CRC STARS CWT/ATPA Briefing

Consolidated Wake Turbulence (CWT) and Automated Terminal Proximity Alert (ATPA)

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ZDC**ARTCC**
WASHINGTON DC

- The latest CRC update has added CWT classes to aircraft's data blocks, as well as ATPA processing.

- In the real world, all terminal facilities within the National Airspace System (NAS) are complying with FAA Order JO 7110.126, Consolidated Wake Turbulence (CWT). This order now supersedes multiple paragraphs in FAA Order JO 7110.65

- Previously, we decided to keep using the older wake turbulence separation minima on VATSIM due to numerous reasons, the new CRC update makes CWT far easier to use on VATSIM.

- Previously, wake separation minima was based from weight categories that came to be considered too broad as more data became available.
  - For example, on approach, a trailing heavy aircraft (under the old wake turbulence system) would require 4 miles of separation from a leading heavy aircraft.
  - An A306 is considered heavy and so is a B744. But, the B744 has an MTOW that's more than twice that of the A306's. Does it really need 4 miles behind the A306?
- So, 9 new classes were created to better capture the variance in wake generated within the previous classes.
  - These new classes also use other factors like wingspan and approach speed, among others, to better categorize aircraft.
  - This will allow us to reduce separation between aircraft where we may have not been able to previously.

CWT Overview

7110.65 Weight Classes	CWT Wake Categories	
Super	A	Super
Heavy	B	Upper Heavy
	C	Lower Heavy
	D	Non-Pairwise Heavy*
B757	E	B757
Large	F	Upper Large
	G	Lower Large
Small Plus	H	Upper Small > 15,400 lbs
Small	I	Lower Small ≤ 15,400 lbs

*Non-Pairwise Heavy a/c lack sufficient performance data to be otherwise categorized.

Common Aircraft/CWT Categories

This table can also be found in FAA JO 7110.126B. A full list of aircraft and their CWT categories can be found in FAA JO 7360.1.

You can use the alias feature of CRC to find out the specific wake category of any aircraft by putting a period (.) before its ICAO designator. For example, ".b738" will display information for 737-800s.

A	B	C	D		E	F		G		H	I
Super	Upper Heavy	Lower Heavy	Non-Pairwise Heavy		B757	Upper Large		Lower Large		Upper Small	Lower Small
A388	A332	A306	A124	E3CF	B752	A318	C130	AT43	E170	ASTR	BE10
A225	A333	A30B	A339	E3TF	B753	A319	C30J	AT72	E45X	B190	BE20
	A343	A310	A342	E6		A320	CVLT	CL60	E75L	BE40	BE58
	A345	B762	A3ST	E767		A321	DC93	CRJ1	E75S	B350	BE99
	A346	B763	A400	IL62		B712	DC95	CRJ2	F16	C560	C208
	A359	B764	A50	IL76		B721	DH8D	CRJ7	F18H	C56X	C210
	B742	C17	AN22	IL86		B722	E190	CRJ9	F18S	C680	C25A
	B744	DC10	B1	IL96		B732	GL5T	CRJX	F900	C750	C25B
	B748	K35R	B2	K35E		B733	GLEX	DC91	FA7X	CL30	C402
	B772	MD11	B52	KE3		B734	GLF5	DH8A	GLF2	E120	C441
	B773		B703	L101		B735	GLF6	DH8B	GLF3	F2TH	C525
	B77L		B741	MYA4		B736	MD82	DH8C	GLF4	FA50	C550
	B77W		B743	R135		B737	MD83	E135	SB20	GALX	P180
	B788		B74D	T144		B738	MD87	E145	SF34	H25B	PAY2
	B789		B74R	T160		B739	MD88	F35	H53	LJ31	PA31
	C5		B78X	TU95		MI26	MD90	F18H	H53S	LJ35	PC12
	C5M		BLCF	VMT		BA11	BE12	F15	H47	LJ45	SR22
			BSCA			P3	F100	C2	V22	LJ55	SW3
			C135			P8	F27	F22	S64	LJ60	B305
			C141			B3XM	YS11		V280	S61R	H500
			DC85							SW4	
			DC86							B214	
			DC87							EC25	

CWT Quick Reference Cards

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Wake Turbulence Separation for Directly Behind

Leader \ Follower	A	B	C	D	E	F	G	H	I
A		5	6	6	7	7	7	8	8
B		3	4	4	5	5	5	5	5
C					3.5	3.5	3.5	5	5
D		3	4	4	5	5	5	5	5
E									4
F									
G									
H									
I									

Wake Turbulence Separation for On Approach

Leader \ Follower	A	B	C	D	E	F	G	H	I
A		5	6	6	7	7	7	8	8
B		3	4	4	5	5	5	5	6
C					3.5	3.5	3.5	5	6
D		3	4	4	5	5	5	6	6
E									4
F									4
G									
H									
I									

Numbers (distances) indicate required *Wake Turbulence Separation,* e.g. B following B requires 3NM Wake Turbulence Separation.

No number indicates no required Wake Turbulence Separation. However, some form of separation must be applied. (e.g. Radar separation, passing/diverging, etc).

Note that the term "on approach" means that the separation between the trailing aircraft and the leading aircraft will exist at the time the leading aircraft is over the landing threshold.

At DCA and IAD, separation can be reduced to 2.5nm within 10 NM of some landing runways (ref. PCT SOP 2-3-5), this is still true when no wake turbulence separation is required. (e.g. G behind G, F behind E)

Where the aircraft's weight class/RNAV capability used to be displayed in their datablock as one character, the CWT category will be displayed instead alongside a caret (^) if the aircraft is RNAV-capable.

In the screenshot at right from CRC, UAL2715 is CWT class B and RNAV-capable.
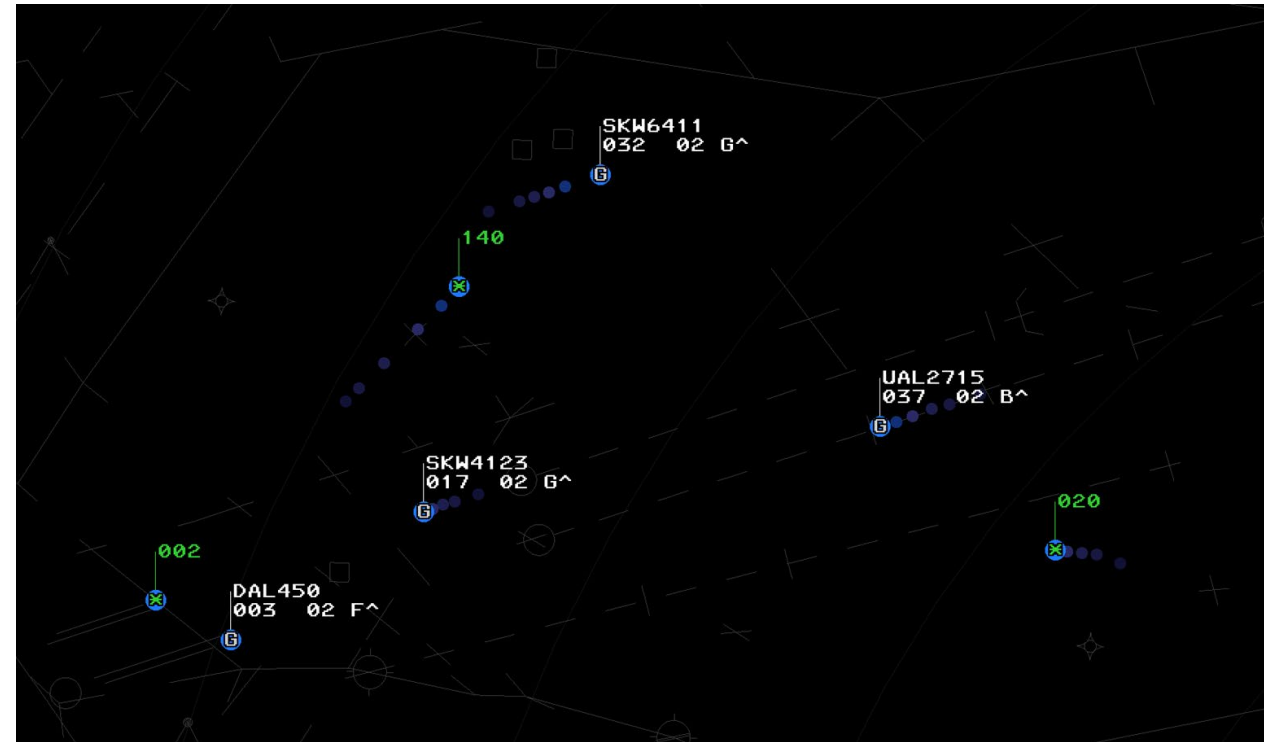
- Type .CWT(trailing category)(leading category) to quickly reference the required separation between a trailer/leader.
  - Example: .CWTFA - F behind A - 7NM
  - Example: .CWTIC - I behind C - 5NM | 6NM

CWT also affects wake turbulence applications in the tower cab. The aircraft category is printed on flight strips as a prefix, for example:
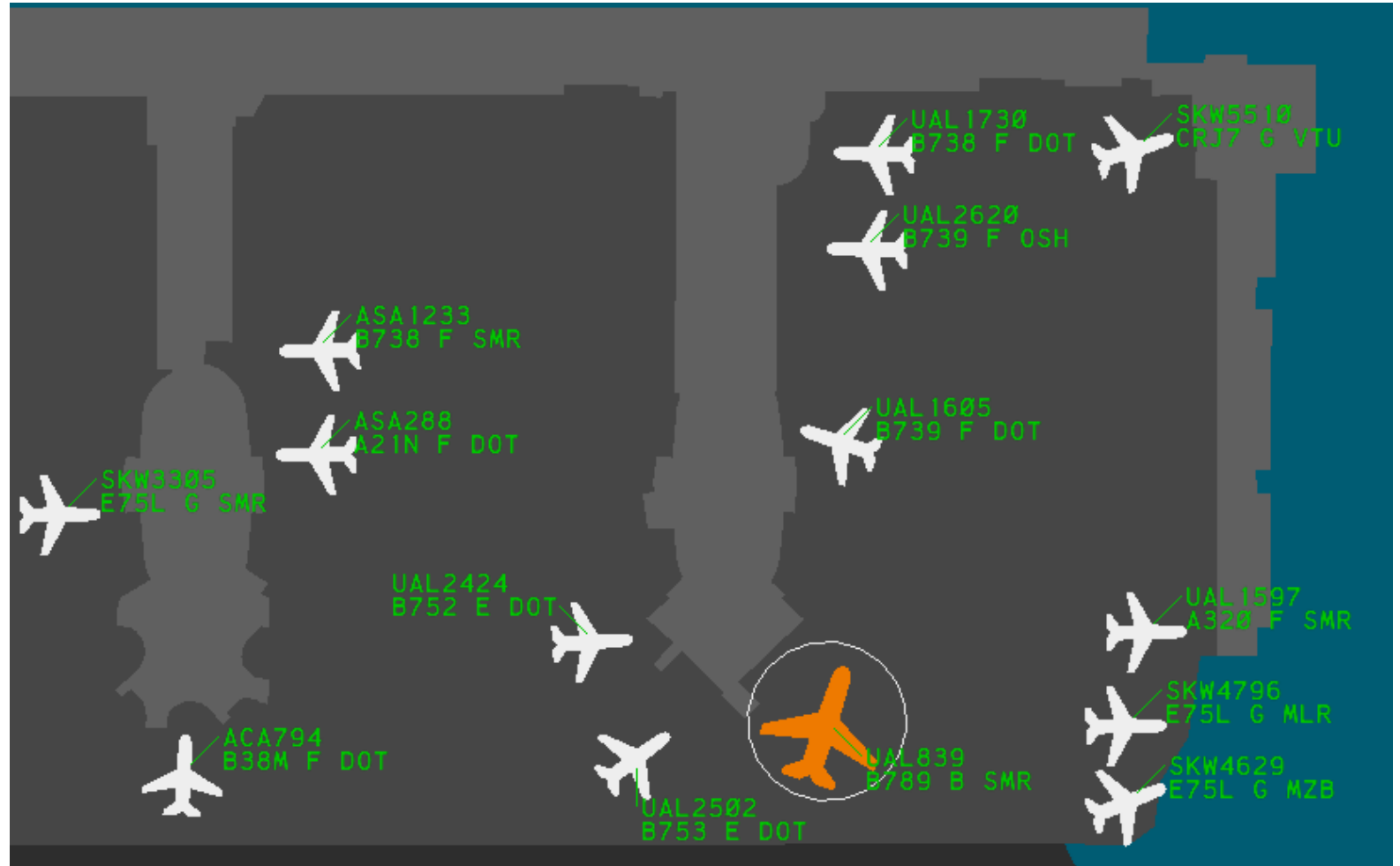
UAL839 is a "B" category aircraft

UAL2424 is an "E" category aircraft.

If "CATEGORY" is enabled in your ASDE-X preferences, the CWT letter will display in the second line as a single letter after the aircraft type and before the scratchpad entry.

More information on CWT, including time-based separation and the replacements for applicable language in FAA JO 7110.65, is available in FAA JO 7110.126.

Next, we will go over the other new feature in CRC, the Automated Terminal Proximity Alert, or ATPA.

What is ATPA?

- Automated Terminal Proximity Alert, or ATPA, is similar to the TPA cones/rings you may be familiar with already in STARS.
  - These are the cones/rings you draw by typing *P or *J along with a number, then slewing an aircraft (TPA cones are commonly called bats, TPA rings are commonly called J-balls).
- The difference is that ATPA cones automatically adjust based on required separation between leading/trailing aircraft, and will point at the leading aircraft in question.
  - ATPA will also show the distance to the leading aircraft in the third line of the aircraft's datablock.
  - See the following slide for an example.

ATPA Example

In the first screenshot at right from CRC, AAL990 is initially considered to be following AAL3007 by ATPA (as seen by the cone pointing at AAL3007, and the distance readout in AAL990's datablock).

In the second screenshot, AMX784 has turned far enough in toward the final approach course (typically <90 degrees is sufficient but it depends on the airport) that AAL990's ATPA cone and distance readout switch to processing AMX784.

Also note that AMX784 does not have an ATPA cone for AAL3007, as ATPA will only display a cone if the trailing distance is greater than the wake turbulence separation required.
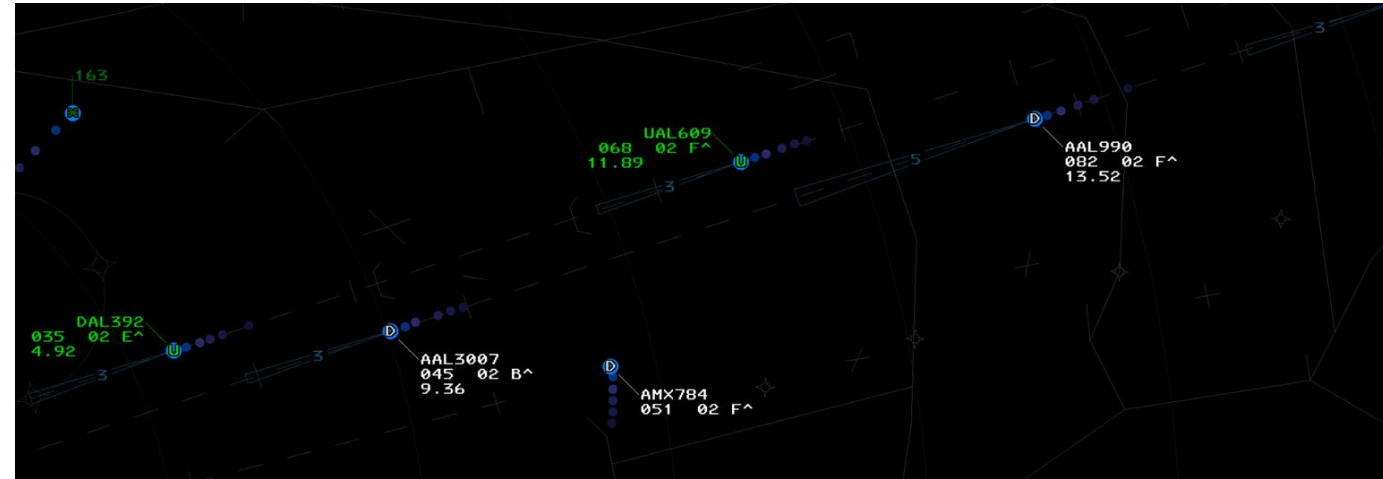
- ATPA takes a lat/long point of the runway threshold and distances left/right of the centerline, along with a distance and maximum altitude where ATPA processing takes place.
- Even though only some busy facilities have ATPA in the real world, we have enabled ATPA for all approach facilities within ZDC on VATSIM.
- ATPA is enabled by default and will determine the separation required (standard, CWT, redued 2.5 nm) so it's easy to see if you have enough spacing.
- ATPA depends on the scratchpad to process. ATPA should appear automatically when the aircraft establishes on the final approach course with proper scratchpad entry.
- If the scratchpad is one of the visual separation with traffic in sight scratchpads (T3L, T19, etc.) then they will be considered "ineligible" by ATPA. This will disable processing for aircraft ahead of them on approach, but they will continue to be processed by the volume for any aircraft behind them on approach.

In the event that a trailing track is predicted to violate the allowable in-trail minimum separation within 45 seconds, an ATPA Warning Cone will be displayed in yellow. The distance readout will also be displayed in yellow (See top screenshot at right).
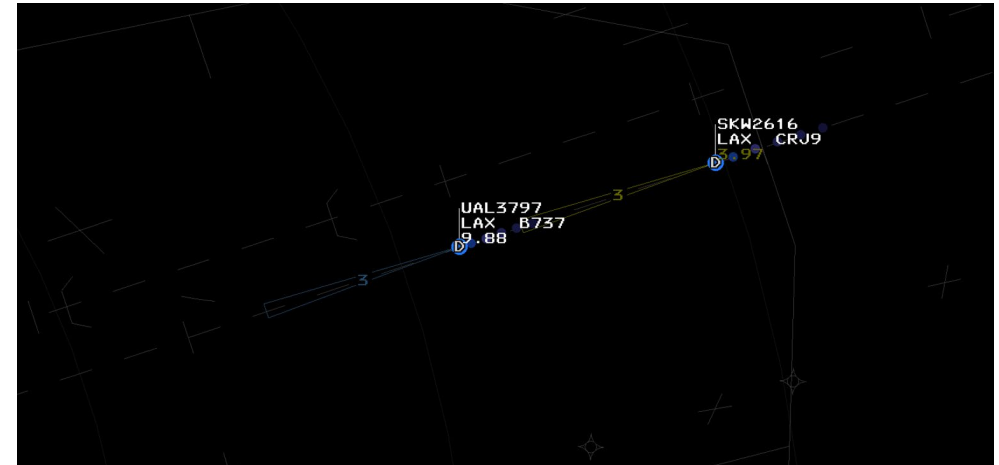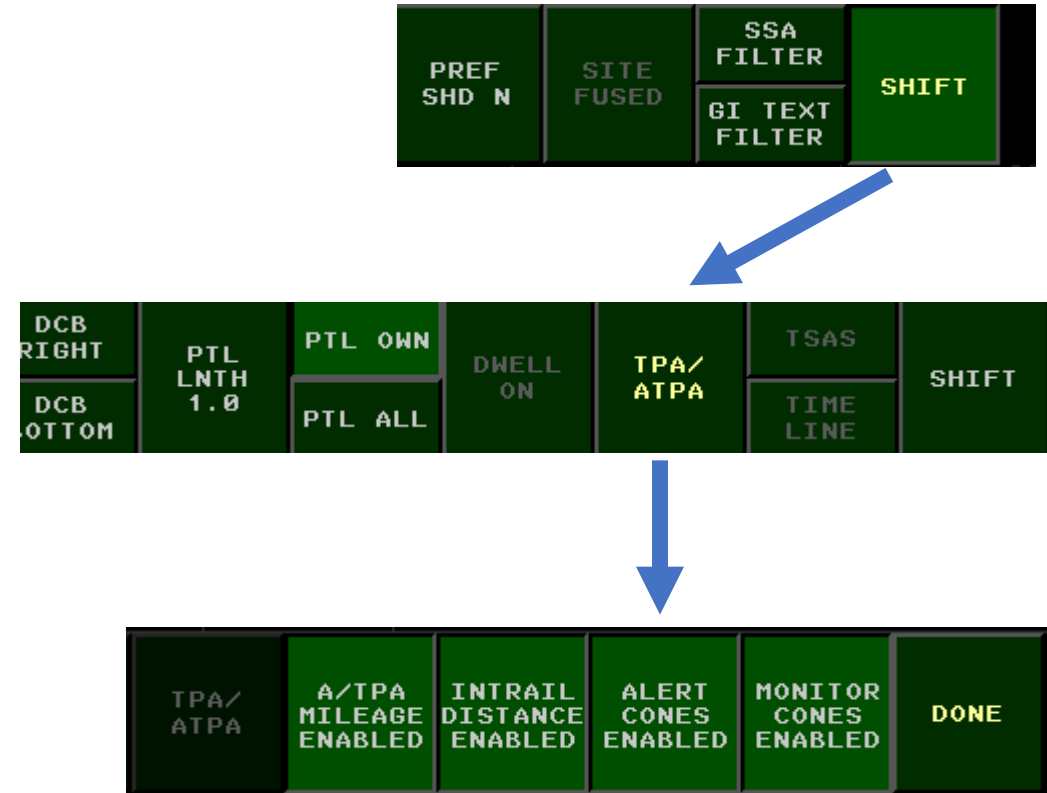

An alert cone (red) will be displayed if the trailing track has violated the allowable in-trail minimum separation or will violate the allowable in-trail minimum separation within 24 seconds (see bottom screenshot at right).

How to disable ATPA?

- If you need to disable ATPA, navigate to your Display Control Bar (DCB), click "SHIFT", then click "TPA/ATPA". Options to disable ATPA should appear.

CWT Quick Reference Cards for Radar

FOLLOWER (Directly Behind)

LEADER \ FOLLOWER	A	B	C	D	E	F	G	H	I
A		5	6	6	7	7	7	8	8
B			3	4	4	5	5	5	5	5
C					3.5	3.5	3.5	5	5
D			3	4	4	5	5	5	5	5
E									4
F									
G									
H									
I									

Standard Separation (3 NM)
(2.5 NM at DCA RWY 1, IAD RWY 1L, 1C/19C, 1R/19L, 12)

FOLLOWER (On Approach)

LEADER \ FOLLOWER	A	B	C	D	E	F	G	H	I
A		5	6	6	7	7	7	8	8
B			3	4	4	5	5	5	5	6
C					3.5	3.5	3.5	5	6
D			3	4	4	5	5	5	6	6
E									4
F									4
G									
H									
I									

Standard Separation (3 NM)
(2.5 NM at DCA RWY 1, IAD RWY 1L, 1C/19C, 1R/19L, 12)

- For more information regarding ATPA, please refer to the CRC documentation: https://crc.virtualnas.net/docs/#/stars?id=atpa-automatic-terminal-proximity-alert
- If you have any feedback for ATPA at a certain facility, please submit a feedback here: https://wkf.ms/4fqZt3O