

The “New Lisbon Airport” project and the Location Assessment Study carried out by LNEC

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(Source: NAER)

Summary

A brief presentation is made on the background and state of progress of the Project of the “New Lisbon Airport” (NAL), launched by the Portuguese Government, to be in operation by 2017.

In 2007, at the planning stage of this process, an assessment study was commissioned by the Ministry of Public Works, Transports and Communications to LNEC (the National Laboratory for Civil Engineering) for the comparison of two alternative sites for the location of the airport.

The author of this article was one of the coordinators of this study whose main aspects are hereafter described.

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1. Background

The existing Lisbon Airport at Portela started operating in 1942. By the end of the 60's, governmental initiatives were initiated aiming at replacing this airport by a new one at the Lisbon Region, for serving the capital city of Portugal. Nearly a dozen possible site locations for this infrastructure have been assessed throughout numerous studies carried out since then.

In 1998, a new public company, NAER, S. A. – New Airport, was established to develop the studies that were necessary to support a decision on this matter. At that time, two alternative sites were under consideration, one to the North (Ota zone) and the other to the South (Rio Frio zone) of the Lisbon Metropolitan Area. A preliminary choice was made in 1999 by the Portuguese Government, indicating Ota as the best alternative, based on the results of an Environmental Impact Assessment. Therefore NAER started a set of studies for that site, involving national and international enterprises and consultants.

The need to replace the existing airport, located within the urban area of Lisbon, was becoming urgent due to increasing passengers' and freight demand and to operational, safety and environmental restrictions (such as noise), as well as the lack of available space for runway extensions. In 2005 it was estimated that the airport (after additional airside and landside investments) would reach its maximum capacity by 2016, accommodating 16 million passengers per year. Considering the previous decision and NAER studies, the Government announced then that the construction works of the New Lisbon Airport (NAL – “Novo Aeroporto de Lisboa”) at Ota would start in 2008, for completion in 2017, with an initial capacity of around 20 million passengers/year.

The site location chosen for the NAL was, however, far from consensual, being criticized by several stakeholders of the technical community, including academia, and echoed by the media. In fact, despite some advantages (e.g. good accessibility either by conventional or planned high speed railways) the Ota zone, located about 45 km from the centre of Lisbon, presented several drawbacks, namely related to difficult terrain and hydrological conditions, implying complex engineering, huge earthworks and high construction costs, as well as some restrictions to air operations.

In June 2007, based on a viability study report, the Portuguese Industry Confederation (CIP), presented to the Ministry of Public Works, Transports and Communications (MOPTC) an alternative site to Ota that had not been previously considered, since it was included in an area reserved for military use: the CTA (“Campo de Tiro de Alcochete”) zone, located at about the same distance as Ota, to the East of Lisbon, at the South bank of river Tagus. The advantages shown in this preliminary study and the willingness to meet a broad technical consensus, led to a decision of the Ministry to commission to the National Laboratory for Civil Engineering (LNEC) a comparative assessment study on the two alternative locations for the NAL: the Ota and the CTA zones (see Figure 1).

The final report of the LNEC study (see section 2) was delivered to the MOPTC in January 2008. The overall findings showed that both locations were viable in technical and economical terms. Nevertheless the two location presented different outcomes according to each of the critical factors selected for the comparative assessment. The conclusions pointed out to overall advantages for the CTA zone, given that equal weights were given to the relative importance of each factor.

A preliminary decision of the Government followed, selecting the CTA zone for the NAL, which was confirmed a few months later by a Council of Ministers Resolution, after the completion of a process that included a public consultation, under a Strategic Environmental Assessment of Transportation Investments, in accordance with the present Portuguese legal framework (transferred from the European Directive 2001/42/CE).



Figure 1 – The two alternative sites for the location of the NAL (Ota and CTA zones)

2. The LNEC comparative study

For undertaking the comparative assessment of the two NAL locations, within period of 6 months given for the whole study, the LNEC organized and coordinated a specific interdisciplinary team comprising 40 experts, among researchers (20) and other technical staff from LNEC (5), external advisors (5), as well as national (7) and international (3) contracted consultants in areas not covered by this institute. The foreign participation was ensured by: the “Institute for Transportation Studies” (ITS) of the University of Leeds (methodological support to the cost-benefit appraisal); EUROCONTROL - the “European Organization for the Safety of Air Navigation” (capacity, safety and efficiency of air traffic operations); and the “Central Science Laboratory for Wildlife Ecology & Management” (wildlife ecology and bird strike risk analysis).

A methodological approach was followed for conducting this study, which adopted Strategic Environmental Assessment principles, integrated with a Cost-Benefit Analysis (CBA), as represented in Figure 2.

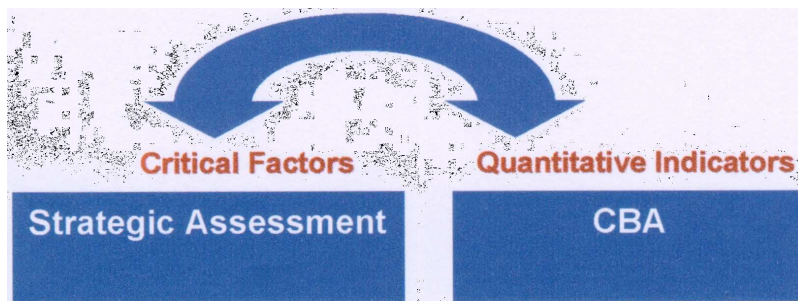


Figure 2 – Methodological approach scheme

This approach implied the selection of a limited number of Critical Factors for Decision (FCD) considered as the most relevant and equally important for the strategic assessment. For each one of the seven selected FCD (see Table 1), analysis domains, criteria and qualitative and quantitative indicators were identified, which could lead to the detection of tendencies, opportunities and risks associated to each alternative site for locating the NAL. The integration of these results with the CBA was accomplished through analysis factors for each FCD that could be quantified in monetary terms.

Costs and benefits were calculated using a simplified method (including some externalities) for the life cycle of the project (2017 – 2050), considering intermediate years (2022, 2030 and 2040), the monetary values being expressed as constant prices, referred to year 2008. The overall results of the CBA, by itself, didn't show a significant difference between the two locations.

The main outcomes which supported the conclusion of this study indicating a preference for the location at the CTA zone compared to Ota zone, were: better conditions for the efficiency of air traffic operations, satisfying all safety requirements, with enhanced

capacity for aircraft movements; much lesser earthworks and other engineering interventions for building the platform, presenting lower costs and a higher flexibility for a phased growth; enough available area for future expansions of the landside and for the settlement of a future airport city; better perspectives for economic development and competitiveness; more favourable financial indicators. The main drawbacks of this location were referred, namely, to higher bird strike risks and to several environmental and land use issues (excepting noise impacts), requiring adequate and timely prevention and mitigation measures, which were presented as recommendations.

Table 1 – Critical Factors for Decision selected for the NAL study

Critical Factors for Decision	Evaluation subjects
<i>FCD1. Safety, capacity and efficiency of air traffic operations</i>	Climate and meteorological conditions; bird strike risks; land obstacles for air navigation; operational efficiency and runways capacity
<i>FCD2. Sustainability of natural resources and risks</i>	Surface water resources: changes in natural drainage networks, measures for flood control and erosion risks; Groundwater: vulnerability to pollution, recharge of the groundwater system and its exploitable potential, protection areas; Geotechnical: earthworks, construction costs and seismic risk ; Noise: Population and other sensitive exposures
<i>FCD3. Conservation of nature and biodiversity</i>	Ecological land value; level of impact on the surrounding natural areas (<i>habitats</i> and protected species)
<i>FCD4. Surface transport systems and accessibility</i>	Sustainability of the transport system (road and rail, existing and planned); integration with the high speed rail; operational costs of the road component, journey times and reliability
<i>FCD5. Land use development and planning</i>	Demographic dynamics; land occupation and use; urban dynamics (population and business sector)
<i>FCD6. Competitiveness and social and economic development</i>	Model of the airport city; support to the internationalization of the economy; strategic positioning, competitive advantages, growth and employment; economic and financial conditions for the development of the project
<i>FCD7. Financial analysis</i>	Financial admissibility of the investment; differential Net Present Value (NPV) of the projects

3. Present situation of the NAL project

As soon as the site location decision was taken, NAER launched a number of studies and field tests for a thorough characterization of the new site (CTA zone) on different aspects. The LNEC was also involved at this phase, providing technical assistance basically for geological, geotechnical, hydrological, hydraulic, and soil contamination issues.

Besides technical and environmental studies, the preparatory work has included financial and legal aspects, which are deemed necessary for launching an international public tender for the NAL construction. It is foreseen that it will start operating by 2017, being built on a DBOT (Design, Built, Operate, and Transfer).

For that purpose a Reference Mater Plan has been developed, incorporating the main features of the new airport, as well as its land accesses. The NAL will be linked both to the conventional and to high speed railway services. A shuttle, running on the high speed line is also foreseen, which will ensure the connection between NAL and the terminal station at Lisbon in approximately 20 minutes. These links imply the existence of a third bridge, crossing the Tagus River in the Lisbon Region, which is already planned within the scope of the Lisbon-Madrid high speed line project.

According to the Master Plan, the airport will occupy an area of 3,400 hectares of a total 7,500 hectares of land which will be liberated after relocation of the current military facilities. A significant part of this whole area will be allocated to environmental protection due to the sensitivity of the site, located near protected areas of the Tagus Estuary. The airfield will comprise two parallel runways (4,000 m long each), separated by 2,180 m, which can comply with independent simultaneous mixed mode operations (space was reserved for future expansions up to 4 runways). The passengers' terminal will be linked to public transport interchange (train and bus stations) and car parking, as well as to a commercial centre and to several operational support facilities.

The NAL is projected for a capacity of 22 million passengers and 160,000 tons of cargo per year at its opening, reaching 44 million passengers and 400,000 tons in 2050. The investment costs of this project are estimated at 3,300 M Euros. It is qualified by the EC as a Priority Project within the Trans-European Transport Network.

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