



LIFE MARINAPLAN PLUS  
LIFE15 ENV/IT/000391



D1.7 – LAYMAN'S REPORT

## D1.7 – Layman's report



**Reliable and innovative technology for the realization of a sustainable  
MARINE And coastal seabed management PLAN**

**LIFE Environment and Resource Efficiency project  
LIFE15 ENV/IT/000391**

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## Project partners

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## D1.7 – LAYMAN’S REPORT

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## D1.7 – LAYMAN’S REPORT

### Chapter 1. Layman’s report

The Layman’s report is targeted at a non-specialist audience and serves to inform decision makers and non-technical parties of the LIFE MARINAPLAN PLUS project objectives and results. It is, along with the project website, the main tools for disseminating information about the project. Moreover, it is often the main source of information for journalists and other parties wishing to find out more about the project.

### Annexes

Annex 01	Layman’s report
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# LAYMAN'S REPORT



# Life 15

## Marina Plan Plus

Reliable and innovative technology for the realization of a sustainable **MARINE** And coastal seabed management **PLAN**



Co-funded by the LIFE15 Programme of the EU through EASME

## PROJECT PARTNERS



## PROJECT BACKGROUND

In the EU, approximately 140 million tons (dry weight) of dredged material is disposed of in coastal areas every year. The impacts that dredged material can have on the seafloor are diverse, ranging from physical differences in sediment structure to significant reductions in the numbers of species that live there since disposal of dredged material on the seabed can disrupt sediment-dwelling animals, with potential knock-on effects further up the food chain. The need for improved operations and maintenance techniques and equipment for sediment bypassing is a profitable sector for research and innovation.

In October 2016, the LIFE15 ENV/IT/000391 Marina Plan Plus officially started to prevent harbour silting. Co-financed by EASME (Executive Agency for Small and Medium-sized Enterprises), Marina Plan Plus is one of the 15 European projects, selected among hundreds of other projects presented by all European countries, that in 2016 received funding in the Water Sector. Trevi, leader in subsoil engineering, is the coordinator of the research team that also includes Bologna University, Cervia Municipality and ICOMIA (International Council of Marine Industry Associations). The Project received € 1.5 million funding from EASME, for the duration of 39 months. The project should have finished in December 2019 but it has been extended and it will be completed in December, 2020.

The project consists of 8 “actions” which involve both technical and communication + management activities. It entails:

- » Setting up of a preliminary test field
- » Design, setting up and running of an innovative silting plant at the entrance of Cervia Canal Harbour
- » Assessment of the technical-economic and environmental impact of the new tested technology



# PROJECT OVERVIEW

## OBJECTIVES

The main objective of the research team is to improve easy access to harbours (Cervia Harbour as pilot) by keeping the seabed at the harbour's entrance at an optimal depth, thus allowing navigation of incoming and outgoing vessels. To achieve this goal, many activities, such as lab tests, bathymetries and sediment analyses, will be carried out in order to install an experimental plant specifically designed to keep seabed's depth constant at the harbour's entrance. Thanks to its features and size, this experimental plant will have no impact on navigation through the harbour's entrance, as well as for the Shipyard activities.

The project aims to realize a technology able to model and maintain the seabed at the entrance of the port at a certain depth and able to:

- » minimize environmental impact
- » avoid the turbidity of sea water
- » not to be an obstacle during operation
- » integrate into the architecture and landscape of the port



## BENEFITS

- » Innovative and customized solution for sediment management
- » Permit dredging not needed only permit to build facilities
- » Lower management cost if compared to dredging
- » Navigation safety improvement
- » Extended and improved port performance
- » Environmental impact reduction (if compared to dredging)
- » Simplification in budget planning
- » No authorization needed (if compared to dredging)
- » Sediment management not dependent from dredging companies
- » In compliance with most relevant EU legislations



## PROJECT PARTNERS

**Trevi** is a company specialized in the field of special foundations and soil consolidation works and belongs to Trevi Group, a worldwide leader in foundation engineering and in the design and production of rigs and special equipment. Trevi was established in Cesena in 1957; it acquired a wide and long-term experience in the sector of foundation engineering and its leadership is acknowledged worldwide. Trevi operates in more than 40 countries with its wholly owned subsidiaries. Among its main activities, these are the ones worth being mentioned: special foundations, tunnel excavation and consolidation, marine works, repair works for dams, soil consolidation, remediation of polluted sites, construction of automated underground car parks, foundation works for private households. In all these sectors, Trevi showed off its ability to solve any problems related to subsoil engineering. [Trevipa.com](http://Trevipa.com)

**Cervia Municipality** has around 30.000 inhabitants and is located in the Emilia Romagna Region, on the Adriatic coast. It belongs to Ravenna Province and consists of an urban centre and of different localities situated across a vast territory covering 82,19 km<sup>2</sup>. The Municipality is in charge of harbour management. Marina di Cervia is located on the NE side of the old harbour, an area intended to host recreational craft, made up of a dock with 8 piers. The harbour can accommodate 300 boats with a maximum length of 22 m. Cervia Harbour is cyclically affected by silting phenomena. The technological solutions adopted until now, including seasonal dredging and/or sand handling through barche a elica as well as docks' lengthening (completed in 2009), didn't solve the problem and caused both sea pollution and financial strain. [comunecervia.it](http://comunecervia.it)

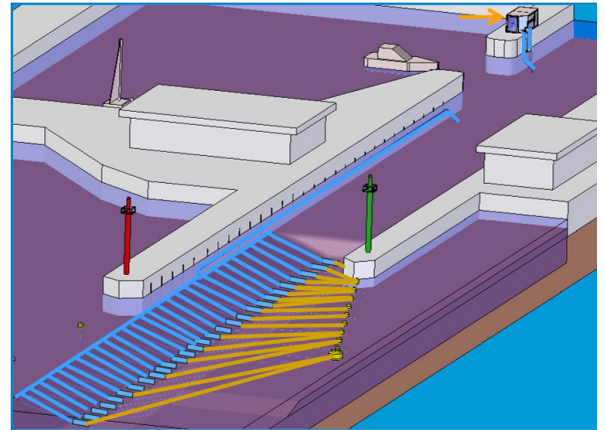
**Bologna University (Unibo)**, founded in 1088, is the oldest University in Western Europe. Nowadays, with 11 Schools, 33 Departments and about 87 000 students within a multi-campus structure. Unibo places special emphasis on achieving Excellence in Education and Research. Activities related to European Funding Programs are supported by the European Research and Innovation Office, with more than 10-year experience in European projects, assisting Research Groups during the project "lifecycle": networking and lobbying, establishment of Consortia, drawing up of proposals, negotiation and project management. In Europe, Unibo is a member of the major European Networks involved in Research and Innovation initiatives, such as ETP Suschem, PPP Spire, ECRA and obtained 91 million Euros from the Seventh Framework Programme and other EU-funded programs (from 2007 to September, 2013). [unibo.it](http://unibo.it)

**ICOMIA** (The International Council of Marine Industry Associations) is the international trade association representing the global marine industry since 1966. ICOMIA brings together national marine industry associations in one global organisation and represents them at an international level, presenting a strong and united voice when dealing with issues challenging the industry. ICOMIA members include the vast majority of the industrialised countries from North America across to Japan and China and from Finland down to New Zealand. With the support of its members throughout the world and in conjunction with the appropriate associations, ICOMIA lobbies international authorities and major organisations, publishes documents and guidelines and produces tools to facilitate the growth of the industry. [icomia.org](http://icomia.org)

## TECHNOLOGY

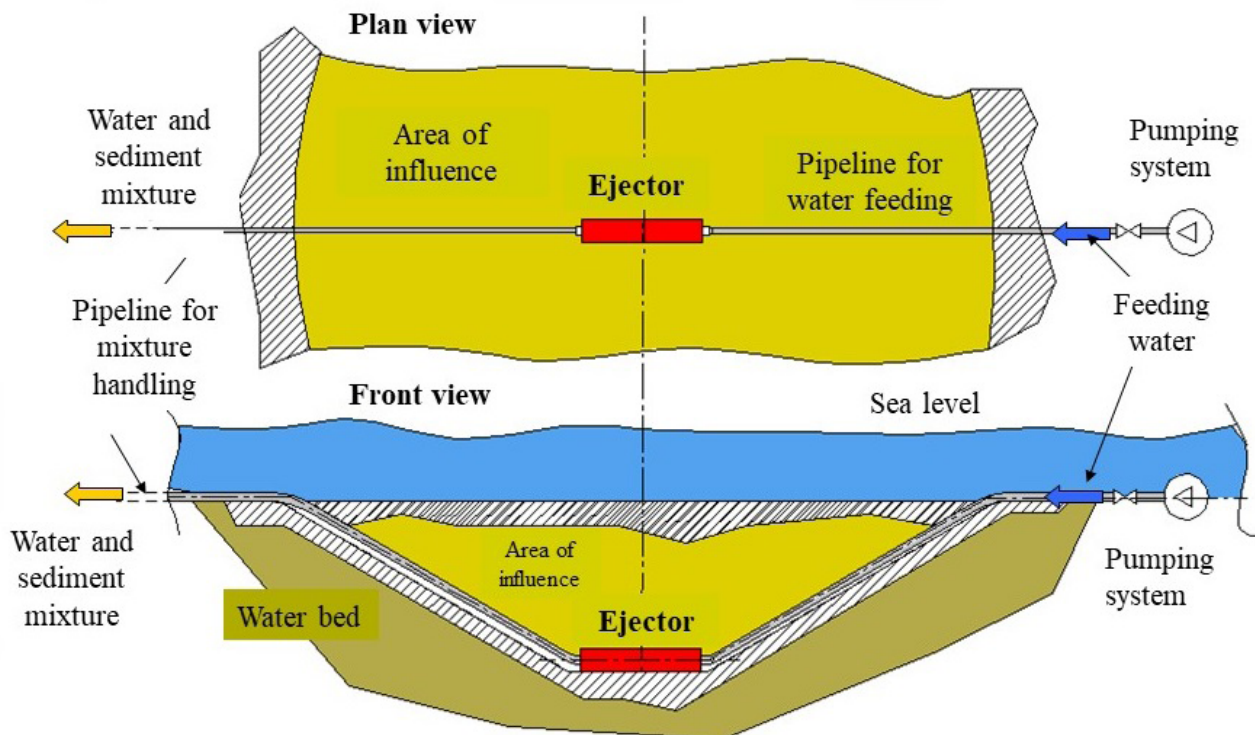
The Department of Industrial Engineering (DIN) of Bologna University, in collaboration with Plant Engineering Srl (Bologna, Italy), developed and tested an innovative plant for seabed maintenance characterized by the fact that the main element, called “ejector”, is an open jet pump (i.e. without closed suction chamber and mixing throat) with a converging section instead of a diffuser. Plant Engineering Srl, which is the patent owner, signed an agreement with Trevi for patent licensing and will be involved in the project as technology supplier by Trevi.

The innovative plant for seabed re-modelling consists of a set of devices, the ejectors, which constantly remove the sediments delivered to their operating area by transferring them to a nearby area where they do not impair navigation. The withdrawal and subsequent transport of materials to be displaced takes place with no submersed moving equipment but with suitably oriented water jets that temporarily keep sediments suspended and convey them to the transportation and discharge pipeline. Ejectors are fixed to the seabed and do not impair navigation.



The whole plant is made up of:

1. a water pumping station which is used to feed ejectors with water pressure
2. feed and discharge pipelines
3. adjustment and control devices (valves, instruments, etc...)



## TECHNOLOGY

By means of one or more grids of ejectors, it is possible to operate in the areas affected by silting phenomena, thus carrying out a continuous removal (24/7) of the materials transported by currents and keeping the seabed at a set constant level. The plant's dimensioning and the choice of ejectors depend on the type of specific application and, in particular, on:

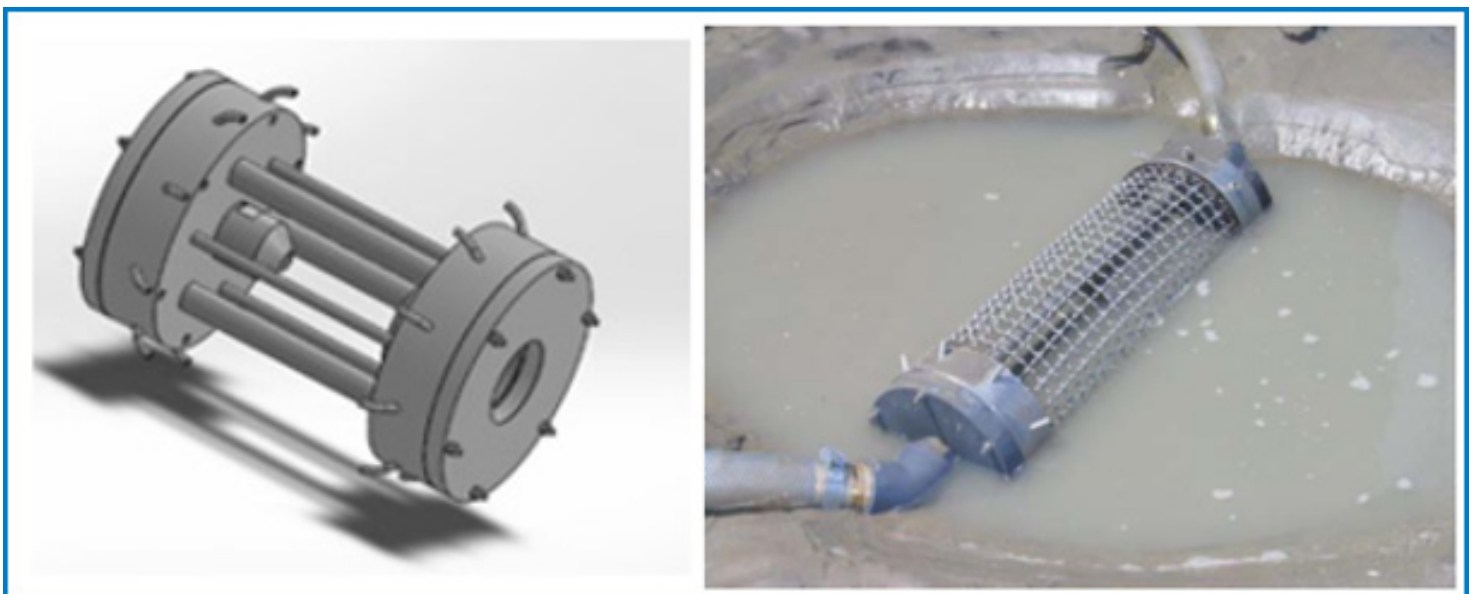
- » The size of the area affected by silting phenomena (it does affect the number of ejectors)
- » The type of sediments (it affects the area where each single ejector operates)
- » The length of the discharge pipeline (it determines the ejectors' minimum feed rate)



## THE EJECTOR

The ejector's operating principle is based on the combined effect of two different nozzles:

- » Radial nozzles: they create a suspension of water and sediment
- » Central nozzle: thanks to the Venturi effect, the central nozzle sucks up a mixture of sediment and water and conveys it into a discharge pipe.



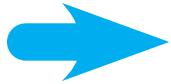
## DISTINCTIVE FEATURES



Actions exerted on the seabed comply with the definition of “re-modelling” stated in DM. 173 of 2016 (Italian Decree about sediment management for dredging works); hence they are not regarded as dredging actions but, rather, as sediment management operations within the same basin.



Reduced environmental impact: while sediments are managed, no turbidity or re-suspension of materials is detected; the only plant emissions are linked to the pumping station’s electric energy consumption



It can be automatically operated and a remote control can be used



Certainty of seabed maintenance costs: the adoption of the plant allows for a precise planning of seabed maintenance costs, solely linked to the plant’s operating costs, regarding dredging activities as extraordinary – and not ordinary! - maintenance interventions.

## THE MARKET

### CUSTOMER SEGMENT

1. Port entrances/Marinas
2. Shipyards/ Drydocks/  
Slipways/Reservoirs
3. Entrances to dry stock areas  
and or winter storages



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