香港 國際機場 | HONG KONG INTERNATIONAL AIRPORT

AIRPORT CDM - Performance by collaboration

Airport Collaborative Decision Making (A-CDM) Operations Guidelines

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1 DOCUMENT CONTROL

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2016/05/03	Fredrik Lindblom/SAAB	00.20	Updated after internal Saab feedback
2016/05/09	Fredrik Lindblom/Saab	00.30	Updated after internal Saab feedback
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2018/06/13	Fredrik Lindblom/SAAB	01.20	Included procedures for ground and air return
2018/10/20	Man Chui/AA	02.0	Update procedures of 1. Air-return 2. Ground return 3. Fallback procedure

2 DOCUMENT STRUCTURE

The Operational Guidelines are structured as follows:

- Chapter 3 – Important A-CDM Definitions: This chapter provides all important A-CDM definitions, including what data source is being used and what Milestones they are related to.
- Chapter 4 – Introduction: This chapter provides the introduction to A-CDM at Hong Kong International Airport (HKIA).
- Chapter 5 – Summary Of HKIA Processes and Procedures: This chapter provides a high level summary of the A-CDM procedures implemented at HKIA that apply to the stakeholders.
- Chapter 6 – Detailed HKIA Processes and Procedures: This chapter provides all the details related to the procedures in term of how they are done and who is doing what. The chapter also covers details about how certain data/information elements are calculated … etc at various steps in the processes. The chapter is designed so that each stakeholder is able to derive certain parts of it if they want to develop their own internal guidelines … etc.
- Chapter 7 – Special flight handling and fall back procedures: This chapter provides inputs to how A-CDM procedures are applied during degraded mode of operations.
- Chapter 8 – Aircraft Docking Guidance System information display.
- Chapter 9 – Use Cases: This chapter provides example Use Case for various scenarios when applying the A-CDM procedures.
- Chapter 10 – Measurement of Key Performance Indicators: This chapter provides What and How Key Performance Indicators that will be measured when A-CDM is implemented.

3 IMPORTANT A-CDM DEFINITIONS

Definition	Explanation	Source	Milestone
AIBT – Actual In Block Time	The time the aircraft arrives in-blocks.	First priority is that is it provided by AODB (AIBT is captured by the marshal on ground and put into the AODB) As the second priority it is generated by Aerobahn (derived from ground surveillance data from CAD)	7, 8
ALDT – Actual Landing Time	The time the aircraft lands on the runway	First priority is that is it provided by CAD As the second priority it is generated by Aerobahn (derived from ground	6

		surveillance data from CAD)	
AOBT – Actual Off Block Time	Time the aircraft pushes back or vacates the parking position also known as off chocks	First priority is that is it provided by AODB data based on the Push Back Program. As the second priority it is generated by Aerobahn (derived from ground surveillance data from CAD)	15
ARDT – Actual Ready Time	When the aircraft is ready for start-up/pushback or taxi immediately after clearance delivery.	Provided by CAD (Electronic Flight Strip System)	12
ASAT – Actual Start-Up Approval Time	Time that the aircraft receives its start-up approval	Provided by CAD (Electronic Flight Strip System)	14
ASBT – Actual Start Boarding Time	Time passengers are entering bridge or bus to the aircraft	Provided by AO/GH via the AODB	11
ASRT – Actual Start-Up Request Time	Time the pilot requests start up clearance	This will not be available in the implementation	(13)
ATOT – Actual Take Off Time	The time the aircraft takes off from the runway	First priority is that is it provided by CAD (derived from their A-SMGCS) As the second priority it is generated by Aerobahn (derived from ground surveillance data from CAD)	16
CTOT – Calculated Take Off Time	Time calculated and issued by CAD as a result of tactical slot allocation at which a flight is expected to become airborne.	Provided by CAD	2
EIBT – Estimated In Block Time	The estimated time that an aircraft will arrive in blocks. Is updated as milestones 3, 4, 5 and 6 are passed.	Initially by SIBT from AO Updated generated by	3, 4, 5, 6

		Aerobahn based on ELDT + EXIT	
ELDT – Estimated Landing Time	The estimated time that an aircraft will touch down on the runway Is updated as milestones 3, 4 and 5 are passed.	Initially generated by Aerobahn based on EIBT – EXIT Updates based on ELDT from CAD (AMAN)	3, 4, 5
EOBT – Estimated Off Block Time	The estimated time that an aircraft will start movement associated with departure	Flight Plan EOBT from CAD	1
ETD – Estimated Time of Departure	This is used to set the Target Off Block Time (TOBT) in cases where AO/GH used data feed to set the TOBT.	From AO/GH (only from specified and approved airlines)	9
ETOT – Estimated Take Off Time	The estimated take off time taking into account the EOBT and EXOT	Generated by Aerobahn	
EXIT – Estimated Taxi In Time	The estimated taxi time between landing and in block. This is also references as the Variable Taxi Time.	Generated by Aerobahn and the Variable Taxi Time Engine (VTT)	
EXOT – Estimated Taxi Out Time	The estimated taxi time between off block and take off. This is also references as the Variable Taxi Time.	Generated by Aerobahn and the Variable Taxi Time Engine (VTT)	
MTTT – Minimum Turn Round Time	The minimum turn-round time agreed with an AO/GH for a specified flight or aircraft type.	Provided by a table look-up in Aerobahn	
POBT – Preliminary Off Block Time	A preliminary version of the TOBT taking EIBT+ MTTT or EOBT into account. This is used in the absence of an AO/GH entered TOBT.	Generated by Aerobahn	
PSAT – Preliminary Start Up Approval Time	A preliminary version of a TSAT taking the POBT and CTOT into account. To be used as an advisory value for planning purposes prior to having a TSAT issued.	Generated by Aerobahn	
SOBT – Scheduled Off Block Time.	The time that an aircraft is scheduled to depart from its parking position. Based upon the seasonal schedule values, one or more days in advance of the flight.	Provided by AODB (based on data from the AO)	
TOBT – Target Off Block Time	The time that an AO/GH 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.	Provided via AO/GH	9

TSAT – Target Start Up Approval Time	The time that an aircraft can expect start up/push back approval taking into account TOBT and CTOT and/or the traffic situation	Generated by Aerobahn but issued by CAD	10
TTOT – Target Take Off Time	The target take off time taking into account the POBT/TOBT, PSAT/TSAT plus the EXOT	Generated by Aerobahn	

4 INTRODUCTION

4.1 A-CDM AT HONG KONG INTERNATIONAL AIRPORT

The A-CDM project at Hong Kong International Airport (HKIA) is a joint initiative between all airport partners: the Airport Authority (AA), air traffic control (ATC), airline operators (AO), the ground handlers (GH), and Business Aviation Centre (BAC).

The objective is for airport partners to work together to facilitate the sharing of timely and accurate operational data which will optimize the turn round process and assure the best possible co-ordination of resources.

The aim is to move away from an operating mode where the pilot calls ATC for start approval when he/she deems the aircraft is ready to push back, and where estimated departure time is not always updated to truly reflect the situation on the ground.

Most importantly, A-CDM is about cultural and behavioral change and re-addressing working practices and relationships.

4.2 BENEFITS OF A-CDM

If the time that an airline expects to be ready to leave its stand, Target Off Block Time (TOBT), is accurate then this time can be used by ATC to determine a pre-departure sequence for departing aircraft.

If every aircraft knows its order in the pre-departure sequence via the Target Start up Approval Time (TSAT) then this time can be shared with all relevant parties and the correct priority can be given in order to maintain the sequence. This time can also be used when assigning stands to arriving aircraft as well as enable the optimization of other airport infrastructure and resources, i.e. aircraft tractor, stands, runways … etc.

If the outbound taxi time can be accurately determined before the aircraft starts to taxi, this will result in a good quality estimate of the Target Take-Off Time (TTOT). As a result of less waiting time and taxiing time around the airfield which would have a positive improvement on aircraft emission.

Once an accurate take off time can be provided and shared, the whole network can benefit. Capacity in terminal resource and en-route sectors could be increased through less tactical regulations and minimum departure intervals.

Similarly, for inbound aircraft, if the inbound taxi time can be determined before the aircraft has landed, the accuracy of estimated time when the aircraft will reach a stand improves. This will result in an appropriate stand being assigned and ground crew being ready.

Potential benefits include:

- Reduction in taxi times and subsequently, fuel burn and engine running time
- Optimization of ground resources such as staff and equipment
- Greater asset utilization, e.g. aircraft, stands, airspace
- Better utilization of existing capacity in terminal resource and en-route sectors
- Improved situational awareness during disruption
- Improved recovery from disruption
- Provision of a management tool that supports performance monitoring and improvement
- Improved reputation with airport users and passengers

Not all benefits are always immediately realizable as it takes time to refine the processes before they can be deemed fully optimized. In large, complex environments such as HKIA, this can take several years of continual improvement.

5 SUMMARY OF HKIA PROCESSES AND PROCEDURES

This section provides the high-level summary of the operational processes and procedures. For the detailed information about all the processes and procedures please read section 6 to section 9.

NORMAL FLIGHT PROCEDURES

1. The flight is activated in the A-CDM system when the ATC flight plan is activated, usually at EOBT -3 hours.
2. After ATC flight plan activation a Preliminary Target Off Block Time (POBT) and Preliminary Target Startup Approval Time (PSAT) will be generated automatically by the A-CDM platform and made available via the A-CDM user interface.
3. At EOBT -40 minutes, the TOBT is automatically updated by using the A-CDM platform's calculated POBT.
    - Direct update of TOBT can be done at any time after point 1 above. This is then done via the A-CDM user interface.
    - If the TOBT is 15 minutes later than EOBT, the AO/GH is required to send a delay message to ATC.
4. At TOBT -25 minutes, the TSAT will be issued.
    - If a direct update is done after the TSAT is issued a reason for the TOBT change shall be put in via the A-CDM user interface. Direct update of the TOBT overrides system generated POBT.
5. At TOBT +/- 5 minutes, the pilot has to call ready to ATC Clearance Delivery. Missing the call at TOBT +5 minutes will result in loss of TOBT and TSAT.
    - If TOBT and TSAT is lost, AO/GH shall put in new TOBT to get a new TSAT
6. Flight Crew shall call Ground Control as soon as possible for start-up approval after instructed by ATC Clearance Delivery.
7. If flight crew has not pushed back at the +5 minutes window of ASAT (i.e. after push back approval has been granted by Ground Control), TSAT and TOBT will be lost and AO is required to re-enter TOBT to get a new TSAT to queue up again.

REGULATED FLIGHT (FLOW CONTROL FLIGHT) PROCEDURES

1. If a flight is regulated, a CTOT will be issued and a corresponding TSAT and TTOT will be issued by the A-CDM platform. This will override the POBT and PSAT.
    - When a flight has a CTOT the EOBT shall never be changed via amendment of the flight plan.
2. Updates of the TOBT by AO/GH can be done up to the issued TSAT value to delay ground operations if needed such as boarding.

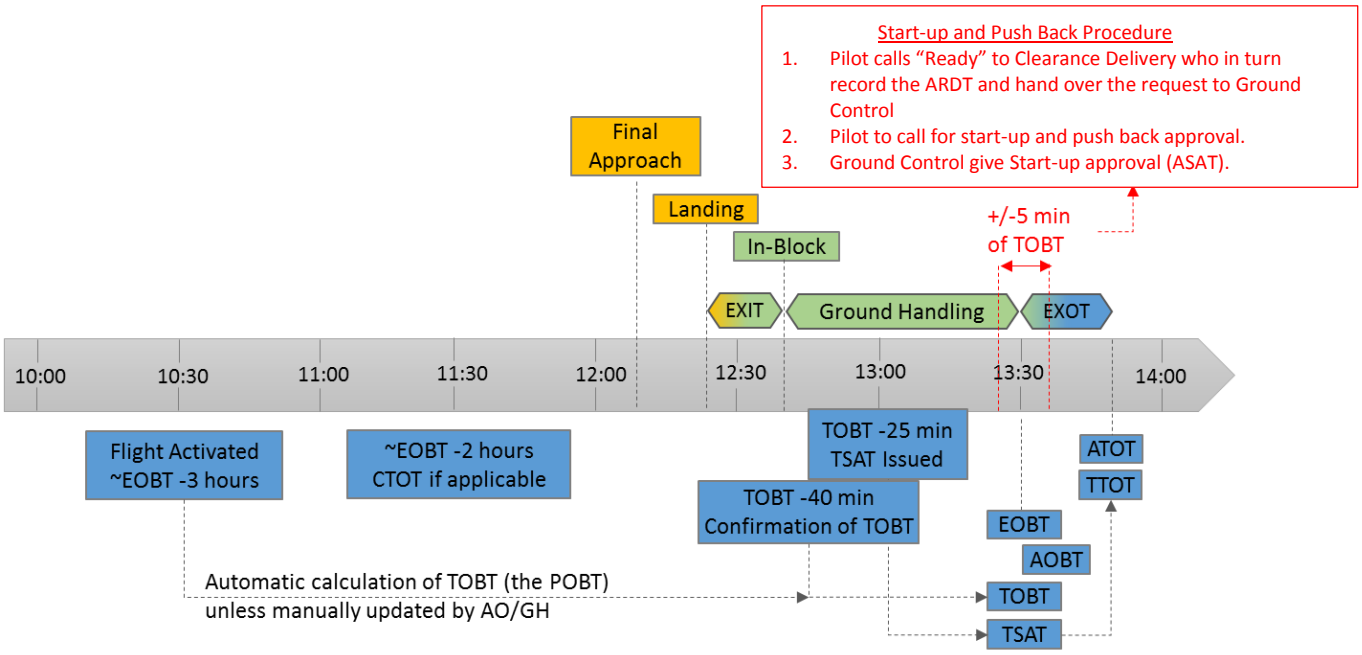
INFORMATION TO PASSENGERS VIA FLIGHT INFORMATION DISPLAY SYSTEM (FIDS)

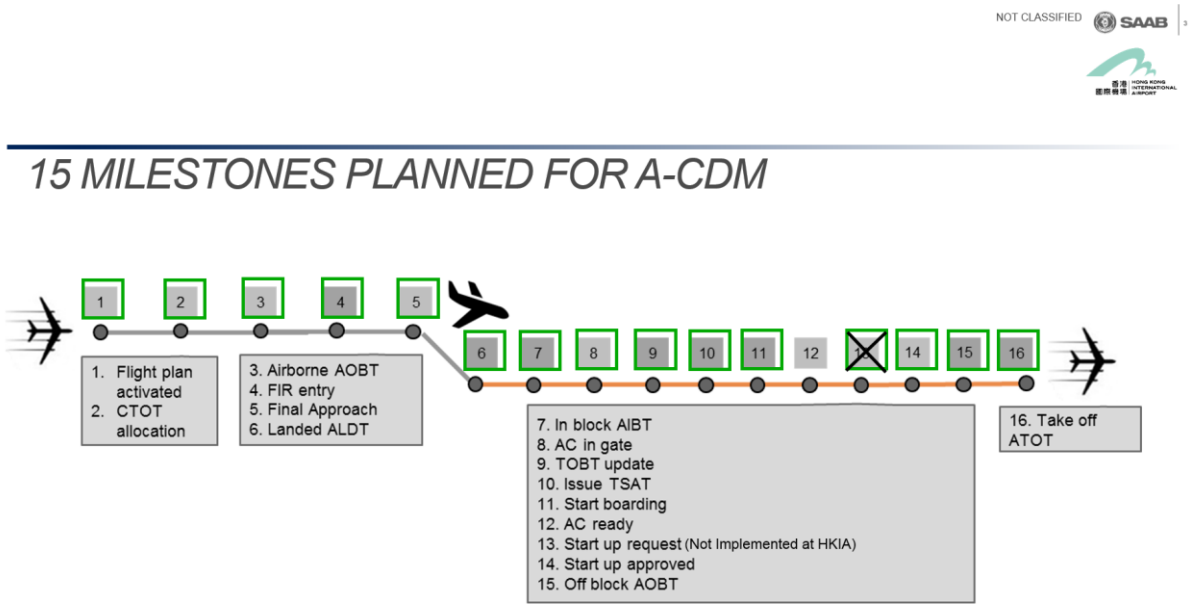
1. TOBT will not be reflected on the FIDS displays for passenger information.
2. Update Estimated Time of Departure (ETD) for passenger information can only be done via FIDS team to input manually or airlines' autolink.

6 DETAILED HKIA PROCESSES AND PROCEDURES

This section provides information about the procedural elements of any flight that will operate under A-CDM procedures at HKIA. The overview chart below depicts the time sphere and scope of the A-CDM procedure at HKIA from the time of ATC flight plan activation (~EOBT -3 hours) all the way up to airborne (take-off).

In the drive to ensure completeness and accuracy of data throughout the flight processes, there are a number of automated alerts, which highlight the need for the potential adjustments, which may become necessary. It is in everyone's interest to ensure the HKIA A-CDM partners get accurate and timely TOBT with a stable and optimal TSAT as a result. Following this, the pilot must call for start-up to ensure this TSAT remains valid and relevant or take necessary actions to accommodate delays.





6.1 FLIGHT PLAN AND ESTIMATED OFF-BLOCK TIME (EOBT)

Flight plan definition (from ICAO Doc 4444)

Specified information provided to air traffic service units, relative to an intended flight or portion of a flight of an aircraft. The flight plan as filed with an ATS unit by the pilot or a designated representative, without any subsequent changes. The time the flight plan is filed for is Estimated Off-Block Time (EOBT)

What is the relation between EOBT and SOBT?

The time filed with Air Traffic Control on the flight plan is the Estimated Off-Block Time (EOBT). As HKIA is a slot coordinated airport each flight also has negotiated to operate at a certain time; the Scheduled Off-Block Time (SOBT).

In a non-CDM world, these times can be very different and can give a distorted picture of the actual traffic demand for the runway and within the airspace network. Some airlines or Aircraft Operators file multiple flight plans with different routings for one and the same flight, which also affect air traffic demand calculations. If an airport has a high demand on peak hours, it needs airlines to adhere to their airport slot time, i.e. the SOBT.

The following checks will automatically happen throughout the A-CDM process at an airport:

- Check filed ATC flight plan (EOBT) correlates to airport slot (SOBT)
- Check when no filed ATC flight plan appears to be available or when multiple ATC flight plans are filed for one and the same flight (with e.g. different routings, call signs or times)
- Check if the data for the filed ATC flight plan matches SOBT data (e.g. aircraft type, destination, times)

The A-CDM system will monitor compliance, encourage honest updates and adherence to both SOBT and EOBT. Where discrepancies are noted in these checks, appropriate stakeholders will be alerted by an automated message from the Aerobahn A-CDM portal. These checks will be carried out when flight plan is activated, normally from EOBT -3 hours.

What happens if the filed ATC flight plan is cancelled?

If the ATC flight plan is cancelled, the TOBT is cancelled and the A-CDM process is stopped until a new flight plan is filed. A flight will only be **completely cancelled** when it is cancelled in AA's AODB via currently established procedures.

NOTE:

- If the AO needs to change the aircraft but have the latest known TOBT and TSAT to remain visible in the A-CDM Portal the AO needs to cancel the current flight plan and filing a new flight plan via ATC. This will not remove the flight in the AODB; hence, the flight is **not completely cancelled.**

6.2 A-CDM ARRIVAL DATA SOURCES AND UPDATES

One of the key purposes of A-CDM is to link the arrival, turnaround and departure phase of a flight. Improving operational efficiency starts with early and better decision-making, based on collectively shared data.

In the early inbound phase of the flight, the best-estimated landing and in-block-times (ELDT and EIBT) need to be established and uniformly shared with the airport partners. Once a flight has landed, the best source for the actual landing and in-block times need to be agreed upon (ALDT and AIBT).

How is the Estimated In Block Time (EIBT) for a flight obtained?

The initial value of the EIBT is based on the schedule:

- Initial EIBT = Scheduled In-Block Time

The updates of EIBT is based on Estimated Landing Time (ELDT) and Estimated Taxi In Time (EXIT):

- EIBT = ELDT + EXIT

How is the Estimated Landing Time (ELDT) for a flight obtained?

The initial value of the ELDT is based on the initial Estimated In Block Time and the Estimated Taxi In Time:

- Initial ELDT = Initial EIBT – Variable Taxi Time

The updates of ELDT are based different sources of arrival data coming from Hong Kong Civil Aviation Department (CAD).

How is the Actual Landing Time (ALDT) for a flight obtained?

As the first priority source, the ALDT is provided by CAD.

As the second priority source, it is generated by Aerobahn (derived from ground surveillance data from CAD).

How is the Actual In Block Time (AIBT) for a flight obtained?

As the first priority source, the AIBT is based on data from Airport Authority's (AA) Airport Operations Database (AODB).

6.3 TARGET OFF-BLOCK TIME (TOBT) AND PRELIMINARY TARGET OFF-BLOCK TIME (POBT)

TOBT Definition (EUROCONTROL, A-CDM Manual version 4)

The time that an Aircraft Operator (AO) or Ground Handler (GH) 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 importance of TOBT?

TOBT is the most important time in the turnaround process and this time is essential for the calculation of TSAT. The TSAT is derived based on optimisation of aircraft ground movement and minimisation of apron congestion on taxiways.

TOBT can be predicted by tracking the flight events that occur prior to landing and during the turnaround process. In order to achieve TOBT accuracy, close coordination of turnaround activities and sharing of operational information among different partners are needed.

TOBT is initially automatically calculated by the A-CDM platform based on available flight information – this is called the Preliminary Off-Block Time (or POBT). Subsequently, airlines and ground handlers will coordinate and update it based on the operational situation.

Calculation of the Preliminary Target Off-Block Time (POBT)?

For all flights, the A-CDM platform will automatically start to calculate the Preliminary Target Off Block Time (POBT) at flight plan activation, typically at EOBT -3 hours.

- For an **originating flight**, the POBT will be equal to EOBT in the filed flight plan.
- For a **turnaround flight**, the initial POBT will be set to the later of EOBT or by calculation based on initial EIBT information. Subsequent updates to POBT will be done as the arrival flight approaches HKIA based on (EIBT or AIBT) + MTTT (Minimum Turn Round Time).
- These MTTT's are stored in the A-CDM database based on the information from AO/GH provided to the Airport Authority.

Who is responsible for the TOBT input?

A TOBT update is a joint and coordinated effort between the AO and the GH. The responsibility of inputting the TOBT has to be clearly defined between the AO and the GH.

Airlines have to ensure:

- The communication with the Flight Deck and relevant airline operational control centre
- The internal working procedures between the Ground Handler and Aircraft Operator on how to work with the TOBT are in place.

What is the general TOBT updating process?

TOBT will be generated automatically by using the calculated POBT at EOBT – 40 minutes. AO/HO can adjust the TOBT to fit the real operations situation if needed.

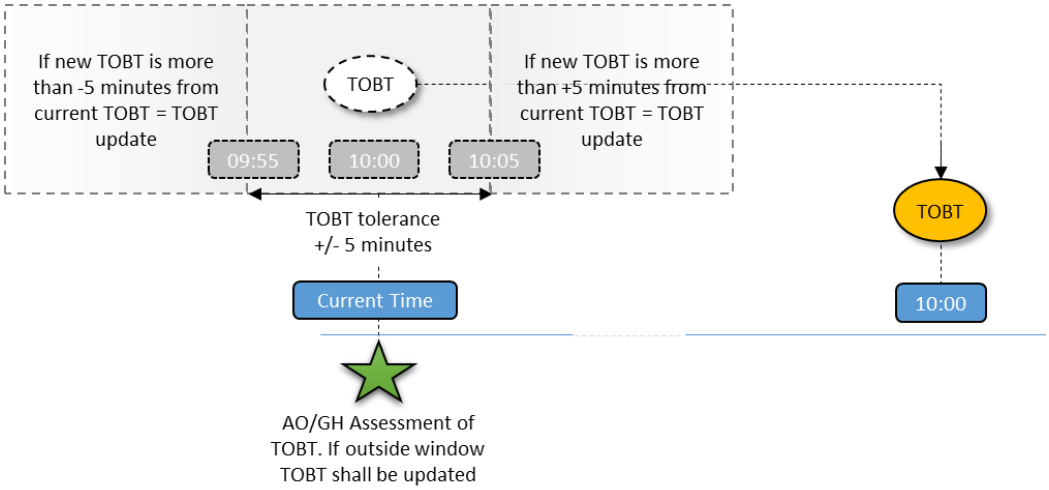
Direct update of TOBT?

The POBT may not always accurately predict when the aircraft is ready for departure, especially for cases of delays caused by turnaround activities. As a result, airlines and ground handlers are required to continuously assess the operational situation and directly input/update TOBT if needed.

- From the time POBT is available, a direct input/update can be input for differences of more than +/- 5 minutes of the latest POBT/TOBT. Once a manual TOBT input occurs, A-CDM will no longer generate a POBT nor an automatically generated TOBT.
- At EOBT - 40 minutes the AO/GH is required to do the following:
  - Ensure that the automatically generated or manually entered TOBT is correct (an incorrect TOBT can result in the loss of TSAT)
  - If it is not correct, it shall be updated via manual update.
- The input/update of the TOBT is to be done via the A-CDM platform user interface.

The following facts have to be taken into account for the input and/or update of the TOBT:

- The entered TOBT has to be at least 5 minutes later than current time.
- New and old TOBT must differ by at least 5 minutes.
- Changes of TOBT after TSAT issued (at TOBT-25 minutes) the AO/GH will be required to input the reason for the change.
- When a TOBT is entered, the POBT is removed and will no longer be automatically updated.



When will the POBT/TOBT be made available to A-CDM partners?

The A-CDM portal will show the POBT/TOBT at ATC flight plan activation (usually EOBT -3 hours) and onwards.

What if the TOBT does not match EOBT?

If the TOBT deviates from the EOBT of the ATC flight plan by more than 15 minutes, the AO/GH is required to send a delay message to ATC.

The only exception from this rule is when a flight is under ATFM regulation (flow control), i.e. a CTOT has been assigned. In that case a new flight plan should NOT be filed as it might result in a further delayed CTOT being issued.

What happens with the TOBT in case of a change of aircraft?

If the AO needs to change the aircraft but have the latest known TOBT and TSAT to remain visible in the A-CDM Portal the AO needs to cancel the current flight plan and file a new flight plan via ATC. This will not remove the flight in the AODB; hence, it is **not completely cancelled.**

What is the relation between TOBT and the FIDS departure time show to passengers?

If the TOBT is updated directly in the A-CDM platform this will not be reflected on the FIDS displays.

For any AO or GH that has a direct interface with the AODB and provides updated Estimated Time of Departure (ETD) due to a delay, this will directly be displayed on the FIDS and set the TOBT value in the A-CDM platform. However, once TOBT is updated manually, it shall then be updated by AO/GH via A-CDM platform manually.

Remarks: TOBT updating is for A-CDM to generate TSAT for departure sequencing. To notify passenger of flight delay, ETD shall be updated through FIDS.

Best Practice for On Time Performance (OTP)

On Time Performance is one of the Key Performance Indicators for airlines and airport to measure their efficiency and services standard. The **Best Practice** to achieve OTP (STD + 0 minute) should be:

- Set TOBT = STD
- All ground activities should be completed and pilot calls HK Delivery (CDC) ready (ARDT) not later than STD - 5 minutes.
- Start-up approval (ASAT) provided by ATC Ground Control not later than STD - 2 minutes.
- Push back (AOBT) at TOBT.

OTP measurement at HKIA

HKIA is using the international standard (STD + 15 minutes) to evaluate the on time performance. To depart on time, all parties should target to achieve AOBT not later than STD + 15 minutes by following the procedure below in the operations:

- Set TOBT not later than STD + 5 minutes.
- All ground activities completed and pilot calls CDC ready (ARDT) before STD + 10 minutes.
- ATC Ground Control will endeavour to approve start-up not later than STD + 13 minutes.

6.4 TARGET START-UP APPROVAL TIME (TSAT)

TSAT Definition (EUROCONTROL, A-CDM Manual version 4)

The time provided by ATC that an aircraft can expect start-up/push back approval. It takes into account TOBT, CTOT and/or the traffic situations.

How is TSAT Calculated?

The Pre-Departure Sequencer (PDS) calculates the Target Start-up Approval Times (TSAT) and the Target Take-Off Times (TTOT) after taking multiple constraints and preferences into account. The PDS bases its TSAT calculation in accordance with the following parameters (not exhaustive):

- TOBT
- Operational capacity
- Take-off runway

- Wake turbulence category
- Variable taxi time
- SID's
- Parking position/area
- CTOT in the case of regulated flights
- Sequencing of Departures

Which flights are planned by PDS?

- IFR (Instrument Flight Rules) flights that depart from HKIA (including Business and General Aviation)
- The flight has a valid flight plan
- The flight plan is available (i.e. present in the ATC system, normally at EOBT -3 hours)
- The flight's TOBT is known

Which flights are NOT planned in PDS?

- VFR (Visual Flight Rules) flights are not included in the planning process.
- A flight that is suspended, will not take part in the planning process. The latest known TOBT and TSAT will remain visible in the A-CDM Portal. Flight plan de-suspension will reactivate the flight in the PDS process. This can be done by cancelling the current flight plan and filing a new flight plan.
- Flights that have a TSAT that is expired (i.e. HH:MM > TSAT + 5 min and the flight has not yet requested start-up) are no longer part of the PDS process. A valid updated TOBT will reactivate the flight in the PDS process.
- Flights that return to stand after push back (this does not apply to remote holding). An updated TOBT (where TOBT should be > current time) will reactivate the flight in the PDS process.

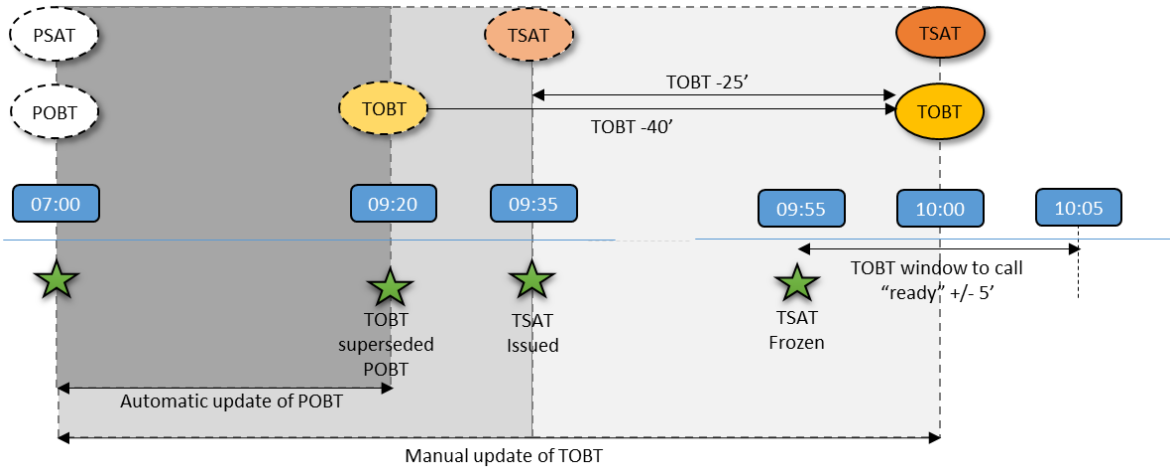
When does TSAT calculation start?

The PDS will start to calculate a Preliminary Target Start up Approval Time (PSAT) at EOBT -3 hours based on the Preliminary TOBT (POBT) and other defined constraints (i.e. in-line with when the POBT is made available).

At TOBT -25 minutes, the PSAT is superseded by the issued TSAT.

NOTE:

- TSAT will be removed if pilot does not call Clearance Delivery (CDC) for "ready" before the end of the TOBT window (i.e. TOBT + 5 minutes). A new TOBT is required to generate a new TSAT.
- TSAT will be invalid if pilot does not call Ground Control (GMC) for "Start up request" before the end of the TSAT window (i.e. TSAT + 5 minutes). A new TOBT is required to generate a new TSAT.
- Change of TOBT will not trigger the reissuance of a new TSAT unless TOBT is greater than TSAT.



What happens with TSAT if TOBT is updated, not exceeding current TSAT?

The TOBT can be updated without affecting the TSAT as long as TOBT is earlier than or equal to the PSAT/TSAT value. If the TOBT is later than the current PSAT/TSAT then a new PSAT/TSAT will be calculated.

When will the PSAT/TSAT be made available to A-CDM partners?

The PSAT information is published via:

- The A-CDM portal at Flight Plan activation (usually EOBT -3 hours) and onwards

The TSAT will published via:

- The A-CDM portal at TOBT -25 minutes

The CTOT and its relation to TSAT?

The Calculated Take-off Time (CTOT) is a regulated take off time issued by Air Traffic Flow Management (ATFM) as a result of tactical slot allocation. The CTOT regulates the flight takes off from HKIA but is held on ground by a flow control from destination airport. The CTOT at HKIA has a defined window of +/- 3 minutes (also commonly known as the Slot Tolerance Window) that has to be met by ATC.

When a flight receives a CTOT this directly affects the TSAT in order to ensure that start-up and push back procedures are done on time to meet the CTOT. The TSAT is therefore based on the CTOT and the variable taxi time plus a buffer value. The buffer value is put in place to make sure the aircraft gets to the runway when the CTOT window starts, i.e. CTOT -3 minutes.

TOBT and TSAT handling in extreme situations?

If TOBT and TSAT deviate from each other by more than 30 minutes **because of CTOT issuance**, airlines should consider to apply special procedure to avoid hassle to passenger such as waiting on board the aircraft for long time before departure. If this situation occurs, the following special procedure should be applied:

- The AO/GH assesses the delay situation based on available information (POBT, TSAT and CTOT for a regulated flight).
- Update TOBT to be closer to TSAT. This delays the whole ground handling process, including boarding of passengers.

It is the responsibility of the AO to assess the situation and make the decision to adjust the TOBT.

For an example Use Case please see section 8.3.

If CTOT is removed, is there a priority of TSAT if TOBT has been updated… etc?

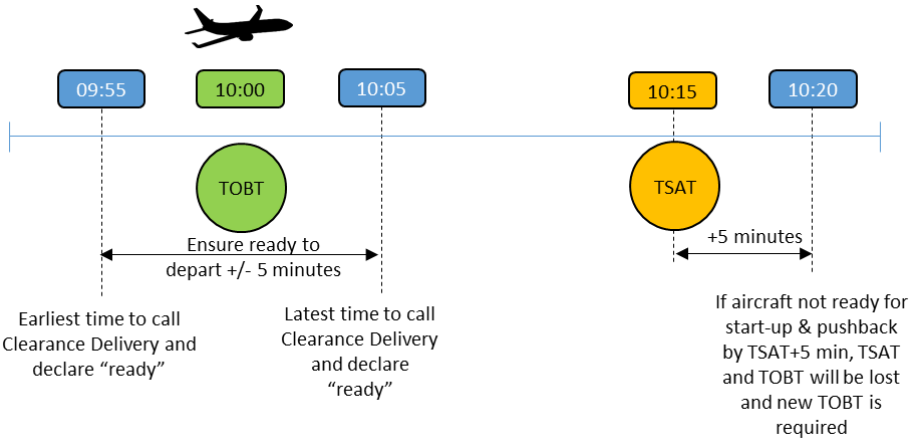
The PDS will always try to give a better/earlier TSAT if the CTOT is removed. This means that a flight will get an earlier TSAT whenever possible, taking all known parameters into account. The new TSAT time will not be earlier than current time + 15min for push back tractor arrangement.

In cases where active decision has been made to adjust the TOBT to be aligned or closer to the TSAT (e.g. delay due to a CTOT) the PDS will not provide a TSAT earlier than the entered TOBT if CTOT is removed.

6.5 START-UP AND PUSHBACK PROCEDURES

What are the normal Start-up procedures?

1. **Ground operations completion** – Normally, "Completion of ground handling"' is set at -5 minutes from TOBT which include push back tractor manned and monitoring of headset and ground staff shall inform Flight crew accordingly.
2. **Flight Crew call Ready** - At TOBT +/-5 minutes (TOBT window) Flight Deck reports "ready" to Clearance Delivery (CDC)
    - If TSAT is within TOBT window, CDC will instruct Flight Deck to contact Ground Control for start-up approval.
    - If TSAT is outside TOBT window, CDC will instruct Flight Deck to "stand-by on frequency" and communicate the delay in relation to the TSAT. Within TSAT window, CDC will call Flight Deck and instruct Flight Deck to contact Ground Control for start-up approval.
3. **Request for Start-up and Pushback:**
    - Flight Crew shall call Ground Control for start-up approval as soon as possible after instructed by CDC. If the flight has not pushed back +5 minutes after ASAT issuance, TSAT and TOBT will be lost and AO is required to re-enter TOBT.



What if AO are not ready at TOBT + 5 minutes?

- If AO is not ready at TOBT +5 minutes, a new TOBT has to be entered by AO/GH.
- Consequently, the flight will be out of departure sequence and a new TSAT will not be available until a new TOBT is entered. Flights will be re-sequenced in the next available slot.
- If the TOBT is deleted (due to e.g. technical problems), the TSAT is automatically deleted as well. A new TOBT must be entered to obtain a new TSAT.

What if pilot does not call for Start-up Approval within the set window?

- If no request for start-up has been done at +5 minutes after hand over to Ground Control the TSAT will be deleted and the flight will be removed from the pre-departure sequence.
- A new TOBT has to be entered and this will result in a new TSAT. Flights will be re-sequenced in the next available slot.

NOTE:

- The Air Traffic Controller always has the right to issue the actual start-up and pushback clearance even if outside the +5 minute rule.

When is the pushback tractor allocated?

Allocating pushback tractor to aircraft is based on TSAT planning. Tractor should be arranged and ready at least 10 minutes prior to TSAT.

Under the condition of CTOT issuance where the tractor is being held up by the aircraft and the TSAT is beyond 30 minutes to the current time, the tractor may be re-assigned to another assignment to ensure effective use of resource. AO and GH coordinate to decide the return time of a tractor which should be back in place at least 10 minutes before TSAT.

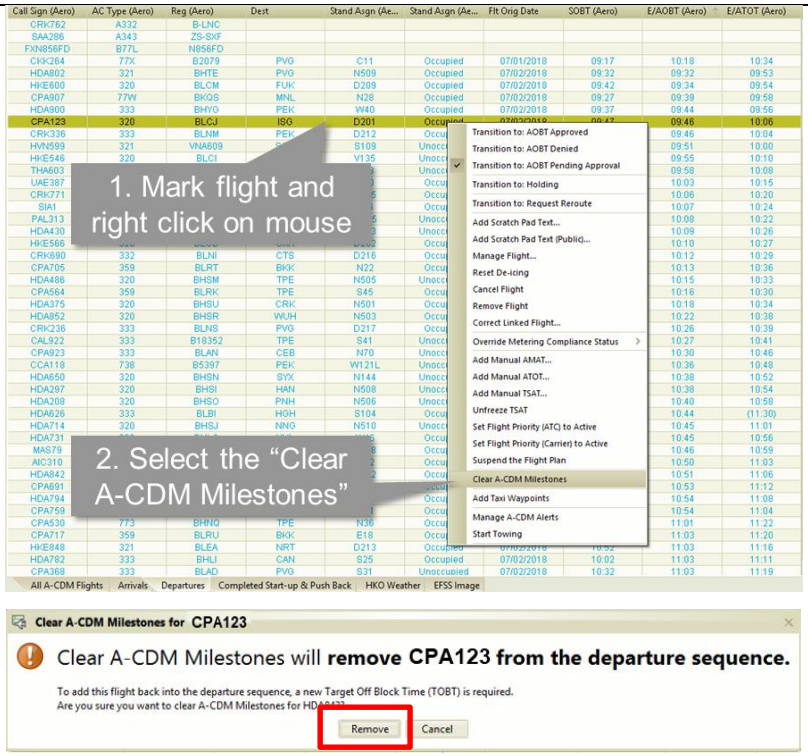
7 SPECIAL FLIGHT HANDLING AND FALL BACK PROCEDURES

7.1 AIR RETURN HANDLING

In some cases and aircraft will have to return to the airfield after departure. When this happens specific actions needs to happen for the aircraft to re-enter the A-CDM process.

a. Upon received air return information from ATC or Airlines, AA FIDS team will create a new arrival flight with the same departure flight number ending with a suffix "R". e.g. XXX123R.
b. The original departure flight will also be added a suffix "R" and changed destination to "HKG" by AA FIDS team. e.g. XXX123R
c. After the aircraft landed, AA FIDS team will create a new departure flight with the same flight number, STD, destination and the new estimate departure time (ETD) provided by airlines. e.g. XXX123
d. After the aircraft has landed, taxied into the stand and parked, the airlines should conduct the following to clear the A-CDM milestones.

Step	By whom
1. Find and select the Original Departure (without an 'R' – e.g. XXX123) in the "Departures" tab in the A-CDM web portal (see image below). *NOTE - The flight should have some departure Milestone times (i.e. MS09, MS10, MS12, MS14, MS15 and MS16) completed.*  	Airlines / Handling Agent
2. Right click on the selected flight and select "Clear A-CDM Milestones" from the drop down list in the A-CDM web portal. This will clear the milestone times for MS09, MS10, MS12, MS14, MS15, and MS16 and the related data fields (see image below). After selecting the "Clear A-CDM milestones", a pop-up message will appear as illustrated in the image below. The user has to select "Remove" to complete this step in the process (see image below).	Airlines / Handling Agent

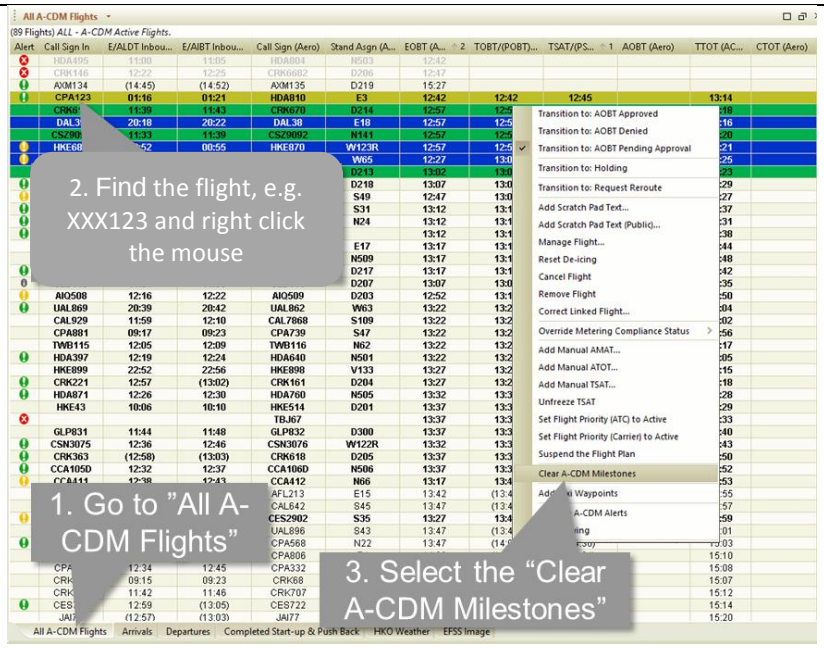
		
3.	Cancel the original flight plan	CAD
4.	Refile the flight plan of the departure flight. Once this is completed, the flight will be displayed in the "Active ACDM Flights" tab.	Airlines / Handling Agent
5.	Follow the normal A-CDM procedure to input a new TOBT for the new departure flight.	

7.2 GROUND RETURN HANDLING

In some cases and aircraft will have to return to the gate after pushback. When this happens specific actions needs to happen for the aircraft to re-enter the A-CDM process.

a. Upon received ground return information, AA FIDS team will delete the chock of time of the in FIDS display.
b. After the aircraft back to the parking stand, the airlines should conduct the following to clear the A-CDM milestones.

Step		By whom
1.	"Clear A-CDM Milestones" for the Original Departure in the A-CDM web portal. This will clear the milestone times for MS09, MS10, MS12, MS14, MS15, and MS16 and the related data fields (see image below). After selecting the "Clear A-CDM milestones", a pop-up message will appear as illustrated in the image below. The user has to select "Remove" to complete this step in the process (see image below).	Airlines / Handling Agent

 	
2. Enter a new TOBT as per normal procedures for the flight.	Airlines / Handling Agent
3. Follow the normal A-CDM procedure for the new departure flight.	

7.3 FALL BACK PROCEDURE

If the A-CDM system is unserviceable and expected prolong system down, Airfield Department will notify the delegated contact points of system users via email. Airport Duty Manager will issue related message via SMS to Handling Agents and Airline Operators Committee (AOC) who will inform the airport community. ATC will issue ATIS message "A-CDM system is unserviceable" to inform pilots accordingly.

Although TSAT cannot be provided in this situation, airlines should complete the aircraft ground serving activities by the TOBT. Pilot should call ready to CDC to request push back approval upon ground operations completed.

8 AIRCRAFT DOCKING GUIDANCE SYSTEM INFORMATION DISPLAY

The Aircraft Docking Guidance System is the system to guide an aircraft to dock into a parking stand. The system has been upgraded to display TOBT and TSAT at the following locations of the parking stands.

- Terminal 1 parking stand at main centerline parking.
- Remote parking stand at main centerline parking (**except** V-stands which are not equipped with the system).
- Midfield Concourse
- West Cargo Apron

8.1 ARRIVAL DISPLAY

- When standby mode is on, current time will be displayed when there is no flight assigned to the parking stand.

- Flight information including Flight no., Registration Mark, Port of call, Best of time (BOT) and Count down time (Current time - BOT) will be displayed 15 minutes prior to Best of Time.

Flight No.
Registration Mark
Port of Call
Best of Time
Count Down Time (Current time – BOT) *-ve number*

- The flight information will disappear when aircraft docking starts.

8.2 DEPARTURE DISPLAY

- Current time will be displayed when there is no flight assigned to the parking stand or at Target off-block Time (TOBT) more than 40 minutes.
- Departing aircraft detection will be activated before the departure flight information is displayed on the screen, for instance, 40 minutes prior to TOBT.
- Flight information including Flight no., Registration Mark, TOBT, TSAT and Count down Time (Current time – TOBT) will then be displayed.

Flight No.
Registration Mark
TOBT
TSAT
Count Down Time (Current time – TOBT) *-ve number*

- Flight information will disappear when TOBT is deleted; or the system recognizes that the flight is pushed back; or TOBT is more than 120 minutes.

9 USE CASES

This section details some of the most important Use Cases that can occur with A-CDM implemented. The Use Cases are:

- **Normal Case** – all processes are running as planned and no issues occurs to delay the flight
- **Ad-Hoc delay** – In the scenario, a "passenger delay" is used as the example but this can be applied to any delay reason like mechanical etc.
- **Regulated Flight** (Flow control with CTOT Allocation) – allowing the AO/GH to proceed according to two alternatives:
    - Alternative 1 – No adjustment of TOBT
    - Alternative 2 – Adjusting TOBT to delay turn around procedures e.g., boarding

Each Use Case is described in a step-by-step approach highlighting the timing of events and the A-CDM actions that occur. To each of the steps an Illustration depicts the actions.

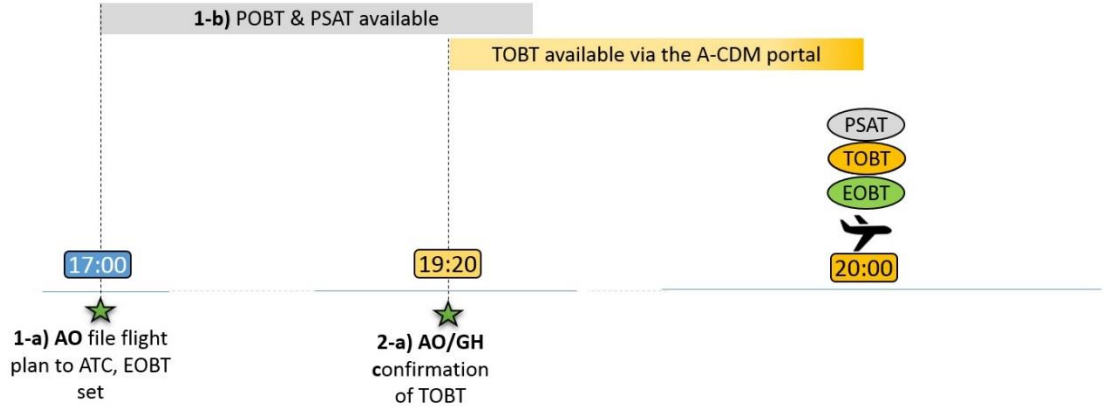
9.1 NORMAL FLIGHT WITH NO DELAYS

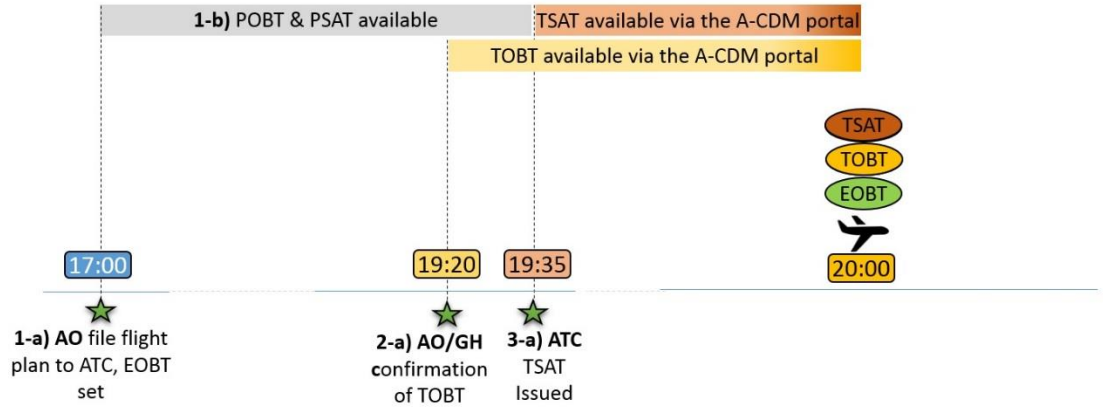
Assumed scenario conditions:

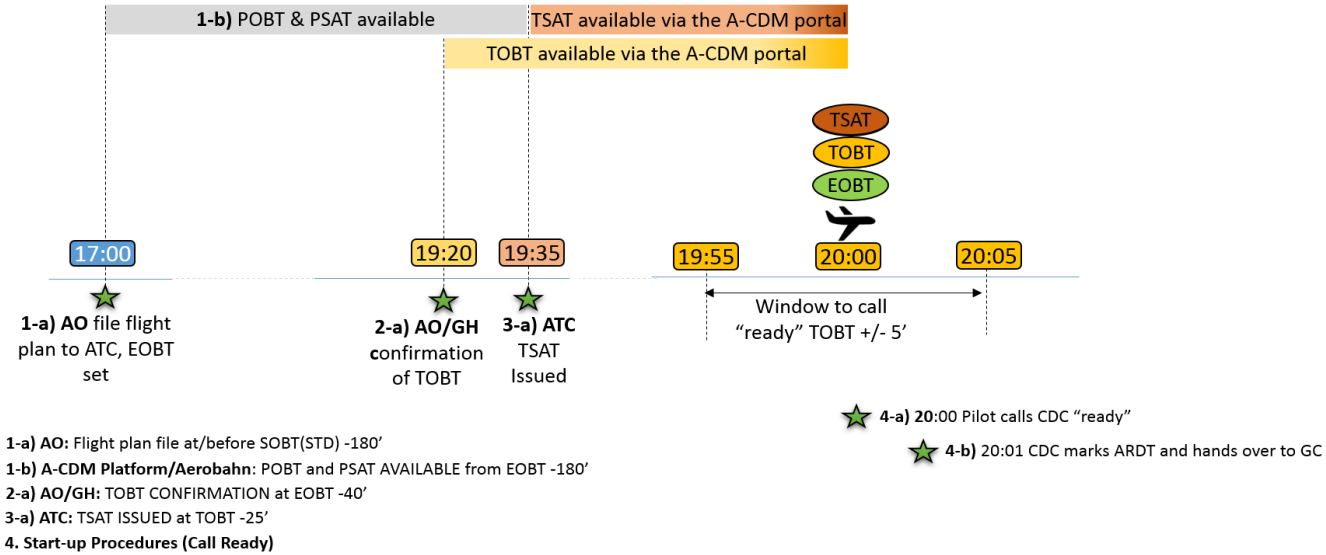
- A flight is departing at 20:00 (i.e. Flight Plan EOBT).
- The flight from the airline side is running perfectly on time
- There are no flow control restrictions

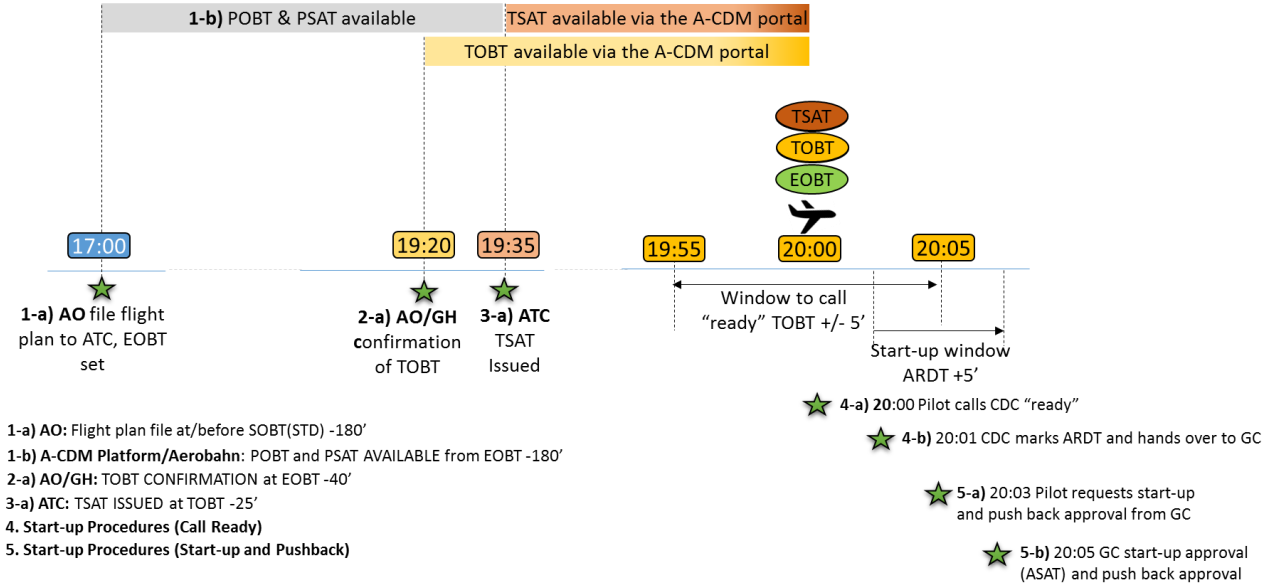
A-CDM Process (step-by-step):

	Time	A-CDM Actions
1	17:00 (EOBT - 180 min)	a) Flight plan has been activated for 20:00 EOBT. Any milestones that the inbound flight may have passed are calculated and checked off. b) The A-CDM platform will calculate a POBT and PSAT at 20:00 and make POBT and PSAT are made available in the A-CDM Portal  **1-a) AO:** Flight plan file -180' before EOBT(STD) **1-b) A-CDM Platform/Aerobahn**: POBT and PSAT AVAILABLE from EOBT -180'

	Time	A-CDM Actions
2	19:20 (EOBT -40 min)	a) TOBT (@20:00) is confirmed by AO/GH  **1-a) AO:** Flight plan file -180' before EOBT(STD) **1-b) A-CDM Platform/Aerobahn**: POBT and PSAT AVAILABLE from EOBT -180' **2-a) AO/GH:** TOBT CONFIRMATION at EOBT -40'

	Time	A-CDM Actions
3	19:35 (TOBT -25 min)	a) TSAT (@20:00) is issued and published via A-CDM platform  **1-a) AO:** Flight plan file -180' before EOBT(STD) **1-b) A-CDM Platform/Aerobahn**: POBT and PSAT AVAILABLE from EOBT -180' **2-a) AO/GH:** TOBT CONFIRMATION at EOBT -40' **3-a) ATC:** TSAT ISSUED at TOBT -25'

	Time	A-CDM Actions
4	19:55 - 20:05 (Call "ready" at TOBT)	a) At 19:55 flight deck calls Clearance Delivery (CD) with "ready" (i.e. inside the TOBT window of TOBT +/- 5 minutes) b) At 20:01 CDC will instruct Flight Deck to contact Ground Control 

	Time	A-CDM Actions
5	19:55 - 20:05 (Start-up and push-back procedure at TSAT)	a) At 20:02 pilot calls ground control for start-up, push-back and taxi-clearance b) At 20:05 ground control gives start-up, push-back and taxi-clearance 

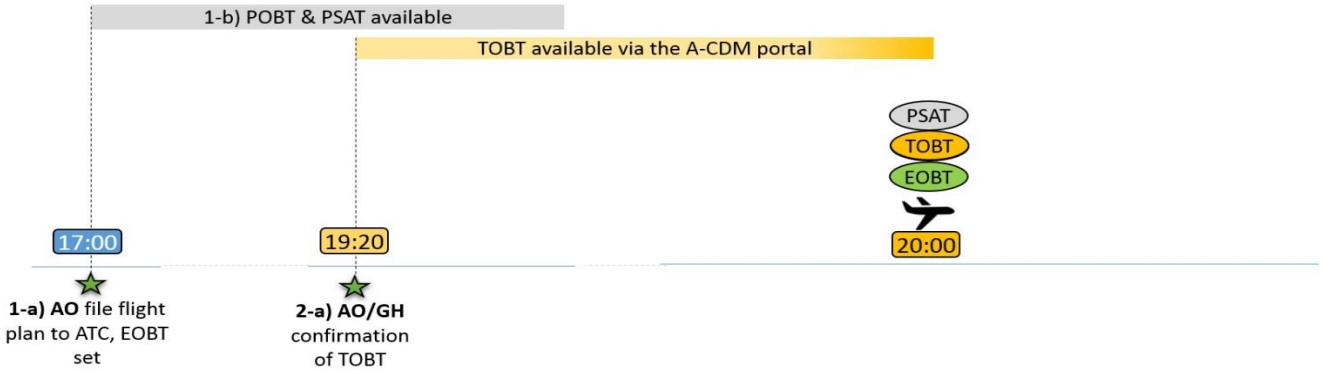
9.2 AD-HOC DELAY (IN THIS SCENARIO, DUE TO MISSING PASSENGER)

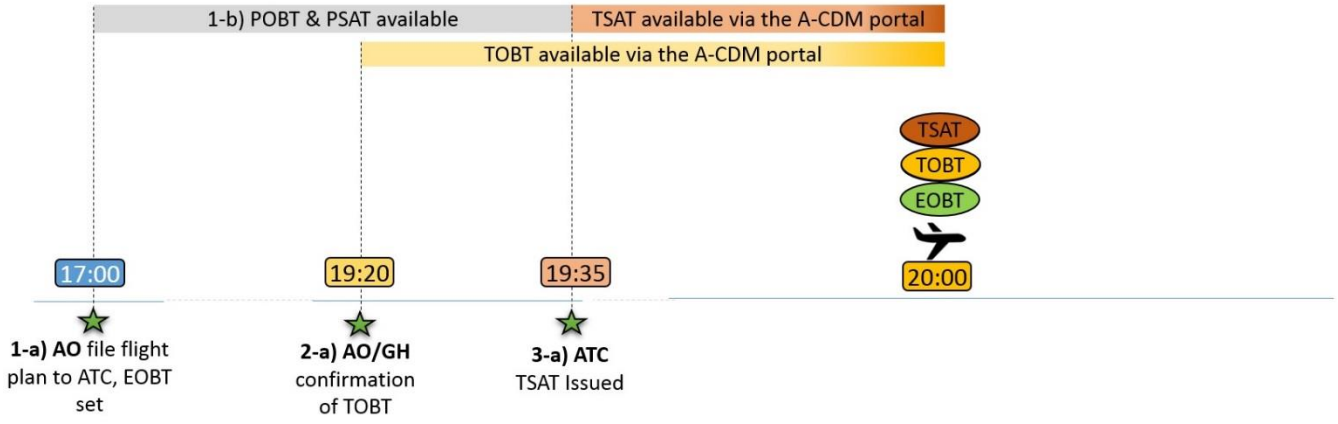
Assumed scenario conditions:

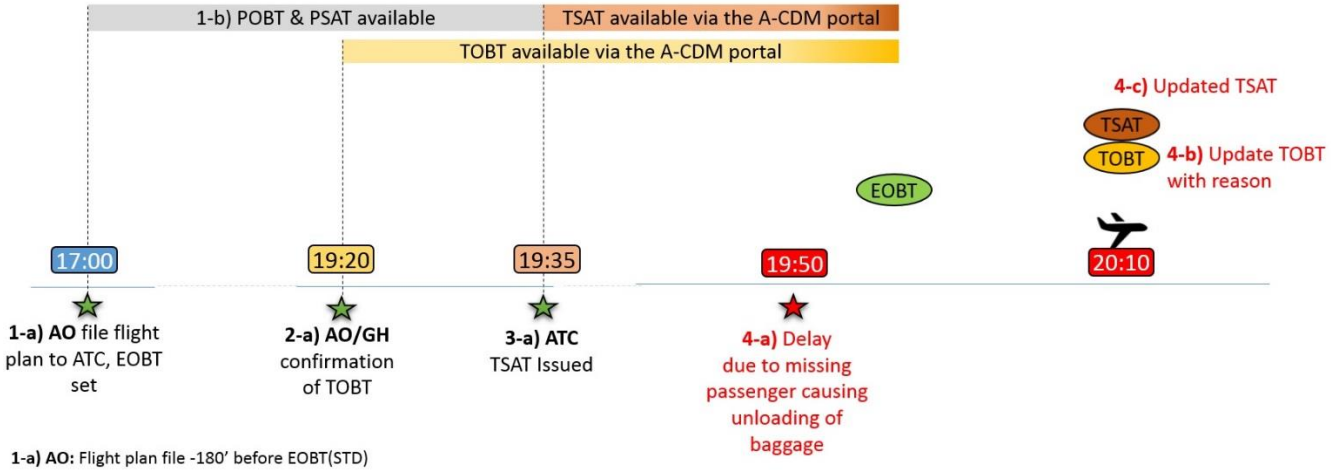
- A flight is departing at 20:00 (i.e. Flight Plan EOBT).
- The flight from the airline side is running perfectly on time up until 19:50 when a passenger is missing and baggage has to be removed off the flight.

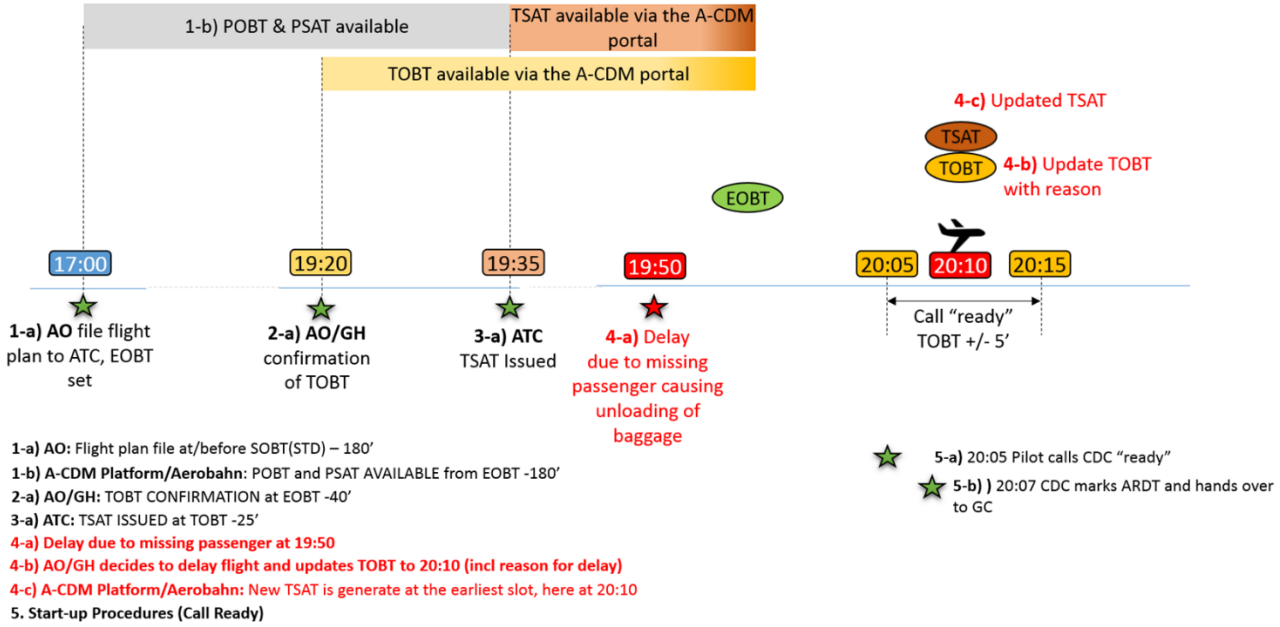
A-CDM Process (step-by-step):

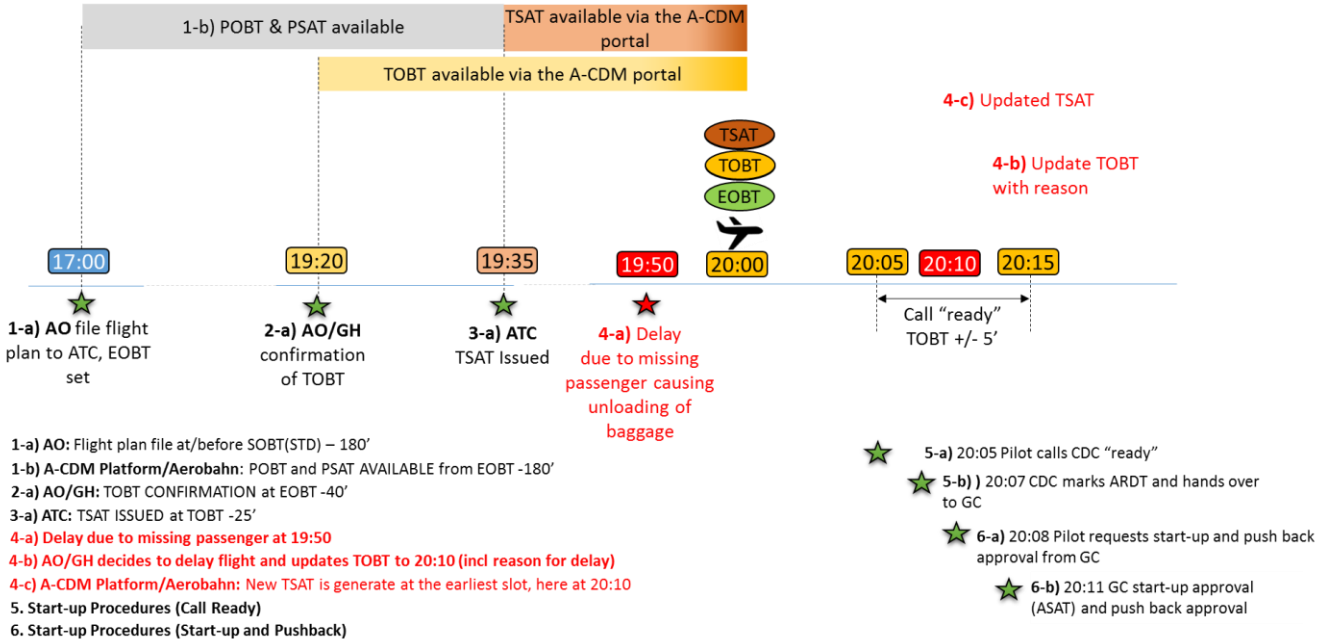
	Time	A-CDM Actions
1	17:00 (EOBT - 180 min)	a) Flight plan has been activated for 20:00 EOBT. Any milestones that the inbound flight may have passed are calculated and checked off. b) The A-CDM platform will calculate a POBT and PSAT at 20:00 and make POBT and PSAT are made available in the A-CDM Portal  **1-a) AO:** Flight plan file -180' before EOBT(STD) **1-b) A-CDM Platform/Aerobahn**: POBT and PSAT AVAILABLE from EOBT -180'

	Time	A-CDM Actions
2	19:20 (EOBT - 40 min)	a) TOBT (@20:00) is confirmed by AO/GH  **1-a) AO:** Flight plan file -180' before EOBT(STD) **1-b) A-CDM Platform/Aerobahn**: POBT and PSAT AVAILABLE from EOBT -180' **2-a) AO/GH:** TOBT CONFIRMATION at EOBT -40'

	Time	A-CDM Actions
3	19:35 (TOBT - 25 min)	a) TSAT (@20:00) is issued and published via A-CDM platform  **1-a) AO:** Flight plan file -180' before EOBT(STD) **1-b) A-CDM Platform/Aerobahn**: POBT and PSAT AVAILABLE from EOBT -180' **2-a) AO/GH:** TOBT CONFIRMATION at EOBT -40' **3-a) ATC:** TSAT ISSUED at TOBT -25'

	Time	A-CDM Actions
4	19:50 (TOBT - 10 min)	a) AO has a missing passenger and decision is made to unload the luggage causing a delayed departure b) New TOBT is entered by AO/GH at 20:10 including reason for the updated of TOBT Once the new TOBT is entered, Aerobahn will recalculate the TSAT (since TOBT is later than current TSAT). Since there a no delays TSAT is @20:10  **1-a) AO:** Flight plan file -180' before EOBT(STD) **1-b) A-CDM Platform/Aerobahn**: POBT and PSAT AVAILABLE from EOBT -180' **2-a) AO/GH:** TOBT CONFIRMATION at EOBT -40' **3-a) ATC:** TSAT ISSUED at TOBT -25' **4-a) Delay due to missing passenger at 19:50** **4-b) AO/GH decides to delay flight and updates TOBT to 20:10 (incl reason for delay)** **4-c) A-CDM Platform/Aerobahn:** New TSAT is generate at the earliest slot, here at 20:10

	Time	A-CDM Actions
5	20:05 - 20:15 (Call "ready" at TOBT)	a) At 20:05 flight deck calls Clearance Delivery (CD) with "ready" (i.e. inside the TOBT window of TOBT +/- 5 minutes) b) At 20:07 CDC marks ARDT and hands over to GC 

	Time	A-CDM Actions
6	20:05 - 20:15 (Start-up and push-back procedure at TSAT)	a) At 20:08 pilot calls ground control for start-up, push-back and taxi-clearance b) At 20:11 Ground Control gives start-up, push-back and taxi-clearance 

9.3 REGULATED FLIGHT (CTOT ALLOCATION)

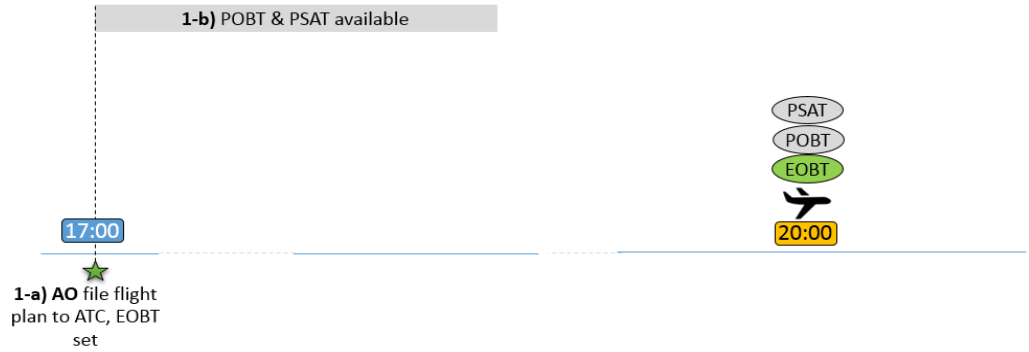
Assumed scenario conditions:

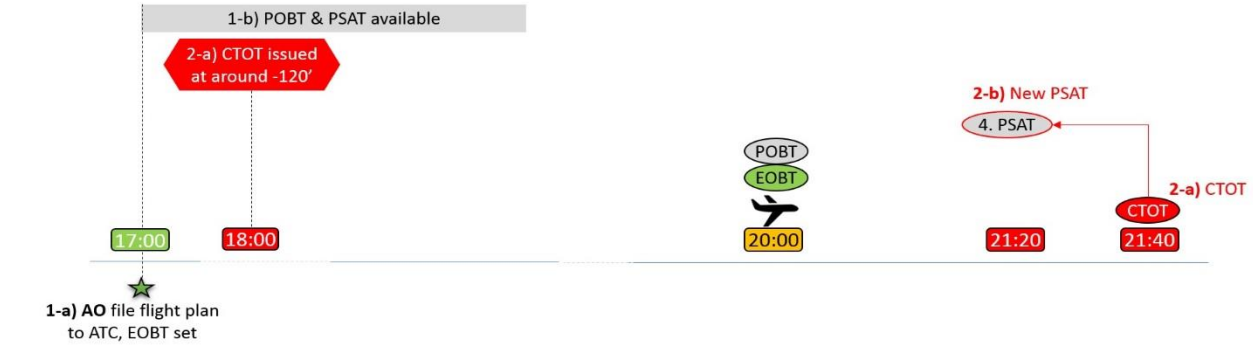
- Assume flight is departing at 20:00.
- The flight from the airline side is running perfectly on time
- There is a flow control restriction and the flight is assigned a CTOT at 21:40 creating a difference between TOBT and TSAT that is more than 60 minutes
- Boarding time is 45 minutes

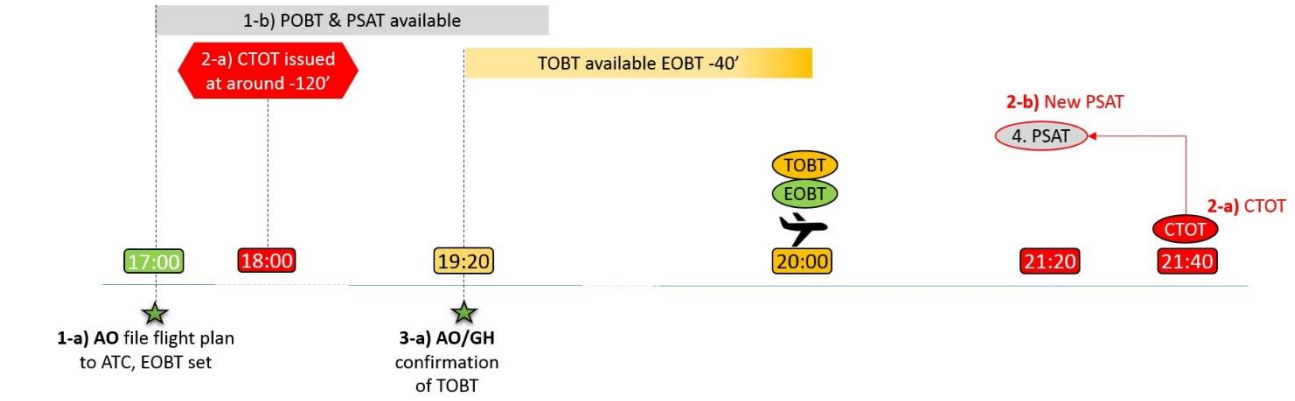
When this delay <occurs, the AO/GH can proceed according to two alternatives:

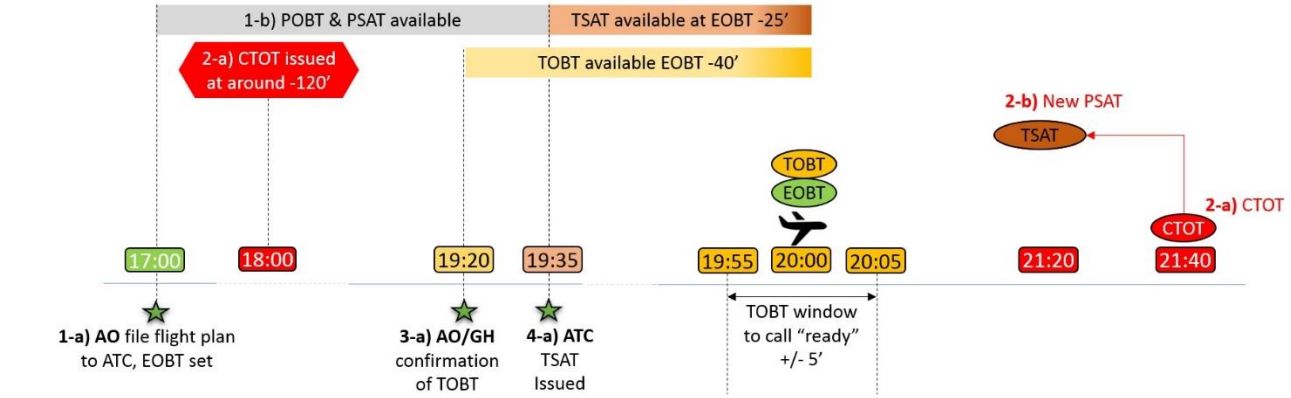
- Maintain Boarding Process - Continue the turnaround process and aim to be ready at TOBT or:
- Delay Passenger Boarding - Decide to delay passenger boarding and update the TOBT accordingly to a new time ensuring they are ready in due time not to miss the TSAT and CTOT.

A-CDM Process for Alternative 1 - Maintain Boarding Process (step-by-step):

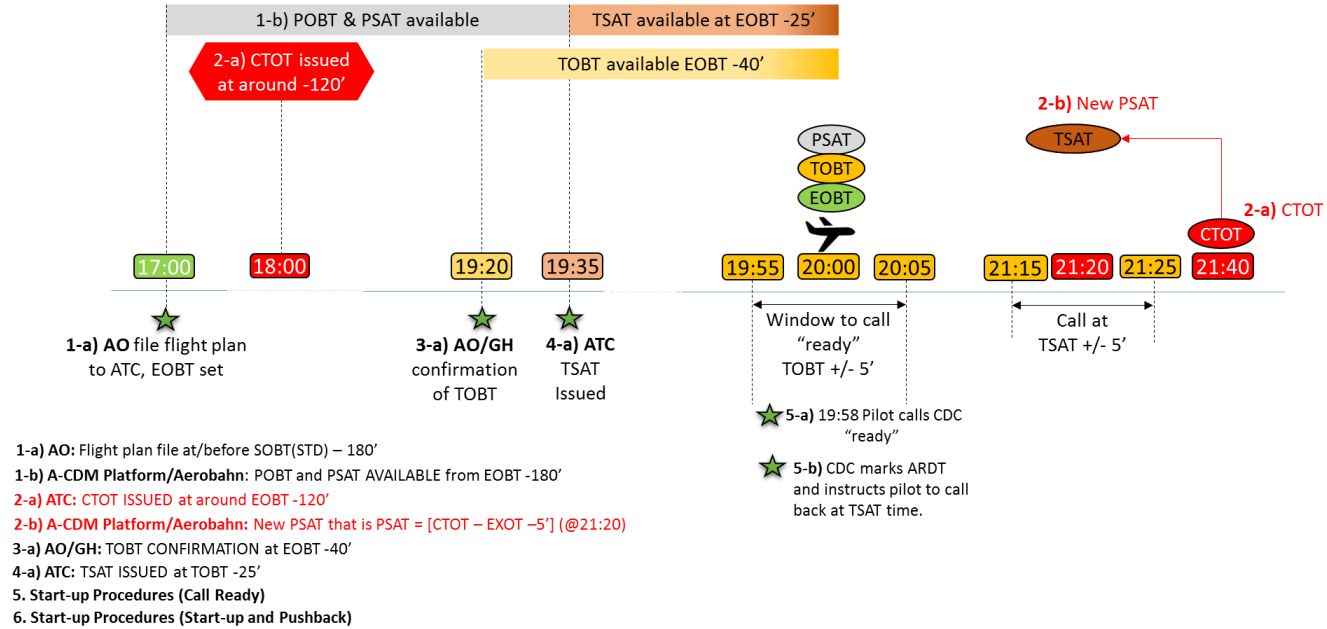
	Time	A-CDM Actions
1	17:00 (EOBT – 3 Hours)	a) Flight plan has been activated for 20:00 EOBT. Any milestones that the inbound flight may have passed are calculated and checked off. b) The A-CDM platform will calculate a POBT and PSAT at 20:00 and make POBT and PSAT are made available in the A-CDM Portal  **1-a) AO:** Flight plan file at/before SOBT(STD) -180' **1-b) A-CDM Platform/Aerobahn**: POBT and PSAT AVAILABLE from EOBT -180'

	Time	A-CDM Actions
2	18:00 (EOBT -2 hours)	a) CAD issues a CTOT for the flight at 21:40 b) A-CDM platform will generate a PSAT at 21:20 (PSAT = CTOT – EXOT – 5 minutes) Due to the CTOT and change of PSAT the AO/GH is aware of the delay and can now make a decision to move TOBT to later and delay the boarding. The AO/GH makes the decision not to change the TOBT and proceed as planned.  **1-a) AO** Flight plan file -180' before EOBT(STD) **1-b) A-CDM Platform/Aerobahn:** POBT & PSAT AVAILABLE **2-a) ATC:** CTOT ISSUED at around EOBT -120' **2-b) A-CDM Platform/Aerobahn:** New PSAT that is PSAT = [CTOT – EXOT –5'] (@21:10)

	Time	A-CDM Actions
3	19:20 (TOBT -40 min)	a) TOBT (@20:00) is confirmed by AO/GH  **1-a) AO** Flight plan file -180' before EOBT(STD) **1-b) A-CDM Platform/Aerobahn:** POBT & PSAT AVAILABLE **2-a) ATC:** CTOT ISSUED at around EOBT -120' **2-b) A-CDM Platform/Aerobahn:** New PSAT that is PSAT = [CTOT – EXOT –5'] (@21:10) **3-a) AO/GH:** TOBT CONFIRMATION at EOBT -40'

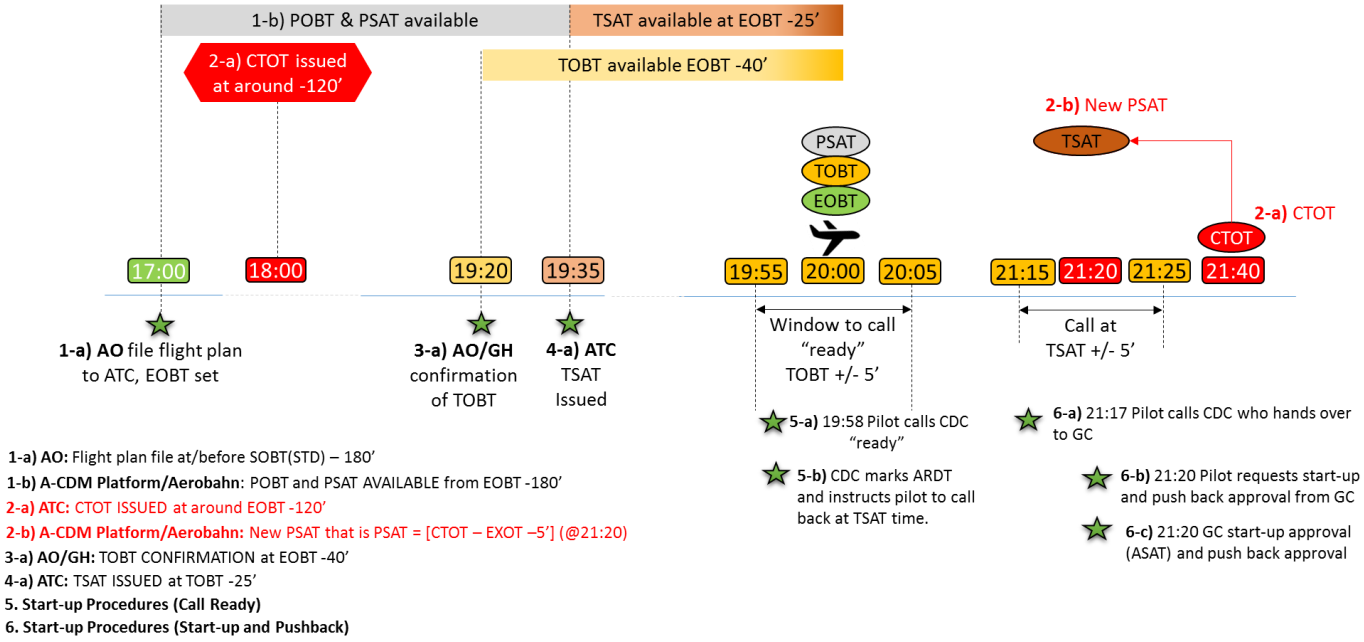
	Time	A-CDM Actions
4	19:35: (TOBT -25 min)	b) TSAT (@21:20) is issued and published via A-CDM platform  **1-a) AO** Flight plan file -180' before EOBT(STD) **1-b) A-CDM Platform/Aerobahn:** POBT & PSAT AVAILABLE **2-a) ATC:** CTOT ISSUED at around EOBT -120' **2-b) A-CDM Platform/Aerobahn:** New PSAT that is PSAT = [CTOT – EXOT –5'] (@21:10) **3-a) AO/GH:** TOBT CONFIRMATION at EOBT -40' **4-a) ATC:** TSAT ISSUED at TOBT -25'

	Time	A-CDM Actions
5	19:55 - 20:05 (Call "ready" at TOBT)	a) At 19:58 flight deck calls Clearance Delivery (CD) with "ready" (i.e. inside the TOBT window of TOBT +/- 5 minutes) CDC marks ARDT and instructs pilot to call back at TSAT time



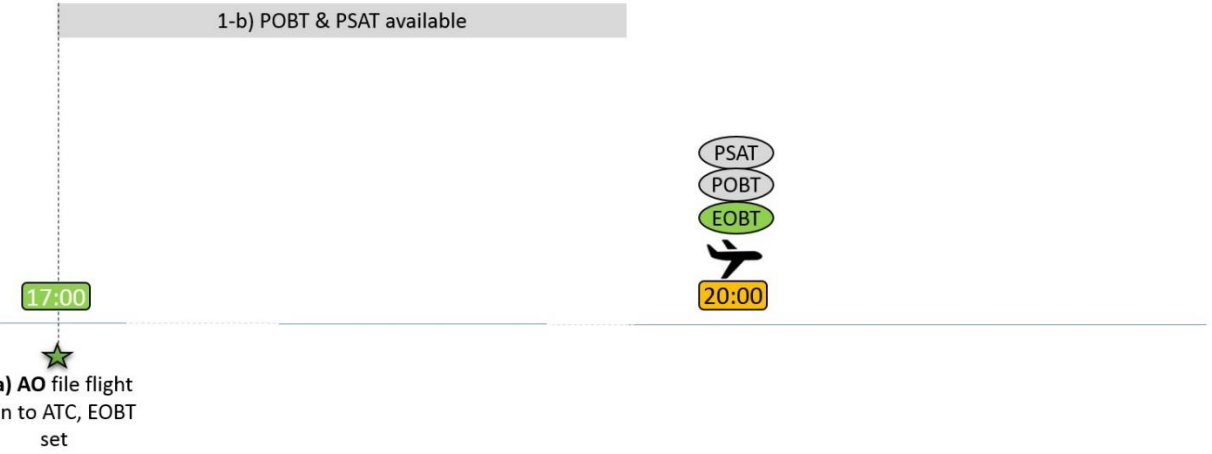
1-a) AO: Flight plan file at/before SOBT(STD) – 180'
1-b) A-CDM Platform/Aerobahn: POBT and PSAT AVAILABLE from EOBT -180'
2-a) ATC: CTOT ISSUED at around EOBT -120'
2-b) A-CDM Platform/Aerobahn: New PSAT that is PSAT = [CTOT – EXOT –5'] (@21:20)
3-a) AO/GH: TOBT CONFIRMATION at EOBT -40'
4-a) ATC: TSAT ISSUED at TOBT -25'
5. Start-up Procedures (Call Ready)
6. Start-up Procedures (Start-up and Pushback)

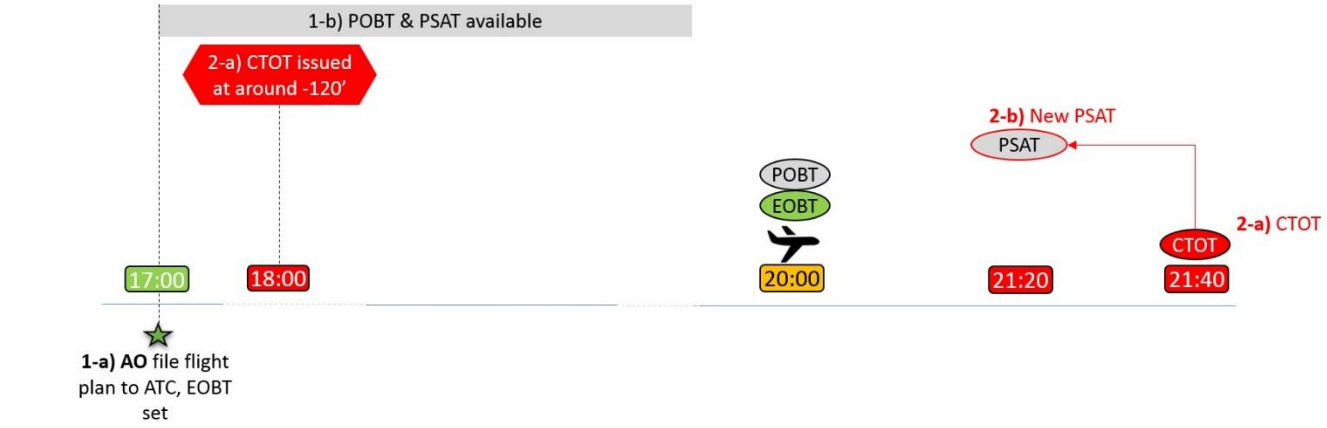
	Time	A-CDM Actions
6	21:15 – 21:25 (Start-up and push-back procedure at TSAT)	a) At 21:17 pilot calls CDC who hands over to GC At 21:20 Pilot requests start-up and push back approval from GC. GC gives the start-up and push back approval (ASAT)

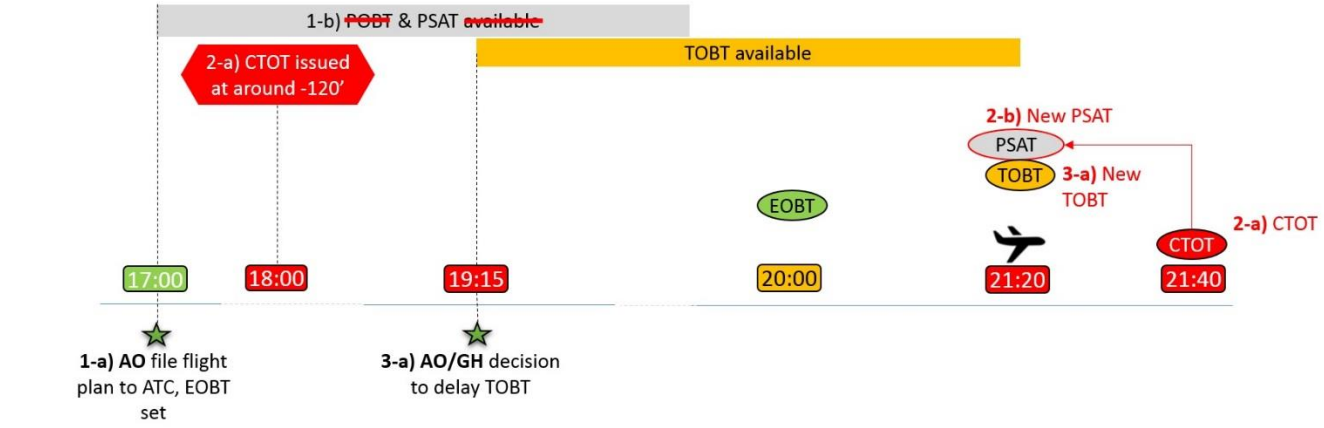


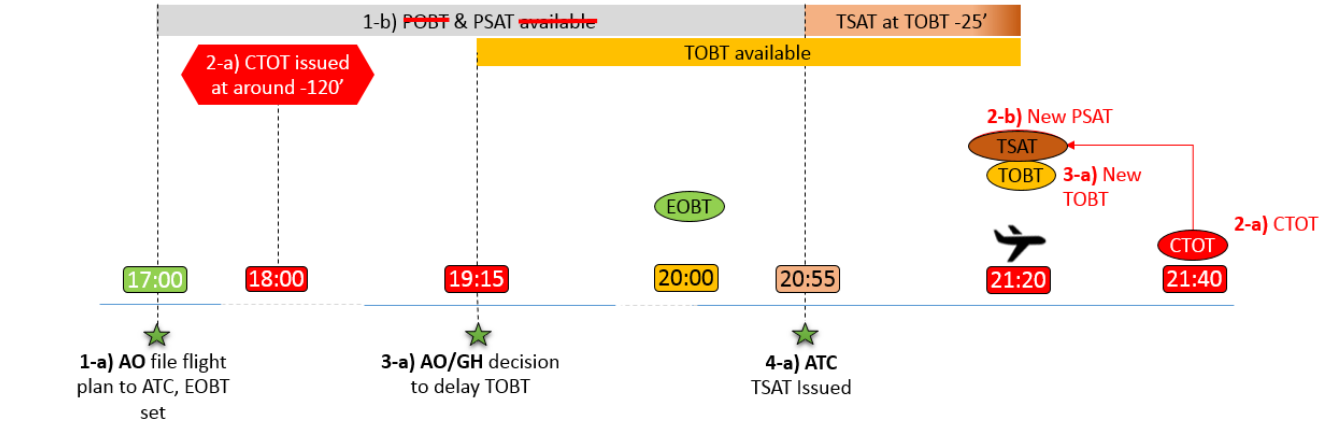
1-a) AO: Flight plan file at/before SOBT(STD) – 180'
1-b) A-CDM Platform/Aerobahn: POBT and PSAT AVAILABLE from EOBT -180'
2-a) ATC: CTOT ISSUED at around EOBT -120'
2-b) A-CDM Platform/Aerobahn: New PSAT that is PSAT = [CTOT – EXOT –5'] (@21:20)
3-a) AO/GH: TOBT CONFIRMATION at EOBT -40'
4-a) ATC: TSAT ISSUED at TOBT -25'
5. Start-up Procedures (Call Ready)
6. Start-up Procedures (Start-up and Pushback)

A-CDM Process for Alternative 2 - Delay Passenger Boarding (step-by-step):

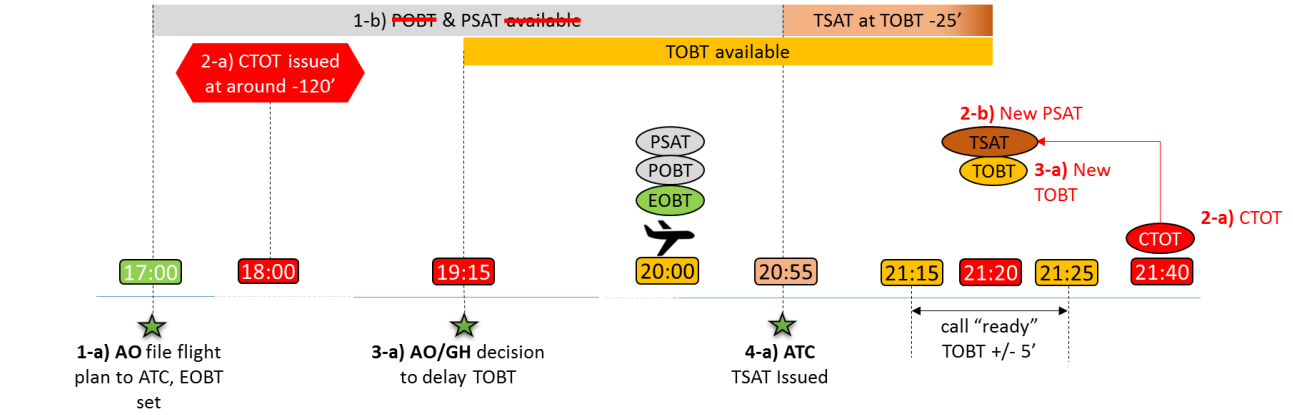
	Time	A-CDM Actions
1	17:00 (EOBT – 3 Hours)	a) Flight plan has been activated for 20:00 EOBT. Any milestones that the inbound flight may have passed are calculated and checked off. b) The A-CDM platform will calculate a POBT and PSAT at 20:00 and make POBT and PSAT are made available in the A-CDM Portal  **1-a) AO** Flight plan file -180' before EOBT(STD) **1-b) A-CDM Platform/Aerobahn:** POBT & PSAT AVAILABLE

	Time	A-CDM Actions
2	18:00 (EOBT -2 hours)	a) CAD issues a CTOT for the flight at 21:40 b) A-CDM platform will generate a PSAT at 21:20 (PSAT = CTOT – EXOT – 5 minutes) Due to the CTOT and change of PSAT the AO/GH is aware of the delay and can now make a decision to move TOBT to later and delay the boarding. Since the boarding time for the flight is 45 minutes the decision has to be made no later than 19:15 (i.e. TOBT – Boarding time)  **1-a) AO** Flight plan file -180' before EOBT(STD) **1-b) A-CDM Platform/Aerobahn:** POBT & PSAT AVAILABLE **2-a) ATC:** CTOT ISSUED at around EOBT -120' **2-b) A-CDM Platform/Aerobahn:** New PSAT that is PSAT = [CTOT – EXOT –5'] (@21:20)

	Time	A-CDM Actions
3	19:15 (TOBT - 45 min)	a) AO/GH assesses the PSAT (and CTOT) and makes decision to move the TOBT until TSAT, i.e. at 21:20. By inputting the TOBT the POBT is deleted and any sub-sequent updates has to be made directly by AO/GH  **1-a) AO** Flight plan file -180' before EOBT(STD) **1-b) A-CDM Platform/Aerobahn:** POBT & PSAT AVAILABLE **2-a) ATC:** CTOT ISSUED at around EOBT -120' **2-b) A-CDM Platform/Aerobahn:** New PSAT that is PSAT = [CTOT – EXOT –5'] (@21:20) **3-a) AO/GH:** Decision to delay by inputting TOBT at 19:15. The POBT is deleted

	Time	A-CDM Actions
4	20:55 (TOBT - 25 min)	b) TSAT (@21:20) is issued and published via A-CDM platform  **1-a) AO** Flight plan file -180' before EOBT(STD) **1-b) A-CDM Platform/Aerobahn:** POBT & PSAT AVAILABLE **2-a) ATC:** CTOT ISSUED at around EOBT -120' **2-b) A-CDM Platform/Aerobahn:** New PSAT that is PSAT = [CTOT – EXOT –5'] (@21:20) **3-a) AO/GH:** Decision to delay by inputting TOBT at 19:15. The POBT is deleted **4-a) ATC:** TSAT ISSUED at TOBT -25'
5	21:15 - 21:25 (Call "ready" at TOBT)	a) At 21:15 flight deck calls Clearance Delivery (CD) with "ready" (i.e. inside the TOBT window of TOBT +/- 5 minutes) b) At 21:16 CDC marks ARDT and hands over to GC

	Time	A-CDM Actions
6	21:15 - 21:25 (Start-up and push-back procedure at TSAT)	a) At 21:18 pilot calls Ground Control and requests push and start-up approval b) At 21:20 Ground control gives start-up, push-back and taxi-clearance



1-a) AO: Flight plan file at/before SOBT(STD) – 180'
1-b) A-CDM Platform/Aerobahn: POBT and PSAT AVAILABLE from EOBT -180'
2-a) ATC: CTOT ISSUED at around EOBT -120'
2-b) A-CDM Platform/Aerobahn: New PSAT that is PSAT = [CTOT – EXOT –5'] (@21:20)
3-a) AO/GH: Decision to delay by inputting TOBT at 19:15. The POBT is deleted
4-a) ATC: TSAT ISSUED at TOBT -25'
5. Start-up Procedures (Call Ready)
6. Start-up Procedures (Start-up and Pushback)

5-a) 21:15 Pilot calls CDC "ready"
5-b) 21:16 CDC marks ARDT and hands over to GC
6-a) 21:18 Pilot requests start-up and push back approval from GC
6-b) 21:20 GC start-up approval (ASAT) and push back approval

10 MEASUREMENT OF KEY PERFORMANCE INDICATORS

In order to achieve full benefits of the A-CDM implementation it is important to measure and analyse the implemented processes and related data. This data is defined as the Key Performance Indicators (KPIs). These KPIs can then be used to measure strategic objectives defined by the A-CDM stakeholders.

The Key Performance Indicators (KPIs) recommended to be measured during the A-CDM program are defined in the following subsection.

10.1 KPI AND DEFINITIONS

KPI	Definition	Benchmark value (if applicable)
KPI 1 (ARDT accuracy at milestone 9)	**-5 >= ARDT-TOBT@MS9 >= +5** • Pilot call ready with +/- 5mins of the First TOBT. • To analyse the predictability of the flight.	
KPI 2 (ARDT accuracy at milestone 15)	**-5 >= ARDT-TOBT@MS15 >= +5** • Pilot call ready with +/- 5mins of the Last TOBT. • To analyse the compliance of pilot to follow TOBT procedure.	
KPI 3 (TSAT accuracy)	**ASAT – TSAT** (at 0min and less than 5mins) • To analyse the accuracy of TSAT and ATC to follow the TSAT procedure.	
KPI 4 (AOBT accuracy according to TSAT)	**-5 >= AOBT – TSAT >= +5** • To analyse if push back according to TSAT.	
KPI 5 (AOBT accuracy according to ASAT)	**AOBT – ASAT** (within 1min, 2min and 3min) • To analyse if pack back immediately after ATC approval.	
KPI 6 (Traffic Congestion)	**TSAT= TOBT (%)** • To analyse ratio of TSAT = TOBT to determine airport congestion situation.	

10.2 KPI MONITORING AND REPORTING

The Airport Authority will conduct routine review of Key Performance Indicators (KPIs) of each individual airlines to identify any major non-compliance or misuse of the A-CDM procedures and system. The Airport Authority will contact the airlines/ground handling agent to seek for explanation and improvement measures. In order to enhance the transparency of the A-CDM performance, AA may consider to publish the KPIs result to all stakeholders periodically.

END