


Project Acronym:

Hydroptics

 Ref. Ares(2021)7388166 - 30/11/2021

Grant Agreement number:

871529 (H2020-ICT-2019-2)

Project Full Title:

Photonics sensing platform for process optimisation in the oil industry



DELIVERABLE

D9.2 – Report on the implementation of dissemination & communication activities: First

Dissemination level	PU – Public
Type of Document	Report
Contractual date of delivery	30/11/2021
Deliverable Leader	Sargis Hakobyan (Alpes Lasers)
Status & version	V2.0
WP / Task responsible	WP9 / Alpes Lasers
Keywords:	Dissemination, communication, exploitation

Deliverable Leader:	Alpes Lasers
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Document History			
Version	Date	Contributor(s)	Description
V1.0	15/11/2021	Alpes Lasers	First complete version
V2.0	30/11/2021	Alpes Lasers, DBC	Final version, after review by the Coordinator

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Executive Summary

This deliverable describes all the developments done in dissemination and communication activities of HYDROPTICS project as per November 30, 2021 (M24). In the present deliverable we discuss in details the initial goals of the project in the aspect of dissemination and communication, and show the obtained results, discuss the achievements, the issues, and possible solutions. We equally provide a detailed report on the progress towards the implementation of the communication and dissemination strategy as part of the deliverable D9.1 “Dissemination and Communication activities”.

We also discuss in details the actions for the next steps, the corrections to make and possible deviations from the initial actions.

This deliverable will be updated by M42 of the project, discussing the outcomes of the upcoming period.

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1. Introduction

Dissemination and communications is one of the essential activities for the project, since awareness raising and stakeholders active involvement to the project is critical for the project success. In this deliverable we are describing in detail the implementation of the dissemination and communication plan and developments done from M1 to M24, showing the achievements, difficulties, and strategies to overcome the difficulties.

The dissemination plan is split into two stages as described in the figure below:

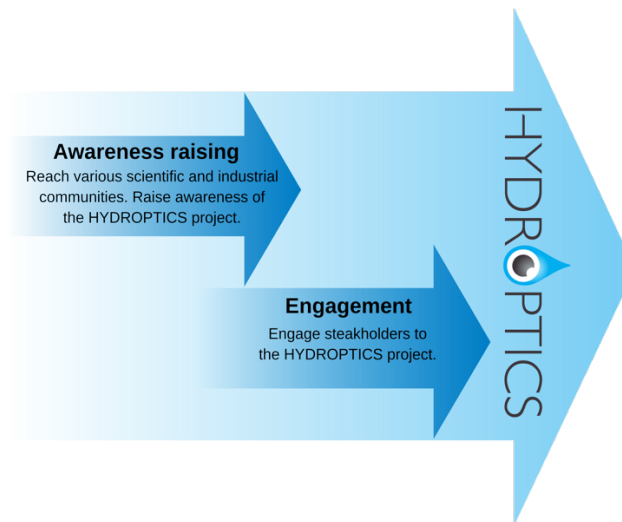


Fig. 1: Dissemination plan of the project HYDROPTICS

The first half of the project was mainly devoted to the Awareness raising phase, where we made use of our dissemination channels to raise awareness of our project to general public, industrial and scientific communities.

2. Awareness raising

The Consortium has accepted a strategy of awareness raising by online media platforms, the following online channels are used for awareness raising:

- 💧 LinkedIn
- 💧 Twitter
- 💧 Website updates
- 💧 Workshops

We have been actively posting new releases on our LinkedIn, Twitter accounts and on the project website with various achievements of our project, since the M1 to M24 we have posted 35 posts on our online platforms, from which 10 were official press releases with achievements and news on the project. We have also participated into various workshops on presenting the project and it's achievements.

2.1. Website

The HYDROPTICS website is accessible at <http://hydroptics.eu/>. The website has continuously being updated with newsletters, press releases, and events announcements. The general structure has remained the same since it has proven to be an efficient one. The overview of the pages of our website can be found in the figure below:

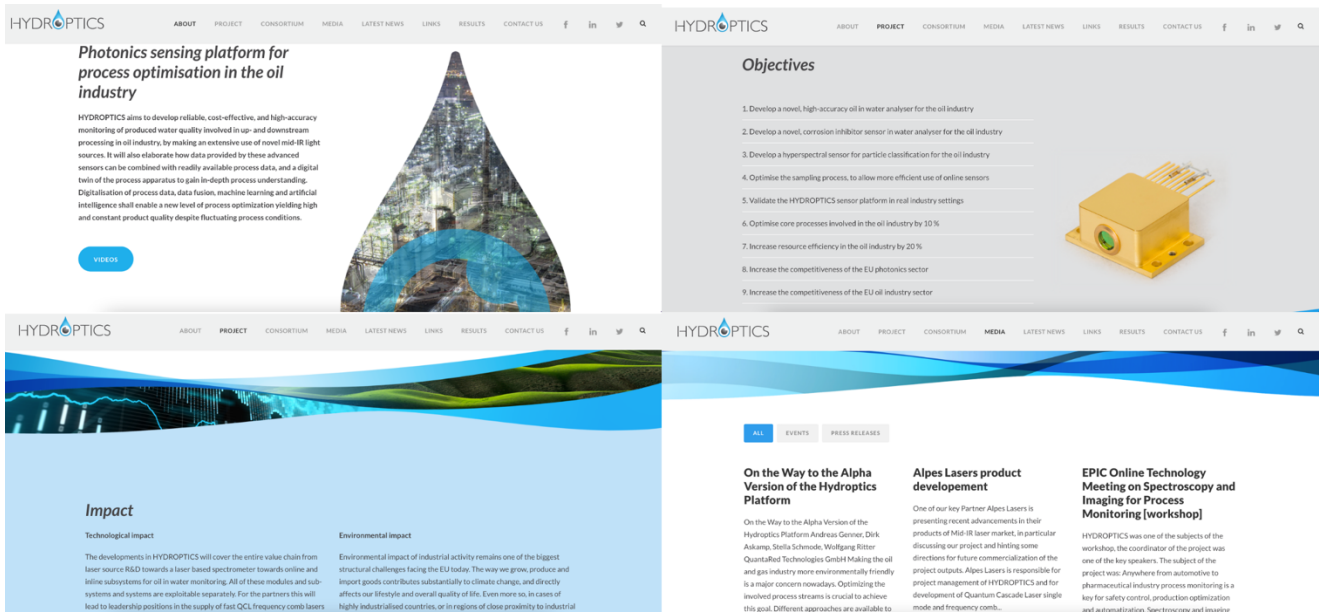


Fig. 2: Pages of the HYDROPTICS website.

We use the website as principal platform for dissemination material, we attempt to add all the information related to the project into the website and we link the website on almost all the social media posts.

The website incorporates all the basic project information, news, press releases, newsletters, events, publications, blog posts, collaboration with similar projects and initiatives and a library including the available promotional material and the project’s general presentation. Information regarding the technical details and content types can be found in the deliverable D9.1 “Dissemination plan and material”.

The content of the website will be regularly updated with the contribution of all partners during the project in order to reflect its progress and present its results. As of M24 of the project we have reached 5725 clicks and 8516 views of the webpage, more detailed analysis of the website can be found in Fig. 3 and Fig. 4.

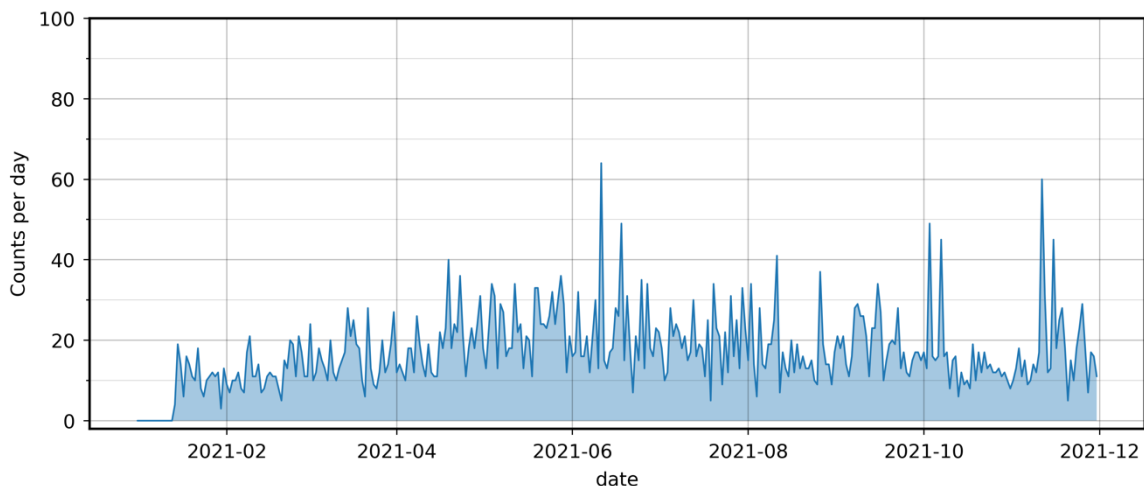


Fig. 3: Counts of clicks per day of www.hydroptics.eu since 01.2021.

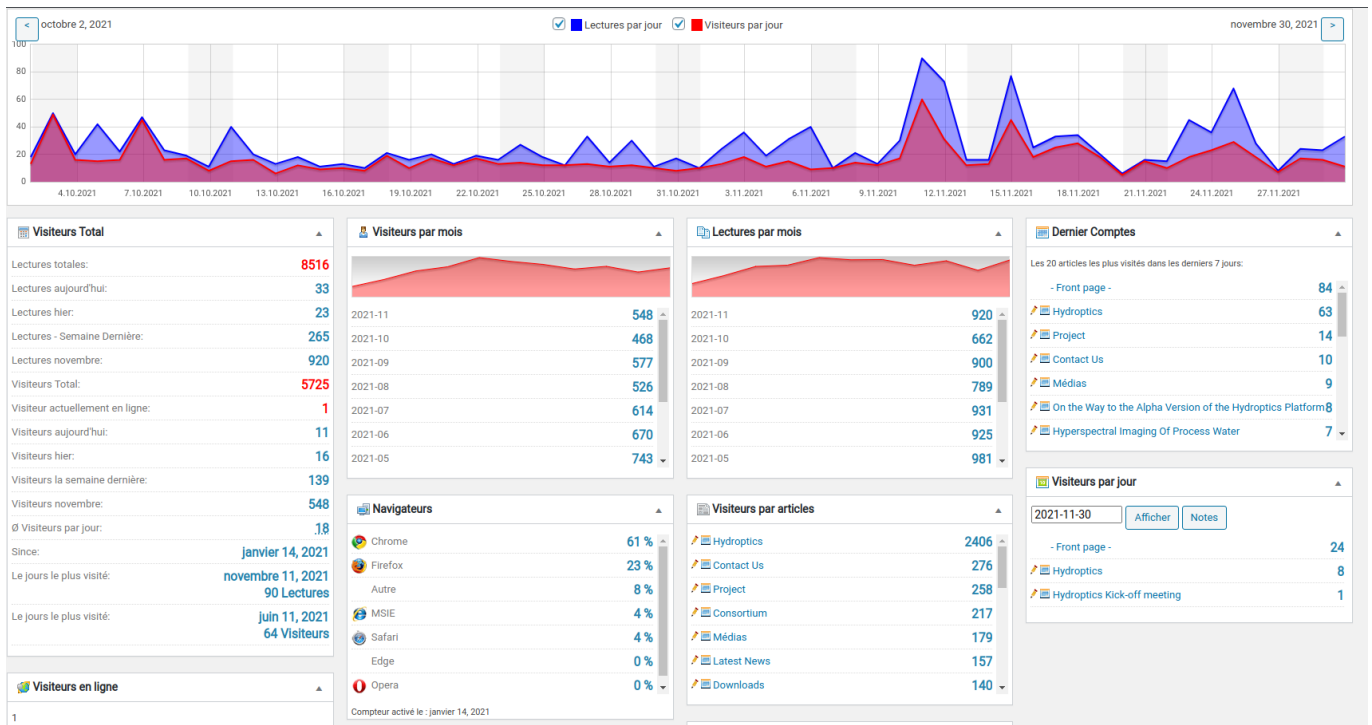


Fig. 4: Statistics of the www.hydroptics.eu website since 01.2021

2.1.1. Videos

The project has been present in multiple conferences and workshops and few insightful video material has been already produced, links can be found in section 2.2.

A video will be produced after M24 following the outcomes of the project, presenting the project and the field validation results as well as the innovations developed. The video will be shared via the project's website and social media accounts and will be used during the HYDROPTICS events and workshops.

2.1.2. Brochure / Banner

HYDROPTICS project has selected from multiple options final versions of the brochure and banner that are available on our website, we have achieved so far 136 downloads of the brochure and 140 downloads of the banner. brochure and the banner can be seen in Fig. 5, the full quality brochure and banner can be downloaded with the following links:

https://hydroptics.eu/wp-content/uploads/2020/12/HYDROPTICS_brochure.pdf

https://hydroptics.eu/wp-content/uploads/2020/12/Hydroptics_banner.pdf



Fig. 5: a) Hydroptrics brochure two sides; b) Hydroptrics banner

2.2. Social Media

Social media platform is a key method for dissemination and exploitation of the project. Since the beginning of the project we have posted 39 posts, with various content to attempt to target different audiences such as Research and academic, marketing, oil & gas industry, spectroscopy industry, and general public audience. It has been identified by the reviewing team of the first review meeting of HYDROPTICS that the oil & gas industry are not sufficiently involved and attracted to the project, and we have decided to modify slightly the style of our content to increase the interest and presence of oil & gas industry sector. It has been decided to publish less scientific and more product directed press releases and posts, and talk much more about the application side rather the scientific achievement side.

The change of strategy has given a certain effect that can be observed by the Fig. 6 and Fig. 7. Fig. 6 represents the visitors demographics during the last year, while the Fig. 7 represents the visitors demographics for the last two months, we see a clear increase of oil & gas sector. The consortium will keep the same strategy of dissemination content to keep the same tendency of our audience demographics change. The followers demographics has also been improved significantly since the last review meeting, the oil & gas sector presence has increased from 9,6 % to 13,66 %, and the tendency keeps in the same direction (see Fig. 8). With the demonstration of our first alpha prototype, the oil & gas industry will be more involved since we will have more of the materials to publish that interest that sector, namely results on the measurements of the prototype, measurement sensitivities etc.

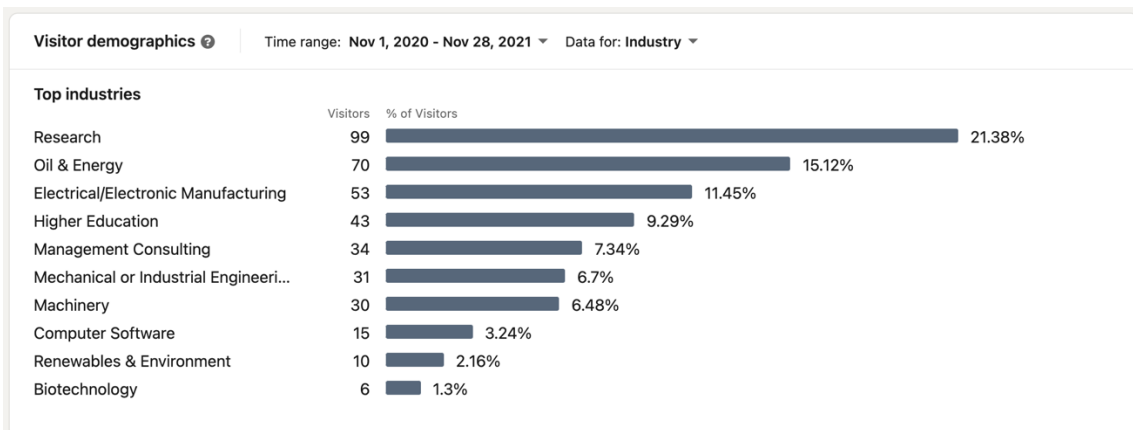


Fig. 6: Visitors demographics by industry for the past one year.

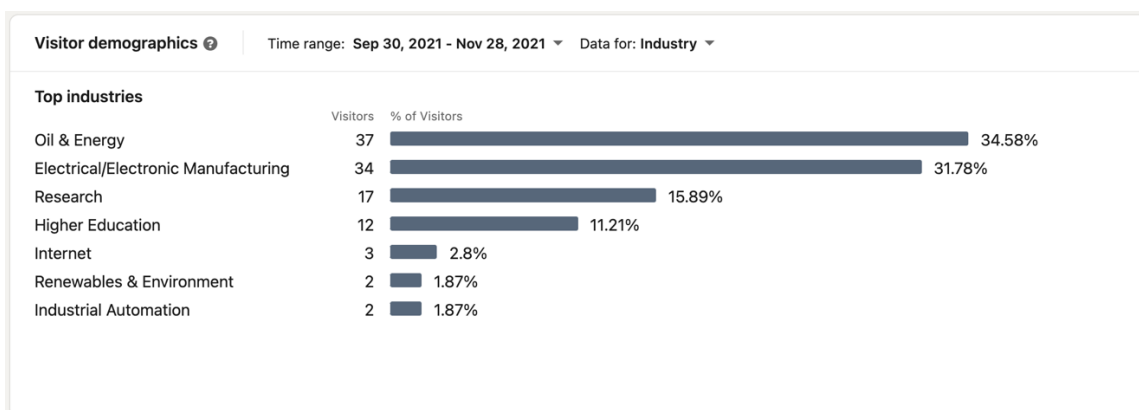


Fig. 7: Visitors demographics by industry for the past 2 months.

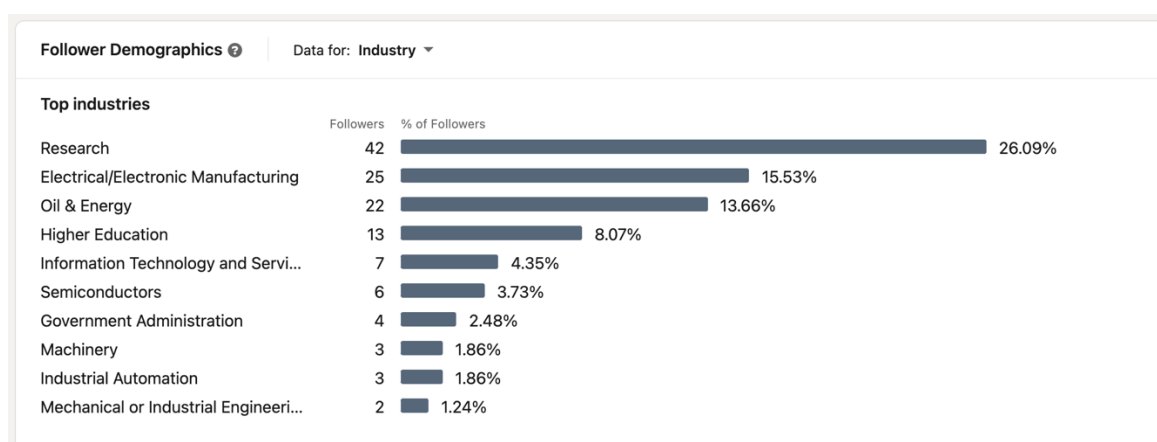


Fig. 8: Followers demographics, showing a clear improvement of the oil & gas sector (third place) with 13,66 %.

2.3. Workshops

HYDROPTICS has participated to two workshops organized by European Photonics Industry Consortium (EPIC):

Photonics Sensors of Safer and Intelligent Oil & Gas Producers:

The workshop was devoted on safe and more intelligent sensors for oil and gas producers, hence it matched perfectly to the subject of project HYDROPTICS. A brief presentation of the project has been presented, showing the results, the vision, and the prototype of the project. A lot of interesting connections have been developed from this workshop, and we are following up with some key organisations on the activities of the project. The workshop was live broadcasted on YouTube, the full video can be found in the link below:

<https://youtu.be/LimpZKrfYw?t=4158>

More details of the workshop can be found by this link:

<https://www.epic-assoc.com/epic-online-technology-meeting-on-photonics-sensors-for-safer-and-intelligent-oil-gas-producers/>

Online Technology Meeting on Spectroscopy and Imaging for Process Monitoring:

The workshop was devoted to different methods of process monitoring of various industries such as automotive, pharmaceutical, oil refinery, etc.

We were one of the 5 key speakers of this workshop, where a complete presentation has been done of the project, the workshop was live-streamed on YouTube, the link below:

<https://youtu.be/-AVIN3NwEZo?t=7326>

After this workshop we have gotten quite a positive feedback from possible stakeholders, from which 2 of them showed intense interest in starting collaboration. We are currently in the process of discussion with them to see how our systems will be utilized for their use-case.

More details on this workshop can be found by the following link:

<https://www.epic-assoc.com/epic-online-technology-meeting-on-spectroscopy-and-imaging-for-process-monitoring/>

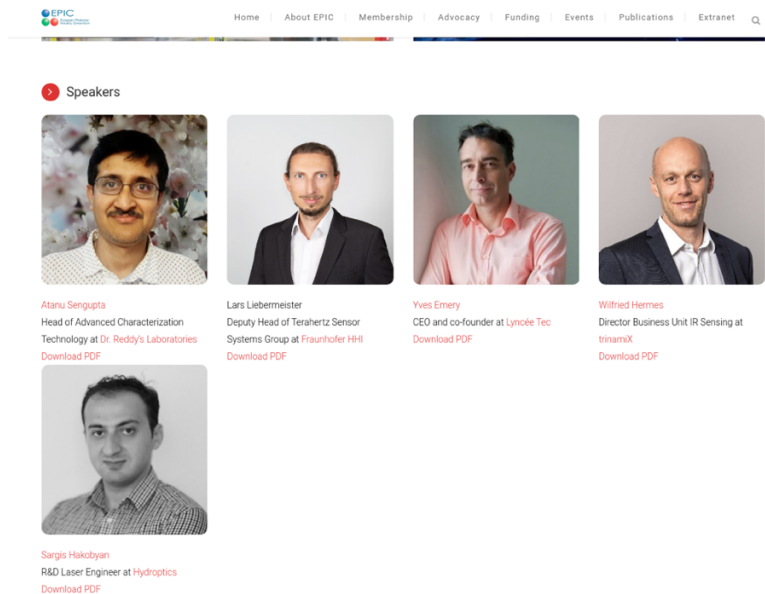


Fig. 9: Cover page of the online technology meeting on spectroscopy and imaging process monitoring.

2.4. External Advisory Board

We had very constructive and very useful meeting with our external advisory board member Mr. Giacomo Scalari from ETH Zürich and Mr. Mathias Busch from Wintershell DEA. Their input was very useful to understand the actual needs of the market and get a first feedback. In particular, the need for novel approaches proposed to be developed in HYDROPTICS project was confirmed by Mr. Busch, as to his knowledge as well, no comparable system is commercially available, thanks to the multi-operationality of the prototype. In particular, the particle analysis with our Hyperspectral Imaging (HSI) adds a significant unique value to the prototype.

Mr. Scalari's inputs were more directed into the laser development and integrated optical circuit side, where he embraced our goals and achievements, and confirmed the potential of such systems to become a very useful tool in research institutions and not only.

2.5. Press releases

Since the beginning of the project we intended to be pro-active on press releases, our belief is that the press releases are one of the most efficient methods of awareness raisings, and for attracting people from various fields. We keep updating our followers of every important event, achievement, and upcoming events of the project. As of M24 of the project, we have initiated and published 10 Press Releases that contained very insightful and interesting information on new findings of the project, as well as related to events participated as a project.

Table 1: List of Press releases with descriptions

Title	description	link
HYDROPTICS Press release	Announce the start of a project HYDROPTICS	https://hydroptics.eu/hydroptics-press-release/
Hydroptics kick-off meeting	Release describing the first kick-off meeting of the project	https://hydroptics.eu/hydroptics-kick-off-meeting/
Photonics21	Scientist use Photonics to Make Wastewater eco-friendly	https://www.photonics21.org/2020/scientists-use-photonics-to-make-wastewater-eco-friendly
Online oil-in water detector	Presenting results on dual-laser balanced detection of oil	https://hydroptics.eu/online-detector/
Dual-Comb spectroscopy for oil detection	Presenting results on dual-comb spectroscopy for oil detection	https://hydroptics.eu/online-oil-in-water-detector/
Multiphase separation of two liquids	Presenting the results on novel centrifugal separator, patent description	https://hydroptics.eu/multiphase-separation-of-two-liquids/
Hyperspectral Imaging of Process Water	Presenting results on newly developed Hyperspectral imaging module for	https://hydroptics.eu/hyperspectral-imaging-of-process-water/
Alpes Lasers product overview	Alpes Lasers describing the latest devices including the developments in the HYDROPTICS projects	https://youtu.be/LfjHhFI-ai4?t=675
On the Way to the Alpha Version of the Hydroptics prototype	Describing the upcoming alpha prototype of the project	https://hydroptics.eu/on-the-way-to-the-alpha-version-of-the-hydroptics-platform/
Particle manipulation with ultrasound waves	Describing the method of particle manipulation with ultrasound waves for efficient imaging	https://hydroptics.eu/particle_manipulation_with_ultrasound_waves/

Technical scientific press releases:

We have published 6 press releases related the significant achievements of the project with the following titles:

- 💧 Online oil-in water detector
- 💧 Dual-Comb spectroscopy for oil detection
- 💧 Multiphase separation of two liquids
- 💧 Hyperspectral Imaging of Process Water
- 💧 On the Way to the Alpha Version of the Hydroptics prototype
- 💧 Particle manipulation with ultrasound waves

These Press releases have been concentrated on significant technical scientific achievements of the project. By publishing the scientific achievement of the project we identify early adapters, and try to adapt our system already to the demands of the market. These press releases have been the backbone of the awareness raising stage, since this platform allows to share at the very early stage of the prototype development the results and the vision of the prototype.

Photonics21:

We have been featured on Photonics21 journal with a title “Scientist use Photonics to Make Wastewater eco-friendly”.

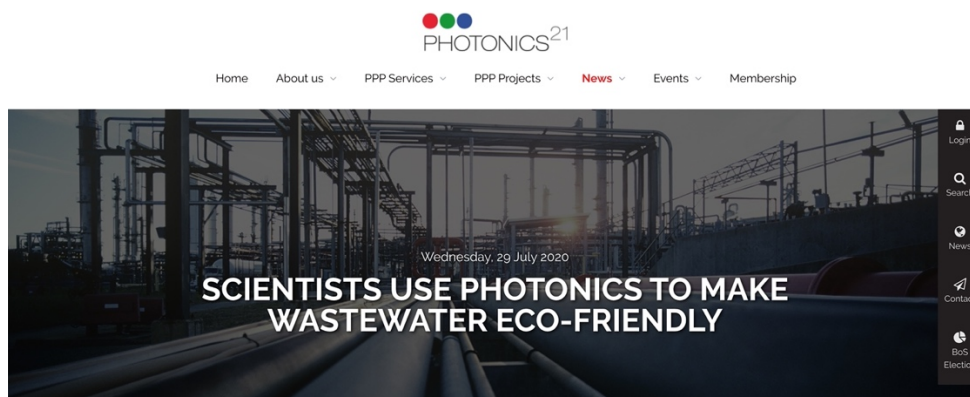


Fig. 10: Photonics21 press release on HYDROPTICS.

In this article we discuss the very important aspect of the project namely the ecological aspects. More details can be found in with the following link:

<https://www.photonics21.org/2020/scientists-use-photonics-to-make-wastewater-eco-friendly>

2.6. Conference scientific journals

The project partners have been very active since the beginning of the project on scientific communities, and as of M24 we have been participating to many Scientific Conferences, and published already some articles, the list of scientific events/publications can be found below:

Table 2: Scientific Conference and article publications.

Information / Title	Partner	Journal (link)
SPIE DCS 2022 enables researchers to present their latest research findings, ideas, and applications in the area of sensors and sensing technology.	SAL	SPIE DCS 2022
CFD related Conference, the project was acknowledged and the audience was encouraged to check web page, social media etc.	TUW	16th OpenFOAM Workshop 2021 (https://www.ucd.ie/openfoam2021/programme/technicalprogramme/)
Development of a New Online Oil-in-Water Analyser Using Mid-IR Sensor	QRT	Produced Water Workshop (TÜV SÜD) (https://www.tuvsud.com/en-gb/-/media/regions/uk/pdf-

		files/event-documents/pww/tv-sd-nel-pww-2020.pdf?la=en-gb&hash=FB9DB011A17F41DA214673BC1085F646
The water treatment in industrial process.	QRT	Word Water Conference
Development of a nonmolar sensitivity dipstick mid-IR ATR sensor for phosphate in water	TUW	ICAVS11 (https://icavs.org/public/files/1ABSTRACT_BOOK_ICAVS.pdf)
A Mesoporous Zirconia Coating for Sensing Applications using ATR-FTIR Spectroscopy	TUW	ICAVS11 (https://icavs.org/public/files/1ABSTRACT_BOOK_ICAVS.pdf)
Applying QCLs for enhanced spectroscopic analysis of liquids	TUW	Photonic Spectra Conference (https://www.photonics.com/Webinars/Applying_QCLs_for_Enhanced_Spectroscopic_Analysis/w366)
Laser Based Mid-IR Dispersion Spectroscopy of Liquid Samples	TUW	LC talks, 1st Global Infrared Sessions (https://www.lasercomponents.com/us/news-events/lc-campus/lc-talks/1st-global-infrared-sessions/)
Mesoporous Silica, Titania and Zirconia for Improved Selectivity and Sensitivity in Evanescent Wave IR Spectroscopy	TUW	SCIX2021 (https://www.eventscribe.net/2021/SciX2021/fsPopup.asp?Mode=presInfo&PresentationID=934172)
Polarimetric Balanced Detection: Background-Free Mid-IREvanescent Field Laser Spectroscopy for Low-Noise, Long-termStable Chemical Sensing	TUW	ACS Sensors (https://pubs.acs.org/doi/10.1021/acssensors.0c01342?ref=pdf)

2.7. KPI

In the beginning of the project we have defined certain Key Performance Indicators (KPI) to achieve for efficient dissemination of the project. In the table below you can see the planned KPIs for the entire lifespan of the project vs the achieved KPIs for the period M1 to M24. We assess the achieved numbers to be sufficient for successful dissemination of the project, we believe that it would be possible to achieve the goals by the end of the project. Moreover, with the demonstration of the prototypes the rhythm of dissemination and engagement phases will increase, since we will have demonstrator data of the entire prototype.

Table 3: list of targeted KPIs and achieved by M24 of project

Metric	Target	Achieved by M24
Number of views of the HYDROPTICS website	10,000	5725
Published articles in technical papers, magazines, newspapers	6	2
Presentation in scientific conferences, trade fairs, exhibitions	4	7
Publications on open access scientific journals	6	1
Project website leaflet and/or poster downloads	200	140 → banner

		132 → brochure
Number of views of video	1000	n.a.
Social media posts	50	18 → Twitter 21 → LinkedIn

3. Engagement

Engagement is the second and the final stage of the dissemination plan of the project, it has slowly started since we slowly start generating very preliminary results on various compartments of the HYDROPTICS prototype. The activities of this stage will increase significantly once we demonstrate the first alpha version of the prototype. With the initial version of the prototype we will organise various workshops showing the potential of the last, the achieved spectroscopic results with it, and possible application to other markets. Workshop will invite all the possible stakeholders of the project, as well as people from other fields to find possible alternative markets for the prototype.

In the later stages of the project, we plan to initiate direct discussions with individuals, interested entities on the prototypes usage for their applications. We are happy to see that although the prototype is not completely ready, we already see a growing interest towards the project and it's prototype, and we have already initiated multiple discussion with different entities, that could become possible end users of HYDROPTICS.

3.1. Dr. Reddy's

Dr. Reddy's is a multinational pharmaceutical company located in India, and represented worldwide. The company has over 190 mediations, 60 pharmaceutical ingredients for drug manufacturing, and biotechnology products. We have been in contact since a while to plan the next steps for collaboration. We see a potential of our prototype to be used for their use case. After multiple brain-storming sessions we have identified two potential use cases of Dr. Reddy's that our systems may be capable to apply.

Nano-emulsion:

The chemical solutions in the pharmaceutical production contain a lot of hard particles with sizes varying from nano to micro meters. The classification of those particles, size distribution verification, and possible identification of chemical compounds of those particles is an ongoing issue that is being tackled by various state-of-the-art technologies. We believe that our Hyperspectral Imaging module could become a valid alternative solution for the aforementioned detection schemes. We are in the process of specification transfer between the project and the company, we plan to have more concrete information once the alpha prototype is in place and running.

Residual solvents in water detection:

As most of the injectable pharmaceutical products are based in water solvents, a very important task is to identify and quantify various chemicals in the water solution. Here we believe that our liquid-liquid extraction system with dual-DFB spectrometer can provide a robust solution for the spectroscopy. More detailed analysis of the use case is ongoing and update will be made by the next report.

3.2. Synovia

SYNOVA is a Swiss company located in Duillier that specializes in advance laser cutting systems. They manufacture precision laser cutting machines with ultrafast femtosecond laser sources using ultra-high pressure water jet for guiding the laser light. HYDROPTICS Consortium has been contacted by them to discuss their use case, they are interested in our prototype and they would like to see if the prototype can be used for spectroscopy of their purified water systems.

Purity of water is of at most importance for them since the high pressure water jet is used to guide the laser cutting light. They have already in place a water purifier that filters almost all hard particles and some known chemicals, however, over time a contamination of the water is possible. Hence, we plan to get more information on spectroscopic fingerprints of their water systems to understand which constituents should be looked and if our system can be of use for them.

3.3. Wintershell DEA

Wintershell DEA is a German oil and gas producer, and is identified to be one of the stakeholders of our project. We have had a very productive and interesting discussion with the representative of Wintershell DEA during our External Advisory Board Meeting. We have explained in deep detail on what the project is aiming, the capabilities of the project prototype. From Wintershell DEA representative we have asked for an opinion on our development, suggestion from their side to understand whether we are in the direction of the market needs.

The feedback was that we are in general on the right direction and in accordance of the today's market needs.

3.4. ETH Zurich

One of our External Advisory Board members is Mr. Giacomo Scalari, who is an associate Professor at ETH. During the EAB meeting we have presented our recent advancements in the integrated dual-DFB laser sources and dual-frequency comb works. The discussion was very interesting, and we confirmed a potential interest of academic society in such systems. The meetings with EAB members is taking place every year, we are planning to continue this discussion and hopefully for the next meeting already present our very last results with the prototype.

4. Covid-19 effect on the project

The project has officially launched on 1st of December 2019, and unfortunately only after 3 months of the kickoff meeting the entire world went into a lockdown due to Covid. Hence, it affected immensely all the activities of the project, particularly all the dissemination and communication activities. Since the beginning of the project, the Consortium has never had an in person meeting, all the meetings were done in online mode, we have had very little chance to participate to conferences in person, all the communications were done online. We have had 12 meeting with the entire Consortium, and unfortunately all of them were done in online mode. Moreover, in total about 6 months the entire Consortium were not working due to the lockdown issues. Hence, the communication and dissemination has been one of the toughest tasks to execute. Nevertheless, we have quickly adapted to the situation and concentrated more on online meetings and events.

We believe that the second part of the project's lifespan will be much more dynamic, we hope to finally have our first meeting in person since the kick-off meeting, to continue having many more in person meetings, and to disseminate more actively the prototypes of the project.

Conclusions

The deliverable describes in details all the dissemination and exploitation activities performed as of M24 of the project. It is an update to the deliverable D9.1 “Dissemination and communication activities”, and will be updated the last time on M42 of the project.

We discuss in detail the two phases of the dissemination and exploitation plan, awareness raising and engagement. The period M1 to M24 has been more devoted of realization of the awareness raisings, while the second half of the project, the consortium will be actively concentrating on engagement phase of the dissemination and communication plan.

We show a detailed analysis of the statistics of the projects website, as well as a complete comparison of the Key Performance Indicators with the achieved numbers for the period M1 to M24. We conclude that the results achieved thus far are encouraging and we hope to become much more efficient in dissemination and communication for the second half of the project’s lifespan. We are confident that this would be possible due to the stabilization of the pandemic situation worldwide, as well as the prototype outcomes that will give much more insightful and interesting material for possible end users. This deliverable is a living document and will be updated by the end of the project (M42).