Tactical Plan

for Technical-Operational Development

2013-2017

NAVIAIR

Air Navigation Services

Tactical Plan 2013-2017

Introduction

Based on the framework set out in Naviair's Business Plan 2013-2017, the aim of this document is to describe Naviair's tactical direction with regard to technical-operational development in the next five years. This takes the form of technical and operational initiatives launched in relation to cost reduction, end-of-life equipment or to comply with regulatory requirements, within Naviair's areas of activity relevant to technical-operational development: En route – Denmark, En route – Greenland, and Local Air Traffic Services.

The general framework for Naviair's technical-operational development arises from regulatory requirements, rules and provisions based on the EU Single European Sky (SES) programme. Under this programme, SESAR shapes technical-operational development by defining Europe's next-generation Air Traffic Management (ATM) system. Being part of a number of technical-operational business initiatives at the forefront of international developments enables Naviair to exert influence over the SES and SESAR programmes. The aim of this is to protect and future-proof Naviair's long-term investments, which are also focused on the environment and climate. From a business point of view, regular follow-up takes place in relation to specific objectives, known as Key Performance Indicators (KPIs); these are intended to ensure that Naviair retains its focus and aims of fulfilling its strategic objectives and ensuring a continued high level of performance in its day-to-day operations.

The context for Naviair's technical-operational development also shapes the structure of this document, as reflected in the illustration on the right.

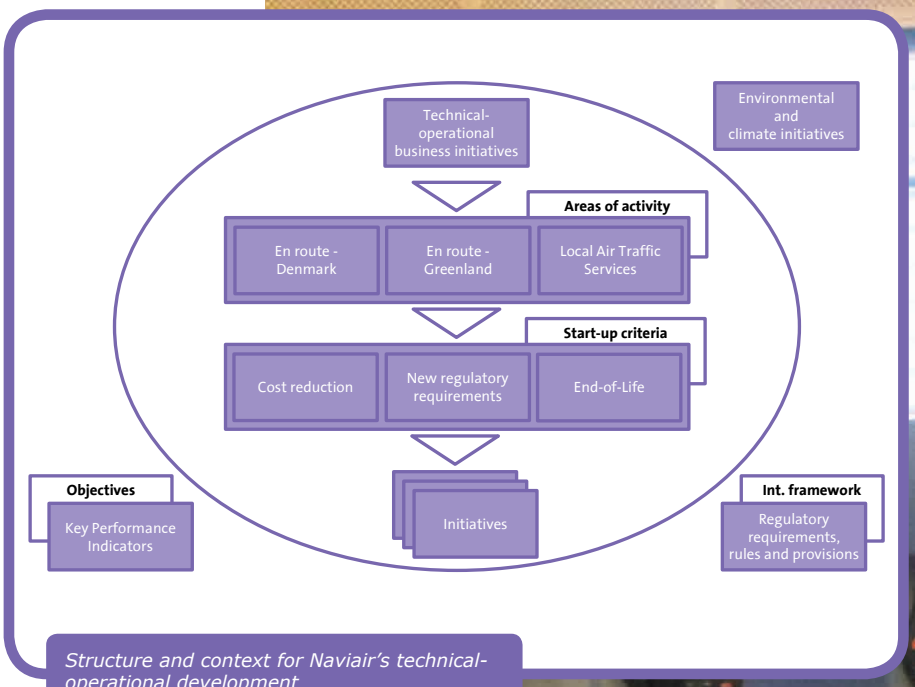
Naviair has made good headway on promoting the implementation of the EU's objectives in recent years and will continue to do so over the next five years. For example, Naviair signed an intergovernmental agreement already in 2009 on the establishment of a joint Danish-Swedish Functional Airspace Block (DK-SE FAB) as the basis for the declaration of DK-SE FAB. NUAC, on behalf of Naviair and LFV, took over the operation of the three ATCCs in DK-SE FAB – Copenhagen, Malmö and Stockholm – on 1 July 2012, as planned. The ATCCs and the technical equipment, etc., operated by NUAC are still owned by LFV and Naviair, and LFV and Naviair are still responsible for areas such as strategy, development plans and the business aspect.

The close cooperation with LFV is also reflected in a variety of joint initiatives, and closer coordination with LFV in an ESSIP-LSSIP context has been introduced and will be stepped up in future.

In the so-called first reference period (2012-2014), 2012 was the first year in which Naviair had to comply with the new European performance scheme with performance targets in the following four areas: Safety, Capacity, Environment and Cost efficiency. In these areas, ANSPs will be measured on their performance. ANSPs that do not satisfy the performance requirements may be subject to corrective action.

From the point of view of system development, Naviair also celebrated a success in 2012 in the context of COOPANS when it commissioned COOPANS Build 1 and subsequently Build 2.1. Both were commissioned according to plan and on budget. From 2013 onwards, upgrades will be implemented on a continuous basis to ensure that the system is always up to date and harmonised. In parallel with this, work is carried out within NORACON and via the A6 cooperation on providing input for SESAR, in order to shape developments and protect long-term strategic investments, such as COOPANS.

Besides COOPANS, CPDLC and Mode S/WAM are key initiatives and new technologies that Naviair is working purposefully to roll out in Naviair, in parallel with the introduction of system and procedural upgrades as part of other initiatives.



Structure and context for Naviair's technical-operational development

In 2012, the Borealis alliance started preparing a joint business plan based on various technical and operational initiatives. So far, this has led to cooperation on three specific initiatives. Borealis will also be able to act as a driving force in the lead-up to the establishment of an even larger FAB in line with the intentions behind SES. In 2013, a decision will be made on whether the Borealis alliance is to continue and, if so, how it is to be made up. The same applies to the FAB 4 cooperation.

In 2012, the jointly owned ATCO training academy, Entry Point North, introduced the first candidates in Malmö who had passed the ATSEP training course for technical personnel that provide support for and maintain ATM equipment. Also in 2012, the subsidiary Entry Point Central, set up in Budapest in 2011, awarded the academy's first diplomas to ATCO trainees who had passed the basic training course, and delivered a course for Slovakia's ANSP towards the end of the year.

In terms of roll-out, SESAR moved a step closer to becoming a reality in 2012 with the establishment of the so-called Interim Deployment Programme (IDP). The programme features seven prioritised areas of a technical and operational nature on which work will continue in 2013.

The technical-operational business initiatives and other technical-operational initiatives that Naviair is undertaking in 2013-2017 are described in greater detail in the relevant sections of this document. Focusing on the customer, these will equip Naviair to continue to provide its services in a cost-conscious, environmentally sound, efficient and safe manner, and to maintain its position among the best ANSPs in Europe.

Technical-operational business initiatives

Naviair is part of a number of strategic alliances and cooperation arrangements with a view to enhancing its efficiency in terms of safety, capacity, cost efficiency and the environment. This also serves to put Naviair at the forefront of international developments, ensuring that Naviair keeps abreast of developments and requirements within the SES and SESAR programmes (see the section on European framework). By being at the forefront of developments, Naviair is also able to influence the outcome of SES and SESAR and thereby protect and future-proof its long-term investments.

Naviair's technical-operational business initiatives are further described in the following sections. These are made up of business initiatives already in place and initiatives the direction and specific content of which Naviair is currently working on determining at strategic level.

NUAC – Nordic Unified Air traffic Control

To provide ATM in the Danish-Swedish Functional Airspace Block (see the section on DK-SE FAB under International framework) and operate the Air Traffic Control Centres (ATCCs) in Copenhagen, Stockholm and Malmö, Naviair has established a jointly owned company, NUAC, together with LFV.

The purpose of setting up NUAC is to create the safest, most efficient and most cost-efficient ATM in the Danish-Swedish area to the benefit of aviation, society and the environment. In this way, the NUAC cooperation strengthens Naviair's ability to continue to implement efficiency improvements and cost reductions without compromising on its high levels of safety and service. It also means that regulatory requirements and the intentions behind the EU SES programme are met.

On 1 July, NUAC, on behalf of LFV and Naviair, took over the operation of the three ATCCs in DK-SE FAB and consequently the management of air traffic across the entire airspace.

The NUAC company is structured in such a way that it is as lean as possible. The almost 750 employees that work in the three ATCCs and FPC or assist with operational support tasks are still formally employed with the owner companies and are on secondment to NUAC. Both the ATCCs and the technical equipment operated by NUAC are owned by LFV and Naviair. At business level, LFV and Naviair will continue to be responsible for liaising with airlines and preparing development plans at strategic level. LFV and Naviair will also handle financial balances with customers, while NUAC will handle the contact with airlines at operational-tactical level.

Through initiatives at technical and operational level, efforts will be made in the coming years to implement efficiency improvements that are designed to deliver total savings of at least EUR 13 million annually for LFV, Naviair and NUAC by the end of 2016. Here, the commissioning of COOPANS in Stockholm at the beginning of 2013 (see the section on COOPANS) will open up possibilities for further harmonisation as all three ATCCs will have adopted the same platform at that stage.

More efficient ATM and other advantages from joint operation will translate into cost reductions for LFV and Naviair and considerable environmental benefits as well as reduction of the airlines' direct costs. This will shorten flight routes, and aircraft will save fuel and emit less CO_2. The ground was prepared for an overall saving of 7,500 flight hours annually with the introduction of Free Route Airspace as far back as November 2011, giving airlines the opportunity to plan their routes according to their own wishes. With an agreement concluded on 17 September 2012 between the partners in NEFAB and DK-SE FAB, it is planned to offer Free Route Airspace operations in 2015 to all airlines that operate in the NEFAB area. This will make for an even larger gain in terms of environmental benefits and flight hours saved across the NEFAB area.

Entry Point North

The ATS training academy Entry Point North is owned jointly by Avinor, LFV and Naviair and was established in 2006 as the first transnationally owned academy offering ATM training. The academy offers Recruitment services, Initial training, Conversion training, Refresher training and Development training, and has, in line with SES, been set up with the primary aim of providing standardised and harmonised training for ATCO trainees and ATCOs.

To meet regulatory requirements applying to Air Navigation Service Providers (ANSPs), Entry Point North broadened its range of courses in 2011 to include the training of technical personnel engaged in the maintenance of ATM equipment. This training course, known as Air Traffic Safety Electronics Personnel (ATSEP), imparts the necessary skills and practical capabilities to enable course participants to provide support for and maintain ATM equipment approved for operational use. In 2012, the first Danish contingent completed the ATSEP course, and the course gained international participation from Maastricht Upper Area Control Centre (MUAC), LVNL in the Netherlands, General Civil Aviation Authority (GCAA), UAE and Indonesia, which had bought a number of spaces on the course.

Besides providing ATS training to its three owners, Entry Point North services ANSPs from around the world on commercial terms by selling training courses tailored to the customers' requirements on-site or in Sturup. This is part of a growth strategy to offer the academy's recognised services to the global market. As a result, Entry Point North now has more than 40 customers in more than 20 different countries.

In that connection, Entry Point North made its mark in 2012 as a leading provider of ATS training and, among other initiatives, held two international seminars attended by more than 100 delegates from more than 20 countries – from Greenland in the north to Australia in the south. Also in 2012, a long-term cooperation agreement with the Civil Aviation Management Institute of China (CAMIC) initially led to a number of courses tailored to CAMIC's needs, with more than 100 participants. In 2012, Entry Point North also signed a contract with FerroNATS on training of tower controllers for ten Spanish airports. Lastly, in 2012, Entry Point North entered into a long-term cooperation agreement with GroupEAD Europe S.L, which provides AIS and AIM-related training and services such as NOTAM, AIXM and AIP, among other things. The agreement gives both companies the option of providing integrated training solutions to ANSPs worldwide, either in partnership or by offering each other's services independently.

Entry Point North's growth strategy has also led to cooperation with HungaroControl (Hungary's ANSP). In 2011, this culminated in the establishment of the Entry Point Central (EPC) ATS training academy in Budapest, which is a subsidiary owned by Entry Point North and HungaroControl.

In September 2011, Entry Point Central started up its first ATCO course based on Entry Point North's training programme and methods. On 6 July 2012, the academy's first class of ATCO trainees were awarded their diploma for successful completion of the basic training. Most recently, from 22-26 October 2012, Entry Point Central delivered its first OJTI course for ATCOs from LPS SR (the Slovakian ANSP), in close cooperation with Entry Point North. The successful course confirms Entry Point Central's ability to deliver development training courses as well as provide these to other ANSPs.

The establishment of Entry Point Central further prepares Entry Point North to operate on the international scene, and the academy has been set up so that this solution can subsequently be provided to other ANSPs in the region. Besides providing a commercial dimension, the initiative fulfils the objective in the EU Single European Sky programme of greater cooperation and harmonisation of ATM in Europe, and equips Entry Point North well for the future and the further implementation of its growth strategy.

COOPANS

– CO-OPeration of Air Navigation Service providers

COOPANS encompasses the upgrading and harmonisation of Swedish (LFV), Irish (IAA), Austrian (Austro Control, ACG), Croatian (Croatia Control, CCL) and Danish ATM systems in a single unified ATM system that uses common software and entails harmonised maintenance processes and operational concepts. The cooperation began in 2006 with Thales as supplier in recognition of the fact that the systems' increasing complexity and increasing requirements concerning functionality, safety, development and maintenance had made this task too costly and inexpedient to undertake independently.

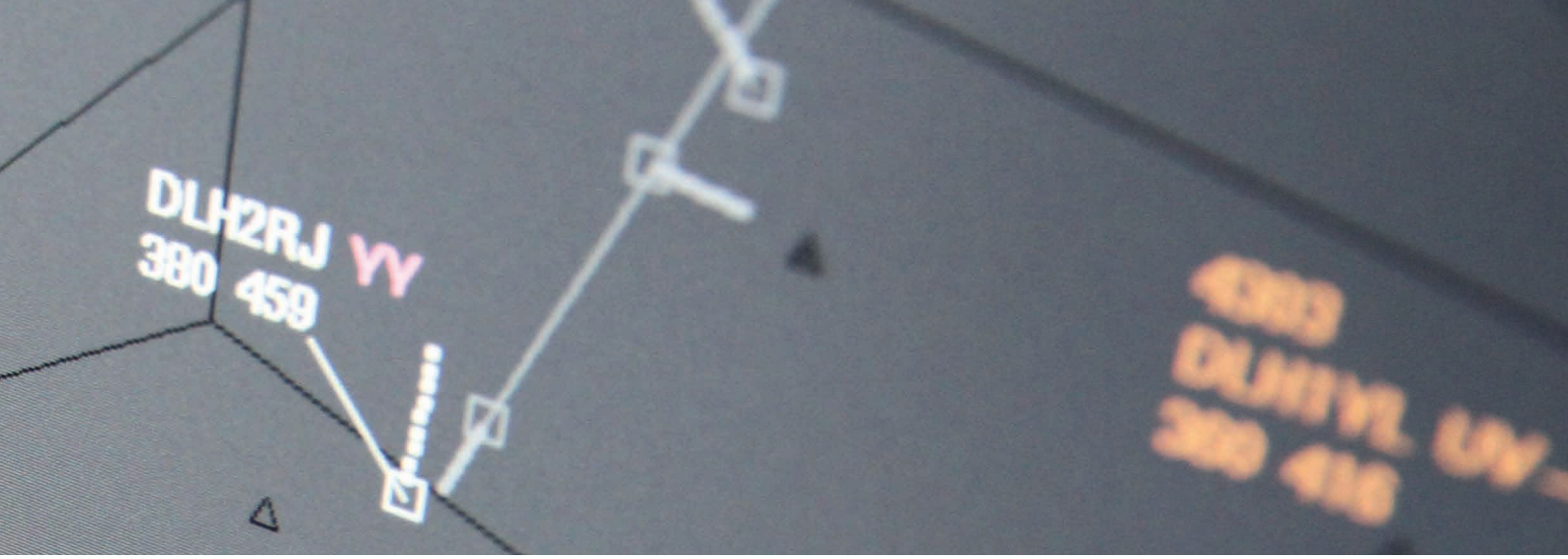
The overarching aim of COOPANS is to achieve financial savings and reduced investment risks by harmonising and standardising technical solutions and operational procedures. COOPANS also meets the EU requirements concerning future harmonisation of ATM systems in Europe. The business partners share development costs. In total, the cooperation is expected to cut system development costs by approximately 30 per cent compared with the costs each partner would incur if it had to develop the technology independently.

The upgrades within COOPANS take place continuously in 'Builds', which are subdivided into six-monthly releases; this approach ensures that the system is always up-to-date and avoids a more costly, complex 'big bang migration' of the system. When a new build is introduced, it is implemented successively in all Member States, limiting maintenance work to no more than two releases at a time (the outgoing one and the new one).

Following the roll-out of the first system upgrade, Build 1, in Dublin, Shannon and Malmö, Naviair implemented Build 1 in Danish airspace and for approach operations from the airports in Copenhagen, Roskilde and Billund according to plan and on budget on 31 March 2012.

The first release (B2.1) of the next system upgrade, Build 2, was then rolled out in Dublin, Shannon and Copenhagen, in the case of the latter on 6 November 2012. Malmö and Stockholm followed suit in January 2013, and the next release (B2.3) will be rolled out in all the ATCCs referred to above, as well as Vienna, in spring 2013. Croatia will implement the COOPANS solution in Zagreb at the beginning of 2014, with an associated release (B2.4). This release will also be rolled out in the other COOPANS member countries to ensure that all countries continue to operate with a harmonised system. In addition to harmonising the systems, the overall Build 2 also features updates that ensure that the ANSPs involved comply with a number of Implementing Rules (IRs), which will become regulatory requirements shortly after the implementation of Build 2.

Subsequent releases are being defined and implemented in the form of six-monthly releases under the auspices of COOPANS. In general terms, they will feature functionality that will contribute to continued seamless and efficient ATM while ensuring that Naviair continuously complies with obligations, standards and regulatory requirements, including the EU performance scheme. Compliance with future regulatory requirements and standards will primarily be ensured by gearing up system functionality for the implementation of new surveillance technology, including support of WAM (Wide Area Multilateration), Enhanced Datalink, Mode S and Download of Aircraft Parameter (DAP) functionality.



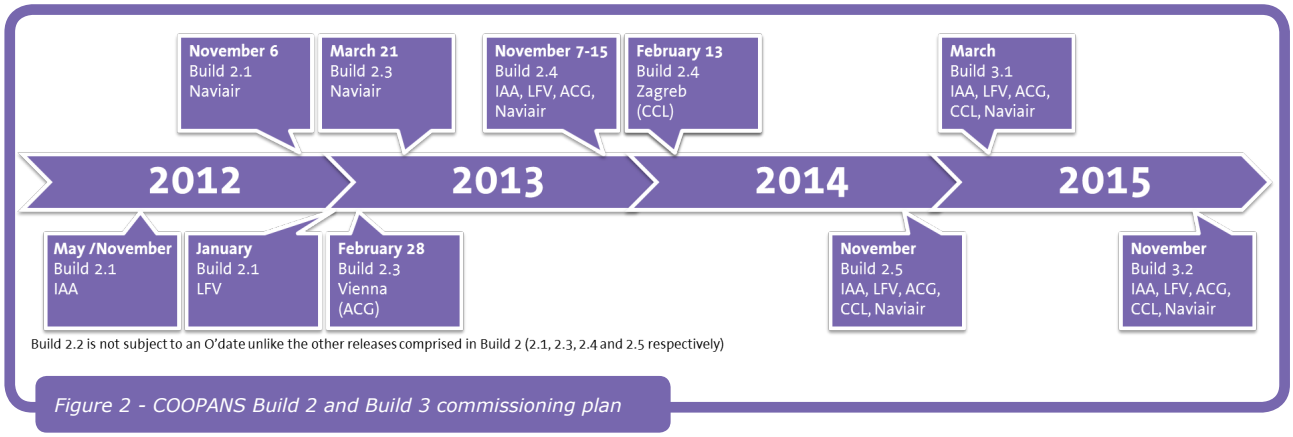


Figure 2 - COOPANS Build 2 and Build 3 commissioning plan

To further protect its COOPANS investment Naviair participates in the work in SESAR Joint Undertaking (SJU) through NORACON and A6 (see the section on NORACON) and is thus able to influence developments in SESAR. The ambition is for COOPANS to become a key element of SESAR and thus be a determining factor of what is implied by being SESAR-compatible. In parallel with these initiatives, possibilities for harmonisation with other ATM systems are also being factored into the development work, primarily in relation to the French-Italian-based 4-Flight-system, for which Thales is also a supplier.

NORACON

- NORth European and Austrian CONsortium

The NORACON consortium was set up in 2009 and consists of Swedavia and eight European ANSPs: Austro Control (Austria) and the North European ANSPs (NEAP), including Avinor (Norway), EANS (Estonia), Finavia (Finland), IAA (Ireland), ISAVIA (Iceland), LFV (Sweden) and Naviair (Denmark). Overall, NORACON handles approximately 13 per cent of European IFR traffic and covers an even larger geographical area.

It is NORACON's mission to secure and develop NORACON members' strategic and long-term investments in the context of SESAR. This is being achieved through the NORACON consortium's formal membership of SESAR Joint Undertaking (SJU). Naviair is thus able to influence decisions on pan-European development on technical-operational matters. From Naviair's point of view, a limited investment of resources and co-funding from SJU (EU) are to ensure that COOPANS becomes a dominant player in the development of SESAR for optimal protection of the COOPANS investment.

To further strengthen NORACON's influence in SESAR the consortium signed a formal cooperation agreement with the A6 umbrella group in June 2011. In addition to NORACON the group consists of Europe's five largest ANSPs: AENA (Spain), ENAV (Italy), DSNA (France), DFS (Germany) and NATS (UK). The A6 group's role is to seek to reconcile views in relation to important SESAR areas in connection with developments in the industry and SJU strategies and to prioritise links with the operational environment. It has been decided that the NORACON consortium is to be active in the A6 group within ATM research and development and during the coming SESAR deployment phase.

Due to the availability of airspace, both continental and oceanic, and complex airports with periods of fairly low traffic and congestion, the NORACON region is well-suited for performing validation through live trials and pre-operational use. Thus one key contribution will be the access to an operational trials environment, including terminal operations using advanced AMAN/DMAN functions, environment-friendly approach procedures and support for Free Route Airspace operations.

The work in a SESAR context is divided into a number of Work Packages (WP). The figure below lists the WPs in which NORACON is involved, with a description of overall scope in relation to the WPs in which Naviair is contributing via its NORACON-allocated resources.

With a view to protecting its long-term investments, including in COOPANS, Naviair's contribution comprises the system-end-user connection, for example in the form of validation tasks and HMI development. With Thales as the industrial partner, this has specifically resulted in the development of a common NORACON ATM validation platform, called Thales IBP, based on the COOPANS platform.

Besides the directly WP-related work, Naviair's work in NORACON in the years ahead will focus on continuing the efforts to build a robust bridge between NORACON/SJU and COOPANS. This will be achieved by on the one hand influencing SJU to adopt a more solution-oriented approach in order to provide a clearer picture of how and when SESAR will require changes in future, and what these changes will be. On the other hand more seamless cooperation must be established among NORACON and in relation to A6 in order to close the gap between strategy and reality.

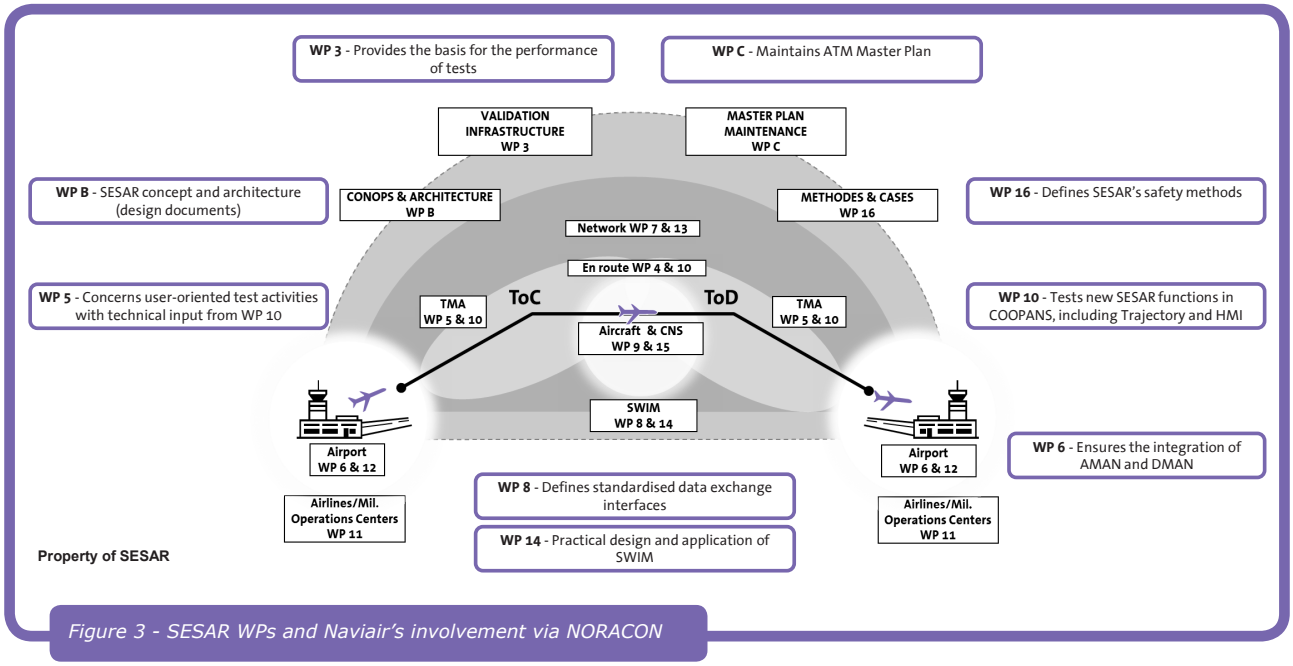


Figure 3 - SESAR WPs and Naviair's involvement via NORACON

Borealis

The Nordic ANSPs Avinor (Norway), Finavia (Finland), ISAVIA (Iceland), LFV (Sweden) and Naviair have been cooperating closely over the last 50 years. In 2004, EANS joined this Nordic partnership, and IAA followed suit in 2007. The name was then changed to NEAC, and later to North European ANS Providers (NEAP). Since then, NATS and LGS have also joined the cooperation.

On 20 June 2012, following a trial period, the NEAP partners set up a formal alliance, Borealis, by signing a Memorandum of Cooperation (MoC) with the aim of improving ATM efficiency and reducing environmental impact and costs related to service and the technical-operational infrastructure in the NEAP area. Strategies and independent management have established Borealis as an alliance with impact and tangible content unlike the more informal cooperation in its precursor NEAP.

It is a prerequisite for Naviair's participation in the Borealis alliance that all Nordic initiatives must respect previous decisions in a Nordic context, including bilateral and multilateral activities such as NUAC, COOPANS, Entry Point North, etc. Within this framework, Naviair can choose business partners from region to region and activity to activity and at the same time staying focused on its own strategies. Naviair thus primarily focuses on specific activities in the cooperation. In parallel with this, Borealis can act as driving force in a FAB context in the lead-up to the formation of a larger pan-North European FAB.

Based on preliminary analyses, the Borealis members commenced work on the establishment of a joint business plan in 2012. The plan is being discussed with reference to a number of technical and operational initiatives based on SESAR and ESSIP objectives. This has initially led to the Borealis member countries initiating cooperation on the 3Di, AMHS and datalink initiatives (see section CPDLC under En route – Denmark). Borealis' business plan will be presented in 2013, following which a decision will have to be made on whether the Borealis alliance is to continue and, if so, how it is to be made up.

FAB 4

The FAB 4 project is exploring the scope for closer cooperation between LFV (Sweden), NATS (UK), IAA (Ireland) and Naviair. The cooperation comprises the development of improved ATM efficiency in airspace over Denmark, Sweden, the UK and Ireland with a view to possibly combining the two existing FABs: UK-IRL and DK-SE (see figure).

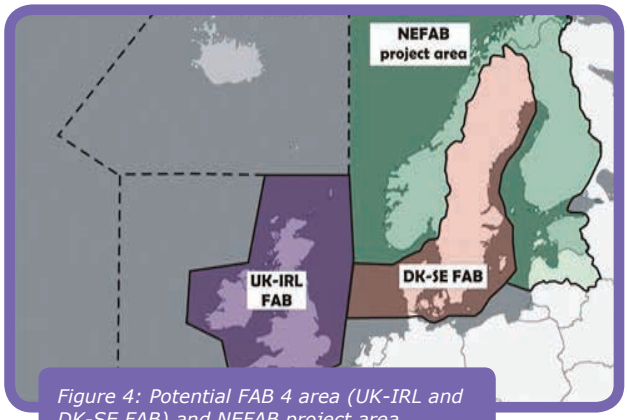


Figure 4: Potential FAB 4 area (UK-IRL and DK-SE FAB) and NEFAB project area

To that end, the FAB 4 project is following a four-step process plan leading up to the formation of joint ventures and an integrated or combined FAB. Of the four steps, the initial two steps have been taken. They have taken the form of a general feasibility study to identify the scope for real savings and greater cost efficiency through closer and transverse cooperation in the three columns ATS, Training and Systems, to create a basis for possibly combining the two existing FABs. Furthermore, analyses and proposals for models for cooperation and for combining the two FABs have been prepared. The direction and focus areas for the further process will be decided in 2013, with subsequent initiation of step three with the aim of modifying the two existing airspace blocks.

The four partners will at the same time maintain their close links with other ANSPs in Northern Europe, for example via Borealis (see the section on Borealis), in such a way that the potential for establishing one, large, joint North European airspace block (FAB) can be considered when the time is ripe. A cooperation agreement was signed with the NEFAB partners already in 2012 that prepares the ground for the possible establishment of a free route area covering DK-SE FAB and NEFAB airspace. From the point of view of geography and the EU Commission's wish to form a few, large airspace blocks in Europe in the longer term, a FAB made up in this or a similar way, possibly with the addition of a single, geographically well-positioned country to the FAB 4 airspace block, would be in keeping with developments.

Environmental and climate initiatives

Naviair helps to cut CO_2 and other polluting gases by continuously developing efficiency-improving procedures and infrastructure systems. Naviair's contribution takes the shape of various initiatives relating to technical and operational procedures, which, taking due account of SES and SESAR, are based partly on Naviair's technical-operational business initiatives, and partly on the local environment in order to ensure that Naviair's climate action is tailored to customer wishes and requirements as far as possible.

In general terms, the initiatives are designed to ensure that aircraft fly as directly as possible between destinations, at the level at which they consume the least fuel, and that they take off, land and operate on the ground at airports with the lowest possible fuel consumption.

The procedure-related initiatives referred to above include Free Route Airspace (FRA), which Naviair introduced in DK-SE FAB in November 2011 jointly with LFV. FRA enables airlines to choose the shortest and most direct routes through DK-SE FAB. This means that aircraft will need less fuel and also reduces the aircraft's take-off weight, cutting annual CO_2 emissions to the atmosphere by approximately 40,000 tonnes.

The redesign of en route airspace is based on Free Route Airspace in DK-SE FAB and the changed traffic flows compared with the previous route structure. The initiative aims to optimise routes in order to cut CO_2 emissions and optimise the use of the airspace block for the benefit of Naviair's customers. In parallel with this initiative, the start-up of work under the 'Øresund TMA' initiative is planned. Here, the aim is to optimise Air Traffic Management (ATM) to and from Copenhagen, Malmö and a number of smaller airports in Southern Sweden. Besides increased capacity, future use of environmentally sound concepts such as Continuous Climb Operations (CCO), Continuous Descent Operations (CDO) and Required Navigation Performance (RNP) will also be analysed.

In response to the ESSIP/LSSIP process and a desire on Naviair's part to always act in an environmentally sustainable manner, a number of initiatives are also being implemented that ensure the fulfilment of ESSIP objectives. In parallel with these initiatives, Naviair is playing an active part in helping to reduce noise at and around the airports at which ATM is provided. Noise inconvenience is reduced through traffic procedures as well as arrival and departure restrictions at these airports.

In terms of technical and procedure-related initiatives, COOPANS is also promoting environmentally sound ATM, which the planning and roll-out of new builds and releases continuously focuses on improving. The same applies to System Wide Information Management (SWIM), which allows the exchange and sharing of ATM information between all parties involved in a flight, so that the right information is available in the right place at the right time. This enhances predictability so that unnecessary delays in and around airports, such as 'holding', are minimised, with a resulting positive environmental impact. Locally, SWIM is part of the Collaborative Decision Making (CDM) initiative.

Naviair supports green and environmentally friendly ATM

With Copenhagen Airports A/S in a steering role, CDM focuses on Airport-CDM (A-CDM) at Copenhagen Airport, which will also contribute to efficient and environmentally sound ATM through the exchange of relevant ATM information between Naviair and Danish airports. Lastly, the ADS-B Greenland & Faroe Islands initiative enables airlines to save fuel and thereby cut CO_2 emissions because the current separation between aircraft over the Atlantic can be reduced considerably. One of the effects of this is that the individual aircraft can more easily reach its desired optimal level, resulting in lower air resistance/fuel consumption.

All the above initiatives are described in more detail in the sections En route – Denmark, En route – Greenland and Local Air Traffic Services, where they form part of the overall initiatives.

In addition to the technical-operational initiatives in this plan, Naviair also undertakes environmental and climate initiatives in connection with buildings and technical equipment that also help reduce energy consumption and CO_2 emissions.

As Naviair's technical installations require a great deal of energy for both operation and cooling, Naviair is establishing groundwater cooling in the period up to 2018 to replace the current cooling systems, which are due to be upgraded on account of both age and official requirements. This will reduce energy consumption and at the same time considerably reduce CO_2 emissions from heat and electricity consumption. The savings will be made by using less electricity for cooling and through heat recovery.

Naviair has also made targeted efforts to reduce its energy consumption for lighting for buildings and technical equipment by replacing light fittings with LED fittings on an ongoing basis. As well as energy savings this leads to lower light fitting consumption and lower man-hour consumption for replacing light fittings as the new fittings have a longer life.

Areas of activity

Naviair's technical-operational development is organised into the following areas of activity: En route – Denmark, En route – Greenland, and Local Air Traffic Services.

En route – Denmark

Area control services in Danish airspace from:
- ATCC in Copenhagen *
- Tower in Roskilde
- Tower in Billund
- Tower in Århus
- Tower in Aalborg

Approach control service to Copenhagen Airport from:
- ATCC in Copenhagen *

**) ATCC in Copenhagen is operated by NUAC on behalf of Naviair*

Briefing service from:
- ATCC in Copenhagen *

Flight Information Services (FIS) from:
- ATCC in Copenhagen *

Technical support and maintenance of ATM/CNS equipment in Denmark:
- Radar installations
- Navigation and communications systems
- ATM equipment

En route – Greenland

Briefing service from:
- Flight Information Centre in Kangerlussuaq

Flight Information Services from:
- Flight Information Centre in Kangerlussuaq

Technical support and maintenance of CNS equipment on the Faroe Islands and in Greenland:
- Radar installations on the Faroe Islands
- Navigation and communications systems on the Faroe Islands and in Greenland
- Surveillance (ADS-B) in Greenland

Local Air Traffic Services

Aerodrome control service from:
- Tower in Copenhagen
- Tower in Roskilde
- Tower in Billund
- Tower in Århus
- Tower in Aalborg
- Tower on Bornholm

Approach control service to airport from:
- Tower in Roskilde
- Tower in Billund
- Tower in Århus
- Tower in Aalborg
- Tower on Bornholm

Aerodrome Flight Information Service from:
- Tower on Vágar

The following sections are subdivided in accordance with the above and will examine each area of activity with regard to:
- The service offered by Naviair
- The operational concept and associated capacity plan that support this service
- The designations/supply agreements that Naviair is comprised by
- The initiatives that Naviair has implemented or will implement to underpin the above.

En route – Denmark

Services

The Air Traffic Control Centre (ATCC) in Copenhagen provides area control services, Flight Information Services (FIS) and alerting service in Copenhagen FIR and areas where responsibility for these services has been delegated to Naviair from neighbouring countries. Controlled airspace extends from 3500' feet to FL 660, but from FL 195 to FL 660 over the North Sea. The ATCC also provides approach control service to Copenhagen Airport under a supply contract between Naviair and Copenhagen Airports A/S.

These services are provided from the ATCC in Kastrup, which has been operated by NUAC on behalf of Naviair since 1 July 2012. There are 13 flight control sectors and 5 approach control positions – a number that may be increased or reduced according to air traffic load.

The procedures and automated equipment used to provide the services conform as far as possible to the ESSIP (see the section on Regulatory requirements, rules and provisions).

Operational concept

For all phases of a flight, a safe, economic, swift and well-organised traffic flow is ensured by the provision of an adaptable, scalable ATM service. This is done in accordance with the requirements laid down by all users in Danish airspace. This service must meet demand in a cost-conscious manner, be globally interoperable, comply with uniform principles, be environmentally sustainable and satisfy national safety requirements. In support of all these requirements, Naviair implemented Free Route Airspace in Copenhagen FIR in November 2011, which means that airlines can now plan direct flights in DK-SE FAB without regard for the airways.

The ATM system is being used optimally by striking an appropriate balance between the development of technical platforms, associated procedures and qualified operational staff and qualified consideration for international safety standards. This is done with a view to planning, preparing and adjusting airspace capacity optimally in relation to current demand. In this manner, efficient capacity planning and forecasting contribute to the ATM network's integrated ASM/ATFCM process.

The integrated ATCC, the established civilian-military coordination and collaborative processes ensure the best possible use of the airspace as a whole.

Capacity plan

Naviair's capacity plan forms part of the common European coordination and will be checked against SES performance targets for the period 2012-2014 to ensure their fulfilment at DK-SE FAB level.

The objective for the ATCC in Copenhagen is, in capacity terms, to monitor the constantly increased traffic so that the latter can, under normal circumstances, enter and move in Copenhagen FIR without delays. Under the performance scheme, the total objective for average delays in DK-SE FAB in 2013 is less than 0.15 minute per operation.

Naviair's en route traffic outlook is based on Eurocontrol's forecasts (STATFOR). Eurocontrol adjusted its growth outlook for the period until 2018 downwards in September 2012. Based on this, 2013 is projected to show growth of the order of 2.1 per cent relative to 2012.

Besides COOPANS, initiatives in the ATCC in Copenhagen for the period 2013–2015 cover regular upgrades of sector configurations in accordance with traffic needs and ongoing improvements to the ATS route network. In terms of resources, Naviair is also well equipped for the traffic growth expected over the period because the ATCO forecasts for both ACC and TWR/APP show a positive trend.

Designation

Naviair has been designated by the Danish Transport Authority (TS) to provide ATM.

Naviair has concluded the following supply agreements in connection with the provision of area control services in the en route area in Denmark, which are to be supported by initiatives in the most cost-efficient manner.

Supply agreements, en route – Denmark

Customer	*Area control services from*	*Service*	*Contractual basis*
The Danish state/the Danish Transport Authority (TS)	ATCC in Copenhagen	Area control services in Danish airspace	• Designation
		Flight Information Services (FIS)	
		Briefing service	
		Technical support and maintenance of ATM equipment	
Copenhagen Airports A/S	ATCC in Copenhagen	Approach control service	• Supply contract on approach control service at Copenhagen Airport between Naviair and Copenhagen Airports A/S

Initiatives – En route

Focusing on the customer, the initiatives in the en route area are implemented in order to reduce costs, replace end-of-life equipment and/or comply with regulatory requirements and supply agreements. They also improve the environment, and influence on European ATM decisions in connection with SES and SESAR is increased via coordination, harmonisation and participation in international development and cooperation.

COOPANS is still a driving force behind initiatives in the en route area. This applies to both commissioning, further development and optimisation of day-to-day work processes, resulting in significant savings over a number of years.

Another key initiative is the establishment of a data link between pilot and ATCO (CPDLC) and harmonisation of data infrastructure. In addition to introducing new technology at Naviair, the benefits of the CPDLC initiative are felt in the form of optimisation of day-to-day work processes, enhanced safety and savings viewed over a number of years.

Mode S is being introduced as a new technology in Copenhagen FIR, which is moving from traditional radar technology to Wide Area Multilateration (WAM). The introduction of Mode S/WAM is providing various advantages in the form of improved data quality and performance (Mode S) and more cost-efficient purchases, support and maintenance.

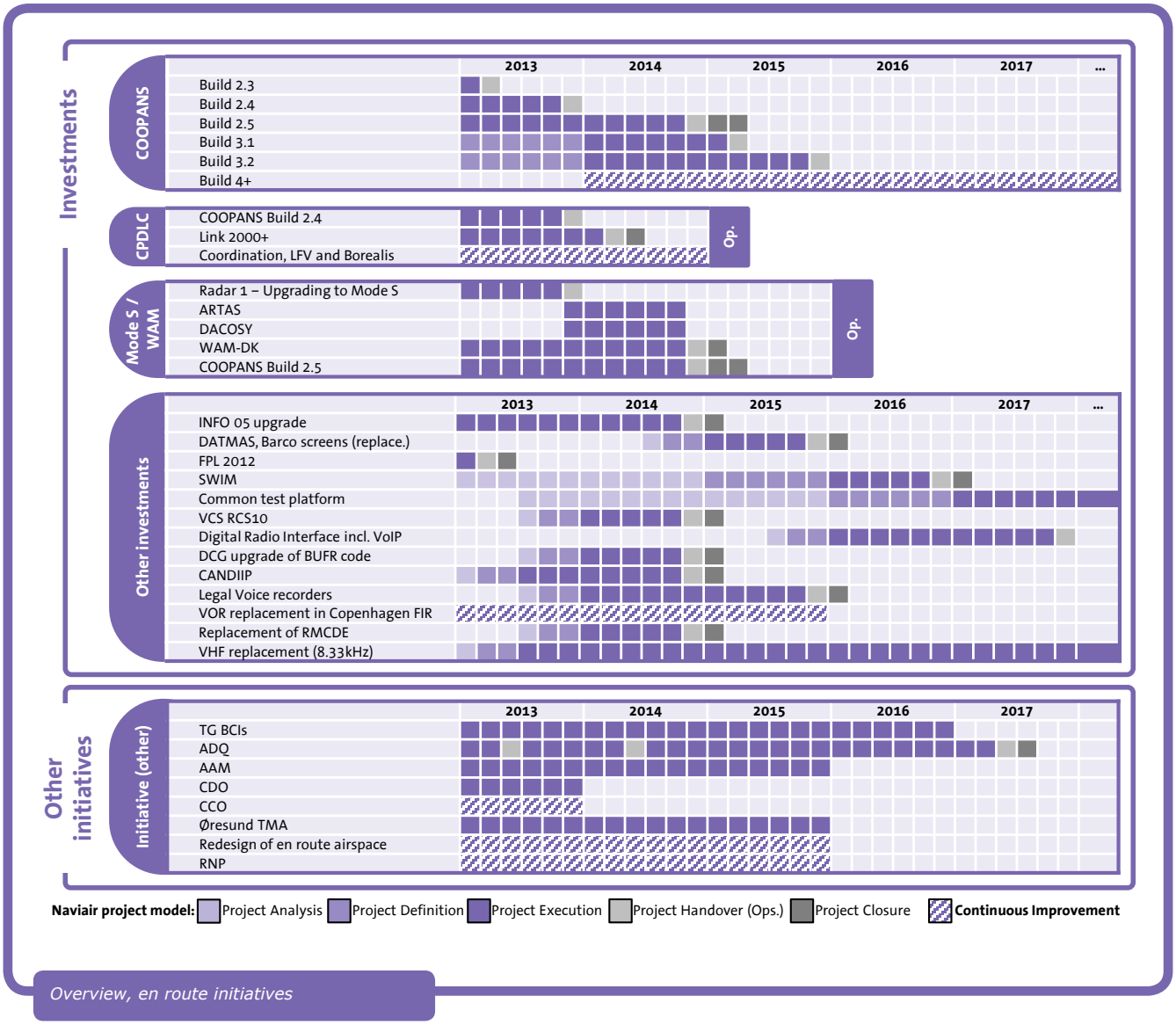
Naviair is keeping abreast of technical-operational development in Europe through its strategic and international alliances. These forums assess joint cooperation on technical-operational development on a case-by-case basis with a view to harmonised introduction wherever deemed

advantageous at the same time as underpinning the SES objectives. Both in COOPANS and in a Borealis context this has led to efforts to harmonise the CPDLC service based on future regulatory requirements so that flights will experience the same service level across the Nordic region and will no longer experience a change in service level each time they pass a FIR or FAB boundary.

To further support the above initiatives, Naviair, LFV and NUAC have set up groups at technical and operational level. These groups receive input from, for example, ESSIP/LSSIP, EU regulatory requirements, international standards and initiatives the joint implementation of which is considered advantageous based on cost/benefit incentives.

Besides the above initiatives, the en route area will require a number of investments to replace equipment that will shortly reach the end-of-life stage. In parallel, various operational initiatives are being undertaken locally and around Copenhagen Airport, Kastrup, and in DK-SE FAB to the benefit of the environment and Naviair's customers, among others.

The overview below sets out the investments and other initiatives planned for implementation in the En route – Denmark area over the period 2013-2017. Further details in the form of start-up criteria and the positive effect of the initiative on one or more of the performance scheme areas are provided under the descriptions of the respective sub-areas.



Overview, en route initiatives

Investments

Programmes in this section comprise COOPANS, CPDLC and Mode S/WAM. A cross in one or more of the start-up criteria represented in the columns Cost reduction, New regulatory requirements and End-of-Life indicates the background for the launch of the initiative. With reference to the performance scheme (see the section on SES under International framework), a cross in one of the associated columns represents whether – and, if so – where the initiative in question has a positive impact on one or more of the areas Safety (S), Cost efficiency (C), Capacity (A) and Environment (E). The effect has not been quantified in relation to the performance scheme.

COOPANS

COOPANS	Cost reduction	New regulatory requirements	End-of-Life	Performance scheme				2013	2014	2015	2016	2017	...
				S	C	A	E						
Build 2.3	X	X		X	X	X	X						
Build 2.4	X	X		X	X	X	X						
Build 2.5	X	X		X	X	X	X						
Build 3.1	X	X		*To follow**									
Build 3.2	X	X		*To follow**									
Build 4+	X	X		*To follow**									

Naviair project model: Project Analysis Project Definition Project Execution Project Handover (Operation) Project Closure **Continuous Improvement** X **: ESSIP objective or standard**
Performance scheme: Safety, **C**ost-efficiency, **CA**pacity, **E**nvironment.
* Build 3.1 and 3.2 and subsequent upgrades (Build 4+) have yet to be finally defined. It is consequently not possible to establish the positive effect of these builds on the performance scheme.

The ANSPs in Denmark, Sweden, Austria, Croatia and Ireland along with the technical supplier Thales constitute the players in COOPANS, the aim of which is to develop a standardised, harmonised – both technically and operationally – ATM system that is also called COOPANS. Over time, harmonised system upgrades will be added, so that the system is always up-to-date and identical in all COOPANS member countries. The regular upgrades are called Builds and are subdivided into half-yearly releases. This avoids costly, 'big bang' migration of the system and at the same time ensures that regulatory requirements are met in a timely manner. COOPANS is also described in the separate section on COOPANS under the section on Technical-operational business initiatives, which also includes the COOPANS Build 2 and 3 commissioning plan.

The primary benefits of COOPANS are savings and ensuring Naviair's infrastructure investments. Specifically, the cooperation is expected to cut system development costs by approximately 30 per cent compared with the costs each partner would incur if it had to develop the technology independently. Moreover, COOPANS supports a common system platform in the three ATCCs in DK-SE FAB and ensures that various implementing rules and international standards are complied with. It also supports a number of ESSIP objectives.

With the roll-out of COOPANS Build 1 in 2012 the ATM systems in Denmark, Sweden and Ireland have been largely harmonised within a single system, with the option of national adaptations/configurations. Subsequent upgrades take the form of standardised builds and releases. The first of these, Build 2.1, was rolled out in Denmark, Sweden and Ireland in November 2012 with the implementation of the joint European code bank called CCAMS, with the aim of remedying the shortage of SSR codes in Europe.

Test of coming COOPANS release. COOPANS ensures cost-efficient development.

Future upgrades will be developed with a view to optimising outdated functions inherited from previous site-specific ATM systems to make COOPANS more future-proof. More stringent efforts will be made on HMI development and the supported system architecture, and efforts will be made to realise potential new areas of cooperation that are not related solely to the ATM system.

The main content of coming builds and releases is described in more detail below for Build 2, Build 3 and subsequent upgrades, which are designated Build 4+:

COOPANS Build 2

Build 2 is subdivided into five releases – Builds 2.1, 2.2, 2.3, 2.4 and 2.5 – and will be implemented at Naviair in the period November 2012 to November 2014. Of these releases, Build 2.2 will not be covered by definite commissioning. In general terms, Build 2 will cater for changes that will enable Austro Control to become operational at the beginning of February 2013. In addition, part of Build 2 is dedicated to the development and integration of modifications required for Croatia to implement COOPANS in Zagreb in February 2014.

On implementation on 21 March 2013, Build 2.3 will support:

- Mode S support, enabling testing of Mode S implementation in Denmark in preparation of implementation of functionality (see Mode S/WAM initiative).
- FPL 2012 (see FPL 2012 initiative) to comply with new international flight plan standard.
- Network Operations Portal (NOP) update for improved compliance with the latest NOP upgrades.
- CPDLC via ATN (see CPDLC initiative), enabling testing of CPDLC in Denmark in preparation of implementation of functionality.
- New OLDI standard designated Arrival Management (AMA).

On implementation on 7 November 2013, Build 2.4 will support:

- CPDLC on trainer (BEST).
- Next remote point in track label to enable tracking of the point to which a flight has been cleared and is being used. Functionality will be fully operational in connection with the implementation of CPDLC in Copenhagen FIR (see CPDLC initiative).
- Smooth handover, a stringent handover method in connection with division of sectors, etc.
- GRIB data (upper winds) in accordance with new international standard.

On implementation in November 2014, Build 2.5 is expected to support:

- Outside AOR Functionalities. This implies MTCD alerts outside AoR to allow fulfilment of the obligation to provide traffic to neighbours in such a way that there is no direct conflict between such traffic and traffic from other sectors to the same neighbour.
- Runway Allocation Enhancement.
- DF_Frequencies_Extension.
- ARTAS and Radar Infrastructure Responsibility.
- Airspace Intrusion Warning to support safety initiative at European level.
- WAM (Mode S Surveillance) and ADS-B Support (see Mode S/WAM initiative), which enables implementation of functionality.
- Mode S DAPs (see initiative DAPs – Mode S enhanced), which allow enhanced synchronisation of data in the ATM system with data in the aircraft's FMS.

In addition to adding important functionality, the above functionalities also ensure that compliance with Implementing Rules Nos 29/2009 and 262/2009 is supported operationally. It will also support the AOM 19 ESSIP objective.

COOPANS Build 3:

The objective for Build 3 is to achieve fully harmonised operational concepts between the member countries for the use of the COOPANS system. Build 3 is expected to be supplied in 2-3 sub-releases.

Build 3 is at the definition phase and is scheduled for roll-out from March 2015. The following main topics are being discussed:

- Dynamic Airspace allocation support for FABs to enable responsibility for a given airspace block, e.g. between Malmö and Copenhagen, to be shifted on a daily basis. This functionality will secure compliance with regulatory requirements.
- AUTO SEP TOOL, a more tactical tool to ensure segregation that 'closes the gap' between MTCD and STCA.
- jHMI, a new technology/industry standard that creates the visual display on the ATCO's working positions.
- A statistical tool for administrative use based on data from the COOPANS platform that can support reporting in connection with the performance scheme and at the same time provide better opportunities for analysis for use for operational statistics, etc.
- The feasibility of various SESAR concepts in a COOPANS context.

In addition to the above, a large number of amendment requests that were not met by Build 2 will have to be re-evaluated and possibly carried forward to Build 3. Furthermore, a number of other additions may also be relevant for Build 3, as it must be expected specifically that the implementation of Build 2, which will implement COOPANS in Austria and Croatia, will give rise to new needs as a consequence of operational follow-up.

COOPANS Build 4+

COOPANS Build 4 and subsequent builds will ensure that all sites will continue to be harmonised technically and operationally and continuously roll out functionality ensuring that future regulatory requirements and SESAR concepts are complied with.

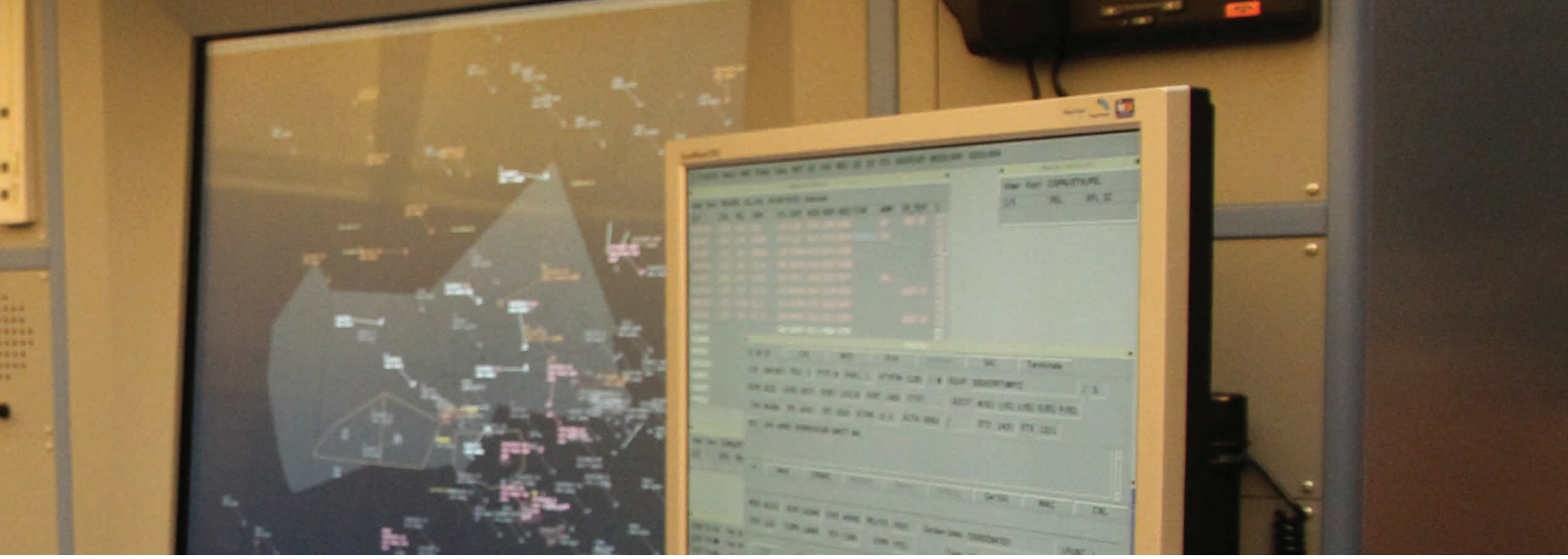
Controller Pilot Data Link Communication (CPDLC)

CPDLC	Cost reduction	New regulatory requirements	End-of-Life	Performance scheme				2013	2014	2015	2016	2017	...
				S	C	A	E						
COOPANS Build 2.4	X	X		X	X	X	X						
Link 2000+	X	X		X	X	X							
Coordination, LFV and Borealis													

Naviair project model: Project Analysis, Project Definition, Project Execution, Project Handover (Operation), Project Closure, **Continuous Improvement**. **X : ESSIP objective or standard**
Performance scheme: **S**afety, **C**ost-efficiency, **CA**pacity, **E**nvironment.

CPDLC enables ATCOs and pilots to communicate with each other without using radio communication in situations where time is not critical. One benefit is that ATCOs can send clearing concerning flight elevations, direct route, etc., via accurately specified data formats. Furthermore, via Mode S service (see Mode S/WAM initiative), ATCOs will be able to receive data from aircraft and view data relating to elevation, heading, etc., input by the pilot.

The advantages of introducing CPDLC in Copenhagen FIR include savings, as the reduction in microphone voice communication (ATCO-pilot) will mean that each ATCO will be able to handle more flights, with associated enhanced efficiency in the sector and a resulting potential increase in capacity. Specifically, simulations have indicated a possible capacity improvement in the longer term of approx. 10 per cent based on the objective of 75 per cent of flights being



connected via CPDLC. Under the auspices of Naviair and COOPANS, all ATCO instructions can initially not be transmitted via CPDLC, and the continued use of radio communication will therefore be required to some extent.

Added advantages of introducing CPDLC are enhanced safety, as there will be fewer human misunderstandings in connection with unclear radio reception and radio communication errors (for example, ATCO and pilot speaking at the same time). In addition, the availability of both voice and data as possible communications media will provide mutual back-up.

As illustrated in the programme, the introduction of CPDLC in Copenhagen FIR will require partly the establishment of the technical infrastructure for data communications, via Link2000+, and partly the implementation of standardised CPDLC functionality, technical interface and operational concept, which will be established as part of COOPANS Build 2.4. Another important element is coordination with LFV and Borealis concerning joint introduction of the technical infrastructure, if possible, and a harmonised CPDLC service in Northern Europe.

On implementation of CPDLC, the ESSIP objective ITY-AGDL and Implementing Rule No 29/2009 on the introduction of Air/Ground Data Link above FL 285 will be met. Denmark and the rest of Scandinavia, among other countries, are part of the group that are required to implement CPDLC by 5 February 2015.

COOPANS Build 2.4

COOPANS Build 2.4 provides a CPDLC-HMI user menu and technical interface as well as the standardised platform functionality that is to support the operational concept that is also planned in COOPANS.

Link 2000+

The technical infrastructure is primarily expected to be put in place by establishing SLAs with data suppliers and via purchases of BIS routers, ensuring cost-efficient introduction and subsequent operation of CPDLC in Copenhagen FIR. If deemed beneficial, efforts will be made to implement the technical infrastructure jointly with LFV.

Coordination, LFV and Borealis

To deliver further savings and efficiencies in the introduction of CPDLC, Naviair has initiated coordination with LFV and Borealis. The former as an element of introducing the technical infrastructure for CPDLC in Copenhagen FIR, while the latter primarily focuses on the introduction of a harmonised CPDLC service springing from future regulatory requirements.

The Borealis coordination is based on the data link initiative, which was one of three initiatives launched in 2012 under Borealis (see the section on Borealis under Technical-operational business initiatives). Specifically, the provision of a harmonised service is being discussed. This would mean that airspace users would experience the same service level across the Nordic region and would no longer experience a change in service level each time they pass a FIR or FAB boundary. Discussions are also underway on whether the service can be extended without considerable additional costs.

Mode S/WAM

Mode S / WAM	Cost reduction	New regulatory requirements	End-of-Life	Performance scheme S	C	A	E	2013	2014	2015	2016	2017	...
Radar 1 – Upgrading to Mode S		X	X										
ARTAS													
DACOSY													
WAM-DK	X	X		X	X								
COOPANS Build 2.5	X	X		X	X	X	X						

Naviair project model: Project Analysis, Project Definition, Project Execution, Project Handover (Operation), Project Closure, **Continuous Improvement**

X **: ESSIP objective or standard**

Performance scheme: Safety, **C**ost-efficiency, C**A**pacity, **E**nvironment.

The introduction of Mode S/WAM will have advantages in the form of improved data quality (elementary Mode S), more cost-efficient purchases, support and maintenance of surveillance equipment (WAM) and compliance with regulatory requirements in the area.

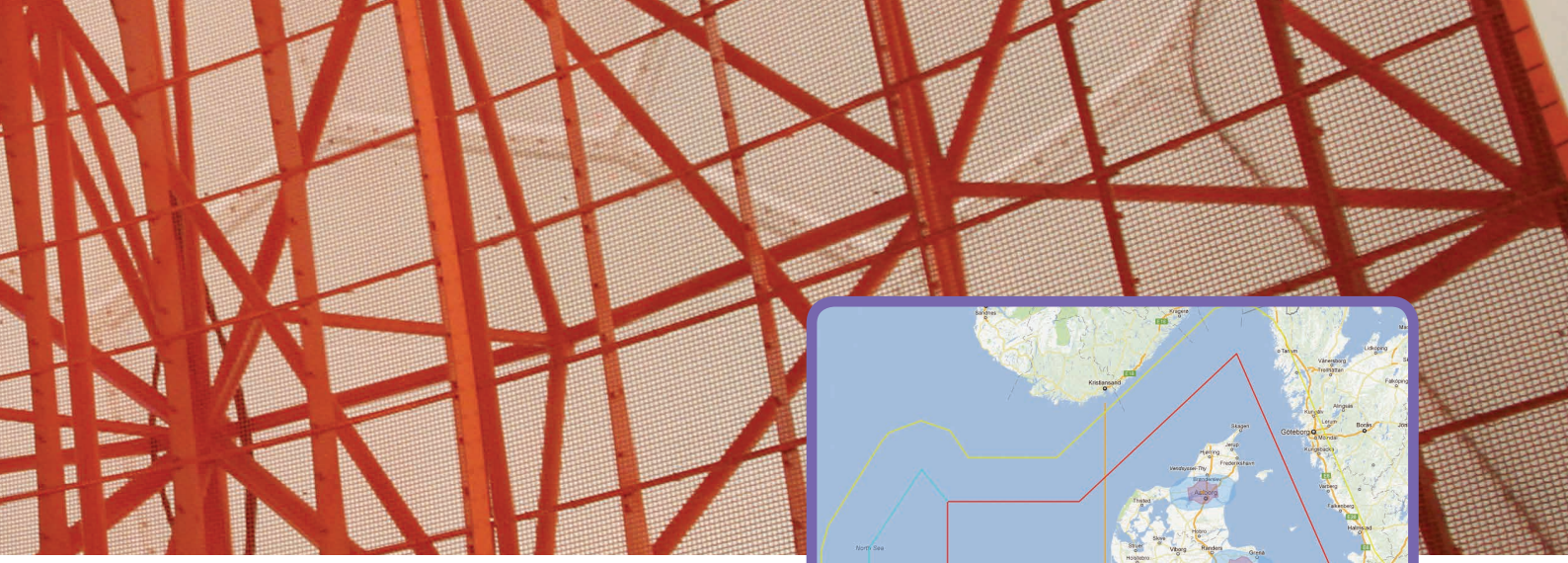
More specifically, Mode S has the advantage over Copenhagen FIR's existing Mode A/C of offering enhanced degree of detailing unique 24-bit address, ACID (Callsign) and more accurate altitude readings from the existing 100 feet to 25 feet. The multilateration technology that will be introduced with the technical WAM infrastructure will be carried out via a number of antenna stations and will therefore minimise the need for purchasing new equipment and upgrading existing costly surveillance infrastructure based on radar technology while at the same time cutting support and maintenance costs.

Mode S/WAM will be introduced via a number of interrelated and interdependent initiatives and investments. The timing and designation of each initiative is shown in the programme. In general terms, the upgrade of Radar 1 to Mode S and WAM-DK implements the technical infrastructure for establishment of Mode S technology in Copenhagen and, with WAM-DK, across Copenhagen FIR. The operational concept for using WAM will be introduced as part of COOPANS B.2.5, while the upgrade of DACOSY to Mode S will ensure availability in a contingency scenario in which the COOPANS system is down for a brief period.

Lastly, ARTAS will be fine-tuned and optimised for the use of WAM and Mode S technology.

The programme for the introduction of Mode S/WAM is illustrated in the programme and will be completed at the end of 2014 with the roll-out of the technical WAM infrastructure and COOPANS Build 2.5. This will mean that Copenhagen FIR can be declared a Mode S area, in compliance with Implementing Rules Nos 1207/2011 and 262/2009, the latter of which will become effective precisely at the time Copenhagen FIR is declared a Mode S area.

Once Mode S/WAM has been introduced, the benefits of elementary Mode S can be reaped in Copenhagen FIR. The next Mode S level, called enhanced Mode S, introduces various added advantages via Downlink of Aircraft Parameters (DAPs). This will allow selective data requests from the ATCO to the aircraft's systems on the aircraft's state and the pilot's intentions – for example the level entered by the pilot in the flight management system. The information will be downlinked from the aircraft to the ATCO, giving the ATCO and the pilot access to the same information about the aircraft. Because the ATCO will have access to both ground-based and aircraft data and can request specific data related to these, the ATCO's situational awareness will be improved in the form of a complete live picture and a faster and more precise picture of the coming development. Enhanced Mode S/DAPs will thus improve efficiency and the already high level of safety.



Coverage diagramme, WAM-DK

Implementation of enhanced Mode S/DAPs in Copenhagen FIR will be technically feasible on introduction of the Wide Area Multilateration (WAM) infrastructure in Denmark (see WAM-DK). An actual roll-out of enhanced Mode S/DAPs in DK-DIR has yet to be determined, but it is expected to take place starting in 2016-2017.

Initiatives related to the implementation of Mode/WAM are described in the following:

Radar 1 – Upgrading to Mode S

The purpose of this project is to replace and upgrade existing software and hardware in Radar 1 located in Kastrup, as support and spare parts for this will expire shortly. At the same time, in Copenhagen, project Mode S has the added advantages already mentioned and also supports compliance with regulatory requirements in this area.

Specifically, the Radar 1 upgrade comprises an extension of the service life of the radar's primary radar processing and secondary radar IRP equipment. Activation of Radar 1 in Copenhagen to Mode S operation will also mean that operational validation of Mode S can commence at the end of 2013. This will mean that the experience gained can be drawn on for the Mode S/WAM initiative, which will introduce Mode S across Copenhagen FIR when it is implemented the following year (see the section on Mode S/WAM).

ARTAS

ARTAS will be fine-tuned and optimised for the use of WAM and Mode S technology.

DACOSY

DACOSY will also be upgraded to support Mode S to enable use of the Mode S technology in a contingency scenario in which the COOPANS system is down for a short period of time.

WAM-DK

The introduction of Wide Area Multilateration (WAM) in Copenhagen FIR is designed to introduce the technical WAM infrastructure in Denmark. This will minimise the need for the acquisition and upgrading of existing more costly surveillance infrastructure based on radar technology featuring cost-intensive radars (secondary radars). On completion, WAM-DK will mean that Naviair will cover the whole of Copenhagen FIR with its own secondary single radar coverage, satisfying operational needs.

WAM supports three radar services simultaneously: Mode S and ADS-B as well as existing Mode A/C Surveillance, and will, as a minimum, provide the same, or better, coverage than the existing surveillance equipment. The aircraft's position is calculated independently of the aircraft's own positional data using multilateration technology, and will be the catalyst that will ensure that Naviair, in cooperation with neighbouring countries, Danish Defence and airspace users, makes the move to a Mode S-declared airspace in future, with the option of enhanced Mode S service.

WAM will be implemented with unchanged separation minima. In controlled airspace, coverage must be from 3,500 feet to FL 660, although over the North Sea including delegated airspace, North Sea High, from FL 195 to FL 660 surrounded by a 30 NM buffer zone.

In 2013, the project will continue its execution phase, which is expected to be completed in 2014.

COOPANS B.2.5

WAM (Mode S Surveillance), ADS-B-Support and the establishment of an operational concept that enables implementation of the functionality are all constituents of the functionality that will be rolled out with COOPANS Build 2.5.

Other investments and other initiatives

The programme below sets out other investments and other initiatives planned for implementation in the En route – Denmark area over the period 2013-2017. A cross in one or more of the start-up criteria represented in the columns Cost reduction, New regulatory requirements and End-of-Life indicates the background for the launch of the initiative. With reference to the performance scheme (see the section on SES under International framework), a cross in one of the associated columns represents whether – and, if so – where the initiative in question has a positive impact on one or more of the areas Safety (S), Cost efficiency (C), Capacity (A) and Environment (E). The effect has not been quantified in relation to the performance scheme.

En route – Denmark	Cost reduction	New regulatory requirements	End-of-Life	Performance scheme				2013	2014	2015	2016	2017	...
Other investments				S	C	A	E						
INFO 05 upgrade			X										
DATMAS, Barco screens (replace.)			X										
FPL 2012		x											
SWIM	X			X	X	X	X						
Common test platform	X				X								
VCS RCS10			X										
Digital Radio Interface incl. VoIP	X	x	X		X								
DCG upgrade of BUFR code		x	X		X								
CANDIIP		X	X		X	X							
Legal Voice recorders			X										
VOR replace. in Copenhagen FIR	X		X		X								
Replacement of RMCDE			X										
VHF replacement (8.33kHz)		X											
Other initiatives													
TG BCIs	X												
ADQ		X											
AAM	X	x				X							
CDO	X						X						
CCO	X						X						
Øresund TMA	X						X						
Redesign of en route airspace	X						X						
RNP	X						X						

Naviair project model: Project Analysis, Project Definition, Project Execution, Project Handover (Operation), Project Closure, **Continuous Improvement**, x : **ESSIP objective or standard**
Performance scheme: Safety, **C**ost-efficiency, **CA**pacity, **E**nvironment.

Other investments

INFO 05 upgrade

The purpose of this project is to upgrade the COOPANS system's INFO 05 system to include a dynamically updated map with adequate weather data.

The reason for this is that the weather display functionality of the COOPANS system is currently limited, both with respect to sharpness of details and data. The latter thus only comprises weather display for the Copenhagen area, leaving a substantial part of the sector without weather display.

To compensate for the above, a provisional solution has been implemented, with weather display on the sector-co-positions' PCs. However, this solution has proved inexpedient in various respects. For this reason, the project will be implemented in 2013-2014, comprising upgrading of hardware and software.

DATMAS, Barco screens (replacement)

The service lives of the existing radar screens in the ATCC were extended in 2010 so that they can also be used in the COOPANS system. However, the screens will have to be replaced in 2015.

FPL 2012

The project aim is to ensure that all Naviair's systems that use flight plan data and will be affected by the changes in connection with FPL 2012 comply with the ICAO standard relating to the conversion of flight plan content to the new Flight Plan 2012 (FPL 2012) format. The project also features a coordinating dimension in connection with the implementation of the change in relation to affected business partners.

The project does not include further development of the systems affected to achieve new functionalities that make use of the opportunities provided by the new FPL format. The project will only ensure the integrity and reliability of the systems.

The new FPL format is the result of the introduction by ICAO of a supplement to their DOC4444 (see the section on ICAO under International framework) to enable pilots and airlines to transfer more details on the equipment of modern aircraft. The date and time of flight plans submitted early as well as a wide variety of supplementary information and abbreviations have also been standardised.

The switch to the FPL 2012 format was not incorporated in COOPANS Build 2.1, as the latter was implemented in Denmark on 6 November 2012. As the FPL 2012 requirement became effective already on 15 November 2012, the requirement was instead met by COOPANS continuing to receive the existing format from IFPS during a transitional period. This arrangement will ensure Naviair's compliance with the requirement until the actual implementation of the FPL 2012 functionality with COOPANS Build 2.3 in 2013.

The project is in the implementation phase and, with the exception of OLDI, will be completed with the commissioning of COOPANS Build 2.3 on 21 March 2013. The OLDI upgrade, which will be implemented as part of Build 2.3, is not expected to be rolled out in relation to Naviair's OLDI partners until the second half of 2013 and the first half of 2014.

SWIM – System Wide Information Management

Under the banner 'the right information at the right place and at the right time', SWIM is concerned with standardisation of interfaces between ATM systems and external systems as a prerequisite for efficient exchange of relevant ATM information between aircraft, ANSPs, airlines, the military and other users of aeronautical information. This will provide the basis for information sharing for use in Collaborative Decision Making (CDM) (see investment relating to CDM). The SWIM concept is very extensive and covers everything from the ANSPs' own networks and aviation networks to satellite-based network information, etc. Internationally, SWIM is taken care of by SESAR in the form of a programme in which Naviair participates via NORACON.

SWIM introduces cost reductions in the form of efficiency improvement of work processes because of SWIM's overall principle to exchange and share ATM information between all parties involved in a flight, so that the right information is available in the right place at the right time. This creates a closer link between the three phases of a flight: planning, execution and completion. This results in improved situational awareness and increases flight safety, as decisions are made on the basis of enhanced data quality, which at the same time increases capacity across the entire chain.

In relation to SWIM, COOPANS will focus on standardisation of the interfaces to tower systems, of which many versions exist today. Besides tower interfaces, the current use of flight plan distribution in COOPANS, supported by IODE (InterOperable Data Exchange) and its gateway, will be reviewed with the aim of standardising and harmonising it. In addition, interfaces between Naviair and LFV systems will be reviewed in a cooperation to underpin operational initiatives such as Øresund TMA and Common test platform in Malmö.

Through its participation in NORACON WP8 and WP14, Naviair follows the work under SESAR's SWIM programme and, following detailed assessment of programme areas, will subscribe to the SWIM areas that are beneficial to Naviair. Against this background, a project analysis will be started up in 2013, followed by a project definition in 2015 to define the project scope before SWIM is implemented in 2016.

Common test platform

The purpose of this project is to establish a common test platform via COOPANS. A common test platform could comprise common testing with LFV of, for example, future COOPANS releases, delivering savings in the form of test facilities in a single country as opposed to two countries.

Options are being discussed on an ongoing basis and will be translated into a project analysis in 2013, leading to a project definition in 2016 with the aim of clarifying where and how a common test platform can be supported and what equipment will be required. A common platform will probably be implemented in 2017-2018, following which a usable test platform will be available.

VCS RCS10

The system is to replace the existing VCS RCS10 remote control system for brought-forward VHF stations that was developed in-house. The existing system is based on 20-year-old analogue technology that is no longer supported because it was developed in-house, and maintenance skills are very limited.

The new system is to support standardised remote maintenance functionality such as VSWR, Rx sensitivity, and is scheduled for implementation in 2014.

Digital Radio Interface incl. VoIP

The purpose of this project is to replace the existing analogue voice system with a digital system based on Voice over Internet Protocol (VoIP) technology. The reason for this is that the system has reached end-of-life stage, and up-to-date technology providing more efficient work processes may result in cost savings. On its completion in 2017, the project will also mean that EUROCAE standards in the area are met and that the ESSIP objective COM 11 is supported.

The project is in keeping with international developments, with Eurocontrol, ANSPs, ICAO, EUROCAE, FAA and industry having completed a number of exercises in autumn 2011 as a result of which implementation of VoIP can now begin. Accordingly, EUROCAE will now put in place the necessary measures as far as standards are concerned.

At European level, much attention is focused on VoIP as standard, as it is in line with SES II and has the potential to become a cornerstone both for the work on FABs at European level, and, in parallel with this, in relation to the development of the global standardised ATM system of the future.

DCG upgrading of BUFR code

This project comprises updating of the DCG system so that it supports the latest BUFR code (Binary Universal Form for the Representation of meteorological data) version. BUFR code is an internationally recognised binary data format standard for meteorological data that is maintained by the World Meteorological Organization (WMO).

The upgrade will take place in 2014, and will ensure that the service life of the system is extended and that the latest version of the BUFR code standard will be supported.

CANDIIP

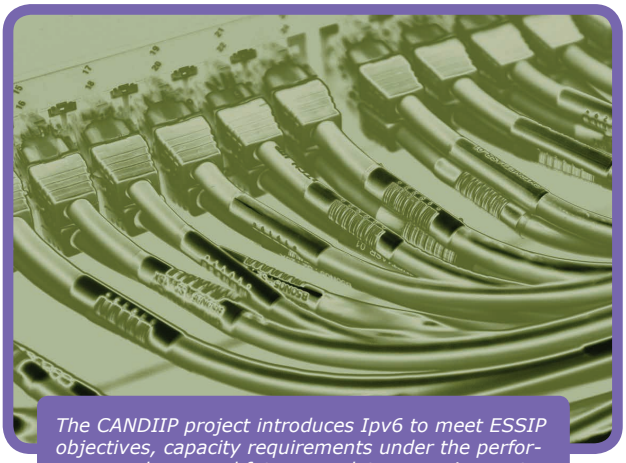
CANDI is Naviair's internal Wide Area Network (WAN), which ensures continuous transport of data in Copenhagen FIR. The CANDIIP project is being implemented due to obsolescence of existing equipment that before long will no longer be supported, and to meet ESSIP objectives, capacity requirements under the performance scheme and future regulatory requirements concerning the introduction of IPv6.

In 2012, a project analysis was kicked off. At the beginning of 2013, it will move on to project definition phase to determine solution options and a recommended solution. This will at the same time be normative for proposals for solutions, including advantages and drawbacks of coming Wide Area Network (WAN) technology taking into account existing LAN technology. Analyses will also explore communication links to transmitting/receiving equipment and links between Roskilde, Copenhagen, Billund and Aalborg.

The project will be executed in 2013-2014 once a decision has been made on the solution recommended as a result of the project definition. On closure, Implementing Rule No 633/2007 will be supported locally, with due consideration for Amendment No 283/2011 relating to the introduction of IPv6 and ESSIP objective ITY-FTMP. At international level, Naviair has already ensured compliance with these IRs via PENS.

Legal Voice-recordere

This project comprises replacement of legal voice recorders in blocks 4 and 5 and Roskilde TWR. The project will be executed in 2014-2015, prompted by the fact that the supplier has announced that the existing recorders, acquired in 2007, are nearing end-of-life, at which point spare parts will no longer be manufactured.



The CANDIIP project introduces Ipv6 to meet ESSIP objectives, capacity requirements under the performance scheme and future regulatory requirements

VOR replacement in Copenhagen FIR

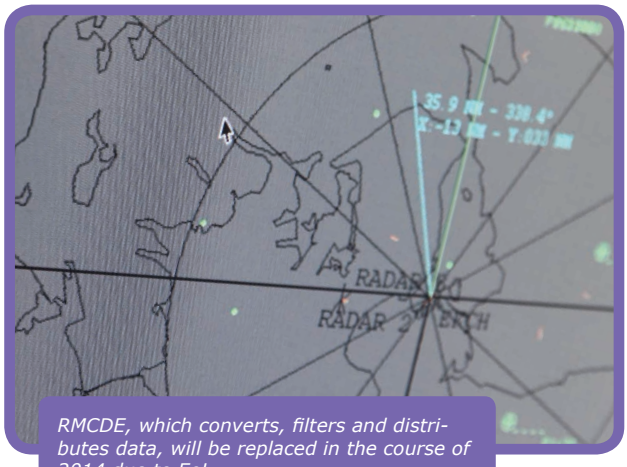
A replacement of VOR stations in Copenhagen FIR is required as the existing VOR stations are obsolete and spare parts no longer available. Naviair will prepare a VOR replacement strategy to ensure that a plan is prepared and relevant buildings refurbished in the most cost-efficient way and with due consideration for both commercial flights and general flights.

Naviair is in the process of preparing its VOR strategy, which will be based on, among other things, ICAO, Eurocontrol and SESAR strategies, including State Report –

Denmark. The strategy must be agreed with the Danish Transport Authority (TS), which has paved the way for phasing out of VOR stations in Copenhagen FIR subject to the necessary corrections of operational procedure and airspace structure.

On this basis, an initial analysis has indicated, via coverage diagrams, that a number of the existing VOR installations can be phased out while maintaining almost complete coverage at 3500' feet in Copenhagen FIR. However, this is subject to the conclusion of SLAs with LFV and DFS.

The VOR strategy is being determined in close coordination with NUAC, TS, Copenhagen Airports A/S and airspace users. Once the VOR strategy has been finalised, relevant VOR installations in Copenhagen FIR will be replaced, with expected completion in 2015.



RMCDE, which converts, filters and distributes data, will be replaced in the course of 2014 due to EoL.

Replacement of RMCDE

This project comprises replacement of the Radar Message Conversion and Distribution Equipment (RMCDE) system, which converts, filters and distributes radar data. RMCDE will be replaced by its successor, the so-called SDDS-NG system, which is more advanced in a number of respects and takes account of all safety and operational standards. The SDDS-NG system is expected to be implemented in 2014.

VHF replacement (8.33kHz)

Based on the coming IR on requirements relating to conversion of frequencies to 8.33kHz, Naviair is converting affected VHF equipment over a number of years.

In relation to the requirements set, Denmark is in the final phase comprising all EU Member States. In these countries, all frequencies must, as far as possible, be converted to 8.33kHz by the end of 2018.

Naviair will initiate a project analysis and a project definition already in 2013 to further analyse the scope. On this basis, Naviair also plans to commence the execution phase in 2013, followed by sequential implementation of the necessary conversions to ensure that Naviair will meet the regulatory requirement by 2018 in a timely manner.

Other initiatives

Technical Group BCI

Technical Group (TG) consists of members from Naviair, LFV and NUAC. This group is tasked with continuously coordinating and receiving input from ESSIP/LSSIP, EU regulatory requirements, international standards and initiatives the joint implementation of which is considered advantageous based on cost-benefit incentives. In this context and as part of the efficiency improvements that are designed to deliver total savings of at least EUR 13 million annually for LFV, Naviair and NUAC by the end of 2016 (see the section NUAC under Technical-operational business initiatives), the group has been working on a number of Business Case Initiatives (BCIs).

It has been decided to initially focus on TG's BCIs relating to COOPANS. In specific terms, this has led to initiatives relating to common use of resources and common terminology, and the investment in a common test platform (see description of the initiative Common test platform).

The initiative relating to shared use of resources is to analyse how common Naviair-LFV use of both technical and operational resources for testing of COOPANS releases could be organised. The purpose would be to eliminate duplication in attendance from both Naviair and LFV in order to deliver savings by having a single person represent both organisations in COOPANS contexts.

In recognition of the fact that Naviair and LFV use different terminology for operational troubleshooting and clarification related to problem, change and release/transition management, the purpose of this initiative relating to common terminology is to investigate how common Naviair-LFV terminology and definition of concepts to improve the efficiency of work processes could look.

Besides these initiatives, TG drafts and evaluates further BCIs on an ongoing basis, including BCIs that can underpin Naviair's, LFV's and NUAC's efficiency targets for the period up to 2016.

Aeronautical Data Quality (ADQ)

The aim of this initiative is to analyse and put in place any adaptations required at Naviair to ensure that Implementing Rule No 73/2010 is met. This IR provides that all manual handling of AIS data must cease and that data quality must be ensured at source. All data transfer must be electronic, across the data chain, to avoid incorrect translations. This IR also provides that all aspects must be risk assessed, including SLAs, training, process descriptions and systems.

The IR on ADQ has been effective since 2010 and, in principle, will apply to new data from 1 July 2013. Requirements relating to data sets and some requirements relating to data exchange will not become effective until 1 July 2014. The above thus applies to data from sender (source) and AIS office (distribution of AIP/NOTAM).

An IR relating to ADQ2 is at draft stage and will address data integrity in connection with composite products, e.g. data sets for ATM systems, FMS on aircraft, and pilot manuals. Naviair will also carry out an analysis in connection with this initiative to determine whether any initiatives will be required at Naviair.

Advanced Airspace Management (AAM)

AAM works by the European ANSPs forwarding their latest information on allocated military training areas to Network Operations Portal (NOP, formerly CFMU) in Brussels. This enables the NOP to react optimally in its daily calculations of capacity in the individual European control sectors.

The NOP in Brussels has undergone a large number of upgrades with new functionalities since its establishment in the early 1990s. These have all been paramount to ensuring that European airspace can be used optimally and flight delays be kept to a minimum.

Naviair plans to review the development that the NOP has undergone in recent years to decide whether the interaction should be expanded towards full Advanced Airspace Management to the benefit of airspace users.

Besides the above, ESSIP objective AOM 19 encompasses the acquisition of system support for Airspace Management Cells relating to activation and coordination of military training areas which is scheduled for implementation by December 2015. At present, Naviair does not anticipate the need for any further system support than that already implemented but will keep up to date about the implementation of such systems in Europe. On that basis, Naviair may acquire a system if the requirements of Danish Defence for training areas increase to such an extent that coordination on allocation warrants investment in further system support.

If, contrary to expectations, Naviair finds itself in a situation where it needs to acquire system support for Airspace Management Cells relating to activation and coordination of military training areas, Naviair will invest in new functionality.

Continuous Descent Operations (CDO) to Copenhagen

The implementation of CDO, previously called Continuous Descent Approach (CDA), is a current wish on the part of users of Copenhagen Airport, as such procedures may, viewed in isolation, provide a fuel saving that will also cut CO_2 emissions.

The CDO concept enables pilots to plan the optimal descent from cruising level to landing. It does not necessarily result in the shortest possible route, but optimises the aircraft's descent profile in terms of level and the use of engine power. In other words, the aircraft approaches at a higher level and using reduced engine power, resulting in lower fuel consumption.

Specific CDO procedures for Copenhagen have not been prepared, although more lenient level restrictions for direct routes to Copenhagen were introduced in 2009. These may be used in periods of low traffic intensity and allow airlines to use approximated CDO. In addition, existing RNAV procedures for Copenhagen can also be used for higher, more predictable approaches. However, this type of approach is only possible in periods of low traffic intensity as it may otherwise have a negative impact on departing aircraft.

Via consultations, Naviair's customers have clearly indicated that the use of CDO must not lead to lower priority being given to short approaches. The customers' wish for later descents has also been on the agenda in connection with supplementary training for ATCOs since spring 2008 to ensure that everyone is aware of this wish and that the possibility of disregarding level restrictions is offered wherever possible.

At airports with a high traffic density, it may be difficult to implement CDO and at the same time maintain high capacity with optimal density between departing and arriving aircraft. But the concept may be used during periods of low traffic intensity – without CDO hampering the possibility of maintaining the high proportion of CCOs (see the section on Continuous Climb Operations (CCO) from Copenhagen).

Efforts are being made to implement specific CDO procedures for Copenhagen. These are expected to be published in the AIP in 2013. However, the relevant ESIP objective ENV01 is deemed to be met already as existing procedures feature CDO techniques.

Continuous Climb Operations (CCO) from Copenhagen

The CCO concept, previously called Continuous Climb Departures (CCD), involves allowing departing aircraft to climb continuously to the desired cruising level and head directly for their destination as soon as possible. This results in the shortest possible route and means that unnecessary flying at low level, with resulting higher fuel consumption, is avoided.

The CCO concept vs standard management of departures from Copenhagen.

Today, CCO is largely being used optimally in Copenhagen. In 2009, at the request of Naviair, Eurocontrol carried out an analysis of the CCO concept in Copenhagen, concluding that the CCO concept was applied to approximately 95 per cent of departing flights. The analysis also concluded that CCO provides significantly higher fuel savings and lower CO_2 emissions than CDO.

Full use is already being made of the concept today in connection with the handling of traffic to Copenhagen, with ongoing evaluation and optimisation of the concept

Øresund TMA

The Øresund region is a hub for traffic to and from Scandinavia. However, Copenhagen's geographical location – close to Swedish airspace – can sometimes result in disrupted, complex Air Traffic Management (ATM). In connection with the establishment of NUAC, it has therefore been natural to take the initiative for a revision of Danish-Swedish airspace over Øresund.

The aim is to optimise ATM to and from Copenhagen, Malmö and a number of small airports in southern Sweden. Besides increased capacity, the possibilities for using environment-friendly procedures such as CCO, CDO and RNP in future will be explored. The focus will also be on simplified airspace classification and harmonisation of procedures across Danish-Swedish airspace.

The possibilities for linking this initiative with Free Route Airspace (FRA), which was implemented in DK-SE FAB en route airspace in November 2011, will also be explored. This adds another aspect to Naviair's efforts to handle air traffic in as environmentally sustainable a manner as possible – with respect to both fuel consumption and CO_2 emissions – based on the gate-to-gate concept.

A project group consisting of operational capabilities from Copenhagen, Malmö and Stockholm has been appointed under NUAC. The group's main task is to explore possibilities for airspace optimisation. No final deadline has been set as yet, but it is assumed that a new Øresund TMA can be implemented in the course of 2015.

Redesign of en route airspace

An initiative launched under NUAC is to explore how en route airspace in DK-SE FAB is being used. The initiative focuses on three areas: Being cost conscious, Optimised use of airspace and Minimising delays.

Following the implementation of Free Route Airspace in DK-SE FAB, traffic flows will change compared with the previous route structure, and the sector structure will therefore need to be adjusted to be able to handle these changed flows.

The purpose of studying this area in greater detail is to optimise use of airspace to the benefit of users. Firstly, routes must be optimised, resulting in a reduction in CO_2 emissions due to shorter routes. Secondly, optimisation must ensure that NUAC is able to deliver ATM in response to demand.

A working group has been appointed under NUAC, which has primarily been tasked with working on airspace optimisation. Moreover, a steering group with representation by both Naviair and LFV has been appointed.

The work has been initiated with participation by operational capabilities from Copenhagen, Malmö and Stockholm. No final deadline has been set as yet, but is assumed that initiatives can be implemented on an ongoing basis.

Required Navigation Performance (RNP)

RNP is a new type of procedure that enables fully automated flights in delegated airspace as well as shorter precision approaches. The concept is very reminiscent of RNAV procedures, but stricter requirements apply with respect to the aircraft adhering to specific limits in terms of speed and precision. In addition, the aircraft's FMS must be compatible with this type of procedure.

RNP procedures have not been prepared for Copenhagen. By contrast, LFV has initiated project Vinga at Landvetter Airport near Gothenburg, where it is testing RNP procedures. Naviair has elected to initially keep informed about this project. The experience gained in this connection will also be used in the work on Øresund TMA.

En route – Greenland

Services

Naviair provides flight information and alerting services in Greenland in the airspace up to FL 195 from its Flight Information Centre (FIC) in Kangerlussuaq. Naviair also provides technical support and maintenance of radar installations on the Faroe Islands and navigation and communications systems on the Faroe Islands and in Greenland as well as surveillance in Greenland.

Besides these services, Naviair operates Search & Rescue Services (SAR) for aviation over Greenland from its Air Rescue Coordination Centre (ARCC) in Kangerlussuaq. This comprises initiating SAR for aviation over Greenland.

Naviair also provides CNS services in Greenland. These services are also provided from Kangerlussuaq, where Naviair operates the national COM centre. From this centre, Naviair monitors international and national ATS networks. In connection with its COM service, Naviair is in charge of the international NOTAM office for Greenland.

En route – Greenland (technical-operational) comprises briefing and flight information from the Flight Information Centre in Kangerlussuaq.

Operational concept

The concept in Greenland is procedural Flight Information Services (FIS). With the exception of the CTA areas around Thule Airbase and Kangerlussuaq Airport, from where Local Air Traffic Services (ATS) are provided, the airspace is uncontrolled below FL 195. Flight plans and flight movement and control messages are received via fixed ATS networks.

Capacity

In Kangerlussuaq, Naviair has four operator positions, one of which is reserved for RCC. The maximum capacity is approx. 50 aircraft/hour.

Designation

Naviair has been designated by the Danish Transport Authority (TS) to provide ATM from ground level to FL 195. Under the delegation agreement between Denmark and Iceland and Canada respectively, these countries' ANSPs take care of operational ATM in the airspace above FL 195. Naviair provides technical equipment for these services.

Supply agreements, en route – Greenland

Customer	En route service from	Service	Contractual basis
The Danish state/the Danish Transport Authority (TS)	Flight Information Centre (FIC) in Kangerlussuaq	Flight Information Services (FIS) Briefing service Technical support and maintenance of ATM equipment Coordination of Search And Rescue services	• Joint Finance Agreement with ICAO, etc. • Act on Naviair

Initiatives – Greenland

Technical-operational development in Greenland primarily involves securing stable communications with aircraft over Greenland, via timely replacement and renewal of equipment and installations.

The overview below sets out the initiatives planned for implementation in Greenland over the period 2013-2017. A cross in one or more of the start-up criteria represented in the columns Cost reduction, New regulatory requirements and End-of-Life indicates the background for the launch of the initiative.

En route – Greenland	Cost reduction	New regulatory requirements	End-of-Life	2013	2014	2015	2016	2017	...
Investments									
HF Kangerlussuaq			X						
VHF Kulusuk			X						
ADS-B Greenland & the Faroe Islands	X								
Prins Christians Sund			X						
Project analysis									
Relocation of FIC Greenland									

Naviair project model: Project Analysis, Project Definition, Project Execution, Project Handover (Operation), Project Closure, **Continuous Improvement**, X : **ESSIP objective or standard**

Investments

HF Kangerlussuaq

This project covers the replacement, due to obsolescence, of the existing HF transmitting and receiving equipment sited in Kangerlussuaq. The project is expected to be executed in 2017.

VHF Kulusuk

Like HF Kangerlussuaq, the purpose of this project is the replacement of equipment due to end-of-life. The replacement comprises the brought-forward transmitting and receiving equipment in Kulusuk, incl. RCMS equipment. The project will be executed with closure in 2017.

ADS-B Greenland & Faroe Islands

This project is designed to enable surveillance of air traffic all the way from take-off to landing on flights between Europe and Canada/North America through the implementation of Automatic Dependent Surveillance-Broadcast (ADS-B) in Greenland, Iceland and on the Faroe Islands. So far, this has only been possible on a small part of the trans-atlantic route using radar.

Besides providing complete coverage over the Atlantic, other benefits of ADS-B are that airlines save fuel and thereby reduce their CO_2 emissions, as it is easier for each aircraft to reach its desired optimal level, resulting in lower air resistance and consequently lower fuel consumption. This is because the current 10-minute separation (approx. 80 NM) between flights will be reduced considerably with ADS-B. The shorter separation between flights will also provide scope for enhanced capacity and profits for airlines, creating a better and more efficient transport system for society. Other advantages of executing the project are improved Search and Rescue options due to increased precision in the monitoring of individual aircraft positions.

The ADS-B stations will, as far as possible, be sited in locations with existing infrastructure to keep costs to a minimum.

Prins Christians Sund

This project is divided into a number of sub-projects and tasks that are being carried out on an ongoing basis with a view to the procurement and upgrading of equipment for Naviair's buildings in Prins Christians Sund over the period 2013-2016. This includes renewal of power supply, tank systems, cable housing, pump housing and harbour warehouse as well as vehicles in the form of a snow scooter, a trench excavator and a 4-wheeler.

Project analysis

Relocation of FIC Greenland

The aim of the project analysis is to explore the possibilities of relocating FIC Greenland from Kangerlussuaq to the building that houses the Arctic Command in Nuuk. This would allow for more efficient coordination between the Greenland rescue services in Nuuk: MRCC, FIC and the police. Other benefits of relocating FIC Greenland include improved accommodation and easier access to technical support and personnel recruitment.

The project analysis scope also includes purchase and installation of new legal voice recorders for FIC Greenland. The system needs to be replaced as the supplier has announced that the existing recorders, acquired in 2007, are nearing end-of-life, at which point spare parts will no longer be manufactured.

It is planned to locate the future FIC in Nuuk together with the Arctic Command

Local Air Traffic Services

Services

Naviair provides aerodrome control, apron and alerting services at and to Copenhagen Airport, Kastrup. Physically, these services are located in the tower in the southern part of the airport.

Naviair also provides aerodrome and approach control services at the local airports in Aalborg, Århus, Billund, Rønne and Roskilde and Aerodrome Flight Information Service (AFIS) at Vágar Airport. Approach control service is provided at Aalborg, Århus, Billund and Roskilde using radar.

Operational concept

In connection with its approach and aerodrome control services, Naviair provides a safe, efficient, economic and well-organised handling of the traffic flow, taking into account the requirements, including with respect to capacity, that are made by the airports at which Naviair provides these services.

Naviair also ensures that the environmental impact for society is minimised in relation to the development and design of control zones, terminal areas and associated route structures.

Capacity plan – Copenhagen Airport, Kastrup

The NOP-coordinated airport capacity (peak operations) for each of the parallel runways 22 L/R and 04 L/R is 48 arrivals and 48 departures per hour. Globally (arrivals and departures simultaneously), this provides a level of 83 operations.

These figures in principle vary only as a result of bad weather or the closure of one of the parallel runways, meaning that only one runway is in operation. If the side wind is too strong to allow the optimal runway configuration of 22 L/R and 04 L/R to be used, cross runway 12/30 may be used for departures and arrivals.

The capacity in situations with bad weather with visibility between 200–800 metres (category II) is 30 arrivals. Category III with visibility below 200 metres allows 15 arrivals per hour. Actual capacity is determined based on weather and runway configurations on the day.

Flight traffic at Copenhagen Airport is expected to increase by 1.5 per cent in 2013. Air traffic in Billund is also expected to increase by 1.5 per cent.

Supply agreements

The following supply agreements apply to the provision of Local Air Traffic Services and local technical maintenance:

Supply agreements – Local Air Traffic Services

Customers	*Local Air Traffic Services*	*Services*	*Contractual basis*
Copenhagen Airports A/S	Tower in Copenhagen	Aerodrome control service (technical-operational)	Supply contract between Naviair and Copenhagen Airports A/S relating to Air Traffic Services (ATS) at Copenhagen Airport and Roskilde Airport
		Apron service at Copenhagen Airport	Supply contract between Naviair and Copenhagen Airports A/S relating to apron and alerting services
Copenhagen Airports A/S	Tower in Roskilde	Aerodrome control service (technical-operational)	Supply contract between Naviair and Copenhagen Airports A/S relating to Air Traffic Services (ATS) at Copenhagen Airport and Roskilde Airport
Billund Airport	Tower in Billund	Aerodrome control service (technical-operational)	Supply contract between Naviair and Billund Lufthavn A/S relating to ATS
Århus Airport	Tower in Århus	Aerodrome control service	Contract on the operation of ATS at Århus Airport
Defence Command Denmark/Aalborg Airport	Tower in Aalborg	Aerodrome control service (technical-operational)	Agreement on the operation of ATS Aalborg Airport – FKO
Bornholms Airport	Tower on Bornholm	Aerodrome control service	Contract on the operation of ATS at Bornholm Airport
Vágar Airport	Tower on Vágar	Flight Information Services (FIS)	Contract on the operation of ATS and weather observation services, Vágar Airport

Initiatives – Local Air Traffic Services (ATS)

Focusing on the customer, the initiatives described in this section are implemented in order to reduce costs, replace end-of-life equipment and/or comply with regulatory requirements and supply agreements.
The overview below sets out the initiatives planned for implementation in the Local Air Traffic Services (ATS) area over the period 2013-2017. A cross in one or more of the start-up criteria represented in the columns Cost reduction, New regulatory requirements and End-of-Life indicates the background for the launch of the initiative.

Local Air Traffic Services	Cost reduction	New regulatory requirements	End-of-Life	2013	2014	2015	2016	2017	...
Investments									
COOPANS Build 2	X	X							
COOPANS Build 3	X	X							
COOPANS Build 4+	X	X							
SWIM	X								
Contingency TWR (CPH)		x							
ATIS/VOLMET	X		X						
Collaborative Decision Making (CDM)		x							
TAMI replacement			X						

Naviair project model: Project Analysis, Project Definition, Project Execution, Project Handover (Operation), Project Closure, **Continuous Improvement**, x : **ESSIP objective or standard**

COOPANS

Further details of COOPANS are provided under the Technical-operational business initiatives area and under initiatives in the en route area. The COOPANS upgrades are implemented on an ongoing basis in 'Builds' installed locally in the towers in Roskilde, Billund and Kastrup.

SWIM

SWIM has various benefits that are described in further detail under the en route initiative relating to SWIM (see the section on SWIM under the en route area). Overlapping with the en route initiative, the purpose of this SWIM initiative – cooperating locally with Danish airports – is to harmonise and standardise interfaces between airport systems, between airport systems and tower systems and between ATM systems, tower systems and airport systems. Interface standardisation will provide a major contribution to efficient ATM based on exchange of relevant ATM information between Naviair and Danish airports as a constituent of Airport Collaborative Decision Making (see the section on CDM).

Through its participation in NORACON WP8 and WP14, Naviair follows the work under SESAR's SWIM programme and, following detailed assessment of programme areas, will subscribe to the SWIM areas that are beneficial to Naviair. Against this background, a project analysis and a project definition will be prepared in 2015 to define the project scope before SWIM is implemented in 2016.

Contingency TWR (CPH)

To ensure that a capacity level of 60–80 per cent of normal capacity can be maintained if the primary tower at Copenhagen Airport, Kastrup (TWR South), cannot be used for air traffic handling for a prolonged period, the establishment of a Contingency TWR in the old ATCC tower (TWR West) is planned. Maintaining a capacity level of 60–80 per cent of normal capacity in TWR West requires the installation of a great deal of additional VCS and ATM equipment and a major refurbishment of the physical conditions in the tower cap. The project will be executed in coordination with Copenhagen Airports A/S and is scheduled for execution at the end of 2014.

ATIS/VOLMET

This project encompasses the complete replacement of ATIS/VOLMET in Kastrup and Roskilde, and will support Kastrup, Roskilde, Billund and Aalborg interfaces. The reason for this project is that it is no longer possible to maintain the existing CIDEPS system, which handles ATIS CPH/RK, VOLMET and Departure Clearance, as well as end-of-life on existing data interfaces. The project also encompasses implementation of an additional position for Building 5 for ash warnings. The project is in the project execution phase and is expected to be closed in 2013.

Collaborative Decision Making (CDM)

CDM will play an instrumental role in the drive to achieve efficient ATM at European airports, providing environmental benefits and smooth ATM. CDM is a pan-European initiative that is designed to ensure that all parties involved in ATM are aware of each other's roles and responsibilities and interdependencies. In general terms, it is made up of a planning part and the execution of the operational service.

Airports are an international focus area in relation to CDM due to the concentration of delays in and around these, including apron and taxiway congestion, with an adverse environmental impact. With Eurocontrol's Airport CDM Team as responsible party, and with participants from airports, ANSPs and airlines, the initiative has been taken for standardised implementation in Europe – a concept that is also part of SESAR. This is in recognition of the fact that the stages of CDM implementation differ widely in Europe; from fully developed interaction with Brussels to almost non-existent CDM at Madrid Airport.

Copenhagen Airports A/S is the driving force behind the implementation of Airport CDM at Copenhagen Airport and has already embarked on an initiative for upgrading – and commissioning in 2015 – of existing system and service support. For enhanced coordination and to produce possible solution scenarios in cooperation with Copenhagen Airports A/S, a project analysis will be launched in 2013 to analyse solution options. This will be followed by a project definition that will further clarify the content. These initiatives will be followed by a project execution phase during which the recommended solution will be executed.

In parallel with the above, Naviair will initiate an analysis of data that can help enhance predictability of airport flight movements at as early a stage as possible. The ability to predict 'turnaround time' is of particular interest.

With reference to ESSIP objective AOP 05, Airport CDM must be fully implemented by January 2016, including a number of sub-targets beginning in 2013.

TAMI replacement

TAMI is an integral part of Naviair's ATCO positions and indicates wind direction and wind speed on taxiways in use. The system has been working smoothly, but is nearing end-of-life, as the hardware used for making the weather panels is no longer being manufactured. In addition, all panels are from the same year, increasing the risk of them reaching end-of-life simultaneously.

Both software and hardware will need to be replaced. A project analysis in 2013 is to clarify how a new set-up to replace the existing TAMI system can be established that can also be used in Contingency TWR (see the description of the Contingency TWR initiative in the section on Local Air Traffic Services). Once a recommended, approved solution is available as a result of the project analysis, the project will be executed in 2013-2014.

International framework

The global framework for civil aviation is established by the UN's International Civil Aviation Organization (ICAO). ICAO promotes the safe and orderly development of civil aviation throughout the world in cooperation with its 191 Member States, including Denmark, based on the Chicago Convention from 1944 and various ICAO-developed standards and recommended practices.

With due consideration for ICAO standards and recommended practices, the EU Member States and a number of other European countries have jointly committed to harmonising and integrating ATM in Europe into a single airspace (Single European Sky). This means that ATM across Europe is subject to the same framework and development targets, formalised in the EU Single European Sky (SES) programme. The programme dictates – via regulatory requirements, directives and standards – the development at European level with the aim of improving efficiency, creating a more cost-efficient ATM system and ensuring environment-friendly handling of air traffic in Europe. The EU Commission is the decision-making and rulemaking body in this context. Consequently, the SES output that is signed by the EU Commission and included in the EU Journal has the force of law and is directly binding on the respective EU Member States and the European countries that have committed to complying with SES.

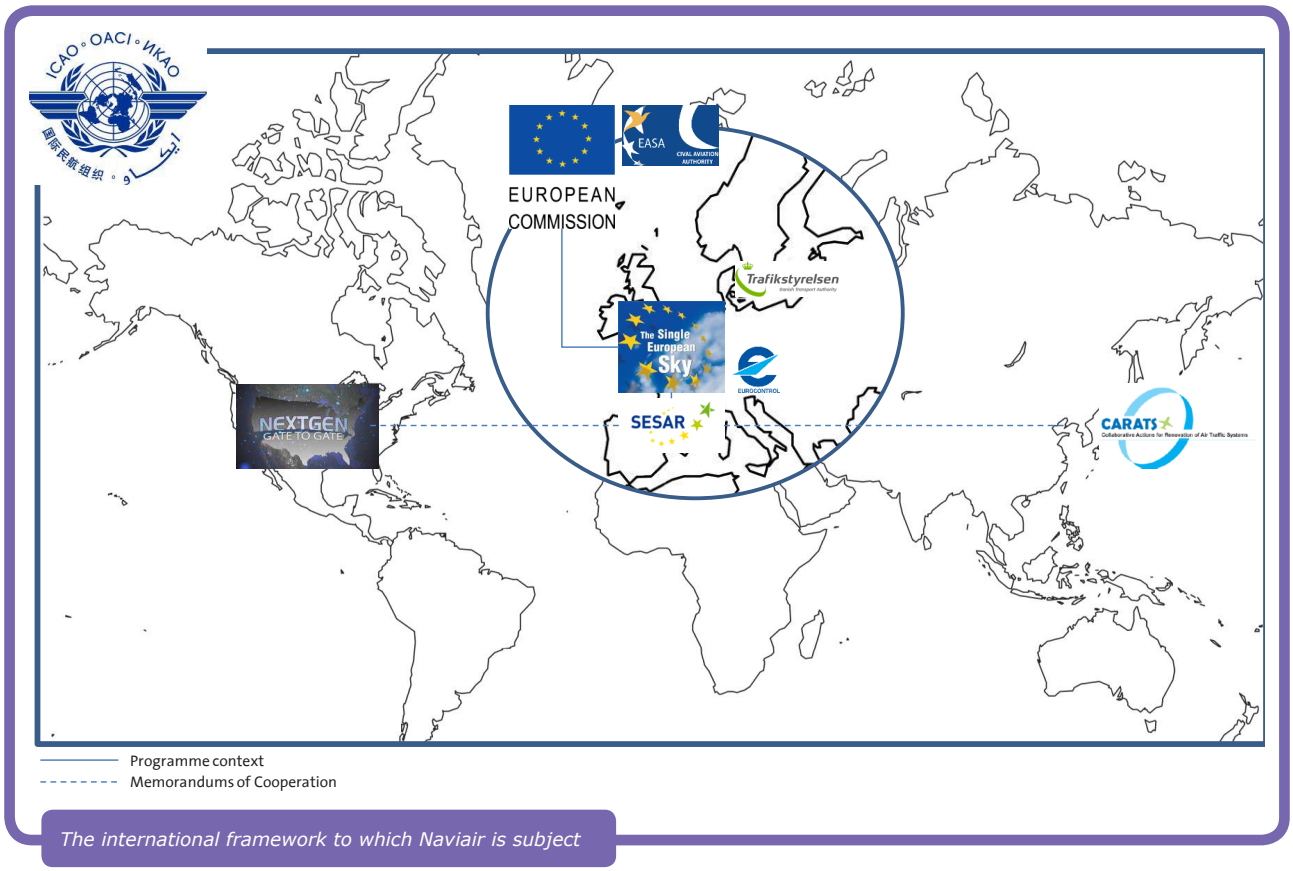
The EU Commission's rulemaking work is being increasingly supported by the European Aviation Safety Agency (EASA), whose remit has been gradually extended in recent years. Eurocontrol also plays a role in this context, providing expert assistance in a number of areas and taking care of overall coordination in its capacity as Network Manager.

SESAR constitutes the technical-operational development under the SES programme with the aim of developing a next-generation European ATM system in Europe. The SESAR members are the EU Commission, Eurocontrol and the aviation sector, including a number of providers of ANS and technical infrastructure, which means that the industry is also represented. Globally, there are several similar programmes designed to upgrade and harmonise ATM systems regionally. Of these, the most specific programmes with which SESAR, represented by the EU Commission, has concluded cooperation agreements are the US NextGen programme, headed by US Federation Aviation Administration (FAA), and the Japanese Collaborative Actions for Renovation of Air Traffic Systems (CARATS) programme. In parallel with these, a number of other countries, including Australia, Brazil, Canada, India, China and Russia, are working on similar development initiatives. Common to the regional programmes is that they must be aligned to the global objectives and framework established by ICAO to ensure global harmonisation.

In addition to the EU SES legislation, which is directly binding on EU Member States, the Danish Transport Authority (TS) drafts national legislation applicable to Denmark. This legislation is issued in the form of Regulations for Civil Aviation (BL) that are updated regularly. Most of these are based on ICAO standards and recommended practices and EU directives that are thus given the force of law and become binding on Naviair. TS is also the approving authority in connection with technical-operational initiatives in Denmark and, via so-called Oversights and Audits, is also tasked with ensuring that Naviair, among others, complies with current legislation at all times. In a DK-SE FAB context, TS shares this task with the Swedish Transport Agency.

The figure below provides a general summary of the international framework in the form of programmes and key players that govern Naviair's technical-operational development globally, regionally and nationally:

In the following sections, ICAO, SES and SESAR are described in further detail together with the leading organisations in this context.



The international framework to which Naviair is subject

ICAO

ICAO's Standards and Recommended Practices (SARP), along with a series of regulations such as ICAO DOC 444, form the basis for civil aviation globally. Further details are provided in ICAO Annexes 1-18, which form annexes to the Chicago Convention. The annexes are revised on a regular basis and are concerned with technical specifications aimed at harmonising and improving the rules applying to aviation. The annexes are not legally binding but have to a great extent been either directly adopted, adapted or referred to in EU legislation or Danish legislation (BLs) and must therefore be complied with by Naviair.

BLs are prepared by TS, which is entitled to impose more stringent national requirements than those laid down in the ICAO annexes.

Besides SARP, ICAO and its Member States are in charge of the global development via cooperation forums and conferences in all areas of civil aviation. One of the benefits of this coordinated action is standardised upgrading of ATM systems at global level to ensure interoperability and harmonisation. This will benefit safety and will also lead to improvement in core areas such as efficiency and environment.

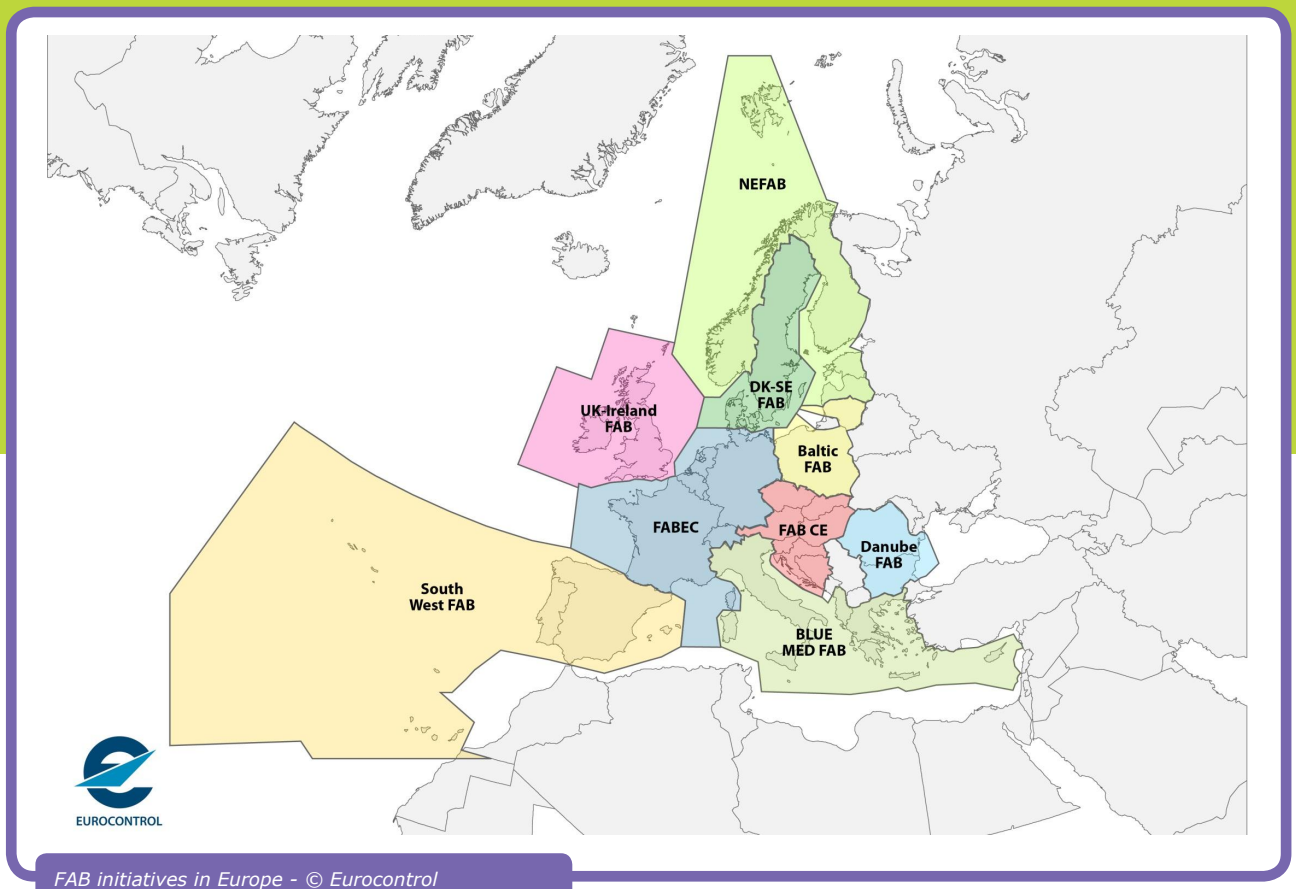
SES – Single European Sky

SES was born because the risk of European airspace and airports becoming overloaded unless considerable investments are made in upgrading. SES was created in recognition of the fact that the current ATM system and parts of the key technology used date as far back as the 1950s, and also that the development in Europe is fragmented in terms of technology, operational procedures and airspace. Through SES, the EU aims to harmonise ATM in Europe into one joint airspace, harmonising European development and leading to improved efficiency, more cost-efficient ATM and environment-friendly handling of air traffic in Europe.

The EU objectives have been coordinated with ICAO and are described in the so-called SES I legislative package from 2004 and various amendments to it in the SES II legislative package from 2009. Legislation adopted under the auspices of the EU is directly binding on Member States. The development is thus dictated directly by the EU unlike previously, when it was driven by fragmented national legislation. This will render a variety of local regulatory requirements based on EU legislation superfluous. SES is thus a key driver of the air traffic sector's future organisation, structure and economy.

The EU legislation includes the following requirements:

- FABs: Establishment of a few large Functional Airspace Blocks by combining more of the many geographical airspaces based on state boundaries, taking into account a number of requirements concerning improvement of, among other things, safety, efficiency and flexibility. The deadline for the establishment of FABs was 4 December 2012. Denmark met this deadline with the establishment of DK-SE FAB (see the section on DK-SE FAB) as a FAB and of NUAC as operator of the ATCCs in Copenhagen, Stockholm, Malmö and Flight Planning Centre (FPC). Naviair is working on establishing an even larger FAB in line with the EU objectives for FABs in Europe.
- Performance scheme: Implementation of performance-based rules with requirements that are governed by actual performance targets to be set and tested in 2012-2014, the so-called first reference period, comprising the en route area only. The first reference period will be followed by subsequent, similar, but five-year reference periods, which will also comprise charges related to terminals and airports. The targets will be legally binding on EU Member States, and the preparations for the second reference period began in 2012. Performance targets are set in the following four areas: Safety, Capacity, Environment and Cost efficiency. The performance improvements will be achieved through EU-wide, FAB-wide and nationwide performance targets. ANSPs will be measured on their performance. ANSPs that do not satisfy the performance requirements may be subject to corrective action. This will make ANSPs more financially exposed than previously and will mean that they must enhance their earning capacity in order to be able to cope with fluctuating finances and earnings, including bearing financial losses up to a specific limit without being able to subsequently recover these losses through increased charges.
- EASA extended remit: Transfer of powers and responsibilities to the European Aviation Safety Agency (EASA). From covering areas such as airworthiness, flight operation and certification of aviation personnel, EASA's remit will now also include ATM and airports. The EU Commission's efforts to create a safe SES area extends to all aspects of safety, and EASA is thus responsible for the harmonisation of rules and standards relating to aviation safety in Europe. EASA fulfils its remit by adapting existing rules and recommendations from ICAO, JAA and EU to become EASA regulatory requirements and guidance material and – under mandate from the EU Commission – drafting new legislation in consultation with national supervisory authorities (including the Danish Transport Authority).
- Eurocontrol trimming: Significant changes to and trimming of Eurocontrol's management, structure and tasks,



FAB initiatives in Europe - © Eurocontrol

with a clear distribution of responsibilities between the EU Commission, EASA and Eurocontrol. The EU Commission has the overall authority role; EASA is responsible for aviation safety, while Eurocontrol's main task is to support the EU Commission and Member States with expert assistance in connection with drafting and revision of legislation, etc. For example, from 2012, Eurocontrol takes care of the overall coordination in its capacity as (ATM) Network Manager. In parallel, Eurocontrol works on setting uniform standards, particularly relating to the utilisation of European airspace. In coordination with SJU, Eurocontrol also has a steering role in the ESSIP/LSSIP reporting process, which monitors progress on SES implementation in the respective Member States.

- Implementation of environmental rules, regulations and regulatory requirements. These are drafted on an ongoing basis with reference to input such as SESAR's progress, output and with due consideration for ICAO.

In practice, the SES regulations mean that the EU Commission, via Eurocontrol and EASA, wants to be the main driver of the development and progress of the legislation and processes that are to create a single European airspace (Single European Sky). To enable it to influence this development, Naviair participates in, among other initiatives, a national working group that assists the Danish Transport Authority in determining Denmark's position on the implementing rules and comments on legislative proposals locally, in a FAB context and through its international trade association, CANSO.

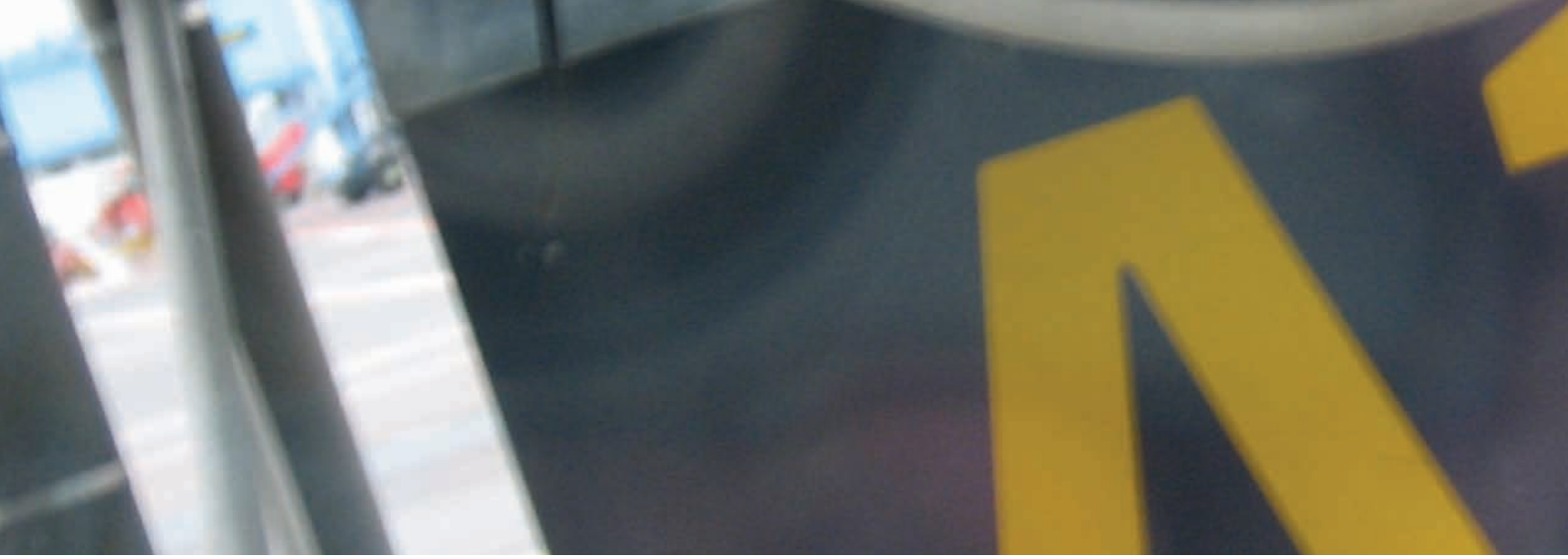
DK-SE FAB

On 17 December 2009, the Danish Minister for Transport and the Swedish Minister for Infrastructure signed a government agreement on the establishment of a joint Danish-Swedish Functional Airspace Block (FAB) under which the Danish-Swedish jointly owned company (general partnership), NUAC HB, took over operation of the ATCCs in Copenhagen, Stockholm and Malmö from 1 July 2012.

Against the background of the EU SES programme (see the section on European framework), the agreement enhances the efficiency of ATM, shortens flight routes, and cuts flight times by avoiding zig-zag flying due to national borders in future. One way in which Naviair is contributing to this in practice is via Free Route Airspace in DK-SE FAB, which was introduced in November 2011. For airlines, this means fuel savings and thus reduced CO_2 emissions.

The cooperation thus provides clear benefits for aviation, the climate and society, which receives a better service at a lower cost.

DK-SE FAB supports objectives from political quarters aimed at continuously enhancing the efficiency of ATM and reducing costs. The objectives are translated into perfor-



mance targets for safety, capacity, cost efficiency and the environment for DK-SE FAB.

With the DK-SE FAB covering 783,000 km², Denmark and Sweden meet the EU requirements (the SES regulations) concerning the establishment of a FAB by the end of 2012. The joint airspace has put Denmark and Sweden at the forefront of European countries in terms of the development of ATM in Europe.

Naviair is required to meet the targets in the performance scheme at FAB level in DK-SE FAB. The establishment of DK-SE FAB has also led to ESSIP/LSSIP progress reporting being coordinated with LFV on objectives where the harmonised introduction of procedures or functionality within DK-SE FAB is desirable.

SESAR – Single European Sky ATM Research

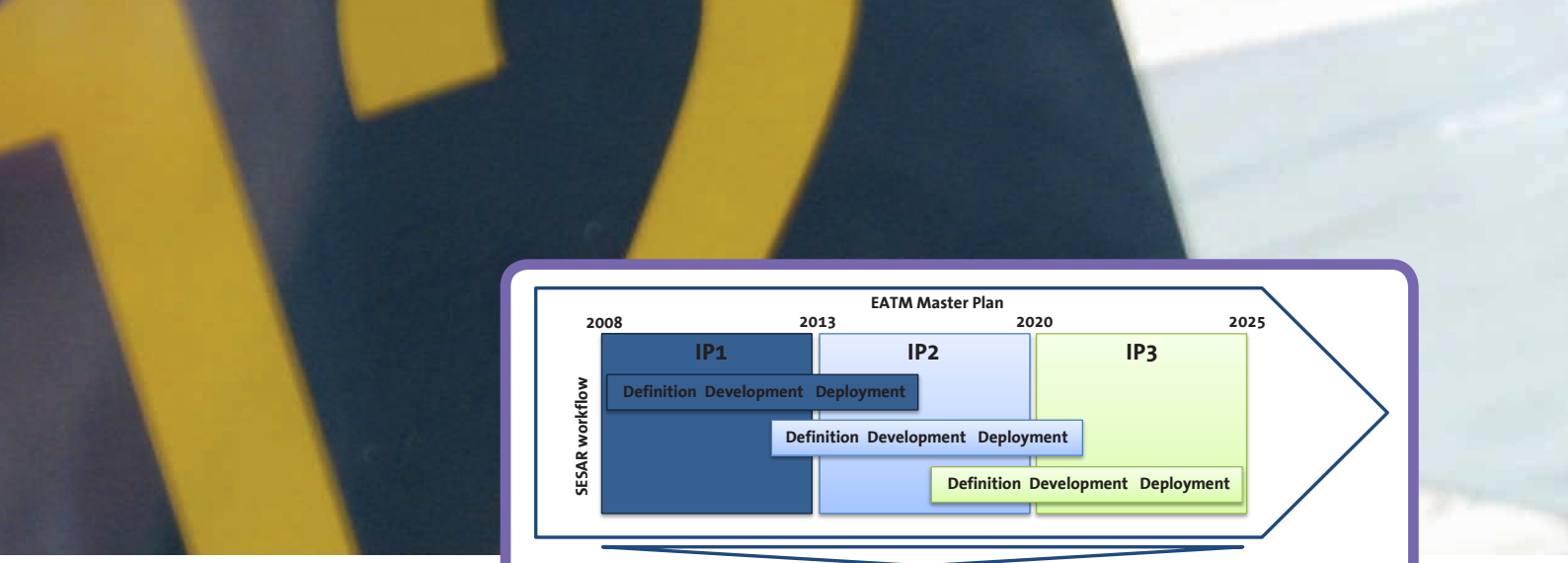
SESAR is the EU's ambitious programme for the development of a next-generation European ATM system by combining technology with operational, economic and legislative aspects. SESAR thus constitutes the technical-operational development in the EU and SES. In Naviair's opinion, there are major advantages associated with SESAR becoming an integral part of the ATM development and Naviair shares the trade association CANSO's positions on the programme. CANSO is advocating operationally driven development of the programme.

Based on the economic benefits of the SES initiative, the aim is for SESAR to achieve average savings of 8-14 minutes' flight time, 300-500 kg fuel reduction and a CO_2 reduction of 948-1,575 kg per flight in European airspace. This is to be achieved through SESAR's output in the form of operationally validated concepts and recommendations for legislation that, if adopted by the EU Commission, will ensure the establishment of a harmonised European ATM system. SESAR can thus be viewed as a means of achieving an objective at European level of harmonised implementation of ATM technologies, some of which exist already. SESAR is also to bring European ATM development in line with ICAO (see the section on ICAO), which, through coordinated efforts, is designed to harmonise the upgrading of ATM systems globally and achieve interoperability and harmonisation between systems – a task in which CANSO is also playing an active part. To further support and be in line with global developments, SESAR signed Memorandums of Cooperation in 2011 with the US and Japanese SESAR counterparts, NextGen and Collaborative Actions for Renovation of Air Traffic Systems (CARATS), which are also concerned with the regional development of a next-generation ATM system.

A joint undertaking, SESAR Joint Undertaking (SJU), has been set up to manage and develop SESAR. SJU has the form of a Public-Private Partnership (PPP). The members are: the EU Commission, Eurocontrol and the aviation sector, including a number of ANSPs and industry players. Each member has one third of the seats and contributes EUR 700 million in cash or in kind. SJU's original mandate to manage SESAR was set to expire in 2014, but was subsequently extended to 2016. Discussions are underway on whether SJU's role should be further extended to 2020 to maintain neutral governance of SESAR and the contribution of solutions by all parties.

Naviair participates in SJU's work through NORACON and A6 (see the section on NORACON under the area Technical-operational business initiatives), and is thus able to influence developments in SESAR. In this way, Naviair is protecting its long-term investments such as COOPANS to ensure that COOPANS can become a key player in SESAR and thus help determine what being SESAR-compatible means.

European ATM Master Plan (EATM) constitutes the backbone of SESAR, and dictates, with political backing, the development of the European ATM system. The EATM Master Plan was updated in 2012 to give more prominence to harmonisation, including ensuring an approach consistent with ICAO and aligning the plan to a performance-



SES/SESAR workflow and development flow

driven process (the performance scheme). The plan was simplified as part of this process and its approach made more pragmatic in relation to aspects such as what changes are essential, the timing of these changes and what the costs and benefits will be.

The EATM Master Plan is sub-divided into Implementation Packages (IP). Three IPs (IP1, IP2 and IP3) have been defined to date. IP1 (time-based) is to ensure a common European ATM-system baseline in the period leading up to further development under IP2 (trajectory-based) and IP3 (performance-based), which will run until 2025+.

The project research part under each IP, currently comprising 18 working packages divided into approx. 300 individual projects, takes place under SESAR. Each project is divided into the phases Definition, Development and Deployment. In between each phase, an assessment is made of whether supplies are still on scope and target for the given project. If so, the work proceeds to the next phase. Alternatively, the project concept is rejected, or moved to a more mature development stage in a subsequent IP, where the project is resumed and reassessed.

Project work kicks off with the definition phase, based on scope and overall guidelines for the direction and objectives for the project in question. During the development phase, the definition phase output is developed further in the form of specification and testing of functionality in an operational environment to produce one or more validated functionalities for incorporation in annual SESAR release packages – the first of which was delivered in 2011. If the validated functionalities are considered acceptable, they will be used in the deployment phase, which means that they will at the same time be part of the supplies for the IP in question, where deployment at national level takes place. In practice, the roll-out will be controlled by SESAR's roll-out plans and a so-called Deployment Manager.

The outcome of the project part defines the supplies for IP1, IP2 and IP3, and leads to standards and regulatory requirements in the form of Operational Improvements (OIs) and Implementing Rules (IRs) if adopted by the EU Commission. Other types of output are Community Specifications (CSs), which are not regulatory requirements but guidelines for the performance of the functionality that is a regulatory requirement in the form of Implementing Rules.

On behalf of the EU Commission, an expert group under Eurocontrol analyses OIs from SESAR on an ongoing basis to identify new ESSIP objectives to be proposed for inclusion in the coming ESSIP Plan, providing a common baseline for the ATM systems in Europe. Naviair contributes comments on the expert group's work via its international work.

To monitor compliance with OIs and IRs at European level, these are adopted in the ESSIP/LSSIP process, the status of which Naviair reports on annually via its input to the LSSIP. The process referred to above is illustrated in the figure showing SES/SESAR workflow and development flow.

In 2012, as part of the validation exercises taking place during the development phase, a successful live test was carried out on initial-4D (i-4D) in the form of a test flight from Toulouse through DK-SE FAB with landing at Copenhagen Airport, Kastrup, and with Stockholm Arlanda Airport as destination. Naviair participated in the validation of this technology together with LFV, Airbus and other industrial partners. Fully developed, the technology will minimise the aircraft's fuel consumption and CO_2 emissions while at the same time increasing capacity and punctuality.

'SESAR Releases Technologies Ready for Pre-Industrialisation', containing 15 priority areas, was published in 2012 based on the above and a range of other validation exercises. In the case of eight of these priority areas, further development activities are scheduled as part of the next SESAR release packages – Release 2 in 2012/2013 and Release 3 in 2013/2014.

IDP

In connection with the SESAR deployment phase and based on a number of criteria, an Interim Deployment Programme (IDP) has been prepared that is to carry SESAR's output into effect. The programme features seven priority areas of a technical and operational nature that refer directly to ESSIP objectives. The functionality that these areas feature is mature, validated concepts that are deemed, by, for example, Eurocontrol's Network Manager, to be critical in relation to the performance of the European route network. These areas can be rolled out in the short term to secure various early advantages at European level consistent with the ATM Master Plan.

Interim Deployment Programme (IDP)

#	Area	EATM Master Plan
1	Collaborative Flight Planning and Demand/ Capacity Balancing Tools	FCM03 + DCB-0205
2	Airspace Management Improvements and Data sharing	AOM19 + AOM20 + AOM13.1
3	Airport CDM	AOP05
4	Air-Ground Data Link	ITY-AGDL
5	Automated assistance to controllers for seamless coordination, transfer and dialogue	ITY-FMTP + ATC15 + ATC17
6	RNP approaches	NAV10
7	CDO/CCO application	ENV01 + AOM0703

Steering and monitoring mechanisms in connection with the work taking place in IDP are expected to take further shape at European level in the course of 2013.

Regulatory requirements, rules and provisions

At global level, standards regulating aviation are set by the UN's International Civil Aviation Organization, ICAO (see the section on ICAO). Using input from, for example, ICAO and supplies from SESAR, regulations and directives are drafted on an ongoing basis under the auspices of SES and adopted by the EU Commission. While regulations are regulatory requirements that are directly binding on Member States, EU directives and relevant ICAO regulations, standards and recommended practices that are not already comprised by EU regulations are adopted as national legislation by TS in BLs.

The SES legislation was introduced by the EU Commission in 2004 with the adoption of the so-called SES I legislative package. The legislative package concerns the establishment of a single European airspace and consists of four regulations designated: Framework Regulation 549/2004, Service Provision Regulation 550/2004, Airspace Regulation 551/2004 and Interoperability Regulation 552/2004, which jointly establish a sound regulatory basis for a homogenous and safe ATM system. These regulations have since been revised in SES II legislative package 1070/2009, which now constitutes the current foundation for SES. The overall framework in the SES II legislative package is set out in more detailed provisions, Implementing Rules (IR), which are also EU regulations and consequently regulatory requirements in the EU Member States. New IRs are added on a continuous basis, with input from SESAR and others.

In 2008, joint rules for civil aviation and the creation of a European Aviation Safety Agency (EASA) were introduced with the EU Commission's

adoption of the new so-called Basic Regulation 216/2008, issued in revised form as regulation 1108/2009 in 2009. As a result, EASA's remit has been extended so that in addition to aircraft it includes ATM, airports and a mandate from the EU Commission to draft new legislation. In this context, Eurocontrol is playing a similar role in the rulemaking area, via its so-called Support to Regulation, which also translates into draft legislation. Following adoption by the EU Commission this draft legislation is enacted in the EU Member States and other countries that have joined SES. The EU Commission grants mandates to draft legislation on a case-by-case basis.

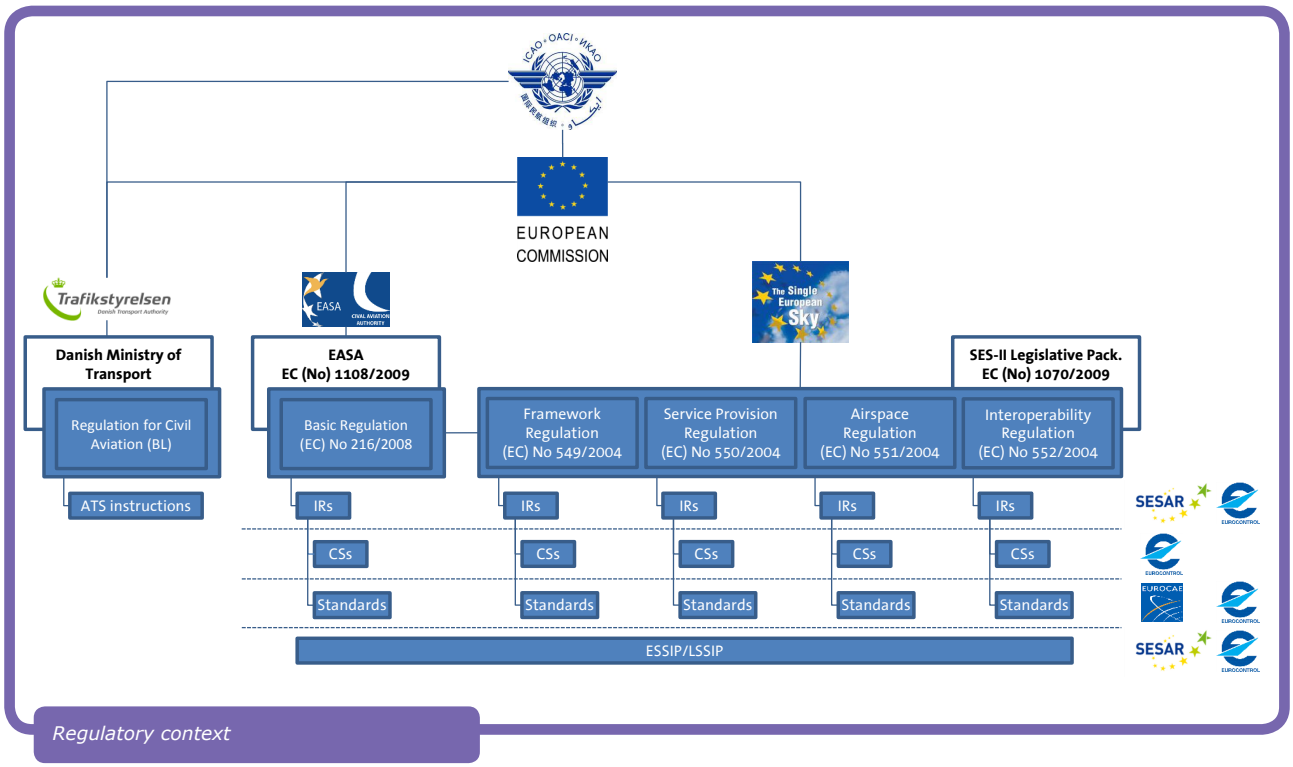
As a contribution to compliance with IRs by Member States, a number of Community Specifications (CSs) for equipment for ANSPs are published on a regular basis. These specifications are not regulatory requirements, but guidelines for the performance of the functionality that is a regulatory requirement in the form of IRs. Via a mandate from the EU Commission, a CS may either be a standard drafted by the European standards organisations (CEN, CENELEC, ETSI) jointly with the European Organisation for Civil Aviation Equipment (EUROCAE) or a specification drafted exclusively by Eurocontrol under mandate from the EU Commission.

SES implementation is monitored via the ESSIP/LSSIP process (see the section on ESSIP/LSSIP) by EU Member States reporting annually on national progress in response to the targets at European level contained in the ESSIP, via the LSSIP for the respective state. Eurocontrol has the steering role, in coordination with SJU, which owns the process.

The figure illustrates the overall context between organisations and regulatory requirements in relation to Naviair's technical-operational development. The organisations responsible for preparing draft or final versions of texts underlying and relating to the main regulations are shown on the right-hand side of the figure.

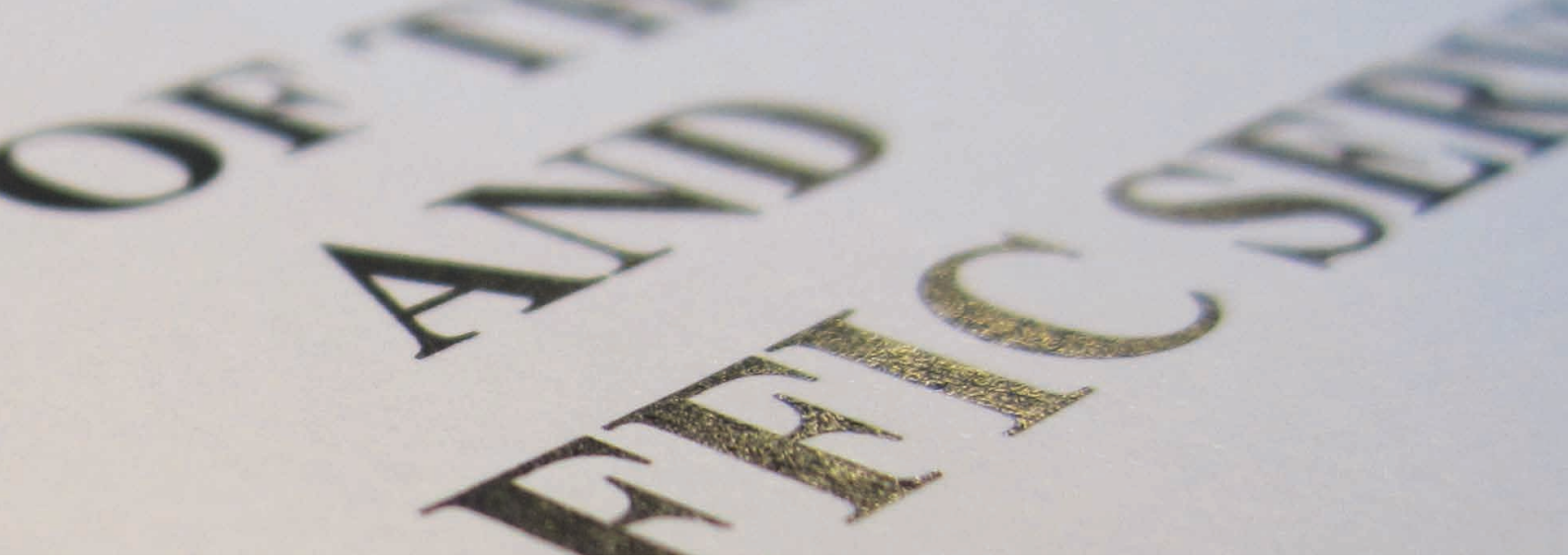
An outline of the four key regulations contained in the SES II legislative package and EASA BR is provided below:

- (EC) No 549/2004 – Framework Regulation: Establishes an ATM regulatory framework designed to optimise safety, efficiency, capacity and regularity in European airspace. The framework regulation sets out fundamental organisational requirements such as providing that national supervisory authorities must be independent of ANSPs and introduces a number of central bodies to promote SES at European level.
- (EC) No 550/2004 – Service Provision Regulation: Lays down joint EU requirements for the provision of ANS in the EU to ensure the safe and efficient provision of these in a lasting and compatible manner. In that connection the Service Provision Regulation sets out overall powers for national supervisory authorities concerning so-called Oversights and certification and requirements that Member States designate certified ANSPs.
- (EC) No 551/2004 – Airspace Regulation: Comprises guidelines for the establishment of Functional Airspace Blocks (FABs) to put an end to the fragmented European airspace and instead create a single, efficient and safe airspace. The Airspace Regulation also requires harmonised principles governing aspects such as route and sector design and flexible use of airspace.
- (EC) No 552/2004 – Interoperability Regulation: Introduces a harmonised method of certifying ATM systems and constituents to ensure the interoperability of the European ATM network.
- (EC) No 216/2008 – EASA Basic Regulation: Comprises common rules for civil aviation and the creation of EASA as the European aviation safety agency. In (EC) No 1108/2009, EASA's remit has been extended to include airports, ATM and ANS and has therefore become relevant for Naviair.



Regulatory context

The overall matrix of regulatory requirements comprises the regulations included in the SES legislative package as well as Implementing Rules referring to one or more of these. Implementing Rules under EASA BR are also set out in a separate matrix. The overview thus does not include Implementing Rules referring to directives and similar. The matrix shows the status for Naviair's compliance with the respective Implementing Rules. For regulatory requirements that have not yet become effective, initiatives launched by Naviair to ensure timely compliance with these are shown. The matrix includes a section showing relevant draft regulatory requirements that it has been deemed likely will be adopted by the EU Commission and that are consequently expected to become Implementing Rules within, probably, five years, and which Naviair must therefore launch initiatives to comply with unless it has already done so.



Applicable implementing rules:

(EC) No	Title	App.	2013	2014	2015	2016	2017	...	Naviair status/initiative(s)
549/2004	**Framework Regulation**								
691/2010	**Performance scheme for ANS and network functions** *as amended by (EC) No 677/2011, 1035/2011 and 1216/2011*	●							Compliant
550/2004	**Service Provision Regulation**								
176/2011	**Information to be provided before the establishment and modification of a functional airspace block**	●							Compliant
482/2008	**Software safety assurance system** *as amended by (EC) No 1035/2011*	●							Compliant
1794/2006	**Common charging scheme** *as amended by (EC) No 1191/2010 and 923/2012*	●							Compliant
551/2004	**Airspace Regulation**								
677/2011	**Implementation of air traffic management (ATM) network**	●							Compliant
255/2010	**Common rules on air traffic flow management** *as amended by (EC) No 923/2012*	●							Compliant
730/2006	**Airspace classification above flight level 195** *as amended by (EC) No 923/2012*	●							Compliant
2150/2005	**Common rules for the flexible use of airspace**	●							Compliant
552/2004	**Interoperability Regulation**								
1207/2011	**Performance and the interoperability of surveillance** *Date of applicability: 01/2020*								Mode-S/WAM
1206/2011	**Aircraft identification for surveillance**	●							Compliant
73/2010	**Quality of aeronautical data and aeronautical information** *Date of applicability:* 01/07/2013, 01/07/2014 and 30/06/2017								ADQ
262/2009	**Coordinated allocation and use of Mode S interrogator codes**								- Mode-S/WAM - COOPANS
29/2009	**Data link services** *Date of applicability:* 05/02/2015								CPDLC
1265/2007	**Air-ground voice channel spacing** *as amended by (EC) No 923/2012*	●							Compliant
633/2007	**FMTP,** *as amended by (EC) No 283/2011 Date of applicability: 31/12/2014 (amendment, IPv6)*								CANDIIP
1033/2006	**Flight plans in the pre-flight phase** *as amended by (EC) No 929/2010 and 923/2012*	●							Compliant
1032/2006	**Exchange of flight data, coordination and transfer of flights** *as amended by (EC) No 30/2009*	●							Compliant

(EC) No 482/2008: Preparation of Declaration of Verification in support of the compliance statement is an on-going process.
(EC) No 1207/2011: Date of applicability 01/2020 refers to ANSP implementation of Mode S and ADS-B.
(EC) No 73/2010: Date of applicability 01/07/2013 refers to dataset . Certain demands to data exchange apply 01/07/2014
(EC) No 262/2009: 31/03/2009 and 01/01/2011 (Art.3). Applicable when DK-FIR is declared Mode S area which is expected in 2014 as illustrated graphically in the table.

(EC) No 1070/2009 – SES-II amending (EC) No 549/2004, 550/2004, 551/2004 and 552/2004

(EC) No	Title	App.	2013	2014	2015	2016	2017	...	Naviair status/initiative(s)
923/2012	Air and operational provisions regarding services and procedures in air navigation								Compliant
748/2012	Initial airworthiness								N/A for ANSPs
1332/2011	ACAS								N/A for ANSPs
1178/2011	Adm proc. aircrew								N/A for ANSPs
1035/2011	Common Requirements *as amended by (EC) No 923/2012*	●							Compliant
1034/2011	Safety Oversight								N/A for ANSPs
805/2011	ATCO license	●							Compliant
2042/2003	Airworthiness *as ammended by (EC) No 593/2012*								N/A for ANSPs

(EC) No 923/2012: With reference to article 11 (2) the Danish Transport Authority has decided not to apply the provisions of this regulation until 4 December 2014.

(EC) No 216/2008 – EASA Basic Regulation

Relevant draft coming Implementing Rules:

(EC) No	Title	App.	2013	2014	2015	2016	2017	...	Naviair status/initiative(s)
-	Air-ground Voice Channel Spacing Phase 2 (VCSII) (ENPRM/11-001) Date of applicability: 12/2018 (all EU countries)	-							VHF-udskiftning (8,33kHz)
-	Performance Based Navigation (PBN) (ENPRM/12-004)	-							RNP
-	Aeronautical Data and Aeronautical Information Quality (ADQ-2)	-							ADQ

VCSII: Date of applicability 12/2018 as referred to in the draft regulation. By this date , all frequency assignments must be converted to 8,33 kHz channel spacing.
PBN: Date of applicability not yet published.
ADQ-2: Date of applicability not yet published.

Relevant draft implementing rules

ESSIP/LSSIP

Naviair reports on the progress on SES implementation via Local Single Sky Implementation Plan (LSSIP). This is in response to objectives contained in European Single Sky Implementation Plan (ESSIP), which is a five-year cyclical plan for the European development within systems and procedures.

The ESSIP/LSSIP process is structured in annual cycles and is initiated by the publication by Eurocontrol of the ESSIP plan in August/September of every year. Naviair then reports on progress, with internal Naviair approval at the end of February. Lastly, Naviair's implementation progress forms part of Denmark's overall progress reporting, for which TS is responsible in a Eurocontrol context. Eurocontrol has the steering role in this process, which is owned by SJU.

The process and the progress reporting provide a combined overview of the changes that need to be put in place to achieve the expected operational advantages in terms of safety, capacity, cost efficiency and environment. ESSIP agreements are not legally binding, but a statement of intent that is coordinated annually by Eurocontrol's Agency Advisory Body (AAB) and adopted by Provisional Council (PC).

The LSSIP status reporting is coordinated with LFV on targets where harmonised introduction of procedures or functionality in DK-SE FAB is desirable. This coordination is carried out in consultation with Eurocontrol's contact person in relation to the Swedish and Danish LSSIP.

The illustrations 'Naviair status on incomplete Country related ESSIP objectives' and 'Naviair status on incomplete Airport related ESSIP objectives' show extracts of LSSIP-DK comprising the technical-operational objectives in respect of which Naviair rolls out initiatives to ensure compliance. The list thus does not include objectives that have already been met or are not relevant to Naviair in the technical-operational area.

ESSIP obj.	Title	App.	2013	2014	2015	2016	2017	...	Naviair status/initiative(s)
AOM13.1	Harmonize Operational Air Traffic (OAT) and General Air Traffic (GAT) handling								**No plan** - Awaiting REG deliverables
AOM19	Implement Advanced Airspace Management (AAM)	●							**Planned** - Advanced Airspace Mgt. (AAM)
ATC16	Implement ACAS II compliant with TCAS II change 7.1	●							**No plan** - Awaiting REG deliverables
ATC17	Electronic Dialogue as Automated Assistance to Controller during Coordination and Transfer								**Planned** - Technically implemented. Full OLDI to be ops. analysed .
COM09	Migrate ground international or regional X.25 data networks or services to the Internet Protocol (IP)								**Planned** - CANDIIP
COM10	Migrate from AFTN to AMHS	●							**Late** - Upgrade to AMHS handled via maintenance contract
COM11	Implementation of Voice over Internet Protocol (VoIP) in ATM								**Planned** - Digital Radio Interface VoIP
FCM01	Implement enhanced tactical flow management services	●							**Late** - COOPANS B.2.3
INF04	Implement integrated briefing	●							**No plan** - Legal arrangements under investigation.
ITY-ADQ	Ensure quality of aeronautical data and aeronautical information								**No plan** - Awaiting REG initiative
ITY-AGDL	Initial ATC air-ground data link services above FL-285								**Planned** - CPDLC (incl. COOPANS B.2.4)
ITY-FMTP	Apply a common flight message transfer protocol (FMTP)								**Planned** - CANDIIP
ITY-SPI	Surveillance performance and interoperability								**Planned** - Status on safety assessment on existing systems to be analysed
NAV10	Implement APV procedures								**No plan** - Awaiting REG initiative

Possible LSSIP status responses on incomplete objectives: Partially completed, Planned, Late, No plan, Not applicable, Missing data
REG: The Danish Transport Authority

Naviair status on incomplete Country related ESSIP objectives

ESSIP obj.	Title	App.	2013	2014	2015	2016	2017	...	Naviair status/initiative(s)
AOP01.2	Implement airside capacity enhancement method and best practices based on Eurocontrol capacity and efficiency implementation manual	●							**Late** - Implemented gradually. No capacity problems in 2013
AOP05	Implement Airport Collaborative Decision Making (CDM)								**Planned** - CDM
AOP08	Implement Airport Airside Capacity Planning Method								**Planned** - Capacity planning is done in cooperation with CPH
AOP09	Implement Optimised Dependent Parallel Operations								**No plan** - Awaits CPH analysis
ENV02	Implement Collaborative Environmental Management (CEM) at Airports								**Planned** - Coordination with CPH

Possible LSSIP status responses on incomplete objectives: Partially completed, Planned, Late, No plan, Not applicable, Missing data

Naviair status on incomplete Airport related ESSIP objectives

Key Performance Indicators 2013

Against the background of the Critical Success Factors (CSFs) set out in the business plan, a number of specific performance measures, Key Performance Indicators (KPIs), have been set up that are designed to ensure that Naviair remains focused on achieving its strategic objectives. The specific targets will be followed up on via Naviair's internal business management system, Balanced Scorecard (BSC). Performance in relation to the KPIs will be published monthly on Naviair's intranet. The KPIs will be reviewed annually to ensure that they continue to support the strategic objective embodied in Naviair's sub-strategies in the business plan. Performance is measured on the four perspectives: Customers, Finance, Internal and Learning & Growth.

Customers

KPI	Definition of KPI	Target
Safety – DK-SE FAB*	Separation minima infringements (categories A and B) per 100,000 flight hours in DK-SE FAB*, directly attributable to LFV/ Naviair/NUAC.	< 1.45 per 100,000 flight hours
Safety – En route	Number of incidents per 100,000 operations (categories A, B & C) directly attributable to Naviair.	< 0.74 per 100,000 operations
Safety – Approach CPH	Number of incidents per 100,000 operations (categories A, B & C) directly attributable to Naviair.	< 1.36 per 100,000 operations
Safety – Tower CPH	Number of incidents per 100,000 operations (categories A, B & C) directly attributable to Naviair.	< 0.78 per 100,000 operations
Safety – Tower Local Airports	Number of incidents per 100,000 operations (categories A, B & C) directly attributable to Naviair.	< 1.88 per 100,000 operations
Delays – DK-SE FAB	Average en route delay in DK-SE FAB expressed as minutes per operation.	< 0.15 minute per operation
Delays – En route Denmark	Average en route delay in DK-SE FAB expressed as minutes per operation.	< 0.15 minute per operation
Delays – Tower/Approach Copenhagen	Average en route delay in DK-SE FAB expressed as minutes per operation.	<0.2 minute per operation
Environment – Noise inconvenience	Number of unauthorised violations of noise abatement procedures at airports directly or indirectly attributable to Naviair.	<5 cases

** According to the performance scheme, DK-SE FAB is made up of en route airspace in Denmark and Sweden and TMA airspace in Copenhagen, Malmö and Stockholm.*

Finance

KPI	Definition of KPI	Target
Investment level	Follow-up on Naviair's investment budget (before capitalisation of payroll and IPO).	<DKK 70.0 million
Staff costs	Actual staff costs (before capitalisation of payroll and IPO)	<DKK 569.8 million
Other operating expenses	Actual operating expenses	<DKK 175.4 million

Internal

KPI	Definition of KPI	Target
Availability – ODSs in ATTC	Percentage availability of radar displays in ATCC	>99.5%
Availability – radar coverage	Percentage availability of radar stations in Danish airspace (Copenhagen FIR)	>99.5%
Availability – radio/emergency radio systems	Percentage availability of communications systems used for radio communication with aircraft.	>99.5%
Incident investigations (average YTD)	For the categories of incidents for which incident investigations are carried out, a preliminary analysis must be available within three days of the incident.	95%
Projects – Content/scope	Weighted portfolio model	90%
Projects – Finance	Weighted portfolio model	90%
Projects – Milestones	Weighted portfolio model	90%
Disposition efficiency – En route (operations)	Number of en route operations per ATCO FTE on duty.	>7,200
Disposition efficiency – TWR/APP CPH (operations)	Number of Tower/Approach (Copenhagen) operations per ATCO on duty.	>4,600

Learning & Growth

KPI	Definition of KPI	Target
Employee information, illness	Sickness absence is measured as average number of sick days per employee.	<8 days
Employee information, illness (excluding long-term illness)	Sickness absence is measured as the average number of sick days per employee (excl. long-term illness).	<6 days
Employee turnover	Turnover is measured as the number of employees that have left the company compared with the total number of employees.	<8%
Pass rate for ATCO training, Initial Training, Entry Point North	ATCO pass rate relative to the number of ATCO trainees enrolled.	≥75%
Pass rate for ATCO training, UNIT Training	ATCO pass rate relative to the number of ATCO trainees enrolled	≥75%

Abbreviations

4 Flight:	French-Italian development of new ATM system with Thales as supplier
ADS-B:	Automatic Dependent Surveillance - Broadcast
AIM:	Aeronautical Information Management
AMHS:	ATS Message Handling System
ANS:	Air Navigation Services
ATIS:	Automatic Terminal Information Service
ATM:	Air Traffic Management
ATS:	Air Traffic Services
ATSEP:	Air Traffic Safety Electronics Personnel
BCI:	Business Case Initiatives
BL:	Regulations for Civil Aviation
BUFR:	Binary Universal Form for the Representation of meteorological data
CANDI:	Naviair WAN between Copenhagen, Roskilde, Billund and Aalborg
CANSO:	The Civil Air Navigation Services Organisation
CARATS:	Collaborative Actions for Renovation of Air Traffic Systems
CCAMS:	Centralised SSR Code Assignment and Management System
CCO:	Continuous Climb Operations
CDO:	Continuous Descent Operations
CDM:	Collaborative Decision Making
CNS:	Communications, Navigation and Surveillance
COOPANS:	CO-OPeration of Air Navigation Service providers
CS:	Community Specification
CPDLC:	Controller Pilot Data Link Communication
DATMAS:	Danish Air Traffic MAnagement System (Naviair's previous ATM system)
DCG:	Danish Communication Gateway
DMI:	Danish Meteorological Institute
D-VOR:	Doppler-VOR
EASA:	European Aviation Safety Agency
EATM:	European ATM Master Plan
EFTMS:	Enhanced Tactical Flow Management System
ESSIP:	European Single Sky ImPlementation
Eurocontrol:	European Organisation for the Safety of Air Navigation
FAB:	Functional Airspace Block
FIR:	(Copenhagen) Flight Information Region (Official designation of the airspace over Denmark and delegated areas)
FL:	Flight Level
FMTP:	Flight Message Transfer Protocol
FMS:	Flight Management System
FPL:	Flight Plan
HMI:	Human Machine Interface
ICAO:	International Civil Aviation Organization
IDP:	Interim Deployment Programme
IP:	Implementation Package
IR:	Implementing Rule
IAA:	Irish Aviation Authority
JAA:	Joint Aviation Authorities
KPI:	Key Performance Indicator

LFV:	Sweden's ANSP
LSSIP:	Local Single Sky ImPlementation
MET:	Meteorology/Meteorological
MoC:	Memorandum of Cooperation
NEAP:	North European ANS Providers
NEFAB:	North European Functional Airspace Block
NOP:	Network Operations Portal (formerly CFMU)
NORACON:	NORth European and Austrian CONsortium
NUAC:	Nordic Unified Air traffic Control Handelsbolag (general partnership)
OI:	Operational Improvement
PENS:	Pan European Network Services
RNP:	Required Navigation Performance
SES:	Single European Sky
SESAR:	Single European Sky ATM Research
SLA:	Service Level Agreement
SJU:	SESAR Joint Undertaking
TG:	Technical Group
TS:	Danish Transport Authority
TWR:	Tower
VCS:	Voice Communication System
VoIP:	Voice over Internet Protocol
VOLMET:	Meteorological information for aircraft in flight
VOR:	VHF Omnidirectional Radio range
WAM:	Wide Area Multilateration
WAN:	Wide Area Network

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