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BAA USE OF SMART SYSTEMS FOR AIRPORT NOISE CONTROL

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ABSTRACT

BAA is the world's leading Airport company. One of the biggest factors affecting aviation growth are environmental impacts, currently the most significant of these is noise which is regulated by the UK Government. In order to help secure growth with the co-operation of local communities it is important that BAA manages and controls its impacts as much as possible. Noise management costs a significant sum of money and, as a private company, BAA must be as efficient as possible and therefore BAA adopts a range of IT solutions to do this. These systems have helped to deliver significant improvements in efficiency as well as real reduction of impact. This paper outlines the uses of the systems, improvements that have been brought about and also some of the issues associated with owning them.

1 - INTRODUCTION

BAA plc is committed to being a good neighbour and recognising the importance of managing and monitoring its impact has invested significant amounts of money in a number of noise management systems.

This paper outlines the reasons for owning such systems, what benefit they bring to BAA and observations on some of the problems associated with owning them. The primary focus of this paper is the noise and track (NTK) monitoring system although reference is made to the other systems, the interaction between them and the benefits that they bring.

2 - BACKGROUND

BAA's London airports (Heathrow, Gatwick and Stansted) are designated under the Civil Aviation Act 1982 for the purposes of air noise. This means that the airport companies are required under statute to monitor adherence to certain rules and to own a noise and flight track monitoring system.

BAA's London Airports must monitor adherence to:

- Statutory noise limits and impose fines against airlines breaching these limits
- Noise preferential departure routes - no fines in place
- Night flight restrictions

They are also required to have Consultative Committees and report performance against these rules to it directly or through one of the committee sub-groups. In the spirit of ownership, BAA also agreed to take over handling noise complaints for its London airports from the Government in 1994.

Heathrow is very close to very high density population of west London. Approach paths during westerly operations approach over west London. Gatwick is also similarly close to high density population, whereas, in contrast, Stansted is in a relatively rural location. Each location brings its own challenges in terms of noise management and community relations that will be familiar to managers of other similarly located airports.

BAA's business must develop, however it is recognised that relative growth cannot be to the detriment of the environment and therefore we believe that noise systems are tools that help us to deliver actions that help minimise our impacts in line with growth.

	BAA London Airports
Area 57 Leq contour (km ²)	296.3
Area per 100000 passengers (km ²)	0.33
No of complaints/year	> 25000
Flights per annum	approx 1 million
Passengers per annum	> 105 million
Spend on noise management 1998 - 2000	over £3 million

Table 1: BAA dimensions.

3 - THE NOISE SYSTEMS

With the level of complaints, cost and movements at each of these airports there is a need for a high level of automation, where the system is smart and able to identify noise caused by aircraft, flights giving rise to complaint, night flights, aircraft not flying within defined flight rules. As shown above, this costs BAA a significant amount of money. The challenge for these systems is not only to deliver monitoring to provide compliance with statutory requirements but also to deliver extra value by enabling focussed use of resource to help build trust and understanding with local community and industry partners.

There are essentially three systems that stand separately from each other. The main noise and track system is the primary source of data for the others and the following is a brief description of each of these systems, what they used for and the benefit that each has delivered. The primary focus is the noise and track monitoring (NTK) system as this is the primary tool used in BAA's noise management however details are also provided of the other systems used.

3.1 - The NTK system

The NTK system automates noise and flight track monitoring and provides the following basic functionality:

- builds flight tracks from the airports SSR data fed in real time; matches flight tracks to aircraft noise events obtained from remote noise monitoring terminals; analyses tracks for offenders of flight and/or noise limits; allows reports breaking down by airline, aircraft type for flight tracks, noise event and noise climate data

Each airport has a number of permanent noise monitors that are positioned in accordance with Government requirements and also has access to a pool of 28 portable noise monitors, all data is fed into the system.

The functionality described above all relate to compliance requirements however this does not demonstrate to the local community that we are committed to finding improvements. The Airports must monitor and report these as a minimum. Automating these functions using smart programming, resources can be focussed on making real benefits. Some examples of which are:

1. Improvements to flight track adherence - improved from 80% to over 95% at Heathrow in two years.
2. Departure noise study - following a departure noise study in partnership with British Airways, they changed their climb out procedures to reduce noise levels.
3. Arrivals noise study - a comprehensive series of studies looking at the arrivals noise impact and ways to reduce impact has been undertaken. This study showed that once established on the ILS pilots have little or no flexibility to affect on the noise impact of that arrival, also suggesting that the imposition of so called noise limits would be inappropriate in this situation.
4. Continuous descent approach (CDA) - more aircraft use CDA and are therefore now higher on approach to the airport flying from the hold points to the ILS.

The tool has released resource from counting numbers to actually addressing the problem and delivering results.

Whilst allowing us to meet our statutory requirements in an efficient manner, the true value of the NTK system has been to shift the focus away from day to day compliance issues and carry out work to provide a deeper understanding of airport operational patterns and behaviours. BAA's London airports have been able to work with our industry partners to investigate, develop and promote the use of best practice.

3.2 - The noise complaint system

The system allows us to pinpoint the location of complainants and using exported data from the NTK system allows us to identify the potential aircraft causing the complaint. The subject type for each complaint is recorded and thus we can look at the geographic distribution of complaints about particular subjects eg night flights. Additionally the system can report numbers of complaints by area to enable us to focus our community relations program to those areas that appear to be most concerned about aircraft noise. Track adherence improvements at Heathrow resulted in a 50% reduction in complaints about track performance. The GIS capability of this system was also used in planning Heathrow's noise insulation scheme to identify all addresses that would be eligible.

3.3 - Night flights monitoring

Again, BAA is required to operate within rules and restrictions that are set by the Government. Monitoring is also subject to audit by the Government.

The night flight restrictions are complex, but by adopting a simple database approach, monitoring and reporting can be made simple and effortless. Additionally the monitoring is transparent to auditing and outside scrutiny. This has added value in allowing the airports to focus energy on "problem" airlines and identifying areas where airline's experience delays and potentially identify improvements to processes to reduce the number of unscheduled departures.

3.4 - Added value

These systems have provided efficiency to BAA in airport noise management and have enabled BAA to carry out some work of real value in reducing noise impact and adherence to rules. As a result we have delivered:

- real improvements in airport noise impact;
- improved community relations;
- recognition of the work that BAA has done;
- a high level of customer service in terms of complaint response;
- greater understanding and communication of impacts.

3.5 - Problems

Although these systems have clearly added significant value, we have made a number of observations deriving from our experiences relating to the supply, development and installation of these systems that are worth noting:

1. Systems are complex
2. Thorough business analysis is essential to capture all requirements
3. High capital investment and also high revenue for support
4. Comprehensive testing, both factory and site, is required
5. Define the level of support according key drivers
6. Data loss should not be tolerated
7. Control and manage expectation
8. Process change associated with installation
9. Change management is crucial
10. Community concern re the data and the system.

4 - CONCLUSIONS

The noise systems installed at the London Airports have delivered real improvements and have improved BAA's standing as a leader in noise management and as a proactive member of the community (both aviation and local). The investment is a key element in the future development plans of BAA. It is

however important to recognise that the systems introduce issues and problems of their own and require active and attentive management.

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