PBN Implementation plan inside Italian Airspace

Paris, 2-3 July, 2012
Contents

• National PBN Task Force
• PBN Implementation plan
• PBN procedure scheduling
• GNSS approach safety case
National PBN Task Force

Involving ENAV (civil ANSP), Italian Air Force (Military ANSP), ENAC (Italian Regulator).

*Tasks achieved:*

• Endorsement of National PBN Implementation Plan

• Deployment of National safety case for the introduction of GNSS approaches

*On going/future tasks:*

• AIC introducing GNSS approaches on national airspace

• GNSS approach procedure post-implementation monitoring
National PBN Implementation Plan

Approved by National Regulator (ENAC) on June, 2012

Inputs

• Operational needs;

• Stakeholders needs: Collected inside the Task Force and through Customer Care meetings scheduled each year on regular basis between ENAV and all commercial operators operating in Italy;

• National PBN policy.
National PBN Implementation Plan

Contents

• PBN concept and challenges;

• PBN policy

• PBN activities for Italy including state of the art, short term (2012-2014), medium term (2014-2016) and long term planning (2016-2020);

• Navaids

• Helicopters
PBN Policy

• Takes account of:
  
  • The current situation concerning RNAV and RNP applications inside Italian airspace;
  
  • SESAR and ATM Master Plan, and future European PBN IR;
  
  • National Regulation such as: ENAC Performance Plan (tackling Safety and Environmental protection objectives); ENAC Safety Plan; ENAC National Airports Plan (Environmental Sustainability)

• Desires from operators to take full advantage from their on-board capabilities in terms of RNAV/RNP navigation;

• Develop new instrument flight procedures, where operationally achievable, according to PBN specification as defined in DOC 9613 ICAO (PBN Manual);
• Terminal operations providing for optimized traffic management supporting CCO/CDO via the introduction of P-RNAV applications;

• NPA approaches replaced by LNAV as ILS backups, retaining a certain number of conventional navaids for backup purposes;

• APV implementation initially based on APV – SBAS;

• APV BARO VNAV implemented where operationally significant and/or for those runway ends in areas not supported by APV I/II requirements;
• Replacement of all circling approach procedures at least with GNSS LNAV for all runway ends where feasible;

• On long term basis implementation of LPV or GBAS approach as PA replacement will be evaluated on a CBA base for those sites where ILS system will need to be replaced;

• Implementation plan shall include PBN procedures for helicopters.
<table>
<thead>
<tr>
<th><strong>PBN Implementation - Expected benefits</strong></th>
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<tbody>
<tr>
<td><strong>Efficiency</strong></td>
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<tr>
<td>• Better flight performance and flight efficiency;</td>
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<td>• Workload reduction;</td>
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<td><strong>Environment</strong></td>
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<td>• Reduction of pollutant gaseous emissions;</td>
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<td>• Potential reduction of areas in airports proximity to be accounted for noise nuisance claims;</td>
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<tr>
<td><strong>Airspace Use and Planning</strong></td>
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<td>• CDO/CCO introduction with flows segregation;</td>
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<td>• Tailored SID &amp; STAR will allow for a more efficient airspace use;</td>
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<td>• Allow for approach procedure development on those runway ends not suitably located for conventional approaches;</td>
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<td><strong>Helicopters</strong></td>
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<td>• Tailored operations for each flight phase, and in particular during the approach;</td>
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<td>• Possibility to operate on areas where VMC are not supported all year long;</td>
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<td>• Possibility to provide for instrument approach until FATO;</td>
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<td><strong>Navaisds optimization</strong></td>
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<td>• The possibility to have more instrument flight procedures will allow for a navaid optimization starting from navigational NDBs.</td>
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| **En-Route**          | • All AWYs above FL95 B-RNAV (RNAV5);  
|                      | • AWYs with lower MEL are so a short number that are expected to remain conventional based at present; |
| **Terminal Operations** | • P-RNAV introduced in spring 2011 (announced by AIC publication on April 2011), based on GNSS, DME/DME;  
|                      | • SID & STAR P-RNAV for LIRF, LIRA, LIMC, LIMZ, LIMF, LIPZ  
|                      | • Overlay P-RNAV on almost all airports.  
|                      | • CDO operations introduced in Italian Airspace according to AIC 6/12 published on 19/04/2012 |
| **Approach**        | • One RNP APCH published (serving LIRF RWY 25 as overlay of a NDB approach) |
| **Air Traffic Controllers training** | • Training modules on PBN familiarization and P-RNAV procedures, including operational aspects, available. Activity already completed on both modules for Milan and Rome ACC during 2011; |
### PBN Implementation – Planning 1/2

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<th><strong>En-Route</strong></th>
<th><strong>Terminal Ops</strong></th>
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| - New route segments based on RNAV 5 criteria reducing track miles and allowing for a better traffic management with potential application of CDO/CCO interfacing with terminal airspace;  
  - Future extension to RNAV1 criteria where operationally achievable and needed; | - New P-RNAV SID & STARs for Milan and Rome TMA;  
  - New P-RNAV SID & STARs for Olbia, Verona, Torino and Venice CTR;  
  - All procedures will be designed to support CDO/CCO application on regular basis within an established volume of airspace;  
  - P-RNAV overlay completion for all airports;  
  - Feasibility studies to implement RNP1 SID & STAR based on DME/DME criteria where operationally advantageous and based on dedicated safety cases;  
  - Future implementation of RNP1 SID & STAR EGNOS based for non radar CTR where DME network does not support these kind of navigation applications;  
  - Future implementation of RF turns on RNAV1 procedure where operationally required and depending on fleet equipage status; |


**Approach**

- ILS expected to be the main navaids for instrument approach procedures;
- Introduction of GNSS LNAV and EGNOS based approach procedures as ILS backups on national aerodromes, the target being the coverage of major airports runway ends between winter 2012 and spring 2013;
- GNSS, at least LNAV, approach procedures for those runway ends served only by circlings;
- Studies to implement APV/BARO procedures for those airports not suitable for EGNOS based procedures or where operationally required;
- Feasibility studies of EGNOS based approach procedures for those sites having strong environment constraints, exploring the need for the introduction of RNP AR requirement where needed;
- Future expansion of GNSS approach procedures in order to comply with ICAO resolution A37/11 with target date 2016;
- Future smoothed introduction of GBAS approach procedure where operationally needed and satisfying cost/benefit requirements.

*Remark: Planning affected by approval of GNSS safety case by Italian Regulator (ENAC).*
| Air Traffic Controllers training | • Training modules on PBN familiarization and P-RNAV procedures, including operational aspects, planned starting from autumn 2012 for radar CTR;  
|                              | • Training module on GNSS approach procedure starting from winter 2012/spring 2013 for those airports where those kind of procedures are expected to be introduced;  
|                              | • Training modules on PBN general concepts for people involved with operational tasks but not necessarily Air Traffic Controllers, starting from Autumn 2012. |
**PBN Implementation – Navaids**

- Progressive rationalization of conventional navaids;

- Gradual removal of NDBs at their lifetime end, starting from Navigational NDBs (Plan developed by an ENAV task force on NDB optimization);

- On site NDBs: Dismissal needs evaluated on a case by case basis depending both on the availability of GNSS approaches and other conventional navaids and on general aviation needs and equipment status;

- Introduction of new DMEs for those sites characterized by a low number of stations or by a poor system geometry.
ENAV has started, jointly with the operators feasibility studies for the introduction of instrument flight procedures for helicopters both conventional and PBN ones;

- Introduction of low level helicopter route requiring EGNOS augmentation. A specific AIC was published last 26/01/2012 introducing the new route.

- Introduction of new instrument flight procedures for helicopters for Milan Linate and Bergamo Orio al Serio jointly with AGUSTA Westland in the framework of ACCEPTA.
PBN Implementation

P-RNAV Schedule

• Development of P-RNAV SID & STARs for Italian TMA s (Milan TMA planned for Spring 2013; studies for Rome TMA, involving LIRF and LIRA starting after summer 2012);
• P-RNAV overlay, where applicable, completion for airports still pending: LIRN (SID), LIMC (SID), LIPE, LIMJ
• Development of P-RNAV SID & STARs for all airspaces served by radar approach. Already planned Olbia, Torino and Verona. Studies in progress for Bologna, Bari and Venice (Rwy 22 scenario);

RNP APCH scheduling

• During 2012/2014, more than 50% of rwy ends planned for the introduction of GNSS approaches. All major airports involved;
• Studies in progress to serve with GNSS approaches all rwy ends today reachable only by circling;
• First approaches to be introduced based on LNAV and LPV minima;
• APV/BARO implementation targeted where operationally needed and/or for those sites not meeting EGNOS performance for LPV;
• LPV procedures for helicopters in Northern Italy airports (ACCEPTA Project)
GNSS approach Safety Case

Manage the lack of certification of GPS as something to be mitigated.

Main Assumptions
• Aircraft certified according to AMC 20-27 or equivalent at least for LNAV specification;
• Instrument flight procedures developed according to a quality management system and undergoing ground and flight validation before publication. A preliminary assessment looking for GNSS interferences already in progress during flight checks.
• Implementation performed following DOC 9613 requirements and designed according DOC 8168.

Main Mitigations
• Missed approach based also on conventional navaids
• First procedures developed inside airspaces where radar monitoring is provided during the final approach
• Design tricks as locating FAF at an altitude not lower than radar minima in order to provide an easy management through radar vectoring by ATCOs in case of sudden GNSS unavailability
Conclusions

• Endorsment of National PBN implementation plan for Italian Airspace last June;
• P-RNAV procedures introduced during 2011, based on GNSS, DME/DME;
• Training modules developed for operational people and ATCOs in order to provide adequate knowledge of PBN, P-RNAV and RNP APCH world, including operational best practices;
• P-RNAV SID & STARs planned for the introduction on all airspace served by radar approach service;
• Safety Case for the introduction of GNSS approaches inside National Airspace already endorsed by ENAV and waiting for Regulator comments and eventually approval;
• GNSS approaches planned in order to cover during next two years more than 50% of runway ends aiming to comply with resolution A37/11 target for 2016. Planning subject to Safety Case approval by the Regulator;
• Introduction of LPV procedures for helicopters. First two airports selected in Northern Italy in the framework of ACCEPTA Project.
Thank you for your attention