

Dublin Airport Bottom-up Efficiency Study

- **Response to comments on draft determination**
- **Re-assessment of operational efficiency**

Summary Report
28th September 2005



by

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Contents

1. Introduction.....	1
2. Summary of Comments and our Responses.....	2
3. Dublin Airport Efficiency Re-assessment.....	13

1. INTRODUCTION

This report sets out our response to comments in relation to our report entitled “Bottom Up Efficiency Assessment of Dublin Airport” dated 28th April 2004 that were received by the Commission for Aviation Regulation (CAR) in response to Commission Paper CP2/2005: Draft Determination and Explanatory Memorandum for Maximum Levels of Airport Charges in respect of Dublin Airport.

It also presents our re-assessment, based on the revised cost data and forecasts (“the 2005 forecasts”) submitted by Dublin Airport Authority (DAA) to CAR in April 2005, subsequent to our assessment.

2. SUMMARY OF COMMENTS AND OUR RESPONSES

DAA Submission		
Location in submission	Comment	Booz Allen Response
Page 62	<p>Slide 96/100 – Car Park Direct Overheads ..overstates the potential efficiencies that may be gained from out sourcing ... costs incurred historically in relation to car park direct overheads have already been substantially outsourced i.e. bussing contract/security for Harristown, therefore the potential to gain further efficiencies from a third party is limited.</p>	<p>At the time of preparing the report, these events had not taken place and were not reflected in the data provided.</p> <p>In any case, potential efficiencies arising from outsourcing long stay car parking were not included in our assessment, as these would have required an assessment of the income side, which was outside the scope of the operational assessment.</p>
Page 63	<p>Slide 108/112 – “Dublin Airport operates many of its own retail facilities, including some catering facilities, and others are operated on a concession basis” This is factually incorrect as, in fact all catering facilities in Dublin are handled by external concessionaires. DAA directly operates Duty Free and Travel Value outlets only and manages concession retail and food and beverage activities.</p> <p>“DAA does not experience direct competition and lack of performance, if any, is not exposed”</p> <p>This is not a relevant point – there is not normally competition</p>	<p>Noted. The statement should be reworded “Dublin Airport operates many of its own retail facilities and others are operated on a concession basis”. This makes no difference to the rest of the content of this slide.</p> <p>The point we make is that, because of the way retailing is structured, there are no suitable data upon which we can make a judgement about the efficiency of DAA’s retail operation.</p>
Page 65	<p>It is difficult to see how efficiencies proposed by BAH following detailed examination of one set of projections could remain valid when applied to a set of projections that encompass a more up to date analysis.</p>	<p>The assessment was undertaken on the basis of projections provided by DAA at the time. Subsequently, but not within the time allowed for our assessment, DAA issued a more up to date analysis. Following the submissions on the draft determination, CAR instructed us to reassess efficiencies based on the 2005 data, and taking into account any other relevant comments. The results of this re-assessment are presented in Section 2 of this report.</p>
Page 66	<p>DAA reports that it expects to continue its efforts to attract air services to areas such as Hong Kong, Dubai and Singapore, and that the economic benefits of such services together with the commercial benefits for the airport justify the retention of marketing support.</p>	<p>It is our view that aviation support is no longer appropriate as Dublin Airport is already well developed.</p> <p>In any case, the assessment of any costs associated with the marketing should be included within an assessment of the income benefits, which is beyond the scope of the operational assessment.</p>
Page 66	<p>CUTE costs The removal of hardware leasing costs over the last 2 years has been a contribution factor to the lower costs we currently incur for CUTE...new equipment</p>	<p>We did not take into account the opportunity for cost efficiencies resulting from the removal of CUTE equipment from desks currently used by Ryanair.</p>

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	<p>would be required as current equipment is life-expired ...cost is reflected in DAA's 2005 projections for CUTE costs as a once off step increase...thereafter the only increases are for inflation. This is further evidence of the importance of projecting efficiencies on the basis of the latest information.</p> <p>Possible cost efficiencies resulting from the removal of CUTE equipment at the desks currently used by Ryanair has previously been explored with SITA...they will offer no reduction</p>	<p>Our understanding is that the CUTE service agreement with SITA is expiring shortly, and that there is an opportunity to go out to tender that may produce cost savings.</p> <p>New costs reflected in the 2005 projections will be taken into account in our new assessment based on the 2005 data.</p>
Page 67	<p>BAH assumption is that this category of cost is driven by FTE numbers and has therefore been linked to changes in FTE numbers by BAH. As previously advised... travel and subsistence is incurred to enable operational assessment and to avail of conferences/training courses etc. A reduction in staff does not necessarily result in a reduction in travel associated with these requirements</p>	<p>It is our view that, if Head Office FTEs reduced significantly, it would be surprising if this did not reduce overall travel and subsistence costs. However, as discussed in the following section of this report, Head Office FTEs are no longer forecast to directly decrease.</p>
Page 67	<p>A decision on accommodation for Group Procurement upon completion of the New Terminal in Cork has not yet been made. It should be noted that were Group Procurement to occupy space within the Terminal Building there would still be a rental charge to Head Office from Cork Airport, therefore there is no reason to reduce the charge currently included.</p>	<p>Our understanding from DAA briefings was that the need to rent offices for DAA Group Procurement staff at Cork would be removed once the offices in the new terminal become available. If it is the case that Cork Airport will require rent to be paid by DAA for accommodation occupied by DAA Group Procurement staff, 78% of a fair market cost can be included, in line with other head office non-payroll costs.</p>
Page 67	<p>Energy costs are outside the control of DAA and these are expected to rise substantially in 2005....</p>	<p>We accept that energy costs are expected to rise substantially more than expected in the 2004 plan, and have taken it into account in our re-assessment.</p>
Page 68	<p>The rostering contingency factor of 34% ...is incorrect as it does not take into account Pest Control Staff</p>	<p>Details of Pest Control Staff were provided by DAA too late for inclusion in our assessment. They have been included in our re-assessment.</p>
Page 69	<p>The night (cleaning) staff complement is not related in anyway to passenger throughput....</p>	<p>Noted. Our analysis does not suggest that it is.</p>
Page 69	<p>We welcome ...recognitions that ASU operations appear to operate relatively efficiently. ...with regard to ... ASU roster not matching demand during the early morning peak, it should be noted that we have been using 4-hour part time staff to match resources to operational demand....serious cost implications in deploying staff prior to 05:00....currently addressing this issue by way of increased</p>	<p>Noted. The ASU operation has been re-examined based on 2005 cost data, 2004 FTE and recent security issues, as set out in Appendix A to this report.</p>

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	staffing at 05:00..having a successful impact.	
Page 70 Trolleys Pay rates	..it would appear applying 1% to the full terminal payroll (of which less than 30% relates to trolley staff is not a reasonable target...	Agreed. This has not been applied.
Page 71	We would appreciate if BAH could re-examine their findings in relation to the trolley section based on the corrected staffing levels	This has been carried out, as described in Appendix A to this report.
Page 72	The suggestion that a static resource of 10 staff could cover an operation of the magnitude of Dublin Airport does not seem to take account of passenger demand.	Our reassessment of the trolley staffing is presented in Appendix A to this report.
Page 72-73	Head Office Payroll The 2004 plan included an estimate of the implications of the Government's decision to establish 3 autonomous airports The current forecast reflects the as-is situation as the impact of this restructuring remains uncertain ...Shannon and Cork may still avail of the shared services...at an agreed cost. It is difficult to assess the impact restructuring will have on the services required at Head Office... It is interesting to note that BAH have benchmarked the number of HR and Finance staff and found them to be close to the benchmark... It is therefore a reasonable assumption on DAA's part, prior to airport restructuring, to keep Head Office staff levels constant going forward.	We have examined the Head Office payroll in some detail, as discussed in the following section of this report.
Page 73	Any efficiencies delivered through headcount reductions assumed by BAH have been factored into the CAR's scenarios without allowing for the associated severance costs associated with them.	Our view is that headcount reductions would be achieved through not replacing staff who will leave in any event. No severance costs would be incurred. We have not allowed for the reduced recruitment requirements and resultant cost savings which would be incurred.

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Page 20, Para. 1	We consider that BAH's bottom-up efficiency study for (sic) DAA fails either to provide robust support for the current level of OPEX or to provide a proper analysis of the scope for future efficiency improvement.	We have undertaken an in-depth assessment of current OPEX based on cost information provided by DAA, additional details of staff rosters, interviews with airlines and on-site inspections by our experts as well third-party benchmarking data from the airport and other industries. Much of the information provided by DAA and others is commercially sensitive and consequently it was not possible to present either the information or our detailed analysis in the version of the report which was made available to the public.
Page 20, Para. 2	The analysis of existing operations is ...irrelevant to determining the appropriate level of DAA's opex. Capacity issues and the poor design of parts of Dublin Airport's infrastructure are discussed without any clear explanation as to their relevance to the matter at hand.	While many of our observations are obvious to those who are already familiar with the airport, analysis and observation of the airport is necessary to provide as complete as possible a picture of the airport in the public report. Lack of capacity and difficulties with aspects of the airport architecture have an immediate and direct bearing on OPEX as operational measures must be taken to overcome shortcomings in the infrastructure. Furthermore, infrastructure inadequacy has an impact on the operational efficiency and OPEX of the users of the airport as they are also restricted in their operational flexibility – this, albeit not a direct OPEX issue, is an important point to raise as it is reflected in the overall costs imposed on the end users.
Page 20, Para. 3	We note that on page 5 BAH rejects the possibility of benchmarking. We feel that this hostility to the use of comparisons undermines the usefulness of BAH's work. As a consequence their report lacks any objective analysis of benchmarks to assess the level of DAA's costs and the potential for efficiency improvement	Our preliminary assessment, which included some high-level benchmarking, was presented at the stakeholders' workshop on 24 th January, which Aer Lingus declined to attend. Those stakeholders that did attend – DAA, Ryanair and bmi, agreed that high-level benchmarking/comparisons to other airports were not relevant and should not be included in a bottom-up efficiency study. However, comparison of individual elements of the airport's operations have been made with suitable benchmarks considering inputs and outputs rather than detailed processes (see following question).
Page 20, Para. 4	While BAH's criticism of benchmarking applied to top-down analysis of costs, it does not apply to the comparison of processes between airports in a bottom-up analysis. Yet BAH present no such process comparison. As a consequence it	In our assessment we made use of what bottom-up benchmarking data was available not only with regard to airports themselves but also to the practices and benchmarks available from a range of industries (competitive and monopoly)

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Page 20, Para. 5 and 6	<p>We can highlight one inefficiency on the part of DAA which has had massive knock on implications on passengers and on DAA's investment plan and as yet is an issue that passes completely unnoticed in BAH's review.....From mid-April 2005, security screening has been tightened at Dublin Airport.. This tightening was a response to an EU audit of DAA's security screening procedures and it became apparent that the existing facilities were inadequate. There are two knock on consequences of the tightening of security.</p> <p>First, DAA has historically failed to invest in the infrastructure necessary...</p> <p>The second impact of DAA's failure directly affects its plans for future CAPEX....</p>	<p>Firstly, our assessment was completed prior to the security screening crisis in mid-April; however as part of that assessment we conducted a detailed analysis of the ASU staffing and rostering arrangements, which are driven to a large degree by regulatory requirements rather than process efficiencies. This analysis has been revised for the re-assessment based on the 2005 forecasts, as discussed later in the report. Secondly, our operational assessment is concerned with operating costs only, not capital investment.</p>
Page 21, 1 st bullet	<p>On Page 14 it is stated that if passenger numbers grow and real operating cost remains constant that service quality must decline. We do not accept the truth of this statement; It would be true if DAA had no scope for productivity improvement. As other parts of CAR's report show, DAA has substantial scope for such improvement.</p>	<p>In principle, we believe that this statement is true. However, observations indicate that in certain areas, such as congestion management, the point at which productivity gains can be used to offset passenger growth has been passed. It is our view that increased passenger numbers will require more staff in certain areas such as terminal services, security, cleaning etc. This requirement is compounded by the fact that the airport terminal is frequently congested which leads to additional requirements for staff to manage queuing etc. Scope for productivity improvement with existing staff is taken into account in</p>

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		our assessment. Details of this have not been provided for reasons of commercial confidentiality. Savings in operating costs have been forecast, indicating scope for productivity improvement.
Page 21, 2 nd bullet	Aer Lingus agrees that the lack of formal service agreements is a serious issue which needs to be addressed as a priority. We do not agree, as suggested on page 74, that it may be adequate merely to quantify and publish statistics on certain aspects of service quality. If DAA does not operate under binding service level agreements, then there is no guarantee that DAA will provide an adequate level of service to airlines.	As stated on the slide, to quantify and publish statistics on certain aspects of service quality would be a pragmatic short term measure which would avoid many of the costs and pitfalls associated with extensive performance regulation. This is important because, as we explain on Page 73 of the assessment report, experience in a wide range of regulated industries shows that incentive and penalty schemes must be carefully designed so as not to introduce and reward perverse behaviour. Also, at airports, direct external regulation of quality of service is often fraught with difficulties, not least because of the complex interaction between all of the actors involved and the differing requirements of the various users. To date, only very limited regulation of service quality has been attempted at any airports throughout the world. Consequently, external regulation of service quality at Dublin Airport would need serious consideration, detailed design and consultation amongst all the parties involved and would therefore take considerable time before being established.
Page 21, 3 rd bullet	Airlines are not in a position to manage passenger flows and congestions within the terminal building.	This is true in the general sense – the airport is responsible for managing passenger flows. However, airlines can manage queues and flows in the areas of their own remit. At airports in other jurisdictions, for example Heathrow, airlines are responsible for managing their own check in queues, and also for “fast tracking “near time passengers through security screening. At many airports, it is the airlines that carry out passenger and baggage screening for their own passengers. These processes are in practice managed jointly by airlines and the airport authority.
Page 22, 1 st bullet	Most costs are assumed to grow with an elasticity of 35% with respect to passenger numbers..... However, given the trend towards using larger aircraft and the fact that the growth in the number of movements is slower than the growth in passengers, we feel that proper consideration should be given to whether	The DAA’s 2005 model is not primarily driven by any elasticity model, so this comment is largely superseded. However, it is worth noting that only a very small proportion of the variable amount of OPEX can be directly linked to aircraft movements, a much higher proportion is linked to passenger

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	<p>this parameter is correct going forward. In particular whether it should be adjusted downward.</p>	<p>movement.</p> <p>Given the current high levels of congestion in some areas of the terminals, it is likely that dis-economies of scale will occur with larger aircraft and the marginal cost of a passenger will increase.</p> <p>An argument concerning larger aircraft could be made, therefore, that a move towards larger aircraft (fewer movements, more passengers) might actually increase the value of the elasticity <u>if</u> increasing economies of scale and productivity gains are not possible <u>or</u>, conversely, service quality is not reduced. Only a definitive study would determine whether any change in elasticity is required. This is beyond the scope of the current assessment.</p>
<p>Page 22, 2nd bullet</p>	<p>We note that the graphs on page 90 indicate a significant increase in costs in 2003 and 2004. We are concerned that BAH do not properly analyse the reasons behind this increase....</p>	<p>Considerable analysis was undertaken, but, for reasons of commercial sensitivity, the detail was not made publicly available.</p>
<p>Page 22, 3rd bullet</p>	<p>It is assumed that payroll costs should be allowed to grow at 3 to 3.5% over the rate of inflation. We believe that the increase in real wages, applied to the 60% of DAA's costs that are accounted for by payroll is one of the reasons that CAR's Draft Determination presents a far too lenient target for DAA's opex efficiency.</p>	<p>Short term pay increases have already been negotiated and it would be unrealistic and imprudent to assume anything lower.</p>
<p>Page 22, 4th bullet</p>	<p>The conclusion to the report is an inadequate efficiency benchmarkless than 1% in real terms. Would expect nearer to 2% national average.</p>	<p>An efficiency benchmark against national productivity growth was not part of our bottom-up assessment. However, the efficiencies which are forecast are not inadequate. In fact, the savings are significant given that many costs of an airport are highly inflexible or uncontrollable, especially security and fire staff, insurance, rates, etc. The efficiencies which were recalculated based on DAA's 2005 forecasts are set out in the following chapter. As a proportion of total costs (NPV), total savings represent 7.5% of baseline costs, of which 6.3% is due to DAA volunteered savings, and 1.2% is due to Booz Allen identified savings.</p>

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Page 22, 4 th bullet	The conclusion to the report is an inadequate efficiency benchmarkless than 1% in real terms. Would expect nearer to 2% national average.	An efficiency benchmark against national productivity growth was not part of our bottom-up assessment. However, the efficiencies which are forecast are not inadequate. In fact, the savings are significant given that many costs of an airport are highly inflexible or uncontrollable, especially security and fire staff, insurance, rates, etc. The efficiencies which were recalculated based on DAA's 2005 forecasts are set out in the following chapter. As a proportion of total costs (NPV), total savings represent 7.5% of baseline costs, of which 6.3% is due to DAA volunteered savings, and 1.2% is due to Booz Allen identified savings.

3. DUBLIN AIRPORT EFFICIENCY RE-ASSESSMENT

Introduction

Dublin Airport Authority released to CAR actual figures from 2004, in place of its previous budgeted figures, and revised forecasts. The most significant differences are in staff numbers required; however there are also differences in other costs.

The purpose of this report is to update our previous study in line with the 2005 forecasts.

DAA has now been instructed by the government to proceed with Pier D and Terminal 2, delivering the latter by end of 2009. We have excluded the cost increases associated with these investments from our analysis, for comparability with our previous study. The additional operating costs of Pier D are in any case quite modest, and we expect CAR will wish to provide for this cost when Pier D is delivered. The additional operating costs of Terminal 2 are substantial, and CAR will wish to firm these up closer to the time.

Summary of FTE Projections

In aggregate, it is evident that Dublin Airport has forecast some efficiencies that it had not previously forecast, as follows:

- DAA is forecasting a need for an additional 122.5 FTE by 2009, by comparison with the previous forecasts; however, some specific requirements need to be subtracted from this new total:
 - 102.5 FTE in security and 53.5 FTE in terminal services (a total of 156)
 - 13 FTE in cleaning (DAA has essentially agreed with the efficiencies that Booz Allen identified, but claim that an additional 13 FTEs are allocated to growth in output, which we consider to be reasonable)
- This indicates that DAA is proposing aggregate efficiencies of at least 46.5 FTEs relative to the previous forecast.

We have identified some areas where there may be potential for further small savings.

DAA is forecasting the need to take on large numbers of additional staff for security and terminal services. We agree that these services require additional staffing. Our study of the security staff rostering suggests that the numbers proposed to be recruited are slightly on the generous side, given the requirement for most of the additional staff is only at times when the terminal might otherwise be congested.

In summary, DAA is in practice forecasting on the basis of greater efficiencies in its use of staff than we had previously been able to identify. In some areas, there is an apparent increase in staff, but possible redistribution of staff around the organisation masks what is going on. The numbers of staff proposed to be recruited in relation to additional requirements may be a few more than is actually required. The CAR may wish to put in place a monitoring programme to ensure that what is being paid for is actually delivered.

Payroll Efficiencies

In addition to the revised DAA efficiencies, and subject to uncertainties detailed in our report, we propose additional efficiencies:

- Additional terminal staff should be reduced gradually by 15 FTE
- Additional security staff should be reduced by 8 FTE
- Head Office procurement should be reduced gradually by 4 FTE
- Marketing should be reduced by 2 FTE, for synergies.

Costs per FTE

The generic assumption in DAA's previous model is that the staff cost would increase by 6.5% per year (nominal). DAA has now been advised that pension costs are substantially increased. It is understood that CAR will undertake a separate analysis as to both the amount of pension provision and the monitoring of use of such provision towards the pensions deficit.

The revised forecasts present variances from the 6.5% rate, due to changes in the structure of staff and related to the increase in pension costs.

Summary of non-pay cost changes

The efficiencies we identified are small in relation to the additional efficiencies that DAA is now forecasting. Some large changes within the cost categories have mostly been explained as cost reclassification. DAA is forecasting some increase in Fees and Professional services, where the outturn was larger than budget in 2004, and part of this is reclassified to Other Overheads, but this is small in relation to the overall cost reduction. Some substantial growth is shown for energy costs (not previously identified) and insurance costs (previously identified). Although these increases have been allowed for in this re-assessment, the CAR may wish to monitor whether these costs grow as much as DAA is currently forecasting.

Summary of Efficiencies

We have identified a number of areas where DAA is proposing to change costs significantly compared with the previous forecast. Although DAA has reversed some cost savings previously shown, we believe that on balance this new projection amounts to a reduction in cost, once adjusted for the effect of additional services to be provided. So although, for example, DAA is no longer proposing to make a large cut in Head Office staff, this is more than made up for by staff reductions elsewhere.

In making this assessment, in relation to payroll costs, we have first excluded the effect of necessary cost increases arising from the cost of additional services now proposed and not previously budgeted for, and unavoidable cost increases outside DAA's control. In particular, we have excluded the cost increase arising from increases in terminal staff and security staff; the need for these additional staff arises from necessary services not previously budgeted for. We have also excluded the effect of the staff cost increase arising from pension costs increases not previously budgeted for. We have additionally counted DAA's reduction of up to 20 cleaning staff, by making an allowance for growth in 13 staff due to growth in the size of

the task. In terms of non-payroll costs, we assume that a change in costs from the previous cost scenario contributes to DAA's volunteered efficiency, except in those areas where DAA costs are largely outside its control (energy, rent and rates, insurance, regulatory levy).

We have deducted from our calculation of net efficiencies those cost reductions previously shown, and now (in whole or part) reversed. Some of these cost changes may in practice result from changes in the allocation of costs. So although these cost savings were included in the first round of DAA volunteered efficiencies, they are netted out in the calculation of the second round, so that the total figure is a net figure taking proper account of this. We have, however, made provision for cost increases which have justified grounds. Note also we did not previously calculate a figure for 2010.

Table 1 presents the key points arising from the re-assessment, side by side with the equivalent points from the previous assessment. Although costs have increased significantly, due mainly to the demand for additional staff for security and passenger congestion management, and pensions costs increases, the cost savings also have increased significantly, both in absolute terms and as a proportion of costs once these unavoidable cost increases are taken into account. Table 2 summarises the key points in each case.

TABLE 1: Comparison of Re-assessment and Previous Assessment

	2005-2009 based on DAA 2005 forecast	2006-2010 based on DAA 2005 forecast	2005-2009 previous assessment based on DAA 2004
Nominal costs over 5 year period (€ millions)			
Before DAA volunteered efficiencies	877	936	874
BAH adjusted baseline	847	915	851
After BAH identified efficiencies	840	905	844
Present value costs over 5 year period (at 7.4%) (€ millions)			
Before DAA volunteered efficiencies	756	810	775
BAH adjusted baseline	730	790	755
After BAH identified efficiencies	724	782	749
Savings over 5 years, in nominal terms (€ millions)			
savings due to DAA volunteered efficiencies	-30	-21	-23
savings due to BAH additional efficiencies	-7	-10	-7
total savings	-37	-31	-30
Savings as a proportion of total (NPV) costs			
proportion due to DAA volunteered efficiencies	-3.6%	-2.5%	-2.7%
proportion due to BAH identified efficiencies	-0.8%	-1.0%	-0.8%
total savings as a proportion of total (NPV) costs	-4.4%	-3.5%	-3.5%

Note: The previous study calculated NPVs at 6%.

TABLE 2: Comparison of Headlines arising from Re-assessment, compared with Previous

Reassessment based on DAA's 2005 Forecasts	Previous Assessment
<ul style="list-style-type: none"> With the latest figures, if no action is taken, costs over the five year period (2005-2009) would total €877m (nominal) (excluding the effect of Pier D and T2). DAA volunteered efficiencies reduce this to €847m and BAH efficiencies provide a further reduction to €840m In present value terms, at 7.4%, without DAA action, costs would have been €756m, DAA's volunteered efficiencies reduce this to €730m, and BAH's identified efficiencies further reduce it to €724m 	<ul style="list-style-type: none"> With previous data, if no action is taken, costs over the five year period (2005-2009) would total €874m (nominal) (excluding the effect of Pier D and T2). DAA volunteered efficiencies reduced this to €851m and, the BAH efficiencies provided a further reduction to €844m In present value terms, at 6%, without DAA action, costs would have been €775m, DAA's volunteered efficiencies reduced this to €755m, and BAH's identified efficiencies further reduced it to €749m
<ul style="list-style-type: none"> Total savings, in nominal terms, represent some €37m of which €30m is accounted for by DAA volunteered efficiencies and €7 million by other efficiencies identified by Booz Allen 	<ul style="list-style-type: none"> Total savings, in nominal terms, represent some €30m of which €23m is accounted for by DAA volunteered efficiencies and €7 million by other efficiencies identified by Booz Allen
<ul style="list-style-type: none"> As a proportion of total costs (NPV), total savings represent 4.4% of baseline costs, of which 3.6% is due to DAA volunteered savings, and 0.8% is due to Booz Allen identified savings 	<ul style="list-style-type: none"> As a proportion of total costs (NPV), total savings represent 3.5% of baseline costs, of which 2.7% is due to DAA volunteered savings, and 0.8% is due to Booz Allen identified savings

Note: Some of DAA's savings described as "volunteered" include the adoption of some savings identified by BAH in the first version of the report.