

**BROADBAND  
TUNABLE QCL BASED  
SENSOR FOR ONLINE  
AND INLINE DETECTION  
OF CONTAMINANTS  
IN WATER**

# AQUARIUS

## MESSAGE FROM THE COORDINATOR

With the fourth issue of the AQUARIUS newsletter we continue the series of technical reports that focus on the research undertaken within the project, by focussing on input from partner OMV.

In this issue, partner OMV will provide more details on their on-going work on industrial process water monitoring in oil and gas production.

In addition, Fraunhofer also briefly describes a new version of the AQUARIUS laser module. Moreover, a short update on past meetings and upcoming events is provided.

### Consortium

8 Partners (5 Countries)

### Project Coordinator

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Project number	<b>731465</b>
Project website	<b><a href="http://www.aquarius-project.eu">www.aquarius-project.eu</a></b>
Project start	<b>1<sup>st</sup> January, 2017</b>
Project duration	<b>3 years</b>
Total costs	<b>EUR 3,891,263.75</b>
EC contribution	<b>EUR 3,891,263.75</b>



PHOTONICS<sup>21</sup>  
PHOTONICS PUBLIC PRIVATE PARTNERSHIP

The project leading to this application has received funding from the European Union under grant agreement No 731465. This project is an initiative of the Photonics Public Private Partnership.

# INDUSTRIAL PROCESS WASTE MONITORING IN OIL AND GAS PRODUCTION

In oil and gas production, the management of produced water is a key factor to success. In mature fields like in Lower Austria, the water cut reaches as high as 93 %. This amount has to be processed to be suitable for reinjection into the reservoir, which is necessary to maintain reservoir pressure.

The water treatment plant in Schönkirchen, Lower Austria, where the AQUARIUS prototypes will be tested by OMV, is designed for processing up to 1320 m<sup>3</sup>/

hour of water and is in full operation since 2015.

It consists of a fully automatized three-step process, reducing the residual oil concentration from initially 300 ppm down to the 2 ppm required for reinjection.

Technologies like those developed by the AQUARIUS project can be used to monitor the facility performance and to ensure the required operational availability.



## NEW VERSION OF THE LASER MODULE

A new version of the laser module was produced, featuring a MOEMS grating optimized for the AQUARIUS wavelength range, further reduced size, and improved long-term stability.

This was accomplished by high-precision in-situ (i.e. during laser operation) alignment and permanent fixing of all optical

components. We strongly relied on the sophisticated alignment equipment developed in the AQUARIUS-related project MIRPHAB ([www.mirphab.eu](http://www.mirphab.eu)).

An alternative QC laser design for extended wavelength coverage, was grown and successfully tested.



The current AQUARIUS laser module

# TECHNICAL & REVIEW MEETING



## Past Events

### Trade Fair Analytica

31<sup>st</sup> March – 3<sup>rd</sup> April 2018  
@Munich, Germany

Fraunhofer was present and gave a live demonstration of real-time spectroscopy with  $\mu$ EC-QCL light source.

### Advances in MIR-IR based Sensing Workshop

5<sup>th</sup> April 2018  
@Vienna, Austria

Discussions about sources, detectors and applications.

### Opatec 2018 and Sensor + test 2018

Fraunhofer attended a presentation of a  $\mu$ EC-QCL light source at the International trade fair for optical technologies, components and systems and at the Measurement Fair "Sensor + Test 2018"

### 9<sup>th</sup> International conference on Optics, Photonics & Lasers

@Berlin, Germany

Fraunhofer gave a talk on „Miniaturized Tunable QCL-Lightsources for MID-Infrared Spectroscopy“ at the conference.

### Optical Spectroscopy Workshop (NB-photonics UGent)

21<sup>st</sup> September 2018  
@Ghent, Belgium

IMEC participated at the Workshop.

TU Wien gave a presentation of mesoporous materials as enrichment material at the following three events:

### 8<sup>th</sup> International Quantum Cascade Laser School and Workshop

2<sup>nd</sup> – 7<sup>th</sup> September 2018  
@Cassis, France

### FLAIR 2018 - Field Laser Applications in Industry and Research

10<sup>th</sup> - 12<sup>th</sup> September 2018  
@Assisi, Italy

### 6<sup>th</sup> ISGS Summer School

10<sup>th</sup> - 14<sup>th</sup> September 2018  
@Alghero, Italy



On the 24<sup>th</sup> of September, the consortium came together for a technical meeting, in Ghent, Belgium. Upcoming work was defined and collaboration was further strengthened.

The meeting was also a good opportunity to further prepare the review meeting, which took place

on the 25<sup>th</sup> of September at the European Commission in Brussels, Belgium.

All in all, the review meeting went rather well and the project officer and AQUARIUS reviewers gave valuable feedback and recommendations for further work.



## Upcoming Events

### SPIE Photonics West 2019

2<sup>nd</sup> - 7<sup>th</sup> February 2019  
@San Francisco, USA

**SPIE** • The international society for optics and photonics

### Pitcon

26<sup>th</sup> February - 1<sup>st</sup> March 2019  
@Philadelphia, USA

**PITCON** CONFERENCE & EXPO 2019  
March 17 - 21, 2019  
Pennsylvania Convention Center  
Philadelphia, Pennsylvania, USA

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## Take a look at the AQUARIUS VIDEO



[vimeo.com/293097550](https://vimeo.com/293097550)