

Creating a European Marketplace for Earth Observation Services



Position Paper prepared by EARSC
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EARSC, the European Association of Remote Sensing Companies represents the Earth Observation geo-information services sector in Europe. Today EARSC has 76 members (67 full members and 9 observers), coming from 23 countries covering the full EO services value chain including commercial operators of EO satellites, resellers of data, value-adding companies, geospatial information suppliers, consultancies and system/software providers. The sector plays a key role in providing value-added, geo-spatial information to its customers in Europe and the world. In 2014, the revenue of the sector in Europe was €900m giving work to 6800 highly skilled employees; it has been growing at around 8 % per annum. The sector is dominated by small and medium enterprises with over 95 % of the companies having less than 50 and over 60 % having less than 10 persons employed.

This paper reflects the views of the full members of EARSC which are commercial companies, coming from Member States in the EU or in ESA, providing services (including consultancy) or supplying equipment in the field of remote sensing or using EO data. EARSC observer members are informed and may have commented on the paper but are not necessarily endorsing its conclusions.

Introduction

The recent launch of the Sentinel 1 and 2 satellites heralds a new era in Earth Observation (EO). The first two satellites of the Copernicus programme will soon be followed by many more and we can truly say that we enter a world where Earth Observation moves out of the science and military worlds and into our everyday lives.

Consequently, the EO services sector is evolving very rapidly. New and innovative satellite operators are entering the market especially in the US, new data sources are emerging - including unmanned aircraft systems (UAS) and crowd or citizen sources using mobile technologies - and large IT companies such as Google and Amazon are seeking to establish global, geospatial, businesses. All is leading to more data and many more potential opportunities to exploit it.

Europe boasts an active and vibrant EO services sector, with over 500 companies spread through the Member States making over €900m revenues and generating nearly 7000 highly skilled jobs in 2014 (according to EARSC industry survey 2015¹). The sector is growing steadily at 8-10% per annum over the last 10 years and this is anticipated to continue supported significantly by Copernicus, the world's first operational, civil, EO programme. Nevertheless, the fragmentation of the industry is both a strength and a weakness. It is a strength where a rich diversity of skills and innovative ideas can flourish spread throughout European Member States. It is a strength where it drives partnerships and collaborative ventures combining these diverse skills. But it is a weakness when it comes to reaching new

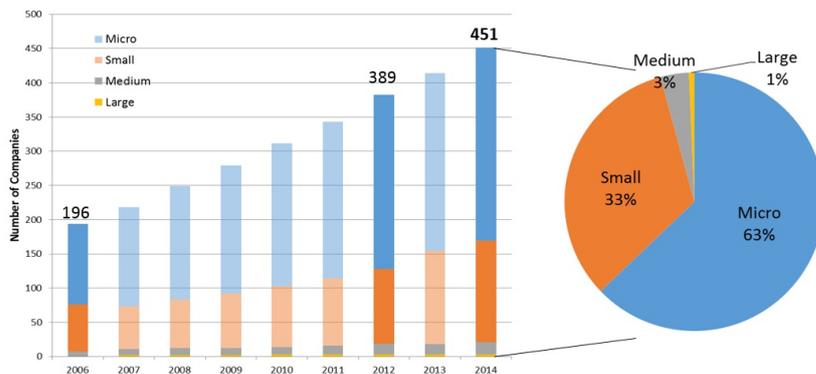
markets both in Europe and for exports especially if companies become dependent on the business models of other, much more powerful companies and potential competitors.

The €7b investment already made by EU Member States in Copernicus, is designed to enable European decision makers' non-dependence on strategic geospatial information coming from anywhere in the world, including data and information for climate change negotiations, for security and humanitarian operations and for peacekeeping. Copernicus also promises to create new jobs and new businesses in Europe as part of the digital "big data" age.

Yet the achievement of these objectives is at severe risk due to under-investment in the infrastructure necessary to make the data available. Google or Amazon are systematically acquiring all the Sentinel data - which they can do legally under the Free and Open data policy of Copernicus - and in the near future may offer the best way for European governments and industry to access Copernicus data.

Hence, we consider that an alternative, complementary marketplace is needed, offering robust and reliable services to end users and intermediate users alike, building on Europe's strengths and operated with European values encouraging innovation, the use of open data, and the protection of the rights of both supplier and client. Like a virtual town square, high street or shopping mall it must be a marketplace open on acceptable terms to anyone for doing business.

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1. EARSC 2015 Survey into the State and Health of the European EO Services Industry

A growing market

The quantity of data is exploding in every direction. Every individual, business and government is both generating data and consuming it. Commentators consider that the data revolution has already started¹. Earth Observation data is a key part of this data explosion with the Sentinel satellites forecast to deliver 8-10TB of data per day² and more and more in-situ data acquisition systems as well as citizens delivering huge quantities of data. For the EO services industry, whilst EO data is the primary raw material with which they work, they depend on its combination with other data sources to generate commercial geospatial products and services.

Some examples where EO data will be a core component to be combined with other data sources are:



The future evolving market for carbon trading where global intelligence is essential for policy makers and commercial actors. New information products to support the market will be needed. According to the World Bank, the value of the carbon pricing mechanism in 2015 is \$50b³.



Agriculture services both to serve farmers in precision farming methods and to help them address increasingly demanding environmental goals such as the EU water quality directive where EO data together with in-situ, meteo, biological and socio-economic data will inform policy makers and citizens regarding healthy and sustainable practices.



Health services where EO data combined with in-situ and meteo data can inform on conditions and risk as well as providing evidence for policy decisions ranging from construction to schools and urban planning. Such an approach supports the Smart Cities initiative of the EU.



Marine information which can serve commercial companies (shipping, fisheries, off-shore) as well as citizens (coastal waters, beaches) and policy makers (pollution) linked to scientific communities providing research into the environment and the global climate system



Citizen risk from natural hazards and supporting mitigation through better, more-directed information allowing citizens to take more-informed decisions and supporting public security services to protect them from extreme events.

These five examples demonstrate some of the potential where surely more domains will emerge as the technology matures and we start to get to grips with the data which is emerging.

But so far, these data are largely unconnected and businesses wishing to offer new products and service have first to work out how to access the data from different organisations, with different formats and limited rights before they can consider any offer to the market. They then face legal and technical issues, not to mention competition coming from the enthusiasm of some public sector bodies to offer their services to new clients both in Europe and world-wide. Hence the Marketplace for EO Services will offer all companies and customers a simpler way to develop and sell products and with a low transaction cost.

"For the EO services industry, whilst EO data is the primary raw material with which they work, they depend on its combination with other data sources to generate commercial geospatial products and services."

1. Four Ways Big Data Will Change Every Business <http://www.forbes.com/sites/bernardmarr/2015/09/08/4-ways-big-data-will-change-every-business/>
2. <https://eos.org/profiles/sentinel-satellites-initiate-new-era-earth-observation>
3. World Bank; Carbon Pricing Watch 2015, <http://documents.worldbank.org/curated/en/2015/09/25053834/state-trends-carbon-pricing-2015>

European Investment at Risk

The €7b EU investment in Copernicus has been mainly dedicated to the deployment of the space infrastructure and the roll-out of publicly driven Copernicus Services. Data and information coming from Copernicus will be a rich asset to be exploited as has been foreseen by the EU in the programme objectives. Yet two core objectives of Copernicus, namely supporting the European non-dependence and fostering the development of a competitive European industry, risk to be missed.

From the 2005 EC Communication starting the GMES programme, SEC(2005)1432

“At a time when the command and appropriate use of information has important geo-strategic implications, Europe needs to have the capacity to independently evaluate its policy responses in a reliable and timely manner.”

From the 2014 EU Regulation establishing the Copernicus programme as being operational, 377/2014

“Objective: fostering the development of a competitive European space and services industry and maximising opportunities for European enterprises to develop and provide innovative Earth observation systems and services”

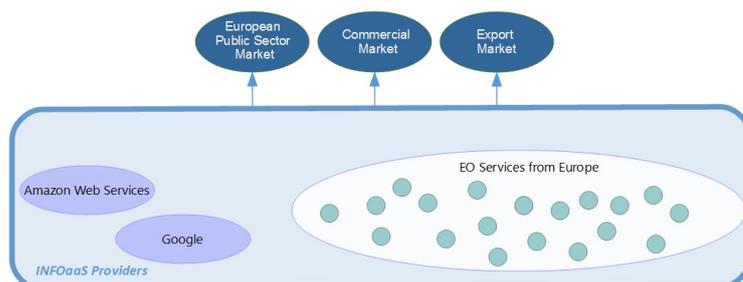
These two objectives are tightly linked to the free and open data policy for Copernicus which was supported by the European industry as a means towards the development of the downstream sector on the precept that European industry would be offered better access than overseas competitors. Yet government investments have favoured national initiatives which has further re-enforced the fragmentation of the sector.

In the US, the 2003 Commercial Remote Sensing Act opened the market to private ventures leading more recently to a number of

new start-ups launching and operating EO satellites. Through clarifying the boundary between the public and private sector with the simple principle that a commercial approach is preferred whenever it is possible, the US government has liberated the private sector leading to new initiatives like Skybox Imaging (now Google), Planetlabs, Blacksky Global and others. Indeed the whole space sector has been opened up for private investment.

In the same vein, NOAA – the agency responsible for the US, non-military, Earth Observation satellites including those for meteorological measurements - has recently signed agreements with Google, Amazon and 3 other US IT companies to make its “vast data resources” and its “tremendous volume of high-quality, environmental data” available under US open access policy. Google and Amazon are also downloading the free and open European Sentinel data as the basis for offering geo-spatial services to global customers. European companies are using these services - which can offer a great way to access the global market - but in doing so they take a risk concerning any future changes to the business practices of the US giants operating under US jurisprudence..

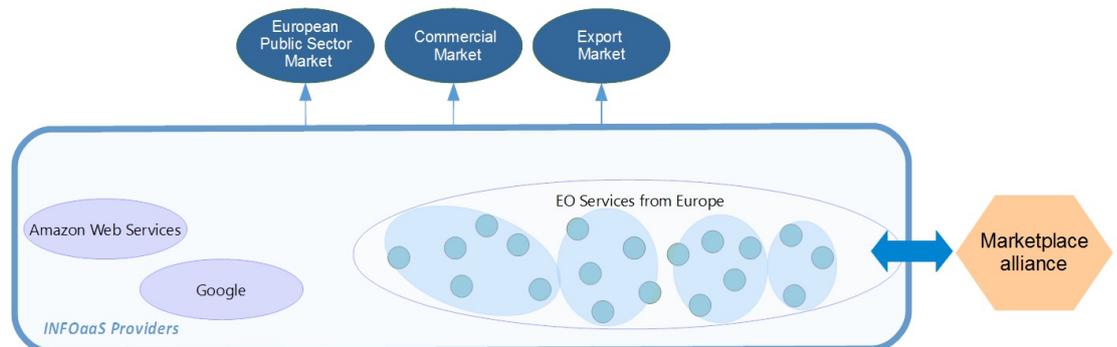
In consequence, both European governments - as users of Copernicus - and the EO services industry, face the possibility to see their access to data and information governed by the legal and business conditions imposed by US IT companies, undermining the goal of non-dependence and leaving European downstream industry dependent on the policies and business models of the US actors. Therefore we consider it necessary that actions are taken towards supporting the development of European industrial alternatives and, in this context, EARSC is preparing to organise the creation of a European Marketplace for EO Services as a leverage for the exploitation of Copernicus data and services alongside commercial offerings.



European EO service providers are too small and fragmented to address the new market opportunities

“The achievement of these objectives is at severe risk due to under-investment in the infrastructure necessary to make the data available.”

Developing a European



A European Marketplace for EO Services will enable companies to offer new products and services building upon those coming from Copernicus and other sources. It will allow the European industry to capitalise on the public investments in Copernicus and, by linking with other data sets, can unleash a new wave of innovative geospatial products addressing many markets. It will provide a single entry point for customers world-wide looking to find geospatial solutions to meet their needs. Several complementary marketplaces offering different business models and run by different operators may offer competitive solutions.

A Marketplace for EO Services should be developed around IT platforms built upon European technology and procured as a service. It should link and provide free access to the public, open-data coming from Copernicus Sentinels with that from commercial satellites. It should enable the development of value-added products and services by facilitating access to the public Copernicus services and enabling them to be combined with commercial data products. It should have the potential to link to further public data such as socio-economic or environmental information enabling additional innovation. In time, even life sciences, energy or transport information could be included into the mix widening in this way the potential of the Marketplace even further.

Like a physical marketplace, transaction costs should be reduced to a minimum so enabling low-cost business to develop.

It will allow a fragmented industry to build on the strengths of its diversity whilst not being limited by national boundaries.

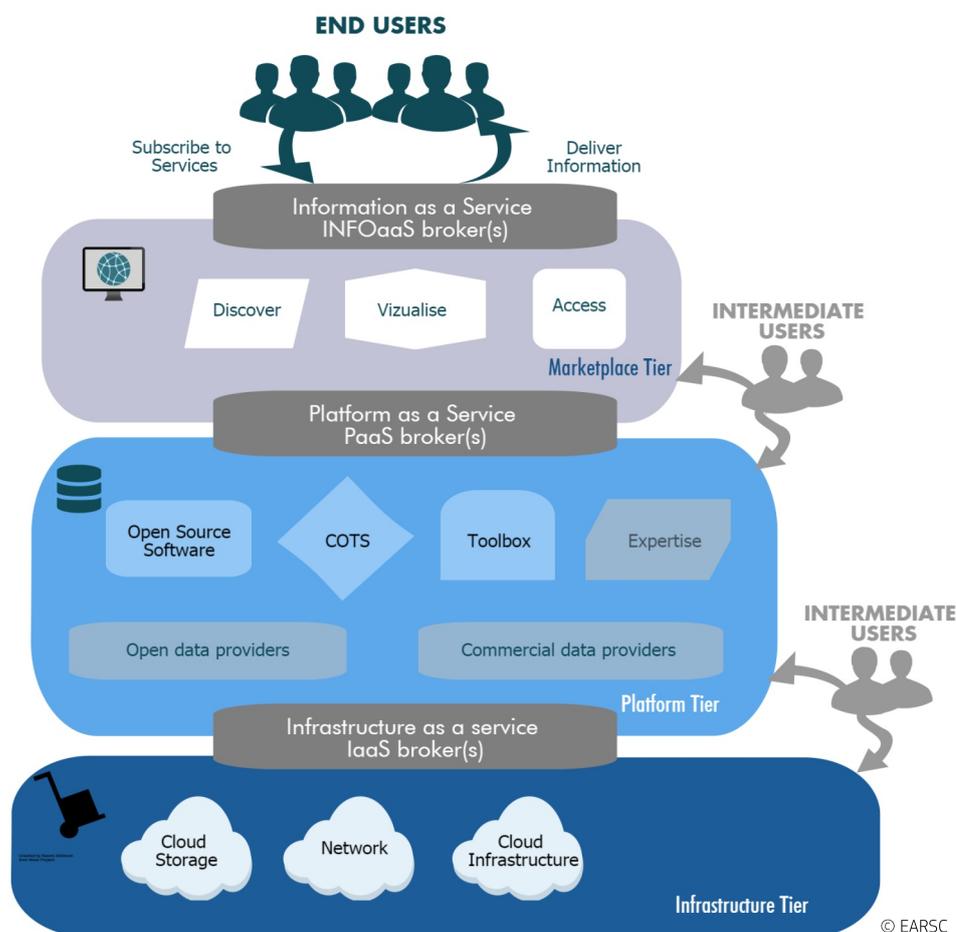
The basic guiding principle should be to enable information as a service (INFOaaS). The platforms and infrastructure to support this should not be monolithic and must enable the large number of individuals and small businesses to innovate and bring new products and services to the market. Competition should be assured at every level. Some platform elements could be picked up and used by different marketplace operators.

Other principles would need to be addressed include the protection of IPR, the rules concerning exploitation of open data, security of information and privacy, financing and supporting new business models. This would offer a new model not available elsewhere and which could be an attractive place to do both science and business.

A Marketplace Alliance will be created to oversee the operation of the Marketplace(s) and represent the interests of all the stakeholders. The Alliance would not do business directly but would act on behalf of all users of, or suppliers to, the one or more Marketplaces by negotiating terms, assembling market information and promoting the platform as a place to find services. The Alliance could also represent the downstream industry on regulatory matters and for the standardisation of products and services.

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Marketplace for EO Services



Key Actions

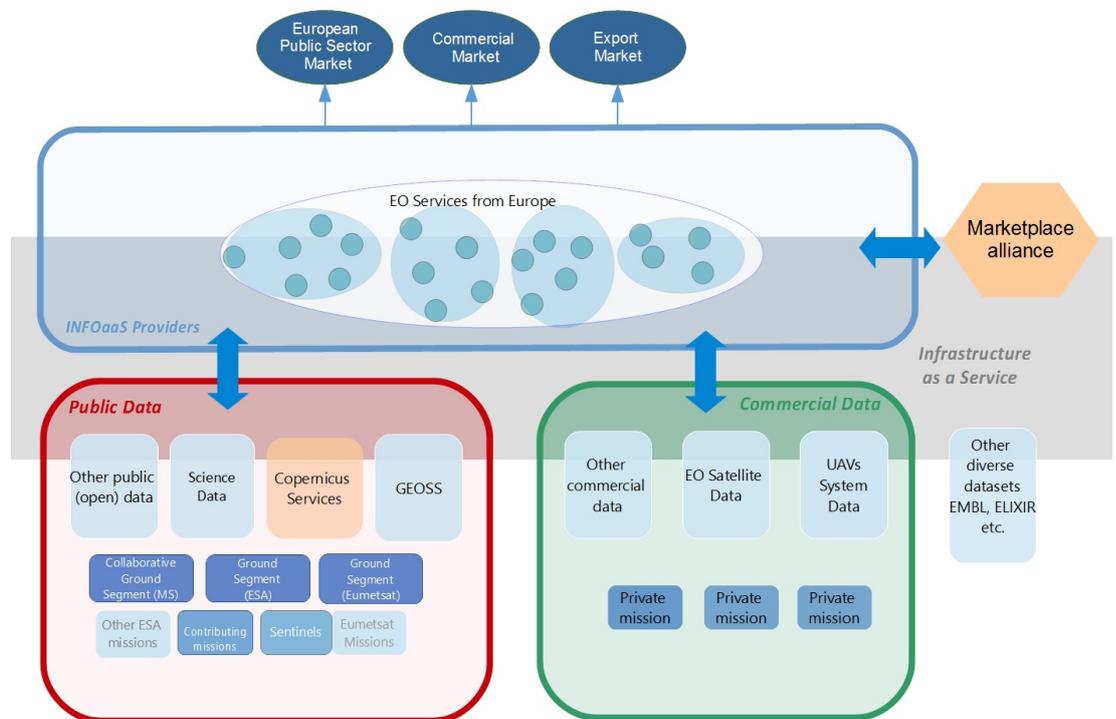
Industry considers that 3 key lines of action need to be addressed:

- ✦ **Ensuring the availability of the service(s) and infrastructure(s) on which the EO Services Marketplace(s) can be developed and operated.** This will combine public (mainly Copernicus) data and information and commercial data and services. It must provide a competitive offer and several platform services could be envisaged to ensure competition. Governance of the infrastructures is critical to (a) balance the weight of interests between the EO service providers and those holding or making it possible to access data and (b) to ensure competition.
- ✦ **Creating an environment in Europe where private initiatives can develop.** This requires clarification of the boundary between what the public sector and the private sector can offer. The guiding principle should be that services should come from the private sector unless there are good reasons why they cannot. Governments should define their needs from a services perspective (including a Services Level Agreement) – leaving implementation to the private sector.
- ✦ **Supporting the creation of the market.** The EO services market has promised much but ultimately failed in several ways despite or because of historic government involvement. The availability of varied and reliable data is changing the picture yet, governments still make up over 50% of the market by value. Industry will need support to demonstrate the value for public services.

Institutional Players and

Industry is prepared to act – but we cannot act alone. Today, over 50% of the market for EO services comes from supplying public sector customers. Furthermore, the strong role of public actors in the supply of services coming from Copernicus means that industry and the key public stakeholders must act together.

Our vision is to create a “platform” bringing together many services, allowing users’ access to many diverse data types and the means to convert them into sustainable services . It will be based on an architecture of 3 layers (Information, platform, infrastructure) all provided as services from competing suppliers via brokers. Competition should be assured at every level to avoid any dependency on the business models of others and to ensure that all customers, public and private alike, obtain the best value for money. Investments from any source should be aimed at enabling the emergence of more than one single player for each role of the marketplace(s) in order to guarantee competition together with a high level of innovation and creativity.



"Our vision is to create a “platform offering many broker services” and giving users access to many diverse data types and the means to convert them into sustainable services”

All actors will need to play their role to realise this vision and to help bring access to the rich and diverse sets of data from both public and private sources. These include the many open data portals which exist such as environmental, statistical and economic data as well as more diverse sources such as that coming from the EMBL (European Micro-biology Laboratory) and ELIXIR the European platform for Life Sciences.

1. Users may be end users of services or intermediate users which are building their business on geospatial products. The latter will benefit by improved and more efficient access to the data and information on which their products are based. Hence businesses offering consultancy or bespoke products will also be supported under the initiative.
2. One possible model for the Marketplace for EO Services is Lloyds Insurance. According to Wikipedia; **Lloyd's of London**, generally known simply as Lloyd's, is an insurance market located in the City of London. Unlike most of its competitors in the industry, it is not a company but rather is a corporate body governed by the Lloyd's Act of 1871. Lloyd's serves as a partially mutualised marketplace within which multiple financial backers come together to pool and spread risk.

Industry Acting Together

Each stakeholder has a clear role to play to help put together the complete picture:

Industry will invest to develop new business leading to the creation of jobs and tax revenues on condition that that they will not be undermined by unfair competition from public sector bodies as is the case today. The information services sector, dominated by SME's, is primed for growth embracing the many new market opportunities which are emerging. Growth downstream will also feed growth upstream providing knowledge of market potential for future satellite missions and helping to secure the manufacturing sector. EARSC will act as an enabler for this process.

EC DG GROW has the overall responsibility to manage the Copernicus programme under the ultimate control of the EU. DG GROW has the means to leverage the investment into Copernicus to develop the European EO services sector. DG GROW also has the means to clarify the public-private sector roles. By developing Copernicus Platform Services access to Copernicus data and information will be made easier, improving the prospects for industry growth and stimulating innovation throughout the sector and enabling combination with data coming from the private sector.

EC DG RTD co-ordinates the European participation to GEO and conducts research activities aimed at meeting goals of the Societal Benefit Areas (SBA's) defined under GEOSS¹. Copernicus is described as "the major European contribution to GEOSS" and represents the largest contribution from any region. The availability of Copernicus Platform Services will allow investments to be focused on the R&D substance rather than on bespoke IT infrastructure. DG RTD has set the goal to establish a European GEOSS hub as the gateway to the GEO community. This must be integrally connected with the Copernicus Platform Services and linked to the Marketplace.

EC DG Connect is in the lead for creating the single digital market and general actions on big data. In this context, existing or future EU IT infrastructure can be leveraged, forming the backbone on which the platform and EO Services Marketplace can run. DG Connect can also ensure the effective linkage of the EO services community to other initiatives.

ESA develops and operates European satellites for Earth Observation and has identified steps that it can take to develop a more integrated European EO ground segment, leveraging the opportunity provided by Copernicus and integrating also other European missions. This initiative, known as EO Innovation Europe, will be an important component in the overall system to make EO data available to public and private service providers as well as the scientific community. It is fully coherent to the platform service and EO Services Marketplace presented here.

Eumetsat is a key source of meteorological, oceanography and climate data, from EUMETSAT, third-parties and Copernicus satellites which will be an important if not critical component for some future products and services. Links should be made at the appropriate level to bring this into the platform services.

In order to bring all the stakeholders together, a dedicated stakeholder forum shall be envisaged, possibly in the form of a Public Private Partnership (PPP) or a structured dialogue.

"the strong role of public actors in the supply of services coming from Copernicus means that industry and the key public stakeholders must act together."

1. GEOSS is the Global Earth Observation System of Systems. It is an international effort managed under the Group on Earth Observations (GEO)

The way forward

The establishment of the Marketplace Alliance for EO would bring together the industry towards implementing the key lines of action. The immediate steps forward include:

Creating a Marketplace Alliance for EO Services

- ✦ Define the legal, commercial and governance rules under which the Alliance will operate and the modus for engagement with public sector stakeholders.
- ✦ Establish the Marketplace Alliance as a legal entity.

Building the Platform and Infrastructure

- ✦ Define the requirements for the marketplace and the platform services on which it will run.
- ✦ Define the legal and commercial relationships between the various actors (operator of marketplace, platform services providers).
- ✦ Maintain competition at every level as far as possible and avoid lock-in to single player.
- ✦ Move from procurement of infrastructure to procurement of services.

Creating an environment where private initiatives can flourish

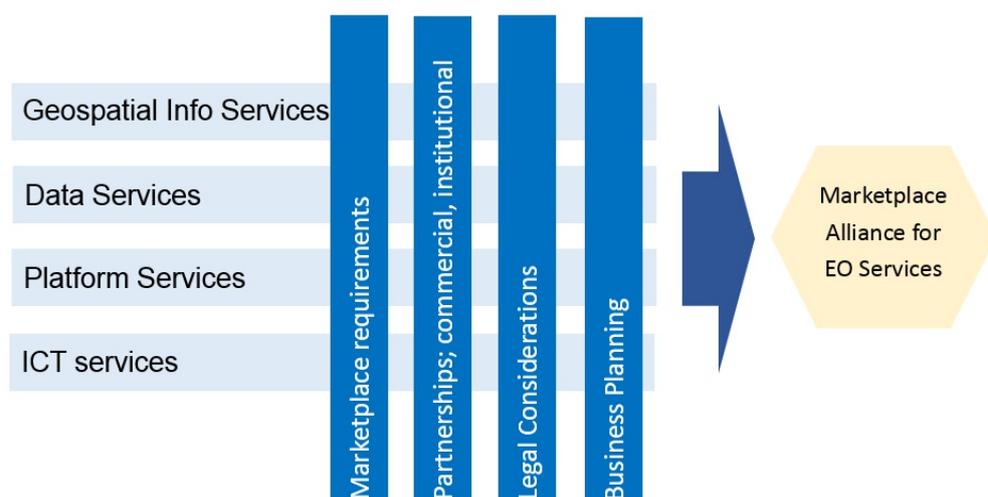
- ✦ Introduce legislation on industrial policy procedures along the lines of a commercial remote sensing act where a commercial approach is favoured wherever possible.
- ✦ Improve industrial access to in-situ data held by national public bodies (open-data and public sector information re-use).
- ✦ Improve industrial access to R&D programmes through new priorities and enhancing exploitation goals.

Creation of the Market: Overcoming Market failure

- ✦ Develop links with other potential user communities in Commercial and Public market sectors.
- ✦ ESA Ambassador role to promote European technology into international bodies.
- ✦ The EC to provide an anchor tenancy contract for the supply of certain EO services to public authorities going beyond those of Copernicus.
- ✦ Develop European and national PCP and PPI initiatives linked to EO services together with regional initiatives.
- ✦ Extend the European partnership globally through engagement with the GEO Community of over 100 national and regional government stakeholders.

Create a Stakeholder Forum whereby complementary actions can be developed along with a strategic plan.

- ✦ Improve co-ordination between the stakeholders
- ✦ Create the structure through which the public and private sectors can engage with each other.



Actions by Each Partner



Industry will:

- ✦ Organise the Marketplace Alliance by establishing the appropriate legal entity.
- ✦ Define the requirements for the platform services on which the Marketplace will operate.
- ✦ Take steps to develop the market by developing links with commercial sectors and working with public stakeholders to develop the market with public users outside of Europe.
- ✦ Ensure European public needs are met by working with the EC and their "Entrusted Entities".
- ✦ Engage with the GEOSS community to bring European products and services to GEOSS stakeholders worldwide.
- ✦ Actively promote the Marketplace and the products and services which European companies can offer.



ESA should:

- ✦ Support the development of European platform technology and improve satellite data availability and interoperability to downstream users and the EO services sector.
- ✦ Support actions to develop the market: (a) by becoming an ambassador for the use of European products and promoting these with industry towards International public stakeholders such as the World Bank, Asian Development Bank etc. and (b) by helping EARSC to work with other commercial/industrial sectors to encourage the adoption of new products and services.
- ✦ Lead the way for the procurement of innovative services both for new EO missions and for supporting elements.
- ✦ Help clarify and maintain the industrial role vis-à-vis the public sector by focusing on meeting public sector needs through the procurement of services wherever possible.
- ✦ Improve co-ordination with the EC regarding the setting of public policy goals and their realisation in close co-operation with the private sector.



The European Commission should:

- ✦ Leverage Copernicus by facilitating the access to Sentinel data and Copernicus Services for exploitation by industry through a new platform service which also supports collaborative efforts by Member States.
- ✦ Enable the link between the Copernicus Platform Services and the international co-operative efforts known as GEOSS. This can help European companies gain access to world-wide open data in the form of satellite observations - as well as products coming from academia and the research laboratories - to meet the GEO Societal Benefit Areas (SBA's) and provide a channel to make European products and services coming from public and private sources to the over 100 national partners to GEO.
- ✦ Encourage the uptake of geospatial services through an anchor tenancy acting on the supply side making commercial services available to public sector users and citizens alongside the Copernicus Services already envisaged.
- ✦ Stimulate government demand for products and services by linking the use of Copernicus services to public policy-making through legislation and use by European Agencies.
- ✦ Ensure that the necessary steps are taken which will enable the Copernicus Platform Services to be operational by 2017 and respond to the needs of the Marketplace. The effort may build upon what exists such as Helix Nebula and Géant to enable the easy access to many divergent, stored data-sets along with associated processing power.
- ✦ Ensure the availability of necessary, large-scale infrastructure allowing for the storage, management and processing of and access to big data. It should help facilitate pan-European public-services networks linking both big data sources and providing access for public-sector users.
- ✦ Introduce new R&D priorities which can help industry benefit from and commercialise new products and services. This should encourage links to academia and research laboratories but with enhanced commercialisation goals.
- ✦ Define the public and private roles through an industrial policy which can clarify the role of the private sector vis-à-vis that of public sector bodies. The US Commercial Remote Sensing Act provides a possible model.
- ✦ Ensure that other relevant public datasets are progressively made available through the platform services which will further stimulate growth in the services marketplace.

Together we should create a suitable forum for stakeholders to work together. Many different PPP models exist such as joint undertakings (which led to the Galileo Supervisory Agency), European Innovation Partnerships (such as those for Smart Cities, Water, etc.), or even the UK National initiative on Catapult's to drive selected sectors. The EC also works with Structured Dialogues which represent a useful way to meet and exchange but without underlying financial commitments.

