

Proposal to update the ACAC CNS-ATM study

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1 Introduction

1.1 General

1.1.1 This proposal has been prepared for the Arab Civil Aviation Commission (ACAC) by Helios in response to a request for an update to ACAC's CNS-ATM study from 2004-2005.

1.2 Understanding of the requirement

1.2.1 ACAC is an Arabic organisation related to the Arab League, which looks to provide a common framework for civil aviation development and safety, and enhance cooperation and coordination in the region. This is done to meet the requirements of the member Arabic States for safe and regular air transport.

1.2.2 In order to fulfil these roles, ACAC commissioned a study in 2004 to examine the CNS-ATM infrastructure of the member States, the underlying demand/capacity situation, and present recommendations for each State to be able to meet predicted demand, whilst increasing the safety and quality of aviation in the region. The role of ACAC in these objectives was also examined, with a series of recommendations given for increasing ACAC's role in coordinating and harmonising Air Navigation Services (ANS) in the region.

1.2.3 Since 2004-5, there have been **several key changes** in the global approach to Air Traffic Management (ATM) and specifically the member States in ACAC.

- § The ICAO Global Performance Framework, based on the ATM Operational Concept (Doc 9854) and the Manual on Global Performance of the Air Navigation System (Doc 9883); from these, Global Performance Initiatives are defined to demonstrate measurable progress for each region and nation towards the ATM Operational Concept.
- § Global technical developments, including the development of Performance Based Navigation (PBN), AMHS (Aeronautical Message Handling Services), augmentation systems (SBAS, GBAS), new surveillance technologies (ADS-B, multilateration), and enhanced information flows through Aeronautical Information Management (AIM).
- § Regional developments, including progress on ICAO initiatives (MID and AFI regions), ACAC actions (e.g. ATFMU, FANS), and European coordination; e.g. with the Single European Sky, new mandates, and Functional Airspace Blocks such as Blue Med), with changes in interoperability requirements and airspace design and management issues.
- § National developments, with new agreements between States, new airports and routes, and procurement of new equipment by ANSPs all leading to changes in Air Navigation Services in individual States.

1.2.4 This update to the CNS-ATM study is therefore intended to:

- § Provide an up-to-date picture of CNS-ATM developments in the ACAC region;
- § Ensure ACAC has the latest information with which to coordinate its planning for the region, giving objective (data-based) justification for regional initiatives by ACAC;

- § Link ICAO Global Performance Initiatives with regional planning and individual State activities, to identify areas where ACAC could look to coordinate harmonised ATS;
 - § Identify gaps in CNS-ATM in the region, and set pragmatic objectives to build capability to solve the issues identified;
 - § Form solid recommendations to guide ACAC in its work to bring cooperation and coordination in the region.
- 1.2.5 If ACAC does not carry out this study, we believe it will not have the data or justifications necessary to push forward the necessary initiatives in the region. The existing study is now seen as being out-of-date, and requires updates of the baseline data as well as an understanding of the latest institutional developments. Sections 2 and 3 of this proposal highlight what we believe will need to be updated, and how we propose to carry this out.
- 1.2.6 This document contains Helios' proposal to undertake this study. Our financial proposal is provided in the cover letter accompanying this document.

1.3 Added value

1.3.1 Helios has established itself as one of the leading consultancies in air transport and will deliver considerable added value to the project:

- § We are proposing staff for the project that have been deeply involved in developing strategies and master plans for Air Navigation Services throughout the world. Curricula vitae are given in section 5. Specific projects in which the members of our project team have played major roles include:
 - § feasibility studies and CBAs for Functional Airspace Blocks (cooperation and harmonisation for groups of ANSPs);
 - § assessment of the impacts and the implementation of the European Common Aviation Area (ECAA);
 - § development of air services strategies in the Middle East, including Abu Dhabi and Lebanon
 - § procurement initiatives – e.g. COOPANS (procurement by the ANSPs of Ireland, Denmark and Sweden), JMATS (Joint Military ATS – procurement from the UK Ministry of Defence); and
 - § operational audits reviewing current and predicted operations and making recommendations on performance improvement.
- § Helios has the capability to produce all aspects of this study, including conducting inventories of CNS-ATM infrastructure, producing cost-benefit analyses tailored to our clients' needs, and giving high-level guidance and recommendations on institutional, policy and procurement matters.
- § We will not just carry out an update to the underlying statistics of the report. We will also use our experience to identify necessary changes in the region, with respect to the ICAO performance framework, along with options that ACAC and its member States could take in addressing the key issues. Clear recommendations will be given on the basis of the data collected, the CBA, and the discussions with ACAC.

- § Helios ensures independence and impartiality. We do not have any vested interests in any stakeholders nor do any of these stakeholders have any undue influence over the team.
- § We have a proven track record and a high reputation for quality and on-time delivery. This is confirmed by our clients' enthusiasm for awarding us follow-on and repeat work and for new clients to award us contracts in similar areas.

1.4 Structure of the document

1.4.1 The remainder of this document is structured as follows:

- § section 2 outlines the major changes over the past 5 years impacting CNS-ATM in the ACAC region, and shows our understanding of the work to be done in this task;
- § section 3 describes our approach to the project, and describes the effort required;
- § section 4 highlights our project management approach including staffing and quality assurance;
- § section 5 details the curricula vitae of the staff proposed for the work;
- § section 6 shows our credibility and experience for this project, including a corporate profile and highlights of some of our recent relevant projects.

2 Major changes impacting CNS-ATM in the Arab region

2.1 Introduction

2.1.1 This section outlines Helios' understanding of the key elements of any update to the CNS-ATM plan. It includes two main aspects:

- § Changes arising from technical, business and organisational transition over the past 5 years, both globally and in the region;
- § Changes to improve the purpose of the study, for example by ensuring a closer link with ICAO's Global Performance Initiatives for the region (MID and AFI).

2.2 Performance-based framework for planning

2.2.1 Over a last few years, ICAO has developed a performance based approach to CNS/ATM evolution. The European SESAR project is fully aligned to the ICAO approach.

The basic concept is to set performance targets and objectives that are in line with the expectations of airspace users. ICAO has defined a set of 14 Key Performance Areas¹ (KPAAs) to help support target setting (see figure 2-1). Within Europe, the setting of targets will be achieved by the second package of Single European Sky Legislation due to be adopted in the second half of 2009. Initially targets will only be set for Cost Effectiveness, Capacity, Safety and Environmental Sustainability.



Figure 2-1: ICAO Key Performance Areas

2.2.2 Regional and Local Plans should react to the targets set; targets should be set in close consultation with stakeholders, most essentially the airspace users. This ensures that modernisation plans reflect the actual needs of the region.

2.2.3 ICAO has set out a vision, strategy and tactics for regions to use in establishing regional and local plans.

¹ ICAO Doc 9882 – Manual on Air Traffic Management System Requirements and ICAO Doc 9883 – Manual on Global Performance of the Air Navigation Services Part 1 – Performance Based Transition Guidelines.

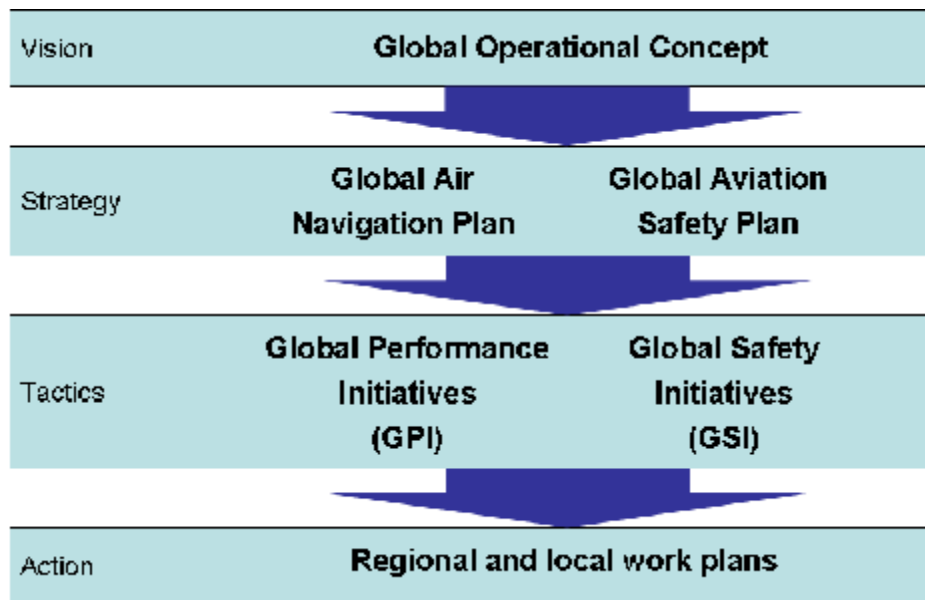


Figure 2-2: ICAO planning documents

2.2.4 The vision is set out in the Global Operating Concept² which defines at a high level how the future ATM should operate on the basis of eight operational concept components.

2.2.5 The strategy and tactics are set out in the Global Air Navigation Plan³ (GANP) and Global Aviation Safety Plan⁴ (GASP) which include the Global Performance Initiatives (GPIs) and Global Safety Initiatives (GSIs) respectively. There are 23 GPIs and 12 GSIs. GANP and GASP also include information on how plans should be developed including analysis of cost benefit and economic impact and potential legal issues.

2.2.6 ICAO defines a three phase transition strategy based on near, medium and long term expectations. The transition strategy does not have associated dates as ICAO recognises that each region will require new capabilities at different times.

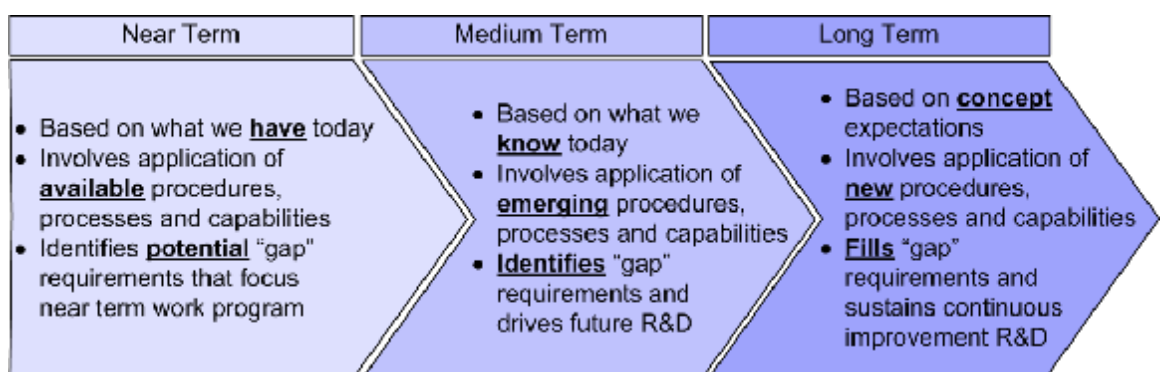


Figure 2-3: ICAO transition strategy

² ICAO Doc 9854 – Global Air Traffic Management Operational Concept – First Edition 2005

³ ICAO Doc 9750 – Global Air navigation Plan – Third Edition 2007

⁴ Global Aviation Safety Plan – July 2007

Our understanding of the ACAC requirement is to establish a concrete regional plan for the short term that supports an eventual evolution to the medium term capabilities as when they are required by the evolving traffic situation.

In order to do so, a simplified planning process is recommended based on an update of the previous work that takes account of the ICAO planning process. This will include:

- § Identification of the core KPAs for ACAC and assessment of process for target setting – noting that performance measurement will be required before actual targets can be set.
- § Review of the GPIs and GSIs against the existing plan and current infrastructure to assess potential changes to the plan to bring it in line with ICAO and airspace user expectations.
- § A refresh of the CBA to ensure that the revised plan is still affordable.

2.3 Traffic changes, both current and predicted

2.3.1 Current traffic change

2.3.1.1 The current traffic change in the 2004-2008 period is displayed on the two following pictures showing annual aircraft movements (airport traffic and overflights) per country/FIR in years 2003 and 2008 respectively. Data for 2008 year was compiled from various sources and for some countries traffic levels had to be based on estimates.

Note that these maps show country borders; they can also be tailored to show traffic growth per Flight Information Region.

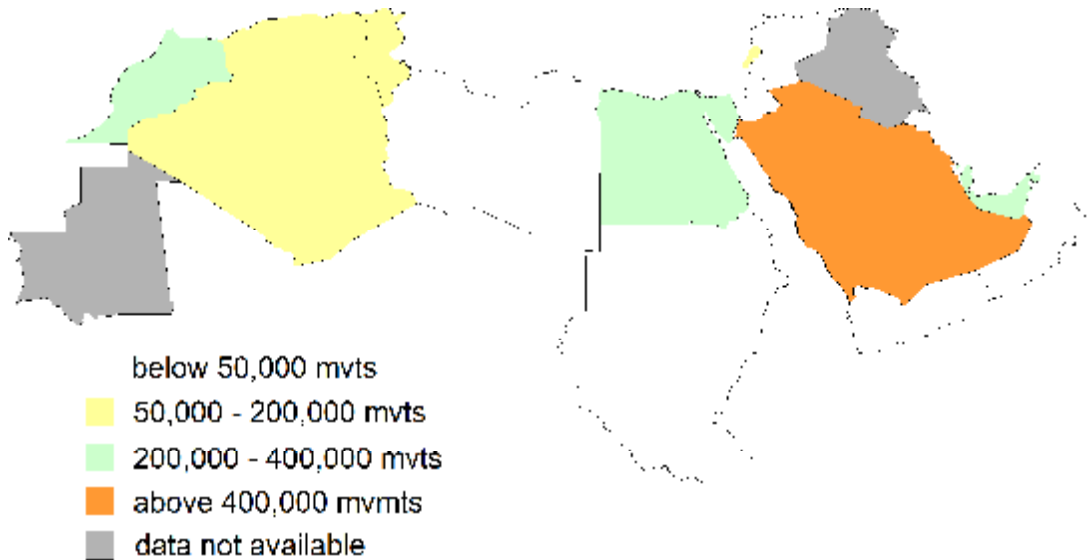


Figure 2-4: Total annual aircraft movements in 2003 by country/FIR

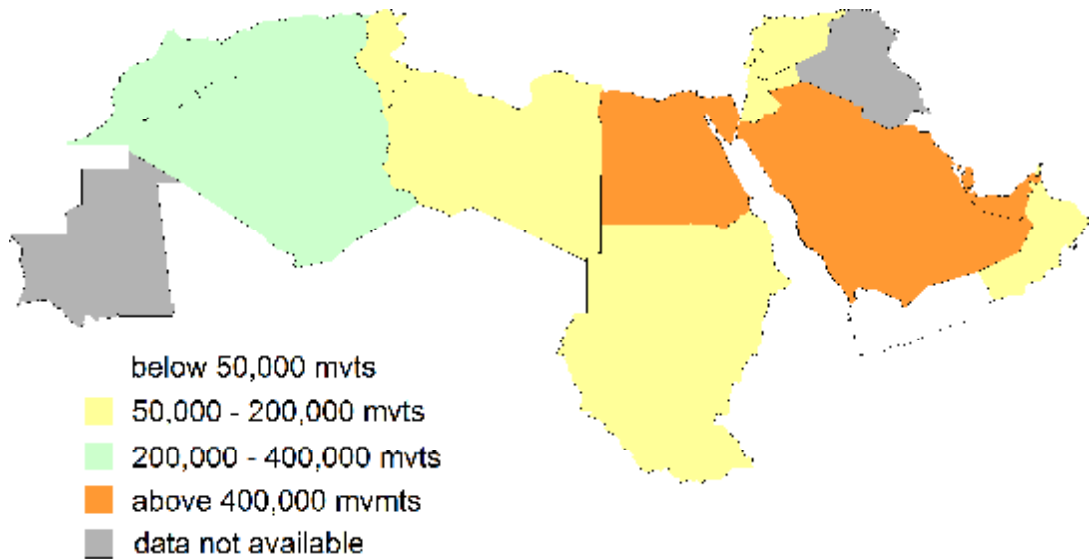


Figure 2-5: Total annual aircraft movements in 2008 by country/FIR

2.3.1.2 It is evident from the pictures that the increase of traffic was significant in almost each country. Traffic levels are highest in the Gulf area, Saudi Arabia and Egypt, but also western part of the ACAC region, represented by Morocco and Algeria, shows substantial flight operations.

2.3.2 Predicted traffic change

2.3.1 According to the forecasts for Middle East (a major part of the ACAC region), the number of passengers is expected to increase from around 71 million in 2007 to about 293 million in 2025. The number of aircraft movements at airports is forecasted to grow from about 625 thousand to above 2.3 million movements over the same period⁵.

Route group	Actual - 2007	Forecast - 2025	Average Annual Growth [%]
Africa-Middle East	84,933	291,159	7.1
Asia-Middle East	165,364	514,979	6.5
Europe-Middle East	158,346	350,380	4.5
Intra Middle East	205,769	1,170,709	10.1
North America-Middle East	11,075	18,703	3.0
Total	625,487	2,345,929	7.6

Table 2-1: Aircraft movements forecast up to 2025¹

2.3.2 It is therefore one of the most dynamic aviation markets in the world, expanding from 5% of international traffic to 10% in the past seven years. The average growth rate for period 2007-2025 was predicted at 7.6% annually. However the most rapid growth is forecasted on routes within Middle East countries (10.1 %), which only underlines the need for improved ATM efficiency and coordination

⁵ MIDANPIRG Traffic Forecasting SG, Report of the Third Meeting, April 2009, Cairo (includes Middle East countries only)

between ACAC member states (see also Figure 2-6). Traffic forecasts will of course be negatively affected by the current global economic crisis and ANSPs could use this opportunity to plan for the likely long-term demand.

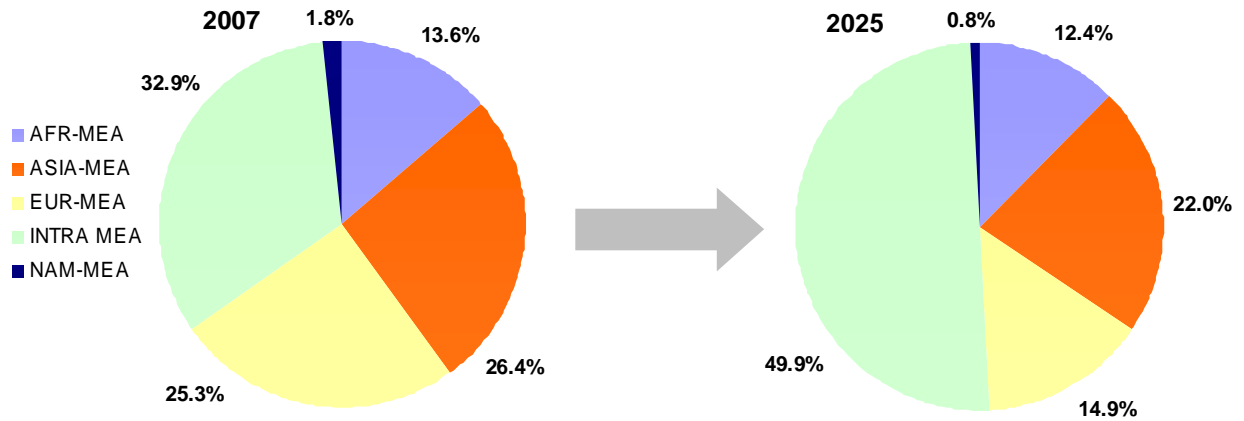


Figure 2-6: Evolution of shares of route groups in aircraft movements

2.3.3 The figure below shows predicted impact of economic crisis on AACO members' RPKs. The current downturn is expected to be very short and another period of steady growth is forecasted. Aircraft orders of air carriers remained untouched by the industry downturn, thus fleet expansion will continue.

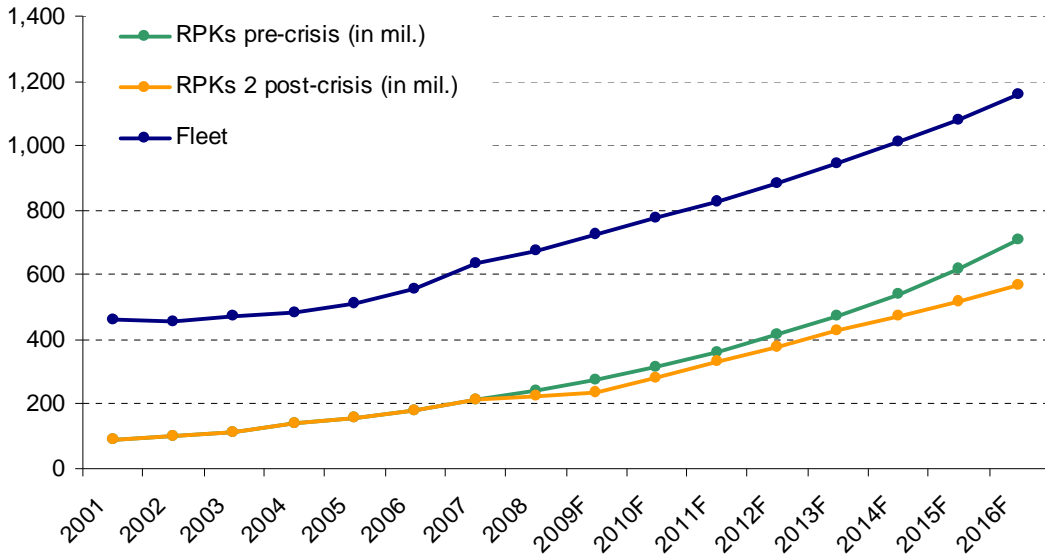


Figure 2-7: AACO forecasted Revenue-Passenger kms (RPKs) and fleet⁶

2.3.4 The update study will analyse in more detail the forecasts per member State, identifying any bottlenecks (current and predicted), and highlighting demand/capacity imbalances.

⁶ Arab Air Carriers Organisation (AACO), Airline Growth and Role of ATM presentation, ATC Global 09.

2.4 ANS changes

2.4.1 There have been a number of changes in the provision of Air Navigation Services in the ACAC region over the last 5 years. New airports, control centres and routes are coming on-line, with airspace design being altered to match the increasing demand. Performance-based navigation is being driven through ICAO (in particular, MIDANPIRG and AFIRG).

2.4.2 Examples of the changes in the region include:

§ New airports, such as:

§ The New Doha International Airport is planned to be completed within 2015, the ATM systems for the new control centre will be provided by Selex Sistemi Integrati;

§ Enfidha International Airport in Tunisia is set to become one of the largest airports in Tunisia with more than 22 million passengers per year once fully operational. The first phase of the airport will go operational in the 4th quarter of 2009;

§ Mesaieed-Al Maktoum International Airport, previously known as Jebel Ali, is under construction in Dubai. It is a major green field airport project in the world with its six parallel runways, three passenger terminals and planned capacity of 120-150 million passengers a year.

§ New control centres: for example in Abu Dhabi, a new APP control centre is being constructed and should become fully operational in Q4 2010. The communications systems include AMHS. Other new ACCs include Riyadh Upper Airspace, and Jeddah in KSA. Modernisation has also taken place in Cairo APP and ACC.

2.4.3 Certain countries and areas are progressing faster than others; for example, the UAE and Saudi Arabia (GACA) have put in place a number of recent improvements to their ANS, including re-sectorisation, CPDLC, OLDI, and new letters of agreement between States (e.g. transfer of sector separation agreements). Egypt has also re-designed its airspace, meeting the needs of the airlines in the country.

2.5 Communications, navigation and surveillance changes

2.5.1 A detailed analysis of the changes in the CNS infrastructure (both current and planned) will be carried out within the study. The following areas have been identified for further analysis.

2.5.2 **Communications:** The following AMHS improvements have been realised in the region:

§ UAE - OLDI connection between GCAA ACCs and Abu Dhabi airport, the first of its kind in the Middle East (April 2009);

§ UAE - AMHS link between GCAA ACCs and Muscat, Oman (March 2009);

§ Saudi Arabia - AMHS planned between Jeddah and Riyadh;

§ Egypt - new AFTN/CIDIN/AMHS solution for the Cairo Air Navigation Centre, which is the central aeronautical communication hub between Europe, North Africa and Middle East. AMHS connections with neighbouring countries are planned.

Some small-scale plans for FANS 1/A airspace are being developed, for example FANS 1/A routes.

- 2.5.3 **Navigation:** many States in the region have plans to move to RNAV routes (under ICAO's Performance Based Navigation). Developments in GNSS and SBAS (the Satellite-Based Augmentation Systems) will need to be captured to understand the options available to the ANSPs for airspace and procedure design.

New approach procedures (Non-Precision and Precision) may be possible, derived from GPS (or GBAS) approaches. The study will need to review latest developments for approach procedures, and highlight where States would benefit from implementing new approaches (e.g. where ground infrastructure is sparse, but airline traffic still uses the airports).

- 2.5.4 **Surveillance:** a move towards performance-based requirements for surveillance has meant that it is no longer straightforward in procuring radars to improve surveillance. The ANSP (or CAA) now has a choice in what to procure (Mode S SSR, ADS-B, WAM, PSR).

Preparation for Mode S implementation should start in UAE during 2009. Saudi Arabia has also recently procured Mode S SSRs. Also, three operational ADS-B ground stations have been deployed in the UAE, in order to gather data and build confidence in the new technology.

Airport-based multilateration is also being deployed in the region as part of the Advanced Surface Movement Guidance and Control System.

2.6 Air Traffic Management

- 2.6.1 In Air Traffic Management, a centralised ACAC ATFM Unit is being planned. Establishment of such unit would significantly contribute to orderly air traffic flow and effective utilisation of existing airspace capacity. There is a potential for transfer of European CFMU technology to ACAC.

- 2.6.2 The ACAC Air Navigation Committee is also planning the IFPS project. A review of IFPS in the ACAC area revealed improper handling and filing of FPLs and ATS messages, having the consequence that FPLs/messages are not received or that a number of manual interventions are needed. This causes a number of internal problems to the ANSPs and therefore a feasibility study for ACAC IFPS is being produced.

2.7 Organisational and institutional changes for ACAC

- 2.7.1 Our understanding of the current shortcomings of the ACAC area in terms of both CNS/ATM infrastructure and ATM coordination and harmonisation is the following:

- § Inadequate MID ATS Route Network - number of crossing points is located on major routes near borders which results into complex air traffic operations. Presence of high number of Danger, Prohibited and Restricted areas results in high airspace fragmentation. Regional airspace management is needed to achieve optimisation of the airspace structure and associated ATS procedures.
- § Civil/Military Coordination - poor civil/military coordination in some states, whilst the implementation of Flexible Use of Airspace (FUA) concept is essential.

- § Performance Based Navigation (PBN) - lack of RNAV procedures. Expedient implementation of RNAV/PBN is essential to increase flight efficiency and safety of flight operations.
- § Air Navigation deficiencies in the ATM/SAR and AIS/MAP fields

2.7.2 The list below provides a summary of the main present activities of the ACAC's Air Navigation Committee:

- § Arab Control - ACAC identified a need for a central agency for coordination of the development of ANS in the region. The main roles would be, among others, creation of a seamless ATM environment in the region, supervision of common planning and coordination, and harmonisation of ATM systems, procedures and rules.
- § ATFMU (see above)
- § IFPS (see above)
- § NAVISAT - a project aimed at implementing African / Middle East satellite system by 2012 offering improved performance and lower costs in comparison to current systems. The satellite system would provide communication (both AMSS and ATFN through VSAT) as well as navigation (SBAS) services.
- § ACAC/FANS1/A Implementation Group (AFIG) - a forum with aim to facilitate FANS implementation in the region by identifying and assigning implementation tasks and acting as a steering group for task forces.
- § GNSS - ACAC GNSS programme is focused on SBAS augmentation of GPS by EGNOS. While ACAC countries located in the Mediterranean region have been already covered by the extension of EGNOS (as part of MEDA programme), a need still exists in the region.

2.7.3 This activity list will be updated during the study, with progress and viability noted, and clear recommendations given to ACAC on whether to keep the above list or move to a new set of activities.

3 Proposed approach

3.1 Overview

3.1.1 Following the previous section's identification of the key issues to be addressed, this section describes the methodology by which we propose to provide all the information ACAC needs. The approach is designed to provide the best possible value for ACAC.

3.1.2 Figure 3-1 gives an overview of the logical flow of the project in terms of the individual tasks to be performed. Full task descriptions are given in section 3.2.

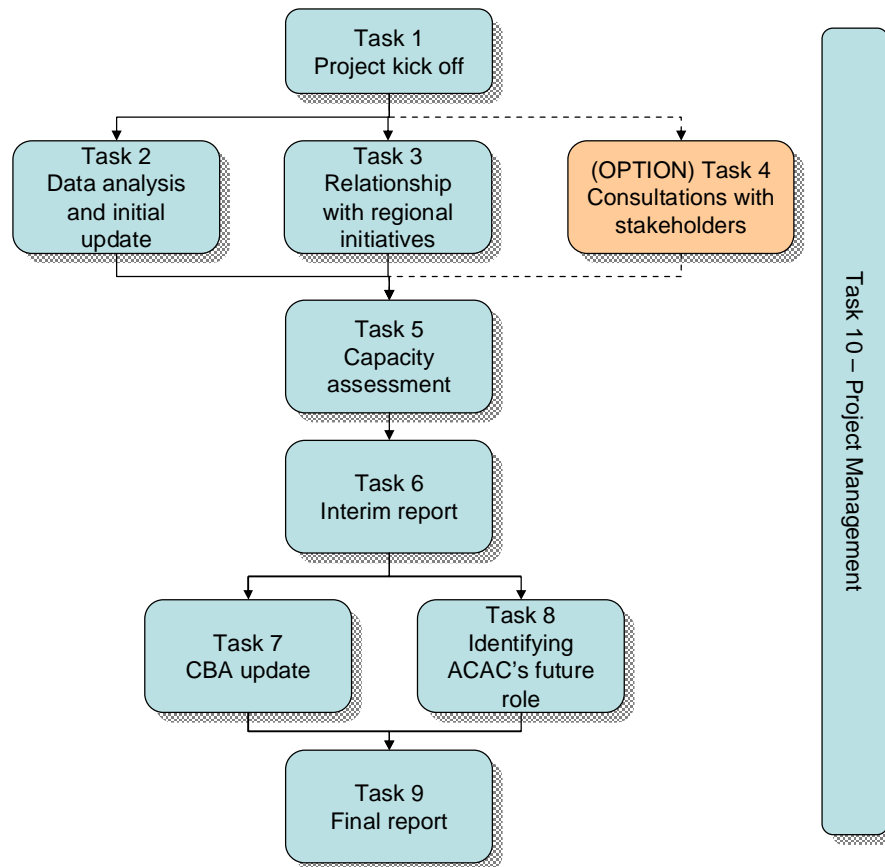


Figure 3-1: Overview of project approach

3.2 Task descriptions

3.2.1 **Task 1: Project kick-off:** The purpose of this task is to ensure a common understanding of the scope and content of the study at the project's commencement. It is envisaged that a meeting will be held with ACAC (in Rabat) where the Helios team will present the outline project plan, based on this document. The project plan will then be revised based on feedback from ACAC to meet evolving requirements. Key outcomes of the meeting will be to confirm:

- § the overall time schedule;
- § the preferred working method, e.g. to confirm the requirement for informal progress meetings and progress reports in addition to the more formal reports

already defined. This will also confirm the need for onsite working in Rabat (or other locations) for data gathering and consultation activities;

- § identification of individual stakeholders to be consulted.

Helios will provide minutes of the kick-off meeting.

3.2.2 **Task 2: Data analysis and initial update:** Helios will review the data provided in the original report, and identify sources for updating the data. Where possible, data will be updated from the States themselves. However, we recognise that in the timescales available (4 months), it may not be possible to collect detailed data from every service provider. As such, the following data sources may be used to update key statistics (*initial list only*):

- § State Aeronautical Information Publications (incl AICs);
- § OAG;
- § IATA;
- § ICAO MID/AFI offices;
- § Flight International; and
- § Air Traffic Intelligence.

Where data is readily available (e.g. traffic figures, forecasts etc), we will produce updates of the key sections in the original report. The sections of the original report that will be updated include:

- § Aircraft fleet inventory (if possible, also taking account of MIL and GA, where this is an issue for airspace and infrastructure for States – e.g. Jordan);
- § Airport growth;
- § Traffic demand and flows (current and predicted);
- § Air Traffic Services (from AIPs etc);
- § Inventory of CNS equipment, including existing and near-term plans in the region.

Where the data is not readily available, we will work with ACAC to identify the best means to consult the States (see optional task 4).

3.2.3 **Task 3: Relationship with regional (and global) initiatives:** Helios recognises that a number of regional and global plans will impact ACAC's strategy for the next few years. This task will look at the initiatives in the region, and identify their impact. This will include:

- § ICAO Global Performance Framework – regional GPI gap studies, MID and AFI region studies
- § Relationship to Single European Sky initiatives, including
 - § Functional Airspace Blocks, particularly Blue Med;
 - § SESAR (ATM Development Programme);
 - § Current status of CNS programmes, including GBAS, EGNOS and AMHS, which have changed significantly in the last 4-5 years.

The purpose of the task is to identify potential changes to the assumptions and recommendations made during the previous study, and feed into task 8 (discussion of ACAC's future role).

3.2.4 **(Optional) Task 4: Consultations with stakeholders (ANSPs, States etc):** In order to provide the best possible value for ACAC, Helios has included the task of individual consultations as an option. This gives ACAC the option of either:

a) consulting the stakeholders themselves, with Helios providing a clear list of the information to be gathered or;

b) allowing Helios to set up meetings with the key stakeholders (e.g. GACA, JCAA, NANSC etc), and emailing others to gather the required data. This will add the expense of travel to the key stakeholders, but will ensure that the data gathered is accurate and relevant (particularly with regard to forecast changes in the future), and that it is collected in a timely manner.

3.2.5 **Task 5: Capacity assessment:** Using the data gathered in task 2 and the consultations with individual States, Helios will conduct a demand/capacity assessment of the ACAC region. Where possible, this will be conducted in line with the European Performance Review Report methodology of ascertaining capacity, demand and bottlenecks. An issue here may be the collection of relevant data from each State – assumptions may need to be made where data is not available.

3.2.6 **Task 6: Interim report:** Based on the results obtained in the analysis, Helios will issue an interim update of the CNS-ATM study, identifying the changes in the baseline scenario, forecast traffic and recommended infrastructure changes.

Importantly, whereas the original report gave deployment guidelines per State for detailed CNS equipment and ATM changes (section 6 of Phase 1 CNS-ATM study), Helios recommends that a more performance-based approach is followed by ACAC, identifying the key performance improvements necessary in the region, and identifying the options and timelines for States to make those performance improvements.

3.2.7 **Task 7: Cost Benefit Analysis update:** Helios will review and update the assumptions for the CBA model, and will update the model based on the latest data gathered in phase 1 of the study. Having done many cost-benefit studies before, Helios already has a large amount of data for costs of CNS and related equipment. Our work on the CNS-ATM Fragmentation Study for the Eurocontrol Performance Review Unit (see section 6 in this proposal) also informs our understanding of the benefits of rationalising infrastructure to meet a performance standard.

We will also separate out the airline business case from the ANSP business case, to address both groups of stakeholders, and ensure that the planned investment is cost-beneficial and affordable to both. The CBA will be performed using ICAO guidelines and take account of issues such as maintenance and training.

A sensitivity analysis will be conducted, showing the baseline, low and high assumptions on costs and benefits for each variable, and highlighting the key variables which impact the overall CBA. From this analysis, recommendations can be made for focused areas for attention for the stakeholders, to gain the most benefits (primarily either from efficiency and safety benefits, or from reduced costs).

3.2.8 **Task 8: Identifying ACAC's future role in improving regional performance:** This task will assess the previous study's recommendations on the institutional role of ACAC, and identify progress in these areas. Through discussions with ACAC, Helios will lay out potential roles for the upcoming years, taking account of the changes in the region identified in task 3. This will be done on a pragmatic basis, understanding the ability of the region to change and the likely timescales. Helios considers that it is of no use to ACAC to recommend European-type solutions where these are not appropriate for the region. Equally, realistic yet ambitious timescales must be set on initiatives such that progress can be tracked and plans put in place, both financial and organisational, for transition.

Helios notes that there may be a need for both a "public" section on ACAC roles and responsibilities, and also a "private" ACAC-eyes only paper for internal ACAC use. The latter would take into account cultural, financial and legislative constraints that may not be able to be detailed in a public document. Helios would advise ACAC directly in the latter paper on a possible future organisation and role.

As this task involves coordination with ACAC, Helios anticipates that a 1-2 day meeting is held in Rabat with key ACAC staff to discuss the issues. This meeting could include a review of the final report (minus the section on ACAC future roles, which would be drafted following the meeting).

3.2.9 **Task 9: Final report:** This task will produce the final study report. The production of both the interim and final reports will follow the following steps:

- § the contents and format will be agreed in advance
- § a draft report will be issued to ACAC for review and comment;
- § ACAC will provide comments and feedback within 10 working days of receipt of the report, through a specially convened meeting if necessary;
- § Helios will address the comments and issue the final version of the report within 5 working days
- § Helios will also prepare presentations summarising the reports.

The final report will describe all of the work undertaken in the project and will contain a concise executive summary.

3.2.10 **Task 10: Project management:** This task is concerned with the overall management of the project, in line with the procedures defined in the Helios quality manual which includes, inter alia:

- § project planning (resulting in the creation of the project plan)
- § project control and monitoring, against the project plan
- § coordination of the work undertaken
- § client liaison and progress reporting
- § risk management
- § contract control and management
- § configuration management
- § internal progress reporting

§ independent review (including technical review and proof reading) of project reports and other documentation.

3.3 Effort

3.3.1 Based on the above task descriptions, it is estimated that the project will require approximately 67 person-days of effort, based on the assumption that the work will start by August and be completed by the end of December. Without the optional task 4 (stakeholder consultations), this becomes 62 person-days of effort.

The break-down of this effort for each task is illustrated in the following table.

Phase	Task	Estimated effort (person-days)
1	Task 1: Project kick off	4
	Task 2: Data analysis and initial update	12
	Task 3: Relationship with regional (global) initiatives	4
	Task 4 (OPTION): Consultations with stakeholders	5
	Task 5: Capacity assessment	4
	Task 6: Interim report	3
2	Task 7: Cost Benefit Analysis update	20
	Task 8: Identifying ACAC's future role	6
	Task 9: Final report	5
	Task 10: Project management	4
Total effort (excluding optional task 4)		62
Total effort (including optional task 4)		67

Table 3-1: Estimated effort

3.4 Timescales

3.4.1 The timescales for the overall project and for the individual tasks are shown in the following figure. A project kick-off in early August is assumed and the project will be completed by early December 2009, giving an overall duration of approximately 4.5 months. Figure 3-2 below shows the proposed timescales for the tasks.

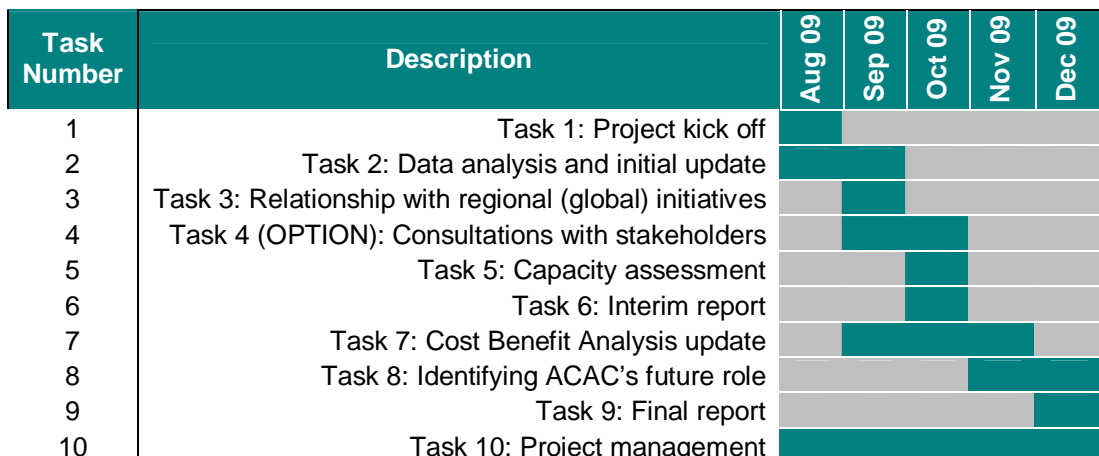


Figure 3-2: Proposed timescales for project

3.5 Meetings

3.5.1 The project schedule allows for 3 formal meetings between the Helios team and ACAC. Dates for these meetings are proposed in the following table.

3.5.2 The M2 progress meeting is proposed to be in London. Helios proposes to pay for the flights and hotel for the ACAC project manager to come to London. The other two meetings are likely to be held at ACAC's headquarters in Rabat.

3.5.3 Each meeting will have two Helios attendees.

Ref	Description	Location	Timing
M1	Project kick-off	Rabat, Morocco	August 2009
M2	Progress meeting – interim report presentation	London, UK	End September 2009
M3	Final report presentation – discussion of ACAC roles	Rabat, Morocco	End November 2009
M4-6	Optional stakeholder consultations (Task 4)	TBD (e.g. Cairo, Amman, Jeddah) – at least 3 planned	Sept-Oct 2009

Table 3-2: Meeting schedule

3.5.4 The stakeholder consultation meetings are optional in the bid, with effort and travel expense quoted separately. This is to allow ACAC to make the decision whether to collect necessary data themselves, or require Helios to collect the data through face-to-face meetings.

3.6 Deliverables

3.6.1 The following formal deliverables are envisaged for the project:

Ref	Description	Timing
D1	Minutes of the kick off meeting	August 2009
D2	Interim report	End September 2009
D3	Interim presentation	End September 2009
D4	Minutes of the progress meeting	October 2009
D5	Final report	December 2009
D6	Final report presentation	December 2009
D7	Internal ACAC final report (incl internal advice on future ACAC roles)	December 2009

Table 3-3: Formal deliverables

3.6.2 The interim and final reports and related presentations will be delivered in electronic format (Microsoft Word/Powerpoint).

3.7 Dependencies on ACAC

3.7.1 There are a number of dependencies on ACAC:

- § to ensure access to the available data through their network of contacts with the individual stakeholders in the region;
- § to provide introductions to stakeholders as required, ensuring updates can be gathered on national CNS-ATM changes in the past 5 years;
- § if task 4 is not included, to liaise with the stakeholders and gather the required data themselves;
- § to provide timely feedback on the work being undertaken.

4 Project management

4.1 Team structure

4.1.1 The team proposed for this project comprises consultants with the optimum blend of skills in air services strategy development and impact assessment and market analysis. The proposed team structure is illustrated in the following figure. CVs of each of the team members are included in section 5.

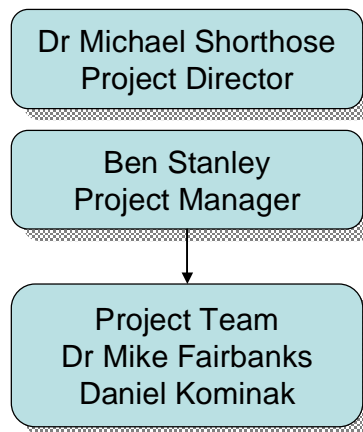


Figure 4-1: Team structure

4.1.2 Helios confirms that the project team are available to begin the project at ACAC's convenience, and are available to work on the project until the anticipated end date of December 2009.

4.1.3 **Dr Michael Shorthose** will be the project director, and in charge of the technical content of the study. As well as guiding the development of Helios, Mike works as a senior consultant advising customers on a range of technical and business issues associated with ATM. In recent years, his expertise has focussed on air traffic technology and control concepts, particularly related to the business consequences of procuring and operating complex systems. For example he provided expert witness support to a major air traffic control authority on an issue related to the consequences of an allegedly flawed procurement processes and is currently the technical advisor to the group of banks providing the funding to UK National Air Traffic Services. Mike has been heavily involved in the COOPANS joint procurement initiative from its outset to the present, including the recent accession of Austro Control to the initiative. He also played a leading role in the technical task force of the FAB Europe Central (FABEC) project where amongst other things he led the analysis of the various options for ATM systems in the context of the FAB's operational concept and alternative airspace structures.

4.1.4 **Ben Stanley** will be the project manager, in charge of coordinating the tasks for the study and leading the project team. Ben will also be the day-to-day point of contact with ACAC. Ben has a background in the ATM business, operational and technical domains, and is highly experienced in facilitation and stakeholder consultation through working with multi-national groups developing international procedures, concepts and master plans. He has worked with all stakeholder categories in the ATM industry in countries such as UK, Sweden, Belgium, Nepal, South Africa, Saudi Arabia, Jordan, and the USA. Ben holds a pilots licence, and has recently completed an MBA at Warwick University. He is also trained in Safety Management.

4.1.5 Both Mike Shorthose and Ben Stanley are anticipated to attend each project meeting.

4.1.6 The project team also consists of:

- § **Dr Mike Fairbanks:** Mike has been a management consultant for over eighteen years. He specialises in operational performance, policy, institutional, regulatory and business aspects relating to air and marine transport infrastructure. Mike has supported a number of organisations in formulating strategies for air services development, including air services development strategy for Abu Dhabi and the development of an aviation strategy (including liberalisation and air services development) for Lebanon.
- § **Daniel Kominak:** Daniel joined Helios two years ago as a competent Air Transport Operation and Economics master graduate with an excellent academic background in aviation. Daniel is a consultant and technical analyst in Helios and his duties include work on wide range of air transport projects. He was involved in several air transport studies and projects in Helios where he was responsible for the development of CBA models in MS Excel. By writing sections of reports presenting CBA results to senior management in various ANSPs, he gained experience in economic information disclosure. The studies he was involved in had a decisive impact on the decision making process of the ANSPs. During his employment in Helios, Daniel gained a deep understanding of the ATM systems and CNS infrastructure as well as ICAO Global Performance Framework and associated initiatives.

4.2 Quality management

4.2.1 Introduction

4.2.1.1 This quality policy describes the approach, process, controls and procedures that will be applied by project team members to their work. It has been produced in accordance with the Helios quality manual. The quality policy applies to all work to be carried out by Helios.

4.2.1.2 Helios is currently formalising its quality management procedures and working towards ISO 9000 accreditation. Our team members have consistently worked in quality-accredited organisations. Helios' quality objectives are shown in Figure 4-2.

Helios Quality Objectives

1. To meet, but aim to exceed, customer expectations.
2. To have a formal quality management system that:
 - is customer focused;
 - is lean and professional;
 - encourages staff buy in;
 - is easy to understand;
 - helps us create partnerships with our customers and sub-contractors;
 - adds value.
3. To measure the performance of our processes and the quality of our outputs.
4. To continuously seek ways to improve our processes and outputs.
5. To periodically review the effectiveness and efficiency of the quality management system and seek ways to improve it.

Figure 4-2: Helios' quality objectives

4.2.2 Project management

4.2.2.1 The activities to be carried out by Helios will be compliant with the procedures defined in the Helios quality manual which includes, amongst others:

- § contract control and management
- § configuration management
- § internal progress reporting
- § review (including technical review and proof reading) of project reports and other documentation.

4.2.3 Acceptance

4.2.3.1 Each deliverable from Helios shall be submitted to ACAC for review. Within ten working days, ACAC shall document any review comments. The resolution of such comments shall be agreed with ACAC, and a revised deliverable incorporating the agreed resolution shall be produced within five working days.

4.2.3.2 Planning and configuration management of issued documents and of models shall be in accordance with configuration management procedures agreed at the start of the project.

4.2.4 Backup and archiving

4.2.4.1 All project-created documents will be held electronically on the Helios server. This is backed up every day to off-site archives and no further project archiving action is required.

4.2.4.2 Each member of the project team is responsible for backing up the work in progress (documents, model source, etc) for which he or she is responsible. This may be done by saving a copy to his Helios personal drive or to the personal folder created on the project share for this purpose.

4.2.4.3 On completion of the project (and any follow-on work that may ensue), project records will be archived. A minimum retention period of 10 years will be applied. The only exception to this being data that is provided under the condition that it is returned or destroyed on completion of the project.

4.2.5 Reviews

4.2.5.1 Regular internal reviews will be carried out in accordance with the project control procedures set out in Section 3.5 of the Helios quality manual.

4.2.5.2 Document reviews will be carried out in accordance with the procedures defined in the Helios quality manual.

4.2.6 Support environment controls

4.2.6.1 Each team member will have a PC with at minimum the following software configuration:

- § Microsoft Office Professional

- § Microsoft Outlook.

4.2.7 Status reporting

4.2.7.1 Reporting to Helios management will be in accordance with section 3 of Helios quality manual.

4.2.7.2 The Helios project manager will submit progress reports to ACAC on an as-required basis.

4.2.8 Helios quality management system

4.2.8.1 Helios quality assurance activities are designed to ensure that the requirements of our customers are being met and that the work is being conducted within the Helios quality system.

4.2.8.2 The Helios quality organisation is documented in the company quality procedures. The QA function is independent of the project function and reports directly to the company Board of Directors. Helios' quality manager is Paul Ravenhill.

4.2.8.3 The Helios' quality manager monitors significant projects for such items as contract, project manager's terms of reference, project and quality plans, status reports and other related information. By the regular review of this information the performance of the project is monitored to identify at an early stage, any deviations from the plan and hence the need for action.

4.2.8.4 The quality manager conducts regular and systematic audits of the entire system throughout Helios. This is to check that the quality system is being applied in an effective and efficient manner and is continuing to meet both our clients' and Helios management's business needs.

4.2.8.5 In addition, project oversight is affected by a director, whose responsibility is to provide independent oversight of commercial aspects of the work. For this project, this role will be provided by Dr Mike Shorthose, Helios' managing director.

4.2.9 Internal progress meetings

4.2.9.1 Internal Progress Meetings (section 3.5 of the Helios quality manual) are conducted monthly or, additionally, at the instigation of line management to determine that:

- § the project conforms to its project and quality plan
- § the processes used are effective
- § risks are managed (identified early and suitably actioned)
- § records are being maintained.

4.2.10 Quality assurance

4.2.10.1 The quality assurance function within Helios is designed to ensure that commercial, technical and quality risks are understood and appropriately managed. The quality assurance function is responsible for the maintenance of Helios quality processes.

4.2.11 Personnel working on the task

4.2.11.1 Helios quality manual defines project roles. For the purpose of the current contract, the following staff will be assigned:

- § Project director: Dr Mike Shorthose
- § Project manager: Ben Stanley
- § Quality manager: Paul Ravenhill.

5 Curricula vitae

5.1 Dr Michael Shorthose

Employment Helios Technology Ltd, 1996 – present, Managing Director

Smith System Engineering, 1989-1996, Consultant

Thorn-EMI Central Research Laboratories, 1985-1989, Principal

Thorn-EMI Electronics Ltd, 1981-1982, Graduate Trainee

Qualifications

Academic D Phil, Solid State Physics, University of Oxford, 1989

MA, Theoretical Physics, Cambridge University, 1989

BA, Theoretical Physics, Cambridge University, 1985

Professional Associate Member of the Institute of Electrical Engineers

Summary of experience:

Mike is Managing Director at Helios and has worked at a technical and business level in all aspects of CNS / ATM and advised a number of clients on the strategic direction of their development programmes, including the European Commission. Mike has been involved in Helios' Industry Consultation Body support contract, most recently providing support to the four industry members (ACI, CANSO, IATA & ICB) drafting a joint paper on future governance for the High Level Group for the Future European Aviation Regulatory Framework.

Mike is also currently the technical advisor to the group of banks providing the funding for the privatisation of the UK National Air Traffic Services, giving first hand appreciation of the current state of the ATM supplier industry and the challenges facing both suppliers and purchasers of ATM systems. His work on new CNS technologies and ATM operational concepts has spanned ADS, Mode S, VDL and FDP as well as many others. Mike's aviation technologies expertise has also been applied in the production and validation of standards and he has worked extensively for international standards organisations including ETSI, ICAO and EUROCAE.

Example projects include:

European Commission Datalink Roadmap: Mike was the consortium leader for a project for the European Commission to develop a roadmap for the implementation of datalink technologies to support ATM applications in Europe. Mike has taken overall responsibility of the project, which has 6 industrial partners. The aim of the study was to develop a plan for the deployment of datalink applications and technologies for ATM in Europe, formulating a strategy for future implementation programmes. As part of the study, recommendations on the selection of future datalink applications, based on benefits, and of technologies, based on the ability to support the selected applications, have been made. One of the key aims of the study was to develop a strategy that can be widely supported by all stakeholders including representative organisations of airlines, controllers and manufacturers. Through this work, Mike has gained an understanding of the

need for clear expression of difficult concepts and the possible techniques that can be used to disseminate information and to build consensus in ATM.

Technical Advisor to lending banks: Mike is the technical advisor to the lending banks funding the UK NATS Public Private Partnership. This is a technical due diligence role that initially focussed on the plans of the Airline Group during the bidding phase but which is now continuing in an on-going monitoring and ad-hoc advisory capacity. Mike has advised on a number of technical and management areas including the separation of NATS into its separate companies (holding company, regulated and unregulated businesses) and the strategy for future large scale investments in infrastructure.

Change management for the UK CAA: Mike carried out several change management assignments for the CAA. This was in preparation for its separation from its subsidiary body, the UK National Air Traffic Services, which was to be established as a Public Private Partnership. The work involved analysis of the role of the regulator in a privatised environment and the division of currently shared services. Particular projects have included development of a paper to determine the evolution of the DAP under PPP and an analysis of how the Corporate Communications department should be divided.

NATS business case support: For UK NATS, Mike has supported a number of business case studies in the application of new technology to ATC operations. The work covered a broad spectrum of the NATS activities and required liaison with experts from ATCs, airlines and manufacturers. For part of the work, Mike acted as the technical head of NATS cost benefit department. Key projects undertaken included:

New Scottish Centre: He carried out a study to support the UK National Air Traffic Services (NATS) in the assessment of options for future Scottish service provision including the New Scottish Centre and the Oceanic Flight Data Processing System (FDPS II).

Cost/benefit framework: He was involved in production of guidelines for carrying out cost/benefit assessment which became the Eurocontrol standard. Recently he has been involved with the development of a cost/benefit planning framework embracing key capacity upgrade projects.

Benefits to aviation users of meteorological forecasts: He was reviewer on a project for the CAA to determine the benefits to aviation of improved accuracy and reliability in meteorological forecasts.

Strategic Planning Framework: He developed a strategic planning framework for NATS, which identified the various planning areas of NATS and defined the links between them.

Private Finance Initiative (PFI) procurement strategy support: Mike supported UK NATS in determining optimum strategies for procurement of new ATC equipment and systems.

Business Services Section (BSS, NATS) Interim Management: Whilst providing an interim management role for the Business Services Section in NATS, he was responsible for:

- § Management of the R&D planning process.

- § Analysis of the R&D planning process and, through widespread consultation, production of a report setting out proposals for a new planning process, which is currently undergoing implementation within NATS.
- § Development and implementation of Performance Indicators for NATS R&D departments.
- § Support to the development of Activity Based Costing (ABC) techniques.

ADS CBA: For Eurocontrol, Mike was closely involved in a cost benefit analysis of ADS applications. A series of case studies were carried out, each requiring a service definition.

Technology and standardisation in ATM: Much of Mike's business expertise is underpinned by an in-depth knowledge of aviation technologies. He has worked on many new CNS technologies and ATM operational concepts. His work has spanned ADS, Mode S, VDL, FDP and datalink technology. He has developed benefit assessment methodologies for assessing the impact of new ATM concepts in terms of capacity and efficiency gains. He has been involved in a number of European Commission sponsored studies including NOAA (flow management), EOLIA, ETSI STF109 (VHF STDMA standardisation) and ETSI STF 148 (VDL Mode 2 and Mode 4 standardisation). He was the European Commission appointed reviewer for the MAASTRICHT project, involving assessment of the TREATY 5 (Wake Vortex data base) and TREATY 8 (enhanced-TDMA) projects and also recently completed a review of the AVENUE project. Much of this expertise has been applied in the production and validation of standards for ICAO, EUROCAE and ETSI. Specific projects Mike has been involved in include:

- § **Ground-ground communications standardisation:** Mike carried out a study for Eurocontrol to investigate possible means of standardising the Eurocontrol ground-ground voice communications protocol within the framework of QSIG.
- § **Mode S experience:** Mike has undertaken many studies into Mode S and has played an active role in development and simulation activities. For example, Mike wrote Eurocontrol's training course describing Mode S as an ATN subnetwork. The course described all aspects of Mode S, the difference between Mode S and conventional radar, and the way in which Mode S supports ATN and non-ATN data transfer. He assessed tenders for Eurocontrol's pre-operational Mode S ground station. Mike also helped to develop the strategy for Mode S in the UK.

5.2 Ben Stanley

Employment: Principal Consultant, Helios Technology Ltd, from April 2003.

Real-Time Consultants (to EUROCONTROL Experimental Centre, Brétigny) March 2002 – March 2003.

QinetiQ (formerly Defence Evaluation and Research Agency) Feb 2000 – Sept 2001.

Academic Qualifications:

BSc Physics, Upper 2nd Class with Honours, University of Warwick Sept 1996 – June 1999.

Summary of experience:

Ben Stanley is a Principal Consultant at Helios, experienced in gathering and balancing stakeholder requirements and drawing out the key issues. He works primarily on operational and safety-related aspects of ATM, including CNS-ATM concept development, safety case development, requirements capture, validation, and impact assessment. He has an excellent overview of ATM developments as the person responsible for the delivery of Helios' operations-related projects, and reviewed the SESAR deliverables on behalf of clients.

In the safety domain, Ben is expert in the assessment methodologies, including the EUROCONTROL SAM, ESARRs and ED-78A. He has applied them to several technical concepts, including ADS-B, multilateration and datalink.

Example projects include:

COOPANS Procurement Review: Ben was the internal project manager for this consultancy task, looking at providing a commercial and technical review of the concept of joint procurement for a group of ANSPs. Ben was one of the principle authors of the study, and conducted some of the consultation exercises with the COOPANS parties. The study has been recognised by the CEOs of the countries concerned (NAVIAR, IAA and LFV) as “high quality” and a “critical factor in the success of COOPANS”.

North European ANSPs Operational Concept Document and Masterplan: Ben was engaged by LFV to aid in the task of preparing and authoring a North European Operational Concept, drawing on SESAR and developing the ideas for the regional environment. He also helped prepare the subsequent Masterplan. His work involved facilitation of meetings, noting of comments, and preparation of the core document, liaising with many senior managers from the North European ANSPs. The Masterplan has since been approved by the CEOs of the ANSPs involved.

GACA CNS-ATM training: Ben is one of the lead trainers at Helios, and frequently gives courses both private and public. In 2008, Ben delivered a series of courses for GACA (Saudi Arabia), aiming to improve the knowledge of the GACA staff members in all aspects of CNS-ATM.

General Aviation Use of ADS-B – Business Case: Ben led this task for the EGOA project (Enhanced General Aviation Operations using ADS-B), looking at developing a market analysis and business case for the use of certain ADS-B

enabled applications in the GA sector. Consultation was undertaken with several different stakeholders, including manufacturers, IAOPA, General Aviation pilots and flying organisations, and the ANSPs. Ben managed a team of consultants in this task as the overall project manager, and authored the final report.

Joint Military ATS procurement support: Ben is the Helios project manager for this support task to the UK MOD looking at the procurement of a new ATM system. Helios works with PriceWaterhouseCoopers (PWC) in developing best practice guidance for the procurement. Ben wrote a note on lessons learnt from other worldwide procurements of ATM systems, and worked with a Helios/PWC team in developing the cost models for the investment decision.

ATNS Surveillance Safety Case: Ben is working with AustroControl to provide a safety case to the South African ANSP for the deployment and operation of Wide Area Multilateration with Secondary Surveillance Radars in the Cape Town TMA. In particular, Ben facilitated the operational and technical workshops, deriving hazards and consequences, and identifying system failures and abnormal modes. He is currently authoring the formal Safety Case Release documentation.

General Aviation datalink applications: Ben directed this task on behalf of a European ANSP to support investment decisions into datalink applications for General Aviation. He managed a team of consultants gathering market information on products and services currently available, and looked at possible pricing and costs.

CAA charges review for AOPA: Ben was a member of the Helios team contracted to review the UK CAA's charging proposals, with particular emphasis on their impact on general aviation and small aircraft operators. Helios was commissioned to undertake this independent review jointly by the Aircraft Owners and Pilots' Association (AOPA), the British Board of General Aviation (BBGA), and the British Helicopter Advisory Board (BHAB).

OATA Avionics: Ben defined an operational concept for 2007, 2011 and 2020 from an airborne perspective. The study required a harmonisation of the various strategies in existence, ensuring that a consistent picture was maintained. In particular, Ben looked at the changes in the pilots' roles over this time period.

European Generic Safety Case for WAM: Ben was the project manager for the EUROCONTROL study to derive a generic safety case for WAM. Ben facilitated the workshops with operational personnel and technical experts involved, and was the prime author of the safety case which was derived in line with the EUROCONTROL Safety Assessment Methodology.

Validation planning for wake vortex projects: Ben has led the work, with NATS UK, to develop a validation strategy and detailed plans for the wake turbulence separation minima reduction concepts in EUROCONTROL. Ben is very familiar with the E-OCVM, and besides authoring the validation strategy and plan, was able to present a well-received "lessons learnt" feedback to the EUROCONTROL validation managers.

Requirements Focus Group for ADS-B/ASAS Package 1: Ben is currently supporting EUROCONTROL in leading the Requirements Focus Group, a RTCA/EUROCAE group with members from EUROCONTROL, FAA, Airservices Australia, Japan, airframers, airlines etc. A high level of organisational skill is necessary to maintain the momentum of the group, allied to strong communication skills in building consensus and establishing robust operational and technical requirements for the applications. Ben also supports the safety and performance

requirements sub-group, in particular in developing methodology for deriving the requirements.

Best practice approvals guidance for Wide Area Multilateration: Ben's knowledge of the procurement and approvals processes for new technology has been used to help draft best practice guidelines for European ANSPs, on behalf of EUROCONTROL. This requires an understanding of the arguments to be made for safe operation of new systems, and the actions that need to be taken to gather evidence for these arguments.

Environmentally Friendly Airport ATM Systems (EFAS): Ben worked as a key expert in the Helios support to the EFAS consortium for the UK Department for Transport. Ben's role focused on operational concept expertise and participation in hazard identification with NATS UK.

Support to EUROCONTROL ATC Domain and AP23: Ben was one of the key Helios staff providing support to the EUROCONTROL ATC Domain, in particular in strategy, planning and technical matters. Ben was focused on the Airborne Surveillance and Data Link areas, and helped drive future applications of airborne surveillance as a founding member and secretary to Action Plan 23 (a joint EUROCONTROL / FAA research initiative).

Software provider safety regulation guidance: Ben is the project manager for this task providing guidance to a large ATM software provider on compliance with international and national safety regulations (for example, ESARR 6). Ben leads a team of Helios safety experts in developing example safety cases for the software products, and guiding the supplier through the necessary steps to be taken to show tolerable safety.

CASCADE Safety Case Support: Ben was the Helios project manager for a joint project with Sofreavia, providing support to the production of the CASCADE Safety Case. This required supporting all aspects of the safety case, including the Safety Argument, Pre-Implementation Safety Case, Final Safety Case for Approval, Guidelines to Stakeholders etc. In particular, the project developed Safety Arguments for ADS-B-RAD and ADS-B-APT, in consultation with regulators and ANSPs.

Air Ground Communications Safety Video: Ben was the project manager in a task to develop a safety awareness video for Pilots and Controllers throughout Europe. The video highlights the communications issues that contribute to many of the world's air incidents and accidents and has been marketed with a fresh approach to ensure maximum exposure and impact.

ADS-B in the UK: Ben participated in a study to investigate the suitability of ADS-B for use in the UK as a complement to radar. The study considered the use of ADS-B in the London TMA and in Scotland. Within the study, a comparison of radar and ADS-B performance was undertaken, including an examination of operational hazards.

North European ADS-B Network Upgrade Programme (NUP II): Ben was responsible for one of the Operational Services and Environment Descriptions (OSED) for the European Commission funded NUP II project. This required an expert knowledge of the ASAS application in question (from the perspective of the NUP II project, including the assumptions and constraints applied by this project), allied to a thorough understanding of the validation process. A full environment (airspace and traffic characteristics) description was written within the scope of this project. This was then applied to a trials platform (see CoSpace below), where

controllers and pilots used the application and environment described in the OSED as a test of the application's operational feasibility.

Aeronautical Information Service: Ben acted as an independent consultant to EUROCONTROL, gathering information and opinions on data content within the AIS document set. This involved liaising with the stakeholders, including airports, airlines, ATSPs and commercial organisations. Ben co-wrote the templates used to interview and survey the stakeholders. He also co-ordinated the contacts (through an Access database) and conducted face-to-face interviews with several organisations (e.g. NATS, BAA, IBERIA, AENA, DFS, British Airways). This required an in-depth knowledge of the AIS document set, and the problems inherent in it, together with an appreciation of the work each organisation was undertaking to improve it. Following the interviews, Ben co-wrote a report for EUROCONTROL, analysing the results and highlighting the areas for immediate action.

OFCOM Radio Frequency Allocation: Ben took a leading role in this Helios study (for the Office of Communications in the UK), looking at possible ways of enhancing spectrum efficiency for aeronautical radio navigation services. This involved a thorough analysis of the spectrum allocated to aviation, and an understanding of near and long-term future trends in technology. His recommendations are currently being reviewed by OFCOM.

Emerging Technologies in ATM (EMERTA): Ben worked on the ASAS section of this project, assessing the feasibility of current technologies, and detailing any intermediate steps that needed to be taken towards full implementation of ASAS. This required a thorough knowledge of the domain, and an understanding of how various technologies complemented each other. He then presented his findings to the European Commission (DG TREN) and EUROCONTROL. Ben provided advice on civil ASAS applications from the pilot's operational perspective and developed detailed templates for two applications (Station Keeping on Approach and Enhanced Visual Awareness). These templates, the structure of which had been developed by ICAO-SICASP, included the operational purposes, procedures, benefits and constraints of the applications.

Other experience and skills

Safety Management Systems training: Ben has been trained by the Irish Aviation Authority in the application and practice of Safety Management Systems for ANSPs.

Pilot Experience: Ben is qualified as a private pilot, having trained under the JAA syllabus at CabAir, Florida.

MBA: Ben has completed a full Masters of Business Administration (MBA) at Warwick Business School, one of the top ranking global business schools.

5.3 Dr Michael Fairbanks

Employment

Helios Technology Ltd, 2006 – present

Booz Allen Hamilton, 1996-1997, 2000-2003 and 2004-2005, Senior Associate

Trinity House, 2003-2004, Principal

Hades Consulting Ltd, 1998-2000, Director

Smith System Engineering Limited, 1989 – 1996, Principal

University of Kent, 1987-1989, Research Fellow

Qualifications

Academic

D Phil, Physics University of Oxford, 1987

MA, Physics, University of Oxford, 1987

BA, Physics, University of Oxford, 1984

Professional

Fellow of the Royal Institute of Navigation

Member of the Institute of Physics

Chartered Physicist

Summary of relevant experience:

Dr Michael Fairbanks has been a management consultant for over eighteen years and specialises in policy, institutional, regulatory and business aspects relating to air and marine transport infrastructure. In particular he has supported a number of organisations to formulate strategies for air services development. These include a project for Scottish Enterprise and VisitScotland to develop a strategy for trans-Atlantic air services development from Scotland (very similar to the project proposed here); a project in Abu Dhabi on an air services development strategy to improve the competitive position of the Emirate relative to Dubai; and a project for the Department for Transport, as part of the SERAS programme to assist in the development of policy concerning the future of the London airport system. He has also recently worked on a comprehensive study for Eurocontrol on the development of regional airports throughout Europe.

Other examples of his work include providing advice to the Norwegian Ministry of Transport and Communications in its project to propose the future strategy for Avinor (the State-owned airports and air traffic management authority); assisting in the transformation of PPL (the Polish airport and ATM authority), including a strategy for the development of its regional airports; and assisting the development of a UK general aviation airport.

He has worked with the European Commission on understanding the economic, social, business and operational impacts of liberal air services agreements between the EU and wide range of third countries, including the US, Canada, Australia, New Zealand, Singapore, Chile, Ukraine and the Western Balkans countries. Mike also led a policy study report for the World Bank on best practices for the governance, ownership, control and operation of air transport infrastructure globally.

Examples of the relevant projects in which Mike has been involved are highlighted below:

- § **Development of regional airports in Europe:** Mike led a project for the forecasting division of Eurocontrol (STATFOR) to improve understanding of the evolution of regional airports in Europe. The study investigated the development of Europe's regional airports to date and classified them into different archetypes, including city centre airports, regional hubs, low cost airports, public service obligation (PSO) airports, cargo airports, seasonal airports and feeder airports. The study also assessed air services developments; operations and business models; governance and regulation; drivers for and the impediments to growth.
- § **Civil aviation strategy for Lebanon:** Dr Fairbanks was the project manager of this World Bank funded project to devise the optimum strategy for civil aviation in Lebanon. The study:
 - § defined the optimum institutional structure for civil aviation in Lebanon, identifying and separating the functions of the government, the regulator and the air traffic service provider and the airport operator.
 - § assessed the impact of various liberalisation, competition and open skies options using a scenario driven approach. The impact assessment considered all relevant parties, including the Lebanese economy as a whole, the airport and air traffic service provider and Lebanese national airlines.
 - § produced an outline aviation law to implement the selected strategy.
- § **Abu Dhabi air services strategy:** For the United Arab Emirates Offsets Group (UOG), he performed the analysis to investigate the impacts of regulatory regimes on the level of air services from Abu Dhabi, identifying where impediments to growth and constraints on competitiveness occurred. He also performed a case study based on the evolution and performance of the airports within the London system to better understand the likely outcome of the various development strategies for the Abu Dhabi airports
- § **Trans-Atlantic air services to Scotland:** For Scottish Enterprise and VisitScotland, Mike led a project to assess the scope and requirement for additional direct air services between North America and Scotland. His particular responsibilities included demand analysis using O&D data, derived from MIDT and CAA surveys, was used to investigate the scope for new direct services from Glasgow and Edinburgh to strategically important American and Canadian based on business or cultural links and the opportunity to facilitate inbound tourism.
- § **Impact assessment of the EU-US Open Aviation Area – EU-US fully open skies:** Mike played a major role in this project, for the European Commission, to evaluate the economic impacts of an open aviation area agreement between the EU and the US. One of Mike's particular responsibilities was to investigate the true O&D traffic between Heathrow and Gatwick airports and American cities to assess the opportunity to create new direct services enabled by the removal of regulatory constraints to replace the connecting services that then had to be used.
- § **UK airport policy study for the UK Department for Transport:** Mike led a study for the then UK Department for Transport to assist in the development of

policy concerning the future of the London airport system. The study focused on, inter alia:

- § the need for policy, regulatory or fiscal instruments, including slot allocation schemes, to promote more optimum use of the available capacity;
 - § the impacts of constraints on hub performance and airline behaviour, including case studies of a large number of airports, including Heathrow, Gatwick, Schiphol, Charles de Gaulle, Frankfurt, Chicago O'Hare, Atlanta Hartsfield, Newark and JFK;
 - § the impact of airline strategy and economics on airport choice, particularly hub selection;
 - § evolution of airport market share, considering the London airports and competition from other leading European hubs.
- § **Scottish airports study for the UK Department for Transport:** Mike also led a study to provide support to a project to investigate the impact that various development options/scenarios for the entire UK airport network could have on passenger demand at the airports at Glasgow and Edinburgh. The project addressed the potential impact on demand of individual developments at Glasgow and Edinburgh airports, including new runways, terminal buildings and surface access enhancements.
- § **Multi-lateral relations between the EU and third countries in the field of air transport:** Dr Fairbanks was a team member in the framework contract to provide the European Commission with economic and policy advice concerning air transport negotiations with third countries. He was responsible for much of the airline-based analysis on a task to investigate the potential of Open Aviation Area Agreements with Australia, Chile, New Zealand and Singapore. He led a task to explore the impacts of the European Common Aviation Area (Western Balkans, Ukraine and Moldova) as well as being involved in previous country studies focused on Russia and India.
- § **Night time use of the European air transport network:** Mike supported Eurocontrol in a study to address how the European air transport network is used at night, with a particular focus on air cargo, including general cargo, express freight (DHL, TNT, FedEx and UPS) as well as mail, with the goals of:
- § raising the general profile of night operations to illustrate their positive economic contribution and to balance the negative perception that they have otherwise
 - § better informing policy-makers and regulators on the significance and requirements of night operations so that they can be adequately and fairly considered during the decision making process.
- § **Evaluation of and strategy for the development of Avinor:** Mike played a major role in a project for the Norwegian Ministry of Transport and Communications in its endeavours to propose an organisational and legal form for the State company Avinor (the organisation responsible for airports and air navigation services in Norway) optimal for safe, punctual, and efficient aviation. Mike's specific task was to propose an institutional framework that derived from best practice, trends and experiences in the organisation of air traffic services and airport operations globally, with specific emphasis on services related to aviation safety

- § **Best practice for governance and private sector participation in aviation infrastructure:** Dr Fairbanks led a study for the World Bank to identify best practices for governance structures and private sector participation (PSP) in air transport infrastructure. The project is considering all types of PSP, ranging from full privatisation, e.g. initial public offering, (IPO), trade sales, leases, concessions, master concessions, service contracts, outsourcing, etc, through to State-Owned Enterprises (SOEs). Particular attention is being paid to the public policy consequences of PSP together with the regulatory regimes that must be in place to enable efficient operation yet protect the consumer and prevent abuse of monopoly position. Lessons were learned from the developments that have occurred globally as well as a series of detailed case studies, including New Zealand, the UK, Canada, South Africa and Brazil.
- § **Development of a strategy for transformation for a major airport and air traffic management authority:** Dr Fairbanks was a core member of the team retained by this authority to support it in crafting the future path of the organisation. Mike's particular responsibilities included: assessing of the impacts of EU and Eurocontrol membership with the associated rules and regulations; benchmarking ATM performance; and developing and applying a methodology for the analysis of the role and potential of the State's regional airports.
- § **UK general aviation airports study:** Mike is part of the Helios team recently engaged to review the level of service provision at two significant general aviation airports in the South East of the UK. The objective of the study is to review the levels of service provided at the airports, e.g. air traffic control, fire and rescue, etc, in the light of statutory obligations and the service levels necessary to sustain the safe, efficient and effective operation of the airports. The second phase of the study is concerned with the strategy to develop the airports, including the introduction of commercial air transport services.
- § **Punctuality performance at Heathrow:** For BAA, Mike is leading a project to assess punctuality performance at Heathrow airport. The project is using operational data to derive statistical punctuality distributions; defining performance criteria and assessing performance against these criteria.
- § **Assessment of runway operations at Heathrow:** Also for BAA, Mike led a study to investigate various factors that affect the efficiency of runway operations at Heathrow airport and assessed potential options for operational improvement.
- § **Investigation of continuous descent approaches at Amsterdam Schiphol airport:** Mike led a recent study for the Dutch government to investigate different options for providing continuous descent approaches at Schiphol airport. In particular the project analysed the impacts of the concept proposed by LVNL, the Dutch air navigation service provider, and compared this with the impacts of different techniques that could be applied. The analysis was undertaken from the various and contradictory perspectives of the stakeholders involved, as diverse as KLM (the main carrier at the airport), the local authorities and the residents. The main indicators that were assessed included noise (from a variety of angles), emissions, capacity and punctuality. The output of the study has informed the ongoing debate in the Dutch Parliament.
- § **Study of the resilience of runway operations at Heathrow and Gatwick airports:** Mike led the project for the CAA to investigate lessons learned from current runway operations at Heathrow and Gatwick airports. The study assessed the operational impacts of using capacity to: either enable additional

flights; or to provide higher quality of service in terms of reduced holding delays, improved predictability and better recovery from significant operational disruption events. Several scenarios were investigated, including:

- § scheduling an additional flight subject to current levels of capacity by time of day and season
- § the impact of evolutionary increases in runway capacity
- § the potential introduction of mixed mode operations at Heathrow in the context of the Department for Transport's consultation, including an assessment of the balance of using capacity for resilience or enabling extra flights.

The analysis was performed for both normal operating conditions and also when significant disruption events occur.

- § **BAA London airports process benchmarking and efficiency review:** Dr Fairbanks led the team that undertook an efficiency review of the BAA London airports (Heathrow, Gatwick and Stansted) on behalf of the UK Civil Aviation Authority. The efficiency analysis was a key input to the five-yearly regulatory review of the airports, the output of which is the regulatory cap on the prices that BAA can charge for regulated services at the airports. The study performed efficiency and quality of service assessment for a number of key processes using benchmarking and ab initio efficiency analysis techniques. In addition to the BAA airports, a wide range of other UK and European airports participated in the study. The study addressed a wide range of key airport operational processes, including: passenger security screening, airside security, management of the baggage systems, management of passenger sensitive equipment (PSE – lifts, escalators and travelators), management of the check-in infrastructure, management of trolleys and management of passengers with reduced mobility (PRM).
- § **Study of the cost efficiency of Dublin airport:** For the Irish Commission of Aviation Regulation, Dr Fairbanks was a core team member in the assessment of the operational efficiency of Dublin airport as part of the regulatory determination of the price cap on user charges. His specific responsibility was to assess the performance and quality of services of all areas of the airport, landside and airside. The processes assessed included: passenger security screening, cleaning, aircraft stand operations management; passenger flows and comfort levels; operation of the baggage systems; management of the check-in system and associated queues and PSE maintenance.
- § **Support to the European Union High Level Group on the future of European aviation regulation:** Dr Fairbanks was a member of the European Commission team supporting the High Level Group (HLG) established by European Commission Vice President Barrot with the objective of proposing policy measures to (1) improve the performance of the aviation system in Europe by strengthening the capabilities of the regulatory framework to drive performance improvements and address bottlenecks, and to (2) rebalance the governance of the aviation system in Europe. Mike's role in the project was two-fold, first synthesising the diverse contributions of the individual members of the High Level Group into a coherent and consensual report as well as drafting that report and, second, providing technical advice to the chairwoman of the High Level Group on a wide range of issues as and when needed.

5.4 Daniel Kominak

Employment:

July 2007 - present Consultant and technical analyst, Helios

Academic Qualifications:

September 2005 – MSc Air Transport (with distinction), University of
June 2007 Zilina, Slovakia

September 2002 – BSc Air Transport, (with distinction), University of
June 2005 Zilina, Slovakia

Summary of experience

Daniel Kominak joined Helios two years ago as a competent Air Transport Operation and Economics master graduate with an excellent academic background in aviation. Daniel is a consultant and technical analyst in Helios and his duties include work on wide range of air transport projects. He was involved in several air transport studies and projects in Helios where he was responsible for the development of CBA models in MS Excel. By writing sections of reports presenting CBA results to senior management in various ANSPs, he gained experience in economic information disclosure. The studies he was involved in had a decisive impact on the decision making process of the ANSPs. During his employment in Helios, Daniel gained a deep understanding of the ATM systems and CNS infrastructure as well as ICAO Global Performance Framework and associated initiatives.

Example projects

Croatia Control strategic review: Croatia Control, the Air Navigation Services Provider in Croatia, contracted Helios to undertake a strategic review of its Air Traffic Services in terminal areas of regional airports and airports with a planned major upgrade of ATM systems. One of the Helios' roles was to conduct a Cost-Benefit Analysis for eight options with different operational configuration of terminal areas and Daniel was ultimately responsible for development of CBA model using MS Excel. He was also responsible for sensitivity tests and economic performance analysis.

Remotely Operated Tower: Daniel was working on a project of Remotely Operated Tower for European ANSP. The aim of the project was to develop closer description of operational concept of remotely operated tower and to conduct a detailed Cost-Benefit Analysis. Daniel was the main analyst and was responsible for development of a CBA model in MS Excel using standard Emosia approach. The model was designed to allow assessing number of different scenarios and thus support the decision-making process. The model was compatible with @Risk tool which allowed performing sensitivity analyses and assess the level of financial risk connected with each scenario.

EGNOS General Aviation case: European GNSS Supervisory Authority contracted Helios to undertake a study into potential EGNOS applications in general aviation. Daniel was part of Helios team and worked on tasks which aimed to provide a complete list of available EGNOS avionics and detailed description of their NAV/COM/SUR functions. He also worked on quantification of total EGNOS equipment installation costs into a range of typical general aviation aircraft. In

addition, Daniel supported analysis of current avionics which were compared against planned future airspace developments and related avionics requirements and worked on quantification of EGNOS benefits for small regional and GA airfields. Daniel participated in interview with one regional airport which aimed to identify potential benefits of EGNOS operations at the airport.

Lead System Integrators study: Daniel was member of Helios team which conducted a world-wide study of airport Lead Systems Integrators (LSI). LSIs are organisations which specify, install, and integrate a full spectrum of airport systems, such as flight information processing, slot coordination, airlines connection (SITA), equipment management, human resources management, etc. The study provided overview of recent airport projects, highlighting the most successful projects as well as biggest failures, eg London Heathrow new T5 terminal. The study provided valuable strategic insights to the LSI market.

Airport Safety Management System: Daniel was involved in a project which is aimed to help implement Safety Management System (SMS) at a Slovak regional airport. Daniel was involved in safety audit and assists with developing SMS-related documentation. With the help of Helios, Airport Piestany managed to improve their Safety Management System and to fulfil requirements of the Civil Aviation Authority of the Slovak Republic. Daniel was also responsible for day-to-day communication with airport's management and provided ad-hoc support where it was necessary.

Safety Audits: Daniel is member of Helios airport safety audit team and was involved in SMS audit of two Slovak regional airports. His responsibilities included interviewing airport managers and consequently production of final safety audit report. The work included reporting of relevant findings and identification of possible improvements of SMS processes.

Support to Shoreham airport: Daniel is member of a team conducting review of Shoreham airport Rescue and Fire-Fighting services (RFF) and ATC services. The airport management is seeking opportunities to improve efficiency of the services in order to optimise the operating costs. The aim is also to provide comprehensive review of relevant RFF and ATC airport requirements from Annexes, ICAO Docs and UK CAA Publications (CAPs) for different options of airport development depending on expected volume of operations, traffic mix, aircraft types, and airport operating hours. The impact of runway extension on traffic and thus on RFF and ATC services is examined as well. Daniel is also responsible for airport movement data analysis.

Aeronautical spectrum charging study: Daniel has been involved in aeronautical spectrum charging study for UK regulator Ofcom. The aim of the study was to assess the financial impact of aeronautical spectrum charging on aircraft operators using UK airspace. Daniel's duties were mostly related to analysing UK flight data provided by CFMU and extracting en-route, approach and landing charges. Daniel also analysed number of air traffic movements between various geographical zones, which crossed UK airspace. Data were processed using MS Access.

Other experience and skills

PC skills: MS Excel - expert, MS Access - advanced, other MS Office modules (Word, Powerpoint, Outlook, Visio) - expert, VBA - basic, Palisade @Risk - advanced

Pilot Experience: Daniel is qualified as a private pilot, having trained under the JAA syllabus at Flight Training Organisation of the University of Zilina.

IAA Safety Training: Daniel attended Safety Management System training course in Dublin provided by Irish Aviation Authority. The course was focused on Safety Management Systems in ANSPs with emphasis on hazard analysis and risk management process.

Eurocontrol courses: Daniel undertook two Eurocontrol e-learning courses: *Introduction to Safety Management* and *Introduction to Safety Regulation*.

PhD. degree: Daniel is currently in his first year of studies (studying via distance-learning) at University of Zilina, Slovakia and works towards a PhD. degree in Air Transport Operation and Economics.

Languages

Slovak – native, English – excellent, Czech – excellent, German – basic, Polish - basic

6 Corporate profile and experience

6.1 Helios corporate profile

6.1.1 Since its creation in 1996, Helios has grown from its roots in air traffic management (ATM) to be Europe's leading independent management and technology air transport consultancy. During this time, we have worked with leading client organisations – governmental bodies and agencies, regulators, service providers, manufacturing industry and investors - to be at the forefront of some of the industry's most exciting developments: the Single European Sky initiative; progress on functional airspace blocks (FABs) and the great strides made towards a performance-based air transport system. Our success has been recognised through Queen's Awards for Industry in 2004 and again in 2009, and also through the long-standing relationships and partnerships that we have developed with our clients.



6.1.2 By combining innovative thinking with a practical approach, we will continue to help our clients improve and transform the industry in the face of the new and emerging challenges of the 21st century.

6.1.3 Uniquely in the industry, we are intimately familiar with all aspects of the aviation business ranging from the strategic; through the operational; to R&D. Our broad staff profile means that we can draw on the internationally-recognised expertise of senior business managers, economists, operational experts, safety and security professionals, systems engineers and technology specialists to create bespoke multi-disciplinary teams tailored to meet our clients' needs.

6.1.4 We combine a wide range of functional expertise into a consolidated set of services covering the entire value chain from policy, regulatory and strategy development through business and operational improvement to system engineering and managing the implementation of new technology systems. Our portfolio of services comprises:

- § Performance improvement
- § Business economics
- § Regulation
- § Safety and security
- § Environment.
- § Technology and innovation
- § Planning and procurement
- § Training

6.1.5 We provide similar services in the defence, maritime, rail and spectrum sectors.

6.2 Key experience

This section outlines Helios' credibility to carry out the update to the ACAC CNS-ATM study by showing our extensive experience in:

- § CNS-ATM planning and strategy;
- § Regional cooperation (e.g. Functional Airspace Blocks);
- § Previous work in ACAC region.

The projects also demonstrate our capability to conduct overviews of CNS-ATM infrastructure, produce cost-benefit analyses tailored to our clients' needs, and give high-level guidance and recommendations on institutional, policy and procurement matters.

6.2.1 CNS-ATM planning and strategy

6.2.1.1 **The impact of fragmentation in European ATM/CNS, PRU:** We undertook this study, conducted on behalf of EUROCONTROL's Performance Review Commission, to investigate the financial implications and operational impacts of fragmentation in Europe. In the first phase of the work, order of magnitude costs of fragmentation were assessed to identify areas where fragmentation had a big impact. The second phase reviewed the coordination activities taking place in Europe that reduce fragmentation, in order to identify any gaps. Extensive stakeholder consultation was carried out throughout the project, in the form of a questionnaire, consultation meetings and workshops.

6.2.1.2 **Joint Military Air Traffic System procurement advice:** Helios advised the UK Ministry of Defence on the procurement of new infrastructure for the entire military air traffic system (including CNS-ATM and related equipment). This advice included guidance on the procurement model to be followed, taking account of global best practice. It also included the development of "as-is" and "should-cost" models, to enable the MoD to benchmark the eventual tenders received and budget effectively during the procurement stages.

6.2.1.3 **Support to the Industry Consultation Body, European Commission:** Helios has been providing technical secretariat support to the Industry Consultation Body since its inception in 2005. The support provides a rapid response to the needs of the Commission and the stakeholders involved in the ICB using a core team, supported by a wide range of experts. The ICB needs EC policy oriented consolidated information in order to support its decision making in a number of areas, primarily CNS-ATM related. In 2007, the European Commission renewed our appointment in recognition of the value placed on our performance in this role.

6.2.1.4 **Support to the European Union High Level Group on the future of European aviation regulation:** A Helios consultant, integrated into the DG TREN team, provided technical support to the High Level Group (HLG) on the future European aviation regulatory framework from its first full meeting in January 2007 until the submission of its final report to the Transport Commissioner, Vice President Barrot, in July 2007. The HLG report was used to set the strategic direction and help define the content of the second package of European Single Sky Legislation (SES II) as well as guiding the institutional and regulatory reform underway in other areas, such as Eurocontrol and EASA. Helios' role in the project was two-fold, first synthesising the contributions of the individual members of the High Level Group into a coherent and consensual report and, second, providing

technical advice to the chairwoman of the High Level Group on a wide range of issues as and when needed.

- 6.2.1.5 **New concept and technology CBAs:** Helios has conducted a number of CBAs and economic impact assessments on emerging technologies and concepts, primarily on behalf of EUROCONTROL and the European Commission. These have included Short Term Conflict Alert, new surveillance, datalink (CPDLC), airborne traffic displays, Flight Management Systems, RNAV (and Performance Based Navigation), 8.33kHz channel spacing in Upper Air Space, and cost-benefits of new ATM systems.
- 6.2.1.6 **Data link roadmap, European Commission:** We undertook this important project on behalf of the EC to develop a roadmap for data link communications in Europe. The aim of the study was to develop a plan for the deployment of data link applications and technologies for ATM in Europe, formulating a strategy for future implementation programmes. A key part of this work was to collect information on future ATM applications and technologies, carry out an initial analysis and then to represent the output of the analysis to a wide range of stakeholders including representative organisations of airlines, controllers and manufacturers. Two stakeholder workshops were organised with general information dissemination via a dedicated website.
- 6.2.1.7 **Nepalese surveillance strategy:** Helios worked with the Nepalese CAA to understand the current situation in Nepal, including capturing safety, performance and interoperability issues arising. Inventories of aircraft, airspace and equipment were taken. This was then used to inform a roadmap for the development of surveillance in the State, taking account of all identified constraints and highlighting the benefits and drawbacks of each option.
- 6.2.1.8 **Croatia Control strategic review:** Croatia Control, the Air Navigation Services Provider in Croatia, contracted Helios to undertake a strategic review of its Air Traffic Services in terminal areas of regional airports and airports with a planned major upgrade of ATM systems. One of the Helios' roles was to conduct a Cost-Benefit Analysis for eight options with different operational configurations of terminal areas.

6.2.2 Regional co-operations

- 6.2.2.1 **FAB Central Europe cost-benefit analysis:** Helios were commissioned to undertake a cost-benefit analysis of the Functional Airspace Block Central Europe, comprising the ANSPs of Austria, Bosnia and Herzegovina, Croatia, Czech Republic, Hungary, Slovakia, and Slovenia. Helios worked closely with Working Groups to evaluate and model the costs and benefits of the cooperative initiatives being undertaken by the ANSPs.
- 6.2.2.2 **SES evaluation of FABs, Performance Review Commission:** Helios was part of the team tasked by the PRC to assess and evaluate the status of Functional Airspace Blocks in Europe.
- 6.2.2.3 **North European Operational Concept and Master Plan:** Helios facilitated the production of an operational concept and Master Plan for the North European ANSPs (including LFV, Avinor, Finavia, Isavia, EANS, Naviar, and subsequently the IAA). This involved detailed stakeholder consultations, and included all aspects of Air Navigation Service Provision (e.g. AIM, ATFM, airspace management, CNS infrastructure, MET etc). The Master Plan highlighted key focus areas for cooperation and coordination in the region, and set timescales for delivery of the initial projects.

6.2.2.4 **COOPANS:** Helios provided independent advice to the 3 ANSPs forming the original buyer's club known as COOPANS (Co-operative Procurement of Air Navigation Systems). The study looked at understanding the potential benefits and risks generated by taking different approaches in jointly procurement an ATM system (from Thales). Part of the study benchmarked each of the price variables for the procurement, giving the ANSPs data to support their negotiations with the supplier.

6.2.2.5 **Airspace Harmonisation CBA:** Helios undertook a study in support of the Eurocontrol airspace strategy to examine the costs and benefits of harmonising airspace rules above FL195 to ICAO Class C specification within the ECAC area. The study involved consultation with stakeholders including civil and military Air Traffic Service Providers and airspace users. Through a combination of questionnaires and face-to-face interviews, Helios determined how the proposed change would impact on the stakeholders and their operations.

In particular, Helios identified what actions each stakeholder needed to undertake, such as staff training, changes in procedures and system upgrades, what costs each stakeholder may incur, and what benefits are foreseen to result from harmonisation.

6.2.2.6 **FAB Europe Central:** Helios was commissioned by the FAB Europe Central project to provide project management support to the feasibility phase of the project for a period of almost two years. The FAB Europe Central project looked at the feasibility of various initiatives for cooperation between 7 ANSPs in Europe, in order to bring about performance improvements. The ANSPs involved were DSNA (France), DFS (Germany), LVNL (The Netherlands), skyguide (Switzerland), MASUAC (Maastricht) and Belgocontrol (Belgium). As well as a full-time project manager, Helios consultants provided technical and secretariat support to seven different expert Working Groups, consisting of ANSP representatives. This included facilitation of the Communications Working Group, developing the communications strategy for FAB Europe Central.

6.2.2.7 **UK-Ireland FAB study:** We were commissioned by the ANSPs of the UK and Ireland to conduct an independent study into the options for establishing a FAB in their countries' joint airspace. The study involved extensive consultation with government officials, regulators, civil airspace users, UK military airspace users, trade unions, ANSP management, EUROCONTROL and other European ANSPs. The current airspace, institutional framework, plans, systems, infrastructure and traffic of both ANSPs was examined. Benefits of the FAB were assessed, an appraisal of airspace options was carried out and a recommended option was proposed. The study looked at economic, airspace management, safety management, social and legal issues which needed to be resolved before the FAB could be established.

6.2.3 Previous work in ACAC region

6.2.3.1 **Operational audit of Jordan Air Traffic Services:** Helios carried out a full operational audit of the Air Traffic Services provided in Jordan, covering en-route, TMA and airport services. The role involved on-site visits to each location of ATS provision in Jordan, and thorough discussions with key stakeholders, including chief commissioners, ATC managers and supervisors. A full inventory of current operations was produced, highlighting areas for improvement from a safety and efficiency perspective. The report and accompanying presentation were delivered to the CEO (Chief Commissioner) of the Jordanian CAA, to positive acclaim.

- 6.2.3.2 **Civil aviation strategy for Lebanon:** A member of the Helios team was the project manager of this World Bank funded project to devise the optimum strategy for civil aviation in Lebanon. The study:
- § defined the optimum institutional structure for civil aviation in Lebanon, identifying and separating the functions of the government, the regulator and the air traffic service provider and the airport operator.
 - § assessed the impact of various liberalisation, competition and open skies options using a scenario driven approach. The impact assessment considered all relevant parties, including the Lebanese economy as a whole, the airport and air traffic service provider and Lebanese national airlines.
 - § produced an outline aviation law to implement the selected strategy.
- 6.2.3.3 **Abu Dhabi air services strategy:** For the United Arab Emirates Offsets Group (UOG), a Helios consultant performed the analysis to investigate the impacts of regulatory regimes on the level of air services from Abu Dhabi, identifying where impediments to growth and constraints on competitiveness occurred. He also performed a case study based on the evolution and performance of the airports within the London system to better understand the likely outcome of the various development strategies for the Abu Dhabi airports
- 6.2.3.4 **New Middle East regional airport conceptual master plan:** Helios subcontracted to a team tasked with developing a conceptual master plan for a new airport in the Middle East. The project involved conducting a review of the suitability of the site and initial designs for runway, taxiway and apron layouts. Helios was responsible for producing an initial passenger forecast to aid the design of the terminal and airside capacity plans. Helios also analysed MET data collected near the site to assess the suitability of various runway orientations.
- 6.2.3.5 **Training in CNS-ATM:** Helios has undertaken a major training programme on behalf of GACA (Saudi Arabian ANSP), including training in communications, navigation, surveillance, procurement and ATM operations. Helios has also been a key part of many seminars in the region, including most recently the ACAC New Surveillance Technologies Seminar in Amman.