"The objective of the Space Situational Awareness (SSA) programme is to support the European independent utilisation of, and access to, space for research or services, through the provision of timely and quality data, information, services and knowledge regarding the space environment, the threats and the sustainable exploitation of the outer space surrounding our planet Earth."

- ESA Ministerial Council
  November 2008
BACKGROUND
AIMS OF THE SSA PROGRAMME

- Independent utilisation of Space
  - Space assets are critical assets
- Guarantee access to Space
  - Diplomatic,
  - Political
  - Regulatory
  - Technical
- Serve EU “Lisbon Objectives”
  - New Applications
  - New Jobs
  - New Markets
BACKGROUND

CUSTOMERS FOR SSA SERVICES

- European Governments
  - EU
  - National
  - Regional
- European Space Agencies
  - ESA
  - National
- Spacecraft Operators
  - Commercial
  - Academic
  - Governmental
- Space Insurance
- Space Industry
- Energy
  - Surveying
  - Electrical Grid
  - Power Supply
- Network Operations
- Telecommunications
- Air Traffic Control
- Search and Rescue Entities
- United Nations
- Defence
- Civil Protection
2009 – 2012

• **Preparatory Programme**
  - Governance Definition
  - Data Policy
  - Architecture
  - Federation
  - Precursor Services
  - Radar Breadboard
  - Pilot Data Centres

2013 – 2019

• **Operational Programme**
  - Implementation of operational system
INTRODUCTION

SSA Programme Structure

1. Core Element
   SSA Architecture
   Governance
   Data Policy
   Security
   Space Surveillance and Tracking Segment

2. Space Weather Element
   (including NEO activities)

3. Radar Element
   Prototype Development

4. Pilot Data Element
   Transversal support for all segments
BACKGROUND
SSA Participating States

- Austria
- Belgium
- Finland
- France
- Germany
- Greece
- Italy
- Luxembourg
- Norway
- Portugal
- Spain
- Switzerland
- United Kingdom
SPACE SURVEILLANCE AND TRACKING
CURRENT STATUS
PRECURSOR SERVICES

• First wave of services have been deployed
  – Re-use of legacy software
  – Enhancement for web-based interaction

• SSTC (Space Surveillance and Tracking Centre) installed
  – Test and Validation of systems and services
CURRENT STATUS
SENSOR CHARACTERISATION

- Mandate to federate existing resources
  - Drives requirement to validate sensors
  - Investigate
    - Performance (time/accuracy)
    - Scheduling
    - Interoperability
  - 2 radar campaigns
    - 5 radar used
    - 11 satellites tracked
  - 3 optical campaigns
    - 7 telescopes
    - 10 satellites tracked
FUTURE DEVELOPMENTS

PRECURSOR SERVICES

• Development of future service baseline for application development (DC-II)
  – Modern software architecture
  – Modular design
• Next-generation service concept
  – Automated chain processing (tasking > observation > catalogue)
  – Enhanced conjunction prediction (CO-VIII)
    • All-on-all calculation
    • LEO / MEO / GEO regimes
  – Re-entry prediction and warning (CO-VIII)
• Focus on surveillance data (as opposed to tracking data)
• Provide test and validation data for SST data chain (DC-II)
  – Track Correlation
  – Long-term reacquisition of objects
  – Representative European catalogue (using current assets)
• Improve tasking and provider coordination
• Identify future requirements for a full SSA system
FUTURE DEVELOPMENTS
FULL SYSTEM

• Developing future system architecture
  Mission Requirements Document

  Customer Requirements Document
  • What is needed by clients?
  • How should this be delivered?
  • Who receives the data

  System Requirements
  Architectural Design
THANK YOU