
SWIFTT
Satellites for Wilderness Inspection
and Forest Threat Tracking
Funded by the European Union
under Grant Agreement 101082732
Funded by
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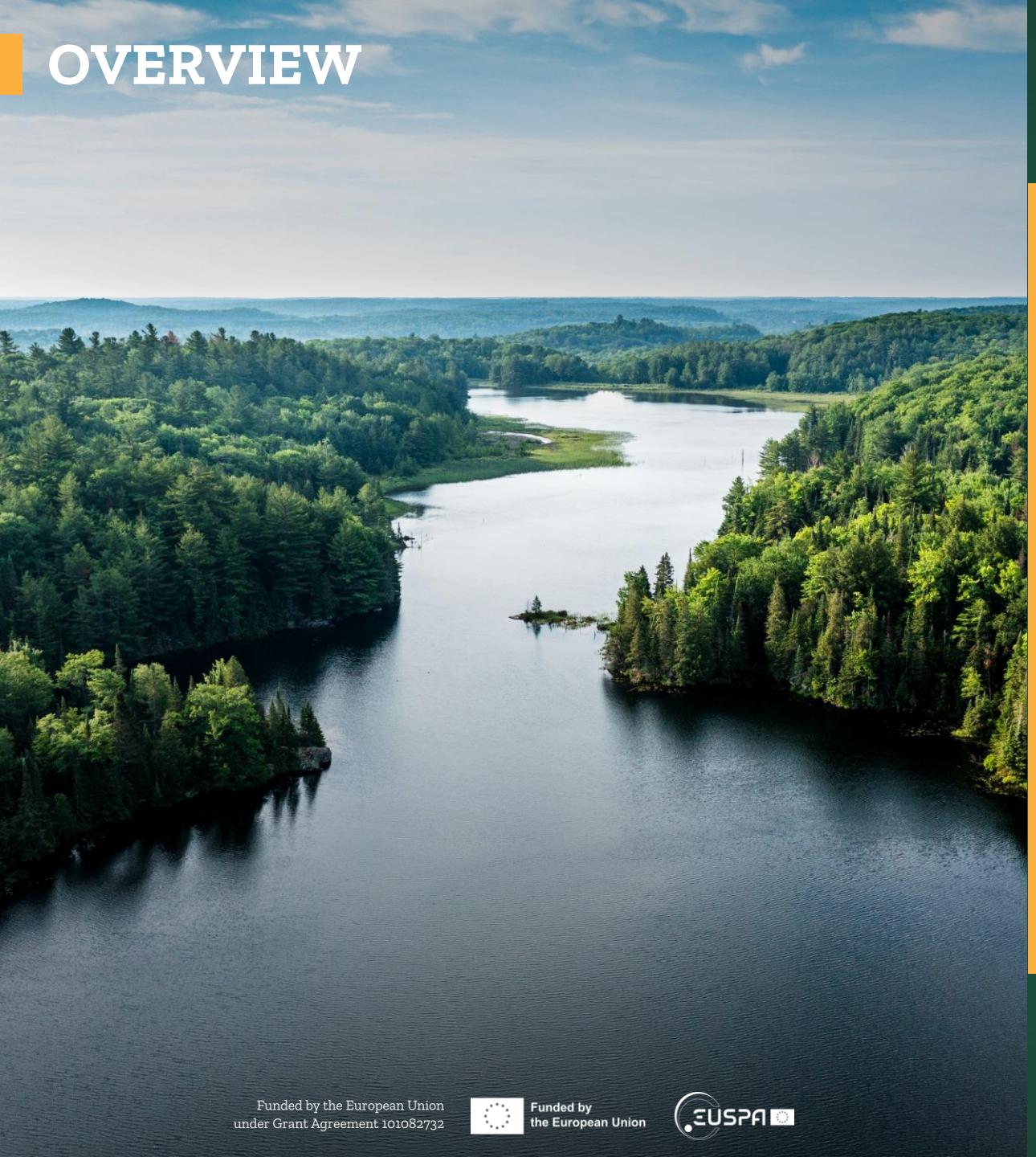
EUSPA

OVERVIEW



- **Forests** around the world provide home and livelihood not only to **billions of people**, but also to the majority of Earth's land biodiversity, and play a key role in responding to the challenges imposed by **climate change**.

- The ever more frequent extreme weather events make trees more vulnerable to **insects and pathogens**, damage and uprooting by **strong winds**, and to becoming dry fuel for **wildfires**, which spread faster and burn for longer.

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OVERVIEW

- With **early and targeted action**, these threats can be contained, and the ecological and economic impacts can be reduced.

- **SWIFTT** will provide **affordable, simple, and effective** remote sensing tools to monitor forests at risk, using **Copernicus Sentinel satellite** imagery and powerful **machine-learning models.**

- As such, **SWIFTT** will make Europe better positioned to **preserve forests, biodiversity, and to fight climate change.**

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CONSORTIUM

SWIFTT

The **SWIFTT** project has been awarded a highly competitive grant in the **Horizon Europe** funding programme, selected in the topic 'EGNSS & Copernicus applications fostering the European Green Deal' managed by **EUSPA**.

Project coordination

AXA Climate

Communication and dissemination

DA VINCI LABS

Scientific research

Leibniz Universität Hannover

IKD

UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO

Technology development

Timbtrack

wildsense

Data collection and technology testing

RĪGAS MEŽI

The consortium partners will receive a cumulative **€2.8M grant** from EUSPA/European Commission between **2022 and 2026**.

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SATELLITE IMAGERY

- The European Union's **Copernicus Sentinel** satellites monitors our planet and its environment.
- Their data is used to provide **forest mapping, forest type classification, biomass estimation and disturbance detection**.
- This information can help governments and companies to make **informed decisions** about how best to **manage, protect and sustain** our important forest resources.

Credit: European Union, Copernicus Sentinel-2 imagery

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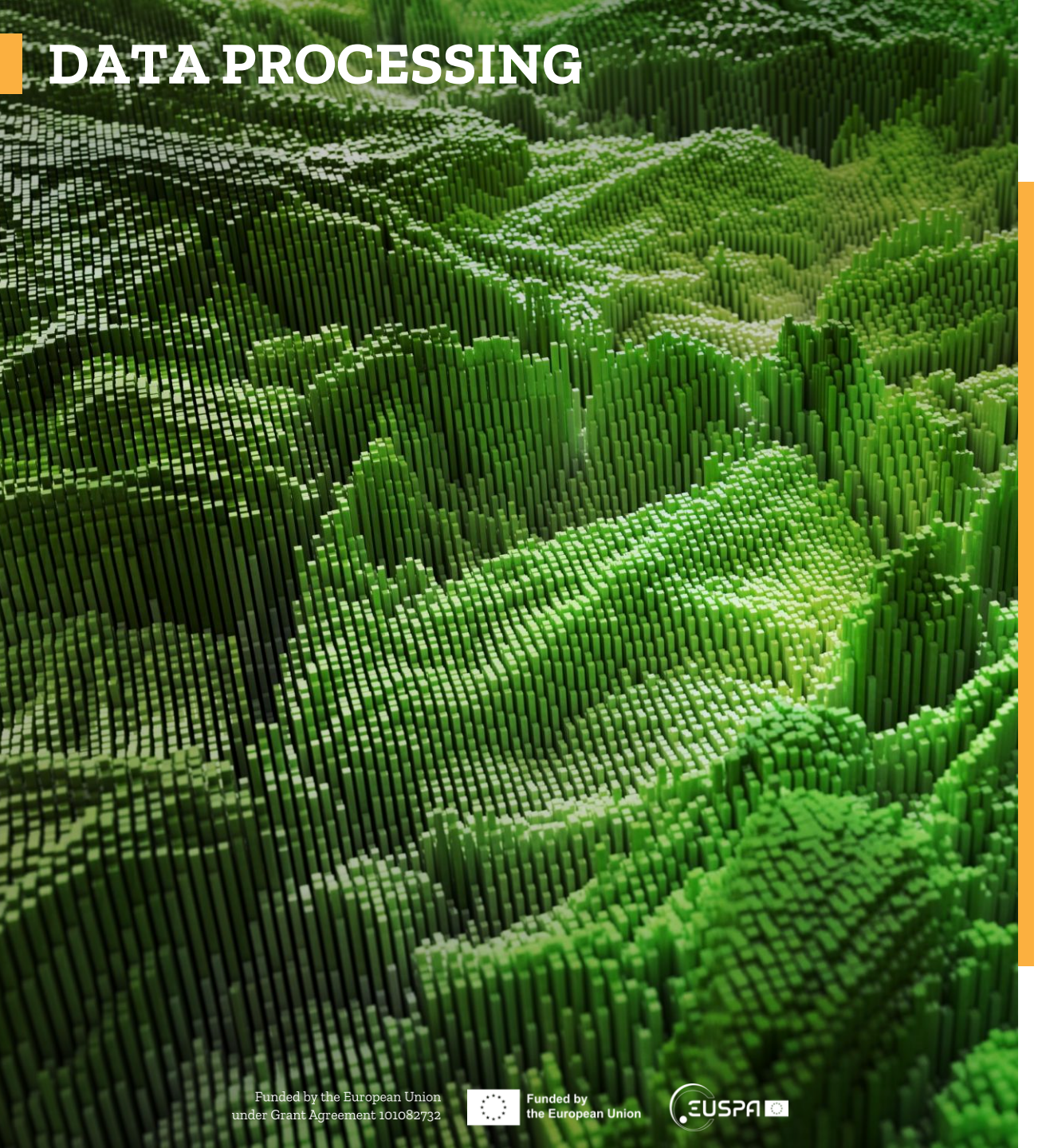
DATA PROCESSING



- New sensor technologies allow **high-resolution** spatial and temporal **data** of large forested areas. They are, however, accompanied by **huge volumes of data**.

- AI methods, such as **deep learning**, can make sense from this massive data to accomplish diverse tasks including **species classification and damage assessment**, or even to identify **patterns for predicting areas at risk** for different threats.

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EXAMPLE: BARK BEETLE INFESTATION

Sentinel-2 images of France collected in 2018

Labeled data prepared and processed by partners

Training of classification model to detect bark beetle infestation

Prediction map for bark beetle infestation

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USE CASE: INSECT OUTBREAKS

- In European forests, the bark beetle (*Ips typographus*) has been a major source of **insect outbreaks**.
- While epidemic scale infestations were historically infrequent, when they do occur, the **ecological and financial impacts** of bark beetles are catastrophic.
- Over the coming decades, they are projected to increase as **climate change** provide the conditions for increased insect breeding.

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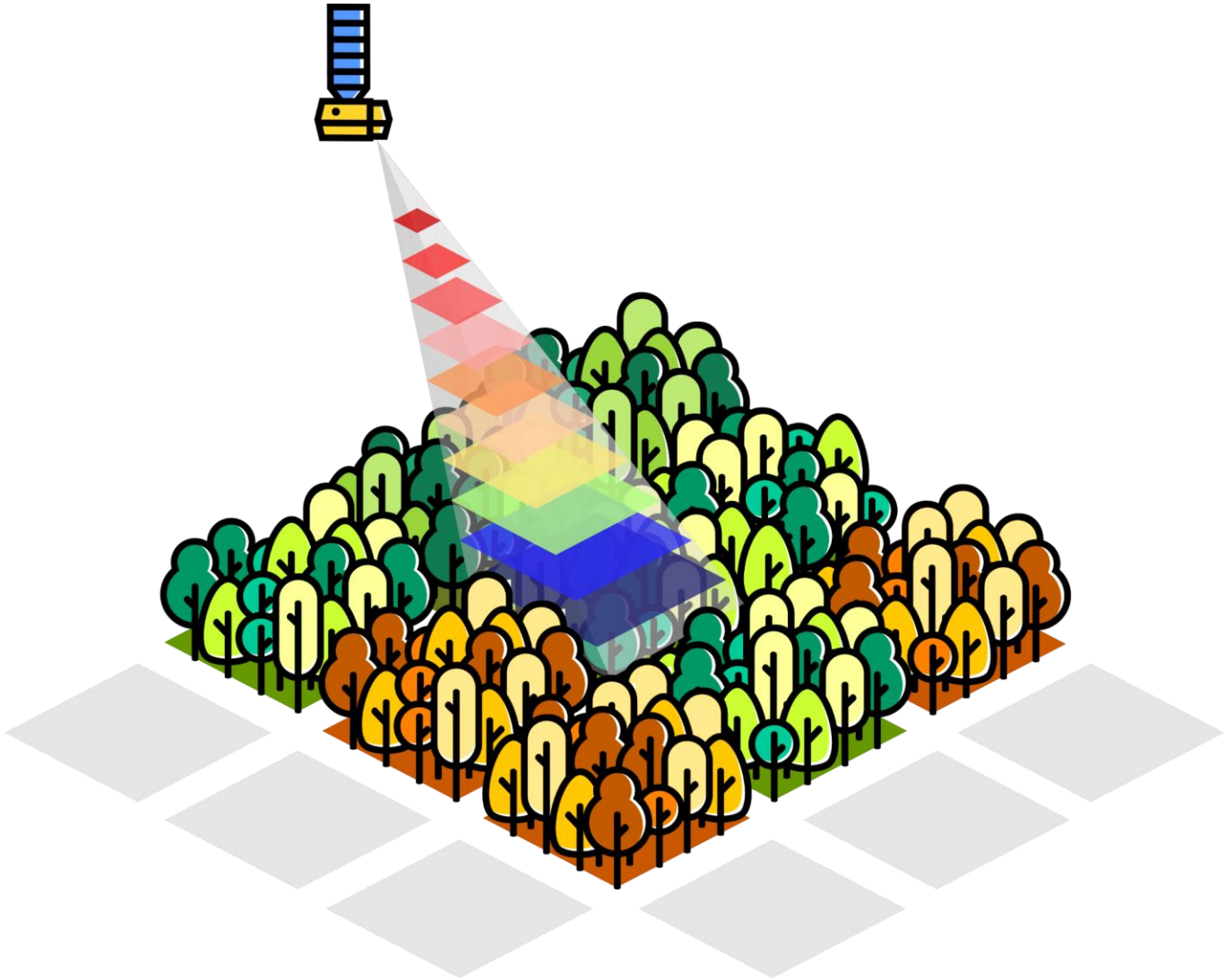
USE CASE: INSECT OUTBREAKS

Early detection of insect infestations

- **SWIFTT** models integrate data from Copernicus Sentinel-2's instruments, which allow us to **differentiate healthy trees** from those suffering **from insect infestation or disease**.

- With it, the **SWIFTT** platform will allow **early detection of insect-infested trees**, helping foresters map dieback in their forests, coordinate sanitary cuts, and **prevent their spread**.



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USE CASE: WINDTHROW

- **Windthrow** accounts for more than half of all damaged timber in European forests.
- **Climate change** leads to more frequent and severe storms, and consequently **increases windthrow damage**.
- Currently there is no solution for monitoring windthrow damage to mitigate its **subsequent effects**, such as dry fuel for **fires** or dead wood from which **insects** can breed and spread.

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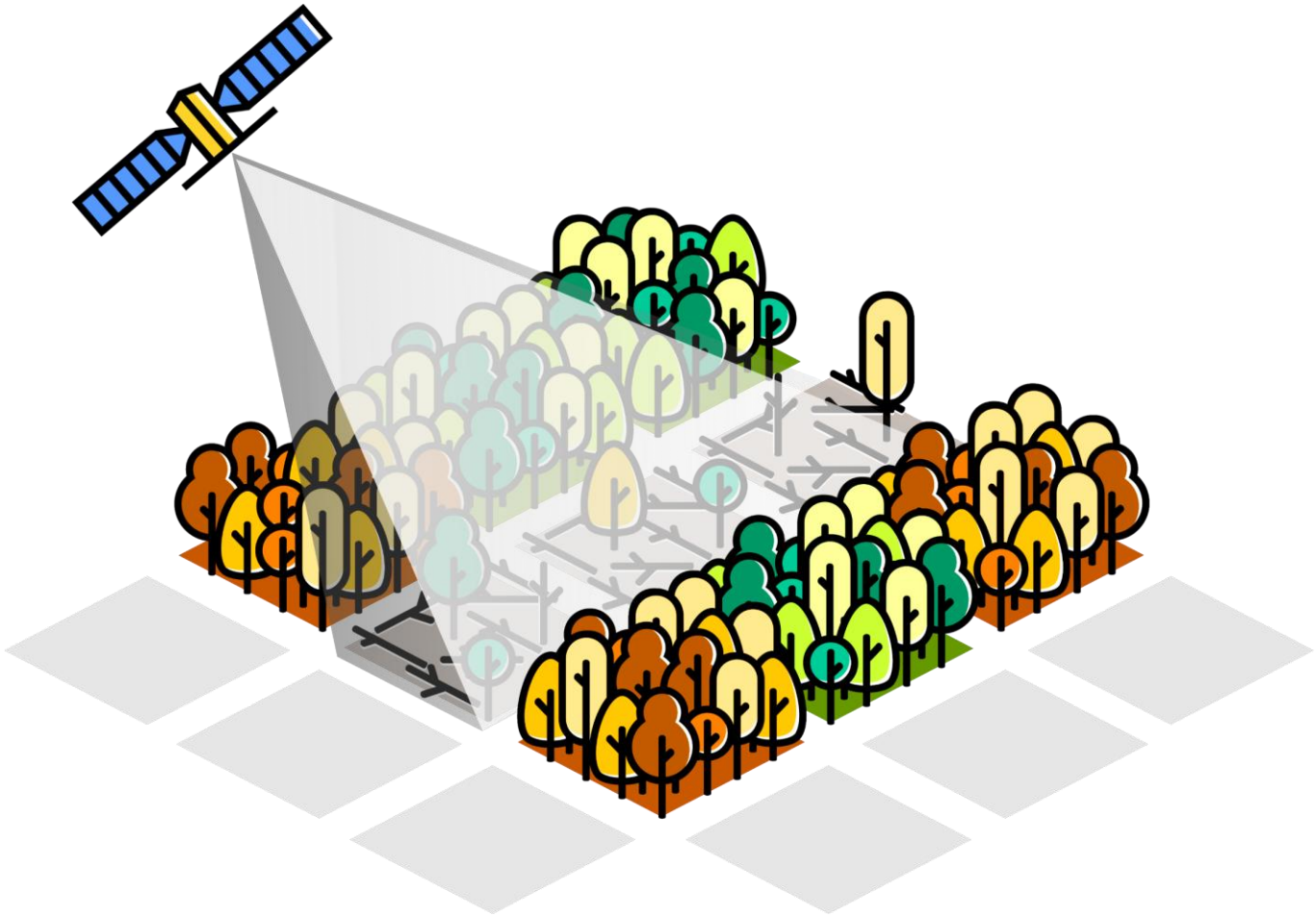
USE CASE: WINDTHROW

Faster post-storm response

- **SWIFTT**'s models use Copernicus Sentinel-1's SAR data to detect the **presence or absence of trees** on a given plot, regardless of cloud cover, making it ideal for mapping **windthrown forest damage** shortly after a storm.

- The **SWIFTT** platform will help foresters to **quickly measure damage** from a recent event and coordinate a **faster post-storm response**, limiting the risk of future threats.



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USE CASE: WILDFIRES

- Every year **65 thousand fires** occur in Europe, burning approximately **500 thousand hectares** of wildland and forests.
- **Climate change** is set to increase the duration and frequency of heat waves and droughts, providing **more dry fuel for wildfires** which spread faster and burn for longer.
- Existing technologies work with low-resolution data, limiting fire risk prediction quality.

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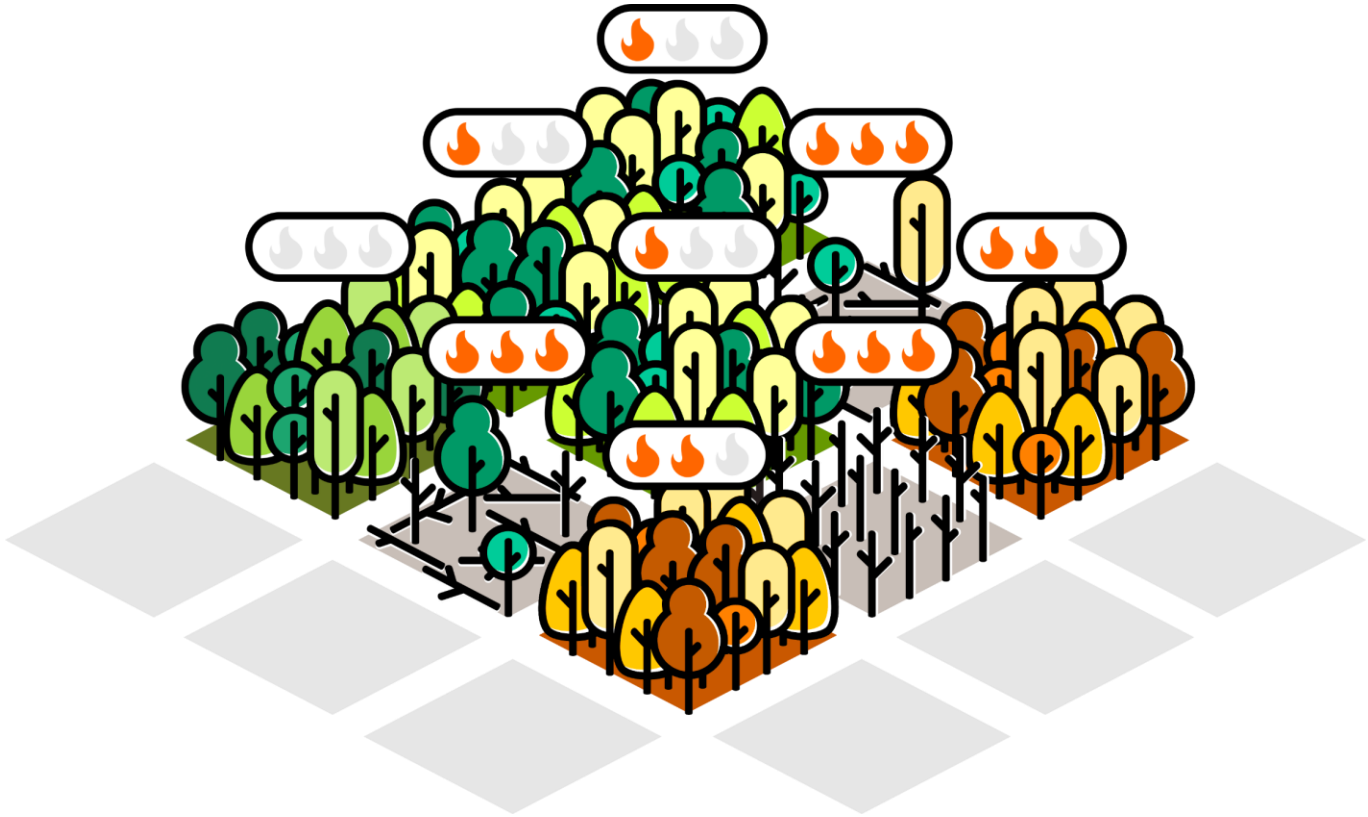
USE CASE: WILDFIRES

More efficient fire prevention

- **SWIFTT** will **identify areas at risk of wildfires at higher resolutions** than current services by applying a variety of state-of-the-art techniques satellite imagery.

- With the incorporation of insect outbreak and windthrow data, it will also be possible to **predict the areas to which fires are most likely to spread**, allowing forest managers to proactively and efficiently allocate resources for fire prevention.



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SWIFTT PLATFORM

- The **SWIFTT** platform will allow forest managers to **prevent, estimate and mitigate** the impact of windthrow, insect outbreaks, and wildfires.

- **SWIFTT** will **increase** forest management **productivity and cost-effectiveness**, and enable public and private forest managers, authorities, and policymakers to deal with forest threats proactively.

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