SESAR DETAILED OPERATIONAL DESCRIPTION

Glossary of Terms and Definitions (Lexicon)

Document information	
EC project title	EPISODE 3
EC project N°	037106
Project / Work package	EPISODE 3 / WP2
EPISODE 3 WBS	{To be completed}
Document Name	SESAR Detailed Operational Description
Deliverable ID/ Doc ID	E3-D2.2-029
Version	1.0
Version date	28-07-2008
Status	Draft
Classification	Public
Filename	E3-D2.2-029-V1.0 SESAR Initial DOD (Lexicon - Terms & Definitions).doc
Owner of the document	
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Edition history

Edition Nº	Date	Status	Author(s)	Justification - Could be a reference to a review form or a comment sheet
0.1	06/17/2008	Draft	D. Dohy	Initial draft
0.2	18/07/2008	Draft	D. Dohy	Consolidation from individual DODs acronyms & definition sections.
1.0	28/07/2008	Draft	D. Dohy	Amendment after internal review.

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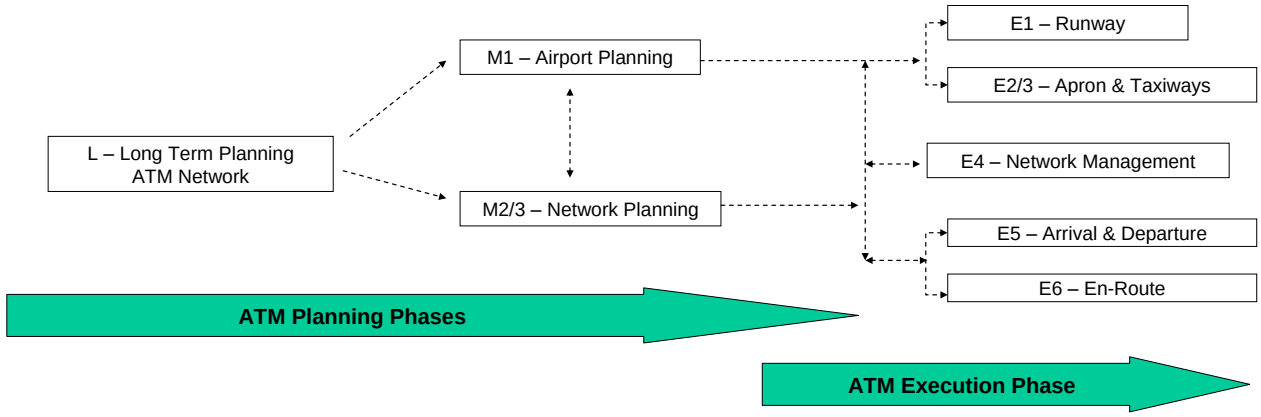
SUMMARY

The aim of EPISODE 3 is to conduct validation exercises with the objective of developing a better understanding of the SESAR Concept. To support these exercises, EPISODE 3 needs to refine and clarify the high level SESAR ConOps concept description.

A set of Detailed Operational Description (DOD) documents have therefore been produced to provide a central reference describing the concept with the required level of detail. The ATM Process Model, developed for EPISODE 3, provides a process breakdown of the SESAR ConOps and has been used to structure the list of Detailed Operational Description documents according to the main phases defined by SESAR:

- Long Term Planning activities;
- Medium and Short Term Planning activities;
- Execution activities.



This document is a complementary document which provides the glossary of terms (i.e. acronyms) as well as the description of the main definitions and terms used in the set of DODs documents.

TABLE OF CONTENTS

LIST OF FIGURES

1 DOCUMENT INFORMATION

1.1 BACKGROUND

The EPISODE 3 project, also called "Single European Sky Implementation Support Through Validation", was signed on 18th April 2007 between the European Community and EUROCONTROL under the contract N° TREN/07/FP6AE/S07.70057/037106. The European Community has agreed to grant a financial contribution to this project equivalent to about 50% of the cost of the project.

The project is carried out by a consortium composed of EUROCONTROL, Entidad Publica Empresarial Aeropuertos Espanõles y Navegacion Aérea (AENA); AIRBUS France SAS (Airbus); DFS Deutsche Flugsicherung GmbH (DFS); NATS (EN Route) Public Limited Company (NERL); Deutsches Zentrum für Luft und Raumfahrt e.V.(DLR); Stichting Nationaal Lucht en Ruimtevaartlaboratorium (NLR); The Ministère des Transports, de l'Equipement, du Tourisme et de la Mer de la République Française represented by the Direction des Services de la Navigation Aérienne (DSNA); ENAV S.p.A. (ENAV); Ingenieria y Economia del Transporte S.A (INECO) ISA Software Ltd(ISA); Ingeneria de Sistemas para la Defensa de Espana S.A (Isdefe); Luftfartsverket (LFV); Sistemi Innovativi per il Controllo del Traffico Aereo (SICTA); THALES Avionics SA (THAV); THALES AIR SYSTEMS S.A (TR6); Queen's University of Belfast (QUB); The Air Traffic Management Bureau of the General Administration of Civil Aviation of China (ATMB); The Center of Aviation Safety Technology of General Administration of Civil Aviation of China (CAST); Austro Control (ACG); LPS SR (LPS); Luchtverkeersleiding Nederland (LVNL). This consortium works under the co-ordination of EUROCONTROL Experimental Centre (EEC)

The mission of EPISODE 3 is to assess key concept areas of the SESAR 2020 Concept of Operations and provide evidence, or otherwise, that these concept areas:

- Are "safe in principle";
- Can attain the "proposed level of performance";
- Are "environmentally efficient"; and
- Are "operationally viable".

The main SESAR inputs to this work are:

- The SESAR Concept of Operations (ConOps): T222 [1];
- The description of scenarios developed: T223 [2] & [3];
- The list of Operational Improvements allowing to transition to the final concept: T224 [4];
- The definition of the implementation packages: T333 [4] & [5];
- The list of performance assessments exercises to be carried out to validate that the concept delivers the required level of performance: T232;
- The ATM performance framework, the list of Key Performance Indicators, and an initial set of performance targets: T212 [6].

One of the objectives of EPISODE 3 is to deliver Detailed Operational Descriptions that will refine the concept and structure the validation work [7]. These documents are provided as input to the SESAR development phase. These documents are produced through the System Consistency work package of EPISODE 3 and will be updated through the life of the project.

1.2 INTENDED AUDIENCE

The intended audience includes:

- EPISODE 3 partners;
- SESAR community.

1.3 PURPOSE AND SCOPE OF THE DOCUMENT

This document contains complementary information to the set of DODs such as the glossary of terms (i.e. acronyms) and the description of the main definitions and terms used in the set of DODs documents. Such documents shall be used within EPISODE 3 in order to identify topics for validation exercises and provide information suitable for the conduct of the validation exercises and can be seen as being step 0.2 of E-OCVM [8] (i.e. the description of the ATM Operational Concept(s)). The DOD document structure and content is derived from the ED-78A standard [9] and the OSED. According to the ED-78A standard, "the OSED identifies the Air Traffic Services supported by data communications and their intended operational environment and includes the operational performances expectations, functions and selected technologies of the related CNS/ATM system". The structure of the DOD has been adapted from that of the OSED to reflect the nature of the concept areas being developed and serve the purpose of EPISODE 3 validation activities.

The complete detailed description of the mode of operations is composed of 10 documents (the set of documents is available from the EPISODE 3 portal home page [10]):

1. The General DOD (G DOD) [11];
2. The Long Term Network Planning DOD (L DOD) [12];
3. The Collaborative Airport Planning DOD (M1 DOD) [13];
4. The Medium & Short Term Network Planning DOD (M2/3 DOD) [14];
5. The Runway Management DOD (E1 DOD) [15];
6. The Apron & Taxiways Management DOD (E2/3 DOD) [16];
7. The Network Management in the Execution Phase DOD (E4 DOD) [17];
8. The Conflict Management in Arrival & Departure High & Medium/Low Density Operations DOD (E5 DOD) [18];
9. The Conflict management in En-Route High & Medium/Low Density operations DOD (E6 DOD) [19];
10. The EPISODE 3 Lexicon (Glossary of Terms and Definitions), this document.

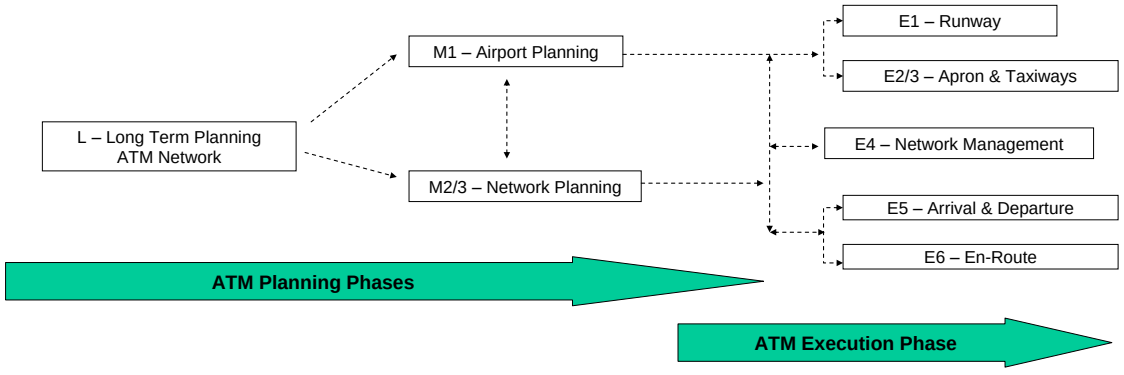


Figure 1: Overview of the EPISODE 3 DODs

1.4 DOCUMENT STRUCTURE

The structure of the document is as follows:

- Section 2 of this document provides the list of the acronyms used in the set of the DODs documents.
- Section 3 provides the descriptions of the terms and definitions used in the DODs.
- Section 4 gives the references to the documents used in the Lexicon.

2 GLOSSARY OF TERMS

A B C D E F G H I J K L M N O P Q R S T U V W X

Terms	Explanation
A	*Go to Top*
ABAS	Airborne Based Augmentation System
ACAS	Airborne Collision Avoidance System
ACC	Air Traffic Control Centre
ACDA	Advanced Continuous Descent Approach
A-CDM	Airport Collaborative Decision Making
ACG	Austro Control
ADD	Aircraft Derived Data
ADF	Air Defence
ADS-B/-C	Automatic Dependent Surveillance -Broadcast / -Contract
AENA	Entidad Publica Empresarial Aeropuertos Espanõles y Navegacion Aérea
AFUA	Advance Flexible Use of Airspace
AGDL	Air Ground Data-Link
AI	Aeronautical Information
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Service
ALDT	Actual Landing Time
AMC	Airspace Management Cell
AMAN	Arrival Manager
AMM	Airport Moving Maps

Terms	Explanation
ANSP	Air Navigation Service Provider
AO	Airline Operator
AOC	Airline Operational Control
AOM	Airspace Organisation and Management
AOP	Airport Operational Plan
APO	Airport Operations
APOC	Airport Operations Centre
APP	Approach
AS	Airborne Surveillance
ASAS	Airborne Separation Assistance Systems
ASEP	Airborne Separation
ASEP-ITP	ASEP – In Trail Procedure
ASEP-CSPA	ASEP – Closely Spaced Parallel Approach
ASEP-C&P	ASEP – Crossing and Passing
ASM	Airspace Management
A-SMGCS	Advanced Airport Surface Movement Guidance and Control System
ASPA	Airborne Spacing
ASPA-S&M	ASPA - Enhanced Sequencing and Merging operations
ATC	Air Traffic Control
ATCO	Air Traffic Controller
ATFCM	Air Traffic Flow and Capacity Management
ATIS	Automatic Terminal Information Service
ATM	Air Traffic Management

Terms	Explanation
ATMB	Air Traffic Management Bureau of the General Administration of Civil Aviation of China
ATOT	Actual Take Off Time
ATS	Air Traffic Service
ATSA	Airborne Traffic Situation Awareness
ATSA-SURF	ATSA - Enhanced Traffic Situational Awareness on Airport Surface
ATSA-VSA	ATSA - Enhanced Visual Separation Approach
ATSAW	Air Traffic Situational Awareness
ATSU	Air Traffic Service Unit
AU	Airspace User
AUO	Airspace User Operations
AUP	Airspace Use Plan
B	*Go to Top*
BA	Business Aviation
BT	Business/Mission Trajectory
BTV	Brake to Vacate
C	*Go to Top*
C&P	Crossing and Passing
CAA	Civil Aviation Authority
CAST	Center of Aviation Safety Technology of General Administration of Civil Aviation of China
CAT	Category Precision Approach (I, II or III)
Cb	Cumulonimbus
CBA	Cross Border Area

Terms	Explanation
CCD	Continuous Climb Departure
CDA	Continuous Descent Approach
CDM	Collaborative Decision Making
CDTI	Cockpit Display Traffic Information
CFMU	Central Flow Management Unit
CM	Conflict Management
CNS	Communication, Navigation and Surveillance
ConOps	Concept of Operations
CORA	Conflict Resolution Assistance
CPDLC	Controller Pilot Data-Link Communication
CSPRs	Closely Spaced Parallel Runways
CTA	Controlled Time of Arrival
CTO	Controlled Time Over
D	*Go to Top*
DCB	Demand and Capacity Balancing
DFS	Deutsche Flugsicherung GmbH
D/L	Data Link
DLR	Deutsche Zentrum für Luft und Raumfahrt
DMA	Dynamic Mobile Area
DMAN	Departure Manager
DOD	Detailed Operational Description document
DOW	Description of Work document
DSNA	Direction des Services de la Navigation Aérienne

Terms	Explanation
DTG	Distance To Go
E	*Go to Top*
EAD	European AIS Database
EATCHIP	European Air Traffic Control Harmonisation and Integration Programme
EATMS	European Air Traffic Management System
ECAC	European Civil Aviation Conference
EEC	EUROCONTROL Experimental Centre
EIBT	Estimated In Block Time
ENAV	Ente Nazionale di Assistenza al Volo
EOBT	Estimated Off Block Time
E-OCVM	European Operational Concept Validation Methodology
ETA	Estimated Time of Arrival
E-TMA	Extended TMA
ETO	Estimated Time Over
EU	European Union
EUROCAE	The European Organization fro Civil Aviation Equipment
F	*Go to Top*
FAB	Functional Airspace Block
FAF	Final Approach Fix
FDP	Flight Data Processing
FDPS	Flight Data Processing System
FIR	Flight Information Region
FL	Flight Level

Terms	Explanation
FMP	Flow Management Position
FMS	Flight Management System
FOC	Flight Operations Centre
FOD	Foreign Object Debris
FPL	Filed flight Plan
FUA	Flexible Use of Airspace
G	*Go to Top*
GA	General Aviation
GBAS	Ground Based Augmentation System
GAT	General Air Traffic
GMC	Ground Movement Control
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
H	*Go to Top*
HMI	Human Machine Interface
HUD	Head up Display
I	*Go to Top*
IAF	Initial Approach Fix
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
IEEE	Institute of Electrical and Electronical Engineers
IOC	Initial Operating Capability
IOP	Interoperability Protocol

Terms	Explanation
IFR	Instrumental Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
INECO	Ingenieria y Economia del Transporte
IP	Internet protocol
IPs	Implementation Packages
ISA	ISA Software Ltd
Isdefe	Ingeneria de Sistemas para la Defensa de Espana S.A
IT	Information Technology
J	*Go to Top*
JAA	Joint Aviation Authority
K	*Go to Top*
KPA	Key Performance Area
KPI	Key Performance Indicator
L	*Go to Top*
LVNL	Luchtverkeersleiding Nederland
LVC	Low Visibility Conditions
LVP	Low Visibility Procedures
LTM	Local Traffic Manager
LPS	Letové prevádzkové služby Slovenskej republiky štátny podnik
M	*Go to Top*
MET	Meteorological Information Service
METAR	Meteorological Aerodrome Report

Terms	Explanation
MLS	Microwave Landing System
MTCD	Medium-Term Conflict Detection
MTCD/R	Medium-Term Conflict Detection and Resolution
MSPSR	Multi-Static Primary Surveillance Radar
MVPA	Military Variable Profile Area
N	*Go to Top*
NAT	North Atlantic Region
NATS	National Air Traffic Services (UK)
NAV	Area Navigation
NERL	NATS En Route Public Limited Company
NG	New Generation
NLR	Stichting Nationaal Lucht en Ruimtevaartlaboratorium
NM, nm	Nautical Mile
NOP	Network Operations Plan
NOPLA	Network Operations Planner
NOTAM	Notice to Airmen
O	*Go to Top*
OAT	Operational Air Traffic
OIs	Operational Improvements
OLDI	On-Line Data Interchange
OSED	Operational Service and Environment Description
P	*Go to Top*
PANS	Procedures for Air Navigation Services

Terms	Explanation
PBN	Performance-Based Navigation
PCA	Air Defence Planning and Coordination Authority
PRM	Precision Runway Monitoring
P-RNAV	Precision Area Navigation
PSR	Primary Surveillance Radar
PT	Predicted Trajectory
PTC	Precision Trajectory Clearances
Q	*Go to Top*
QUB	Queen's University of Belfast
R	*Go to Top*
RBT	Reference Business/Mission Trajectory
RET	Rapid Exit Taxiways
RNAV	Area Navigation
RNP	Required Navigation Performance
RPK	Revenue Passenger Kilometres
ROT	Runway Occupancy Time
R/T	Radio Telephony
RVR	Runway Visual Range
RWY	Runway
S	*Go to Top*
SADT	Structured Analysis and Design Technique
SAIP	Single European AIP
SBAS	Space/Satellite Based Augmentation System

Terms	Explanation
SBT	Shared Business/Mission Trajectory
SES	Single European Sky
SESAR	Single European Sky ATM Research programme
SID	Standard Instrument Departure (Route)
SIGMET	Significant Meteorological Information
SMAN	Surface Manager
SNOWTAM	NOTAM on Snow Conditions
SSEP	Self Separation
STAR	Standard Terminal Arrival Route
STCA	Short Term Conflict Alert
SWIM	System Wide Information Management
SYSCO	System Assisted Coordination
T	*Go to Top*
TACCS	Tactical Airborne Command Control and Surveillance
TAM	Total Airport Management
TBS	Time Based Separation
TC-SA	Trajectory Control by Ground Based Speed Adjustments
TGL	Temporary Guidance Leaflet
THAV	THALES Avionics S.A
TIS-B	Traffic Information Service -Broadcast
TMA	Terminal Area
TMR	Trajectory Management Requirement
TOBT	Target Off Block Time

Terms	Explanation
ToC	Top of Climb
ToD	Top of Descent
TP	Trajectory Predictor
TR6	THALES Air Systems S.A
TREN	Transport and Energy (General Directorate EU)
TS	Traffic Synchronisation
TSA	Temporary Segregated Area
TSAT	Target Start-up Approval Time
TSD	Traffic Situation Display
TTA	Target Time of Arrival
TTOT	Target Take Off Time
TWR	Control Tower
TWY	Taxiway
U	*Go to Top*
UDPP	User Driven Prioritization Process
UIR	Upper Flight Information Region
UPT	User Preferred Trajectory
USA	United States of America
UUP	Updated (Airspace) Use Plan
V	*Go to Top*
VDL	VHF Data-Link
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions

Terms	Explanation
VNAV	Vertical Navigation
VRNP	Vertical required Navigation Performance
W	*Go to Top*
WAM	Wide Area Multi-lateration
WOC	Wing Operations Centre
WP	Work-Package
WV	Wake Vortex
X	*Go to Top*
XAIP	XML AIP
XML	Extensible Mark up Language
XNOTAM	XML NOTAM
XSNOWTAM	XML SNOWTAM

3 DEFINITIONS

The following terminology is used throughout the EPISODE 3 documents:

4-D Trajectory

A set of consecutive segments linking waypoints and/or points computed by FMS (airborne) or by TP (ground) to build the vertical profile and the lateral transitions; each point defined by a longitude, a latitude, a level and a time.

The Business/Mission Trajectories will be described as well as executed with the required precision in all 4 dimensions. The trajectories will be shared and updated from the source(s) best suited to the prevailing operational circumstances and capabilities and the sources include the aircraft systems, flight operational control systems and ANSP trajectory predictors. The ability to generate trajectories in the ATM system from flight plan data will be retained for those flights that are unable to comply with SESAR trajectory management requirements.

Source: SESAR

4-D Trajectory Management

It is the process that captures the overall traffic situation in the NOP and controls the development of the business or mission trajectories (BDT to SBT to RBT) in 4 dimensions (latitude, longitude, flight-level and time). Specifically, 4-D Trajectory Management is the process by which the Business Trajectory of the aircraft is established, agreed, updated and revised. This is achieved through Collaborative Decision Making processes between the aircraft operator, ATM and Airports (where applicable) except in time-critical situations when only Flight Crew and Controller are involved.

Source: EPISODE 3

Advanced Surface Movement Guidance and Control Systems (A-SMGCS)

A system providing, routing, guidance and surveillance for the control of aircraft and vehicles in order to maintain the declared surface movement rate under all weather conditions within the aerodrome visibility operational level while maintaining the required level of safety.

Source: EMMA/EPISODE 3

Airport Operational Plan (AOP)

The Airport Operational Plan (AOP) is a set of interactive data that provide a window on the Airport situation for monitoring the traffic evolution and updating the planning. The AOP is a rolling plan, a sliding window that is not for a specific day but is applicable to any point on the ATM time-line from the past through the present into the future. It includes the plan for the use of the airport resources (rules, configurations, and capacities), the available traffic demand and the demand capacity balance assessment at airport level. The AOP is part of the Network Operations Plan (NOP).

Source: EPISODE 3

Airspace and control phases

Aircraft are potentially within an AMAN horizon and will be under the influence of renegotiations via the NOP and Dynamic DCB. The phases are defined as:

Tower, Apron and Ground Control Phase

This control phase starts when traffic requests pushback from the gate and start up. It includes the taxi to the runway and the take off clearance.

Departure Control Phase

The departure phase starts when traffic is airborne in the initial climb out on the SID. It ends once the traffic is leaving the TMA, or passing a defined flight level (Top of Climb).

En-route Control Phase

En-Route operations are considered to encompass the flight segments between the Top of Climb and Top of Descent events.

Approach Control Phase

The approach phase can start at the TOD in an E-TMA but certainly in the descent phase of a flight into the TMA. It includes the control of traffic to final approach and to landing of traffic on the runway.

Source: EPISODE 3

Area Navigation (RNAV)

RNAV is “a method of navigation which permits aircraft operation on any desired flight path within the coverage of station-referenced navigation aids or within the limits of the capability of self-contained aids, or a combination of these”. A further development of the concept of area navigation within the European region, Precision Area Navigation (P-RNAV) is being implemented in terminal airspace as an interim step to obtain increased operating capacity together with environmental benefits arising from route flexibility. No ECAC-wide mandate for the carriage of P-RNAV is foreseen; however European States will progressively introduce P-RNAV requirements for Terminal Area RNAV procedures, as defined in already published AIPs.

Note: recently, the Performance Based Navigation concept (PBN) was introduced for harmonization purposes at the ICAO level. In particular, there was a need to address confusion and inconsistencies due to a number of local/regional specific definitions and solutions for RNP/RNAV applications. In addition, where RNP provided a limited statement of required performance accuracy, PBN specifies more extensively RNAV system performance i.e. accuracy, integrity, continuity, availability and functionality.

PBN is divided along:

- “RNAV X” specifications, which do not require on-board performance monitoring and alerting;
- “RNP X” specifications, which do require these functions.

The “Performance Based Navigation Manual” [22] replaces the “Manual on Required Navigation Performance (RNP)” [23].

Formally, under the PBN concept, P-RNAV is designated as ‘RNAV 1’.

Source: ICAO, EUROCONTROL

Arrival Manager (AMAN)

AMAN is a Decision Support Tool (DST) and provides the controller with information on a calculated sequence to the runway and support the delivery of, an optimised arrival sequence for an aerodrome. It calculates times for aircraft to arrive at designated fixes and in particular at the Initial Approach Fix (IAF).

Arrival Management

In SESAR context, the traffic will be considered much earlier for the preparation of the sequence and required spacing to enable an optimal approach to be flown. The aim is to ensure an efficient descent portion of the RBT, undisturbed by tactical actions that might jeopardise the lateral or vertical efficiency of the arrival.

The airport will be served by a set of optimised arrival routes. The arrival manager function will be able to allocate arrival routes and set constraints such as Controlled Time of Arrival (CTA) on merging points with the objective of building an optimum sequence. The CTA technique fits well with Time Based Spacing (TBS) which would follow on after passing the CTA point.

Source: EPISODE 3

Arrival Management Horizon

The use of improved trajectory data allows the arrival management process start earlier to deliver traffic efficiently into the structured arrival route system at the optimal place and time with minimum tactical intervention. Therefore, the preparation of the arriving traffic sequence is expected to be completed by around 20 minutes prior to touchdown, and should start only as early as necessary to achieve the stated objectives. It is thought that at least 1 hour will be needed to smooth out ripples in the traffic delivery, which will be the result of RBT, which is expected to be +/- 2 or 3 minutes.

Source: EPISODE 3

ATM Service and Capability Levels

The notion of ATM Service Level and ATM Capability Level will be used as the top-level, System-wide basis to establish the performance characteristics with which all components (covering both those on-board aircraft and within the ground-based systems) of the future European ATM System will be linked.

Capability levels

They are associated with Stakeholder systems, procedures, human resources etc. Upgrading a Stakeholder to a higher capability level means deployment of new enablers, and this requires investments (costs).

Service levels

They are associated with operational services offered by a service provider and consumed by a service user. Upgrading a service to a higher service level means deployment of operational improvement steps, and this leads to benefits (performance improvements).

Source: SESAR

Business/Mission Trajectory (BDT)

A 4D trajectory which expresses the business or mission intentions of the user with or without constraints. It includes both ground and airborne segments of the aircraft operation (gate-to-gate) and is built from, and updated with, the most timely and accurate data available (FOC, FMS, etc.).

Source: SESAR

Continuous Descent Approach (CDA)

In the absence of an internationally agreed definition of Continuous Descent Approach, EUROCONTROL proposes the following: "Continuous Descent Approach is an aircraft operating technique in which an arriving aircraft descends from an optimal position with minimum thrust and avoids level flight to the extent permitted by the safe operation of the aircraft and compliance with published procedures and ATC instructions.

As local conditions require, CDA may comprise any of the following:

- Standard Arrival Routes (STARs) (including transitions) which may be designed with vertical profiles. The routes may be tailored to avoid noise-sensitive areas as well as including the vertical profile and the provision of Distance To Go (DTG) information;
- Provision of 'distance from touchdown' (also referred to 'distance to go' (DTG)) information by Air Traffic Control during vectoring; or
- Combination of these: STARs being used in low traffic density, and DTG estimates being issued by ATC as and when radar intervention is required, e.g. during busy periods.

Basic CDA

The tactical procedure where ATC provides DTG information during vectoring is also known as "Basic CDA" or "B-CDA".

Advanced CDA

The term "Advanced CDA" (A-CDA) is generally referring to further developments of CDA, involving P-RNAV procedures, and appropriate sequencing tools to allow their use even in high density traffic situations.

Source: EUROCONTROL

Collaborative Decision Making (CDM)

The concept of Collaborative Decision Making consists of two high level elements; the sharing of information related to progress of flights and priorities and acting on the shared information.

Experience in the airport environment has shown that just by sharing relevant information between partners, common situational awareness and understanding of a situation increases the quality of decisions sufficiently to enable a better use of resources, allow partners to set priorities and improve the predictability of operations, not only in the airport itself, but system wide.

CDM requires trust in the quality of the information being shared and the legitimate business and other interests of the partners being properly protected. This is ensured via a combination of procedures and information communications technology.

Benefits are achieved through better quality decisions enabled by shared information, while preventing any one partner gaining a competitive advantage.

Making collaborative decisions does not only imply actually talking to other partners. Better decisions can be made taking all of the newly available information into account rather than basing decisions on a limited view. Collaborative decisions may also involve two or more systems comparing data and generating advice to the human operators.

CDM can work equally effectively in all circumstances where ATM decisions need to be made and thanks to global information sharing CDM does have powerful network effects. This means that the more widespread CDM becomes the greater the measurable benefits to individual partners.

Source: EPISODE 3

Controlled Time of Arrival (CTA)

An ATM imposed time constraint on a defined merging point associated to an arrival runway.

Source: SESAR

Controlled Time Over (CTO)

An ATM imposed time constraint over a point.

Source: SESAR

Demand and Capacity Balancing (DCB)

Demand and Capacity Balancing, DCB, is one of the ICAO Operational Concept Components.

DCB will still be accomplished through a layered planning process applied at the ECAC level (i.e. the regional level) in close cooperation both with Sub-Regional and Local levels.

DCB starts with the long-term planning phase (several years in advance) and finishes during the flight execution phase, through the medium and short term planning phases is Airspace User oriented meaning that the new ATFM process shall do its utmost to offer as much as required en-route capacity so that Airspace Users can meet their business objective.

Compared to today, and according to the here before principles, DCB, and more generally every ATM process, is based on a rolling Network Operations Plan that allows access to every authorised entity. In addition, DCB is enhanced to manage flights after departure, filling the gap between ATFM and ATC. In addition, the User Driven Prioritisation Process will be triggered in case of severe capacity drop so that Airspace Users can favour the flights of high marginal cost.

DCB is now mainly business/mission trajectory oriented. Precision of trajectory planning and execution should allow capacity increase while maintaining the required safety target.

Source: EPISODE 3

Departure Manager (DMAN)

DMAN is a planning tool developed to improve the departure flows at airports and increase the predictability. As a result the DMAN provides a planned departure flow with the goal to maintain an optimal throughput at the runway, reduce queing at holding point and distribute the information to various stakeholders at the airport (i.e. the airline, ground handling and Air Traffic Control).

If aircraft take-off within the arrival manager horizon, there will be interactions between the departure management and the arrival manager functions. Their agreed RBT will be influenced by the arrival manager, which might apply a time constraint on a point in the vicinity of destination with the aim of preparing the arrival sequence. When the aircraft becomes airborne, this constraint point becomes a CTA.

Source: EPISODE 3

Flight Management System (FMS)

The FMS representation of the flight path of an aircraft describes the lateral and vertical profile over time, including:

- a series of consecutive segments linking several waypoints defined in terms of latitude, longitude and altitude (or flight level);
- waypoints (from ICAO flight plan), pseudo waypoints (to build the vertical profile, such as TOC, TOD, etc) and lateral transitions (to build the lateral path taking into account turn radius, etc) ;
- predictions over waypoints (FMS ETO, speed, wind, remaining fuel, etc);
- possible constraints over waypoints (RTA, speed, altitude);
- Additional information (figure of merit, navigation accuracy, etc).

The lateral profile consists in a smooth lateral path including turns around waypoints (from ICAO flight plan and input in the FMS) and is made of straight and curved segments (built with various lateral transition types computed by the FMS).

The vertical profile consists in the optimal flyable vertical path (built with additional pseudo waypoints computed by the FMS) respecting the ATC constraints (altitude and speed constraints from selected terminal procedure or aircrew input such as cruising flight level, cost index, wind on way points) and aircraft limits in the forecast environment (flight envelope, passenger comfort, performances and limitations). It is the reference for guiding the aircraft from origin to destination along the longitudinal axis. It is recomputed upon flight plan or context changes (pressure, temperature and wind changes from aircraft sensors, or cost index, flight level, wind or take off parameter form aircrew input).

Source: EPISODE 3

Medium Term Conflict Detection (MTCD)

Medium-Term Conflict Detection is a predictive tool monitoring the aircraft's progress against the trajectory, the detection of conflicting trajectories and the presentation of this information to the controllers, currently up to 20 minutes ahead.

Source: EPISODE 3

Network Operation Plan (NOP)

The Network Operations Plan works with a set of collaborative applications (i.e. NOPLA applications) providing access to traffic demand, airspace and airport capacity and constraints and scenarios to assist in managing diverse events. The aim of the NOP is to facilitate the processes needed to reach agreements on demand and capacity.

Source: SESAR

Network Operation Planner (NOPLA)

The NOPLA applications represent a highly automated environment offering users the possibility to initiate complex tasks which the applications carry out making sure that the proper context is used and results are returned based on the best available actual, archive, planned and expected information, formulated as proposals and/or complex decision support information, as appropriate, to help users develop plans and make decisions. In some cases, the NOPLA application (remote or local) may actually complete negotiations between each other fully automatically.

Source: SESAR

Operational service

The term “service”, or “operational service”, in the context of this document refers to “a set of related Air Traffic Management transactions, both system supported and manual, which have a clearly defined operational goal and begin and end on an operational event”.

Source: EPISODE 3

Precision Trajectory Clearances (PTC)

The objective of a Precision Trajectory Clearance is to authorise the execution of a segment of trajectory with the required precision. Although they are described as “clearances” they should be thought of as “rolling authorisation” ahead of the passage of the aircraft and will be heavily supported by automation. PTC may be in terms of 2D (lateral route portion only), 3D (lateral and vertical trajectory) or a 4D Contract in which the precision with which all 4 dimensions of flight are to be executed is described with high precision (N.B. 4D Contract is out of scope of the DOD).

Precision Trajectory Clearance - 2D (2D-PTC)

2D-PTC will be used to authorise the execution of 2D route with the required precision. The route may be predefined (i.e. published), user defined as part of a user preferred trajectory or created on an ad-hoc basis by an ANSP (i.e. a closed-loop route portion to resolve a conflict). The precision with which the 2D route should be flown will be specified and combined with the lateral spacing of the routes will ensure separation between the subject aircraft and other aircraft on adjacent 2D routes, subject also to ground and airborne monitoring requirements. The 2D-PTC will be complimented by level instructions and may include other constraints such as speed, CTA or relative instructions such as ASPA-S&M.

Precision Trajectory Clearance - 3D (3D-PTC)

3D-PTC will be used to authorise the execution of a trajectory defined both laterally and vertically. The route may be pre-defined (i.e. published – such as a 3D SID or STAR), user defined as part of a user preferred trajectory. The precision with which the 3D trajectory should be flown will be specified. This, combined with continuous airborne and ground

monitoring will ensure separation between the subject aircraft and other aircraft on adjacent 3D trajectories. The 3D-PTC may include other constraints such as speed, CTA or relative instructions such as ASPA-S&M.

Source: SESAR

Queue Management

The tactical establishment and maintenance of a safe, orderly and efficient flow of traffic. It includes the handling of queues, both in the air and on the ground. It operates on individual flights and is closely related to, and sometimes indistinguishable from, the Separation Provision process. It aims to facilitate the highest achievable capacity of the ATM System and to manage delays in a fuel-efficient and environmentally acceptable manner.

Source: SESAR

Reference Business Trajectory (RBT)

The business/mission trajectory which the airspace user agrees to fly and the ANSP and Airports agree to facilitate (subject to separation provision).

Most times indicated in the RBT are estimates, some may be target times (TTA) to facilitate planning and some of them may become constraints (CTA, CTO) to assist in queue management when appropriate, e.g. at AMAN horizon. The RBT consists of a 2D route, altitude and time constraints when required, altitude, time and speed estimates at way points and trajectory change points.

Source: SESAR

Required Time of Arrival (RTA)

The RTA is an FMS parameter. In the full managed mode, when no performance constraints are applied (RTA, forced Mach), the FMS optimises speeds using the cost index value in order to minimize fuel consumption or optimise time/speed criteria fixed by airline economic considerations[1].

The FMS computes its predictions along the trajectory through a back-tracking from the RTA. The RTA may be set on the P-RNAV STAR entry point (e.g. for major airports), on the IAF (e.g. for regional airports), on the FAF (e.g. for minor airports) or on another specific way point (e.g. before a congested sector). The speed is automatically adjusted by the FMS to meet the RTA. If the RTA cannot be met in the aircraft speed limits, the FMS warns the aircrew (RTA missed).

[1] The cost index allows for time/speed optimisation of the flight, mainly relatively to the cruising phase where there are no constraining intermediate altitudes and speed regimes imposed by ATC.

The RTA window should provide sufficient accuracy for DCB and to minimise the need for frequent revision of RTA. The FMS should be capable of speed management to keep the ETA within the RTA window.

Source: EPISODE 3

Shared Business Trajectory (SBT)

Published business/mission trajectory that is available for collaborative ATM planning purposes. The refinement of the SBT will be an iterative process.

Source: EPISODE 3

Target Off Block Time (TOBT)

The TOBT is defined in the context of SESAR[2] as the time that an aircraft operator/handling agent estimates that an aircraft will be ready, all doors closed, boarding bridge removed, push back vehicle connected, ready to commence push back and start up immediately upon reception of an ATC clearance.

Source: EPISODE 3

Target Time of Arrival (TTA)

An ATM computed arrival time[3]. It is not a constraint but a progressively refined planning time that is used to coordinate between arrival and departure management applications.

Source: EPISODE 3

Tolerance window

Window defining the authorised threshold(s) of a constraint outside of which the revision mechanism shall triggered (e.g. time tolerance for the Controlled Time of Arrival).

Source: EPISODE 3

[2] This SESAR definition of the TOBT is based on the "EUROCONTROL CDM project" 2008 definition [24]. It differs in the 2 following areas: the push back vehicle should be "connected" to the aircraft (and not only "available") and the aircraft should be ready to commence "push back and start up" (instead of "taxi").

[3] This definition is in line with [1], and does not reflect the need for a "TTA-like" mechanism applicable to flights already airborne when entering the AMAN horizon.

Trajectory Control by Ground Based Speed Adjustments (TC-SA)

This is an automated de-confliction method that supports conventional surveillance based operations. In this mode automation support tools impose speed adjustments (horizontal and/or vertical) within a limited range and constrained to the medium term time horizon in order to tactically de-conflict traffic and reduce complexity and controller task load. ERASMUS project is currently investigating a possible approach of it.

Source: ERASMUS (refer to [25] for more details)

Trajectory Management Requirement (TMR)

Trajectory Management Requirements are associated with the Reference Business Trajectory for ATM Level 3 and upper capable aircraft. The TMR specify the aircraft requirement to share the revised trajectory in the event that the flight detects a 'delta' from previous predictions.

The TMR could be expressed in terms of time, climb rate or lateral/vertical position. The TMR may be tight for a portion of the trajectory where the traffic is dense and looser elsewhere. Also, the TMR could be loose for a long look ahead time and tight where the look ahead is short, for example the TMR for the time at the FAF could be 5 minutes when the aircraft is 3 hours from the airport, but reduce to 30 seconds when it is 45 minutes away.

Source: EPISODE 3

Open & Closed Loop

Air Traffic Controllers may have to vector aircraft on their course, e.g. in the frame of a tactical intervention involving a deviation from the planned route for safety reasons, or in a more systematic way – as is often the case in terminal airspace, to sequence aircraft towards the runway(s).

"Open-loop" vectors, as opposed to "closed-loop" vectors, correspond to the case when no indication is given as to the duration or limit of the ATC vector instruction, nor how the aircraft will re-join its initial route. Typically, a simple heading instruction is an open-loop vector, while a "Direct To" instruction is a closed-loop vector.

Throughout the documents, the terms "vector(s)" and "vectoring" without additional indication refer to open-loop vectors.

Source: EPISODE 3

Strategic Deconfliction

Today, strategic deconfliction is achieved by the allocation of separated routes or levels. Traffic is separated tactically using such techniques as headings and temporary levels.

In SESAR, this clear differentiation no longer exists with the elimination of current tactical intervention techniques wherever possible. SESAR techniques include deconfliction by the deployment of advanced PRNAV route structures (2D and 3D) in dense traffic situations but in the all other situations separation will be assured by the use of new trajectory based separation modes in which aircraft will be provided with conflict free trajectory segments to be flown.

Source: EPISODE 3

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