

6.2.4 P-RNAV Procedures

6.2.4.1 Pre-Flight Planning

Availability of appropriate navigation infrastructure shall be confirmed. Generally this will be satisfied by GPS.

6.2.4.2 FMS Set-Up

Confirm the FMS Navigation Database is current and verify the aircraft's Present Position is loaded accurately using GPS inputs. All Departure Waypoints at or below the highest charted Minimum Safe Altitude (MSA) must be checked against the Departure Procedure charted information, including the following:

1. Waypoint sequence
2. Waypoint Lat/Long Coordinates
3. Individual Leg Courses (Tracks) and Distances
4. Flight Level, Altitude, and Speed Constraints
5. Fly-Over and Fly-By Waypoints
6. A comparison of the MFD Plan display with the charted procedure

If a Departure Procedure is designed to be started using conventional navigation, then requires transition to P-RNAV, the last point using conventional navigation must be indicated on the chart as a reminder to the crew to make the transition to P-RNAV navigation.

A P-RNAV Procedure must not be used if any doubt exists as to the validity of the procedure in the navigation database.

Addition, deletion, or modification of Departure Procedure Waypoints is prohibited. If there is a conflict between the FMS Navigation Database waypoint data and the charted waypoint data, the P-RNAV procedure must be declined and the departure must be flown using non-P-RNAV procedures.

6.2.4.3 Before Takeoff

Verify the selected FMS is available and operating correctly.

Reconfirm the correct Airport and Departure Runway data are loaded.

If GPS is not available, a Runway Position Update must be done just prior to Takeoff.

If GPS is not available and a Runway Position Update is not completed, the FMS IRS sensors must be de-selected and the FMS must be receiving suitable VOR/DME and/or DME/DME signals. The IRS sensors may be reselected once established on a Radar Vector Above the MSA or once established on a published Enroute Segment.

6.2.4.4 Departure

When feasible, flight progress should be verified by cross checking with ground based navigation aids (e.g. VOR, NDB, DME.)

6.2.4.5 Arrival

When feasible, prior to top of Descent, all Arrival Waypoints at or below the highest charted Minimum Safe Altitude (MSA) must be checked against the Arrival Procedure charted information, including the following:

1. Waypoint sequence
2. Waypoint Lat/Long Coordinates
3. Individual Leg Courses (Tracks) and Distances
4. Flight Level, Altitude, and Speed Constraints
5. Fly-Over and Fly-By Waypoints
6. A comparison of the MFD Plan display with the charted procedure

If required by the procedure, a determination must be made that any navigation aids excluded by the procedure are de-selected on the FMS.

A P-RNAV Procedure must not be used if any doubt exists as to the validity of the procedure in the navigation database.

Addition, deletion, or modification of Departure Procedure Waypoints is prohibited. If there is a conflict between the FMS Navigation Database waypoint data and the charted waypoint data, the P-RNAV procedure must be declined and the arrival must be flown using non-P-RNAV procedures.

The flight crew must make the necessary preparation to revert to a conventional navigation Arrival procedure where required as a contingency. In particular, the flight crew shall tune and monitor the VOR/DME used for the VOR/DME RNAV Procedure.

To ensure the greatest navigation accuracy and to provide for sensor redundancy, the flight crew will tune and monitor (via the Bearing Pointers) the applicable navigation aids associated with the Arrival Procedure.

If the FMS loses GPS inputs, it will revert to VOR/DME or DME/DME sensors. Assuming these are available, there should be no position shift or Map shift.

If the GPS, VOR, and DME inputs become unavailable, the FMS will revert to IRS inputs. In the average 30 minutes required to complete an Arrival Procedure, the Drift Rate of the IRS should be minimal. An abnormally high Drift Rate within one IRU will be moderated as its position is blended and averaged with the other one or two IRUs. If an IRU develops a Drift Rate that exceeds 2 nm/hour, the IRU will revert and be withdrawn from the FMS Position solution. The flight crew will receive an "IRS Reverted" or "IRS Deselected" message in the FMS Scratchpad.

Check the AFM Limitations Sections for further limitations when using IRS only for navigation.

When feasible, flight progress should verify by cross checking with ground based navigation aids (e.g. VOR, NDB, DME).

If GPS is unavailable, a Navigation Reasonableness Check is required during Descent prior to the Initial Approach Fix (IAF.)

If GPS is available, absence of a "Loss of RAIM" message is considered a sufficient Reasonableness Check prior to the Initial Approach Fix (IAF.)

6.2.4.6 Contingency Procedures

Loss of Flight Director. Flightcrew will select the opposite Flight Guidance Computer to regain a Flight Director. If a Flight Director is still unavailable, the Pilot Flying will continue to fly without use of the Flight Director. The Pilot Not flying will report loss of the Flight Director system to ATC and will request Radar Vectors, if required.

Loss of the Autopilot. Flightcrew will select the opposite Flight Guidance Computer to regain an Autopilot. If an Autopilot is still unavailable, the Pilot Flying will "hand-fly" the aircraft with reference to the Flight Director. The Pilot Not flying will report loss of the Autopilot System to ATC and will request Radar Vectors, if required.

Loss of P-RNAV Capability. The flight crew must notify ATC of any loss of P-RNAV capability and the flight crew's proposed course of action. Generally, the flight crew will need to navigate using an alternative means of navigation. The alternative need not be RNAV.

Lost Communication. In the event of lost communication, the flight crew shall continue with the published Lost Communication procedure.

6.2.4.7 Incident Reporting.

The following reports to ATC are required. Aircraft system malfunctions during P-RNAV operations, including:

1. Navigation errors (e.g. Map Shifts) not associated with a transition from P-RNAV to conventional navigation or vice versa.
2. Significant navigation errors attributed to incorrect data or navigation database coding error.
3. Unexpected deviations in lateral or vertical flight path not caused by pilot input.
4. Significant misleading information without a failure warning.
5. Total loss or multiple navigation equipment failure.
6. Problems with ground based navigational facilities leading to significant navigations errors not associated with a transition from P-RNAV to conventional navigation or vice versa.