

A-CDM OPS Manual ARN

Table of Content

1. History of Changes References and Glossary

- 1.1 Changes
- 1.2 References
- 1.3 Glossary

2. Purpose of this document

3. Airport Collaborative Decision Making (A-CDM) at ARN (ESSA)

4. Procedures and processes used at ARN Airport

- 4.1 Milestone 1, ATC Flight Plan activation
- 4.2 Milestone 2, EOBT-2 hours
- 4.3 Milestone 3 Take off from outstation
- 4.4 Milestones 4, Local radar update
- 4.5 Milestone 5, Final approach
- 4.6. Milestones 6 – 8
 - 4.6.1 Milestone 6, Landing
 - 4.6.2 Milestone 7, In-block
 - 4.6.3 Milestone 8, Ground handling starts, **(Not used at ARN)**
- 4.7 Milestone 9, TOBT confirmation
- 4.8 Milestone 10, TSAT issue
- 4.9 Milestone 11, Boarding starts
 - 4.10 Milestone 12, **(Not used at ARN)**
 - 4.11 Milestone 13, **(Not used at ARN)**
 - 4.12 Milestone 14, Start Up approved, ASAT
 - 4.13 Milestone 15, Off-block
 - 4.14 Milestone 16, Take off

5. A-CDM Operational Aspects

- 5.1 EOBT update – impact on TOBT

- 5.1.1 Eurocontrol EOBT update service
- 5.1.2 Automatic TOBT management
- 5.1.3 Manual TOBT management
- 5.2. Departure sequencing
- 5.3 Departure Planning Information (DPI)
- 5.4 Visual Docking Guidance System (VDGS)
- 5.5 A-CDM app for Arlanda
- 5.6 A-CDM information in Swedish AIP
- 5.7 Variable Taxi Time (VTT)
- 5.8 Contacts at ARN/ESSA

6. Winter Operations with A-CDM (to be completed)

- 6.1 Aircraft De-icing status
- 6.2 TOBT/ETD management during De-icing conditions
- 6.3 TOBT management / TSAT generation for flights with on-stand De-icing
- 6.4 Determination of De-icing Time
- 6.5 DPI data exchange with NMOC
- 6.6 Factors contributing to smooth De-icing operation

1. History of changes

1.1 Changes

Changes and Reviews			
Version	Status	Date of Issue	Author
1.0	Active	2019.08.23	Swedavia/B.Hansson

1.2 References

1.3 Glossary

SOBT	Scheduled Off Block Time
EOBT	Estimated Off Block Time
TOBT	Target Off Block Time

TSAT	Target Start Up Approval Time
CTOT	Calculated Take Off Time
NMOC	Network Management Operations Center
EXIT	Estimated Taxi In Time
AXIT	Actual Taxi In Time
EXOT	Estimated Taxi Out Time
AXOT	Actual Taxi Out Time
ELDT	Estimated Landing Time
EIBT	Estimated In Block Time
ASAT	Actual Start Up Approval Time
AIBT	Actual In Block Time
DPI	Departure Planning Information
ALDT	Actual Landing Time
MTTT	Minimum Turn Around Time
ATTT	Actual Turn Around Time
AOBT	Actual Off Block Time

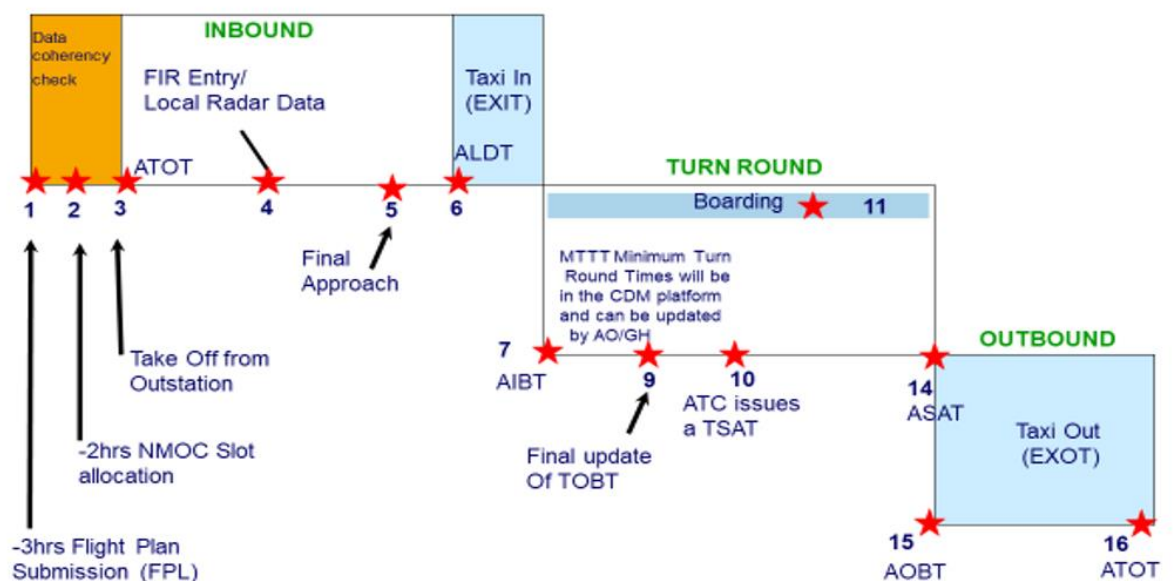
2. Purpose of this document

This manual contains and describes the operational procedures used at Stockholm - Arlanda Airport (ARN/ESSA) in regard of the A-CDM process and its fulfillment.

This document requires a general understanding of the A-CDM process and deeper knowledge of its elements. These details can be found in the Eurocontrol A-CDM Implementation Manual, available via the Eurocontrol link:
<https://www.eurocontrol.int/publication/airport-collaborative-decision-making-cdm-implementation-manual>

3. Airport Collaborative Decision Making (A-CDM) at ARN (ESSA)

A-CDM milestones used at Arlanda/ESSA



Preconditions

Airport slot

A flight must have an airport slot, which basically means that a flight record must exist in the AODB (Chroma). This slot consists of a flight identifier (e.g. SK 123) and a scheduled time of operation (e.g. 12:00 on a specific date). The scheduled time of operation is equal to the SOBT for a departure flight. The flight record also holds information about aircraft type and destination list, which are required in the flow below. Airport slots are handled by ACS (Airport Coordination Sweden)

ATFCM slot (CTOT)

The flight may also have an ATFCM (Air Traffic Flow and Capacity Management) slot, if its route passes through busy airspace or if there are capacity constraints at the departure or arrival aerodrome. This is expressed as a Calculated Take-off Time (CTOT), which is issued by Eurocontrol and sent to the Aircraft Operator/AODB as SAM and SRM messages. This is done either through SITA or AFTN network.

When a flight has a long ATC delay (CTOT) it may be necessary to let the aircraft wait at a different location, rather at the stand. In this case, a push-and-hold procedure may be used, where the aircraft is pushed away from the gate to another area at the airport. A coordination with ground handling/ATC/pilots is always done prior to a push and hold procedure.

Callsign

The flight needs to have a callsign used for communication with different ATC units. The callsign often consists of the ICAO representation of the airline combined with the flight number (e.g. SK 123 is assigned a callsign of SAS123), but several exceptions to this pattern apply, in which case the AODB is responsible for holding a callsign translation table.

This translation and assignment must be in place 3 hours before SOBT for everything to work properly.

Flight rules

The A-CDM process only applies to IFR (Instrument Flight Rules) flights, so VFR flights are not included in the process.

Actors

Airline Operations

Airline Operators are responsible for filing of flight plans and may also replace the individual aircraft in the case of late arrivals.

Ground Handling

GH are responsible for keeping the TOBT updated at all times, so that it reflects aircraft readiness as realistic as possible.

RT

The ramp tower is responsible for gate/stand allocation and other resource management, and also supervises the CDM process in general through the AODB client.

ATC

ATC manages the departure rate, runway selection and runway blocks (breaking action tests, snow sweeping etc.) via DST (Departure Sequence Tool)

ATC will use the result of the departure sequencing (TSAT:s) as a proposed departure sequence, but can always modify the sequence based on the operational situation.

Eurocontrol

NMOC is the receiver of all DPI messages, generated though the A-CDM process, including departure sequencing. They may also take actions on regulated flights, e.g. issuing new CTOTs.

Pilots

The pilot's main relation to the departure sequencing is to observe the TSAT and thus request engine startup clearance within TSAT +/- 5 minutes.

4. Milestones at Stockholm Arlanda

Currently not all 16 A-CDM Milestones are used at Stockholm Arlanda. The reason is that some of them have not been seen as needed and some due to technical limitations. However, additional milestones may be used in the future.

4.1 Milestone 1 (ATC Flight Plan activation)

Flight plan input

Flight plans are filed by the airlines or aircraft operators and fed to the Chroma AODB from the AFTN network. This should happen at least 3 hours before the scheduled time of operation in order not to be considered a "late filer".

In case the ATC FPL is cancelled (FPLCNL), CDM13 alert is raised (No ATC Flight Plan Available)

Flight plan matching

Callsign and EOBD matching

The easiest way of matching the flight plan is when the callsign and date of operation both match. Then the flight plan is associated with the flight.

Other M1 fulfillment criteria

When a flight plan is associated with the flight, the following checks are done:

- Is the EOBT from the flight plan later or equal to the SOBT +/- 120 minutes? This is a local value that most probably will be changed to a much smaller acceptable range. As a KPI (Key Performance Indicator for SOBT adherence, we are looking at a much smaller window, to spot flights outside SIBT/SOBT +/- 10 minutes.
- Does the first destination match the one in the AODB?
- If SOBT/EOBT discrepancy is larger than 120 minutes, CDM02 alert is raised (SOBT vs. EOBT discrepancy)

If these conditions are satisfied, Milestone 1 is fulfilled. This result is stored in the AODB, and an E-DPI is sent to Eurocontrol.

If any significant information is changed after this time (normally 3 hours before SOBT) but earlier than 2 hours before SOBT, then another E-DPI must be sent to Eurocontrol. Such changes could be a change of aircraft type, change of TOBT of more than 5 minutes etc.

Check that Aircraft type matches type in AODB is already done, prior to this. If no match, CDM03 alert is raised (Aircraft Type Discrepancy)

4.2 Milestone 2 (EOBT – 2 hours)

TOBT verification

2 hours before the EOBT, there is a check that the TOBT exists, and has a value between EOBT – 10 minutes and EOBT + 15 minutes.

If not, the handling company or operator must either adjust the TOBT or update FPL or file a new flight plan (including a cancellation of the current FPL), to change the EOBT.

If OK, Milestone 2 is now fulfilled, and the first T-DPI-t should be sent to Eurocontrol.

Inbound flights

Linked or not?

If a departure flight is to be carried out using the same aircraft as an arrival flight, both flights are said to be linked to each other. Thus, a turnaround or rotation, consists of an inbound flight, ground handling and an outbound flight.

This linking is handled by the RMS (Resource Management System)

If the departure flight is linked, all events on the inbound flight are significant also for the outbound flight.

Milestones 3 through 7 are all tied to the inbound flight, i.e. if the flight is not linked, these milestones are ignored, and the flight goes directly to Milestone 9.

However, if the flight is linked, there is a need to handle these milestones properly and the dependency on data from various sources is a complicating factor.

4.3 Milestone 3 (Take off from outstation)

Data sources

The fact that the inbound flight has taken off from its origin airport is only known through messaging.

Either (most common) there is an MVT message from the originating airport, or rather the ground handler at the outstation. This message goes via the SITA network.

Or, there is a FUM (Flight Update Message) issued by Eurocontrol once they know that the flight is airborne.

Actions

The AODB will handle the ELDT stated in the message received:

The TOBT of the departure flight is adjusted so that the EIBT (ELDT+EXIT) of the inbound flight plus the MTTT forms the new TOBT, unless the TOBT is already further into the future.

TOBT can always be manually set by the handling agent.

See an example in section 5.1.2 Automatic TOBT management.

Home base carriers

A special rule applies for “Home base carriers”. Currently only SAS and Norwegian.

Normally if an arriving flight is late, the departure will also be delayed. However, for an operator who is considered to be a Home Base carrier, there is a different solution.

The AODB is configured so that any EIBT of an arriving flight would not affect the TOBT of the departing flight, unless TOBT is more than 25 minutes later than the TOBT in the AODB. The reasoning behind this is that a Home Base Carrier may have a chance to swap the departing aircraft in case of a late incoming flight, or possibly shorten the turnaround time.

Fulfillment

Milestone 3 is fulfilled when:

- A message that the inbound flight has taken off has been received.
- The TOBT (updated by the handling company) is between EOBT – 10 and EOBT + 15 minutes.

4.4 Milestone 4 (Local radar update)

Data sources

Under development.

Actions

If the TOBT (and thus the TTOT) is changed more than 5 minutes, a new T-DPI-t is sent.

Fulfillment

4.5 Milestone 5 (Final approach)

Data sources

The data source used today is CIES once the incoming flight is on final. The message typically arrives to the AODB a few (3-5) minutes before touchdown.

Actions

The message contains a quite accurate ELDT of the inbound flight. This ELDT is handled similarly to the situation in M3, i.e. it updates the TOBT if there is a delay, so that MTTT is kept.

If the TOBT (and thus the TTOT) is changed more than 5 minutes, a new T-DPI-t is sent.

Fulfillment

When:

- . There is a message that the inbound flight has been radar located, and
 - The TOBT (updated by the handling company or changes/delays on the inbound flight) is between EOBT – 10 and EOBT + 15 minutes.
 - If all of the above are satisfied, then Milestone 5 is fulfilled, and a T-DPI-t is sent to Eurocontrol.

4.6 Milestone 6-8

4.6.1 Milestone 6 (Landing)

Data sources

Information on actual landing time comes from two systems, CIES and E-STRIP. It may also be set manually. Sometimes all three data sources are used to update the ALDT.

Actions

The E-STRIP message contains an accurate ALDT of the inbound flight. This ELDT will update the TOBT if there is a delay, so that MTTT is kept.

If the TOBT (and thus the TTOT) is changed more than 5 minutes, a new T-DPI-t is sent.

Fulfillment

When:

- . There is an E-STRIP message stating that the incoming flight has landed and
 - The TOBT (updated by the handling company or changes/delays on the inbound flight) is between EOBT – 10 and EOBT + 15 minutes.
 - If EOBT/TOBT is outside accepted values, CDM08 alert will be raised (EOBT compliance Alert).
 - If all of the above are ok, then Milestone 6 is fulfilled.
- If any of the DPI content thereby is changed, T-DPI-t is sent to Eurocontrol.

4.6.2 Milestone 7 (In block)

Data sources

On stands where there is a docking system (APIS or SAM), these systems act as data sources for M7.

On stands lacking a docking system (remote stands or Terminal 3), the in-block times are supposed to be entered manually by RT.

Fulfillment

Milestone 7 is fulfilled when:

- The inbound flight has blocked in (set by one of the data sources or manually or using Auto In-block) and
- The TOBT (updated by the handling company or changes/delays on the inbound flight) is between EOBT – 10 and EOBT + 15 minutes.
- If EOBT/TOBT is outside accepted values, CDM08 alert will be raised (EOBT compliance Alert).

If any of the DPI content thereby is changed, T-DPI-t is sent to Eurocontrol.

4.6.3 Milestone 8 (Ground handling starts) Not in use at Arlanda

4.7 Milestone 9 (TOBT confirmation)

Data Sources

There is no specific interface or data source for M9. Rather, it is a final check that all necessary data is in place.

Milestone 9 is checked at 30 minutes before FPL EOBT

Actions

The main action taken on the fulfillment of M9 is to release the flight for departure sequencing, and to generate alarms if data is not correct.

Fulfillment

When:

- The TOBT (updated by the handling company or changes/delays on the inbound flight) is between EOBT – 10 and EOBT + 15 minutes.
- If all of the above are satisfied, then Milestone 9 is fulfilled.
- If the TTOT is changed by more than 5 minutes, a T-DPI-t is sent to Eurocontrol.

4.8 Milestone 10 (TSAT issued)

Data Sources

The only data source for M10 is DST.

Actions

A T-DPI-s (sequence DPI) is sent to Eurocontrol to inform NMOC that ATC has now planned a departure sequence for the aircraft. For regulated flights (CTOT), this DPI is sent at TSAT-

10 minutes and for non-regulated flights at TSAT-40 minutes.
 Once the TSAT is set, there is currently no rule for how many times TOBT may be updated.
 Some airports use a maximum of 3 to 5 updates in order to create TOBT stability. If more updates are done, a C-DPI will be sent to Eurocontrol.
 At Arlanda we currently don't see a need for a limitation of TOBT updates.

Fulfillment

Fulfillment of M10 is defined as the condition when a TSAT and corresponding TTOT is issued by the DST.

If EOBT/TOBT is outside accepted values, CDM08 alert will be raised (EOBT compliance Alert).

Picture below, shows example of flights in A-CDM web view, with allocated TSAT. Note that flights with no stand yet allocated, have EXOT set to the default value of 15 minutes.

Inbound													Turnaround				Outbound														
Oper/Fin	C/S	HA	Origin	STS	RWY	LDT	EXIT	AXIT	IBT	Stand	Reg	A/c Typ	MTT	Alert	Oper/Fin	C/S	Dest	STS	RWY	Stand	SOBT	EOBT	TOBT	TSAT	ASAT	AOBT	CTOT	TOT	EXOT		
SK486	SAS486	SGH	OSL	ARR	26	13:00A	0:04		13:04E	F39L	LNRGL	32N	0:25		SK491	SAS65P	OSL	INI	01R	F39L	13:40	13:40	13:40	13:40					13:53T	13	
DY4202	NAX2VJ	AVI	ALC	ARR	26	12:58A	0:05		13:03E	13	YRBMH	73H	0:25		DY4253	NAX3MB	BCN	INI	01R	13	13:50	13:50	13:50	13:50					14:02T	12	
FI308	ICE82B	SGH	KEF		19L	13:53E	0:15		14:08E			75W																			
DY4040	NAX4CD	AVI	LLA	INI	26	13:21E	0:05		13:26E	31	LNNIE	73H	0:25		DY4043	NAX43E	LLA	INI	01R	31	14:00	14:00	14:00	14:00					14:10T	10	
DY4312	NAX4312	AVI	CDG	INI	19L	13:57E	0:08		14:05E	33	LNNHG	73H	0:25	●	DY4051	NAX51N	MMX	INI	01R	33	14:00	14:00	14:00	14:01					14:11T	10	
SK709	SAS709	SGH	HEL	INI	26	13:19E	0:04		13:23E	F35	EIFPD	CR9	0:15		SK2473	SAS47K	TRD	INI	01R	F35	14:00	14:00	14:00	14:00					14:13T	13	
														●	SWD1901SWD1901	ALC	INI	01R			14:00	14:00	14:00	14:01					14:16T	15	
														●	SWD1902SWD1902	OSL	INI	01R			14:00	14:00	14:00	14:00					14:15T	15	
														●	SWD1903SWD1903	OSL	INI	01R			14:00	14:00	14:00	14:00					14:18T	15	
															AEA1642	AEA1642	MAD	INI	01R		14:10	14:10	14:10	14:10					14:25T	15	
SK1011	SAS1011	SGH	SFT	IBK	26	05:15A	0:15	0:04	05:19A		OYKAW	320	0:20		SK579	SAS579	CDG	INI	01R		14:10	14:10	14:10	14:11					14:26T	15	
VY1265	VLG126C	MEN	BCN	INI	26	13:42E	0:15		13:57E			320	0:25		VY1266	VLG12HE	BCN	INI	01R		14:10	14:15	14:22	14:26					14:41T	15	
NVR332	NVR332	SGH	PVK	IBK	26	12:32A	0:15	0:09	12:41A		SERKA	32Q	0:25		NVR391	NVR391	CFU	INI	01R		14:15	14:15	14:15	14:19					14:34T	15	
SK1806	SAS41P	SGH	PMI	INI	19L	13:14E	0:07		13:21E	F32L	EISIB	32N	0:25		SK1523	SAS1523	LHR	INI	01R	F32L	14:15	14:15	14:15	14:26				14:39	14:39T	13	
SK009	SAS009	SGH	LLA	IBK	19L	12:48A	0:15	0:05	12:53A		SERDOO	32N	0:25		SK1555	SAS1555	AMS	INI	01R		14:15	14:15	14:15	14:15				14:30	14:30T	15	
SK536	SAS30H	SGH	DUB	INI	26	13:39E	0:15		13:54E		SEREU	73W	0:25		SK1605	SAS1605	ZRH	INI	01R		14:15	14:15	14:15	14:15				14:30	14:30T	15	
SK406	SAS406	SGH	CPH	INI	19L	13:41E	0:15		13:56E		LNRIKI	321	0:25		SK407	SAS407	CPH	INI	01R		14:15	14:15	14:15	14:20					14:35T	15	
BLX624	BLX624	SGH	AYT		19L	14:39E	0:15		14:54E			733																			
															PC1282	PGTSCU	SAW				19L		14:20							14:35T	15
															SK2549	SAS2549	MAN	INI	01R	F37	14:20	14:20	14:20	14:24					14:37T	13	
															LH807	DLH807	FRA				19L		14:25							14:40T	15
															SK2491	SAS2491	AAR	INI	01R	143	14:25	14:25	14:25	14:30					14:43T	13	
SK4201	SAS4201	SGH	OUL	INI	26	13:25E	0:03		13:28E	143	EIFPR	CR9	0:15																		
LPA305	LPA305	AVI	MHQ		19L	14:33E	0:15		14:48E			SF3																			
DY4356	NAX56J	AVI	FCO	IBK	26	-12:39A	0:15	0:04	-12:43A		EIGBI	73H	0:25		DY4287	NAX4287	HEL	INI	01R		14:30	14:30	14:30	14:31					14:46T	15	
DY816	NAX816	AVI	OSL	INI	19L	14:00E	0:15		14:15E		LNNGU	73H	0:25		DY817	NAX817	OSL	INI	01R		14:30	14:30	14:30	14:33					14:48T	15	
SK2616	SAS2616	SGH	GVA	INI	26	13:00E	0:15		13:15E		LNRNU	73W	0:25		SK7851	SAS7851	PVK	INI	01R		14:30	14:30	14:30	14:30				14:45	14:45T	15	

4.9 Milestone 11 (Boarding started)

Data Sources

A time stamp is recorded in Chroma indicating Boarding Started.

Actions

If ASBT is not filled out before TOBT – 15 minutes, alert CDM09 is raised (Boarding Not Started)

Fulfillment

M11 is fulfilled for boarding flights when there is an ASBT and for non-boarding flights automatically at TOBT – 15 minutes.

4.10 Milestones 12 (Aircraft ready)

Milestones 12 is not implemented at ARN as agreed with Eurocontrol. They are therefore ignored. The reason is that this function is not available on e-strip.

4.11 Milestones 13 (Start up request)

Milestones 13 is not implemented at ARN as agreed with Eurocontrol. They are therefore ignored. The reason is that this function is not available on e-strip.

4.12 Milestone 14 (ASAT = Actual Start Up Approval Time)

Data Sources

When pilot is given start-up clearance by ATC, this is marked on the e-strip.

Timestamp of ASAT is recorded in AODB via e-strip.

4.13 Milestone 15 (Off block)

Data Sources

Milestone 15 is triggered by the off-block event

An off-block event can come either from one of the docking systems, APIS and SAM or manually entered by a dedicated position in the ramp tower (RT).

Actions

Setting the AOBT will trigger the last DPI, the A-DPI to be sent to Eurocontrol in all normal cases. Thus, the regular CDM process for the flight is over.

An A-DPI will be sent when the flight blocks out, if M14 is fulfilled.

Fulfillment

M15 is fulfilled when an AOBT is set.

4.14 Milestone 16 (take off)

Data Sources

M16 is set when the aircraft is airborne. This is registered either from CIES, originated from radar data. It is also set by Estrip, both sources are equally valid. It may also be entered manually by RT.

Actions

No special actions are taken on ATOT. However, if the aircraft has any kind of problems during taxi-out, there will be a return-to-stand event, resulting in a C-DPI being sent.

Fulfillment

M16 is fulfilled when the flight takes off.

5. A-CDM Operational Aspects

5.1 EOBT update – impact on TOBT

If EOBT is delayed with more than 5 minutes after TOBT, TOBT is automatically changed to match EOBT.

If EOBT is delayed with 5 minutes or less, TOBT remains unchanged.

- If EOBT/TOBT is outside accepted values, **CDM08** alert will be raised (EOBT compliance Alert).
- If TOBT for any reason is removed, a C-DPI is sent to NMOC followed by a FLS message. **CDM10** alert is raised. When a new TOBT is introduced, NMOC will send a DES message and the flight is back in the A-CDM process again.

5.1.1 Eurocontrol EOBT update service

This service is strongly recommended by Swedavia, as this procedure guarantees an EOBT and TOBT alignment. As soon as TOBT is updated to a time later than 15 minutes after EOBT, Eurocontrol will for Airlines using this service, update the EOBT to match TOBT.

5.1.2 Automatic TOBT management

Chroma A-CDM platform will for turnaround flights, automatically update TOBT, if the arriving flight can not meet it's declared TOBT.

This is done by checking the aircrafts Estimated Landing Time (ELDT) + EXIT (Estimated Taxi in Time) + MTTT (Minimum Turnaround Time) and comparing it to the TOBT. If the aircraft can not make the TOBT, an automatic TOBT will be set according to the formula:

EIBT (Estimated In block Time) + MTTT will be the new TOBT.

Example:

Arriving SWE123 is slightly delayed

ELDT 13:43

EXIT 15 minutes

EIBT 13:58

MTTT 25 minutes

Departing SWE456

SOBT 14:15

EOBT 14:15

TOBT 14:15, can not be met as $EIBT+MTTT= 14:23$

Result: New automatically generated TOBT 14:23.

Note: The handling company can always manually confirm the TOBT if they are sure they can shorten the turnaround process, in order to meet the original TOBT.

5.1.3 Manual TOBT management

Handling agents may manually set the TOBT and this will be indicated with the letter **M** after the TOBT in the A-CDM Grid View or a time in the column "Man.TOBT" in Chroma AODB.

5.2 Departure sequencing

Systems

AODB

The AODB gathers all information from the other different systems and generates DPIs for NMOC.

DST

The Departure Sequencing Tool takes data from the AODB to calculate a start-up sequence for the departures, based on value input by ATC.

It has a user interface for ATC personnel to monitor the situation and to modify departure rate/control runway usage.

E-strip

E-strip is the main system for digital clearance and displays data both from the AODB and DST besides its own data.

Data Link

In some aircraft, there is a data link to the cockpit so that the pilots are aware of the TSAT updates.

Principles

Runway capacity and use

ATC controls the planned runway-in-use and the maximum number of departures through the UI of the DST. The planned runway for each flight is then written back to the AODB, unless the planned runway is already set by E-strip. I.e. E-strip has a higher priority than DST for setting planned runway. The actual runway is set through E-strip only.

ATC also sets the runway capacity (Departure Rate), i.e. the maximum number of departures for the current departure runway. The standard departure rate when using one runway for departures and one for arrivals is normally 35, meaning 35 departures per hour. With this departure rate, flights can during peak hours, expect a difference between TOBT and TSAT of up to 10 minutes, with the current demand at Arlanda. This may change with a different demand. During off-peak hours, TSAT is normally set at TOBT or very close to.

Some flights request a longer runway even if that runway is not the current departure runway. This is due to performance reasons (large or heavy aircraft). In this case, the flight can be dragged from a runway to another in the DST UI, but E-strip is still the master of runway allocation so that change must be made there too.

The DST UI can also be used for blocking runways from use for a certain period. The reason may be snow sweeping, brake effect testing etc. Then, the waiting departure flights are moved in time to either before or after the blocked time.

Prioritization

The status (STS) field of the flight plan, and the "regulated flight" (i.e. having a CTOT) control the priority of the flight.

Flights with a priority status (Ambulance flights, state flights etc.) are prioritized first.

Then, flights with a CTOT issued by Eurocontrol are prioritized according to their CTOTs.

Then, all other flights are sequenced according to their TTOT.

Sequencing

Sequencing itself consist of creating an optimal sequence of departures according to the rules above and then calculating a TSAT for all the departing flights. This is done continuously, in fact the TSAT is calculated for all the flights as soon as there is an ATC flight plan in the AODB.

Results of sequencing

The TSAT is displayed in the DST UI (see picture below)

The TSAT is written back to the AODB if milestone 9 is fulfilled.

The AODB sends the TSAT to E-strip through the integration platform, GIPS. TSAT will then be visible for the TWR controller and will be used in the start-up clearance process.

TSAT can be communicated via datalink to the cockpit. ATC uses the ACARS FSM message to provide ACARS update to the cockpit.

Example:

"FSM

FI SK419/AN OY-KBH

- /ARNCLXA.FS1/FSM 0525 160912 ESSA

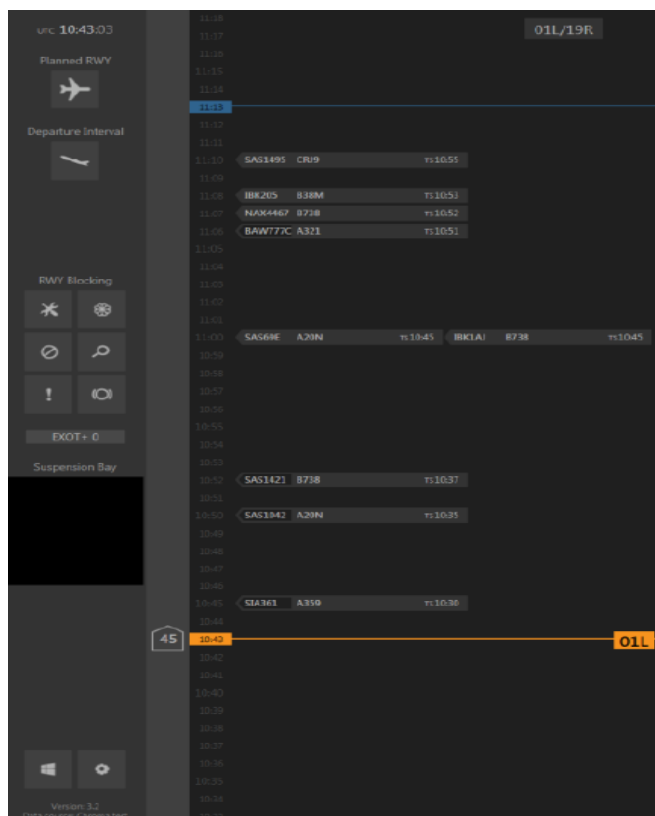
SAS419 CDA

NEW TSAT 0541C13D"

The pilots are then supposed to request engine startup clearance within TSAT +/- 5 minutes.

If the pilots have not requested startup (or rather, have not received startup clearance) **within TSAT + 10 minutes**, the process is interrupted, a C-DPI is sent to Eurocontrol and the process must be resumed by a new TOBT from the Ground Handler.

DST UI (Departure Sequence Tool User Interface)



5.3 Departure planning information (DPI)

Departure Planning Information (DPI) messages between the Network Operations and a CDM Airport, to provide estimates for arriving flights to CDM Airports and improve the ATFM slot management process for departing flights

The aim is to improve the coordination between Air Traffic Flow and Capacity Management (ATFCM) and airport operations at a CDM Airport.

For each non-VFR flight that has taken off from ARN, there should be:

- At least one E-DPI.
- At least one T-DPI-t
- At least one T-DPI-s
- At least one A-DPI.
- If for some reason, the A-CDM process is interrupted, a C-DPI (Cancel DPI) is sent to Eurocontrol NMOC. NMOC will then reply with a FLS (Flight Suspension Message).
C-DPI will be sent when:
 - TOBT is deleted
 - TSAT has expired
 - Aircraft returns to stand
 - Cancellation of Airport slot before ATC Flightplan has been cancelled.

5.4 VDGS (Visual Docking Guidance System) and A-CDM app

A-CDM information is displayed on docking index (VDGS) and currently there are 2 types of index at Arlanda. The latest version can display 3 lines of information and the older version only 2 lines.

Currently all times are in local time (SNT) but will in the near future be displayed in UTC

For stands without an index, pilots must refer to the Swedavia A-CDM app (see picture) or via Ground Handling company/ATC.

Index with capability of showing 3 lines.

Current time: 11:26 SNT

TOBT: 11:30

TSAT 11:32

TOBT and TSAT will show the value every 5 seconds.



Index with capability of showing 2 lines.

As soon as the index is activated, TSAT and the value will be shown on this type of index. No other information is shown if a TSAT is available. If for some reason a TSAT would not exist for a flight, TOBT and a time will be shown.

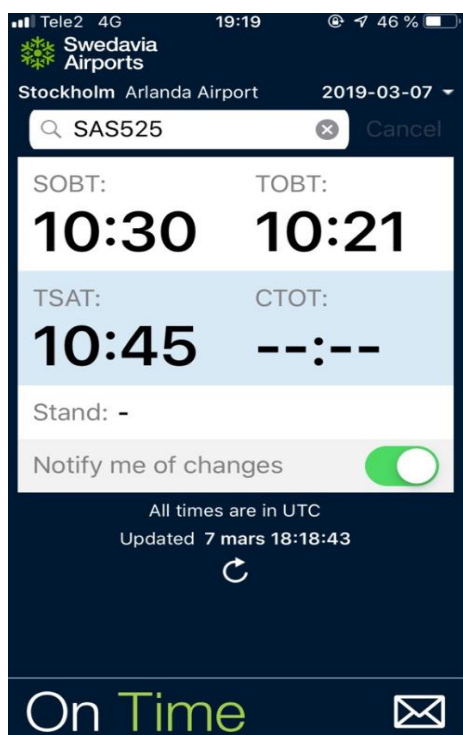
Swedavia will in the near future update these index, in order to show both TOBT and TSAT.



5.5 A-CDM app for Stockholm Arlanda

An A-CDM app is available for Stockholm Arlanda and download instructions can be found on the main A-CDM web page.

The data is provided from the AODB and all updates done in the AODB will be shown on the app.



5.6 A-CDM information in Swedish AIP

The following A-CDM related information can be found in the Swedish AIP:

2.2.2.2.1 Airport Collaborative Decision Making (A-CDM)

Target Off Block Time (TOBT)

1. TOBT måste uppdateras med en precision på +/- 5 minuter.
2. TOBT skall uppdateras via vanliga rutiner t.ex. standard IATA (ETD) estimerat avgångsmeddelande.
3. TOBT skall endast uppdateras vid förändring på 5 minuter eller mer.
4. Vid en försening på 15 minuter eller mer, måste ett DLA-meddelande skickas av marktjänstföretag eller flygoperatör.

Target Start Up Approval Time (TSAT)

1. TSAT meddelas av ATS i samband med avgående klarering.
2. Om TSAT uppdateras meddelas pilot via:
 - DCL eller,
 - Docking Guidance System-display eller,
 - CDM App, sök på "callsign", TSAT visas och notifieras vid uppdatering eller,
 - a. Installera CDM App:
<https://www.swedavia.net/sv/Arlanda/CDM1/>
 - Webbapplikation, sök på "callsign", TSAT visas och notifieras vid uppdatering eller,
 - a. Webblink:
<https://www.swedavia.net/sv/Arlanda/cdm-callsign/>
- Marktjänstföretag eller flygoperatör.

TOBT/TSAT

1. Pilot ansvarar för att luftfartyget är klart för start-up vid TOBT.
2. Om luftfartyget är klar före TOBT måste ny TOBT registreras av marktjänstföretag eller flygoperatör.
3. Om luftfartyget inte är klar vid TOBT måste ny TOBT registreras av marktjänstföretag eller flygoperatör.
4. Pilot ska vara uppmärksam på TOBT och TSAT och följa dessa.

Start Request

1. Start-up/push-back skall begäras inom TSAT-fönster +/- 5 minuter.
2. Om pilot har gjort begäran inom TSAT-fönster men blir försenad av ATS behövs ingen ny TOBT.
3. Om Arlanda Ground inte anropats för start-up vid TSAT +5 minuter, kommer luftfartyget att förlora sin plats i sekvenseringen (TSAT raderas). Pilot begär ny TOBT från marktjänstföretag eller flygoperatör.
4. Som fort ny TOBT blir registrerad kommer luftfartyget att få ny plats i sekvenseringskön och ny TSAT.
5. Luftfartyget kommer inte att kunna avgå förrän ny TOBT är registrerad och uppdaterad TSAT visas och följs.

2.2.2.3 Inflyttad startposition

Start från inflyttad position skall alltid begäras av TWR.

2.2.2.2.1 Airport Collaborative Decision Making (A-CDM)

Target Off Block Time (TOBT)

1. TOBT must be updated and accurate to within +/- 5 minutes.
2. TOBT shall be updated through the usual channels, e.g. standard IATA (ETD) estimated departure message.
3. Only updates 5 minutes or more should be sent.
4. For a delay of 15 minutes or more, a DLA message must be sent by the ground handling company or airline operator.

Target Start Up Approval Time (TSAT)

1. TSAT is provided by ATS with the departure clearance.
2. If TSAT is updated pilot will be notified via:
 - DCL or,
 - Docking Guidance System-display or
 - CDM App, by given "callsign" TSAT displayed – Notified if TSAT updates or,
 - a. Install CDM App:
<https://www.swedavia.net/en/Arlanda/CDM-eng/>
 - Web application by given "callsign" TSAT displayed – Notified if TSAT updates or,
 - a. Webblink:
<https://www.swedavia.net/en/Arlanda/cdm-callsign/>
- Ground handling company or airline operator.

TOBT/TSAT

1. Pilot shall ensure the flight is ready for start-up at TOBT.
2. If flight is ready before TOBT then TOBT must be updated by ground handling company or airline operator.
3. If flight is not ready then TOBT must be updated by ground handling company or airline operator.
4. Pilot shall take notice of TOBT and TSAT and comply with them.

Start Request

1. Start-up/push-back shall be requested within TSAT-window +/- 5 minutes.
2. If pilot has called ready but is then delayed by ATS there is no requirement for TOBT to be updated.
3. If at TSAT + 5 minutes Arlanda Ground has not received a start-up request, the aircraft will lose its TSAT. Pilot shall request new TOBT from ground handling company or airline operator.
4. Once new TOBT is entered the aircraft will be re-sequenced with new TSAT.
5. Aircraft will not be allowed to depart until a valid TOBT is entered and revised TSAT is given and complied to.

2.2.2.3 Intermediate take-off position

Take off from intermediate positions shall always be requested from TWR.

5.7 Variable Taxi Time (VTT)

Variable Taxi Time is the estimated time that an aircraft spends taxiing between its parking stand and the runway or vice versa

Variable Taxi Time is the generic name for both inbound as outbound taxi time parameters, used for calculation of TTOT or TSAT. Inbound taxi time (EXIT) includes runway occupancy and ground movement time, whereas outbound taxi time (EXOT) includes push back & start up time, ground movement, remote or apron de-icing, and runway holding times

At an A-CDM airport all taxi times are unique for all stands and all runways. VTT (Variable Taxi Time) can easily be adjusted to reflect the realistic taxi time. Every single stand has a unique taxi time for every runway and is also adjusted depending on aircraft size (L/M/H). The VTT is published in the AODB for all flights and may change if the runway for arrival/departure will change.

ATC can also adjust the taxi time for all flights by adding X number of minutes, using the DST (Departure Sequence Tool).

5.8 Contacts

If operators have technical problems with updating TOBT, contact Ramp TWR (Stand and gate allocation unit) for assistance on + 46 (0)10 – 109 10 52 (H24)

Via mail (office hours): cdm@swedavia.se

6. Winter operations with A-CDM (to be completed)

Aircraft De-icing status

TOBT management during De-icing conditions

Determination of De-icing time

Factors contributing to smooth De-icing operation

Swedavia Dokument