MASSAO

ESA Telecom Start-up Initiative - Workshop

ESTEC Contract 16094/02/NL/DS

April 2002-October 2003

Euro Telematik

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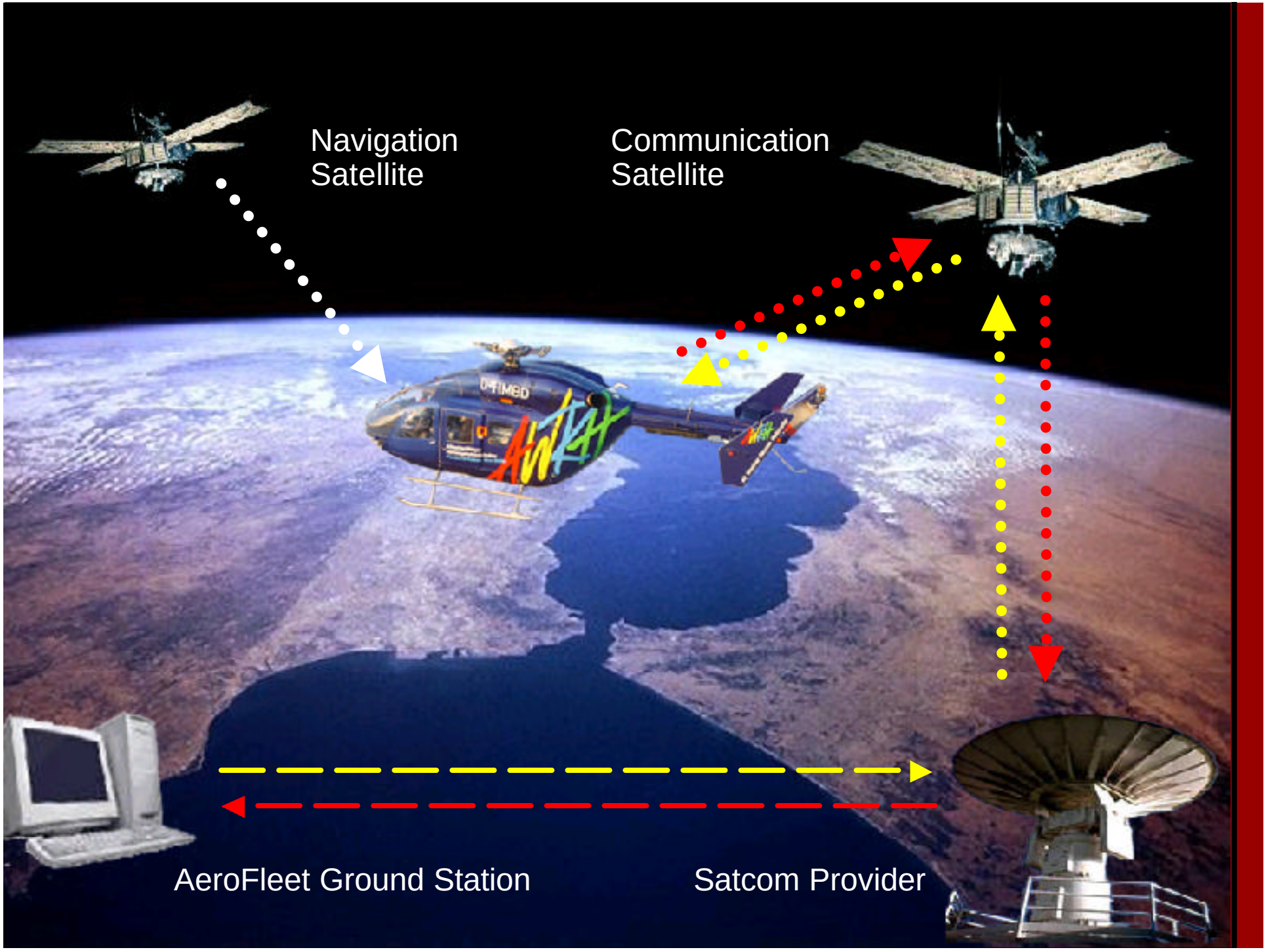
Definition

MASSAO

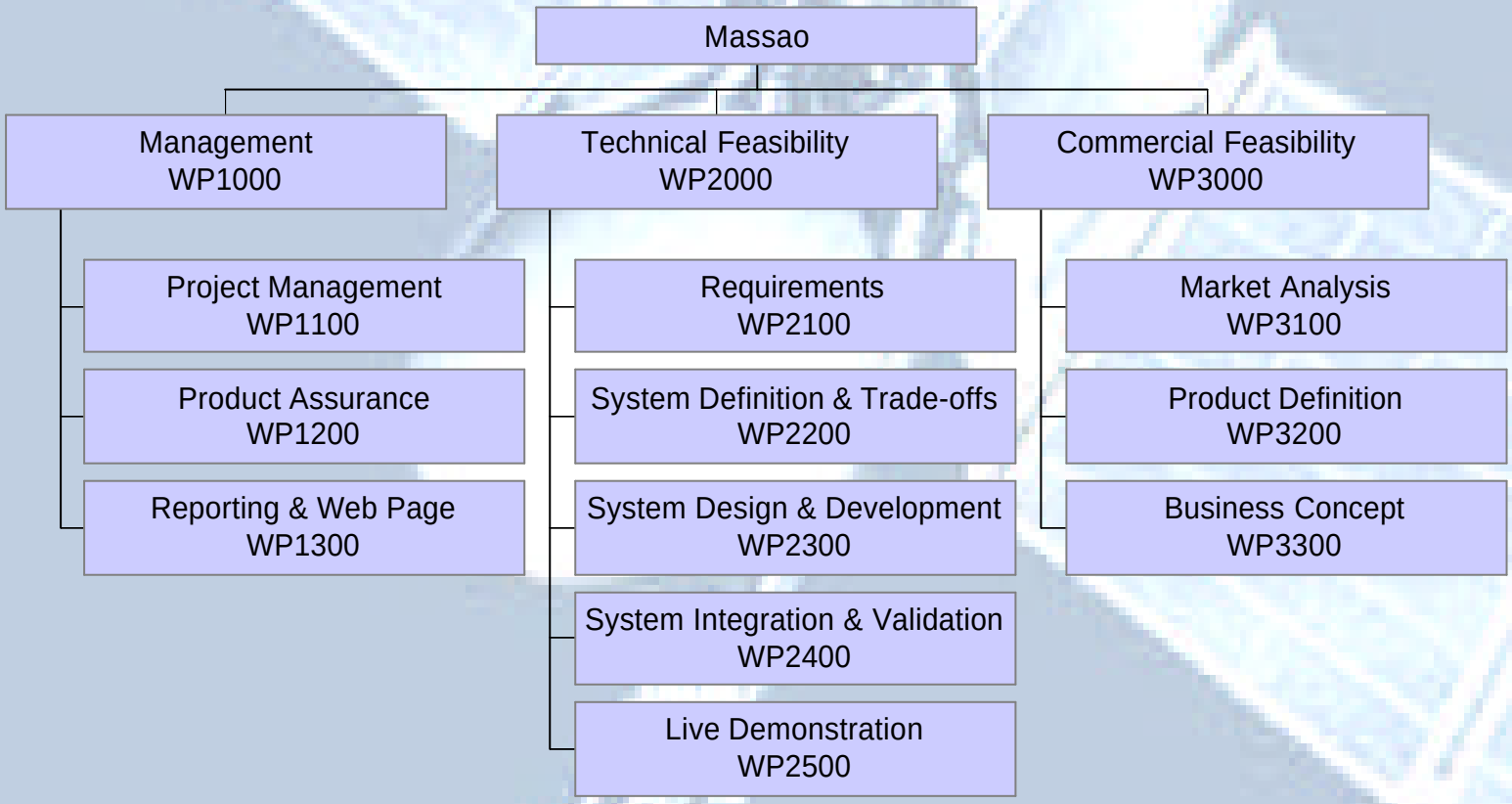
Management And Supervision system for Special Aircraft Operation takes requirements and operational limitations of small, specialised air vehicle fleet operators into account to connect the operating centre with aircraft using satellite communication.

MASSAO consists of three main components:

- Fleet monitoring and management ground station at the home base of the aircraft operator
- A satellite based communication link between the ground station and the air vehicles
- Airborne control and display unit for the air vehicles


Navigation
Satellite
Communication
Satellite
AeroFleet Ground Station
Satcom Provider

Work Breakdown Structure



User Consultations

User Requirements WP 2100

- **Off-shore Platform Operations**

  Operators in Europe :
  Stavanger/Norway
  Esbjerg/Denmark
  Shetland Island/United Kingdom

  Operators in Asia:
  SSFC/Vietnam

- **Search and Rescue Operations (AWRH)**

  ADAC, Munich
  Rescue central stations, Ulm and Friedrichshafen
  Rescue service of German Armed Forces

- **Further Operations**

  Weather Observation Flights, Austria

Summary of requirements

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User Requirements WP 2100

- **Overall Requirements**
  7 requirements defining the objective of the Massao System, its operation context, and limitations.
- **Application Requirements**
  6 requirements defining the services provided by the Massao System.
- **Data link Requirements**
  6 requirements defining the communication channel.
- **Requirements for the Airborne System**
  12 requirements defining the onboard components, the airborne architecture, and operational limits.
- **Requirements for the Ground System**
  9 requirements defining the ground system components, architecture, and capabilities.

Service Criteria

System Definition and Trade-Offs WP 2200

High Priority:	Service Availability and Lifetime Data Service Available Costs
Middle Priority:	Latency Time Coverage
Low Priority:	Data Package Size Support

Hardware Criteria

System Definition and Trade-Offs WP 2200

High Priority:
Data service capable
Interfaces

Middle Priority:
Airworthiness
Costs
Antenna size

Low Priority:
Support
Specialized Hardware Equipment

Satcom System Selection

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System Definition and Trade-Offs WP 2200

The following systems and services were considered:

- **Intelsat**
- **Eutelsat**
- **Thuraya**
- **Globalstar**
- **Orbcomm**
- **Iridium**
- **Inmarsat**
- **Artemis**

Recommendation

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System Definition and Trade-Offs WP 2200

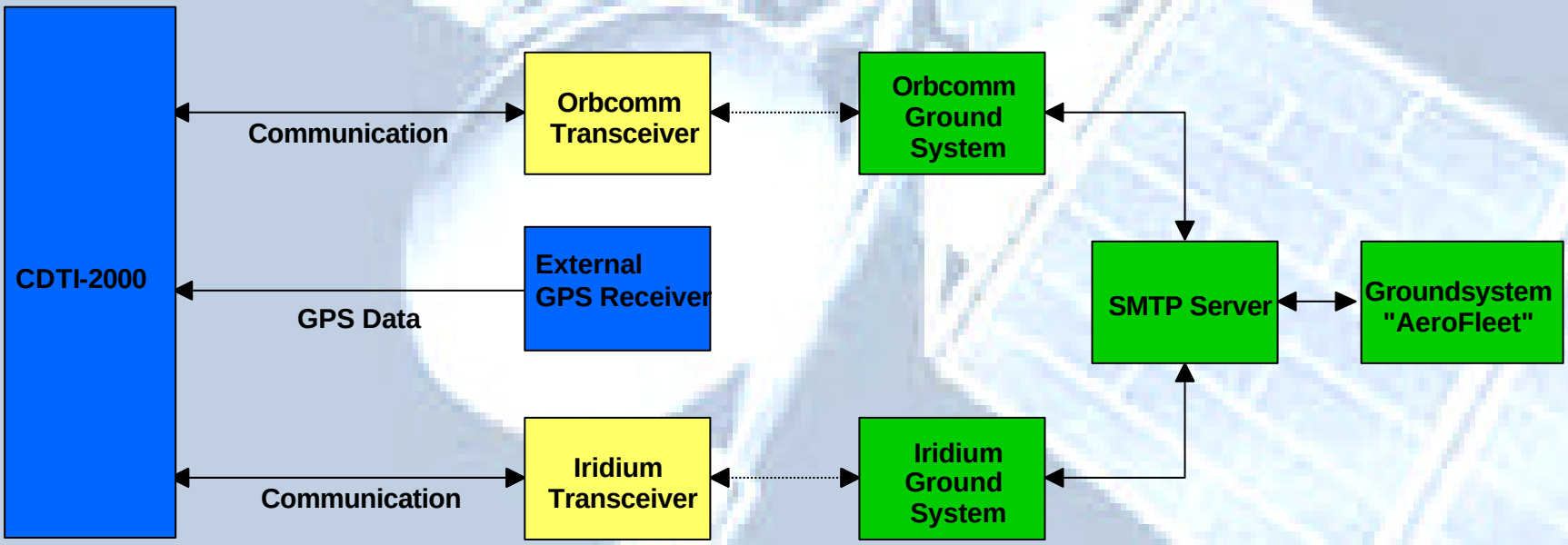
Results :

ORBCOMM is the baseline solution. It provides a true packet switched data service. Service is operational and airtime costs are within a reasonable price range. Equipment is easy to integrate.

IRIDIUM is recommended for an additional implementation in phase 2. Iridium has launched a data service in June, 2003 and aviation approved equipment is available at a reasonable price.

System architecture

System Design & Development WP 2300



Laboratory Testing

System Integration & Validation WP 2400

Components:

- Running CDTI
- Dynamic Position Input
- GPS
- Communication Link
- AeroFleet

Aircraft Installation

System Integration & Validation WP 2400

Installation of ***MASSAO*** demonstrator into a Piper Lance PA32R-300

Installation comprises:

- CDTI 2000 running SW 1.1pre.
- A standard GPS receiver
- The ORBCOMM V2200 modem
- A VHF antenna Cabling
  (made by Avionik Straubing,
  connectors supplied
  by Euro Telematik)

Modem Installation in rear baggage compartment

Aircraft Installation

System Integration & Validation WP 2400

Example for an **AeroFleet** Aircraft Installation

Task Description

Live Demonstration WP 2500

Flight from Augsburg (EDMA) to Erbach/Ulm (EDNE) on April 8th, 2003

- To validate of the system concept in a realistic scenario
- To comprise flight preparation, briefings and a flight of typically one hour
- To plan, prepare & carry out demonstration runs
- To comprise the compilation of task 1 (WP 2000) results and overall analysis

Target Market

Market Analysis WP 3100

Target market defined according to the following aspects:

1. Geographical region
2. Kind of operation
3. Area of operation
4. Size of fleet

Primary market:

Geographical region of **Germany, Austria & Switzerland**

Secondary market:

Geographical region of Europe & those countries in the world, where ETG has a certain presence through partners or sales agents (E.g. India,USA, Vietnam)

Target market segments

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Market Analysis WP 3100

Market segments of primary interest:

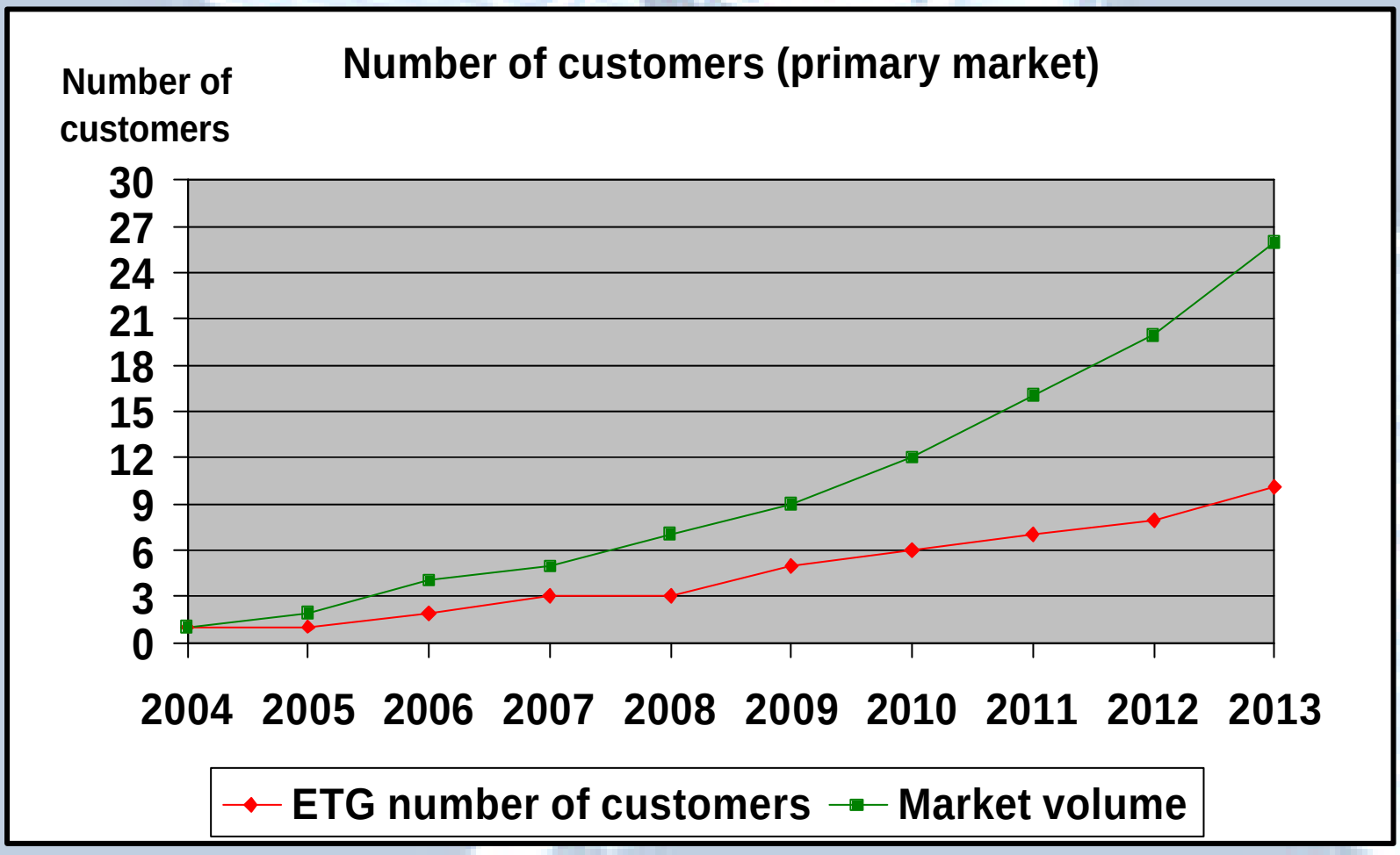
- Civil governmental operators in Ger / A / CH
- Small to medium sized, locally operating, commercial emergency response air fleets in Ger / A / CH
- Small to medium sized, locally operating, commercial off-shore shuttle service air fleets in Ger / A / CH

Market segments of secondary interest:

- Civil governmental operators, medium to large sized, locally operating in Europe
- Commercial off-shore shuttle service air fleets in Europe / worldwide

Market Share

Market Analysis WP 3100



Competitors

Market Analysis WP 3100

Current competitive situation

- Currently very little competition
- Growing air fleet management will attract more competition

Main competitors expected from three areas:

- Manufacturers of cockpit displays
- Manufacturers of ground vehicle fleet management systems
- Telecommunication service providers

Product Functions

Product Definition WP 3200

Onboard functions

Onboard functions	Government Entities	Off-shore Service	Emergency Response	Minimum Configuration
Communication interface	y	y	y	y
Tracking	y	y	y	y
Navigation	y	y	y	y
Moving map	y	y	y	y
Cockpit display of traffic information (CDTI)	y	y		
Visualisation of uplinked inormation + data base elements	y		y	
Visualisation of uplinked weather		y		
Emergency functions		y		
Communication equipment management	y			
Mission equipment management	y			
Automatic dependent surveillance		y		

Component revenue prices

Product Definition WP 3200

The following revenue prices are expected for the core components of a MASSAO system

Airborne equipment

CDTI-2000	10.000 – 15.000 €
AeroPhone	14.000 €
Installation	10.000 – 30.000 €

Prices of
- **CDTI-2000** → **are** → **distribution channel**
- **AeroNav** → **depending** → **configuration**
- **Installation** → **on the** → **type of aircraft**

Component revenue prices

Product Definition WP 3200

Ground equipment

AeroFleet server	20.000 €
AeroFleet client	3.000 €
AeroPhone ground modem	14.000 €
AeroFleet browser	10.000 €

Recurrent costs

Iridium SBD service (depending on volume)	50 – 200 € per unit/month
Internet access per month	100 €

Expenses

Business Concept WP 3300

Expenses
Fixed costs out of following fields have to be considered:

Sales expenses
Including labour costs for the sales team of the company:
Organisation of marketing activities, communication

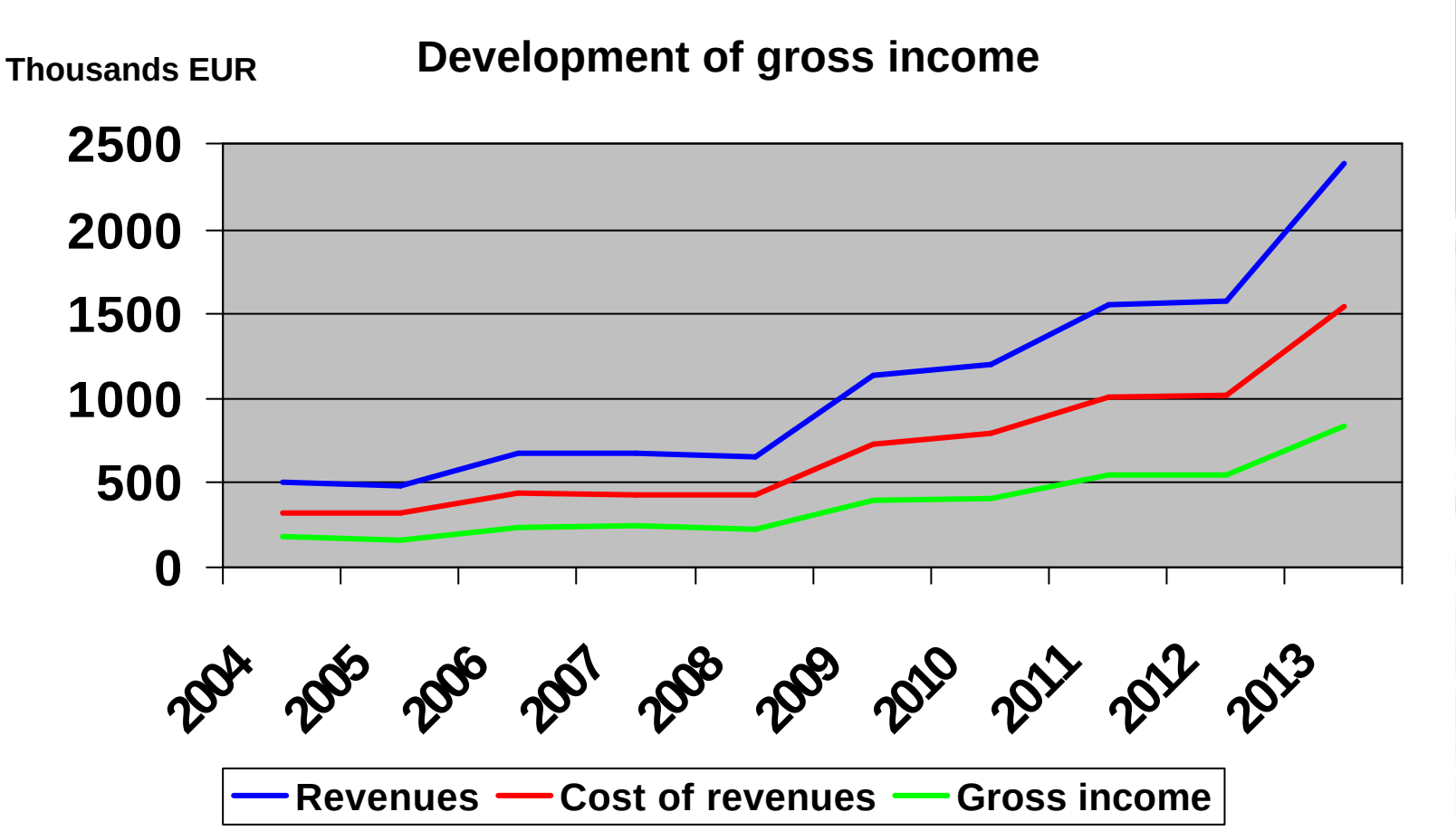
Marketing Expenses
Costs related to marketing activities

General and administrative expenses
Costs resulting from operation of the company, negotiations, contract preparation

Research and development expenses
Engineering and development, Integration of new functions + new Technologies, Customization of the product

Business Plan

Business Concept WP 3300



Marketing Strategy

Business Concept WP 3300

MASSAO system is a **highly specialized product**

MASSAO system is a **manufactured to measure** product and meets the potential **customer requirements** by its system modules

Geared towards a **limited number** of potential users, not mass market

Marketing activities

- Product presentations at exhibitions and shows
- Direct marketing Advertising in aviation magazines
- Press relations
- Sales partner relations

Strategic Plan

Business Concept WP 3300

Short Term Goals

Establish **personal contact** between Euro Telematik and potential customers of the **target group** by the help of marketing instruments

- more important than creating general awareness of the product
- find one or more launching customers
- reach product level of maturity
- validate product definition concept (user groups)

Medium and Long Term Goals

Use marketing instruments to

- establish and maintain technology leadership
- reach and defend market leadership with high market share
- control costs and expenses

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End of Presentation