e-shape

EuroGEO Showcases: Applications Powered by Europe

D4.4 Capacity Building Best Practice Guide

Assessing the maturity of EO activities at country level

e-shape

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EO Maturity Indicators – in a nutshell

Earth Observation (EO) is increasingly used across the globe in support of key economic and societal challenges. To maximise its impact, decision makers and other actors along the value chain (e.g. research institutes, companies, user communities), require reliable data regarding the state and progress of different aspects of EO activities in their country. The EO Maturity Indicators Methodology is a robust tool that empowers these actors to design, develop and exploit EO activities on the basis of a solid understanding of current strengths, weaknesses and gaps. In developing a good level of "knowing thyself" around EO activities, one needs to have a good grasp of how advanced the stakeholder ecosystem is, how well developed the enabling infrastructure, how widespread the level of uptake across different domains, how well established are partnerships with other actors, and, finally, how well structured the innovation environment. These are precisely the (pillars?) parameters assessed by the EO Maturity Indicators Methodology. Its application yields a powerful visualisation (maturity cards) that can help EO actors understand their countries' capacities and act towards their enhancement.

I. MONITORING THE STATUS OF EO ACTIVITIES – WHY IS IT IMPORTANT

1.1 Why is it important to know the current state-of-play of EO activities?

Earth Observation (EO) data and services can support the informed implementation of numerous policies, help in addressing key societal challenges, and boost economic prosperity, competitiveness and growth. The key to unlock the wide range of benefits EO data enables[1] and build a more prosperous future, lies in understanding where we are today. Thus, understanding the needs on the demand side helps to develop the capacity of the supply side to meet them; understanding the capabilities of the supply side helps to build the capacity of the demand side to make the most out of them. This dynamic process requires constructing a full picture of the current state-of-play of EO activities at national level and a solid monitoring approach on how they progress over time. Eventually, by identifying gaps, the competent stakeholders at national and international level can efficiently mobilise resources to address them.

1.2 Who benefits from this knowledge?

Having a solid understanding of a country's current level of EO maturity, as well as of how it evolves over time, can be empowering for various stakeholders as described below:

[1] See for instance the Sentinel Benefits Study: http://earsc.org/Sebs/

- Policy/Decision Makers: By drawing a full picture of the EO and related capabilities within their country, policy/decision makers can develop informed plans driving investment. Externally, the output of the assessment can serve as a "business card" of the country abroad – providing insights and inviting investments. Periodical assessment of the indicators can help show how the overall EO maturity of a country, or its various components, progress over time.
- "Country partner" implementing the EO Maturity assessment: The organisation designated to perform the assessment has the opportunity to acquire an immense amount of valuable insights on the local EO scene. The liaisons with local experts (part of the methodology) shall contribute to broadening the existing knowledge and provide networking opportunities.
- Stakeholders in the national ecosystem (research institutes, private sector): Gaining a solid view of the current status of the EO landscape in their country, as well as its evolution, can inform their strategies, concentrate their efforts (e.g. to address gaps) and make the most of opportunities.
- International organisations: Looking at the complete picture of EO activities maturity in a given country, but also at specific dimensions (e.g. uptake of data) can help international organisations draw plans and mobilise resources towards addressing existing gaps or leveraging a particular country's strengths.
- Other stakeholders outside the national ecosystem (research institutes, private sector) - can use the insights into the local EO market to gain access and build collaborations.

The list of possible beneficiaries can be expanded further, as the relevant indicators, and the combination of them, provide insights of interest for potentially very different stakeholders.

1.3 How can EO Maturity be assessed?

The EO Maturity Indicators Methodology has been designed[2], and fine-tuned (after a few cycles of implementation), to produce an assessment of the current state and the relative progress over time of EO activities in a given country. This is done against a set of pre-defined indicators and levels, corresponding to five thematic pillars: stakeholder ecosystem, infrastructure, uptake, partnerships, innovation.

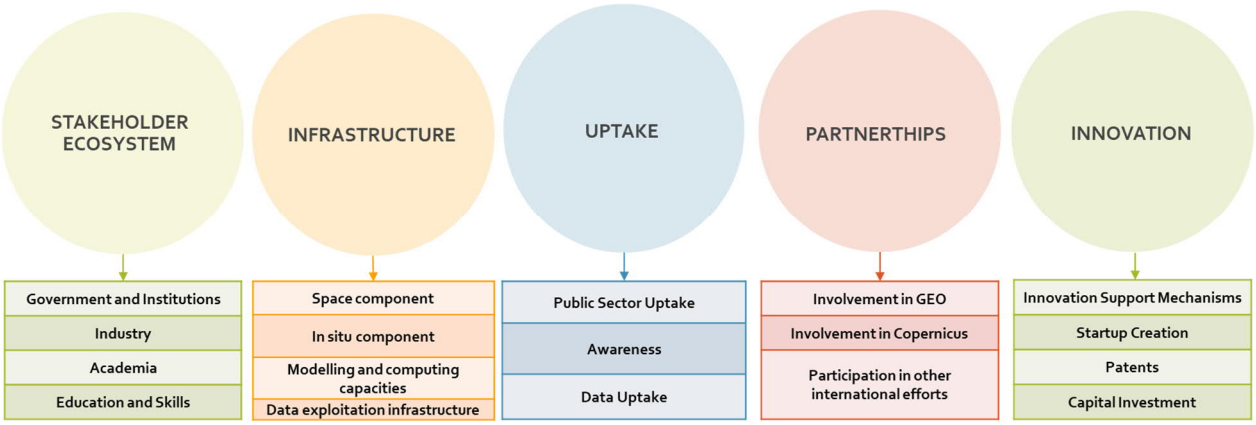

Figure 1. Thematic pillars within e-shape and underlying groups of indicators

[2]The maturity indicators methodology was developed under the GEOCRADLE project: http://geocradle.eu/en/regional-capacities/maturity-level/

These pillars and the indicator groups they refer to should provide a comprehensive picture of the current EO maturity. However, the methodology is modular; each implementing country can choose[3] to only assess some of the proposed pillars or even individual indicators, and in some cases, it is possible to slightly adapt the pre-defined indicators and levels to the specificities of the country's profile.

The Methodology is implemented for each country by a qualified local actor – "Country partner" - a research institution, public service body or leading EO company within the country. The implementation itself consists of gathering data on the maturity of different EO indicators, as stated by their description and matching the outcome to one of the five levels for each indicator. The levels reflect quantitative (e.g. number of EO companies) or qualitative (e.g. existence or not of EO-focused venture funding) aspects. The qualification of the different levels is shown below.

0 – Initial	1 - Basic	2 – Intermediate	3 - Advanced	4 – Optimised

Within e-shape[4], the country partners will be assisted in their efforts to carry out an assessment by the "e-shape EO maturity team", consisting of members from Task 4.2 Leaders Evenflow and WP4 Leaders EARSC. Thus, the whole data-gathering and data-analysis process will be supervised by the e-shape EO maturity team, who shall provide any support, clarifications, and help – e.g. by supplying initial explanations, help identifying national experts to assist with the implementation, and continuously reviewing and validating the gathered data.

The present guidelines aim to present briefly and concisely the best practices in implementing the EO maturity methodology, and to provide a step-by-step guide to be used by future implementing country partners. These guidelines are complementing the Maturity Indicators Expansion report (produced as deliverable D4.3 under e-shape). The guidelines will be followed by a dedicated webinar that will be produced under e-shape.

II. STEP-BY-STEP APPLICATION OF THE METHODOLOGY

It is recommended that the EO maturity methodology is carried out in the following manner:

2.1 Introducing the methodology to the country partner

Once the country partners are solicited (step 1), they are in charge of the implementation process, and it is necessary for them to acquire a deep understanding of it. Following a thorough reading of the guidelines provided here, the country partner will hold a 1st virtual meeting with the e-shape EO maturity team. The latter will, then and there, explain the main principles of implementation (step 2), provide tools (e.g. excel sheets, presentations illustrating the methodology and its implementation), discuss and solve doubts and prevent potential misconceptions of the country partner. There shall be discussion over the indicators of interest for the country in question, as well as what the specific aim of the assessment is for the country, so that the e-shape maturity team can provide tailored support and orientation, if needed. It is possible that the ountry partner is not in a position to indicate the country's priorities; in such event it is encouraged that national experts are included already in this first meeting, so that such matters can be tackled.

[3] During e-shape implementation a full assessment will be pursued.

[4] For organisations interested to implement the methodology outside e-shape, the EO maturity team can provide guidance and instructions, but cannot be involved in the implementation of the different steps of the methodology.

If this has not been done before, national experts - additional experts whose competences the country partner may want to make use of, will be identified, at the latest, during this first meeting. Ideally, both experts from the private and public sector will be involved as early as possible in the implementation. The country partner can nonetheless make use of other experts to discuss one or more specific problems.

2.2 Carrying out of the assessment

Their overall EO specific knowledge and experience within a country, positions the "country partners" best for leading the implementation of such an assessment. Therefore, their ability to access data, analyse them, and synthesise the findings is heavily relied on.

It is up to them to select the most appropriate methods for data gathering (step 3), which can vary and be complementary to each other. Some instances of data gathering methods that have been used in past EO maturity assessments are desktop research, surveys, interviews, workshops, etc. Combining these methods would yield the optimal result and ensure that the necessary data is collected (step 4a). This step further entails the identification of gaps (step 4b). For this, it is essential that the e-shape EO maturity team provides support and guidance when the country partner requests it: to discuss appropriate means for assessment of a problematic indicator, to ask for further clarifications and to jointly address potential challenges. The e-shape EO maturity team will also help with putting the country partner in contact with national experts, if needed.

Regular discussions (at least monthly) and reporting on the progress of the assessment shall occur between the e-shape maturity team and the country partner (and national experts, if needed) in order to ensure smooth progress.

2.3 Completing the first assessment and validating the results

Once all available data is collected and gaps are identified, a first assessment of all pillars (or a subset thereof) can be implemented (step 5). In practice, this means that the country partner, with guidance from the e-shape maturity team when needed, fills in the information against each indicator on the provided spreadsheet and ventures into a preliminary assignment of levels. In this process, the support of national experts is critical as they can quickly identify potential outliers and direct the country partner to additional sources which could help fine-tune the assessment. Once additional data is included (step 6), a critical analysis of the full assessment can be carried out. This allows a final validation of the results (step 7) which is done by the country partner, together with national experts and the e-shape maturity team.

2.4 Finalising and visualising findings

Moving from the first to the final assessment of maturity is carried out in an iterative process. Adding and validating the collected data as described above enables the consolidation of the findings and their visualisation in the form of maturity cards (step 8).

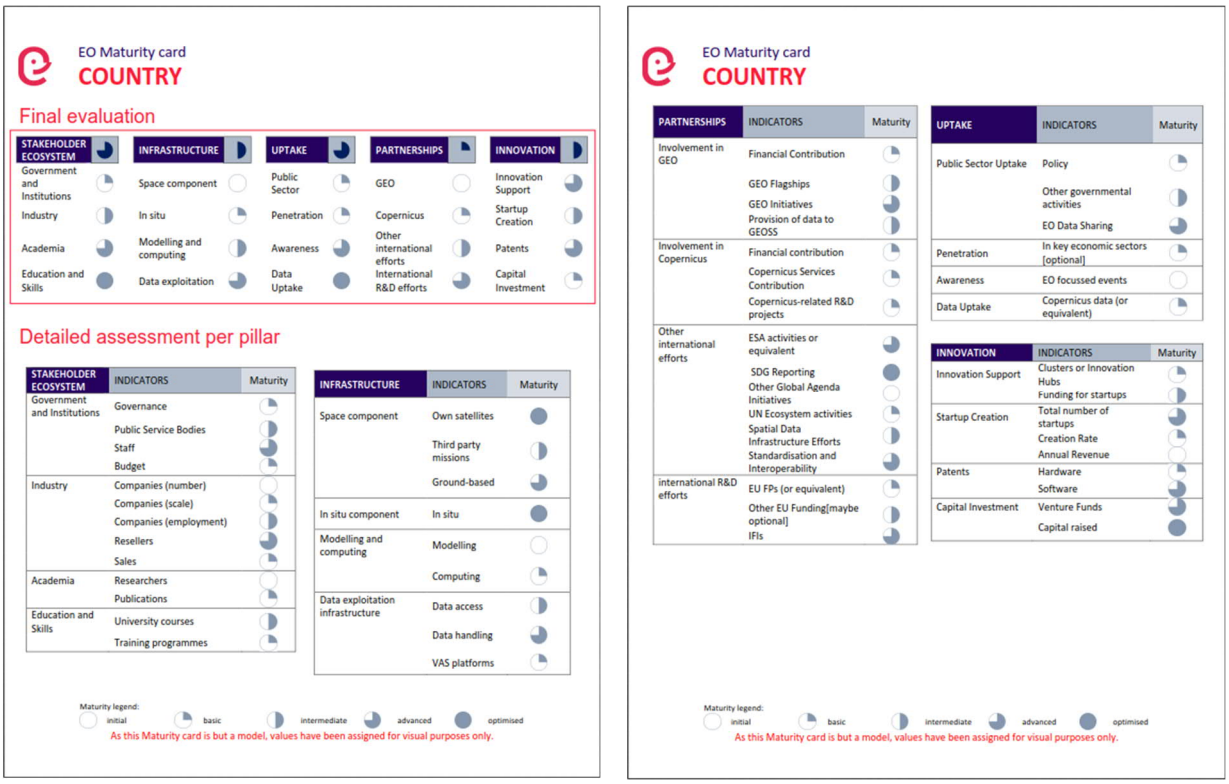

Figure 2 e-shape maturity card

With the maturity cards in hand, the e-shape maturity team together with country partners (ideally from multiple countries that carried out the methodology) can carry out a contextualisation of the findings. This might result in small fine-tuning exercises in order to reflect appropriately comparative results based on the collected information. Once this is done, the final assessment is concluded (step 9) and the results can be published (step 10).

The steps described previously form part of a complete workflow which is visualised below.

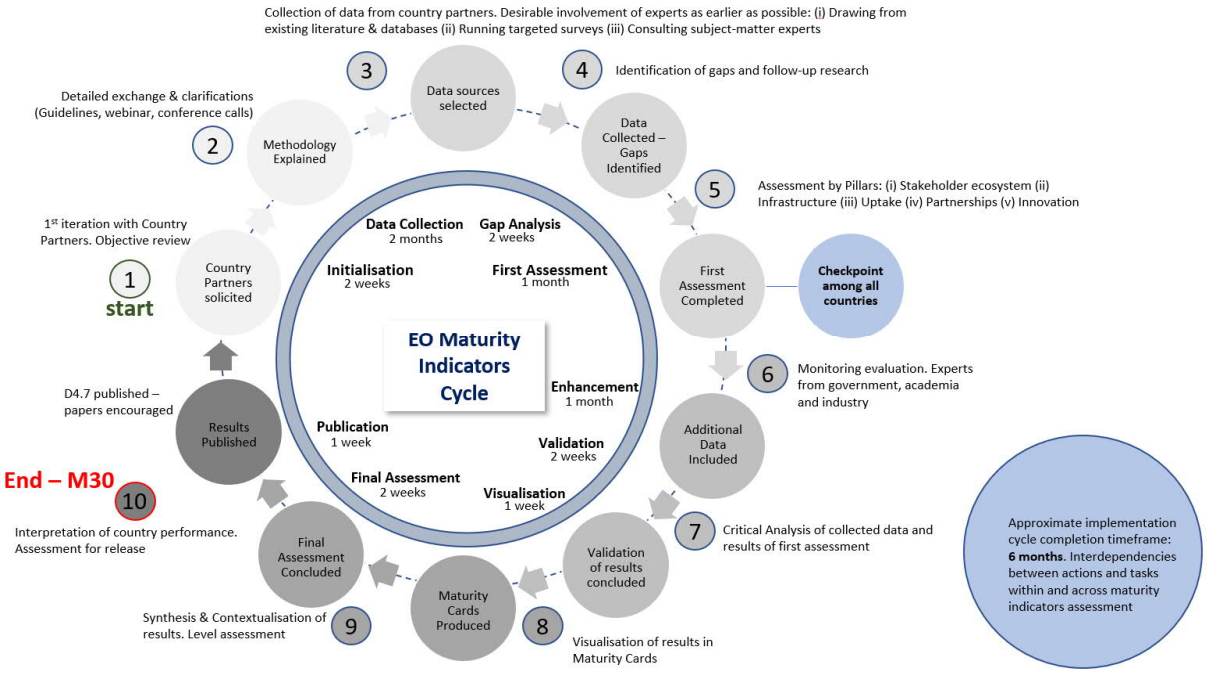

Figure 3 EO Maturity assessment workflow

All the steps described in this guideline are essential for the implementation of the EO Maturity Indicators Methodology and the production of the Maturity cards. Additional details on each of these steps will be provided – within e-shape – to country partners via a dedicated webinar that will be produced and via the direct teleconferences organised with each of them. At this stage, it is useful to conclude these guidelines by recalling the responsibilities of different actors against the different workflow steps. This is done in the table below.

			Involvement by					
Phase	Step	Activity		Country Partner		National Experts		e-shape Maturity Team
Initialisation	1	Solicit Country Partners		NA		NA		Based on report D4.3
	2	Explain Methodology		Read guidelines		Participate in 1-1 conference if agreed		Using guidelines, webinar, 1-1 conference
Data collection & Gap analysis	3	Select Data Sources		Decide data gathering method		Consult country partners wrt to available info		Support country partners where needed (e.g. surveys)
	4	Collect Data and identify gaps		Perform data collection		Assist in gap identification		Provide guidance where needed
First Assessment	5	Complete first assessment		Carry out first assessment		Consult country partners and eMT		Assist country partners in concluding first assessment
Enhancement	6	Provide additional data		Carry out data gathering where enhancement is needed		Direct country partners to additional sources		Suggest areas for enhancement
Validation	7	Validate results		Provide feedback to experts and eMT for validation		Carry out validation of results		Perform ad hoc validations with desk research/critically review process
Visualisation	8	Produce Maturity Cards		Provide inputs for the generation of maturity cards		NA		Generate maturity cards
Final Assessment	9	Conclude final assessment		Carry out final assessment with assignment of levels per indicator		Provide final views on final assessment		Contextualise results and propose small fine-tuning where needed
Publication	10	Publish results		Support the production of deliverable		NA		Produce e-shape deliverable with all results for all countries

Legend
- Leading activity
- Supporting activity
- Providing assistance
- No involvement

Table 1 Responsibilities of the implementing actors throughout the EO Maturity Indicators Cycle

III. REFERENCES AND MORE LEARNING MATERIALS

3.1 References

- The present document contains the implementation guidelines to the EO Maturity Indicators Methodology, as developed in, and described by the e-shape deliverable D4.3 EO Maturity indicators expansion[5]
- The methodology has initially been developed and applied under the H2020 GEO-CRADLE project (now a GEO Initiative). For deeper background understanding of the methodology (now revised and upscaled within e-shape) see related GEO-CRADLE deliverable[6] and publication[7].

3.2 Attachments

- EO Maturity level assessment grid containing the full list of indicators and corresponding levels can be found under Annex I

[5] Available on the e-shape website under "WP4": https://e-shape.eu/index.php/resources

[6] D3.4 – Maturity Indicators and country (G)EO Profile (II), GEO-CRADLE: http://geocradle.eu/wp-content/uploads/2016/07/D3.4.pdf

[7] M. Miguel-Lago, L. Mamais, H. Kontoes, A. Tsouni - Assessing the maturity of EO activities at national level Based on the GEO-CRADLE Maturity Indicators Methodology: http://earsc.org/file_download/509/IAF2018+Assessing+the+maturity+of+EO+capacities+at+national+level_vf.pdf

Annex I – EO Maturity level assessment grid

Pillar	Group of indicators	#	Indicators	Description	0 - initial	1 - basic	2 - intermediate	3 - advanced	4 - optimised
Stakeholders Ecosystem	Government and Institutions	1	Governance	Maturity and strength of the governance model at country level	Unspecified governance model.	Formally designated authority.	Formally designated authority, with geospatial departments present in in other ministries as well.	Clear agenda is implemented between authority and ministries-without international involvement and impact.	Clear agenda is implemented between authority and ministries - with international involvement and impact.
		2	Public Service Bodies	Number of entities at national, regional, local level using or producing EO data	Less than 5.	6 - 20	21-50	51- 100	Over 100.
		3	Staff	Employment numbers of people working on EO-tasks in governmental agencies and associated institutions	Less than 25.	26-200	201- 500	501- 1000	Over 1000.
		4	Budget	Volume of annual public investment in EO-related activities (upstream, downstream, mid)	Less than EUR 10 M	EUR 10-50M	EUR 50-100 M	EUR 100-300 M	Over EUR 300 M
	Industry	5	Companies (number)	Number of companies active in acquiring and supplying EO data and/or delivering geo-information	No private companies in the EO domain [no companies on EO]	1-5 companies in the country serving any category in the EO value chain [between 1-5 companies]	6-25 companies serving at least 3 categories covering the EO value chain [between 6-25 companies]	26-50 companies serving at least 3 categories covering the EO value chain	Over 50 companies representing all the categories covering the EO

Pillar	Group of indicators	#	Indicators	Description	0 - initial	1 - basic	2 - intermediate	3 - advanced	4 - optimised
				services/products suitable				[between 26-50 companies]	value chain. [> 51 companies]
		6	Companies (scale)	Composition of industry base with regards to company size:(micro <10, small<50, medium <250)	[no comparable]	Micro companies only	Micro and small companies	Micro, small and medium companies [SMEs]	All types of companies spread all over the country. Note: usually the EO companies are the small size ones. They have around 2-10 employees [all types industry]
		7	Companies (employment)	Estimated total employment among industry	Private sector employment up to 10 employees [up to 10 employees]	Private workforce between 10-50 employees. Note: usually the EO companies are the small size ones. They have around 2-10 employees/company [10-50 employees]	Private task force between 51-150 employees [51-150 employees]	Private task force between 151-300 employees [151-300 employees]	Private task force more than 300 employees [>300 employees]
		8	Resellers	Percentage of companies who operate only as resellers of international companies	Only resellers, not companies members of international specialised groups. [only resellers]	Over 60% resellers	Between 60% and 30% and resellers	Between 30% and 10% resellers.	Less then 10% resellers only

Pillar	Group of indicators	#	Indicators	Description	0 - initial	1 - basic	2 - intermediate	3 - advanced	4 - optimised
		9	Sales	Volume of sales (as documented in their annual revenues) by companies incorporated in the country	Less than EUR 1 M	EUR 1-5 M	EUR 5-50 M	EUR 51-100 M	Over EUR 100 M.
	Academia	10	Researchers	Number of researchers working on Earth Observation topics	No significant number of researches in the EO domain [no significant EO staff]	Less than 50 EO researchers	50-250 EO researchers	250-500 EO researchers	> 500 EO researchers
		11	Publications	Number and impact of relevant scientific publications within the last 5 years (e.g.: indexed in Elsevier's Scopus and Compendex, publications in journals ranked in JRC among the top 30% of journals in the (G)EO field)	no papers published [no EO publications]	1-25 papers published at department level (from those at least 10 paper citations who have an impact factor)[1-25 papers]	25-100 papers published that will provide some excellence of the research resulting from national projects related to EO funded by Government or other EU funding (from those at least 25 paper citations who have an impact) [25-100 papers]	100-500 scientific papers (+ thesis research) produced by research organizations and universities on innovative topics (from those at least 50 paper citations who have an impact. [100-500 papers]	Over 500 between number of theses and scientific papers produced by research organizations and universities with impact in prestigious magazines or presented in high level conferences; [>500 papers]
	Education and Skills	12	University courses	Dedicated or tightly linked to EO courses offered at university level	No specific EO courses.	Sporadic EO dedicated courses within various curricula.	Multiple EO dedicated courses within various curricula with proven impact and peer recognition.	At least one EO dedicated recognised and renowned curriculum.	More than one EO dedicated recognised and renowned curricula.

Pillar	Group of indicators	#	Indicators	Description	0 - initial	1 - basic	2 - intermediate	3 - advanced	4 - optimised
		13	Training programmes	Training programmes focussed on the development of EO-related skills	No known EO training programmes.	Rare instances of EO training programmes by local and international actors. (e.g. summer schools, seminars)	Sporadic EO training programmes by local actors.	Periodic EO training programmes by local and international actors.	Systematic (i.e. multiple annual) EO training programmes by local and international actors, serving coherent agenda (s)
National infrastructure	Space component	14	Operation of own satellites	If the country itself operates own satellite missions (public and private)	No missions, no technical readiness.	Technical readiness but no EO mission in course	At least one EO mission.	1-5 EO missions	> 5 EO missions
		15	Access to third party missions	Not owned nor operated by the country. Either a satellite operator or 3rd party mission/ including meteo.	No access to other missions [no access missions]	Access to less than 5 third party missions.	Access to 5-10 third party missions.	Access to 11-25 third party missions.	Access to over 25 third party missions.
		16	Ground-based facilities	Number of stations.	No capacity for ground-based control elements of EO spacecraft system [no ground-based capacity]	1 ground station	2-5 ground stations	6-10 ground stations	>11 ground stations
	In situ component	17	In situ monitoring networks	Number of in situ networks within the country or providing data to international networks.	0 in situ networks.	Up to 5 in situ networks.	Up to 10 in situ networks.	Up to 20 in situ networks.	Over 20 in situ networks.

Pillar	Group of indicators	#	Indicators	Description	0 - initial	1 - basic	2 - intermediate	3 - advanced	4 - optimised
	Modelling and computing capacities	18	Modelling	Measuring both number and quality of models (i.e. models for atmospheric modelling, what those are, what is the status).	No modelling capacities	TBD	TBD	TBD	TBD OR internationally renowned/ standardized models have been developed within the country.
		19	Computing	Availability of computing processing capacities (high-performance computers: HPC), assessing who these belong to (i.e. total number of organizations with computing capacities) and how advanced they are.	No HPC [no computing capacities]	One institution with HPC facilities for their executions with multiprocessing systems and large external memory units. [one HPC]	Multiple computing resources for the processing and exploitation of EO data for one or more institutions. [between 2 to 10 modelling capacities]	TBD	TBD
	Data exploitation infrastructure	20	EO Data portals and gateways (data access)	Number of data portals originating from the country.	No data portals.	One generic data portal.	Up to 5 (including thematic ones).	Between 6 and 20 (including thematic ones-some serving different communities).	Over 20 (including thematic ones-some serving different communities).
		21	Data handling (incl. data cubes)	Tools for data-handling available through portals in the country	Raw data only. (level 0-1A*)	Capability to query and gather various types of data. (level 0-1B*)	Capability to query and gather various types of data and additional tools to ingest additional data. (level 2*)	Capability to do develop services on the portal. (level 2*)	Capability to do develop services on the portal. (level 2*). Data cubes available as well.

Pillar	Group of indicators	#	Indicators	Description	0 - initial	1 - basic	2 - intermediate	3 - advanced	4 - optimised
		22	Value-added services exploitation platforms (services/advanced products level)	Number of existing VAS exploitation platforms (access to thematic products or services)	No existing platforms.	Up to 5 existing platforms.	6-15 existing platforms.	16-30 existing platforms.	Over 30 existing platforms.
Uptake	Public Sector Uptake	23	EO for policy making	Exploitation of EO as a policy making and policy monitoring tool	EO not used for policy-making and policy-monitoring.	One public service body using EO data for the monitoring status of policies.	2-5 public service bodies using EO data for the monitoring status of policies.	6-10 public service bodies using EO data for the monitoring status of policies.	Over 10 public service bodies using EO data for the monitoring status of policies. EO explicitly mentioned in legislation.
		24	EO for operational public activities	Use of EO in operational activities of governmental agencies (including local and regional, excl. policy)	EO not used for public operational activities.	At least two public service bodies using EO data for operational activities.	5-10 public service bodies using EO data for operational activities.	11-20 public service bodies using EO data for operational activities.	Over 20 public service bodies using EO data for operational activities.
		25	EO Data Sharing	Level of adoption of data sharing practices	Not adopted.	Intra-ministry.	Inter-ministry.	Data sharing between central and regional.	Between any public and private.
	Awareness	26	EO focused events	Occurrence of events allowing both awareness (for general audiences) and networking (for specialised audiences) around EO	No data for organised EO events.	Sporadic EO events without clear link or overall agenda.	EO events organised in a focused way to promote specific agendas.	One renowned (at least regionally) periodic EO event.	More than one renowned (at least regionally) periodic EO events.

Pillar	Group of indicators	#	Indicators	Description	0 - initial	1 - basic	2 - intermediate	3 - advanced	4 - optimised
	Data Uptake	27	Uptake of Copernicus data (or equivalent)	Volume of Copernicus/Sentinel (or equivalent) number of product downloads per year	Less than 1000 products.	Between 1000 and 10 000 products	Between 10k and 500k products	500k-1 million products	Over 1 million products.
Partnerships	Involvement in GEO	28	Financial Contribution	Financial contribution to GEO or to projects/initiatives which are linked to GEOSS	0	<EUR 1k	EUR 1-25k	EUR 26-100k	Over EUR 100k
		29	GEO Flagships	Involvement in GEO Flagships	No involvement in Flagships.	Involvement in 1 flagship.	Involvement in 2 flagships.	Involvement in 3 flagships.	Involvement in 4 flagships.
		30	GEO Initiatives	Involvement in GEO Initiatives	No involvement in GEO initiatives.	Involvement in 1 or 2 initiatives.	Involvement in 3-8 initiatives.	Involvement in more than 8 initiatives.	Leading at least one initiative (and involvement in at least 3 other initiatives)
		31	Provision of data to GEOSS	Volume and quality of datasets contributed to GEOSS	No provision of data to GEOSS.	Plans for provision of data to GEOSS at country level (plans for sharing metadata brokered directly through the GEODAB) [plans for data to GEOSS]	Provision of one to five metadata types brokered directly through GEODAB [1-5 datasets to GEOSS]	Provision of 5 to 15 metadata types brokered directly through GEODAB [6-15 datasets to GEOSS]	Provision of more than 15 metadata types brokered directly through GEODAB and ideally [provision >15 datasets to GEOSS]
	Involvement in Copernicus	32	Financial contribution	Financial contribution to the Copernicus programme	None.	Agreement in place.	EU Member State, not contributing through ESA.	EU Member State, and contributing less than EUR 200 M per year through ESA as well.	EU Member State, and contributing over EUR 200 M per year through ESA as well.

Pillar	Group of indicators	#	Indicators	Description	0 - initial	1 - basic	2 - intermediate	3 - advanced	4 - optimised
		33	Contribution for Copernicus Services Provision	We look into involvement into Copernicus Services for services provision as carried out by public or private organisations within the specific country.	No organisations from the country is involved in provision to Copernicus service component(s).	Less than 5 companies from the country are involved in provision to Copernicus service component(s).	Over 5 companies from the country are involved in provision to Copernicus service component(s).	Over 5/10? companies from the country are involved in provision to Copernicus service component(s), with a clear focus on one of the components.	At least one company from the country is leading the provision for at least one service component.
		34	Copernicus-related R&D projects	Participation into Copernicus-related R&D projects (within the past 3 years)	No projects using data from Copernicus [0 projects using Copernicus data]	1-5 projects using data from Copernicus [1-5 projects using Copernicus data]	6-25 projects using data from Copernicus [6-25 projects using Copernicus data]	26-50 projects using data from Copernicus [25-50 projects using Copernicus data]	Over 50 projects using data from Copernicus. [< 50 projects using Copernicus data]
	Participation in other international efforts	35	Involvement in ESA activities or equivalent	Level of involvement implied by the status of ESA member state or ESA cooperating state, and the information beyond these terms.	No involvement.	Involvement through a general Cooperation Agreement.	European Cooperating State.	ESA Member State contributing less than EUR 500 million/year.	ESA Member State contributing more than EUR 500 million/year.
		36	Involvement in SDG Reporting	Exploitation of EO as a tool to support SDG reporting (within the past 3 years)	No use of EO in monitoring/reporting of SDG´s [no SDGs actions]	Use of EO in reporting on at least in one SDG´s [1 SDGs action]	Use of EO in reporting on more than one action in SDG´s [2-10 SDGs actions]	Active use of EO for reporting on to different actions in SDG´s [11-25 SDGs actions]	Active use of EO for reporting on different actions in SDG´s in the last 3 years [over 25 SDGs actions]
		37	Involvement in other Global Agenda Initiatives	Exploitation of EO as a tool in relevant Global Agenda initiatives and conventions (other than SDGs)	No national strategy to tackle it.		Use of EO in reporting.		Specific EO mention in consolidated country roadmap.

Pillar	Group of indicators	#	Indicators	Description	0 - initial	1 - basic	2 - intermediate	3 - advanced	4 - optimised
		38	Involvement in UN Ecosystem activities	Country participation to UN EO-focused programmes and relations with UN institutions (UNITAR, UNOSAT, UN-OOSA, UN-SPIDER, UNEP, etc.).	No membership of UN bodies related to Space activities nor participation in UN activities [no participation UN bodies]	Participation in at least one UN [EO activity (events w/g´s) [at least 1 active participation in UN agency/organisation]	Participation (between 2-5 activities) or plans for links to reference UN sites to focus international efforts, facilitate traceability and enable the establishment of measurement 'best practices' and active participation at one of the UN offices [participation in 2-5 UN agencies/organisations]	Active participation in more than 6 of the UN offices [participation in >6 UN agencies/organisations]	Active participation or membership of more than 6 UN bodies / offices related to space activities: in the last 5 years [participation >6 UN agencies/organisations/10 years]
		39	Involvement in Spatial Data Infrastructure Efforts	Involvement with Infrastructure for Spatial Information (INSPIRE or other. Possibly monitoring of n. of reports about the implementation and use of their infrastructures for spatial information)	TBD	TBD	TBD	TBD	TBD

Pillar	Group of indicators	#	Indicators	Description	0 - initial	1 - basic	2 - intermediate	3 - advanced	4 - optimised
		40	Involvement in Standardisation and Interoperability Efforts	Country participation in other international organisations dealing with interoperability, standards, etc such as OGC	Not following programmes on standardisation processes: compatibility, interoperability, safety, repeatability [no engagement with Standardization discussions]	One public or private organisation participating in one of other international organizations dealing with standardisation, interoperability…etc [one organisation engaged with Standardization discussions]	2-5 public or private organisations in the country have fully implemented and developed technical standards for EO [2-5 organizations engage with Standardization discussions]	6-10 public or private organisations participating in an international organisations dealing with standardization, interoperability…etc [6-10 organizations engage with Standardization discussions]	Over 10 public or private organisations are leading standardisation processes [> 10 organizations engage with Standardization discussions]
	Involvement in International R&D efforts	41	IFIs (World Bank, Regional Development Banks, etc.)	R&D funds from IFIs implemented on the country's territory within the past 3 years	None.	Up to 5 projects, all of them small.(<100k)	Small projects and at least two over EUR 250k.	At least two medium projects (>EUR 1 M) present as well.	At least two big projects (>EUR 3 M) present as well.
		42	Other funds	Other Projects executed by national actors funded through national or international institutions (other than IFIs) within the past 3 years.	None.	Up to 5 projects, all of them small(<EUR 50k)	Small projects and at least one of them over EUR 100k.	At least two medium projects (>EUR 500k) present as well.	At least two big projects (>EUR 1M) present as well.
Innovation	Innovation Support Mechanisms	43	Clusters or Innovation Hubs	Number of clusters and innovation hubs in a country	No concentration of business activities around EO information [no clusters]	At least one ICT cluster and hubs which could promote innovation and technological development [1 cluster]	2-5 professional cluster and hubs organisations involved in technological transfer and innovation [2-5 clusters]	6-10 clusters and hubs in more than one thematic (EO sector-specific). one cluster with silver impact [6-10 clusters]	Over 10 clusters and hubs in more than one thematic[1] including silver impact and at least

Pillar	Group of indicators	#	Indicators	Description	0 - initial	1 - basic	2 - intermediate	3 - advanced	4 - optimised
									one with golden [>10 clusters]
		44	Funding for startups	Amount of available funding for startups	None.	TBD	TBD	TBD	TBD
	Startup Creation	45	Total number of startups	Number of existing startups (created within the last 3 years)	0	1-5	6-10	11-20	Over 20
		46	Creation Rate	Creation rate of startups (for the past year)	0	1	2-5	6-10	Over 10
		47	Annual Revenue	Average annual revenue of startups	Less than EUR 10k	EUR 10-50k	EUR 51-250k	EUR 251k - 1 M	Over EUR 1 M
	Patents	48	Hardware	Number of patents registered for hardware innovation	No patents registered.	TBD	TBD	TBD	TBD
		49	Software	Number of patents registered for software innovation	No patents registered.	TBD	TBD	TBD	TBD
	Capital Investment	50	Venture Funds	Existence of available venture funds	None available.	Less than 3 generic innovation -research related.	4-10 generic innovation -research related.	Over 10 generic innovation -research related.	Over 10 generic innovation - research related. Dedicated EO funds as well.
		51	Capital raised	Amount of investment raised by national players in the space sector	Less than EUR 100k	EUR 100k-1 M	EUR 1-10 M	EUR 10-50 M	Over EUR 100 M

Optional:

Uptake	Penetration		Uptake of EO in key economic sectors [optional]	Operational use of EO in key economic activities within a specific sector (e.g. agriculture)	No uptake.	Government uses it for basic activities (Land-cover and land use)	Offering access to the private sector via a platform.	Prolific use by private sector of the platform.	Prolific use by private sector of the platform and building on top of it.

Next steps

As already indicated, the Capacity Building Modules proposed and developed as part of this deliverable were the result of internal consultations for the purposes of identifying gaps to be addressed under this task. The current iterations were developed to the best of our collective understanding of and assumptions on what is needed and potentially useful. These modules are then to be introduced to and tested by the pilots so as to make sure they bring added value to their intended audience. The thus fine-tuned iterations will then be laid-out (M40) and promoted via the available channels to ensure reach not only within e-shape but beyond. In line with this same philosophy, webinars will be developing these topics further to ensure maximum exploitation of available communication channels. A timeline of the envisaged next steps is provided below, for convenience, to help with the visualisation of the remaining efforts.