Centralised Service on Network Infrastructure Performance monitoring and analysis Service (NIPS)/
the Performance of 1030/1090 RF bands (NIPS/SUR-RF) (CS7-2)
Concept of Operations (CONOPS)
The CNS infrastructure is a key enabler of a safe and efficient ATM system. The European Network is increasingly depending on good operation of surveillance systems using the 1030/1090 MHz RF bands. The uncoordinated use of these frequencies could result in congestion. These frequency bands must therefore be monitored and managed as a scarce resource.

The objective of the Network Infrastructure Performance monitoring and analysis Service of the Performance of 1030/1090 RF bands (NIPS/SUR-RF or CS7-2) is to monitor the use of the 1030/1090 MHz frequencies in order to ensure a good performance of the surveillance systems in Europe.

The aim of this document is to provide an operational concept of the service and provide a top level description of how the service will be provided.

**Abstract**

**Keywords**

**Authors**

Eric Potier

**Contact(s) Person**

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<thead>
<tr>
<th>Name</th>
<th>Tel</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eric Potier</td>
<td>+32 2 729 4741</td>
<td>NMD/NS/SCC</td>
</tr>
</tbody>
</table>
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<tr>
<td>CS7-2 Project Manager</td>
<td>Eric Potier</td>
<td>19/11/14</td>
</tr>
<tr>
<td>CS Programme Manager</td>
<td>Herman Baret</td>
<td>19/10/2014</td>
</tr>
<tr>
<td>Director Pan-European Single Sky</td>
<td>Luc Tytgat</td>
<td>19/11/2014</td>
</tr>
<tr>
<td>Director ATM</td>
<td>Philippe Merlo</td>
<td>20.11.2014</td>
</tr>
<tr>
<td>Director NM</td>
<td>Joe Sultana</td>
<td>20.11.2014</td>
</tr>
<tr>
<td>Director General</td>
<td>Frank Brenner</td>
<td>20.11.14</td>
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Publications
EUROCONTROL Headquarters
96 Rue de la Fusée
B-1130 BRUSSELS

Tel: +32 (0)2 729 1152
Fax: +32 (0)2 729 5149
E-mail: publications@eurocontrol.int
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EXECUTIVE SUMMARY

The CNS infrastructure is a key enabler of a safe and efficient ATM system. The European Network Infrastructure Performance Analysis Service (NIPS) enables the creation of an ECAC wide, consistent, high quality CNS infrastructure performance monitoring and anomaly resolution service.

The European Network is increasingly depending on good operation of surveillance systems using the 1030/1090 MHZ RF bands. The uncoordinated use of these frequencies could result in congestion.

For these reasons the monitoring of 1030/1090 MHz RF bands is necessary to ensure an efficient and safe operation. Such monitoring requires common tools and approach to be efficient and cost effective.

The scope of the NIPS/SUR-RF service is to monitor the use of the 1030/1090 MHz frequencies in order to ensure a good performance of the surveillance systems sharing these frequencies in EUROCONTROL Member States.

After introducing the central services concept and the main purpose of CS7-2 the document describes the detailed scope, the components of CS7-2 and the roles and responsibilities of the different parties involved.
INTRODUCTION

Introduction by the Director General of EUROCONTROL

Following a request of the European Commission in November 2012, EUROCONTROL developed the concept of Centralised Services (CS).

Version 2.0, dated March 2013 of the EUROCONTROL Proposal for a first set of nine Centralised Services to contribute to SES Performance Achievement is attached as Annex 3. A short description of the proposed CS is attached as Annex 4.

The Agency proposed the CS concept in order to significantly support:

• the Member States and their ANSPs to reach or at least to come closer to the EU performance targets,
• the implementation of SESAR results on a central pan-European level,
• the development of high tech solutions by European ATM manufacturers to be deployed on a central level providing the services to all ANSPs of the EUROCONTROL Member States,
• the creation of pan-European operational concepts for the Centralised Services proposed,
• the creation of a pan-European market for these ANS support services,
• the implementation of market mechanisms for some ANS support services through tendering of the services with time limited performance based contracts,
• the creation of market opportunities for the ANSPs of EUROCONTROL Member States to provide services outside of their national boundaries, cooperating in newly founded consortia,
• the strengthening of the European Network, increasing capacity and safety.

EUROCONTROL works closely with the Member States, ANSPs, civil and military airspace users, airports, the aerospace industry, professional organisations, intergovernmental organisations and the European institutions.

On 29 April 2013 EUROCONTROL invited the Airspace Users to participate in a workshop where the concept of Centralised Services was briefed. The Minutes of this Workshop are attached as Annex 5.

EUROCONTROL also invited the EUROCONTROL Member States on 4 March 2013, the ANSPs on 24 April 2013 and the ATM Manufacturing Industry on 17 May 2013 to demonstrate the Centralised Services concept. The minutes of these workshops are respectively attached as Annex 6, 7 and 8.

Following the PC/39 on 16 May 2013 and PCC/31 on 2 July 2013 EUROCONTROL updated on the CS concept. The working papers and slides presented as well as an extract from the Minutes of both meetings are respectively attached as Annex 9 and 10.

EUROCONTROL advisory groups such as AAB, NMB, MAB, CMIC, as well as EU bodies such as the SSC, ICB and its subgroups were briefed. These briefings were followed by so called CS specific workshops. This was a series of 9 workshops held in June and July 2013
– for each proposed CS one specific workshop was held; CS7 (NIPS) workshop was held on 8 July 2013. The slides presented as well as the minutes of this meeting are attached as Annex 11.

The questions asked and answered in an intensive dialogue since the beginning of the program are publicly available. We like to refer to the FAQ list that is constantly updated and available on the EUROCONTROL homepage.

The CBA figures presented in detail for all the 9 CS support the initial assessment done, that a 150 to 200 million € cost reduction for the airspace users is possible through the implementation of the 9 centralised services proposed by EUROCONTROL. Specific focus was put on the synergy effects foreseen between the different centralised services.

It was agreed with the stakeholders, that the Agency would invite the participants to the individual CS workshops, as well as the existing EUROCONTROL advisory groups to participate in specific meetings in September and October 2013 to develop a pan-European ops concept for each of the Centralised Services.

A draft ops concept was prepared for the presentation and discussion with all interested stakeholders at the Ops Concept Workshop for CS7 (NIPS) which was held on 21 October 2013. Upon the request of stakeholders (e.g. ANSPs), the initial CS7 CONOPS was split into a set of CONOPS, one per CS7-X service.

By Directive No14/83 of the Permanent Commission dated 3 February 2014, the EUROCONTROL Member States tasked the Agency with the development, set up and demonstration of CS7; and proceeding to implementation of each CS only after a positive decision of the PC/CN.

The Ops Concept is used by EUROCONTROL to develop requirements to be part of a Call for Tenders for CS-7-2 (NIPS/SUR-RF). All proposed Centralised Services will be operated under performance based contracts by a Service Provider on behalf of EUROCONTROL.

Our partners are involved at every level of the corporate governance structure. The deployment and operation of CS will impact the remit of the Network Manager. Therefore, its governing body, i.e. the Network Management Board where the EC, EUROCONTROL, ANSPs, airspace user, airports and the military are represented could be extended in the future, the operation of the CS being supervised by EASA; the latter is already supporting the European Commission in the oversight of the Network Manager. Through its nomination as Network Manager, EUROCONTROL will be entrusted to manage the centralised services.

Frank Brenner
Director General of EUROCONTROL
November 2014
CHAPTER 1 – Context

1.1 Geographical applicability

The Network Infrastructure Performance Analysis Service / the Performance of 1030/1090 RF bands (NIPS/SUR-RF or CS7-2) is intended to be applied in all EUROCONTROL Member States.

It may be expanded to adjacent States if so required as part of the NM area of interest and in case it is identified as being beneficial for the overall ATM network or on requests from non-Member States.

1.2 Aim

The objective of the Network Infrastructure Performance monitoring and analysis Service / the Performance of 1030/1090 RF bands (NIPS/SUR-RF or CS7-2) is to monitor the use of the 1030/1090 MHz frequencies in order to ensure a good performance of the surveillance systems sharing these frequencies in EUROCONTROL Member States. CS7-2 was initially part of the Network Infrastructure Performance monitoring and analysis Service (NIPS or CS7) which was split in three services after the CONOPS workshop held in 2013.

The monitoring of the 1030/1090 RF bands is becoming increasingly important as a more and more important part of the surveillance system is relying on good operation of cooperative surveillance techniques using these RF bands.

The objective of this document is to describe the operational concept of the NIPS/SUR-RF Centralised Service and to identify the roles and responsibilities of the key stakeholders in CS7-2.

CS7-2 will be run under the auspices of EUROCONTROL as the Network Manager and will support an efficient CNS infrastructure helping the States and their ANSPs to reach or at least to come closer to the performance targets.

1.3 Intended Audience

The intended audience are the participants to the NIPS/SUR-RF Service Tender and all the stakeholders who are interested in the development of CS7-2. The document will also be used to define the operational and technical requirements of the Call(s) for Tenders for the Centralised Service CS7-2.

1.4 Intended Benefits

The improvements expected from NIPS/SUR-RF (CS7-2) will encompass the following benefits, supporting the KPAs on environment /flight efficiency, safety and capacity:
Better and more frequent analysis of the use of the 1030/1090 MHz bands;

Earlier anticipation of possible saturation before it impacts surveillance operation;

States and ANSPs will have access to means to measure the performance of the 1030/1090 MHz frequency bands and will be able to take measures to avoid the frequencies bands saturation and therefore avoiding operation restriction;

Cost-effectiveness – one set of tools in use for the defined services across the applicable geographical area;

Commercial-level service provision – tools and services are provided under service-level agreements;

Competitive service provision – any future Service Provider has the same access to the service specification and tools required to provide the service;

Network efficiency and safety – maintain the Network performance by detecting and analysing problems impacting the use of the 1030/1090 MHz bands. CS7-2 findings will be used by EUROCONTROL/NM and EASA to address problems such as the one that happened in June 2014 in Central Europe.

The added value of the centralized service approach is to be able to extend the use of the existing service to all EUROCONTROL States Members, and to improve the level of service while keeping the cost at a reasonable level using competitive service provision.

1.5 Evolution of the CNS infrastructure and need for 1030/1090 MHz monitoring

The CNS infrastructure is a basic enabler of a safe and efficient Air Traffic Management. Surveillance systems such as Mode A/C radar, military IFF systems, Mode S radar, ADS-B, Multilateration systems and ACAS, rely all on good operation of the 1030/1090 MHz frequencies network. A good sharing of this common resource is therefore critical for an efficient and safe operation of surveillance and therefore of flight.

The higher reliance on cooperative surveillance systems, the development and deployment of different new techniques such as Wide Area Multilateration, the complexity of new RF protocols (e.g. Mode S enhanced surveillance airborne parameters extraction), the diversity of users (civil, military, ground or airborne), re-enforce the need for a central 1030/1090 MHz monitoring.

A problem of transmission on the 1030 or 1090 MHz frequency can result in a number of aircraft not correctly detected forcing a drastic capacity reduction in the impacted sectors. The event that happened in Central Europe in June 2014 shows how the network efficiency could be impacted by the reduction of performance of systems operating on 1030/1090 MHz frequencies.

As the RF transmissions do not stop at the borders between states the 1030/1090 MHz RF bands need to be monitored and addressed in a consolidated way at European level so that necessary actions can be initiated at the lowest possible cost and at the earliest time to avoid frequency congestion.
CHAPTER 2 – Operational Concept

2.1 Scope

The scope of the SUR-RF service (CS7-2) is to survey the usage of the 1030/1090 RF bands in order to allow the Network Manager, National Authorities and ANSPs to take the actions to ensure its long term usability.

The objective of CS7-2 is to monitor the usage of the 1030/1090 MHz bands throughout the whole European airspace in order to:

- Anticipate problems on 1030/1090 MHz network and be able to take pro-active measures to avoid them;
- Investigate the causes of problems, to be able to restore a good operation as soon as possible and to derive lesson to avoid a problem to repeat;
- Get data which could be used to support the demonstration of compliance with regulation including spectrum requirements specified in EU 1207/2012 Article 6.

Some tools already exist to monitor the 1030/1090 MHz frequencies however the service is in general not available on a permanent basis neither on a large scale. The systems that provide the current service need to be improved in order to provide more frequent reports on the real occupancy of the RF bands in a wider coverage (all EUROCONTROL Member States).

The goal of CS7-2 is to improve the existing tools used to monitor the 1030/1090 MHz RF bands, to demonstrate a feasible way to perform the 1030/1090 MHz monitoring in EUROCONTROL Member States, and to set up and operate the future service provision on a centralised basis.

CS7-2 will provide a consistent and updated view of 1030/1090 MHz RF band in Europe allowing the Network Manager and National Authorities to understand the evolution of its use and take the necessary measures to maintain the efficiency of the systems operating on these frequencies.

The NIPS/SUR-RF consists of the following tasks:

- Monitoring the 1030/1090 MHz RF band usage at different places in Europe using airborne and ground measurements;
- Determining the sources polluting the RF band;
- Investigating and understanding the causes of the RF band pollution;
- Assessing current and estimating future 1030/1090 RF usage using a RF model calibrated with RF recordings;
- Reporting on the current use, the current and future evolution of 1030/1090 MHz RF band usage.

Using this information the Network Manager and National Authorities will:

- Determine the impact of the RF pollution sources on the network operation;
• Develop guidance/recommendation and manage actions with respective oversight authorities (NSAs, EASA), operators, manufacturers and international standardization bodies to keep the band useable;

• Plan the network capacity taking into account new transmissions and developing acceptability criteria.

All anomalies detected in the transmission or in the use of the Mode S formats and Mode S procedure will also be reported.

The principle is to record signals provided by 1030/1090 MHz receivers and to analyse these recordings off-line.

The recordings will be performed either on a permanent basis (receiver installed on remote sites) or on a periodic basis using mobile receivers (on the ground or airborne).

Ground measurements will be conducted at different places in Europe in order to establish the level of usage of the 1030 MHz Band and of the 1090 MHz band. 1030 MHz transmissions measured on ground are not always representative of what an aircraft is subject to at high altitude however it allows to know local 1030 MHz band situation.

In low density area, the measurement may be repeated at long time interval (i.e. several years) or when a significant change has happened (air traffic density change, new functions installed or new active sensors installed).

Currently airborne recordings are performed using flights of opportunity, such as flights performed by the Beluga aircraft. The use of opportunity flights is driven by cost effectiveness; however the flights of opportunity are not always guaranteed to happen. In order to be able to investigate specific issues the CS7-2 service will provide the capability to make specific airborne recording. This possibility to equip an aircraft will be considered and assessed - Operational, Technical and financial point of view - as part of the Phase1 of the CS Programme. Such flights could also be used as a cost effective way to perform the RF recordings at different places in Europe rather than using a mobile system on the ground. In any case data will continue to be collected from flight of opportunities to reduce cost.

A report on the situation at different places in Europe will be produced twice a year using data collected by ground recordings and by airborne recordings. In addition all analysis and trends will be made available on a website.

Specific measurements will be performed on request to determine the possible causes of bad performance on 1030/1090 RF bands in specific areas.

Using these reports, the NM team will determine the reasons and the impacts of the RF pollution on the network operation, and proposes in coordination with supervisory authorities actions to clean the RF bands.

Using results of planning tools (RF model) and the knowledge acquired through the measurements, the NM team will develop guidelines to facilitate the management of the bands by the States including acceptability criteria for the new transmissions.

The following sections described the components, the roles and responsibilities of the different actors for CS7-2 (civil, military, ground or airborne).
2.2 Components

2.2.1 Data inputs Data are collected using specific systems to receive signal on 1030 and 1090 MHz RF bands. Data collection is done on a sampling approach (the full coverage of the volume is not necessary) using ground fixed remote sensors or deployable sensors, and airborne sensors.

The 1030/1090 MHz monitoring is proposed to be established using:

- Data collected from specific fixed remote sites;
- Data collected through periodic or on-demand recordings using mobile receiving ground or airborne chains providing detailed information (video information);
- Data generated by a RF Model to extrapolate the 1030/1090 network load.

2.2.2 Architecture and tools

The following figures show the tools currently used by the Network Manager to collect and analyse 1030/1090 MHz transmission data on an aircraft or on the ground. Each time there are two chains: one to record 1030 MHz signal and another one to record the 1090 MHz signal.

![Figure 1: Existing 1030/1090 MHz Airborne recording and analysis chain](image-url)
Centralised Service on Network Infrastructure Performance monitoring and analysis Service (NIPS)/the Performance of 1030/1090 RF bands (NIPS/SUR-RF) (CS7-2) Concept of Operations (CONOPS)

Figure 2: Example of 1090 MHz airborne chain used for recording

A similar set of tools (see Figure 3) is used to record 1030/1090 MHz on the ground. In this case the recorder does not need to be certified for airborne operation and different receivers can be used including ADS-B or Multilateration receivers.

Figure 3: Existing 1030/1090 MHz ground recording and analysis chain

A simple RF model running in Excel is used to estimate the RF pollution in current and future environment.

The current level of recording is the video level signal. Future tools used by CS7-2 could records signals at a different level; however data will need to be converted to a format.
readable by the RFAT.

The following figure shows the different components of the future CS7-2.

![Components used to support CS7-2](image)

**Figure 4: Components used to support CS7-2**

Data from fixed remote sites can be extracted on site and will be automatically processed by the RF Analysis Tool. Data collected from remote sites will be automatically uploaded to a central repository place and the results of analysis will be made available on a Web site. A basic network of remote sites will be provided by CS7-2. This network could be extended using receivers installed by national authorities on a voluntarily basis.

The on-demand ground or airborne recordings will be performed using systems providing access to raw data (baseband video) in order to also check the presence of unexpected signals. Data from more detailed ground or airborne recordings (video recording) will be manually analysed although they could also be automatically processed. A format for video recording [RD 2] has already be defined and is expected to be used to be able to exchange raw data.

Measurement results will be made available to the different stakeholders on a Web site (Web Reporting tool in Figure 4).
2.3 **Roles and responsibilities**

2.3.1 General

The following figure describes the interactions between the main actors of the SUR-RF.

![Relationship between actors involved in NIPS/SUR-RF](image)

**Figure 5: Relationship between actors involved in NIPS/SUR-RF**

2.3.2 NIPS/SUR-RF Service Provider

The NIPS/SUR-RF Service Provider shall:

- Provide, install and maintain the infrastructure required to collect and analysis 1030/1090 MHz data;
- Provide airborne and ground measurement capability for specific measurements (airborne capability other than the BELUGA is subject to feasibility analysis & demonstration in Phase1);
- Analyse the data collected through own receiver network or provided by external stakeholders;
- Provide reports with absolute measurements and trend analysis of 1030/1090 MHz RF band usage at different places in Europe using airborne and ground measurements;
- Determine the sources polluting the RF band;
- Investigate and explain the causes of the pollution;
- Estimate 1030/1090 RF usage based on air and ground scenarios using a RF model.
To support these tasks, the NIPS/SUR-RF Service Provider shall:

- Operate and manage a network of 1030/1090 MHz RF recording chains;
- Process data recorded from flight of opportunities operated by a third party or by additional remote receiver chains installed by National Authorities;
- Operate and manage an RF Analysis Tool (e.g. the RFAT);
- Operate and manage a Web tool to report the RF monitoring results;
- Provide raw data in the format defined in [RD 2] or another format to be implemented in the RFAT tool;
- Operate and manage the simple NM RF model allowing a first order estimation of RF usage (the IPR of this tool shall remain with NM). Other tools can be used to provide more accurate estimation.

The reports shall provide an indication of the RF traffic generated by the different sources.

The reports shall be made available to NM and possibly directly to NSAs when agreed with NM.

2.3.3 NM

NM will:

- Define the areas where periodic measurements of the 1030/1090 RF activity is to be done;
- Determine the impact of the pollution sources on the network operation;
- Develop guidance/recommendation and manage the associated actions with NSA, operators, manufacturers and international standardization bodies in order to keep the band useable;
- Provide capacity planning taking into account current transmissions and future transmissions, and develop acceptability criteria for new transmissions.

To support these tasks NM will:

- Review the measurement reports and estimation provided by the Service Provider;
- Specify on-demand ground or airborne measurements of 1030/1090 RF activity together with ANSPs and NSA.

NM will review and publish the reports and propose actions to regulatory authorities (NSAs) and standardization bodies to keep the performance of the 1030/1090 RF bands.

NM will publish guidelines for manufacturers, ANSPs and NSA based on the 1030/1090 RF measurement reports.

2.3.4 NSA

Anomaly resolution will be undertaken by NSA.

NSA will receive the 1030/1090 RF reports and will derive actions on the 1030/1090 MHz band users (civil, military, ground or airborne) operating in their area of responsibility to maintain the RF bands operational.

2.3.5 ANSPs & Military authorities

ANSPs and Military authorities shall apply the recommendations proposed to maintain the RF bands operational.
2.4 **Safety**

NIPS/SUR-RF is not an operational service therefore it is not expected to be necessary to perform a thorough safety case. The NIPS service contributes to improve safety by proactively detecting and resolving surveillance RF anomalies.

2.5 **Security**

Critical and sensitive information will be handled by the NIPS service including commercial in confidence/ state data about surveillance sensor configurations and locations.

All these information shall be protected against the use by non-authorised persons.

The data will not belong to the companies to which tasks will be outsourced. This will be protected by specific Non-Disclosure Agreements. The contractor will need to develop a security plan to ensure the protection of data.

2.6 **Service level Agreement**

The service provided is not an operational service and can accommodate some interruptions. A minimum operational availability will be defined in the SLA (Service Level Agreement). The SLA will also provide performance indicators related to the coverage level of European airspace.

2.7 **Data property**

All collected data and reports will be the property of NM.
CHAPTER 3 – Regulatory requirements

3.1 Existing applicable regulation

3.1.1 EU SES Package

At the level of European Union, no regulatory provisions address yet specifically the centralised services and the NIPS/SUR-RF in particular. However, the following regulations are worth considering in relation to CS7-2:

4. Commission Regulation (EC) No 482/2008 of 30 May 2008 establishing a software safety assurance system to be implemented by air navigation service providers;
3.1.2 ICAO

ICAO Annex 10 Volume IV [RD 3] specifies limits on interrogator transmissions on the 1030 MHz RF band as well as transponder minimum transmission capability on 1090 MHz. In general national regulations point to these requirements, which need to be checked.

3.2 Requirements for new/updated regulations to implement/operate the CS7-2 (NIPS/SUR-RF)

3.2.1 Requirements related to the EU framework

A provision in the SES Regulations is necessary to make the technical migration to the future centralized services (or ‘support services’) mandatory for stakeholders concerned (e.g. by a further amendment to Regulation No 677/2011).

For CS7-2 (NIPS/SUR-RF), provisions may also be envisaged to facilitate the installation of monitoring stations by a third party to allow 1030/1090 performance monitoring by CS7-2.

3.2.2 Requirements related to the EUROCONTROL framework

The NIPS will be implemented as a Pan-European Service in the applicability area of the EUROCONTROL Member States. To unlock the full benefits for the Network on one side and the ANSPs and other operational stakeholders on the other side, it is pivotal that all Member States cooperate in the set-up and implementation of the service.

While the above-mentioned EU regulations will apply to EU Member States and their operational stakeholders, as well as ultimately to non EU Member States bound by these Regulations because of relevant agreements with the EU for the implementation of aviation regulations (e.g. ECAA), the intention is to achieve consent in the Provisional Council and Permanent Commission of EUROCONTROL to make full use of the services in all EUROCONTROL Member States.

Therefore, it is expected that by a Decision, the Permanent Commission of EUROCONTROL will make the centralised services and their related conditions binding on all the EUROCONTROL Member States and their operational stakeholders.

3.2.3 Requirements related to the national legal/regulatory frameworks

Updated/amended EU regulations are directly applicable in the EU Member States and would not require measures at national level.

For EUROCONTROL Member States not bound by EU Regulations, appropriate rules and regulations would have to be adopted at national level to comply with the obligations deriving from the decision of the Permanent Commission of EUROCONTROL.
CHAPTER 4 – Links of the CS7-2 (NIPS/SUR-RF) to ICAO GANP, SESAR deployment, ESSIP – current procedures and future evolution

4.1 Baseline – Interim Deployment Programme (IDP)

Centralised Services (CS) are in line with the Interim Deployment Programme (IDP). The conformity analysis was initiated by EUROCONTROL and further completed at the Interim Deployment Steering Group (IDSG) Expert Team in the meeting of 27 June 2013.

The possible relationships between CS and IDP deployments have been analysed and clustered in four categories of potential interactions, which are:

1. **No relationships** between IDP activities and CS. This means that the functions and services deployed in a centralised manner by the CS do not directly interface any of the deployments of the IDP.

2. IDP deployment is improved by the independent CS capabilities. The functions and services deployed in a centralised manner by the CS will be used by one or several IDP deployments but in an independent way. This is the case when CS does not impact functionalities already deployed, i.e. **Independent function improvements**, or when the CS implements some add-on function or services such as equipment performance monitoring, centralised management of shared parameters, i.e. **Development of supporting option**.

3. IDP is a **pre-requisite** for CS. This means that the functions and services deployed in a centralised manner by the CS reuse an IDP deployment.

4. IDP deployment is an **alternative** to the CS solution. The functions and services deployed in a centralised manner by the CS offer a different implementation of an IDP deployment.

The NIPS/SUR-RF centralised service proposes a service to manage in a cost-effective way the frequencies used to support the surveillance infrastructure.

This centralised service is categorised as **no relationships**, as IDP has no surveillance related deployments. There are no conflicts between the use of CS7-2 and the IDP deployments.
4.2 **Pilot Common Projects (PCP) and Common Projects (CP)**

The Centralised Services interact with the Pilot Common Project (PCP). Interdependencies between Centralised Services and the six ATM Functionalities (Afs) of the Pilot Common Projects (PCP) have been analysed.

The NIPS/SUR-RF centralised service provides monitoring capabilities for surveillance frequency bands. Its use is independent from the PCP deployments as PCP has no surveillance related deployments.

CS7-2 will enhance the benefits of some of the SESAR initiatives such as the new ADS-B link being developed in SESAR Project 9.22 that are likely to be deployed in future Common Projects (CP).

The NIPS/SUR-RF centralised service provides monitoring capabilities that will increase the benefits of CNS PCP deployments.

4.3 **European Single Sky Implementation (ESSIP)**

The possible relationships between CS and ESSIP, being the Level 3 of the European ATM Master Plan, have been analysed.

The NIPS/SUR-RF centralised service is categorised as development of supporting options of the ESSIP surveillance Objectives (e.g. ITY-SPI “Surveillance performance and Interoperability”, ITY-ACID “Aircraft Identification”).

Furthermore, it provides additional performance monitoring services and supports the good operation of already deployed or being deployed systems such as Mode S and ADS-B.

4.4 **ICAO Global Air Navigation Plan (GANP)**

The possible relationships between CS and ICAO Global Air Navigation Plan (GANP) have been analysed.

The NIPS centralised service contributes to more efficient surveillance infrastructure, related to a number of enablers in GANP CNS roadmaps.

The NIPS/SUR-RF centralised service monitoring supports:

- B0-ASUR – Alternative surveillance;
- B0-SEP, B1-SEP, B2-SEP and B3-SEP – Airborne separation;
- B0-ACAS – ACAS Improvements;
- B2-ACAS – New Collision Avoidance system.
ANNEX 1 – Current procedures and future evolution
Information flows

A1.1 Operational process

Figure 6: Operational process

Note: Figure 6 depicts the operational use cases covered by CS7-2. There will be manual analyses and automatic analyses. Automatic analyses will provide essential measurements to establish a 1030/1090 MHz RF dash board while manual analyses will go deeper in the analysis.
A1.2 Technical process

CS7-2 will collect 1030/1090 MHz data using specific sensors (see figure 4). Data will be analysed and results will be provided through reports and a Web site application.
ANNEX 2 – Data set

High level data flows have been highlighted in other sections of this document. Detailed data sets will be refined during the CS Programme Phase1 and/or at time of CFTs.

CS7-2 has no interface with the rest of the ATM system except for providing operational state of the Web Reporting Tool to a central monitoring function and reporting security events.
ANNEX 3 – EUROCONTROL Proposal for a first set of Centralised Services to contribute to SES Performance Achievement, March 2013

ANNEX 4 – Brief description of the Centralised Services

ANNEX 5 – Minutes of the 29 April 2013 Airspace Users CS workshop

ANNEX 6 – Minutes of the 4 March 2013 Member States CS workshop

ANNEX 7 – Minutes of the 24 April 2013 ANSPs CS workshop

ANNEX 8 – Minutes of the 17 May Manufacturing Industry CS workshop

ANNEX 9 – Working papers, slides and extract from the Minutes of PC/39, 16 May 2013

ANNEX 10 – Working papers, slides and extract from the Minutes of PCC/31, 02 July 2013

ANNEX 11 – Slides and Minutes of CS7 specific workshop of 08 July 2013

These annexes are provided in a separate file.
REFERENCES


[RD 2] RF Video Recording ICD, Edition 2.4, 24/07/14


GLOSSARY

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
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<tbody>
<tr>
<td>24 bit aircraft address</td>
<td>A unique combination of twenty-four bits available for assignment to an aircraft for the purpose of air-ground communications, navigation and surveillance.</td>
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<tr>
<td>Multilateration</td>
<td>A surveillance technique that relies on signals from an aircraft’s transponder being detected at a number of receiving stations. Multilateration system uses a technique known as Time Difference of Arrival to establish surfaces that represent constant differences in distance between the target and pairs of receiving stations. The aircraft position is determined by the intersection of these surfaces.</td>
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## ABBREVIATIONS

<table>
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<tr>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>ACAS</td>
<td>Airborne Collision Avoidance System</td>
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<tr>
<td>ADS-B</td>
<td>Automatic Dependent Surveillance — Broadcast</td>
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<tr>
<td>ANSP</td>
<td>Air Navigation Service Provider</td>
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<tr>
<td>ATM</td>
<td>Air Traffic Management</td>
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<tr>
<td>B2B</td>
<td>Business to Business</td>
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<tr>
<td>B2C</td>
<td>Business to Customer</td>
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<td>CONOPS</td>
<td>Concept of Operations</td>
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<td>CP</td>
<td>Common Project</td>
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<td>CS</td>
<td>Centralized Service</td>
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<td>EASA</td>
<td>European Aviation Safety Agency</td>
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<td>ECAC</td>
<td>European Civil Aviation Conference</td>
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<td>ESSIP</td>
<td>European Single Sky Implementation</td>
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<tr>
<td>ICAO</td>
<td>International Civil Aviation Organization</td>
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<tr>
<td>MHz</td>
<td>Mega Hertz</td>
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<td>MOPS</td>
<td>Minimum Operational Performance Specification</td>
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<td>NM</td>
<td>Network Manager</td>
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<td>NSA</td>
<td>National Supervisory Authority</td>
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<td>PCP</td>
<td>Pilot Common Project</td>
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<tr>
<td>PRISME</td>
<td>EUROCONTROL Fleet data-base</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>RF</td>
<td>Radio Frequency</td>
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<td>RFAT</td>
<td>RF Analyser Tool</td>
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<tr>
<td>SARPS</td>
<td>Standards And Recommended Practices (SARPS)</td>
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<tr>
<td>SES</td>
<td>Single European Sky</td>
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<tr>
<td>TCAS</td>
<td>Traffic Alert and Collision Avoidance System</td>
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