Agenda Item 3: Planning and implementation issues related to ATM/SAR
Updates from MID States on ATM/SAR Implementation

Update on ATM/SAR developments and implementation

Presented by Saudi Arabia

Contents

- Latest developments related to ATM/SAR.
- Identified needs and priorities.
- Challenges and difficulties.
- Lessons learnt, and capacity building activities; and
- Ongoing and Planned projects.
- Air Traffic Flow and Capacity Management: Overview on KPIs

Latest developments related to ATM/SAR

The Aeronautical Rescue Coordination Centre (ARCC) & SAMCC facilities were enhanced by the installation of:

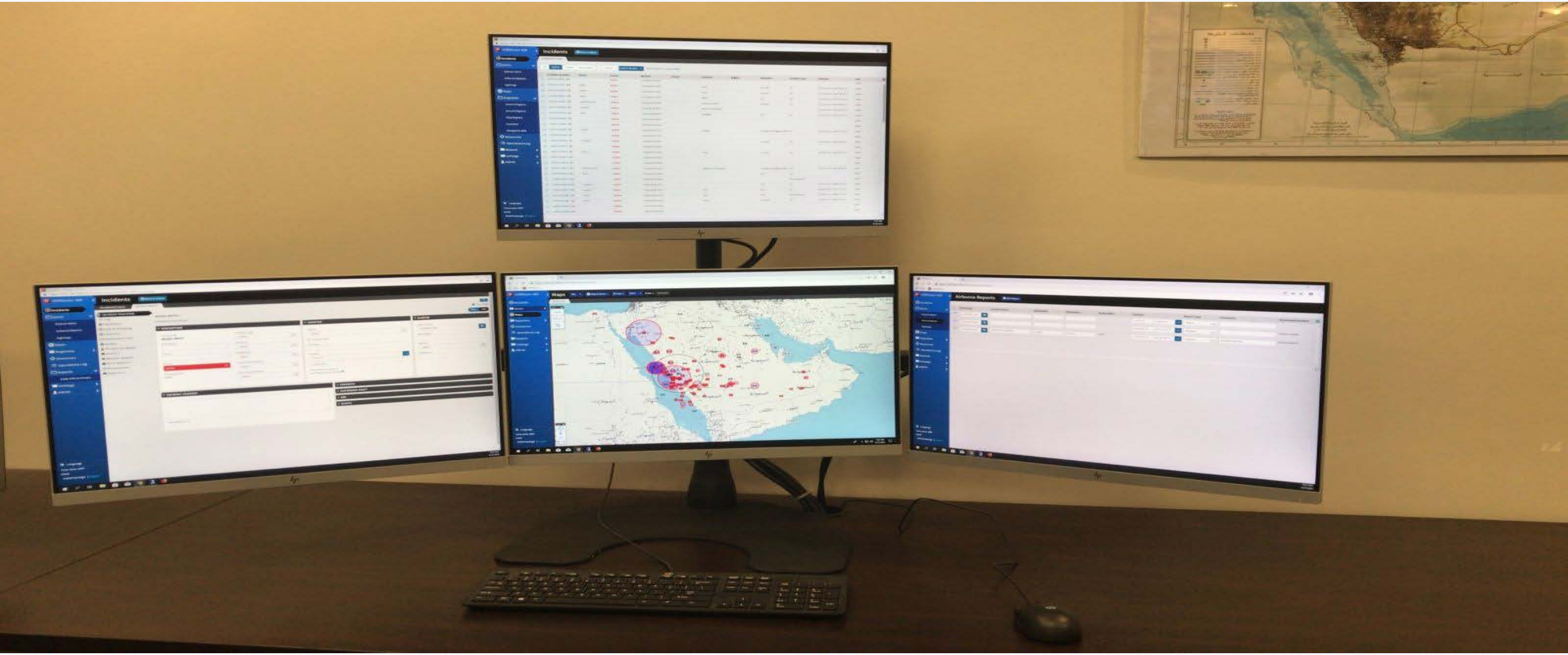
- Deployment of MEOSAR System with 10 Medium Earth Orbit LUTs (MEOLUTs) channels: 6 Channels in Jeddah ACC and four additional/extra channels in Riyadh ACC with local User Terminals/ work-stations to track, receive and process alerts from COSPAS-SARSAT. The MEOSAR system is considered as major enhancement of distress detection and processing capabilities in the MID region. Moreover, SAMCC will introduce return link services- messages (RLS-M) in accordance with Cospas-Sarsat requirements.

- **New Advanced Search and Rescue incident management system** which supports SAR planning and coordination, this system provides the aeronautical rescue coordination centres with a complete view of SAR data, including emergency beacon locations and information about local SAR resources and facilities (e.g. Vessels, helicopters and personnel).

ARCC/SAMCC are Staffed by 12 SAR Controllers/operators providing services and supporting distribution of distress alerts and SAR operations 24h/7 within the service area. The Staff will be trained as SAR Mission Coordinator using the **New Advanced Search and Rescue incident management system.**

MEOLUTs Channels at Jeddah ACC

SAR Management System used by ARCC/SAMCC



Latest developments related to ATM/SAR

Cont'd

Deployment of New ATM System at Jeddah, Riyadh ACCs including providing of APP Services in Jeddah, Riyadh, Madinah, Gassim, and Hail)

A new ATM system with enhanced capabilities for traffic management, conflict detection, and automatic handover was deployed at Jeddah and Riyadh ACCs with CWPs providing APP services for Jeddah, Riyadh, Madinah, Gassim and Hail. Jeddah and Riyadh ACCs have contingency configuration allowing each Center takeover the whole traffic in case of major failure/outage in one of the centers. A real time exercise to check the contingency configuration was conducted on 13 October 2021.

Deployment of New ATM System at Dammam and Abha Approach Centers.

The same new ATM system was deployed at Dammam and Abha Approach Centers with the same ATC tool capabilities.

Deployment of remote connections using the new ATM system during Q3/Q4-2021

Under the enhancement of Air Navigation Systems and Procedures (EANSP), remote connections using the new ATM system were set at Jazan, Taif, Tabuk, Yenbu, Najran and Khamis Towers. The Situation Data Display (SDD) is mainly used for awareness purpose on traffic from/to the related airports and Electronic Flight Strips Management system is used to manage the progress of the flights (Paper strip is used as backup).

Latest developments related to ATM/SAR

Cont'd

Deployment of new MSSR Radars serving Jeddah, Riyadh, and Dammam CTAs

To keep the redundancy level of ATS Surveillance within Jeddah, Riyadh and Dammam CTAs/TMAs, new MSSR radars were deployed to replace old radars that were dismantled due the end of lifecycle and lack of spare parts

Deployment of new MSSR Radar at Jazan Airport and introduction of ATC APP service

A new MSSR Radar is deployed at Jazan airport to support the introduction of approach service for this airport. The ATC approach service will be operational by the Q2-2022 and will be provided remotely from Abha Approach Center.

Deployment of two new RCAGs and three MSSR Radars at Um Almelh and Shaibah (Empty Quarter)

Under the upgrading of ATS communications and surveillance in KSA empty quarter, two new Remote Communication Air/Ground (RCAGs) and three MSSR radars were installed. All facilities will use VSAT connections/Links between the sites and Jeddah ACC. The commissioning is expected to be by Q1-2022.

Latest developments related to ATM/SAR

Cont'd

Deployment of IT platform for airspace reservation (Trial Phase)

A new platform was deployed for airspace reservation and activation. The platform is aiming to introduce efficiency in the process of managing the airspace reservation requests and activation. It's considered as enabler for FUA.

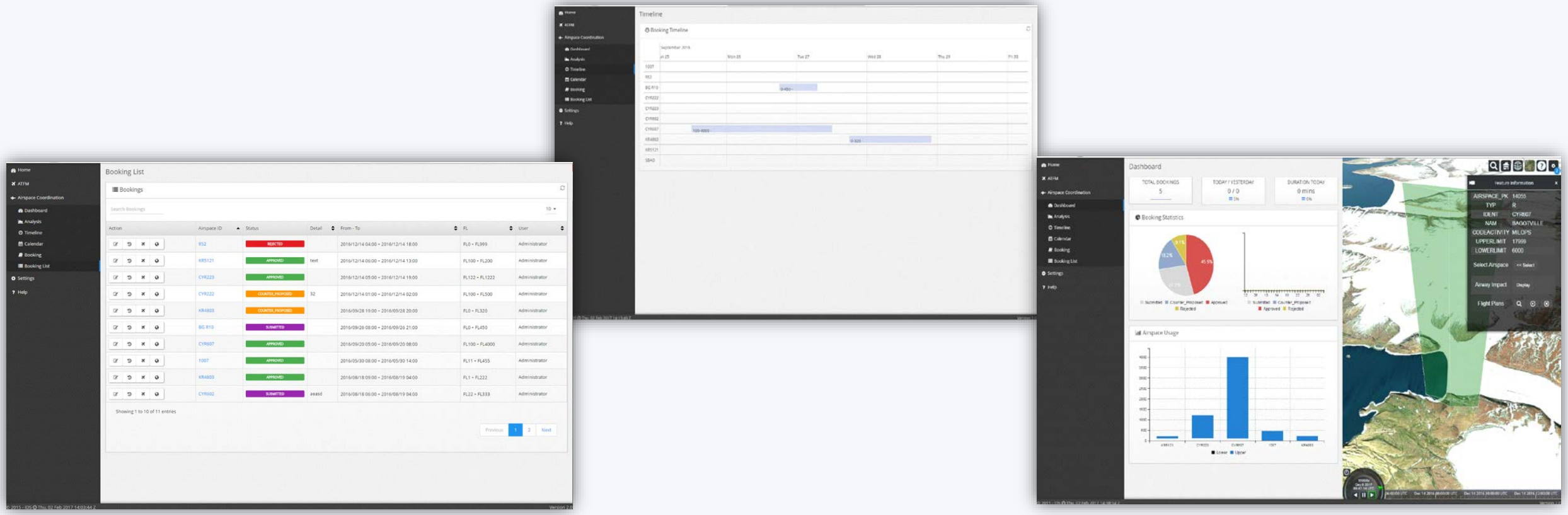
Deployment of Integrated Electronic Flight Plan System (IFPS)

A new system for flight plan data processing and exchange allowing airspace users and operators to submit their FPLs through web-based service. The System will check automatically the validity of the data items considering the status of ATS routes, the flight profile, and active NOTAMs ..etc.

Cooperation with SITA to enhance the ground network related to Data Link Services (DLS)

Agreement with SITA to install 17 VHF/VDL (VHF Ground Stations - VGS) Mode 2 supporting Data Link Services using selected RCAG and RTR sites. The VGS are used to provide DLS for Airlines Operational Control (AOC) and ATS.

IT platform for airspace reservation (Trial Phase)



Latest developments related to ATM/SAR

Cont'd

Installation and operation of new Voice Communication Systems (VCS) at Jeddah & Riyadh

Installation and operation of new VCS at Jeddah and Riyadh ACCs with revision of IP backup system established between the two ACCs to allow switchover and takeover all ATC sectors in case of major failure or outage at one of the ACC Centers.

Upgrade of ATC Towers Communication Systems at Hail, Gassim and Jazan.

Upgrade of communication systems (VCS, Recorder, Master Clock) with redundant IP-LAN connections and Main/Standby radios and backup portable radios.

Upgrade of ATIS Systems

Implementation of new ATIS system to automatically extract METAR messages from the Central Database of the National Centre of Meteorology (NCM) in Saudi Arabia and display it at ATIS system located in TWRs. This system will be implemented for all ATS TWRs with local backup based on the arrangements between ATS TWRs and MET Offices.

Latest developments related to ATM/SAR

Cont'd

Introduction of 5NM radar Separation in CTAs at Jeddah, Riyadh, Madinah, Dammam & Abha

Optimization of radar separation by application of 5 NM within CTAs of Jeddah , Riyadh, Madinah, Dammam, and Abha.

Enhancement of PBN IFPs at Jeddah.

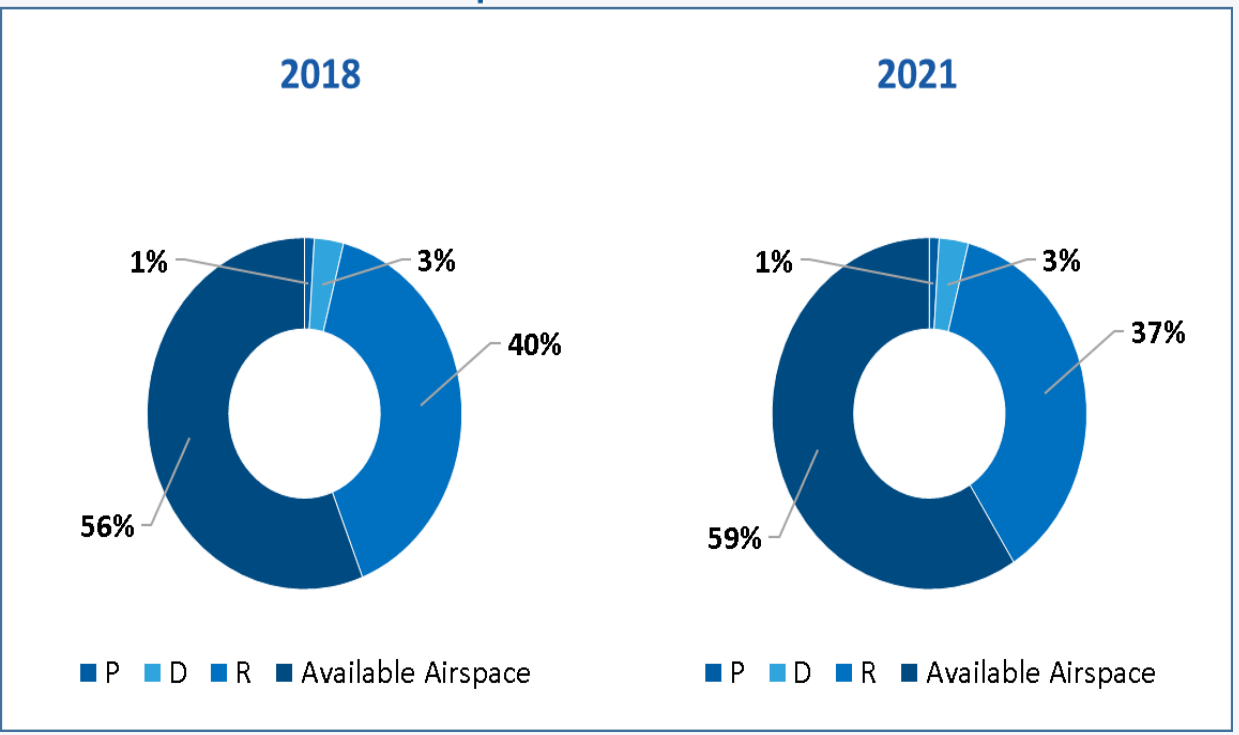
Enhancement of PBN IFPs by introduction of Point Merge Concept to allow efficient sequencing of arrivals and increase capacity.

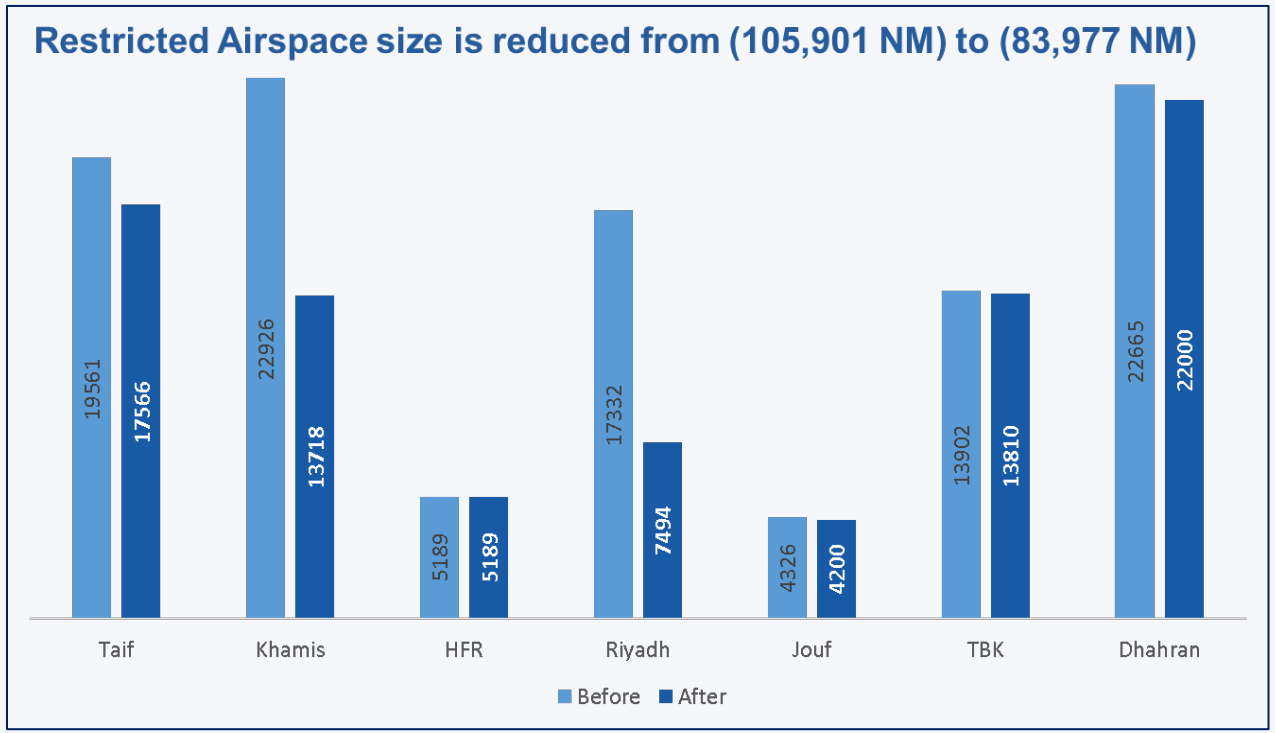
Progressive implementation of Flexible Use of Airspace through arrangements with military

Signature of 8 LoAs and an SLA related to CNS/ATM facilities.

Progressive implementation of Flexible Use of Airspace through arrangements with military

Recaptured 3.6%





Identified needs and priorities

Needs

- Specialized training targeting emerging activities and new entrants (UAS)
- Workshops on best practices and success stories related to ATM enhancements/improvements
- Involvement of ICAO MID Office to facilitate the development and signature of working arrangements.
- Regular updates and exchange of information on the upcoming development related to ATM.

Priorities

- Widely implementation of PBN
- Signature of contingency arrangements between States
- Setting of AMHS/OLDI connections
- High skilled ATM Staff to cope with needs and upcoming developments.

Challenges and difficulties

Challenges

- Meet airspace user needs including new entrants (e.g. UAS, Water ADs)
- Management of new flying activities below 1000 FT.
- Use of virtual/online technologies for the qualifications of Staff
- Introduction of new technologies and automation for aeronautical data management and exchange.
- Cyber-threats

Difficulties

- Resources required for the development of services
- Slow recovery from COVID-19 pandemic
- Replanning of CNS/ATM projects
- Integration between all services providers for automatic exchange of aeronautical data and information.

Lessons learnt, and capacity building activities

- Success of ATM projects should focus on training, OJT and hands-on activities
- Customize and quick guide documentation will support compliance and implementation of changes
- Detailed Safety Risk Assessment will allow identification of Safety Requirements supporting efficient and effective implementation of projects.
- Introduction of e-Library and portal will ease access and sharing of the technical and operational documentation.
- Encouragements will enhance the overall performance
- Online/virtual meetings will increase the number of participants in any event and contribute to the enhancement of capabilities.
- Cooperation with universities will offer opportunities for the development of customize and local tools and applications.

Ongoing and Planned projects

Deployment of ATS digital remote TWRs at ALULA and for the new Red Sea airport (under construction)

Introduction of ATS digital remote TWRs to provide AFIS service at ALULA and ATC service at Red Sea airport. The Red Sea Digital Remote TWR will be based on local solution where the digital TWR is based at the airport.

Deployment of ADS-B Ground Stations Network by the end of Q4-2022

Introduction of 13 ADS-B Ground Stations network to be used as secondary layer of ATS Surveillance and to enhance the level of situational awareness for ATCOs within Non-radar Areas.

Introduction of CPDLC Service within areas with low and medium traffic

The new ATM System is capable of processing CPDLC messages and data. The feature was validated during the deployment of the ATM system at Jeddah, Riyadh, ACCs, and Dammam, Abha APP Centers. SANS has a plan to introduce the service by the end of 2022.

Extension of airspace “Class A” upper limit up to FL600 in Jeddah FIR

Extension of the Airspace Class A upper limit up to FL 600. This extension will affect all ATC Sectors, CTAs and ATS routes. This will increase the capacity of the airspace by adding seven (7) additional IFR flight levels (East bound:3 flight levels and westbound :4 flight levels).

Agenda Item 3: Planning and implementation issues related to ATM/SAR MID ATFM Implementations

Air Traffic Flow and Capacity Management

Presented by Saudi Arabia

KPI-01 Departure punctuality

Percentage of flights departing from the gate on-time (compared to schedule time).

This is an airspace user and passenger focused KPI: departure punctuality gives an overall indication of the service quality experienced by passengers, and the ability of the airlines to operate their schedule at a given departure location.

AirPort	TOTAL FLIGHTS	TOTAL ON-TIME	KPI (%)
OERK	6121	5374	87.80%
OEJN	4805	4209	87.60%
OEDF	2159	1959	90.74%
OEMA	679	625	92.05%
KSA	**13764**	**12167**	**88.39%**

KSA departure punctuality assessed based on the four major international airport assessment is:

Airline	TOTAL FLIGHTS	TOTAL ON-TIME	KPI (%)
SVA	7623	6836	89.68%
KNE	2376	2128	89.56%
FAD	1600	1432	89.50%
MSR	322	274	85.09%
QTR	185	146	78.92%
GFA	159	152	95.60%
RJA	141	134	95.04%
UAE	127	105	82.68%
BDR	102	68	66.67%
ETH	88	56	63.64%
DHX	85	76	89.41%
TQQ	80	56	70.00%
PIA	76	69	90.79%
ETD	72	58	80.56%
ABY	66	63	95.45%
RBG	64	54	84.38%
FDB	60	30	50.00%
JZR	53	44	83.02%
IYE	50	42	84.00%
KAC	47	42	89.36%
DLH	44	36	81.82%
MEA	39	35	89.74%
PAL	37	22	59.46%
BBC	33	19	57.58%
ALK	31	26	83.87%
AXB	30	27	90.00%
OMS	22	19	86.36%
CLX	21	15	71.43%
THY	19	14	73.68%
KMF	17	14	82.35%
AFG	12	7	58.33%
OMA	12	10	83.33%
RAM	8	7	87.50%
ASA	4	3	75.00%
SEJ	3	2	66.67%
BAW	2	1	50.00%

KPI-02 Taxi-out additional time

Actual taxi-out time compared to an unimpeded/reference taxi-out time.

This KPI will give an efficiency indication for the ground movement operations. It includes an average of queuing/sequencing that is taking place at the departure runways, no-optimal taxi routing, intermediate aircraft stops, aerodrome layout and CO2 emission considerations.

AirPort	TOTAL FLIGHTS	TOTAL ON-TIME	KPI (%)
OERK	6124	5018	81.94%
OEJN	4801	4231	88.13%
OEDF	2159	2072	95.97%
OEMA	679	639	94.11%
KSA	**13763**	**11960**	**86.89%**

KSA Taxi-out additional time assessed based on the four major international airport assessment is:

Airline	TOTAL FLIGHTS	TOTAL ON-TIME	KPI (%)
SVA	7623	6618	86.82%
KNE	2376	2141	90.11%
FAD	1601	1468	91.69%
MSR	322	290	90.06%
QTR	185	127	68.65%
GFA	159	137	86.16%
RJA	141	127	90.07%
UAE	127	102	80.31%
BDR	102	65	63.73%
ETH	88	63	71.59%
DHX	85	66	77.65%
TQQ	80	55	68.75%
PIA	76	54	71.05%
ETD	72	63	87.50%
ABY	66	59	89.39%
RBG	64	46	71.88%
FDB	60	48	80.00%
JZR	53	40	75.47%
IYE	50	43	86.00%
KAC	47	36	76.60%
DLH	44	35	79.55%
MEA	39	31	79.49%
PAL	37	31	83.78%
KLM	34	33	97.06%
BBC	33	25	75.76%
ALK	31	23	74.19%
AXB	30	26	86.67%
CLX	21	15	71.43%
THY	19	14	73.68%
AFG	12	9	75.00%
OMA	12	10	83.33%
RAM	8	6	75.00%
CPA	5	2	40.00%
SEJ	3	2	66.67%

KPI-13 Taxi-in additional time

Actual taxi-in time compared to an unimpeded/reference taxi-in time

This KPI will give an efficiency indication for the ground movement operations. It includes an average queuing/sequencing that is taking place at the departure runways, no-optimal taxi routing, intermediate aircraft stops, aerodrome layout and CO2 emission considerations.

AirPort	TOTAL FLIGHTS	TOTAL ON-TIME	KPI (%)
OERK	6336	6297	99.38%
OEJN	5241	5074	96.81%
OEDF	2337	2331	99.74%
OEMA	708	698	98.59%
KSA	**14622**	**14400**	**98.48%**

KSA Taxi-in additional time assessed based on the four major international airport assessment is:

Airline	TOTAL FLIGHTS	TOTAL ON-TIME	KPI (%)
SVA	8020	7895	98.44%
KNE	2615	2586	98.89%
FAD	1766	1723	97.57%
GFA	201	191	95.02%
QTR	193	188	97.41%
RJA	170	169	99.41%
BDR	111	110	99.10%
TQQ	101	99	98.02%
DHX	87	83	95.40%
ETH	60	59	98.33%
DLH	46	45	97.83%

KPI-14 Arrival punctuality

Percentage of flights arriving at the gate on-time (compared to the schedule time)

This is an airspace user and passenger focused KPI:
Arrival punctuality gives an overall indication of the service quality experienced by passengers, and the ability of the airlines to operate in accordance with their schedule at a given destination.

AirPort	TOTAL FLIGHTS	TOTAL ON-TIME	KPI (%)
OERK	6321	2741	43.36%
OEJN	5220	3126	59.89%
OEDF	2333	1278	54.78%
OEMA	705	458	64.96%
KSA	**14579**	**7603**	**52.15%**

KSA Arrival punctuality assessed based on the four major international airport assessment is:

Airline	TOTAL FLIGHTS	TOTAL ON-TIME	KPI (%)
SVA	7998	3975	49.70%
KNE	2610	1469	56.28%
FAD	1765	1210	68.56%
MSR	392	183	46.68%
GFA	199	143	71.86%
QTR	190	28	14.74%
RJA	169	45	26.63%
BDR	110	60	54.55%
TQQ	99	34	34.34%
DHX	87	39	44.83%
UAE	77	26	33.77%
JZR	74	39	52.70%
PIA	71	46	64.79%
RBG	71	25	35.21%
KAC	63	29	46.03%
ETH	59	12	20.34%
ETD	49	10	20.41%
BBC	46	10	21.74%
DLH	45	8	17.78%
IYE	45	22	48.89%
OMS	43	29	67.44%
AXB	41	29	70.73%
KLM	35	17	48.57%
MEA	34	15	44.12%
ALK	32	25	78.13%
CLX	21	16	76.19%
OMA	19	7	36.84%
THY	19	9	47.37%
FDB	18	2	11.11%

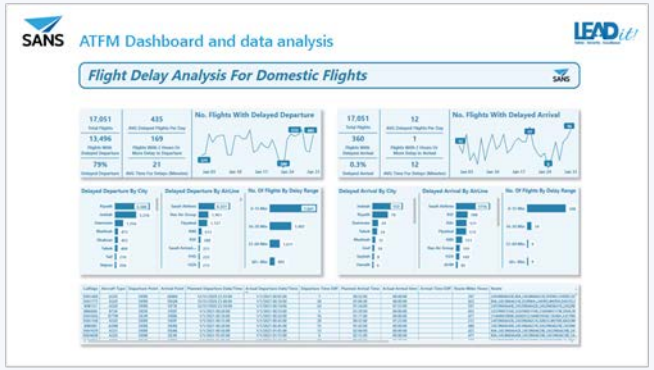
ATFM Dashboard and data analysis

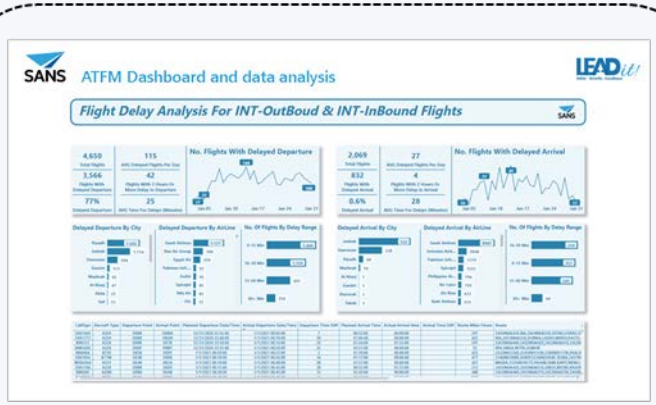
Its crucial to have a clear and overall required data presented in a way, to ease the data analysis and identifying the focused area to improve and find solutions

In SANS, we developed a dashboard to ensure having an overview overall performance area where we can uplift operation and ensure on time performance

Data outcome shall be coordinated to concerned stakeholder internally and externally addressing the issue and propose solution if applicable

zoom
ATFM Dashboard





ICAO KPI LINK “https://www4.icao.int/ganpportal/ASBU/KPI ”

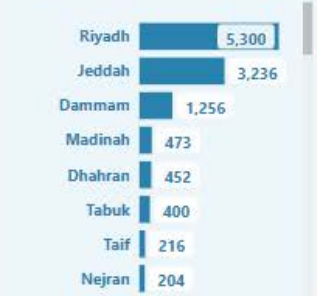
ATFM Dashboard and data analysis

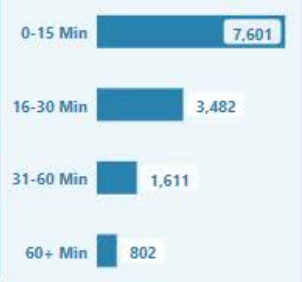
Flight Delay Analysis For Domestic Flights

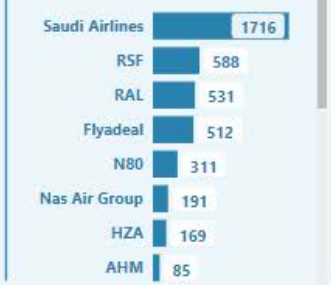
SANS

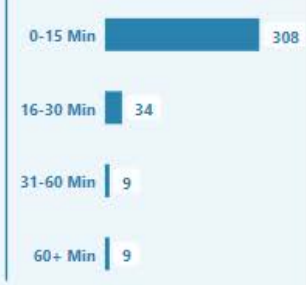
17,051 Total Flights	435 AVG Delayed Flights Per Day
13,496 Flights With Delayed Departure	169 Flights With 2 Hours Or More Delay In Departure
79% Delayed Departure	21 AVG Time For Delays (Minutes)

17,051 Total Flights	12 AVG Delayed Flights Per Day
360 Flights With Delayed Arrival	1 Flights With 2 Hours Or More Delay in Arrival
0.3% Delayed Arrival	12 AVG Time For Delays (Minutes)









CallSign	Aircraft Type	Departure Point	Arrival Point	Planned Departure Date/Time	Actual Departure Date/Time	Departure Time Diff	Planned Arrival Time	Actual Arrival time	Arrival Time Diff	Route Miles Flown	Route
SVA1469	A320	OERK	OEMA	12/31/2020 23:55:00	1/1/2021 00:02:00	7	00:52:00	00:00:00		397	2456N04643E,KIA,2454N04633E,IVONU,OVEKU,SC
SVA1773	A320	OERK	OEGN	12/31/2020 23:40:00	1/1/2021 00:10:00	30	01:06:00	00:00:00		422	KIA,2453N04633E,DURMA,LADRO,MERVI,DASTO,I
KNE121	A320	OERK	OETB	12/31/2020 23:50:00	1/1/2021 00:14:00	24	01:24:00	01:53:00		597	2455N04644E,2452N04642E,2452N04641E,2452N(
N804XA	B738	OESB	OEDF	1/1/2021 00:20:00	1/1/2021 00:23:00	3	01:39:00	00:00:00		425	2222N05336E,2241N05159E,2306N05119E,DHA,KI
SVA1056	B77W	OEJN	OERK	1/1/2021 00:10:00	1/1/2021 00:26:00	16	01:17:00	00:00:00		477	2146N03908E,EGREP,2236N03958E,TASBA,2437N0
SVA1168	A320	OERK	OEDF	1/1/2021 00:15:00	1/1/2021 00:43:00	28	00:52:00	01:23:00		213	2455N04643E,2503N04651E,GIBUS,MUSRI,KASOM
KNE083	A20N	OERK	OEAB	1/1/2021 00:30:00	1/1/2021 00:45:00	15	01:43:00	00:00:00		480	2453N04640E,2453N04637E,2452N04629E,2450N(
SVA1659	A333	OERK	OEAB	1/1/2021 00:50:00	1/1/2021 01:03:00	13	02:04:00	00:00:00		422	KIA,2453N04642E,2453N04639E,2452N04638E,24
FAD4608	A320	OERK	OEJN	1/1/2021 01:05:00	1/1/2021 01:13:00	8	02:15:00	00:00:00		471	KIA,2454N04640E,2453N04639E,2453N04638E,24

GACA
الهيئة العامة للطيران المدني
General Authority of Civil Aviation

ATFM Dashboard and data analysis

Flight Delay Analysis For INT-OutBoud & INT-InBound Flights

SANS

4,650 Total Flights	115 AVG Delayed Flights Per Day
3,566 Flights With Delayed Departure	42 Flights With 2 Hours Or More Delay In Departure
77% Delayed Departure	25 AVG Time For Delays (Minutes)

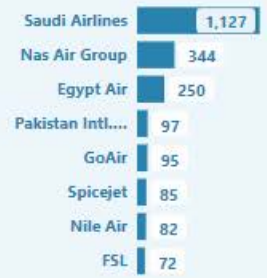
No. Flights With Delayed Departure

2,069 Total Flights	27 AVG Delayed Flights Per Day
832 Flights With Delayed Arrival	4 Flights With 2 Hours Or More Delay in Arrival
0.6% Delayed Arrival	28 AVG Time For Delays (Minutes)

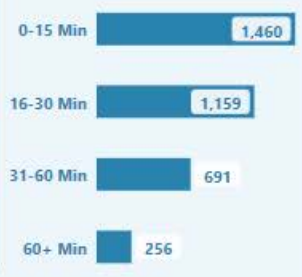
No. Flights With Delayed Arrival

Delayed Departure By City

Delayed Departure By AirLine



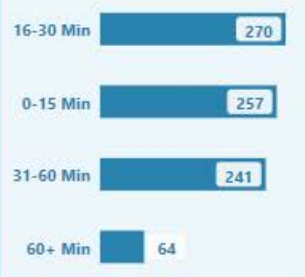
No. Of Flights By Delay Range



Delayed Arrival By City

Delayed Arrival By AirLine

No. Of Flights By Delay Range



CallSign	Aircraft Type	Departure Point	Arrival Point	Planned Departure Date/Time	Actual Departure Date/Time	Departure TIme Diff	Planned Arrival Time	Actual Arrival time	Arrival Time Diff	Route Miles Flown	Route
SVA1469	A320	OERK	OEMA	12/31/2020 23:55:00	1/1/2021 00:02:00	7	00:52:00	00:00:00		397	2456N04643E,KIA,2454N04633E,IVONU,OVEKU,S
SVA1773	A320	OERK	OEGN	12/31/2020 23:40:00	1/1/2021 00:10:00	30	01:06:00	00:00:00		422	KIA,2453N04633E,DURMA,LADRO,MERVI,DASTO,
KNE121	A320	OERK	OETB	12/31/2020 23:50:00	1/1/2021 00:14:00	24	01:24:00	01:53:00		597	2455N04644E,2452N04642E,2452N04641E,2452N
HIM5602	A320	OEDF	VNKT	12/31/2020 23:55:00	1/1/2021 00:20:00	25	03:51:00	00:00:00		33	KFA,SIBGA,ROTEL,EGMOR
N804XA	B738	OESB	OEDF	1/1/2021 00:20:00	1/1/2021 00:23:00	3	01:39:00	00:00:00		425	2222N05336E,2241N05159E,2306N05119E,DHA,K
SVA1056	B77W	OEJN	OERK	1/1/2021 00:10:00	1/1/2021 00:26:00	16	01:17:00	00:00:00		477	2146N03908E,EGREP,2236N03958E,TASBA,2437N
MSR2664	A333	OEJN	HECA	1/1/2021 00:10:00	1/1/2021 00:40:00	30	01:51:00	00:00:00		421	MIGDA,2335N03817E,PASAM,SHM,KAPIT,MENLI,
SVA1168	A320	OERK	OEDF	1/1/2021 00:15:00	1/1/2021 00:43:00	28	00:52:00	01:23:00		213	2455N04643E,2503N04651E,GIBUS,MUSRI,KASOM
KNE083	A20N	OERK	OEAB	1/1/2021 00:30:00	1/1/2021 00:45:00	15	01:43:00	00:00:00		480	2453N04640E,2453N04637E,2452N04629E,2450N

QUESTIONS or COMMENTS

GACA
الهيئة العامة للطيران المدني
General Authority of Civil Aviation

VISION رؤية 2030
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Thanks..