



The European Coordination Hub for Open Robotics Development



4th Review Meeting – WP3

R.D. Haken, co-founder Avular b.v.

SAGA, Swarm Robotics for Agricultural Applications

Luxembourg – 2018-02-21

Background

Motivation for the Work Conducted

- Weed problem, volunteer potatoes from sugar beet fields.
- Creating maps for automatic weeding or spot-spraying.

Technical Problem Addressed / Challenge Overcome

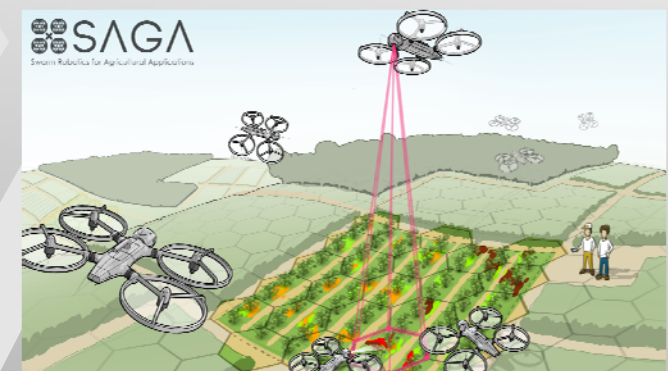
- **Nature of the problem:** Unlike land surveying (high altitude, fixed-wing), weed mapping requires close inspection. Weeds usually appear in patches.
- **Technical challenge:** Creating a scalable mapping solution: Drone adaptation for swarming, computer vision, and swarm behavior.

Expertise Relied on

- Swarming knowledge (CNR), Farming / Computer vision (WUR), Robotics expertise (AVU)

Start-date: 01.06.2016 / End-date: 31.03.2018

Participation in Experiment Booster



Solution Developed

Starting Point

- We had a prototype drone with standard hardware.
- A seed investment was received in April 2015 to get to this starting point.

Approach Followed / Development Work Conducted

- During the SAGA project, a second and third prototype were modified for swarming and weed mapping.
- Switch from large platform to smaller platform.

Technical Result / End Point

- Data collection tested in an operational environment
- Swarming proof-of-concept in an indoor setting



Being an Experiment in ECHORD++

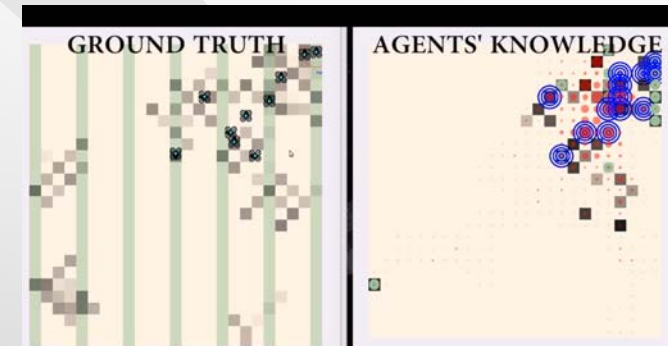
Benefit from participation in ECHORD++

Impact on Development Process

- Cooperation with (international) project partners
- Support during pivot
- Funding for commercialization (Boosters)

Actionable Insights

- A lot of reinventing the wheel in robotics.
- Finding commercially viable robotics solutions in open-field agriculture is hard. Agriculture is one of the least digitized businesses. Different business model needed.



Impact of Work Conducted

What do you have to show for it?

- Prototyping platform for mobile robots
- Indoor / outdoor local positioning system
- Field tested system

What has the support allowed you to achieve

- Failing with the first drone platform, then making a succesfull pivot to a platform that is easily programmable for other users / developers.
- Team of 7 FTE, >100k sales in 2017.

How does the outcome fit with your development strategy

- The outcome will be used to allow developers and researchers to innovate in (mobile) robotics.



Outlook

Next steps

- Validating repeatable and scalable sales and marketing process for the “Curiosity Box”
- Looking for follow-up project related to swarming, agriculture and spot-spraying (e.g. Herbicides)
- Raising additional capital

Longer term perspectives and growth expectations

- Revenue growth
- Facilitating the creation of more robot applications with less effort.