



Earth Observation at ESA in the context of a 'Digital Earth' and a Changing Anthropocene

ICES Biennial Workshop V

"Digital Earth in a transformed Society"

Geneva, 2-3.December 2019

Michael Rast

ESA-ESRIN, Frascati, Italy








ESA UNCLASSIFIED - For Official Use



European Space Agency

Sentinel Status



S-1	S-2	S-3	S-4	S-5P	S-5	S-6
						
Radar	High Res. Optical	Medium Res. Optical & Altimetry	Atmospheric Chemistry (GEO)	Atmospheric Chemistry (LEO)	Atmospheric Chemistry (LEO)	Altimetry
A 3 Apr. 2014	A 23 Jun. 2015	A 16 Feb. 2016	A 2022	A 13 Oct. 2017	A 2021	A 2020
B 25 Apr. 2016	B 6 Mar. 2017	B 25 Apr. 2018	B 2027		B 2027	B 2025
C 2022/23	C 2022/23	C 2023			C > 2027	
D > 2022/23	D > 2022/23	D > 2023				



Sao Paulo
Brazil



Los Angeles
United States



London
United Kingdom



Beijing
China



ESA UNCLASSIFIED – For Official Use



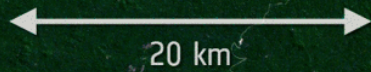
European Space Agency

Rainforest Clearing

Rondonia, Brazil

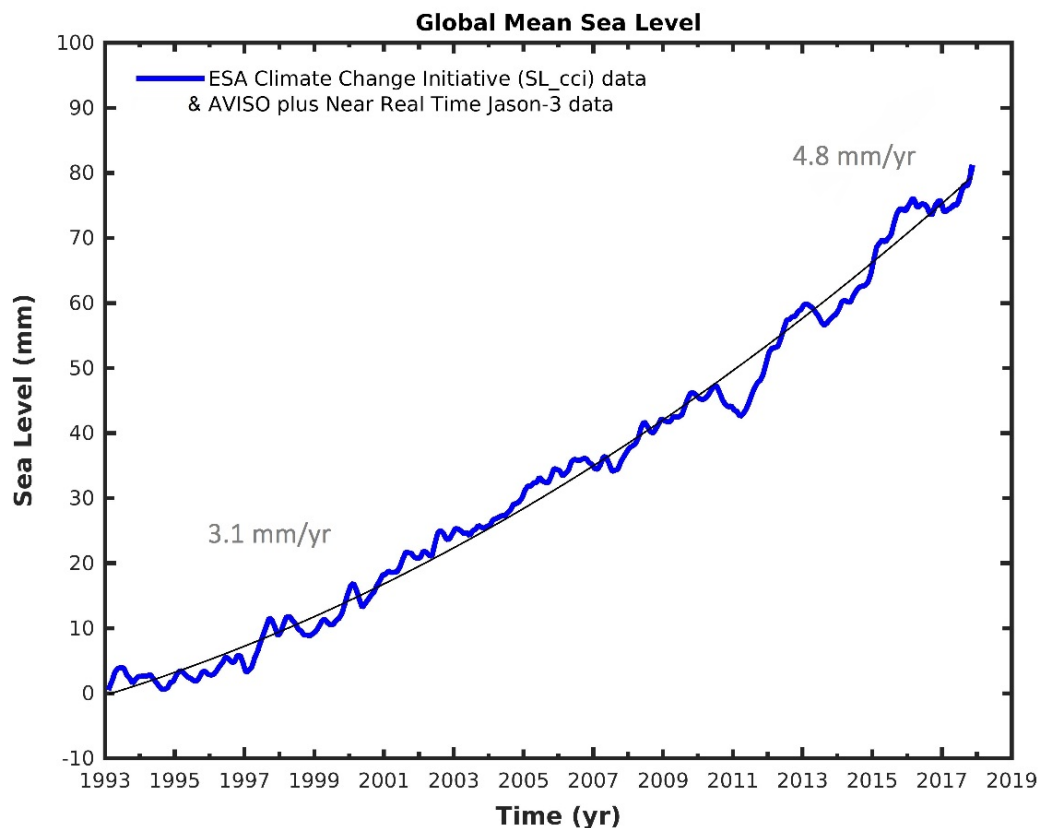
Landsat 5

8 July 1989



European Space Agency

Sea Level Rise



Sea level rise is accelerating. Sea levels could rise 1.3 meters in the next 80 years.

Proceedings of the National Academy of Sciences

February 2018



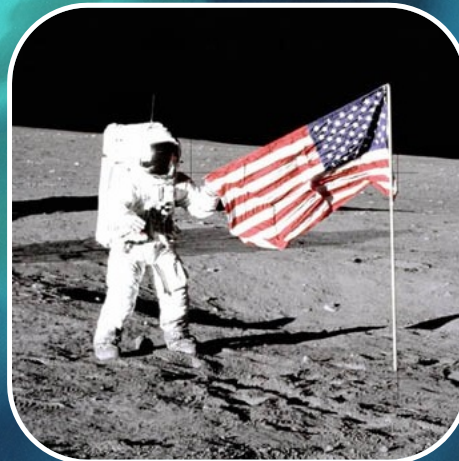
The Space 4.0 Era



Space 1.0

Astronomy

Since millennia



Space 2.0

Space Race

Since 1958



Space 3.0

Int. Cooperation

Since Fall of the Wall



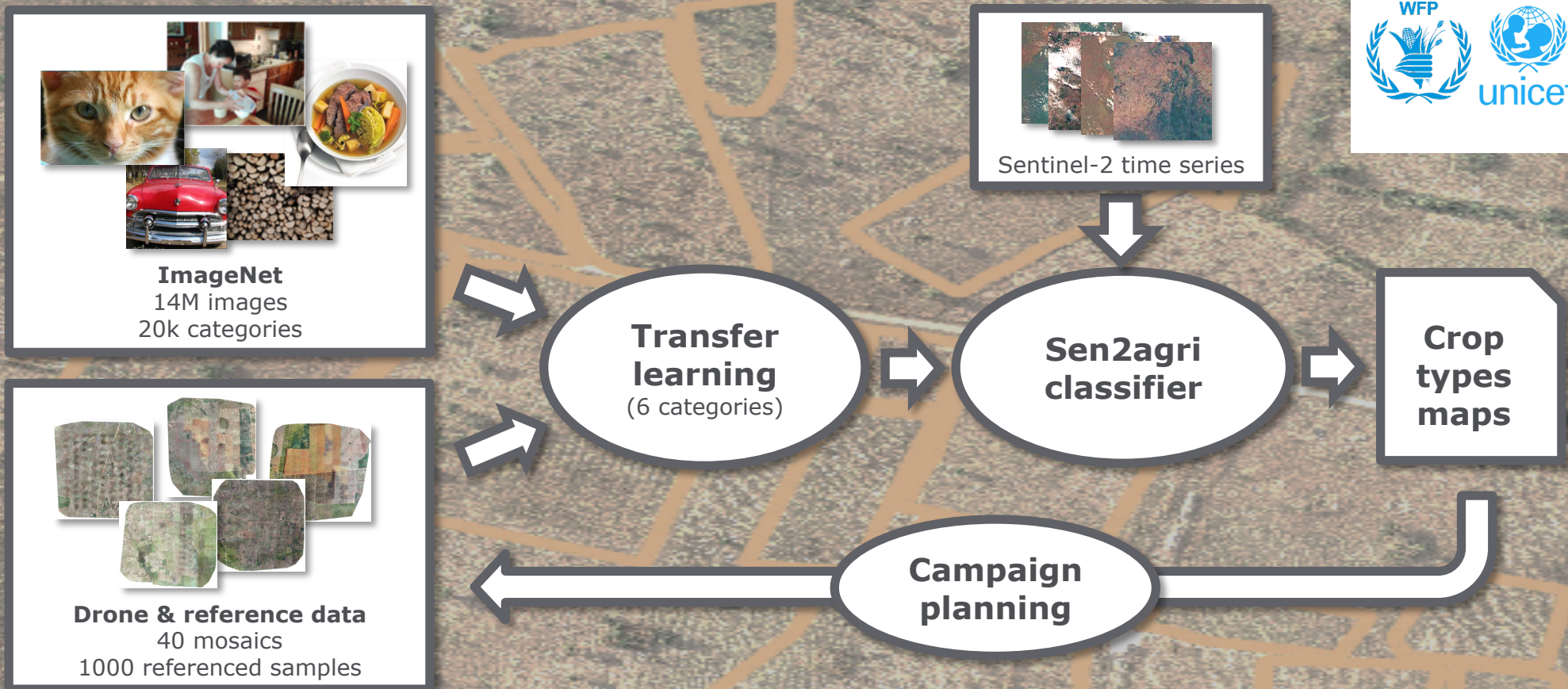
Space 4.0

Space for Society

Now



Transfer learning from drone data to Sentinel 2



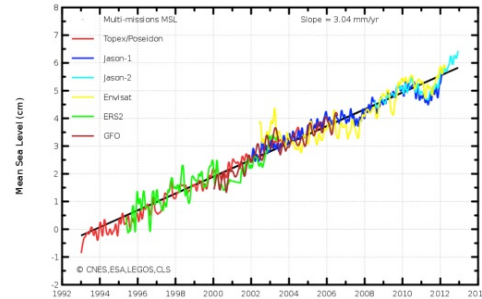
Big Data Challenges



ESA EO Data Archive
Petabyte



Data volume



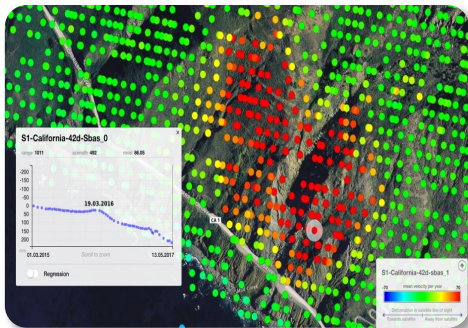
Data continuity



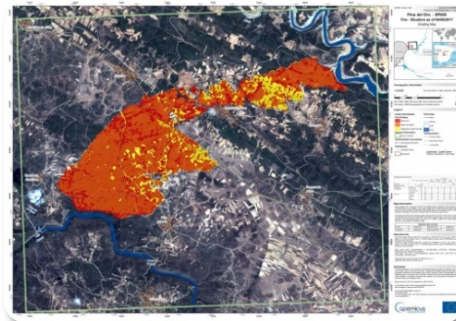
Data sharing



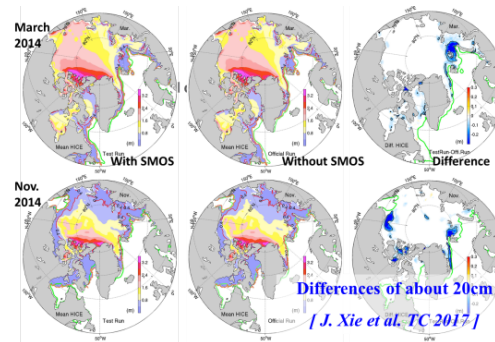
Data quality



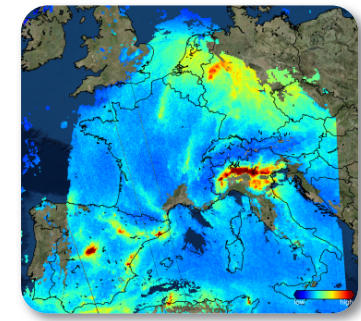
Innovation



Timeliness



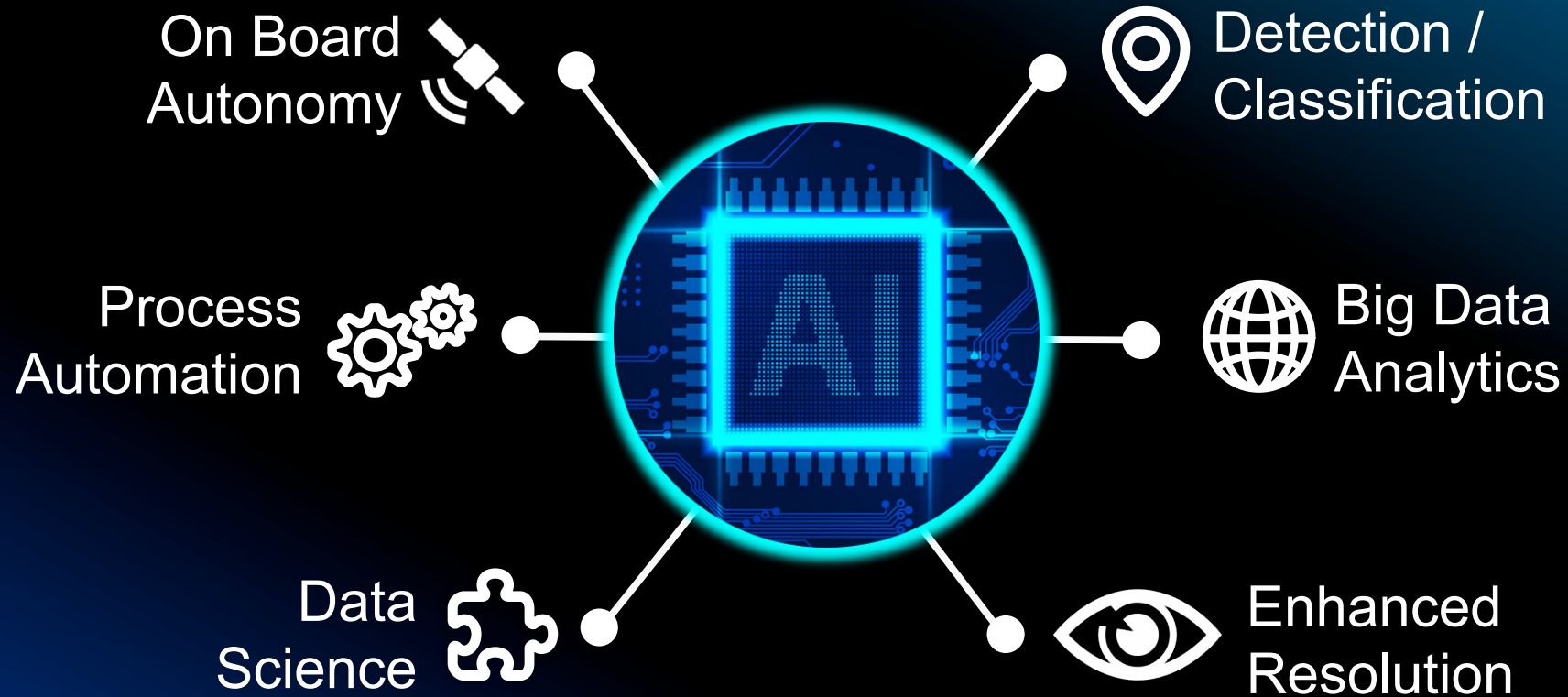
Mission synergies



Uniqueness



AI Opening a new Dimension for EO



ESA UNCLASSIFIED – For Official Use

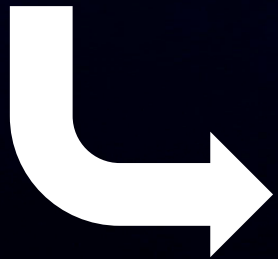


European Space Agency

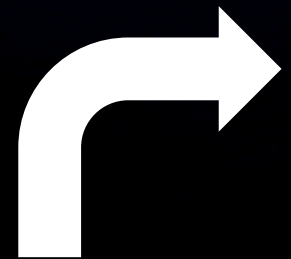
Building a Digital Twin Earth



Observations



AI



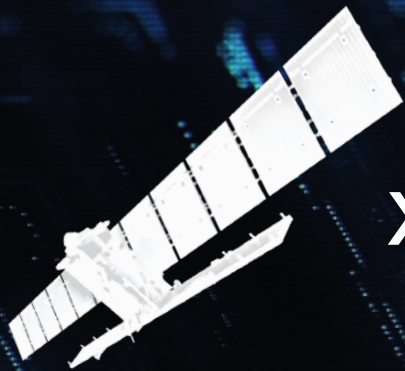
Modelling

ESA UNCLASSIFIED – For Official Use



European Space Agency

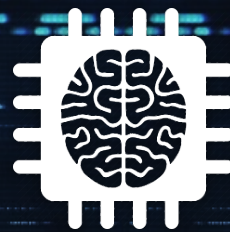
EONEXT =



X



X



X



X



**reference
missions**

new space

brain

connected

programmable

Copernicus
Earth Explorers

Constellations

AI
on-board

Internet to
space

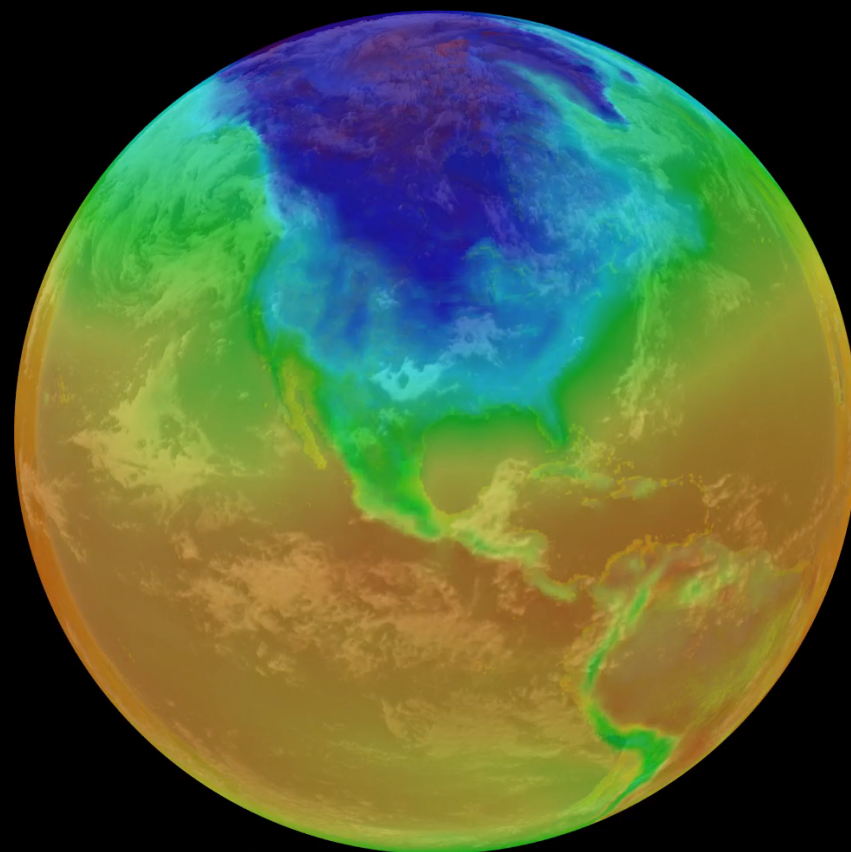
Interactive
community

ESA UNCLASSIFIED – For Official Use



European Space Agency

ESA Monitors the Health of our Planet



European Space Agency

Earth Explorers

Meteo Sat.

Sentinels

Small Sat Constellations

HAPS

Drones

HAPS

Drones

IoT

IoT

IoT

