

DRAFT Think Piece on the Role of CEOS in New Space and the Role of New Space in CEOS

CEOS New Space Task Team

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This document has been prepared by the CEOS New Space Task Team, to inform discussions around CEOS and the New Space sector. The Task Team is led by the 2022-23 SIT Chair, the European Space Agency (ESA).

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1. Introduction

1.1 What is meant by “New Space”?

- New Space companies address both upstream and downstream sectors, within the boundaries and limitations further explained.
- New Space should encompass all companies that provide EO data or EO based information on a commercial basis and with the following typical New Space working methods: disruptive industrial organisation (rapid development, low-cost) and new business models (attracting external investments – public and private – by proposing innovative tools and services that are more tailored to users’ needs).
- There is no intention to exclude the traditional EO companies that also adopt New Space working methods.

1.2 What is out of scope?

- CEOS is not going to consider New Space launch providers
- We should not exclude the possibility of having a future dialogue with the New Space sector (via a survey or otherwise) on specific topics such as the free use of cal/val data from public missions for the calibration of smallsats that do not carry any calibration instrument onboard.
- The critical point is that CEOS as a whole should not privilege a particular New Space satellite provider. CEOS should define actions that can benefit all commercial providers (upstream and downstream) without any distinction. For instance, if a survey is organised, the companies surveyed shall represent a large panel.
- There is no intention to invite companies to participate in CEOS meetings, unless in very specific agenda items for SIT, Working Groups or other CEOS groups. It should be noted though that at the working level, some private companies are involved in activities from the CEOS Working Groups through contracts managed by CEOS Agencies, as contribution in kind from those public Agencies.

1.3 A win-win partnership

- The task team should consider both what CEOS can do for New Space but also what New Space can do for CEOS.
- The complementarity between the public CEOS Agencies and New Space companies is key.

2. The EO New Space sector – the status now

In recent years, we have observed a greater involvement of the private sector, both Space and ICT sectors, especially in the US. The Global Space Economy has reached €370 billion in 2021 (+8.8% from 2018) but EO still represents only a small fraction (3 to

5%). The EO revenues from data sales and services are forecast to double from approximately €2.8 billion (in 2021) to €5.5 billion over the next decade. In particular, the New Space sector (upstream and downstream) is challenging the competitiveness of traditional EO commercial actors with strong support from national governments and private investors (e.g., in the US).

2.1 What interactions have there been so far at CEOS Agency level and what has been learnt?

Some examples:

- NASA has an anchor tenant arrangement for Planet Labs Inc. to provide satellite imagery for scientific purposes to all U.S. Federal civilian agencies.
- IMEO collects data from both public EO space satellites (e.g., Copernicus Sentinel-5P) and from New Space missions (e.g., GHGSat)
- The UK de-risked the build of NovaSAR through a contract with Australia
- EUMETSAT purchases SPIRE data for numerical weather prediction
- The CO3D mission is an interesting case study of collaboration between CNES & New Space (Airbus)

2.2 What does a joined up EO sector look like?

- As CEOS, we need to understand what do the New Space companies want / need from space agencies as anchor customers (e.g., create a sustainable model and lower the budget to de-risk the new tech, etc.)

2.3 What can CEOS do for New Space?

- First of all, CEOS should enter into a dialogue to discuss this with New Space companies.
- It has been suggested that CEOS could provide some kind of quality assurance characterisation, or common assessment framework to perform such characterisations, for New Space companies with societally relevant data. This has been attempted in the past with the WGCV QA4EO project. For some users the lack of quality assurance and the confusion it brings when data or information is not consistent is a real obstacle for its use.
- CEOS Agencies can also act as anchor customers for companies or data, however this depends on the political will of the members. When to develop and when to buy is an interesting discussion.
- Commercial Smallsats operators have specific needs from the public sector such as the free use of cal/val data from public missions for the calibration of smallsats that do not carry any calibration instrument onboard (to reduce development cost). Some missions from public agencies can provide the necessary references to other satellite missions, especially smallsat missions (public and commercial), to

improve the accuracy of their measurements. For instance, TRUTHS and CLARREO Pathfinder (CPF), whilst having different routes to obtain traceability, offer the prospect of a factor of 10-fold improvement in accuracy of not only their own observations but also those of other satellites through reference in-flight calibration.

- Commercial value-add services seek to exploit / combine several sources of data (public or commercial). CEOS should ensure this data is available and of sufficient quality.
- CEOS activities should not privilege a particular New Space satellite provider or a specific downstream company. On the contrary, the CEOS community should define actions that can benefit ALL commercial companies without any distinction.
- Discussions are needed around users in general accessing commercial datasets. In the US, NASA is making datasets available to the community, but current EULA's mean they are only available for government agencies. A lot of outside organisations, e.g. universities, may have issues accessing datasets for research.
- CEOS can bring expertise and data that address several aspects such as the QA aspects, data policies, management plans, and many activities undertaken in various CEOS groups.

2.4 What New Space can do for CEOS ?

- The user should be the ultimate beneficiary of any partnership between CEOS members and the New Space sector.
- Can New Space capabilities fill user requirements for CEOS?
- New Space can provide data in a cost-effective manner. This is in addition to institutional missions like Copernicus, scientific or meteorological missions or, in the longer term, data that is until now provided by institutional space agencies' own satellites. In other words, "make or buy" could become a discussion in space agencies.
- Complementarity between space agencies' own data and the commercial smallsat data should be exploited. While public satellites can provide useful data (e.g. cal/val, AOCS data, low resolution with large swath – such as TROPOMI for GHGSats), smallsats with higher resolution and more frequent revisiting time can provide useful observations that complement the public ones. The combination of both types of missions result in more accurate information and better tailored services.
- The added value of New Space companies to CEOS translates into improved information and services to society.

2.5 What will drive the change in the relationship between the public and New Space sectors?

- The users of the data and the funders of the system know what they want such as cheaper, better coverage, more frequent data and long-term continuity of the data.

2.6 What are the barriers to progress?

- We must identify the intrinsic limitations to each sector. For instance, we can't do "good science" with small satellites due to the types of sensors flying as not all types of sensors represent some commercial interest. On the other hand, space agencies can't act fast enough for the markets.
- Data policy is another barrier, as a majority of public missions offer free and open data concepts but this is not the baseline for commercial data providers.

3. Conclusions and recommendations

The main tasks of the New Space Task Team in 2023 will be as follows:

- Organise the New Space session at the main 2023 CEOS events (SIT meeting, SIT Technical Workshop and the CEOS Plenary)
- Produce a White Paper to be endorsed at CEOS Plenary that includes a list of key findings and recommendations on the actions that should be undertaken by CEOS entities (Working Groups, Virtual Constellations, *Ad Hoc* Teams) to foster the development of the New Space sector in a neutral manner. It should be noted that some of the actions already suggested by CEOS groups such as the production of CEOS-ARD are already ongoing or are planned to start in the near-future. In particular, the White Paper will describe for each action, the expected benefits for the New Space sector. A draft version of the White Paper will be shared at the time of the 2023 SIT Technical Workshop.
- Supervise the implementation of those actions by the relevant CEOS groups, for those actions that are either ongoing or that will be initiated in 2023. The SIT Chair, as lead of the New Space Task Team, will report on the progress during the monthly CEOS Secretariat telecons and at all main CEOS meetings.

Appendix A - Task Team Membership

Current membership as of March 2023 is listed below.

- Adan Salazar (AEM)
- Adrián Guzmán González (AEM)
- Alexis Sarraute (ESA, SIT Chair Team)
- Antonio Ciccolella (ESA, NSTT Lead)
- Andreia Siqueira (GA, LSI-VC Co-Lead)
- Anthony Rea (WMO)
- Astrid-Christina Koch (COM)
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- Beth Greenway (UKSA)
- Christopher Kidd (NASA, P-VC Co-Lead)
- Cody Anderson (USGS, WGCV Vice Chair)
- Dave Borges (NASA, SEO)
- Eleni Paliouras (ESA, SIT Chair Team)
- Eric Lalibeté (CSA)
- Frank Gallagher (NOAA)
- Fritz Policelli (NASA)
- George Dyke (SIT Chair Team)
- Heikki Pohjola (WMO)
- Helene De Boissezon (CNES, WGDisasters Chair)
- Hugo Costa (Portugal Space)
- Ivan Petiteville (ESA)
- Jean-Christophe Gros (European Commission)
- Jeff Privette (NOAA, WGClimate Chair)
- Joan Alabart (Portugal Space)
- Joost Carpay (NSO)
- Jorge Del Rio Vera (UNOOSA, WGCapD Chair)
- Laura Frulla (CONAE, WGDisasters Vice Chair)
- Libby Rose (SIT Chair Team)
- Makoto Natsuisaka (JAXA, WGISS Chair)
- Marc Beaudry (CSIRO)
- Marie-Claire Greening (CEO)
- Marie-Josée Bourassa (CSA)
- Matt Steventon (CEOS Chair Team)
- Michael Nyenhuis (DLR)
- Paolo Castracane (ESA, WGCV Team)
- Paul Counet (EUMETSAT)
- Philippe Goryl (ESA, WGCV Chair)
- Riza Singh (WGCV)
- Satoshi Uenuma (JAXA)
- Stephen Briggs (SIT Chair Team)
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