

ATM SYSTEM

USBU AND EVOLUTION

TOPSKY

Presented by Sudan

Top sky ATM system

- We have transferred from EUROCAT to Top Sky, which is a new version of the air traffic management system manufactured by French company THALES. We have a ten-year contract with the company with comprehensive technical and operational support, including all ICAO blocks evolutions.

Top sky ATM system

- The transition process went through three phases, the pre-transition phase, the transition and the last phase is the full transition, and it was completed since 7/20/20 with remote technical and operational support by THALES due to the Corona pandemic, during the three phases and all of them were successfully completed

Top sky ATM system

- Now Sudan is ready to link with other systems ready for automatic coordination for neighboring countries (OLDI & ADIC)
- TOPSKY offer a new generation of tools for airspace management. Designed with controllers in mind, it handles traffic in surveillance or in non-surveillance environment. Selected by the most demanding CAAs around the global

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- We have two part ions operation and training system is a copy of operational system integrated with advanced simulator also used as backup in case of failure of the main system

Comparison E-X to TopSky –ATC

- New/Enhanced Safety Nets and Monitoring Aids

New/Enhanced Safety Nets and Monitoring Aids

- NEW Pre-STCA supports earlier detection and conflict resolution



New/Enhanced Safety Nets and Monitoring Aids

- Enhanced -MSAW warning inhibited when aircraft assigned VSA



New/Enhanced Safety Nets and Monitoring Aids

- Enhanced -Special Use Airspace and Temporary Special Use Airspace can be dynamically managed



New/Enhanced Safety Nets and Monitoring Aids

- Enhanced -APMW alerting processing enhanced to reduce false alert



New/Enhanced Safety Nets and Monitoring Aids

- NEW NTZ -supports ICAO recommendations for SOIR





New/Enhanced Safety Nets and Aids

New/Enhanced Safety Nets and Monitoring Aids

- NEW TCT -multi-hypotheses MTCD



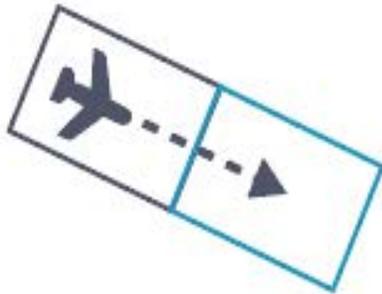
New/Enhanced Safety Nets and Monitoring Aids

- NEW -DAP data used to alert ATC of non-compliance with clearance based on FMS inputs in cockpit



New/Enhanced FDP Functions

- NEW –Verbal/ICAO/AIDC/OLDI integrated coordination support



Automated Coordination Support

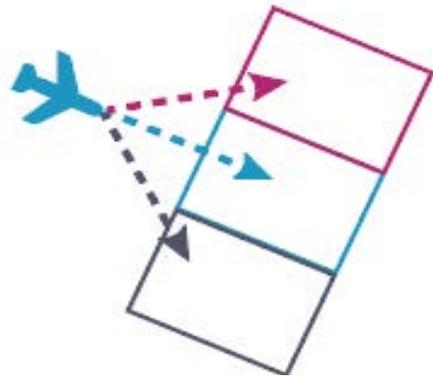
New/Enhanced FDP Functions

- NEW -BADA (Total Energy model) provides more accurate profile



New/Enhanced FDP Functions

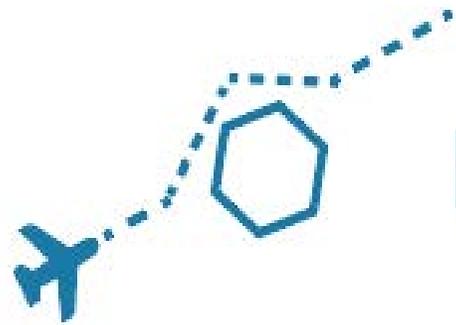
- NEW –Transfer Management “invisible” to controller across all coordination protocols



Multi-Protocol Support

New/Enhanced FDP Functions

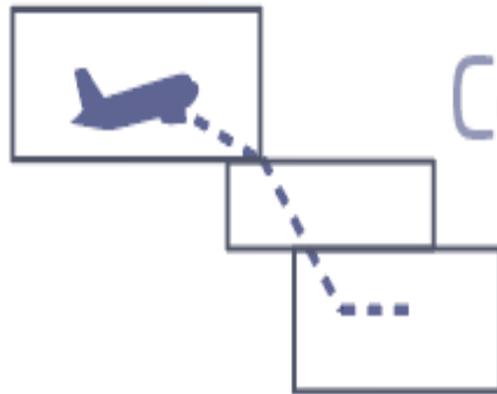
- Enhanced FUA supports free-flight



Flexible Use of Airspace

New/Enhanced FDP Functions

- Enhanced –position information posting now completely automated



Complex TMA Posting Logic

All NEW HMI

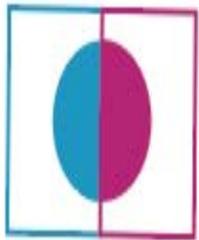
- NEW –User Profiles allow complete customization of the controller HMI



Dynamic User Profile Management

All NEW HMI

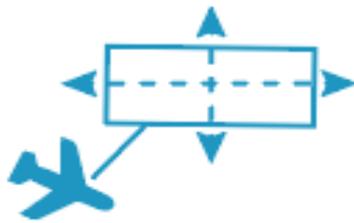
- NEW –ASD and Track/List colors and contents customizable to support local procedures



Custom HMI Configuration for Colours/Lists/Labels

All NEW HMI

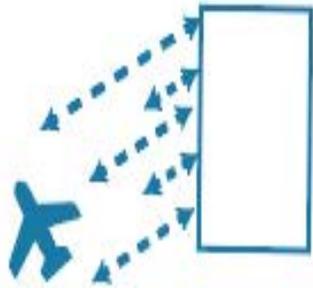
- NEW –smart compaction and label behaviors reduce clutter



Intelligent Label Behaviours

All NEW HMI

- NEW –simpler and user-friendly HMI easier to learn



Rapid & Consistent Function Access

All NEW HMI

- NEW –Follows current Human Factors Design Principles



Aligned to Eurocontrol & FAA HMI Design Specifications

NEW: Release 20.2 -Enhancements linked to ASBU thread

- **ECR-285: Inter-Partition Sectorization**
 - FRTO-B1/4 Dynamic sectorization
- **ECR-312: Weather Display**
 - AMET-B0/4 Dissemination of meteorological products

NEW: Release 20.2 -Enhancements linked to ASBU thread

- **ECR-321: RECAT-1 Support 7 Groups**
- WAKE-B2/1 Wake turbulence separation minima based on 7 aircraft groups

NEW: Release 20.2 -Enhancements linked to ASBU thread

- **ECR-314 -Pre-STCA Alert**
- SNET-B1/1 Enhanced STCA with aircraft parameters
- **0.5NM MSAW Resolution**
- SNET-B0/2 Minimum Safe Altitude Warning (MSAW)

NEW: Release 20.2 -Enhancements linked to ASBU thread

- **ECR-305: Space Based ADS-B**
- ASUR-B1/1 Reception of aircraft ADS-B signals from space (SB ADS-B)

FUTURE: 2021 & beyond - Enhancements linked to ASBU thread

- **ECR-307: PBCS Reporting**
- CSEP-B1/3 Performance Based Longitudinal Separation Minima
- CSEP-B1/4 Performance Based Lateral Separation Minima

FUTURE: 2021 & beyond - Enhancements linked to ASBU thread

- **ECR-359: PBCS Enhancements**
- COMS-B1/2 PBCS approved ADS-C (FANS 1/A+) for procedural airspace

FUTURE: 2021 & beyond - Enhancements linked to ASBU thread

- **Spacing Tool**

- RSEQ-B3/3 Increased utilization of runway capacity by improved real-time runway scheduling
- WAKE-B2/4 Wake turbulence separation minima based on leader/follower static pairs-wise

FUTURE: 2021 & beyond - Enhancements linked to ASBU thread

- **Spacing Tool (cont.)**
- RSEQ-B3/3 Increased utilization of runway capacity by improved real-time runway scheduling
- WAKE-B2/4 Wake turbulence separation minima based on leader/follower static pairs-wise
- WAKE-B2/7 Time based wake separation minima for arrival based on leader/follower static pair-wise



FUTURE: 2021 & beyond - Enhancements linked to ASBU thread

- *ECR-380: FDL Configuration enhancement*
- *HMI enhancement -not in scope of ASBU threads*

FUTURE: 2021 & beyond - Enhancements linked to ASBU thread

- **ECR-358 STAR and Approach Enhancements**
- APTA-B0/1 PBN Approaches (with basic capabilities)
- APTA-B1/2 PBN SID and STAR procedures (with advanced capabilities)

FUTURE: 2021 & beyond - Enhancements linked to ASBU thread

- **ECR 367 Missed Approach**
 - RSEQ-B0/1 Arrival Management
- **■ ECR-365 Label Anti-Overlap**
 - *HMI enhancement -not in scope of ASBU threads*
- **■ ECR-366 Departure Path Monitoring**
 - RSEQ-B0/2 Departure Management
- **■ ECR-369: STS/ Extraction**
 - *Situational awareness enhancement -not in scope of ASBU threads*

FUTURE: 2021 & beyond - Enhancements linked to ASBU thread

- **ECR-371 Runway Mode Update (Phase 2)**
- WAKE-B2/2 Dependent parallel approaches
- WAKE-B2/3 Independent segregated parallel operations

FUTURE: 2021 & beyond - Enhancements linked to ASBU thread

- **ECR-372: Area of Interest**
- FRTO-B0/2 Airspace planning and Flexible Use of Airspace (FUA)
- **■ ECR-374: Aerodrome names in DEP and DEST switches**
- *HMI enhancement -not in scope of ASBU threads*
- **■ ECR-375: Multiple STCA Areas**
- SNET-B1/1 Enhanced STCA with aircraft parameters
- **■ REGCAUSE Display**
- NOPS-B1/1 Short Term ATFM measures

FUTURE: 2021 & beyond - Enhancements linked to ASBU thread

- **Asterix Cat 33 support**
- ASUR-B0/1 Automatic Dependent Surveillance –Broadcast (ADS-B)

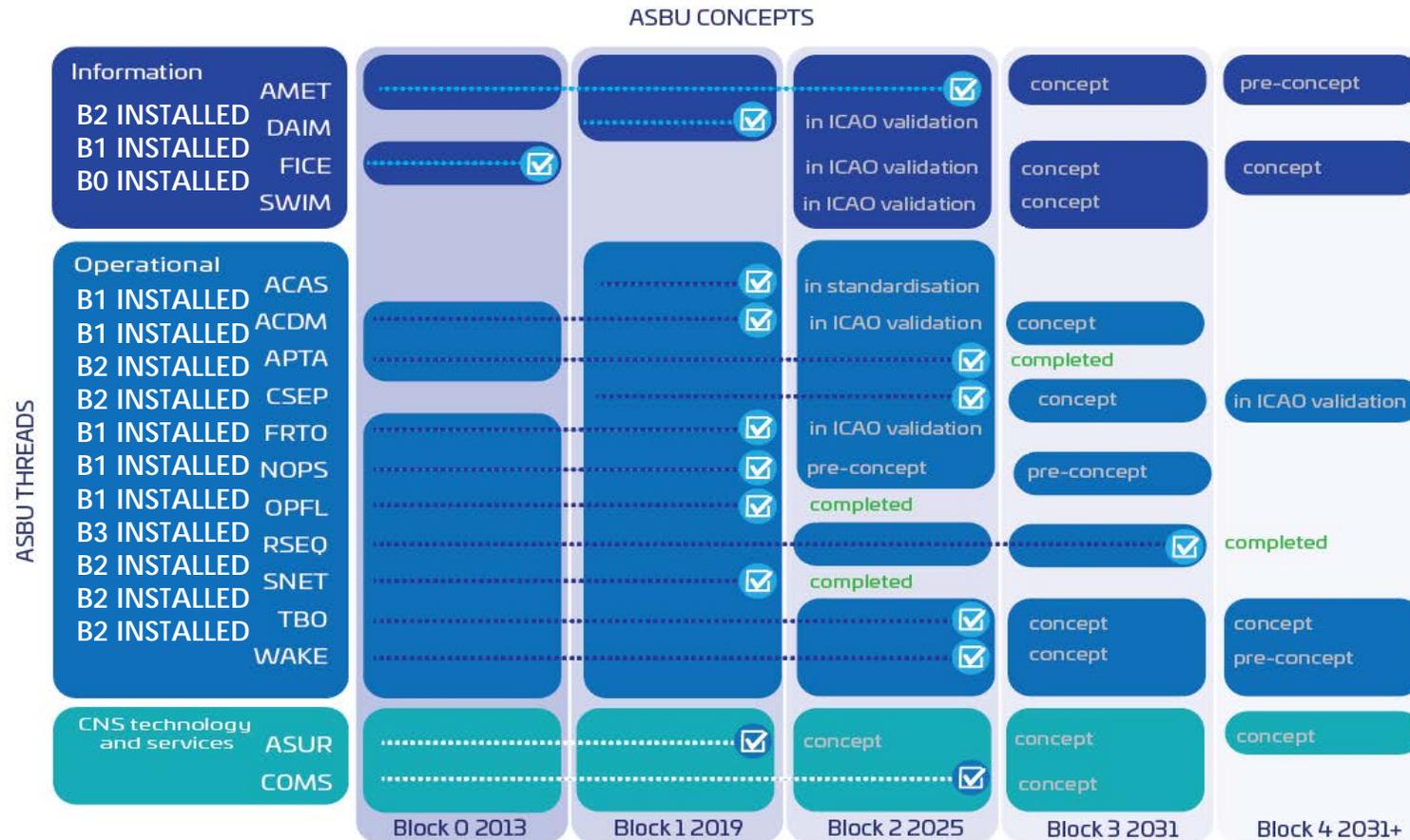


FUTURE: 2021 & beyond - Enhancements linked to ASBU thread

- *ECR-389: Separation Probe Enhancement*
- *HMI enhancement -not in scope of ASBU threads*

Future proofing ANSP investments –Roadmap to Future

Alignment of Thales to the ICAO ASBU Technology Roadmap



- TopSky -ATC already meets or exceeds the operational needs expressed for the ASBU thread.



- ICAO is yet to conduct exploratory research in this topic.



- ICAO is currently conducting exploratory research in this topic and is not yet ready to validate the concept.



- Note: when each thread becomes mature it will be added to the Roadmap



acronyms

- ASBU : ICAO Aviation System Block Upgrades:
- HMI : human machine interface
- PBCS : Performance Based Communications and Surveillance
- STCA : short conflict alert
- MSAW : mamma safe altitude alert
- BADA : Base of Aircraft Data
- DAP
- FMS : Flight management system
- MTCD : Medium Term Conflict Detection
- NTZ : No Transgression Zone
- SOIR : **SIMULTANEOUS OPERATIONS ONPARALLEL OR NEAR-PARALLEL INSTRUMENT RUNWAYS**
- SOIA : **SIMULTANEOUS OPERATIONS ONPARALLEL OR NEAR-PARALLEL INSTRUMENT approach**
- APMW : Approach Path Monitor warning
- ASTERIX : All Purpose Structured Eurocontrol Surveillance Information Exchange
- PRM : Precision Runway Monitor

Thank you