ENAV’s Flight Efficiency Plan aims to contribute proactively to lowering Airspace User’s operating costs, reducing fuel consumption and pollutant emissions related to flight operations. Since its first disposition in 2008/2009, the planned interventions are meant to ensure a greater accessibility of the airspace with more available routes for the Users, through a continuous process of review and improvement of the air navigation system that can contribute to fly safely and efficiently.

The FEP is strictly linked to the successfully application of the PBN in Italy which is granting benefits over the global efficiency of ATM. It also contributes to the fulfilment of “Italy’s action plan on CO2 emissions reduction” that the States draw up - within the ECAC / ICAO framework – as a contribution to the achievement of the overall objectives of reducing the environmental impact of aviation and contrast changes climate.

Annually ENAV’s Customer Care promotes several initiatives to meet the Airspace users’ needs that are significant for the definition of ENAV’s annual FEP.

The implementations allowed considerable savings in terms of fuel consumption and GHG emissions thus producing their positive effects year after year in accordance with the airspace users’ expectations.

In December 2016 ENAV, according to the EU Regulation 716/2014 and before the scheduled deadline, implemented the Free Route operations in the Italian airspace (FRAIT) above FL335, achieving the third step of a multiannual programme started in 2013.

Because of its environmental relevance the Italian NSA monitors ENAV’s FEP in the framework of the SES National Performance Plan. Outcomes from the implementation are estimated through monitoring carried out year by year.
EN-ROUTE AIRSPACE DESIGN AND NETWORK AVAILABILITY

The Italian airspace and its route system is continuously improved exploiting the area navigation capability mostly within the Blue Med FAB framework. Hand in hand, the Route Availability Document (RAD) is updated on a regular basis with the aim to both optimize the network and better balance capacity and efficiency. During these years, a particular attention has been paid to the improvement of flight profiles, by gradually making available higher flight levels for most domestic city pairs and certain cross-border connections.

Now FRAIT operations offer capability for optimal trajectories 24/7 in the Italian airspace above FL335 thus delivering better compliance with Airspace Users’ needs.

FRA-IT - A new operating method that meets Airspace Users

ENAV implemented the Free Route operations in the Italian airspace (FRAIT) above FL335, on December 8th 2016, achieving the third step of a multiannual programme started in 2013. The Phase 1, in mid-December 2013, enabled the availability of dedicated direct and near direct routings for overflights operating at night and during the weekends in the Italian airspace above FL335 and the extension of the temporal availability of some ATS routes. The second step, in January 2015, lowered the dedicated routing.

Within FRAIT aircraft may freely fly a direct path and an optimal vertical profile between a pair of defined Entry Point and Exit Point, without reference to an ATS Route Network. FRAIT operations are available for overflights as well as for arriving and departing traffic.

Ad hoc continuous training sessions and some technological upgrades to the ATC systems have been accomplished to provide ATCOs with tools to manage traffic in Free Route airspace.

<table>
<thead>
<tr>
<th>City-Pair</th>
<th>AC Type</th>
<th>RFL</th>
<th>TOTAL Route Dist. (NM)</th>
<th>TOTAL Flight Time (hh:mm)</th>
<th>Δ Dist (NM)</th>
<th>Δ Time (hh:mm)</th>
<th>Δ Fuel (Kg)</th>
<th>Δ CO2 (Kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LICJ-LIPZ</td>
<td>B712</td>
<td>PRE FRAIT</td>
<td>300</td>
<td>483</td>
<td>01:16</td>
<td>-17</td>
<td>-0.03</td>
<td>-101</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FRAIT</td>
<td>340</td>
<td>466</td>
<td>01:13</td>
<td>-3.5%</td>
<td>-4.0%</td>
<td></td>
</tr>
</tbody>
</table>
During the first four weeks of FRAIT operation, the actual shortest flight plans for the sample of comparable City-pairs have got an average reduction of 18 NM. This indicator marks 20NM for the overflights. The first outcomes as well as the positive feedbacks received from AOs who have already benefit from FRAIT, confirm the expectations in terms of optimisation of the flight trajectories.

The assessed period includes AOs’ actual flight schedules for Christmas holidays which makes it special. More, part of the AOs, which fly in Italy, have not promptly updated their Flight Planning to the new routing opportunities, thus failing to fully exploit the potential from the first weeks of operations. The two factors suggest there is scope for further improvement in flight efficiency performance already being valuable in the early months of 2017.
Interesting is to see how change the occupancy duration and distance after FRAIT implementation. While leading to an overall reduction of the route length and fuel consumption, thanks to the absence of the ATS route network and to the possibility to plan efficient trajectories most of overflight traffic also gains, on average, in terms of occupancy distance and occupancy duration in the Italian Airspace. International Departure and Arrival now may plans their flight higher and direct, the effect is a longer stay in FRAIT than before.

<table>
<thead>
<tr>
<th></th>
<th>PRE-FRAIT</th>
<th>FRAIT</th>
<th>FRAIT vs Pre-FRAIT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Occupancy Duration (min)</td>
<td>Average Occupancy distance (NM)</td>
<td>Average Occupancy Duration (min)</td>
</tr>
<tr>
<td>ALL Flights</td>
<td>29:00</td>
<td>211.2</td>
<td>30:04</td>
</tr>
<tr>
<td>Overflights</td>
<td>40:09</td>
<td>297.0</td>
<td>39:29</td>
</tr>
<tr>
<td>DEP INTL</td>
<td>19:03</td>
<td>133.6</td>
<td>20:42</td>
</tr>
<tr>
<td>ARR INTL</td>
<td>22:39</td>
<td>168.6</td>
<td>23:17</td>
</tr>
<tr>
<td>Domestics</td>
<td>31:13</td>
<td>221.8</td>
<td>28:43</td>
</tr>
</tbody>
</table>

Free Route operations have been implemented simultaneously in Italian and Maltese airspaces, according to the BLUE MED FAB Implementation Programme, with the objective to increase flight efficiency and improve the use of the airspace. This achievement was made possible through a continuous coordination with the Network Manager to share and validate the new concept of operations.

**Plan 2017 – 2019**

Free Route in Italy:
- Lowering FRAIT inferior limit
- Integration FRAIT with FRA ML
- Integration FRAIT with FRA GR

Review of CDR classification following the implementation of military areas with high flexible use, Third phase: Sardinia area

Re-Classification military areas above FL335 in AMC manageable and application of AUP/UUP process for Airspace Management

Coordination with FAB Blue Med Partners to improve both intra-FAB and trans-FAB route network; Implementation of intra-FAB BM DCTs for selected routings

Network optimization based on traffic demand and harmonization of new RAD implementations
DESIGN AND USE OF TERMINAL AREAS

The optimization of the air traffic management and the reduction of flight distance and time are accomplished through a rational and efficient use of airspace by means of new Instrument Flight Procedures and of the CTRs reorganization.

Several link routes and IFP have been updated in the recent years also to reduce the distances, in so meeting the Customer’s expectations of mile savings.

New Instrument Flight Procedures, also enabled by PBN, will be designed with the aim to facilitate Continuous Descent and Climb Operations whenever feasible.

Plan 2017 - 2019

New implementations or improvements of P-RNAV SIDs/STARs:
LIPX, LIMF_STAR, LIBR_SID, LIRN_STAR, LIME_STAR, LIPR, LICJ, LIMJ, LIPZ, LIBR_STAR, LIEA, LIPQ, LICA, LIBD

Implementations of RNP Approach procedure:
LIBD, LIBR, LICG, LIME, LIPX, LIRQ, LICJ, LIRN, LIMJ, LIMF, LICR, LIEA, LIMZ, LIMP, LIRZ, LICA

New implementations STAR TROMBONI P-RNAV:
LIRF and LIMC

Implementation of CDO IFP over PBN to be implementing structures:
LIPX, LIMF, LIRN, LIME, LIRF and LIMC
AIRPORT OPERATIONS

ENAV is leading, in cooperation with airport operators and airspace users, the deployment of A-CDM for the main Italian airports in order to improve the airport operations’ efficiency allowing to optimize the departure sequence and the taxi-times (-in and -out).

After Roma Fiumicino, Milano Malpensa and Venezia, from May 2016 Milano Linate is the fourth Italian full A-CDM Airport.
In a number of other airports a basic system for automatic data exchange managed by ENAV is available.

Air Traffic Controllers skilled in delivering efficient ground operations along with automation represent enabling factors for the reduction of apron and taxiway congestion while still guaranteeing the traffic flows and the airspace users’ needs.

Plan 2017 - 2018

Implementation of A-CDM - Local and Full - with SW support for automatic data exchanging among ATC, AOP, Airlines, NMOC and related operational procedures for LIRN, LIME.

Implementation of airport data management tool: LIEE
OPERATIONAL STAFF AWARENESS

One of the four cornerstones of the Flight Efficiency Plan is to raise Air Traffic Controllers’ awareness since they can give a mighty contribution for fuel savings both to in flight and on ground operations.

The principles of flight efficiency and their environmental implications were planned to be part of all the trainings and updating for ATCOs ever since ENAV’s first FEP in 2009.

Currently they are included in both the training plans and report cards of ab-initio and advanced courses of the ATCOs’ students of ENAV Academy as well as in the ATCOs continuous training courses.

The positive achievements in the airports ground operation and in tactical behavior in every phase of flight are the main follow-up of this increasing in-depth training for operational personnel more deeply focused on efficiency.

Plan 2017

Ab initio and advanced ATCOs students will follow around 100 hours on flight efficiency.

ATCOs continuation training will include around 3,000 hours focused on flight efficiency.
“ENAV programs and implements the optimization of the ATS network and the air traffic management procedures that enable, together with the highest levels of safety, the reduction of planned distances and flight times, resulting in a lower fuel usage and carbon dioxide released into the atmosphere.”
ACHIEVEMENTS
EN-ROUTE AIRSPACE DESIGN AND NETWORK AVAILABILITY

2016
The main design and implementation effort in 2016 was allocated to the Free Route realisation nonetheless some achievements took till summer season:

- Route realignments, changes in lower/upper limits, or time availability
- Route availability maintenance and improvements
- Review of CDR classification following the implementation of military areas with high flexible use, Ionio and Sicilian areas

2016 Performance
FRAIT excluded

\[ \Delta \text{Km} = -492,200 \]
\[ \Delta \text{Kg Fuel} = -1,917,000 \]
\[ \Delta \text{Kg CO}_2 = -6,038,500 \]

2015 ÷ 2008
Free route in Italy (FRI): first and second phases (2013-2015)
Redesign of the Italian Airspace and ACC Airspace Reorganization (2014)
Reorganization of route network portion over ALG, BZO, FRZ and Verona
Reorganization of route network for Milan and Rome U/FIRs
Dedicated direct routings, available night-time or H24 and improvements from NGT-WE to H24
Implementation of new routes, extensions, realignments and direct routings in Italian airspace
Conversion of DCTs into ATS routes and time extension of their availability
Improvements in flight profile Italy to/from Tunisia, to/from Spain, to/from France.
User preferred flight level through raising or removal of level cappings for citypairs
Increase of hourly network availability in winter seasons
Summer season two more hours clear of RAD constraints every day
ACHIEVEMENTS
DESIGN AND USE OF TERMINAL AREAS

Review of ROMA and MILANO TMAs
Withdraw of PADOVA and BRINDISI TMAs
Implementation of BRINDISI, MILANO, PADOVA and ROMA CTAs

Reorganization of LICJ, LIPY, LIPE, LIME, and LIRF CTRs and related IFP
Implementation of RNAV approach procedures for LIEA
Review of LIMP and LIPZ Initial Climb Procedures and SIDs
Reorganization of SIDs for LIRF and LICJ
New STAR and/or SID for LIMP
New IAC for LIBC
P-RNAV SIDs/STARs:
LIPX, LIRF, LIMZ
New IFPs (STAR or SID or IAP or ICP):
LIBC, LIBP, LIPY, LIPO, LIRZ ,LIMP, LIMZ, LICA, LIRA, LIRF
Publication of an ad hoc AIC describing the implementation of Continuous Descent Operations
Implementations of P-RNAV SIDs/STARs:
LIPZ, LIEO, LIPE, LIPX, LICJ, LIRQ
New IFPs (STAR):
LIME, LIMF, LIMZ
New IFPs (SID):
LICA, LIBP

2016
2015
2008
ACHIEVEMENTS
AIRPORT OPERATIONS

2016
Full A-CDM @ LIML

2015 ÷ 2008
Optimization and automation of the apron management of LIMC, LIML, LIME, LIMF, LIPE, LIPZ, LIRN, LICJ, LIEA, LIMJ, LIRQ, LIEO, LIBD, LICC and LICA.

Full A-CDM implementation with SW support for automatic data exchanging among ATC, Airport Operators, Airlines, NMOC and related operational procedures for LIRF, LIMC, LIPZ

ACHIEVEMENTS
OPERATIONAL STAFF AWARENESS

2016
15.430 hours on flight efficiency provided to ATCOs during continuous training

250 hours on flight efficiency provided to ab initio ATCOs and advanced ATCOs

2015 ÷ 2009
Around 1000 people - ab initio ATCOs, advanced ATCOs and FISO students - have attended modules on flight efficiency at ENAV’s Academy

Managerial dedicated workshops for all ENAV’s ATS Units

23.240 hours on flight efficiency provided to ATCOs during continuous training