

CDM Operation

CDM Procedures, What it is? How it works? How to use it? How it is intergrated into FlightStrips...

1. CDM Principles



CDM - Explained

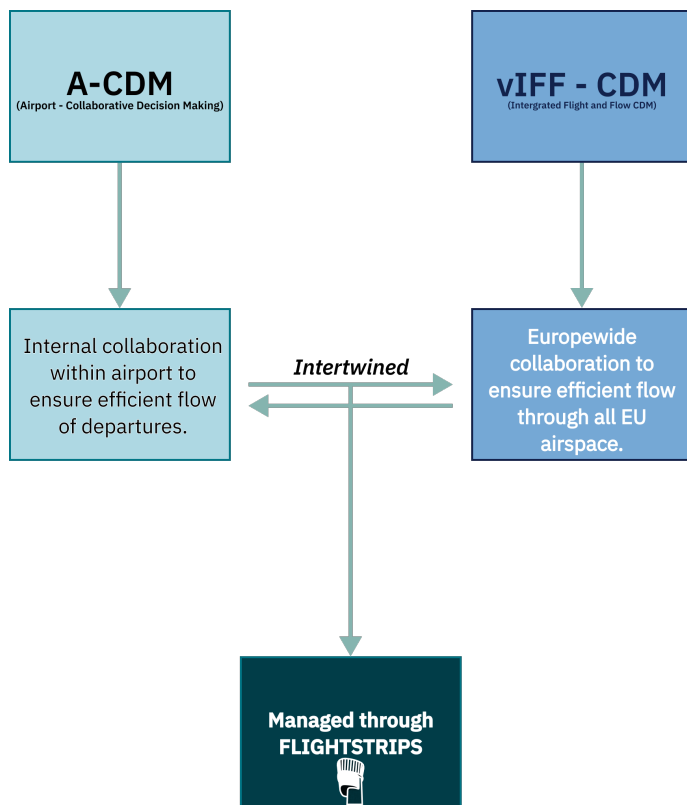
CDM (Collaborative Decision Making) is a complex but vital part of ensuring we can cope with the traffic levels on VATSIM. In order to use CDM properly it is important that you understand

- The logic behind CDM operation
- How to effectively use CDM operation

1.1 Purpose

The first thing you need to understand is that there are **TWO** (2) different kinds of CDM, They are intertwined and both must be respected.

- A-CDM (Airport - Collaborative Decision Making)
- vIFF CDM (Intergrated Flight and Flow - Collaborative Decision Making)



These two systems work towards separate goals, but must constantly talk to each other as they are co-dependent.

A change to one of the entities can affect the other one. In order to ensure compliance we have integrated it all in a user friendly managed manner within FlightStrips

1.2 Abbreviations & Explanations

Many foreign abbreviations are being used for CDM, and we need to cut it into the bone of knowing just the basics for your daily routing:

NOTE: Blue background items are operational items, **gray background items** are purely administrative and not governing when controlling

TERM	NAME	DESCRIPTION	USAGE
EOBT	Estimated Off Block Time	The time the pilot has filed his flightplan to be ready for Startup	Used as initial planning for the TOBT until system, ATC or Pilot says otherwise.

TOBT	Target Off Block Time	Time the pilot targets to be ready for Startup, depending on the loading process and pax delays	Accepted via pilot EOBT. Can be modified by ATC, the Pilot, CTOTs or automatically by the system at any time.
TSAT	Target Start Approval Time	Time the ATC targets to provide pilot with his startup, based on capacity restrictions at his TOBT	Based on the filed TOBT, system will calculate the closest time to the TOBT that startup can be approved to respect all flow restrictions
CTOT	Calculated Take-Off Time	Time pilot must be "Takeoff" in order to respect a restriction en-route or at arrival field	If a vIFF restriction en-route forces aircraft to be airborne in a certain time window a CTOT will be produced to ensure this.
ASAT	Actual Start Approval Time	Actual time of Start.	Locks the timings in vIFF
EXOT	Estimated Taxi-Out Time	Expected time between Start and Takeoff	Standard timings based on gate
TTOT	Target Take-Off Time	Expected Takeoff Time based on Taxi out time and TOBT.	Used to ensure an even departure rate

1.3 Flow Control Logic

Flow Control logic works through constant calculations. It is important that you understand the logic.

1. Pilot Logs onto VATSIM Network. In his Flightplan he has filed an **EOBT**.
2. FS evaluates the validity of **EOBT**, and assigns a **TOBT**.
3. A-CDM process begin. Based of the **TOBT** and available space in sequence a **TSAT** is "calculated"
4. The **TSAT** is send to vIFF servers for calculation.
5. vIFF servers used **TSAT** to calculate the routing to the destination, and if it exceeds ATC capacity anywhere
6. One of two things happen:

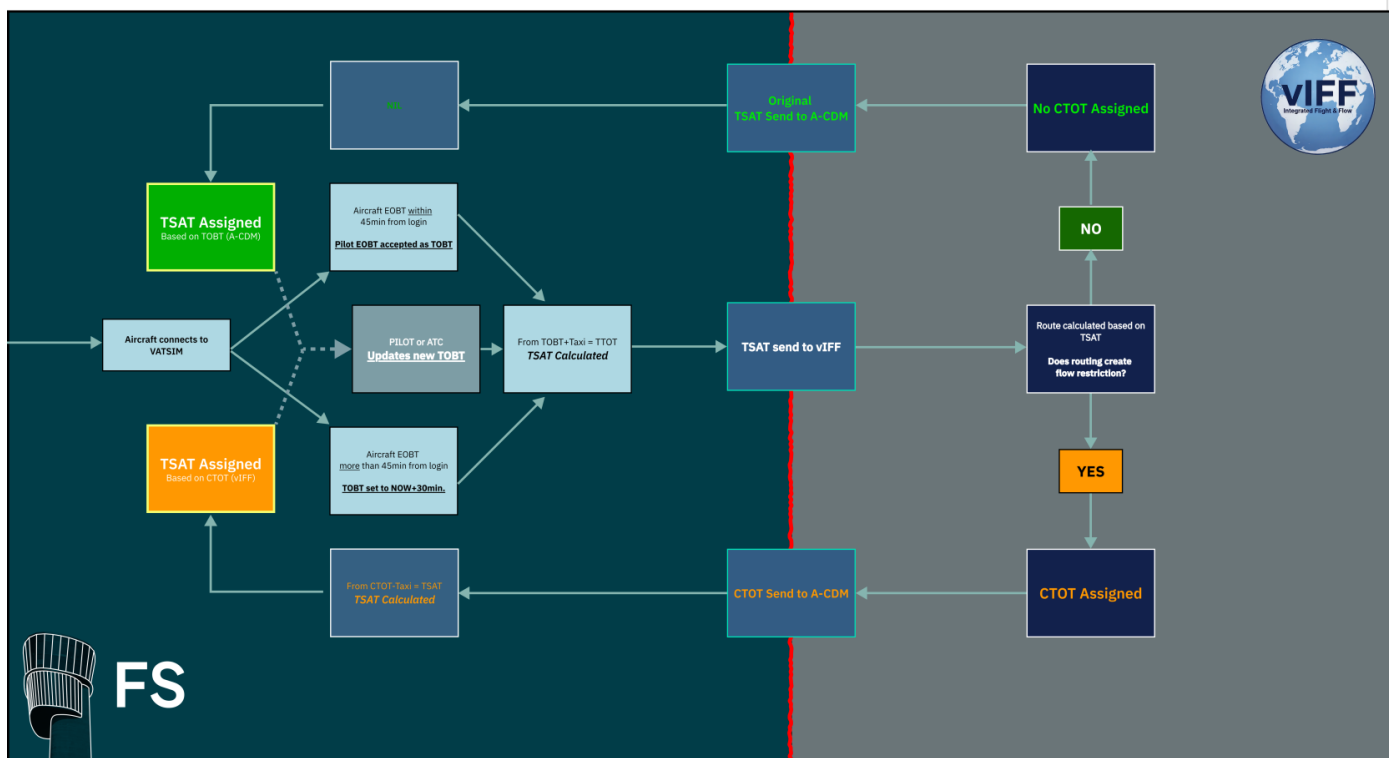
- a) No restrictions are identified, and **TSAT** is returned without edits to A-CDM.
- b) Restrictions identified, **CTOT** produced to comply with restrictions and returned to A-CDM.

7. A-CDM either confirms the **TSAT**, or calculates a new TSAT based on CTOT restriction

8. **TSAT** is "Assigned" to an aircraft.

9. If a **TOBT** is updated by either pilot or ATC, **steps 3-8 are repeated**.

Refer to flowchart below for visual explanation



1.4 Calculation

1.4.1 A-CDM

A-CDM needs to calculate a takeoff sequence. The core purpose is to only have as many departures an hour as the airport can handle, and nicely spread out. Therefore it is all based on TTOT (Target Takeoff Time).

- In EKCH the capacity is 40flts/hr and therefore we have 40TTOT spots, spaced 1.5 minutes apart.

The calculation of A-CDM is as follows:

1. **EOBT** is recorded from flightplan, and based on that a **TOBT** is assigned.
2. Stand is recorded and based on RWY in use, a EXOT is established.
 $TOBT + EXOT = TTOT$
 - Example: TOBT: 1435z. EXOT 12min; 1435z+00:12min
= **TTOT=1447z**
3. The system then compares the TTOT to available TTOTs and does one of two things:
 - TTOT available: TSAT issued at TOBT
 - Example: TTOT: 1447z available, EXOT 12min. 1447z-00:12min = **TSAT=1435z**
 - TTOT occupied: Find next available TTOT, calculate back EXOT, which becomes TSAT
 - Example: TTOT: 1453z first available, exit 12min. 1453z-00:12min = **TSAT=1441z**
4. TSAT assigned to optimize traffic flow depending on what TTOT is available.

1.4.1 vIFF - CDM

vIFF does NOT care about our internal capacity. Only about:

- Enroute Sector capacity
- Arrival TMA capacity
- Arrival Airport capacity
- ECFMP special restrictions

vIFF knows the EXOT of EKCH.

1. TSAT which was determined by A-CDM is send to vIFF.
2. vIFF, uses TSAT+EXOT to determine TTOT, and afterwards a 3D routing through all airspaces
3. If a sector capacity does not allow the flight it will assign a CTOT at a time the capacity allows.
4. CTOT is send back to A-CDM
5. A-CDM produces a TSAT to fit that CTOT, overriding all other A-CDM restrictions, and delaying subsequent aircrafts TTOT.

- **SEQ PLN, AA+AD (or APRON DEP), GND + TWR**
 - Controlled using conventional FlightStrips techniques
- **EST Scope**
 - Controlled using EST Scope technique.

MESSAGES				INFO MISC. EQUIP					
FINAL									
IB	AFR46HR	A318	22L	A18					
IB	SNB242	B727	22L	W1					
TE	EZY129	A320	22L	F1					
TE	WZZ4A	A321	22L	F9					
RWY ARR									
	SAS1206	CRJ9/M 7377	E82 7377	22L B	TSPH3C EKDH				
	LNRMR	DC68/M 7377	W1 7377	22L	NONE				
TWY ARR				MEM AID					
	SWR175D	A321 ODEGE	22L	K3	A20				
STARTUP									
SAS									
PUSHBACK									
TWY DEP									
AD	SAS665	EKYT D3	EOBT 1312 TSAT 1312	TOBT 1312					
NORWEGIAN									
SAS665		EKYT D3	EOBT 1312 TSAT 1331	CTOT					
OTHERS									
SEQ PLN				DEP	22R	ARR	22L		
QNH				1015	1015	D	250 / 17		
TRF				MRK	REQ	X	19:24:56z		

CDM operation IS **NOT** possible from the CLR DEL scope. CLR DEL must use the **SEQ PLN** scope.

CDM operation is accomplished via the STARTUP bay in conventional FlightStrips scopes. Aircrafts are sorted with earliest TSAT in bottom.

CDM Design on Strips

2.1.1 Unrestricted Strips

An unrestricted aircraft will not have any color codes until its start-up window.

AD	SAS665	EKYT D3	EOBT 1312	TOBT 1312
				TSAT 1312

2.1.2 Startup Approved Strips

An aircraft which has reached its startup window will show a green TSAT. Start-up may be approved.

AD	SAS665	EKYT D3	EOBT 1312	TOBT 1304
				TSAT 1304

TSAT Sequence

Start-up window may include a CTOT, but TSAT will still indicate green.

AD	SAS665	EKYT D3	EOBT 1312	TOBT 1312
			CTOT 1336	TSAT 1325

When a TSAT is one (1) minute from expiring, TSAT will indicate Yellow.

AD	SAS665	EKYT D3	EOBT 1312	TOBT 1312
			CTOT 1336	TSAT 1325

When TSAT is expired, TSAT coloring will disappear and a Red TOBT appears.

AD	SAS665	EKYT D3	EOBT 1312	TOBT 1312
			CTOT 1336	TSAT 1325

New TOBT must be filed

2.1.3 A-CDM Delayed Strips

An aircraft which has been delayed by A-CDM due to RWY capacity, will show an **Orange TOBT** indicating a >5min delay between the TOBT and TSAT.

AD	SAS665	EKYT D3	EOBT	1312	TOBT	1312
					TSAT	1325

- When within startup window TSAT will turn green

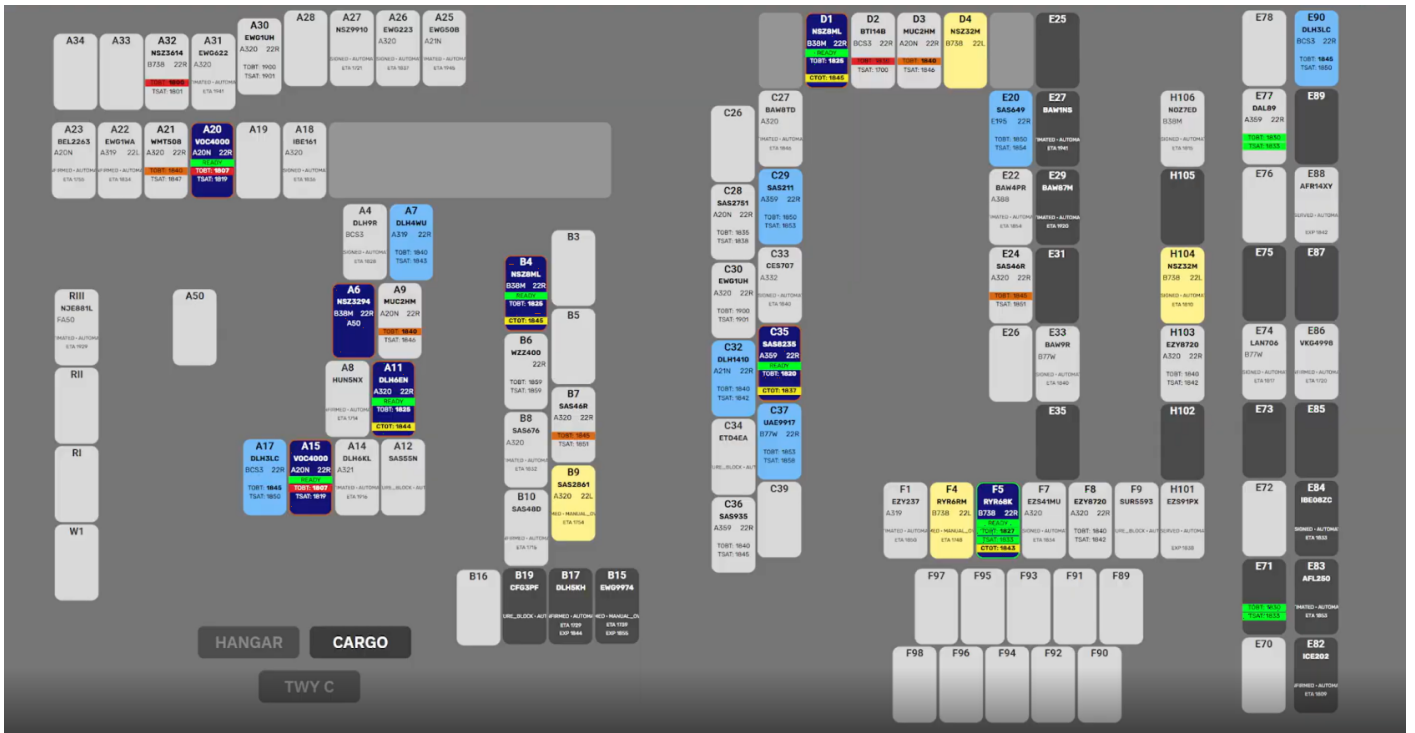
2.1.4 vIFF Delayed Strips

An aircraft which has been delayed by VIFF due to EU capacity, will show an **Yellow CTOT** to warn controllers. The CTOT may or may not also be accompanied by an **Orange TOBT** if the CTOT results in a >5min delay from TOBT

AD	SAS665	EKYT D3	EOBT	1312	TOBT	1331
			CTOT	1348	TSAT	1337

- When within startup window TSAT will turn green

2.2 CDM Design on EST



EST Scope has a different layout as it is an image of all the stands. It will show for each individual stand the same color codes as the regular scopes.

CDM Design on EST

2.1.1 Unrestricted Strips

An unrestricted aircraft will not have any color codes until its start-up window.

A20

SAS7786

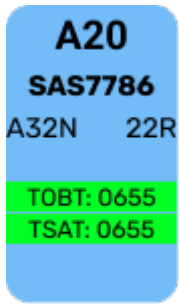
A32N 22R

TOBT: 0655

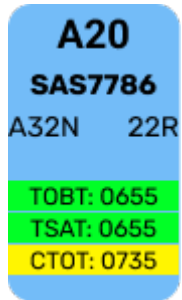
TSAT: 0655

2.1.1 Startup Approved Strips

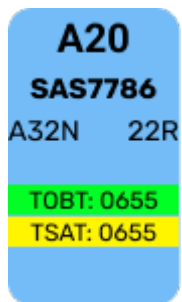
An aircraft which has reached its startup window will show a green TSAT & TOBT. Start-up may be approved.



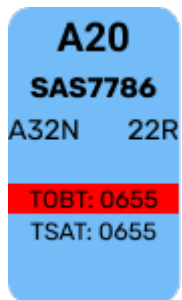
Start-up window may include a CTOT, but TSAT will still indicate green.



When a TSAT is one (1) minute from expiring, TSAT will indicate Yellow.



When TSAT is expired, TSAT coloring will disappear and a Red TOBT appears.



New TOBT must be filed

2.1.1 A-CDM Delayed Strips

An aircraft which has been delayed by A-CDM due to RWY capacity, will show an **Orange TOBT** indicating a >5min delay between the TOBT and TSAT.

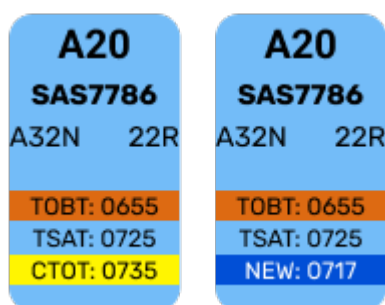


- When within startup window TSAT will turn green

2.1.1 vIFF Delayed Strips

An aircraft which has been delayed by VIFF due to EU capacity, will show an **Yellow CTOT** to warn controllers. The CTOT may or may not also be accompanied by an **Orange TOBT** if the CTOT results in a >5min delay from TOBT.

A CTOT which has had an improvement will show in Dark Blue to alert controller of an improvement



- When within startup window TSAT will turn green

3. CDM Procedures



This chapter is about what procedures you must adhere to when managing CDM. You have learned the philosophy and how it looks, now you need to know how to use it. Its

developed into 4 subchapters:

- Timings
- EST procedures
- SEQ PLN procedures
- AA+AD procedures

3.1 Acceptable Timing

CDM procedures varies from Apron (and DEL) and Towers.

- GND/DEL prime concern is to ensure Aircraft starts in accordance with **TSAT**
- TWR prime concern is to ensure Aircraft takes off in accordance with **CTOT**

By following the guidelines of Chapter 3 - FlightStrips CDM operation, controller shall adhere to following timings:

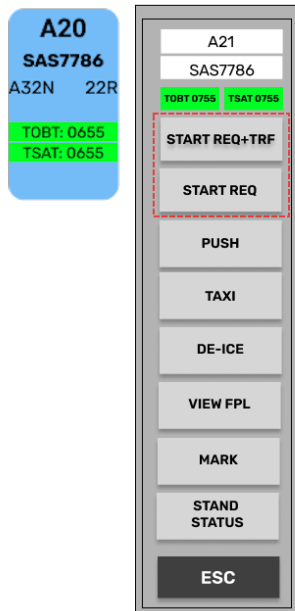
- **GND/DEL**: Start-up approval within -5 min until +5min of **TSAT**.
- **TWR**: Takeoff commenced within -5min until +10min of **CTOT**

Outside of **TSAT+6** a new TOBT must be requested

Outside of **CTOT+11** TWR should consider severity of exceedance, and allow aircraft to depart only if deemed safe and responsibly to do so by judgement of controller.

3.2 EST Scope Procedures

On EST Screen, clicking on an aircraft on a stand, the menu appears with several different options



- **START REQ + TRF**
- **START REQ**

Which one you need is dependent on the situation of the aircraft. The visual action is similar, but what goes on behind the scenes are different.

START REQ + TRF

START REQ + TRF

Only available when aircraft is WITHIN TSAT Window. It performs following actions

- Approves the aircraft for startup by assigning ASAT, locking the CDM.
- Transfers the strip automatically over to APRON
- Changes appearance to a dark blue color labelled READY above. TOBT & TSAT removed.



START REQ

START REQ

Available if aircraft reports ready before the TSAT window. It performs following actions:

- Selects TOBT to current time in order to look for an earlier TSAT.
- Changes appearance to dark blue color labelled READY above.
- Orange outline, until within TSAT window, then changing to green outline.



START REQ can be used for:

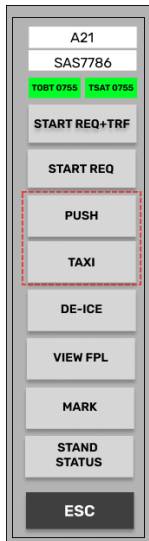
- TSAT not yet within window. looking for an earlier TSAT
- TSAT expired. Resetting TOBT to find new TSAT
- RDY MSG send by pilot. Will look for an earlier CTOT.

If a START REQ results in a new TSAT found within the window, START REQ + TRF must subsequently be pushed.

START REQ will not look for a new TSAT if current TSAT is within 10min **AND** has a CTOT attached to it.

OTHER BUTTONS

Other Buttons



Two additional buttons called **PUSH** and **TAXI** is also available. This does the same as **START REQ+TRF**, but instead of transferring it automatically moves them directly to **PUSHBACK** and **TWY DEP** bay respectively.

Useful for when using EST screen, while sitting on a GND or TWR position.

3.3 SEQ PLN Procedures

On SEQ PLN scope, on the strip there are only one click spot you can use.

AD	SAS665	EKYT D3	EOBT 1312	TOBT 1312
				TSAT 1312

Clicking on TOBT field, will do the same as START REQ does on the EST scope. It will set TOBT to current time and allow an earlier TSAT to be found. Can be used for:

- TSAT not yet within window. looking for an earlier TSAT
- TSAT expired. Resetting TOBT to find new TSAT
- RDY MSG send by pilot. Will look for an earlier CTOT.

If an earlier TSAT is found, TSAT and TOBT will light up green and start-up can be approved.

AD	SAS665	EKYT D3	EOBT 1312	TOBT 1304
				TSAT 1304

Transfer must be done by clicking on the SI Field indicator to commence transfer.

Transfer via SI field will **NOT** work outside of TSAT window. Manual transfer only in case of CDM malfunction

TSAT click spot will not look for a new TSAT if current TSAT is within 10min **AND** has a CTOT attached to it.

3.4 AA+AD / GND+TWR Procedures

On AA+AD (And GND+TWR), Strips have a different layout and only displays TSAT and CTOT

KLM18X	B738 PHPJK	A18	TSAT 1325 CTOT 1336	22R
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NOTE: In above example CTOT is also present

Clicking on TSAT field, will set TOBT to current time and look for a new TSAT. Can be used for:

- TSAT not yet within window. looking for an earlier TSAT
- TSAT expired. Resetting TOBT to find new TSAT
- RDY MSG send by pilot. Will look for an earlier CTOT.

If an earlier TSAT is found, TSAT will light up green and start-up can be approved.

KLM18X	B738 PHPJK	A18	TSAT 1304 CTOT 1311	22R
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NOTE: In above example CTOT is improved and shows in Blue.

Aircraft can then be transfered into PUSHBACK bay by standard procedures.

If aircraft is positioned in **PUSHBACK** or **TWY DEP** bay before TSAT window, the TOBT will automatically be set to current time, and earliest TSAT assigned.

Failure of system to find an earlier TSAT will result in a "**Validation status**", warning controller.

VALIDATION STATUS
UAE151

Aircraft pushed outside TSAT window with/without CTOT

OVERRIDE ACKNOWLEDGE
ESC

Controller must delay pushback/taxi/takeoff or override to serve delay at holding point

Revision #10

Created 27 September 2026 10:32:47 by Lukas Agerskov (1226374)

Updated 29 September 2026 16:21:09 by Lukas Agerskov (1226374)