Argus Technology:
Project EUDR
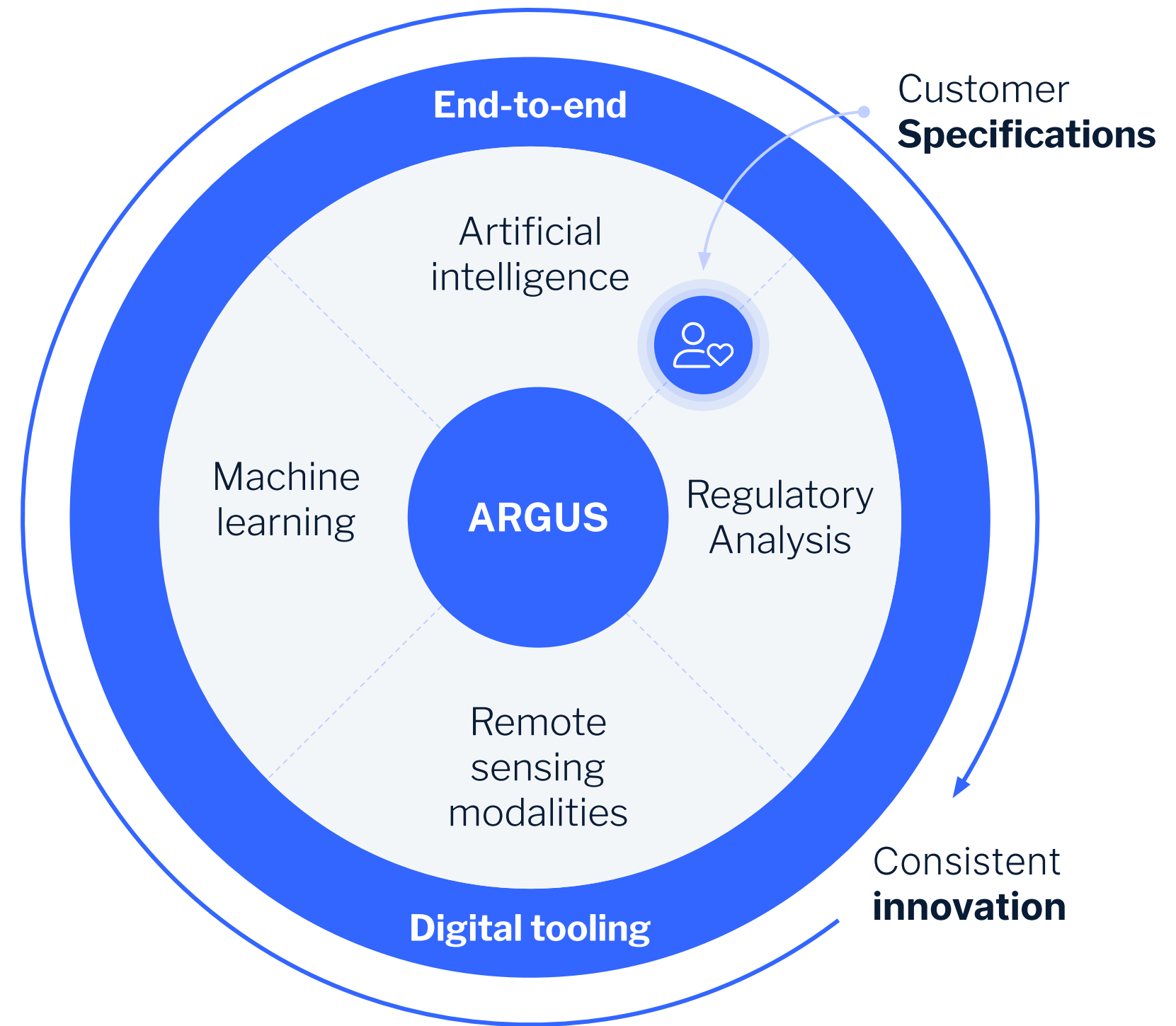
Private analysis for public compliance

Argus | Company Overview
Private analysis for public compliance

Argus is a **machine learning and satellite imagery analysis company** with a focus on creating digital tools that simplify, strengthen and streamline public compliance across multiple industries.

Leveraging state-of-the-art machine learning, artificial intelligence, and deep learning techniques, combined with high revisit/high resolution remote satellite imagery **to reduce compliance risk and inform business decision-making** for customers.

Industries: *agriculture, development, infrastructure, investment and capital markets, textiles, digital banking, defense/intelligence.*

Partners

End-to-end

Customer **Specifications**

Artificial intelligence

Machine learning

ARGUS

Regulatory Analysis

Remote sensing modalities
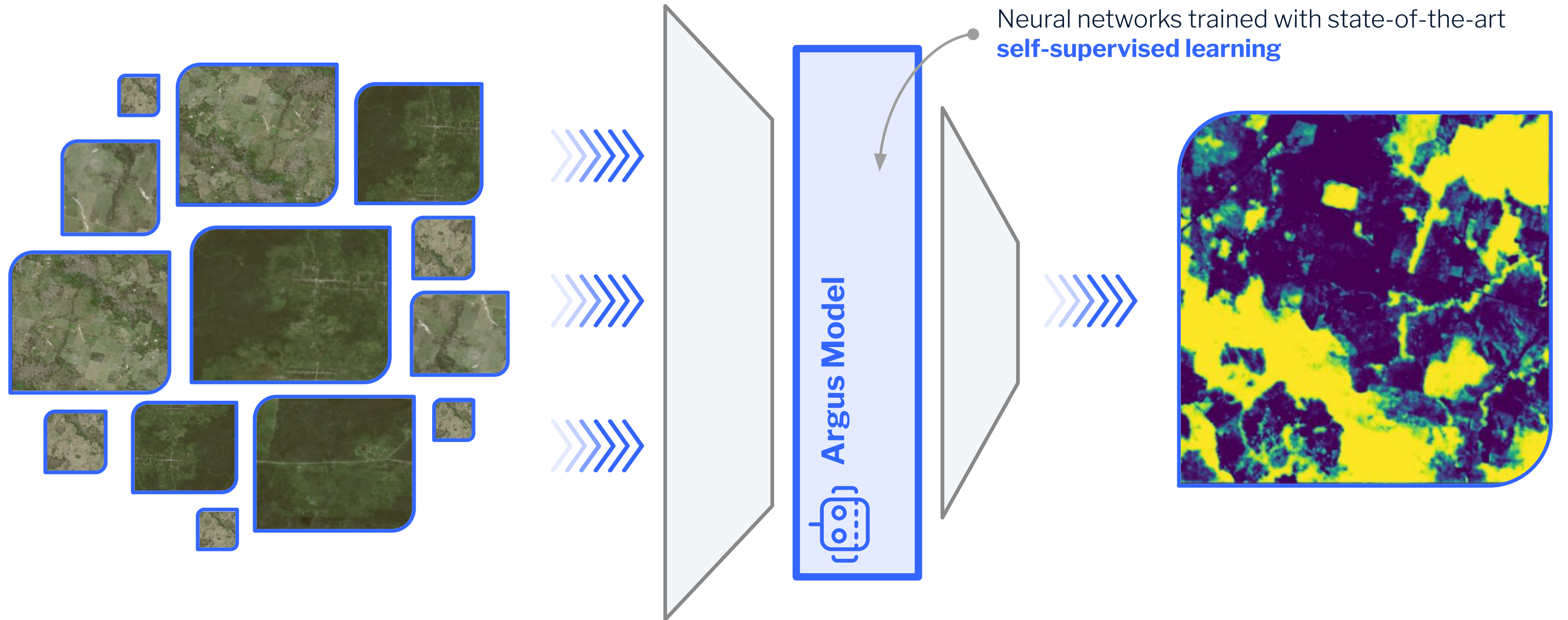
Consistent **innovation**

Digital tooling

Project EUDR:
Argus-powered deforestation monitoring tool

Deforestation monitoring with increased accuracy and regulatory versatility.

Argus's solution impact

Key regulatory obligations &

Product scope:

Wood, coffee, cocoa, soy, rubber, beef, palm oil
+All derived products

Article 3(a)-(b): Legally produced

All listed commodities that are imported or exported must be legally produced (according to the country of production laws) **and deforestation free as of 31/12/2020**

Article 9-10: Conduct due diligence

- Scientific description of product/quantity/country of production
- Geolocation of plots of production / date range of production,
- **Verifiable evidence that product 'deforestation free',**
- Verifiable evidence that product is produced in compliance with legislation

Article 10: Annual evaluation

Due diligence systems must be evaluated/updated on an **at least** annual-basis.

Article 10(a): Online information system submission

A due diligence statement must be submitted to the online information system of the European Union

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Argus | Machine Learning deforestation analysis

Leveraging powerful machine learning system analysis at the lowest possible cost

Neural networks trained with state-of-the-art **self-supervised learning**

Argus Model

Unlabelled Dataset
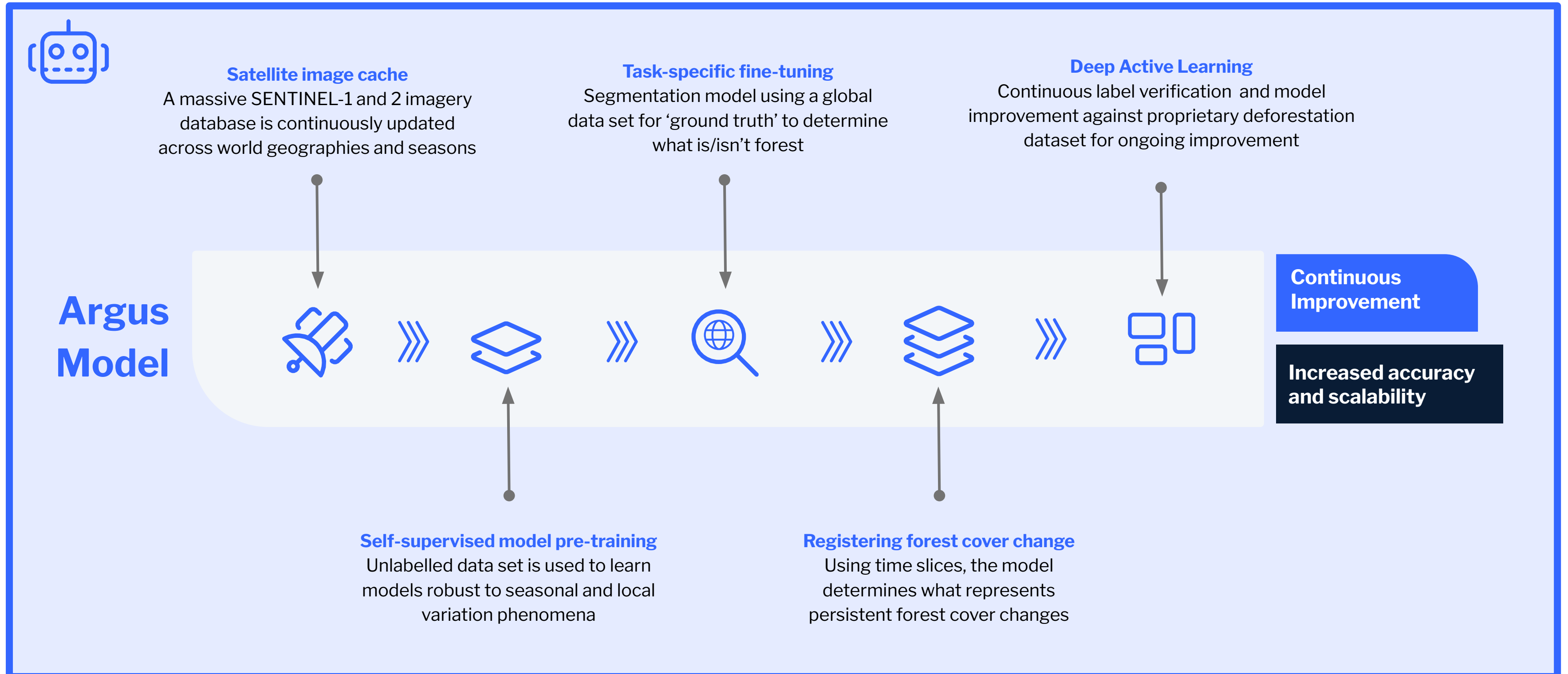Massive, global, multispectral satellite imagery – updated 24/7

Argus-Powered Model
Our backbone neural networks are continuously learning and improving on the ever expanding satellite imagery database

Downstream Task
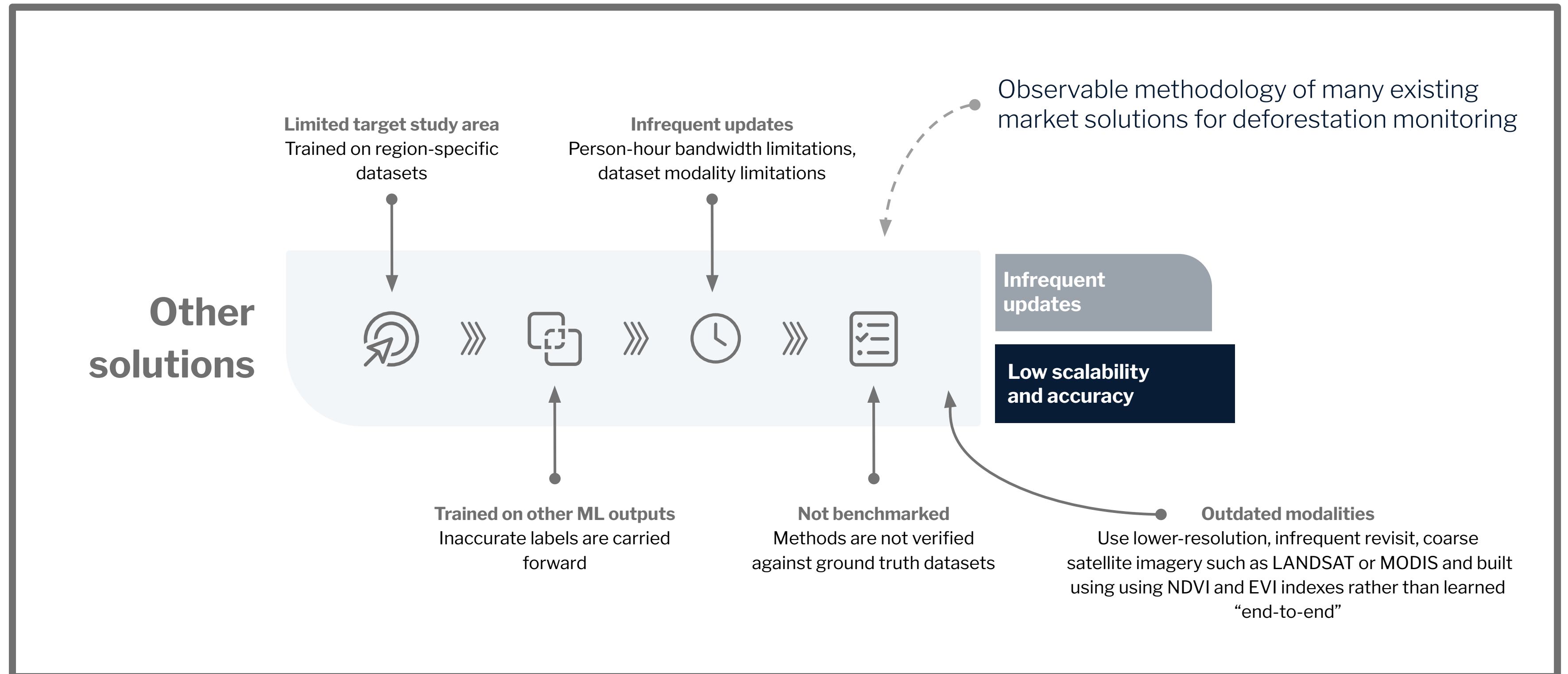Proprietary label-sets are used to fine-tune models on downstream tasks

Argus | Machine Learning deforestation analysis

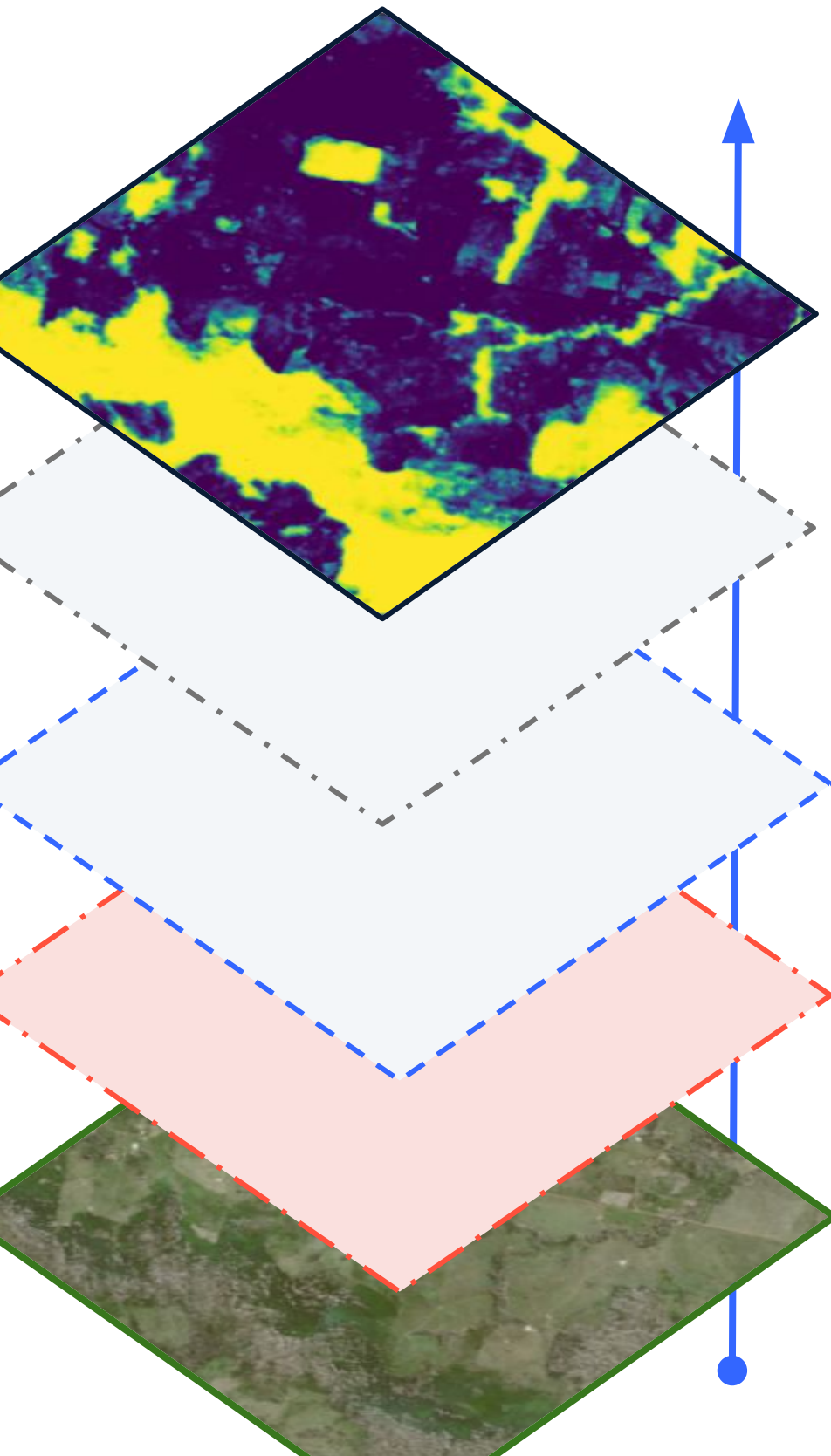## Increasing accuracy, regulatory versatility and global scalability with proprietary models

Satellite image cache
A massive SENTINEL-1 and 2 imagery database is continuously updated across world geographies and seasons

Task-specific fine-tuning
Segmentation model using a global data set for 'ground truth' to determine what is/isn't forest

Deep Active Learning
Continuous label verification and model improvement against proprietary deforestation dataset for ongoing improvement

Argus Model

Continuous Improvement

Increased accuracy and scalability

Self-supervised model pre-training
Unlabelled data set is used to learn models robust to seasonal and local variation phenomena

Registering forest cover change
Using time slices, the model determines what represents persistent forest cover changes

Argus | Legacy deforestation monitoring solutions

Designed for voluntary reporting thresholds: lower accuracy, no costs of non-compliance

Limited target study area
Trained on region-specific datasets

Infrequent updates
Person-hour bandwidth limitations, dataset modality limitations

Observable methodology of many existing market solutions for deforestation monitoring

Other solutions

Infrequent updates

Low scalability and accuracy

Trained on other ML outputs
Inaccurate labels are carried forward

Not benchmarked
Methods are not verified against ground truth datasets

Outdated modalities
Use lower-resolution, infrequent revisit, coarse satellite imagery such as LANDSAT or MODIS and built using using NDVI and EVI indexes rather than learned "end-to-end"

Argus | Self-supervised Machine Learning

Multi-spectral imaging combined with leading-edge computing research

Deep-Active-Learning
Hand label areas of model uncertainty to continuously improve segmentation system

Registering changes in forest cover
Using time slices, the model determines what represents persistent forest cover changes

Task-specific fine-tuning
Segmentation model built using a global data set for 'ground truth' to determine what is/isn't forest

Self-supervised model pre-training
Unlabelled data set is used to learn models agnostic to global, seasonal and local patterns

Satellite image cache
SENTINEL-2 images over time are segmented using the neural network

Self-supervised deep learning model

- Versatile to requirement changes (regulatory, regionally etc.)

- Cheaper; less manual configuration required

THANK YOU

APPENDIX

Argus | EUDR non-compliance

What does this mean for businesses?

The scope of EUDR mandates **new and far-reaching requirements on in-scope businesses to prove products are sourced deforestation free**. The cost-of-compliance therefore, are substantial. These include:

Start-up costs:
Initial system and capacity building, employee trainings, new staff, consultancy fees, and IT system implementation etc.

Recurring costs:
Permit handling, inspections, monitoring, reporting, communicating with stakeholders, associated research, etc.

Opportunity costs:
Operational delays owing to approval or processing by public administrations

Non-compliance costs:
Heavy fines up to at least 4% of union-wide turnover, confiscation, import bans, sale bans, increased future compliance threshold, reputational damage
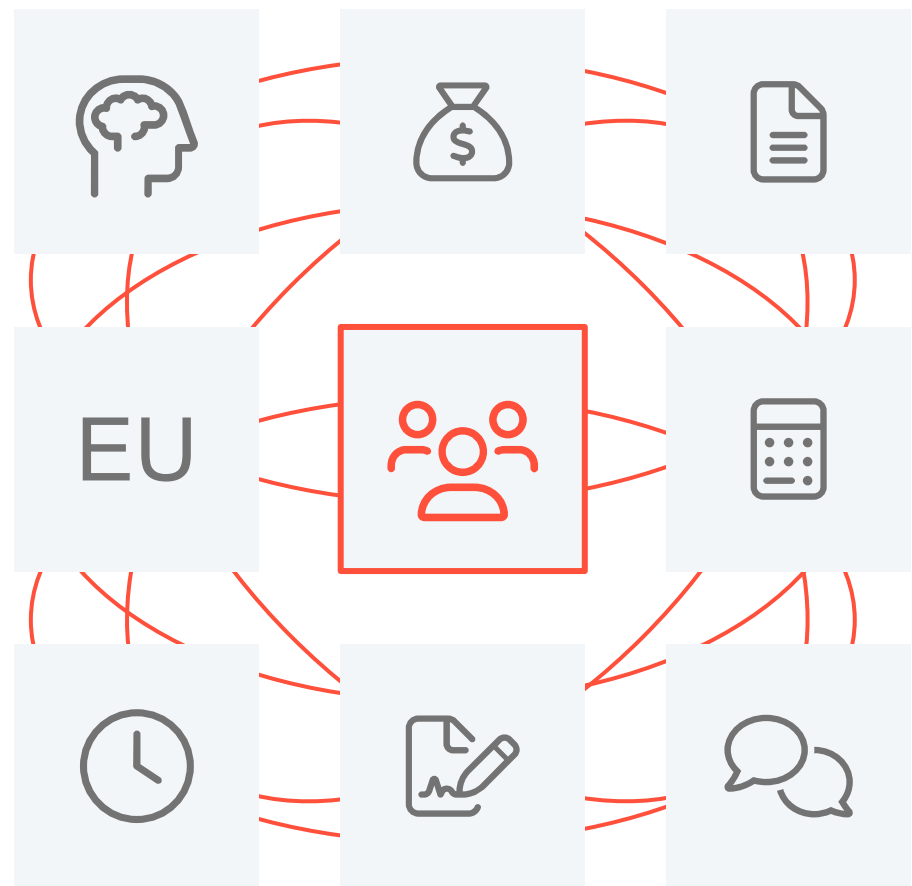
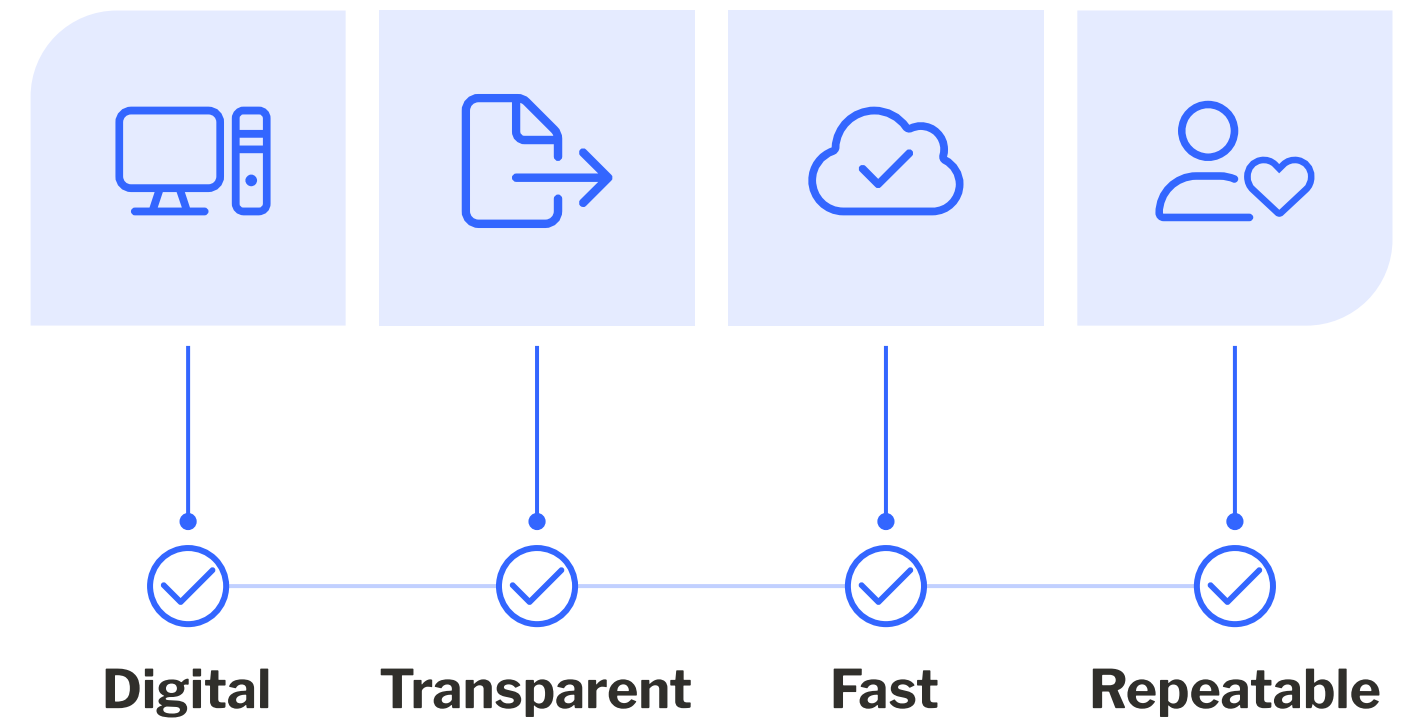**Internal Compliance**
Multiple FTEs, time-consuming, costly

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Argus | Simplify EUDR compliance

Reducing your business' time and cost of achieving EUDR compliance

from: Internal Compliance
Multiple FTEs, time-consuming, costly

to: Argus-Powered
Fast, quality-assured compliance

EU

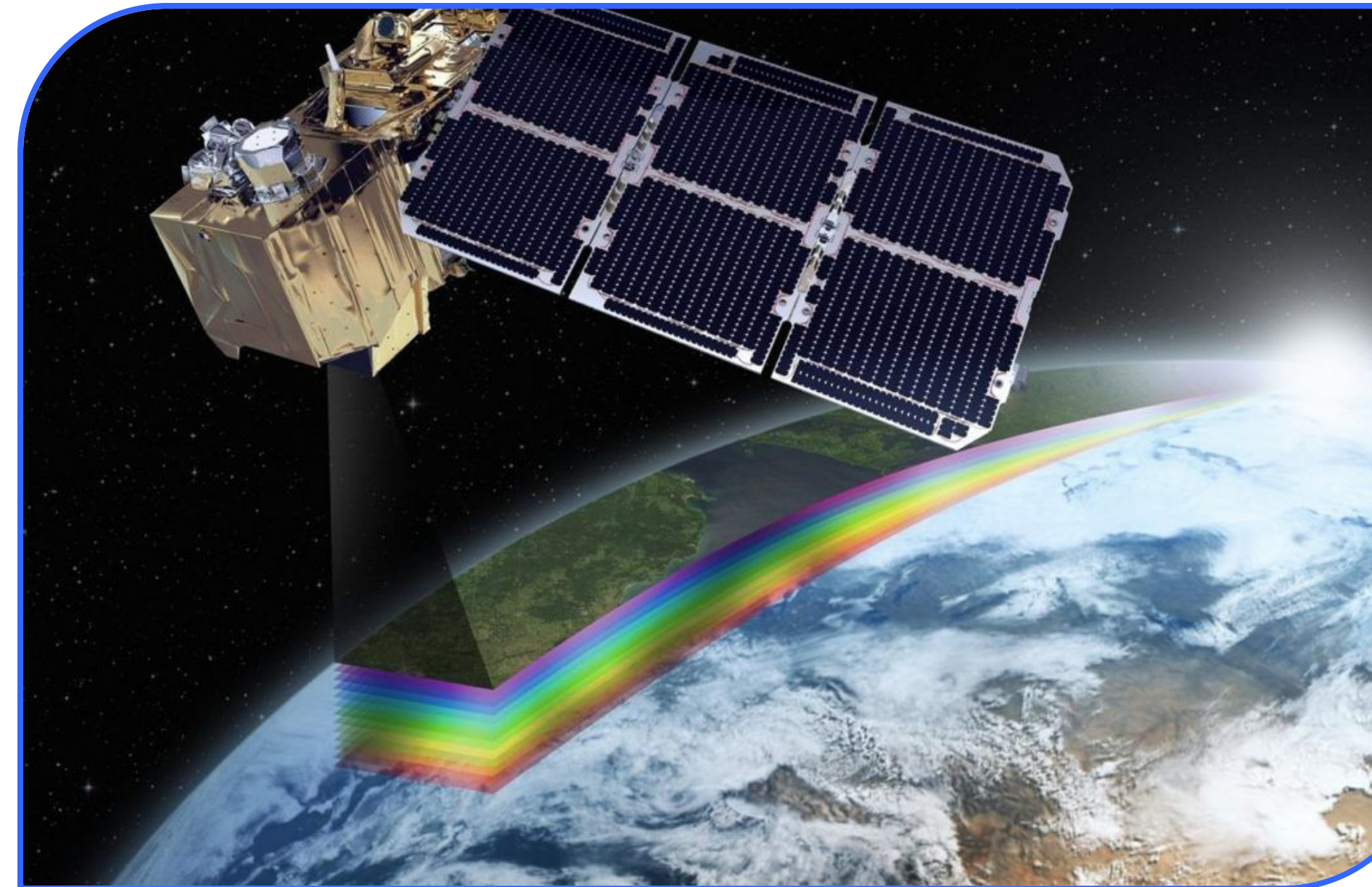**Digital**   **Transparent**   **Fast**   **Repeatable**

Argus | EUDR Solution: Satellite Imagery

Leverage Europe's multi-spectral imaging mission for the highest quality analysis

Copernicus SENTINEL-2:

The constellation of two polar-orbiting satellites placed in the same sun-synchronous orbit, phased at 180° to each other, which underpins the project's satellite imagery capabilities.

✓ **High-revisit time;** 5 days with 2 satellites under cloud-free conditions which results in 2-3 days at mid-latitudes

✓ **High-resolution imaging;** three spectral bands: four bands at 10m, six bands at 20m and three bands at 60 m spatial resolution

✓ **Multispectral;** 13 spectral bands from VNIR to SWIR for analysis in a variety of climactic, light, and environmental conditions.

Copernicus
Europe's eyes on Earth

sentinel-2

Argus | Neural Network analysis

Neural Network-enabled high-accuracy satellite imagery deforestation detection

Satellite Imagery
Satellite captures the Region of Interest across time

Period X

Pixel-level labels
Forest cover is segmented using neural network – to a 99.6% accuracy

Period Y

Deforestation Model Overlay
Detected changes in forest cover (ignoring seasonal patterns, nonhuman interventions, etc.)

Closer view of the detected deforestation