EUROPEAN ORGANISATION
FOR THE SAFETY OF AIR NAVIGATION

EUROCONTROL EXPERIMENTAL CENTRE

Collaborative Decision Making at LISBON Airport

EEC Note No. 02/05

Project CDM LISBON AIRPORT

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Collaborative Decision Making at Lisbon Airport

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Abstract:
This project is a collaboration between the EUROCONTROL Experimental Centre (EEC) and Lisbon aeronautical platform represented by Lisbon's Airport Operator (ANA), Aircraft Operators TAP, SATA, PGA and AIR LUXOR, Handling Agents PORTWAY, SPDH and Air Traffic Services Provider NAV.

The project's main objective is to improve the decision making process and hence to optimize operations by making best use of available information by increased information sharing by Aircraft Operators, Air Traffic Service providers, Airports, European Central Flow Management Unit, and Meteorological Offices.
EXECUTIVE SUMMARY

INTRODUCTION

Following the successful LISBON AIRPORT CAPACITY ENHANCEMENT PLANNING pilot exercise conducted in 2003 by EUROCONTROL. The conclusion (document 030729-1) identified Airport CDM implementation as a way to enhance operational efficiency of the airport with improved information sharing between partners.

EUROCONTROL was asked by Aeroportos de Portugal SA (ANA) to assist Lisbon Airport Stakeholders in investigating the current operational practices at Lisbon Airport and ascertain where Collaborative Decision Making (CDM) applications could enhance the operational efficiency of the airport with improved information sharing between partners.

The kick-off meeting of the Lisbon CDM project was held on the 7th October 2003 with representatives from ANA, Navegacao Aerea de Portugal (NAV), Aircraft Operators (including Air Portugal – TAP) and ground handlers. It was agreed based on lessons learnt from other airports that the project needed to phased into three work-packages. This document represents phase one, which includes an overview of the current operational business processes and recommendation for identified CDM applications to be implemented to improve the operational efficiency of the airport and maximised infrastructure usage.

Interviews and meetings with the various Stakeholders were carried out between November 2003 and March 2004 and this document was reviewed and agreed by Lisbon Airport partners on the 28th April 2004. Following this it was agreed with the pending EURO 2004 Championship being hosted by Portugal and coupled with the summer 2004 busy airport schedules the project would be temporary put on hold until September 2004.

Initial Gaps identified

It was determined from an early stage that the quality of arrival information at Lisbon airport was good. This is achieved by reliable NAV data (entry into Portuguese airspace) and continually updated by radar data generating accurate landing estimates for the airport community. Longer range arrival estimates will be available with the introduction of Flight Update Messages described later.

Basically, departure information is subject to much more parameters than arrival in consequence departure is more difficult to predict. Uncertainty parameters such as CTOT, limited ground handling resources, late aircraft arrival, late passengers, lack of situational awareness etc influence the accuracy of departure data.

Departure must refer to take-off time as well as off block time. ATC is requested to generate Target Take Off Time out of a Target Off Block Time using flexible Taxi Time, and the CFMU is interested to get an accurate prediction of the Target Take Off Time. Obtaining a more accurate Off Block Time (TOBT) can be achieved by updating the events (milestones) that occur during a turn-round and providing that information to the concerned partners CSA (Common Situational Awareness).

An accurate Estimated In Block Time is essential data allowing the AO or Ground handling agent to evaluate the required turn-round time in order to obtain a Target Off Block Time. This TOBT shall be confirmed by firstly the AO/GH and then adjusted by ATC. TSAT (Target Startup Approval Time) is subject to the operational situation at the time. When an accurate TSAT has been agreed it can be linked to a variable taxi time to provide an accurate Target Take Off Time, which will be used by the CFMU to enhance the European Air Traffic Flow Management.
Common situational awareness gives a better view of partners intentions, thus departure management will become more efficient – better punctuality, reduced queuing, enhanced resource management, fewer wasted slots and less stress for many of the partners involved in the turn-round. In order to reach this situation, the current system and operational processes will need to be modified by the partners and could result in changes to Letters of Agreement / Service Level Agreements.

RECOMMENDATIONS AND NEXT STEPS

The CFMU is currently modifying their software to be able to send and receive new messages (FUM/DPI) to/from an airport. The aim of these messages is to enhance the overall flow of European Air Traffic by firstly providing a CDM airport (CDM-A) with an accurate estimated landing time up to 3 hours before, and then to use an accurate take off estimate from the airport to update the flight plan for ATFM purposes. The airport will have to ensure that the departure data sent to the CFMU conforms to certain requirements, therefore, it will be essential that the airport introduces CDM applications such as the TOBT procedure and variable taxi times in order to reach a high data quality. The messages will be managed by the airport's CDM platform and exchanged automatically with the CFMU from one address at the airport. By providing precise information on departure times, one of the main benefits Aircraft Operators can expect to receive will be more flexibility from the CFMU regarding slot shifting.

The foundation for CDM is for the partners to provide and have access to accurate and timely information. There are many systems currently used by the different partners and many feed into the main ANA interface UFIS. The situation can be improved by linking/upgrading the current systems so that the partners have access to a platform that displays the best data available at the right time. Enhanced functionalities should be integrated in order to process CFMU FUM/DPI messages.

Commencing WP3 the leadership of the project will be transferred to Lisbon Airport. In the near future the MILESTONE APPROACH (procedure/process) has to be implemented in the CDM platform and thus into the existing IT systems of the different partners. Implementations of CFMU FUM and DPI messages have to be integrated to the functional and operational requirement of the airport CDM project. SLA/LoAs have to be modified/agreed accordingly. It is required to instruct/inform the partners about the changes to be expected.

The results from the CAMACA study concerning flexible taxi times at Lisbon Airport should be taken into consideration for the CDM platform.

It is recommended that ANA dedicates a full time Project Manager (PM) to be responsible for implementing CDM at LIS. The PM will require technical and operational advisors as well as the continued support of LIS CDM Working / Steering Groups and EUROCONTROL.

The findings described above refer to the EUROCONTROL Airport CDM Levels 1 and 2. Adaptation to EUROCONTROL Airport CDM Level 3 could be based on a stable CDM platform in use.
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WP1

1 INTRODUCTION

1.1 Background

During 2003, EUROCONTROL (EHQ) Airport Throughput Business Division (APT) successfully completed the LISBON AIRPORT CAPACITY ENHANCEMENT PLANNING pilot exercise. The Final document (030729-1) acceptance was given by Lisbon Airports Stakeholders in July 2003. EUROCONTROL has been tasked to incorporate airport capacity parameters in the overall EUROCONTROL Air Traffic Management (ATM) capacity enhancement planning process for the short and medium term.

The Airport Capacity Enhancement Planning exercise had performed an analysis of constraints including mitigation plans and/or studies envisaged by the airport according to the unconstrained / constrained demand forecasts and the planned airport capacity for the short and medium term. The purpose of the document was to serve as a reference, outlining common projects undertaken by all stakeholders. For the longer-term it can provide a way to prioritise development plans and studies based on an evaluation by experts of the respective authorities.

Overall efficiency of the airport system is linked by the characteristics of the least efficient component. Policy, expectations and constraints vary from airport to airport with the declared capacity being governed by the most restrictive component. The identification of capacity constraints in the current infrastructure of an airport will enable all stakeholders (ANSP, Airport & Aircraft Operators) to prioritise mitigation studies and the implementation of solutions to enhance capacity. The primary objective of capacity enhancement planning is the effective and efficient means to increase capacity and minimise delay.

The conclusion of the exercise was that the Terminal / Gates / Apron areas were the overall major constraint, generally caused by lack of Apron space. Many mitigation plans and studies are well under way, and will have a major enhancing impact on these constraints. However many other additional enhancements were possible and the report concluded that the EUROCONTROL Airport CDM applications project was a low cost and high return enhancement initiative to improve the operational efficiency of Lisbon Airport. The Airport CDM project would facilitate enhanced information exchange between Lisbon Airport partners, with the aim to improve operational situational awareness.

1.2 Next Step

LISBON Airport and its partners decided to study and to implement CDM concepts in order to optimise the operations on Lisbon’s aeronautical platform, This project is conducted in collaboration with EEC’s (Eurocontrol Experimental Centre) APT Business Area (AIRPORT THROUGHPUT) and LISBON Airport Partners.

LISBON’s partners agreed, initially, that the overall CDM project would be conducted in 4 Work packages.

WP1/2 - State of operations processes at LISBON & Define a CDM target, analyse the Gaps and design new processes and information systems.

This combined work package would initially assess the current operational and co-ordination business processes between LISBON Airport partners, identifying the major decision drivers and analysing the information systems and flows. The second part of the WP will select common improvement targets, detect the gaps with the current state of operations and design the required new macro collaborative processes, information systems and information flows to reach the common targets in the form of proposal for change (PfC).
WP3 - Implement and run

This work package would implement the processes, the information systems and the information flows. It would also establish a set of parameters, including a method to check and to verify that the required improvements are met.

WP4 - Measure and follow-up

This work package would measure the results obtained and would evaluate the changes made according to the defined parameters and definitive establishment of the model in LISBON.

1.3 Document purpose

The main objectives of the WP1 & 2 are to assess the state of operations at Lisbon's aeronautical platform. It describes the operational business processes, the actual co-ordination processes, the main information flows between Lisbon's partners, the information systems used by Lisbon’s partners and the time estimates used by those partners.

1.4 Structure of document

- Section 2 provides the assessment of the business processes. It presents and defines the main operational business processes at LISBON, their main inputs and outputs and the links between the processes. This section contains an assessment of the actual co-ordination processes between Lisbon’s partners,
- Section 3 provides an assessment of the state of information flows and sources at LISBON. It presents the information flows, the origin and the destination of the data and finally the means by which those information flows are exchanged,
- Section 4 presents the main information systems used at Lisbon. This section lists the main functionalities of each information system and describes the main links between those information systems,
- Section 5 provides the analysis of the processes of update of time estimates. It presents the main terminologies of time estimates as used by Lisbon's partners.
- Section 6 stands for the annexes of this report. This section details for each partner the four items listed above: detailed business processes maps, detailed information flows maps, detailed information systems analysis and detailed processes of update of time estimates and time estimates terminology analysis.
PARTNERS

LISBON’s Airport Authority ANA Aeroportos de Portugal SA (ANA) and its affiliate Madeira Airports (ANAM) operate and manage the nine airports in continental Portugal, the Azores and Madeira.
TWR and ACC (Area Control Centre - NAV) Navegacao Aerea de Portugal (NAV EPE) is responsible for all ATS in Portugal.

TAP (Aircraft Operator)

On March 14, 1945 the public service TAP was created. The first DC3 Dakota has been purchased 1946. September 19, 1946 TAP opened its first commercial line between Lisbon and Madrid. At the moment TAP fleet is composed as follows:

- Four A 340
- Five A 310
- Two A 321
- Eight A 320
- Sixteen A 319

PGA (Aircraft Operator)

WEB site under construction

SATA (Aircraft Operator)

On June 15th, 1947 a Beechcraft aircraft, CS-TAA, with 7 passengers began company operations with a flight between the islands of São Miguel and Santa Maria. Sata was set up as a private company but, in 1980, was turned into a state-owned company under the jurisdiction of the Regional Government of the Azores and the name was changed to Serviço Açoriano de Transportes Aéreos, E.P., maintaining the acronym SATA. In 1999, as a modern airline, SATA joined the European Regional Airlines Association, ERA and International Air Transport Association, IATA

SATA International is a subsidiary company of SATA Air Açores licensed to operate flights outside the archipelago. A SATA International is the result of the transformation of the airline company Oceanair, which was acquired by SATA Air Açores in 1994.
AIR LUXOR (Aircraft Operator)

Air Luxor is a Portuguese Aviation Company incorporated on 14th December 1988 by the Mirpuri family. Air Luxor divides its activities into three distinct sectors: Regular air transportation, non-regular air transportation (charter) and business aviation.

PORTWAY (handling agent)

Ground handling services in Portugal used to be the responsibility of the airlines. After European deregulation the Portuguese airport operator ANA decided to enter this field. In 2000 ANA (60%) and Fraport AG (40%) founded a joint venture to provide ground handling services at Portuguese airports. The company commenced operations in July 2000 at the three Portuguese airports of Lisbon, Porto and Faro

- Ramp and baggage services
- Passenger services
- Ramp and ground services
- Freight and post handling
SPDH (handling agent)

Portugália legalizes entered in the capital of the SPdH OF The Portugália Airlines (PGA) legalized with the TAP-Air Portugal its entrance in the capital of Portuguese SPdH-Serviços of Handling, had announced both the transporters in official notice, according to communicated, "the Advice of Administration of the TAP, SGPS, of Portugália Airlines (PGA) and of the Portuguese Services of Handling (SPdH), with the participation of the respective Presidents, António Cardoso and Cunha and Ribeiro of the Fonseca, had subscribed (15 of October) the agreement that legalizes the entrance of the PGA in the capital of the SPdH". They have affirmed that, in simultaneous, also the SPdH was firmed the contract of rendering of services through which will be the lender of services of handling of the PGA, being that this agreement will be valid for next the seven years. The SPdH resulted of the split of the unit of business of handling of the TAP, having started to operate in the past day 1 of October. With the privatization of the business of handling of the TAP, the national transporter will be with 43,9% of the new company, the PGA with 6%, while the strategical partner will be with remains 50,1%. 
3 BUSINESS PROCESSES ASSESSMENT

3.1 General business process model

The following simplified model has been used in order to assess and to analyse the operational business processes and the state of collaboration at LISBON.

Tables 1 through Table 9 describe the operational business processes. Each process has been described following 5 items:

- Major inputs and outputs,
- Major inbound and outbound links,
- A detailed model of each process (see section 6),

In order to complete the process analysis, an assessment of the actual co-ordination processes between Lisbon’s partners has been realised. WP2-3 report will assess the gaps in co-ordination between Lisbon’s partners.
### 3.2 Description of operational business processes

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<th>Major Outputs</th>
<th>Actual links to another processes</th>
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| Airport slots planning (pre-tactical phase) | Day-1 of operations at 15:00 | - Home based AOC send flight programme for next day  
- None Home based AOC send planning after a/c type changes | - Amendment of Lisbon’s airport resource planning  
- Pre-stand and gate plan established off-line from 22:00 | Airport slots management (tactical phase),  
Airport’s resources allocation and management (tactical phase),  
Push-back Truck planning | Airport slots planning (pre-tactical planning),  
Airport slots planning (strategic phase) |
| Airport (planning unit) | Day-1 of operations  
To modify and to adapt the airport slots programme by taking into account aircraft operators requests and ad-hoc constraints, | - Home based AOC send flight programme for next day  
- None Home based AOC send planning after a/c type changes | - Amendment of Lisbon’s airport resource planning  
- Pre-stand and gate plan established off-line from 22:00 | Airport slots management (tactical phase),  
Airport’s resources allocation and management (tactical phase),  
Push-back Truck planning | Airport slots planning (strategic phase) |
| Aircraft operators | Day-1 of operations  
To modify and to adapt the airport slots programme by taking into account aircraft operators requests and ad-hoc constraints, | - Home based AOC send flight programme for next day  
- None Home based AOC send planning after a/c type changes | - Amendment of Lisbon’s airport resource planning  
- Pre-stand and gate plan established off-line from 22:00 | Airport slots management (tactical phase),  
Airport’s resources allocation and management (tactical phase),  
Push-back Truck planning | Airport slots planning (strategic phase) |
| Airport’s resources planning (pre-tactical phase) | Day-1 of operations  
To establish the airport’s resources planning (check-in banks and stand & gate for outbound flights, baggage belts and stand & gate for inbound flights) | - Home based AOC send flight programme for next day  
- None Home based AOC send planning after a/c type changes | - Amendment of Lisbon’s airport resource planning  
- Pre-stand and gate plan established off-line from 22:00 | Airport slots management (tactical phase),  
Airport’s resources allocation and management (tactical phase),  
Push-back Truck planning | Airport slots planning (pre-tactical planning),  
Airport slots planning (strategic phase) |

Table 1: Business processes description (1/9)
<table>
<thead>
<tr>
<th>Process/Partners</th>
<th>Definition/objectives</th>
<th>Major Inputs</th>
<th>Major Outputs</th>
<th>Actual links to another processes</th>
<th>Actual links from other processes</th>
</tr>
</thead>
</table>
| Airport slots management (tactical phase) | Day of operations, To adapt airport slots programme to daily operations and constraints by taking into account aircraft operators requests, | • Aircraft operators add-hoc requests, | • The realised during day of operations,  
• Amended of airport slots programme, | Airport slots planning (strategic phase),  
Airport's resources allocation and management (tactical phase), | Airport slots planning (pre-tactical phase),  
Airport's resources allocation and management (tactical phase), |
| Aircraft operators | Day of operations, To adapt airport slots programme to daily operations and constraints by taking into account aircraft operators requests, | • Airport resources planning,  
• Airport slots allocation during day of operations,  
• Aircraft operators and handlers data and time estimates,  
• Add-hoc conditions and constraints, | • Amended airport resources planning,  
• Realised activity during day of operations, | Airport slots management (tactical phase),  
Ramp handling,  
Passengers handling,  
Airlines operations control,  
Handling flight dispatching and operations control | Airport slot management (tactical phase),  
Airport's resources planning (pre-tactical phase)  
Ramp handling,  
Passengers handling,  
Airlines operations control,  
Handling’s flight dispatching and operations control |
| Airport’s resources allocation and management (tactical phase) | Day of operations, To adapt airport resources planning to daily operations by taking into account airlines’ data and time estimates and add-hoc conditions and constraints | • airport resources planning,  
• Airport slots allocation during day of operations,  
• Aircraft operators and handlers data and time estimates,  
• Add-hoc conditions and constraints, | | |
| Airport OPS Centre | Day of operations, To adapt airport resources planning to daily operations by taking into account airlines’ data and time estimates and add-hoc conditions and constraints | | | |

Table 2 : Business processes description (2/9)
<table>
<thead>
<tr>
<th>Process/Partners</th>
<th>Definition/objectives</th>
<th>Major Inputs</th>
<th>Major Outputs</th>
<th>Actual links to another processes</th>
<th>Actual links from other processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portway,</td>
<td>Day-1 of operations Receiving of the aircraft operator programme</td>
<td>daily and weekly programs a/c rotation type change 24 to 48 hours in advance</td>
<td>• Daily aircraft operator programme</td>
<td>Airports’ resources planning (pre-tactical phase),</td>
<td>Airport operations centre</td>
</tr>
<tr>
<td>SPDH, AIR LUXOR</td>
<td>Day of operations Receiving of the aircraft operator programme</td>
<td>daily programs</td>
<td>• Daily aircraft operator programme</td>
<td>Airports’ resources planning (tactical phase),</td>
<td>Airport operations centre</td>
</tr>
<tr>
<td>Ramp handling SPDH, Portway, AIR LUXOR</td>
<td>Day of operations To manage the activities on and around ramp. It includes baggage handling, cargo handling, aircraft’s cleaning, aircraft’s catering, provision of the machinery and equipment, co-ordination with passengers handling, It could also include : Flight dispatching and push-back truck planning and allocation,</td>
<td>• Airlines data (schedules…), • Load and Weight &amp; Balance orders, • Catering data, • Cockpit and cabin crews data, • Passengers data, • airport resources planning and allocation,</td>
<td>Estimated and actual departure and arrival times, • Load and Weight &amp; Balance orders and sheets,</td>
<td>Ramp handling (other handlers and airlines), Passengers handling, Push-back trucks planning and allocation, Airlines operations control,</td>
<td>Airport resources allocation and management (tactical phase), Ramp handling (other handlers and airlines), Passengers handling, Push-back trucks planning and allocation, Aircraft operator flight planning and operations dispatch,</td>
</tr>
<tr>
<td>Passengers handling</td>
<td>Day of operations To manage activities related to passengers. It includes check-in, boarding, management of the departures and arrivals passengers management and management of passengers information,</td>
<td>• Passengers reservation data (check-in processes…) • Ramp handling data for boarding activities and arrivals management,</td>
<td>• Check-in data, • Boarding data (boarding time, start of boarding, end of boarding …), • Arrivals data (baggage transfer, connecting passengers …)</td>
<td>Airport resources allocation and management (tactical phase), Ramp handling (other handlers and airlines), Airlines operations control,</td>
<td>Airport resources allocation and management (tactical phase), Ramp handling (other handlers and airlines), Airlines operations control,</td>
</tr>
<tr>
<td>Push-back trucks planning SPDH, Portway, AIR LUXOR</td>
<td>Pre-tactical time frame To establish the push-back truck planning by taking into account airport slot programme and airlines schedules</td>
<td>• Airlines schedules, • airport slots programme,</td>
<td>• Push-back Trucks planning</td>
<td>Ramp handling (other handlers and airlines), Push-back truck allocation,</td>
<td>Airport slots planning (pre-tactical phase), Airport’s resources planning (pre-tactical phase) Ramp handling (other handlers and airlines), Airlines schedules</td>
</tr>
</tbody>
</table>

Table 3 : Business processes description (3/9)
<table>
<thead>
<tr>
<th>Process/Partners</th>
<th>Definition/objectives</th>
</tr>
</thead>
</table>
| Push-back tractor allocation | Day of operations  
To adapt and to manage the push-back truck planning to daily operations, constraints and add-hoc conditions, |
| SPDH, Portway, AIR LUXOR   | • Push-back tractor planning,  
• Airlines’ data and time estimates,  
• Pilot’s request for push-back and taxi,  |
|                          | • Amended push-back tractor planning,  
• Realised activity during day of operations, |
| Actual links to another processes | Ramp handling,  
Airlines operations control, |
| Actual links from other processes | Airport's resources allocation and management (tactical phase)  
Ramp handling,  
Push-back tractor planning,  
Airlines operations control, |

| (8) TAP flight planning and operations dispatch | Day of operations :  
To manage daily operations and dispatching activities.  
This includes managing operational and ATC flight plans, managing ATFM slots, managing and dispatching crews, computing and editing Load and Weight & Balance sheets, establishing fuelling requirements and managing aeronautical and technical data, |
| TAP OPS unit | • Provisional ATFM regulations and re-routings for day of operations,  
• ATFM slots and regulations during day of operations,  
• Cockpit and cabin crew data,  
• Weight & Balance data,  
• Catering and passengers data,  
• Check-in data,  
• Boarding data,  |
| | • TAP flights - operational and ATC flight plans,  
• Flight plans amendments and re-routing requests,  
• Load and Weight & Balance sheets,  
• Cockpit crews duty sheets and data (NOTAMS, Weather, commodities),  
• Cabin and aircraft data,  |
| | • Ramp handling,  
TAP operations control,  
CFMU’s management of flights plans,  
CFMU’s amendment of flights plans,  
CFMU’s operations management (slots and regulations management)  
Other TAP’s handling units (Pax …)  |
| Actual links from other processes | CFMU’s pre-tactical planning,  
CFMU’s management of flights plans,  
CFMU’s amendment of flights plans,  
CFMU’s operations management (slots and regulations management)  
Other TAP’s handling units (Pax …)  |

Table 4: Business processes description (4/9)
<table>
<thead>
<tr>
<th>Process/Partners</th>
<th>Definition/objectives</th>
<th>Major Inputs</th>
<th>Major Outputs</th>
<th>Actual links to another processes</th>
<th>Actual links from other processes</th>
</tr>
</thead>
</table>
| SATA operations control                | Day of operations. To manage and to control daily operations. This includes monitoring the state of operations and adapting schedule to daily constraints, co-ordinating all TAP partners at LISBON and TAP central services | • Inbound flights’ time estimates and data,  
• Outbound flights’ time estimates and data,  
• CFMU slots’ and delay data,  
• Ramp handling data,  
• Passengers handling data,  | • Inbound flights’ time estimates and data,  
• Outbound flights’ time estimates and data,  
• Schedules amendments,  
• Flights related data (disruptions ...),  | Ramp handling,  
Passengers handling,  
TAP’s flight planning and operations dispatch,  | Ramp handling,  
Passengers handling,  
TAP’s flight planning and operations dispatch,  |
| (10) AIR LUXOR flight planning and operations dispatch | Day of Operations: To manage daily operations and dispatching activities. This includes managing operational and ATC flight plans, managing and dispatching cockpit and cabin crews, managing aeronautical and technical data,  | • Operational and ATC flight plans data,  
• Passengers data,  
• Technical and aircraft data,  
• Cockpit and cabin crews data,  
• Weather data,  
• ARO/ATIS data,  | • Operational and ATC flight plans,  
• Cockpit crews duty sheets,  
• Catering and passengers figures,  
• Cabin and aircraft data,  
• NOTAM for each sector and each airport,  
• Weather data for each sector,  
• Commodities data for cockpit and cabin crews,  | Sata’s operations control,  
(6) Ramp handling,  
Other Sata units (operations control),  | Sata’s operations control,  
Other Sata units (operations)  |
| AIR LUXOR operations control unit      | Day of operations. To manage and to control daily operations. This includes monitoring the state of operations, computing and editing Load and Weight & Balance orders and sheets, co-ordinating all partners at LISBON, establishing fuelling requirements and adapting schedules to daily constraints  | • Inbound flights’ time estimates and data,  
• Outbound flights’ time estimates and data,  
• CFMU slots’ and regulations,  
• Ramp handling data,  
• Passengers handling data,  
• Operations data (time estimates for departures and arrivals),  | • Inbound flights time estimates and data,  
• Outbound flights time estimates and data,  
• Schedules amendments,  
• Weight and Balance orders and sheets,  | Ramp handling,  
Passengers handling,  
flight planning and operations dispatch,  
CFMU’s Operations management (slot and regulations management),  | Ramp handling,  
Passengers handling,  
flight planning and operations dispatch,  
CFMU’s Operations management (slot and regulations management),  |

Table 5 : Business processes description (5/9)
<table>
<thead>
<tr>
<th>Process/Partners</th>
<th>Definition/objectives</th>
<th>Major Inputs</th>
<th>Major Outputs</th>
<th>Actual links to another processes</th>
<th>Actual links from other processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPDH</td>
<td>Day of operations. To manage and to adapt daily operations and dispatching activities. To manage and to control daily operations. This includes managing and co-ordinating ramp handling activities, monitoring the state of operations, adapting daily operations to ad-hoc conditions and adapting daily push-back truck planning.</td>
<td>• Inbound flights’ data and time estimates (MVT, ticketing, cargo, containers position, passengers requirements and connecting passengers, load and fuel messages), • Requirements for outbound flights (Load, Weight &amp; Balance, check-in, fuelling, flight plan, catering data and requirements), • Inbound flights’ CTOT,</td>
<td>• Outbound flights’ data and time estimates (MVT, ticketing, cargo, containers position, passengers transfer, passengers special requirements, load and fuel messages), • Operational and ATFM flight plans, • Catering data for outbound flights, • Load and Weight &amp; Balance orders and sheets, • Outbound flights’ CTOT,</td>
<td>Airport’s resources allocation and management (tactical phase), Ramp handling, Passengers handling, Push-back truck planning and allocation, Airlines operations control,</td>
<td>Ramp handling, Passengers handling, Push-back truck planning and allocation, Airlines operations control,</td>
</tr>
</tbody>
</table>

Table 6 : Business processes description (6/9)
<table>
<thead>
<tr>
<th>Process/Partners</th>
<th>Definition/objectives</th>
<th>Major Inputs</th>
<th>Major Outputs</th>
<th>Actual links to another processes</th>
<th>Actual links from other processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>(16) TWR’s start-up clearance</td>
<td>Day of operations To deliver the start-up clearance for departure flights,</td>
<td>• Flights strips from ATC system,</td>
<td>• Start-up clearance to pilots,</td>
<td>TWR’s Push-back and taxi clearances, Co-ordination between FMP, TWR and ACC,</td>
<td>Co-ordination between FMP, TWR and ACC,</td>
</tr>
<tr>
<td>LISBON’s TWR</td>
<td></td>
<td>• Pilots’ data and start-up requests,</td>
<td>• Flight strips to TWR’s push-back and taxi clearances,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TWR’s push-back and taxi clearances</td>
<td>Day of operations To deliver the push-back and taxi clearances for departure flights,</td>
<td>• Flights strips from start-up clearance,</td>
<td>• Push-back and taxi clearances to pilots,</td>
<td>TWR’s ground movement control, Co-ordination between FMP, TWR and ACC,</td>
<td>TWR’s start-up clearance, Co-ordination between FMP, TWR and ACC,</td>
</tr>
<tr>
<td>LISBON’s TWR</td>
<td></td>
<td>• Pilots’ push-back and taxi requests,</td>
<td>• Flight strips to TWR’s ground movement control,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TWR’s ground movement control</td>
<td>Day of operations To manage and to control ground movement for departure and arrival flights,</td>
<td>• Aircraft movements for departures and arrivals,</td>
<td>• Aircraft guidance on ground and apron control,</td>
<td>TWR’s Local or aerodrome control, (19) Co-ordination between FMP, TWR and ACC,</td>
<td>TWR’s Push-back and taxi clearances, TWR’s Local or aerodrome control, Co-ordination between FMP, TWR and ACC,</td>
</tr>
<tr>
<td>LISBON’s TWR</td>
<td></td>
<td>• Flights strips from start-up clearance (departures),</td>
<td>• Flight strips to TWR’s aerodrome control (departures),</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Flight strips from aerodrome control (arrivals),</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TWR’s local or aerodrome control</td>
<td>Day of operations To manage departures and arrivals and all air movements around the airport,</td>
<td>• Aircraft arriving to holding and / or stop point,</td>
<td>• Take-off and landing clearances to pilot (departures),</td>
<td>TWR’s ground movement control, Co-ordination between FMP, TWR and ACC,</td>
<td>TWR’s ground movement control, Co-ordination between FMP, TWR and ACC,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Inbound traffic,</td>
<td>• Flight strips to TWR’s ground movement control (arrivals),</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Flight strips from ground control (departures)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Flight strips from TWR’s ground movement control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co-ordination between FMP, TWR and ACC</td>
<td>Day of operations To co-ordinate actions between FMP, ACC and TWR (runway configurations, regulations to apply, landing separation and rates …), To provide ACC with delay information and traffic forecasts,</td>
<td>• State of traffic on airport and sectors,</td>
<td>• Actions to be taken over airport and sectors in case of disruptions (regulations to apply, runways configurations, landing separations and rates …)</td>
<td>FMP’s operations management (tactical phase), TWR processes, ACC operations management (tactical phase),</td>
<td>FMP’s operations management (tactical phase), TWR processes, ACC operations management (tactical phase),</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Weather conditions and data,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Apron data,</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7: Business processes description (7/9)
<table>
<thead>
<tr>
<th>Process/Partners</th>
<th>Definition/objectives</th>
<th>Major Inputs</th>
<th>Major Outputs</th>
<th>Actual links to another processes</th>
<th>Actual links from other processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFMU’s pre-tactical planning</td>
<td>From Day-3 to Day of operations To establish pre-tactical planning studying demand data, analysing results of previous ATFM measures, co-ordinating with other FMPs and co-ordinating ATFM plan for the whole ATFM area,</td>
<td>• FMPs pre-tactical planning, • Archive data, • Demand data</td>
<td>• ATFM daily plan for the day of operation, • ATFM provisional regulations for the day of operations, • For pre-tactical flow re-routings in the critical areas for day of operations,</td>
<td>(14) FMP’s pre-tactical planning, (8) TAP’s flight planning and operations dispatch, (10) Sata’s flight planning and operations dispatch</td>
<td>(14) FMP’s pre-tactical planning, (23) CFMU’s operations management (slot and regulations management),</td>
</tr>
<tr>
<td>CFMU (IFPS, RPL units)</td>
<td>Strategic, pre-tactical and tactical time frames To manage flight plans. This includes receiving FPLs and RPLs, correcting FPLs and RPLs and accepting or rejecting FPLs and RPLs,</td>
<td>• Flight plans (FPLs and RPLs) from airlines or handlers,</td>
<td>• Acceptance messages, • Rejection messages, •</td>
<td>(8) TAP’s flight planning / operations dispatch, (12) Portway’s flight dispatching and operations control, (20) CFMU’s pre-tactical planning, (23) CFMU’s operations management (slot and regulations management), Airport ARO - COM/AIS unit,</td>
<td>(8) TAP’s flight planning / operations dispatch, (12) Portway’s flight dispatching and operations control, Other airlines flight planning, Airport ARO - COM/AIS unit,</td>
</tr>
<tr>
<td>CFMU’s flight plans’ amendment</td>
<td>Strategic, pre-tactical and tactical time frames To amend FPLs and RPLs To amend EOBT to a later or an earlier time, To cancel flights plans, To modify route and re-routing,</td>
<td>• Airlines requests and messages, • Handlers requests and messages,</td>
<td>• FPLs amendments</td>
<td>(8) TAP’s flight planning / operations dispatch, (12) Portway’s flight dispatching and operations control, Airlines flight planning, (23) CFMU’s operations management (slot and regulations management), Airport COM/AIS unit,</td>
<td>(8) TAP’s flight planning / operations dispatch, (12) Portway’s flight dispatching and operations control, Airlines flight planning,</td>
</tr>
<tr>
<td>CFMU (TACT/CASA systems)</td>
<td>Day of operations To monitor daily operations, To apply ATFM measures, To send and manage ATFM slots and regulations,</td>
<td>• State of daily operations, • Airlines requests and messages, • Airlines data and times estimates,</td>
<td>• ATFM regulations for the day of operations, • CFMU slot messages, •</td>
<td>(8) TAP’s flight planning and operations dispatch, (11) Sata’s operations control; (12) Portway’s flight dispatching and operations control, (15) FMP’s operations management (tactical phase),</td>
<td>TAP’s flight planning and operations dispatch, Sata’s operations control, Portway’s flight dispatching and operations control, FMP’s operations management CFMU’s Pre-tactical planning, Management,Amendments of flights plans,</td>
</tr>
</tbody>
</table>

Table 8 : Business processes description (8/9)
| Process/Partners | Definition/objectives | Major Inputs | Major Outputs | Actual links to another processes | Actual links from other processes |
|-----------------|-----------------------|--------------|---------------|-----------------------------------|--------------------------------
| (13) FMP’s strategic planning | 3 day prior to day of operations To optimise LISBON’s sectors capacities, to improve procedures and to decrease traffic complexity by defining and setting : New routes structures, New air navigation sectors for LISBON’s, Major modifications to be applied to the actual routes and sectors at LISBON. | • Archive data, • Routes and sectors data, | • New sector's capacities and structures, | (14) FMP’s pre-tactical planning, (20) CFMU’s pre-tactical planning, CFMU’s strategic planning (strategic phase) |  |
| LISBON’s FMP | | | | CFMU’s strategic planning (strategic phase), |  |
| | From day-3 to day of operations, To define the regulations to be applied during day of operations, To define sectors’ capacities and constraints for the day of operations | • Strategic phase’s outputs, • Data from the equivalent day of the previous week (for normal days), • Data from the equivalent day of the previous year (for week-end, holidays,…), | • Traffic volumes, regulations for the day of operations, • Sectors capacities and constraints, | (15) FMP’s operations management (tactical phase), (20) CFMU’s pre-tactical planning, | (13) FMP’s strategic planning, (20) CFMU’s pre-tactical planning, CFMU’s strategic planning (strategic phase), |
| (14) FMP’s pre-tactical planning | Day of operations To monitor daily operations (regulations to apply, weather conditions, demand of LISBON’s and surrounding sectors …), To provide the CFMU with updated information and traffic forecasts, | • Pre-tactical phase outputs, • Traffic demand and state for LISBON’s and boundary sectors from the CFMU during day of operations, | • State of operations over LISBON’s and boundary sectors during day of operations, • New applied regulations, • Cancelled regulations, | (23) CFMU’s operations management (slot and regulations management), (19) Co-ordination between LISBON’s FMP, TWR and ACC, Handlers and airlines operations | (14) FMP’s pre-tactical planning, (19) Co-ordination between LISBON’s FMP, TWR and ACC, (20) CFMU’s pre-tactical planning, Handlers and airlines operations |
| LISBON’s FMP | | | | |  |
| (15) FMP’s operations management (tactical phase) | | | | |  |
| | Table 9 : Business processes description (9/9)
3.3 Assessment of the actual co-ordination processes between LISBON’s partners

The description of the actual co-ordination processes will complete the assessment of the actual state of operations at LISBON. In order to describe the actual state of co-ordination, the following definition of “co-ordination” will be used: a co-ordination is an interactive exchange of information flows and actions between partners which imply an interactive decision making process.

Based on this definition, 6 main co-ordination processes have been identified. Tables 10 and 11 describe for each co-ordinated process, the involved partners and the main actions and decisions taken and the main information flows exchanged by those partners. The other actual links are to be considered as basic information and data flows between the partners. Chapter 3 details those data flows and assesses the main information and data sources.
<table>
<thead>
<tr>
<th>Co-ordinated processes</th>
<th>Definition</th>
<th>Involved partners</th>
<th>Actions and decisions</th>
<th>Main exchanged information</th>
</tr>
</thead>
</table>
| Airport slots planning (strategic, pre-Tactical and tactical phases) | • To establish and to manage LISBON’s slots planning,  
• To co-ordinate airport slots planning with airport and air navigation capacities and constraints during strategic, pre-tactical and tactical phases,  
| SCO,  
LISBON’s Airport operations division, | • Decide and establish airport’s slots programme,  
• Modify airport’s slots programme,  
| LISBON’s airport constraints and requirements,  
Air navigation constraints and requirements,  
LISBON’s airport slots planning,  
The realised during day of operations, |
| Airport slots planning (strategic, pre-Tactical phases) | • To establish LISBON’s airport slots planning,  
• To co-ordinate LISBON’s airport slots planning activities and airlines requests and complains, | SCO,  
Airlines (TAP, Sata…), | • Take into account aircraft operators requests, constraints and complains,  
• Modify LISBON’s airport slots programme,  
• Take into account IATA biannual conference outputs, | Airport slots programme,  
Aircraft operators requests and complains (re-schedule of historical slots, change historical slots, new requests …), |
| ATFM strategic and pre-tactical planning | • To establish the strategic and the pre-tactical ATFM planning, | CFMU,  
LISBON FMP, | • Decide and establish strategic and pre-tactical programmes for LISBON’s sectors, | LISBON’s sector capacities and constraints for a given time frame and for day of operations,  
LISBON’s sectors’ ATFM provisional regulations and provisional slots, |
| ATFM management during tactical phase | • To co-ordinate and to manage the tactical ATFM activities (regulations …), | CFMU,  
LISBON FMP, | • Communicate and co-ordinate LISBON’s sectors configurations,  
• Decide and set or cancel regulations over LISBON’s sectors, | LISBON’s sectors capacities and constraints during day of operations,  
ATFM regulations and slots of LISBON’s sector,  
ATFM regulations of LISBON’s boundary sectors, |

Table 10 : Assessment of the actual co-ordination processes (1/2)
<table>
<thead>
<tr>
<th>Co-ordinated processes</th>
<th>Definition</th>
<th>Involved partners</th>
<th>Actions and decisions</th>
<th>Main exchanged information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-ordination process between LISBON’s FMP, ACC and TWR</td>
<td>• To co-ordinate actions between ATS partners during day of operations,</td>
<td>• LISBON’s FMP,</td>
<td>• Decide, modify and establish new air configurations (runways,</td>
<td>• LISBON’s airport constraints and operations conditions (apron operational conditions, meteorology ...) ,</td>
</tr>
<tr>
<td></td>
<td>• To manage ATS activities under disrupted conditions,</td>
<td>• LISBON’s ACC,</td>
<td>apron configurations …),</td>
<td>• LISBON’s and boundary sectors’ operational conditions (state of the traffic and traffic evolution …) ,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• LISBON’s TWR,</td>
<td>• Decide and set or cancel regulations over LISBON’s sectors,</td>
<td>• Flight constraints and requests,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Apply special procedures,</td>
<td></td>
</tr>
<tr>
<td>Co-ordination between ramp handling and passengers handling</td>
<td>• To co-ordinate boarding activities with ramp activities (aircraft cleaning, catering, fuelling, unloading…),</td>
<td>• Airport operators,</td>
<td>• Decide when the boarding could start,</td>
<td>• Ramp handling data (time at which the aircraft could board, state of aircraft servicing …),</td>
</tr>
<tr>
<td></td>
<td>• To manage connecting passengers,</td>
<td>• Handlers</td>
<td>• Transfer and communicate passengers, baggage and cargo,</td>
<td>• Boarding data (number of passengers to board, state of boarding, passengers left to board,</td>
</tr>
<tr>
<td></td>
<td>• To manage baggage and cargo transfer,</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 11 : Assessment of the actual co-ordination processes (2/2)
4 INFORMATION FLOWS ASSESSMENT

In order to complete the assessment of the actual state of co-ordination at LISBON, the “passive” co-ordination (information flows) have been described. To do so the major information flows between LISBON’s partners and the usability of such information and data have been assessed.

- Paragraph 3.1 summarises the state of information flows between LISBON’s partners,
- Paragraph 3.2 presents a detailed assessment of actual exchanged information and data,
- Paragraph 3.3 presents the mains information sources for each partner,

4.1 Main information flows between LISBON’s partners

4.2 Description of the information and data flows

Tables 12 through 15 describe the information flows. It assesses for each information flow the origin and the destination of the information flow, the exchanged data and the type of the information flow (manual or automatic, SITA, MVT, telephone, radio messages …).
<table>
<thead>
<tr>
<th>Flow</th>
<th>From</th>
<th>To</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SCO</td>
<td>Airlines</td>
<td>• LISBON’s airport slots programme,</td>
<td>• SITA/TELEX</td>
</tr>
<tr>
<td>2</td>
<td>Airlines</td>
<td>SCO</td>
<td>• Requests and complaints about historical and airport slots (modifications, new slots ...),</td>
<td>• SITA/TELEX SCORE</td>
</tr>
<tr>
<td>3</td>
<td>SCO</td>
<td>LISBON’s Airport operations</td>
<td>• LISBON’s airport slots programme,</td>
<td>• Automatic at day-1 15h</td>
</tr>
<tr>
<td>4</td>
<td>LISBON’s Airport operations</td>
<td>SCO</td>
<td>• LISBON’s airport capacities and constraints, • Air navigation services capacities and constraints, • The realised during the previous seasons,</td>
<td>• SITA/TELEX, • SITA/TELEX, • Automatic</td>
</tr>
<tr>
<td>5</td>
<td>LISBON’s Airport planning unit</td>
<td>Airlines</td>
<td>• LISBON’s airport slots programme, • Airport resources planning, • Airport resources allocation during day of operations (stand and gate for inbound and outbound flights, check-in banks for outbound flights, baggage belts for inbound flights)</td>
<td>• SITA/TELEX • DAVIS system</td>
</tr>
<tr>
<td>6</td>
<td>Airlines</td>
<td>LISBON’s Airport operations</td>
<td>• Airline daily programme modifications’ • Flight data and time estimates during day of operations (arrivals and departures time estimates), • LDM messages and daily report for billing purposes,</td>
<td>• SITA/TELEX • Manually (radio frequencies ... • Automatic</td>
</tr>
<tr>
<td>7</td>
<td>LISBON’s Airport operations</td>
<td>Handlers (Portway - SPDH)</td>
<td>• LISBON’s airport slots programme, • Time estimates for inbound and outbound flights, • Airport resources planning, • Airport resources allocation during day of operations, (stand and gate for inbound and outbound flights, check-in banks for outbound flights, baggage belts for inbound flights)</td>
<td>• SITA/TELEX • DAVIS system</td>
</tr>
<tr>
<td>8</td>
<td>Handlers (Portway – SPDH)</td>
<td>LISBON’s airport operations</td>
<td>• Outbound flights data, actual and estimated departure times, • Inbound flights data, actual ands estimated arrival times,</td>
<td>• SITA/TELEX,</td>
</tr>
<tr>
<td>9</td>
<td>LISBON’s Airport</td>
<td>LISBON’s TWR</td>
<td>• Stands and gates allocation, • Modifications of stands and gates allocation on short and very short notice,</td>
<td>• DAVIS system, • Radio,</td>
</tr>
<tr>
<td>10</td>
<td>LISBON’s TWR</td>
<td>LISBON’s airport operations</td>
<td>• Aircraft’s push-back clearances, • Aircraft’s landing clearances and actual landing times • ETA (ELDT), ATA (ALDT), CTOT</td>
<td>• Radio frequencies, • ATC system (LISATM) • Telephone</td>
</tr>
</tbody>
</table>

Table 12 : Information flows between partners (1/4)
<table>
<thead>
<tr>
<th>Flow</th>
<th>From</th>
<th>To</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
</table>
| 11   | LISBON's airport operations | CFMU | • Nil from OPS CENTRE to CFMU,  
• Flight plans from Airport's ARO - COM/AIS unit to CFMU, | FPL messages, |
| 12   | CFMU | LISBON's airport operations | • Flight plans messages from CFMU to airport's ARO - COM/AIS unit,  
• ATFM slots and messages from CFMU to airport's ARO - COM/AIS unit, | FPL messages |
| 13   | LISBON's airport operations | LISBON's FMP | • Nil | N/A |
| 14   | LISBON's FMP | LISBON's airport operations | • Nil | N/A |
| 15   | LISBON's airport operations | LISBON's ACC | • Nil | N/A |
| 16   | LISBON's ACC | LISBON's airport operations | • Nil | N/A |
| 17   | Airlines | Handlers (own handlers and/ or other handlers) | • Airlines schedules,  
• Aircrafts’ technical data,  
• Messages for inbound LISBON's flights: (MVT message / ticketing message / cargo message / containers position message / passengers special requirements message / load message / fuel message / delay message / ATFM slots),  
• Messages for outbound LISBON's flights (load data (check-in data, cargo data, passengers data) / catering data / passengers data/fuelling data / flight plan data), ATFM slots),  
• Passengers data (number of passengers, check-in and boarding data…), | SITA |
| 18   | Handlers (own handlers and/ or other handlers) | Airlines | • Messages for outbound LISBON's flights (MVT messages for outbound flights / cargo message / fuel message / containers position message / load message / delay messages),  
• Messages for inbound LISBON's flights (time estimates (ETA at destination) / MVT messages (AIBT, AOBT) / Operations reports),  
• Boarding data (ready to board time…), | SITA |
| 19   | Airlines | CFMU (IFPS, TACT/CASA) | • RPLs for a given season and FPLs at least 3 hours before the flight,  
• ATFM messages (SRR (Slot Revision Request) / SMM (Slot Missed Message) / DLA (Delay Message) / CHG (Flight plan Changement message) / SPA (Slot Improvement Proposal Acceptance Message) / SRJ (Slot Improvement Proposal Rejection Message) / RFI (Request For Improvement Message) / SWM (SIP Wanted Message) / FCM (Flight Confirmation Message) / RJT (Rejection Message), re-routing request messages. | FPL messages, |

Table 13 : Information flows between partners (2/4)
<table>
<thead>
<tr>
<th>Flow</th>
<th>From</th>
<th>To</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>CFMU</td>
<td>Airlines</td>
<td>• Provisional ATFM regulations (ANM (ATFM Notification Message)), • Provisional ATFM slots (AIM (ATFM Information Message)), • Pre-tactical re-routing messages, • Flight plans messages (acceptance, rejection...), • ATFM regulations and ATFM slots messages during day of operations (SAM (Slot Allocation Message) / SRM (Slot Revision Message) / SLC (Slot Requirement Cancellation Message) / SIP (Slot Improvement Proposal) / FLS (Flight Suspension Message) / FSH (Flight Shift Message) / DES (De-suspension Message) / RRP (Re-routing Proposal Message) / RPN (Re-routing Notification Message) / ERR (Error Message)), • FPL messages, • ATFM messages,</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Airlines</td>
<td>LISBON's FMP</td>
<td>• Nil for major airlines, • Airlines which don't have an RCA terminal: requests CTOT information and communicates new EOBT and request ATFM slot,</td>
<td>• Radio frequencies/telephone</td>
</tr>
<tr>
<td>22</td>
<td>LISBON's FMP</td>
<td>Airlines</td>
<td>• Nil for major airlines, • Airline which don't have an RCA terminal: CTOT and ATFM data and regulations,</td>
<td>• Radio frequencies/telephone</td>
</tr>
<tr>
<td>23</td>
<td>Airlines</td>
<td>LISBON's TWR</td>
<td>• Aerodrome Data, ATC clearance, Push-back, taxi, take-off and landing requests from pilots,</td>
<td>• Radio frequencies,</td>
</tr>
<tr>
<td>24</td>
<td>LISBON's TWR</td>
<td>Airlines</td>
<td>• Aerodrome Data, ATC clearance, Start-up, push-back, take-off and landing clearances to pilots and operations control centres,</td>
<td>• Radio frequencies,</td>
</tr>
<tr>
<td>25</td>
<td>Airlines</td>
<td>LISBON's ACC</td>
<td>• Nil, • Could request from ACC a landing priority for specific flights,</td>
<td>• Radio frequencies/telephone</td>
</tr>
<tr>
<td>26</td>
<td>LISBON's ACC</td>
<td>Airlines</td>
<td>• Nil, • Could co-ordinate departure sequence for special cases,</td>
<td>• Radio frequencies/telephone</td>
</tr>
<tr>
<td>27</td>
<td>Handlers (Portway ...)</td>
<td>LISBON's TWR</td>
<td>• Nil, • Could co-orderate departure sequence for special cases,</td>
<td>• N/A</td>
</tr>
<tr>
<td>28</td>
<td>LISBON's TWR</td>
<td>Handlers</td>
<td>• Landing and push-back clearances, (indirect by scanning radio frequencies)</td>
<td>• Radio frequencies,</td>
</tr>
<tr>
<td>29</td>
<td>Handlers</td>
<td>Handlers</td>
<td>• Co-ordinate transit baggage and connecting passengers, • Co-ordination of ramp handling with passengers handling (boarding, check-in, W&amp;B and load sheets),</td>
<td>• N/A</td>
</tr>
<tr>
<td>30</td>
<td>Handlers</td>
<td>LISBON's FMP</td>
<td>• Nil</td>
<td>• N/A</td>
</tr>
<tr>
<td>31</td>
<td>LISBON's FMP</td>
<td>Handlers (Portway ...)</td>
<td>• Nil</td>
<td>• N/A</td>
</tr>
</tbody>
</table>

Table 14 : Information flows between partners (3/4)
<table>
<thead>
<tr>
<th>Flow</th>
<th>From</th>
<th>To</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>Handlers (Portway ...)</td>
<td>ACC</td>
<td>• Nil</td>
<td>N/A</td>
</tr>
<tr>
<td>33</td>
<td>ACC</td>
<td>Handlers (Portway ...)</td>
<td>• Nil</td>
<td>N/A</td>
</tr>
<tr>
<td>34</td>
<td>Handlers (Portway ...)</td>
<td>CFMU</td>
<td>• Nil</td>
<td>N/A</td>
</tr>
<tr>
<td>35</td>
<td>CFMU</td>
<td>Handlers (Portway ...)</td>
<td>• Nil</td>
<td>N/A</td>
</tr>
<tr>
<td>36</td>
<td>LISBON's FMP</td>
<td>LISBON's TWR</td>
<td>• ATFM slots for a given flight, • LISBON’s regulations • Data for REA messages</td>
<td>telephone</td>
</tr>
<tr>
<td>37</td>
<td>LISBON's TWR</td>
<td>LISBON's FMP</td>
<td>• Request to send REA message, • Request information about ATFM slots co-ordinate traffic situation</td>
<td>telephone</td>
</tr>
<tr>
<td>38</td>
<td>LISBON's FMP</td>
<td>LISBON's ACC</td>
<td>• Traffic demand and state of operations for LISBON and boundary sectors</td>
<td>telephone</td>
</tr>
<tr>
<td>39</td>
<td>LISBON's ACC</td>
<td>LISBON's FMP</td>
<td>• Co-ordinate with FMP and advise FMP of regulations to be implemented during day of operations</td>
<td>telephone</td>
</tr>
<tr>
<td>40</td>
<td>LISBON's FMP</td>
<td>CFMU</td>
<td>• Pre-tactical planning (sectors capacities, regulations for day of operations), • State of flows and traffic demand during day of operations, • REA messages, • Slot requests for a given flight (airlines which don’t have an RCA terminal).</td>
<td>RCA terminal</td>
</tr>
<tr>
<td>41</td>
<td>CFMU</td>
<td>LISBON's FMP</td>
<td>• Pre-tactical data (provisional ATFM regulations, provisional ATFM slots, provisional ATFM re-routings, • ATFM regulations for LISBON's and boundary sectors during day of operations, • Slot allocation and state of ATFM regulations for a given flight</td>
<td>RCA terminal</td>
</tr>
<tr>
<td>42</td>
<td>LISBON's TWR</td>
<td>LISBON's ACC</td>
<td>• Co-ordinate the required runways configurations,</td>
<td>telephone</td>
</tr>
<tr>
<td>43</td>
<td>LISBON's ACC</td>
<td>LISBON's TWR</td>
<td>• Co-ordinate in case of disruptions the arrival sequence, • Co-ordinates departure sequence for special cases</td>
<td>telephone</td>
</tr>
<tr>
<td>44</td>
<td>LISBON's TWR</td>
<td>CFMU</td>
<td>• Lisbon TWR uses a CFMU terminal (RCA)</td>
<td>RCA</td>
</tr>
<tr>
<td>45</td>
<td>CFMU</td>
<td>LISBON's TWR</td>
<td>• Lisbon TWR uses a CFMU terminal (RCA)</td>
<td>RCA</td>
</tr>
</tbody>
</table>

Table 15 : Information flows between partners (4/4)
4.3 Main information sources for each partners

In order to assess information and data sources, three major items has been analysed. The analysis focused on major information means (tools and systems), the received data and data originators. The following paragraphs details those items for each partners.

4.3.1 Information sources at LISBON's airport OPS Centre

LISBON's OPS Centre is a data receiver. It receives data and time estimates exclusively from non-airport partners (aircraft operators, handlers, TWR, ATC system…). OPS Centre operators rely on the availability and the usability of the received data to achieve the stand and gate management and allocation during tactical phase.

![Figure 1: Data sources at airport's OPS Centre](image)

The most important automatic information data sources are ATC, MVT and DLA messages. The ATC system is the most important data provider for inbound flights. It provides flight data and updates landing estimates, actual landing times, the actual take-off time and also ATFM slots for outbound flights. MVT and DLA messages are automatically received from Portuguese airlines (TAP, SATA, AIR LUXOR and PGA) in the UFIS system and on a SITA printer for other airlines. Other actual times (off-block, take-off, landing and in-block) are a manual input to the system. DLA messages give delay times and thus estimated off-block and in-block times.

LDM (Load Message) is received from handling agents. Sporadically ACARS messages are received from equipped aircraft. Airline priorities are received by SITA or e-mail.

Some important data and information must be retrieved and manually processed from other data sources: telephone and radio facilities, fax and telex facilities. Those data sources provide estimated and actual off-block and in-block times.

The ARO – COM/AIS department is an important data receiver. They receive and issue flight plans data (scheduled time, routes, aircraft registrations…), ATFM slots for inbound and outbound LISBON's flights (from RCA terminal). They issue the ATIS data (runways news, transition and transoceanic levels in use, meteorological data, NOTAM messages…).
4.3.2 **Information sources at TAP operations centre**

TAP operations control centre collects all data and time estimates related to TAP and its partner’s flights. TAP data and time estimates received provide mainly TAP interior partners and own handlers (flight dispatching, ramp and passengers handling …). MVT and DLA messages are sent to Airport OPS Centre.

All the required data and information (estimated and actual times for arrivals and departures) for TAP flights are available. The most important part of the data is received by fax/telex (SITA messages) and by e-mail. Messages are manually input to the operations system.

![Diagram of data sources at TAP operations control centre]

The operations control systems receives and updates estimated and actual off-block and in-block times for inbound and outbound LISBON, which allows TAP operations centre to fully manage their flights. MVT and ACARS messages are automatically processed by the system and are also received by fax/telex and e-mail. They update the actual arrival and departure times for inbound and outbound flights.

Outbound data and time estimates are received by SITA faxes, radio and telephone facilities from Lisbon’s Airport partners. The data received are:

- Estimated, actual off-block, in-block times, delays and ATFM slots.

4.3.3 **Information sources at SATA operations centre**

SATA operations centre collects all data and time estimates related to SATA and its partner’s flights. SATA data and time estimates received provide mainly SATA interior partners and own handlers (flight dispatching, ramp and passengers handling …). MVT and DLA messages are sent to Airport OPS Centre.

All required data and information (estimated and actual times for arrivals and departures) for SATA flights are available. The most important part of the data is received by fax/telex (SITA messages) and by e-mail. Messages are manually input to the operations system.
The operations systems receives and updates estimated and actual off-block and in-block times for inbound and outbound LISBON, which allows SATA operations centre to fully manage their flights. MVT and ACARS messages are manually input to the system and trigger the update of actual arrival and departure times inbound and outbound.

Outbound data and time estimates are received by SITA, faxes e-mail and radio / telephone facilities from LISBON’s Airport partners. The data received are:

- Estimated, actual off-block, in-block times, delays and ATFM slots.

### 4.3.4 Information sources at the AIR LUXOR operations centre

AIR LUXOR operations centre collects all data and time estimates related to AIR LUXOR and its partner’s flights. AIR LUXOR data and time estimates received provide mainly AIR LUXOR interior partners and own handlers (flight dispatching, ramp and passengers handling …). MVT and DLA messages are sent to the Airport OPS Centre.

All required data and information (estimated and actual times for arrivals and departures) for AIR LUXOR flights are available. The most important part of the data is received by fax/telex (SITA messages) and by e-mail. Messages are manually input to the operations system.
The operations systems receives and updates estimated and actual off-block and in-block times for inbound and outbound LISBON, which allows AIR LUXOR operations centre to fully manage their flights. MVT and ACARS messages are manually input to the system and trigger the update of actual arrival and departure times inbound and outbound.

Outbound data and time estimates are received by SITA, faxes e-mail and radio/telephone facilities from LISBON’s Airport partners. The data received are:

- Estimated, actual off-block, in-block times, delays and ATFM slots.

4.3.5 **Information sources at the PGA operations centre**

PGA operations centre collects all data and time estimates related to PGA and its partner’s flights. PGA data and time estimates received provide mainly PGA interior partners and own handlers (flight dispatching, ramp and passengers handling …). MVT and DLA messages are sent to Airport OPS Centre.

All required data and information (estimated and actual times for arrivals and departures) for PGA flights are available. The most important part of the data is received by fax/telex (SITA messages) and by e-mail. Messages are manually input to the operations system.
The operations systems receives and updates estimated and actual off-block and in-block times for inbound and outbound LISBON, which allows PGA operations centre to fully manage their flights. MVT and ACARS messages are manually input to the system and trigger the update of actual arrival and departure times inbound and outbound.

Outbound data and time estimates are received by SITA, faxes e-mail and radio / telephone facilities from LISBON’s Airport partners. The data received are:

- Estimated, actual off-block, in-block times, delays and ATFM slots.

**4.3.6 Information sources at PORTWAY**

Portway operations centre collects all data and information related to handle flights. They receive and issues data from and to handled airlines and Lisbon’s airport.

The major part of data and time estimates are received and issued using airlines’ systems, MVT/DLA messages and SITA faxes and request extra manual processing. These data are mainly estimated and actual off-block and in-block times, actual take-off and landing times, delay estimates, ATFM slots (for inbound and outbound flights), passengers and cargo data.

Other data sources (DAVIS system, radio and telephone facilities) allow Portway flight dispatchers and planners to collect stand and gate data, actual landing times and other time estimates.
4.4 Information sources at SPDH

SPDH operations centre collects all data and information related to handle flights. They receive and issues data from and to handled airlines and Lisbon’s airport.

The major part of data and time estimates are received and issued using airlines’ systems, MVT/DLA messages and SITA faxes and request extra manual processing. These data are mainly estimated and actual off-block and in-block times, actual take-off and landing times, delay estimates, ATFM slots (for inbound and outbound flights), passengers and cargo data.

Other data sources (DAVIS system, radio and telephone facilities) allow Portway flight dispatchers and planners to collect stand and gate data, actual landing times and other time estimates.

4.4.1 Information sources at Lisbon’s TWR

Cockpit crews are the main Lisbon’s TWR data receivers and providers. The number of the data sources at Lisbon’s TWR seems to be important. Nevertheless Lisbon’s TWR planners and operators use mainly the radio facilities to communicate and to collect data from aircraft operators (pilots). These data are departure, push-back, taxi, take-off and landing requests and clearances. The ATC system (LISATM) provides Lisbon’s TWR with flight plans data and arrival times estimates (flight strips). The UFIIS system provides the stands and gates numbers.
5 INFORMATION SYSTEMS ANALYSIS

The assessment of information systems used by Lisbon’s partners have been undertaken following four axis: description of information systems’ main functionalities, analysis of the state of main automatic links between information systems, assessment of the main automatic links between airport’s information systems and between airport’s information systems and air navigation systems.

5.1 Information systems main functionalities

<table>
<thead>
<tr>
<th>Designation</th>
<th>Partner</th>
<th>Main functionalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCOR</td>
<td>Ana / Airport</td>
<td>• SCOR manages and optimises co-ordination activities (calculation of historical slots and rights, computation of airport slots programme, management of airlines’ requests and modification of airport slots …). It is automatically linked with UFIS. It updates the airport slots planning and receives from the realised in order to analyse it and to compare it to the airport slot programme,</td>
</tr>
</tbody>
</table>
| UFIS        | Airport  | • Contains Lisbon’s airport slots (updated by SCOR). It allows the management of traffic data and time estimates during day of operations  
• Centralises these data and feeds all airport systems with real time information  
• Allows the planning, the allocation and the management of Lisbon’s airport resources and capacities (e.g. stands and gates, baggage belts and check-in banks). This system is automatically linked to LISATM/TWRATM and receive flight data and time estimates |
| DAVIS/      | Airport  | • The DAVIS system is software dealing with transmission and updating of the flight information displayed to the attention of Lisbon’s handlers and passengers. It receives the real time information from UFIS and displays it on handlers’ and passengers monitors. |
| UCA         | Airport  | • The UCA system is a common use system of Lisbon’s Airport. It is fully integrated with the rest of airport information systems, compatible with the installations and information systems used by the airlines. It allows each company to choose the service provider and communications network best suited to its needs. |
| SIRE        | Airport  | • The SIRE system follows up delays for Lisbon’s inbound and outbound flights. |
| OMEGA/AIX   | Sata     | • The OMEGA/AIX system is Air LUXOR’s operations control system. It collects and centralises all data and time estimates regarding Air LUXOR’s flights during day of operations. |
| ROCADE      | Air LUXOR | • The ROCADE system is Sata’s operations control system. It collects and centralises all data and time estimates regarding Sata’s flights during day of operation |
| NETLINE     | PGA      | • The NETLINE system is PGA’s operations control system. This system collects and centralises all data and time estimates regarding PGA’s flights during day of operations. |
| --          | Portway  | • actually no system in use |
| MARE        | Portway  | • The MARE system is a Portway system that manages the push-back tractors planning and their allocation during day of operations. |
| LISATM      | NAV      | • LISATM system is the Portuguese flight plan processing system. It controls and takes into account flights’ and flight plans’ status during the approach, the en-route phases.  
• LISATM system updates departure and arrival time estimates, dispatches data to air navigation control centres (ACC/TWR), receives data from approach radar, receives data from and to the CFMU … |

Table 16 : Information systems main functionalities (1/2)
<table>
<thead>
<tr>
<th>Designation</th>
<th>Partner</th>
<th>Main functionalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCA (CIA) terminal</td>
<td>CFMU</td>
<td>The RCA terminal is the graphical users interface with CFMU information systems. This interface runs under Windows systems (PC).</td>
</tr>
<tr>
<td>RPL (Repetitive Flight Plan System)</td>
<td>CFMU</td>
<td>The RPL system receives processes and stores repetitive flight plans (RPLs). It ensures the proper reception, processing and distribution of RPL data. It receives data from ENV system and communicates with TACT/CASA and IFPS systems.</td>
</tr>
<tr>
<td>IFPS</td>
<td>CFMU</td>
<td>IFPS system enables the reception, the processing and the delivery of flight plan data in the IFPS zone. It provides a centralised flight planning system for the states within the CFMU area in order to rationalise reception, to perform initial processing and distribution of flight plans data to ATC units. It provides RPLs and FPLs data to use for ATFM planning, monitoring and slot allocation. It receives data from ENV database and RPL system. It communicates data to TACT/CASA system.</td>
</tr>
<tr>
<td>TACT/CASA</td>
<td>CFMU</td>
<td>The TACTICAL systems (TACT/CASA) provide a Computer Assisted Slot Allocation (CASA), assesses the re-routing for flows and individual flights. They also provide specific forecast traffic data for the preparation of the ATFM pre-tactical plan, presents and monitors the traffic situation during day of operations. TACT/CASA receive data from RPL, IFPS, ENV database and PREDICT system and communicate data to ARC database.</td>
</tr>
<tr>
<td>ARC</td>
<td>CFMU</td>
<td>The archive system records the CFMU data and processes it to provide historical data. It assesses the ATFM performance and provides a forecast flight demand model based on historical data. The ARC database receives data from ENV database and TACT/CASA system. It communicates data to PREDICT system.</td>
</tr>
<tr>
<td>ENV</td>
<td>CFMU</td>
<td>The ATS environment system is a database that includes ATS routes and routing systems, airfields, standard instrument departures, standard arrival routes, navigation aids, ATC sectorisation … This database provides data for use by IFPS, RPL, TACT/CASA, ARC and PREDICT systems.</td>
</tr>
</tbody>
</table>

Table 17: Information systems main functionalities (2/2)

5.2 Main links between Lisbon’s information systems

This chapter studies the existing automatic links between partners’ information systems. It details all automatic links between all Lisbon’s partners information systems, the architecture and the links between airport information systems, between airport and air navigation information systems.
5.2.1 Links between Lisbon’s partners information systems

The table below identifies the main automatic links between Lisbon’s partners’ information systems. It lists the main links from and to those information systems and the type of each link.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Links to</th>
<th>Type of links</th>
<th>Links from</th>
<th>Type of links</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCOR</td>
<td>• UFIS</td>
<td>Interface</td>
<td>UFIS</td>
<td>Interface</td>
</tr>
<tr>
<td>UFIS</td>
<td>• SCOR (SLOT SYSTEM), • DAVIS, • FIDS, • Interface, • Slot System, • UFIS, • ATC, • AOC Handlers</td>
<td>• Interface, • Slot System, • UFIS, • ATC, • AOC Handlers</td>
<td>• Interface, • Slot System, • UFIS, • ATC, • AOC Handlers</td>
<td></td>
</tr>
<tr>
<td>DAVIS</td>
<td>• AOC Handlers</td>
<td>• Interface</td>
<td>UFIS</td>
<td>• Interface</td>
</tr>
<tr>
<td>UCA</td>
<td>• UFIS</td>
<td>Interface</td>
<td>UFIS</td>
<td>Interface</td>
</tr>
<tr>
<td>FIDS</td>
<td>• N/A</td>
<td>Interface</td>
<td>UFIS</td>
<td>Interface</td>
</tr>
<tr>
<td>AOC</td>
<td>• N/A</td>
<td>Interface</td>
<td>UFIS / DAVIS, RCA</td>
<td>Messages, Interface</td>
</tr>
<tr>
<td>Handler</td>
<td>• N/A</td>
<td>Interface</td>
<td>UFIS / DAVIS, RCA</td>
<td>Messages, Interface</td>
</tr>
<tr>
<td>ATC</td>
<td>• UFIS</td>
<td>Messages, Interface</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>RCA terminal</td>
<td>• TACT/CASA</td>
<td>Interface</td>
<td>TACT/CASA</td>
<td>Interface</td>
</tr>
</tbody>
</table>

Table 18: Main links between Lisbon’s information systems

5.2.2 Links between Airport and Air Navigation Information systems

UFIS system receives several ATC messages (creation, pre-activation, activation, slot allocation or cancellation, flight plans modifications or cancellations, arrival messages).
1. UFIS  FIDS
   UFIS provides information about flights, including code share (schedule, arrivals, departures, infra-structures, stands, arrival belts, check-in counters, boarding gates)
   FIDS provides to UFIS information about boarding gates opening and closing times and use of arrival belts

2. BELTS  FIDS
   BELTS provides to UFIS information about first and last bag

3. UFIS  ATC
   ATC provides UFIS with flight plan info at the time they are actioned as well as ETA/ETD, ATA/ATD and CTOT
   UFIS provides ATC with stand allocation and aircraft registration

4. UFIS  SIFACT
   UFIS provides SIFACT with flights arrival/departures and ground movements (towing)
   SIFACT provides UFIS with master data (airline operators, airports, aircraft types, aircraft registrations)

5. SITA  UFIS

6. FIDS  CHECK-IN COUNTER
   FIDS provides CUTE workstations the listing of allocated flights
   CUTE provides a shortcut to allow the activation of check-in counter monitor

7. FIDS  INTERNET
   Commercial flight information

8. FIDS  DATELKA (Access Central)
   FIDS provides to DATELKA information about boarding gate allocation
   DATELKA provides FIDS information about boarding process (gate opening and closing, boarding room, last call and gate occupancy times)

9. UFIS  SCORE (slot coordination)
   (to be implemented)
   SCORE provides do UFIS season schedules and updates
   UFIS provides to SCORE actual flight information to allow coordination monitoring
6 PROCESSES AND INFORMATION FLOWS MODELS BY PARTNER

6.1 LISBON’S AIRPORT

Lisbon’s Airport operations are in charge of the following activities:

- Management and planning of stands and gates
- Check-in banks for departure flights
- Baggage belts for arrival flights
- Management of Lisbon’s Apron and security management over Lisbon’s apron,

The OPS CENTRE unit is in charge of the management and the allocation of the airport resources (stands and gates, check-in banks and baggage belts). In order to achieve this mission Lisbon’s Airport OPS CENTRE is organised as follows:

- Two planners in charge of monitoring and co-ordinating airport daily operations, collecting from operators (airlines, handlers, TWR ...) data (aircraft type, passengers ...) and time estimates (arrivals and departures times...), updating these data manually or automatically into the UFIS database and updating time estimates and data for the public and for handlers through DAVIS system (public FIDS, handlers and airlines FIDS).
- A supervisor in charge of co-ordinating planners activities and allocating airport resources (S&G, check-in banks, baggage belts) during day of operation.

As agreed with Lisbon’s operations manager and Ana airport operations department, the following processes have been modelled and analysed:

- Pre-allocation of airport's capacity and resources,
- Airport’s resources allocation and planning adaptation,
- Follow-me cars management and allocation during day of operations

6.1.1 Airport slot management during pre-tactical and tactical phase

During pre-tactical phase, airport slots programme amendments are taken into account by Lisbon’s airport planning department. Airlines requests are submitted by fax and telex.

During day of operations, amendments of airport slots should be requested by the airlines 3 hours before the scheduled departure time. Slots amendments are submitted by SITA and Telex to airport planning unit. Generally, slot requests are submitted by general aviation flights and rarely by the major airlines.

72 hours before operations, Lisbon’s airport slot program is downloaded from SCOR into Lisbon’s UFIS database. Airport slots are then managed by Lisbon’s airport using UFIS database.

During day of operations, airport slots and ATFM slots are not co-ordinated. If a flight is subject to ATFM delays, aircraft operators submit rarely requests to amend airport slots or applies rarely for new slots. Hence, the airport slot (e.g. capacity) is lost and could not be re-allocated to another flight.
6.1.2 Pre-allocation of airport resources and capacities

Airport slots programme is downloaded into UFIS system. The airport resource planning is automatically computed starting with the planning of stands and gates. The planning of check-in banks is then performed followed by the baggage belts’ planning (2 flights can be allocated per belt (3 flights can be informed), the flights must be separated by 30 minutes).

Pre-allocation filters are applied during the pre-allocation process:

- Aircraft type (maximum size, minimum size, turn around time ...),
- Flight type (inbound flights, outbound flights, passenger, cargo, mixed, domestic, Schengen, non Schengen, international)
- Airlines priorities and dedicated stands to an airline,
- Contact or remote stand (the contact stand is allocated for a turn around time of maximum 2.5 hours, the remote stand could be allocated for a turn around time superior to 2.5 hours)

6.1.3 Airport resources allocation and planning adaptation

Airport resources planning are updated and modified during the day of operations. The amendment of airport resources’ planning is performed using time estimates and data received during day of operations.

6.1.4 Follow-me cars planning and management

“Follow-me” cars at Lisbon are in charge of controlling and managing Lisbon’s apron. This includes guiding inbound aircrafts from apron’s entry point to their parking position, guiding all type of vehicle on Lisbon’s apron (cars, buses, ambulances, fire trucks…) and managing safety and controlling the correct application of safety procedure over Lisbon’s apron. They are parked beside of each apron access.

The allocation of follow-me vehicles are described is the following process:

- Receives the allocated gate from airport’s OPS CENTRE by radio (a specific radio frequency is allocated for the communications between OPS CENTRE and the follow-me cars),
- When the aircraft lands, the follow-me car in charge leaves its position beside the apron entry point,
- This indicates, the entry point of the apron to the pilot and the follow-me car to follow,

6.1.5 Update of time estimates and data at Lisbon’s OPS CENTRE

The process of update of time estimates is the following for inbound Lisbon’s flights:

- The scheduled data are the first “estimates” received and recorded into UFIS.
  - scheduled in-block times as given by airport’s slots programme
  - Estimated in-block times as given by airlines’ flight plans.
- In case of delay at outstation, OPS CENTRE could receive DLA messages from airlines or handlers updating the estimated in-block time,
- The first “real” estimates of the arrival time at Lisbon are received when the flight takes-off from the origin airport. Two time estimates could then be available :
  - Estimated landing time at Lisbon given by ATC system or by airlines’ MVT messages,
- During the en-route phase, ATC issues new landing estimates (if there is a difference for more than 5 minutes from the last estimated landing time,
- For international flights, the first ATC estimates are received when the flight enters Portuguese sectors or the boundary sector, (in the radar coverage airspace)
- A new ATC landing estimate is received when the flight passes the last fix point (several minutes
before landing),
• During final approach, landing estimates are received from the ATC system
• The actual landing time is received from the ATC system
• Finally, the actual in-block time is updated by adding 5 minutes to the actual landing or by message from handling agent

The process of update of time estimates is the following for outbound Lisbon’s flights:

• The ATFM slots are received from the ATC system,
• During ground rotation, few time estimates are received by OPS CENTRE planners. Delay messages are received from handling agents
• The actual off-block times are received by MVT message or from follow-me agent. An actual off-block time is then retrieved and an actual take-off time is computed by adding 5 minutes.
• The actual take-off time is sent by the ATC system

6.1.6 Information sources at Lisbon’s Airport Operations (OPS CENTRE)

The main data and information sources at Lisbon airport OPS CENTRE are the following:

• **The ATC system.** ATC messages are automatically received and computed by UFIS. ATC updates estimated and actual landing times for inbound Lisbon’s flights, the CTOT and actual take-off time for outbound Lisbon’s flights,
• **Movement (MVT) and delay (DLA) messages.** MVT messages are received at remarkable time events (off-block, take-off, landing and in-block). Delay messages could be received when the flight are subject to severe delays,
• **SITA and Fax/Telex printer.** OPS CENTRE planners receive departure and arrival time estimates. Those messages contain delay data, cancelled flight data, aircraft type modification data. These data request manual processing,
• **Telephone facility.** Allows OPS CENTRE planners to call (or be called) by aircraft operators and handlers in order to collect or to receive data and time estimates,
• **Radio facility.** Allows OPS CENTRE planners to contact aircraft operators and handlers and to collect data and time estimates,
• It is to note that OPS CENTRE doesn’t have an RCA or CIA terminal (CFMU user terminal)

6.1.7 Lisbon’s Airport information systems

6.1.7.1 UFIS system

This database contains Lisbon’s airport slots which are updated into UFIS database 1 day before day of operations. During day of operation traffic and demand data are updated by airport’s planners and operators. Estimated and actual in-block and off-block times and origin, destination, registration number, aircraft type, airport resources are recorded
This system also pre-allocates, allocates and manages airport resources and capacities

The main UFIS window contains for the outbound flights the following data:

• Commercial code and aircraft registration
• Scheduled Off-block time (called STD),
• Destination airport and stations,
• Estimated off-block time (called ETD),
• Commercial code for next flight,
• Allocated stand,
• Aircraft type,
• Other flight data,
For each flight a window containing precise data for arrival and departure flights is available. The rotation data and parameters (aircraft data, callsign, scheduled times for next flight) could be managed using this window.

The inbound flights window contains the following data:

- callsign and aircraft registration,
- estimated in-block time,
- allocated stand, baggage belt and arrival gate,
- rotation data (callsign and scheduled off-block time for next flight),
- departure airport and stations,
- scheduled In-block time as given by airport slots programme,
- scheduled In-block time as given by the flight plan,
- estimated/actual landing time as given by the Atc system,
- airline information data received by SITA and Fax,
- flight type (regular, charter, passenger flight, cargo flight ...),
- flight's class (Schengen, no Schengen, domestic flight, international ...),
- aircraft type,

The window for the outbound flights shows the following:

- Callsign and aircraft registration
- Estimated off-block time
- Allocated stand, gate and check-in banks
- Rotation data (callsign and scheduled in-block time for next flight)
- Destination airport and stations
- Scheduled Off-block time as given by airport slots programme
- Scheduled off-block time as given by the flight plan
- ATC’s time estimates (F/H ATC - only for inbound flights),
- ATFM slot
- Airlines information received by SITA and Fax (F/H SITA),
- Flight type (regular, charter, passenger flight, cargo flight ...),
- Flight class (schengen, no schengen, domestic flight, international ...),
- Aircraft type,
6.1.7.2 The DAVIS system

The DAVIS system is software dealing with transmission and updating of the flight information displayed to the attention of Lisbon’s airlines and handlers. It receives the real time information from UFIS and displays it on dedicated monitors.

The DAVIS’s window contains the following data:
• Arrival flights: callsign, departure airport, ETA (estimated in-block time), aircraft type, aircraft registration, stand & gate and baggage belts numbers,
• Departure flight: callsign, destination airport, ETD (estimated off-block time), aircraft type, aircraft registration, stand & gate and boarding gate numbers,

6.1.8 Information flows between Lisbon’s Airport and other partners

Between Airport’s Operations and the Airlines:

• Lisbon’s airport sends to the airlines the following data:
  • Lisbon’s airport resources planning
  • Lisbon’s airport resources allocation during day of operations,
• Airlines send to Lisbon’s airport the following data:
  • Requests for modifications of airport slots programme after day-1,
  • Data and time estimates using SITA and MVT messages during day of operations,
  • Daily reports and LDM (load messages) for billing purposes,

Between Airport’s Operations and the handlers:

• Lisbon’s airport makes the following data available to the handlers:
  • Lisbon’s airport slot programme,
  • Lisbon’s airport resources planning,
  • Lisbon’s airport resources allocation during day of operations,
  • Time estimates and data for inbound and outbound flights (through DAVIS system),
  • Handlers send the following data to Lisbon’s Airport
  • Actual in block-time, actual off-block time by MVT and SITA messages,
  • Daily reports and LDM (load messages)

Between Airport’s Operations and TWR:

• Lisbon’s airport sends to the TWR the following data:
  • Stand, on-block or off-block time and aircraft registration, through specially developed interface
  • Modifications of stand and gate number on short and very short term (by telephone),
  • The TWR sends to Lisbon’s Airport the following data:
  • landing time through specially developed interface

Between Airport’s Operations and the CFMU:

• There are no direct communications between Lisbon’s airport and the CFMU,
• The ATFM slots are received via the ATC system for departure flights,

There is no direct communications between Lisbon’s OPS CENTRE and Lisbon’s ACC and FMP

6.1.9 Time estimates terminology as used by Lisbon’s Airport

STA / STD: Scheduled in-block time and scheduled off-block time for next flight,
ETA / ATA: Estimated and actual in-block time,
ETD / ATD: Estimated and actual off-block time,
CTOT: ATFM slot (Calculated Take-off Time).
6.2 SATA

6.2.1 Flight planning and operations dispatch

The flight planning and operations dispatch unit is in charge of managing and co-ordinating the flight planning activities and crews activities during the day of operations. The activities of the flight dispatching unit includes computing operational and ATC flight plans and management of the related activities (co-ordination with IFPS …) and the management and the collection of cockpit and cabin crews data.

The flight planning activities and the co-ordination with the CFMU are managed by SATA’s operations centre at Lisbon airport.

• Nearly all Sata’s flight plans are repetitive flight plans. They are filed once per season by Sata’s Operations Centre,
• CFMU slots, ATFM restrictions and regulations are sent to Sata’s at Lisbon via STATEXT and CIA. Sata’s operations centre in Lisbon do have a CIA connection,
• Amendments to flight plans (re-routing, EOBT, aircraft type …) are all managed by SATA’s operations. In that case a new flight is issued and filed to Lisbon and a new ETA (estimated in-block time) is issued.

6.2.2 Operations control

Operations control centre manages Lisbon’s flights and co-ordinates all Sata’s partners at Lisbon (ramp handling, passengers handling, flight dispatching …). All handling, ground/ramp/pax/baggage, is done by TAP SPDH and supervised by SATA traffic staff.

The operations centre informs and gets informed of the status of Sata’s flights and time estimates during the gate to gate process. These data are received from all partners related to Sata’s flights (ramp handlers, passenger’s handlers, caterers, Sata outstations, flight dispatchers …). All handling, ground/ramp/pax/baggage, is done by TAP SPDH and supervised by SATA traffic staff.

At the departure from Lisbon, the operations centre issues two MVT messages. These MVT messages contain:

• The actual off-block time and an estimated take-off time,
• The actual take-off time and an estimated in-block time at outstation,
• The departure MVT message could also be a one and only message containing: the actual off-block time, an estimated take-off time (actual off-block time + 5 minutes) and an ETA (estimated in-block time) at destination.

All MVT messages related to SATA aircraft at Lisbon are done by TAP SPDH.

CTOT for outbound and inbound flights are received by STATEXT or e-mail and are recorded through printout

6.2.3 Update of time estimates and data at SATA

The process of update of time estimates is the following for inbound Lisbon’s flights:

• Scheduled off-block and in-block times are the first time estimates. They are issued by Sata’s flight plan,
• If the inbound flight is subject to ATFM regulations, the CTOT is received from operations centre and a new estimated in-block time is computed,
• When the aircraft leaves the parking position, an estimated airborne message could be received (in case of congestion on airport’s apron and taxiways). This message gives the actual off-block time and an estimation of the take-off time,

• At take-off, an MVT message is received. This message contains the actual off-block time, the actual take-off time and an estimated in-block time at Lisbon is computed by Sata's operations control system,

• 10 or 20 minutes before landing, Lisbon’s operations receives an estimated landing time from cockpit crews,

• A new estimated landing time and the actual landing time are known by scanning TWR’s frequencies during final approach and landing,

• The actual in-block time is computed by adding 5 minutes to the actual landing time,

The process of update of time estimates is the following for outbound Lisbon’s flights:

• Scheduled off-block and in-block times at destination are the first time estimates. They are issued by Sata’s flight plan,

• If the outbound flight is subject to ATFM regulations, the CTOT send by operations centre and estimated in-block time at destination is computed,

• When the aircraft leaves its parking position, the actual off-block time and an estimation of the take-off time could be issued by Sata’s operations centre (EO message – in case of apron and taxiways congestion),

• At take-off, a MVT message is issued by Sata’s operations centre. This message contains the actual off-block and the actual take-off time. The estimated in-block time at destination is computed by Sata’s operations control system, MVT sent by TAP SPDH.

• When the flight arrives at destination, a MVT message containing the actual landing and in-block times at destination is received by Sata’s operations centre at Lisbon,

• If the aircraft returns to its parking position, a return to parking message is issued and the following data are updated:
  • Actual off-block time and actual in-block time,
  • New EOBT (new estimated off-block time) and new EIBT (new estimated in block time) at destination,

6.2.4 Information sources at Sata operations centre

The main information sources at Sata’s operations centre are the following:

• **FPL, MVT and Delay messages.** Some MVT and delay messages are automatically received by Sata’s operations control system. Those messages updates the actual off-block, the actual take-off and the estimated off-block times for outbound flights and the actual landing, the actual in-block and the estimated in-block times for inbound flights,

• **ACARS messages.** (for some aircrafts),

• **FAX/Telex printers.** MVT and delay messages are printed and then manually updated into the system,

• **Telephone.** Allows Sata’s operations controllers to contact Sata’s partners and airport OPS CENTRE,

• **DAVIS screen.** The DAVIS screen gives the stand and gate numbers,

• **Radio facilities.** Allows Sata’s operations controllers to scan TWR frequencies and to contact Sata’s partners
6.2.5 Information flows between Sata and other partners

Between SATA and the Airport:

- SATA sends to airport operations (OPS CENTRE and planning) the following data:
  - Requests for modification of airport slots programme after Day-3,
  - Requests for modification of the stand and gate number,
  - Flight data and time estimates during day of operations,
  - MVT and delay messages for inbound and outbound flights (automatically received and decoded by UFIS),
  - LDM messages and daily reports for billing purposes,
  - SATA has the possibility to update the public FIDS with their own time estimates. All MVT/LDM and handling related issues are done by TAP SPDH.
- Lisbon’s Airport sends to SATA the following data:
  - Lisbon’s resources planning (stand and gate for inbound and outbound flights, check-in banks for outbound flights, baggage belts for inbound flights),
  - Lisbon’s airport resource allocation during day of operations,
  - The airport resource allocation and modification during day of operations is known by using the DAVIS system,

Between Sata and the TWR:

- Sata operations receives information from the TWR by scanning TWR frequencies:
  - Local control: take-off and landing clearances,
  - Ground control: Start-up, push-back clearances

Between Sata and the CFMU:

- The communications between Sata operations at Lisbon and the CFMU are
  - Telephone calls
  - The CIA terminal
- CFMU data are manually introduced in Sata’s system
- CTOT for outbound and inbound flights are received from CIA terminal and by telex from SATA operations centre and are recorded,
- Sata at Lisbon is connected to a CIA terminal,

There is no regular communication between Sata and Lisbon’s FMP and ACC, exceptional telephone calls.
6.3 AIR LUXOR

6.3.1 Flight planning and operations dispatch

The flight planning and operations dispatch unit is in charge of managing and co-ordinating the flight planning activities and crews activities during the day of operations. The activities of the flight dispatching unit includes computing operational and ATC flight plans and management of the related activities (co-ordination with IFPS ...) and the management and the collection of cockpit and cabin crews data.

The flight planning activities and the co-ordination with the CFMU are managed by AIR LUXOR's operations centre at Lisbon.

• Nearly all Air Luxor’s flight plans are repetitive flight plans. They are filed to Air Luxor at Lisbon one day before operations by Air Luxor Operations Centre,
• CFMU slots, ATFM restrictions and regulations are sent to Air Luxor at Lisbon by telex. Air Luxor’s operations centre in Lisbon has an CIA terminal,
• Amendments to flight plans (re-routing, EOBT, aircraft type ...) are requested to AIR LUXOR’s operations. In that case a new flight is issued and filed to Lisbon and a new ETA (estimated in-block time) is issued.

6.3.2 Operations control

Operations control centre manages Lisbon's flights and co-ordinates all Air Luxor’s partners at Lisbon (ramp handling, passengers handling, flight dispatching ...).

The operations centre informs and gets informed of the status of Air Luxor’s flights and time estimates during the gate to gate process. These data are received from all partners related to Air Luxor’s flights (ramp handlers, passenger’s handlers, caterers, Air Luxor outstations, flight dispatchers ...).

At the departure from Lisbon, the operations centre issues two MVT messages. These MVT messages contain:

• The actual off-block time and an estimated take-off time,
• The actual take-off time and an estimated in-block time at outstation,
• The departure MVT message could also be a one and only message containing: the actual off-block time, an estimated take-off time (actual off-block time + 5 minutes) and an ETA (estimated in-block time) at destination.
6.3.3 Update of time estimates and data at Air Luxor

The process of updating time estimates is the following for inbound Lisbon’s flights:

- Scheduled off-block and in-block times are the first estimates. They are issued by Air Luxor’s flight plan.
- If the inbound flight is subject to ATFM regulations, the CTOT is received from operations centre and a new estimated in-block time is computed.
- At take-off from outstation, a MVT message is received. This message contains the actual off-block time, the actual take-off time and an estimated in-block time at Lisbon is computed by Air Luxor’s operations control system.
- A new estimated landing time and the actual landing time are known from DAVIS system.
- The actual in-block time is computed by either adding 5 minutes to the actual landing time from handling agent or from ‘follow-me’ staff.

The process of updating time estimates is the following for outbound Lisbon’s flights:

- Scheduled off-block and in-block times at destination are the first time estimates. They are issued by Air Luxor’s flight plan.
- If the outbound flight is subject to ATFM regulations, the CTOT send by operations centre and estimated in-block time at destination is computed.
- At take-off, a MVT message is issued by Air Luxor’s operations centre. This message contains the actual off-block and the actual take-off time. The estimated in-block time at destination is computed by Air Luxor’s operations control system.
- If the aircraft returns to its parking position, a return to parking message is issued and the following data are updated:
  - Actual off-block time and actual in-block time,
  - New ETD (new estimated off-block time) and new ETA (new estimated in block time) at destination.
6.3.4 **Information sources at Air Luxor operations centre**

The main information sources at Air Luxor’s operations centre are the following:

- **FPL, MVT and Delay messages.** Some MVT and delay messages are automatically received by Air Luxor’s operations control system. Those messages update the actual off-block, the actual take-off and the estimated off-block times for outbound flights and the actual landing, the actual in-block and the estimated in-block times for inbound flights,

- **ACARS messages.** (for some aircrafts),

- **FAX/Telex printers.** MVT and delay messages are printed and then manually updated into the system,

- **Telephone.** Allows Air Luxor’s operations controllers to contact Air Luxor’s partners and airport OPS CENTRE,

- **DAVIS screen.** The DAVIS screen gives the stands and gates numbers,

- **Radio facilities.** Allows Air Luxor’s operations controllers to contact Air Luxor’s partners,

![Figure 8: Data sources at Air Luxor’s operations centre](image)

6.3.5 **Information flows between Air Luxor and other partners**

**Between AIR LUXOR and the Airport:**

- AIR LUXOR sends to airport operations (OPS CENTRE and planning) the following data:
  
  - Requests for modification of airport slots programme after Day-3,
  - Requests for modification of the stand and gate number,
  - Flight data and time estimates during day of operations,
  - MVT and delay messages for inbound and outbound flights (automatically received and decoded by UFIS),
  - LDM messages and daily reports for billing purposes,
  - Lisbon’s Airport sends to AIR LUXOR the following data:
    - Lisbon’s airport resources planning (stand and gate for inbound and outbound flights, check-in banks for outbound flights, baggage belts for inbound flights),
    - Lisbon’s airport resources allocation during day of operations,
    - The airport resources allocation and modification during day of operations is known by using the DAVIS system.
Between Air Luxor and the TWR:

No direct communication

Between Air Luxor and the CFMU:

- CFMU data are received by ROCADE system,
- CTOT for outbound and inbound flights are received by SITA from AIR LUXOR operations centre and are recorded,
- Air Luxor at Lisbon is connected to a CIA terminal,

There is no communication between Air Luxor and Lisbon’s FMP and ACC.

6.4 TAP

The flight planning and operations dispatch unit is in charge of managing and co-ordinating the flight planning activities and crews activities during the day of operations. The activities of the flight dispatching unit includes computing operational and ATC flight plans and management of the related activities (co-ordination with IFPS …) and the management and the collection of cockpit and cabin crew data.
The following figure gives an overview of TAP’s organisation at Lisbon.

![Figure 9: TAP’s handling organisation at Lisbon](image)

**Input data**

- ICAO – notams
- INMG – meteo
- ANA – airport resources as check in counters, tarmacs, etc.
- COMPASS – TAP crew and aircraft management system.
- APRA – Portuguese airports flights data base.
- MVT – movement msg.
- LDM/SLS – load distribution msg.

**Output data**

- DB2 – multipurpose database
- Handling operations – historical database
- Facturation – system who produces HCN (handling charge notes)

The HANDLING department is in charge of:

- Collecting data and time estimates from all TAP partners,
- Dispatching data and time estimates for all TAP partners,
- Co-ordinating actions and operations between TAP partners,
- Co-ordinating with Lisbon’s Operations Department,

The Operations control centre is the central co-ordination unit for TAP flights and fleet. This unit manages TAP schedule and co-ordinates all actions to be taken in all TAP’s stations. It is the only department in TAP allowed to change the registration of an aircraft during day of operations. In that case a SITA message is sent to OPS unit, maintenance unit, TAP handling agent and catering company. It is in charge of:

- Initiate, cancel, consolidate or advance flights;
- Exchange aeroplane or aeroplanes versions;
Delay flights more than 15 minutes;
Divert or re-route flights, except for in-flight diversion, which is in the responsibility of the commander.
Activation of the emergency committee.

Ramp handling unit handles and manages ramp activities.

As agreed with TAP the following processes had to be modelled and analysed:

- Flight plan and slot management processes,
- Management of the feeder flights and management of aircraft rotations,
- Flight dispatch processes (flight plan issuing, delay management …)

6.4.1 TAP’s process models

Nearly all TAP’s flight plans for Lisbon’s flights are RPL’s (Repetitive Flight Plans. RPL’s are sent to the CFMU, Lisbon’s ACC and ATC. They are valid for 15 minutes after the scheduled departure time (scheduled off-block time). If the delay is more than 15 minutes, a delay message (DLA) is sent to the CFMU and to the ATC system (ICAO rules) (see CFMU processes).

The flight schedule is established using the aircraft type (e.g. A320, A321 …). The day of operations, aircraft (registrations) are allocated to the flight schedule by Lisbon’s operations Control centre.

The day before operations, the CFMU sends an “AIM” message to TAP Operations dispatch. This message lists the busiest sectors and could be used by TAP OPS to re-route their flights. Other Lists of provisional ATFM regulations are available through CIA terminals. TAP could then start managing the flight schedule or trying to reduce the ATFM delays. During the day, new regulations are set and new ATFM slots are issued.

TAP operations dispatch tries to improve ATFM delays, 2 hours before the departure of the flight, by re-routing the flights or changing the flight levels (CHG change message).

If the ATFM regulations could be avoided, TAP’s operations dispatch will re-route or modify the flight level. In the other cases, TAP OPS dispatch cannot avoid those regulations. Re-routing and flight level modifications are based on the experience of the dispatch managers and staff. There are performed as described in the following procedure:

- TAP OPS lists all ATFM regulations that could impact a given flight,
- TAP OPS selects a given route or a given flight level,
- They send a change route message or a flight level modification message (CHG message to the IFPS)

ATFM slots are received automatically for outbound flights. For inbound flights, they are received when the delay message is sent by the outstation. These messages are processed manually and time estimates are updated manually in the system.

Once these messages are received, TAP OPS at Lisbon sends a delay message by SITA to the IFPS (CFMU) and to Lisbon’s airport ARO department.

Decisions to delay or to cancel a flight are taken only by Lisbon’s Operations Control centre. In the following an example of co-ordination process between all TAP’s partners at Lisbon and Lisbon’s operations Control centre:

The number of connecting passengers on a flight is known from reservation data. The final figures are known when the check-in is closed and issued within the load sheet.

For outbound flights, at least 1 hour before the scheduled time of departure (scheduled off-block time) or the estimated time of departure (Estimated off-block times), TAP’s Operations dispatch receives the provisional number of passengers, cargo and mail loads (reservation data) and issues a prediction of the fuel load for the flight and the Load and Weight and Balance orders.
The load sheet is computed when the check-in is closed (20 to 25 minutes before the flight departure). The load sheet is checked by the pilot and by the flight co-ordinator.

6.4.2 **Update of time estimates and data at TAP HANDLING**

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</table>

**Figure 8**: TAP’s Operations information display

The process of updating time estimates is the following for inbound Lisbon's flights:

- The scheduled off-block and in-block time are the first received time estimates. They are issued by TAP’s flight plans.
- In case of delay, when the check-in is closed, (20 minutes before the scheduled off-block time), a delay message is sent to the airport which contains an estimated off-block time.
- When the flight departs from outstation, a MVT message is sent containing the actual off-block time, the actual take-off time and an estimated in-block time at Lisbon. It is received by a system called FISOS that updates the in-block time and computes an estimated departure time for the outbound flights.
- 10 minutes before the arrival of the flight, an estimated landing time could be send by the pilot. It could be updated into TAP’s system.
- 3 or 4 minutes prior to arrival, HANDLING unit retrieves through TWR- airport link an estimate of the landing time. This time is updated into the system.
- If the aircraft doesn’t have ACARS facility, an actual landing time is updated into the system at landing. The actual landing time is also given from the radar system.
- A MVT message is generated and issued when the aircraft arrives at the parking position, it contains the actual landing time and the actual in-block time.

The process of updating time estimates is the following for outbound Lisbon’s flights:

- The scheduled off-block and in-block time are the first received time estimates. They are issued by TAP’s Handling Agent.
The first estimated off-block time is issued when the movement message of the previous flight is received. An estimated off-block time is issued,
• If the flight is subject to ATFM regulations, the CTOT is automatically received by TAP’s OPS unit,
• In the case of delay, when the check-in is closed (20 minutes before the scheduled off-block time), a delay message is sent to the airport, containing an estimated off-block time
• At take-off, the actual take-off time is received from the ACARS system or through the DAVIS system
• A MVT message containing the actual off-block time, the actual take-off time and an estimated in-block time at destination.

The following messages could be sent from the Fisos system:

- **AD message (Actual Departure)**: sent when the flight takes-off and contains the actual off-block time, the actual take-off time and an estimated in-block time at destination,
- **ED message (Estimated Departure)**: gives an estimated departure time in case of delay,
- **NI message (New Information)**: gives an update of data (delay, airport data …),
- **EA (Estimated Arrival)**: gives an estimated in-block time at destination,

### 6.4.3 Information sources at TAP

The main information and data sources at TAP Handling and OPS are the following:

- **TACT/CASA.** The ATFM slot messages (SAM, SRM, SRR …) are automatically received. The CTOT is automatically updated into Fisos for outbound flights. The CTOT for inbound flights are not received by Lisbon’s CIC but could be retrieved from the RCA terminal at TAP’s OPS,
- The aircraft should receive from TAP OPS all relevant data (load sheet, fuel data, passengers data …),
- **DAVIS system.** The stand and gate planning and allocation are automatically received. TAP remarks that the stand and gate number modifications in short and very short notice are not generally updated in the DAVIS system.
- **TWR frequencies.** Push-back, take-off and landing clearances are received and updated by TAP’s operators,
- **TAP partners.** Time estimates and data are received from TAP partners (flight co-ordinators (red caps), handling staff, pilot …) using radio frequencies. These data are updated into the system by the handling unit.
6.4.4 TAP’s information systems

TAP handling units use mainly one information system, called Fisos, which collects and centralises all data and time estimates regarding all TAP flights. Time estimates are updated into the system either manually by the handling staff or automatically using ACARS messages, and MVT messages.

Data contained in the departure window of the FISOS system includes:

- Flight callsign and aircraft registration and aircraft type,
- Destination airport,
- Gate number,
- STD: scheduled off-block time,
- ETD: estimated off-block time.
- Slot : ATFM CTOT,

Data contained in the arrival window of the Fisos system include:

- Flight callsign, aircraft registration and aircraft type,
- Origin airport,
- STA : schedule in-block time,
- ETA : estimated in-block time
- Passenger data,

If an outbound or an inbound flight has a CFMU slot or is delayed, CTOT and ETA are updated in TAP’s operations control system and the destination station is informed of the delay.

6.4.5 Information flows between TAP and other partners

Between TAP and the Airport:

TAP receives from airport operations the following data:

- Airport resources planning (stand and gate for inbound and outbound flights, check-in banks for outbound flights, baggage belts for inbound flights),
- Airport resources allocation through the DAVIS system.
TAP sends to airport operations the following data:
- Modification requests of airport slots programme after day-3,
- Flight data and time estimates during day of operations,
- Movement (MVT) and delay (DLA) messages,
- LDM messages and daily report for billing purposes,
- Airport operations don’t receive the seasonal flight plans (RPL’s) from TAP,

**Between TAP and the FMP:**
- There are no communications between the FMP and

**Between TAP and the TWR:**
- The TWR sends to TAP (pilot) the following data:
  - Start-up, push-back, take-off and landing clearances (flow to ALL companies)
  - There is no operational link between any Airline Operations

**Between TAP and the ACC:**
- There are no communications between TAP and the ACC

**Between TAP and the CFMU:**
- TAP receives automatically the messages regarding the ATFM slots (SAM, SRM, SCM …),
- TAP sends to the CFMU flight plans, slot revision messages, flight plan revision messages,

The are no communications between TAP and other handling agents at Lisbon and the ATC system.

### 6.4.6 Time estimates terminology as used by TAP

**Departures:**
- STD: scheduled off-block time,
- ETD: estimated off-block time.

**Arrivals:**
- STA: schedule in-block time,
- ETA: estimated in-block time

### 6.5 SPDH

- The newly created handling company SPDH is using the FISOS system of TAP as described above.

### 6.6 PORTWAY

Partway is the major handling company at Lisbon. They manage four main handling activities:

1. **Ramp handling:** ramp handling is the management of the activities on and around the ramp (load and unload baggage and cargo and remote services). It’s supervised by airlines’ duty manager.
2. **Landside or passengers handling**: landside handling is the management of all passengers’ related activities (check-in and boarding, passenger’s information management…).

3. **Flight dispatching** (flight plan and crew management, slot time management, load and balance).

4. **Cargo handling** (all cargo flights at Lisbon are handled by Portway)

Portway handles a large number of airlines.

6.6.1 **Ramp handling and flight dispatching**

Ramp handling is the management of the activities on and around the ramp. It includes the following activities:

- Baggage handling: unloading and loading of baggage, baggage sorting, transfer baggage between the aircraft and the terminal, lost and found activities…,
- Cargo handling: unloading and loading of cargo, transfer cargo between the aircraft and cargo areas…,
- Cleaning activities: aircraft cleaning, water supply…,
- Catering activities: co-ordination with catering companies and staff co-ordination of loading and unloading catering…,
- Flight dispatching activities: flight co-ordination, flight plan management, computation of Load and Weight & Balance orders and sheets, CFMU slot management…,
- Push-back tractors planning and allocation,
- Provision of the machinery and the equipment to load and unload aircraft and to board and disembark passengers (busses, stairs…),

6.6.2 **Ramp handling’s main partners**

Ramp duty manager: manages and supervises ramp activities and resources (ramp supervisors and ramp staff),

- Establishes the planning of handling staff and equipment (buses, push-back tractors, stairs and high loaders),
- Manages and allocates resources during day of operations,
- Supervises the maintenance activities of the handling equipment,

Flight co-ordinator or flight dispatcher: manages and co-ordinates all the ramp handling processes. The flight co-ordinator is responsible of the flight during the ground rotation,

1. Receives issues and manages all messages for inbound and outbound flights. Those messages are received and issued by Portway when the aircraft leaves the parking position at outstation and are sent by the flight co-ordinator when the flight departs from Lisbon:

- MVT messages: contains the actual off-block time, actual take-off time and an estimated in-block time at destination,
- Ticketing message (SLS message): passengers data,
- Cargo message: cargo type, total weight and cargo positions in cargo bays…,
- Containers position message: position of baggage and cargo in cargo bays,
- Passengers transfer message: number of connecting passengers and their destinations,
- Passengers special requirements message (wheel chairs, ambulance…),
- Load message (passenger type (M, F, Infant…), cargo and baggage weights…),
- Fuel message: remaining fuel on board, initial fuel on board, uploaded fuel at outstations and other fuelling data,
2. Receives and issues service requirements and prepares all data and instructions for outbound flights. It includes the following:

- The load and balance data (the Load and Weight & Balance orders and sheets). These orders are computed before and during the check-in using passengers and cargo reservation and provisional fuelling data and could be recomputed if major modifications are made to passengers, cargo or fuelling data,
- When the check-in is closed, new Load and Weight & Balance orders are computed (the of check-in processing is monitored by the flight co-ordinator (number of passengers to check-in, number of passengers checked-in, remaining number of passengers…)),
- When the load of the aircraft is over (passengers, baggage, cargo and fuel), the final Load and Weight & Balance sheets are computed, signed and given to the cockpit crews who verify then, sign and give then back to the flight co-ordinator,
- Catering and passengers data (passengers number, catering requirements…),
- Fuelling requirements for departing flight,
- The flight plan (if necessary) and meteorological data for outbound flights,
- ATFM slots are received from airlines operations centre or Lisbon’s FMP. Estimated departure estimates and delay codes are also received.

3. Communicates data to the ramp partners:

- The Load and Weight & Balance orders to the ramp supervisor,
- Catering requirements to the catering company,
- Catering and passengers data to cockpit and cabin crews,

4. Co-ordinates activities during ground rotation:

- Boarding activities with the passengers handling co-ordinator and decides when the boarding could start (after the end of re-catering, refuelling and cleaning (normal procedures)),
- Fuelling activities (checks fuelling figures with the fuelling company and cockpit crew receive request for a fire truck, request fuel trucks, provides fuelling figures to fuelling company, signs the fuelling order…),
- Catering activities (co-ordinates catering with cabin crew and catering staff…),
- Provides flight plan, Weight & Balance sheet, Load sheet and load figures, catering figures, re-fuelling figures, receives cockpit crews requirements to cockpit crews,
- Provides all co-ordinators and staff with turn around time objectives,

*Note:* The flight co-ordinator knows when the aircraft could be ready and could issue an Estimated Ready Time (ERDT). This time estimate is actually not used by Portway.

5. Co-ordinates the push-back activities and sequence:

- Receives pilot request to push-back, requests push-back tractors from the push-back co-ordinator, manages the push-back of the aircraft and co-ordinates with cockpit crew…,

**Ramp supervisor: manages and supervises ramp activities for a given flight**

- Receives all figures and messages for inbound and outbound flights from the flight co-ordinator and communicates them to ramp staff…,
- Manages and supervises baggage and cargo loading and unloading:
  - Receives the number of baggage,
  - Co-ordinates with the supervisors in charge of arrivals’ and departures’ baggage belts, correlates passengers boarding and baggage loading,
  - Ensures correct unloading and loading of baggage and cargo,
  - Supervises dangerous goods,
  - Ensures that the load has been done following the instructions given by the Load and Weight & Balance orders,
• Signs the load order sheet and passes it to the flight co-ordinator (if there is a difference between the load order and the real load the load sheet must be recalculated by the flight co-ordinator),

Catering supervisor

• Manages resources and staff,
• Co-ordinates catering and re-catering activities with caterer and flight co-ordinator,

Cleaning supervisor

• Manages the cleaning resources and staff,
• Co-ordinates cleaning activities with flight co-ordinator,

Baggage belts supervisor manages the activities around baggage belts

• Manages the loading and the unloading of baggage at baggage belts based on load orders,
• Co-ordinates with ramp supervisor,

6.6.3 Ramp handling for inbound flights

At the departure of the aircraft from outstation Portway receives all inbound flights’ data (MVT message, ticketing message, cargo message, containers position message, passengers transfer message, passengers special requirements message, load message, fuelling message). The daily planning of handling resources is modified if necessary and the required handling resources are allocated to the flight.

The estimated time of landing is read from DAVIS screen. The ramp handling resources are mobilised accordingly and sent to the parking position. The stand and gate number is known through Airport’s DAVIS system or by scanning the TWR frequencies.

The amendments of the stand and gate numbers in very short notice (for 2 to 3 % of the inbound flights) are generally not received by Portway. This could generate disruptions and delays.

The unloading of baggage and cargo starts when the flight co-ordinator gives the clearance for unloading. Baggage belts numbers are known several minutes before unloading. The first baggage must be unloaded 10 minutes after aircraft landing and the last one 20 minutes after. Aircraft cleaning, re-catering and refuelling starts when all passengers left the aircraft.

6.6.4 Ramp handling for outbound flights

The Load and Weight & Balance orders are computed before the check-in and are updated during the check-in. The Weight & Balance sheets are computed at the end of the check-in. When aircraft loading ends, the Weight & Balance sheets are issued and signed by the cockpit crew and the flight co-ordinator and if necessary could be recalculated.

In normal procedure, aircraft refuelling starts when all passengers have left the aircraft. Boarding starts only when refuelling has ended. In other cases, airport fire department must be contacted and a fire truck is sent to supervise the boarding and the fuelling.

The flight co-ordinator closes the flight and send to the outbound station all the departure messages (see section Handling partners / flight co-ordinator).
6.6.5 **Push-back sequence planning and management**

A push-back tractors planning is established for daily operations based on the airlines schedules and the airport stands and gates planning.

6.6.6 **Update of time estimates and data at Portway**

The process of update of time estimates is the following for inbound Lisbon’s flights:

- The scheduled off-block and in-block times are the first received time estimates. They are issued within airlines’ flight plans and available on the DAVIS screen.
- In case of delay, Portway receives a delay message containing an estimated in-block at Lisbon.
- At take-off from outstation, the actual off-block, the actual take-off time at outstation and an estimated in-block time at Lisbon are received by the depart MVT message.
- When the flight is in approach, Portway receives an estimated landing time from DAVIS. At arrival to gate, the arrival MVT message is issued containing the actual landing and in-block times.

The process of update of time estimates is the following for outbound Lisbon’s flights:

- The scheduled off-block and in-block times for the outbound flight are the first received time estimates.
- If the flight is subject to ATFM regulations, the CTOT is received by and an in-block time at destination is computed.
- If the ground rotation is delayed, an estimated off-block time and an in-block time at destination could be issued within a DLA message.
- The flight dispatcher in charge could issue an estimation of the ready time (e.g. an estimation of the all doors closed time). This time estimate is actually not used by Portway.
- At take-off, the departure MVT message is sent to outstation giving the actual off-block time, the actual take-off time and an estimation of the in-block time at destination.
- When the flight arrives at destination, Portway should receive the arrival MVT message (actual landing and in-block time at destination),
6.6.7 **Information sources at Portway**

The main information sources at Portway operations centre are the following:

- **Movement (MVT) and Delay (DLA) messages.** DLA message contains estimated in-block and off-block times. MVT message issues actual times (off-block, take-off, landing and in-block),
- **Fax / Telex facilities.** Allows Portway operators to contact aircraft operators and other Lisbon’s partners,
- **Telephone facilities.** Allows Portway operators to contact other Lisbon’s partners,
- **DAVIS screen.** Allows Portway to receive stand and gate planning and allocation,
- **Radio facilities.** Allow Portway operators to contact other Portway operators and other Lisbon’s partners,

6.6.8 **Portway’s information systems**

Portway doesn’t use a specific information system yet.

The following data mainly come through SITA or e-mail:

- STD/STA: scheduled off-block time for outbound flights / scheduled in-block time for inbound flight,
- ETD/ETA: estimated off-block time for outbound flights / estimated in-block time for inbound flights,
- ATD/ATA: actual off-block time / actual in-block time,
- Departure and destination airports,
- ATFM slot for outbound and inbound flights,
- Aircraft registration,

6.6.9 **Information flows between Portway and other partners**

**Between Portway and Airport Operations:**

- Portway receives from the airport the following data:
  - Daily airport slots programme
  - Airport resources allocation (stand and gate for inbound and outbound flights, check-in banks for outbound flights, baggage belts for inbound flights),
  - Time estimates for inbound flights using the DAVIS system,

- Portway sends to the airport the following data:
  - Actual in block-times, actual off-block time by MVT and SITA messages,

- Portway sends to the airlines the following data:
  - Messages for outbound Lisbon’s flights (MVT messages for outbound flights, Cargo messages, fuel messages, containers position messages, load messages, delay messages in case of delays),
  - Messages for inbound Lisbon’s flights (time estimates (ETA at destination), MVT messages (AIBT, AOBT), Operations reports),
  - The co-ordination between Portway and the airline is shared during day of operations between airline’s flights co-ordinator and Portway’s flight co-ordinator,
Between Portway and other handlers

- The co-ordination of the handling activities is done between flight co-ordinators. They share with Load and Weight and Balance sheets, check-in and boarding data, transit baggage and connecting passengers.

Between Portway and the TWR:

There is no direct communication between Portway and Lisbon’s FMP, the CFMU and the ATC system.

6.6.10 Time estimates terminology as used by Portway

The following time estimates terminology is used by Portway:

- STD : scheduled off-block time,
- STA : scheduled in-block time,
- ETA (received from airlines) : estimated landing time,
- ATA (sent by MVT message) : actual in-block time,
- ATD (sent by MVT message) : actual off-block time,
- ETD (sent by MVT message) : estimated take-off time (ATD+5 minutes),
- The ERT (Estimated Ready Time) is known by the flight co-ordinator but actually it is not used or issued by Portway.

6.7 LISBON’S TWR

Lisbon’s Control Tower manages aircraft operations on the ground and within the airspace around Lisbon’s airport. TWR controllers manage the ground MVT of aircraft around the airport and ensure appropriate spacing between aircrafts taking-off and landing. They issue a variety of instructions to pilots on how to enter into a pattern for landing or on how to depart the airport for their destination. Lisbon’s TWR main positions are the following:

- **Ground control, push-back and taxi clearances:**
  - gives the clearance to start-up and establishes the departure sequence in case of congestion at the airport;
  - guides an aircraft between the parking point and the holding point for outbound flights and from runway exit point to apron entry point for inbound flights. The ground control establishes the departure sequence based on the clearance given by the clearance controller (first to call, first to taxi);
- **Local or Aerodrome control:** aerodrome control manages the departures and the arrivals over Lisbon’s airport. They deliver to pilot the take-off and landing clearances and establishes the last departure sequence based on the traffic at the holding point.

6.7.1 Ground control and push-back / taxi clearances

The clearance position, gives the clearance to start-up, the route clearance (SID: Standard Instrument Departure) and establishes the departure sequence in case of congestion on airport taxiways and apron.

The clearance controller receives the flight plan between 30 minutes before flight’s departure from ATC System (LISATM). The call for start-up is generally received between 10 and 15 minutes prior to ETD (scheduled or the estimated off-block time (if the flight is not regulated)) or the CTOT (if the flight is regulated).
During normal operations, the first aircraft to call is the first to start-up. In case of congestion, the start-up sequence is established taking into account the start-up call time (first to call first to start-up) and the ATFM slot time (the most urgent ATFM slot is to start-up).

CTOT from pilot is compared it with the CTOT indicated on the flight display. If there is any difference, the clearance controller co-ordinates with Lisbon's FMP and takes into account the ATFM slot given by Lisbon's FMP.

If the start-up call is too late to comply with the CTOT, the clearance controller will ask the pilot to request a new CTOT through his airline or the handling agent or in co-operation with TWR through FMP.

The ground controller establishes the push-back and the departure sequence taking into account the following parameters:

- The start-up sequence as established,
- The time of the call for push-back,
- The stand and the gate number of the aircraft…,
- The runways and taxiways in use during day of operation.

6.7.2 Local or aerodrome control

The local controller manages the departures and the arrivals at Lisbon’s airport. For outbound flights, the local controller establishes the final departure sequence, ensures the correct separation between departing and arriving aircrafts, controls the state of aerodrome and delivers the take-off clearance. For inbound flights, aerodrome controller guides the aircraft to landing runway and delivers the landing clearance.

6.7.3 Update of time estimates and data at the TWR

During the departure process Lisbon’s TWR receives few time estimates from Lisbon’s partners. Departure time estimates and ATFM CTOTs are received from the ATC system.

The TWR could issue several time estimates during the Start-up – Take-off process. Those time estimates are actually recorded by the TWR for statistical purposes.
During the arrival process Lisbon’s TWR receives few time estimates from Lisbon’s partners. Arrival time estimates are received from the ATC system. The TWR system issues the actual landing time (ALDT).

### 6.7.4 Information sources at Lisbon’s TWR

The main data sources at Lisbon’s TWR are the following:

- **LISATM system.** Provides the flight strips for inbound and outbound Lisbon’s flights and arrival time estimates for inbound flights,
- **Telephone facilities.** Allows the TWR controllers to communicate with ACC and FMP controllers and aircraft operators and Lisbon’s airport operations,
- **Radio facilities.** Allows the TWR controller to communicate mainly with pilots and with Airport vehicle drivers (follow-me, maintenance, fire…),
- **Approach and surface radar.** Allows the controller to follow aircrafts during approach and ground movement phases.

### 6.7.5 Information flows between Lisbon’s TWR and other partners

**Between TWR and airport operations:**

- The TWR receives from airport operations the following data through an automated link:
  - Stand and gate number
  - Modifications of stand and gate number on short and very short term
Between the TWR and the FMP:

- The ready messages (REA) are sent by the FMP to the CFMU on the request of Lisbon’s TWR,
- Lisbon TWR has a CFMU terminal (RCA) and can send a REA,
- Lisbon’s FMP could give ATFM slot information to the TWR for a given flight on the request of Lisbon’s TWR,

Between the TWR and ACC:

- Lisbon TWR communicates during day of operation the required runways configurations,
- Lisbon TWR co-ordinates every Departure with APP sector (ACC),
- Lisbon TWR co-ordinates with ACC in case of disruptions in order to increase the arrival separation,
- Lisbon TWR contacts ACC (departure or approach) when a jet takes off behind a small aircraft, in order to know when to release the jet.

6.8 Air Navigation systems: The LISATM system

ATC system is the Portuguese flight plan processing system. It controls and takes into account the aircraft and the flight plan status during the Approach, the En-Route phases. ATC system updates departure and arrival time estimates, dispatches data to control centres, receives data from approach radar, receives and sends data from and to the CFMU …

Note: The TWR domain and processes (clearance, ground control and push-back/taxi clearance, local or aerodrome control) and the flight plan’s status at the TWR are not taken into account by the ATC system.

6.8.1 Information flows between the Air Navigation system and other partners

Between ATC and the airport information systems (UFIS)

The ATC system sends data to airport systems. The main messages sent to UFIS by ATC are summarised in the table below.

<table>
<thead>
<tr>
<th>Messages from ATC to UFIS</th>
<th>Data and time estimates contained in the messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flight plan creation:</td>
<td>1. Callsign, 2. Origin and destination airport, 3. Aircraft registration and type,</td>
</tr>
<tr>
<td>The first message sent by ATC to UFIS is the flight plan creation message. This message</td>
<td>4. ETD (Estimated Off-block Time), 5. IOBT (Initial Off-Block Time), 6. ETA</td>
</tr>
<tr>
<td>indicates that the flight plan has been created (with origin or destination to ATC region)</td>
<td>(Estimated Landing Time),</td>
</tr>
<tr>
<td>This message is also used to:</td>
<td></td>
</tr>
<tr>
<td>- Modify of the ETD (Estimated Off-block Time),</td>
<td></td>
</tr>
<tr>
<td>- Modify in the aircraft type before the departure,</td>
<td></td>
</tr>
<tr>
<td>CFMU slot allocation, modification or cancellation :</td>
<td>1. Callsign, 2. Origin and destination airport, 3. Aircraft registration and type,</td>
</tr>
<tr>
<td>This message is sent to UFIS when the slot is allocated, modified or cancelled (only for</td>
<td>4. ETD (Estimated Off-block Time), 5. CTOT, 6. IOBT (Initial Off-Block Time),</td>
</tr>
<tr>
<td>outbound Lisbon’s flights), ATC receives the ATFM and the slot messages from the CFMU.</td>
<td></td>
</tr>
<tr>
<td>Arrival estimates :</td>
<td>1. Callsign, 2. Origin and destination airport, 3. Aircraft registration and type,</td>
</tr>
<tr>
<td>This message is sent when the first reliable ETA (Estimated Landing Time) is known</td>
<td>4. ETA (Estimated Landing Time),</td>
</tr>
<tr>
<td>(inbound or outbound flights about to enter ATC region). The ETA will be updated when</td>
<td></td>
</tr>
<tr>
<td>there is a difference of more than 5 minutes from the last ETA sent.</td>
<td></td>
</tr>
<tr>
<td>Flight activation for all flights departing from a ATC airport :</td>
<td>1. Callsign, 2. Origin and destination airport,</td>
</tr>
<tr>
<td>This message is sent to UFIS when the departure flight is activated (see</td>
<td></td>
</tr>
</tbody>
</table>
section “Flight Plan Activation”).

### Modification of the FPL:
This message is sent to UFIS if the origin airport of the flight is modified.

- 1. Callsign,
- 2. Origin and destination airport,
- 3. Aircraft registration and type,
- 4. ETD (Estimated Off-block Time),
- 5. CTOT,
- 6. IOBT,
- 7. 1st Point of Route,

### Arrival messages:
The arrival message is sent when the aircraft passes through the last fix point of the route (e.g. the aircraft is in final approach). In that case an update of the ETA (Estimated Landing Time) is sent to UFIS.

- 1. Callsign,
- 2. Origin and destination airport,
- 3. Aircraft registration and type,
- 4. ETD (Estimated Off-block Time),
- 5. CTOT,

### FPL cancellation:
Indicates that the flight plan has been cancelled.

- 1. Callsign,
- 2. Origin and destination airport,

---

**Table 19: The main ATC messages sent to UFIS**

<table>
<thead>
<tr>
<th><strong>Between ATC and the TWR</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Flight strip printed for outbound flights 30 minutes before EOBT</td>
</tr>
<tr>
<td>- Flight strip printed for inbound flights 30 minutes before Estimated Landing given by ATC</td>
</tr>
</tbody>
</table>

**Between ATC and the CFMU:**

- The ATC system sends the activation messages to the TACT/CASA system (CFMU)
- The TACT/CASA system sends to the ATC system the ATFM and Slot messages for the departing flights from Portuguese sector

**6.8.2 Time estimates terminology as used by the CFMU**

- EOBT: Estimated Off-Block Time,
- IOBT: Initial Off-Block Time,
- E/CTOT: Estimated/Calculated Take-off Time
1 PHASED PARTNERS CDM TARGETS

With the aggressive growth forecasted in the aviation industry in the forthcoming years and the recent enhancements to the ATC en-route network such as RVSM, airports will continue to be the restricting bottleneck to the overall ATM system, with delays (see graph below) continuing to spiral unless radical enhancements are achieved. This meeting was seen as the first and important step towards enhancing the efficiency and infrastructure utilising Airport CDM at Lisbon Airport.
2 GENERIC AIRPORT CDM CONCEPTS

2.1 CDM as a team

Successful performance often involves interaction amongst several individuals who must work as a team. A critical feature of teams is that individuals must co-ordinate their decisions and activities by sharing information and resources to attain shared goals. Clearly, efforts to improve team performance must focus attention on the performance of individuals.

However, individuals are depending on other team members to provide information and for co-ordination of activities. Communication, team orientation, team leadership, monitoring, feedback, backup and co-ordination are critical CDM components.

Today: “Individual Company View”

- Individual optimisation, often not considering the effect on other stakeholders
- Little or no cross-organisational communication with respect to decisions with cross-organisational impact

Non-optimal Result

Tomorrow: “Extended Enterprise View”

- All companies aware of cross organisational interfaces
- All companies balancing their economic targets in an integrated way
- Interfacing with other partners (e.g. handlers, AOC, etc.
- Cross-organisational teams and decision making
- Cross-organisational key performance indicators

Figure 12: Airport partners – Extended enterprise view

Today common objectives are often specified between two airport partners through existing Service Level Agreement(s) (SLAs), for instance between airline(s) and handler(s) regarding turn-round operations or provision of information and messages between airline(s) and the CFMU. CDM specifies collaborative procedures between three or more partners in order to obtain a better efficiency in the current management of the resources.
2.2 Common objectives

2.2.1 On local airport

CDM requires airport partners to have positive attitudes towards each other (team behaviour), to receive adequate direction and support to accomplish common goals, to understand other airport partners' tasks with whom they interact and to share good and bad experiences.

Common objectives will help partners to co-ordinate their activities by:

• Sharing experience
• Monitoring the co-ordination
• Synchronising operations
• Communicating and providing feedback and backup assistance when needed

The difficult challenge is to move from individual partners with specific role assignments and specific tasks to a team where interaction, co-ordination and collaborative procedures and decisions are required to achieve common goals and outcomes.

Throughout experience gathered, the following CDM principles must be respected:

• The sharing of new information or improved quality of service must be paid back with quantifiable benefits for the originator;
• As a corollary, incentives for sharing new information or improving quality of service shall be found in order to eliminate penalties and to give rewards to entities that contribute to a better situation,
• The responsibility of the information belongs to the person best placed to execute the task,
• The partner who does not participate to the CDM implementations will be treated like today.

Implementing CDM is a continuous improvement and results (amongst other considerations) from a sound analysis of airport operations and expected benefits assessment. This explains why CDM projects need to be included in the airport organisation and structures, where resources and budgets already exist.
2.2.2 Regional CDM Concept

While local CDM addresses collaboration between all partners within a single airport, regional CDM concept connects several local CDM-Airports with en-route CDM processes through the CFMU.

Consistent, collaborative airport data and CFMU data will be linked and shared with the new Air Traffic Flow Management (ATFM) messages to greatly enhance traffic predictability and global efficiency, by developing a

“Network Real-Time Monitoring System”

Therefore, CDM has not only local, but also regional and European-wide applications in all phases of the gate-to-gate concept, from pre-flight planning to “on-blocks” at the arrival stand.

Thus a common and shared view about CDM implementation objectives at local CDM-Airports is required first to contribute to a European-wide vision in order to bring huge benefits for participants.
### 2.2.3 Generic implementation

<table>
<thead>
<tr>
<th>Strategic Objective</th>
<th>Performance Driver (HOW)</th>
<th>CDM Link (THROUGH)</th>
<th>Performance Measurement (WHAT)</th>
<th>CDM Project</th>
</tr>
</thead>
</table>
| Optimise Use Of Available Capacity | • Optimise Resources Information  
• Fill Gap of Information  
• SLA (Sharing DATA)  
  ➢ Public Data  
  ➢ Sharing Data Rules (automation, accuracy...) | • Information System  
  ➢ Airport Data Base  
  ➢ User Profile Driven HMI | • Shared Data Evolution (FPL, Movement Messages, Airport, CFMU, Meteo ...)  
  ➢ new data : TOBT, TSAT, TXIT, TXOT, TTOT | L E V E L 1 |
| Improve Punctuality | • Trigger Decisions  
• Optmise Turn-Around Process  
• Improve Arrival Predictability  
• Improve Departure Predictability | • Milestones Approach  
  ➢ Optimise DATA Quality (Accuracy, Predictability...)  
  ➢ Use of Real Time Data  
  ➢ Constraints Consideration | • Landing -30’, Landing, In Block,  
  • Off-Block -30’, TSAT -20’, Off-Block, Take-off ... (extract) | L E V E L 2 |
| Increase airport efficiency | • Collaborative Procedures | • Pre-Arrival Sequence  
• Pre-Departure Sequence  
• DPI, FUM Messages  
• Airline Priority  
• Recovery From Disruption  
• Airline S&G Preference | • ETIF, TXIT, TIBT  
• TLDT  
• TOBT, TSAT-20’, TSAT  
• TXOT, TTOT  
• Delay / Priority Status  
• Shifting / Swapping Slot  
• Satisfactory Rate | L E V E L 3 |

Figure 14: CDM common objectives

### 2.3 Milestones Approach

The Milestones Approach is one of the main enablers to achieve common goals and outcomes. It will lead to manage the continuous improvement of CDM information sharing events, data quality and control rules.

#### 2.3.1 Basic principles

- **Milestone**: A critical event during the progress of a flight. Successfully completed milestones will trigger decision making processes for downstream events and influence both the future progress of the flight and the accuracy with which the progress can be predicted.

- **Decision time window**: The main requirement is the need for stability after a decision has been taken. For instance the airlines prefer not to have changes to the stand allocation in the last thirty minutes before the in-block time.
2.3.2 Quality of information

- **Accuracy**: the quality of information makes partners confident in the data and enables them to make right decisions. A funnel rule defines the expected accuracy amongst the milestones: more accurate data is needed as the event becomes imminent.

- **Data**: The data linked to events show, more than the status of a process, the result of a decision or the confirmation of estimation. This concept defines clearly the owner of a data and the responsibility of each user.

- **Monitoring**: The events and their related data allow a monitoring and a control of the progress of the turn-round process. The milestones allow the results for timeliness, accuracy, reliability and predictability of the data to be checked. On any inconsistency an alarm will be raised. When an event occurs it is time to set or to update the related data and to raise alarms in case of disruptions. A post-analysis shall determine when a process turned out unsuccessful, will point the reason and will allow a solution to be proposed.

- **Post Data Analysis**: Providing information and better quality induces costs that should be balanced by higher benefits. Giving access to information of expected quality would benefit to the addressee and should directly be reflected through quantitative measurable improvement for the entity providing the information (return on investments). Consequently, in order to quantify the results it is important to obtain an agreement on KPIs and the use of recorded data.

The milestones should help to identify potential deviation plans, trigger re-planning and allow collaborative decisions to be made. A post-analysis can evaluate quantifiable benefits amongst the milestones for each partner who shares CDM information and improves his quality of service.

2.4 Description of Milestones

A list of significant milestones (see Table 3) have been identified associated with arrival and departure flights in order to:

![Figure 15: Main milestones](image-url)
• Increase the awareness of essential information to users.
• Define events and triggers for associated information along with their accuracy.
• Provide the basis for monitoring the accuracy of data.
• Create a framework for airport users decision making based on a sliding horizon of 30 minutes.
• Provide the framework for collaborative procedures and decisions.

Once quality (accuracy and timeliness) is attained, aircraft operator benefits will be obtained through a reduction of late stand / gate changes, implementation of new procedures (pre-departure management, CFMU slot adaptation, etc.).

The quality of all estimated data can be improved. The milestones control the expected data accuracy and use real time data shared between the airport partners before several predefined events for both the arriving and departing flights.

Note: The list of defined milestones is not exhaustive and may not necessary apply to every situation. Other milestones such as de-icing may need to be considered in the turn-round process.

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>MILESTONE</th>
<th>TIME REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Flight plan submission</td>
<td>3 hours before EOBT</td>
</tr>
<tr>
<td>2</td>
<td>CFMU slot allocation</td>
<td>2 hours before EOBT</td>
</tr>
<tr>
<td>3</td>
<td>Take off from outstation</td>
<td>ATOT from outstation</td>
</tr>
<tr>
<td>4</td>
<td>FIR entry</td>
<td>Varies according to airport</td>
</tr>
<tr>
<td>5</td>
<td>Final approach</td>
<td>Varies according to airport</td>
</tr>
<tr>
<td>6</td>
<td>Landing</td>
<td>ALDT</td>
</tr>
<tr>
<td>7</td>
<td>In-block</td>
<td>AIBT</td>
</tr>
<tr>
<td>8</td>
<td>Ground handling starts</td>
<td>AGHT</td>
</tr>
<tr>
<td>9</td>
<td>Final update of TOBT</td>
<td>Varies according to airport</td>
</tr>
<tr>
<td>10</td>
<td>ATC issues TSAT</td>
<td>Varies according to airport</td>
</tr>
<tr>
<td>11</td>
<td>Boarding starts</td>
<td>Varies according to airport</td>
</tr>
<tr>
<td>12</td>
<td>Aircraft ready</td>
<td>ARDT</td>
</tr>
<tr>
<td>13</td>
<td>Start up request</td>
<td>ASRT</td>
</tr>
<tr>
<td>14</td>
<td>Start up approved</td>
<td>ASAT</td>
</tr>
<tr>
<td>15</td>
<td>Off-block</td>
<td>AOBT</td>
</tr>
<tr>
<td>16</td>
<td>Take Off</td>
<td>ATOT</td>
</tr>
</tbody>
</table>

Table 3, List of Milestones

2.5 Key Performance Indicators

2.5.1 Introduction

This chapter defines the objectives and related performance indicators for implementation of CDM processes and supporting applications in airports.

Global target objectives at an airport can be classified under punctuality, capacity, efficiency, resources, environment and safety. In addition to the global objective that is shared by all the partners, specific improvement objectives can be defined for each partner.

A set of performance indicators has been derived from the jointly defined objectives. Achieved improvements shall be measured by comparing the status of the performance indicators "before and after" the CDM implementations.
2.5.2 Airport

The objective of the airport operators is to maximise throughput and efficiency whilst complying with their operational plan. The major impacts of delays on airport operators are mainly the loss of image/reputation and a sub-optimum usage of airport resources (e.g.: manpower, equipment) and infrastructure (e.g.: stands, gates). On the other hand, both departure and arrival punctuality are the foundation for efficient operations, leading to a possible reduction of delay or infrastructure investment.

### KPI - Airport

#### Benefits and Performance Indicators

<table>
<thead>
<tr>
<th>PERFORMANCE INDICATOR</th>
<th>DEFINITION</th>
</tr>
</thead>
</table>
| **Improve Punctuality** | • Measure occupancy duration AOBT - AIBT  
| - Evaluate Turn around time | • Measure estimates occupancy in /out block EIBT/EOBT and EIBT/ESDT |
| | • Measure the number of changes in the S&G allocation |
| - Decrease S&G changes | • Measure and compare period between EOBT-EIBT and ESDT-EIBT |
| - Evaluate Security Check-in Period | • Measure ESCP (Start check-in time and End check-in time)  
| | • Compare ESCP and ASCP |
| - Passengers Information | • Change ETD information by TOBT information (no ATFM delay)  
| | • Give ESCP (Start check-in time and End check-in time) information |
| **Optimise use of Available Capacity (S&G, Checking pax and bax)** | • Count flights request to the TWR with earlier off block time (for waiting bay or taxi way)  
| | • Count flights with earlier off block time (accepted by the TWR) |
| | • Count number of ESCP end after the start boarding time |
| **Increase Efficiency** | • Measure satisfaction rate: airline, handlers  
| | • Count number of luggage out of allowed volume and/or weight  
| - Adapt S&G allocation to: | • Count number of flight with handbag problem after the boarding  
| - Airline preferences | • Compare the number of containers and the number of destinations  
| - Handlers preferences | **Reduce Environmental Nuisance**  
| | • Reduce noise on ground  
| | • Reduce emission from engines  
| | • Measure taxi-in and taxi-out periods by runways configuration  
| **Improve Safety** | • Measure number of last S&G changes vs. the number of incidents  
| | • Reduce Movements Number (trucks, bus,...) |

Figure 16: Airport’s KPIs
2.5.3 Handlers

The objectives of the ground handlers are to maximise their resource management and maintain service level agreements (including departure punctuality and turn-round times). The best use of available resources partly depends on the quality of arrival and departure estimates.

<table>
<thead>
<tr>
<th>PERFORMANCE INDICATOR</th>
<th>DEFINITION</th>
</tr>
</thead>
</table>
| Improve Punctuality    | • Measure: turn-round period (ETAP)  
|                        | : start and end handling operations (AGHT / ARDT)  
|                        | : difference between TOBT and ARDT |
| Improve Turn-round predictability | • Check real TA against schedule TA (ATAP and STAP)  
|                        | • Measure: gaps between STAP and TTAP (=AIBT to ARDT).  
|                        | : number of Boarding alarms (Milestones approach)  
|                        | : number of TOBT updates between EOBT -30' and AOBT |
| Optimize Turn Around   | • Measure delay : between EIBT and AIBT at ELDT -30'  
|                        | : due to late equipment (e.g. buses, push-back tractors, steps etc)  
|                        | : due to late personnel |
| Reduce delays due to late equipment and personnel. | |
| Optimize use of Resources (Refuelling, Push-back, De-icing) | • Measure impact on TOBT due to:  
|                        | : fuelling, push-back, de-icing  
|                        | : unloading baggage of missed passengers  
|                        | : too many handbags on board  
|                        | : sorting of transit baggage |
| Optimise data quality provided to services | |
| Increase Efficiency    | • Measure: respect of the prioritisation given by airline  
|                        | : number of later flights due to later passengers |
| Airline preferences, SLA.. | |
| Improve Safety         | • Measure number of flights : without passengers numbers (bus), without slot update (staff),  
|                        | : Measure request time for fuelling, push back, de-icing against EOBT -30' |
| Reduce movements number | |

Figure 17: Handlers’ KPIs
2.5.4 Airlines

The global objective of the airlines is to meet their planned schedule. The major impact of delays on airlines is additional costs (e.g., extra fuel, missed connections and subsequent knock-on effects incurred).

KPI - Airlines
Benefits and Performance Indicators

<table>
<thead>
<tr>
<th>PERFORMANCE INDICATOR</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve Punctuality</td>
<td>• Measure Estimated Off Block Time (EOBT)</td>
</tr>
<tr>
<td></td>
<td>• Measure Target Off Block Time (TOBT)</td>
</tr>
<tr>
<td></td>
<td>• Measure Period between the Start Boarding Time and TOBT</td>
</tr>
<tr>
<td></td>
<td>• Measure Pilot Startup Request Time (ASRT)</td>
</tr>
<tr>
<td>Establish predeparture sequence</td>
<td>• Measure Pilot reactivity: comparison with TOBT and ASRT, ASAT and AOBT</td>
</tr>
<tr>
<td></td>
<td>• Measure number of TOBT updates between EOBT and AOBT</td>
</tr>
<tr>
<td></td>
<td>• Measure Pilot TOBT accuracy: comparison with TOBT and AOBT between EOBT and AOBT</td>
</tr>
<tr>
<td>Optimize departure sequence</td>
<td>• Measure period between all doors closed and TOBT</td>
</tr>
<tr>
<td></td>
<td>• Measure contributing delays, based on IATA standard delay categories</td>
</tr>
<tr>
<td></td>
<td>• Establish the link (REG) between arrival and departure leg</td>
</tr>
<tr>
<td>Optimize Turn Around</td>
<td>• Measure the comparison of aircraft swapping at the hub arrival before and after the use of the priority status</td>
</tr>
<tr>
<td></td>
<td>• Measure the delay reduction between AIBT and ALDT for each level of priority</td>
</tr>
<tr>
<td>Total Flight Delay</td>
<td>• Measure number of passengers by destination at E D-T30' and A D-T30'</td>
</tr>
<tr>
<td></td>
<td>• Measure number of changes in the next destination between E D-T30' and A D-T30'</td>
</tr>
<tr>
<td>Optimise use of Resources (Bus, S&amp;G, slots airport and ATFM)</td>
<td>• Measure the Turn Around Period ASRTAIBT and the estimated EOBT EIBT at ELDT-30'</td>
</tr>
<tr>
<td></td>
<td>• Measure number of passengers by destination at ELDT and AIBT</td>
</tr>
<tr>
<td></td>
<td>• Measure number of TOBT updates by flight between EOBT and AOBT</td>
</tr>
<tr>
<td></td>
<td>• Measure number of flights out of the slot window at TOBT</td>
</tr>
<tr>
<td>Increase Efficiency</td>
<td>• Measure the Turn Around Period ASRTAIBT and the estimated EOBT EIBT at ELDT-30'</td>
</tr>
<tr>
<td></td>
<td>• Measure the difference between inbound flight delay and outbound flight delay</td>
</tr>
</tbody>
</table>

Figure 18: Airlines’ KPIs
2.5.5 **Tower**

The global objective of air traffic service providers at airports is to ensure safety whilst making the best use of the available infrastructure (i.e.: runways and taxiways).

---

**Figure 19: Tower’s KPIs**

<table>
<thead>
<tr>
<th>PERFORMANCE INDICATOR</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Improve Punctuality</td>
<td>• Measure Estimated first Clearance Delivery Time (SLIP or ESAT)</td>
</tr>
<tr>
<td></td>
<td>• Measure Estimated Taxi Out Period per flight (EXOT:period between block and holding point)</td>
</tr>
<tr>
<td></td>
<td>• Measure Estimated and Target Take-Off Time (ETOT / TTOT)</td>
</tr>
<tr>
<td>• Establish predeparture sequence</td>
<td>• Comparison with ESAT and ASAT, EXOT and AXOT, TTOT and ATOT</td>
</tr>
<tr>
<td>• Optimize departure sequence</td>
<td>• Measure the Reactivity between Request and Delivery clearance (EDT and ASRT)</td>
</tr>
<tr>
<td>• Establish arrival sequence</td>
<td>• Measure Estimated Holding or Vectoring time</td>
</tr>
<tr>
<td></td>
<td>• Measure Estimated Landing Time (ELDT)</td>
</tr>
<tr>
<td></td>
<td>• Measure Estimated Taxi In Period per flight (EXIT)</td>
</tr>
<tr>
<td></td>
<td>• Measure Estimated In Block Time (EIBT)</td>
</tr>
<tr>
<td>• Optimize arrival sequence</td>
<td>• Comparison with ELDT and ALDT, EXIP and AXIP, EIBT and AIBT</td>
</tr>
</tbody>
</table>

- **Optimise use of Resources (runways, taxi ways, slots airport ATFM)**
  - • Optimize runway throughput | • Measure movements number (landing and take-off) per hour vs. declared capacity |
  - • Slot Compliance | • Measurement average taxi in and out period, min and max |
  - | • Changes number in the sequence after TOB20' |
  - • Increase Efficiency | • Measure number of refused TOBT (not compliant with CTOT) |
  - | • Percentage of missed slots (departing out of the CTOT window) |

- **Impact on Safety**
  - • Earlier recovery after disruption | • Measure time normal capacity recovery and cancelled regulation (cancel slots) |
  - | • Measure time between cancelled regulation and start or normal operations |
  - • Minimize number of a/c moving at the same time | • Measure the optimised taxi period. (Less a/c taxiing at the same time greater is the safety on ground) |
  - | • Comparison with capacity change and numbers of incidents |

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2.6 ARRIVAL information

2.6.1 **Current situation**

- **ELDT** – Radar information plus default flying times
- **ALDT** – Radar
- **EIBT** – ELDT + variable taxi time
- **AIBT** – Manual input
- **FIDS/WEBSITE/SMS** – Information from UFIS Information already optimised


2.6.2 **Benefits to Partners**

More precise information on estimated landing time will lead to

- Better S&G planning
- Optimised handler staff planning

2.7 **TOBT**

2.7.1 **Current situation**

TOBT does not exist in conventional airport systems

2.7.2 **Future situation**

**TOBT.** A Target Off-Block Time should be used to provide all the airport partners with a reliable, accurate and timely assessment of the ready-to-move time. TOBT is a CDM defined data and has to be created in an airport database as well as the appropriate processes have to be agreed.

- **Definition:** TOBT is the target off-block time for the aircraft to be ready, all doors closed, boarding bridge removed (contact stand), push back truck present, ready to taxi at reception of the ATC clearance.
- **Issue and updates:** TOBT should be issued either by the aircraft operator or by the handler at least twenty five* minutes before EOBT. Several updates should be possible before TOBT is frozen at [TSAT* – 20* min.].
  
  * TSAT (Target start-up approval time) should correspond in phase 1 of WP2 to Start boarding

2.7.3 **Proposed improvement**

More precise knowledge of the time when an aircraft goes off-block will improve

- the efficiency of stand and gate management
- the optimisation of taxi ways and runway use
- Departure punctuality

2.7.4 **Trial methodology**

See KPI's

2.7.5 **Benefits to Partners**

- No short term notice of last minute S&G changes
- Avoidance of a/c waiting until stand gets free
2.8 Pre-departure sequencing

2.8.1 Current situation

- Departure sequencing is done on the first called first served basis

2.8.2 Proposed improvement

- Pre-departure sequencing should be calculated with various parameters based on TOBT and/or CTOT using variable taxi times

2.8.3 Trial methodology

See KPI's

2.8.4 Benefits to Partners

The benefit of establishing a pre-departure sequence at i.e. the moment of boarding (later start-up delivery) would show in an increased CTOT compliance thus meet the partners main objective:

- Depart as close as possible to scheduled departure time.

2.9 FUM & DPI Message exchange

2.9.1 Current situation

The CFMU is not fed by data available at the airports.

2.9.2 Proposed improvement

Including the CFMU in the decision process of the aircraft rotation the CFMU will deliver (share) the information available through a message called FUM, Flight Update Message. This message contains relevant information of a flight like CTOT information at out station departure information and online landing estimates based on radar information available at the CFMU. In exchange CDM airports deliver DPI, Departure Planning Information, allowing the CFMU to update the global ATFM situation and thus perform an increased airspace distribution.

2.9.3 Trial methodology

This chapter shall be developed in WP3.

2.9.4 Benefits to Partners

As a feedback on DPI messages the CFMU will be able to proceed the mechanisms like slot shifting and/or slot swapping.
2.10 Responsibility of the CDM data issue and management

For each data introduced or improved in the Milestones Approach, responsibilities for issue and management have been defined.

The partners responsible for the data issue and management shall be chosen as follows:

- If applicable, the responsibility for the data issue and management shall be preferably given to the partner that performs the related activity;
- The partner responsible for the data issue and management shall hold the most accurate and the timeliest data;
- The partner responsible for the data management shall hold the latest updates of the data;
- Data shall be easily available;
- Automatic data issue and updates shall always be preferred to manual ones in order to guarantee the best level of quality.

The partner responsible for the data issue may be different from the one responsible for the data management.

The partners responsible for the data issue and management shall have to respect the rules for accuracy and timeliness defined in the Milestones Approach.
ANNEX :

1. MILESTONE DESCRIPTION

Flight Plan Submission (Number 1)

Definition
ICAO flight plan submission.

Origin
The ICAO flight plan will be issued by the aircraft operator. All involved units will receive the flight plan, including departure and destination aerodromes.

Timing
Normally this shall take place at least 3 hours before EOBT. In some cases a repetitive flight plan (RPL) has been submitted, covering daily or weekly flights.

Data Quality
The FPL should conform to the airport slot program.

Effect
One aircraft turn-round will normally include an arriving and a departing flight, meaning that it will have two related flight plans.
For co-ordinated airports, the outbound flight will already be known. The flight plan may be used to update certain information such as type of aircraft. For long distance flights, also the ELDT may differ from the airport slot.
For non co-ordinated airports, the flight plan may be used to initiate the outbound flight.
The flight shall be ready not later than 15 minutes after the planned EOBT. For a delay greater than 15 minutes a DLA message will be required.

CFMU Slot Allocation (Number 2)

Definition
SIT1 is the CFMU Slot (CTOT) Issue Time.

Origin
The CTOT is issued by the CFMU and is sent to relevant ATS units as well as the departure aerodrome.

Timing
If the flight is regulated, a CTOT is issued at EOBT–2h.
If the flight is not regulated, the flight will respect EOBT+15 minutes.

Certain time parameters limit the possibility for the CFMU to revise the CTOT:

- The TRS (Time to Remove from the Sequence) prevents a change to a later CTOT when the flight is already in the departure sequence.
- The TIS (Time to Insert into the Sequence) prevents an improvement into an already organised departure sequence.
Data Quality:
Not applicable

Effect
For inbound flights, ELDT shall be updated based on information provided by the CFMU, taking into account the actual progress of the flight. For outbound flights, in order to adhere to the CTOT, regulated flights shall take off at CTOT –5/+10 minutes. A CTOT has an effect on the TOBT as well as on the Departure Sequence.

Take off from outstation (Number 3)

Definition
The ATOT from the outstation (ADEP).

Origin
The outstation will provide the ATOT to the CFMU and Aircraft Operator.

Timing
The data shall be available as soon as possible after occurrence of the milestone.

Data Quality
The accuracy of ATOT should be +/- 1 minute.

Effect
The destination airport (ADES) will receive the ATOT from either the CFMU or via the aircraft operator/handling agent.
When the ATOT from the outstation is known, an accurate ELDT can be calculated by using the Estimated Elapsed Time on the FPL.
On reception of the ELDT the aircraft operator will review the EOBT for the outbound flight and if required send a DLA message.
In the future it is foreseen that the CFMU will monitor the progress of the flight using the ETFMS and send to the CDM airport a Flight Update Message that constantly tracks a flights progress after Take off.

FIR Entry (Number 4)

Definition
The flight enters the FIR (Flight Information Region) of the destination airport.

Origin
This information will normally be available from the Area Control Centre (ACC) or Approach Control Unit that is associated with an airport. The radar system will be able to detect a flight based upon the assigned SSR code and identify when the flight crosses a defined FIR boundary.

Timing
Dependant upon the position of the airport in relation to the FIR boundary.

Data Quality
The accuracy will depend on the ATC radar system.

Effect
The accuracy of ELDT is particularly important at this stage since downstream decisions are taken, such as stand / gate / aircraft changes, preparation of arrival sequence, preparation of ground handling operations, decisions for connecting passengers. Uncertainty and ELDT non-accuracy at this stage significantly increase risks for bad and last minute decisions and internal disruptions.

The objective to decrease the number of stand and gate changes in the last 30’ requires high accuracy regarding departure and arrival times. Therefore, taking into account the taxi-in time (TXIT), any change to a stand or gate should be avoided after ELDT-30’.

An update of TOBT for the related departing flight should take place following this milestone. Decisions such as the turn-round period, connecting passengers etc should be taken and be as stable as possible at this event.

An estimated in-block time (EIBT) can be computed using the ELDT and the estimated taxi-in time

**Final Approach (Number 5)**

**Definition**
The flight enters the Final Approach phase at the destination airport.

**Origin**
This information will normally be available from ATC. The radar system will detect a flight based upon the assigned SSR code and identify when the flight passes either a defined range/position or leaves an assigned altitude.

**Timing**
Dependent upon local parameters that are defined by ATC

**Data Quality**
The accuracy will depend on the ATC radar system.

**Effect**
The accuracy of ELDT can be further updated. When a flight reaches this stage it is usually between 2 and 10 minutes from landing (depending on the parameter set by ATC). This is often the prompt for many partners to start moving resources connected with the flight, such as positioning a parking marshal and ground handling services.

**Landing (Number 6)**

**Definition**
ALDT – Actual Landing Time. This is the time that an aircraft lands on a runway. (Equivalent to ATC ATA –Actual Time of Arrival = landing, ACARS=ON).

**Origin**
Provided by ATC or from ACARS equipped aircraft

**Timing**
The data shall be available as soon as possible after occurrence of the milestone.

**Data Quality**
Data should be available with an accuracy of +/- 1 minute.

**Effect**
The occurrence of ALDT should trigger an update of downstream estimates: TOBT and TTOT can be updated automatically by the ACISP or by manual input into the ACISP by the aircraft operator/handling agent, calculated on the basis of the defined turn-round period for the departing flight.

The EIBT can be updated according to the ALDT and the estimated Taxi time.

**In block (Number 7)**

**Definition**

**AIBT** - Actual In Block Time. This is the time that an aircraft arrives in blocks. (Equivalent to Airline/Handler ATA –Actual Time of Arrival, ACARS = IN).

**Origin**

ACARS equipped aircraft or automated docking systems or ATC systems (e.g. A-SMGCS) or by manual input.

**Timing**

The data shall be available as soon as possible after occurrence of the milestone.

**Data Quality**

Data should be available with an accuracy of +/- 1 minute.

**Effect**

The occurrence of AIBT should trigger an update of downstream estimates: TOBT can be updated automatically by the ACISP or by manual input into the ACISP by the aircraft operator/handling agent, calculated on the basis of the defined turn-round period for the departing flight.

**Ground handling starts (Number 8)**

**Definition**

The start of Ramp Operations (AGHT).

**Origin**

Aircraft operator / Ground handling will provide the information.

**Timing**

The data shall be available as soon as possible after occurrence of the milestone

**Data Quality**

Data should be available with an accuracy of +/- 1 minute.

**Effect**

The occurrence of AGHT should trigger an update of downstream estimates: TOBT can be updated automatically by the ACISP or by manual input into the ACISP by the aircraft operator/handling agent, calculated on the basis of the defined turn-round period for the departing flight.

**Final update of TOBT (Number 9)**

**Definition**

The time at which the aircraft operator or handling agent gives ATC their most accurate TOBT taking into account the operational situation.
Origin
The aircraft operator / handling agent provides the information.

Timing
The information is provided no later than EOBT – X minutes (X= local CDM agreement).

Data Quality
The accuracy of TOBT should be +/- X minutes (X= local CDM agreement).

Effect
The aim of the TOBT information is to give a fair, timely, accurate and reliable assessment of the off-block time. It is recognised that main benefits of sharing the TOBT are expected in case of disruptions (internal or external). In such cases, the difference between EOBT (shared by ATC, CFMU and Stand / Gate Management) and TOBT may be important.

An accurate TOBT at [EOBT-X'] is a pre-requisite for ATC to establish a push back / pre-departure sequence.

Emphasis is put on the need for the aircraft operator to integrate his own strategy to compute a TOBT related to the flight.

Following the receipt of the TOBT, ATC will calculate and provide the Target Taxi-Out Time (TXOT) based on the predicted traffic load, gate / stand, runway in use, waiting period at the Holding Position etc.

ATC Issues TSAT (Number 10)

Definition
The time ATC issues the Target Start up Approval Time.

Origin
ATC.

Timing
The information is provided X minutes (X= local CDM agreement) after reception of TOBT.

Data Quality
The accuracy of TSAT should be +/- X minutes (X= local CDM agreement).

Effect
The flight is introduced into the pre-departure sequence. The aircraft operator/handling agent, in co-ordination with the aircrew, can manage the turn-round process accordingly.

Boarding starts (Number 11)

Definition
The gate is open for passengers to physically start boarding (independent of whether boarding will take place via an airbridge/pier, aircraft steps or coaching to a stand). This is not to be confused with the time passengers are pre-called to the gate via flight information systems (FIDS) or public address system's normally in advance of actual aircraft boarding.

Origin
Automatically by airport system or manual input by aircraft operator/handling agent.
Timing
The data shall be available as soon as possible after occurrence of the milestone

Data Quality
Data should be available with an accuracy of +/- 1 minute.

Effect
When boarding commences it will give CDM partners a good indication of whether the TOBT/TSAT will be respected.

Aircraft Ready (Number 12)

Definition
The time when all doors are closed, boarding bridge removed, push back vehicle present, ready to taxi immediately upon reception of TWR instructions. (ARDT)

Origin
Provided by the aircraft operator/handling agent

Timing
The data shall be available as soon as possible after occurrence of the milestone

Data Quality
Data should be available with an accuracy of +/- 1 minute.

Effect
ATC can refine the pre-departure sequence. Pilot can request Start up following co-ordination with the handling agent (Dispatcher/Supervisor/Redcap).

Start up request (Number 13)

Definition
The time that Start up is requested (ASRT)

Origin
Pilot

Timing
The data shall be available as soon as possible after occurrence of the milestone

Data Quality
Data should be available with an accuracy of +/- 1 minute.

Effect
ATC will provide the aircraft with a TSAT in order to insert the aircraft in the pre-departure sequence. Provided the aircraft was ready on time (ARDT), it is now up to ATC to assure that a regulated flight can respect its CTOT.

Start up approved (Number 14)

Definition
**ASAT** - Actual Start up Approval Time. This is the time that an aircraft receives its Start up approval.

**Origin**

ATC

**Timing**
The data shall be available as soon as possible after occurrence of the milestone

**Data Quality**
Data should be available with an accuracy of +/- 1 minute.

**Effect**
On receipt of ATC approval to push back, the aircraft will start up and start to taxi.

**Off block (Number 15)**

**Definition**

AOBT – Actual Off Block Time. The time the aircraft pushes back/vacates the parking position (ACARS=OUT)

**Origin**
ACARS equipped aircraft or automated docking systems or ATC systems (e.g. A-SMGCS) or by manual input.

**Timing**
The data shall be available as soon as possible after occurrence of the milestone.

**Data Quality**
Data should be available with an accuracy of +/- 1 minute.

**Effect**
TTOT can be updated considering the TXOT.

**Take off (Number 16)**

**Definition**

ATOT – Actual Take Off Time. This is the time that an aircraft takes off from the runway. (Equivalent to ATC ATD–Actual Time of Departure, ACARS = OFF).

**Origin**
Provided by ATC or from ACARS equipped aircraft

**Timing**
The data shall be available as soon as possible after occurrence of the milestone.

**Data Quality**
Data should be available with an accuracy of +/- 1 minute.

**Effect**
FSA and MVT message are sent
2. MEMORANDUM OF UNDERSTANDING

To be defined in WP3

3. ACRONYMS

ATA : actual landing time,
ATC : air traffic control,
ATD : actual time of departure,
ATFM : air traffic flow management,
AIBT : actual in-block time,
ANM : ATFM notification message,
AIM : ATFM information message,
AIS : airport information service,
AOBT : actual off-block time,
AIBT : actual in-block time,
ATOT : actual take-off time,
ATIS : automatic terminal information service,
ATS : air traffic service,
ARO : airport reporting office,
ART : actual ready time,
ATS : air traffic services,
ACC : area control center,
ART : actual ready time (all doors closed time),
LIS : LISBON,
CDM : collaborative decision making,
CTOT : calculated take-off time,
CFMU : central flow management unit,
CHG : flight plan changement message,
DES : de-suspension message,
DLA : delay message,
EO : estimated airborne message,
EOBT : estimated off-block time,
EIBT : estimated in-block time,
ETA : estimated time of arrival,
ETD : estimated time of departure,
ERR : error message,
ERT : estimated ready time,
FIDS : flight information display system,
FPL : flight plan,
FMP : flow management position,
FLS : flight suspension message,
FTA : flight time arrival
FTD : flight time departure,
FSH : flight shift message,
FCM : flight confirmation message,
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<th>Acronym</th>
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<tr>
<td>FSA</td>
<td>first system activation message,</td>
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<td>IFPS</td>
<td>integrated initial flight plan processing system,</td>
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