
IFATCA

RECAT
LONDON AND DUBAI

PRESENTED BY
ADAM EXLEY AND JANUS STRØM-TEJSEN


LONDON

HEATHROW WAKE TURBULENCE TIMELINE

1997

UK 6 CAT

- No tool support
- Modification to the ICAO wake turbulence categories

2015

Time Based Spacing

- Continuation of UK 6 CAT
- Controller tool support

2018

Enhanced TBS

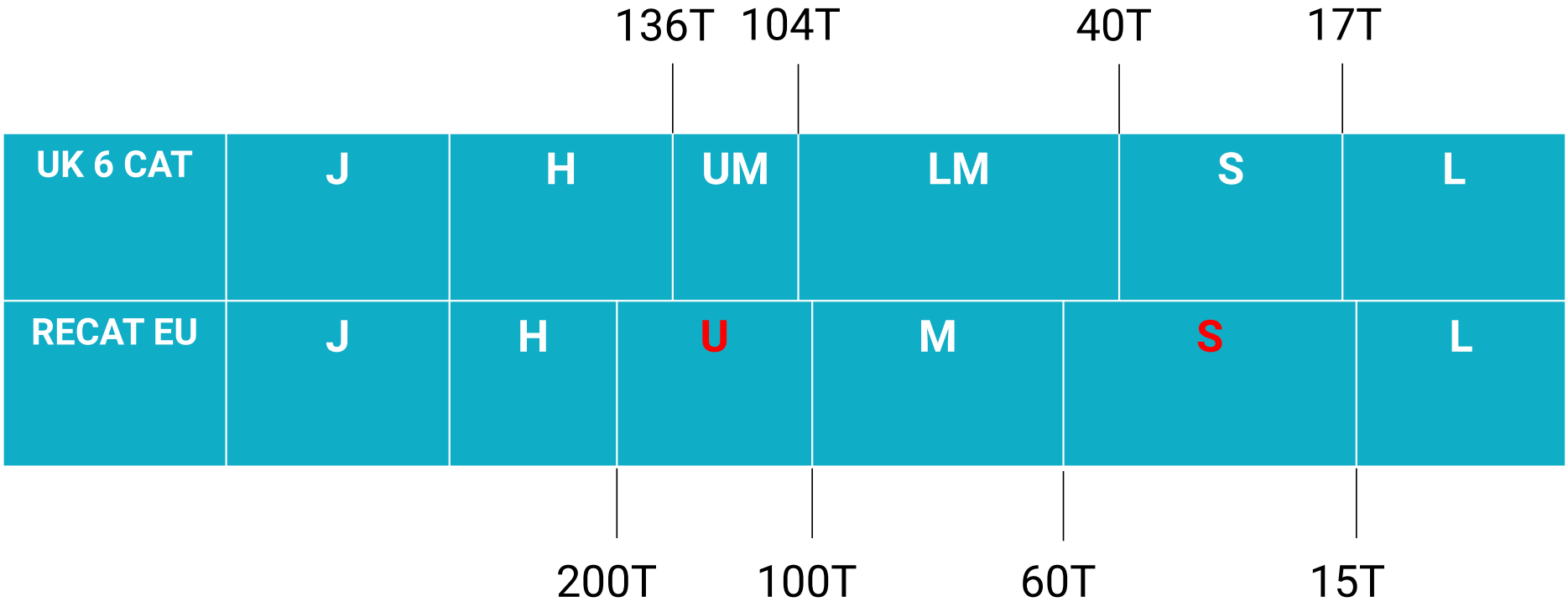
- Introduction of **RECAT-EU** at Heathrow
- Controller support re-designed

Future...

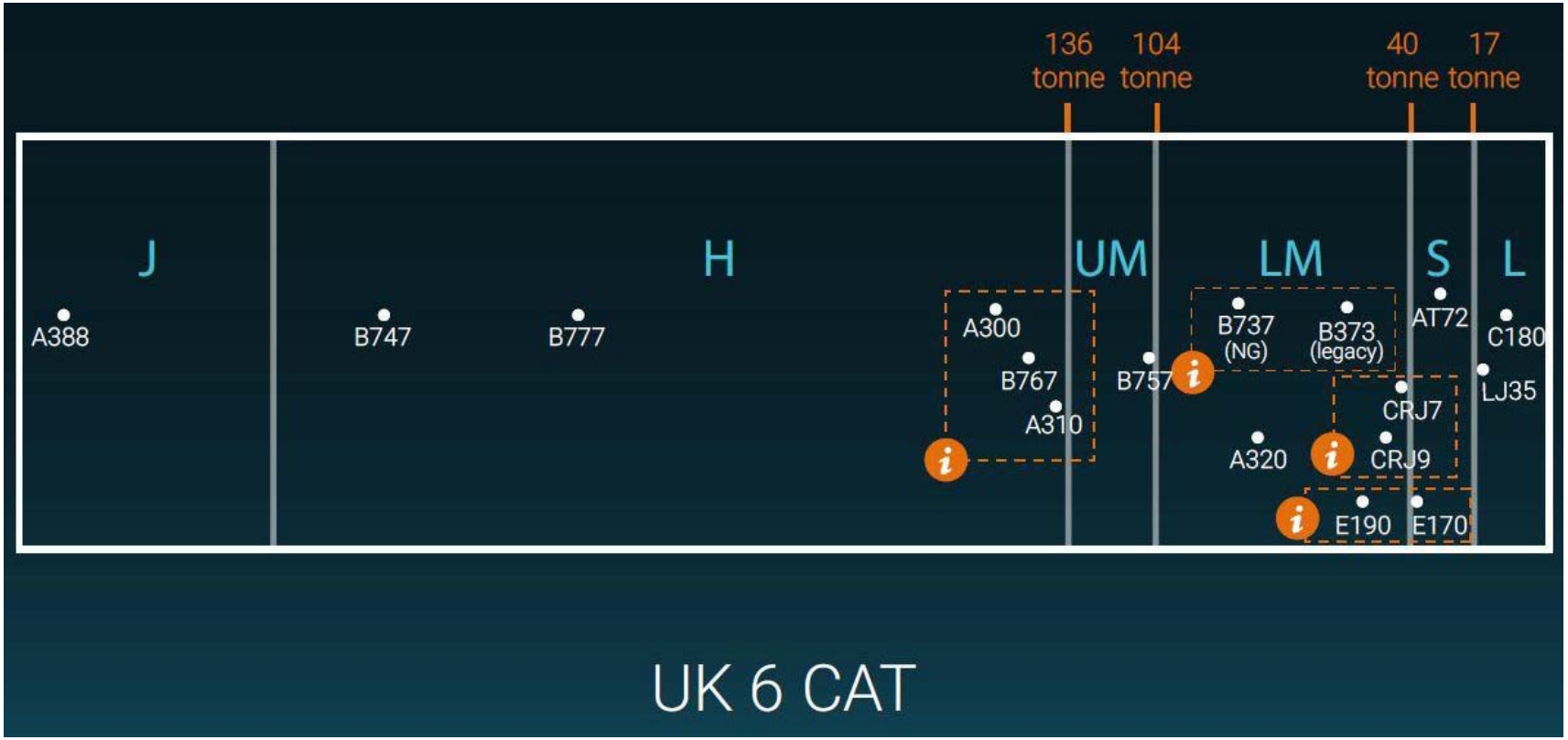
PWS

- Indicator support for all aircraft pairs

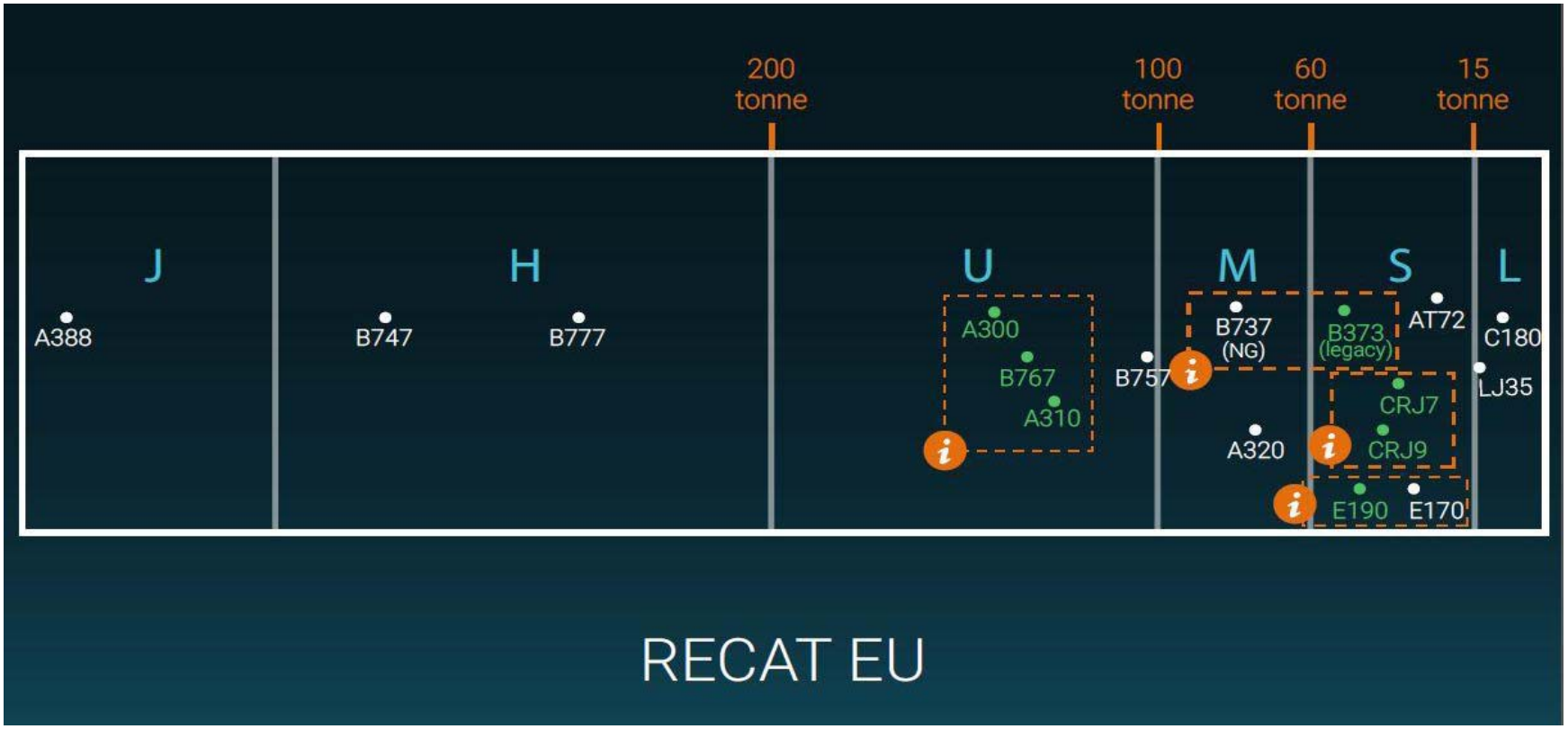
RECAT-EU AND UK 6 CAT



UK 6 CAT


136 tonne
104 tonne
40 tonne
17 tonne
J
H
UM
LM
S
L
A388
B747
B777
A300
B767
A310
B757
B737 (NG)
B373 (legacy)
AT72
C180
LJ35
CRJ7
A320
CRJ9
E190
E170
UK 6 CAT

RECAT-EU

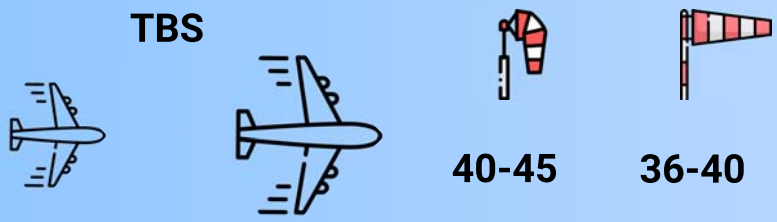

200 tonne
100 tonne
60 tonne
15 tonne
J
H
U
M
S
L
A388
B747
B777
A300
B767
A310
B757
B737 (NG)
B373 (legacy)
AT72
C180
LJ35
CRJ7
CRJ9
A320
E190
E170
RECAT EU

IMPLEMENTATION OF RECAT-EU AT HEATHROW

UK 6 CAT

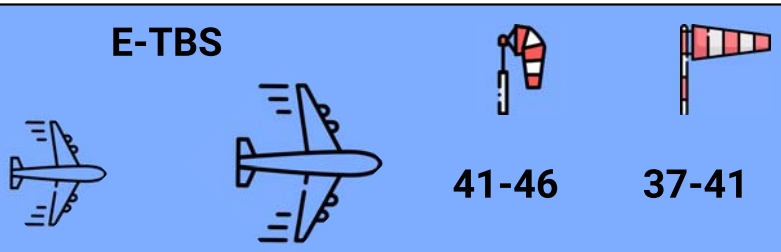
- Introduced in 1997
- Difference from ICAO wake turbulence specification
- No controller tool support

TBS

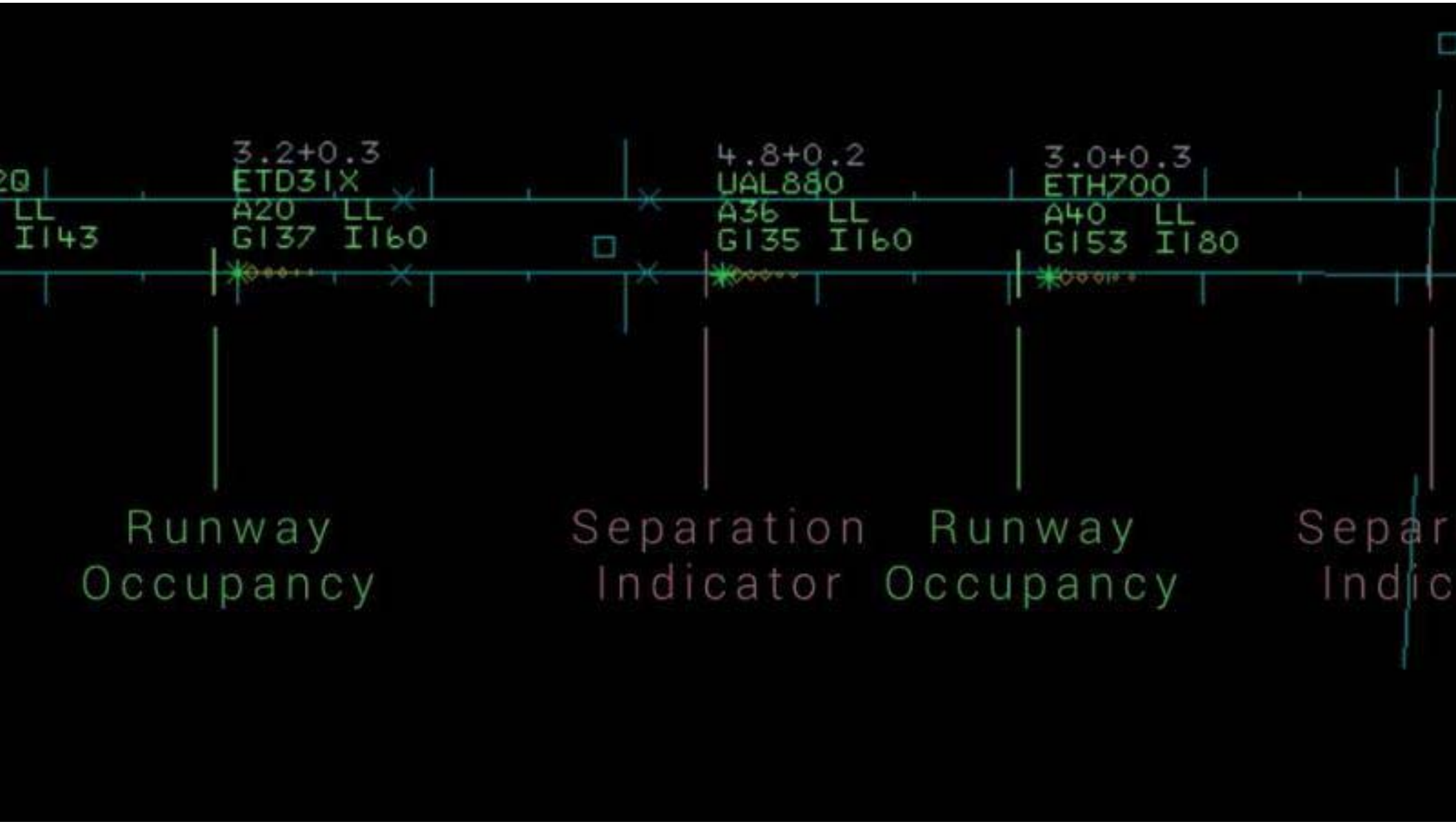


- Introduced in 2015
- Controller support tools designed and implemented
- Continued to use **UK 6 CAT** as reference

E-TBS



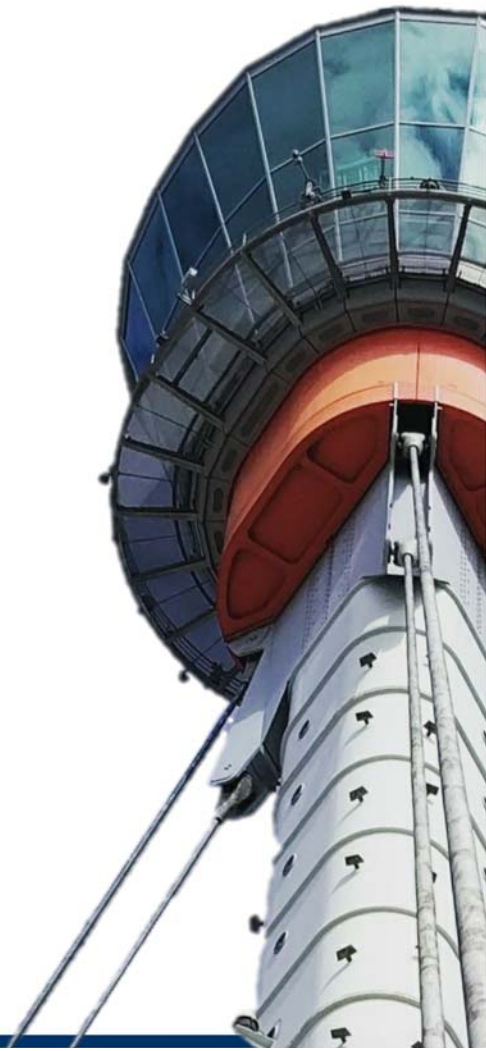
- Introduced in 2018
- Controller support tools re-designed with associated rule/procedure changes
- Introduced **RECAT-EU** as the wake turbulence minima


20
LL
I143
3.2+0.3
ETD31X
A20 LL
G137 I160
4.8+0.2
UAL880
A36 LL
G135 I160
3.0+0.3
ETH700
A40 LL
G153 I180
Runway Occupancy
Separation Indicator
Runway Occupancy
Separ
Indic

- Designed with controllers
- Only introduced at Heathrow
- System adaption
- Procedure changes for implementation
- ATCO Training

DESIGN

- Simulation and workshops had input from ATCOs, Pilots, safety and human factor teams
- Transparent and visible safety process with briefings, presentations and open channels for dialogue
- Updated A-MAN (Arrival Manager) system to interpret RECAT-EU separation minima

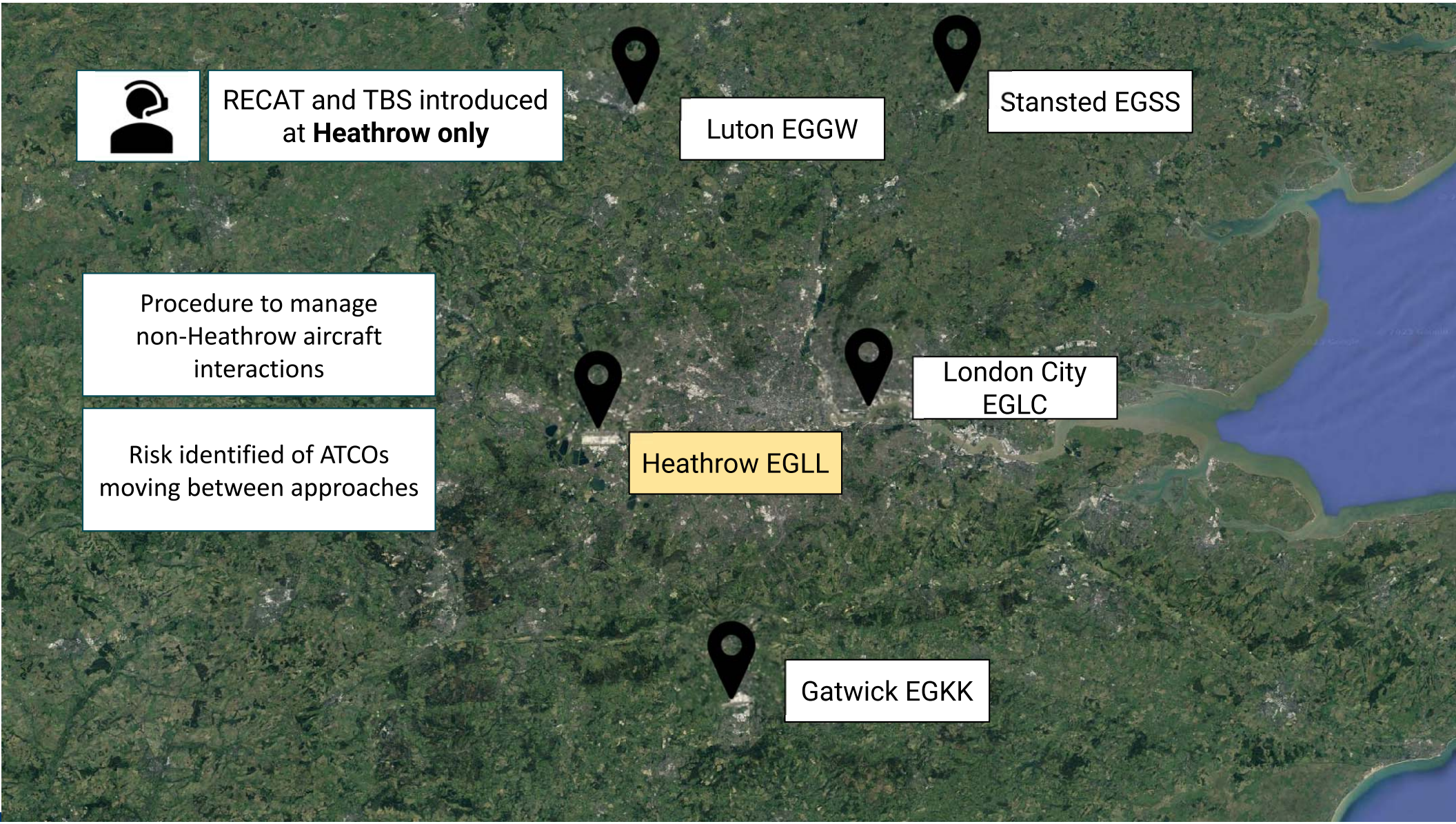


ATCO TRAINING

- TBS system was already in use for a few years prior
- Reassurance of the new wake turbulence minima was given and controller liability was a constant discussion point
- Confidence from the safety team provided the reassurance within the ATCO workforce
- Full ATCO team briefings
- CBT packages
- Simulator sessions for all ATCOs

PROCEDURE CHANGES REQUIRED FOR IMPLEMENTATION

- Requirement to separate until threshold rather than 4dme
- introduced new concepts for the ATCO to understand
  - ORD (Optimised Runway Delivery)
  - Mode-S derived wind profiles
  - RECAT-EU wake turbulence minima
  - Runway occupancy markers
- Operating with mixed wake turbulence minima within the London TMA
- RECAT-EU wake turbulence separation applies from the holding fixes until touchdown


RECAT and TBS introduced at **Heathrow only**
Luton EGGW
Stansted EGSS
Procedure to manage non-Heathrow aircraft interactions
London City EGLC
Risk identified of ATCOs moving between approaches
Heathrow EGLL
Gatwick EGKK

SYSTEM ADAPTION

	RECAT-EU scheme		"Super Heavy"	"Upper Heavy"	"Lower Heavy"	"Upper Medium"	"Lower Medium"	"Light"
	Leader / Follower		"A"	"B"	"C"	"D"	"E"	"F"
Super	"Super Heavy"	J	3 NM	4 NM	5 NM	5 NM	6 NM	8 NM
Heavy	"Upper Heavy"	H		3 NM	4 NM	4 NM	5 NM	7 NM
Upper	"Lower Heavy"	U		(*)	3 NM	3 NM	4 NM	6 NM
Medium	"Upper Medium"	M						5 NM
Small	"Lower Medium"	S						4 NM
Light	"Light"	L						3 NM

Table 3: RECAT-EU WT distance-based separation minima on approach and departure

(*) means minimum radar separation (MRS), set at 2.5 NM, is applicable as per current ICAO doc 4444 provisions.

WHAT THE HEATHROW ATCO SEES

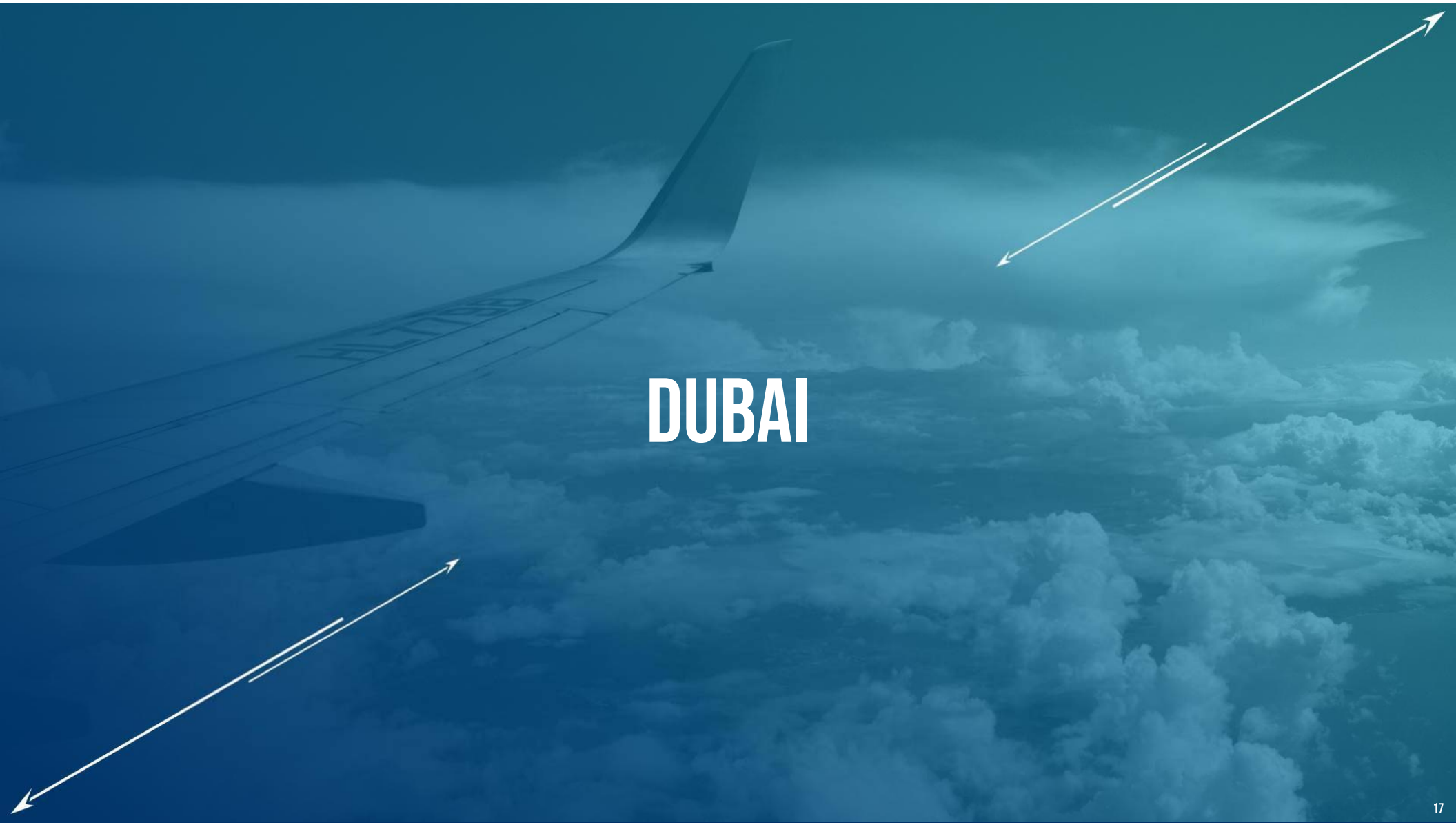
- Increased landing rate by around 1 movement per hour
- Consistent landing rate in different wind conditions

- Occasional pilot requests to know what aircraft type they are following on approach

  Usually in lighter winds and has two general outcomes

  1) Request to slow down earlier on the approach to have a larger gap between them
  2) Curiosity with no effect on the approach speed profile

- Workload reduction for ATCOs deciding the order of arrival
- Slightly increased RT associated with the extra movement and the requirement to check aircraft variants


DUBAI

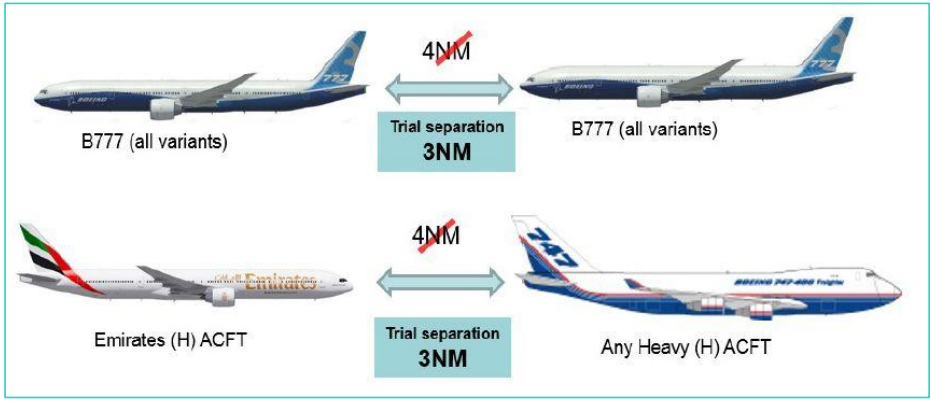
INTRODUCTION TO DUBAI ENHANCED WAKE TURBULENCE SEPARATION

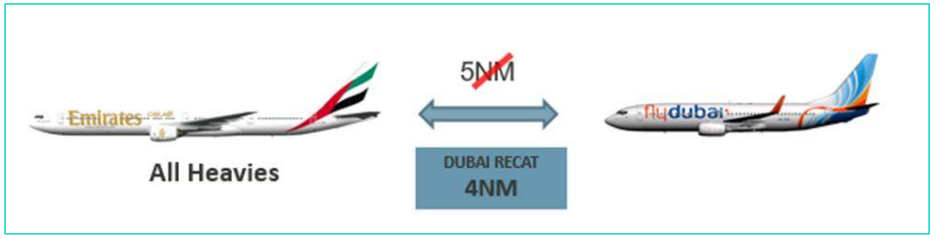
- ICAO enhanced WTS as per ICAO DOC 4444 was implemented in DUBAI CTA on 21 February 2021.
- Legacy ICAO WTS no longer used by Dubai Approach.
- Dubai Approach provides an approach control service to four aerodromes within DUBAI CTA (OMDB, OMSJ, OMDM, and OMDW). eWTS is applied between arrivals to all aerodromes.
- eWTS implemented between departures at OMDB and OMDW.
- National regulations define arrival/departure phase to be at and below 6000ft, i.e. WTS applied at and below 6000ft within DUBAI CTA.


Sharjah Airport / OMSJ
Dubai International Airport / OMDB
Al Minhad/ OMDM
Al Maktoum Airport / OMDW

REDUCED WAKE SEPARATION TRIALS

- Dubai Air Navigation Service (dans) and Emirates with GCAA approval introduced a wake trial in 2015 allowing for a reduction for in-trial spacing from 4NM to 3NM between all B777 variants and Emirates heavy aircraft following any heavy aircraft.
- In 2019 the trial was expanded to included a reduction for in-trial spacing from 5NM to 4NM for FlyDubai B737 (medium) following heavy aircraft.





TRAFFIC MIX AND MOVEMENT

- Most frequently aircraft pairing at Dubai International Airport (OMDB) are B-B, B-D, D-B, and D-D.
- Approx. 10% of aircraft operating at OMDB are A380/A.
- Peak arrival throughput increase of 2-4 movements per hour post ICAO eWTS implementation.

ICAO legacy same runway minima

Leading \ Trailing	A	B	C	D	E	F	G
A		6	6	7	7	7	8
B		4	4	5	5	5	6
C		4	4	5	5	5	6
D							5
E							5
F							5
G							

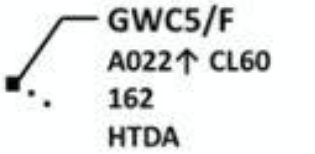
ICAO eWTS same runway minima

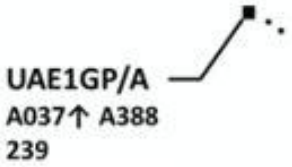
Leading \ Trailing	A	B	C	D	E	F	G
A		4	5	5	6	6	8
B		3	4	4	5	5	7
C				3	3.5	3.5	6
D							4
E							4
F							0
G							

Difference

Leading \ Trailing	A	B	C	D	E	F	G
A		-2	-1	-2	-1	-1	0
B		-1	0	-1	0	0	1
C		-4	-4	-2	-1.5	-1.5	0
D							-1
E							-1
F							-5
G							

EQUIPMENT

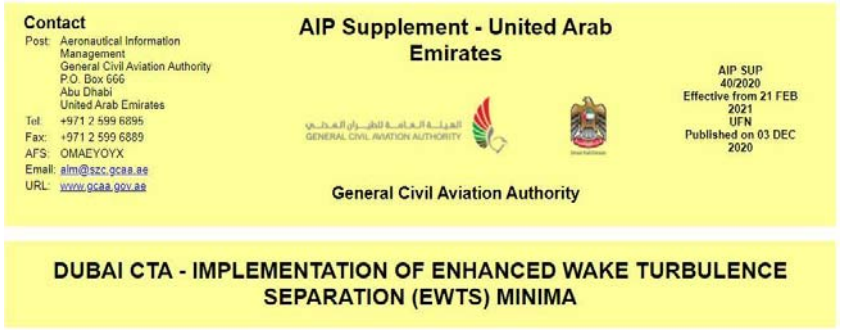




- ATM Platform updated to display WTG
  - FPL provides A/C type and WTC, conversion to WTG done by ATM Platform (ICAO Doc 8643).
  - WTG permanently displayed in all aircraft labels.
  - Generic aircraft types adapted to manually display WTG.
- Aircraft type available in label, permanently displayed on Final Director sector.
- External ATM equipment
  - Arrival Manager (AMAN) continued use of legacy ICAO.
- ATM Platform spacing tool not in use.

ATC PROCEDURES AND STAKEHOLDER AWARENESS.

- Transposition of ICAO eWTS procedures (Doc 4444) to Local ATS Instructions.
- Handling of unknown/special aircraft types (missing, UAS, unidentified etc.)
- Letter of Agreement between involved ATCU updates
- DUBAI CTA section of UAE AIP update.
- Reporting aircraft type.



Contact
Post: Aeronautical Information Management
General Civil Aviation Authority
P.O. Box 666
Abu Dhabi
United Arab Emirates
Tel: +971 2 599 6895
Fax: +971 2 599 6889
AFS: OMAEYOYX
Email: aim@szc.gcaa.ae
URL: www.gcaa.gov.ae

AIP Supplement - United Arab Emirates

AIP SUP 40/2020
Effective from 21 FEB 2021
UFN
Published on 03 DEC 2020

General Civil Aviation Authority

DUBAI CTA - IMPLEMENTATION OF ENHANCED WAKE TURBULENCE SEPARATION (EWTS) MINIMA

ATCO PREPARATION

- Extensive safety work and training needs analysis completed prior to implementation
- ATC procedures were promulgated prior to implementation and included as part of the training.
- Quicklook sheet available at all ATCO work positions.
- ATCO received a ‘Credit-card’ aide-memoire with eWTS spacing, including common aircraft types.

ICAO eWTS 7 GROUPS		TRAILING AIRCRAFT						
LEADING AIRCRAFT	eWTS	A	B	C	D	E	F	G
	A A380	MRS	4	5	5	6	6	8
	B B777/B747/B787/A330	MRS	3	4	4	5	5	7
	C B767/A310/MD11	MRS	MRS	MRS	3	3.5	3.5	6
	D B738/A320/A321/A319	MRS	MRS	MRS	MRS	MRS	MRS	4
	E B735/F100/GLEX	MRS	MRS	MRS	MRS	MRS	MRS	4
	F AT72/B462/E170/RJ85	MRS	MRS	MRS	MRS	MRS	MRS	MRS
	G BE19/C650/E50P/FA20/SR22	MRS	MRS	MRS	MRS	MRS	MRS	MRS

ICAO eWTS DISTANCE-BASED SEPARATION MINIMA ON APPROACH AND DEPARTURE

ICAO RECAT eWTS 7 GROUPS		FOLLOWER						
LEADER		A	B	C	D	E	F	G
	A A380		1:40	2:00	2:20	2:40	2:40	3:00
	B B777/B747/B787/A330				1:40	2:00	2:00	2:20
	C B767/A310/MD11				1:20	1:40	1:40	2:00
	D B738/A320/A321/A319							2:00
	E B734/B735/F100/GLEX							1:40
	F CRJ2/RJ85/CL60/GLF4							
	G C25A/H25B/LJ60/CL30/SR22							

DEPARTURE TIME-BASED SEPARATION IN MINUTES AND SECONDS

ATCO TRAINING

- ATCO training consisted of:
  - CBT completion prior to simulator session, and again 4 days prior to go-live date. Pass score required.
  - Simulator sessions with multiple scenarios.
  - Information campaign
  - Unlimited CBT via MS Teams allowing ATCOs to complete the training in their own pace, optimal environment and at the best suitable time.
- Positive Feedback related to type and amount of training was received from the majority of ATCOs.
- Temporary suspension of OJT/OJTI and COC post-implementation

ATCO WORKLOAD

- Reduced ATCO Workload when deciding the order of arrival
- Reduced coordination with feeder sectors to change sequence
  - Previously, extensive coordination required to optimize aircraft sequence/grouping.
- Reduced need to alter arrival sequence
  - ATCO was regularly alternating routing of aircraft to achieve a certain sequence of aircraft.

HUMAN FACTORS / ATCO OBSERVATIONS

- ATCO observed a reduction in complexity:
  - WTS range between frequent aircraft pairings reduced from 3-7NM to 3-5NM.
  - Increase predictability of aircraft behavior on final.
- An initial increase in pilot inquiring about preceding aircraft.
- No significant increase in wake reports or go-around due to wake encounter.
- Certain aircraft type are subject to misidentification.
- Alphanumeric callsign have greater potential to lead to a misidentification of wake groups.


IFATCA

IFATCA POLICY RELEVANT TO RECAT

ATS 3.32 Recategorization of aircraft for wake turbulence

"...When the prescribed separation is applied, ATCOs shall not be held responsible for wake vortex encounters and related accidents/incidents."

LM 7.1.1 General policy on the legal liability of the Controller

"...In the event of an accident or incident that can be shown to have been caused wholly or in part due to inadequate standards, regulations, staffing, equipment and training or any other professional tool given to the ATCO, the employer should demonstrate that they are not vicarious liable whether or not such acts or omissions were specifically authorized by the employer."


THANK YOU