

BLUEPRINT Geospatial for a Better World
Transforming the Lives of People, Places and Planet



UN GEOSPATIAL NETWORK
UNITED NATIONS COMMITTEE OF EXPERTS ON
GLOBAL GEOSPATIAL INFORMATION MANAGEMENT

The General Assembly opens
Seventy-first General Debate
and holds a brief special
segment to mark the first
anniversary of the adoption
of the 2030 Agenda and the
Sustainable Development
Goals (SDGs) prior to starting
its general debate (2016)
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NO



EXECUTIVE SUMMARY

In 2011, the Economic and Social Council (ECOSOC) of the United Nations established the Committee of Experts on Global Geospatial Information Management (UN-GGIM),¹ as the apex intergovernmental mechanism for making joint decisions and setting directions on the production, availability and application of geospatial information within national, regional and global policy frameworks. In 2016, ECOSOC stressed the need to strengthen the coordination and coherence of global geospatial information management including in the broader United Nations system, building on the work of the Committee of Experts. Further, UN-GGIM established the United Nations Geospatial Network with the aim to strengthen the coordination and coherence of geospatial information management within the United Nations system and to enable the efficient use and optimisation of geospatial information, in support of the United Nations mandates, across appropriate parts of the Organisation, including where it is not currently being used.

The world of the United Nations is rich and diverse, traversing a wide spectrum of entities some more oriented towards regulations and policy; others in the interface of science, policy and society; and some supporting operations and actions on the ground. Moreover, the United Nations benefits today from a distributed and specialised structure including the UN Regional Economic Commissions, which enhance the potential of proximity in nations all over the world, connecting People, Places and Planet. The United Nations is especially well positioned to leverage and realise this goal, focusing on the transformational potential for maintaining peace and security, the protection of human rights, the delivery of humanitarian aid, the promotion of sustainable development and the upholding of international law.

Most of the data used to support the United Nations mandates and operations is geospatial in nature² and as such needs to inform where events happen or where services and resources are available to support people in the moments that matter the most and fulfil the Organisation's pledge, from the 2030 Agenda, to ensure that "no one will be left behind."³ Geospatial information management is the science, innovation and technology related to 'Where', to *location*, which has been critical for humanity since the dawn of time.


The aim of the Blueprint is to ensure that the United Nations Geospatial Network realises its goal and therefore aims to guide and organise the work of the Network by explicitly detailing its considerations, current situation across the United Nations system, aim, collective objectives and activities. The Blueprint presents a review of the current status of the Geospatial Landscape in the United Nations system, builds upon an analysis of current geospatial activities to present its Strategic Design towards its future and details its proposed implementation through seven Transformation pathways and 50 proposed activities.

Geospatial information, technology and services can support efforts to maximise the value of our data, for better decisions and deliver stronger support to people, places and planet, and address the Organisation priorities as set out in the United Nations Charter and global agendas such as the implementation and monitoring of the Sustainable Development Goals (SDG), Sendai Framework, Paris Agreement on Climate Change, Small Islands Developing States Accelerated Modalities of Action or when addressing a global events such the pandemic crisis (COVID-19). Leaving no one behind.

1. [E/RES/2011/24](#).

2. The term geospatial data is used throughout this document to qualify any type of information that is associated with a geographic location on the Earth, either explicitly with X,Y,Z coordinates, or implicitly through such as a reference to names, addresses, area, geographic unit or a location. Synonyms include geographic data, spatial data, geo-referenced data or location-based data.

3. General Assembly (2015), "[Transforming our world: the 2030 Agenda for Sustainable Development](#)."



The 3D model provides an overview of damaged buildings (in red) and unaffected buildings (in blue) following the tropical cyclone Harold which hit Vanuata in April 2020. Credits: Image copyright: 2020 DigitalGlobe, CNES, distribution Airbus D&S. International Charter Space & Major Disasters. Building footprints: Open Street Map. Analysis: UNITAR-UNOSAT.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

TABLE OF CONTENT

1. OVERVIEW

| | |
|--------------------------------|---|
| 1.1 Background | 1 |
| 1.2 Members of the Network | 3 |
| 1.3 Purpose and scope | 3 |
| 1.4 Structure of the Blueprint | 5 |

2. BLUEPRINT: GEOSPATIAL LANDSCAPE

| | |
|---|----|
| 2.1 Geospatial Landscape in the United Nations system | 7 |
| 2.2 Landscape summary | 7 |
| 2.3 Analysis from the Landscape | 8 |
| 2.4 Strengths, Weaknesses, Opportunities and Threats | 10 |

3. BLUEPRINT: STRATEGIC DESIGN

| | |
|--|----|
| 3.1 Guidance | 13 |
| 3.2 Principles | 13 |
| 3.3 Aim and objectives | 14 |
| 3.4 Strategic objectives and transformation pathways | 15 |
| 3.5 A common platform: The Hub | 15 |

4. BLUEPRINT: TRANSFORMATION PATHWAYS

| | |
|---|-----------|
| Strategic Objective I: Building and strengthening the Network | 20 |
| 4.1 Governance | 20 |
| 4.2 Policies | 21 |
| Strategic Objective II: Delivering (geospatial information) as One | 23 |
| 4.3 Data and standards | 23 |
| 4.4 Innovation and technology | 28 |
| Strategic Objective III: Partnerships, Capacity Development and Outreach | 29 |
| 4.5 Partnerships | 29 |
| 4.6 Capacity development | 31 |
| 4.7 Communication and outreach | 32 |

| | |
|----------|----|
| ACRONYMS | 34 |
|----------|----|

| | |
|--------------|----|
| CONTRIBUTORS | 36 |
|--------------|----|



1 OVERVIEW

1.1 Background

In 2011, the Economic and Social Council (ECOSOC) of the United Nations established the Committee of Experts on Global Geospatial Information Management (UN-GGIM),⁴ as the apex intergovernmental mechanism for making joint decisions and setting directions on the production, availability and application of geospatial information within national, regional and global policy frameworks. In 2013, UN-GGIM included an agenda item in its proceedings on the coordination of geospatial information within the United Nations system and took note of the report by the United Nations Geographic Information Working Group (UNGIWG) on activities on geospatial information within the United Nations system.⁵ Between 2013 and 2016, UN-GGIM highlighted the need for better coordination and sought clarification of the roles and responsibilities of geospatial information management activities, both within and outside the United Nations system.

In 2016, ECOSOC stressed “the need to strengthen the coordination and coherence of global geospatial information management [...] including in the broader United Nations system, building on the work of the Committee of Experts.”⁶ Further, ECOSOC detailed in its Programme review of UN-GGIM the importance of a concerted effort to increase the awareness and value of geospatial information by the Member States and United Nations system.” ECOSOC further noted the “many valuable geospatial information initiatives undertaken throughout the United Nations system, while expressing some concern that they should be sustainable and not appear to be fragmented.” ECOSOC also concluded that existing United Nations coordination frameworks be studied stressing the need for support from senior management to ensure effective cooperation, including the elaboration of a proposal for a more structured coordination mechanism.⁷

In 2017, UN-GGIM established the United Nations System Network on geospatial activities within its global architecture,⁸ as a formal coordination mechanism to build on the efforts and achievements of UNGIWG since 2000. UN-GGIM also endorsed the Terms of Reference of the Network in 2018,⁹ which were attached as an annex to the report of UN-GGIM on the item “Review of United Nations activities in geospatial information management”¹⁰ and welcomed the formal establishment of the Steering Group and renaming of the network to the United Nations Geospatial Network in 2019.¹¹

The Network’s membership is composed of designated most-senior professionals working in the field of geospatial information management, led by a chair, two vice-chairs and a steering group; its mission is to “strengthen the coordination and coherence of geospatial information management within the United Nations system.” The United Nations Geospatial Network reports to UN-GGIM and supports its aims to address global challenges regarding the use of geospatial information, including in the development agendas, and to serve as a body for global policymaking in the field of geospatial information management.

The strategic priorities of the Network, as endorsed in its work plan,¹² include the development of a United Nations Geospatial Network Blueprint (hereafter ‘Blueprint’). The Blueprint is to be the foundation for strategies to enhance coordination, communication, governance and knowledge for the United Nations activities in geospatial information management. The Blueprint is intended to be the point of reference for current activities and to identify synergies for programmes, strategic orientations, cooperation and a proposed governance model for geospatial activities in the United Nations system.

4. [E/RES/2011/24](#).

5. [E/2013/46-E/C.20/2013/17 decision 3/110](#).

6. *Ibid.* 2.

7. [E/2016/47](#).

8. [E/2017/46-E/C.20/2017/18 decision 7/115\(d\)](#).

9. [E/2018/46-E/C.20/2018/19 decision 8/115\(d\)](#).

10. [E/C.20/2018/18/Add.1](#).

11. [E/2020/46-E/C.20/2019/19](#).

12. [Background document](#) to E/C.20/2020/5/Add.1 on UN System, Annex 1.

FIGURE 1 – MEMBER ENTITIES OF THE NETWORK



SECRETARIAT

1.2 Members of the Network

The United Nations Geospatial Network comprises entities¹³ across the United Nations system from Secretariat offices and departments, regional commissions, agencies, funds, programmes and related organizations of the United Nations system. As of today, there are 35 members in the Network.

1.3 Purpose and scope

The Blueprint purpose is to **guide the work and activities of the Network** and is developed at a time of significant change. Currently, the United Nations faces new challenges, in the form of climate change, defiance against multilateralism, ever-tightening budgets alongside ever-increasing lists of mandates, rapidly evolving technologies and the advent of the COVID-19 global pandemic. There are many opportunities for geospatial information – and the Network – to support the resolution of these challenges: through enhancing coordination, communication, governance and knowledge, the Network works towards its vision statement “Geospatial for a Better World, Transforming the Lives of People, Places and Planet.”

Geospatial information provides an understanding of ‘where’. It is crucial for informing policy and decision-makers, but its optimal capacity is not fully utilized across the United Nations system. The United Nations Geospatial Network aims to enable the efficient use and optimization of geospatial information, in support of the United Nations mandates, across appropriate parts of the Organization and where it is not currently being used.

What the Blueprint is

The Blueprint intends to support all United Nations entities and has various key objectives. It aims to develop and provide United Nations entities with relevant good practices, frameworks, policies, technologies and standards whilst facilitating access to geospatial information and technologies. The Blueprint also aims to leverage the Network’s function of fostering collaboration among United Nations entities, by providing a platform within the United Nations system, through which geospatial needs, knowledge, training, technology, data, practices, partnerships and external collaborative arrangements can be shared, so as to avoid duplication and create synergies.

Another of the Blueprint’s objectives is to provide an overview of geospatial capabilities to increase senior management’s communication and awareness regarding the relevance of geospatial information and its management. Further, the Blueprint aims to provide guidance for United Nations entities to independently develop geospatial capacity, support the consolidation of geospatial activities in their respective context, increase awareness regarding ongoing activities, inform its members of existing technology and data, and enable opportunities for synergy building and the development of cooperative mechanisms.

The Network is provided with an opportunity to highlight good practices, identify where resources can be shared and developed, and support greater prevalence of geospatial information use across the United Nations system and for Member States. As such, the Blueprint supports the development of a governance model on geospatial information management, in accordance with existing mandates to build capacity where it is missing and to strengthen capacity where it exists.

What the Blueprint is NOT

The Blueprint is not designed to be a prescriptive policy for the United Nations system; instead, it intends to foster discussions and awareness-raising among the Network’s members. The Network recognizes the specialised nature of each United Nations entity, including their functioning geospatial structures, and respects the balance and disparate needs between and within its entities. A ‘one-stop shop’ or ‘one size fits all’ approach to provide the technical, policy and operational geospatial information capacity for the United Nations system is beyond the scope and mandate of the Network; nor is the Network an envisaged solution to mainstream the provision of geospatial information for the mandates of the Organization.

13. The term “entity” or “entities” hereinafter refers to offices, departments, regional commissions, agencies, funds, programmes and related organizations of the United Nations System.



Peacekeeper Captain Nampumelelo Ntepo, from South Africa, is checking her patrol movement on her Global Positioning System (GPS) and the map after a surveillance and verification mission at Camp Ndromo, Democratic Republic of the Congo (2006). Credits: UN Photo/Martine Perret

1.4 Structure of the Blueprint

The Blueprint is organized across three interlinked parts, illustrated in Figure 2, as follows:

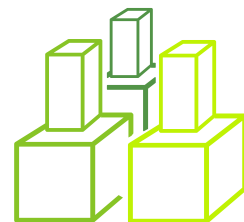
- **BLUEPRINT: GEOSPATIAL LANDSCAPE** – which is a review of the United Nations system which aims to inform and provide an inventory and status summary of the current ‘construction’ of geospatial information management activities across the United Nations system;
- **BLUEPRINT: STRATEGIC DESIGN** – which builds on the current landscape of geospatial activities in the United Nations, providing an overview of the strategic orientations and governance required to complement and inform already-existing activities, individual mandates and independent responsibilities of its Members; and
- **BLUEPRINT: TRANSFORMATION PATHWAYS** – which details activities and deliverables to be considered for the implementation of the design, a sort of operationalized work plan for the Network, to harness opportunities, maximise the value of what already exists within the Network and propose how best to resolve issues through development or consolidation of geospatial capabilities across the UN system and point to relevant resources.

■ FIGURE 2 – BLUEPRINT CONCEPT





2 BLUEPRINT: GEOSPATIAL LANDSCAPE



2.1 Geospatial Landscape in the United Nations system

The current geospatial activities in the United Nations are reported by entity in the **Blueprint Geospatial Landscape** of the United Nations system: while the document is stand-alone in view of its length, it forms an integral part of the Blueprint. The landscape document is also intended to be a living document to reflect the current situation of each of the members and as the membership of the Network grows. It should be noted that the Geospatial Landscape may have omitted some entities due to difficulties associated with reaching everyone conducting geospatial activities in the Organization.

In 2016, to better understand the geospatial capabilities and activities in the United Nations system, UN-GGIM requested the Secretariat to conduct an analysis, through a questionnaire, in order to provide an overview of the existing geospatial resources, activities and governance arrangements (decision 6/112).¹⁴ While the value of geospatial information for analysis, visualisation, decision-making and delivery of United Nations mandates was clearly recognized in the seventh session report (2017),¹⁵ the Committee of Experts realized the necessity to further pursue the analysis of existing geospatial capabilities in the United Nations system as a continuous activity. This was because of the difficulty in estimating geospatial capabilities as a result of four main factors: a) senior management is often not aware of ongoing geospatial activities; b) professional geospatial titles are not used consistently and are often hidden or obscured by the categorization within other domain experts groups under a specific domain experts denomination; c) geospatial activities sometimes only comprise part-time jobs; and d) the variety of contracts, partnership agreements, project-based capabilities and headquarters and field locations further complicate the estimates.

As part of the elaboration of the Blueprint, and as a part of the continued efforts to seek clarification on United Nations activities in geospatial information management, surveys and interviews were conducted regarding mandates, activities and resources related to geospatial information management, to reference as many entities as possible in the Blueprint: Geospatial Landscape in the United Nations system. A final outreach was also conducted in May 2020 to incorporate the latest contributions to attempt to provide the most comprehensive overview of geospatial activities in the United Nations system.

The Blueprint: Geospatial Landscape in the United Nations system is therefore the result of numerous activities: a questionnaire in 2017; interviews and survey in 2019; consultation meetings (2019–2020) and outreach (May–June 2020) which allowed for the analysis of the geospatial capabilities in the United Nations system.

2.2 Landscape summary

In broad terms, the questionnaire results of 2017, published in UN-GGIM report,¹⁶ established that 33 entities of the United Nations system have some geospatial capabilities with four entities accounting for over half of the total geospatial human resources capabilities (57 per cent). Although only about half of the United Nations entities answered the questionnaire, it was assumed that these 33 entities cover the majority of the geospatial capabilities of the Organization. However, the distinction between those who only use geospatial information and those who produce it and may also use it might affect the responses. This issue is further blurred by the absence of a clear distinction between geospatial information and other types of information through the availability of new data sources, tools and technologies (smartphones,

14. [E/C.20/2016/15](#).

15. [E/C.20/2017/14](#).

16. Ibid 15.

drones, machine learning, big data, artificial intelligence, etc.). Despite these factors, it is, however, assumed that geospatial information is pervasive within the United Nations system.

Depending on the entity, geospatial information is either coordinated centrally, concentrated in one specific function (preparedness, emergency, operations or policy) or fragmented within the entity (at headquarters, regional offices or autonomous departments). Some entities have recognized the challenge this presents and have developed roadmaps or strategic plans to improve and coordinate geospatial activities internally (UNICEF, WFP, ITU, OICT, etc.). In the context of the Blueprint, the analysis of current or past documents related to geospatial activities¹⁷ were also used to establish the challenges and opportunities facing the United Nations system.

A key aspect of the assessment highlighted that the United Nations system does not appear coordinated and structured when establishing or maintaining its relations and partnerships regarding geospatial capabilities and services. Through in-country offices or partnerships, United Nations entities collaborate with Official Development Assistance agencies, non-governmental organizations, technology companies, data providers, public (Member States) and private organizations, and research and academic organizations, amongst others, to develop tools and methodologies and new ways to address geospatial information management.

In considering the purpose of establishing geospatial capabilities in the United Nations system, the UN-GGIM report highlighted that the geospatial functions and staffing are in support of humanitarian aid at 36 per cent (OCHA, WFP, UNHCR), peace and security at 34 per cent (OICT formerly in DFS, DSS, ODC, OOSA) and sustainable development at 27 per cent (UNEP, FAO, UNESCO).¹⁸ The report further noted the different foci of the United Nations entities towards operational work, advocacy and support to intergovernmental bodies with some entities addressing mandates across multiple themes addressed by the United Nations. It also noted that two entities have geospatial activities related to the marine domain (UNESCO, OLA (DOALOS)).

Overall, the successful establishment of geospatial capabilities in support of the United Nations' mandates emerged from three general configurations: an intergovernmental process by Member States; a critical operational requirement from the United Nations; or a project-based approach to address immediate requirements.

2.3 Analysis from the Landscape

A concise Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis was used to evaluate and make the most of existing resources, identify advantages to leverage and activities to develop in the context of the Network.

During the analysis, a number of common functional requirements stood out as impediments to the optimization of geospatial activities and capabilities within the United Nations system:

- Absence of sustained or appropriate advocacy for adequate funding (or budget);
- Inability to retain expertise and associated sustainability of functions as well as the absence of consistent designation and recognition of professional expertise;
- Inadequate provision of support for software, hardware and digital environments for deploying enterprise geospatial services;
- Lack of recognition and will to leverage capabilities by senior management;
- Difficulty in finding best authoritative information quickly and access restrictions;
- Difficulty in readily accessing or extracting data in a usable format, including managing updates;
- Inability to easily integrate geospatial information with non-geospatial information;
- Concerns over privacy, security and terms of use related to using geospatial data;
- Inability to develop web-maps on thematic data; and
- Lack of readily-available data to analyze risks and vulnerability, or correlation of populations to various factors (water access and quality, air pollution, floods).

17. Geospatial roadmap (UNICEF, 2017), GIS Strategy (WFP, 2018), Geospatial activities (ITU, 2019), Geospatial strategy (OICT-GIS, 2020), etc.

18. Ibid 15.

The analysis, however, also identified significant potential to overcome these challenges in view of the following factors:

- Determination of entities to coordinate better for the collective benefit;
- Clear governance and guidance through UN-GGIM as the relevant expert community;
- Existing geospatial expertise and community within the United Nations system, including entities with robust and long-standing geospatial programmes;
- Interest and ongoing efforts in applying new technologies to geospatial information (artificial intelligence (AI), machine learning, big data);
- Interest of the geospatial industry, academia, non-governmental organizations (NGOs) and societies in supporting the United Nations system and global agendas; and
- Existing capacity development programmes and functions on geospatial information management.



Setting up the drone for the documentation of the historic urban fabric of Mosul Old City, including the Nouri Mosque complex. Drones and mapping technology are used in the context of the United Nations mandates to evaluate and monitor the status of cities and settlements over time. In this case, detailed mapping is used in support of reconstruction and preservation of historical heritage.
Credits: UNESCO/ICONEM

2.4 Strengths, Weaknesses, Opportunities and Threats

The following table summarises the strengths, weaknesses, opportunities and threats of the use of geospatial information in the United Nations system.

| STRENGTHS | WEAKNESSES |
|--|---|
| Existing geospatial expertise and resources in many entities at Headquarters, regional, and country offices | Senior management often lacks understanding of the specialized skill set required for geospatial experts |
| Standards and policies to improve geospatial data management exist and are enforced in some entities | External stakeholders do not conduct business with UN entities as one |
| Existing geospatial capacity development programmes (though limited and poorly funded) | Existing coordination mechanism is informal and on a voluntary, best-effort basis |
| | Perception of geospatial information systems as just a tool for ad-hoc use and not viewed as a core asset to be integrated in decision-making |
| | Not all agencies at same level of geospatial capacity, knowledge and resources |
| | Limited awareness of the potential of geospatial applications at all levels |
| | Lack of corporate understanding on inefficiencies caused by the lack of a better use of geospatial information |
| OPPORTUNITIES | THREATS |
| Determination of respective entities to enhance coordination and collaboration through the Network | Difficulties to obtain or absorb costs related to infrastructure, software and environment |
| Reporting to relevant and expert intergovernmental mechanism (UN-GGIM) | Poor recognition or unsustainable resources makes retention of expertise difficult |
| Industry is providing more and more solutions, including innovative technologies | Lack of sustained or limited funding and resources (e.g. project-based approach) |
| Leveraging existing UN-GGIM networks, working groups and frameworks such as for the Integration of Statistical and Geospatial Information, Global Statistical Geospatial Framework, etc. | Lack of coordination leads to redundancy in initiatives and programmes among entities |
| Leveraging geospatial information and data with Member States for use/benefit of the Organization, through UN-GGIM | Lack of awareness, availability and accessibility to existing geospatial services |
| Emerging technologies (Big Data, AI and machine learning, etc.) can enhance conventional analysis | Limited 'bandwidth' in certain Member States to access resources (data, tools, applications) |
| | Activities of the Network should not negatively affect United Nations entities with geospatial capabilities in the fulfilling of their mandates |



In conclusion, there are four key opportunities to optimize the use of geospatial information in the United Nations system:

- 1. Improved transparency:** the UN-GGIM has raised the profile around geospatial coordination and cooperation, thereby providing an opportunity to raise awareness and improve transparency regarding geospatial information;
- 2. Improved coordination and collaboration:** all interviewed United Nations entities expressed a genuine desire to improve coordination and further collaboration in geospatial information management for the overall benefit and improved use in the Organization;
- 3. Mainstreaming expertise:** expertise in geospatial information is now becoming mainstreamed in a number of disciplines (environment, forestry, agriculture, statistics, ocean affairs), which allows staff to leverage geospatial information more rapidly; and

- 4. Emerging technologies:** These can further support the mainstreaming of geospatial information use and related services such as smartphones, new positioning systems (GLONASS, Galileo), drones, satellite imagery, artificial intelligence, Internet of Things (IoT) and big data, as well as the availability of affordable, ubiquitous software and cloud-based solutions to use geospatial data.

To take advantage of these major opportunities, while addressing the mandates and operations of the United Nations system, the Network must act collectively to better manage geospatial information, improve coherence and coordination as well as propose pragmatic recommendations for developing geospatial information management to its full potential while taking into account each entity's mandates, independence, culture and resources.

3

BLUEPRINT: STRATEGIC DESIGN



3.1 Guidance

The Blueprint strategic design is guided by the overarching mandate of UN-GGIM and the prevailing good practices and standards of the geospatial industry. The Blueprint is further informed and guided by the following documents:

- The *Integrated Geospatial Information Framework*¹⁹ provides a basis and guide for developing, integrating, strengthening and maximizing geospatial information management and related resources. While prepared as support for countries, the Framework developed by UN-GGIM provides relevant guidance and pathways to enhance the role and value of geospatial information;
- The *Data Strategy of the Secretary-General*,²⁰ that aims to build a United Nations data ecosystem, makes direct references to geospatial information, which maximizes the value of data for better decisions, and “delivers stronger support to people and planet in the moments that matter most”;
- The *Secretary-General’s Strategy on New Technologies*²¹ and its five underlying principles: protect and promote global values; foster inclusion and transparency; work in partnership; build on existing capabilities and mandates; and, be humble and continue to learn; and
- The *Work Plan of the Network*²² and its activities which can be considered as an early version of the Blueprint. The Blueprint aims to augment, complement and support the realisation of the work plan.

3.2 Principles

Led by the overarching guidance, the seven principles of the Blueprint are:

1 - Protection and promotion of global values

The Blueprint, and the Network, are anchored in the values and missions of the United Nations Charter and its five pillars in peace and security, human rights, humanitarian assistance, sustainable development and international law. Global agendas, international agreements and frameworks further guide the objectives of the Network such as the Sustainable Development Goals and the Sendai Framework on Disasters.

2 - Guided by leadership and commitment

Strong leadership and commitment are critical to support, promote and sustain the mainstreaming of geospatial information in the United Nations system, and to invest in capabilities necessary for a greater efficiency in programmes, operations and management at national, regional and global levels in delivering mandates and responsibilities carried out by the Organization.

3 - Building on existing capabilities and mandates

Significant geospatial capabilities, catering for the various bodies, committees and operations of the Organization, have been developed, nurtured and matured as specialised geospatial information functions. The Network, through its Blueprint, intends to build upon these capabilities, mandates and responsibilities to further develop synergies and foster cooperative mechanisms in the United Nations system and beyond.

19. See [Integrated Geospatial Information Framework](#).

20. See [Secretary General’s Data Strategy](#).

21. See [Secretary-General’s Strategy on New Technologies](#).

22. Ibid 12.

4 - Enhancing data accessibility, efficiency and insight

Geospatial data and information management and use is central to effective decision-making. It is imperative to ensure that all staff, especially senior management, can discover, access, integrate and share geospatial data for the fulfilment of responsibilities of the United Nations system and the realization of mandates entrusted by Member States.

5 - Promoting transparency and dynamic adaptation

The Blueprint is guided by information entrusted to and originating from the United Nations – an imperative for openness and transparency.²³ Further, the Blueprint recognizes the dynamic nature of geospatial information and related technologies which cannot thrive in the context of rigid processes. The Blueprint will therefore remain a dynamic and agile process which should constantly monitor the need for adjustments and adaptation to global challenges, societal evolution and mandated changes.

6 - Fostering collaboration and inclusiveness

Collaboration and cooperation within the United Nations system and with external partners is critical to increase collective knowledge, test ideas, expand dialogue and share geospatial information use and application across the Organization. Cooperation through effective partnerships, collaboration and inclusiveness is key to multiply the benefits of geospatial information with a wide range of actors such as Member States, geospatial societies, the private sector, academia and other networks within and beyond the United Nations system.

7 - Integrative and innovative solutions

Implementation of the Blueprint must be innovative in bringing new ideas and bold approaches to support the mandates of the United Nations. Parallel to innovation, people, data, technology, infrastructure, services and policies must work together to form an integrative solution for managing and using geospatial information.

3.3 Aim and objectives

The aim of the Blueprint is to ensure that the United Nations Geospatial Network realises its goal to “strengthen the coordination and coherence of geospatial information management within the United Nations system”. The Blueprint therefore aims to **guide and organize the work of the Network** by explicitly detailing its considerations, current situation and upcoming activities, objectives or trends that it should consider.

As the guide for the implementation of the objectives of the Network, the Blueprint objectives are the same as those of the Network, as described in its Terms of Reference:

- Strengthen coordination, collaboration and sharing mechanisms on geospatial information resources (policies, capacity development, data, management, delivery infrastructures and systems);
- Increase communication and awareness of senior management of the relevance and value of geospatial information management in relation to the mandates of the United Nations system;
- Aim to avail accessible geospatial information and related systems to support Member States and United Nations mandates on local, national, regional and global issues;
- Promote the use and relevance of geospatial information for better decision-making through increased collaboration and coordination of geospatial information resources, data, skills, technology and policies within the United Nations; and
- Support the aims of UN-GGIM, including in the development of norms, frameworks, principles and guides, and capacity development initiatives.

23. [ST/SGB/2007/6](#).

3.4 Strategic objectives and transformation pathways

Further to its general aims and objectives, the Network is guided by the nine pathways from the Integrated Geospatial Information Framework and its agreement to three strategic objectives from its work plan:

- Strategic objective I: Building and strengthening the Network;
- Strategic objective II: Delivering geospatial information as One; and
- Strategic objective III: Partnerships, capacity development and outreach.

The Blueprint aims to further structure its implementation activities against seven transformation pathways:

Strategic objective I: Building and strengthening the Network (Governance)

1. **Governance** that provides effective guidance, ensures oversight and objectives that are supported and implemented across the United Nations system;
2. **Policies** to ensure efficient management of information including frameworks, standard operating procedures, guidelines and best practices;

Strategic objective II: Delivering geospatial information as One (Technology)

3. **Data and standards** to enable data custodians to organize, collect, plan, integrate, coordinate and publish geospatial information and to ensure data and technology interoperability and deliver quality of information made available for everyone
4. **Innovation and technology** to support common applications related to the collection, management, use and distribution of geospatial information as well as the integration with domain-specific applications and to further enable experimentation with new technologies or methodologies;

Strategic objective III: Partnerships, capacity development and outreach (People)

5. **Partnerships** to share resources, progress and engage a wide range of actors to contribute and connect to the wider data ecosystem to enhance the delivery of mandates for a better world;
6. **Capacity development** and mainstream geospatial information management and its use, and work in a coordinated manner to support Member States' capacity development; and
7. **Communication and outreach** to increase the level of understanding and promote better utilisation of geospatial resources.

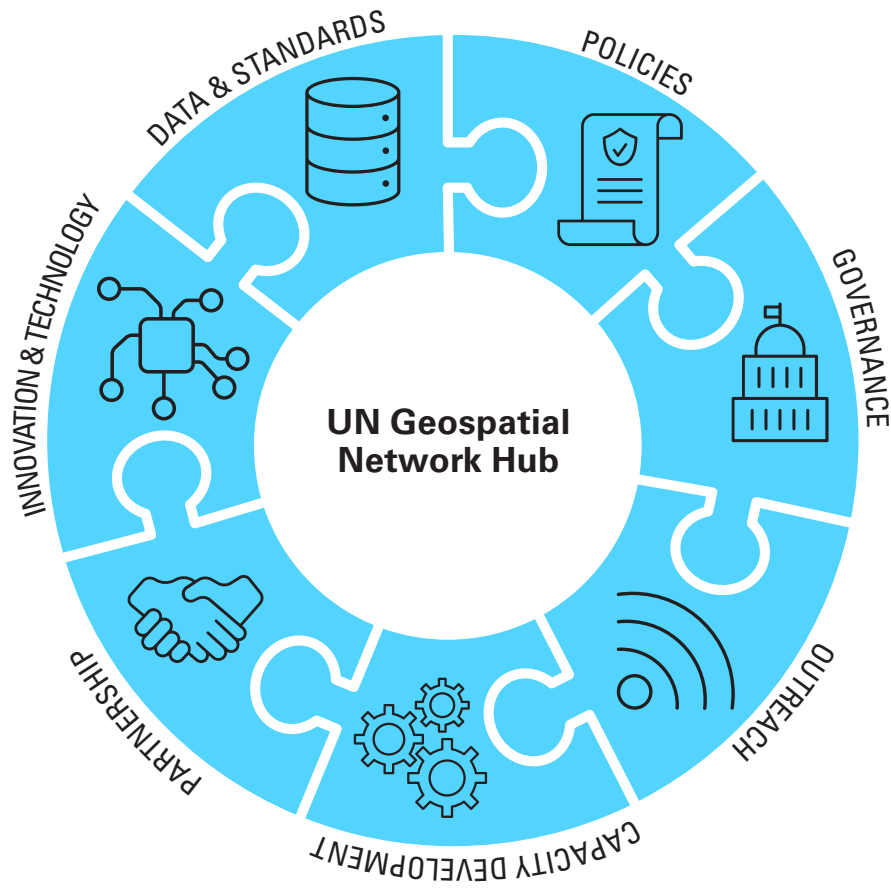
Activities from the seven transformation pathways are collaboration, coordination and goals for acting independently or collectively. Some activities, from independent or concerted efforts, would form specific tangible outcomes and outputs. These deliverables are interconnected and stored in a platform for all to share, use and collaborate.

3.5 A common platform: The Hub

The transformation pathways and their related activities, some of which are already included in the work plan of the Network, propose specific outputs and outcomes. These deliverables are to be stored virtually on a common platform as referenced services, data, standards, policies, contracts, adopted documents, best practices and tools.

This virtual common platform of resources – the United Nations Geospatial Network Hub – is the proposed solution for the Network to fulfil its objectives; the Hub context is illustrated in Figure 3. The structure of the hub is based on the seven transformation pathways: governance; policies; data and standards; innovation and technology; partnerships; capacity development; and communication and outreach.

FIGURE 3 – CONTEXT OF THE HUB



The stakeholders of the United Nations Geospatial Network Hub include:

- Users, initially mainly from the United Nations system, who benefit from the Hub by accessing relevant geospatial resources, such as available training, common policies and standards, best practices, geospatial data and applications.
- Providers or ‘Publishers’, also mainly from the United Nations system, who contribute and maintain geospatial resources in the Hub. In most cases, providers are also users.
- Developers and Enablers (from the United Nations system or external, including private sector, research institutions, space agencies, geospatial societies and academia) who contribute to the implementation of frameworks and activities that promote or facilitate the wide utilisation of geospatial resources, in particular geospatial data.
- Partners, whether countries, NGOs, ODAs or private companies who exchange or provide geospatial resources, in particular, geospatial data.

All these stakeholders utilize the United Nations Geospatial Network Hub as a common repository for the effective support of the United Nations mandates: peace and security, human rights, humanitarian aid, sustainable development and international law.

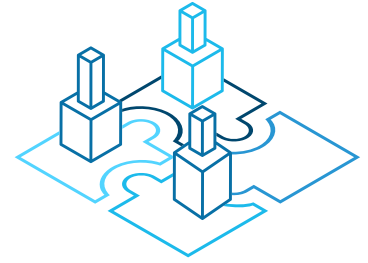
The **BLUEPRINT: TRANSFORMATION PATHWAYS** further details the transformation pathways as the *implementation components of the Blueprint*, and the activities toward the foreseen United Nations Geospatial Network Hub.



Fires in Australia, as shown by Sentinel satellites, each carry just one instrument – a high-resolution multispectral imager with 13 spectral bands. The smoke, flames and burn scars can be seen clearly in the image shown here, which was captured on 31 December 2019. The large brownish areas depict burned vegetation and provide an idea of the size of the area affected by the fires here – the brown ‘strip’ running through the image has a width of approximately 50 km and stretches for at least 100 km along the Australian east coast. Credits: Copernicus Sentinel (2019), processed by European Space Agency



4 BLUEPRINT: TRANSFORMATION PATHWAYS



The realisation of the objectives of the Network, through its strategic design presented previously, is presented in detail in the coming section and is structured according to the three strategic objectives and seven transformation pathways, as follows:

Strategic objective I: Building and strengthening the Network (Governance)

1. Governance
2. Policies

Strategic objective II: Delivering geospatial information as One (Technology)

3. Data and standards
4. Innovation and technology

Strategic objective III: Partnerships, capacity development and outreach (People)

5. Partnerships
6. Capacity development
7. Communication and outreach

The Blueprint incorporates traditional considerations on geospatial information and data collection, management sharing and publishing principles which have long been identified when establishing Spatial Data Infrastructure (SDI).²⁴ Traditional SDI include considerations on data, standards, data dissemination and policies and to an extent, partnerships and policies. The seven transformation pathways of the Blueprint, as guided by the IGIF, have a stronger emphasis on 'softer' approaches that relate to the coordination, coherence and promotion of geospatial information management within the United Nations system including on governance, policies, communication, capacity development, and partnerships. United Nations entities already have significant traditional experience in data management, and it is probably in the 'softer' skills approaches that the Network can provide the most value added in providing coherence and synergies.

The Network revisited and reconsidered its 2019 work plan and decided to redistribute some of its activities between strategic objectives, to ensure consistency of activities in the appropriate transformation pathway. The interconnections and linkages of the activities are key and are highlighted between the transformation pathways.

The realisation of the objectives of the Network through the Blueprint is structured, in below sections, according to the three strategic objectives, seven transformation pathways and further detailed through 50 activities. The richness of the approach, through the transformation pathways is the ability for dynamic adaptation according to priorities, the ability to work in parallel in the different transformation pathways, achieving outputs along the way according to opportunities and resources in the moment.

24. Global Spatial Data Infrastructure (2004), "[Developing Spatial Data Infrastructures: The SDI Cookbook](#)".

Strategic Objective I: Building and strengthening the Network

4.1 Governance



Overview

Governance of the Network is of paramount importance as it relates directly to the ability of the Network to bring geospatial information management to the next level, both in the Organization, with the delivery of respective offices' and agencies' mandates, responsibilities and programmes, in providing further support to Member States. Governance is the pathway to strengthen political endorsement and institutional mandates for geospatial information sharing and usage.²⁵

UN-GGIM, as an intergovernmental expert body under ECOSOC, was designed to, inter-alia, provide capacity development opportunities for Member States in geospatial information management as the enabler that underpins all sectors of the economy, society and the environment. As such, UN-GGIM provides a significant opportunity to positively contribute to developing the use of geospatial information worldwide and in the United Nations system. In turn, the United Nations system can provide capacity development opportunities for Member States in developing geospatial information management.

UN-GGIM is the convening entity that brings together a wide range of actors in the realm of geospatial information management. As such, the reporting and oversight provided by UN-GGIM to the Network is a key factor in the provision of meaningful advice, guidance, collaboration and support to the United Nations Geospatial Network. However, the Network members also have their own reporting mechanism, in that each entity reports to its management and oversight bodies independently.

UN-GGIM established the Network in 2017 and stated that the Network would “be self-organized with appropriate modalities and Chair, report annually to the Committee, and inclusive of the Chair participating in the Expanded Bureau of UN-GGIM.”²⁶

While the Network constitutes a great opportunity for geospatial information management in the Organization – to elaborate on orientations, address challenges and act collectively on opportunities to the appropriate Committee of Experts and the global geospatial community – the Network needs to consider how it can be further guided and supported within its own institutional context and reporting lines.

In April 2020, the United Nations Executive Committee discussed and approved the Secretary-General's Data Strategy for “Data Action by Everyone, Everywhere for Insight, Impact and Integrity” as a living document, including its principles, key concepts and recommendations. The United Nations Geospatial Network must consider opportunities to further provide contributions to the implementation of the Data Strategy and avail its knowledge and resources to the aim of the Data Strategy which is to create value with data and focus on priorities of the Organization. In particular, the Network could also seek active engagement in the constitution of the Data Council. The Blueprint highlights specific actions and activities that can be used, leveraged and integrated in a wider data strategy implementation, including through contributing to data use cases (Decade for Action, Climate Action, Conflict Prevention, Hate Speech, Gender Equality, Open Data, Peacekeeping Impact, etc...). In addition, the Network could present its activities to [the Chief of Executive Board](#) (CEB).

Reaching out to these two executive offices would allow raised awareness on ongoing geospatial information management activities in the United Nations system and its potential contribution to the wider United Nations data ecosystem. A dual reporting mechanism through UN-GGIM, and CEB or the Data Council, could provide an effective governance mechanism and guidance to develop the use of geospatial information management and increase the impact of the Network.

25. IGIF - [Strategic Pathway 1: Governance and Institutions](#).

26. [E/C.20/2017/14/Add.1](#), paragraph 17.

Activities

1. Ensure effective **reporting to UN-GGIM and solicit guidance** when required, including the exploration of partnerships with a wide range of actors, especially with Member States, on geospatial information management. *See also Partnerships*
2. Reach out to the **Chief Executives Board** for Coordination and request the inclusion of the Network in their next upcoming agenda, share the Blueprint and suggest the inclusion of a report of the Network on its annual activities to the CEB.
3. Present the Blueprint to the **Executive Office of the Secretary-General** and propose that Network representatives be included in the upcoming composition of the Data Council on data management.
4. Ensure sustainability of the **Network's leadership** by identifying potential candidates for the position of chair, vice chairs and steering group members.
5. Engage **United Nations system entities** working in the field of geospatial information management, and those who are interested in this field, with a goal to grow membership of the Network. *See also Communication and Outreach*
6. Maintain a **permanent list of Network representatives and web-platform** to communicate on geospatial knowledge, education and training, community of practice, technology, data, needs, partnerships and collaborative arrangements and to facilitate the proceedings, work and synergies of the Network. *See also Communication and Outreach*
7. Establish **working groups** for the implementation of recommended activities for each respective transformation pathway; these working groups would establish appropriate coordination mechanisms with relevant UN-GGIM Subcommittee, Working Groups, Expert Groups and Networks of UN-GGIM, as and when necessary. *See also Partnerships*
8. Establish a **technical review board**, that reports to the chair, vice chairs and steering group, composed of technical focal points from interested agencies: the board would provide the technical direction of the Hub to review data, technical documentation and standards prior to its incorporation in the Hub. *See also Data & Standards*

4.2 Policies



Policies, legal frameworks and international instruments are critical in regulating and instituting mandates, terms and processes for the collection, use, storage and distribution of geospatial information. Policies have multiple implications within other transformation pathways.²⁷ However, in the context of the United Nations system, few policies and instruments establish mandates and processes concerning the use of geospatial information, including international instruments, internal policy documents and the sporadic establishment of data terms of use and procurement contracts.

An exception to this is the United Nations Convention on the Law of the Sea of 1982 which encoded articles referring directly to the use of geography and cartography in its operative articles.²⁸ Supported by subsequent relevant General Assembly resolutions,²⁹ the United Nations Secretariat established a geographic information management team to discharge special responsibilities of the Secretary-General relating to the deposit of charts and coordinates concerning baselines and limits of maritime zones and due publicity thereof.

Within the United Nations Secretariat, two internal policy documents, issued by the Secretary-General, are associated with geospatial information management concerning the dissemination of maps and the handling of information, as follows:

- Secretary-General's bulletin on "Information sensitivity, classification and handling"³⁰
- Administrative Instruction of the Secretary-General on "Guidelines for the Publication of Maps"³¹

The "Guidelines for the Publication of Maps" functions are undertaken by a team of geospatial experts within the Secretariat (in OICT-GIS) who have also been responsible for the establishment of systems' contracts in coordination with the relevant procurement services of the Organization. Contracts have been progressively expanded to an enterprise "UN system-wide" terms to incorporate as many United Nations entities as possible, to broker deals and avoid redundancy of contracts within the United Nations system. Established through strict bidding

27. IGIF – [Strategic Pathway 2: Policy and Legal](#).

28. United Nations (1982) "Convention on the Law of the Sea", [Article 16, 47, 75, 76 and 84](#).

29. GA resolutions 49/28 of 1994, 52/26 of 1997, 59/24 of 2004, 60/30 of 2005, 67/78 of 2012, 74/19 of 2019 and Secretary-General's bulletin ST/SGB/2008/13 paragraph 9.2.

30. [ST/SGB/2007/6](#).

31. [ST/A/189/Add.25/Rev.1](#).

processes, the contracts currently address the provision of satellite imagery (remote sensing via satellite), of proprietary geospatial software and geospatial services.³²

Finally, few entities have established relationships with their respective legal departments to pave the way for crafting terms related to the use and dissemination of geospatial data.

The Network and respective entities should also use and contribute to the activities of the Working Group of UN-GGIM on legal issues and policy, in particular by using and leveraging relevant elements of the Compendium on licensing of Geospatial Information.³³

However, despite the aforementioned policies and frameworks on geospatial activities, there are many gaps to address. There is a need for:

- Systematic documentation of best practices and successful geospatial projects, (though some references exist from UNGIWG before 2015);
- Common operational policies pertaining to geospatial information management;
- Formal policies for proper use of geospatial information and corresponding best practices;
- Policies related to protection, security and sharing, on the collection and dissemination of geospatial information;
- Generic job titles and description templates for jobs related to geospatial information management; and
- Policies on the ethical aspects concerning privacy related to the use of geospatial information.

Activities

9. Prepare and establish **data custodianship and related guidance** for the development of a governance model on geospatial information management, in accordance with existing mandates and responsibilities. The governance model will ensure currency, consistency, quality, availability and best usage, in collaboration with relevant standards development organizations (SDOs) and Member States. *See also Data & Standards*
10. Liaise with **relevant legal affairs specialists on data**, to develop, establish, adapt³⁴ and adopt policies concerning the acquisition, management and dissemination of geospatial data in consideration of data privacy, protection, security and related confidentiality.
11. Establish a **clear and sustainable cooperation mechanism** between United Nations entities and their partners to foster collaboration according to clearly defined goals and terms in defined timeframes, including through formal arrangements, such as memorandums of understanding, letters of assist, licensing and contractual arrangements. *See also Partnerships*
12. Prepare **generic job title and description templates** for geospatial professionals and support staff to promote geospatial professions and develop a consolidated approach to human resource management, including facilitating recruitment, mobility and identification of geospatial experts in the United Nations system. *See also Capacity development*
13. Develop further **enterprise contracts and provision agreements of geospatial data** that can be shared within United Nations entities, in coordination with relevant procurement offices of the Organization. *See also Data & standards*
14. Support the creation of an online **repository of best practices and guidance documents**, in conjunction with UN-GGIM activities, for the successful implementation of geospatial activities within or outside of the United Nations. *See also Capacity development*

32. Available on the internal United Nations Geospatial Network platform.

33. See [Compendium on Licensing of Geospatial Information](#).

34. Ibid 29.

Strategic Objective II: Delivering (geospatial information) as One

4.3 Data and standards



Overview

The goal of this transformation pathway is to address data and standards concurrently, as the data used and shared must conform to available or developing standards.³⁵

Standards

Standards ensure the interoperability of geospatial data for Member States, the United Nations system, and users including partners and the general public. This interoperability requires standards and best practices that address the legal, semantic, data and technical aspects of geospatial information management. Significant contribution from the Standards Development Organizations (SDOs) is already ongoing through the work of the Open Geospatial Consortium (OGC), Technical Committee 211 of the International Organization for Standardization (ISO/TC 211) and the International Hydrographic Organization (IHO). A guide produced by these SDOs is available through UN-GGIM.³⁶

Standards, promoted to ensure interoperability, are widely used in the United Nations (such as for services, Web-Mapping Services or Web-Feature Services), as agreed earlier within UNGIWG. However, the United Nations entities should further consider two key aspects:

- To further contribute to the establishment of global standards and perspectives in collaboration with Member States, SDOs and partners.
- To further mainstream standards to the United Nations context, validate compliance or address specificities.

As UNGIWG was formally represented in OGC, ISO/TC211 and in the Committee on Earth Observation Satellites (CEOS) standardization, the Network should consider its representation and contribution to these SDOs.

There are few cases of support and contributions from the United Nations system to standards.

The standardized description of the datasets included in the [FAO GeoNetwork](#) catalogue is based on the ISO 19115:2003 metadata standard, approved by the international community in April 2003 as a tool to define metadata in the field of geographic information. The standard defines how geographic information and related services should be described, the underlying format compliant metadata is XML and uses the ISO Technical Specification 19139 Geographic information - Metadata- XML schema implementation. The Food and Agriculture Organization's (FAO) land cover classification system (LCCS/LCML) and the land cover product form the GLC-SHARE tradition. LCCS is an ISO standard developed by FAO and its partners and the LCCS/LCML is an ontology-based land cover classification system enabling the establishment of a common global standard which has flexibility to accommodate individual country legend requirements. Furthermore, LCCS/LCML has been recognised by the System of Integrated Environmental and Economic Accounting (SEEA) and by the Inter-agency and Expert Group on SDG Indicators (IAEG-SDGs) as the required method to develop the land cover baseline that will serve the SDG process for landcover-based indicators (e.g. SDG 15.3 etc.). The Land Cover Meta Language (LCML), an ISO standard (ISO 19144-2:2012), was developed with the aim of providing a common reference structure for the comparison and integration of data for any generic land cover classification system, thus ensuring the ability to exchange land cover data. FAO has been investing in this standard since 2003.

The Division for Ocean Affairs and the Law of the Sea (DOALOS) of the Office of Legal Affairs (OLA), has established close cooperation with the International Hydrographic Organization (IHO) to develop, perform initial implementation testing and evaluate data product specifications on maritime limits and boundaries, to ensure their compatibility with geographic information

35. Note this transformation pathway is treated as two separate pathways in the IGIF.

36. See [A Guide to the Role of Standards in Geospatial Information Management](#).



First drone testing for evaluation of programme implementation in Kazakhstan (2019)
Credits: UNICEF



The use of satellite image data, in particular Landsat images which provide coverage since 1972, can support monitoring and evaluation related to forestry, agriculture, environmental and urban dynamics. The imagery supports the assessment of the impact of society on ecosystems and the environment. This Landsat image provides an overview of the interface between society, its activities and the environment, south of Guayaquil, Ecuador (2019).
Credits: United States Geological Survey (USGS), Earth Resources Observation and Science (EROS), Landsat 8 OLI (2019)

systems, electronic nautical charts and other systems. Amongst other uses, the standard for maritime limits and boundaries (S-121) is used for the storage and management of geospatial information deposited by coastal States in relation to baselines, limits of maritime zones and maritime boundaries.

The International Telecommunication Union (ITU) assists in the development of Information and Communications Technology standards that may include the use or transport of geospatial data. Some of those standards are developed in cooperation with OGC. For example, recommendation ITU-T Q.3615 (2015) “Protocol for GeoSMS” standardizes the communication of location information between various location-based services (LBSs) over short message service (SMS).³⁷

Technical specification currently evolving on a ITU-T Recommendation³⁸ on the SensorThings API, in the scope of ITU standardization activities to support IoT and Smart Cities & Communities. This Recommendation specifies the SensorThings application programming interface (API) which provides an open standard-based and geospatial-enabled framework to interconnect Internet of things (IoT) devices, data, and applications over the Web.

ITU-T Technical Report ESTR.CLE³⁹ (06/2020) “Identify call location for emergency service” provides guidance on provision of the different technologies to identify the call location of fixed and mobile devices for emergency services. Such information can save vital seconds for first responders and reduce mortality due to the lack of timely arrival of emergency services.

Other entities in the Organization, such as the World Meteorological Organization (WMO) and the International Civil Aviation Organization (ICAO) are contributing to global standards, and others should consider their contribution, in line with their mandates and geospatial activities, to establish, support and promote the development of global standards and protocols for the efficient and interoperable use of global geospatial information management.

With reference to the mainstreaming of standards in the United Nations context, the Network should: establish a common geographic reference system; update the minimum definition by UNGIWG of the metadata prescribed to describe geospatial resources; provide dictionaries of geographical names and features (ontologies, semantics) in multiple languages; develop and use standard disclaimers for terms of geospatial data; agree to common standard formats for data exchange; and develop standards related to symbology for (web)maps at different scales.

In most cases, the proposed standards will not be prescriptive but rather suggestions and references on implementation options. In addition, standards are not static. They need to evolve and be adapted to technological advances and the adoption of new standards by SDOs.

Data

While the transformation pathways are mostly delivering outputs as documents, the data requires actual delivery of geospatial data and related services, to deliver information and knowledge to users. The intent is to share existing data components used by multiple United Nations entities by selecting the best ones in each domain, standardize them and enhance information delivery, including through implementation of standards, as well as reduced redundancy. The main element of the transformation pathway on data (and standards) consists of the unified data repository of common geospatial data, in accordance with relevant standards, to ensure the best authoritative geospatial information are available to as many users as possible in a timely and interoperable manner.

There are many entities in the Network that have activities and expertise on maintaining specific types of geospatial information. For example, OICT maintains functional and administrative boundaries; FAO, Land Cover and Agro-Ecological Zoning (AEZ), soils and water; ITU, radio-meteorological data for radio wave propagation; OCHA, Common Operational Datasets; UNEP, environmental indicators; UNICEF, educational establishments; UNITAR (UNOSAT), interpreted imagery; WHO, health boundaries and facilities; WMO, earth observations; OLA (DOALOS), deposited outer limits of maritime zones and maritime

37. A complete list of relevant ITU Recommendations and Reports relevant for geospatial is available [here](#).

38. <https://www.itu.int/md/T17-SG20-200706-TD-GEN-1828/en>.

39. https://www.itu.int/dms_pub/itu-t/opb/tut/T-TUT-DIS-2020-PDFE.pdf.

boundaries; and UNFPA, population data etc. While these are not clear cut, as many of the entities also have complimentary functions in the collection, analysis or dissemination of geospatial data, clearer delimitation of responsibilities, custodianship and collaboration of similar activities is required.

The repository should be maintained by designated data custodians (data providers) and conform to policies and standards defined in other pathways to ensure sharing and reuse. The Network would build a repository over time, in collaboration with Member States to leverage their data and promote existing national geospatial data for the benefit of the wider community.

The United Nations Geospatial Network prioritizes geospatial data for the delivery of its mandates: in consideration of the 14 global fundamental geospatial data themes as defined by UN-GGIM.⁴⁰ However, other thematic data themes pertinent to United Nations field operations are also required and identified as critical for the delivery of the United Nations global mandates. The data – geospatial and other – include security threats, education, displaced population, health and disease, human rights violations, economy or environment. The complementarity and integration with non-geospatial data, such as statistical data, is key to providing insight. UN-GGIM has long recognized the importance of synergies with the statistical community and the integration between statistical and geospatial data, which resulted in preparation of the Global Statistical and Geospatial Framework.⁴¹ The Framework should be used, leveraged, supported and further promoted within the United Nations system and during capacity development activities in country.

Once clear custodianship and responsibilities are established through a coherent governance model, respective data custodian entities can further coordinate and collaborate with Member States, private sector, academia, geospatial societies, standards organizations and a wide array of actors to develop, consolidate or reinforce capacities to avail authoritative geospatial data to the wider community.

Activities

15. Perform an **inventory of geospatial data** (data gap analysis) to identify and consider existing geospatial data and information produced and used in each entity: which are relevant to many, which should be shared and which are to be prioritised.
16. Establish the **data custodians and related governance** for the establishment of a governance model and strategy on geospatial information management within the United Nations system, in accordance with existing activities and mandate, including leadership and responsibilities for coordination, collection, management, maintenance and dissemination. *See also Policies*
17. Define and make **priority geospatial dataset available and accessible**, through the Hub, under the supervision of the Technical Review Board on geospatial data, and establish data characteristics for each geospatial data category, such as access, privacy, protection and restrictions, spatial accuracy, coverage, standards and regulations, to ensure they can be used properly.
18. Develop further **common acquisition activities and methods to collect once**, but use many times, including through enterprise contracts and provision agreements of geospatial data. *See also Policies*
19. Coordinate the **collection of geospatial data with/ from Member States**, in particular through Member States from UN-GGIM, and relevant UN-GGIM Subcommittee, Working Groups, Expert Groups and Networks to coordinate actions, practices and standardization activities on methods, tools and dissemination of geospatial information management. *See also Partnerships*
20. Develop and promote **demonstration projects** to showcase best practices in the application and usage associated with the (priority) geospatial data. *See also Communication and outreach*
21. Review and update **minimum standards and metadata**, through the Technical Review Board, for geospatial data through an inventory and collection of existing and used standards, including format, reference system, metadata and dictionaries as well

40. [The Global Fundamental Geospatial Data Themes](#), include: geodetic reference, addresses, buildings and settlements, elevation and depth, functional areas, geographical names, geology and soils, landcover and land use, land parcels, ortho-imagery, infrastructure, population, transport networks and water.

41. [The Global Statistical and Geospatial Framework](#).

as the use of standard disclaimers for terms of use of geospatial data. *See also Policies*

22. Develop, support and **promote geospatial data and international standards**, through the Technical Review Board and in line with respective mandates and activities. *See also Communication and Outreach*

4.4 Innovation and technology



Overview

The innovation and technology transformation pathway aims to support the Network's ability to deliver innovative geospatial services and solutions for the Organization's mandates and activities through adequate technology and systems configurations. These include the use of innovative solutions, such as the use of earth observations, Artificial Intelligence (AI), machine learning, algorithms, augmented reality, big data, analytics, Autonomous Aerial Vehicles (AAV), sensors and Internet of Things (IoT). The technological components that innovations are built upon, are the software, network components, infrastructure services, applications and secure services for these solutions. The information is mainly extracted from the geospatial data repository as well as from other geospatial and non-geospatial datasets provided by United Nations entities and external partners

The objective is to have one set of common innovative and technological components within the Network, but implementation considerations may favour an approach with connected nodes that depend on the mandates and technology of United Nations Geospatial Network entities (see Figure 6). The concept of nodes facilitates the use of products that have different licensing terms depending on usage (imagery, commercial software licences, etc.). Nodes could also have a more technical objective such as focusing access to earth observation imagery or providing specific tools (image analysis, data mining, statistical analysis).

The intent of the innovation and technology pathway is not to build new systems but rather to share and leverage existing ones, in particular the ones that use cloud technologies that can easily be scaled.

The main component of the innovation and technology pathway is common geospatial applications that will deliver information to end-users. Its objective is to share existing geospatial applications (services) or implement new ones that are required by multiple entities. These may include:

- Tools for editing and processing geospatial information as well as output production (shared GIS desktop licences);
- A metadata catalogue to allow data managers to describe geospatial data, including web-map services;
- An application to allow end-users to search for and access geospatial resources in the metadata catalogue (portal);
- An application to allow the publication of geospatial datasets as web-map services;
- A web-map viewer to access common geospatial data using a browser, including mobile browsers. The map viewer initially provides basic viewing and navigation functionality and is progressively enhanced with functionality to extract information, integrate information and processing capabilities;
- A 3D map viewer;
- An application to integrate maps for presentation purposes;
- A Geo-Dashboard application to offer senior management a "map-oriented" view of real-time updates of situations, mainly through mobile devices; and
- Tools for automated image analysis.

Each of these applications requires the customization of existing technologies, Esri or Open Source technologies. The Hub would include shared and common services provided by partners. These partners could be other entities of the Network that maintain their own technical components, Space Agencies such as ESA, the European Commission (Copernicus), or private companies such as Esri (ArcGIS Online), Google (Google Maps), Mapbox or Microsoft (Bing Maps).

The objective of the infrastructure services' component is to provide common tools for security and networking. These are not specific to the United Nations Geospatial

Network Hub and include authentication, communications, archiving, etc. The plan is to ensure that the geospatial components are integrated with existing infrastructure services at the United Nations (access permissions, browsers, archiving, etc.) and ensure privacy and protection of the geospatial data.

Activities

23. Perform a **review of existing infrastructures and progress toward the pooling of geospatial infrastructures** with due consideration to existing mandates, open source technologies, cloud computing and hosting, and United Nations policies.
24. Establish a **governance structure for the management of technology**, including leadership, responsibilities and resources.
25. Design a **technical architecture for geospatial data priorities** that integrates with the different infrastructures used by United Nations entities. Identify the most appropriate software products for the Hub, consider whether nodes should be established and prioritise geospatial applications. *See also Data & Standards*
26. Deliver **common geospatial applications for users** (design, develop, customise, implement) according to priorities, including the Organization's priorities to develop test cases for the delivery of mandates.
27. Perform an **inventory of updated geospatial tools, platforms, innovative practices**, algorithms, methods, technologies and instruments with relevance for application within and outside the United Nations system.
28. Deliver **priority innovation initiatives, common processes and projects** based on new methods and technology of geospatial data and sources (AI, machine learning, Internet of Things, satellite imagery, drones, social media data etc.) for the benefit of the larger community through showcasing demonstration projects. *See also Partnerships*
29. Foster and **establish research, innovation and technology initiatives** to address operational and mandated delivery challenges of the Organization with innovators, private sector and academia. *See also Partnerships*

Strategic Objective III: Partnerships, Capacity Development and Outreach

4.5 Partnerships



Overview

At the outset, the 2030 Agenda highlights its goals through five pillars: People, Planet, Prosperity, Peace and Partnerships and in its preamble invites “all countries and all stakeholders, acting in collaborative partnership” to implement the Sustainable Development Goals. Partnership enables “maximum potential from resources, avoid redundant or overlapping investments, exploit synergies, and introduce a culture of sharing” (IGIF on [Partnerships](#)).

With the development of geospatial capacities in the United Nations system, respective entities have forged partnerships with major international, regional and national geospatial actors from the private sector, academia, geospatial societies and international organizations. As noted in the SWOT analysis however, external stakeholders often do not conduct business with United Nations entities as ‘One’. This too often allows, depending on actors and objectives, for redundancy of efforts, duplication of costs, poor synergies of activities and, probably most importantly, the absence of benefits for many in the United Nations system, and beyond, of potential access to added value geospatial data and information in the delivery of their respective mandates.

The UN Geospatial Network should work with UN-GGIM to develop a ‘One Geospatial Partnership’ to promote transparent access and sharing of geospatial data to support policy and action for peace and security, human rights, sustainable development and humanitarian action, across the United Nations system, at the global, regional and national levels.

As part of the medium- and short-term strategy of partnerships of the United Nations Geospatial Network, the Network should foster partnerships with other UN-GGIM and United Nations system networks. In 2020, the Network established initial connections with:

- UN-GGIM Academic Network
- UN Committee for the Coordination of Statistics Activities
- World Geospatial Industry Council
- UN-GGIM Private Sector Network
- UN-GGIM Geospatial Societies
- UN Digital Technology Network

The Network further aims to establish dialogue with existing networks (such as UN Innovation Network) and upcoming initiatives related to geospatial information (such as the Data Strategy).

In addition to these global partnerships, the Network must also look within itself to establish partnerships, as its member entities provide an opportunity to establish joint projects, combine resources for analysis, or deliver jointly on large-scope programmes related to geospatial information. Since the establishment of the Network, some members have already identified synergies, forged stronger ties and shared resources on activities of common interest. These interactions and joint activities should be promoted and further amplified including through partnerships with external actors.



Austrian peacekeepers with the United Nations Disengagement Observer Force (UNDOF) consult a map while on patrol in the Golan Heights, Syria (2011). Credits: UN Photo/Wolfgang Grebien



Activities

30. Facilitate the **establishment of partnerships by promoting the Network**, its activities and activities of its Members including through the exchange of the Executive Brief and its work plan, in particular with other Networks. *See also Communication and outreach*
31. Organize and support **common activities, webinars, workshops and online training** platforms in collaboration with partners. *See also Capacity development*
32. Facilitate and invite **geospatial actors to develop demonstration projects** in collaboration with the United Nations system including for the selected 10 demonstration projects. *See also Communication and Outreach*
33. Identify **potential joint activities among Network members** and further facilitate and foster the establishment of partnerships on these activities with external actors (SDGs, common societal challenges, demonstration projects, standards; licensing, common tools and methods, frontier technologies). *See also Innovation and technology*
34. Liaise with and **coordinate activities with international and regional organizations** related to geospatial data and earth observation including geospatial data systems, acquisition, processing and distribution: in particular, the Committee on Earth Observing Satellites (CEOS), the CEOS Satellite Data Coordination Group (SDCG) and the Group on Earth Observations (GEO), as well as UN-Space, and other relevant United Nations entities and groups.
35. Engage with relevant **initiatives and activities of the UN-GGIM** Subcommittee, Expert and Working Groups of the Committee of Experts which provide opportunities for consultative proceedings and to engage with relevant stakeholders and potential partners. *See also Governance*
36. Foster and establish **clear and sustainable cooperation mechanisms** through the Network, between the United Nations entities, to foster collaboration including through formal arrangement such as memorandums of understandings, letters of assist, licencing and contractual arrangements. *See also Policies*

4.6 Capacity development

The Regional Commissions of the United Nations are conducting geospatial technical assistance activities in their respective countries in order to strengthen their national capacities in geospatial information management. This assistance has been provided through inter-institutional workshops convened by geospatial agencies (UN-GGIM focal points) and often with the national statistical offices of the countries and the participation of public, academia and non-governmental organizations involved in geospatial information management. As an example, since 2018, ECLAC has conducted support missions with 10 countries in the region: Guyana, Paraguay, Dominica, Ecuador, Costa Rica, Suriname, Dominican Republic, Uruguay, Cuba and Panama. In the Asia and Pacific region, after the breakout of COVID-19 pandemic, ESCAP organized two webinars with stakeholders from more than 30 countries to share good practices and cross-cutting approaches in integrating geospatial information into COVID-19 response, and explore how to strengthen regional collaboration to develop capacity to map health risk hotspots and mitigate potential risks using geospatial information and big data.

The agendas of the regional workshops, conducted with the Statistics Division, have included collective and collaborative self-assessment exercises around the nine strategic pathways of the Integrated Geospatial Information Framework (IGIF). The results of these self-evaluations have enabled the prioritization of activities in the short- and medium-term and their integration into roadmaps, strengthened communication and coordination among public actors, and a contribution to the design of foundational normative instruments to formally install geospatial initiatives at the national level. In addition, the workshops have further promoted the frameworks of UN-GGIM such as the Global Statistical Geospatial Framework (GSGF) and its five principles, and the Strategic Framework for Geospatial Information and Services for Disasters.

Numerous members of the Network already implement significant capacity building activities in the area of geospatial information management. For example, the Office for Outer Space Affairs (OOSA) delivers capacity development workshops on the use of space-based data and derived geospatial information for disaster management, emergency response, natural resources

management and other societal benefit areas. Further, FAO delivers training on methodologies and tools on land cover mapping and accuracy assessment for the effective production, management, safeguarding and for building resilience of natural resources.

The United Nations Geospatial Network should consider the coordination and collaboration for joint workshops on relevant geospatial capacity development activities requested by Member States. Internal capacity development activities in the Organization should be pursued to further mainstream the use of geospatial information including through online training, knowledge platforms, pooled workshops and awareness campaigns and to promote a wider outreach and impact of capacity development initiatives.

Activities

37. Assess and develop **an inventory of knowledge, skills, and resources** within the United Nations system to identify existing capacity development and education policies, programmes, and resources – technological, financial, and human – that are currently in place (see IGIF Implementation Guide that provides templates for conducting this kind of inventories- Annexes of SP8).
See also Governance
38. Act as **broker on capacity development** by assessing needs of Member States and of the United Nations system and identifying capacity building activities in the United Nations system to support Member States.
39. Conduct a **needs assessment and gap analyses to development capacities**, and for the identification of gaps in capabilities within the UN System (see Capacity Scanning Matrix template in the IGIF Implementation Guide).
40. Develop **capacity building activities in areas where none exist** in cooperation with external partners, such as the UN-GGIM Academic Network, the Committee for the Coordination of Statistics Activities (CCSA), the UN-GGIM Geospatial Societies, the UN-GGIM Private Network, etc. *See also Partnerships*
41. Design and develop **strategies and programmes that promote and improve competencies, skills, education, training, and continuous professional development** to improve capacities in the United Nations system. *See also Communication and Outreach*
42. Coordinate and **conduct technical assistance to strengthen national capacities** in geospatial information management, including through inter-institutional workshops convened by geospatial agencies and others in accordance with respective mandates, intergovernmental mechanisms and global frameworks.
43. Maintain **a directory of events, conferences, workshops and related activities** on geospatial information management within and outside the United Nations system, that is relevant to the Network (available through the web-platform).
44. Organize regular **on-line training and webinars**, through partnership with other Organizations, e.g. the Eye on Earth Alliance, the IEEE Computer Society, Academic Network, and on-line resource outreaching in areas of global geospatial information management.
See also Communication and Outreach

4.7 Communication and outreach



The objective of the communication and outreach transformation pathway is to deliver effective and efficient communication and engagement processes to encourage wider and better use of geospatial resources. The Network itself is a vehicle for improved communication and outreach, as well as to deepen collaboration between its members and further with UN-GGIM. The internal platform already supports an increased awareness of activities amongst its members, and further awareness on the role of UN-GGIM.

Communication and outreach have not been optimized by the geospatial community to promote its activities. Apart from notable exceptions, geospatial data and activities have not often been promoted prominently, such as on the public website of the Organization. The Network intends to promote geospatial activities across its entities through presentations, events, websites, social media, promotional videos and other related materials to raise awareness around the role of geospatial information and the work of the United Nations in this realm to deliver on its mandates.

Going beyond the Network, five major stakeholders or 'target audiences' have been identified for the future outreach and communication plans of the Network:

- **Policy makers:** policy makers at the global, regional and national levels, including within the United Nations system
- **Scientific and technology community:** academics, scientists and technologists
- **International organizations:** United Nations System and other interested international organizations
- **Business and innovators:** companies with an interest in geospatial information management
- **Citizens and civil society:** civil society including youth and new generations

Communication and awareness should first and foremost start by having a common identity for the United Nations Geospatial Network and its affiliation to UN-GGIM.

The adoption of the name 'United Nations Geospatial Network' at the Ninth Session of UN-GGIM (2019) was a good step to ensure clear, succinct and compelling branding and facilitate communication within the United Nations. In January 2020, the Network also adopted a common 'Executive Brief' which can be used by all members of the Network to raise awareness, communicate and provide outreach on the role of the Network, its activities and its role within the global UN-GGIM architecture

Activities

45. Discuss and **establish a communication strategy for the Network**, including via presentations, events, website, social media, promotional videos and other related materials for both within and outside the United Nations system, leveraging the UN-GGIM websites and content, as appropriate.
46. Organize and **coordinate events/venues targeted at raising awareness on geospatial activities** towards senior management of the United Nations, Member States and the general public, in collaboration with UN-GGIM Member States and its regional Committees and Networks. *See also Partnerships*
47. Facilitate the **organization and advertisement of public events, trainings, capacity development and education opportunities** related to geospatial information conducted, organized or attended by the United Nations system and UN-GGIM. *See also Capacity strengthening*
48. Conduct **fund raising activities**, based on agreed overarching data governance, implementation priorities and agreed action items of the Network.
49. Develop **content and mediums to promote geospatial information and activities** of the United Nations system entities, the Network and UN-GGIM, in accordance with an established Communication Strategy through presentations, events, website, social media, newsletters, promotional videos, demonstration projects and leveraging the UN-GGIM websites and content as appropriate.
50. Develop **demonstration projects, as showcases, on the use and application of geospatial information management** by the United Nations system. The demonstration projects should be selected each year at Plenary sessions of the Network. *See also Data & Standards*

ACRONYMS

| | |
|-----------|--|
| AAV | Autonomous Aerial Vehicles |
| AEZ | Agro-Ecological Zoning |
| AI | Artificial Intelligence |
| CCSA | Committee for the Coordination of Statistics Activities |
| CEB | Chief of Executive Board |
| CEOS | Committee on Earth Observation Satellites |
| DFS | Department of Field Support |
| DOALOS | Division for Ocean Affairs and the Law of the Sea |
| ECOSOC | Economic and Social Council |
| ESA | European Space Agency |
| GEO | Group on Earth Observations |
| GIS | Geographic Information Systems |
| GLC-SHARE | Global Land Cover-SHARE |
| GLONASS | Global Navigation Satellite System |
| GSGF | Global Statistical Geospatial Framework |
| IAEG-SDGs | Inter-agency and Expert Group on SDG Indicators |
| IEEE | Institute of Electrical and Electronics Engineers |
| IGIF | Integrated Geospatial Information Framework |
| IHO | International Hydrographic Organization |
| IoT | Internet of Things |
| ISO | International Organization for Standardization |
| TC 211 | Technical Committee 211 on geographic information/geomatics |
| LCCS | Land Cover Classification System |
| LCML | Land Cover Meta Language |
| NGOs | Non-Governmental Organizations |
| ODA | Official Development Assistance |
| OGC | Open Geospatial Consortium |
| SDCG | Satellite Data Coordination Group |
| SDG | Sustainable Development Goals |
| SDI | Spatial Data Infrastructure |
| SDOs | Standards Developing Organizations |
| SEEA | System of Environmental-Economic Accounting |
| SWOT | Strengths, Weaknesses, Opportunities and Threats |
| UN | United Nations |
| UNOSAT | United Nations Operational Satellite Analysis and Research programme |
| UN-GGIM | Committee of Experts on Global Geospatial Information Management |
| UNGIWG | United Nations Geographic Information Working Group |

United Nations entities

The term “entity” or “entities” refers to offices, departments, regional commissions, agencies, funds, programmes and related organizations of the United Nations system

SECRETARIAT

| | |
|--------|---|
| DESA | Department for Economic and Social Affairs |
| OCHA | Office for the Coordination of Humanitarian Affairs |
| OICT | Office of Information and Communications Technology |
| OLA | Office of Legal Affairs |
| UNDRR | United Nations Office for Disaster Risk Reduction |
| UNDSS | United Nations Department of Safety and Security |
| UNODC | United Nations Office on Drugs and Crime |
| UNOOSA | United Nations Office for Outer Space Affairs |

REGIONAL COMMISSIONS

| | |
|-------|---|
| ECA | Economic Commission for Africa |
| ECE | Economic Commission for Europe |
| ECLAC | Economic Commission for Latin America & the Caribbean |
| ESCAP | Economic & Social Commission for Asia and the Pacific |
| ESCWA | Economic & Social Commission for Western Asia |

FUNDS, PROGRAMMES & RESEARCH

| | |
|------------|--|
| UNDP | United Nations Development Programme |
| UNEP | United Nations Environment Programme |
| UNFPA | United Nations Population Fund |
| UN Habitat | United Nations Human Settlements Programme |
| UNICEF | United Nations Children’s Fund |
| WFP | World Food Programme |
| UNITAR | United Nations Institute for Training and Research |
| UNHCR | United Nations High Commissioner for Refugees |
| UNOPS | United Nations Office for Project Services |
| UN Women | United Nations Entity for Gender Equality & the Empowerment of Women |

SPECIALIZED AGENCIES

| | |
|------------|--|
| FAO | Food and Agriculture Organization |
| ICAO | International Civil Aviation Organization |
| IFAD | International Fund for Agricultural Development |
| ILO | International Labour Organization |
| ITU | International Telecommunication Union |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| WHO | World Health Organization |
| WMO | World Meteorological Organization |
| World Bank | World Bank Group |

OTHER RELATED ORGANIZATIONS

| | |
|------|--|
| IAEA | International Atomic Energy Agency |
| IOM | International Organization for Migration |
| ISA | International Seabed Authority |

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'Algae bloom' is the term used to describe the rapid multiplying of phytoplankton – microscopic marine plants that drift on or near the surface of the sea. The chlorophyll that phytoplankton use for photosynthesis collectively tints the surrounding ocean waters, providing a way of detecting these tiny organisms from space. Although algal blooms are a natural and essential part of life in the sea, human activity is also said to increase the number of annual blooms. Large summer blooms can contain toxic algae that are dangerous for both humans and other animals. Satellite data can track the growth and spread of harmful algae blooms in order to alert and mitigate against damaging impacts for tourism and fishing industries. Credits: Copernicus Sentinel (2019), processed by European Space Agency



UN GEOSPATIAL NETWORK
UNITED NATIONS COMMITTEE OF EXPERTS ON
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