Proposal to the European Space Agency
AO/1-6124/09/NL/US, issue 3

SENSA

Sustainable, **En**vironmental &
Safe tourism in protected areas

ARTES 20

Integrated **A**pplications **P**romotion (**IAP**) Programme

DEMONSTRATION PROJECT

Submission date:
September 21, 2012

Cybercultus, Centre de Recherche Public - Gabriel Lippmann, GeoVille, SIEL

Author	Date	Version	Comment
Farid Meinköhn	30 August 2012	V.0	Document created
Farid Meinköhn	19 November 2012	V.1	Final release

Prepared By	Cybercultus	Signature:
Reviewed By	Centre de Recherche Public Gabriel Lippmann	Signature:
Authorized By		Signature:

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1. COVER LETTER

Mr. Ulrich Sterzl
European Space Research and Technology
Centre
Keplerlaan 1
2201 AZ Noordwijk
The Netherlands

Esch-sur-Alzette, 20 November 2012

Ref.: Cybercultus/FM – AO/1-6124/09/NL/US

Dear Mr. Ulrich Sterzl,

Would you please find herewith our proposal in answer to the ESA Open Invitation to Tender AO1-6124, referenced ESA ARTES-20, "*IAP AO/1-6124/09/NL/US Integrated Applications Promotion*", ESA 3rd issue (2012), published on EMITS on 12 April 2012, ESA/IPC(2009)11, 09.153.75.

This document is the proposal of Cybercultus and partners to ESA's ARTES-20 program to realise an Integrated Application Promotion (IAP) Demonstration Project.

The SENSA Consortium will implement the **SENSA** *(Sustainable, Environmental and Safe tourism in protected areas)* project aiming at a collaborative platform supporting "sustainable & responsible tourism" in protected / remote areas, such as natural parks, natural reserves and historical sites. SENSA targets two main field actors, namely "Protected Areas" actors *(natural parks / protected areas managing authorities)* and "Ecotourism" actors *(responsible travel operators and local providers of tourism services)* and addresses the needs of end-users *(responsible travellers / tourists)* seeking authentic and natural travels in well preserved wilderness areas. Satellite navigation / tracking, Satellite communication and Satellite earth observation will be relied upon to support environmental mapping, site accessibility, travellers' itineraries and geographic distribution in protected areas, geo-localised emergency services, geo-localised field best practice and environmental awareness building, as well as on-site field observations from the travellers *(geo-localised pictures / measurements / observations)*.

The SENSA consortium is as follows:

Economic Operator Name and legal nature	Address and contact details	SME (indicate with YES or NO)*	EMITS Bidder Code	Country
Cybercultus S.A.	13, rue du Quartier L-4289 Esch / Alzette, Luxembourg *Farid Meinköhn* *Tel: +352 26.56.56-54* *Mob: +352 621 234 123* *farid@cybercultus.com*	Yes	52015	LU
Centre de Recherche Public - Gabriel Lippmann	41, rue du Brill L-4422 Belvaux, Luxembourg *Lucien Hoffmann* *Tel : +352 470261-400* *hoffmann@lippmann.lu*	No	52048	LU
GeoVille Information Systems GmbH	Sparkassenplatz 2, 315 – 325, A - 6020 Innsbruck, Austria *Christian Hoffmann* *hoffmann@geoville.com* *Tel : +43 512 562021-18*	Yes	33147	AT
SIEL Sarl	70, Route de Luxembourg L-8140 Bridel, Luxembourg *Bruno De Greef* *bruno.degreef@sielcanada.com* *Tel : + 352 33 27 47*	Yes	52078	LU

The validity of the offer is 6 months in conformance with the General Conditions of Tender.

Cybercultus, the Tenderer and the Subcontractors hereby confirm that they fully comply with the Article 18.1 of the Procurement Regulations.

Cybercultus, the Tenderer and the Subcontractors hereby confirm that they have submitted or updated their Tenderer questionnaire on http://emits.esa.int/ within the last twelve months preceding the submission of the present SENSA proposal.

Cybercultus, the Tenderer hereby confirms his acceptance of the "Management Requirements" for Demonstration Projects as specified in the Appendix 3 to the Draft Contract.

Cybercultus, the Tenderer hereby confirms that he has read the conditions of the Draft Contract as specified in Appendix 2 to this Call for Proposals, that he has understood them and that he accepts them and that any sales conditions of the Tenderer do not apply.

The person responsible for the technical management is Mr. Noureddine Zouache, for the administration tasks Ms. Cecilia Ibarra and for the contractual management Mr. Farid Meinköhn.

The Cybercultus legal representative who will sign the Contract is Mr. Farid Meinköhn.

The contact person to whom all communications relating to the ITT should be addressed is:

Cybercultus
Mr. Farid Meinköhn
13 Rue du Quartier, L-4289 Esch-sur-Alzette, G.D. Luxembourg
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Mr. Farid Meinköhn (Cybercultus) and Ms.Cecilia Ibarra (Cybercultus) are the authors of the proposal, with the following partners having contributed to the SENSA project:

- Cybercultus (Prime contractor) – LU
- Centre de Recherche Public - Gabriel Lippmann – LU
- GeoVille Information Systems – AT
- SIEL – LU

Yours faithfully,

Farid Meinköhn

CEO

Note: Attached to the cover letter are the following letters of support signed by the National Delegates of:
Luxembourg
Austria

2. FULL PROPOSAL

2.1 EXECUTIVE SUMMARY

Project Challenge and Solution

Environment preservation and tourism in protected areas represents an often opposing challenges for the thousands of National Parks and Protected Areas worldwide. Tourism represents a unique opportunity of revenues for National Parks who have expanded both in size and numbers over the years and who find it more difficult to finance their preservation costs, and even more so in the current difficult economic times. At the same time tourism, if not managed adequately with the relevant means, is certain to degrade natural environments. There is an intrinsic opposition between the need to increase revenues for protected areas via tourism and the need to secure an ever better conservation of these unique and still preserved natural areas.

It is this challenge that the **SENSA** (*Sustainable, Environmental and Safe tourism in protected areas*) project addresses by implementing a collaborative platform supporting "sustainable & responsible tourism" in protected / remote areas, such as natural parks, natural reserves and historical sites. SENSA targets two main <u>field actors</u>, namely "Protected Areas" actors (*natural parks / protected areas managing authorities*) and "Ecotourism" actors (*responsible travel operators with local providers of tourism services*) and addresses the needs of <u>end-users</u> (*responsible travellers / tourists*) seeking authentic and natural travel in well preserved wilderness areas. Satellite navigation / tracking, Satellite communication and Satellite earth observation will be relied upon to support environmental mapping, site accessibility, travellers' itineraries and geographic distribution in protected areas, geo-localised emergency services, geo-localised field best practice and environmental awareness building, as well as on-site field observations from the travellers (*geo-localised pictures / measurements / observations*).

The SENSA environment overview below illustrates its core concept & actors:
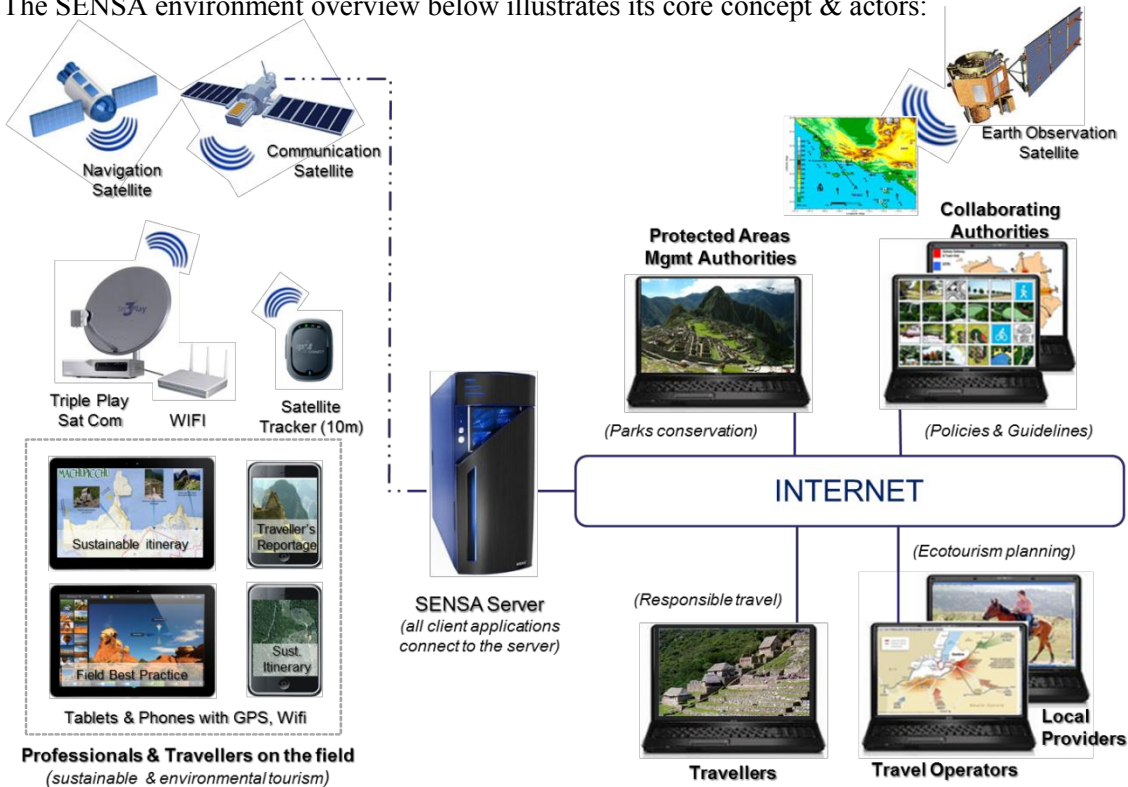

Fig 1: SENSA Concept & Actors

Therefore, in a nutshell the SENSA addresses the complementary needs of two field actors / user groups:

- **Protected areas actors** seeking both "site preservation" and "revenues generation" for a better sustainable management of their natural parks / reserves

- **Responsible travel actors** seeking to enhance their tourisms package offers via the "access & discovery" of new authentic natural / historical sites *(that would not be accessible to tourists if not managed / moderated via SENSA)*, while becoming "active local preservation agents" through best practices and field observation reporting.

The SENSA project aims at:

- Demonstrating the added value and the commercial sustainability of the SENSA service through a representative pilot stage with the full involvement of the main stakeholders

- Securing a win / win context enabling the involved actors to jointly foster the sustainable development of protected areas while increasing revenues.

At the end of 2012 worldwide ecotourism revenues are forecasted to represent $470 billion *(sources: UNWTO, Travel Weekly, Kiplinger - 2010),* whereby if SENSA would only target 1% of it would represent a potential market of 4,7 billion! SENSA initially will target Africa and Europe and at a later stage the five continents.

Project Objectives

The International Ecotourism Society (TIES) defines ecotourism as: 'Responsible travel to natural areas that conserves the environment and improves the welfare of local people'. It is this essential challenge that SENSA aims at fostering through the use of advanced satellite based applications, thus providing new opportunities for protected areas and ecotourism **actors.**

Protected areas will be able, through better environmental management means, to increase the number of visitors and to allow a more comprehensive access to their sites. Satellite based applications, enabling optimised temporal & spatial distribution of travellers in natural parks, in adequacy with mapped environmental and safety considerations will be fostered.

Ecotourism operators will be able, through the use of ELBS (Environmental Location Based Services), to plan fully personalised itineraries, opening new discovery frontiers and authentic immersion of travellers in protected areas, as well as enabling them to become active preservation agents by reporting from the field, the state of conservation of the visited areas.

Metsähallitus, the Finish authority in charge of managing 35 natural parks, has carried out a study in 2010 across all its parks and has found a very strong correlation between the number of visits and the supply of opportunities, whereby the number of visits more than **doubled** when the supply went from **low opportunity** *(limited areas to visit, limited activities, limited encounter with wilderness)* to **high opportunity** *(many different areas to discover, many activities to practice, close encounter with nature and wilderness) (source: Journal for Nature Conservation 18 - 2010).* SENSA will foster this by enabling an increase of opportunities for travellers while enhancing environment preservation, thus substantially increasing revenues. This finding is further reinforced by findings from "wiki.answers.com" to the question: "why has tourism increased in national parks?" Answer: "the number of tourists to national parks has increased due to better access to the area and also to the development of facilities meaning that there is more there for tourists".

Field Actors and End-User Stakeholders

The SENSA core stakeholders are the "Natural Parks Managers", the "Ecotourism Operators" and the "Responsible Travellers". Collaborating stakeholders are environmental agencies and supervisory authorities *(providing guidelines, recommendations, applicable rules, incentives, etc.)* and local services providers *(offering sustainable activities and accommodation).*

The SENSA consortium has integrated, in addition to the SENSA "Software Development Actors" and to the "Environmental Research Actor", "Field Actors" who will provide to the project the environmental / ecotourism *field knowledge and expertise*. The End-Users (Travellers / Tourists), while not being formally a member of the SENSA consortium, will nevertheless be fully involved in all the critical phases of the project, be it at the "User Requirement" and "System Specification" stage or during the "Pilot Demonstrator Phase" of the last 12 months of the project where they will be participating using the SENSA facilities for "Trip Planning", for on-site "Environmental Aware Navigation", for "Preservation status reporting of the landscape, vegetation and fauna" and for "debriefing / evaluating their experience in using the SENSA facilities".

a) The Field Actors

Natural Parks / Protected Areas Administration Authorities are faced with the contradictory need of having at the same time to protect their sites and to generate revenues from them. Ecotourism generates such revenues, yet its environmental impact must be carefully managed. In existing solutions tourism is managed through limited set of fixed itineraries under very restricted conditions, thus strongly reducing the "supply opportunity". These solutions do not foster the full tourism capabilities of a given protected area, nor do they enable the travellers to become an active "preservation agent" of the protected site, nor do they allow to dynamically managing the temporal / spatial distribution of the travellers within the park to minimise environmental impact.

Eco-tourism Travel Operators dream of being able to provide their customers (the Travellers) with an authentic and fully personalised access to protected areas. Responsible Travellers dream of a unique and authentic experience with nature, discovering new frontiers, whilst participating to the preservation of the visited areas. Providing more access opportunities, more natural activities in protected areas and allowing individualised exploration of the protected areas, through the use of ICT applications, will strongly increase the "supply opportunities", thus easily increasing proportionally the revenues for parks

b) The End-Users

Travellers seek new frontiers: they look for full immersion in authentic natural settings with fully preserved vegetation and fauna in wilderness areas. At the same time travellers are increasingly made aware of the environmental risks incurred by the already reduced natural areas of our planet. The travellers, in order to be able to enjoy their dream of becoming "one with nature", of making unique encounters and of exploring the great wilderness of natural parks, must become preservation actors and not remain simple tourists. They also must be provided with safety support, in particular for remote / little or none at all populated areas. Through the use of advanced satellite and ICT solutions, travellers can see their dream of authentic wilderness immersion combined with an active participation in its preservation become reality.

c) Other indirect stakeholders

The 2 main SENSA field stakeholders *(Protected Areas Managing Organisations and Ecotourism Travel Operators)*, interact with a range of complementary external stakeholders as follows:

a) For the *Natural Parks / Protected Areas Managing Organisations*, in addition to a close relationship with the End-Users *(Travellers / Visitors),* they do often collaborate with Environmental Protection Agencies and at times with Local Sustainable Development

Authorities. In particular they receive environmental protection data and sustainable development / best practices guidelines from these stakeholders which they then integrate onto the SENSA platform for an optimised management of the parks / reserves. These collaborating stakeholders will be provided with access means to input their contributions onto the SENSA platform, for use by the Natural Parks / Reserves Managers.

b) For the *Ecotourism Travel Operators*, in addition to dealing in their daily activities directly with the End-Users (Travellers), are in a business / collaboration relationship with the Local Services Providers. These third party stakeholders do provide local services offers *(activities, accommodation, transport)* which the Ecotourism Travel Operators integrate on their SENSA Ecotourism Platform and enabling them to provide, based on the End-Users (Travellers) requests, fully customized trips. Dedicated SENSA tools will be available to the Ecotourism Travel Operators in order to describe the characteristics of the services offered by the Local Providers.

SENSA Stakeholders Value Chain

The SENSA project and consortium, in order to secure a fully viable Value Chain, integrates all the key business and operational actors as illustrated below:
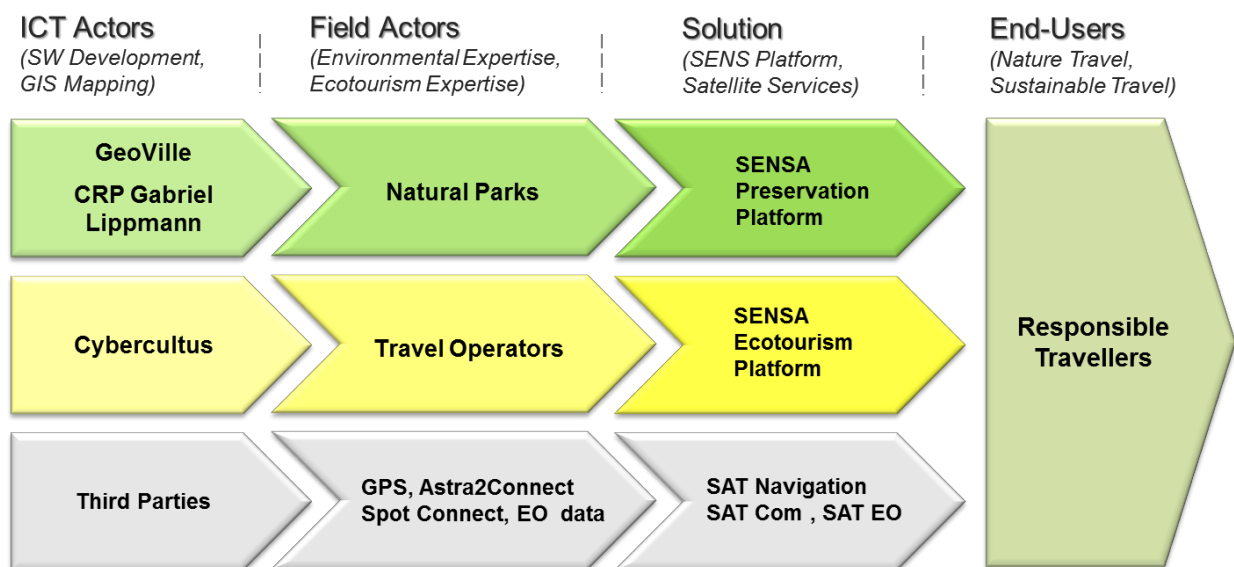
Fig 2: SENSA Value Chain

The SENSA project integrates: ICT Actors *(GeoVille, CRP - Gabriel Lippmann and Cybercultus)* that will be responsible for the development of the SENSA platform and for the GIS Environmental / Ecotourism mapping; Field Actors *(Natural Parks: Peace Parks Foundation & Kgalagadi Transfrontier Park, PAN Parks Foundation & Peneda-Gerês National Park, La Maddalena Archipelago Park – Tour Operator: SIEL)* that have the dual role of providing the knowledge content / expertise related to Environmental Preservation and Ecotourism Travelling and of being business customers of the developed SENSA Software Platform; and End-Users *(Responsible Travellers / Tourists)* that will be invited to participate to the user requirements specifications and to the pilot demonstrators, using the SENSA facilities and providing the evaluation of their use in protected areas, from travel planning to on-site in the Natural Parks travelling. Satellite services will be acquired by the project on standard commercial offering, be it for Satellite Navigation (free), for 2 Way Satellite Communication from Astra2Connect, Satellite tracking from Spot Connect and Satellite Earth Observation from the relevant data providers.

SENSA Operational Scenario

From the previous section we have seen how the SENSA project has taken care to integrate all the key stakeholders needed for a full operational scenario, so as to ensure that all the needs of the business chain are addressed in a comprehensive and adequately combined approach.

The following operational scenario is addressed by the SENSA project & team write:
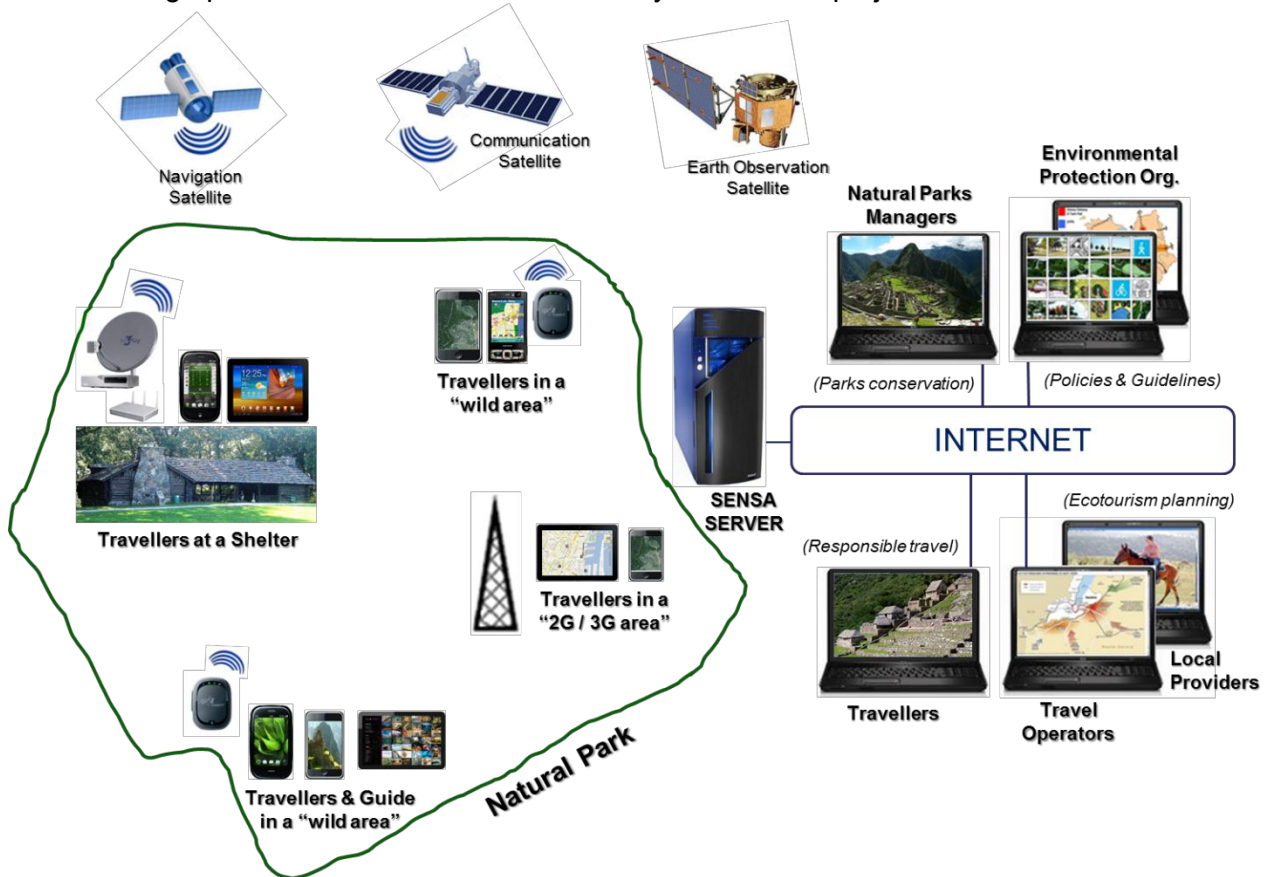
Fig 3: SENSA Operational Scenario

On the right side of Fig 3 we see the "core SENSA Stakeholders, namely the "Natural Parks Managers" and the "Tour Operators", as well as collaborating stakeholders such as Environmental Protection / Sustainable Development Organizations and the Local Tourism Services Providers. These actors in a first operational phase generate the environmental and ecotourism needed mapping data using the GIS facilities on the SENSA Server, as well as all the geo-localised awareness and best practice content. In a second operational phase they organize, using facilities from the SENSA Server, the distribution of the park's travellers and the park's activities for an optimal temporal and spatial preservation of the protected areas. In a third operational phase they manage in real-time, using again the relevant SENSA Server facilities, the environmental and ecotourism handling of the travellers *(environmental misuse reporting, travellers field observations processing, safety alerts management, etc.)* .

On the left side of Fig 3 we see the operational contexts the SENSA End-Users, namely the "Travellers / Visitors" are faced with, which varies from park to park as well as within areas of a park. In particular communication coverage varies a lot and ranges from wireless 2G/3G network coverage, to bidirectional satellite communication in shelters with local WIFI connectivity, to satellite tracking and alert messages communication when no other forms of coverage is available. As a result in an operational situation the travellers have all the geo-localised environmental and ecotourism information related to their trip downloaded from the SENSA Server on their terminal *(Tablet or Smartphone)* prior to their trip. They can then update this

information, as well as uploading their observations / pictures to the SENSA Server in areas where either 2G/3G is available or at shelters equipped with bidirectional satellite communication, and when out in the wilderness thanks to Satellite Navigation and to Satellite Tracking services they can run all the SENSA geo-localised applications and send back short information about their where about, their activities / happenings or their emergency calls to the SENSA Server.

In an operational setting all the needed Satellite Navigation, Satellite Communication and Satellite Earth Observation services are provided on a standard commercial basis by the relevant providers covering the corresponding protected areas / natural parks.

SENSA Market & Business Model

The SENSA project targets two complementary market segments, namely the **Sustainable Management of Natural Parks / Reserves market** and the **Responsible / Eco-tourism market**. The natural parks / reserves market segment has been on a constant expansion over the past 50 years and has reached 158 000 protected areas in 2011 covering a total surface 16 million Km^2! *(source: IUCN and UNEP - 2012).* This rapid growth has drastically increased the pressure for securing sustainable revenues in order to preserve these vast areas, in particular in this period of public spending reduction. At the same time the responsible / eco-tourism market has seen a rapid expansion over the past years from 7 % of the international tourism market in 2007 with $77 billion of revenues to an expected 25% of the world market by the end of 2012 with $473 billion of revenues *(sources: UNWTO, Travel Weekly, Kiplinger - 2010).* As a result a unique opportunity exists for "Protected Areas" to capture & strengthen its share of the expanding ecotourism market through the use of the SENSA platform, thus securing much needed added revenues for the sustainable preservation of expanding protected areas, whilst at the same time strengthening the business potential of "Ecotourism Operators" by providing them with more travel opportunities & personalisation capabilities. All in all, based on the Metsähallitus study *(see Project Objective section),* the SENSA project aims to enable the natural parks using SENSA to **double the revenues** generated from visits to their protected areas and with a corresponding increase of revenues for the Ecotourism Travel Operators.

The SENSA Business Model relies on a revenue chain which starts from the SENSA End-User (Travellers / Visitors), followed by the SENSA Field Actors (Natural Parks / Travel Operators) and ends-up with the SENSA Platform Providers (Cybercultus & GeoVille). This is illustrated below:
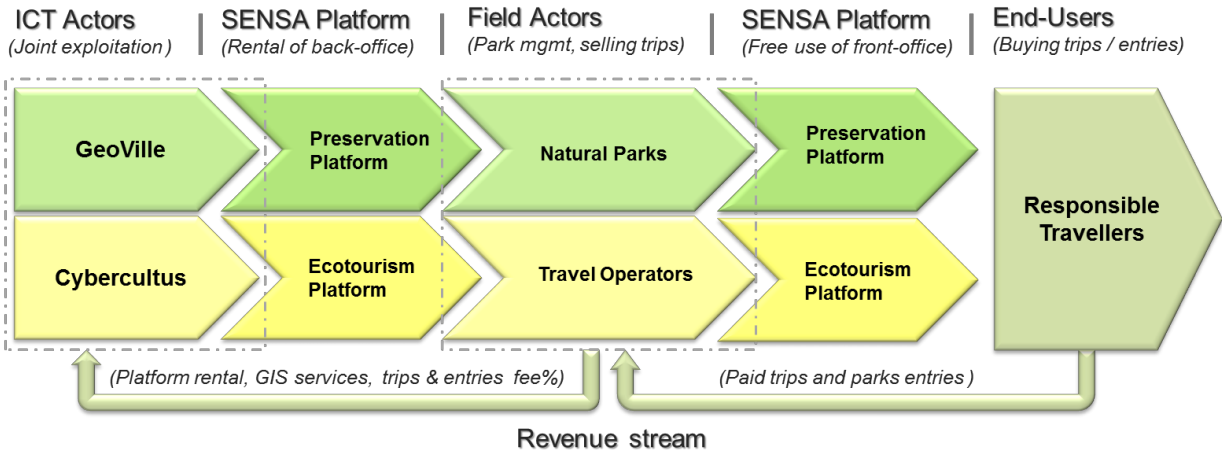
Fig 4: SENSA Revenue Stream Model

The SENSA Business Model is a B2B2C one, whereby the Consumer (Traveller / Visitor) pays a fully customized trip to the Travel Operator and an entry / ITC use fee to the Natural Park (about 5 EUR for using the SENSA facilities). The Travel Operator then pays a commission (between

5% to 10% of the sold trip) to the Ecotourism Platform Owner as well as a small annual platform rental fee (in the range of 600 EUR).

Also the Natural Park pays a small "traveller's SENSA use fee (about 5 EUR on a sold park's entry) to the Preservation Platform Owner as well as a small annual platform rental fee (in the range of 600 EUR). The Natural Park may also if needed order mapping services to the GIS specialists. For the platform owners the SENSA business model is a cumulative one, where revenues increase as more Natural Parks and Tour Operators join the platform, which in turn makes it more attractive for the Consumers.

Partnerships and exploitation model

The SENSA consortium is composed of industrial partners, of a research centre and of field actors. The IPR of the SENSA platform will principally rest upon the SENSA industrial partners, namely Cybercultus and GeoVille. The following exploitation model will be followed:

- Public Research Centre Partner *(CRP - Gabriel Lippmann): conception / development of SENSA methods and procedures*

  o will secure technology transfer to the industrial partners in consideration for a financial compensation, which shall be determined in good faith in the exploitation framework agreement between all the partners of the consortium
  o free use of the SENSA Platform and its content free of charge for educational and research purposes only.

- Industrial Partners *(Cybercultus and GeoVille): development of the SENSA Platform*

  o full ownership of the SENSA Preservation Platform by GeoVille
  o full ownership of the Ecotourism Platform by Cybercultus
  o provision free of charge *(no rental fees)* to the Field Partners of the access and use of the SENSA platform
  o commission fees to be paid by the Field Partners on favourable terms for any trip / entry to a park sold

- Field Partners *(SIEL, Peace Parks Foundation & Kgalagadi Transfrontier Park, PAN Parks Foundation & Peneda-Gerês National Park, La Maddalena Archipelago Park):* conception and authoring of the SENSA Environmental and Ecotourism

  o full ownership of their content
  o use of the SENSA platform free of any rental charges
  o only dedicated mapping services and commission fees on sold trips will be charged on favourable conditions

- End-Users *(Participating Travellers / Tourists)*: participation to the user requirements and to the pilot demonstration and validation

  o Free use of all the SENSA Travellers facilities & equipment during the pilot.
  o Travel costs offered at very favourable conditions

An exploitation agreement framework will be sealed between all the partners and participating parties during the first year of the project and a joint industrial exploitation agreement will be signed before the end of the project by the two industrial partners *(Cybercultus and GeoVille)*.

2.2 LIST OF ABBREVIATIONS / ACCRONYMS AND LIST OF APPLICABLE DOCUMENTS

Abbreviations / Acronyms

AWA: Awareness Building tools
B2B2C: Business to Business to Consumer
EAR: Environmental Alert & Reporting tools
EBO: Ecotourism Back-Office of the travel platform
EES: Environment Expert System
EFO: Ecotourism Front-Office of the travel platform
ELBS: Environmental Location Based Services
EMF: Ecotourism Mapping Facilities
EO: Earth Observation
EPS: Environmental Protection & Safety tools
FOB: Field Observation tools
GIS: Geographical Information Systems
INA: Itinerary Navigation
LBS: Environmental Location Based Services
SENSA: Sustainable, Environmental and Safe tourism in protected areas
SEO: Satellite Earth Observation
SOS: Safety Operational System
SWOT: Strengths, Weaknesses, Opportunities, Threats
TAD: Travellers Activities Distribution tools
TIES: International Ecotourism Society
TO: Tour Operator
TSM: Travel Services Manager

Applicable documents

RD: Requirements Documents
DSA: Demo System Architecture
DUP: Demo Utilisation Plan

2.3 BUSINESS PLAN

2.3.1 SENSA Services Overview

The SENSA Environment will provide a range of services to a range of stakeholders, including the SENSA Field Actors and the SENSA End-Users as follows:

2.3.1.1 The SENSA Field Actors

The SENSA Field Actors *(Natural Parks / Protected Area Managing Organisations and Ecotourism Travel Operators)* have a <u>dual role</u> of **SENSA CONTENT PROVIDERS** and of **SENSA PROFESSIONAL USERS**.

a) As **SENSA CONTENT PROVIDERS** they will secure the following SENSA services:

   I. **Services provided by the Natural Parks / Protected Areas Managing Organisations**

   - Collecting, organising, structuring environmental mapping data from the protected areas *(landscape, vegetation, fauna, trails, track, fragile land, endangered vegetal and animal species, etc.)*

   - Collecting, organising, structuring ecotourism mapping data from the protected areas *(sustainable activities such as walking – trekking – canoeing – bird watching – whale watching - wildlife encounter – etc. , historical sites, cultural heritage, etc.)*

   - Collecting, organising, structuring safety mapping data from the protected areas *(landslides areas, flooding areas, frozen lakes, ancient mines, toxic vegetal species, fauna risks such as bears – tigers – lions – snakes – scorpions – etc.)*

   - Collecting, organising and authoring environmental awareness and best practices content *(how to behave in the park with respect to vegetation and fauna, what to do and not to do, how to contribute to the site preservation, etc.)*

   II. **Services provided by the Ecotourism Travel Operators**

   - Collecting and structuring the services description of the local sustainable tourism services providers *(local guides, local activities providers, local lodging providers, local transport providers, etc.)*

   - Collecting, organising and authoring ecotourism awareness and best practices content *(how to become a responsible travellers, how to contribute to the local sustainable development, information about the local populations and traditions, etc.)*

b) As **SENSA PROFESSIONAL USERS** they will rely on the following SENSA Services:

   I. **Services used by the Natural Parks / Protected Areas Managing Organisations**

   - GIS Environmental SENSA Mapping Services

- Macro Resolution GIS Mapping of the protected areas *(landscape, vegetation, road network, etc.)*

- Medium Resolution GIS Mapping of areas open for ecotourism *(landscape, vegetation, trails, tracks, rivers, local fauna, historical references, cultural heritage objects, etc.)*

- Micro Resolution GIS Mapping of critical spots in the protected areas *(landslides spots, flooding spots, ancient mines, toxic vegetal species, fauna risks, critical cultural objects, etc.)*

Note: Satellite Earth Observation data will be supplied mostly for Macro and Medium Resolution mapping.

- GIS Ecotourism SENSA Mapping Services

    - GIS Mapping of sustainable activities in the protected areas *(walking – trekking – canoeing – bird watching – whale watching – wildlife encounter - etc.)*

    - GIS Mapping of the local heritage in the protected areas *(historical sites, cultural objects, traditional products, etc.)*

- Travellers & Activities Distribution SENSA Services

    - Optimising the distribution in the park at a planning stage of the travellers / visitors along temporal and spatial considerations *(example: restricting the access to fauna reproduction areas at given periods of the year, limiting the number of persons per day in given critical areas, managing the average numbers of persons in the park, etc.)*

    - Optimising the distribution at a planning stage of the activities in the park along temporal and spatial considerations *(example: seasonal activities, activities linked to the fauna habitat and reproduction cycles, activities linked to local traditions and celebrations, activities linked to cultural preservation, etc.)*

- Environmental Alert and Reporting SENSA Services

    - When a traveller or visitor in the Park finds himself in a protected area at the wrong time period or at the wrong place, the Park Managers will be informed and at the same time the SENSA local application on the Tablet or Smartphone will inform the Traveller / Visitor of the situation and suggest corrective actions. If the situation persists for a longer period of time and reaches a critical level, the Park Manager will be again informed of the situation. He may take actions, such as trying to get in contact with the traveller / visitor, inform the persons at the nearest shelter, etc.

    - SENSA facilities allowing the Park Managers to specify geo-localised questions targeting field reporting from travellers / visitors. The application will enable textual questions *(example: have you seen tigers in this area? If yes how many, or Please take a picture of Cedar Trees in this localisation, etc.).* The tools will also allow the Park Managers to process the field observation responses / pictures / videos received and link them with the SENSA Mapping services.

- Safety Operational Management SENSA Services

o Finally SENSA safety facilities will be available to the Park Managers, allowing them on one side to issue risk warnings *(example: drastic weather conditions, broken bridge, fallen trees, landslide, etc.)* and on the other side to receive any emergency or SOS message send by a traveller / visitor in difficulty. With the SENSA platform the relevant park staff will be immediately notified through different means *(email, SMS, alert phone call, etc.*). The Park Managers can then take the appropriate measures depending on the nature of the Emergency / SOS message received and its geo-localisation in the Park.

II. Services used by the Ecotourism Travel Operators

- Ecotourism Back-Office SENSA Services

  o A range of SENSA ecotourism back-office facilities will be available to the Travel Operators, ranging from the visualisation of the environmental and ecotourism mapping of the Parks / Protected Areas, to the building of personalised circuits / tours in the Parks, taking into account the Travellers interests and the field temporal & spatial constraints.

  o Facilities supporting the reservation and booking process with the Travellers of the customised travel circuits will also be available to the Travel Operators.

- Local Travel Products Management Services

  o A range of SENSA back-office facilities targeting the management of the "Local Providers" of ecotourism offers, starting from the description of their services and their insertion onto the SENSA platform, to the reservation and booking process with these local services providers.

2.3.1.2 The SENSA End-Users

The SENSA **END-USERS** *(Travellers / Visitors)* will use a range of SENSA services covering facets such as "planning their ecotourism trips in the protected areas", "geo-localised navigation while on the move using personalised itineraries", "geo-localised awareness and best practices while on the move", "geo-localised field reporting of their observations" and " sending anytime anywhere help requests / emergency messages".

c) As **END-USERS** they will rely on the following SENSA Services:

- Ecotourism Front-Office SENSA Services

  o SENSA facilities will be provided allowing the Travellers to discover the Natural Parks and the protected areas, in terms of landscape, vegetation, fauna, ecotourism activities, local lodging, shelters in the parks, trails, tracks, etc.

  o SENSA facilities to express their "responsible travel" interests and wishes.

  o SENSA facilities to interact with the Travel Operator to reserve and book a fully personalised trip.

- Itinerary Navigation SENSA Services

  o Once on the move and travelling in the Natural Park, the Travellers are provided with a "standalone GPS navigation application" running on his tablet or

smartphone and enabling him to visualise on a map his personalised journey / itinerary on a day to day basis in the Park.

- o All the points of interests and activities selected are also on his personalised map itinerary.

- o He may also, if he wishes to, inform family and friends in real-time of his whereabouts and activities carried out.

- Environmental Protection and Safety SENSA Services

  - o While on the move all the spatial and temporal environmental and safety constraints are taken into account by the SENSA "standalone GPS application". The traveller is immediately informed, should he for any reason whatsoever, act in contradiction with these safeguards and corrective actions will be proposed to him.

  - o Also, if while one the move, in particular in remote wilderness areas, the Traveller is confronted with an emergency situation, the SENSA Alert / SOS facilities will enable him to send via satellite short messages specifying the situation and the urgency needs.

- Awareness and Best Practices SENSA Services

  - o While on the move any spatial and temporal contextualised awareness and best practices multimedia content is prompted to the Traveller / Visitor, providing him with recommendations, suggestions, and information about the areas he is visiting, about the activities he is performing, etc.

- Field Observation SENSA Services

  - o While on the move the Traveller / Visitor is prompted with invitations to provide spatial and temporal contextualised field observations about the preservation status of the encountered landscape, vegetation, fauna, cultural heritage, etc. He is invited to become a preservation reporter, by answering multiple choices questions and by associating - when applicable - pictures or even at times short videos. These field observations are then automatically uploaded onto the SENSA Server when a network (Wifi or 2G/3G) connection is available.

2.3.2 SENSA Stakeholders and Service Value Chain

The SENSA main stakeholders are grouped in three main categories as follows:

- ICT Actors (SENSA Platform Providers)
  - o Environmental GIS Software Developers *(in the project: GeoVille)*
  - o Environmental GIS Mapping *(in the project: CRP-Gabriel Lippmann)*
  - o Ecotourism Travel Software Developer (in the project: Cybercultus)

- Field Actors (SENSA Content Providers and SENSA Users)
  - o Natural Parks / Protected Areas Managing Organisations *(in the project: Peace Parks Foundation & Kgalagadi Transfrontier Park, PAN Parks Foundation & Peneda-Gerês National Park, La Maddalena Archipelago Park)*
  - o Ecotourism / Wilderness Travel Operators *(in the project: SIEL)*

- End-Users (SENSA Consumer Users)

- o Travellers to protected areas *(in the project: they will be external users)*
- o Visitors to protected areas *(in the project: they will be external users)*

In addition to the SENSA main stakeholders we find the following collaborating stakeholders:

- Environmental Protection Agencies *(indirect external users)*
- Sustainable Development Authorities *(indirect external users)*
- Local Tourism Providers *(indirect external users)*

These later ones do not intervene directly in the project, but their needs are addressed by the SENSA Field Actors *(Natural Parks & Travel Operators).*

The SENSA project is driven by the needs of the Field Actors and of the End-Users as follows:

- Issues / needs related to Field Actors

  - o Natural Parks / Protected Areas Manager
    - Increased scope of the preservation needs
    - Increase in the sources of environmental degradation
    - Limitations in the human and financial management resources
    - Democratisation of the access to protected areas
    - Supporting the local economy actors *(craft, culture, tourism)*
    - Need for additional sources of income
    - Expanding demand for ecotourism from travellers

  - o Ecotourism / Wilderness Travel Operators
    - Enhanced environmental awareness of the travellers
    - Travellers' desire to participate to nature conservation
    - Increased demand for full immersion in natural settings
    - Increased demand for discovering authentic & unique areas
    - Increased demand for fully personalised trips
    - A greater concern for safety considerations

- Issues / needs related to the End-Users

  - o Responsible Travellers / Visitors
    - Seeking unique emotions
    - Motivated to support nature preservation
    - Dreaming of the origins when man & nature was one
    - Hoping for encounter with authentic nature and fauna
    - Seeking fully personalised trips
    - Looking for safe travel

In order to meet the above listed needs of the different stakeholder, the SENSA platform will provide services that address in an integrated mode and with an innovative approach the complementary needs of the different actors. In particular the need to equate "greater access" to natural protected areas with "preservation" of the natural areas is one of the major challenges undertaken by the SENSA Environment. The SENSA Preservation Platform and SENSA Ecotourism Platform will make it happen, by enabling the conservation of the protected areas to be enhanced through an optimised management of the travellers' access and activities in the protected areas through the use of advanced space technologies, such as *Satellite Navigation, Satellite Communication and Satellite Earth Observation*, whilst enabling the travellers to make a unique and fully personalised experience with nature in protected areas.

The following value chain and contractual team roles characterises the SENSA project:
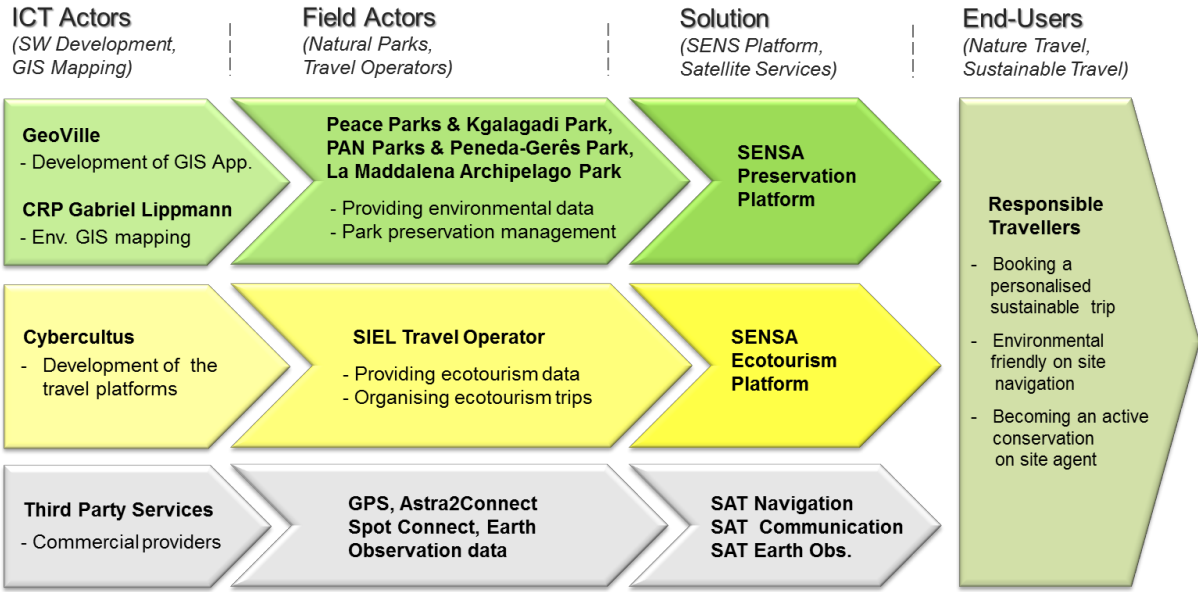

Fig 5: SENSA Value Chain and Team Actors Role

2.3.3 Market Analysis

The SENSA exploitation market is driven by two factors, namely the expanding number and size of protected areas *(158 000 protected areas in 2011 covering a total surface of 16 million Km^2)* and the expanding interest in ecotourism by the travellers *(20 percent of the world tourism market).* This situation creates a unique opportunity for SENSA, since by capitalising on a solution that combines environment preservation with ecotourism, it creates a multiplying effect whereby visitors are offered more opportunities to access and discover protected areas, whilst at the same providing enhanced conservation means for these areas. The net effect would be a substantial increase in the number of visits to the parks, which in turn would proportionally increase the revenues of the parks, of the ecotourism travel operators and of travel services providers.

Two separate studies, one in Finland in 2010 by Metsähallitus in 35 Natural Parks and one in Germany in 2011 by EUROPARC in its 14 National Parks have respectively shown for the Finish study that it was possible to double or more the number of visitors by increasing the tourism opportunities within the parks and for the German study that the 50 million people a year who visited the parks have generated EUR 2.1 billion of revenues. This makes an average spending of €42 per visitor. This figure is confirmed by another study from the largest UK National Park (Brecon Beacons National Park) which has 4 million visitors yearly spending £206 million there or £51,5 (€65,6 per visitor). Another study from "The International Ecotourism Society" found that Travel Operators ranked "being in the wilderness areas and viewing wildlife" as the most important elements of an ecotourism trip, and that the average spending per eco-trip was between $1100 and $1500 (not including the transport to the area) for European trips. . This is in line with a study from Vital Wave Consulting in 2011 which found that the average spending of US eco-travellers to worldwide destinations was $1200. The average spending goes to €2000 per person for eco-trips in Africa. From the above findings we can assume an average trip cost for Europe and Africa to be €1500, of which 25% (€375) would go to the Travel Operator, 70% (€1050) to the Local Travel Services Providers *(local transport, accommodation, activities, etc.)* and 3% to 5% (€45 to €75) to the Natural Park.

If we take a conservative assumption whereby the use of the SENSA platform would enable to increase by 20% the areas made accessible to the visitors, then we could envisage a proportional 20% increase of the visiting opportunities, which in turn would increase proportionally the number of visitors by at least 20% *(much more in reality due to the resulting higher number of circuits combinations possible),* thus creating an increase of revenues of the stakeholders involved *(Natural Parks and Travel Operators / Services Providers)* by the same amount *(by at least 20%).* If SENSA would very conservatively target **only 1%** of the world ecotourism market estimated to reach $473 billion (€365 billion) by end of 2012 *(sources: UNWTO, Travel Weekly, Kiplinger - 2010),* then this would represent a potential target market of €3,65 billion for SENSA. From this potential market, if we estimate that the introduction of the SENSA solution would increase by 20% the number of travellers then the revenue increase generated would be €730 million *(representing 487 thousand additional trips at an average of €1500 per trip).* From these additional revenues, following the traditional revenues distribution model of the tourism industry for sold trips, between 3% & 5% *(€22 million to €26 million)* would go to the Parks, 25% (182,5 million) to the Travel Operators and 70% *(€511 million)* to local Travel Services Providers. Knowing that the ecotourism market relies strongly on the access to natural sites, we can in fact assume that the SENSA potential market would be much higher than 1% of the ecotourism market thus opening even higher revenues perspectives.

In the upcoming section 2.3.5 we will show that the SENSA Consortium Partners would be required, to become fully sustainable, to only secure a very small portion of the 1% share of the potential Ecotourism Market. As a result return on investment is very well within reach of the SENSA Partners.

2.3.4 SENSA Competitive Assessment

The SENSA platform aims at a specialised market targeting ecotourism in protected areas. As a result competition is likely to come from traditional online travel platforms products and services providers who would like to enter this market also. Today online ecotourism offers are provided via classical travel platforms and do not provide specific environmental protection facilities.

In the market we see three categories of online travel platform providers as follows:

a) Largest well established Online Reservation Systems
   - *Amadeous (ES) → lead player for online reservation systems & services for the travel industry*
   - *Travelport (US) → lead player for registration systems and other services to the travel industry*

b) Open source travel platform software
   - *Open Source Travel Booking Online Joomla → provides a wide range of online travel modules*

c) Products enabling to setup an online reservation web site
   - *ResLogic (US) → providing smart online travel reservation solutions products*
   - *Realmdigital Travel Platform (SA) → tools enabling a travel operator to put online his offers*
   - *BlueClaw (UK) → one-stop solution for all online booking and marketing needs*

d) Personalised trips online travel platform
   - *Evaneos (FR) → online travel platform allowing travel operators to offer their services*
   - *Toogonet (BO) → software matching the needs of Tour Operators and Travel Agencies*
   - *Trip à la Carte (LU) → online travel platform allowing travel operators to provide decomposed travel offers enabling the travellers to build their own circuit à la carte*

The Lead players of *(a)* are not direct competitors since the SENSA market would be too specialised for them. The Open Source players of *(b)* would need substantial customisation effort to integrate the SENSA requirements and are thus not perceived as a direct threat. The players

offering tools to Setting-up of Reservation Sites in *(c)* represent a higher risk since them may wish to cover ecotourism capabilities, yet it would still require substantial adaptation efforts from them. Finally the last category of Personalised Trips Travel Platform in *(d)* represents the most serious challenge, since they already support customised travel services. Of course they would still require efforts to integrate the SENSA environmental and ecotourism dimension as summarised below:

	Customised Travel Plan facilities	Travel Booking facilities	Environment Protection facilities	Environment Awareness facilities	Field observations reporting tools for travellers	On the move safety support facilities
Personalised Trips Travel Platforms	√	√				
SENSA Environmental & Ecotourism Platform	√	√	√	√	√	√

Note: as of today none of the "on market" offers support the additional facilities provided by SENSA.

2.3.5 SWOT Analysis

The SWOT analysis presented here takes into account the current and foreseeable market context:

	++ Strength / -- Weakness	**++ Opportunity / --Threat**
Political (context)	++ Environmental protection is high on the political agenda in Europe ++ Ecotourism is politically encouraged -- Political promises are not always transformed into concrete field policies	++ Environmental protection support actions available at national and regional levels -- Environmental protection actions are not always a budgetary priority
Economic (context)	++ Ecotourism has been expanding rapidly over the past 5 year (from 7% of world tourism market in 2007 to an expected 25% end of 2012) -- Global Economic outlook is not good for the coming years in Europe	++ Many Natural Parks embark on sustainable tourism revenue ++ Ecotourism labels are emerging -- Too much tourism revenues from protected areas may harm the preservation of these areas
Technology (context)	++ Worldwide Satellite Navigation available ++ Tablet and Smartphones now equipped with GPS, Wifi, 3G, etc. and powerful enough to run standalone GIS applications. ++ Low cost bidirectional satellite communication ++ Low cost satellite "users on the move" tracking -- Plurality of Satellite Navigation systems (US GPS, European Galileo, Russian Glonass, Chinese BeiDou or Indian IRNS)	++ Standardisation of the satellite navigation terminals (global support for GPS applications) ++ HTML5 becoming a global standard for web based applications and natively support navigation / geo-positioning functions -- standards rapid evolution, and at times commercial obsolescence of some standards
Innovation	++ Use of space technology to bridge the gap between the need to foster tourism in natural parks and the need to preserve this protected areas from human degradation effects. -- Reliance on technology, in particular in remote areas, can prove at times challenging (electrical power availability, applications failures, network coverage, etc.)	++ Development of innovative facilities integrating the preservation needs of protected areas with income generating ecotourism services -- Risk of complexity when implementing the innovative solution -- usability / intuitiveness of the innovative facilities are critical
Products	++ SENSA Preservation Platform targeted specifically at the needs of the Protected Areas Managers (activities & travellers optimal temporal and spatial distribution in the Park, field alert of environmental misuse by travellers, safety alerts, field observations reporting by the travellers, etc.)	++ The need for an all in one solution for the Protected Areas Parks Managers to manage both their environmental and sustainable tourism undertakings ++ Then needs for Travel Operators to have professional means enabling them to provide

	++ SENSA Ecotourism Platform targeted specifically at the needs of the Travel Operators and the Travellers (planning of personalised eco-trips taking into account the preservation constraints, environmental & safety aware on site navigation, field observations reporting, etc.) -- Power limitations / recharging needs for the user terminals (tablets, smartphones, trackers)	fully customised travel itineraries for responsible travellers seeking true and authentic nature experiences ++ The future market development of more efficient solar recharging solutions for user terminals such as "portable solar panels", "flexible solar panels", "solar backpacks & bags", etc. -- Risks to see other providers of online travel platforms to seek to enter the ecotourism market in protected areas -- Risks to see other providers of environmental GIS solutions wanting to expand in sustainable tourism in protected areas
Services	++ An organised framework for GIS mapping of Natural Parks with Protected Areas (implemented mapping processes, interfacing with relevant sources of EO and GIS data sources, etc.)	++ availability of two highly specialised environmental / GIS mapping partners in the project
Customers	++ The number of Protected Areas has expanded from 100 000 site in 2000 to 160 000 in 2011 (source: IUCN). ++ Ecotourism market makes up 6% of the GDP and has an average yearly growth of 5% (source: Economy watch – June 2010) -- Terminal devices (tablet, smartphone, spot connect and associated communication subscriptions) needed for the end-users -- Consequent commercial effort needed to turn the potential customers (protected areas managers and travel operators / ecotourists) into SENSA users	++ Need for protected areas to secure conservation revenues ++ an expanding ecotourism consumer market -- reversal of the ecotourism expansion trend due to a more difficult economic context
Competitor	++ currently only the SENSA partners offer an integrated platform addressing in a complementary way the needs of the "Protected Areas Managers" and those of "Ecotourism Travel Operators"	++ SENSA consortium will have a clear initial market lead and will have acquired invaluable field experience -- Alliances could be formed between providers of environmental GIS solutions and developers of travel platforms
Price	++ low entry level investment costs (~600 EUR annual rental cost + a commission fee on sold trips and entries to protected areas / parks) -- Need for the Protected Areas Managers to devote human resources for mapping the area and for monitoring the ecotourism activities	++ Means to increase the parks revenues -- A balance must be found between the management resources needed by the parks and the revenues generated

Table 1: SENSA SWOT Analysis Summary

2.3.7 SENSA Roll-Out

The SENSA project has been conceived from the start to incorporate directly and indirectly all the key Business Actors needed for a full exploitation of the SENSA results immediately after the end of the project.

To make it happen the SENSA project has incorporated the following business actors and background facilities:

- GeoVille for the SENSA Preservation Platform *(as an extension / specialization of their RegioCover facilities)*

- Cybercultus for the SENSA Preservation Platform *(as an extension / specialization of their Trip à la Carte facilities)*

- Peace Parks Foundation & Kgalagadi Transfrontier Park, PAN Parks Foundation & Peneda-Gerês National Park, La Maddalena Archipelago Park *(as environmental protection field experts and early adopters of the SENSA platform)*

- SIEL Travel Operator *(as Ecotourism field experts and early adopters of the SENSA platform)*

- Real Travellers and Park Visitors *(as early adopters of the SENSA facilities and the first user references for the consumers)*

As a result, a few months only following the end of the SENSA project *(within the first year)*, and consecutive to some enhancements resulting from the SENSA Pilot Demonstrator findings Cybercultus and GeoVille will be commercially running respectively the SENSA Ecotourism Platform and the SENSA Preservation Platform in the Peace Parks Foundation & Kgalagadi Transfrontier Park, PAN Parks Foundation & Peneda-Gerês National Park, La Maddalena Archipelago Park and with the SIEL Travel Operator.

Following this initial early adopters approach and showcase Cybercultus & GeoVille will deploy a marketing strategy aimed at expanding in a sustained way every year the number of Parks and Travel Operators joining the SENSA Platform. Participation to specialized fairs, online demonstrations of the SENSA facilities to potential customers, free trial periods, low entry investment ticket, success stories viral marketing for consumers, etc., will be some of the means used to secure new customers every year.

2.4 RISK ASSESSMENT

The project relies on a range of satellite services, assumes a current state of infrastructure, and relies on standards, in additional of being a software customization and integration project. These different facets taken individually have all some potential risks and taken in combination result in an even more important potential of risks. We will have a look at those potential risks and see what better mitigations could be taken.

a) Risks linked to the satellite services

The SENSA facilities will rely on the following satellite services:

- Satellite Communication
- Satellite Navigation
- Satellite Earth Observation

With respect to the use of **satellite communication** by SENSA, the assumption is that in most protected areas there is little or no cellular network coverage. It can be imagined that in the future with the introduction of 4G / WiMax like cellular networks the coverage in parks could become much more extensive, thus requiring SENSA to rely less on satellite communication and more on 4G. In this perspective the SENSA architecture will be conceived in a way to allow new or emerging communication means to be supported.

With respect to the use of **Satellite Navigation** by SENSA, the assumption taken is to initially use the commercially freely available GPS service, yet we can certainly expect at some future stage the operational use the Galileo service, as well for market reasons, the use of the Russian Glonass, Chinese BeiDou or Indian IRNS services. Here again care will be taken at the SENSA architecture level to support future upgrades allowing the integration of other navigation systems.

With respect to the use **Satellite Earth Observation** services, the risk here is mainly the discontinuity of the availability of some EO data sources, which may result from a number of different causes, such as the discontinuity of an EO service, the failure of an EO satellite, or a change in the commercial access conditions to an EO service, all of which may result in the necessity to cope for and seek new sources. Here care will be taken at the architectural level to ensure easy replacement of one mapping source by another one.

b) Risks linked to user terminals and standards

SENSA relies on an assumed set of user terminals, namely Wifi enabled Tablets and Smartphones. This sector is a rapidly evolving one, with new models coming out every six months, thus making it risky to rely on any system dependent functionality. Operating systems on these devices also evolve rapidly and represent potential risks for the longevity of the SENSA client applications. As a result care will be taken at the system level to rely as little on system specific functions and instead to rely as much as possible on open programming standards such as HTML 5 and its system classes.

c) Risk linked to software implementation

As any software development, risks of misinterpretation of user requirements, implementation delays not being fully controlled or simply unforeseen additional developments exists. In order to limit these risks "Agile Software Implementation" is proposed, securing more iterations and rapid prototyping, thus enabling to adjust before too much effort and time have already been spent.

d) The SENSA platform will imply some changes in the way the Parks Managers will deal and cope with their daily management and conservation activities. As a result a risk exists that that SENSA related activities are not properly carry out either in full or in time, which could impact negatively the quality of the parks environmental preservation. To address this possible risk, logging functions of all the SENSA related happening, in particular field reporting of environmental misuse will be implemented so as to enable supervising authorities to monitor the QoS provided by the park's staff when using SENSA facilities.

2.5 TECHNICAL PROPOSAL

This chapter will focus on the description of the currently anticipated SENSA user needs and requirement, on the SENSA system architecture and on the SENSA envisaged demonstrator.

Cybercultus, on behalf of the SENSA consortium, confirms that the SENSA work proposed does not overlap with any currently running ESA contract awarded to any entity in the proposed SENSA consortium.

The SENSA project is essentially an integration project with some dedicated developments, and combining market facilities with background information from the SENSA partners.

The following on the market third party services to be used

- Earth Observation data sources (to map landscape, vegetation, hazardous areas, etc.)
- SAT3PLAY communication (Astra2Connect covering Europe and Africa)
- SAT Navigation (GPS and in the future Galileo – World coverage)
- SAT tracking (SpotConnect from "Globalstar built by Thales Space" – World coverage)

From the consortium Background information to be used

- Protected Areas: mapping assets (roads, trails, tracks, historical & cultural heritage, etc.)
- Centre de Recherche Public - Gabriel Lippmann: expertise in environmental mapping methodologies and processes and expertise in earth observation
- GeoVille: GIS information facilities proprietary image processing chain RegioCover (which is partly built on COTS) → http://www.esri.com/news/arcnews/summer07articles/intelligent-geoinformation.html
- Cybercultus: Trip à la Carte online Travel Patform enabling tour operators to offer travellers activities / accommodation / local transport services in different locations of a touristic region which can then be customize to meet the personalized needs of each customer → http://siel.tripalacarte.com/

2.5.1 Requirements Document (RD)

2.5.1.1 User Needs

The SENSA project "users needs" are those of the "Protected Areas Management Authorities", those of the "Ecotourism Travel Operators" and those of the "Responsible Travellers". We will in this section summarise the core needs.

a) Core user needs of the Protected Areas Management Authorities

- Securing the protection and preservation of the natural parks / reserves
  - Preservation of the landscape

- o Preservation of the vegetation
- o Preservation of the fauna / wildlife
- o Preservation of the cultural heritage
- o Preservation of the local communities / traditions

- Securing the safety of the visitors / travellers in the park / protected areas
  - o Warning about the risks areas *(landslides, flooding, ancient mines, etc.)*
  - o Warning about vegetation/flora risks *(poisonous plants, falling trees, etc.)*
  - o Warning about fauna risks *(bears, musk ox, tigers, snakes, scorpions, etc.)*
  - o Being informed about any emergency situation / accident in the parks

- Securing financial revenues for the management of the protected areas
  - o Finding new means of revenues for financing their conservation activities
  - o Fostering responsible / environmental friendly ecotourism

- Securing volunteer help support for the parks / reserves preservation
  - o Transforming the visitor / traveller from a potential environmental risk factor into and a conservation volunteer agent
  - o Using the visitor / traveller as a preservation reporter from the field

- Securing public awareness about the parks' unique natural and heritage assets
  - o Providing the visitors / travellers with geo-localised information about the parks assets *(history, landscape, vegetation, fauna, cultural heritage, etc.)*
  - o Providing the visitors / travellers with geo-localised environmental best practices

b) Core user needs of the Ecotourism Travel Operators

- Securing access to authentic natural and cultural heritage sites
  - o Being able to propose to the travellers unique sites with an authentic and fully preserved nature / wilderness
  - o Being able to propose to the travellers well preserved cultural heritage assets in natural settings

- Being aware of the environmental and safety consideration
  - o Being informed of the environmental risks
  - o Being informed of any land risk areas
  - o Being informed of any natural risks (vegetation & fauna)

- Organizing unique / tailored / environmental trips for their customers
  - o Transforming the travellers dreams into a fully personalized trip
  - o Integrating environmental consideration into the trip

- Guiding and informing the travellers while on site
  - o Becoming fully knowledgeable about the assets in the areas to be visited
  - o Providing the travellers with the relevant environmental best practices
  - o Being able to geo-localize all these the information

- Securing business revenues from their activities
  - o Increasing the revenues by providing travellers with a unique travel opportunity and a fully personalized service

c) Core user needs of the Responsible Travellers

- Discovering new frontiers, living authentic experiences in natural & historical sites
  - o Discovering something totally new and unique
  - o Living new experiences through fusion with nature
  - o Being entirely immersed in wilderness with unspoiled vegetation & fauna
  - o Discovering authentic cultural and historical sites

- Practicing environmental friendly and healthy activities
  - A quest for usefulness by contributing to the preservation of nature
  - A quest for healthy / natural activities that go back to the origins

- Becoming knowledgeable about the areas they visit
  - Understanding where they are, what they see
  - Knowing about the history and the cultural heritage of the site
  - Becoming aware of the faced environmental issues
  - Being able to geo-localize the information

- Being able to fully personalize their itineraries and activities
  - Seeking to entirely personalize the areas to be visited and the activities to be undertaken, through a fully customized itinerary

- Actively contributing to the environment conservation
  - Desire to become an active conservation actor
  - Being aware about their responsibility in the preservation of the planet

2.5.1.2 User Requirements

Based on the above described user needs we can derive the following user requirements:

a) Core user requirements of the Protected Areas Management Authorities

- GIS mapping of landscape, vegetation, fauna, cultural assets, trails, tracks, safety, etc.

- Ecotourism mapping integrating environmental sustainability such as maximum travellers density per area, maximum numbers of travellers over a period, optimal distribution of travellers, activities distribution across different areas, travellers reported pictures and observations from the field, lodging / camping possibilities on the park, etc.

- Authoring and publishing environmental awareness information and best practices about the park assets

- Operational management of the tourism access and use of the park, including awareness of environmental misuse when it happens and safety alerts management receive from travellers.

b) Core user requirements of the Ecotourism Travel Operators

- Travel Planning facilities integrating the park environmental considerations

- Personalization of the trips based on the travellers interests and the parks assets

- Receiving awareness, environmental and local assets info about the park to visit

- Sustainable travel navigation and safety supervision facilities based on the trip itineraries

c) Core user requirements of the Responsible Travellers

- Formulating personalized travel interests and getting personalized itineraries & activities

- Traveling safely and respectful of the environmental using satellite navigation

- Getting interactive / personalized field information based on individual interests

- Reporting geo-localised environmental observations / pictures following parks requests

In order to support the above user requirements, reliance on spatial technologies becomes essential for the following requirements considerations:

- Satellite Communication in areas where no wireless coverage is available

- Satellite Tracking / Communication to geo-localise travellers in the protected areas

- Satellite Tracking / Communication to receive geo-localised emergency / alert calls from travellers in difficulties or for reporting urgent matters

- Satellite Earth Observation for landscape and vegetation mapping of protected areas

2.5.2 Demo System Architecture (DSA)

The SENSA environment is composed of office workstations linked via the internet and web browsers to the SENSA platform enabling protected areas professionals and ecotourism professionals and travellers to organize and run their respective activities and businesses. These facilities are extended by "on the field / on the move" applications running on smartphones, tablets and tracking devices which are GPS enabled and which connect to the internet via a range of satellite and terrestrial means, thus enabling the travellers and the travelling professionals to effectively and safely enjoy their trips in protected areas while becoming active preservation actors.

The following illustration shows the SENSA workstations / server configuration and actors:
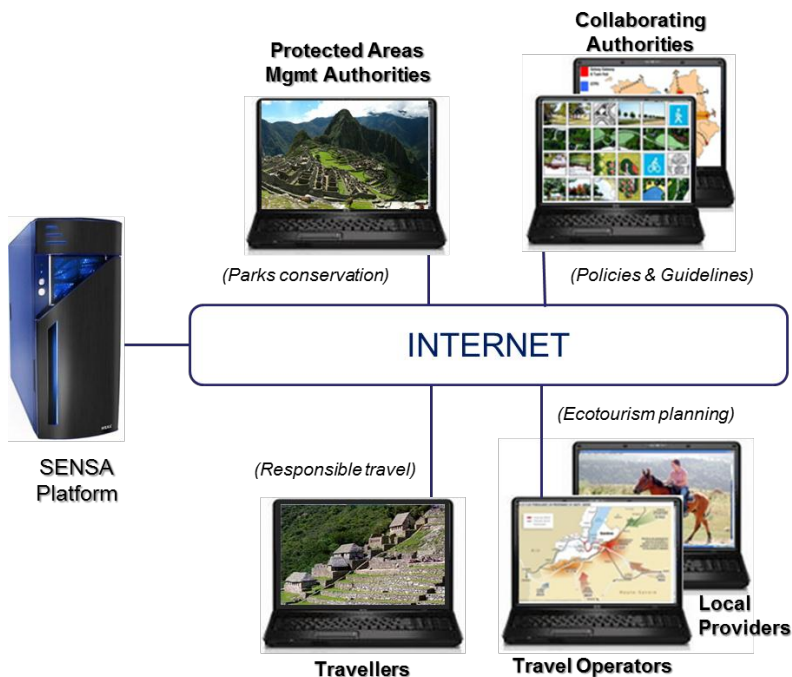
Fig 6: SENSA Workstations / Servers Infrastructure

The following illustration shows the SENSA field configurations and actors:
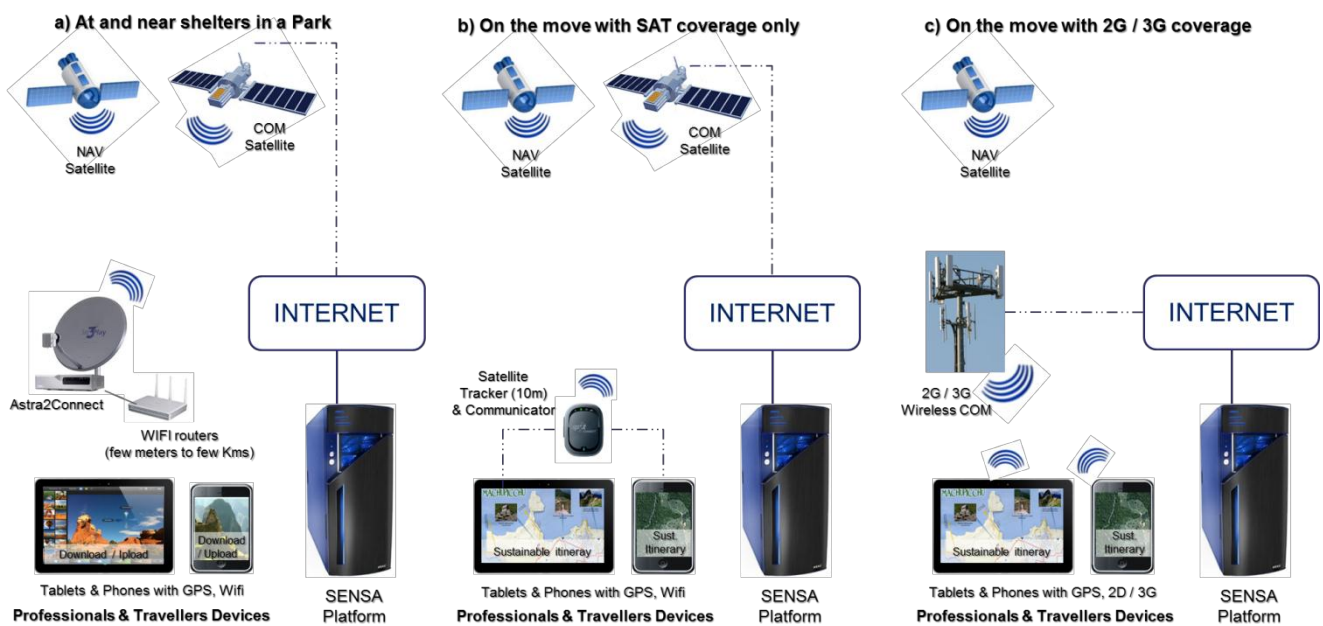
Fig 7: SENSA Workstations / Servers Infrastructure

In the configuration **"a) at and near shelters in a Park"** field communication is enabled via Sat3Play in combination with WIFI securing transparent connection to the internet, thus supporting all the SENSA applications. This is particularly useful for downloading the latest environmental / safety data and for uploading the users' observation data. If the landscape configuration allows it WIFI coverage can reach a few kilometers from the shelter.

In the configuration **"b) on the move with SAT coverage only"** field communication is secured by Mobile Satellite Communication, whilst field geo-positioning is secured via GPS. Satellite Communication will be essentially limited to tracking / emergency services using Spot Connect, enabling the sending of geo-localised *(10 m resolution with a sampling rate from 10 mn to 30 mn depending on the application needs)* short messages, thus asserting that the travelling persons are within the defined "temporal and spatial" itinerary of their personalized / environmental friendly trip, as well as being informed of any critical situation should it happen. Also for those travelling persons equipped with Satellite Mobile Phones, voice communication and data reception will be possible thus further enhancing their safety.

In the configuration **"c) on the move with 2G / 3G wireless coverage"**, all the SENSA services will be available all the time, yet this option is only accessible from a few locations in protected areas.

The SENSA concept covers a range of innovative services distributed among a range of actors, of which field best practices, field observations reporting, sustainable / environmental friendly itineraries, risks warning & management, etc., as illustrated next.

The following diagram summarizes the SENSA key thematic, actors and services:

Fig 8: SENSA Concept (application field, actors & services)

The SENSA high level system architecture is composed of the "SENSA Preservation Platform" *(addressing the needs of the "Natural Parks / Protected Areas Managers")* and the "SENSA Ecotourism Platform" *(addressing the needs of the "Ecotourism Travel Operators").* The SENSA environment is web based.

The following SENSA system architecture is envisaged:

Fig 9: SENSA high level functional / system architecture

The **Preservation Platform** incorporates the *"Environmental Expert System"* which manages all the preservation rules to apply such as levels of protections, acceptable density and frequency of travellers per areas, optimal distribution of activities, etc.; the *"Ecotourism Mapping Facili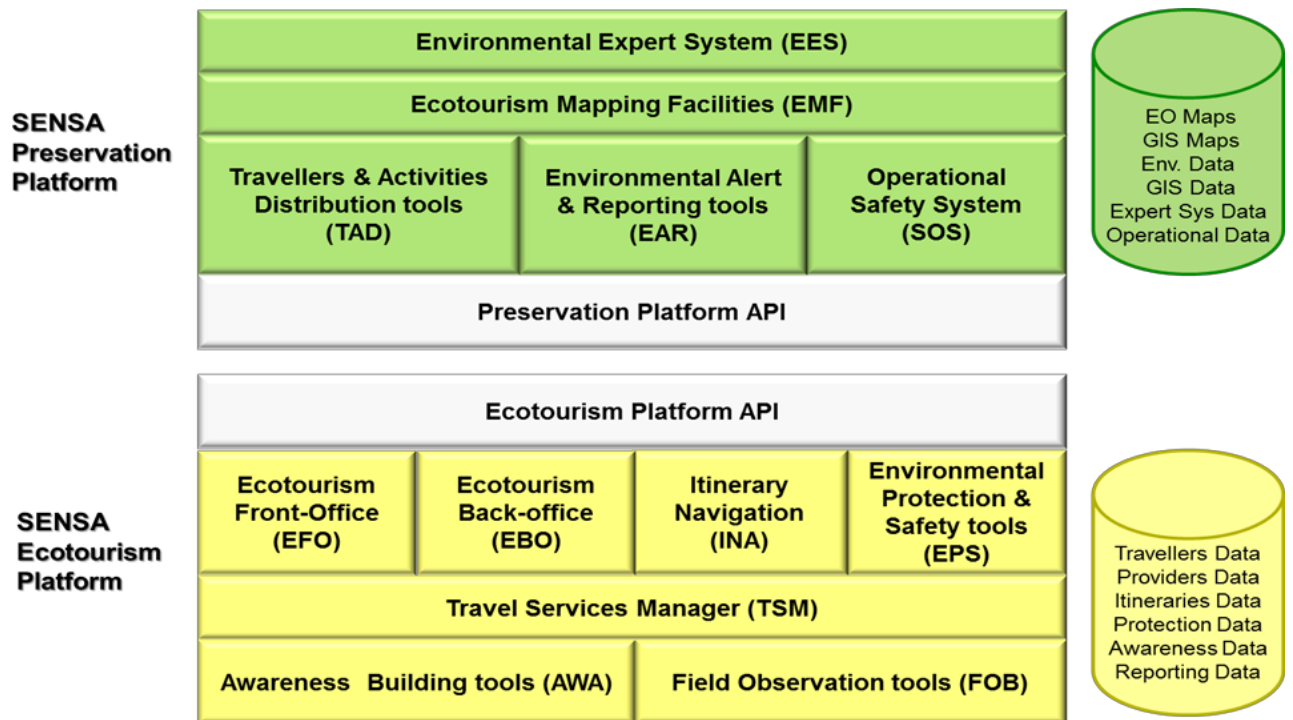ties"* which take as input environmental maps and GIS data generated by "on the market GIS tools", and combines them into an interactive mapping of all the information to be used by the other SENSA components; the *"Travel & Activities Distribution tools"* which enable to manage, at travel planning stage and based on the environmental expert system rules, the optimal temporal and spatial distribution of the travellers; the *"Environmental Alert & Reporting tools"* which take as input any detected preservation issue from the "Environmental Protection tools" as well as any travellers' findings transmitted by the "Field Observation tools" and enact the appropriate actions such as enriching the environmental data base or informing the Park Professionals of the situation; and finally the *"Operational Safety System"* which takes as input any received field alert or SOS, processes it and transmits it to the relevant staff and / or emergency service.

The **Ecotourism Platform** incorporates the *"Ecotourism Front-Office"* which enables the travellers to formulate their travel interests and to book / purchase their fully personalized trip; it is fully integrated with the "*Ecotourism Back-Office*" which enables the Travel Operators to plan fully customized trips, based on the formulated travellers interests and on the environmental constraints received from the "Ecotourism Mapping Facilities", as well as on the local providers data available via the *"Travel Services Manager"*. This later one has facilities enabling the full specification of the locally services including its description, pricing, availability, etc.; the *"Itinerary Navigation module"* which secures, while on the move, temporal & spatial navigation along the travellers personalized circuit and activities; the *"Environmental Protection & Safety tools"* which analyse the navigation data received from the "Itinerary Navigation" tools and the preservation constraints and generate an alert message to the traveller, or if further action is needed, an environmental risk warning to the "Environmental Alert tools". Also in case of an emergency / SOS message from the traveller the relevant geo-localisation and time is associated to the message and transmitted to the "Operational Safety System"; the *"Awareness Building tools"* which consist of a multimedia editor capable of generating interactive and geo-localised information and best practices tutoring content and of an LBS (localisation Based Service), capable of rendering GPS triggered awareness content; the *"Field Observation Tools"* which take as input requests from "Environmental Alert & Reporting tools", asking the traveller to describe what he sees in a given localisation / time and to take pictures of the targeted environmental objects, which are then transmitted for ecotourism mapping.

The **Initial Mapping of a natural Park / Protected Area** which will be fed into the SENSA platform, will be realized using best practice strategies at three different spatial scales using appropriate satellite data, available spatial and non-spatial data provided by the Park Management and newly collected on-site sampling data (e.g. training and validation samples). Large scale maps will be produced from coarse spatial resolution satellite data (e.g., MERIS, MODIS, SPOT Vegetation) and complemented by available land cover products (e.g., GlobCover) to illustrate major land cover and vegetation zones. Natural Park areas accessible for tourists will be mapped with higher resolution data (e.g., TM/ETM+, ASTER, SPOT-HRV). A sampling strategy will be developed for calibration and validation of the map products to secure high quality standards. Output thematic layers comprise detailed landcover information and habitat type. Regions of particular interests for tourists (hot spot areas) are identified to be mapped with very high resolution data (e.g., Ikonos, Quickbird, Worldview, Rapid Eye). At each level of scale appropriate mapping methods (e.g. supervised/unsupervised/hybrid image classification, pixel-wise/object-based approach, Maximum Likelihood/Support Vector Machines/Decision Trees/ ensemble based classification methods, appropriate sampling design (e.g. stratified random sampling)) will be specified and implemented. Texture analysis will provide a complementary source of information for cases where the spectral information alone is not sufficient. Spatial landscape

patterns, an important parameter in biodiversity issues, will be assessed using the spatial pattern analysis program FRAGSTATS as additional information.

In addition digital elevation models will be analysed for extraction of topographical points of interest such as locations with good points of view, steep hiking parts, dangerous hiking paths, and good camping sites, etc.

Procurement/Development approach

The following procurement / customisation / new development approach will be used:

	Procurement	**Customisation**	**Development**
Data, Services, components	Earth Observation Data, GIS Data, GIS Software. Astra2Connect & SpotConnect COM services, WIFI routers. Smartphones & tablets with GPS/ WIFI, PCs and Servers	Environmental mapping from existing sources. GeoVille "RegioCover image processing facilities" customisation (EES & EMF tools). Cybercultus "Trip à la Carte Tourism Platform" customisation: (EFO, EBO, INA & TSM tools)	GeoVille: development of new facilities (TAD, EAR, SOS tools) Cybercultus: development of new facilities(EPS, AWA, FOB tools)
Justification	Market readily available data (free at times), low cost satellite communication services, on the market terminals / devices.	Adapting existing background information to the specific "environmental & ecotourism" needs of the SENSA project.	These new facilities do not rely on existing background information.

Note: The background facilities stem from software tools owned respectively by Cybercultus and GeoVille. Cybercultus has developed over the past years on its own investment the online travel platform called Trip à la Carte. Relevant components will be made available to the SENSA project in order to customize them and support the SENSA specific needs.

The following SENSA components will be implemented by customizing the corresponding Trip à la Carte components:

- EFO *(Ecotourism Front-Office)* : a customisation of the Trip à la Carte Front-Office tools to integrate « ecotourism » specific requirements

- EBO *(Ecotourism Back-Office)* : a customisation of the Trip à la Carte Back-Office tools to integrate « ecotourism » specific requirements

- INA *(Itinerary Navigation)* : a customisation of the Trip à la Carte navigation tools to support environmental preservation aware navigation

- TSM *(Travel Services Manager)* : a customisation of the Trip à la Carte core services database management system to support the much wider scope of services of the SENSA platform

GeoVille has developed over the past years on its own investment the RegioCover image processing facilities. The following SENSA components will be implemented by customizing the corresponding RegioCover facilities:

- EES *(Environmental Expert System)* : customization of the RegioCover smart GIS Data Management System to support the use of environmental rules and constraints

- EMF *(Ecotourism Mapping Facilities)* : customization of the RegioCover Multilayer image processing tools to support ecotourism specific mapping of protected areas

Design & Development approach

The development of the SENSA platform is intended to be performed using the "Agile Web Development" approach with the aim to have an iterative process enabling to validate periodically what is being developed and to adjust / enhance based on use / testing of the intermediate results. Also the project pilot will be divided into two main periods, a first pilot trial phase using early integrated SENSA components, at the project mid-term development phase, with the aim to gather early on feedback from the users and a second more extensive pilot trial aiming at full field validation of the SENSA facilities.

The project's developments will strongly rely on background information from the two main software development partners of the project (Cybercultus and GeoVille) and on the use of agile software development iterations and on the involvement all along of the end users (Natural Parks and Ecotourism Operators). This combined approach aims at ensuring a very high level of maturity of the SENSA platform at the end of the project which would enable the project end users to immediately become the early adopters of the platform and to operate it right after the last project pilot phase ends and the fine tuning adjustments have been made.

The implementation of the SENSA platform will be carried out in four major phases, the first one (Specification Phase) will start at T0 and will end at T0+9. At T0+6 the functional specifications will already be available and the System Architecture will be delivered at T0+9. The second phase *(Development Phase)* starting at T0+6 and ending at T0+15 will consist of two main activities, namely the customisation of the background facilities and the development of the new SENSA facilities. At this point the developed components are checked against their core functional requirements. If successfully passed the third phase *(Integration Phase)* starting at T0+15 and ending at T0+20 will be carried out. At T0+18 the Integrated SENSA platform will be functionally tested and if successfully passed, field deployed for the pilot demonstration and tested against functional and performance capabilities. At T0+20 start the final phase of the project *(Demonstration Phase)* which lasts until T0+30. During the demonstration phase two activities will be carried, namely an Alpha Demonstrator from T0+20 to T0+24 and a Beta Demonstrator from T0+25 to T0+30. This last year phase is market by multiple iterations between the Field Actors *(Natural Parks and Travel Operators)* running the demonstrators and the ICT Actors constantly enhancing the SENSA platform based on the findings from the demonstrators. An important iteration is at month T0+24 where the field actors summarize all the key findings from the SENSA Alpha Demonstration.

In order to integrate effectively the external African and European Parks entities in the conception and implementation of the SENSA environment, three key workshops will be organised with them as follows:

❑   **Workshop 1** at T0+3: User Requirements Specification *(SENSA Partners & the Parks)*

❑   **Workshop 2** at T0+18: Running Pilot Demonstrators *(SENSA Partners & the Parks)*

❑   **Workshop 3** at T0+29: Pilot Demonstrators Findings *(SENSA Partners & the Parks)*

The diagram below illustrates the SENSA implementation phases and the corresponding execution logic and software procurement:
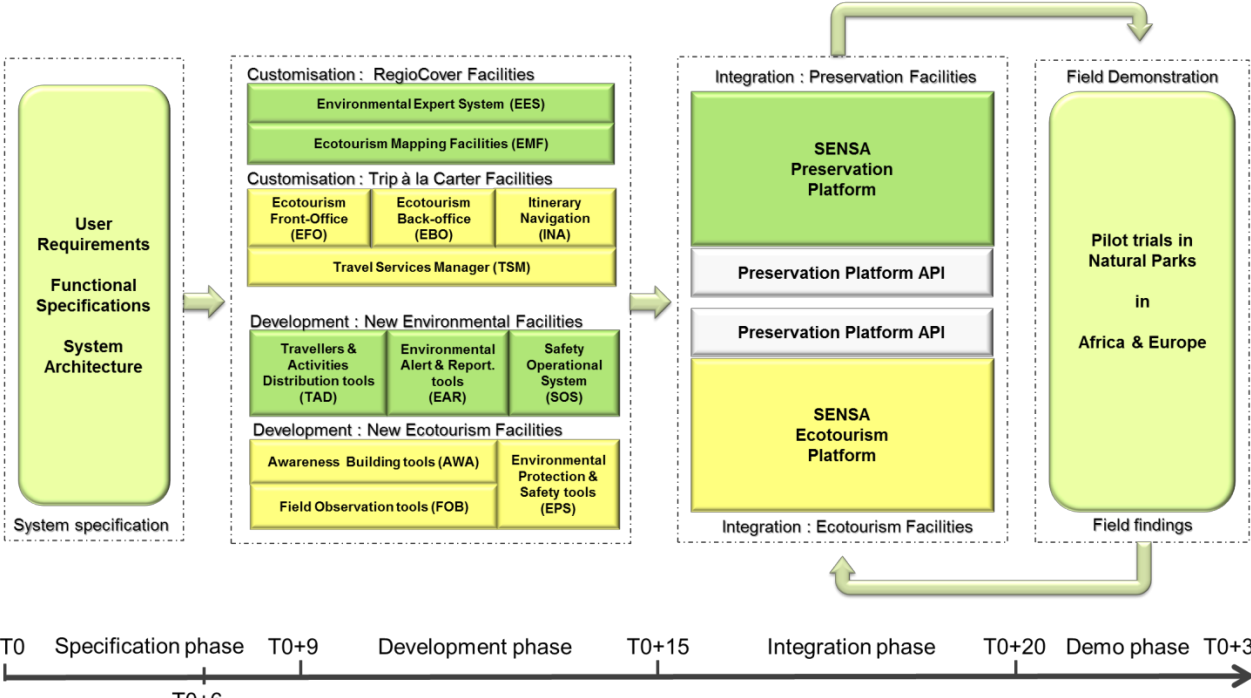
Fig 10: Design and development approach summary

2.5.3 Demo Utilisation Plan (DUP)

The SENSA project plans to carry out a 12 month demonstration of the utilization of the SENSA system, starting from month T0+18 to T0+30. The demonstration will be organized in three major phases: System Field Deployment, Alpha Demonstrator, Beta Demonstrator. The "Deployment phase" lasting 2 months will focus on securing that the entire SENSA facilities behave correctly in a real field settings. The Alpha Demonstrator lasting 4 months will enable to validate the SENSA system in real use contexts and to provide feedback to the SENSA designers / developers to enhance / optimize the platform. The Beta Demonstrator will enable to run in a "near exploitation" context the SENSA environment and to collect all the findings needed for a successful exploitation after the end of the project.

2.5.3.1 SENSA Field Actors and End-Users

The SENSA business model is a B2B2C one where the Field Actors *(Natural Parks Managers & Ecotourism Travel Operators)* are the Business Users of the SENSA platform and where the End-Users *(Travellers / Visitors)* are the Consumers of SENSA facilities.

The SENSA Business Users are:

- The Natural Parcs
    - Peace Parks Foundation & Kgalagadi Transfrontier Park
    - PAN Parks Foundation & Peneda-Gerês National Park
    - La Maddalena Archipelago National Park

- The Ecotourism Travel Operators
    - SIEL

The SENSA Business Consumers are:

- The Ecotourism Travellers
    - from SIEL

- The Parks Visitors
    - Peace Parks Foundation / Kgalagadi Transfrontier Park
    - PAN Parks Foundation & Peneda-Gerês National Park
    - La Maddalena Archipelago National Park

Note 1: The difference between travellers and visitors is that the travellers have organised an ecotourism trip with a travel operator which integrates a planned itinerary with activities over a couple of days in the natural park, whilst the visitors are simply tourists who want to visit the park without prior preparation *(usually a same day visit, but can at times be for 2 or 3 days)*.

Note 2: Even if the SENSA technical partners (Cybercultus, GeoVille and CRP - Gabriel Lippmann) do not directly participate to the SENSA demonstration, they remain available in the background for any needed technical assistance.

The following diagram illustrates the SENSA demonstration users and their involvement:

Field Actors
(Travel Operator)

SIEL Sarl

End-User
(Travellers / Visitors)

Tourists from Europe

Field Actors
(Terrestrial Natural Parks,)

Peace Parks Foundation & Kgalagadi Peace Park
(South Africa - Bostwana)

Field Actors
(Terrestrial Natural Parks,)

PAN Parks Foundation & Peneda-Gerês National Park
(Portugal)

Field Actors
(Maritime Natural Parks,)

La Maddalena Archipelago National Park
(Italy)

Fig 11: SENSA Demonstration Users

Figure 11 shows the Ecotourism Travel Operator *(SIEL)* who will organise for their Travellers, using the SENSA facilities, personalised ecotourism trips to the national parks. The Travellers *(from SIEL)* will go to the Natural Parks to enjoy and live, using the SENSA "on the move" facilities, their unique and authentic travel experience. The Natural Parks Manager *(Peace Parks Foundation & Kgalagadi Transfrontier Park, PAN Parks Foundation & Peneda-Gerês National Park, La Maddalena Archipelago National Park)* will organise the optimal environmental preservation of their protected areas and the access to authentic / nature activities.

2.5.3.2 SENSA Utilisation Baseline

The SENSA pilot phase will be organised along 2 demonstrators, namely an Alpha Demonstrator between T0+20 and T0+24 and a Beta Demonstrator between T0+25 and T0+30. Each of the demonstrators involve the following field / user actors:

- ❑ **1 Travel Operator**
    - o **SIEL** *(Luxembourg based)*
- ❑ **3 Natural Parks in Europe & Africa**
    - o **Peace Parks Foundation & Kgalagadi Transfrontier Park** *(Bostwana and South Africa)*
    - o **PAN Parks Foundation & Peneda-Gerês National Park** *(Portugal)*
    - o **La Maddalena Archipelago National Park** *(Italy)*

The following maps illustrate the areas where the Demonstrators will take place in:

a) Kgalagadi Transfrontier Park *(a member of Peace Parks)*, sitting between Bostwana and South Africa
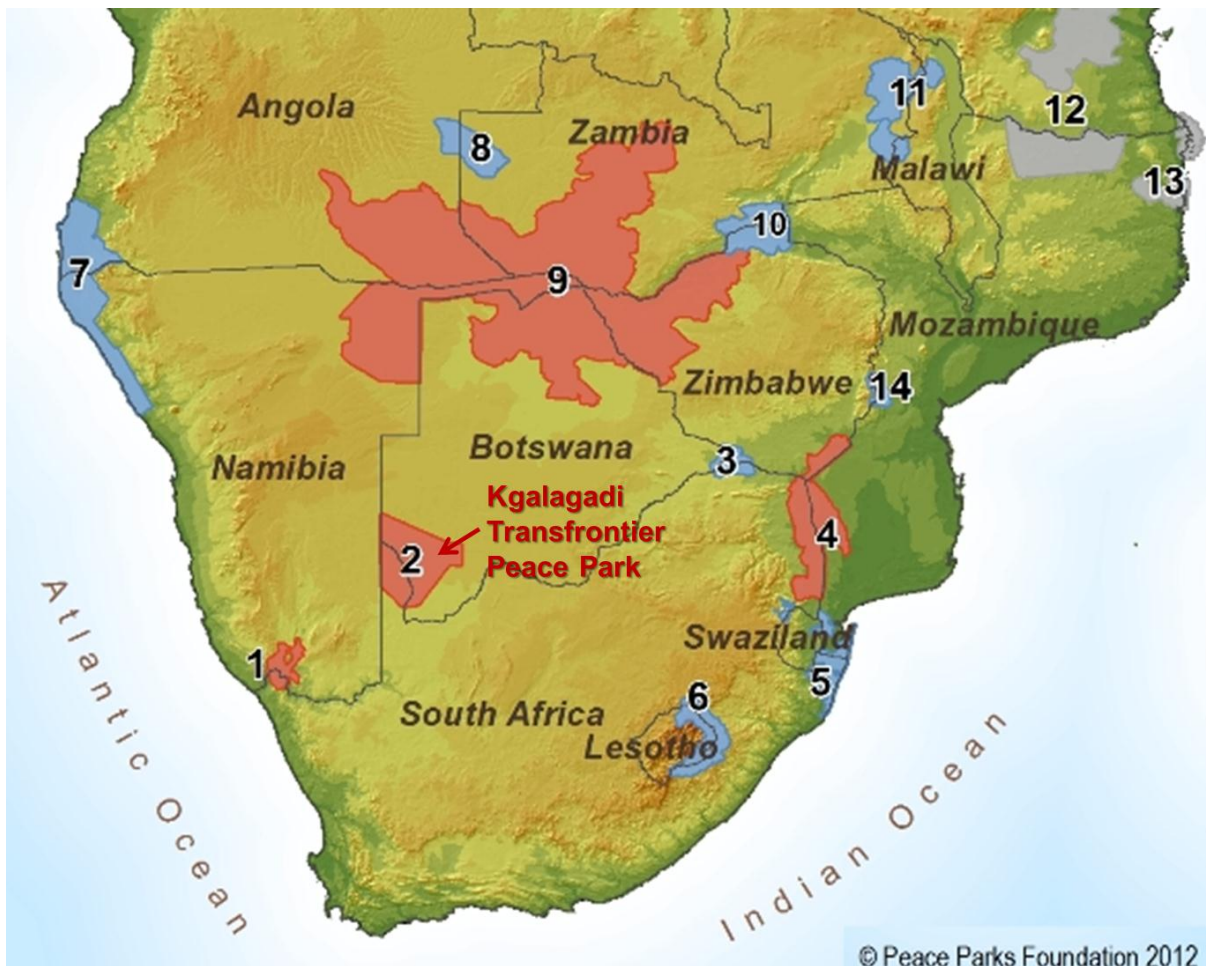
Map 1: Geographical location of the Kgalagadi Park

b) Peneda-Gerês National Park *(a member of PAN Parks)*, Sitting in Northern Portugal
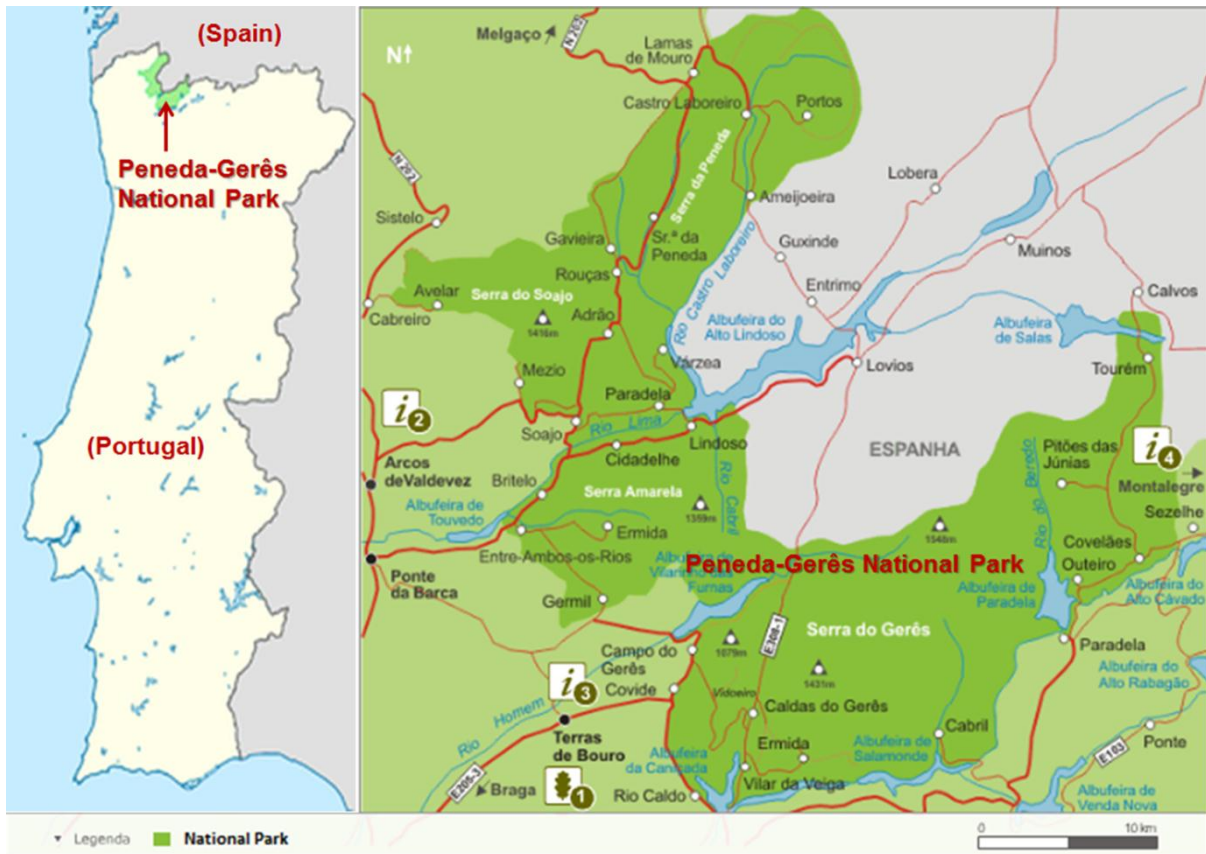
Map 2: Geographical location of the Peneda-Gerês Park

c) La Maddalena Archipelago National Park, sitting between Corsica and Sardinia

Map 3: Geographical location of La Maddalena Park

Main characteristics of the Alpha Demonstrator *(from T0+20 to T0+24)***:**

❑ It will take place in the 3 participating parks *(Kgalagadi, Peneda-Gerês & La Maddalena Parks)*

❑ It will consist of 3 "multi days" trips organized by SIEL with the parks covering both the "travel planning" stage and the "on the move field" stage *(an average of 5 travellers per trip is foreseen)*
  o One travel group going to Kgalagari Park *(average stay is 5 days)*
  o One travel group going to Peneda-Gerês Park *(average stay is 3 days)*
  o One travel group going to La Maddalena Park *(average stay is 2 days)*

❑ It will consist of "single day" visits organized by the participating European parks
  o 10 "single day" visitors to Peneda-Gerês Park will be offered to select SENSA itineraries and to use of the SENSA applications via SENSA terminals *(tablet or smartphone and spot connect)*
  o 10 "single day" visitors to La Maddalena Park will be offered to select SENSA itineraries and to use of the SENSA applications via SENSA terminals *(tablet or smartphone and spot connect)*

Main characteristics of the Beta Demonstrator *(from T0+25 to T0+30)***:**

❑ It will take place in the 3 participating parks *(Kgalagadi, Peneda-Gerês & La Maddalena Parks)*

❑ It will consist of 3 "multi days" trips organized by SIEL with the parks covering both the "travel planning" stage and the "on the move field" stage *(an average of 5 travellers per trip is foreseen)*
  o One travel group going to Kgalagari Park *(average stay is 5 days)*
  o One travel group going to Peneda-Gerês Park *(average stay is 3 days)*
  o One travel group going to La Maddalena Park *(average stay is 2 days)*

❑ It will consist of "single day" visits organized by the participating European parks
  o 10 "single day" visitors to Peneda-Gerês Park will be offered to select SENSA itineraries and to use of the SENSA applications via SENSA terminals *(tablet or smartphone and spot connect)*
  o 10 "single day" visitors to La Maddalena Park will be offered to select SENSA itineraries and to use of the SENSA applications via SENSA terminals *(tablet or smartphone and spot connect)*

The Pilot Phase demonstration characteristics are summarized in the table below:

Planned trips and visits for the Demonstrators									
Destination	**Period envisaged (Alpha Demo)**	**Duration**	**Average n° of tourists**	**Period envisaged (Beta Demo)**	**Duration**	**Average n° of tourists**	**Total period**	**Total duration**	**Total n° of tourists**
Trips organised by SIEL									
Kgalagari Park	T0+20 to T0+24	5 days	5	T0+25 to T0+30	5 days	5	T0+20 to T0+30	10 days	10
Peneda-Gerês Park	T0+20 to T0+24	3 days	5	T0+25 to T0+30	3 days	5	T0+20 to T0+30	6 days	10
La Maddalena Park	T0+20 to T0+24	2 days	5	T0+25 to T0+30	2 days	5	T0+20 to T0+30	4 days	10
Single day visits									
Peneda-Gerês Park	T0+20 to T0+24	1 day	10	T0+25 to T0+30	1 day	10	T0+20 to T0+30	20 days	20
La Maddalena Park	T0+20 to T0+24	1 day	10	T0+25 to T0+30	1 day	10	T0+20 to T0+30	20 days	20
Total	**T0+20 to T0+24**	**30 days**	**35 Tourists**	**T0+25 to T0+30**	**30 days**	**35 Tourists**	**T0+20 to T0+30**	**60 days**	**70 Tourists**

Note: the variation in average trip duration of the different parks is linked to the individual characteristics of each Park, which call for longer or shorter trips.

Table 5: Alpha & Beta Demonstrators key characteristics

The data usage characteristics of the Alpha & Beta Demonstrators are:

Each traveller / visitor to a park will be downloading the following range of SENSA data

- ❑ Environmental map of the park *(GIS mapped info)*
- ❑ Ecotourism map of a park *(GIS mapped info)*
- ❑ Safety map of a park *(GIS mapped info)*
- ❑ Geo-localized awareness information *(multimedia content)*
- ❑ Geo-localized best practices *(multimedia content)*

The data storage size on the SENSA clients *(tablet or smartphone)* needed to support the SENSA application will very much depend on the size of the park to be visited and on the number of multimedia assets the park has integrated onto the SENSA platform. Typically we can expect between 250 and 1000 multimedia assets, with an average weight of 1 MB per multimedia asset *(it can be a single asset or a composed asset),* thus creating a need for storing between 250 MB and 1 GB of data locally. The downloading of this data will in large part take place prior to the start of the field travelling, using a home or office Wifi Connection. Regarding the upload of information by the travellers to the SENSA platform, it will consist mostly of "field observation" from the traveller in the form of taken pictures. We can assume an average of 100 geolocalised field pictures taken per travellers per trip in response to requests from the parks managers. This would amount to uploading an average of 100 MB per traveller per trip via a Wifi / Astr2Connect communication. Personal picture taken by the traveller may also be uploaded to the SENSA platform and shared with friends. Here we can assume another 100 MB of personal pictures upload. *Finally if video upload is allowed, the capacity required would be in the gigabytes range.*

With respect to the Spot Connect Device carried by a traveller, we can assume a satellite uplink / GPS tracking sampling ranging between once an hour to every 10 minutes. Dedicated "reporting" satellite messages or "emergency requests" are expected to have an average frequency of 2 to 3 messages per day per traveller using the Spot Connect device.

The SENSA Alpha and Beta Demonstrators will be organised along the following actions:

Action 1: Deploying the SENSA environment

- ■ **Actors**
    - ➢ Peace Parks Foundation & Kgalagadi Transfrontier Park
    - ➢ PAN Parks Foundation & Peneda-Gerês National Park
    - ➢ La Maddalena Archipelago National Park
    - ➢ SIEL
    - ➢ Technical Partners *(as support: GeoVille, Cybercultus)*
    - ➢ Third party vendors *(tablets, smartphones, spot connect, Astra2Connect satellite broadband, Spot Connect service subscription)*

- ■ **Prerequisite**
    - ➢ The SENSA system must be ready and functional
    - ➢ Terminal equipment must have been purchased (9 tablets, 9 smart phones, 18 spot connect devices)
    - ➢ Satellite Broadband equipment must have been installed in shelters
      (2 Astra2Connect installations in the Peneda-Gerês National Park,
      1 Astra2Connect installation in the Kgalagadi Transfrontier Park,
      1 Astra2Connect installation in La Maddalena Archipelago Park)

Satellite Broadband communication annual subscription must have been contracted *(2 Astra2Connect subscriptions for the Peneda-Gerês National Park, 1 Astra2Connect subscriptions for the Kgalagadi Transfrontier Park, 1 Astra2Connect subscriptions for La Maddalena Archipelago Park)*
   - ➢ Spot Connect annual subscriptions must have been contracted *(18 Spot Connect subscriptions)*

- ■ **Services**
  - • Validating access to the SENSA services by the Business Actors
    - ○ Testing access to the SENSA server using a PC / Laptop *(done by the Park Managers and Travel Operator)*
  - • Validating access to the SENSA services by the Consumers
    - ○ Testing the access to SENSA server using the tablet and smartphones applications *(done by the Park Managers and Travel Operator)*
      - ▪ Via Wifi / Terrestrial fixed line
      - ▪ Via Wifi / Satellite communication at shelters
      - ▪ Via 2G / 3G wireless networks
    - ○ Testing the access to SENSA server using the spot connect trackers *(done by the Park Managers and Travel Operator)*
      - ▪ Via Spot Connect satellite communication

Action 2: Generating the Environmental and Ecotourism Mapping of the Parks

- ■ **Actors**
  - ➢ Peace Parks Foundation & Kgalagadi Transfrontier Park
  - ➢ PAN Parks Foundation & Peneda-Gerês National Park
  - ➢ La Maddalena Archipelago National Park

- ■ **Prerequisite**
  - • D 202 Protected Areas Mapping *(GIS Maps)*
  - • D 203 Risk Areas Mapping *(GIS Maps)*
  - • D 204 Ecotourism Areas Mapping *(GIS Maps)*

- ■ **Services**
  - • Actualising all the mapping information with the latest available data
    - ○ Environmental protection data update *(done by the Park Managers)*
    - ○ Ecotourism activities update *(done by the Park Managers)*
  - • Generating the integrated environmental and ecotourism mapping of the Parks
    - ○ Running the Environmental Expert System *(done by the Park Managers)*
    - ○ Running the Mapping Facilities *(done by the Park Managers)*

Action 3: Organising the optimal travellers and activities distribution in the Parks

- ■ **Actors**
  - ➢ Peace Parks Foundation & Kgalagadi Transfrontier Park
  - ➢ PAN Parks Foundation & Peneda-Gerês National Park
  - ➢ La Maddalena Archipelago National Park

- ■ **Prerequisite**
  - • Environmental and Ecotourism mapping of the Park must be available

- ■ **Services**
  - • Temporal and spatial distribution thresholds across the parks areas
    - ○ Running the Travellers Distribution tools *(done by the Park Managers)*
    - ○ Running the Activities Distribution tools *(done by the Park Managers)*

Action 4: Authoring and geo-localising the awareness and best practices content, as well as the field reporting multimedia questionnaire

- ■ **Actors**
  - ➤ Peace Parks Foundation & Kgalagadi Transfrontier Park
  - ➤ PAN Parks Foundation & Peneda-Gerês National Park
  - ➤ La Maddalena Archipelago National Park

- ■ **Prerequisite**
  - Awareness and best practices raw content (texts and images) must be available

- ■ **Services**
  - Authoring the awareness and best practices content with the relevant templates
    - o Running the Awareness Building tools *(done by the Park Managers)*
  - Authoring the field reporting questionnaire (for contribution requests to the traveller)
    - o Running the Field Observation authoring tools *(done by the Park Managers)*

Action 5: Organising the travel services

- ■ **Actors**
  - ➤ SIEL
  - ➤ Peace Parks Foundation & Kgalagadi Transfrontier Park
  - ➤ PAN Parks Foundation & Peneda-Gerês National Park
  - ➤ La Maddalena Archipelago National Park

- ■ **Prerequisite**
  - Selecting local services providers in the Kgalagadi Transfrontier Park region
  - Selecting local services providers in the Peneda-Gerês National Park
  - Selecting local services providers in La Maddalena Archipelago Park region

- ■ **Services**
  - Describing the local providers services
    - o Running the Ecotourism Online Back-Office *(done by the Travel Operators)*
  - Managing the travels reservation / booking with local providers
    - o Running the Ecotourism Online Back-Office *(done by the Travel Operators)*

Action 6: Planning the Ecotourism Trips to the Parks

- ■ **Actors**
  - ➤ SIEL
  - ➤ Travellers

- ■ **Prerequisite**
  - Selecting 3 groups of 5 travellers *(average)* for the Alpha Demonstrator
    (1 group for Kgalagadi Park, 1 group for Peneda-Gerês Park and 1 group for La Maddalena Park)
  - Selecting 20 "single day" visitors for the Alpha Demonstrator *(10 visitors for Peneda-Gerês Park and 10 for La Maddalena Park)*
  - Selecting 3 groups of 5 travellers *(average)* for the Beta Demonstrator
    (1 group for Kgalagadi Park, 1 group for Peneda-Gerês Park and 1 group for La Maddalena Park)

- Selecting 20 "single day" visitors for the Beta Demonstrator *(10 visitors for Peneda-Gerês Park and 10 for La Maddalena Park)*

■ **Services**
- Expressing the travellers interests
  - o Running the Ecotourism Online Front-Office *(done by the Travellers)*
- Planning the customised trip
  - o Running the Ecotourism Online Back-Office *(done by the Travellers)*
- Planning predefined "single day" itineraries
  - o Running the Ecotourism Online Back-Office *(done by the Park Managers)*

Action 7: Using the "On the move" travel facilities

■ **Actors**
  - ➢ SIEL
  - ➢ Travellers

■ **Prerequisite**
- Trip planning and booking finalised

■ **Services**
- Discovering the personalised itinerary
  - o Running the itinerary navigation on the tablets and smart phones *(done by the Travellers)*
- Being prompted with geo-localised awareness and best practice content
  - o Running the awareness / best practice application *(done by the Travellers)*
- Safeguarding the environment
  - o Running in background the environment safeguard application *(done by the Travellers)*
- Contributing to the protected areas preservation, becoming an actor
  - o Running the field observation application *(done by the Travellers)*
- Reporting emergency situations
  - o Running the safety application *(done by the Travellers)*

Action 8 (run in parallel with Action 7): Managing the travellers environmental and safety impact

■ **Actors**
  - ➢ Peace Parks Foundation & Kgalagadi Transfrontier Park
  - ➢ PAN Parks Foundation & Peneda-Gerês National Park
  - ➢ La Maddalena Archipelago National Park

■ **Prerequisite**
- Travellers are out in the Park "on the move"

■ **Services**
- Managing environmental misuse alerts
  - o Running the Environmental Alert tools *(done by the Park Managers)*
- Managing the travellers field reporting (textual observations and taken pictures)
  - o Running the Reporting tools *(done by the Park Managers)*
- Managing emergency / safety alerts
  - o Running the Safety Operational System *(done by the Park Managers)*

Typical field utilisation configuration
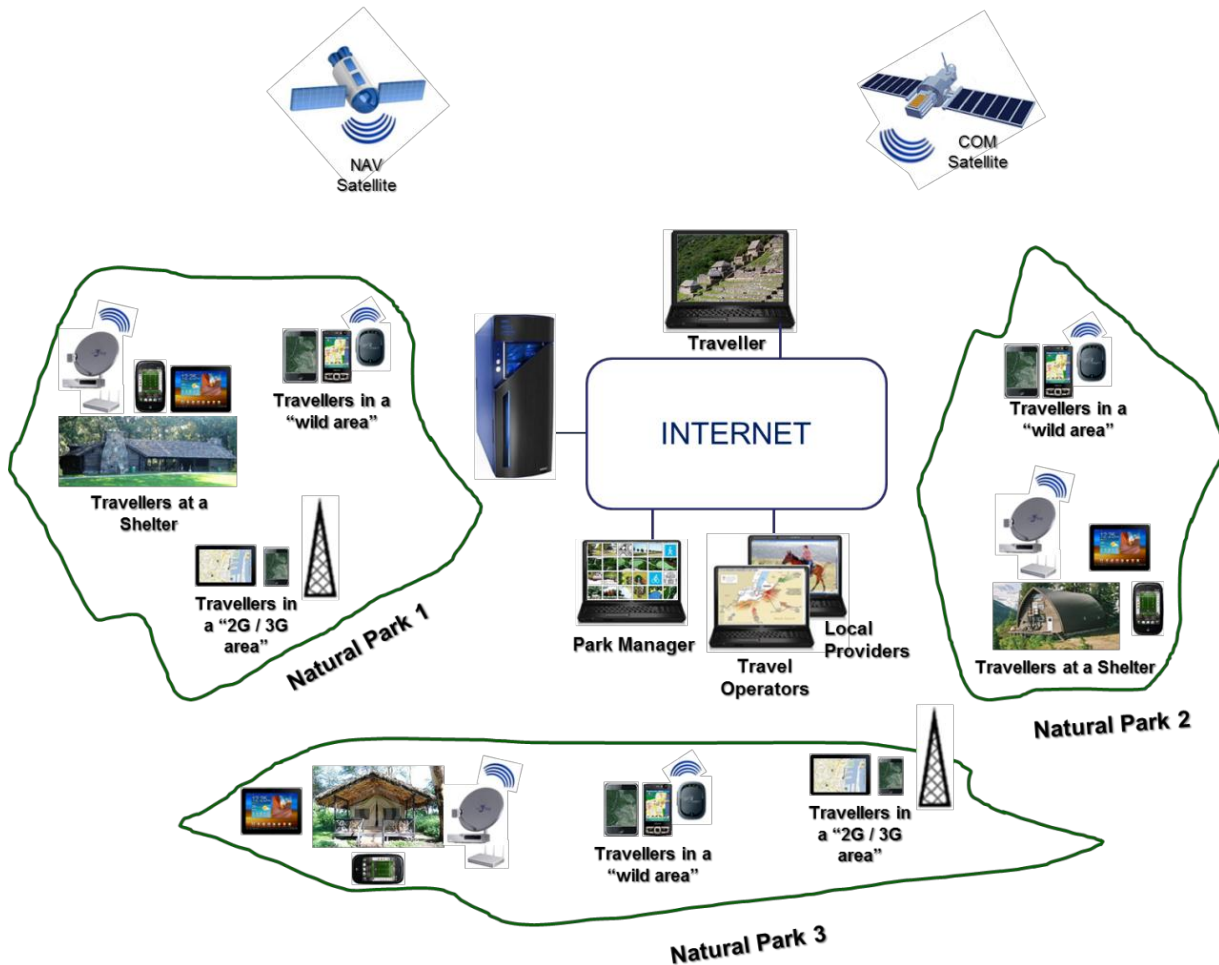
Fig 12: SENSA Field Demonstration Configuration

2.5.4 SENSA Procurement, Integration & Verification Approach

The procurement, integration and verification will cover external sources procurement *(EO / GIS data, Satellite services and end-users equipment)*, customisation of background information procurement from the SENSA partners, development of new complementary components procurement by the SENSA partners, SENSA platform system integration and field pilot trials, all of which will be validated for functional conformance, usability and intuitiveness of use, system reliability and performance.

The diagram below shows the procurement, integration and verification approach:

| Components & system functional validation Usability and intuitiveness evaluation | Integrated platform field validation and fiability / performance testing |

| Customisation of background facilities (RegioCover & Trip à la Carte) | Development of new SENSA tools (TAD, EAR, SOS, EPS, AWA, FOB) | SENSA Platform System Integration | Field Pilot Trials |

| Third parties: EO & GIS data, Development equipment (PCs, servers), Satellite main services, End-user test devices | Third parties : Astra2Connect equip & service, SpotConnect devices & service Tablets & smartphones |

Fig 13: SENSA procurement and validation approach

From the above diagram we can see that the foreseen approach consists of a set of procurement and quality assurance activities, which are organised along three action lines running in parallel and securing an optimal implementation of the project.

At the start of the project, following the system specification phase, we have an initial procurement of external equipment and services, as needed for the development of the SENSA platform, namely the acquisition of EO / GIS data *(most of them free of charge or low cost such as SENTINEL 2 data which will be fully available in 2014 with the final use and pricing conditions to be known then)* and the acquisition of equipment from the retail market *(PCs / servers for development)*. This initial procurement is followed by the components development and system integration procurement which encloses customisation of background information and new foreground development. In this phase user devices from the retail market *(tablets, smartphones, SpotConnect terminals)* will be purchased for testing purposes, whilst satellite communication *(Astra2connect)* will be leased from SES Astra authorised providers. Finally the last field trial phase will see the procurement of additional user devices as needed by each of the different trial areas *(Astra2Connect + Wifi installations)* with a leasing contract in a number of shelters in natural parks, 5 smartphones and 5 tablets and 10 spotconnect devices with a one year leasing contract per travel operator.

During the development and integration procurement phase, components and integrated system functional validation and usability testing will be carried out, whilst during the trial phase field validation and system usability and performance will be tested. End-Users *(Travellers / Visitors)* and Field Professionals *(Natural Parks & Travel Operators)* will be at the centre of the user requirements definition and of the pilot demonstration stage. Relevant validation methods will be used, mock-ups at the requirement stage in order to secure pertinent feedback and direct involvement in near exploitation contexts will be used for the pilot demonstrators.

The development of the SENSA platform is intended to be performed using the "Agile Web Development" approach with the aim to have an iterative process enabling to validate periodically what is being developed and to adjust / enhance based on use / testing of the intermediate results. Also the project pilot will be divided into two main periods, a first pilot trial phase using early integrated SENSA components, at the project mid-term development phase, with the aim to gather early on feedback from the users and a second more extensive pilot trial aiming at full field validation of the SENSA facilities.

3. CONTENTS OF THE FINANCIAL, MANAGEMENT AND ADMINISTRATIVE PROPOSAL

3.1 BACKGROUND EXPERIENCE OF THE PARICIPATING ORGANISATIONS

3.1.1 CYBERCULTUS *(Coordinator)*

Created in 1999 and specialised in SIM (Social & Immersive Media) technology, Cybercultus provides back-end and front-end solutions to the tourism, cultural heritage and entertainment industries. Cybercultus has three lines of eBSA (eBusiness Solutions for the Arts industry) products, namely: a) The eBSA Travel product is an online "trip à la carte" platform allowing on the one side tour operators and travel specialists to manage customised travel requests and on the other side travellers to build their own "trip à la carte" circuit from the different tourism offers made available on a map. b) The eBSA TV product is a social and immersive entertainment solution enabling TV producers to extend their current TV programmes with a direct user participation via avatar representations, as well as the co-production of TV programmes mixing professional content with user generated content. c) The eBSA Museum product is an end-to-end cultural heritage environment enabling digital archiving, digital consultation, GIS navigation, collections valorisation and 2D / 3D assets display, as well as a geo-localisation of cultural objects. Among the Cybercultus partners and customers we can identify the Tour Operators SIEL, Authentic South Travel, the museum Musée Albert Khan of Paris, Museums Online, the TV broadcasters RTBF, ORF, ARD.

Farid Meinköhn has been involved for over 25 years in the field of Information Technology and Media. His professional career in the United States, the United Kingdom and Luxembourg is divided into three chronological phases. The first phase (from 1983 to 1989) was devoted to HW / SW multimedia design and developments. The second phase (from 1989 to 1994) was devoted to operating an R&D department dedicated to the development of TV media applications and telematic solutions. The third and current phase (from 1994 onwards) is devoted to senior management activities with a focus on large IT projects. Since 2001 he is the Managing Director of Cybercultus.

Cecilia Ibarra has over 20 years of experience in the financial sector with activities ranging from financial markets analysis, business strategies development, financial products development, market statistics generation, market trends and potentials evaluation. Since the last 5 years she has been involved as a market analyst and business advisor to Cybercultus.

Noureddine Zouache has over 12 years of experience in the field of software development. He has joined Cybercultus in 2011 and has been assigned to the development of the Trip à la Carte travel platform. He has also been actively taking part in the development of the FAKIR geo-localised virtual visit access and display application of the 100 000 autochromes collection of the Albert Kahn Museum in Paris. Before joining Cybercultus he has been developing software applications for the Luxembourg Post & Telecommunication company as well for other companies such as Lombard Insurance or Infopartners.

Fabian Grzeszeyk has during the last 10 years been actively involved in the development of multimedia TV and web applications using 2D and 3D authoring and object oriented technologies. He has been responsible for the development of the COTV (Community TV Content Making) platform as well as for the development of the "Trip à la carte" online travel platform.

3.1.2 GEOVILLE *(Subcontractor)*

GeoVille is an internationally operating company providing consultancy, services and products related to remote sensing, geo-information and geographic information systems. It provides value-added services in the land domain with focus on regional and spatial planning, environmental surveillance, forestry, biodiversity and infrastructure applications. Specialised services comprise generation of land cover and land use maps, titling, cartography and the development of turnkey information systems. GeoVille's mission is to offer turnkey solutions for efficient spatial data management and analysis. Since its establishment in 1998 GeoVille has established a broad international customer base and successfully participated in more than 250 national and international projects located in 45 countries around the world. At present, GeoVille is employing a staff of more than 30 experts and consultants graduated in Earth sciences and informatics. GeoVille's team has experience and expertise in managing and executing projects in Europe, Asia, Africa and Latin America. All of our staff members are holding MSc grade or equivalent, and 30% a PhD title. GeoVille is an ISO 9001:2008 and 14001:2004 certified company.

Jürgen Weichselbaum holds a degree of geography and spatial planning from the University of Vienna. He has very specialised knowledge in matters related to remote sensing, monitoring and in a range of GIS-applications. He is the Technical Director of GeoVille Group and under his responsibility are the EO Data Processing, GI Operations and the Consulting Group. Furthermore, he has a great experience in supervising the development of new EO/GIS based products.

Andreas Walli, holds PhD. from University of California in Environmental Sciences and has over 10 years of experience in earth observation and GIS applications. As Chief GI & RS Analyst he led project acquisition and execution at Stanford University for 7 years. As Commercial Director of GeoVille Group his responsibility include promotion & marketing, data distribution and project management. His profound experience in the development and promotion of novel EO products and services will serve as an excellent basis for the contribution to the current project.

3.1.3 CRP - GABRIEL LIPPMANN *(Subcontractor)*

The CRP - Gabriel Lippmann, created in July 1987, is a public establishment devoted to applied scientific research and technological development, as well as technology transfer and permanent high-level training. Its activities aim to reinforce the economic fabric of the country through the creation of new technological skills within the CRP - Gabriel Lippmann and by transferring this know-how to companies. The Centre de Recherche Public - Gabriel Lippmann is composed of three main research departments as follows:

- Innovative materials technology: analysis, instrumental development, surface treatment
- Sustainable management of natural resources
- Technologies of the Information Society

The Sustainable management of natural resources department covers land management using knowledge of the temporal dynamics of land use, whether from an economic, social or environmental and landscape viewpoint, notably to simulate development scenarios. To undertake this updated observation, data obtained via new earth observation techniques are used.

Dr Lucien Hoffmann : Scientific Director of the Sustainable Management of Natural Resources Dpt. PhD in biology is the research director of the Department 'Environment and Agro-biotechnologies' (EVA). His scientific background is in hydrobiology and environmental

monitoring. He is currently also responsible for the Climate & Environmental Observatory of the Dpt. Besides the coordination on the CRP-GL side, he will bring his experience in monitoring & management of natural resources.

Dr. Martin Schlerf is project leader of the Remote Sensing Group within the EVA Department. Among activities in the fields of imaging spectrometry and ecosystem mapping and modelling, the group has practical experience in the pre-processing and advanced analysis of satellite and airborne data. The group has developed solutions and software tools for automated
supervised land-cover classification, vegetation attribute retrieval, data mining, and
data assimilation.

3.1.3 SIEL *(Subcontractor)*

SIEL is a Luxembourg based travel operator providing discovery / thematic trips in Canada, Europe and Africa (Kenya and Sénégal). SIEL CANADA is a specialized entity of SIEL focusing on organizing fully personalized itineraries in the vast authentic open spaces of CANADA. Circuits with accompanying professionals and circuits in liberty are both proposed. SIEL organizes its discovery trips along different themes such as cultural visits, wildlife observation, polar bears habitat discovery, sleeping with the caribous, dogsledding expeditions, river tours, safaris, lakes by seaplane, 1000 km in snowmobile. SIEL has an in depth knowledge of the destinations it proposes and is driven a young enthusiastic team of travel experts offering flexibility in the conception of trips and rapidity of execution with a quest for permanent perfection. All of its accompanying guides have a minimum of 3 years field experience. www.sielcanada.com

Bruno de Greef, has taken over in 2005 the Travel Company (Siel Voyages) and the Tour Operator (Siel Canada) at Bridel in Luxembourg. He has since then been managing the 2 companies (now a single entity) and is developing new travel concepts with a focus on fully customised travels in Europe, Canada and Africa. A further specialisation is on travellers' immersion in wilderness and large natural areas. He also has a strong IT background having worked as an IT Director for 10 years in two software companies (SOPRA Group and Real Solutions S.A). He holds a diploma in Computer Science from the Institut Paul Lambin of Brussels and an International Air Transport Association Consultant diploma (CTTC).

3.1.5 Peace Parks Foundation *(External User)*

Transfrontier conservation areas, also known as peace parks, are ecological systems that straddle the boundaries of neighbouring countries. Peace Parks Foundation assists countries to create peace parks, thus enabling harmonised management of ecosystems shared across international borders. Wild animals, and tourists, are able to move across borders where once there were fences. In this manner, ecosystems are managed as a unified entity and not separately by the countries involved. The creation of peace parks thus leads to improved biodiversity conservation through improved land and ecosystem management. Peace parks development also contributes to improving socio-economic circumstances of people living in and around these areas through sustainable community conservation and eco-tourism initiatives.

In many cases, if not for the establishment of peace parks, these wildlife areas would not obtain the necessary protection and resources. Furthermore, these peace parks have huge potential to improve people's livelihoods. Over the next 10 years, and through the creation of peace parks and associated eco-tourism, Peace Parks Foundation aims to create one million additional jobs in southern Africa. For every eight new tourists one job is created and eight mouths are fed. Thus the ultimate goal is to encourage eight million new tourists to visit southern African peace parks.

Peace Parks Foundation was established in South Africa in 1997 by Dr Nelson Mandela, Prince Bernhard of the Netherlands and Dr Anton Rupert in recognition of the importance of cross-border collaboration in nature conservation and the potential of peace parks to contribute to sustainable development.

Peace Parks Foundation is currently assisting 10 southern African countries to develop 10 peace parks. These are:
- ✓ Ai/-Ais-Richtersveld (Namibia and South Africa)
- ✓ Kgalagadi (Botswana and South Africa)
- ✓ Limpopo-Shashe (Botswana, South Africa and Zimbabwe)
- ✓ Great Limpopo (Mozambique, South Africa and Zimbabwe)
- ✓ Lubombo (Mozambique, South Africa and Swaziland)
- ✓ Malti-Drakensberg (Lesotho and South Africa)
- ✓ Malawi-Zambia
- ✓ Kavango-Zambezi (Angola, Botswana, Namibia, Zambia and Zimbabwe)
- ✓ Liuwa Plain-Mussuma TFCA (Angola and Zambia)
- ✓ Lower Zambezi - Mana Pools (Zambia and Zimbabwe)

3.1.6 Kgalagadi Transfrontier Park *(External User)*

Kgalagadi Transfrontier Park is a large wildlife preserve and conservation area in southern Africa. The park straddles the border between South Africa and Botswana and comprises two adjoining national parks: Kalahari Gemsbok National Park in South Africa and Gemsbok National Park in Botswana. The total area of the park is 38,000 square kilometres (15,000 sq mi). Approximately three-quarters of the park lies in Botswana and one-quarter in South Africa. Kgalagadi means place of thirst. The park is located largely within the southern Kalahari Desert. The terrain consists of red sand dunes, sparse vegetation, occasional trees, and the dry riverbeds of the Nossob and Auob rivers. The rivers are said to flow only about once per century. However, water flows underground and provides life for grass and camelthorn trees growing in the river beds. The rivers may flow briefly after large thunderstorms, a cause for celebration among the wildlife, who will flock to the river beds and

slake their eternal thirst. The park has abundant, varied wildlife. It is home to large mammalian predators such as black-maned Kalahari lions, cheetahs, leopards, and hyenas. Migratory herds of large herbivores such as blue wildebeest, springbok, eland, and red hartebeest also live and move seasonally within the park, providing sustenance for the predators. More than 200 species of bird can be found in the park, including vultures and raptors such as eagles, buzzards, and secretary birds.

The weather in the Kalahari can reach extremes. January is midsummer in southern Africa and the daytime temperatures are often in excess of 40 °C (104 °F). Winter nights can be quite cold with temperatures below freezing. Extreme temperatures of –11 °C and up to 45 °C have been recorded. Precipitation is sparse in this desert area. Within the park there are three traditional tourist lodges, called "rest camps". These are full-service lodges and include amenities such as air conditioning, shopping, and swimming pools. There are also six wilderness camps in the park. The wilderness camps provide little more than shelter and wash water; visitors must supply their own food, drinking water, and firewood.

3.1.7 PAN Parks Foundation *(External User)*

The PAN Parks Foundation was founded in 1998 by the World Wide Fund for Nature and the Dutch travel company Molecaten.The organisation aims to create a network of European wilderness areas where wilderness and high quality tourism facilities are balanced with environmental protection and sustainable local development. It attempts to achieve this through a process of auditing and verification, enabling it to certify parks owned by partners as meeting particular standards, combined with political advocacy on the local and European level. PAN Parks showcase examples of best practices in wilderness management, working with local communities and offering a unique wilderness experience to visitors. PAN Parks protect Europe's most undisturbed areas of nature, setting a benchmark for high standards in protected area management. The PAN Parks Foundation is responsible for providing the certification for such areas, using a system under WCPA (World Commission on Protected Areas) Framework for Management Effectiveness.

Parks are certified on the basis of 5 principles (natural values, habitat management, visitor management, sustainable tourism development, tourism business partners). All certified PAN Parks include a significant wilderness in their core, which is defined as " an area of at least 10 000 hectares of land or sea, which together with its native plant and animal communities and their associated ecosystems, is in an essentially natural state. " These wilderness areas are those lands that have been least modified by man, and they represent the most intact and undisturbed expanses of Europe's remaining natural landscapes. The Foundations also actively supports European protected area managers to meet PAN Parks quality standards and link them to a European-wide network with opportunities to exchange expert ideas.

PAN Parks certified parks are:
- ✓ Central Balkan National Park, Bulgaria
- ✓ Fulufjället National Park, Sweden
- ✓ Majella National Park, Italy
- ✓ Oulanka National Park, Finland
- ✓ Paanajärvi National Park, Russia
- ✓ Retezat National Park, Romania
- ✓ Rila National Park, Bulgaria
- ✓ Borjomi-Kharagauli National Park, Georgia (country)
- ✓ Southwestern Archipelago National Park, Finland
- ✓ Peneda-Gerês National Park, Portugal

- ✓ Soomaa National Park, Estonia
- ✓ Čepkeliai-Dzūkija National Park, Lithuania
- ✓ Küre Mountains National Park, Turkey

3.1.8 Peneda-Gerês National Park *(External User)*

The Peneda-Gerês National Park (PGNP) is located in the northwestern region of Portugal occupying an area of 70.920 ha. It is the only National Park in Portugal (classified and established since 1971), the highest degree for protected areas in the country. Thus, the study of all the components of the Natural Heritage inside the PGNP is very important for the correct management of this important region. The PGNP presents remarkable features regarding the geological, biological, archeological and cultural aspects. In the extreme North of Portugal, between the Atlantic Coast and the Spanish border, remnants of wildlife that once roamed all Europe have survived next to the vestiges of long lost civilizations.

On foot or astride a garrano pony one can appreciate the vast expanse and diversity of Peneda Gerês, travelling along narrow shepherd trails or on the ancient cement of Roman roads. From lush river valleys to bare rocky mountain peaks, from golden gorsefields to sweeping oak. Peneda-Gerês National Park is the refuge of some of Europe's last surviving great predators. A transition zone between the Mediterranean and the Euro-Siberian regions with a hotch potch of microclimates and new plants on every new trail.

Wild boars, otters, roe deers and foxes exist side by side with badgers, eagles and the last surviving wolves on the continent. Ancient megaliths, rock carvings and old dolmen graves lie scattered in the park. The ruins of Celtic "castros" and medieval castles rise above little hill towns, where modern life has not yet intruded and oxen are still used to plough the fields.

3.1.7 Parco Nazionale dell'Arcipelago di La Maddalena *(External User)*

La Maddalena Archipelago National Park is a geomarine protected area consisting of a group of islands situated in the north-east of the coast of Gallura, in the stretch of sea between Sardinia and Corsica known as Bocche di Bonifacio. These islands – except for La Maddalena Island housing the homonymous town and characterized by a significant human presence – are entirely deserted or scattered with small human settlements, like in Caprera and Santa Maria Islands. Established with Law 4th January 1994 according to the reference regulations on protected areas, the Park Authority is regulated by Decree of the President of the Republic (D.P.R.) of 17th May 1996, which also introduced the first safeguard rules. The Decree also delimits the Park borders, which include "all the islands and islets belonging to the territory of the Municipality of La Maddalena, as well as the surrounding marine areas". The Archipelago is part of the European network of areas of great environmental importance (Site of Community Importance and Special Protection Area) for the presence of habitats and creatures that seem to have come together to perform a unique show.

La Madddalena Park is involved in the EU FP7 funded MEDUSE project which aims at developing a prototype service infrastructure for the delivery of location based services, enhanced by the use of European EGNOS and Galileo Commercial Service, within restricted access maritime areas. MEDUSE would complement well with SENSA.

3.2 ORGANISTION AND MANAGEMENT

3.2.1 Project Organisation Structure

The project management is divided into workpackages and subworkpackages (tasks) with the following three leadership categories, as well as a steering committee being defined:

The Project Coordinator is responsible for the execution of the contract, for maintaining a close contact with the European Space Agency as well as with the workpackage leaders and with external services providers. Aspects such as monitoring the project progress, disseminating the results, preparing the exploitation phase, ensuring support for the project on a national and European level are part of his responsibilities.

The Assistant Coordinator is responsible for providing human and material resources for the project management. He will act as a moderator during the entire project implementation and will organise an ftp server (Internet - file transfer protocol) for all the participants in the project, documents exchange repositories, on-line dialogue facilities and bulletin boards / forums for specific Workpackages. He will also establish dedicated fact sheet standards, thus securing a common understanding, both for the used nomenclature and for the drawn specifications. He will follow-up the monthly consortium reporting and will collect all the relevant inputs from all the partners and will secure the compilation of the consolidated report. Finally he will install and monitor a dedicated CVS (Control Versioning System), thus securing proper application development and system integration.

The Workpackage Leader is responsible for the technical co-ordination between the different parties involved in a given Workpackage and for monitoring the achievements originating from the different tasks of the Workpackage. He is also responsible for ensuring that the results of his Workpackage suitably integrate the results coming from the other Workpackages. The Workpackage Leader reports to the Project Manager.

The Task Leader is responsible for the technical co-ordination of the group involved in the implementation of the task, for the conception and the organisation of the activities to be performed as well as for the monitoring of the achievements. The Task Leader reports to the Leader of the "Parent Workpackage" to which the task (subworkpackage) pertains.

The Project Managers are responsible for the management of the contribution of their organisation to the project. Their activities will be to allocate and manage their internal resources to the project.

The Steering Committee consists of the Project Coordinator, the Assistant Coordinator and the Project Managers. This committee is responsible for solving all the issues linked to the global definition, progress and implementation of the project. The Steering Committee will meet twice a year to address all the pending issues and to validate the up-coming activities.

The Working Committee consists of the Project Coordinator, the Workpackage Leaders and the Task Leaders. This committee is responsible for solving all the conceptual, technical and implementation issues faced by the consortium during the realisation of the software developments, of the content productions and of the pilot services. The Working Committee will meet on a bi-monthly basis.

Technical workshops will be organised periodically, depending on requirements, for solving problems linked to a given Workpackage, to a given task or to integration activities. Technical

aspects, such as problem solving, testing, debugging, enhancing, generating alternatives, etc., will be addressed.

3.2.2 Organisation of responsibilities

The following chart shows the distribution of key responsibilities among the partners:
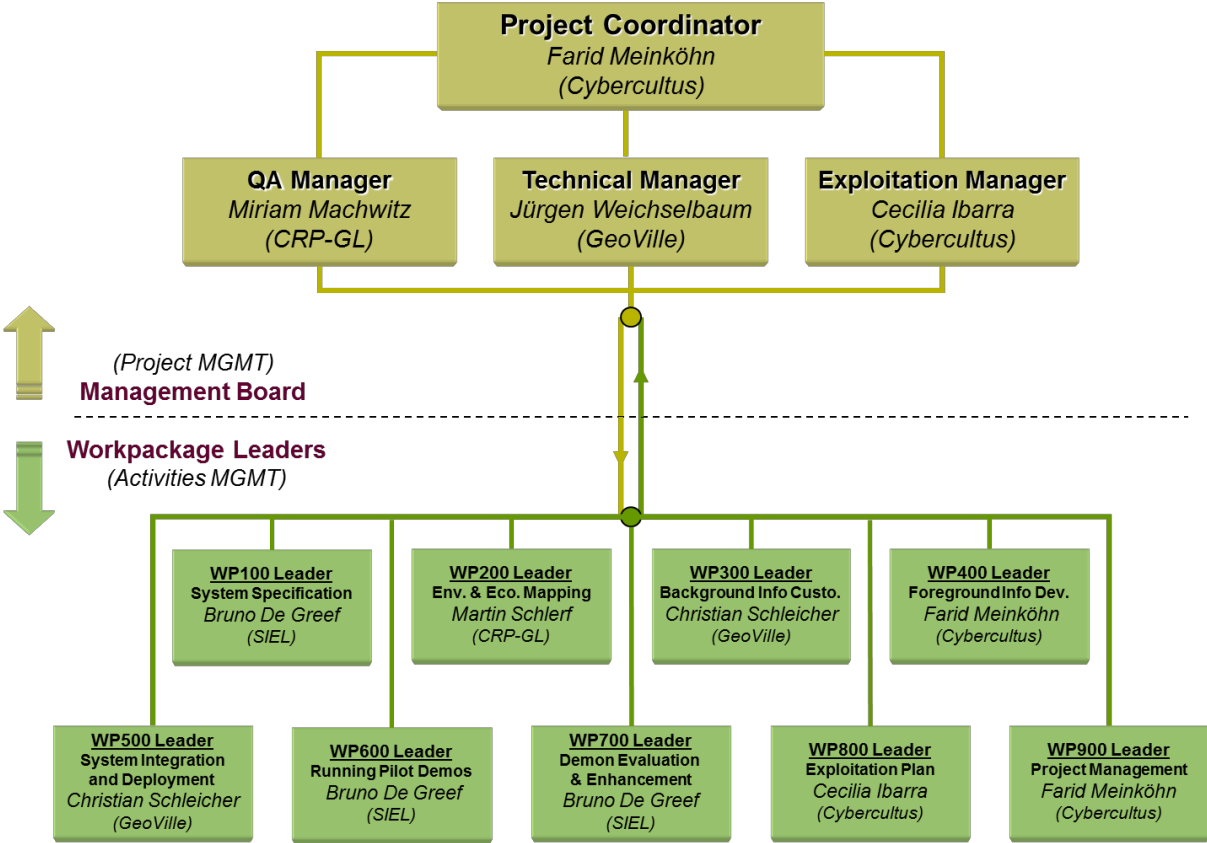
3.6 WORK BREACKDOWN STRUCTURE AND WORK PACKAGE DESCRIPTION (WBS & WPD)

The project, to last 30 months, will be organized and executed along a set of complementary workpackages as follows:

Workpackage	Partners involved
WP 100: System Specification	**Leader: SIEL**
WP 101: User Requirements	All Partners
WP 102: Scenario Specification	SIEL & Natural Parks
WP 103: Functional Specification	CRP-Gabriel Lippmann, Cybercultus, GeoVille, SIEL & Natural Parks
WP 104: System Architecture	GeoVille, Cybercultus, CRP - Gabriel Lippmann
WP 200: Environmental and Ecotourism Mapping	**Leader: CRP - Gabriel Lippmann**
WP 201: Mapping Methodology & Processes Definition	CRP-Gabriel Lippmann
WP 202: Protected Areas Mapping	CRP-Gabriel Lippmann, GeoVille, Natural Parks
WP 203: Risk Areas Mapping	CRP-Gabriel Lippmann, GeoVille, Natural Parks
WP 204: Ecotourism Areas Mapping	CRP-Gabriel Lippmann, GeoVille , Natural Parks
WP 205: Geo-localised Awareness & Best practices	SIEL & Natural Parks
WP 300: Background Information Customisation	**Leader: GeoVille**
WP 301: Customisation of the EO / GIS facilities	GeoVille
WP 302: Customisation of the Online Travel facilities	Cybercultus
WP 400: Foreground Information Development	**Leader: Cybercultus**
WP 401: Environmental Distribution & Reporting Tools	GeoVille
WP 402: Location based Observation & Awareness Tools	Cybercultus
WP 500: System integration and Deployment	**Leader: GeoVille**
WP 501: Background & Foreground Integration	GeoVille, Cybercultus
WP 502: SENSA Environment Deployment	Cybercultus, GeoVille, SIEL & Natural Parks
WP 600: Running Pilot Demonstrators	**Leader: SIEL**
WP 601: Running Alpha Demonstrator	SIEL & Natural Parks
WP 602: Running Beta Demonstrator	SIEL & Natural Parks
WP 700: Demonstrators Evaluation & Enhancement	**Leader: SIEL**
WP 701: Evaluation Methodology	CRP-Gabriel Lippmann
WP 702: Alpha Demonstrator Evaluation	SIEL & Natural Parks
WP 703 Beta Demonstrator Evaluation	SIEL & Natural Parks
WP 800: Exploitation Plan	**Leader: Cybercultus**
WP 701: Strategic Plan	All Partners
WP 802: Exploitation Agreement	All Partners
WP 803: Dissemination	All Partners
WP 900: Project Management	**Leader: Cybercultus**
WP 901: Project Planning	All Partners
WP 902: Project Control	All Partners
WP 903: Project Reporting	All Partners

3.6.1 WP 100: System Specification

The WorkPackage WP100 will run from "T0 to T0 + 9" and will cover 2 milestones, namely the Baseline Design Review (BDR) and the Critical Design Review (CDR) milestones. The WP 100 is essential to the project, since it will define the user requirements and the usage scenarios of all the SENSA field and user actors; set the functional specifications of the SENSA platform; and established detailed macro and micro system architecture of the whole SENSA environment.

WP 100 will be led by: Bruno De Greef (SIEL)

WP 100 contains: WP 101: User Requirements, WP 102: Scenario Specification, WP 103: Functional Specification and WP 104: System Architecture.

For each of these workpackages a PSS-20 description is performed below:

I.   WP 101 : User Requirements

PROJECT: SENSA	WP REF: 101
WP Title: WP101 – User requirements	Sheet: 1 of 26
Contractor: Cybercultus	Issue Ref: SENSA FP
Start event: Kick off meeting Planned Date: T0 End Event: User Requirements Planned Date: T0+3 WP Manager: B. De Greef (SIEL)	Issue Date: 9/10/20
Objective: to specify the user requirements of the different SENSA field actors and end-users *(Protected Areas Management Authorities, the Travel Operators, Travel Services Providers and the Travellers).* Inputs: Background components and facilities (Trip à la Carte travel platform, RegioCover Image Processing tools, Satellite Earth Observation data sources, GIS data sources) Tasks: Analysing the needs of the different actors in a SENSA chain, namely those of the Protected Areas Organizers, of the Ecotourism Travel Operators, and of the Travellers. Also indirectly associated stakeholders needs will be looked at such as public environmental protection and sustainable development authorities, as well as the local providers of ecotourism services. Tasks excluded: No pilot at this stage Output / Deliverable: • D 101 SENSA User Requirements (report)	

II. WP 102 : Scenario Specification

PROJECT: SENSA	WP REF: 102
WP Title: WP 102 - Scenario Specification	Sheet: 2 of 26
Contractor: Cybercultus	Issue Ref: SENSA FP
Start event: User Requirements Planned Date: T0+2 End Event: Scenario Specification Planned Date: T0+4	
	Issue Date: 9/10/2012
WP Manager: B. De Greef (SIEL)	
Objective: to identify and generate a set of typical use scenarios of the SENSA platform by the key field actors and end-users *(Protected Areas Management Authorities, the Travel Operators, Travel Services Providers and the Travellers)*. Inputs: User requirements Tasks: Elaborating and specifying typical field scenarios for the use of the SENSA facilities by the different SENSA actors. Care will be taken to portray real cases usage scenarios by the different actors in order to identify what sort of concrete contexts the different actors are faced with and what sorts of solutions could be provided by the SENSA facilities. Tasks excluded: No pilot at this stage Output / Deliverable: • D 102 SENSA Field Use Scenarios (report)	

III. WP 103 : Functional Specification

PROJECT: SENSA	WP REF: 103
WP Title: WP 103 - Functional Specification	Sheet: 3 of 26
Contractor: Cybercultus	Issue Ref: SENSA FP
Start event: User Requirements & Scenario Planned Date: T0+4 End Event: Functional Specification Planned Date: T0+6	
WP Manager: F. Meinköhn (Cybercultus)	Issue Date: 9/10/2012
Objective: to identify and specify all SENSA platform functionalities to be made available to the different SENSA actors Inputs: User requirements and Use scenarios Tasks: Specifying all the core functionalities of the SENSA platform and facilities . For each stakeholder of the SENSA environment as set of system functions will be established, as well as the functional interactions between the different stakeholders. The functions will also be linked to the targeted infrastructure contexts (in an office, on the move, in the open wilderness, etc.). Tasks excluded: No pilot at this stage Output / Deliverable: • D 103 SENSA Platform Functional Specification (report)	

IV. WP 104 : System Architecture

PROJECT: SENSA	WP REF: 104
WP Title: WP 104 - System Architecture Contractor: Cybercultus Start event: Functional Specification Planned Date: T0+6 End Event: System Architecture Planned Date: T0+9 WP Manager: C. Schleicher (GeoVille)	Sheet: 4 of 26 Issue Ref: SENSA FP Issue Date: 9/10/2012

Objective: to conceive and specify the SENSA overall macro system architecture as well as the detailed component micro system architecture.
 	
Inputs: Functional Specifications
 	
Tasks: Specifying the high level and the detailed component level system architecture.
 	
Development of the System Detail Design covering all SENSA components (DSA-DD); all major tradeoffs within design process are documented in the Design Justification File (DSA-DJF)
 	
Tasks excluded: No pilot at this stage
 	
Output / Deliverable:
    •   D 104 SENSA System Architecture (report) with sections
        o   System Detail Design (DSA-DD)
        o Design Justification File (DSA-DJF)	

3.6.2 WP 200: Environmental and Ecotourism Mapping

The WorkPackage WP200 will run from "T0 + 6 to T0 + 15 " and will cover the Factory Acceptance Test Review (FAT) milestone. WP 200 will process and provide the GIS mapping data. It will also secure geo-localised environmental and ecotourism awareness and best practices for the protected areas involved in the SENSA project. Collaboration between CRP - Gabiel Lippmann and GeoVille and the Natural Parks involved in the project will secure the proper instantiation of the mapping activities.

WP 200 will be led by M. Schlerf (CRP - Gabriel Lippmann)

WP 200 contains: WP 201: Mapping Methodology & Processes Definition, WP 202: Protected Areas Mapping, WP 203: Risk Areas Mapping, WP 204: Ecotourism Areas Mapping and WP 205: Geo-localised Awareness & Best practices.

For each of these WP200 pertaining workpackages a PSS-20 description is performed and displayed below:

V.   WP 201 : Mapping Methodology & Processes Definition

PROJECT: SENSA PHASE:		WP REF: 201
WP Title: WP 201 : Mapping Methodology & Processes Definition		Sheet: 5 of 26
Contractor: Cybercultus		
Start event: User Requirements Planned Date: T0+3 End Event: Mapping Methodology Planned Date: T0+9 & Processes		Issue Ref: SENSA FP
WP Manager: M. Schlerf (CRP - Gabriel Lippmann)		Issue Date: 9/10/2012
Objective: to analyse the mapping requirements, harmonize existing data and to specify the most appropriate environmental earth observation and GIS mapping methods; to implement a set of corresponding mapping processes to automate the mapping activity. Inputs: User Requirements and Scenarios Specification **Task 201-1: Analysis of mapping requirements** The mapping requirements are analysed for the involved Natural Parks and existing data will be collected and harmonized. Depending on the size and nature of the park different mapping products are of interest and different EO data is available. **Task 201-2: Specification of EO/GIS mapping method** Based on the existing data and the required missing information,		

the mapping will be realized using best practice strategies. Three different spatial scales are foreseen using appropriate satellite data, available spatial and non-spatial data provided by the Park Management and newly collected on-site sampling data (e.g. training and validation samples).

Large scale maps (macro resolution) will be produced from coarse spatial resolution satellite data (e.g., MERIS, MODIS, SPOT Vegetation) and complemented by available land cover products (e.g., GlobCover) to illustrate major land cover and vegetation zones. Natural Park areas accessible for tourists will be mapped with medium resolution data (e.g., TM/ETM+, ASTER, SPOT-HRV). A sampling strategy is developed for calibration and validation of the map products to secure high quality standards. Output thematic layers comprise detailed landcover information and habitat type. Regions of particular interests for tourists (hot spot areas) are identified to be mapped with very high resolution data (e.g., Ikonos, Quickbird, Worldview, Rapid Eye). At each level of scale appropriate mapping methods (e.g. supervised/unsupervised/hybrid image classification, pixel-wise/object-based approach, Maximum Likelihood/Support Vector Machines/Decision Trees/ ensemble based classification methods, appropriate sampling design (e.g. stratified random sampling)) will be specified and implemented. Texture analysis will provide a complementary source of information for cases where the spectral information alone is not sufficient. Spatial landscape patterns, an important parameter in biodiversity issues, will be assessed using the spatial pattern analysis program FRAGSTATS as additional information.

In addition digital elevation models will be analysed for extraction of topographical points of interest such as locations with good points of view, steep hiking parts, dangerous hiking paths, and good camping sites, etc.

Tasks excluded: No pilot at this stage

Output / Deliverable:
- D 201 SENSA Mapping Methodology & Processes (report)

PROJECT: SENSA	WP REF: 202
WP Title: WP 202 : Protected Areas Mapping	Sheet: 6 of 26
Contractor: Cybercultus	
Start event: User Requirements & Scenario, Planned Date: T0+6 Mapping Methodology & Processes	Issue Ref: SENSA FP
End Event: Protected Areas Mapping Planned Date: T0+15	
WP Manager: M. Schlerf (CRP – Gabriel Lippmann)	Issue Date: 9/10/2012

Objective: to map the landscape, fauna and vegetation of the SENSA participating Protected Areas, with a focus on environmental protection an ecotourism activities.

Inputs: Satellite Earth Observation data, Parks Own Data

Task 202-1: Land cover (landscape) mapping
The landscape will be mapped into coarse land cover classes using an unsupervised procedure. Image classes will be assigned following a visual assessment of the images using contextual information.

Task 202-2: Vegetation mapping
Vegetation mapping will include field data collection (according to the existing sampling design), image classification and interpretation and map construction but also existing data sets and ecological mapping. Qualitative and quantitative vegetation attributes , percentage cover, presence/absence of species and habitats, dominant species, etc.) will be used (if existing) or colleected for different strata and classified into suitable vegetation/habitat classes. Maps will be classified, interpreted and finally their accuracy will be assessed.

Task 202-3: Fauna mapping
At biodiversity hotspots, key animal species will be mapped through reporting from Park staff, tourists (WP 402) and existing data sets using available EO data and maps (target and endangered species), environmental layers (e.g., DEM) and presence/absence field observations (collected by the parks or from available database or new observations).. By integrating tourists' information on detected animal species, potential habitats of these species can be visualized The occurrence probability of the species can be an important information for the tourists interested in animal watching.
Additionally, reported animals for only a recent time period can be visualised and the tourist to have a higher chance to see animals in the Park.

Tasks excluded: No pilot at this stage

Output / Deliverable:	
• D 202 Protected Areas Mapping (GIS Maps)	

VII.   WP 203 : Risk Areas Mapping

PROJECT: SENSA	WP REF: 203
WP Title: WP 203 : Risk Areas Mapping	Sheet: 7 of 26
Contractor: Cybercultus	
Start event: User Requirements & Scenario, Planned Date: T0+6 Mapping Methodology & Processes	Issue Ref: SENSA FP
End Event: Risk Areas Mapping Planned Date: T0+15	
	Issue Date: 9/10/2012
WP Manager: M. Schlerf (CRP - Gabriel Lippmann)	
Objective: to map areas that potentially could represent a safety risk, both in terms of landscape (ex: potential flooding areas, ancient mines, landslide areas, frozen lakes, etc.) and in terms of fauna (ex: bears, snakes, tigers, etc.) Inputs: Satellite Earth Observation data, Parks Own Data, Other sources **Task 203-1: Maps indicating potential natural hazards** High resolution earth observation data and elevation models provide important information on different environmental attributes (e.g. floodings, snow, slope steepness, geological unit for landslide hazards). Together with existing maps and the expertise of the Nature Park management, risk zones are defined. **Task 203-2: Maps indicating the potential occurrence of selected animal species** Tourists and management of the Park have the possibility to mark areas points (described in WP 402), where they saw dangerous species (poisonous plants or dangerous animals). The expertise of the Park management in combination with this occurrence data and satellite data allow the mapping of areas with high and low risk. If sufficient species data is available, species distribution models (e.g. MAXENT) can additionally produce species distribution maps. Tasks excluded: No pilot at this stage Output / Deliverable: • D 203 Risk Areas Mapping (GIS Maps)	

VIII.   WP 204 : Ecotourism Areas Mapping

PROJECT: SENSA	WP REF: 204
WP Title: WP 204 : Ecotourism Areas Mapping Contractor: Cybercultus Start event: User Requirements & Scenario, Planned Date: T0+6 Mapping Methodology & Processes End Event: Ecotourism Areas Mapping Planned Date: T0+15 WP Manager: M. Schlerf (CRP – Gabriel Lippmann)	Sheet: 8 of 26 Issue Ref: SENSA FP Issue Date: 9/10/2012
Objective: to map the ecotourism dimension of the protected areas (environmental preservation levels, accessible trail, activities to be pursued available shelters, infrastructure, local services, etc.) Inputs: Parks Own Data, Other sources **Task 204-1: Ecotourism mapping** High resolution maps of the natural parks will provide relevant infrastructural and touristic information for the traveller. Information provided will include environmental constraints, points of interests, available tourism infrastructure, transport network (car, bike, boat, kayak, on foot, etc.), available touristic activities and local services providers. Existing GIS data layers will be complemented by on-site data collection. For instance, hiking tracks will be traced by walking the tracks with a high accuracy DGPS device. The final product can additionally contain alternatively high resolution satellite date instead of only having a map, which can help for orientation in the Park (like Google Maps). Therefore the satellite data will be prepared and combined with other GIS data. Tasks excluded: No pilot at this stage Output / Deliverable: • D 204 Ecotourism Areas Mapping (GIS Maps)	

IX.   WP 205 : Geo-localized Awareness & Best Practices

PROJECT: SENSA	WP REF: 205

WP Title: WP 205 : Geo-localized Awareness & Best Practices
 	
Contractor: Cybercultus
 	
Start event: User Requirements & Scenario,   Planned Date: T0+6
         Mapping Methodology & Processes
 	
End Event: Geo-localized Awareness   Planned Date: T0+15
         & Best Practices
 	
WP Manager: Bruno De Greef (SIEL)
	Sheet: 9 of 26
	
	Issue Ref:
	SENSA FP
	
	Issue Date:
	9/10/2012

Objective: to collect, to geo-localize, and to organise all the environmental and ecotourism awareness content and best practices linked to the protected areas of the SENSA project. Inputs: User Requirements and Scenarios Tasks: Collecting from different relevant sources environmental and best practice content linked to the targeted protected areas, organizing them into different thematic, editing them into multimedia presentations and geo-localising them. Tasks excluded: No pilot at this stage Output / Deliverable: • D 205 Geo-localised Awareness & Best Practices Content (Multimedia assets)	

3.6.3 WP 300: Background Information Customization

The WorkPackage WP300 will run from "T0 + 6 to T0 + 15 " and will cover the Factory Acceptance Test Review (FAT) milestone. WP 300 will essentially focus on customizing two background facilities stemming from Cybercultus and from GeoVille, namely the Trip à la Carte Platform and the RegioCover Image Processing facilities, in order to meet the specific needs of the SENSA Preservation Platform and the SENSA Ecotourism Platform.

WP 300 will be led by: C. Schleicher (GeoVille)

WP 300 contains: WP 301: Customisation of the EO / GIS facilities, WP 302: Customisation of the Online Travel facilities.

For each of these WP300 pertaining workpackages a PSS-20 description is performed and displayed below:

X. WP 301 : Customisation of the EO / GIS facilities

PROJECT: SENSA	WP REF: 301
WP Title: WP 301 : Customisation of the EO / GIS facilities	Sheet: 10 of 26
Contractor: Cybercultus	
Start event: Functional Requirements, Planned Date: T0+6 System Architecture	Issue Ref: SENSA FP
End Event: Customised EO / GIS facilities Planned Date: T0+15	Issue Date: 9/10/2012
WP Manager: C. Schleicher (GeoVille)	
Objective: to extract the relevant modules from the RegioCover Information Processing environment and to customising them to meet the needs of the SENSA Preservation platform. This activity will be carried out by GeoVille. Inputs: Functional Requirements, System Architecture, Background Source Code of RegioCover environments Tasks: Taking the relevant source code components from RegioCover and customising them to meet the requirements of the following components: • EES (Environmental Expert System): customization of the RegioCover smart GIS Data Management System to support the use of environmental rules and constraints • EMF (Ecotourism Mapping Facilities): customization of the RegioCover Multilayer image processing tools to support ecotourism specific mapping of protected areas Tasks excluded: No pilot at this stage Output / Deliverable: • D 301 Customized EO / GIS facilities (SW)	

XI.   WP 302 : Customisation of the Online Travel facilities

PROJECT: SENSA	WP REF: 302
WP Title: WP 302 : Customisation of the Online Travel facilities	Sheet: 11 of 26
Contractor: Cybercultus	
Start event: Functional Requirements, Planned Date: T0+6 System Architecture	Issue Ref: SENSA FP
End Event: Customized Online Travel Planned Date: T0+15 facilities	Issue Date: 9/10/2012
WP Manager: N. Zouache - Cybercultus	
Objective: to extract the relevant modules from Trip à la Carte environment and to customising them to meet the needs of the SENSA Ecotourism platform. This activity will be carried out by Cybercultus. Inputs: Functional Requirements, System Architecture, Background Source Code of the Trip à la Carte. Tasks: Taking the relevant source code components from Trip à la Carte and customising them to meet the requirements of the following components: • EFO (Ecotourism Front-Office) : a customisation of the Trip à la Carte Front-Office tools to integrate « ecotourism » specific Requirements • EBO (Ecotourism Back-Office) : a customisation of the Trip à la Carte Back-Office tools to integrate « ecotourism » specific Requirements • INA (Itinerary Navigation) : a customisation of the Trip à la Carte navigation tools to support environmental preservation aware navigation • TSM (Travel Services Manager) : a customisation of the Trip à la Carte core services database management system to support the much wider scope of services of the SENSA platform Tasks excluded: No pilot at this stage Output / Deliverable: • D 302 Customized Online Travel facilities (SW)	

3.6.4 WP 400: Foreground Information Development

The WorkPackage WP400 will run in parallel with the previous WP300 WorkPackage, namely from "T0 + 6 to T0 + 15 " and will also cover the Factory Acceptance Test Review (FAT) milestone. WP 400 will essentially focus on developing a range of dedicated components, capable of addressing the SENSA Preservation Platform and the SENSA Ecotourism specific needs.

WP 400 will be led by: F. Meinköhn (Cybercultus)

WP 400 contains: WP 401: Environmental Distribution and Reporting Tools, WP 402: Location based Observation and Awareness Tools.

For each of these WP400 pertaining workpackages a PSS-20 description is performed and displayed below:

XII.   WP 401 : Environmental Distribution and Reporting Tools

PROJECT: SENSA	WP REF: 401

WP Title: WP 401: Environmental Distribution & Reporting Tools
 	
 Contractor: Cybercultus
 	
 Start event: Functional Requirements,   Planned Date: T0+6
             System Architecture
 End Event: Environmental Distribution   Planned Date: T0+15
             & Reporting Tools
 	
 WP Manager: C. Schleicher (GeoVille)
	Sheet: 12 of 26
	
	 Issue Ref:
	 SENSA FP
	
	 Issue Date:
	 9/10/2012

Objective: to implement a range of dedicated SENSA facilities covering the needs of the SENSA Preservation Platform, in particular the need to optimise the travellers distribution in a park to minimise the environmental impact, the need alert the park managers of any environmental misuse, and to handle emergency requests from travellers. Inputs: Functional Requirements, System Architecture Tasks: development of the following components / tools: • TAD (Travellers & Activities Distribution tools): which enable Parks to manage at a planning stage the optimal distribution of travellers and ecotourism activities in the protected areas • EAR (Environmental Alert & Reporting tools): which alert the Parks staff / rangers, if an environmental trespassing or misuse has happened, as well as receiving and processing field observation from the travellers with respect to dedicated environmental issues in dedicated areas	

• SOS (Safety Operational System): which based on travellers SOS / emergency request messages received from the field or on third party data sources informing of any safety risk allows the Park Managers to be informed and to take appropriate measures Tasks excluded: No pilot at this stage Output / Deliverable: • D 401 Environmental Distribution & Reporting Tools (SW)	

XIII.   WP 402 : Location based Awareness, Observation & Safety Tools

PROJECT: SENSA	WP REF: 402
WP Title: WP 402: Location based Awareness, Observation & Safety Tools Contractor: Cybercultus Start event: Functional Requirements, Sys. Architecture Planned Date: T0+6 End Event: Environmental Distribution & Rep. Tools Planned Date: T0+15 WP Manager: N. Zouache - Cybercultus	Sheet: 13 of 26 Issue Ref: SENSA FP Issue Date: 9/10/2012
Objective: to implement a range of dedicated SENSA facilities covering the needs of the SENSA Ecotourism Platform, in particular the need to secure the Travellers safety and the environment protection, the Travellers access to field best practices, and the Travellers active participation to the sites preservation. Inputs: Functional Requirements, System Architecture Tasks: development of the following components / tools: • EPS (Environmental Protection & Safety tools): which are designed to help the traveller to stay within environmental safe boundaries and within the relevant temporal intervals (ex: not disturbing fauna at given periods of the year), to be warned if any environmental trespassing is taking place, to be guided back to environmental safe areas, to be alerted of hazardous areas and of potential dangers (landscape and fauna). EPS tools also enable SOS, emergency help or simply tracking messages to be sent via satellite anywhere any time. • AWA (Awareness building tools): which are tools addressing both the needs of the Protected Areas Managers and of the Travellers. For the Parks Managers the tools allow them to conceive and author easily geo-localised awareness & best practices content, using multimedia containers specifically designed for that purpose. For the Travellers the tools allow to be prompted in the relevant geo-localisations with corresponding awareness and best practice content. • FOB (Field Observation tools): which are tools designed to enable the	

Travellers to become field conservation actors. The facilities are also divided into back-office tools enabling the Parks Managers to geo-localise areas and objects (Lanscape, Vegetation, Fauna, Cultural Heritage) of interest and to specify the observation / feedback requested from the Travellers, in the forms of questions to answer and of pictures / videos to be taken) and into front-office tools allowing the Travellers to be prompted in the corresponding locations for their observations by responding to questions or by taking pictures / video .

Tasks excluded: No pilot at this stage

Output / Deliverable:
  • D 402 Location based Awareness, Observation & Safety Tools (SW)

3.6.5 WP 500: System Integration and Deployment

The WorkPackage WP500 will run from "T0 + 15 to T0 + 20" and will cover the On Site Acceptance Review (SAT) milestone. WP 500 will focus in a first stage on integrating the SENSA customized background information and the SENSA developed foreground information and in a second stage to deploy **them** in a field pilot demonstration context.

WP 500 will be led by: Jürgen Weichselbaum (GeoVille)

WP 500 contains: WP 501: Background & Foreground System Integration, WP 502: SENSA Environment Deployment

For each of these WP500 pertaining workpackages a PSS-20 description is performed and displayed below:

XIV.   WP 501 : Background & Foreground System Integration

PROJECT: SENSA	WP REF: 501
WP Title: WP 501: Background & Foreground System Integration	Sheet: 14 of 26
Contractor: Cybercultus	Issue Ref: SENSA FP
Start event: SENSA System Components Planned Date: T0+12 End Event: Integrated SENSA Platform Planned Date: T0+18 Update at T0+24, 30 WP Manager: C. Schleicher (GeoVille)	Issue Date: 9/10/2012
Objective: to implement the SENSA Integrated Platform composed of the SENSA Preservation Platform and the SENSA Ecotourism Platform. Inputs: SENSA background & Foreground Components Tasks: all the customised background SENSA component and the dedicated foreground SENSA components will be integrated into a comprehensive / collaborative SENSA environment composed of two complementary platforms, namely the SENSA Preservation Platform and the SENSA Ecotourism Platform. Activities such as interfacing the different components APIs, integrating the user interfaces, and implementing the missing or the required additional "glue" for the system to become operational will be carried out. The two SENSA platforms and the SENSA environment as a whole will be functionally tested and validated. Support for bug fixing and optimisation, based on user provided feedback during the pilot demonstration phase, will also be provided. Tasks excluded: No pilot at this stage Output / Deliverable: • D 501 Integrated SENSA Preservation and Ecotourism Platforms (SW)	

XV.   WP 502 : SENSA Environment Deployment

PROJECT: SENSA	WP REF: 502
WP Title: WP 502: SENSA Environment Deployment Contractor: Cybercultus Start event: SENSA Integrated System Planned Date: T0+18 End Event: SENSA Deployed Environment Planned Date: T0+20 Update at T0+24, 30 WP Manager: N. Zouache (Cybercultus)	Sheet: 15 of 26 Issue Ref: SENSA FP Issue Date: 9/10/2012
Objective: to deploy the full SENSA environment on the field with the Natural Parks Managers and the Tour Operators and to test it in an operational mode Inputs: Integrated SENSA Preservation and Ecotourism Platforms Tasks: the SENSA Preservation Platform will be made accessible online to the Natural Parks Managers, the satellite communication facilities (Astra2Connect) will be installed by the third party providers in the selected park shelters; the SENSA Ecotourism Platform will be made accessible online to the Travel Operators and to selected Travellers; the Spot Connect devices and satellite communication subscriptions will be purchased and all the needed tablets and smartphones will be purchased. Field functional conformance and reliability tests of the entire deployed SENSA facilities will be carried out. New releases, based on user provided feedback during the pilot demonstration phase, will also be provided . Tasks excluded: No pilot at this stage Output / Deliverable: • D 502 Integrated SENSA Field Deployed Environment (SW)	

3.6.6 WP 600: Running Pilot Demonstrators

The WorkPackage WP600 will run from "T0 + 20 to T0 + 30" and will cover the Final Review (FR) milestone. WP 600 will focus on carrying out a "two phases" pilot demonstration with all the SENSA Field Partners (Natural Parks and Tour Operators) and with the End-Users (Travellers). The first Alpha Pilot Demonstration phase will run for 4 months from "T0+20 to T0+24" and will focus on testing the SENSA environment in real field conditions and in identifying any short comings or desirable enhancements. The second Beta Pilot Demonstration phase will run for 6 months enhanced SENSA facilities and will test real "near market exploitation" field situations of the SENSA environment and its actors. In parallel to the two demonstration phases, an evaluation of the pilot operations carried out will be performed.

WP 600 will be led by: B. De Greef (SIEL)

WP 600 contains: WP 601: Running Alpha Demonstrator, WP 602: Running Beta Demonstrator, WP 603 Evaluating Pilot Operations

For each of these WP600 pertaining workpackages a PSS-20 description is performed and displayed below:

XVI.   WP 601 : Running Alpha Demonstrator

PROJECT: SENSA	WP REF: 601
WP Title: WP 601 : Running Alpha Demonstrator Contractor: Cybercultus Start event: Deployed SENSA Environment Planned Date: T0+20 End Event: Alpha Demonstrator Ended Planned Date: T0+24 WP Manager: Bruno De Greef (SIEL)	Sheet: 16 of 26 Issue Ref: SENSA FP Issue Date: 9/10/2012
Objective: to run for 4 months the entire SENSA environment in a full field context with the Natural Parks and the Tour Operators involved and to report back to the SENSA technical partners any conceptual and technical issues encountered. Inputs: Integrated SENSA Preservation and Ecotourism Platforms Tasks: an ALPHA pilot scenario will be established and run with 3 groups of Travellers between 2 to 6 members each (average 5 tourists). The 3 groups will stem from the Travel Operators organised multiday trips to the 3 protected areas / natural parks, whilst two additional "single day visitors" groups (2 * 10 tourists in all) will be selected by the 2 European parks from "on the site" visitors to the protected areas. The Travellers / Parks Visitors will be fully equipped with the SENSA devices and applications. Reporting of the pilot finding from the different involved actors will be performed. In particular any functional, technical and usability shortcomings will be reported. Tasks excluded: No evaluation here. Output / Deliverable: • D 601 Running Alpha Demonstrator (Pilot)	

XVII.   WP 602 : Running Beta Demonstrator

PROJECT: SENSA	WP REF: 602
WP Title: WP 602 : Running Beta Demonstrator Contractor: Cybercultus Start event: Finalised Alpha Demonstrator Planned Date: T0+25 End Event: Beta Demonstrator Ended Planned Date: T0+30 WP Manager: B. De Greef (SIEL)	Sheet: 17 of 26 Issue Ref: SENSA FP Issue Date: 9/10/2012
Objective: to run for 6 months the entire SENSA environment in a "near commercial exploitation" setting with the Natural Parks and the Tour Operators involved and to report back the findings. Inputs: Integrated SENSA Preservation and Ecotourism Platforms Tasks: a BETA pilot scenario will be established and run with 3 groups of Travellers between 2 to 6 members each (average 5 tourists). The 3 groups will stem from the Travel Operators organised multiday trips to the 3 protected areas / natural parks, whilst two additional "single day visitors" groups (2 * 10 tourists in all) will be selected by the 2 European parks from "on the site" visitors to the protected areas. The Travellers / Parks Visitors will be fully equipped with the SENSA devices and applications. Reporting of the pilot finding from the different involved actors will be performed. In particular system performance, reliability, usability and added value will be looked at, with a commercial exploitation in sight. Tasks excluded: No evaluation here. Output / Deliverable: • D 602 Running Beta Demonstrator (Pilot)	

3.6.7 WP 700: Demonstrators Evaluation & Enhancement

The WorkPackage WP700 will run from "T0 + 18 to T0 + 30" and will cover the Final Review (FR) milestone. WP 700 will analyse the finding of the Demonstrators as they come in and compile every month a short report highlighting the positive outcomes and the shortcomings and will emit recommendations for the technical partners who will accordingly adjust / enhance the SENSA environment.

WP 700 will be led by: Bruno De Greef (SIEL)

WP 700 contains: WP 701: Evaluation Methodology, WP 702: Alpha Demonstrator Evaluation, WP 703 Beta Demonstrator Evaluation

For each of these WP700 pertaining workpackages a PSS-20 description is performed and displayed below:

XVIII.   WP 701 : Evaluation Methodology

PROJECT: SENSA	WP REF: 701
WP Title: WP 701 : Evaluation Methodology	Sheet: 18 of 26
Contractor: Cybercultus Start event: Integrated SENSA Environment Planned Date: T0+18 End Event: Start of the Pilot Demonstrations Planned Date: T0+20 WP Manager: M. Schlerf (CRP - Gabriel Lippmann)	Issue Ref: SENSA FP Issue Date: 9/10/2012
Objective: to establish an evaluation methodology enabling to gather relevant and meaningful feedback from the different SENSA actors participating in the Demonstrators (Natural Parks, Tour Operators, Travellers). Inputs: Demonstration scenarios Tasks: an evaluation methodology of the pilot demonstrators will be established, covering the elaboration of field questionnaires, the analysis of log files and the proposition of debriefing procedures. The evaluation methodologies will be targeted at the specificities of each SENSA actor category participating to the pilot demonstrations. Tasks excluded: No evaluation here. Output / Deliverable: • D 701 Evaluation Methodology (Pilot)	

XIX. WP 702 : Alpha Demonstrator Evaluation

PROJECT: SENSA	WP REF: 702
WP Title: WP 702 : Alpha Demonstrator Evaluation Contractor: Cybercultus Start event: Evaluation Methodology Planned Date: T0+20 End Event: Alpha Demonstrator Evaluation & Planned Date: T0+24 SENSA environment enhancement WP Manager: B. De Greef (SIEL)	Sheet: 19 of 26 Issue Ref: SENSA FP Issue Date: 9/10/2012
Objective: to evaluate the Alpha Demonstration, using the established evaluation methodology and enhancing the Alpha SENSA environment. Inputs: Running Alpha Demonstrator Tasks: performing an on-going evaluation of the running Alpha Demonstrator with all the actors involved using the established Evaluation Methodology and compiling every month a short report highlighting the positive outcomes and the shortcomings with recommendations for the technical partners who will accordingly adjust / enhance the SENSA environment. Findings summary will be sent to SENSA technical partners for enhancement of the SENSA platform. Tasks excluded: No beta demonstrator evaluation at this stage. Output / Deliverable: • D 702 Alpha Demonstrator Evaluation (Report)	

XX.   WP 703 : Beta Demonstrator Evaluation

PROJECT: SENSA	WP REF: 703
WP Title: WP 703 : Beta Demonstrator Evaluation Contractor: Cybercultus Start event: Evaluation Methodology Planned Date: T0+25 End Event: Beta Demonstrator Evaluation & Planned Date: T0+30 SENSA environment enhancement WP Manager: B. De Greef (SIEL)	Sheet: 20 of 26 Issue Ref: SENSA FP Issue Date: 9/10/2012
Objective: to evaluate the Beta Demonstration, using the established evaluation methodology and enhancing the Beta SENSA environment. Inputs: Running Beta Demonstrator Tasks: performing an on-going evaluation of the running Beta Demonstrator with all the actors involved using the established Evaluation Methodology and compiling every month a short report highlighting the positive outcomes and the shortcomings with recommendations for the technical partners who will accordingly adjust / enhance the SENSA environment. Findings summary will be sent to SENSA technical partners for enhancement of the SENSA platform. Tasks excluded: No commercial deployment at this stage. Output / Deliverable: • D 703 Beta Demonstrator Evaluation (Report)	

3.6.8 WP 800: Exploitation

The Workpackage WP800 will run from "T0 + 6 to T0 + 30" and will cover the Final Review (FR) milestone. WP 800 will prepare for the post project exploitation of the SENSA results through main actions, namely the establishment of a strategic plan covering rollout planning and an exploitation agreement among the SENSA consortium partners, as well as conceiving and enacting a dissemination plan.

WP 800 will be led by: C. Ibarra (Cybercultus)

WP 800 contains: WP 801: Strategic Plan, WP 802: Exploitation Agreement, WP 803 Dissemination

For each of these WP800 pertaining workpackages a PSS-20 description is performed and displayed below:

XXI.   WP 801 : Strategic Plan

PROJECT: SENSA	WP REF: 801
WP Title: WP 801 : Strategic Plan	Sheet: 21 of 26
Contractor: Cybercultus Start event: System Specification　　Planned Date: T0+6 End Event: End of project　　　　　Planned Date: T0+30 WP Manager: C. Ibarra (Cybercultus)	Issue Ref: SENSA FP Issue Date: 9/10/2012
Objective: Intends to establish a set of commercial exploitation actions and agreements for the SENSA results and to secure an appropriate exploitation plan and deployment strategy. A rollout strategy will be elaborate during this workpackage. It intends to define a set of steps for the planning of an optimal phasing from the project pre-operational pilot to a full commercial exploitation. Inputs: System specification Tasks: Elaboration of a market analysis for the different stakeholders, elaborating a marketing and exploitation action plan and elaboration of a rollout plan. Tasks excluded: No commercial operations at this stage. Output / Deliverable: • D 801 SENSA Strategic Plan (Report)	

PROJECT: SENSA		WP REF: 802
WP Title: WP 802 : Exploitation Agreement		Sheet: 22 of 26
Contractor: Cybercultus		
Start event: SENSA platform deployment	Planned Date: T0+18	Issue Ref: SENSA FP
End Event: End of project	Planned Date: T0+30	
WP Manager: C. Ibarra (Cybercultus)		Issue Date: 9/10/2012
Objective: to elaborate and sign an exploitation agreement of the SENSA results Inputs: Initial strategic plan; deployed SENSA platform Tasks: Elaborating an exploitation agreement that specifies the conditions under which the different results of the SENSA project may be exploited and commercialised. Signing of the exploitation agreement before the end of the project by all the partners. Tasks excluded: No commercial operations at this stage. Output / Deliverable: • D 802 Signed SENSA Exploitation Agreement (Report)		

XXIII.   WP 803 : Dissemination

PROJECT: SENSA	WP REF: 803
WP Title: WP 803 : Dissemination Contractor: Cybercultus Start event: SENSA platform deployment Planned Date: T0+9 End Event: End of project Planned Date: T0+30 WP Manager: C. Ibarra (Cybercultus)	Sheet: 23 of 26 Issue Ref: SENSA FP Issue Date: 9/10/2012
Objective: to elaborate and perform dissemination actions the SENSA results . Inputs: System specification; deployed SENSA platform Tasks: Elaborating a dissemination plan involving all the SENSA partners. Actions per stakeholders categories (Natural Parks, Travel Operators, SENSA Platform Owners, Innovation Centre) will be organised and will cover means such as web promotion, presentation at workshops, participation to specialised fairs, demonstrations, etc. Tasks excluded: No commercial operations at this stage. Output / Deliverable: D 803 SENSA Dissemination Plan (Report)	

3.6.9 WP 900: Project Management

The Workpackage WP900 will run from "T0 to T0 + 30" and will cover the Final Review (FR) milestone. WP 900 will secure the proper management of the SENSA project using the available management structure and means and trough three types of activities, namely project planning, project control and project reporting.

WP 900 will be led by: F. Meinköhn (Cybercultus)

WP 900 contains: WP 901: Project Planning, WP 902: Project Control, WP 903 Project Reporting

For each of these WP900 pertaining workpackages a PSS-20 description is performed and displayed below:

XXIV.   WP 901 : Project Planning

PROJECT: SENSA	WP REF: 901
WP Title: WP 901 : Project Planning Contractor: Cybercultus Start event: Start of project Planned Date: T0+0 End Event: End of project Planned Date: T0+30 WP Manager: Farid Meinköhn (Cybercultus)	Sheet: 24 of 26 Issue Ref: SENSA FP Issue Date: 9/10/2012
Objective: WP 901 will secure project overall planning as well as the detailed month to month activities planning. These activities are essentially carried out by the Project Coordinator (Cybercultus) in collaboration with all the SENSA Partners. Inputs: Individual activities planning, the technical annex. Tasks: define an overall work plan and detailed activities Tasks excluded: No software development occurs here. Outputs/Deliverables: • D 901 Workplan	

XXV. WP 902 : Project Control

PROJECT: SENSA		WP REF: 902
WP Title: WP 902 : Project Control		Sheet: 25 of 26
Contractor: Cybercultus		
Start event: Start of project	Planned Date: T0+0	Issue Ref: SENSA FP
End Event: End of project	Planned Date: T0+30	
WP Manager: Farid Meinköhn (Cybercultus)		Issue Date: 9/10/2012
Objective: WP 902 will secure both quality results and timely delivery. This activity is very important and will be carried out by all the partners during the entire project under the supervision of the Project Coordinator and the Quality Manager with the active participation of all the Workpackage Leaders. Inputs: Daily activities of the consortium. Tasks: Issuing quality assurance procedures and establishing verifications and controls. Tasks excluded: No software development occurs here. Outputs/Deliverables: • D 902 Project control procedures		

PROJECT: SENSA	WP REF: 903
WP Title: WP 903 : Project Reporting Contractor: Cybercultus Start event: Start of project Planned Date: T0+0 End Event: End of project Planned Date: T0+30 WP Manager: Farid Meinköhn (Cybercultus)	Sheet: 26 of 26 Issue Ref: SENSA FP Issue Date: 9/10/2012
Objective: WP 903 will provide monthly reporting of the activities carried out as well as those expected for the next period. This task will involve all the partners and will be supervised by the project coordinator assistant. The reports will follow the forms provided by ESA as well as the eProject platform. Inputs: Individual activities reporting from all the participants, the technical annex, a quality control manual. Tasks: Collect individual reporting, summarise achievements, plan upcoming activities, schedule meetings and reviews, establishing final reports, etc. Tasks excluded: No software development occurs here. Outputs/Deliverables: • D 903.1 Management reports	

3.7 PLANNING

3.7.1 Milestones workplan

The SENSA project will be carried out over a 30 months period and with 6 major milestones foreseen as follows:

M0 at T0: NM-KO
Kick-off meeting, project formal presentation, validation of the next phases

M1 at T0+6: BDR
Specifying of the SENSA user requirements, functional requirements and the SENSA stakeholders applications scenarios

M2 at T0+9: CDR
Implementation of the SENSA system architecture, initial strategic and dissemination plans, and the mapping methodologies & processes definition

M3 at T0+18: FAT
Implementation of the SENSA GIS mapping (protected areas, risk areas and ecotourism areas), implementation of the SENSA platform (preservation platform and ecotourism platform)

M4 at T0+20: SAT
Field deployment of the SENSA platform (preservation platform and ecotourism platform)

IM5 at T0+24: IPR
Evaluation finding of the field Alpha Demonstrator carried out between T0+20 and T0+24

M6 at T0+30: FR
Fully deployed, run, tested and evaluated SENSA pilot demonstrator, provision of the final strategic plan and the signed exploitation agreement

Note:

M = Milestone,   IM = Intermediate Milestone, IPR=Intermediate Pilot Report

3.7.2 Detailed workplan

Workpackages	Project duration (in months) and milestones
	M0=NM (month 1), **M1**=BDR (month 6), **M2**=CDR (month 9), **M3**=FAT (month 18), **M4**=SAT (month 20), **IM5**=IPR (month 24), **M6**=FR (month 30)

Workpackages	Milestone	Months
WP 100: System Specification		1–9
WP 101: User Requirements		1–3
WP 102: Scenario Specification		1–4
WP 103: Functional Specification		3–5
WP 104: System Architecture		6–9
WP 200: Environmental & Ecotourism Mapping		1–15
WP 201: Mapping Methodology & Processes Definition		6–9
WP 202: Protected Areas Mapping		6–15
WP 203: Risk Areas Mapping		6–15
WP204 TW1 content authoring		6–15
WP 205: Geo-localised Awareness & Best practices		6–15
WP 300: Background Information Customisation		6–15
WP 301: Customisation of the EO / GIS facilities		6–15
WP 302: Customisation of the Online Travel facilities		6–15
WP 400: Foreground Information Development		6–15
WP 401: Environmental Distribution & Reporting Tools		6–15
WP 402: Location based Observation & Awareness Tools		6–15
WP 500: System integration and Deployment		13–18, 21–22, 28–30
WP 501: Background & Foreground Integration		13–18
WP 502: SENSA Environment Deployment		18–30
WP 600: Running Pilot Demonstrators		19–30
WP 601: Running Alpha Demonstrator		19–24
WP 602: Running Beta Demonstrator		24–30
WP 700: Demos Evaluation & Enhancement		18–30
WP 701: Evaluation Methodology		18–20
WP 702: Alpha Demonstrator Evaluation		20–24
WP 703: Beta Demonstrator Evaluation		24–30
WP 800: Exploitation Plan		6–30
WP 801: Strategic Plan		6–30
WP 802: Exploitation Agreement		12–30
WP 803: Dissemination		12–30
WP 900: Project Management		1–30
WP 901: Project Planning		1–30
WP 902: Project Control		1–30
WP 903: Project Reporting		1–30