

# **DELIVERABLE 7.3**

## **Report on dissemination activities**

**UDLR**

**UPV, SYM**

The D7.3 is focused on dissemination activities derived from the research and development of the project. In this deliverable we consider that it is important to include the industrial dissemination, thus providing an optimal overview of the whole project.

## Year 1

### Industrial dissemination

The tradeshows that partners considered strategic for enhancing the visibility of the project were:

- **Global Robot Expo: 2 - 4 February 2017, Madrid (Spain).** In their webpage they announce that there were more than 2,200 appearances in media, a total of 11,000 visitors, more than 140 brands presented, more than 8,000m<sup>2</sup> of exhibition, media impact of 45 million euros, and global audience of 400 million people. In Figure 1 is shown different moments in the tradeshow when the coordinator was interviewed by different press media.



Figure 1. VineScout coordinator being interviewed by two different press media

- **SITEVI: 27-29 November 2017, Montpellier (France).** SITEVI is the international equipment and expertise exhibition for the vine-wine (mainly), olive, and fruit-vegetable productions. In their website they said that SITEVI has confirmed its status as the imperative business & innovation event for all producers, with more than 1,000 companies exhibiting, 54,000 registrations/entries, and with visitors from 52 different countries.
- Other forums, where UPV members were invited to talk about the project: **Bayer Digital Farming Day** (23 May 2017, Seville, Spain), organized by the company Bayer, **VineScout:**

**FTI project success story** (27 September 2017, Valencia, Spain), organized by Universitat Politècnica de Valencia, and **CIGR Next Leaders meeting**: 13-15 July 2017, Chicago (Illinois, USA). The CIGR is the International Commission of Agricultural and Biosystems Engineering. From their webpage, it is an international, non-governmental, non-profit organization consisting of a network of Regional and National Societies of Agricultural Engineering as well as private and public companies and individuals worldwide. They manage different kinds of resources, such as the CIGR Journal, conference proceedings, newsletters, a CIGR Handbook, as well as Working Groups. The coordinator of VineScout is involved in Section III of CIGR, Plant Production, as the secretary. This meeting brought an opportunity to introduce the VineScout project to the international community represented by the CIGR.

## Scientific dissemination

- **ASABE Annual International Meeting: 16 – 19 July 2017, Spokane (Washington State, USA).** The American Society of Agricultural and Biological Engineers (ASABE) holds the Annual International Meeting (AIM) every year. The ASABE conference is the most important meeting for Agricultural Engineers worldwide. This year, the number of people attending the conference according to ASABE publication magazine “Inside ASABE” (article named Speaking of Spokane: Wrapping up the 2017 Annual International Meeting) was more than 1,700 people, one among the highest attendance in the recent years. During this meeting, VineScout project was presented in a parallel session called Automation and Robotics for fruit, vegetables and other specialty crops - Part 2. That session took place in a room with about 60 people attending. The article presented was ***Performance Improvement of a Vineyard Robot through its Mechanical Design***, by Veronica Saiz-Rubio (UPV), Francisco Rovira-Más (UPV), and Christophe Millot (WALL) - DOI: 10.13031/aim.201701120. In Figure 2, there is a copy of the conference program announcing the oral session presentations. The presentation given by UPV is highlighted. Figure 3a shows UPV member presenting the project to the audience, and Figure 3 shows the increase in visits to VineScout webpage during UPV stay in USA: the aquamarine dots are visits before the meeting, and red dots are the visits after the conference. There were also seven visits from Spokane, where the conference took place.

Wednesday, July 19 – 10:15AM-12:15PM  
**SESSION 331 AUTOMATION AND ROBOTICS FOR FRUIT, VEGETABLES AND OTHER SPECIALTY CROPS - PART 2**  
 – Sponsored by MS-48  
 Moderator: Manoj Karkee, Washington State Univ  
**Location: 203**

Time	Paper#	Title/Author
10:15AM		<b>Introduction</b>
10:20AM	1700662	<b>Development of a new dry bin filler for apple harvesting and infield sorting with a review of past and existing technologies</b> Zhao Zhang, Michigan State University, East Lansing, MI United States (Presenter: Renfu Lu) (Zhao Zhang, Anand Pothula, Renfu Lu)
10:35AM	1700160	<b>Designing and evaluating the use of crop signaling markers for fully automated and robust weed control technology</b> Thuy Nguyen, University of California Davis, Davis, CA United States (Presenter: Vivian Vuong) (Thuy Nguyen, David Slaughter, Steven Fennimore, Vivian L. Vuong)
10:50AM	1700587	<b>Evaluation of a new apple in-field sorting system for fruit singulating and imaging</b> Anand Pothula, USDA Sugarbeet and Bean Research Unit, East Lansing, MI United States (Anand Pothula, Renfu Lu, Zhao Zhang)
11:05AM	1700871	<b>An Automated System for Crop Signaling and Robotic Weed Control in Processing Tomato</b> Vivian Vuong, University of California Davis, Davis, CA United States (Vivian Vuong, David Slaughter, Thuy Nguyen, Steve Fennimore, D Ken Giles)
11:20AM	1701288	<b>Stereo Vision for Computational Bird Detection and Deterrence</b> Shivam Goel, Washington State University, Pullman, Washington United States (Shivam Goel, Santosh Bhusal, Matthew Taylor, Manoj Karkee)
11:35AM	1701420	<b>Automated high-throughput machine vision-guided waterjet knife strawberry calyx removal system</b> Yang Tao, University of Maryland, College Park, MD United States (Yang Tao, John Lin, Robert Vinson, Maxwell Holmes, Xuemei Cheng, Gary Seibel)
11:50AM	1701120	<b>Performance Improvement of a Vineyard Robot through its Mechanical Design</b> Veronica Saiz-Rubio, Universitat Politècnica De Valencia, Valencia, Spain (Veronica Saiz-Rubio) (Veronica Saiz-Rubio, Francisco Rovira-Mas, Christophe Millot)

Figure 2. ASABE Program announcing UPV presentation about VineScout

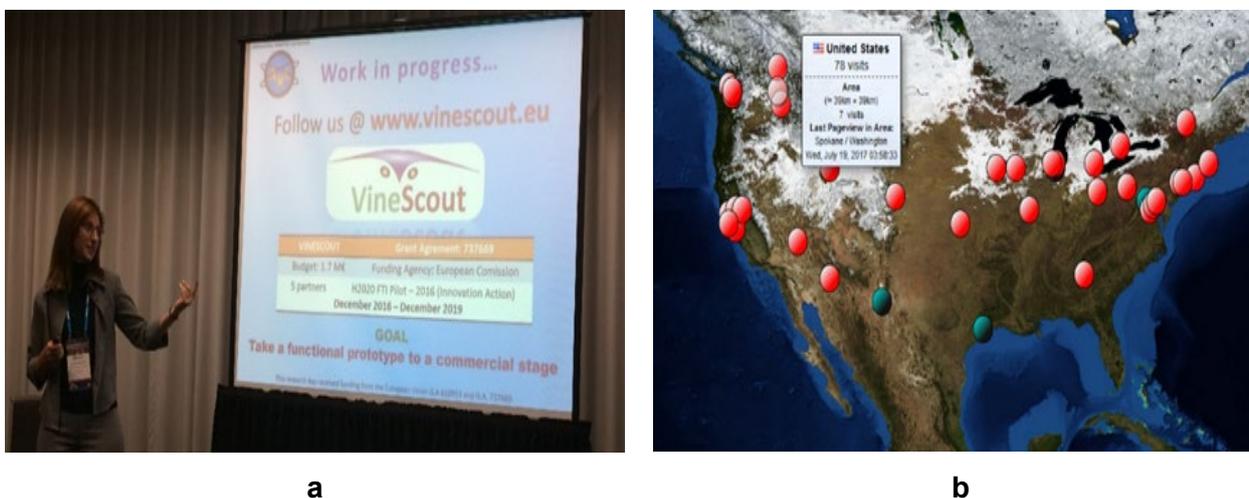


Figure 3. Presentation of VineScout European Project

After ASABE meeting, members of UPV visited some laboratories in Washington State University to disseminate the H2020 European Project VineScout. They were to two different campuses: Prosser (CPAAS: Center for Precision & Automated Agricultural Systems), and Pullman (Department of Biological Systems Engineering).

- **ECPA** (European Conference on Precision Agriculture): **16-20 July 2017, Edinburgh (UK)**. The conference welcomes papers about all aspects of precision agriculture related to any cropping system—from soil and crop sensing, to data management, information systems and spatial decision support systems. The paper presented was titled ***On-the-go thermal imaging for water status assessment in commercial vineyards***, by S. Gutiérrez, M. P. Diago, J. Fernández-Navales, and J. Tardaguila (all members from UDLR).
- **GiESCO: 5 – 10 November 2017, Mendoza (Argentina)**. GiESCO stands for "Group of international Experts of vitivinicultural Systems for Cooperation". In their webpage they announce GiESCO as one of the most important scientific and technological meeting related to viticulture. GiESCO Meetings are organized every two years and about 300 people assist to them. Scientific and technological subjects are presented during the meeting as talks or posters, and there are also field visits to local research and commercial vineyards and wineries. One day of the meeting, the Professional Day, is usually targeted to the local audience of professionals and growers. The research article presented was ***Vineyard water status assessment by non-destructive, proximal, NIR spectroscopy***, by Juan Fernández-Navales, Salvador Gutiérrez, and Maria Paz Diago (all members from UDLR) - DOI:10.1017/S204047001700108X.
- Another minor conference, where UPV members were invited to talk about the project: **Agrichains workshop** (6-8 November 2017, Vila Real, Portugal).

## Year 2

### Industrial dissemination

The tradeshow that partners had opportunity to attend was:

- **Global Robot Expo II edition: 18 – 20 April 2018, Madrid (Spain)**. This is the first time that the tradeshow is located in IFEMA, one of the biggest pavilions in Madrid. In their webpage they announce some Global Robot Expo 2018 highlights, as that there were 150 brands or 6,000 people attending. Figure 4 showed one moment of the Vinescout stand, as well as the roll-up brought to the fair.



The Global Robot Expo is an international trade show where companies, research institutions, and professional associations show their last advances in robotics. This edition was the 3rd one, and took place from 18 to 20 April in Madrid, Spain. The VineScout project was shown under the Polytechnic University of Valencia (UPV) stand. There were 85 stands in the show, being almost 90 % from private companies.

Figure 4. Piece of news in VineScout webpage about the attendance to the Global Robot Expo 2018.

Figure 5 shows the press release that one of the most known, if not the most, newspaper brand in Spain launched for that event.

## Global Robot Expo: feria referente en el mundo de la robótica

Para más información visita [www.globalrobotexpo.com](http://www.globalrobotexpo.com)

**ZIMMER**

En Zimmer Group son líderes en tecnología. Con su red de distribución llega a 125 países. En los distintos ámbitos tecnológicos, el Grupo garantiza un servicio amplio y transparente de todos los componentes y las soluciones.

¿Qué tipo de productos fabrica y para qué sectores? Empresa fundada en 1980 en el sur de Alemania, Zimmer Group fabrica y desarrolla productos para la automatización. La empresa se estableció en el mercado con el desarrollo y producción de componentes altamente complejos y soluciones de sistemas para clientes OEM reconocidos, convirtiéndose rápidamente en una empresa High Tech. Es uno de los principales fabricantes en la industria de hoy. Los sectores que se benefician de nuestros productos son el del automóvil, consumo, eléctrico, farmacéutico, aero-espacial, plástico, máquina herramienta, etc.

¿Cuáles son las tecnologías que utilizas? El mundo está cambiando continuamente. En la construcción de máquinas y la automatización, este cambio, se conoce como revolución Industrial 4.0. Esta tecnología combina la ingeniería clásica con la tecnología de la información, la interconexión de componentes, máquinas y compases de fabricación completos. En definitiva, plantea una solución para los desafíos futuros en entornos de producción del mañana. Industrial 4.0 aporta a los clientes del Grupo Zimmer todo el potencial de posibilidades crear y optimizar de redes de componentes, de máquinas y de personas en el entorno de producción.

¿Cómo realizas la distribución? Zimmer Group cuenta con filiales propias en todos los continentes, aparte de delegaciones comerciales en la mayoría de los países industrializados. Con ello, tanto la consultoría técnica, como el servicio postventa están garantizados. [www.zimmer-group.de/es](http://www.zimmer-group.de/es)

Como especialista en robótica y tecnología de automatización, KUKA se encuentra entre las empresas líderes en fabricación de robots industriales. Con su amplia gama de robots, KUKA cubre prácticamente todos los tipos y rangos de carga, y establece los estándares de la colaboración hombre-robot. Hablamos con Fernando Sánchez, CEO de KUKA Iberia.

¿En qué tipo de robótica estáis especializados? KUKA se presenta en el sector como líder mundial en el suministro de robótica industrial y tecnología de instalaciones y sistemas. Actualmente el sector de componentes de automóvil sigue liderando el crecimiento en España, así como el de fabricantes de maquinaria, otros tienen un crecimiento sostenido durante los últimos años, como el de la alimentación y el metal en general.

¿Qué tipo de necesidades pueden cubrir las empresas con sus productos? La industria 4.0 no es una opción, es una realidad. Por este motivo ya se habla de necesidades como conectividad, productividad, big data, etc. En sintonía con las funciones propias de las tareas automatizadas que ofrecen los robots de KUKA diseñados para operar de forma rápida, efectiva y flexible. Ofrecen una gran versatilidad de aplicación, así como la posibilidad de interactuar con otros procesos de automatización.

¿Cuáles son las ventajas de utilizar la robótica en empresa? Hay una necesidad real de automatizar procesos en los que la presencia de las personas es preciosa y difícilmente sustituible, es ahí donde los robots aportan gran valor, cuando el robot y la persona trabajan juntos. Actualmente ya hay elementos de seguridad que combinados con robots convencionales, aportan más prestaciones, agilizan y flexibilizan el proceso de producción. [www.kuka.com](http://www.kuka.com)

Ocio Global Import está especializada en la distribución de productos de robótica y robótica educativa. Unifican la educación y el ocio, con productos para la formación básica, superior y profesional. Buscando la forma divertida y creativa de explorar la tecnología y la robótica. Su objetivo es introducir al usuario en el mundo de la tecnología, utilizando juegos creativos que estimulan el aprendizaje y se motiva la curiosidad desde los niños.

Son los distribuidores oficiales de compañías como Fischertechnik, EDISON o Tinkerbot.

Fischertechnik dispone de varias líneas de producto: Línea TOY, juguete educativo y creativo. Línea educativa enfocada a la enseñanza. Y la línea Industrial enfocada a ingenieros, empresas y universidades. Se trata de un producto de construcción, con el que se aborda de manera didáctica disciplinas como la electrónica, la electrónica y la óptica. Además de las energías renovables, la física, la programación y la impresión 3D.

EDISON Robot, producto compatible con LEGO que funciona con y sin programación. Sin programación a través del lenguaje de códigos de barra y con programación desde la programación por bloques hasta lenguaje avanzado Python.

Tinkerbot, es un sistema de construcción robótico diseñado para niños de 5 años en adelante. Construirán sus primeros robots y aprenderán a programar de forma lúdica. Es compatible con LEGO y fomenta la memoria, la concentración y la creatividad. Todos los productos incluyen material didáctico explicativo, ejercicios y documentación para profesores. [www.ocio-globalimport.com](http://www.ocio-globalimport.com) / [info@ocio-globalimport.com](mailto:info@ocio-globalimport.com)

Hablamos con Francisco Rovira Más, catedrático y director del Laboratorio de Robótica Agrícola creado en el año 2012 en la Universidad Politécnica de Valencia.

Francisco, ¿qué te lleva a dirigir este laboratorio? Poder continuar con las investigaciones que estaba realizando en EEUU para la multinacional John Deere, y la firme convicción de que la docencia en educación superior debe ir íntegramente ligada a la investigación.

¿En qué se centra la investigación del laboratorio? En el laboratorio intentamos abordar las múltiples facetas que conforman el término agricultura digital, en concreto la robótica móvil, la agricultura de precisión, y los sistemas de información digital.

¿Cuáles son sus objetivos principales? El objetivo principal es aplicar las últimas tecnologías digitales a los vehículos utilizados en cultivos intensivos. Entre las tecnologías utilizadas en nuestras investigaciones, podemos citar los sistemas de posicionamiento por satélite como GPS y GALILEO, la visión artificial monocular y estereoscópica, los sistemas de control automático, y la implementación de nuevos sensores no invasivos para extraer información de los cultivos.

¿Qué forma de trabajar tenéis y con qué equipo contáis? Aunque recibimos visitas frecuentes de corta duración, el trabajo del laboratorio se centra en proyectos de investigación competitivos, especialmente los que provienen de la Comisión Europea que permiten la contratación de personal investigador. En estos momentos estamos participando en un proyecto nacional financiado por el I+D+i y en el proyecto europeo Vineduc2.

[www.robotagri-lab.webs.upv.es](http://www.robotagri-lab.webs.upv.es)

**LZF LAMPS: CALIDAD, DISEÑO Y MATERIALES DEFINEN ESTA FIRMA DE PRESTIGIO INTERNACIONAL**

Desde 1994 LZF está presente en el sector de la iluminación, retando al diseño y la creatividad de manera continua y exitosa. Desde su fábrica en el Medfordino, cada pieza se fabrica a mano, con suma precisión teniendo en cuenta la sostenibilidad del planeta.

Vuestros lámparas tienen un diseño exclusivo ¿cómo os cogéis a vuestros diseñadores? Contamos con equipo de diseño íntimo y una consultora externa y entre ambos estamos atentos para poder seleccionar aquellos diseñadores/as que pensamos que podrían ser interesantes para una unión. Una vez realizada la selección proponemos reuniones, para nosotros es muy importante que los profesionales con los que trabajamos entiendan y compartan la filosofía de la marca, el material con el que trabajamos y que ambos conectemos desde lo humano, ya que el proceso posterior requiere de un gran trabajo en equipo. Es una tarea difícil pero, sin duda, que suma valor cuando es exitosa.

¿Qué tipo de materiales utilizáis? La madera es nuestra pasión y nuestro sello. Tras un largo proceso de I+D conseguimos poder modularla y hoy podemos decir que somos capaces de crear esculturas e iluminarlas.

¿Cómo realizáis la distribución? ¿Tenéis catálogo digital? La marca tiene sedes en España y Miami, y desde estos dos puntos distribuimos a todo el mundo. Nuestro catálogo está disponible a través de la página web, donde se pueden ver todas las colecciones disponibles en este momento. [www.lzf-lamps.com](http://www.lzf-lamps.com) / Tel. +34 962 524 786

Figure 5. Global Robot Expo press release from El País.

- Some partners attended **VINITECH on 20<sup>th</sup> – 22<sup>nd</sup> Nov 2018 in Bordeaux (France)** with the objective of analysing the evolution of the robotics market. Figure 6 shows some moments of the tradeshow where partners are posing with some robots for the vineyard.



**Figure 6.** Partially potential competitors for VineScout: robots for vineyards.

- **FIRA2018: 11 – 12 December 2018, Labège (France).** The second VineScout prototype VS-2 was presented to the robotics community in the third edition of the international tradeshow FIRA2018 (Forum International de la Robotique Agricole). VineScout had its own booth in the main exhibition area where the robot occupied the center of the stand and the promotional video was continuously displayed to attendees. The event centered on farm robots and related autonomous equipment. The coordinator of the project, Francisco Rovira Más, gave a short talk presenting the project, the last robot prototype, and the results of the 2018 testing season (Figure 9).



**a**



**b**

**Figure 9.** Exhibition area in FIRA2018 tradeshow (a). VineScout coordinator presenting the project (b).

## Scientific dissemination

The conferences attended by partners, and the correspondent research articles written during the second reporting period were:

- **World Congress of the International Commission of Agricultural and Biosystems Engineering (CIGR): 22 – 25 April 2018, Antalya, (Turkey).** The research article that was written for the conference was *Physical requirements for vineyard monitoring robots*. Figure 7 shows one moment of the event during the presentation of the article.



The CIGR is the International Commission of Agricultural and Biosystems Engineering. Its XIX World Congress was held from 22 to 25 April in Antalya, Turkey. On-going progress carried out under VineScout was presented in this international event, which approximately included 250 abstracts. The VineScout consortium was represented by UDLR and UPV.

**Figure 7.** Piece of news in VineScout webpage about the CIGR conference in Turkey.

- **14<sup>th</sup> International Conference on Precision Agriculture: 24 - 27 June 2018, Montreal, Quebec (Canada).** The paper presented was titled *Canopy temperature mapping with a vineyard robot*.
- **EuroAgeng: 8 – 11 July 2018, Wageningen (The Netherlands).** The article orally presented had the title *Comparison between Ultrasonic Sensors and 2D Lidar as Perception Systems for Autonomous Vineyard Robots*.
- **Cimeira Nacional da Inovação na Agricultura: 29 October 2018 (Porto Salvo, Portugal).** VineScout Project was presented with the poster of Figure 8.



Com Apoio



Trabalho experimental - Julho e Agosto, 2018, Qta. do Abade

II Agronomy Day - 29 de Agosto, 2018, Qta. do Abade



Mapa de temperatura das folhas (exemplo) - Agosto, 2018

Início: 11/2016  
Fim: 11/2018  
Orçamento: ≈ 2,13M €



H2020: 737669 

VineScout - Intelligent decisions from vineyard robots

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**Parceiros**

<p>Tipo:</p> <p>Universidade Empresa Tecnológica Empresa Tecnológica Universidade Empresa Vitícola (End-User)</p>	<p>Nome:</p> <p>Universitat Politècnica de València (Espanha) Wall - Ye SARL (França) Sundance Multiprocessor Technology (Reino Unido) Universidad de La Rioja (Espanha) Symington Family Estates, Vinhos, S.A. (Portugal)</p>
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**Projeto**

O VineScout procura uma solução prática, que permita uma amostragem das condições da vinha, com robustez estatística, sensível à variabilidade das parcelas, que apoiará os viticultores na tomada de decisão e produção de vinhos de qualidade superior.

**Objetivos:**

O projeto VineScout pretende construir um robot capaz de se mover de forma autónoma pela vinha, com distintos tipos de sensores conectados e processar a informação com os algoritmos adequados, cujo resultado deve ser simples e de fácil utilização pelo viticultor.

O objetivo final consiste na produção de mapas para apoio da gestão vitícola, como por exemplo a disponibilidade hídrica e a condição nutricional das plantas.

O robot irá utilizar um sistema GNSS para georeferenciar os dados recolhidos, tornando possível localizar com precisão a videira a que se referem e correlacionar com a informação produzida nas fases chave ao longo do ciclo vegetativo e entre diferentes anos, potenciando a capacidade de uma elevada taxa de aquisição de informação.

A versão comercializável deste robot deverá chegar ao mercado no final de 2019.

**Resultados:**

Ao longo do verão de 2018 o VineScout V2 foi testado em vinhas da Symington Family Estates. Durante estes ensaios o robot foi capaz de navegar de forma autónoma com os sensores a recolher e processar dados de forma eficaz.

Neste momento, a versão V2 do robot está equipada com dois sensores: uma câmara multispectral que recolhe informação a partir da qual é possível calcular índices de vigor e um radiómetro de infravermelho que mede a temperatura das folhas e, a partir dessa informação, compreender a dinâmica estomatosa.

Foi possível criar mapas de temperatura da vegetação, índices de vigor e estado hídrico da videira e delimitar zonas diferenciadas dentro da mesma parcela a partir das quais foram produzidos vinhos com diferentes potenciais qualitativos.

**Atividades de divulgação:**

Tema: "Canopy temperature mapping with a vineyard robot"  
Local: 14th International Conference on Precision Viticulture, Montreal (Canada)  
Data: 24 a 27 de Junho de 2018

Tema: II Agronomy Day  
Local: Quinta do Abade, Vila Flor  
Data: 29 de Agosto de 2018

Para mais informações consultar o site do projeto <http://vinescout.eu/web/>

Contato: Prof. Francisco Rovira-Más  
E-mail: [frovira@dmata.upv.es](mailto:frovira@dmata.upv.es)






CIMEIRA NACIONAL INOVAÇÃO NA AGRICULTURA, FLORESTAS E DESENVOLVIMENTO RURAL 2018

Mais informação: <https://agro-inovacao.intav.pt>

Figure 8. Poster presented in Cimeira Nacional da Inovação na Agricultura, 2018.

The publications in peer-reviewed journals presented were:

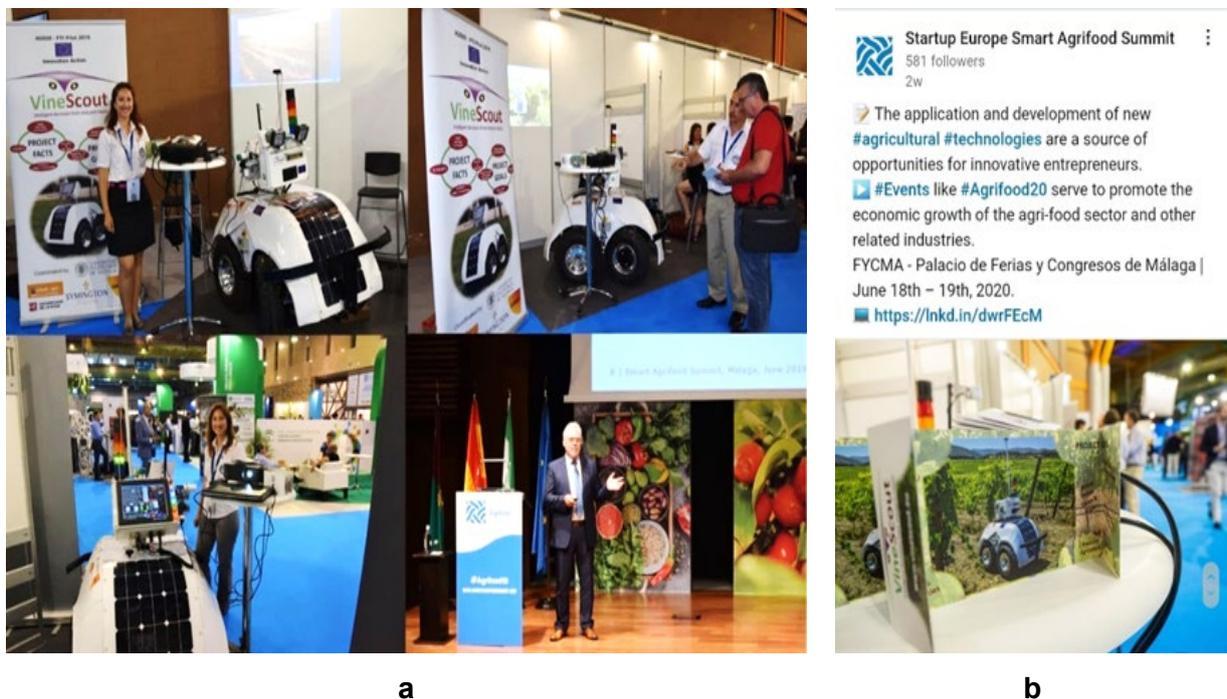
- Journal: **Frontiers in Plant Science** with the article titled ***On-the-go Hyperspectral Imaging Under Field Conditions and Machine Learning for the Classification of Grapevine Varieties***, and it was published on 25th July 2018. DOI: 10.3389/fpls.2018.01102. (open access)
- Journal: **Australian Journal of Grape and Wine Research** with the article ***On-the-go hyperspectral imaging for the in-field estimation of grape composition***. DOI: 10.1111/ajgw.12376

## Year 3

### Industrial dissemination

The tradeshows that partners had opportunity to attend to, and in which the VineScout prototype VS-2 was publicly exhibited were:

- Smart Agrifood Summit: 20 - 21 June 2019, Málaga (Spain).** This event attracted all kind of stakeholders from the agricultural sector, including such key players as John Deere, Bayer, IBM, Bosch, or Deloitte, in addition to representatives from the Spanish Government and the European Commission. A number of investors stopped by the project booth, and requested an update on the project progress and the second prototype. UPV attended the trade show in Málaga. Figure 10 shows some moments of the show (a), where also the Advisory Board member Thomas Engel, gave a keynote talk. Figure 10b shows the announcement of the tradeshow for the 2020 edition in LinkedIn feeds, where a flyer of VineScout is shown. The photo was taken during the 2019 edition.



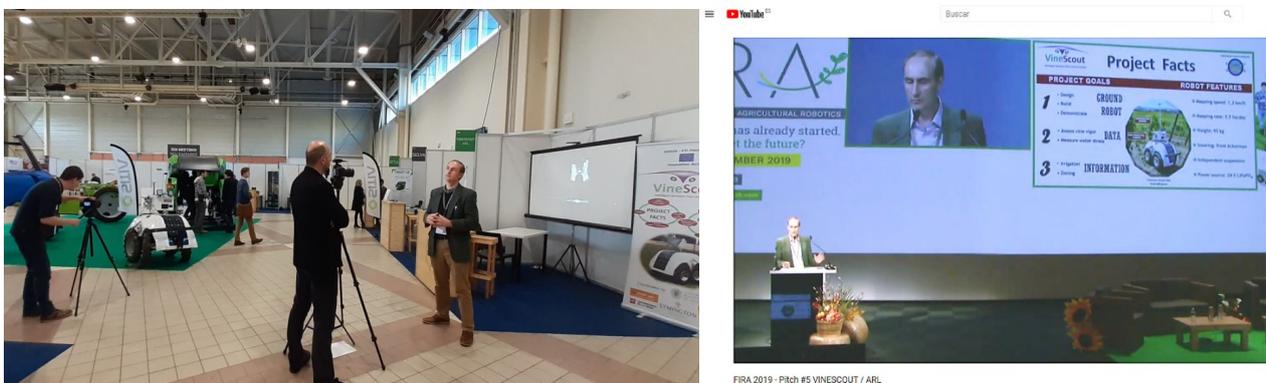
**Figure 10.** Exhibition of VS-2 robot in Smart Agrifood Summit tradeshow (a). Photo announcing the 2020 edition (b).

- **Feira Nacional de Agricultura: 13 - 14 June 2019, Santarém (Portugal).** This is an important national trade show in Portugal. VineScout robot was shown in the main entrance of the fair, where the four Portuguese different vineyard ecosystems were reproduced with actual vines planted on a grass and sand soil. SYM and UPV explained the features of the VineScout project to the attendees (Figure 11).



**Figure 11.** VineScout at the Feira Nacional de Agricultura 2019.

- **FIRA2019: 10 – 11 December 2019, Labège (Toulouse, France).** The VineScout prototype VS-2 was presented to the robotics community in the third edition of the international tradeshow FIRA2019 (Forum International de la Robotique Agricole). VineScout had its own booth in the main exhibition area, and the robot was sharing stage with other two robots. The event was centered on farm robots and related autonomous equipment. The coordinator of the project, Francisco Rovira Más, gave a talk presenting the project, which was then uploaded by FIRA organization to YouTube (link).



**Figure 12.** VineScout at FIRA2019. The coordinator being recorded for French TV and YouTube.

## Scientific dissemination

The conference attended by UPV, UDLR and SYM, and the peer-reviewed journals presented were:

- The **12<sup>th</sup> European Conference of Precision Agriculture (ECPA2019)**: 8 – 11 July, Montpellier (France). VineScout members presented the results of the 2018 season, regarding the mechanical improvements of the autonomous platform as well as the last NDVI and Temperature maps taken with the crop sensors. The research work presented was ***VineScout: a vineyard autonomous robot for on-the-go assessment of grapevine vigour and water status.***
- Journal: **Australian Journal of Grape and Wine Research** with the article ***On-the-go hyperspectral imaging for the in-field estimation of grape berry soluble solids and anthocyanin concentration***, and it was published in 2019, vol. 25, no 1, p. 127-133.
- Journal: **Molecules** with the article ***On-The-Go VIS+ SW- NIR spectroscopy as a reliable monitoring tool for grape composition within the vineyard***, and it was published in 2019, vol 24, n°15, 2795. (open access).

## Year 4

[Due to COVID-19 (pandemic), the conferences has been canceled since March 2020]

## Industrial dissemination

Several tradeshows taking place during 2020 were cancelled due to the pandemic; partners had opportunity to attend to some of them before the alarm state and some virtual. Then, VineScout prototype VS-3 was publicly at:

- **VineScout exhibition at OECD: 24 - 27 February 2020, Paris (France)**. In FIRA2019 (see above), a representative of the OECD (Organisation for Economic Co-operation and Development, or in French: Organisation de coopération et de développement économiques, OCDE), José Brambila (when he saw the robot at FIRA2019 edition), asked about the possibility of exhibiting VineScout robot during the OECD Annual Meeting of the Tractor Codes in Paris. This was a great opportunity to show the state of the art in agricultural robotics, and

demonstrate the necessity of talking about robot regulations in the agricultural field. UPV attended the meeting, as experts in robotics, that took place in the OECD building. Figure 61 shows the exhibition of the robot in the OECD building in Paris, the presentation of the project in front of the different country's representatives, and VineScout presentation in the official agenda.



TAD/CA/T/A(2020)1/REV1   7
<b>Wednesday 26 February 2020, 9.30 – 13:00</b>
<b>Agricultural Robots – Trends, challenges and opportunities</b>
12.00
<b>Item 24. VineScout (Spain)</b>
ORAL PRESENTATION
The Universitat Politècnica de València (UPV) will make a presentation about their robot “VineScout”. The Research Group Agricultural Robotics Laboratory, within the Department of Rural and Agrifood Engineering, was established in 2012 with the purpose of applying the core ideas of robotics, information technology, and precision farming to off-road vehicles operating in the environments required by specialty crops, in particular the typical crops grown in the Mediterranean areas. Research is basically focused on emergent technologies such as satellite-based positioning systems, computer vision, control architectures, farm robots, and novel field-oriented sensors.
<b>For information, discussion</b>
REVISED DRAFT AGENDA OF THE 2020 ANNUAL MEETING OF THE OECD TRACTOR CODES
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**Figure 131.** Exhibition of VineScout robot in the OECD building, moment during VineScout presentation, and VineScout oral presentation in the official agenda.

- **Smart Agrifood Summit: 24 – 25 September 2020, Málaga (Spain).** The VineScout third prototype VS-3 was presented to the public for the first time at the third edition of the Smart Agrifood Summit, held in Málaga, Spain, on 24 and 25 September, 2020. The robot was nominated for the Agrifood Summit Innovation Awards, so we were allowed to show VineScout in the demo area. Project flyers were distributed among the onsite visitors, mainly to the potential investors that attended this international event, which was half onsite half online.



**Figure 14.** VineScout coordinator speaking for the TV at Malaga Agrifood Summit.

- **FIRA2020: 8 – 9 December 2020, online.** This FIRA edition will be entirely online. The event has not yet taken place at the upload of this document, but the coordinator has booked a time slot to give an elevator pitch where VS-3 will be presented. Also, the last version of the promotional video will be played during his speech.



**Figure 15.** Announcement of FIRA2020 edition and the Best Concept Field Robot award.

## Scientific dissemination

The conference attended by UDLR, and the peer-reviewed journal papers proposed by UDLR, UPV, and SYM are:

- **II Simpósio Ibérico de Engenharia Hortícola (SIBEH2020):** 4 – 6 March, Escola Superior Agraria – Instituto Politécnico Viana Do Castelo, Ponte de Lima (Portugal). VineScout members presented the results of the 2019 season. The research work presented was **On-the-go estimation of grapevine water status in the field using an autonomous robot prototype (VineScout)**.
- Journal: Agronomy, with the article ***From Smart Farming towards Agriculture 5.0: A Review on Crop Data Management***. [DOI: 10.3390/agronomy10020207](https://doi.org/10.3390/agronomy10020207)
- Journal: IEEE, with the article ***Augmented Perception for Agricultural Robots Navigation***, [DOI: 10.1109/JSEN.2020.3016081](https://doi.org/10.1109/JSEN.2020.3016081).
- Journal: Remote sensing, with the article ***Use of a combined non-invasive approach from manned and autonomous ground vehicles to monitor vineyard water status***, and it is at the final stage to be submitted to the journal.
- Journal: Computers and electronics in Agriculture, with the article ***High resolution photochemical reflectance index maps as a rapid evaluator of plant water status (tentative)***, and it is at the final stage to be submitted to the journal.