

1 *Proceedings*

2 **Early Detection of Bark Beetle Infestation by Drone-** 3 **Based Monoterpene Detection**

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13 **Abstract:** The project PROTECT^{FOREST} deals with the improvement of early bark beetle detection to
14 allow a fast and effective response to initial infestation. The removal of trees in the early infestation
15 stage can prohibit bark beetle population gradation and successive timber price decrease. A semi-
16 conductor gas sensor array was tested in the lab and attached to a drone under artificial and real-
17 life field conditions. The sensor array was able to differentiate between α -pinene amounts and
18 between different temperatures under lab conditions. In the field, the sensor responded to a strong
19 artificial α -pinene source. The real-life field trial showed preliminary results, as technical and
20 environmental conditions did compromise a proof of principle. Further research will evaluate the
21 detection rate of infested trees of the new proposed sensor concept.

22 **Keywords:** UAV; VOC; bark beetle detection; semi-conductor metal oxide gas sensors