Space Situational Awareness (SSA) - Whose responsibility?

FMV Sensor Symposium 2014

Christer Andersson
Swedish Defence Research Agency (FOI)
SSA - Swedish Armed Forces (SwAF)

- Utilize opportunities
  - Control of space domain
  - Information superiority
- Counter threats
  - Space infrastructure
  - Intelligence collection
- A foundation for all space operations

Overflight analysis of Vidsel test facility
SSA – A definition

"A tool to maintain peaceful, secure and sustainable global space activities"

Swedish nomenclature: ‘Rymdlägesbild’
The unique space domain

- Space not only an extension of the air domain:
  - No territorial borders/jurisdiction
  - No “code of conduct” for space operations
  - Mixed MIL/CIV activities
  - Weak legal foundation (OST)
  - Space orbits a “common good”

Image: ESA
SSA – The space vulnerability gap

- Large dependence
  - We are all dependent
  - Weather, Navigation, …
  - Military operations, …
  - Global communication

- Space assets at risk
  - Increasingly contested
  - Persistent debris increase
  - Fragile environment
  - Satellite proliferation

- Vulnerability Gap
  - Need to act proactively
  - Rules and regulations
  - Space Situational Awareness
  - Global cooperation
SSA – Broad context

Space and Security

Security for Space
- Independent Access
- Security of Space Infrastructure
- Security of Ground Segment
  - Security of Cyberspace

Space for Security
- Communication
- Navigation
- Earth Observation

- SSA
- Trieties and Code of Conduct

SSA
SSA – Four capabilities

- Near Earth Object (NEO)
- Space Weather (SWE)
- Space Surveillance and Tracking (SST)
- Recognized Space Picture (RSP)

Images: ESA
SSA - Main purpose

• Dual-Use
  • Support the use and accessibility of space
  • Promote safe use of space assets
  • Support of defense policy goals
  • Support risk and liability management
  • Support confidence building measures
  • Verify international agreements and rules

Image: US Navy
Air Traffic Control (ATC)
SSA - Support of defense policy goals

- Protect space infrastructures
- Enable detection and identification of space objects
- Allow analysis of adversaries’ space capabilities
- Protect troops and our own operations
- Coordination of joint space & air combat plans

Image: ESA

NPT Satellite Galileo
SSA – A paradigm change

- On the political agenda
  - UN, US and EU/ESP
  - Ministry for Foreign Affairs
- Experience from operations
  - Targeting during OUP in Libya
- Studies and research
  - Space Study LUFT 11203S
  - Research & experiments of FOI
  - Participation ESA SSA Program

Estimated uncertainty in satellite and debris position

Image: FOI
SSA – A Swedish road map (LUFT 11203S)

- **Build national capacity**
  - Dual-use, joint, initial
  - Partner exchange of data

- **Cooperation**
  - ESA, EUSC, GSSAC, US AFRL

- **Research & studies**
  - Outline a Swedish SSA architecture
  - Develop an initial SSA ‘ToolBox’
  - Establish own sources

Image: FOI

First measurement of Swedish satellite orbits by the EISCAT radar facility
SSA – Whose responsibility?

- Sweden is a space nation
  - We operate and pollute space
  - SSA is a national responsibility
- SwAF use space services
  - We need to protect our common EU space infrastructure
  - SSA is a duty of SwAF
- Space is a “common good”
  - A peaceful and sustainable space is all our responsibility

Image: ESA

The SSA vision as predicted by ESA
Questions and Contact!

- christer.andersson@foi.se
- @LChAnTw