



THE SSA CHALLENGES FOR INDIA WORKSHOP 14 – 15 JUNE 2018

**GLOBAL SSA CAPABILITIES AND DATA SHARING – STATUS AND
TRENDS**

A EUROPEAN PERSPECTIVE

SCOPE

- **History of UK SSA Contribution**
- **UK Capabilities**
 - Military
 - Civil
 - Future
- **Collaboration**
 - Military
 - Civil
- **Commercial**
 - SDA
 - Other
- **Conclusion**



RAF FYLINGDALES

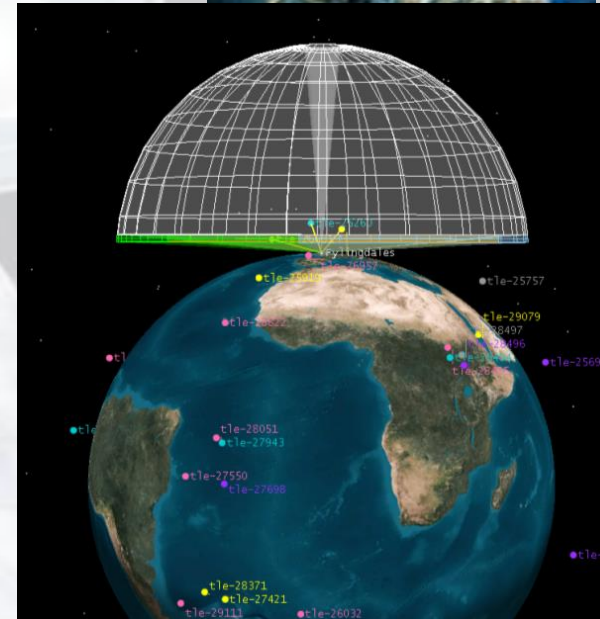


Ballistic Missile Early Warning System (BMEWS)

1960 - Site I - Thule AB, Greenland

1961 - Site II - Clear AFS, Alaska

1963 - Site III - RAF Fylingdales



- 1990-92 Upgrade to SSPAR
- 2007-11 Upgraded Early Warning Radar



UK SPACE OPS CENTRE (UK SPOC)

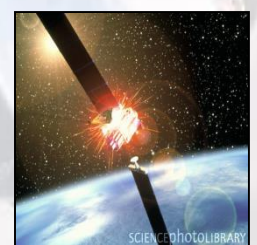
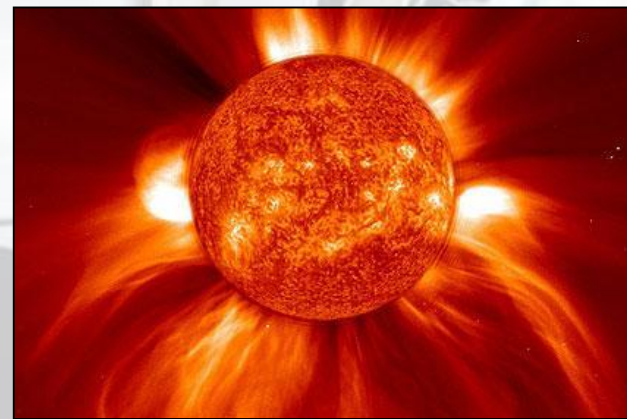
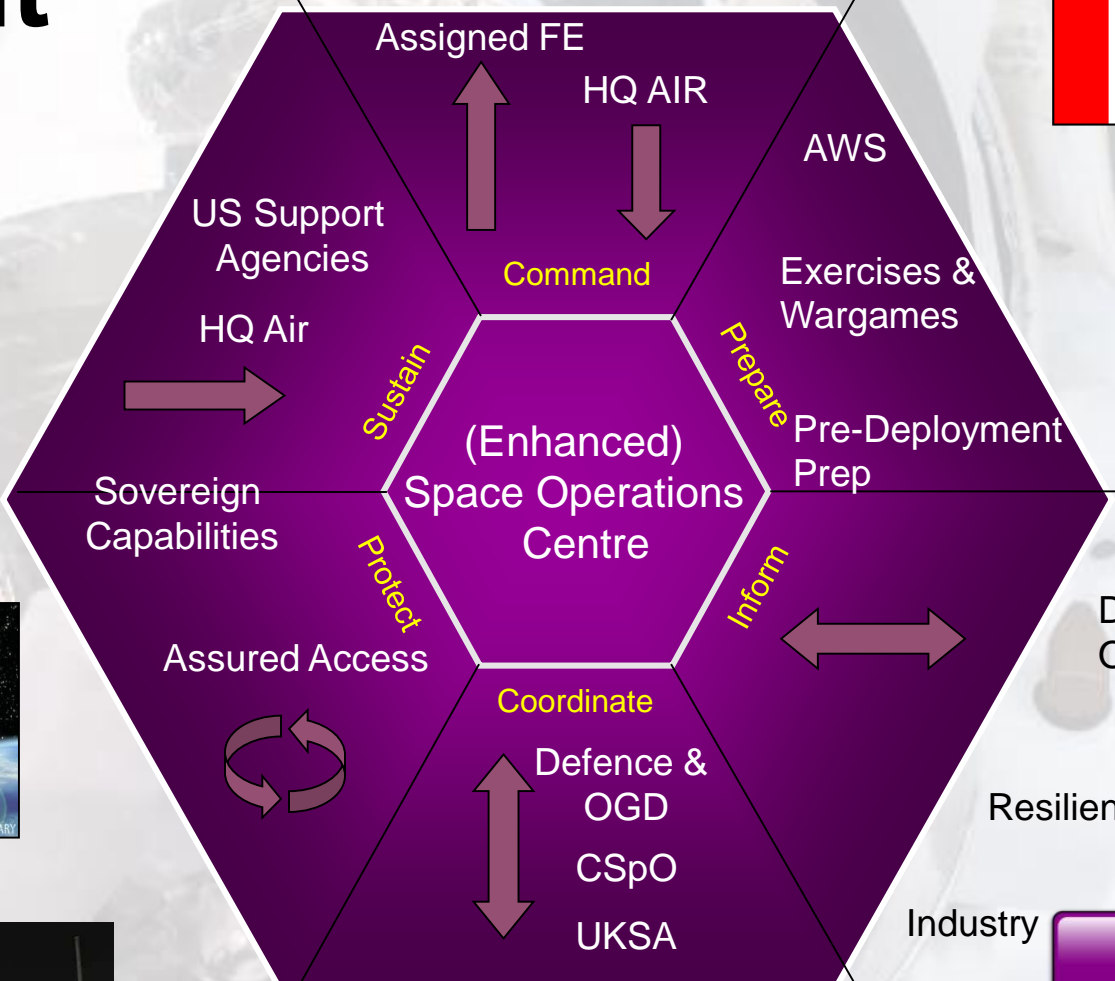


To deliver AIR's space control and space force enhancement support capability to **UNDERSTAND** and **EXPLOIT** the space domain, to **PROTECT** our access to critical space capabilities, **DEFEND** our national interests and integrate space control into UK military operations.

UK Civil and Commercial Capabilities

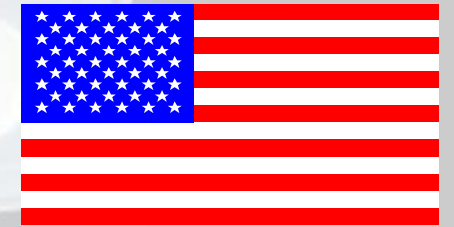


UK Future Development



Combined Space Operations Initiative

- Initial focus of SSA
- NSS 2010 & NSSP 2014
- UK SpOC & Fylingdales
- Initially '5EYES' Community
- Military
- Extending to include France and Germany
- Potential to grow to include others!



EU Space Surveillance & Tracking Framework

- **Decision of the European Parliament and EU Council 16 April 2014 establishing a Framework for SST Support**
- **Ensuring the long-term availability of European and national space infrastructure (article 3)**
- **With the aim to (article 4): Establish a SST capability...with an appropriate level of autonomy » :**
 - (a) The establishment and operation of a sensor function consisting of a network of Member State ground-based and/or space-based sensors, including national sensors developed through ESA, to survey and track space objects and to produce a database thereof;**
 - (b) The establishment and operation of a processing function to process and analyse the SST data at national level to produce SST information and services for transmission to the SST service provision function;**
 - (c) The setting up of a function to provide SST services as defined in Article 5(1) to the entities referred to in Article 5(2).**

European Union Capabilities

11 Radars

Mode	Name	MS
Surveillance	GRAVES	FR
	BIRALES	IT
	S3TSR*	ES
Tracking	TIRA	DE
	MSSR Santorcaz	ES
	CASTR	UK
	SATAM (3)	FR
	BIRALET	IT
	MFDR	IT

4 Laser stations

Mode	Name	MS
Tracking	SLR Graz	DE
	ROA SLR	ES
	MLRO	IT
	SGF (Herstmonceux)	UK

19 Telescopes

Mode	Name	MS
Surveillance	Centu 1	ES
	TFRM	ES
	TAROT network (3)**	FR
	Starbrook**	UK
	SPADE**	IT
	PdM-MiTe**	IT
Tracking	Tracker 1	ES
	TJO	ES
	IAC80	ES
	BOOTES network (3)	ES
	ANTSY	ES
	CAS	IT
	GEOF	UK
	COATS	UK
	Cassini / Loiano	IT

* Not in operation yet, start of operation planned for mid 2018

**Those surveillance telescopes are also used for tracking purposes

Sensor - Worldwide geographical distribution



European Space Agency

the basics
About Operations
The Right Stuff
#ESOC50
ESOC timeline - start

SSA Programme
About SSA
SSA Programme overview
SSA team
SSA brochure 2018
SSA flyer - quick facts

SSA activities
Space Weather - SWE Segment
Near-Earth Objects - NEO Segment
Space Surveillance and Tracking - SST Segment

ESA > Our Activities > Operations > Space Situational Awareness

Search here



Detecting space hazards

SSA PROGRAMME OVERVIEW

The Space Situational Awareness (SSA) Programme is being implemented as an optional ESA programme with financial participation by 19 Member States¹. It began in 2009, and the programme's mandate was most recently extended to 2020 at the 2016 ESA Ministerial Council. The current phase of the programme is funded at €95 million through to 2020.

Under the programme, Europe is acquiring the independent capability to watch for objects and natural phenomena that could harm satellites in orbit or infrastructure such as power grids on the ground. To achieve this, ESA's SSA programme is focusing on three main areas:

clean space



SA SPACE ENGINEERING & TECHNOLOGY CLEAN SPACE

Clean Space
The Challenge
Contact us

ESA > Our Activities > Space Engineering & Technology > Clean Space

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The Solutions
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Clean Space Blog

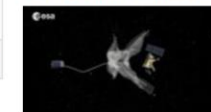


ESA presents... Clean Space



ESA presents... Clean Space

ESA's e.Deorbit mission



ESA's e.Deorbit mission

Commercial

- **Space Data Association (SDA)**
- **Other**
 - **ExoAnalytic Solutions**
 - **Leolabs**
 - **Analytical Graphics Inc**
 - **RT Logic**



Conclusion

Collaboration is Key

- **Congested**
- **Contested**
- **Competitive**
- **Complement**
- **Cooperate**
- **Collaborate**