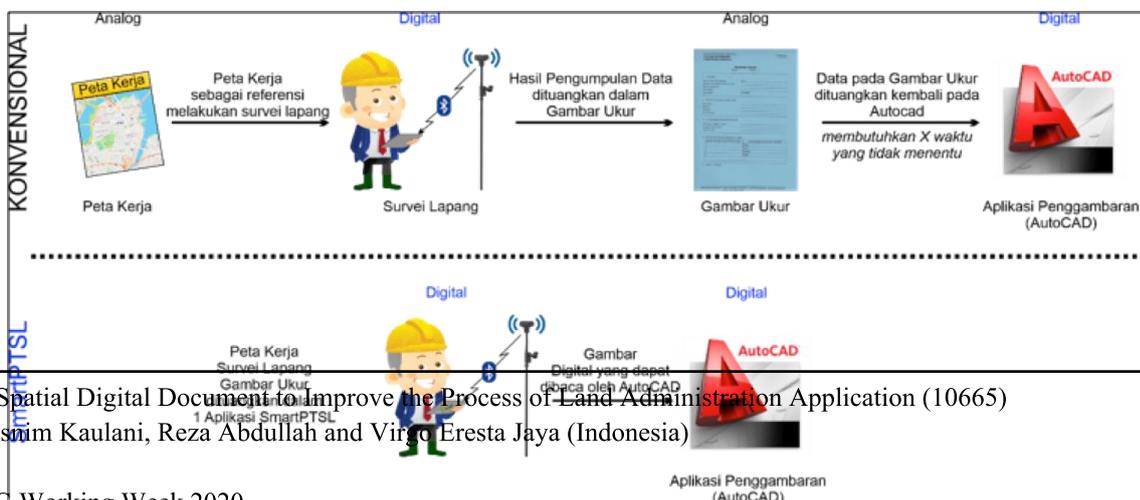


Figure 8. Comparison of data retrieval
 Conventional methods and SmartPTSL Applications
 source: author

Based on Figure 9 above, using the Smart PTSL application can be shortened time in data collection and processing, it can be done in one job, So that, the results get real time. Unlike the conventional way, the data obtained from the measuring instrument is poured manually into the Measuring Image media, and then the data is digitalized back into the AutoCAD for drawing. It makes repetitive work, from digital data to manuals and then to digital again. Not only that, in the process of drawing from a measuring image to the AutoCad Application there is an X time which is uncertain. Thus, the data obtained is not directly processed.



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Figure 9. Measurement and Mapping of Plots in welcoming the Industrial Revolution 4.0

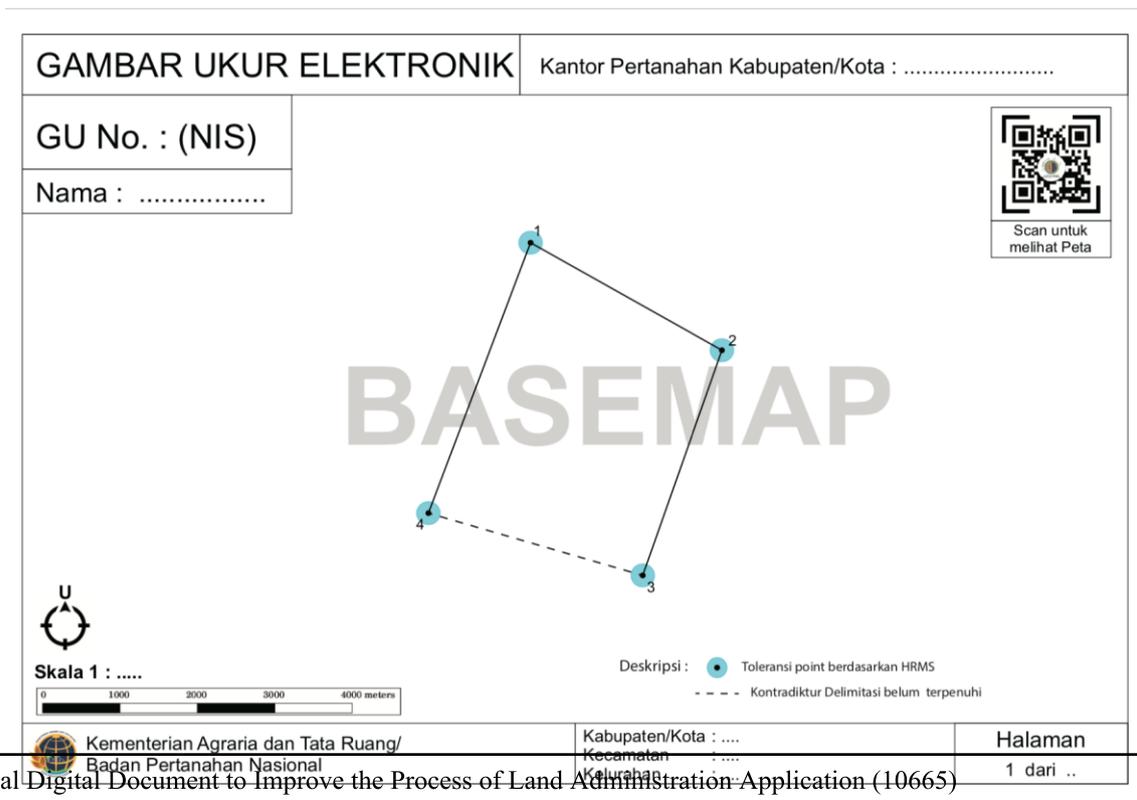
Source: author

The SmartPTSLS process in welcoming the Industrial 4.0 slashed time and a repetitive manual process (figure 10). Users are more optimal in conducting data collection and more efficient and effective in carrying out land measurement and mapping work.

B. the concept of A Spatial Digital Document to Improve The Process of Land Administration

Development technology to land collect data have changed with use application mobile so surveyor to do measurement in the field don't need measurement manually anymore and then forward development is a spatial digital document to give velocity toward end data, in another country like Australia, Netherlands have had good spatial document, therefor in indonesia will make a spatial document digitize and will sell a information related land information and spatial data.

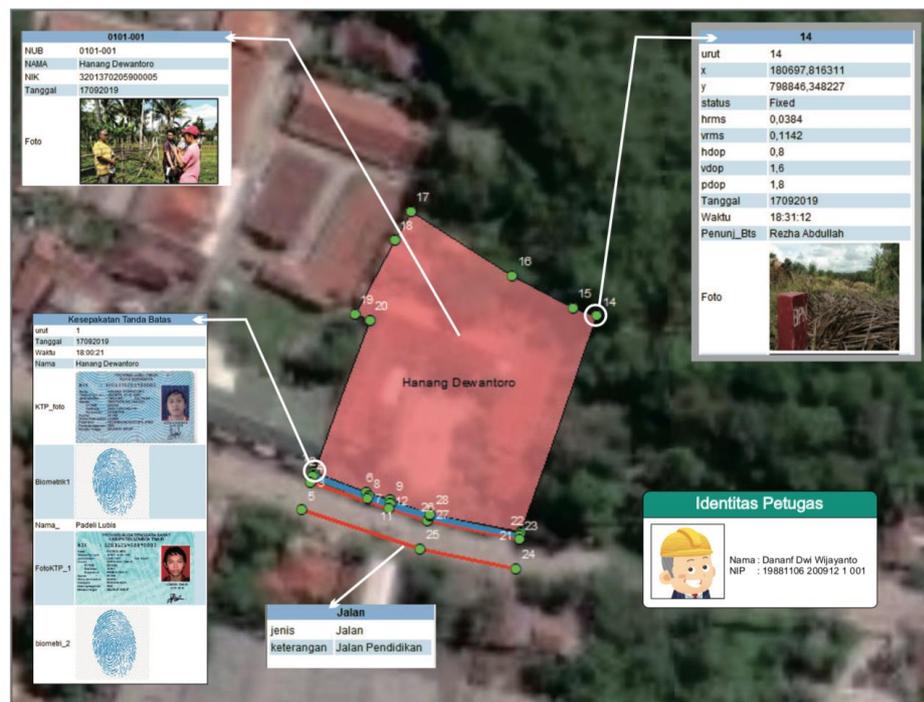
One of that concept is every data have save in database and then this digitize data will be opened if the people request about that digitize data, and the people mandatory to make payment to take the data it.



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Figure 10. Spatial document after downloaded by request
 Source: Author

Based on figure above is example a spatial digital document after downloaded when request by people, this data is not free and every people that want get this data have to payment to ministry of agrarian affairs and spatial planning. ministry of agrarian



affairs and spatial planning preparing for improvement data spatial so that the people will be easier to get in data spatial.

Figure 11. The result collect data in the field
 Source: Author

This land data will be evidence when one day have problem about collect data in the field, that evidence is picture when collect data, sign land owner, and the people parcel land boundaries. And the result from all of this there is in figure 10 so the people can download through website be prepared by Ministry Of Agrarian Affairs and Spatial Planning.

3. Conclusion

Mobile-based applications become an unavoidable phenomenon. Accommodation applications with existing databases urgently must be realized in order to adjust the demands of the Industrial Revolution 4.0. Development technology to land collect data have changed with use application mobile so surveyor to do measurement in the field don't need measurement manually anymore and then forward development is a spatial digital document to give velocity toward end data, in another country like Australia, Netherlands have had good spatial document, therefor in indonesia will make a spatial document digitize and will sell a information related land information and spatial data.

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Name	:	Hasnim Kaulani
NIP	:	19881106 200912 1 001
Place/date of Birth	:	Painan/06 November 1988
Grade/Class	:	Penata Muda / IIIa
Religion	:	Islam
Hanphon Number	:	62882284455440
Position	:	Analisis management data and land information, spatial
Task Area	:	West Sumatera, Indonesia
Address	:	Jalan Darwis No 59 IV Jurai Pesisir Selatan
Email	:	Hasnim.kaulani@gmail.com

CV AUTHOR

A. BIODATA

B. HISTORY OF FORMAL EDUCATION

NO	GRADE	DEPARTMENT	SEKOLAH/PERGURUAN	TAHUN
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			TINGGI	KELULUSAN
1	SMA	Natural Sciences	senior high school 02 Painan	2007
2	D-I	Measurement and Mapping Kandastral	National Land Collect	2009
3	D-IV	Mapping	National Land Collect	2018

C. HISTORY OF POSITION

NO	Position	Grade	Time	INFORMATION
1	Staff of Measurement Section	II/a	01-01-2009	West Sumatera Province Land Agency Regional Office
2	study assignments D-IV	II/a	01-09-2014	National Land Collect
3	Staff of the Infrastructure Section	III/a	01-10-2018	West Sumatera Province Land Agency Regional Office