JURNAL WYDIA CLIMAGO
ISSN : 2797-0078 (Online)
Volume 5, Nomor 2, Edisi November 2023, Halaman 154 -159
https://ejournal-pusdiklat.bmkg.go.id/index.php/climago

THE MANAGEMENT SERVICE SYSTEM BUILDING EARTHQUAKE SENSOR EQUIPMENT (SiMPANSE) BASED ON INFORMATION TECHNOLOGY AT THE UPT LEVEL TO REALISE EXCELLENT EARTHQUAKE INFORMATION SERVICES

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Informasi Artikel

Sejarah Artikel:

Accepted November 15, 2023

Keywords:

service, archive, regulation

***Kata Kunci* :**
Manajemen,
Arsip,
Peraturan

A B S R A C T

The purpose of this study is to create a SIMPANSE application to monitor, identify sensor problem conditions, and perform preventive maintenance to maintain the operational viability of gempa bumi sensors in the regional technical area of the unit (UPT). Excellent earthquake services must be carried out by identifying earthquake sources, monitoring seismic activity, disseminating information, and increasing the community's response capacity to earthquake hazards. This research, using several tools for data processing, including Urgency Seriousness Growth (USG) and ASTRID Criteria (Actual, Specific, Transformative, Relevant, Innovative, Implementable). The research data was obtained from the Likert scale system. The result of this research is to provide the SIMPANSE application in the working geophysics area unit. The Geophysical stations, that are in charge of maintaining observation equipment that is able to identify sensor conditions for maintenance routine checks. This system can also monitor the UPT service level and budget absorption used for maintenance. UPT and budget absorption are used for maintenance. Maintenance of geophysical instruments is carried out through the development of the Information System Applications Management Main Operational Instruments Maintenance. With the safeguarding of the reliability of this system, we also realize the primary services of gempabumi from the sides of accuracy, speed, and range.

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1. Introduction

In accordance with the objectives of BMKG in the 2020-2024 strategic plan, in order to ensure the continuity of meteorological, climatological, air quality, and geophysical information and services that are fast, accurate, precise, comprehensible, and comprehensive coverage for safety, well-being, resilience, and sustainability, that is the reference of the international community [2]. In

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order to provide a fast, precise, accurate, comprehensible, and comprehensive information primary service, a reliable equipment operating infrastructure is needed through the development of the main operational device maintenance management information system application and the optimization of maintenance and self-calibration decentralization [2].

In accordance with the Regulations of the Chief of the Meteorological, Climatological, and Geophysical Agency No. 4 of 2020 on the Strategic Plan of the Meteorological, Climatological, and Geophysics Agency for the years 2020–2024, according to the Policy and Directions of the Operational Infrastructure Area Strategy, BMKG equipment, namely "Maintaining the reliability of the operation of MKG equipment," is implemented according to the tasks of the implementing unit of the work of the geo-physical station; one of its tasks is the maintenance of geophysical instruments; then the activities of Building Application Management Information System Maintenance of the Main Operational Tool [4]. It aims to monitor, identify the problem state of the sensor, and perform preventive maintenance to maintain the operational continuity of the Gempumi sensor in the area of its responsibility. By ensuring the reliability of the system, it also provides a prime service in terms of accuracy, speed, and range [2].

On the other hand, the database of the state of Gempabumi observation equipment is still centralized and has not been distributed by UPT territory; the monitoring system of the observatory equipment is not integrated; the competence of human resources in the field of information technology (IT) is still lacking; and there is no information system for the maintenance of the equipment with an integrated and easily accessible budget. With the optimum performance of the sensor, it will be able to drive the realization of primary service gempabumi at the level of technical unit [1].

However, at the moment, according to his duties in the maintenance of geophysical instruments, there is a problem of unavailable information system management of integrated and easily accessible gempabumi observation equipment. It becomes important to implement it immediately because, according to the policy of the Inskalrekjarkom headquarters from 2022, independent maintenance will be carried out by the Technical Unit (UPT) of geophysics. Therefore, the technical unit needs an information management system for observation equipment that is capable of mitigating the problem of sensors existing in the region of the technical unit [1], [2].

2. Methods

This research uses several tools for data processing, including Urgency Seriousness Growth (USG) and the ASTRID Criteria (Actual, Specific, Transformative, Relevant, Innovative, Implementable) [3]. The research data was obtained using a 1-5 Likert scale. According to ASTRID criteria obtained three issues selected are:

a. Still less optimum speed and accuracy of information gempabumi perceived.
b. Not optimum one-door service system of data and geophysical information that can improve the quantity, quality, and speed of service of data geophysical information,
c. There is no information and communication technology-based service management system for sensor equipment at the UPT level [1].

After that, data processing is carried out using the USG criteria, from the processing of the data, one of the main issues is "The unavailability of the information and communications technology-based system of service management for sensor equipment at the technical unit level" [1]. From the result of the selected problem (USG result) then the next step is to determine the alternative solution to the main problem to be solved, the tool used is the Mc Namara method [5].

After knowing the root of the problem that causes less than optimal service management of the main operational equipment at the Geophysical Station Task Implementation Unit, then alternative problem solving is made, including among others. Building a team, collaborating with universities or other UPTs that have competent human resources, coordinating with the central BMKG for system development, looking for appropriate information technology system references, collecting detailed equipment data according to a standardised format and combining it in one database system, developing SOPs, developing an information technology-based earthquake sensor equipment management service

system at the UPT level consisting of real time monitoring, an equipment database and guidelines. equipment database and guidelines [2].

From these alternative options, the chosen strategy is the development of an integrated and accessible earthquake sensor equipment management service system. With well-maintained sensor services, it is expected to positively impact earthquake services by being fast, accurate, and having a broad detection range. Based on the identified problems and analyses, the theme of the change action is: Development of a Service Management System for Earthquake Sensor Equipment "SiMPANSE," based on information technology at the UPT level to realize excellent earthquake information services [2].

Then from the solution to the root of the problem it will be solved by doing short-term activities. The most important major activity in this regard is the construction of the technical device SIMPANSE to realize the earthquake prima service in terms of information speed, accuracy, precision, and its wide range through the maintenance of the seismic sensor so that the public can obtain faster, more accurate and accurate earthquakes information as well as its broad range [1].

3. Results and Discussion

In the initial phase of the activity, identification related to the development needs of Simpanse is done. In the construction of the application. The need for information or data, mentioned among others, can be described in the following Figure 1.

Kebutuhan rencana pembangunan SIMPANSE

1.	Komputer	
	spesifikasi :	-Merk Hp
		-Processor Intel Core-i7
		-Ram 8 GB
		-Tipe system 64-bit
2.	Software :	-Xampp (PHPMyAdmin versi 8)
		-Notepad ++
		-Telegram (BotTelegram)
		-Bahasa pemrograman PHP, JavaScript, CSS BootStrap/HTML

Figure 1. SIMPANSE development plan requirements

For such an earthquake service, the basis of consideration requires the following four things:

1. Identification of the source of the earthquake in the area of responsibility of the technical unit
2. Earthquake monitoring
3. Earthquake dissemination
4. Response capacity of the community

In the next phase, before making a SiMPANSE application, it is necessary to compile the design of the system. By using the SiMPANSE application to obtain related information in picture below (as illustrated in the Figure 2):

1. Status of sensor sites on and off throughout Indonesia
2. Sensor maps in the area of UPT responsibility
3. Complaints page for technicians
4. Provision of budget

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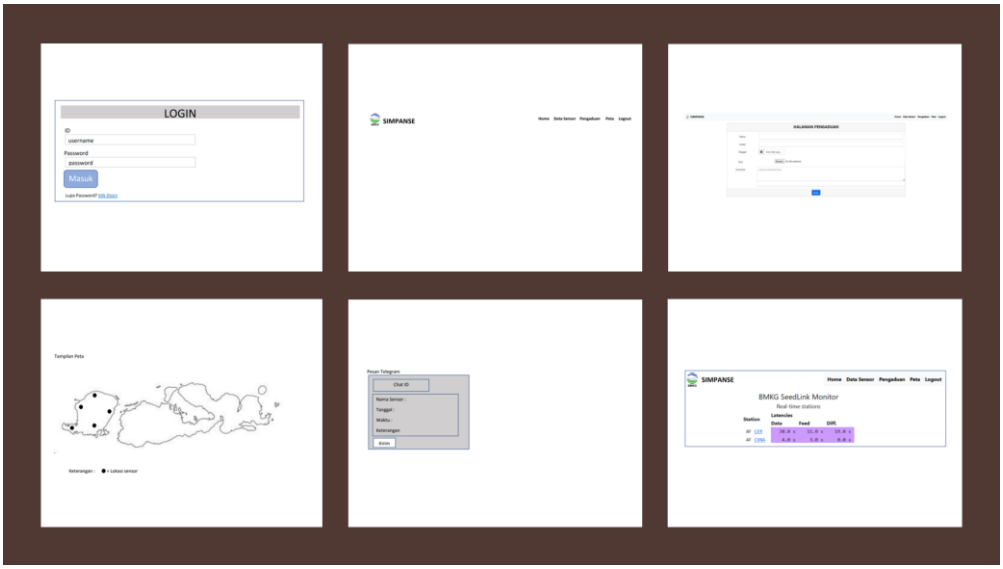

Figure 2. The SiMPANSE application

After the design of the SiMPANSE application was built, the creation of the SiMPANSE application began to be implemented as planned from April 28 to May 12, 2022. In making the SiMPANSE application, the Information Technology Team always coordinates with the other effective teams.

The development of Seismic Site Analysis and Monitoring (SiMPANSE) is a system that monitors the condition of sensors, and if there is damage, it is reported by technicians through the complaint page and scheduled for prevention. The budget absorption that has been implemented and carried out can then be monitored. After rechecking after preventive maintenance whether the sensor is on or still off, if it requires spare parts, the technician will report it on the complaints page so that it can be reported to the center.

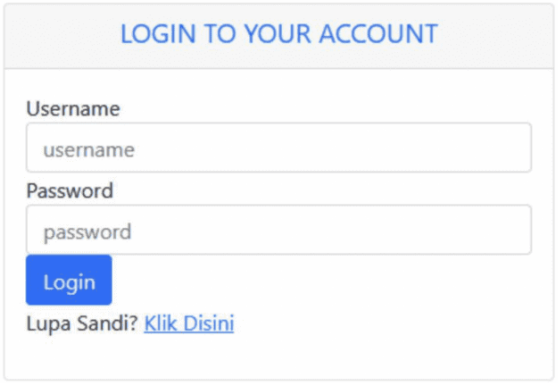

Figure 3. Login Page

After all stages have been passed and several evaluations have been conducted in the process of making SiMPANSE, the SiMPANSE guidebook has been compiled (Figure 4). process of making SiMPANSE, a SiMPANSE guidebook was compiled to facilitate operators in operating SiMPANSE. It is hoped that this guidebook can be easily understood by its users in carrying out preventive and corrective maintenance activities as well as evaluating the results of maintenance. maintenance. The preparation of the guidebook was carried out by the Data Analysis/Administration Team for one (one) week from May 12, 2022. The implementation of the preparation of the guidebook can be completed by the team in accordance with the scheduled time. with the scheduled time.

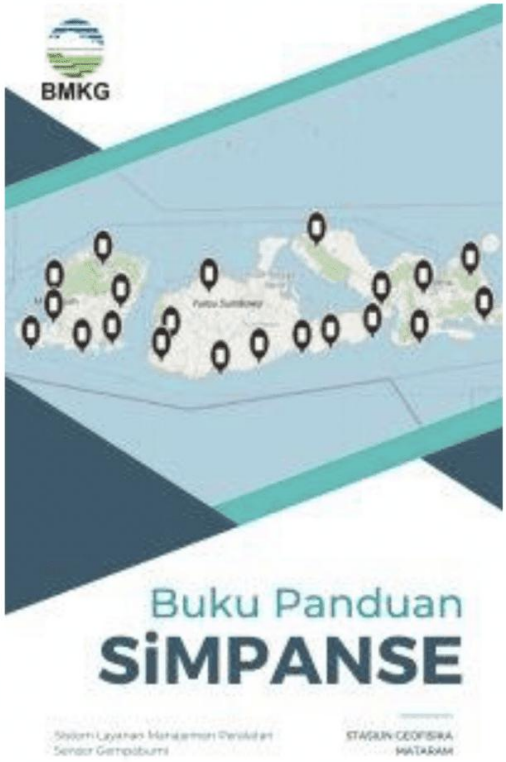

Figure 4. SiMPANSE Guidebook

After making improvements and adding features by the Information Technology Team, the SiMPANSE trial was carried out on May 13, 2022, which was carried out online with the attendance of the Head of the Regional Office III, Denpasar, all Heads of Stations, and UPT operational staff in the Bali and Nusa Tenggara regions (Figure 5).

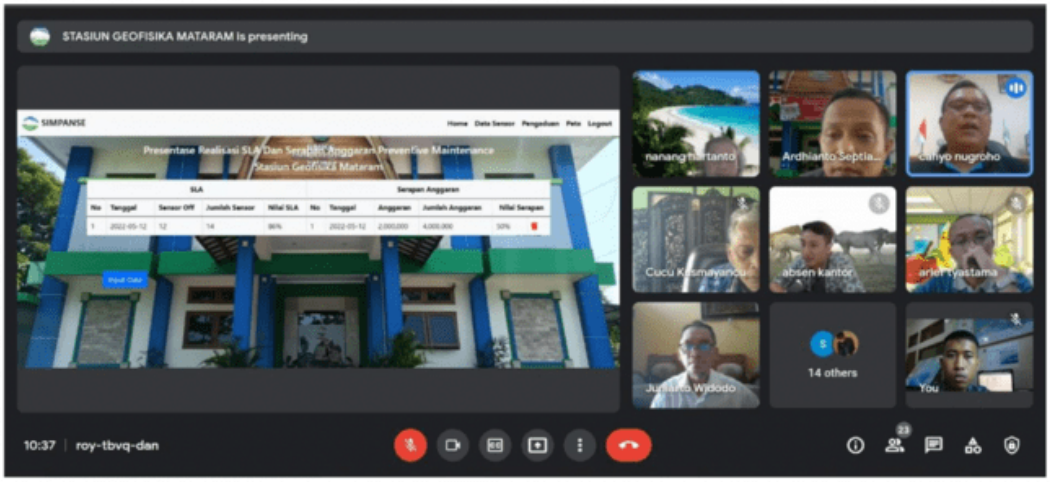

Figure 5. Online Trial of SiMPANSE

SiMPANSE development change action provides benefits in general, which are able to improve the effectiveness and efficiency of monitoring the quality of maintenance of earthquake observation equipment (seismographs). of earthquake observation equipment (seismographs). Specifically, the benefits obtained are the monitoring of the sensor condition status in the UPT's area of responsibility and immediate decisions for preventive maintenance. Decisions can be made immediately for preventive maintenance. When well-maintained earthquake sensors are used,

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information can be optimized. Earthquake services become excellent with the addition of community capacity-building activities on the dangers of earthquakes and their impacts so that the community can be optimized. earthquakes and their impacts so that people are ready to survive.

Maintaining the reliability of the operation of geophysic equipment is implemented in accordance with the tasks of the implementing unit of the work of the geophysical station, one of which is the maintenance of geophysical tools. Then implemented the activities of building applications. Information System Management Maintenance of Main Operational Tools aims to monitor, identify the state of sensor problems, and carry out preventive maintenance to maintain the operational survival of gempabumi sensors in the area of its responsibility. By ensuring the reliability of the system, it also provides a prime service in terms of accuracy, speed, and range.

4. Conclusions

SiMPANSE development change action provides benefits in general, which are able to improve the effectiveness and efficiency of monitoring the quality of maintenance of earthquake observation equipment (seismographs). of earthquake observation equipment (seismographs). Specifically, the benefits obtained are the monitoring of the sensor condition status in the UPT's area of responsibility and immediate decisions for preventive maintenance. Decisions can be made immediately for preventive maintenance. When well-maintained earthquake sensors are used, information can be optimized. Earthquake services become excellent with the addition of community capacity-building activities on the dangers of earthquakes and their impacts so that the community can be optimized. earthquakes and their impacts so that people are ready to survive. All short-term milestones have been fully implemented, despite the experienced obstacles at some stages of the activity. However, they can be resolved well based on the strategies implemented by the project leader.

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