

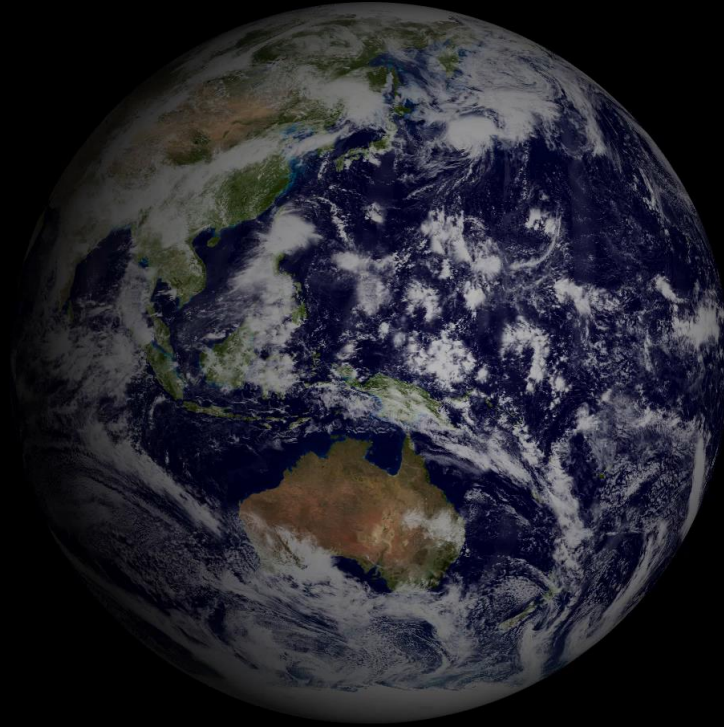
The Copernicus Sentinels – Impact and Perspective

Nationales Forum für Fernerkundung und Copernicus 2018
Berlin, 28 November 2018

Nicolaus Hanowski, ESA

Head of the Mission Management & Ground Segment
Department

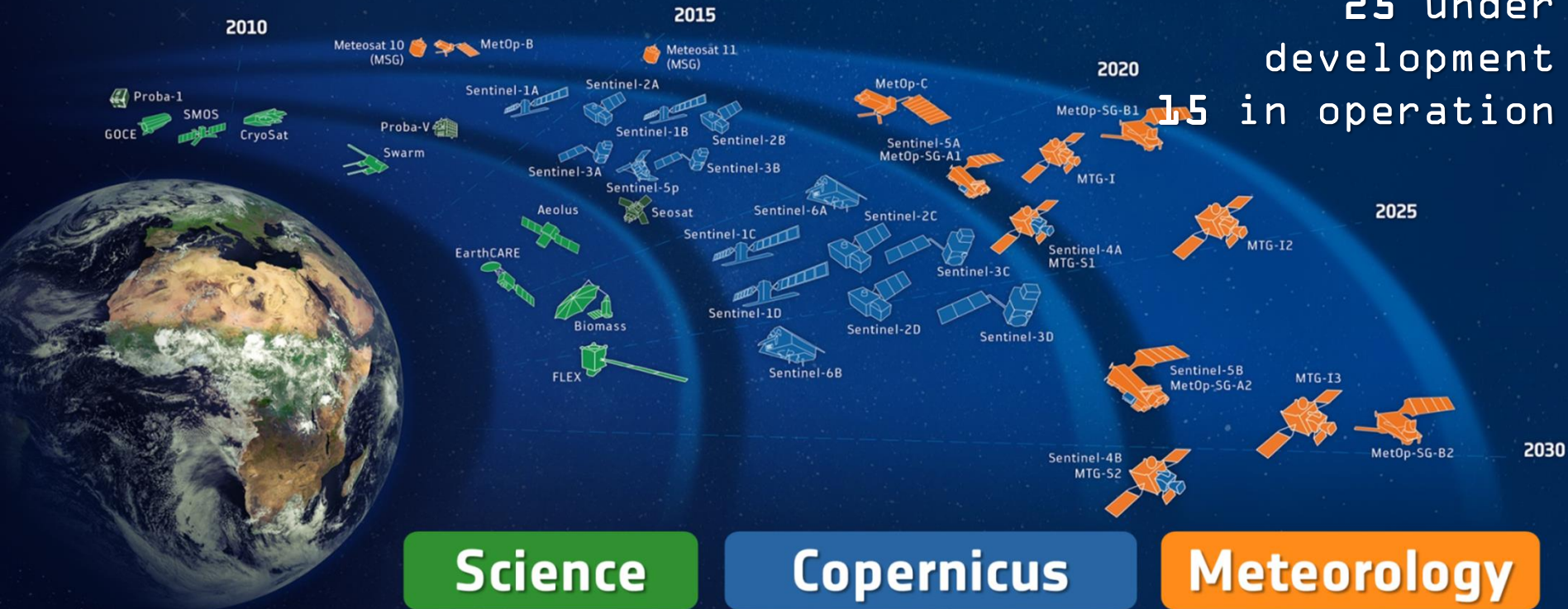
Feeling the Pulse of our Planet



ESA-DEVELOPED EARTH OBSERVATION MISSIONS



Satellites
25 under
development
15 in operation



Copernicus – global leadership in EO



> 180.000

registered users
= tip of the iceberg



Land



Atmosphere



Ocean



Climate



Disaster



Security

6 operational services



150 TB satellite data
distributed per day



full, free & open
data policy

7 satellites flying

S1



S2



S3



S4



S5P



S5



S6



preparing Copernicus 2.0



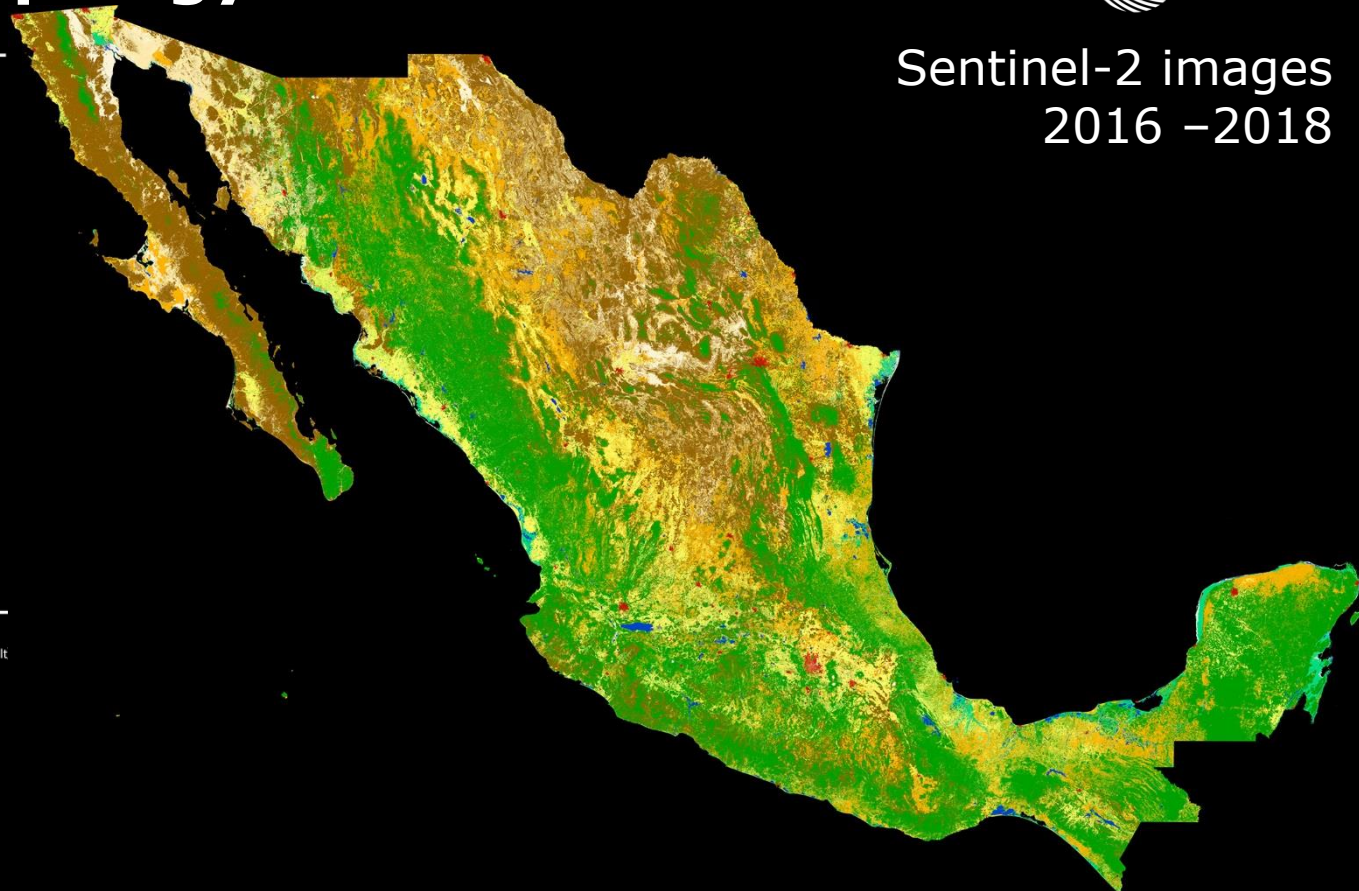
Land Cover Typology



Mexico land cover map



Sentinel-2 images
2016 – 2018



Credits: Contains modified Copernicus Sentinel data (2016/2017/2018), processed
by ESA Climate Change Initiative - Land Cover project 2018 (UCLouvain and Brockmann Consult)

© ESA 2018



European Space Agency

EO for European Agrofood Industries



June 2018



EOPLUG-IN will enable easy, fast access to continuous business intelligence data streams for industry



European Space Agency

Air Pollution Monitoring Sentinel-5P

NO₂ Concentrations Europe

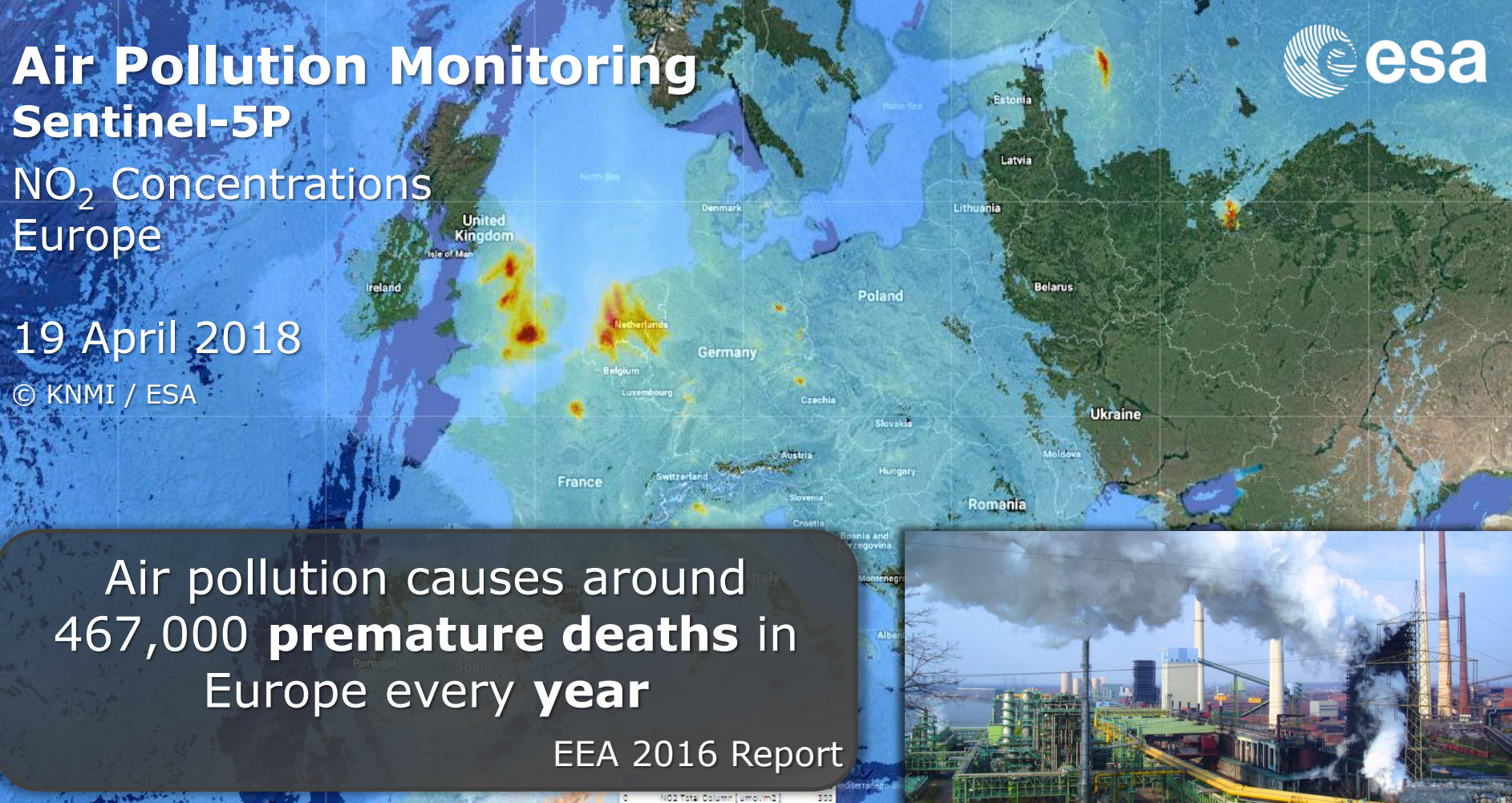
19 April 2018

© KNMI / ESA

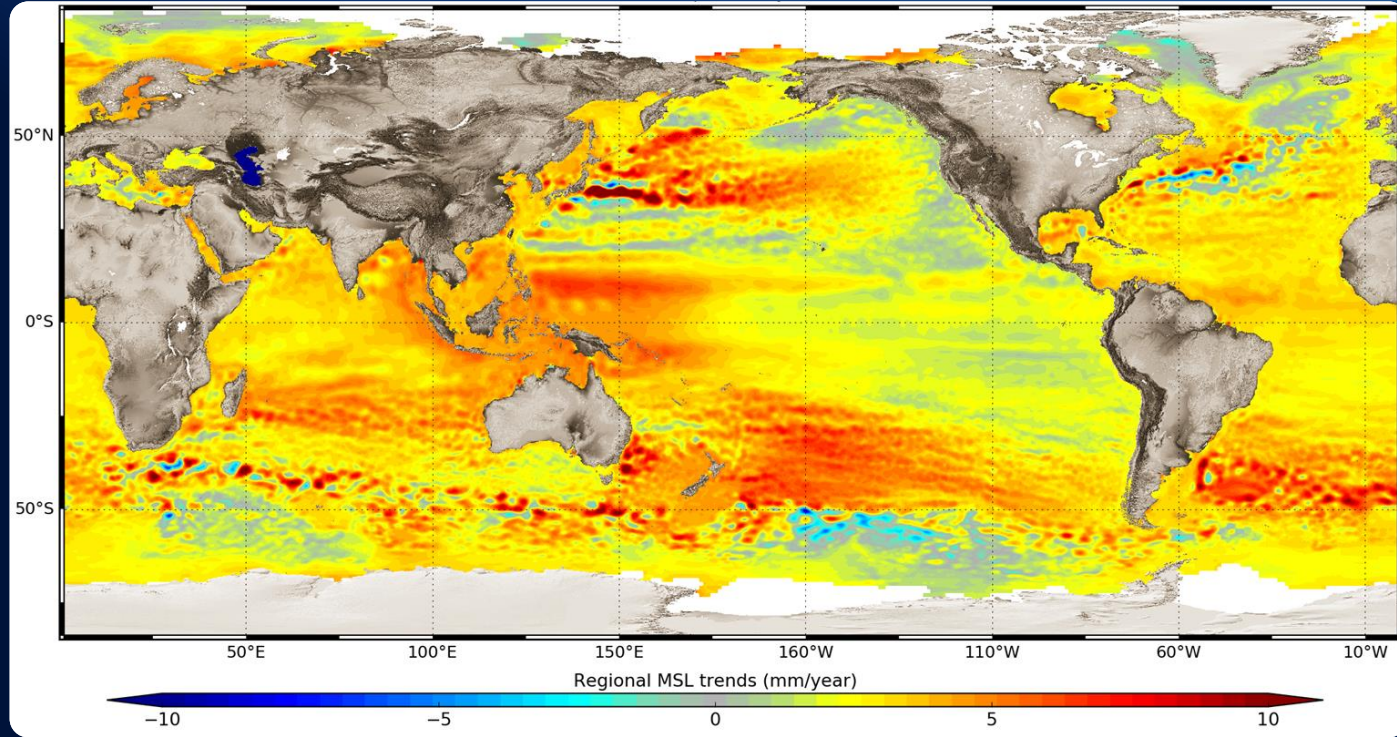


Air pollution causes around
467,000 **premature deaths** in
Europe every **year**

EEA 2016 Report



Sea Level Trends



Copernicus Marine Service, 2018

© CNES/LEGOS/CLS/EU

Copernicus Space Component Evolution



2014

Current Sentinels

Sentinel **Expansion**

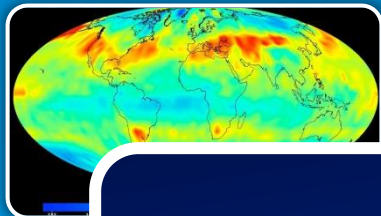
Copernicus **for Security**

Next-Gen. missions
will replace current &
expansion missions

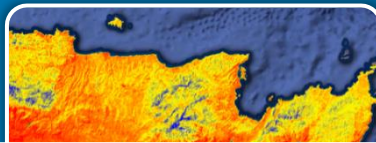
Sentinel **Next
Generation**



6 High Priority Candidate Missions



Anthropogenic CO₂
Monitor causes of
Imaging Climate Change



High Resolution
Agriculture & Water
Surface Temp.

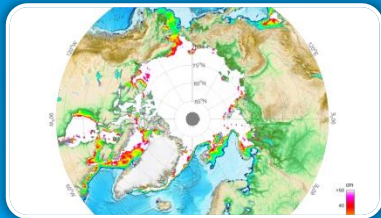
Phase A/B1 for new Sentinels ongoing



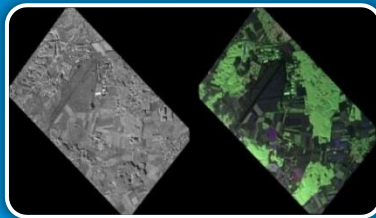
volume)



Biodiversity



Passive Microwave SST
(Aging situational
awareness)



Soil Moisture,
Vegetation &
Ground Motion

New EO Challenges and Trends



**From 20 to 80 EO
satellite Launches per
Year worldwide**

**Copernicus revolutionises
EO**

**Daily EO dataflow in TB
Archives entering PB era**

**New Players and
Innovation
Approaches in EO**

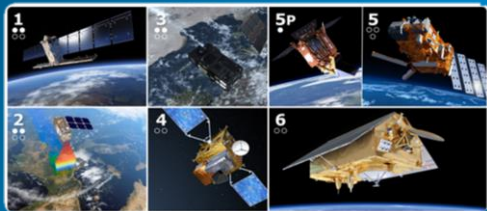
- Non-space players
- AI, IoT, HAPS, nanosat
etc.



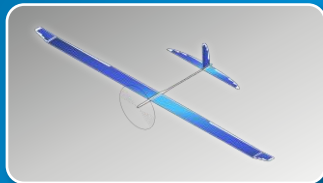
FutureEO – bringing EO into the 21st Century



Hardware



Big
&
Small



HAPS

Operations

Increased Data
Diversity & Volumes



EO
AFRICA



Software

Machine
Learning



Artificial Intelligence
Data Analytics
Internet of Things



Cloud
Computing

21st
Century EO

Earth Explorers



Meteo Sat.

Sentinels

Small Sat Constellations

HAPS

Drones

HAPS

Drones

IoT

IoT

IoT

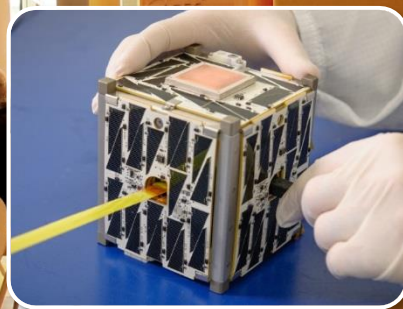


Φ -lab as Catalyst

"Introducing disruptive innovation into European EO"



HAPS



NanoSats

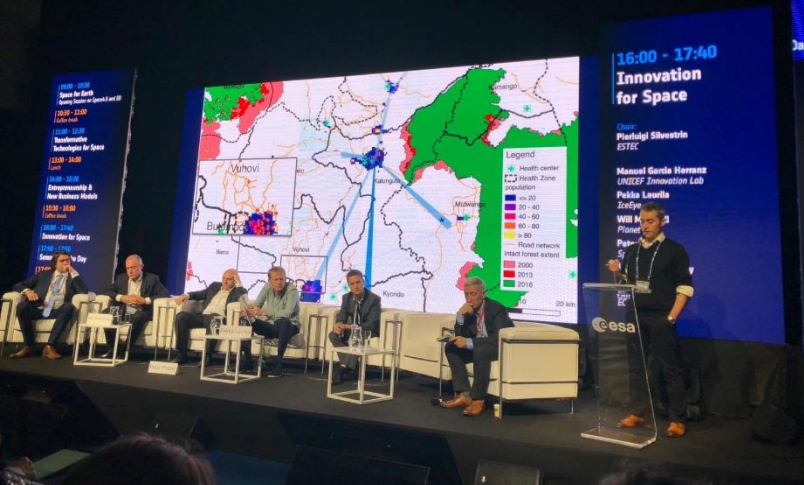


Constellations



AI for EO

Phi Week – Big Success



Thank you for your attention!

www.esa.int

[@AschbacherJosef](https://twitter.com/AschbacherJosef)