
Request for Information Future ATM System



July 2012

Avinor AS

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1 Introduction

Avinor, Air Navigation Service Provider and Airport Operator

Avinor AS is a 100% state-owned private limited company, headquartered in Oslo. The company has approximately 3,100 employees and is responsible for the planning, establishment and operation of airports and air navigation systems in the entire country.

The shares in Avinor AS are wholly-owned by the Norwegian state as represented by the Ministry of Transport and Communications. The Ministry of Transport and Communications manages the Norwegian state's ownership of Avinor and determines the aviation fees.

The Air Navigation Services division is responsible for the provision of air traffic services in Norwegian airspace, including designated airspace over Norway and the North Atlantic/Barents Sea. Avinor AS also provides air navigation services at 46 aerodromes, including the main airport, Oslo Airport Gardermoen. Avinor AS is the national certified Air Navigation Service Provider (ANSP) designated by the Norwegian government to deliver air navigation services for en-route and TMA air traffic within Norwegian airspace. Avinor handled 794 000 flights and 44 million passengers in 2011.

For more information about Avinor please refer to the Avinor web site [1] including annual reports [2], and the Local Single Sky Implementation for Norway [3].

Avinor ANS Division

The Air Navigation Services Division, who will be responsible for the new ATM system, employs approximately 1000 persons and is organised into two business areas.

Business Area Air Traffic Management is responsible for providing the air traffic services within Norwegian airspace and designated parts of the North Atlantic airspace. In addition, air traffic services are provided at 21 controlled aerodromes, including Oslo Airport.

Business Area ATM/CNS Systems is responsible for installation and management of ATM/CNS equipment to the Business Area Air Traffic Management and to 52 aerodromes in Norway.

A leading provider of Air Navigation Services in Northern Europe

Avinor's ambition is to be among the leading providers of Air Navigation Services in Northern Europe, both in the regulated en-route segment and in the emerging deregulated segment (TWR/APP service provision) in the years to come.

Avinor has made important strategic decisions to meet the challenges within the Single European Sky legislation, to position the company in the best possible way for cross border cooperation and to create the necessary competitive power. Therefore, Avinor has recently, together with the ANSPs from Estonia, Finland and Latvia established the North European Functional Airspace Block (NEFAB) in order to improve the overall ATM performance in the North European Area according to Single European Sky regulations.

Avinor is also member of the formal commercial alliance named "Borealis Alliance". Borealis includes the ANSPs of Denmark, Estonia, Finland, Iceland, Ireland, Latvia, Norway, Sweden and the UK. This commercial alliance aims to improve efficiency, reduce costs and environmental impact.

The upgrade of Avinor's ATM systems is in this context an essential project for the purpose of realizing the economic performance targets arising out of Commission Regulation No 691/2010 (The Performance Regulation) as put in concrete terms through the National Performance Plan (NPP) for Norway. The upgrade will be amongst the dominating vehicles to be put in place in Avinor to meet the future performance needs as prepared for implementation in the NPP for the second Reference Period (RP2) of the Performance Scheme.

The upgrade of Avinor's ATM systems shall also assure functional compliance with the European ATM Master Plan edition 2, and through this meeting customer's needs, requirements and expectations. The automation needs to satisfy Avinor's business needs both in the regulated segment (NEFAB) and within the future deregulated segment (TWR and TMA).

Strategic projects and business improvement

The Future ATM System project is one of the prioritized strategic investment and development projects in Avinor. The project is parallelized with a project that is responsible for defining the future operational concept and operational structure through an analysis of the following operational service provision structures: a reduction from three to one ACC, centralized approach controls, and combined TWR/APP.

These two projects are of great strategic importance in the sense that the implementation of new service provision structures and the most up to date and cost efficient ATM technology are key enablers in achieving the performance targets that will be defined under the Performance Scheme Reference period II. Likewise, the indicated business re-engineering and the implementation of SESAR compatible ATM technology shall ensure that Avinor is adequately positioned for the development of NEFAB into a future expanded airspace block.

One major objective for introducing a more capable ATM system is to increase Avinor's economic performance. It is thus important that a technology and project proposal for the Avinor Future ATM System from industries responding to this RFI clearly indicates its potential for contributing to improved business efficiency, maintained safety and compliance with the European ATM Master Plan.

As Avinor will emphasize the aspects of a long term relation with the ATM ground industry partner(s) ultimately selected after competitive tendering, the industry's way of integrating validated functions and solutions coming out of the SESAR R&D should be presented in the response to this RFI, as Avinor as an end user intends to rely on its industry partner to ensure access to future SESAR developments, becoming available for SESAR Step 2 and Step 3.

2 Objectives of the RFI

This RFI is intended to be used to gather information from ATM System Suppliers regarding their interest in the Avinor Future ATM system project, products relevant for this project and also their view on how Avinor best shall meet the operational concept and requirements listed in this document. The received information will be used by Avinor to refine the path towards our future ATM system.

Due to the expected de-regulation of the Tower and Approach service provision within the European domain, Airport Operators will typically procure their Tower ATM systems independently. These systems need to be interfaced to the En-route and Approach ATM system.

Avinor, being both an ANSP and an Airport Operator, is therefore interested in responses from suppliers able to provide:

1. An "End-to-End" ATM System supporting En-route, Approach, and Tower service provision
2. An ATM System supporting En-route and Approach service provision, capable to integrate to third party tower solutions.
3. A specialized ATM solution for Tower service provision

In Chapter 4 Target Operational Concept and Chapter 5 High Level System Requirements Avinor has set out high level requirements covering all three options above. For options 2 and 3 some of the requirements will thus be Not Applicable.

3 Current ATM System

Avinor's current ATM systems NATCON (Norwegian Air Traffic Control System) support Norway's en-route, approach and tower air traffic control, SAR and information service performed in the 3 AoRs (Oslo, Stavanger and Bodø AoR). The airport end of the system is for all of Avinor's 46 airports fully integrated to the common approach- and en-route systems in the control centres. Norway's main airport, Gardermoen, operates a standalone TWR ATM system but with a comprehensive interface to the surrounding ATM system both with respect to exchange of real time operational information as well as to using common technical support and maintenance platforms. The Gardermoen TWR ATM system is for the purpose of this RFI regarded as an external interface.

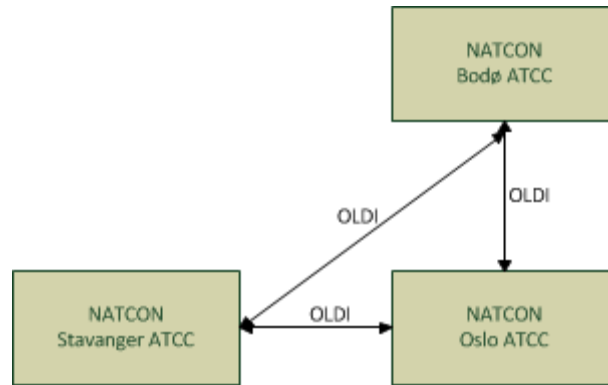


Figure 1: The three ATCC in Norway, each including one ACC.

NATCON has the capability to interface to IFPS, CFMU, AFTN, NAIS, OLDI partners through X-25 and/or FMTP, AMAN, ADS-B, Radars (SSR, MSSR, PSR) and to process flight plan data, met data and surveillance data. The interface to the Integrated Controller Workstation system (ICW) at Gardermoen airport is a customized proprietary interface as shown in the figure below.

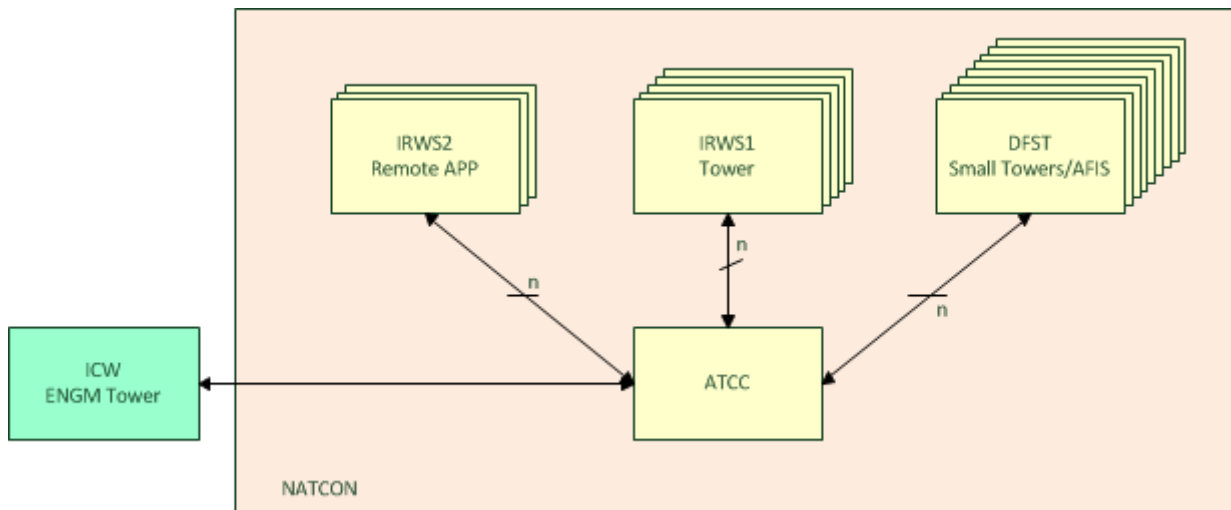


Figure 2: Typical NATCON configuration.

See Appendix A for a simplified figure of the main components and interfaces for the NATCON ATM system.

NATCON was originally delivered as an Autotrack-1 system from Raytheon and Indra in the mid-90's. The system went operational in 1996 in Oslo ATCC, 2004 in Stavanger ATCC, and 2008 in Bodø ATCC. The Oslo system went through a major upgrade for software and hardware during 2010. As part of this upgrade an AMAN system from Barco (OSYRIS) was introduced for arrival management for Oslo airport.

Avinor is maintaining and developing its ATM systems with in-house resources and/or in close cooperation with the original suppliers.

4 Target Operational Concept

ACC, APP, TWR

Avinor's ATM system shall integrate all of Norway FIR, Bodø OFIR, and designated Towers/AFIS/HFIS. The ATM system shall provide support for ATS services provided from ACC, APP and TWR units.

Number of sites

The ATM system shall support: one ACC, served from one or multiple sites (up to three), multiple APP units served from separate sites (up to 16) or in relation to an ACC or TWR unit and multiple TWR units.

International integration/interface

The ATM system shall enable seamless and flexible integration of Norway FIR into FAB/FABs across national borders, including cross-border dynamic sectorisation, and therefore comply with SESAR/International standards of interoperability.

Operational Concept

The new ATM system shall support or surpass operational requirements from the European ATM Master Plan Step 1 and be prepared for implementation of required functionality from ATM Master plan, Steps 2 and 3.

The current Operational Concept is based on a traditional airspace based environment where Avinor also provide ATS for military users. The intention is to migrate to a trajectory/performance based environment in line with the SESAR operational concept.

5 High Level System Requirements

The main high level requirements for the SESAR compliant target ATM system are listed below. The supplier shall indicate how these requirements will be supported.

5.1 High-Level Functional Requirements

The Avinor Future ATM system shall be compliant with the following functional requirements:

F1	The flight data processing system shall support integrated ATS provision related to en-route (ACC), approach (APP) and remote TWR/AFIS/HFIS positions within the Norway FIR area.
F2	The system shall also support ATC service provision for the Bodø OFIR oceanic area from 2020 according to ICAO requirements for the North Atlantic CC ICD [5] and GOLD [6].
F3	The system shall be able to support GAT and OAT, including normal military air operations.
F4	The system shall be able to interface in a flexible and efficient way with other non-Avinor ATM systems used for ACC (adjacent AoR), APP or TWR/AFIS/HFIS.
F5	The system shall be able to connect to common European systems; at present CFMU/NMOC (IFPS, ETFMS), CRCO and EAD.

F6	The system should interface with ICW tower ATC system at Oslo Gardermoen airport for exchange of flight plan data and surveillance data.
F7	The Tower ATM system shall be able to interface with A-SMGCS at designated airports – for the time being quantity four.
F8	The system architecture and installation shall not impose any limitations to the future structure and localization of ATS units for ACC and APP (to be decided).
F9	The system shall be implemented for the following operating environments: a) Operational b) Training (simulation) c) Development and test
F10	The training simulation capability shall use the same HW, SW and adaptation data as for the operational mode and include generation of all the operational data needed.
F11	There shall be a contingency solution for the ATM system.
F12	The system shall be implemented with fall-back mode of operation. Degradation of functionality shall be indicated.
F13	The system shall include support functions for system monitoring and control, data recording and playback, statistics and data analysis (traffic logs, charging, safety and investigations, maintenance) and SW development and testing.
F14	The system shall include human-machine interface (HMI) for Controller Working Positions (CWP), Flight Data Operators (FDO), System Monitoring and Control (SMC) for Operational and Technical Supervisors, exercise preparation and training session supervisor for simulation. The HMI should be adapted to Avinor specific requirements.
F15	The ATM system shall be compliant with all SES regulations (Implementing Rules) applicable for Norway and in force by start of operations.
F16	The system shall be eFDP compliant based on SESAR 4D Trajectory management concepts for ATM Master Plan Step 1. This includes initial 4D Trajectory operation (i4D / Time based) using aircraft derived data for precision trajectory prediction and initial SWIM capability as required by the Avinor/NEFAB operational concept.
F17	The system shall be compliant with all system requirements for SESAR Deployment Baseline phase. This shall include flight conformance monitoring aids (MONA), Medium Term Conflict Detection (MTCDD), Safety Nets Level 2 as well as data link (see F18). AMAN functionality will be reused from legacy system (separate imported window in HMI), but shall interface with the core system for extended horizon sequencing in ACC sectors.
F18	The system shall support basic air/ground data link according to Commission Regulation No 29/2009 (DLS IR) and also Data link Extension (DLS II) for SESAR Step 1 as well as data link clearances for TWR system. DLS via FANS will also be supported. There will be an interface to one or more communication service providers.
F19	The system shall support paper stripless operation, possibly electronic flight strips for TWR.
F20	The system shall process ARTAS surveillance multitrapper data with UDP/IP interface (Asterix Cat 62/63/65). The industry-standard Avinor ARTAS multitrapper sub-system shall be reused.
F21	The system shall process elementary and enhanced Mode S data.

F22	The system shall support flexible sectorisation through configuration or dynamic adaptation data.
F23	The system should include ASM support tools for Flexible Use of Airspace at tactical level. This includes management of restricted areas and Conditional Routes (CDR).
F24	The system shall be highly configurable by use of adaptation data. This relates to issues like airspace configurations, CWP allocations to airspace, CWP HMI configuration etc. The system provider shall describe how management of adaptation data is done (integrated or using separate support tool).

5.2 High-Level Non-Functional Requirements

The Avinor Future ATM system shall be compliant with the following non-functional requirements:

N1	The system shall be dimensioned for operation in an Area of Responsibility (AoR) equal to Norway FIR plus external airspace constituting an Area of Interest (AoI) around the AoR.
N2	The system shall support combined system support for ACC, APP (possibly remote) and remote TWR/AFIS.
N3	The system shall cater for at least 40% traffic growth in the period from introduction of the new system to 2030. The supplier shall show the system scalability. For current traffic status in Norway please refer to [3], chapter 17.
N4	The system shall be based on open, modular, and Service Oriented Architecture in line with SESAR specifications.
N5	The maintenance of the system shall be organised in the most cost-effective way. The supplier shall propose how SW maintenance and upgrade activities can best be divided between the supplier and the Avinor SW development team to achieve this.
N6	To achieve both lowered risk and possibility for iterative development of customer specific HMI features, operational validation shall be performed on prototype versions of the target system as early as possible.
N7	The supplier shall provide required training for operational and technical personnel.
N8	The supplier shall document the system's security performance. Ref. EC No 2096/2005; Annex 1 §4b "the security of operational data it receives or produces or otherwise employs, so that access to it is restricted only to those authorised."

6 Project Roadmap

The transition plan towards full deployment of the Future ATM system is dependent on the on-going planning of consolidation steps towards the future operational structure with one ACC and a combination of centralized and distributed APPs. The roadmap for operational restructuring as well as transition steps towards the Future ATM system will be finalized by the end of this year.

Thus, the project roadmap with its transition from old to new ATM system is one area where we believe the responses to this RFI would provide particularly useful information.

Full deployment of the SESAR compatible Future ATM system is required by 2017.

7 Main Issues to be addressed in the RFI response

Avinor invites the interested suppliers to deliver a focused response to this RFI describing its proposed solutions and technology and the supplier's positioning of the solution into the European regional legislative context. Compliancy statements addressing the operational concept set out in Chapter 4 as further detailed in Chapter 5; High Level System Requirements should be supported by textual rationales for the indicated compliancy.

In addition to the structured response to the listed requirements in the RFI, Avinor requests the supplier's feedback and proposal on the below issues. The supplier is free to address and highlight other issues as well.

1. The project roadmap for operational restructuring as well as transition steps are under development. In principle that process analyses the following three main scenarios and strategies;
 - i) A transition from the current ATM system to a new ATM system starting with rolling out parts of the new system e.g. first ACC, then APP and TWR. The current and the new system would operate in parallel during the transition.
 - ii) A concurrent transition for ACC, APP, and TWR from the current to the new ATM system, thus, an "over-the-night" transition from the current to the new ATM system. The legacy and the new ATM system will not operate in parallel.
 - iii) An evolutionary process where Avinor renews/updates component for component (functional blocks) in the current ATM system.

Avinor asks suppliers to comment on those implementation strategies and recommend approach. A reference to relevant implementation/transition experience will be appreciated.

2. The current Avinor ATM system does not meet all requirements from ATM Master Plan Deployment Baseline; especially requirement F17 and F18 above. To meet this by 2015 system suppliers are encouraged to propose how a short term step (early delivery of essential functionality) may be introduced in the overall roadmap towards the Future ATM system.
3. If Avinor in the future should decide to implement the ATM system proposed by you – please expand on and describe the solution's potential for risk reduction, cost sharing, harmonized roll-out of new functionality and more efficient deployment and fielding through ANSP/industry or ANSP/ANSP partnerships. In this context any potential connected to sharing of simulation and training facilities should be drawn up.
4. Since the number of ATCOs and training capacity is at a premium, proposals on pragmatic solutions as to how the supplier can assist in training for all involved parties as well as in the transition to the new ATM system will be welcomed.
5. Definition of HMI for operational users is a very important issue; please describe your suggested process to achieve an effective and user friendly HMI, taking into consideration the Controller Working Position definition and validation efforts being undertaken within SESAR.
6. The supplier should describe the scope and contents of the ATM system proposed for introduction in Avinor's TWRs if such system is provided as part of an integrated solution with the main centralized ATM system for ACC and APP. The description should detail whether the TWR solution is part of supplier's own system portfolio or provided as an integrated third party solution. Please also clarify whether a possible A-SMGCS surface segment functionality is included or catered for as a future upgrade.

8 RFI Process and Guidelines

8.1 Process

Please be advised that following the subject RFI process, a two-phased Tender Procedure in accordance with Norwegian Law governing Public Procurement for the Utilities Sector is planned executed. The two phases are the Qualification- and the Tender phase, whereas participation in the tender procedure will be open on equal terms to the pre-qualified tenderers. This implies that the RFI process is recognised as a preparatory step towards a formal procurement process, hence information submitted under the RFI will not influence the prequalification process. Furthermore, please be advised that suppliers that choose to submit a request for qualification in an upcoming procurement process will have to resend information for that specific purpose.

Furthermore, Avinor reserves the right to ask for additional information or meetings with suppliers to discuss or clarify issues in their replies. Hosting meetings with the suppliers at Avinor's premises in Oslo will be preferable, but visiting the suppliers may be considered as an option.

8.2 Schedule

For the purpose of information, the following schedule identifies the main milestones with the corresponding dates related to the RFI Process. Suppliers are advised that this information is of an indicative nature, hence Avinor reserves the right to alter the tentative dates if need be.

10 th July 2012	Distribution of RFI
July – 6 th September	Preparation phase for the Suppliers
7th September 12.00 GMT	Deadline for incoming replies from Suppliers
Autumn 2012	RFI evaluation process

8.3 Queries and additional information during the RFI phase

Please be advised that Ms Gunhild H. Synnestvedt, Head of Contracts ANS, is Avinor's single point of contact for this RFI, and that any queries or requests for additional information related to this RFI shall be forwarded in writing to the following email address: Gunhild.H.Synnestvedt@avinor.no

We kindly ask you to note that Norway has general staff holiday during July and therefore some questions might not be answered before early August.

Avinor reserves the right to make corrections, alterations or provide supplementary information to this RFI within the deadline for submission of responses. Avinor will distribute all and any corrections, alterations or supplementary information by email to the contact persons indicated by the interested parties.

8.4 Guidelines for the submission of response

Deadline: The deadline for submission of response to this RFI is 7th September 2012 at 12:00 GMT.

Language: We kindly ask you to use the English or Norwegian language throughout the response documentation.

Copies: 1 printed copy (we kindly ask you to limit the number of pages of the reply to a maximum of 50 pages + annexes) and one electronic copy on CD/DVD shall be delivered together with the printed version.

Delivery address: Replies, clearly marked with "REPLY ATM SYSTEM, RFI-181767" may be forwarded to the following addresses:

By Courier Service or by hand to Office/ Street Address* :	By Registered Mail to Post Address:
AVINOR AS ATT: Gunhild Hernes Synnestvedt Dronning Eufemias gate 6 NO-0154 OSLO Norway	AVINOR AS ATT: Gunhild Hernes Synnestvedt PO Box 150 NO-2061 Gardermoen Norway

*The reception desk in the office building is open and served the following hours:

Monday – Thursday: 08:00 – 17:00 CET/CEST

Friday: 08:00 – 16:00 CET/CEST

Saturdays, Sundays and national holidays: Closed

Contact Details: The name and contact details of the contact person appointed by the Company authorised to handle all matters related to the RFI process on behalf of the Company.

Contact details shall include the following information:

Contact Details
Name
Position
Office Address
Post Address
Email Address
Telephone numbers

8.5 Cost

No compensation may be claimed by Companies whose response to this RFI has been forwarded, including when Avinor decides not to follow up this RFI with a procurement process, hence Avinor will not be responsible for any costs or expenses incurred by the Companies in connection with the preparation or delivery of the responses and any subsequent effort made in connection with the RFI process.

8.6 Disclaimer

This is a Request For Information (RFI) only and does not constitute a Request for Quotation, Request for Proposal, an Invitation to Tender, or a commitment, implied or otherwise, hence Avinor reserves the right to either abandon the process or bring it to an end, and thus cancel the process without entering into a procurement phase, without the companies or suppliers being entitled to claim any compensation. A decision of terminating the process will be substantiated and the companies will be notified.

8.7 Confidentiality

Avinor acknowledges that information submitted in the responses to this RFI may be of a business confidential nature, hence will be treated accordingly, and will not be disclosed to any Third Party without the original disclosing party's prior written approval, unless such information

- a) is already known to the party in question at the time the information was received by it,
- b) is or becomes part of the public domain other than through the parties, or
- c) is rightfully obtained from a Third Party without an obligation of confidentiality.

Also please be advised that any need for a Non-Disclosure Agreement covering the information submitted should be communicated to Avinor at your earliest convenience.

8.8 Right to use the Information submitted

Avinor reserves the right to use the information submitted under this RFI and the results derived thereof for its internal purposes and for any subsequent procurement(s) and other activities.

A. Block diagram, current ATM system

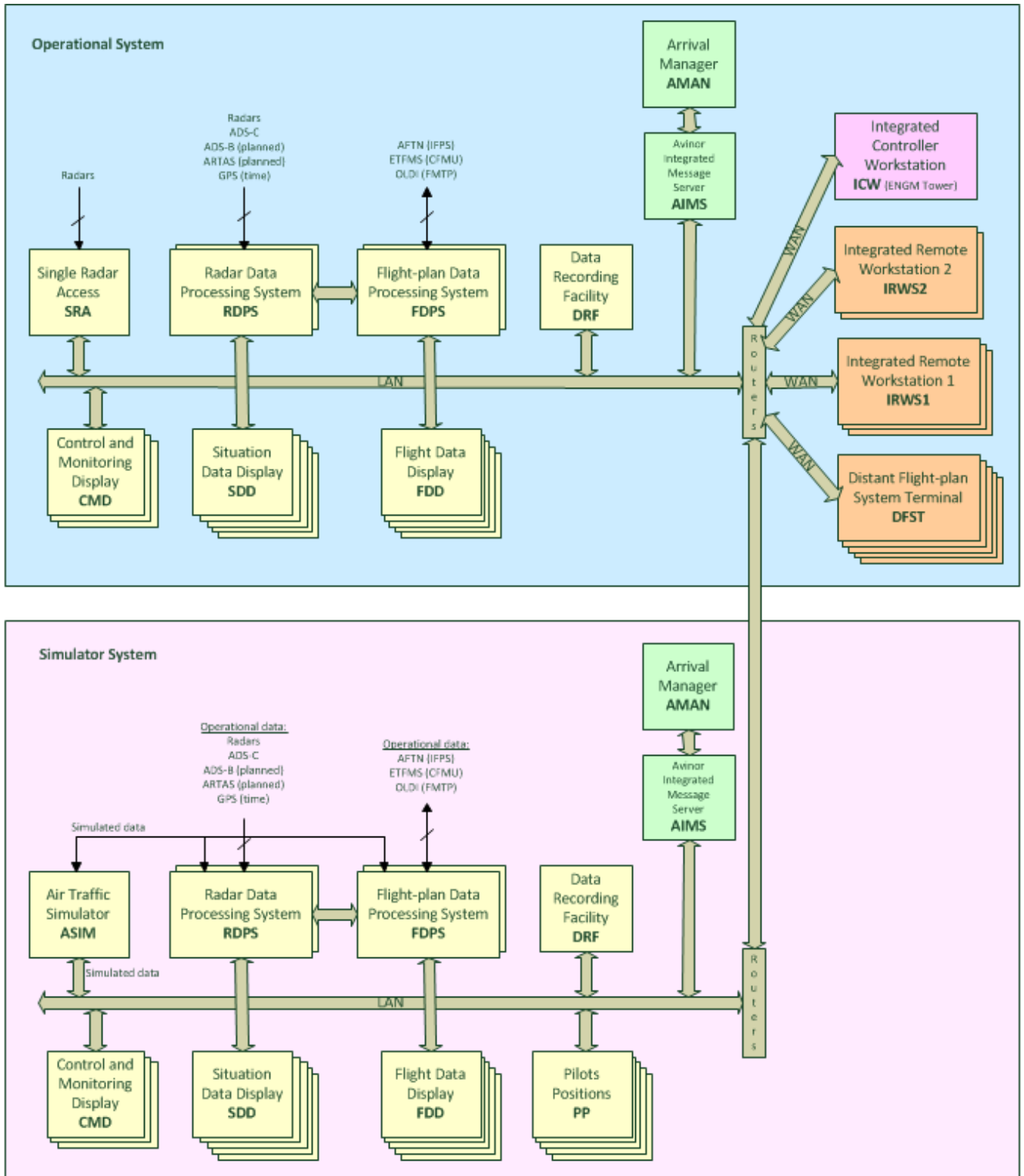


Figure 3: A simplified figure of the main components and interfaces for the NATCON ATM system.

B. References

[1] Avinor web site in English:

<http://www.avinor.no/en/avinor/frontpage>

[2] Avinor Annual Reports in English:

http://www.avinor.no/en/avinor/financialinformation/50_Reports

[3] Local Single Sky Implementation(LSSIP) for NORWAY Years 2011-2015 Level 1:

<http://www.eurocontrol.int/sites/default/files/content/documents/official-documents/reports/201115-lSSIP-no.pdf>

[4] Norway National Performance Plan for air navigation services 2012-2014

<http://www.regjeringen.no/pages/37009520/RevisedNationalPerformancePlan.pdf>

[5] The North Atlantic Common Coordination Interface Control Document (Version 1.2.8 Dec 2010)

http://www.paris.icao.int/documents_open/download.php?maincategory=106&subcategory=113&file=NAT%20CC%20ICD%201-2-8.pdf

[6] Global Operational Data Link Document ICAO

http://legacy.icao.int/WACAF/APIRG/SG/2011/CNS_SG4/Docs/wp29a_app_a_en.pdf

C. Abbreviations

ACC	Area Control Centre
ADS	Automatic Dependent Surveillance
ADS-B	ADS Broadcast
ADS-C	ADS Contract
AFIS	Aerodrome Flight Information Service
AFTN	Aeronautical Fixed Telecommunication Network
AIMS	Avinor Integration Message Server
AIS	Aeronautical Information Service
AMAN	Arrival Manager
ANSP	Air Navigation Service Provider
Aoi	Area of Interest
AoR	Area of Responsibility
APP	Approach
ARTAS	ATM surveillance Tracker And Server
ASIM	Air Traffic Simulator
A-SMGCS	Advanced Surface Movement Guidance and Control System
ATCC	Air Traffic Control Centre (Co-located ACC and APP)
ATS	Air Traffic Services
CC ICD	Common Coordination Interface Control Document
CDM	Collaborative Decision Making
CDR	Conditional Routes
CFMU	Central Flow Management Unit (to be renamed NMOC)
CMD	Control and Monitoring Display
CRCO	Central Route Charging Office
CWP	Controller Working Position
DFST	Distant Flight-plan System Terminal
DL	Data Link
DLS	Data Link Services
DMAN	Departure Manager
DRF	Data Recording Facility
EAD	European AIS Database
eFDP	European Flight Data Processing
EFSS	Electronic Flight Strip System
ENGM	ICAO code for Oslo Airport Gardermoen
ETFMS	Enhanced Tactical Flow Management System
FAB	Functional Airspace Block
FANS	Future Air Navigation System
FASTI	First Air Traffic Control Support Tools Implementation (Eurocontrol program)
FDD	Flight Data Display
FDO	Flight Data Operators
FDP	Flight Data Processing
FDPS	Flight Data Processing System
FIR	Flight Information Region
FMTP	Flight Message Transfer Protocol
FPL	Flight Plan
GAT	General Air Traffic

GOLD	Global Operational Data Link Document (ICAO)
HFIS	Helicopter Flight Information Service
GPS	Global Positioning System
HMI	Human-Machine Interface
ICW	Integrated Controller Workstation
IFPS	Initial Flight Plan Processing System
IR	Implementing Rule
IRWS	Integrated Remote Workstation
IRWS1	IRWS – type 1 (Towers)
IRWS2	IRWS – type 2 (Remote APP)
LAN	Local Area Network
MONA	Monitoring Aids
MSSR	Monopulse Secondary Surveillance Radar
MTCD	Medium Term Conflict Detection
NAIS	Norwegian Aeronautical Information System
NATCON	Norwegian Air Traffic Control System
NEFAB	North European Functional Airspace Block
NMOC	Network Manager Operations Centre
NPP	National Performance Plan
OAT	Operational Air Traffic
OFIR	Oceanic Flight Information Region
OLDI	On-Line Data Interchange Standard
PBN	Performance-Based Navigation
PP	Pilot Position
PSR	Primary Surveillance Radar
RDPS	Radar Data Processing System
RFI	Request For Information
RNP	Required Navigation Performance
RP	Reference Period
SDD	Situation Data Display
SDPS	Surveillance Data Processing System
SES	Single European Sky
SESAR	Single European Sky ATM Research
SMC	System Monitoring and Control
SRA	Single Radar Access (radar bypass channel)
SSR	Secondary Surveillance Radar
STCA	Short Term Conflict Alert
SWIM	System-Wide Information Management
TMA	Terminal Manoeuvring Area
TWR	Tower
WAN	Wide Area Network
WAM	Wide Area Multilateration