NUAC Programme

Definition Phase Supplementary Report

The feasibility of a joint enterprise for the carrying out of Air Navigation Services in Danish and Swedish airspace

August 2007

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1 Introduction

In light of the Single European Sky legislation, the national strategies in Denmark and Sweden, and the general pressure for change in the European air traffic management industry, the NUAC Programme was established with the purpose of investigating the possibilities for a higher degree of cost efficiency for air navigation services in Denmark and Sweden in different strategic scenarios – while maintaining today's high level of flight safety at the least.

As the first firm result from the NUAC Programme, the "NUAC Programme – Definition Phase Final Report" was submitted in February 2007. The report sums up the results of the work conducted in the Definition Phase of the programme and provides a high-level picture of the aspects in a possible Case for Change regarding Danish and Swedish air navigation services and the future development of the NUAC Programme.

The purpose of this Supplementary Report is to show the results of the analyses conducted on a new possible scenario (Operational Alliance) as well as any new findings or results from further analyses conducted on the original scenarios for the future strategic cooperation between LFV/ANS and Naviair. The report also shows the results of the more detailed analyses and descriptions of the Business Model, Business Case and Integration Strategy.

Consequently, this Supplementary Report, together with the underlying Socio-economic Analysis, should be seen as the final part of the analyses needed in order to establish a robust platform for the decision-making regarding the future development of the NUAC Programme.

1.1 Scope for the Supplementary Report

In the "NUAC Programme – Definition Phase Final Report", a thorough description is provided of the background as well as the overall aim and scope for the NUAC Programme along with chapters describing the need for change and development in the ATM industry, including key strategic rationales. The "NUAC Programme – Definition Phase Final Report" also provides a detailed description of the Case for Change, including the financial implications of the scenarios and a high-level description of the Business Model, which holds the key design principles for a possible new NUAC Company.

The Integration Strategy provided in the "NUAC Programme – Definition Phase Final Report" has been revitalised by exploring a more dynamic method where the integration is based on implementation of the individual initiatives for benefit realisation (designed in the Business Case).[1]

This forms the background for the Supplementary Report which, together with the Socio-economic Analysis, is expected to be the final part of the robust platform for decisions regarding the future development of the NUAC Programme.

[1] The original report regarding HR Aspects ("NUAC Programme – Definition Phase Final Report", Appendix no. 9) has also been analyzed as part of the analyses covered by this report in order to ensure that the Operational Alliance Scenario is covered by the original analyses. The conclusion from this work was that the original report in a sufficient manner also covered the identified HR Aspects relevant for the affected staff groups in the Operational Alliance Scenario. Consequently, no new HR Appendix has been drawn up.

1.1.1 Background

The original three scenarios defined and analysed during the Definition Phase were:

- Merger Scenario
- NUAC/SKAANE Scenario
- Alliance Scenario.

Hereafter, for the sake of ensuring the robustness of the platform for decisions, a fourth scenario – Operational Alliance – has been analysed. As an outcome of the analyses in the "NUAC Programme – Definition Phase Final Report", it was decided not to develop the "NUAC/SKAANE Scenario" further in this phase of the Programme. As a consequence of this initial decision, this supplementary report only describes possible new findings and further analyses regarding Business Case, Business Model and Integration Strategy for the following scenarios:

- Merger Scenario
- Alliance Scenario
- Operational Alliance Scenario (the new scenario).

Figure 1 Supplementary Analysis scenarios

	Merger scenario	Alliance scenario	Operational Alliance scenario
Description	• Merger of relevant parts of the two organisations LFV/ANS and Naviair into one organisation • NUAC is responsible for the carrying out the Air Traffic Service provision within Danish and Swedish airspace and working in a FAB environment with possibility of one en-route charging zone and a common unit rate. • Drive the cost base down through innovative approaches to organisational structure and resource allocation	• As independent organisations in a closer corporation LFV/ANS and Naviair are establishing a co-owned Alliance Company for the carrying out of certain support functions. This with only minor changes to the operational parts of the two organisations working in a FAB environment with possibility of one en-route charging zone and a common unit rate.	• LFV/ANS and Naviair as co-owners of a NUAC Company carrying out the provision of Air Navigation Services within Danish and Swedish fully integrated airspace • The services covers all Air Navigation Services except MET, AIS and TWR. • Support functions will be provided in NUAC Company in accordance with Common Requirements and when necessary to reach the full potential of the operational core business
Rationales	• To investigate the feasibility and effects of the most comprehensive Scenario for cooperation in order to ensure highest possible degree of cost-effectiveness/cost reduction and strategic alignment with Single European Sky regulations as well as the national strategies • To show clear and formalised lines of command in a merged company and entail management of all core processes and related support processes	• The Scenario should to the largest extent possible be in alignment with Single European Sky regulations and the national strategic directions outlined in Denmark and Sweden • Find out to what extent the cost-effectiveness could be reached without influencing the core business within LFV/ANS and Naviair • To give the answer regarding to what extent the Strategic Rationales for the NUAC Programme could be met.	• To investigate the feasibility and effects of an scenario with focus on cost effectiveness and national corporate strategies without compromising SES and national strategic directions • To investigate to what extent the cost-effectiveness/cost reductions could be reached when only including the core business in the NUAC Alliance Company

1.2 Reader's guidelines

This report has three chapters containing the main findings and conclusions from each analysis:

- **Business Case (chapter 2.1).** The purpose of the Business case is to display the financial implications and benefit potentials related to implementation of the three scenarios**.** Finally, it includes an additional assessment of new potential benefit areas in relation to formalised cooperation between LFV/ANS and Naviair
- **Business Model (chapter 2.2).** The purpose of the Business Model is to establish a high-level conceptual description of the value NUAC offers its customers and of the architecture of the organisation and its network of partners for creating and delivering value to the customers. The primary focus has been to develop a coherent governance structure covering all three organisations (NUAC Company, Naviair and LFV/ANS)
- **Integration Strategy (chapter 2.3).** The purpose is to develop an initiative-based integration scheme which is a strategic sequence for the implementation of the initiatives in a complete integration process based on relevant change perspectives.

2 Main findings and conclusions

During the NUAC Definition Phase, three strategic scenarios have been analysed in order to describe the effect of a formal cooperation between LFV/ANS and Naviair. After the submission of the report, a fourth scenario – the Operational Alliance scenario – was added as described in section 2.1.5, and it was decided not to develop the original NUAC/SKAANE scenario any further. The three sections Business Case, Business Model and Integration Strategy describe the analyses of the scenarios:

- Re-investigated Merger Scenario (from hereon referred to as Merger Scenario)
- Alliance Scenario
- Operational Alliance Scenario.

Focus will be on the new scenario and additional findings; hence the sections for the Operational Alliance Scenario are more thorough, since the Merger and Alliance are mainly described in the NUAC Definition Phase Final Report.

The Business Case analyses carried out are on the same level of detail as the description in the NUAC Definition Phase Final Report, in order to make the analysis of the Operational Alliance Scenario comparable with the other scenarios.

The Business Model describes a coherent high-level Business Model for the NUAC Company, covering all three scenarios – some scenario-specific exceptions are stated in the description.

The Integration Strategy section describes an initiative-based integration scheme, which does not focus on a specific scenario, since it can be applied to all scenarios. The rationale is to develop a more coherent and flexible approach compared to the scenario-based Integration Scheme in the NUAC Definition Phase Final Report.

The analyses are based on a common set of principles, which includes:

- Top-down hypothesis-driven approach, i.e. analysing the overall best case for the three defined scenarios
- Fact-based analysis based on key research and experience from the ATM industry and ANSP providers in general as well as interviews with selected ATM and ANSP experts
- Best practice from comparable industries in terms of merger and integration experience and learning.

In the following chapters, these analytical areas will be described and the results presented.

2.1 Business Case

The primary purpose of the Business Case is to display the financial implications and benefit potentials related to implementation of the three scenarios during the fiscal years 2006 through 2020.

This chapter contains additional analysis to the findings conducted during the NUAC Definition Phase – presented in the NUAC Definition Phase Final Report (and Appendices 1, 2 and 3). More specifically, the chapter contains two additional analysis areas:

- An extension of the Business Case to include the refined Merger scenario and the Operational Alliance scenario, which has been formulated on the basis of the findings in the NUAC Definition Phase as well as inspiration from the stakeholder responses. The Alliance scenario remains as described in the NUAC Definition Phase Final Report but is included here in order to evaluate the results for all scenarios. The financial results in the Business Case describes the financial impact of the initiatives as incremental value costs or cost savings, compared to the "baseline" (as described in the NUAC Definition Phase Final Report).
- An additional assessment of new potential benefit areas in relation to formalised cooperation between LFV/ANS and Naviair.

The chapter is structured according to the two analytical areas i.e. description of the business case extension consisting of the overall conclusion and three scenario specific sections and finally an assessment of new potential benefit areas.

2.1.1 The analytical framework

The additional Business Case analyses are based on the analytical framework and assumptions presented in the NUAC Definition Phase Final Report and appendix 1– unless otherwise stated. Specific assumptions for the three scenarios are stated in their respective sections

The Business Case reflects the same subject and methodology as the Business Case described in the NUAC Definition Phase Final Report, where each scenario is defined by the benefit realisation initiatives[2]. The initiatives are derived from the strategic rationales and cover the benefit potential by formalised corporation in the different functional areas of the two organisations. The scenarios differentiate – based on their specific definition/rationale and related business model – on the initiatives which are included (i.e. functional areas of NUAC) and how the initiatives are included. The focus in this supplementary analysis has been to validate, and if possible improve the 17 previously identified initiatives and also to include possible new benefits.

The Cost Model in the Business Case describes the financial impact of the initiatives as incremental value costs or cost savings, compared to the "baseline". This means that only additional costs or cost savings related to implementation of the initiatives are considered. The reason for choosing the incremental value approach is to identify the differences between the benefits obtained by implementing the three scenarios, hereby obtaining the required transparency when comparing the results.

In order to estimate the sensitivity related to the financial impact of the three scenarios, risks related to implementation in the initiatives have been analysed (as described in NUAC Definition Phase Final Report – Appendix 1 and 3). Furthermore, the variance related to the estimated financial impact has been included in the sensitivity calculations, shown in the graphs for the cash flow results.

The outcome of the additional analysis of new potential benefit areas has resulted in further potential benefits or costs, but it should be stressed that these will depend on further detailed analysis. It is therefore mentioned that the solutions identified are all possible with the current knowledge, but the actual financial results are considered with some uncertainty.

[2] The initiatives were determined during the analysis for the NUAC Definition Phase Final Report, described in the NUAC Definition Phase - Appendix 2 (which contains rationale, design, baseline etc. for each initiative).

2.1.2 Overall financial impact and results from the analysis

The overall conclusion of the Business Case analysis is shown in figure 2 covering the most important financial indications (annual savings, NPV[3], IRR[4], Cumulative cash flow and reduction in need for resources).

Figure 2 Conclusions from the Business Case

	Merger	Alliance	Operational Alliance
Annual savings in 2020	€29.5 million	€12.0 million	€13.0 million
NPV (2006-2020)	€172.4 million	€68.8 million	€72.6 million
IRR	55%	40%	39%
Integration costs	€30–35 million	€ 15–18 million	€15–20 million
Payback	2011 – 4 years	2012 – 4½ years	2011 –5years
Reduction in the need for resources	233 FTE, through natural attrition and staff turnover	104 FTE, through natural attrition and staff turnover	129 FTE, through natural attrition and staff turnover
Implementation timeframes	4 years	2,5 years	3 years

The Merger scenario realises **annual savings** from year 2020 and onwards of €29.5 million, whereas the Operational Alliance and Alliance scenarios result in annual savings of €13.0 million and €12.0 million respectively. The total lasting annual savings in the scenarios from year 2020 and onwards are:

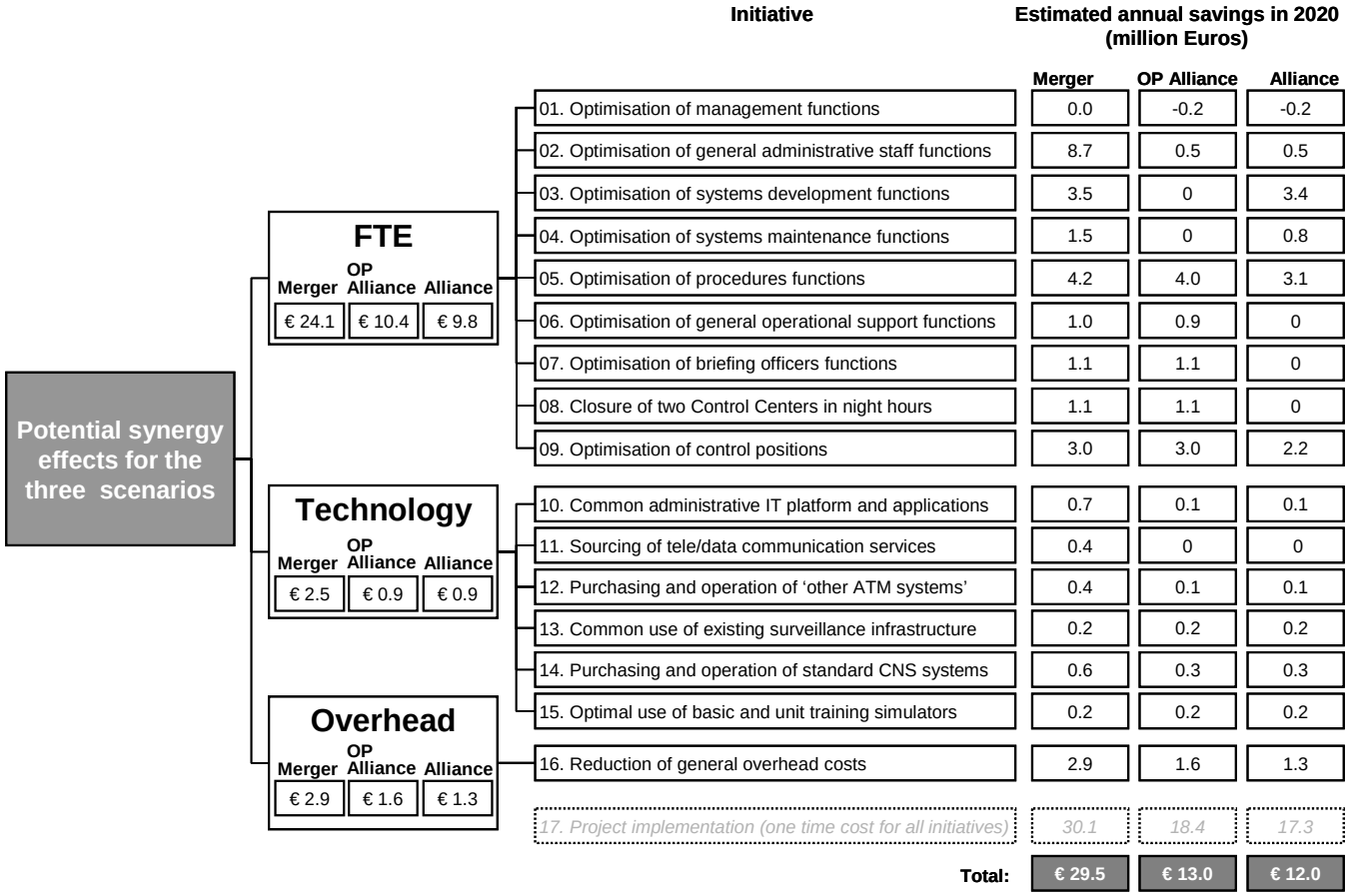
- €29.5 million in the Merger scenario
- €12.0 million in the Alliance scenario
- €13.0 million in the Operational Alliance scenario.

As illustrated in Figure 3 below, the annual savings potential of the Merger scenario from 2020 and onwards is higher than in the Alliance and Operational Alliance scenarios. This implies that from a financial perspective the Merger scenario will be the best solution in the long term. The reason for the annual savings being almost the same in the Alliance scenarios, while the FTE reductions differ, is that the annual savings in the Alliance scenario include savings from sourcing of maintenance and development functions. Savings as a results of sourcing solutions, is not considered as an actual reduction in FTEs, since these will be employed elsewhere, but naturally contributes as a cost saving.

[3] NPV represents total cash flow across the analysis period, adjusted to reflect the time value of money.

[4] Internal Rate of Return (IRR) is a financial metric that reflects the time value of money (like NPV). The IRR for an investment is the discount rate for which the total present value of future cash flows equals the cost of the investment. It is the interest rate that produces a 0 NPV i.e. the IRR describes the maximum rate that would result in the investment being defined as beneficial.

Figure 3 Estimated Annual Savings in 2020 (million Euro)



The savings potential in all scenarios are mainly derived from the "FTE initiatives", which is a consequence of the reduction in need for resources. In the Merger and Alliance Scenario 82% of the annual savings are derived from the "FTE initiatives", while it is 80% in the Operational Scenario. The difference in potential savings related to the "FTE initiatives" between the Merger and Operational Alliance scenarios is primarily based on the fact that LFV/ANS and Naviair will remain as two separate organisations in the Operational Alliance and Alliance scenarios and also maintain the necessary administrative staff functions within the respective organisations. In the Alliance scenario both organisations will have to obtain certification and designation which also limits the possibilities of reducing the need for resources due to demands for certain functions. In addition, the potential savings in the Alliance scenario are reduced due to the assumption that the Alliance Company will not include the actual carrying out of Air Navigation Services as these functions will remain as part of the retained organisations LFV/ANS and Naviair.

The primary sources for potential cost savings in payroll and overhead costs, as a result of reductions in the need for resources, are realised through the following synergy sources:

- Elimination of duplicate functions
- Increased effectiveness
- Harmonisation and standardisation of current processes
- Sourcing solutions for non-core processes
- Optimal size of organisation.

"Technology" related initiatives constitute annual cost savings of €2.5 million, corresponding to 9% of the cost savings in the Merger scenario. Annual cost savings within "Technology" in the Operational Alliance and Alliance scenarios constitute a total of €0.9 million, corresponding to 7% and 8% of the cost savings respectively. Cost savings related to technology initiatives are mainly realised through

- Standardisation, harmonisation and consolidation of existing system platforms
- Reductions in procurement costs due to increased bargaining power, reduced adjustment and implementation costs.

The results from savings in the "Technology" related initiatives are seen as a rather small part of the overall savings, which has led to the investigation of further potential benefit areas. Given that technology obtains a large part of the cost base in both Naviair and LFV/ANS, intuitively technology should also result in a larger savings potential from the synergy of a more formal cooperation. It should be noted that a number of financial benefits are assumed to be realised through COOPANS (these have not been included in the NUAC Business Case).

The Merger scenario realises a positive **net present value** (NPV) result of €172.4 million, the Operational Alliance scenario a positive NPV of €72.6 million, and finally the Alliance scenario a positive NPV of €68.8 million, in the fiscal years 2006 through 2020, with a discount rate of 5%.

NPV for the Alliance scenario and the Operational Alliance scenario reveal similar results, even though the reduction in need for resources is larger in the Operational Alliance scenario. This is due to the fact that the implementation costs are larger in the Operational Alliance scenario, and participate significantly to the NPV since they contribute in the beginning of the period 2006-2020. Other things being equal, the action or investment with the larger NPV is the better option i.e. considering only the financial results the Merger scenario is the best alternative.

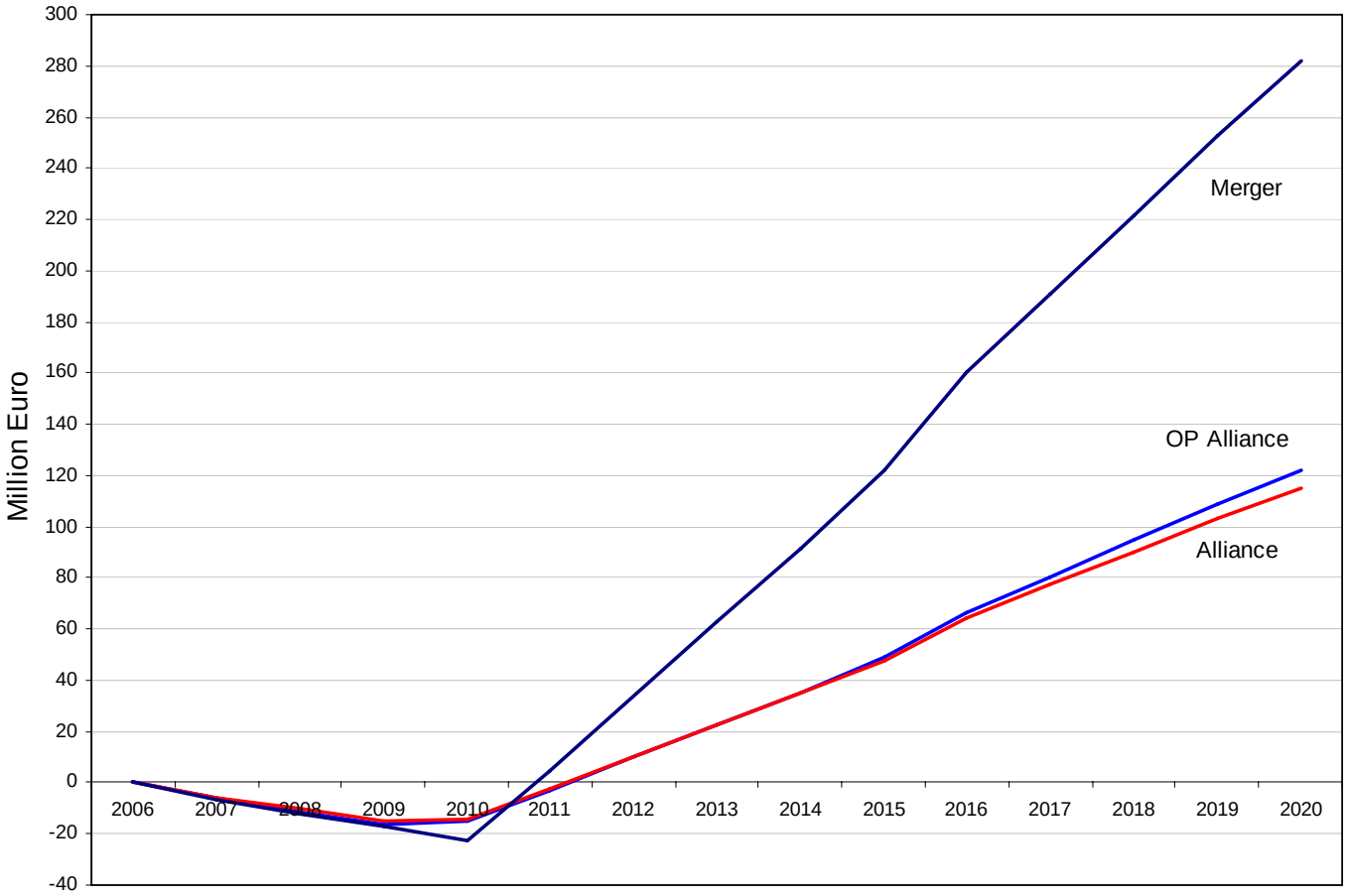
The Merger scenario shows an **internal rate of return** (IRR) of 55%, the Operational Alliance an IRR of 39%, and the Alliance scenario an IRR of 40%. This can be interpreted as the Merger scenario being the safest investment if the discount rate changes due to increased inflation or other aspects which influence interest rates etc. The answer in each case is an interest rate; the higher the interest rate - that is, the higher the IRR - the more robust the investment and the better the returns compared to the costs.

An estimation of the annual saving potentials and savings on investments etc. contributes to the cumulative cash flow for the scenarios. Figure 4 shows the cumulative cash flow for the scenarios over the time period 2006–2020.

- Merger scenario shows a cumulative cash flow of €281.9 million
- Alliance scenario shows a cumulative cash flow of €115.0 million
- Operational Alliance scenario shows a cumulative cash flow of €121.8 million

The Merger scenario reaches break-even early in 2011, based on the fact that the majority of the initiatives have financial effect starting from 2011, while the Operational Alliance and Alliance scenarios have a break-even point in late 2011, since both have relatively low implementation costs compared to the benefits realised in the initiatives.

Figure 4 Cumulative Cash Flow for the Scenarios, 2006-2020 (million Euro)



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Merger	0.0	-6.9	-12.2	-17.2	-22.4	4.6	33.6	62.6	91.7	121.9	160.0	190.7	221.5	252.4	281.9
OP Alliance	0.0	-6.1	-11.2	-16.3	-15.1	-2.8	9.8	22.4	35.1	48.9	66.6	80.6	94.6	108.7	121.8
Alliance	0.0	-5.7	-10.4	-15.1	-13.9	-2.6	10.0	22.5	35.1	47.8	64.3	77.2	90.1	103.1	115.0

The results for the Merger scenario indicate the most significant resource implications in terms of the highest level of reduced need for resources and sourcing. In general the reduction in need for resources is expected to be accommodated through natural attrition and general staff turnover. The natural attrition and staff turnover in the period 2008-2011 are in pure numbers covering the calculated FTE reductions in all three scenarios. However, the level of which the total FTE reductions may be reduced through natural attrition and general staff turnover is subject to some uncertainty due to the fact that detailed analyses on individual FTE levels need to be conducted, i.e. specific staff groups and competencies must be investigated in the next phase of the programme in order to determine the exact number and organisational placement of the reductions.

An assessment of the internal and external non-financial and qualitative effects – reflected by the strategic rationales in Figure 5 – reveals how the scenarios comply with the strategic rationales, described in detail in NUAC Definition Phase Final Report.

Figure 5 Compliance with strategic rationales

	Strategic Rationale	Merger	Alliance	Operational Alliance
Internal drivers	Cost effectiveness	High	Medium	Medium
	Operational flexibility	High	Medium	Medium
	Alignment of business model	High	Medium	Medium
	Strategic readiness	High	Low	Medium/High
	Attraction and bargaining power	High	Medium	Medium
External drivers	Potential safety improvement	High	High	High
	Flight efficiency	High	High	High
	Customer orientation	High	Medium	Medium
	Political and social effects*	High	Medium/High	High
	Environment*	Medium/High	Medium/High	Medium/High

* The political and environmental impact of the scenarios will be further analysed in the NUAC Definition Phase Socio-Economics Report

To conclude on the Business Case results the Merger scenario shows the highest results for NPV, IRR and annual savings, meaning that the scenario is the safest investment and most robust solution financially. This is also the case when considering the relative risks and related sensitivity to the financial results. It should be noted though that the reason for the results being so large, is the substantially higher reduction in the need for resources (the need for resources is reduced with 233 FTEs in the Merger scenario, while the reduction is 129 FTE in the Operational Alliance scenario). Therefore other areas should also be considered e.g. HR aspects and social dialogue, before deciding on the better alternative i.e. financial results cannot be relied upon as the only source for the decision.

2.1.3 Merger Scenario

This section provides additional analyses and results, complementing the results presented in the NUAC Definition Phase Final Report. An overview of the assumption used in the analysis of the scenario is provided. Furthermore the specific findings in terms of cash flow and FTE implication are presented, showing the results of the reinvestigation of the Merger scenario. Finally an overview of the adjustments the initiatives is given.

2.1.3.1 Assumptions

Assumptions, cost model and data sources stated in the Business Case sections in the NUAC Definition Phase Final Report also apply for the Business Case results for the re-investigated Merger scenario in this document.

With constant focus on safety and the core processes related to Air Navigation Services, the merged organisation is fully driven by cost effectiveness. Only the NUAC organisation needs to be certified and designated for area control services in Denmark and Sweden. NUAC handles area control and approach activities in Denmark and Sweden, including related support functions as defined in the Business Model.

As part of the re-investigation of the Merger scenario management level in the NUAC organisation, as described in NUAC Definition Phase Final Report, has been optimised further in accordance with the analysis of the coherent Business Model. Some of the results include a more lean management level, where managers are assumed to perform and deliver in small units.

Comparisons between ratios for administrative staff and management staff compared to number of total staff in Naviair and LFV/ANS, are used in order to verify the necessary number of administrative staff in the NUAC Company compared to the descriptions in the NUAC Definition Phase Final Report. Sourcing of support processes is done when beneficial and follows the descriptions provided in the NUAC Definition Phase Final Report. Optimising resource management by developing standards, integration and control is another improvement in the Merger scenario. Finally, the investigation unit has been moved to the strategic level in the organisation in order to ensure independence of investigators.

2.1.3.2 Effects related to realisation of FTE initiatives

The resource implications of implementing the scenario (with regards to the 1213 FTE in scope for NUAC) are: 759 FTE will be employed at the NUAC Company, 162 FTE will be sourced, 233 FTE will be redundant, and finally remaining staff will stay in the retained organisations.

The savings are realised through elimination of duplicate functions, increased efficiency and sourcing. All FTE reductions are assumed to be reached through natural attrition (FTEs retiring and reduced through natural attrition assuming 5% staff turnover in Naviair and LFV/ANS gives a total of 253 FTE from 2008 to 2011).

FTE Area	Baseline[5]	NUAC Company	Sourcing	Reduction[6]
Management and admin. Support (initiative 1 -9)	271	100	35	109
Tech. Support (initiative 3-4)	211	35	127	34
OP support (initiative 5-7)	130	71		42
Operational (initiative 8-9)	601	553		48
TOTAL	**1213**	**759**	**162**	**233**

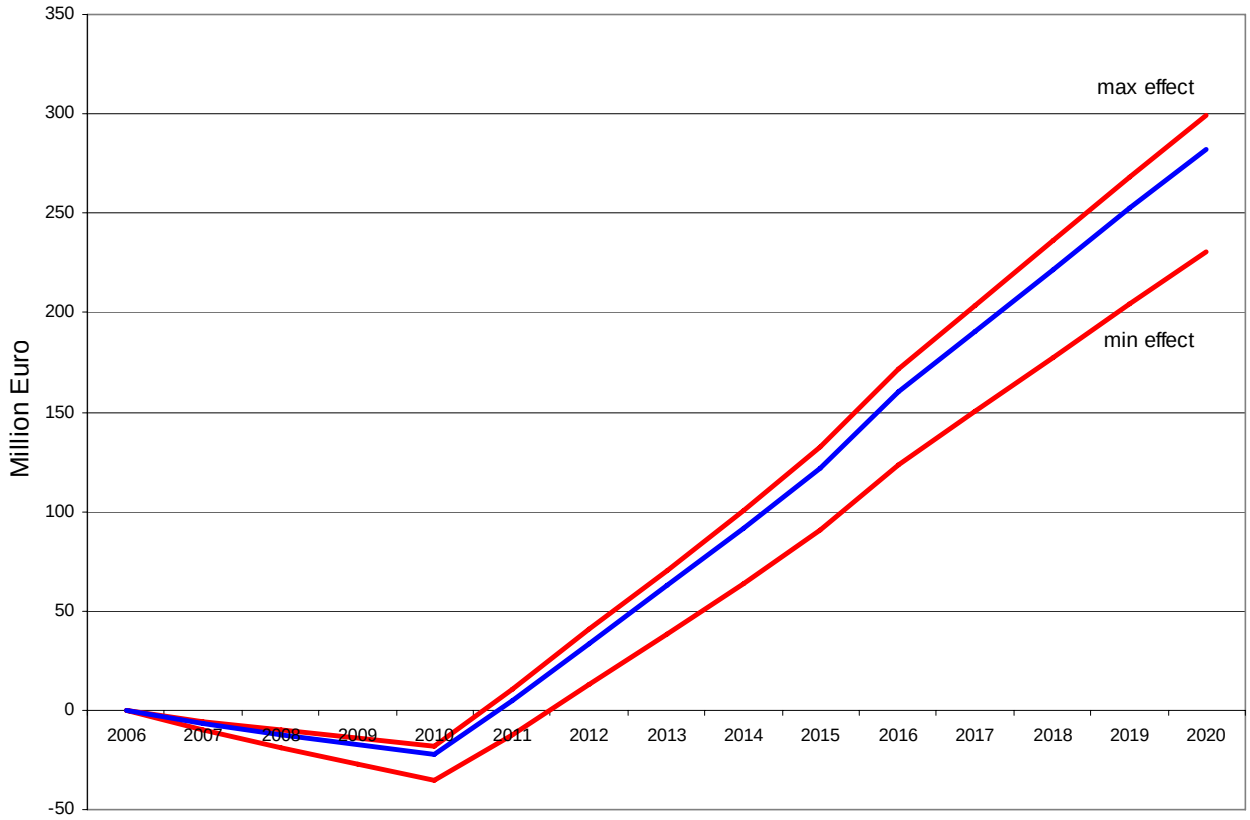
[5] Baseline includes 721 FTE from LFV/ANS (the following staff is not in scope: TWR-ATCO, APP-ATCO, other leavers, EPN, EPN Tech. Main., ATM Training (Operational Support), Environment) and 492 FTE from Naviair (the following staff is not in scope: TWR/ATWR, domestic employees and ATCO candidates).

[6] The rest of the baseline i.e. 59 FTE (in scope for NUAC) along with remaining staff (out of scope for NUAC) will stay in the retained organisations and handle TWR, infrastructure activities etc.

2.1.3.3 Cash Flow Summary

The Merger scenario reaches break-even in 2011. This is based on the fact that costs related to project implementation will occur from 2007 to 2011. Cost savings related to optimisation of staff functions ("FTE") will occur from 2011, outweighing the severance costs and implementation costs. The cumulative cash flow also displays the sensitivity caused by the identification of risks associated with the initiatives.

Figure 6 Cumulative Cash Flow for Merger Operational Alliance Scenario (million Euro)



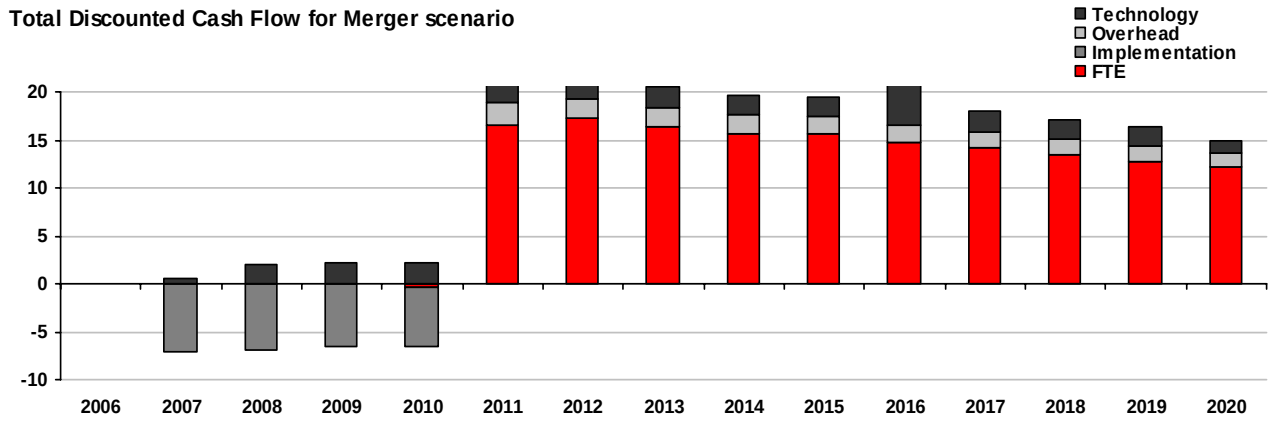
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Max	0.0	-5.9	-10.1	-14.0	-18.0	10.4	40.5	70.6	100.8	132.3	171.9	203.9	236.0	268.2	298.9
Average	0.0	-6.9	-12.2	-17.2	-22.4	4.6	33.6	62.6	91.7	121.9	160.0	190.7	221.5	252.4	281.9
Min	0.0	-10.0	-18.6	-26.9	-35.4	-12.5	13.0	38.5	64.1	90.5	123.7	150.6	177.5	204.5	230.2

As indicated by the span of cumulative cash flow in the figure, there are risks and related sensitivity to the financial results. This is based on the implementation risks combined with the variance related to the estimated potential benefits, described in the NUAC Definition Phase Final Report (and appendices 1-3).[7]

[7]Sensitivity is defined by the risks related to implementation of the scenarios and the variance related to the estimated benefit potentials. See the NUAC Definition Phase Final Report: Appendix 1 – Business Case - section 7.1 for further details on sensitivity analysis.

Figure 7 displays the discounted cash flow for the Merger scenario including project implementation costs occurring from 2007 to 2011, and cost savings related to FTE, Technology and overhead occurring from 2011. It also displays the cost of hiring a CEO for NUAC in 2010. As indicated in the figure, an increase in cost savings related to systems and technology ("Technology") occurs in 2016. These additional cost savings relate to avoidable investment costs related to 'other ATM systems'.

Figure 7 Discounted Cash Flow for Merger Scenario (million Euro)



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
€ million	0.00	-6.60	-4.79	-4.29	-4.30	21.17	21.60	20.62	19.69	19.48	23.36	17.98	17.16	16.38	14.92

2.1.3.4 Analysis of the initiatives

The analysis is based on the NUAC Definition Phase Final Report – Appendix 2, as well as the adjustments in the Business Model performed during the supplementary analyses. The table displays the adjustments to the initiatives and also the financial effects.

Initiative	Area	Description	Assumptions	Financial impact in Euro
1	FTE	Optimisation of management positions	· Reductions in management resources and additional hiring of 1 Head of NUAC	0
2	FTE	Re-design of administration functions	▪ Additional reduction compared to the Definition Phase Final Report – appendix 2: ▪ 2 FTE Senior Manager (the NUAC Company will only have one Senior Manager in each business unit) ▪ 3 FTE Manager (the NUAC Company has 1 Manager in each separate business area) ▪ 3 FTE Assistant (In the NUAC Company only Senior Managers will have assistants) ▪ 2 FTE, PR (the NUAC Company has 2 FTE working within communication including Manager - one for each Country) ▪ Additional hiring of 1 FTE, Administrative IT (the NUAC Company will have a supervisor with responsibility for the sourcing of administrative IT) ▪ No additional hiring of Legal (the NUAC Company has 2 FTE working within legal including manager)	8,664,625
3	FTE	Re-design of technical staff functions – ATM system development	· Additional reduction of 1 FTE, junior management	3,489,500
4	FTE	Re-design of technical staff functions – system maintenance	· Additional reduction of 6 FTE Junior Manager – LFV/ANS and Naviair have the same ratio of management staff – in the current ratio are Naviair 10/85 and LFV/ANS 5475 · Additional reduction of 1 FTE Assistant · Additional reduction of 3 FTE Facility management – Facility management will be handled centrally	1,462,700
5	FTE	Re-design of operational support functions – procedure	· Additional reduction of 2 FTE Junior Management · Additional reduction of 1 FTE, Assistant · Additional reduction of 3 Investigation (the NUAC Company will have 2 FTE, Investigation in each branch and 2 FTE, investigation working within Quality, Safety & Security)	4,248,870
6	FTE	Re-design of operational support functions – roster planning	· Additional reduction of 2 FTE, Junior Management	1,019,000
7	FTE	Re-design of operational functions – briefing officers	· As described in Definition Phase Final Report - appendix 2	1,140,500
8	FTE	Re-design of operational functions – night hours	· As described in Definition Phase Final Report - appendix 2	1,070,000
9	FTE	Re-design of operational functions – control positions	· As described in Definition Phase Final Report - appendix 2	3,045,000
10	Technology	Common procurement of administrative IT	· As described in Definition Phase Final Report - appendix 2	714,000
11	Technology	Common sourcing of tele/data communication	· As described in Definition Phase Final Report - appendix 2	360,500
12	Technology	Common purchasing and operation of 'other ATM systems'	· As described in Definition Phase Final Report - appendix 2	380,000
13	Technology	Common use of existing surveillance infrastructure	· As described in Definition Phase Final Report - appendix 2	245,000
14	Technology	Common purchasing and operation of CNS systems/infrastructure	· As described in Definition Phase Final Report - appendix 2	580,000
15	Technology	Optimal use of basic and unit training simulators	· As described in Definition Phase Final Report - appendix 2	241,000
16	Overhead	Reduction in general overhead cost	· Total resource reduction 233 FTE · Average variable overhead cost per employee = 12.383	2,885,239
17	IS Costs	Project implementation cost	· Total implementation costs of €30.1 million · As described in Definition Phase Final Report - appendix 2	
Total				29,545,934

2.1.4 Alliance Scenario

The supplementary Business Case analyses include no adjustments or changes to the Alliance Scenario. For a complete description of the specific Business Case for the Alliance scenario the reader is referred to the NUAC Definition Phase Final Report and appendices 1-3.

2.1.5 Operational Alliance Scenario

This section contains the Business Case for the Operational Alliance scenario, i.e. the financial costs and benefits related to implementation of the scenario. This section includes only specification to the conclusions in terms of the general Business Case assumptions, specific findings (cash flow, FTE implication) and finally an overview of the adjustments of to original initiatives including the integration costs. Finally the integration costs for the Operational Alliance scenario are described.

2.1.5.1 Assumptions

The cost model used is similar to the presented model in the NUAC Definition Phase Final Report, i.e. it describes the financial impact of the identified benefit realisation initiatives as incremental value cost and savings. Data sources stated in the Business Case sections in the NUAC Definition Phase Final Report also apply for the Business Case results for the Operational Alliance scenario in this document.

With constant focus on safety and the core processes related to Air Navigation Services, the NUAC organisation is fully driven by cost effectiveness. NUAC handles area control and approach activities in Denmark and Sweden, including related support functions as defined in the Business Model for the scenario. Only the NUAC organisation needs to be certified and designated for area control services in Denmark and Sweden. Tower services and infrastructure ownership remain in LFV/ANS and Naviair.

Necessary support functions will be provided in the NUAC Company in accordance with common requirements and when necessary in order to reach the full potential of the operational core business. Therefore initiatives and benefits related to administrative support functions identified in the analysis of the Merger and Alliance scenarios are considered, and relevant benefits are included in the Business Case in accordance with the definition of the Operational Alliance scenario. Initiatives and benefits related to operational support are included when regarding:

- Procedures
- ATM training
- Duty roster planning
- Briefing officers.

Initiatives and benefits related to technical support functions (systems development and maintenance) are not considered since these functions will remain within Naviair and LFV/ANS in accordance with the definition of the Operational Alliance scenario.

Based on the “NUAC Programme Airspace Design Report” document regarding consolidation of positions, it is estimated that the required amount of ATCO and ATCO support positions are the same as the identified number in the Merger scenario which equals 107 working positions (excluding military positions).

2.1.5.2 Effects related to realisation of FTE initiatives

The resource implications of implementing the scenario (with regards to the 1213 FTE in scope for NUAC) are: 676 FTE will be employed at the NUAC Company, 408 FTE will be employed in the retained organisations, in total 129 FTE will be redundant.

All FTE reductions are assumed to be reached through natural attrition (FTEs retiring and reduced through natural attrition assuming 5% staff turnover in Naviair and LFV/ANS gives a total of 253 FTE from 2008 to 2011).

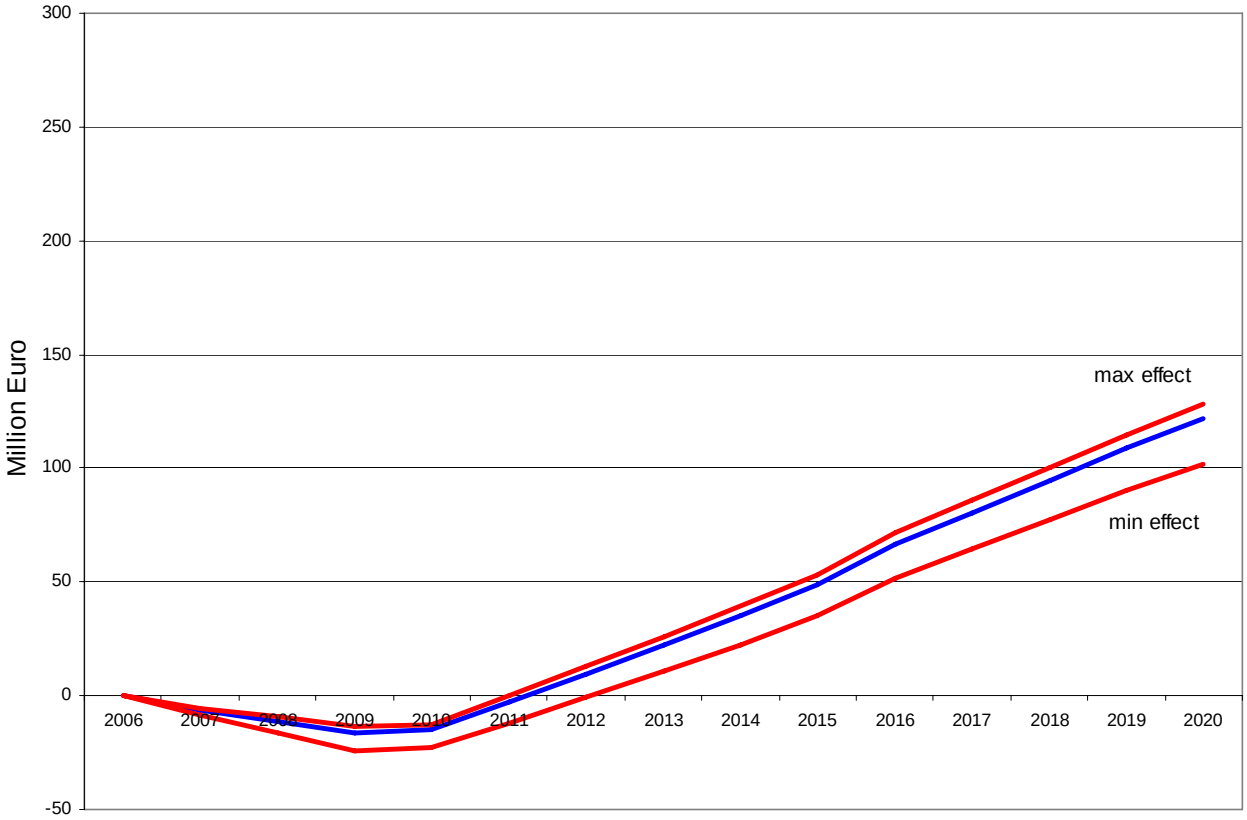
FTE Area	Baseline[8]	NUAC Company	Reduction[9]
Management and admin. Support (initiative 1 -9)	271	46	42
Tech. Support (initiative 3-4)	211	6	0
OP support (initiative 5-7)	130	71	39
Operational (initiative 8-9)	601	553	48
TOTAL	**1,213**	**676**	**129**

2.1.5.3 Cash Flow Summary

The Operational Alliance reaches break-even ultimo 2012. This is based on the fact that costs related to project implementation will occur from 2007 to 2010. Cost savings related to optimisation of staff functions (“FTE”) will occur from 2011, outweighing the severance costs and implementation costs. The cumulative cash flow also displays the sensitivity caused by the identification of risks associated with the initiatives.

[8] Baseline includes 721 FTE from LFV/ANS (the following staff is not in scope: TWR-ATCO, APP-ATCO, other leavers, EPN, EPN Tech. Main., ATM Training (Operational Support), Environment) and 492 FTE from Naviair (the following staff is not in scope: TWR/ATWR, domestic employees and ATCO candidates).
[9] The rest of the baseline i.e. 408 FTE (in scope for NUAC) along with remaining staff (out of scope for NUAC) will stay in the retained organisations and handle TWR, infrastructure activities etc.

Figure 8 Cumulative Cash Flow for Operational Alliance Scenario (million Euro)

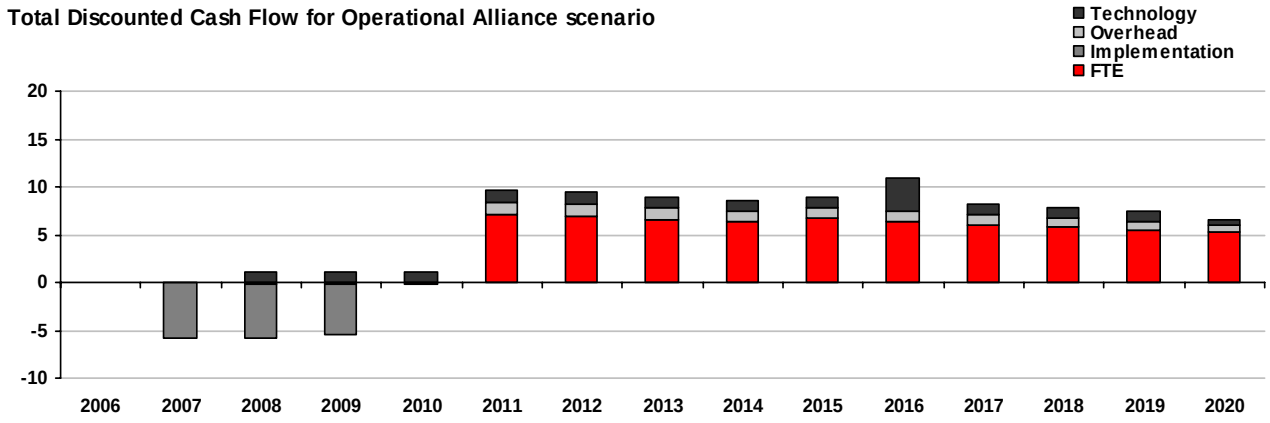


	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Max	0.0	-5.3	-9.5	-13.7	-12.5	0.2	13.1	26.1	39.2	53.4	71.5	85.9	100.4	114.9	128.2
Average	0.0	-6.1	-11.2	-16.3	-15.1	-2.8	9.8	22.4	35.1	48.9	66.6	80.6	94.6	108.7	121.8
Min	0.0	-8.6	-16.3	-24.0	-23.0	-11.9	-0.4	11.1	22.6	35.3	51.4	64.3	77.2	90.1	102.1

As indicated by the span of cumulative cash flow in the figure, there are risks and related sensitivity to the financial results. This is based on the implementation risks combined with the variance related to the estimated potential benefits. The implementation risks are derived from the identified risks and variance in the Merger scenario, described in the NUAC Definition Phase Final Report (and appendices 1-3) in a way such that initiatives with the same financial effect are assumed to have the same related risks as for the merger scenario, while initiatives with lower benefits have relatively lower risks.

Figure 9 displays the discounted cash flow in the Operational Alliance scenario, including project implementation costs occurring from 2007 to 2010 as well as cost savings related to FTE, technology and overhead occurring from 2011. It also displays cost of hiring an alliance manager for NUAC in 2008. As indicated in the figure, an increase in cost savings related to systems and technology ("Technology") occurs in 2016. These additional cost savings relate to avoidable investment costs related to 'other ATM systems'.

Figure 9 Discounted Cash Flow for Operational Alliance Scenario (million Euro)



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
€ million	0.00	-5.80	-4.65	-4.35	0.94	9.62	9.40	8.99	8.59	8.90	10.84	8.20	7.83	7.48	6.58

2.1.5.4 Analysis of the initiatives

The Business Case for the Operational Alliance is based on the initiatives described in the NUAC Definition Phase - Appendix 2 (which contains rationale, design, baseline etc for each initiative). The column “assumptions” in the table shows if the initiative is included in the scenario and if relevant the specific assumptions for the scenario.

Initiative	Area	Description	Assumptions	Financial impact in Euro
1	FTE	Optimisation of management positions	· Reduction of 1 FTE and additional hiring of 1 CEO and 1 senior manager for NUAC	-196,500
2	FTE	Re-design of administration functions	· Resource reduction of 7 FTE working within ATM Training	472,500
3	FTE	Re-design of technical staff functions – ATM system development	· Business area is out of scope	0
4	FTE	Re-design of technical staff functions – system maintenance	· Business area is out of scope	0
5	FTE	Re-design of operational support functions – procedure	· Resource reduction of 44 FTE in Procedures	3,987,500
6	FTE	Re-design of operational support functions – roster planning	· Resource reduction of 13 FTE in Roster planning and other OP support staff	885,500
7	FTE	Re-design of operational functions – briefing officers	· Establishment of one common briefing officer functions (located in Denmark or Sweden) · Resource reduction: 18 FTE	1,140,500
8	FTE	Re-design of operational functions – night hours	· Closure of two ATCC during night hours · Resource reduction: 13 FTE	1,070,000
9	FTE	Re-design of operational functions – control positions	· Optimisation of control position based on the analysis made by Airspace Design work group · Resource reduction: 35 FTE	3,045,000
10	Technology	Common procurement of administrative IT	· Common procurement of administrative IT · Because of retained organisations, common maintenance of administrative IT is not possible	120,000
11	Technology	Common sourcing of tele/data communication	· Business area is out of scope in this scenario	0
12	Technology	Common purchasing and operation of ’ other ATM systems’	· Common future purchasing of ‘other ATM systems’ (improved bargain power, adjustment costs etc) · Common future operation of ‘other ATM systems’ (improved framework agreement, licenses etc)	126,500
13	Technology	Common use of existing surveillance infrastructure	· Due to overcapacity of radar coverage two existing radar units can be closed down	245,000
14	Technology	Common purchasing and operation of CNS systems/infrastructure	· Common future purchasing of CNS systems (improved bargain power, adjustment costs etc) · Common future operation of CNS systems (improved framework agreement, licenses etc)	290,000
15	Technology	Optimal use of basic and unit training simulators	· Shutdown of CATCAS and SMART simulator	241,000
16	Overhead	Reduction in general overhead cost	· Total resource reduction 129 FTE · Average yearly variable overhead cost per employee = €12.383	1,597,000
17	IS Costs	Project implementation cost	· Total implementation costs of €18.4 million.	-
Total				13,024,000

2.1.5.5 Integration Costs

The integration costs are derived from the analysis in the NUAC Definition Phase Final Report regarding Integration Costs for the Merger and Alliance scenarios, and are adjusted to fit the scope of the Operational Alliance scenario. The Operational Alliance implementation is assumed to have a timeframe of three years.

Integration cost areas	Detailed description	Total in Euro
1) Establishment costs setting up the new cooperation	• **Establishment costs for joint limited company = €799,000** • **Cost for legal services, preparation and establishment of new legal entities, legal aspects of separating the new business model, legal advice concerning certification and designation etc.** • 1A) Legal services - Internally (1 FTE * 3 years * 64,000 €) + Externally (½ FTE * 3 years * 405,000 €) = € 799,000	799,000
2) Personnel: • Internal FTE • Cost for consulting & legal services	• **Personnel (internal FTE and external FTE/advisors) = €9,605,500** • **Cost for process, procedures and organisation structural alignment and optimisation, change and integration management, benefit management, preparation of certification and designation, development of HR (retrenchment) plan etc.** • 2A) Program management – Internally (2 FTE * 3 years * € 64,000) + Externally (1 FTE * 3 years * € 405,000) = € 1,599,000 • 2B) Concepts & solutions - Internally (4 FTE * 1 year * € 64,000) + Externally (3 FTE * 1 year * € 405,000) = € 1,066,000 • 2C) Corporate - Internally (4 FTE * 3 years * € 64,000) + Externally (1 FTE * 3 years * € 405,000) = € 1,983,000 • 2D) Operations - Internally (6 FTE * 3 years * € 64,000) + Externally (1½ FTE * 3 years * € 405,000) = € 2,974,500 • 2E) Technical - Internally (4 FTE * 3 years * € 64,000) + Externally (1 FTE * 3 years * € 405,000) = € 1,983,000	9,605,500
3) Costs for IT/software upgrades	• **IT upgrades/technology (hard ware/soft ware) = €4.000.000** • **Cost for system alignment and optimisation, system hardware and software upgrades, ATM system integration, administrative IT/ERP alignment etc.** • 3A) Operative system integration (ATM, CNS etc.) = € 3,000,000 • 3B) Other/remaining administrative IT upgrade (common platforms, etc) = € 1,000,000	4,000,000
4) Training, competence development and other attrition aiming activities.	• **Training, competence development and other attrition aiming activities = €4,000,000** • **Cost for integration related training, competence development in relation to new job descriptions and/or new job roles and technical content, voluntary retrenchment package pool to be used if necessary**	4,000,000
5) Preparation of sourcing (technical maintenance & administrative IT/ERP)	• **Not relevant since potential sourcing is handled in retained organisations**	
Total integration costs		18,404,500

2.1.6 New potential benefit areas

As part of the supplementary analyses, a number of initiatives have been completed in order to investigate further potential benefits in a more formal cooperation between Naviair and LFV/ANS.

The purpose of the additional synergy potential analysis is to provide indications on whether more synergies can be identified for further analysis in the next phase of the programme. Potential benefit areas have been identified through interviews with relevant experts from Naviair and LFV/ANS. Note that the identified benefit potentials relies on which areas are handled in NUAC i.e. it has not been analysed what the specific differences in the savings potentials are depending on each scenario.

This section contains a description of these potential new benefit areas, including a brief description of the rationales that the analyses are based on. The potential benefit initiatives are divided into the areas:

- Systems
- Resource management
- External costs
- Stakeholders
- Operations.

The estimated savings potential are considered with varying degree of uncertainty, which is why it has been chosen not to include them in the cost benefit analyses described in the previous section. Furthermore solutions regarding the implementation of the initiatives have to be developed before the financial impact can be determined. The Business Case cost-benefit analyses contain only initiatives which are reliable in their savings potential. Some of the potential benefit areas might turn out to results in only minor financial benefits, whereas they might result in greater non-financial benefits to the organisation – and even to some extent benefits for the retained organisations.

The new potential benefit initiatives shown in Figure 10, are described in NUAC Supplementary Report – Business Case Appendix and will be further investigated during the Design and Development phase. The estimated total savings potential with varying degree of uncertainty is approximately €8.5 Million/year.

Figure 10 New potential benefits

Area	Potential	Potential financial benefits
Systems	Implementation of deliveries from COOPANS – corrections to ATM systems	Approx. € 1.7 million/year
	Technical administrative system and handling of spare parts	Approx. € 1.3 million/year
	ANS data preparation	Approx. € 0.3 million/year
	Route Charging Office system (investment savings of 1M€)	No annual savings
Resource management	Exercise preparation	Approx. € 0.4 million/year
	Use of ATCO personnel in systems development and Business Development projects	Approx. € 0.6 million/year
External costs	Procurement of services and systems - Suppliers, purchasing	Approx. € 2.0 million/year
Stakeholders	Authority approval	Approx. € 0.2 million/year
Operations	Technical Maintenance centre	Approx. € 0.3 million/year
	Airspace Management Cells	Approx. € 0.4 million/year
	Aeronautical Fixed Telecommunication Network	Approx. € 1.0 million/year
	Harmonisation of flight safety reporting and assessment in ATM	Approx. € 0.3 million/year
TOTAL		**Approx. € 8.5 million/year**

Remark: One major cost saving activity is probably the education and training. To find out the saving potential extensive investigations and negotiations is necessary.

Note that the implementation costs related to the implementation of the potential benefit initiatives have not been investigated, hence some initiatives might turn out to be less profitable.

Other areas with potential savings have been identified and discussed, but these areas depend on the design of the organisation, and also depend on which functional areas are handled in NUAC i.e. the scenarios. Those initiatives will be further investigated during the Design and Development phase. The identified areas are:

Systems:	*Common roster planning system*
Resource management:	*Optimising of resource planning*
External costs:	*International membership fees: CANSO, EUROCONTROL etc.*
Stakeholders:	*Cost for delivering and receiving data to and from airports and airlines.*

2.2 Business Model

The chapter contains additional Business Model analyses, elaboration on the findings conducted during the NUAC Definition Phase and presented in the NUAC Definition Phase Final Report (and Appendices 4, 5 and 10). The primary focus has been to develop a coherent governance structure covering all three organisations. Furthermore, the aim is to highlight all aspects of the three scenarios: Merger, Alliance and especially the Operational Alliance. The chapter will primarily focus on the Business Model for the NUAC Company.

It must be stressed that the details and specific solutions regarding the Business Model will be further developed during the Design and Development Phase, since many of the presented elements in the Business Model are yet undecided.

The chapter contains two parts:

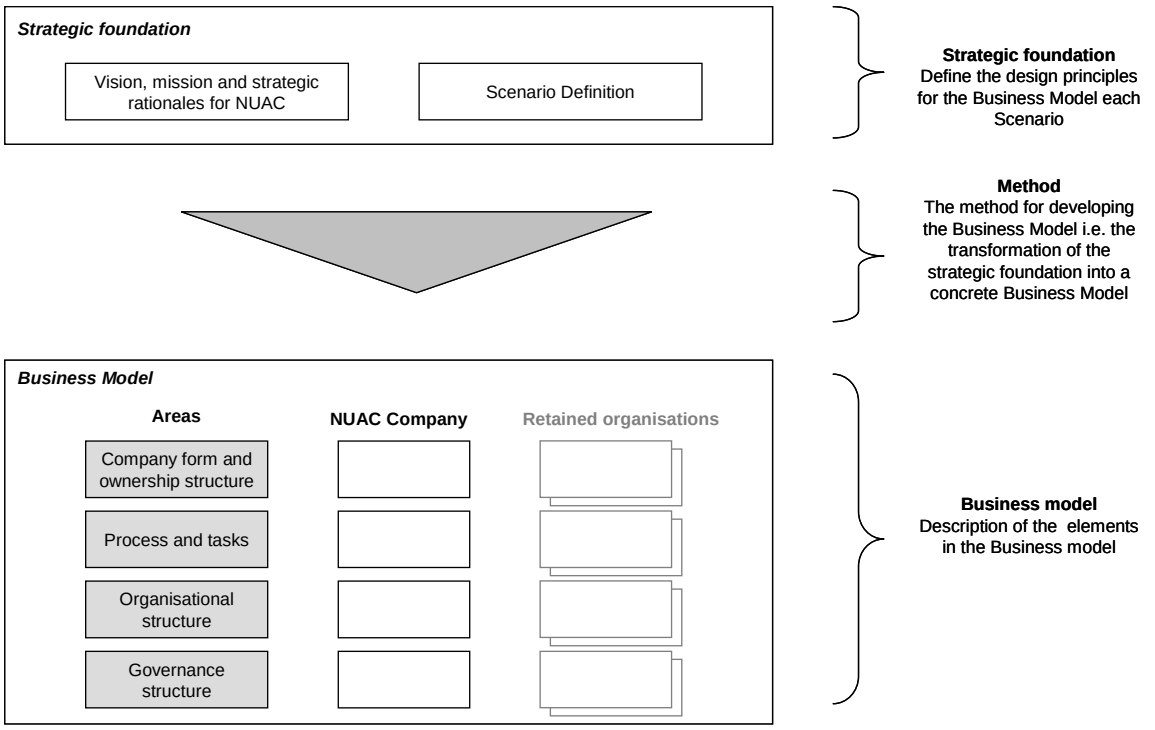
- **Analytical framework** – a complete description of the applied Business Model framework including the methods and sources which the Business Model are based on
- **Business Model** – a description of the content in each element of the Business Model, i.e. legal frame, processes, organisational structure and governance structure.

2.2.1 Analytical framework

The purpose of the Business Model is to establish a high-level conceptual description of the value NUAC offers its customers and of the architecture of the organisation and its network of partners for creating and delivering value to the customers. The Business Model contains a set of elements and their relationships and allows for the expression of the business logic of a specific organisation.

The logic behind the Business Model is illustrated in the figure below. The Business Model is designed in order to realise the strategic foundation for NUAC in the best possible way.

Figure 11 Business Model framework



During the Definition Phase, a **clear strategic foundation** for the NUAC Company has been developed in terms of a strategic framework and scenarios for future cooperation. The Business Model should reflect this strategic foundation in the best possible way; more specifically, the Business Model should:

- Reflect the *strategic framework of NUAC* in terms of the defined mission, vision and underlying strategic rationales for the NUAC Programme. The NUAC Definition Phase Final Report and Appendix 10 present detailed information regarding the strategic framework
- Handle the specific management and organisational possibilities in each scenario. The three scenarios outline different Business Model possibilities, since they differentiate on ways of cooperation and on which functional areas are included in the NUAC Company.

The presented Business Model is based on a top-down **method**, which favours an academic methodology based on existing data in order to develop an overview of the Business Model with less focus on specific details.

The Business Model is based on four different sources:

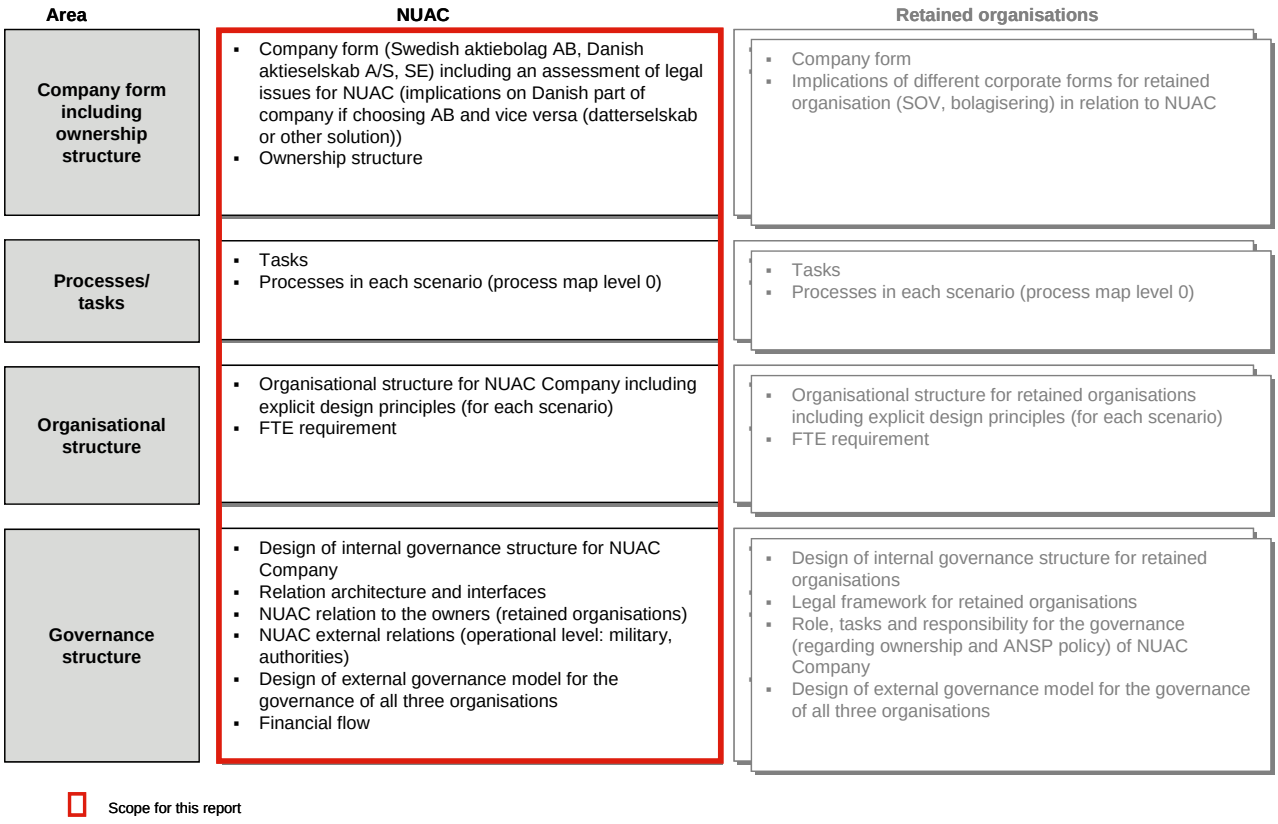
- *Existing material* – the basis for the presented Business Model are the conclusions, findings and data conducted during the Definition Phase including stakeholder consultations, interviews with steering committee and experts from the two organisations, and general knowledge

- *Comparable experience* – relevant experience and best practice from inside the ATM sector as well as similar industries have been used in order to identify the Business Model possibilities
- *Regulation and legislation* – a preliminary analysis of the relevant regulation and legislation has been used in order to determine the overall framework of the NUAC Company
- *Specific literature regarding public companies* – The ministries of Finance in both Denmark and Sweden have developed comprehensive studies and best practice in terms of design and governance of publicly owned aktieselskab/aktiebolag companies.

The **Business Model** for all scenarios is based on the same framework, logic and principles – as illustrated in Figure 12 – and divided into four different elements as shown in the figure:

- *Company form and ownership structure* outline the most important bounds for the NUAC Company in terms of the company form and ownership structure
- *Processes and tasks* outline the core and support processes for NUAC in each scenario and thus give the core business set-up for the NUAC Company
- *Organisational structure* outlines the organisational set-up for handling the specific processes and tasks in order to realise the vision of NUAC in the best possible way
- *Governance structure* outlines the governance structure for NUAC both in terms of the internal management of NUAC and in terms of external governance for all three organisations.

Figure 12 Contents of the Business Model



The description of the company form/ownership structure and governance structure will be identical in all scenarios while the process and tasks, as well as organisational structures differentiate in the scenarios. Even though there will be some degree of variations in the governance structures for the different scenarios, only one generic description of governance structure covers all three scenarios in this document.

2.2.2 Company form and ownership structure

This section outlines the most important organisational bounds for the NUAC Company in terms of the company form and ownership structure, both of which affect all other elements in the Business Model.

2.2.2.1 Company form

The possible company form for the future NUAC Company has been addressed and analysed on a high level during the Definition Phase, and the findings are listed in the NUAC Definition Phase Final Report and Appendix 5.[10]

The analysis has narrowed the options considerably. The option of a company form with limited liability results in three different options: a Danish Aktieselskab, a Svedish Aktiebolag or a European SE company. The analysis showed that there are no major principal differences between choosing the Danish Aktieselskab or Swedish Aktiebolag. The Danish Aktieselskab or Swedish Aktiebolag company form will also be in line with the strategic foundation of NUAC focusing on improving the cost efficiency. In both Denmark and Sweden, a number of traditional public organisations have been transformed into Danish Aktieselskab and Swedish Aktiebolag companies respectively, in order to improve efficiency (Finansministeriet, 2005).

2.2.2.2 Ownership structure

Ownership structure in this report is defined as high-level principles covering the fundamental aspects of the ownership of the NUAC Company, i.e. questions such as how the ownership is distributed between the two countries, and which organisational units will manage the ownership etc.

During the Definition Phase, different aspects of the NUAC ownership have been analysed – the main conclusions are:

- **Mutual ownership** (50%/50%) between the participating parties Naviair and LFV/ANS. The conclusion was based on an assessment of different ownership models. The ownership principle is reflected in all aspects of the ownership structure and the governance structure
- **The retained organisation will be responsible** for managing the ownership. The analysis – based on experience from comparable industries combined with preliminary negotiations between the relevant stakeholders – showed that the

[10] More specifically, six different company forms have been analysed: company forms without limited liability: Danish interessentselskab I/S, Swedish handelsbolag, European Økonomisk Firmagruppe; company forms with limited liability: Danish Aktieselskab, Svedish Aktiebolag, European aktieselskab.

ownership is best managed through the retained organisations. The retained organisations thereby become responsible for managing the national interests.[11]

A high-level description of how the retained organisation will manage the ownership is outlined in section 2.2.5.4 in this report. The specific content of the responsibility will be developed during the Design and Development Phase.

During the Design and Development Phase, important aspects of the ownership structure will be completed by further analysis and negotiations regarding:

- Financial agreement
- Composition of employees
- Payments and shareowner agreements
- Terms of resignation
- Procedures and process for admission of new partners
- Procedures for handling of fundamental disagreement.

A legal document will be developed and will address all relevant aspects and dimensions of holding the ownership of the NUAC Company.

2.2.3 Processes and tasks

This section describes the processes and tasks for NUAC in each scenario – which is an important part of the Business Model since they describe the core business set-up for NUAC and determine the requirements of competences, employees and systems for the NUAC Company.

In this report, a process is defined as a flow of activities that has a distinct, measurable and valuable deliverable to either a following process or to an internal or external customer. Support processes are defined as processes without external customers, but which are important in relation to the efficiency of the core processes; hence they also contribute to creating value.

In order to establish a complete map of the activities and functions within the NUAC Company, the processes must be mutually exclusive and collectively exhaustive, meaning that processes should cover all tasks and activities for NUAC, but without having several processes covering each task. The process description will have the same detail level (i.e. level 0) as in the NUAC Definition Phase Final Report. In the Design and Development Phase, the processes will be broken down into: sub-processes, activities and tasks. Furthermore, there will be focus on optimisation of the sub-activities within the new process flow and optimising the interfaces and deliverables accordingly.

The process maps for the scenarios are structured in three levels:

- **Management processes** with the aim of managing, governing and pointing out the strategic direction for NUAC
- **Core business processes** the main activities in the NUAC Company that from a customer perspective create value and customer satisfaction[12]

[11] Due to the code of practice regarding publicly owned aktieselskab/aktiebolag companies in both countries, responsibility will be extended compared to the management of regular shareholders (Finansministeriet, 2005, p.21).

- **Support processes** including the operational and technical support which is necessary in order to support the operational core business and also including administrative support, i.e. generic administrative processes which are necessary to run the organisations. Often, it is the support processes that are subject to optimisation, since they usually operate in a specific area and do not relate to a large number of functional units across the organisation.

The processes in the Merger and Alliance Scenario will be described on a high level in this report, since a detailed description is given in the NUAC Definition Phase Final Report, but are included since a number of key success factors for the particular process areas have been added.

2.2.3.1 Merger

This section contains a high-level description of the process map for the Merger Scenario; an additional description is given in the NUAC Definition Phase Final Report.

Figure 13 below shows the process map for the future NUAC Company. The aim is to align processes using best practices from Naviair and LFV/ANS in order to secure homogeneous operating standards. It should also be ensured that processes are aligned between the three organisations in the areas where the processes are interconnected, due to cooperation and interfaces in operations, technical support and administration.

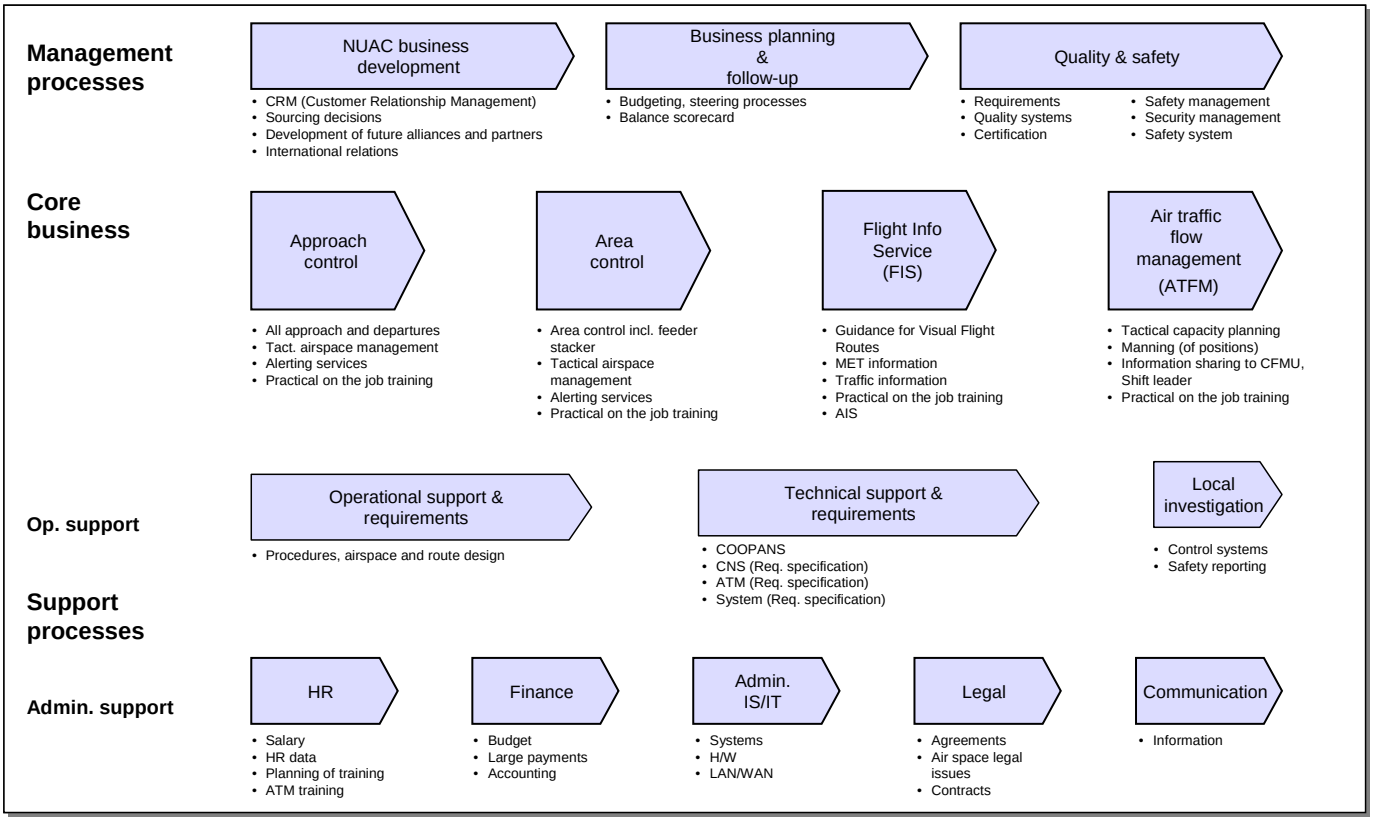
The rationale for the Merger Scenario is to show clear and formalised lines of command in a merged company and entail management of all core processes and related support processes. This also relates to alignment and optimisation of processes and ensures that flow is optimal between processes that relate across the three organisations. Interfaces between all three organisations are described in the section related to external governance structure. Alignment of processes across the organisations will support the compliance of the strategic rationales for NUAC including customer orientation and flight efficiency.

The process map provided supports the design criteria for the Business Model as:

- Processes enable positive synergies in terms of increased financial efficiency and quality
- Processes support scalability as standard operating procedures will be implemented by new joiners of NUAC
- Processes are needed for the certification process.

[12] The three scenarios have different customers, since NUAC will act primarily as a production unit delivering services for the retained organisations in the Alliance Scenario.

Figure 13 Process map – Merger Scenario



The **core business** is represented in the core processes related to En-route and Approach control, and associated processes for Flight Info Services and Air Traffic Flow Management. These are the vital processes in the business in order to ensure the production which generates value for the external customers and also provides the larger part of the revenue for NUAC. It is also necessary to focus on the core processes in order to ensure that NUAC is designed in the leanest and most optimal way, only including non-core processes which are essential in order to carry out the provision of air navigation services. This is important to ensure compliance with the strategic rationales such as cost efficiency, flight safety, strategic readiness, alignment of business model and operational flexibility.

Key success factors for the core business processes are:

- Alignment and optimal flow, especially on critical interfaces internally in NUAC and between NUAC and retained organisations (e.g. in coordination with approach and TWR processes) since these are placed in different organisations
- Ensuring continuance in flight efficiency and flight safety
- Customer satisfaction.

These success factors will be achieved and measured through benchmarking against other service providers on commonly agreed industry parameters to ensure that NUAC maintains the high standards of Naviair and LFV/ANS at the least.

The **support processes** are defined as an effect of the necessary functions in order to carry out the core business and management. As all the support processes are not defined as

critical for the business, they will be evaluated according to whether sourcing options exist and might turn out to be profitable.

Key success factors for the support processes are:

- Supporting the core business in the best possible and most efficient way while remaining cost-efficient
- Resource utilisation
- Optimal flow internally in NUAC on interfaces between support and core processes.

Finally in order to manage and control the business, a set of management processes are defined. The **management processes** are designed to ensure an optimal management of the NUAC Company and to ensure the development of the business – both long-term (strategic) and short-term (tactical). This should be provided by the processes for business development and business planning as well as follow-up. Quality, Safety and Security are also defined as a management process, since air navigation services are dependent on safety in the form of requirements and safety monitoring systems etc.

Key success factors for the management processes are:

- Ensuring an overall coherent NUAC Business Model by continually improving and including the relevant business areas in NUAC
- Keeping balance between the business areas
- Remaining cost-efficient.

2.2.3.2 Alliance

This section contains a high-level description of the process map; an additional description is provided in the NUAC Definition Phase Final Report.

The Alliance Scenario forms cooperation between LFV/ANS and Naviair, establishing a co-owned Alliance Company for the carrying out of certain support functions, while LFV/ANS and Naviair otherwise remain as independent organisations. This will require only minor changes to the operational parts of the two organisations, but still opens up a possibility of working in a common airspace (FAB environment).

As illustrated in Figure 14 below, the Alliance Company will be formed in accordance with the scenario definition and the underlying rationales, resulting in three core areas:

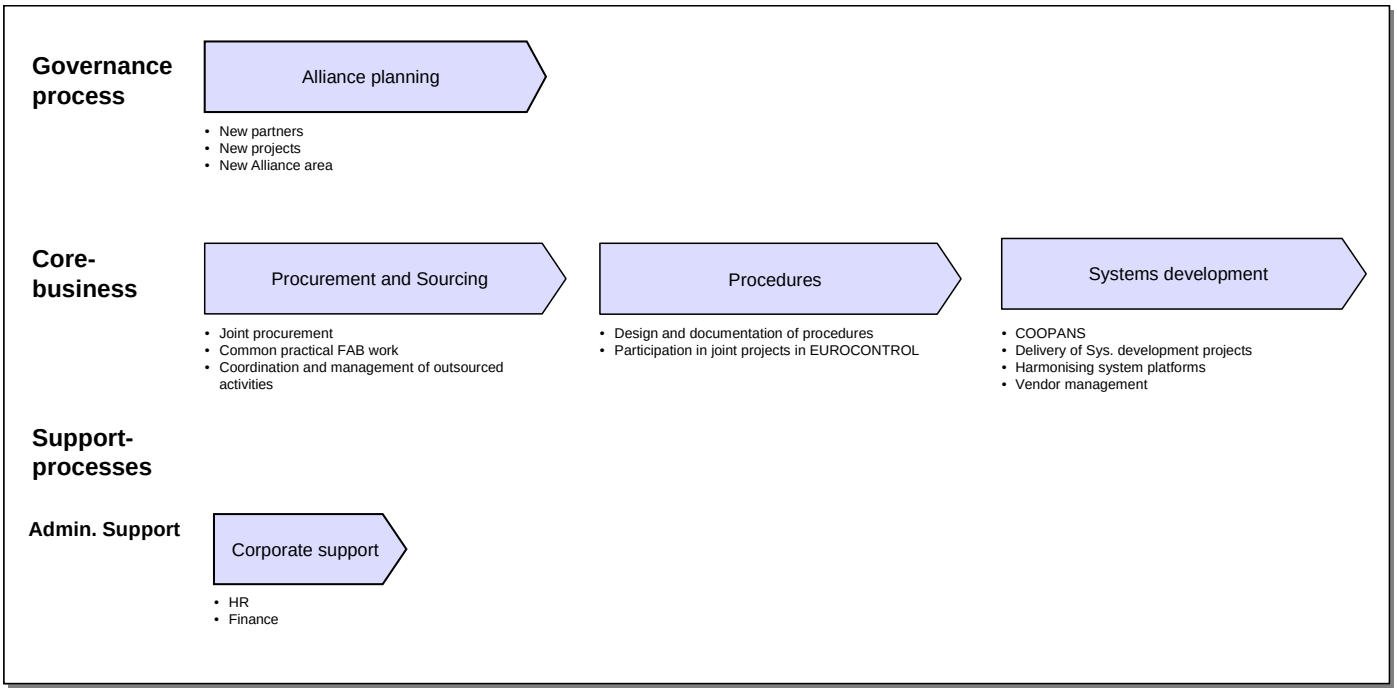
- Procurement and Sourcing
- Procedures
- Systems Development.

Apart from the areas mentioned above, the Alliance will not have a predefined process framework, since the aim is to initiate new future alliance processes and projects, which can be governed within the Alliance, to enhance the formalised cooperation between Naviair and LFV/ANS.

Key success factors for the processes in the Alliance are:

- Alignment with retained organisations in coordination and formation of the strategic development of NUAC and potential inclusion of new potential alliance areas since business development is controlled in the retained organisations
- Alignment and optimal flow, especially regarding critical interfaces between NUAC and the retained organisations (e.g. in coordination between development and implementation of new procedures) since these are placed in different organisations
- Customer satisfaction (internally) in exchange for services between NUAC and the retained organisations, e.g. the primary administrative processes are controlled in the retained organisations but have implications in NUAC
- Optimal flow and reduction of duplicate processes in NUAC and the retained organisations when coordinating activities.

Figure 14 Process map – Alliance Scenario



Customers in the Alliance Company are the retained organisations, which is why it is essential to ensure optimal cooperation and alignment between processes and activities in all three organisations, including focusing on critical handlings between the organisations and interfaces between business areas provided by NUAC and supported and supervised by the retained organisations.

2.2.3.3 Operational Alliance

In the Operational Alliance Scenario, the NUAC Company is responsible for carrying out the provision of Air Navigation Services within Danish and Swedish fully integrated airspace. The

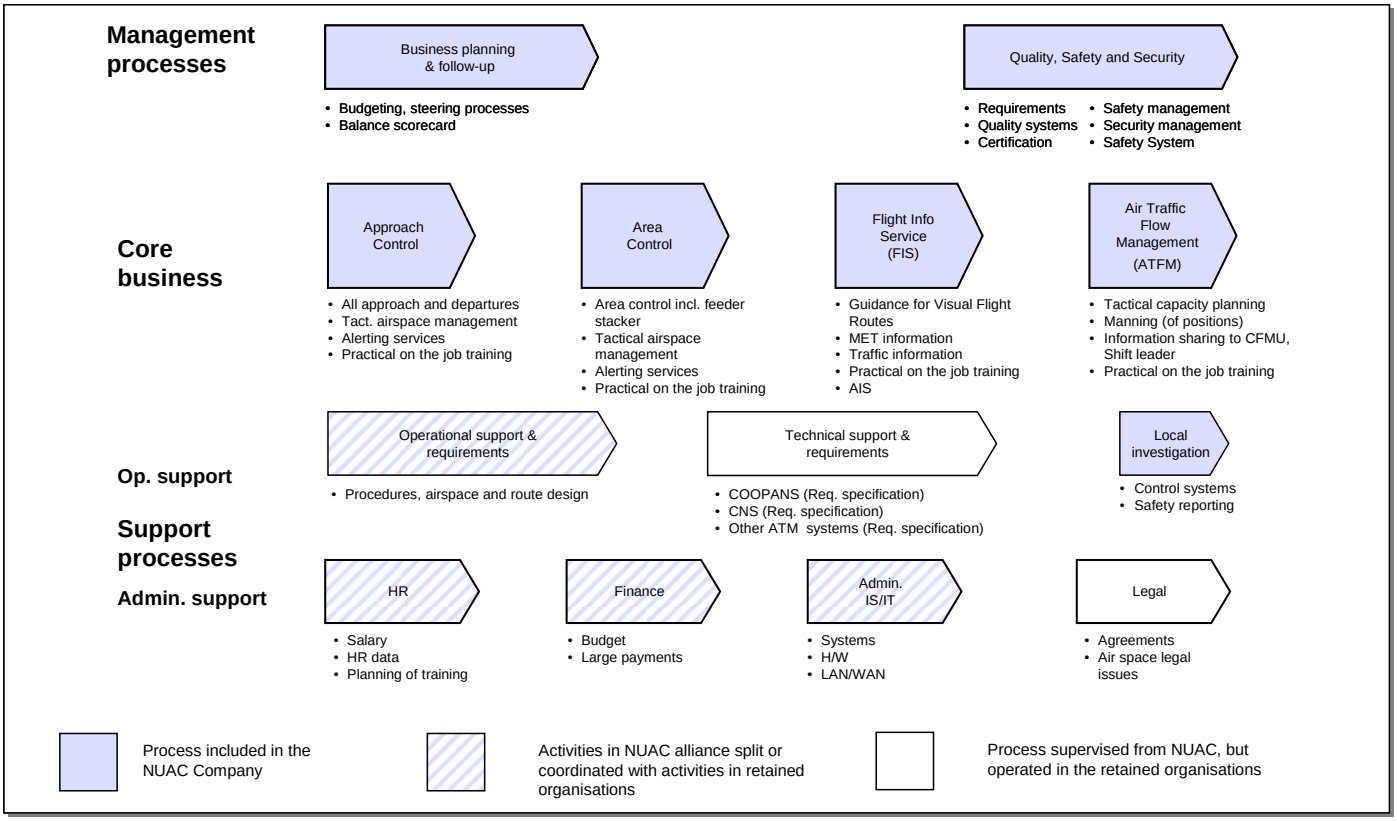
services cover all Air Navigation Services except MET, AIS and TWR.[13] Support functions will be provided in the NUAC Company when necessary to reach the full potential of the operational core business and will be designed in accordance with EC Common Requirements.

The aim of the Operational Alliance is to drive the cost base through innovative approaches to organisational structure and resource allocation, when including only the core business of the two companies Naviair and LFV/ANS in the NUAC Company. This makes it essential that processes are aligned between the NUAC Company and the retained organisations in order to ensure optimal flow between activities handled in retained organisations, and supervised and supported from NUAC. This is also important in order to fulfil the strategic rationales in the best possible way – especially flight safety and efficiency, customer orientation, alignment of business model, and attraction and bargaining power.

The process map provided supports the design criteria for the Business Model as:

- Processes enable positive synergies in terms of increased financial efficiency and quality
- Processes support scalability as standard operating procedures will be implemented by new joiners of NUAC
- Processes are needed for the certification process
- Optimal process flow between processes in the three organisations.

Figure 15 Process map – Operational Alliance Scenario



[13] The description of the scenario is more detailed compared to the previous sections, since the Operational Alliance is not covered in the NUAC Definition Phase Final Report

2.2.3.3.1 Core business

The NUAC process map focuses on the core business, and the processes included are shown in Figure 13. These processes cover the essence of the business, and what directly brings value to the customers. The core processes are En-route and Approach control, and related processes for Flight Info Services and Air Traffic Flow Management. The focus on the core processes will encourage that NUAC is designed in the leanest and most optimal way and also ensure compliance with the strategic rationales.

Key success factors for the core business processes are:

- Alignment and optimal flow, especially on critical interfaces internally in NUAC and between NUAC and the retained organisations (e.g. in coordination between approach and TWR processes) since these are placed in different organisations
- Ensuring continuance in flight efficiency and flight safety
- Customer satisfaction.

These success factors will be achieved and measured through benchmarking against other service providers on commonly agreed industry parameters to ensure that NUAC maintains the high standards of Naviair and LFV/ANS.

As shown in Figure 15, the core business processes are defined as:

Approach Control
Approach control includes: approach services, all approaches and departures within the approach area, tactical airspace management and alerting services.

Area Control
Area Control services include feeder and stacker, tactical airspace management and alerting services.

Flight Information Services (FIS)
A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights. Included is guidance for visual flight routes, MET-services and traffic information.

Air Traffic Flow Management (ATFM)
Air traffic flow management is the process that aims to optimise the traffic flow given the constraints and capacity of the airspace. Included is tactical airspace planning, manning of positions and information sharing to CFMU.

2.2.3.3.2 Support processes

The support processes are evaluated according to whether they should be controlled by NUAC or by the retained organisations. Due to the rationale of the scenario, NUAC will only include the core support processes, while supporting processes are mainly provided in the retained organisations. *Local investigation* is handled in NUAC, since it is related to the core business and also to *Quality, Safety and Security* processes. As illustrated in Figure 15, support processes such as *HR* and *Finance* are coordinated with activities in retained organisations, meaning that NUAC has employees responsible for managing the tasks and coordinating these activities with *HR* and *Finance* processes performed by the retained organisations.

Operational support

Technical support and requirements
The processes handle the technical areas i.e. requirements specifications and deployment and supplier management and systems. These processes are coordinated with corresponding processes in the retained organisations. COOPANS will be managed from the retained organisations.

Operational support and requirements
This support process handles the operational areas of ANS provision such as procedures, route design, airspace design, ATCO instructions/manuals etc. These processes are coordinated with corresponding processes in the retained organisations.

Local investigation
All control systems and safety reporting are managed through a local investigation process in order to comply with safety standards and carry out investigation of air traffic incidents.

Key success factors for the operational support processes are:

- Resource utilisation
- Optimal flow internally in NUAC on interfaces between support and core processes, and between processes coordinated between NUAC and the retained organisations.

Administrative support

Main parts of administrative support in the Operational Alliance scenario is presumed to be delivered by the retained organisations, i.e. NUAC will only supervise and monitor the functions. Hence *Human Resources (HR)*, *Finance*, *Administrative IT*, *Legal PR and Communication* and *Facility Management* will mainly be provided by Naviair and LFV/ANS.

Key success factors for the administrative support processes are:

- Customer satisfaction (internal) in exchange for services between NUAC and the retained organisations, since the primary administrative processes are controlled in the retained organisations but have implications in NUAC
- Optimal flow and reduction of duplicate processes in NUAC and the retained organisations when coordinating administrative activities.

2.2.3.3.3 Management processes

Finally in order to manage, control and govern the business, a set of management processes are defined. The management processes in the Operational Alliance scenario, focus on the tactical management of the NUAC Company, which includes business planning, control, tactical planning and formulation of the strategic direction. Strategic planning and business development for NUAC are handled in the retained organisations.

Key success factors for the management processes are:

- Alignment of NUAC business direction with national strategies
- Keeping the budget and control of planning
- Alignment with the retained organisations in coordination and direction of NUAC business development, since business development is controlled in the retained organisations.

Quality, Safety and Security is defined as a management process, since all handling of air navigation services depend on safety regulations, which supports the rationale of the scenario; the focus on delivering the operations. This process includes specifications and control of requirements, management of safety systems and certification.

Business Planning and Follow-Up
Business planning and follow-up processes focus on middle to short-term tasks. This also includes governing the business and the balance scorecard process, where the framework for individual target setting is managed.

2.2.4 Organisational structure

The organisational structures for the NUAC Company in the three scenarios are organised around the main processes as described in the previous chapter. The organisational structure should provide simplicity and transparency in order to provide clarity and ease operation and communication in all parts of the organisation. Furthermore, the design of the organisation focuses on process relations in order to directly relate the activities and the organisation of the company. These matters are important in order to achieve the NUAC strategic rationales of flexibility, change readiness and alignment of business model and to prepare for the development of the industry.

The organisational structure is a blueprint of areas of responsibility – it does not provide any information regarding which processes are used (described on a high level in the previous section; detailed role descriptions and responsibilities will be handled in the next phase of the NUAC Programme). Neither does it determine the level of responsibility but it should provide for an unambiguous placement of responsibility and accountability, thus helping to streamline internal governance and create increased focus on critical interfaces and deliverables. This is especially important in the scenarios where business areas are interrelated between all three organisations, e.g. in the Operational Alliance where administrative support for NUAC is mainly carried out from the retained organisations.

The description of the organisational structure for each scenario includes a more detailed description of the Business Model design principles followed by an illustration of the organisational charts including a short description of each functional unit in the organisation is provided, and relevant interfaces between organisational units are presented briefly.

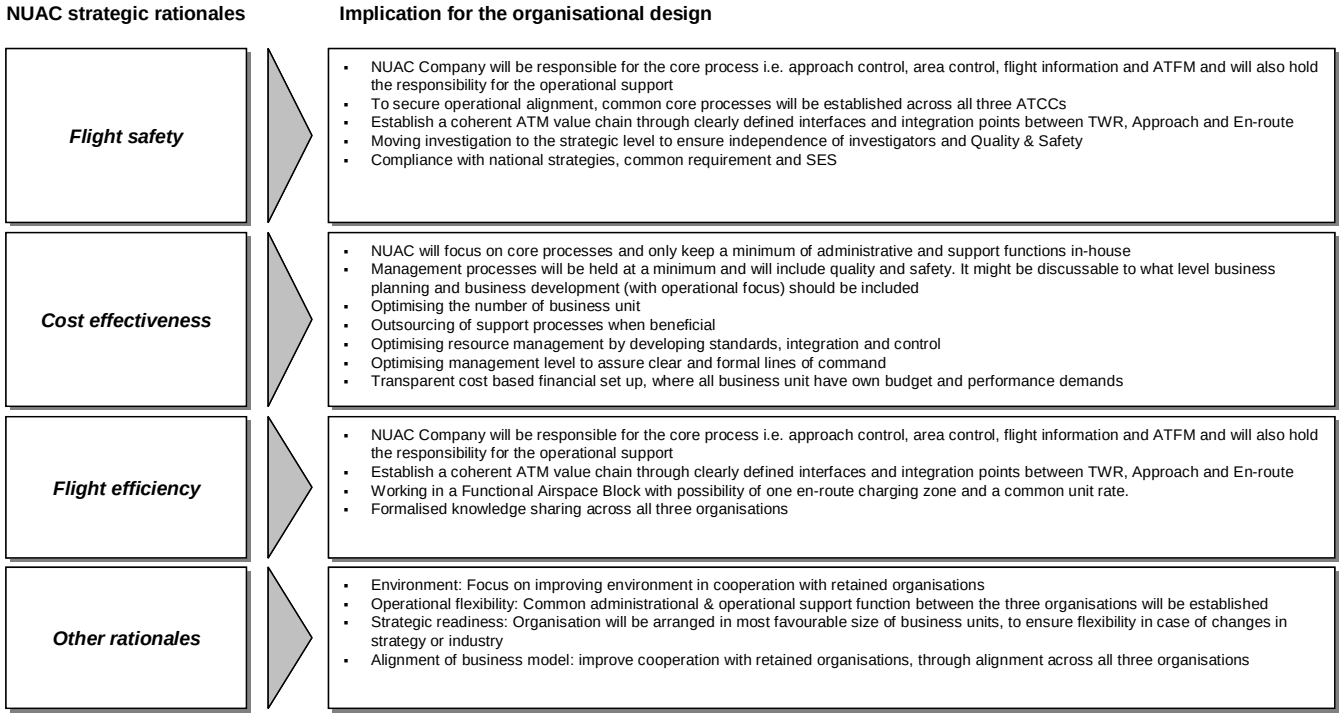
2.2.4.1 Merger Scenario

The design of the NUAC Company is based on a set of design principles, which reflect the scenario rationales and the generic strategic drivers for the NUAC Programme, primarily focusing on flight safety, cost efficiency and flight efficiency, since these are the strategy drivers which affect the design of the internal organisation.[14]

[14] For the complete list of the strategic rationales, see the NUAC Definition Phase Final Report page 58.

The figure shows how the most important design principles, related to the strategic rationales, are operationalised, and how these affect the organisational structure.

Figure 16 Overall design principles Merger Scenario



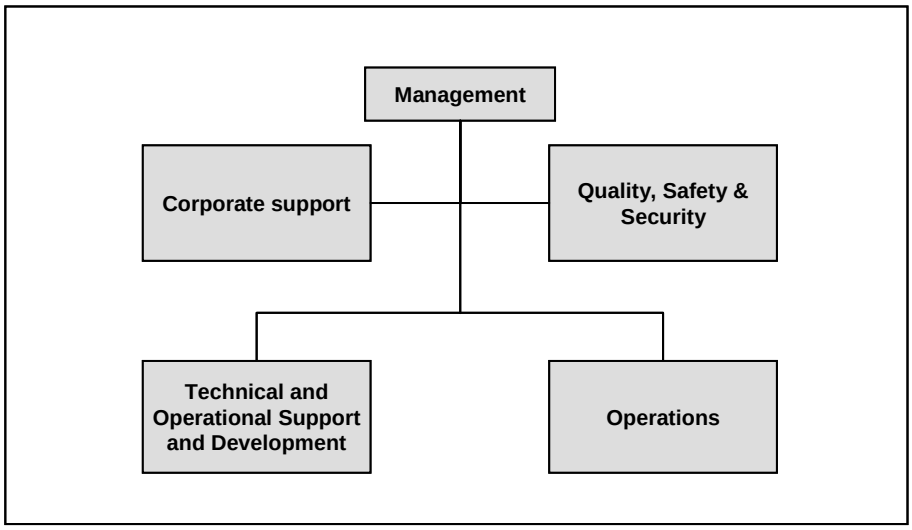
2.2.4.1.1 Organisational structure of the Merger Scenario

The organisational structure in the Merger scenario, illustrated in Figure 17 below, is based on the process map described in the previous chapter with some adjustments in order to design the most optimal and coherent organisation.

The organisation is split into a management unit and four main units; *Corporate support* and *Quality, Safety and Security* are executive functions (or staff functions) while *Technical and operational support and development* and *Operations* are line functions. It sends a signal concerning the importance of *Technical support and development* to the rest of the organisation when aligning the unit with the line organisation.

In the outline presented, the more “classical” placement of *Corporate support* (and *Quality, Safety and Security*) as a staff function to the CEO has been chosen. The corporate support must provide strong communication to ensure effective alignment between the support functions and the operations organisations.

Figure 17 Organisational structure of the Merger Scenario



In the Merger scenario, *Quality, Safety and Security*, including *Investigation*, has been separated in an executive functional unit, organised directly under the management to comply with EC Common Requirements and to ensure independence of investigators. The unit is responsible for providing the quality process outlined in Figure 13.

All other supporting functions, except functions directly related to operations and IT systems, have been collected in a *Corporate support* functional area, arranged as an executive function. The corporate support becomes responsible for providing the following processes:

- Finance including Controlling & Accounting, Budget & Planning
- Supervision of administrative IT
- Business development and business planning, balanced scorecard and follow-up, partner/sourcing and international relations
- HR, administration, development, PR and communication
- Supervision of facility management
- Roster planning.

The *Technical and operational support and development* includes systems requirements, maintenance and supervision and also operational support such as procedures and ATM training. All system related processes are placed in the same unit in order to establish a coherent flow in all elements of the handling of the ATM and related operational systems. In addition, one common unit will ensure coordination between the external providers (vendor management) and the internal providers (system development in NUAC).

The including of the technical development and elements of operational support in the same unit encourages mutual positive impact. The two different disciplines complement each other and will together improve the core business of NUAC, e.g. the procedures and ATM Training together constitute a complete, concentrated insight into NUAC operations, which are fundamental in the systems development. In addition, there will be a synergy in terms of sharing project experiences.

Finally, the operational core business has been arranged in an *Operations* unit, containing three sub-units: ATCC CPH, ATCC MM, ATCC STO. Apart from ATCO functions, briefing officers etc., these include local Q&S, training, investigation, roster planning and procedures responsible, supporting the corporate functions.

The different organisational units are connected by clearly defined and formalised interfaces. The most important are:

- Interface between *Corporate support*, *Management and Quality, Security and Safety* units since these three units manage the company both on short-term and long-term – strategically and tactically – e.g. business development involves all three units
- Interface between *Operational support* and *operational core business* as these clearly depend on each other in the daily operations of air navigation services
- Interface between *Corporate support* and *Operations* since it is suggested that local representatives in the operational production units coordinate their work regarding procedures, roster planning etc. with the corporate staff functions
- Interface between *Operations* and *Quality, Security and Safety* since local representatives in the operational units coordinate their work related to quality, safety and investigation with the *Quality, Security and Safety* organisational unit.

This resulting organisational set-up has the following core strengths:

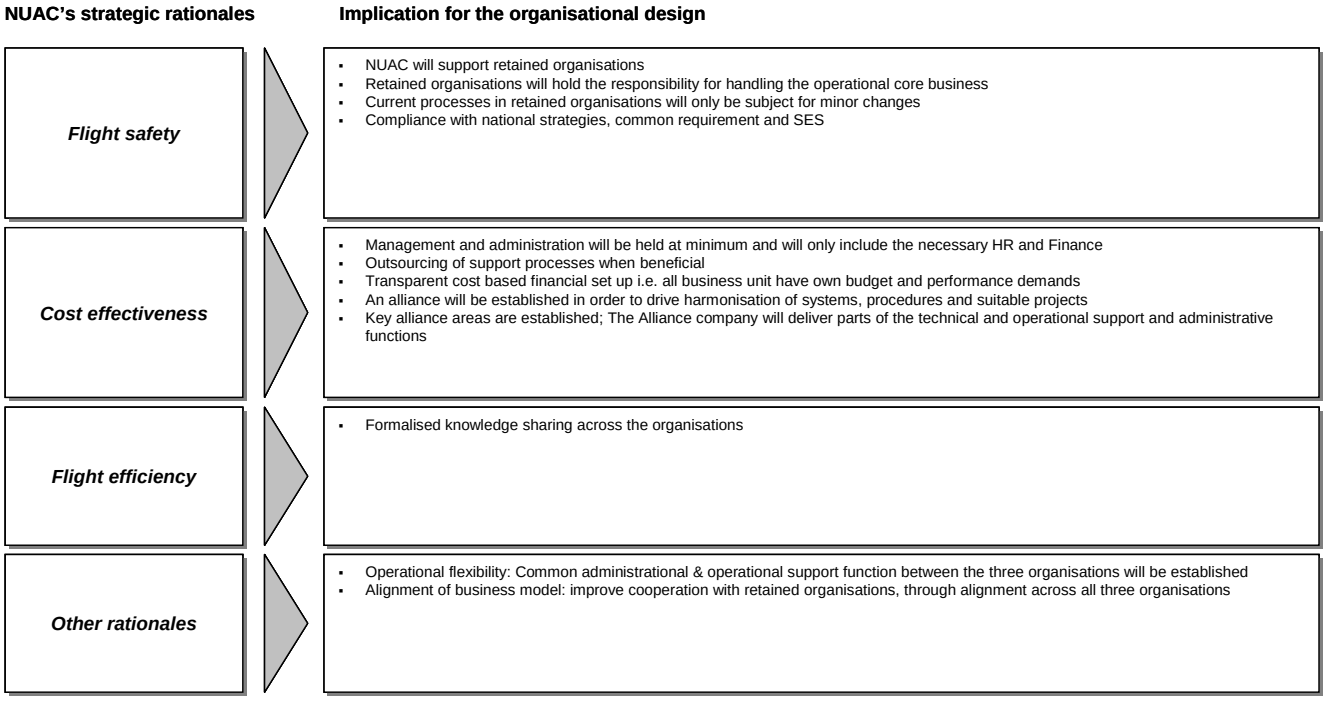
- Process-oriented and built around processes
- Simple as it is directly aligned with the actual core tasks being performed in NUAC
- Should provide for a simple and unambiguous responsibility and accountability split, hence avoiding misunderstandings when assigning process owners in the organisation
- Should provide transparency and identify the core interfaces and deliverables between organisation units, which should ensure optimal performance
- Balanced power structure between operational and technical/support functions
- Easy handling of the complex interactions across organisational boundaries (both internally in NUAC, and between NUAC and Naviair and LFV/ANS).

An additional description of the NUAC organisation in the Merger Scenario is provided in the NUAC Definition Phase Final Report, section 6.3.2.5 and describes the strategic and tactical level of the organisation and gives a brief description of each unit, process owners etc.

2.2.4.2 Alliance scenario

Figure 18 illustrates how the most important strategic rationales, in relation to the design of the internal organisation, are operationalised, and how these affect the organisational structure. The section elaborates further on the findings described in section 6.5.2.5 in the NUAC Definition Phase Final Report. The figure shows how the most important design principles, related to the strategic rationales, are operationalised, and how these affect the organisational structure.

Figure 18 Overall design principles of the Alliance Scenario



2.2.4.2.1 Organisational structure of the Alliance Scenario

As shown in Figure 19 below, the associated organisation is aligned to the four main processes. In this proposed organisation, process ownership and organisational structure become identical. The organisational structure is optimised towards minimising the number of interactions across the critical interfaces, but there will still be a number of cross process interactions between NUAC and the retained organisation, since NUAC will act primarily as a production company delivering services to the retained organisations.

The organisation is split into a management unit and four main units; *Administrative support* is an executive function (or staff function) while *Procurement and Sourcing*, *Procedures* and *Systems Development* are line functions. These areas reflect the fact that the alliance will not have a predefined full process framework, as initially no activities will be included in the Alliance. From the start, the Alliance will only have a set of activity areas. New alliance projects will then be initiated and governed within the Alliance.

Management has the primary purpose of developing NUAC by attracting new partners, supporting the alliance business and establishing new alliance areas and projects.

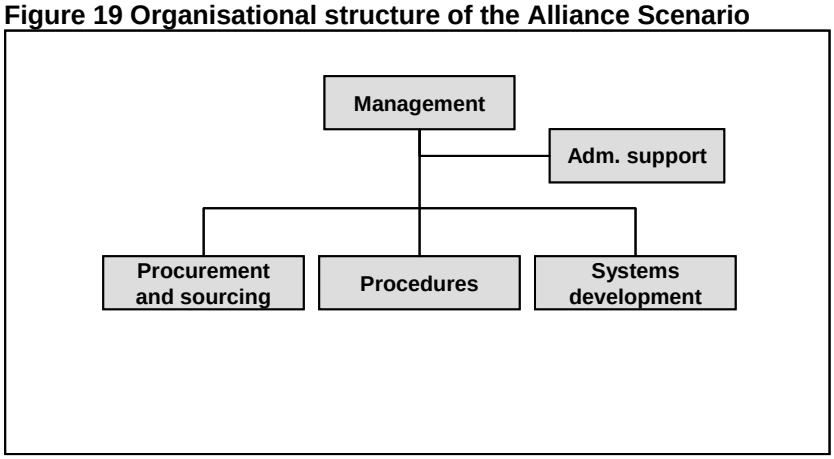
Procurement and Sourcing deliver all activities related to coordination and management of outsourced activities, as well as supporting the retained organisations in joint procurement.

Procedures support the retained organisations in the development and revision of common procedures, ensuring alignment with industry standards and participating in international projects.

The *Systems development* unit supports the sourcing solution for the delivery of systems solutions including vendor management.

Administrative support only contains the necessary HR and Finance functions and is only included in NUAC to support the core alliance areas in coordination with retained organisations.

Figure 19 Organisational structure of the Alliance Scenario

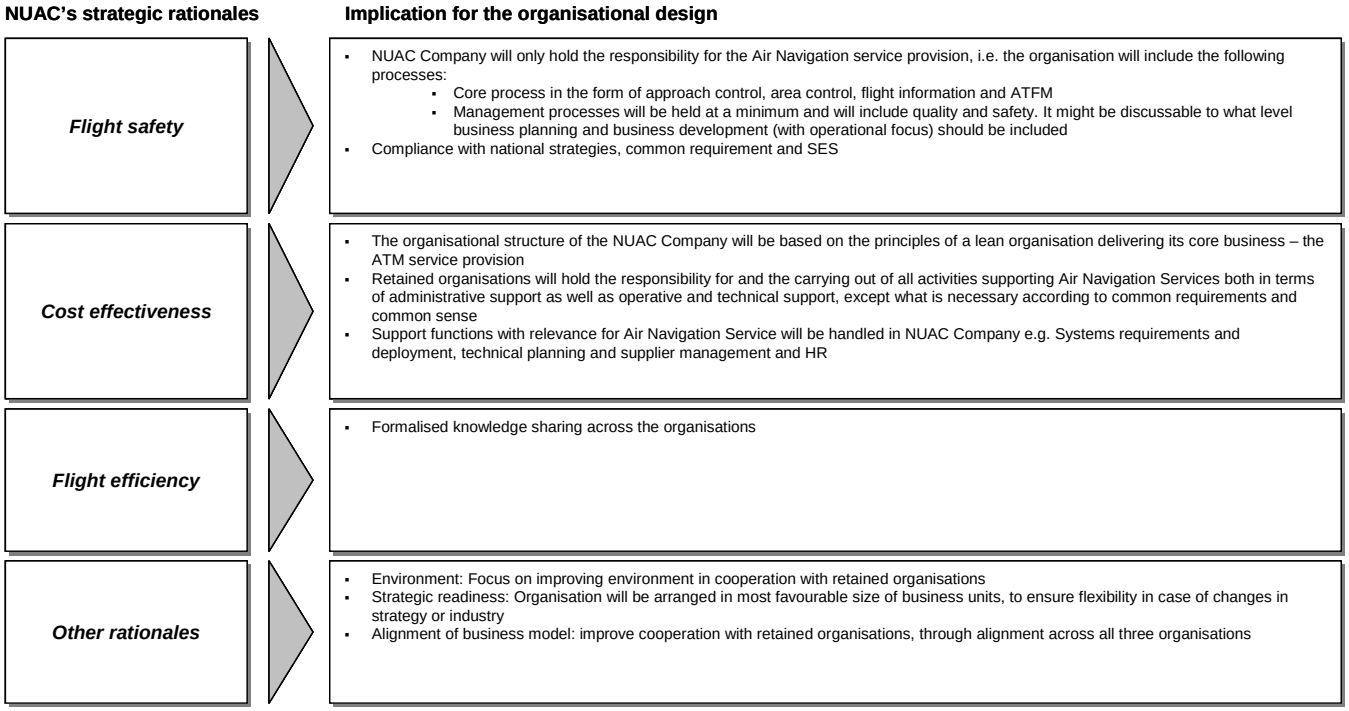


An additional description of the NUAC organisation in the Alliance Scenario is provided in the NUAC Definition Phase Final Report, section 6.5.2.5.

2.2.4.3 Operational Alliance Scenario

The design of the NUAC Company in the Operational Alliance Scenario has been developed on the basis of the design principles in the Merger Scenario and adapted so that NUAC is responsible for the core business only – the carrying out of ANS. The figure shows how the most important design principles, related to the strategic rationales, are operationalised, and how these affect the organisational structure.

Figure 20 Overall design principles of the Operational Alliance Scenario

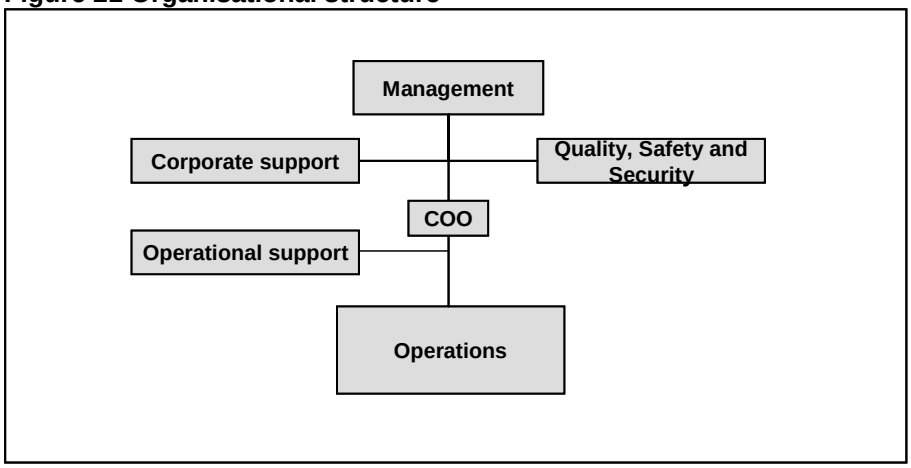


2.2.4.3.1 Organisational structure of the Operational Alliance Scenario

The organisational structure is based on the process map outlined in section 2.2.3 including some adjustments in order to design the most optimal and coherent organisation. The organisational structure will have some critical interfaces since some processes and activities are split between NUAC and retained organisations in this scenario.

The organisation is split into a management unit and four main units: *Corporate support*, *Quality, Safety and Security* and *Operational Support* are executive functions (or staff functions) while *Operations* is the only line function. In the outline presented, the placement of *Corporate support* is "classical" whereas the placement of *Operational support* differs from the Merger Scenario, as it is a line function in the Merger, but a staff function in the organisational set-up in the Operational Alliance Scenario. This supports the NUAC organisation as being based on the principles of a lean organisation focusing on the core business – the provision of Air Navigation services. It also supports the incentive of aligning and streamlining the activities in the three control centres. The necessary activities supporting the core services, both in terms of administrative support as well as operative and technical support, will be included in the NUAC Company so that the core business will be able to perform optimally.

Figure 21 Organisational structure



Management consists of the CEO, who is legally responsible for the business and all activities within the organisation. All management processes reside under *Corporate support* except for *Quality, Safety and Security* which is arranged in a special unit, which emphasizes the rationale of the scenario; the focus on the operations.

The *Operational support* function will be responsible for formalising and structuring the way of working within the operation. This includes airspace design, procedures, working methods, MET, AIS, NOF, ARO and local investigation. As in the Merger Scenario, *Quality, Safety and Security*, including investigation, has been separated in an executive functional unit, organised directly under the management to comply with EC Common Requirements and to ensure independence of investigators.

The operations have been arranged in an *Operations unit*[15], containing three sub-units: ATCC København, ATCC Malmö and ATCC Stockholm. Apart from ATCO functions, briefing officers etc., these include local Q&S, training, investigation, roster planning and procedures responsible for supporting the corporate functions. All core processes outlined in the process map will reside under the Operations unit.

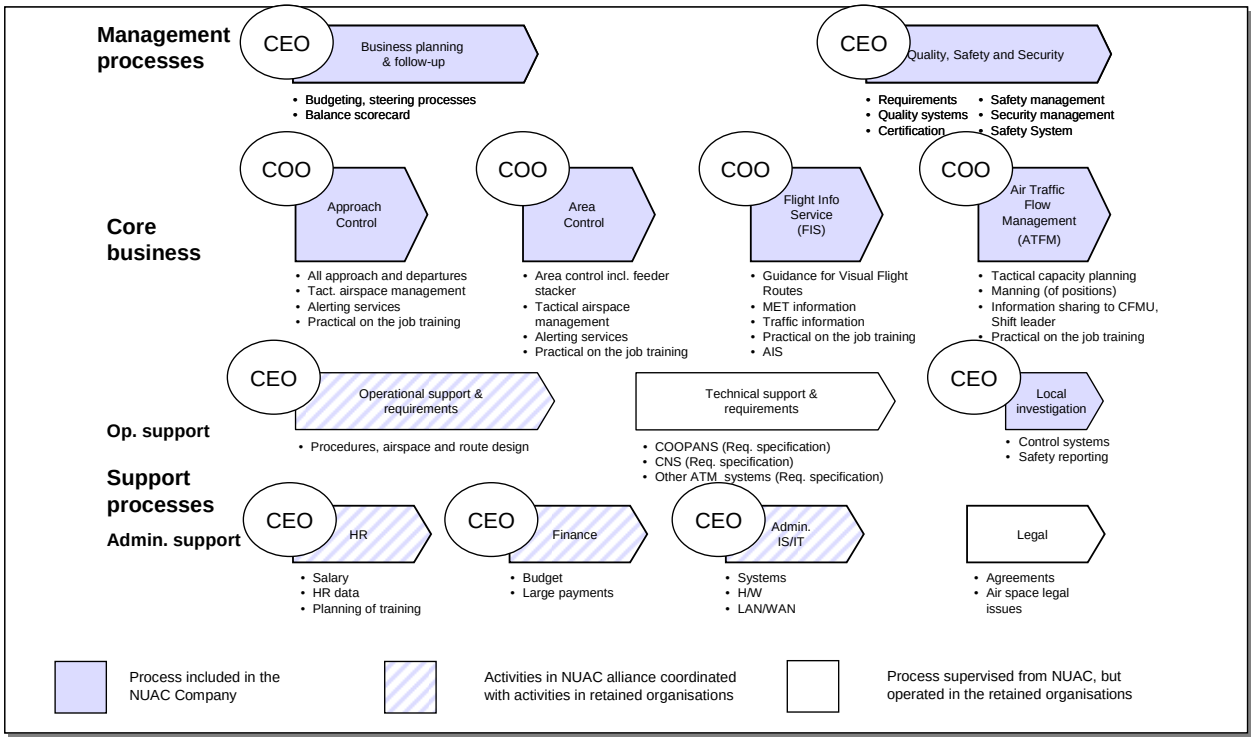
Finally, the *Corporate support* functions include all other supporting functions, except functions directly related to operations and *Quality, Safety and Security*. *Corporate support* is arranged as an executive function. It should be noted that the primary administrative support is supposed to be delivered by the retained organisations, i.e. NUAC will only perform the main necessary activities and supervise and control the corporate functions. NUAC *Corporate support*, related to the processes, includes necessary parts of:

- Finance
- Admin IS/IT
- HR.

[15] The Chief Operation Officer (COO) is responsible for the production of ATM and the support services produced in order to develop and maintain the ATM. As responsible for ATS, the COO will secure operational alignment within all core processes and secure an efficient operational support.

All processes defined in the process section will have a process owner in the NUAC organisation. The COO is the process owner of all operational support process and also core processes, while the CEO is the process owner for all other support functions including *Quality, Safety and Security*, as shown in Figure 22.

Figure 22 Process ownership – Operational Alliance



The different organisational units are connected by clearly defined and formalised interfaces. The most important are:

- Interfaces between *Corporate support, Management and Quality, Safety and Security* units – the interfaces are important since they manage the company both on short-term and long-term – strategically and tactically
- Interfaces between *Operational support* and *operational core business* as these clearly depend on each other in the daily operations of air navigation services
- Interfaces between *Corporate support* and *Operations* since it is suggested that local representatives in the operational production units coordinate their work regarding procedures, roster planning etc. with the corporate staff functions
- Interfaces between *Operations* and *Quality, Safety and Security* since local representatives in the operational units coordinate their work related to quality, safety and investigation with the *Quality, Safety and Security* organisational unit.

This resulting organisational set-up has the following core strengths:

- Process-oriented and built around processes
- Simple as it is directly aligned with the actual core tasks being performed in NUAC
- Providing a simple and unambiguous responsibility and accountability split
- Providing transparency and identifying the core interfaces and deliverables.

The potential weaknesses of this organisational outline are the complex interactions across organisational boundaries (between NUAC, Naviair and LFV/ANS). This should be handled through clear and formalised interfaces and deliverables between the organisations.

2.2.5 Governance structure

The governance structure, as referred to in this report, is a broad term covering all governance aspects of the NUAC Company. It is a generic governance structure, meaning that it is supposed to cover all scenarios. The governance structure covers the *internal* governance of the NUAC Company, i.e. the management hierarchy, management roles and legal framework affecting NUAC. Furthermore, it covers the *external* governance aspects, i.e. the coordination between the three organisations, the relation architecture for NUAC as well as the relation between NUAC and the owners.

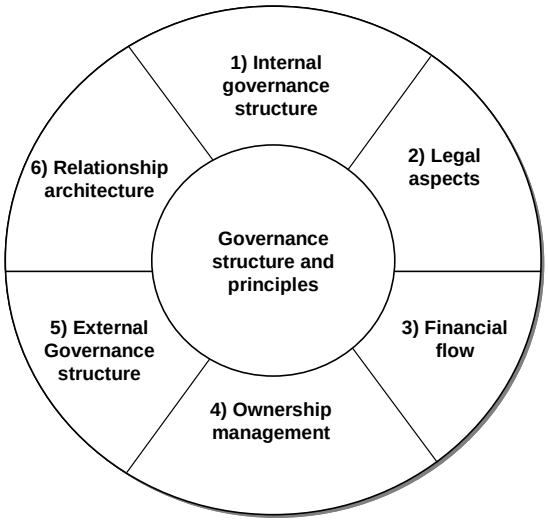
The purpose of the presented governance structure is to outline the high-level governance framework in order to highlight the most important aspects. It should be noted that details in the governance structure will be further developed in the Design and Development Phase. For this reason, some governance elements will only be handled on a high level in this report.[16]

The governance structure consists of six different coherent elements (as shown in Figure 23 below), which together establish a robust governance model reflecting the generic governance principles, covering all scenarios, except where specifically indicated:

- **Internal governance structure** – description of the management hierarchy of the NUAC Company including the different management roles and responsibilities
- **Legal aspects** – identification of the relevant current legislation including a review of how it affects NUAC operations
- **Financial flow** – the administration of the financial flow between the three organisations and the customers
- **Ownership management** – an assessment of ownership management seen from a NUAC perspective with specific focus on NUAC responsibilities in order to contribute to the ownership tasks (which the retained organisations are responsible for)
- **External governance structure** – the organisational set-up in order to ensure coordination between the organisations
- **Relation architecture** – description of the relation architecture including roles and tasks for NUAC in relation to major stakeholders.

[16] The presented governance structure is based on a top-down approach (based on comparable experiences including literature studies and the legal frame).

Figure 23 Elements in the governance structure



As indicated in the figure, the six elements of the governance structure reflect the same generic governance principles as described below. The overall aim of the principles is to address and handle the natural inherent complexity of the three organisations.[17]

The governance model will be:

- **Non-bureaucratic** – the governance model and structure should be as lean and simple as possible without any unnecessary control levels etc.
- **High level of formalised structure** in order to anchor the governance structure among the different organisations (LFV/ANS, Naviair and NUAC) and cultures
- Ensuring a **coherent ATM value chain** between the three organisations despite the fact that connected elements in the value chain are administrated in different organisations. This interaction will be established through mutual coordination as well as explicit interfaces and integration points between the organisations
- Establishing clear **management roles and responsibilities** – the content in different management roles will be explicit and well-communicated through the organisations
- The NUAC Company will have a clear **relation architecture**, i.e. each stakeholder will have one point of contact in NUAC, and roles and responsibilities for NUAC related to all stakeholders will be clearly defined
- All elements in the governance structure should support the realisation of the **NUAC Vision**
- All elements must be in compliance with **EC Common Requirements**.

The following section will describe each element of the governance model.

[17] The overall governance structure of the NUAC Company and the retained companies is complex, due to cross-border operations and different cost bases.

2.2.5.1 Internal governance structure for the NUAC Company

The overall purpose of internal governance structure is to ensure that performance and development of NUAC are in accordance with major stakeholders, legislations and strategic rationales for NUAC.

In this section, the management hierarchy and the most important management roles including areas of responsibility are described.

The NUAC Company will have a single-line management structure with a clear management hierarchy in order to ensure a robust decision-making ability for the organisation. The main principle is that the ownership will be managed through the general assembly, while the business will be handled by the management of the company (Finansministeriet, 2005, p. 21 which covers both Danish and Swedish terms). The management structure will – in accordance with shareholder legislations in both countries – consist of three different levels with specific responsibilities and authorities:

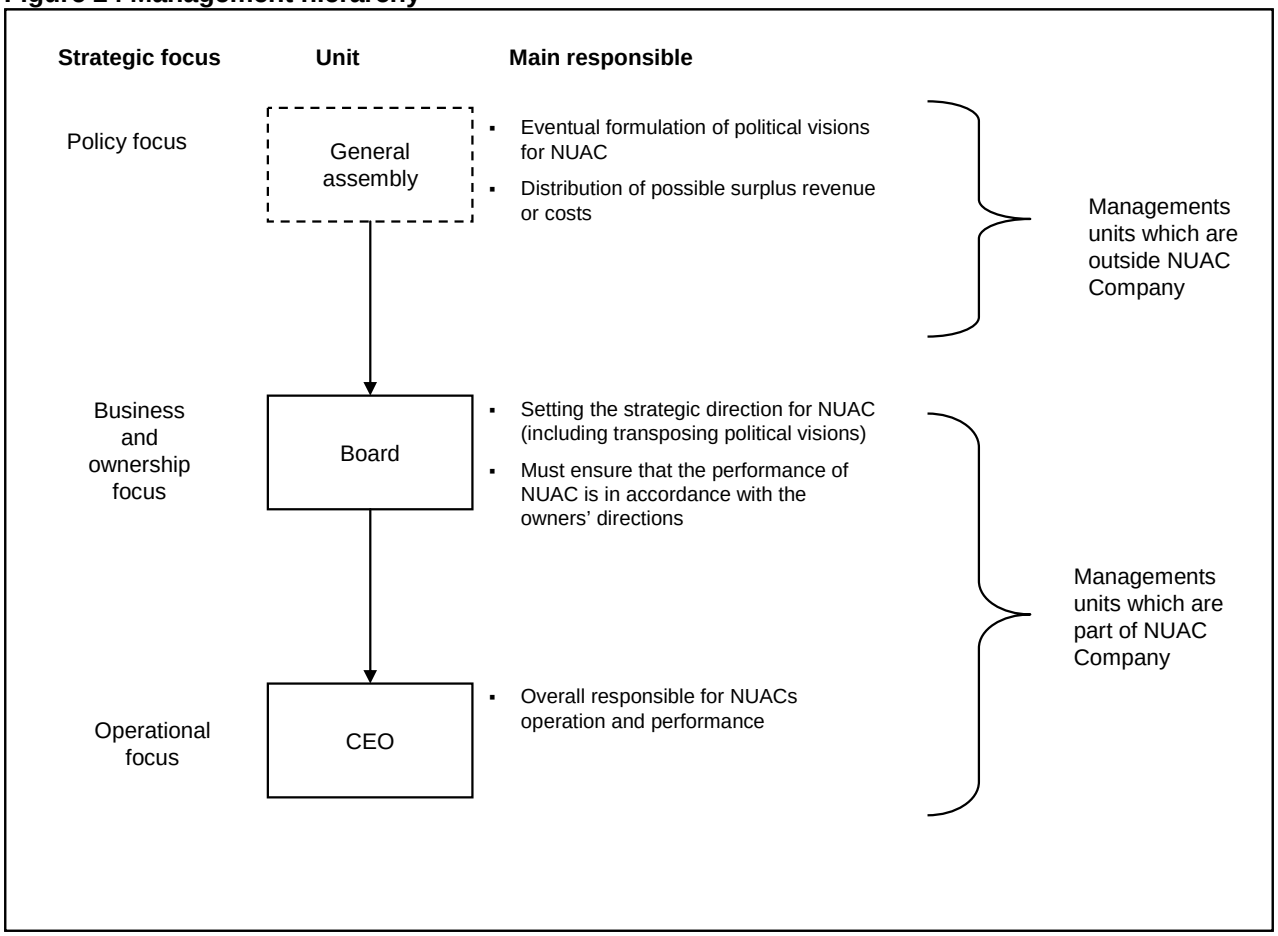
- **General assembly** is the upper organ for the NUAC Company. The general assembly is the only unit, which can formulate political visions for the NUAC Company
- **Board** will have the overall responsibility for the company with main focus on developing the strategic direction for NUAC. The board will also be responsible for managing the ownership for the retained organisations in terms of performance, finance etc.
- **CEO** will have the daily responsibility for the overall business of the company. The CEO must inform and interact with the board regarding strategic or tactical issues.

It should be stressed that the specific role and responsibility for the upper organ – the general assembly – is subject to some uncertainty. Due to the legislations, the assembly must be responsible for some high-level tasks such as the appointment of the directors, the appointment of an auditor etc. But in a situation with only two shareholders, Naviair and LFV/ANS can sign a shareholders' agreement, which transfers some of the traditional roles for the assembly to the principal shareholders.[18]

The management hierarchy reflects a well-considered balance between the different management focus areas. The management of NUAC (board and CEO) will have the definite operational and strategic responsibility for NUAC, while the owners will manage their ownership including representing any possible sector policy interest through the general assembly (Finansminsiteriet, 2003:24, Finansministeriet, 2004:21).

[18] This is in accordance with an existing practice in both countries, which gives the state privileged status when it is the sole owner (i.e. communication and involvement in important strategic issues) (Riksdagen, 2006:4). The management of the ownership should be defined as formalised as possible, which is in accordance with recently developed explicit guidelines (in both countries) regarding how the state can manage its ownership and influence publicly-owned aktieselskab/aktiebolag companies (Finansministeriet, 2004:21).

Figure 24 Management hierarchy



2.2.5.1.1 General assembly

The general assembly is in principle the upper unit for the NUAC Company and will be responsible for defining the high-level strategic direction for the NUAC Company. In practice, it is the board that defines strategy for NUAC – based on yearly input from e.g. the general assembly.[19]

One general assembly meeting will be held per year where representatives from the two shareholders will participate. The specific role of the general assembly is connected with some uncertainty as some of the traditional tasks for the general assembly might be transferred to other units through a shareholder agreement between the two shareholders.[20] Tasks for the general assembly include formulation of political goals for the NUAC Company. Furthermore, the general assembly is in charge of decisions regarding distribution of any financial net surplus of the NUAC Company. The final set-up of the general assembly will be designed when the management tasks for NUAC Company are determined.

[19] It is essential that the general assembly respects the independence and decision-making authority of the board.
[20] An important aspect of this is situations where the general assembly holds the responsibility for performing the tasks related to NUAC, since the public will have access to the decisions in wider sense, compared to the situation where the decisions are taken in other forum, defined by a shareholders' agreement.

2.2.5.1.2 Board

The board consists of a yet undetermined number of members, and it is not decided who will be responsible for appointing the board; it could be the general assembly or the retained organisations.

The board must be able to act in a double role in terms of formulating professional demands for the CEO and acting as sparring partner for the CEO. The competence requirements of the board members should be a combination of professional insight and knowledge regarding ATM industry as well as management capabilities and experience in order to provide qualified support to the CEO in the leadership task.

The composition of the board will reflect the mutual ownership between the participating countries, i.e. half of the board members will have a Danish, respectively Swedish background. The board members should have a common background and appointment process across the countries in order to optimise the decision-making ability.[21]

The main responsibilities for the board are overall decision regarding strategy and investments in the NUAC Company. Furthermore, the board must set up goals for the NUAC Company in dialogue with the CEO and follow up on the targets and performance of NUAC, and at the same time represent the owners' interests.

The final set-up of the board including the appointment process and competence requirement will be designed when the management tasks for NUAC are determined (depending on which functional areas are included in the NUAC Company).[22]

2.2.5.1.3 CEO

The CEO is chosen by the board and holds the overall responsibility for NUAC operations and performance including implementation of strategy, and controls the budget in accordance with the rules for NUAC. The CEO will also be responsible for interaction and communication with the board.

Some of the main responsibilities for the CEO include information to the board regarding overall performance of NUAC, communication of policies of the NUAC Company and ensuring that NUAC is in compliance with management systems and delivers relevant information to owners.

The most important competence requirements for the CEO are that the role of experience-based ATM insight is combined with a business-oriented personality, in order to comply with and fulfil the strategic rationales of NUAC.

[21] Denmark and Sweden have different traditions regarding the appointment of board members in publicly-owned aktieselskab/aktiebolag companies. Denmark does not appoint public servants, while Sweden often appoints public servants responsible for the management of the company (Finansministeriet, 2005, p. 22). Another important difference between the two countries is the question of whether the board members should be independent –Denmark has a tradition of board members not working externally, while it is the opposite in Sweden.

[22] Both the Danish and Swedish state have developed guidelines for the design of boards for publicly-owned joint enterprises (Finansministeriet, 2005, Riksdagen, 2006).

2.2.5.2 Legal framework for the NUAC Company

At the current level of the programme, it is not possible to elaborate on all relevant legislation regarding the NUAC Company, and how this affects the NUAC Company. These questions await final decision regarding company form for the NUAC Company and the retained organisations. Relevant legislation areas that must be considered are SES legislation, national air traffic legislation etc.

2.2.5.3 Financial flow

This section deals with the administration of the financial flow between the three organisations, i.e. the distribution of revenue and costs generated by NUAC between the three organisations. The financial activities with no relevance for NUAC will be administrated as usual in the retained organisations.

The administration covers only administrative tasks such as receipt of charging costs (Approach and En-route) and distribution of revenue related to NUAC cost areas based on SLA agreements and rules. The management of the administration (i.e. determining the overall allocation principle between the organisations and adjustment of SLA agreement) is handled by the owners.

The overall allocation principle between the two current organisations (Naviair and LFV/ANS) suggests that there will be a proportional relation between revenue and costs, i.e. relatively higher costs related to NUAC might be compensated for by higher revenue. The specific allocation principles for each functional area will be developed during the Design and Development Phase based on further analysis and relevant experiences (e.g. from EPN).

The administration of costs will be based on Service Level Agreements, i.e. an agreement will be developed for costs related to each functional area or service related to NUAC. This means that all three organisations must have transparent and cost-based finances, where the costs of each functional area in the organisations are well-known and agreed by all parts.

Two different administration models for the financial flow are under consideration: the NUAC Company as responsible for the administration of relevant financials, and retained organisations as responsible for the administration.

Figure 25 shows NUAC as responsible for the administration, i.e. the distribution of costs and revenue. The NUAC Company will administrate and distribute revenue:

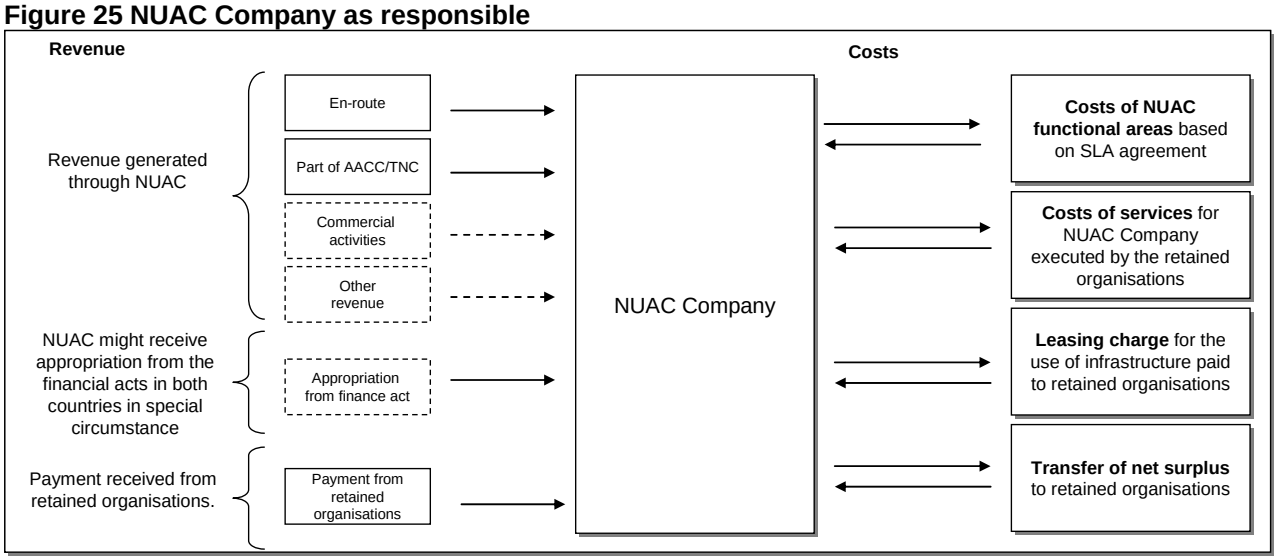
- **Revenue generated by the NUAC Company** – NUAC will generate revenue from the operational areas and will also be responsible for the interaction with EUROCONTROL and Military regarding charging scheme
- **Receiving appropriation** – the NUAC Company might receive appropriation in situations where NUAC experiences additional costs
- **Payments received from retained organisations** – NUAC will receive payments from the retained organisations in scenarios where NUAC activities generate more costs than revenue.

The NUAC Company will distribute the received revenue to the cost areas based on explicit SLA agreements. The most important cost areas are (as shown in Figure 25):

- **Costs of NUAC functional areas** – even though NUAC is responsible for the distribution and administration of the financial flow, the functional areas for NUAC will still be governed through SLA agreement
- **Costs of services for the NUAC Company** – in some scenarios, the NUAC Company will pay for services delivered by the retained organisations
- **Leasing charges** – in all scenarios, the NUAC Company should pay for the use of infrastructure to the retained organisations
- **Transfer of net surplus to the retained organisations** – this cost is proportionally connected with "payment received from the retained organisations" and depends on two factors: a) The distribution key agreed between the owners, b) the balance between costs and revenue in the NUAC Company, which depends on which functional areas are included in NUAC (scenarios); only some functional areas generate revenue.

This administrative model may be relevant mainly when the NUAC Company holds the responsibility for the core business (Merger and Operational Alliance scenario).

Figure 25 NUAC Company as responsible

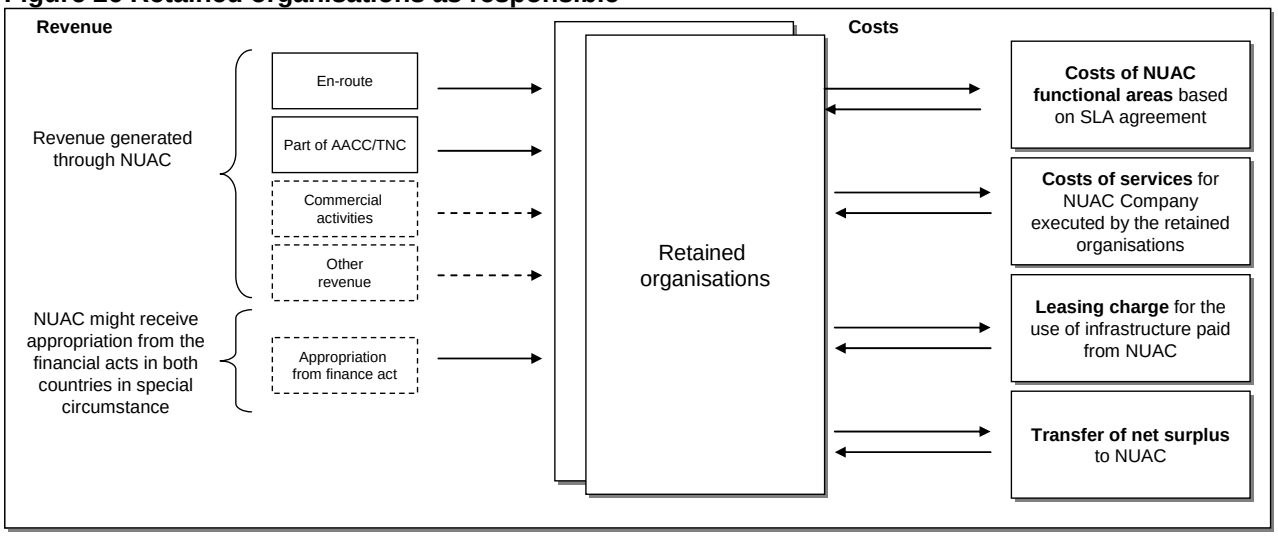


When retained organisations are responsible for handling the financial flow, there will be a need for coordination between the organisations, as shown in Figure 26; this can be done through a joint secretary or by formalised coordination.

The financial flow depends on the certification and designation, i.e. in the Alliance Scenario, NUAC cannot be responsible for the financial flow since NUAC is not certified and designated for Air Navigation Services.

This model could be relevant in all three scenarios, as it does not depend on the size of NUAC; but it might provide les transparency and could be more complex to administrate due to the need for coordination between Naviair and LFV/ANS.

Figure 26 Retained organisations as responsible



2.2.5.4 Ownership management and tasks

This section deals with management of the ownership seen from the NUAC perspective, i.e. tasks for NUAC in order to support the retained organisations in maintaining the ownership.

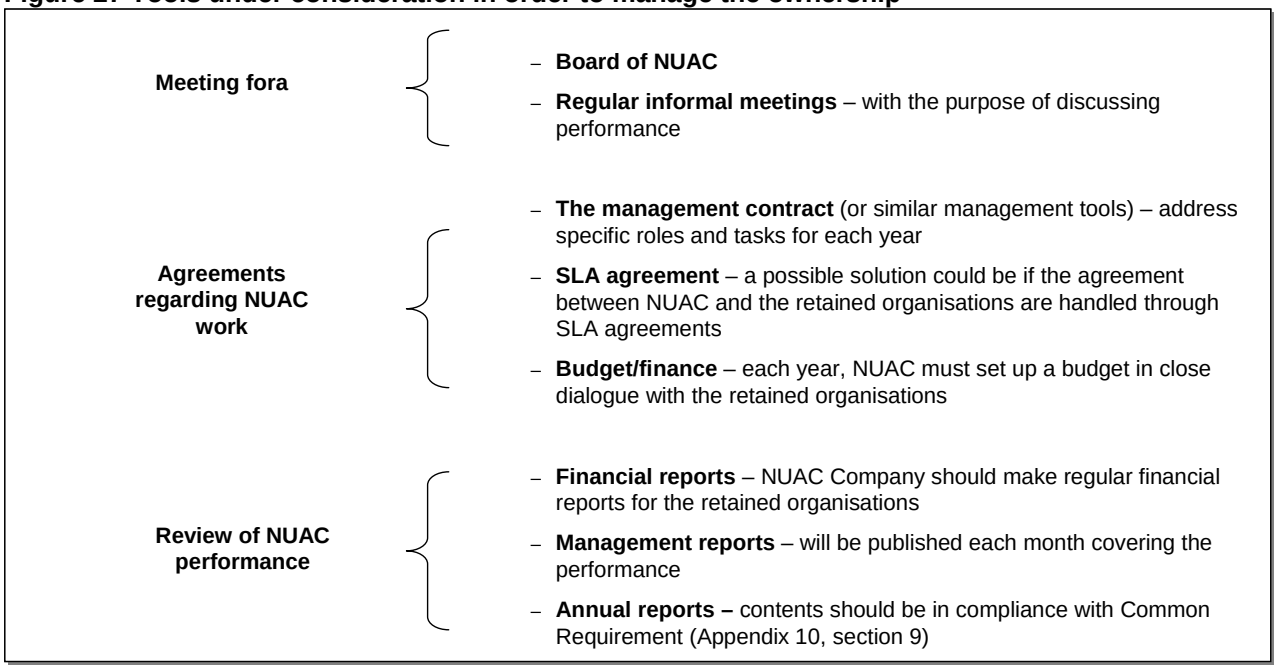
As outlined previously, the retained organisations will be responsible for managing the ownership of NUAC. All tasks and aspects related to the management of the ownership of NUAC are administrated in the retained organisations, and they will be responsible for the following:

- **Managing the ordinary ownership of NUAC** – the retained organisations are responsible for the operational outcome of NUAC and defining the tactical and strategic direction
- **Representing the national interests** – the retained organisations will be responsible for representing the national interests, i.e. when establishing an aktieselskab/aktiebolag company such as the NUAC Company, the state (in terms of the responsible ministry) – due to legislations – has some specific tasks in order to manage the ownership of the shares in a financially proper way and to formulate sector policy.[23]

The specific tools and units for the management of the NUAC Company have not yet been developed – this depends on further analysis and negotiations. The list below contains different tools – of both formal and informal character – which are under consideration:

[23] The specific responsibility of managing the ownership has not yet been defined, but due to the code of practice regarding publicly owned aktieselskab/aktiebolag companies in both countries, the responsibility will be extended compared to the management of regular aktieselskab/aktiebolag companies (Finansministeriet, 2005, p.21). The retained organisations must handle the responsibility in accordance with EC Common Requirements (Appendix 2, section 1), legislations and national guidance.

Figure 27 Tools under consideration in order to manage the ownership



2.2.5.5 Relation architecture

The relation architecture describes the formalised structure for the interaction between NUAC and major stakeholders regarding areas where NUAC is responsible. The relation architecture covers the stakeholders' admission to NUAC including NUAC tasks, roles and responsibilities in relation to the stakeholders.

The overall division of responsibility in the relation architecture is that the retained organisations are responsible for issues regarding ownership and sector policy, while NUAC Company is responsible for the operational areas. This principle is consistent with allocation of responsibility; the retained organisations are responsible for the ownership.

The overall ambition is that NUAC and the retained organisations should be considered as one service provider by stakeholders. This means that NUAC should coordinate the stakeholder work with the retained organisations and cross-border in order to ensure the same level of communication, interaction etc. to give the stakeholders the impression that they communicate with one organisation.

The NUAC Company will have clearly defined roles and responsibilities for the handling of each stakeholder in order to avoid differences of interests from different stakeholders (ownership, authorities etc.). Major stakeholders and related role and tasks for NUAC are described in the figure below.

Figure 28 Major stakeholders

Stakeholder	NUAC roles and tasks
Customers (Airlines, non-commercial airlines and airports)	▪ NUAC will be responsible for the handling of the customers in matters related to NUAC operations ▪ The daily operational contact with customers will be handled by the operational units in NUAC Company ▪ NUAC will also establish a key customer forum where more tactical and overall questions can be addressed ▪ The contact-responsible in NUAC will on a regular and ad-hoc basis coordinate with the retained organisations ▪ NUAC will ensure a satisfying standard of their product by continuous dialogue with the customers and annual customer survey
Military	▪ NUAC will have the responsibility for the cooperation with military in Denmark and Sweden regarding NUAC operational areas. The cooperation will cover both operational, tactical and strategic levels as well as education of ATCOs ▪ The contact-responsible position in NUAC will coordinate with both retained organisations and board of directors
Authority	▪ NUAC will be responsible for the contact with the Swedish and Danish authority relevant for NUAC operations. NUAC will give the authority the necessary support in their inspections. NUAC will also cooperate with the authority on all aspects of traffic handling relevant for NUAC and the respective national airspace ▪ The person responsible in NUAC will provide the necessary coordination with both the retained organisations and the NUAC owners
International	▪ NUAC will only be responsible for the contact to international organisations (EU and EUROCONTROL) in matters relevant for NUAC operations ▪ The international contact responsible in NUAC Company will ensure coordination with retained organisations both in terms of operational issues and more tactical/strategic matters

2.2.5.6 External governance structure

The external governance structure will ensure that the three organisations – NUAC, Naviair and LFV/ANS – will be able to meet their specific goals and support the joint goal of delivering efficient and secure air navigation services in Danish and Swedish airspace both in their daily operations and in strategic planning.

The specific purpose of the external governance will be:

- Ensuring optimal flight efficiency and safety
- Avoiding sub-optimisation
- Ensuring an efficient and coherent ATM value chain (i.e. optimal interfaces between specific functional areas despite different organisations)
- Ensuring a transparent and efficient decision-making process including an escalation process
- Strengthening competitive power.

This will be obtained through mutual coordination/cooperation and necessary adjustments of the functional areas of the organisations influencing the performance/service of the other organisations.

The external governance structure (as shown in the figure below) consists of three different coordination levels and is managed by an escalation principle:

- **Owners**
- **Management levels** consist of representatives from the board of directions
- **Functional levels** consist of the functional area managers from the three organisations.

Figure 29 External governance structure – escalation process

Focus	Level	Responsibilities	Tasks	
			Operational	Strategic
Strategic	Owners	▪ Strategic development of the area ▪ Solving strategic differences if they cannot be solved by the management forum	▪ Solving escalated matters	▪ Preparing changes in legislation ▪ Contact to authorities regarding national issues
	Management forum	▪ Regular meeting forum with the management of the three organisations ▪ Solving operational differences and fundamental questions ▪ Ensuring stakeholder coordination, strategic proposals, developing strategic direction for development, legislation and other tasks	▪ Fundamental decisions ▪ Solving escalated matters	▪ Strategic development of the area ▪ Proposing changes in legislation ▪ Contact to authorities regarding company issues
Tactical	NUAC Company/ retained organisations	▪ Firmly defined roles and responsibilities in the three organisations in relevant function areas ▪ Ensuring necessary coordination of operations in function areas ▪ Maintaining ordinary business relations between organisations ▪ Ad hoc and regular meetings	▪ Regular as well as ad hoc dialogue regarding necessary coordination	▪ Contact to authorities regarding tactical/operational issues ▪ Stakeholder management

The external governance structure should ensure a coherent solution – although the different functional areas are located in specific organisations, i.e. the governance structure should ensure efficient interfaces between coherent functional areas. The coherent interfaces will be developed during the Design and Development Phase.

The main interfaces – which vary according to scenarios (and thus the different placements of the functional areas) – are

- **Interfaces in administration** (e.g. *HR, Finance* and *Facility Management*) – in some scenarios, administrative tasks are produced in an organisation and should apply in other organisations. This requires coordination, so that the producing organisation receives input from the other organisations and vice versa.
- **Interfaces between TWR and Approach/En-route** – in the scenarios, *TWR* and *APP/En-route* areas are placed in different organisations – which requires a certain degree of coordination in relation to e.g. legislation, knowledge gathering, education, handlings, operational support etc.
- **Interfaces between Systems Development and Maintenance and operational functions** – in two of the scenarios, *Systems Development* and *Maintenance* are separated from the operational core areas and *Infrastructure Management*, which are

the two main sources of initiating replacement, adjustment and maintenance of systems/infrastructure – this requires a large degree of coordination.[24]

2.3 Integration strategy

This chapter contains results from additional analyses to the integration strategy presented in the NUAC Definition Phase Final Report and Appendix 5. As described, the overall purpose of the integration strategy is to determine the NUAC Programme's general targeting and strategic focus areas (including the handling of the project benefits, risks and complexity) and to develop a general strategic integration process for the areas that are to be integrated.

The rationale has been to develop a more coherent and flexible integration approach compared to the integration strategy presented in the NUAC Definition Final Report. The scenario-based approach – as used in the NUAC Definition Phase Final Report – implies a choice between the scenarios and does not take into account that elements from more than one scenario can be combined. The integration strategy forms the input for the integration plan which will be developed during the Design and Development Phase.

Thus, the purpose is to determine which initiatives should be implemented, and in what order and timeframe they should be implemented. The areas which should be integrated are defined by the integration initiatives, i.e. the building blocks which are part of the NUAC cooperation, and which together form the complete NUAC Company once they are implemented. Consequently, it was necessary to analyse which dependencies exist between the different initiatives and areas in order to construct a flexible integration approach.

The chapter supplements the integration strategy in the NUAC Definition Phase Final Report in two areas by way of further development of the NUAC Programme Integration Strategy:

- **Integration principles** which are a number of concrete strategic principles for the Programme's Design and Development Phase in relation to ensuring that the integration is implemented as efficiently as possible (i.e. maximising the benefits and minimising risks). See Supplementary Report – Integration Strategy Appendix for further details
- **Strategic integration scheme** which shows a strategic combination and sequence of the integration initiatives in relation to the creation of the most optimal integration. Different integration schemes are presented and reflect different rationales in an integration strategy. A complete proposition regarding an integration scheme will be presented – based on a strategic weighting of the four perspectives and an assessment of the Programme's strategic rationales and possibilities.

It should be noted that the completion of the integration strategy depends on the final decisions regarding the future development of NUAC, especially in relation to which areas are included in the cooperation.

[24] There are four possible solutions to the position of Systems Development: a) The NUAC Company, b) retained organisations, c) independent company or d) based on function so that NUAC and retained organisations each handle ATM and TWR development. This will be decided in the final decisions regarding the future development of NUAC.

2.3.1 Initiative-based integration scheme

The purpose is to develop an initiative-based integration scheme which is a strategic sequence for the implementation of the initiatives in a complete integration process based on relevant change perspectives. Four different integration schemes have been developed each reflecting four different underlying perspectives in an integration process. The integration schemes are fact-based and are developed on the basis of the supplementary analyses.

As an introduction, the four integration perspectives and their underlying rationales are described. Subsequently, the method that is used to develop the four different integration schemes is described.

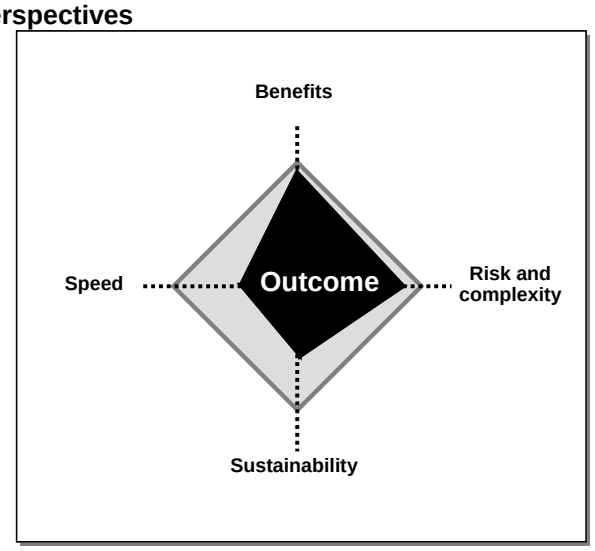
2.3.1.1 Integration perspectives

The four different integration perspectives and their underlying rationales reflect the most common best practice change programme imperatives. This means that the four perspectives combined represent a clear picture of the different possibilities. The four integration perspectives – illustrated in Figure 30 – are:

- **Benefit perspective** – the integration phase will have strong focus on the realisation of the benefits. Initiatives with the highest benefit potential are considered as the most important and will have the highest focus
- **Risk/complexity perspective** – the integration will focus strongly on minimising the risks; initiatives which are complex (e.g. due to lack of experience with the initiative) and contain high risk will be implemented late
- **Sustainability perspective** – the integration will focus on delivering a robust embedded solution; initiatives with critical stakeholders will be implemented late
- **Speed perspective** – the integration process will focus on delivering the changes as quickly as possible; initiatives with potential show stoppers or with integration horizon will not be implemented.

The integration will be based on a combination of the four perspectives, but the change programme needs to be focused towards the dominant change imperative, since experience shows that the best outcomes are achieved when one or two perspectives dominate the change programme.

Figure 30 Integration perspectives



2.3.1.2 Methodology

The methodology started by defining the basis of the strategic integration scheme, i.e. all the integration initiatives which was to be part of the complete integration scheme. Subsequently, the initiatives' mutual dependencies were identified in order to determine the possibilities of manoeuvring the initiatives. After this, each initiative was analysed on the basis of four different assessment criteria which each reflects the different integration perspectives. Finally, the results of the analyses were transformed into four aggregated integration schemes for each of the integration perspectives.

The analysis for the integration strategy integration scheme was divided into five stages:

- Defining the integration initiatives
- Defining the interdependencies between the initiatives
- Defining the evaluation criteria
- Conducting the analysis
- Developing the integration scheme.

2.3.1.3 Conducting the analysis

2.3.1.3.1 Defining the integration initiatives

The purpose of the first stage was to define the integration initiatives which will be analysed for the initiative-based integration scheme.

The integration initiatives are the building blocks, which are part of the NUAC cooperation, and which together form the complete NUAC Company once it is implemented. The integration initiatives are developed in the different analytical workstreams focusing on different elements of the future NUAC Company:

- Airspace design – describing the solution for the design of the common airspace
- Business Case – initiatives describing the solutions for the high-level business areas/activities for the NUAC Company (management, operations, technology and administration)
- Business Model – describing the solution for processes and organisational set-up for NUAC.

HR aspects also need to be considered in relation to the integration strategy – in order to describe the solution for the future HR aspects for NUAC. A number of HR aspects will be given once a decision regarding NUAC headquarters is taken, since these depend on national legislation.

Figure 31 shows the integration initiatives which constitute the basis of the integration scheme. There are 26 different integration initiatives which cover six different business areas for the future NUAC Company[25]. The last column in the figure shows where to find the analytical background information for each initiative in the NUAC Definition Phase Final Report and appendices.

[25] The business areas are: business model, airspace design, management process, administration, operational and operational support, and technology.

It should be noted that the integration initiatives are primarily based on the Business Case initiatives, while the conclusions from the business model, HR Aspects and airspace design have not yet been transformed into specific integration initiatives.[26] This means that there are activities or initiatives required to complete the integration, which are not included, e.g. technical integration of ATM and CNS systems, training, integration of administrative IT, career development etc.

Figure 31 Overview of the integration initiatives

Integration initiative	Business area for NUAC Company	The analytical background and sources for the initiative
Establish company (legal entity) (Initiative 17 & Business Model) **Establish headquarter** (Initiative 17 & Business Model)	Business Model	*Business Case & Business Model*
Establish Airspace (Initiative 7 and 9) **Establish certification, designation** (Initiative 17)	Airspace design	*Business Case & Airspace design*
Establish management (Initiative 1)	Management	*Business Case*
Establish HR, PR, communication functions (Initiative 2a) including transferral of resources and alignment/establishment of processes **Establish finance function** (Initiative 2b) including transferral of resources and alignment/establishment of processes **Sourcing of facility management** (Initiative 2c) **Establish Q&S function** (Initiative 2d) including transferral of resources and alignment/establishment of processes **Establish legal services function** (Initiative 2e) including transferral of resources and alignment/establishment of processes **Establish ATM training function** (Initiative 2f and initiative 15) **Sourcing of admin IT services** (Initiative 2g) **Establish business development function** (Initiative 2h) including transferral of resources and alignment/establishment of processes	Administration	*Business Case & Business Model*
Establish procedures function (Initiative 5) including transferral of resources and alignment/establishment of operating procedures **Establish roster planning function** (Initiative 6) **Common briefing officer resource pool** (Initiative 7) including transferral of resources alignment/establishment of operating procedures **Common ATCO resource pool** (Initiative 9) including transferral of resources alignment/establishment of operating procedures **Night closure of control centres** (Initiative 8) including establishment of new operating procedures	Operational and operational support	*Business Case & Business Model*
Establish tech. development function (Initiative 3) including transferral of resources **Establish tech. maintenance function** (Initiative 4) including transferral of resources **Alignment of procurement and maintenance of administrative IT and additional applications** (Initiative 10) **Alignment of sourcing of tele/data communication services** (Initiative 11) **Alignment of purchasing and operation of standard 'other ATM systems'** (Initiative 12) **Alignment of use of existing surveillance infrastructure** (Initiative 13) **Alignment of purchasing and operation of standard CNS systems and infrastructure** (Initiative 14) **Alignment of use of existing basic and unit training simulators** (Initiative 15)	Technology (system)	*Business Case & Business Model*

2.3.1.3.2 Defining the interdependencies

The purpose of the second stage is to define the possible solution space and timeframe by analysing the interdependencies between the integration initiatives. This is done to clearly show that some integration initiatives are related to others; hence it is not necessarily possible to create the scheme entirely on the basis of e.g. the size of the benefit potential.

Figure 32 shows which integration initiatives depend on other initiatives, e.g. a predecessor for establishing *certification* (third initiative) is the *establishment of the NUAC Company* legal entity (first initiative), meaning that the company will have to be established before it can apply for certification. The left hand side of the figure shows the integration initiatives, and

[26] This is a consequence of the natural focus in the definition study – to establish a robust decision platform by benefit, cost and risk analyses.

where indicated by an x (e.g. next to *Certification*) it shows that this initiative depends on the initiative in the top of the figure (e.g. *Company (legal entity)*) being implemented prior to implementing *Certification*.

As illustrated in the figure, all the integration initiatives depend on the establishment of the *NUAC Company (legal entity)* and on the establishment of the NUAC management – in order to control and manage the development of NUAC.

Figure 32 Interdependencies between the integration initiatives

Integration Initiative	Depend on implementation of	Company (legal entity)	Headquarter	Certification	Designation	Impl. of New Airspace Design	Management	HR function	PR, Communication	Finance function	Facility Management	Q&S function	Legal Services	ATM Training function	Admin IT Services	Business Development	Tech. Development	Tech. Maintenance	Procedures function	Roster Planning function	Briefing Officers function	ATCO function	Training simulators
Company (legal entity)																							
Headquarter		x																					
Certification		x					x	x		x		x		x					x			x	
Designation		x		x																			
Implementation of New Airspace Design		x		x	x		x	x		x		x		x					x		x	x	
Management		x																					
HR function		x					x																
PR, Communication functions		x					x																
Finance function		x					x																
Sourcing of Facility Management		x					x																
Q&S function		x					x																
Legal Services function		x																					
ATM Training function		x		x			x					x							x			x	x
Admin IT Services		x					x																
Business Development function		x					x																
Tech. Development function (1)		x		(x)			x					(x)											
Tech. Maintenance function		x					x																
Procedures function		x		x		x	x					x											
Roster Planning function		x					x																
Common Briefing Officer function		x		x		x	x					x							x				
Common ATCO function		x		x	x	x	x	x				x		x					x	x			
Night Closure of control centres		x		x	x	x	x	x				x		x					x	x		x	
Administrative IT systems		x					x																
Sourcing of tele/data comm.		x					x																
Standard 'other ATM systems'		x					x																
Surveillance infrastructure		x					x																
CNS systems and infrastructure		x					x																
Training simulators		x		x			x					x		x									

(1) Note: Implementation of *Tech. Development function* only depend on *Certification* and *Q&S* in Merger scenario, where NUAC is responsible for Tech. Development

The rationales for the interdependencies between the integration initiatives are included to show that some integration initiatives are related to others; hence it is not necessarily possible to create the scheme entirely on the basis of e.g. the size of the benefit potential:

- It is assumed that **establishing the company (legal entity)** is the first initiative; all other integration initiatives depend on this
- Establishing a common NUAC **Headquarters** only depend on having established the company
- Establishment of all business areas in NUAC (**HR, finance, business development** etc.) depend on the establishment of the NUAC **management** team

- **Certification** depends on fulfilling EC Common Requirements and national legislation, i.e. having **established a company** with **Management**, **HR**, **Finance**, **Q&S**, **ATM training** and **Procedures functions** in place, and also **ATCO functions** established
- **Designation** depends on **Certification**
- In order to **implement a new airspace design,** it is necessary to have a common set of **procedures**, or alignment of procedures, and also to have a formal **quality and safety** policy. It also depend on **Certification**, **Designation**, **Management**, **HR**, **Finance**, **Q&S**, **ATM training**, **Procedures functions** and **ATCO functions** being established prior to the implementation. Some alignment of ATM and CNS systems is also necessary in order to implement new airspace design (but does not directly depend on the common procurement and operation of CNS and 'other ATM systems' integration initiatives)
- It might be possible to implement **ATM training** and common use of **Training simulators** independently, but in this context, the integration initiatives are defined so that they depend on each other. **ATM Training** also depend on having **Certification**, **Q&S** and common **ATCO function** established
- **Technical Development** depends on **Certification** and **Q&S** in the Merger Scenario where NUAC is responsible for the technical development
- Operational initiatives (common **ATCO function**, **briefing officers** and **Night Closure**) depend on common **procedures** and **quality and safety** policies and also depend on **Certification**, **Designation**, **Implementation of new airspace design** (sectors and positions), **Management**, **HR**, **Roster Planning** and **ATM Training**
- Common **IT procurement**, **sourcing**, **operation** and **maintenance** might be possible to establish without having a **NUAC management** team in place – but monitoring the processes will be easier if management is established first
- Use of **Training simulators** depends on **Certification** and **Q&S** since these are the units which control the equipment
- **Night closure** is deemed for late integration due to the high complexity and dependency on all other operational areas to be fully aligned and functional.

It should be noted that interdependencies will be analysed further in the Design and Development phase in order to assure compliance with EC Common Requirements, certification, designation, legislation etc.

The analysis of the dependencies is based on the description of the integration initiatives (as seen in the NUAC Definition Phase Final Report – Appendix 2) combined with interviews with experts from the two organisations. It should be stressed that the dependencies are high level and will be further elaborated in the integration planning. Further details are given in the Supplementary Report – Integration Strategy Appendix.

2.3.1.3.3 Defining the evaluation criteria

The purpose of the third stage is to specify the evaluation criteria for the analysis of the integration initiatives for each of the four integration perspectives.

The evaluation criteria for each perspective are described in details in "appendix 17 Integration Strategy". The perspectives have different evaluation criteria.

- **Benefits** are evaluated according to:
  - Financial benefits from the Business Case (annual savings and NPV for the integration initiatives)
  - Qualitative benefits and indications from the socio-economic analysis, i.e. integration initiatives related to airspace are important in relation to socio-economic benefits
  - Business benefits, i.e. how the initiative contributes to form a more formalised cooperation
  - The integration initiatives' importance in order to fulfil NUAC vision, thus fulfilling the SES vision and national strategies
- **Risk/Complexity** is evaluated from a perspective of:
  - Flight safety
  - Influence on retained organisations
  - Implementation and integration complexity
  - Technology and systems integration complexity
  - Stakeholder opinions
  - Ability to actually realise the benefits
  - HR aspects.
- **Sustainability** – integration initiatives which are core for the business are important in relation to ensuring sustainability and creating a robust solution, and it is necessary to focus on integration initiatives which instigate a more formal cooperation in order to create a sustainable solution
- **Speed** – integration initiatives which are necessary to implement before others can be initiated are seen as especially important in relation to a rapid integration to drive the programme and change.

Seen from the current perspective of the NUAC Programme, it was natural to focus on investigating two main perspectives: Benefits and Risk/complexity in order to obtain an overall integration scheme. As mentioned earlier, a change programme needs to be focused towards the dominant change imperative, since the best outcomes are achieved when one or two factors dominate the change perspective:

- **Benefits** – is an important integration perspective due to the fact that the primary strategic rationales for NUAC is to improve the cost efficiency and socio-economic benefits (political and socio-effects and environment). In addition, cost efficiency is the overall rationale for the Single European Sky initiative
- **Risk/complexity** – as Air Traffic Management is complex and has to focus on flight safety, it is important to prioritise risk assessment and mitigation to ensure that safety and legislation issues are handled correctly. Another important argument for focusing on the risk/complexity perspective is the set-up for the implementation of NUAC which holds an additional complexity due to cross-border perspectives. Finally, risk/complexity is an important perspective when dealing with HR issues, so in order to create a successful change, HR aspects should be thought into every aspect of the integration.

An important reason for not choosing speed as the primary perspective lies in the nature of the industry, which from a historical point of view does not comply with radical changes in short time frames (EC, 2007). Sustainability is by far an important factor in this project also, but seen from an overall point of view, sustainability should be assured when taking all risk and complexity issues into consideration by choosing a less radical change strategy. Sustainability is also important for integration initiatives which are core for the business, and it is necessary to focus on integration initiatives which instigate a more formal cooperation in order to create a sustainable solution.

2.3.1.3.4 Conducting the analysis

The purpose of the fourth stage was to analyse the integration initiatives according to the four integration perspectives: Benefits, Risk/complexity, Sustainability and Speed to determine the relative scores for the integration initiatives for each of these perspectives. As mentioned, the primary focus will be on the Benefits and Risk/complexity perspectives.

The starting point for each perspective was the evaluation criteria defined in the earlier section. Each initiative can get the score *low*, *medium* and *high* in order to determine the impact.

Figure 33 below shows the benefit scores for all the integration initiatives. The integration initiatives with the highest scores are:

- **Implementation of New Airspace Design** due to socio-economic benefits and feedback from stakeholders – in addition, it is the corner stone in realising the NUAC Programme
- **Certification** and **Designation** since these are important aspects related to NUAC core business
- **Establish tech. development function** since the initiative contributes significantly to the annual savings in the Business Case
- **Establish procedures function** since it is important in order to realise the NUAC vision and leads to a significant savings potential in the Business Case
- **Common ATCO resource pool** since it is the core business for NUAC and leads to a significant savings potential in the Business Case
- **Purchasing and operation of CNS** due to high avoidable investment costs.

Figure 33 Benefit potential scores for the integration initiatives

Initiative	Benefit potential	Overall rationale
Establish company (legal entity)	Low	No specific financial benefits (but some costs), but a precondition for establishing NUAC
Establish headquarters	Low	Possibility of financial benefits, but this depend on the decision on location of NUAC
Implementation of New Airspace Design	High	High potential socio-economic benefits, environment, very beneficial for stakeholders (airlines)
Establish Certification	High	No specific financial benefits, but important in order to realise NUAC
Establish Designation	High	No specific financial benefits, but important in order to realise NUAC
Establish Management	Low	Initiative is approx. cost neutral due to management re-staffing from retained organisations
Establish HR function	Medium	Some reductions in need for resources and therefore small financial benefits, but important in order to realise NUAC
Establish PR, Communication functions	Low	Few reductions in need for resources and therefore small financial benefits, but important in order to realise NUAC
Establish Finance function	Medium	reduced need for resources result in some financial benefits, important in order to establishing NUAC Business support
Sourcing of Facility management	Low	Few reductions in need for resources and therefore small financial benefits
Establish Q&S function	Medium	Some financial benefits, some importance with regards to NUAC core business
Establish Legal services function	Medium	Some reductions in need for resources and therefore small financial benefits, important for NUAC core business
Establish ATM training function	Medium	Some reductions in need for resources and some financial savings potential
Sourcing of Admin IT services	Low	Few reductions in need for resources and therefore small financial benefits
Establish Business development function	Medium	Few reductions in need for resources and therefore small financial benefits, some importance for NUAC vision
Establish Tech. development function	High	Reductions in need for resources leads to a significant annual savings potential
Establish Tech. maintenance function	Medium	Sourcing solution result in financial savings potential
Establish Procedures function	High	Large annual savings potential, important for NUAC vision and establishment of core business
Establish Roster planning function	Medium	Some reductions in need for resources and some financial savings potential
Common Briefing officer resource pool	Medium	Some reductions in need for resources and some financial savings potential, important for core business
Common ATCO resource pool	High	Reductions in need for resources leads to a significant annual savings potential, important to fulfil NUAC vision
Night closure of control centres	Low	Some reductions in need for resources and some financial savings potential
Purchasing and maintenance of administrative IT	Medium	Some savings potential due to economics of scale, no significant fulfilment of strategic rationales
Alignment of sourcing of tele/data communication services	Low	Some savings potential due to economics of scale, no significant fulfilment of strategic rationales
Purchasing and operation of standard 'other ATM systems'	Medium	Some savings potential due to economics of scale, investment savings
Alignment of use of existing surveillance infrastructure	Medium	Savings related to closure of duplicate radars, investment savings
Purchasing and operation of standard CNS systems	High	Some savings potential due to economics of scale, large investment savings
Alignment of use of existing basic and unit training simulators	Low	Few savings related to closure of duplicate simulators

Figure 34 shows the risk/complexity scores for the integration initiatives. As mentioned earlier, risk/complexity relies on whether the initiative influences the core business and also on the indications from the internal stakeholder responses. Integration initiatives with high scores are:

- **Implementation of New Airspace Design** due to complexity in changing the airspace and controlling and operating cross-border
- **Establish tech. development function** since tech. development is a complex area that relies on input from various other functions
- **Establish procedures function** due to complexity in national legislations etc.
- **Night closure of control centres** is very complex since new solutions need to be developed regarding legislation, resources need new certificates etc.

Figure 34 Risk/complexity scores for the integration initiatives

Initiative	Risk/Complexity	Overall rationale
Establish company (legal entity)	Low	Little complexity in establishing the company once terms have been agreed
Establish headquarters	Low	Little complexity in establishing once the decision on location has been taken
Implementation of New Airspace Design	High	Complex to establish, demands and common requirements, no current successful European experiences
Establish Certification	Medium	Some complexity due to common requirements, legal demands etc.
Establish Designation	Medium	Some complexity due to common requirements, legal demands etc.
Establish Management	Low	No specific complexity in establishing management
Establish HR function	Low	No specific complexity in establishing general business division areas
Establish PR, Communication functions	Low	No specific complexity in establishing general business division areas
Establish Finance function	Low	No specific complexity in establishing general business division areas
Sourcing of Facility management	Low	No specific complexity in sourcing of facility management services
Establish Q&S function	Medium	Some complexity due to different requirements in Sweden and Denmark
Establish Legal services function	Low	Some complexity due to different requirements and legislations in Sweden and Denmark
Establish ATM training function	Medium	Some complexity due to different coordination and administration in DK and SE
Sourcing of Admin IT services	Medium	Different administrative IT systems and infrastructure in the two organisations
Establish Business development function	Medium	Some complexity in alignment of business development and strategies
Establish Tech. development function	Medium	Experience with common tech. Development from COOPANS
Establish Tech. maintenance function	Low	Little complexity in common sourcing of technical maintenance
Establish Procedures function	High	Some complexity in establishing common procedures, fulfilling national legislation etc.
Establish Roster planning function	Medium	Some difficulty in establishing ATM roster planning due to business complexity
Common Briefing officer resource pool	Low	Little complexity in common briefing officer function
Common ATCO resource pool	Medium	Some difficulty in establishing common ATM core business area
Night closure of control centres	High	Large complexity in development of solution regarding legislation etc.
Purchasing and maintenance of administrative IT	Medium	Some complexity in common tech. areas due to differences in standards
Alignment of sourcing of tele/data communication services	Low	Little complexity in alignment of sourcing telecommunication.
Purchasing and operation of standard 'other ATM systems'	Medium	Some complexity in common tech. areas due to differences in standards
Alignment of use of existing surveillance infrastructure	Low	Little complexity in cooperation regarding radar coverage due to current experiences between Denmark and Norway
Purchasing and operation of standard CNS systems	Medium	Some complexity in common operation due to differences in standards, systems etc.
Alignment of use of existing basic and unit training simulators	Medium	Some complexity in closing simulators

Sustainability and speed scores for the integration initiatives are given in the Supplementary Report – Integration Strategy Appendix.

2.3.1.3.5 Developing the integration schemes

The logic in constructing the integration scheme is that each initiative is placed in the scheme according to the primary score from the analysis, i.e. all integration initiatives with the highest scores are placed as early as possible, still following the predecessor rules from the analysis of interdependencies.

It should be stressed that even though there is a clear connection between the score and the order of the integration initiatives in the integration scheme, there might be some differences, since other aspects have been taken into consideration[27].

- **Benefit** imperative suggests the earliest possible integration of integration initiatives with high benefits (financial or non-financial and socio-economic benefits)

- **Risk/complexity** takes into account that less complex and risk implying integration initiatives might be implemented early in the project, compared to more complex and high-risk initiatives

- **Sustainability** proposes that integration initiatives with high risks might be implemented early to create a change and thereby forcing the mitigation at a later stage not to create to much disturbance:
  - Sustainability is also important for integration initiatives which are core for the business, and it is necessary to focus on integration initiatives which instigate a more formal cooperation in order to create a sustainable solution
  - It is also taken into consideration that the integration of too many integration initiatives at the same time could create too much disturbance and thereby not help create a sustainable solution

- **Speed** implies implementing as much of the solution as early as possible to create an immediate change:
  - It should be noted that the ATM business does not usually focus predominantly on speed since this imperative is difficult to apply due to thorough safety regulations etc. which need to be investigated before a change can be approved.

The overall integration scheme has been constructed with focus mainly on Benefits and Risk/Complexity, suggesting that high benefit imposes some importance on the integration of each initiative, i.e. high benefit will also have some impact on the timing of the integration, but that integration initiatives with e.g. both high benefits and high risks must be balanced. The integration initiatives in grey illustrate that these integration initiatives need to be more or less implemented simultaneously due to interdependencies.

[27] E.g. the procurement of CNS systems initiative has high benefit scores, but due to avoidable investments in 2016, indicating that it is not necessarily important to implement this initiative as early as possible in order to realise the benefits.

Figure 35 illustrates the implementation scheme when focusing on the benefit perspective. As illustrated, the integration initiatives with high benefits are placed as early as possible in the initiative running order, in order to realise benefits as soon as possible so that the contribution to the benefit case is optimal. Driving out benefits of the project implies focusing on identifying potential benefits and realising these as quickly as possible. The integration initiatives in grey illustrate that these integration initiatives need to be more or less implemented simultaneously due to interdependencies.

Figure 35 Integration scheme – benefit perspective

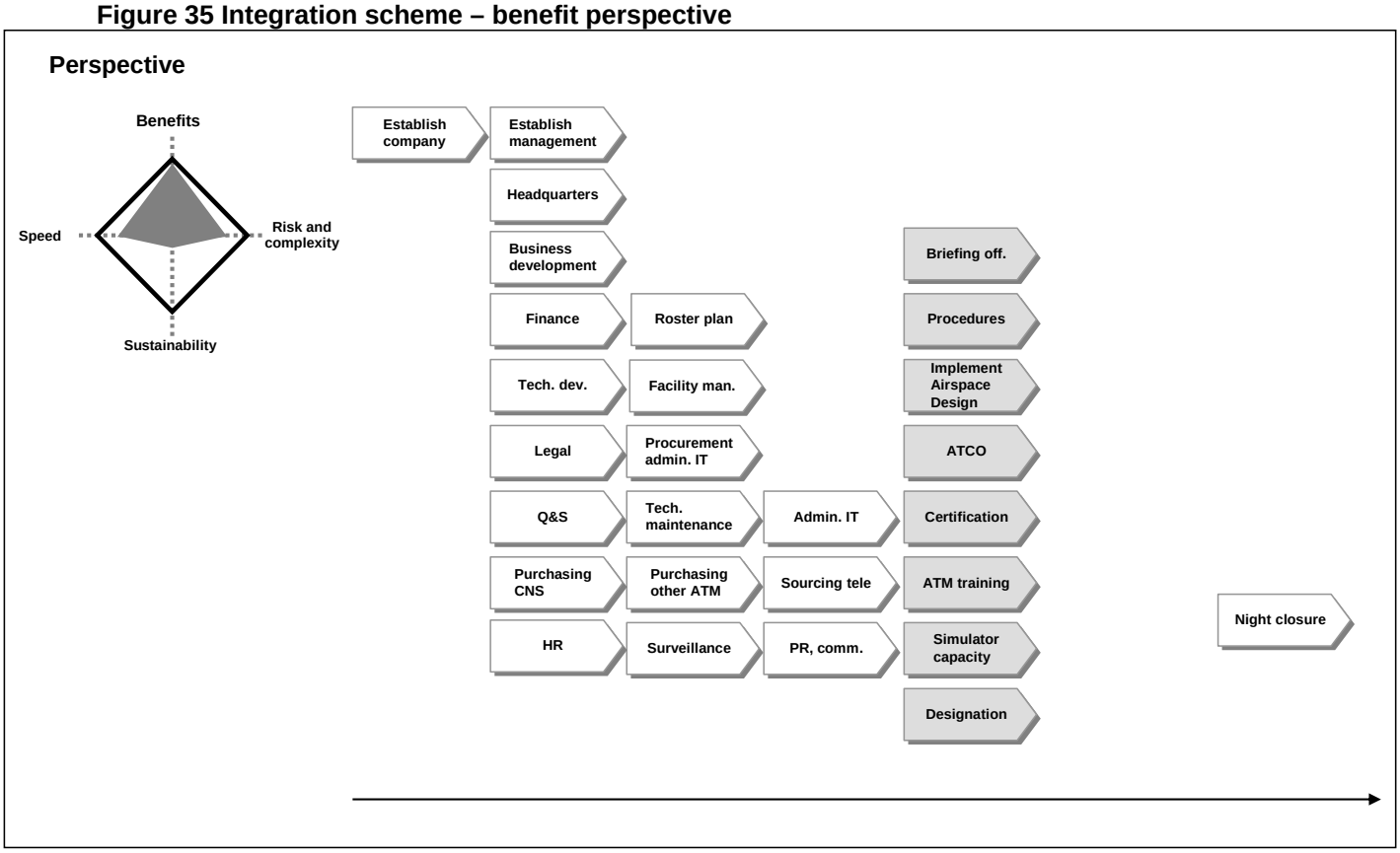
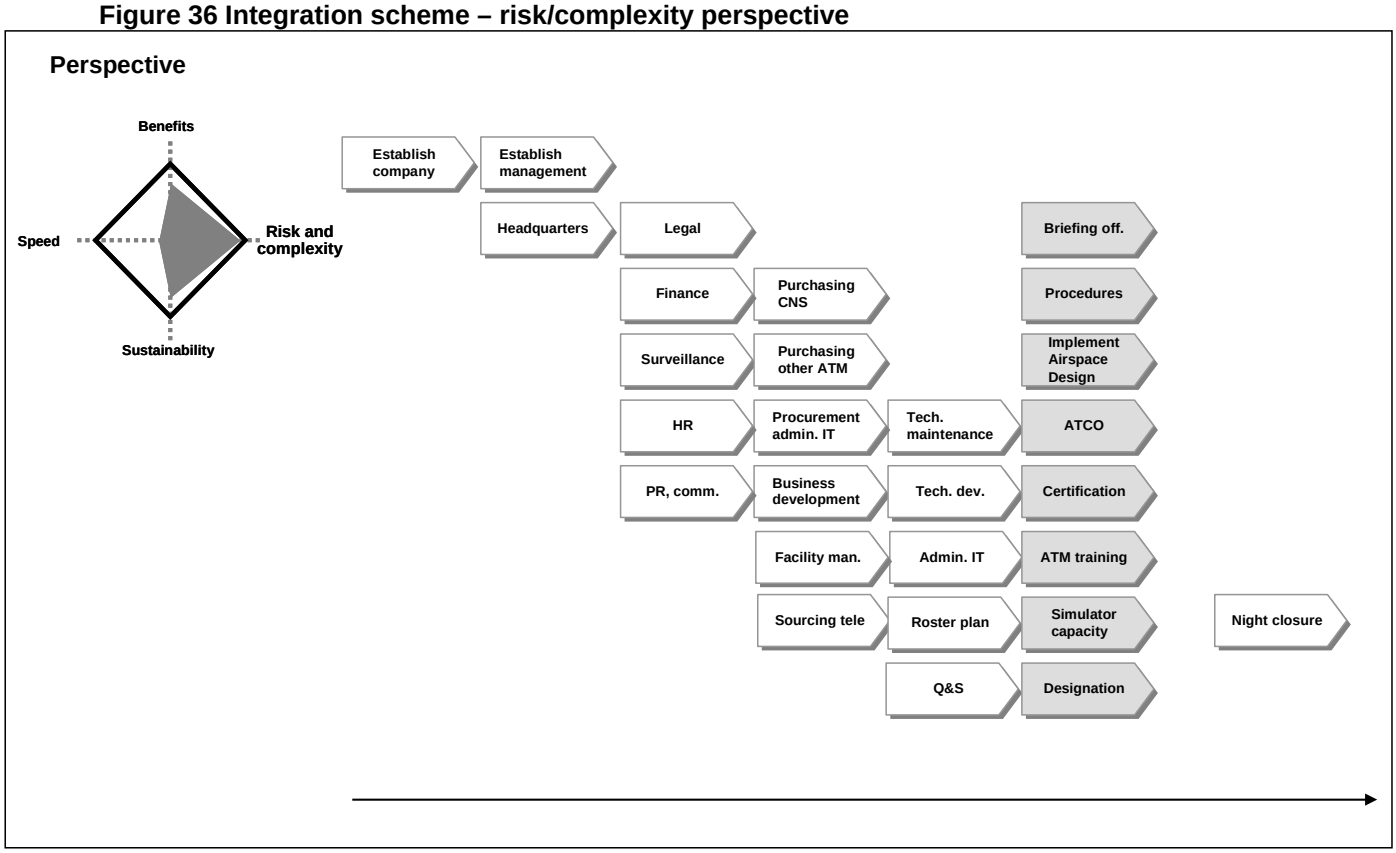


Figure 36 shows the integration order of the integration initiatives when risks and complexity of each individual initiative are considered. Non-core integration initiatives such as HR, finance and common procurement are implemented earlier than more complex core business integration initiatives such as ATCO and briefing officers. Some integration initiatives are implemented late e.g. implementation of New Airspace Design, which is due to the fact that a number of other integration initiatives need to be implemented simultaneously with implementation of a common airspace due to interdependencies. Managing risk and complexity focuses on minimising risk in order to actually deliver the objectives of the project. If risks regarding safety, environmental or customer impact are high, then rigorous risk management is required in order to successfully deliver the change.

Figure 36 Integration scheme – risk/complexity perspective



Integration schemes have also been developed, illustrating the integration from a sustainability perspective and from a speed perspective, and are shown in the Supplementary Report – Integration Strategy Appendix.

To summarize differences and similarities of the four Integration schemes:

- Some integration initiatives differ in their position in the different integration schemes:
  - **Tech. development** and **Tech. maintenance** differ due to medium-high benefits and low-medium risk/complexity
  - Due to low scores for most imperatives; the timing of e.g. **Sourcing tele** and **PR and Communication** integration initiatives can be chosen more dynamically once considerations to more important integration initiatives have been taken.
- What might also differ for the integration schemes are the timescales, but whether that actually will be the case will only be revealed in the detailed planning process.

The initial conclusion from the ongoing analysis is that even with different perspectives, the hard dependencies between core integration initiatives suggest limited room for choosing between alternative integration roadmaps.

It should be stressed that the integration scheme is a logical order of integration, not a timetable; e.g. although roster planning and legal are in the same column meaning that they could be implemented in parallel at the same time, other outside dependencies might influence the order of integration.

2.3.1.4 Conclusion

The purpose of the initiative-based integration scheme has been to develop a strategic sequence for the implementation of the integration initiatives in a complete integration process based on relevant perspectives. Four different integration schemes have been developed reflecting different perspectives in an integration process, i.e. an integration process primarily driven by a *Benefits, Risk/complexity, Sustainability or Speed* perspective. Primary focus has been on Benefits and Risk/complexity since these are analysed to be the important perspectives in order to comply with strategic rationales for NUAC Programme, i.e. cost efficiency and flight safety.

The overall conclusion is that an initiative-based integration scheme is feasible and a desirable alternative to the scenario-based perspective because the different integration initiatives do not have to be implemented at once, and to some extent they can be combined.

This implies an alternative to a “big bang” integration approach, characterised by the situation where a complete scenario is implemented, as outlined in the original integration approach.

The design of the final integration scheme gives some flexibility in the timing of the integration initiatives, since it is possible to vary which integration initiatives are implemented, and when they are implemented. This gives room for designing the most attractive integration scheme due to different integration perspectives – it is possible to formulate an integration scheme with the purpose of reaching high benefit with low risks.

By comparing the four integration schemes, it is possible to derive some tendencies, which will be useful when finalising the integration scheme. Some integration initiatives follow almost the same sequencing in all four perspectives – the most important difference is the timescale, e.g. the overall timeframe of the implementation can vary. These tendencies must

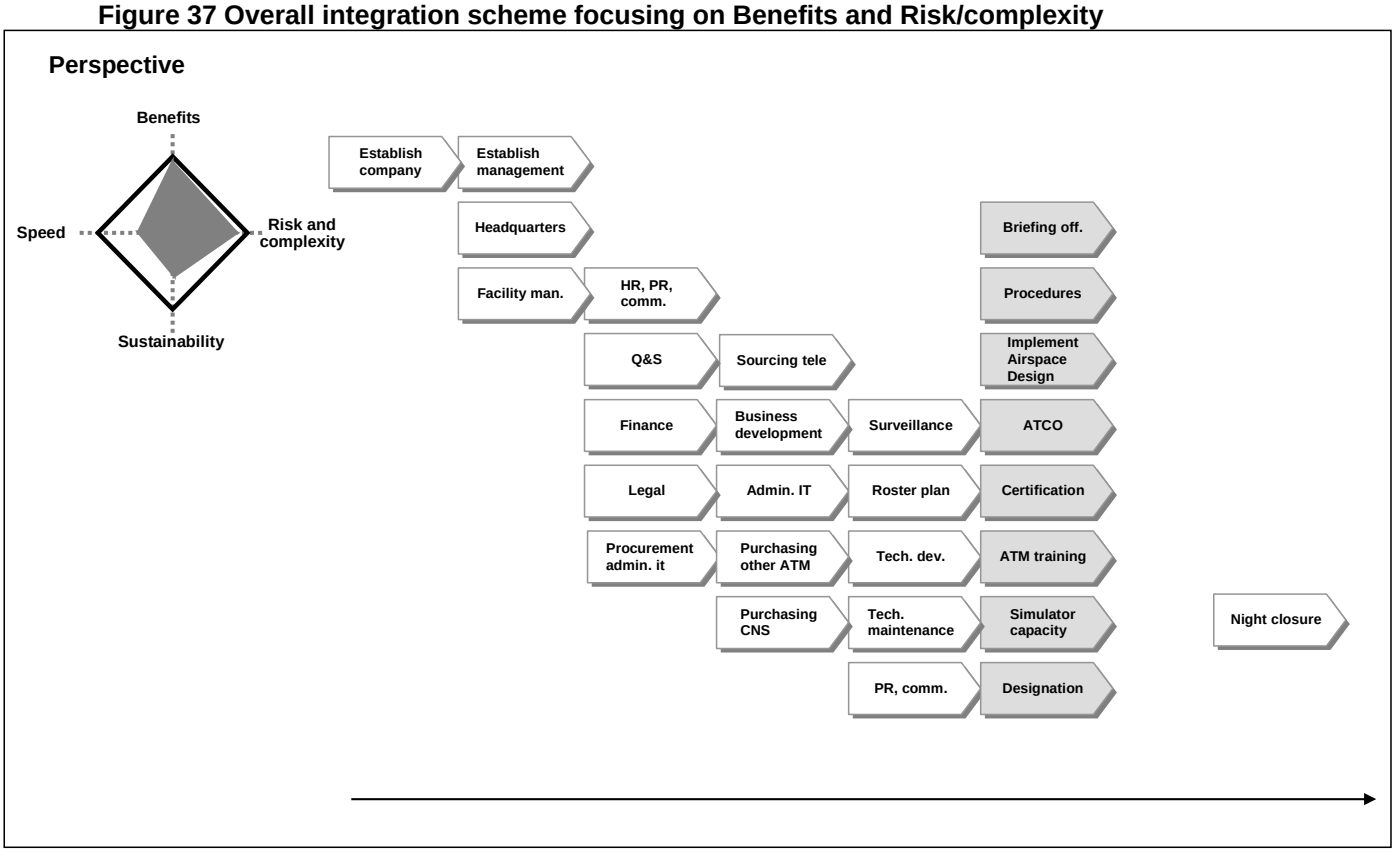
be reflected in the final integration scheme, since they are reflected in all integration schemes:

- **Establish the NUAC Company** should be the first initiative, since it sets up the whole integration programme and does not imply any significant risk/complexity
- **Certification**, **Designation**, **ATM training, Training simulators**, **Procedures functions, ATCO functions**, **Briefing Officer function** and **Implementation of New Airspace Design** need to be implemented more or less simultaneously due to interdependencies
- **Night closure of control centres** should be the last initiative to be implemented since it is connected with a high level of risks and complexity.

The comparative analysis also identified the initiative which differentiates most among the different perspectives; those findings can be used to determine what and when these integration initiatives should be implemented (due to the choice of integration perspective).

The complete integration scheme, shown in the figure below, reflects the most important integration perspective seen from the strategic rationales and the current challenges facing the NUAC Programme, i.e. Benefits and Risk/complexity as described previously.

Figure 37 Overall integration scheme focusing on Benefits and Risk/complexity



A number of specific findings related to each initiative can be derived from the analysis based on the main perspectives Benefits and Risk/complexity:

- Some integration initiatives are analysed to have **high benefits**, but also **high risk/complexity,** and it should therefore be considered carefully when these are implemented. The integration of the integration initiatives must balance between ensuring the momentum and the respect for ATM complexity and HR Aspects. When

dealing with these integration initiatives, special attention must be on providing proactive risk management, an HR strategy for handling rigor, incorporate people aspects and test a solution based on relevant experience and dialogue with relevant stakeholders. All this also in order to ensure flight safety and regularity during the process

- Integration initiatives with **high benefits** and **low risk/complexity** should be implemented as early as possible in order to get a strategic good start for the integration project, and to ensure momentum in the programme and realise "quick wins". This will also have significant impact for the programme by strengthening the internal culture in the NUAC Company and showing stakeholders that the NUAC vision will be realised
- Integration initiatives with relative **low benefits** and **high risk/complexity** should be implemented later rather than sooner. An assessment of the risk/complexity versus benefits must be considered for each initiative before integration. Finally, it should be considered whether it is necessary to include them all in the cooperation
- Integration initiatives with **low benefits** and **low risk/complexity** are not as important with regards to timing. The sequence of those integration initiatives can be chosen more dynamically once considerations regarding more important integration initiatives have been taken.

It should be mentioned that the Benefits and Risk/complexity model-based sequencing of the integration initiatives will in actual detailed integration planning be augmented by:

- Relations between the integration initiatives and external dependencies:
  - Work relations/agreements and procedures, and roster planning
  - Regulatory directives and procedures
  - Initiatives in retained organisations
- Available resources for implementation, necessary competencies etc.
- System dependencies, related to the implementation
- Integration initiatives of lesser importance from the benefit and risk/complexity perspectives, e.g. administrative IT, might be important to address up-front because they are needed to facilitate the establishment of the NUAC Company from the very beginning.

2.4 HR Aspects and social dialogue

The original report regarding HR Aspects ("NUAC Programme - Definition Phase Final Report", Appendix no. 9) has as part of the analyses covered by this report also been analysed in order to ensure that the Operational Alliance scenario is covered by the original analyses.

The conclusion from this work was that the original report also covered in a sufficient manner the identified HR Aspects relevant for the affected staff groups in the scenario Operational Alliance.

Consequently, no new HR Appendix has been drawn up.

3 Glossary

The reader is referred to section 7 in the *NUAC Definition Phase – Final Report* for a complete glossary.