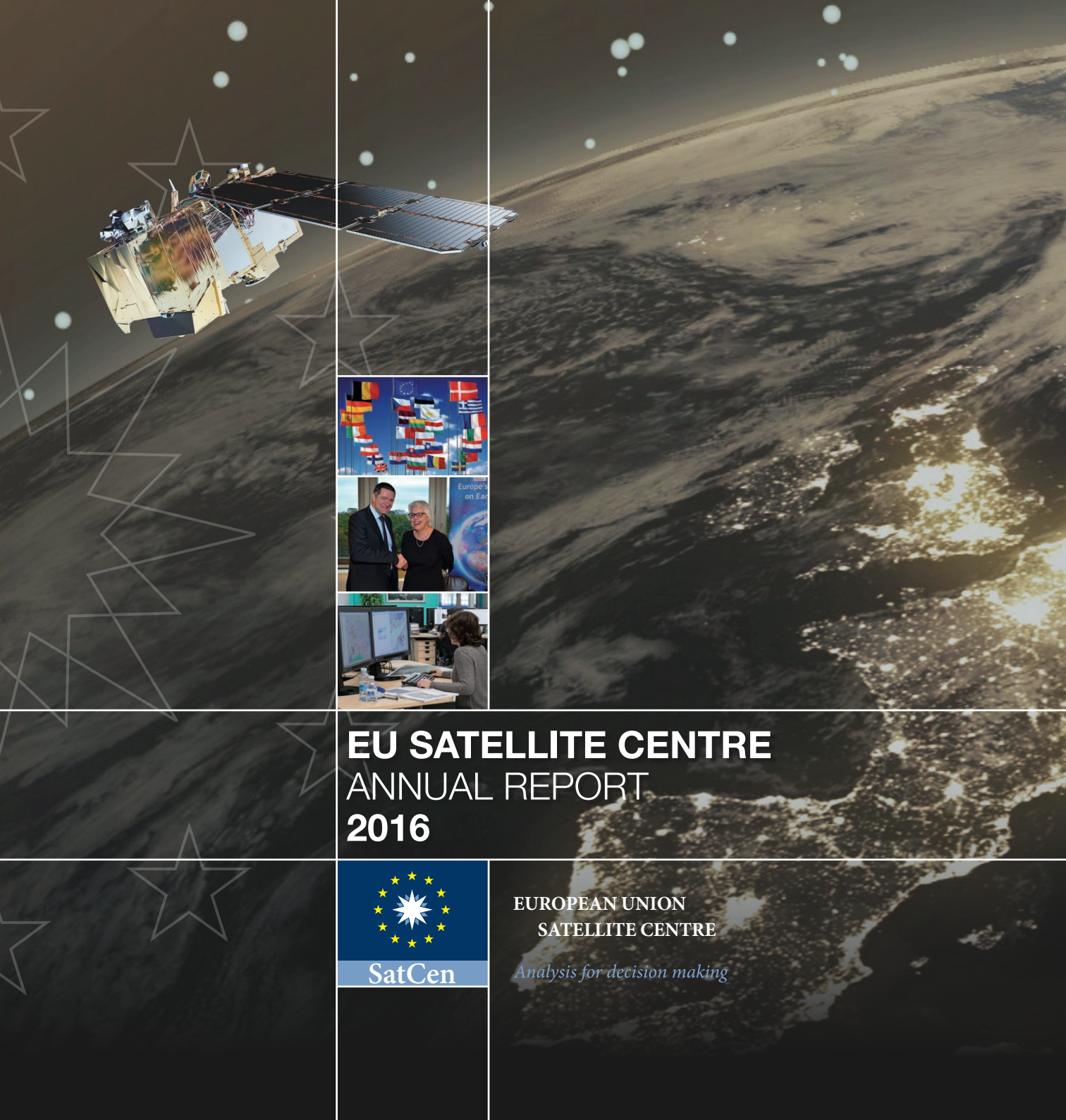

EU SATELLITE CENTRE
ANNUAL REPORT
2016

SatCen

EUROPEAN UNION
SATELLITE CENTRE

Analysis for decision making

EU SatCen
Annual Report 2016

EUROPEAN UNION
SATELLITE CENTRE

Analysis for decision making

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""I am confident that, through our cooperation, EDA and SatCen can bring a significant added value to their respective Member States by reducing the administrative burden, facilitating common action where possible, supporting better planning, as well as contributing to the best use of our respective resources"

(Jorge Domecq, EDA Chief Executive, during the exchange of letters between the EDA and SatCen, 18 July 2016)

Photos: (top row) Signature of Delegation Agreement on Copernicus Service in Support to EU External Action on 06 October 2016; Exchange of letters with the European Defence Agency on 18 July 2016; (bottom right) Signature of Administrative Arrangement with the EU Institute for Security Studies on 16 November 2016; (background) EU SatCen and staff

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Foreword by the Director

During the course of 2016, the EU Satellite Centre was intensively called upon to contribute to facing the crises in Eastern Europe, Middle East, Africa and South China Sea along with major threats, including terrorism, migration, piracy, organised crime and proliferation of weapons of mass destruction.

Pascal Legai
Director

In particular, SatCen was strongly involved in supporting Frontex and EU NAVFOR Med Operation SOPHIA for the border control and migration issues, alongside the requirements expressed by the HR, the EEAS – mainly SIAC -, the Member States and various other EU missions and operations in the CFSP field.

Under the political supervision of the PSC and the operational direction of the HR, the relevance of SatCen fundamentally lies in the quality, quantity and timeliness of its production and service delivery. The strong link to the CMPD, its tasking authority, and the Space Task Force is an essential factor for its work and evolution. In order to be at the cutting edge of performance, SatCen makes constant efforts in capability development, innovation, personnel skills, whilst nurturing contacts with stakeholders and end users in order to develop a perfect mutual understanding and win-win partnership. In pursuing its line of action to improve and set up new services and products in order to meet customer needs, SatCen has sought cooperation with various EU institutional actors and agencies, and with Member States to obtain operational access to the second generation of governmental systems. Non-EU partners such as the ESA, the US, Norway and Switzerland have also been part of this approach. These efforts permit SatCen to optimise existing resources as well as cost savings.

This cooperation aims at creating synergies while avoiding duplications. The year 2016 was particularly successful in this regard, as agreements have been signed with the two other CSDP agencies, EDA and EUISS. Further to this, yet of equally high importance, in the frame of the Copernicus programme, the Centre signed,

along with Commission DG GROW, the delegation agreement on the coordination of the service in support of EU External Action. Commencing in April 2017, this service will give SatCen's users access to new operational services.

2016 also saw the operational start of the Space Surveillance and Tracking (SST) support framework aimed in particular at providing better protection of European space assets. Here, SatCen will assume the role of Front Desk between National Operational Centres and users.

Finally, the first steps were taken towards the implementation of the Global Strategy for the EU's Foreign and Security Policy and the European Defence Action Plan.

As in previous years, SatCen production reached unprecedented levels (product output multiplied by a factor of three between 2011 and 2016). The major challenge now facing SatCen is to obtain the necessary human and budgetary resources and working space in order to at least sustain its current capabilities and this way efficiently contribute to the credibility of EU external action.

Sincerely,

Pascal Legai
Director

1. Fulfilling the mission

As a unique operational asset in the field of space and security, the EU SatCen serves a variety of institutional users ranging from the EU's high-level decision makers, such as the High Representative of the Union for Foreign Affairs and Security Policy and Vice President of the Commission (HR), the crisis management and situational awareness structures of the European External Action Service (EEAS), right down to the personnel on the ground involved in missions and operations. Within the EEAS, the main users of SatCen products are the Crisis Management and Planning Department (CMPD), the EU Military Staff (EUMS), the Intelligence and Situation Centre (IntCen) and the Civilian Planning and Conduct Capability (CPCC). Furthermore, Ministries of Foreign Affairs and Ministries of Defence of EU Member States, the European Commission, Third States and International Organizations such as the United Nations can also request the support of the Centre.

SatCen is a concrete example of pooling and sharing of know-how and services within a high profile, sensitive field. Each Member State, paying only a fraction of contributions to the SatCen budget, but receiving 100% of the output, directly benefits, both in terms of operational work, common information for joint decision making, financial optimisation and savings. Pooling of analysis capabilities and the sharing of the resulting services strengthens the case for further utilisation of the concept upon which the SatCen is built and for wider application of its working methods.

This specific role requires tailoring the Centre's Geospatial Intelligence (GEOINT) and Imagery Intelligence (IMINT) products and services to support and enable SatCen users in their specific undertakings ranging from diplomatic,

SatCen's Mission
(Art. 2 of the Council Decision)

1. SatCen shall support the decision making and actions of the Union in the field of the CFSP and in particular the CSDP, including European Union crisis management missions and operations, by providing, at the request of the Council or the HR, products and services resulting from the exploitation of relevant space assets and collateral data, including satellite and aerial imagery, and related services.

2. In the framework of SatCen's mission, the HR shall also, upon request and if the capacity of SatCen so allows and without prejudice to its core tasks set out in paragraph 1, direct SatCen to provide products or services to:

- a Member State, the European External Action Service (EEAS), the Commission, or Union agencies or bodies with which SatCen cooperates;
- third States having agreed to the provisions set out in the Annex on the association with SatCen's activities;
- if the request is relevant in the field of the CFSP, in particular of the CSDP, international organisations such as the United Nations, the Organisation for Security and Cooperation in Europe and the North Atlantic Treaty Organisation (NATO).

3. SatCen may also, in accordance with Article 18 and without prejudice to its core tasks set out in paragraph 1, cooperate with the Commission and with Union agencies, bodies or Member States, with a view to maximising synergies and complementarity with other Union activities that have a bearing on SatCen and where SatCen's activities are relevant to those Union activities, in particular in the area of space and security.

4. In order to facilitate the organisation of activities in Brussels, SatCen shall have a liaison office in Brussels.

IMINT versus GEOINT

IMINT (Imagery Intelligence)
describes the exploitation of information from satellite and aerial imagery. Analysis of this imagery by specialists turns the information into intelligence for further use.

GEOINT (Geospatial Intelligence)
embraces the comprehensive analysis of geospatial information to describe, assess and visually depict physical features and geographically referenced activities on Earth. GEOINT data sources include imagery and mapping data as well as collateral data, using all spatial skills and disciplines, including photogrammetry, cartography, imagery analysis, remote sensing and terrain analysis.

economic and humanitarian efforts, to mission planning or intervention through a permanent exchange to support their core business.

The Lisbon Treaty increased the operational engagement of European actors and made it more diverse. This is reflected in the demand for SatCen products and services, consequently, capability development has become a central tenet and guiding concern for the SatCen.

1.1. Operational chain

The Centre operates under the political supervision of the Political and Security Committee (PSC) and the operational direction of the High Representative.

SatCen's primary sources of satellite data are commercial providers. It also benefits from agreements with Member States allowing access and exploitation of high quality governmental satellite imagery. Collateral data, i.e. essential additional information underpinning and complementing the imagery analysis, are acquired from open sources and users.

Reactivity and consolidated products are the main pillars to ensure the efficiency of the operational chain. Thus, the generic tasking – allowing a direct contact between the SatCen and the end-user in a defined framework – and anticipation measures (e.g. a real partnership with data providers) contribute to the necessary reactivity.

EU SatCen products, handled at various levels of confidentiality, are delivered both to central operational entities (e.g. EU Military Staff and IntCen) and to the

Operations Headquarters (OHQs). Every single product is systematically distributed to all Member States, facilitating cooperative decision-making in the field of Common Foreign and Security Policy (CFSP), including Common Security and Defence Policy (CSDP).

1.2. Users' need as a driving factor

SatCen executes its mission in close cooperation with the crisis management structures of the European External Action Service under the operational direction of the HR. The strengthening of the links with these bodies to collect operational needs as well as to support and refine the tasking continued to be a primary concern in 2016. This implied nurturing user awareness through exchanges of expertise and the collection of requirements.

Member States and other concerned entities were engaged through Board Meetings, Technical Working Groups (TWG), Expert Users Fora (EUF), the Governmental Imagery Forum, the SatCen Software Days, bilateral meetings and other events.

The increasing number of tasks from the Organisation for Security and Cooperation in Europe (OSCE) enhanced the regular contact with this organisation in order to tailor the services provided to the exact needs of the end user.

2. Sustaining and developing a unique CFSP instrument

In 2016, thanks to the continuous review of internal procedures, processes, methods and mechanisms at SatCen, the growing availability of data and services on the market and the increase of work carried out for OSCE, SatCen was able to increase its output by nearly 40%.

The SatCen guiding principle and vision:

> *Grounded in the needs of its customers and pursuing cooperation with EU, national and other partners, the EU SatCen aims at being a comprehensive reference provider of state-of-the-art space-related security services, in support to CFSP.*

SatCen strategy is predicated on being at the forefront of the transition currently ongoing in Geospatial Intelligence (GEOINT). The Spectral and temporal resolution of commercially available imagery and other location-based data continues to develop as costs decrease. At the same time, GEOINT, which has, up until now, been transactional - meaning request, analysis, packaging and delivery - is shifting towards a new model where analysis is performed in near real-time as the data is acquired and distribution is streamlined straight into users hands through ready to use portals, apps and other channels. Analytical tools will continue to replace and even commoditise geospatial analysis and visualisation.

Solutions in which value is co-created and co-owned by all actors are within sight. The availability and volume of data is rising exponentially. For this reason, Big Data exploitation solutions are required in order to effectively manage the volumes of data received, this will aid the supply of better, faster, higher-quality and cheaper access to actionable information.

GEOINT teams will interact with stakeholders to find answers to their problems. Furthermore, this shift to a greater reliance on automation will free analysts to be able to focus on more complex analytical problems.

Tomorrow's GEOINT professionals will need to be more than just specialised employees – they will also need to be specialised learners. Further, integration and collaboration with other disciplines will be necessary to address complex problems. The challenge will consist in being capable of anticipating the problems of the future by equipping the Centre with analysts who are competent, professional, and capable of rapid adaptation.

These issues drive the Centre to cultivate an effective user community, whilst striving to integrate its products into the intelligence cycle, from the early phases of analysis and planning, especially with regard to EU crisis management missions and operations.

In order to achieve these objectives, engaging across the entire spectrum of stakeholders, from providers to political decision makers, is a capital priority.

3. Core business: geospatial and imagery intelligence

The year 2016 followed the previous years' trend of an increasing involvement of the EU CFSP on the international stage. SatCen continued to anticipate and respond to user demands in a rapidly changing political and operational scenario, tailoring its products and services to support and enable its users in their specific undertakings.

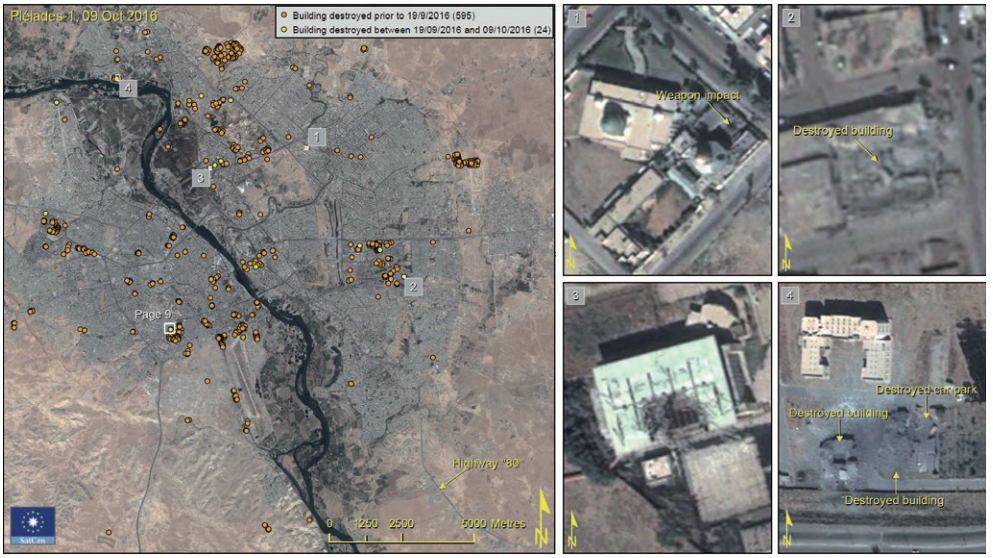
3.1. Highlights in 2016

In 2016, SatCen delivered a total of 1846 products. This was due to an overall increase in tasks from Member States, the OSCE, Frontex and EU Missions and Operations. SatCen's main customers were the European External Action Service (especially the EU Military Staff, the EU Intelligence and Situation Centre and

the Civil Planning and Conduct Capability), the Organisation for Security and Cooperation in Europe, EU Member States, Frontex, EU NAVFOR - Mediterranean Operation Sophia and the EU Monitoring Mission in Georgia (EUMM Georgia).

Support to the EEAS

In 2016, the Centre continued to support EEAS with the provision of on-demand GEOINT products and a set of services in support of decision making and operational support during crises.



Example of damage assessment (© CNES (2016), Distribution AIRBUS DS)

Non-proliferation of Weapons of Mass Destruction

The SatCen continued monitoring possible proliferation of weapons of mass destruction and the development of nuclear technology in several countries. The Centre analysed suspected facilities in various countries where ballistic missiles as well as test and launch facilities are possibly being developed.

Further to this, the development of nuclear facilities was analysed by monitoring uranium mines, uranium conversion facilities, heavy water reactors, nuclear power plants and yellow cake production facilities.

Support to the Organisation for Security and Cooperation in Europe

SatCen products for OSCE included analysis of military activity and equipment to support the OSCE Special Monitoring Mission to Ukraine (SMM Ukraine) in the verification of the Minsk Agreement.

Support to Frontex

SatCen started its operational support to Frontex in March 2015 when a Service Level Agreement was signed to support the Agency in its efforts to monitor coast activity and external border activity related to the migration crisis. In 2016, the analysis of satellite imagery was used to identify routes, means of transport, patterns of the launch and landing operations and border-crossing activities.

Example of migration analysis
(© CNES (2016), Distribution AIRBUS DS)

Support to EU NAVFOR – Mediterranean Operation Sophia

SatCen support to this Operation consisted in surveillance and assessment of human smuggling and trafficking networks.

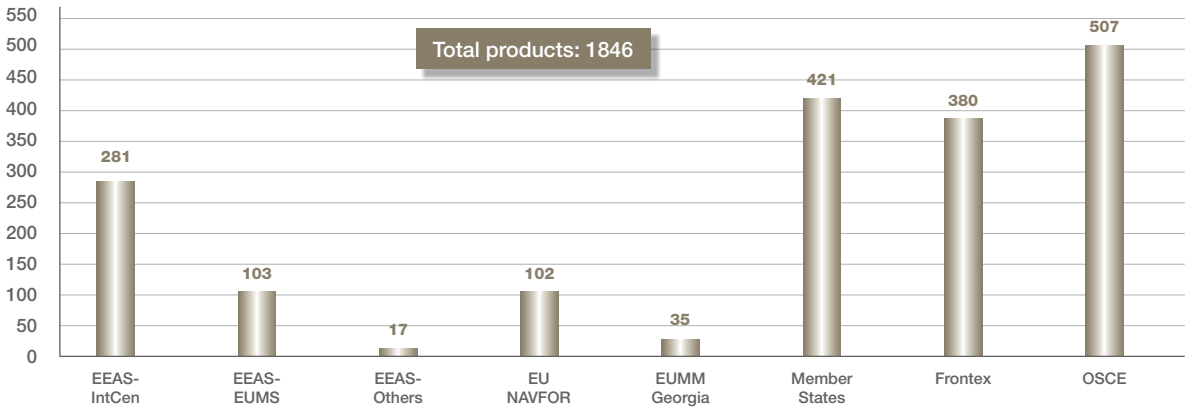
EUMM Georgia

SatCen support to EUMM Georgia continued with both ad-hoc requests and pre-existing monitoring tasks. The resulting products included analysis of imagery reporting on important infrastructure and activities in the region.

Distribution of products

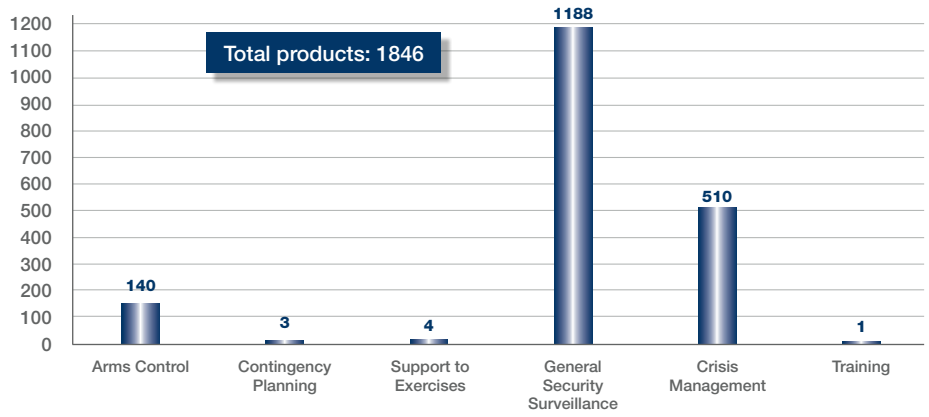
As shown in the following chart, in 2016, 1846 products were delivered, the main users being the EEAS, OSCE, Member States and Frontex.

Distribution of products by requester in 2016



The majority of products corresponded to general security surveillance tasks, followed by support to crisis management and arms control, as shown in the chart below.

Distribution of products by type in 2016



3.2. Training

In line with its strategy, SatCen continued to empower analysts with skills and knowledge, firstly for SatCen needs, then for Member States and institutions. Training also enables SatCen to exchange experience and knowledge, as well as to create cohesion in the very sensitive GEOINT domain with different stakeholders, developing a common culture and common methods. In-situ courses are also favoured when possible, resulting in savings for Member States because they do not have to send trainees to SatCen. Specific courses are also designed for non-specialists (decision makers, users) to better understand the possibilities and limitations of imagery.

In 2016, SatCen delivered in-house training courses and coordinated SatCen staff training from numerous external providers, including language training and software courses. In-house imagery analysis training included the delivery of IMINT and GEOINT introduction courses as well as SAR I and II, Nuclear I and II, and the Imagery Analysis of Strategic Industries course.

External training and in-situ courses in 2016 included the delivery of Imagery for Decision Makers and OSINF/OSINT training to IntCen in Brussels, and a small Imagery for Decision Makers course was provided to a Member State. Furthermore, an in-situ course was given to Frontex in Warsaw; an Industries course to the Scuola di Aerocooperazione in Italy; and a customised in-situ course was provided for EUMM Georgia, this was the first course delivered to this mission, consisting of imagery and products training to 20 HQ staff and field officers.

Another important activity is the continuation of training cooperation arrangements with EU institutions and Member States. In 2016, SatCen received guest speakers from Italy and Belgium for its SAR course, and different lectures were delivered within the framework of the National Imagery Analyst's initial Course and the NATO International IMINT Course at the French Intelligence Centre in Creil, France.

4. Supporting the core business by improving capabilities

SatCen continued to improve internal processes and develop support tools in order to optimise the workflow and the use of resources. As in previous years, Seconded National Experts (SNE) were a channel for mutual exchange of know-how, a means to spread awareness of SatCen capabilities and a way to reinforce the Centre in high-level activity circumstances.

4.1. Data Provision Services

SatCen does not have direct control over or access to satellite sensors. Although its sources of primary data are commercial and governmental providers activated on a case-by-case basis, SatCen continued directing its efforts towards the development of an autonomous European capability in the field of IMINT/GEOINT, giving preference to European space assets when quality, reactiveness and costings were equal. In this context, and with the objective of improving the use of European governmental imagery for the EU decision-making process, SatCen organised the seventh Governmental Imagery Forum, strengthening ties to EU Member States contributing data to SatCen (GE, FR, IT, SP, BE, GR). The Helios 2 community suggested some practical procedural changes with regard to the SatCen requests in order to facilitate and speed up the delivery process.

The SAR-Lupe classified link between SatCen and the German ground segment is fully operational and is used to place requests and download SAR-Lupe classified imagery. In addition, several advances were presented with the final objective being to broaden the use of SAR imagery via declassification and releasability improvements.

The classified COSMO-SkyMed link between SatCen and IT authorities was installed and declared operational. SatCen now has the ability to order and download classified COSMO-SkyMed products in an easy, secure and fast manner.

During the last four years, Pléiades imagery has been increasingly used, contributing to SatCen's operational capacity. The tri-stereo capability of the Pleiades & Spot 6 / 7 sensors has provided an additional enhancement to SatCen's analytical capacity by making it possible to generate DEM (Digital Elevation Model)

products with a 1-metre up to 5-metre post spacing, ideal for 3D modelling and relief. In addition, the new Airbus tasking procedures have been adapted to SatCen needs.

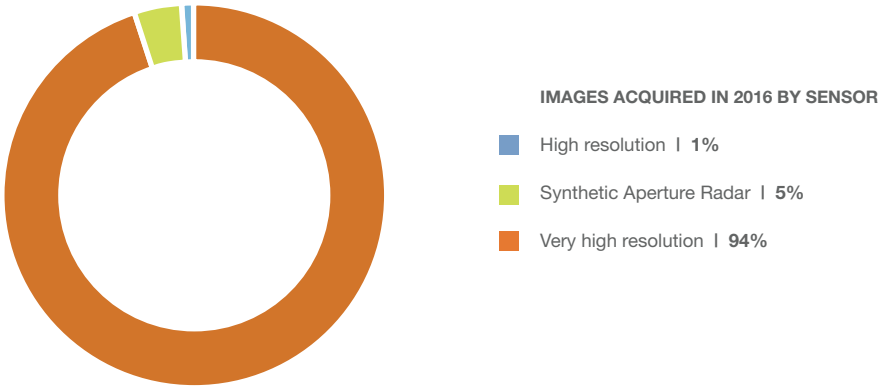
The increase in tasking has not only had a remarkable effect on the production process, but has also led to a substantial improvement of the capability to place urgent programming or archive orders with maximum priority of commercial imagery over areas of interest.

Constantly seeking to improve the access to satellite resources and capabilities, further contact with commercial providers was pursued. Negotiations with the most relevant providers is a continuous process, thus allowing SatCen to receive improved contractual conditions with a significant optimisation of the financial aspect and the service provided.

Below is the distribution of imagery acquired in 2016 by sensor. The vast majority is optical very high resolution imagery as a consequence of the nature of the requirements.

Sensor	Images	Square km
Synthetic Aperture Radar	88	6181
High resolution[1]	20	53639
Very high resolution[2]	1804	204263
Total	1910	264083

[1] Between 1 and 15 metres
[2] Below 1 metre



4.2. Innovation in Information and Communication Technology

In spite of a growing demand for products and continuing budgetary constraints, SatCen continued to develop its business intelligence infrastructure in support of the Centre's core activities. This process, involving business owners and the user community for the implementation of improvements and innovations of processes and tools, makes the Centre a de facto pooling and sharing entity in the EU.

Development of tools for acquisition, sharing and analysis of data

The final release of the GeoHub - delivery of the GISMO project[3] - was installed in the Operations Headquarters (OHQ) in Rome. The tool was accredited and deployed in the operational network of EU NAVFOR Med SOPHIA. The GeoHub is an operational geospatial web application specifically designed to support the work of the OHQ.

An adapted version of the GeoHub was delivered to the OSCE Special Monitoring Mission in Ukraine to help manage geospatial information.

[3] More information on the GISMO project can be found on page 29.

After successfully deploying the GeoHub in the offices of the OSCE Mission in Kiev, a newer version was deployed at the premises of EUMM Georgia in order to help produce, share and manage large quantities of geospatial products.

Three different portable Web Service products, able to run on offline laptops or disconnected environments, were also prepared and distributed to three Member States following their requirements.

A new procurement tool was developed to accommodate the SatCen website with regards to new procurement rules; and the SnapIT Geo tool was improved to be able to query commercial catalogues as well as public image and vector providers and to be able to order images directly.

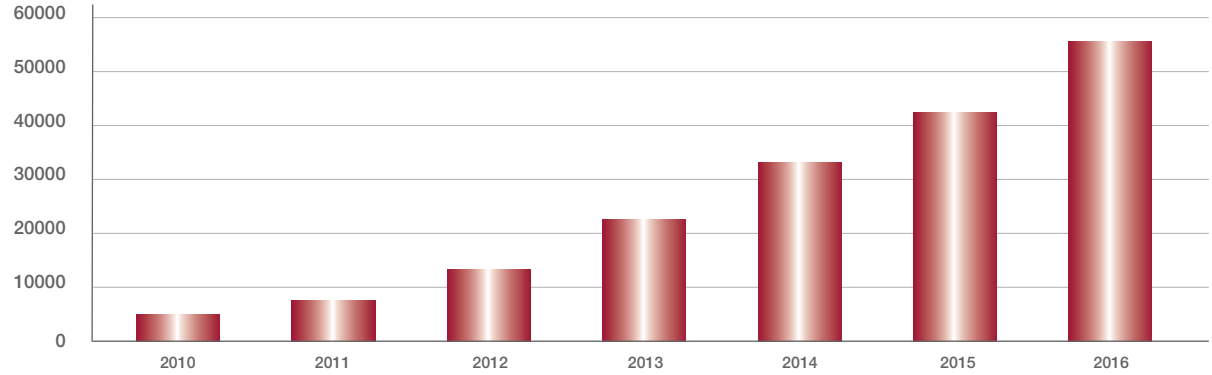
SatCen hosted three days of conferences and exhibitions during its 2016 Industry Days, which took place on 04, 05 and 06 October, with the aim of gathering key companies and users in the Earth Observation and GEOINT domain. The topic was Solutions to automate the work of the GeoInt Analyst. Representatives of EU Member States and 20 companies attended the event, as well as other interested institutions. More than 150 participants attended.

With this event, companies had the chance to display products that respond to SatCen's needs and in particular those of the Operations Division. Participants from the SatCen Operations Division as well as from the SatCen User community (EU Member States) attended these presentations and discussed the functionalities or specifications of the presented solutions. Depending on the suitability and utility of the tools for operational needs, further investigations could follow. The event was a big success, appreciated by all participants.

The SatCen Download Central

The graph on page 23 shows the last seven years' trend in product downloads from the SatCen Download Central – a tool developed for SatCen users to be able to download encrypted products classified up to RESTREINT UE. The graph shows a significant increase in downloads from 2010 to 2016.

Product downloads from 2010 to 2016

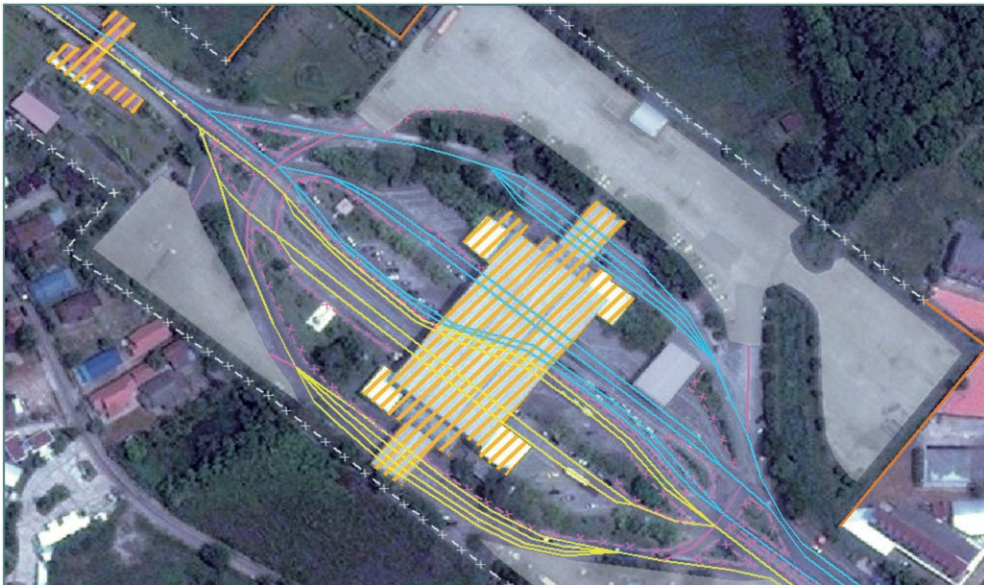


4.3. Capability Development in Space and Security

In compliance with the framework provided by the Council Decision and following the decisions and recommendations of the Board and the Council, the Centre continued participating in EU space and security programmes, and their related initiatives. The involvement in such programmes has provided valuable tools and services in support of the SatCen core business, contributing to the protection of space assets or related to image processing research, support to EU external action and border surveillance activities. It also constitutes an important source of additional tools and resources for the benefit of SatCen, its stakeholders and users, as well as for the Commission who are responsible for these programmes.

Copernicus programme

The Centre continued cooperating in the Copernicus programme in its security dimension to support the development of services addressing Maritime Surveillance, Border surveillance and in particular Support to EU External Action.



Example of a Non-EU Border Map, providing users with the possibility to acquire information for supporting decisions about non-EU border issues. Pleiades (acquired on 02.10.2014, GSD 0.5m), includes material ©CNES 2014, Distribution Astrium Services/ Spot Image S.A., all rights reserved.

This cooperation was conducted both at the institutional level, together with relevant stakeholders, such as other EU Agencies, different DGs (Directorate-Generals) of the Commission and EEAS bodies. In particular, the participation of SatCen in Copernicus governance structures such as the Copernicus Committee and the Copernicus User Forum and at working level, through the participation in several projects, including meetings with the Commission and ESA for the development of services and access to satellite imagery.

In 2015, the pre-operational phase of the Copernicus Service in support to EU External Action ended successfully. On 06 October 2016, the European Commission entrusted SatCen with the operations of the Copernicus services in Support to EU External Action (SEA) with the signature of a Delegation Agreement between Lowri EVANS, Director-General DG Internal Market, Industry, Entrepreneurship and SMEs (GROW) and Pascal Legai, SatCen Director.

In the framework of this agreement, SEA will provide the External Action user community - including CFSP/CSDP and its Missions and Operations - with a portfolio of services ranging from Reference Mapping to Activity Reports, in full compliance with SatCen governance. Since 2006, SatCen has been involved in the preparation of these services through activities funded by EU Framework Programmes (FP6, FP7), notably the LIMES, G-MOSAIC, BRIDGES and G-NEXT projects. In particular, G-NEXT implemented the pre-operational phase of the service and BRIDGES addressed its governance.

The Delegation Agreement foresees an implementation period of six months in order to commence services in April 2017.

In the case of SatCen support to Frontex, under the Copernicus Border Surveillance Service, SatCen delivers a pre-operational component called Service Evolution, enabling continual service improvement. The Service Evolution brings additional value and proposes new technical capabilities to match them with the end user requirements (Member States, National Coordination Centres and Frontex) and with potential new operational needs. One of the Service Evolution core functions is to engage market stakeholders in the development of innovative and effective Earth Observation downstream applications and value-added services.

Participation in H2020 - Secure societies – Protecting the freedom and security of Europe and its citizens

Two new projects, Reaching Out and CIVILEX, started in 2016:

- Reaching Out proposes an innovative multi-disciplinary approach that will optimise the efforts, address a wide spectrum of users and maximise market innovation success in the crisis management domain. The principal aim of this project is to improve efficiency of external disaster management.
- CIVILEX supports European Civilian External Actions by aiming to identify, characterise and model the communication and information systems in use within civilian EU missions, understand the stakeholders' requirements and provide possible solutions to a future interoperable Situational Awareness, Information Exchange and Operational Control Platform.

Space Situational Awareness (SSA)

Space Situational Awareness refers to the knowledge of location and function of space objects and space environment, including operational satellites, space debris, near Earth objects and space weather. The potential development of a European system will underpin the exploitation of space assets, a key capability contributing to autonomous access to and sustainability of space for the EU and its Member States.

The final review of the de-mining project TIRAMISU took place in February 2016. TIRAMISU was a four year long project in which the Centre was funded to develop products to support the planning of humanitarian de-mining operations.

Space Situational Awareness (SSA)

On 1 January 2016, SatCen initiated work on three new projects (1SST2015, 2SST2015 and 3SST2015) in the context of the Space Surveillance and Tracking (SST) Support Framework.

In this regard, several coordination and technical working meetings were organised between SatCen and the SST Consortium (ASI, CDTI, CNES, DLR, UKSA) in order to discuss the definition of the SST services, the SST service provision portal interfaces and the way forward for the provision of the initial services that started on 01 July 2016. The EU SatCen, acting as the EU-SST Front Desk, currently provides initial SST services - Collision Avoidance, Re-Entry and Fragmentation - through a dedicated SST service provision portal.

A progress meeting took place in November, in Bonn, in order to discuss further development of the 2SST2015 and 3SST2015 projects, as well as planning specific working meetings to continue performing the activities of the SST Support Framework. Furthermore, SatCen carried out activities concerning the definition of a preliminary Action Plan for the future of the SST Support Framework, the identification of user requirements and the development of the SST service portfolio.

The SSA team also attended the Final Review meeting of the EDA Recognised Space Picture (RSP) Display, a project co-funded by EDA (European Defence Agency). This meeting was also the official conclusion of the project, whose objective was to develop a common understanding for an RSP Display, focusing on visualisation aspects, proposing a draft Operational Concept and analysing external interfaces and interoperability aspects.

Initial EU SST service provision portal developed under PASS and SST2015 projects.
© EU SatCen

In December, the SSA team completed and submitted all the technical deliverables of the PASS project, which finished early 2017, after the completion of the Final Project Review and the financial audit of the project.

Research, Technology Development and Innovation

During 2016, SatCen continued with its RTDI (Research, Technology Development and Innovation) initiatives, aiming at implementing new solutions with regard to the whole data lifecycle on subjects such as Big Data, as well as fostering cooperation with the EC, EU entities and key organisations in Space such as ESA and GEO.

With regard to the H2020 BigDataEurope and EVER-EST (European Virtual Environment for Research - Earth Science Themes) projects, SatCen worked on relevant pilots in the Secure Societies domain to validate the Big Data and Cloud Computing solutions developed within the consortia. Moreover, in the framework of

Group on Earth Observations (GEO)

GEO is a global network connecting government institutions, academic and research institutions, data providers, businesses, engineers, scientists and experts to create innovative solutions to global challenges at a time of exponential data growth, human development and climate change that transcend national and disciplinary boundaries.

BigDataEurope, SatCen organised the 2nd Workshop on Big Data in Secure Societies, which was held in Brussels in October. The workshop was attended by nearly 60 participants from several EC DGs, CDTI, EARSC, EDA, ESA, Frontex, GEO, and a number of stakeholders from a variety of domains such as Cybersecurity.

The H2020 NextGEOSS project started in December 2016. NextGEOSS, a European contribution to GEOSS, will develop the next generation centralised hub for Earth Observation data, where the users can connect to access data and deploy EO-based applications. SatCen will liaise with GEO communities/ activities and implement a Space and Security pilot.

Whilst awaiting the upcoming signature of the SatCen-ESA Administrative Arrangement, SatCen started participation in the ESA ARTES IAP (Advanced Research in Telecommunications Systems - Integrated Applications Promotion) programme with an activity related to Big Data for Migration. Moreover, SatCen co-organised, together with ESA and the Joint Research Centre (JRC), the 2nd edition of the Big Data from Space conference, which was held at the Auditorio de Tenerife on 15-17 March. Nearly 300 participants from almost 40 countries attended.

As GEO Participating Organisation and leader of the GEO Space and Security Activity, the Centre attended the GEO Work Programme Symposium (where the Strategic Plan 2016-2025 was discussed) and the GEO-XIII Plenary (where the 2017-2019 Work Programme was approved).

Furthermore, building on the experience gained in various H2020 projects, the RTDI Team started working on an innovative prototype platform, providing the user with the possibility to access, process, analyse and visualise satellite and collateral data.

Example of change detection and event detection performed by the RTDI prototype platform with Sentinel-1 data. © EU SatCen

Cooperation with the EDA

On 18 July, EDA and SatCen formalised their cooperation with an exchange of letters between Jorge Domecq, EDA Chief Executive, and Pascal Legai, SatCen Director, at the EDA premises in Brussels.

During 2016, EDA and SatCen have continued the collaboration in projects such as GISMO (Geospatial Information to Support decision Making in Operations) and GISMO 2, SULTAN (persistent SUrveillance Long Term ANalysis) and REACT (Radar imagEry Applications supporting ACTionable intelligence).

The kick-off meeting and the first technical meeting of REACT took place in February at SatCen. The REACT Consortium, composed of e-GEOS, INTA, and Telespazio-Iberica, presented their first vision on how to conduct the project, which aimed to add value to imagery data and to assist imagery analysts with tools and workflows. It focused on SAR imagery with the combined use of electro-optical images, having a duration of ten months. The intermediate review meeting of the EDA REACT

project took place in July. An update and the status of the project were presented to Member States in a meeting held in connection with the Technical Working Group at SatCen on 16 June. In October, SatCen hosted the REACT Study Implementation Sessions with the presence of participants from eight Member States, Frontex, EDA and SatCen.

The EDA GISMO3 project started in June 2016. Its aim is to support decision making in CSDP operations by identifying short-term solutions to enhance the access of OHQs and FHQs to geospatial information. This is being developed in close cooperation with relevant EU actors (i.e. EUMS, SatCen and Member States). Its deployment at the Italian EU OHQ of Operation Sophia started successfully in 2016 and is planned to finish in October 2017.

Also in 2016, an exchange of documents concerning procedural, technical and financial aspects with the MARSUR (Maritime Surveillance) Management Team took place as a part of the preparation for the membership of SatCen within this network. This activity is included in the Maritime Surveillance domain of the recent SatCen - EDA roadmap for 2017.

Other initiatives

On 16 November 2016, the European Union Satellite Centre and the European Union Institute for Security Studies (EU ISS) signed an Administrative Arrangement. The aim of the Agreement is to provide a structured relationship and mutually beneficial cooperation, taking into account the Agencies' relevant responsibilities and tasks.

As has already taken place on several occasions, according to the Agreement, analysts of the EUISS may provide, at the premises of one of the two Agencies, lectures and presentations on specific geopolitical areas of the world or topics of interest for both organisations. Equally, similar presentations may be given by SatCen analysts.

Furthermore, SatCen may grant EUISS analysts the possibility to exchange ideas with SatCen analysts and have access to information obtained and analysed by SatCen on specific topics, in order to corroborate and strengthen their analysis.

5. A secure context

To maintain the security system at the highest standard is a major concern for SatCen, and it contributes to strengthening the Centre's trustworthiness amongst its Member States and concerned EU bodies.

In order to achieve the highest level of proficiency, a specific programme has been identified and implemented for 2016/2017, including speakers from the EEAS.

Improving defence against cyberattacks has been an important priority in 2016. New technical preventive equipment was installed in cooperation with the EU CERT. The SatCen participated in the biggest European Cybersecurity exercise to date: Cyber Europe 2016. Numerous awareness presentations were also given to staff and all employees had to undergo a simulation of phishing attack.

Physical security is a constant concern for SatCen. The security regulations in force and the recommendations of the EU security assessment visit in 2014 were always taken into account during all system upgrades, devices installations and construction work. The preventive and corrective maintenance of the systems were also carried out successfully and, as a result, the classified information, assets and personnel of SatCen were protected and never compromised in any way.

The security procedures and plans were updated when necessary and tested out through various drill exercises, including fire and evacuation exercises.

As a follow-up of the Health and Safety Policy at SatCen, the recurrent training on cardio pulmonary resuscitation was accomplished.

The security awareness of SatCen staff was considered the highest priority, and regular briefings reinforced this message.

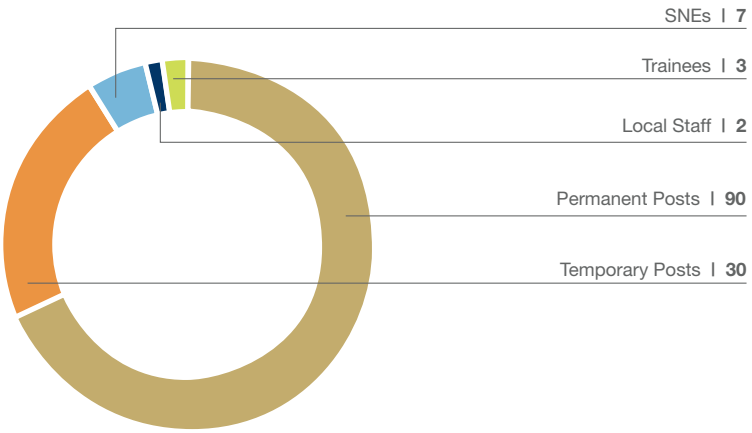
6. Resource management

6.1. Personnel

The Human Resource management system continued to be reviewed to ensure alignment with the Centre's strategy. Human resources are considered the main asset of the Centre and have to be permanently taken into consideration and encouraged.

SatCen personnel in 2016 was composed of 132 staff – 90 permanent posts, 30 temporary posts, 2 local staff, 3 trainees and 7 seconded national experts (SNEs) – complementing the pool of imagery analysts and Directorate staff.

The breakdown by type is given below:



EU SatCen personnel, 2016

The Centre hosted seven SNEs from the Czech Republic, Denmark, France, Italy, Hungary and the UK, reinforcing the SatCen analysis and Directorate capability while at the same time strengthening operational ties to Member States.

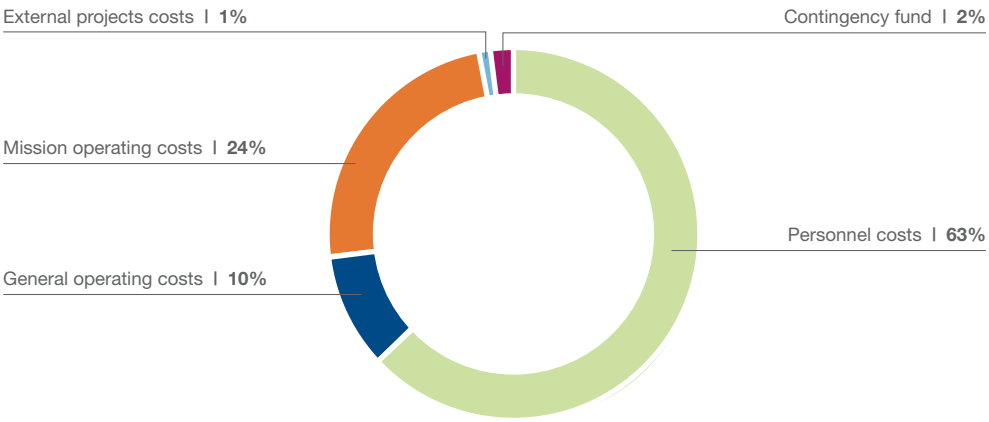
SNEs not only reinforce the operational capacity and widen the spectrum of services, as recommended by the High Representative, but also permit transparency and a fruitful exchange of knowledge as an efficient means to spread awareness of SatCen capabilities and to achieve a common approach.

6.2. Finance

6.2.1. EU SatCen Budget

The Budget 2016 was approved by the SatCen Board under silence procedure on 18 December 2015 for a total amount of 17.375.129 €. This represents a decrease of 601.335 € (-3,35 %) over the 2015 Budget. Out of this, 12.260.665 € were financed through Member State contributions, representing an increase of 15.006 € (0,12 %) over the 2015 approved figure.

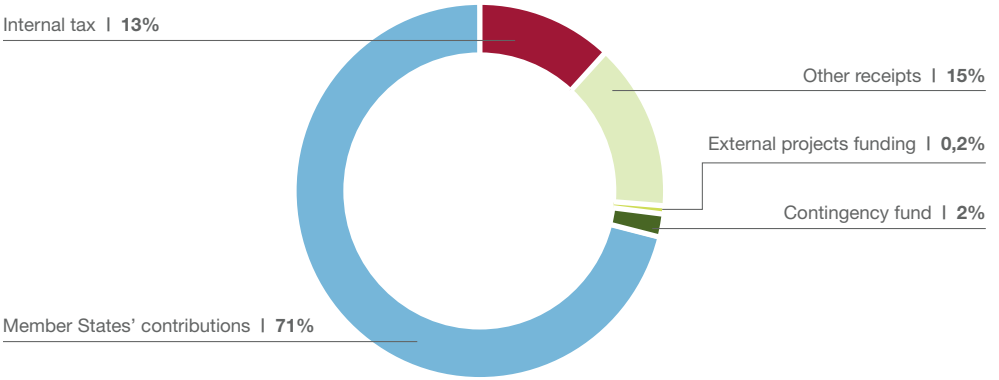
The following chart shows the SatCen Budget 2016 by expenditure chapters.



EU SatCen Budget 2016 by cost categories

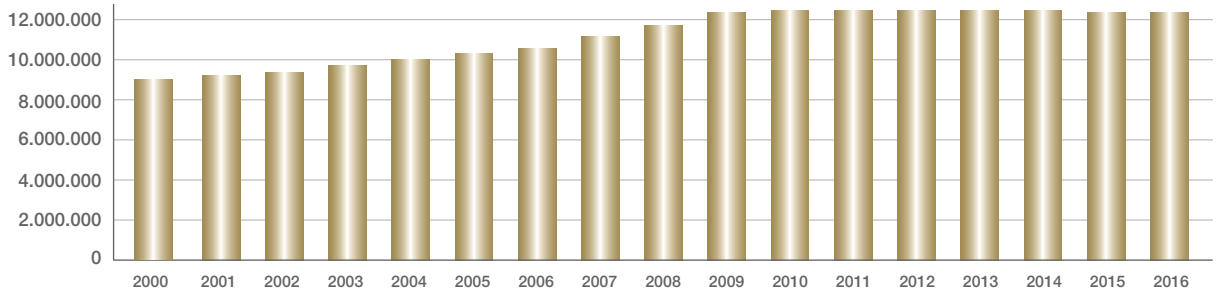
The income sources of the SatCen Budget 2016 are depicted below.

EU SatCen Budget 2016 by funding source



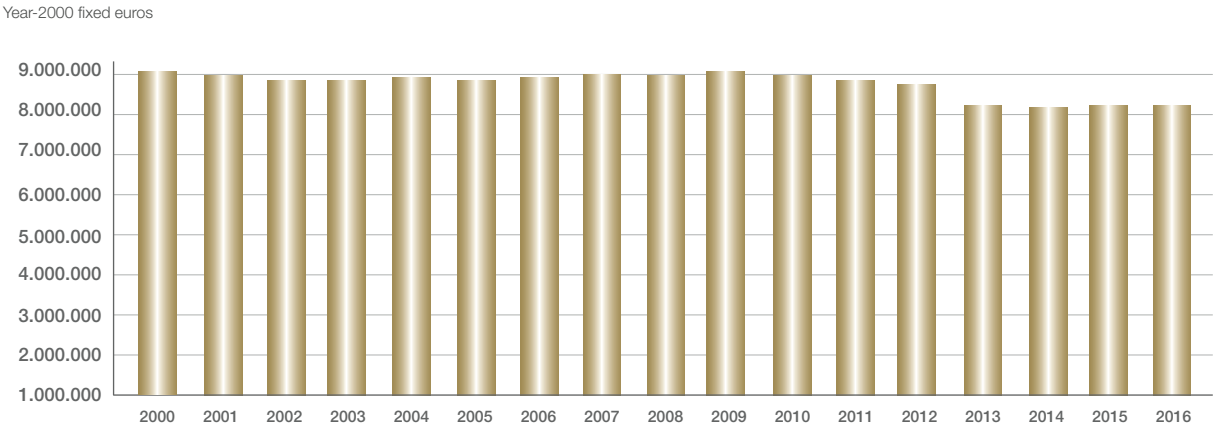
The following chart compares the evolution of the Centre's approved budgets (Member States' contributions) in nominal and in real terms from 2000 to 2016.

EU SatCen budget evolution (Member States' contributions)



Despite the impression that the trend in budgets was slightly increasing and then stagnating in the last years, a very different trend results from the comparison of the different budgets given in year-2000 fixed euros below.

SatCen budget evolution (SatCen budget in fixed 2000 euros)



6.2.2. Financial Management

Since 2010, the Centre has faced an increase of more than 25 % in tasking, whilst the policy adopted by the Board on Member States' contribution to the Operational Budget has implied a real loss of almost 1,3 Million € (around 10 % of funding) until 2016.

The budgetary development during 2016 has no precedents as the operational activity of the Centre shows a unique scenario owing to an extraordinarily high consumption of data.

Whilst human efforts (Chapter I), general operating costs (Chapter II) and most mission operating costs (Chapter III) could be and have been stretched to exceptional levels, it has been demonstrated that it is not possible to achieve all the demand without an increase in funding for data procurement. Although the Centre has developed notable efforts in terms of acquisition savings, resources for this particular need to be reinforced in order to solve the structural erosion of the SatCen budget. This is despite the great success of the Cost Recovery procedures, which found an effective temporary solution but does not constitute a sustainable funding system.

In 2016, for the first time, funding provisions were supported by the Cost Recovery Procedures, adopted by the Board on 23 July 2015 and amended on 28 April 2016. The approval of these procedures aimed at accommodating the indications from the Member States to maximise efficiency while producing cost savings within a European scenario of austerity. The Centre based its budget on an estimated income of 2 million euros in 2016, reducing these amounts from the national budgets of Member States.

Facing the International situation, the increased operational scenario of 2016 showed that this estimation, made in December 2015, was widely exceeded.

This activity has also involved an increase in the volume of resources dedicated to production. This new experience of fast demand of products, and subsequent consumption of data also revealed the need to timely incorporate these incomes in the budget, allowing to reach the desired operational level and producing cost savings for Member States.

The current experience confirms that these incomes mostly cover direct and indirect costs, but they do not solve the structural erosion of the SatCen budget. On the contrary, they are factor of stress and instability of the SatCen planning and budget execution processes. It is foreseen that in 2017 cost recovery should continue constituting a base of funding as most important agreements will probably be renovated and continued in 2017, although it is difficult to measure its amount with a reasonable precision.

Beyond 2017, the possibility to reach such levels of cost recovery is critical and more sustainable financial solutions will be likely necessary to maintain current SatCen capabilities.

7. Conclusion

The year 2016 was a critical period at political level in facing the International situation, where the future and role of the EU is at stake. In this respect, the Global Strategy for Foreign and Security Policy constitutes a major achievement. For the next few years, the successful implementation of these important political orientations will be crucial. In this context, the EU Satellite Centre represents a unique, concrete, GEOINT instrument of implementation with 25 years of experience and knowledge.

The major goal of the EU Satellite Centre is to constantly improve its services, ensuring 24/7 availability, guaranteeing a secure context to handle sensitive and classified data, promoting the extension of the classified network EU OPS WAN to the Member States Capitals for fast delivery of products. It is also important to take an active part in the EU moving operational process, for instance - with the setting up of the MPCC, associating the SatCen with the early stages of the planning phase, in order to be effective during the conduct of missions and operations.

Furthermore, the general performance of the Centre is based on strong communication action towards external actors, but also internally as a key awareness leverage. In this regard, the SatCen Brussels Office is key in order to have direct contact with end users and understand their needs.

The main asset of the SatCen is its personnel. We collectively defined corporate values to make them a reality: team spirit, commitment, proactivity and excellence. An essential effort is ongoing training to maintain the staff with state of the art knowledge and competence in a quickly changing specialised domain.

In addition, the optimal use of existing human, technical, budgetary resources now raises the fundamental issue of the further development of the Centre's capability to face the evolving demand. In this regard, the coming decision of the Member States and the HR will prove to be decisive in finding a sustainable long-term solution for stable resources, most notably for funding.

The SatCen team is fully committed to tackling the future challenges with complete dedication and determination.

SatCen

Annexes

Annex I

ABBREVIATIONS

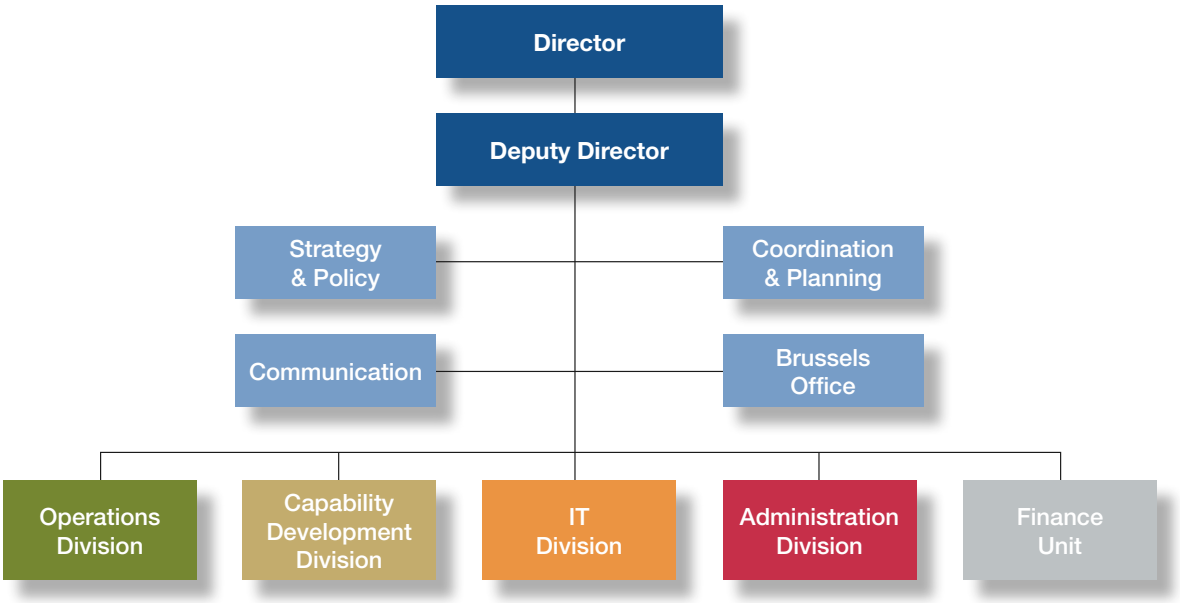
ARTES	Advanced Research in Telecommunications Systems
ASI	Agenzia Spaziale Italiana (Italian Space Agency)
BRIDGES	Building Relationships and Interactions to Develop GMES for European Security
CDTI	Centro para el Desarrollo Tecnológico Industrial
CFSP	Common Foreign and Security Policy
CMPD	Crisis Management and Planning Department
CNES	Centre National d'Études Spatiales (French National Centre for Space Studies)
CPCC	Civilian Planning and Conduct Capability
CSDP	Common Security and Defence Policy
DEM	Digital Elevation Model
DG	Directorate General
DLR	Deutschen Zentrums für Luft- und Raumfahrt (German Aerospace Center)
EARSC	European Association of Remote Sensing Companies
EC	European Commission
EDA	European Defence Agency
EEAS	European External Action Service
ESA	European Space Agency
EU CERT	EU Computer Emergency Response Team
EU ISS	EU Institute for Security Studies
EUF	Expert User Forum

EUMM	European Union Monitoring Mission
EUMS	European Union Military Staff
EVER-EST	European Virtual Environment for Research - Earth Science Themes
Frontex	The European Border and Coast Guard Agency
GEO	Group on Earth Observations
GEOINT	Geospatial Intelligence
GISMO	Geospatial Information to Support decision Making in Operations
G-MOSAIC	GMES services for Management of Operations, Situation Awareness and Intelligence for regional Crises
G-NEXT	GMES pre-operational security services for supporting external actions
H2020	Horizon 2020
HR	High Representative of the Union for Foreign Affairs and Security Policy / Vice President of the European Commission
IA	Image Analyst
IAP	Integrated Applications Promotion
IMINT	Imagery Intelligence
INTA	Instituto Nacional de Técnica Aeroespacial
INTCEN	Intelligence and Situation Centre
JRC	Joint Research Centre
LIMES	Land and Sea Integrated Monitoring for Environment and Security
MARSUR	Maritime Surveillance
MPCC	Military Planning and Conduct Capability

MS	Member State(s)
NAVFOR	Naval Force(s)
OHQ	Operational Headquarters
OSCE	Organisation for Security and Cooperation in Europe
OSINF	Open source information
OSINT	Open source intelligence
PASS	Preparation for the establishment of A European SST Service provision function
PSC	Political and Security Committee
REACT	Radar imagEry Applications supporting ACTionable intelligence
RSP	Recognised Space Picture
RTDI	Research, Technology Development and Innovation
SAR	Synthetic Aperture Radar
SatCen	European Union Satellite Centre
SIAC	Single Intelligence Analysis Capacity
SEA	Support to External Action (Copernicus)
SMM	Special Monitoring Mission
SNE	Seconded National Expert
SSA	Space Situational Awareness
SST	Space Surveillance and Tracking
STF	Space Task Force
SULTAN	Surveillance Long Term Analysis
TWG	Technical Working Group
UKSA	UK Space Agency

Annex II

ORGANISATIONAL CHART



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Annex III

MEETINGS AND EVENTS

The Centre has received and organised the following key visits and meetings in 2016:

21 January	Col. Terol (CESAEROB) and Col. Allende (Centro Cartográfico y Fotográfico)
03 February	EDA REACT Study Kick-Off meeting
04 February	35th Technical Working Group
05 February	35th Expert User Forum
18 February	Escuela Diplomática del Ministerio de Asuntos Exteriores y de Cooperación
24 February	Delegation of the Embassy of Poland in Madrid
29 February	Delegation of the Embassy of Hungary in Madrid
03 March	Deputy Head of Mission of EUMM Georgia
09 March	Delegation of the Embassy of France in Madrid
10 March	Général de corps aérien Adam, Major général de l'armée de l'air
04 April	Capt (N) Antonios Boumpas, Greek SatCen Board Member, Permanent Representation of Greece to the EU
04 April	Delegation of the Combined Air Operations Centre Torrejón (CAOC-TJ)
18 April	Centro Universitario de la Guardia Civil (CUGC), Academia de Oficiales
19 April	Mr Marco Riccardo Rusconi, Embassy of Italy in Madrid
20 April	Director of the Strategic Intelligence Agency, Austrian Ministry of Defence
21 April	Brigadier MAGOWAN, Commander JFI at RAF Wyton, UK
12 May	Brig. Gen Välivehmas, Finish defence Policy Department
25 May	97th EU SatCen Board Meeting
13 June	Meeting with Fernando Martín Pascual, DIGENPOL, Spain, on the extension of the SatCen building

14 June	General Testé, Commandement Interarmée de l'Espace, Colonel Franck Scher, French MoD, Colonel Olivier Fabre, French Defence Attaché in Madrid
15-16 June	3rd EDA REACT Study Experts Working Group
16 June	36th Technical Working Group
17 June	36th Expert User Forum
17 June	Rear Admiral Waldemar Gluszco, Deputy Director General EUMS
21 June	Maj. Gen. Candotti, Italian Ministry of Defence
05 July	Dr Gerhard Conrad, Director, IntCen, Brig Gen Lars-Olof Corneliusson, Director Intelligence EUMS
12 July	IGA Caroline Laurent, Directrice de la stratégie DGA, French MoD
14 July	S.E: Mr Ambassador Yves Saint-Geours, French Ambassador in Madrid, Col Olivier Fabre, French Defence Attaché in Madrid
30 September	Brigadier General Juan Antonio Ortega Vázquez, Outgoing Commander of Torrejón Air Base
30 September	XIV Edición Jóvenes Líderes Iberoamericanos
03-06 October	SatCen Industry Days
07 October	37th SatCen Expert User Forum
07 November	Delegation of the Spanish Guardia Civil
16-17 November	Signature of Administrative Arrangement with the European Union Institute for Security Studies
01 December	First CSDP Seminar European Union-South America & Mexico
02 December	7th Report on the Use of Governmental Imagery at the EU SatCen to the Contributing Countries

13 December	Brigadier General Francisco González-Espresati Amián, Commander of Torrejón Airbase
14 December	H.E. Ambassador Peter Tempel, Embassy of Germany in Madrid
15 December	12th CSDP High Level Course, Module 2
19 December	H.E. Ambassador Stefano Sannino, Embassy of Italy in Madrid
20 December	Ph. D. Dănuţ Maftei, Ministro Plenipotenciario, Consul, Embassy of Romania in Madrid

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