



SESAR 2020_PJ04_EXE 412

BAG and PRM Process Integración in the Airport Operations Plan (AOP)

VISITORS DAY

OCTOBER 24th 2017

WELCOME, INTRODUCTION & AGENDA

October, 24th 2017

Paula Gonzalez

Juan R. Matas

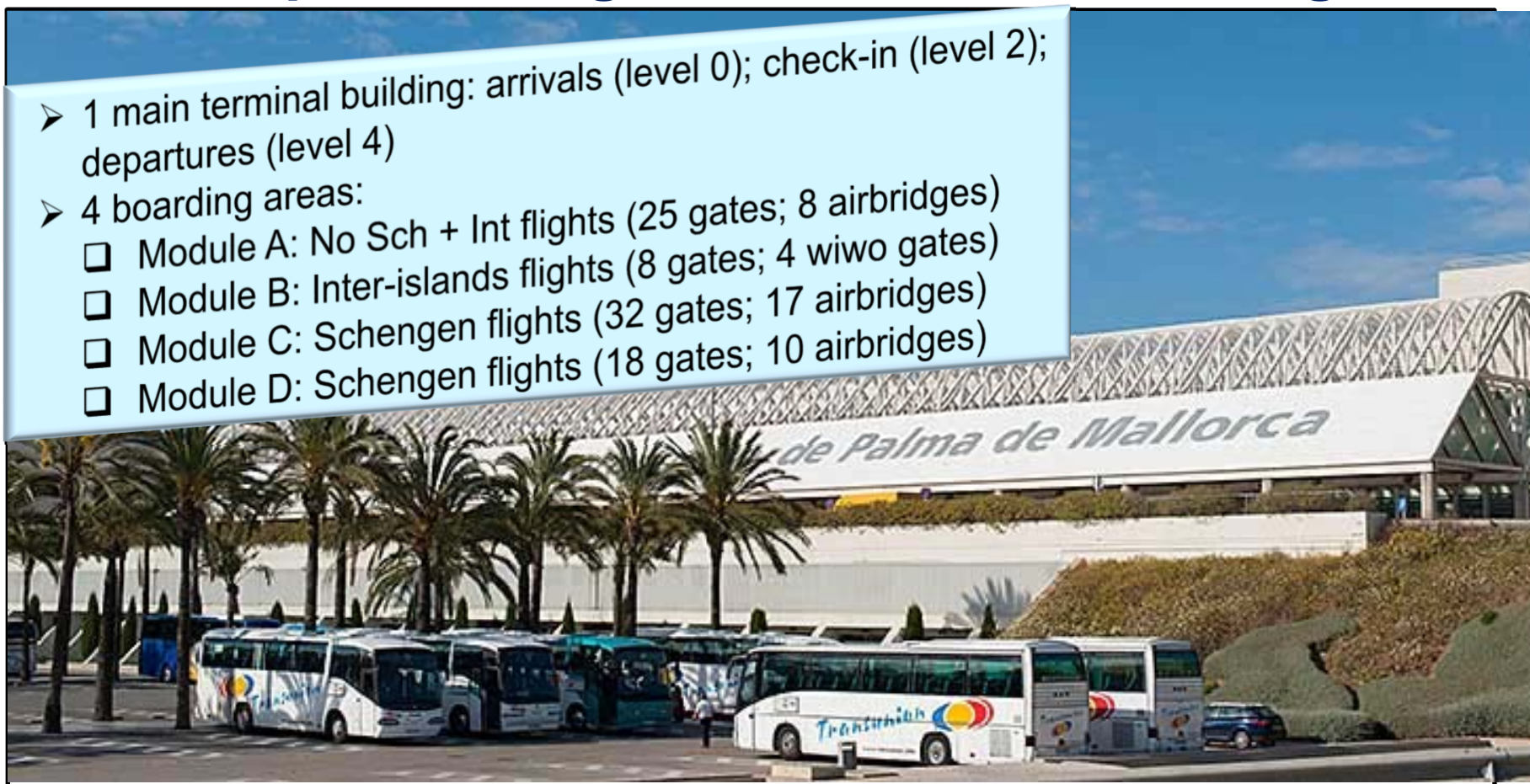
SESAR 2020_PJ04_EXE 412

□ PMI Airport Configuration: Airfield configuration



□ PMI Airport Configuration: Terminal configuration

- 1 main terminal building: arrivals (level 0); check-in (level 2); departures (level 4)
- 4 boarding areas:
 - ❑ Module A: No Sch + Int flights (25 gates; 8 airbridges)
 - ❑ Module B: Inter-islands flights (8 gates; 4 wiwo gates)
 - ❑ Module C: Schengen flights (32 gates; 17 airbridges)
 - ❑ Module D: Schengen flights (18 gates; 10 airbridges)





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VISITORS DAY

OCTOBER 24th 2017

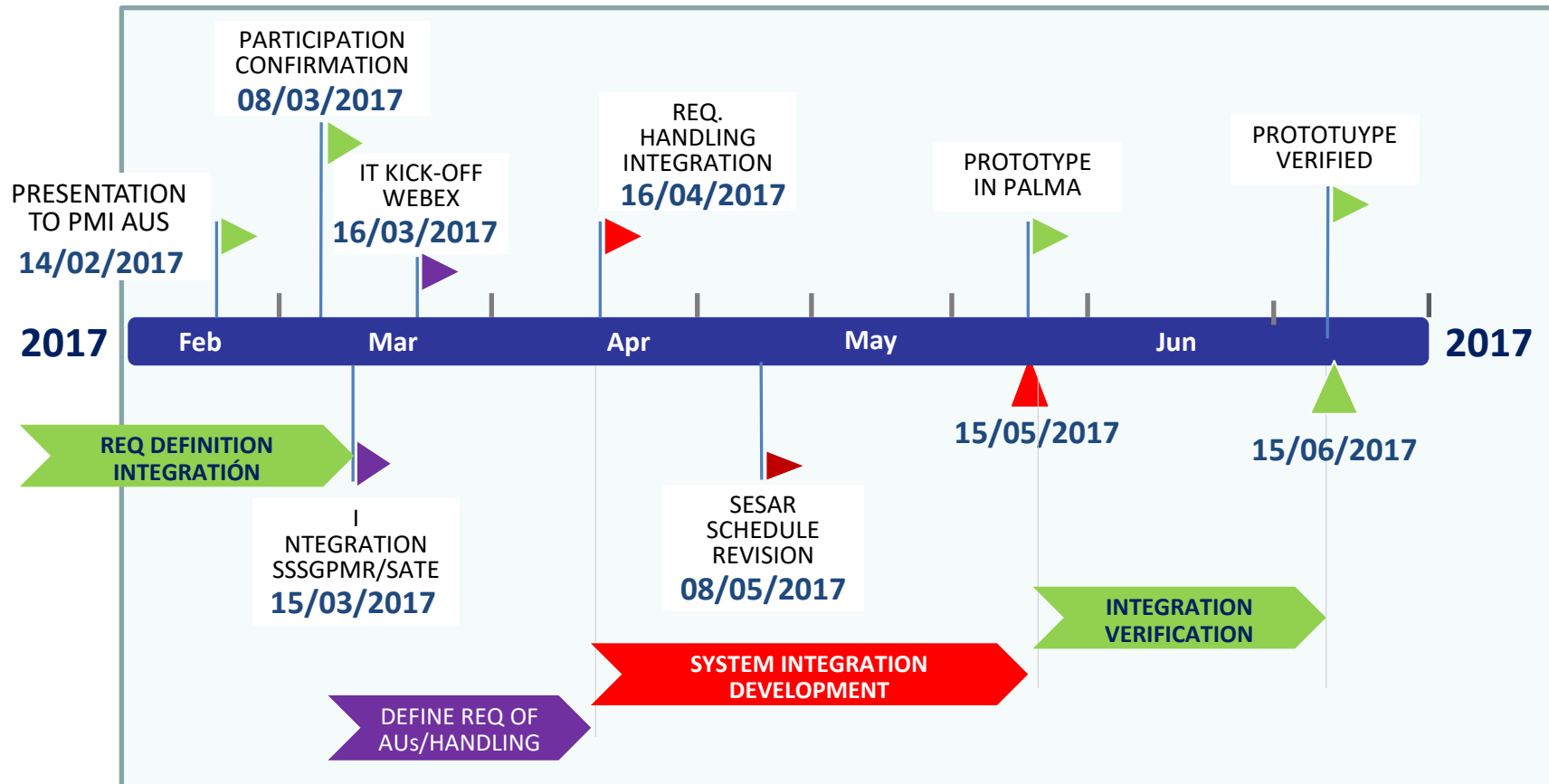
Validation Exercise Execution

October, 24th 2017

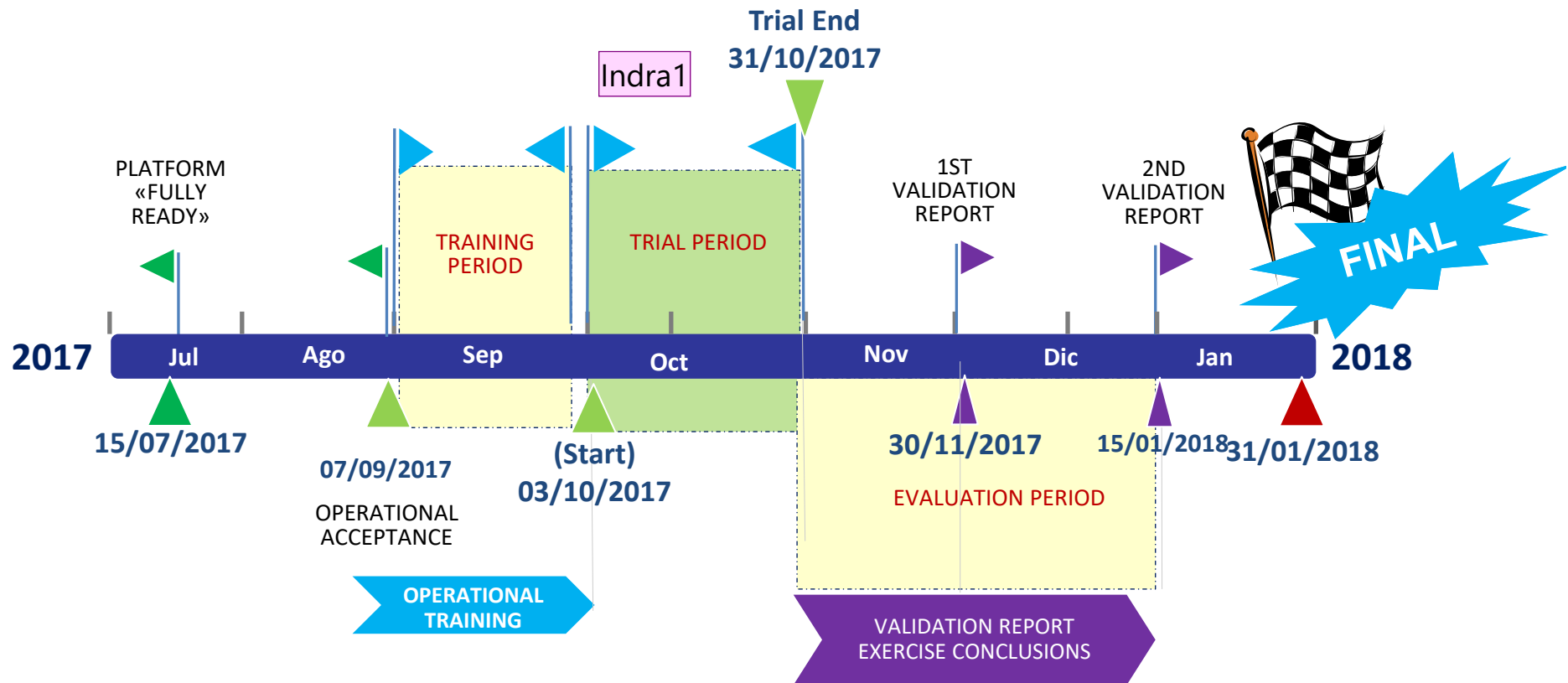
Alejandro Egido

Juan R. Matas

Global Exercise Planning



Activity Planning



VALIDATION EXERCISES: Schedule & flights (1)

TRIAL SCHEDULE_SESAR 2020_EXE412

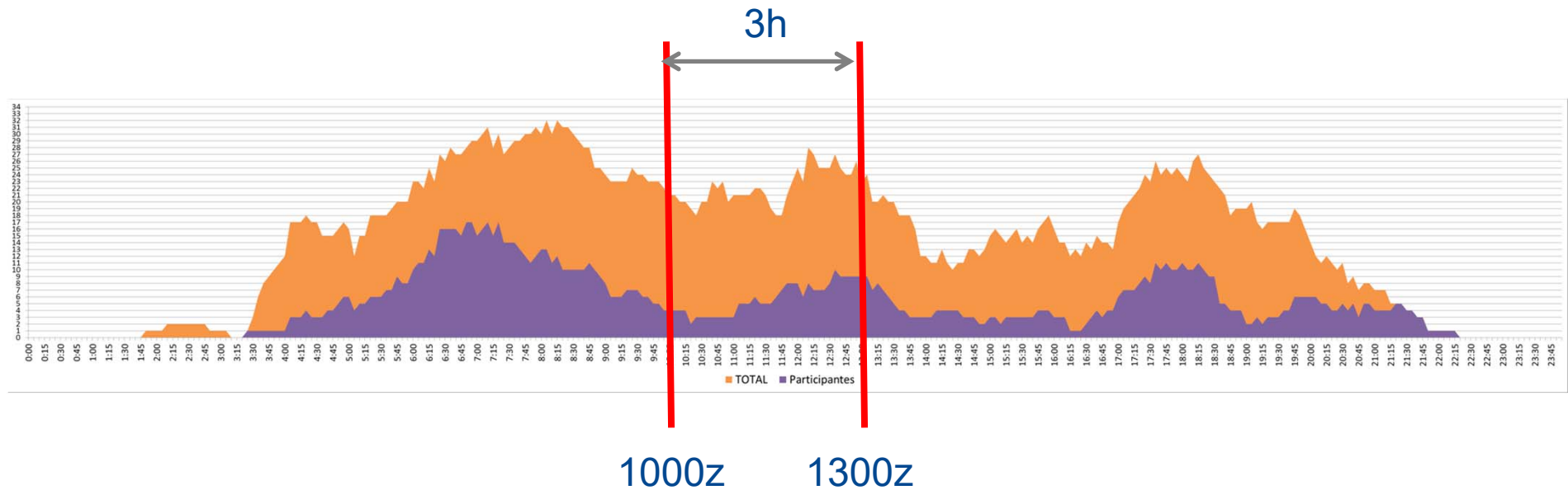
OCTUBRE 2017						
L	M	X	J	V	S	D
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

 Trial days (data capture)

 Debriefing session (webex)

 Visitors' day

VALIDATION EXERCISES: Schedule & flights (2)



☐ Flight Monitoring departing from 1000utc to 1300utc

- ✓ Start: **0800utc**
- ✓ Finish: **1300utc**

VALIDATION EXERCISES: Schedule & flights (3)

	Departing Flights 1000utc - 1300utc				
	EZY	Acciona		Non Participants	TOTAL
		G.TC	Rest		
03-oct	3	3	9	52	67
05-oct	2	1	14	43	60
10-oct	3	0	9	52	64
17-oct	3	1	8	52	64
19-oct	2	1	12	44	59
24-oct	3	0	8	50	61
26-oct	2	1	13	41	57
31-oct	?	?	?	?	?

VALIDATION EXERCISES: Schedule & flights (4)

VUELOS SALIDA_VENTANA 1000 - 1300 UTC										03-OCT
CIA	VUELO	STD	PLAZAS	AVO	ARP	ARP1	FECHAVU	HAND	EJERCICIO	VENTANA 1
EWG	6814	1000	180	32A	NUE	NUE	03/10/2017	GK6	NO PARTICIPA	SI
ANE	5622	1000	50	CR2	CDG	CDG	03/10/2017	IBE	NO PARTICIPA	SI
KTG	8202	1000	336	767	DUS	DUS	03/10/2017	GK6	NO PARTICIPA	SI
TOM	1219	1005	148	73C	GLA	GLA	03/10/2017	GK6	NO PARTICIPA	SI
VKG	1537	1010	396	333	OSL	OSL	03/10/2017	HA2	PARTICIPA	SI
RJR	6657	1010	189	73H	EDI	EDI	03/10/2017	RJR	NO PARTICIPA	SI
VKG	1015	1015	212	321	TRD	TRD	03/10/2017	HA2	PARTICIPA	SI
VKG	1723	1015	396	333	ARN	ARN	03/10/2017	HA2	PARTICIPA	SI
TOM	2241	1015	328	76W	MAN	MAN	03/10/2017	GK6	NO PARTICIPA	SI
EZY	8666	1020	180	320	LGW	LGW	03/10/2017	EZY	PARTICIPA	SI
RJR	6032	1020	189	73H	EMA	EMA	03/10/2017	RJR	NO PARTICIPA	SI
MON	221	1020	214	321	LGW	LGW	03/10/2017	IBE	NO PARTICIPA	SI
AEA	6048	1030	186	73H	MAD	MAD	03/10/2017	GK6	NO PARTICIPA	SI
TOM	3213	1030	189	73H	HUY	HUY	03/10/2017	GK6	NO PARTICIPA	SI
MON	873	1030	174	320	LTN	LTN	03/10/2017	IBE	NO PARTICIPA	SI
TOM	2285	1040	189	73H	MAN	MAN	03/10/2017	GK6	NO PARTICIPA	SI
TOM	3265	1040	189	73H	LPL	LPL	03/10/2017	GK6	NO PARTICIPA	SI
TOM	7207	1040	189	73H	EMA	EMA	03/10/2017	GK6	NO PARTICIPA	SI
BLX	138	1050	328	76W	ARN	ARN	03/10/2017	GK6	NO PARTICIPA	SI
EWG	2597	1050	180	32A	STR	STR	03/10/2017	GK6	NO PARTICIPA	SI
ANE	8108	1050	100	CRK	IBZ	IBZ	03/10/2017	IBE	NO PARTICIPA	SI
RJR	6579	1100	189	73H	BCN	BCN	03/10/2017	RJR	NO PARTICIPA	SI
RJR	8032	1100	189	73H	WRO	WRO	03/10/2017	RJR	NO PARTICIPA	SI
DLH	1153	1100	170	32A	FRA	FRA	03/10/2017	GK6	NO PARTICIPA	SI
NLY	3359	1110	212	321	ZRH	ZRH	03/10/2017	HA2	PARTICIPA	SI
TOM	6273	1110	221	75W	BRS	BRS	03/10/2017	GK6	NO PARTICIPA	SI
RJR	3442	1115	189	73H	MAN	MAN	03/10/2017	RJR	NO PARTICIPA	SI
ANE	8488	1115	100	CRK	MAH	MAH	03/10/2017	IBE	NO PARTICIPA	SI
EZY	1060	1120	186	320	BSL	BSL	03/10/2017	EZY	PARTICIPA	SI
NLY	3507	1120	144	73G	TXL	TXL	03/10/2017	HA2	PARTICIPA	SI
AEA	1706	1125	68	AT7	IBZ	IBZ	03/10/2017	GK6	NO PARTICIPA	SI
IBE	3919	1125	200	321	MAD	MAD	03/10/2017	IBE	NO PARTICIPA	SI

VUELOS SALIDA_VENTANA 1000 - 1300 UTC										03-OCT
CIA	VUELO	STD	PLAZAS	AVO	ARP	ARP1	FECHAVU	HAND	EJERCICIO	VENTANA 1
AEA	6060	1130	186	73H	BCN	BCN	03/10/2017	GK6	NO PARTICIPA	SI
CFE	8486	1130	98	E90	LCY	LCY	03/10/2017	IBE	NO PARTICIPA	SI
IBK	6790	1130	186	73H	BCN	BCN	03/10/2017	IBK	NO PARTICIPA	SI
RJR	6219	1135	189	73H	NRN	NRN	03/10/2017	RJR	NO PARTICIPA	SI
VLG	1232	1135	180	320	MRS	MRS	03/10/2017	IBE	NO PARTICIPA	SI
VLG	3905	1135	180	320	BCN	BCN	03/10/2017	IBE	NO PARTICIPA	SI
GWJ	8591	1140	150	319	TXL	TXL	03/10/2017	GK6	NO PARTICIPA	SI
MON	225	1140	214	321	LGW	LGW	03/10/2017	IBE	NO PARTICIPA	SI
RJR	2327	1145	189	73H	LBA	LBA	03/10/2017	RJR	NO PARTICIPA	SI
RJR	5273	1155	189	73H	SVQ	SVQ	03/10/2017	RJR	NO PARTICIPA	SI
EWG	5690	1200	180	32A	CWL	CWL	03/10/2017	GK6	NO PARTICIPA	SI
NLY	3575	1200	212	321	DUS	DUS	03/10/2017	HA2	PARTICIPA	SI
NLY	7541	1200	186	73H	BSL	BSL	03/10/2017	HA2	PARTICIPA	SI
EZY	6428	1210	186	320	NCL	NCL	03/10/2017	EZY	PARTICIPA	SI
RJR	2054	1210	189	73H	MAD	MAD	03/10/2017	RJR	NO PARTICIPA	SI
EWG	593	1215	180	32A	CGN	CGN	03/10/2017	GK6	NO PARTICIPA	SI
NLY	7569	1215	212	321	NUE	NUE	03/10/2017	HA2	PARTICIPA	SI
TRA	6512	1215	189	73H	EIN	EIN	03/10/2017	IBE	NO PARTICIPA	SI
RJR	9867	1220	189	73H	HHN	HHN	03/10/2017	RJR	NO PARTICIPA	SI
NLY	3661	1220	186	73H	FRA	FRA	03/10/2017	HA2	PARTICIPA	SI
EWG	2593	1225	150	319	STR	STR	03/10/2017	GK6	NO PARTICIPA	SI
EWG	7581	1230	180	32A	HAM	HAM	03/10/2017	GK6	NO PARTICIPA	SI
RJR	111	1235	189	73H	SXF	SXF	03/10/2017	RJR	NO PARTICIPA	SI
NLY	3253	1235	212	321	VIE	VIE	03/10/2017	HA2	PARTICIPA	SI
AEA	1297	1240	120	E95	ORY	ORY	03/10/2017	GK6	NO PARTICIPA	SI
NLY	7521	1240	186	73H	MUC	MUC	03/10/2017	HA2	PARTICIPA	SI
EWG	6850	1245	180	32A	HAI	HAI	03/10/2017	GK6	NO PARTICIPA	SI
EWG	7587	1245	180	32A	HAM	HAM	03/10/2017	GK6	NO PARTICIPA	SI
NLY	7617	1245	144	73G	LEJ	LEJ	03/10/2017	HA2	PARTICIPA	SI
VLG	3940	1245	180	320	SVQ	SVQ	03/10/2017	IBE	NO PARTICIPA	SI
EWG	5913	1250	180	32A	VIE	VIE	03/10/2017	GK6	NO PARTICIPA	SI
VOE	2801	1250	150	319	NTE	NTE	03/10/2017	GK6	NO PARTICIPA	SI
IBE	3653	1255	171	320	STR	STR	03/10/2017	IBE	NO PARTICIPA	SI
VLG	3153	1255	180	320	XRY	XRY	03/10/2017	IBE	NO PARTICIPA	SI
TUI	2649	1255	189	758	STR	STR	03/10/2017	GK6	NO PARTICIPA	SI

TRIAL EXECUTION: Actors involved

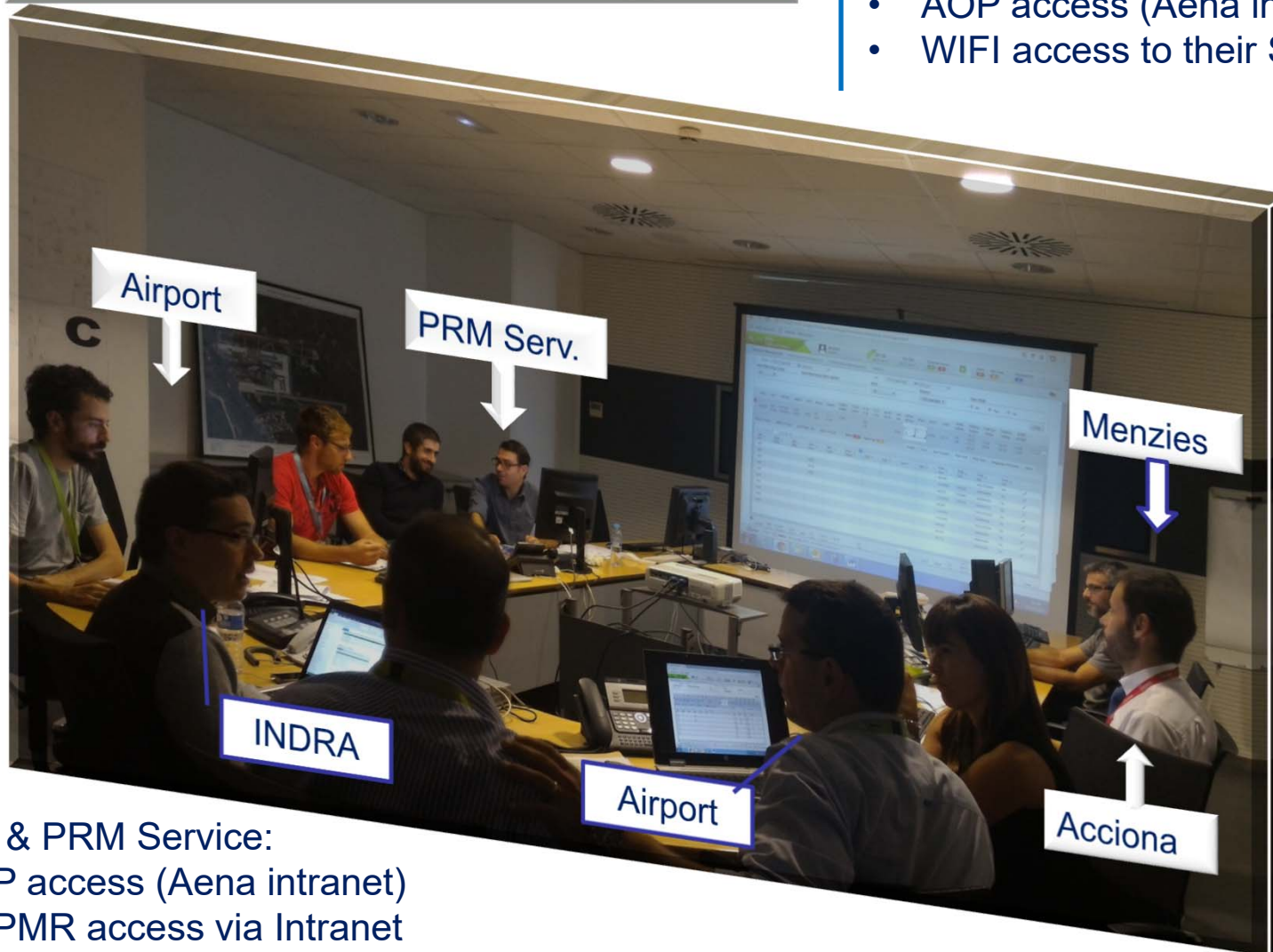
Participant	Rol
Handling Agent  	• Flight Monitoring • Bag and Passenger data input (Manual or integrated) • Decision execution upon Bag & PRM alarms • Use of new available information. • Action Coordination with Ramp Agents • Questionnaire fulfilment. • Post-analysis
PRM Service 	• Service Monitoring and Service Priority depending on TSBT • PRM seat data input(100% necessary) • Decision execution upon PRM alarms • Use of new available information.. • Coordination with Airport Terminal Agents • Questionnaire fulfilment. • Post-analysis
Airport Manager 	• Flight Monitoring • Handling Agents and PRM Service support • Questionnaire fulfilment. • Post-analysis
IT Partner (INDRA) 	• AOP technical definition, development and verification • IT Support • Post-analysis

□ TRIAL EXECUTION: Trial Room Layout

Palma de Mallorca Airport Crisis Room

Handling Agents:

- AOP access (Aena intranet)
- WIFI access to their Systems



Airport & PRM Service:

- AOP access (Aena intranet)
- SGPMR access via Intranet

❑ TRIAL EXECUTION: System and Trial Limitations

PJ04_EXE 412 is a V2 Operational Validation Exercise

- V2 constraints limited Full System Integration

Full System Integration



Main objective for V3 Validation

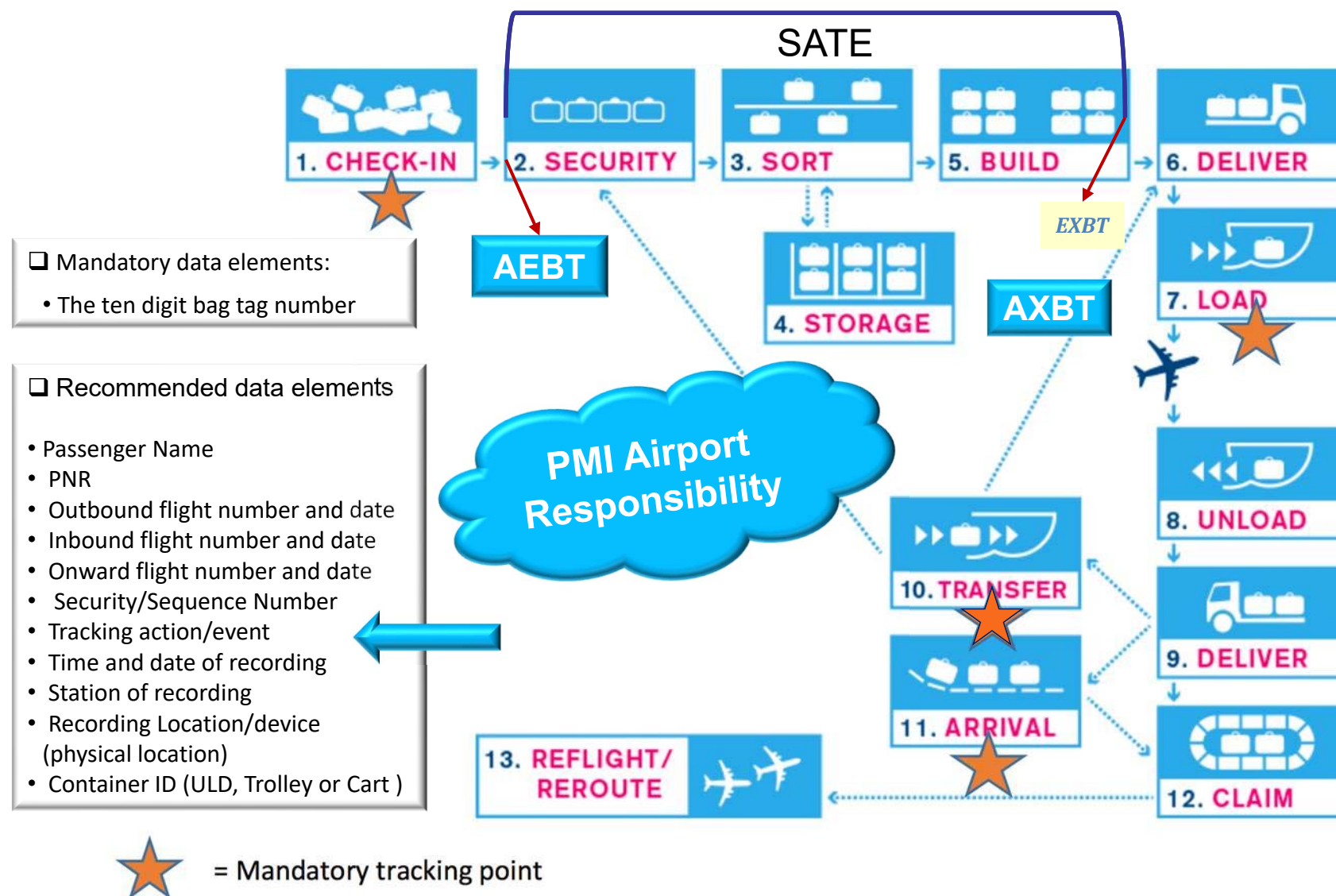
Lesson learnt
from Palma July
2015

Real benefits increase with the
level of system integration,
and.....

.....only new operational
procedures can benefit from
enhanced information

Full System
Integration
not achieved

❑ IATA 753 Bag Tracking Options



❑ TRIAL EXECUTION: System and Trial Limitations

❑ OPERATIONAL PROCEDURES

❑ BHS Process

- Support to IATA 753 Resolution
- Participant Handling Agents mainly focusing on Process Monitoring
 - Monitoring Baggage Status
 - Analysing Performance Drivers
 - *No new procedures developed*

Feedback from Handlers on:

- ✓ Baggage Alarm triggering
- ✓ Anticipation from TOBT
- ✓ Potential use of the new info at their Ops Room

❑ PRM Process

- New procedure to set Service Priority based on TSBT
- Main focus on being first at the Boarding Gate
- Prepare Ambulift for transport in time

Feedback from PRM Service:

- ✓ TSBT timeliness
- ✓ PRM Alarm triggering
- ✓ Anticipation from TOBT

Feedback from Handlers on:

- ✓ TSBT usefulness
- ✓ TOBT_{PRM} Accuracy



SESAR 2020_PJ04_EXE 412

BAG and PRM Process Integration in the Airport Operations Plan (AOP)

Visitors' day

24th October 2017

Exercise (raw) conclusions at this stage

OCTOBER 2017

-Juan Ramón Matas Sebastia

Exercise (raw) conclusions (1)

- **Full system integration** has been identified as a needed step to be achieved before the V3 validation in order to obtain evidence of performance enhancements.
- **BAG PROCESS**
 - **For a better use of the new information of the baggage process**, it should be **available in the handlers ops room** in order to put in place new management procedures (during the exercise, only a few “manual” procedures could be launched)
 - SATE provider should modify some internal procedures to be compliant with the requirements of the IATA 753 (i.e: decrease the number of no-identified baggage by increasing the tag reading ratio at manual positions).
 - AOP is fully ready to be compliant with the requirements of the IATA 753 as soon as handlers could receive the new information.

Exercise (raw) conclusions (2)

➤ PRM PROCESS

- The **prioritization based on TSBT** (instead of SOBT) has been proved to be **useful for the PRM service provider**, after **streamlining** the TSBT algorithm made throughout the trials.
- **A procedure to set the TSBT among stakeholders** involved (i.e: PMR Service, handlers), similar to the TOBT setting procedure, should be implemented at the airport.
- The **TSBT should be integrated in the PRM Service system**.
- TOBT_prm algorithm has been tuned up throughout the trials to finally achieve a TOBT accuracy enhancement pursued by the validation (see case 1).

CASE 1_NLY 3397 19OCT (1)

➤ INTEREST OF THIS CASE:

- ☐ Shows the algorithm streamlining process (typical in a V2 validation)
- ☐ Shows some performance benefits
- ☐ Shows a investigation methodology for the exercise post-analysis

CASE 1_NLY 3397 19OCT (2)

➤ **TaG calculation seems to be not valid....**

- ❑ 2 late PRM are detected....TaG _prm = **12:07:09**
- ❑ Actual arrival time to gate (from PRM Service ops system): **11:57**
- ❑ **10 min difference!!! How come???!!!!!**

CASE 1_NLY 3397 19OCT (3)

SGPMR 3.3.0.03
Sistema de Gestión de Personas con Movilidad Reducida

Jerarquía de Menú: Listado de Vuelos | Solicitudes Asistencia | Solicitudes Especiales | SITA | Informes | Históricos | Administración

Fecha: Sábado 21/10/2017 12:02 [L]

Listado de vuelos

Criterios de búsqueda

Aeropuerto: PMI - PALMA DE MALLORCA

Tipo de vuelo: LLEGADA/SALIDA

Fecha/hora: STD/STA ETD/ETA

Fecha desde: 19/10/2017 13:00

Fecha hasta: 19/10/2017 16:00

Otros: ☐ No mostrar Operados ☒ No mostrar Fundidos ☒ Sólo vuelos con PMR

Ordenación: STD/STA ETD/ETA

Vuelos filtrados

Fecha Prog.	L/S	Cia. Aérea	Vuelo	STD/STA	ETD/ETA	Estado	D/D	SS	Con.	Sit.	T. Av.	Matricula	Stand	Pue./Cin.	Mostrador	Area T.	PAL	PSM	CAL	IV	Silla	Vuelo principal
19/10/2017	S	HG/NLY	2745	13:15	13:30	AIR	MUC	1/1	-	OPE	737W	D-AQEC	60	C60	154,169	-	SI	-	No	-	0	-
19/10/2017	S	HG/NLY	3575	14:00	13:57	AIR	DUS	1/4	-	OPE	A321	OE-LCF	122	C59	180,186	-	SI	-	SI	-	0	-
19/10/2017	S	HG/NLY	3397	14:00	14:15	AIR	STR	2/2	-	OPE	738W	D-ABAF	122	C66	154,169	-	SI	-	No	-	0	-
19/10/2017	S	HG/NLY	7617	14:45	15:23	AIR	LEJ	1/2	-	OPE	B737	D-AHXG	66	C66	180,186	-	SI	-	SI	-	0	-
19/10/2017	S	HG/NLY	7569	15:25	15:43	AIR	NUE	1/1	-	OPE	B734	OM-GTB	68	C68	154,169	-	SI	-	SI	-	0	-
19/10/2017	S	HG/NLY	7541	15:15	15:59	AIR	BSL	2/2	-	OPE	A321	OE-LCI	29	C67	154,169	-	SI	-	SI	-	1	-

Solicitudes del vuelo

Tipo	Cat. PMR	Asignación	Nom. PMR	Apel. PMR	H. P/LL	H.I.	H.F.	Obs.	Obs. SITA	Estado	Canal	Pre.	Vuelo Conex.	ETO Conexión	Lugar mi. asist.	Vuelo fundido
EM	WCHS	A	MARGOT	EITH	13:35	13:39	14:04	-	19/10/...	Finalizada	SITA	SI	-	-	169	-
EM	WCHS	A	HILDE	THUMM	13:35	13:39	14:04	-	19/10/...	Finalizada	SITA	SI	-	-	169	-

Detalles de observación:

- 19/10/2017 - PMI - HP 13.57
- 19/10/2017 - PMI - HE 13.58

CASE 1_NLY 3397 19OCT (3)

SGPMR 3.3.0.03
Sistema de Gestión de Personas con Movilidad Reducida

Jerarquía de Menú: Listado de Vuelos, Solicitudes Asistencia, Solicitudes Especiales, SITA, Informes, Históricos, Administración

Fecha: Sábado 21/10/2017 12:02 [L]

Listado de vuelos

Criterios de búsqueda

Aeropuerto: PMI - PALMA DE MALLORCA

Tipo de vuelo: LLEGADA/SALIDA

Fecha/hora: STD/STA ETD/ETA

Fecha desde: 19/10/2017 13:00

Fecha hasta: 19/10/2017 16:00

Ordenación: STD/STA ETD/ETA

☒ No mostrar Operados ☒ No mostrar Fundidos ☒ Sólo vuelos con PMR

Fecha Prog.	L/S	Cla. Aérea	Vuelo	STD/STA	ETD/ETA	Estado	D/D	SS	Con.	Sit.	C. Av.	Matricula	Stand	Pue./Cin.	Mostrador	Area T.	PAL	PSM	CAL	IV	Silla	Vuelo principal
19/10/2017	S	HG/NLY	2745	13:15	13:30	AIR	MUC	1/1	-	OPE	37W	D-AGEC	60	C60	154,169	-	SI	-	No	-	0	-
19/10/2017	S	HG/NLY	3575	14:00	13:57	AIR	DUS	1/4	-	OPE	321	OE-LCF	122	C59	180,186	-	SI	-	SI	-	0	-
19/10/2017	S	HG/NLY	3397	14:00	14:15	AIR	STR	2/2	-	OPE	38W	D-ABAF	122	C66	154,169	-	SI	-	No	-	0	-
19/10/2017	S	HG/NLY	7569	15:25	15:43	AIR	NUE	1/1	-	OPE	737	D-AHXG	66	C66	180,186	-	SI	-	SI	-	0	-
19/10/2017	S	HG/NLY	7541	15:15	15:59	AIR	BSL	2/2	-	OPE	A321	OE-LCB	39	C67	154,169	-	SI	-	SI	-	1	-

Solicitudes del vuelo

Tipo	Cat. PMR	Asignación	Nom. PMR	Apel. PMR	H. P/LL	H.I.	H.F.	Obs.	Obs. SITA	Estado	Canal	Pre.	Vuelo Conex.	ETD Conexión	Lugar mi. asist.	Vuelo fundido
PM	1	A	MARQUE	ETTU	13:30	13:30	14:00	13:15		Rechazado	SITA	SI			154	

Detalle de vuelo 3397

Fecha Prog.	L/S	Cla. Aérea	Vuelo	STD/STA	ETD/ETA	Estado	D/D	SS	Con.	Sit.
19/10/2017	S	HG/NLY	2745	13:15	13:30	AIR	MUC	1/1	-	OPE
19/10/2017	S	HG/NLY	3575	14:00	13:57	AIR	DUS	1/4	-	OPE
19/10/2017	S	HG/NLY	3397	14:00	14:15	AIR	STR	2/2	-	OPE
19/10/2017	S	HG/NLY	7569	15:25	15:43	AIR	NUE	1/1	-	OPE
19/10/2017	S	HG/NLY	7541	15:15	15:59	AIR	BSL	2/2	-	OPE

CASE 1_NLY 3397 19OCT (3)

http://sgpmr.sccc.aena.es/sgpmr/auth/index.jsp

Convertir Seleccionar

aena sin barreras

SGPMR 3.3.0.03
Sistema de Gestión de Personas con Movilidad Reducida

Listado de Vuelos Solicitudes Asistencia Solicitudes Especiales SITA Informar

Criterios de búsqueda

Aeropuerto: PMI - PALMA DE MALLORCA

Tipo de vuelo: LLEGADA/SALIDA

Fecha/hora: STD/STA ETD/ETA

Fecha desde: 19/10/2017 13:00

Otros: ☐ No mostrar Operados ☒ No mostrar Fundidos

Ordenación: STD/STA ETD/ETA

Vuelos filtrados

Fecha Prog.	L/S	Cia. Aérea	Vuelo	STD/STA	ETD/ETA	Estado	D/D	SS	Con.	Sit.	T. Av.	Matrícula	Stad	Pue./Cin.	Mostrador
19/10/2017	S	HG/NLY	2745	13:15	13:30	AIR	MUC	1/1	-	OPE	737W	D-AQEC	22	C60	154,169
19/10/2017	S	HG/NLY	3575	14:00	13:57	AIR	DUS	1/4	-	OPE	A321	OE-LCF	22	C59	180,186
19/10/2017	S	HG/NLY	3397	14:00	14:15	AIR	STR	2/2	-	OPE	738W	D-ABAF	22	C66	154,169
19/10/2017	S	HG/NLY	7617	14:45	15:23	AIR	LEJ	1/2	-	OPE	B737	D-AHXG	66	C66	180,186
19/10/2017	S	HG/NLY	7569	15:25	15:43	AIR	NUE	1/1	-	OPE	B734	OM-ET	68	C68	154,169
19/10/2017	S	HG/NLY	7541	15:15	15:59	AIR	BSL	2/2	-	OPE	A321	OE-L	29	C67	154,169

Solicitudes del vuelo

Tipo	Cat. PMR	Asignación	Nom. PMR	Apel. PMR	H. P/LL	H.I.	H.F.	Obs.	Obs. SITA	Estado	Canal	Pre.	Vuelo Con
EM	WCHS	A	MARGOT	EITH	13:35	13:39	14:04	-	19/10/...	Finalizada	SITA	SI	-
EM	WCHS	A	HILDE	THUMM	13:35	13:39	14:04	-	19/10/2017 - PMI - HP 13.57	Finalizada	SITA	SI	-
								-	19/10/2017 - PMI - HE 13.58				

Obs. - 19/10/2017 - PMI - HP 13.57

Obs. - 19/10/2017 - PMI - HE 13.58

CASE 1_NLY 3397 19OCT (4)

➤ TaG algorithm

$$\square \text{TaG_prm} = \text{Check_date} + \cancel{Tq} + T_{pu} + T_{toG} + \cancel{Tadd}$$

DEP ID	CheckDate	LectorId	Filter	Gate	zigzagSur	filterToGate	tiempoArcosSur	tpu	timeToGate	TimeAtGate	TatG_PR
HG3397	11:46:27	13	Sur	C66	0.57	9.37	4.34	2	15.71	12:02:09	12:07:09
HG3397	11:46:24	13	Sur	C66	0.57	9.37	4.34	2	15.71	12:02:07	12:07:07

$$\square Tadd (5') ???$$

$$\square \text{Is the PRM using the South filter ???}$$

$$\square \text{TaG_prm} = 11:46:27 + 00:02:00 + 00:09:22 = \mathbf{11:57:49}$$

GREAT!! ...Algorithm streamlining process

CASE 1_NLY 3397 19OCT (5)

➤ TOBT_prm algorithm seems to be not valid (as well!!)...

- ☐ During all the trials, several examples showed that TOBT_prm tended to be over the real aircraft readiness due to the PRM process (in some cases, 30min over the real aircraft readiness)
- ☐ An alternative algorithm is built between 3rd and 5th trial

	TOBT	TOBTprm	
		In place	New
Until 1139, TOBT 1	1210	1210	1210
At 1140, TOBT 2	1219	1219	1219
At 1144, ASBT	1219	1219	1211
At 1146, late PMR at Sec	1219	1159	1211
At 1211, ARDT	1219	1159	1211

- ☐ Which one will you choose? In place or New?

CASE 1_NLY 3397 19OCT (6)

	Fecha	Hora	Usuario	Tp.Msj.	Sistema
TSAT	19-10-2017	12:19	SACTA	CDM	SACTA
TTOT	19-10-2017	12:27	SCENA	OBK	SCENA
ASBT	19-10-2017	11:44	UCA	BRD	UCA
ARDT	19-10-2017	12:11	SACTA	ASRT	SACTA
ASRT	19-10-2017	12:11	SACTA	CDM	SACTA
ASAT	19-10-2017	12:11	SACTA	CDM	SACTA
EXOT	12min (0:12)		SCENA	OBK	SCENA
ETTT					
CTTT	45min (0:45)		CDM	CDM	CDM
ATXT	19-10-2017	12:13	SACTA	PREAC	

And now

Which option would you choose???

ETTT Forzada:

	Fecha	Hora	Usuario	Tp.Msj.	Sistema
TSAT	19-10-2017	12:19	SACTA	CDM	SACTA
TTOT	19-10-2017	12:27	SCENA	OBK	SCENA
ASBT	19-10-2017	11:44	UCA	BRD	UCA

GREAT!! ... (Another) Algorithm streamlining process

POBT	19-10-2017	12:15	FBASC...	
AOBT	19-10-2017	12:15	FBASC...	
SIGMA				
CTOT				
ATOT	19-10-2017		SACTA	DEP
F.Rep.				
FSTANDS				

Until 1139, TOBT 1
At 1140, TOBT 2
At 1144, ASBT
At 1146, late PMR at Sec
At 1211, ARDT

TOBT

TOBTpmr

In place

New

1210

1210

1210

1219

1219

1219

1219

1219

1211

1219

1159

1211

1219

1159

1211

CASE 1_NLY 3397 19OCT (7)

➤ Let's compare the different TOBTs against ARDT....

	TOBT	ARDT	TOBTpmr	
			actual	nuevo
Until 1139, TOBT 1	1210	-	1210	1210
At 1140, TOBT 2	1219	-	1219	1219
At 1144, ASBT	1219	-	1219	1211
At 1146, late PMR at Sec	1219	-	1159	1211
At 1211, ARDT	1219	1211	1159	1211

	TOBT_pmr - ARDT		TOBT - ARDT
	actual	nuevo	
Until 1139, TOBT 1	-1	-1	-1
At 1140, TOBT 2	+8	+8	+8
At 1144, ASBT	+8	+0	+8
At 1146, late PMR at Sec	-12	+0	+8
At 1211, ARDT	-12	+0	+8

CASE 1_NLY 3397 1900T (8)

	TOBT	ARDT	TOBTpmr		TOBT_pmr - ARDT		TOBT - ARDT
			In place	New	In place	New	
Until 1139, TOBT 1	1210	-		1210	-1		-1
At 1140, TOBT 2	1219	-		1219	+8		+8
At 1144, ASBT	1219		1219	1211	+8	+0	+8
At 1146, late PMR at Sec	1219		1159	1211		+0	+8
At 1211, ARDT		1211	1159	1211		+0	+8

- Would you say that ever since ASBT (1144), we would have enhanced the accuracy of the TOBT (ACDM procedure) with the TOBT_pmr_new??
- If you say that ever since ASBT (1144) we would have obtained that accuracy enhancement (the TOBT 27min before the ARDT (aircraft readiness))?



“SESAR Alicante trial demonstrates a simplified turnaround monitoring process for Regional Airports”



Source: AENA Archives



A simplified approach to sharing information between the Airport and the EUROCONTROL Network Manager has been demonstrated at Alicante Airport. The exercise highlighted that automating the process for the calculation of Target off Block Times saves time and effort for airlines, ground handlers and ATC.

Can elements of the Airport Collaborative Decision Making (A-CDM) concept be automated in regional airports?

We went to the airport of Alicante to explore the feasibility of a low cost, low workload, simplified approach to A-CDM specifically applicable to regional airports.

In the full A-CDM concept, airports provide information to the EUROCONTROL Network Manager in Brussels relating to the time at which individual flights will become airborne. The accuracy of this information is reliant on a detailed monitoring of the arrival flight and particularly the turnaround process which can create additional workload for the airline / ground handler.

In Alicante, we wanted to know whether the aircraft monitoring process could be automated, thereby significantly reducing the workload of the handler. If, in addition, the quality of information provided to the Network could be guaranteed, then there is a great potential for increasing the number of airports providing accurate flight information to the Network Manager should this concept be deployed on a wider scale.

The feasibility testing took place over a period of one week and involved the entire Alicante airport operational community. The feedback on the concept that was tested was extremely positive and all participants stressed the necessity to accelerate its deployment into operations.

For more information on the underlying concept and the work performed in Alicante please continue reading.....

Airport Collaborative Decision Making (A-CDM) was developed to generate efficiency gains locally at the airport whilst optimising resources and improving operational predictability.

A key element of A-CDM relates to the sharing of information between the airport and the Network Manager (NM). The transmission of Flight Update Messages (FUM) by NM provides an accurate landing time estimate for each flight allowing the airport community to plan and optimise the allocation of their resources.

A Departure Planning Information (DPI) message set is designed so the airport can provide NM with the most up-to-date estimates of when a given flight will become airborne – based on the best knowledge of the airline / ground handler responsible for the efficient turnaround of the aircraft.

The transmission of DPI messages from the CDM airport to the network is a continual process, refined over time as the status of the flight evolves. The more accurate data contained in the DPI messages as compared to the filed flight plan allows NM to optimise its operation of flow and capacity management.

Probably the most important aircraft related parameter associated to A-CDM is the 'Target Off Block Time (TOBT)' which is defined as the time that an Aircraft Operator or Ground Handler estimates that an aircraft will be ready, all doors closed, boarding bridge removed, push back vehicle available and ready to start up / push back immediately upon reception of clearance from the Tower.

The take-off time communicated to NM in the DPI message is derived directly from the TOBT. In order to ensure an accurate TOBT, it is necessary to monitor the key events associated to a given

flight and this monitoring and TOBT management is called the 'milestones approach' of A-CDM. One issue that has been raised in the past relating to the milestones approach is the necessity for the airlines/handlers to monitor up to 16 milestones for each flight in order to be able to provide reliable TOBT estimates. The perceived workload associated to this process is a contributory factor to slowing down the pace of A-CDM deployment, particularly in airports with limited resources to devote to such activities.

Within SESAR2020 Project PJ04 Solution 1 (Enhanced Airport Collaborative Performance Monitoring), AENA airports and EUROCONTROL have been working on a simplified approach to sharing information via the DPI message based on the following ambitious objectives:

1. Significantly reduce the number of milestones from 16 (to around 7) and use only those event-based milestones which provide real-value.
2. Determine the TOBT in an automated manner
3. Revise the TOBT automatically based on knowledge of the landside (boarding) process monitoring
4. Reduce the handler workload significantly to one of monitoring only within a philosophy that manual TOBT inputs become the 'exception' rather than the 'rule'. Effectively, a manual input is only deemed necessary where the handler considers that the automated calculation would not be within +/-5 minutes of the reality – for example in the case of a technical problem with the aircraft.
5. Based on this automated approach to TOBT calculation, provide NM with the full suite of DPI messages coherent with full A-CDM implementation and with equivalent degrees of accuracy

For this concept to function with the degree of automation that we are looking for, it is necessary to be able to reliably translate each event-based milestone into a forward prediction of the TOBT. Such a translation relies on the stability and therefore predictability of certain characteristics of the airport performance covering both airside and landside aspects, in particular taxi-in and taxi-out times as well as the turnaround and expected boarding duration times. These values and their main drivers are an integral element of this approach and are derived from an analysis of a large amount of historical data from the airport.

Based on the work performed to date within PJ04 on this concept, and in collaboration with ArianeGroup, the EUROCONTROL APOC validation platform has been upgraded to create an environment suitable for the evaluation of the concept. As a result of this collaboration, the validation platform was recently installed at Alicante airport for a week-long 'shadow-mode' exercise with the participation of the airport operator, the Air Navigation Service Provider (FerroNATS) and the entire ground handling community (Ryanair, EasyJet, Jet2, Iberia, Norwegian, Groundforce and swissport).

The participation of the entire stakeholder community, effectively ensuring 100% of the airport traffic was included in the trial, is a testament to the commitment and drive of Alicante airport toward ensuring the quality and value of this exercise.

The platform was connected to NM via a B2B connection for the reception of FUM messages and was configured to determine (and record for analysis purposes) the full set of DPI messages based on automatically generated TOBT estimates from the flight events and the boarding process.

In addition, the platform was connected to the local Alicante airport operations database in order to capture various 'aircraft status' events, including the boarding status. We were also provided with information relating to the presence of 'Reduced Mobility' Passengers on a flight as this impacts the boarding time which is a key parameter used in the decision-making process linked to automatic TOBT updates.

A separate position in the ATC Tower allowed controllers to monitor the 'departure sequence' as derived from the TOBT estimates – thereby providing a visual representation of the likely runway demand for the coming hour. This display was highly valued by the controllers who would like to see it deployed into the current operational system.

As for the ground handling community, analysis of the accuracy of the recorded DPI messages is now ongoing. The questionnaires which were completed after each simulation by all participants have provided highly positive results relating both to the ease of understanding the TOBT calculation and the vastly reduced workload as compared to manual entry and management of the TOBT.

On the final day of the trial, an 'Open-Day' was held which allowed senior management from a number of the participating companies as well as SESAR industry members and ACI-Europe to learn about the concept and to visit the trial and hear the feedback from the different participants.

The project team were particularly pleased by the positive feedback from the exercise participants and from those attending the open-day. This concept potentially offers a 'quick-win' for the SESAR2020 Programme and the desire to accelerate its deployment was a common theme in the feedback received.

Early indications are that for certain airports, this 'simplified and automated' milestones approach could provide a cost-effective and highly efficient means of providing accurate flight departure estimates to NM – as well as being a key enabler for deployment of A-CDM in such 'regional' airports.

Alan Marsden

EUROCONTROL



Airport Post Ops Analysis Prototype Training

PJ04.01 OI Step AO-0821

Training material for exercise Pj04-01.V2.03 – Madrid Airport (LEMD)

Created by Alan Groskreutz



Founding Members



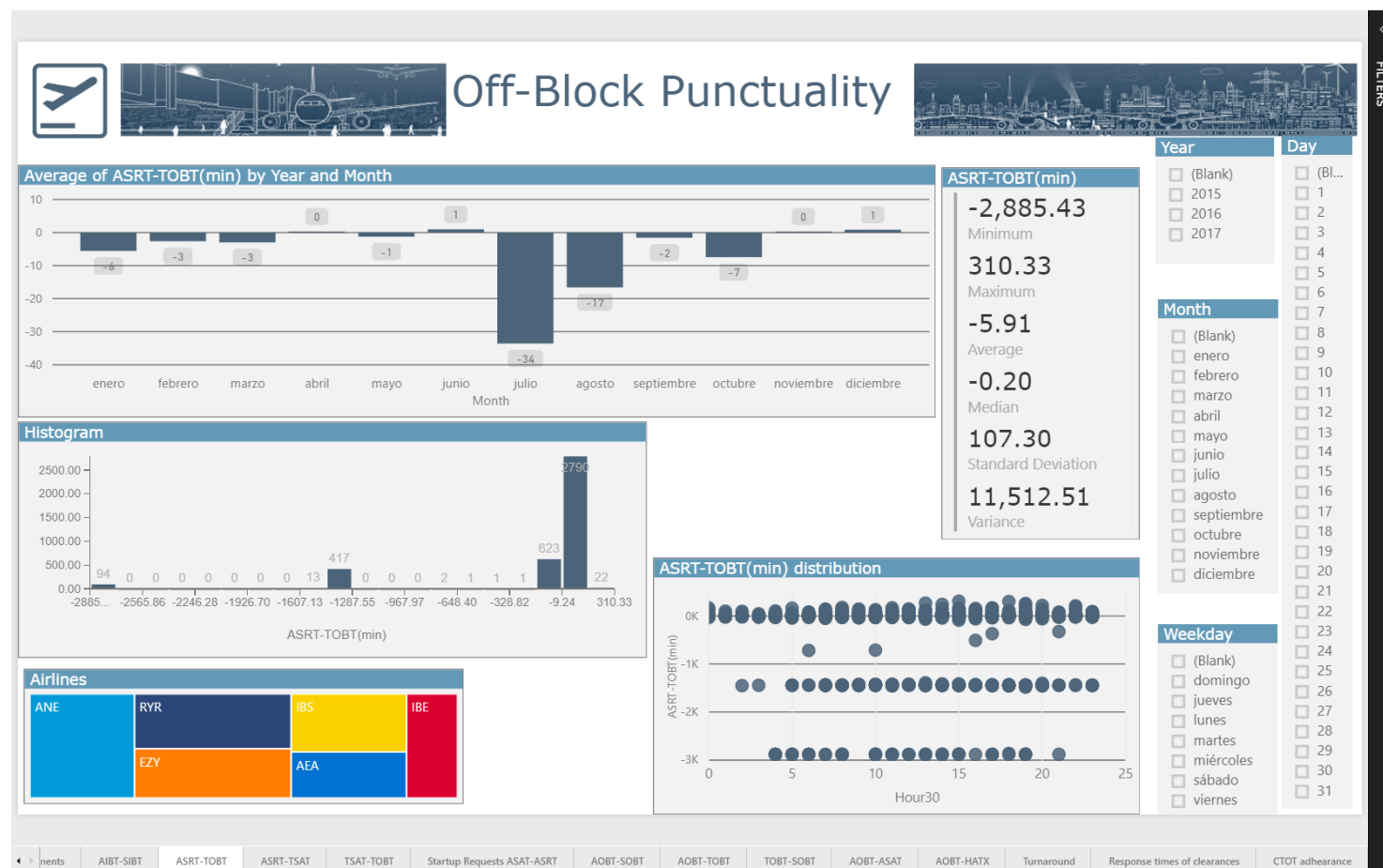
EUROPEAN UNION



EUROCONTROL

Introduction

- Objectives of the Exercise
- Questionnaire Overview
- How to use the Prototype
- Closing Points



Exercise Objectives



EXE-04.01-v2.03 aims at validating improvements to the production of Post Operations reports.

A Post Operational analysis validation does not fit into the tradition definition of Shadow mode, or live trial, as it does not take place during the execution phase. It is by definition, conducted after execution operations. For this reason, the “remote” and disconnected nature of the activity is valid.

Airport Operational experts will validate the procedures and prototype by looking at the following key objectives:

- Assess the change in accessibility of the recorded AOP data for Post Operations analysis
- Assess the change in operators ability to notice anomalous events
- Assess the change in speed with which the operator can notice anomalous events
- Assess the change in time to determine the root cause of an anomalous event
- Assess the change in stakeholder situational awareness

Other Concept Maturity related objectives are also addressed

Questionnaires



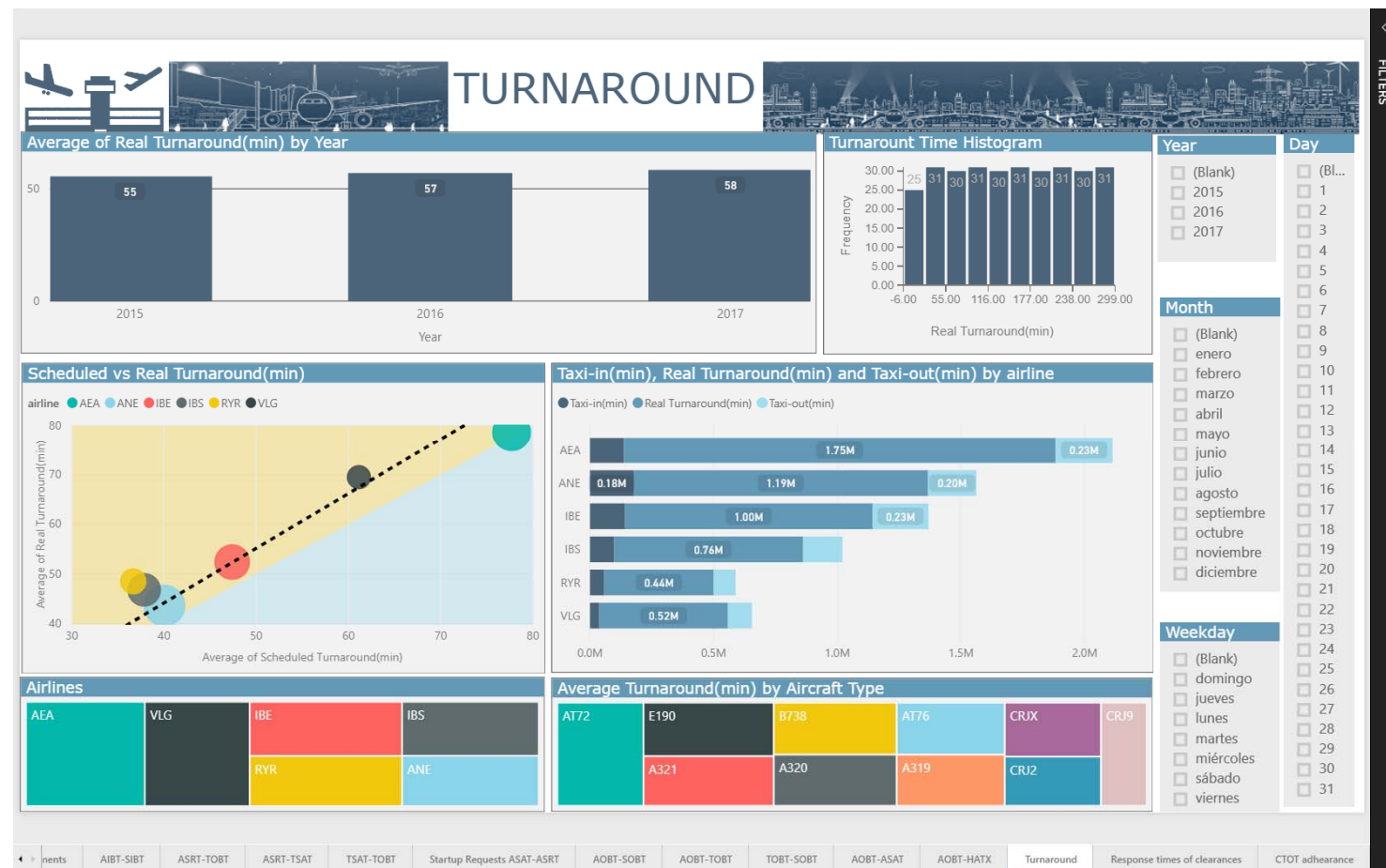
A questionnaire will be distributed that is to be completed after you feel that you have used the PostOps Analysis prototype to a sufficient degree.

These questions are linked to the Validation Objectives

Answers are scaled from 1 to 7 regarding how much you disagree (1) or agree (7) with the question.

How to use the Prototype - Overview

- Notes regarding the data and prototype layout
- Moving from page to page
- Selecting dates
- Drilling down vs Hierarchies
- Looking at one chart



Notes regarding the data and prototype layout



To keep things simple, data from only one airport (LEMD) was included in this exercise. Data is available for many more Spanish airports, but not all included airports have the same level of data (not all are A-CDM).

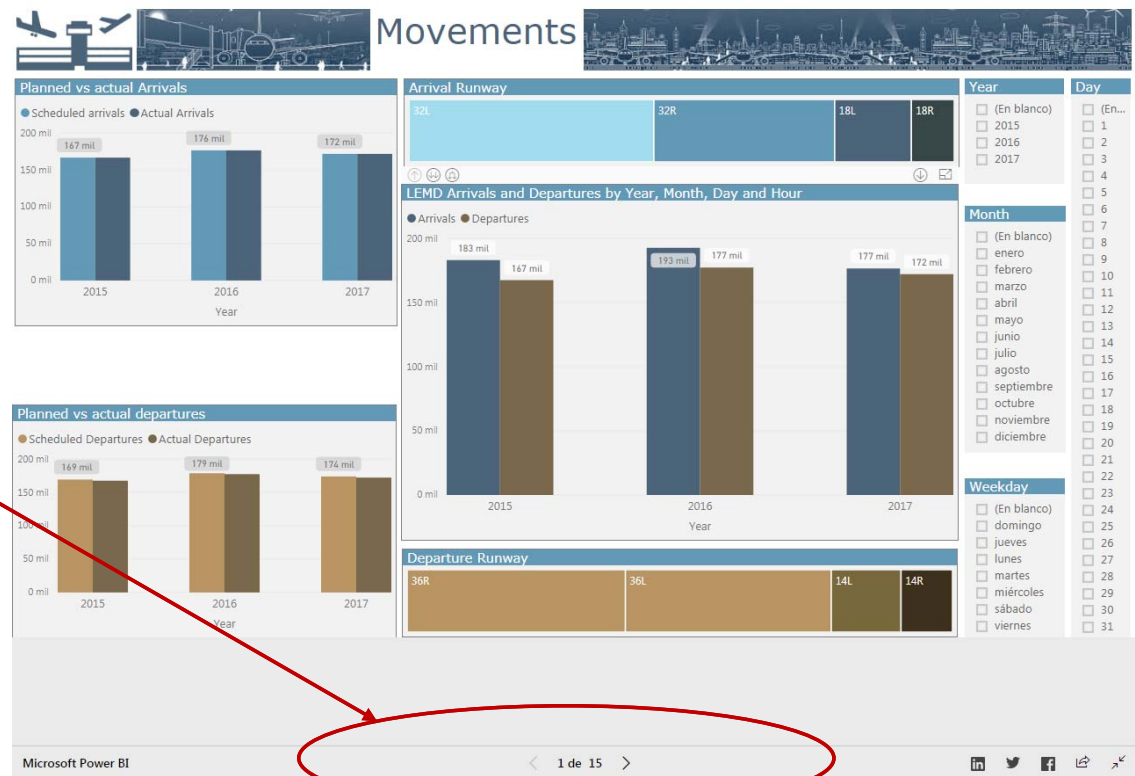
There are known errors with the dataset that are being looked into for correction in the production version of PERSEO. Part of this exercise is to see if data problems and outliers are more easily detected with these types of tools that with the former reports, therefore the errors were left in.

The displays and charts were constructed to closely copy what is currently available in PERSEO. Many other different styles can be chosen in future versions (Guages, Map overlays, Forcasts, Flows, etc)

Moving from page to page

To move back and forth between the pages, click on the arrows at the bottom.

There are a total of 14 tabs



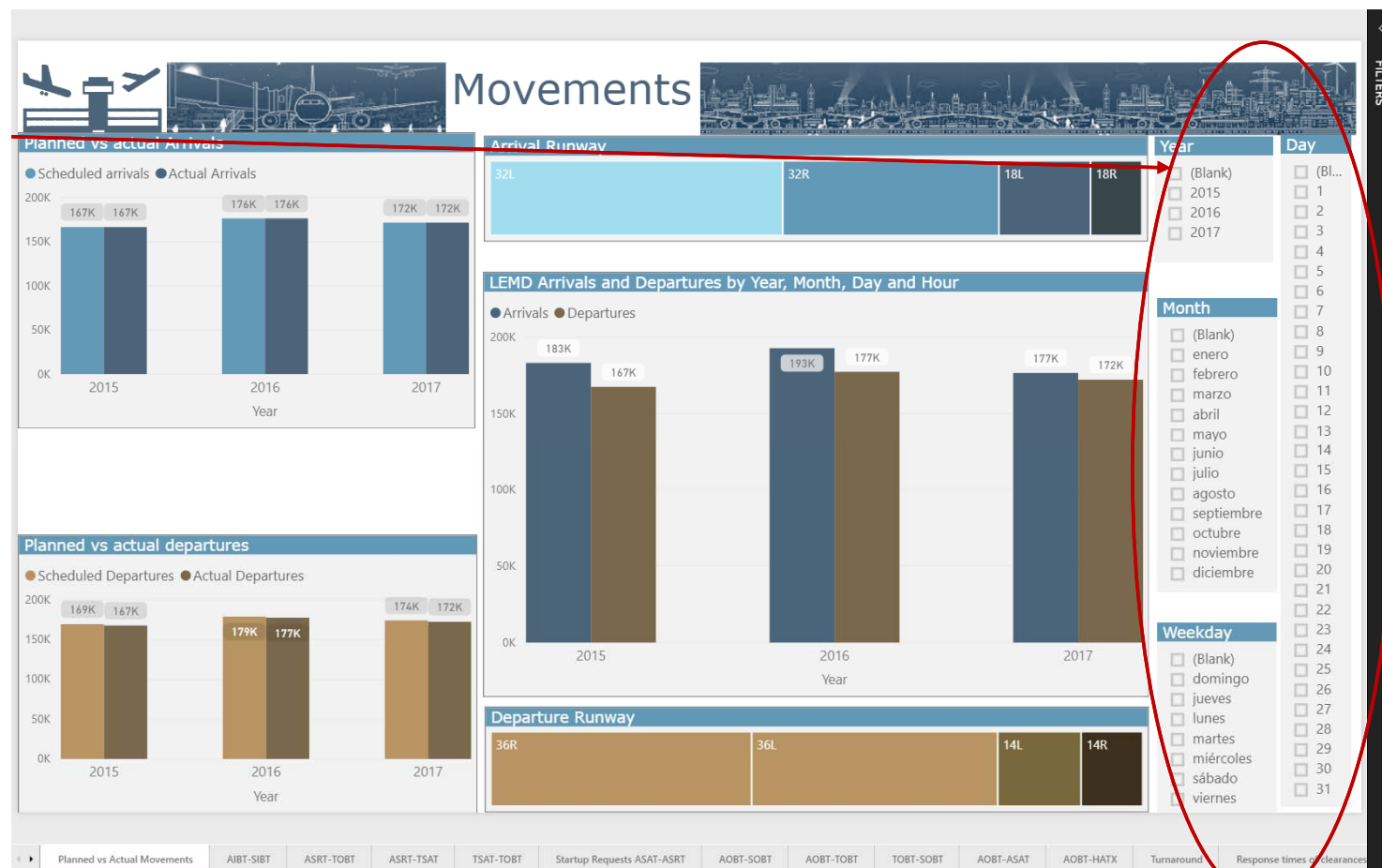
Selecting dates

Specific dates can be selected using the radio buttons on the right

The selection follows through on all the pages.

If just one option is selected, the data will show the averages for all those selections (i.e. results for Mondays)

This can be combined with the hierarchies to show hourly distributions for a year, a month, a certain day of the week, etc.



Drilling down vs Hierarchies

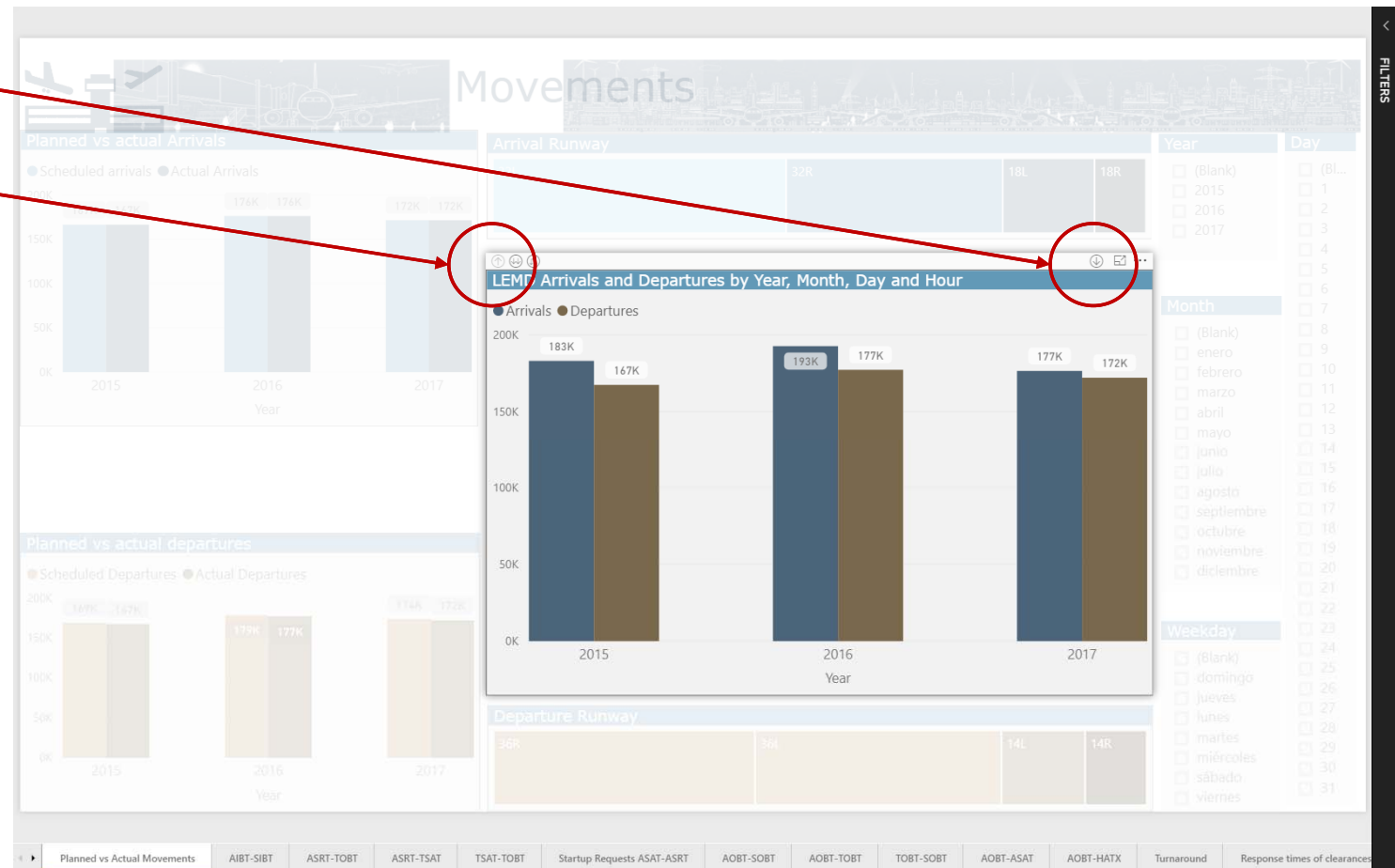
To drill down into the chart data, select the button on the top right, then the data section to drill down.

To go back up a level, click on the up arrow in the top left.

Drilling down goes from years to show the months of that year, then days, hours, to individual flights.

The other displays are linked so that the information changes according to the drill down.

This is an alternative way to view a given date's data, but the selection will not carry over to other pages



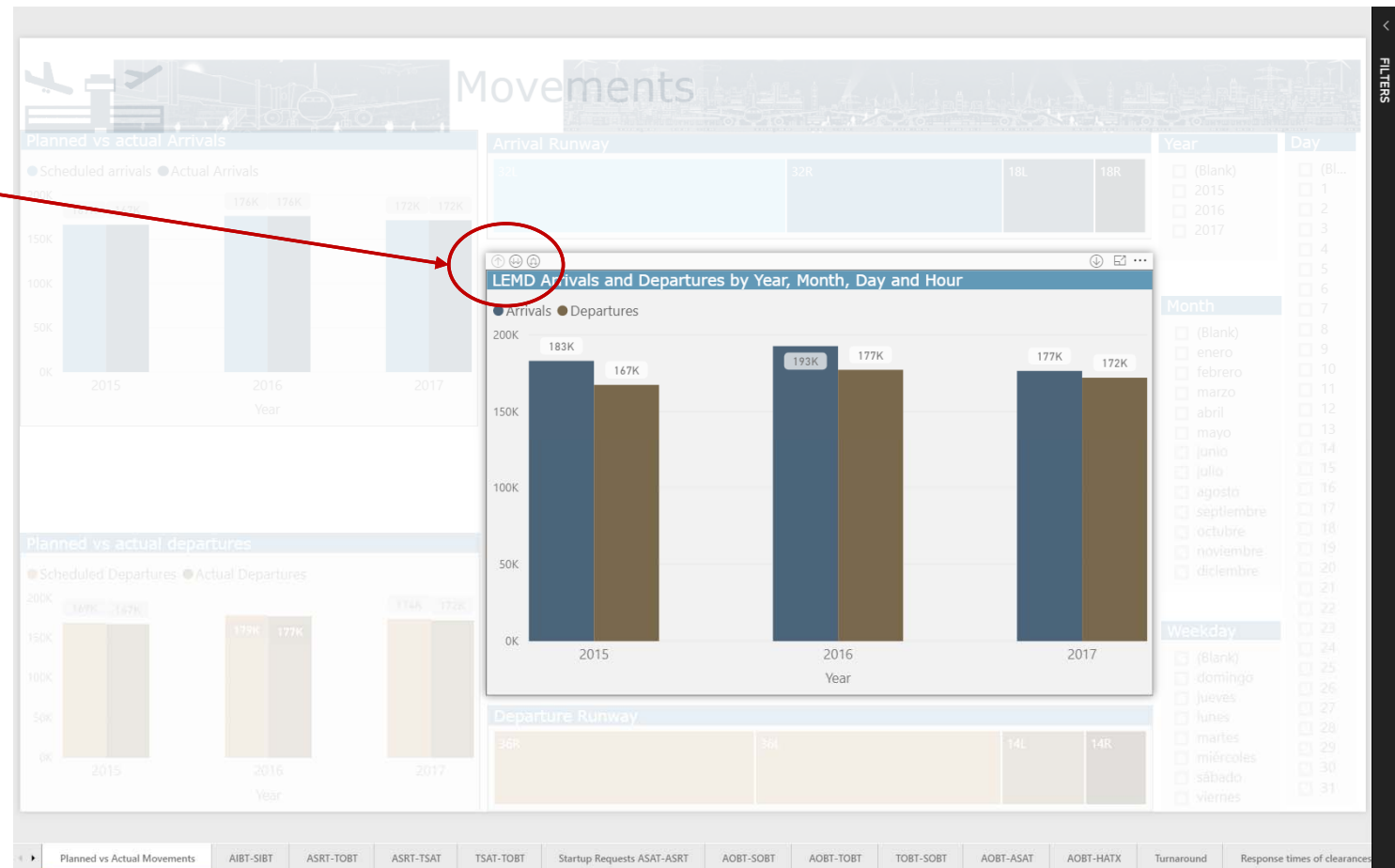
Drilling down vs Hierarchies

To view the hierarchies, use the down and up arrows in the upper left corner.

While drilling down to hours will show the hourly data for a single day, going down to hours using the hierarchy buttons will show the average hourly data across the entire data.

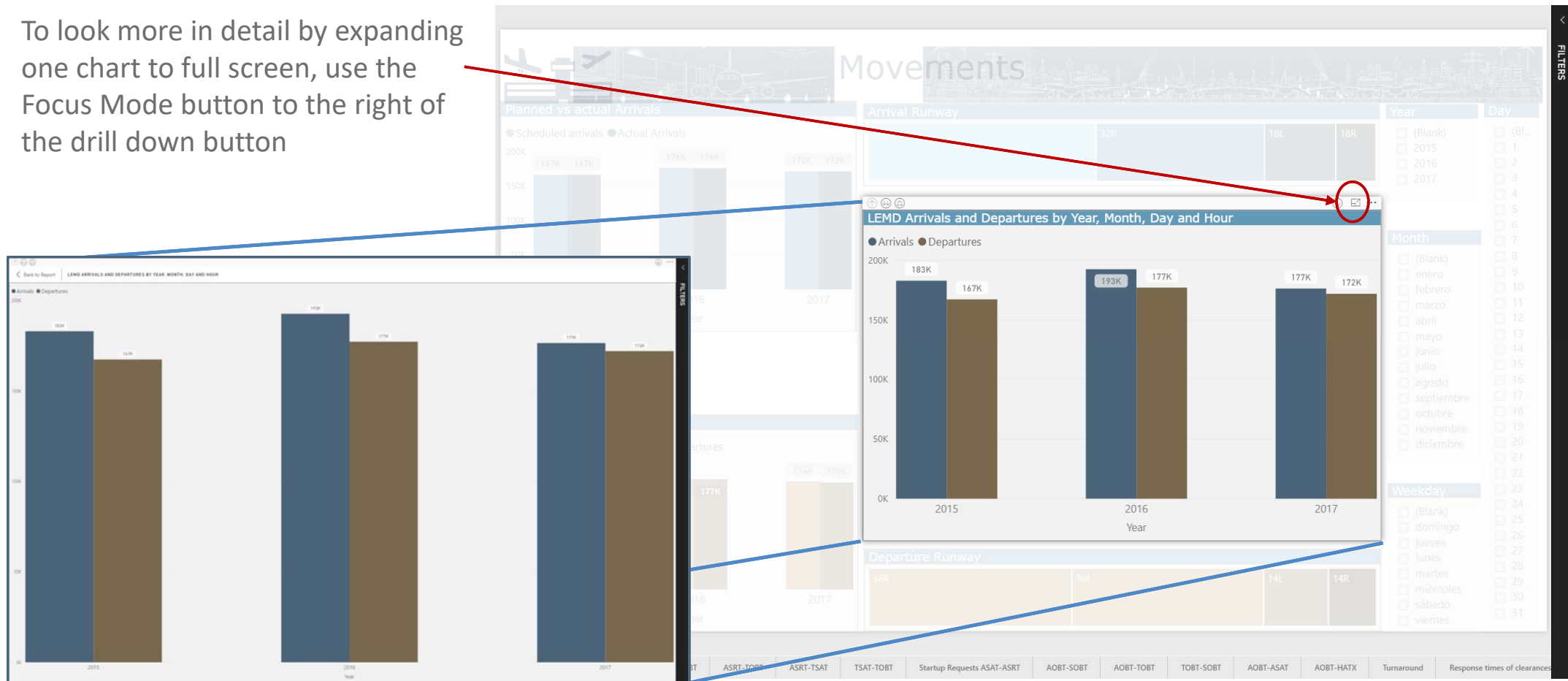
Drill down and hierarchy selection can be combined to, for instance, see the hourly data across an entire month.

The other displays are also linked, just like the drill down.



Looking at one chart

To look more in detail by expanding one chart to full screen, use the Focus Mode button to the right of the drill down button



Closing thoughts



What are we looking for?

When should I get the feedback/questionnaires?

“Open Day” with others that have shown interest (SJU, ACI, etc.)



LYON AIRPORTS

Sesar 2020 PJ04

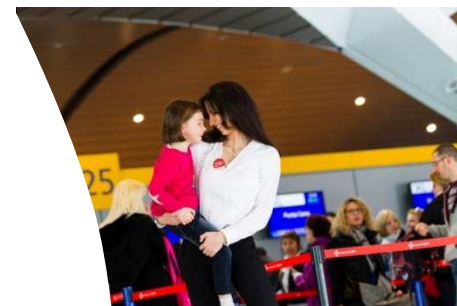
1

PRESENTATION AND KEY FIGURES

1 | PRESENTATION AND KEY FIGURES

Our vision and Customer promise

connect & fly



Mission

- Connecting Lyon and its region
- Connecting transfer passengers
- Connecting customers in mobility
- Connecting the airport to business
- Being a real hub of activity and enjoyment, on a human scale (pleasant and efficient experience)

Ambition

An international airport that boosts trade in its region

- 2nd largest airport gateway to France
- Natural point of departure for inhabitants in South-East France
- A lively place for shared experiences
- A real front-runner in Europe

1 | PRESENTATION AND KEY FIGURES

Our vision and Customer promise

connect & fly

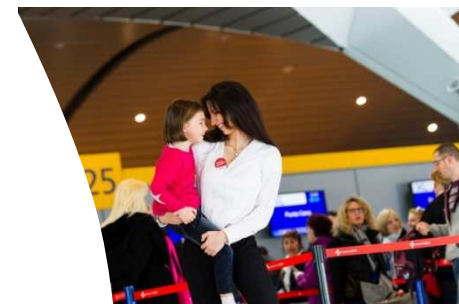
PLATFORMS

- **Commercial aviation**
3rd busiest airport in France for passenger traffic
2 passenger terminals
- **Business aviation**
3rd busiest airport in France for business aviation
- **Cargoport**
Multi-modal hub
Service and storage capacity



COMPANY

- 500 employees
- **A limited-liability company** with Executive and Supervisory Boards



1 | PRESENTATION AND KEY FIGURES

Lyon-Saint Exupéry

KEY ASSETS

- **Multi-specialist** Airport
- **10,3 million** passengers in 2016
- **Euro- regional hub** of the Air France-KLM group
- **easyJet base** at a terminal dedicated to the low-cost segment
- **No. 2 economic region** in France

POTENTIAL

- **900 hectares** of land available for development – one of its kind in Europe
- **Target : 4 runways** APPM (airport plan)
- **Multi-modal hub**
 - High-speed train station
 - Rhonexpress tram
 - Shuttle buses
 - Motorways
- **Cargoport**
 - Soon to be connected to the railway with the CAREX project

Fully interconnected!

25' from Lyon
with Lyon
Express

At the
crossroads of a
road and rail
network



1 | PRESENTATION AND KEY FIGURES

Lyon-Bron

KEY ASSETS

- **Platform** dedicated to business aviation
- Base for **5 airlines**
- **5 hangars** : 17 000 m² of hangar and also office space

POTENTIAL

185 hectares

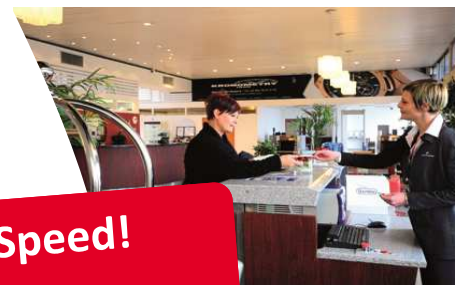
- **Adjacent** to the Eurexpo convention and exhibition centre
- At the heart of a **dynamic commercial zone**
- **Plans to expand** the Terminal and plans for new hangars
- **Aviation cluster**

Speed!

10 kms from the city centre

10' from Lyon-Saint Exupéry via the A43 motorway

Close to Geneva and the Alps



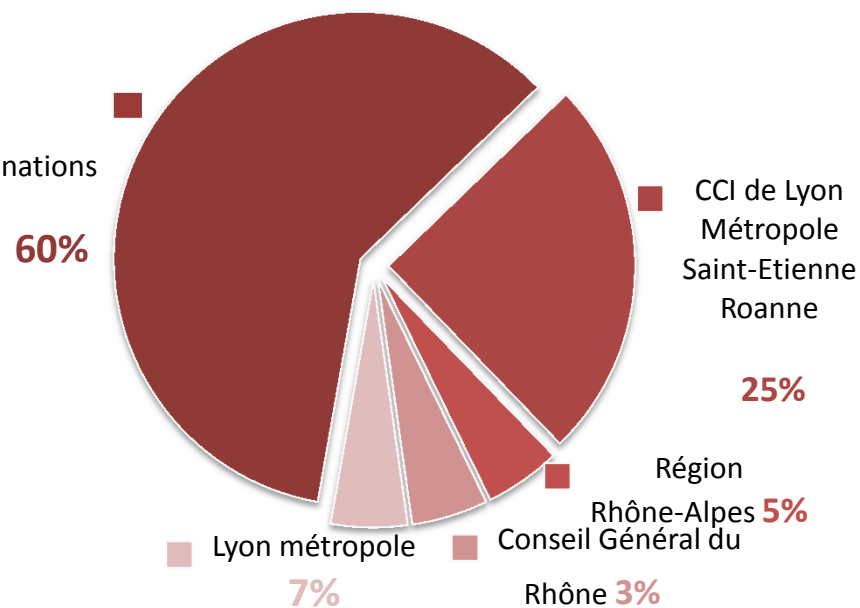
1 | PRESENTATION AND KEY FIGURES

Shareholders and supervisory board



ADL Participations

- VINCI Airports
- Crédit Agricole Assurances
- Caisse des Dépôts et Consignations



1 | PRESENTATION AND KEY FIGURES

A Company of VINCI Airports
Access to worldwide network

35 Airports
7 Countries
3 Continents



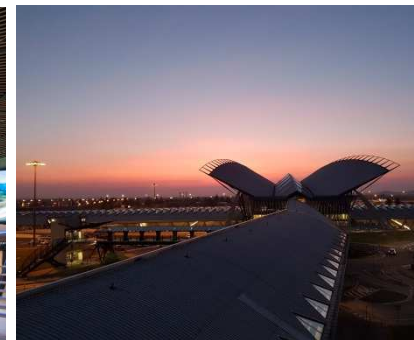
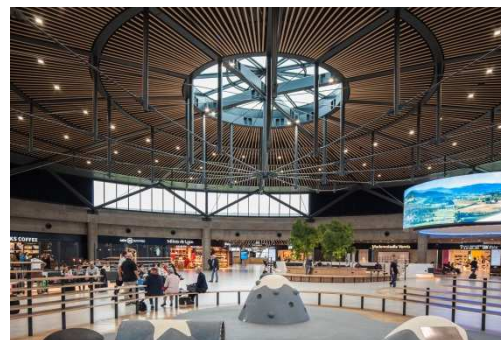
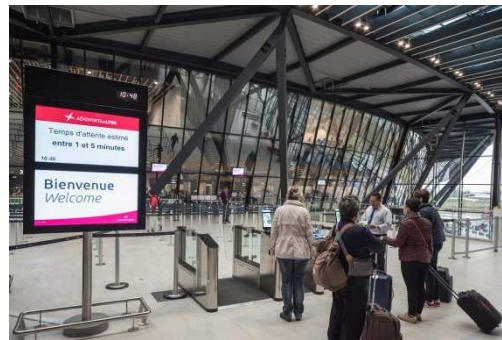
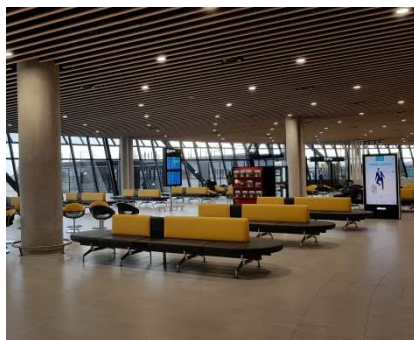
1 | PRESENTATION AND KEY FIGURES

Infrastructure : one of the most modern in Europe



- **2 runways**
Runway A: 4,000 m
Runway B: 2,670 m
- **Capacity**
53 movements/hour
- **Passenger terminals :**
2 passenger terminals (70,000 m²)

1 freight platform (25,000 m²)
- **48 gates directly connected** to the terminals (incl. 16 with bridges)
- More than **14,000 parking spaces**
- **2,000 hectares**, including **900 ha of land available** for future development

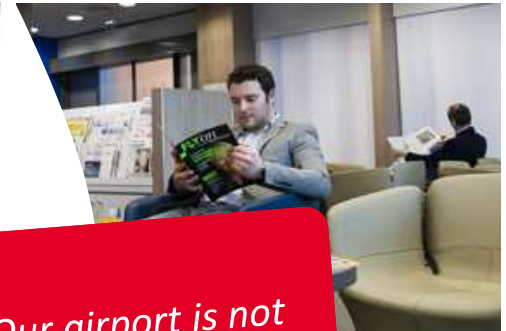


Multi-specialist airport

- **Multi-specialist Airport**
 - Air France hub
 - Legacy Carriers
 - Low-cost Carriers
 - Charter Carriers
 - Cargo Freight
 - Business aviation
- **A “city airport”**
 - A wide range of innovative services

*"We have a well-balanced business portfolio. Aéroports de Lyon is aiming to attract **13 million passengers** in 2025"*

*"Our airport is not only an infrastructure for transport. It is also a **unique place of exchange** that drives business forward"*



1 | PRESENTATION AND KEY FIGURES

Multi-specialist airport



1 | PRESENTATION AND KEY FIGURES

A « City AIRPORT » : a unique place of exchange that drives business forward

- **900 hectares**
High potential for expansion (land available for future development)
- **38,000 people/day**
A business cluster
for up to 34,000 people/day
- **An attractive property offer**
Price competitive, close to the airport,
international
- Committed to protecting
the environment
- A powerful interconnection network
- 47,000 m² of real estate surface area
305,000 m² of land for rent



2

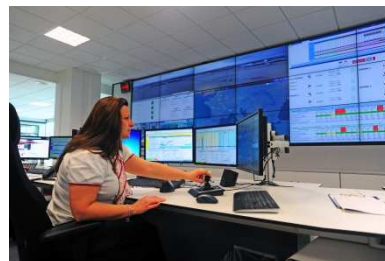
Lyon Airports the Sigma 2016 Project : the APOC Release 1!

5 | AN EFFICIENT AIRPORT

A new Operational Control Centre (OCC)

Proximity, coordination, exchange

- **Improving** flight punctuality and quality of service
- **Managing** major events affecting the platform
- Combining centres for:
 - Traffic
 - Access & Transport
 - Technology
 - Remote information center
- Involving partners in the decision-making process



A unique location

700 m²

5 centres

18 operational professionals

Operational efficiency



3

Lyon Airports and Sesar2020 Toward a new APOC

Lyon Airports and Sesar2020 Toward a new APOC

- After 3 years from the first APOC and with the New Terminal 1 project we need to review our processes**
- We have taken the opportunity of the Sesar2020 PJ04 project**
- As you can see Sesar2020 is a key point of our project**
- New Organization of the new Apoc :**
We want to use Sesar2020 and the Validation Exercise as a “LAB” for the new processes and the new software platform

4

Lyon Airports and the PJ04 Uses Cases

Lyon Airports and the PJ04 Uses Cases

-Passengers Transfer Process

-Turnaround management

Lyon Airports and the PJ04 Uses Cases

Passengers Transfer Process

- We have seen this use case as a specific one of a more general one about the waiting time too long at the border control or at the security check.
- Could be one of the rules we could apply for passengers prioritizations when we have waiting time too long .
- But the TAM platform should help us for the other rules for the prioritization we would like to manage with the TAM platform
- And sure the best is to avoid to have this kind of issues :
the TAM platform should help us to anticipate them.

Lyon Airports and the PJ04 Uses Cases

Passengers Transfer Process : first feedback of the validation exercises

- When you could anticipate situations you can solved problem with only one more lane for the security check instead of waiting that problem arrive and you need to open more than one lane to solve it.
- It's not the role of the airport to manage the passengers of the AU ?
Sure not, but the airport could give to the airlines some data's about the passengers process.
- We need to involve the airspace users , yes but at which level ,
airport level , or at the FOC (Flight Operating Center) level
So the Airspace Users should not be a direct users of the TAM platform)

Lyon Airports and the PJ04 Uses Cases

Turnaround Management

The keypoint for the turnaround management is to gather the data from the real time process on the field

➤ **Mobile application could be a solution but still some open points :**

-One mobile application for the aircraft manager or

One for each operator of the turnaround the catering , fueling ?

-Who are going to buy to manage this application, the airport or the ground handler ?

-Who are going to manage the devices ?

-This application should be a module or the APOC or only a standalone application connected to the webservices of the APOC ?



PJ04.01-V2.04 Validation Exercise Results and Conclusions

Mr Riccardo NICOSIA
Mr Stefano BUSONI
Thales SpA

2018 June, 26th - Lyon



Founding Members



Open Day Agenda



PJ04.01-V2.04 Landside integration in A-CDM process + Turnaround monitoring and optimization
&
PJ04.01-V2.05 Network security and cyber protection of Total Airport Management Solutions

	Topic
1.	Welcome Lyon Airport APOC presentation
2.	PJ04.01-V2.04 Operational Concept
3.	PJ04.01-V2.04 Exercise Modelling & Architecture
4.	PJ04.01-V2.04 Exercise Demonstration
5.	PJ04.01-V2.04 Results and Conclusions
6.	PJ04.01-V2.05 Exercise Modelling
7.	PJ04.01-V2.05 Results and Conclusions



PJ04.01-V2.04 Results and Conclusions

Topics



- Results typologies
- Categories
- KPIs measured

Results typologies used



Two kinds of results typologies collected:

- **Qualitative results**

These results comes from the ***Final Exercise questionnaires*** provided to the actors involved in the exercise ***at the end*** of the exercises execution

- **Quantitative results**

These results comes from the ***Exercise questionnaires*** provided to the actors involved in the exercise ***during*** the exercises execution

For each typology, two categories collected:

- Transfer Passenger results
- Turnaround results

Operators feedback collected for qualitative typology only.

The previous categories are related to the Reference Scenario vs Solution Scenario

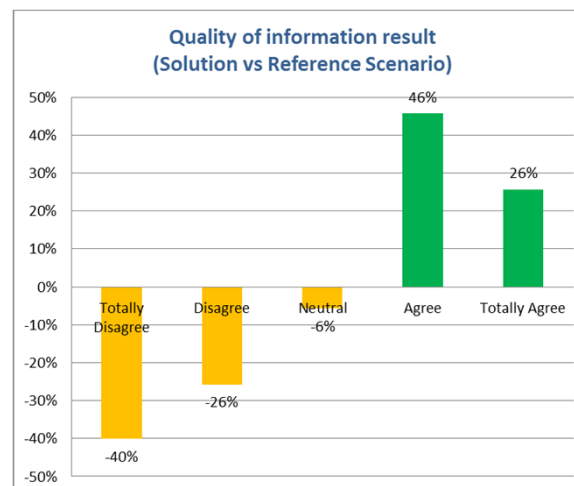
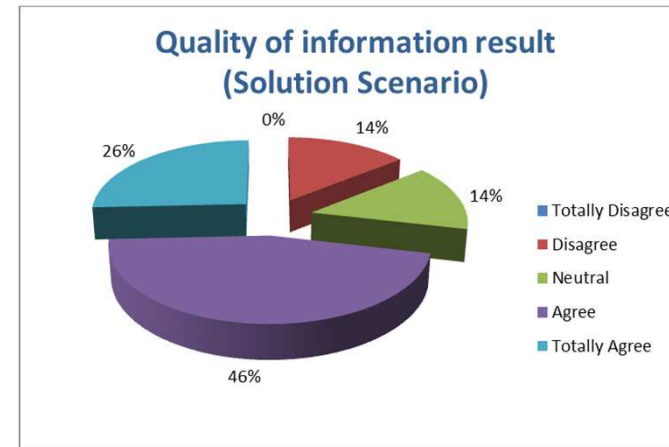
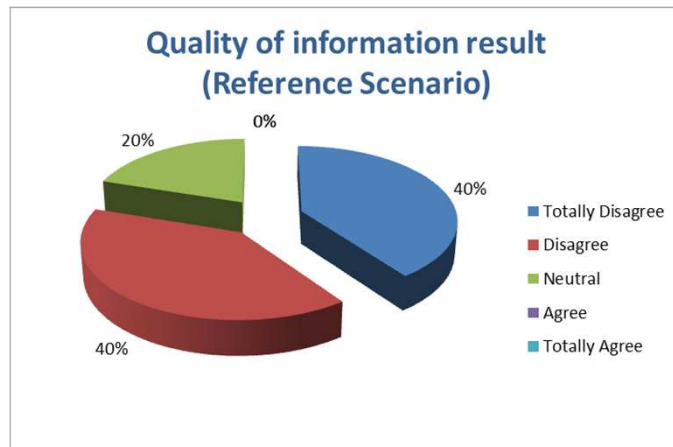
KPIs measured



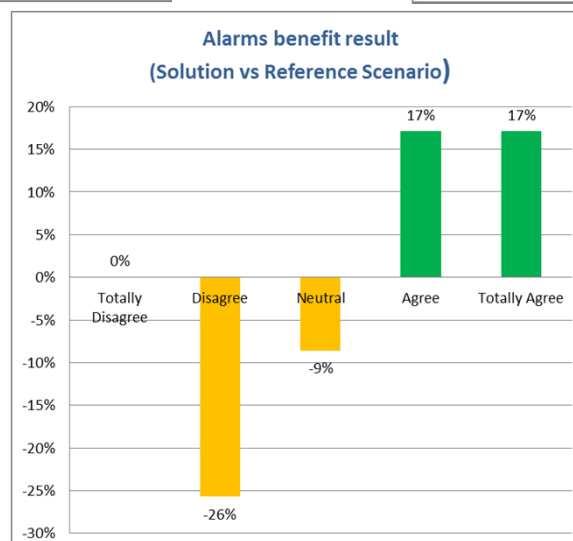
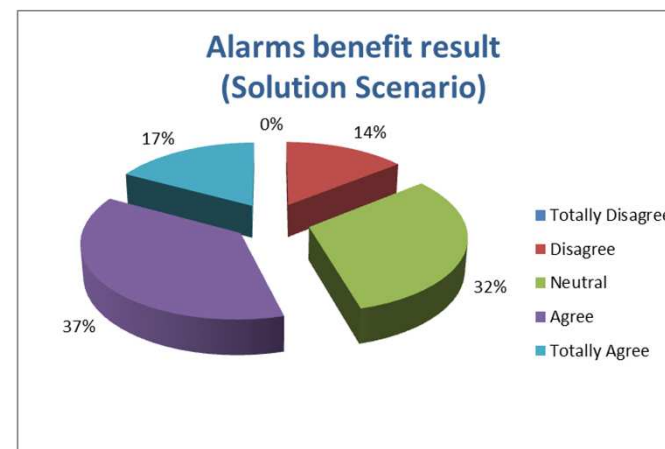
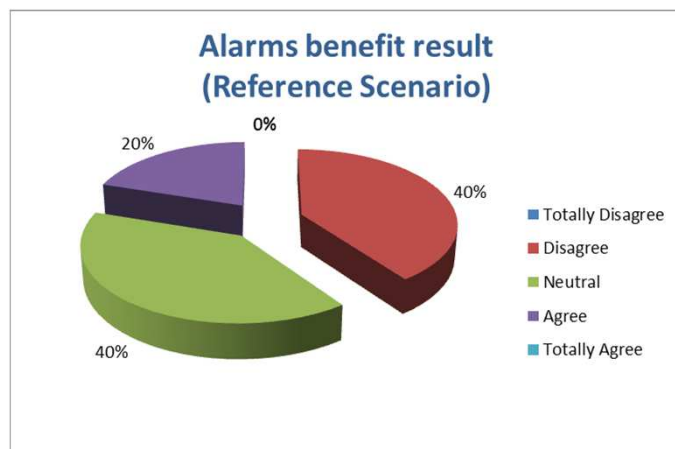
For each category, the KPIs measured are:

- Punctuality
- Predictability
- Flexibility
- Cost efficiency

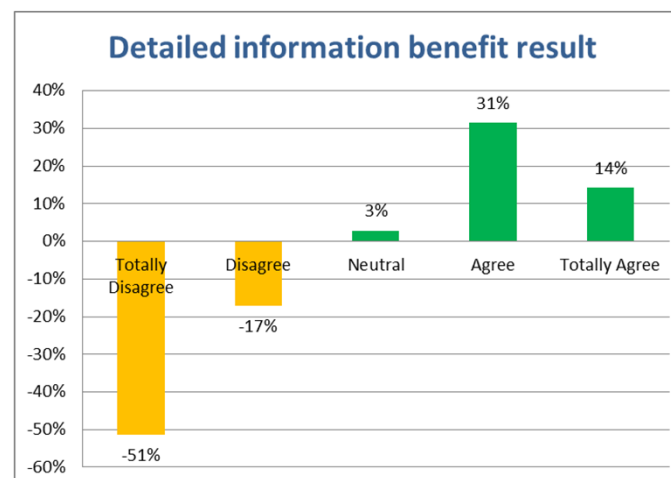
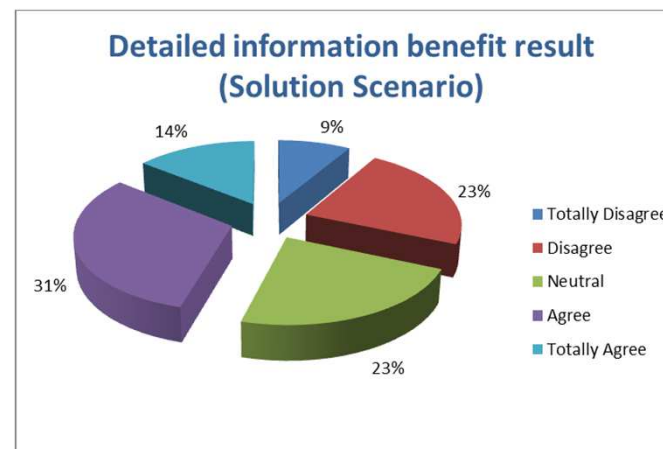
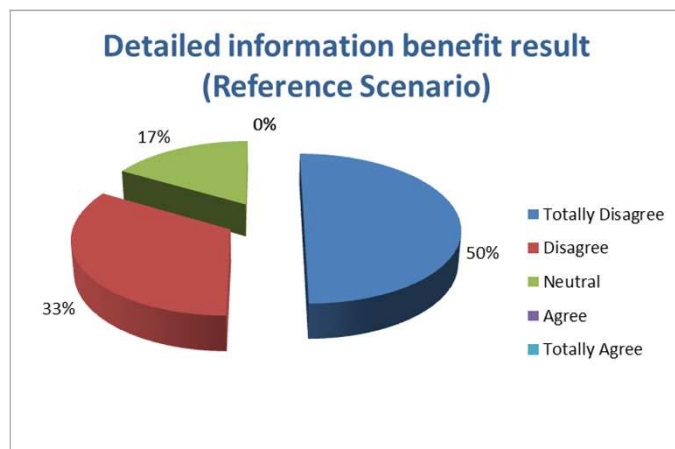
Qualitative results: Quality of information



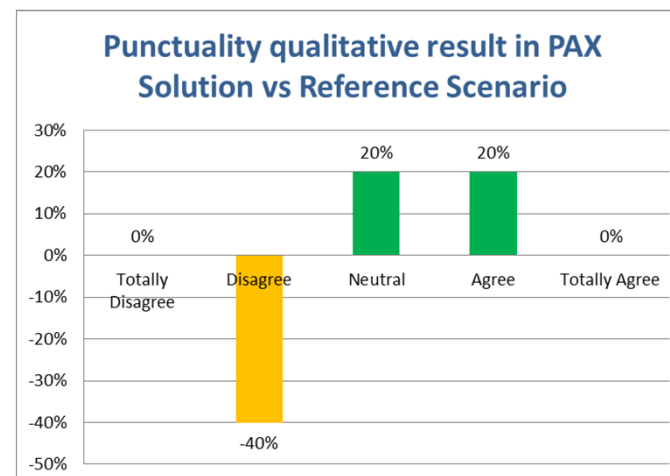
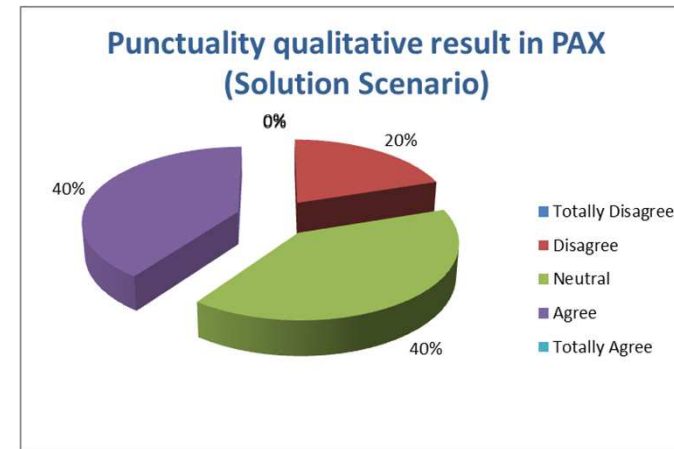
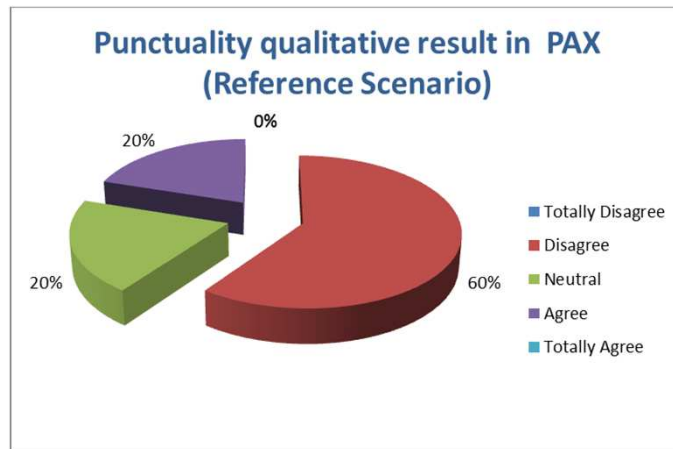
Qualitative results: Alarms benefit



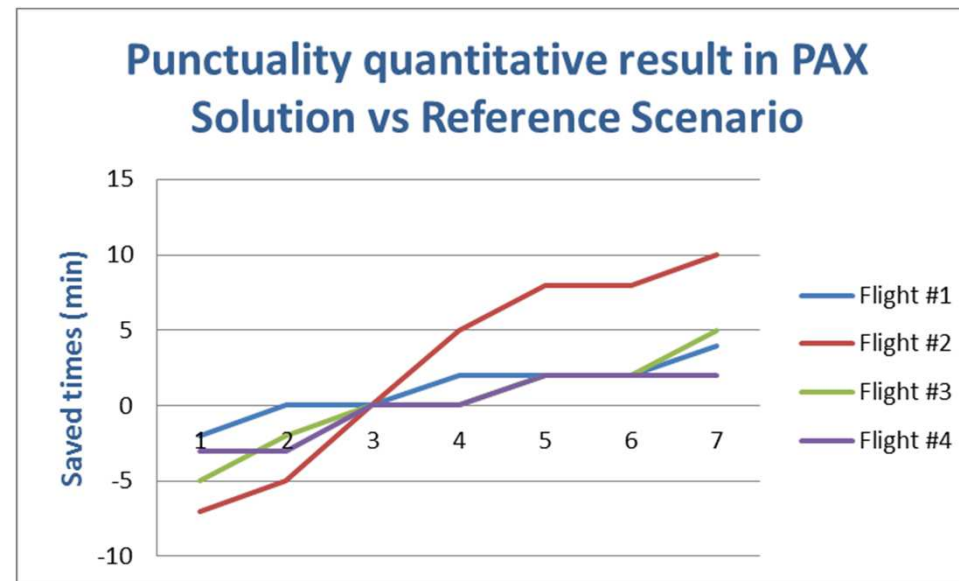
Qualitative results: Detailed information benefit



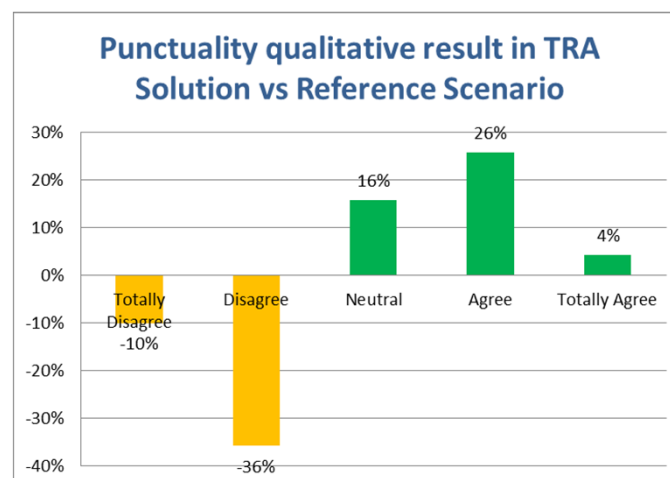
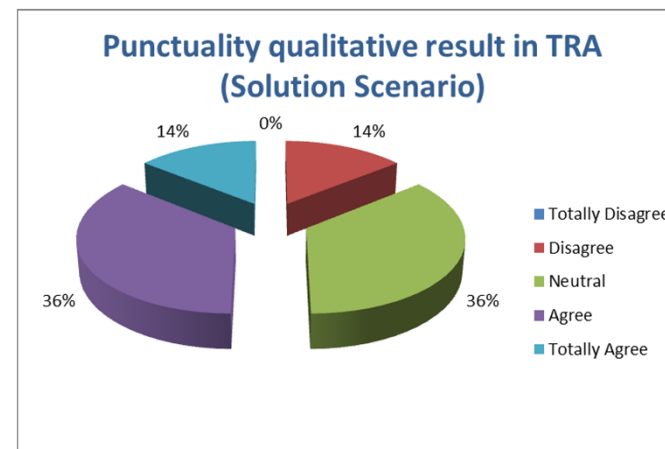
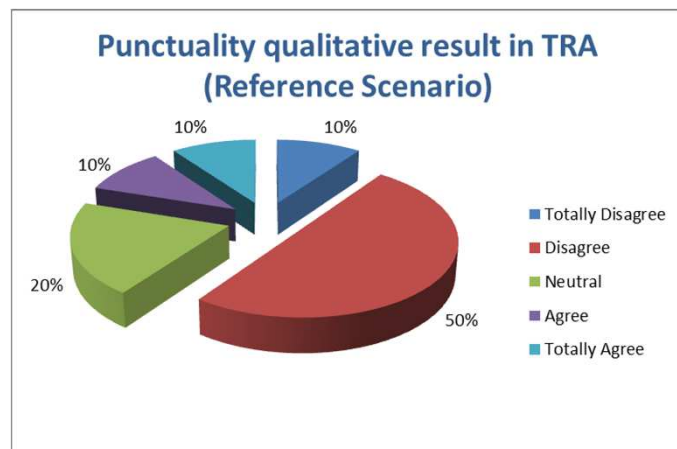
Qualitative results: Transfer Passenger process Punctuality & Predictability



Quantitative results: Transfer Passenger process Punctuality

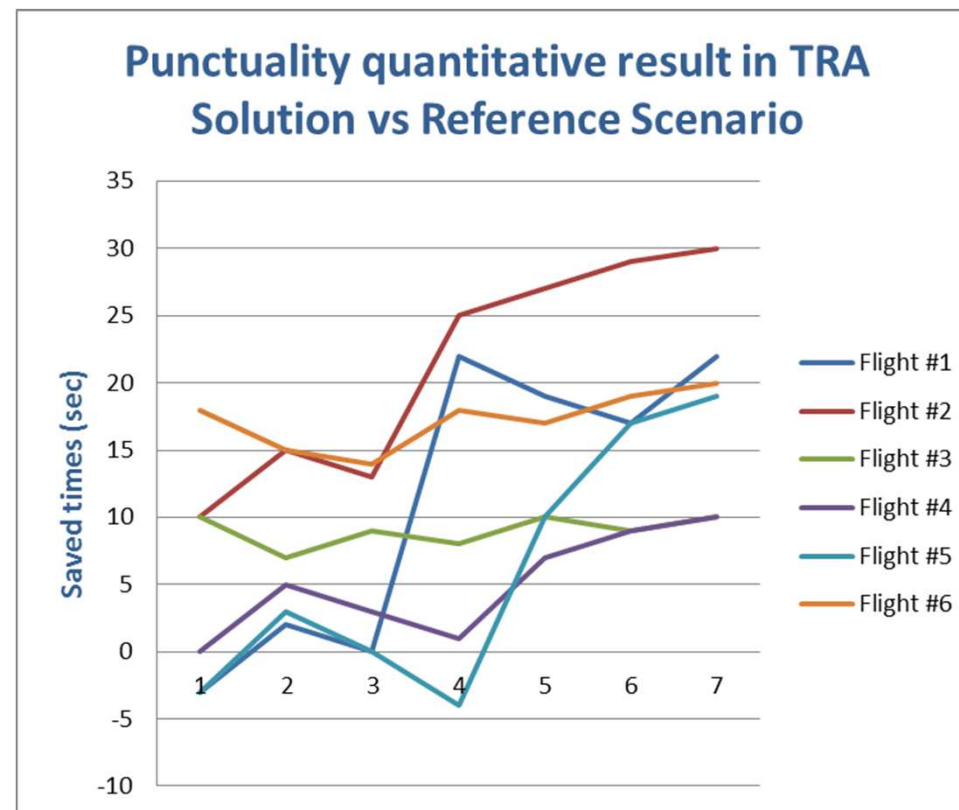


Qualitative results: Turnaround process Punctuality & Predictability

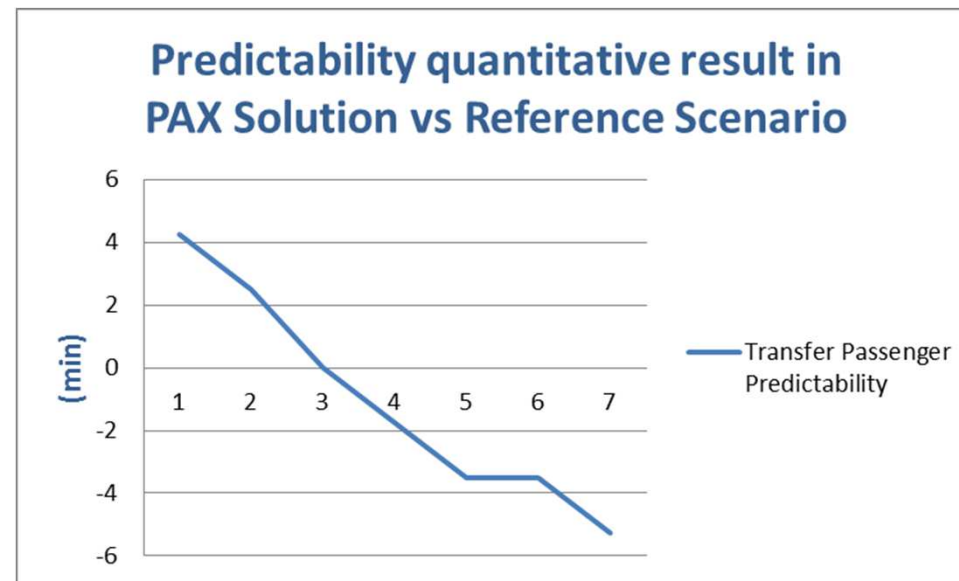


Quantitative results: Turnaround process

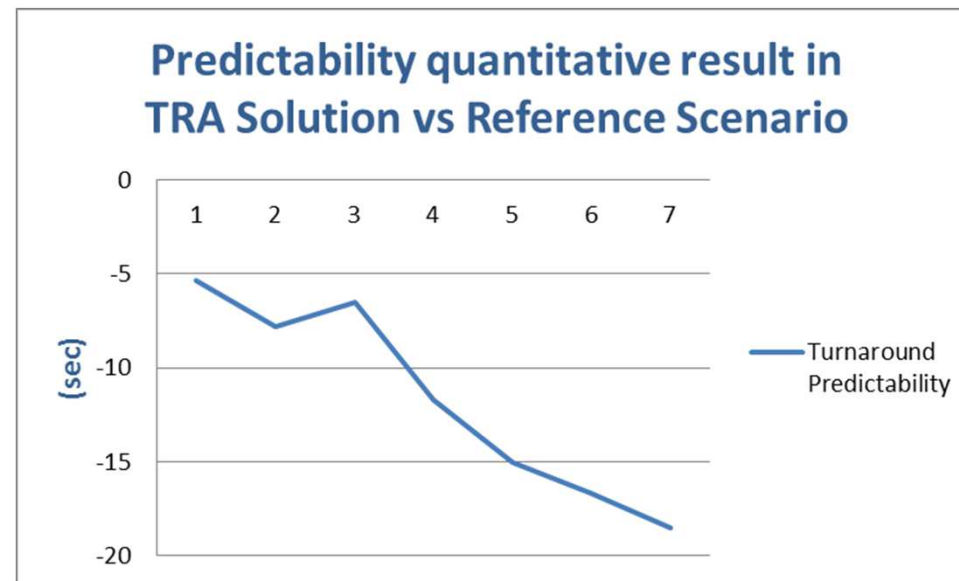
Punctuality



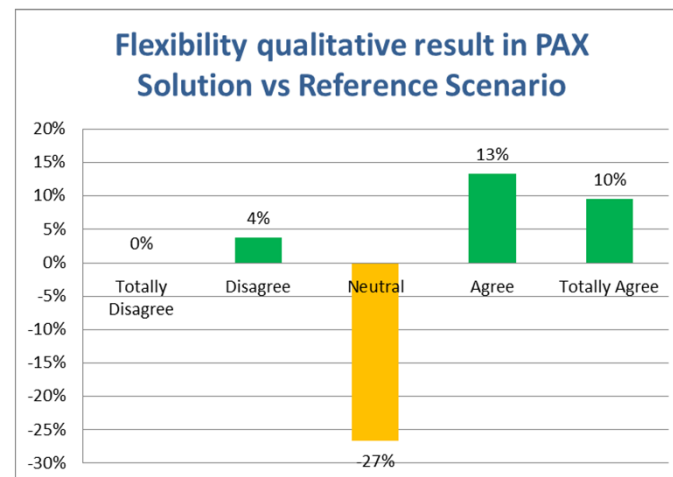
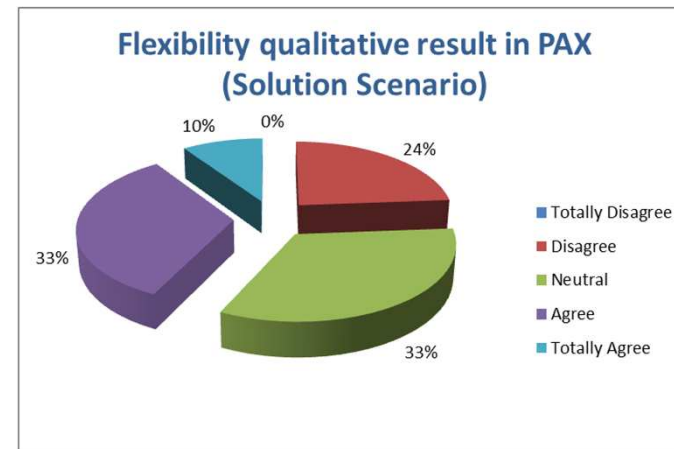
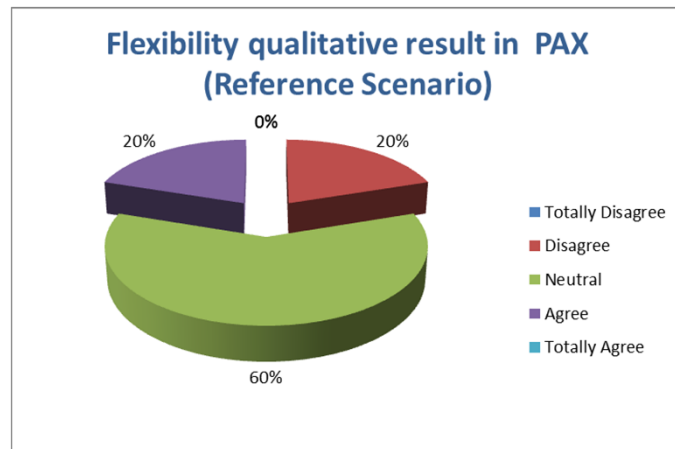
Quantitative results: Transfer Passenger process Predictability



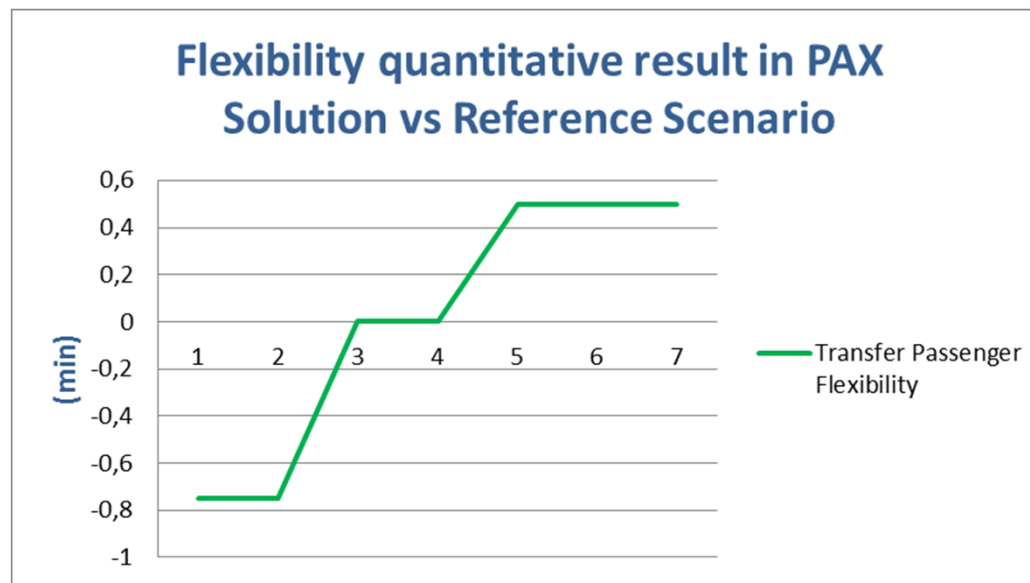
Quantitative results: Turnaround process Predictability



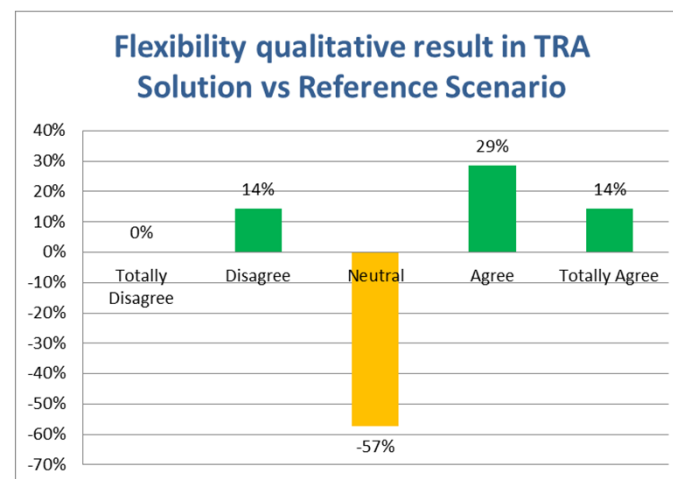
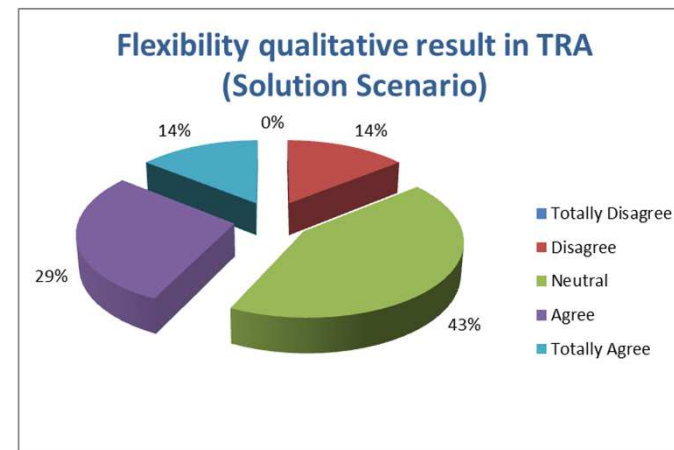
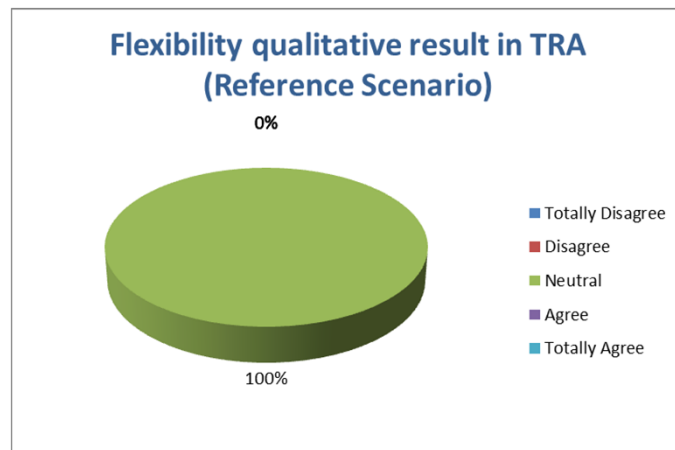
Qualitative results: Transfer Passenger process Flexibility



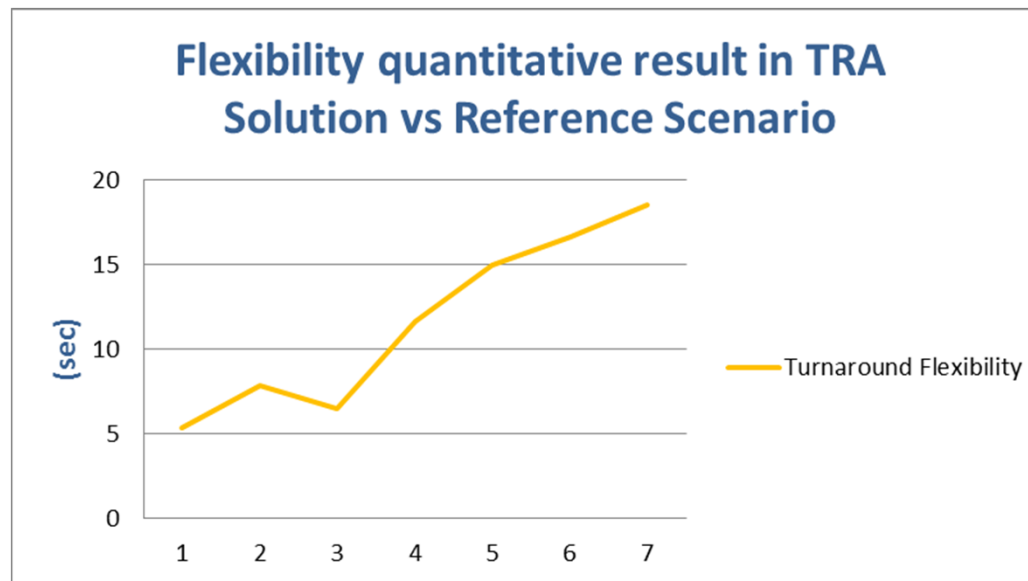
Quantitative results: Transfer Passenger process Flexibility



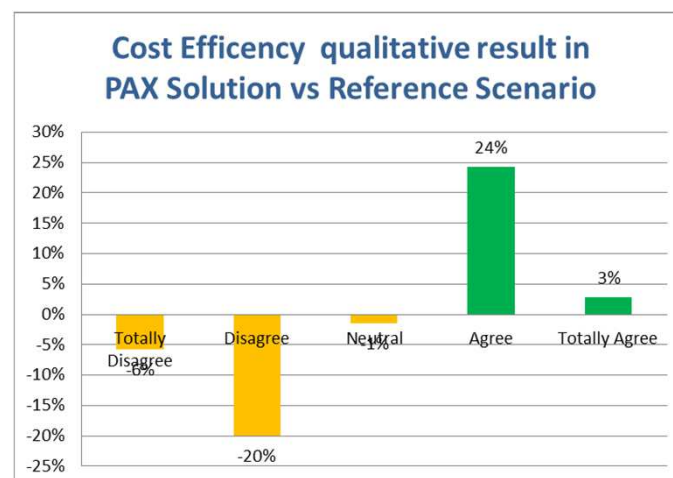
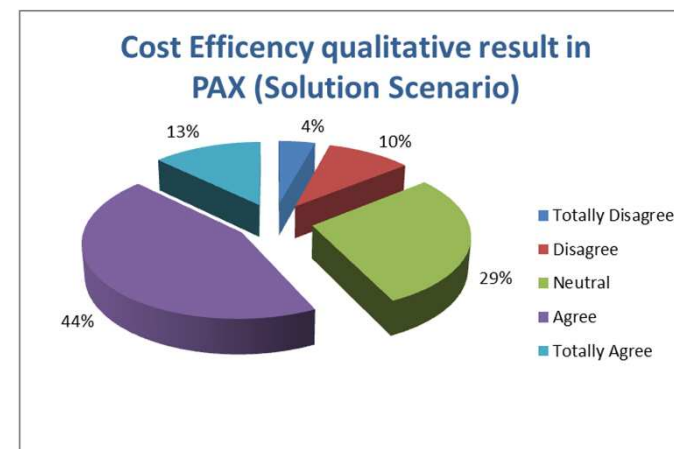
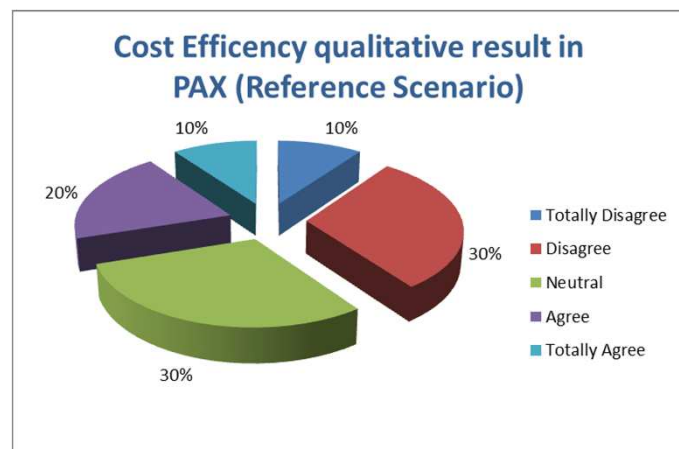
Qualitative results: Turnaround process Flexibility



Quantitative results: Turnaround process Flexibility



Qualitative results: Transfer Passenger process Cost Efficiency



Quantitative results: Transfer Passenger process

Cost Efficiency



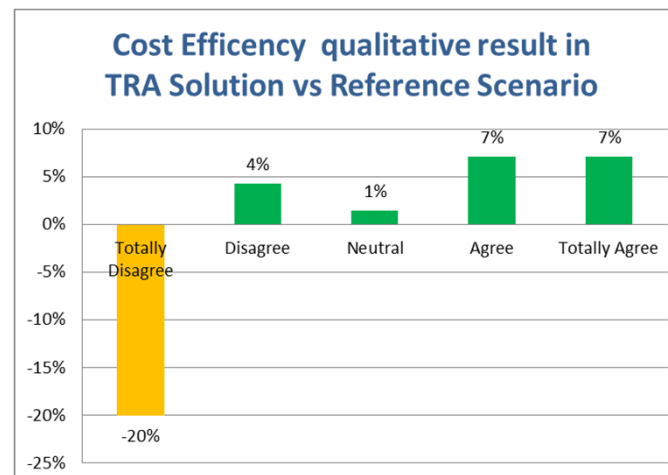
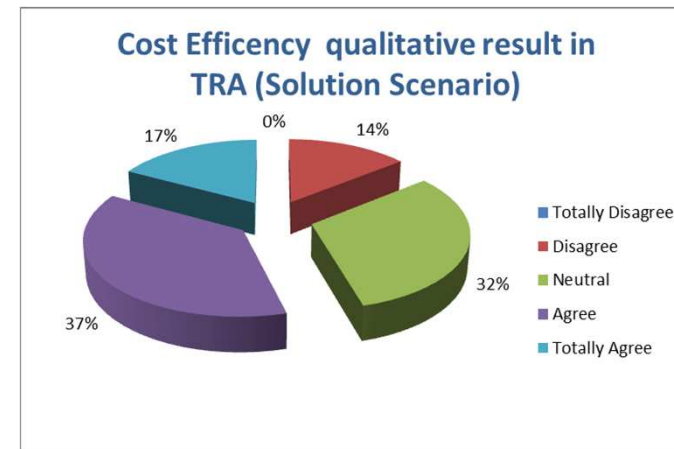
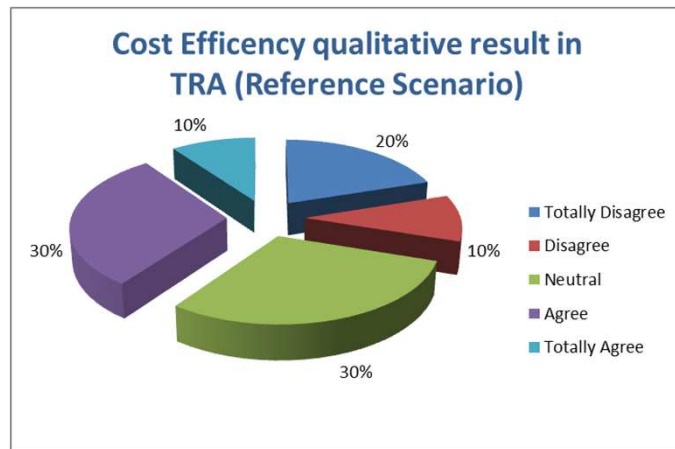
Flight #	Issue #1	Issue #2	Issue #3
Flight #1	5%	14%	46%
Flight #2	11%	36%	24%
Flight #3	3%	26%	61%
Flight #4	45%	34%	23%

Issue #1 – High PIF waiting time

Issue #2 – High PAF waiting time

Issue #3 – Low connecting time

Qualitative results: Turnaround process Cost Efficiency



Quantitative results: Turnaround process Cost Efficiency



Flight #	Issue #1	Issue #2	Issue #3
Flight #1	5%	14%	12%
Flight #2	11%	11%	8%
Flight #3	3%	12%	17%
Flight #4	11%	23%	23%
Flight #5	-4%	21%	18%
Flight #6	6%	20%	7%

Issue #1 - Disembarking of PAX in delay

Issue #2 - Refuelling of PAX in delay

Issue #3 - Boarding of PAX in delay



PJ04.01-V2.05 Validation Exercise - Results & Conclusions

Samuele Foni
Thales SpA

2018 June, 26th - Lyon



Founding Members



Open Day Agenda



Pj04.01-V2.04 Landside integration in A-CDM process + Turnaround monitoring and optimization
&
Pj04.01-V2.05 Network security and cyber protection of Total Airport Management Solutions

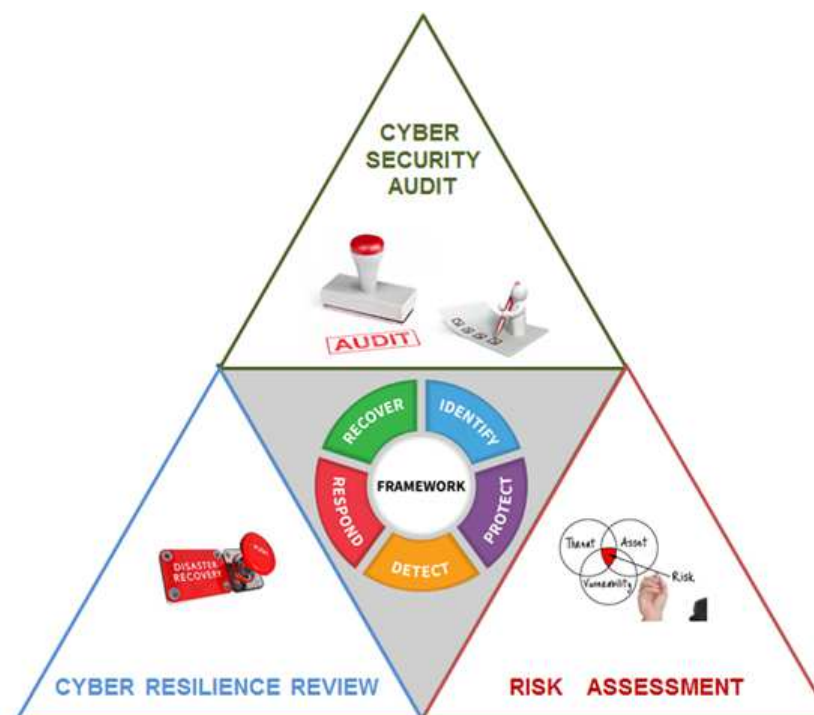
	Topic
1.	Welcome Lyon Airport APOC presentation
2.	PJ04.01-V2.04 Operational Concept
3.	PJ04.01-V2.04 Exercise Modelling & Architecture
4.	PJ04.01-V2.04 Exercise Demonstration
5.	PJ04.01-V2.04 Results and Conclusions
6.	PJ04.01-V2.05 Exercise Modelling
7.	PJ04.01-V2.05 Results and Conclusions



OBJ-PJ04.01-V2-VALP-SOL1

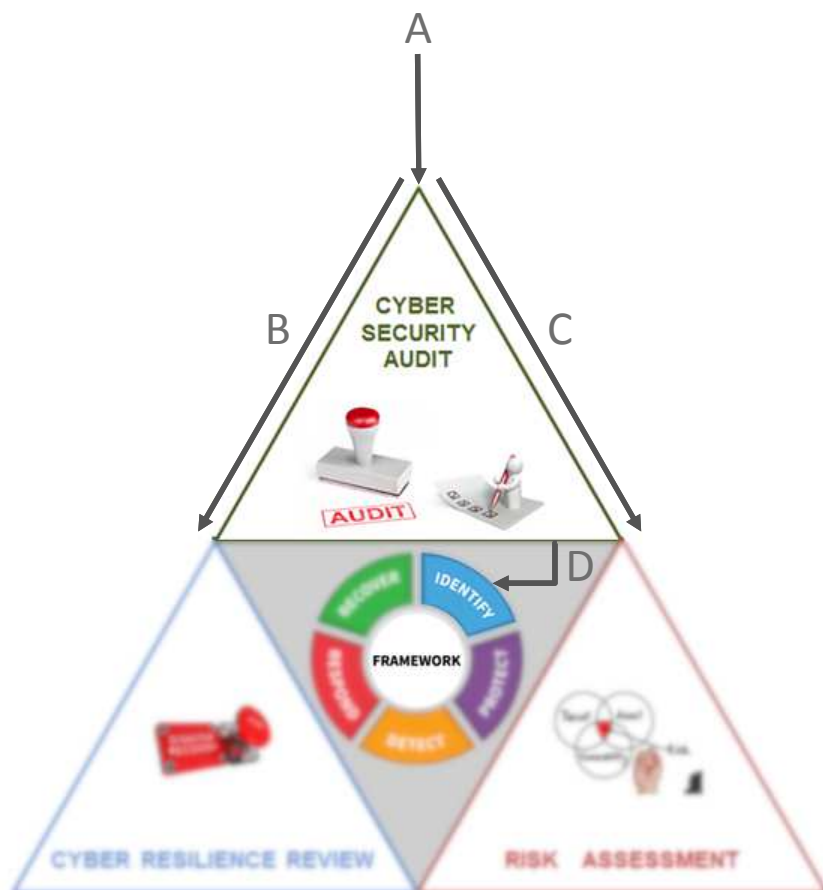
To define the airport cyber security framework for the TAM solution.

- The framework core is based on **NIST** standard
- This module is **kept alive, populated and updated** on the results of three additional cyber security processes:
 1. *Cyber security Audit*
 2. *Risk Assessment*
 3. *Cyber Resilience Review*



OBJ-PJ04.01-V2-VALP-SOL1

To define the airport cyber security framework for the TAM solution.

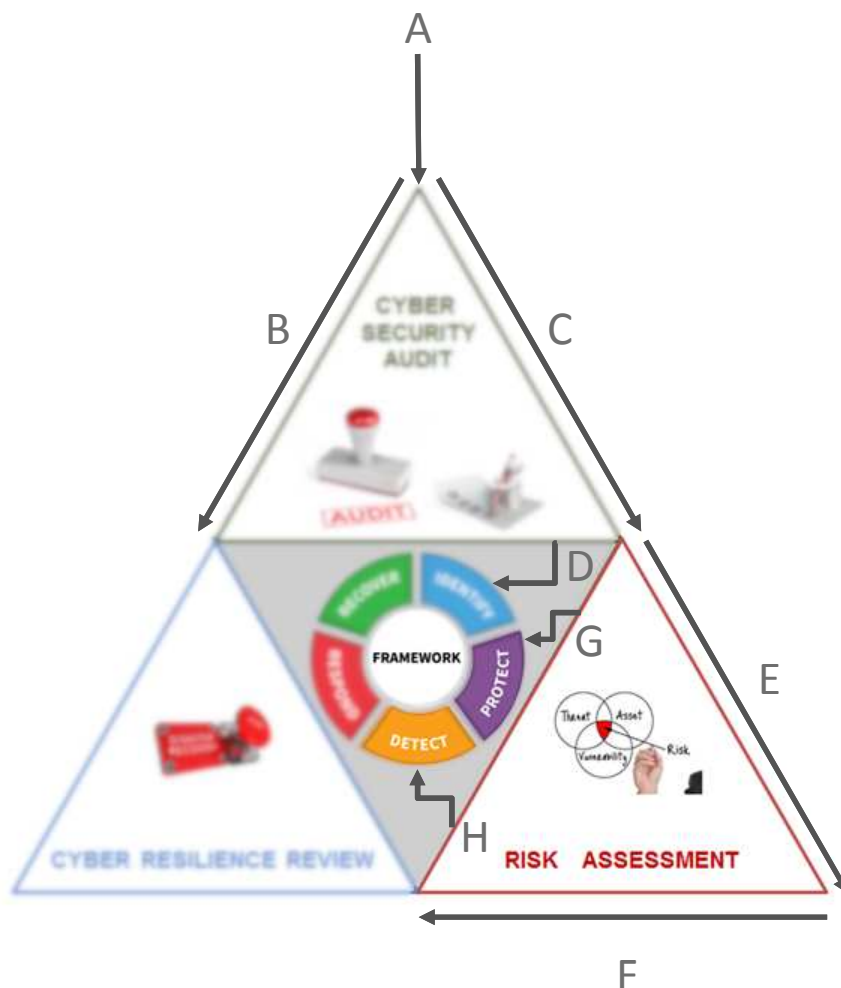


Cyber security Audit steps:

- A. Pre-engagement interactions
- B. List of perimeter defense devices, access control systems, etc.
- C. Primary Assets identification
- D. New threat scenarios

OBJ-PJ04.01-V2-VALP-SOL1

To define the airport cyber security framework for the TAM solution.

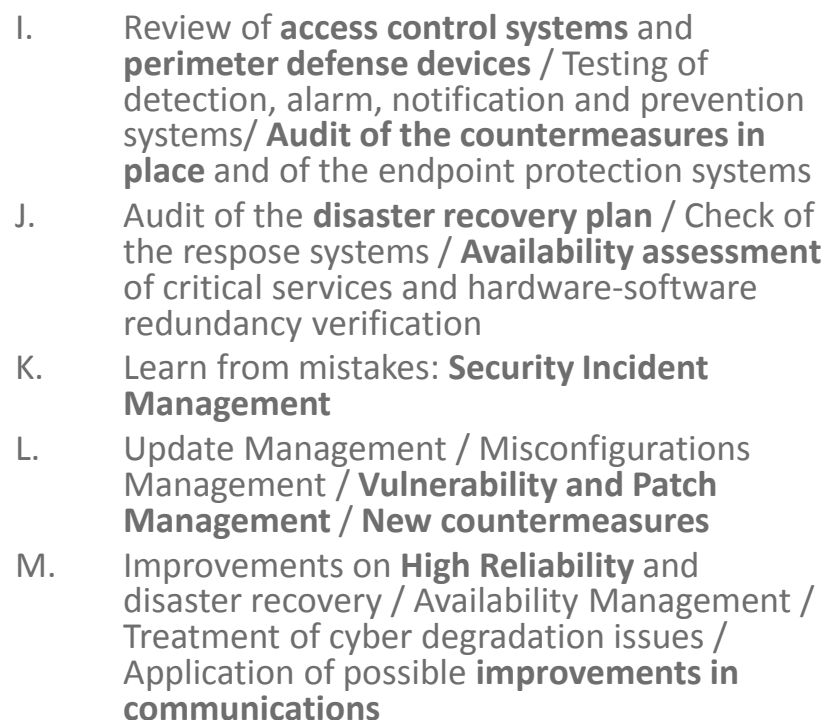


Risk Assessment steps:

- E. Assets prioritization and evaluation, Supporting Assets derivation
- F. Penetration testing and Risk Evaluation
- G. Patch management operations, Code reviews, Hosts hardening, etc.
- H. Risk Treatment, Identification of countermeasures and remediations, etc.

The risk assessment activity is based on the SecRAM procedure, therefore the new framework completely integrates what was defined in SESAR 1

To define the airport cyber security framework for the TAM solution.



6

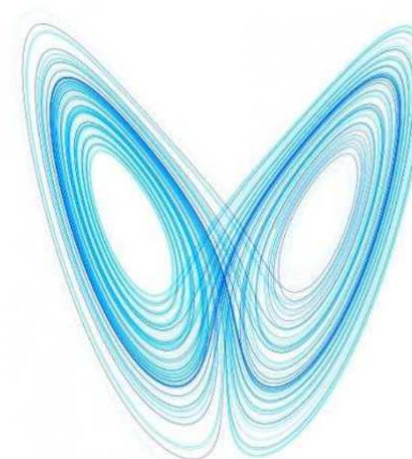
OBJ-PJ04.01-V2-VALP-UUU2

To define an advanced approach based on specific best practices and how-to implement guidelines based on the Airport Cyber Security Framework for TAM Solution.

- **Airports are Complex systems** besides being critical and complicated
- **Complex system** is any system in which the parts of the system and their interactions together represent a behavior, which cannot be explained by the analysis of all its constituent parts.
- **Complicated Systems** are an intricate set of devices, protocols and procedures that are difficult to setup but which provide an absolutely predictable output.
- Limitations of traditional Cyber Security approaches in Complex Environments: **The paradox of undecidability.**



Lawrence attractor



Making a good tea is complex

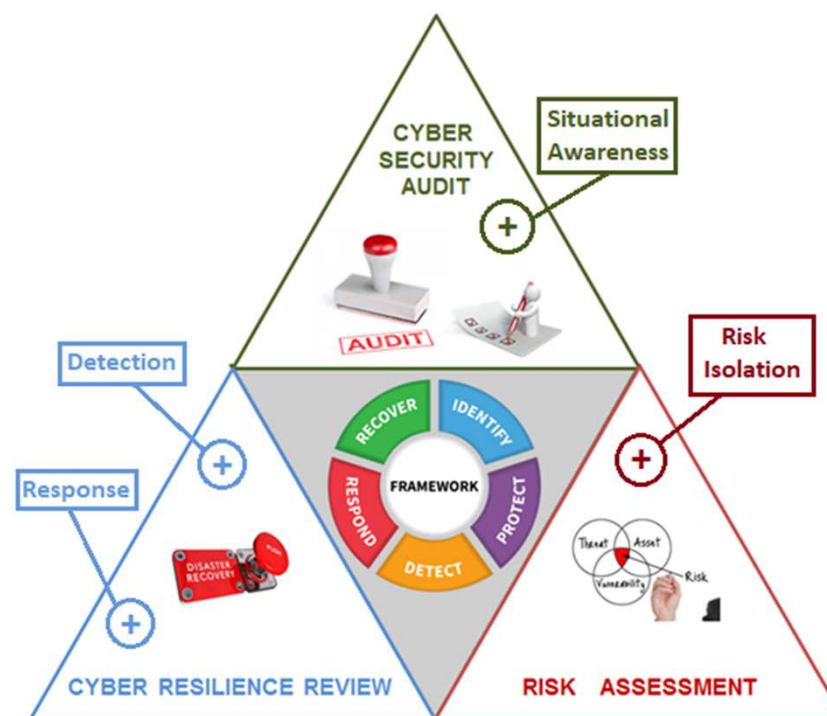


Building a car is complicated

OBJ-PJ04.01-V2-VALP-UUU2

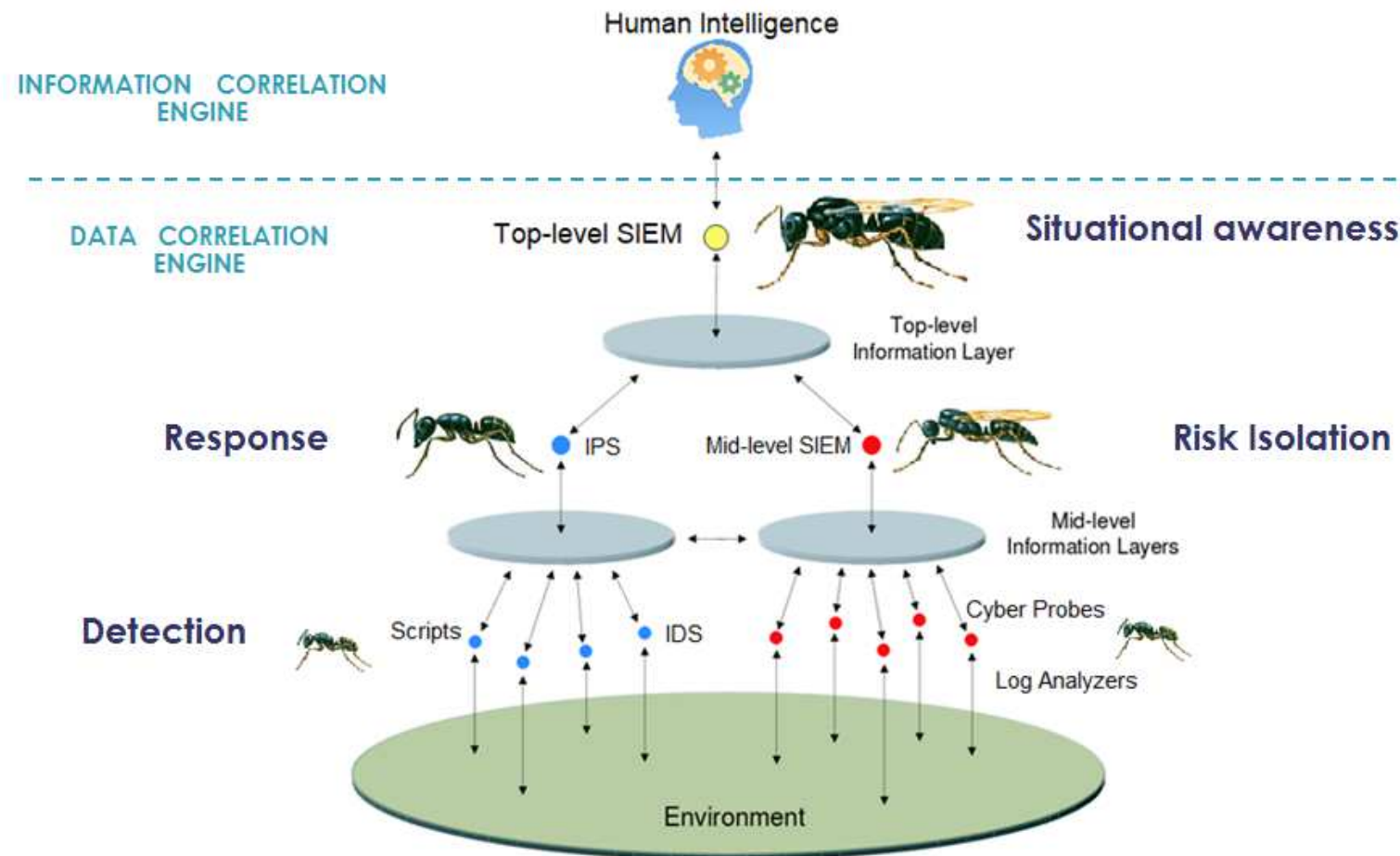
To define an advanced approach based on specific best practices and how-to implement guidelines based on the Airport Cyber Security Framework for TAM Solution.

- The idea is to introduce **Artificial Intelligence techniques** into the framework
- it is possible to identify some examples of artificial intelligence application to cyber security, mostly theoretical, with the aim of making improvements to one or more of the following aspects:
 1. *Detection*
 2. *Situational Awareness*
 3. *Risk Isolation*
 4. *Response*
- The goal of this implementation choice is to **anticipate and prevent cyber attacks using an automatic whole-resilient approach**



OBJ-PJ04.01-V2-VALP-UUU2

To define an advanced approach based on specific best practices and how-to implement guidelines based on the Airport Cyber Security Framework for TAM Solution.



The introduction of swarm intelligence into the cyber security field, is a prime example of the integration of artificial intelligence techniques into the process of adaptive investigation of the evolutionary behavior of a complex system.

OBJ-PJ04.01-V2-VALP-UUU3

To define and perform a complete and security audit and a security assessment based on Airport Cyber Security Framework for TAM Solution.



- **This objective aims** to put into practice the theoretical results provided by SESAR 1, **to test the effectiveness of the Risk Assessment framework** produced on a real infrastructure. This objective consists of two main activities:
 1. *The execution of the **Security Process Audit** that includes the **Cyber Resilience Analysis***
 2. *The fulfillment of a **Risk Assessment** based on SESAR 1 **SecRAM** methodology (please refer to the SecRAM v2.0).*

OBJ-PJ04.01-V2-VALP-UUU3

To define and perform a complete and security audit and a security assessment based on Airport Cyber Security Framework for TAM Solution.



- The execution of the Security Process Audit that includes the Cyber Resilience Analysis

1. Security Process Audit

- i. Execution of **questionnaires** to operational staff and technical managers based on **ITIL and ISO / IEC 27000 set of standards**
- ii. Evaluation of **operational processes** and **security procedures**
- iii. Analysis of the network architecture of the TAM operational and control center; **mapping of its interconnections** with the other airport systems

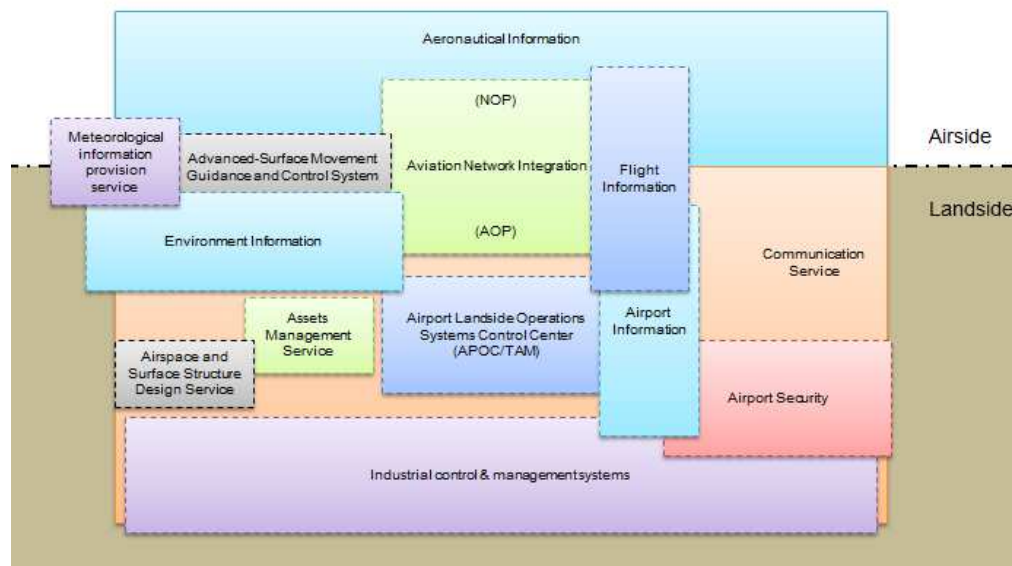
2. Cyber Resilience Analysis (**partially achieved**)

- i. Verification of the configurations of access control and perimeter defense systems
- ii. Audit of active countermeasures
- iii. Verification of the disaster recovery plan

OBJ-PJ04.01-V2-VALP-UUU3

To define and perform a complete and security audit and a security assessment based on Airport Cyber Security Framework for TAM Solution.

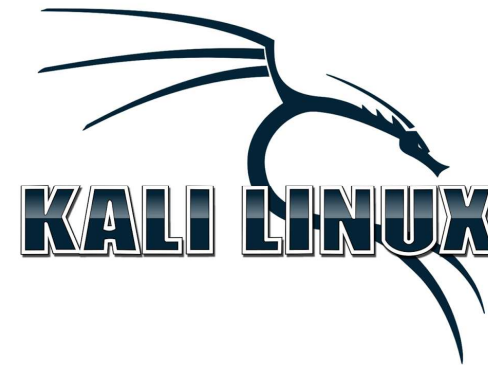
- The fulfillment of a Risk Assessment based on SESAR 1 SecRAM methodology (please refer to the SecRAM v2.0)
 1. OSED Security Assessment Report Part IIIA - Primary Assets identification
 2. OSED Security Assessment Report Part IIIB - Impact assessment on Primary Assets
 3. OSED Security Assessment Report Part IIIB - Supporting Assets derivation
 4. OSED Security Assessment Report Part IIIB - Risk evaluation and treatment
 5. OSED Security Assessment Report Part IIIC - Identification of Vulnerabilities
 6. OSED Security Assessment Report Part IIIC - Identification of Threats and probabilistic analysis of their combination



OBJ-PJ04.01-V2-VALP-UUU4

To complete the validation process, an ethical hacking Security testing activity will be performed versus the TAM infrastructure.

- A **Vulnerability Assessment** was performed against a real **TAM environment** as type of ethical hacking security testing activity
- The vulnerability assessment was conducted according to the following strategy:
 1. *Information Gathering*
 2. *Components Mapping*
 3. *Finding vulnerabilities*
 4. *Security review*



OBJ-PJ04.01-V2-VALP-UUU4

To complete the validation process, an ethical hacking Security testing activity will be performed versus the TAM infrastructure.

1. Information Gathering

- i. *Assets identification*
- ii. *Data and application localization*
- iii. *Hidden data sources extraction*
- iv. *Harvesting of cyber and physical access control systems*



2. Components Mapping

- i. *Network topology derivation*
- ii. *Operating Systems and services fingerprinting*
- iii. *Security measures identification*



MALTEGO



SHODAN

OBJ-PJ04.01-V2-VALP-UUU4



To complete the validation process, an ethical hacking Security testing activity will be performed versus the TAM infrastructure.

3. Finding Vulnerabilities

i. Vulnerability scanning



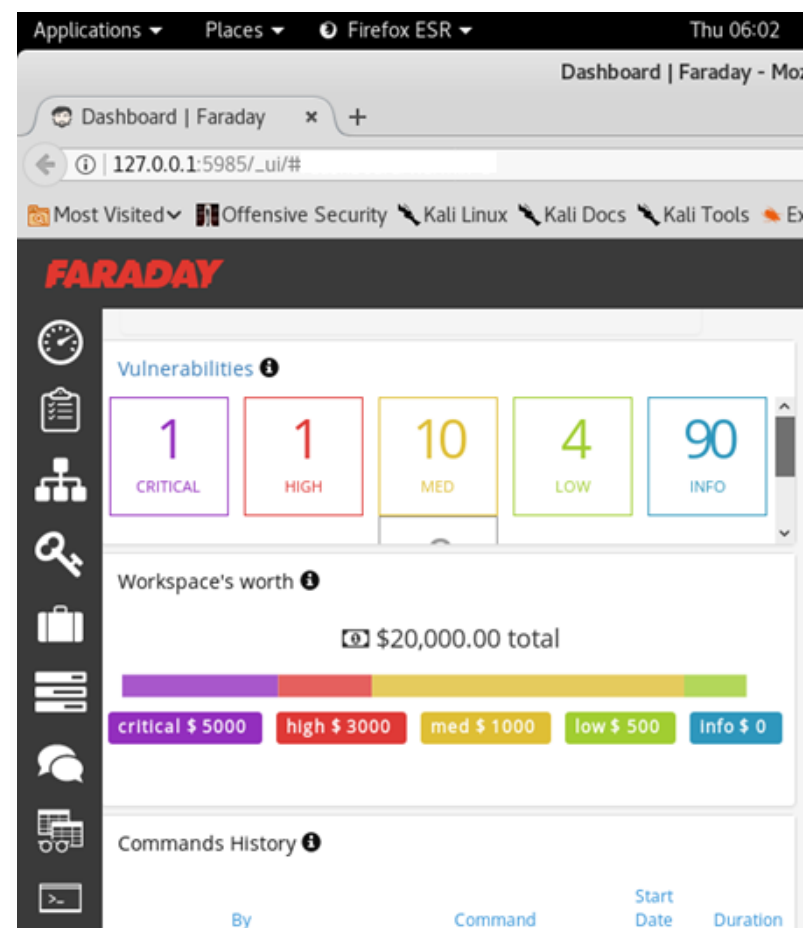
Nikto

OBJ-PJ04.01-V2-VALP-UUU4

To complete the validation process, an ethical hacking Security testing activity will be performed versus the TAM infrastructure.

4. Security review

- i. Vulnerabilities description
 - ii. Vulnerabilities severity evaluation
 - iii. Recommendations identification
 - iv. Drafting of the report of Security Process Assessment
- **The identified vulnerabilities have been collected into a classified report** that has to be **distributed exclusively to the airport's IT staff**, together with the list of recommended remediation that must be applied.
 - **Some of these vulnerabilities were anonymized and included even into the OSED - Part IIIC - Security Assessment Report**, along with other threats identified in other real world scenarios. Anyhow also **this document** which completes the risk assessment activity according to the SecRAM methodology **is categorized as high risk material**, to be shared exclusively with SJUs and the SESAR 2020 Cyber security Task Force leaders.



Conclusions



- **What are the biggest risks for TAM?**
 - i. The **TAM** platform is particularly **susceptible to attacks coming from the internal network**, particularly by disgruntled employees with a mean technical background and an adequate knowledge of the TCP/IP protocol stack.
 - ii. Theoretically **it is possible** for a particularly skilled hacker to be able **to reach some systems that manage the airside part**, carrying out the attack from the inside through the exploitation of the servers that composes the TAM.
- **What are the best cyber security improvements for TAM?**
 - i. The effective **use of a security-oriented framework**. The periodic execution of the three tasks of Cyber Security Audit, Risk Assessment and Cyber Resilience Review leads that framework **to improve its status and capabilities** from every point of view, providing new scenarios to consider, new countermeasures to be taken, new threats to be assessed, and so on, **in order to establish a continuous progress on the needs of the whole TAM infrastructure**.
 - ii. The use of **advanced cyber security techniques** (based on artificial intelligence and integrated within the framework) **can reduce the level of uncertainty** linked to the manifestation of a threat as much as possible, **by automating properly detection and correlation operations**. In this way it would be possible **to bring a simple and immediate result to the attention of the human operator**, which can promptly implement a remediation plan.

**Our business is to ensure performance and flyer experience
through risk-oriented security**



EXE-PJ04-01.V2.06-20180118

**Validation of Recording and Replay
System performance and
parameters**

Jozef JANKOVIC

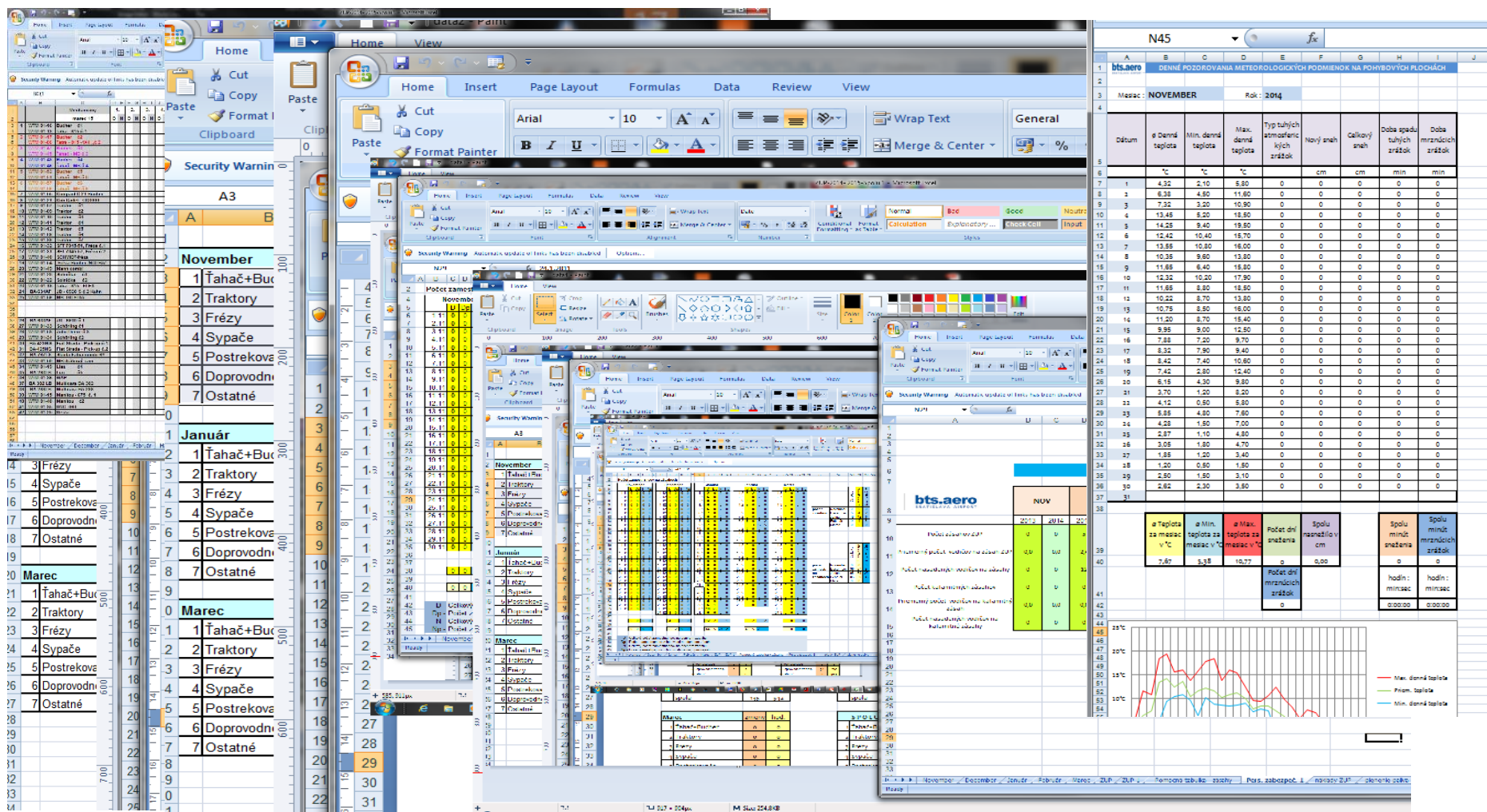


EXE-PJ04-01.V2.06-20180118

Validation of Recording and Replay System

- **Status of information management**
- **Recording capability & interfaces**
- **Data analysis**
- **System concept & architecture**
- **Post Operational Analysis Requirements**

Status of information



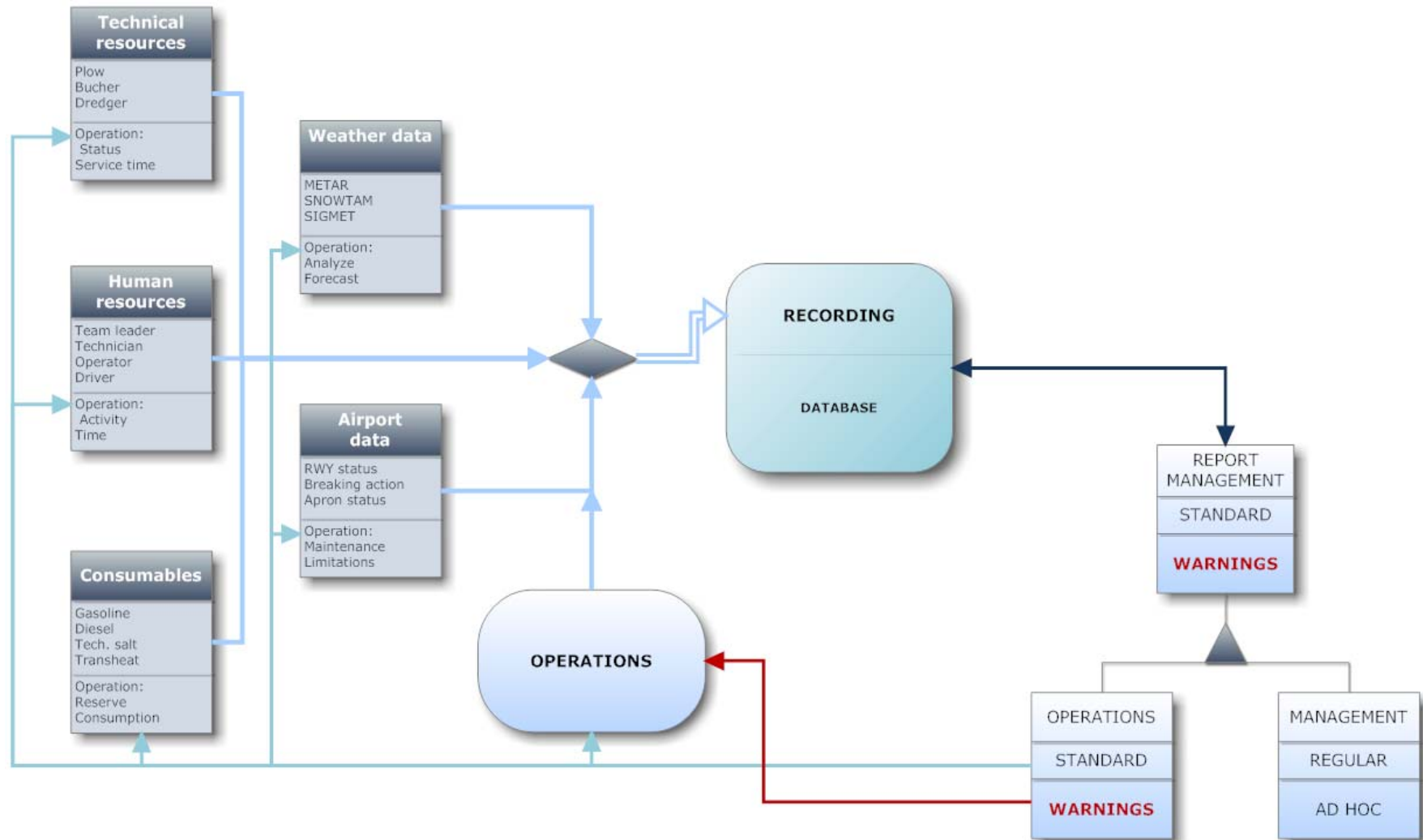
DATA ANALYSIS

- Technical resources
 - Different types
 - Different tasks
- Human resources
 - Different tasks
 - Multitasking
- Consumables
 - Season sensitive
 - Special storage and treatment (chemicals)
- Weather ...

Recording capability

- Strong and proven system 24/7 available, but:
 - Different, non-compatible interfaces required
 - Lack of automation data input at airport side
 - Missing data interchange (ATC $\leftrightarrow$ airport)
 - Missing interfaces, manual inputs
 - Lack of post operational analysis tools related to CDM and airport operations
 - Lack of standards

System concept & architecture



Post Operational Analysis Requirements

- Interface INPUT definition /automation
 - Technical resources
 - Machinery
 - Chemistry
 - Fuel
 - Human resources
 - Operational standards
 - External data input (weather status, warnings, et.)
 - Internal data input / forms and operational reporting
- DATA MODEL ANALYSIS/CREATION
- Report templates definition / Standards definition