


An Overcoming Red Indicator Alarm Disruptions Server 2 AMSC Comsoft in a Public Company, Palembang Branch

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Article Info	ABSTRACT
Keywords: DFRduino Uno R3 microcontroller, MC-38 Magnet Sensor, PIR Sensor, Twitter	Security officers often cannot monitor the security of the financial room at any time, especially outside working hours or at night because the financial room is in a special room. Security officers do not receive warnings quickly if someone who does not have the right to enter the financial room when it is empty or outside working hours. The aim of this research is to design an application that can monitor the security of the financial room by providing information or giving warnings in the form of alarms. and sending SMS and Twitter notifications to security officers if someone who does not have access rights enters the financial room, using the DFRduino UnoR3 microcontroller, MC-38 magnetic sensor, PIR sensor, alarm, Sony Ericsson Z530i cellphone, wifi modem, and Bluetooth. If a door opening or movement is detected, the computer will send a command to the DFRduino which is then forwarded to the alarm to provide a sound warning. And with an Android cellphone with a connection via the GSM network, it can be connected to the application so that the computer can send warning notifications to the number that has been registered as the recipient of the notification via Twitter to the username that has been registered. With the magnetic sensor it is possible to detect if a door or window has been forced open and The PIR sensor is used as a support if the magnetic sensor does not work or if the thief enters the room not through a door or window. PIR sensors installed indoors allow all activities that occur to be monitored properly.
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INTRODUCTION

Indonesia has a unique topography with many islands, and aviation is the main means of maintaining connectivity between regions. The aviation sector in Indonesia has played a central role in supporting the country's connectivity and economic growth. With a geography consisting of more than 17,000 islands, aviation is a vital means of overcoming geographic challenges and facilitating community mobility, trade and tourism. Aviation is the main driver of the tourism industry in Indonesia. International and domestic flights allow tourists to explore various destinations throughout Indonesia.

Aviation safety and security is a very important aspect. Improvements in aviation safety standards and airport security are priorities to protect passengers, flight crew and aviation assets. In accordance with PP 77 of 2012, as the basis for the formation of the Air

Navigation Service Provider Public Company (Perum LPPNPI) or commonly known as AirNav Indonesia. The formation of Perum LPPNPI is a historical milestone in the world of Indonesian national aviation, because Perum LPPNPI is a State-Owned Enterprise (BUMN) and is the only aviation navigation operator in Indonesia that prioritizes safety in aviation.

Based on the regulations of the Head of the Center for Human Resources Development for Civil Aviation Number: SM.106/003.A/I/PPSDMPU-2017 concerning guidelines for On the Job Training (OJT) Diploma Program Education and Formation Training at the Technical Implementation Unit of the Center for Human Resources Development Air Transportation.

Medan Aviation Polytechnic is one of the universities under the Transportation Human Resources Development Agency (BPSDMP) which has the task of producing graduates for the benefit of the Air Transportation sub-sector with a harmony of knowledge, skills and expertise.

Medan Aviation Polytechnic is holding an On the Job Training (OJT) program. Implementation of On the Job Training (OJT) activities is a mandatory activity that must be carried out and participated in by all Medan Aviation Polytechnic cadets, useful as a place to consolidate the results of the education and training that has been undertaken while carrying out education at the Medan Aviation Polytechnic campus, both theoretically and practically. So that cadets are given the opportunity to know, understand, deepen and apply the extent of the abilities obtained from the learning outcomes in real work situations and conditions, so that they can produce technicians who are experts in their fields, especially for Telecommunication and Air Navigation Engineering cadets as expected. , skilled, competent and professional in their field.

During the implementation of On the Job Training (OJT), there was a problem that occurred, namely the presence of a red indicator alarm on the (Recording Subsystem) RSS and (Core Subsystem) CSS on server 2 AMSC Comsoft which was caused by server suddenly shuts down and a buildup of congested messages is found which then causes the server to go down.

Literature

A brief History

The Indonesian Aviation Navigation Service Provider Public Company (Perum LPPNPI) is a business entity that provides Indonesian aviation navigation services and is not profit-oriented, in the form of a State-Owned Enterprise (BUMN) whose entire capital is owned by the State in the form of separate and undivided State assets on shares in accordance with Law Number 19 of 2003 concerning State-Owned Enterprises (BUMN). The Indonesian Aviation Navigation Service Provider Public Company (Perum LPPNPI) was established in accordance with the mandate of Law No. 1 of 2009 concerning Aviation and Government Regulation (PP) Number 77 of 2012 concerning Perum LPPNPI.

Airnav Indonesia manages the entire Indonesian air space which is divided into two FIRs (Flight Information Region), namely the Jakarta FIR which is centered at the JATSC (Jakarta Air Traffic Services Center) Branch Office and the Ujung Pandang FIR which is centered at the MATSC (Makassar Air Traffic Services Center) Branch Office. . The total

area of the Jakarta FIR = 2,219,629 km² while the total area of the Ujung Pandang FIR = 1,476,049 km², with total flight traffic >10,000 movements per day.



Figure 1. Flight Information Region

General description of Perum LPPNPI Palembang Branch



Figure 2. Perum LPPNPI Palembang Branch

Source: Perum LPPNPI Palembang Branch, November 2023

In September 2009, the Indonesian government responded to the ICAO audit by initiating a draft PP establishing Airnav Indonesia and it was ratified on September 13 2012 as PP No 77 of 2012. Airnav Indonesia began carrying out its duties in managing flight navigation throughout Indonesia starting on January 16 2013. Services provided by Airnav Indonesia includes flight traffic services, aeronautical information, aviation telecommunications, aviation meteorological information and SAR information.

Sultan Mahmud Badaruddin II International Airport or also known as Sultan Mahmud Badaruddin II International Airport. (IATA : PLM ; ICAO : WIPP). This airport is an airport that serves the city of Palembang, South Sumatra and its surroundings. The location of this

airport is in the KM.10 area of Sukarami District. Sultan Mahmud Badaruddin II International Airport is operated by PT. Angkasa Pura II. Sultan Mahmud Badaruddin II is a name taken from the name of an Indonesian National hero (1767-1862) who fought against the Dutch VOC and once led the Sultanate of Palembang Darussalam (1803-1819).

When South Sumatra Province was officially selected as the host for the 2004 PON XVI, the government's efforts were to increase the capacity of the airport and change the status of this airport to an international airport. The new terminal building at Sultan Mahmud Badaruddin II Airport was finally successfully completed and inaugurated on January 1 1990. This airport has also officially become an international airport. and can be landed by large-body aircraft on January 1 1970. With 12 cities with direct domestic flights and 3 cities with direct international flights. The development of this airport can enable Sultan Mahmud Badaruddin II International Airport to be landed by Boeing 747, Airbus A330, Boeing 777 and similar aircraft.

Table 1. Aerodrome Data

Aerodrome Location Indicator	: WIPP – Palembang / SMB II
ARP Coordinate and Site at AD	: 02°54'01"S – 104°42'00"E
Direction and Distance from city	: 6.7 NM from City Palembang
Transition Levels	: 13,000 feet
Transition Altitude	: 11,000 feet
Runway Designation	: Runway 11/29
Directions	: 113°/293°
Tower Frequencies	: 118.1 Mhz
Airspace Classification	: C

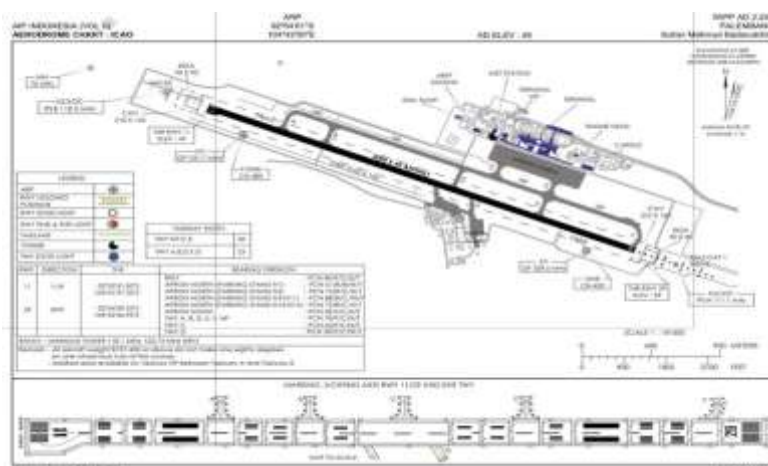


Figure 3. Sultam Mahmud Badaruddin II Airport Layout – Palembang

METHOD

In preparing this report on the implementation of On the Job Training (OJT), there are several general competencies that the author must know and understand. Apart from that, the author also discusses the function of each navigation equipment which is the

responsibility of the Communication, Navigation, Surveillance, Automation (CNSA) unit in Perum LPPNPI AirNav Palembang Branch which is based on CASR 69 concerning General Competencies in Air Navigation Techniques and Doc. ICAO 10057 concerning ATS electronic personnel. General competency Equipment facilities at Perum LPPNPI AirNav Palembang Branch are divided into four facilities, namely, communication, navigation, surveillance and automation equipment facilities.

Communication equipment facilities consist of several pieces of equipment that support good communication in flight. The following are included in the communication equipment facilities at Perum LPPNPI Airnav Palembang Branch, including:

Aeronautical Terminal Information Services(ATIS)

ATIS is a device that converts news from data to voice which is used to send continuous information regarding the condition of the terminal or airport to pilots. Information sent by ATIS includes weather, air temperature, wind speed, wind direction and air humidity.

Table 2. ATIS Equipment Specifications

Brand	Pilot System
Type	CR 42U-1100-3YW
Frequency	127.2 MHz
Installation Year	2008
Power	460 Watts



Figure 4. ATIS Equipment

Voice Switching Communication System(VSCS)

VSCS is an interface that coordinates all communication networks used by ATC using simulated buttons on the touch screen. VSCS makes it easier for ATC to communicate by

simply pressing the selected line on the touch screen without having to use communication media such as a telephone or handy talkie.

Table 3. VSCS Equipment Specifications

Brand	Garex
Type	230 Compact 3
Placement	ATC Systems Building
Installation Year	2017



Figure 5. Garex VSCS panels



Figure 6. Garex 230 VSCS Server

Very Small Aperture Terminal(VSAT)

VSAT is communications equipment that uses satellites as a transmission medium for voice communications, flight data and radar data. One of the VSATs used at Perum LPPNPI AirNav Palembang Branch Office is Least Channel (channel rental) to PT. Lintas Arta, which was installed in 2017, functions as *Direct Speech* Pekanbaru, Jakarta, Padang, Pangkal Pinang, Jambi and flight data (TTY). The VSAT communication system uses point to point, meaning from one airport to another airport.



Figure 7. VSAT Antenna

RESULT ANALYSIS

Analysis Automatic Message Switching Center.

AMSC (Automatic Message Switching Center) is a computer-based Message Switching news distribution management system that works in a store and forward manner, meaning that news entering the AMSC is stored and then distributed according to the destination address. The functions carried out by AMSC are receiving news, processing news, distributing news according to existing priorities and responding to special news. This flight data communication is very important because it is used to transmit flight data in the form of flight schedules, weather news, (Notic to Airman) NOTAMs, and other news related to aviation. This system is called AFTN.

News processing includes:

1. Identify news
2. News filtering (filtering messages) according to known formats
3. Correction of distorted news but still within system tolerance limits
4. News storage
5. News addressing
6. Responding to news is in accordance with existing rules

Because the AMSC system is used for the aviation environment, the AMSC system must follow the format standards and news handling rules set by ICAO (International Civil Aviation Organization) Annex 10 Volume II for AFTN (Aeronautical Fixed Telecommunication Network) networks. At Perum LPPNPI Palembang Branch, the tools used are COMSOFT brand with Type CADAS (Comsoft Aeronautical Data Access System) products made in Germany. This tool already uses an IP Address system so it does not require many AFTN computer units which can be accessed via the internet with a specific IP address. The parts of COMSOFT CADAS-PB are:

1. One server unit consisting of main and standby. On this server you will see incoming or rejected news.
2. Client who functions as an operator in the BO, Tower, APP, Com Cent and R-Dara, Meteo, PIA units.

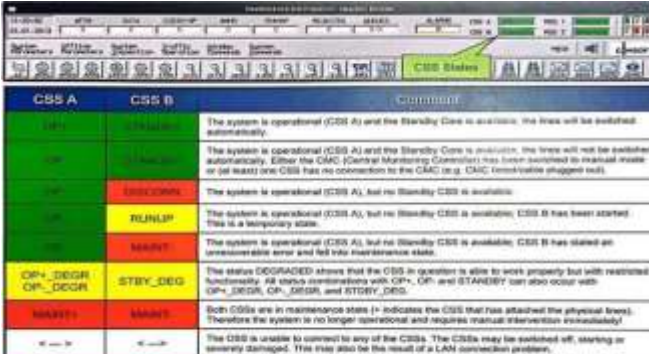
The COMSOFT flight data access system is a flight information and messaging system, based on the latest web application technology. This covers a wide range of aeronautical applications and various large-scale services distributed through its various modules so that the system can be easily adapted to requirements.

CADAS (Comsoft Aeronautical Data Access System) Client-Server based AMHS (ATS Message Handling System) terminal system for ATS end use. Which has the following functions:

1. Message Switch AFTN (Aeronautical Fixed Telecommunication Network)
2. ATS (Air Traffic System) message database
3. AFTN Gateway

Main System Components

Core Subsystem(CSS) is the core system that functions as routing in sending incoming flight news/data to the server. The Core Subsystem also has the functions of receiving, storing (using RSS) and forwarding messages. Under normal conditions CSS operates with two identical core subsystems (CSS A/B) for redundancy and CSS one is in operational mode, the second CSS waits in hot standby mode. In problematic situations or conditions CSS will switch automatically. All serial WAN interfaces are switched mechanically between two CSS (transparent to external) via LSU (Line Switching Unit) with CMC (Central Monitoring Controller). The LAN connection is made by the operational core (there is only one AIDA-NG IP address known to all LAN partners)



CSS A	CSS B	Comment
OP	OP	The system is operational (CSS A) and the Standby Core is available; the time will be switched automatically.
OP	STBY	The system is operational (CSS A) and the Standby Core is available; the time will not be switched automatically. Either the CMC (Central Monitoring Controller) has been switched to manual mode or at least one CSS has no connection to the CMC (e.g. CMC communication stopped).
OP	STBY_DEGR	The system is operational (CSS A), but no Standby CSS is available.
OP	STBY	The system is operational (CSS A), but no Standby CSS is available; CSS B has been started; this is a temporary state.
OP	STBY	The system is operational (CSS A), but no Standby CSS is available; CSS B has started an unscheduled error and fell into maintenance state.
OP_DEGR	STBY_DEGR	The status DEGRADED shows that the CSS in operation is able to work properly but with restricted functionality. All status combinations with OP+, OP- and STANDBY can also occur with OP+, DEGR, OP-, DEGR, and STBY+, DEGR.
MAINT	MAINT	Both CSSs are in maintenance state (+ indicates the CSS that has attached the physical lines). Therefore the system is no longer operational and requires manual intervention immediately!
MAINT	MAINT	The CSS is unable to connect to any of the CSSs. The CSSs may be switched off, starting or severely damaged. This may also be the result of a LAN connection problem.

Figure 8. System States CSS (Core Subsystem)

Subsystem (CSS) has the following functions:

- a. Receive messages
- b. Route and forward messages
- c. Functions as a message gateway, for example AFTN

RSS (Recording Subsystem)

RSS (Recording Subsystem) is a functioning recording system as data redundancy or can be called a place to store the same data repeatedly. Both RSSs operate and run in parallel mode and receive and store the same data. If one of the RSS is in a problematic condition or is turned off, the database will automatically be updated again via Operational RSS when it restarts.

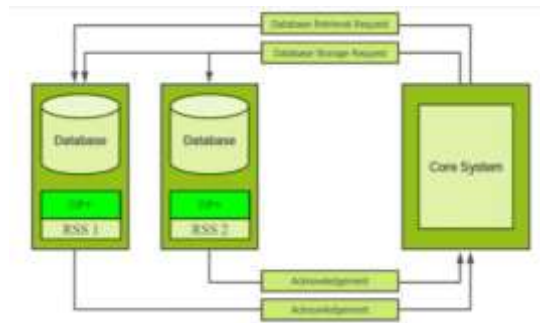


Figure 9. RSS (Recording Subsystem)



Figure 10. RSS (Recording Subsystem) when warning

The Recording Subsystem (RSS) has the following functions:

- Save all messages (incoming and outgoing messages)
- Saves local configuration
- Storing internal log messages (Events)
- Save statistical data
- Save archives

AFTN (Aeronautical Fixed Telecommunication Network)

Aeronautical Fixed Telecommunication Network(AFTN) is a point to point communication network that functions to exchange news from or between Meteo, NOTAM offices, within certain limits between airline company offices. (App et al., n.d.)

AFTN Terminal is a data communications device connected to the AMSC system. Can use a regular telex or electronic telex, the AFTN terminal used can be connected to the system serially (using RS-232 type cable media) or Current Loop. If connected serially, COM 1 on the AFTN Terminal is connected using a 10-pack data cable to one of the channels on the signal selector. Meanwhile, if it is connected via Current Loop to AFTN.

The AFTN system at airports uses equipment called AMSC. AFTN's address routes are divided into 2 large areas, namely Jakarta and Makassar. The Jakarta area is connected to international networks, namely Singapore and Brisbane, so that Jakarta is in charge of western Indonesia while Makassar is in charge of eastern Indonesia.



1. *Communication Centre*: A station in the AFTN network whose function is to relay or re-transmit (forward) sending news from or to a number of other stations that are directly connected to the Communication Center.
2. *Sub Center Station*: A station in the AFTN network whose function is to relay or continue sending news from or to a number of other stations that are directly connected to the Sub Center Station.
3. *Tributary Station*: A station in the AFTN network whose function is to receive or send news but cannot relay news.

- Headings
- Address
- Origin
- Text / News Content



CONCLUSION

Based on the On the Job Training (OJT) which was carried out at Perum LPPNPI Palembang Branch, it can be concluded that the problems that occurred in the CSS (Core Subsystem) and RSS (Recording Subsystem) on Server 2 AMSC had a red alarm indicator caused by a congested message so that server 2 is down. However, apart from the accumulation of messages (congested messages) on the server, another cause is because the server suddenly shuts down.

REFERENCES

- [1] AirNav Indonesia. (2018). *airnavindonesia*. Taken from *airnavindonesia*: <https://airnavindonesia.co.id/> (31 December 2022)
- [2] Annex 10 Vol II. (2001). *Aeronautical Telecommunications*. International Civil Aviation Organization.
- [3] AMSC Comsoft Manual Book. (2013). *IDN-AIM Hardware Maintenance*
- [4] Work Procedure Guidelines. (2013). *About Shipping and Aviation Navigation Facilities*. Jakarta: SKK MIGAS.
- [5] Regulation of the Director General of Civil Aviation Number: KP 103. (2015). *regarding Technical Specifications for aviation telecommunications facilities*. Jakarta: Directorate General of Civil Aviation.
- [6] Regulation of the Director General of Civil Aviation Number: KP 35. (2019). *regarding Maintenance and Reporting Procedures Facility Telecommunication Flight*. Jakarta Directorate General Air Transportation.
- [7] Government Regulation (PP) Number 77. (2012). *About the Public Company (Perum) Indonesian Aviation Navigation Service Organizing Institution*. Jakarta: Republic of Indonesia.
- [8] SELEX. (2011). *Operation and Maintenance Manual Model 1150 A Doppler*
- [9] *VHF Omnidirectional Range*. Overland Park: SELEX Integration.
- [10] SKYbrary. (2020). *Safety Nets*. Retrieved from *skybrary.aero*:
- [11] https://www.skybrary.aero/index.php/Safety_Nets
- [12] SKYbrary. (2021). *Automation and ATM*. Retrieved from *skybrary.aero*:
- [13] https://www.skybrary.aero/index.php/Automation_and_ATM
- [14] Y.Doc, "MSSR-1 Radar System Description Y7400A ELDIS MSSR-1 Radar Y7400A System Description."
- [15] Y. Doc, "MSSR-1 Radar Maintenance Manual Y7415A ELDIS Pardubice MSSR-1 Radar Y7415A Maintenance Manual."