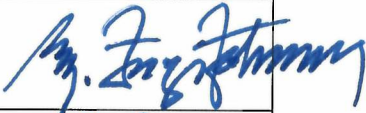



Icelandic Performance plan Air Navigation Services

Reference period 0: 2020-2024



Árangursáætlun (frammistöðuáætlun) Íslands er unnin af Samgöngustofu í samræmi við grunnkröfur um hið samevrópska loftrými, sbr. reglugerð nr. 870/2007 ásamt síðari breytingum. Áætlunin er í samræmi við þær aðlaganir sem Ísland samdi um við innleiðingu rammareglna um hið samevrópska loftrými og einnig í samræmi við ákvarðanir stýrihóps flugleiðsögu í NAT svæði Alþjóðaflugmálastofnunarinnar (NAT SPG) að því er varðar frammistöðuvísa og árangursmarkmið. Samgöngu og sveitastjórnarráðuneytið, sem ber ábyrgð á málefnum sem varða flugmál, samþykkir með undirritun sinni meðfylgjandi áætlun um árangur og frammistöðu flugleiðsögu á Íslandi.

| Nafn | Staða | Dagsetning | Undirritun |
|---------------------------|--------------------------------------|------------|--------------------------------------------------------------------------------------|
| Sigðurður Ingi Jóhannsson | Samgöngu- og sveitarstjórnarráðherra | 13/3 '20 |  |
| Jón Gunnar Jónsson | Forstjóri Samgöngustofu | 26/2 2020 |  |
| | | | |
| | | | |

| Register of editions | | | |
|----------------------|---------------|------------------|----------------------|
| Edition/revision no | Date of issue | Affected page(s) | Reason for change |
| 0.16 | 29.04.2019 | All | Draft in development |
| 0.3 | 5.11.2019 | All | Draft in development |
| 0.8 | 4.2.2020 | All | Draft in development |



8. Contents

| | |
|------------------------------------------------------------------------------------------------------------------|-----------|
| Icelandic Performance plan | 1 |
| 1. Introduction | 6 |
| 1.1. Description of the situation | 6 |
| 1.2. Description of the macroeconomic scenario for the reference period including overall assumptions..... | 8 |
| 1.3. The stakeholder consultation | 13 |
| 1.4. Overview of movements in key areas | 13 |
| 2. INVESTMENT | 13 |
| 2.1. Cost of new ATM systems and major overhauls of existing ATM systems | 14 |
| 2.2. The description and justification of investments | 14 |
| 3. PERFORMANCE AREAS AND INDICATORS | 15 |
| 3.1. Performance indicators in each key performance area | 15 |
| 3.1.1. Environment..... | 15 |
| 3.1.2. Capacity..... | 15 |
| 3.1.3. Cost-efficiency..... | 16 |
| 3.1.4. Safety | 16 |
| 3.2. Description and explanation of the interdependencies and trade-offs between the key performance areas..... | 17 |
| 4. INCENTIVE SCHEMES | 17 |
| 4.1. Description and explanation of the incentive schemes to be applied on air navigation service providers..... | 17 |
| 5. MILITARY DIMENSION OF THE PLAN | 17 |
| 6. ANALYSIS OF SENSITIVITY | 17 |
| 6.1. Sensitivity to external assumptions..... | 17 |
| ATC | 18 |
| COM | 20 |
| MET | 22 |
| 7. IMPLEMENTATION OF THE PERFORMANCE PLAN | 23 |





| | |
|---------------------------------------------------|----|
| Ongoing performance monitoring and reporting..... | 23 |
| Data collection | 23 |
| REFERENCES | 24 |
| ABBREVIATIONS AND ACRONYMS | 25 |
| Annex I..... | 27 |
| Annex II..... | 28 |
| Annex III..... | 30 |





Executive summary

States within the Single European Sky legislation framework are required to develop a performance scheme for air navigation services (ANS). This report describes the first performance plan developed by the Icelandic Transport Authority with the reference period noted as zero (RP0). This performance plan is considered a precursor performance plan as it does not include any targets. The justification for this is the uniqueness of the Icelandic Control Area (Reykjavik CTA). It is unfeasible to use targets set out in other performance plans as Reykjavik CTA is both among the world's largest control areas and Iceland is the only state to have its airspace solely within the NAT region. The investment chapter summarizes all the investments made by the Air Navigation Service Provider (ANSP), Isavia ANS, which are fully allocable to en-route air navigation services. A total of 11 performance indicators were chosen for this reference period in the 4 key performance areas (KPA): environment, capacity, cost-efficiency and safety. The air navigation services provided by Isavia in the Reykjavik Control Area, excluding domestic traffic, are subject to an agreement made by the International Civil Aviation Organization (ICAO), the Joint Financing Agreement which is a full cost recovery mechanism. Therefore Isavia ANS is not permitted to profit from the service and accordingly, no incentive scheme was introduced for this reference period. Furthermore, a military dimension is often an integral part of a performance plan. However, Iceland is a non-military state and effects of Air Navigation Services (ANS) regarding this plan were ignored. Sensitive analysis on the imposed unit rate for Air Traffic Control (ATC), Communication (COM) and Meteorology (MET) were conducted. Finally, plans for the implementation of the performance plan were laid out.



1. Introduction

The Icelandic Transport Authority (ICETRA) is the National Supervisory Authority (NSA) for Iceland and as such is responsible for the preparation of the Icelandic performance plan. The plan is prepared in coordination with the two air navigation service providers (ANSPs), Isavia ANS and the Icelandic Meteorological office (IMO) and approved by the Minister of Transport and Local Government. This first Icelandic Performance plan covers the reference period RP0, from 2020 to 2024 inclusive. The zero indicator is representative of binding national targets not being set for this reference period. The RP0 is focussed on data gathering and setting a baseline for future target settings.

Table 1: Overview of stakeholders and scope

| | |
|--------------------------------|---------------------------------------------------|
| National Supervisory Authority | Icelandic Transport Authority |
| Accountable entities | Icelandic Transport Authority, Isavia ANS and IMO |
| Geographical scope | Reykjavik Control Area, as further defined |

1.1. Description of the situation

Commission regulation (EU) No 549/2004, as amended by (EU) No 1070/2009 and transposed into Icelandic legislation with regulation No 870/2007 with later amendments requires states within the Single European Sky to develop a performance scheme for air navigation services. The scheme shall include a national performance plan with performance targets for the KPAs of safety, environment, capacity and cost-efficiency. In addition, to set up the monitoring and benchmarking of the air navigation services performance, the performance targets shall be consistent with the performance targets defined within the North Atlantic Region of ICAO (ICAO NAT) region by the North Atlantic Systems Planning Group (NAT SPG). The performance plan shall contribute to the sustainable development of the air transport system by demonstrating the overall efficiency of air navigation services. In order to assess and monitor each KPA, separate key performance indicators (KPIs) shall be introduced. This first performance plan shall be considered as a *precursor* performance plan as it does not include any targets. The logic behind this approach is to get a good overview of the current situation and subsequently we will introduce performance targets with the sole purpose of improving the performance.

To reflect that fact the reference period is numbered as zero, RP0.

The performance plan has been in development for a while and both the Ministry of Transport and local government and the EFTA Surveillance Authority (ESA) have been kept informed

and updated of its progress. The scope of the Icelandic performance plan for RPO is air navigation within the Reykjavík Control Area; traffic within the domestic area. Iceland is located in the ICAO North-Atlantic (NAT) region, the airspace linking Europe and North America.




Figure 1: Overview of the ICAO regions

As seen in Figure 1, The North-Atlantic Region encompasses virtually all of the non-domestic airspace over the Atlantic Ocean between roughly 20° north latitude and the North Pole. It is divided into seven Flight Information Regions (FIRs) with Reykjavík FIR being one.

The regional planning process is the principal engine of ICAO's planning and implementation work, setting the stage for national planning and implementation. NAT SPG was established in 1965 by the Council of ICAO as the first regional implementation planning group. From its terms of reference the NAT SPG continuously studies, monitors and evaluates the air navigation systems in light of changing air traffic characteristics, technological advances and updated traffic forecasts. The NAT SPG has studied the use of performance indicators and has defined safety KPIs as well as discussing usable indicators for cost-effectiveness. As per the Icelandic implementation of the SES framework, the Icelandic performance plan shall be consistent with NAT performance indicators.

In further iterations of the performance plans the goal is to take a *gate-to-gate* approach on ANS performance and to define targets for the different KPIs.

Route charges for the Reykjavík CTA (excluding traffic within the domestic area) are managed by a Joint Finance Agreement (JFA), set up and administered by ICAO. Originally set up to assist the financing of ANS services provided, it covers the operation of facilities and services provided by Denmark and Iceland for civil aircraft flying across the North Atlantic,



north of the 45°N latitude. The first joint financing arrangement came into existence in 1956 and was amended and updated in 1982 and 2008. At present, 25 States with civil aircraft flying across the North Atlantic are parties and whereas originally members to the agreement jointly financed the services, today costs are recovered from the airspace users. The United Kingdom National Air Traffic Services Limited serves as the billing and collecting agent.

1.2. Description of the macroeconomic scenario for the reference period including overall assumptions

ICETRA performed a PESTEL analysis to better assess the macroeconomic scenario. A PESTEL analysis is a framework or tool often used to analyse and monitor the macro-environmental (external marketing environment) factors that have an impact on an organization. PESTEL stands for political, economic, sociological, technological, environmental and legal which represent the factors that should be analysed


1.2.1. Political


Iceland is a member of the European Free Trade Association (EFTA) and The European Economic Area (EEA). EFTA is an intergovernmental organization, established in 1960 by the EFTA Convention for the promotion of free trade and economic integration between its member states (currently Iceland, Liechtenstein, Norway and Switzerland), within Europe and globally. The European Economic Area (EEA) agreement is an international agreement, which allows for the extension of the EU's single market to non-EU states. Iceland is not a member state of the EU.

Through the EEA-agreement, European regulations and directives are transposed into the Icelandic legal system by national implementing acts or regulations. International obligations including ICAO and IMO are similarly transposed into the Icelandic legal system. Furthermore, national initiatives for new regulations and/or their amendments are drafted based on a confirmed need, i.e. established during audits, inspections and occurrence reporting. Before new regulations enter into force, ICETRA carries out impact assessments of new regulations and the Ministry of Transport and Local Government either adopts a regulatory act, or submits an implementing bill to the Parliament.

1.2.2. Legal

Commission regulation (EU) No 549/2004, as amended by (EU) No 1070/2009 and transposed into Icelandic legislation with regulation No 870/2007 with later amendments lays down the requirements for a single performance and charging scheme. The SES implementing rules for performance and charging have a limited geographical scope, exclusive to the Europe region of ICAO (ICAO EUR) and applying the same approach for Iceland as for *core Europe* is not considered to be feasible. When the SES regulatory framework was incorporated into the European Economic Area (EEA) agreement, including





Commission regulation (EU) No 549/2004, Iceland received adaptations concerning certain requirements related to performance and charging. Iceland is hence not bound by the Community-wide performance targets set by the Commission but shall instead ensure consistency with regional performance targets. Also, Iceland is not required to be consistent with the Eurocontrol charging system.

Concerning levied air navigations charges in Iceland, Isavia ANS forecasts the cost of services for the next year (rekstraráætlun) and the Joint Support Committee (JSC) calculates the unit price for the service which is then accepted by the ICAO council, unlike for other EU/EES member states where the unit price is set at a national level, by the State.

ICETRA as the NSA oversees and monitors that the charging scheme is in compliance with the applicable regulations and requirements, ICAO standards and appropriate guidelines.

1.2.3. Economic

- GDP

Gross domestic product (GDP) in Iceland has declined to after reaching a peak of 7.3% in 2016. GDP in 2018 was 4.3% and has declined further in the first quarter of 2019 to 1.7%. The decline is associated with slower growth in the tourism industry and GDP is expected to grow again in 2020 (Hagstofa Íslands, 2019) (Landsbankinn, 2019) (Seðlabanki Íslands, 2019) (Íslandsbanki, 2019).

- Inflation

Inflation has been relatively stable in recent years. The inflation increased from 2.7% in 2017 to 3.7% in 2018 and continued to increase during the later quarters of 2018 but decreased to 3,4% in the second quarter of 2019. Short term forecasts expect inflation to be just under 4%, however forecasted inflation for the next 5-10 years is around 2.8% (Landsbankinn, 2019) (Seðlabanki Íslands, 2019) (Íslandsbanki, 2019).

- Currency

Iceland's monetary unit is the Icelandic krona. The exchange rate for the krona devaluated by 7% in the third quarter of 2018 after being relatively stable the year before. Financial problems of the airline WOW air a key factor in the krona's devaluation. The devaluation of the krona was the primary reason for increased inflation in the later half of 2018. The krona is expected to be somewhat stable with fluctuations under 5% (Landsbankinn, 2019) (Seðlabanki Íslands, 2019) (Íslandsbanki, 2019).

- State of airlines

In the beginning of 2019, there were two major airlines in Iceland; Icelandair and WOW air. In the summer of 2018, these airlines were responsible for 77% of all departures from Keflavík airport (Icelandair, 44,7% and WOW air 32,2%) (Sigurjónsson,

2019). Both airlines have had some complications, and WOW air has already filed for bankruptcy. Before bankruptcy, WOW air had already reduced its fleet by almost half and simplified their operation by limiting their route network. The more established Icelandair has also had its own challenges. Icelandair has had issues with profit margins due to increased competition, increased cost of labour and currency fluctuation. Furthermore, Icelandair had begun renewing their fleet with the Boeing 737MAX aircraft which have since been grounded for safety reasons. This has forced Icelandair to cancel flights and adapt their routes.

- Traffic development and forecast

Isavia issues a yearly forecast of traffic numbers at Keflavík airport. The forecast is based on information from all airlines operating flights in Keflavík airport, ensuring accuracy. The last two years have shown a decrease in traffic for the first time since 2009, due to less flight availability. As shown in Table 2, the number of passengers for 2020 is expected to decrease by 7,8%.

Table 2: Isavia's passenger forecast for 2020

| | Departure | Arrival | Transfer | Total | Increase / Decrease |
|--------------|------------------|------------------|------------------|------------------|------------------------|
| Jan | 166.537 | 152.990 | 82.607 | 402.135 | -25% |
| Feb | 176.185 | 178.028 | 54.208 | 408.421 | -20% |
| Mar | 196.148 | 194.129 | 70.137 | 460.414 | -22% |
| Apr | 188.907 | 185.370 | 101.912 | 476.188 | 0% |
| May | 196.547 | 207.870 | 168.765 | 573.182 | -1% |
| Jun | 265.579 | 270.806 | 211.954 | 748.338 | -5% |
| Jul | 297.877 | 300.275 | 208.516 | 806.668 | -4% |
| Aug | 299.461 | 293.998 | 200.691 | 794.151 | -5% |
| Sep | 238.428 | 227.324 | 160.958 | 626.710 | -3% |
| Oct | 207.093 | 201.196 | 104.065 | 512.355 | -8% |
| Nov | 174.228 | 168.526 | 83.255 | 426.009 | -2% |
| Dec | 178.017 | 186.803 | 80.919 | 445.738 | -2% |
| Total | 2.585.005 | 2.567.316 | 1.527.988 | 6.680.309 | -8% |

The NAT Systems Planning Group releases a yearly traffic forecast in the NAT region. The near-term five year outlook forecasted by the NAT SPG can be seen in Table 3. There has been a decrease from previous forecasts which is due to the WOW air bankruptcy and the 737MAX grounding. Growth will continue but may lessen on a year to year basis. The traffic decrease due to the cessation of WOW air was expected to be higher but was offset somewhat by Icelandair and Norwegian Air increasing seat availability.

Table 3: Near term outlook forecasted by the NAT SPG in 2019 (NAT-SPG)

| Forecast Growth | 2019-2020 | 2020-2021 | 2021-2022 | 2022-2023 |
|-----------------|-----------|-----------|-----------|-----------|
| Reykjavik CTA | 3,9% | 4,7% | 3,9% | 0,8% |

Other factors which were considered to be included in the economic part of the analysis were new airlines and fuel prices. Fuel prices are a large base cost for airlines, with the development of fuel price likely to impact the growth of Reykjavik CTA.

1.2.4. Sociological

The business of air navigation services involves many stakeholders and therefore a massive amount of information. The rapid development of Information Systems Technology is increasing cyber risks. Threats to systems used to provide air navigation services are accessible via data communications networks which are becoming prevalent and sophisticated. Vulnerabilities inherent in almost all computer operating systems, many support services and network and Communication, Navigation and Surveillance (CNS) applications can be exploited in a variety of ways. On the other hand, civil aviation organisations rely on the interconnection of electronic communications networks even for critical parts of their operations, including safety-critical functions (e.g. surveillance data exchange, flight plan processing, etc.). The protection of information systems from malicious attacks and the means of dealing with the consequences of such attacks are encompassed by cyber security. Security events and security incidents could be the result of accidental or deliberate acts by staff or malicious attacks by an external attacker. They may also arise from weaknesses in hardware, software, configurations or processes (Eurocontrol, 2018).

In such an industry as the air navigation, a widespread consultation is needed and in Iceland consultation between stakeholders and NSA has continued to grow. This performance plan should also increase consultation between the various stakeholders.

1.2.5. Technological

The technology in air navigation has increased with the capabilities of providing better, more efficient services but it introduces new risks for both safety and security. Recently, emphasis has been placed on cyber security, as mentioned above, which will without a doubt continue to be a pressing topic in relation to technology.

Also, air navigation service providers have increased the dependency on advanced technology in surveillance and communications.



1.2.6. Environment

Environmental issues, especially climate related issues are a major topic in modern society and no less so for the aviation sector. Iceland is a participant of the Paris Agreement of 2015 to limit the average increase in the temperature of the Earth's atmosphere to 1.5°C from the reference level. However, it is worth noting, aviation is not directly included in the Paris Agreement. The reason is that Green House Gas (GHG) emissions associated with international aviation are to be dealt with under ICAO. The ICAO agreement on carbon neutral growth and Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) complements the ambition of the Paris Agreement and constitutes the most significant international climate-related agreement since its adoption. A market-based measure (MBM) is a policy tool which was developed and is designed to achieve environmental goals at a lower cost and in a more flexible manner than traditional regulatory measures. Examples of MBMs include levies, emissions trading systems, and carbon offsetting (ICAO, 2019).

The ICAO Assembly has resolved that ICAO and its member states, with relevant organizations, would work together to strive to achieve a collective medium term global aspirational goal of keeping the global net CO₂ emissions from international aviation from 2020 at the same level (so-called “carbon neutral growth from 2020”).

CORSIA has three phases: a pilot phase (2021 – 2023); a first phase (2024 – 2026); and a second phase (2027 – 2035). The difference between the phases is that the participation of states in the CORSIA offsetting in the pilot phase and in the first phase is voluntary, whereas the second phase applies to all ICAO Member States (ICAO, 2019).

Environmental issues are not only driven by a demand for more environmentally friendly operations but also by a purely economic standpoint. Environmentally friendly aviation is more efficient aviation. Technologies such as lighter airframes, higher engine performance and new certification standards, operational improvements (e.g. improved ground operations and air traffic management), sustainable aviation fuels, and market-based measures (MBMs) have been identified by ICAO (ICAO, 2019).

In recent years public attention has been drawn to aircraft noise which might lead to conflicts between targets for emission and noise pollution. Other factors which were discussed were extreme weather events and natural disasters. Extreme weather events could change the jet stream and minor weather events such as a severe storm season can lead to Air Traffic Management (ATM) delays. As evident in the Eyjafjallajökull eruption, a large scale eruption can lead to a major incident in the Reykjavik CTA and cause widespread ATM delays. It is worth noting that steps have been taken in the aviation world to reduce the ATM delays caused by an eruption with better research and analysis.

1.3. The stakeholder consultation

During the course of the project there have been numerous meetings. Additionally, informal consultation has been regularly sought through e-mail, phone calls and other meetings. Overview of the stakeholder meetings can be found in Annex I.

1.4. Overview of movements in key areas

As stated above, the geographical scope of this reference period is only Reykjavík CTA excluding domestic traffic and therefore only traffic to/from Keflavik airport is included in the performance plan. Table 4 presents an overview of the grand total of civil and military movements at international airports in 2019 in Iceland, with October, November and December excluded as that data was still unavailable at time of publishing.

Table 4: Grand Total civil and military movements at Keflavik airport, overflights and flights to/from Iceland in 2019 (Isavia)

| | Keflavik Airport | Overflights | To/From Iceland |
|------------|------------------|-------------|-----------------|
| Jan | 6.011 | 8.947 | 4.292 |
| Feb | 5.231 | 7.634 | 3.882 |
| Mar | 7.340 | 9.262 | 4.492 |
| Apr | 6.946 | 9.211 | 3.693 |
| May | 7.644 | 10.210 | 4.614 |
| Jun | 8.353 | 11.291 | 6.005 |
| Jul | 9.542 | 12.324 | 6.450 |
| Aug | 8.763 | 12.709 | 6.312 |
| Sept | 7.293 | 11.360 | 5.200 |
| Oct (2018) | 8.501 | 11.016 | 6.234 |
| Nov (2018) | 6.880 | 9.102 | 4.773 |
| Dec (2018) | 5.718 | 9.303 | 4.559 |
| Total | 88.222 | 122.369 | 60.506 |

Overflights are more than double in number compared to flights to/from Iceland.

2. INVESTMENT

Investments in the Icelandic airspace are to a large extent subject to the JFA and as such, subject to scrutiny and user consultation. First, the need for investments is introduced/discussed with users. Next, the need for investments is introduced to JSC. Thirdly, the proposal and project description, and investment plans are sent to ICAO Air Navigation Bureau (ANB). Subsequently, the investment can be introduced in more detail in a user

consultation meeting. Lastly, the proposal and project description are sent to ICAO ANB and in the end an ICAO council meeting decides on the approval of the project.

2.1. Cost of new ATM systems and major overhauls of existing ATM systems

Table 5 shows planned investment during the reference period. Investment, Total Capital Expenditure (CAPEX) for the project in Icelandic krona, presumed lifecycle and the ratio of allocation en-route to other source of financing (%). According to the JFA there are clear rules on which costs are allocable to the joint finance cost base. Lastly, the planned date of entry. Further information on how the CAPEX is divided by years can be found in the Annex.

Table 5: Overview of the investments allocable within the oceanic airspace

| Investments | Total CAPEX for the project (ISK) | Lifecycle (Amortisation period in years) | Allocation en-route / Other source of financing (%) | Planned date of entry into operation (IOC / FOC dates) |
|-------------------------------------------------------------------------------------|-----------------------------------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| Airspace Simulator Phase III | 207.000.000 | 10 | 100% international en-route | 2021 |
| Renewal of the Weather Radar and Upper Air Station in Keflavik and Miðfell | 329.520.000 | 10 | Weather radar in Miðfell: 100% international en-route. Weather radar in Keflavik and Upper Air Station in Keflavik: 50% international en-route / 50% Icelandic State | 2020 |
| Renewal of the Flight Data Processing System at Reykjavik Centre | 2.077.326.000 | 12 | 100% international en-route | 2022 |
| Implementation of Satcom services in the voice communications control system (VCSS) | 89.100.000 | 10 | 100% international en-route | 2020 |
| Backup ATM system (JS-WP/2006) | 233.500.000 | 10 | 94% international en-route/ 6% domestic en-route | 2022 |

2.2. The description and justification of investments

The description and justification of investments referred to in 2.1 were analysed further. A brief description and justification was given and differentiated between investments in new systems, overhaul of existing systems and replacement investments. The benefits expected from these investments were detailed in terms of performance across the four key performance areas, allocating them between the en-route and terminal/airport phases of flight, and the date as from which benefits are expected. This analysis can be found in Annex II



3. PERFORMANCE AREAS AND INDICATORS

Within the framework of the Global Air Navigation Plan, ICAO has defined the following eleven KPAs: access and equity, capacity, cost-effectiveness, efficiency, environment, flexibility, interoperability, participation by the ATM community, predictability, safety and security (ICAO, 2018). In alignment with the requirements of the performance scheme, Iceland will focus on the four KPAs of environment, capacity, cost-efficiency and safety. For those KPAs, performance indicators were defined based on discussions with stakeholders, analysis of possible problem areas, and assessment of performance indicators identified by ICAO (NATSPG) and the Civil Air Navigation Services Organisation (CANSO). The intention is for performance indicators to provide a useful indication of the ANSPs' performance in the focus areas. To be noted, for the area of safety, as the NAT SPG has defined several KPIs it is found to be more appropriate to monitor the safety KPIs within the Icelandic Aviation Safety Plan rather than this performance plan. As previously described, no targets are set for performance in RP0.

3.1. Performance indicators in each key performance area

The performance indicators for the four key performance areas of environment, capacity, cost-efficiency and safety considered most appropriate are the following:


3.1.1. Environment

- (i) Percentage of approved height changes

Isavia ANS currently collects data on the percentage of approved height changes. It is more environmentally friendly for aircrafts to be in the optimal height according to their flight profile.

3.1.2. Capacity

- (i) Air Traffic Controller (ATCO) in OPS productivity
- (ii) En-Route Network Delays
- (iii) Adherence to CTOT
- (iv) Working hours and message handled by Gufunes COM unit
- (v) Total working hours in Reykjavík Area Control Centre (ACC) per number of flights
- (vi) Average response time for Gufunes COM unit



ATCO hour productivity is a KPI as identified by CANSO and is already analysed by Isavia ANS. The indicator calculates the Instrumental Flight Rules (IFR) flight hours divided by ATCO operational hours. Data regarding en-route network delays is collected and published by Eurocontrol and is emphasised as a KPI in Europe. Adherence to CTOT is the assigned calculated take off time (CTOT), and the CTOT times are allocated by the network manager. This indicator has been identified as a key variable connected too en-route network delays and the data is compiled by Isavia Ohf. The working hours and messages handled by Gufunes is an interesting indicator since there has been a steady drop of messages handled with improved technology (CPDLC). The amount of messages handled by Gufunes has been steady over the past years because of increased traffic. With this indicator it is possible to monitor the amount of message handled. The data is collected by Isavia ANS's COM unit in Gufunes. Total working hours in Reykjavík ACC per number of flights is a variable that can be compared to other performance plans and is therefore ideal for this performance plan. The average response time for Gufunes COM unit is an indicator of the efficiency of the unit, it measures the time it takes Gufunes COM unit to transfers messages from aircrafts to Reykjavik ACC.

3.1.3. Cost-efficiency

- (i) Average cost per flight
- (ii) Costs per IFR flights hours
- (iii) ATCO employment cost divided by the total cost of operation

Average cost per flight is the total cost base excluding MET divided by total flights in the Reykjavik CTA. Costs per IFR flights hours is a similar indicator with the total cost base excluding MET divided by total IFR flight hours in the Reykjavík CTA. ATCO employment cost divided by the total cost of operation gives a better understanding of Isavia ANS's cost base since ATCO employment cost is a significant number in the cost base.

3.1.4. Safety

- (i) Level of the effectiveness of safety management (EOSM)

This performance indicator measures the level of implementation of the following safety management objectives: safety policy and objectives; safety risk management; safety assurance; safety promotion and safety culture with a questionnaire filled out every year.



3.2. Description and explanation of the interdependencies and trade-offs between the key performance areas

It is obvious that some key performance areas can conflict with or be dependent on each other. To name a few, safety and cost-efficiency, environment and cost efficiency, capacity and cost efficiency. However, some key performance areas can support each other; more efficient services can lead to less use of fuel and therefore be better for the environment. Capacity is currently not a problem in the Reykjavík CTA unlike in many airspace blocks in Europe, although we need to be aware of the aerodromes' part in capacity issues when considering a gate-to-gate approach in future versions of the performance plan.

4. INCENTIVE SCHEMES

4.1. Description and explanation of the incentive schemes to be applied on air navigation service providers.

Air navigation service which is provided in Reykjavik control area excluding domestic traffic, is subject to the Joint Financing Agreement. The charging scheme is a full cost recovery mechanism. Isavia ANS is not permitted to profit from the service nor shall they be subject to loss. An incentive scheme is not a part of this performance scheme at present (for RP0) but ICETRA will continue to develop such a scheme in close relation with stakeholders.

5. MILITARY DIMENSION OF THE PLAN

Iceland is a non-military state and the effect of military operations on the performance of ANS in terms of this plan is considered negligible. Regulations are in place concerning management and flexible use of airspace. Established procedures for airspace utilization ensure, for the most part, that international and scheduled flights take priority over military training flights.

6. ANALYSIS OF SENSITIVITY

6.1. Sensitivity to external assumptions

As a sensitivity analysis, a graphical sensitivity analysis was created with key variables in the calculation of the user charge for each domain; ATC, COM and MET. The slope indicates the user charge sensitive on changes, with a steeper slope indicating greater sensitivity. All variables were calculated with a difference of -20%-20% with 5% interval.

ATC

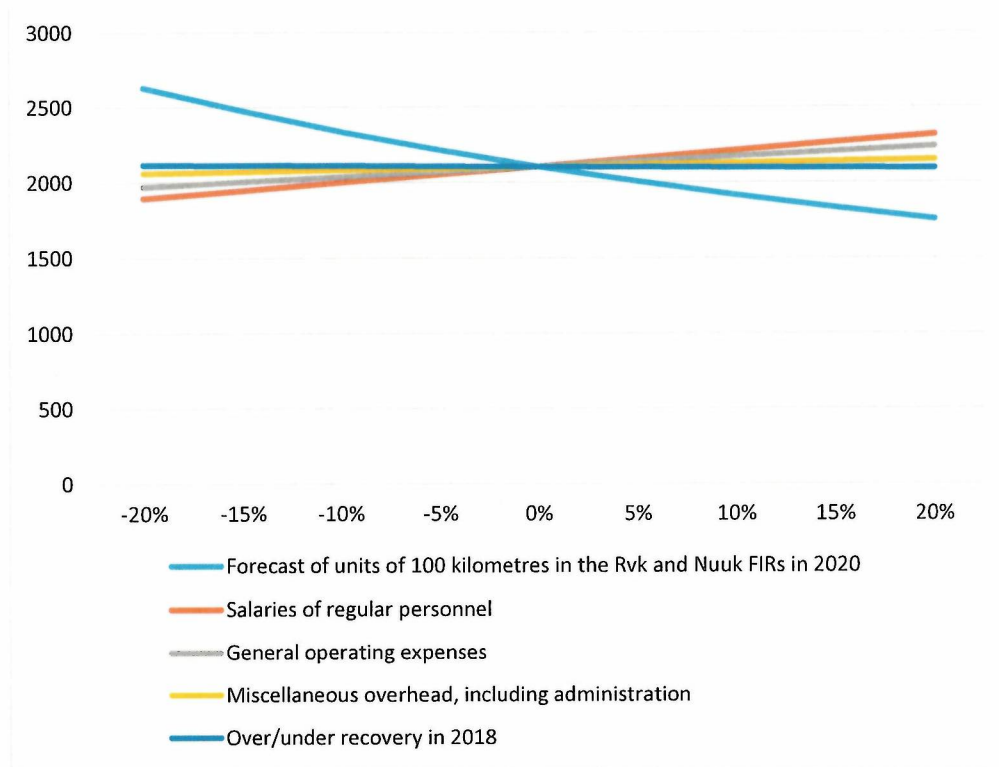


Figure 2: Sensitivity analysis for key variables in the 2020 unit rate for ATC

As shown in Figure 2 the most sensitive variables in the ATC cost base are: forecast of units of 100 kilometres in the Reykjavik and Nuuk FIRs in 2020. This is in line with Figure 3 which shows a pie chart with proportion of cost.

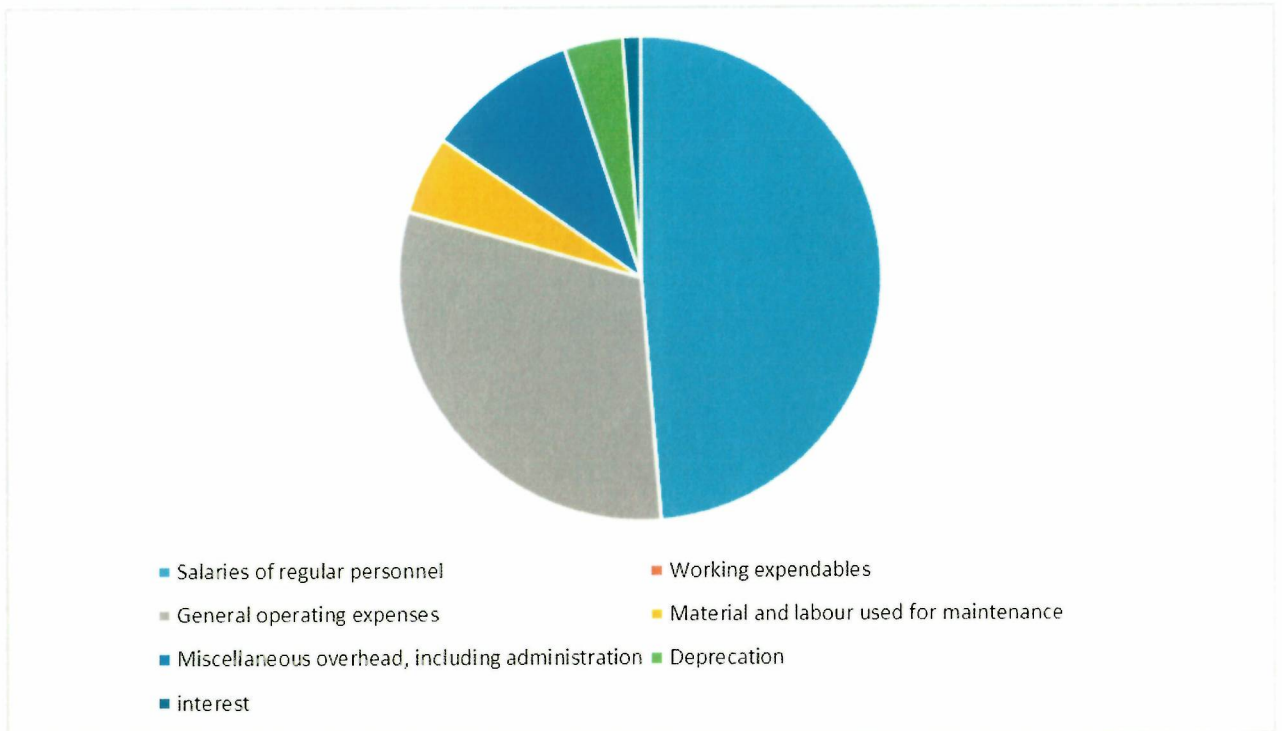


Figure 3: Pie chart with proportion of cost in ATC for 2018

Figure 4 shows it is evident that salaries of regular personnel and general operating expenses are the largest parts of the user charge cost base for ATC.

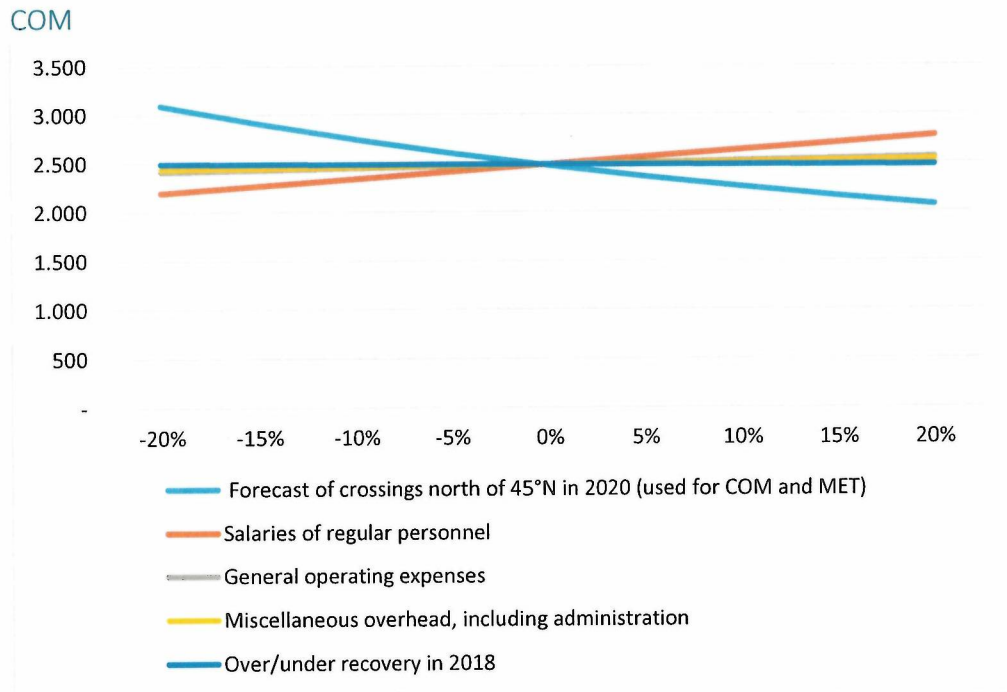


Figure 4: Sensitivity analysis for key variables in the 2020 unit rate for COM

Figure 4 the most sensitive variables in the COM cost base are: Forecast of units of crossing north of 45°N in 2020 and salaries of regular personnel. Other variables are less sensitive to the user rate. This is in line with Figure 5 which shows a pie chart with proportion of cost.

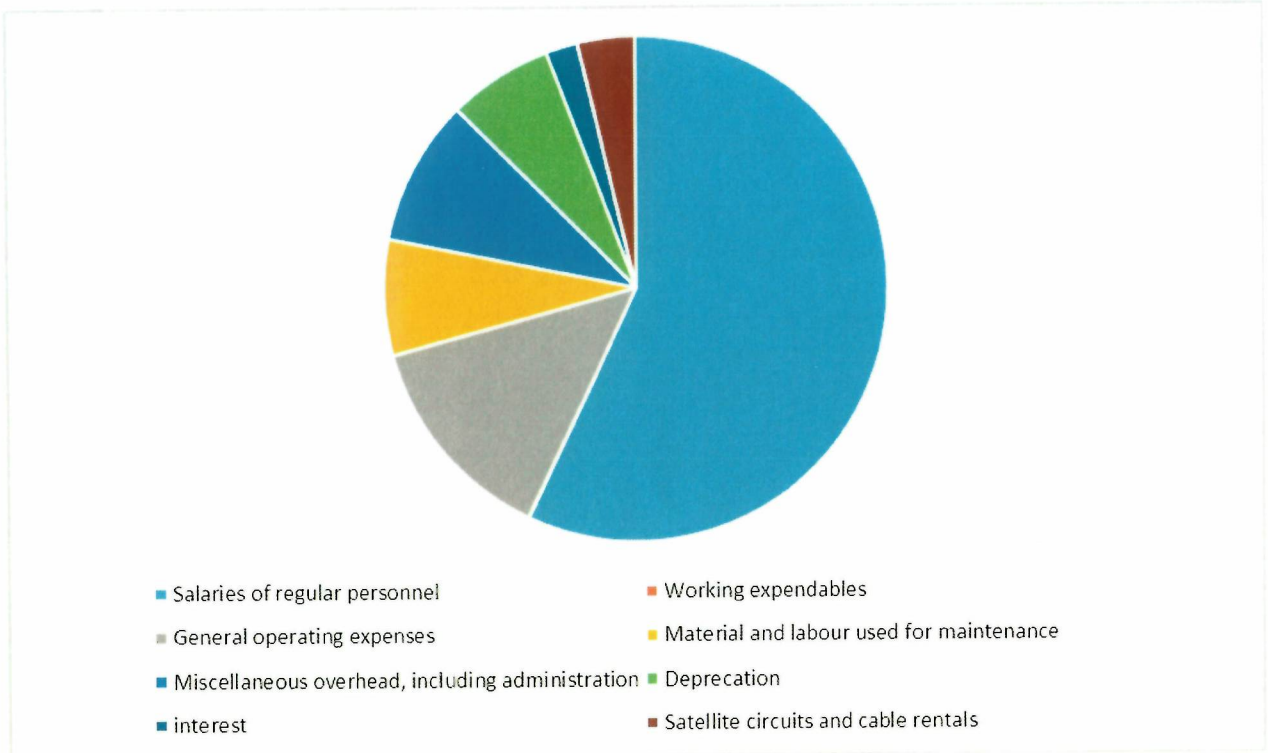


Figure 5: Pie chart with proportion of cost for COM services in 2018

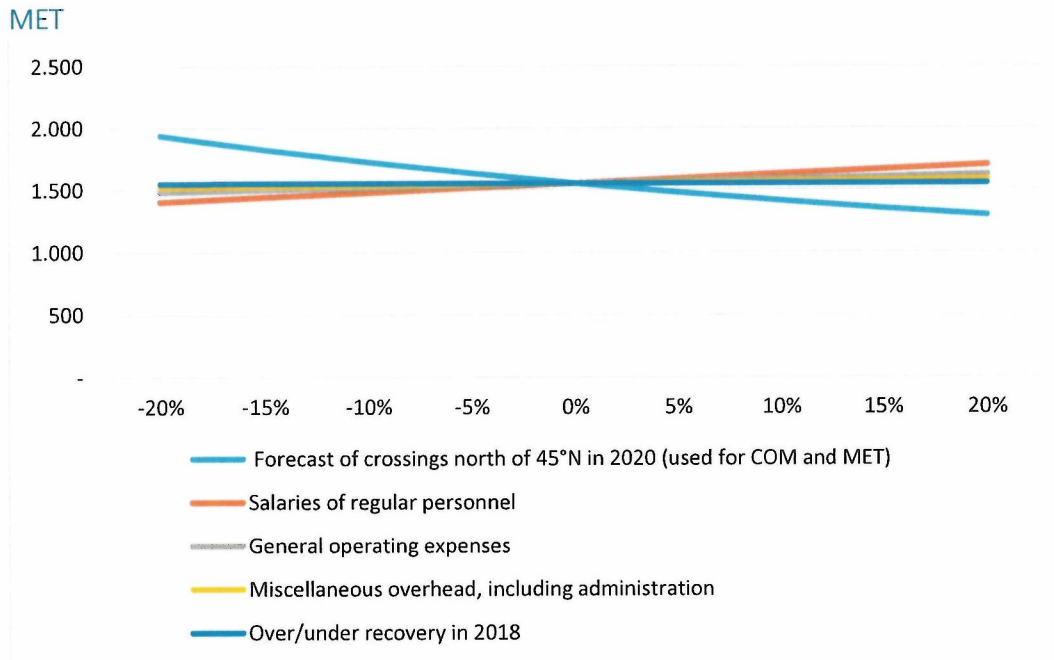


Figure 6: Sensitivity analysis for key variables in the 2020 unit rate for MET services

The MET cost base is the least sensitive to the variables since its cost base is more even. However, like in COM the most sensitive variables in MET cost base are: Forecast of units of crossing north of 45°N in 2020 and salaries of regular personnel. Other variables are less sensitive to the user charge. This is in line with Figure 7 which shows a pie chart with proportion of cost.

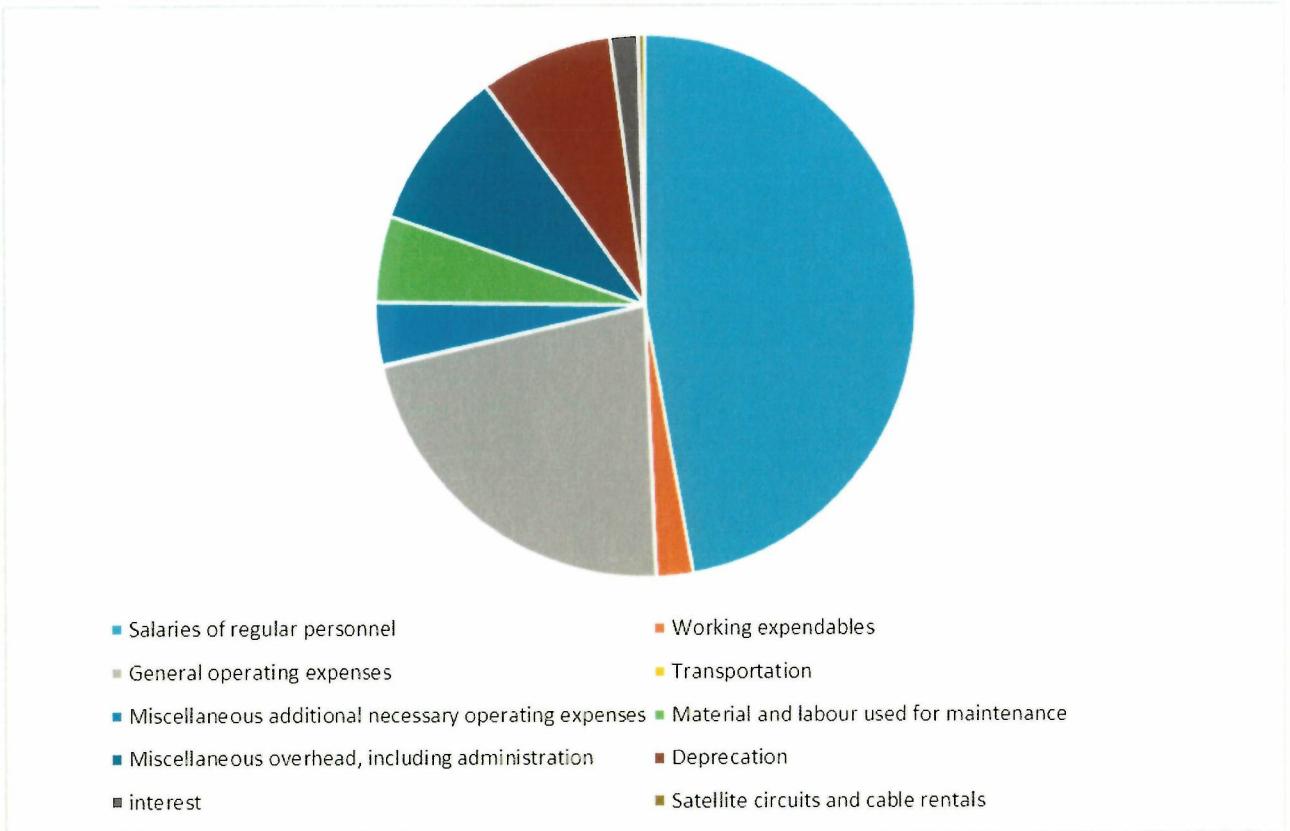


Figure 7: Pie chart with proportion of cost of MET in 2018

7. IMPLEMENTATION OF THE PERFORMANCE PLAN

Ongoing performance monitoring and reporting

The NSA is responsible for monitoring and overseeing the performance indicators introduced in this performance plan. ICETRA has already developed a formal procedure in the Quality Management System (QMS) to monitor the performance plan which states that the performance plan shall be reviewed yearly. The NSA will also continue their oversight in charging matters. ICETRA also reviews business publishing by Isavia ANS. That is; yearly business overview report, system development road plan every two years, business plan for JF services every five years and attend JFA consultation meetings. ICETRA is responsible for validation, examination, evaluation and dissemination relevant to civil performance monitoring.

Data collection

An agreement in the form of a letter of agreement (LoA) has been made with Isavia ANS on data collection. The format of this letter can be found in Annex III. This letter lays out which data and at what frequency Isavia ANS will send to ICETRA. It is worth noting that the some data is processed by Isavia ANS and some is raw.



REFERENCES

- Eurocontrol. (2018). *Cyber Security in ATM*. Luxembourg: Eurocontrol.
- Hagstofa Íslands. (15. October 2019). Sótt frá Heimasíða hagstofunnar - Landsframleiðsla: <https://www.hagstofa.is/talnaefni/efnahagur/thjodhagsreikningar/landsframleidsla/>
- ICAO. (2018). *e Global Air Navigation Plan (GANP)*. Montreal: ICAO.
- ICAO. (2019). *Carbon Offsetting and Reduction Scheme*. Montreal: ICAO.
- ICAO. (22. August 2019). *ICAO website*. Sótt frá <https://www.icao.int/sustainability/Joint-Financing/Pages/danish-icelandic-agreements.aspx>
- Isavia. (án dags.). *Isavia - Flugtölur*. Sótt frá <https://www.isavia.is/fyrirtaekid/um-isavia/utgefid-efni/flugtolar/flugtolar>
- Íslandsbanki. (15. October 2019). Sótt frá Vefsíða Íslandsbanka: <https://www.islandsbanki.is/is/frett/uppfaerd-thjodhagsspa>
- Landsbankinn. (November. 14 2019). Sótt frá Heimasíða Landsbankans: <https://umraedan.landsbankinn.is/umraedan/efnahagsmal/hagspa-landsbankans-2018-2021/inngangur-og-samantekt/>
- NAT-SPG. (án dags.). *WP17 Outcomes*. Paris: ICAO.
- Seðlabanki Íslands. (2019). *Peningamál 2019/1*. Reykjavík: Seðlabanki Íslands.
- Sigurjónsson, K. (5. July 2019). *Túristi*. Sótt frá <https://turisti.is/2018/07/hlutdeild-islensku-flugfelaganna-breyttist-ekki/>
- Skybrary. (10. October 2019). *Skybrary*. Sótt frá https://www.skybrary.aero/index.php/North_Atlantic_Operations_-_Airspace

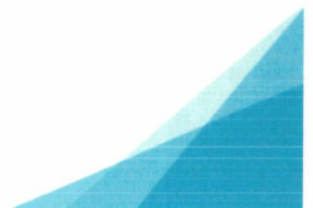


ABBREVIATIONS AND ACRONYMS

| | |
|--------------|-------------------------------------------------------------------|
| ACC | Area Control Centre |
| ANB | ICAO Air Navigation Bureau |
| ANS | Air Navigation Service |
| ANSP | Air Navigation Service Provider |
| ATC | Air Traffic Control |
| ATCO | Air Traffic Controller |
| ATM | Air Traffic Management |
| CANSO | the Civil Air Navigation Services Organisation |
| CAPEX | Capital Expenditure |
| CNS | Communication, Navigation and Satellite |
| COM | Communication |
| CORSIA | Carbon Offsetting and Reduction Scheme for International Aviation |
| CPDLC | Controller Pilot Data Link Communications |
| CTA | Control Area |
| CTOT | Calculated Take off Time |
| EEA | European Economic Area |
| EFTA | European Free Trade Association |
| EOSM | Effectiveness of Safety Management |
| ESA | EFTA Surveillance Authority |
| FIRs | Flight Information Regions |
| GDP | Gross Domestic Product |
| GHG | Green House Gas |
| ICAO EUR | Europe Region of ICAO |
| ICAO NAT | North Atlantic Region of ICAO |
| ICAO NAT SPG | ICAO NAT Planning and Implementation Regional Group |



| | |
|--------|-------------------------------------------|
| ICAO | International Civil Aviation Organization |
| ICETRA | Icelandic Transport Authority |
| IFR | Instrumental Flight Rules |
| IMO | Icelandic Meteorological office |
| JFA | Joint Finance Agreement |
| JSC | Joint Support Committee |
| KPA | Key Performance Area |
| KPI | Key Performance Indicator |
| MET | Meteorology |
| NSA | National Supervisory Authority |
| OPS | Operations |
| RP0 | Reference Period 0 |



Annex I

| Date | Participants | Duration |
|------------|-----------------------------------------------------------------------------------------------------------------------|----------|
| 22.3.2019 | Guðbjörn Jensson (Icetra), Hlín Hólm (ICETRA), Úlfur Sturluson (Isavia ANS) and Ásgeir Pálsson (Isavia ANS) | 1 hour |
| 5.4.2019 | Guðbjörn Jensson (ICETRA), Guðný Unnur Jökulsdóttir (Isavia ANS) and Úlfur Sturluson (Isavia ANS) | 1 hour |
| 6.9.2019 | Guðbjörn Jensson (ICETRA) and Úlfur Sturluson (Isavia ANS) | 1 hour |
| 27.9.2019 | Guðbjörn Jensson (ICETRA), Úlfur Sturluson (Isavia ANS) and Árni Guðbrandsson (Isavia ANS) | 1 hour |
| 29.10.2019 | Guðbjörn Jensson (ICETRA), Hlín Hólm (ICETRA), Úlfur Sturluson (Isavia ANS) and Guðný Unnur Jökulsdóttir (Isavia ANS) | 1,5 hour |

Annex II

| Name of Capex | | Airspace Simulator Phase III | | |
|----------------------------------------------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------------------------|
| Description | | Air Traffic Control Training simulation enhancements. Pseudo pilot interface - Trajectory support, exercise creation, exercise creation and action lists, new tools to support first level training, Datalink support, NAT-OPS support and Dynamic coordination interface | | |
| Justification of the cost, nature and contribution | | | | |
| Differentiation | | Overhaul of existing systems | | |
| Consultation with stakeholders | Yes | | | |
| Decision-making process | JFA | | | |
| KPA | Impact | Expected benefits per KPA | Date of expected benefits | Area (en-route / terminal / airport / phases) |
| Safety | Yes | Increased quality of training for ATCOs as it is an exact replica of the operational controller working position | 2021 | en-route |
| Environment | No | | | n/a |
| Capacity | No | | | en-route |
| Cost efficiency | Yes | More efficient training and transitional training | | en-route |

| Name of Capex | | Renewal of the Weather Radar and Upper Air Station in Keflavik | | |
|----------------------------------------------------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------------------------|
| Description | | The C-band weather radars and the upper-air station need renewal as they have shown decreased operational reliability and incurred high maintenance costs | | |
| Justification of the cost, nature and contribution | | | | |
| Differentiation | | Replacement investments | | |
| Consultation with stakeholders | Yes | | | |
| Decision-making process | JFA | | | |
| KPA | Impact | Expected benefits per KPA | Date of expected benefits | Area (en-route / terminal / airport / phases) |
| Safety | Yes | Increased accuracy of weather forecasts | 2020 | en-route |
| Environment | No | less technical failures | | |
| Capacity | No | | | |
| Cost efficiency | Yes | Reduced cost of maintenance | 2020 | en-route |

| Name of Capex | | Renewal of the Flight Data Processing System at Reykjavik Centre | | |
|----------------------------------------------------|--------|---------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------------------------|
| Description | | An upgrade of the FDPs to support future sectorization in the Reykjavik CTA. | | |
| Justification of the cost, nature and contribution | | | | |
| Differentiation | | Overhaul of existing systems | | |
| Consultation with stakeholders | Yes | | | |
| Decision-making process | JFA | | | |
| KPA | Impact | Expected benefits per KPA | Date of expected benefits | Area (en-route / terminal / airport / phases) |
| Safety | Yes | Increased operational safety | | en-route |
| Environment | Yes | Full tactical air traffic control in more sectors allows for more efficient flight route and less separation | | en-route |
| Capacity | Yes | Supports future sectorization. The present system cannot accommodate increased traffic density in some areas. | | en-route |
| Cost efficiency | No | | | n/a |

| | | | | |
|-----------------------------------------------------------|--------------------|--------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------------------------|
| Name of Capex | | Implementation of Satcom services in the voice communications control system (VCCS) | | |
| Description | | To establish a satellite based voice communications feature to the VCCS used in the Reykjavik ACC | | |
| Justification of the cost, nature and contribution | | | | |
| Differentiation | Replace investment | | | |
| Consultation with stakeholders | Yes | | | |
| Decision-making process | JFA | | | |
| KPA | Impact | Expected benefits per KPA | Date of expected benefits | Area (en-route / terminal / airport / phases) |
| | | Increased safety with possibility of quicker connection of Satcom services. Increases redundancy in communication. | | en-route |
| Safety | Yes | | | n/a |
| Environment | No | Less ATCO time used in dialling. | | en-route |
| Capacity | Yes | | | en-route |
| Cost efficiency | No | | | en-route |

| | | | | |
|-----------------------------------------------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------------------------|
| Name of Capex | | Backup ATM system | | |
| Description | | A backup Air Traffic Management (ATM) system is needed to meet the future surveillance requirements in the Reykjavik and Nuuk FIRs, for the service level south of 70°N. | | |
| Justification of the cost, nature and contribution | | | | |
| Differentiation | Overhaul of existing systems | | | |
| Consultation with stakeholders | Yes | | | |
| Decision-making process | JFA | | | |
| KPA | Impact | Expected benefits per KPA | Date of expected benefits | Area (en-route / terminal / airport / phases) |
| | | Increased safety with better backups and possibly better service level in the future | | en-route |
| Safety | Yes | More efficient flight route and less separation | | en-route |
| Environment | Yes | More efficient flight route and less separation | | en-route |
| Capacity | Yes | | | n/a |
| Cost efficiency | No | | | n/a |



Annex III

Letter of Agreement

Between

Icelandic Transport Authority

And

Isavia ANS

On the data collection for the performance indicators as agreed upon in the Icelandic Performance Plan Reference Period 0 (RP0).

Isavia ANS commits to sending data on the performance indicators, listed below, yearly or more often by Icetra's request. When applicable, Icetra can request for non-aggregated data. The data of performance indicators collected by Isavia ANS and agreed upon in the Icelandic Performance plan are:

Environment

Percentage of approved height changes

Capacity

ATCO in OPS productivity

Working hours and messages handled by Gufunes COM unit

Total working hours in Reykjavík ACC per number of flights

Average response time for Gufunes COM unit

Cost-efficiency

Average cost per flight

Costs per IFR flights hours

ATCO employment cost divided by the total cost of operation

Safety

Level of the effectiveness of safety management (EOSM)

Isavia ANS will ensure the quality, validation and timely transmission of the data. The data is processed by Isavia ANS unless otherwise stated.



Jón Gunnar Jónsson, Director General

Icelandic Transport Authority

Ásgeir Pálsson, Chief Executive Officer

Isavia ANS