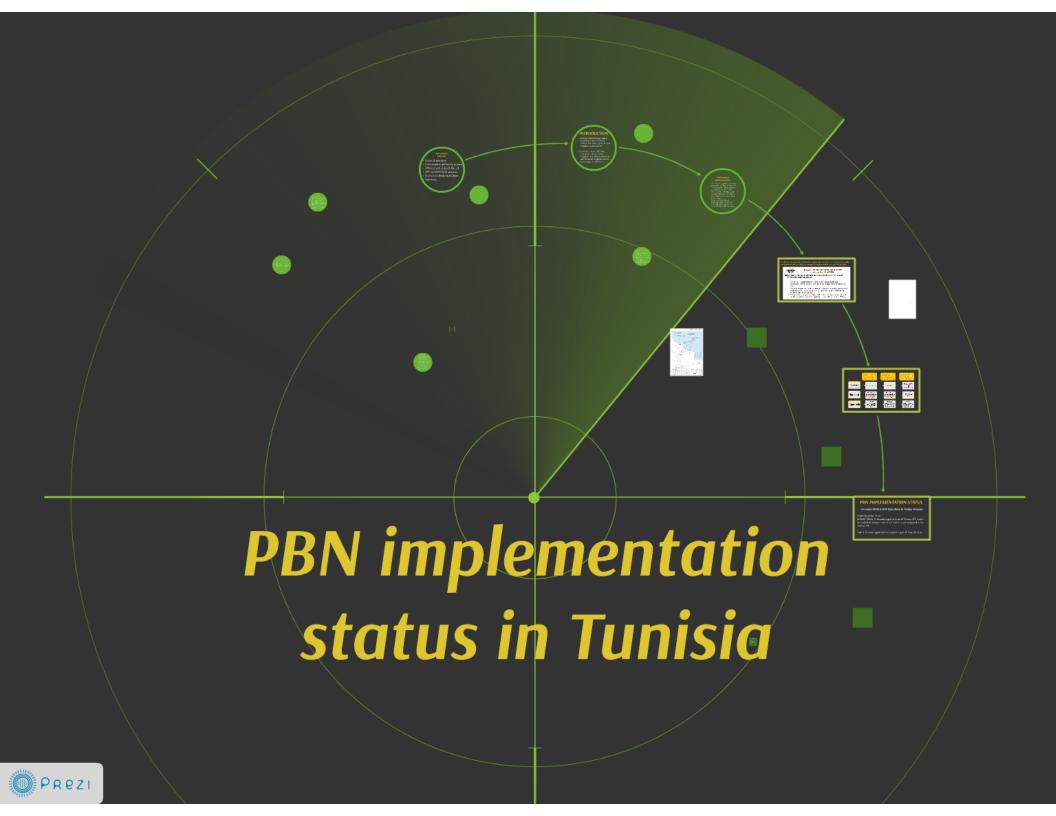


Presentation Overview

- General overview
- Civil aviation authority actions
- PBN current state of the art
- LPV in MONASTIR success
- Barriers to implementation
- Summary

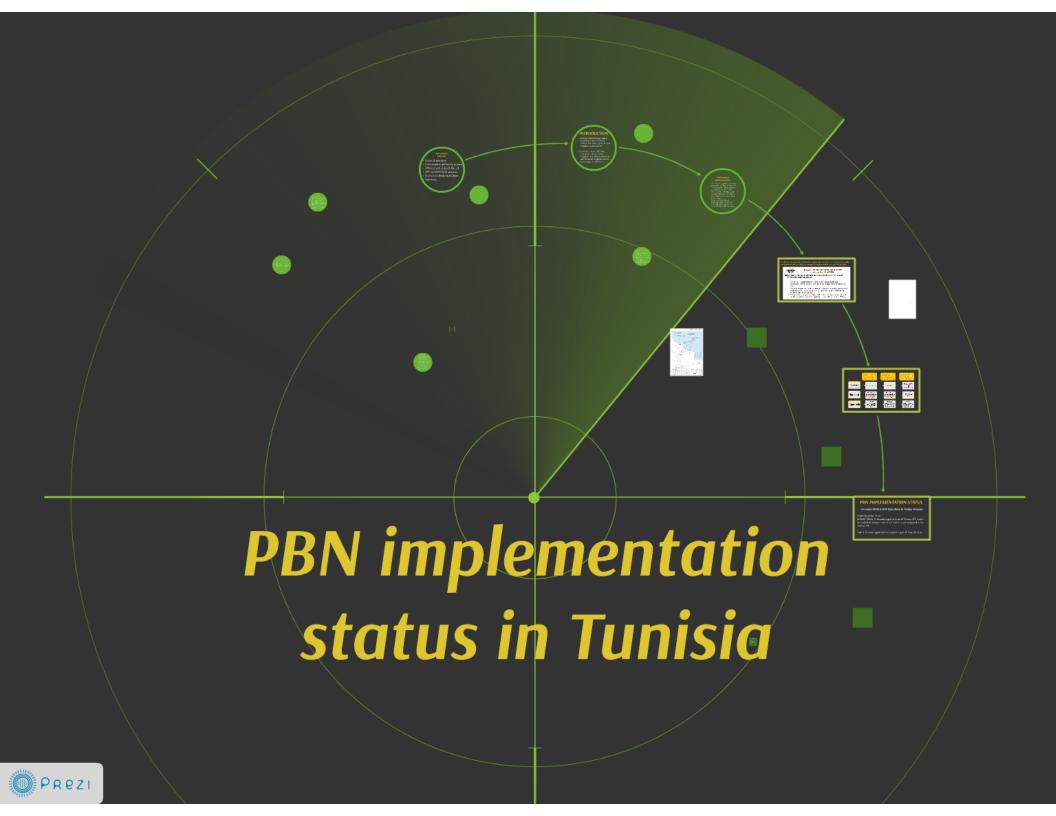




INTRODUCTION

- PBN describe the broad range of technologies that are moving aviation away from a ground-based navigation system toward
- It involves a major shift from conventional ground-based navigation aids and procedures to satellite-based navigation aids and area navigation procedures





In 2007 the International Civil Aviation Organization (ICAO) passed a General Assembly resolution that calls on States to complete an implementation plan for PBN by 2009.



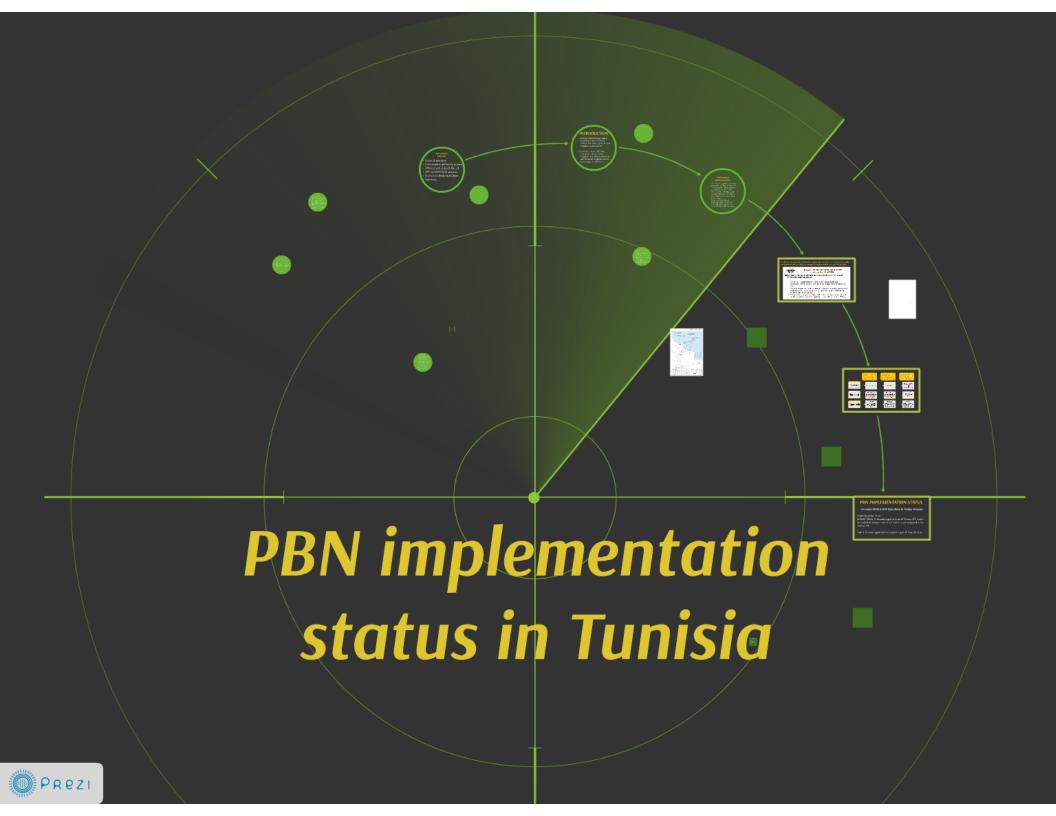
ICAO Implementation Goals

(as contained in A36-23)

States and/or regions to develop an implementation plan by 2009 to achieve the following goals:

- where RNAV operations are required, enroute (oceanic and continental) and terminal ATS routes to be implemented according to PBN,
- all instrument runway ends to have an approach procedure with vertical guidance (APV), either as the primary approach or as a back-up for precision approaches by 2016
- States are encouraged to develop APV's for runways that are currently non-instrument runways and operated by aircraft in excess of 5700 kg.

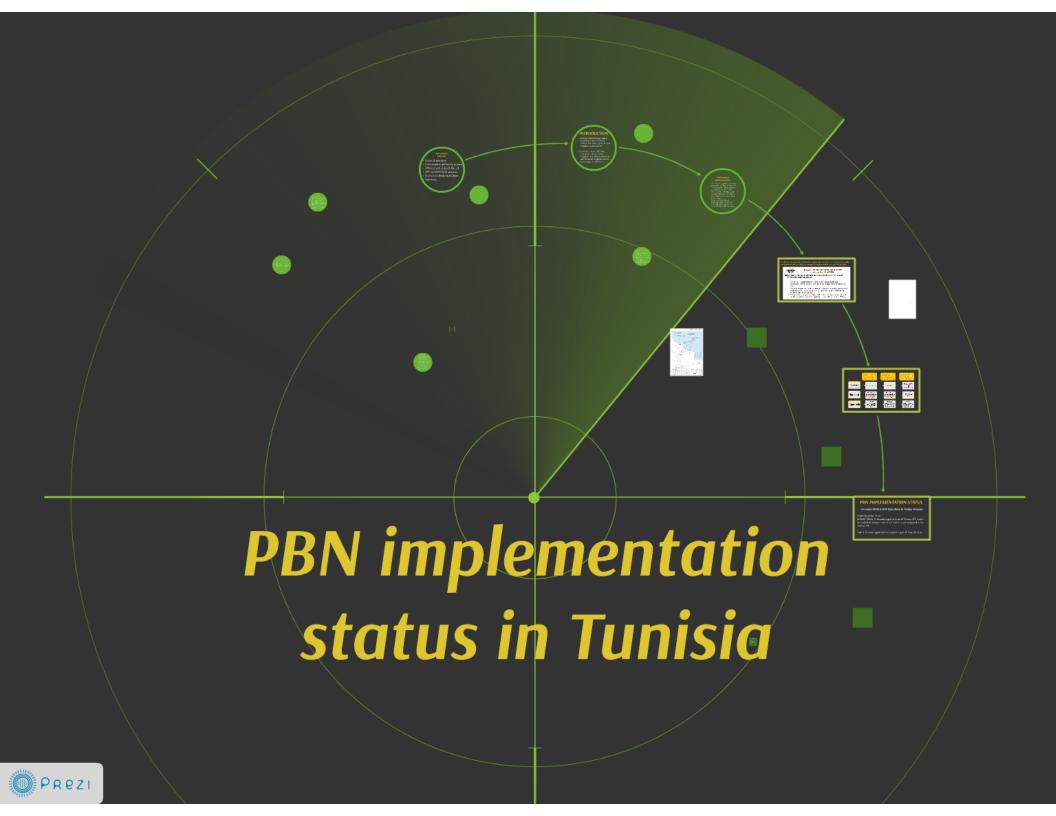




Civil aviation authority actions

- The Tunisia CAA agreed in 2009 to the development of a National PBN plan
- A PBN committee is set up under CAA control introduced by ministerial ORDER, to which the following are associated the Ministry of Defense; OACA; representatives of all Tunisian airlines companies.
- This committee had the task developing, implementation and monitoring of PBN operations in Tunisia. had developed PBN master





Short term 2012-2014

Medium term 2015-2019

Long term 2020 and after

En-route

RNAV 5/RNP4

RNAV 5

RNAV1/RNAV2 4D TRAJECTORY

RNAV 1 &A-

Terminal

SID et STAR conventionnal & RNAV 1 & RNP 1 de base SID et STAR conventionnal & RNAV 1 & RNP 1 de base

RNP

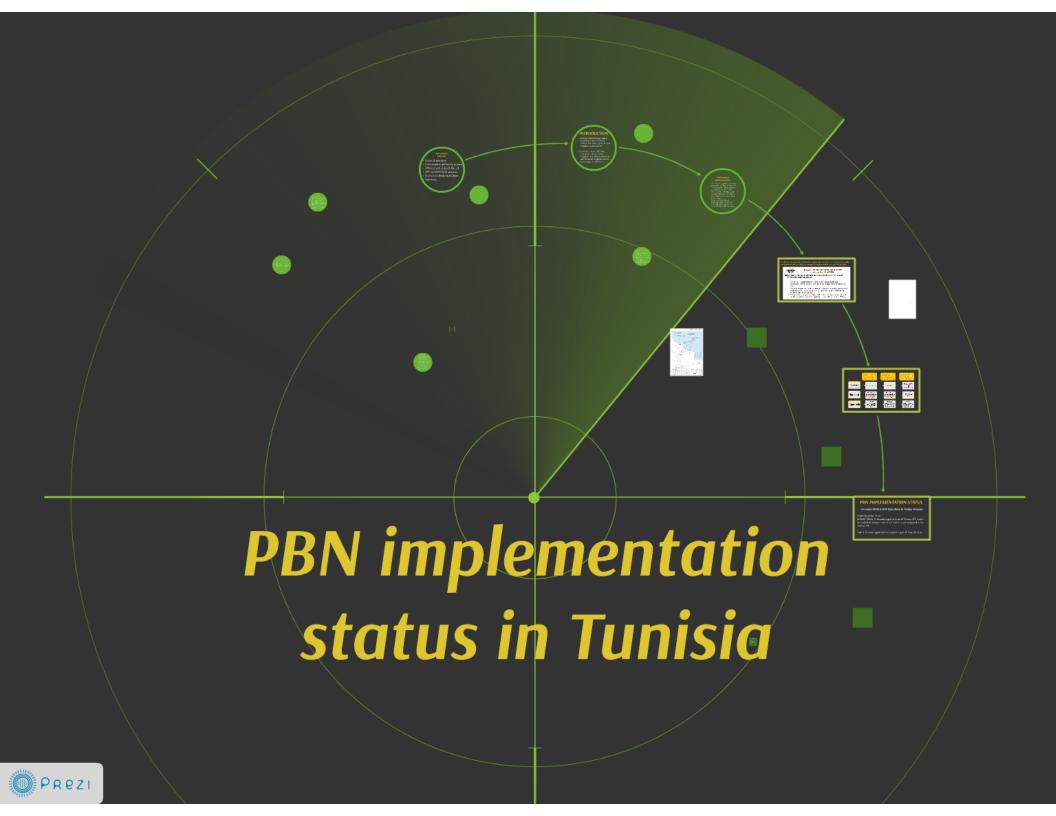
Approach

NPA/PA APV BARO VNAV & RNP APCH

NPA/PA
APV BARO VNAV
& RNP APCH &
RNP AR APCH

PA GNSS BARO VNAV & RNP APCH & RNP AR APCH





PBN IMPLEMENTATION STATUS

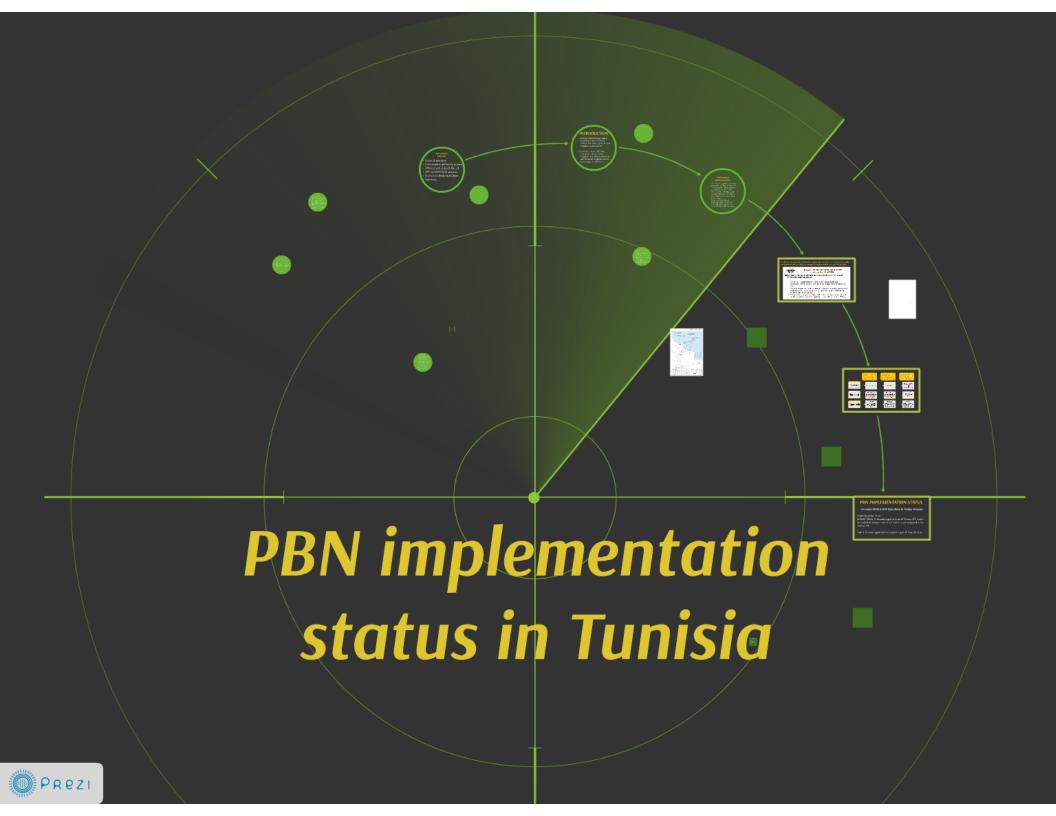
• En-route: RNAV & RNP Operations in Tunisia Airspace

From December 2014:

B-RNAV (RNAV 5) became applicable on all Tunisia ATS routes in controlled airspace area (1,2,3 and 4) as promulgated in the Tunisia AIP

RNP 4: became applicable on southern part of Tunis FIR/UIR



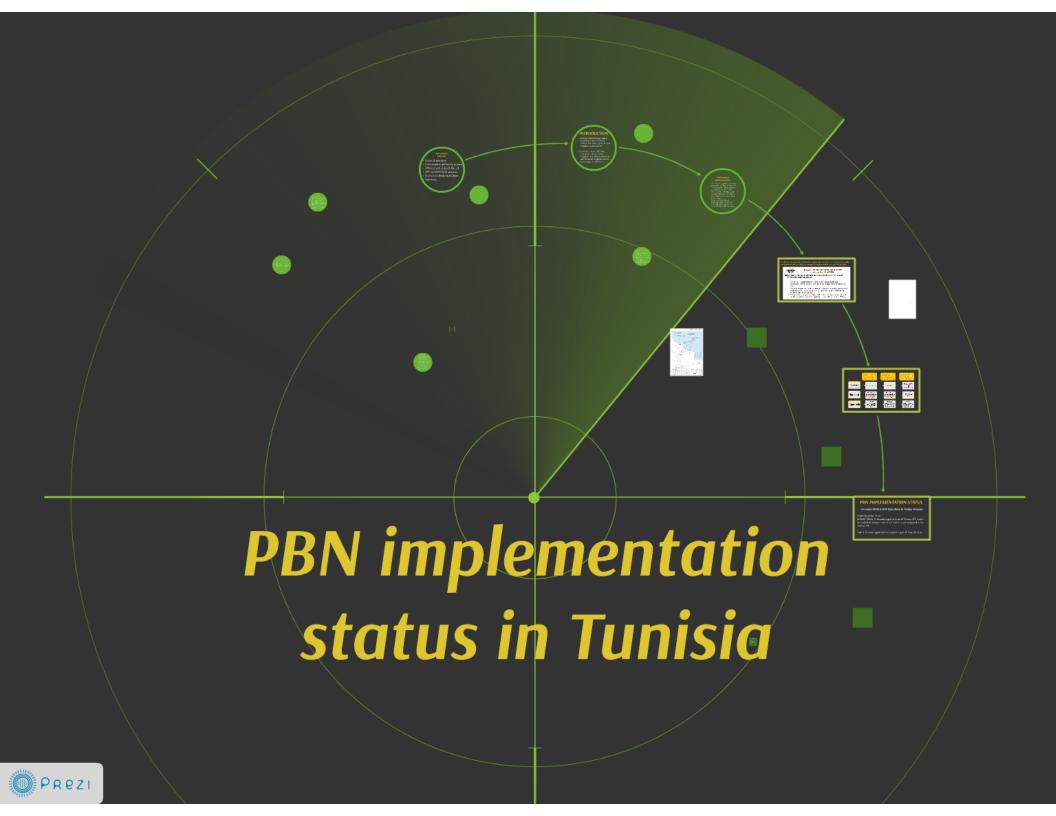


PBN IMPLEMENTATION STATUS

Approach:

- DTTJ RNAV GNSS RWY27 LNAV only
- DTTX RNAV GNSS RWY15 AND 33 LNAV AND LNAV/VNAV
- DTTG RNAV GNSS RWY06 AND24 LNAV only
- DTTZ RNAV GNSS RWY27 AND 09 LNAV only
- DTMB RNAV GNSS RWY07 AND 25 LNAV , LNAV/VNAV and LPV.
- DTTZ RNAV GNSS RWY09 AND 27 LNAV , LNAV/VNAV (planned for 2014)

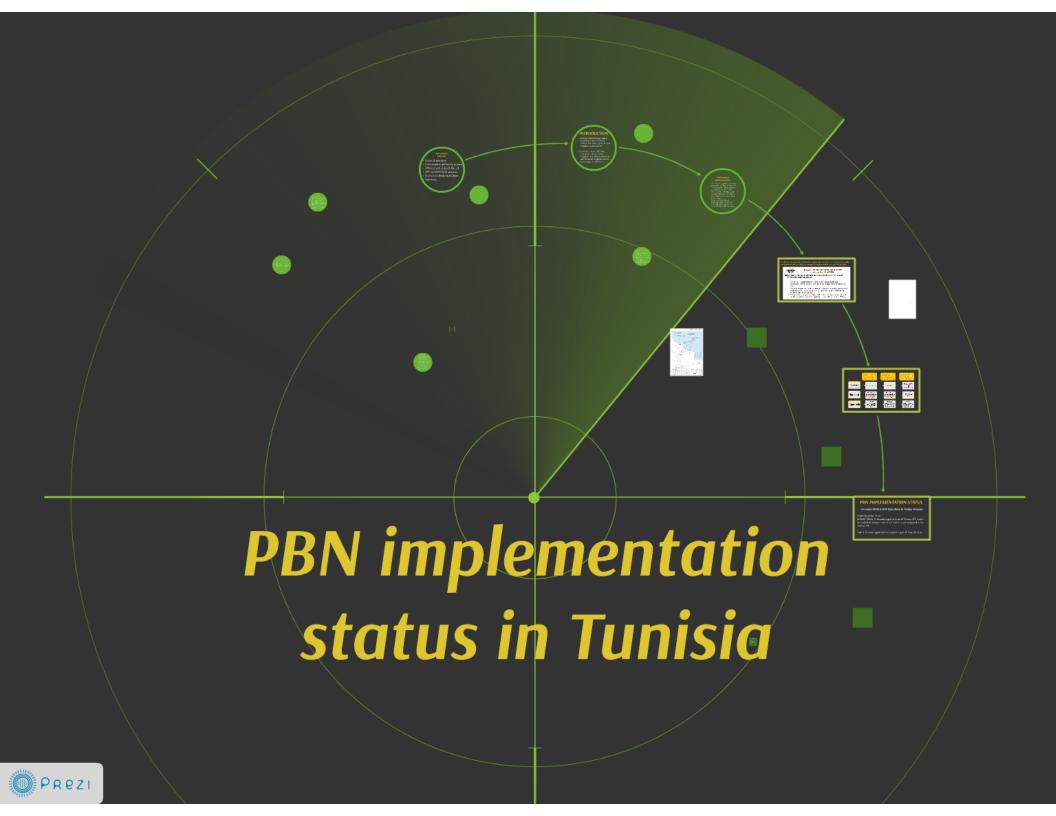




LPV in MONASTIR success

- In the frame work of Euromed GNSS II/MEDUSA project which deals with the introduction of the European (EGNOS) in the MEDA region
- MEDUSA's team led by Telespazio as a project manager and composed by ENAV, OACA, INECO and Helios with ESSP and eurocontrol assistance, have validated GNSS-based approach procedures for for Monastir airport
- The performances obtained during more than 4
 months period has shown that the implementation
 of EGNOS based operations was feasible, in
 particular LPV approach procedures

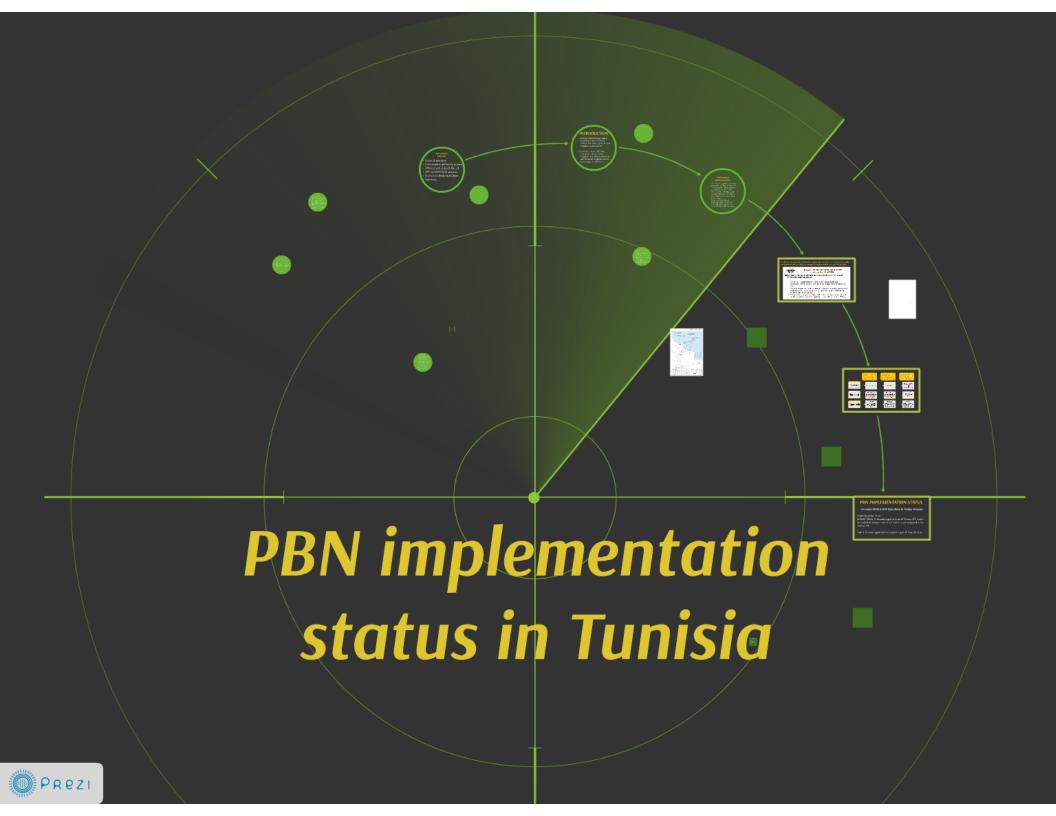


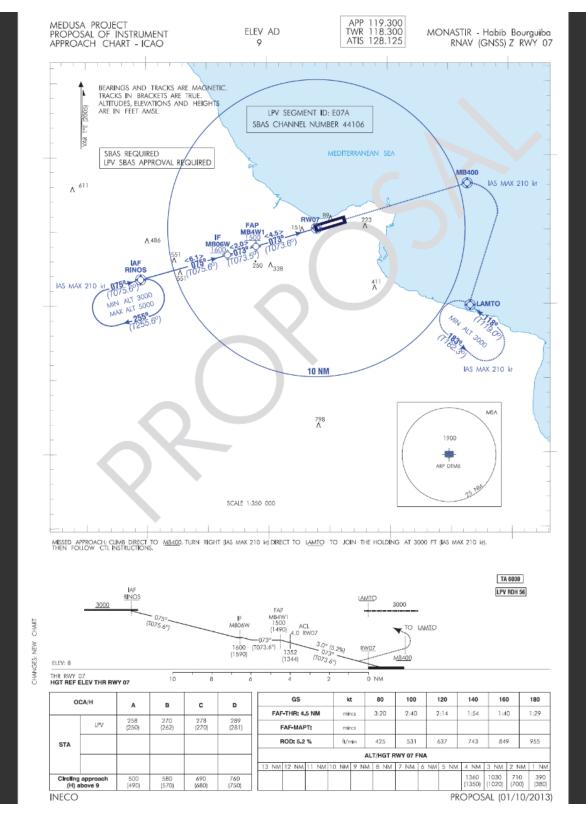


LPV in MONASTIR success:

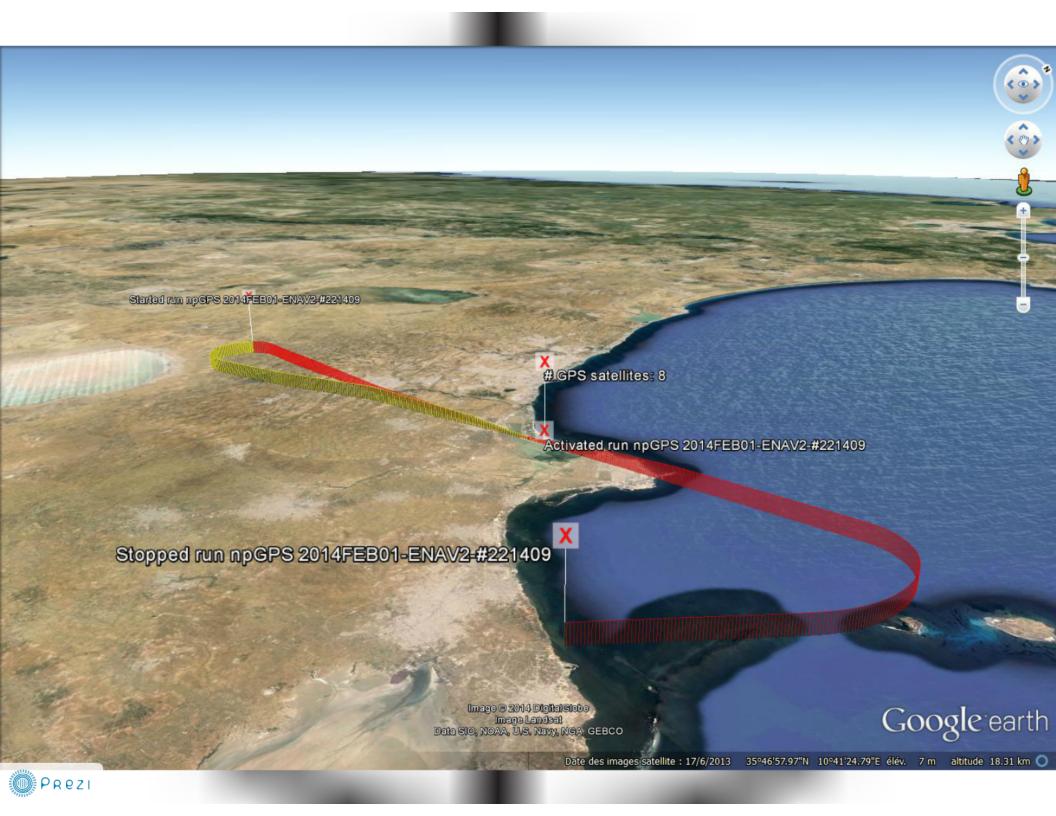
• The validation flights campaign was carried out by ENAV with the support of TLZ OACA and ESSP in order to obtain a qualitative assessment of the procedure design including obstacle, terrain and navigation data, and provide an assessment of the flyability of the procedure

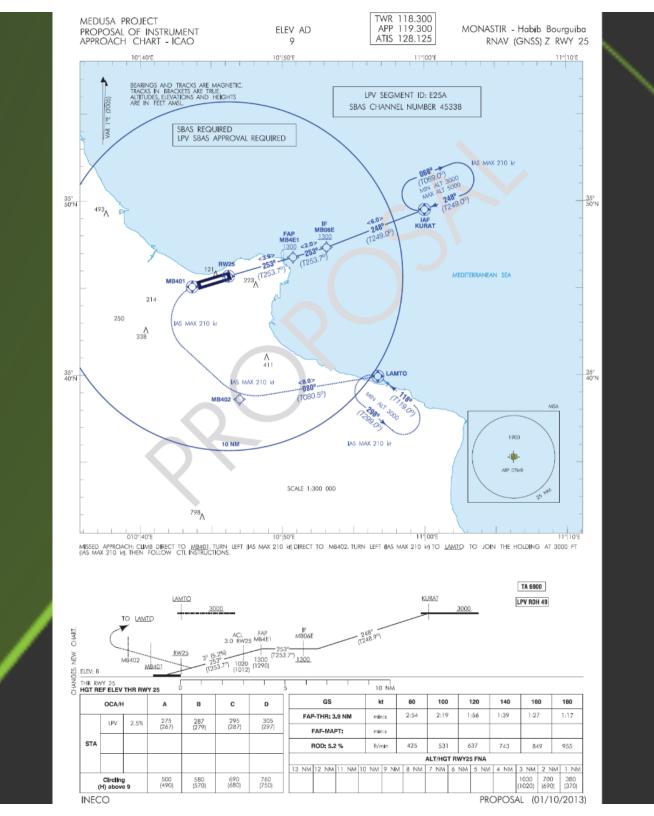


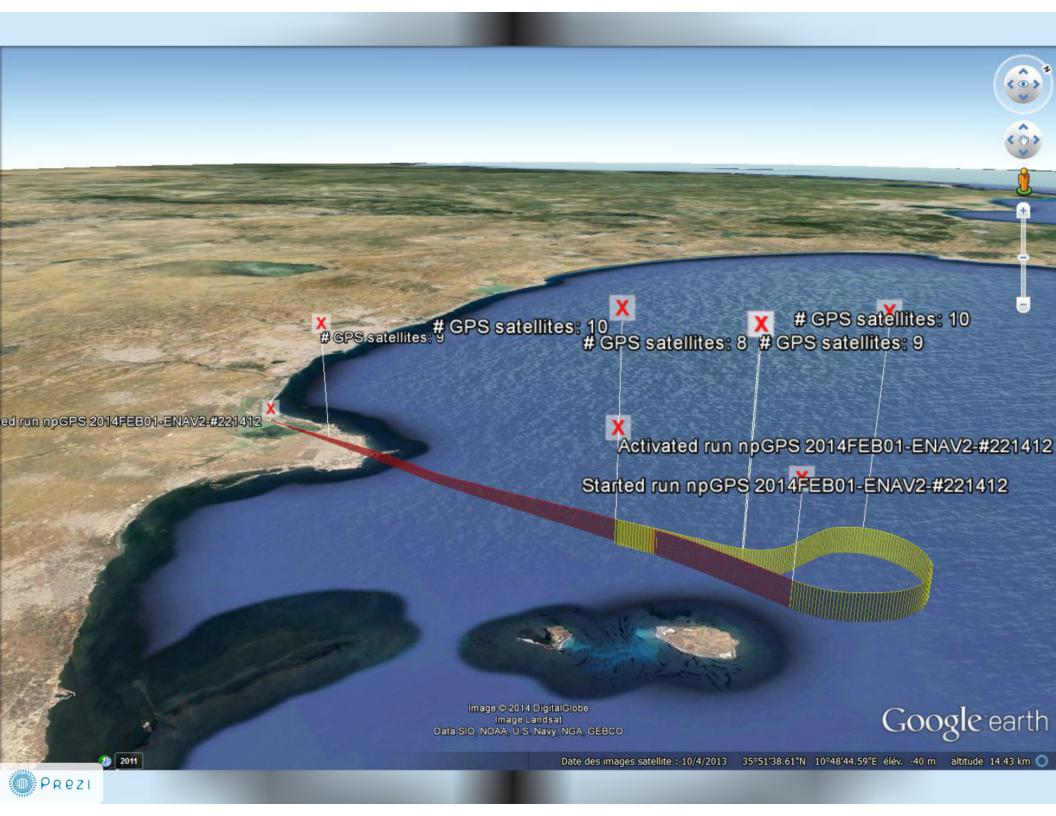


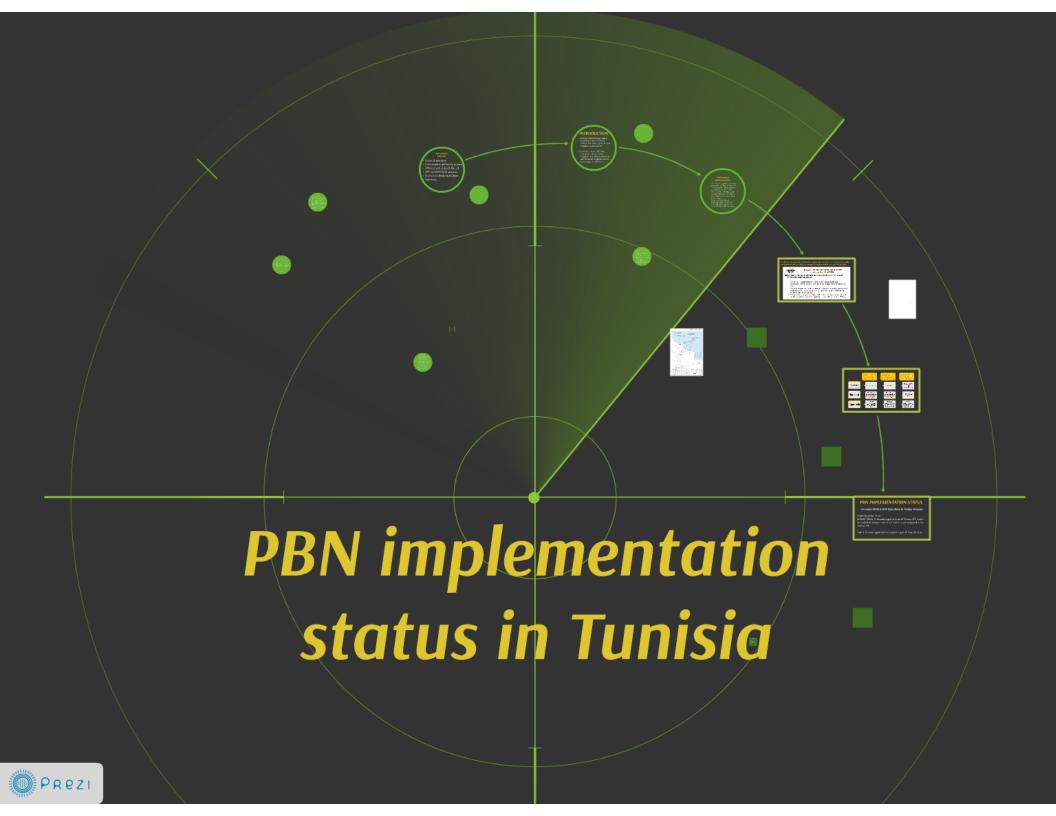


PREZI





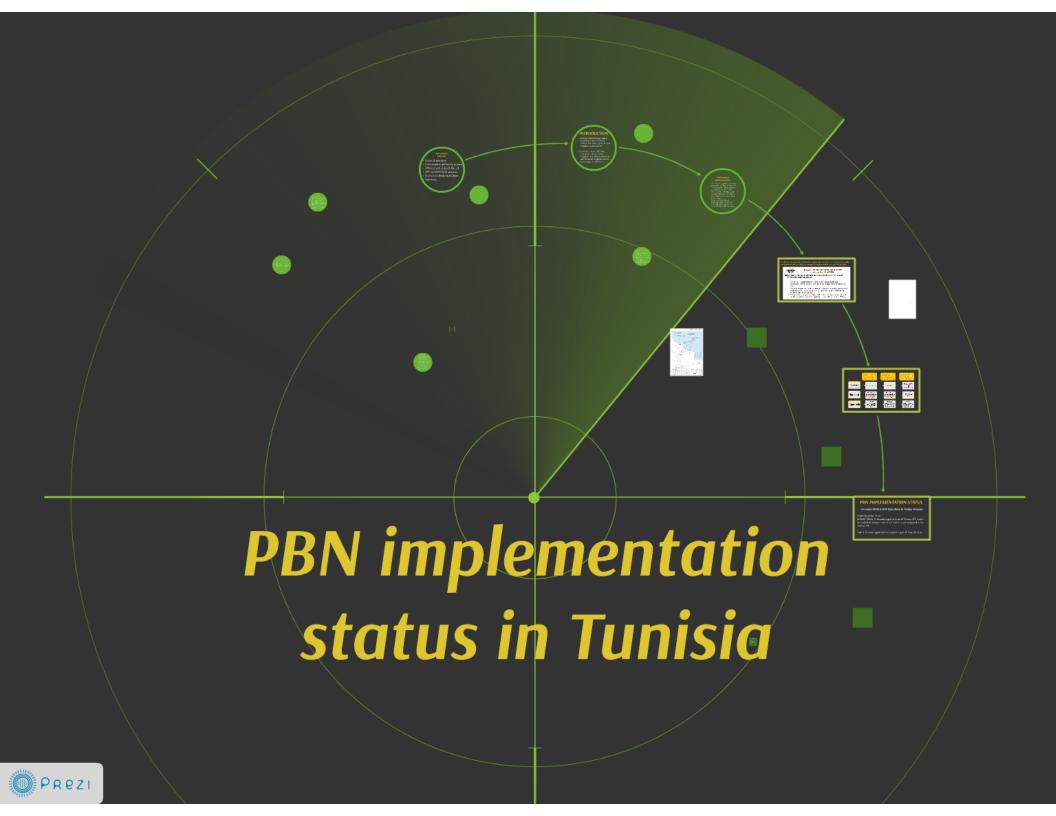




LPV in MONASTIR success

- EGNOS service availability at monastir is sufficient to support LPV approaches.
- Good opportunity to count the benefits of EGNOSbased operations and the added value LPV approaches in a concrete case
- Monastir presents an encouraging model for the exploitation of RNAV APCH procedures down to LPV minima
- Stimulate and motivate the decision-makers In order to generalize this model to several northern airports.



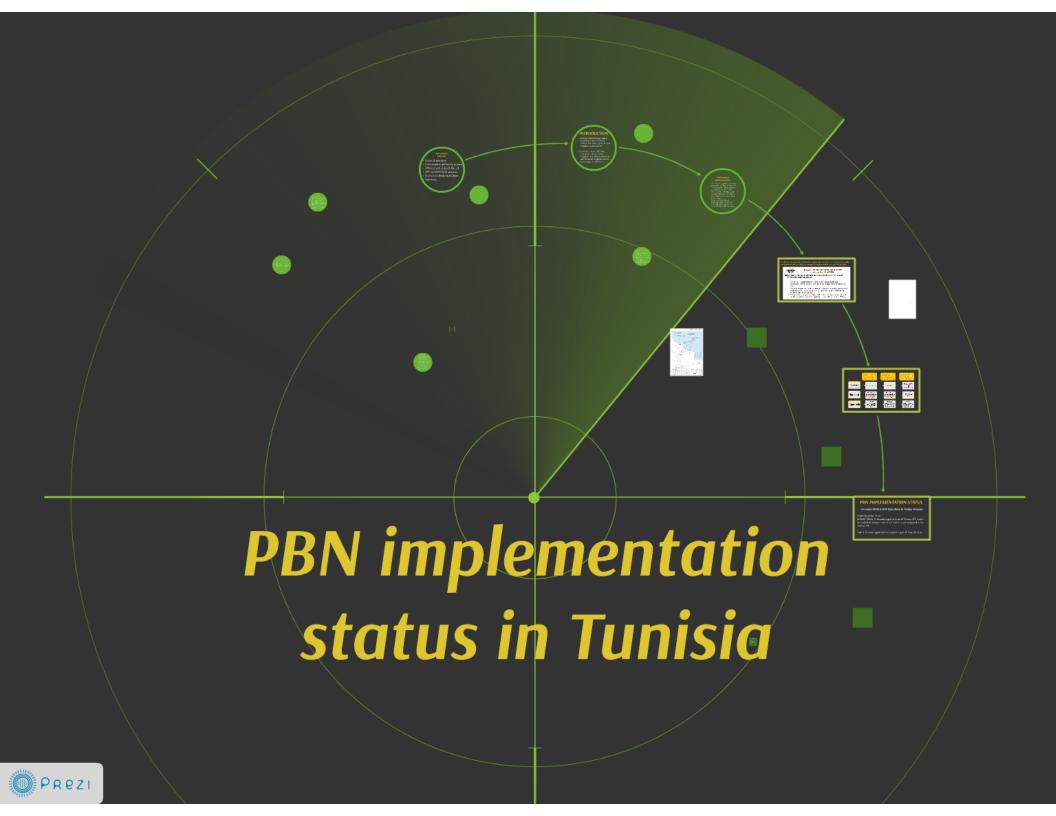


Barriers to implementation

GNSS an essential key enabler for PBN implementation but:

- Guidance on the steps necessary to put in place monitoring and recording systems
- Signals are very reliable but What about jamming and a backup plan
- AUGUR coverage was limited to ECAC airspace only.





SUMMARY

- TUNISIA PBN PLAN UPDATE Interest in APV SBAS
- The implementation of PBN operations in Tunisia will be closely related to the various changes taking place at a European level and the decisions that may be made.
- Will gradually be adjusted in relation to international works.



thank you for your kind attention

