Samgöngustofa

Ákvörðun Samgöngustofu nr. 2/2016

um gildistöku öryggisreglna fyrir tæknifólk flugumferðar-, fjarskipta-, leiðsögu- og kögunarþjónustu sem sinnir öryggistengdum verkefnum

Samgöngustofa hefur ákveðið að frá og með 14. mars 2016 skuli eftirfarandi öryggisreglur fyrir tæknifólk flugumferðar-, fjarskipta-, leiðsögu- og kögunarþjónustu gilda.

Öryggisreglurnar eru settar á grundvelli 9. gr. framkvæmdarreglugerðar framkvæmdastjórnarinnar (ESB) nr. 1035/2011 sem innleidd er með reglugerð nr. 1129/2014 um starfsleyfi flugleiðsöguþjónustu og rekstrarstjórnun flugumferðar.

Með vísan til 140. gr. laga nr. 60/1998 um loftferðir með síðari breytingum er ákvörðun þessi birt á heimasíðu Samgöngustofu og öðlast þegar gildi.

Reykjavík, 14. mars 2016

Þórólfur Árnason forstjóri

Öryggisreglur fyrir tæknifólk flugumferðar-, fjarskipta-, leiðsögu- og kögunarþjónustu sem sinnir öryggistengdum verkefnum

Kafli 1 - Almennt

1. Gildissvið.

1.1. Öryggisreglur þessar gilda fyrir veitanda flugumferðar-, fjarskipta-, leiðsögu- og kögunarþjónustu (ATS og CNS) að því er varðar þjálfun og mat á hæfni tæknifólks.

1.2. Tæknifólk, í skilningi þessara reglna, telst vera starfsfólk veitanda flugumferðarþjónustu (ATS) og fjarskipta-, leiðsögu- og kögunarþjónustu (CNS) sem er hæft til að starfrækja, viðhalda, taka úr og setja í notkun, búnað sem er hluti af hinu starfræna kerfi flugleiðsöguþjónustu og rekstrarstjórnunar flugumferðar (ANS/ATM).

1.3. Þjónustuveitandi flugumferðar-, fjarskipta-, leiðsögu- og kögunarþjónustu sem hefur tæknifólk við störf skal koma á þjálfun og skilgreina fyrirkomulag fyrir mat á hæfni tæknifólks sem nær til allra starfa og verkefna tæknifólks sem fellur undir skilgreiningu í gr. 1.2.

1.4. Þegar tæknifólkið eru starfsmenn undirverktaka skal veitandi ATS/CNS tryggja að tæknifólkið hafi fengið viðeigandi þjálfun og búi yfir þeirri hæfni sem þessar öryggisreglur fjalla um.

2. Vistun skráa.

2.1. Veitandi flugumferðar-, fjarskipta-, leiðsögu- og kögunarþjónustu sem hefur tæknifólk við störf skal halda skrár um alla þá þjálfun sem tæknifólkið fær, og einnig vegna mats á hæfni tæknifólks. Skrárnar skulu gerðar tiltækar:

a) fyrir viðkomandi tæknifólk sem eftir því óskar; og

b) eftir því sem óskað er eftir og með samþykki viðkomandi tæknifólks, fyrir nýjan vinnuveitanda tæknifólks sem ráðið hefur tæknifólk til starfa.

3. Tungumálafærni.

Veitandi flugumferðar-, fjarskipta-, leiðsögu- og kögunarþjónustu skal tryggja að tæknifólk búi yfir færni í því tungumáli eða þeim tungumálum sem nauðsynlegt er til að tæknifólk geti sinnt verkefnum sínum.

Kafli 2 – Kröfur um þjálfun

1. Veitandi ATS/CNS skal tryggja að tæknifólk:
1.1. hafi lokið með fullnægjandi hætti:
a) undirstöðuþjálfun í samræmi við gr. 2 í þessum kafla;
b) færniþjálfun í samræmi við gr. 3;
c) þjálfun vegna sértækra kerfa/búnaðar í samræmi við gr. 4; og
1.2. hafi lokið síþjálfun í samræmi við 5. gr. í kafla þessum

2. Undirstöðuþjálfun.
2.1. Undirstöðuþjálfun tæknifólks skal samanstanda af:
a) námsefni (*e. subject*), fögum (*topics*) og undirfögum (*sub*-topics) sem talin eru upp í Viðauka I[1] við reglur þessar;
b) þar sem við á vegna verkefna, fögin sem talin eru upp í Viðauka 2 við reglur þessar.

2.2. Veitandi þjónustu getur ákveðið hvaða menntunarkröfur eiga best við varðandi tæknifólk og í kjölfarið, aðlagað fjölda og/eða stig námsefnis, faga og undirfaga sem vísað er í lið (a) þar sem við á.

3. Færniþjálfun (*qualification training*).
Færniþjálfun tæknifólks skal samanstanda af:
a) námsefni, fögum og undirfögum sem talin eru upp í Viðauka III; og
b) þar sem við á vegna verkefna tæknifólks, að lágmarki eitt af færniþjálfunarnámsefnum sem talin eru upp í Viðauka IV.

4. Réttindaþjálfun vegna kerfa og búnaðar.
4.1. Þjálfun vegna kerfa og búnaðar fyrir tæknifólk skal miðuð við þau verkefni sem sinna skal og innihalda:
1. bókleg námskeið; og/eða
2. verkleg námskeið; og/eða
3. þjálfun á vinnustað (starfsþjálfun).

4.2. Þjálfun vegna kerfa og búnaðar skal tryggja að viðkomandi tæknifólk öðlist þekkingu og færni sem lúta að:
1. virkni kerfisins og búnaðarins;
2. raunverulegum og hugsanlegum áhrifum sem aðgerðir tæknifólks geta haft á kerfi og búnað; og
3. áhrif kerfisins og búnaðarins á rekstrarumhverfið í heild sinni.

5. Síþjálfun

[1] Ath. að Viðaukar við reglur þessar eru eingöngu birtir á ensku.

Síþjálfun tæknifólks skal samanstanda af endurþjálfun, þjálfun vegna breytinga/uppfærslu á kerfum og búnaði og þjálfun vegna neyðarviðbragða. Tíðni og tímalengd síþjálfunar skal skilgreind í handbókum veitanda flugumferðar-, fjarskipta-, leiðsögu- og kögunarþjónustu og taka mið af nýlegri reynslu starfsmanns og flækjustigi starfrækslu og viðhalds tækjabúnaðar.

Kafli 3 - Kröfur um mat á hæfni

1. Hæfnimat – Almennt

Veitandi flugumferðar-, fjarskipta-, leiðsögu- og kögunarþjónustu skal tryggja að tæknifólk:

a) hafi verið metið hæft til starfa áður en það tekur til starfa og sinnir verkefnum sínum; og

b) fari reglulega í hæfnismat í samræmi við ákvæði 2. gr.

2. Mat á hæfni, í upphafi starfs og reglulega þar á eftir meðan á störfum stendur

2.1. Þjónustuveitandi flugumferðar-, fjarskipta-, leiðsögu- og kögunarþjónustu með tæknifólk við störf skal:

a) koma á, innleiða og skjalfesta verklag í handbók sinni fyrir:
   i. mat á hæfni, í upphafi starfs sem og viðvarandi meðan á störfum stendur;
   ii. viðbrögð við afturför eða hnignun í hæfni tæknifólks,
   iii. eftirlit með starfsfólki sem hefur ekki verið metið hæft til starfa; og

b) skilgreina viðmið vegna mats á hæfni við upphaf starfs og reglubundið hæfnismat meðan á störfum stendur, fyrir eftirfarandi þætti:
   i. tæknilega færni;
   ii. persónubundna færni (t.d. samvinnu- og samskiptafærni, viðhorf til öryggis og verndar; sveigjanleiki); og
   iii. kunnáttu.

2.2. Verklagið sem grein 2.1 fjallar um skal skilgreint í handbók þjónustuveitanda og ná yfir tíðni og aðferð sem beitt er við hæfnimat.

Kafli 4 - Leiðbeinendur og matsmenn

1. Leiðbeinendur fyrir tæknifólk.

Þjónustuveitandi sem er með tæknifólk við störf skal tryggja að:

a) starfsþjálfarar tæknifólks hafi viðeigandi reynslu innan þess sviðs sem kennslan/þjálfunin nær til; og

b) starfsþjálfarar hafi lokið með fullnægjandi árangri námskeiði starfsþjálfara og hafi færni til að grípa inní þegar öryggi getur verið ógnað meðan á starfsþjálfun stendur.

2. Matsmenn fyrir tæknilega færni.

Þjónustuveitandi með tæknifólk við störf skal tryggja að matsmenn fyrir tæknilega hæfni hafi lokið með fullnægjandi árangri námskeiði fyrir matsmenn og hafi viðeigandi reynslu til að meta viðmiðin sem skilgreind eru í samræmi við gr. 2.1 b) í kafla 3. Heimilt er að sami aðili sinni bæði hlutverki leiðbeinanda og matsmanns.

Kafli 5 – Framkvæmdarákvæði

1. Varðandi innleiðingu reglna þessara gildir eftirfarandi:

1.1. Varðandi tæknifólk sem ráðið er til starfa eftir gildistöku reglna þessara, skulu reglurnar gilda án undantekninga.

1.2. Varðandi tæknifólk sem er við störf hjá veitanda ANS/CNS við gildistöku reglna þessara gildir eftirfarandi:

a) Næsta hæfnismat hvers starfsmanns (þó eigi síðar 15. mars 2017) skal taka mið af þeim kröfum sem settar eru fram í reglum þessum. Sé hæfni metin fullnægjandi skal litið svo á að þjálfun viðkomandi starfsmanns í samræmi við reglur þessar hafi verið tryggð. Ef í ljós kemur að hæfni er ekki fullnægjandi hvað varðar einhvern þátt skal brugðist við því í samræmi við núverandi verklag Isavia þar að lútandi til að tryggja fullnægjandi hæfni.

b) Eigi síðar en 18 mánuðum eftir gildistöku reglna þessara skulu starfsþjálfarar hafa lokið námskeiði í samræmi við ákæði greinar 1.b) í kafla 4;

c) Eigi síðar en 12 mánuðum eftir að reglurnar taka gildi skal tungumálafærni alls tæknifólks hafa verið tryggð í samræmi við ákvæði 3. greinar í kafla 1;

2. Fylgja skal eftirfarandi leiðbeiningarefni til að uppfylla öryggisreglur þessar, nema til komi a.m.k. jafngildar aðferðir sem ekki eru taldar skerða flugöryggi að mati Samgöngustofu.

a) EUROCONTROL forskrift fyrir grunnþjálfun tæknifólks (*Specification for Air Traffic Safety Electronics Personnel, Common Core Content Initial Training*; EUROCONTROL-SPEC-132); 1. útg. dags. 27.08.2009;

b) Leiðbeiningar EUROCONTROL um réttindaþjálfun vegna kerfa og búnaðar (*Guidelines for Air Traffic Safety Electronics Personnel System/Equipment rating Training*; EUROCONTROL-GUID-145); 3. útg. dags. 14.10.2010;

c) Leiðbeiningar EUROCONTROL um hugtök og framvindu þjálfunar tæknifólks (Guidance for ATSEP Training Progression and Concepts; 10/10/15-119); 1. útg. dags 14.10.2010

Viðauki I

Basic training — Shared

Subject 1: INDUCTION

TOPIC 1 BASIND — Induction

Sub-topic 1.1 BASIND — Training and Assessment Overview

Sub-topic 1.2 BASIND — National Organisation

Sub-topic 1.3 BASIND — Workplace

Sub-topic 1.4 BASIND — ATSEP role

Sub-topic 1.5 BASIND — European/Worldwide Dimension

Sub-topic 1.6 BASIND — International Standards and Recommended Practices

Sub-topic 1.7 BASIND — Data Security

Sub-topic 1.8 BASIND — Quality Management

Sub-topic 1.9 BASIND — Safety Management System

Sub-topic 1.10 BASIND — Health and Safety

Subject 2: AIR TRAFFIC FAMILIARISATION

TOPIC 1 BASATF — Air Traffic Familiarisation

Sub-topic 1.1 BASATF — Air Traffic Management

Sub-topic 1.2 BASATF — Air Traffic Control

Sub-topic 1.3 BASATF — Ground-based Safety Nets

Sub-topic 1.4 BASATF — Air Traffic Control Tools and Monitoring Aids

Sub-topic 1.5 BASATF — Familiarisation

Viðauki II

Basic training — Streams

Subject 3: AERONAUTICAL INFORMATION SERVICES

Subject 4: METEOROLOGY

Subject 5: COMMUNICATION

Subject 6: NAVIGATION

Subject 7: SURVEILLANCE

Subject 8: DATA PROCESSING

Subject 9: SYSTEM MONITORING & CONTROL

Subject 10: MAINTENANCE PROCEDURES

Viðauki III

Qualification training — Shared

Subject 1: SAFETY

TOPIC 1 — Safety Management

Sub-topic 1.1 — Policy and Principles

Sub-topic 1.2 — Concept of Risk and Principles of Risk Assessment

Sub-topic 1.3 — Safety Assessment Process

Sub-topic 1.4 — Air Navigation System Risk Classification Scheme

Sub-topic 1.5 — Safety Regulation

Subject 2: HEALTH AND SAFETY

TOPIC 1 — Hazard Awareness and Legal Rules

Sub-topic 1.1 — Hazard Awareness

Sub-topic 1.2 — Regulations and Procedures

Sub-topic 1.3 — Handling of Hazardous Material

Subject 3: HUMAN FACTORS

TOPIC 1 — Introduction to Human Factors

Sub-topic 1.1 — Introduction

TOPIC 2 — Working Knowledge and Skills

Sub-topic 2.1 — ATSEP knowledge, skills and competence

TOPIC 3 — Psychological Factors

Sub-topic 3.1 — Cognition

TOPIC 4 — Medical

Sub-topic 4.1 — Fatigue

Sub-topic 4.2 — Fitness

Sub-topic 4.3 — Work Environment

TOPIC 5 — Organisational and Social Factors

Sub-topic 5.1 — Basic Needs of People at Work

Sub-topic 5.2 — Team Resource Management

Sub-topic 5.3 — Teamwork and Team Roles

TOPIC 6 — Communication
Sub-topic 6.1 — Written Report
Sub-topic 6.2 — Verbal and Non-verbal Communication
TOPIC 7 — Stress
Sub-topic 7.1 — Stress
Sub-topic 7.2 — Stress Management
TOPIC 8 — Human Error
Sub-topic 8.1 — Human Error

Viðauki IV

Qualification training — Streams

1. COMMUNICATION — VOICE

Subject 1: VOICE

TOPIC 1 — Air-Ground

Sub-topic 1.1 — Transmission/Reception

Sub-topic 1.2 — Radio Antenna Systems

Sub-topic 1.3 — Voice Switch

Sub-topic 1.4 — Controller Working Position

Sub-topic 1.5 — Radio Interfaces

TOPIC 2 — COMVCE — Ground-Ground

Sub-topic 2.1 — Interfaces

Sub-topic 2.2 — Protocols

Sub-topic 2.3 — Switch

Sub-topic 2.4 — Communication chain

Sub-topic 2.5 — Controller working position

Subject 2: TRANSMISSION PATH

TOPIC 1 — Lines

Sub-topic 1.1 — Lines Theory

Sub-topic 1.2 — Digital Transmissions

Sub-topic 1.3 — Types of Lines

TOPIC 2 — Specific Links

Sub-topic 2.1 — Microwave Link

Sub-topic 2.2 — Satellite

Subject 3: RECORDERS

TOPIC 1 — Legal Recorders

Sub-topic 1.1 — Regulations

Sub-topic 1.2 — Principles

Subject 4: FUNCTIONAL SAFETY

TOPIC 1 — Safety Attitude

Sub-topic 1.1 — Safety Attitude

TOPIC 2 — Functional Safety

Sub-topic 2.1 — Functional safety

2. COMMUNICATION — DATA

Subject 1: DATA

TOPIC 1 — Introduction to Networks

Sub-topic 1.1 — Types

Sub-topic 1.2 — Networks

Sub-topic 1.3 — External Network Services

Sub-topic 1.4 — Measuring Tools

Sub-topic 1.5 — Troubleshooting

TOPIC 2 — Protocols

Sub-topic 2.1 — Fundamental Theory

Sub-topic 2.2 — General Protocols

Sub-topic 3.3 — Specific Protocols

TOPIC 3 — National Networks

Sub-topic 3.1 — National Networks

TOPIC 4 — European Networks

Sub-topic 4.1 — Network Technologies

TOPIC 5 — Global Networks

Sub-topic 5.1 — Networks and Standards

Sub-topic 5.2 — Description

Sub-topic 5.3 — Global Architecture

Sub-topic 5.4 — Air-Ground Sub-Networks

Sub-topic 5.5 — Ground-Ground Sub-Networks

Sub-topic 5.6 — Networks on Board of the Aircraft

Sub-topic 5.7 — Air-Ground Applications

Subject 2: TRANSMISSION PATH

TOPIC 1 — Lines

Sub-topic 1.1 — Lines Theory

Sub-topic 1.2 — Digital Transmission

Sub-topic 1.3 — Types of Lines

TOPIC 2 — Specific Links

Sub-topic 2.1 — Microwave Link

Sub-topic 2.2 — Satellite

Subject 3: RECORDERS

TOPIC 1 — Legal Recorders

Sub-topic 1.1 — Regulations

Sub-topic 1.2 — Principles

Subject 4: FUNCTIONAL SAFETY

TOPIC 1 — Safety Altitude

Sub-topic 1.1 — Safety Attitude

TOPIC 2 — Functional Safety

Sub-topic 2.1 — Functional Safety

3. NAVIGATION — NON-DIRECTIONAL BEACON (NDB)

Subject 1: PERFORMANCE-BASED NAVIGATION

TOPIC 1 — Navigation Concepts

Sub-topic 1.1 — Operational Requirements

Sub-topic 1.2 — Performance-based Navigation

Sub-topic 1.3 — Area Navigation Concept (RNAV)

Sub-topic 1.4 — NOTAM

Subject 2: GROUND-BASED SYSTEMS — NDB

TOPIC 1 — NDB/Locator

Sub-topic 1.1 — Use of the System

Sub-topic 1.2 — Ground Station Architecture

Sub-topic 1.3 — Transmitter Sub-system

Sub-topic 1.4 — Antenna Sub-system

Sub-topic 1.5 — Monitoring and Control Sub-systems

Sub-topic 1.6 — On-board Equipment

Sub-topic 1.7 — System Check and Maintenance

Subject 3: GLOBAL NAVIGATION SATELLITE SYSTEM

TOPIC 1 — GNSS

Sub-topic 1.1 — General View

Subject 4: ON-BOARD EQUIPMENT

TOPIC 1 — On-board Systems

Sub-topic 1.1 — On-board Systems

TOPIC 2 — Autonomous Navigation

Sub-topic 2.1 — Inertial Navigation

TOPIC 3 — Vertical Navigation

Sub-topic 3.1 — Vertical Navigation

Subject 5: FUNCTIONAL SAFETY

TOPIC 1 — Safety Attitude

Sub-topic 1.1 — Safety Attitude

TOPIC 2 — Functional Safety

Sub-topic 1.1 — Functional Safety

4. NAVIGATION — DIRECTION FINDING (DF)

Subject 1: PERFORMANCE-BASED NAVIGATION

TOPIC 1 — Navigation Concepts

Sub-topic 1.1 — Operational Requirements

Sub-topic 1.2 — Performance-Based Navigation

Sub-topic 1.3 — Area Navigation Concept (RNAV)

Sub-topic 1.4 — NOTAM

Subject 2: GROUND-BASED SYSTEMS — DF

TOPIC 1 — DF

Sub-topic 1.1 — Use of the System

Sub-topic 1.2 — VDF/DDF Equipment Architecture

Sub-topic 1.3 — Receiver Sub-system

Sub-topic 1.4 — Antenna Sub-system

Sub-topic 1.5 — Monitoring and Control Sub-systems

Sub-topic 1.6 — System Check and Maintenance

Subject 3: GLOBAL NAVIGATION SATELLITE SYSTEM

TOPIC 1 — GNSS

Sub-topic 1.1 — General View

Subject 4: ON-BOARD EQUIPMENT

TOPIC 1 — On-board Systems

Sub-topic 1.1 — On-board Systems

TOPIC 2 — Autonomous Navigation

Sub-topic 2.1 — Inertial Navigation

TOPIC 3 — Vertical Navigation

Sub-topic 3.1 — Vertical Navigation

Subject 5: FUNCTIONAL SAFETY

TOPIC 1 — Safety Attitude
Sub-topic 1.1 — Safety Attitude
TOPIC 2 — Functional Safety

Sub-topic 2.1 — Functional Safety

5. NAVIGATION — VHF OMNIDIRECTIONAL RADIO RANGE (VOR)

Subject 1: PERFORMANCE-BASED NAVIGATION

TOPIC 1 — Navigation Concepts

Sub-topic 1.1 — Operational Requirements

Sub-topic 1.2 — Performance-Based Navigation

Sub-topic 1.3 — Area Navigation Concept (RNAV)

Sub-topic 1.4 — NOTAM

Subject 2: GROUND-BASED SYSTEMS — VOR

TOPIC 1 — VOR

Sub-topic 1.1 — Use of the System

Sub-topic 1.2 — Fundamentals of CVOR and/or DVOR

Sub-topic 1.3 — Ground Station Architecture

Sub-topic 1.4 — Transmitter Sub-system

Sub-topic 1.5 — Antenna Sub-system

Sub-topic 1.6 — Monitoring and Control Sub-system

Sub-topic 1.7 — On-board Equipment

Sub-topic 1.8 — System Check and Maintenance

Subject 3: GLOBAL NAVIGATION SATELLITE SYSTEM

TOPIC 1 — GNSS

Sub-topic 1.1 — General View

Subject 4: ON-BOARD EQUIPMENT

TOPIC 1 — On-board Systems

Sub-topic 1.1 — On-board Systems

TOPIC 2 — Autonomous Navigation

Sub-topic 2.1 — Inertial Navigation

TOPIC 3 — Vertical Navigation

Sub-topic 3.1 — Vertical Navigation

Subject 5: — FUNCTIONAL SAFETY

TOPIC 1 — Safety Attitude

Sub-topic 1.1 — Safety Attitude

TOPIC 2 — Functional Safety

Sub-topic 2.1 — Functional Safety

6. NAVIGATION — DISTANCE MEASURING EQUIPMENT (DME)

Subject 1: PERFORMANCE-BASED NAVIGATION

TOPIC 1 — Navigation concepts

Sub-topic 1.1 — Operational Requirements

Sub-topic 1.2 — Performance-Based Navigation

Sub-topic 1.3 — Area Navigation Concept (RNAV)

Sub-topic 1.4 — NOTAM

Subject 2: GROUND-BASED SYSTEMS — DME

TOPIC 1 — DME

Sub-topic 1.1 — Use of the System

Sub-topic 1.2 — Fundamentals of DME

Sub-topic 1.3 — Ground Station Architecture

Sub-topic 1.4 — Receiver Sub-system

Sub-topic 1.5 — Signal Processing

Sub-topic 1.6 — Transmitter Sub-system

Sub-topic 1.7 — Antenna Sub-system

Sub-topic 1.8 — Monitoring and Control Sub-system

Sub-topic 1.9 — On-board Equipment

Sub-topic 1.10 — System Check and Maintenance

Subject 3: GLOBAL NAVIGATION SATELLITE SYSTEM

TOPIC 1 — GNSS

Sub-topic 1.1 — General View

Subject 4: ON-BOARD EQUIPMENT

TOPIC 1 — On-board Systems

Sub-topic 1.1 — On-board Systems

TOPIC 2 — Autonomous Navigation

Sub-topic 2.1 — Inertial Navigation

TOPIC 3 Vertical Navigation

Sub-topic 3.1 — Vertical Navigation

Subject 5: FUNCTIONAL SAFETY

TOPIC 1 — Safety Attitude

Sub-topic 1.1 — Safety Attitude

TOPIC 2 — Functional Safety

Sub-topic 2.1 — Functional Safety

7. NAVIGATION — INSTRUMENT LANDING SYSTEM (ILS)

Subject 1: PERFORMANCE-BASED NAVIGATION

TOPIC 1 — Navigation concepts

Sub-topic 1.1 — Operational Requirements

Sub-topic 1.2 — Performance-Based Navigation

Sub-topic 1.3 — Area Navigation Concept (RNAV)

Sub-topic 1.4 — NOTAM

Subject 2: GROUND-BASED SYSTEMS — ILS

TOPIC 1 — ILS

Sub-topic 1.1 — Use of the System

Sub-topic 1.2 — Fundamentals of ILS

Sub-topic 1.3 — 2F-Systems

Sub-topic 1.4 — Ground Station Architecture

Sub-topic 1.5 — Transmitter Sub-system

Sub-topic 1.6 — Antenna Sub-system

Sub-topic 1.7 — Monitoring and Control Sub-system

Sub-topic 1.8 — On-board Equipment

Sub-topic 1.9 — System Check and Maintenance

Subject 3: GLOBAL NAVIGATION SATELLITE SYSTEM

TOPIC 1 — GNSS

Sub-topic 1.1 — General View

Subject 4: ON-BOARD EQUIPMENT

TOPIC 1 — On-board Systems

Sub-topic 1.1 — On-board Systems

TOPIC 2 — Autonomous navigation

Sub-topic 2.1 — Inertial Navigation

TOPIC 3 — Vertical Navigation

Sub-topic 3.1 — Vertical Navigation

Subject 5: FUNCTIONAL SAFETY

TOPIC 1 — Safety Attitude

Sub-topic 1.1 — Safety Attitude

TOPIC 2 — Functional Safety

Sub-topic 2.1 — Functional Safety

8. NAVIGATION — MICROWAVE LANDING SYSTEM (MLS)

Subject 1: PERFORMANCE-BASED NAVIGATION

TOPIC 1 — Navigation Concepts

Sub-topic 1.1 — Operational Requirements

Sub-topic 1.2 — Performance-Based Navigation

Sub-topic 1.3 — Area Navigation Concept (RNAV)

Sub-topic 1.4 — NOTAM

Subject 2: GROUND-BASED SYSTEMS — MLS

TOPIC 1 — MLS

Sub-topic 1.1 — Use of the System

Sub-topic 1.2 — Fundamentals of MLS

Sub-topic 1.3 — Ground Station Architecture

Sub-topic 1.4 — Transmitter Sub-system

Sub-topic 1.5 — Antenna Sub-system

Sub-topic 1.6 — Monitoring and Control Sub-system

Sub-topic 1.7 — On-board Equipment

Sub-topic 1.4 — System Check and Maintenance

Subject 3: GLOBAL NAVIGATION SATELLITE SYSTEM

TOPIC 1 — GNSS

Sub-topic 1.1 — General View

Subject 4: ON-BOARD EQUIPMENT

TOPIC 1 — On-board Systems

Sub-topic 1.1 — On-board Systems

TOPIC 2 — Autonomous navigation

Sub-topic 2.1 — Inertial Navigation

TOPIC 3 — Vertical navigation

Sub-topic 3.1 — Vertical Navigation

Subject 5: FUNCTIONAL SAFETY

TOPIC 1 — Safety attitude

Sub-topic 1.1 — Safety Attitude

TOPIC 2 — Functional safety

Sub-topic 2.1 — Functional Safety

9. SURVEILLANCE — PRIMARY SURVEILLANCE RADAR

Subject 1: PRIMARY SURVEILLANCE RADAR

TOPIC 1 — ATC surveillance

Sub-topic 1.1 — Use of PSR for Air Traffic Services

Sub-topic 1.2 — Antenna (PSR)

Sub-topic 1.3 — Transmitters

Sub-topic 1.4 — Characteristics of Primary Targets

Sub-topic 1.5 — Receivers

Sub-topic 1.6 — Signal Processing and Plot Extraction

Sub-topic 1.7 — Plot Combining

Sub-topic 1.8 — Characteristics of Primary Radar

TOPIC 2 — SURPSR — Surface Movement Radar

Sub-topic 2.1 — Use of SMR for Air Traffic Services

Sub-topic 2.2 — Radar Sensor

TOPIC 3 — SURPSR — Test and Measurement

Sub-topic 3.1 — Test and Measurement

Subject 2: HUMAN MACHINE INTERFACE (HMI)

TOPIC 1 — SURPSR — HMI

Sub-topic 1.1 — ATCO HMI

Sub-topic 1.2 — ATSEP HMI

Sub-topic 1.3 — Pilot HMI

Sub-topic 1.4 — Displays

Subject 3: SURVEILLANCE DATA TRANSMISSION

TOPIC 1 — SDT

Sub-topic 1.1 — Technology and Protocols

Sub-topic 1.2 — Verification Methods

Subject 4: FUNCTIONAL SAFETY

TOPIC 1 — SURPSR — Safety Attitude

Sub-topic 1.1 — Safety Attitude

TOPIC 2 — SURPSR — Functional Safety

Sub-topic 2.1 — Functional Safety

Subject 5: DATA PROCESSING SYSTEMS

TOPIC 1 — System Components

Sub-topic 1.1 — Surveillance Data Processing Systems

10. SURVEILLANCE — SECONDARY SURVEILLANCE RADAR

Subject 1: SECONDARY SURVEILLANCE RADAR (SSR)

TOPIC 1 — SSR and Mono-pulse SSR

Sub-topic 1.1 — Use of SSR for Air Traffic Services

Sub-topic 1.2 — Antenna (SSR)

Sub-topic 1.3 — Interrogator

Sub-topic 1.4 — Transponder

Sub-topic 1.5 — Receivers

Sub-topic 1.6 — Signal Processing and Plot Extraction

Sub-topic 1.7 — Plot Combining

Sub-topic 1.8 — Test and Measurement

TOPIC 2 — Mode S

Sub-topic 2.1 — Introduction to Mode S

Sub-topic 2.2 — Mode S System

TOPIC 3 — Multilateration

Sub-topic 3.1 — MLAT in use

Sub-topic 3.2 — MLAT Principles

TOPIC 4 — SURSSR — Environment

Sub-topic 4.1 — SSR Environment

Subject 2: HUMAN MACHINE INTERFACE (HMI)

TOPIC 1 — HMI

Sub-topic 1.1 — ATCO HMI

Sub-topic 1.2 — ATSEP HMI

Sub-topic 1.3 — Pilot HMI

Sub-topic 1.1 — Displays

Subject 3: SURVEILLANCE DATA TRANSMISSION

TOPIC 1 — SDT

Sub-topic 1.1 — Technology and Protocols

Sub-topic 1.2 — Verification Methods

Subject 4: FUNCTIONAL SAFETY

TOPIC 1 — Safety attitude

Sub-topic 1.1 — Safety Attitude

TOPIC 2 — Functional safety

Sub-topic 2.1 — Functional Safety

Subject 5: DATA PROCESSING SYSTEMS

TOPIC 1 — System components

Sub-topic 1.1 — Surveillance Data Processing Systems

11. SURVEILLANCE — AUTOMATIC DEPENDENT SURVEILLANCE

Subject 1: AUTOMATIC DEPENDENT SURVEILLANCE (ADS)

TOPIC 1 — General view on ADS

Sub-topic 1.1 — Definition of ADS

TOPIC 2 — SURADS — ADS-B

Sub-topic 2.1 — Introduction to ADS-B

Sub-topic 2.2 — Techniques of ADS-B

Sub-topic 2.3 — VDL Mode 4 (STDMA)

Sub-topic 2.4 — Mode S Extended Squitter

Sub-topic 2.5 — UAT

Sub-topic 2.6 — ASTERIX

TOPIC 3 — ADS-C

Sub-topic 3.1 — Introduction to ADS-C

Sub-topic 3.2 — Techniques in ADS-C

Subject 2: HUMAN MACHINE INTERFACE (HMI)

TOPIC 1 — HMI

Sub-topic 1.1 — ATCO HMI

Sub-topic 1.2 — ATSEP HMI

Sub-topic 1.3 — Pilot HMI

Sub-topic 1.1 — Displays

Subject 3: SURVEILLANCE DATA TRANSMISSION

TOPIC 1 — SDT

Sub-topic 1.1 — Technology and Protocols

Sub-topic 1.2 — Verification Methods

Subject 4: FUNCTIONAL SAFETY

TOPIC 1 — Safety Attitude

Sub-topic 1.1 — Safety Attitude

TOPIC 2 — SURADS — Functional Safety

Sub-topic 2.1 — Functional Safety

Subject 5: DATA PROCESSING SYSTEMS

TOPIC 1 — System components

Sub-topic 1.1 — Surveillance Data Processing Systems

12. DATA — DATA PROCESSING

Subject 1: FUNCTIONAL SAFETY

TOPIC 1 — Functional Safety

Sub-topic 1.1 — Functional Safety

Sub-topic 1.2 — Software Integrity and Security

TOPIC 2 — Safety Attitude

Sub-topic 2.1 — Safety Attitude

Subject 2: DATA PROCESSING SYSTEMS

TOPIC 1 — User requirements

Sub-topic 1.1 — Controller requirements

Sub-topic 1.2 — Trajectories, Prediction and Calculation

Sub-topic 1.3 — Ground Safety Nets

Sub-topic 1.4 — Decision Support

TOPIC 2 — System Components Data

Sub-topic 2.1 — Processing Systems

Sub-topic 2.2 — Flight Data Processing Systems

Sub-topic 2.3 — Surveillance Data Processing Systems

Subject 3: DATA PROCESS

TOPIC 1 — Software process

Sub-topic 1.1 — Middleware

Sub-topic 1.2 — Operating Systems

Sub-topic 1.3 — Configuration Control

Sub-topic 1.4 — Software Development Process

TOPIC 2 — Hardware platform

Sub-topic 2.1 — Equipment Upgrade

Sub-topic 2.2 — COTS

Sub-topic 2.3 — Interdependence

Sub-topic 2.4 — Maintainability

TOPIC 3 — Testing

Sub-topic 3.1 — Testing

Subject 4: DATA

TOPIC 1 — Data Essential Features

Sub-topic 1.1 — Data Significance

Sub-topic 1.2 — Data Configuration Control

Sub-topic 1.3 — Data Standards

TOPIC 2 — ATM Data — Detailed structure

Sub-topic 2.1 — System Area

Sub-topic 2.2 — Characteristic Points

Sub-topic 2.3 — Aircraft Performances

Sub-topic 2.4 — Screen Manager

Sub-topic 2.5 — Auto-coordination Messages

Sub-topic 2.6 — Configuration Control Data

Sub-topic 2.7 — Physical Configuration Data

Sub-topic 2.8 — Relevant Meteo Data

Sub-topic 2.9 — Alert and Error Messages to ATSEP

Sub-topic 2.10 — Alert and Error Messages to ATCO

Subject 5: COMMUNICATION DATA

TOPIC 1 — Introduction to Networks

Sub-topic 1.1 — Types

Sub-topic 1.2 — Networks

Sub-topic 1.3 — External Network Services

Sub-topic 1.4 — Measuring Tools

Sub-topic 1.5 — Troubleshooting

TOPIC 2 — Protocols

Sub-topic 2.1 — Fundamental Theory

Sub-topic 2.2 — General Protocols

Sub-topic 2.3 — Specific Protocols

TOPIC 3 — DATDP — National Networks

Sub-topic 3.1 — National Networks

Subject 6: SURVEILLANCE PRIMARY

TOPIC 1 — ATC Surveillance

Sub-topic 1.1 — Use of PSR for Air Traffic Services

Subject 7: SURVEILLANCE SECONDARY

TOPIC 1 — SSR AND MSSR

Sub-topic 1.1 — Use of SSR for Air Traffic Services

TOPIC 2 — Mode S

Sub-topic 2.1 — Introduction to Mode S

TOPIC 3 — Multilateration

Sub-topic 3.1 — MLAT Principles

Subject 8: SURVEILLANCE — HMI

TOPIC 1 — HMI

Sub-topic 1.1 — ATCO HMI

Subject 9: SURVEILLANCE DATA TRANSMISSION

TOPIC 1 — Surveillance Data Transmission

Sub-topic 1.1 — Technology and Protocols

13. SYSTEM MONITORING AND CONTROL — COMMUNICATION

Subject 1: ANS STRUCTURE

TOPIC 1 — ANSP Organisation and Operation

Sub-topic 1.1 — SMCCOM — ANSP Organisation and Operation

TOPIC 2 — ANSP Maintenance Program

Sub-topic 2.1 — Policy

TOPIC 3 — ATM Context

Sub-topic 3.1 — ATM Context

TOPIC 4 — ANSP Administrative Practices

Sub-topic 4.1 — Administration

Subject 2: ANS SYSTEM/EQUIPMENT

TOPIC 1 — Operational Impacts

Sub-topic 1.1— Degradation or Loss of System/Equipment Services

TOPIC 2 — SMCCOM — User Position Functionality and Operation

Sub-topic 2.1 — User Working Position

Sub-topic 2.2 — SMC Working Position

Subject 3: TOOLS, PROCESSES AND PROCEDURES

TOPIC 1 — Requirements

Sub-topic 1.1 — SMS

Sub-topic 1.2 — QMS

Sub-topic 1.3 — SMS application in the working environment

TOPIC 2 — Maintenance Agreements with Outside Agencies

Sub-topic 2.1 — Principles of agreements

TOPIC 3 — SMC General Processes

Sub-topic 3.1 — Roles and responsibilities

TOPIC 4 — Maintenance Management Systems

Sub-topic 4.1 — Reporting

Subject 4: TECHNOLOGY

TOPIC 1 — Technologies and Principles

Sub-topic 1.1 — General

Sub-topic 1.2 — Communication

Sub-topic 1.3 — Facilities

Subject 5: COMMUNICATION VOICE

TOPIC 1 — Air-Ground

Sub-topic 1.1 — Controller Working Position

TOPIC 2 — Ground-Ground

Sub-topic 2.1 — Interfaces

Sub-topic 2.2 — Switch

Sub-topic 2.3 — Controller Working Position

Subject 6: COMMUNICATION — DATA

TOPIC 1 — European Networks

Sub-topic 1.1 — Network Technologies

TOPIC 2 — Global Networks

Sub-topic 2.1 — Networks and Standards

Sub-topic 2.2 — Description

Sub-topic 2.3 — Global Architecture

Sub-topic 2.4 — Air-Ground Sub-networks

Sub-topic 2.5 — Ground-Ground Sub-networks

Sub-topic 2.6 — Air-Ground Applications

Subject 7: COMMUNICATION — RECORDERS

TOPIC 1 —Legal recorders

Sub-topic 1.1 — Regulations

Sub-topic 1.2 — Principles

Subject 8: NAVIGATION — PBN NDB

TOPIC 1 — NAV Concepts

Sub-topic 1.1 — NOTAM

14. SYSTEM MONITORING AND CONTROL — NAVIGATION

Subject 1: ANS STRUCTURE

TOPIC 1 — ANSP Organisation and Operation

Sub-topic 1.1 — ANSP Organisation and Operation

TOPIC 2 — ANSP Maintenance Program

Sub-topic 2.1 — Policy

TOPIC 3 — ATM Context

Sub-topic 3.1 — ATM Context

TOPIC 4 — ANSP Administrative Practices

Sub-topic 4.1 — Administration

Subject 2: ANS SYSTEM/EQUIPMENT

TOPIC 1 — Operational Impacts

Sub-topic 1.1 — SMCNAV — Degradation or Loss of System/Equipment Services

TOPIC 2 — User Position Functionality and Operation

Sub-topic 2.1 — User Working Position

Sub-topic 2.2 — SMC Working Position

Subject 3: TOOLS, PROCESSES AND PROCEDURES

TOPIC 1 — SMCNAV — Requirements

Sub-topic 1.1 — SMS

Sub-topic 1.2 — QMS

Sub-topic 1.3 — SMS application in the working environment

TOPIC 2 — Maintenance Agreements with Outside Agencies

Sub-topic 2.1 — Principles of agreements

TOPIC 3 — SMC General Processes

Sub-topic 3.1 — Roles and responsibilities

TOPIC 4 — SMCNAV — Maintenance Management Systems

Sub-topic 4.1 — Reporting

Subject 4: TECHNOLOGY

TOPIC 1 — SMCNAV — Technologies and Principles

Sub-topic 1.1 — General

Sub-topic 1.2 — Communication

Sub-topic 1.3 — Facilities

Subject 5: COMMUNICATION — DATA

TOPIC 1 — SMCNAV — European Networks

Sub-topic 1.1 — Network Technologies

TOPIC 2 — Global Networks

Sub-topic 2.1 — Networks and Standards

Sub-topic 2.2 — Description

Sub-topic 2.3 — Global Architecture

Sub-topic 2.4 — Air-Ground Sub-networks

Sub-topic 2.5 — Ground-Ground Sub-networks

Sub-topic 2.6 — Air-Ground Applications

Subject 6: COMMUNICATION — RECORDERS

TOPIC 1 — Legal Recorders

Sub-topic 1.1 — Regulations

Sub-topic 1.2 — Principles

Subject 7: NAVIGATION — PBN NDB

TOPIC 1 — NAV Concepts

Sub-topic 1.1 — NOTAM

Subject 8: NAVIGATION — GROUND-BASED SYSTEMS - NDB

TOPIC 1 — NDB Locator

Sub-topic 1.1 — Use of the System

Subject 9: NAVIGATION — GROUND-BASED SYSTEMS - DFI

TOPIC 1 — SMCNAV — DF

Sub-topic 1.1 — Use of the System

Subject 10: NAVIGATION — GROUND-BASED SYSTEMS - VOR

TOPIC 1 — VOR

Sub-topic 1.1 — Use of the System

Subject 11: NAVIGATION — GROUND-BASED SYSTEMS - DME

TOPIC 1 — DME

Sub-topic 1.1 — Use of the System

Subject 12: NAVIGATION — GROUND-BASED SYSTEMS - ILS

TOPIC 1 — ILS

Sub-topic 1.1 — Use of the System

15. SYSTEM MONITORING AND CONTROL — SURVEILLANCE

Subject 1: ANS STRUCTURE

TOPIC 1 — ANSP Organisation and Operation

Sub-topic 1.1 — ANSP Organisation and Operation

TOPIC 2 — ANSP Maintenance Program

Sub-topic 2.1 — Policy

TOPIC 3 — ATM Context

Sub-topic 3.1 — ATM Context

TOPIC 4 — ANSP Administrative Practices

Sub-topic 4.1 — Administration

Subject 2: ANS SYSTEM/EQUIPMENT

TOPIC 1 — Operational Impacts

Sub-topic 1.1 — SMCSUR — Degradation or Loss of System/Equipment Services

TOPIC 2 — User Position Functionality and Operation

Sub-topic 2.1 — User Working Position

Sub-topic 2.2 — SMC Working Position

Subject 3: TOOLS, PROCESSES AND PROCEDURES

TOPIC 1 — Requirements

Sub-topic 1.1 — SMS

Sub-topic 1.2 — QMS

Sub-topic 1.3 — SMS application in the working environment

TOPIC 2 — Maintenance Agreements with Outside Agencies

Sub-topic 2.1 — Principles of agreements

TOPIC 3 — SMC General Processes

Sub-topic 3.1 — Roles and responsibilities

TOPIC 4 — Maintenance Management Systems

Sub-topic 4.1 — Reporting

Subject 4: TECHNOLOGY

TOPIC 1 — Technologies and Principles

Sub-topic 1.1 — General

Sub-topic 1.2 — Communication

Sub-topic 1.3 — Facilities

Subject 5: COMMUNICATION — DATA

TOPIC 1 — European Networks

Sub-topic 1.1 — Network Technologies

TOPIC 2 — Global Networks

Sub-topic 2.1 — Networks and Standards

Sub-topic 2.2 — Description

Sub-topic 2.3 — Global Architecture

Sub-topic 2.4 — Air-Ground Sub-networks

Sub-topic 2.5 — Ground-Ground sub-networks

Sub-topic 2.6 — Air-Ground Applications

Subject 6: COMMUNICATION — RECORDERS

TOPIC 1 — Legal Recorders

Sub-topic 1.1 — Regulations

Sub-topic 1.2 — Principles

Subject 7: NAVIGATION — PBN

TOPIC 1 — NAV Concepts

Sub-topic 1.1 — NOTAM

Subject 8: SURVEILLANCE — PRIMARY

TOPIC 1 — ATC Surveillance

Sub-topic 1.1 — Use of PSR for Air Traffic Services

Subject 9: SURVEILLANCE — SECONDARY

TOPIC 1 — SSR AND MSSR

Sub-topic 1.1 — Use of SSR for Air Traffic Services

TOPIC 2 — Mode S

Sub-topic 2.1 — Introduction to Mode S

TOPIC 3 — Multilateration

Sub-topic 3.1 — MLAT Principles

Subject 10: SURVEILLANCE — HMI

TOPIC 1 — HMI

Sub-topic 1.1 — ATCO HMI

Subject 11: SURVEILLANCE — DATA TRANSMISSION

TOPIC 1 — Surveillance Data Transmission

Sub-topic 1.1 — Technology and Protocols

16. SYSTEM MONITORING AND CONTROL — DATA

Subject 1: ANS STRUCTURE

TOPIC 1 — ANSP Organisation and Operation

Sub-topic 1.1 — ANSP Organisation and Operation

TOPIC 2 — ANSP Maintenance Program

Sub-topic 2.1 — Policy

TOPIC 3 — ATM Context

Sub-topic 3.1 — ATM Context

TOPIC 4 — ANSP ADMINISTRATIVE PRACTICES

Sub-topic 4.1 — Administration

Subject 2: ANS SYSTEM/EQUIPMENT

TOPIC 1 — Operational Impacts

Sub-topic 1.1 — Degradation or Loss of System/Equipment Services

TOPIC 2 — User Position Functionality and Operation

Sub-topic 2.1 — User Working Position

Sub-topic 2.2 — SMC Working Position

Subject 3: TOOLS, PROCESSES AND PROCEDURES

TOPIC 1 — SMCDAT — Requirements

Sub-topic 1.1 — SMS

Sub-topic 1.2 — QMS

Sub-topic 1.3 — SMS application in the working environment

TOPIC 2 — Maintenance Agreements with Outside Agencies

Sub-topic 2.1 — Principles of agreements

TOPIC 3 — SMC General Processes

Sub-topic 3.1 — Roles and responsibilities

TOPIC 4 — Maintenance Management Systems

Sub-topic 4.1 — Reporting

Subject 4: TECHNOLOGY

TOPIC 1 — Technologies and Principles

Sub-topic 1.1 — General

Sub-topic 1.2 — Communication

Sub-topic 1.3 — Facilities

Subject 5: COMMUNICATION — DATA

TOPIC 1 — European Networks

Sub-topic 1.1 — Network Technologies

TOPIC 2 — Global Networks

Sub-topic 2.1 — Networks and Standards

Sub-topic 2.2 — Description

Sub-topic 2.3 — Global Architecture

Sub-topic 2.4 — Air-Ground Sub-networks

Sub-topic 2.5 — Ground-Ground sub-networks

Sub-topic 2.6 — Air-Ground Applications

Subject 6: COMMUNICATION — RECORDERS

TOPIC 1 — Legal Recorders

Sub-topic 1.1 — Regulations

Sub-topic 1.2 — Principles

Subject 7: NAVIGATION — PBN

TOPIC 1 — SMCDAT — NAV Concepts

Sub-topic 1.1 — NOTAM

Subject 8: SURVEILLANCE — PRIMARY

TOPIC 1 — ATC Surveillance

Sub-topic 1.1 — Use of PSR for Air Traffic Services

Subject 9: SURVEILLANCE — SECONDARY

TOPIC 1 — SSR AND MSSR

Sub-topic 1.1 — Use of SSR for Air Traffic Services

TOPIC 2 — Mode S

Sub-topic 2.1 — Introduction to Mode S

TOPIC 3 — Multilateration

Sub-topic 3.1 — MLAT Principles

Subject 10: SURVEILLANCE — HMI

TOPIC 1 — HMI

Sub-topic 1.1 — ATCO HMI

Subject 11: SURVEILLANCE — DATA TRANSMISSION

TOPIC 1 — Surveillance Data Transmission

Sub-topic 1.1 — Technology and Protocols

Subject 12: SURVEILLANCE — DATA PROCESSING SYSTEMS

TOPIC 1 — User Requirements

Sub-topic 1.1 — Controller requirements

Sub-topic 1.2 — Trajectories, Prediction and Calculation

Sub-topic 1.3 — Ground Safety Nets

Sub-topic 1.4 — Decision Support

Subject 13: SURVEILLANCE — DATA PROCESS

TOPIC 1 — Hardware Platform

Sub-topic 1.1 — Equipment Upgrade

Sub-topic 1.2 — COTS

Sub-topic 1.3 — Interdependence

Subject 14: SURVEILLANCE — DATA

TOPIC 1 — Data Essentials Features

Sub-topic 1.1 — Data Significance

Sub-topic 1.2 — Data Configuration Control

Sub-topic 1.2 — Data Standards