DGAC PBN Flight Inspection and Validation

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RÉPUBLIQUE FRANÇAISE

Ministère de l'Environnement, de l'Énergie et de la Mer

dgac

DSNA

Direction Générale de l'Aviation Civile

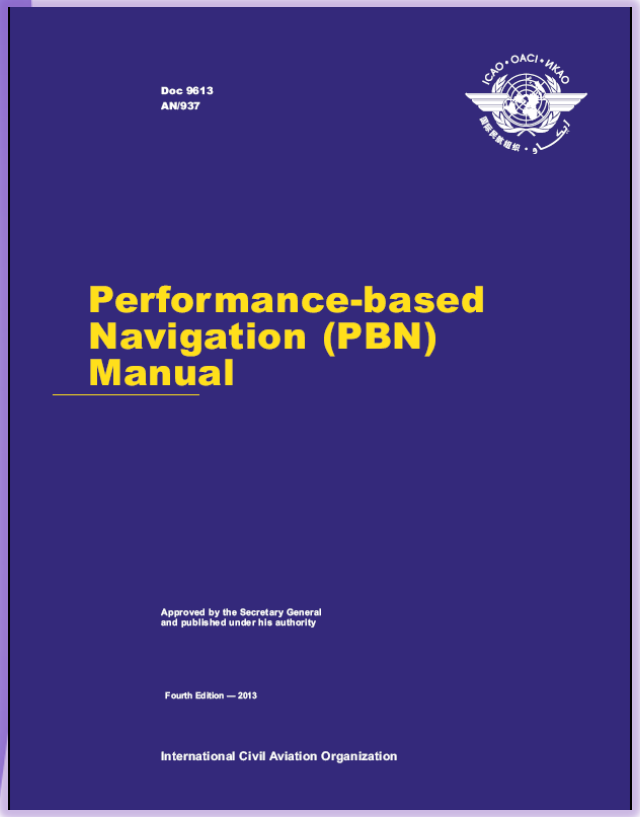
Ministère de l'Environnement, de l'Énergie et de la Mer

SUMMARY

- Applicable Regulations
- DSNA PBN Flight Inspection

Regulations

PBN Manual – doc 9613



Fourth Edition — 2013

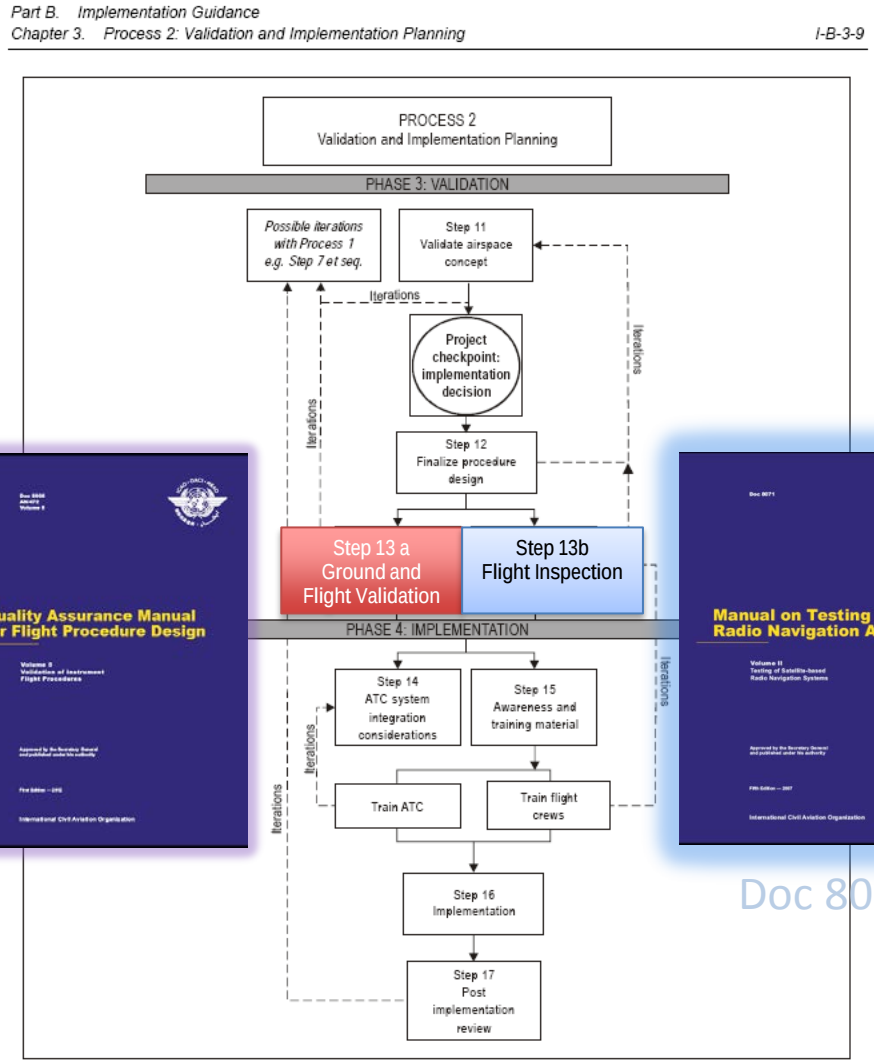


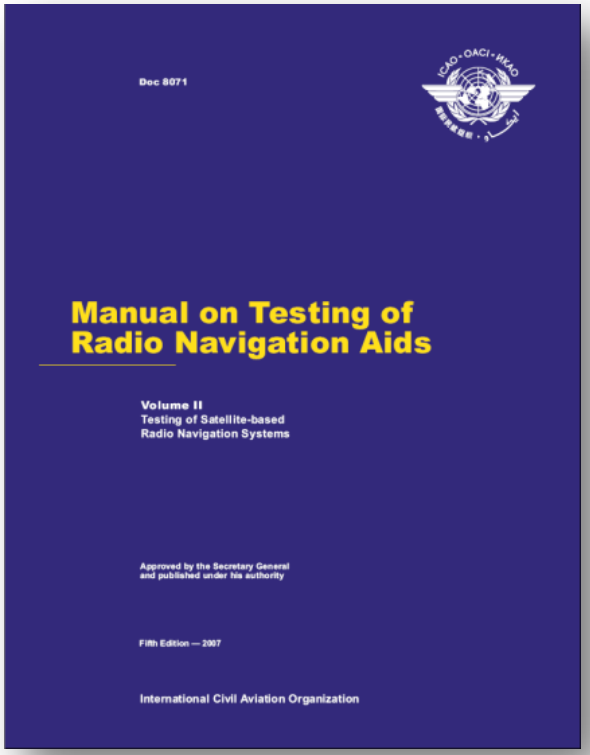
Figure I-B-3-1. Summary of Process 2

Doc 8071

PBN procedures validation

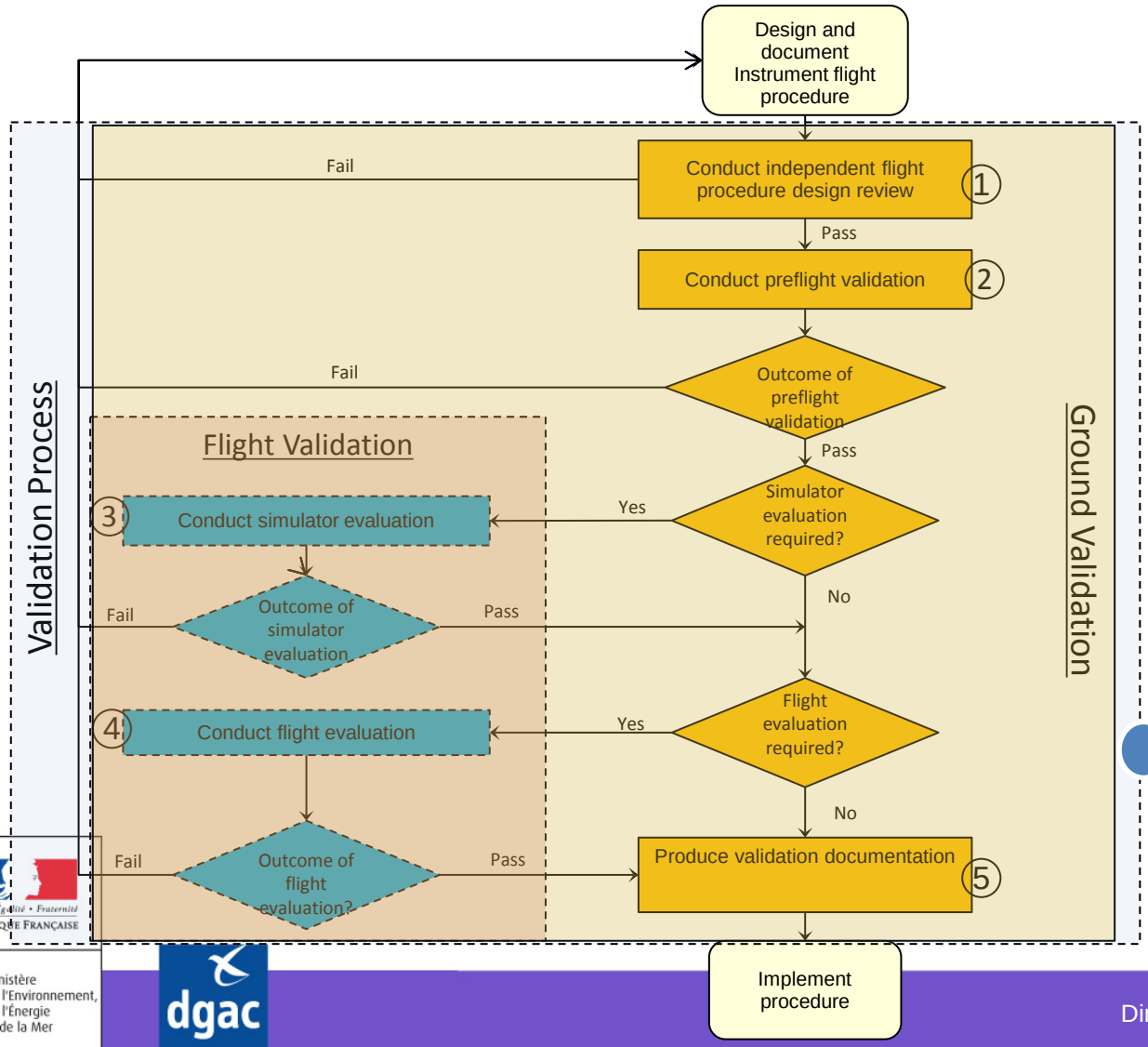
VALIDATION

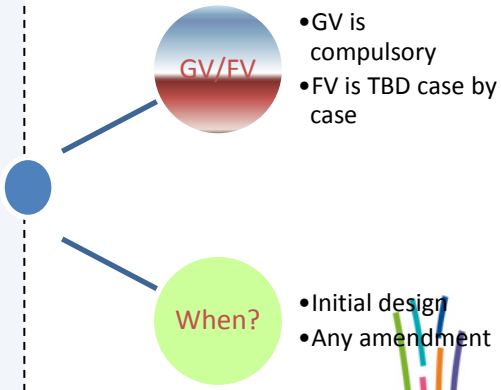
INSPECTION



"Flight validation and flight inspection are separate activities that, if required, may or may not be accomplished by the same entity" [ICAO 9906]

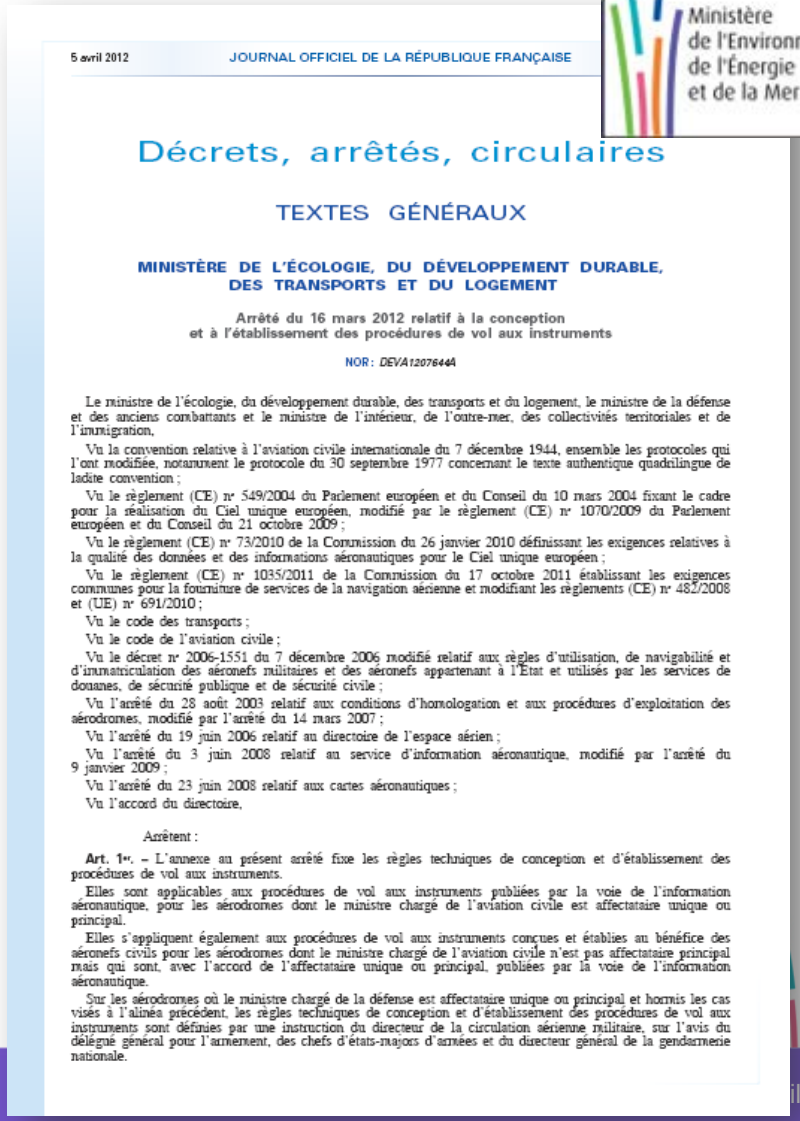
Doc 9906 vol 5





French regulation

- "French regulation on Design and Implementation of an IFP "
- French regulation issued on March 16th 2012, modified to take into account Validation recommendations of doc 9906



5 avril 2012 JOURNAL OFFICIEL DE LA RÉPUBLIQUE FRANÇAISE

Décrets, arrêtés, circulaires

TEXTES GÉNÉRAUX

MINISTÈRE DE L'ÉCOLOGIE, DU DÉVELOPPEMENT DURABLE, DES TRANSPORTS ET DU LOGEMENT

Arrêté du 16 mars 2012 relatif à la conception et à l'établissement des procédures de vol aux instruments

NOR : DEVA1207644A

Le ministre de l'écologie, du développement durable, des transports et du logement, le ministre de la défense et des anciens combattants et le ministre de l'intérieur, de l'outre-mer, des collectivités territoriales et de l'immigration,

Vu la convention relative à l'aviation civile internationale du 7 décembre 1944, ensemble les protocoles qui l'ont modifiée, notamment le protocole du 30 septembre 1977 concernant le texte authentique quadrilingue de ladite convention ;

Vu le règlement (CE) n° 549/2004 du Parlement européen et du Conseil du 10 mars 2004 fixant le cadre pour la réalisation du Ciel unique européen, modifié par le règlement (CE) n° 1070/2009 du Parlement européen et du Conseil du 21 octobre 2009 ;

Vu le règlement (CE) n° 73/2010 de la Commission du 26 janvier 2010 définissant les exigences relatives à la qualité des données et des informations aéronautiques pour le Ciel unique européen ;

Vu le règlement (CE) n° 1035/2011 de la Commission du 17 octobre 2011 établissant les exigences communes pour la fourniture de services de la navigation aérienne et modifiant les règlements (CE) n° 482/2008 et (UE) n° 691/2010 ;

Vu le code des transports ;

Vu le code de l'aviation civile ;

Vu le décret n° 2006-1551 du 7 décembre 2006 modifié relatif aux règles d'utilisation, de navigabilité et d'immatriculation des aéronefs militaires et des aéronefs appartenant à l'État et utilisés par les services de douanes, de sécurité publique et de sécurité civile ;

Vu l'arrêté du 28 août 2003 relatif aux conditions d'homologation et aux procédures d'exploitation des aérodromes, modifié par l'arrêté du 14 mars 2007 ;

Vu l'arrêté du 19 juin 2006 relatif au directoire de l'espace aérien ;

Vu l'arrêté du 3 juin 2008 relatif au service d'information aéronautique, modifié par l'arrêté du 9 janvier 2009 ;

Vu l'arrêté du 23 juin 2008 relatif aux cartes aéronautiques ;

Vu l'accord du directoire,

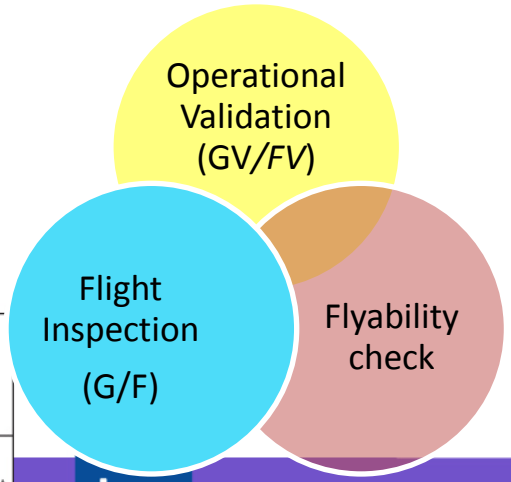
Arrêtent :

Art. 1er. – L'annexe au présent arrêté fixe les règles techniques de conception et d'établissement des procédures de vol aux instruments.

Elles sont applicables aux procédures de vol aux instruments publiées par la voie de l'information aéronautique, pour les aérodromes dont le ministre chargé de l'aviation civile est affectataire unique ou principal.

Elles s'appliquent également aux procédures de vol aux instruments conçues et établies au bénéfice des aéronefs civils pour les aérodromes dont le ministre chargé de l'aviation civile n'est pas affectataire principal mais qui sont, avec l'accord de l'affectataire unique ou principal, publiées par la voie de l'information aéronautique.

Sur les aérodromes où le ministre chargé de la défense est affectataire unique ou principal et hormis les cas visés à l'alinéa précédent, les règles techniques de conception et d'établissement des procédures de vol aux instruments sont définies par une instruction du directeur de la circulation aérienne militaire, sur l'avis du délégué général pour l'armement, des chefs d'états-majors d'armées et du directeur général de la gendarmerie nationale.



French Regulation – 16/03/2012 decree

2.4.1 Operational Validation

An Operational Validation of the IFP is systematically conducted to:

- Verify the **accuracy** of navigation **data** to be published, as well as those that were used in the design process. For RNAV procedures, the proposed **coding** table must be checked
- Evaluate the **operational suitability** of the procedure from a pilot point of view;
- Evaluate the **cartographic** aspects, the required **infrastructure**, **visibility** and other **operating** factors

It is the procedure designer responsibility to determine and describe the means used to achieve this operational validation including assessing the need for the expertise of qualified professional IFR pilots. The type of procedure studied and similarities with existing procedures at the airport are to be considered in doing this choice.

If a **Flight Check of the flyability** is deemed necessary, the Procedures Design Organization must notify as soon as possible the **N**ational **S**upervisory **A**uthority, who will liaise with **OCV** to perform the flight check.

French Regulation – Flight Validation

2.4.2. Validation flight of the flyability of the procedure by OCV (FCO)

The **National Supervisory Authority** refers to **OCV** when a Validation of the flyability of the procedure was deemed necessary during the Operational Validation. It can also refer to OCV for other cases, where it is deemed necessary.

- The purpose of the flight check is to **verify the procedure can be flown without any unacceptable flyability isue**.

- A report of this **assessment on the flyability** is provided by the OCV to the National Supervisory Authority and the Procedure Designer.

The Flight Control Organisation

Reporting to the DGAC's General Director, the Flight Control Organisation (OCV) involves 12 pilots-in command who are accredited inspectors (11 aircraft pilots and 1 helicopter pilot). These pilots are on part-time assignment from the airlines they work for. They bring to the DGAC all their knowledge of the operational world in order to improve flight safety. The OCV acts as advisor and expert of the General Director and the DGAC departments. The OCV carries out surprise controls on air carriers during flights and at flight schools on the ground, and then submits its reports to the DSAC. It is involved at the launch of new airlines or new aircraft by an operator. In 2011, the OCV carried out 249 flight controls.

French Regulation – Flight Inspection

- 2.4.3.1. Flight inspection

For GNSS-based RNAV procedures, a **Flight Inspection** aiming at verifying the **absence of permanent interference** shall be performed, **systematically**, before commissioning of the procedure:

- along the Intermediate Segment, Final Approach segment, and the Missed Approach;
- on SIDs, in an area of 10 NM around the DER, or, if this reduces the distance to the first point from which a 150 meters MOC is acquired and can be maintained according to published minimum slope.

➢ GPS RFI

For **LPV** approaches using SBAS, a **Flight Inspection** aiming at **verifying** the Final Approach Segment Data Block (**FAS Data Block**) shall be performed **before the Operational commissioning** of procedure.

➢ FASDB

In the case of RNAV procedures based on **DME**, if the DME infrastructure study using a simulation tool concluded to its necessity, a Flight Inspection along the flight path shall be performed **prior to the commissioning,** to verify the appropriate reception of the DME beacons.

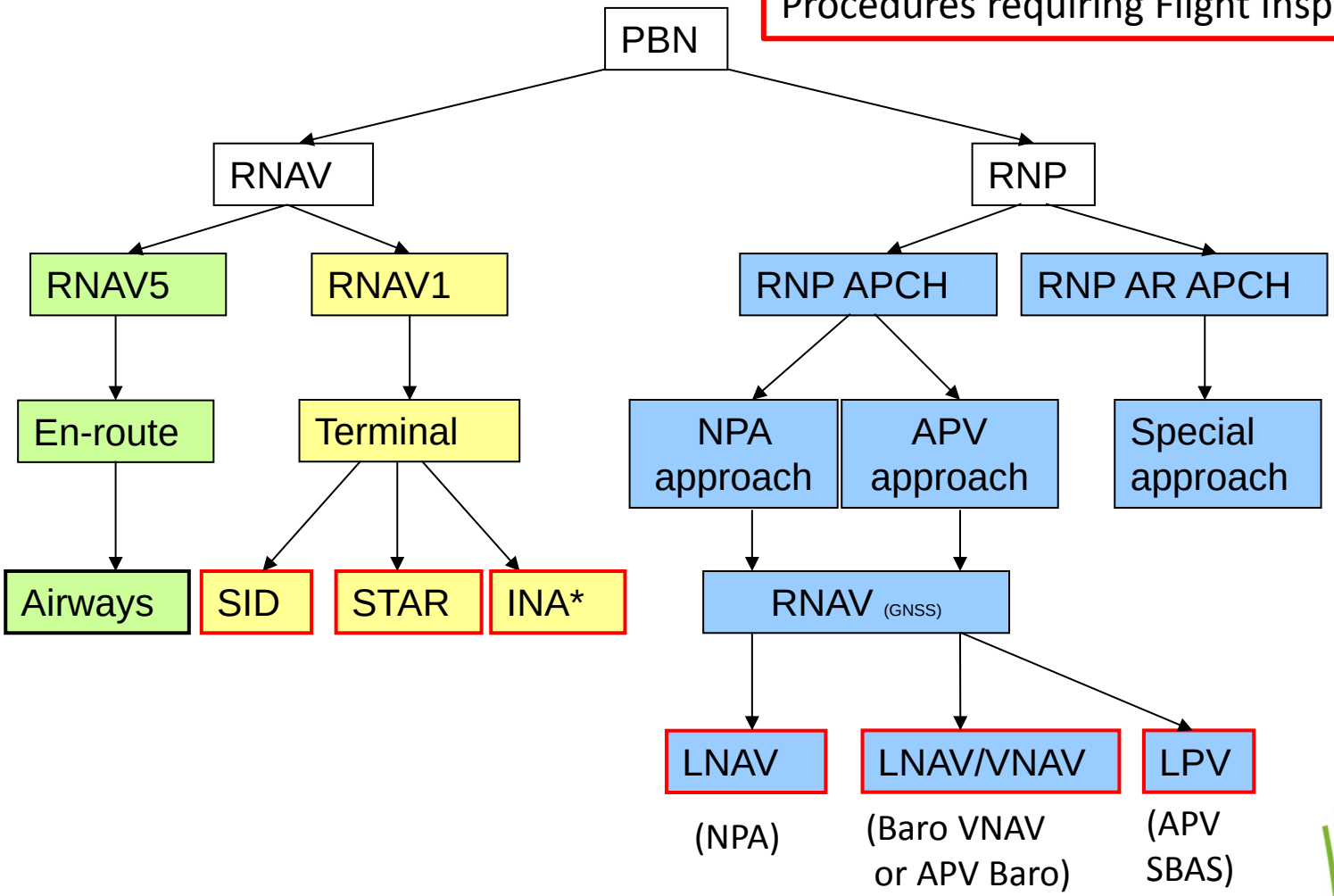
➢ DME coverage

French Regulation – Flight Inspection

- Flight Inspection Organisations allowed:
  - DGAC/DSNA
  - or any State approved Flight Inspection Organization selected by DSNA or by the regional ANSP
  - Minister of Defense for civil operations on military airports.

PBN Operations (in France)

Procedures requiring Flight Inspection



DSNA Flight Inspection

DSNA Flight Inspection

- 1 ATR42-300
- 1 KingAir Be200
- new KA Be250 by end of 2016
- lease of 1 KA Be90 in the Caribbean for Guadeloupe, Martinique and Guyana
- 6 flight inspectors
- 10 pilots
- On 1st July 2016:
  - 157 LPV Flight inspected
  - > 200 LNAV Flight inspected
- 2 Helicopters procedures with light FIS

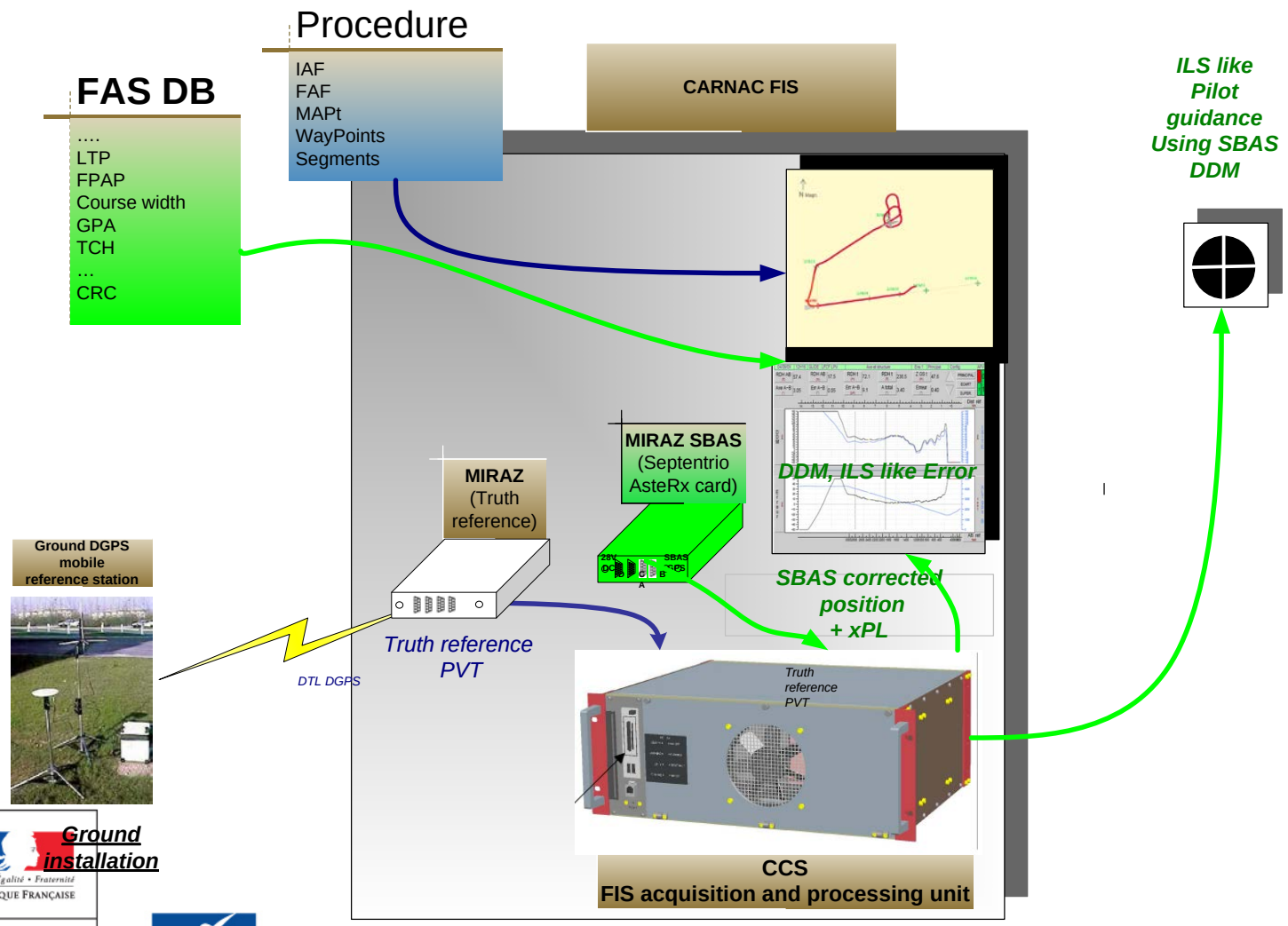
DSNA Flight Inspection

- Beech 200 and new 250:
  - **Full PBN capability** with Rockwell Collins PL21 avionics (+LPV+ RF leg+ baroTemperature compensation)
  - **Custom Database** capability with pre-coded procedures (Jeppesen + Rockwell Collins contract) if coding needed
  - But most of the time, manual entry of the data in the FMS and **FIS guidance for LPV**

DSNA Flight Inspection

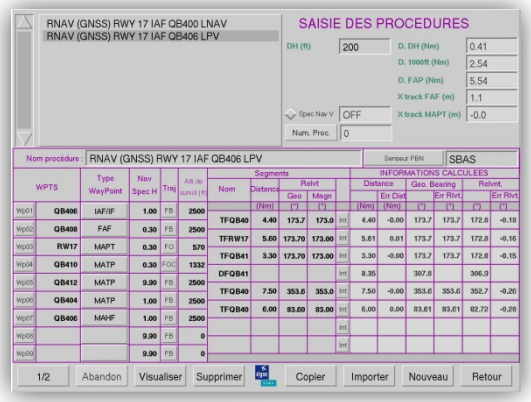
- SAFRAN Electronics and Defense **Carnac** FIS:
  - a single software for Ground Validation and FlightInspection
  - **PBN procedures ground validation:**
    - courses, distances validation
    - LPV FASDB automatic validation
    - offset procedures automatic validation
    - helicopters PINS LPV automatic validation
  - **PBN procedures Flight Inspection:**
    - RNP APCH: LNAV, LNAV/VNAV, LPV RNAV parameters recordings
    - GNSS Satellites C/N0 recordings
    - RNAV 1 DME/DME measurements (6 DME at once)

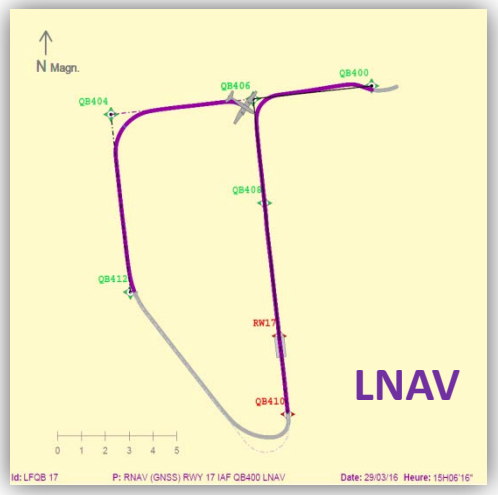
Carnac LPV Flight Inspection

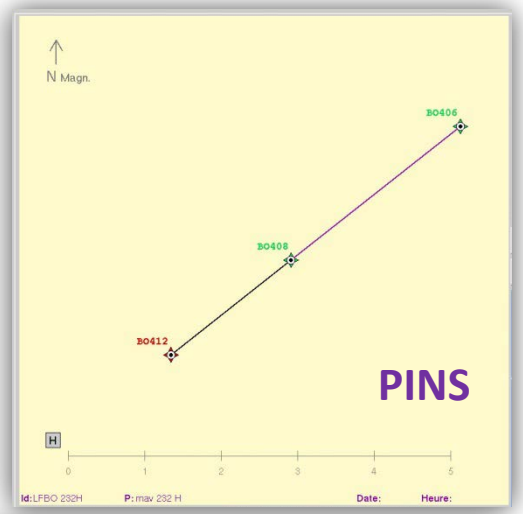


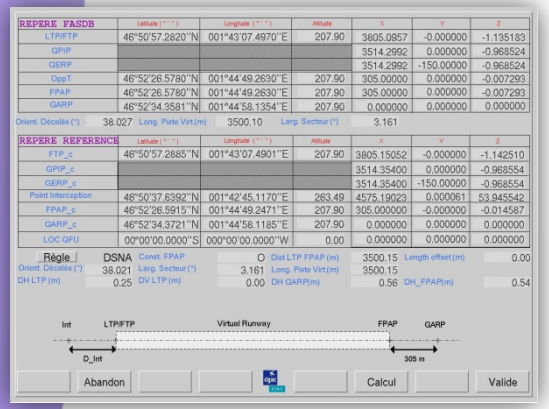
DSNA Flight Inspection

Ground Validation



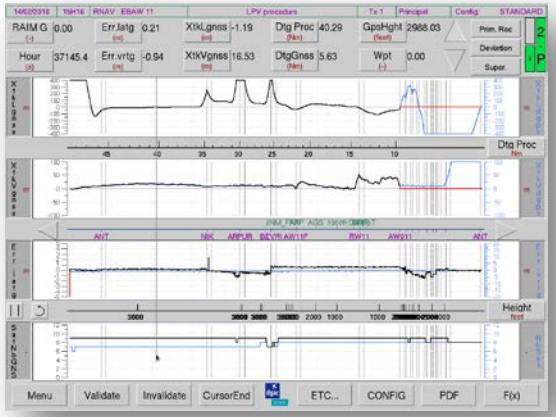




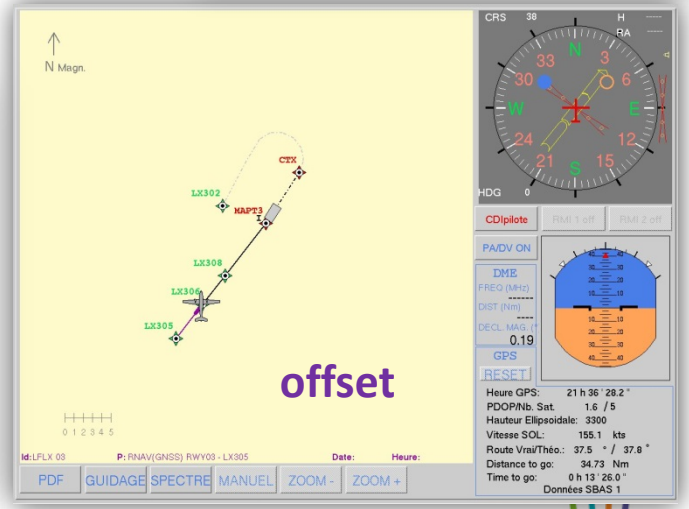


FASDB automatic validation

SAFRAN



Real Time procedure parameters



RF Interference monitoring

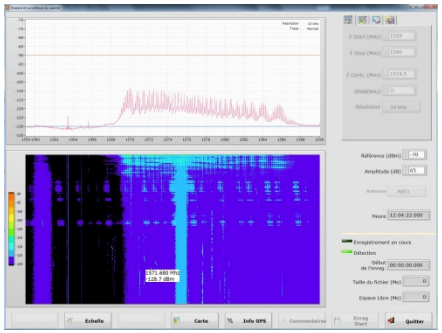
- Hardware
  - High performance monitoring receiver Rhode & Schwarz EB500

  - Adapted antenna (GPS L1/L2+Low noise amplifier+Filters)
  - Direction finder

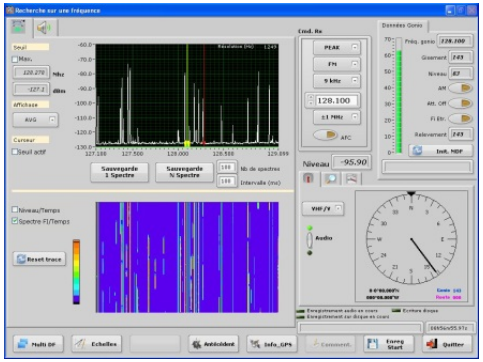
- Software

  DSNA/CGX AERO AiRFIndeR® software used for :

  - Spectrum Monitoring



  - Identification and localization

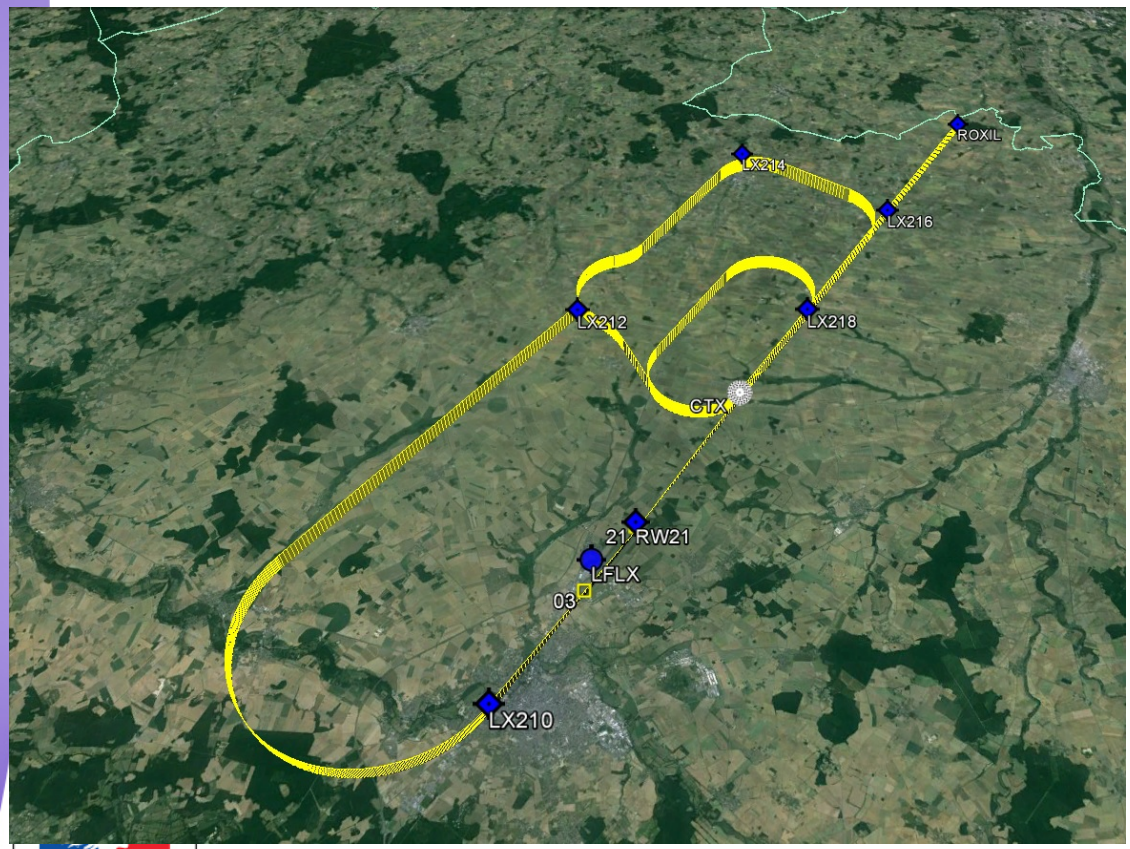


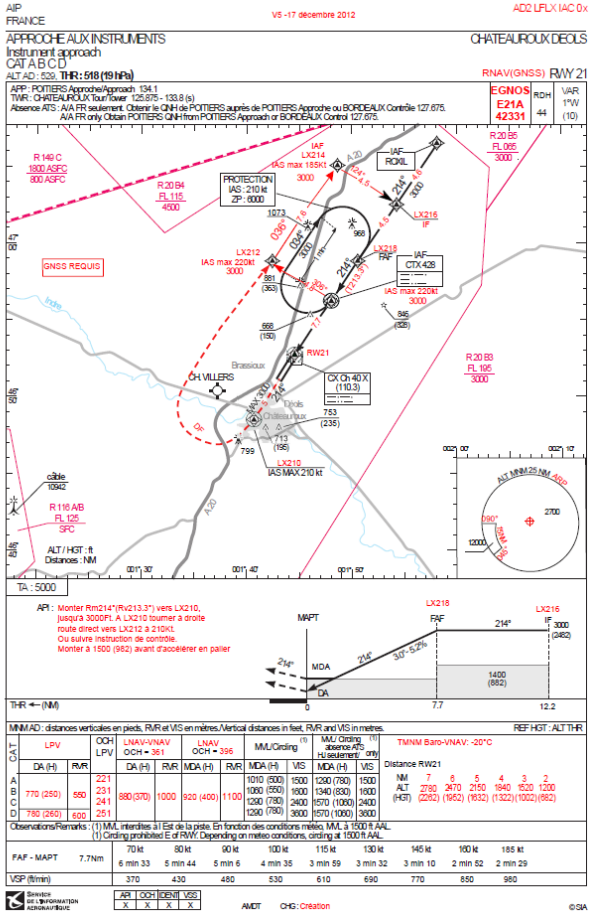
RFI detected on GNSS signal

- 3 RFI caused by malfunctions on TV equipments (TV transmitters, Amplified reception antenna)
  - Detected prior publication of GNSS procedures
  - RFI identified and stopped rapidly
- 1 RFI caused by illegal use of GNSS frequency (foreign country)
  - Detected after user complaints on RNAV SIDs and STARs
  - RFI identified and stopped rapidly
- 1 RFI case caused by 1 PPD that was ceased later on
- 3 RFI cases probably due to PPDs, not ceased

GNSS RFI Example:

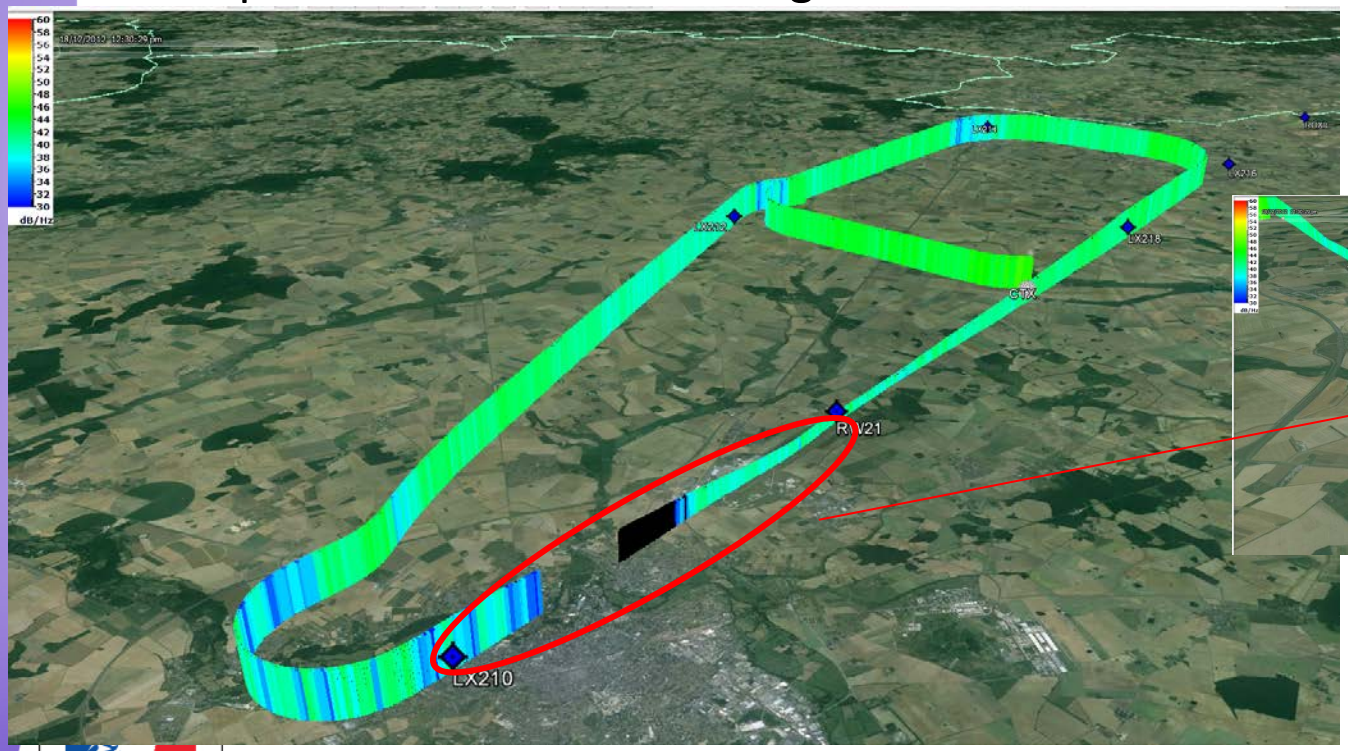
Châteauroux Déols LFLX 21

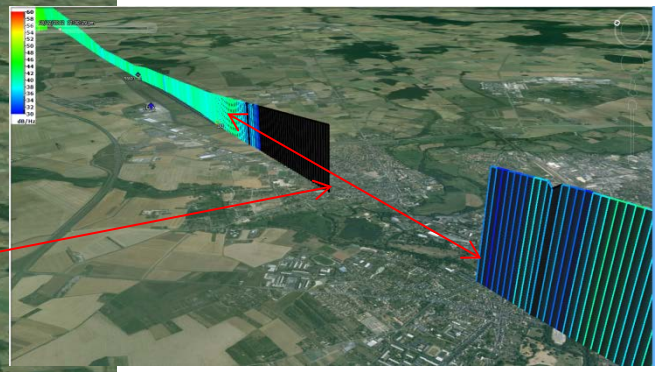




GNSS RFI Example

- During flight inspection of LPV RWY 21, first missed approach leg, complete loss of GNSS tracking



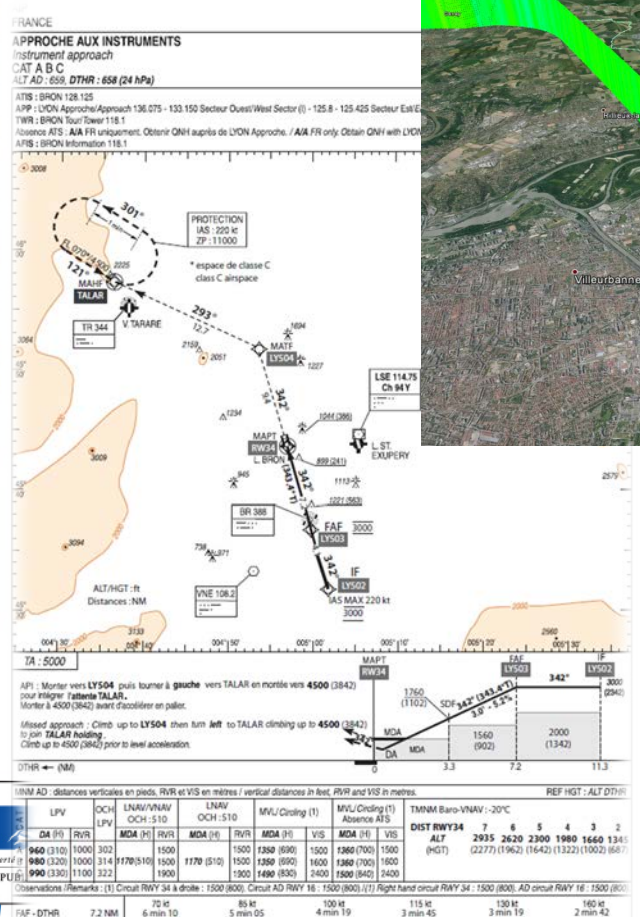


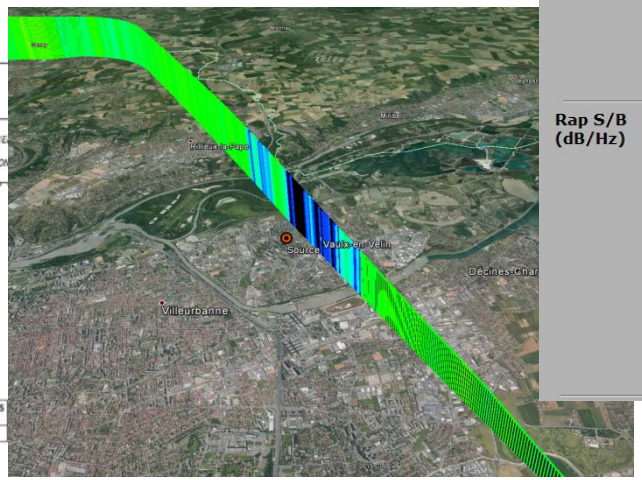
« Dead Reckoning » during 2Nm

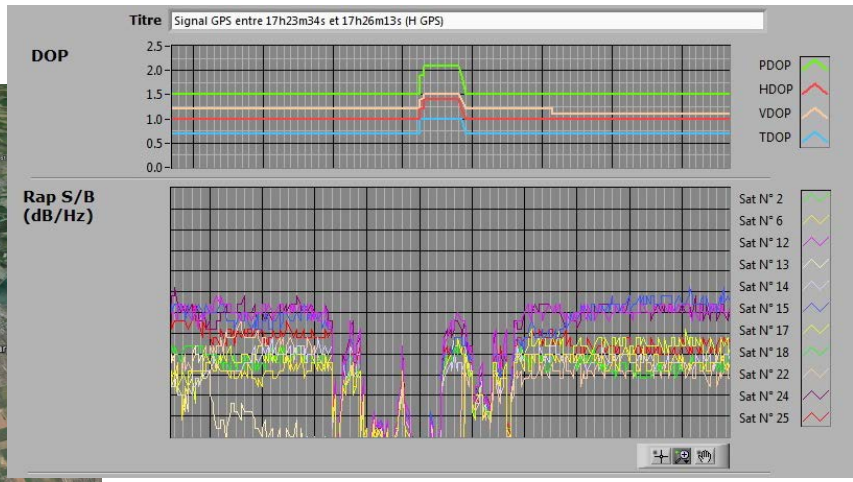
RFI: Lyon Bron 34

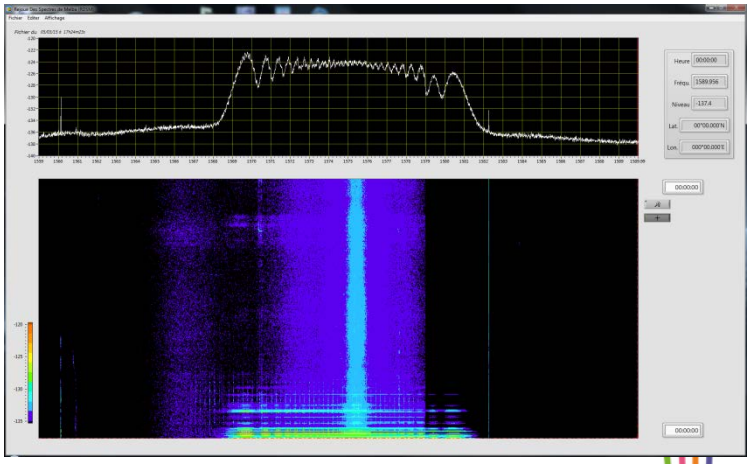
Example of LFLY

RNAV(GNSS) 34









Helicopter portable FIS

Used in Sécurité Civile EC145 helicopters

Also used in French Caribean on a KA Be90