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| Deployment Scenario Title | Next generation AMAN for a 4D environment |
| Deployment Scenario Description | Next generation AMAN for a 4D environment: this aims to extend the arrival planning horizon, and to incorporate increasingly complex and high-density environments in which en-route sectors serve more than one airport or more than one TMA, using advanced ground support tools and automation, including with regard to airspace constraints (speed and level restrictions, wind and temperature information). The solution also involves looking at highly integrated airports within the wider context of balancing demand and capacity across the network, and in relation to sharing data between systems. |
| Essential Operational Change | Airport and TMA performance |
| Maturity | In development phase: Key R&D Activities |

| Applicable Operating Environment | | | |
|---|--------------------------|-----------------|----------------|
| Airport | Terminal Airspace | En-Route | Network |
| | | | |

| Timeline | | | | | | | | | | | | | | | | | | | | | |
|-----------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 |

| Performance Contribution of the DS | | | | |
|---|---------------|--------------------|------------------------|-------------------------------|
| Capacity | Safety | Environment | Cost-efficiency | Operational efficiency |
| | | | | |

| Stakeholders affected (at least one enabler to be deployed) | | | | | | |
|--|-------------------------------|--------------|-----------------|--|----------------------------|------------------------|
| ANSP | | AO | | AU | | Network Manager |
| Civil | Military | Civil | Military | Civil | Military | |
| TWR, APP, ENR, SWIM, AIS, MET | TWR, APP, ENR, AIS, MET, SWIM | APT Operator | APT Operator | Scheduled, BA Fixed, BA Rotorcraft, GA, FOC | Transport, Fighter, WOC | Network Manager |

| SESAR Solutions | | | |
|------------------------|---|---|--|
| Solution Code | Solution Title | Solution Description | Related Elements |
| PJ.01-01 | Extended Arrival Management with overlapping AMAN operations and interaction with DCB and CTA | Extended Arrival Management with overlapping AMAN operations and interaction with DCB integrates... | SOL PJ OI DS EOC ICAO |
| PJ.01-W2-01 | Next generation AMAN for 4D environment | This key R&D activity will provide enhancements to the arrival management systems and... | PJ DS EOC |

| Operational Improvement Steps | | | |
|-------------------------------|---|--|--------------------------|
| OI Step Code | OI Step Title | OI Step Description | Related Elements |
| TS-0109 | Controlled Time of Arrival (CTA) in high density/complexity environment | The CTA (Controlled Time of Arrival) is an ATM imposed time constraint on a defined point... | SOL OI EN DS ICAO A A |
| TS-0305-B | Arrival Management Extended to En-Route Airspace - impact of overlapping AMAN operations for En Route ATC | En-Route sectors are expected to contribute to the arrival sequencing towards multiple TMA... | SOL OI EN DS |
| TS-0315 | Arrival Management Systems integrated with DCB | To improve the overall efficiency of arrival and airport operations, the Arrival Management... | SOL EN DS |

| Enablers | | | | | | |
|-------------------|---------------|-------------|------------------|--|---|---------------------|
| Required/Optional | New/Inherited | Develop/Use | Enabler Code | Enabler Title | Enabler Description | Related Elements |
| 🔒 | | | A/C-11 | Flight management and guidance for improved single time constraint achievement (CTA/CTO) | Flight management and guidance for improved control loop on a single time constraint (Controlled... | STK OI EN DS |
| 🔒 | | | BTNAV-STD-02 | Navigation Performance in ICAO provisions for Enhanced CTA | Update of Doc 4444 PANS-ATM and PBN Manual Doc 9613 for enhanced CTA | OI EN DS 📄 |
| 🔒 | | | A/C-31a | Controller pilot data link communication (CPDLC) compliant with ATN baseline 2 (FANS 3/C) | Data link exchange for ATN/VDL2 baseline 2 (FANS 3/C) i.e. for Departure Clearance,... | STK OI EN DS 📄 |
| 🔒 | | | REG-0100 | Regulatory Provisions for Datalink Extension (DLS II) | Interoperability of data link systems, constituents and associated procedures deployed in a... | OI EN DS PCP |
| 🔒 | | | A/C-37a | Downlink of trajectory data according to contract terms (ADS-C) compliant to ATN baseline 2 (FANS 3/C) | Downlink of trajectory data (waypoints or pseudo waypoints with associated constraints and/or... | STK OI EN DS PCP |
| 🔒 | | | AGDLS-ATC-AC-14d | New SPR for data link exchange of instructions or clearances related to CTA allocation (4DTRAD) | On-going work of WG78/SC214 | OI EN DS |
| 🔒 | | | AGDLS-ATC-AC-15d | New IOP for data link exchange of instructions or clearances related to CTA allocation (4DTRAD) | On-going work of WG78/SC214 | OI EN DS |
| 🔒 | | | REG-0100 | Regulatory Provisions for Datalink Extension (DLS II) | Interoperability of data link systems, constituents and associated procedures deployed in a... | OI EN DS PCP |
| 🔒 | | | AGDLS-ATC-AC-14d | New SPR for data link exchange of instructions or clearances related to CTA allocation (4DTRAD) | On-going work of WG78/SC214 | OI EN DS |
| 🔒 | | | AGDLS-ATC-AC-15d | New IOP for data link exchange of instructions or clearances related to CTA allocation (4DTRAD) | On-going work of WG78/SC214 | OI EN DS |

| Enablers | | | | | | |
|-------------------|---------------|-------------|-----------------|--|---|------------------|
| Required/Optional | New/Inherited | Develop/Use | Enabler Code | Enabler Title | Enabler Description | Related Elements |
| 🔒 | | | AIMS-23 | Enhanced digital data chain to ensure Aeronautical Information data provision to meet full 4D trajectory management requirements | Enhanced aeronautical information data provision chain enabling the provision of high quality... | STK OI DS |
| 🔒 | | | APP ATC 148 | System Support For Controlled Time of Arrival (CTA) | The arrival manager is modified to be able to sequence and space arrival flights by use of CTA.... | STK OI DS |
| 🔒 | | | APP ATC 158 | Enhanced arrival management to cover ground holding at the departure aerodrome | Queue management processes including HMI upgraded to take account of longer time horizons and... | STK OI DS |
| 🔒 | | | APP ATC 162 | AMAN Sequence build with integration of constraints applied for DCB/dDCB purposes | The Arrival Management sequence will integrate constraints applied for DCB/dDCB purposes,... | STK OI DS |
| 🔒 | | | BTNAV-STD-02 | Navigation Performance in ICAO provisions for Enhanced CTA | Update of Doc 4444 PANS-ATM and PBN Manual Doc 9613 for enhanced CTA | OI EN DS 📄 |
| 🔒 | | | ER APP ATC 100 | 4D Trajectory Management by Synchronization of Air and Ground Trajectories through EPP | ATC system updates the planned trajectory with data contained in the EPP. | STK OI DS PCP |
| 🔒 | | | ER APP ATC 119 | Air/Ground Datalink Communication/Protocols for i4D and Controlled Time of Arrival | Enhance the air/ground data communications to support the reception and transmission of messages... | STK OI EN DS PCP |
| 🔒 | | | REG-0100 | Regulatory Provisions for Datalink Extension (DLS II) | Interoperability of data link systems, constituents and associated procedures deployed in a... | OI EN DS PCP |
| 🔒 | | | ER APP ATC 149a | Air-Ground Datalink Exchange to Support i4D - Extended Projected Profile (EPP) | Air/Ground datalink management is modified to support the acquisition of the EPP via ADS-C. The... | STK OI EN DS PCP |
| 🔒 | | | ER APP ATC 149b | Air-Ground Datalink Exchange to Support i4D - ETA min/max | Air/Ground datalink management is modified to support the acquisition of ETA min/max through ADS-C. | STK OI EN DS |
| 🔒 | | | REG-0100 | Regulatory Provisions for Datalink Extension (DLS II) | Interoperability of data link systems, constituents and associated procedures deployed in a... | OI EN DS PCP |
| 🔒 | | | ER APP ATC 149c | Air-Ground Datalink Exchange to Support i4D - Controlled Time of Arrival/Overflight (CTA/CTO) | Air/Ground datalink management is modified to support the delivery of CTA/CTO using CPDLC. | STK OI EN DS |
| 🔒 | | | REG-0100 | Regulatory Provisions for Datalink Extension (DLS II) | Interoperability of data link systems, constituents and associated procedures deployed in a... | OI EN DS PCP |
| 🔒 | | | ER APP ATC 160 | ATC to ATC Flight Data Exchange Using The Flight Object | Implement ground-ground flight data exchange between ATC units through the use of Flight Object... | STK OI EN DS PCP |

| Enablers | | | | | | |
|-------------------|---------------|-------------|---------------|---|---|-----------------------|
| Required/Optional | New/Inherited | Develop/Use | Enabler Code | Enabler Title | Enabler Description | Related Elements |
| 🔒 | | | ER ATC 158 | Enroute ATC System Share and Display Sequencing Advisories from Multiple AMANs | The system integrates information of the Sequencing advisories from Multiple AMAN Systems and... | STK OI DS |
| 🔒 | | | ER ATC 163 | Support to En-route delay absorption for cross-border implementation of arrival sequence | The system supports ATCO for smoother En-route delay absorption in C-ATSU prior to traffic being... | STK OI DS PCP |
| 🔒 | | | PRO-118 | ATC Procedures for use of CTA across several AoRs | ATC Procedures developed for the use of CTA management involving protocol for coordinating with... | STK OI DS |
| 🔒 | | | REG-0100 | Regulatory Provisions for Datalink Extension (DLS II) | Interoperability of data link systems, constituents and associated procedures deployed in a... | OI EN DS PCP |
| 🔒 | | | SWIM-APS-05a | Provision and Consumption of Flight Object Sharing services | Provision and Consumption of Flight Object Sharing services (In line with AIRM and ISRM)... | STK OI EN DS PCP S |
| 🔒 | | | SWIM-INFR-01a | High Criticality SWIM Services Infrastructure Support and Connectivity. | Provision of the additional functionality needed by the individual Stakeholder to support their... | STK OI EN DS PCP |
| 🔒 | | | SWIM-NET-01a | SWIM Network Point of Presence | Provision of the individual stakeholder's point of presence onto the common/interconnected... | STK OI EN DS PCP |
| ➔ | | | METEO-05c | Generate and provide MET information relevant for TMA and En-route related operations at short notice ('time to decision' between 3 minutes and 7days), including for low-level IFR operations. | The ATM-MET system is acquiring, generating, assembling and providing Meteorological (MET)... | STK OI EN DS |
| ➔ | | | SWIM-SUPT-01a | SWIM Supporting Registry Provisions | Provision, by specific stakeholders, of Register functionality to support the use of SWIM... | STK OI EN DS PCP |
| ➔ | | | SWIM-SUPT-03a | SWIM Supporting Security Provisions | Provision, by specific stakeholder(s) of functionality to support the use of Security Keys for... | STK OI EN DS PCP |
| ➔ | | | SWIM-SUPT-05a | SWIM Supporting IP Network Bridging Provisions | Provision, by specific stakeholders, of the functionality to provide bridging between separate... | STK OI EN |