

SURINAME

ACTION PLAN FOR THE IMPROVEMENT OF COMMUNICATIONS, NAVIGATION AND SURVEILLANCE SYSTEMS TO MEET SHORT- AND MEDIUM-TERM OPERATIONAL REQUIREMENTS FOR EN ROUTE AND TERMINAL AREA OPERATIONS

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1. Objective

1.1 This action plan describes the actions to take for the improvement of CNS systems, with the aim of supporting short- and medium-term en- route and terminal area operations, within the framework of the Air Navigation Global Plan.

1.2 To comply with this objective, an analysis and diagnosis has been made of the CNS systems currently supporting short- and medium-term en-route and terminal area operational requirements.

1.3 Taking into account the status of operation of the CNS systems supporting short- and medium-term en-route and terminal area operational requirements, as well as the new regional CNS systems implementation plans approved by GREPECAS, following are the action plans for the improvement of CNS systems in support of en-route and terminal area operations.

2. Scope

2.1 This document takes into consideration the action plans for short- and medium-term implementation, respectively, up to 2010 and between 2011 and 2015, as indicated in the guidelines contained in the Air Navigation Global Plan.

3. Analysis and diagnosis of the current CNS situation

3.1 Communications

3.1.1 Aeronautical Fixed Service

Conventional services

3.1.1.1 AFTN message switch: Server operating in single configuration and only one client terminal (ACC) in the LAN is operational.

AFTN network configuration: PVC with SBMN and SVCA implemented and operating satisfactorily. The PVC with SYGC is implemented but not operational due to lack of stand-alone terminal in Guyana.

Date of installation: November 1995.

3.1.1.2 No PBX installed.

VHF frequency selection: Analogic VCS with three (3) Controller Working Positions interfacing the radio frequencies for ACC, APP, TWR, SMC and EMG.

Date of installation: November 1995

ATS oral service through REDDIG: Switched circuits with Georgetown-, Amazonico- and Rochambeau ACC and one (1) direct circuit with Piarco ACC operating satisfactorily.

Date of installation: September 2003

Services under the ICAO CNS/ATM concept

3.1.1.3 No ATN ground applications implemented.

3.1.2 **Aeronautical Mobile Service**

Conventional services

3.1.2.1 Site: Zanderij/ Johan A. Pengel Int'l Airport

AC/U- 123.9 MHz; N 05:26:17.3 W055:12:13.1; satisfactory coverage within the assigned FIR upper level but inconvenient coverage in the low level space.

APP/I- 120.0 MHz; N 05:27:24.5 W055:12:03.1; satisfactory coverage within defined space.

TWR- 118.5 MHz; N 05:27:24.5 W055:12:03.1; satisfactory coverage within defined space.

SMC- 121.9 MHz; N 05:27:24.5 W055:12:03.1; satisfactory coverage within defined space.

EMG- 121.5 MHz; N 05:27:24.5 W055:12:03.1; satisfactory coverage within defined space.

Date of installation: November 1995

Site: Paramaribo/ Zorg en Hoop Airport

TWR- 118.7 MHz; N 05:48:40.6 W 055:11:14.4; satisfactory coverage within defined space. NAT

Date of installation: July 2009

Site: Nickerie/ Majoor H.Fernandes Airport

TWR- 118.7 MHz; N 05:57:22.4 W 057:02:25.1; satisfactory coverage within defined space. NAT

Date of installation: February 1997

Services under the ICAO CNS/ATM concept

3.1.2.2 No CPDLC, VDL, HFDL and VDL systems implemented.

3.1.3 **Radiobroadcasting service**

3.1.3.1 No radiobroadcasting service implemented.

3.1.4 **National communications network for the transport of air navigation services**

3.1.4.1 No national communication network implemented.

3.2 **Navigation Service**

Conventional services

3.2.1 Site: Zanderij/ Johan A. Pengel Int'l Airport.

VOR- N 05:27:02.2 W 055:11:03.6; coverage 200NM /45000ft ,without inconveniences.

VOR/DME- N 05:27:02.2 W 055:11:03.6; coverage 200NM/45000ft

ILS/Localizer- N 05:27:10.6 W 055:10:14.7; satisfactory coverage within defined space. II*

ILS/GP- N 05:27:06.0 W 055:12:03.3; satisfactory coverage within defined space.

ILS/MM- N 05:27:09.8 W 055:12:42.0

Date of installation of VOR, VOR/DME and ILS: November 1995

Services under the ICAO CNS/ATM concept

3.2.2 No GBAS installed.

Use of GPS as Primary Means of IFR Navigation Aid in FIR Paramaribo for En-route

purposes is approved by way of regulations.

3.3 **Surveillance Service**

Conventional services

3.3.1 **No surveillance service available.**

Services under the ICAO CNS/ATM concept

3.3.2 **No ADS-C systems, multilateration or ADS-B implemented.**

4. **GREPECAS-approved regional plans and guidelines in the implementation of new ICAO CNS systems**

4.1 **Background**

4.1.1 This section will describe the regional plans and strategies for the new CNS systems, with the aim that States take them under consideration when presenting the action plans for CNS improvements pertaining to Chapter 4 of this document.

4.2 **Communications**

4.2.1 **Aeronautical Fixed Service**

4.2.1.1 For the implementation of ATN and of ATN ground applications in the Region, there is an ATN router plan and an ATN ground applications plan.

4.2.1.2 The ATN router plan contains information on the planning of routers, indicating the following for each: administration and location where the router is found, type of router, connections corresponding to the router, speed of the links, communications means and date of implementation..

4.2.1.3 The ATN router plan for the SAM Region (Table CNS 1Ba) is shown in Appendix D to SAM I/G/3-WP/19.

4.2.1.4 The ATN ground applications implementation plan for the SAM Region takes under consideration AMHS and ADC implementation. The plan contains the administration and location where the application is found, the type of ground application to implement, the sites to interconnect, the standard to use and the date of implementation. The ATN ground application plan is shown in Appendix D to SAM/IG/2-WP/19.

4.2.2 **Aeronautical Mobile Service**

4.2.2.1 For the implementation of communications systems in support of the aeronautical mobile service, GREPECAS approved an *Activity plan for the planning and implementation of air-ground data links*. The Plan contains guidelines for States before starting with the implementation of ground-air communications data link systems.

SAM activity plan for the planning and implementation of air-ground data links

- a) Participate in air-ground data link seminars and workshops.
- b) Review and update the air-ground data link regional plan (FASID Table CNS 2A) to obtain communications benefits by improving safety, efficiency and capacity, through the reduction of voice communications and implementing automation processes to comply with the operational requirements in coordination and harmony with the ATM global system.
- c) Evaluate the capacity and modernization need of the control centres and aircraft fleet operating in the respective FIR and airspace, to implement air-ground data links in conformity with operational requirements, ICAO SARPs and guidelines, and incorporating the respective implementation planning.
- d) Establish and participate in a trial and demonstration programme on air-ground data link systems and applications.
- e) Study and evaluate the arrangements made by other States/International organizations for the implementation of data links, by establishing multinational cooperation mechanisms.
- f) In conformity with the global roadmap, establish a CAR/SAM programme for the evolutionary implementation of air-ground data links, ensuring regional and interregional interoperability to meet global ATM system requirements in a coordinate, harmonious and seamless manner.
- g) Undertake and monitor investigations and developments on communications technology, as well as follow-up on ICAO SARPs and guidelines on the future evolution of data links and its services.
- h) These activities should be developed to carry out the below indicated air-ground applications programme.

Regional programme for the implementation of air-ground data links

4.2.2.2 The regional programme for the implementation of air-ground data links contains information of the implementation of air ground data links in the immediate (2009-2011), medium (2011-2015) and long term (2015 and onwards).

CAR/SAM PROGRAMME FOR THE IMPLEMENTATION OF AIR-GROUND DATA LINKS		
TERM	GOALS	SERVICES
Immediate (2009-2011)	Implement ACARS and FANS based data link services and start the use of VDL-Mode 2 and HFDL in conformity with ICAO SARPs and guidelines.	Maximize the use of: <ul style="list-style-type: none"> - pre-departure dispatch; - oceanic dispatch; - D-ATIS; - other flight and routine information messages; and

		- aircraft automatic position reporting.
Medium (2011–2015)		- more complex information related with security, including ATC dispatch, can be exchanged.
Long (after 2015)	Implement VDL data links in accordance with its future evolution and in conformity with the new ICAO SARPs and guidelines.	- The use will include descending flight parameter link, for use of the ATM system; and - ascending traffic data link, to improve awareness at the pilot cabin.

4.3 Navigation Service

4.3.1 For the navigation service, a *CAR/SAM Strategy for the Introduction and Application of Non Visual Aids for Approach, Landing and Departure* , as indicated hereunder:

- a) maintain the ILS as the ICAO standard precision approach and landing system as long as necessary and as long as it remains operationally acceptable and economically beneficial, doing everything possible to not deny access to airports to aircraft equipped only with ILS;
- b) implement GNSS with augmentation as required for APV and Category I operations where operationally required and technically feasible and economically beneficial, taking into account GNSS evolution;
- c) promote the development and use of a multi-modal airborne landing capability;
- d) promote the use of APV operations, particularly those using GNSS vertical guidance, to enhance safety and accessibility; and
- e) identify and resolve operational and technical feasibility issues for GNSS with ground-based augmentation system (GBAS) to support Category II and III operations; Implement GNSS for Category II and III operations where operationally required and economically beneficial.

Guidelines for transition to satellite navigation systems in the CAR/SAM regions

4.3.2 GREPECAS also elaborated guidelines for the transition to CAR/SAM satellite navigation, as follows:

4.3.3 GNSS should be introduced in an evolutionary manner, with improvements in GNSS capability generating increasing benefits, and culminating in GNSS supporting all phases of flight. As GNSS evolves, the planning for the removal of ground-based navigation aids should take account of the issues described below.

4.3.4 the ground infrastructure for current navigation systems must remain available during the transition period.

- a) States/regions can consider segregating traffic according to navigation capability and granting preferred routes to aircraft with better navigation performance where this can be done without reducing airspace capacity;
- b) before any existing ground infrastructure is considered for removal, users shall be given reasonable transition time to allow them to equip with GNSS to attain equivalent navigation service;
- c) as GNSS is introduced for enroute operation, States/regions should coordinate to ensure that harmonized separation standards and procedures are developed and introduced concurrently in all flight information regions along major traffic flows to allow for a seamless transition to GNSS-based navigation;
- d) In planning the transition to GNSS, the following issues must be considered:
 - maintaining or improving the current level of safety;
 - schedule for provision and/or adoption of a GNSS service, including aircraft and operator approval processes;
 - extent of existing ground-based radio navigation services;
 - strategy for transition schedule to GNSS capability (i.e. benefits-driven or mandatory);
 - appropriate level of user equipage with GNSS capability;
 - provision of other air traffic services (i.e. surveillance and communications);
 - density of traffic/frequency of operations;
 - mitigation of risks associated with radio frequency interference failures and ionospheric issues;
 - design and implementation of procedures; and
 - over-all economics and lead times to introduce aircraft avionics requirements.

4.4 **Surveillance Service**

4.4.1 The surveillance systems implementation plans are found in FASID Table CNS 4A. The planning for the new surveillance systems is in the surveillance systems implementation guide presented at the sixth meeting of the ATM/CNS Subgroup (ATM/CNS/SG/6).

4.4.2 Following is a description of the surveillance systems implementation guide.

Surveillance infrastructure evolution

En-Route and TMA airspace

4.4.3 Independent Surveillance, in the form of Primary Surveillance Radar still be used in En-Route Surveillance and Terminal Maneuvering Area (TMA) based on local country specific security requirements.

Short term (until 2011)

4.4.4 From 2008 to 2011, co-operative surveillance, in the form of SSR and SSR Mode S, will still be the main means of surveillance and will be extensively used for air traffic surveillance by civil agencies for TMA and En-Route services within coverage of (ground based) interrogator station(s). Implementation of monopulse SSR, adaptable to Mode S, in medium- and high-traffic en route and terminal areas will continue. Use of ADS-B (ES Mode S receivers) will begin to provide surveillance for en-route and terminal areas not covered with radar and to strengthen surveillance in areas covered with SSR Modes A/C and S.

Medium term (2011-2015)

4.4.5 SSR Mode S elementary surveillance will be implemented from 2010 onwards in high density TMAs in order to improve secondary radar performances. Since there will still exist legacy aircrafts that will not be able to reply on mode S, a mixed mode interrogation will be required up to 2015.

4.4.6 Ground implementation for ADS-B (based on ES Mode S receivers) will increase from 2011 onwards to fill en route and terminal areas not covered with radar and to strengthen surveillance in areas covered with SSR Modes A/C and S.

4.4.7 Depending on the percentage of ADS-B equipped aircrafts, wide area multilateration (WAM) implementation should be considered as a possible transition path to ADS-B environment in a shorter timeframe.

4.4.8 ADS-C surveillance should be operationally used in all oceanic and remote airspace associated with FANS 1/A capacities

4.4.9 Surveillance Data Processing and Distribution systems based on surveillance server technology will have to be progressively upgraded, in order to merge legacy radar data information contained in the ADD and/or from Multilateration position calculations and promote data sharing between States using TCP/IP patterns.

4.4.10 Each State/Territory/Organization should investigate and report their Administration's policy in respect to the ADS-B data sharing with their neighbors and from cooperative goals.

4.4.11 The ADS-B data sharing plan should be based on selecting centres by pairs and analyzing the benefits and formulating proposals for the ADS-B use for each pair of centre/city with the purpose to improve the surveillance capacity.

4.4.12 To support the ADS-C and ADS-B regional plan, the States/Territories/International organizations, as well as the entity representing the airspace users, should organized and provide the following information; a focal point of contact, its respective implementation plan, including a time-table, and information on its air-ground communications and automation systems.

4.4.13 The ADS-B data links technology that will be used for the Mode S 1,090 MHz extended squitter (1090 ES). ADS-B data sharing could be initiated.

4.4.14 SSR Mode A/C and SSR Mode S will continue to be the main surveillance elements for approach, en route, and terminal areas.

Long term (until 2015-2025)

4.4.15 The majority of the SSR and SSR Mode S systems currently installed would be at the end of their operational life by 2015. SSR Mode A/C radars that have completed their life cycle by that time will not be replaced. Continuation of the ADS-B use with the 1090 ES technique and the planning initiation for the ADS-B implementation by new data links to satisfy the ATM global system requirements will fully replace those decommissioned SSRs.

Aerodrome Operations

Short term (until 2011)

4.4.16 The main technology for calculating the position of mobiles (both aircraft and vehicles) will be Surface Movement (primary) Radar.

4.4.17 Implementation of multilateration will gradually increase, where aircraft respond to SSR Mode A/C or SSR Mode S queries.

Medium term (2011-2015)

4.4.18 A-SMGCS Level I/II will provide the benefits at the aerodrome and additional information may be required by the ground systems. The most effective means of achieving this would be via ADS-B, since aircraft will already be equipped and there will be a cost-effective upgrade path for the Multilateration ground stations, although there may be an impact on the avionics. Although many Multilateration systems are configured with their own data fusion trackers as standard, a possible upgrade to existing SDPDs to support Aerodrome operations will be required.

Long term (until 2015-2025)

4.4.19 The introduction of A-SMGCS Levels III/IV at selected aerodromes will require aircrew to be presented, with an airport map and other mobiles for situational awareness and possible conflict prediction tools in the aircraft. Where airports foresee a benefit from these kinds of applications then a TIS-B service may be required to ensure a complete and consistent airport situation picture.

Aircraft systems

Short term (until 2011)

4.4.20 In accordance with ICAO requirements, all aircraft flying within CAR/SAM controlled airspace are required to be equipped with a pressure altitude reporting device. It is not foreseen that there will be significant changes for aircraft systems prior to 2011 on that matter.

4.4.21 The proportions of equipped aircrafts are also critical for the ADS-C and ADS-B deployment, for which it is required that ANSP and aircraft users periodically coordinate, at least, the following information: number of equipped aircrafts operating in the concern airspace, number and name of the airlines that have equipped aircrafts for ADS-C and ADS-B, type of equipped aircrafts, categorization of the accuracy/integrity data available in the aircrafts.

5. Improvements in the Communications, Navigation and Surveillance systems

5.1 Background

5.1.1 In this section, States will indicate all plans scheduled for the improvements in the services indicated hereunder. In this respect, States will have to add estimated dates for their implementation.

5.2 Communications

5.2.1 Aeronautical Fixed Service

5.2.1.1 *Conventional services*

Short term

Project in execution for installation of modern state-of-the art VCS system to switch all ATS oral services (telephones and ATS network) and VHF radio communications. All functionalities needed in current ATM environment will be included.

Site: Zanderij/J.A.Pengel Int'l Airport.

Estimated date for implementation: february 2010

5.2.1.2 *Services under the ICAO CNS/ATM concept*

Short term

Project in execution for installation of AMHS, with local network and national network connecting two other nodes through the national digital communications network's WAN leased lines. AMHS/AFTN Gateway Type II (type B) will be used for integration with the international AFTN circuits. Connection to domestic systems, FDP, AWOS, NOTAM databanks and future OPMET will be implemented.

Site: Zanderij/J.A.Pengel Int'l Airport.

Estimated date for implementation: february 2010

5.2.2 Aeronautical Mobile Service

5.2.2.1 *Conventional services*

Short term

Project in execution for installation of VHF radios with VDL capability for en-route and terminal area. For improvement of the coverage in low level spaces in the en-route area, a remote station will be installed on the top of Brownsberg mountain with the coordinates: N 04:56:56.7 W 055:11:01.5 at an altitude of about 500m AMSL. The coverage of the EMG radio (121.5 MHz) will be improved by installing its antennas on a higher Antenna tower (90m) than the current 30m tower. Both primary as the secondary frequencies for the ACC will be installed.

Site: Zanderij/J.A.Pengel Int'l Airport.

Estimated date for implementation: february 2010

- 5.2.2.2 *Services under the ICAO CNS/ATM concept*
 No short term plans for implementation of services under this concept.
- 5.2.3 **Radiobroadcasting Services**
 No short term plans for implementation of services under this concept.
- 5.2.4 **National communications network for the transport of air navigation services**
Short term
 A multi-protocol multi-service Aeronautical Digital Network (SADNET) based on fibre optic will be installed that will provide Campus and WAN communication support and will support CNS/ATM concept applications and prepared to be integrated to VSAT networks.
Site: Zanderij/J.A.Pengel Int'l Airport.
Estimated date for implementation: february 2010
- 5.3 **Navigation**
- 5.3.1 *Conventional services*
 No short term plans to improve existing services.
- 5.3.2 *Services under the ICAO CNS/ATM concept*
 No short term plans for implementation of services under this concept.
- 5.4 **Surveillance**
- 5.4.1 *Conventional services*
Short term
 An ATC Automatic Surveillance Radar system (ASR) comprising a MSSR mode S radar collocated with a PSR and an ATC radar training Simulator system will be installed.
Site: Zanderij/J.A.Pengel Int'l Airport.
Estimated date for implementation: february 2010
- 5.4.2 *Services under the ICAO CNS/ATM concept*
 No short term plans for implementation of services under this concept.

END