Geographic Information System for Spatial Utilization Licensing of Tabalong Regency Based on Web and Mobile Applications

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Abstract. The management of spatial use permits aims to prevent negative impacts on the environment due to spatial use that is not in accordance with the regulations in the regional spatial plan. Currently, in Tabalong Regency, several violations of aaaaa aaa aaspatial use do not match its designation. In order to minimize the occurrence of violations of spatial planning, it is necessary to strengthen control over spatial use through the development of information systems. This study aims to adopt the use of information and communication technology for space utilization permits in the form of implementing the geographic information system concept using the web and mobile-based application media. This study used a qualitative approach through descriptive methods to explore the urgency of geographic information systems as an instrument of utilization control. The results of the study show that the information system application developed is a means for the community, business actors, investors who plan to submit applications related to space utilization permits. This research also produces information system products that can realize transparency of spatial information and control processes of space utilization that can minimize the potential for deviation from procedures and results of licenses issued.

Keywords: Geographic Information System, GIS, Mobile, Website.

1. Introduction

A space utilization permit is intended as an effort to control space utilization so that every space utilization must be carried out in accordance with the spatial layout plan [1]. Space utilization permits are regulated and issued by local governments in accordance with their respective authorities [2]. In order to protect natural resources from investment activities, the role of permits is very important. A permit is a government facility or instrument that can be used by local governments to exercise control over community actions in utilizing space. In line with the concept of regional autonomy, the local government of the Tabalong Regency has

the authority to regulate the use of space in its area. This will provide flexibility as well as a challenge for the local government of Tabalong Regency in developing potential and overcoming problems that arise from spatial use activities. Licensing is one of the instruments for controlling space utilization in preventing environmental damage [3]. Spatial use licensing is expected to realize spatial use that can support sustainable environmental management; there is no waste of space utilization and does not cause a decrease in room quality.

Currently, the information system has been used to support spatial planning activities in the planning and utilization sector but has not been widely used in the control sector [4]. The information system developed in this study is a geographic information system that can support the Tabalong government in carrying out spatial planning controls related to the granting of space utilization permits. Geographical information systems for spatial planning are still website-based [5]. In this research, the application is developed based on website and mobile. The selection of websites and mobile-based technology aims to make it easier for system users to get services [6].

This study uses a qualitative approach through descriptive methods and uses the Rational Unified Process (RUP) method for the program development cycle. This study aims to develop the ability of the local government of the Tabalong Regency in realizing quality public service management for the community, business actors, and investors who plan to apply for space utilization permits. The results of this research are in the form of geographic information system products that can provide information services related to spatial planning activities, which include spatial planning, utilization, and control.

2. Method

This study uses a qualitative approach through descriptive methods to explore the urgency of the system. This research also uses the RUP method for software development [7]. Rational Unified Process (RUP) is a software development process framework created by Rational Software Corporation [8]. The RUP provides guidance, templates, and examples of all information system development stages aspects. There are three perspectives in the RUP, namely Dynamic Perspective and Lifecycle Phases, Static Perspective, and Practice Perspective, and Core Process. Dynamic Perspective shows the phase of the RUP over time which keeps changing. Static Perspective is made of things that do not change themselves but work to change dynamic processes. Practice Perspectives are created from effective implementations based on previous good experiences used during the process. The RUP is shown in Figure 1.
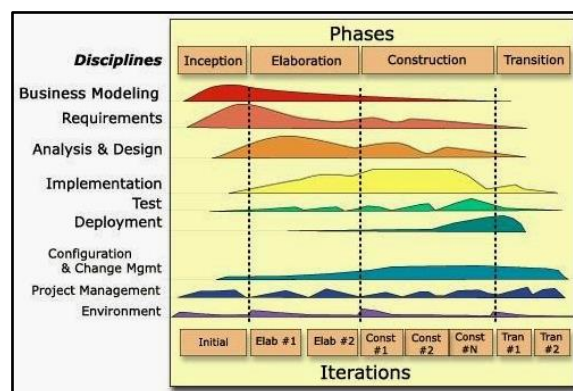

Figure 1. Rational Unified Process (RUP) [8]

In the RUP (Figure 1), there are two dimensions, namely horizontal and vertical. The horizontal dimension shows the time and dynamic aspects of the process, which are described in terms of cycles, phases, iterations, and milestones. Meanwhile, the vertical dimension shows the static aspects of the process, which are represented by activities, artifacts, workers, and workflows. The research procedure in this study is shown in Figure 2.
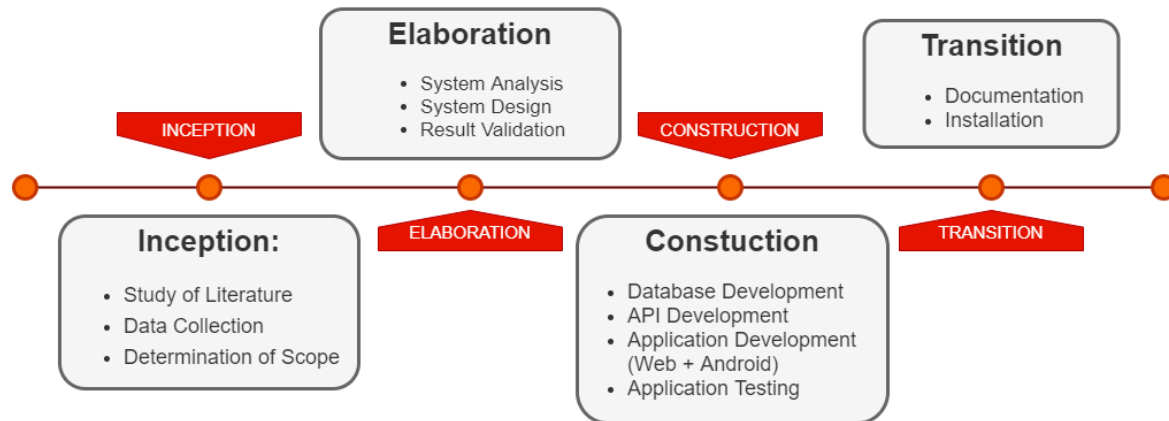

Figure 2. Research procedure.

Research procedures (Figure 2) are grouped based on Dynamic Perspective and Lifecycle Phases, which have four phases, namely: inception, elaboration, construction, and transition. Each phase has one or more iterations and is accompanied by milestones. The focus of the iteration at each phase is to produce technical results that will meet the objectives of the phase.

3. Results and Discussion
3.1. System Analysis

System analysis aims to determine the condition of the current system so that it can be transformed into an information system. The space utilization permit procedure is shown in Table 1.

Table 1. Space Utilization Permit Procedure

Phase	Activities	Document
1	Apply for a space utilization permit	Application Form, Cover Letter of DPMPTSP
2	Complete the requirements	KTP, NPWP, Company Deed, SHM, Site Plan, Location Plan, Proposal
3	Carry out a Location Survey	Survey Minutes
4	Conducting TKPRD Meetings	Meeting Invitation, Minutes of Meeting
5	Decision Recommendation	Letter of recommendation

3.2. System Design

The system modeling developed in this study uses one of the UML diagrams, namely the use case diagram. UML diagrams are tools that can be used for system development with an

object-oriented approach [9]. The use case diagram of the Geographical Information System for Spatial Use Permits is shown in Figure 3.
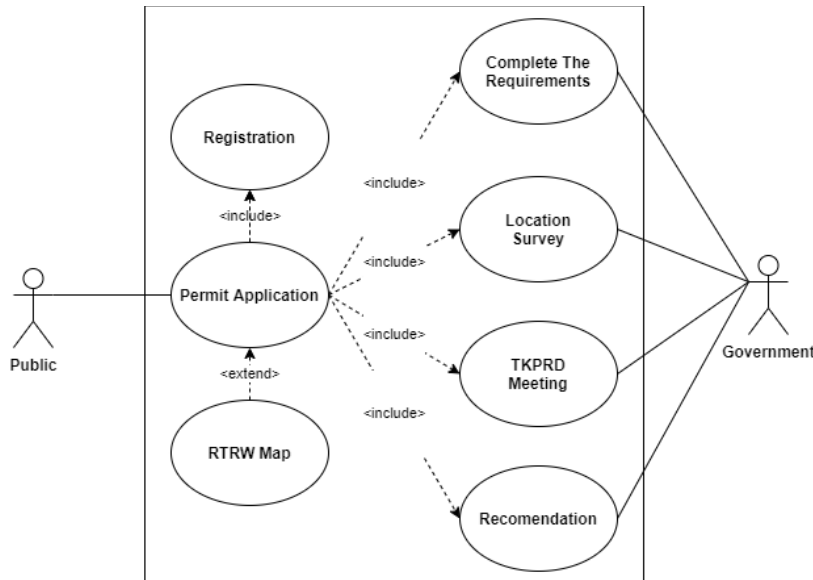

Figure 3. Use case diagram of GIS for Spatial Use Permits

Use Case diagram is a diagram that can briefly model system users and functions/services provided by the system [10]. The use case description of Geographical Information System for Spatial Use Permits is shown in Table 2.

Table 2. Use case description

Use Case	Description	Actor
Registration	The community registers user accounts before using the application.	Public
Permit Application	Public users can apply for space utilization permits. The government verified the application.	Public, Government
Complete The Requirements	Public users complete the requirements according to the space utilization permit application category. The government validates all requirements.	Public, Government
Location Survey	The government documents the survey results through the application. The public gets information on survey results.	Public, Government
TKPRD Meeting	The government documents the results of the TKPRD meeting through the application. The public gets information on the results of TKPRD meeting activities.	Public, Government
Recommendation	The government includes the results of recommendations on the application for space utilization permits. The public gets information on the results of recommendations.	Public, Government
RTRW Map	The public gets information on the RTRW map, which is managed by the government.	Public, Government

3.3. Development of Application

Space utilization permit is based on the stipulated Regional Spatial Plan. In this application, the public can view information about the Regional Spatial Plan in the form of a digital map.

Before applying for a space utilization permit, the public is required to register a user account. Registration is done by filling in the registration form provided in the application. If the public already has an account, they can apply for a space utilization permit by filling in the form in the application shown in Figure 4.
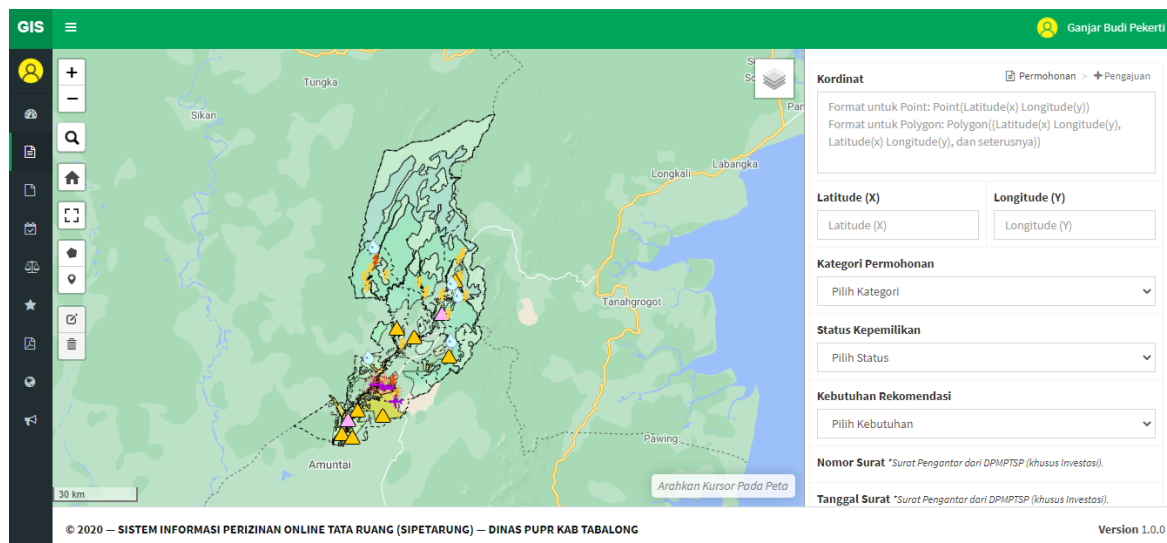

Figure 4. Permit Application.

After filling out the space utilization permit application form, the public is obliged to upload the required file requirements according to the space utilization permit category. Government administrators will verify requirements files that have been uploaded if this stage has been successfully passed. The next step is to carry out a location survey by the government. Site survey activities will be documented in the application, from scheduling to survey results. The next step after the site survey is the TKPRD meeting to decide on a recommendation. The implementation of TKPRD meetings is also documented through the application by the government administrator and can be accessed by the public as the applicant.

The public, through a website-based application or mobile-based application, can carry out permit application activities. The appearance of the mobile base application for space utilization permits is shown in Figure 5.
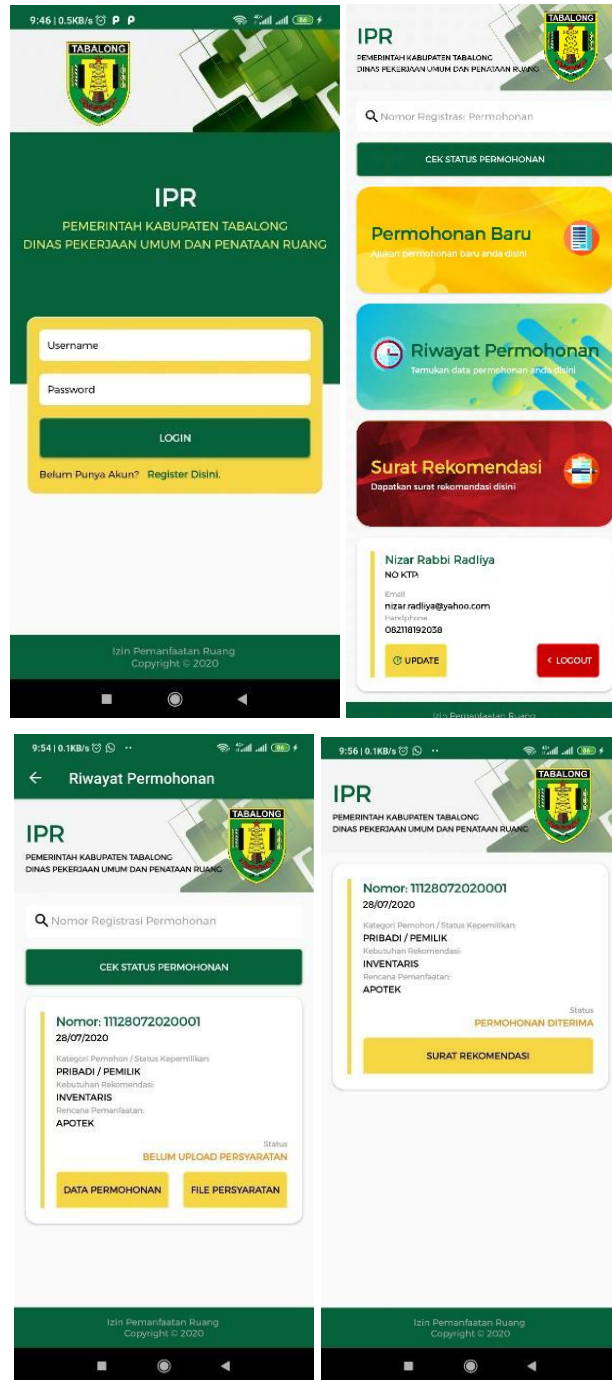
Figure 5. Mobile Based Application Interface

The choice of mobile-based technology aims at providing another alternative to the public in obtaining space utilization permit application services. Given that currently, it is still rare to find mobile-based applications for government services to the community, especially spatial planning services [11]. Regarding spatial planning service applications, there has not been much research developed to focus on the control sector. This is a motivation in this study to develop a geographic information system application to support the Tabalong government in carrying out spatial planning controls related to the granting of space utilization permits.

4. Conclusion

This research produces a product in the form of a geographic information system application that can be used as a means for the community, business actors, investors who will submit applications related to space utilization permits. The existence of a web-based and mobile-based information system can create transparency of information to the public in spatial control activities related to space utilization permits.

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