NEFAB Project
Initiative 8
Supervision and Monitoring of CNS Infrastructure
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1. EXECUTIVE SUMMARY

Supervision and monitoring of CNS infrastructure in NEFAB can be done in many different ways, and the more advanced the solution from a Systems perspective is, the more costly it is. This initiative will contain costs for the change of existing supervision technology, in order to support the operational service concept. Hence this initiative is both a cost and benefit driver and will be driven by the operational requirements based on service provision in a new airspace design and Central Management.

According to and in line with the operational concept, this initiative focuses on establishing a central Helpdesk Service, which needs technical support of TMCs (monitoring of operational NEFAB systems status and controlling functionalities of the NEFAB systems within the limit of the Helpdesk responsibility (like Start/Stop/Reset)).

The initiative is not directly linked to the Central ASM Service as outlined in initiative 3, meaning that a Central Helpdesk Service could be established regardless. However, establishing Central Monitoring and Control Service in parallel with ASM would reduce or use synergies on resources used.

In the short term the following is included: by 2015 limited range of service making cross-border supervision of operational systems possible within operational NEFAB airspace design, and a more ambiguous concept, which focuses on a long term implementation of a Central Control and Monitoring functionality and service, based on worldwide interface standards, making it possible to monitor and control any required operational system status, at any given time.
2. DESCRIPTION OF THE INITIATIVE

This initiative describes an establishment of a Central Monitoring and Control Service of existing and new operational ATM systems used for operational ATS within the NEFAB airspace to either support initiative 3 & 4 or the initiative itself since the initiative is an independent enabler.

The purpose of this initiative is to increase the functionality, efficiency and cost effectiveness of Air Traffic Control Services through optimised cooperation and harmonisation regardless of national borders.

The target of the initiative is to be able to Monitor and Control any relevant system, at any level, within NEFAB region, from one or more geographically different locations, using current and future data networks and related standards.

This initiative looks into the different techniques, which are currently deployed in each regional ATCC. The reason being to get to grips with the scale and amount of work needed to support a uniform and harmonised technical service.

Implementation of this initiative will require substantial costs for exchange of existing supervision technology, in order to support the operational ATS concept in the different scenarios. This initiative is a cost driver and will be driven from the operational requirements based on service provision according to the operational concept and new airspace -design and -management.

The following is included:

1. In short term by 2015 limited range of services on supporting cross-border system monitoring and supervision is possible within NEFAB;

2. A more “futuristic” concept, which focuses on the long term, NEFAB-wide implementation of a Monitoring and Control service from Central Technical Management Centres (TMC), making it possible to monitor and control all required operational system information at any level, at any given time according to the common rules;

3. Suggested Incident Management Process including Services Desk and Incident reporting and handling functionality and service, based on current worldwide standards supporting efficiencies to Continuity Management.

The following is not included:

1. Corresponding uniform maintenance procedures including Problem, Change, Release, Transition and Configuration Management;

2. Establishment of Technical Management Centres.
3. RATIONALE AND PURPOSE OF THE INITIATIVE

Within the NEFAB four different ANSPs reside using various techniques and processes. One process, in particular, with regards to interoperability makes sense to focus on for further work. These processes relate to Incident- and Continuity Management.

It is important that the NEFAB area is able to give the same positive and harmonised service to its customers throughout. Today, different processes and system techniques are put in place. This initiative focuses on the aforementioned area resulting in a more efficient, central, coordinated and rationalized operational and system service, thus a more efficient use of resources, at some cost.

Incident Management is the process by which the NEFAB are able to return to full operational status within the shortest time possible after a system or operational event has taken place having a negative influence on the operational service. Hence operational and technical instructions are aligned giving the best possible operational service to the customers. The Helpdesk service is part of the Incident Management process and acts as a Single Point of Contact with regards to Control and Monitoring and escalation procedures of operational systems.

Continuity management is the process by which plans are put in place and managed to ensure that operational services can recover and continue should a serious incident occur. It is not just about reactive measures, but also about proactive measures – reducing the risk of a disaster in the first instance.

This initiative will give positive results already by 2015 and laying down the plan for a unified process and system interoperability solution by 2020.
4. DESCRIPTION OF CURRENT STATE

Each ANSP within NEFAB currently has a different approach towards Incident and Capacity Management and Control and Monitoring Service/System (CMS), supporting regional ATS. The most common form of control and monitoring is supported at system level. Meaning that for each system, supporting an operational functionality or service, the system itself only gives its unique performance and status to technical staff via the system’s own CMS HMI, delivered by the system vendor. Hence information regarding the system’s status is not known, except to the system itself and whoever might look at the CMS HMI, being able to interpret its information.

Not all the ANSPs have 24h technical supervisor presence at ATCC.

The information itself, by which all support recommendations relating to supervision and monitoring of system status are set forth by ICAO, and the systems are differently mapped throughout the NEFAB region.

Improvements and the challenges to get them harmonized are based on the NEFAB Operational Concept of being a uniform and the most efficient airspace seen from the costumers point of view. To support this operational concept, Incident and Capacity Management processes supported by a Central Control and Monitoring Service must also be uniform. Hence a great deal of investments needs to be made on current processes and systems to align its services.

Some new systems are being adopted to support an international standard of SNMP, which could be used for TMC.
5. ONGOING DEVELOPMENT

First steps towards working together:

- NEAP TECH 1-3 has assessed potential for common/harmonised concepts and systems and has carried out initial system inventory;
- Lessons learnt from previous attempts are available and considered.
6. FUTURE SERVICE CONCEPT

The main goal of this initiative is to have unified top-down processes for each ATCC, including a common set of high-level instructions, by which the operational service is supported in the NEFAB area. Specifically the full support of Incident-, Capacity and Continuity management processes need to be aligned. This includes supporting NEFAB with one or more Technical Management Centres (TMC), which can support a central Service Desk functionality and service. In the first approach at least support those cross-border regions within NEFAB that require system monitoring of joint use of each other’s system and infrastructure shall be given. This could for example be the joint use of radio transmitters as part of each ANSP Voice Com Systems or surveillance data due to realignment of sectors of a new airspace design as per Initiatives 1 and 3.

Supervision and Monitoring shall first be supported by uniform processes. This work will be required to make that sure each ANSP has a set of high level requirements to strive for.

The Technical support by cross-border supervision could be firstly established using VNC (Virtual Network Computing)/Remote Desktop service for those systems supporting the operational concept and new airspace design. VNC allows for remote network access to the graphical desktop of a system’s Control and Monitoring System, thus being able to view and control the remote system in a “Multi Display” environment. Meanwhile, new system interfaces are being adopted to support an international standard of Monitoring systems called Simple Network Management Protocol (SNMP). SNMP enables any recipient of this data to be able to operationally monitor system status.

6.1 2015 to Meet the NEFAB Vision

- Supervision and monitoring processes need to be aligning based on Best Practice processes: Incident and Continuity management;
- Special/individual arrangements to support specific cross-border areas. Depending on how the airspace is designed specific efforts will be performed regarding supervision of affected CNS infrastructure;
- Joint supervision - development of a common future supervision plan that can be implemented in new equipment for further evolution;
- Approval of concept regarding supervision at system/equipment level;
- Common supervision established by 2015 using VNC at specific cross-border areas. The planning of 2020 minimum/performance scenario can be ready by 2015 but it will not yet be implemented.

6.2 2020 Minimum Scenario

Incident Management is a fully supported process, by which NEFAB is able to return to full operational status within the shortest time possible after a system or operational event has taken place having a negative influence on the operational
service. Hence operational and technical instructions are aligned giving the best operational service to the customers possible.

One or more TMCs providing support to ACCs possibly covering the cross-border area during night time or weekends. Service given equal supervision via SNMP (Simple Network Management Protocol) only and control using VNC, based on common SLA.

Sharing of control and monitoring data using SNMP interface description at system level. Thus adjacent system supervision and control can be integrated cross-border. Supervision by certified organisations:

- Implement SNMP at system level
- SLAs.

### 6.3 2020 Performance Scenario

For the performance scenario, Incident and Capacity Management processes, by which the NEFAB are able to return to full operational status within the shortest time possible after a system or operational event has taken place having a negative influence on the operational service, are fully supported. Hence operational and technical instructions are aligned giving the best possible operational service to the customers. The system and resources used for monitoring are based on a Central Technical Management Center supporting the NEFAB ANSPs.

To be able to support one or more Central TMCs, geographic locations and provider has to be chosen. Specific requirements to the provider are to support and abide to the same rules and regulations as a Certified ANSP as per EC commission. The central Incident and Capacity Management including Service Desk services could in essence be sourced to one of the ANSPs, member of NEFAB.

A subset of establishing more than one Central TMC is due to the need to divert to an alternative Control and Monitoring facility in case one has been deemed incapable of providing the service.

Implement a jointly agreed control and monitoring system:

- Central Control and Monitoring system to be provided or upgrade existing to common specification;
- Supervision at national and cross-border system/equipment level using a multi display environment;
- Supervision by certified organisation;
- SLAs;
- Joint strategy.
7. DESCRIPTION OF EXPECTED BENEFITS

7.1 Expected Benefits of the Minimum Scenario, 2020

Capacity:

• To maintain and increase the existing capacity levels, information regarding system availability and operational status is required. This initiative thus gives the possibility of usage of cross-border sectors.

Cost efficiency:

• In the short term this initiative gives rise to permanent costs in order to reduce the number of technical staff.

Safety:

No impact on safety is envisaged rather sustaining existing high safety.

Environment:

No impact.

7.2 Expected Benefits of the Performance Scenario, 2020

Capacity:

• To maintain and increase the existing capacity levels, information regarding system availability and operational status is required. This initiative thus gives the possibility to, from one or more Central TMCs receive and control system information throughout the NEFAB area.

Cost efficiency:

In the short term this initiative gives rise to permanent costs in order to reduce the number of technical staff.

Safety:

No impact on safety is envisaged rather sustaining existing high safety.

Environment:

No impact.
8. IMPLEMENTATION COSTS FOR BENEFIT REALISATION

8.1 Preconditions and Assumptions

By 2015 the cost from systems is mainly the cost already planned in each individual investment plan. There is no possibility for systems to estimate the real cost for the cross-border adjustments until the changes are more detailed. This is what must/can be done by 2015.

For the supervision arrangements around cross-border areas that have to be planned as soon as the airspace design has become more detailed. Such a planning should also include the complete infrastructure affection that could require COM complements and SUR and NAV integration in other systems depending on how the airspace to be covered looks like.

Joint procurement activities are more work time rather than additional cash flow. The single ANSPs efforts (expert man/hours mainly), spent not only on creation of common specification, but also on process work, are higher than single ANSPs may have in an individual approach. But the “over cost” is paid back in other benefits, like increased safety, favourable investments, decreased running costs, etc.

8.2 High Level Implementation Activities

Following is the list of high level activities necessary to execute for initiative implementation:

1. Building up joint process organisation:
   - Setting up NEFAB technical governance structure or dedicated task force (if feasible);
   - Issuing NEFAB common technical instructions and procedures;
   - Promotion of the initiative idea among technical support personnel.

2. Preparation for joint activities:
   - Proceeding inventory of systems/services;
   - SNMP planning, harmonisation of strategies and development plans for Control and Monitoring;
   - Setting up working groups for performing particular implementation plans;
   - Common rules (SLAs).

3. ANSPs individual decision on involvement of implementation this initiative

4. Implementation
   - Implementing SNMP at system/equipment level;
• Training of the technical staff.

8.3 Implementation Cost

Implementation cost consists of:

• SNMP implementation;
• Arrangements to support specific cross-border areas;
• Development of common supervision plan;
• Setting up TMC(s);
• Issuing NEFAB common technical instructions and procedures;
• Joint procurement procedures.
## 9. HIGH LEVEL TIME LINE FOR REALISATION

<table>
<thead>
<tr>
<th>High level roadmap</th>
<th>Start date</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Common Incident Management principles</td>
<td>2013</td>
<td>1 year</td>
</tr>
<tr>
<td>2. Implementation of Cross border TMCs</td>
<td>After Operational Concept has been developed pinpointing individual cross borderer system needs 2014 - 2015</td>
<td>1-2 years</td>
</tr>
<tr>
<td>3. Implementation VNC/Remote desktop applications</td>
<td>2014 - 2015</td>
<td>1 - 2 years</td>
</tr>
<tr>
<td>4. SNMP Planning and implementation activities on system level</td>
<td>2014</td>
<td>1+ years</td>
</tr>
<tr>
<td>5. Migration of SNMP at system level</td>
<td>2016+</td>
<td></td>
</tr>
<tr>
<td>6. Specification of Central TMC (plus SNMP implementation activities on equipment level). Developing SLA’s drafts and other regulatory documentation</td>
<td>2016</td>
<td>1 year</td>
</tr>
<tr>
<td>7. Selection of Central TMC service provider and geographical location</td>
<td>2016</td>
<td>1 year</td>
</tr>
<tr>
<td>8. Procurement of central Service Desk System</td>
<td>2016</td>
<td>2 years</td>
</tr>
<tr>
<td>9. Installation work on new location</td>
<td>2017</td>
<td>1 year</td>
</tr>
<tr>
<td>10. Migration of current monitoring to new, Training and certification.</td>
<td>2017 - 2018</td>
<td>7+ for migration for the new equipment/systems</td>
</tr>
<tr>
<td>11. Central TMC start to provide service</td>
<td>2018</td>
<td></td>
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</table>

This initiative is dependent on the Operational concept being developed for the 2015 operations, pinpointing which cross-border system services are operationally needed and thereby controlled and supervised.
## 10. IMPLEMENTATION RISKS

<table>
<thead>
<tr>
<th>Risk Description</th>
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<tbody>
<tr>
<td>Missing commitment due to the level of independency each ANSP want to keep</td>
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<tr>
<td>Commercial interests from states or other might prohibit the sharing of information required</td>
</tr>
<tr>
<td>Operational concept (Initiatives 1, 3 and 4) not fully developed; systems requirements unknown</td>
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