Geospatial and Information and Communication Technologies for the SDGs

Andrea Manara
ITU focal point for Geospatial Information Management
International Telecommunication Union

International Telecommunication Union

ITU-R (BR): global management of the radio-frequency spectrum and satellite orbits

ITU-T (TSB): develops the technical standards to ensure ICT networks and devices interoperability

ITU-D (BDT): strives to improve access to ICTs to underserved communities worldwide.

General Secretariat: corporate functions and strategic planning

Membership

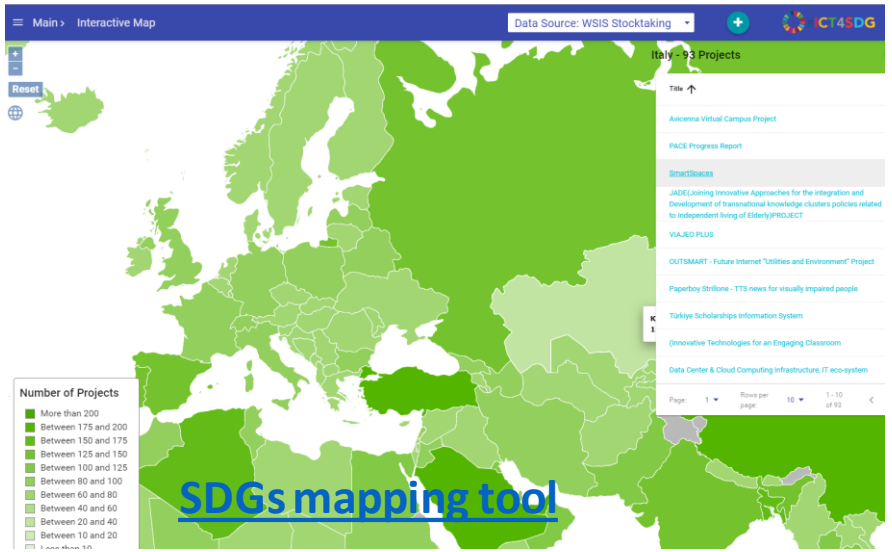
- 193 Member States
- Over 900 private-sector entities and academic institutions

ITU and the SDGs

ICTs to achieve the United Nations Sustainable Development Goals (ITU Media Center)

SDG Target 9.c

Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020



Geospatial and Telecom

HIGH-LEVEL POLITICAL FORUM ON SUSTAINABLE DEVELOPMENT

VOLUNTARY NATIONAL REVIEWS

Ghana is exploring new sources of data—geospatial and call details records from the telecommunication industry.

UK report Case study: Innovation in Geospatial Data

Many developing countries lack the up-to-date, local level estimates of population, that are needed to plan services. GRID3 is helping developing countries better understand where populations are distributed, and the location of key features such as roads, hospitals and schools.

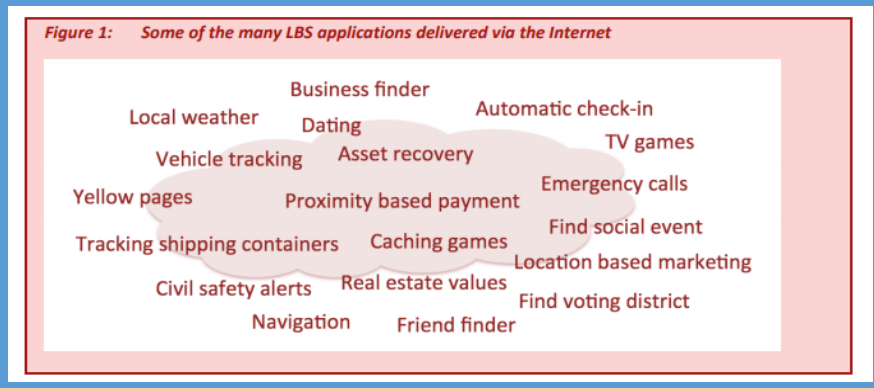
In Nigeria… the use of mobile phone data is now being explored to provide more accurate local level population estimates.

ITU Geospatial/telecommunication standardization activities

Q.3615 "Protocol for GeoSMS" (04/2015) OGC standard

Reccomendation which defines the protocol for GeoSMS which is used to encode location information in a plain text message.

Standardization is needed to ensure consistent encoding of location data and the use of well-defined, consistent service interfaces for finding, accessing and invoking Location Based Services (LBS) and associated data



Location matters: Spatial standards for the Internet of Things

ITU-T Technology Watch Report September 2013, report written by OGC staff and members in collaboration with ITU Secretariat.

Radio frequency spectrum planning and geospatial data

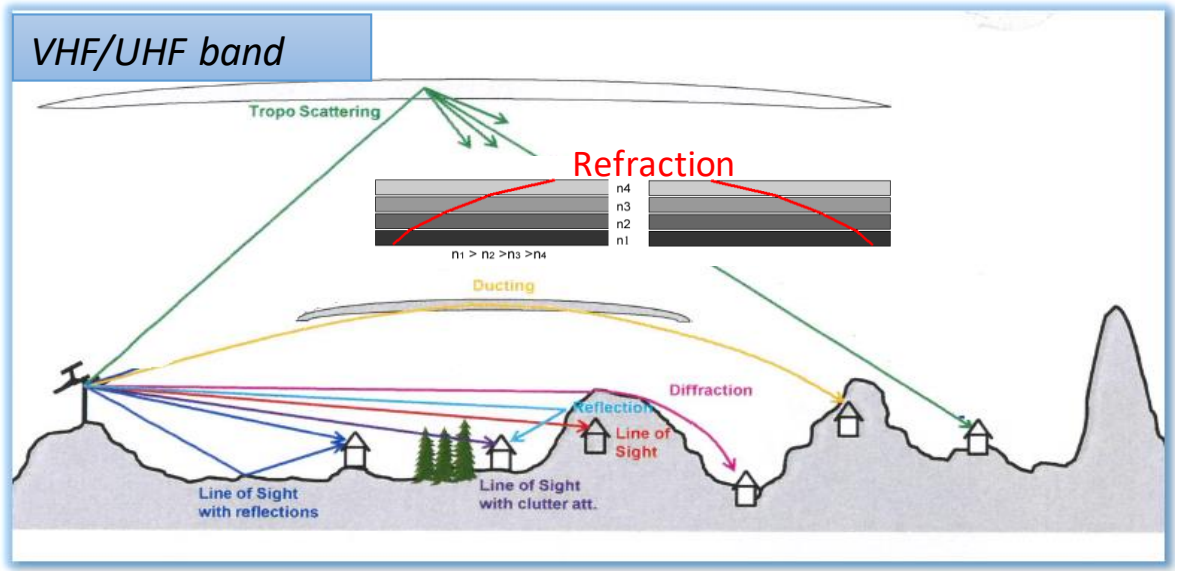
Radio communication services planning

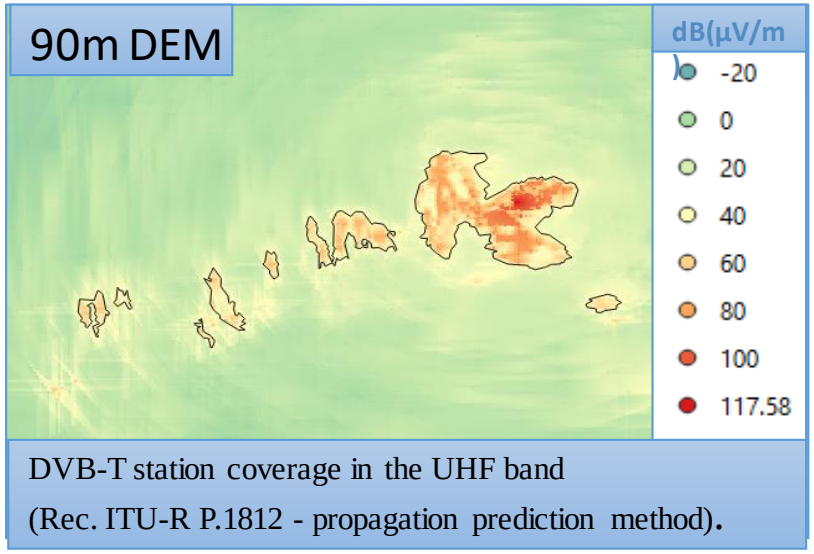
Coverage determination, interference analyses, international coordination

ITU-R propagation models

Geospatial data

radio-meteorological data, terrain height and surface features





DVB-T station coverage in the UHF band (Rec. ITU-R P.1812 - propagation prediction method).

Resolution ITU-R 40-4 Worldwide database of terrain height and surface features provides guidance on use of DEM - 1 arc second resolution is suitable for planning

IMT-2020 (5G) deployment to advance the SDG

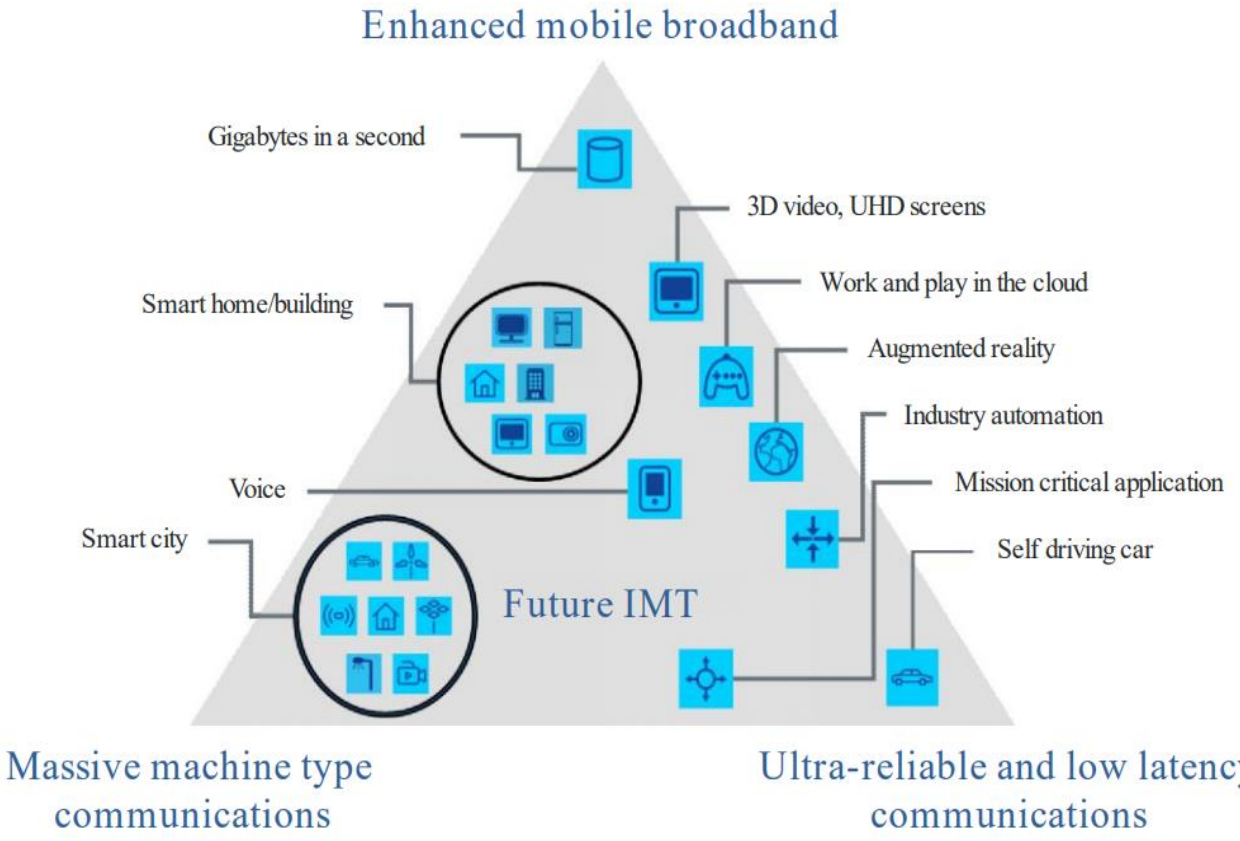
Mobile connectivity continues to transform the lives of billions. More than two-thirds of the global population are now connected to mobile, making it one of the most far-reaching technologies worldwide. For many, mobile is the primary – sometimes only – channel for accessing the internet and life-enhancing services. With its unprecedented scale and growing impact on daily lives, mobile is a powerful tool for achieving the United Nations Sustainable Development Goals (SDGs), helping to reduce poverty, improve healthcare and education, and drive sustainable economic growth.

Geospatial data critical for efficient and economic IMT-2020 (5G) planning

5G rollout at millimeter wave frequencies → Radiowave propagation very challenging → Several geospatial datasets needed (3D models)

IMT-2020/5G

The fourth industrial revolution needs a telecommunication infrastructure that is stable, secure, reliable and interoperable to support an enormous volume of ICT-based applications and services.



More frequency bands for IMT-2020/5G to be allocated/identified at WRC-19!

ITUWRC SHARM EL-SHEIKH2019
28 October - 22 November
Sharm El-Sheikh, Egypt

Rec. ITU-R M.2083: IMT Vision – Framework and overall objectives of the future development of IMT for 2020 and beyond.

Few ITU GIS data/platform/applications…

ITU Compatibility analyses and propagation on-demand calculation and display services

eBCD 2.0 Broadcasting Online

To assist Member States plan migration to digital broadcasting

African region (2012-2013)
Arab region (2014-2015)
Central America and Caribbean Region (2017-2018)

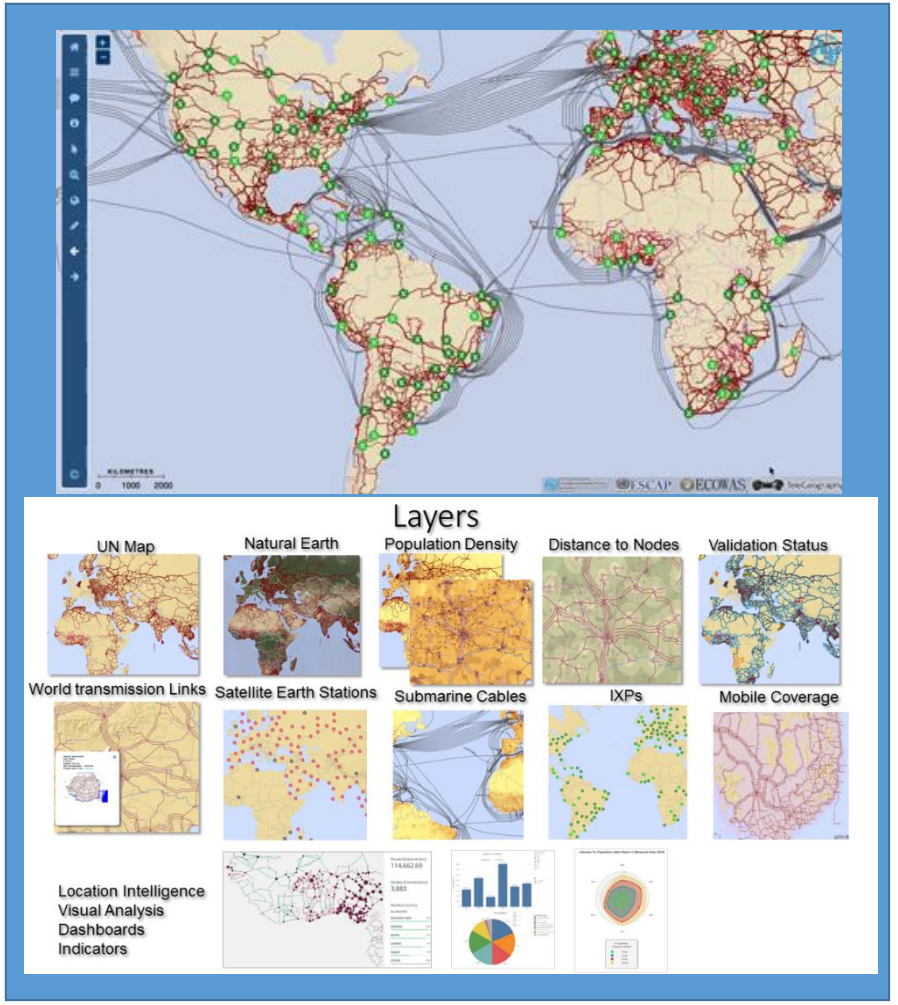
Rec. ITU-R P.1812 | Rec ITU-R P.1546

Spectrum Management System for Developing Countries (SMS4DC)

Detailed presentation:
https://prezi.com/view/cff4SIqWyS9oUUeCWvGf/

SMS4DC subscriptions

ITU Broadband Transmission Maps



For more information: https:/itu.int/go/Maps
Detailed presentation

Conclusions

- ITU is at the forefront of the digital revolution that accelerates progress towards every United Nations Sustainable Development Goals (SDGs)
- Multi-stakeholder partnerships, a core component of ITU's membership and activities, play a key role.
- An intersectorial team was created to deal with Geospatial Information Management in the ITU.
- ITU is contributing to ensure effective collaboration in Geospatial Information Management and ICTs amongst all relevant players to accelerate the progress towards the SDGs

Thank you!

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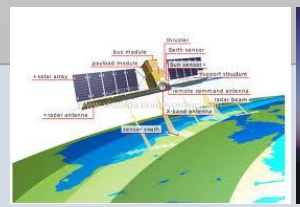
ITU Study Groups
relevant activities for 5G and sustainable development

ITU-R

SG3 Radiowave Propagation: Propagation models and related geospatial data

SG5 Terrestrial Services: Radio Interface Technologies for 5G. Local area networks, broadband wireless access systems. High Altitude Platforms Systems, Intelligent Transport Systems

SG7 Science services: i. a. space research (SRS), space operation, Earth exploration-satellite (EESS), meteorological-satellite (MetSat), meteorological aids (MetAids) and radio astronomy (RAS) services



ITU-D

SG1 Enabling environment for the development of telecommunications/ICTs

SG2 ICT services and applications for the promotion of sustainable development

ITU-T

SG5 Environment, climate change and circular economy: environmental performance of 5G equipment.

SG9 Broadband cable and TV: distribution of TV and sound programs supporting advanced capabilities

SG11 Signalling requirements, protocols, test specifications and combating counterfeit products: define how telephone calls and other calls (such as data calls) are handled in the network.

SG12: Performance, QoS and QoE: performance, quality of service (QoS) and quality of experience (QoE)

SG13 Future networks: 5G network architecture and network capability exposure

SG15 Transport, Access and Home: technologies and architectures of optical transport networks, fibre- or copper-based access networks and home networks

SG16 Multimedia: multimedia coding, systems and applications

SG17 Security: Security aspects of telecom services, networks, and IoT

SG20 Internet of Things, smart cities and communities: IoT technologies for smart sustainable cities

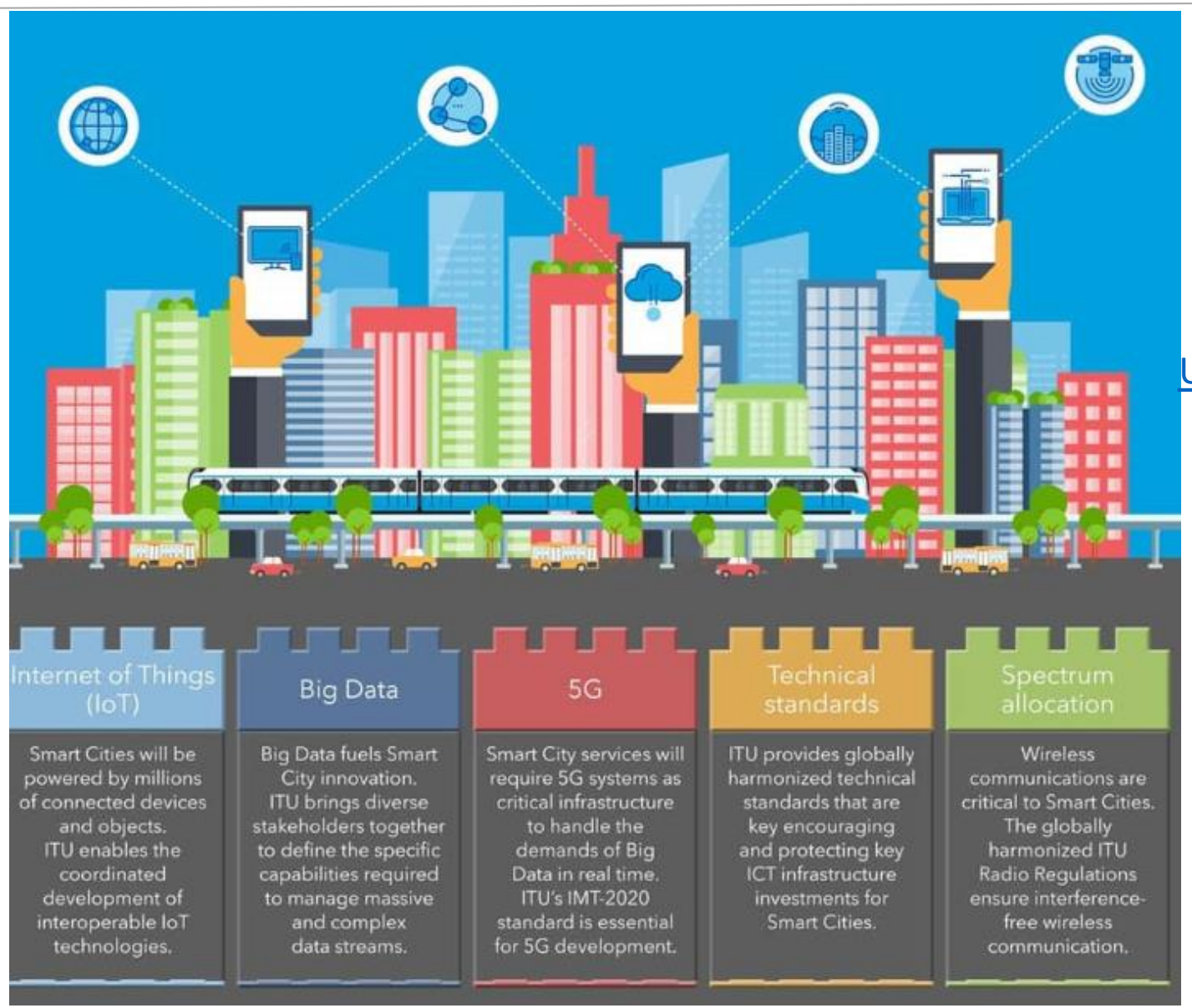
Artificial Intelligence

The 2019 summit showcased numerous artificial intelligence (AI) projects (i.a. education, healthcare and wellbeing, social and economic equality, space research, and smart and safe mobility) with promise to advance all United Nations Sustainable Development Goals (SDGs).

Example project: predicting deforestation before it occurs

Smart Sustainable Cities and Communities

11 SUSTAINABLE CITIES AND COMMUNITIES



Artificial Intelligence

AI helps deriving meaningful insight from Big Data. ITU organizes the AI for Good Global Summit

[ITU-T Study Group 20](#)
Internet of Things, smart cities and communities

[United 4 Smart Sustainable Cities](#)

UNITED 4 SMART SUSTAINABLE CITIES

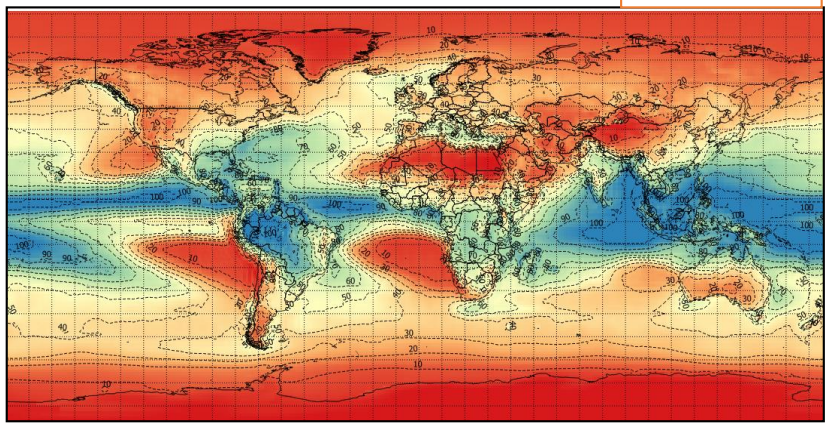
U4SSC

ITU News magazine, [Building tomorrow's Smart Sustainable Cities](#)

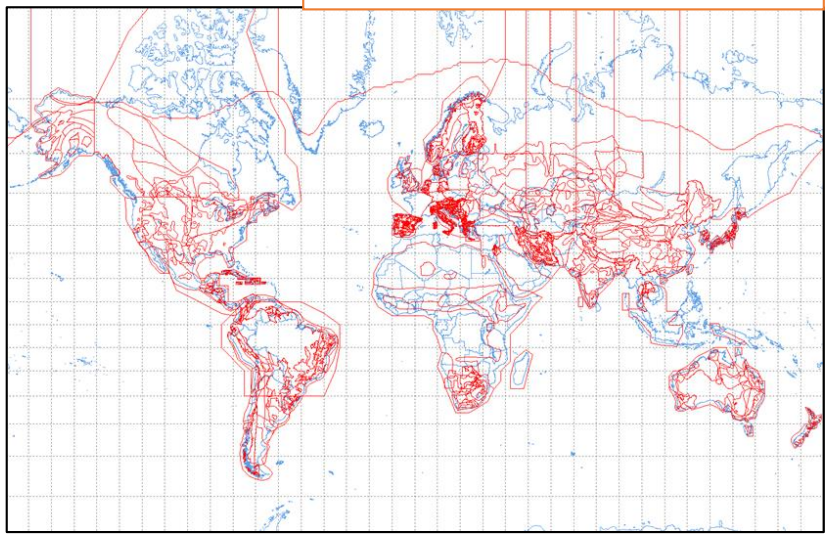
Geospatial data for spectrum planning

- Radio-meteorological data collected from the Membership, via the ITU-R Study Group 3. This data is needed for the development of propagation prediction methods.
- ITU Digitized World Map (IDWM) database (binary proprietary format) containing geographical data (coastlines, seas, island, and lakes), political data (country borders), radio-meteorological data (rain climatic zones, ground conductivity areas, noise zones, coastal zones, propagation zones and maritime zones defined in the ITU-R Recommendations).
- Terrain database (SRTM3, SRTM1, etc.). There is no formal agreement of ITU Membership on a specific DEM.
- Resolution ITU-R 40-4 Worldwide database of terrain height and surface features – provides guidance on use of DEM - 1 arc second resolution

Rainfall rate



Medium-wave ground conductivity



ITU on-demand online calculation services consuming geospatial data (eTools)

eBCD 2.0 Broadcasting Online

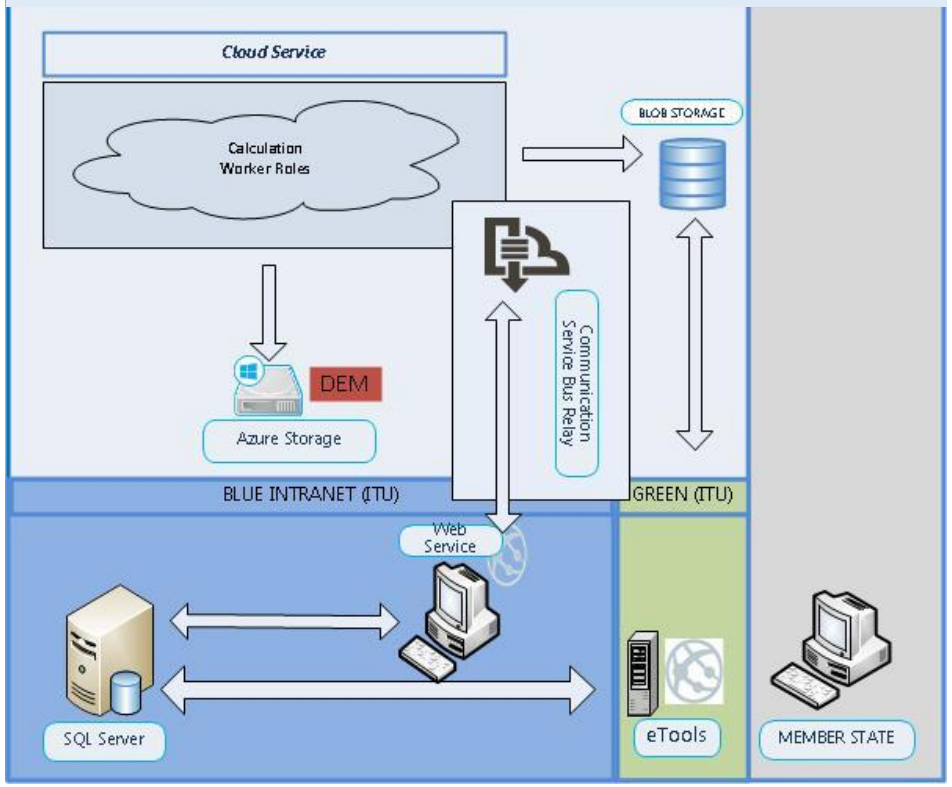
eTools compatibility and propagation on-demand calculation services: instrumental in assisting member states to migrate from analogue to digital broadcasting

- African region
  ATU (2012-2013)
- Arab region
  ASMG (2014-2015)
- Central America and Caribbean Region
  COMTELCA (2017-2018)

2013 Pilot project

Propagation model and usage of DEM data

The main goal of the project was to study the challenges of integrating ITU's on-premises computing facilities with cloud resources, with particular considerations for scalability, data confidentiality and security issues



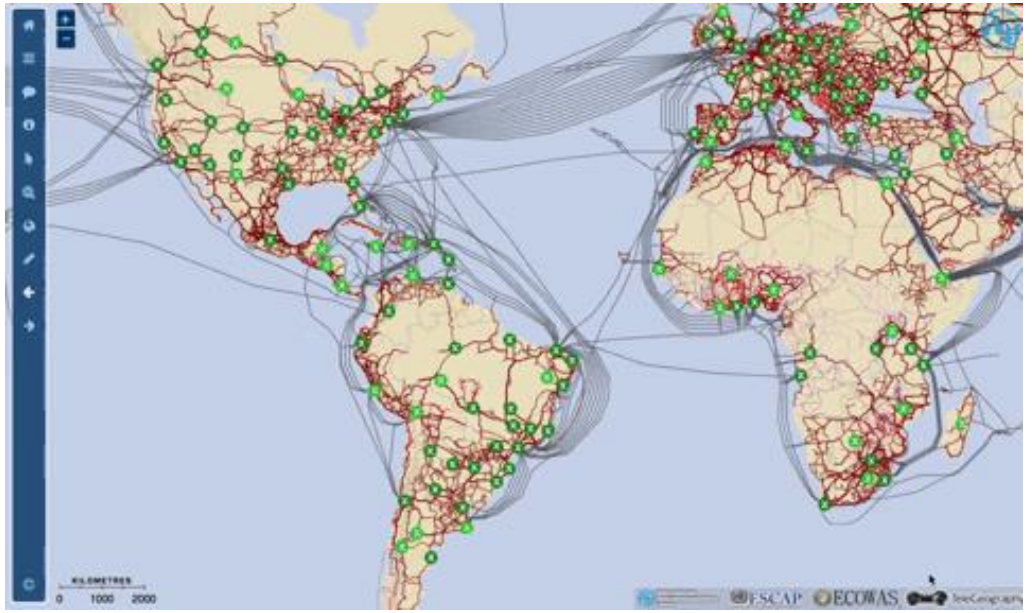
ITU Broadband Transmission Maps

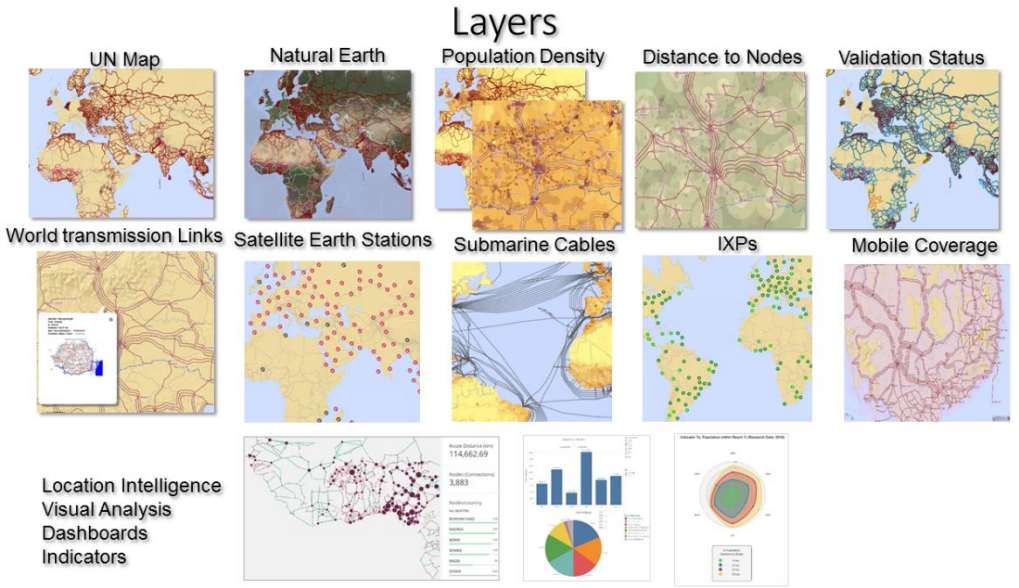
Lack of network infrastructure is one of the principal reasons ½ of population is unconnected

The ITU Broadband Maps are a GIS platform taking stock of global backbone connectivity (e.g. Optical Fibres) and other key infrastructure metrics

➢ Contribution to **SDG 9**:

- Assessing the status of info-highways and identifying connectivity gaps
- Supporting investment opportunities in ICT infrastructure
- Harmonized metrics on ICT infra-connectivity data





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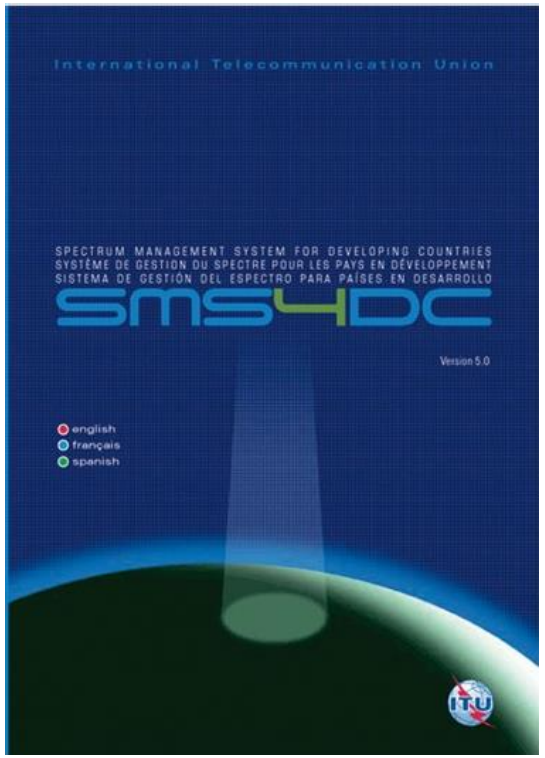
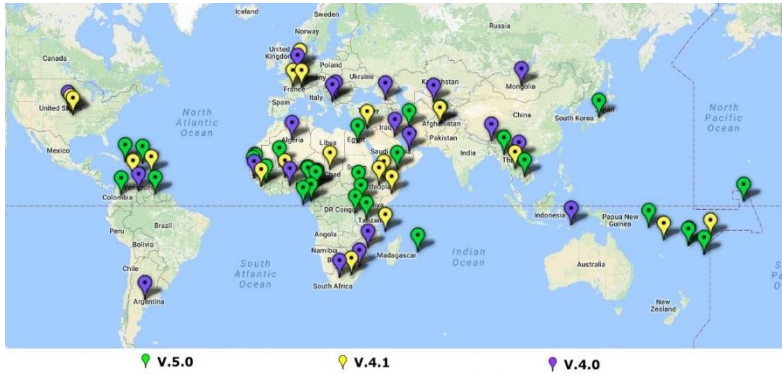
Detailed presentation

Spectrum Management System for Developing Countries (SMS4DC)

- **SMS4DC is software designed by ITU based on ITU recommendations**
- **Developed to assist the administrations of developing countries to undertake their spectrum management responsibilities more effectively;**
- **SMS4DC covers terrestrial fixed, mobile, sound and television broadcasting services in the bands above 30 MHz, including GE-06 as well as frequency coordination of Earth stations**
- **Functions of SMS4DC**
  - **Administrative Functions**
  - **Graphical User Interface (GIS) Functions** *(including Map Displays)*
  - **Engineering Analysis Functions**



SMS4DC subscriptions



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