Welcome to the third issue of the Flourish Newsletter!

This is the last issue of the Flourish newsletter reporting the latest project progress, results, events and activities undertaken within the precision agriculture domain. This issue is also available on our project website: http://flourish-project.eu/

Sections

- Flourish project
- Keep informed
- Get together

Newsletter contents

In this issue you will find a general description of the Flourish project, all the activities related to the dissemination of the main Flourish progresses and results and finally all the opportunities for project partners and relevant stakeholders to exchange knowledge, experiences and technologies within the consortium or with external audience.
The Flourish Project

**Summary**

This section provides an introduction to the Flourish project and presents its main goals. The Flourish team is currently carrying out the last experimentations and tests on two main crops (sugar beet and sunflower) in order to design an efficient and integrated robotic system for precision farming.

**Flourish project**

Flourish is a three-year project on precision farming started on March 2015 and funded by the European Community Horizon 2020 Programme under grant agreement no 644227 and from the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 15.0029.

The FLOURISH project is carried out by a consortium made up of seven partners from four European countries (Switzerland, Germany, France and Italy), with highly specialized know-how ranging from robot design to crop management. Read more

**Project goals**

The aim of the Flourish project is to develop a robotic agriculture system that helps increasing yields to reach the growing food demand and, at the same time, to reduce the amount of applied agro-chemicals pesticides to meet the future pesticide usage requirements of a sustainable and safe food production on the field. Furthermore, the Flourish solutions are expected to contribute to more efficient use of human resources in crop development and to reduce farms emissions.

Read more on Flourish Project on the newsletter 1st Issue
Flourish results are disseminated towards several stakeholders such as scientific experts, agriculture operators and organizations, business sector and policy makers.

This section presents the Flourish main dissemination channels and events and the latest news related to the project.

### Latest news

**Community Research and Development Information Service (CORDIS)**

A project factsheet reporting the main Flourish results has been published on the Community Research and Development Information Service (CORDIS) webpage on May 2018. CORDIS is the European Commission's primary public repository and portal to disseminate information on all EU-funded research projects and their results. [Read the Flourish factsheet on Cordis](#).

### Social media

A YouTube channel, a Facebook and a Twitter account contribute to Flourish results dissemination. Videos, activities and news on the project are available on these media.

Moreover a Flourish project space is available on the scientific social networking site “ResearchGate”. The space contains a description of the project, project log, references, and a space for questions. This allows interested people to follow the project and to stay up to date, especially with respect to scientific achievements within the project.
**Flourish Demo**

In May 2018 ASSAM, in collaboration with Flourish partners, organized the event “Flourish-Demo” in the Marche Region (Italy), to promote the precision farming theme and to publicly present the Flourish progress. Several meetings on specific themes and a field demo have been scheduled to fill the gap between research and the professional areas and to discuss about the state of the art of technologies and innovations developed within the sector so far.

Overall the Demo involved about 300 participants including researchers/experts working in precision agriculture and robotics, public administration representatives, potential end-users of the developed technologies, students and other stakeholders. [Read more]

**FLOURISH DEMO EVENTS**

**Performance Evaluation for Small UAVs in Precision Agriculture**

This event aimed to provide a systematic evaluation of the performance of small UAVs (multi-copters) by means of tests assessing the UAVs’ capability to generate a 3D map of a field and the capability to find and inspect a specific object from a close proximity. The tests have been organized following the tools and methodologies developed by international standardization bodies (National Institute of Standards and Technology - NIST). [Read more]

**Workshop on Small UAVs for Precision Agriculture**

This workshop provided a forum for scientific dissemination of the results achieved by Flourish and created an exchange opportunity with researchers working on the related technical challenges. [Read more]

The latest research developments in the sector have been presented by researchers from the Swiss Federal Institute of Technology of Zurich, several Italian research bodies and from the National Institute of Standards and Technology (U.S.A). At the end of the event a panel discussion on the challenges for robotics research in precision agriculture has been organized.
Presentation of the Flourish project and field demonstrations

This event has been conceived to introduce the precision farming theme and the Flourish system to a large audience (about 100 participants). Agricultural and engineering academics, economists and representatives of Italian Civil Aviation Authority presented an overview on precision farming, gave inputs to discuss about the economic sustainability of this sector and illustrated some regulatory aspects for UAVs flight in Italy. The Flourish team presented the project and its potential application in the precision farming sector.

Flourish end-user evaluation

The main goal of this event was to collect feedbacks from potential end-users of Flourish technologies and to provide inputs for a Flourish system validation. The evaluating panel was an heterogeneous group made up of 17 professionals, public officers, researchers, employee of the Italian Ministerial experimental field testing centres, representatives of Multi-national chemical product traders and of crop storage companies, high-school teachers and students.

After a short general introduction on precision farming technologies, partners presented the main Flourish results. Field demonstrations were performed also during this event to allow end-users to assess the Flourish system operation in real field conditions. The potential applicability of the Flourish robotic system in the current European precision farming was discussed as well.

Workshops with students

Farm technicians, engineers academics and Flourish partners presented to a group of 140 students and teachers from agricultural and technical secondary schools some applications of precision farming technologies and research activities linked to the sector and the Flourish project.
FLOURISH DEMO FOLLOW UP

RAI3 TV reports

The RAI3 regional news programme of the Italian public broadcasting company shot two TV reports during the “Presentation of the Flourish project and field demonstrations” event of the Flourish Demo. The reports were aired on the programme "Buon Giorno Regione" and one of them was re-transmitted on the Regional TV newscast. Watch the video (minute 11:28-13:42 and 23:31-27:46)

ASSAM and Regione Marche videos

ASSAM produced a 5’ video shortly introducing the Flourish project and then narrating the activities carried out during the Flourish Demo. Watch the “Flourish demo” video

A further video presenting the Flourish project has been published as a result of a press conference organized at the Marche Region offices (Italy) to promote and invite people to the Flourish demo. Watch the video

Article on “Pianeta PSR”

A long article presenting the main contents of the Flourish Demo event has been published on the Italian newspaper "Pianeta PSR" dealing topics linked to the Rural Development Plan (read article).

Presentations

In the last months the Flourish project has been presented at numerous workshops: e.g. the “Mobile Robotics in Uneven Environment” workshop, the workshop for Image analysis in Agriculture Computer-Bildanalyse in der Landwirtschaft 2018 and ICRA 2018.

ICRA 2018 - Workshop for Robotic Vision and Action in Agriculture

UBN and ETHZ contributed to the organization of this workshop bringing together researchers and practitioners to discuss advances in robotics applications and their intersection with agricultural practices. The workshop explored the impact of these advances on agricultural practices and robotics applications in the crop and environment managing. Read more
Moreover several talks on Flourish were held in various context: e.g. Invited Talk about New Technologies for Sustainable Crop Production at the Universitätsgessellschaft Bonn, Keynote Talk at the British Machine Vision Association Meeting in London, talks in three different German cities about UAV-based detection of PA-Weeds in peppermint.

Along with these latter events a demo of the Flourish classification system performed in Darmstadt (DE). The Flourish team also intervened at the 14th International Conference on Precision Agriculture and to the ESA 2018 Congress.

Finally Flourish results have been presented at the Live Demo at Campus Klein-Altendorf of the Bonn University for the German newspaper “Frankfurter Allgemeine Zeitung”, at an In-house presentation for Toyota Research Institute and at an ETHZ public event on Smart Farming.

**ETHZ public event on Smart Farming**

A public event with ETH President Lino Guzzella, Federal council Schneider-Ammann and Achim Walter was organized by the ETH Studio AgroFood, ETH Global, and the World Food System Center. The presentations were followed up by a moderated panel discussion.

**Publications**

During the project time lapse, the Flourish team produced around 50 scientific papers, many of them have been published in two of the most prestigious conferences of the robotic research sector: ICRA (International Conference on Robotics and Automation) and IROS (International conference on RObotic Systems).

Please find the list of Flourish scientific publications [here](#).

In the last semester further informative articles on Bonirob were published on the Newspaper "Freiburger Wochenbericht" and Agriculture magazine "top agrar" ([read article](#)).
Get together!

Section #3

Summary

This section presents the main opportunities for project partners to exchange knowledge and experiences each other and the scheduled events linked to the Flourish theme.

Meetings

From the beginning of the project 5 integration weeks have been organized to ensure integration of all the individual modules to a working subsystem. Moreover 2 review meetings have been organized to explain to the EC Project Officer and to external experts assisting the EC in the project assessment the work carried out by partners and progress achieved so far.

The 5th integration (May 2018) week has been embedded within the Flourish Demo event. The Flourish Demo has also been an intense interdisciplinary collaboration session for partners, which could work together to the tuning of the robotic system at the final stage of the project.

During the event the different modules for weed detection, tracking and spraying were successfully tested and ran simultaneously on real field conditions (on sugar beet and sunflower crops). UAV-UGV coordinated missions were performed as well.
Three videos resulted from the 5th integration week work have been published on the Flourish website. They deal with the UGV autonomous navigation modes (off-field, in-field and weeding), they show UGV weeds detection and treatment with the spraying module and they illustrate the steps of a UAV-UGV joint mission carried out on the field.

Autonomous navigation—Watch video

Selective spraying—Watch video

UAV-UGV coordination—Watch video

Next events

The last Flourish integration week is planned for the period 12-18 September 2018 in Eschikon (CH) just before the final review meeting that is scheduled on the 19th of September.

IROS 2018 conference - Oct 2018

ETHZ organized a IEEE Robotics and Automation Letters (RA-L) special issue on “Precision Agricultural Robotics and Autonomous Farming Technologies” with IROS2018 conference option. The Special Issue will be associated with the 2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2018, Spain) and accepted articles will be presented at the conference.

Moreover the Flourish team will participate to the IROS exhibition as one of EU funded-projects exhibitors.

REFAB Conference - Oct 2018

ETHZ will present Flourish at the “Revolution in food and biomass production” conference (Germany) under the topic “Precision farming, robotics, drones and Artificial Intelligence”
The Flourish consortium, led by ETHZ, consists of Universities, a leading technology supplier, a scientific research center and a regional agency for agro-food sector services. Read more on Flourish Consortium [here](#)!