
SAFEE
SAFEE
Security of Aircraft in the Future European Environment
Welcome to
ICAS, Programme Committee
Workshop
Oct, 4th 2005 in Mykonos

SAFEE

Security of Aircraft in the Future European Environment

Integrated Project in EC Sixth Framework Programme
DG Research AERONAUTICS & SPACE
1st call March 2003
contract n° AIP3-CT-2003-503521

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Marco BRUSATI (our EC/Project Officer)

SAFEE Consortium
31 Partners
12 Countries

Sagem Défense Sécurité
Groupe SAFRAN

12 Countries	15 Large Firms	10 SME	6 Reseach centers
Finland		Environics	
France	**Airbus**, **Sagem**, **Thales Avionics**, Rockwell-Collins MORS, EADS-CRC, SITA	IEEA, Miriad, ENERTEC	ONERA
Germany	**Airbus** , EADS-CRC Siemens		BAM,Munich University of Technology (TUM)
Belgium		CEDITI	
Greece	HAI		
Ireland		Airtel	
Israel		GS-3	
Italy	Galileo, Marconi, Teleavio	Cenciarini	
Netherland		Ecorys	**NLR**
Portugal		Skysoft	
Spain			ISDEFE
United Kingdom	**BAE Systems**		University of Reading

* CORE TEAM

SAFEE Consortium (31 partners, 12 countries)

Country	Major Companies	SMEs	Research Institutes
Belgium		CEDITI	
Finland		Environic	
France	Sagem, Thales Avionics, Airbus, Rockwell Collins, MORS, EDS-CRC, SITA	IEEA, Miriad, ENERTEC	ONERA
Germany	Airbus, EADS-CRC, Siemens		BAM, Munich University of Technology (TUM)
Greece	HAI		
Ireland		Airtel	
Israel		GS-3	
Italy	Galileo, Marconi, Teleavio	Cenciarini	
Netherlands		Ecorys	NLR
Portugal		Skysoft	
Spain			ISDEFE
United Kingdom	BAE Systems		Univ of Reading

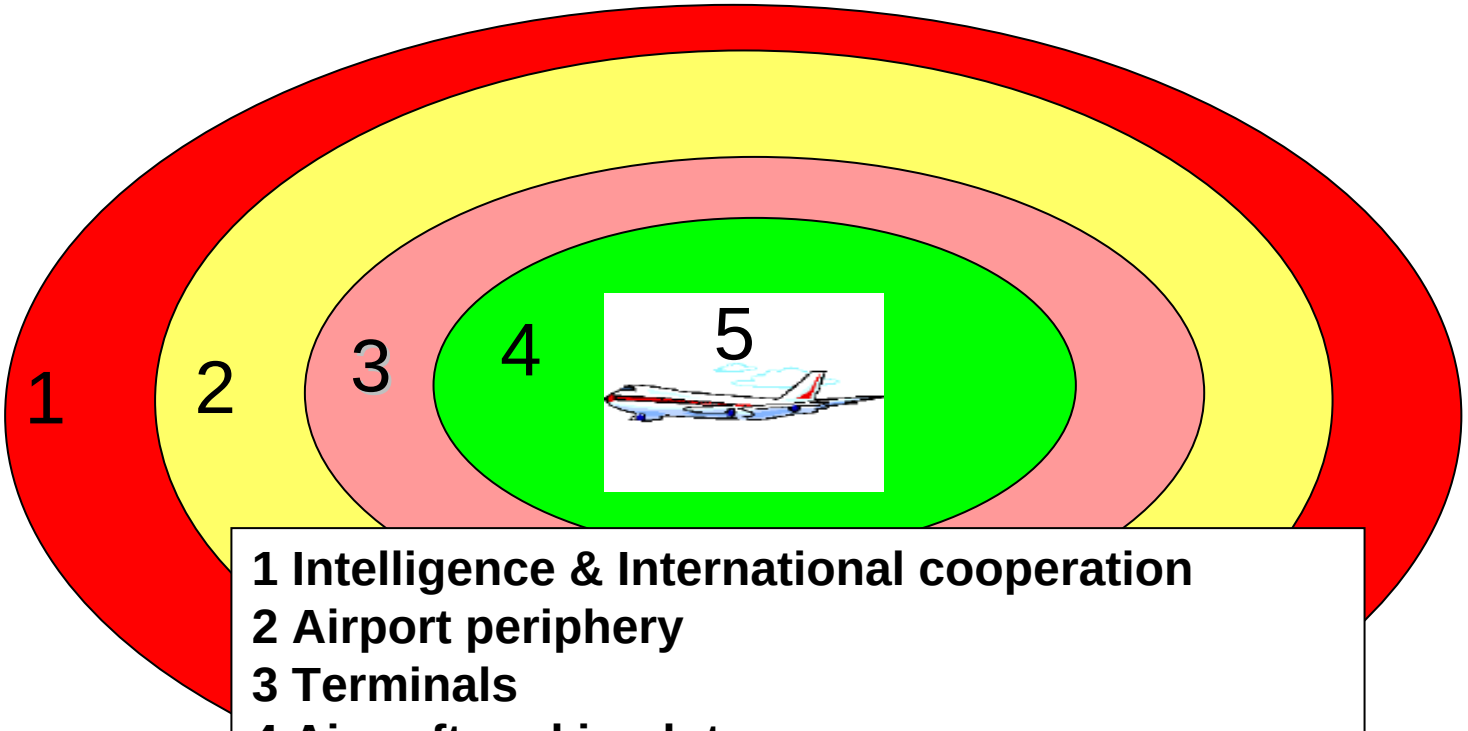
Presentation of the SAFEE Programme

Started on February 1st, 2004
duration: 4 years

Budget: 36 M€
EC grant: 19,45 M€

Scope of SAFEE

The last defence against hostile actions



1 Intelligence & International cooperation
2 Airport periphery
3 Terminals
4 Aircraft parking lots
5 Aircraft in flight

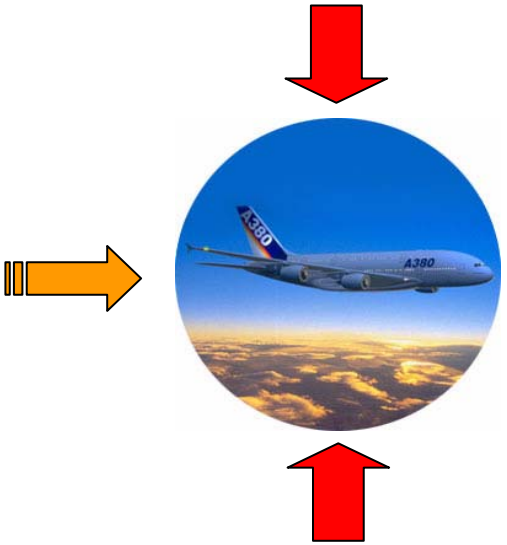
Scope of SAFEE

Three origins of Threats

Crew & Passenger attacks

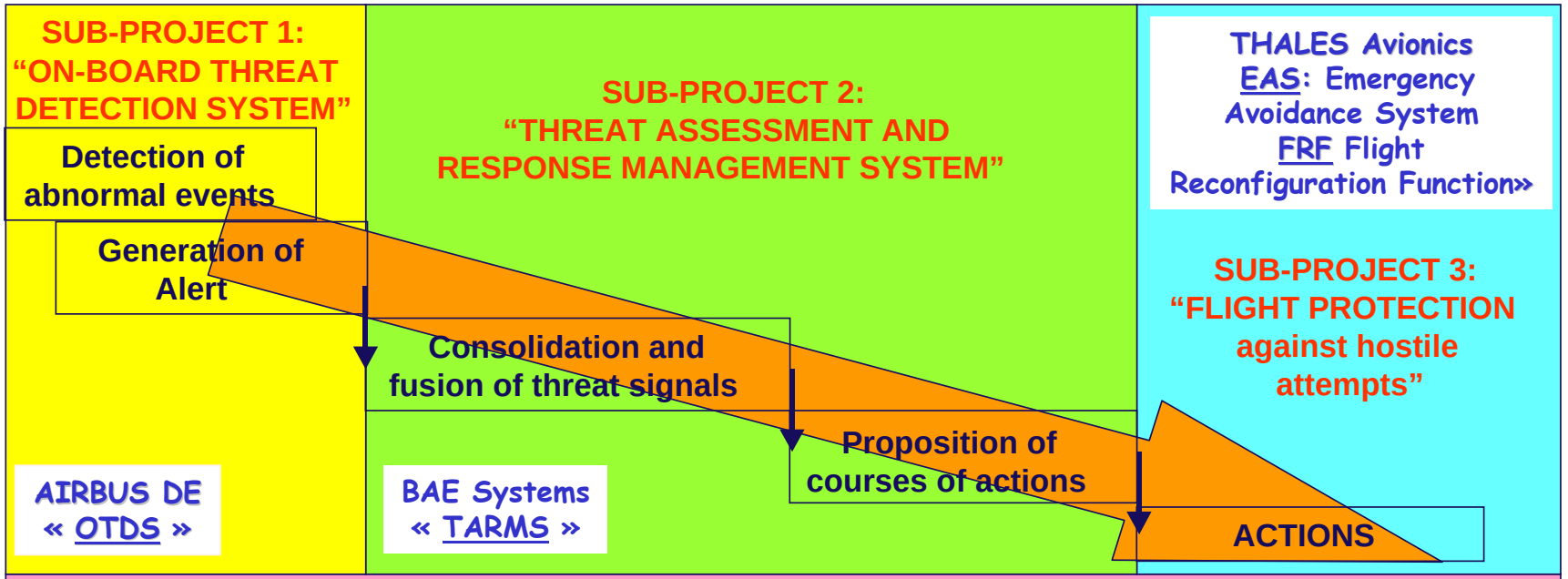
Outside Threats

« Currently Manpads Out of SAFEE for the Time being »

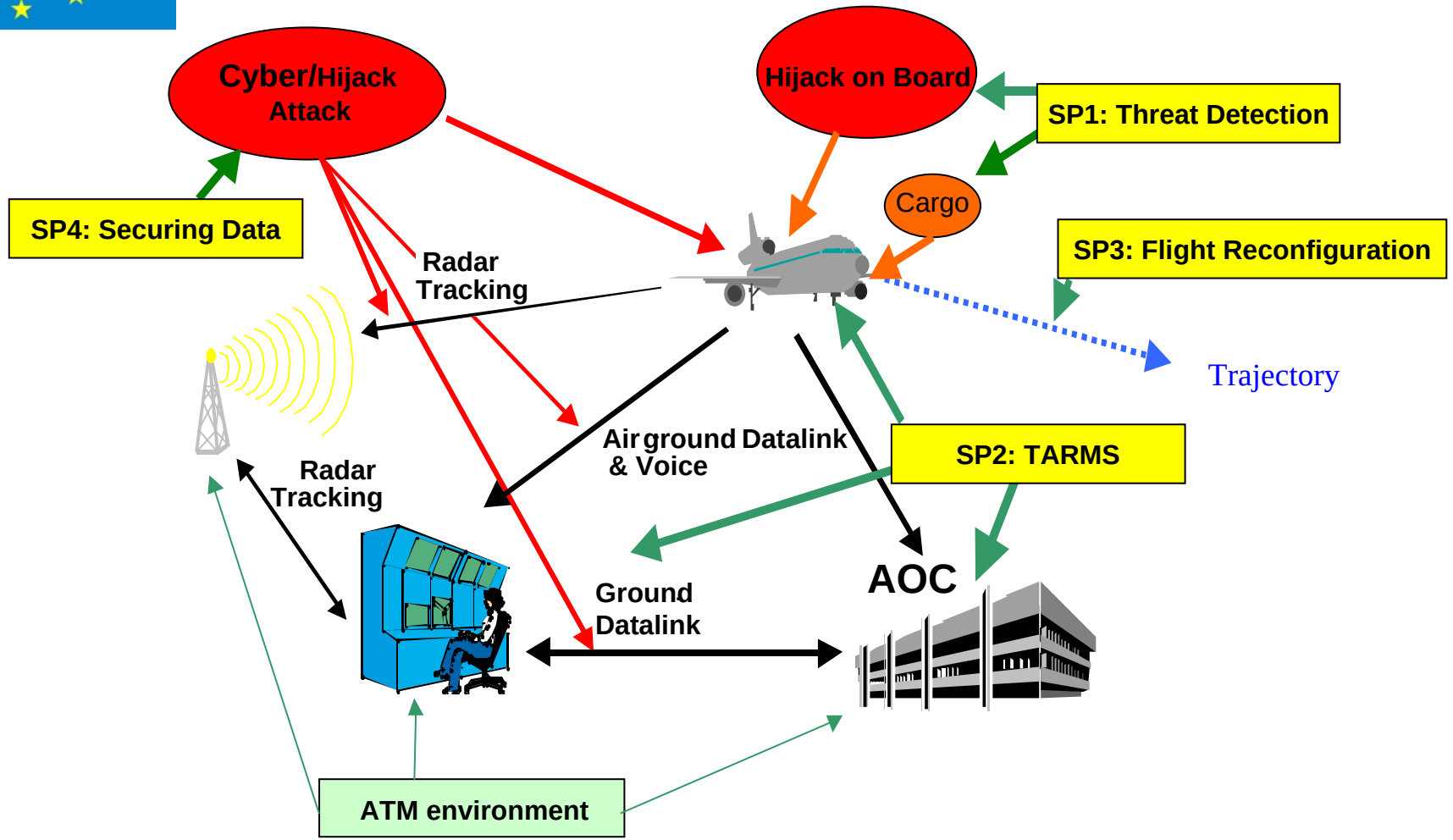


Cargo Hold Threats

Reminder: Broad Project Design



Scope of SAFEE SP's



SP1

Onboard Threat Detection System (OTDS)

Leader: AIRBUS HAMBURG

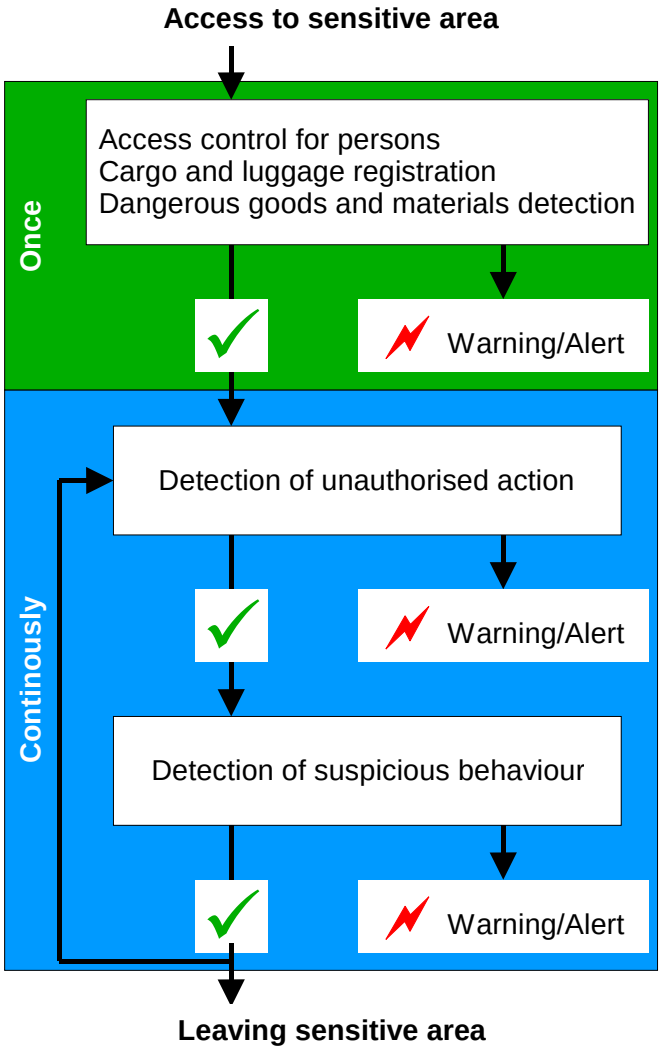
SAFEE SP1 Objectives

Detection of threats coming from

- Persons (passengers, crew, personnel) or
- Dangerous goods and materials

by

- Access control for persons, luggage and cargo,
- Detection of suspicious behaviour



Scope of SAFEE SP1: Onboard Threat Detection System (OTDS)

Sagem Défense Sécurité
Groupe SAFRAN

Cabin Area

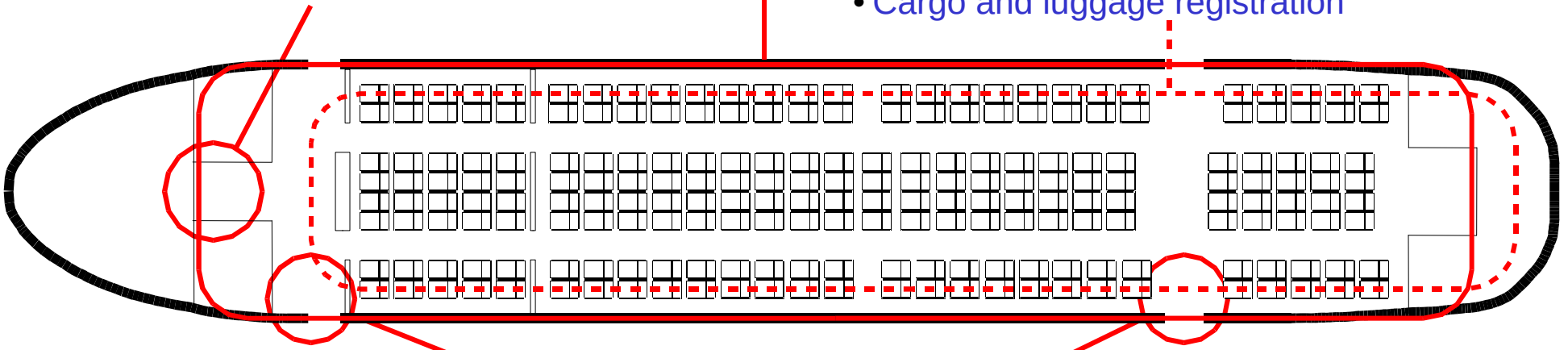
- Detection of suspicious behaviour

Cockpit Access Area

- Access control for persons (in SP4 validation)
- Detection of dangerous goods and materials

Cargo Area

- Detection of dangerous goods and materials
- Cargo and luggage registration



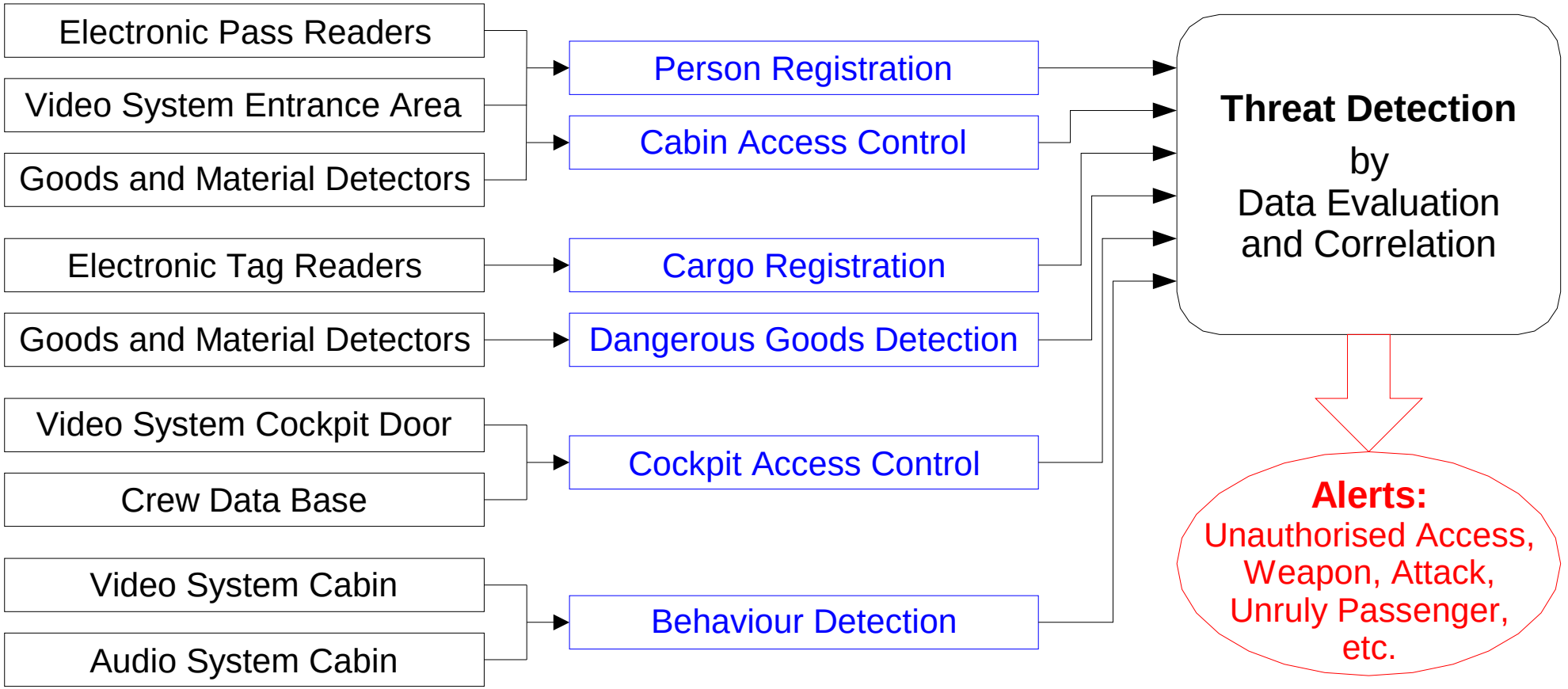
— To be prototyped

— To be specified only

Aircraft Entrance Area

- Access control for persons
- Detection of dangerous goods and materials

OTDS Schematics



SP2 - TARMS

Threat **A**ssessment and **R**esponse **M**anagement **S**ystem

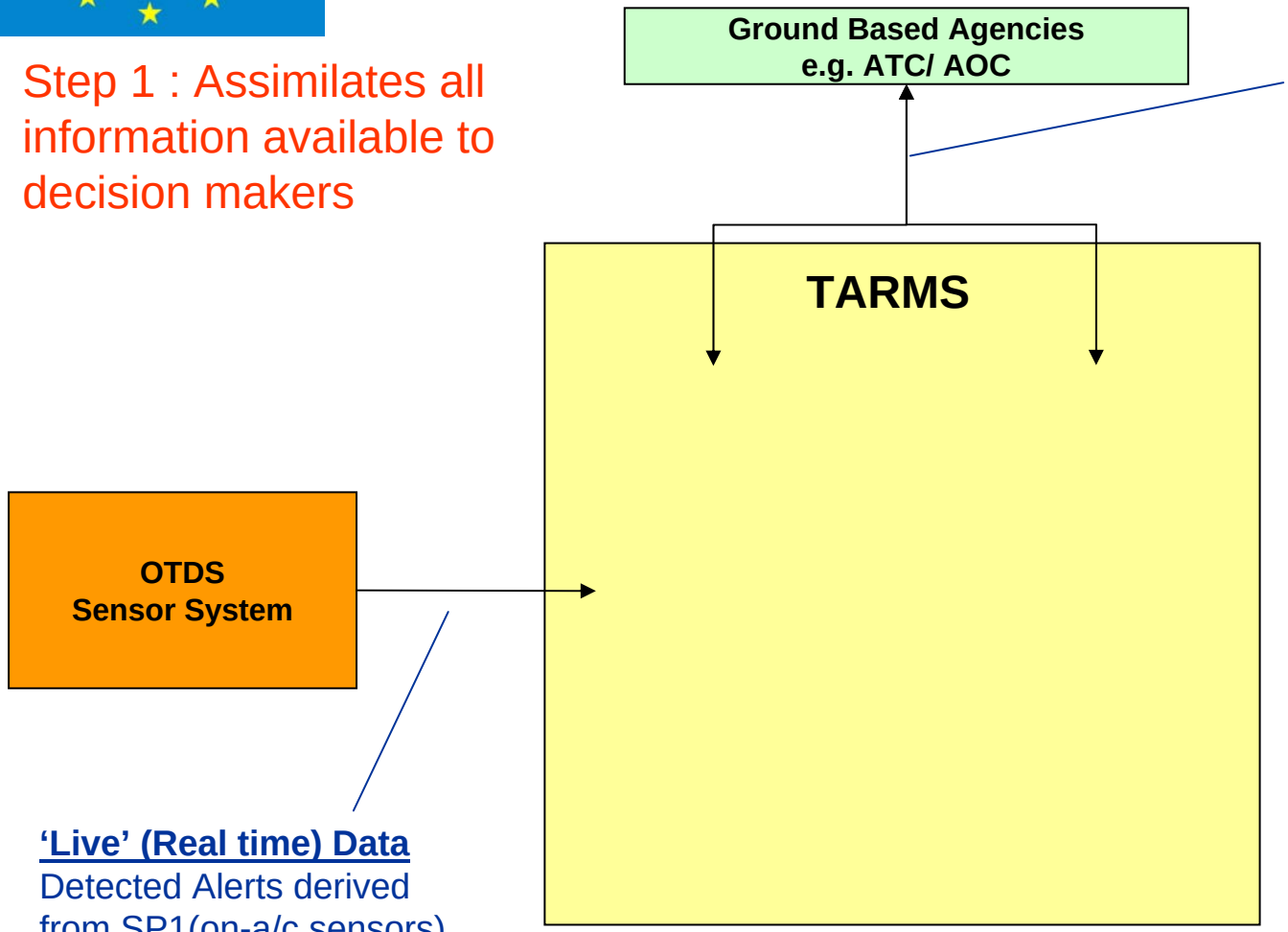
Leader: BAE Systems (Bristol)

What is TARMS?

- **T**hreat **A**ssessment and **R**esponse **M**anagement **S**ystem
- Decision-support tool to enable end-users to:-
  - 1) Assess threat levels
  - 2) Choose appropriate responses

What does TARMS Do?

Step 1 : Assimilates all information available to decision makers



Background & Context Information

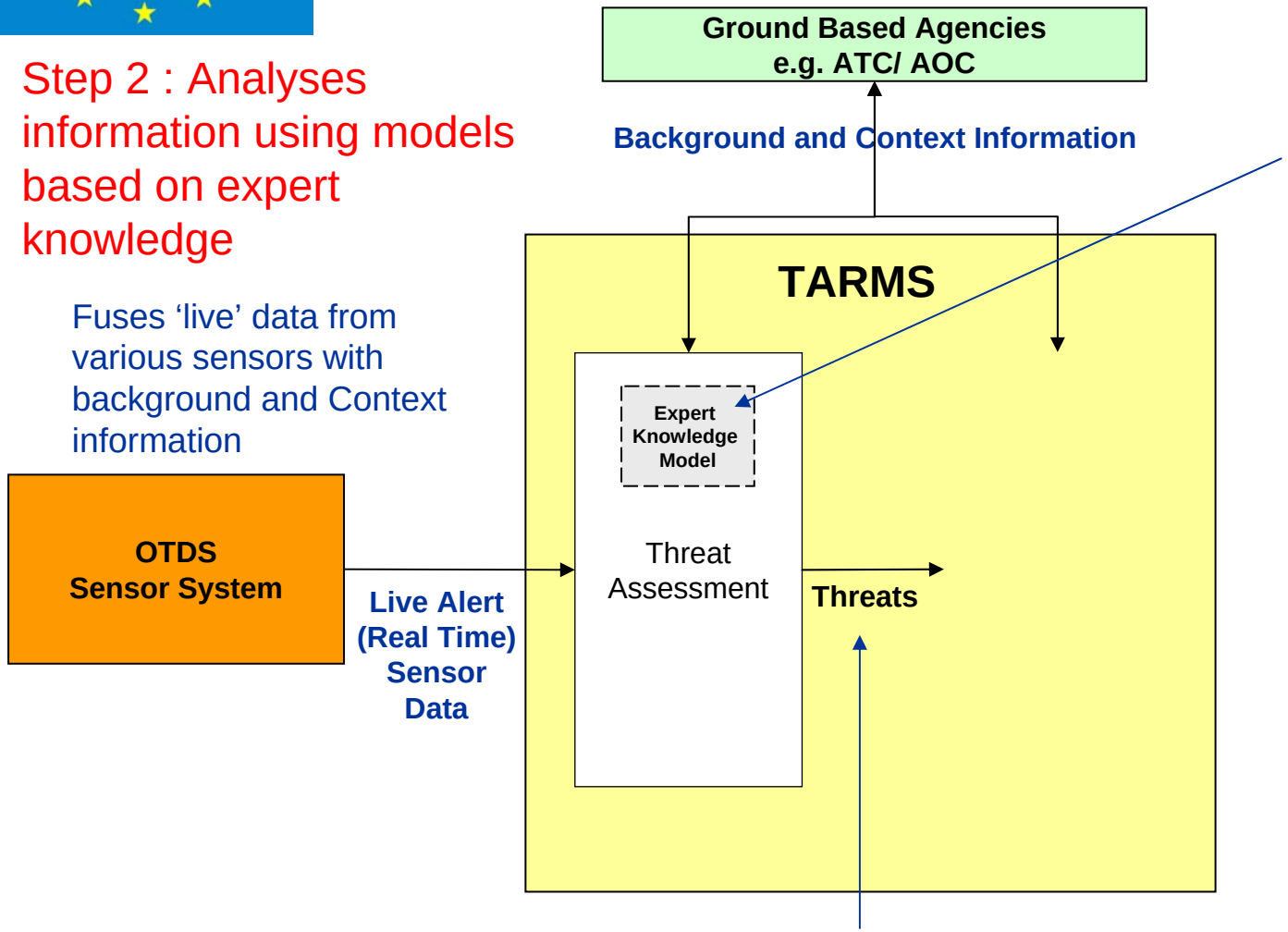
- Intelligence from security agencies
- Information from Pre-Board checks
- Databases of current Terrorists/Criminals and Unruly Pax
- Knowledge bases of current terrorist activity
- Prior Knowledge, about the Flight
  - Destination
  - Passengers
  - Luggage/Cargo
  - The Prevailing Security Situation
  - etc

'Live' (Real time) Data
Detected Alerts derived from SP1(on-a/c sensors)

What does TARMS Do?

Step 2 : Analyses information using models based on expert knowledge

Fuses ‘live’ data from various sensors with background and Context information

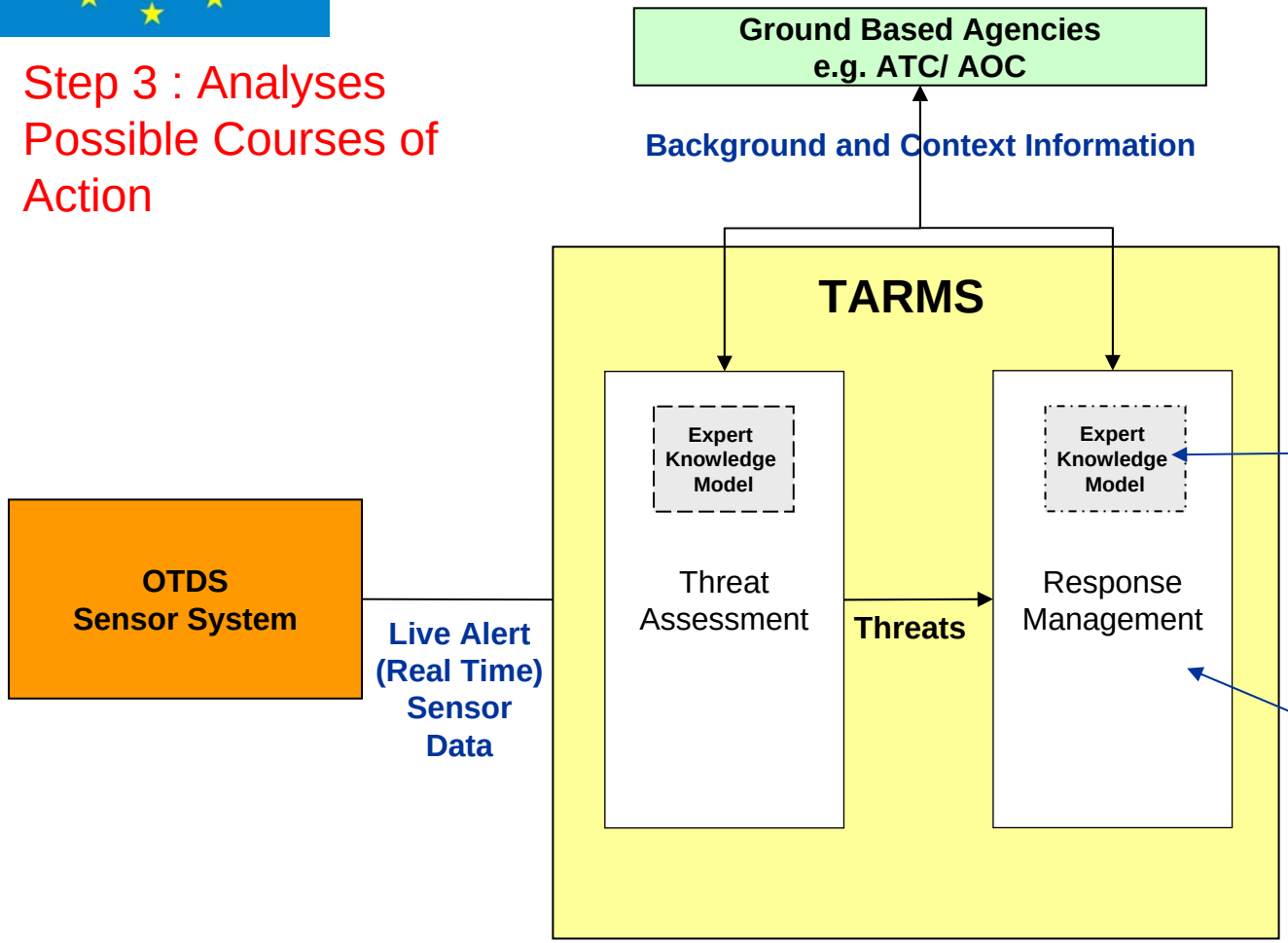


Uses a threat model based on expert knowledge to place ‘live’ data in context of background information

Makes judgements about the current threat levels

What does TARMS Do?

Step 3 : Analyses Possible Courses of Action

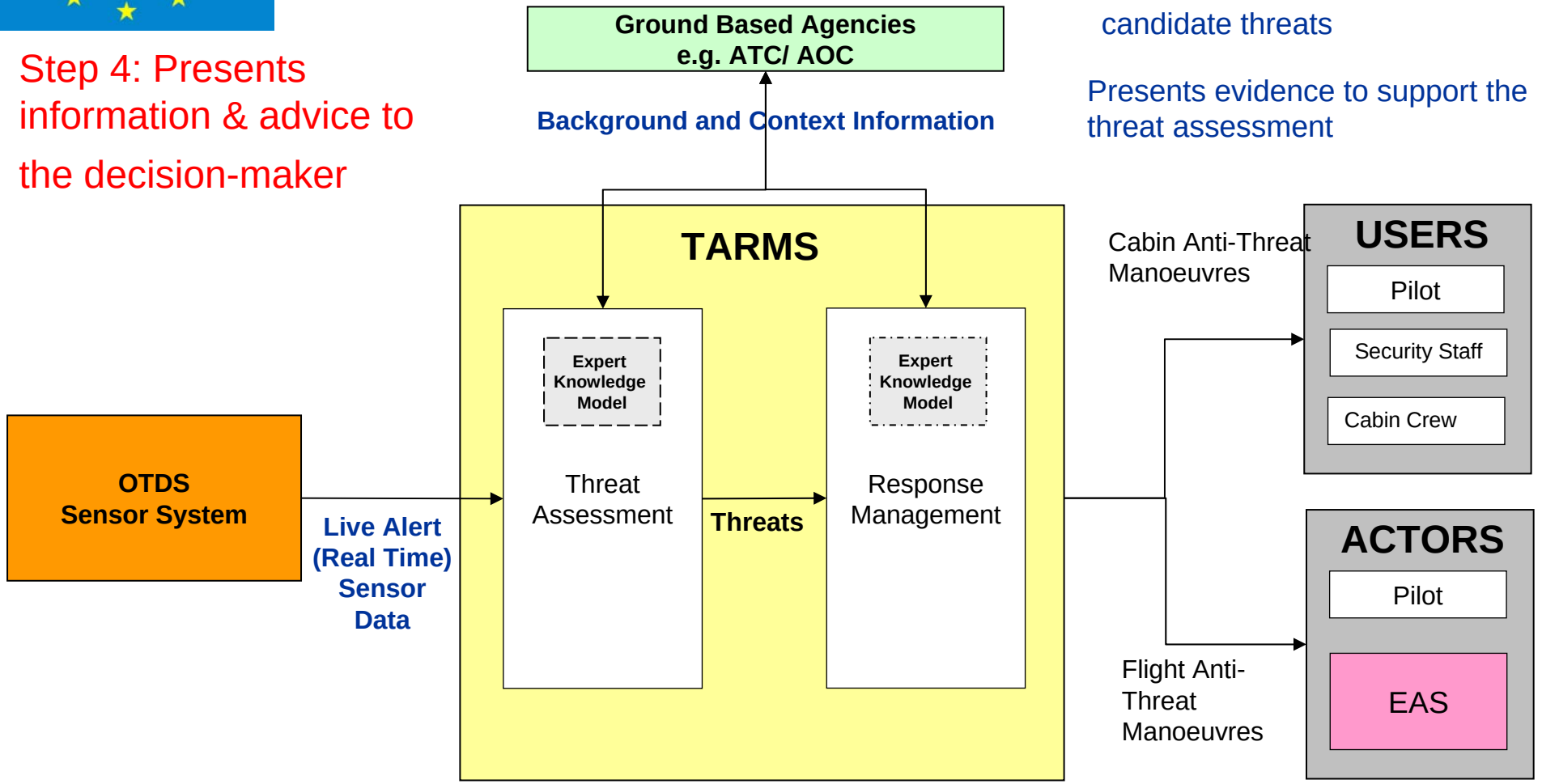


Courses of action are also based on expert knowledge

Response Management Process determines best courses of action based on type & level of threat and current situation

What does TARMS Do?

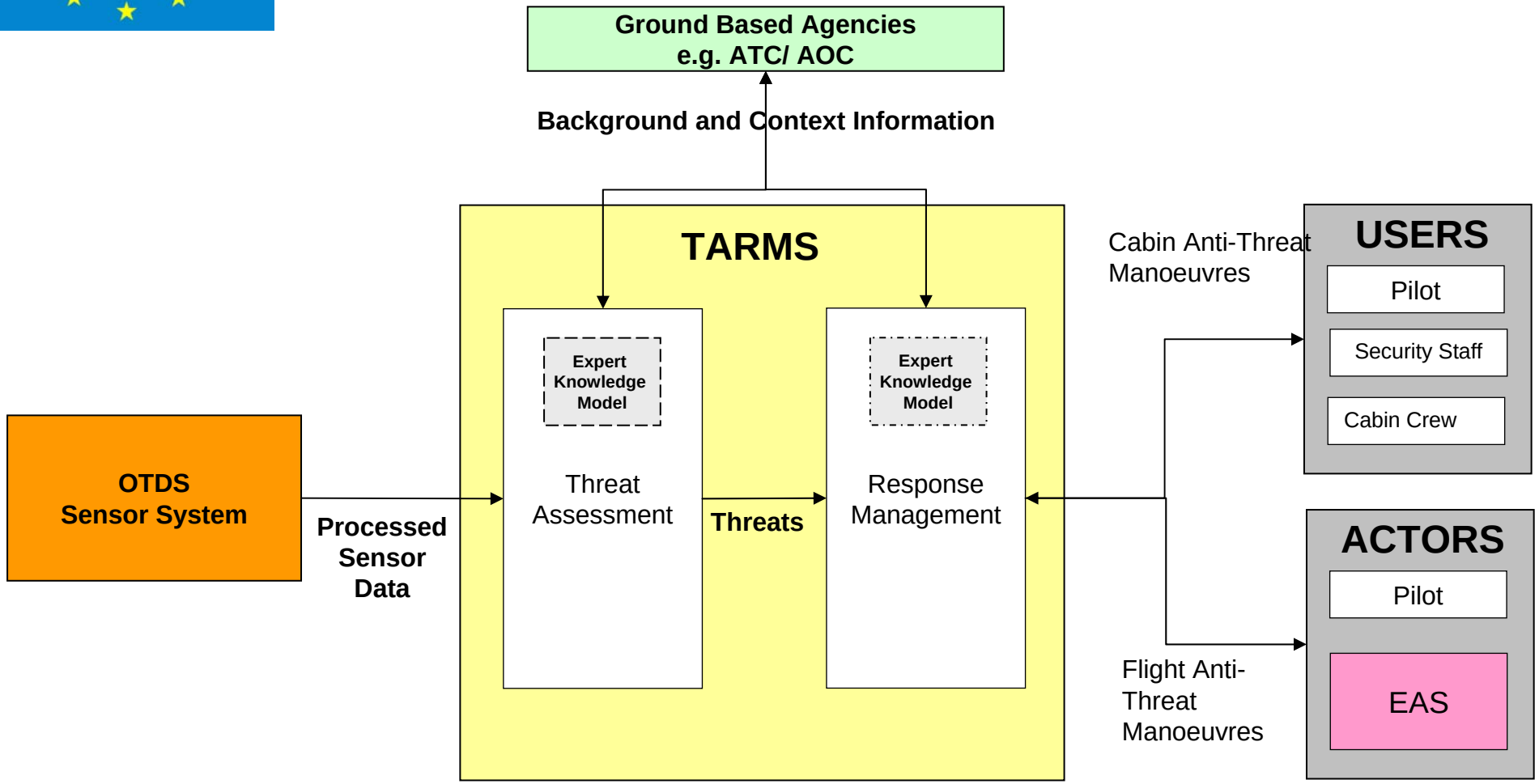
Step 4: Presents information & advice to the decision-maker



Provides decision-maker with the option to re-examine data or request more data

Presents proposed courses of action associated with each threat

TARMS 'Knowledge Models'



SP3 – FRF/EAS

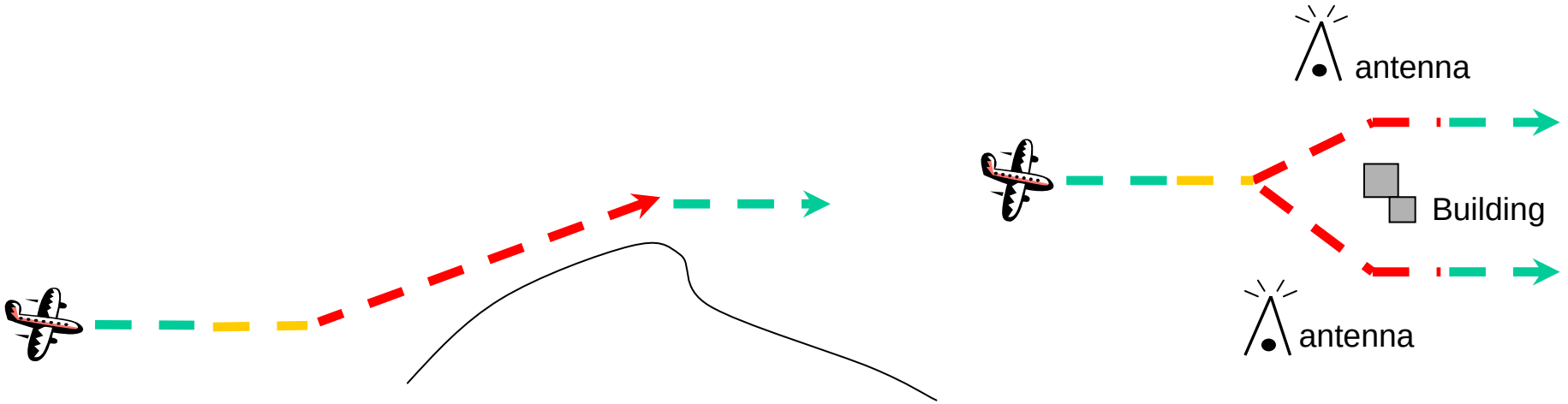
Leader THALES Avionics

9/11
10 seconds before impact

Proposed response :

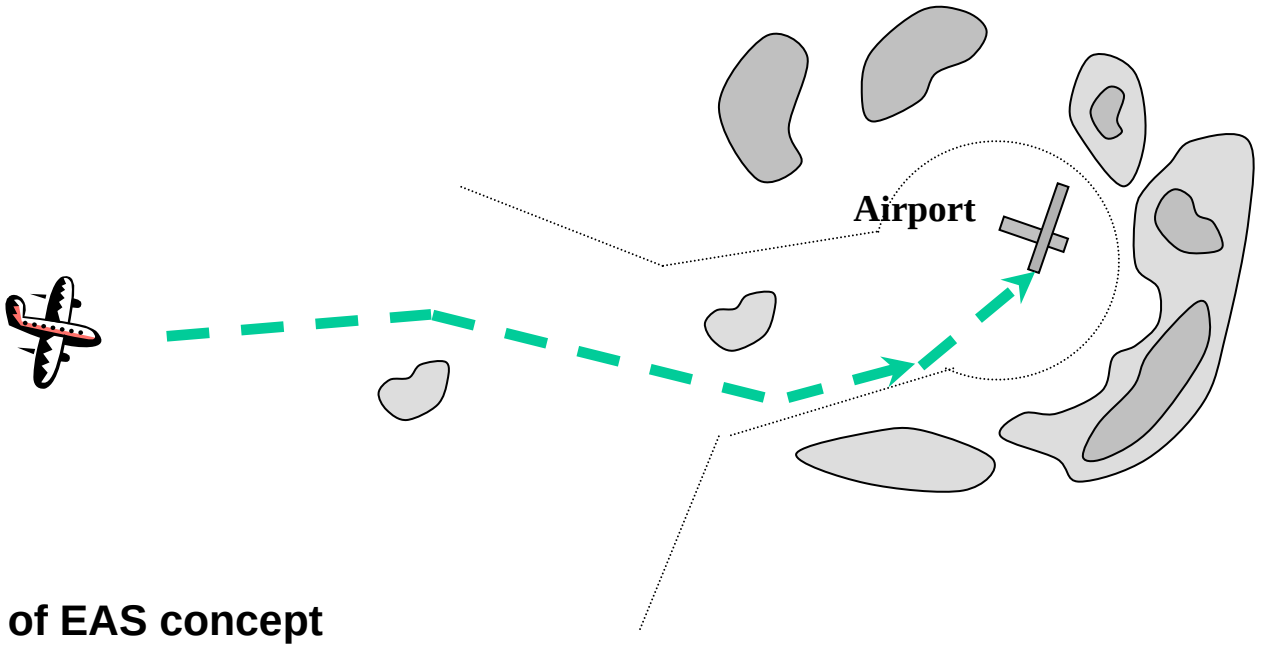
After original pilot is inoperative, the Flight Reconfiguration Function (FRF) takes over the A/C flight controls

Emergency Collision Avoidance System (EAS) Description



Flight controlled by the pilot
Collision detection Alert
Automatic avoidance

The ultimate step : Flight Reconfiguration Function



- Extension of EAS concept

- Long term, advanced research study

SP4 DATA

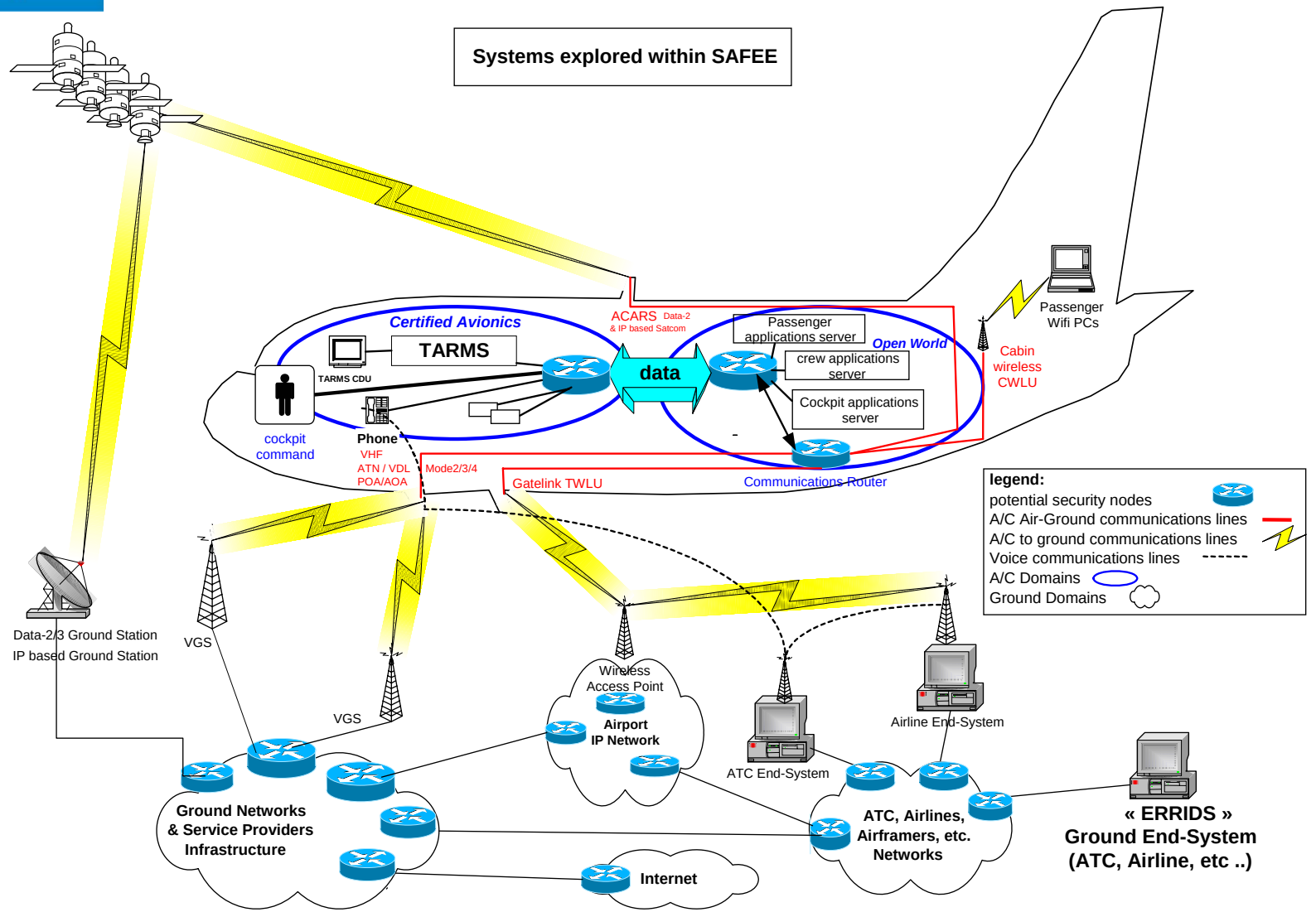
Leader: SAGEM Défense Sécurité

SP4 Objectives

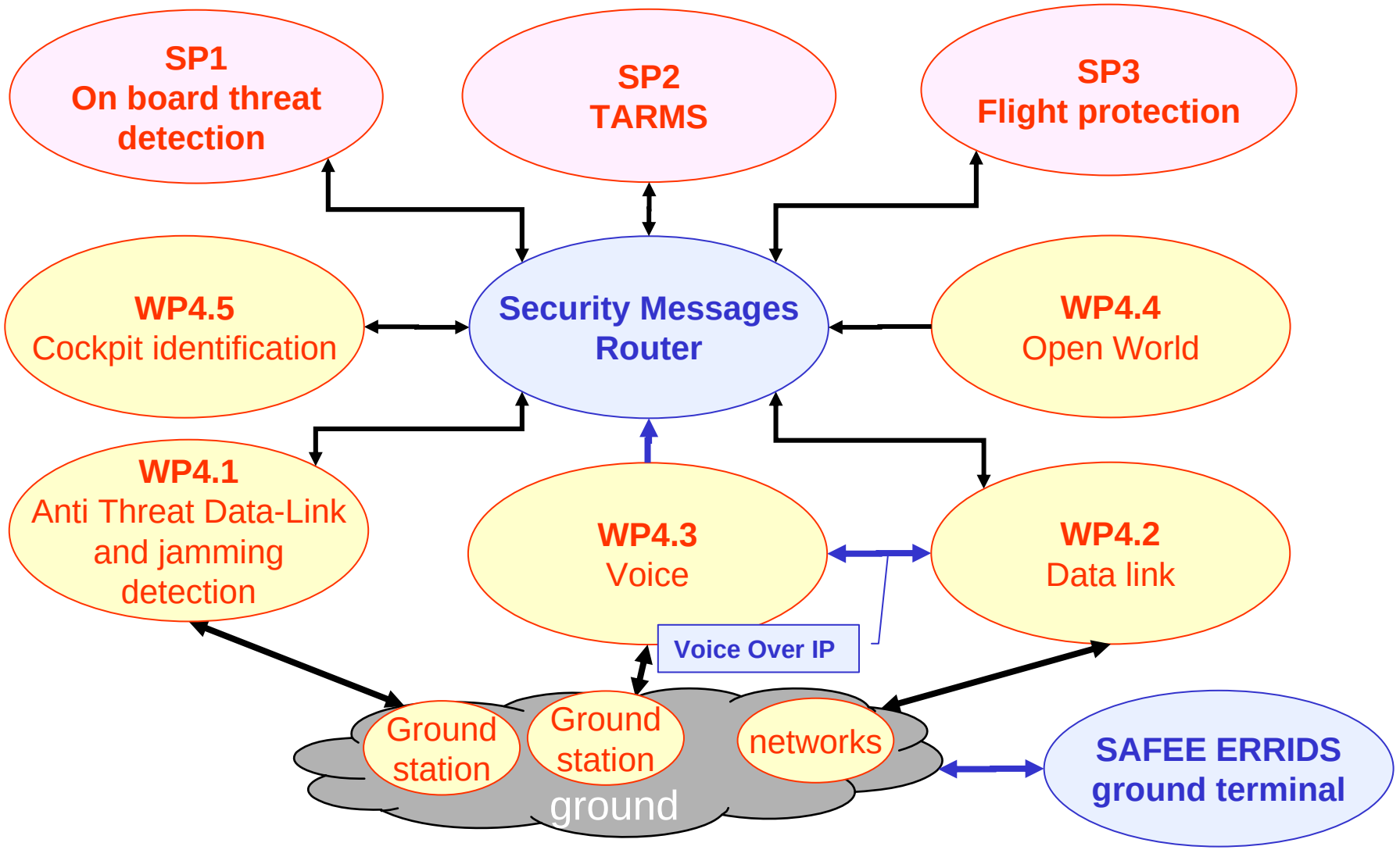
- To protect communications and data that are daily used for exploitation of aircraft in an hostile environment

- SP4 aims at working on security aspects around DATA in the aircraft. Main interest is to detect attacks to on-board related data, pre-assess, and then act to protect the data which are critical for flight safety.

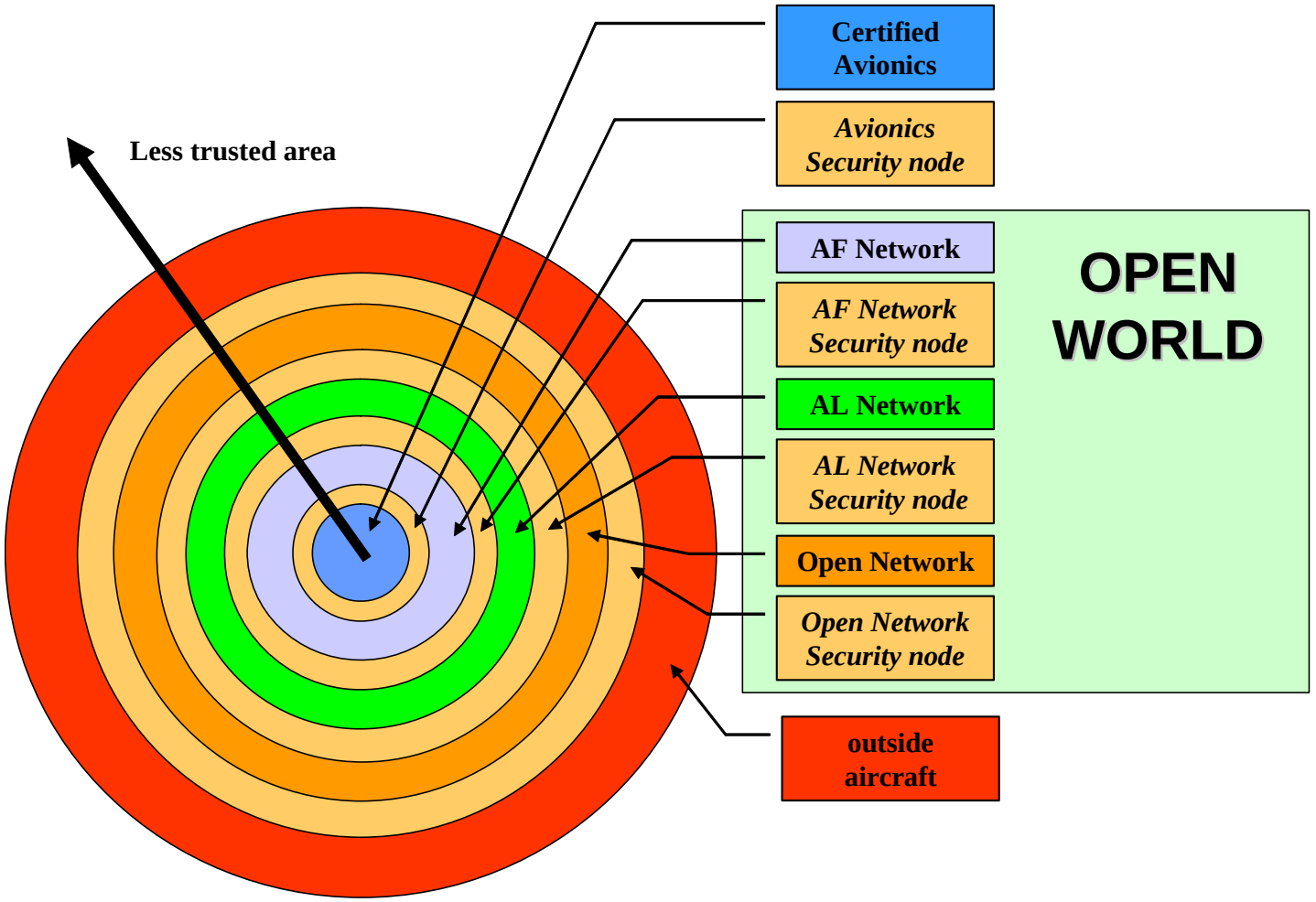
SP4 DATA


Systems explored within SAFEE
Certified Avionics
TARMS
TARMS CDU
cockpit command
Phone
VHF
ATN / VDL
POA/AOA
Mode2/3/4
ACARS Data-2
& IP based Satcom
data
Open World
Passenger applications server
crew applications server
Cockpit applications server
Communications Router
Gatelink TWLU
Passenger Wifi PCs
Cabin wireless CWLU
legend:
potential security nodes
A/C Air-Ground communications lines
A/C to ground communications lines
Voice communications lines
A/C Domains
Ground Domains
Data-2/3 Ground Station
IP based Ground Station
VGS
VGS
Wireless Access Point
Airport IP Network
ATC End-System
Airline End-System
Ground Networks & Service Providers Infrastructure
Internet
ATC, Airlines, Airframers, etc. Networks
« ERRIDS » Ground End-System (ATC, Airline, etc ..)

Global Security SAFEE Architecture



Security layers



SP5 Security Evaluation

Leader: NLR

SP5 Objectives

- To identify and analyse legal and regulatory issues relevant for the introduction of the new SAFEE systems
- To analyse and evaluate the security of flight operations (with and without the SAFEE systems) through a threat assessment
- To develop a validation strategy and experiment design plan, and to evaluate the overall SAFEE system validation results
- To provide training to the potential end-users of the SAFEE systems, using a validated real-time flight simulation environment
- To perform an economic analysis of the SAFEE systems and measures
- To study international security improvements, and to evaluate their potential to support the further improvement of the SAFEE systems

Legal and regulatory issues

- **Review, analysis and evaluation of relevant existing aviation legal and regulatory requirements and (both international & national documents):**
  - **ICAO Documents**
  - **EU Documents**
  - **ECAC Documents**
  - **ACARE Document**
  - **EASA (JAA) Documents**
  - **FAA Documents**
  - **IATA Documents**
  - **EU state members' documents**

Who is responsible ?

Legal and regulatory issues

Aircraft	Parking			Parking
Boarding	Taxi Out	Flight	Taxi in	Disembarking
People — Check In, Work, Immigration		*Pilot responsible (JAR-OPS)*		Immigration, Baggage

Airport	Airline	Airlines and Air Traffic Control Centers	Airline	Airport
+ National Police and Customs	+ Airport	+ country (plus specific regulations)	+ Airport	+ National Police and Customs

Responsibilities and liabilities

- The novelty of SAFEE creates new perspective of pilot in command authority.
- The current basic rule is that the pilot in command has the ultimate authority regarding the operation of the aircraft

- However, SAFEE EAS creates for the first time a situation when the aircraft is not controlled by the pilot in command
  - Who is responsible then?
  - Is there a need for re-evaluation of the pilot in command's legal status?

- Post 9/11 two developments occurred on board: (1) increased enforcement of locked cockpit doors and (2) much wider deployment of Sky Marshals
- Therefore, is the pilot in command responsible/liable for the combat activity of the sky marshal or a new envisaged "flight security officer" ?

Human Rights Issues

- **SAFEE operational concept requires information processing of passengers, crew members, airline and airport employees, by:**
  - **Monitoring – on board cameras and sensors**
  - **Recording of information (pre flight and during the flight)**
  - **Gathering Intelligence information**
  - **Use of “black list” of suspected passengers and industry employees**
  - **Information collected during ground passengers screening**
  - **Pre flight data collection (PNR) and passengers profiling**

Human Rights Issues

- However, these elements most probably will entail a departure from what is universally considered as "privacy“
- The EC has already recognized this problem in Reg. (EC) 2320/2002, dealing with civil aviation security – stating that the fundamental rights of the EU Charter have to be respected. This regulation also emphasises the principals of proportionality.
- Possible direction for legal solution is shown in the 2004 agreement between the EU and the USA authorizing EU airlines to transmit Passenger Name Records (PNR) to the US Department of Homeland Security. The agreement stresses that the necessary balance has to be maintained between security concerns and privacy concerns

Direction for Possible Solutions

The <u>primary objective</u> of International *civil aviation security* is - to <u>assure protection and safety</u> of the *passengers and crew.* An inherent dilemma:

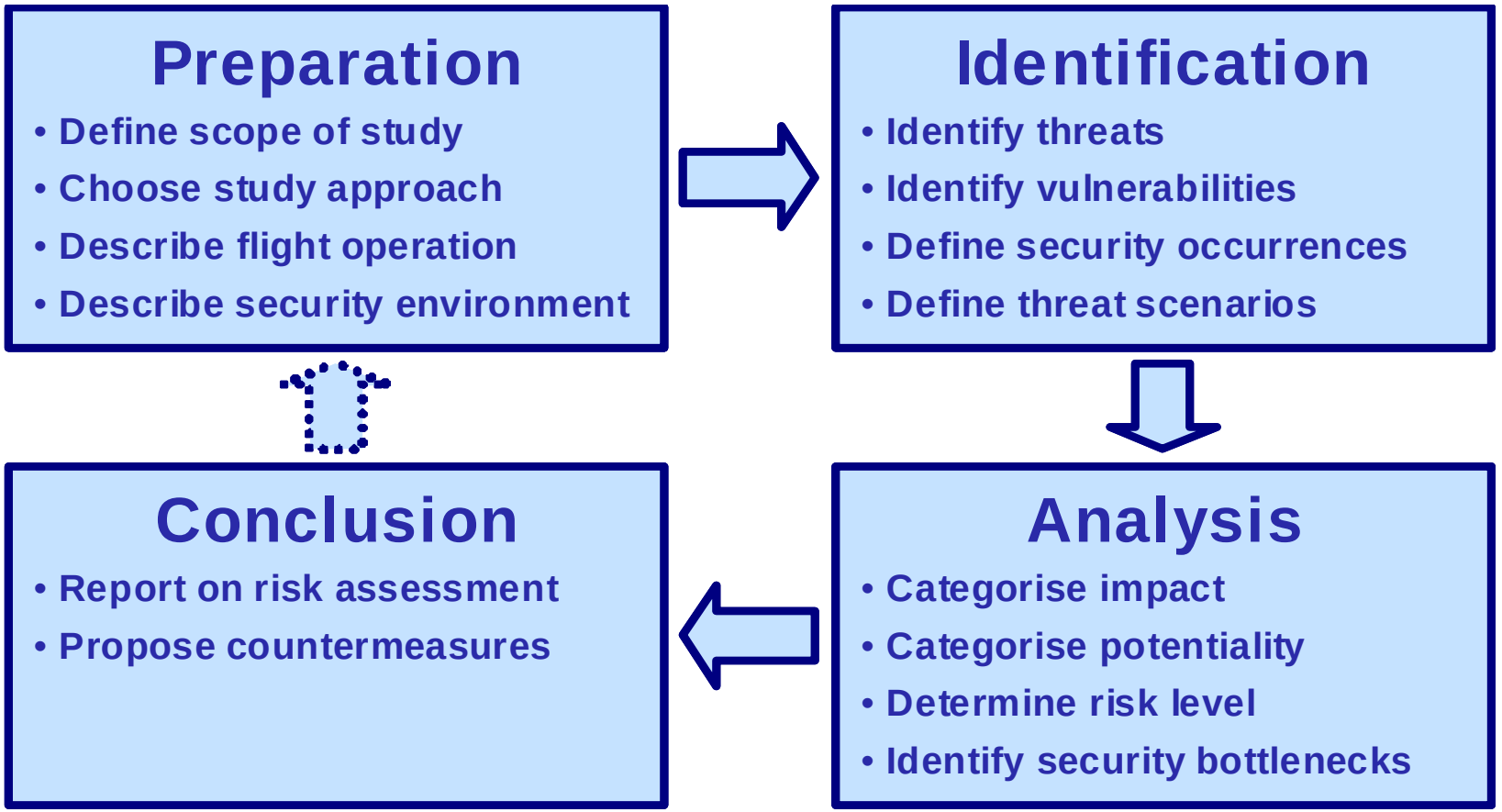
How to assure maximum security with minimum breach of human rights

- **This dilemma between security & human rights will continue to exist,i.e. :**
  - **The world community will have to accept that when one enters the aircraft some rights will have to be sacrificed to secure civil aviation**
  - **This not a too expensive price - when we consider what is at stake**

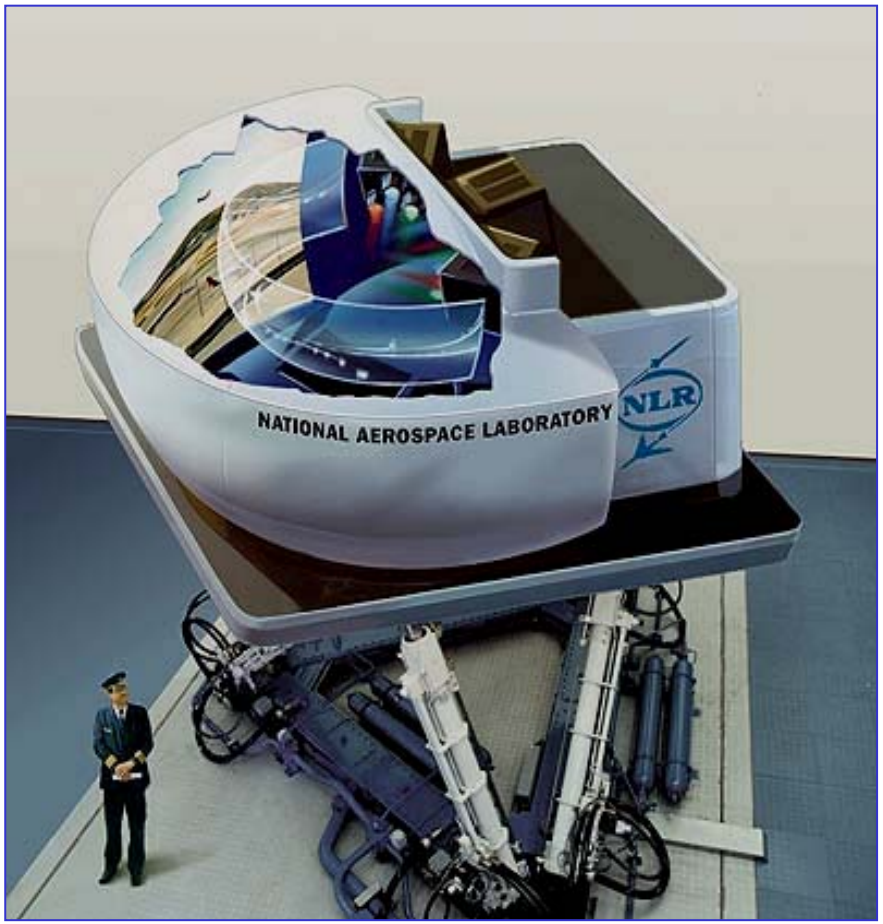
SAFEE Impact on Regulatory Bodies

- At Airlines level
  - improvement of current security manuals
- At National level (for instance in France)
  - improvement of current regulations: new amendments in Security Programme for each international airport (different controls at the SC/P)
  - introduction of new regulations: renewal of the CNIL regulations
- At European level
  - direct impact (improvement?) of Doc. 30 Part II of ECAC
- At World level
  - improvement of Annex 17 of ICAO

Threat Assessment Methodology



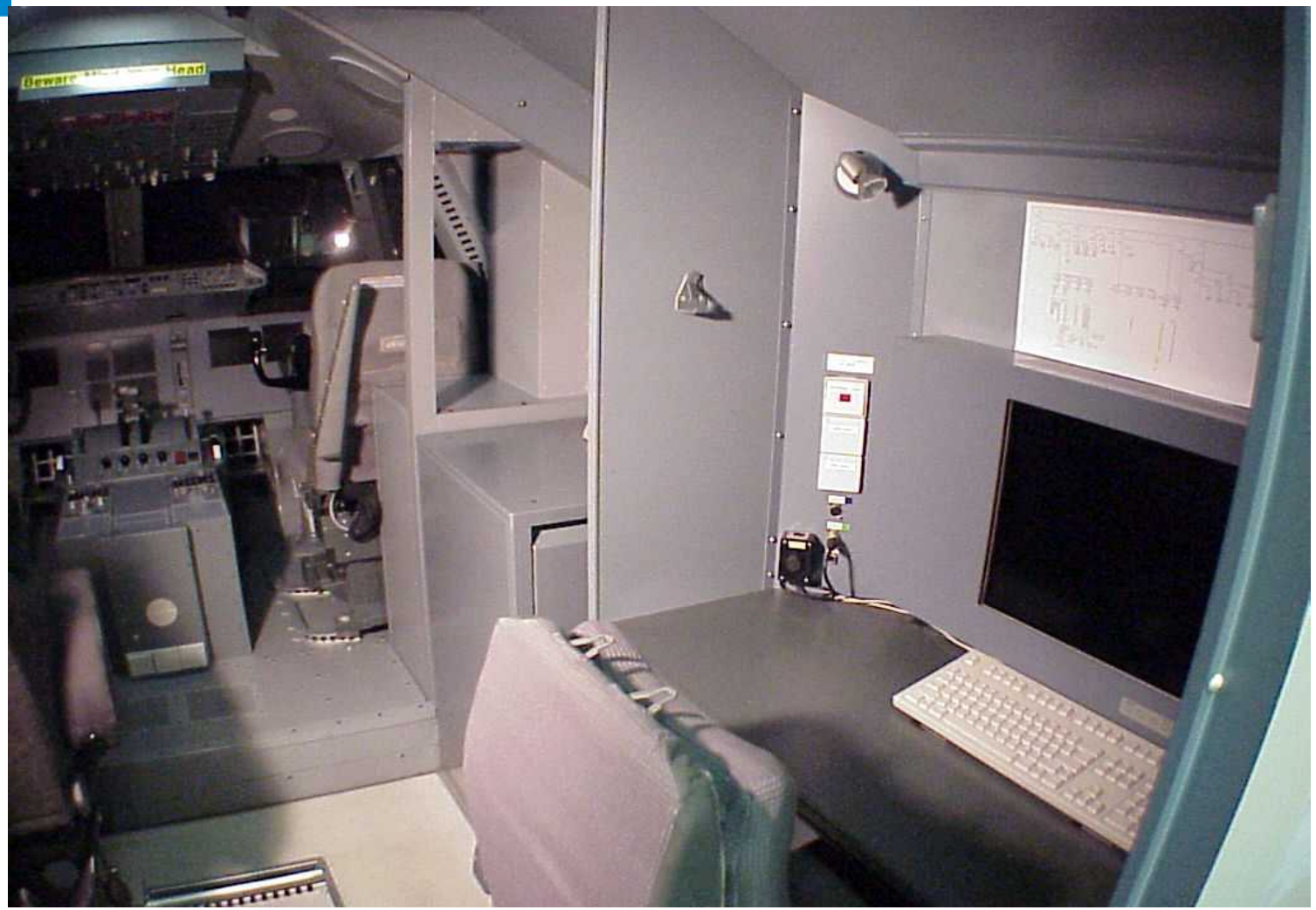
How to validate?
(flight simulators; also for training)



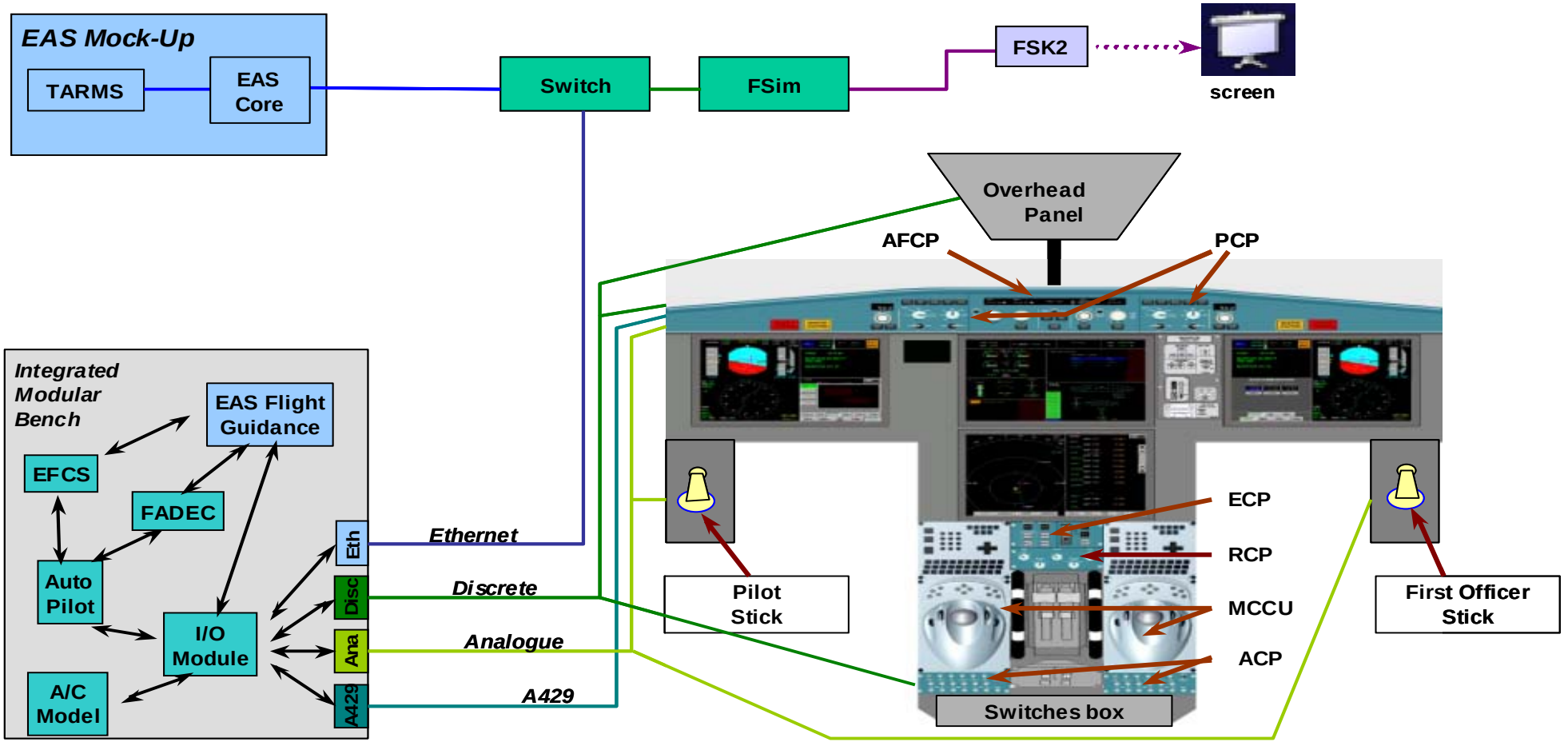
Involvement of end-users!

NLR GRACE Simulator

NLR GRACE Simulator
AFT Station

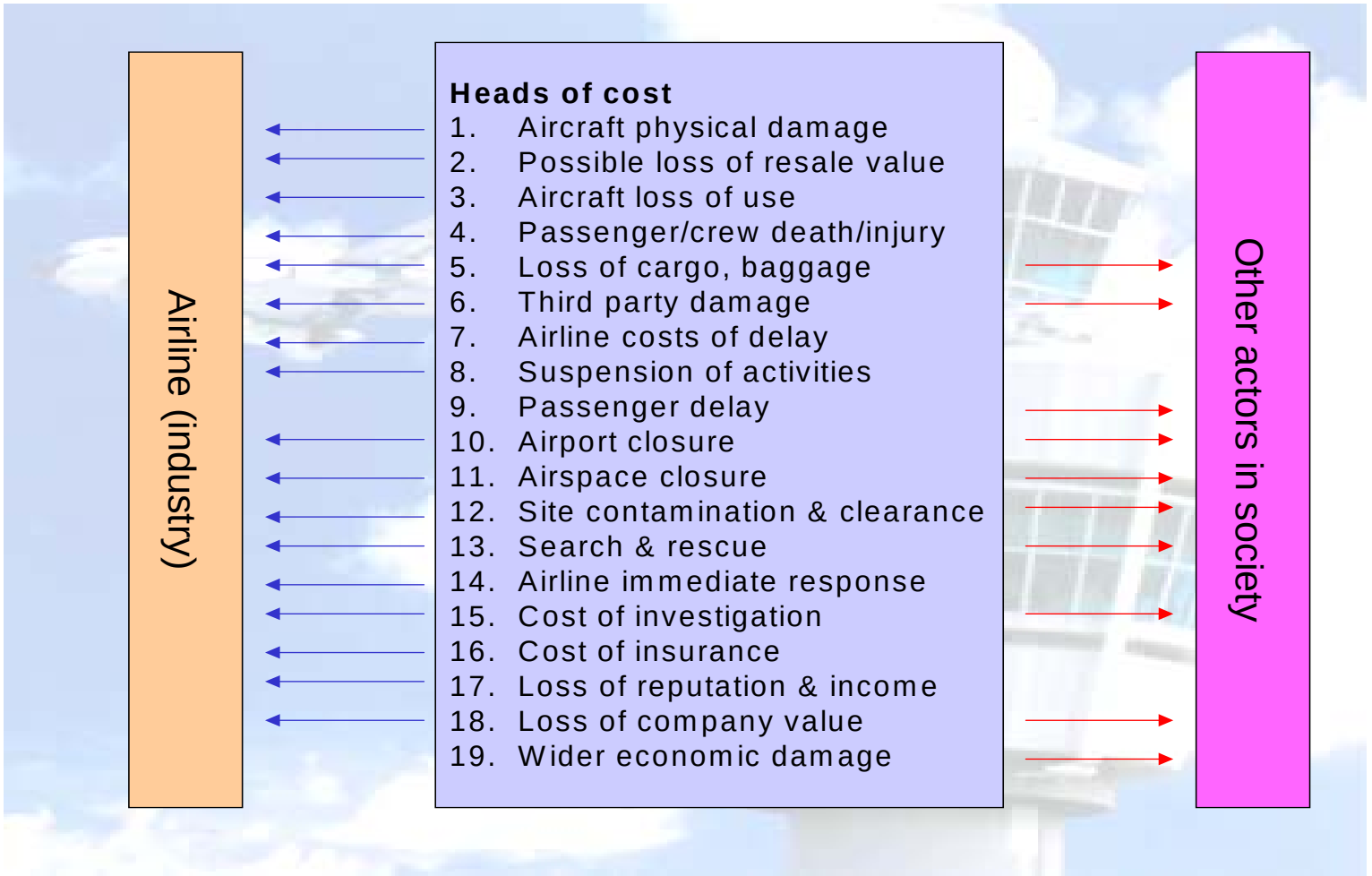


THALES Simulator



AIRBUS Cabin Simulator

Who is expected to finance?
Costs and benefits of security measures



Who will support design of SAFEE systems?
Managing *the end-users* club

SAFEE

Security of Aircraft in the Future European Environment

INVITATION: SAFEE USER CLUB

BAE SYSTEMS

NLR

You have received this as we believe you would be able make a valuable contribution to the current debate regarding security and safety in civil aviation.

Background

SAFEE is a four-year EU Commission part-funded project contained within the Sixth Framework Programme with the aim of restoring passenger confidence in civil aviation to pre-2001 levels. It intends to develop on-aircraft technologies that will complement off-aircraft security systems. The project will be broken into three phases:

- Review of the problem and initial assessment of possible solutions
- Development of technology to produce a solution
- Trials and validation of the solutions

The technical partners in the SAFEE project have been recruited from across Europe and together represent a powerful grouping of companies across aviation industry (including Sagem, Airbus, BAE SYSTEMS, Thales, NLR, GS-3, Galileo, Marconi and SITA).

The SAFEE partners are committed to making a valuable contribution to aviation security and safety. It is vital that the technologies be optimised for use in commercial aviation. Therefore, in the initial stages of the project it is critical to engage representatives from European civil aviation to gather opinions and test ideas. In the latter stages of the project it is vital that the results of the project be available for immediate dissemination and implementation. The User Club is intended to fulfil both of these functions and it is for this reason that we would value your contribution.

If you are interested and would like more information please fill in the form and return to your point of contact within the SAFEE programme and to safee.userclub@baesystems.com.

Sixth Framework Programme

Plan for SAFEE User Club

The User Club is being created at the outset of the project. This is because we would like to schedule a meeting early in the lifetime of the project to gather information from individuals like yourself on the issues to be examined. The User Club will be jointly run by BAE SYSTEMS in the UK and the Netherlands National Aerospace Laboratory NLR.

The User Club has the following objectives:

- Annual meetings for communication of SAFEE project results
- Emphasis on two-way communication — your views are relevant to the project!
- Direct communication of SAFEE results for those unable to attend the meetings

Contact Details

If you would like to become a member of the User Club please enter your contact details in the space provided below. The first meeting is planned for early 2004 and we will issue invitations and further details of this event in the near future.

Please complete the following details

Name	
Position	
Organisation	
Email	
Telephone	
Address	
Passport number	
Your SAFEE point of contact (from whom did you receive this invitation)*	
Your interests (e.g. technology for in-flight security)	

Please return the completed form to the SAFEE project member who sent you this invitation* and to safee.userclub@baesystems.com.

The success of the SAFEE User Club relies on the assistance of individuals such as yourself. We would encourage you to participate and we would welcome your contribution. Please remember, there is no commitment whatsoever at this, or any other stage.

Security

Due to the sensitive nature of this project and the associated information, which may be disseminated through the SAFEE User Club, please only send this notice to colleagues within your organisation who are cleared to represent you. Membership of the User Club will be by invitation only and by approval of the SAFEE Project team.

Please note that any personal details you provide will be handled in confidence and not passed onto to any other parties who are not directly involved with the SAFEE project.

- **Affiliate User Club Meeting, l'Aéro-Club de France, Paris, June 7&8th, 2004**
- **Plenary User Club Meeting, NLR, Amsterdam, November 25&26th, 2004**
- **Plenary User Club Meeting, Musée Air & Espace Le Bourget, June 14th 2005**

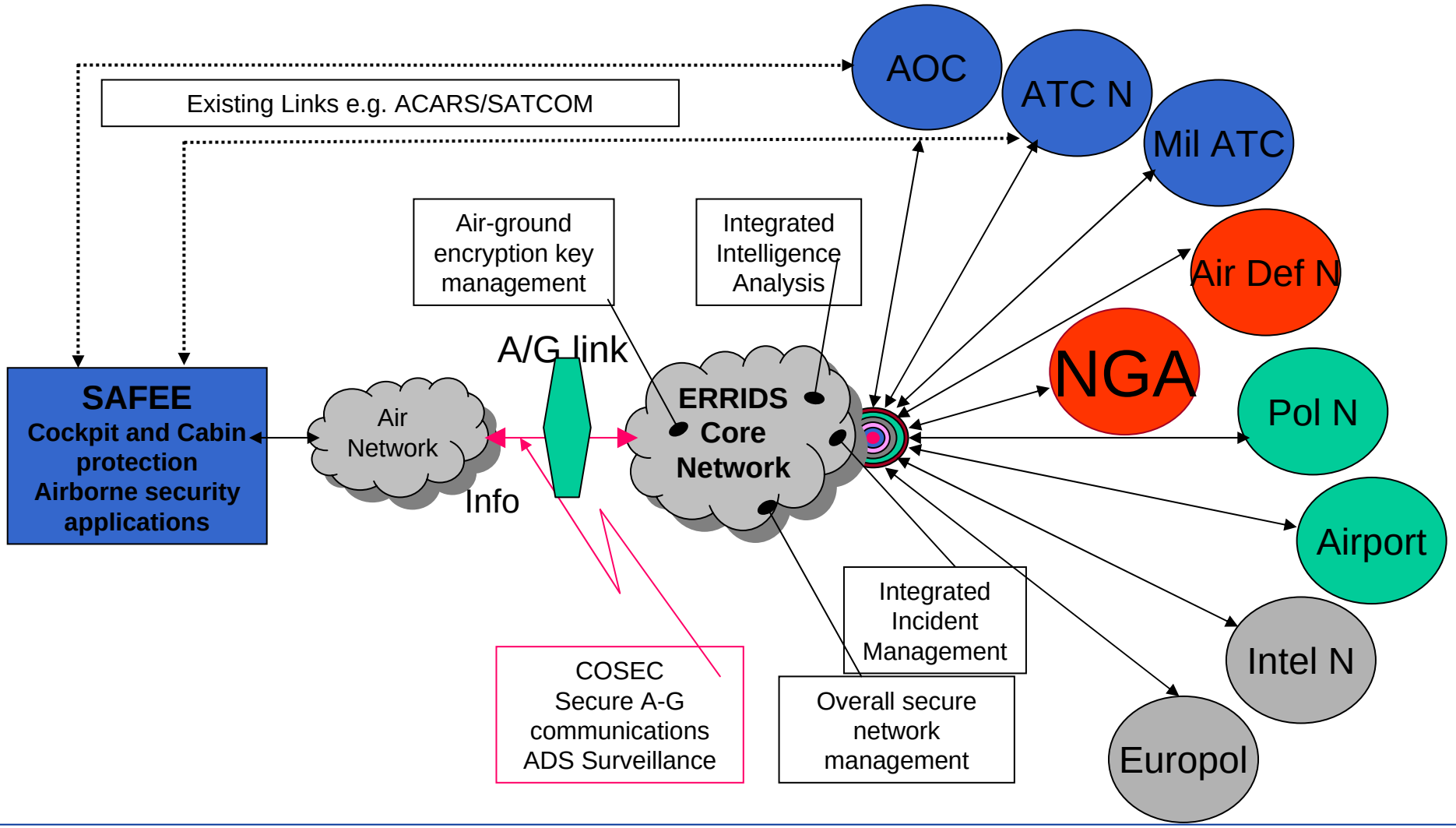
SAFEE User Club

- If you are dealing with this « security approach » you can join SAFEE User Club
- So feel free to contact SAFEE Coordinator (daniel.gaultier@sagem-ds.com)
- Next meetings
  - Plenary meeting in May 2006
  - Affiliate meeting in November 2006

Collaboration
SAFEE / ERRIDS

European Regional Renegade Information Dissemination System (ERRIDS)

SAFEE-ERRIDS NEXT STEP




SAFEE
SAFEE
Security of Aircraft in the Future European Environment
Thanks for your attention and your foreseen comments
Welcome on board
Line up
Set « Trust »
And Take off