

Advanced Software Technologies for the European Space Situational Awareness

ESA/ ESOC

M. Sarkarati, M. Spada, G. Di Girolamo, S. Moulin, D. Fischer

Email: firstname.lastname@esa.int

The Space Situational Awareness (SSA) is defined as a comprehensive knowledge, understanding and maintained awareness of:

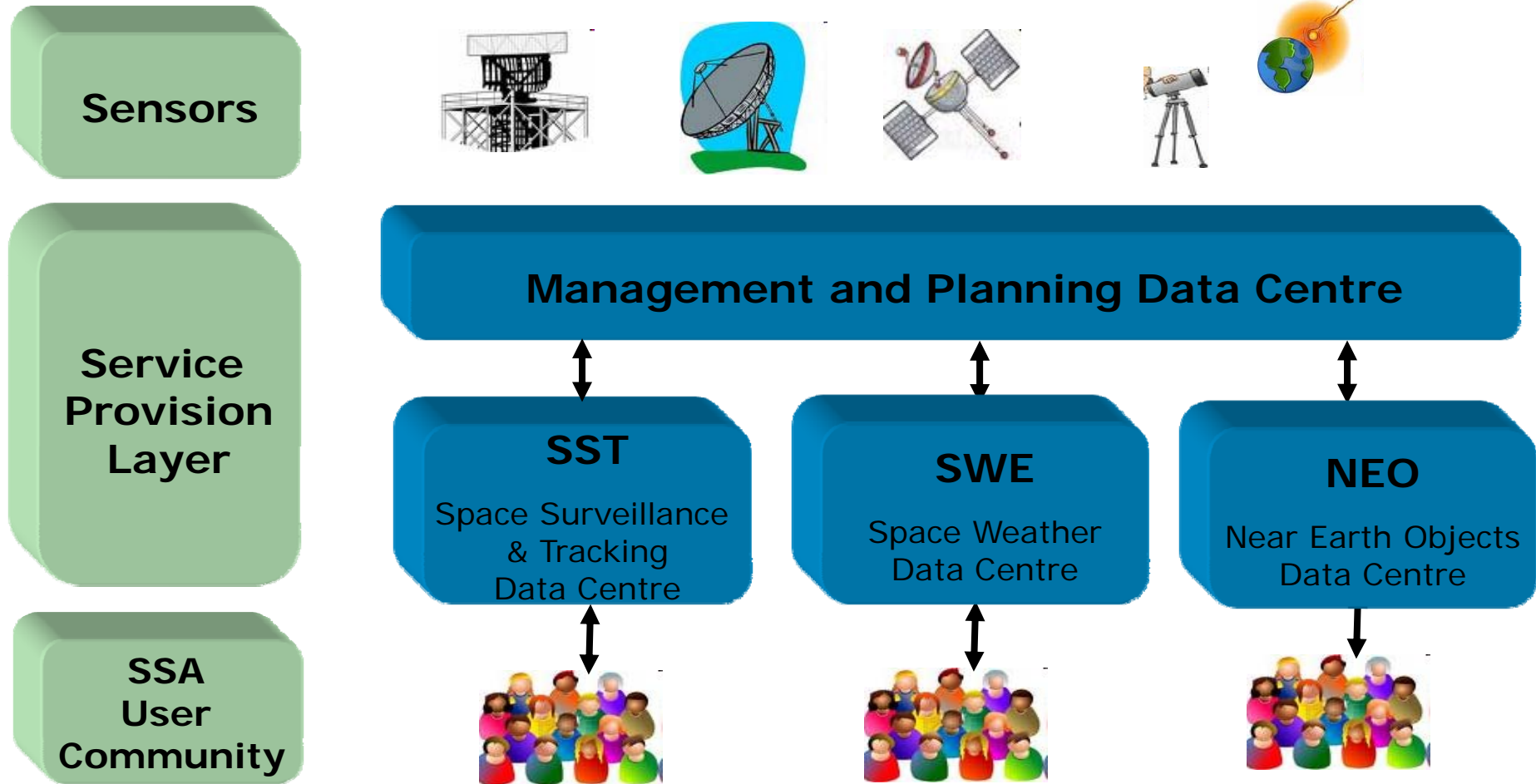
- the population of space objects;
- the space environment;
- the existing threats/risks.

- Support the European independent utilisation of and access to space
- Provide timely and quality *data, information, services* and *knowledge* regarding the environment, the threats and the sustainable exploitation of the outer space surrounding the Earth

- Phase-1: The SSA preparatory programme, 2009 - 2011
 - Specification of the System Requirements and the Architectural Design for the future European SSA System
 - Deployment and operation of SSA Precursor Services

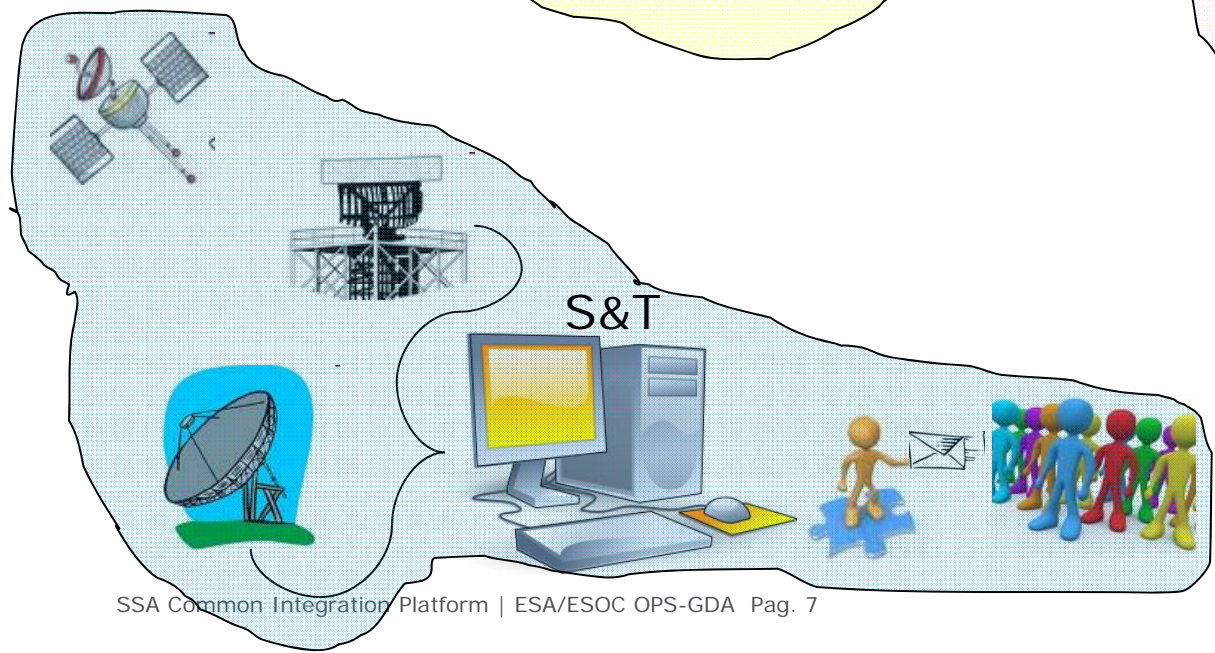
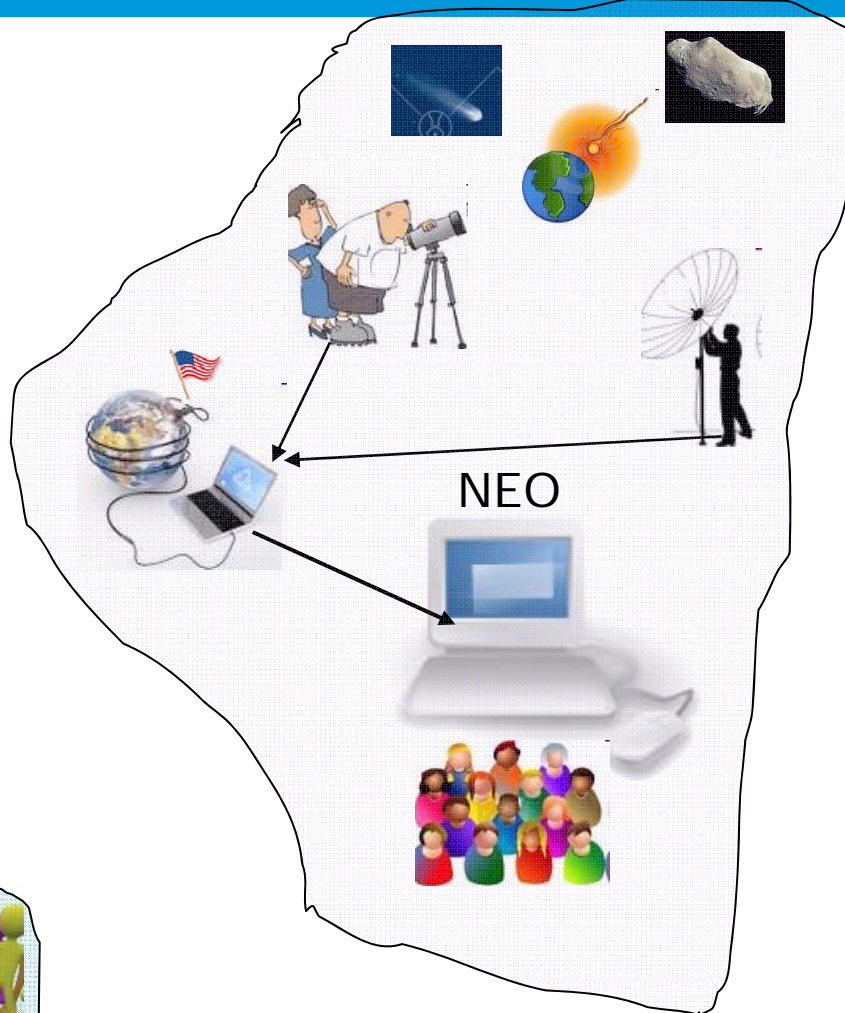
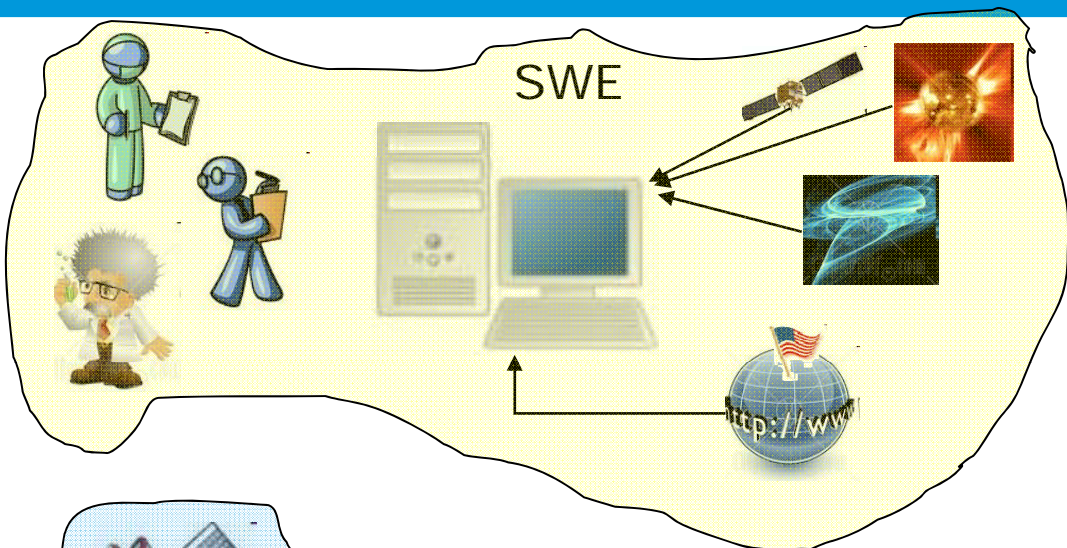
- Phase-2: The SSA full programme, 2012 -2020
 - Deployment and operation of the full European SSA system

The European SSA Programme – System Perspective

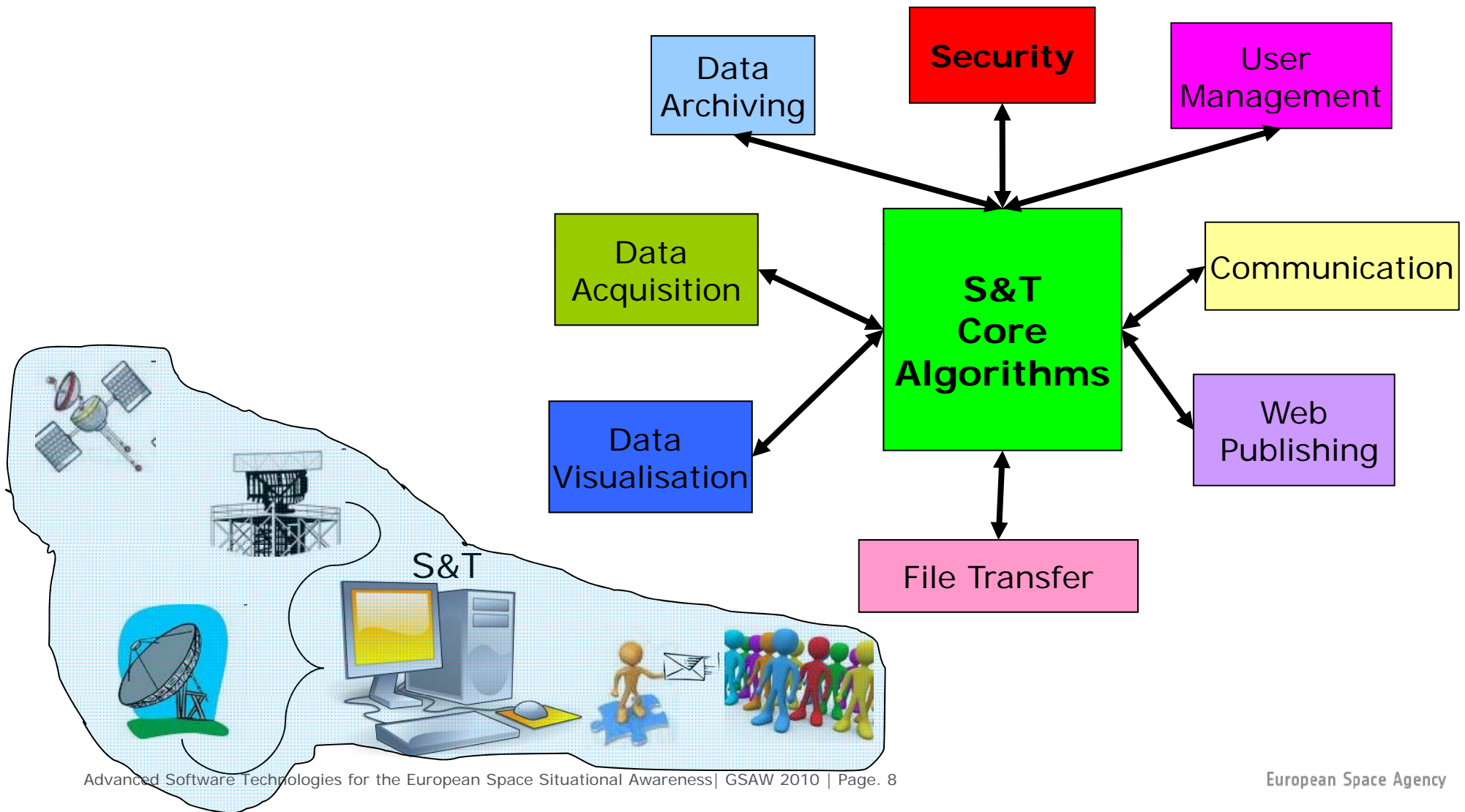


- Rapid provision of SSA precursor services, already in 2010
- Federation of existing assets
 - Integration of legacy applications
- Provision of timely (highly available) and quality (QoS) services
 - Primarily focus on web-based service provision
- Handling of classified data and system critical applications
 - Implementation of strict security and safety requirements
- Geographically distributed setup for sensors and the data centres

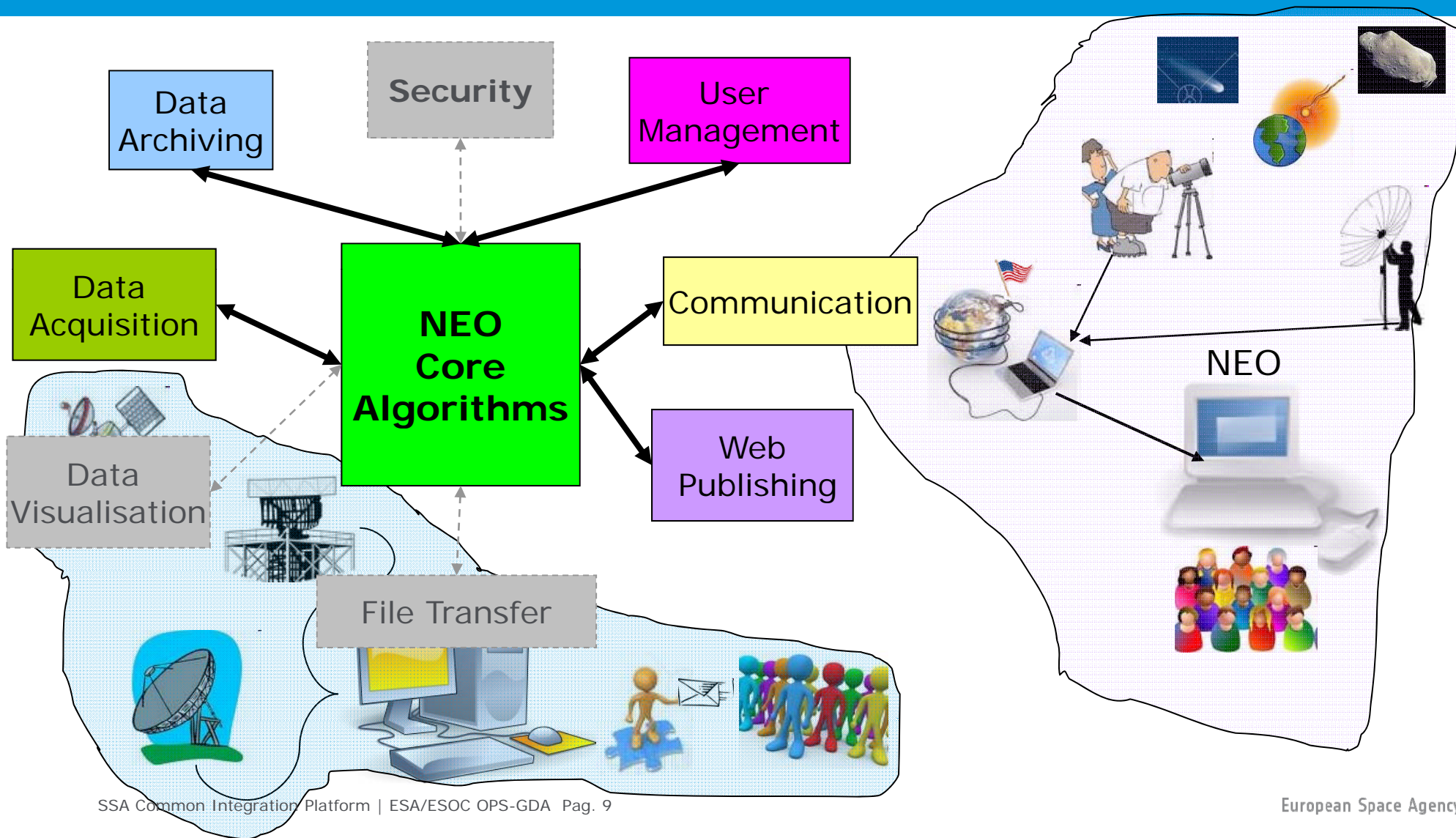
The SSA Preparatory Programme - Precursor Services



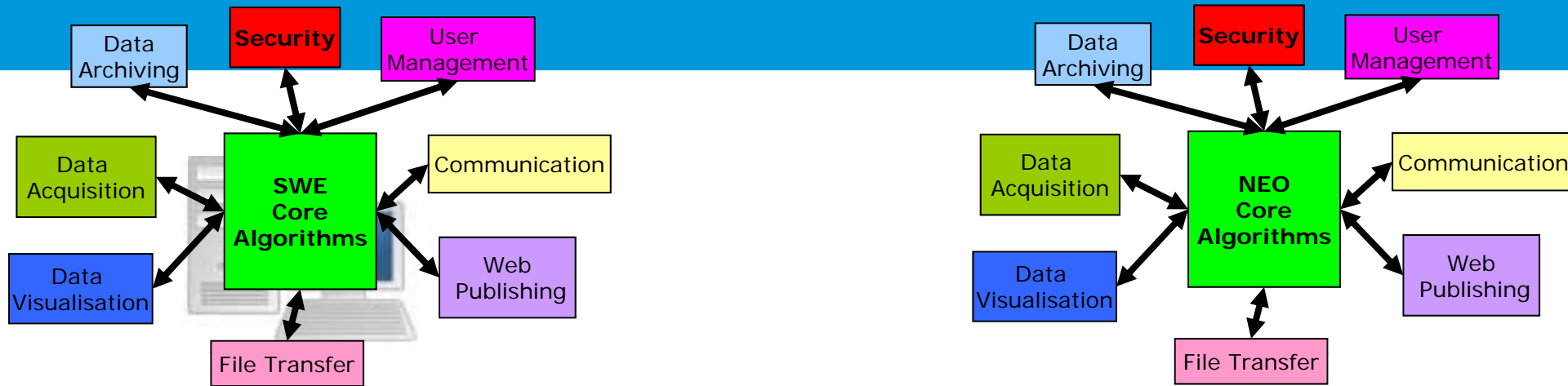
SSA Services- An IT Perspective



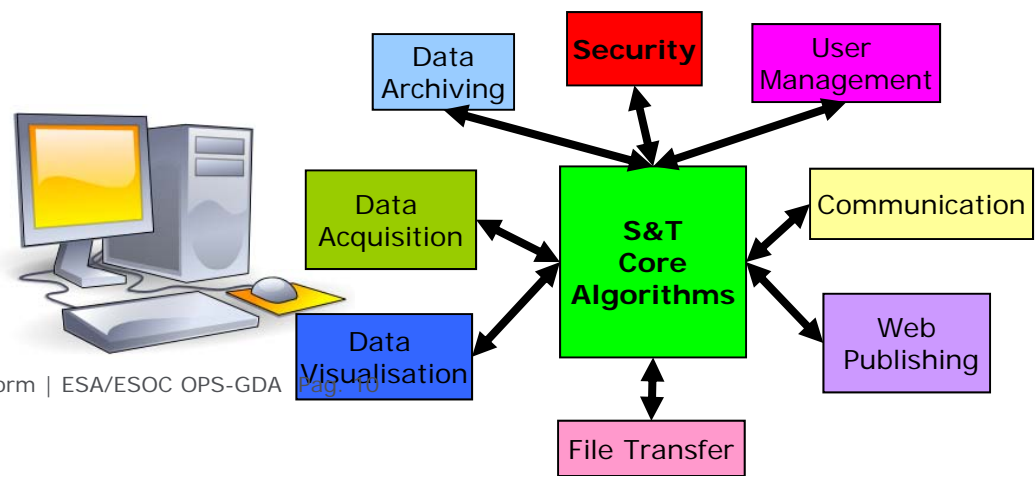
SSA Services- An IT Perspective



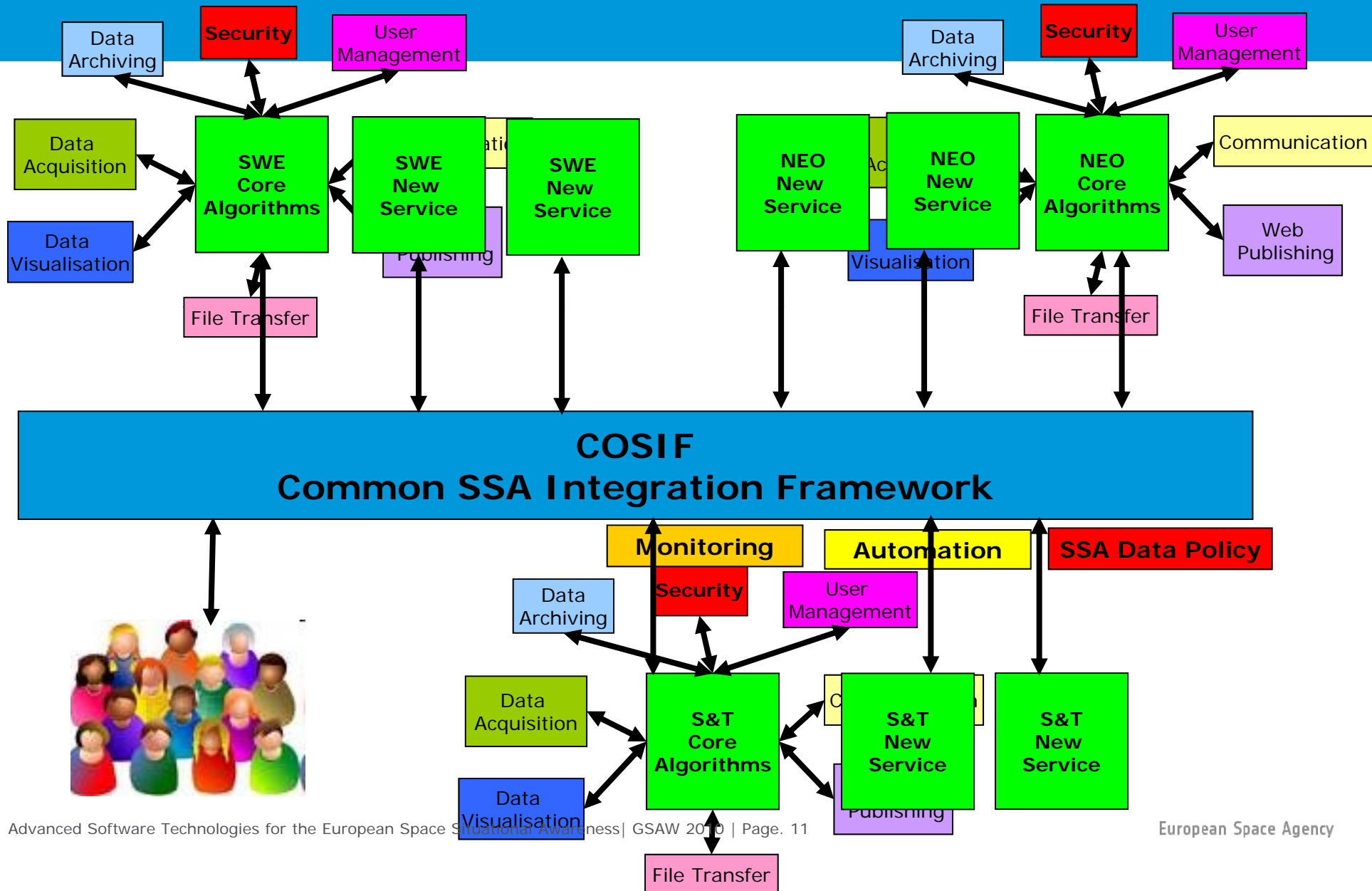
Moving towards a Service Oriented Architecture



COSIF Common SSA Integration Framework

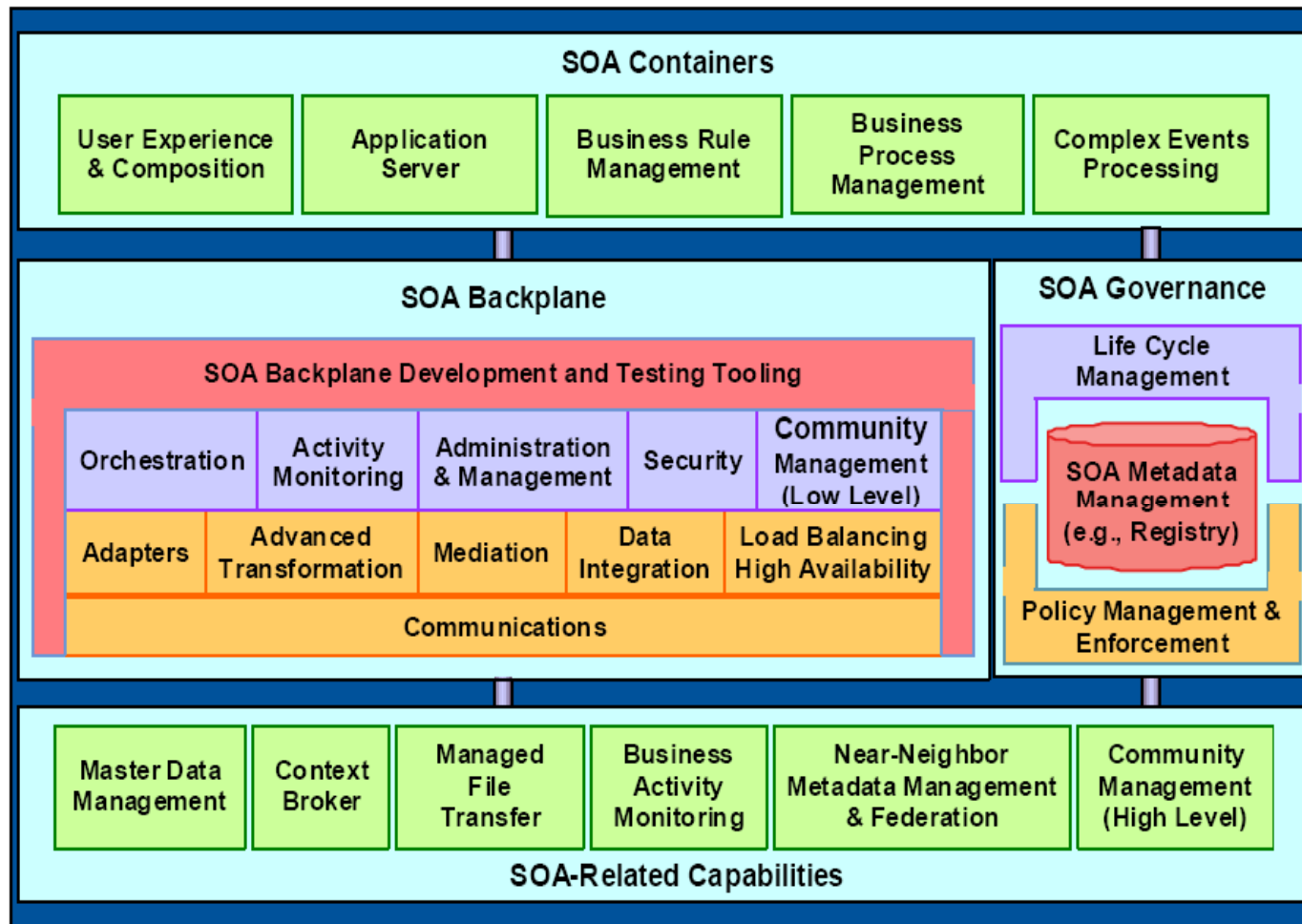


Moving towards a Service Oriented Architecture



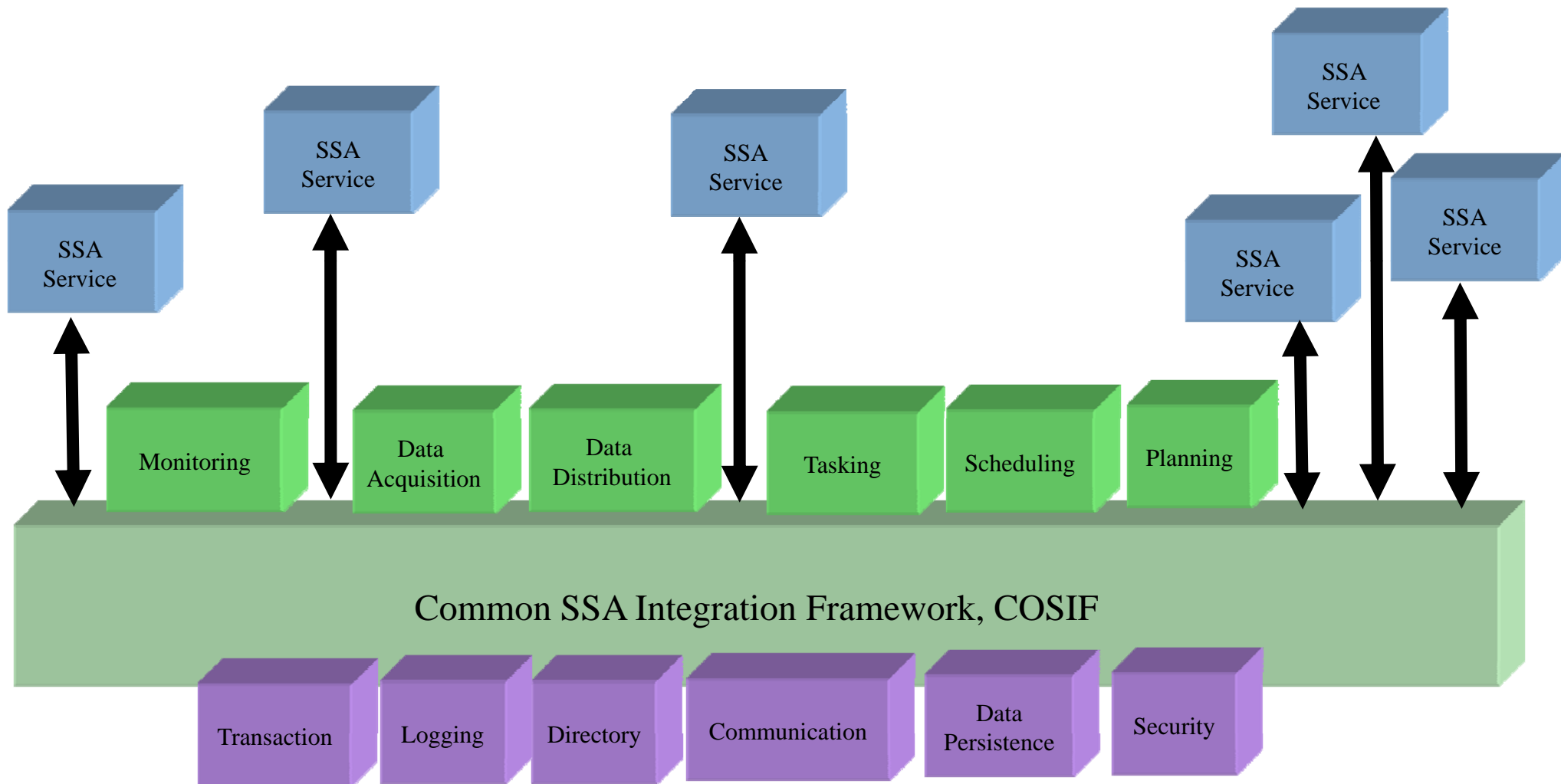
- Selection and deployment of the COSIF based on a **commercial or open-source SOA framework**
- Development and Deployment of the common enabling services
- Provision of interface requirements for service integration
- Provision of software development guidelines for new SSA services
- Integration of the SSA domain specific services on the COSIF

Reference Service Oriented Architecture for SSA



Source: Gartner Inc.

Common SSA Enabling Services based on the selected SOA Suite



- Service Implementation based on **Web-Services** Technology
- Business logic implementation based on **J2EE** technology
- Service provision to the users via **thin web clients**, i.e. JavaFX, JSF, AJAX
- Service Orchestration based on Service Component Architecture, **SCA**
- Utilisation of Business Process Management, **BPM** technologies
- Utilisation of Business Rule Management technologies
- Utilisation of Complex Event Processing, **CEP**, technologies
- Potential adoption of the **CCSDS MO** concept, based on the selected SOA suite

Where do we stand today: Technology Assessment and Framework Selection Phase



- Extensive Evaluation of five SOA suits

- **Three Commercial SOA Suits**

- IBM WebSphere
 - Oracle WebLogic
 - SoftwareAG WebMethods



- **Two Open Source SOA Suits**

- RedHat JBOSS
 - SOPERA ASF



- **Evaluation based on four Proof of Concept, PoC, Services**

- Two PoCs based on integration of legacy applications
 - One PoC as a new Space Weather Monitoring service
 - One PoC for adoption of the CCSDS MO concept on COSIF

Questions?

For any question please contact the authors.

THANK YOU

ESA/ESOC

M. Sarkarati, M. Spada, G. Di Girolamo, S. Moulin, D. Fischer

firstname.lastname@esa.int