Training Opportunity for Luxembourgish Trainees

Reference	Title	Duty Station
LU-2022-EOP-SDA	**Hydrology Applications Development**	**ESRIN**

Overview of the mission

The Data Applications Division in the Department of Science, Applications and Climate based at ESA/ESRIN in Frascati, Italy, is in charge of engaging scientific, public and commercial sector user communities, identifying their needs, implementing EO data exploitation projects, tools and platforms to address these needs, and progressively transferring validated results and applications from research to operations. The Division builds up new scientific and end-user communities and works with them in targeted R&D and demonstration activities, that range from science up to pre-commercial applications development, to advance Earth system knowledge, maximise ESA missions impact in society and underpin the definition of future EO systems. The Division is responsible for coordinating ESA's EO training and education activities.

Overview of the field of activity proposed

As part of the Applications Section, within the Data Applications Division, you will be involved Hydrology related applications to investigate innovative EO approaches to monitor the dynamics of inland waters and their seasonal changes in extent, flow and volume.

This will include the following tasks:

- the review of existing multi-sensor approaches (including AI) to capture the intra- and inter-annual variations of inland water extent exploiting the frequent temporal revising of high spatial resolution SAR and optical missions (e.g., Sentinel 1, Sentinel 2, Landsat 8) and the assessment of their limitations,
- the review of existing methods to monitor inland surface water level estimations derived from satellite radar altimeter (e.g. Sentinel 3 SRAL, JASON, Cryosat) and the assessment of their limitations,
- the review of: a) the EO-products assimilation processes in hydrological/hydrodynamic models to estimate the changes in river discharges, and b) the combination of surface water extent and level estimations with ancillary data (e.g. digital surface model, bathymetry data) to infer the changes in lake volumes,
- the study of how the upcoming Surface Water Ocean Topography (SWOT) mission will improve the monitoring of surface water bodies (with possibility to exploit the first SWOT data in 2022),
- the development with an agile approach of improved/innovative application software to monitor the changes in extent, flow and volume of inland waters over representative pilot sites, leveraging existing ESA platform infrastructure,
- the quality assessment of the developed methods with scientifically robust validation steps,
- the writing of a final report and production of final presentation material.

Required background:

- Master's degree in a relevant technical or scientific discipline
- Good interpersonal and communication skills
- Ability to work in a multi-cultural environment, both independently and as part of a team
- Fluency in English and/or French, the working languages of the Agency