



Support to Precursor SSA Services



Project Final Report Deliverable D7.5

Grant Agreement number: 262930
Project acronym: SPA
Project title: Support to Precursor SSA services
Funding Scheme: Coordination and support action
Period covered: From 1st March 2011 to 31st October 2012
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The opinions expressed in this document are solely those of the authors. This document does not constitute any formal commitment on behalf of the European Union Satellite Centre. At the time of writing, the architecture, governance and data policy of a future European SSA capability have not been defined by the appropriate decision making bodies. This document in no way prejudices any decisions or specifies any design aspects of a future SSA capability in Europe.

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Author and Approval

Title	Project Final Report - Deliverable D7.5		
Reference	EUSC-CAPDEV-SPA-RP-7005		
Version	1.0	Date	31/10/2012
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Action	Name	Date	
Verified by	Juan Luis Valero, SPA project co-ordinator	30/10/2012	
Approved by	Juan Luis Valero, SPA project co-ordinator	31/10/2012	

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Change Log

Issue	Date	Description
1.0	31/10/2012	First Issue

Change Record

Issue	Date	Changed Items	Description	Author

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1. Introduction

This chapter provides an overview of the SPA (Support to Precursor SSA services) Support Action #262930, summarizing the background, document purpose, scope, intended audience and document chapter contents.

1.1 SPA Project Background

Space assets are essential for the activities of modern societies. Communications, navigation, positioning and timing, meteorological and scientific services, geospatial information, understanding of Earth environment, civilian and Common Foreign and Security Policy (CFSP) operations & missions, to name just a few services, rely on space assets. Any disturbance of these activities could damage or completely disrupt services needed to ensure the safety and the well-being of European Union (EU) citizens, in addition reducing the associated economic benefits of space (the return of investment for space activities is estimated to be a factor three).

In September 2008, the 5th Space Council underlined the need for Europe to develop a capability for Space Situational Awareness (SSA), drawing on existing capabilities and infrastructures both at national and European level. SSA refers to the knowledge of location and function of space objects and the space environment, including operational satellites, space debris, near Earth objects and space weather. The 7th Space Council invited the European Commission (EC) and the EU Council, in close cooperation with ESA and Member States, to propose a Governance scheme and a Data Policy for a future European SSA capability.

The development of a European SSA capability will underpin the exploitation of European space assets contributing to access (and utilization) of space for Europe (as requested by the European Space Policy). This way the EU and its Member States will be able to better use space, strengthening their security and economy in accordance with the Europe 2020 Strategy.

The EC has launched a number of research projects on space weather and the protection of space assets from on-orbit collisions, this in the framework of the EU FP7 R&D programme.

The SSA Preparatory Program (PP), launched in 2008, is managed directly by the European Space Agency (ESA) on behalf of the thirteen ESA Member States who fund the programme. ESA is actively cooperating with European national authorities, ministries of defence, European scientific and technical organisations, national research establishments and national space agencies as well as institutions and agencies of the EU including the European Defence Agency (EDA) and the EUSC. It is expected that the ESA Council at ministerial level will adopt the next phase of the implementation of an SSA programme in November 2012.

While ESA has coordinated the identification of civil user requirements for SSA, the EDA Project Team for SSA has elaborated a Common Staff Target (CST) document on harmonising defence requirements for SSA. Based on these, the European SSA High Level Civil-Military User Requirements (prepared in the framework of the Structured Dialogue on Space and Security) have been endorsed by the PSC in November 2011.

The future European SSA System has the potential to be, in its operational phase, a dual use system of systems composed of various elements (civil and military, national and EU)

distributing data to a variety of communities of governmental and possibly commercial users. It will probably be based on specific data fusion and distribution facilities, it would have a multilevel data flow with several levels of confidentiality and it would be developed in an incremental manner including contributions from international partners.

The EUSC is contributing to the current European SSA activities through the Support to Precursor space situational Awareness services (SPA) project. The SPA project is a Support Action under the 7th Framework Program of the EC (Grant Agreement No. 262930, theme SPA.2010.2.3-2: Security of space assets from on-orbit collisions) managed by the EUSC and started the 1st of March 2011 with a duration of twenty months.

SPA has studied and evaluated aspects of SSA Governance and key elements of Data Policy in the EUSC secure environment. Within this context and to provide advice from a technical point of view, SPA has experimented with a number of preliminary SSA-SST services, e.g. Satellite Over-flight, Satellite Conjunction Alert and Space Re-entry Prediction.

The SPA project is fully complementary to the ESA programme and has contributed to the implementation of the European Space Policy, being totally aligned with the conclusions of the 7th Space Council on the development of a European capability for the monitoring and surveillance of its space infrastructure and of space debris.

It is worth noting that SPA is supporting the CFSP (including civilian security and CSDP) as the preliminary SSA services to be evaluated have aims to protect EU citizens as well as satellite-based services and infrastructures in orbit which in turn will protect future EU missions and operations.

It has to be highlighted that the SPA project is under the full control of EU Member States (benefiting from their support), fulfilling the conditions established by the EUSC Board, complementing current SSA activities in Europe from a technical side and implemented in cooperation with EU Member States, EC, EDA, EEAS and ESA.

Through SPA the EUSC is contributing in the long term to the protection of space assets (needed to perform its mission), exploiting its expertise in secure handling of dual nature data, enhancing its capabilities by studying SSA-SST services relevant for CFSP and increasing SSA awareness in the EU (both spreading gained knowledge among key SSA stakeholders and providing a forum for technical discussion).

1.2 Purpose

The purpose of this document is to describe the context and objectives of the SPA (Support to Precursor space situational Awareness services) project, to report the obtained results and achievements and to present the financial and management figures.

This present document corresponds to the SPA Project deliverable D7.5 Final Project Report.

1.3 Scope

The document treats the SPA project, reporting on financial and management aspects and technical results and achievements. Technical results and project impact are reported more in depth in the Study Report with Findings and Recommendations (SPA Deliverable D6.7). [RD-4]

This document follows the guidelines of the Project Final Report set by the EC. [RD-17] The guidelines refer to specific sections, such as Project Context and Objectives, which have been addressed in depth in D6.7 "SPA Project Study Report with Findings & Recommendations" and they have been briefly described in this document for completeness. [RD-4]

1.4 Intended Audience

This document is addressed to the Programme Officer and Legal Officer of the Research Executive Agency (REA) and EC, to EU Member States (MS), European External Action Service (EEAS), relevant stakeholders as well as to the EUSC Management and Technical staff.

1.5 Document Overview

Chapter 1 – Introduction (this Chapter), provides an overview the project background, as well as document purpose, scope, intended audience and document chapter contents.

Chapter 2 – Project Summary Report

Contains a first sub-chapter with the description of the SPA project context and objectives.

Contains a second sub-chapter with the main SPA Results with respect to the project deliverable items and description of work.

Contains a third sub-chapter with the description of SPA project potential benefits.

Chapter 3 – Use and dissemination of foreground

The chapter contains a summary of the main dissemination activities carried out during the SPA project.

Chapter 4 – Project societal implications

This chapter contains the answers to the Commission "Societal Implications" questionnaire. This questionnaire will be used to obtain statistics and indicators on societal and socio-economic issues addressed by projects.

Chapter 5 – Project financial figures

The financial figures of the SPA project are presented in this chapter.

Chapter 6 – Project Management

The chapter contains an explanation of the management and administrative aspects of the SPA Project.

2. Final Publishable Summary Report

This document follows the guidelines of the Project Final Report set by the EC. The guidelines refer to specific sections, such as Project Context and Objectives, which have been already addressed in depth in D6.7 "SPA Project Study Report with Findings & Recommendations" and consequently they have been briefly described in this document. [RD-4]

2.1 Executive Summary

This document reports on financial and management aspects and describes in a briefly manner the technical results and achievements, of the SPA (Support to Precursor space situational Awareness services) project, co-financed by the European Commission 7th Framework programme, [RD-23]. The document corresponds to the SPA project deliverable D7.5 "Project Final Report".

In the background of an increasingly congested space environment and recognition of the importance of the space infrastructures underpinning national and European policies, a number of key steps have been taken to establish an autonomous European SSA capability. The Treaty of Lisbon, [RD-24] entered into force on December 2009, provides the EU with competence to carry out activities in Space, without preventing Member States to exercise their competences. Since then Space Council resolutions and EU communications have continued to support the goal of an SSA capability for the protection of space infrastructure such as Galileo and GMES.

Furthermore, initial SSA needs and requirements have been elaborated by the European Defence Agency (EDA) for Military aspects in the "Common Staff Target", [RD-25] the European Space Agency (ESA) for civil aspects in the ESA SSA Preparatory Programme (PP) "Mission Requirements Document" [RD-26], and based on these needs the Political and Security Committee (PSC) has endorsed the civ/mil "European Space Situational Awareness high level civil-military user requirements" document, [RD-27].

The ESA SSA PP is being implemented as an optional programme with financial participation by thirteen ESA Member States, [RD-28]. The next ESA ministerial council will be held in November 2012. ESA has prepared a proposal for the next programme phase which will be subject to endorsement during the ESA ministerial council.

In the context of the present state of SSA development in Europe, the SPA project has produced technical findings and recommendations on key Governance and Data Policy issues. SPA has established a forum and highlighted the major issues to SSA stakeholders through dissemination activities such as workshops and presentations. The SPA project deliverables offers a reference resource for key aspects of SSA governance and data policy.

Through extensive scenario based exercises, major governance and data policy issues have been encountered or confirmed. To carry out the scenario based assessments and to increase its technical skill base in the space surveillance domain, the centre has installed indicative SSA SST services study simulators. In addition, the SPA project has developed an

orbit determination processing chain and treated observational data from a number of prominent SSA surveillance and tracking sensors in the EU, [RD-20].

Hypothetical SSA-SST architecture models have been elaborated and documented as material for discussion, these are referred to as the “Federated”, “Unified” and “Joint” models and these models have been presented in a way that supports a neutral and comprehensive evaluation and not to define or prejudice any aspect of a future SSA capability.

In addition to new SPA staff, their experience and the working facilities put into use to host the SPA project, a number of capability development aspects are beneficial to the EUSC and its member states. For example, the SPA project has supported the EUSC operations division by providing flight dynamics “Over-Flight” service support for the optimisation of image acquisition planning. The EUSC has facilitated communication among actors and improved its own contacts in this domain. The EUSC (through) SPA benefited from hosting key SSA stakeholders during three interactive workshops, [RD-29][RD-30][RD-31].

The SPA project has been carried out with the co-operation of European SSA stakeholders while considering their activities and is also compatible with existing work of the ESA SSA PP, [RD-28].

2.2 Summary description of SPA Project context and Objectives

2.2.1 Description of SPA Project Context

The SPA activities have been performed in the context of supporting from a technical perspective the definition of data policy and governance for a future European SSA Capability. The European SSA is expected to address three main areas:

- Space Surveillance and Tracking (SST) of man-made objects;
- Space Weather (SWE) monitoring and forecast;
- Near-Earth Objects (NEO) monitoring (of natural space objects).

The SPA project is focused on the SSA-SST segment and services which, being sensitive and dual use (civil and military) in nature, represent the greatest challenges from a governance and data policy development perspective. The SSA-SST could support the implementation of the CFSP by facilitating the autonomous European access to space, the enhancement of the security of space assets and the sustainability of space. The SPA project has followed an analysis methodology based on use cases and scenarios suitable to perform an analytical and technical evaluation. The said methodology used for the technical analysis of the data policy and governance needs aims to:

- Provide a systematic and pragmatic approach.
- Develop an increased understanding of the problem for analysing data policy and governance needs.
- Offer a tool to communicate and discuss with stakeholders.
- Provide a clear analysis roadmap to perform the SPA analysis work.

The following diagram depicts an overview of the SPA workflow:

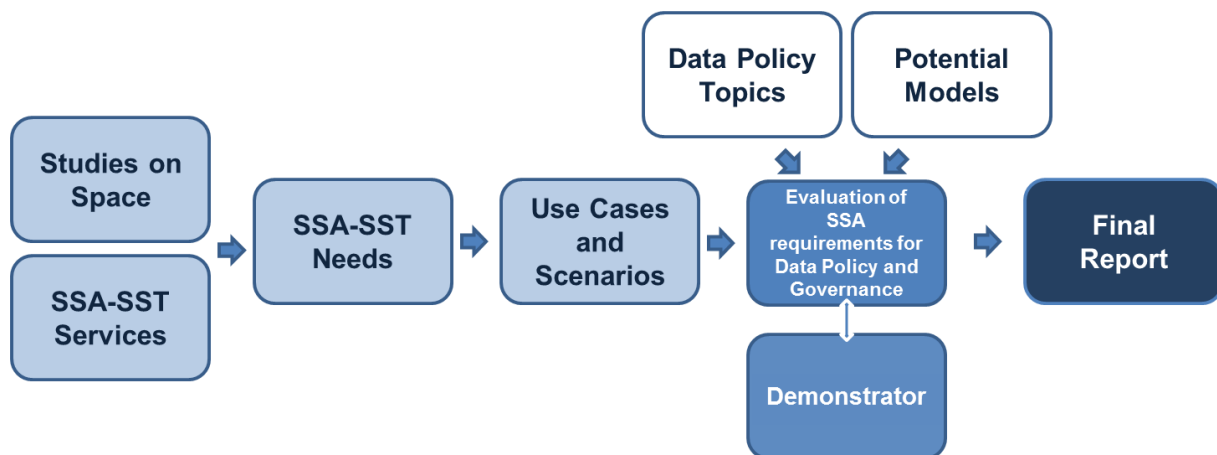


Figure 1. SPA Project overall workflow.

The workflow logic driving the activities of the SPA project is as follows:

- At the beginning of the SPA project the importance of space from the economic and strategic point of view has been analysed.
- Concurrently, a number of SSA-SST experimental services related to the protection of space infrastructure have been described and characterized in cooperation with relevant SSA's stakeholders in Europe:
 - Satellite Over-flight,
 - Satellite Conjunction Alert,
 - Space Re-entry Prediction.
- Starting from the studies performed on the importance of space and on the preliminary SSA-SST services, an analysis on existing SSA requirements has been completed and preliminary SSA-SST needs and requirements have been derived.
- With the appropriate background context set by previous activities, high level use cases first and detailed use case scenarios after have been defined as a tool to better understand and analyse data policy and governance needs in cooperation with relevant SSA's stakeholders in Europe.
- In a parallel way, main Data Policy topics and potential architecture models with relation to the Governance of a future SSA-SST capability in Europe have been derived.
- Finally, the EUSC has performed an evaluation of SSA-SST use case scenarios in order to outline SSA-SST Data Policy and Governance technical inputs as well as additional functional needs.
- To perform this evaluation, the EUSC has hosted within its already existing secure premises demonstrator software for the above SSA-SST services (cooperating with ESA and using EUSC experience on the area of the analysis and integration of heterogeneous data sources with multiple security levels). The EUSC demonstrators are based on existing ESA SSA software and Commercial off the Shelf tools (COTS) such as AGI Satellite Toolkit (STK). The setup of the demonstrators and the associated governance and data policy technical evaluation has allowed the EUSC to provide recommendations, mainly regarding data policy security aspects.

- The output of the dissemination activities performed during the SPA project summarises knowledge gained, lessons learned and the achievements of the SPA project with recommendations in view of further developments of SSA in Europe, particularly on the technical aspects of its Governance and Data Policy.

2.2.2 Description of SPA Project Objectives

The overall SPA project objective is to perform a study summarizing the gained knowledge, including lesson learned, on SSA during the execution of the SPA study as well as recommendations in view of further developments of SSA in Europe, particularly on the technical aspects of its Governance and Data Policy. [RD-11]

The SPA project is structured into seven work packages with associated tasks and clearly identified milestones. Each work package is led by an expert in the respective knowledge field and assisted by other EUSC staff. The seven SPA's work packages are:

- WP1 – Project Management, ensures that the project is given a management level suitable to European Commission – REA standards.
- WP2 – SSA Precursor Service Definition, characterizes three SSA preliminary services related to the protection of space infrastructure having relevance to civilian security as well as the CSDP.
- WP3 – Adaptation, Integration and Testing, provides a suitable secure environment to host a preliminary SSA system.
- WP4 – SSA Prototype Hosting, integrate an SSA prototype system based on ESA development an COTS suitable to be developed by ESA in order to implement preliminary SSA services (satellite over-flight, space re-entry prediction and satellite conjunction alert).
- WP5 – Precursor Services testing, validates the requirements for preliminary services determined in WP2, being the core element of the SPA project.
- WP6 – Dissemination, conveys the experiences obtained during the development of the SPA project.
- WP7 – Support, provides technical coordination and support for the proper management of the SPA project.

2.3 Description of main SPA Project Results and Achievements

This chapter offers an overview of the main results and achievements of the SPA project. The results are outlined with respect to the corresponding project deliverable items (as defined in the Description of Work. [RD-21]

More details on the technical results of the SPA project, in particular on the description of SSA-SST services, High level SSA-SST needs and requirements, potential SSA-SST models used in SPA, SPA Demonstrator and Use Cases scenarios, are treated in the SPA

deliverable D6.7 Study Report with Findings and Recommendations. [RD-4]

2.3.1 Project results

The SPA support action has produced twenty eight deliverable items of which ten deliverable documents treat themes of key importance to the Governance and Data Policy of a future European SSA capability. Below is an outline of the SPA project results and achievements with respect to the deliverable item.

The deliverable D2.1 “Findings on SSA requirements to support civilian security & CSDP” contains:

- An outline of three indicative SSA-SST services that are suitable for the implementation of the SPA FP7 support action as well as to support the CFSP and civilian security. The description of these services have been reviewed in the first SPA’s workshop by stakeholders and confirmed relevant for the SPA study, which indeed are expected to form part a future SSA-SST capability in Europe. The services are Satellite Over-Flight, Satellite Conjunction Warning and Space Re-Entry Prediction. It is concluded that they could serve to protect valuable space assets that in-turn underpin an important level of economic activity and technological lead in various sectors such as earth observation, telecommunications and navigation. The re-entry service helps to protect civilian life and property.

The deliverable D2.2 “Findings on SSA requirements for governance / data policy” presents:

- A brief study on the current setting of SSA and space activities in Europe, including the economic and strategic (in particular for the CFSP) importance of space as well as the legislative framework currently applicable to SSA in Europe.
- An identification, summary and analysis of key requirements sets and needs (particular to governance and data policy) for a future SSA capability in Europe along with initial recommendations. The complex interrelationship between governance and data policy has been addressed.
- An analysis of the security and communications needs of the potential stakeholders, including a discussion of the security dimensions in the data policy and more specifically about the need of a data security policy in a future SSA capability in Europe.
- An outline and illustration of potential architecture models suitable to identify data policy and governance elements on a future EU SSA-SST capability. The potential models are further considered and elaborated in D5.1 “Precursor Service WorkFlow” deliverable.

At the European Union Satellite Centre, providing a secure environment, the installation of representative SSA tools and software packages corresponding to the three services of Over-Flight, Satellite Conjunction Warning and Space Re-Entry Prediction has been carried out. The following software packages with corresponding service that is emulated are: AGI Satellite Tool Kit, ESA CRASS collision estimation and CNES STELA re-entry. The SPA

project deliverables D2.3, “Prototype hosting requirements”, D3.1, “Acceptance of SSA hosting” and 4.1 “Prototype Integration, Validation and Testing” document the needs, compliance, details of the demonstrator packages and the secure environment in use at the European Union Satellite Centre.

In the context of the SPA project and SSA in general, the EUSC has developed the capability and tools to do initial orbit determination based on unprocessed observation data of satellites and space objects see EUSC document “Tracking & Orbit Determination”. [RD-20]

In the SPA deliverable “Preliminary SSA Services WorkFlow Report”, Deliverable D5.1, the DataFlow/WorkFlow of the SPA demonstrator SSA-SST segment installed at the EUSC is outlined along with a dataflow and identification of the important functional elements and interfaces. Three models of possible future SSA SST segment architectures for a European capability have been investigated and schemas are documented. The “Joint” and “Federated” architecture models have emerged by stakeholder feedback as the most adequate models to perform the analysis on governance and data policy carried out by SPA. It is to be noted that these models have not been employed to prejudge any configuration and have been solely used to extract common issues related to data policy and governance.

Related to the work package 5, the set of D5.2, “Detailed Preliminary SSA governance and data policy test cases” and “D5.3, Evaluation of Preliminary SSA services report”, based on a scenario based methodology, presents a test/scenarios plan and analysis report respectively. A comprehensive set of use cases, scenarios and simulation are detailed. These test and exercises are the basis for analysis that is used to confirm and encounter key Data Policy and Governance points for a future SSA capability.

The SPA project has had a dedicated work package (WP6) for dissemination. Three workshops involving key stakeholders have been held and the results disseminated appropriately, papers have been presented, a promotional video, numerous presentations made to visiting dignitaries and a web forum has been established. In addition, the key deliverable output D6.7 “Study Report with Findings & Recommendations” has been submitted at the end of the project. For a complete summary of achievements of the dissemination activities, please see section 3.

2.3.2 Project achievements

Table 2-1 shows the overall SPA project achievements for each Work Package.

Table 2-1. Project achievements

Work package	Achievements
WP1: Project Management	<p>The Wp1 is 100% completed in M20:</p> <ul style="list-style-type: none"> • D1.1 – Project Plan was delivered in M1
WP2: SSA precursor services definition	<p>The WP2 is 100% completed in M20:</p> <ul style="list-style-type: none"> • D2.1 – Findings on SSA requirements to support civilian security and CSDP was delivered in M6 • D2.2 – Findings on SSA Precursor service requirements for governance/data policy was delivered in M7 • D2.3 – Technical requirements for prototype hosting was delivered in M6
WP3: Adaptation, integration, validation and testing	<p>The WP3 is 100% completed in M20:</p> <ul style="list-style-type: none"> • D3.1 – Acceptance of a SSA hosting area was delivered in M9
WP4: SSA prototype hosting	<p>The WP4 is 100% completed in M20:</p> <ul style="list-style-type: none"> • D4.1 – Prototype integration, validation and testing reports was delivered in M12
WP5: Precursor SSA services testing	<p>The WP5 is 100% completed in M20</p> <ul style="list-style-type: none"> • D5.1 – Precursor service workflow was delivered in M9 • D5.2 – Detailed test case description was delivered in M12 • D5.3 – Evaluation of precursor SSA services was delivered in M20
WP6: Dissemination	<p>The WP6 is 100% completed in M20:</p> <ul style="list-style-type: none"> • D6.1 – Summary of technical workshop 1 was delivered in M5 • D6.2 – Promotional video was delivered in M9 • D6.3 – Summary of technical workshop 2 was delivered in M11 • D6.4 – Summary of technical workshop 3 was delivered in M17 • D6.5 – Summary of communication actions with SSA stakeholders 1 was delivered in M9 • D6.6 – Summary of communication actions with SSA stakeholders 2 was delivered in M20 • D6.7 – Study report with findings and recommendations was delivered in M20
WP7: Support	<p>The WP7 is 100% completed in M20:</p> <ul style="list-style-type: none"> • D7.1 Periodic Report 1 was delivered in M3 • D7.2 Periodic Report 2 was delivered in M6 • D7.3 Periodic Report 3 was delivered in M12 • D7.4 Periodic Report 4 was delivered in M15 • D7.5 Final Project Report was delivered in M20 • D7.6 Gender Issues Intermediate Report was delivered in M9 • D7.7 Gender Issues Final Report was delivered in M18 • D7.8 Mid Term Report was delivered in M9 • D7.9 Periodic Report 4 was delivered in M18

2.4 Potential SPA Project Impact

Space assets are essential for the activities of modern societies. Communications, navigation, positioning and timing, meteorological and scientific services, geospatial information, understanding of Earth environment, civilian and Common Foreign and Security Policy (CFSP) operations, to name just a few services, rely on space assets. Any disturbance of these activities could damage or completely disrupt services needed to ensure the safety and the well-being of European Union (EU) citizens.

In September 2008, the 5th Space Council underlined the need for Europe to develop a capability for Space Situational Awareness (SSA), drawing on existing capabilities and infrastructures both at national and European level. SSA refers to the knowledge of location and function of space objects and the space environment, including operational satellites, space debris, near Earth objects and space weather. The 7th Space Council invited the European Commission (EC) and the EU Council, in close cooperation with ESA and Member States, to propose a Governance scheme and a Data Policy for a future European SSA capability.

The development of a European SSA capability will underpin the exploitation of European space assets contributing to access (and utilization) of space for Europe (as requested by the European Space Policy). This way the EU and its Member States will be able to better use space, strengthening their security and economy in accordance with the Europe 2020 Strategy.

The SPA supporting action main objective is to perform a study summarizing the gained knowledge, including lessons learned, on SSA during the execution of the SPA project as well as recommendations in view of further developments of SSA in Europe, particularly on the technical aspects of its Governance and Data Policy.

SPA is supporting SSA activities in Europe and consequently Space through:

- the identification and characterization of indicative services, such as the Satellite Conjunction Alert, Satellite Over-flight and Space Re-entry Prediction;
- the contribution from a technical side to the definition of a European SSA governance and data policy;
- the evaluation of SSA-SST use case scenarios in order to outline SSA-SST Data Policy and Governance technical inputs;
- the identification of best practices and standards in security and data handling.

The main benefits of SPA project for the EU, EU Member States, EU citizens and other SSA stakeholders are:

- **EU and its MS**
 - to support EU MS's national security and sovereignty;
 - to support the secure and traceable information exchanges among all SSA elements;
 - to support SSA activities adding value in data policy issues;
 - to exploit the expertise of the EUSC in handling, analysing and disseminating data of both civilian and military origin with multiple levels of confidentiality in a secure environment;
 - to simulate indicative SSA scenarios using a demonstration platform and promote innovation through the definition of SSA services and products;
 - to facilitate the dialogue among key SSA stakeholders through the establishment of a technical forum and workshops.


- **ESA**
 - to bridge the gap with policy makers and technical developers;
 - to provide advice in handling, analysing and disseminating sensitive data and derived products within the highest security standards.
- **EU Citizens**
 - to protect and add value to services needed for the well-being and safety of EU citizens;
 - to support the identification of new services needed for the well-being of EU citizens.
- **Other SSA stakeholders**
 - to support SSA activities, adding value in data policy issues from a technical point of view;
 - to guarantee interoperable information exchanges among all the SSA elements.
- **Third parties**
 - to communicate in order to reach a common understanding of space capabilities.

2.5 SPA Project Public Website

The SPA Web Page has been added to the EUSC Web Page (to maximise the number of possible contacts) and contains a presentation of the project activities and some other information for general public and interested users. Moreover people can contact the SPA Team using a dedicated email address (spa@satcen.europa.eu) to request more information about the SPA activities.

Figure 2 shows a screenshot of the SPA Web Page, reachable at the following link:

(http://www.eusc.europa.eu/index.php?option=com_content&task=view&id=60&Itemid=84)



European Union Satellite Centre

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Support to Precursor SSA Services

Support to Precursor space situational Awareness services (SPA)

The SPA project is an [EPT Support Action](#) (Grant Agreement No. 262220, theme SPA.2010.2.32: Security of space assets from on-orbit collisions) managed by the European Union Satellite Centre (EUSC), under the full control of Member States, and started on the 1st of March 2011 with duration of eighteen months.



SPA Objectives

The SPA project has the aim to contribute to the technical definition of European [Space Situational Awareness](#) (SSA) Governance and Data Policy testing possible models in the EUSC operational and secure premises (located at the Torrejón Air Base in Spain near Madrid) by experimenting with three preliminary services:

- Satellite Conjunction Warning (i.e. protecting operational satellites from collisions).
- Satellite Over-flight (i.e. the knowledge of satellites position with time).
- Space Debris Re-entry Prediction (i.e. warning of space objects re-entry to Earth's surface).


SPA Expected Outcomes

The final output of the SPA project will be a report summarizing knowledge gained, lessons learned and recommendations for further development of Space Situational Awareness in Europe, particularly on the technical aspects of its Governance and Data Policy.

SPA current activities

Currently three different activities are on-going:

- The definition and description of SSA preliminary services relevant to the Common Security and Defence Policy (in cooperation with the European External Action Service).
- The initial identification of Data Policy & Governance needs for preliminary services (in cooperation with the European Commission and with Member States).
- The definition of technical requirements to host a prototype SSA system at EUSC (in cooperation with the European Space Agency).



SPA Workflow

Relation with EUSC's mission

EUSC shall, in coherence with the European Union Security Strategy, support the decision-making of the European Union in the field of the Common Foreign and Security Policy (CFSP) and in particular the Common Security and Defence Policy (CSDP), including European Union crisis management operations, by providing products resulting from the analysis of satellite imagery and collateral data, and related services; within this context, the SPA project will sustain the CFSP (including civilian security and CSDP) as the precursor services to be tested are related to the current and future EU missions and operations (e.g. in case of civilian and CSDP operations, the non-availability of space assets could represent the inability to fulfil their mission by the lack of operational means and/or having an increased risk onto deployed personnel).

Space Situational Awareness (SSA)

SSA refers to the knowledge of location and function of space objects and space environment, including operational satellites, space debris, near Earth objects and space weather. The development of a European SSA system will underpin the exploitation of European space assets, a key capability contributing to the autonomous access to (and utilization of) space for Europe (as requested by the [European Space Policy](#), drawing on existing capabilities and infrastructures at national and European level).

Get in Touch

To request further information on any issue or to be kept informed of details of current SPA activities, please email the EUSC SPA Team (spa@eusc.europa.eu).

Figure 2. SPA Web Page

3. Use and Dissemination of Foreground

Results generated by FP7 projects are required to be disseminated and promoted as swiftly and effectively as possible to benefit the whole interested community. At the same time a dialogue with Institutions and SSA Key Stakeholders is needed to contribute effectively (with a pragmatic and focused approach) to the technical definition of European SSA Governance and Data Policy.

To reach these objectives, selected key audiences have been reached with focused messages, validated by the different SSA actors. Different communication strategies have been implemented, based on appropriate tools and activities such as, a webpage (added to the EUSC website and containing a presentation of the project activities), an internal workspace (a secure site allowing the SPA team to exchange useful information internally at EUSC), a technical forum (a collaboration tool used to allow institutions and key stakeholders to cooperate actively to the SPA project and containing all the SPA deliverables submitted to EC/REA). Three technical workshops have been organized at EUSC to show the results of the SPA project at different milestones and to obtain a relevant evaluation of the project.

SPA has been presented by the EUSC mainly to Institutions and Key Stakeholders (such as the Ambassadors of EU MS in Spain, the EDA SSA PT, the EEAS, the ESA SSA PP Team, the EUSC Board, and the EUSC Expert Users). Also interested parties and general public have been informed (mainly through the participation to some international conferences or workshops and the production of articles).

The key messages disseminated by SPA (with the agreement of participants to the 2nd Stakeholders Advisory Board meetings) have been:

- Security IN space is critical to have security FROM space;
- The development of a European SSA capability
 - Will protect space assets and satellite-based services which in turn are protecting EU citizens and operations/missions and consequently will improve the sustainability of space
 - Will be a key tool to achieve CFSP results supporting national security and sovereignty;
- The main challenge on Data Policy is to facilitate the optimization of SSA resources usage including the contribution of EU MS capabilities and protecting EU, EU MS and allies interests through security requirements and regulations;
- Contributing to SSA activities, the EUSC (a CFSP agency linking space and security) is
 - exploiting its expertise in secure data handling (highlighting security aspects),
 - contributing to the protection of space assets needed to perform its mission,
 - enhancing its know-how by studying SSA-SST services relevant to civilian security and CFSP,
 - increasing SSA awareness in EU (also spreading gained knowledge);
- The SPA FP7 Support Action is
 - under the full control of EU MS benefiting from their support,

- developed in the EUSC secure environment,
- complementing current SSA activities in Europe from a technical side.

All EU Member States have been invited to cooperate on the implementation of the SPA Study and the interested parties have been invited to participate to the SPA Technical Workshops; moreover representatives from EC, EDA, EEAS and ESA have been invited.

More details on the dissemination activities of the SPA project are treated in the SPA deliverable D6.6 Summary communications actions with SSA Key Stakeholders 2. [RD-11]

3.1 Dissemination Activities

The SPA project has been presented to 74 events (see Table 3-2) with different targets and 6 abstracts/articles (see Table 3-1) have been accepted in international conferences and workshops.

Table 3-1 and Table 3-2 show the list of scientific publications and dissemination activities performed during the implementation of the SPA support action.

Additionally, three promotional videos have been realized to disseminate the SPA project and the related EUSC activities.

Moreover:

- The **SPA webpage**, describing the SPA project, has been added to the existing EUSC website;
- The **SPA Technical Forum** has been realized and is now open to selected people from EU MS, EC, EEAS, ESA and EDA;
- The **1st SPA Technical Workshop** has been held the 28th of June 2011 with ten participants from EUSC and ten external participants from EU MS, EC, EDA, EEAS and ESA. [RD-29]
- The **2nd SPA Technical Workshop** has been held the 19th of January 2012 with nine participants from EUSC and ten external participants from EU MS, EC, EDA, EEAS and ESA. [RD-30]
- The **3rd SPA Technical Workshop** has been held the 12th of June 2012 with nine participants from EUSC and eleven external participants from EU MS, EC, EDA, EEAS and ESA. [RD-31]

Table 3-1. Scientific publications

NO	Title	Main author	Title of the periodical	Number, date or freq.	Publisher	Place of publication	Year of publication	Is/Will open access ¹ provided to this publication?
1	The Support to Precursor Space Situational Awareness Services (SPA) Project	J.L. Valero, S. Albani, B. Gallardo, J. Matute, A. O'Dwyer	The 5th IAASS Conference, A Safer Space for a Safer World	SP-699, January 2012	European Space Agency	Versailles, France	17/10/2011	Yes
2	A technical contribution supporting the definition of the European Space Situational Awareness Governance and Data Policy: the SPA Project	J.L. Valero, S. Albani, B. Gallardo, J. Matute, A. O'Dwyer	European Space Surveillance Conference	WPP-321	European Space Agency	Madrid, Spain	07/06/2011	Yes
3	Support to Precursor SSA Services-SPA	J.L. Valero	Space Research, A European Journey	2011	European Commission	Brussels, Belgium	31/12/2011	Yes
4	Support to Precursor Space Situational Awareness Services (SPA)	J.L. Valero, S. Albani, B. Gallardo, J. Matute, A. O'Dwyer	Let's Embrace Space, FP7 Space Conference	2011	European Commission	Budapest, Hungary	12/05/2011	Yes
5	The SPA project contribution to European Space Situational Awareness	J.L. Valero, S. Albani, B. Gallardo, J. Matute, A. O'Dwyer	Near Space Security Conference	2011	Near space Security	London, UK	03/11/2011	Yes

¹ Open Access is defined as free of charge access for anyone via Internet. Please answer "yes" if the open access to the publication is already established and also if the embargo period for open access is not yet over but you intend to establish open access afterwards.

Table 3-2. Dissemination activities

NO	Type of activities ²	Main leader	Title	Date	Place	Type of audience ³	Size of audience	Countries addressed
1	Workshops	EUROPEAN UNION SATELLITE CENTRE	First Technical Workshop	28/06/2011	EUSC	Policy makers	10	EU Member States
2	Workshops	EUROPEAN UNION SATELLITE CENTRE	Second Technical Workshop	19/01/2012	EUSC	Policy makers	10	EU Member States
3	Workshops	EUROPEAN UNION SATELLITE CENTRE	Third Technical Workshop	12/06/2012	EUSC	Policy makers	10	EU Member States
4	Videos	EUROPEAN UNION SATELLITE CENTRE	SPA Promotional Video	30/11/2011	EUSC	Scientific - Industry - Civil society - Policy makers	N/A	EU Member States
5	Videos	EUROPEAN UNION SATELLITE CENTRE	Atalanta Operation	31/08/2012	EUSC	Policy makers	20	EU Member States
6	Videos	EUROPEAN UNION SATELLITE CENTRE	Satellite Image Acquisition Process	31/08/2012	EUSC	Policy makers	20	EU Member States
7	Conference	EUROPEAN UNION SATELLITE CENTRE	Let's Embrace Space FP7 Space Conference	12/05/2011	Budapest, Hungary	Scientific community	120	All countries
8	Conference	EUROPEAN UNION SATELLITE CENTRE	European Space Surveillance Conference 2011	08/06/2011	Madrid, Spain	Scientific community	120	All countries

² A drop down list allows choosing the dissemination activity: publications, conferences, workshops, web, press releases, flyers, articles published in the popular press, videos, media briefings, presentations, exhibitions, thesis, interviews, films, TV clips, posters, Other.

³ A drop down list allows choosing the type of public: Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other ('multiple choices' is possible).

9	Conference	EUROPEAN UNION SATELLITE CENTRE	Space Security Trough the Transatlantic Partnership Conference	28/06/2011	Prague, Czech Republic	Scientific - Industry - Civil society - Policy makers	90	EU Member States
10	Conference	EUROPEAN UNION SATELLITE CENTRE	Near Space Security 2011	03/11/2011	London, UK	Scientific community	120	All countries
11	Conference	EUROPEAN UNION SATELLITE CENTRE	A Safer Space for a safer world, 5th IAASS	17/10/2011	Paris, France	Scientific community	120	All countries
12	Conference	EUROPEAN UNION SATELLITE CENTRE	Sustainability of Space activities symposium	21/02/2012	Strasbourg, France	Scientific community	120	All countries
13	Presentations	EUROPEAN UNION SATELLITE CENTRE	SPA Kick Off	01/03/2012	EUSC	Policy makers	20	EU Member States
14	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to ESA SSA Team	03/03/2011	European Space Agency	Scientific community	8	All EU and ESA Member States
15	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to EUSC's Board	28/03/2011	EUSC	Policy makers	25	EU Member States
16	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project at the Séminaire Espace	28/03/2011	Salon de Provence, France	Scientific - Industry - Civil society - Policy makers	5	France
17	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to AGI-Agenium	05/04/2011	EUSC	Industry	3	France, UK
18	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to GSA and SIT-CEN	07/04/2011	EUSC	Civil society	4	EU Member States
19	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to EDA SSA Project Team	05/05/2011	European Defence Agency	Policy makers	4	EU Member States

20	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to Ambassadors of EU Member Countries	05/05/2011	EUSC	Policy makers	19	EU Member States
21	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to Secretario de Estado para la EU	06/05/2011	EUSC	Policy makers	8	Spain
22	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to CNES	08/06/2011	EUSC	Scientific community	7	France
23	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to 21st Expert Users Forum	08/06/2011	EUSC	Policy makers	36	EU Member States
24	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to the Major of Torrejón de Ardoz	07/07/2011	EUSC	Civil society	17	Spain
25	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to CNES	12/07/2011	Toulouse, France	Scientific community	5	France
26	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to the Director of Polish SRC	14/07/2011	EUSC	Policy makers	1	Poland
27	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to GMES-Security OHB	19/07/2011	EUSC	Policy makers	12	EU Member States
28	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to Astrium	20/07/2011	EUSC	Industry	14	Astrium Member States
29	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to CDTI	21/07/2011	EUSC	Policy makers	4	Spain
30	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to Deimos	23/08/2011	EUSC	Industry	1	Spain
31	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to University of Alcalá de henares	06/09/2011	EUSC	Scientific community	3	Spain

32	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to NATO Committee	21/09/2011	EUSC	Policy makers	5	NATO Member Countries
33	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to the Ambassador of the Republic of Poland in Spain	26/09/2011	EUSC	Policy makers	3	Poland
34	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to Astrium	28/09/2011	EUSC	Industry	4	Astrium Member Countries
35	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to German Embassy in Spain	03/10/2011	EUSC	Policy makers	2	Germany
36	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to Secretaria de Estado del Ministerio de Defensa Español	06/10/2011	EUSC	Policy makers	3	Spain
37	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to 22nd Expert Users Forum	20/10/2011	EUSC	Policy makers	34	EU Member States
38	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to CIFAS and CESAEROB	25/10/2011	EUSC	Policy makers	4	Spain
39	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to Cienclsaac Students	27/10/2011	EUSC	Scientific community	14	Spain
40	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to CITS	21/11/2011	EUSC	Policy makers	3	EU Member States
41	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to ESA-ESRIN	23/11/2011	ESRIN, Italy	Scientific community	5	Italy
42	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to Commandement Interarmées de l'espace, Bureau politique et coopération	01/12/2011	EUSC	Policy makers	7	France

43	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to EDA SSA Project Team	01/12/2011	EDA, Belgium	Policy makers	5	EU Member States
44	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to MoD France	02/12/2011	EUSC	Policy makers	4	France
45	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to Comunidad de Madrid	15/12/2011	EUSC	Policy makers	3	Spain
46	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to ESA-ESAC	16/01/2012	EUSC	Scientific community Policy makers	3	EU and ESA Member States
47	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to the Embassy of the Republic of Latvia in Spain	17/01/2012	EUSC	Policy makers	2	Republic of Latvia
48	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to EUSC Staff	25/01/2012	EUSC	Policy makers	65	EU Member States
49	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to 23rd Expert Users Forum	03/02/2012	EUSC	Policy makers	39	EU Member States
50	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to Slovenian Centre of Excellence for Space Sciences and Technologies	13/02/2012	Slovenia	Policy makers	2	Slovenia
51	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to EEAS	28/02/2012	EUSC	Policy makers	2	EU Member States
52	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to EUSC's Board	29/02/2012	EUSC	Policy makers	32	EU Member States
53	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to GMV	08/03/2012	EUSC	Industry	3	Spain

54	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to SENER	12/03/2012	EUSC	Industry	3	Spain
55	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to Croatian Ministry of Defence	16/03/2012	Croatia	Policy makers	2	Croatia
56	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to ESA	21/03/2012	EUSC	Scientific community - Policy makers	2	EU and ESA Member States
57	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to the Embassy of the Republic of Slovenia in Spain	22/03/2012	EUSC	Policy makers	2	Republic of Slovenia
58	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to the Embassy of the Netherlands in Spain	12/04/2012	EUSC	Policy makers	2	Netherlands
59	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to Indra	24/04/2012	Indra, Spain	Industry	3	Spain
60	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to Commandement Interarmées de l'Espace	16/05/2012	Command. Interarmées de l'Espace, France	Policy makers	5	France
61	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to Segenpol	30/05/2012	EUSC	Policy makers	6	Spain
62	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to German SSA Centre	01/06/2012	German SSA Centre, Germany	Policy makers	5	Germany

63	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to CDTI	05/05/2012	CDTI, Spain	Policy makers	2	Spain
64	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to the Embassy of Swiss	21/06/2012	Swiss	Civil society	2	Swiss
65	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to the Slovenian SPACE-SI	17/09/2012	EUSC	Civil society	2	Slovenia
66	Presentations	EUROPEAN UNION SATELLITE CENTRE	Presentation of SPA Project to 7FP representatives	10/10/2012	EUSC	Policy makers	25	All 7FP countries
67	Web sites/Applications	EUROPEAN UNION SATELLITE CENTRE	Internal SPA Project workspace	21/03/2011	EUSC	Policy makers	N/A	EU Member States
68	Web sites/Applications	EUROPEAN UNION SATELLITE CENTRE	Technical Forum	21/03/2011	EUSC	Policy makers	15	EU Member States
69	Web sites/Applications	EUROPEAN UNION SATELLITE CENTRE	SPA Project Website	16/05/2011	EUSC	Scientific - Industry - Civil society - Policy makers	N/A	All countries
70	Publication	EUROPEAN UNION SATELLITE CENTRE	Support to Precursor Space Situational Awareness Services	12/05/2011	Budapest, Hungary	Scientific - Industry - Civil society - Policy makers	N/A	All Countries
71	Publication	EUROPEAN UNION SATELLITE CENTRE	A technical contribution supporting the definition of the European SSA Governance and Data Policy	07/06/2011	Madrid, Spain	Scientific - Industry - Civil society - Policy makers	N/A	All countries
72	Publication	EUROPEAN UNION SATELLITE CENTRE	The Support to Precursor Space Situational Awareness Services (SPA) Project	17/10/2011	Versailles France	Scientific - Industry - Civil society - Policy makers	N/A	All Countries

73	Publication	EUROPEAN UNION SATELLITE CENTRE	The SPA project contribution to European Space Situational Awareness	03/11/2011	London, UK	Scientific - Industry - Civil society - Policy makers	N/A	All countries
74	Publication	EUROPEAN UNION SATELLITE CENTRE	Support to Precursor SSA Services-SPA	31/12/2011	Brussels, Belgium	Scientific - Industry - Civil society - Policy makers	N/A	All countries

3.2 Exploitable foreground

The mechanism for the exploitation of the SPA project results has been described in the D6.0 “Dissemination Plan” [RD-22] and D6.6 “Summary communications actions with SSA key stakeholders 2” [RD-11]. This includes the D6.7 “SPA study report with findings and recommendations” [RD-4], summarizing the gained knowledge on SSA during the execution of the SPA study as well as recommendations in view of further developments of SSA in Europe.

Applications for patents, trademarks and registered designs are not applicable within the SPA project.

4. Report on Societal Implications

According with the EC reporting guidelines [RD-17], this section describes the societal implications of the SPA (Support to Precursor SSA Services) project filling out a questionnaire addressed in Annex 1.

Moreover, specific information about SPA project societal implications has been already addressed in the following deliverables:

- D7.6 “Gender Issues Intermediate Report” [RD-34] and D7.7 “Gender Issues Report” [RD-33]. These two deliverables report on Gender Aspects within the SPA project.
- Chapter 2.4 Potential SPA Project Impact. This chapter describes the main benefits of SPA project for the EU, EU Member States, EU citizens and other SSA stakeholders.
- D6.5 “Summary communications actions with SSA Key Stakeholders 1” [RD-32] and D6.6 “Summary communications actions with SSA Key Stakeholders 2”, [RD-11]. These deliverables describe the dissemination activities of the SPA project and they also address media and communication issues.

5. Financial Report on the Distribution of the European Union Financial Contribution

The SPA project financial figures, shown in Table 5-1, are an accurate estimation declared in conformity with the accounting and management principles of the EUSC.

The SPA project financial figures will be adjusted in M21 and they will be included in Form C after the audit performed by the EUSC auditor's college next 28th November 2012.

Table 5-1. Project financial figures

Concept description	Expenditures							Total Mar11 – Oct12
	Mar11–May11	Jun11–Aug11	Sep11–Nov11	Dec11–Feb12	Mar12–May12	Jun12–Aug12	Sep12–Oct12	
Personnel costs	81 069.91€	64 322.03€	64 592.03€	68 607.76€	52 718.55€	52 996.19€	37 050.21€	421 356.67€
Travel	38.27€	-	630.61€	1 095.46€	1 346.90€	-	3 000.00€	6 111.24€
Other	32 094.83€	1 637.10€	-	1 897.16€	-	21 433.25€	9 980.11€	67 042.45€
Total direct cost	113 203.01€	65 959.13€	65 222.64€	71 600.38€	54 065.45€	74 429.44€	50 030.32€	494 510.36€
Indirect cost (7%) <i>As per Support Action</i>	7 924.21€	4 617.14€	4 565.58€	5 012.03€	3 784.58€	5 210.06€	3 502.12€	34 615.73€
TOTAL COST	121 127.22€	70 576.27€	69 788.22€	76 612.40€	57 850.03€	79 639.50€	53 532.44€	529 126.08€

These financial figures refer only to the EC contribution to the SPA project.

These financial figures are currently estimations subject to audit by the EUSC's colleague of auditors.

6. Project management

At management level, no critical issues have been identified during the execution of the SPA project. **The SPA support action was on schedule and within budget in the course of the whole project.** Only some minor deviations in terms of project schedule (<6%) were identified in some periods with peaks of work. (See Table 6-2)

An exhaustive control of the SPA project has been performed during its execution. Different reports have been prepared to internally and externally inform about the status of the project, in particular:

- 20 Monthly reports: each report has been generated with a one-month periodicity and it describes the performed activities of each member of the team per each work package. For traceability purposes, the official EUSC's staff time sheets have been attached to each monthly report. (See Figure 3)
- 5 Periodic reports: each report describes the project objectives and achievements, as well as the financial and management figures for each 3-month period. [RD-5][RD-6][RD-7][RD-8][RD-9]
- 1 Mid-term report: this report was generated in M9 and presented the accumulative objectives and achievements of the project, and the financial status. [RD-10]
- 1 Final report: the present report provides an overview of the SPA project, describing its objectives, achievements, dissemination activities, impact and financial figures.

In M14 the SPA project duration was extended by two additional months in order to facilitate the interaction with the EUSC's board. This extension has allowed meeting the EUSC's board twice after the 3rd workshop. The first EUSC's board meeting after the 3rd workshop was held in September 2012 and it allowed the presentation of the SPA project Report to EUSC Board based on preliminary SPA project results (following the recommendations of the 3rd workshop participants) to all EU MS. The second meeting was held in October 2012 (during the project's extension) and it let to obtain the authorization of the EUSC's board to release the SPA project. [RD-18][RD-19]

The extension of the SPA support action only entailed a modification of the following deliverables' submission dates (initially foreseen for M18 and finally submitted in M20):

- D5.3 Evaluation of precursor SSA services,
- D6.6 Summary communication actions with SSA stakeholders 2,
- D6.7 SPA study report with findings and recommendations,
- D7.5 Project final report,
- D7.7 Gender report.

In order to cover specific activities and support the SPA team over the course of the project, experts of the EUSC contributed to the achievement of the SPA project. In particular approximately 7% of the total SPA hours of the project were performed by the following experts:

- Mr Lorenzo Mulero, Head of Financial Department at the EUSC.
- Ms Nuria Fernandez, Project Assistance at the EUSC CAPDEV division.
- Ms Ilze Berzina, Financial Assistance at the EUSC CAPDEV division.
- Ms Nina Christensen, Planning and Communication Assistant at the EUSC.
- Mr Fernando Miralles, Production Officer at the EUSC IT division.
- Mr Jean-Baptiste Taupin, Administrative & Legal Officer at the EUSC.
- Ms Esther Molinero, Legal and Data Protection Assistance at the EUSC.
- Mr Piergiorgio Rossi, System Manager at the EUSC IT division.

SPA Progress Report: March 2012		SPA Progress Report: March 2012	
Project Name	Support to Precursor SSA Services (SPA)	Planned activities for April 2012	
Project Share Point	spa_progress_report_month13_30032012.docx	General activities (all team)	
Report compiled by	Beatriz Gallardo	<ul style="list-style-type: none"> • Participation to SPA internal and external meetings • Presentation of SPA to external visitors 	
Reporting period	March 2012	Sergio Albani	
Activity and progress		<ul style="list-style-type: none"> • Preparation of the SPA Final Report • Filling FP7 site with dissemination activities 	
General activities (all team)		Beatriz Gallardo – Technical Assistant	
<ul style="list-style-type: none"> • Participation to SPA internal and external meetings • Presentation of SPA to external visitors 		<ul style="list-style-type: none"> • Preparation of SPA Progress report for May 2010 (WP7) • Continue the development of Overflight Tool to support OPS division • Continue the preparation of D7.4 Project Periodic Report 4 (WP7) • Provide comments to D5.3 Evaluation of Preliminary SSA Services Report (WPS) • Support to the different work packages (WP1, WP4, WP5, WP6) 	
Sergio Albani		Jacobo Matute – IT Officer	
<ul style="list-style-type: none"> • Initial activities for the preparation of the SPA Final Report (WP6) • Participation to the SPA Middle Review and performance of the subsequent activities 		<ul style="list-style-type: none"> • Continue the analysis and assessment of SPA scenarios described in D5.2 and support the definition of the associated demonstrator (WP5) • Continue the definition of D5.3 including the details regarding the analysis description and relevant findings (WPS) • Continue liaison with ESA regarding DC-II and CO-VIII activities and deliverables that supports, via demonstrators, the scenario assessment work (WP4) 	
Beatriz Gallardo – Technical Assistant		Anthony O'Dwyer – Flight Dynamics Officer	
<ul style="list-style-type: none"> • Preparation of SPA Progress report for March 2010 (WP7) • Continue the development of Overflight Tool to support OPS division • Start the preparation of D7.4 Project Periodic Report 4 (WP7) • Support to the different work packages (WP1, WP4, WP5, WP6) 		<ul style="list-style-type: none"> • Finalization of the technical note on tracking and initial orbit determination • Continue the analysis and assessment of SPA scenarios described in D5.2 and support the definition of the associated demonstrator (WP5) • Continue the definition of D5.3 including the details regarding the analysis description and relevant findings (WPS) 	
Jacobo Matute – IT Officer		Juan Luis Valero – Project Coordinator	
<ul style="list-style-type: none"> • Start the analysis and assessment of SPA scenarios described in D5.2 and support the definition of the associated demonstrator (WP5) • Definition of D5.3 including the details regarding the analysis description and relevant findings (WPS) • Continue liaison with ESA regarding DC-II and CO-VIII activities and deliverables that supports, via demonstrators, the scenario assessment work (WP4) 		<ul style="list-style-type: none"> • Project coordination, guidance and support 	
Anthony O'Dwyer – Flight Dynamics Officer		References	
<ul style="list-style-type: none"> • Preparation of a skeleton version of the technical note on tracking and initial orbit determination • Start the analysis and assessment of SPA scenarios described in D5.2 and support the definition of the associated demonstrator (WP5) • Definition of D5.3 including the details regarding the analysis description and relevant findings (WPS) 		<ul style="list-style-type: none"> • RD1 http://intranet/SPA/Documents/SPA-ProjectDocumentation/NoM/SPA_mom_ssa_02032012.docx • RD2 http://intranet/SPA/Documents/SPA-ProjectDocumentation/NoM/SPA_mom_susp_06032012.docx • RD3 http://intranet/SPA/Documents/SPA-ProjectDocumentation/NoM/SPA_mom_susp_GMV_08032012_v01.pdf • RD4 http://intranet/SPA/Documents/SPA-ProjectDocumentation/NoM/SPA_mom_susp_27032012.docx 	
Juan Luis Valero – Project Coordinator		Duration of project	
<ul style="list-style-type: none"> • Project coordination, guidance and support 		18 months	
Meetings		Reporting period	
<ul style="list-style-type: none"> • 2nd March 2012: SPA Mid Term Review [RD1] • 6th March 2012: SPA Internal meeting [RD2] • 8th March 2012: GMV meeting [RD3] • 21st March 2012: Meeting EUSC-ESAC • 27th March 2012: SPA Internal Meeting [RD4] 		1 month (March 2012)	
Outputs and Deliverables			
<ul style="list-style-type: none"> • Not Applicable 			
Dissemination/publications			
<ul style="list-style-type: none"> • Not Applicable 			
Collaboration and support			
<ul style="list-style-type: none"> • Not Applicable 			
Missions			
<ul style="list-style-type: none"> • 2nd March 2012: Mission to Brussels – SA and JLV 			

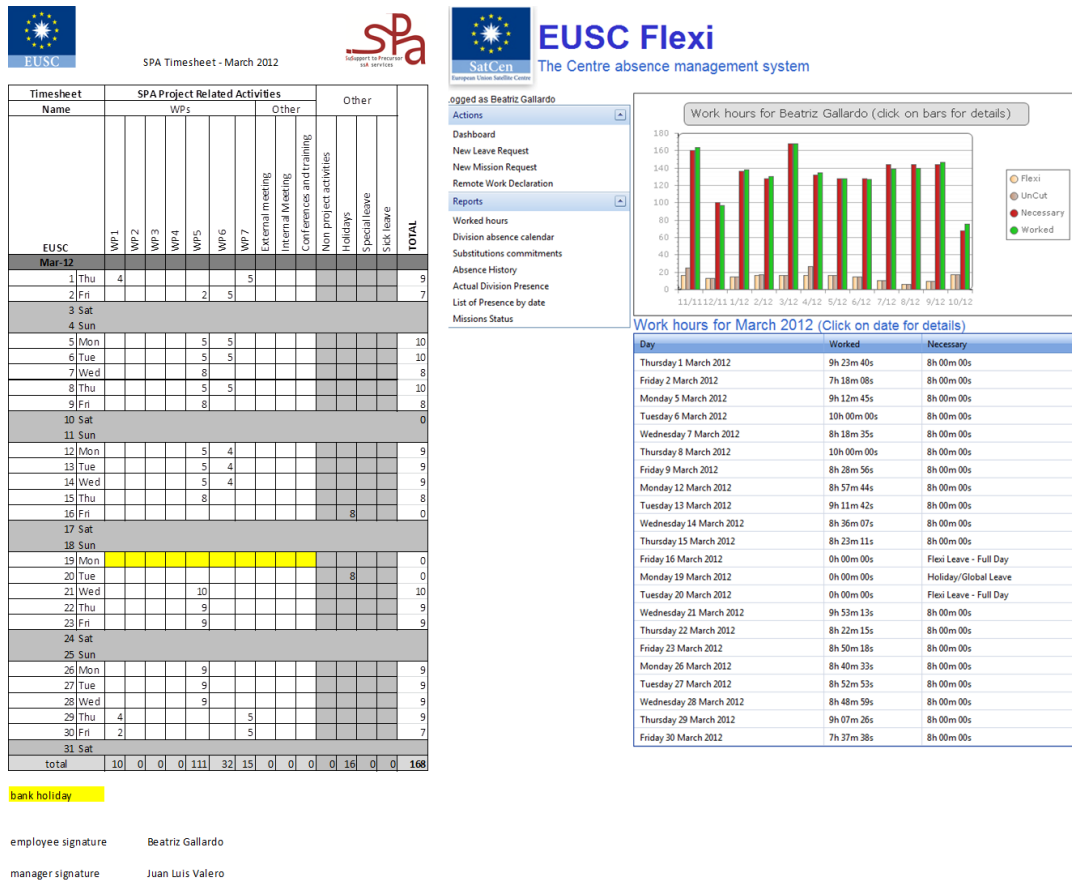


Figure 3. Monthly reports

6.1 SPA Project Earned Value Analysis

The measurement of SPA project performance and progress has been achieved applying Earned Value analysis, as it is widely recognized for its ability to provide accurate forecasts and project performance estimations. [RD-2][RD-3].

In the particular case of SPA, earned value analysis is based in the hours actually worked on the project, and the work actually accomplished. Results presented in this chapter have to be understood as indications of SPA's implementation (the exact implementation of key elements for the project's success were defined during its execution).

The results, showed in the Table 6-2, are based on the following variables:

- Budgeted Cost of Work Scheduled (BCWS) is the budgeted amount of cost work scheduled to be accomplished plus the amount or level of effort or apportioned effort scheduled to be accomplished in a given time period.
- Budgeted Cost of Work Performed (BCWP) or Earned Value (EV) is the budgeted amount of cost for completed work, plus budgeted for level of effort or apportioned effort activity completed within a given time period.
- Actual Cost of Work Performed (ACWP) is the amount reported as actually expended in completing the work accomplished within a given time period.

- Schedule Variance (SV) is the difference between the Budgeted Cost of Work Performed (BCWP) and the Budgeted Cost of Work Scheduled (BCWS).
- Labor Variance (LV) is the difference between the Budgeted Cost of Work Performed (BCWP) and the Actual Cost of Work Performed (ACWP).

And assumptions:

- The percentage of work accomplished is subject to the SPA project status and deliverables and milestones deadlines (Table 6-1).

Table 6-1. Project accomplished work

WP	Deliverables (M12)	Status	Person/Month	Work accomplished (%)
1	D1.1 – Work Plan	100%	1/1	1%
2	D2.1 – Findings on SSA requirements to support civilian security and CSDP	100%	15/15	17%
	D2.2 – Findings on SSA Precursor service requirements for governance and DP	100%		
	D2.3 – Technical requirements for prototype hosting	100%		
3	D3.1 – Acceptance of a SSA hosting area	100%	7/7	8%
4	D4.1 – Prototype integration validation and testing	100%	6/6	7%
5	D5.1 – Precursor service workflow	100%	5/30	34.5%
	D5.2 – Detailed test case description	100%	6/30	
	D5.3 – Evaluation of precursor SSA services	100%	17/30	
6	D6.1 – Summary of technical workshop 1	100%	2/24	28%
	D6.2 – Promotional video	100%	0.25/24	
	D6.3 – Summary of technical workshop 2	100%	2/24	
	D6.4 – Summary of technical workshop 3	100%	2/24	
	D6.5 – Summary of communication actions with SSA Stakeholders 1	100%	2.75/24	
	D6.6 – Summary of communication actions with SSA Stakeholders 2	100%	1.5/24	
	D6.7 – Study report with findings and recommendations	100%	9.6/24	
7	D7.1 – Project Periodic report 1	100%	0.50/4	4.5%
	D7.2 – Project Periodic report 2	100%	0.50/4	
	D7.3 – Project Periodic report 3	100%	0.50/4	
	D7.4 – Project Periodic report 4	100%	0.50/4	
	D7.5 – Project Final report	100%	1.5/4	
	D7.6 – Gender issues Intermediate report	100%	0.25/4	
	D7.7 – Gender issues report	100%	0.25/4	
	D7.8 – Mid Term Report	100%	-	
	D7.9 – Project Periodic report 5	100%	-	
TOTAL Work accomplished (M20)			87/87	100%

Table 6-2. Earned Value Analysis results

Concept	2011										2012									
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Actual Work accomplished (%)	15	18	24	28	32	36	39	44	49	53	59	65	70	74	77	85	88	93	97	100
Scheduled Work accomplished (%)	11	16	21	26	31	37	40	44	49	56	61	66	71	75	79	84	88	93	96	100
Budgeted Cost of Work Scheduled	705	1410	2165	3020	3825	4730	5635	6515	7436	8166	8896	9626	10226	10831	11416	11922	12313	12726	13329	13876
Budgeted Cost of Work Performed	775	1551	2381	3032	3775	4509	5302	6128	7036	7315	8192	9013	10083	10687	11125	11782	12313	12726	13468	13876
Actual Cost of Work Performed	907	1564	2286	2981	3730	4535	5417	6246	7129	7618	8464	9271	9906	10533	11120	11628	12154	12701	13238	13888
Schedule variance (h)	70	141	216	0	0	-46	-108	-62	0	-426	-254	-138	-143	-144	-290	-140	0	0	139	229
Labor variance (h)	-132	-13	95	39	45	-26	-115	-118	-93	-303	-272	-258	177	154	5	154	159	25	0	-13
Acc. Work accomplished (%)	+4	+2	+3	+2	+1	-1	-1	0	0	-3	-2	-1	-1	-1	-2	+1	0	0	+1	0
Acc. Schedule variance (%)	10	10	10	0	0	-1	-2	-1	0	-6	-3	-1.5	-1.4	-1.3	-2.6	-1.2	0	0	0	0

The computed hours refers to the total EUSC staff hours.

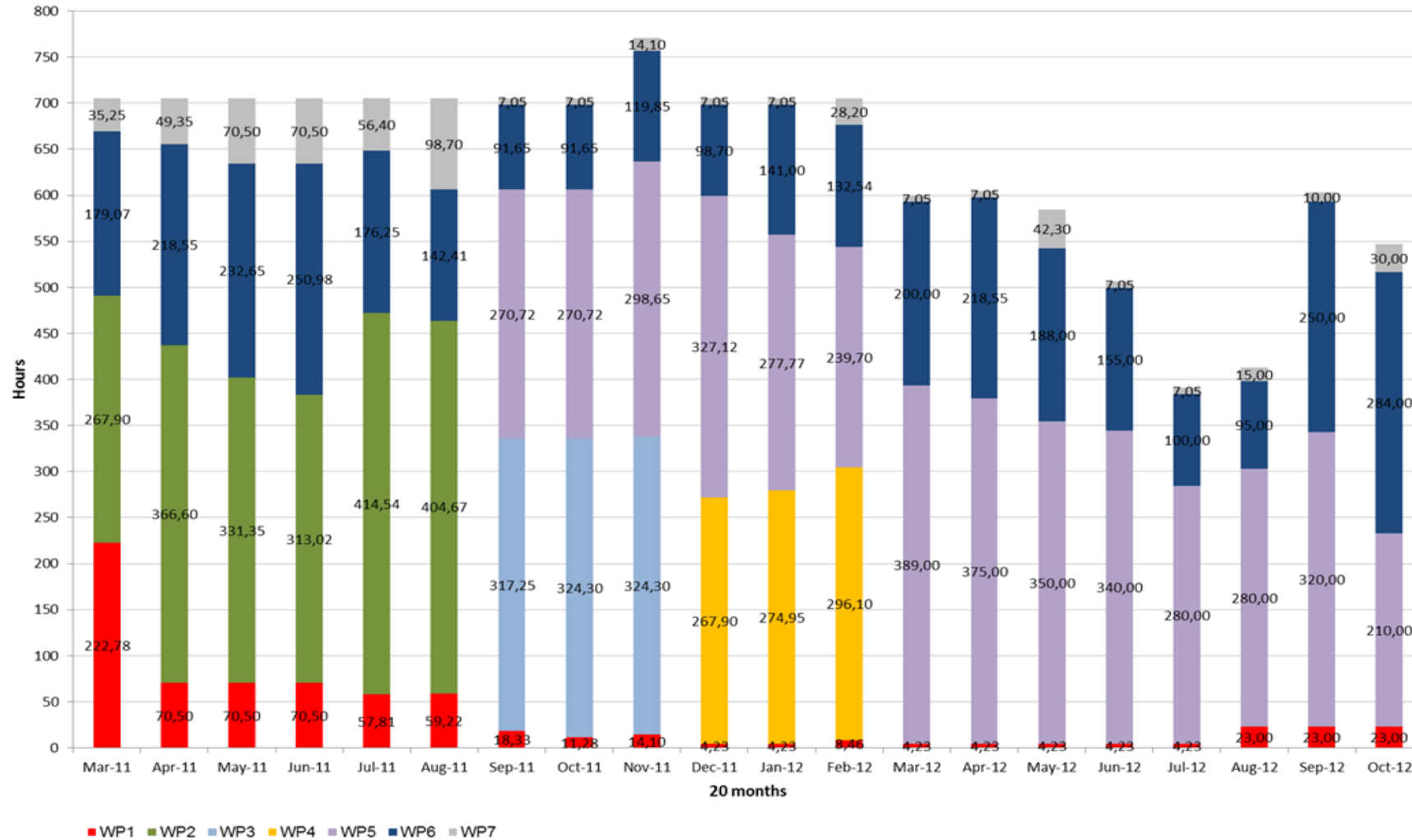


Figure 4. Budgeted Cost of Work Scheduled

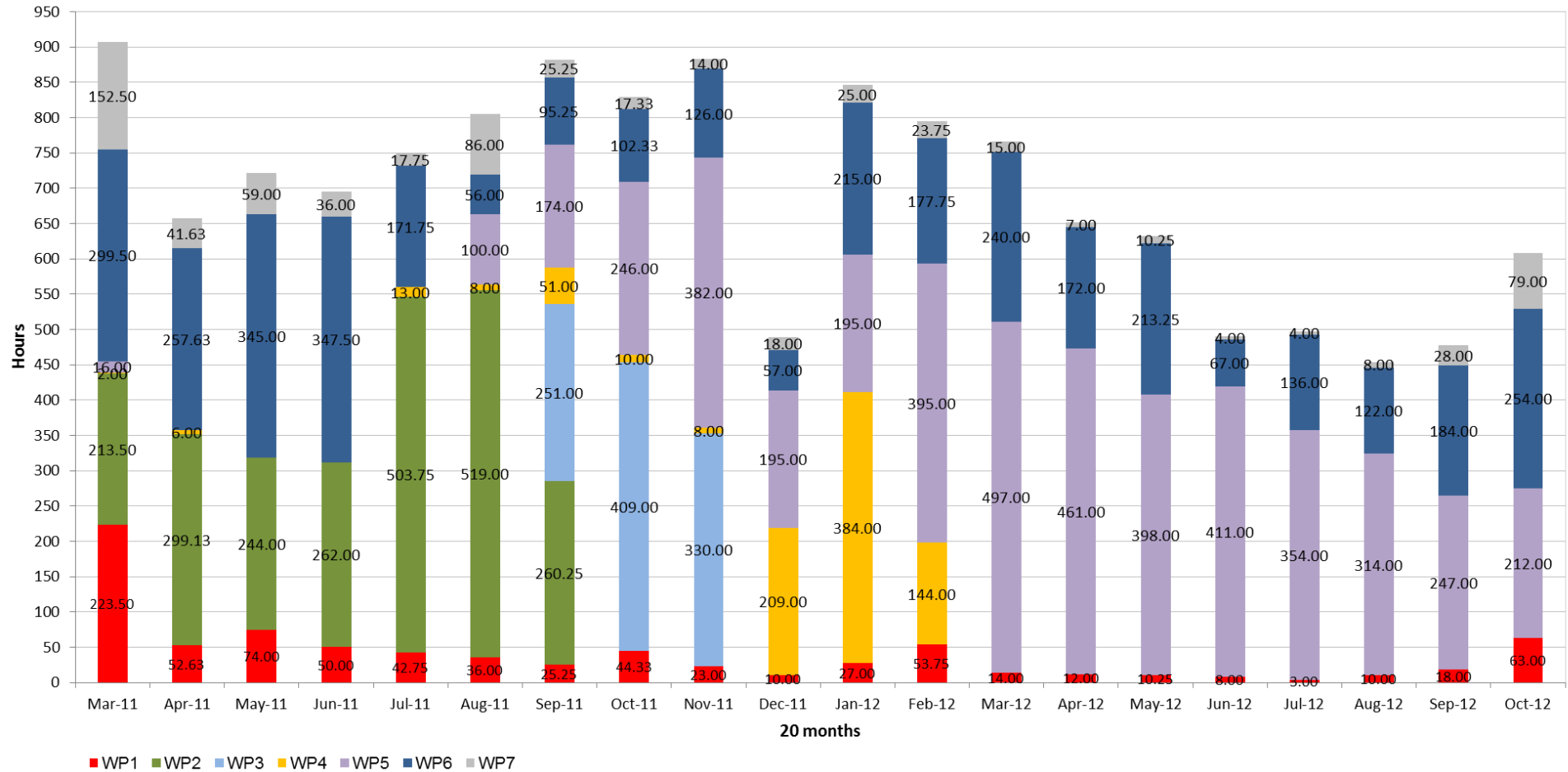


Figure 5. Actual Cost of Work Performed

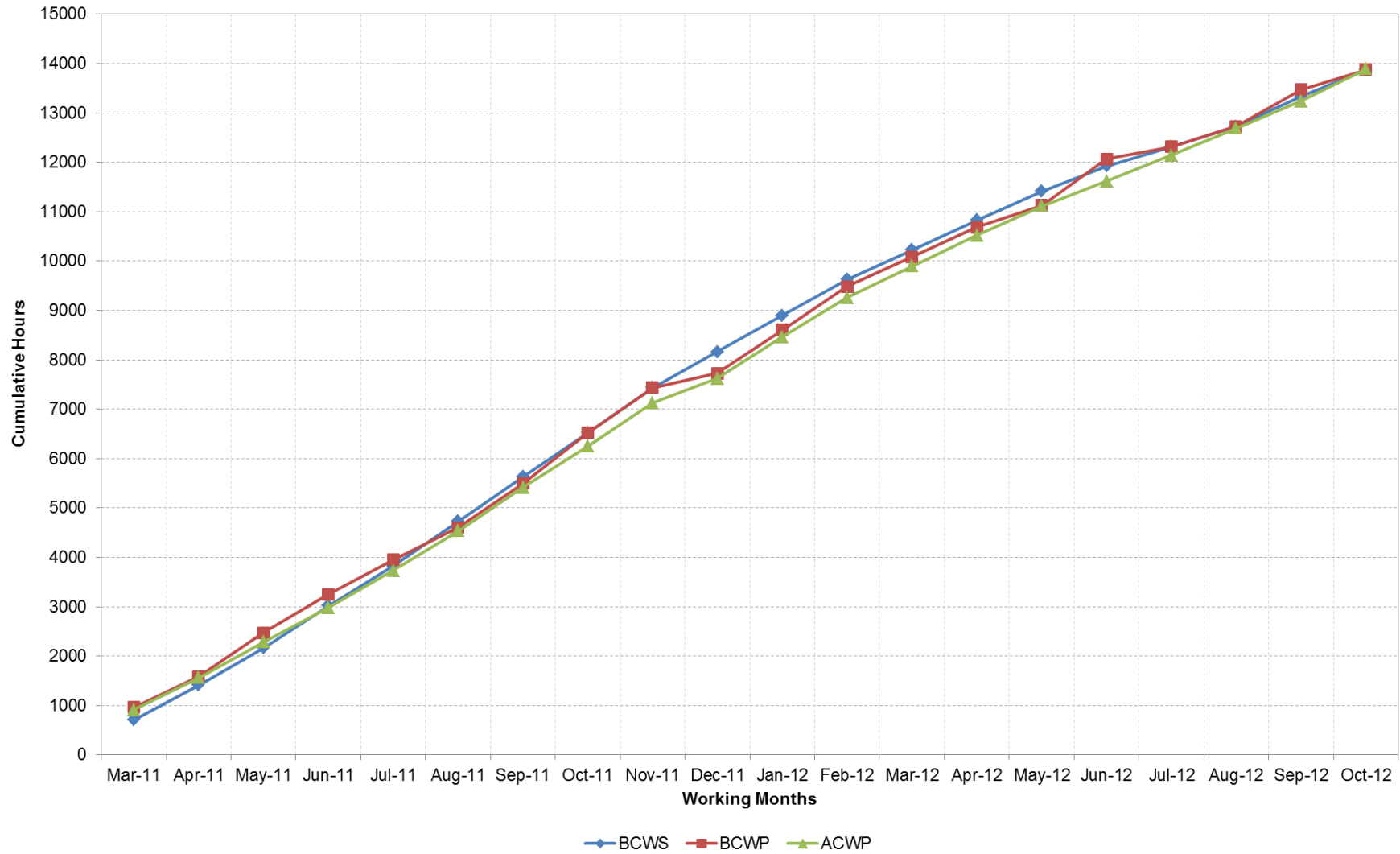


Figure 6. Earned Value figure

6.2 Project milestones and deliverables

6.2.1 Milestones

The list of the SPA project milestones is provided in Table 6-3 below.

Table 6-3. Project Milestones List

Milestone	Milestone name	WP N°	Nature	Delivery Date	Achieved	Comments
MS1	Precursor Services Definition	WP2	Report	M6	Yes	-
MS2	Prototype installed	WP4	Report	M12	Yes	-
MS3	Precursor SSA test case definition	WP5	Report	M12	Yes	-
MS4	Evaluation of SSA precursor services	WP5	Report	M20	Yes	-
MS5	SPA Study Completion	WP6	Report	M20	Yes	-

6.2.2 Deliverables

The list of the SPA Project deliverables is provided in Table 6-4 below.

Table 6-4. Project Deliverables List

Del. No.	Deliverable name	Version	WP N°	Nature	Dissemination ⁴	Delivery Date	Status	Contractual
D1.1	Project plan	1	WP1	Report	PU	M1	Submitted	-
D2.1	Findings on SSA requirements to support civilian security and CSDP	1	WP2	Report	RE	M6	Submitted	-
D2.2	Findings on SSA Precursor service requirements for governance/data policy	1	WP2	Report	RE	M7	Submitted	-
D2.3	Technical requirements for prototype hosting	1	WP2	Report	RE	M6	Submitted	-
D3.1	Acceptance of a SSA hosting area	1	WP3	Report	CO	M9	Submitted	-
D4.1	Prototype Integration Validation and Testing	1	WP4	Report	RE	M12	Submitted	-
D5.1	Precursor service workflow	1	WP5	Report	RE	M9	Submitted	-
D5.2	Detailed Test case Description	1	WP5	Report	RE	M12	Submitted	-
D5.3	Evaluation of precursor SSA services	1	WP5	Report	RE	M20	Submitted	-
D6.1	Summary technical workshop 1	1	WP6	Report	RE	M5	Submitted	-
D6.2	Promotional Video	1	WP6	O	PU	M9	Submitted	-
D6.3	Summary Technical Workshop 2	1	WP6	Report	RE	M11	Submitted	-

⁴ PU= Public

PP= Restricted to other programme participants (including the Commission Services)

RE=Restricted to a group specified by the consortium (including the Commission Services)

CO= Confidential, only for members of the consortium (including the Commission Services)

Del. No.	Deliverable name	Version	WP N°	Nature	Dissemination ⁴	Delivery Date	Status	Contractual
D6.4	Summary Technical Workshop 3	1	WP6	Report	RE	M20	Submitted	-
D6.5	Summary communication actions with SSA stakeholders 1	1	WP6	Report	PU	M9	Submitted	-
D6.6	Summary communication actions with SSA stakeholders 2	1	WP6	Report	PU	M20	Submitted	-
D6.7	SPA Study Report with findings and recommendations	1	WP6	Report	RE	M20	Submitted	-
D7.1	Project periodic report 1	1	WP7	Report	PP	M3	Submitted	-
D7.2	Project periodic report 2	1	WP7	Report	PP	M6	Submitted	-
D7.3	Project Periodic Report 3	1	WP7	Report	PP	M12	Submitted	-
D7.4	Project Periodic Report 4	1	WP7	Report	PP	M15	Submitted	-
D7.5	Project Final Report	1	WP7	Report	PU	M20	Submitted	-
D7.6	Gender issues Intermediate Report	1	WP7	Report	PU	M9	Submitted	-
D7.7	Gender issues Report	1	WP7	Report	PU	M20	Submitted	-
D7.8	Mid Term Report	1	WP7	Report	PP	M9	Submitted	-
D7.9	Project Periodic Report 5	1	WP7	Report	PP	M18	Submitted	-

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8. Acronyms

Acronyms	Description
ACWP	Actual Cost of Work Performed
BCWP	Budgeted Cost of Work Performed
BCWS	Budgeted Cost of Work Scheduled
CFSP	Common Foreign and Security Policy
COTS	Commercial of The Shelve
CRASS	Collision Risk Assessment Software
CSDP	Common Security and Defence Policy
EC	European Commission
EEAS	European External Action Service
EFQM	European Foundation for Quality Management
EDA	European Defence Agency
ESA	European Space Agency
ESDP	European Security and Defence Policy
EU	European Union
EUSC	European Union Satellite Centre
LV	Labour Variance
MS	Member States
PP	Preparatory Programme
REA	Research Executive Agency
SPA	Support to Precursor SSA Services
SSA	Space Situational Awareness
STK	Satellite Tool Kit
SV	Schedule Variance
WP	Work Package



9. Annex 1

A General Information <i>(completed automatically when Grant Agreement number is entered.)</i>	
Grant Agreement Number:	262930
Title of Project:	Support to Precursor SSA Services
Name and Title of Coordinator:	Juan Luis Valero
B Ethics	
1. Did your project undergo an Ethics Review (and/or Screening)? <ul style="list-style-type: none"> If Yes: have you described the progress of compliance with the relevant Ethics Review/Screening Requirements in the frame of the periodic/final project reports? <p>Special Reminder: the progress of compliance with the Ethics Review/Screening Requirements should be described in the Period/Final Project Reports under the Section 3.2.2 'Work Progress and Achievements'</p>	No
2. Please indicate whether your project involved any of the following issues (tick box) :	YES
RESEARCH ON HUMANS	
• Did the project involve children?	
• Did the project involve patients?	
• Did the project involve persons not able to give consent?	
• Did the project involve adult healthy volunteers?	
• Did the project involve Human genetic material?	
• Did the project involve Human biological samples?	
• Did the project involve Human data collection?	
RESEARCH ON HUMAN EMBRYO/FOETUS	
• Did the project involve Human Embryos?	
• Did the project involve Human Foetal Tissue / Cells?	
• Did the project involve Human Embryonic Stem Cells (hESCs)?	
• Did the project on human Embryonic Stem Cells involve cells in culture?	
• Did the project on human Embryonic Stem Cells involve the derivation of cells from Embryos?	
PRIVACY	
• Did the project involve processing of genetic information or personal data (eg. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)?	
• Did the project involve tracking the location or observation of people?	
RESEARCH ON ANIMALS	
• Did the project involve research on animals?	
• Were those animals transgenic small laboratory animals?	
• Were those animals transgenic farm animals?	
• Were those animals cloned farm animals?	
• Were those animals non-human primates?	
RESEARCH INVOLVING DEVELOPING COUNTRIES	
• Did the project involve the use of local resources (genetic, animal, plant etc)?	
• Was the project of benefit to local community (capacity building, access to healthcare, education etc)?	
DUAL USE	
• Research having direct military use	
• Research having the potential for terrorist abuse	

C Workforce Statistics		
3. Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).		
Type of Position	Number of Women	Number of Men
Scientific Coordinator	0	1
Work package leaders	1	3
Experienced researchers (i.e. PhD holders)	1	3
PhD Students	0	0
Other		
4. How many additional researchers (in companies and universities) were recruited specifically for this project?		0
Of which, indicate the number of men:		0
D Gender Aspects		
5. Did you carry out specific Gender Equality Actions under the project?		<input checked="" type="radio"/> Yes <input type="radio"/> No
6. Which of the following actions did you carry out and how effective were they?		
	Not at all effective	Very effective
<input checked="" type="checkbox"/> Design and implement an equal opportunity policy	○ ○ ● ○ ○	
<input type="checkbox"/> Set targets to achieve a gender balance in the workforce	○ ○ ○ ○ ○	
<input type="checkbox"/> Organise conferences and workshops on gender	○ ○ ○ ○ ○	
<input type="checkbox"/> Actions to improve work-life balance	○ ○ ○ ○ ○	
<input type="radio"/> Other: <input style="width: 200px;" type="text"/>		
7. Was there a gender dimension associated with the research content – i.e. wherever people were the focus of the research as, for example, consumers, users, patients or in trials, was the issue of gender considered and addressed?		
<input type="radio"/> Yes- please specify <input checked="" type="radio"/> No		
E Synergies with Science Education		
8. Did your project involve working with students and/or school pupils (e.g. open days, participation in science festivals and events, prizes/competitions or joint projects)?		
<input type="radio"/> Yes- please specify <input checked="" type="radio"/> No		
9. Did the project generate any science education material (e.g. kits, websites, explanatory booklets, DVDs)?		
<input checked="" type="radio"/> Yes- please specify: Website, publications and videos. <input type="radio"/> No		

F Interdisciplinarity		
10. Which disciplines (see list below) are involved in your project?		
<ul style="list-style-type: none"> <input checked="" type="radio"/> Main discipline⁵: 2.3 <input checked="" type="radio"/> Associated discipline⁵: 1.2 	<input type="radio"/>	Associated discipline ⁵ :
G Engaging with Civil society and policy makers		
11a Did your project engage with societal actors beyond the research community? <i>(if 'No', go to Question 14)</i>	<input checked="" type="radio"/> <input type="radio"/>	Yes No
11b If yes, did you engage with citizens (citizens' panels / juries) or organised civil society (NGOs, patients' groups etc.)?		
<ul style="list-style-type: none"> <input type="radio"/> No <input type="radio"/> Yes- in determining what research should be performed <input type="radio"/> Yes - in implementing the research <input checked="" type="radio"/> Yes, in communicating /disseminating / using the results of the project 		
11c In doing so, did your project involve actors whose role is mainly to organise the dialogue with citizens and organised civil society (e.g. professional mediator; communication company, science museums)?	<input type="radio"/> <input checked="" type="radio"/>	Yes No
12. Did you engage with government / public bodies or policy makers (including international organisations)		
<ul style="list-style-type: none"> <input type="radio"/> No <input type="radio"/> Yes- in framing the research agenda <input checked="" type="radio"/> Yes - in implementing the research agenda <input checked="" type="radio"/> Yes, in communicating /disseminating / using the results of the project 		
13a Will the project generate outputs (expertise or scientific advice) which could be used by policy makers?		
<ul style="list-style-type: none"> <input checked="" type="radio"/> Yes – as a primary objective (please indicate areas below- multiple answers possible) <input type="radio"/> Yes – as a secondary objective (please indicate areas below - multiple answer possible) <input type="radio"/> No 		
13b If Yes, in which fields?		
Foreign and Security Policy Space		

⁵ Insert number from list below (Frascati Manual).

13c If Yes, at which level? <input type="radio"/> Local / regional levels <input type="radio"/> National level <input checked="" type="radio"/> European level <input type="radio"/> International level		
H Use and dissemination		
14. How many Articles were published/accepted for publication in peer-reviewed journals?	6 Conference papers	
To how many of these is open access⁶ provided?	6	
How many of these are published in open access journals?	0	
How many of these are published in open repositories?	6	
To how many of these is open access not provided?	0	
Please check all applicable reasons for not providing open access:		
<input type="checkbox"/> publisher's licensing agreement would not permit publishing in a repository <input type="checkbox"/> no suitable repository available <input type="checkbox"/> no suitable open access journal available <input type="checkbox"/> no funds available to publish in an open access journal <input type="checkbox"/> lack of time and resources <input type="checkbox"/> lack of information on open access <input type="checkbox"/> other ⁷ :		
15. How many new patent applications ('priority filings') have been made? <i>("Technologically unique": multiple applications for the same invention in different jurisdictions should be counted as just one application of grant).</i>	0	
16. Indicate how many of the following Intellectual Property Rights were applied for (give number in each box).	Trademark	0
	Registered design	0
	Other	0

⁶ Open Access is defined as free of charge access for anyone via Internet.

⁷ For instance: classification for security project.

Question F-10: Classification of Scientific Disciplines according to the Frascati Manual 2002 (Proposed Standard Practice for Surveys on Research and Experimental Development, OECD 2002):

FIELDS OF SCIENCE AND TECHNOLOGY

1. NATURAL SCIENCES

- 1.1 Mathematics and computer sciences [mathematics and other allied fields: computer sciences and other allied subjects (software development only; hardware development should be classified in the engineering fields)]
- 1.2 Physical sciences (astronomy and space sciences, physics and other allied subjects)
- 1.3 Chemical sciences (chemistry, other allied subjects)
- 1.4 Earth and related environmental sciences (geology, geophysics, mineralogy, physical geography and other geosciences, meteorology and other atmospheric sciences including climatic research, oceanography, vulcanology, palaeoecology, other allied sciences)
- 1.5 Biological sciences (biology, botany, bacteriology, microbiology, zoology, entomology, genetics, biochemistry, biophysics, other allied sciences, excluding clinical and veterinary sciences)

2. ENGINEERING AND TECHNOLOGY

- 2.1 Civil engineering (architecture engineering, building science and engineering, construction engineering, municipal and structural engineering and other allied subjects)
- 2.2 Electrical engineering, electronics [electrical engineering, electronics, communication engineering and systems, computer engineering (hardware only) and other allied subjects]
- 2.3. Other engineering sciences (such as chemical, aeronautical and space, mechanical, metallurgical and materials engineering, and their specialised subdivisions; forest products; applied sciences such as geodesy, industrial chemistry, etc.; the science and technology of food production; specialised technologies of interdisciplinary fields, e.g. systems analysis, metallurgy, mining, textile technology and other applied subjects)

3. MEDICAL SCIENCES

- 3.1 Basic medicine (anatomy, cytology, physiology, genetics, pharmacy, pharmacology, toxicology, immunology and immuno-hematology, clinical chemistry, clinical microbiology, pathology)
- 3.2 Clinical medicine (anaesthesiology, paediatrics, obstetrics and gynaecology, internal medicine, surgery, dentistry, neurology, psychiatry, radiology, therapeutics, otorhinolaryngology, ophthalmology)
- 3.3 Health sciences (public health services, social medicine, hygiene, nursing, epidemiology)

4. AGRICULTURAL SCIENCES

- 4.1 Agriculture, forestry, fisheries and allied sciences (agronomy, animal husbandry, fisheries, forestry, horticulture, other allied subjects)
- 4.2 Veterinary medicine

5. SOCIAL SCIENCES

- 5.1 Psychology
- 5.2 Economics
- 5.3 Educational sciences (education and training and other allied subjects)
- 5.4 Other social sciences [anthropology (social and cultural) and ethnology, demography, geography (human, economic and social), town and country planning, management, law, linguistics, political sciences, sociology, organisation and methods, miscellaneous social sciences and interdisciplinary, methodological and historical SIT activities relating to subjects in this group. Physical anthropology, physical geography and psychophysiology should normally be classified with the natural sciences].

6. HUMANITIES

- 6.1 History (history, prehistory and history, together with auxiliary historical disciplines such as archaeology, numismatics, palaeography, genealogy, etc.)
- 6.2 Languages and literature (ancient and modern)
- 6.3 Other humanities [philosophy (including the history of science and technology) arts, history of art, art criticism, painting, sculpture, musicology, dramatic art excluding artistic "research" of any kind, religion, theology, other fields and subjects pertaining to the humanities, methodological, historical and other SIT activities relating to the subjects in this group]