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Digitalization of Routine Activity Report of Aviation Security (AVSEC) Unit Based on Google Workspace at Aji Pangeran Tumenggung Pranoto Airport Samarinda

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Abstract

The routine activity report of the Aviation Security (AVSEC) unit plays a crucial role in maintaining the operational security of the airport. However, the manual reporting system still faces challenges in terms of efficiency, accuracy, and information accessibility. This final project aims to digitize the routine AVSEC activity reports at Aji Pangeran Tumenggung Pranoto Airport in Samarinda using the Google Workspace platform. The system integrates Google Forms for data collection, Google Sheets for data management, Google Drive for storage, and Google Sites as the user interface. Additional features such as secure login, digital signatures, the Autocrat plugin for report automation, Bitly, QR Codes, and Google Analytics are also implemented to enhance system performance. The implementation results show that this digitalization streamlines the reporting workflow, accelerates distribution, reduces paper usage, and improves data accuracy and accessibility. Consequently, the system successfully delivers a modern, efficient, and accountable reporting process, supporting the enhancement of security operations at the airport.

1 INTRODUCTION

Information technology has brought significant changes across various sectors, including air transportation, which has now become the primary choice for long-distance mobility due to its efficiency and speed. Airports, as vital nodes in the air transportation system, are required to continuously adapt to maintain security and service quality. Aji Pangeran Tumenggung Pranoto Class I Airport in Samarinda faces growing security challenges in line with increasing economic activity and passenger volume. The Aviation Security (AVSEC) unit, as the front line of airport security, still relies on manual reporting methods in its routine activities, resulting in time inefficiency, risk of data loss, and limited information accessibility (Hasibuan et al., 2023; Moonlight et al., 2022; Hasan, 2022).

Previous studies have examined the digitalization of reporting systems based on cloud technology (Putri et al., 2021; Nugroho & Ramadhan, 2020; Sari et al., 2019), as well as the utilization of platforms such as Google Workspace, Google Documents, and Google Drive (Indra et al., 2021; Sutanto et al., 2022; Onero Solutions, 2024). However, their implementation has been largely limited to general institutional environments and has not specifically targeted the operational security sector of airports. This study offers a novelty in the form of digitalizing routine AVSEC activity reports using Google Workspace, integrating

Google Forms, Sheets, Drive, and the Autocrat plugin, along with additional features such as QR Codes and Google Analytics. A gap analysis shows that no AVSEC reporting system with a low-cost and real-time approach based on Google Workspace has been directly implemented in an airport environment.

The aim of this study is to design and implement a digital reporting system for routine AVSEC activities to improve work efficiency, data accuracy, and the speed of information delivery. The implications of this research are expected to not only benefit AVSEC operations at APT Pranoto Airport but also serve as a low-cost digital reporting model for other airports in Indonesia (Moonlight et al., 2023; Silvia et al., 2025; Southey, 2021).

2 METHODS

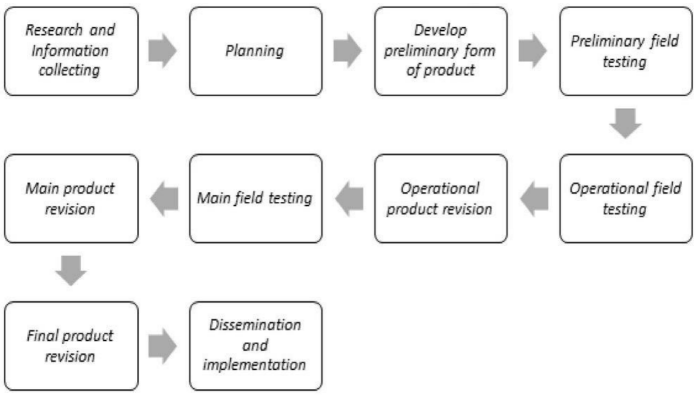

Figure 1: Borg & Gall Development Model

This study employs the Research and Development (R&D) method using a modified Borg & Gall development model consisting of three main stages: (1) preliminary study, (2) product planning and development, and (3) limited trials and expert validation (Sugiyono, 2020; Sugiyono, 2021; Yulianti & Prastowo, 2021). The purpose of this design is to develop and validate a Google Workspace-based reporting system for routine activities of the Aviation Security (AVSEC) unit at Aji Pangeran Tumenggung Pranoto Airport in Samarinda, aiming to improve the efficiency, accuracy, and speed of reporting.

The conceptual framework of this study focuses on system development through an iterative approach involving design, testing, and refinement based on feedback from users and experts (Tambun et al., 2020; Hidayat & Irvanda, 2022). Data collection methods included observation, interviews, and documentation. Observations were conducted on the manual reporting system still used by AVSEC personnel. Interviews were conducted with three AVSEC personnel to identify challenges, needs, and expectations regarding the system being developed. Documentation was used to collect data such as standard operating procedures (SOPs), report formats, and archives related to reporting activities (Studi, n.d.; Universitas Indraprasta PGRI, 2022).

The research subjects were AVSEC personnel at A.P.T. Pranoto Airport in Samarinda, while expert informants for system validation consisted of an information technology expert, an AVSEC instructor from the Surabaya Aviation Polytechnic, and two AVSEC personnel from the airport. The system prototype was developed using Google Forms, Sheets, Drive, and Sites, integrated with Autocrat for automation, Bitly and QR Codes for quick access, and Online Signature as a form of digital authentication (Filianti et al., 2022; Hancock, 2024; Putra et al., 2023).

System validation was conducted through expert assessment using questionnaires to evaluate the clarity, functionality, and feasibility of the system, without statistical analysis. This research was carried out during the author's On the Job Training (OJT) period at A.P.T. Pranoto Airport in Samarinda from January to February 2025. The results of this stage were used to evaluate the system's effectiveness and provide a foundation for further development toward broader implementation.

3 RESULTS

Figure 2. Physical archive condition (left); manual reporting documentation (right)

Interviews with three AVSEC personel reinforced the observational findings. They stated that reporting through the WhatsApp Group often accumulates, while logbooks are easily damaged or scattered. All three strongly supported the transition to digital systems such as Google Forms, as they were considered more efficient, searchable and accessible in real-time.

Table 1. Summary of Interview Results on the Efficiency of Manual Reporting and Response to Digitization

Pertanyaan	Informan		
Bagaimana proses pelaporan kegiatan routine di AVSEC?	**Informan 1** Kalau pelaporan kita ada dua macam. Jadi pelaporan dua macem ini. Kita melalui via WA Group ya. WA AVSEC itu nanti banyak pos yang mau dilaporkan semua pos lah. DKT (Daerah Keamanan Terbatas), Kedatangan, *Dropzone,* SCP 1, SCP 2 dan juga Danru (Komandan Regu) paling laporan apel. Itu juga kita foto dan juga kegiatan serta nama-nama personel biasanya. Yang kedua itu, laporan melalui *logbook*. *Logbook* kita masih manual tuh, melalui tulisan tangan. Itu sama situasi, kondisi yang ada di lapangan personelnya, dan yang bertanggung jawab di situ. Lebih kurang kayak gitu aja.	**Informan 2** Oke, kalau pelaporan kita sesuai jam dinas ya dan jam dinas dari pagi, siang, malam dan itu pun kita lewat satu. Lewat Via WhatsApp yang kedua Formulir kita catat di logbook tuh. Kalau kita di via WA kita bisa cepat tuh kalau misalnya ada problem di mana. Jadi saat dinas itu bisa langsung cepat tindakan di suatu tempat tersebut, misalnya ada problem. Nah, yang kedua untuk *logbook* gunanya itu tadi misalnya ada problem apa dan masalah, misal kita bisa ke tulis situ di *logbook* disitu dan di situ, kita jam sekian-sekian. Nanti kita bisa tuh, nanti misal ada laporan bisa dilihat dari *logbook* kita tersebut.	**Informan 3** Saat ini masih menggunakan WA Sama manual untuk laporan per hari, kegiatan di unit
Apakah metode pelaporan saat ini efisien dan efektif di unit AVSEC?	**Informan 1** Kalau kita sih ya, menurut kita sih Efficient lah tapi apa namanya, yang namanya Pelaporan WA Group ya, namanya kan WA Group ya sering ketindih pesannya. Kalau laporan kita manual kalau namanya manual ya, kertas ya kertas kan kadang-kadang lecek, kadang-kadang rusak. Nah jadi, itu aja sih.	**Informan 2** Kembali lagi seperti tadi, efisien efektif bagus, cuman ada revisi harus di revisi lagi biar lebih bagus tertata lagi agar apa itu kemanjuan era digital lah.	**Informan 3** Kalau efisien, efisien ya karena laporan langsung diterima. Terus kalau yang tidak efisien masih tercatat. Itu kadang-kadang kadang tercecer atau hilang.
Bagaimana pendapat atau tanggapan mas, untuk pelaporan kegiatan rutin di unit AVSEC, dilakukan secara digitalisasi contohnya via *Google Form Online*?	**Informan 1** Menurut kita sih kalo lapor-lapor yang digital. Digital kan udah oke banget sih, jadi kalo misalkan kita mau liat data sampai sebelumnya kan bisa kelihatan. Jadi menurut saya sih kalo digitalisasi kan di jaman sekarang udah oke banget karena ya tadi kan WA grup itu udah digital juga tapi alangkah baiknya kita lakukan digital yang lebih baik	**Informan 2** *Google Form* bagus juga, nah itu ya kita perlu belajar lagi nih mengenal era digital yang sekarang dan lebih mudah pelaporan, gitu.	**Informan 3** Ohh semuanya mau dijadikan digital. Bagus biar efisien ya, biar langsung bisa kedata untuk hari ini gitukan, *up to date* gitu ya. Bagus bagus.

	lagi, tadi kan dari kertas ke Google Form.		

Through R&D and development stages using the Borg & Gall model, the ADAR system was successfully built and consists of several main components: QR Code for quick access, login page with security script, 12 digital reporting forms, integrated spreadsheet, automatic report conversion to PDF using Autocrat, and report delivery via email. The following is the flowchart of the ADAR system:

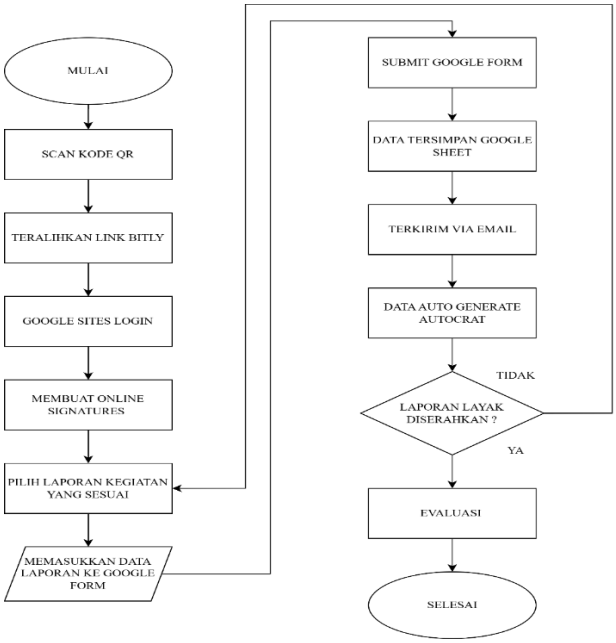

Figure 3. Flowchart of how the instrument works

The process begins with the user scanning a QR code which then redirects to a Bitly link. From the link, users are directed to log into Google Sites and create digital signatures (online signatures). After that, users select the appropriate type of activity report, then enter the report data into the Google Form. After the Google Form is submitted, the data will be automatically saved in Google Sheet and also sent to email. Furthermore, the data is automatically processed by Autocrat to produce a report document. At this stage, the system checks the feasibility of the report. If the report is deemed unfit for submission, it will return to the initial process for improvement. However, if the report is feasible, it will proceed to the evaluation stage.

Internal test results show that the system can be accessed via bit.ly/avsecaptpranotoAAP, and any data input is successfully processed, converted, and sent automatically to the user's email.

Table 2. Digital Form Access and Input Testing Results

Factor Test	Success		Description
	Yes	No	
The appearance and features of the ADAR system website with the address https://bit.ly/avsecaptpranotoAAP and QR Code.	✓		The website and all features available in the system have been successfully accessed.
Digital form display (Google Form) presented with integrated navigation access through the website.	✓		The form has been successfully accessed.

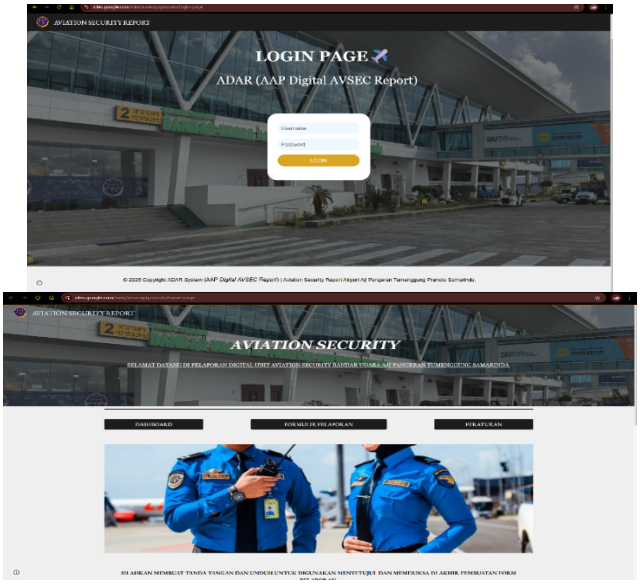

Figure 4. Login page (left); dashboard page (right)

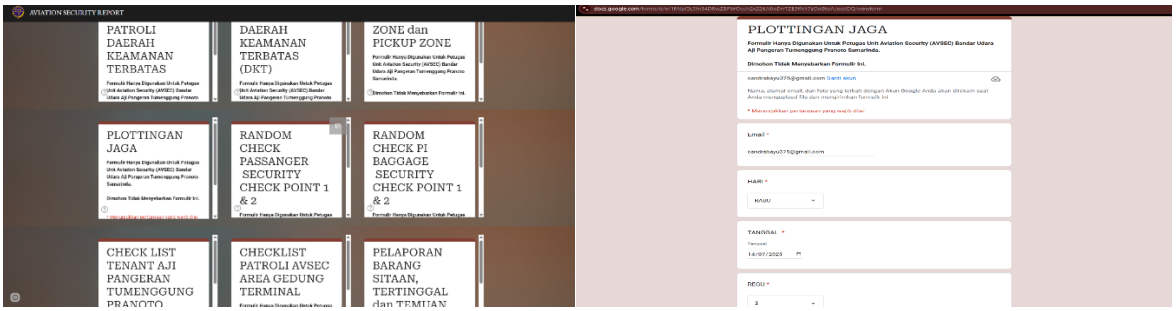

Figure 4. Form Type page (left); digital form page (right)

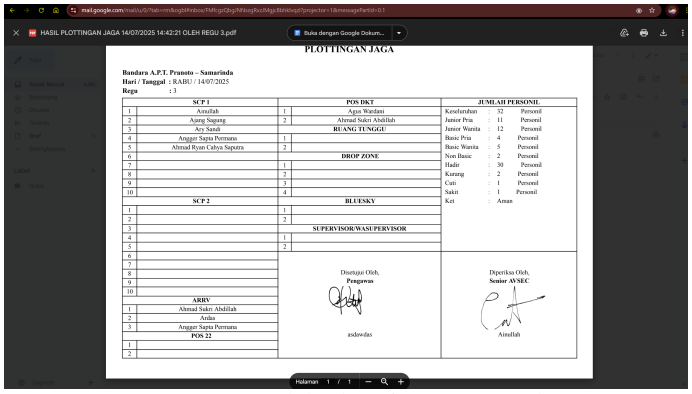

Figure 6. Email display of reporting results

4 DISCUSSIONS

The results of the study show that the ADAR system successfully addresses the main issues of manual AVSEC reporting, namely inefficiency, risk of data loss, and low accountability. This supports the hypothesis that digitalization can significantly improve the quality of reporting (Anshari & Manjaleni, 2024; Maulita et al., 2024; Hasanah et al., 2018).

Scientifically, system efficiency is demonstrated by the ability to fill out forms in real time, the elimination of manual data entry, and the automation of report distribution. Accuracy is enhanced through input validation via forms and the reduction of human error due to standardized formatting. The system also improves data security and accessibility through encrypted cloud storage on Google Drive (Asaniyah, 2017; Z. Yusra et al., 2021; Moonlight et al., 2021).

These findings are consistent with the research of Putri et al. (2021), which stated that Google Workspace-based reporting systems can enhance the operational efficiency of public institutions. However, the advantage of the ADAR system compared to previous studies lies in its full integration of Google Workspace components, resulting in an end-to-end automated workflow

from input to report distribution, as well as its adaptation to the AVSEC work environment, which demands a high level of security (Rahmanita, 2022; Shiddiq, 2020; Safitri et al., 2022).

Compared to reporting systems in other institutions that still have separated functions (e.g., only using Google Forms without automation), this system surpasses them in terms of efficiency and digital accountability. The system is also unique in that it includes features such as QR Codes, Google Analytics, and online signatures, which are rarely found in similar systems in previous studies (Sari et al., 2019; Nugroho & Ramadhan, 2020; Panggalo & Jumlad, 2024).

It is important to note that the effectiveness of digital reporting is also influenced by data management capabilities during crisis situations, as demonstrated in LKP management during the pandemic (Yusra et al., 2021). Furthermore, AI-based approaches and predictive modeling, such as those used in exchange rate forecasting by Moonlight et al. (2023; 2024), can serve as inspiration for developing advanced features in data-driven security reporting.

Nevertheless, the ADAR system still has limitations, such as dependency on Google's policies and potential storage capacity issues with free accounts. Despite these constraints, its flexibility, data recovery capabilities, and the security of Google's servers make this system highly feasible for broader implementation in AVSEC environments and other organizational units (Moonlight et al., 2019; Moonlight et al., 2023; ANNEX 17, 2017).

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