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ČESKÉ VYSOKÉ
UČENÍ TECHNICKÉ
V PRAZE

Practical Lecture 155DPRZ

Lesson 2 – Data download

The COPERNICUS program

- **EU Earth Observation Programme**
- **The programme is coordinated and managed by the European Commission**
- **It is implemented in partnership with Member States, the European Space Agency (ESA), the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), the European Centre for Medium-Range Weather Forecasts (ECMWF), EU agencies and Mercator Océan.**
- **All data is freely available at no charge**
- **<https://youtu.be/MGJss4lDaBo>**

„The Sentinels“

- **S1** – Radar images (what sensor is it?); S1A from 2014, S1B from 2016
- **S2** – High resolution optical data (what is the sensor?); 1A from 2015 and 1B from 2017; land monitoring
- **S3** – 3 satellites - High resolution optical, radar and altimetry (altimetry) data for ocean and sea monitoring; S3A since 2016, S3B since 2018
- **S4** – Ground and satellite measurements (UVN spectrometer) Air quality monitoring - under construction
- **S5** - UV-SWIR spectrometer - Air quality monitoring – planned
- **S6** – Altimetry data - planned

About Copernicus Sentinel-1...

WHAT?

The first in the Copernicus Sentinel series, a constellation of two identical radar imagery satellites in the same orbit, providing an all-weather, day-and-night supply of images of Earth's surface



WHEN?

Sentinel-1A was launched on 3 April 2014 and Sentinel-1B on 25 April 2016. Both were taken into orbit on a Soyuz rocket, from Europe's Spaceport in French Guiana



WHERE?

Designed and built by a consortium of around 60 companies led by **Thales Alenia Space** and **Airbus Defence and Space**



APPLICATIONS

Main applications include:

- Monitoring sea ice and icebergs • monitoring of land ice (glaciers, ice sheets, ice caps) • river and lake ice monitoring • oil spills and ships • marine winds & waves • land-use change, agriculture, deforestation • land deformation • and support to emergency management such as floods and earthquakes



DATA AND USERS

As of end 2020, about 6 million products have been generated and made available for download, culminating a total of 10 Petabytes. More than 30 million Sentinel-1 product downloads have been made by users, representing nearly 40 Petabytes. Data are exploited by various users: Copernicus Services, public institutions, scientists, commercial companies



BENEFITS

Services relate to:

- Monitoring of Arctic sea-ice extent • routine sea-ice mapping • maritime surveillance (oil spill monitoring, ship detection, illegal fisheries) • monitoring land-surface for motion risks including subsidence, landslides • understanding of Earth processes (earthquakes, volcanoes) • monitoring of infrastructure • mapping for forest, water and soil management • and mapping to support humanitarian aid and crisis situations



WHAT'S NEXT?

Continuity over the coming years will be ensured by the launch of additional satellites (Sentinel-1C and Sentinel-1D). Furthermore, a new generation of Sentinel-1 satellites is being prepared, to take up the relay from the first generation



DATA ACCESS

<https://scihub.copernicus.eu/>

About Copernicus Sentinel-2...

WHAT?

A constellation of **two identical satellites in the same orbit**, Copernicus Sentinel-2 images land and coastal areas at high spatial resolution in the optical domain



WHICH?

Main applications include agriculture; land ecosystems monitoring; forests management; inland and coastal water quality monitoring; disasters mapping and civil security



WHERE?

Designed and built by a group of around **60 companies** led by **Airbus Defence** and Space for the space segment and **Thales Alenia Space** for the ground segment



WHO?

Services include **CLMS** (Copernicus Land Monitoring Service); **CMEMS** (Copernicus Marine Environment Monitoring Service); **CEMS** (Copernicus Emergency Management Service) and Copernicus Security Service; among others



WHEN?

Sentinel-2A was launched on 23 June 2015; Sentinel-2B on 7 March 2017, both on a Vega rocket from Kourou, French Guiana



DATA AND USERS

As of July 2020, about **20 million products** have been generated and made available for download, culminating a total of 10 Petabytes



DATA ACCESS

<https://scihub.copernicus.eu>

WHATS NEXT?

Continuity over the coming years will be ensured by the **launch of additional satellites** (Sentinel-2C and Sentinel-2D). Furthermore, a new generation of Sentinel-2 satellites is being prepared, to take up the relay from the first generation



Sentinel 2 – Data download

<https://dhr1.cesnet.cz/#/home>

<https://scihub.copernicus.eu/dhus/#/home>

1. Choose an unique area, size appx. 30 x 30km

- The area must include – Water body, city/buildings, forest, agriculture area, road
- Beware of clouds!
- Timing – vegetation period – late spring or summer

2. Download corresponding tile(s)

ESA SNAP

- 1. Upload data to SNAP**
- 2. Band demonstration**
- 3. Metadata demonstration**
- 4. Choosing area of interest**
- 5. Data saving**

Task – prepare unique dataset, area size appx 30 x 30km, requirements above