



# FLYSAFE OVERVIEW

**Marc FABREGUETTES, THALES**  
**18th September 2007**



**THALES**





# FLYSAFE



*Airborne Integrated Systems for Safety Improvement,  
Flight Hazard Protection and All Weather Operations*

**Scope and main activities**

**Current status**

**The consortium**



# The challenge of Safety



- Air traffic will **triple** in the next **20** years
  
- Ambition of Vision 2020 is that increased traffic will **not** lead to an increase in the number of accidents, meaning ...  
  
... the performance of safety-related systems and procedures must triple in the 20 years
  
- This improvement must be achieved with :
  - All weather operation
  - Operation at airports 24 hours per day
  - 99 % of flight departing within 15 min of schedule

- Several EU programmes deal with the challenge of maintaining the high level of Air traffic Safety
- FLYSAFE addresses this challenge from an integrated operational perspective:  
*"How to provide the crews and controllers with the right information / signals at the right time to prevent / further reduce risks of accidents in all circumstances"*



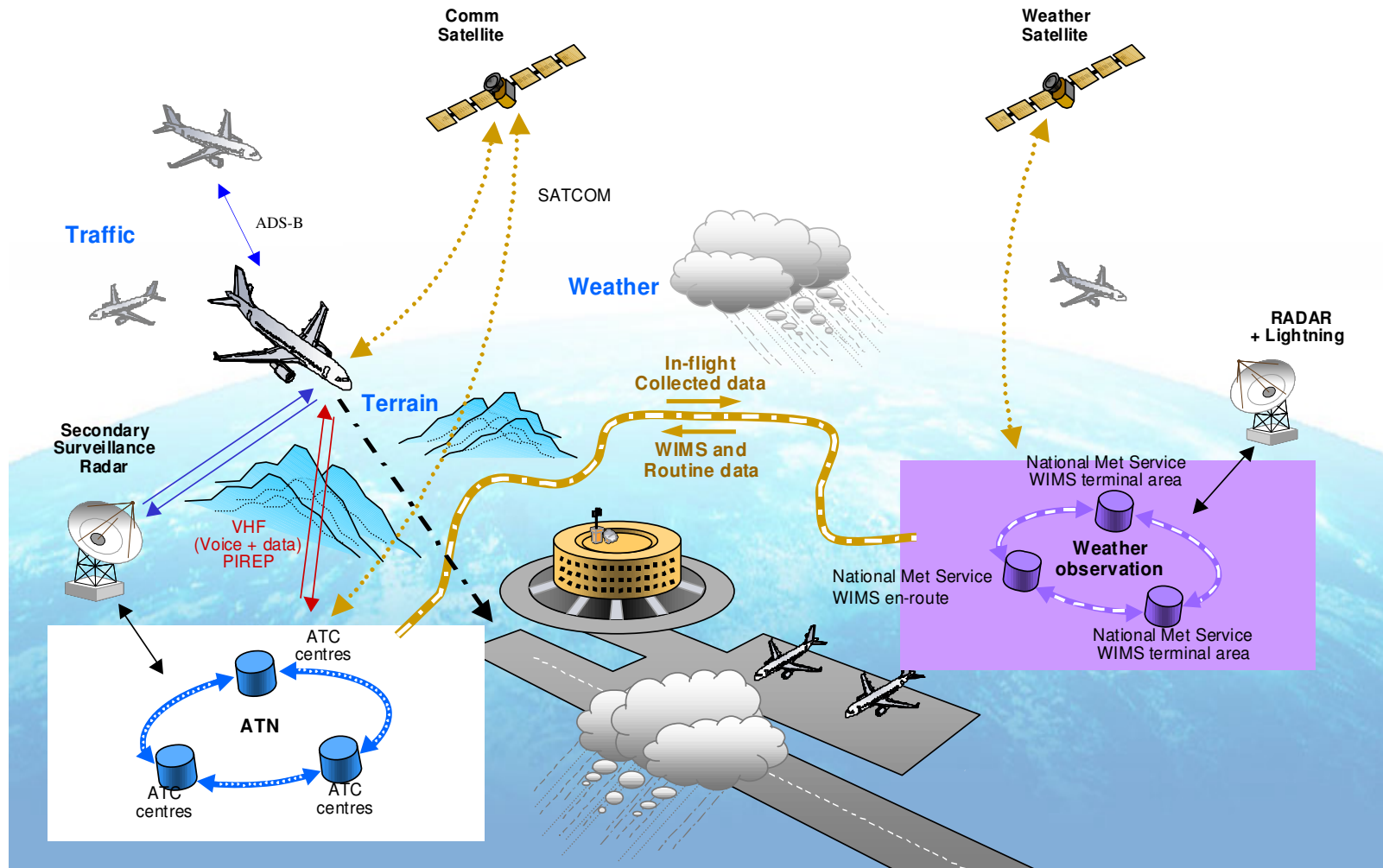
- First target: transport aircraft
- Application to business jets and helicopters also studied



# The FLYSAFE approach



- **FLYSAFE will meet its objectives through :**
  - the design, validation and testing of a **on-board Integrated Surveillance System (ISS)**, going a generation further than the emerging integrated safety systems
  - the design, validation and testing of **ground Weather Information Management Systems (WIMs)**, gathering all relevant atmospheric information to inform the aircraft along their mission



- **FLYSAFE addresses the design, development, implementation and evaluation of an innovative on-board integrated safety system :**
  - With new **sensors** and sensor **fusion** techniques
  - With improved weather data communication means, including design of new ground-based **weather information systems**
  - With all on-board means integrated in a **consistent** system
  - And their **integration** into a global ATM **environment**
  
- **All this to deal with**
  - All flight phases
  - All weather situation
  - At minimum cost and weight



# FLYSAFE WBS

## “Driving factors”



- **Review of past accidents, analysis and definition of means (that would allow) to prevent them with careful consideration of human factors issues**
- **Analysis in three branches for the different hazard information management**
  - **Weather, with specific studies in atmospheric hazards**
  - **Traffic**
  - **Terrain**
- **Definition and validation of a new generation integrated solution**
- **Support the design and development with standardisation and certification activities**



# Results of FLYSAFE market acceptability pre-assessment



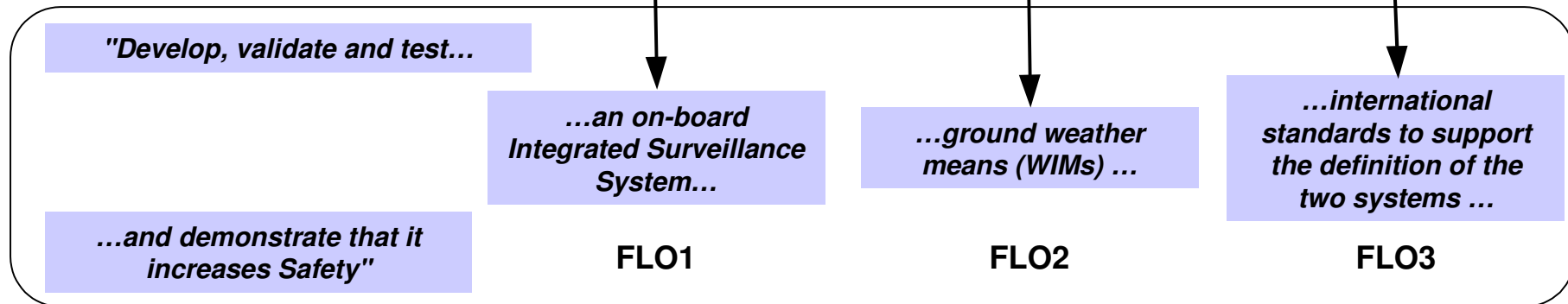
- In the first year of the project, a Questionnaire has been issued to pilots and airlines on a public web site to validate FLYSAFE objectives and assess "market" expectations.
  
- Salient points:
  - A large majority of pilots (75%) expect to get improvements in the **accuracy and reliability of information related to the different hazards**, and more particularly the atmospheric hazards, in future products
  
  - The overall results obtained highlight the need for **improved display of information** (atmospheric hazards, airport, airborne traffic, terrain and obstacle situational awareness).
  
  - However, there was a **mix of opinions regarding which types of screen** should be used to display the new kinds of information. (Larger PFDs and NDs, Central Displays, Side Displays and also HUDs)
  
  - There is a clear need for availability **of coherent weather information in a timely and relevant manner**, for the **crew** as well as for the **AOC personnel**.

# Breakdown of Top Level Objectives

TOP LEVEL OBJECTIVE:

**ACARE VISION 2020**  
*"reduce accident rates by 80% in 2020"*

First Level Objectives (FLO1 to 3):





## FLYSAFE WIMSS



- **FLYSAFE develops 4 ground-based Weather Information Management Systems (WIMS) :**
  - ◆ **Clear Air Turbulence**
  - ◆ **Thunderstorms**
  - ◆ **Icing**
  - ◆ **Wake vortices**
  
- **They will provide accurate forecasts of specific atmospheric hazards to be uplinked to the cockpit and copied to Air traffic Management (ATM)**
  
- **Information on hazards currently available will also be uplinked to the cockpit (including volcanic ash)**

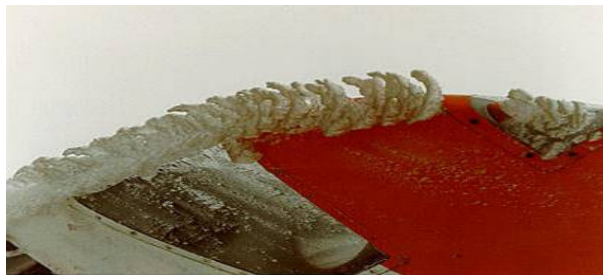
The 4 categories of atmospheric hazards addressed by the WIMSS :



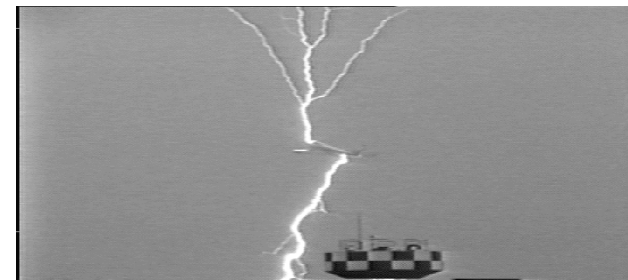
■ Wake vortices



■ Clear-Air-Turbulence



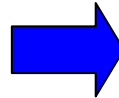
■ Aircraft icing



■ Thunderstorms

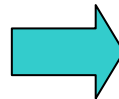
## WIMSS will provide flight-specific, route relevant information on three scales

Global scale,  
with particular emphasis  
on field of view



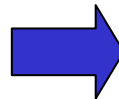
Low resolution data and  
relatively infrequent updates

Continental scale



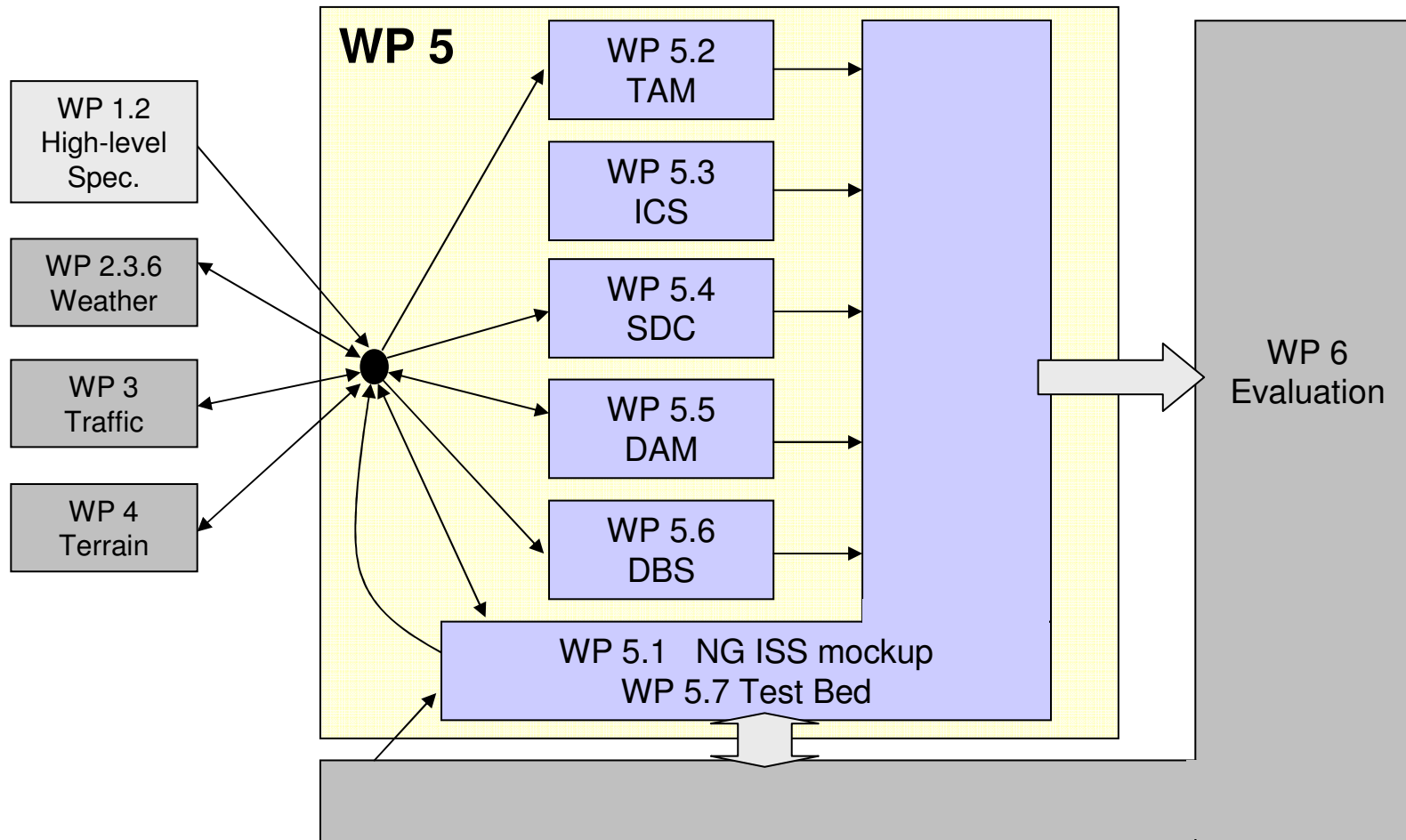
Mid resolution data and fairly  
frequent updates

TMA scale

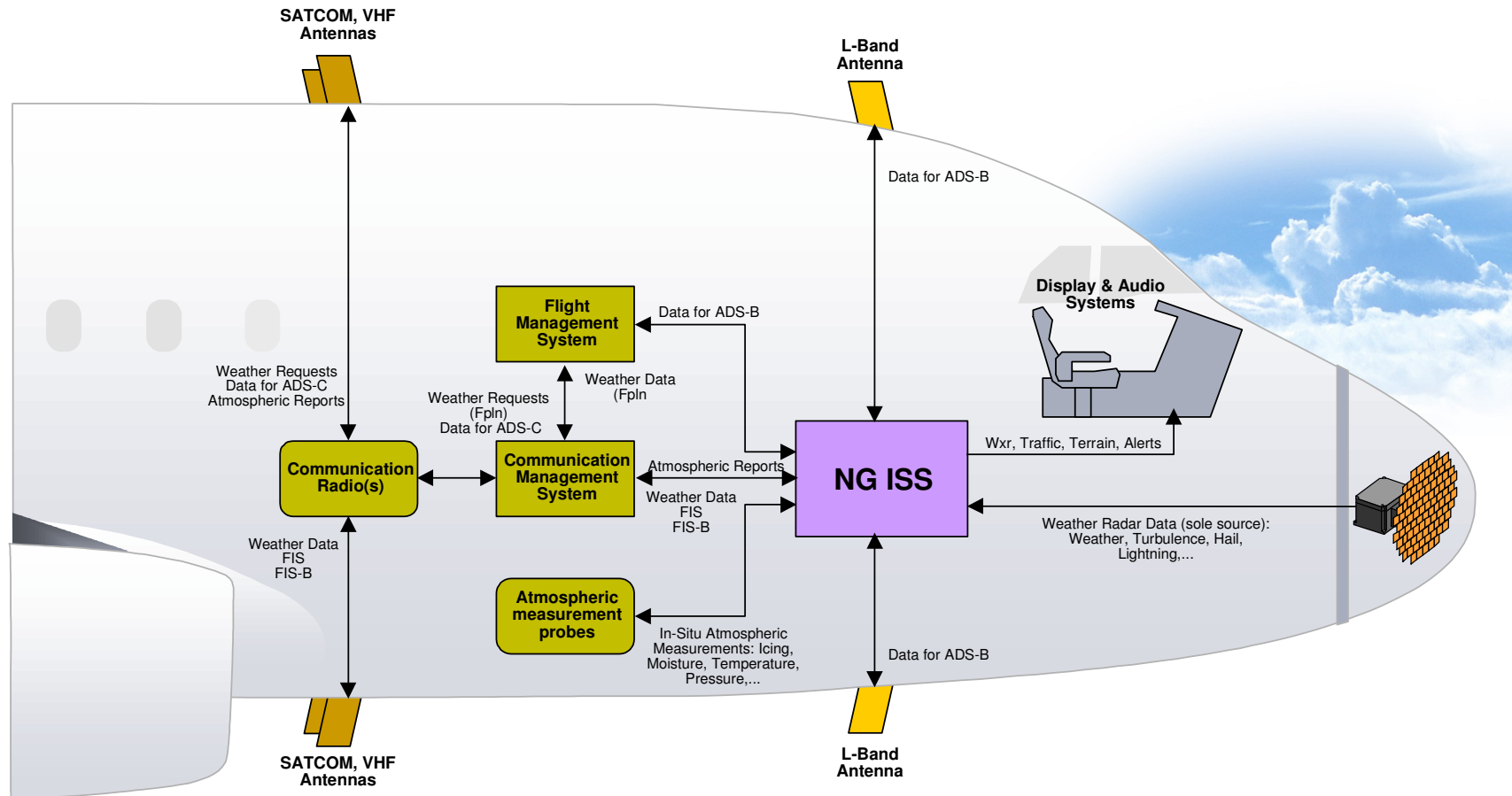


High resolution data with  
frequent updates

- **FLYSAFE designs and will develop a new generation ISS with:**
  - **New on-board systems and functions**
    - ◆ improved situation awareness
    - ◆ advanced warning
    - ◆ alert prioritisation
    - ◆ enhanced human-machine interfaces
  - **New sensors and sensor fusion technique**
  - **Improved on-board weather hazard detection and data fusion with new ground-based, specific weather hazard information products, uplinked to the aircraft**
  - **All on-board means integrated in a consistent system, with innovative HMI**
  - **And their integration into a global ATM environment**



# FLYSAFE NGISS on-board architecture



Data transmitted to the aircraft: WIMS data + standard product for volcanic ashes, standard MET forecast products  
 Data transmitted to the ground: atmospheric report, altitude, P, T, humidity, EDR



# FLYSAFE

**THALES**  
AVIONICS

*Airborne Integrated Systems for Safety Improvement,  
Flight Hazard Protection and All Weather Operations*

## Scope and main activities

# The consortium

## Current status

■ **List of other projects considered at FLYSAFE Project level:**

- **ISAWARE II**
- **I-WAKE**
- **MFF**
- **ANASTASIA**
- **C-ATM 1**
- **EMMA**
- **OPTIMAL**
- **NUP II+**
- **ASSTAR**
- **CAATS**
- **CREDOS**
- **SESTAR**
- **ASAS-TN2**



# The FLYSAFE Project



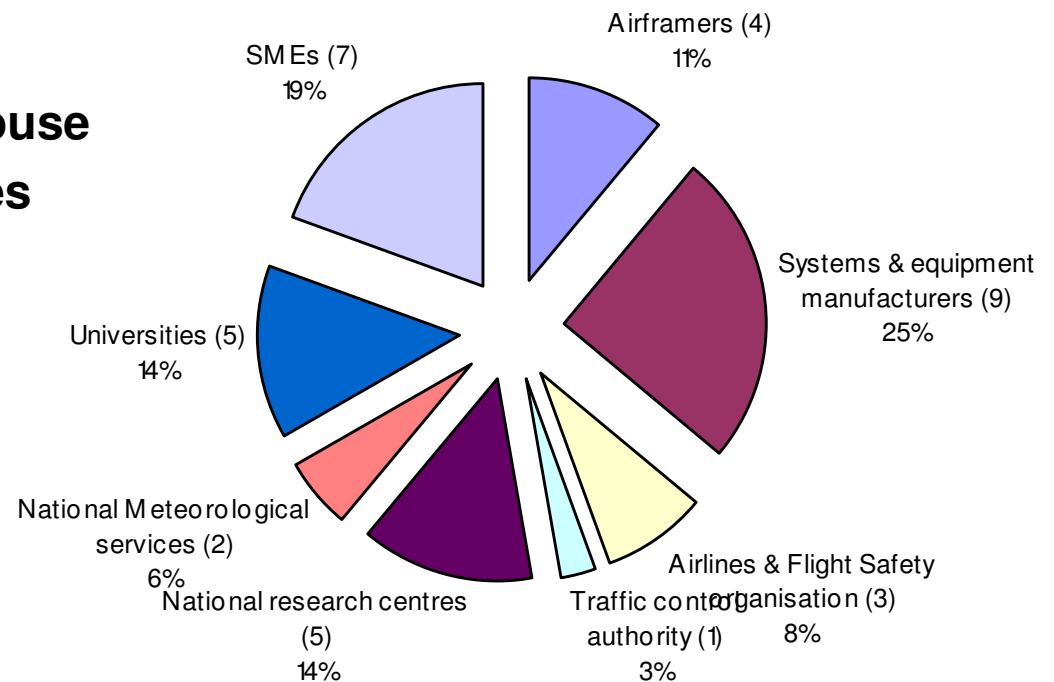
■ Project full title : *Airborne Integrated Systems for Safety Improvement, Flight Hazard Protection and All Weather Operations*

■ Integrated Project of the 6<sup>th</sup> Framework Programme of the European Commission

- Coordinator: THALES, Toulouse
- 36 Partners from 14 countries

■ Started on February 1<sup>st</sup>, 2005

■ Duration: 53 months





**FLYSAFE**



**THALES**

**DIEHL**  
Aerospace



**BAE SYSTEMS**



L-UNIVERSITÀ TA' MALTA



UNIVERSITY OF MALTA

INGENIERÍA DE SISTEMAS  
Y DE SOFTWARE

**European Commission Project  
6th Framework Programme 2005-2009**

***Airborne Integrated Systems for Safety Improvement, Flight Hazard Protection  
and All Weather Operations***

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# FLYSAFE Partners location



- ★ Austria
- ★ Belgium
- ★ France
- ★ Germany
- ★ Greece
- ★ Italy
- ★ Malta
- ★ Netherlands
- ★ Portugal
- ★ Russia
- ★ Slovenia
- ★ Spain
- ★ Sweden
- ★ UK



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# FLYSAFE



*Airborne Integrated Systems for Safety Improvement,  
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## Scope and main activities The consortium **Current status**

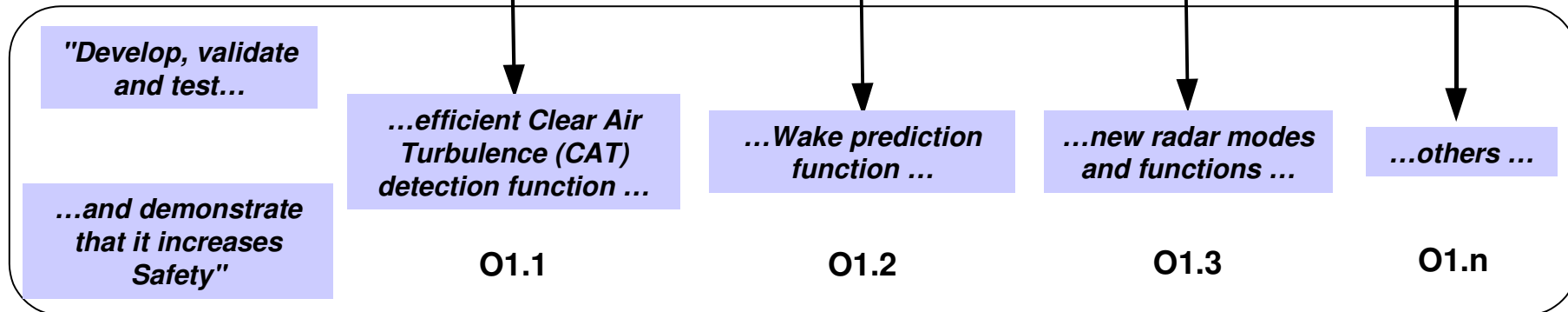
# From 1<sup>st</sup> level to 2<sup>nd</sup> level objectives

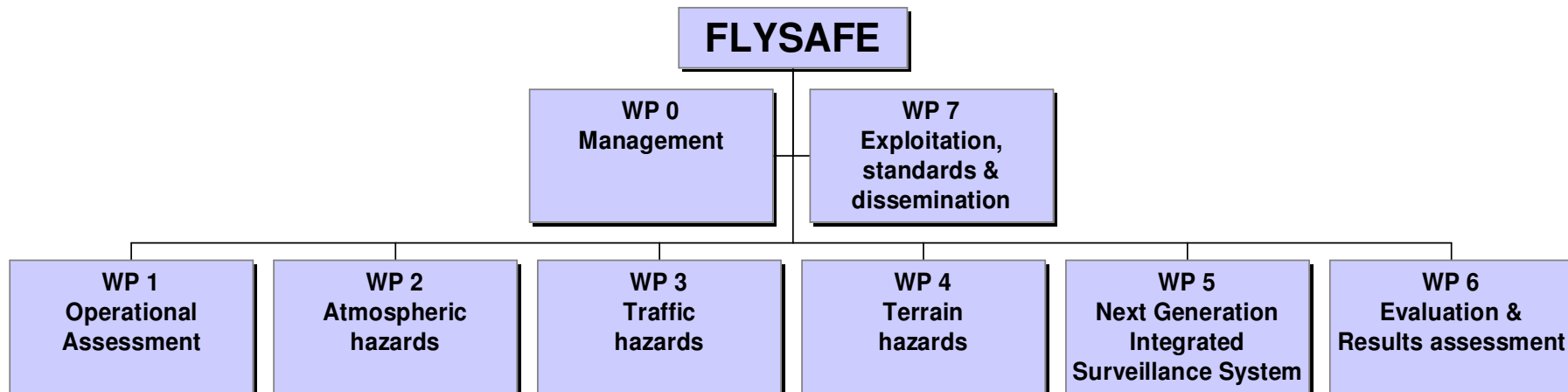
**Example:**

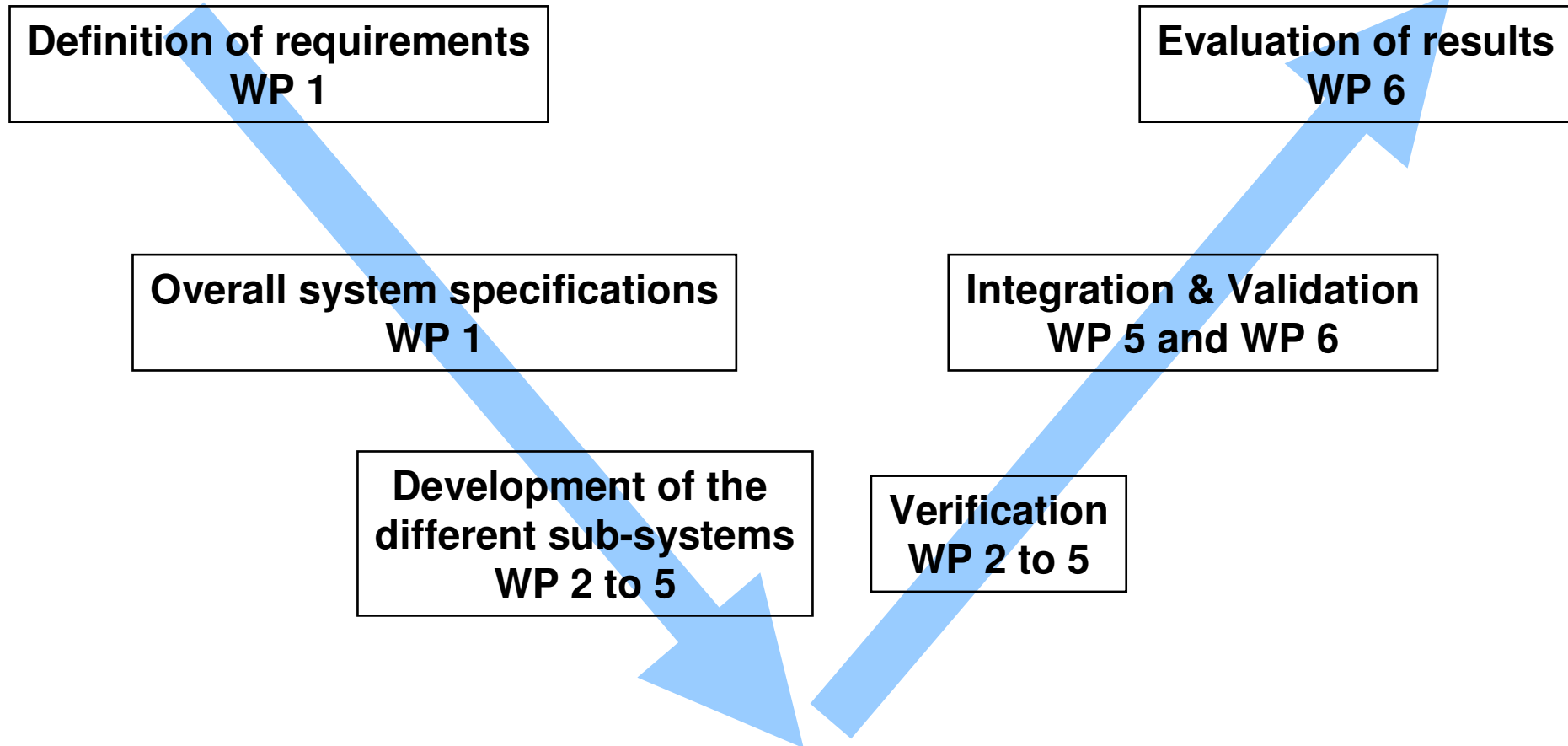
**First Level Objective 1  
(FLO1)**

*"Develop, validate and test an on-board Integrated Surveillance System and demonstrate that it increases Safety"*

**Second Level Objectives :**







- **All the functions will be integrated :**
  - **first into a common platform assembled in THALES Toulouse**
  - **then tested on the NLR simulator in Amsterdam, which will allow simulation of the complete aircraft environment:**
    - ◆ **aircraft behaviour,**
    - ◆ **atmospheric conditions,**
    - ◆ **other traffic in the air and on the ground,**
    - ◆ **terrain,**
    - ◆ **obstacles and**
    - ◆ **a realistic ATC environment,**
    - with a high degree of accuracy**

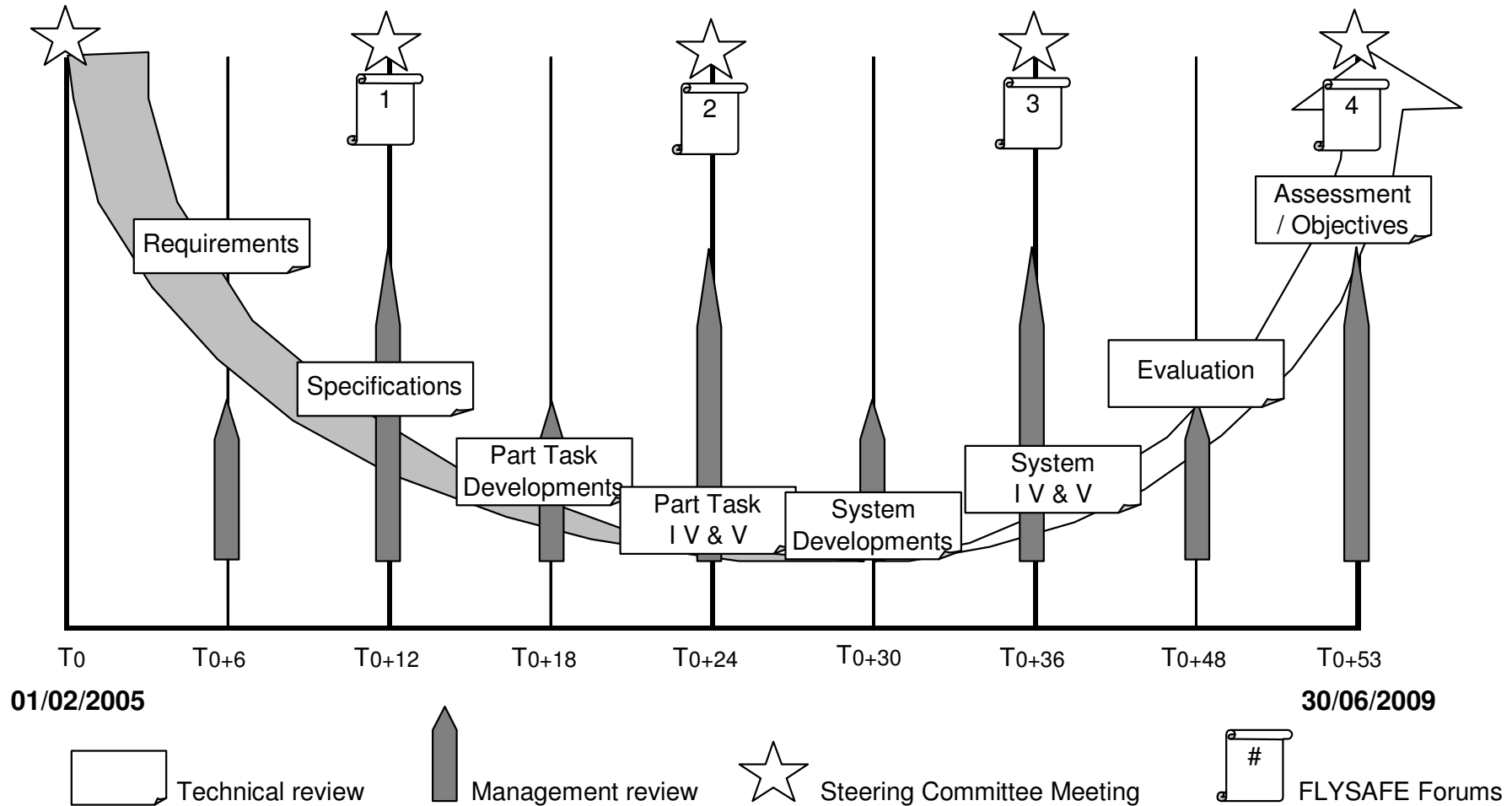
ATC Simulator

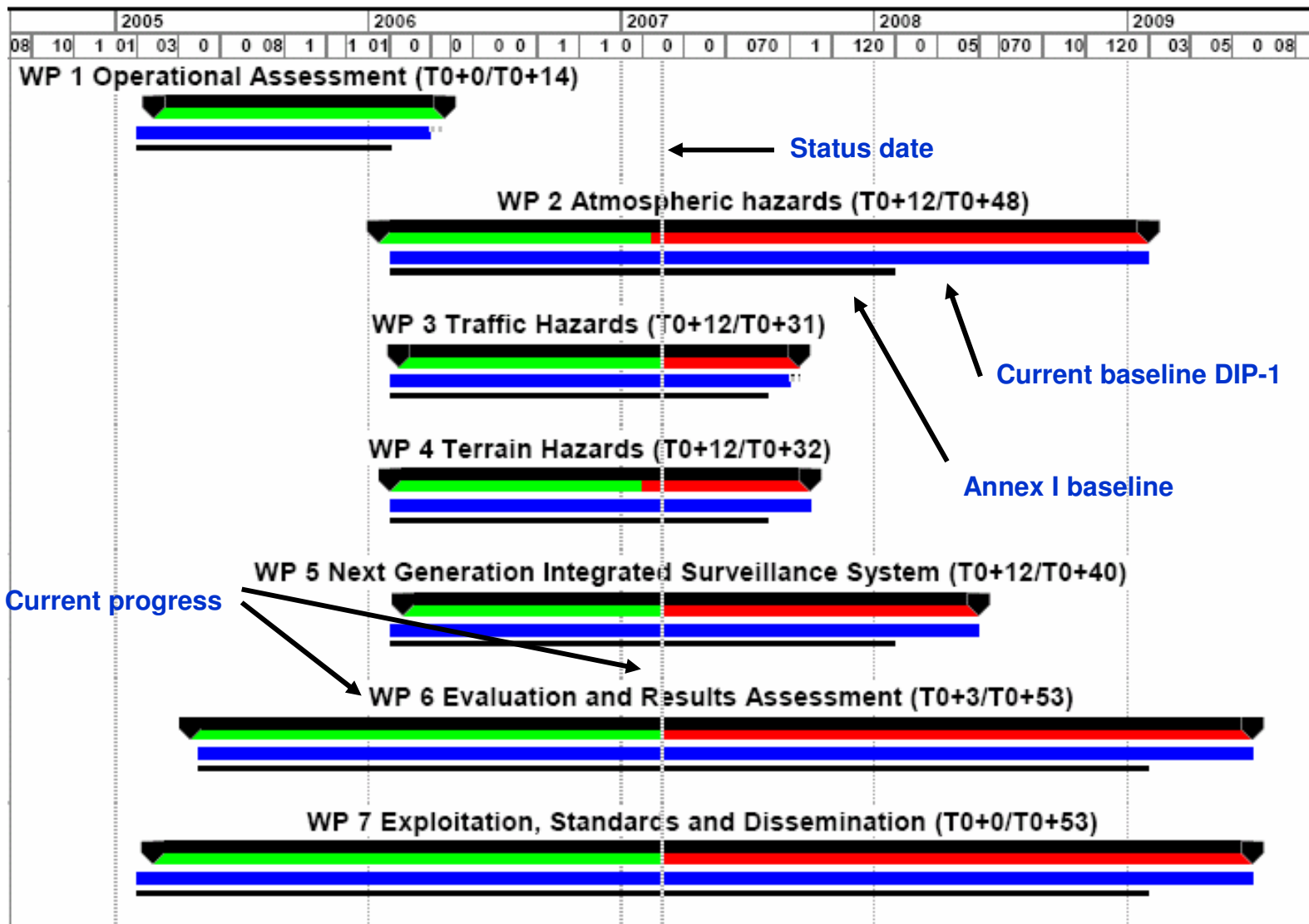


GRACE in Airbus Layout



Tower Simulator







**For further questions please contact:**

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**Please visit our website: <http://www.eu-flysafe.org>**