Project FOCUS: an interdisciplinary approach to monitor disturbances in European forest ecosystems

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European forest ecosystems are subject to a complex web of stressors including biotic agents, wildfires, climate change, and regional population shifts.

The drivers operate at multiple spatial and temporal scales and across many domains, calling for a truly interdisciplinary approach to understand and manage change.

Project FOCUS (Forest Operational monitoring using Copernicus and UAV hyperSpectral data), funded by the European Commission through the Horizon 2020 programme aims at introducing new methodologies to innovatively address these challenges. The use of Earth Observation data (multi- and hyperspectral) acquired by Satellite and Remotely Piloted Aerial Platforms is combined with extensive field and laboratorial research and the development of pervasive networks of stakeholders. These bring together academia, industry, and end-users, in a common forum to identify technical requirements and user needs. In this context, the process to adopt new solutions and policies is simplified and rendered seamless to end-users.

Widespread damage to forests caused by biotic agents creates a singular environment where such dynamics can be tested in a rapidly evolving scenario. A representative case-study is discussed where the threat posed by Pinewood Nematode (PWN) (Bursaphelenchus xylophilus) is assessed.

Preliminary results of the development of algorithms relying on Sentinel-2 data to detect infested trees are presented, with a focus on implementing an operational solution in collaboration with a broad network of users. The challenges, obstacles, and opportunities created by the integrated approach are discussed, offering clues for future initiatives addressing similar challenges.