





TITAN Turnaround Integration in Trajectory And Network Project Number: 233690		
High Level User Requirements		
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EXECUTIVE SUMMARY

The Turnaround Integration in Trajectory and Network (TITAN) project directly addresses the airport operations focusing on the turnaround process. WP1 identifies the problems, user needs and expectations, set the performance target objectives and propose an operational concept fully in line with ICAO and SESAR concept of operations.

This deliverable presents the high level user's requirements that were identified by analysing stakeholders' needs and feedbacks, collected via personal and phone interviews and a workshop.

The objective of this analysis was to compile the main necessities that the airlines, airport operators, ground handlers and ANSPs are facing related to the turnaround process and to provide a valuable input to the performance framework and the concept of operations.

The findings coming out of the analysis shows that the initial objectives were achieved and the list of the users' requirements are a solid basis for further work in the project.



1. INTRODUCTION

1.1 Purpose

The TITAN project (Turnaround Integration in Trajectory and Network) is aimed at enhancing the predictability, cost efficiency and punctuality of the operations by improving the turnaround process.

In order to develop the enhanced concept of operations of the turnaround process according to the stakeholders' necessities, their requirements were collected through questionnaires, personal interviews and workshops.

This document represents the analysis of the stakeholders' feedback and reports the list of the High Level User Requirements. This deliverable provides input to Task 1.3 dealing with the performance drivers of the project and to Task 1.4 dealing with the TITAN concept and will be also used as a reference for other work packages of the project.

1.2 Intended audience

This document is public and may be distributed freely, both within and outside the TITAN consortium.

1.3 Associated documentation

1. TITAN_WP7_INE_DEL_07_v0.7_workshop1 report
2. TITAN_WP1_SLO_DEL_01_v1.0_Analysis current situation
3. TITAN Description of work, Annex I v0.4;
4. E-OCVM, v3.0, Eurocontrol

1.4 Abbreviations and Acronyms

Abbreviation	Definition
ADIT	Actual De-Icing Time
AIBT	Actual In Block Time
ALDT	Actual Landing Time
ANSP	Air Navigation Service Provider
AOBT	Actual Off-Block Time
ARDT	Actual Ready Time
ASAT	Actual Start-Up Approval Time
ATOT	Actual Take Off Time
AXIT	Actual Taxi-In Time
AXOT	Actual Taxi-Out Time
CTOT	Calculated Take Off Time
ECS	Environmental Control System



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Abbreviation	Definition
EDIT	Estimated De-Icing Time
EEZT	Expected End of De-Icing
EIBT	Estimated In Block Time
ELT	Estimated Landing Time
EOBT	Estimated Off-Block Time
ETA	Estimated Time of Arrival
ETAPP	Estimated Time of Approach
ETOT	Estimated Take Off Time
ETTT	Estimated Turnaround Time
EXIT	Estimated Taxi-In Time
EXOT	Estimated Taxi-Out Time
FLP/ FPL	Flight Plan
FUM	Flight Update Message
LDM	Loading Message
MTT	Minimum Turnaround Time
MVT	Movement message
Pax	Passengers
RFID	Radio Frequency Identification
SOBT	Scheduled Off-Block Time
STD	Scheduled Time of Departure
TITAN	Turnaround Integration in Trajectory And Network
TLDT	Target Landing Time
TOBT	Target Off-Block Time
TSAT	Target Start-Up Approval Time
ULD	Unit Load Device
VTT	Variable Taxi Time
WP	Work Package



2. LIST OF REQUIREMENTS

The table below contains the detailed stakeholder's requirements which have been uniquely identified with the following name convention REQ-Xnnn, where X is a letter and nnn is a 3 digit number:

The code used for the X letter is:

- L used for landside processes related requirements,
- P used for airside processes related requirements,
- I used for general information related requirements,
- CDM used for requirements directly related to CDM information,
- O used for other requirements on the technical side that are out of scope of the current analysis.

Regarding the 3-digit numbers and in order to avoid entire document changes in case of corrections, modifications, split or deletion of any requirement, an increment of 10 has been included in the numbering system (i.e. nnn).


On the top of naming convention, users' requirements have been also phrased under two grammatical constructions:

- "shall be known": this phrasing has been used for all this information required to ACHIEVE some action and related to a particular time event linked to an activity/process;
- "shall be monitored": this phrasing has been used for all information required to PREDICT a future event that is not related to a particular time event, but that could be provided anytime along the linked activity/process.


There are a number of requirements that are not directly coming from the stakeholders' needs, but came to light during the analysis of their answers. They have been included with the purpose of producing a seamless list and are highlighted in the column called 'Note'.

The reader could find further information on how these requirements have been elicited in the following chapters.

Requirement number	Requirement	Note
LANDSIDE RELATED REQUIREMENTS		
REQ-L010	Location of any passenger inside the terminal shall be monitored	
<i>REQUIREMENTS FOR SPECIAL PASSENGERS</i>		
REQ-L020	Disabled passenger assistance process shall be monitored	
REQ-L030	Average time for a disabled passenger to arrive from any point to the airport to any boarding gate shall be known	
REQ-L040	Location of disabled passenger assistance resources shall be known	
REQ-L060	Location of disabled passengers shall be monitored	
REQ-L070	Kind of disabled passenger assistance resource shall be known	
REQ-L080	Number of disabled passenger shall be know	
REQ-L090	UM shall be monitored	
REQ-L100	Average time for an UM to arrive from any point to the	Derived from the analysis


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Requirement number	Requirement	Note
	airport to any boarding gate shall be known	
REQ-L110	Location of UM personnel shall be known	Derived from the analysis
REQ-L120	Location of UM shall be monitored	Derived from the analysis
REQ-L130	Number of UM shall be known on time	Derived from the analysis
REQ-L140	Staff to attend UM shall be known on time	Derived from the analysis
<i>REQUIREMENTS FOR CHECK - IN</i>		
REQ-L150	Check-in status shall be monitored	
REQ-L160	Average time for check-in process shall be known	
REQ-L170	Availability of check-in desks shall be known	
REQ-L180	Number of pax at check-in desks shall be known	
REQ-L190	Actual check-in start time shall be known	
REQ-L200	Actual check-in end time shall be known	
<i>REQUIREMENTS RELATED TO SECURITY PROCESS</i>		
REQ-L210	Security process status shall be monitored	
REQ-L220	Elapsed time between arriving to the security desks and leaving the security desk shall be estimated	Passenger is not willing to leave the security without his/her hand-bag. Consequently the throughput capacity of passenger and hand-bag security needs to be considered as one.
REQ-L230	Passenger security facilities shall be monitored	
REQ-L240	Capacity of the X-ray per pax shall be known	
REQ-L250	Hand-bag security facilities shall be monitored	
REQ-L260	Capacity of the X-ray for bags shall be known	
<i>REQUIREMENTS RELATED TO LATE PASSENGERS</i>		
REQ-L330	Potential missing passengers shall be identified as soon as possible	
REQ-L340	Boarding time of any passenger shall be known	
REQ-L350	Boarding gate of any passenger shall be known	
REQ-L360	Average walking time from any airport location to any boarding gate shall be known	
REQ-L370	Location of any passenger at the airport shall be known	
REQ-L390	Notification shall be received about passenger refused at passport control	
REQ-L400	Notification shall be received if passenger has updated the APIS data (if necessary)	
AIRSIDE RELATED REQUIREMENTS		
REQ-P001	All turnaround activities shall be monitored	
REQ-P002	All turnaround resources shall be monitored	
<i>REQUIREMENTS RELATED TO FUELLING</i>		
REQ-P010	Fuelling activity shall be monitored	Derived from the analysis
REQ-P020	Duration of fuelling activity shall be estimated	
REQ-P030	Availability of fuelling trucks shall be monitored	


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Requirement number	Requirement	Note
REQ-P040	Quantity of fuel in each fuelling truck shall be known	
REQ-P050	Location of fuelling trucks shall be known	
REQ-P060	Duration of fuelling activity shall be known	
REQ-P070	Fuelling end time shall be known	Derived from the analysis
REQ-P080	Fuelling start time shall be known	Derived from the analysis
REQ-P090	Any change related to the fuelling activity shall be known	
REQ-P095	Fuel provider company shall know the location of passenger when affecting safety	
REQ-P096	Fuel provider company shall know whether passengers are in the aircraft	
REQUIREMENTS RELATED TO POWER SUPPLY		
REQ-P100	Power supply method shall be known	
REQ-P110	Power supply process shall be known	
REQ-P120	Duration of power supply shall be estimated	
REQ-P130	End of the power supply process shall be known	
REQ-P140	Start of the power supply process shall be known	
REQUIREMENT RELATED TO SUPERVISION¹		
REQ-P150	Supervision activities shall be monitored	Derived from the analysis
REQ-P160	Start of supervision activities shall be known	Derived from the analysis
REQ-P170	End of supervision activities shall be known	Derived from the analysis
REQUIREMENTS RELATED TO ON BOARD ACTIVITIES		
REQ-P180	On board activities shall be monitored	
REQ-P190	Start of on board activities shall be monitored	Derived from the analysis
REQ-P200	End of on board activities shall be monitored	Derived from the analysis
REQUIREMENTS RELATED TO PASSENGER DISEMBARKING/BOARDING		
REQ-P215	Notification shall be sent out of any change related to the boarding activity	
REQ-P210	Boarding activity shall be monitored	Derived from the analysis
REQ-P220	Location of boarding facilities shall be known	
REQ-P230	Passenger bus shall be monitored	
REQ-P240	Passenger steps shall be monitored	
REQ-P250	Aero bridge shall be monitored	In some airports mobile finger can be removable. Derived from the analysis
REQ-P260	Availability of boarding facilities shall be known	
REQ-P270	Average time for passenger boarding shall be known	
REQ-P280	Number of passengers that can be located in each type of bus shall be known	
REQ-P290	Number of passengers in each departing flight shall be known	
REQ-P300	Start of boarding activity shall be known	
REQ-P310	End of boarding activities shall be known	


¹ Supervision understood as activities related to safety (e.g.: visual checking of tires and wheels)

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Requirement number	Requirement	Note
REQ- P740	Disembarking activity shall be monitored	Derived from the analysis
REQ-P750	Start of disembarking activity shall be known	
REQ-P760	End of disembarking activity shall be known	
REQ-P770	Average time for passenger disembarking shall be known	
REQ-P780	Number of passengers in each arriving flight shall be known	
REQ-P790	Incoming transfer passengers shall be monitored	
REQ-P800	Notification shall be sent out of any change related to the disembarking activity	
REQUIREMENT RELATED TO OTHER ACTIVITIES		
REQ-P320	Sewage water removal shall be monitored	
REQ-P330	Start of sewage water removal activities shall be known	Derived from the analysis
REQ-P340	End of sewage water removal activities shall be known	Derived from the analysis
REQ-P350	Pumping water in the plumbing aircraft system shall be monitored	Derived from the analysis
REQ-P360	Environmental Control System shall be monitored	Derived from the analysis
REQ-P370	Availability of Environmental Control System shall be known	Derived from the analysis
REQ-P380	Loading activity shall be monitored	
REQ-P390	Loading facilities shall be monitored	
REQ-P400	Stock report about ULD in each airport of each stop shall be monitored	
REQ-P410	Location of ULD in each airport for each stop shall be known	
REQ-P420	Number of free ULDs in each airport for each stop shall be known	
REQ-P430	Availability of pallets in each airport for each stop shall be known	
REQ-P440	Availability of igloo in each airport for each stop shall be known	
REQ-P450	Availability of nets in each airport for each stop shall be known	
REQ-P460	Availability of loading facilities inside the aircraft shall be known	
REQ-P470	Availability of loading staff shall be known	
REQ-P480	Start of loading activity shall be known	
REQ-P490	End of loading activity shall be known	
REQ-P500	Any problem related to the loading activity shall be known	
REQ-P810	Unloading activity shall be monitored	
REQ-P820	Start of unloading activity shall be known	
REQ-P830	End of loading activity shall be known	
REQ-P840	Any problem related to the unloading activity shall be known	
REQ-P505	Catering truck shall be monitored	
REQ-P510	Cargo loading shall be monitored	

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Requirement number	Requirement	Note
REQ-P850	Cargo unloading shall be monitored	
REQ-P520	Characteristic of the special cargo upon arrival shall be known	
REQ-P530	Baggage loading shall be monitored	
REQ-P860	Baggage unloading shall be monitored	
REQ-P540	Location of baggage trucks shall be monitored	
REQ-P550	Baggage loading end time shall be known	
REQ-P560	Baggage loading start time shall be known	
REQ-P870	Baggage unloading end time shall be known	
REQ-P880	Baggage unloading start time shall be known	
REQ-P570	Baggage drop-off counter needs shall be known	
REQ-P580	Processing time of the baggage handling system shall be known	
REQ-P590	Location of any bag in the aircraft decks shall be known	
REQ-P600	Baggage on transfers shall be identified	
REQ-P610	Location of baggage in the compartment according to its destination shall be identified	Derived from the analysis
REQ-P620	Location of any ULD in the aircraft deck shall be known	
REQ-P630	Pilot and ANSP shall be provided with a proper communication regarding to starting-up	
REQ-P640	Start-up activities shall be monitored	
REQ-P650	Availability of starting-up facilities shall be monitored	
REQ- I150	ASAT shall be known	
REQ-I160	TSAT shall be known	
REQ-P660	Towing shall be monitored	
REQ-P670	Availability of towing trucks shall be known	
REQUIREMENT RELATED TO PROCESS ON MOVEMENT AREA		
REQ-P680	EXIT attached to any taxiway shall be known	Out of the turnaround process
REQ-P690	EXOT attached to any taxiway shall be known	Out of the turnaround process
REQ-P685	AXIT attached to any taxiway shall be known	Out of the turnaround process
REQ-P695	AXOT attached to any taxi shall be known	Out of the turnaround process
REQ-P704	De-icing process shall be monitored	De-icing on bay can be outside of turnaround process while de-icing on platform would be considered within the turnaround
REQ-P703	Start of de-icing activity shall be known	same as REQ-P704
REQ-P700	End of de-icing activity shall be known	same as REQ-P704
REQ-P710	Average time of de-icing shall be known	same as REQ-P704
REQ-P705	Location of de-icing trucks shall be monitored	same as REQ-P704
REQ-P706	Type of de-icing process shall be known	same as REQ-P704

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Requirement number	Requirement	Note
REQ-P730	EEZT shall be known	same as REQ-P704
REQ- P140	Expected holdover time shall be known	same as REQ-P704
SYSTEMS RELATED REQUIREMENTS²		
REQ-CDM001	A/c type shall be known	
REQ-CDM003	A/c parking stand shall be known	
REQ-CDM004	MTT shall be known	
REQ-CDM005	TOBT shall be known	
REQ-CDM006	A/c status shall be known	Out of the turnaround process
REQ-CDM009	EIBT shall be known	
REQ-CDM011	AIBT shall be known	
REQ-CDM012	ELDT shall be known	Out of the turnaround process
REQ-CDM014	ALDT shall be known	Out of the turnaround process
REQ-CDM016	SOBT shall be known	
REQ-CDM017	EOBT shall be known	
REQ-CDM018	AOBT shall be known	
REQ-CDM019	ETOT shall be known	Out of the turnaround process
REQ-CDM020	CTOT shall be known	Out of the turnaround process
REQ-CDM021	ATOT shall be provided	Out of the turnaround process
REQ-CDM022	Flight plan inconsistency shall be known	Deviation regarding CTOT/ FLP. Derived from the analysis Out of the turnaround process
REQ-CDM023	CTOT inconsistency shall be known	
REQ-CDM024	EOBT inconsistency shall be known	Deviation regarding EOBT. Derived from the analysis
REQ-I005	Any change related to turnaround activities shall be known	
REQ-I010	Information shall be provided about slot allocation	Out of the turnaround process
REQ-I015	Information shall be provided about any change related to slot allocation for each flight leg	Out of the turnaround process
REQ-I020	FLP shall be known	Out of the turnaround process
REQ-I025	Any change related to change in FLP shall be known	Out of the turnaround process
REQ-I040	ETTT shall be known	Out of the turnaround process

² Although the requirements collected in this list are not technical requirements, users have shown their concern on the systems that will support the future concept of operations. These requirements are under this category and they can provide a valuable input to WP4.

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Requirement number	Requirement	Note
REQ-I120	TLDT shall be known	Out of the turnaround process
REQ-I130	ARDT shall be known	Stakeholder requested for the "end of the turnaround" and it has been considered as ready time. Derived from the analysis
REQ-I140	STD shall be known	Out of the turnaround process
REQ-I160	ETA shall be known	Out of the turnaround process
REQ-I170	ETAPP shall be known	Out of the turnaround process
REQ-O010	The interface of any tool implementing TITAN concept shall be standardized	Out of the turnaround process

Table 1: High Level User requirements

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3. METHODOLOGY FOR GATHERING THE REQUIREMENTS

This chapter describes the methodology for collecting, analysing and listing the requirements. The methodology is in accordance with Sub-step 1.1 and 1.3 of the E-OCVM (see 4).

3.1 Stakeholder analysis

Anyone that has any input to, or is in any way affected by the implementation of the proposed concept is a stakeholder. The co-operation and advice of stakeholders is vital to ensure that a good operational concept is developed and that it responds to their daily needs and concerns.

The first stage was to perform a stakeholder analysis which identifies all the parties that have an interest (stake) in the ATM problem under analysis or in the proposed solution. Their interests are assessed, and also the ways in which their interests affect the development of the proposed concept.

The list of the stakeholders is based on the contacts of the TITAN Consortium members

3.2 Stakeholder expectation

The second stage is to discuss with stakeholders what level of involvement they wish to have regarding this analysis (stakeholder expectations). Stakeholders may have conflicting views and interests that need to be analyzed and brought to a common denominator.

3.3 Information collection

To identify the stakeholders' expectations several information sources are used:

- Main input:


The main source to collect the majority of stakeholders' requirements is through interviews where the external stakeholders can provide their answers to a pre-defined questionnaire (see Annex - A).

The questionnaire contains questions regarding likely impact of the TITAN concept on the efficiency of the turnaround procedure. It contains guided and open questions to allow the stakeholders to freely express their opinion.

The primary channels for filling in the questionnaires are through personal interviews and phone calls, but the interviewees also have the opportunity to fill in the questionnaire by themselves and send it back via e-mail.

- Other inputs:

- 1st TITAN Workshop (17th March 2010): in close cooperation with WP7, feedbacks from the workshop - where external participants and consortium members discussed the issues related to the turnaround process – were collected;
- Analysis of available documentation which provides an additional set of issues, gaps and necessities to be solved;
- Internal workshop (26th May 2010): it was held within Slot Consulting Ltd, with the attendance of some active (pilot, air traffic controller, ground handler) and former (airport operator, ground handlers) actors involved in the turnaround process to collect their requirements and needs.

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4. METHODOLOGY FOR ANALYSING THE REQUIREMENTS

After running the interviews, the received data were systemized and analyzed. The analysis also highlighted if the requirements are within the scope of TITAN or not and to what extent they can be used during the TITAN project and how.

The analysis is supported by information gathered during the 1st TITAN workshop and other information sources mentioned in the previous chapter.

4.1 Statistical analysis

Based on the results of the questionnaire several diagrams were prepared: one diagram was arranged on the basis of each stakeholder expectations and another summarizes the needs of all of them (see chapter 6.1 Statistical analysis).

The figures are depicted based on the following methodology:

1. Yes answer will be estimated as 1.
2. No answer will be estimated as 0.
3. Empty brackets will not be represented.
4. The sum of Yes and No answers will be averaged dividing by the number of stakeholders providing answer.
5. The final result will be depicted in bar chart format.

4.2 List of requirements

To prepare the list of requirements the initial step is to sort out the answers given to the questionnaire. The first column named “**Y/N**” will be used to identify which actors are interested in which resources or activities. The cells titled as “**use**”, “**need**” and “**description of the activity**” can be filled in a quite heterogeneous way by the stakeholder, so the information requires to be analyzed and systemized.

Once the information has been properly located in the corresponding cell, the requirements concerned to each question could be easily listed. This bottom-up methodology will allow to:

- Organize the information;
- Elicit the requirements;
- Complete the requirement by a deep understanding of the process;
- Show the relation between different requirements.

Once the requirement has been elicited, the **final use** of each requirement will be also identified;

- Use: the real activity achieved by a stakeholder with the REQUIREMENT;
- Final use: the real purpose of achieving that activity.

In the next step the final uses of each requirement will be used to elicit the real **goals** following these actions:

- Create a final uses list;
- Compare similar final uses according to its meaning;
- Specify the general goals;



- Attach each requirement to their related goal.

Collected stakeholder requirements could not be enough to meet the TITAN scope and it may happen that important requirements are missed. In order to complete the list of requirements, it is needed to start from the TITAN scope and identify the main goals that need to be reached. In this way a bottom-up approach (from the analysis) and a top-down approach (from the TITAN scope) are converged in a unique list of requirements.

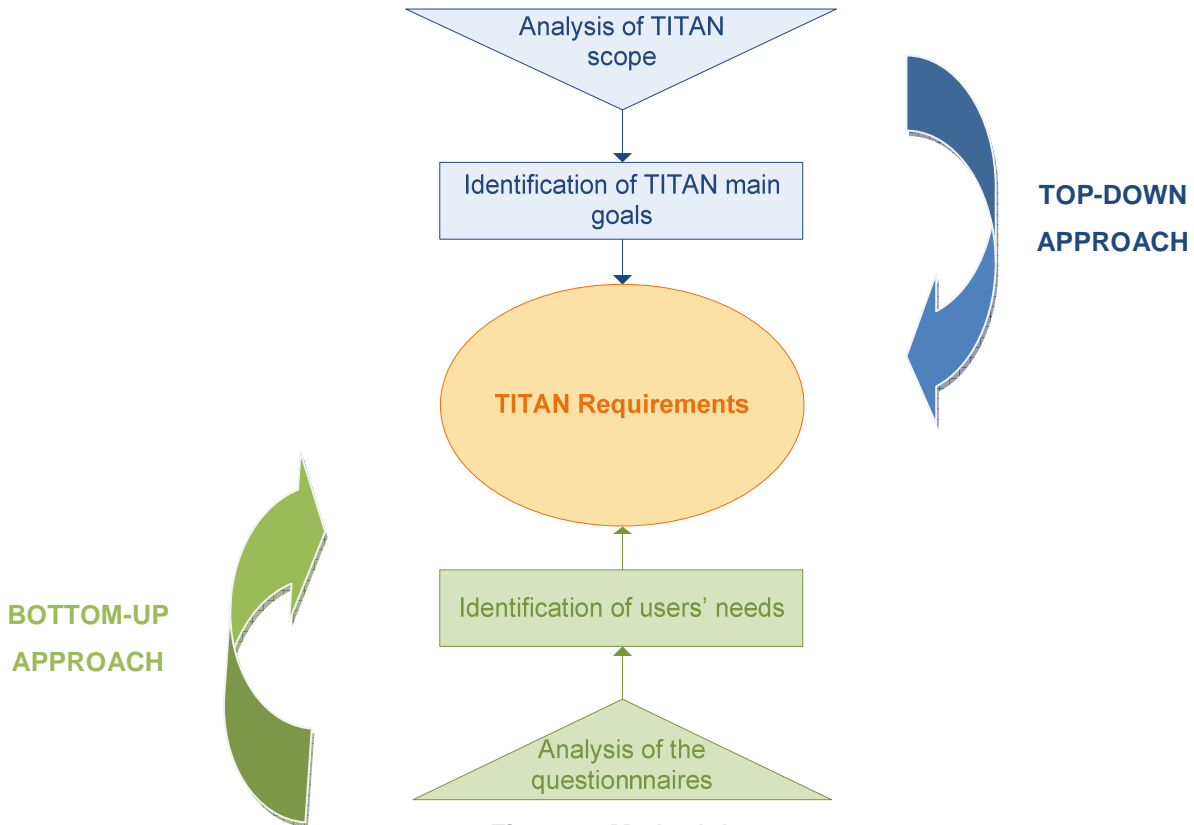


Figure 1: Methodology

The Requirements elicited during the analysis of the questionnaire will be completed by the data gathered during the 1st TITAN workshop and an internal workshop as well as the knowledge of the TITAN consortium members and the analysis of the related materials.

4.3 Information tree

Information trees are predictive models, used to graphically organize information about possible options, consequences and end value. If the requirements and goals have been elaborated and structured an information tree can be prepared. On the figure below the draft model of the information tree is presented.

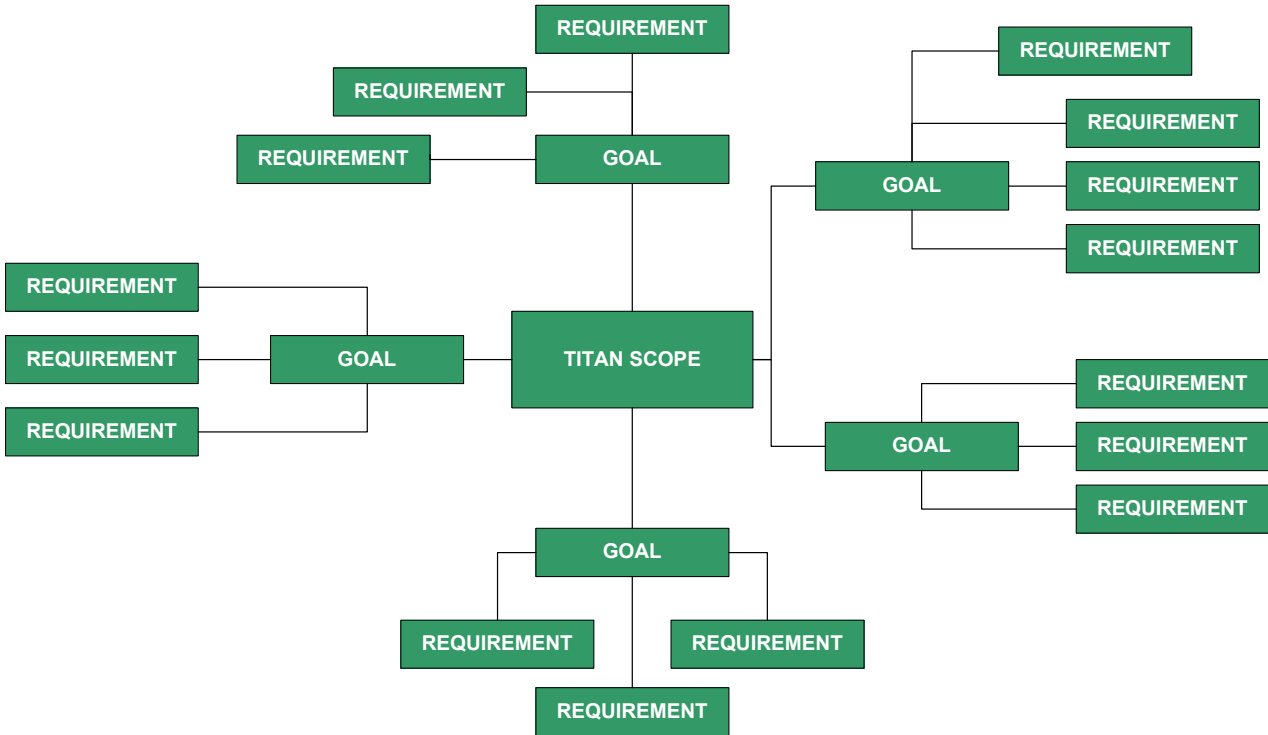


Figure 2: Model of the information tree

5. REQUIREMENT GATHERING

The collection of the requirements is focused on the changes from the current situation to the desired one.

5.1 Stakeholders list

The type of stakeholders was identified following the methodology given in the previous chapter and a small database was established on the persons interviewed.

The following table summarizes the list of the interviewees:

Nr.	Name of the interviewee	Organization details			
		Name	Department	Type ³	Service provided
1.	Alan Marsden	EUROCONTROL		Other	
2.	Albert Coenen	Brussels Airlines		Airline Operator	
3.	Alejandro Egido Salazar	AENA		ANSP	Deputy director of Palma airport
4.	Aleria Lizariturry Harley	Iberia Airport Services		Ground Handling	
5.	Balázs Bogáts	Malév Ground Handling	Operations	Ground Handling	GHA Manager
6.	Bob J. H. Grimberg	Amsterdam Airport	Capacity Management	Airport Operator	
7.	Bruno Desart	EUROCONTROL		Other	
8.	Clive Croome	Globe Ground		Ground Handling	
9.	Henk Hesselink	NLR		Other	Research
10.	Henrik Bagewitz	Stockholm-Arlanda		Airline Operator	
11.	Johan Bloom	Amsterdam Airport		Airport Operator	
12.	Laura de Mateo	AENA	Integration	ANSP	Interface
13.	Lukasz Michalik Boldin	Air Europe		Airline Operator	
14.	Marcos Moura	Malpensa Airport		Airport Operator	
15.	Martin Schipper	AAS		Other	

³ Type: ANSP, Airline Operator, Airport Operator, Ground Handling, other

Nr.	Name of the interviewee	Organization details			
		Name	Department	Type ³	Service provided
16.	Mongenie Olivier	EUROCONTROL		Other	
17.	Etienne van Zuijlen	Amsterdam Airport Schipol		Airport Operator	
18.	Natalia García / Jesús Creus	Confederación Logística de Hidrocarburos (CLH)	Aviation	Other	
19.	Paul Hopf	Belgocontrol		ANSP	
20.	Philip De Coninck	Flight Care		Ground handling	
21.	Stefano Porfiri	SELEX		Other	
22.	Vanessa Luiña	AENA	Simulation	ANSP	Requirements
23.	Wolfgang Klapdor	Cologne/Bonn Airport		Airport Operator	Managing Director of Cologne/Bonn Airport


Table 2: List of the interviewees

5.2 Stakeholders' feedback

Through questionnaires the stakeholders were interviewed about the information that is currently available for them and their future information needs from the different actors involved in the turnaround process.

The following table summarizes their answers:

Stakeholder	Currently provided information	Required future information that needs to be provided
Airline	<ul style="list-style-type: none"> Aircraft's technical parameters Routing MVT message Flight information (aircraft type, LDM, passenger/cargo/mail data) Operational information 	<ul style="list-style-type: none"> Accurate TOBT Arrival time and stand of arriving transfer passengers
Airport Operator	<ul style="list-style-type: none"> ETA, ATA, Stand Meteorological information Availability of airport facilities (stand, gate, check-in desk, etc.) Airport status towards passenger flow/border control 	<ul style="list-style-type: none"> Location of passengers (RFID information)


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Stakeholder	Currently provided information	Required future information that needs to be provided
ANSP	<ul style="list-style-type: none"> • Estimated arrival and departure times (EIBT, EOBT, etc.) • Actual arrival and departure times (ATOT, AOBT, etc.) • Confirmation of the schedule • Flight Plan data • Radar data • Stand 	<ul style="list-style-type: none"> • Modification of flight plan • Resource allocation • TSAT • ASAT • TOBT and its updates • VTT • Holdover time
Handling	<ul style="list-style-type: none"> • MVT messages • LDM messages • Real use of facilities 	
CFMU	<ul style="list-style-type: none"> • Flight Plan related information • CTOT 	<ul style="list-style-type: none"> • FUM Messages (Flight Updates)
Immigration		<ul style="list-style-type: none"> • Information on restrictions
Fuel Company		<ul style="list-style-type: none"> • Availability of trucks/staff, quantity of fuel in each truck; location of trucks
Meteorologic al Service	<ul style="list-style-type: none"> • Meteorological forecast 	
Other		<ul style="list-style-type: none"> • More information on the moduling: connection of the services, interrelation between the services

Table 3: Currently available and future information needs

The interviewees were asked about the resources and activities that they would like to monitor and the actions that they would be ready to collaborate with. In addition, together with the other stakeholders they expressed their ideas regarding the changes that would improve the efficiency of the turnaround process. They had the following conception:

- Better information exchange required to be reached by:
 - Application of CDM mentality;
 - Encouraging different actors involved to collaborate and to share information;
 - Sharing of the actual information in an integrated central database;
 - Increase communication between ANSP and Handling Agent during arrival and departure;
 - More up-to-date information about gate allocation: it was mentioned that the aircraft type, the time needed for fuelling and other actions as well as the stand limitations should match as well;
- Sharing of supplementary information to improve the efficiency of the turnaround process is needed, because:

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- Further information on the passenger movement like passenger passed the check-in or security or passport control would be of value for the handling agents and the airlines;
- More punctual information about the disabled passengers and UMs would help the work of the ground handling and would provide valuable information for the airlines;
- The delayed passengers cause a lot of problems for the handling agencies. It was proposed to investigate the possibility to eliminate the rules that forbid baggage to travel alone, if and only if the passenger and the baggage come from a secure origin (and therefore have been already inspected);
- Development of the information systems is required:
 - Unification of mandatory shared information is compulsory;
 - Automated decision making in some of the services (e.g. how many check-in desks should be opened) would help the work of the airlines and handling agencies;
 - Common interfaces for each stakeholder and updating policies to standardize the different systems: integrated check-in interfaces to help the work of the check-in agents and passengers checking-in at self check-in kiosks;
 - Easier access to the information (hand held) for the actors of the turnaround during the process: the territory of the airport could be covered with Wi-Fi for example;
- General policies focused on the overall performance of the turnaround;
- Use of GPS systems to monitor resources, such as passengers buses or containers (ULDs);
- Improving situational awareness.

One of the interviewees expressed that some airline tools have similar goals to those discussed in this document and being in the scope of the TITAN project. The main problem with the existing tools is that they are applicable only at the home base airport of the airlines as there is no manpower and equipment available to run it at different airports.

Another interviewee pointed out, that due to the online check-in neither the airport operators nor the airlines know when the passengers arrive at the airport, whether they are planning to check-in the luggage and whether they have passed the security check. Therefore, if the passengers are not on time at the gate, the airlines prefer to delay the flight and wait for the missing passengers. He envisaged possible problems at airports, such as stakeholders not willing to share information or constraints in behavioural and procedural changes. Therefore, a regulatory framework at the EU level might be necessary to fully benefit from the CDM implementation especially with respect to the larger European airports.



6. REQUIREMENT ANALYSIS

This chapter contains the result of the analysis of the stakeholders' feedback given in Chapter 5 following the methodology described in Chapter 4.

6.1 Statistical analysis

This analysis summarizes the interviewees' answers collected via questionnaires and processed following the methodology given in sub-chapter 4.1. Only complete questionnaires with valuable answers have been taking into account.

6.1.1 Airline

The following figure shows the answers given by the airlines staff interviewed. The statistic was made on the basis of 3 filled questionnaires.

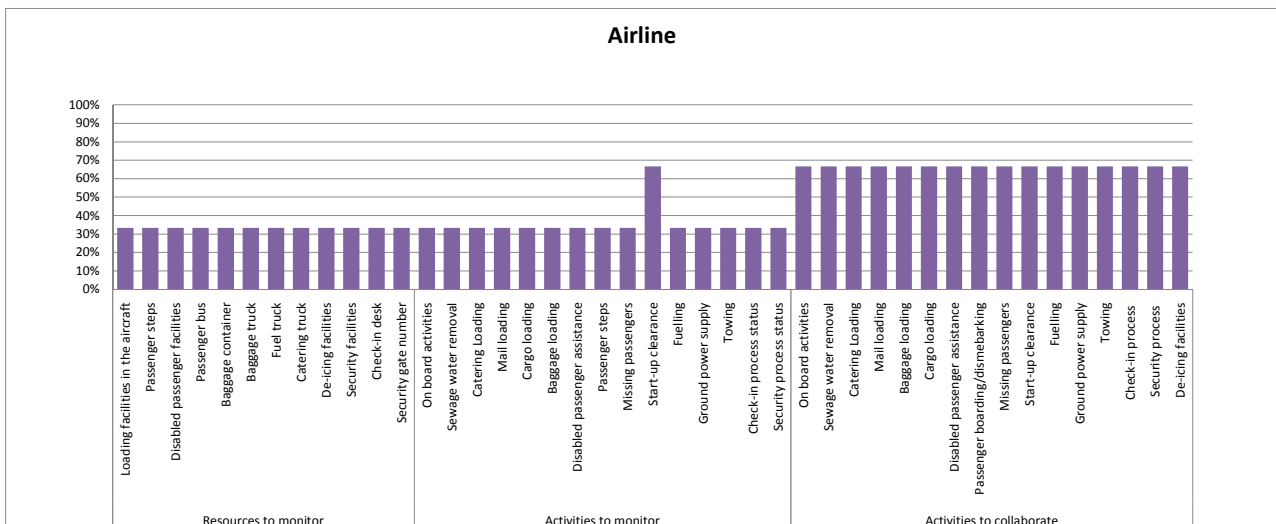
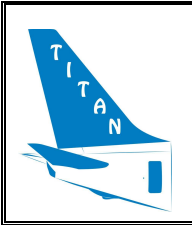


Figure 3: Statistics - Airline

From the diagram above it can be concluded that the Airlines are interested in the whole lifecycle of the turnaround process and are ready to collaborate in the different services. One of the interviewees noted that they're not interested in the processes unless the scheduled time of departure (STD) would change. In this case they want to be advised about the new STD.



6.1.2 Airport Operator

The following figure shows the answers given by the Airport staff interviewed. The statistic was made on the basis of 2 filled questionnaires.

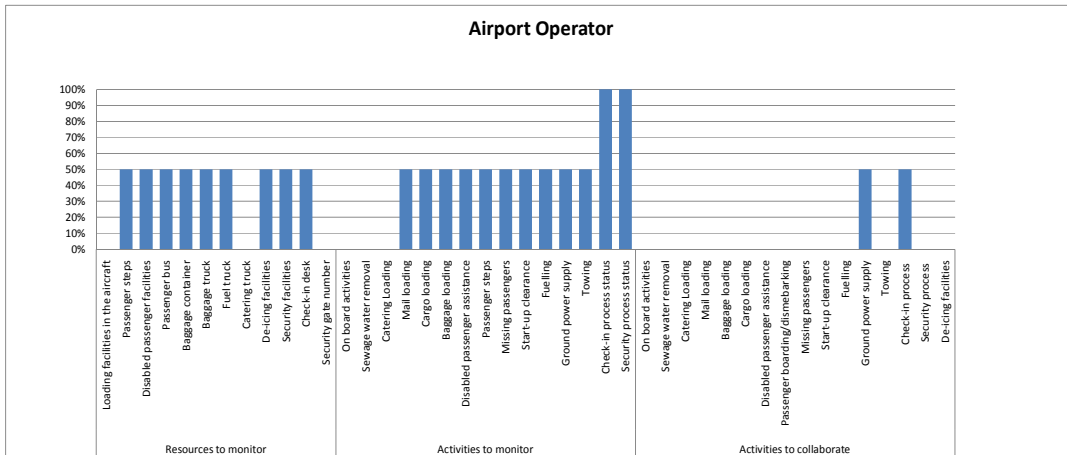


Figure 4: Statistics - Airport Operator

From the diagram it can be concluded that the most important part of the turnaround process from the Airport Operator perspective is the monitoring of check-in and security processes (landside processes). The Airports are slightly interested in collaborating during the turnaround.

6.1.3 ANSP

The following figure shows the answers given by the ANSP staff interviewed. The statistic was made on the basis of 3 filled questionnaires.

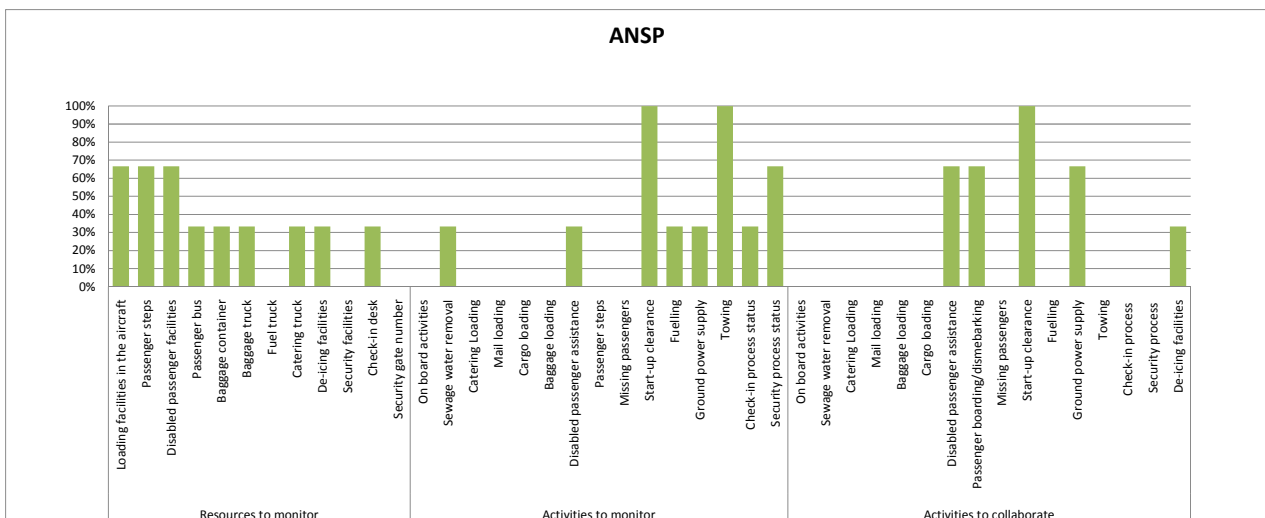


Figure 5: Statistics - ANSP

From the above diagram it can be concluded that from the ANSP perspective only few activities are interesting: mainly actions related to de-icing and start-up clearance, and also the towing and



the status of the security process. More than a half of them is ready to collaborate in the activities during the turnaround, namely in the assistance of the disabled passengers or UMs, in the passenger boarding and disembarking and in the activities connected to the ground power supply.

6.1.4 Ground Handling

The following figure shows the answers given by the ground handling staff interviewed. The statistic was made on the basis of 3 filled questionnaires.

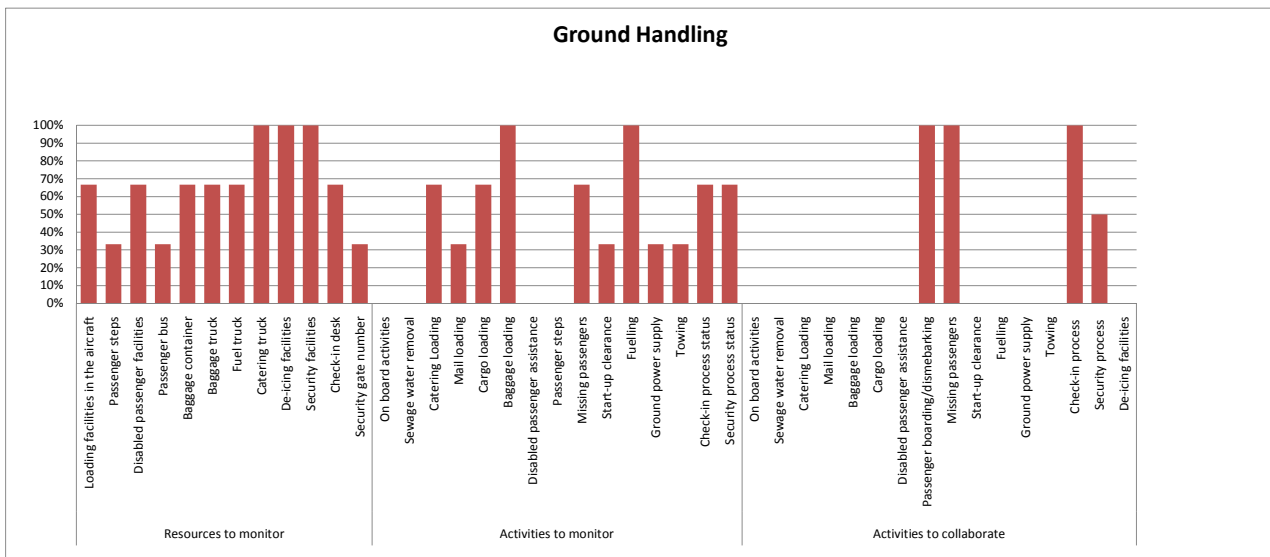


Figure 6: Statistics - Ground Handling

The high interest they showed in the monitor of resources is because ground handling companies are the executors of most of the activities related to the turnaround process, especially those regarding the airside. However they are also interested in collaborating with the other parties involved in the process as well as in the improvement of their own resources and activities. As they provide the turnaround related services, they own most of the information that is rarely shared in a central database system to make it visible to all the partners.



6.1.5 Conclusion

The following figure summarizes the answers given by all of the stakeholders.⁴

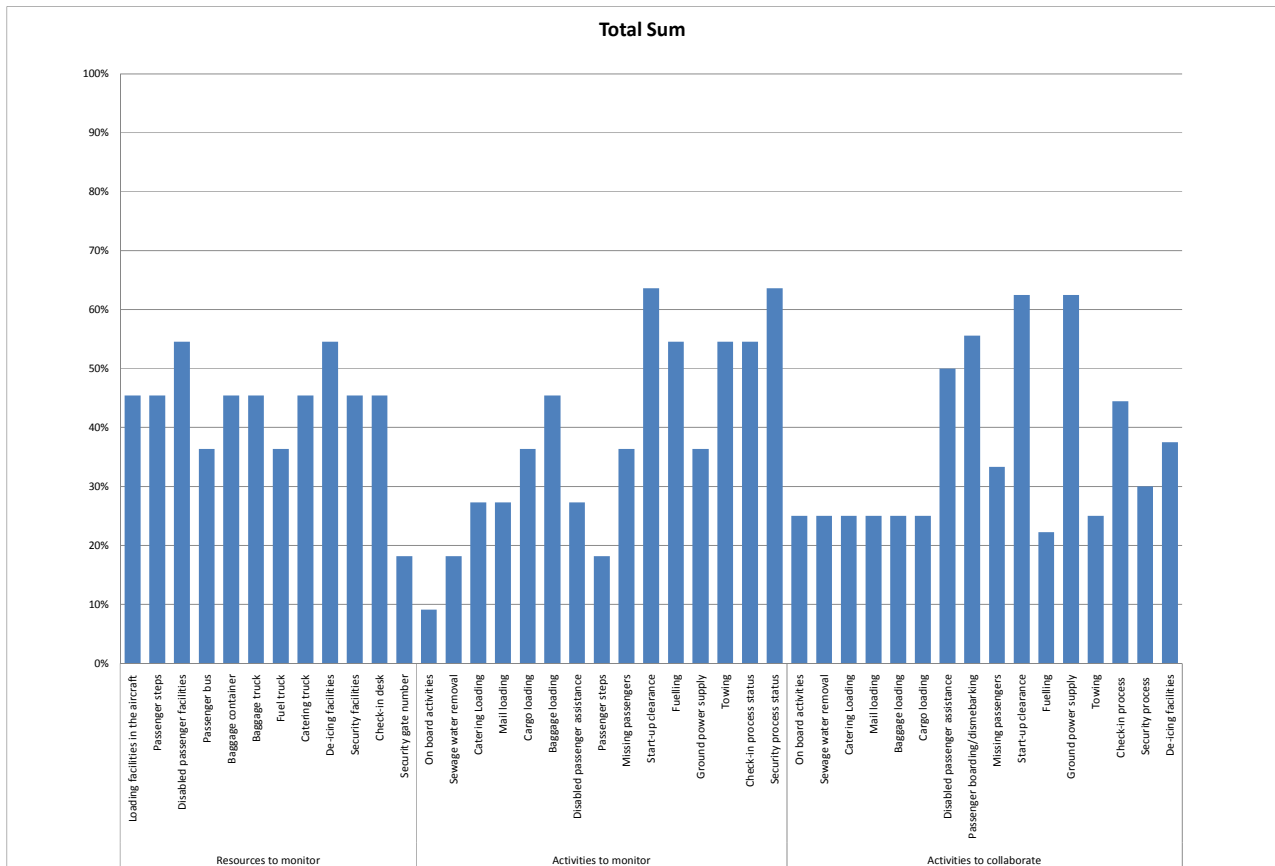


Figure 7: Statistics - Summary

The above diagram shows that the major concerns from stakeholders’ perspective regarding turnaround are related to the de-icing, start-up, check-in and security processes.

The passenger handling is a remarkable process for most of the interviewees:

- 50% of them are interested in the monitoring of the handling of the disabled passengers and UMs;
- 42% would like to collaborate in the disembarking and boarding of the passengers and in the management of the missing passengers.

It is also important to remark that half of the stakeholders would like to monitor the baggage loading and the re-fuelling of the aircraft while only a minor number is interested in the onboard activities and the sewage water removal.

⁴ The answers coming from organizations/interviewees categorized as type ‘Other’ under column “Organization Details” in Table 2 has been excluded due to inadequate or missing information



6.2 Listing of the users' requirements

The list of the users' requirements was created on the basis of evaluation of the questionnaires and on the feedbacks received from the stakeholders during the workshops. The compilation of the requirements followed the methodology presented in Chapter 4.

The table listing the High Level User Requirements is included in Chapter 2.

6.3 Information tree

The information tree below shows how the requirements of the stakeholders can be matched to the TITAN goals and scope (see 3).

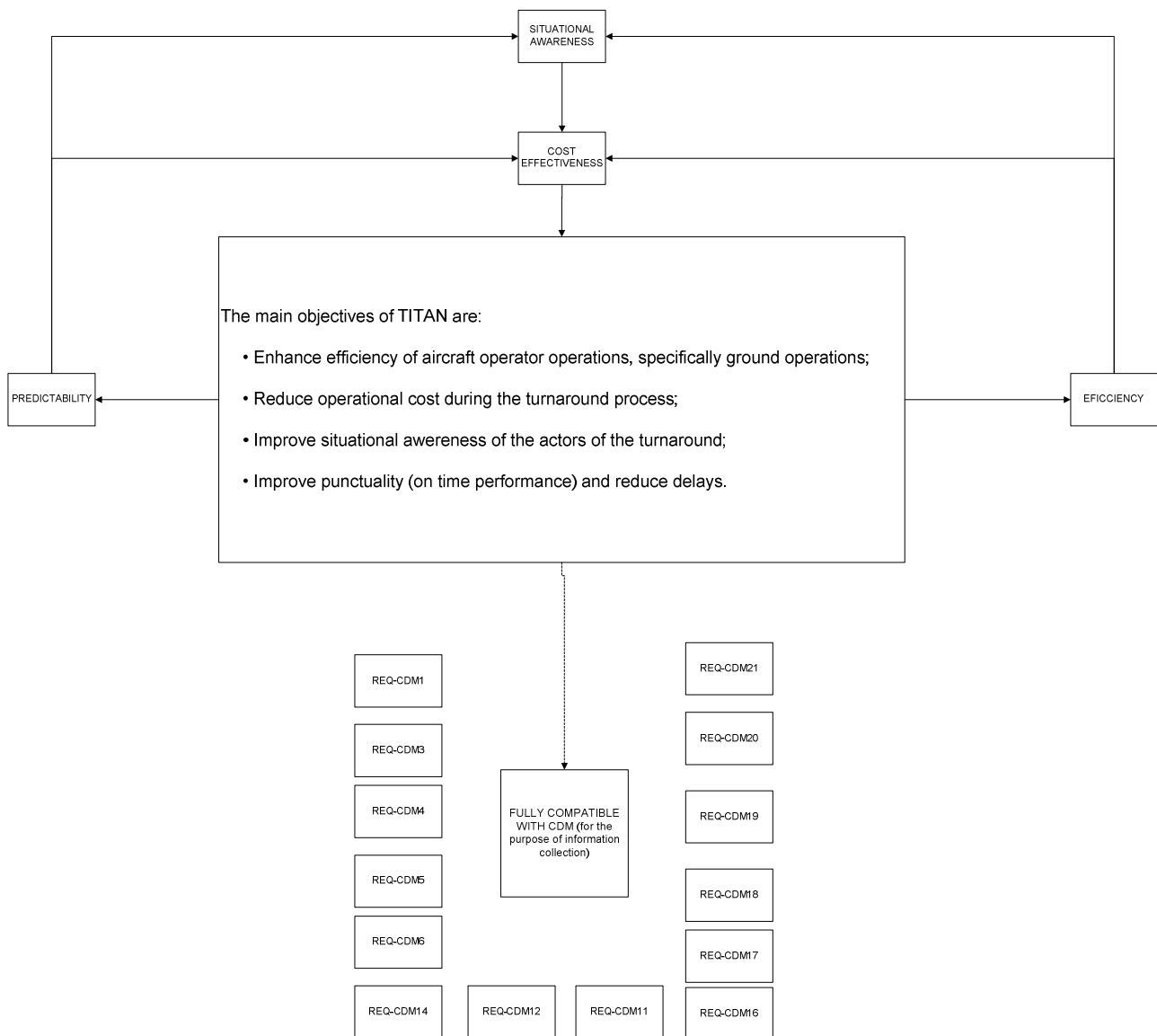



Figure 8: Information tree

In the centre of the information tree the scope of TITAN project is described, while on the side branches the goals can be found. These goals have been identified in such a way to ensure that the TITAN targets are fulfilled.

The goals derived from the scope of the project are:

	High level User Requirements	Issue: v1.0 Date: 29/10/2010
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- Increased predictability;
- Improved efficiency;
- Reduced operational costs (cost-effectiveness);
- Enhanced situational awareness.

Following a top-down approach, to be able to better identify detailed requirements linked to predictability and efficiency goals, requirements have been divided into Action and Estimation type requirements. Users information requests can be related to “know if something IS GOING TO happen in order to DO something” (action type requirements linked to “Efficiency” goal) or to “estimate the PROBABILITY OF something to happen in order to be ready” (estimation type requirements linked to “Predictability” goal).

The bottom branch, namely ‘Fully compatible with CDM’, contains answers coming from the questionnaires that are fully in line with some CDM requirement.

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7. CONCLUSIONS

Based on the personal experience of the interviewees and on the material gathered during previous workshops it can be concluded that there is an urgent need for sharing the information related to the turnaround process, however the legal aspect of the process is not clarified yet.

According to the feedback provided by the majority of the stakeholders (especially ANSPs and airport operators) they are mainly interested in the monitoring of the processes and do not really want to be involved in the turnaround itself. Though, they want to be informed about the changes in the Scheduled Time of Departure to enable them to organize their services according to it. The airline operators and the handling agencies are more interested in the running of the turnaround process, especially in some activities like security and check-in process and the start-up clearance. Passenger processes are a main concern for them as currently the related information is available at a very low rate and poor quality while delays caused by passengers are substantial.

Most of the interviewees express their concern about the technological systems that would support the enhanced concept of operations. In fact, they have heard or known about systems, used by the major airlines at their home airport, that supports the turnaround process in detail. As nowadays the turnaround related information is mainly showing an overall state of the process at a particular moment, the interviewees received positively the idea of having an up-to-date picture of the process. Moreover, the information is currently available on request and received/sent as preformatted text messages and by oral communication. Any improvement on this sense would be really appreciated by the stakeholders.

Today's environment, as depicted above, creates a need to develop such a concept that enables predictable, efficient and cost-effective execution of the turnaround either at home or remote airports. On the basis of this analysis we are in a situation to start developing such a concept following the stakeholders' expectations.



ANNEX A: TEMPLATE QUESTIONNAIRE

Information about the resources availability, staff, aircraft state, etc, can be understood from different points of view by stakeholders. In this table we are looking for the information needs that each stakeholder consider essential for the properly ac

What are your information needs?

Actors	Currently available information	Further information needs
ANSP		
Airline		
Airport Operators		
Handling Agencies		
CFMU		
other (please specify)		



High level User Requirements

Issue: v1.0

Date: 29/10/2010

Resources availability at the airports has a mayor impact on the turnaround performance, what resources allocation, availability would you like to monitor? Please complete the list according to your necessities

What resources would you like to monitor?

					ACTORS INVOLVED					
Resource	Y/N	USE	NEEDS	Description of the activity requiring the resource	ANSP	airlines	Airport operators	Handling agencies	CFMU	Other (please specify)
Loading facilities in the aircraft										
Passenger steps										
Disabled passenger facilities										
Passenger bus										
Baggage container										
Baggage truck										
Fuel truck										
Catering truck										
De-icing facilities										
Security facilities										
Check-in desk										
Security gate number										



High level User Requirements

Issue: v1.0

Date: 29/10/2010

Turnaround activities are linked each other. A delay in an activity impacts on the performance of incoming activities. Which activities would you like to monitor in order to better adapt your schedule?

Which activities would you like to monitor?

Activities	Y/N	USE	NEEDS	Description of the activity	Influence on the activity	ACTORS INVOLVED						
						ANSP	airlines	Airport operators	Handling agencies	CFMU	Other (please specify)	
On board activities (restocking seat pockets,												
Sewage water removal												
Catering Loading												
Mail loading												
Cargo loading												
Baggage loading												
Disabled passenger assistance												
Passenger steps												
Missing passengers												
Start-up clearance												
Fuelling												
Ground power supply												
Towing												
Check-in process status												
Security process status												



High level User Requirements

Issue: v1.0

Date: 29/10/2010

Linked activities can be better achieved by a close cooperation among actors involved, please specify which activities would you like to collaborate and describe them.

Which activities would you like to collaborate?						ACTORS INVOLVED					
Activities	Y/N	USE	NEEDS	Description of the activity	ANSP	airlines	Airport operators	Handling agencies	CFMU	Other (please specify)	
On board activities											
Sewage water removal											
Catering Loading											
Mail loading											
Baggage loading											
Cargo loading											
Disabled passenger assistance											
Passenger boarding/dismebarking											
Missing passengers											
Start-up clearance											
Fuelling											
Ground power supply											
Towing											
Check-in process											
Security process											
De-icing facilities											



High level User Requirements

Issue: v1.0

Date: 29/10/2010

Turnaround is a complex process involving many activities,actors and resources. According to your experience, which changes would improve the turanaround efficiency?

how would you make the T.A more efficient?



High level User Requirements

Issue: v1.0

Date: 29/10/2010

Information sharing can improve the general performance of the turnaround process, please write down the communication/information system you use and complete the blanks below.

Are you aware of any similar concept?

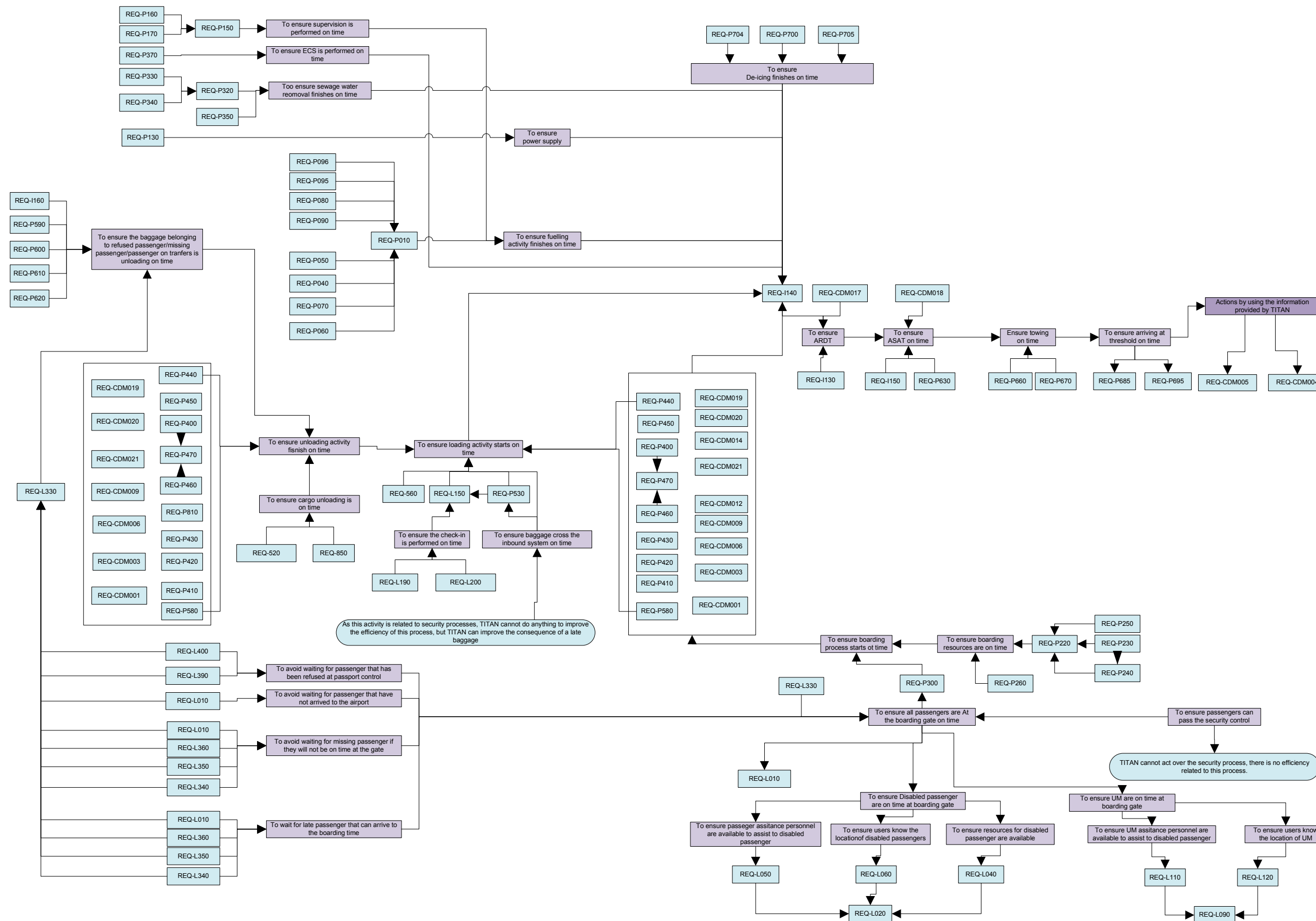
Blank area for response to the question: Are you aware of any similar concept?

Are you aware of CDM methods?

Blank area for response to the question: Are you aware of CDM methods?



ANNEX B: INFORMATION TREE (ACTION RELATED REQUIREMENTS)





ANNEX C: INFORMATION TREE (ESTIMATION RELATED REQUIREMENTS)

