

### Introduction

#### Required Navigation Performance (RNP)

RNP is a new approach to navigation increasing the profitability and safety of aviation worldwide. RNP operation is mainly based on GPS (generic term: GNSS) technology, rather than ground-based radio navigation aids. RNP capable aircraft fly precise, predetermined paths loaded into their Flight Management Computer (FMC). On-board performance monitoring and alerting, a key feature of RNP, alerts the flight crew if their position becomes uncertain.

RNP brings improved aircraft trackkeeping performance in all flight phases, facilitating new routes, access to new (remote) airports, environmentally beneficial arrival and departure procedures, optimised approach routing, allowing for shorter approaches and lower decision altitudes. Using the GNSS solution of Fokker Services can save your organization time and fuel and thereby reduce operating costs.



### Your needs

Do you want to make your return on investment feasible in one year? Fokker Services has developed a unique solution for providing a low-cost means of modernising the airborne navigation system without replacing existing equipment or making extensive changes to the aircraft. This solution is far more cost effective and pays off within one year. GNSS-derived navigation data is combined with the original inertial navigation data and fed into the existing FMS. The added GNSS functionality is fully integrated with the existing FMS, flight instrumentation and automatic flight control system.

### Your benefits

Our GNSS solution offers multiple benefits:

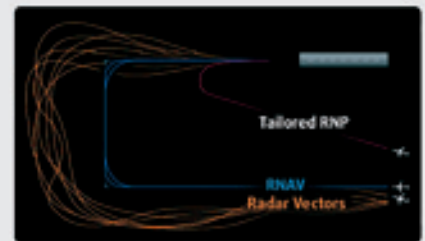
- Shortening routes and optimising approach routing leads to reductions in flight time, fuel and other costs. Savings up to 8% are feasible.
- Lower emissions due to reduced fuel consumption.
- Access to "new" areas through accurate navigation in remote and oceanic areas.
- Independent of ground-based navigation aids.
- (Improved) access to remote airports.
- Enhanced safety thanks to excellent and reliable position awareness.
- Environmentally-beneficial solution.
- Reductions in noise due to optimised approach routing (i.e. noise abatement)

The GNSS system is suitable for the following types of aircraft:

- Fokker 70/100
- Airbus A300/A310 series
- Boeing 737 classic series
- Boeing 757 and 767 series
- Boeing MD-80/90 series

The solution is suitable for aircraft equipped with:

- A single or dual FMS installation (without GNSS capability)
- A dual or triple IRS or AHRS installation
- EFIS or analogue flight Instrumentation



Source: Naverus

Elements of Radar vectors

- Longest flight tracks
- Multiple step down profiles
- Widest variance

Elements of RNAV

- Long flight tracks
- Multiple step down profiles
- Wide variance

Elements of Tailored RNP

- Shortest flight tracks
- CDA
- No Variance

### Product description

#### Technical concept

RNP is enabled by the addition of a GPS-IRS data Converter (GIC) to a legacy FMS and the installation of a Navigation Status Display (NSD):

- IRS position to FMS is replaced by a GPS corrected IRS position.
- The FMS position is controlled to the GNSS position.
- The additional Navigation Status Display (NSD) provides navigation and system status data to the flight crew.

#### Required modification

The following equipment will be added to the existing FMS installation to enable the RNP navigation capability:

- 2x GPS-IRS data Converter - Navigation Status Display:
  - GPS-IRS data Converter (GIC) combines IRS and GPS data.
  - Navigation Status Display (NSD) displays navigation system status and maintenance data. - GIC and NSD in one LRU.
- 2x GPS/WAAS receivers (TSO C145a) for high integrity position data.
- 2x GPS antennas (TSO C144) for receipt of GPS satellite signals.
- 1x FMS NAV Source Switch for selection of preferred FMS navigation source (RADIO/GNSS). Reversion capability to VOR/DME or DME/DME.

The RNP capability is established by introducing specified equipment, without changing the existing FMS and other related aircraft systems.

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