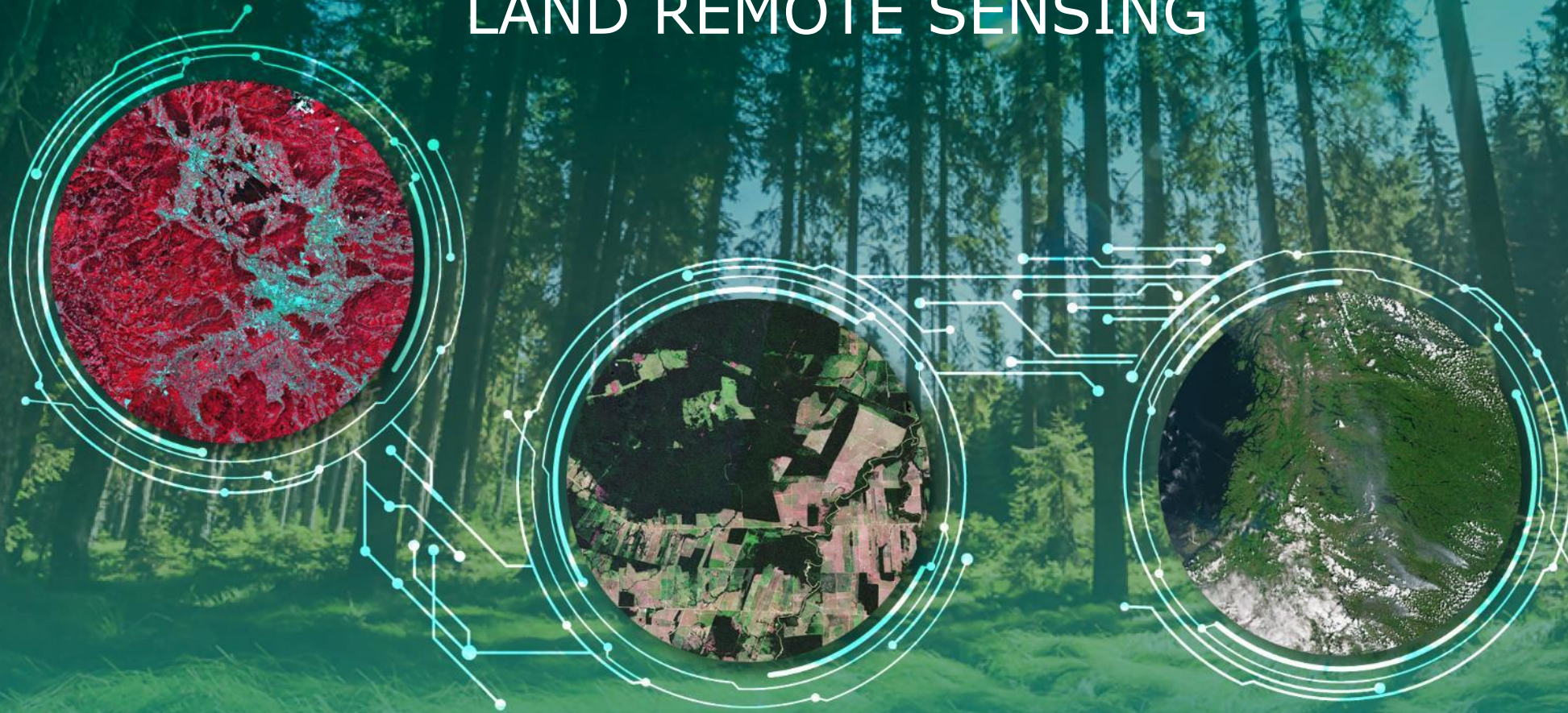


10TH ADVANCED TRAINING COURSE ON LAND REMOTE SENSING



Forestry TEP: Platform solution for forest analyses

Renne Tergujeff & Jukka Miettinen, VTT

ESA UNCLASSIFIED – For ESA Official Use Only



→ THE EUROPEAN SPACE AGENCY

- Platform Introduction
- Demonstration: Features and Capabilities
- **Hands-on: Service Development**
- Q&A



Renne Tergujeff



Jukka Miettinen



An aerial photograph of a dense evergreen forest, likely a spruce or fir forest, with a thick layer of mist or fog hanging over the trees. The trees are a deep green color, and the mist is a light, hazy white. The overall scene is serene and natural.

Forestry TEP Overview



Climate change

Forest loss

Illegal logging

Sustainable forest use

Forest monitoring

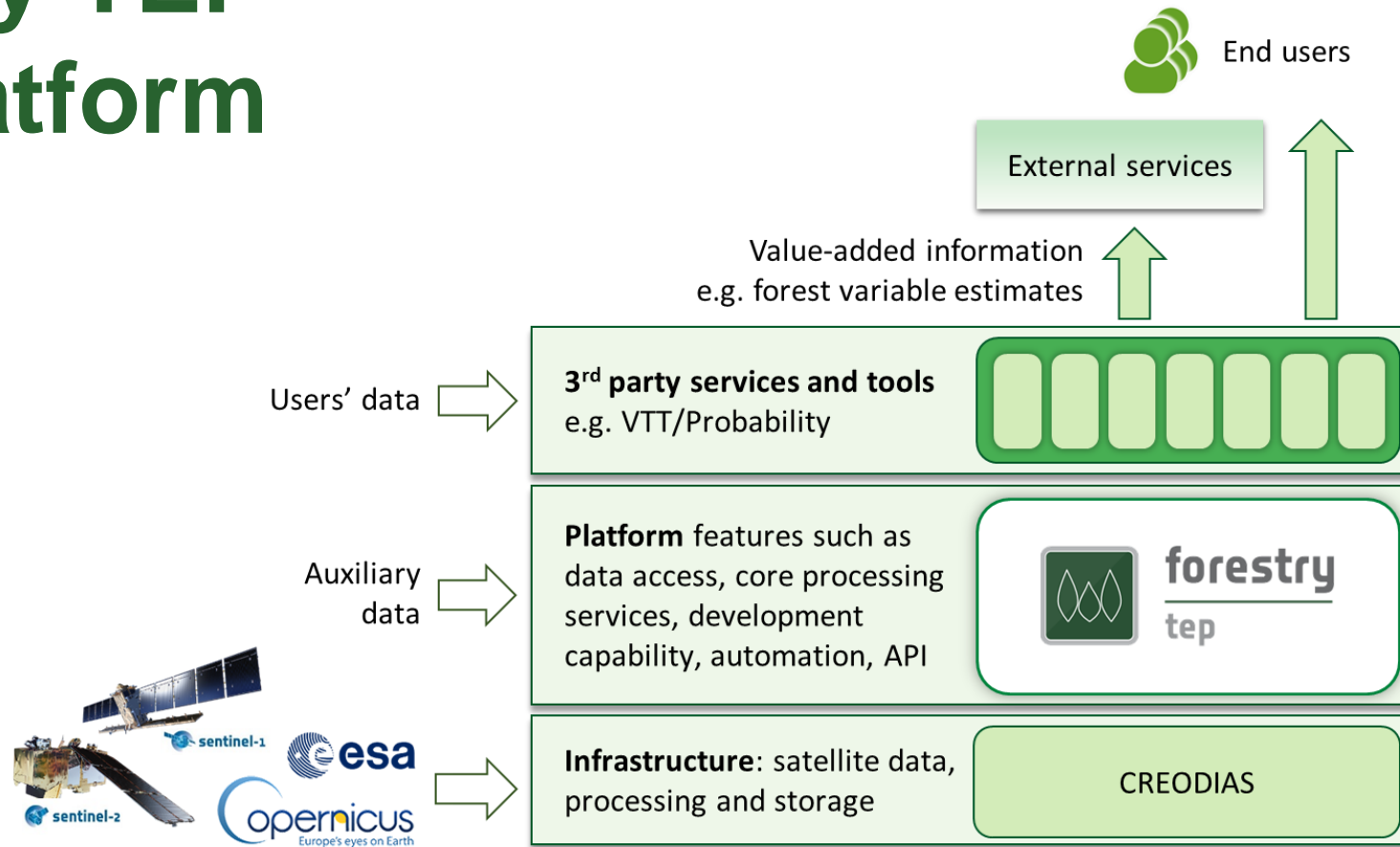
Forest research

Biocarbon assessment

Forest asset management

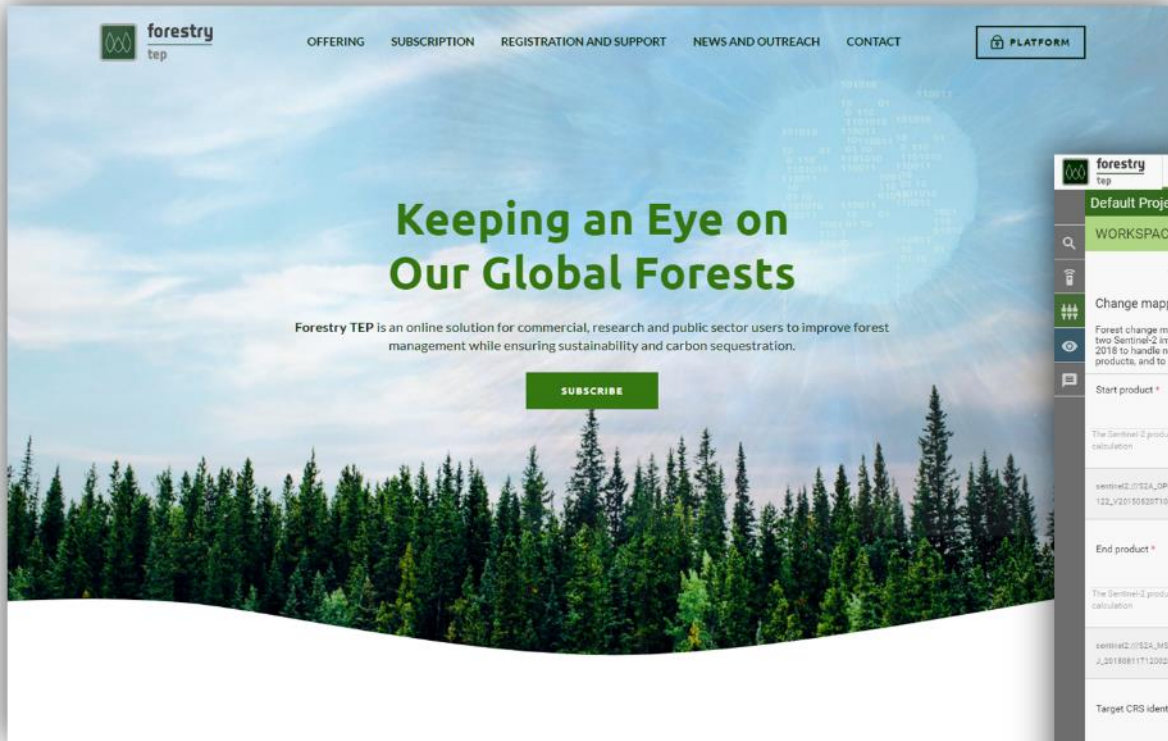
- Forest and climate research community
- Forest owners and managers
- Forest certification organisations
- Regional/national forest administration
- International initiatives, research programmes and panels
- International development banks
- Sustainable development NGOs
- UN organisations
- Value adding (SME) industries

Forestry TEP as a platform

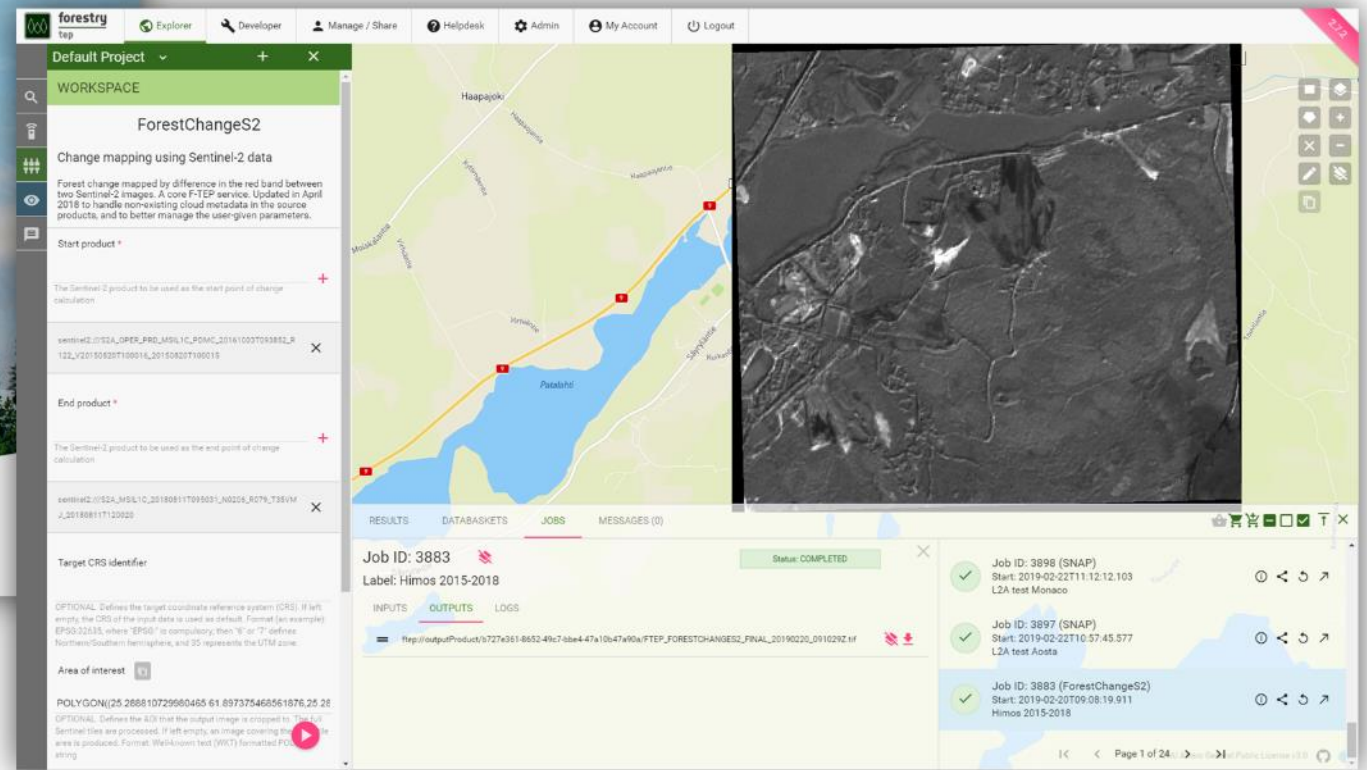


Forestry TEP Overall concept





f-tep.com



Platform access

- Subscription-based services
- Trial accounts
- Sponsorship for research and pre-commercial uses via the ESA Network of Resources (NoR) – see <https://f-tep.com/subscription/#NoR>
- Strong use in multiple projects (see <https://f-tep.com/news-and-outreach/>):
 - [Forest Flux \(EU\)](#) → New services to Forestry TEP
 - [Forest Digital Twin Precursor \(ESA\)](#)
 - Forest Carbon Monitoring (ESA)

Get involved with Forestry TEP!

- **Utilize in projects – by yourself or together with us**
 - VTT Remote Sensing team has long experience in coordinating and participating in cooperative projects
 - Expertise in remote sensing based forest monitoring and platform processing
- **Bring in your business!**
 - We will support you to onboard your business ideas on the platform



Contact us at: f-tep.com

An aerial photograph of a dense evergreen forest, likely a spruce or fir forest, with a thick layer of mist or fog hanging over the trees. The trees are a deep green color, and the mist is a light, hazy white. The overall scene is serene and natural.

Forestry TEP Offering

How to exploit Forestry TEP?

- ❖ **Use the services and data available on the platform**
 - Access or share the output products
- ❖ **Develop your own processing service**
 - Share or license the service, or the output products
...to your contacts, users or customers – or publicly to all
- Modes of usage:
 - Online web user interface
 - REST API for interconnecting between systems
- Guidance at f-tep.com > [Registration and support](#):
 - **Registration and login**: how to access the platform
 - **Learning**: introductory videos, 2-4 min each
 - **User manual**: User Manual document (pdf) and REST API tutorial
 - **Creating services**: Service Developer Guide (pdf) & supporting information

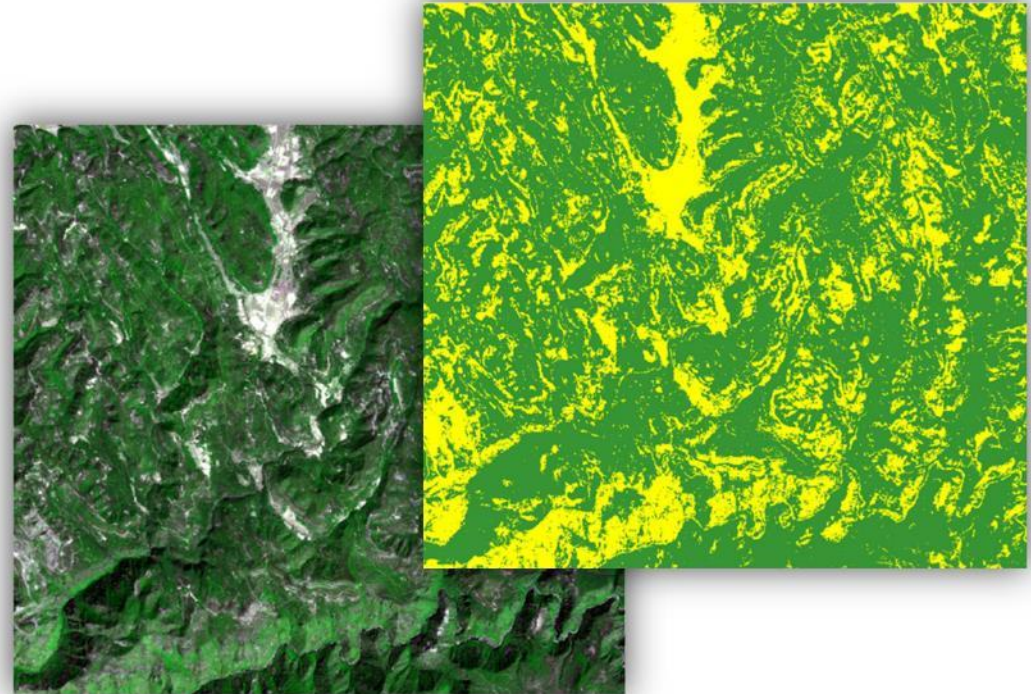


Processing Services and Tools

- **Thematic processing services**
e.g. vegetation indices, land cover mapping, forest change mapping
- **Supporting processing services**
e.g. S-1 stacking, masking, mosaicking, radiometric correction
- **Interactive (GUI) applications**
QGIS, SNAP, Monteverdi

Full listing at f-tep.com

Additional services by agreement, e.g. VTT AutoChange and Probability



Data

- Sentinel-1: C-band synthetic aperture radar (SAR)
- Sentinel-2: Optical MultiSpectral Instrument (MSI)
 - S-2 Level 2A available for processing globally including archive via automated ordering & sen2cor production
- Sentinel-3: SLSTR, OLCI, SRAL
- Landsat 5, 7, 8 (the ESA archive)

- Additionally available in service development – via access to the **eodata/** directory:
 - Copernicus services: CAMS, CEMS, CLMS, CMEMS
 - Mapzen DEM, SRTM DEM, Copernicus DEM
 - Sentinel-5P, Envisat, SMOS, S2GL, Jason-3 altimeter



Service development

- **Online development environment**
 - Based on Docker and Linux
 - Developer defines the processing logic and input parameters
 - Implementation in any programming language
 - Libraries such as SNAP, Orfeo Toolbox, GDAL etc. can be used
 - Templates are provided
 - No software needed locally
- **Guidance:** <https://f-tep.com/helpdesk>

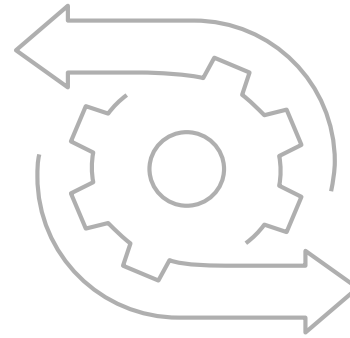
The screenshot displays the F-TEP service development environment. The main window shows a service definition for 'VegetationIndices' with a Dockerfile and a table of input parameters.

```
FROM ubuntu:16.04
MAINTAINER Forestry TEP
# Dependencies
RUN apt-get update && apt-get install -y \
    bc \
    curl \
    libfreexml \
    gdal-bin \
    proj-bin \
    python \
    python-dev \
    python-gdal \
    && apt-get clean && rm -rf /var/lib/apt/lists/*
# Download and install SNAP
ENV SNAP_BASE_URL="http://step.esa.int/downloads/SNAP"
ENV SNAP_INSTALLED="esa-snap_sentinel1_unix_${SNAP_VER}"
LABEL snap.version="${SNAP_VER}.${SNAP_HDN_VER}"
RUN curl -sL "${SNAP_BASE_URL}/${SNAP_INSTALLED}" -y \
    # Install SNAP
    && echo -e
```

ID	Title	Description	Data Type	Default Value	Min Occurs	Max Occurs	Input Defs	Search Param	Parallel	Edit	Remove
inputfile	Input data	Sentinel-2 data file(s)	string		1	50	True	False	True	<input checked="" type="checkbox"/>	<input type="checkbox"/>
vegindex	Radiometric index algorithm	Vegetation index to calculate	string	NDVI	1	1	False	False	False	<input checked="" type="checkbox"/>	<input type="checkbox"/>
aoi	Area of interest	AOI to be processed, in the well-known text (WKT) format, e.g. POLYGON((...))	string		0	1	False	False	False	<input checked="" type="checkbox"/>	<input type="checkbox"/>
targetResolution	Output pixel spacing	Request output spacing in metres, e.g. 10 or 20	string		1	1	False	False	False	<input checked="" type="checkbox"/>	<input type="checkbox"/>

REST API

- The F-TEP REST API allows to (e.g.):
 - Query the data catalogue (HTTP GET)
 - Query the available services and their parameters
 - Create and launch processing jobs
 - Retrieve outputs of the completed job
- Based on Spring Data REST, with JSON contents
- Authenticated use of resources
 - Services, data, processing
- **Guidance:** <https://f-tep.com/helpdesk>



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