



CONTRACT-BASED AIR TRANSPORTATION SYSTEM (CATS)

Project Overview & Concept

Presented by FREQUENTIS AG

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Workshop Agenda (morning session)



- 10:00 – 10:45: CATS Concept *FRQ*
- 10:50 – 11:20: TW modelling *AFC*
- 11:25 – 12:25: HIL results *EEC*
- 12:30 – 13:30: Lunch
- 13:30 – 14:30: Visit of the museum (*AFC*)
- 14:30 – 15:00: Legal assessment results *IIASL*
- 15:05 – 15:35: Benefit assessment *ORTS*
- 15:40 – 16:10: Safety assessment *ETH*
- 16:15 – 16:45: Discussions
- 16:45 – 17:00: Closure (*FRQ*)
- 17:00 – 17:30: Free visit of the Museum (*AFC*)

Motivation for CATS



- Air Traffic in Europe is expected to triple till 2020
- Air Traffic Management (ATM) system currently in operation will not be able to cope with such growth figures

→ Need for more capacity, efficiency, safety and cost-effectiveness

→ Radical changes are required to fulfil these requirements

→ Contract-based Air Transportation System

Current Situation



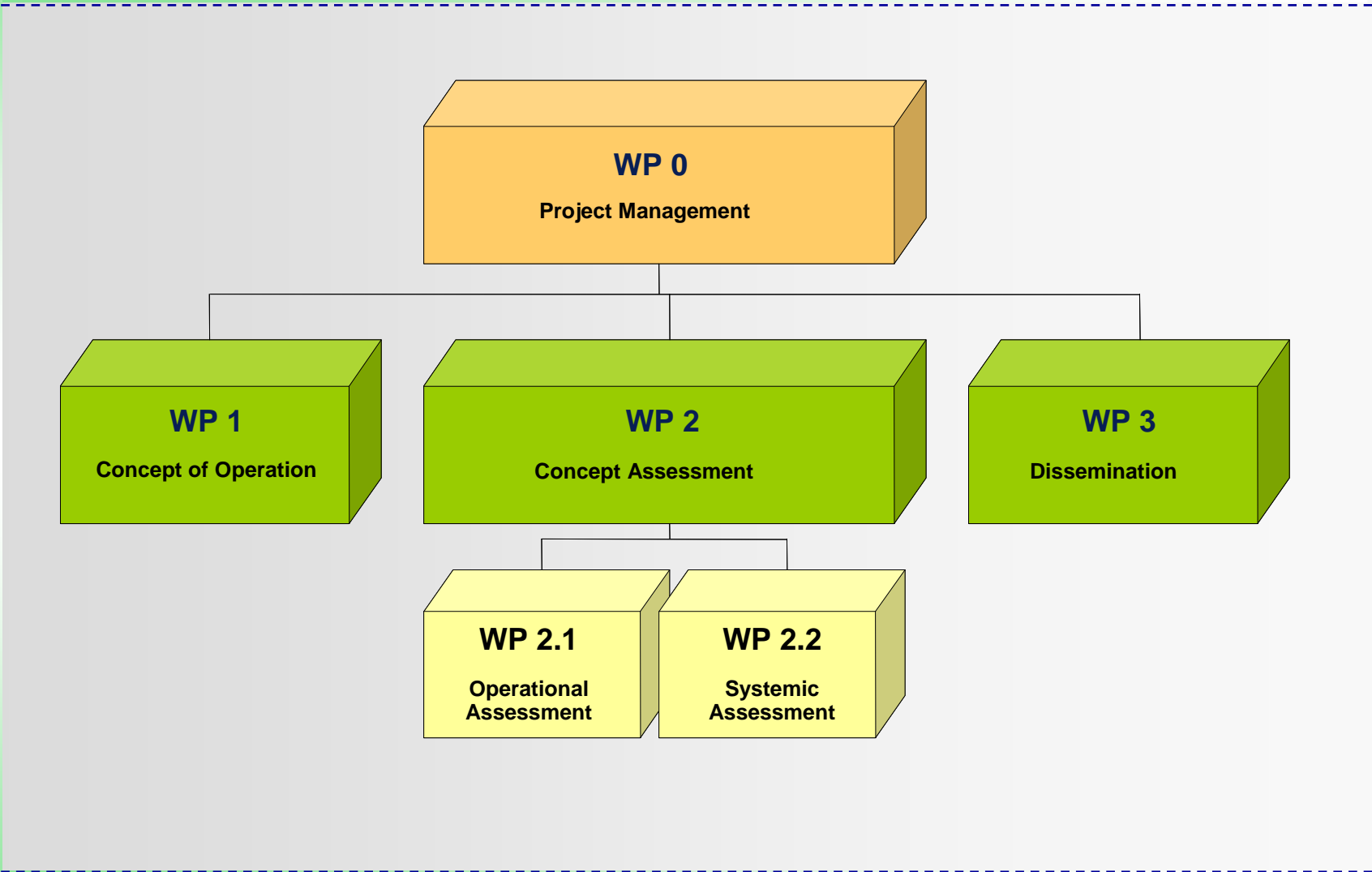
- Air transport supply chain involves e.g.
 - Airports
 - Airlines
 - Air Navigation Service Providers (ANSPs)
 - Different interests and objectives
 - ANSPs' prime objective is safety
 - Airlines' objectives are punctuality & costs
 - Actors optimise their processes locally
 - in accordance with their own constraints
 - not considering the global objectives
- Highly collaborative and system-wide approaches shall be applied for optimising the overall ATM system

Project Overview – Aims



- Define and assess the CoO and Target Windows involving all actors in the supply chain
- Assessment is conducted by two means:
 - Operational Assessment (3 HIL experiments: small-scale prototyping sessions)
 - ▶ Controller-Controller
 - ▶ Controller-Aircrew
 - ▶ Renegotiation involving
 - Controller (ANSP)
 - Aircrew (Airline), and
 - Airport
 - Systemic Assessment
 - ▶ Safety and Risk Assessment
 - ▶ Cost benefit Assessment
 - ▶ Legal Assessment

CATS Work Breakdown Structure



Project Overview – Key facts



- FP6 project, co-funded by the European Commission
- Project duration: 11/2007 to 10/2010

- 9 Partners (6 countries)

- Frequentis AG
- EUROCONTROL
- Air France Consulting
- University of Leiden
- SkySoft ATM
- Unique – Zurich Airport
- ETH – Eidgenössische Technische Hochschule Zurich
- University of Trieste
- ENAV – Italian ANSP



Objectives of the CATS Concept



Find a simple object to manage all the aspects of the ATM system

- Organisational aspect
- Performance aspect
- Business aspect
- Legal aspect
- Planning phase
- Execution phase

Specify how this object is could be made operational in order to support ATM

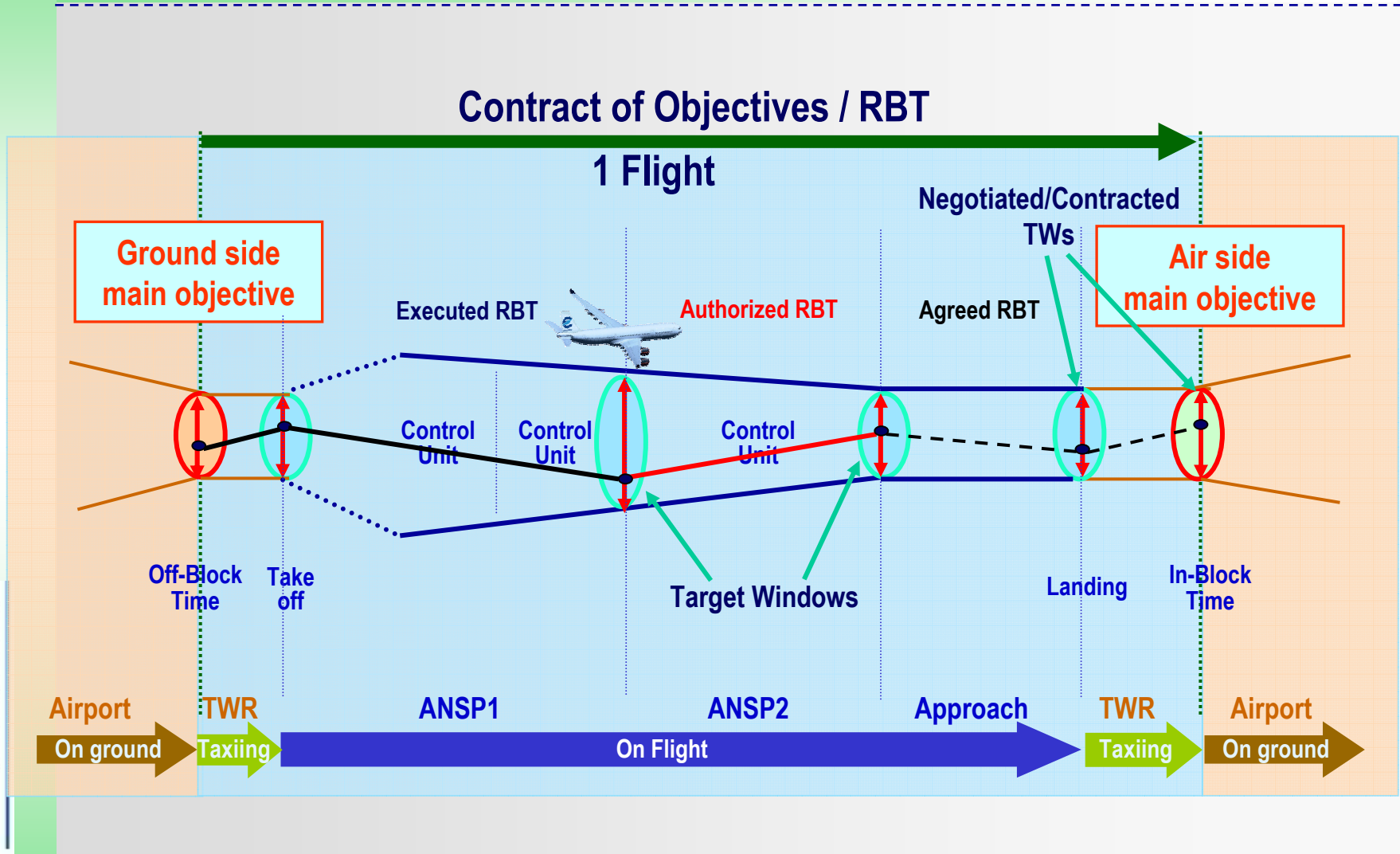
CATS concept: ATM through TW



Object : the Target Windows (TW)

- A flight is composed of a set of Target Windows
- These TWs are:
 - defined through the Airline trajectory, at transfers of responsibility area (spatial and temporal intervals: variable size)
 - refined during the planning phase
 - through a collaborative process (CDM)
 - based on punctuality at destination
 - best use of scarce resources
 - integrate room of manoeuvre (disruption, uncertainty)
 - fixed before departure (signature of the Contract of Objectives) -> (commitment / accountability)
 - become Objectives for all the actors/operators

CATS: TW Organisational aspect

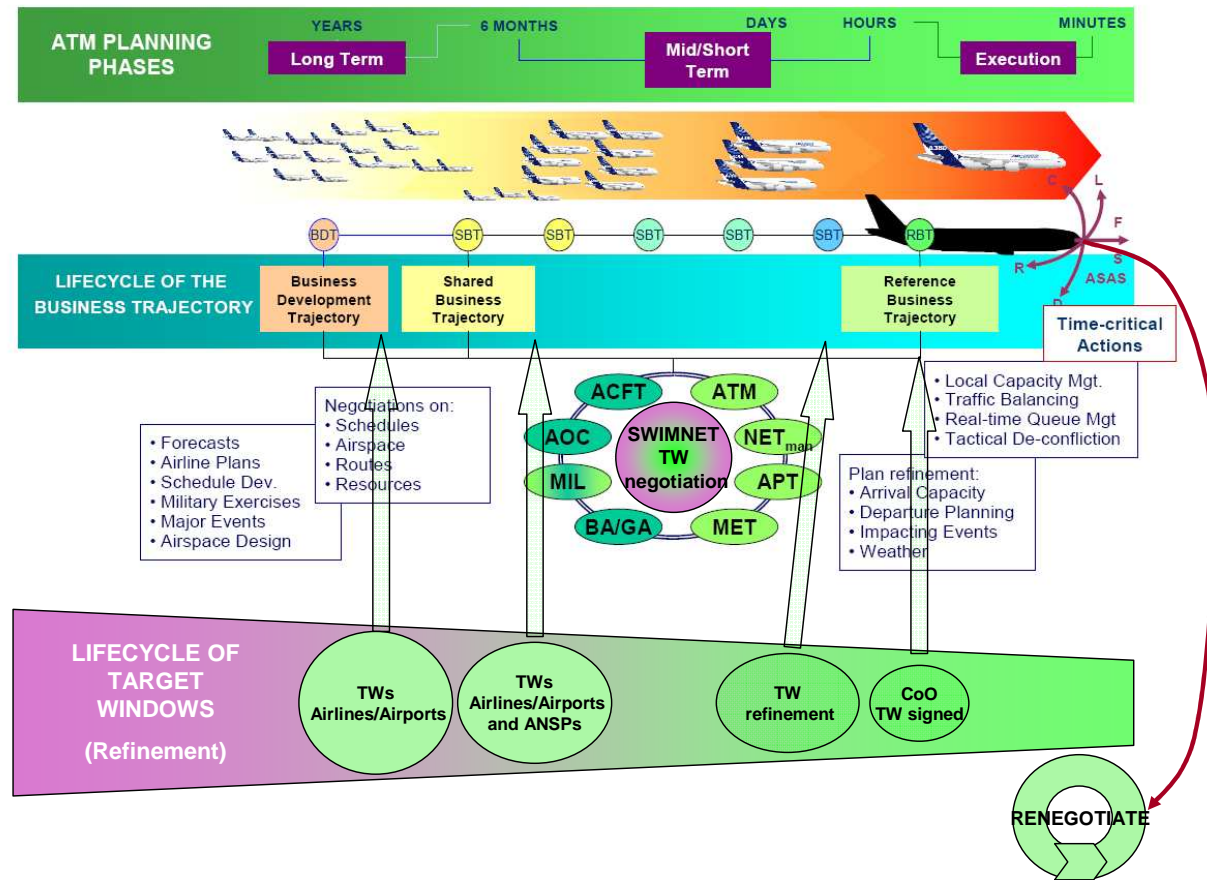


CATS: TW lifecycle



- Drafting process comprises three phases:
 - Phase 1: Airport resource management
 - ▶ Airports (departure and destination) and airlines
 - ▶ Assessing runway capacities, in order to bring the resources in line with airline demand on the date when the requested flights are planned to be performed
 - Phase 2: Resource management and anticipation of disruption
 - ▶ Airports, airlines and ANSPs (CDM process)
 - ▶ Incorporation of known or probable medium-term disruptions
 - Phase 3: Disruption management
 - ▶ The TW incorporates the most recent data and any current disruptive factors which will affect future traffic.
 - ▶ The "Contract of Objectives" is issued shortly before off-block time at the airport.
 - ▶ the Target Windows become fixed.

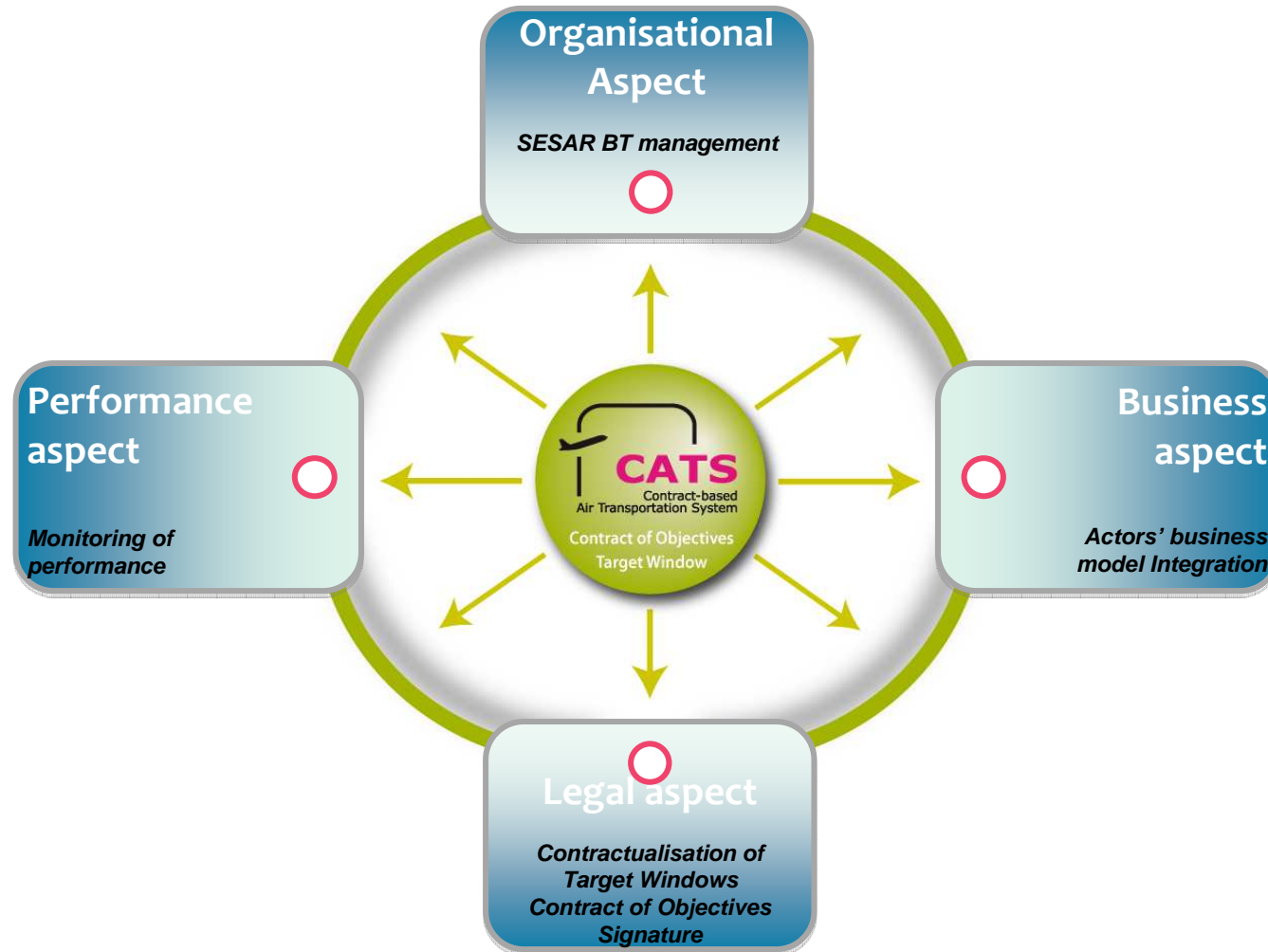
CATS: TW lifecycle



CATS concept: a global framework



CATS concept : Global framework through TW management



CATS: TW Organisational aspect



■ CoO/TW create a link :

- between actors through formal commitment
- to synchronise the planning and the execution phase within a consistent and explicit framework

Plan what is feasible and fly what is planned

■ TWs allows for optimizing resources at strategic level

- facilitation of the BT by contractualising the transfer of responsibility area
- through negotiations

■ For controllers and aircrew (integrating some room of manoeuvre in TW size), the CoO provides:

- the means of managing the imprecision inherent in air traffic
- the means to integrate local objectives with the aim to improve the efficiency of the global system

CATS: TW Business aspect



- Contract of Objectives (CoO) will be concluded among all involved actors through CDM
 - Integration of ATM corner point (capacity, environment, ...)
 - Integration of actors' specificity (business model ...)
 - Cooperation on management of resources
- New way for performing ATM by

Mutually agreed objectives

CATS: TW Legal aspect



- CATS project integrates the legal aspect by ensuring consistency with current rules and regulation
- Safety will never be bound by contract
- Accountability is linked with agreed assignment of responsibility (responsibility vs. organisational means)
- CATS concept could be a framework to smoothly shift the ATM paradigm:
 - e.g. put in place a route charging scheme link to performance

CATS: TW Performance aspect



- Enhanced collaboration will improve ATM efficiency and predictability (be on time with the optimal usage of available resources)
- TW is a means of monitoring performance (SES2 initiative)
 - Analyse the performance level through fulfilment of TWs
- TW allows post-analysis to continuously improve the system
 - Identify failure, bottleneck (learn from the past and propose solutions)

CATS concept: a global framework



CATS concept : Global framework through TW management



