UNOOSA / UNU-INWEH / CEOS

EO for Humanitarian Aid Training Course

Partners: UNOOSA, UNU-INWEH, CEOS (European Space Agency, ...)

Introduction to the EO for Resilience and Humanitarian Aid Training Programme

The Earth Observation (EO) for Resilience and Humanitarian Aid Training Programme is an intensive five-day hybrid course designed to strengthen the ability of UN personnel to use geospatial and satellite-derived information in operational, programmatic, and emergency-response settings. Taking place at the United Nations Office in Vienna from 23-27 March 2026, the programme is jointly delivered by UNOOSA, UNU, CEOS, ESA, and partner institutions, bringing together technical expertise from across the international EO community.

Satellite data now plays an essential role across humanitarian response, development programming, disaster preparedness, and climate resilience. This training equips participants with the practical skills and conceptual understanding needed to integrate EO into workflows related to situational awareness, needs assessment, crisis monitoring, environmental analysis, and resilience planning.

Through hands-on sessions, guided exercises, and real UN case studies, participants will engage with optical, SAR, hyperspectral, and medium-resolution EO datasets, deep learning techniques for feature extraction, and integrated approaches for climate–health analysis. Special emphasis is placed on *replicable workflows*, *open tools and platforms*, *inter-agency coordination*, and the operational realities of using EO to support humanitarian and development mandates.

This training follows a Bring Your Own Device (BYOD) modality, ensuring participants leave with tools and workflows they can immediately deploy in their own missions and field operations.

Essential Information for Prospective Participants

Dates: 23–27 March 2026 (5 days)

Venue: United Nations Office in Vienna (UNOV)

Modality: Hybrid, with *priority given to in-person participants*.
Remote participation will be available but may be limited for practical components.

Maximum Number of Participants: 30 participants

Target Participant Profile

The programme is designed for technical and semi-technical staff from UN entities who work with, or are expected to work with, Earth Observation and geospatial information in the context of development, humanitarian aid, disaster risk reduction, or climate-related operations.

Typical Participants Include

- Programme or technical officers integrating EO products into projects on technical assistance, development, climate, disasters, food security, displacement, or related areas

- GIS / Remote Sensing / EO analysts supporting development, humanitarian operations, disaster response, recovery or resilience planning

- Information management or data officers producing or using maps and geospatial analyses for decision-making

Minimum Prerequisites

Background & Motivation

- Affiliation with a UN entity working on technical assistance, humanitarian aid, development, disaster risk reduction, climate, or related fields
- Clear motivation to apply EO and geospatial analysis in operational or programmatic work (e.g. situational awareness, needs assessment, risk mapping, monitoring)
- Ability to participate actively and follow discussions in English (spoken and written)

Geospatial Foundations

- Basic experience with GIS tools (QGIS, ArcGIS, or web-based platforms).
- Knowledge of vector/raster concepts, layers, CRS, and map production.
- Basic awareness of optical vs. radar imagery (helpful but not mandatory).

Computer & Programming Literacy

- Comfortable using a laptop for geospatial analysis and handling medium-size datasets.
- Familiarity with software installation, plugins, and EO web tools.
- Basic familiarity with at least one programming language—preferably Python (ability to read and modify simple scripts).

Language

- Ability to actively participate in discussions in **English**.

Logistics

- Availability for the full five days.
- BYOD: access to a personal or work laptop capable of running necessary software.

Programme Summary

The five days will guide participants through:

Day 1 - EO Foundations for Humanitarian Aid
EO applications, platforms, tools, coordination mechanisms, and hands-on exploration of EO resources.

Day 2 - Deep Learning for Building Extraction
Use of VHR imagery, SAM models, training data preparation, and evaluation.

Day 3 - Crisis Monitoring with SAR
Flood mapping, subsidence, land-use mapping, and emergency response.

Day 4 - Agriculture, Health & Hyperspectral Applications
Sentinel-2 and hyperspectral workflows for vegetation, crop health, and environmental monitoring.

Day 5 - Climate Resilience & Multi-Source EO Integration
Climate monitoring datasets, EO–climate–socioeconomic integration, workflow challenge, and EO4Health applications.

Draft Programme (work in progress – some blocks might be subject to change)

Day 1: Humanitarian Context and introduction to EO

Time	Session
08:30 – 09:00	Registration
09:00 – 09:15	Opening Remarks
09:15 – 10:00	Participant Expectations: Lightning Talks to Gauge EO Knowledge & Objectives
10:00 – 11:30	EO for Humanitarian Aid: Applications, Trends, Use Cases Overview
11:30 – 12:00	Coffee Break
12:00 – 13:30	EO Data Sources, Platforms, and Tools: Leveraging Existing EO Resources to Avoid Duplication and Maximise Impact
13:30 – 14:30	Lunch
14:30 – 16:00	**Practical:** Hands-on Exploration of ESA GDA Knowledge Hub and APP for Humanitarian EO Data Access and Visualisation
16:00 – 16:30	Coffee Break
16:30 – 18:00	EO in UN Operations & International Coordination: CEOS & the International Charter on Space & Major Disasters
18:00 – 20:00	Social event

Day 2: Building extraction - focus on the use of VHR Optical Imagery & Deep Learning

Time	Session
09:00 – 10:30	Deep Learning Theory and Frameworks Overview (CNNs, SAM for Building Extraction) - include examples from humanitarian disaster damage assessments
10:30 – 11:00	Coffee Break
11:00 – 12:30	**Practical**: Inference Using Pretrained Models (SAM) on VHR Imagery for Building Footprint Extraction
12:30 – 13:30	Lunch
13:30 – 15:00	**Practical**: Deep Learning Data Preparation, Preprocessing, and Training of Custom Models in HPC/GPU Environments
15:00 – 15:30	Coffee Break
15:30 – 17:00	**Practical**: Hyperparameter Tuning and Evaluation of Deep Learning Models; Research Frontiers in EO AI for Humanitarian Use

Day 3: Different applications related to Crisis Monitoring - focus on SAR data

Time	Session
09:00 – 10:30	SAR Theory and Applications: Underlying Principles, Bands & Penetration, polarimetry, Use Cases in Subsidence, Flood, Crop Mapping
10:30 – 11:00	Coffee Break
11:00 – 12:30	**Practical**: SAR Data Access and Interpretation - Flood Monitoring/Land Use Mapping using SAR Imagery
12:30 – 13:30	Lunch
13:30 – 15:00	**Practical**: Crop Mapping with SAR Data/Change and Damage Detection Techniques
15:00 – 15:30	Coffee Break
15:30 – 17:00	Cross-Agency Tabletop Exercise on Satellite-based Flood and Subsidence Monitoring for Humanitarian Crisis Response

Day 4: Health, Agriculture, Sustainable Development - focus on Hyperspectral Data

Time	Session
09:00 – 10:30	Hyperspectral Data Fundamentals: EnMAP, Landsat, Sentinel-2 Overview; Use in Safeguards and Environmental Monitoring
10:30 – 11:00	Coffee Break
11:00 – 12:30	**Practical**: Access and Initial Landcover and Crop Type Mapping using Sentinel-2 Multispectral Data
12:30 – 13:30	Lunch
13:30 – 15:00	Targeted Hyperspectral Applications for Agriculture: Crop Health Assessment and Precision Farming Case Studies (e.g., Nutrient & Stress Detection)
15:00 – 15:30	Coffee Break
15:30 – 17:00	**Practical:** Hands-on in Hyperspectral Crop Stress and Soil Property Mapping, Comparison with Multispectral Approaches

Day 5: Climate Resilience and Humanitarian Operations – use of EO data from multiple sources

Time	Session
09:00 – 10:30	Earth Observation Data and Tools for Climate Resilience and Risk Monitoring: Medium-Resolution EO (Sentinel-3, MODIS) and Integrated Approaches
10:30 – 11:00	Coffee Break
11:00 – 12:30	Introduction to Use Cases: Integrating EO with Climate and Socioeconomic Data for Humanitarian Resilience Planning
12:30 – 13:30	Lunch
13:30 – 15:00	**Group Activity:** EO Data Workflow Challenge -- Designing Rapid Response & Resilience Mapping Product Using EO Datasets
15:00 – 15:30	Coffee Break
15:30 – 16:30	ESA EO4Health Programme: EO for Public Health Monitoring; Use Cases on Climate-Linked Health Risks
16:30 – 17:00	Course Feedback, Certification Ceremony, Closing Remarks