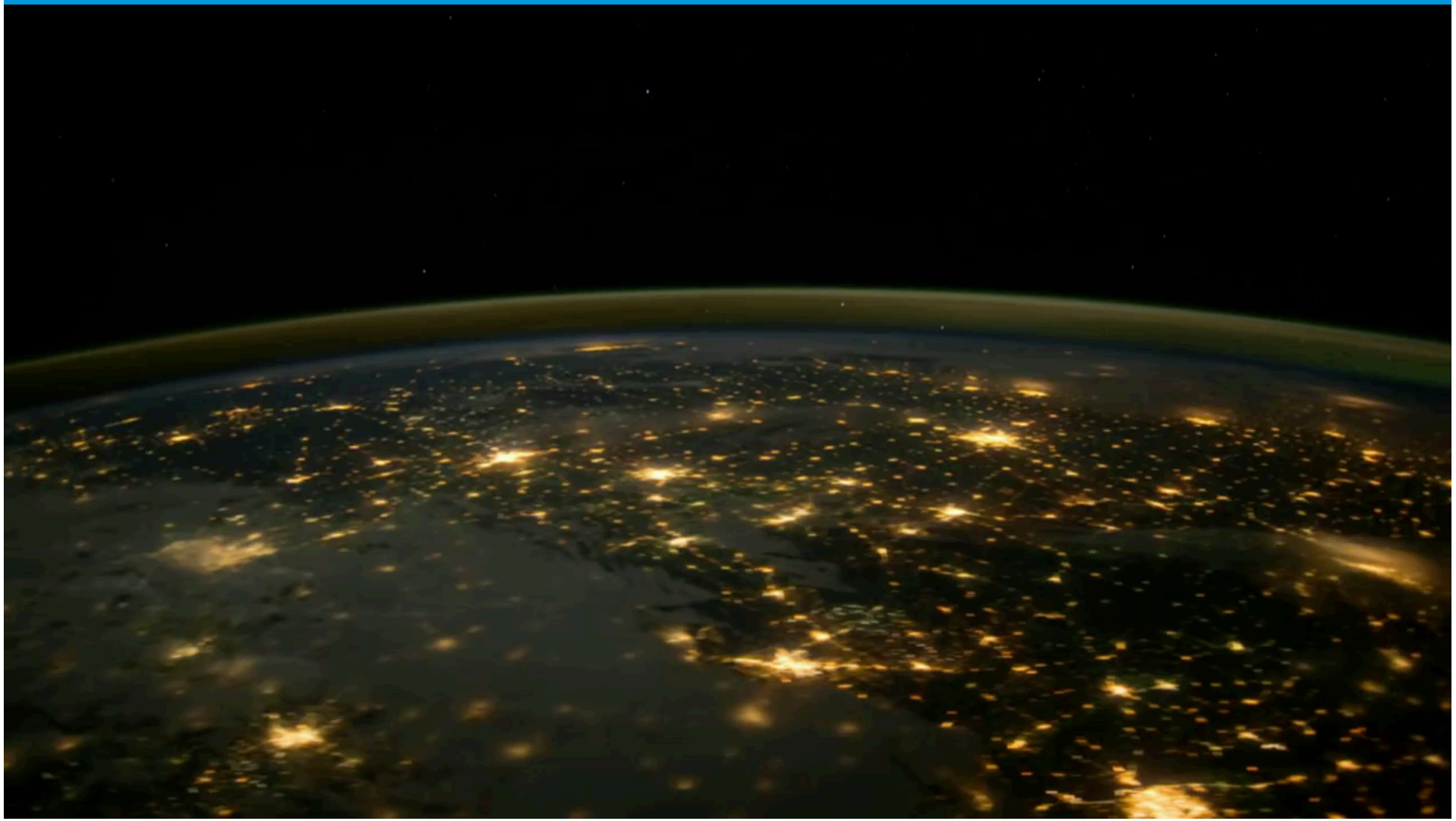
# Space 4:0
# Enabling a smarter world with Earth Observation from Space

Pierre.Philippe.Mathieu@esa.int
Directorate of Earth Observation Programmes
European Space Agency

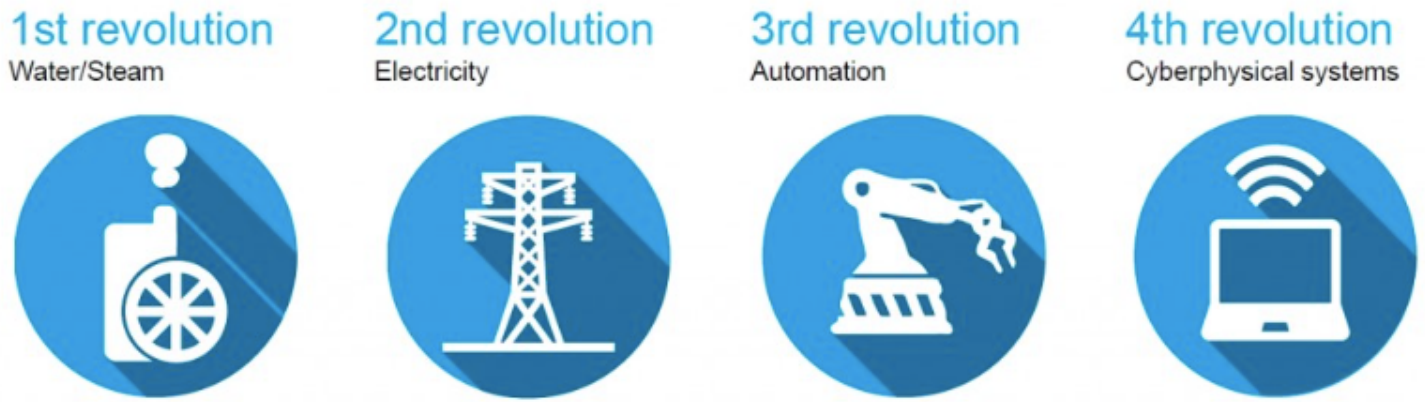
www.esa.int

# A global view from Space



# A new Era for Space

# Space 4.0 & Fourth Industrial Revolution




**space 1.0: astronomy (astrology)**
**space 2.0: space race (Apollo)**
**space 3.0: ISS**
**space 4:0: new playing field, new actors, new tech**
**space as enabler**

# Sentinels: guardian of our planet

# Earth Observation Data Revolution

esa

Copernicus Data

- Global
- High Res
- Operational
- Sustained
- Open & Free

CATIA e OLGA

# Seamless Nav Data

# Seamless Geospatial Data

# SnapPlanet & Copernicus Master

A Social Network

to create and share pictures from space

for everyone

from scientist to artist

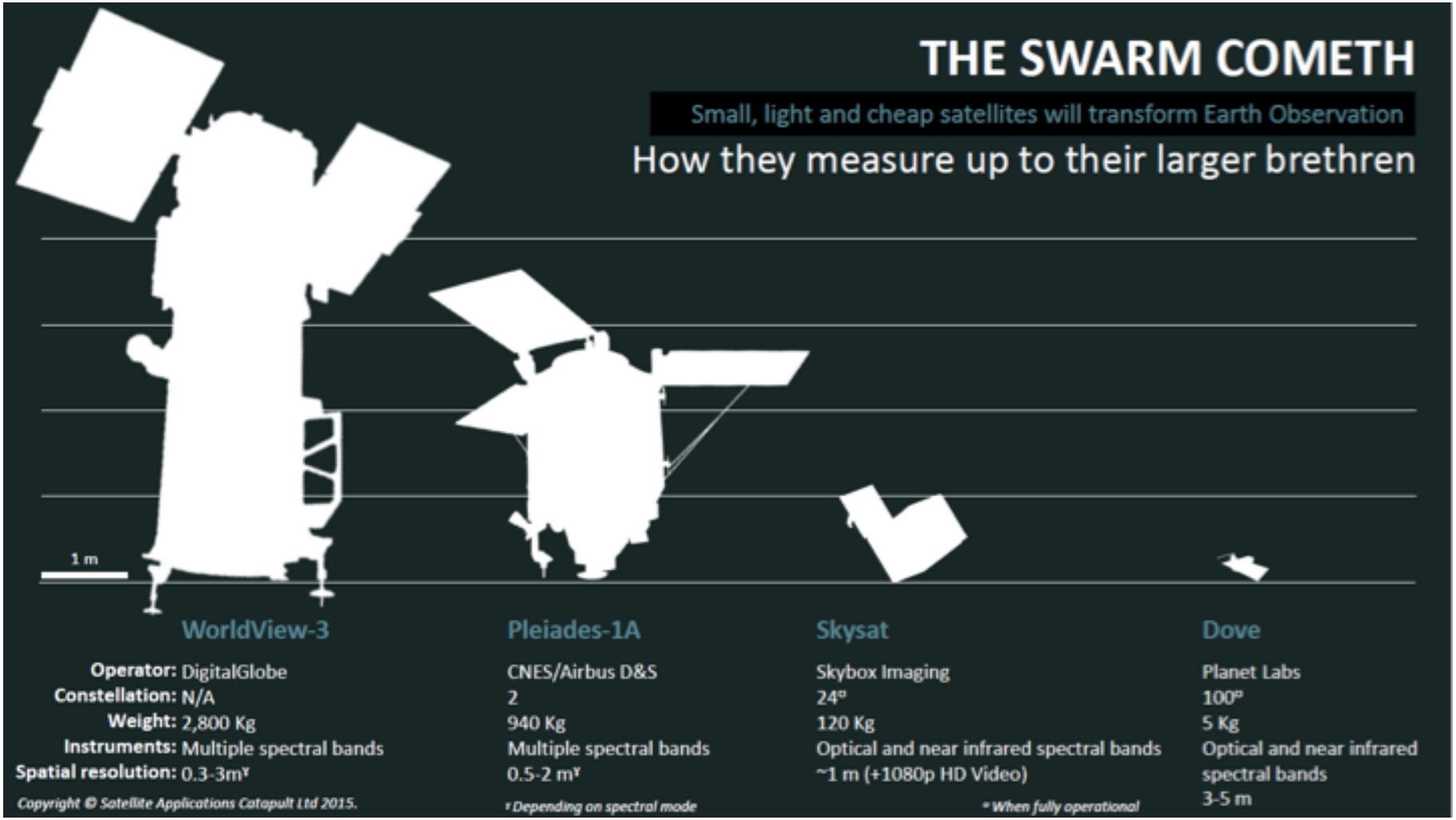
Courtesy Jerome Gasperi

# New Frontier for Private Sector

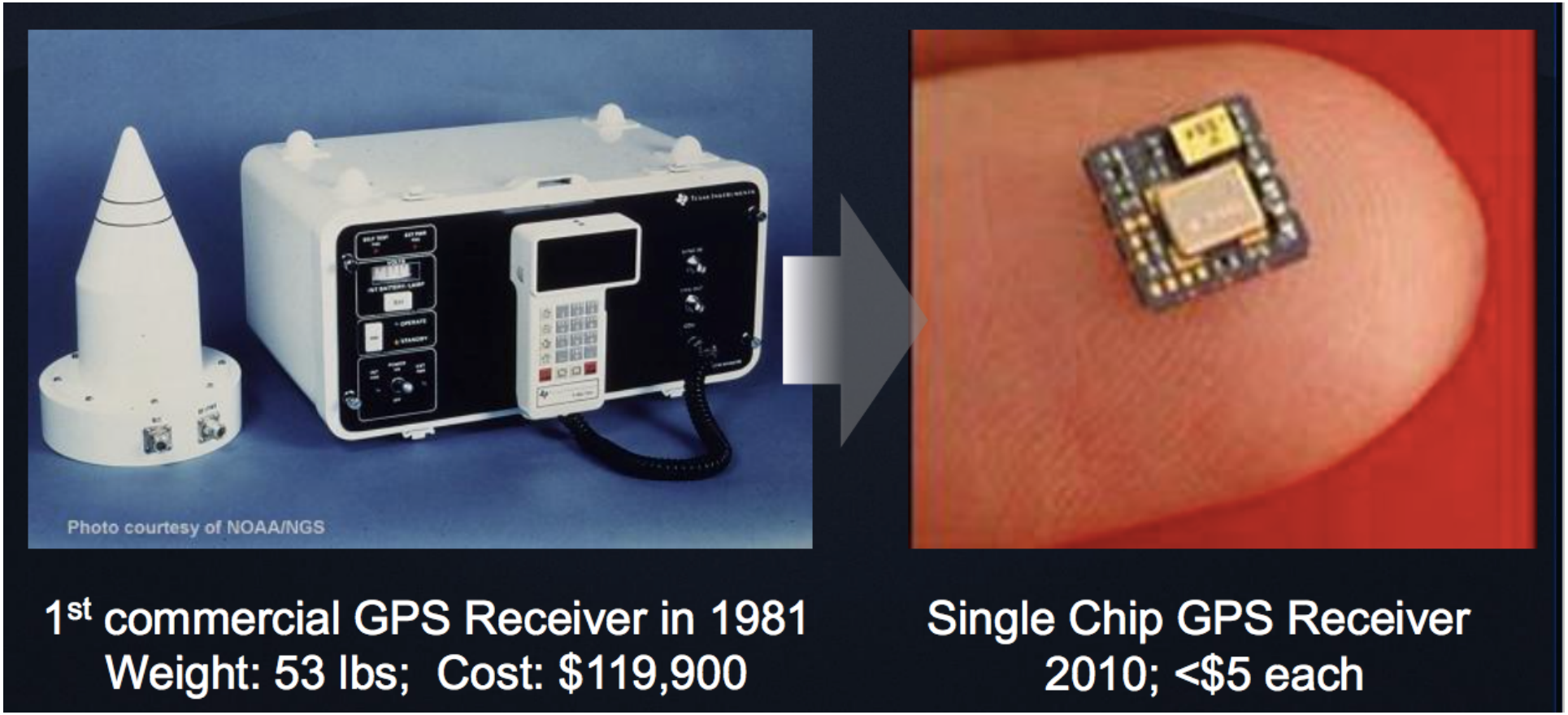
Mark Zuckerberg said that drones, satellites and laser are being used in Facebook's labs to beam the internet to underdeveloped countries

In April, Google also acquired Titan Aerospace, which is building solar-powered drones (pictured) to provide similar connectivity

# Small is the new Big



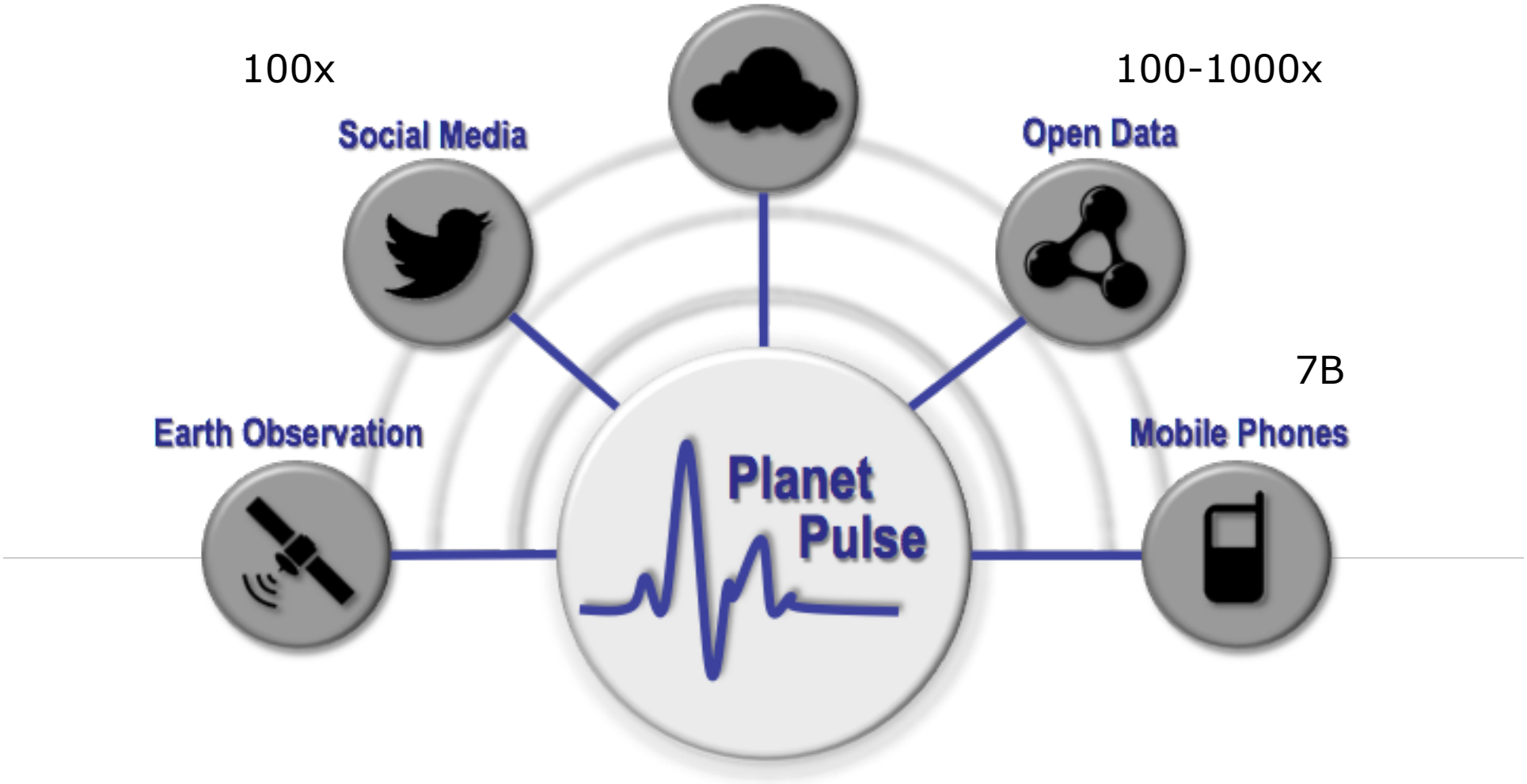
# IoT: Cheaper, Smaller, Faster, Connected



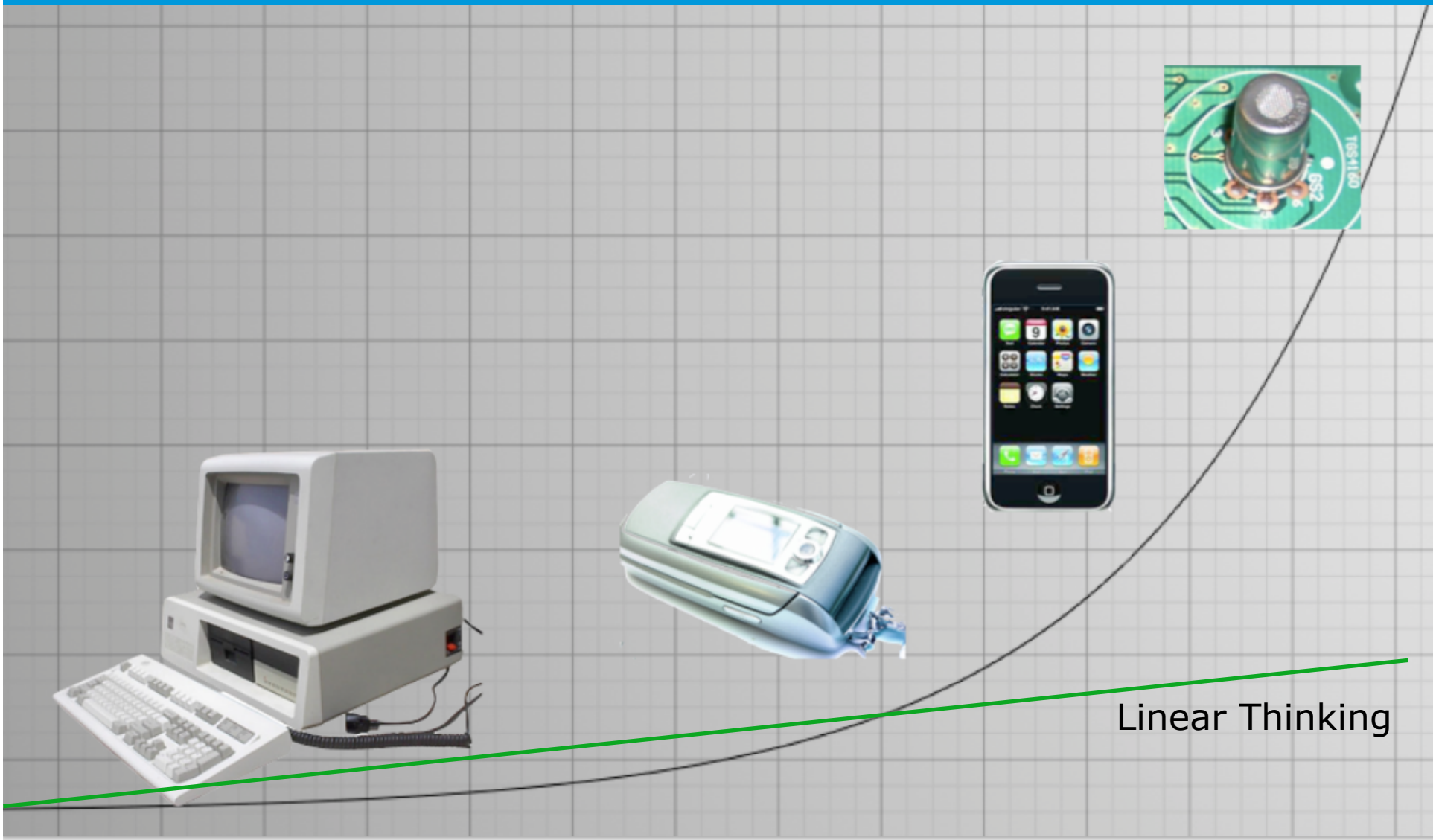



Courtesy SU

# EO key part in a wider Sensing Revolution



# Moore's law to Exponential Tech



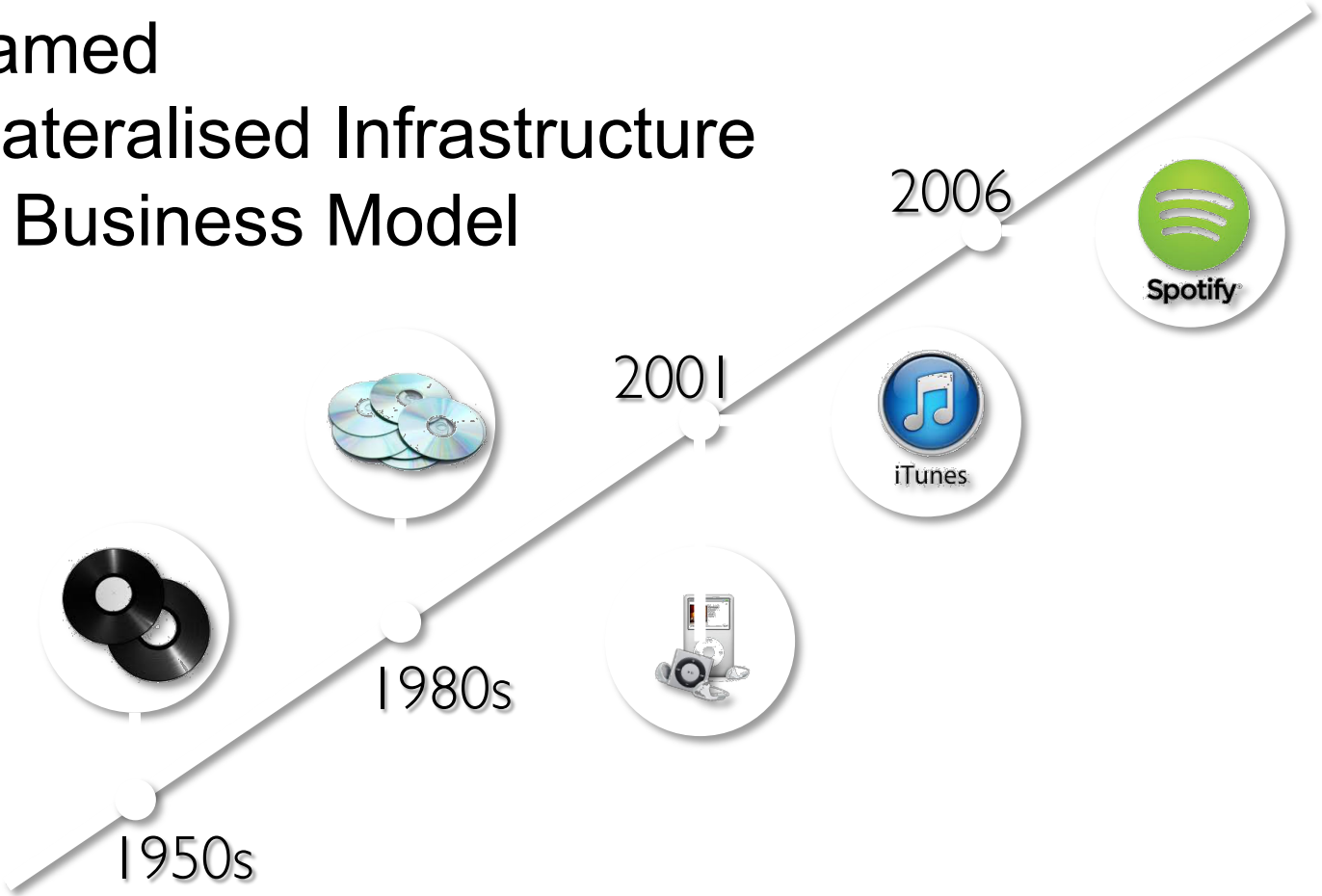

Courtesy David Orban

# New Kodak moment

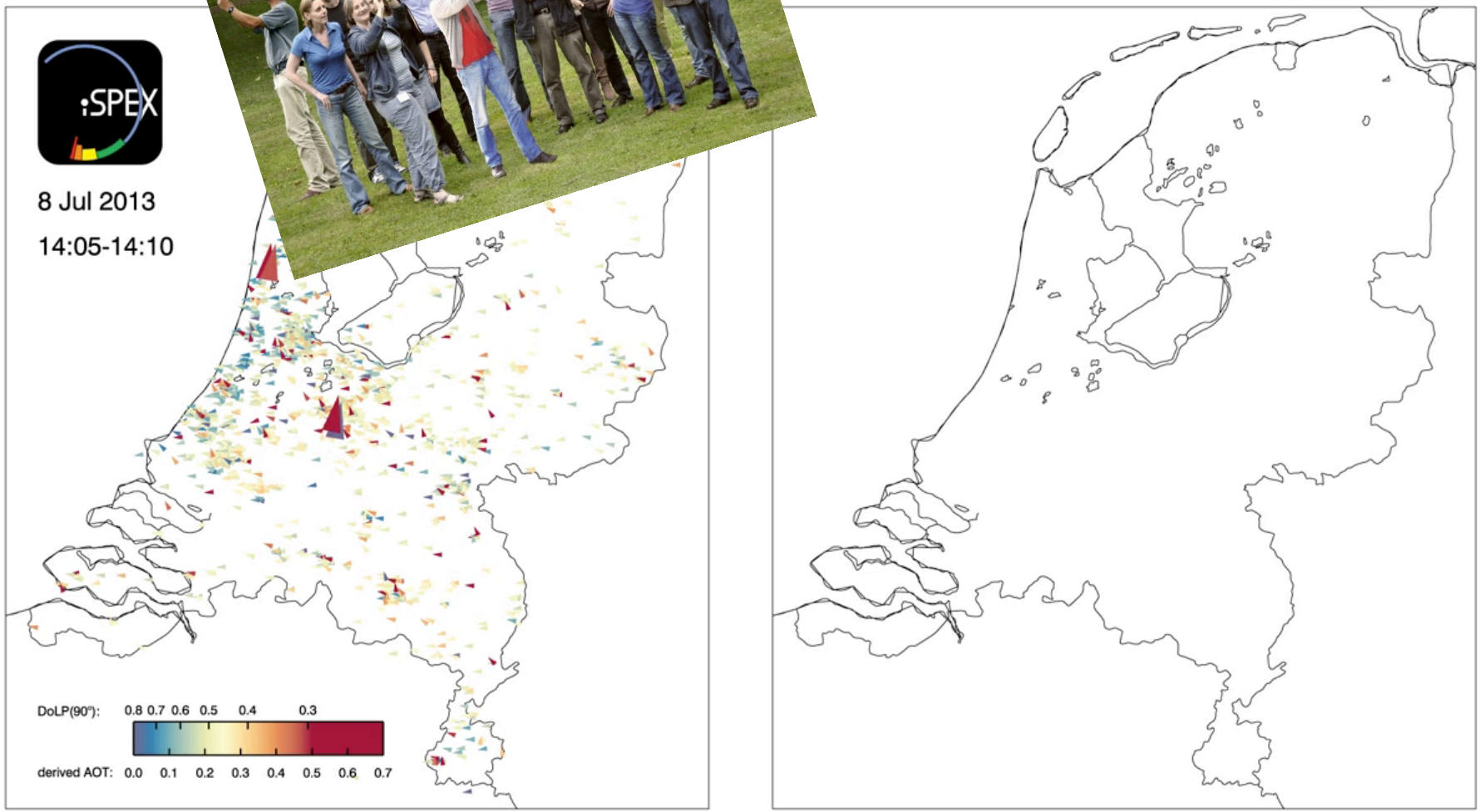
# Digital Transformation

Digital Data

- On-demand
- Streamed
- Dematerialised Infrastructure
- New Business Model

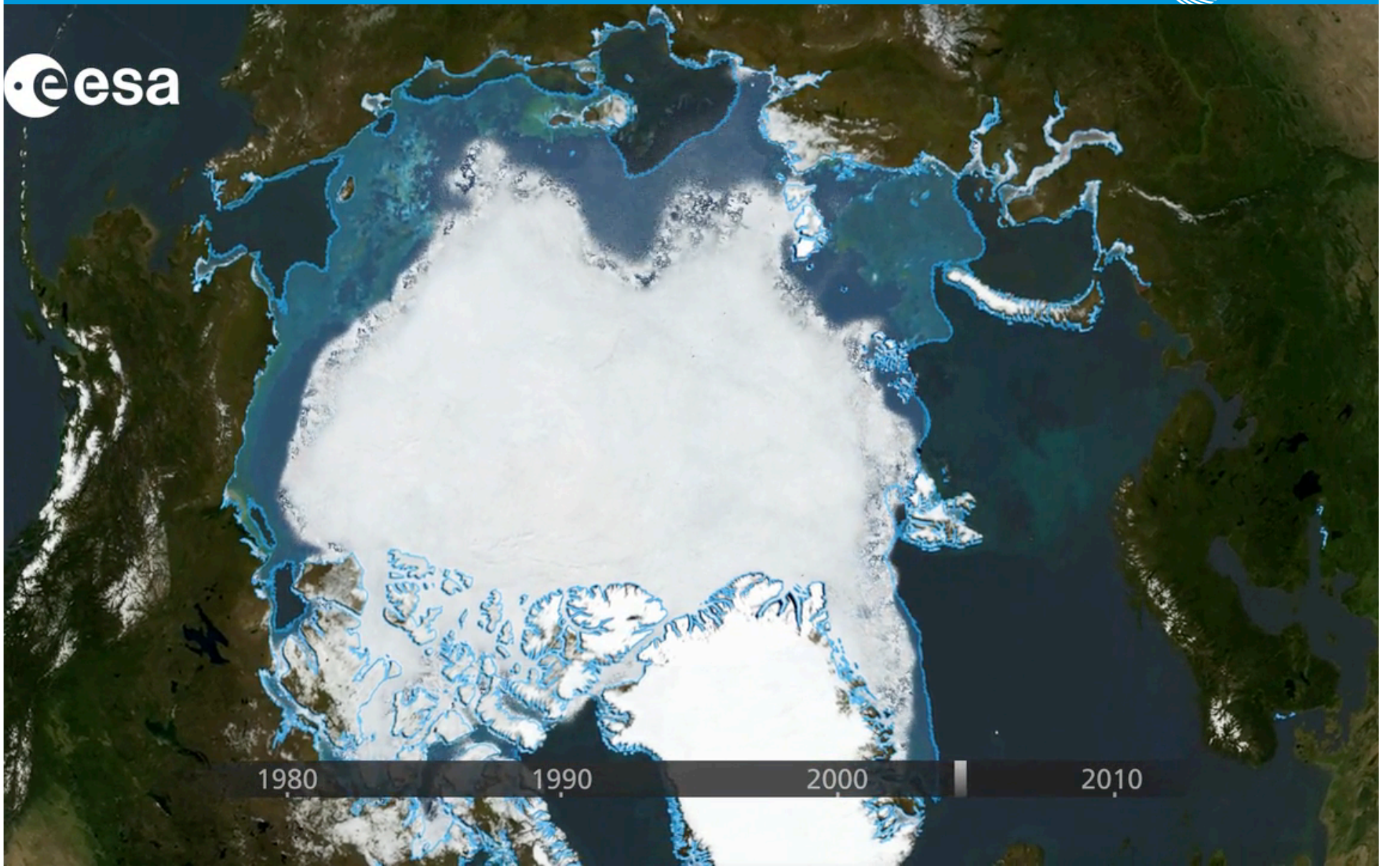


# Engaging with Citizen Scientists

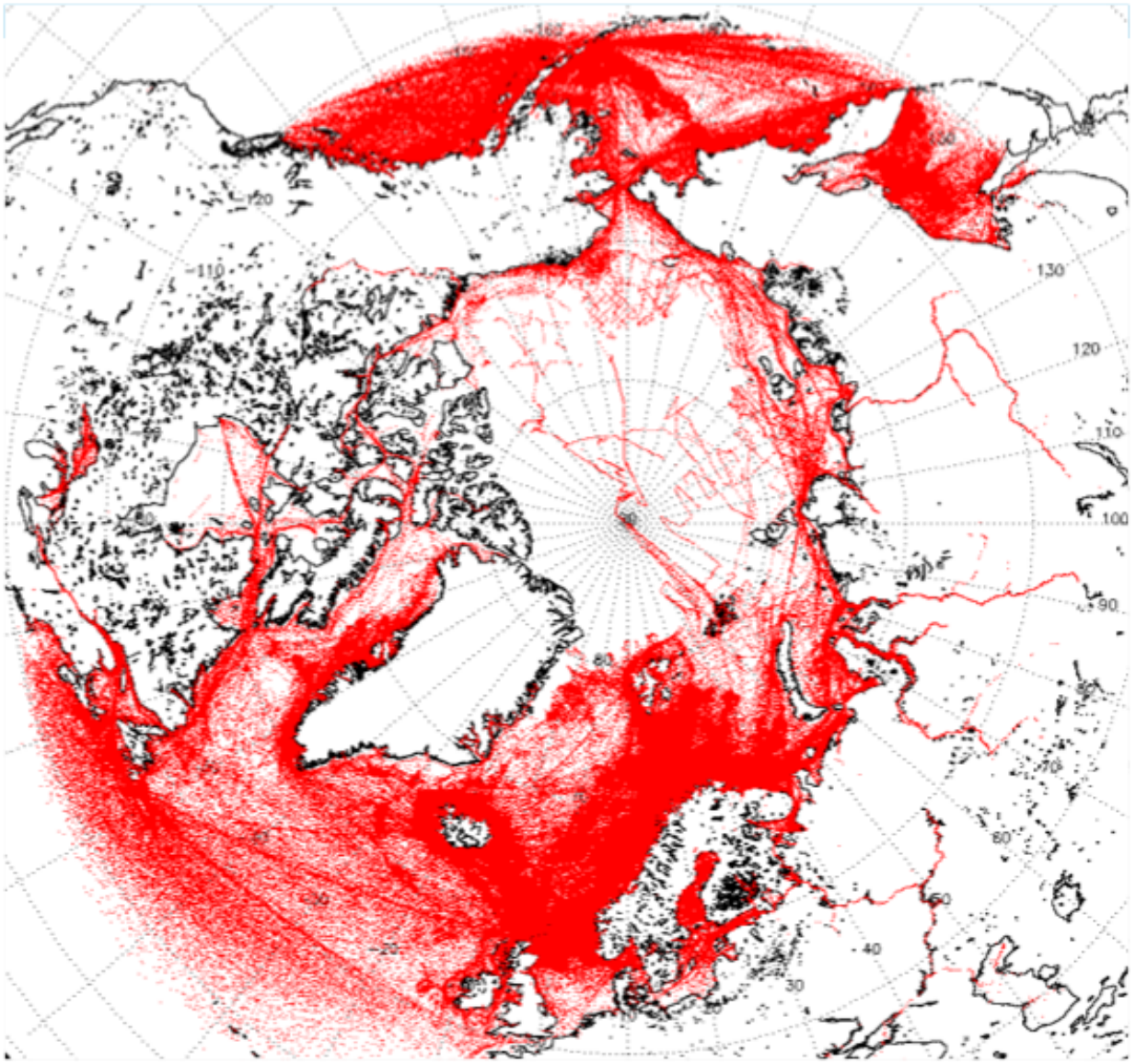


# Our Planet under Pressure

# Melting Ice



# The Arctic & Sustainable Development



# Rice Monitoring

## Sentinel-1 time series (Oct.2014-Jan.2015)

GEOGLAM Asia-RICE Site: An Giang (Mekong River Delta, Vietnam)

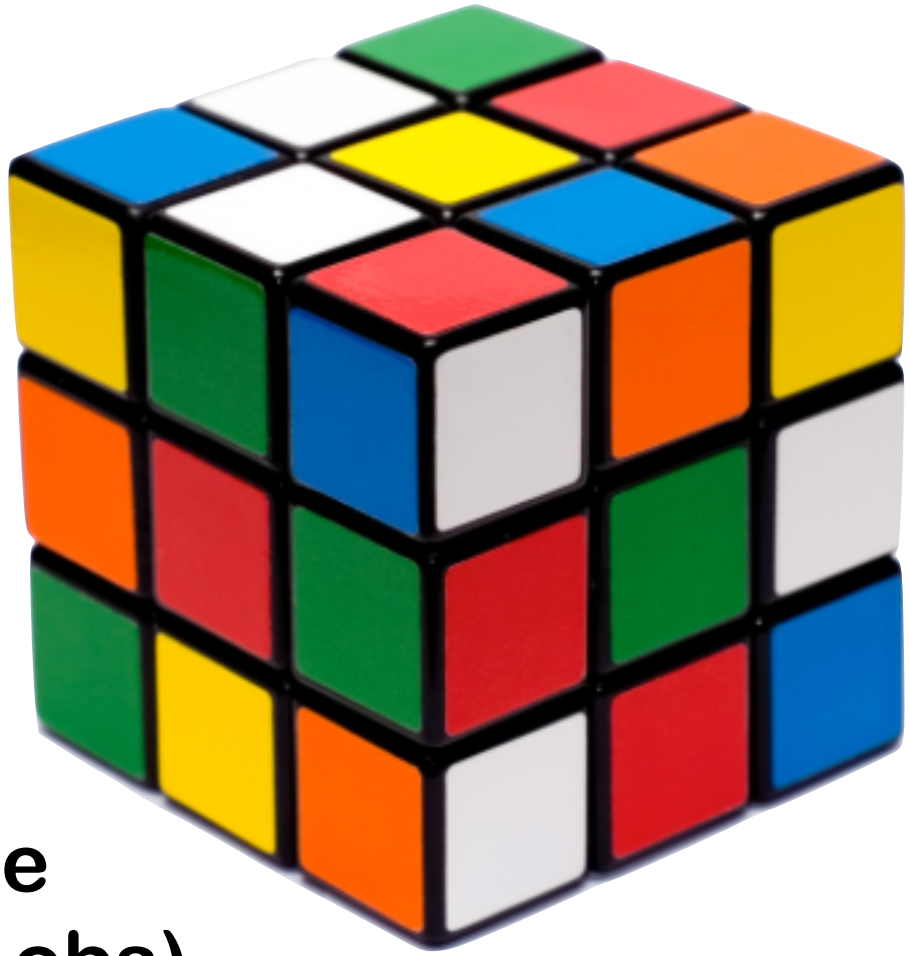
# A new framework to understand our changing planet

# A perfect storm of technologies

- Connectivity (e.g. sat, wifi, lan, ..)
- Cloud Computing
- Artificial Intelligence
- Earth System Modelling
- Human Computation
- Linked Data & API economy
- Robotics
- 3D Printing

# An integrated view

GIS as integrator

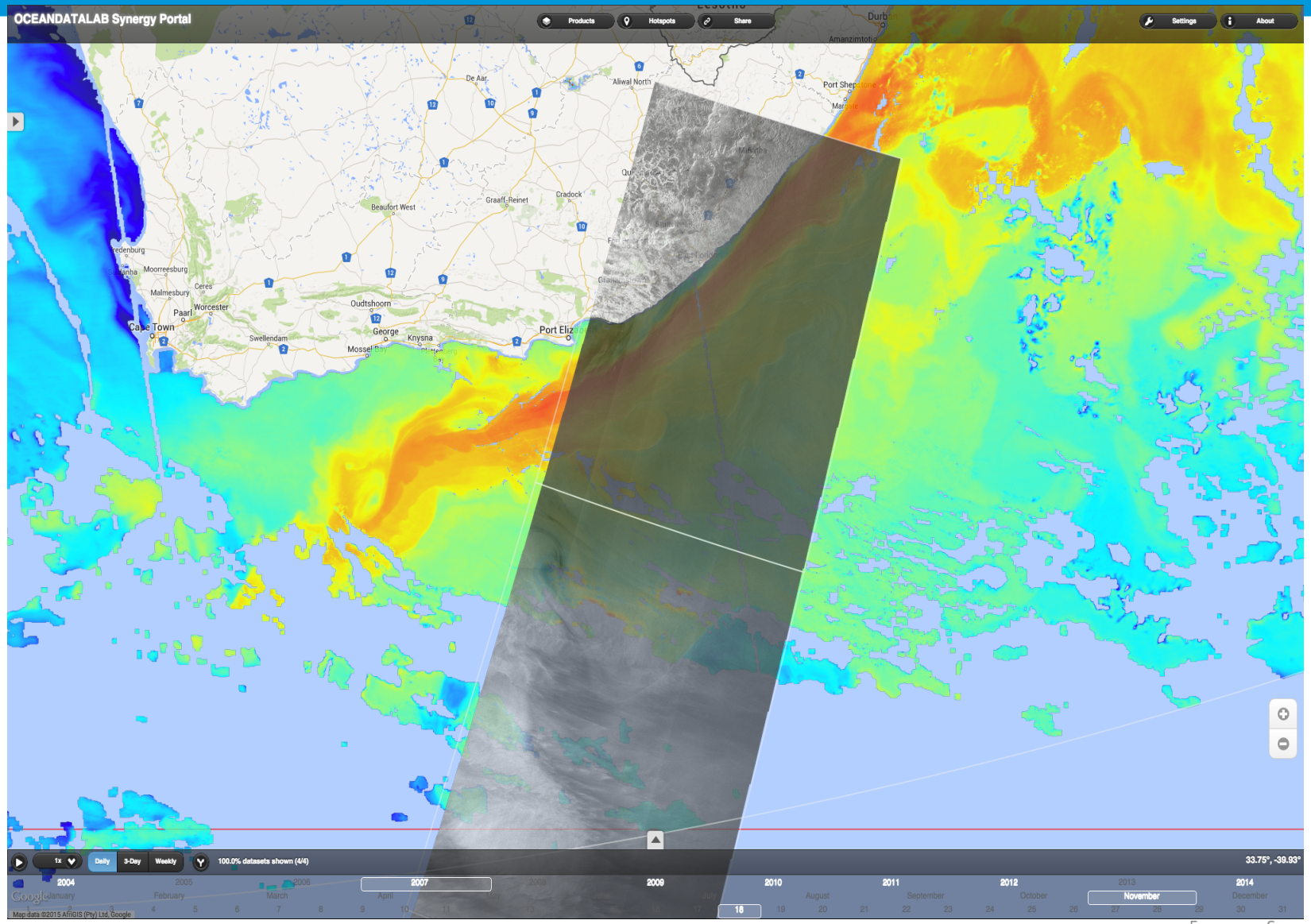


Policies (form/inform decisions, nexus view)

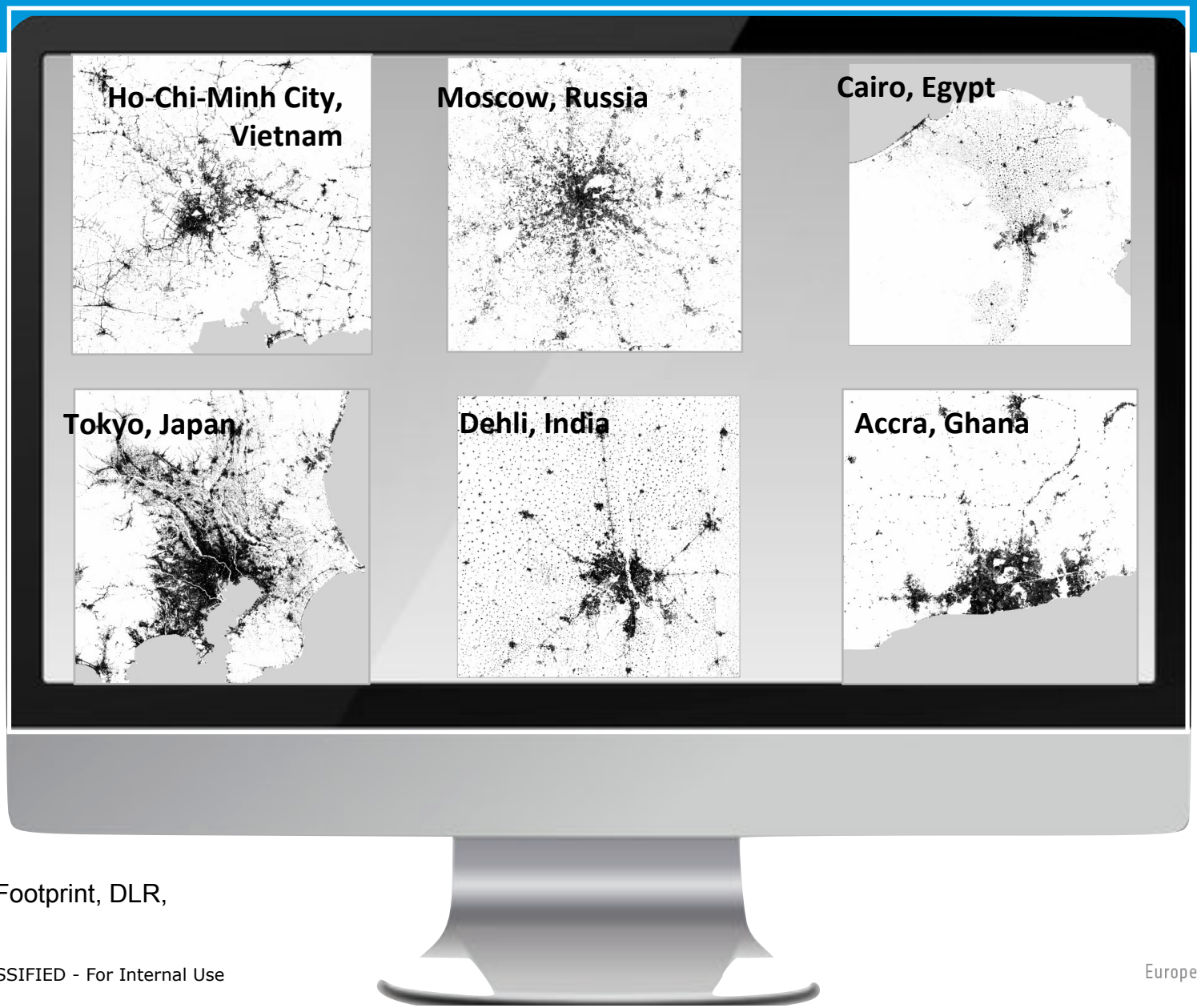
Science (model vs. obs)

Applications (business)

# Earth at our fingertip



# ` Global Urban Footprint

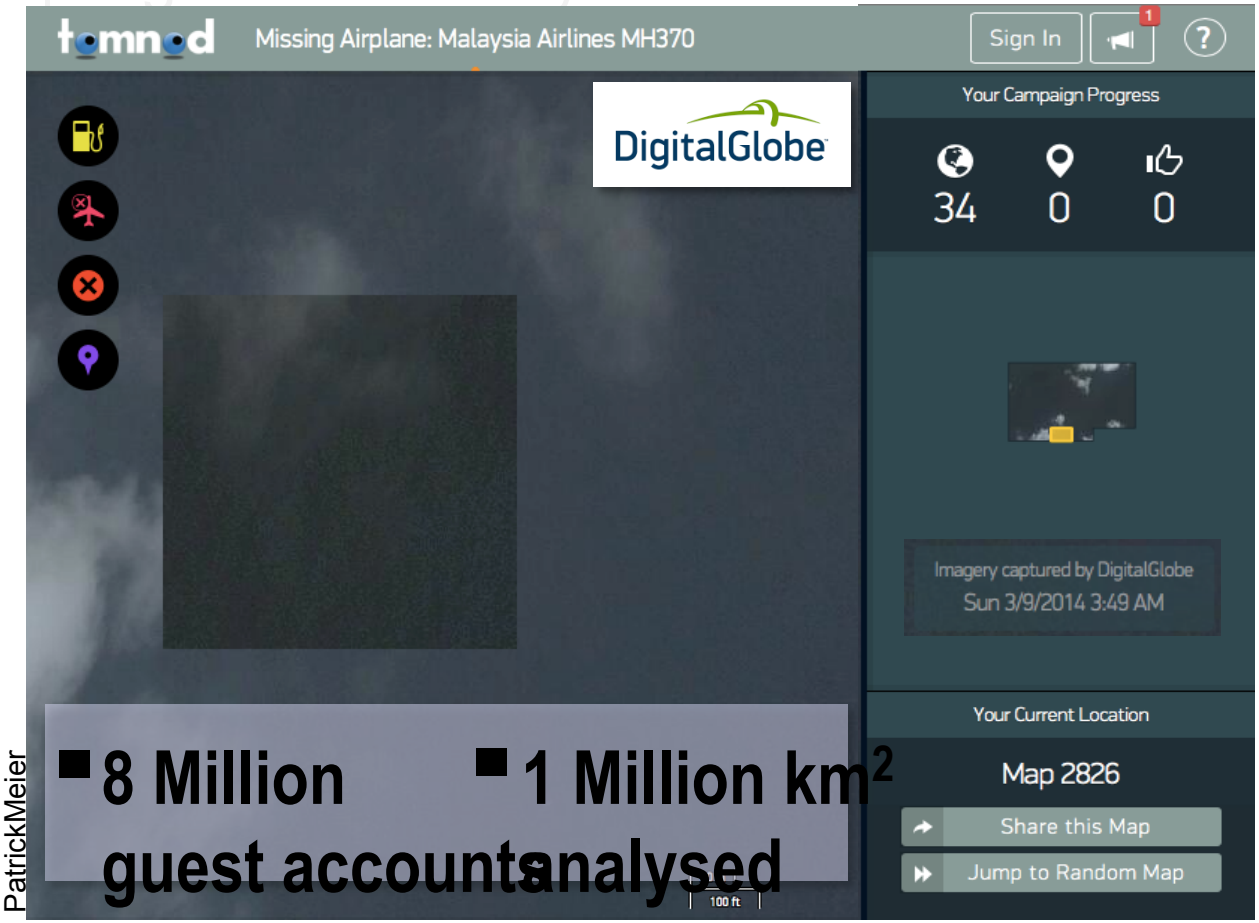



Global Urban Footprint, DLR, Terra-SARx

# Big Data and AI

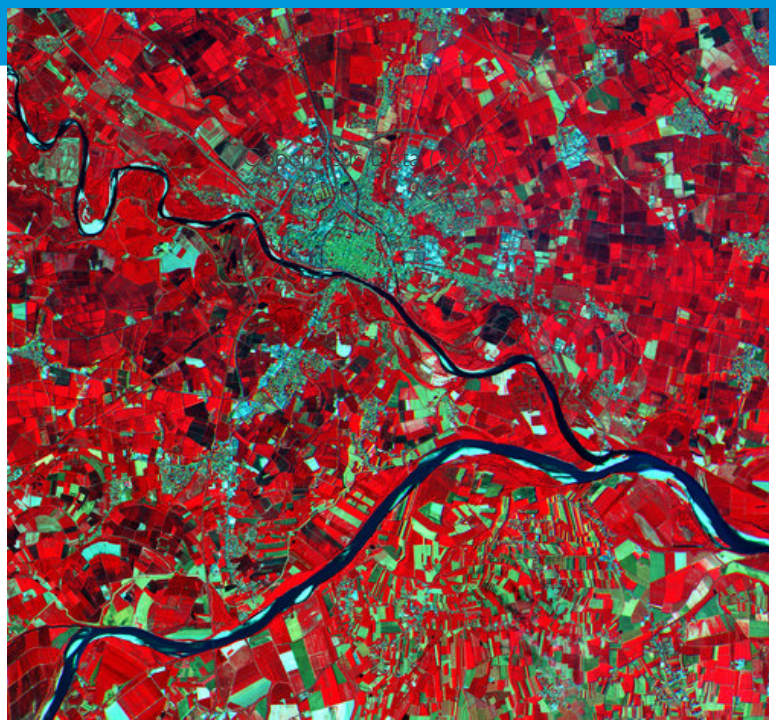
# Human Computation

| Flight 370 - Malaysia




Credit: PatrickMeier

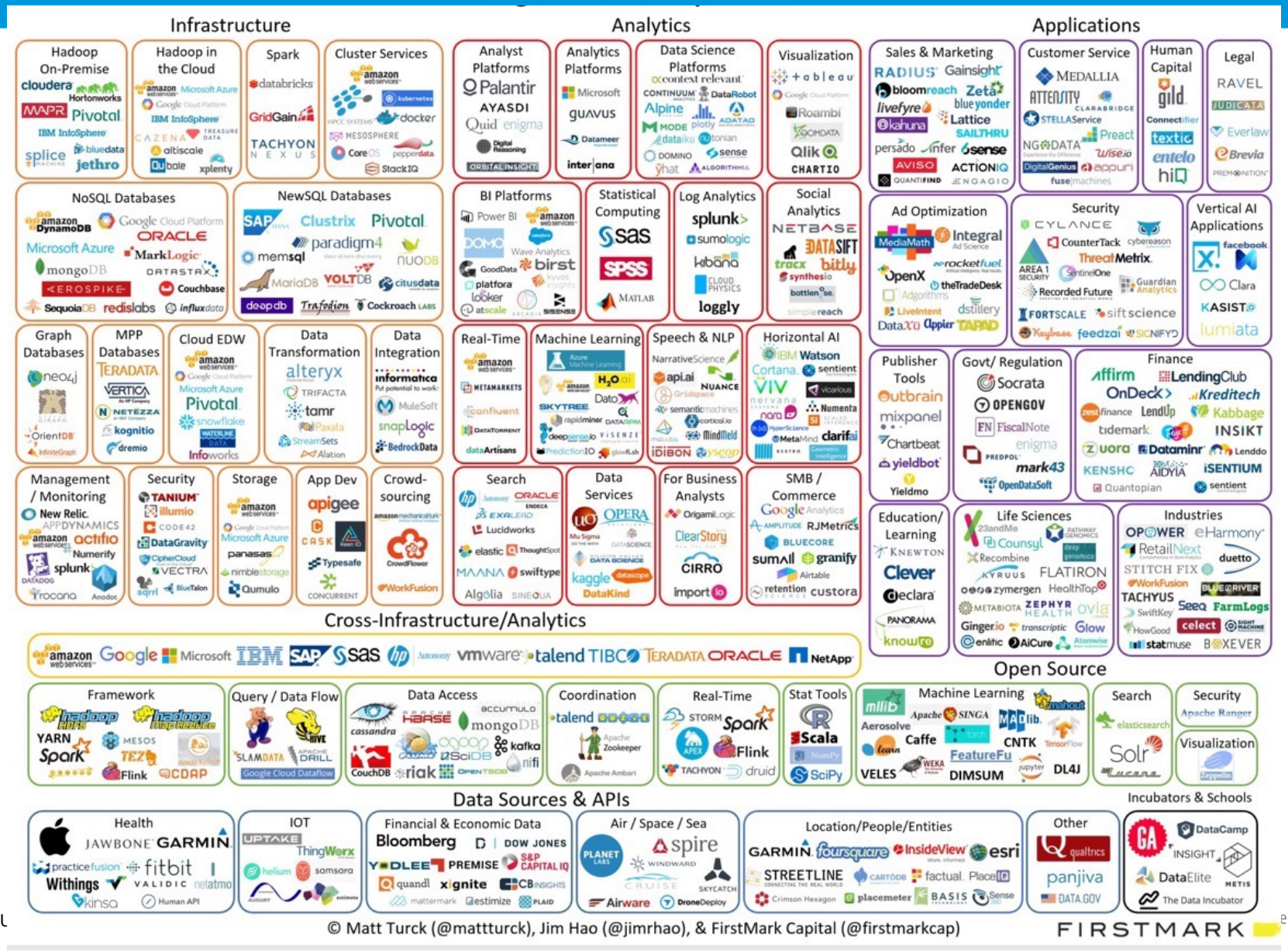
# Human Validation



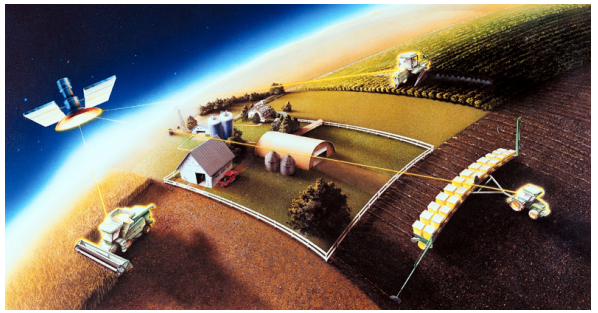
# Partnership

# Platform for Innovation

# Complex Landscape of Big Data



# Every company is a data company



SAP **Human Face of Big Data**

## Award-Winning Documentary – Official Film Trailer

**Produced by a critically acclaimed Hollywood director and an internationally renowned photo-journalist (read their bios next). Watch more film clips below.**

discover.sap.com/human-face-big-data

"Data is the world's great new natural resource. What steam power was to the 18th century, electromagnetism to the 19th and fossil fuels to the 20th... data will be to the 21st."
Ginni Rometty, President and Chief Executive Officer of IBM

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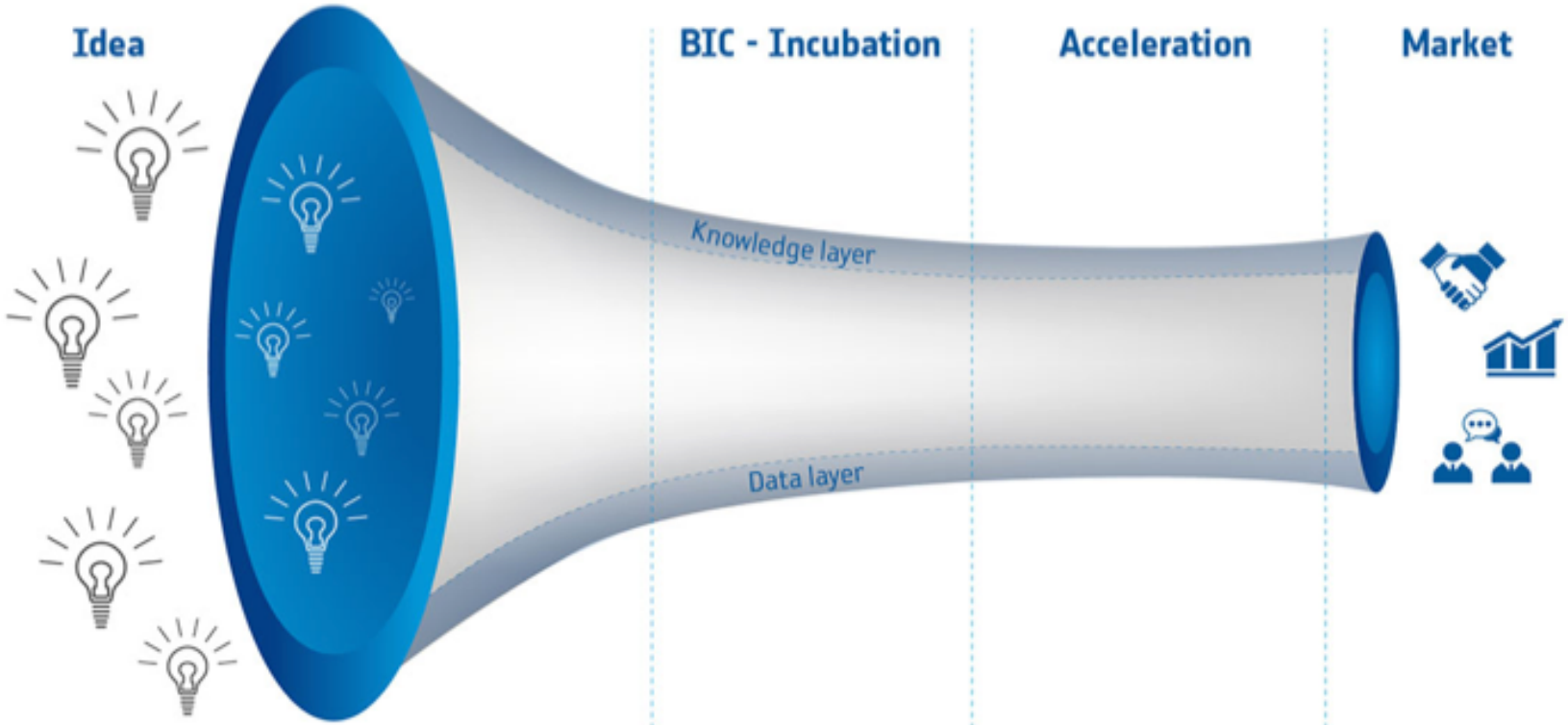
# Corporate Accelerator

Wayra, Telefonica

**Disruptive Innovation =**
**Ideas + Talent + Density + Culture + Capital + Regulations**

# Seamless Pipeline of Innovation

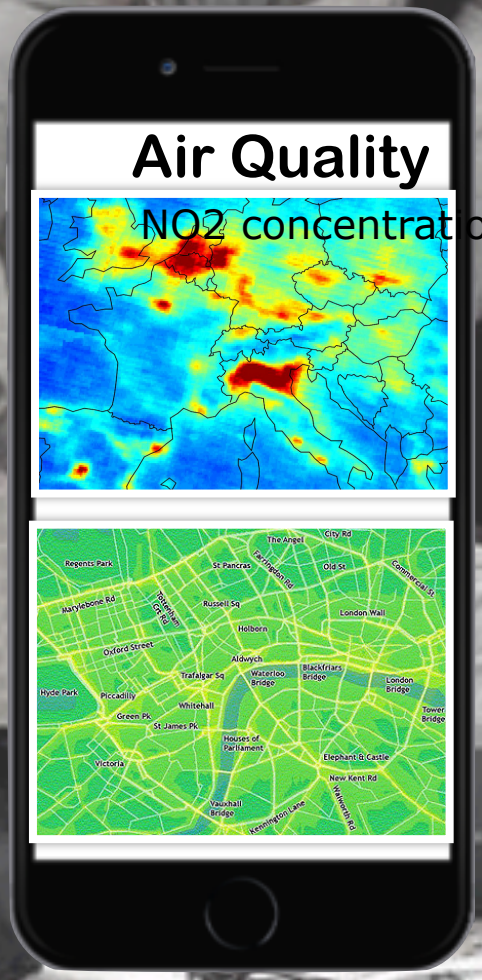


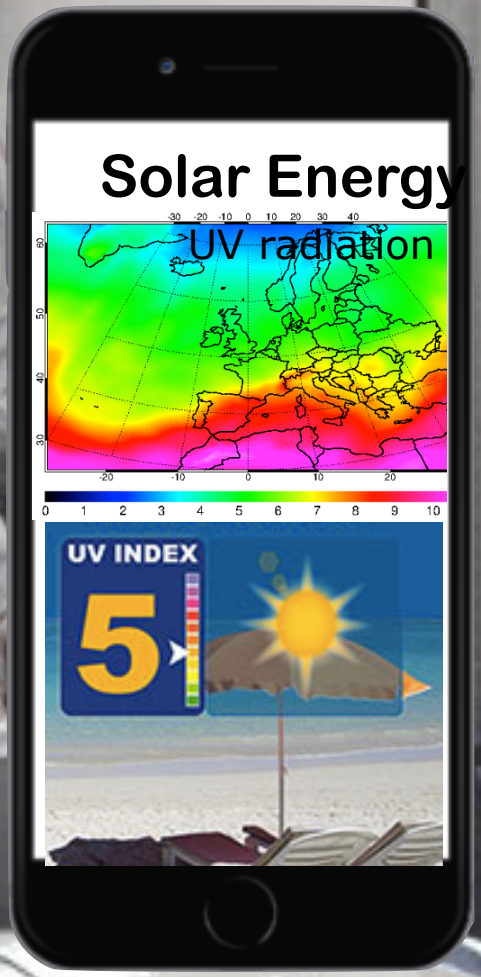

earth observation entrepreneurship initiative

Blue Marble, Apollo 17, 1972, Image courtesy NASA Johnson Space Center

# The next big Thing?

# Innovative Apps



Credit: ESA SAP App Camp, Barcellona, 2016.

Adapting to Change

“All around us, technology is democratizing the power to change the world.”
Peter Diamandis
XPRIZE, Singularity University,
Planetary Resources

# Where do we go?

# Thank you

*The Future is here, it is just not evenly distributed.*
William Gibson