SCANWORLD

Switch 2 Space 2

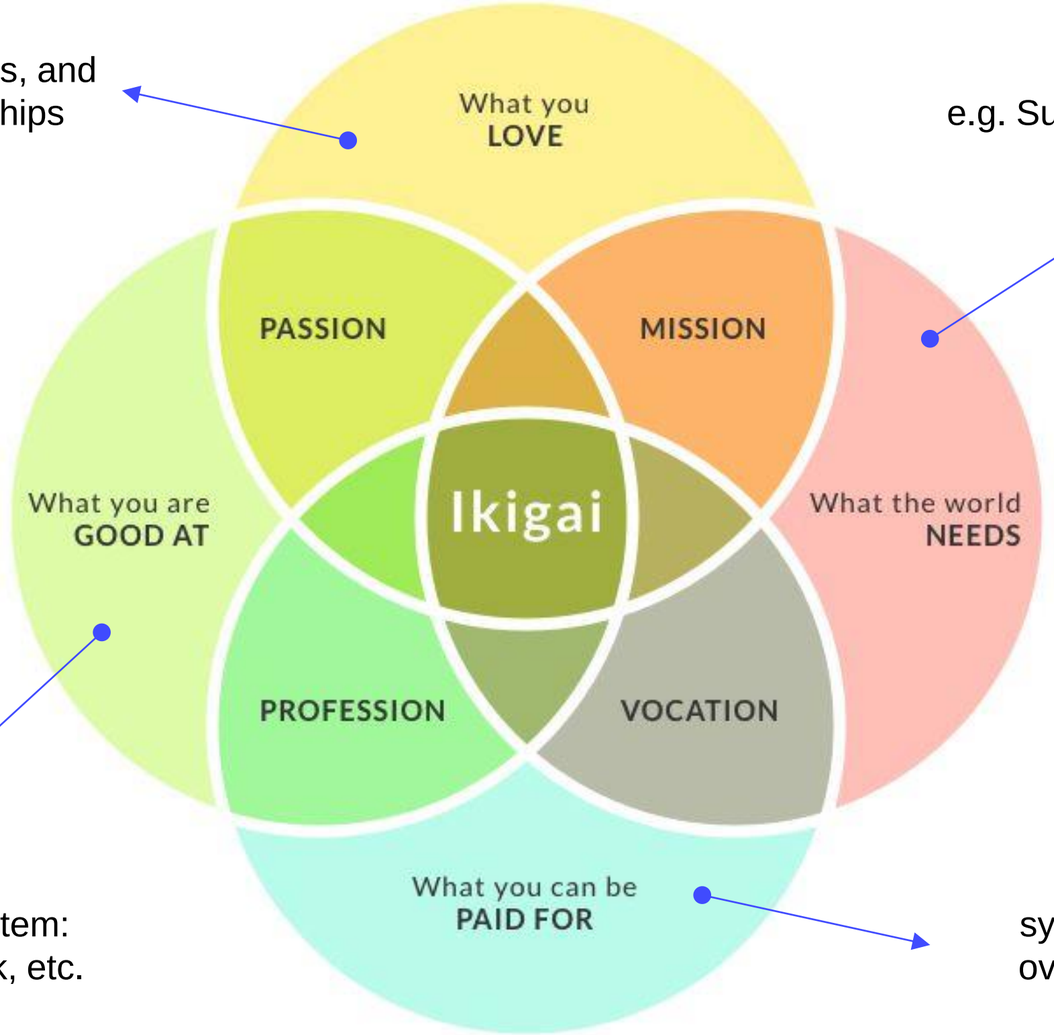
13th of October 2020

3-steps guide
to create your own
space (data) business

Step 1: find a problem to solve

building rockets, going to Mars, and flying interplanetary spaceships

sadly, plenty of choice, e.g. Sustainable Development Goals



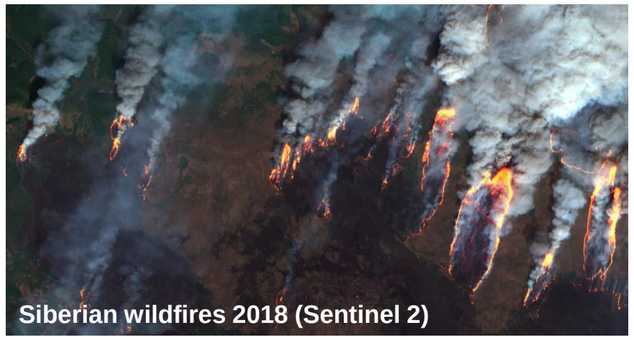
you & your personal ecosystem: industrial landscape, network, etc.

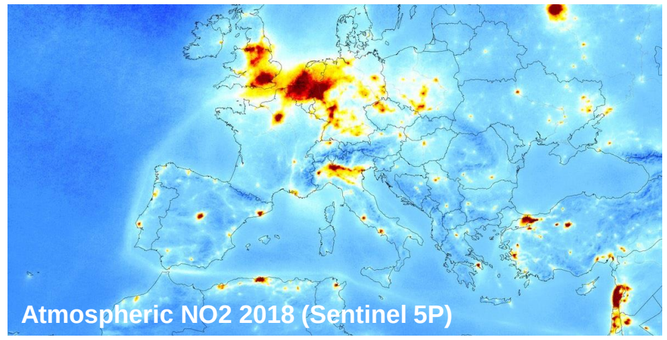
systematically neglected by over-enthusiastic engineers

Step 2: find the right dataset to solve it

Copernicus provides access to
tens of terabytes of free data every day !


Radar image of Brussels 2014 (Sentinel 1)


Siberian wildfires 2018 (Sentinel 2)


Atmospheric NO2 2018 (Sentinel 5P)

Commercial imaging companies are collecting
over hundred terabytes every day !


Radar image of Singapore 2019 (ICEYE)

BLM mural in Washington 2020 (MAXAR)


Kharg Island refinery 2020 (Planet)

Step 2bis: if needed, make your own data

1
Buy yourself a satellite

30+ suppliers in Europe only, coming in all sizes and all shapes

2
Book a launch

Only 5k$/kg with SpaceX, (almost) as straightforward as booking a flight

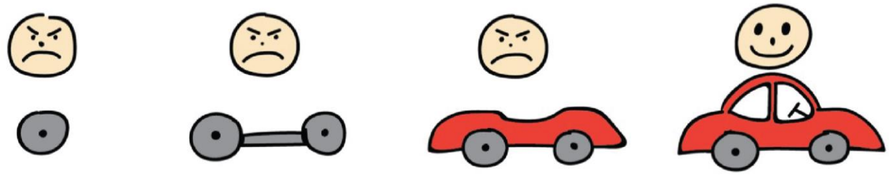
3
Pick a Ground Station Service provider

Don’t worry about anything, they handle it all

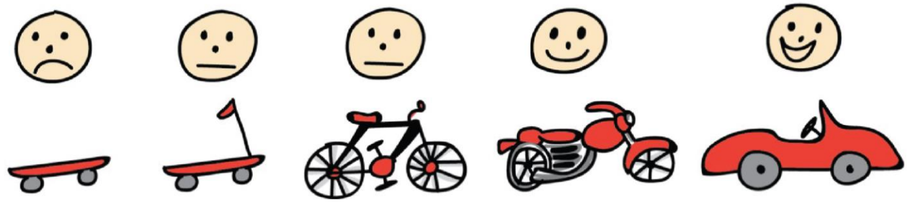
4
Enjoy

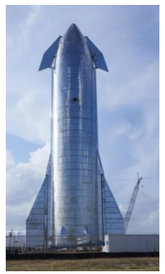
Step 3: build, confront, iterate… forever

the way we (used to) do things on the Old Continent



the way they do things in the Silicon Valley





case study
-
ScanWorld

Step 1: find a problem to solve

The complicated relationship of agriculture with climate change…

Cause

Close to **30% of GHG emissions** are linked to food systems

Victim

By 2050, climate change will cause an average **yield decrease of over 10%**

Solution

1 trillion tons of CO_2 could be remove from the atmosphere to enrich soils

And in the meanwhile…

Population growth

60% more food will be needed by 2050 to feed the globe

Deforestation

75% of global deforestation is due to agriculture

Food security

12% of the world population is undernourished

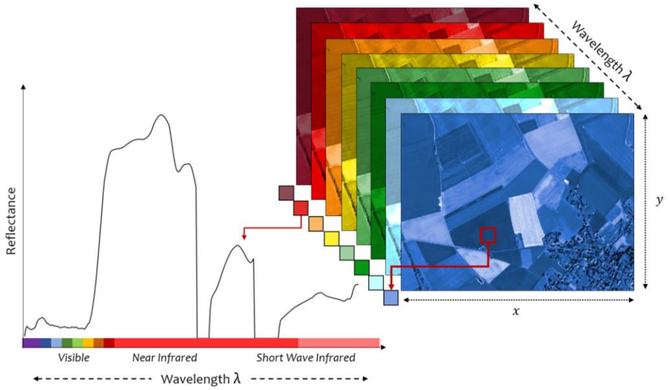
… a sizeable problem, indeed.

Step 2: find the right dataset to solve it

Hyperspectral datacube

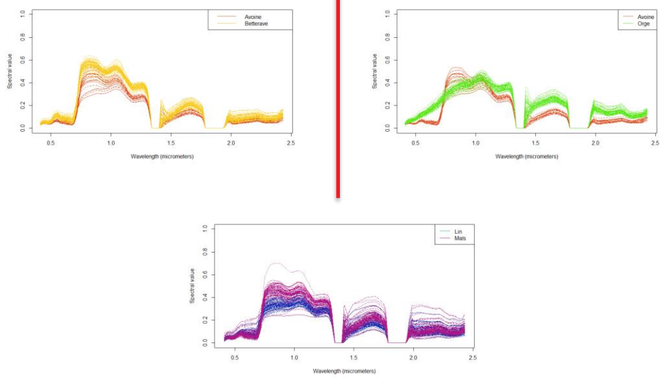
Full spectral signature for each pixel,
giving access to the chemical nature of objects

Processed image of Gembloux, Belgium, based on the APEX aerial campaign



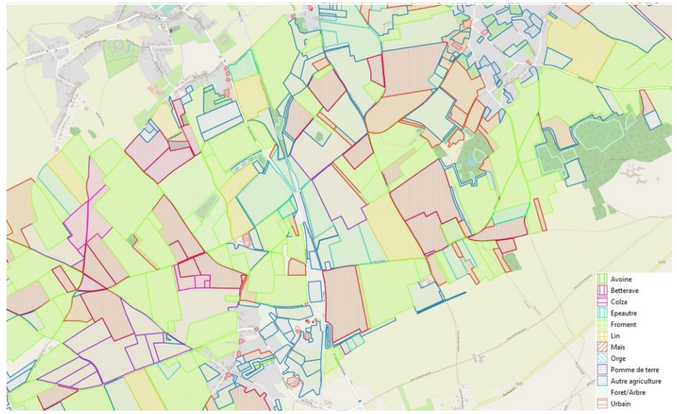
Information extraction

Matching with known spectral profiles,
allowing to identify what each pixel contains



Actionable insight

Value-added information for the end-user,
from minerals mapping to drought alerts



Step 2: find the right dataset to solve it (cont'd)

Fertilizers

Accurate assessment of pasture Crude Protein and Metabolizable Energy content

Pullanagari et al., "Integrateing Airbone Hyperspectral, Topographic, and Soil Data for Estimating Pasture Quality", Remote Sens., 2018, 10

Water

Generic methodologies to calculate Water Content over a great variety of crops

Pasqualotto et al., "Retrieval of Canopy Water Content of Different Crop Types", Int J Appl Earth Obs Geoinformation, 2018, 67:69-78

Carbon sequestration

Accurate assessment of Soil Organic Content

Guo et al., "Exploring the Influence of Spatial Resolution on the Digital Mapping of SOC by Airborne Hyperspectral", Remote Sens., 2019, 11

Yield quantity & quality

Good prediction of wheat Grain Yield and Grain Protein Content of over 75% of a given area

Rodrigues et al., "Multi-Temporal and Spectral Analysis of High-Resolution Airborne Imagery for Precision", Remote Sens., 2018, 10

Disease

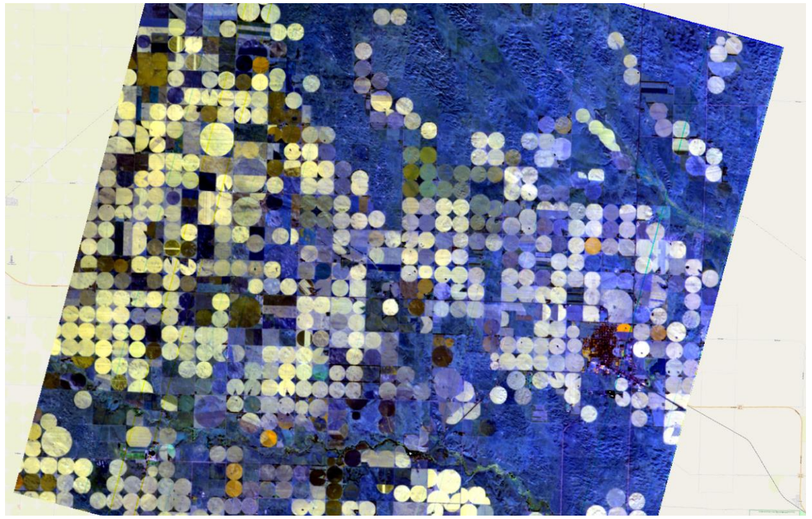
Yellow rust detection at least three days before the appearance of visible symptoms

Bohnenkamp et al., "In-Field Detection of Yellow Rust in Wheat on the Ground Canopy and UAV Scale", Remote Sens., 2019, 11

Contaminations

Detection and mapping of heavy metals, including Cr, Pb and Cu

Tan et al., "Estimation of the Spatial Distribution of Heavy Metal in Agricultural Soils", Journal of Hazardous Materials, 2020, 382



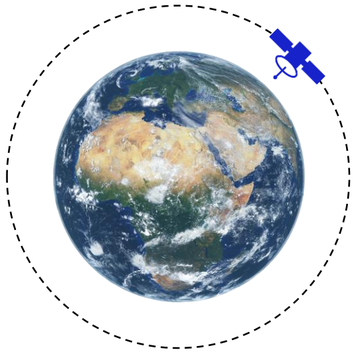
Processed images of Denver, USA, based on PRISMA satellite imagery

Step 2bis: if needed, make your own data

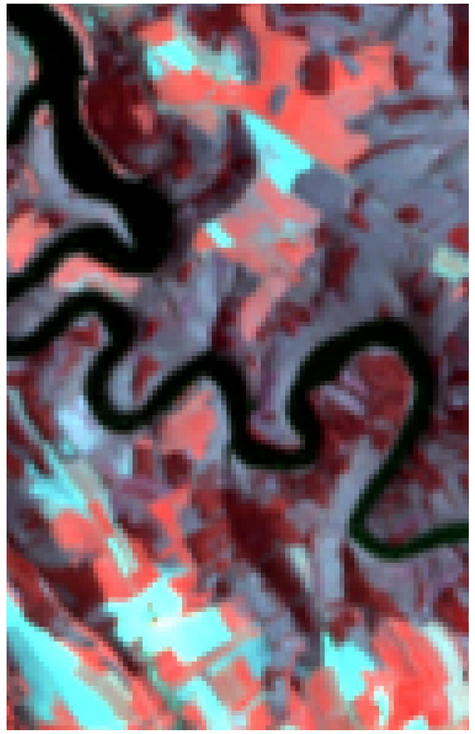
Level 0 → referencing, rectification, calibration, processing → **Level 2** → deep learning & Sentinel 2 data fusion → **Level 2+** → cloud-based access or API integration → **End-user**

Hyperspectral imagery

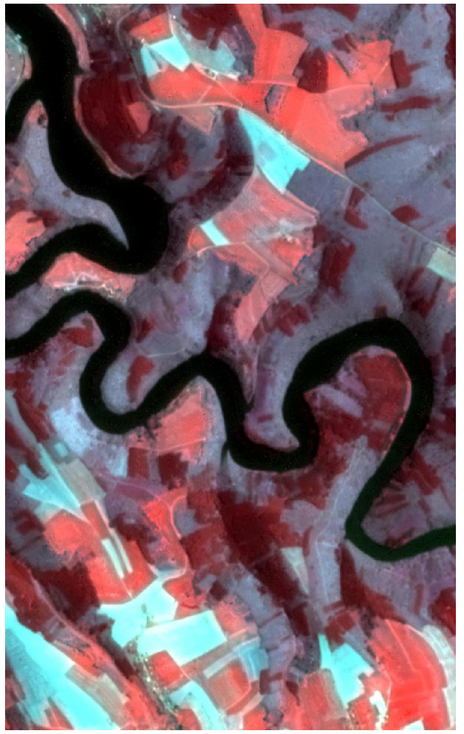
Covering the VNIR and SWIR,
from 500 nm to 2,500 nm
with a spectral resolution of 10 nm



9 small satellites on orbit
at an altitude of 550 km
Imaging at 11:00 AM solar time



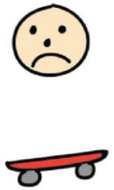
Processed image on Luxembourg, based on PRISMA satellite imagery – 30 meters resolution



Processed image on Luxembourg after PAN sharpening, based on PRISMA satellite imagery – 5 meters resolution

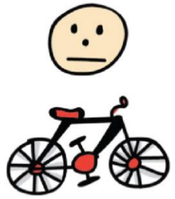
Step 3: build, confront, iterate… forever

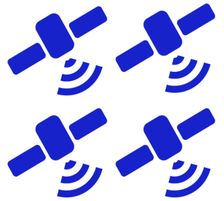
Today
Representative data sets
from third-party imagery



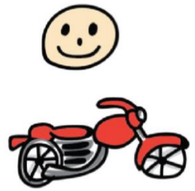
2021
On-demand dedicated
aerial campaign

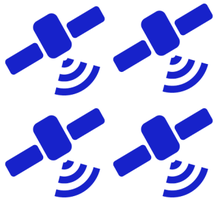
2023
Proof of concept in orbit
Bi-monthly revisit rate





2025
First batch of 4 satellites
Weekly revisit rate





2026
Second batch of 4 satellites
Bi-weekly revisit rate

SCANWORLD

Contact Us

Agriculture is both one of the major contributor to climate change, and one of its first victims. Coincidentally, agriculture is also a key lever to enable a smooth transition to a more sustainable world - but that will require data-driven decisions.

ScanWorld delivers Level 2 hyperspectral imagery, twice a week, for any point of the globe. This enables a wide range of applications such as disease alerts, water and fertilisers management, yield quantity and quality assessment, etc.

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