Space Science and Technology for Advancing Public Health

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World Health Organization

World Health Organization

Key Messages

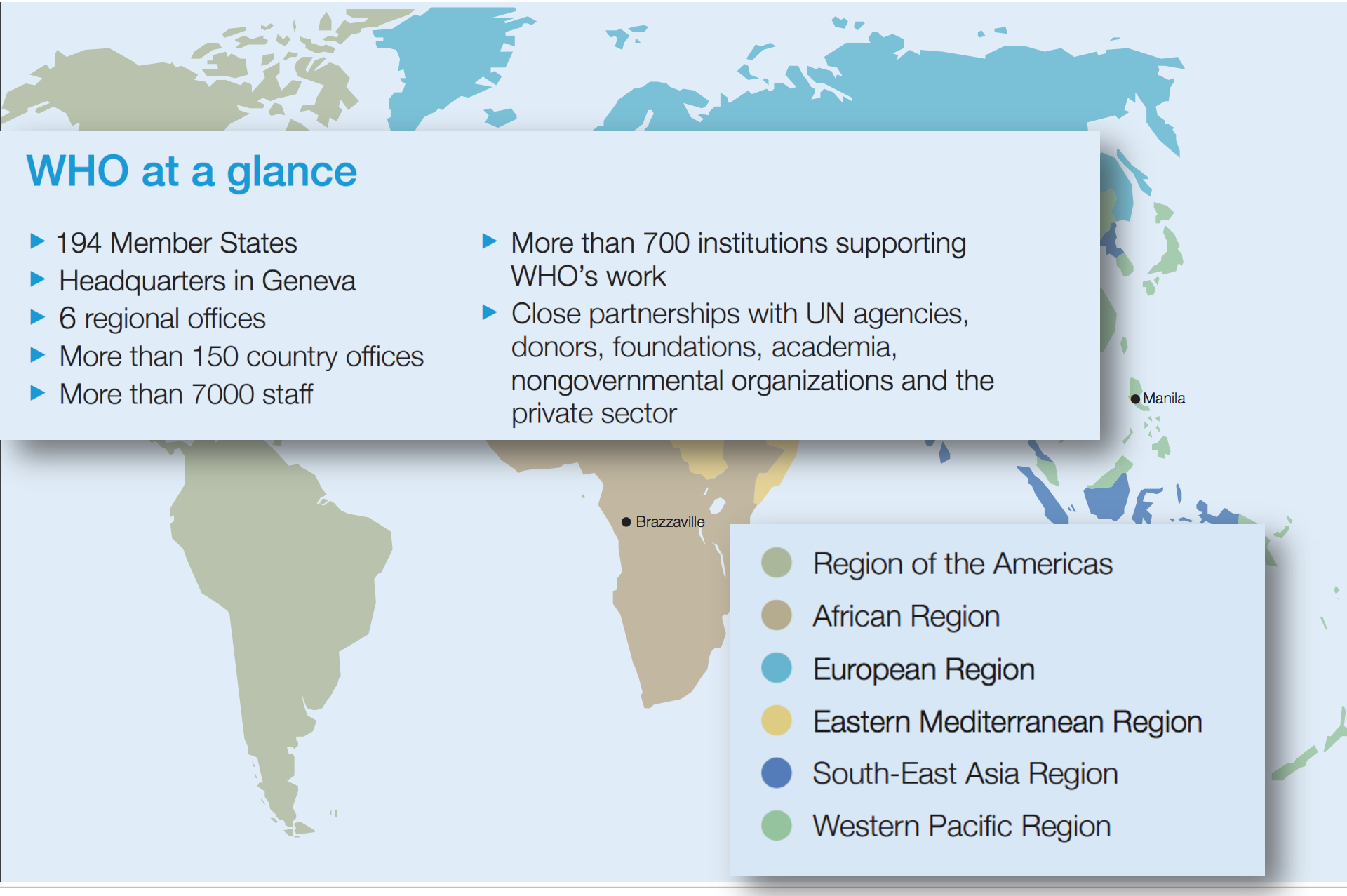
- Integration of Space science and technology to health systems strengthening efforts to be more widely practiced
- Closer collaboration between Ministries of Health and Ministries of Science/Technology is essential

World Health Organization

World Health Organization

WHO at a glance

- 194 Member States
- Headquarters in Geneva
- 6 regional offices
- More than 150 country offices
- More than 7000 staff
- More than 700 institutions supporting WHO's work
- Close partnerships with UN agencies, donors, foundations, academia, nongovernmental organizations and the private sector



World Health Organization

World Health Assembly
the decision-making body of WHO

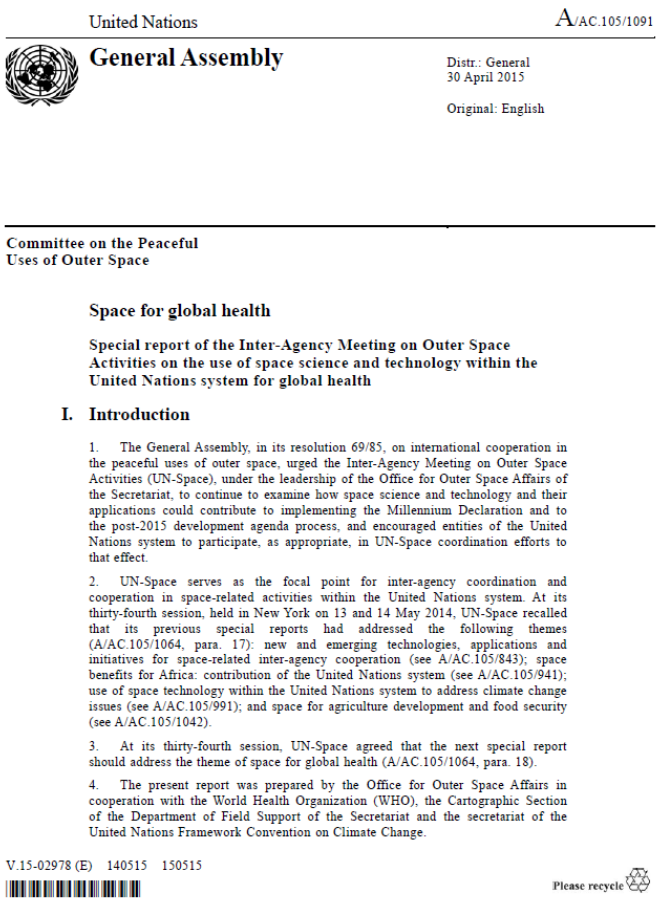
World Health Organization

World Health Organization

Relevant Documents for Discussion

World Health Organization

Space Science and Public Health



United Nations A/AC.105/1091

General Assembly

Distr.: General
30 April 2015

Original: English

Committee on the Peaceful
Uses of Outer Space

Space for global health

Special report of the Inter-Agency Meeting on Outer Space Activities on the use of space science and technology within the United Nations system for global health

I. Introduction

1. The General Assembly, in its resolution 69/85, on international cooperation in the peaceful uses of outer space, urged the Inter-Agency Meeting on Outer Space Activities (UN-Space), under the leadership of the Office for Outer Space Affairs of the Secretariat, to continue to examine how space science and technology and their applications could contribute to implementing the Millennium Declaration and to the post-2015 development agenda process, and encouraged entities of the United Nations system to participate, as appropriate, in UN-Space coordination efforts to that effect.

2. UN-Space serves as the focal point for inter-agency coordination and cooperation in space-related activities within the United Nations system. At its thirty-fourth session, held in New York on 13 and 14 May 2014, UN-Space recalled that its previous special reports had addressed the following themes (A/AC.105/1064, para. 17): new and emerging technologies, applications and initiatives for space-related inter-agency cooperation (see A/AC.105/843); space benefits for Africa: contribution of the United Nations system (see A/AC.105/941); use of space technology within the United Nations system to address climate change issues (see A/AC.105/991); and space for agriculture development and food security (see A/AC.105/1042).

3. At its thirty-fourth session, UN-Space agreed that the next special report should address the theme of space for global health (A/AC.105/1064, para. 18).

4. The present report was prepared by the Office for Outer Space Affairs in cooperation with the World Health Organization (WHO), the Cartographic Section of the Department of Field Support of the Secretariat and the secretariat of the United Nations Framework Convention on Climate Change.

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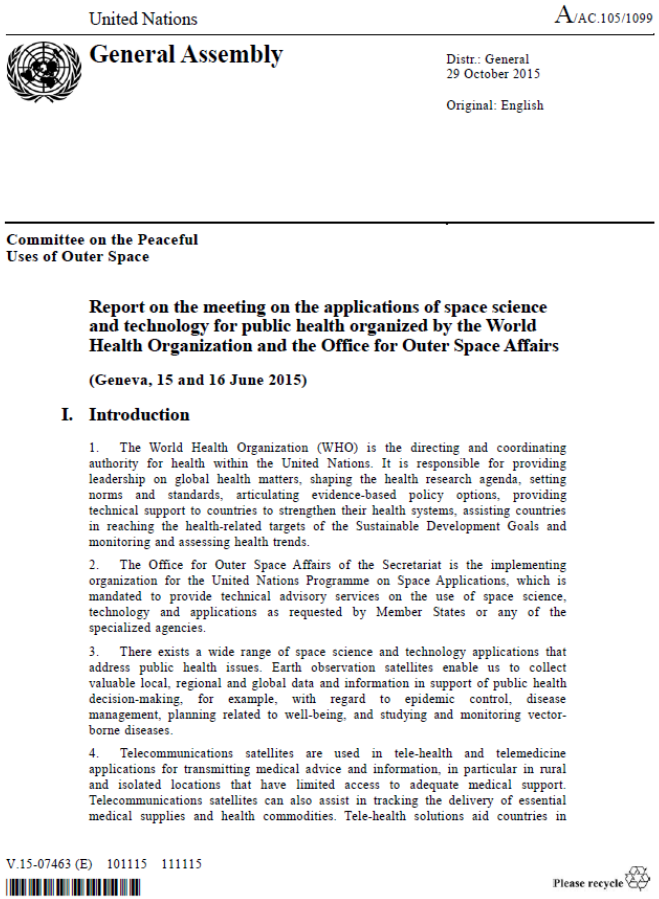
Special report of the Inter-Agency Meeting on Outer Space Activities on the use of space science and technology within the United Nations system for global health

UN Document:
A/AC.105/1091
30 April 2015

World Health Organization

Space Science and Public Health



United Nations A/AC.105/1099

General Assembly

Distr.: General
29 October 2015

Original: English

Committee on the Peaceful Uses of Outer Space

Report on the meeting on the applications of space science and technology for public health organized by the World Health Organization and the Office for Outer Space Affairs

(Geneva, 15 and 16 June 2015)

I. Introduction

1. The World Health Organization (WHO) is the directing and coordinating authority for health within the United Nations. It is responsible for providing leadership on global health matters, shaping the health research agenda, setting norms and standards, articulating evidence-based policy options, providing technical support to countries to strengthen their health systems, assisting countries in reaching the health-related targets of the Sustainable Development Goals and monitoring and assessing health trends.

2. The Office for Outer Space Affairs of the Secretariat is the implementing organization for the United Nations Programme on Space Applications, which is mandated to provide technical advisory services on the use of space science, technology and applications as requested by Member States or any of the specialized agencies.

3. There exists a wide range of space science and technology applications that address public health issues. Earth observation satellites enable us to collect valuable local, regional and global data and information in support of public health decision-making, for example, with regard to epidemic control, disease management, planning related to well-being, and studying and monitoring vector-borne diseases.

4. Telecommunications satellites are used in tele-health and telemedicine applications for transmitting medical advice and information, in particular in rural and isolated locations that have limited access to adequate medical support. Telecommunications satellites can also assist in tracking the delivery of essential medical supplies and health commodities. Tele-health solutions aid countries in

V.15-07463 (E) 101115 111115

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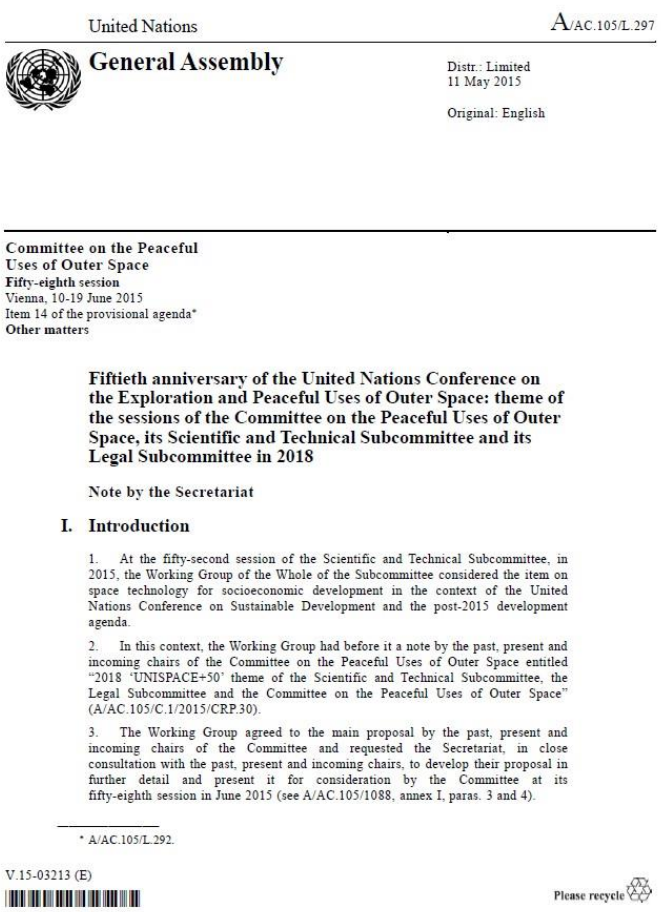
Report on the meeting on the applications of space science and technology for public health organized by the World Health Organization and the Office for Outer Space Affairs

UN Document:
A/AC.105/1099
29 October 2015

World Health Organization

Space Science and Public Health



United Nations A/AC.105/L.297

General Assembly

Distr.: Limited
11 May 2015

Original: English

Committee on the Peaceful Uses of Outer Space
Fifty-eighth session
Vienna, 10-19 June 2015
Item 14 of the provisional agenda*
Other matters

Fiftieth anniversary of the United Nations Conference on the Exploration and Peaceful Uses of Outer Space: theme of the sessions of the Committee on the Peaceful Uses of Outer Space, its Scientific and Technical Subcommittee and its Legal Subcommittee in 2018

Note by the Secretariat

I. Introduction

1. At the fifty-second session of the Scientific and Technical Subcommittee, in 2015, the Working Group of the Whole of the Subcommittee considered the item on space technology for socioeconomic development in the context of the United Nations Conference on Sustainable Development and the post-2015 development agenda.

2. In this context, the Working Group had before it a note by the past, present and incoming chairs of the Committee on the Peaceful Uses of Outer Space entitled "2018 'UNISPACE+50' theme of the Scientific and Technical Subcommittee, the Legal Subcommittee and the Committee on the Peaceful Uses of Outer Space" (A/AC.105/C.1/2015/CRP.30).

3. The Working Group agreed to the main proposal by the past, present and incoming chairs of the Committee and requested the Secretariat, in close consultation with the past, present and incoming chairs, to develop their proposal in further detail and present it for consideration by the Committee at its fifty-eighth session in June 2015 (see A/AC.105/1088, annex I, paras. 3 and 4).

* A/AC.105/L.292.

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Fiftieth anniversary of the UN Conference on the Exploration and Peaceful Uses of Outer Space: theme of the sessions of the Committee on the Peaceful Uses of Outer Space, its Scientific and Technical Subcommittee and its Legal Subcommittee in 2018

UN Document:
A/AC.105/L.297
11 May 2015

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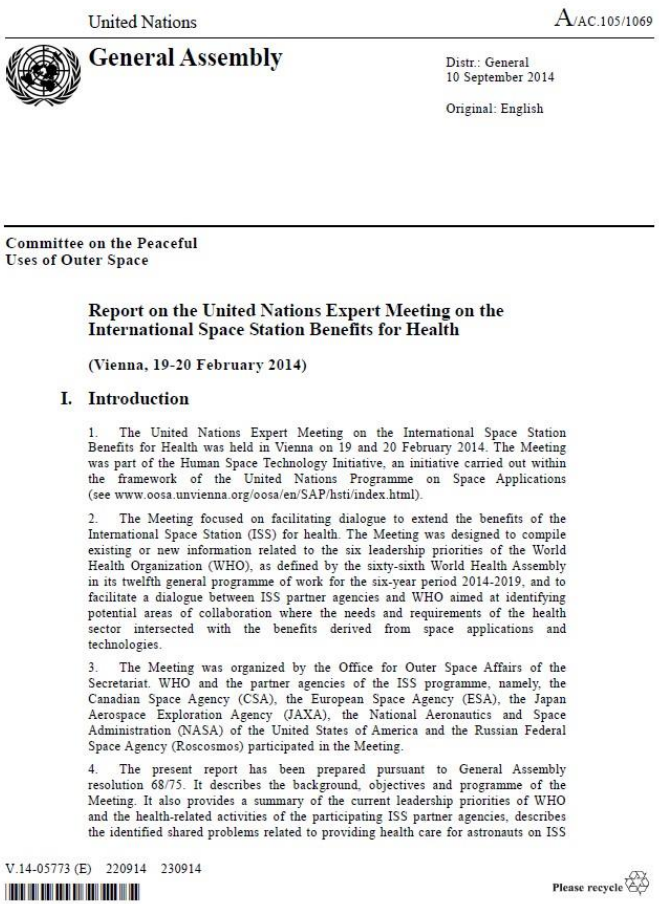
Space Science and Public Health



United Nations A/AC.105/1069

General Assembly

Distr.: General
10 September 2014

Original: English

Committee on the Peaceful
Uses of Outer Space

Report on the United Nations Expert Meeting on the International Space Station Benefits for Health

(Vienna, 19-20 February 2014)

I. Introduction

1. The United Nations Expert Meeting on the International Space Station Benefits for Health was held in Vienna on 19 and 20 February 2014. The Meeting was part of the Human Space Technology Initiative, an initiative carried out within the framework of the United Nations Programme on Space Applications (see www.oosa.unvienna.org/oosa/en/SAP/hsti/index.html).

2. The Meeting focused on facilitating dialogue to extend the benefits of the International Space Station (ISS) for health. The Meeting was designed to compile existing or new information related to the six leadership priorities of the World Health Organization (WHO), as defined by the sixty-sixth World Health Assembly in its twelfth general programme of work for the six-year period 2014-2019, and to facilitate a dialogue between ISS partner agencies and WHO aimed at identifying potential areas of collaboration where the needs and requirements of the health sector intersected with the benefits derived from space applications and technologies.

3. The Meeting was organized by the Office for Outer Space Affairs of the Secretariat. WHO and the partner agencies of the ISS programme, namely, the Canadian Space Agency (CSA), the European Space Agency (ESA), the Japan Aerospace Exploration Agency (JAXA), the National Aeronautics and Space Administration (NASA) of the United States of America and the Russian Federal Space Agency (Roscosmos) participated in the Meeting.

4. The present report has been prepared pursuant to General Assembly resolution 68/75. It describes the background, objectives and programme of the Meeting. It also provides a summary of the current leadership priorities of WHO and the health-related activities of the participating ISS partner agencies, describes the identified shared problems related to providing health care for astronauts on ISS

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Report on the United Nations Expert Meeting on the International Space Station Benefits for Health

UN Document:
A/AC.105/1069
10 September 2014

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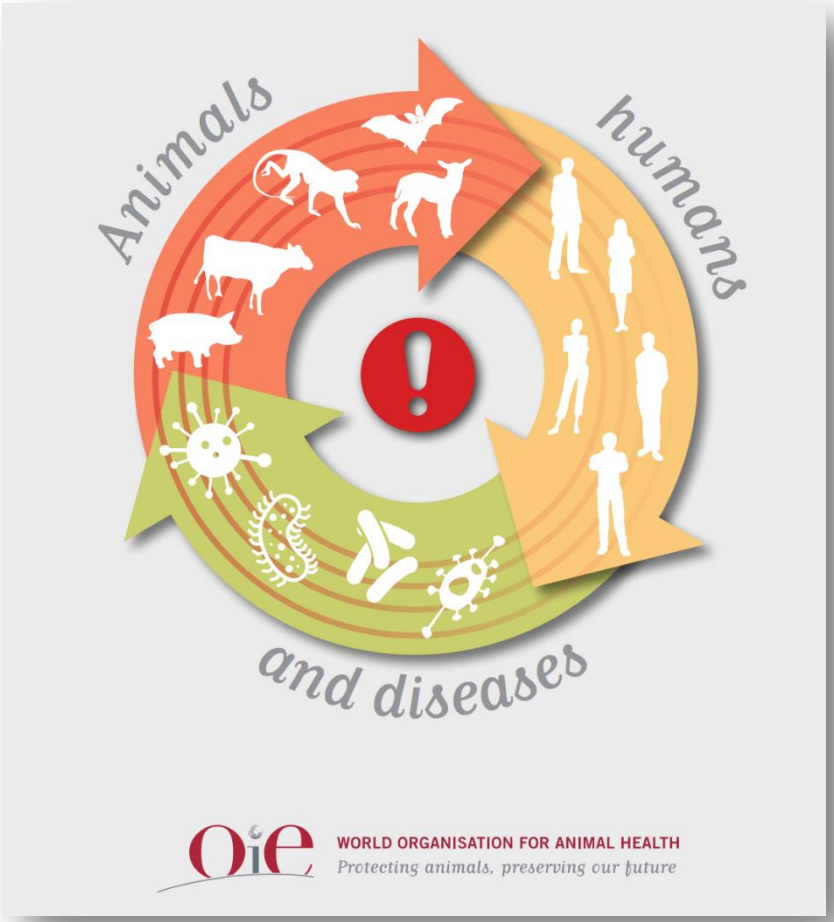
Notion of Health - One Health

the interconnectedness of human health, animal health and the ecosystem

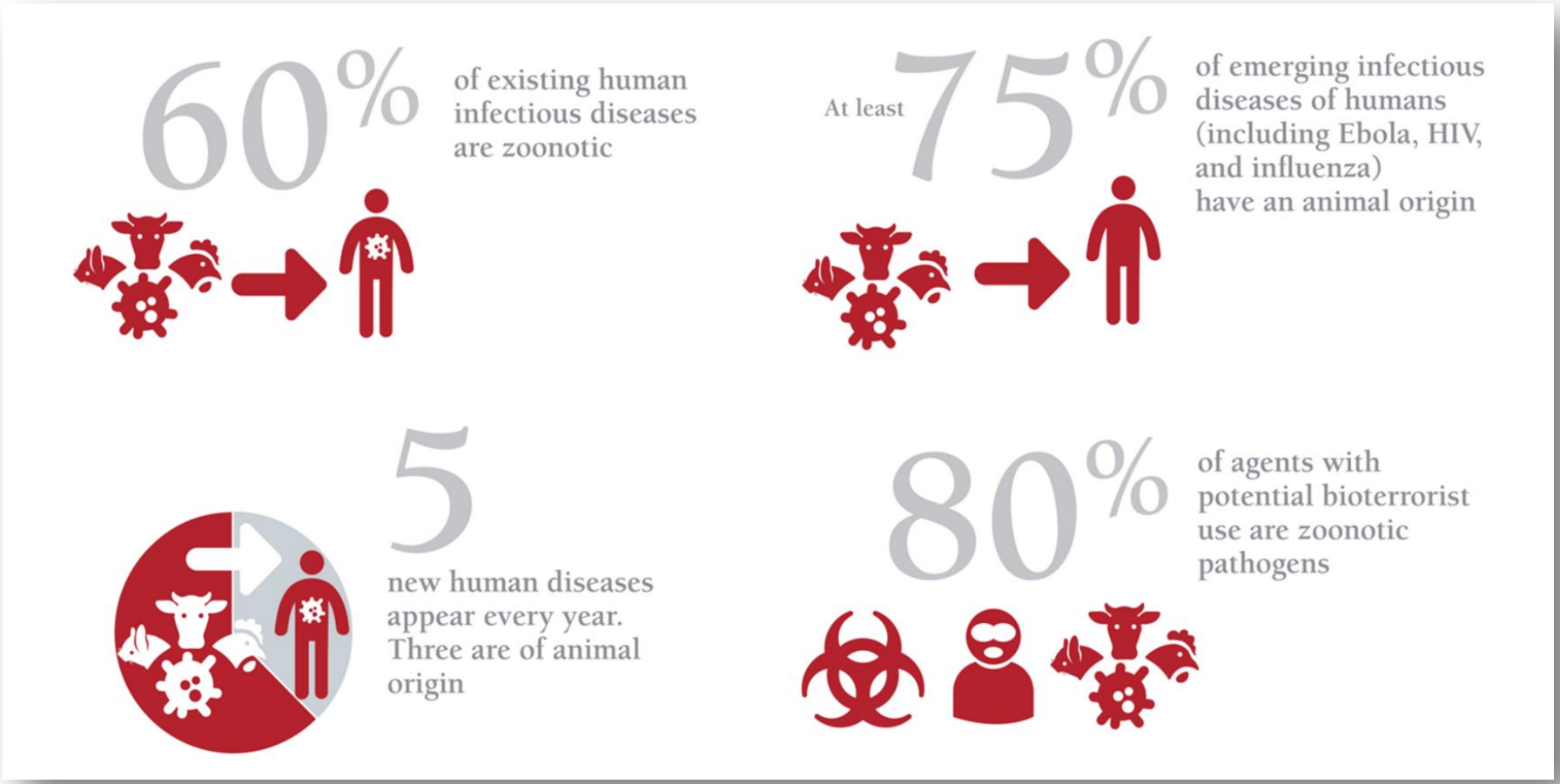
World Health Organization

One Health



Source: OIE, 2016; http://www.oie.int/for-the-media/onehealth/

One Health



Source: OIE, 2016; http://www.oie.int/for-the-media/onehealth/

Relevance of Space Science to SDG for Health

Leveraging benefits of space science, geospatial data for advancing health agenda

World Health Organization

Underpinnings

- Need to understand the current needs of healthcare and public health
- Need to understand the relevance of Space science and technology to overall health systems strengthening efforts
- Need to match appropriate public health and health services delivery needs to innovative space science and technology solutions

Cross sectional View of Relevance of Space Science to Public Health

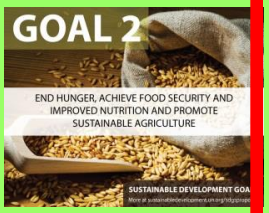
World Health Organization


Cross-sectional View of Relevance of Space Science to Public Health


1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE AND JUSTICE
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS

SDGs and Benefits from Space Science

Poverty



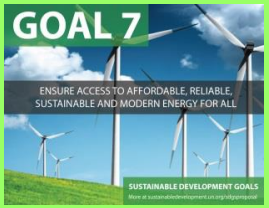
Food Security

Health

Education

Gender Equality

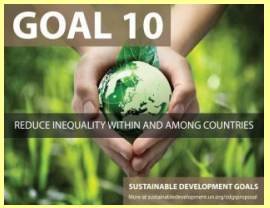
Water



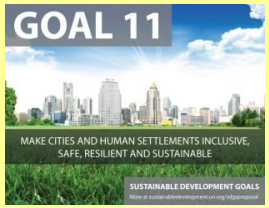
Energy

Employment

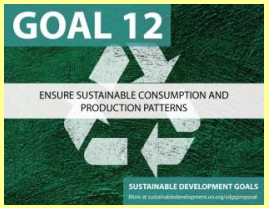
Resilient Infrastructure



Reduce Inequality



Cities

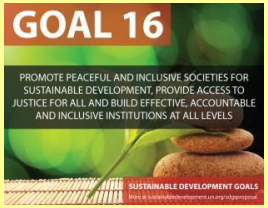


Sustainable Consumption

Climate Change

Marine Resources

Ecosystems and Biodiversity



Justice and Good Governance

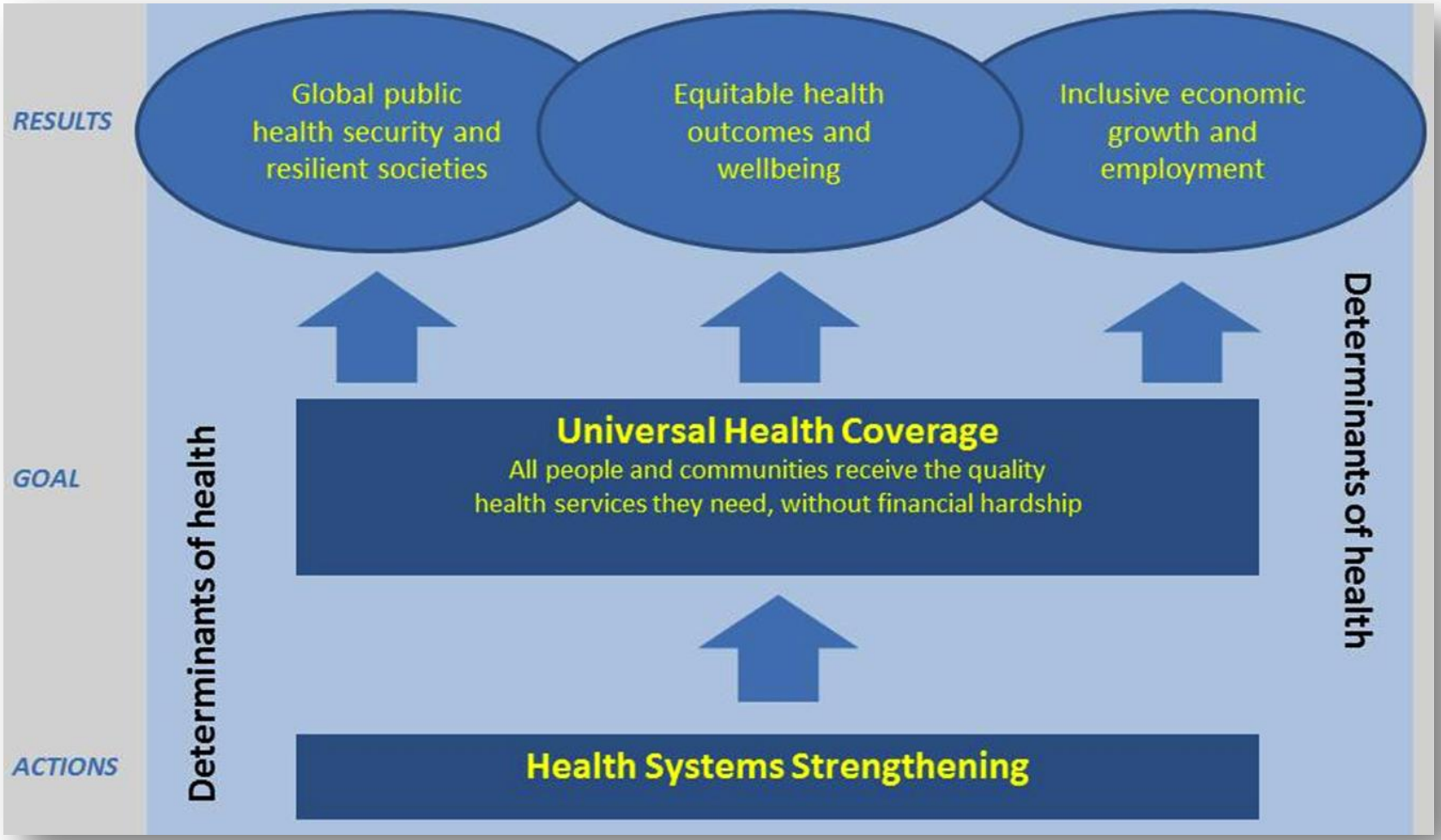
Partnerships for Implementation

Source: UNOOSA June 2015

HEALTH IN THE SDG ERA


Cross-sectional View of Relevance of Space Science to Public Health

Health Systems for SDGs



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Matrix of Relevance

SDG	SPACE SCIENCE AND HEALTH RELEVANCE
1: No Poverty	Prioritizing the health needs of the poor
2: Zero Hunger	Addressing the causes and consequences of all forms of malnutrition
6: Clean water and sanitation	Preventing diseases through safe water and sanitation for all
10: Reduced inequalities	Ensuring equitable access to health services through Universal Health Coverage Based on stronger primary care
13 Climate Action	Protecting health from climate risks, and promoting health through low-carbon development
14: Life below water	Supporting the restoration of fish stocks to improve safe and diversified healthy diets
15: Life on land	Promoting health and preventing diseases through healthy natural environments

World Health Organization

Potential Areas of Collaboration

WHO Global Health Priorities	Shared Interest	Current Applicable Techology	Future Appliciable Technology
›	In situ Diagnostics: In development: possible diagnostic equipment and may develop sample preparation that could be used by both Water supply: (1) Quality (2) Purification (3) Storage	CSA: Microflow: There is a terrestrial variant of robust flow cytometer ESA: Water Recycling / Food production: - Micro-Ecological Life Support System Alternative (MELISSA) for recovering food, water and oxygen from waste - Gray water recycling (active at Concordia) JAXA: Share information on: - Food safety - Eco-systems NASA: Lab On A Chip water testing NASA: Rapid water purification NASA: Ultrasound for prenatal care ROSCOSMOS: Prenosological population physical health evaluation methods and devices: - ECOSAN device designed for prenosological control of health level on the basis of a cardio-respiratory examination (already used in ten world regions) - HEALTH NAVIGATOR all-round health screening - Loading tests for the estimation of functional reserves	CSA: In situ diagnostics CSA: Sample preparation for in situ diagnostics including environmental and water supplies. ESA: Minaturised bioreactor with sensor systems; will be tested on ISS in 2015 in the Arthrospira Experiment on the ISS (ArtEMISS) ESA: Black water recycling system development for Concordia station ESA: ICARUS project, implemented by the German Space Agency DLR, addressing animal-borne disease tracking & prediction JAXA: Nutritionally enforced (functional food): anitioxidant, protein-rich NASA: Foodborne illness / vaccine work (2018) NASA: Pneumonia vaccine work (2018) NASA: Shelf-stable full untrition food bar (2018) ROSCOSMOS: Development of special telemedicine programmes and projects on the governmental level with other institutions ROSCOSMOS: Development and creation of new telemedicine technologies and devices for the use in space medicine and in public health care

Potential Areas of Collaboration

WHO Global Health Priorities	Shared Interest	Current Applicable Techology	Future Appliciable Technology
LP 3: Addressing the challenge of noncommunicable diseases. WHO Global NCD Action Plan.	Ageing: Muscle loss, bone loss, neurovestibular, vision impacts New or enhanced therapies for non-communicable diseases emphasizing ageing populations (typically multimorbid and frail)	CSA: None ESA: Human Health related studies in ELIPS programme, including human physiology, biology &animal experiments; flight & ground JAXA: Joint research on the aging and space physiology issue for the wellbeings of the society NASA: Neurocognitive test battery NASA: Non-pharmaceutical interventions for osteoporosis NASA: Vitamin D and Omega-3 fatty acid ROSCOSMOS: A treatment for cardio-respiratory diseases with warmed-up oxygen-helium mixtures ROSCOSMOS: Technologies for neuro-rehabilitation for stroke and Parkinson patients like Corrigent suit, Regent suit, KORVIT, and an IMMERSION FACILITY ROSCOSMOS: High technological training machines for the testing, training and rehabilitation of people of different physical capacity ROSCOSMOS: Foot supporting zone stimulation device adapted for the elderly	CSA: SHARE initiative to bring together international community of space and aging to work together. CSA: Research: various areas CSA: Mitigation strategies: Measures of neurocognitive state with a Performance Readiness Evaluation Tool (PRET) and look for others ESA: European Life and Physical Science Research Platform (ELIPS) offering a programme framework for project incubation, coordination and and experimental platform opportunities JAXA: Series of pamphlet for outreach on e.g. excersise, sleep, nutrition NASA: Freeze-dried or pouch "super foods" (2018) NASA: Non-invasive intracranial pressure monitor (2018) ROSCOSMOS: The conception of physical health centers ROSCOSMOS: New methods of gravitation therapy on the basis of short radius centrifuge ROSCOSMOS: Probiotics (microorganisms reviving the normal microflora of the human organism)

Potential Areas of Collaboration

WHO Global Health Priorities	Shared Interest	Current Applicable Techology	Future Appliciable Technology
LP 5: Increasing access to essential, high-quality and affordable medical products (medicines, vaccines, diagnostics and other health technologies). -- Supporting UHC -- Monitoring and use of information -- Access to medicines for noncommunicable diseases -- Rational use of medicines antimicrobal resistance -- Access to medicines for HIV/AIDS, TBC, malaria, reprod/mat/child health -- Innovation & local production of medicines	In situ diagnostics and products Telemedicine Longer shelf life of pharmaceuticals	CSA: NeuroArm surgical robot that can operate inside an magnetic resonance imaging machine for e.g. brain surgery making inoperable brain tumours become operable; very expensive but shows potential of what can be done; a surgical robot for pediatric surgery is in development ESA: None JAXA: Share information on the devices used for stress monitoring JAXA: 24-hour ECG for biological or circadian rhythms and heart rate variability in frequency domain JAXA: Actigaphy to monitor physical activity, e.g. for assessing sleep quality NASA: Long-term efficacy tests across a basic medical kit of about 80 major medicines ROSCOSMOS: CARDIOSON contact-less recording of physiological signals during sleeping and ECOSAN-TM with the translation of physiologycal signals to a doctor	CSA: Advanced Crew Medical Systems includes remote health monitoring, biosensor devices and textiles, e.g. physiological monitor "Astroskin" CSA: Bioanalysis and Biodiagnostics CSA: Research: Looking for biomarkers of disease; data-mining ESA: None JAXA: None NASA: Infrared machine to measure pharmaceutical potency (2018) ROSCOSMOS: New devices on the basis of current space prototypes for the effective diagnostic of cardio-vascular system disfunctions (with the three dimensional ballisticardiography, dispersive mapping, etc.) ROSCOSMOS: Contactless recording of physiological signals during sleeping with signal transmission

Potential Areas of Collaboration

WHO Global Health Priorities	Shared Interest	Current Applicable Techology	Future Appliciable Technology
LP 5: Increasing access to essential, high-quality and affordable medical products (medicines, vaccines, diagnostics and other health technologies). -- Supporting UHC -- Monitoring and use of information -- Access to medicines for noncommunicable diseases -- Rational use of medicines antimicrobal resistance -- Access to medicines for HIV/AIDS, TBC, malaria, reprod/mat/child health -- Innovation & local production of medicines	In situ diagnostics and products Telemedicine Longer shelf life of pharmaceuticals	CSA: NeuroArm surgical robot that can operate inside an magnetic resonance imaging machine for e.g. brain surgery making inoperable brain tumours become operable; very expensive but shows potential of what can be done; a surgical robot for pediatric surgery is in development ESA: None JAXA: Share information on the devices used for stress monitoring JAXA: 24-hour ECG for biological or circadian rhythms and heart rate variability in frequency domain JAXA: Actigaphy to monitor physical activity, e.g. for assessing sleep quality NASA: Long-term efficacy tests across a basic medical kit of about 80 major medicines ROSCOSMOS: CARDIOSON contact-less recording of physiological signals during sleeping and ECOSAN-TM with the translation of physiologycal signals to a doctor	CSA: Advanced Crew Medical Systems includes remote health monitoring, biosensor devices and textiles, e.g. physiological monitor "Astroskin" CSA: Bioanalysis and Biodiagnostics CSA: Research: Looking for biomarkers of disease; data-mining ESA: None JAXA: None NASA: Infrared machine to measure pharmaceutical potency (2018) ROSCOSMOS: New devices on the basis of current space prototypes for the effective diagnostic of cardio-vascular system disfunctions (with the three dimensional ballisticardiography, dispersive mapping, etc.) ROSCOSMOS: Contactless recording of physiological signals during sleeping with signal transmission

Potential Areas of Collaboration

WHO Global Health Priorities	Shared Interest	Current Applicable Techology	Future Appliciable Technology
LP 6: Addressing the social, economic and environmental determinants of health. -- Social and econonomic environment -- Physical environment -- Person's individual characteristics and behaviours	Environmental factors Stress & behavioral interaction	CSA: EVARM dosimeter variant is being used in cancer clinics for targeting radiation therapy ESA: Human Physiology Experiments - ISS & isolation studies, Bedrest JAXA: Share the information: - Environmental monitoring - Eco-systems JAXA: SS-HDTV (super-sensitive high-definition TeleVision) camera for Earth observation. JAXA: Joint research on multicultural issue related to LP 6 NASA: Family communication from isolated environments ROSCOSMOS: Estimation of micro-ecological status of human with the use of chromatography mass-spectrometry	CSA: Research on psychosocial issues associated with changes in value systems, family relations and work-life issues values and family ties linked to space-related isolation ESA: Developing countermeasures and psychological support methodologies for isolated individuals or groups JAXA: None NASA: Improving psychosocial health through environmental factors (2020) ROSCOSMOS: Modified methods of micro-ecological status of human (including express-tests) ROSCOSMOS: Expert assessment of toxicological and micro-biological contamination of environment

Cross sectional View of Relevance of Space Science to Public Health

World Health Organization

Use of space science and technology in environmental health and health systems research

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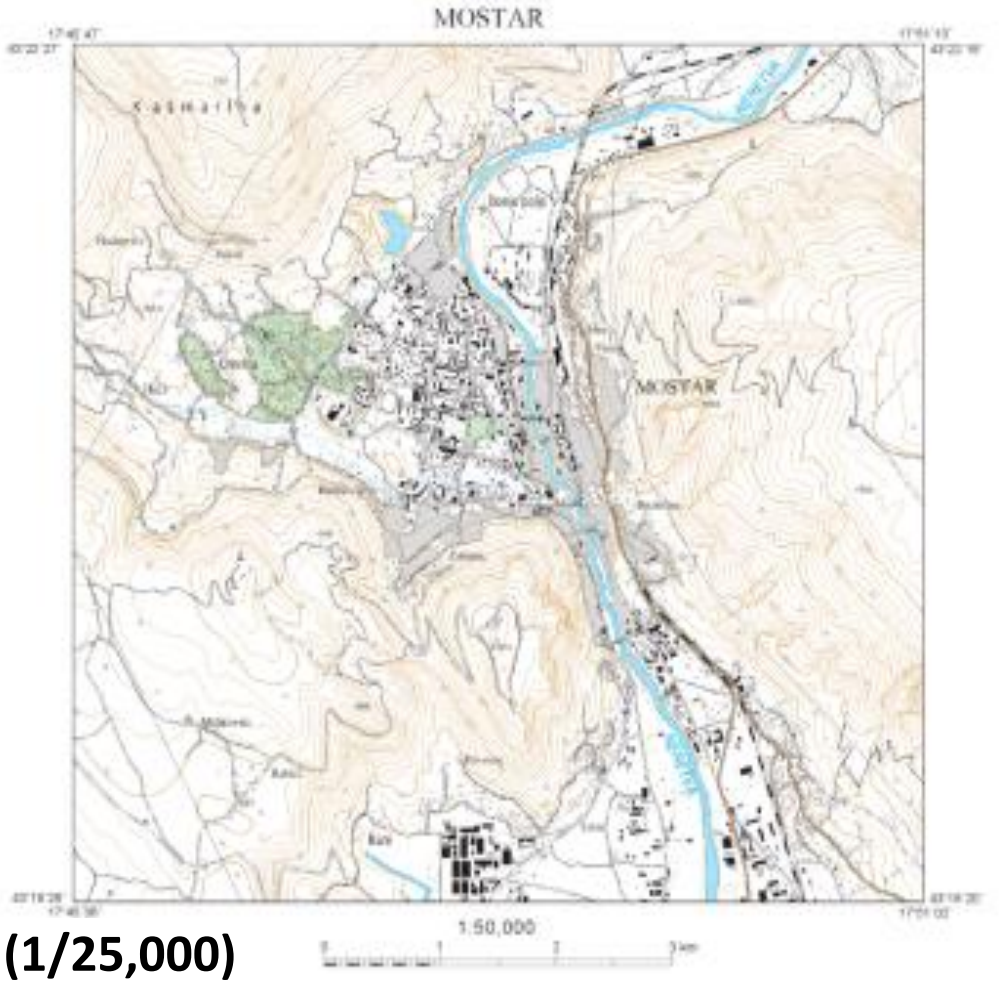
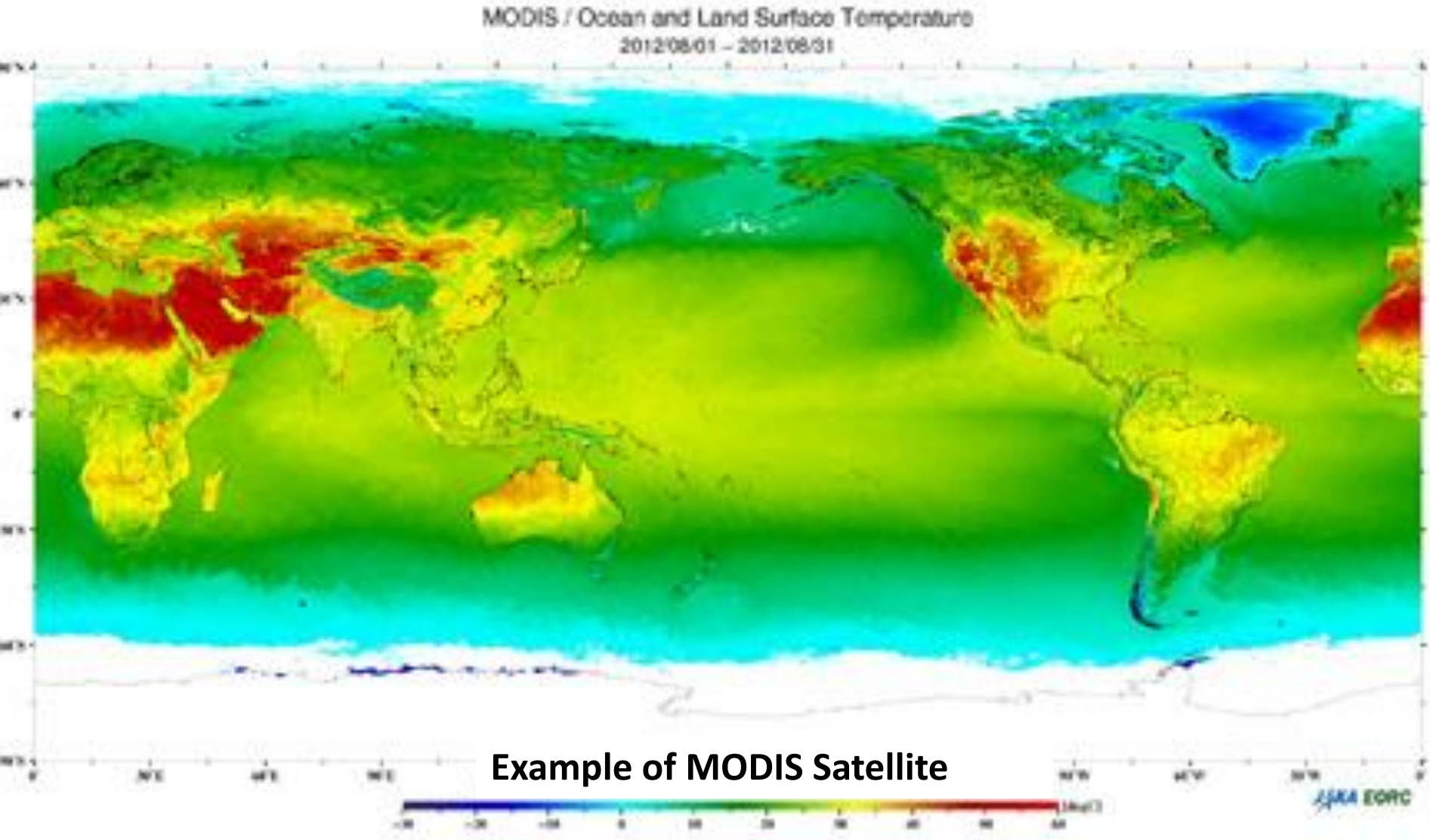
Source: Jaxa 2013



Bosnia (1/25,000)

Topographic map from ALOS is useful in developing countries. Road network is essential to deliver vaccines and to visit medical facilities.

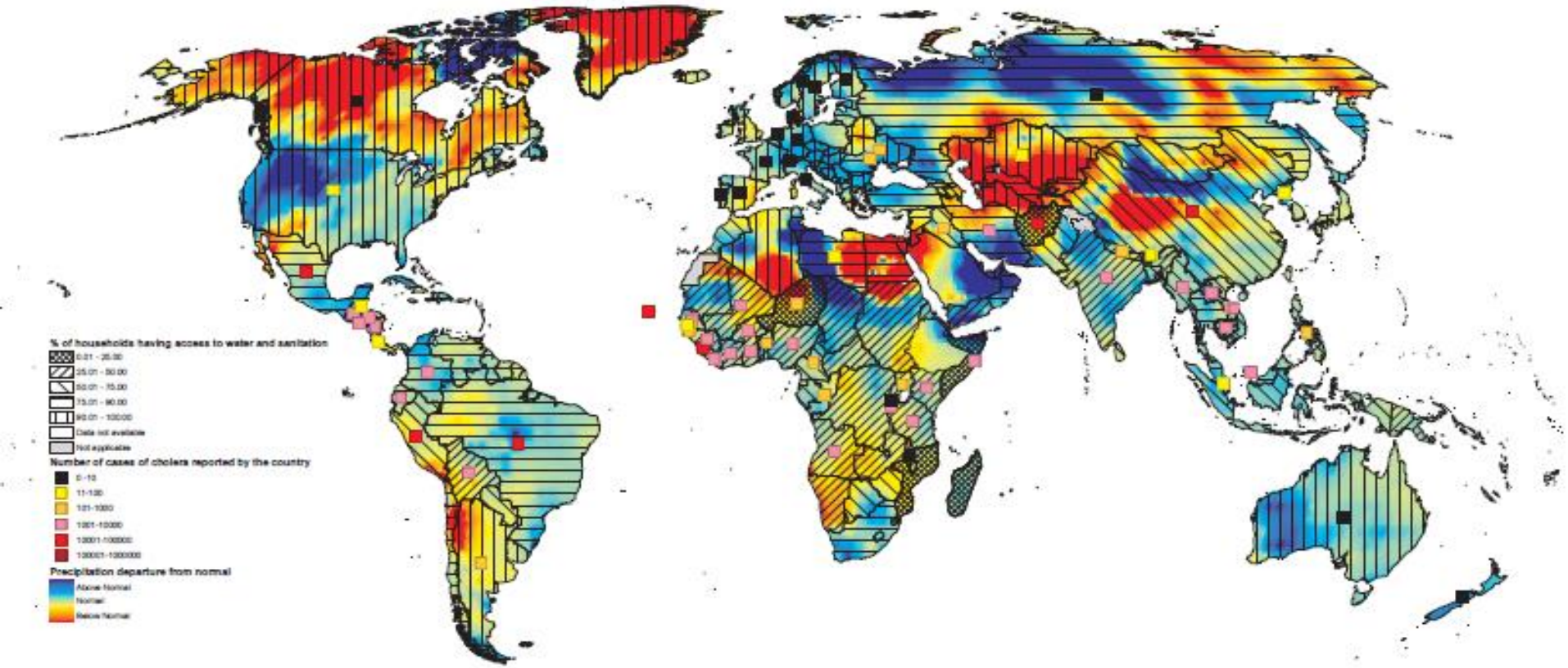
Source: JAXA, 2014



Example of MODIS Satellite

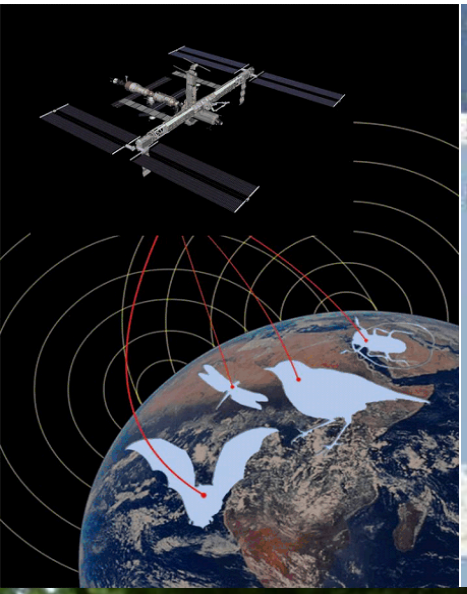
JAXA's GCOM-C will continue to observes surface temperature, which can be used for countermeasures of heat stroke.

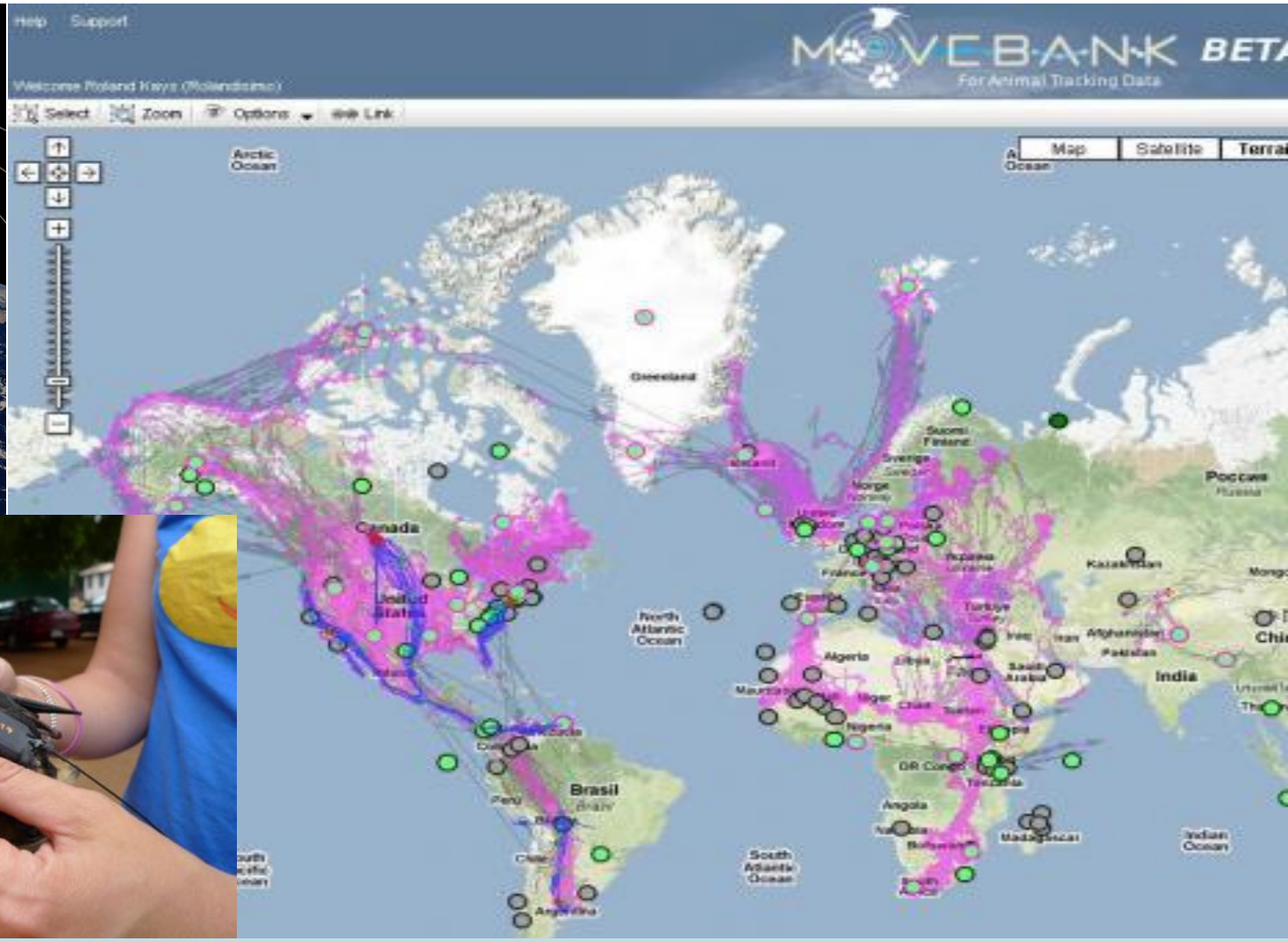
Mapping WASH and NTDs…hotspot analyses



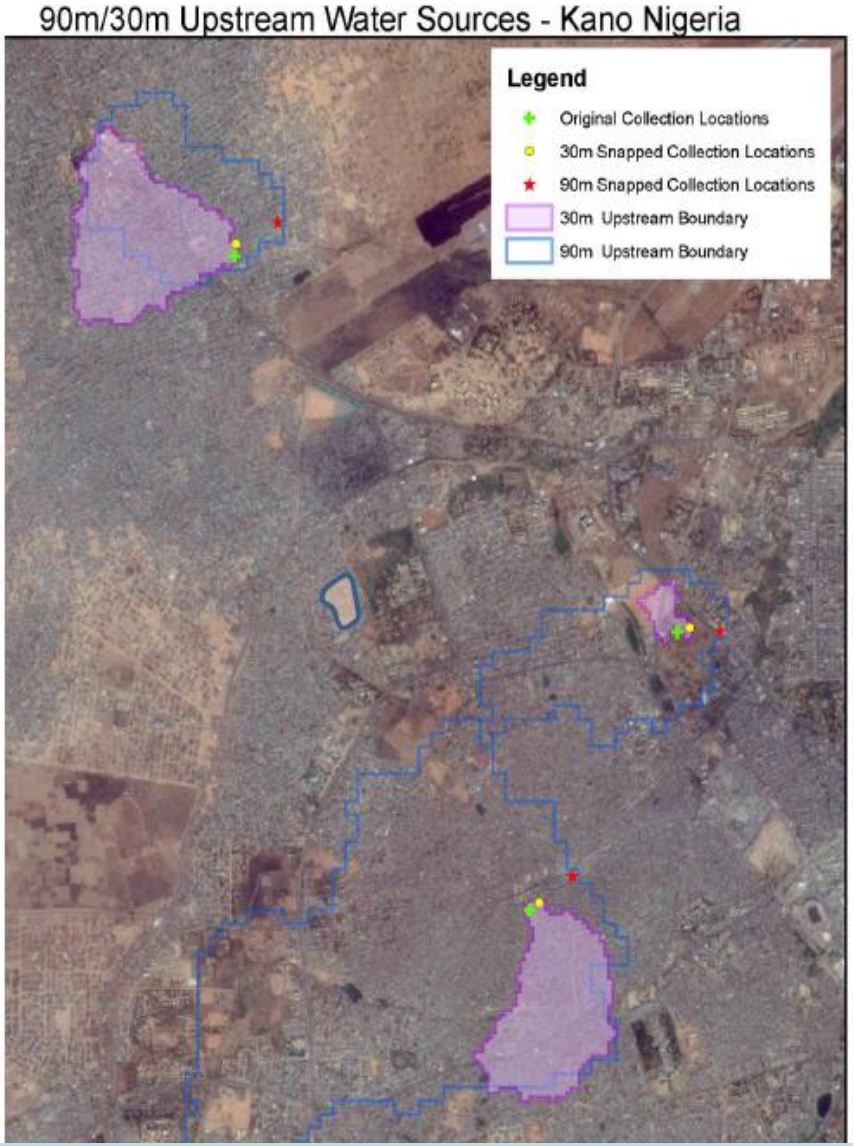
Source: Rifat Hossain, WHO, 2015

Source: Dr Hatton, ESA 2015





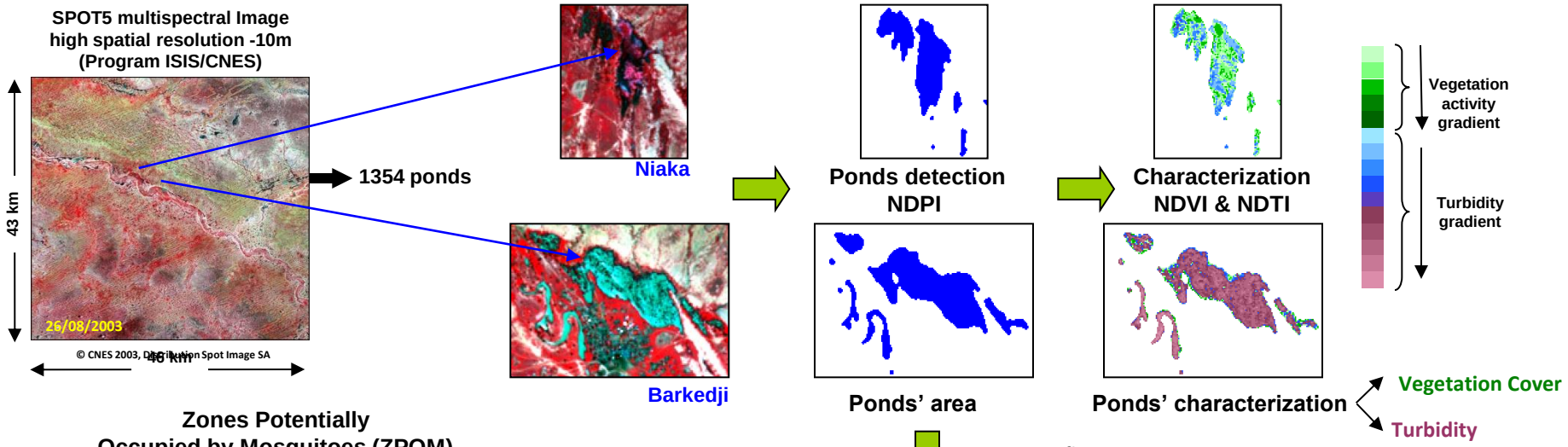
Tracking of spread of animal born diseases:
Small Animal Tracking from ISS: DLR ICARUS Project

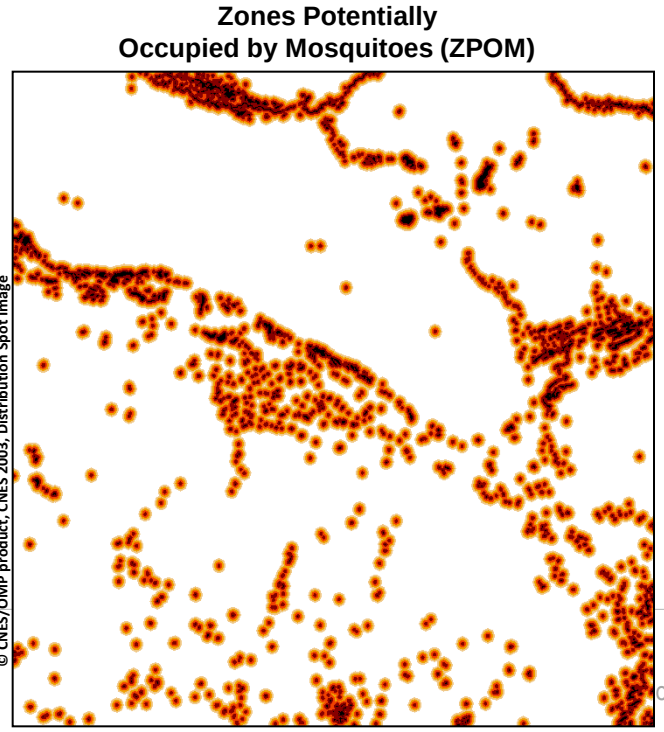


Polio eradication project: Locating sample sites on the satellite images and tracking over time using JAXA's 5-m resolution DEM data

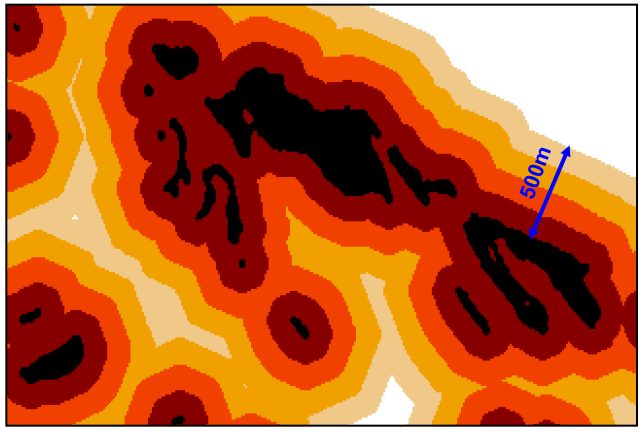
A Remote-sensing tool applied to Rift Valley Fever (RVF) Monitoring

Identify environmental factors of A. vexans & C. poicilipes presence by remote sensing to obtain risk map





Mosquitoes flying range
~500m (Bâ et al., 2005)

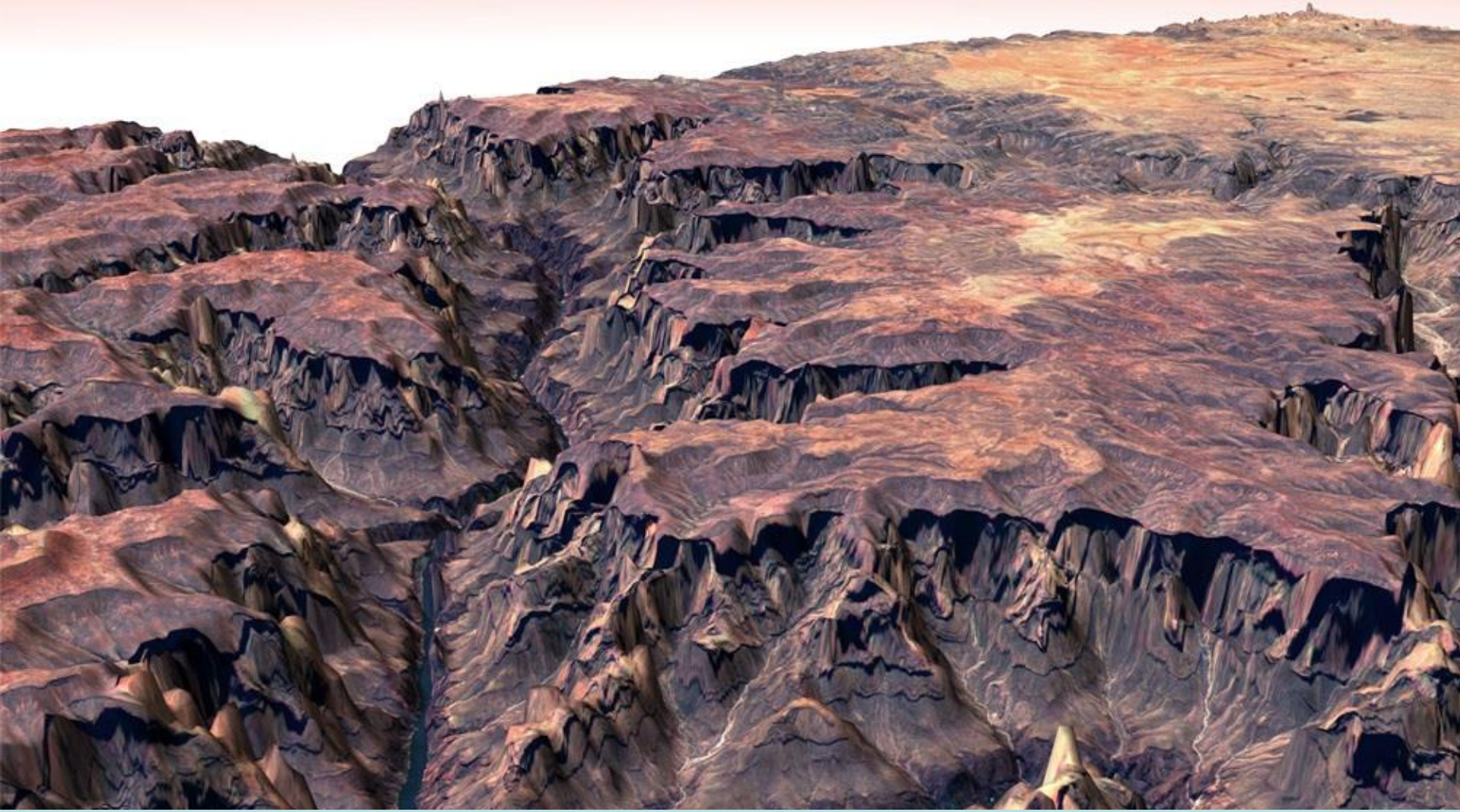


26/08/2003

Ponds ~ 1%

ZPOM = 25%

Source: JAXA, 2014
Grand canyon , USA.

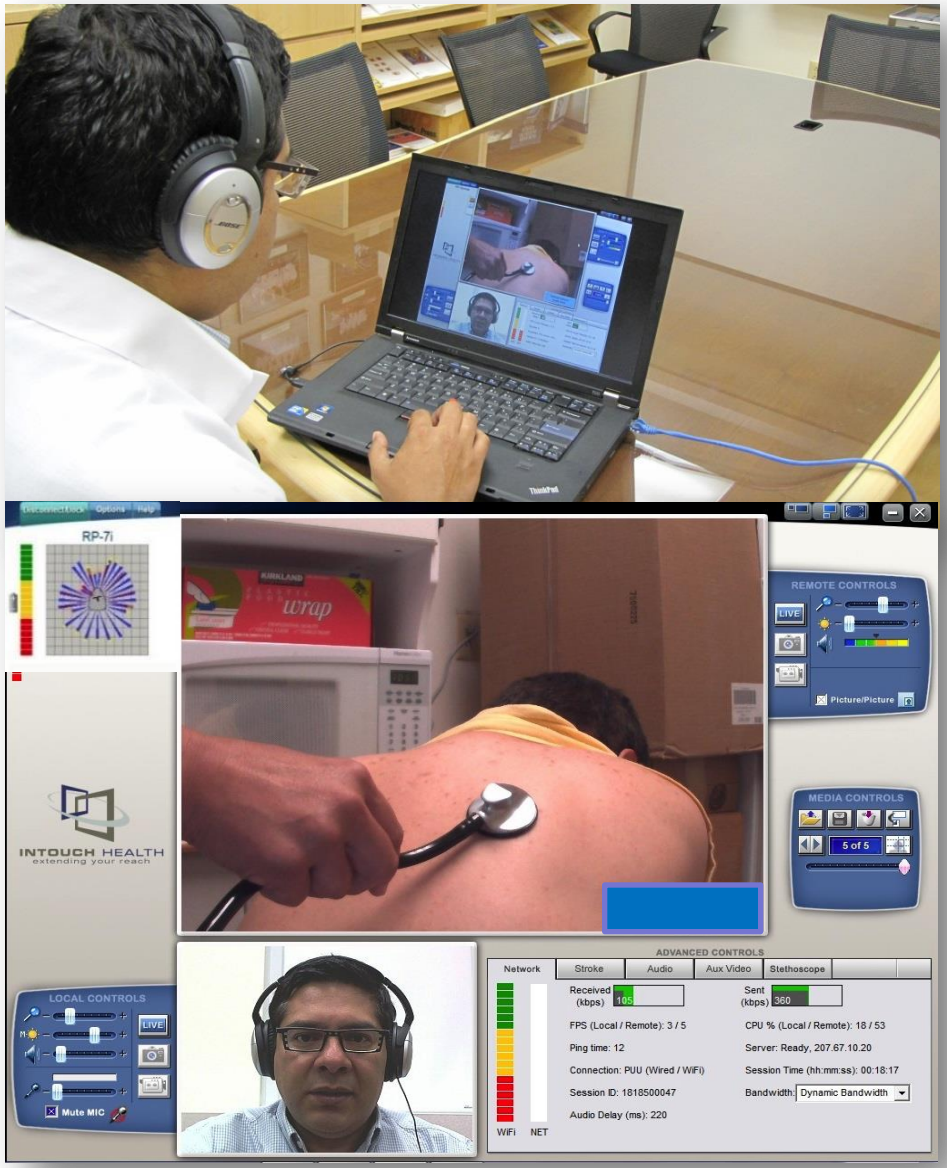


This shows ALOS 3-D mapping capacity. It is the world's most accurate vertical resolution, 5m, among satellites.

Use of space science and technology in clinical care settings

World Health Organization

Source: Ivar Mendez, June 2015



Tele-health applications, connecting patients and caregivers

Source: Ivar Mendez, June 2015

Halifax

Bolivia

Tele-health applications, connecting two countries

Source: Dr Gerzer, German Aerospace Center, June 2015

terrestrial

cellular

remote expert located at:
control center
hospital
doctors office
telemedical expert center

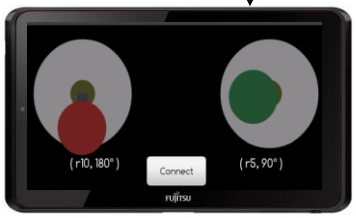
SATcom

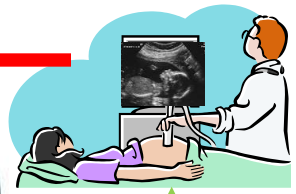
examiner on-site:
space station
off shore rigs
hospitals
doctors offices
ships
aircrafts
patient's home
research station

expert in ultrasound scanning

ASYSTED
expert's system

ASYSTed
examiner's system





presentation of control commands

change of probe position

ASYSTED
joystick or smartphone-app

markus.lindlar@dlr.de
www.asyst.care

Advanced System for Tele-guided Ultrasound Diagnosis

CMAJ Medical knowlege that matters

INNOVATIONS

Mobile remote-presence devices for point-of-care health care delivery

Tele-health applications, connecting field sites and physicians

Robotics and health care delivery

B-LiFE at Ebola treatment centre
Last Accessed: 13/09/2016 16:14
http://www.esa.int/spaceinimages/Images/2015/04/B-LiFE_at_Ebola_treatment_centre
ESA: Telecommunications and Integrated Applications

Source: NASA 2015

Application of Space Technology:
Water filtrations solutions developed and deployed.

Space Science and Big Data Analytics

World Health Organization

analysis and use of rapidly collected

extremely large volumes of

both structured and unstructured electronic data

through multiple data sources

to answer complex questions

that are ordinarily cannot be answered using single datasets

Big Data

- Mega datasets and longitudinal data
  - Details and location of telephone call logs
  - Daily global airline passengers manifest
  - Hourly mean temperature of all cities of the world
  - Hospital admissions and discharges around the world
  - Hourly weather data
  - Monthly projection of populations worldwide

Data driven decision-making

…large scale pattern recognition,

unseen unless combined by various data types…

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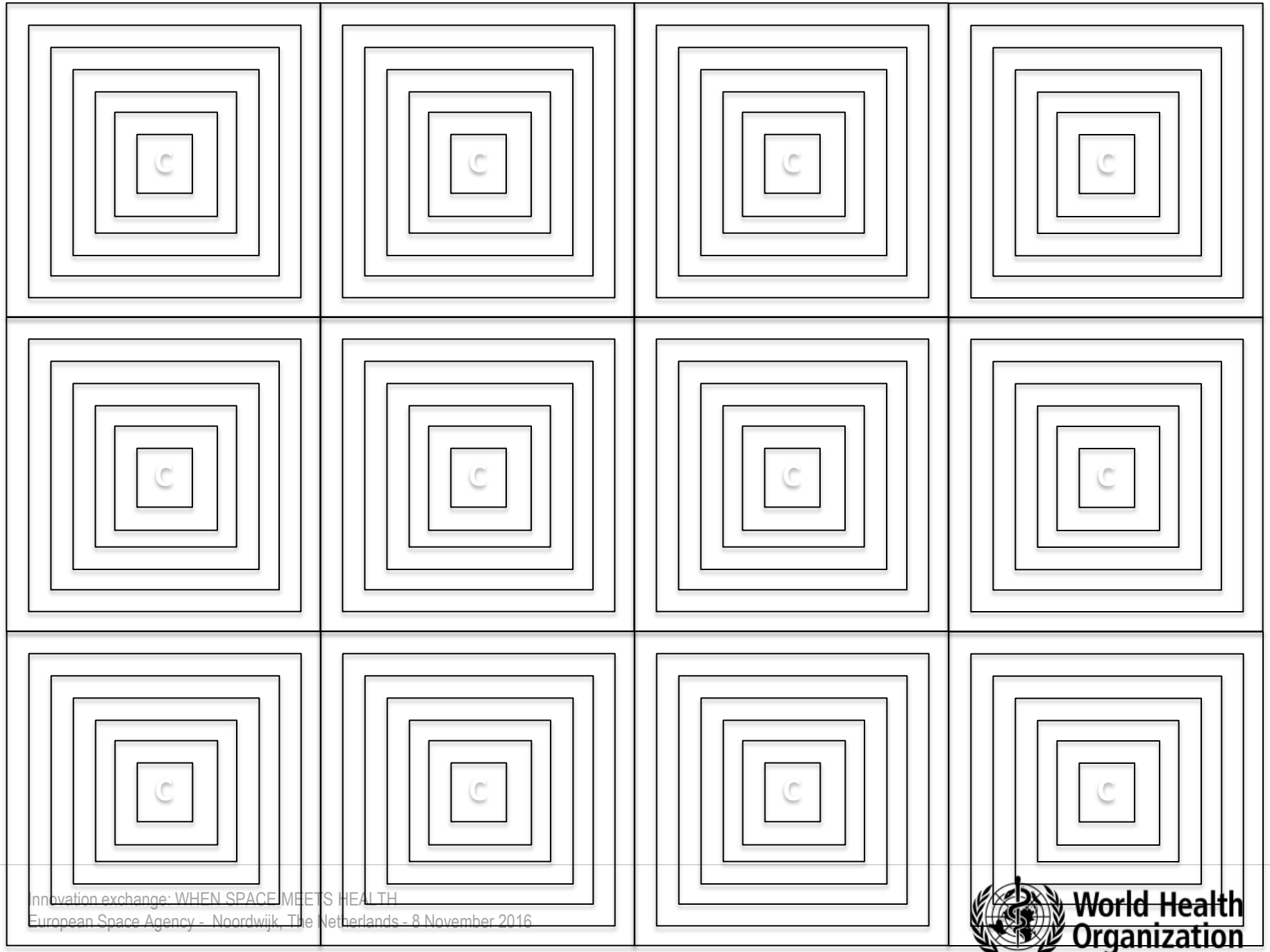

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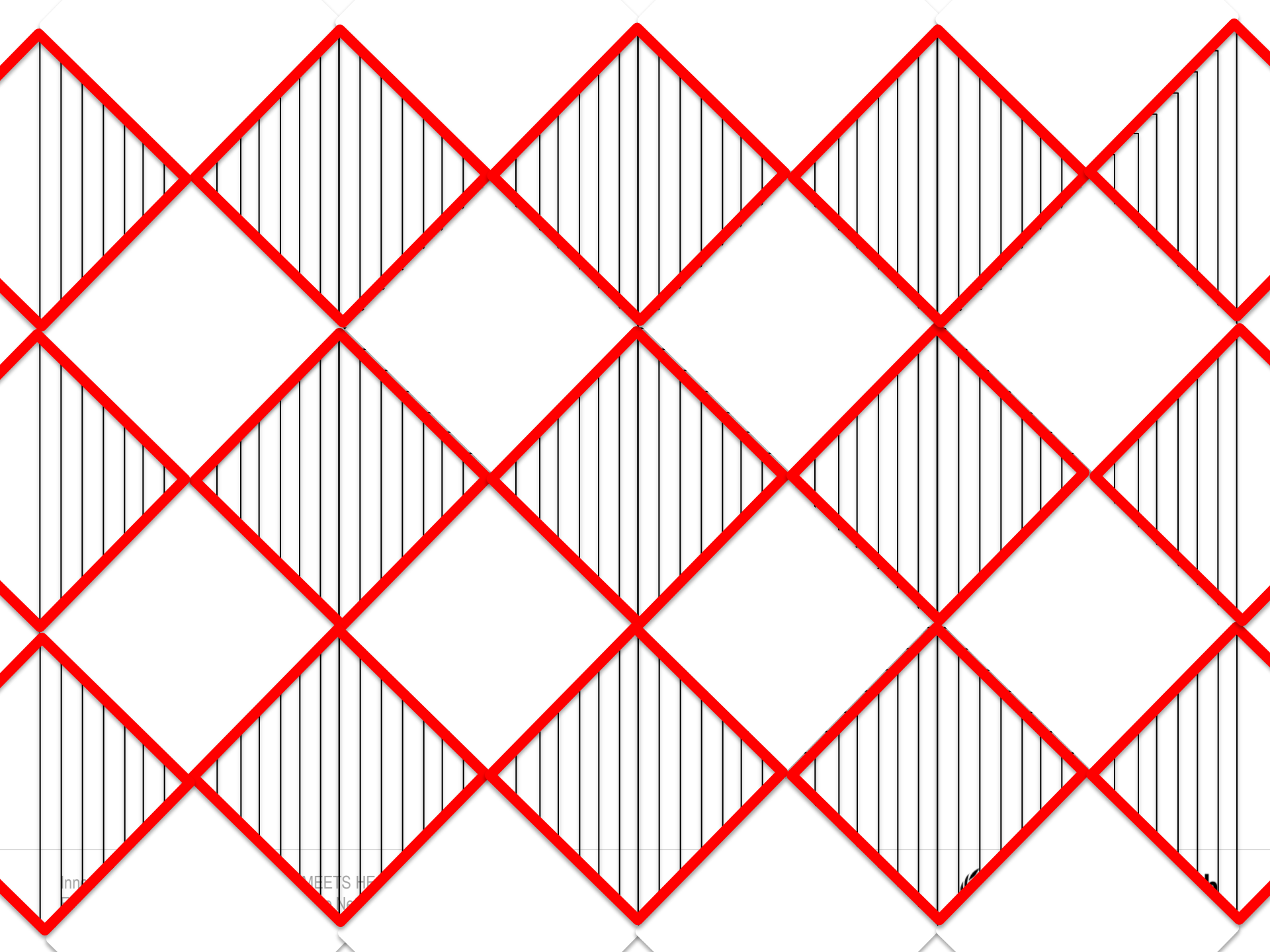

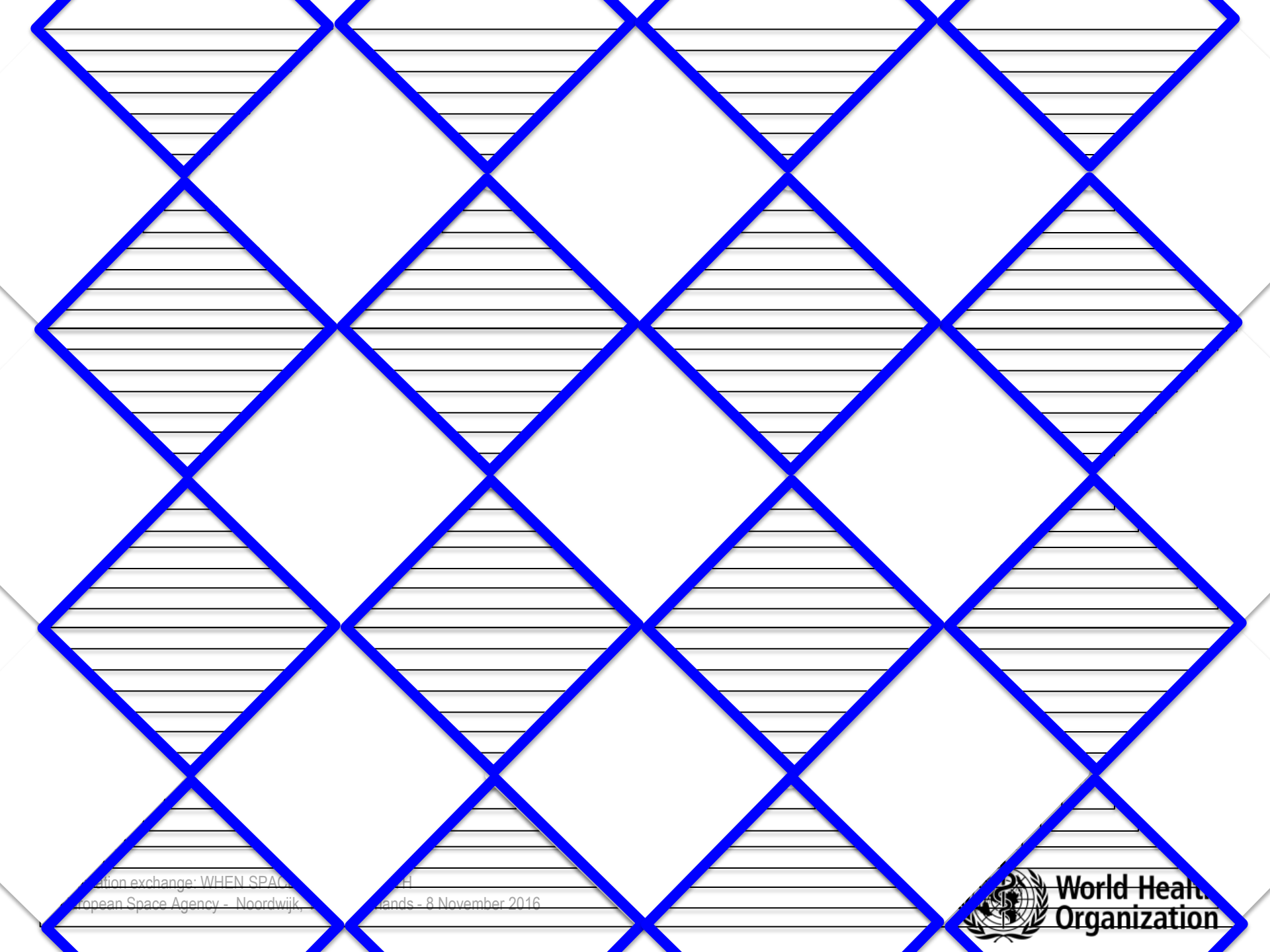

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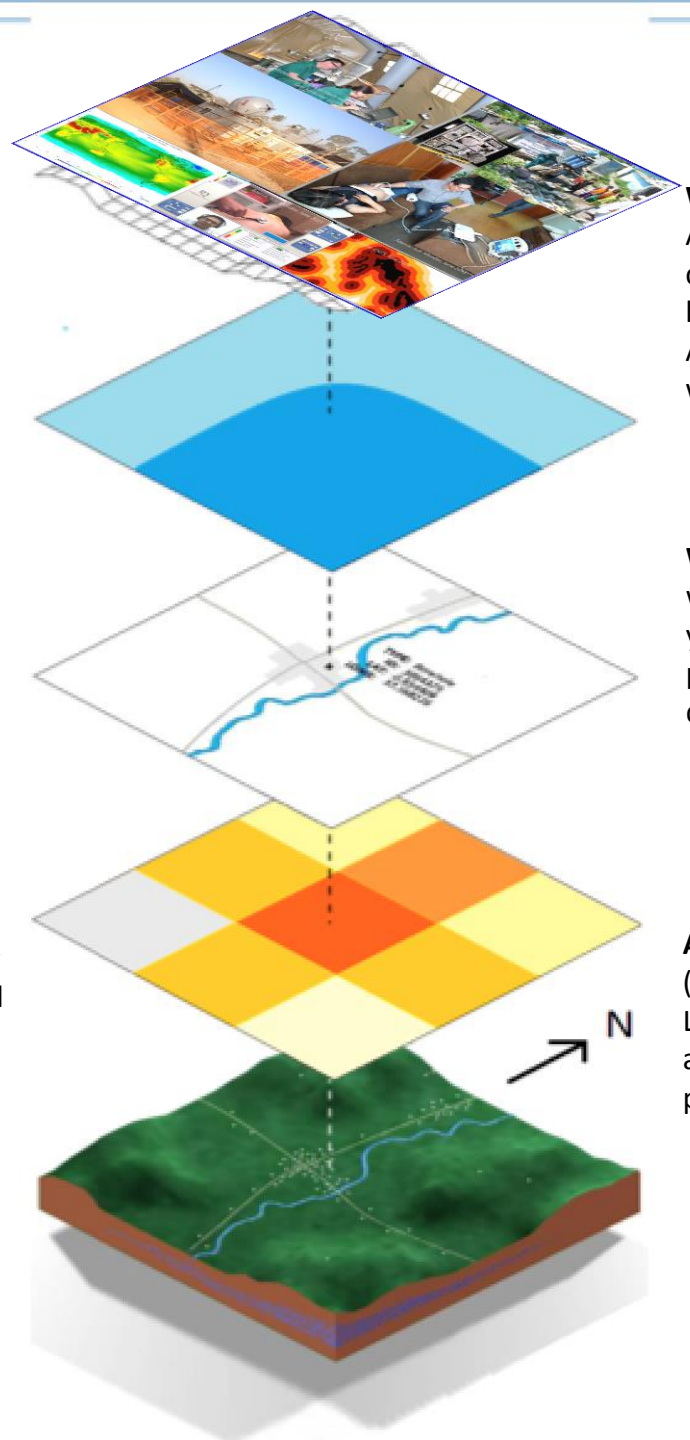
Digital Elevation Model (DEM): Worldwide coverage from NASA's ASTER mission with 30-meter resolution.

Water Resource Map: Aquifer yield data from multiple sources.

Improved water source location: Location of wells continually updated with new water projects via interactive Web 2.0 application.

LandScan Population Database: commercially available 1-kilometer population database updated yearly (http://www.ornl.gov/sci/landscan/landscan_data_avail.shtml).



Water accessibility: (combination of layers) Access measured in amount of energy per capita (calories) needed to collect water, highlighting access limitations due to terrain. Also shows populations living on marginal land without water access.

Water resources per person: Determines whether underlying water resources (aquifer yield) can meet demand of overlying population based on 50 liters per person per day .

Areas with improved water access: (combination of layers) Displays 1-km LandScan areas that have achieved water access per guidelines, i.e. at least one access point per 1-sq.km

Earth Observation and Geospatial Data

Modified after: Source: Rifat Hossain, WHO, 2015

World Health Organization

Integrating space science and technology as part of national health information architecture

World Health Organization

Ideal Dataset Requirement Matrix for Unified Systems

Data set required for	Prevention	Preparedness	Response	Recovery
Data from External sources (National EOC/situation reports, HMIS, routine disease specific active/passive surveillance/ notification systems)				
Exhaustive List of disease/ conditions list *(ICD)*		**List of donor and partner agencies**		
Health facilities (all types and levels)		**Health workforce** (all cadre)		
Essential Medicine		**Logistics**		**Essential Medical devices**
Satellite Imagery (various types and resolutions)				**Other remotely sensed data** (temperature, precipitation, terrain and topology)
Geographic Information System with shape files, base maps				
Transportation assets (Airport locations, transportation hubs, Road network maps)				**Country-specific Population Data** (/sub-national level; projections, census, actual)

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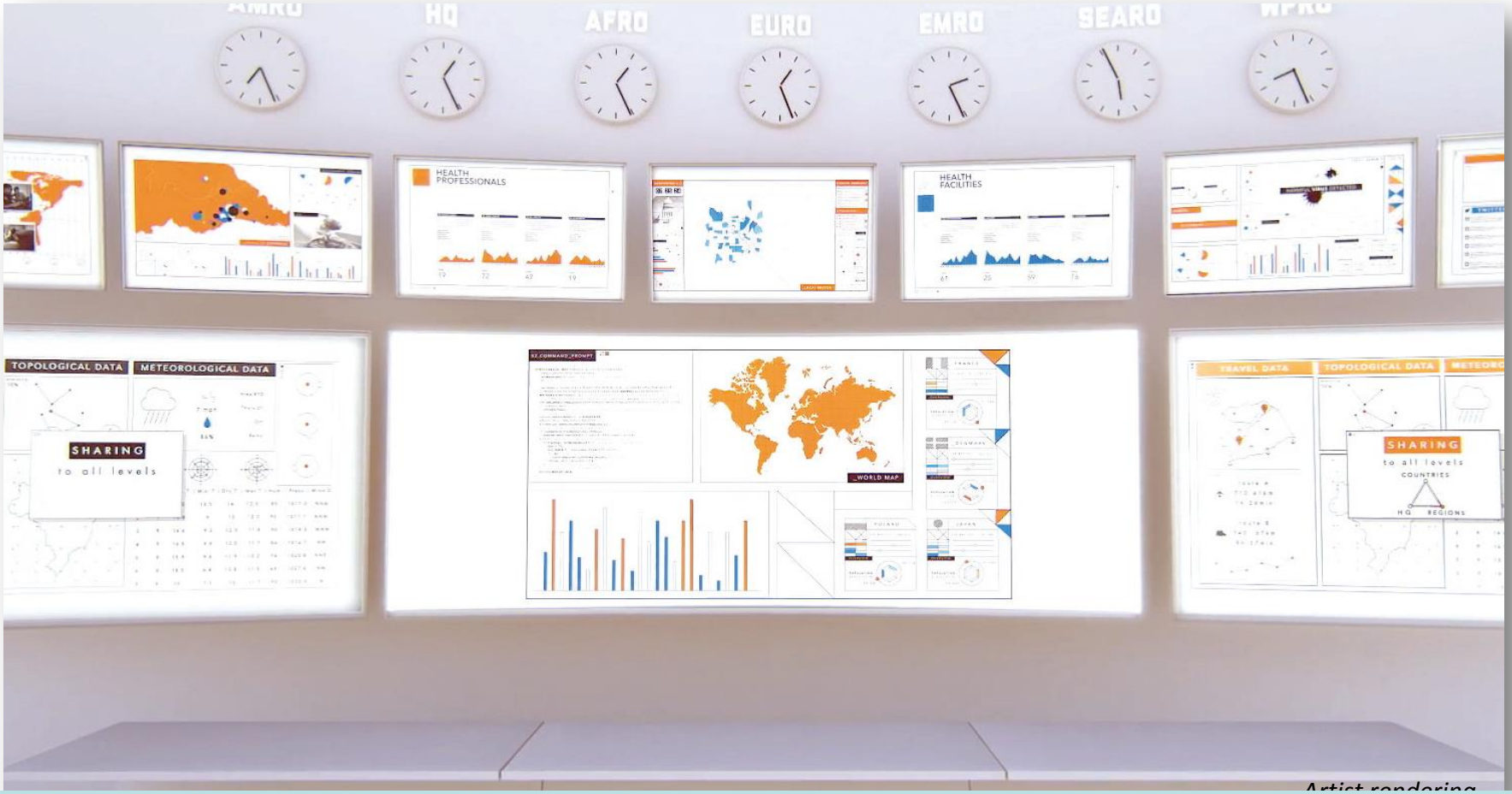
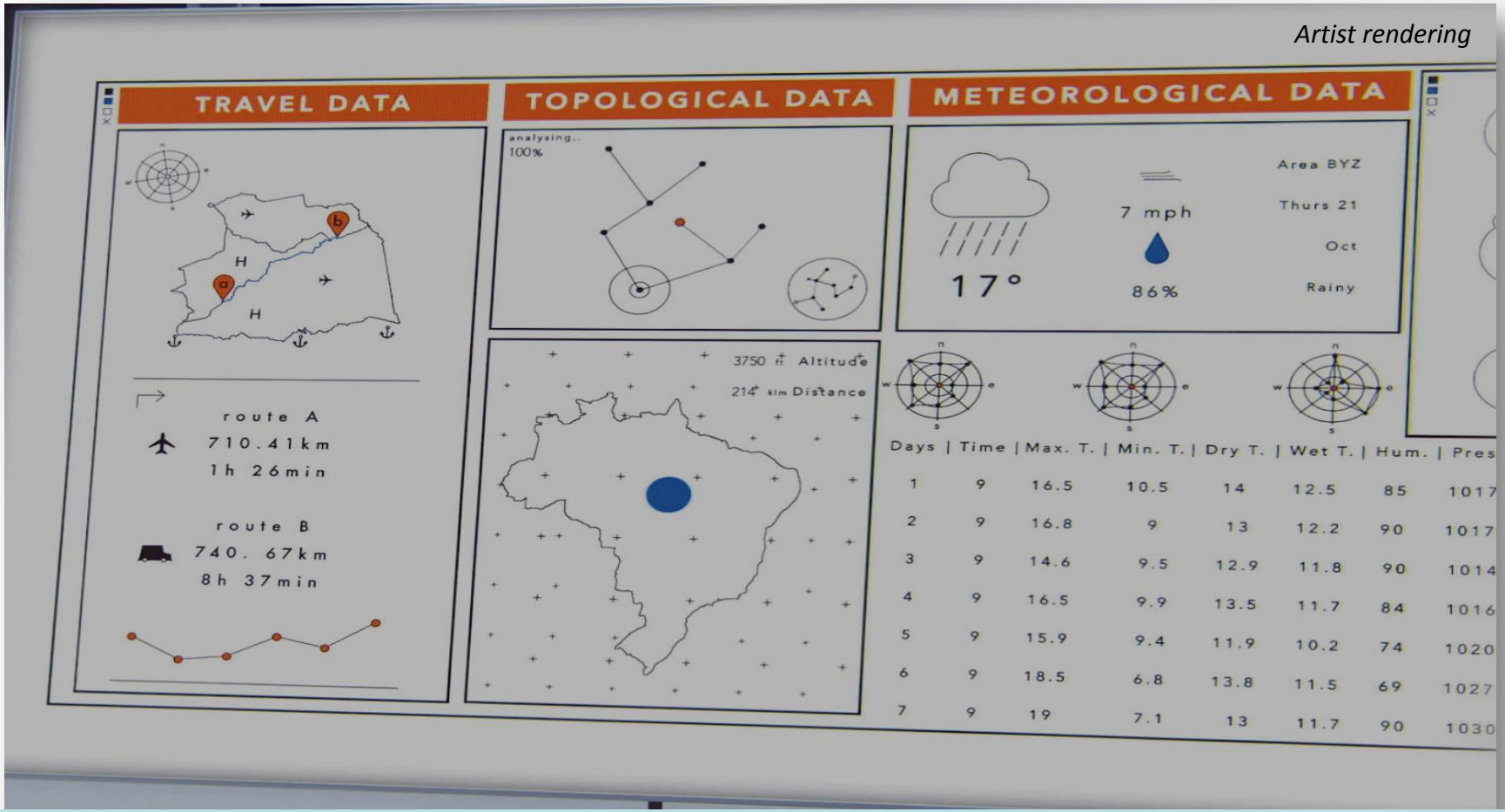
Future Health Information Platforms



Artist rendering

Health information platform for monitoring public health combined with context specific geospatial data.

Future Health Information Platforms

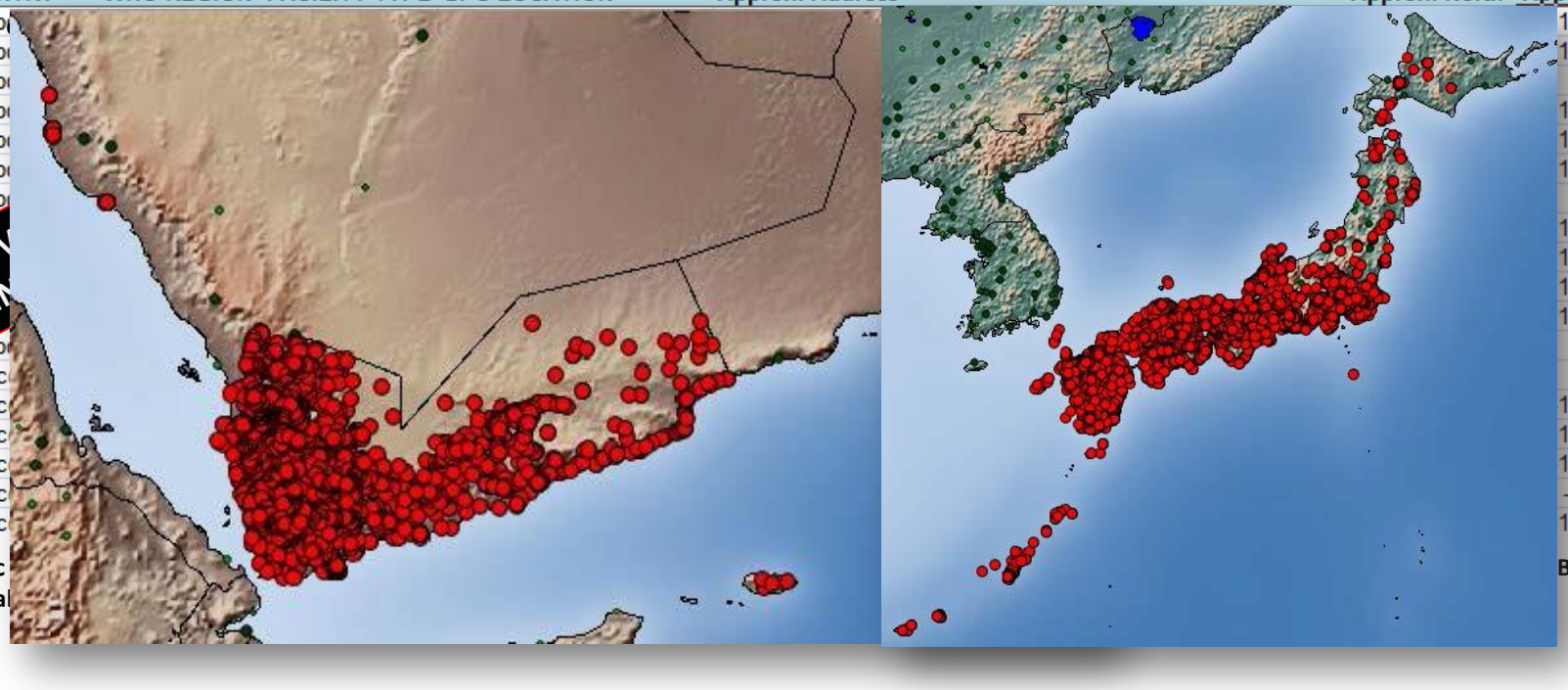


Health information platform for monitoring public health combined with context specific geospatial data.

Health Facilities Locator

1	COUNTRY	WHO REGION	FACILITY TYPE	GPS LOCATION	Approx. Address	Approx. North	Approx. Eas
11109	Camb						105.2845
11110	Camb						104.9358
11111	Camb						104.935
11112	Camb						104.9306
11113	Camb						104.7791
11114	Camb						104.9251
11115	Camb						104.935
11116	Ca						104.9363
111							104.9349
							104.9356
							104.9354
	amb						103.880
121	Mexic						-98.208
11122	Mexic						105.2215
11123	Mexic						105.2317
11124	Mexic						105.2447
11125	Mexic						-100.349
11126	Mexic						100.3497

SAMPLE V IN



Sourc BY-SA);
Special

Locating health facilities using space-based technologies:
Mapping of health facilities

Intersections of Space Science and Technology and Public Health

World Health Organization

Space Science and Public Health

- Area 1: Space science and technology for epidemic intelligence
- Area 2: Space science and technology Health Emergencies
- Area 3: Shaping the research agenda on Benefits of space science and technology to pubic health

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Key Messages

- Integration of Space science and technology to health systems strengthening efforts to be more widely practiced
- Closer collaboration between Ministries of Health and Ministries of Science/Technology is essential

Thank you

World Health Organization