

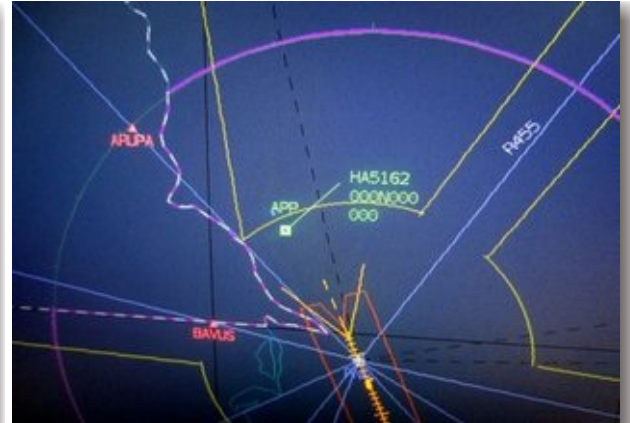


Ganesh Avionics

Air Traffic Control System

*National Product with International Standard
of The Air Control System*





Ganesha Avionics Air Traffic Control System

Air Traffic Control System is a computer-based air traffic control real time system that processes RADAR data as the source of information.

Ganesha Avionics Air Traffic Control System provides solution for various airport requirements. It is an optimum system for all level of airports; from airports with low traffic, up to international airports with medium traffic that has an enterprise system equal to international scale products.

The overall solution is supported by a national base company with the utmost detail towards safety aspects of avionic and sustainable development.

One Sky One System

Our mission is to establish a one elaborate Ganesha Avionics Air Traffic Control System for one elaborate archipelagic sky region of Indonesia.

The one system of Ganesha Avionics Air does not imply that the whole archipelago will be using the same system, rather that the solution offered by GA will be tailored to synchronize the needs with the applied technology.

The vast span of controlled air space, the difficulty level of the air space, and the intensity of air traffic are some of the main variables of Air Traffic Control that has become our main concern in providing the appropriate Ganesha Avionics Air Traffic Control System.

- **GA-SDPS**
Surveillance Data Processing System
- **GA-FDPS**
Flight Data Processing System
- **GA-RBP**
RADAR By-Pass Processor
- **GA-HMI**
Human-Machine Interface
- **GA-RPS**
Recording & PlayBack System
- **GA-MCS**
Monitoring & Control System
- **GA-Eternity**
RADAR Data Interface, Con-verter & Active Splitter Device
- **GA-Chronus**
GPS-Network Time Protocol Device
- **Playback Conversion System**
- **GA-RAZER**
RADAR Analyzer
- **GA-EFPS**
Electronic Flight Strip Processor



Surveillance Data Processing System (SDPS)

RADAR (Radio Detection And Ranging) is the main source of information for the air traffic controllers system. A number of RADARs including ADS-B (Automatic Dependent Surveillance-Broadcast), Multi Lateration etc. covering a certain designated areas of airspace will be the input to the Surveillance Data Processing System (SDPS).

Ganesh Avionics SDPS is capable to processing RADAR data with different types/formats, including: Asterix (in various categories), Thomson Aircat Format (PR-800, PLA-1000), Extractor Video (EV-760, EV-720), NEC, and a number of other types/formats.

Here are the features of Ganesh Avionics SDPS:

- Multi RADAR Sources (up to 16 RADARs, 8000 tracks and plots).
- Multi Source RADAR Tracking, with multiple Algorithm of RADAR Data Filter Decision.
- RADAR By-Pass.
- Fault Tolerant, Redundants with multiple backups.
- SSR Based Alert
- Safety Net: Short Term Conflict Alert, Minimum Safe Altitude Warning, and Restricted Area Intrusion Alert.
- RADAR Data Filter.
- RADAR Mode Support.

Flight Data Processing System (FDPS)

With the Aeronautical Fixed Telecommunication Network (AFTN) connection, each Air Traffic Service (ATS) unit communicates to provide flight data.



Flight Data Processing System (FDPS) processes the Flight Plan data which are communicated by the ATS Unit. The Data processing includes flight simulations based on the characteristics of the airplane's data, the control area management (airspace), and the FDPS's flight plan input.

FDPS also processes a scheduled flight data known as Repetitive Flight Plan. Repetitive Flight Plan Data is generated by airlines to schedule the flight plans that will be carried out over a period of time.

Flight Plan and Repetitive Flight Plan Processing will enhance the work efficiency of the ATC Controller.

Here are the features of Ganesh Avionics FDPS:

- Ready for the new ICAO 2012 Flight Plan format.
- Correlates with RADAR data (Ganesh Avionics SDPS).
- Handle up to 10,000 flight plans & repetitive plans.
- Handle up to 8,000 flight plan track (simulation of flight plan).
- Multi Sector (Control Area).
- Message Center Communication (ATN/AFTN).
- SSR Code Management.
- Automated Handoffs.
- Automated Electronic and Paper flight strips.
- Aircraft & Airspace Modeling System.
- Alert: Medium Term Conflict, Minimum Safe Altitude, Vertical & Lateral Conflicts.
- ATS Interfacility Data Communication (AIDC).



Human-Machine Interface (HMI) & Recording and PlayBack System (RPS)

Human Machine Interface (HMI) is a part of the air traffic control system that interacts directly with the ATC Controller as a user.

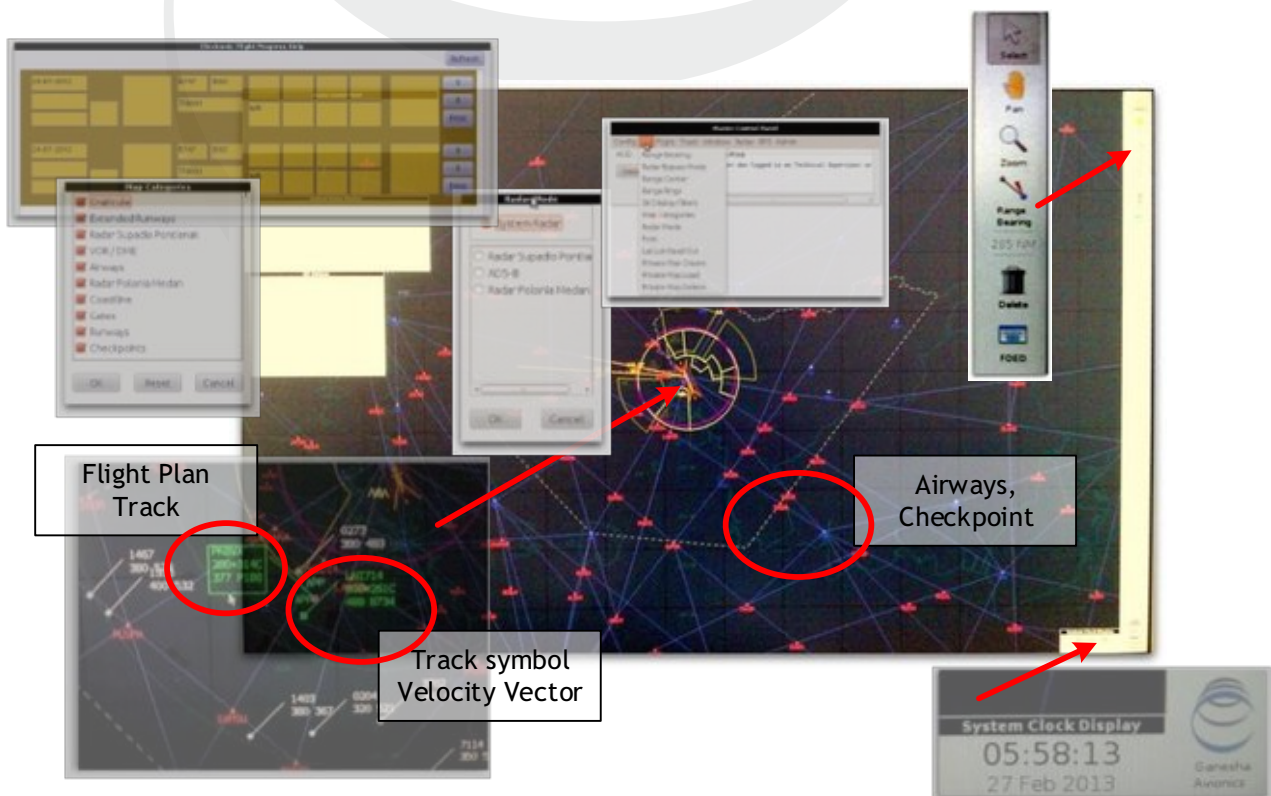
The overall ATC Controller interaction in using HMI is recorded by the Recording and Playback System (RPS) in a transparent manner.

Recordings can be playback in detail up to the pointer and keyboard interactions.



Features of Ganesh Avionics HMI & RPS are:

- LED/ LCD Color Monitor with 2048x2048 (2k.2k), 1024x1024 or 2560 x 1600 (Wide Screen) resolution.
- Standard design User Interface with X/Motif (customizable)
- Multi Workstation
- Independent User Profile
- Multi Layer Map
- Private Map
- Map Editor
- RADAR Reinforce
- PSR & SSR Tracks (Plots) Display
- Advance Track Label
- Emergency & Alert Display
- Situation Display Filter
- Range Bearing, Range Ring, & Range Center
- Data Block Options: Track Trail (History), Velocity Vector, Auto Offset
- Transparent recording process on HMI & sync with VSCS
- Record all interaction between Controller and HMI
- Easy Playback System: play, pause, stop, fast forward
- Printable situation display on Playback Mode
- Daily backup data to DVD





Monitoring and Control System (MCS)

In air traffic control systems there is a very important component although it is not directly related to air traffic control. That is the Monitoring and Control System (MCS).

Monitoring and Control System enables/ disables/ activates/ deactivates all existing system's entities, including SDPS servers, FDPS servers, Workstations, RADAR's data, and so on.

To monitor the availability of the entire entities (and its provided Services) on the local network (Local Area Network) an OpenNMS based system is used.

MCS supports the mechanism for the data conversion (adaptation of data) of the Ganesh Avionics Air Traffic Control System.

Monitoring and Control System Features:

- Easy User Interface for Workstation Administration
- Configurable RADAR Setting
- User Management and Setting
- Versioning for binary and # configuration files
- Using standard protocol for Management SNMP
- Using OpenNMS for Network Management

Machine	Group	Service	Mode	Status
gmk-mcs #4:11:56:a5:8f:80	MCS	Machine (Control A)	Online (unary)	Operational
	MCS	Radar Converter &	Standby	Operational
	MCS	Display Translator	Online (unary)	Operational
	MCS	Situation Display	Online (unary)	Operational
	MCS	Networking	Dual (bond)	Reachable
gmk-rdp1 #8:39:75:22:bb:c	RDPServer	Machine (Control A)	Online (unary)	Operational
	RDPServer	Radar Converter &	Standby	Operational
	RDPServer	Radar Data Process	Standby	Operational
	RDPServer	Flight Data Process	Primary	Operational
	RDPServer	Display Translator	Online (unary)	Operational
	RDPServer	Networking	Dual (bond)	Reachable
gmk-rdp2 #8:39:75:22:bb:c	RDPServer	Machine (Control A)	Online (unary)	Operational

GA-Ethernity

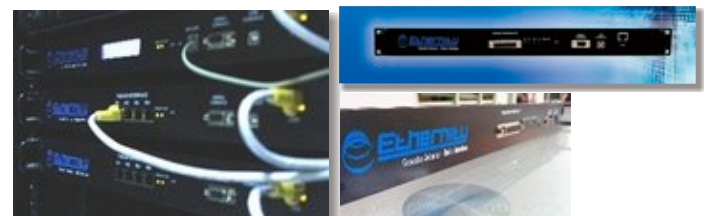
Ethernity is an embeded system device that serves as an interface between RADAR and Air Traffic Control System. It can also serve as an Active Splitter to split and share RADAR Data to other system that need it.

Ethernity is specially designed for real time data processing system complemented with fault tolerance. Ethernity comes with a redundant module that operates in the Primary and Standby. If there is a failure occurred in the primary module then it is automatically overtaken by the Standby module . The redundant module increases the availability of Ganesh Avionics Air Traffic Control System.

Ethernity can be used directly as the RADAR By Pass (RBP) for the RADAR data monitor system. Ethernity can also be used for RADAR data transfer via Internet Protocol (IP) as an alternative to VSAT.

The main features of the Ether consists of:

- RADAR Interface: Converts the signal of synchronous serial into TCP / IP packages.
- RADAR Data Converter: Converts the RADAR data format into the various format required by the SDPS.
- Active Splitter: Split and share RADAR Data for use by other systems that need it.





GA-Chronus

Chronus is a GPS-based NTP (Network Time Protocol) device to obtain a very precise time for the purpose of network time synchronization, which is very important in the Air Traffic Control System.

Chronus broadcast a highly accurate time reference, with accuracy to the micro-second units with the UTC time. The system can receive signals from up to 12 satellites in orbit. Each satellite contains an extremely precise atomic clocks which can be used by the equipment on the surface of the earth as an accurate timing reference. GPS signal received through an antenna mounted on the outside of the room.



The main feature of CHRONUS are:

- True Stratum-1 NTP Server
- GPS time reference input
- Battery-backed Real-Time Clock (RTC) circuit
- Handles >10.000 NTP request per minute
- Supports Main-StandBy state for fault-tolerant redundancy purpose
- Supports NTP, SNTP, NTP Unicast/Broadcast/Multicast
- Supports all types of Operating Systems.

Playback Conversion System (PCS)

Playback Conversion System (PCS) is a sub product of Ganesh Avionics Air Traffic Control System, used as a tool to support technical and operational functions..

PCS developed to convert the recorded ATCS output/ display combined with sound recording, into a commonly used video format (ex: MPEG, AVI, MP4 etc). The output of the PCS can be displayed easily on a TV screen, computer or other video player.



PCS has several times used to support the NTSC investigation on some aircraft Accident/ Incident in Indonesia.

The main feature Playback Conversion System (PCS) are:

- Convert HMI playback system format into video format (Theora, MPEG, AVI/MPEG4)
- Multi screen resolution: 1024x768, 1280x1024, 1600x1200, 2048x2048
- The conversion process is done transparently
- Synchronized with voice switch system as audio data input.
- PCS Application has an intuitive user interface for operation and setting.





GA-Razer

GA-RAZER (Ganesh Avionics RADAR Analyzer) is an integrated system, used as a tool of Performance Monitoring, Data Validation and Calibration of the RADAR Head.

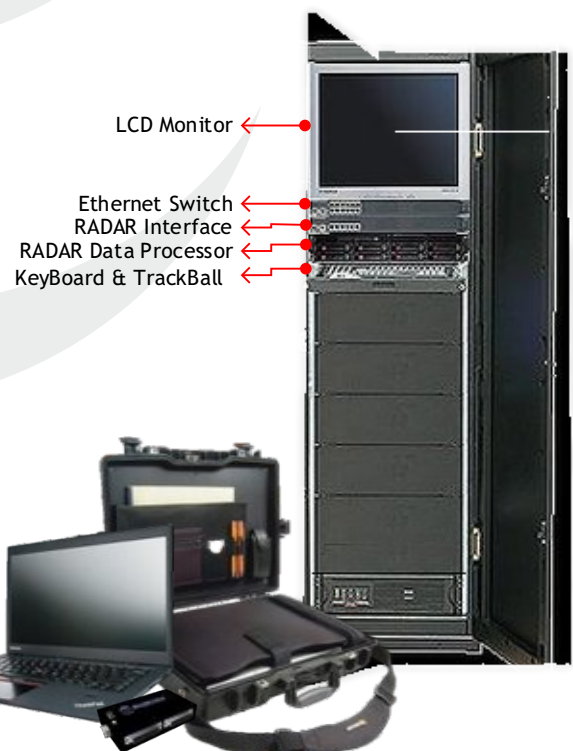
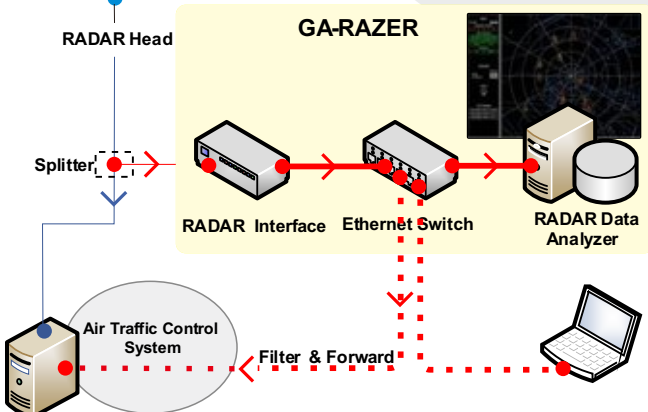
GA-RAZER's situation display showing Maps and Tracks (representing aircraft) in the coverage area of the RADAR Head in real time. GA-RAZER implement Human-Machine Interface (HMI) and Menu System for easy to use and understand. HMI provides zooming, range bearing, etc. This ability makes GA-RAZER also used as an Airspace Monitoring System.

GA-RAZER also display the raw data released by the RADAR Head, which can then be frozen and captured for data analysis needs. GA-RAZER also has filtering and forwarding functions (optional). The raw data issued by the RADAR Head will be analyzed by the system, to check the suitability of the format. Only the correct data is forwarded to the Air Traffic Control System, so that the validity of the data received by the ATCS can be guaranteed.

Features:

- *RADAR Data Formats Supported: PR-800, EV-760/ EV-720, NEC, ASTERIX Cat. 34/48*
- *Total RADAR Input: 1 (Max. 4 Optional)*

- *Track Display & Labeling:*
- *Showing Track (representing aircraft) that are within RADAR range. Track can be given a label for easy monitoring.*
- *Multilayer Map Display:*
- *Map showing location are within RADAR range. Maps can consist of several layers (Layer) such as: Basic Map (Boundary, Boundary Beach etc..), Mountains, Water Ways, MSAW, VOR, etc..*
- *Zoom In - Zoom Out:*
- *Zoom in/ Zoom out the screen to adjust the accuracy.*
- *Range & Bearing:*
- *Set the distance/ height monitoring (Range) and defines radius range RADAR display (Bearing).*
- *Capture & Analysis:*
 - *Freeze display a set of data released by RADAR. Used for the correctness of data analysis.*
- *Filter & Forward (Optional):*
 - *The ability to perform analyzes and checking the accuracy of data by the system. Only the data that has been deemed valid by the rules and the format of certain criteria (Filtering) which is then forwarded to the Air Traffic Control System.*





GA-EFPS

EFSP (Electronic Flight Progress Strips) is a sub-product of Ganesha Avionics Air Traffic Control System which functions to produce a digital flight progress strips, and transfers the strips between the controller working positions (workstation) via a local network.

EFPS developed to be easily customizable to user needs. This is possible because EFSP supports dynamic configuration based on data adaptation.

EFPS is developed based on the specifications needs of the ATC Controller by considering a userKey features Electronic Flight Progress Strips (EFPS):

- Support AFTN input
- Support JTA (serial based) printer format data input
- Drag data position
- Auto Image Shrinking
- Clicked area to add data to strip
- Manual strip handoff and auto strip handoff
- Strip printing using plain paper
- Logging facility
- Master/Slave configuration Data Synchronization
- Auto member administration

DEPARTURE				12:22:25				ARRIVAL			
LNT 388P7320	MELBORNE	REP	WIRN	LNT 388P7320	MELBORNE	REP	WIRN	LNT 388P7320	MELBORNE	REP	WIRN
2012/07/21	08:20:00	0302	0302	2012/07/21	08:20:00	0302	0302	2012/07/21	08:20:00	0302	0302
LNT 388P7320	MELBORNE	REP	WIRN	LNT 388P7320	MELBORNE	REP	WIRN	LNT 388P7320	MELBORNE	REP	WIRN
2012/07/21	08:20:00	0302	0302	2012/07/21	08:20:00	0302	0302	2012/07/21	08:20:00	0302	0302
LNT 388P7320	MELBORNE	REP	WIRN	LNT 388P7320	MELBORNE	REP	WIRN	LNT 388P7320	MELBORNE	REP	WIRN
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2012/07/21	08:20:00	0302	0302	2012/07/21	08:20:00	0302	0302	2012/07/21	08:20:00	0302	0302
LNT 388P7320	MELBORNE	REP	WIRN	LNT 388P7320	MELBORNE	REP	WIRN	LNT 388P7320	MELBORNE	REP	WIRN
2012/07/21	08:20:00	0302	0302	2012/07/21	08:20:00	0302	0302	2012/07/21	08:20:00	0302	0302

Profile

Ganesha Avionics Air Traffic Control System is a product of PT. LAPI Divusi in the field of Air Traffic Services. GA-ATCS was first developed in 2004 and used for the first time at Polonia International Airport, Medan. Besides Medan, GA-ATCS also been implemented at the Supadio International Airport at Pontianak, and operational since October 2012.

To this day, Ganesha Avionics products constantly being developed to keep up with the technology of air traffic control systems. Ganesha Avionics has also produced several variations of products and sub-systems based on the needs of airports in Indonesia.

Here are the main reasons why Ganesha Avionics product a perfect choice to meet the needs of air traffic management services:

- Ganesha Avionics is a national product;
- Ganesha Avionics is the optimum solution to minimize deployment and operational costs;
- Ganesha Avionics is easy to be customized and developed;
- Ganesha Avionics is a robust product;
- Ganesha Avionics is being developed on an ongoing basis;
- Ganesha Avionics has a reliable national support.



Ganesha Avionics
Air Traffic Control System



PT LAPI Divusi

Head Office:

Grha Divusi lvl. 2-3
Jl. DR. Djundjungan no. 194 Bandung 40163
West Java - Indonesia
Phone +62.22.2020331 Fax +62.22.2020332
E-mail: info@divusi.com
Url: http://www.divusi.com





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