

Seru Mahuma z/n, Willemstad, Curacao  
Dutch Caribbean

Phone : (599-9) 839-3510  
Telefax : (599-9) 868-3012  
AFS: TNCCYNYX  
E-mail: [AISNA@dc-ansp.org](mailto:AISNA@dc-ansp.org)



## GLOBAL NAVIGATION SATELITE SYSTEM (GNSS) IN THE JULIANA TMA (TNCM)

### 1 INTRODUCTION

- A. This AIC outlines the approved use of GPS for IFR en VFR navigation in the Juliana TMA. The approved operations are based on using the GPS satellites and GPS receivers; neither SBAS nor GBAS are required. The provisions of this AIC apply to both commercial and noncommercial operators unless otherwise specified.
- B. In this AIC, instrument approach and departure procedures based on GPS are referred to as “RNAV approaches/departures”.
- C. Attachment 1 describes the GNSS-related acronyms and terms used in the AIC.
- D. Attachment 2 contains web links to the documents mentioned in the AIC.

### 2 USE OF GPS FOR IFR NAVIGATION

- A. Provided the equipment, training and operating requirements in paragraph 2 are met, GPS may be used:
  - 1. for IFR departure, enroute and approach navigation;
  - 2. outside the service volume of ground-based navaids (VOR, NDB, ILS, DME);
  - 3. in lieu of temporarily unavailable VOR, NDB and DME facilities.
- B. MINIMUM EQUIPMENT REQUIREMENTS
  - 1. One basic GPS receiver certified in accordance with FAA TSO-C 129a or equivalent, and installed in accordance with FAA AC 20-138A or equivalent; or one multi-sensor system, with a GPS sensor certified in accordance with FAA TSO-C129a or equivalent, installed in accordance with FAA AC 20130A or equivalent. In this AIC the term “GPS equipment” will refer to single and multi-sensor systems.
  - 2. The GPS equipment shall include a current navigation database, provided by an approved supplier, that contains the enroute fixes and RNAV approach and departure procedures that are used. The database shall be used in accordance with the aircraft operating manual or GPS equipment manual.
  - 3. An FMS with VNAV capability certified in accordance with FAA AC 20-129 or equivalent is required to utilize the LNAV/VNAV minimums displayed on certain RNAV approach charts.
  - 4. Ground-based navigation capability (such as VOR, NDB, ILS) is required, suitable for the intended operation, for backup use in the unlikely event that GPS navigation capability is lost.
  - 5. A barometric altimeter to provide altitude information.

Seru Mahuma z/n, Willemstad, Curacao  
Dutch Caribbean

Phone : (599-9) 839-3510  
Telefax : (599-9) 868-3012  
AFS: TNCCYNYX  
E-mail: [AISNA@dc-ansp.org](mailto:AISNA@dc-ansp.org)



## C. TRAINING REQUIREMENTS

### 1. Ground training

- a. Required topics
  1. The principles of GNSS navigation including RAIM and FDE.
  2. Hardware operation and interface with other navigation equipment, including CDI sensitivity.
  3. The approved operations, requirements, limitations and warnings contained in the aircraft operating manual or GPS equipment manual.
  4. The course of action following loss of GPS navigation capability
  5. Interpretation of the RNAV procedure charts.
  6. The CAA regulations concerning GNSS.
- b. For-hire operators shall formalize training materials and document completion of the training for pilots and dispatchers.
- c. Not-for-hire operators may obtain this information via self-study.

### 2. Flight training and checking

- a. Flight training: shall be consistent with the flight training provided for other navigation systems, and shall be sufficient to permit competent use of the GPS equipment during all phases of flight.
- b. Checking: the examiner shall confirm adequate knowledge of the "Required topics" noted above, and competent use of the GPS equipment in all phases of flight.

## D. OPERATING REQUIREMENTS

### 1. ALL PHASES OF FLIGHT

- a. GPS IFR operations shall be conducted in accordance with the aircraft operating manual or GPS equipment manual.
- b. In the event of a loss of GPS navigation capability, operators shall:
  1. Advise ATC immediately.
  2. Revert to ground-based nav aids. Dead reckoning may be used for a short period until receiving a ground-based nav aid.
  3. Amend the equipment suffix for subsequent flight plans.
- c. Operators shall not accept an ATC clearance if they cannot comply with the requirements of this AIC.
- d. Operators shall comply with published minimum altitudes using a barometric altimeter.
- e. Active RAIM is required to use GPS outside the service volume of ground-based nav aids.

Seru Mahuma z/n, Willemstad, Curacao  
Dutch Caribbean

Phone : (599-9) 839-3510  
Telefax : (599-9) 868-3012  
AFS: TNCCYNYX  
E-mail: [AISNA@dc-ansp.org](mailto:AISNA@dc-ansp.org)

**AIC**

**03/08**

**27 MAR 08**

- f. To facilitate traffic separation, operators shall be prepared to provide position reports in terms of radial and distance from VOR/DME facilities, and bearings and distance from NDB facilities.
- g. An acceptable one-degree difference may occur between the charted segment track and the track presented by the GPS equipment, due to rounding of a track's bearing and/or application of magnetic variation.
- h. An acceptable 0.1nm difference may occur between the charted segment distance and the distance presented by the GPS equipment due to rounding.  
An acceptable greater difference may occur when turn anticipation is in progress.

## 2. FLIGHT PLANNING

- a. The operator shall check the GPS NOTAMs, referred to as NANUs and utilize a pre-departure prediction program to confirm that RAIM will be available throughout the intended operation. This may be done as follows (specific steps may vary by prediction program):
  - 1. Obtain a pre-departure prediction program from the GPS equipment manufacturer; load the program on a computer connected to the internet.
  - 2. Download the latest satellite almanac from the US Coast Guard site:
    - navigate to [www.navcen.uscg.gov](http://www.navcen.uscg.gov);
    - click on "YUMA Almanacs", download the most recent YUMA almanac (at bottom of list).
  - 3. Return to the US Coast Guard home page and click on "Active NANUs". Read through the active NANUs to identify any satellites that will not be available during the intended operation. The site contains guidance on how to interpret the NANUs. Further guidance may be obtained by contacting the US Coast Guard via e-mail or telephone.
  - 4. Activate the pre-departure prediction program after loading:
    - the departure and destination airports and time of flight;
    - the current YUMA almanac;
    - any unavailable satellites.
  - 5. The prediction program will indicate whether or not a sufficient number of satellites is expected to be available for RAIM to function throughout the flight. In the unlikely event the result is "no", the flight may be delayed until adequate satellite coverage is predicted or an alternate means of navigation may be used.
- b. Operators shall check the NOTAMS to ensure that any ground-based nav aids required for backup enroute and approach navigation will be available.

Seru Mahuma z/n, Willemstad, Curacao  
Dutch Caribbean

Phone : (599-9) 839-3510  
Telefax : (599-9) 868-3012  
AFS: TNCCYNYX  
E-mail: [AISNA@dc-ansp.org](mailto:AISNA@dc-ansp.org)



- c. The flight plan, field 10, shall include the equipment suffix “G” to indicate Global Navigation Satellite System (GNSS)/Global Positioning System (GPS) equipped aircraft with IFR departure, enroute and approach capability.
- d. An alternate airport, when required, shall have an approved instrument approach, other than GPS, which is anticipated to be operational at the estimated arrival time.

### 3. PREFLIGHT

- a. The operator shall follow the start-up procedures specified in the aircraft operating manual or GPS equipment manual including checking the currency of the database.
- b. Published RNAV departure procedures shall be loaded into the active flight plan from an onboard database provided by an approved supplier. Manual entry of RNAV departure waypoints is not permitted.
- c. After loading an RNAV departure into the active flight plan, and prior to executing the procedure, operators shall check the data displayed for reasonableness.

### 4. TAKEOFF AND DEPARTURE

Published RNAV departures shall be executed in accordance with the aircraft operating manual or GPS equipment manual and the procedure depicted on an appropriate instrument departure chart.

### 5. APPROACH

- a. RNAV approaches shall be executed in accordance with the aircraft operating manual or GPS equipment manual and the procedure depicted on an appropriate instrument approach chart.
- b. RNAV approaches shall be loaded into the active flight plan from an onboard database provided by an approved supplier. Manual entry of RNAV approach waypoints is not permitted.
- c. After loading an RNAV approach into the active flight plan, and prior to executing the procedure, operators shall check the data displayed for reasonableness.
- d. The missed approach obstacle assessment for RNAV approaches is based on maintaining the charted heading (not GPS guidance) during the climbout.
- e. Straight-in minimums reflected on RNAV approach charts:
  1. LNAV – These minimums may be used with basic GPS receiver’s certified for IFR approach.
  2. LNAV/VNAV – These minimums may be used with FMS equipment certified for VNAV.

Seru Mahuma z/n, Willemstad, Curacao  
Dutch Caribbean

Phone : (599-9) 839-3510  
Telefax : (599-9) 868-3012  
AFS: TNCCYNYX  
E-mail: [AISNA@dc-ansp.org](mailto:AISNA@dc-ansp.org)



## E. USING GPS IN LIEU OF VOR, NDB AND DME

1. Subject to the requirements and restrictions in paragraph 2.E.2, GPS may be used during IFR departure, enroute and approach operations to:
  - a. navigate to/from a VOR or NDB;
  - b. determine the aircraft position, and hold, over a VOR or NDB;
  - c. fly a DME arc.
2. Requirements and restrictions
  - a. The GPS equipment shall be certified in accordance with TSO-C129 for enroute and terminal operations, and RAIM shall be active.
  - b. The VOR and DME transmitter outages are temporary.
  - c. The waypoints, fixes, intersections and VOR/NDB/DME facilities to be used shall be retrieved from a database provided by an approved supplier.
  - d. With basic GPS receivers, the CDI sensitivity shall be set to terminal CDI sensitivity, in accordance with the aircraft operating manual or GPS equipment manual, when tracking GPS course guidance in the terminal area.
  - e. GPS shall not be used to execute a complete VOR or NDB approach.
3. USE OF GPS FOR VFR NAVIGATION
  - a. Approved use – In accordance with the GPS equipment user manual and this AIC.
  - b. Equipment requirements
    1. Hand-held GPS equipment is authorized for VFR navigation only. Such units may not have RAIM, in which case the indicated aircraft position may not be accurate.
    2. Panel-mounted VFR units shall be installed in accordance with the manufacturer's guidance. Useful guidance is available in FAA AC 20 138A, Appendix 5.
  - c. Training requirements – The operator may use self-study to become thoroughly familiar with the GPS equipment, including its limitations.
  - d. Operating requirements – Operators shall not use the equipment suffix "G" in their flight plans, as "G" is reserved for GNSS/GPS equipment that is IFR certified.

Seru Mahuma z/n, Willemstad, Curacao  
Dutch Caribbean

Phone : (599-9) 839-3510  
Telefax : (599-9) 868-3012  
AFS: TNCCYNYX  
E-mail: [AISNA@dc-ansp.org](mailto:AISNA@dc-ansp.org)



## ATTACHMENT 1: GNSS-RELATED TERMS AND ACRONYMS USED IN THE AIC

**Area navigation** – Refers to the ability to navigate from any point direct to any other point, without reference to ground-based nav aids. These points are defined by latitude and longitude coordinates. The acronym for area navigation is RNAV.

**ATC** – Air traffic control.

**Augmentation** – The existing GPS system supports IFR departure, enroute and approach navigation. Satellite-based augmentation systems (SBAS) and ground-based augmentation systems (GBAS) are in development that will provide additional functionality and benefits.

**Basic GPS receiver** – A panel mounted receiver that may or may not be interfaced with other equipment such as the altimeter or a horizontal situation indicator (HIS), and may or may not be certified for IFR operations.

**CDI** – Course deviation indicator

**FDE** – Fault detection and exclusion is GPS receiver function which excludes a faulty satellite from the position solution, permitting continued navigation using the remaining healthy satellites.

**FMS** – Flight management system.

**GBAS** – Ground based augmentation system.

**GNSS** – Global Navigation Satellite System (GNSS) is an ICAO umbrella term that refers to all existing and future navigation systems that are based on satellites.

**GPS** – Global Positioning System, is the main component of the current GNSS system.

**Ground based nav aids** – VOR, NDB, ILS.

**IFR** – Instrument flight rules.

**LNAV** – Lateral navigation.

**LNAV minimums** – RNAV approach straight-in minimums that recognize the aircraft's certified lateral navigation capability. No VNAV capability is recognized.

**LNAV/VNAV minimums** – RNAV approach straight-in minimums that recognize the aircraft's certified LNAV and VNAV capability.

**MAP** - Missed approach point.

**Multi-sensor system** – a “navigation management system (NMS)” or “flight management system (FMS)” which incorporates more than one navigation sensor, such as VOR, NDB, ILS and GPS.

**SBAS** – Satellite based augmentation system.

**RAIM** – Receiver autonomous integrity monitoring is an internal receiver function which detects a satellite that is transmitting erroneous guidance and alerts the pilot. If a faulty satellite is detected and annunciated, GPS navigation may not be used until this condition no longer exists.

**RNAV** – Is the acronym for “area navigation”.

**RNAV approaches** – The term used commonly when referring to instrument approaches based on GPS navigation.

**RNAV departures** – The term used commonly when referring to instrument departures based on GPS navigation.

**VNAV** – Vertical navigation.

Seru Mahuma z/n, Willemstad, Curacao  
Dutch Caribbean

Phone : (599-9) 839-3510  
Telefax : (599-9) 868-3012  
AFS: TNCCYNYX  
E-mail: [AISNA@dc-ansp.org](mailto:AISNA@dc-ansp.org)



## ATTACHMENT 2: LINKS TO DOCUMENTS MENTIONED IN THE AIC

1. FAA TSO-C129a, updated 2/20/96:  
<http://av-info.faa.gov/tso/Tsocur/C129a.doc>
2. FAA AC 20-138A, updated 12/22/03:  
[www.airweb.faa.gov/Regulatory and Guidance Library/rgAdvisoryCircular.nsf/0/8A2AE2491C85226F86256E35004C638B?OpenDocument](http://www.airweb.faa.gov/Regulatory%20and%20Guidance/Library/rgAdvisoryCircular.nsf/0/8A2AE2491C85226F86256E35004C638B?OpenDocument)
3. AC 20-130A, published 6/14/95:  
[www.airweb.faa.gov/Regulatory and Guidance Library/rgAdvisoryCircular.nsf/0/83E208EBAEE3F233862569AF006ABA6B?OpenDocument](http://www.airweb.faa.gov/Regulatory%20and%20Guidance/Library/rgAdvisoryCircular.nsf/0/83E208EBAEE3F233862569AF006ABA6B?OpenDocument)
4. AC 20-129, published 9/12/88:  
[www.airweb.faa.gov/Regulatory and Guidance Library/rgAdvisoryCircular.nsf/0/44D02208237AF050862569AF006AB0EA?Open Document](http://www.airweb.faa.gov/Regulatory%20and%20Guidance/Library/rgAdvisoryCircular.nsf/0/44D02208237AF050862569AF006AB0EA?OpenDocument)