EU Space Surveillance &Tracking Support Framework

A Consortium of Member States Safeguarding European Space Infrastructure & Orbital Environment

Regina Peldszus, Co-Chair

On behalf of Pascal Faucher, Chair

12th ESPI Autumn Conference “Security in Outer Space: Rising Stakes for Civilian Space Programmes”

Session 1 - State of Play in Space Security Strategies: Space Assets in an Evolving Environment

Consortium Governance
Decision 541/2014/EU for a Support Framework

Decision of the European Parliament and of the Council of 16 April 2014 establishing a Framework for Space Surveillance and Tracking Support

« Ensuring the long-term availability of European and national space infrastructure, facilities and services which are essential for the safety and security of the economies, societies and citizens in Europe » (article 3)

With the aim to (article 4):

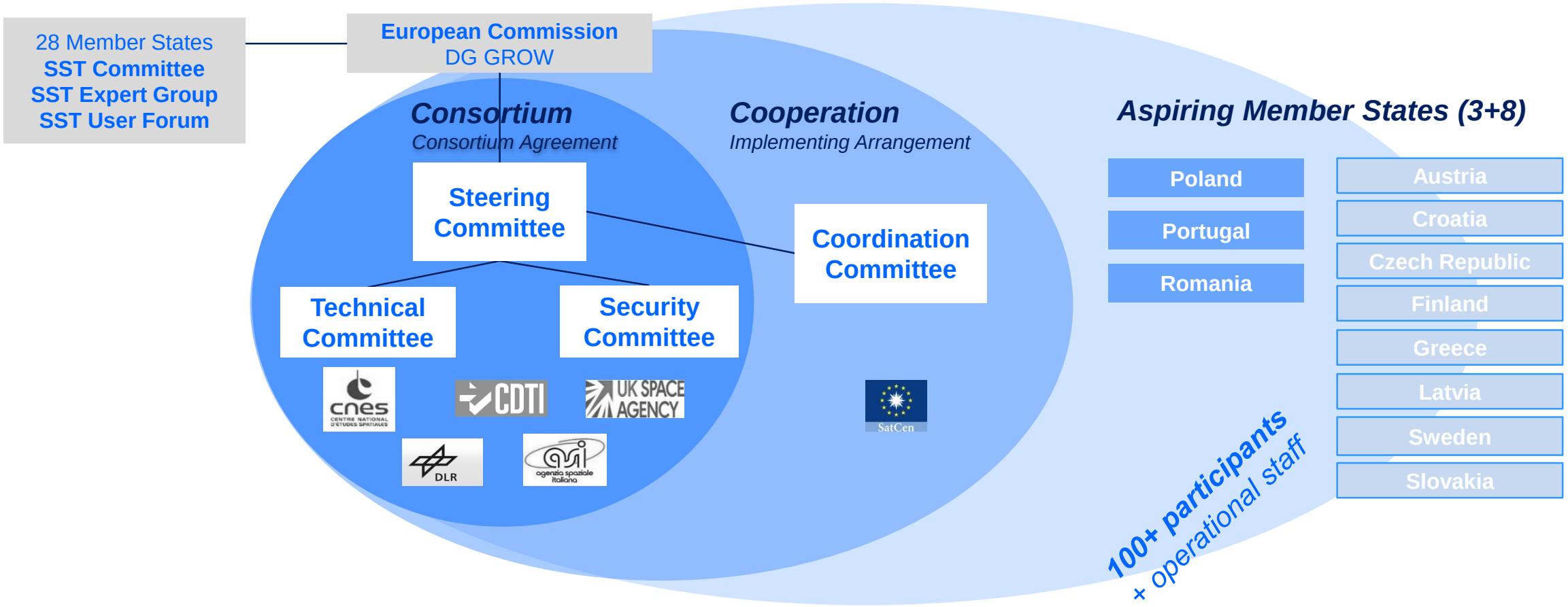
« Establish a SST capability at European level and with an **appropriate level of autonomy** » :

(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;

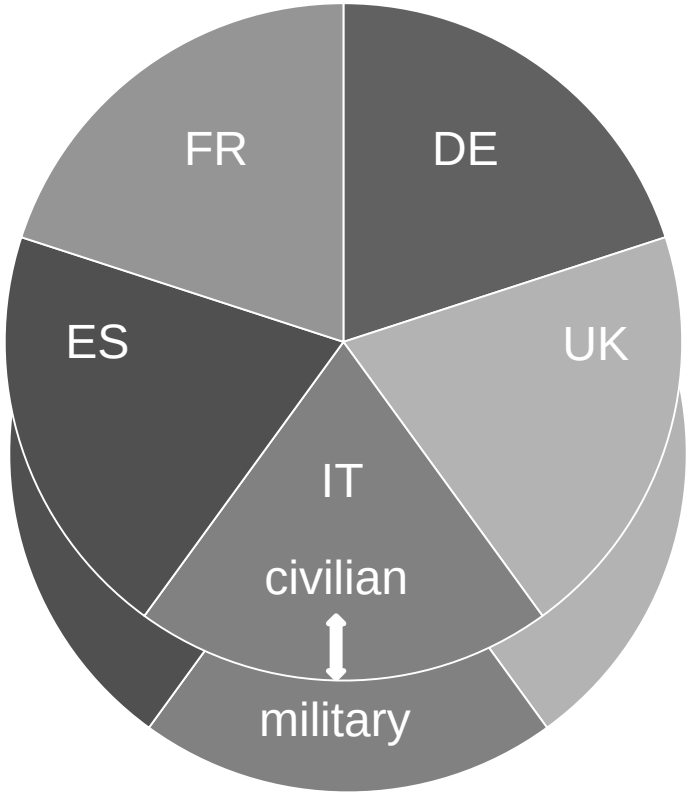
(b) The establishment and operation of a **processing function** to process and analyse the SST data at national level to produce SST information and services for transmission to the SST service provision function;

(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).

Consortium Governance
Preparation of the next Consortium Agreement



Consortium Governance
Dual Dimension



- Particularity of governance to answer specificities of the space sector:
  - ✓ **Dual nature of systems**, services and actors: military legacy, civilian orientation
  - ✓ **National security** dimension: collaboration at national level between civilian, military and security actors
  - ✓ **National control, operation and ownership** retained over SST sensors
- Delegates and experts from MoDs and Space Agencies

Sensors
Sensors in operation

11 Radars

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

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


GRAVES


BIRALES


S3TSR


TIRA


MSSR


CASTR


SATAM network

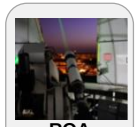

BIRALET


MFDR

4 Laser stations

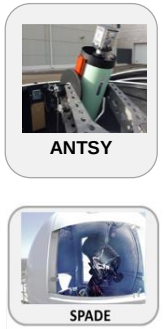
Mode	Name	MS
Tracking	SLR Graz ROA SLR MLRO SGF (Herstmonceux)	DE ES IT UK


SLR Graz

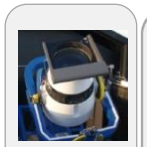

ROA LASER

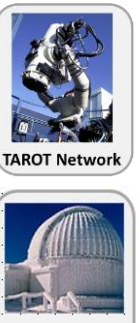

MLRO


SGF


ANTSY


CENTU1 & TRACKER


TFRM


TAROT Network


Starbrook


SPADE


MITE


TJO

IAC-80


BOOTES Network


CAS


GEOF


COATS


Cassini/ Loiano

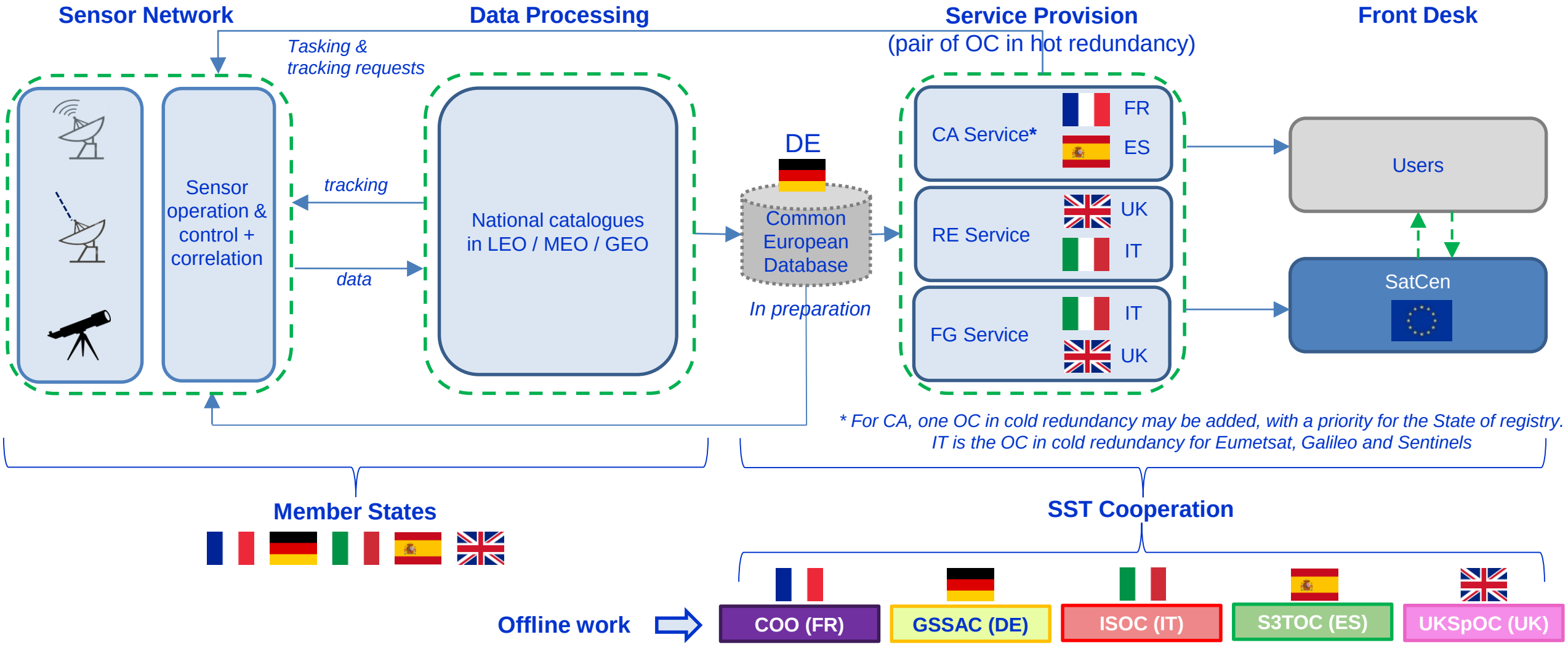
19 Telescopes

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

***Those surveillance telescopes are also used for tracking purposes*

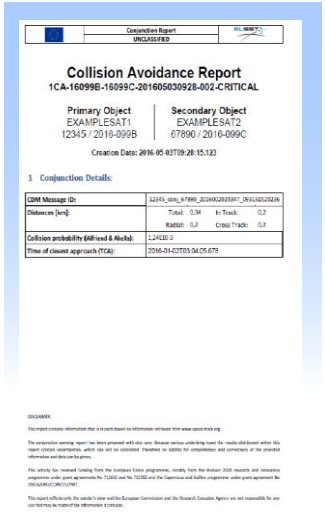
Service Provision

Service Provision Model Until E/O 2018



Service Provision
Increasing Number of Users

Collision Avoidance (CA)


Conjunction Report
UNCLASSIFIED

Collision Avoidance Report
1CA-16099B-16099C-201605030928-002-CRITICAL

Primary Object	Secondary Object
EXAMPLESAT1	EXAMPLESAT2
12345 / 2016-099B	67890 / 2016-099C

Creation Date: 2016-05-03T09:28:15.123

1 Conjunction Details:

CDM Message ID:	12345_sim_67890_20160502025417_26151525226
Distances [km]:	Total: 0,34 In Track: 0,3 Radial: 0,2 Cross Track: 0,3
Collision probability (Alfriend & Akella):	1,24130 -3
Time of closest approach (TCA):	2016-01-02T03:04:05.678

DISCLAIMER:

This report contains information that is in parts based on information retrieved from www.space-track.org

The conjunction warning report has been prepared with due care. Because various underlying input the results distributed within this report contain uncertainties, which can not be controlled. Therefore no liability for completeness and correctness of the provided information and data can be given.

This activity has received funding from the European Union programmes, notably from the Horizon 2020 research and innovation programme under grant agreements No 713630 and No 713762 and the Copernicus and Galileo programme under grant agreement No 2016/GMOC/CSM/15/7987.

This report reflects only the sender's view and the European Commission and the Research Executive Agency are not responsible for any use that may be made of the information it contains.

Re-entry (RE)


Re-entry Analysis Report
UNCLASSIFIED

Re-entry Analysis Report
1RE-97067A-EU-1

EXAMPLESAT
NORAD ID: 12345
Int.Designator: 2016-099C

Creation Date: 2016-05-03T09:28:15

Overview:

This report presents the results of the EXAMPLESAT re-entry analysis in accordance with the latest available information:

Epoch of the re-entry:	2016-01-01T01:25:03
Uncertainty of epoch:	±0h15m
Nominal re-entry point:	Lat. 50.54°N Lon. 54.34°E

Table 1: Re-entry information

Apogee:	215 km
Perigee:	185 km
Inclination:	53°

Table 2: Object information

	Epoch	Longitude [deg]	Latitude [deg]
Entry:	2016-01-01T01:02:03	-6.411085	36.877597
Exit:	2016-01-01T01:20:03	23.851466	50.851466

Table 3: Area of interest information

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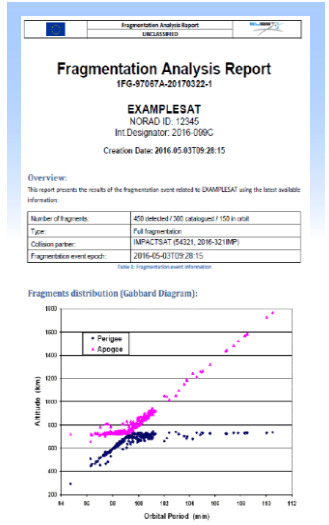
Fragmentation (FG)


Fragmentation Analysis Report
UNCLASSIFIED

Fragmentation Analysis Report
1FG-97067A-20170322-1

EXAMPLESAT
NORAD ID: 12345
Int.Designator: 2016-099C

Creation Date: 2016-05-03T09:28:15

Overview:

This report presents the results of the fragmentation event related to EXAMPLESAT using the latest available information:

Number of fragments:	450 detected / 300 catalogued / 150 in orbit
Type:	Full fragmentation
Collision partner:	IMPACTSAT (54321, 2016-321IMP)
Fragmentation event epoch:	2016-05-03T09:28:15

Table 1: Fragmentation event information

Fragments distribution (Gabbard Diagram):

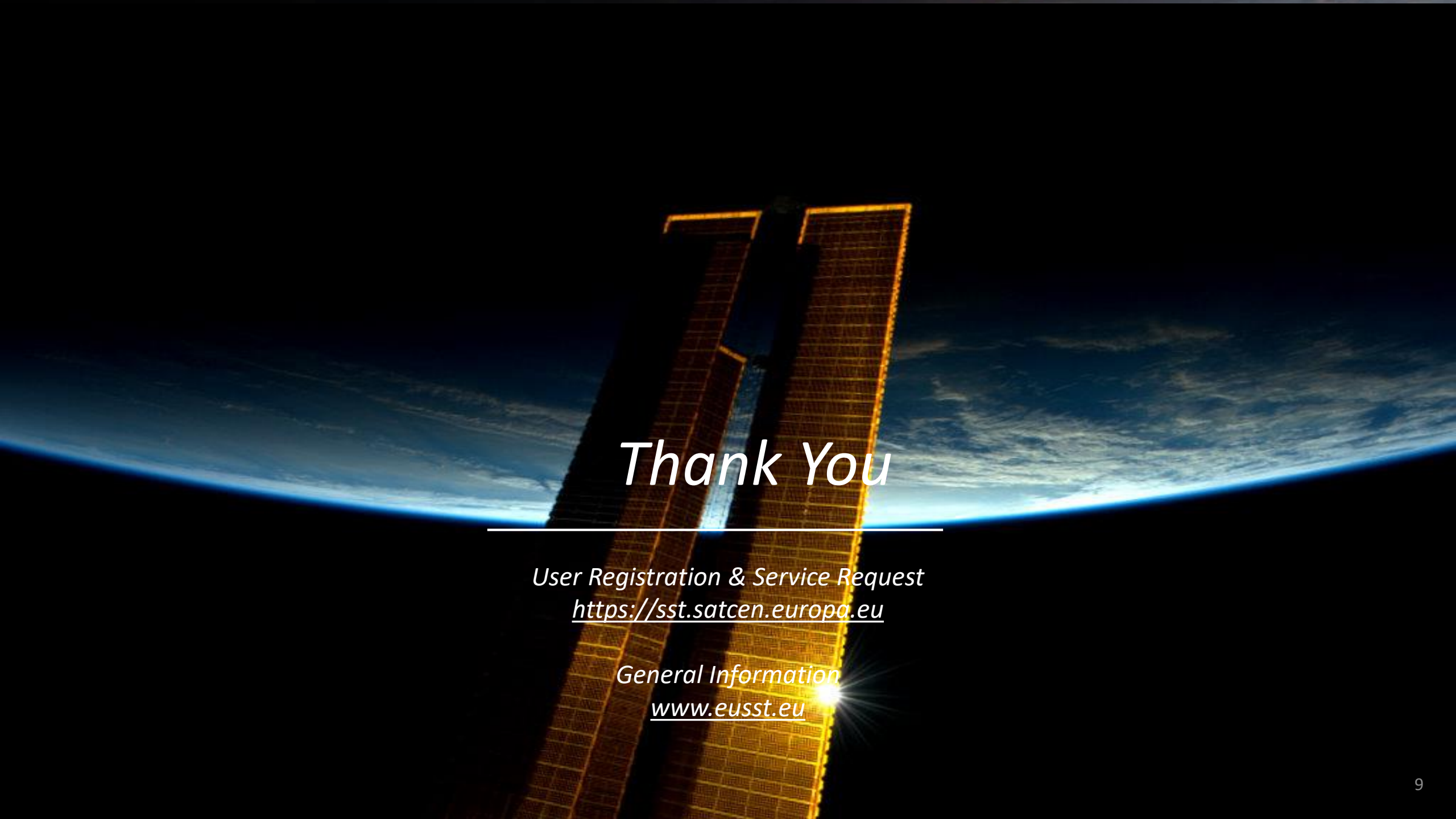
- **80 user accounts**
  - CA: 40 (14 S/C Owners/Operators)
  - FG: 42
  - RE: 53
- **15 EU MS**

  AT BE BG CZ ES FR DE GR HR IT NL PL RO SK UK
- **43 Organisations**

  S/C Operators, Space Agencies, MSs, Industry, NOCs, COM, EEAS, Civil Protection, Air Traffic Management agencies, research facilities

Service provision to Users
CA service: 117 registered spacecraft (14 O/O)

LEO: 34 S/C		MEO: 30 S/C		GEO: 53 S/C		
BIROS	SAR-LUPE 3	GSAT0101	GSAT0219	SICRAL 1	INMARSAT 3F1	EUTE 28B
CALIPSO	SAR-LUPE 4	GSAT0102	GSAT0220	SICRAL 1B	INMARSAT 3F2	EUTE 36A
ELISA E12	SAR-LUPE 5	GSAT0103	GSAT0221	SICRAL 2	INMARSAT 3F3	EUTE 36B
ELISA E24	SMOS	GSAT0104	GSAT0222	SPAINSAT	INMARSAT 3F5	EUTE 3B
ELISA W11	TET-1	GSAT0201	O3B FM15	XTAR-EUR	INMARSAT 4F1	EUTE 5WEST A
ELISA W23	METOP-A	GSAT0202	O3B FM16	COMSATBW-1	INMARSAT 4F2	EUTE 65W
HELIOS 2A	METOP-B	GSAT0203	O3B FM14	COMSATBW-2	INMARSAT 4F3	EUTE 7WEST A
HELIOS 2B	SENTINEL 1A	GSAT0204	O3B FM13	METEOSAT-10	INMARSAT AF1	EUTE 70B
JASON2	SENTINEL 1B	GSAT0205		METEOSAT-11	INMARSAT 5F1	EUTE 7A
JASON3	SENTINEL 2A	GSAT0206		METEOSAT-8	INMARSAT 5F2	EUTE 7B
MICROSCOPE	SENTINEL 3A	GSAT0208		METEOSAT-9	INMARSAT 5F3	EUTE 8WEST B
PLEIADES 1A	TANDEM-X	GSAT0209			INMARSAT 5F4	EUTE 9A
PLEIADES 1B	TERRASAR-X	GSAT0210			SES-4	EUTE 9B
SAR-LUPE 1	SENTINEL 2B	GSAT0211			SES-5	EUTE HOT BIRD 13B
SAR-LUPE 2	SENTINEL 5P	GSAT0207			EUTE 10A	EUTE HOT BIRD 13C
	VENµS	GSAT0212			EUTE 16A	EUTE HOT BIRD 13D
	PAZ	GSAT0213			EUTE 172A	EUTE KA SAT 9A
	BRITE PL-1	GSAT0214			EUTE 21B	EUTELSAT 12WEST B
	BRITE PL-2	GSAT0215			EUTE 25B	EUTELSAT 172B
		GSAT0216			EUTE 28A	HYLAS 1
		GSAT0217				HYLAS 2
		GSAT0218				HYLAS 4



Thank You

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