WaterSpy – towards the of the journey (and the beginning of a new one)

The WaterSpy project ends in February 2020. The project has been developing water quality analysis photonics technology suitable for online, field measurements. WaterSpy technology has been integrated, for validation purposes, into an existing, commercial water quality monitoring platform, in the form of an extension module. The WaterSpy has been designed for use in the field for the analysis of critical points of water distribution networks.

The final WaterSpy prototype has been extensively validated in the laboratories of the consortium partners, before its use in the field validation site, which is the Prato water treatment plant in Genova, managed by IREN. The prototype will remain there at least till the end of April 2020. A workshop was also organised in February 2020 in Genova, presenting the project results to the community of stakeholders. A visit to the demonstrator was also part of the workshop.

The WaterSpy project has been a wonderful journey, through which important results were obtained. For the WaterSpy team though, the journey does not end here. The plan is to continue working on the project results, aiming at a commercial version of the system and of some of its submodules. It should also be highlighted that new EU regulations are being prepared, asking for continuous water quality analysis systems, such as WaterSpy. Thus, there is an important need from the market side, as well as interest from the WaterSpy consortium side in continuing this line of research and development. Main outcomes of the project can be briefly summarised as:

1. The validations have shown that the integrated WaterSpy system is able to detect the targeted bacteria in drinking water, even at low concentrations. In fact, for *E.coli* the system is able to meet the strict regulatory requirements, while for *Salmonella* and *P.aeruginosa* adaptation further investigation is required, but results seem promising.
2. A complete analysis with the WaterSpy takes about 6-7 hours, which is significantly faster with respect to conventional techniques that require minimum 18h (but usually more than 40h).
3. Improved design capability and understanding of the Vernier Quantum Cascade Lasers. ALPES is already on the market with improved, custom-built QCLs
4. The novel balanced detection amplifier designed and developed by VIGO is also a major photonics result, unique at a global level. This is already part of the 2020 VIGO catalogue.
5. A new fiber coupler with an external lens was also produced in the project. This is not yet a commercial product, since more R&D is required, but it is definitely a wonderful achievement with commercial potential.
6. A new crystal structure orientation was also tested for the WaterSpy photodetectors. This technology can be used to deliver state-of-the-art detectors in terms of detectivity for niche applications.
7. A novel polarimetric setup for ATR spectroscopy measurements was developed and a patent application was also submitted.
8. A fully automated pre-concentrator for bacteria has been developed, exploiting CyRIC's novel engineering designs and TUM's know-how.

9. An automated sample incubation module was also delivered and is part of the WaterSpy device.
10. Significant advancements have been made in terms of ultrasound particles manipulation, within a fluidic cell used for ATR measurements.

The final project review by the EC will take place in April 2020. The WaterSpy project has been funded by Horizon 2020, the EU Framework Programme for Research and Innovation for 2014-2020 and is an initiative of the Photonics Public Private Partnership (www.photonics21.org). The WaterSpy project consortium includes 10 partners from 7 different European countries, coordinated by CyRIC, Cyprus Research and Innovation Center Ltd. The project was launched in November 2016.

More information about the project and the partners can be found on our website: www.WaterSpy.eu.