Il programma Copernicus a supporto della digital transformation

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Geospatial Digital Transformation:
la chiave di successo per la rivoluzione industriale 4.0 verso la Società 5.0

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Introduzione

Geospatial Digital Transformation: la chiave di successo per la rivoluzione industriale 4.0 verso la Società 5.0

I vantaggi socio-economici dell'innovazione provocata dalla disponibilità dei dati

Data

I dati sono la materia prima della Digital Economy. Il loro uso intelligente può trasformare il settore pubblico e molti settori industriali, dando un grande impulso all'economia

Traditional Data Delivery

Vent'anni fa, agli albori di Copernicus, i dati satellitari venivano archiviati su supporti magnetici e il loro utilizzo era possibile solo a «esperti» e scienziati, che li analizzavano utilizzando il proprio PC.

Move User activities to the Data

Volume, velocità e varietà dei dati satellitari sono ormai tali da collocarli nel dominio dei BIG DATA. Servono adeguate e-infrastructures (archivi, cloud computing, reti di comunicazione) e la capacità di analizzare i dati velocemente e di apprendere da essi, condividendo le conoscenze acquisite.

Introduzione

Società 5.0

… I benefici delle nuove tecnologie saranno inizialmente presenti nella sfera industriale del Paese, ma andranno incentrati e indirizzati verso le persone: “super-smart society” fatta di smart cities, turismo digitalizzato, case intelligenti, cybersicurezza, smart agriculture, 5G, data mining e open data, trasformazione digitale dell’healthcare …

Impresa 4.0

Nell’ICT e per alcuni servizi, il modo di fare impresa è già cambiato con l’avvento del digitale

Case study

Google: la più grande media company senza contenuti e , senza venditori di pubblicità

Paypal: il più grande operatore di pagamenti elettronici, ma non emette carte di credito

Amazon: Il più grande retailer al mondo, senza punti vendita

Uber: la più grande società di trasporti passeggeri, senza mezzi e guidatori

Twitter: La più grande news agency, senza giornalisti

Electronic Arts: tra i maggiori produttori di intrattenimento e sport, senza attori e campioni

Whatsapp: la telecom con più clienti al mondo, senza reti e bollette telefoniche

Netflix: la più grande pay TV, senza decoder

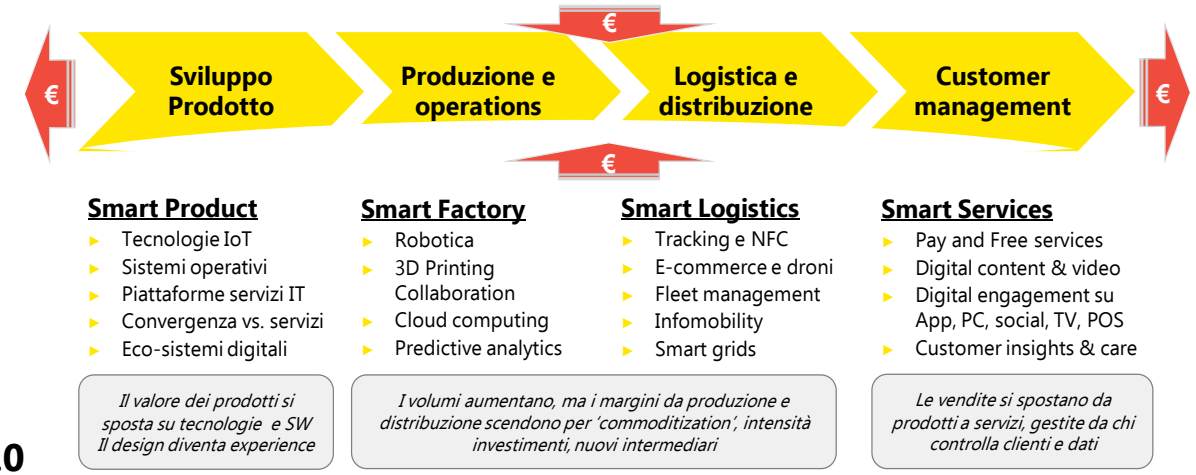
Alibaba: il più grande wholesaler B2B; non ha magazzini

40% Penetrazione Internet a livello globale	**62%** Navigatori va online prima o per comprare	**23%** Navigatori compra online	**$1.5 Trillion** fatturato e-Commerce	**Xx mld** Smartphone nel mondo

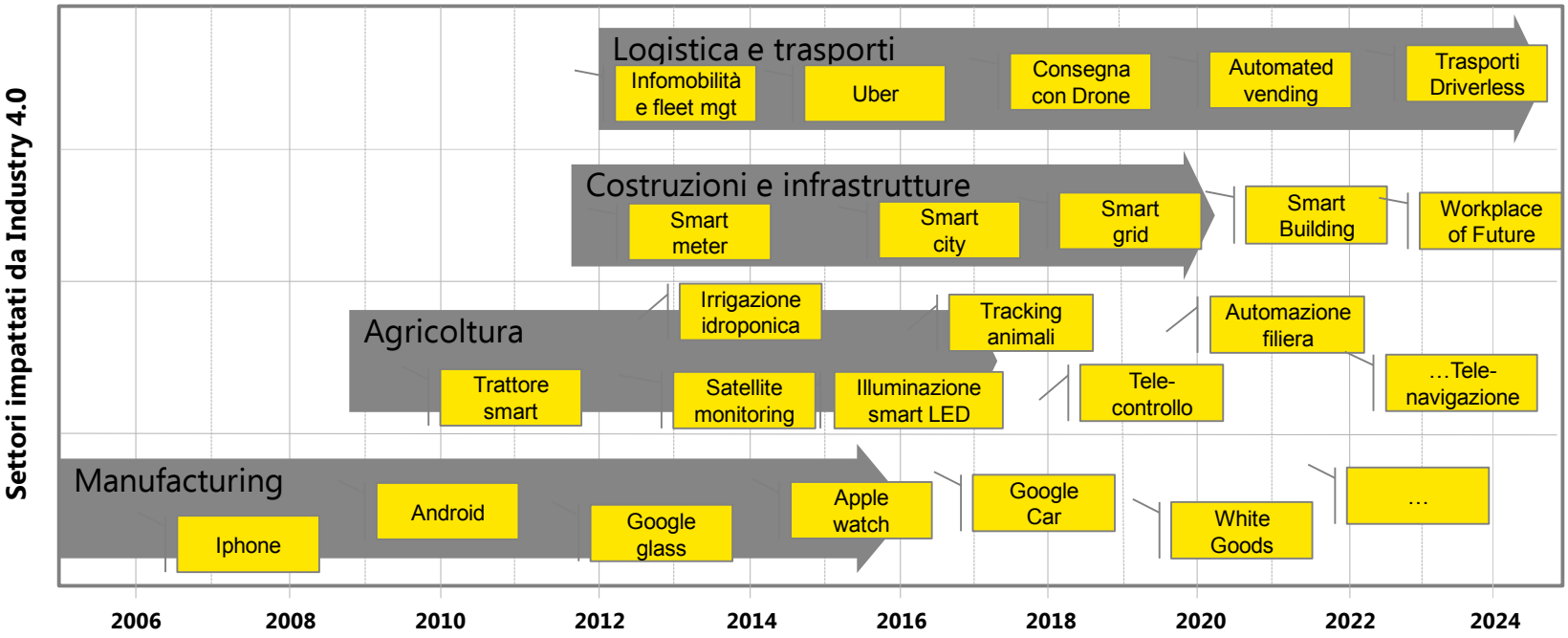
Introduzione

Il digitale ora cambia le filiere produttive dei prodotti industria-lizzati, stravolgendo le dinamiche di creazione valore e i mercati

Fattori di successo, capability e spostamento valore nell'industry 4.0



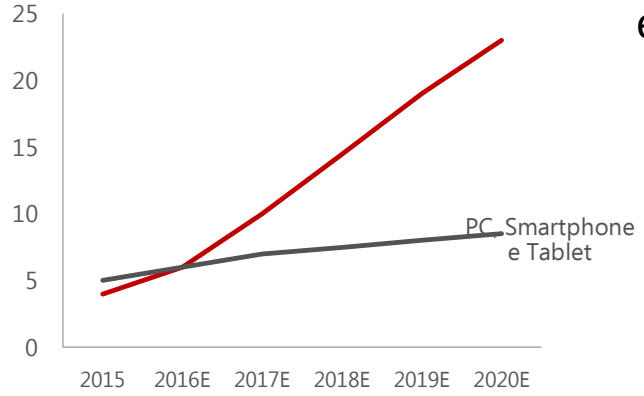
Possibile Roadmap Industry 4.0



Introduzione

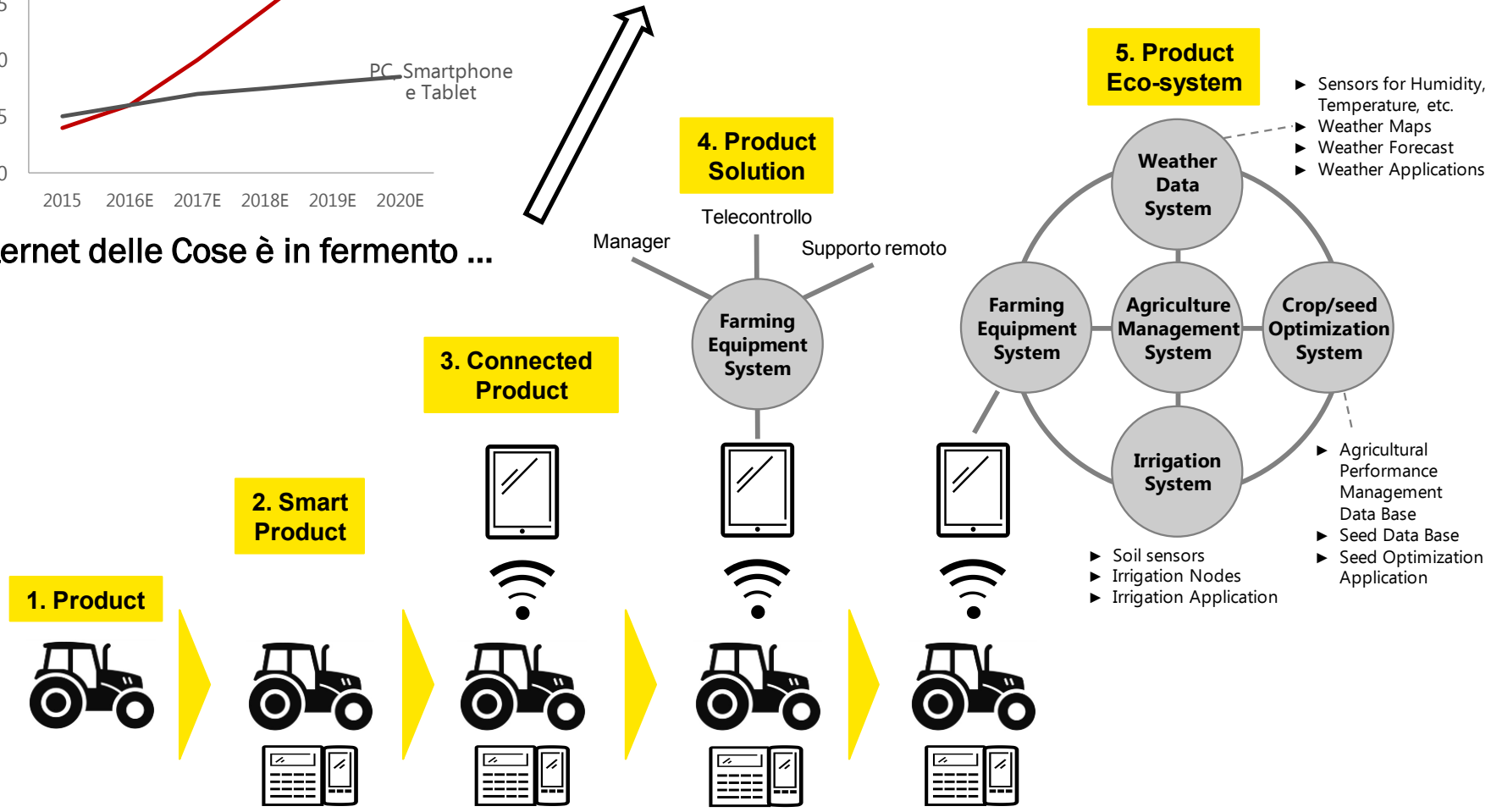
I macchinari industriali oltre a connettersi, saranno supportati da SW integrati con i sistemi aziendali e nuovi eco-sistemi …

Crescita Device
in mld di unità



L'Internet delle Cose è in fermento …

… e come cambia l'agricoltura ?



… A brief introduction to the evolution of the European and national “Space and Policy Economy”, starting from the signature of the Baveno Manifesto in May 1998 ...

Space component economy: launchers, satellites, telecommunications and ground segments …

It is mainly boosted by the development and use of new space technologies and because of the needs of the national scientific research and security communities

It produces raw and processed data of first and second level

<u>Baveno Manifesto, May 1998</u>

Basically the Baveno Manifesto calls on the EC and ESA for a long term commitment to set up a global observation capability for the reasons of environment, agriculture and national safety and security, making use of, and further developing, European skills and technologies.

Space component economy: launchers, satellites, telecommunications and ground segments …

It produces raw and processed data of first and second level

<u>Service component economy (GMES, 2010)</u>: development and management of platforms capable of developing informative levels and provision of the services at high added value, starting from the availability of the data processed on the basis of a qualified and organized question mainly expressed by institutional users.

Space component economy: launchers, satellites, telecommunications and ground segments …

It produces raw and processed data of first and second level

<u>Service component economy (GMES, 2010)</u>: development and management of platforms capable of developing informative levels and provision of the services at high added value, starting from the availability of the data processed on the basis of a qualified and organized question mainly expressed by institutional users.

<u>Service component economy (Copernicus, 2014)</u>: development and management of platforms capable of making informative levels available and provision of the services at high added value, for the public and private market.

Copernicus objectives

The objective of Copernicus should be to provide accurate and reliable information in the field of the environment and security , **tailored to the needs of users and supporting other Union policies**, in particular relating to the internal market, transport, environment, energy, civil protection and civil security, cooperation with third countries and humanitarian aid

In order to attain its objectives, **Copernicus should ensure an autonomous Union capacity for spaceborne observations and provide operational services** in the field of the environment, civil protection and civil security, fully respecting national mandates on official warnings. It should also make use of the available contributing missions and in situ data provided mainly by the Member States. **To the greatest extent possible, Copernicus should make use of capacities for spaceborne observations and services of Member States**. Copernicus should also **make use of the capacities of commercial initiatives in Europe, thereby also contributing to the development of a viable commercial space sector in Europe**. In addition, systems to optimise the transmission of data should be promoted to further enhance capabilities in response to growing user demand for near real-time data

REGULATION (EU) N.377/2014.

Copernicus Committee and User Forum

Since **Copernicus is user driven**, it requires the continuous, effective involvement of users, particularly regarding the definition and validation of service requirements.

In order to increase the value of users, their input should be actively sought through regular consultation with end-users from the public and private sectors. For that purpose, a working group (the 'User Forum') should be set up to assist the Copernicus Committee with the identification of user requirements, the verification of service compliance and the coordination of public sector users.

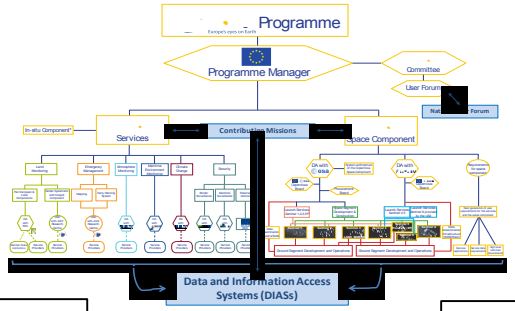
Article 30

Committee procedure

1. The Commission shall be assisted by a committee (the Copernicus Committee). That committee shall be a committee within the meaning of Regulation (EU) No 182/2011. …
2. **The Copernicus Committee shall set up the 'User Forum', as a working group to advise the Copernicus Committee on user requirements aspects, in accordance with its rules of procedure**.
3. and 4. …
5. Representatives of the entities to whom tasks of Copernicus are entrusted shall be involved, where appropriate, as observers in the work of the Copernicus Committee under the conditions laid down in its rules of procedure.
6. and 7. …

REGULATION (EU) N.377/2014.

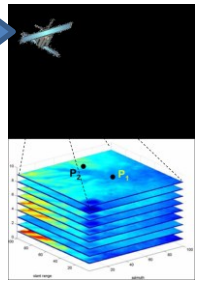
The Copernicus Space & Services Components

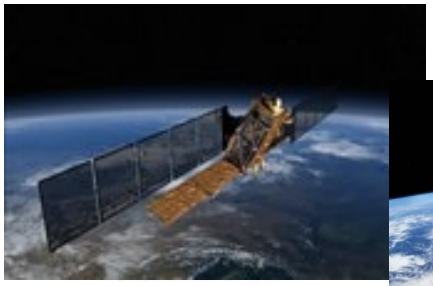


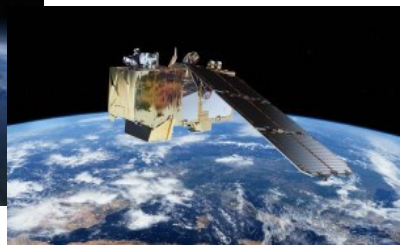
… the Contribuiting Missions: CSK National Constellation …

… the Sentinels Copernicus Constellation …

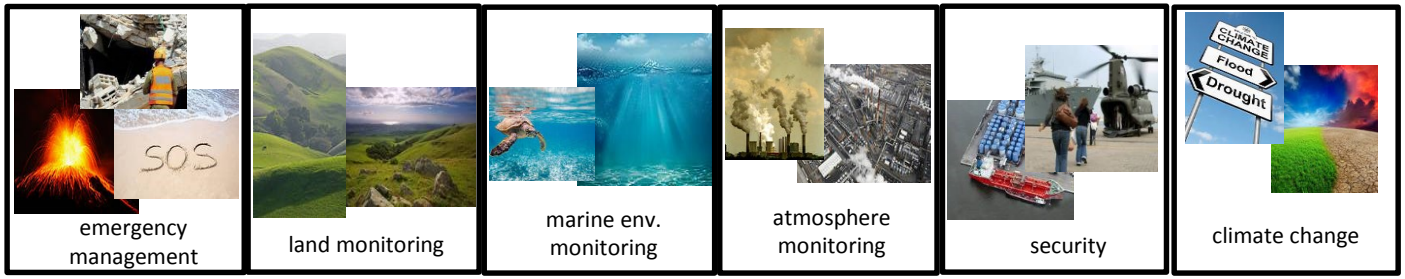
… National "Core Services" …







… Copernicus "Core Services" ….



emergency management

land monitoring

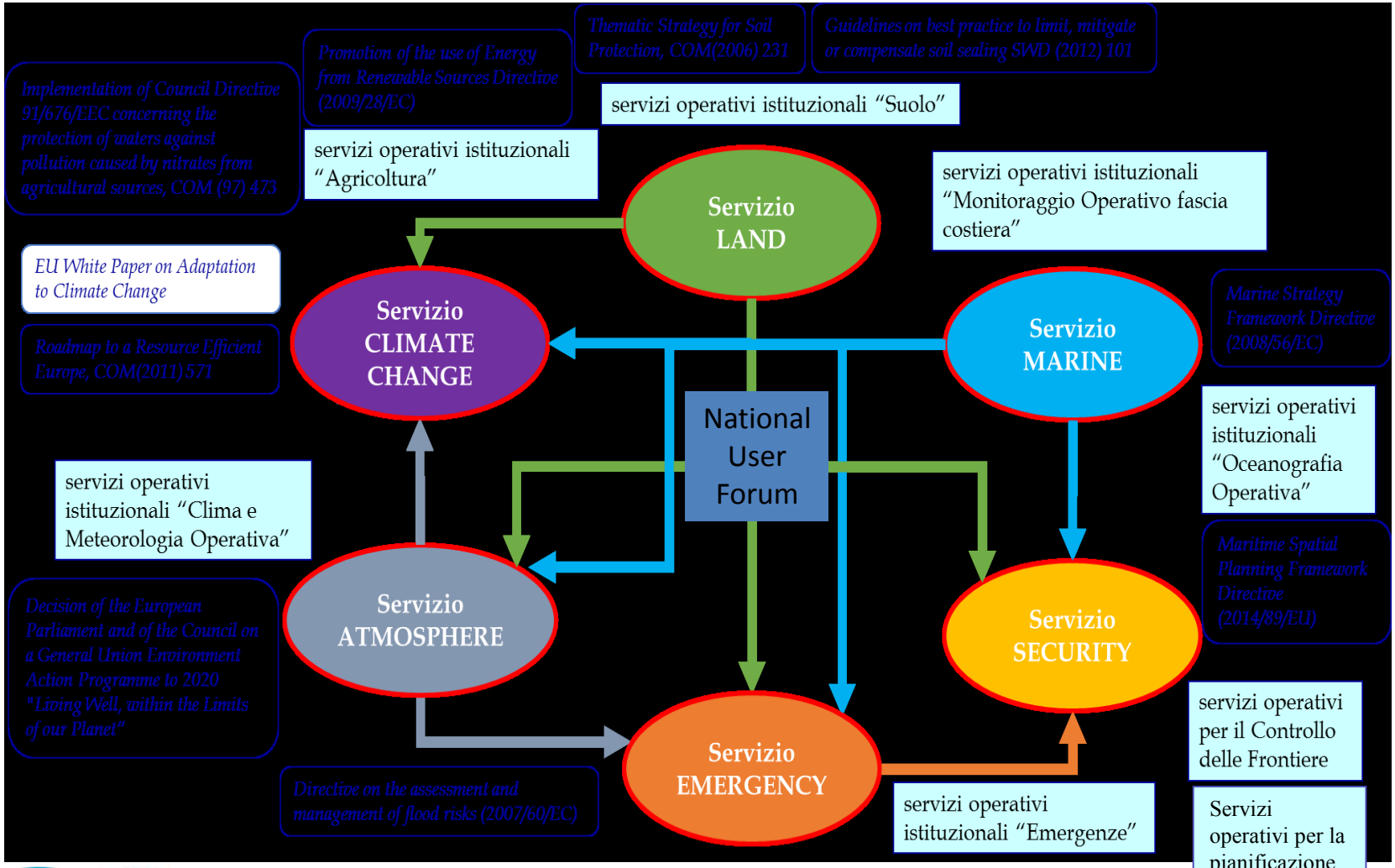
marine env. monitoring

atmosphere monitoring

security

climate change

Copernicus Core Services to support the National Implementation of several EU Environmental Framework Directives



agenzia spaziale italiana

ISPRA
Istituto Superiore per la Protezione e la Ricerca Ambientale

… Policies and application domains …

European Policies	Application domains
Common Agricultural Policy (CAP)	Agricolture/Food security
Nitrates European Directive (91/676/EEC)	
Habitats Directive (92/43/EEC)	
Birds Directive (2009/147/EC)	
Water Framework Directive (2000/60/EC)	Inland/coastal water and environment
Floods Directive (2007/60/EC)	
Marine Strategy Framework Directive (2008/56/EC)	
Bathing Water Directive (2006/7/EC)	
Maritime Spatial Planning Directive (2014/89/EU)	
Strategic Environmental Assessment Directive (2001/42/EC)	
Directive urban waste water treatment (91/271/EEC)	
Habitats Directive (92/43/EEC)	Ecosystem structure/composition
Birds Directive (2009/147/EC)	
Animal By-products Regulation (1069/2009/EU)	
Ambient air quality and cleaner air Directive (2004/107/EC AND 2008/50/EC)	Air quality
The General Conference of the United Nations Educational, Scientific and Cultural Organization meeting in Paris from 17 October to 21 November 1972	Cultural heritage
Raw Materials Initiative [COM(2008)699]	Raw Materials
Restrictions on the marketing and use of certain dangerous substances and preparations (asbestos) [1999/77/CE]	Natural and man-made hazards
Floods Directive (2007/60/EC)	
Water Framework Directive (2000/60/EC)	
Thematic strategy for soil protection [COM(2006)231]	
Waste Directive (2008/98/EC)	Urban area management
National Urban Directives	
Identification and monitoring of national protected areas	

… Copernicus Core Services and the Application domains …

Copernicus Application Domain	Related Copernicus Service(s)	Link
Agriculture, Forestry and Fisheries		http://www.copernicus.eu/main/agriculture-forestry-and-fisheries
Biodiversity and Environmental Protection		http://www.copernicus.eu/main/biodiversity-and-environmental-protection
Climate and Energy		http://www.copernicus.eu/main/climate-and-energy
Civil Protection and Humanitarian Aid		http://www.copernicus.eu/main/civil-protection-and-humanitarian-aid
Pulic Health		http://www.copernicus.eu/main/public-health
Tourism		http://www.copernicus.eu/main/tourism
Transport and Safety		http://www.copernicus.eu/main/transport-and-safety
Urban and Regional Planning		http://www.copernicus.eu/main/urban-and-regional-planning

Legend

Copernicus Marine Environment Monitoring Service (CMEMS) Copernicus Land Monitoring Service (CLMS)
Copernicus Climate Change Service (C3S) Copenricus Emergency Managament Service (CEMS)
Copenricus Security Service (CSS) Copernicus Atmosphere Monitoring Service (CAMS)

Copernicus Users Comunities

Article 3
Definitions

For the purposes of this Regulation the following definitions apply:

… … …

(9) '**Copernicus users**' means:

(a) Copernicus core users: Union institutions and bodies, European, national, regional or local authorities entrusted with the definition, implementation, enforcement or monitoring of a public service or policy in the areas referred to in point (a) of Article 2(2);

(b) research users: universities or any other research and education organisations;

(c) commercial and private users;

(d) charities, non-governmental organisations and international organisations …

REGULATION (EU) N.377/2014.

The National User Forum is composed by Representatives of Public and Research Institutions, Industries and Enterprises.

Copernicus National User Forum

Cabina di regia Spazio for Space Economy and Space Activities
Presidency of the council of the Ministers

Outcomes

National and European space policy discussion – Copernicus National User requirement coordination

The Italian National User Forum Architecture

Responsible to the Presidency of The Council of the Ministers
National delegated to the Copernicus User Forum and Committee
Responsible for security aspects (Copernicus security board)

National members for the management of Copernicus Services

National representative in ESA, EUMETSAT, ECMWF, WMO, EEA, INSPIRE
National coordinating Boards representatives on the matter of Copernicus Service sectorial exploitation (even Downstream)

National User Forum Operational Boards:
Security, Infrastructure & Transports, Cultural Heritage, Agriculture, Environmental Controls,
Industry, Gerology, Climate, Hydrology.

Users Community Representatives

National, regional or local institutions, bodies and authorities entrusted with the definition, implementation, enforcement or monitoring of a public service or policy:
- Ministries
- Environmental control system
- Civil Protecion Service
- Italian Regions

Universities or any other research and education organisations
- Representative of Academia
- National representative of Research Bodies and Institutions

Industrial and commercial public and private enterprises
- Industrial Space and Aeronautic Associations
- Commercial EO Associations

charities, non-governmental organisations and international organisations
- National Convention for innovation policy and promotion

Copernicus National User Forum

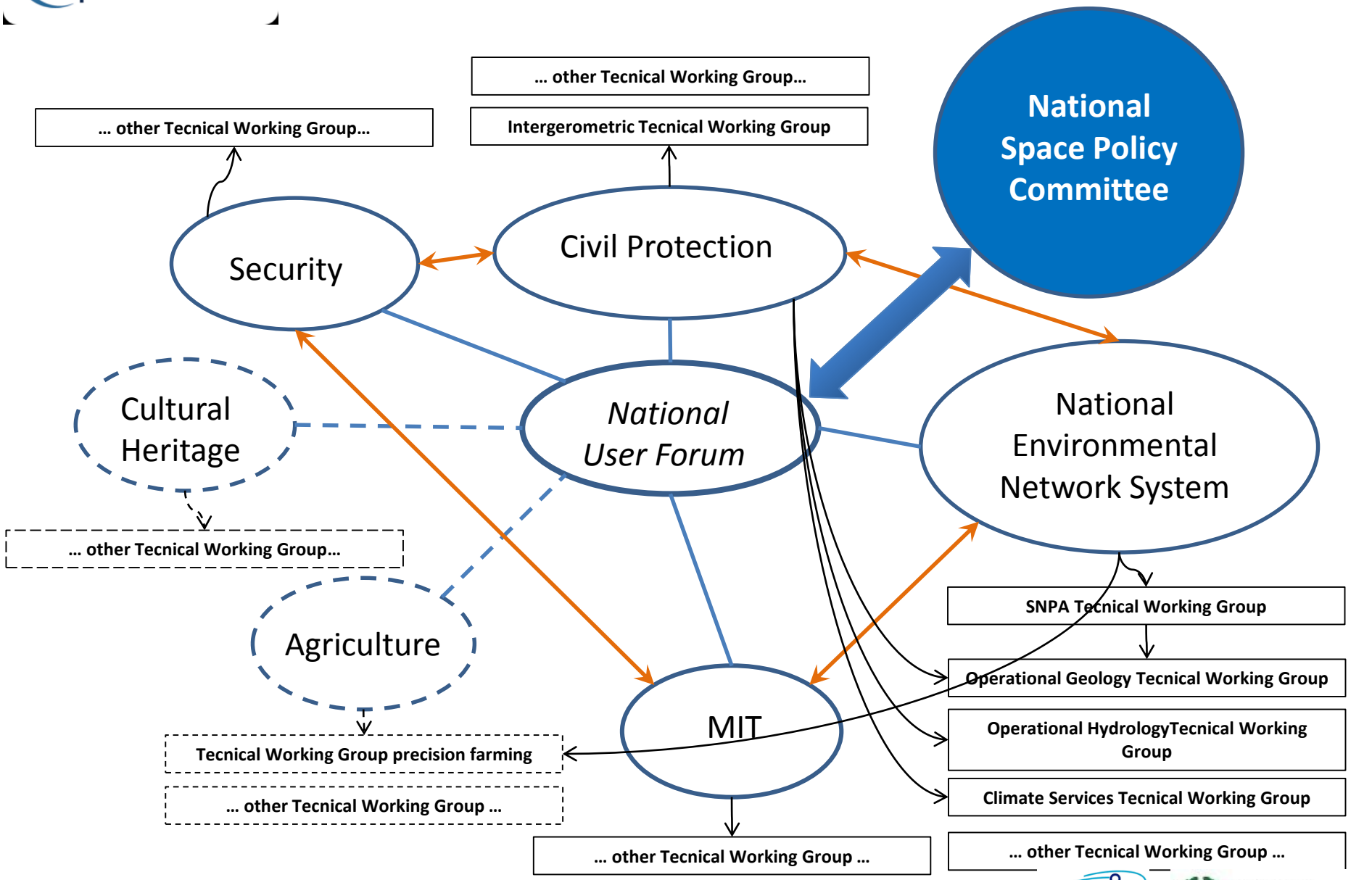
When?

The **Italian National Copernicus User Forum** has been formally constituted in December 2014.

Why?

The primary aim of the **National User Forum** is to **share information and coordinated decisions** about the ongoing and foreseen activities in the three Copernicus Committee, User Forum and Security Board. Moreover the **National User Forum** has been set up **to define the National and European state of play of the Copernicus Programme** as a whole, with focus on the **national users' needs and requirements**, and **to stimulate and produce a qualified, authoritative and coordinated national space policy in the Programme**, particularly regarding **all Core Services** offered at the European levels as well as **the Downstream Services** that can be originated from them.

Copernicus National User Forum



A full process to collect users needs and requirements

Fabbisogni e Requisiti utente: metodo di raccolta ed analisi

Identificazione utenti
Coinvolgimento nella raccolta requisiti

Analisi dei requisiti

Valutazione dai requisiti ai servizi operativi

Identificazione domini applicativi e normativa di riferimento

Identificazione delle comunità utente

Definizione e disseminazione della matrice di interazione

Raccolta dei contributi dagli utenti

Feedback

Analisi e prioritizzazione dei requisiti in funzione dei processi decisionali

Risultati

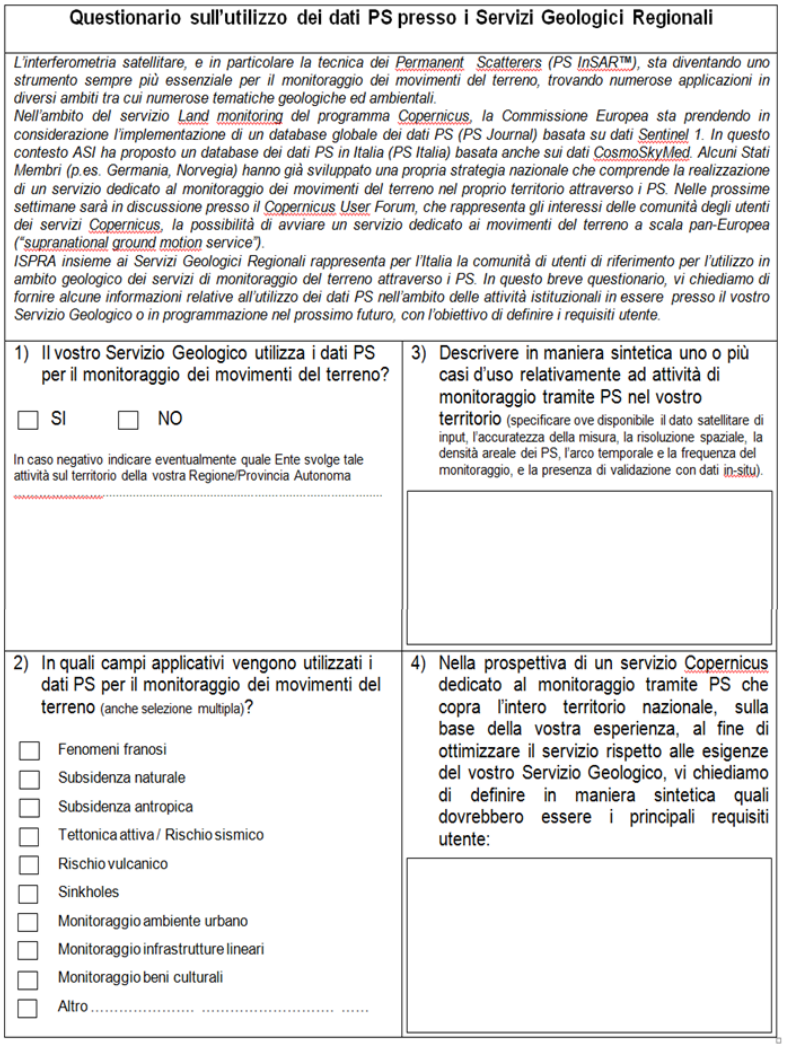
Visualizzazione delle priorità sui domini applicativi – requisiti - parametri

Associazione dei requisiti con prodotti (layers) già esitenti

Identificazione di prodotti e servizi da svilupppare

Survey ISPRA (2017) per il progetto: ***ITT ESA - Hyperspectral Imaging Mission Concepts***
ESA-ESRIN ITT AO/1-8579/16/I-SBo

A full process to collect users needs and requirements



Questionario sull'utilizzo dei dati PS presso i Servizi Geologici Regionali

L'interferometria satellitare, e in particolare la tecnica dei Permanent Scatterers (PS InSAR™), sta diventando uno strumento sempre più essenziale per il monitoraggio dei movimenti del terreno, trovando numerose applicazioni in diversi ambiti tra cui numerose tematiche geologiche ed ambientali.
Nell'ambito del servizio Land monitoring del programma Copernicus, la Commissione Europea sta prendendo in considerazione l'implementazione di un database globale dei dati PS (PS Journal) basata su dati Sentinel 1. In questo contesto ASI ha proposto un database dei dati PS in Italia (PS Italia) basata anche sui dati CosmoSkyMed. Alcuni Stati Membri (p.es. Germania, Norvegia) hanno già sviluppato una propria strategia nazionale che comprende la realizzazione di un servizio dedicato al monitoraggio dei movimenti del terreno nel proprio territorio attraverso i PS. Nelle prossime settimane sarà in discussione presso il Copernicus User Forum, che rappresenta gli interessi delle comunità degli utenti dei servizi Copernicus, la possibilità di avviare un servizio dedicato ai movimenti del terreno a scala pan-Europea ("supranational ground motion service").
ISPRA insieme ai Servizi Geologici Regionali rappresenta per l'Italia la comunità di utenti di riferimento per l'utilizzo in ambito geologico dei servizi di monitoraggio del terreno attraverso i PS. In questo breve questionario, vi chiediamo di fornire alcune informazioni relative all'utilizzo dei dati PS nell'ambito delle attività istituzionali in essere presso il vostro Servizio Geologico o in programmazione nel prossimo futuro, con l'obiettivo di definire i requisiti utente.

1) Il vostro Servizio Geologico utilizza i dati PS per il monitoraggio dei movimenti del terreno?

☐ SI ☐ NO

In caso negativo indicare eventualmente quale Ente svolge tale attività sul territorio della vostra Regione/Provincia Autonoma

2) In quali campi applicativi vengono utilizzati i dati PS per il monitoraggio dei movimenti del terreno (anche selezione multipla)?

- ☐ Fenomeni franosi
- ☐ Subsidenza naturale
- ☐ Subsidenza antropica
- ☐ Tettonica attiva / Rischio sismico
- ☐ Rischio vulcanico
- ☐ Sinkholes
- ☐ Monitoraggio ambiente urbano
- ☐ Monitoraggio infrastrutture lineari
- ☐ Monitoraggio beni culturali
- ☐ Altro .....

3) Descrivere in maniera sintetica uno o più casi d'uso relativamente ad attività di monitoraggio tramite PS nel vostro territorio (specificare ove disponibile il dato satellitare di input, l'accuratezza della misura, la risoluzione spaziale, la densità areale dei PS, l'arco temporale e la frequenza del monitoraggio, e la presenza di validazione con dati in-situ).

4) Nella prospettiva di un servizio Copernicus dedicato al monitoraggio tramite PS che copra l'intero territorio nazionale, sulla base della vostra esperienza, al fine di ottimizzare il servizio rispetto alle esigenze del vostro Servizio Geologico, vi chiediamo di definire in maniera sintetica quali dovrebbero essere i principali requisiti utente:

Ground motion

SNPA and Operational Geology Technical Working Groups moving towards the PS National Journal…

…the two Technical Working Groups were aimed to gather users needs and requirements through a sequence of connected questionnaires on the use of PS data to monitor the anomalous ground movement and to integrate the satellite born information into in-situ surveillance all over the Italian territory

…

A full process to collect users needs and requirements

From the user consultation to a qualified, codified authoritative requirement

Agenzia compilatrice:	Infrastruttura informatico-informativa	Infrastruttura di rete è allacciata o compatibile con la Rete GARR	Questa Agenzie è già connessa con l'ISPRA, altre Arpa/Appa ed istituzioni regionali	Questa Agenzia detiene licenze software per la gestione del dato spaziale (GIS) sia per l'elaborazione di dati satellitari (elaborazione/trattamento di immagini telerilevate)	Questa Agenzia possiede le risorse desktop (workstation) aggiornate per gestire dati spaziali	Questa agenzia gestisce e mantiene la rete di sensori per il monitoraggio della qualità dell'aria	Questa agenzia gestisce e mantiene la rete per il monitoraggio idro-pluvio-meteo e climatologico	Questa Agenzia dispone delle risorse necessarie per il monitoraggio delle variazioni ed evoluzioni del territorio	Questa agenzia gestisce e mantiene strumenti di misura per il monitoraggio dell'ambiente marino	Questa Agenzia gestisce e mantiene la rete di monitoraggio della qualità delle aque	Questa Agenzia è dotata di personale e delle competenze per la gestione delle infrastrutture informatico-informative e delle catene di processamento per il monitoraggio ambientale
ARPA Umbria											
ARPAV											
ARPA Valle d'Aosta											
ARPA PUGLIA											
Arpae Emilia-Romagna											
ARPA Liguria											
ARPA Piemonte											
ARPAC											
ARPA Lombardia											
ARPA Toscana											
Arpa FVG											
APPA Bolzano											

Programma:	Implementazione programma Mirror Copernicus	**Obiettivi: T5 – T6 – T7 –T8 – T9**
Project:	Componente SNPA	**Scheda:** S2
		Investimento: € 28.650.400

Titolo attività: Infrastrutturazione reti di monitoraggio

Rete di monitoraggio della qualità dell'aria: M24 – M36
Rete di monitoraggio idro-meteo-climatico: M6 – M24
Rete di monitoraggio variazioni ed evoluzioni territoriali: M6 – M24
Rete di monitoraggio ambiente marino: M6 – M24
Rete di monitoraggio del consumo di suolo: M0 – M12

Data di inizio: XX/XX/2017
Data di termine: XX/XX/2019

Implementazioni Correlate: Infrastrutturazione informatico-informativa e di rete

Obiettivo:

T5 – Modello nazionale di monitoraggio e previsionale della qualità dell'aria.
T6 - Completamento della rete di monitoraggio idro-pluvio-meteo-climatico regionale;
T7 - Monitoraggio delle variazioni ed evoluzioni territoriali a scala regionale e locale;
T8 - Completamento della rete per il monitoraggio dell'ambiente Marino.
T9 - Realizzazione di una rete di monitoraggio del consumo di suolo con elevata frequenza di aggiornamento

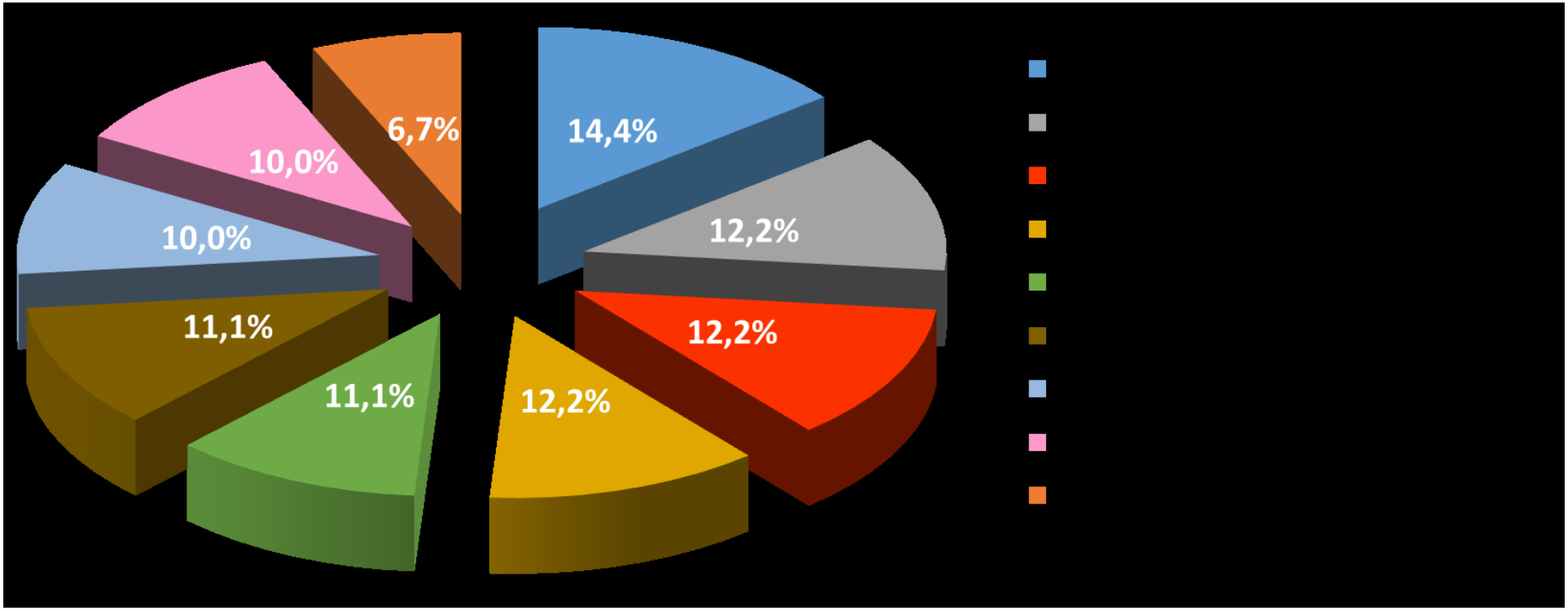
Attività:

R2 T5.01: Messa a in esercizio operativo in ambito CGS-ED del servizio pre-operativo realizzato nell'ambito dell'Accordo Quadro ASI-ISPRA finalizzato alla valutazione e previsione della qualità dell'aria a scala regionale e locale ed alla costruzione del modello nazionale di dispersione e trasformazione chimica degli inquinanti atmosferici, sulla base dell'integrazione del dato raccolto in-situ ed integrato con i prodotti Copernicus, utile alla costruzione dei modelli regionali.
R2 T5.02: manutenzione servizio (3 anni)
R3 T5.03: estensione del servizio a più modelli;

Some identified Services:

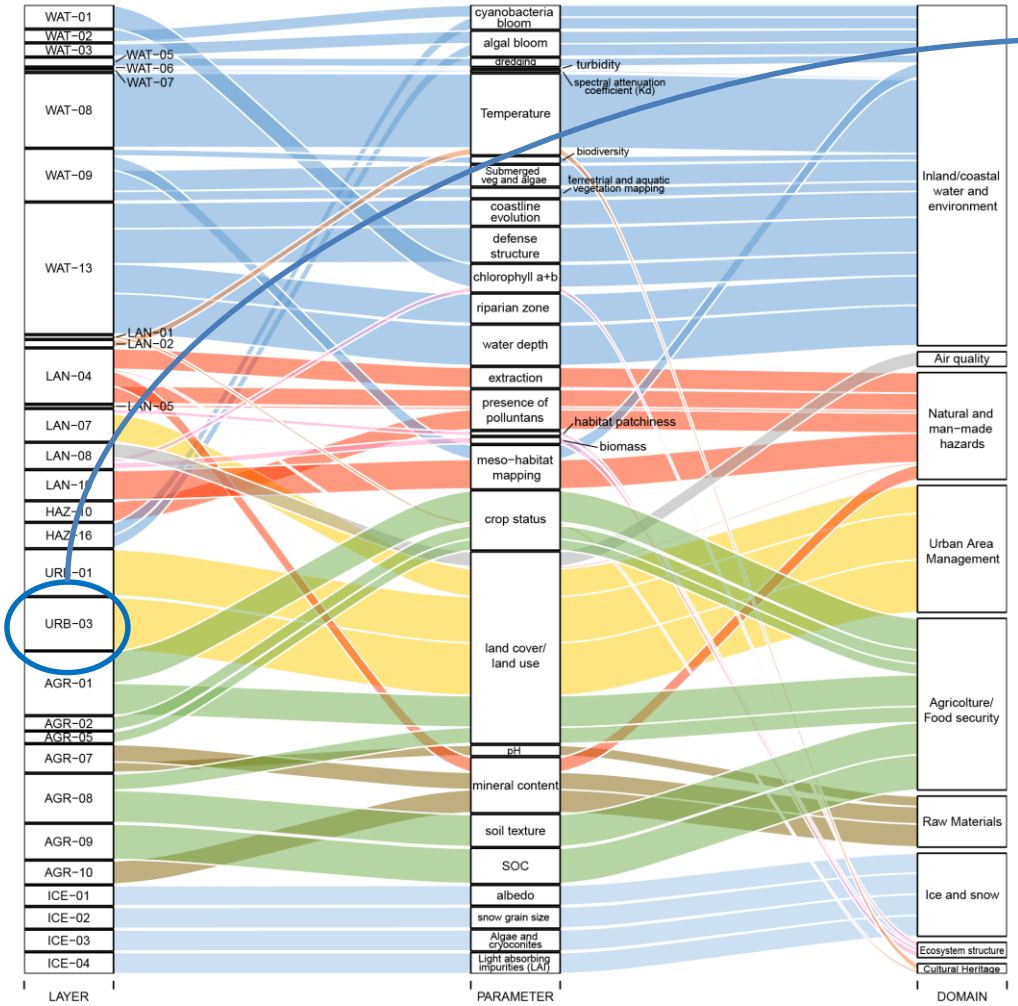
Envoronmental Control
Air qualitiy monitoring Service
Idro-geo Risk & Floods
Fresh and maine Water quality
Soil Sealing
Ground Motion & PS Journal
Oil Spill
Vessel Traking
Comunication infrastructure monitoring
Airports management
Maritime navigation services
Meteo-climate services…

Interest of the user community for the investigated application domains



A full process to collect users needs and requirements

Policy and Application Domain and the related parameters and layers



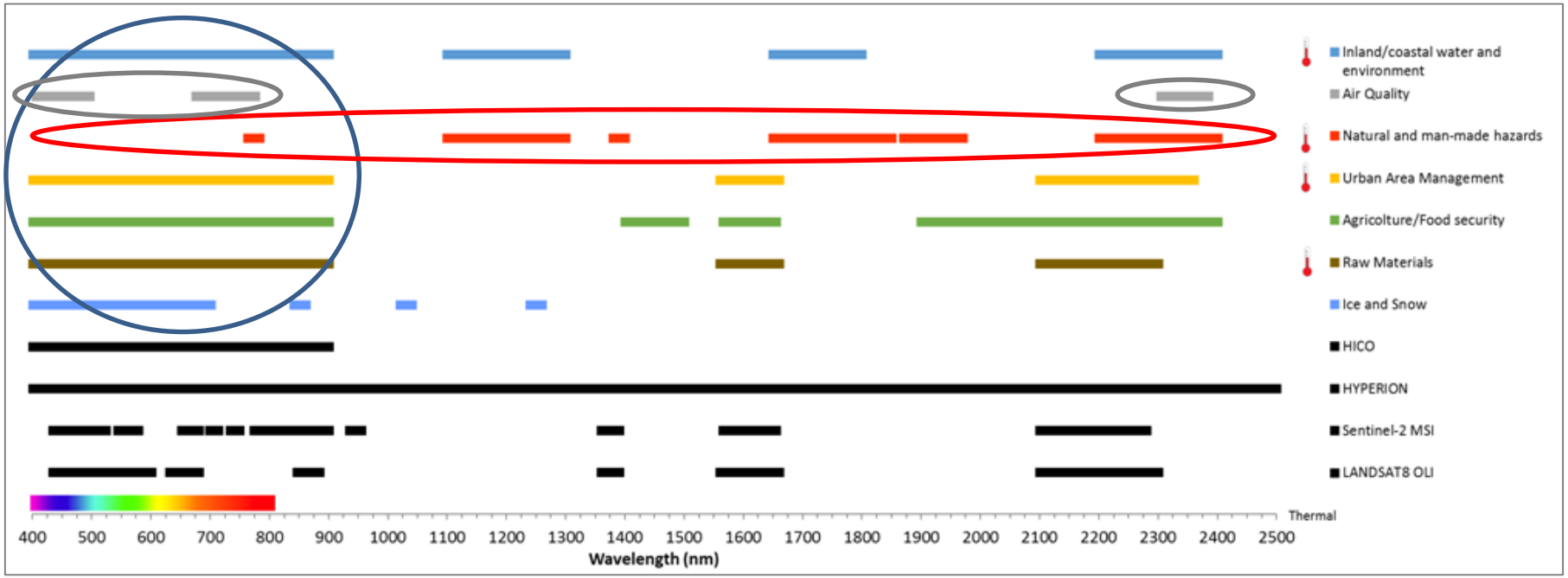
THE CONSOLIDATED LAYERS URB-03:
High Definition Asbestos Distribution Maps

1. COLORS REPRESENTS THE APPLICATION DOMAINS AND TRACE THE MAGNITUDE OF LINKS WITHIN THE TREE BLOCKS OF INFORMATION: THE CONSOLIDATED LAYERS, THE PARAMETERS AND THE SPECIFIC DOMAIN THEY FEED.

2. THE THICKNESS OF EACH LINKS REPRESENT THE IMPORTANCE VALUES ASSIGNED BY THE ENVIRONMENTAL CONTROL SYSTEM USERS' COMMUNITY TO THE PARAMETER / CONSOLIDATED LAYER ASSOCIATION .

Policy and Application Domains vs Spectral Ranges

Analysis of the consolidated layers and associated spectral ranges needs described by application domain.

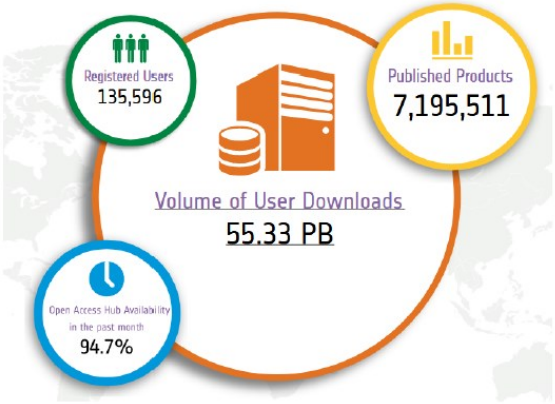


1. THERE ARE **SPECTRAL RANGES** RELEVANT IN TERMS OF NUMBER OF APPLICATIONS (VIS)
2. THERE ARE EXCLUSIVE **CONSOLIDATED LAYERS** THAT COVER THE EXTREMES OF THE SPECTRUM (AIR QUALITY)
3. THERE ARE **DOMAINS** THAT REQUIRE THE HYPERSPECTRAL MAPPING APPLICATIONS (NATURAL AND MANMADE HAZARD, COASTAL, AGRICULTURE)

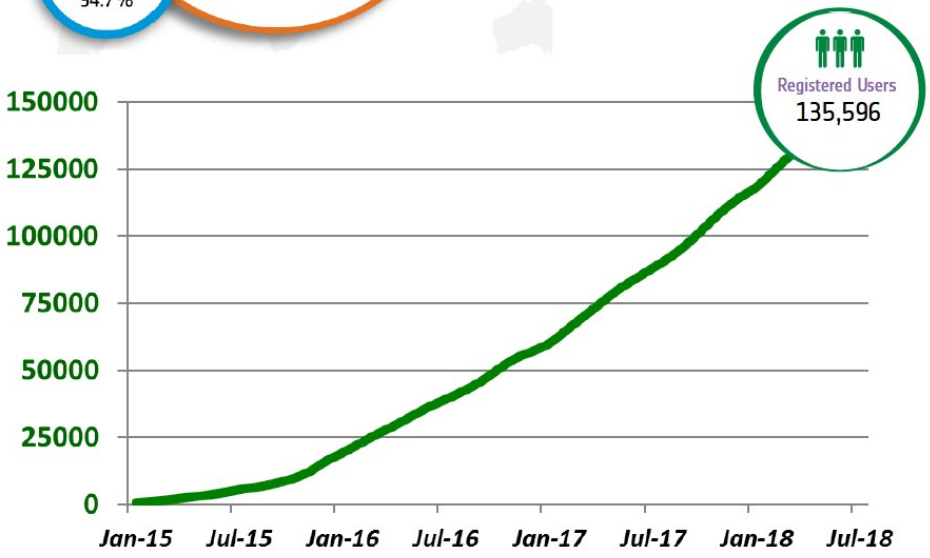
… Copernicus Sentinels Data Access: Users & Downloads…

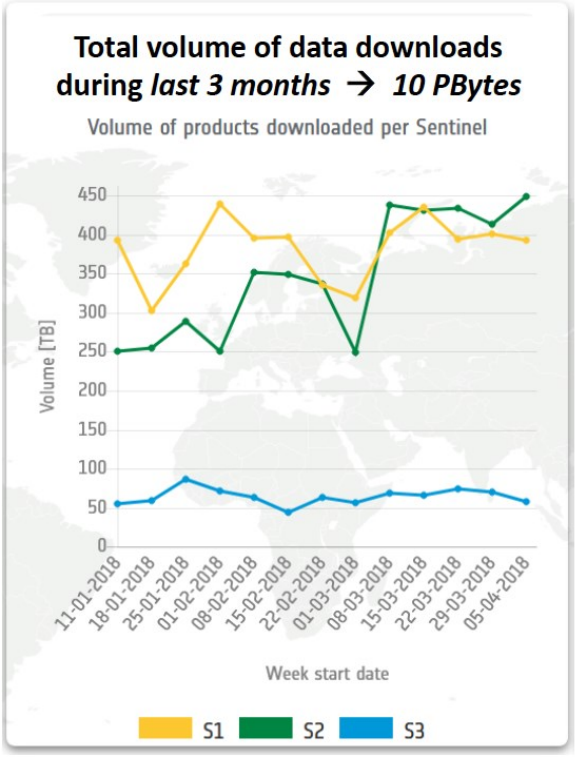
Data Access

Sentinels Data Access at ESA - Statistics



Statistics at mid-April 2018



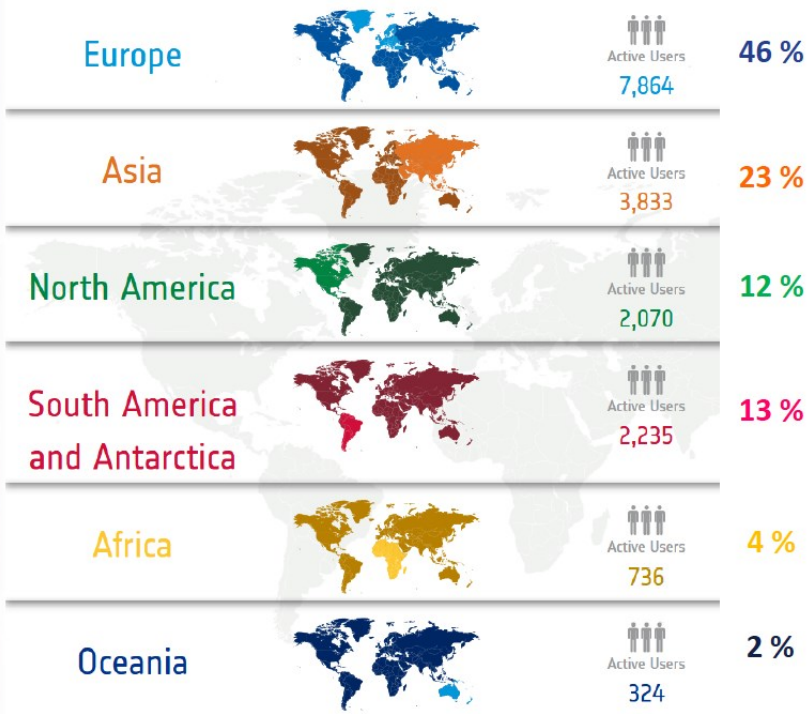


… Copernicus Sentinels Data Access: Users & Downloads…

Data Access

Sentinels Data Access – Open Access Hub

Distribution of active users on ESA Open Access Hub (i.e. downloading data) during *last 3 months*



Statistics at mid-April 2018

Statistics of ESA Open Access Hub do not include active users <u>downloading</u> Sentinel data through :

- ***Eumetsat (Sentinel-3)***
- ***Partners within national collaborative ground segment (in Europe)***
- ***Partners within international ground segment (e.g. US or Australia)***

Statistics of ESA Open Access Hub do not include active users <u>using</u> Sentinel data (without downloading products) through image visualisation and handling tools:

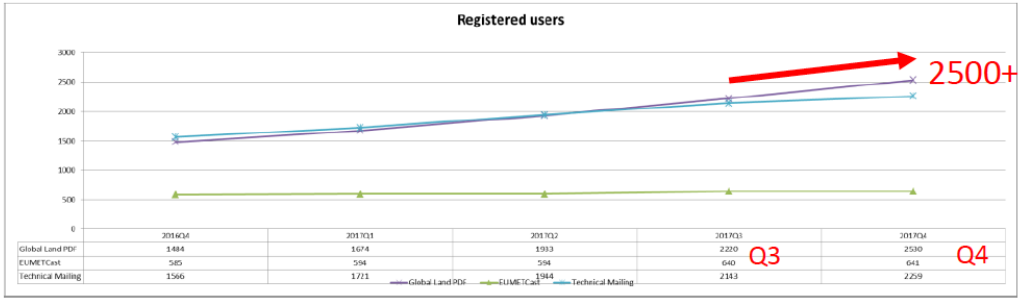
- ***"EO Browser"*** *(see next slide)*

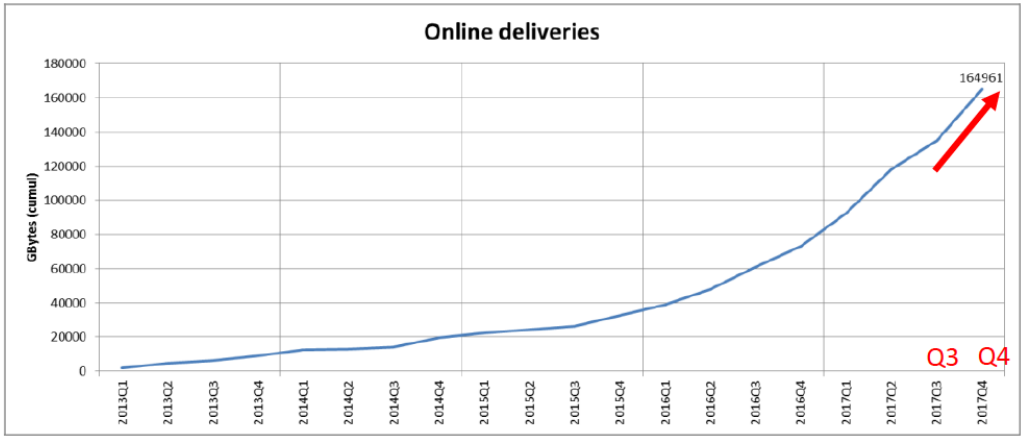
… Copernicus Land Monitoring Core Services: Users & Downloads…

Land Monitoring

Users and Downloads

- More than 2500 users are registered,
- An additional interface for time aggregation for cryosphere products will allow users to request several products simultaneously, is being tested.
- Preparations are in the final stage for the uptake of the first lake products (Lake Surface Water Temperature and Lake Water Quality).
- Data has been brokered to the Copernicus Climate Change Service (C3S), following their reformatting to netCDF4.





Copernicus Europe's eyes on Earth

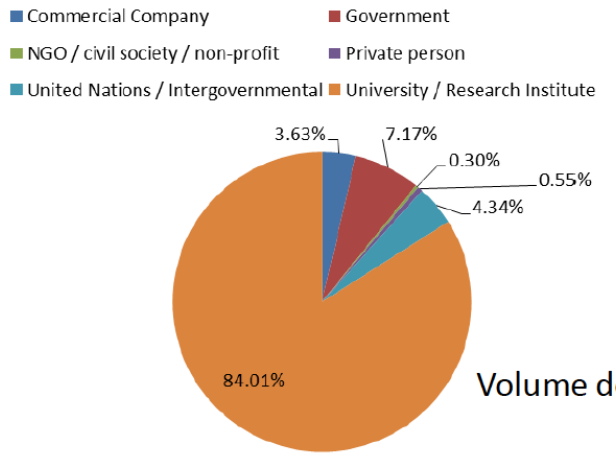
European Commission

… Copernicus Land Monitoring Core Services: Users & Downloads…

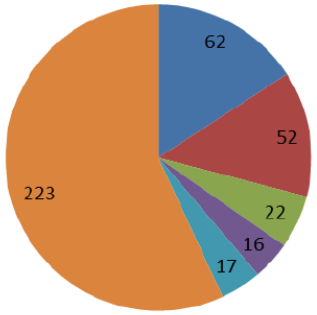
Land Monitoring

New Users Typology

- In terms of volumes, the UN/inter-governmental, Commercial company and Academic sectors show increases, with largest (relative) changes for UN/inter-governmental sector, which remains the smallest in absolute terms.
- In absolute figures, the Academic sector remains the largest.
- In terms of the number of users, comparison with the previous quarter shows increase for the academic sector (+24) and a slight decrease for national/regional Government



Volume downloaded



Number of users

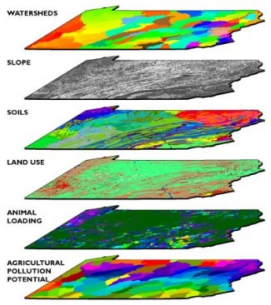
Copernicus Europe's eyes on Earth — European Commission

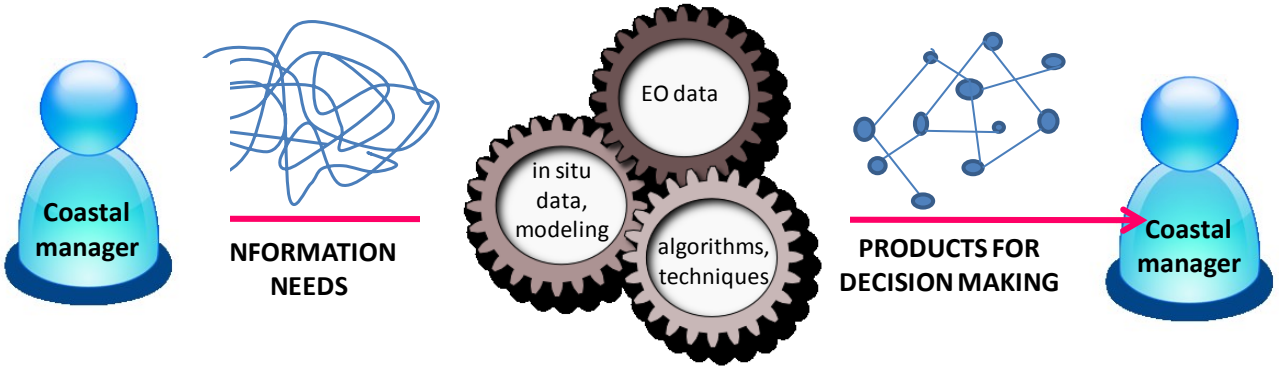
Mainstreaming EO products and services user-driven

"**Mainstreaming EO products and services user-driven**" means to make aware public and private users, and intermediate users as well, of the great advantages they certainly obtain by using EO products and services as well as to boost and set up the process of downstream services construction and offer on the free and mass market ….

FROM THE USER

FOR THE USER





Mainstreaming EO products and services user-driven

In its 2016 Communication on a European Space Strategy the Commission states that "*The Commission's aim is to optimise the benefits that space brings to society and the wider EU economy. Achieving this means boosting demand among public and private users, facilitating access to and use of space data, and stimulating the development and use of innovative downstream applications. It also means ensuring the continuity and user-driven development of EU space programmes.*"

Therefore, three basic action have to be set up:

- the **simplification of the existing system of heterogeneous platforms** to facilitate the users access to Copernicus data and services
- the **improvement of user uptake** of Copernicus data and services
- the promotion of the **development and offer of downstream services** derived from Copernicus data and information

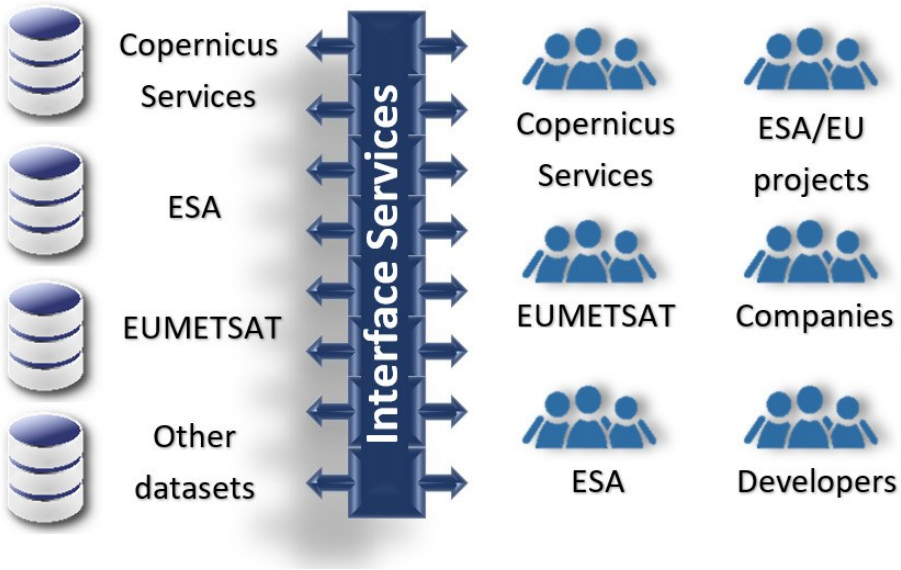
DIAS: A game changer for accessing and processing Copernicus data and information ...

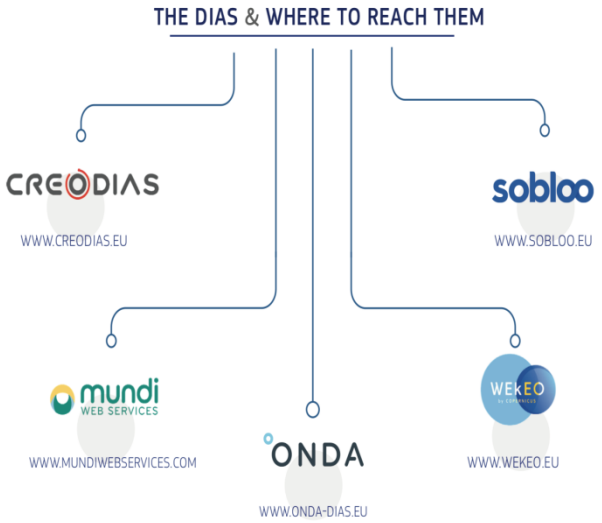
The mass sharing and use of Copernicus data and information started across a series of heterogeneous platforms while the user carried the burden of download, processing and storage. To facilitate and standardise access to this data, the European Commission is funding the deployment of five cloud-based platforms providing centralised access to Copernicus data and information, as well as to processing tools.

These platforms are known as the DIAS, or Data and Information Access Services.

The five DIAS online platforms allow users to discover, manipulate, process and download Copernicus data and information. Each platform provides access to the full set of Copernicus data and information, as well as the ability to process and combine it with data from other sources (space and non-space). Their cloud-based systems architecture performs the heavy lifting on the back end, so users get coherent and analysis-ready information on the front end. Because the DIAS platforms are providing mass storage and handling of data, users can begin using information from a single entry point.

DIAS: A game changer for accessing and processing Copernicus data and information ...





- **'Creodias – http://www.creodias.eu' :** Creotech (PL) with cloud provider CloudFerro (PL)
- **'ONDA – http://www.onda-dias.eu' :** Serco (IT) with cloud provider OVH (FR)
- **'SOBLOO** – http://www.sobloo.eu' : Airbus (FR) with cloud provider Orange (FR)
- **'Mundiwebservices – www.mundiwebservices.com' :** ATOS (FR) with cloud provider T-Systems (DE)
- '**WeKEO – http://wekeo.eu' :** EUMETSAT, with Mercator Ocean and ECMWF

… the Copernicus User Uptake and the National User Forum activities …

A principal element of achieving this aim is to enhance user uptake of Copernicus data and services. The Commission has defined a User Uptake Strategy (CUF-2016-73), identifying objectives, key principles and 16 specific actions to implement user uptake measures in the framework of Copernicus.

EU Member States and Copernicus Participating States have been implementing user uptake measures at the national level for a long time. Such measures have included national coordination mechanisms ("User Fora"), funding provision for downstream service/application development or information activities, including topical workshops, events, or innovative development and matchmaking formats.

Then, some important user uptake measures to be implemented at the national level are:

- National topical workshops at along with sectorial seminars
- Relays and Copernicus Academy coordinate activities.
- FabSpace networking and activities
- National OpenGeoData and Satellite Facilities Schools

…How does the national forum work?...

Thematic Workshops *organized* by the National User Forum

Agriculture – From satellite information to in-situ data (9 December 2014)

Organized in the frame of a Memorandum of Understanding between ISPRA and the Ministry of Agricolture (MIPAAF), the workshop aimed to stress the integration of different data source to improve tools and methods to better support EU Directives implementation.

… … …

Thematic Workshops organized & contaminated by the National User Forum

National Workshop

From Core Services to User Uptake - Downstream Potential for SME (11/15)

Provide elements on the state of involvement, perspectives and position of SME, Start-up and Spin-off in the frame of Copernicus downstream Services, upstream processes and in the European Space Sector outside the Copernicus boundaries

… … …

Seminars on

(Feb. 2016 – **Security Services** – Coast Guard – Port Authority)

… … …

Events (2017):

Climate Services (27/02 – EC, ECMWF)

… … …

…How does the national forum work?...

Copernicus Relays and the Copernicus Academy

To unleash the full potential of the Copernicus Open Data and Information, the European Commission is running several initiatives to ensure that current and potential users of Copernicus can make the most of the Programme and its data, in Europe and beyond.

Two networks were launched at the end 2016:
The Copernicus Relays is to ensure that information on the benefits and potential applications of the programme are unleashed at local level, to foster the awareness and use of Copernicus by local user communities;
The Copernicus Academy is to empower the next generation of researchers, scientists, and entrepreneurs and ensure they have suitable skill sets to use Copernicus open data and that results of research hit the market in a fast and efficient manner, to develop interdisciplinary educational, training and skills activities.

The Copernicus Networks wish to allow both the Copernicus programme and its users to work together to enlarge its user base and unleash its positive impact on the economy and society through concrete actions.

…How does the national forum work?...

Copernicus Relays and the relationships with the National Copernicus User Forum

The Network of Copernicus Relays is a concept and process whereby the Commission will work closely with different stakeholders / multipliers in view of fostering the use of Copernicus data and information within the SM.

The Relays are to be recognized by users as dedicated representatives and permanent interlocutors on Copernicus, acting as principal helpdesks/information points on the Programme. The Relays will act as multipliers, developing initiative s to reach two different sets of objectives:

1. To promote Copernicus as a sustainable source of free, open and reliable information to meet the **needs of local public services**.

2. To promote Copernicus as sustainable source of full, free, open, and reliable data for the **development of environmental services with high commercial potential by local entrepreneurs.**

- Relays should ensure complementarity with ongoing and future initiatives undertaken by existing national activities.
- The Relays will be considered as operational actors in coordination with the National User Forum and the Relays Network providing support to the coordination of Copernicus-related activities in their area of influence.
- Relays shall work closely with the representatives of the Copernicus Participating Countries in the Copernicus political fora (Copernicus European User Forum and Committee).
- Relays should primarily focus on activities developed at local and regional levels.
- Copernicus Relays, in cooperation with Participating Countries Representatives, may support the promotion of uptake opportunities that may arise at national level and Could help further stimulate the Network.

…How does the national forum work?...

Copernicus Academy and the relationships with the National Copernicus User Forum

CALL FOR EXPRESSION OF INTEREST COPERNICUS ACADEMY NETWORK

RELEVANCE FOR THE CALL

Among the many recommendation the Commission suggests to "Enlarge the pool of Copernicus---savvy students and researchers". This strategy is crucial in order to create a generation of end---users across sectors: not only in space applications domains but across sectors. It is therefore important to create awareness in universities and business schools. The aim is to implement what is now the role of Copernicus Academy and to make this an independent process among a network of universities.

The main actions identified in order to reach the objectives are:
-**Develop set of curse material** on Copernicus data and information under a public license;
-**Develop** a systematic plan to organize **Copernicus lectures;**
-**Form the Copernicus Universities Alliance** to stimulate cooperation on knowledge building;
-**Support Summer Schools.**

The Copernicus Academy Network has the main objective to **bridge the gap between skills and data use and uptake.**

The Commission spells out some important points to take into consideration in the application for the open call. Among them is the focus on **interdisciplinary and cross-sectorial skills** for potential users in order to boost diverse knowledge areas.

Moreover the Commissions is stressing the need to increase the **marketability** of Copernicus related research and innovation by fostering **private-academic partnership.**

The prerogative for the success of the Copernicus Academy Network is the involvement of **national stakeholders** to become part of the Network.

The Space Economy recipe for the construction of a national downstream industry

The European Space strategy should be mainly devoted to the **onset** in **Europe** of a **sustainable Space Economy.** This objective can be achieved only through a **strong downstream services** development process.

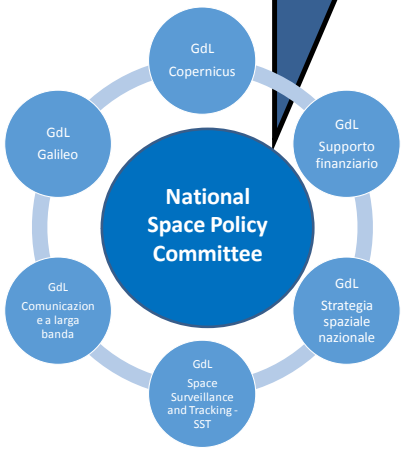
According with the **Space Strategy for Europe** and the analysis carried out in the Italian **Cabina di regia Spazio**, the main elements of the Space Economy recipe are:

- **lowering technical barriers** related to the exploitation of space technologies;
- **improving general market conditions**, establishing a favorable regulatory framework, assuring a long term **anchor tenancy** for services demand;
- **addressing the matching of demand and supply sides of the value chains through suitable PPP partnership frameworks**, with the aim of establishing a solid EU based.

Therefore, at National level, a **Space Economy Strategic Plan** has been defined with the aim to broaden the scope of exploitation of space activities and develop the adaptation, adoption and use of space systems, products, services and applications also in **non-space markets.**

Space Economy Strategic Plan Pillars

Space Economy National Strategic Plan



Mirror Galileo	*National Infrastructure- Galileo*
Mirror SST	*National Infrastructure- SST*
Mirror Copernicus	*National Infrastructure- Copernicus*
Mirror PRS	*National Infrastructure- Galileo PRS*
Telecomunication	*National Infrastructure- GOVSATCOM*
Space Technology and Exploration	*National Plan – Svil.Tech esplor.spazio*
Activity Plan	Public Private Partnership

National Investiment SFC

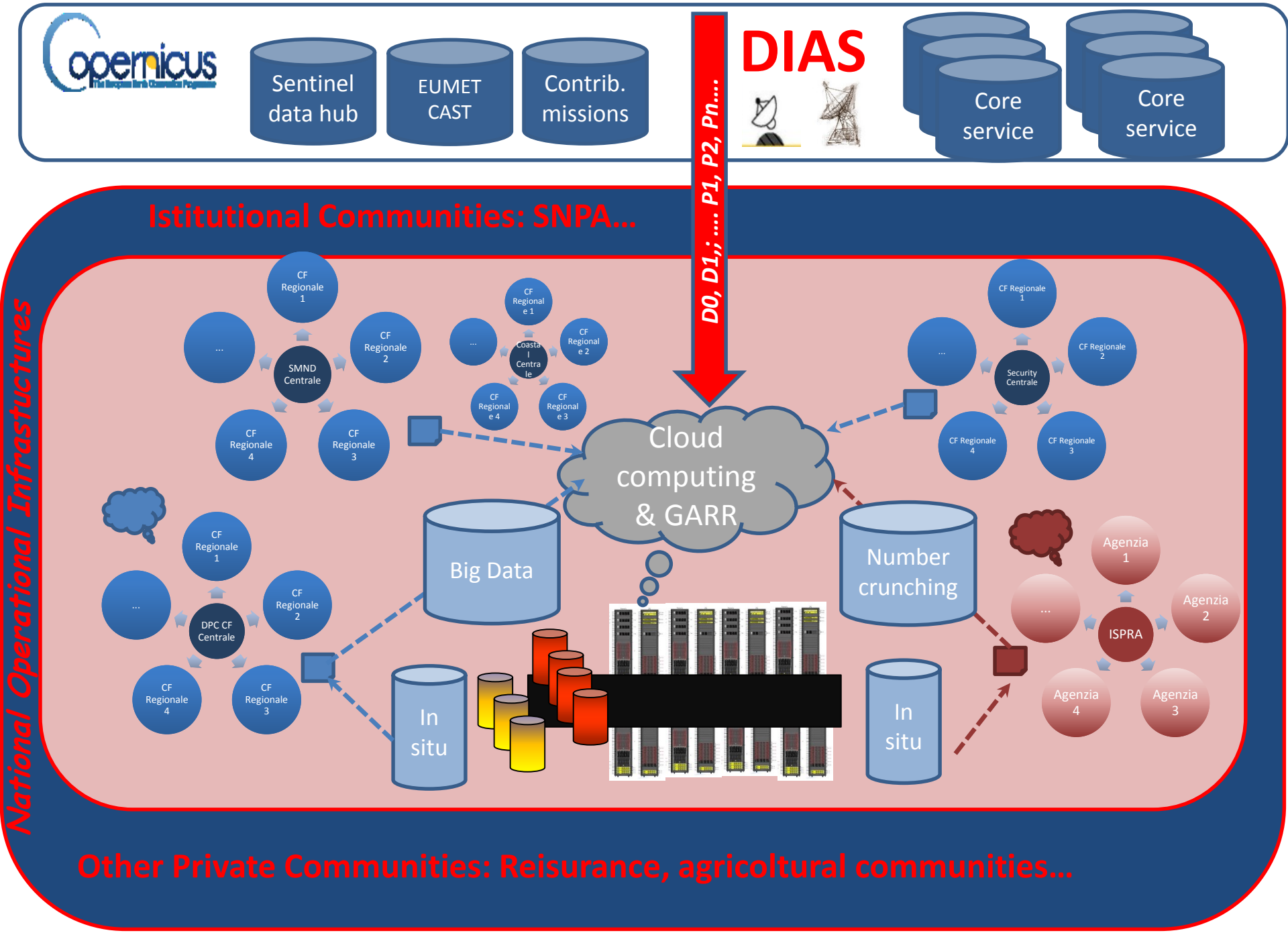
Mirror Copernicus:
National Operational Infrastructures

The Mirror Copernicus program is the main investment within the National Strategic Plan, **500 Meuro**, building a set of **National Operational Infrastructures** based on a public user requirements and needs :

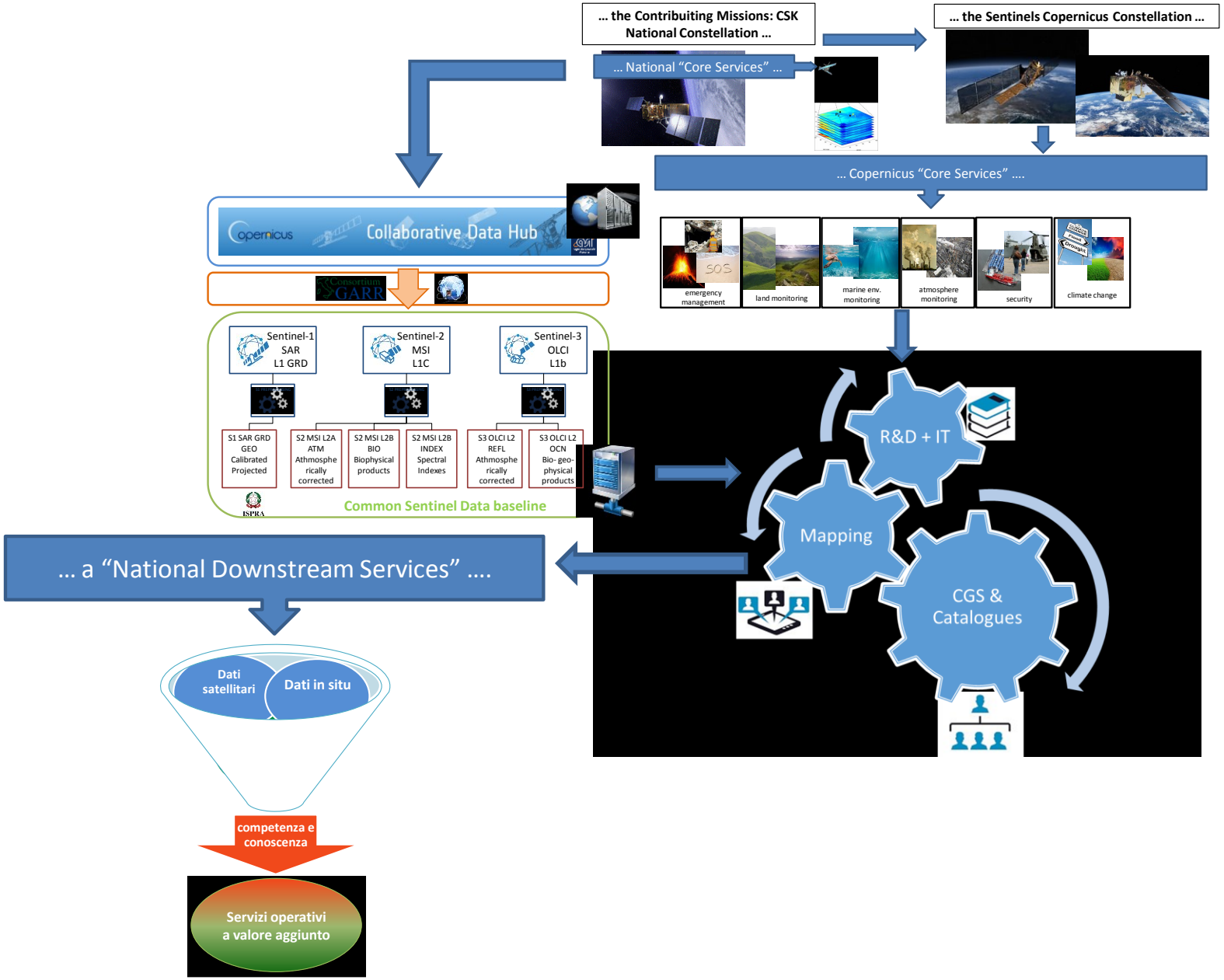
- **National Operational Infrastructure for Environmental Monitoring** (Sistema Nazionale per la Protezione e l' Ambiente SNPA, ex art.15 del DM 21 maggio 2010 n. 123);
- **National Operational Infrastructure for Emergency and Risk Assesment** (National Civil Protection Department, ex L. 225/92 s.m.i)
- **National Operational Infrastructure Meteo-Climatic Service** ;
- **National Operational Infrastructure for security and defence**;
- **National Operational Infrastructure for Coastal Monitoring** (Centro nazionale ISPRA);

(PI-ION)

- **National Operational Infrastrutures data and information access platform**.


Sentinel data hub
EUMET CAST
Contrib. missions
DIAS
Core service
Core service
D0, D1,; .... P1, P2, Pn....
Istitutional Communities: SNPA...
National Operational Infrastuctures
CF Regionale 1
CF Regionale 2
CF Regionale 3
CF Regionale 4
SMND Centrale
Coastal Centrale
Security Centrale
DPC CF Centrale
ISPRA
Agenzia 1
Agenzia 2
Agenzia 3
Agenzia 4
Cloud computing & GARR
Big Data
Number crunching
In situ
In situ
Other Private Communities: Reisurance, agricoltural communities...

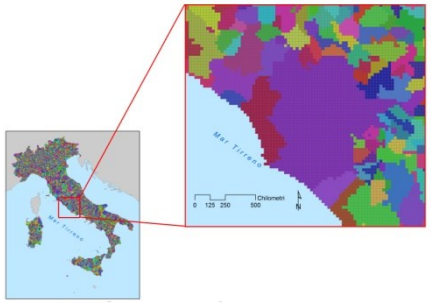
A downstream service construction

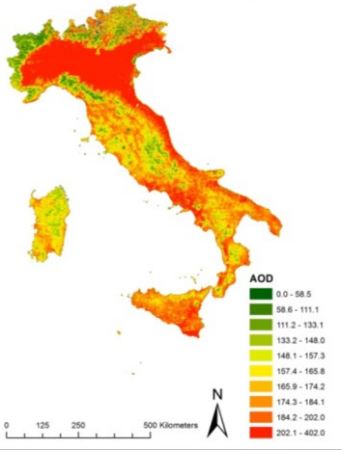


Valutazione annuale/stagionale e di scenario

INPUT

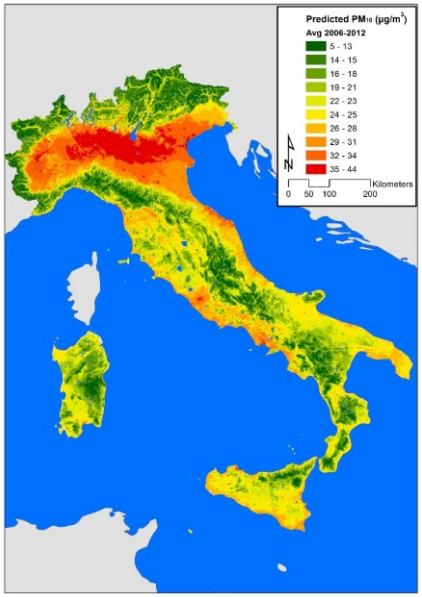
- Dati delle reti di monitoraggio
- Variabili di land use
- Dati di osservazione dallo spazio (AOD)
- Variabili emissive





METODO

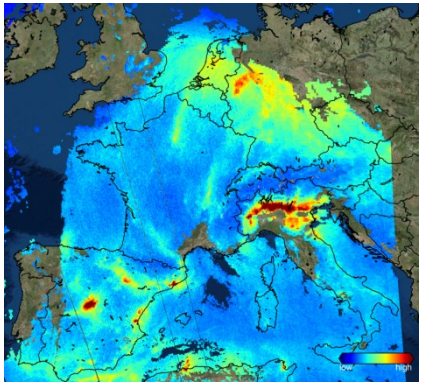
Sviluppo di modelli empirici ad alta risoluzione spaziale e temporale



Collaborazione con DIP EPIDEMIOLOGIA SSNR LAZIO

OUTPUT

Miglioramento delle stime con l'uso di dati Sentinel 3 e 5p



Estensione ai gas e al PM 2.5 di quanto già fatto per il PM10 con dati NASA

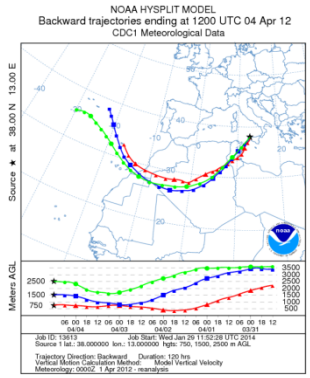
Servizio preoperativo di rianalisi annuale/stagionale

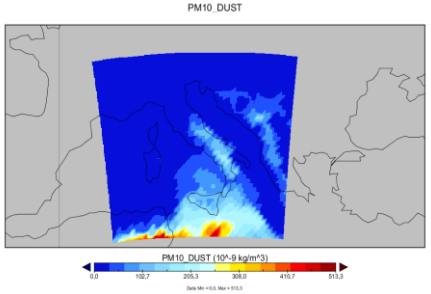
Servizi operativi Qualità dell'aria

Eventi accidentali e naturali all'inquinamento atmosferico

INPUT

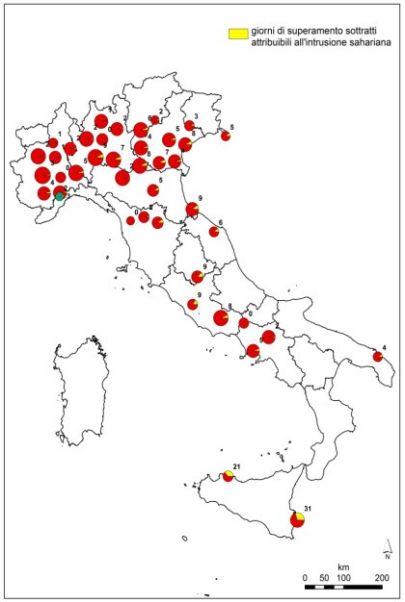
- Dati delle reti di monitoraggio
- DB Corpo Forestale
- Stime emissive ISPRA
- Strumenti di identificazione





METODO

Identificazione e stima del contributo alle concentrazione nei giorni di evento



Collaborazione con ARPA LAZIO, ARPA PIEMONTE

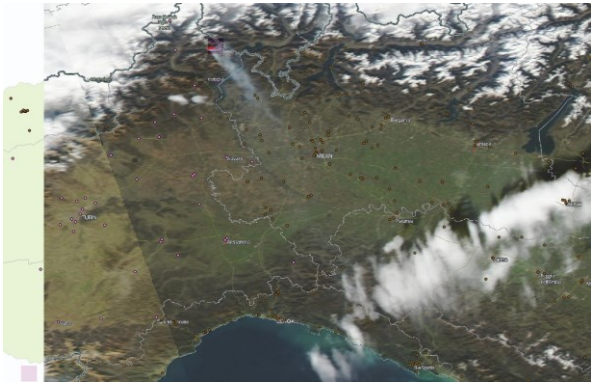
OUTPUT

Estensione agli eventi accidentali (incendi) del metodo di quantificazione (in forma prototipale)

Miglioramento delle stime con l'uso di dati Sentinel 3 e 5p e prodotti CAMS

Automatizzazione del processo di identificazione di eventi naturali

Servizio preoperativo di rianalisi annuale/stagionale



RIFERIMENTI NORMATIVI: Directive 2008/50/EC; Directive 2004/107/EC
SEC(2011) 208 final: establishing guidelines for demonstration and subtraction of exceedances attributable to natural sources under the Directive 2008/50/EC on ambient air quality and cleaner air for Europe

… Framework Partnership Agreement …

As part of its user uptake strategy for Copernicus, the European Commission published a Call for Proposals for the establishment of the **Caroline Herschel Framework Partnership Agreement** (**FPA**) between the European Commission and Copernicus Member States.

This 4-year FPA, which is undoubtedly one of the most important measures implemented by the European Commission in the context of the Copernicus user uptake activities, will facilitate the co-financing by the European Commission of national, regional and local actions in the Copernicus Participating Countries.

The FPA will establish a contractual canvas setting programmatic objectives as well as the governance and scope of actions to be funded and carried out through **Specific Grant Agreements**.

The FPA includes three different action lines (referred to as "Tiers"):
Tier 1: national user uptake. The activities under this tier will aim at organising national or local awareness events, training sessions, online courses, hackathons, etc.
Tier 2: global action. The activities under this tier will aim at supporting European cross-borders user uptake (e.g. actions or events organised in several Member States) and the internationalisation of European companies offering applications based on Copernicus and space data
Tier 3: business solutions and innovative products and applications. The activities under this tier will aim at supporting innovation businesses and start-ups, their incubation and maturity, providing them with access to finance, lifting administrative and legal barriers, etc.

Applicants would be established in one of the Copernicus Participating States (28 Member States of the European Union + Norway and Iceland).

Applications would be presented by a consortium of Member States, represented by public bodies (or bodies with a public service mission).

… thanks !…

Bernardo De Bernardinis,
National Delegate to Copernicus User Forum and Coordinator of National User Forum