

A satellite view of Earth from space, showing the curvature of the planet and a satellite in orbit. The Earth's surface is visible with clouds and landmasses. A satellite is seen in the upper center of the frame, and another satellite is visible in the lower right. The text "Space for Sustainable Development Goals(SDGs)" is overlaid in orange.

Space for Sustainable Development Goals(SDGs)

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Space Activities Contribute to Sustainable Development



Talking Point

Satellite programs

Human space flight activity:
International Space Station

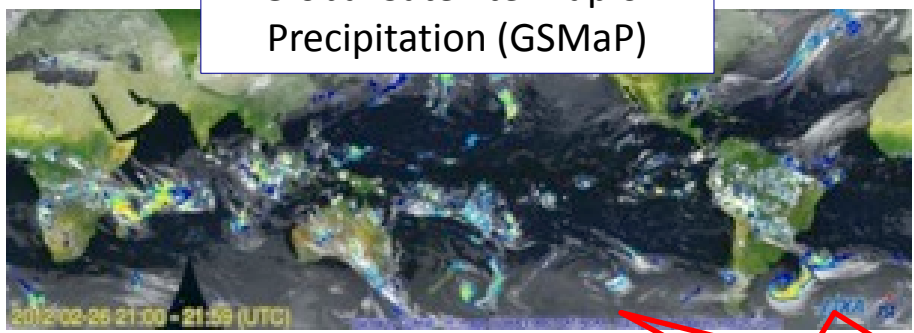
Flood Damage Mitigation

Satellite observation data and in-situ data are merged to predict floods in downstream areas a few days advance. System alarms & informs citizens of evacuation plans.

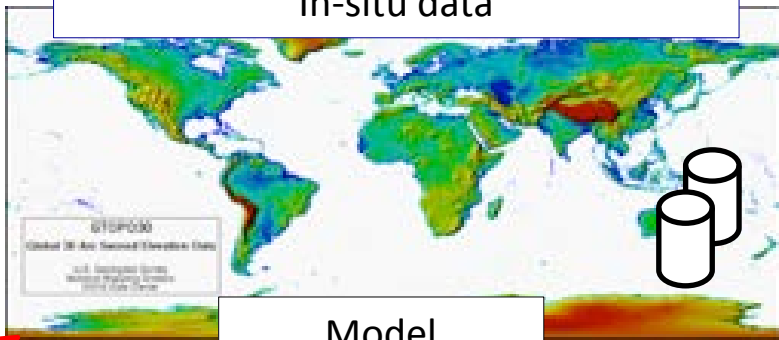


11.5 reduce the number of deaths caused by disasters, including water-related disasters

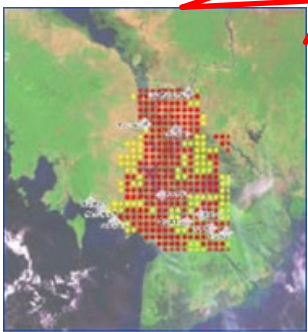
Global Satellite Map of Precipitation (GSMaP)



In-situ data



Model



Global satellite data is effective to grasp the situation on water level of international cross-border rivers. In Bangladesh, it takes a few days before the downstream area is flooded after a flood in an upstream area occurred. Flood forecast enables crop harvesting prior to the extreme weather event.

Partners



(Under preparation)

11 SUSTAINABLE CITIES AND COMMUNITIES



3 GOOD HEALTH AND WELL-BEING



12 RESPONSIBLE CONSUMPTION AND PRODUCTION



Protect Our Health from Air Pollution

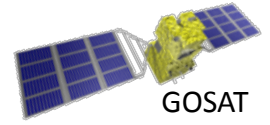
Earth observation satellites monitor haze and particles PM2.5.

GCOM-C

Satellite data & in-situ data detect hot spots to forecast air pollution.

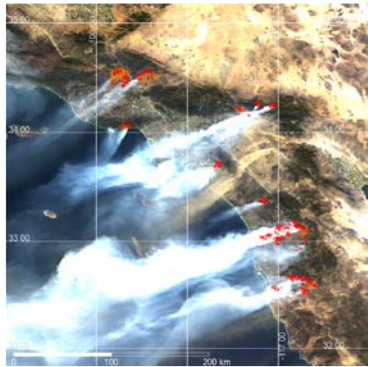
JAXA Himawari Monitor P-Tree System accurately releases

information on air pollution estimates.

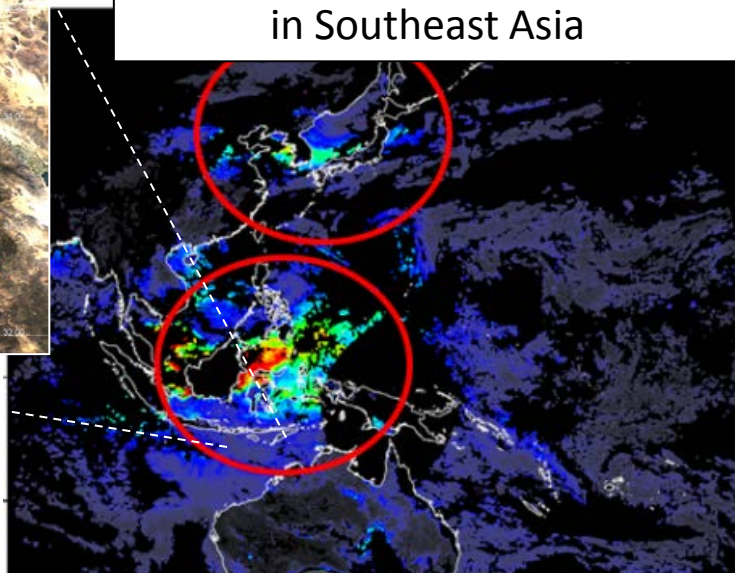


GOSAT

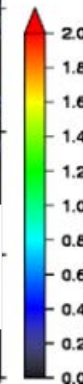
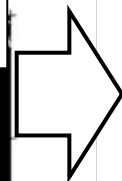
Captures the wide-spread haze in Southeast Asia



Red dots represents fires.



A forest fire in the island of Borneo in Southeast Asia and air polluting particles



ASEAN Specialized Meteorological Center (ASMS)



Estimates when/where/how haze migrates



Alert to local citizens

11.6 Reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality

Available on the website: <http://www.eorc.jaxa.jp/ptree/>



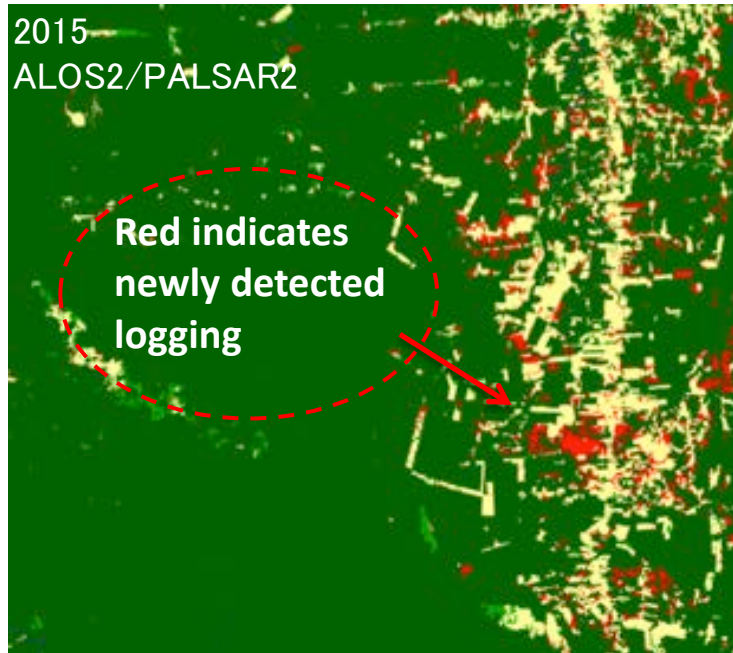
15.1 ensure the conservation, restoration and sustainable use of terrestrial ecosystems

Save the Tropical Forests



ALOS-2

Radars penetrate clouds, provide data on an all-weather, day/night basis. JAXA promotes the use of L-band SAR for forest monitoring to reduce emissions from deforestation and forest degradation.



Detecting deforested areas (Brazil)



JICA-JAXA Forest Early Warning System in the Tropics (JJ FAST) service started in November 2016. Logging area information analyzed by ALOS-2 is provided for authorities and governments. It is more accessible to anyone with computers or mobile devices than it ever was before.

Partner



Currently, information of the Amazon and Central & Southern Africa areas are available. Information will be available to the 77 tropical-area countries in early 2018.



Protection against Infectious Diseases

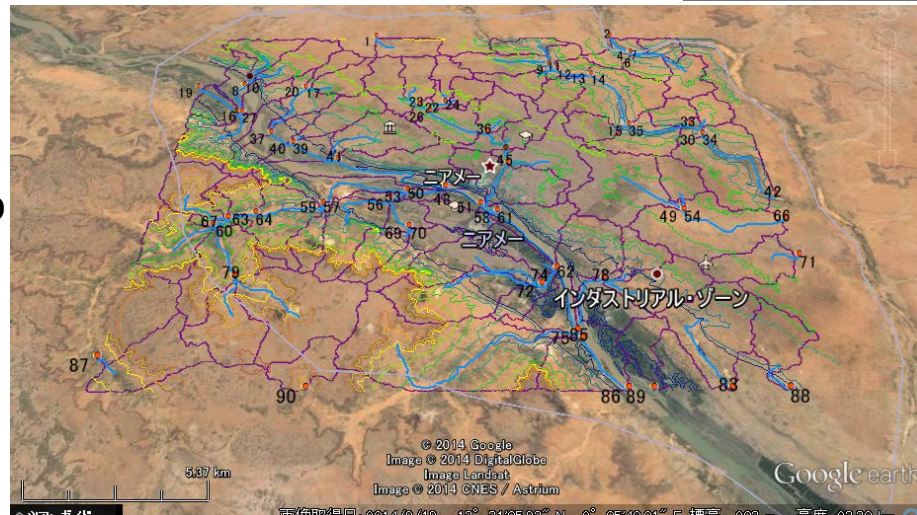
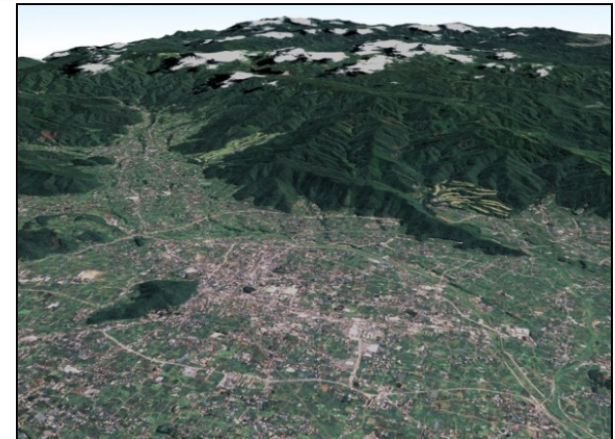
JAXA uses Digital Elevation Models (DEMs) to create maps of places that are difficult to access, in order to implement efficient measures for infectious diseases.

JAXA provides data from the Advanced Land Observation Satellite 2 (ALOS2) to combat infectious diseases like polio.



The place to collect sewage samples in Niger

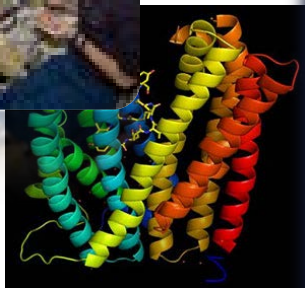
Acknowledging elevation differences identifies the flow of water





Benefits of ISS to Life on Earth

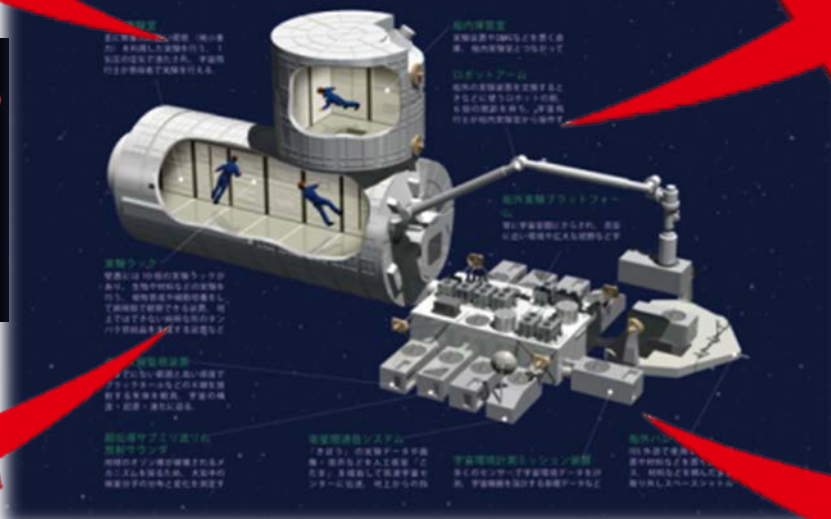
Science
(Tele-science)



Medical Support
from the Earth
(Tele-medicine)



Technology
for living
in Space



Education
(Tele-education)



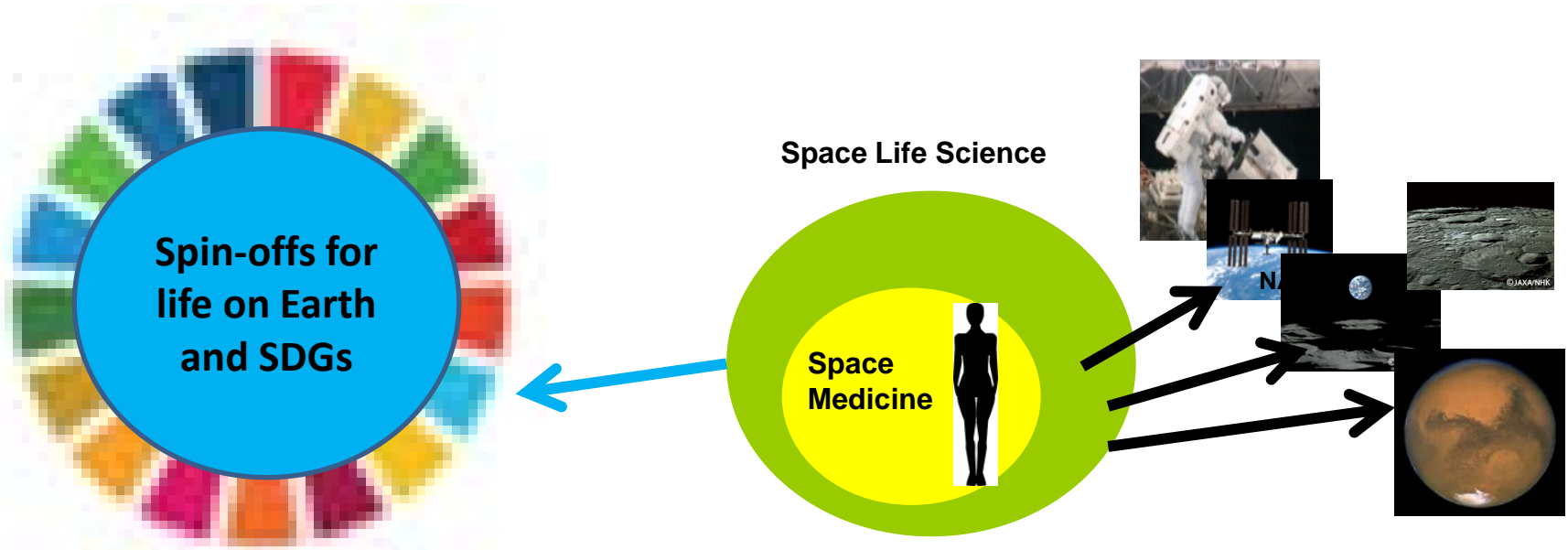


Space medicine will contribute to creating a better society

Aerospace medicine (www.asma.org)

Aerospace medicine concerns the determination and maintenance of the health, safety, and performance of persons involved in air and space travel.

Space medicine and space life science enable human space exploration

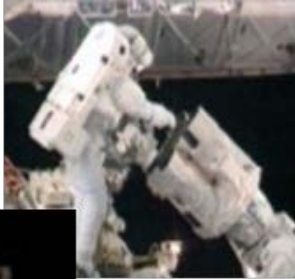


Spin-offs from space

Exploration

Space environment accelerates aging process?

- **Phenomena augmented**



- Decrease of bone density

- Astronaut: 9%/ 6 mon.

- Menopausal women on Earth: 1-2%/y: more than 10 X in space

- Muscle atrophy

- Astronaut: 1%/day

- Bed rest study: 0.5%/day

- (Elderly above 60yo: 2%/y): more than 2 X in space



- **Entire clinical course (cause, onset, adaptation, recovery) observed in a short duration**
- **Problems (physical, psychological) more visible and clarified**

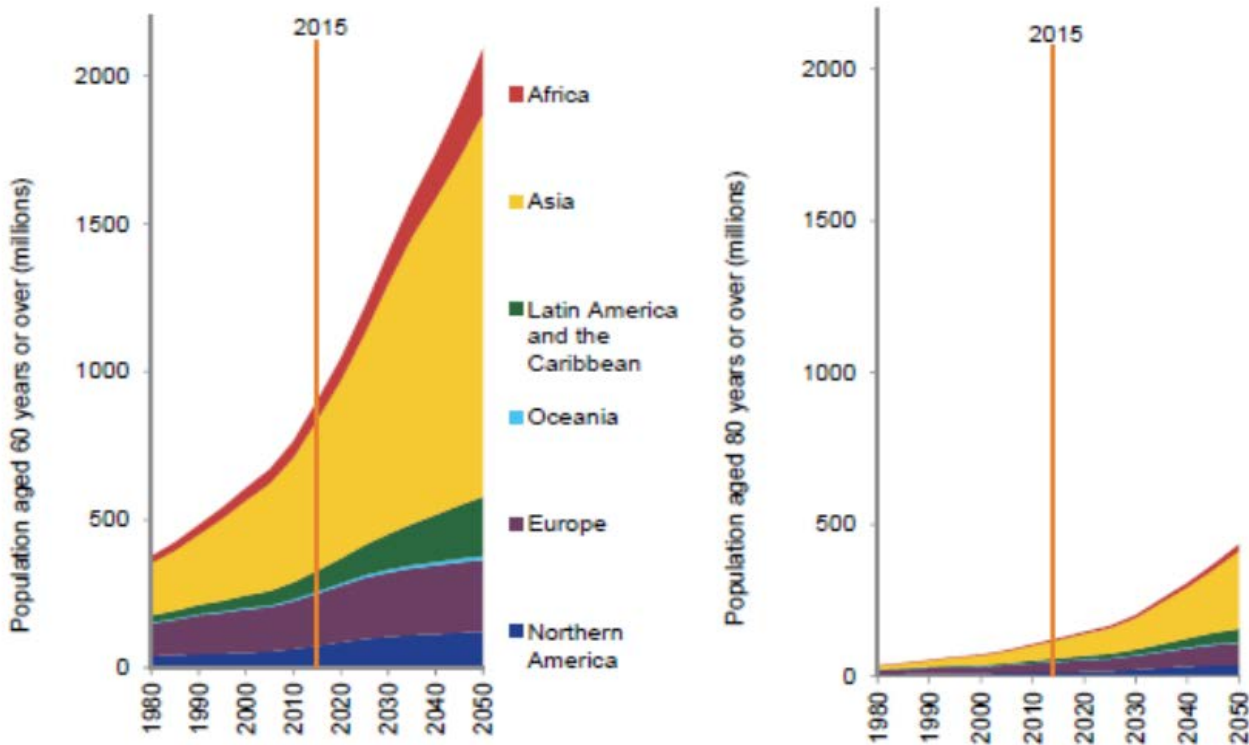
Solutions/countermeasures in space could be more effective on Earth



Live Long and Healthy

An increasingly aging society can be helped by space medicine as a preventive medicine

Figure II.2.
Population aged 60 years or over and aged 80 years or over, by region, 1980-2050



Data source: United Nations (2015). *World Population Prospects: The 2015 Revision*.

World Population Aging 2015

Department of Economic and Social Affairs Population Division

ST/ESA/SER.A/390

United Nations • New York, 2015



Live Long and Healthy

Health practices in space that could be applied to life on Earth

Preventive medicine in space

Physiological Countermeasure

- Bone Loss
- Exercise method

Long-term
bed rest
verification



Psychological Support

- Behavior and performance
- Stress management

Long-term
isolation
experiment



Telemedicine in orbit

- HD T V
- Portable Medical device

High-
definition
Camera



Development of Japanese Space Food

- Fortified foods

Japanese
Space
Food



Health Care of Astronauts

- Health care
- Sleep work cycle

Health
Care
from
the
Earth



Application to life on Earth

Practice of Health and Preventive Medicine

- Health care for elderly people
- Preventive medicine

Countermeasures for Mental Health

- Stress management
- Sleep

Enhancement of Medical Care

- Emergency medicine
- Disaster Management

Food Safety

- Food for disasters
- Biodegradable containers
- Nutritional management
- HACCP

Occupational Medicine

- Providing health care to workers in a variety of sectors, e.g. nurses,

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