Thesis topic: Designing areal deployable GNSS sensors for landslide monitoring

Description of the work:

This thesis aims to assess technical solutions, develop, and experimentally evaluate initial design concepts for a sensor deployed by helicopter or drone. Building on an existing sensor platform incorporating GNSS, an inertial measurement unit, and radio communication, the work will focus on mechanical protection, impact energy absorption, landing behavior, and coupling between the sensor and the ground.

- Defining functional requirements and representative deployment conditions.
- Reviewing and comparing alternative approaches to impact protection, housing design, and stable positioning after landing.
- Developing and prototyping selected design concepts.
- Conducting controlled drop tests to assess impact survivability, landing stability, and functionality after impact.
- Comparing the tested concepts and recommending a preferred solution for further development.

What do we expect from you:

- Background in mechanical engineering, mechatronics, or a related field.
- Basic knowledge of mechanics, materials, and design.
- CAD and prototyping experience is beneficial.

What will you learn:

- Compare solutions for airdroppable sensors.
- Design and prototype impact-resistant concepts.
- Conduct drop tests and analyse results.
- Improve designs based on experimental findings.

Why does it matter?

Monitoring highly unstable rock slopes requires instruments that can be deployed without exposing personnel to hazardous conditions. Airdroppable sensors offer a potential solution, but must withstand impact, establish stable contact with the slope, and provide reliable motion measurements after deployment.

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