

**Airbus ProSky**  
Peter Cabooter

## **ATFM**

Unlocking the sky

# Agenda

- Introduction Airbus ProSky
- Capacity
- Benefits of ATFM
- ATFM contributes to CDM
- Customer references & cases

# Airbus ProSky Solutions to Modernize Air Traffic Management Efficiently

Increase **flow**  
efficiency

Increase **airspace**  
efficiency

Increase **ground**  
efficiency

**ATFM / CDM**



**Airspace Services**



**Airport Solutions**



## **An outstanding team of ATM experts**

# Capacity

# Capacity = many pieces of one puzzle

1. Knowing capacity and constraints
2. Capacity = maximizing usage of current capacity + increasing capacity
3. Capacity = PBN + ATFM + surveillance capabilities + tactical tools + ...

# Benefits of ATFM

# Benefits of ATFM

- Balancing demand vs capacity AND maximizing capacity:
  - Arrivals:
    - Reduce airborne holding
    - Reduce arrival delay
  - Departures:
    - Reduce Taxi out delay
    - Reduce Push back delay
    - Improve RWY usage
    - TMA exit points

# Benefits of ATFM

- Transfer airborne holding to ground delay → Reduce Fuel burn, emissions and increase safety
- Manage all recourses:
  - airspace / sectors
  - airports
- ATFM contributes to CDM:
  - ANSP, Airport and Aircraft Operators all have access to the same information
  - Better situational awareness for better decision making:
    - Decision is taken where it needs to be taken
  - Better planning of resources
- Post-operation analysis

# ATFM contributes to CDM

# ATFM – Airspace User perspective – Slot swapping

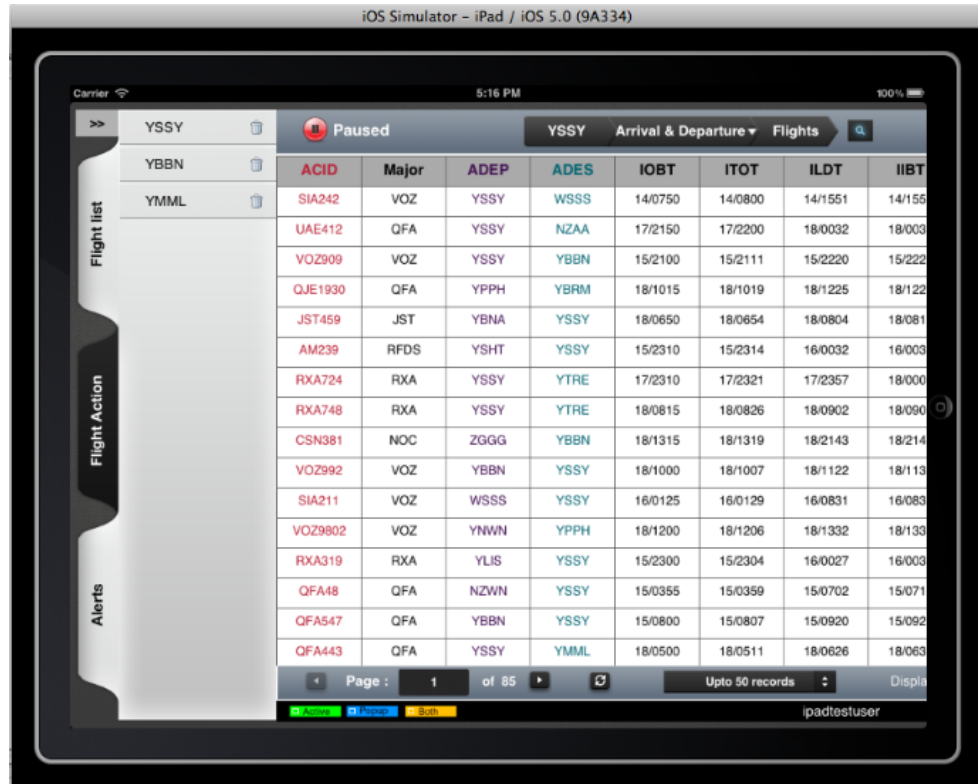
- Manage flight schedules and prioritize flights according to the operational needs within the own fleet and swap slots with other airlines

The screenshot displays the 'Flight Schedule' application interface. The main window shows a table with columns: ACID\*, Major\*, ADEP\*, ADES\*, OBT\*, IBT\*, Type\*, CNX\*, AC Reg\*, ELOBT, ELIBT, and ADEP Terminal. The table lists 26 flight entries. A tooltip 'OBT must be before IBT.' is visible over row 7. Red boxes highlight OBT and IBT values in rows 8, 19, and 21. The interface includes a menu bar (Tools, Alerts, Reports, Window, Help), a user profile (devoper1), a date/time stamp (2011-07-12 18:35), and a Logout button. At the bottom, there is a legend for data validation: a red box for 'Invalid data and/or format' and a yellow box for 'Permission issue'. Below the legend is an 'Upload Status' table with columns: File Origin, Upload Summary, Time Uploaded, and Time Completed.

ACID*	Major*	ADEP*	ADES*	OBT*	IBT*	Type*	CNX*	AC Reg*	ELOBT	ELIBT	ADEP Terminal
1 ARG707	QFA	YXGL	YBVY	13/1228	13/1433	CL60	N	KRH			
2 DHL57	DHL	YOSB	YXEG	13/0055	13/0545	B712	N	QTWB			
3 TST666	TST	YXFR	EGLK	13/1148	13/1409	DHC7	N	TYGTE			
4 CSN738	QFA	KAEL	SVSC	21/1512	21/2348	C130	N	S			
5 CFH176	CFH	YRLL	KTVR	13/0042	13/1127	BE76	N	Q			
6 QLK390	QFA	YBEV	YKIU	26/1956	27/0537	C337	N	CLFU			
7 AZW321	AZW	KBYH	SNC			BE99	N	AJWW			
8 EFA300	QFA	KTCM	LTFC	201107132315	201107130443	SH33	N	XJOT			
9 PAC101	QFA	YCUO	KYNG	13/0013	13/0202	B789	N	DFR			
10 CS192	CS	EHRD	SAZL	11/0717	11/1138	PAY3	N	W			
11 AFL541	AFL	YLRS	YSTM	20/1625	21/0120	P180	N	ORUUU			
12 SRO647	SRO	YOAD	YGSC	13/0856	13/1919	C550	N	JSEBT			
13 HAL674	QFA	KMQT	YMOY	19/0020	19/1112	G44	N	BAAB			
14 JAL852	QFA	SBPN	RJOM	13/0442	13/1456	E737	N	X			
15 AXF788	AXF	YRMA	YIGB	13/1131	13/1459	F27	N	LEJSS			
16 MEA989	QFA	FACT	KSMX	13/0526	13/1236	SW4	N	YDCYK			
17 VIR165	VOZ	SKMR	YIER	13/0326	13/0441	H25A	N	KTXGF			
18 AWK484	AWK	YKAI	KPLN	30/0355	30/0520	GL5T	N	UWN			
19 CDN655	QFA	YIGM	SCNM	201107132319	201107130102	BE24	N	HF			
20 EFA901	QFA	GMTT	OJAM	13/1027	13/1647	F2TH	N	V			
21 ACA817	QFA	KBAM	YBMA	201107132114	201107130201	C340	N	HTNGJ			
22 ANE714	ANE	YAUS	YGMD	22/1052	22/1531	TBM7	N	JS			
23 PAO22	QFA	YLCS	OPTA	13/0817	13/1012	G150	N	UOL			
24 CDN360	QFA	KAGC	LSGK	19/0753	19/1730	CRJ2	N	CGQJK			
25 UAE875	QFA	LFBL	MMIA	12/0156	12/0328	C210	N	XXT			
26 CFS950	QFA	CYZX	HLSH	13/0108	13/1050	1328	N	Z			

# CDM – Flight crew, ground handlers, gate agents, ...

- Communication of flight times including ATFM controls to mobile system stakeholders such as flight crew, ground handlers, gate agents, airport authorities, etc.



# Airport view – flight lists, slot list, RWY strategy,...

Slot Substitution
Tools Alerts Reports Window Help
developer1 2011-06-27 13:04 Logout
Updated 2011-06-27 13:04:26

Traffic Management Initiatives
Retrieved substitution data of all controlled flights for airport named YSSY.

Ground Delay Programs (GDPs)
YSSY Slots List

YSSY - SUBS: ALL ON
27/2000 to 28/1259

	Slot	Slot Hold	ACID	Major	AC Reg	ADEP	IOBT	ELOBT	COBT	ETD	ADES	ARwy	CLDT	CIBT	ETA	Program Delay	Gate Delay
1	27/2000	<input type="checkbox"/>	<a href="#">VIR200</a>	VOZ	GVFIZ	VHHH	27/1120		27/1120	27/1130	YSSY	34L	27/2000	27/2004	27/1959	1	0
2	27/2000	<input type="checkbox"/>										34R					
3	27/2003	<input type="checkbox"/>	<a href="#">UAL839</a>	UAL		KLAX	27/0532		27/0532	27/0542	YSSY	34L	27/2003	27/2007	27/2003	1	0
4	27/2003	<input type="checkbox"/>										34R					
5	27/2006	<input type="checkbox"/>										34R					
6	27/2006	<input type="checkbox"/>										34L					
7	27/2009	<input type="checkbox"/>	<a href="#">CPA111</a>	QFA	BLAD	VHHH	27/1100		27/1100	27/1110	YSSY	34L	27/2009	27/2013	27/2007	2	0
8	27/2009	<input type="checkbox"/>										34R					
9	27/2012	<input type="checkbox"/>	<a href="#">QFA829</a>	QFA		YPDN	27/1615		27/1615	27/1620	YSSY	34R	27/2012	27/2021	27/2012	0	0
10	27/2012	<input type="checkbox"/>	<a href="#">CCA173</a>	QFA	B6090	ZBAA	27/0820		27/0820	27/0830	YSSY	34L	27/2012	27/2016	27/2012	0	0
11	27/2015	<input type="checkbox"/>	<a href="#">VOZ4150</a>	VOZ		WADD	27/1415		27/1418	27/1428	YSSY	34L	27/2015	27/2023	27/2015	3	3
12	27/2015	<input type="checkbox"/>	<a href="#">PBN182</a>	VOZ	ZKPBG	NFTF	27/1423		27/1425	27/1435	YSSY	34R	27/2015	27/2025	27/2015	0	0
13	27/2018	<input type="checkbox"/>	<a href="#">UAL863</a>	UAL		KSFO	27/0552		27/0552	27/0602	YSSY	34L	27/2018	27/2022	27/2018	1	0
14	27/2018	<input type="checkbox"/>										34R					

Page 1 of 14
Display: Up to 50 Results

YSSY Cancelled Flights List

	Slot	Slot Hold	ACID	Major	AC Reg	ADEP	IOBT	ELOBT	COBT	ETD	ADES	ARwy	CLDT	CIBT	ETA	Program Delay	Gate Delay
1	27/2218	<input checked="" type="checkbox"/>	<a href="#">CPA161</a>	QFA	BLAC	VHHH	27/1330		27/1330	27/1340	YSSY	34L	27/2218	27/2222	27/2218	0	0
2		<input type="checkbox"/>	<a href="#">CPA2033</a>	QFA	BKAE	VHHH	27/1335		27/1335	27/1345	YSSY	34L	27/2151	27/2155	27/2151	0	0

Page 1 of 1
Display: Up to 50 Results

- Active - Pop-Up - Active, Pop-Up
Undo Cancel Flight Reinst. Flight Swap Submit

Flight List
Search Flight List: YMML

YMML Flight List
Custom Filter: [None]

Display: Arrivals & Departures
Tower View
Updated 2011-06-27 13:04:10

	Sorted Time	ACID	Major	AC Reg	Status	ADEP	IOBT	COBT	ETD	ADES	Slot	CIBT	ETA	EIBT
1	27/1250	<a href="#">NJZ</a>	UNKN	VHNJZ	Departure	YMML	27/1242		27/1250	YSSY			27/1357	27
2	27/1252	<a href="#">VOZ898</a>	VOZ	VHBZG	Arrival	YSSY	27/1136		27/1142	YMML			27/1252	27
3	27/1257	<a href="#">VOZ754</a>	VOZ	VHVUL	Arrival	YBCG	27/1100		27/1103	YMML			27/1257	27
4	27/1300	<a href="#">TFX4</a>	TFX	VHTOX	Arrival	YPAD	27/1100		27/1125	YMML			27/1300	27
5	27/1301	<a href="#">JST214</a>	JST	VHVQB	Arrival	NZAA	27/0900		27/0923	YMML			27/1301	27
6	27/1301	<a href="#">QFA29</a>	QFA	VHOJF	Departure	YMML	27/1250		27/1301	VHHH			27/2119	27
7	27/1303	<a href="#">QTR31</a>	QTR	A7BBD	Departure	YMML	27/1255		27/1303	OTBD			28/0217	28
8	27/1308	<a href="#">THA462</a>	QFA	HSTKD	Departure	YMML	27/1330		27/1308	VTBS			27/2150	27
9	27/1316	<a href="#">VOZ356</a>	VOZ	VHYFC	Arrival	YBBN	27/1100		27/1116	YMML			27/1316	27
10	27/1320	<a href="#">JST712</a>	JST	VHVJG	Arrival	YMHB	27/1220		27/1229	YMML			27/1320	27
11	27/1321	<a href="#">QFA776</a>	QFA	VHEBM	Arrival	YPPH	27/1020		27/1014	YMML			27/1321	27
12	27/1321	<a href="#">QFA497</a>	QFA	VHOGQ	Arrival	YSSY	27/1210		27/1218	YMML			27/1321	27

Page 1 of 13
Display: Up to 50 Results

Runway Configuration
Runway Configurations - YSSY

Start Time	End Time	Configuration	Arrival Runways	Departure Runways	Descri...
27/1243	27/1359	34VMC	34L,34R	34L,34R	
27/1400	27/1959	34VMC	34L,34R	34L,34R	
27/2000	28/1259	34LS15	34L,34R	34L,34R	

Arrival Runways			Departure Runways		
Time	Runway	Aircraft Category	Time	Runway	Aircraft Category
27/2000	34L	H,J,L,T	27/2000	34L	H,J,L,T
	34R	J,L,T		34R	J,L,T
27/2015	34L	H,J,L,T	27/2100	34L	H,J,L,T
	34R	J,L,T		34R	J,L,T
27/2030	34L	H,J,L,T	27/2200	34L	H,J,L,T
	34R	J,L,T		34R	J,L,T
27/2045	34L	H,J,L,T	27/2300	34L	H,J,L,T
	34R	J,L,T		34R	J,L,T
27/2100	34L	H,J,L,T	28/0000	34L	H,J,L,T
	34R	J,L,T		34R	J,L,T
27/2115	34L	H,J,L,T	28/0100	34L	H,J,L,T
	34R	J,L,T		34R	J,L,T
27/2130	34L	H,J,L,T	28/0200	34L	H,J,L,T
	34R	J,L,T		34R	J,L,T
27/2145	34L	H,J,L,T	28/0300	34L	H,J,L,T
	34R	J,L,T		34R	J,L,T
27/2200	34L	H,J,L,T	28/0400	34L	H,J,L,T
	34R	J,L,T		34R	J,L,T

Page 1 of 13
Display: Up to 50 Results

Displaying 1 - 50 of 637
Displaying 1 - 2 of 2

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# Implementing ATFM

- Change of behaviour
- Human resources and Training
- Incremental steps, based on your specific situation/environment
- Include different stakeholders from the start
  
- Plan for the impact on your organization:
  - ANSP
  - Airlines
  - Airport

# Airbus ProSky

## References

# CAA, ANSP & Airport Customers



# Our ATFM/CDM Customers



# Harmony in North America

## FAA's challenge

- World's largest ANSP responsible for 80,000 flights/day
- In 1990, huge traffic increase brought unprecedented delays
- Limited common situational awareness and no access to delay information

## The Solution

- For more than 15 years, the FAA partners with Metron Aviation on systematic approach to ATFM/CDM strategies & deployment

## Benefits

- Since commissioning the Collaborative ATFM system in 1998, stakeholders have saved more than:
  - 70 million minutes of delays
  - 191 million liters of fuel
  - 590 thousand metric tons of CO2 emissions
  - Over US\$7.0 Billion in operating costs



## Stakeholders



# Harmony in South Africa

## Air Traffic Navigation Services' (ATNS) challenge

- Johannesburg airport (JNB) experienced a daily average of 350 total minutes of airborne holding
- Need to address projected demand growth during the FIFA 2010 World Cup

## The Solution

- Harmony allowed ATNS to efficiently manage South African airspace during the FIFA 2010 World Cup
- Training and operations support with ATFM Subject Matters Experts on site

## Benefits

### Airborne holding has been eliminated at JNB airport

- +US\$1.2M in savings per annum for every one minute of saving at runway hold
- +US\$0.7M reduction in airborne hold due to weather disruption
- +US\$0.4M in additional fuel burn savings
- = **US\$2.3M in total savings per annum**



## Stakeholders



# Harmony in Australia

## Airservices Australia's (ASA) challenge

- 3 million flights and traffic increasing by 3% annually
- Already experiencing demand and capacity imbalances
  - Increased airborne holding

## The Solution

- Harmony (operational in Australia since March 2012)
  - Sydney, Perth, Brisbane, and Melbourne
- Training with ATFM Subject Matters Experts on site

## Benefits

- **Airborne holding reduced by 33%** in peak hours representing:
  - **Average flight time reduced by 5 min** in MEL-SYD city pair,
  - **US\$39M of annual fuel savings** (Sydney)
  - Equivalent to over **40,000 tonnes of CO2 reduced** per year



## Stakeholders



# Regional ATFM/CDM Proof of Concept

- Research project with Civil Aviation Authority of Singapore
  - Current ATFM concepts not applicable for Singapore's 100% international arrival traffic
  - Project initiated March, 2013 to develop operational concept for regional ATFM/CDM
- Research Objectives
  - Establish ATFM Technology Test bed based on Harmony for ANSPs
  - Engage local and regional stakeholders (Singapore and APAC)
  - HITL and concept demonstrations
  - HITLs conducted successfully in November and final report including the validated Concept of Operations delivered in January, 2014



# Air Traffic Flow Management (ATFM) and A-CDM in China

Cooperate on modernizing the country's Air Traffic Management System and to implement the latest Air Traffic Management (ATM) technologies

## Phase 1: HITL March 2014

- Integration with East China ATMB
- Proof of Concept for a National Flow Management System

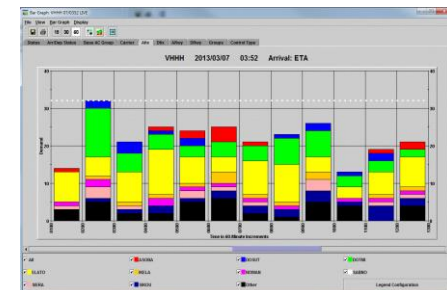
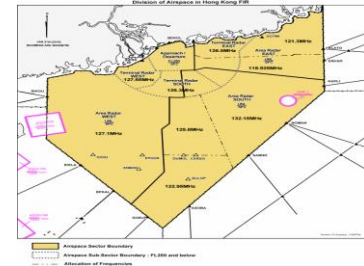
## Phase 2: Operational trial

- Standalone National System – completed August 2014
- Integrated with regional ATMB's – November 2014



# Hong Kong ATFM Trial

- Hong Kong FIR Challenges
  - HKIA accepts traffic from up to 9 different arrival fixes
  - Manual procedures currently used to smooth arrival fix demand
  - Airborne flow restrictions passed to neighboring FIRs creates potential for inefficiency and inequity
- Hong Kong CAD ATFM Trial Project
  - 8 month ATFM Trial using Harmony for ANSPs
    - Improved arrival fix and HKIA demand/capacity prediction
    - Automated tools for modeling and implementing ATFM measures
  - Outcomes:
    - Efficiency of HKIA maintained and improved
    - Improved efficiency & equity in airborne flow restrictions
    - Increased situational awareness



# APAC ATFM Strategy Study for IATA – April 2014



- Project Scope

- Survey ATFM capabilities and interoperability among APAC States
- Develop ATFM implementation strategy for APAC
- Communicate recommendations to ICAO and APAC states

- Project Activities

- Based on survey inputs, collate and evaluate current ATFM initiatives among APAC States and international organizations to form coherent picture and timeline of ATFM capabilities and initiatives with focus on multi-FIR programs
- Perform analysis and make recommendations on the establishment of sub-regional ATFM via an implementation strategy
- Present survey findings and implementation strategy for consideration by ICAO APAC ATFM Steering Group

# Colombia ATFM/CDM System - December 2013

- Aeronautica Civil Challenges
  - Volume increase at El Dorado International Airport (SKBO)
  - Current slot assignment performed manually with participation of the major airlines
  - Lack of visibility with the demand for remote regions, such as El Yopal
  - Outcomes:
    - Efficient use of resource capacity
    - Fuel and emission reductions
    - Improved visibility of demand for remote regions



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# Q&A