How To Run A RAIRM Report

**Background:**

- RAIRM is the abbreviation for *Receiver Autonomous Integrity Monitoring*, a technology developed to assess the integrity of Global Positioning System (GPS) signals in a GPS receiver system. It is of special importance in safety critical GPS applications in aviation navigation.

- RAIRM has enabled GPS to be certified as primary means of navigation in transoceanic flights as well as for supplemental navigation in domestic flights en route or in non-precision approaches.

- The Jeppesen RAIRM solution:
  - Supports both RAIRM prediction algorithms common in GPS devices:
    - Fault Detection (FD): Used by traditional RAIRM to detect faults (differences between a satellite’s pseudo range measurement and its expected value).
    - Fault Detection and Exclusion (FDE): Used by newer GPS receivers to allow continued operation in the presence of a GPS failure.
  - Supports configurable minimum duration outages—the acceptable duration that an aircraft can be without GPS coverage
  - Our algorithm uses RNP 0.3 in the terminal environment and RNP 2.0 in the en route environment.
  - Supports variable Mask Angles for Airports and aircraft saved in Airport or Aircraft database
    - Can be adjusted at time of RAIRM request
    - Default 5.0 used if no specifics saved

- A mask angle is the minimum acceptable elevation above the horizon that a GPS satellite has to be at to avoid blockage of line-of-sight.
- GPS receivers have an in-built mask angle that prevents them trying to get signal lock onto satellites that are too close to the horizon.
- GPS receivers eliminate satellites that are below the mask angle based on almanac data. This is done to reduce the power requirements of the GPS receiver.

- Enroute RAIRM Checks.
  - Jeppesen’s solution calculates RAIRM at each waypoint at the time the aircraft is expected to arrive at the waypoint, in addition, RAIRM is checked 15 min prior and 15 min after at 5 min intervals for each waypoint
  - We fill in calculation points between waypoints such that the minimum sample time is maintained between calculation points. The calculations will always be made on the waypoints themselves and at the calculated intermediates.
  - The intermediates are calculated by assuming constant speed between waypoints and splitting the leg into chunks which are the specified number of seconds apart. The sample period can be passed in as a calculation parameter with the request, or if it is not supplied, the default value of 60 seconds is used.
Prior To Use:

Prior to using RAIM, you will have to make sure to set up your Aircraft Database for each aircraft requiring a RAIM prediction. These settings are found at the bottom of the Equipment tab in your JetPlan.com account:

![Change Equipment in Aircraft Record](image)

Once these fields have been successfully populated, you can easily generate a RAIM report in JetPlan.com by going to the Actions column of your Dispatch tab and selecting GPS RAIM Prediction next to the flight plan number of your choice:
The resultant RAIM Prediction will look like this:
In OpsControl you simply highlight the desired flight plan, click on the RAIM tab, then You may need to scroll down a bit and click Make RAIM:
In JetPlanner, just right click on the desired flight plan, scroll down to RAIM, and click on Get Report:
Please keep in mind, if your aircraft database is not set up correctly for RAIM Predictions you may get errors and/or inaccurate reports.