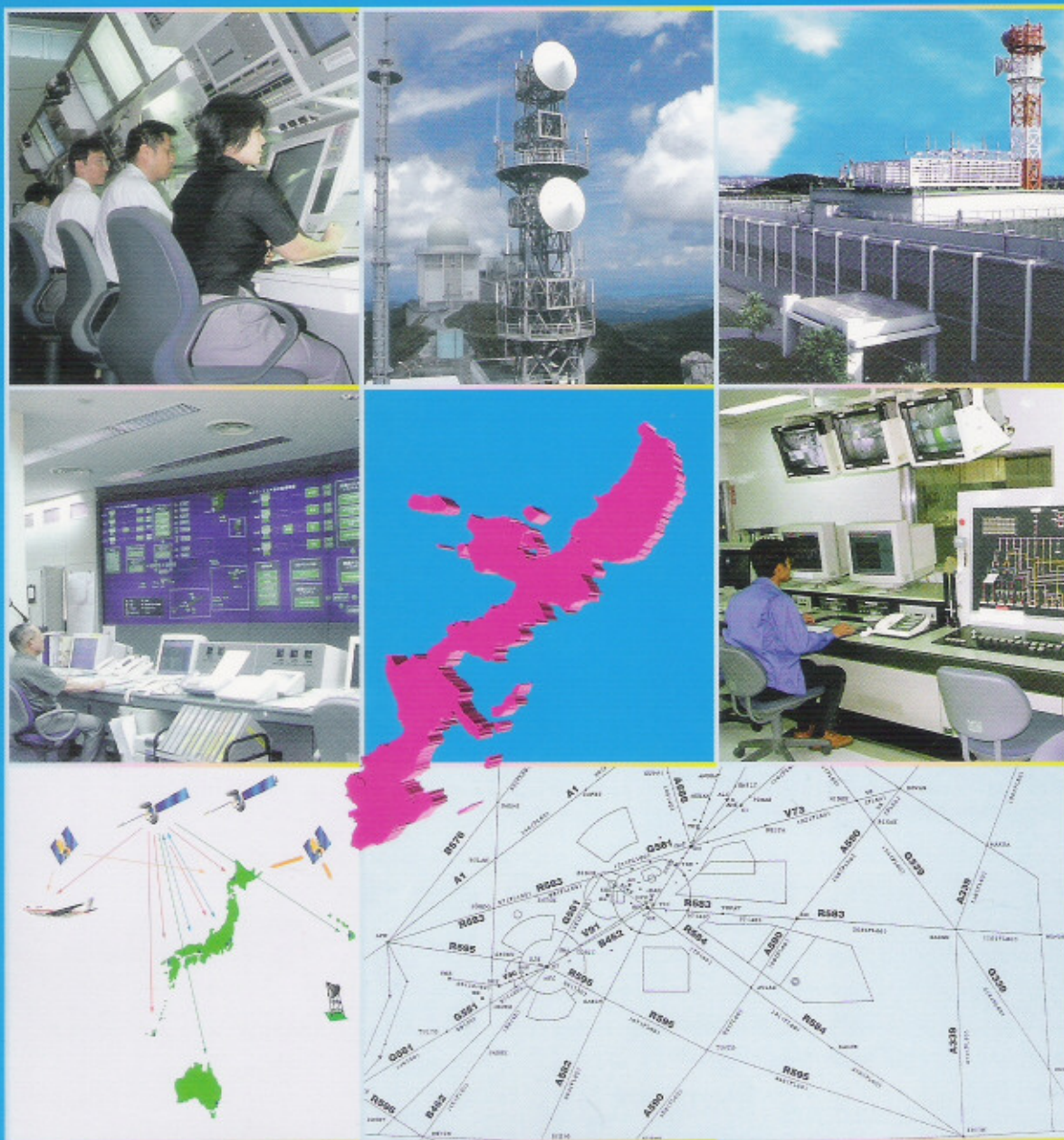


NANA AREA CONTROL CENTER



MINISTRY OF LAND, INFRASTRUCTURE AND TRNSPORT

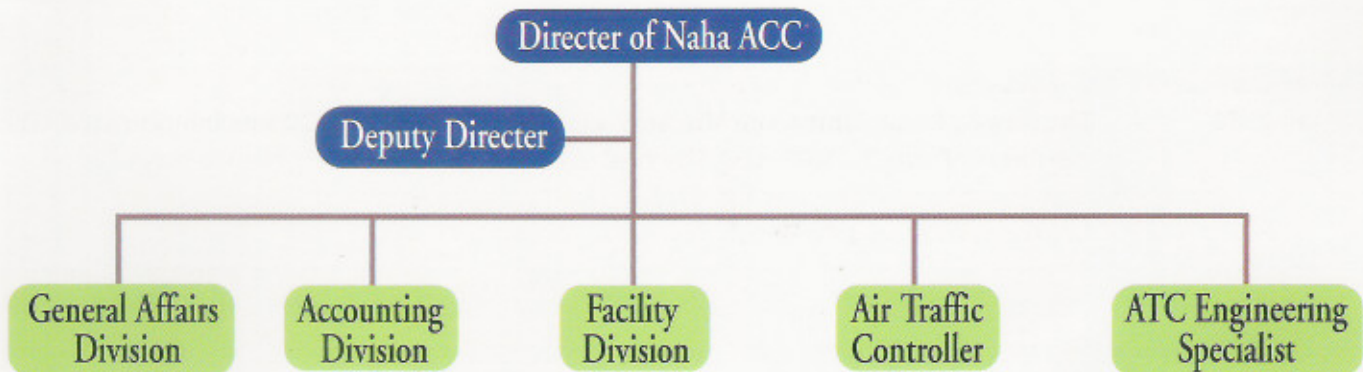
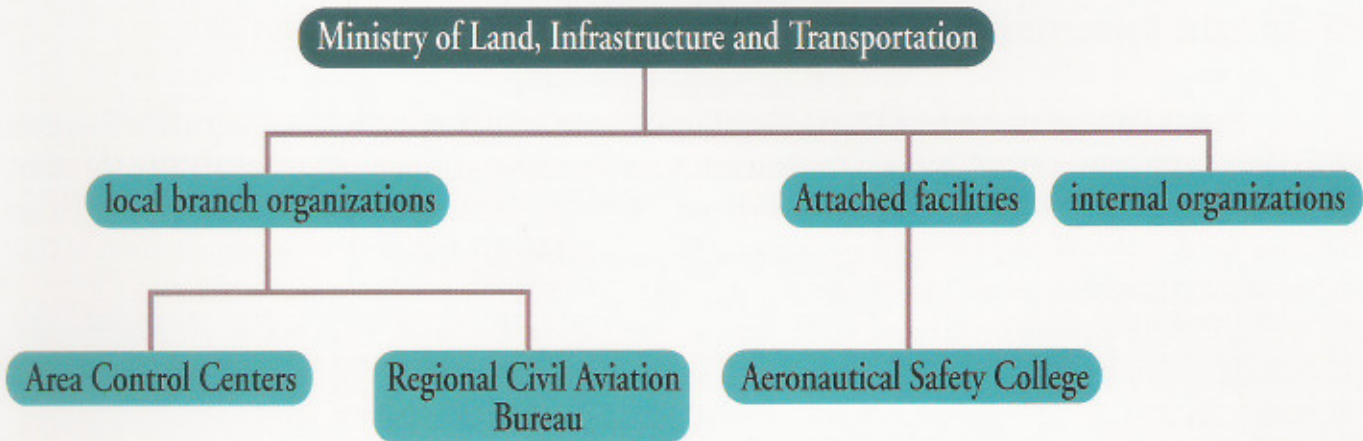
Historical Background of Naha Area Control Center (ACC)

The authority to provide air traffic control services in Okinawa region was partially returned when Okinawa was returned to Japan in 1972. Then, "Okinawa Flight Information Region (FIR)" where the U.S. Forces had temporarily provided service was returned and changed to "Naha FIR", and Naha ACC took over the service on 15 May 1974.

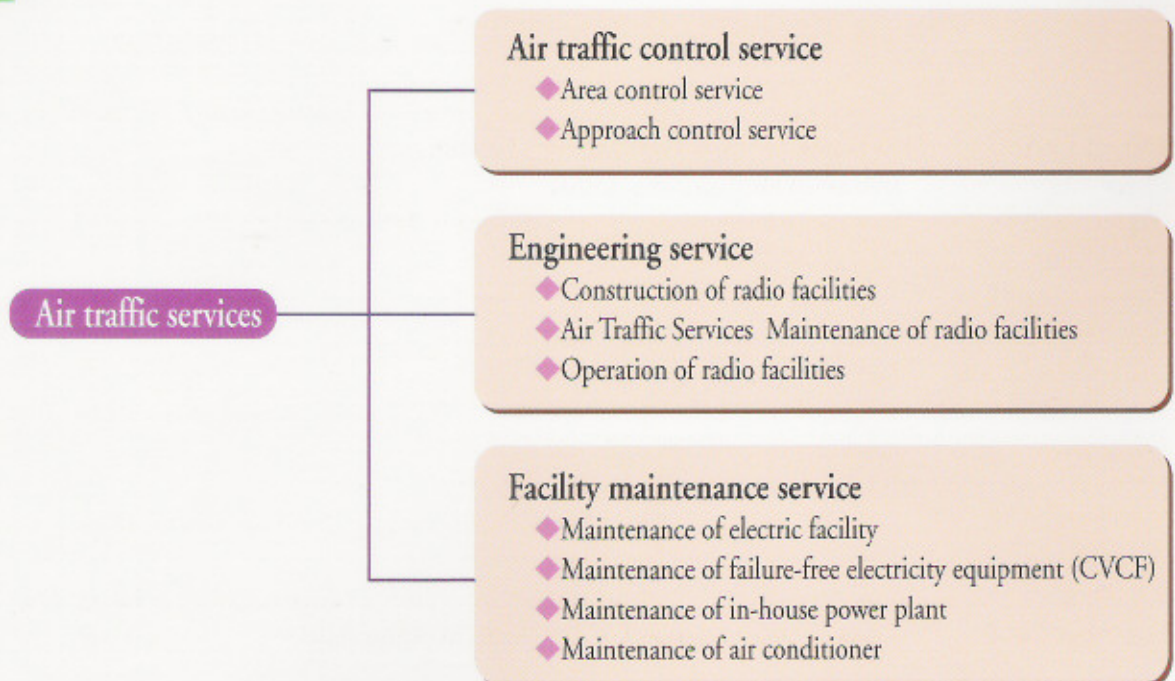
Historical Background

15 May 1972	Naha ACC Preparation Office was established at Naha Airport Office.
1 January 1974	Naha ACC Preparation Office was reorganized to Naha ACC Preparation Department.
28 February 1974	Completed the phase I construction.
13 May 1974	The Law of Establishing the Ministry was amended. Naha ACC was inaugurated (the number of staff, 152) and General Affairs Division, Communications Division, Communication Engineering Division, ATC Engineering Division and Air Traffic Controller were established.
15 May 1974	Started area control service in the area of 1.25 million square kilometers around Okinawa Island where the U.S. had provided air traffic services provisionally after the reversion of Okinawa. Yaedake Air Route Surveillance Radar (ARSR) was installed.
10 May 1976	Facility Division and System Engineering Division was established. The Radar Data Processing (RDP) system was installed.
1 April 1978	Phase II construction was completed.
5 April 1978	Established the Deputy Director.
1 October 1978	Abolished the Communications Division and established ATC Communication Specialist. Aeronautical Enroute Information Service (AEIS) was started.
5 April 1980	Consolidated Communication Engineering Division, ATC Engineering Division and System Engineering Division into the ATC Engineering Specialist.
3 April 1981	Established the Accounting Division.
1 May 1983	Installed Miyakojima ARSR.
15 March 1984	Completed the phase III construction (construction of an annex).
1 July 1985	Installed Amami ARSR.
18 November 1987	RDP was upgraded.
29 June 1989	Yaedake ARSR was replaced.
1 November 1991	Refurbished control consoles.
1 May 1995	Started the operation of Oceanic ATC Data Processing (ODP) system.
3 February 1998	Modified the RDP.
1 March 1998	Modified system control equipment.
1 October 1998	Started the operation of the Maintenance Data Processing (MDP).
27 July 1999	Upgraded the RDP with colored display.
26 February 2001	Completed the construction of new Yaedake ARSR site building.
1 October 2001	Ceased the operation of the AEIS at Naha ACC

Organization



Services

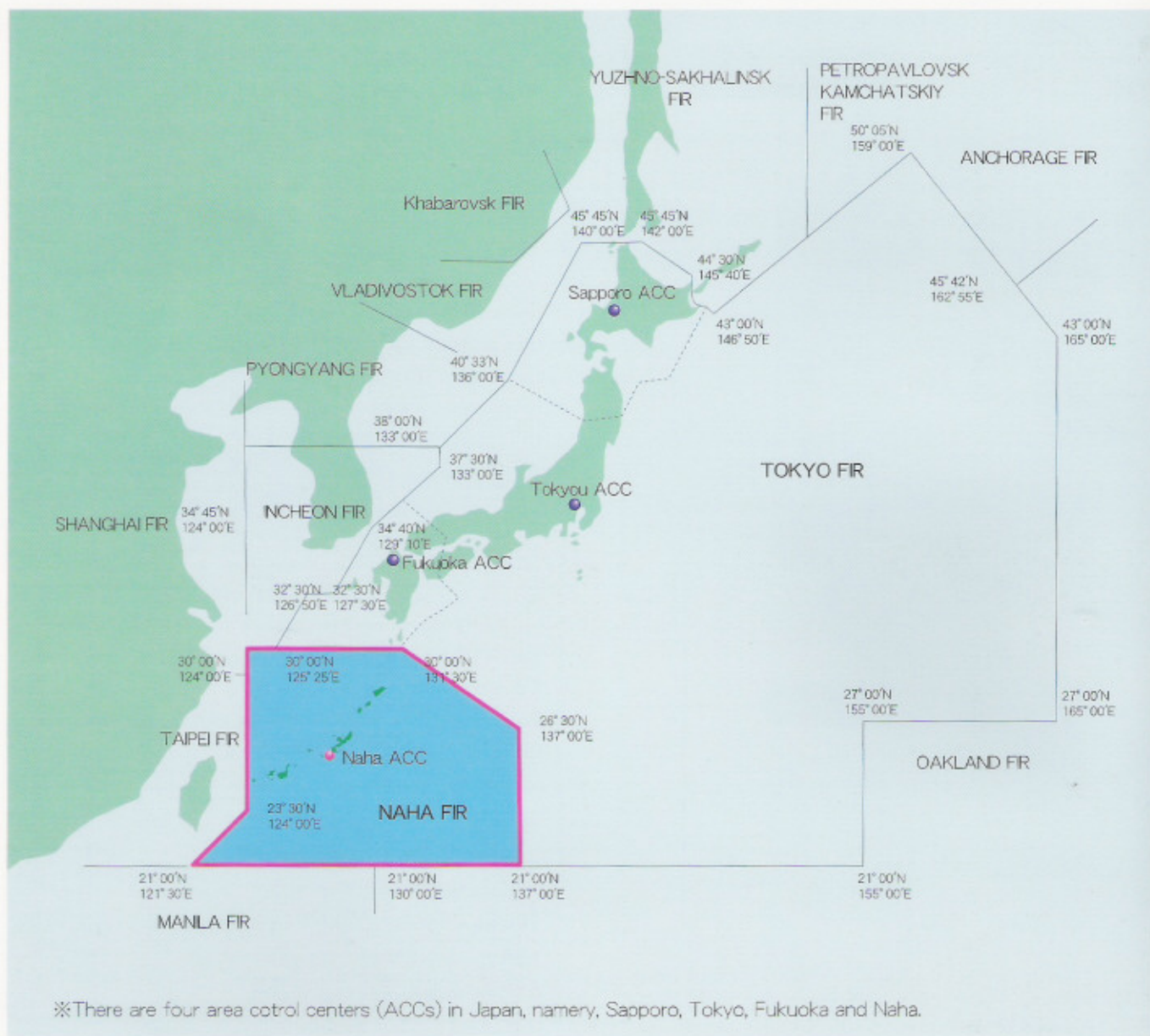


Flight Information Region(FIR)and ACC's Jurisdiction Airspace

FIR (Flight Information Region)

An FIR is airspace with defined dimensions where flight information and search-and-rescue services are provided. It is established by International Civil Aviation Organization (ICAO). An FIR includes both airspace of sovereignty and over the high seas, and is delineated in line with safe and smooth flow of air traffic.

FIR is not identified with the name of the state, but with the name of the area control center or the flight information center responsible for that region. In Japan, Sapporo, Tokyo and Fukuoka ACCs have the responsibility over Tokyo FIR and Naha ACC has the responsibility over Naha FIR.



Air Traffic Control Services Provided by Naha ACC

ACC provide area control and approach control services.

Area Control Service

Pilots file flight plans before they depart from airports located within Naha FIR. Naha ACC authorizes the flight plan and establish the safe separation between aircraft flying on airways are provided.

Approach Control Service

To specify an approach procedure and direct the way of climbing or descending to aircraft departing from/arriving to small island airports such as Amami Island or Ishigaki Island.

Type of Air Traffic Control Service

There are five kinds of air traffic control service: area control service, approach control service, terminal radar control service, aerodrome control service and ground control approach service.



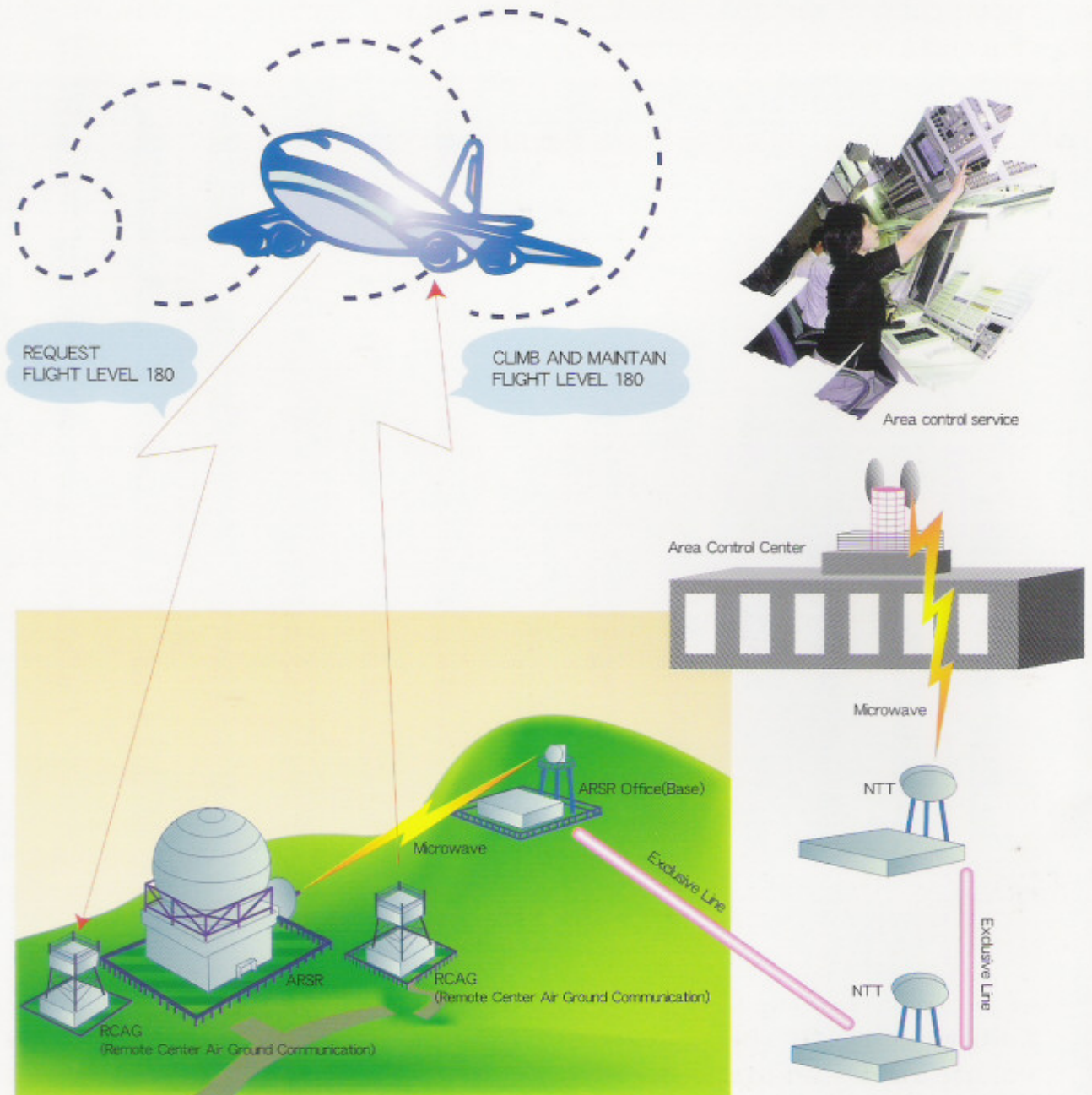
Outline of Radar System

ARSR (Air Route Surveillance Radar)

The ARSR is radar used for the area control service to detect aircraft within 450 kilometers radius of a radar site, and is used to provide radar navigational guidance and to establish radar separation.

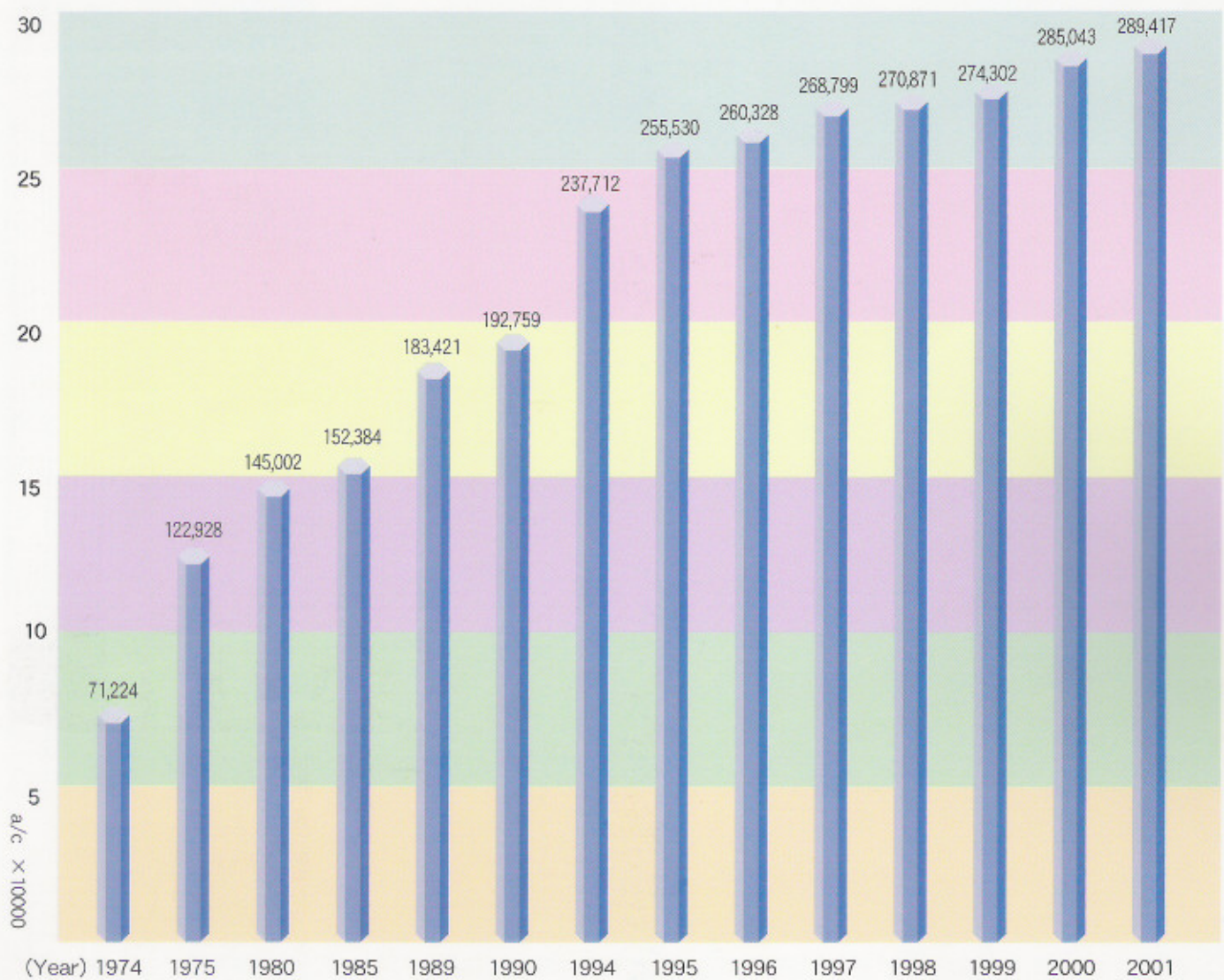
SSR (Secondary Surveillance Radar)

The SSR is installed atop of the ARSR. When aircraft receives interrogating signal from this radar, ATC transponder onboard send back a reply signal unique to each aircraft, and its call sign, altitude, speed and information such as emergency are shown on the radar screen.



Traffic Volume Handled by Naha ACC

◆ Change in Annual Traffic Volume in Naha FIR



The traffic volume handled by four Japanese ACCs is increasing year after year, and the annual traffic volume in the year 2000 almost reached 2.06 million. Of these, Naha ACC handled 0.29 million, and its traffic volume amounted to about 900 on a busy day.

Flight Data Processing System <FDP>

The flight plans filed by pilots before departure are sent to Tokyo ACC by way of teletype and processed with computers of the FDP.

The information is presented to controllers in the form of a flight strip as shown below, which is output automatically to control positions. Once departure time is input, the system assists controllers by calculating estimated time over each reporting points and estimated arrival time at destination airport, and show them as well as altitude on the flight strips.



Flight Strip

ANA305			29	ONC	350	RJNN XMC V52 KEC A597	
1664						TAPOP G581 ONC NHC	↓
B762/M						ROAH	
3445	S 465		07				1024*0626

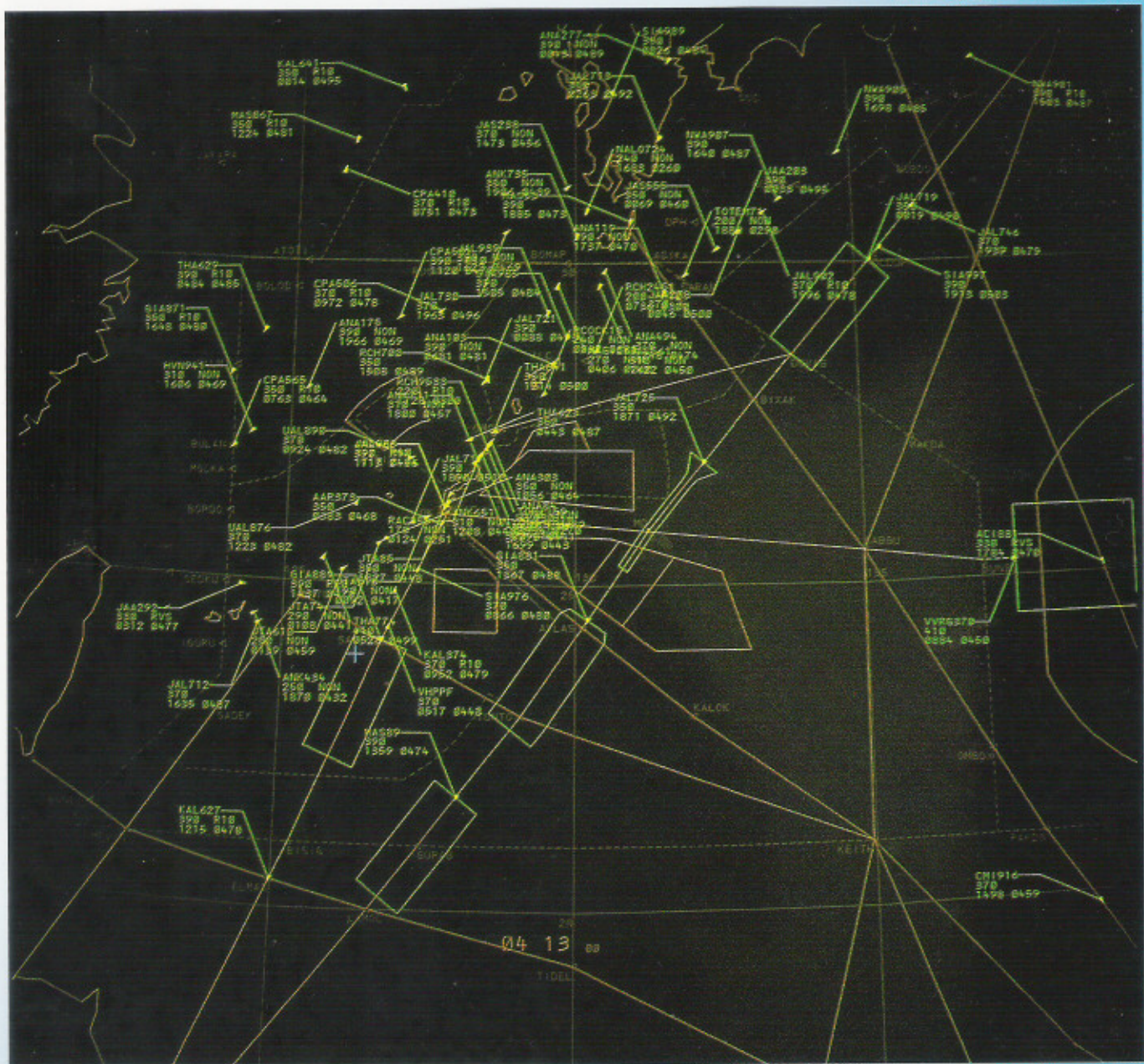


Description of the Flight Strip

ANA305:	Aircraft identification (All Nippon Flight 305)
1664:	Computer number
B762/M:	Type of aircraft (Boeing 767-200)
3445:	Secondary radar code
465:	Cruising speed (465 knots = about 860km/h)
ONC:	Reporting point (Estimating over Erabu VORTAC at 0729 (Universal coordinated time) = 16:29 (Japan standard time))
350:	Cruising altitude (35,000 feet = 10,650 meters)
RJNN~:	Route of flight (Departed Nagoya Airport, bound for Naha Airport via airway G581)

Oceanic ATC Data Processing System (ODP)

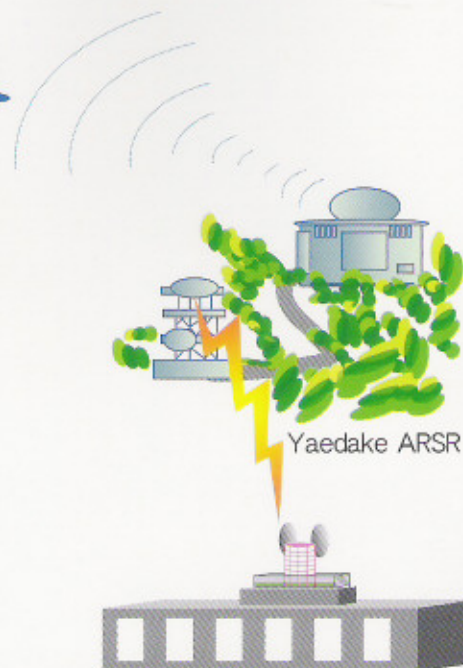
The FDP sends information about aircraft flying over ocean to the ODP. Based on these data, the ODP calculate positions of aircraft and present them on the screen.



Radar Data Processing System <RDP>



In Naha ACC, radar data sent from the four radar sites of Yaedake, Miyakojima, Amami and Kaseda are processed by computer and the targets of aircraft, aircraft identifications, altitude and destination airports are presented on the screen.



An Example of Aircraft Target Displayed on a Radar Screen



Explanation of how a target is displayed

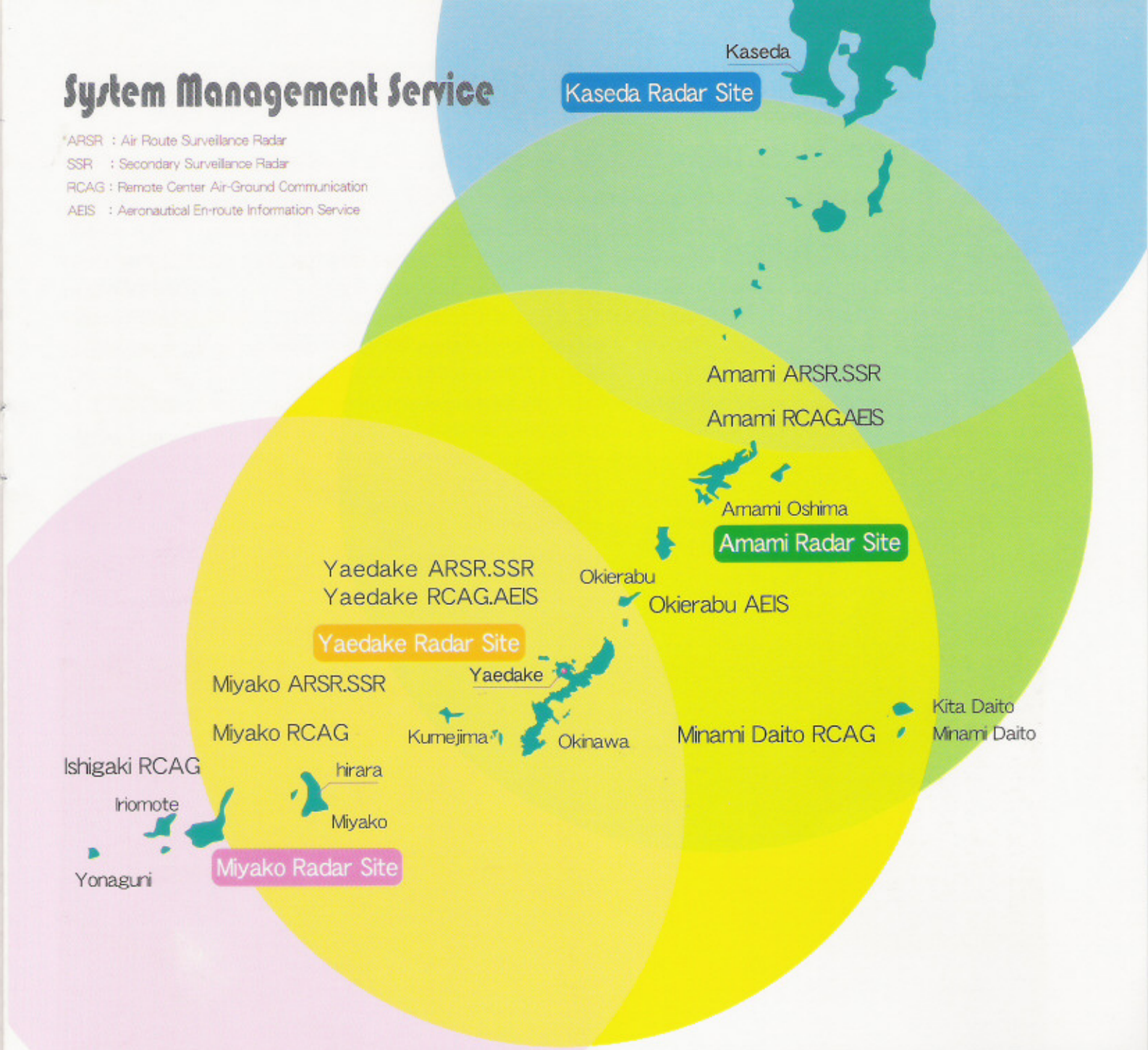
All Nippon Airways Flight 175
 Final cruising altitude 28,000 feet
 Climbing through 25,000 feet
 Speed 470 knots
 Destination airport Hong Kong

Naha Area Control Center



System Management Service

- *ARSR : Air Route Surveillance Radar
- SSR : Secondary Surveillance Radar
- RCAG : Remote Center Air-Ground Communication
- AEIS : Aeronautical En-route Information Service



In order to cover the vast jurisdiction area, radar sites and the RCAG sites are placed along islands, and these facilities are remotely operated from the control room. ACC has equipment to process radar videos and flight plans which should work as a total system, and these systems need to be centrally monitored all the time and quick actions would be taken if something occurs.

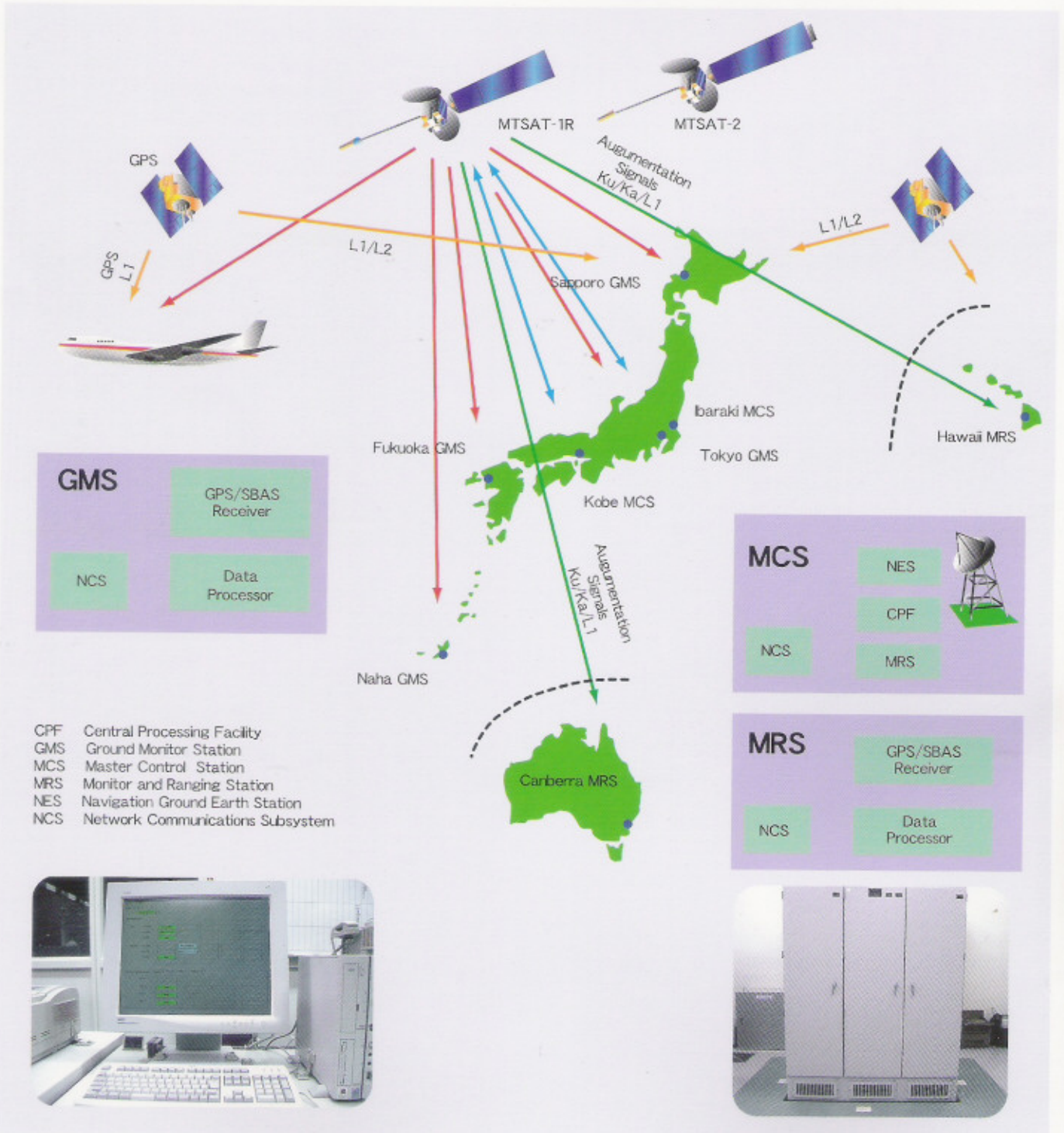


MSAS

MTSAT Satellite-based Augmentation System

GPS is available worldwide as a satellite-based navigation means. However, it can not always provide stable, accurate and wide navigational guidance. In order to enable safe and efficient navigation for the civil aviation, GPS capability should be augmented. The augmentation information is generated at Master Control Stations (MCS) based on the positioning information received at Ground Monitoring Stations (GMS). The total system consisting of the MTSAT and ground system is called MTSAT Satellite-based Augmentation System (MASAS).

One of the GMS is installed at Naha ACC. Its full operation will start when MTSAT is launched.



Electricity/Air Conditioning

In order to operate many kinds of facility to be used for air traffic control, power supply without failure is necessary. Therefore, power is supplied through two lines, and when one line fails, the other line is used as back-up.

Further, if commercial power fails, in-house power generator is instantaneously available.

To the computers and the ATC equipment, which is sensitive to the deviation of voltage and frequency, stable and high quality electric power is supplied through Constant Voltage and Constant Frequency (CVCF) unit?

Additionally, large-scale air conditioners are installed to keep temperature and humidity for computers, control room and equipment room.

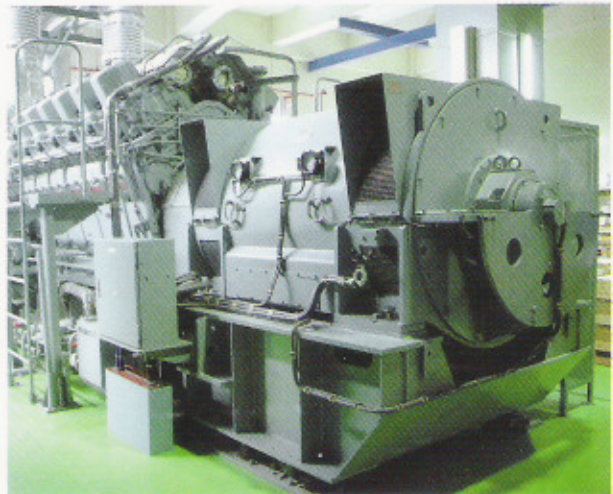
▼ Monitoring Room

Operational status of electric power supply and air conditioners are centrally monitored.



▼ Power generator

1915KW. 2000KVA. One generator is equipped, and if commercial power fails, it starts working automatically in 10 seconds.



▼ The generator has power like this!

Equivalent of 25 1500cc-cars

1915KW
2600PS



Electric power/air conditioner

As ACC's power supply should not fail, ACC has its own power generator. If the power fails, electricity can be supplied instantaneously from the generator.

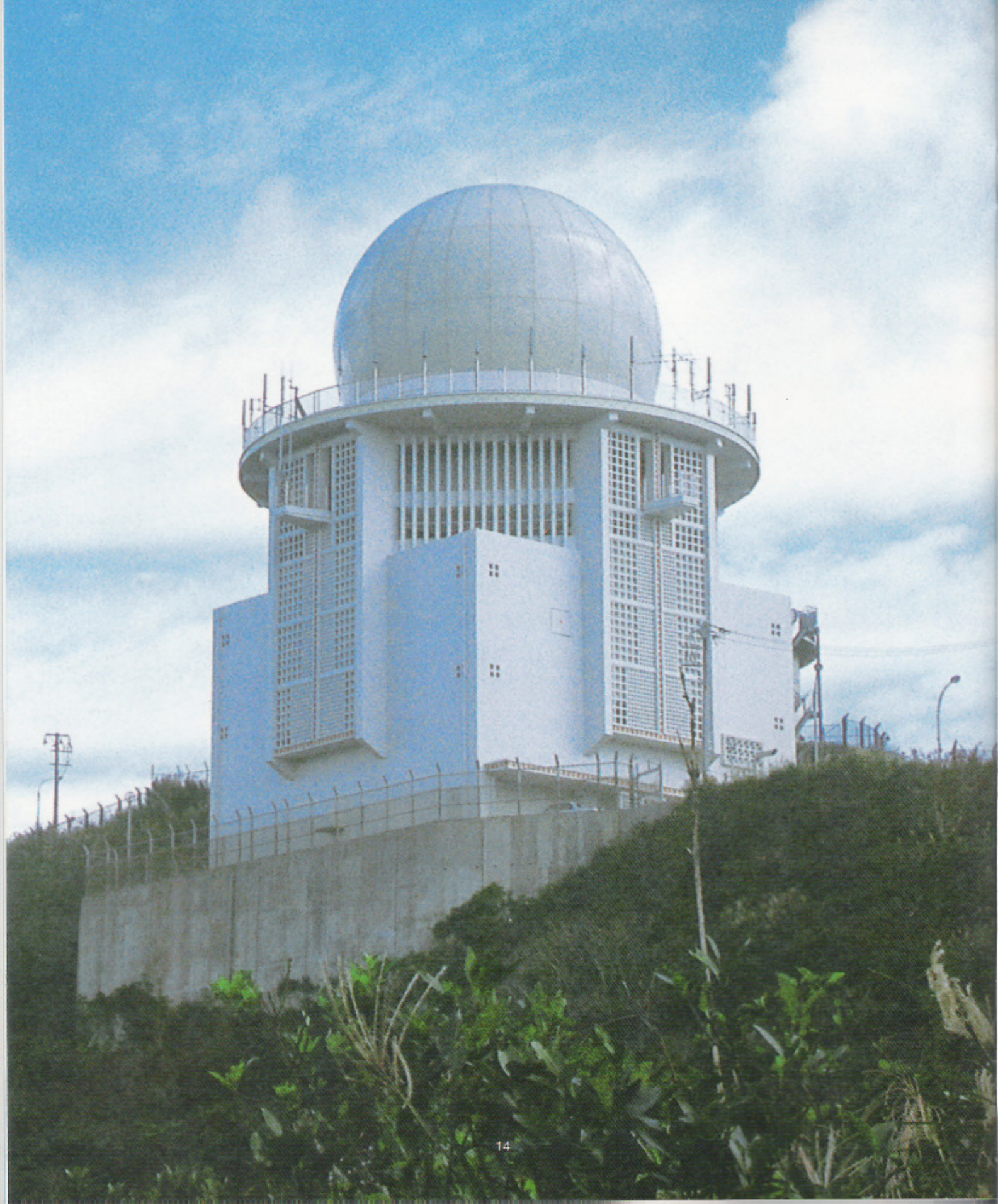
2000KW

Able to supply to 500 households.



Air Route Surveillance Radar (ARSR) Site

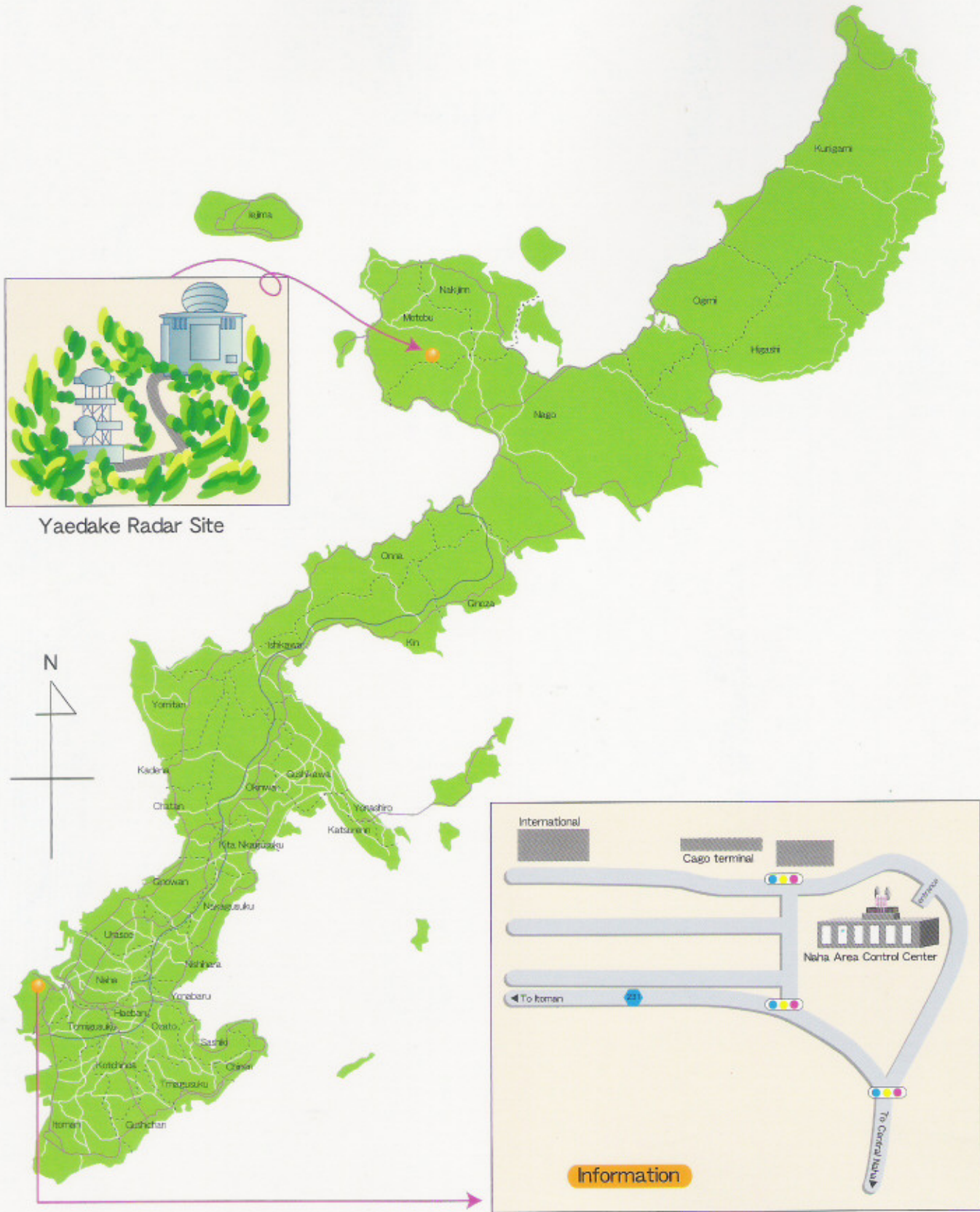
The radar installed on top of Yaedake (453m) in the northern Okinawa is one of 16 ARSR placed nationwide, and can detect aircraft within 450km (250NM) radius of the site. Radar data are sent to ACC via micro-wave line.



Remote Center Air-Ground (RCAG)

On Yaedake, the transmitter and the receiver of VHF (Very High Frequency) and UHF (Ultra High Frequency) are also installed.





Ministry of land, Infrastructure and Transportation
Naha Area Control Center.
334 Kagamizu, Naha-shi, Okinawa, JAPAN 901-0142
Tel. 098-858-8201