



Space for Earth: EO Downstream Solutions

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Private and confidential

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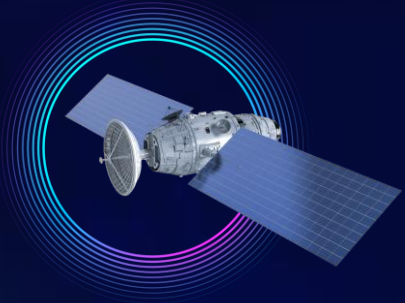
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NewSpace: Overview

Over the next decade, the global space sector comprising of national space agencies, private companies and emerging Start-Ups are expected to:



Launch 25,000+

satellites from across the world for EO, SATCOM and PNT services.



Generate 350 Exabytes

of traffic from satellites for use-cases spanning across sectors.



Create USD 600+ billion

of value through DOWNSTREAM SERVICES (excl. DATA).

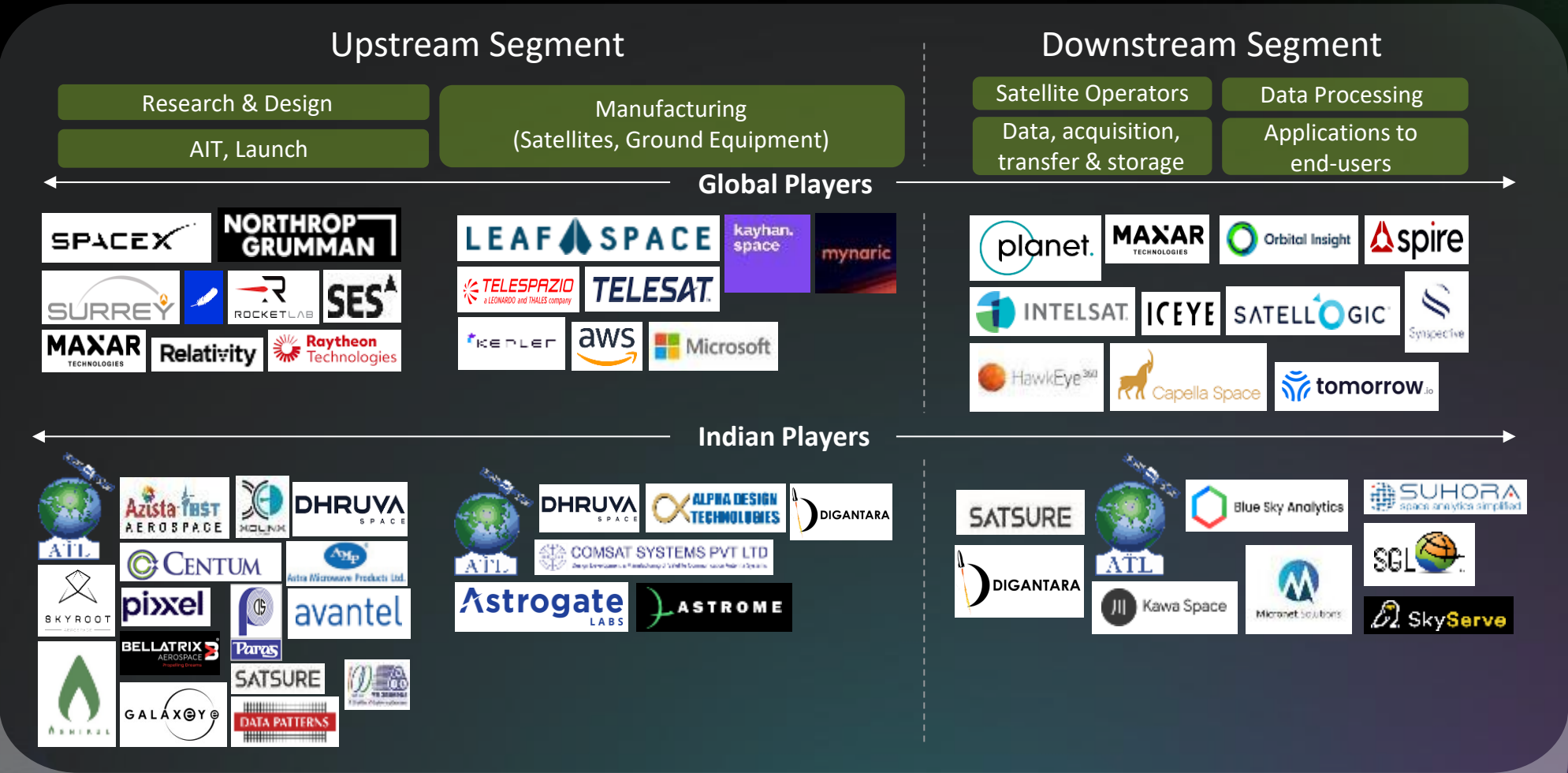


Solutions and applications for Earth Observation will be central to not only the launch and satellite segments but also drive value creation and societal impact: Earth Observation has the potential to drive \$3.8 trillion in economic benefit from 2023-2030 while positively impacting climate and nature.

* Source : Deloitte compilation from various market reports and national space agencies' reports

Earth Observation: Overview of value chain

*Non-exhaustive



This is in addition to the national space agencies who have mature solutions and offerings across the value chain.

Earth Observation: Key trends

Global trends shaping EO sector...

 **Lowering cost of launching and operating LEO based space assets** along with **liberalisation of sector** to allow private sector in end-end activities including design and operations of space assets is **generating more data**.

 Evolving global consensus that **remote sensing data and applications be considered as public goods** to be collectively used for achieving sustainable development.



Offering: Increasing penetration and ease of use of terrestrial alternates viz., UAV imagery, **enables integrated approach** with combination of satellite based and earth-based imagery



Technology: Cloud/Gen Ai for storage and processing of data; developments in payloads viz., **multi-sensor(optical +SAR) payloads, edge computing in space, hyperspectral imagery etc. creates new possibilities.**



Business models: Lines between design, operations of space assets and application blurring quickly. **Application companies and users are increasingly inclined towards owning and operating own assets.**

Earth Observation: Possible future state

Image

Data

Collect and disseminate data from proprietary or publicly accessible sensors,

Future: Launch constellation for desired specifications.

Cloud Providers

Platform

Infrastructure providers to store and process the data. Several prominent cloud providers already have dedicated offerings that cater to the Earth Observation industry.

Future: Ground-station as a service.

Geo-Spatial Intelligence

Analytics

Employ advanced analytics techniques to process the data into formats that are applicable across various domains.

Future: adoption of AI (Gen AI/ML) into image analytics.

Insights

Generate actionable insights from the processed data.

Future: Customised and integrated with non-space data and personalised for user needs.

SaaS

Application

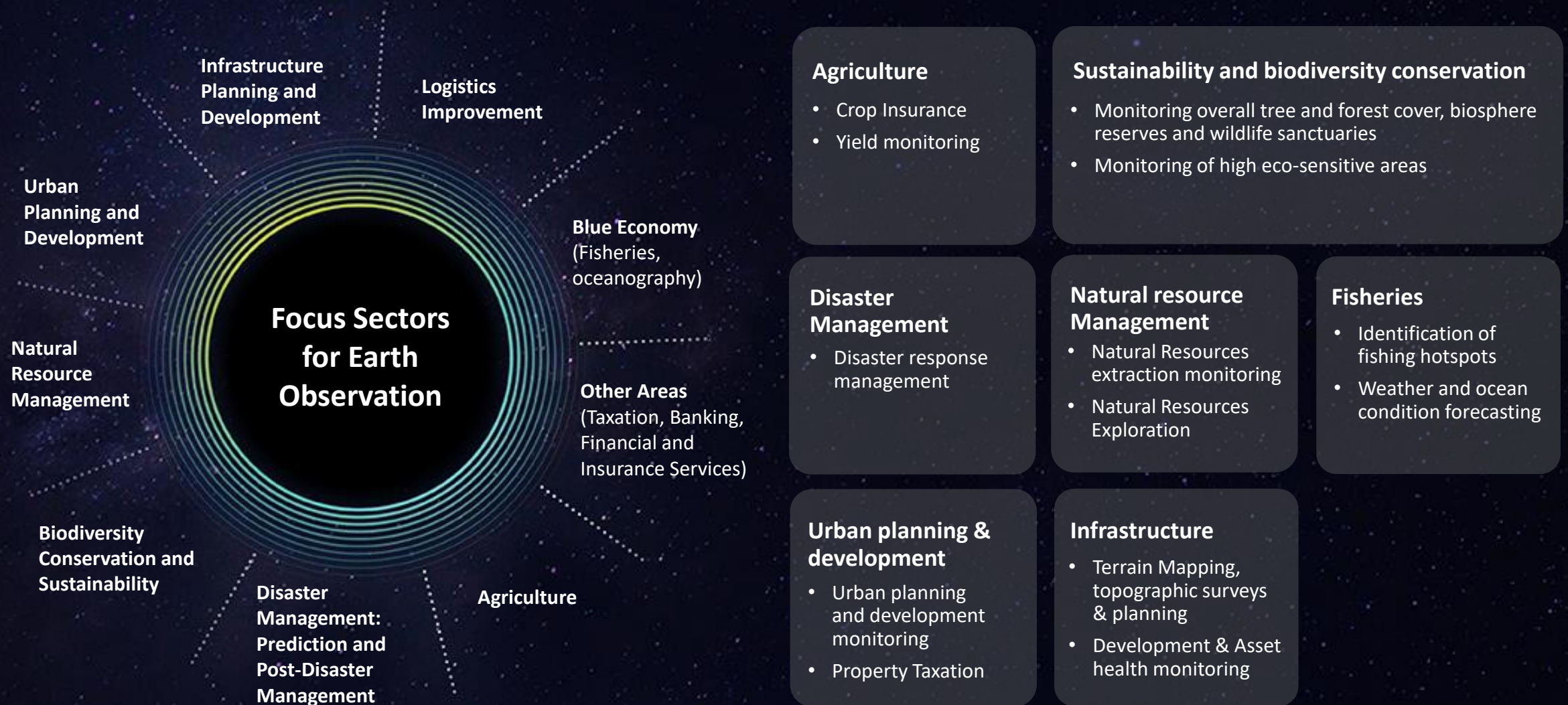
Develop products and services to solve specific problems across all industries.

Future: Feed into Ag-Tech, Fin-Tech, Climate-Tech, Reg-Tech, etc.

*The evolving value chain of Earth Observation**

Source : Adapted from Terra Watch Space basis industry consultation and Deloitte analysis.

Earth Observation: Impact creating use-cases



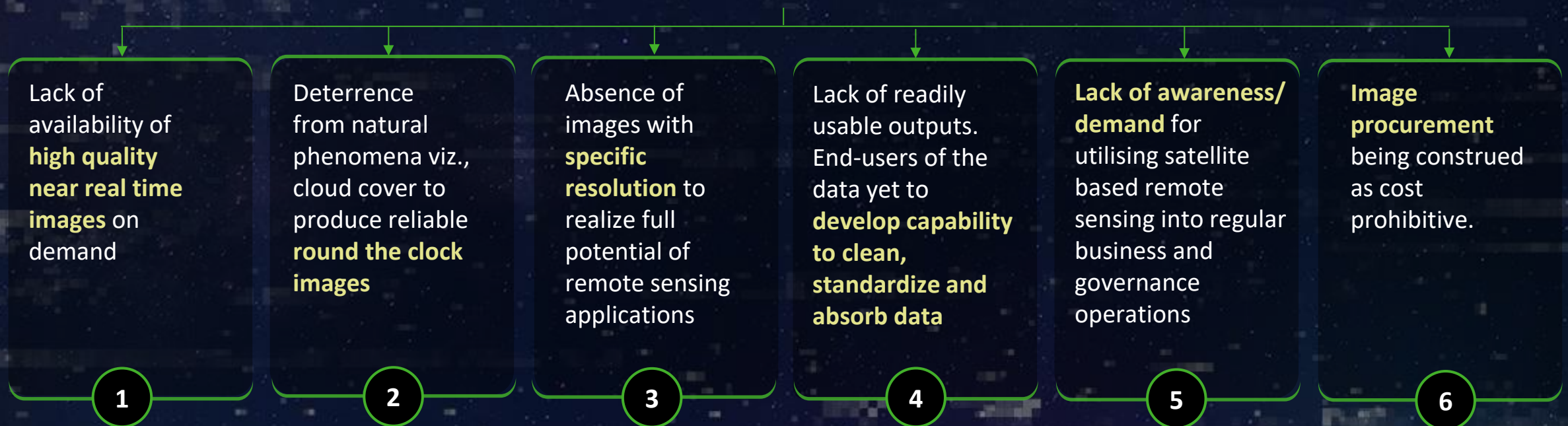
Value creating service offerings/use-cases are products of technology capability, socio-economic impact potential and commercial viability.

Earth Observation: Overview of challenges

*Non-exhaustive

There are several challenges* and gaps that creates scope and space for new and innovative solutions across the value chain.

Current Critical Gaps and Challenges



**Source: The challenges are non-exhaustive and are a product of Deloitte synthesis of industry research and stakeholder consultation.*

Earth Observation: Mitigation strategies to leverage EO for earth

- 1** | Serviceable propositions to every sector should be in line with sectoral needs married to image availability, analytics capabilities and overall value to stakeholders.
- 2** | National level strategies may include payload analysis to carve out the overall strategy for the segment.
- 3** | User industry and customer centricity particularly Governments is extremely mission critical for leveraging EO solutions for larger societal welfare.
- 4** | Increased focus on adoption and solutions that can be integrated into end-user systems for actionable insights.



Earth Observation: Call of Actions to leverage EO for earth

Towards a larger societal vision where every citizen accesses EO data and applications for improved quality of life.



“Space-Stack” - DPI/DPG approach: from downstream data acquisition to analytics can be a game changer.

Private sector to accelerate innovation and products to deliver solutions catered to Indian needs.

Government can act as a catalyst to enhance adoption and usage of downstream applications in focus sectors.

Earth Observation: Paths for EO adoption for any organisation

A well-oiled downstream ecosystem that can enable and maximise value propositions for all stakeholders and feed into..

Enable Space Data as a Service

- Forge partnerships to collate reliable satellite data for desired region of varying specifications to satiate use-case/impact needs.
- Processing of images to make on-demand, analytics ready images available.
- Attract talent and partnerships to build solutions on top of the images.

Enable Space Insights as a Service

- Identify challenges and capture requirements for potential solutions.
- Co-create solutions with Start-Ups and enterprises to satiate user needs.
- Integrate solutions into native systems and provide direct insights through existing channels.

Enable Space Constellation as a Service

- Identify existing gaps and supply chain disruptions to provide business needs and specifications for spacecraft development: sensor and payload level inputs.
- Develop the right business models and partnership ecosystem.
- Seamless supply of space data from own spacecrafts to developed ecosystem.

..the development of an upstream ecosystem that can together position make EO for earth.



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