# Low-Cost, Land-Based IoT Geolocation: a Smart-Farm Solution



Tractor path

WINET node/anchor

## Challenge & Solutions

While the Internet of Things (IoT) is beginning to offer land-based alternatives to the Global Positioning System, GPS is still the primary technology for locating and tracking objects. But GPS devices are energy hungry and require high-capacity batteries that may need more frequent replacement than with land-based systems. That makes them unsuitable for many critical uses, including smart farming. The Localization and Tracking with Inertial Sensors (LTIS) project, coordinated by Winet Srl, leveraged EuroCPS platforms in a new device that excedes other land-based, state-of-the-art object localization and tracking systems for agribusiness applications. The device, W-LTIS, enhances Winet's existing wireless sensor network solution by integrating inertial sensing capabilities in the EuroCPS iNEMO platform. That platform's inertial modules integrate complementary types of sensors for more compact, robust and easy-to-assemble solutions compared to discrete MEMS products. The new energy-efficient system tracks fruit bins, farm vehicles, cattle and people, and even estimates their trajectories across work areas, such as fields, farms and storage buildings.

## EuroCPS Support

Winet's new device also employs a motion MEMS and environmental sensor evaluation board from STMicroelectronics to implement node location awareness for IoT applications. It autonomously determines its position by applying inertial navigation techniques, in which measurements provided by accelerometers, gyroscopes and magnetometers are jointly used to track movement. In addition, the Centre for Industrial Research on ICT at the University of Bologna (UNIBO CIRI-ICT) guided the design of state-of-the-art inertial navigation algorithms for the new system. EuroCPS also supported the integration process of the new localization algorithms with the existing Winet network infrastructure.

## Digital Skills

**Winet Srl**: wireless sensor networks for agricultural and landslide monitoring.
**UNIBO CIRI-ICT**: inertial navigation algorithms

## Company

Winet creates and develops wireless sensor networks for innovative IoT applications, mainly in the field of environmental monitoring, agricultural support and landslide detection. Its small multifunctional devices are designed for low cost and energy efficiency (IT) www.winetsrl.com/en/

**Employees :** 4 full time, 4 part time

**Partners:** UNIBO CIRI-ICT

Since 2011

## Impact/What's next

The LTIS project promises to make agriculture production more efficient from field to market, while conserving water. Building on Winet's core business of providing agricultural monitoring sensors and services that analyze temperature, humidity and soil moisture content, and indicate when crops should be irrigated, W-LTIS introduces new functionalities for tracking fruit bins, people, vehicles and cattle. In addition to improving management of crops and orchards, it will help assure high quality fruits and vegetables for consumers. The tracking capability meets a primary need of food growers and agriculture cooperatives to follow their products from harvest to market. More broadly, localization and tracking are increasingly requested to track humans inside structures, e.g. doctors in hospitals and firefighters in emergency operations. The LTIS project is expected to increase business with Winet's existing customers and open new markets. For 2018, following product introduction in Italy, the company estimates revenue will reach €140,000 and grow 25 percent to €175,500 in 2019, as the com pany begins to introduce W-LTIS across Europe. Revenue is expected to surge 122 percent to €389,400 in 2020.