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European Union Network for the Implementation
and Enforcement of Environmental Law

2019 Technology Mini-Conference

Final Report

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Introduction to IMPEL

The European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL) is an international non-profit association of the environmental authorities of the EU Member States, acceding and candidate countries of the European Union and EEA countries. The association is registered in Belgium and its legal seat is in Brussels, Belgium.

IMPEL was set up in 1992 as an informal Network of European regulators and authorities concerned with the implementation and enforcement of environmental law. The Network's objective is to create the necessary impetus in the European Community to make progress on ensuring a more effective application of environmental legislation. The core of the IMPEL activities concerns awareness raising, capacity building and exchange of information and experiences on implementation, enforcement and international enforcement collaboration as well as promoting and supporting the practicability and enforceability of European environmental legislation.

During previous years IMPEL has developed into a considerable, widely known organisation, being mentioned in a number of EU legislative and policy documents, e.g. the 7th Environment Action Programme and the Recommendation on Minimum Criteria for Environmental Inspections.

The expertise and experience of the participants within IMPEL make the network uniquely qualified to work on both technical and regulatory aspects of EU environmental legislation.

Information on the IMPEL Network is also available through its website at: www.impel.eu



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Executive Summary Environmental regulators face a constant struggle to be able to do more with less or more with the same level of resources. To become or continue to remain an efficient and effective regulator new technology needs to be embraced. This Mini-Conference was focused on cutting edge developments in the use of technology including artificial intelligence (and machine learning), eDNA, sensor technology and the use of earth observation techniques, and it created the opportunity for IMPEL practitioners, with a variety of roles, to ensure their latest technology developments were shared with their peers.	
Disclaimer This report is the result of a project within the IMPEL Network. The content does not necessarily represent the view of the national administrations or the Commission.	



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1. Conference Organization

This mini-conference aimed to create the opportunity for IMPEL practitioners, with a variety of roles, to share their latest technology developments with their peers. This exchange, share and discussion of experiences (and best practices) has contributed to strengthen and build up the Cross-cutting network.

The project team was composed by:

- **Project Manager:** Simon Bingham, (UK - Scotland).
- **IMPEL Secretariat:** Carmen Herreras Martínez (Administration Officer), Elisabete Dias Ramos (Project Officer).

After receiving abstracts and contributions, the agenda for the Conference was drawn up (Annex I) and sent to all registered participants.

2. Technology Mini-conference

The *2019 Technology Mini-Conference* was held on November 07th and 08th and it was organized in Copenhagen, Denmark with the help and support of the [European Environment Agency \(EEA\)](#).

Speakers from nine competent authorities from around Europe delivered presentations about their latest technological developments, highlighting not only their achievements but also the barriers they had to overcome and the lessons learnt in the process. The aspiration of the conference was to show how embracing new technology helped optimise ways of doing daily activities with the aim of being more effective and efficient. Delegates came from a range of organisations including national ministries, environment agencies, inspectorates and regional and local regulatory organisations as well as a representative of the EU Commission.

The presentations covered a wide range of topics including:

- Earth Observation from satellite images including from the [Copernicus programme](#) for water classification, land and atmospheric issues.
- Artificial Intelligence and machine learning to identify invasive species.
- On-going developments in sensors, automatic measuring stations and automatic field instruments for monitoring air and water emissions.
- DNA bar coding for fauna and eDNA for fish species detection.
- GPS tracking of waste and 3D measurements of waste to help tackle illegal activities.
- Mobile applications specifically developed to help inspectors in the field.
- Data analytics used for selecting inspection targets with the assistance of an algorithm.



- Development of an end-to-end system that included several customised dashboards and analytics for inspections of farms and fields that saves time and money in the battle against diffuse pollution.
- Several case studies in a number of environmental detection and enforcement activities, e.g. inspections of landfills, ships, maritime surveillance, nature protection, cooperation with firefighters, police and other authorities when necessary and the development of a comprehensive country wide drone program.

Those present agreed there was need for further collaboration to support developments and to stop each organisation from having to waste time and resources “reinventing the wheel” individually. IMPEL aims to continue to be an enabler in this area by supporting cooperation and the sharing of knowledge.

The presentations that were delivered by the speakers during the Conference (11 presentations) can be accessed by clicking on each image in the Annexes chapter, however they can also be [downloaded here](#).

3. Plenary Discussions

- [Open session 1: exploring the barriers, challenges and opportunities to implementing new technology](#)

This plenary discussion was led by the EU Commission representative and there was interest in knowing **what barriers and challenges there were to implement new technology in the organisations of the attendees.**

From the range of answers given it's worth to emphasize that some feel it is difficult to be pioneers and to get the financial resources to fund tests and the implementation of new technology and, even though, sometimes the tests / trials are successful that doesn't guarantee that the implementation will be successful. Professional enthusiasm is not enough to secure its success.

There was the general agreement that in order to adopt new technology in the organisations it must come from 'the top down' and it is of the outmost importance that everyone along the regulatory chain is on the same page. One the first steps when assessing the implementation of new technology is to identify what and/or who the new techniques are going to replace. Therefore, implementing new technology creates the need for capacity building and to train the human resources, and while some seem to have some degree of difficulty in finding enthusiastic professionals who are willing to embrace new technology and in learning how to use it, others have pointed out that the major challenge is to get the necessary funds. There seems to be a consensus that a balance between professional enthusiasm and funds availability is crucial to enable the implementation of new technology in the organisations.

Regarding opportunities to implement new technology the delegates mentioned that it would be useful if different competent authorities could share technology instead of every organisation buying or



developing its own technology. Training centres were mentioned has an opportunity to extend training to MS and regions, to make sure experts are trained for a specific job with the right and latest tools/skills. Therefore, cooperation between agencies across the EU to get the expertise they need in critical times and the exchange of good practices should happen frequently and to become a priority.

It was pointed out that there are opportunities for competent authorities to get new technology and to have advancements in technology based on the new demands that appear in legislation from the EU Commission or to make good use of what is already in the main legislative drivers to use technology (e.g. GPS tracking of waste to avoid illegal shipments of waste). If the MS Administration's engage and work closely with universities that could also translate into advancements and development of new technology that will meet their needs.

The following question was about **conflict vs balance: breaking barriers on both sides and how to optimise what already exists and combine it with new technology**. There was a consensus that legislation should not be prescriptive of a determined type of technology and it was suggested that the EU COM with the help of IMPEL could develop some kind of 'BAT Conclusions' about what kind of technology can be used for e.g. monitoring / tracking / enforcement / inspections / etc. that the competent authorities across EU can assess and find out what fits their needs in the most efficient way.

The EU Commission representative stated that the COM will support IMPEL to bring together not only inspectors, but also experts from environmental agencies across Europe, prosecutors and judges in order to close the gap by working together and move forward in terms of technology. The idea is to bring together multidisciplinary teams, in different stages, to evolve towards the desired goals. Having in mind the Environmental Compliance Assurance (ECA), digitalisation and new technology are certainly important to bring everything together and to close the existing gaps.

■ Open session 2: what's next?

During this open session the aim was to get a sense of **what's next and how IMPEL can help**. The joint 'brainstorm' of the conference delegates and speakers has resulted in the following suggestion:

- To produce a Guidance with what is being done in the different Member States, that will focus on:
 - Tools and services;
 - Good / best practices;
 - Identifying common requirements;
 - Capacity building and training.

It was also pointed out that such Guidance should be built on lessons learned and it should be a 'live document' in order to continue to add to it. After the first version is concluded and approved it should be disseminated throughout IMPEL Network so all members can benefit from it.



4. Final Considerations

There seems to be opportunities to develop further the existent and new technology and the competent authorities within the Member States can pursue such advancements compelled by the demands of the legislative drivers from the EU Commission.

Most participants affirmed that some decisions are at a top management level, nevertheless it's crucial to have enthusiastic experts focused on technological developments and working for a common goal. Furthermore, cooperation between agencies and frequent exchanges of good practices are fundamental to achieve optimal results and to close the existing gaps across the Member States.

IMPEL aims to continue to be an enabler in this area by supporting cooperation and the sharing of knowledge and will investigate the possibility of producing a Guidance on this topic having into consideration the suggestions given by conference delegates.

5. A Note of Thanks

Simon Bingham, the IMPEL Cross-cutting Tools & Approaches Expert Team Leader, would like to extend his thanks personally, and on behalf of IMPEL, to the European Environment Agency for hosting the *2019 Technology Mini-Conference* and for the warmth and hospitality afforded by the staff involved in the organization of the event.



Annexes



Annex I. 2019 Technology Mini-Conference Agenda

IMPEL X-Cutting Expert Team presents:

A Mini-Conference on

“Advances in the use of technology in environmental and regulatory monitoring”

Held in the offices of the European Environment Agency

Kongens Nytorv 6, 1050 Copenhagen K, Denmark

7th – 8th November 2019



Thursday 7th November 2019 (08:30 Registration)

1	Registration	08:30 - 09:00
1.1 30 mins	Registration	All
2	Welcome & Introductions	09:00 - 09:15
2.1 10 mins	Welcome	Simon Bingham
2.2 5 mins	Tour de table	All
3		09:15 - 10:15
3.1 60 mins	The Finnish MONITOR program	Petri Liljaniemi Finland
***	Coffee Break	10:30 - 11:00
4		10:45 - 13:00
4.1 45 mins	Applications of advanced data analytics for environmental oversight	Jasper van Vliet Netherlands
4.2 45 mins	Cutting edge technology for environmental monitoring	Joel Davidse Netherlands
4.3 45 mins	Copernicus data for water management authorities in Germany - water quality assessment, flood prevention, enhancement of hydrological models.	Annalena Goll Germany
***	Lunch Break	13:00 - 14:00
5		14:00 - 15:30
5.1 45 mins	The future of bio-monitoring	Willie Duncan United Kingdom
5.2 45 mins	Operational use of innovative monitoring techniques in the Environment Agency	Alison Matthews United Kingdom
***	Coffee Break	15:30 - 16:00
6		16:00 - 17:00



6.1 60 mins	Open session exploring the barriers, challenges and opportunities to implementing new technology	All
Close: 17:00		

Friday 8th November 2019 (08:25 Start)		
7	Welcome back	08:25 - 08:30
7.1 5 mins	Welcome	Simon Bingham
8		08:30 - 10:45
8.1 45 mins	Estonian Environmental Inspectorate drone program	Ardi Lepp Estonia
8.2 45 mins	GPS tracking of waste	Jonas Lundin Sweden
8.3 45 mins	Application of mobile technology for waste inspections	Stuart Fallis United Kingdom
***	Coffee Break	10:45 - 11:15
9		11:15 - 12:45
9.1 45 mins	Smart2030 at the Province of Overijssel	Remko Wicherson Netherlands
9.2 45 mins	Scotland's digital end-to-end system for diffuse pollution farm inspections: 4 years on.	Jonathan Bowes United Kingdom
10	Close out	12:45 - 13:00
10.1 15 mins	What next?	Simon Bingham
***	Thanks & End Meeting Lunch	13:00



Annex II. 2019 Technology Mini-Conference Presentations

The 11 presentations that were delivered by the speakers at the *2019 Technology Mini-conference* in Copenhagen are in the following pages.

In order to see and/or download the presentations click on each image.



- Finland's Monitor Program



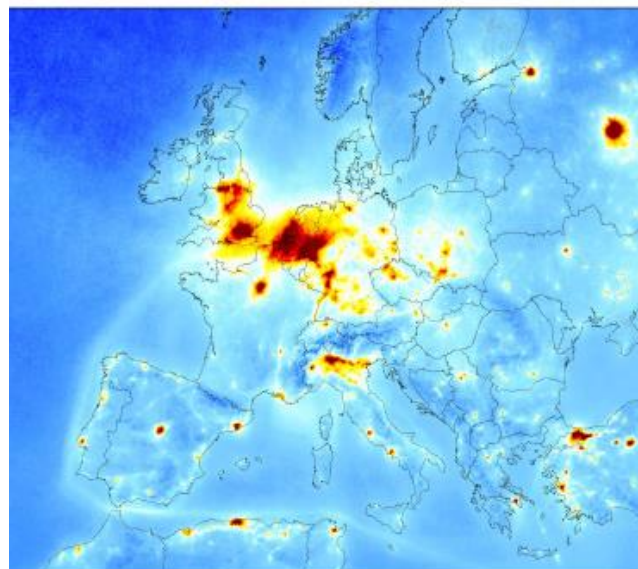
Ympäristöministeriö
Miljöministeriet
Ministry of the Environment

Part 1: New methods for environment monitoring and surveillance – MONITOR 2020-programme, Finland

IMPEL-Conference, Copenhagen 7.11.2019
Petri Liljaniemi
Ministry of the environment FINLAND



- Data Analytics



NO₂ tropospheric column (1e-6 mol m⁻²)

TROPOMI NO₂-average April-September 2018



Human Environment and Transport Inspectorate
Ministry of Infrastructure and Water Management

Eat, Drink, Data, Repeat

Jasper van Vliet
IMPEL X-cutting experts mini-conference
7-8 November 2019, Copenhagen



- Cutting Edge Technology for Environmental Monitoring

Cutting edge technology for environmental monitoring

Applications by ILT



- Copernicus Data for Water Management



Federal states and Federal Government
German working group on water issues
(LAWA)



Rheinland-Pfalz
MINISTERIUM FÜR UMWELT,
ENERGIE, ERNÄHRUNG
UND FORSTEN

COPERNICUS data

for water management authorities in Germany

—

water quality assessment, flood prevention,
enhancement of hydrological models

Dr. Annalena Goll, Copernicus for LAWA

Ministry for Environment, Energy, Food and Forestry Rhineland-Palatinate



- The Future of Biomonitoring



The Future of Biomonitoring- Catching the Wave

Willie Duncan
SEPA
November 2019

www.sepa.org.uk



- Operational Use of Innovative Monitoring Techniques



Operational use of innovative monitoring techniques in the Environment Agency

Dr Alison Matthews, Geomatics Manager

Jon Hateley, Crispin Hambidge, Matt Loewenthal, Jonathan Porter

IMPEL conference on Advances in the use of technology in environmental and regulatory monitoring

7th and 8th November 2019 Copenhagen





- Estonian Environmental Inspectorate “Drone Program”



Estonian Environmental Inspectorate „drone program“

“Advances in the use of technology in environmental and regulatory monitoring”

7th – 8th November, Copenhagen

Ardi Lepp



- GPS Tracking of Waste

GPS TRACKING PROJECT

Länsstyrelsen
Norrbotten

Elinkeino-, liikenne- ja
ympäristökeskus

IMPEL

European Union Partnership for
the Implementation and Enforcement
of Environmental Law

**GPS TRACKING PROJECT –
TRACKING ILLEGAL WASTE
STREAMS WITH GPS
TRACKERS**



- SMART 2030 - Province of Overijssel, Netherlands





- Application of Mobile Technology for Waste Inspections

Advances in the use of technology in environmental and regulatory monitoring

Application of mobile technology for waste inspections

Stuart Fallis

Department of Agriculture, Environment and Rural Affairs
Northern Ireland Environment Agency



- SEPA's Digital End-to-End System for Diffuse Pollution Farm Inspections

