

HARMONIC RADAR TRACKS VESPA VELUTINA FLIGHT TO NESTS



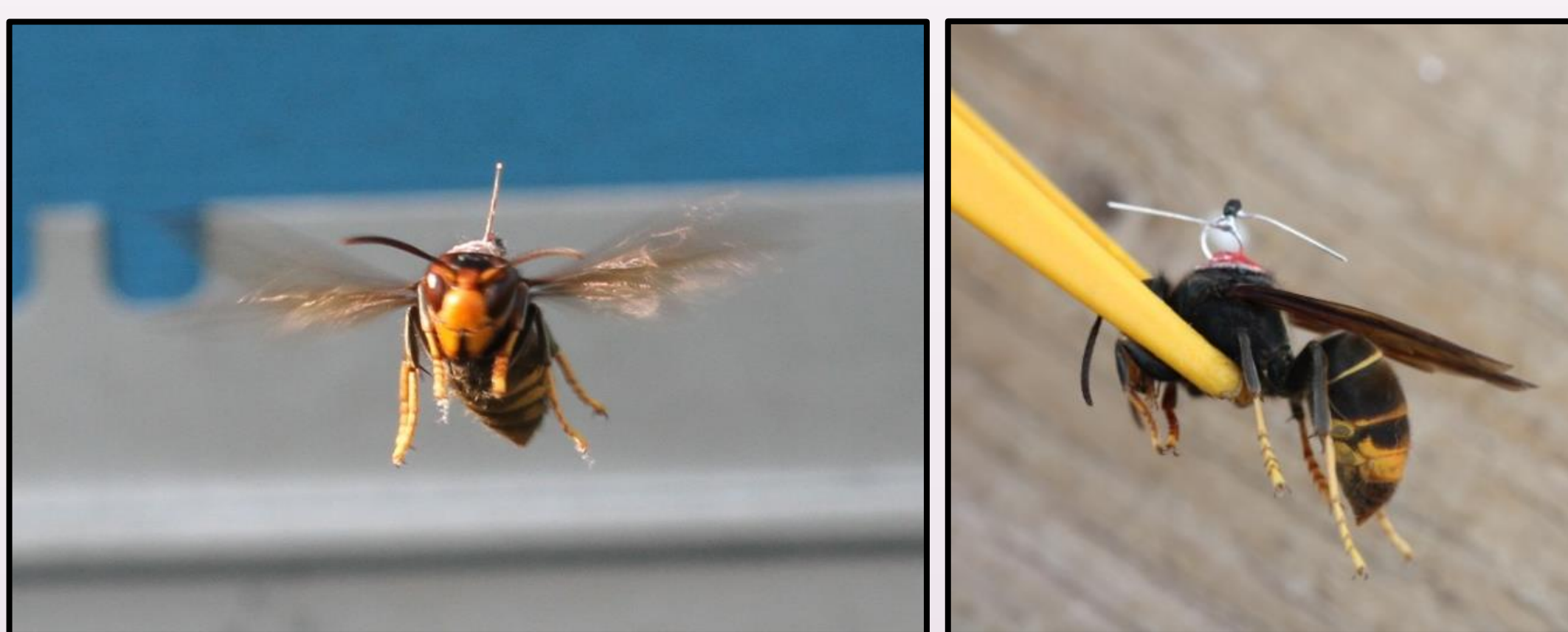
POLITECNICO
DI TORINO

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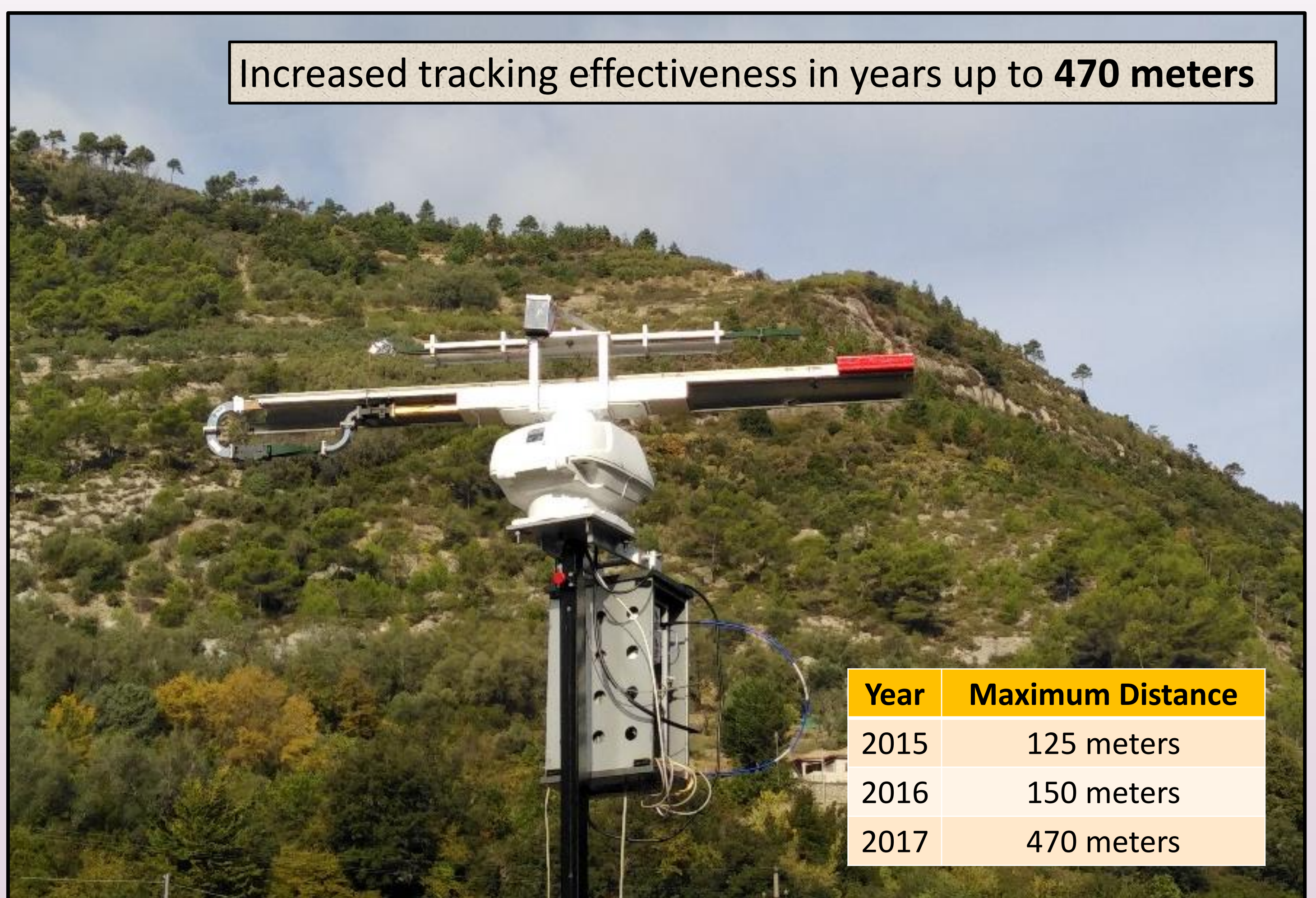
Harmonic radars have been used to track the flight of various insect species. Within the **LIFE14 NAT/IT/001128 STOPVESPA project - *Spatial containment of Vespa velutina in Italy and establishment of an Early Warning and Rapid Response System*** - a harmonic radar prototype has been developed for tracking the invasive hornet *Vespa velutina*. The radar is characterized by a vertical polarization of the radiated field and advanced processing techniques able to suppress clutter and improve target detection. The radar is capable to cover 360° in the horizontal plane and a large field of view in the vertical plane (20°). It allows to follow the tracks of the hornets tagged with a 12.3 mm wire antenna and a diode (12.1 mg) up to 470 m. The harmonic radar has been used in autumn 2017 in the westernmost part of Liguria (Italy), where *V. velutina* is present since 2012, and allowed the detection of three nests that were immediately destroyed. The radar will be used in 2018 for the control of *V. velutina* diffusion in Italy, but it could find use in several other fields of entomological research and pest management.



Different type of diodes used to follow the tracks of the hornets tagged

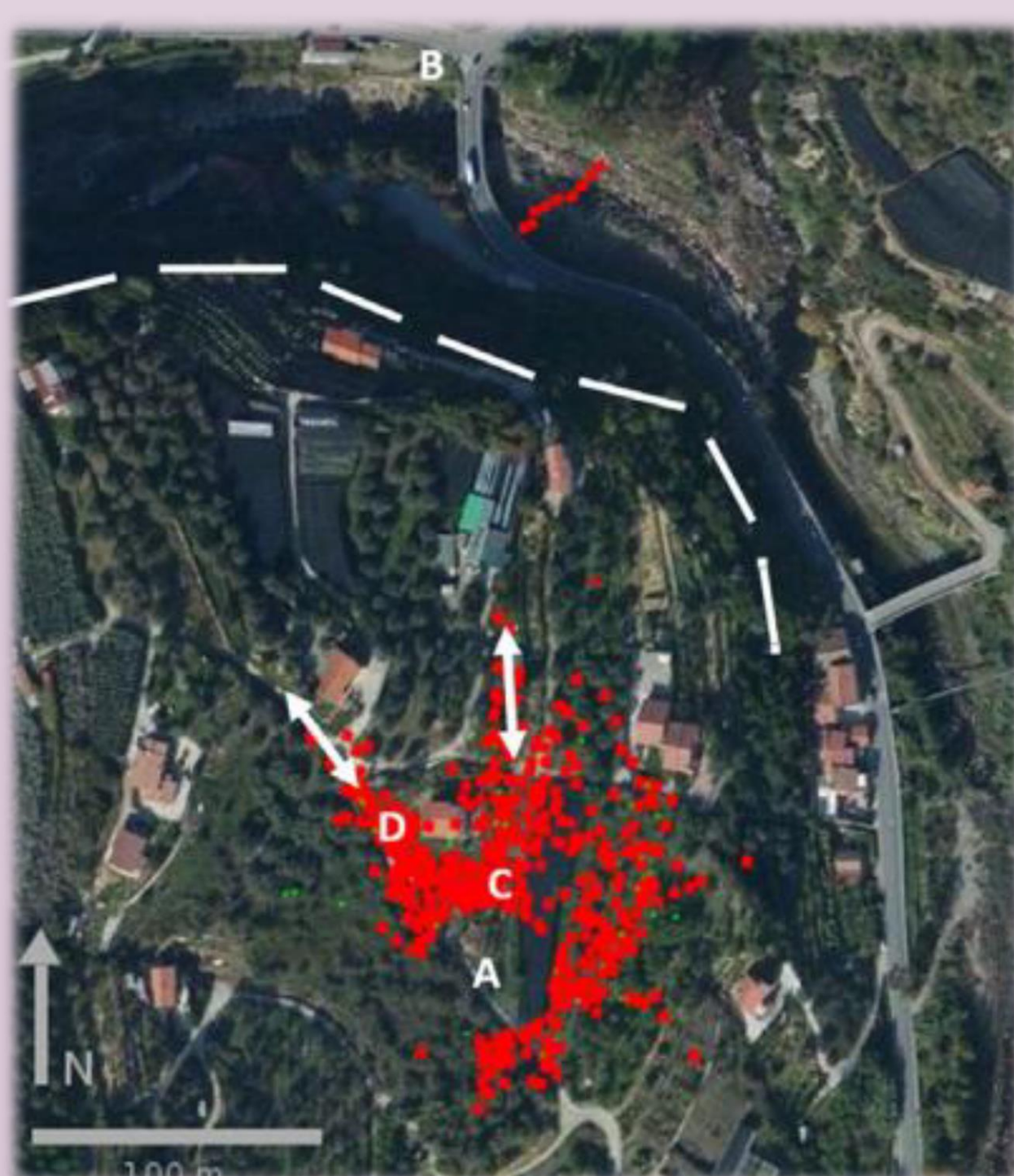


Increased tracking effectiveness in years up to **470 meters**

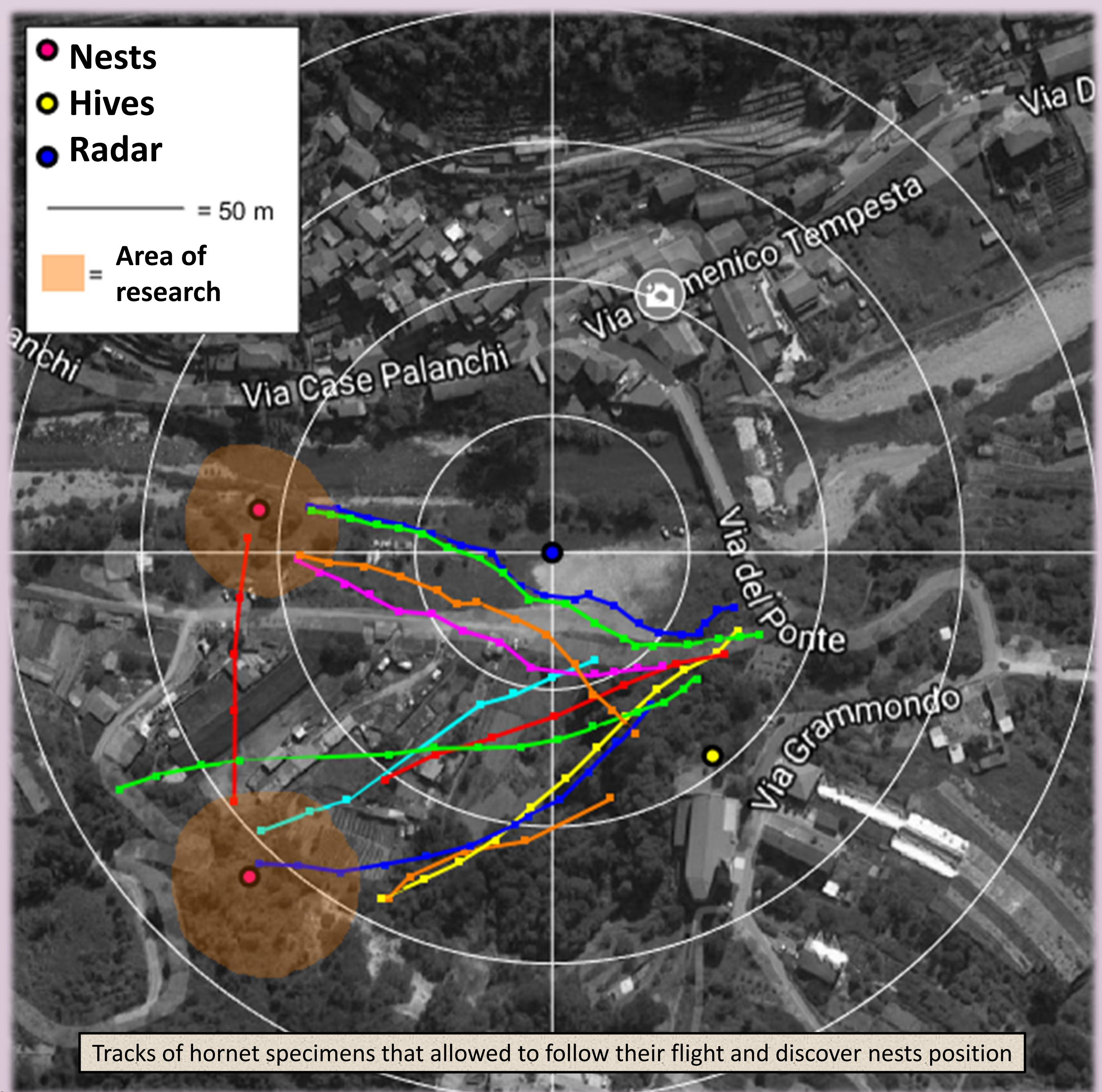
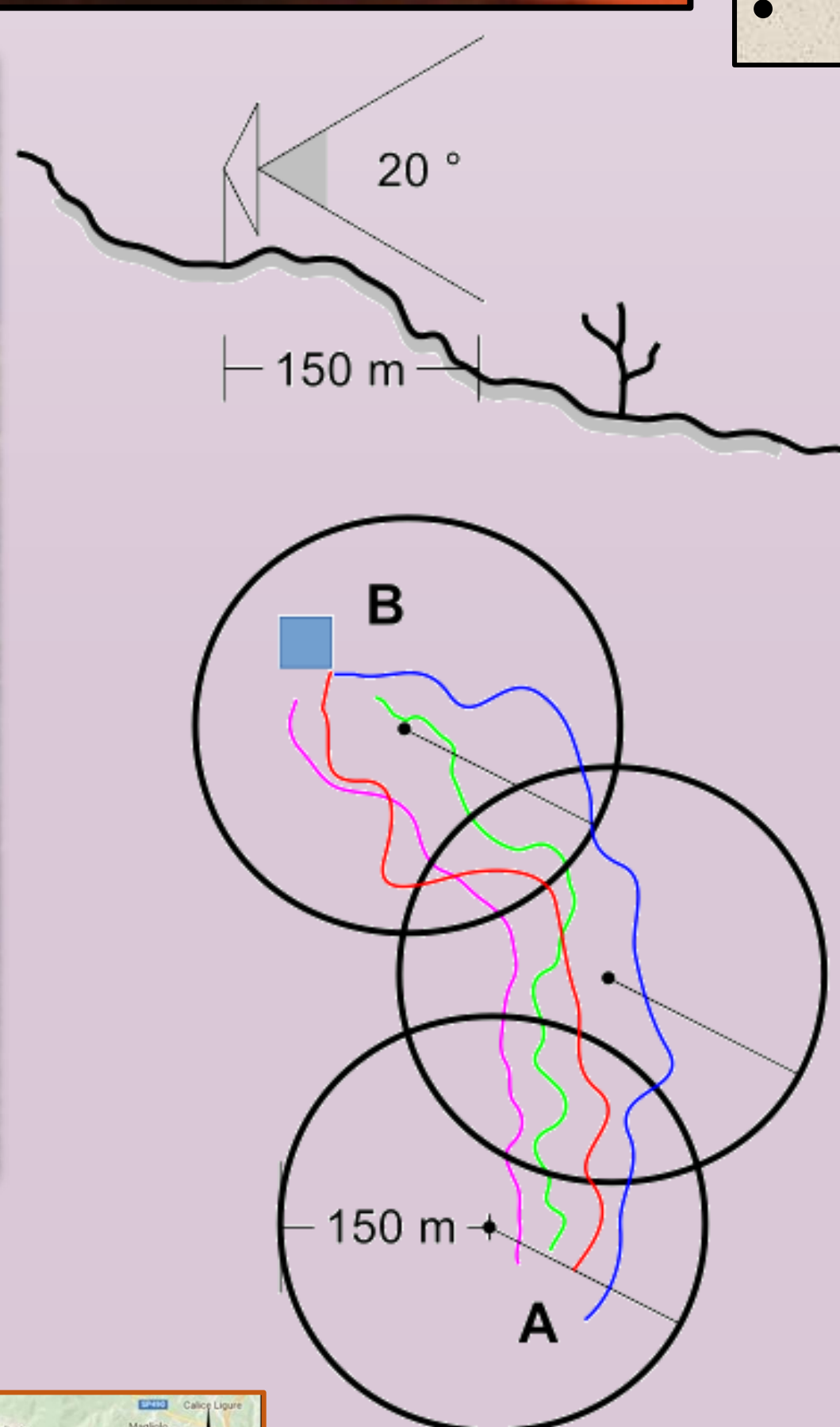
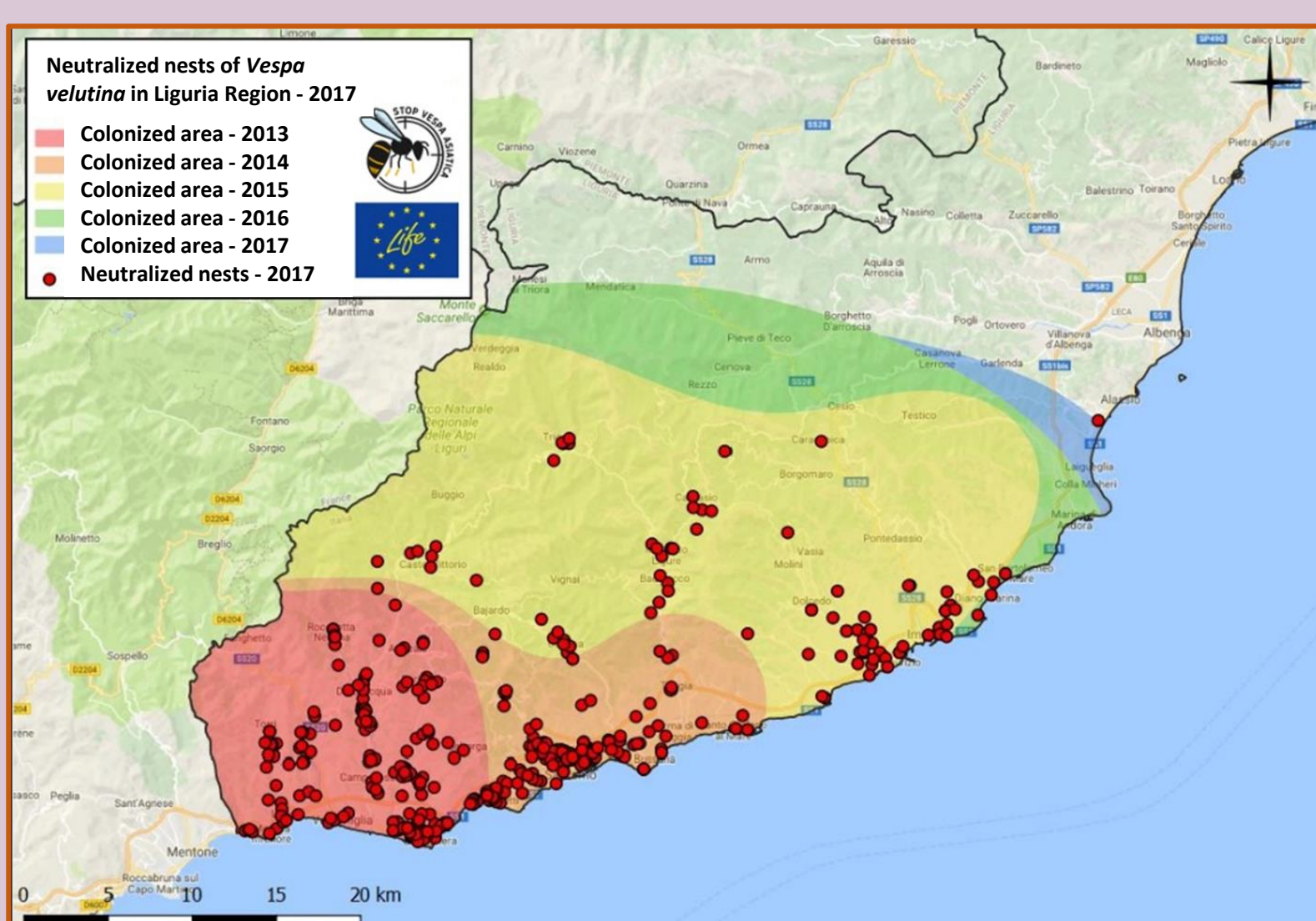


Year	Maximum Distance
2015	125 meters
2016	150 meters
2017	470 meters

- Ability to work in environments with complex topography
- Particularly suitable for new invasion outbreaks



Map of the overall tracks of 30 tagged hornets in a survey of three hours



Tracks of hornet specimens that allowed to follow their flight and discover nests position