

Italian Airspace Reorganization – Case study

ICAO Template for good practice examples of environmental assessment (Draft V1.0)	
<p><i>Note: The italicized text is for guidance only and merely indicates the kind of information that is likely to be of value for users of the ICAO assessment guidance. You do not need to cover all points if some are not applicable to your case study.</i></p>	
<p>Organisation/Company: <i>(The name of the body that undertook or sponsored this assessment)</i> ENAV S.p.A.</p>	
<p>Project Title: <i>(The title of the project being assessed)</i> Italian Airspace Reorganization</p>	<p>Date of Assessment: February 2014</p>
<p>ASBU Module Code(s)¹: (Partially NOPS, FRTO)</p>	<p>States' Action Plan²: Italy</p>
<p>Project Description: <i>(Briefly describe the project or proposed operational change to be assessed for its environmental implications; Please when possible, use schematics for illustration.)</i> The project involves all Italian Area Control Centres (ACCs) and aims to review the existing airspace structure and to improve the network usability with a flight efficiency oriented solution while increasing performance in the Capacity and Cost-Efficiency Key Performance Areas while maintaining and/or increasing performance in the Safety KPA. In order to develop an improved network—i.e., a network with fewer flight planning constraints, more direct routes, and better vertical profiles, allowing for a reduced environmental impact from flight operations--the modifications mainly affect:</p> <ul style="list-style-type: none"> ○ ACCs Line of Responsibility, vertical limits and Coordination Points (COPs) ○ Air Traffic Service (ATS) route scheme and availability ○ Use of flexible ACC operational configurations 	
<p>Reason for the environmental assessment: <i>(Explain why the environmental assessment was undertaken and if applicable include any specific regulation, policy, or rule that requires the assessment to be undertaken)</i> There is no specific regulation requiring an environmental assessment, however the company has an internal QMS procedure to estimate <i>a posteriori</i> the effects on flight efficiency of the changes in airspace, ATS route structure, procedure design, and subsequently in flight planning. For some specific major projects, however, pre-assessments of potential benefits from improvements in flight planning and related changes in fuel burn and CO₂ are carried out.</p>	
<p>Client or competent Authority: <i>(Explain which body the assessment will be submitted to for their approval or decision making. Was the assessment internal or public? What audiences is it intended to inform?)</i> ENAV organized a Customer Care event (Airlines Plenary Meeting) in February 2014 to inform in advance the airspace users about the envisaged operational changes. This was also the opportunity to inform them about the environmental implication of the changes being undertaken.</p>	

¹ **APTA**-Approach procedures including vertical guidance; **WAKE**-Wake vortex; **RSEQ**-AMAN / DMAN; **SURF**-A-SMGCS, ASDE-X; **ACDM**-Airport CDM; **FICE**-Increased efficiency through ground - ground integration; **DAIM**-Digital AIM; **AMET**-Meteorological information supporting enhanced operational efficiency; **FRTO**-En route Flexible Use of Airspace and Flexible routes; **NOPS**-Air Traffic Flow Management; **ASUR**-ADS-B satellite based and ground based surveillance; **ASEP**-Air Traffic Situational awareness; **OPFL**-In-Trail procedures (ADS-B); **ACAS**-ACAS improvements; **SNET**-Ground based safety nets; **CDO**-Continuous Descent Operations, PBN STARS; **TBO**-Data link en-route; **CCO**-Continuous Climb Operations

² <http://www.icao.int/environmental-protection/Pages/action-plan.aspx>

Assessment Approach: *(This section asks for a brief description of your application of the ICAO guidance for each main assessment step. If a step was not undertaken give a brief explanation of why the step was omitted or is not applicable to this assessment example. Please complete each section individually. In this box you can explain why the ICAO approach to assessment was chosen. If you did not apply the ICAO methodology please explain how your methodology differed from the ICAO approach.)*

The assessment has been accomplished by internal environmental experts in accordance with ICAO guidelines and methodology in the following steps:

- determine scope;
- preparation;
- assessment;
- analysis of results.

Time has also been spent checking the reliability of the results and evaluating the interdependencies among the involved parties of the project, thus bringing into the assessment loop the designers and the experts of the other operational KPAs.

Preparatory Work: *(Briefly explain the relevant background activities that have been undertaken to prepare for the assessment. This may include decisions or processes such as, deciding that an environmental assessment is required, identifying the assessment client, gathering base data, deciding on years to be assessed, deciding on assessment methods or standards to be applied. There is no need to cover all possible information, simply provide a sufficient explanation of the reasons why the assessment steps and approach were selected. How did you establish which rules, regulations, or standards applied to the assessment?)*

In addition to the abovementioned information provided, it is worthwhile to also report that:

- the documentation produced by the Airspace design department has been carefully examined to clearly characterize the project scope and objectives from the assessment point of view;
- research has also been done to look for reference material on the environmental assessments of operational changes similar to those that are under analysis.
- fast time simulations have been chosen as techniques that fit the assessment needs;
- the comparative approach has been decided. The process required the definition of the reference scenario, i.e., the “current” one which reproduces the operational context in place at the time of project definition, used as a basis for comparison for the designed scenario, the proposed one, including all the envisaged changes active at the full implementation in the project;
- to model the traffic, the traffic sample of a representative week of 2013 has been used. From this traffic sample a “short list” of main connections (city-pairs or flow direction) has been investigated;
- fuel burn and CO₂ have been selected as metrics to address the comparison between the current operational scenario and the envisaged solution scenario;
- before starting the assessment, data availability and quality have also been analysed.

Describe the proposed [operational] change, its purpose and alternatives: *(Explain what will change as a result of the proposal to be assessed – this may repeat the information in the earlier project description. Explain why this project is required and what purpose it serves, and what alternatives have been considered. Information on why these alternatives were rejected is useful but not essential)*

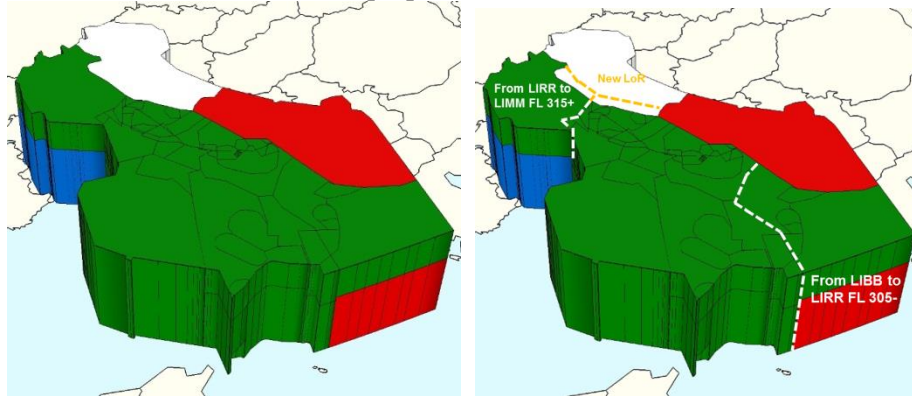
Within the Italian Airspace Reorganization project, different infrastructural and operational changes have been planned, with potential environmental impacts. The modifications mainly affect:

- ACCs Line of Responsibility, vertical limits, sectorisations and COPs
- Airspace scheme, i.e. ATS routes and their availability;
- CTR lateral and vertical boundaries; and
- Increase in number of logical sectors to allow for flexible configurations

The feasibility study started in 2012. The project envisages a three steps implementation, in April, May and November 2014 implying:

- handover management of sectors until below FL305, from Brindisi ACC to Rome ACC;
- handover management of sectors inside Milan FIR above FL315, from Rome ACC to Milan ACC; and
- rearrangement of Line of Responsibility of all ACCs.

Each of the above changes includes the update of ATS route network and/or adaptation of the Route Availability Document which contains the proper information on restrictions active on some routes.



Italian ACCs, on the left an illustrative schema before the Airspace Reorganization, on the right a schema of designed implementation.

Describe the scope and extent of the assessment: (How was it decided that this assessment was needed – “screening”. Describe the impacts to be assessed, for example, aircraft noise, CO₂ or NO_x emissions, climate impacts or air quality impacts. Explain the decision making process that determined this scope and the level of detail to be used in the assessment – “scoping”. Also describe any formal processes to consult upon or agree on the scope, for example, via a nominated competent authority if applicable. Explain for example if the scope was set using expert judgement or a pre-assessment checks or information gathering. Also describe how the decision to undertake a more detailed assessment, or not, was taken. How were the base-case and proposed case(s) determined, why were particular years chosen.)

See Section “Reason for the environmental assessment” and “Preparatory Work”

Describe the assessment itself: (Describe any standards or mandatory requirements for the assessment to be undertaken together with the methodology, monitoring or model used to determine the extent of the environmental impacts for the proposal. Give an indication of the extent or time-horizons that were chosen (if not already described earlier). Was quality management applied? For example, was there a process to ensure that the input data for the environmental assessment was consistent with other parallel assessments? Were interdependencies encountered and how did you address any trade-off issues³? Was the expertise for this assessment available from internal resources or procured externally?)

The study included the development of two scenarios: Reference Scenario, the current at that time, ante reorganization, and What-if Scenario, which took into changes assumed in the reorganization plan.

The Reference Scenario reproduced network infrastructure, vertical constraints and rules in force for the operational management of the Area Of Responsibility AOR of Brindisi, Milan, Padua and Rome ACCs, prior to the review of the Italian airspace, with air traffic sample derived from flight plans in the EUROCONTROL DDR2 database, related to the 29th week of Y2012 (16 July to 22 July 2012). The W29_2012 was chosen as qualifying week to represent the volumes of traffic operating in the airspace managed by ENAV during the "Summer Season".

What-if scenario reproduced network infrastructure, vertical constraints and rules of operations assumed to be in force in the AOR of the a.m. ACCs at 31/12/2014, after the implementation of the project Italian Airspace Reorganization, with air traffic sample being the planned one of the 29th week of Y2012 updated to the network improvements expected from the project, i.e. with change of flight profiles in order to use the improvements in the routes available (both horizontal and vertical profile).

³ For definitions and examples of interdependencies and trade-offs, please refer to Chapter 4 of ICAO Doc 10031, Guidance on Environmental Assessment of Proposed Air Traffic Management Operational Changes.

In order to gather the two output datasets needed to estimate fuel burnt and CO₂ emissions, the two scenarios have been run with the Airtop Fast Time simulator tool and BADA v3.11 with standard settings factors such as prevailing winds, specific "Cost Index", ATFCM adjustments, etc. have not been taken into account.

A comparison between the solution dataset vs. the reference dataset was performed to estimate the delta values, i.e. to assess the reduction in fuel burn and CO₂ in the envisaged scenario (what-if) compared to the reference one for some of the most important air route or city pairs.

The data input was consistent with the data input for Capacity assessment.
Internal environmental experts accomplished the assessment.

Describe the results and how they were communicated: *(Explain in general terms what the results of the assessment were, how this was used, for example to what extent it informed decision making or approval for the project. Was it produced as a draft for consultation or simply as a final report? Were the results validated or verified in any way – for example were the assessment processes or quality management processes independently audited? Did the results feed into a wider process, for example, a business case assessment?)*

The outcomes of the assessment showed a clear lowering of CO₂ emissions under the investigated conditions. The details of the assessment have been distributed to the internal stakeholder (mainly, airspace design experts and network experts) for reviewing and gathering feedback prior to collating the final results.

Lessons learned: *(Explain here what worked well, what could be improved, what you would do differently next time –If applicable please explain if you think the ICAO assessment guidance could be improved and in what way. If you did not use the ICAO methodology can you identify aspects of your methodology that could provide benefits to future iterations of the ICAO guidance? What aspects of the ICAO guidance would you apply to your own methodology for future assessments?)*

Despite the narrow scheduled times for the realization of environmental assessment, this has been achieved on schedule with satisfying outcomes, thanks to the very good level of pre-coordination that has been reached among KPAs experts, airspace designers and en-route operations specialists.

Comments: *(Optional - Offer here any other advice or hints that may be of value to others using ICAO environmental assessment guidance)*

The explanatory text included in the boxes sometimes leads to redundancy in the responses since some topics needed to be repeated in one or more boxes. A streamlining of the questionnaire could reduce it. To improve the readability an idea could be to move the box "Describe the proposed [operational] change, its purpose and alternatives" to just below the box "Client or competent Authority"