

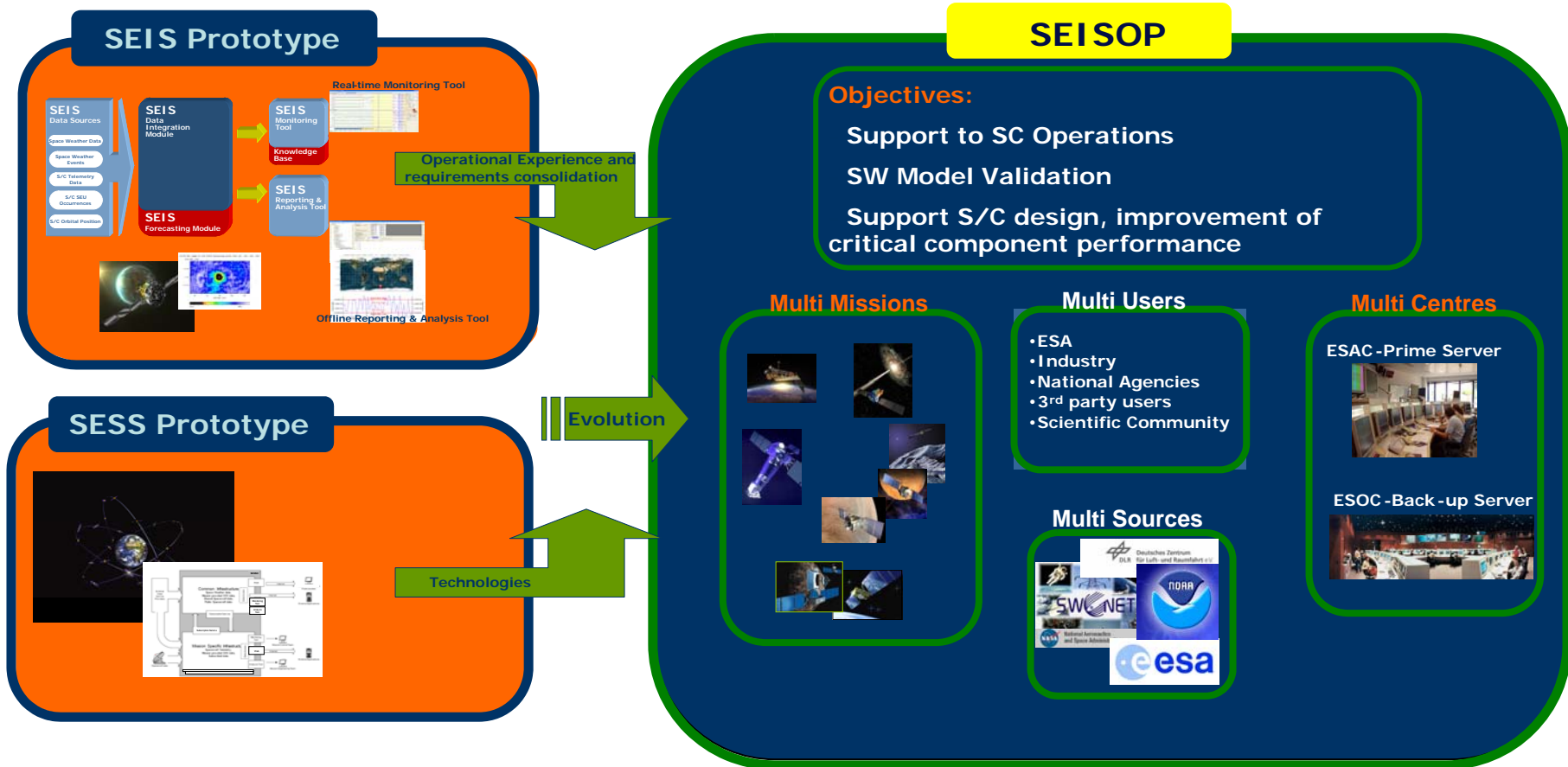
SEISOP

Space Environment Information System to
support Satellites Operations



SEISOP

(Space Environment Information System for Operations)



SEIS

(Space Environment Information System)

- **Main Goal:**
 - **Reinforce awareness of correlation btw. Space weather events and Spacecraft/Payload health status and performance**
 - **Refine end users requirements and procedure on S/C and P/L radiation protection in operations**
- **Main services/functionalities:**
 - Near real-time monitoring (MT)
 - Off-line data exploration and correlation analysis (RAT)
 - Configurable alarm services through the SEIS Alarm's Engine
- **Usage:**
 - INTEGRAL FCT has been using it increasingly to:
 - monitor space weather conditions in real time
 - issue weekly radiation reports
 - analyse solar storms effects on the S/C

SEIS

Current Status

- **Status:**
 - Prototype
 - used at Integral/XMM DCR at ESOC since 2005
- **Current Users:**
 - INTEGRAL FCT
 - XMM FCT
- **Upcoming development:**
 - None, only maintenance provided

SESS

(Space Environment Support System)

- **Main Goal:**
 - provide to Navigation and Telecom Mission operators a prototype to supply, in a structured manner, information regarding space environment and its effects on the spacecraft.
- **Status:**
 - the development finished in early 2007
- **Upcoming development:**
 - none, the contract is finished
- **Needs & expectations:**
 - technologies demonstrator for SEISOP

SEISOP

(Space Environment Information System for Operations)

- Main Goal:
 - **Decision Support System to manage and support Space Weather Hazards-to-Satellites**
- Services (in addition to those provided by SEIS):
 - Predictive/preventive hazard mitigation operations planning
 - Space weather induced anomaly investigation support
- Technology:
 - Validation of data mining technology in context
 - Validation of geo-diversity redundant server architecture
 - Plug-in for validation of externally developed SW models
 - Web services exploitation for web tools and data exchange

SEISOP

Current Status

- **Status:**
 - under development,
 - PDR completed on February 2009;
 - iterative design process;
 - final delivery 2nd half 2010
- **Current funding:**
 - ESA GSTP4 (Spain, Portugal and Germany)
- **Upcoming development:**
 - First Engineering Delivery: phase 1 of Implementation

SEISOP

Summary

- **Architecture and Features:**
 - Redundant concept (servers at ESA/ESOC and ESA/ESAC)
 - Data access fully configurable
 - Multiple missions (Observatory, Space Exploration, Earth Observation, Planetary, Navigation and Telecom)
 - Support several different users (Flight Control Teams, Science Operations Teams, Launcher Teams.....)
 - Platform to validate new models and compare their output to real data
 - Modular and expandable
 - Services through client applications and web based tools
 - Data available to the general public by using a web browser

SEISOP

Summary (cont'd)

SEISOP

Status: Started in Oct. 2008 with the user requirements elicitation phase.

Objectives:

- Support spacecraft (S/C) operations
- Validate Space Weather models
- Support performance assessment and re-design of S/C on-board radiation-sensitive components.

Multi Users

- ESA:
 - Flight Control Teams
 - Science Operation Centres
- Industry
- National Agencies
- Scientific Community

Multi Sources

SEISOP will be able to retrieve, process, classify and store data from several data sources.



- Examples:
- External Space Weather Databases (e.g., NOAA, SIDC, etc)
 - Satellite Telemetry data
 - Mission specific and auxiliary data

Multi Centres

Two independent systems will be deployed for increased reliability and availability at ESAC and ESOC.

ESAC Server



ESOC Server



Multi Missions

The missions' data to be included in SEISOP include, but are not limited to:



- ENVISAT (in operation)
- SEU data [Real]
 - Orbital data [Real & Predicted]

- INTEGRAL (in operation)
- SEU data [Real]
 - Orbital data [Real & Predicted]
 - Telemetry [Real Time & Forecasted]



- XMM (in operation)
- Telemetry [Real]
 - Orbital data [Real & Predicted]

- ROSETTA, MEX & VEX (in operation)
- Telemetry [Real]
 - Orbital data [Real & Predicted]



- GALILEO & BEPI COLOMBO (in preparation)
- Telemetry [Real]
 - Orbital data [Real & Predicted]

