

**GRANT N°:** 871153  
**PROJECT ACRONYME :** JERICO-S3  
**PROJECT NAME :** Joint European Research Infrastructure for Coastal Observatories - Science, services, sustainability  
**COORDINATOR :** Laurent DELAUNEY - Ifremer, France - jerico-s3@ifremer.fr

### JERICO-S3 MILESTONE

Joint European Research Infrastructure network for Coastal Observatory  
**Science, Services, Sustainability**

<b>MS40</b>	Intelligent services integrated in JIIM and data science methodologies integrated in the VA e-infrastructure Demonstration of Pilot
<b>5 Key words</b>	Coastal EGIM, Intelligent Services, JERICO CORE, e-infrastructure
<b>Lead beneficiary</b>	CNR
<b>Lead Author</b>	Simone Marini
<b>Co-authors</b>	
<b>Contributors</b>	Eric Delory, Andrés Cianca
<b>Submission date</b>	05/09/2024

Report after a specific action

#### Diffusion list

<u>Consortium beneficiaries</u>	Third parties	Associated Partners	other
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## A) TEMPLATE B - Other cases (not a workshop or meeting report)

### 1.B – Objectives and implementation process

The objective of this report is to describe the integration of the cEGIM intelligent services, developed within the activity T7.4, in the JERICO-CORE facility. The data science methodologies investigated and implemented within the T7.4 activities have been used to define and implement the intelligent services for the coastal EGIM module (cEGIM). Such intelligent services are aimed at triggering the cEGIM sensors and to automatically set the sensor configurations (e.g. data sampling frequency) to implement the automated adaptation of the cEGIM behaviour to the dynamic relevant environmental conditions. In particular, data processing algorithms have been implemented for the detection of phytoplankton blooms and IoT services for changing the acquisition frequency of the sensors hosted on board the cEGIM and for transferring the acquired data to a land station in case a data transfer link is available. Details are presented and discussed in the deliverable D.7.8 - WP7 - "Intelligent services and data science methodologies for the JIIM and the VA eInfrastructure".

Following the instructions provided by the task T7.5 "JERICO e-Infrastructure" and the deliverable "D7.6 Documentation of JERICO-RI e-infrastructure and capabilities" a JSON file containing the metadata describing the intelligent services software package has been realized and integrated in the JERICO-CORE facility.

### 2.B - Main report

An algorithm developed conjointly by the Université du Littoral de la Côte d'Opale and Ifremer ensures bloom detection using the two Fluorescence and Nitrate measurements received periodically. The challenge was to integrate the algorithm into the EGIM COSTOF2 control system to enable in situ bloom detection, and to increase the sampling frequency of all sensors while bloom is being detected. This work has been completed.

As defined in the T7.5 activities, the integration of the software resources, in the JERICO e-infrastructure, is obtained by sharing the software package into a public repository and encoding the software package metadata to make the software searchable and accessible.

Currently, the software package is available through the GitLab infrastructure at the following link:

<https://gitlab.com/epoisson/cegim>

The most relevant metadata requested to make the software package available to the community are listed below:

- Class of resource: software, dataset, document)
- Abstract: free text
- Author information: e.g. person, organization, web site
- Contributors: who participate to the definition and realization of the resource (name, surname, affiliation)
- Description of the resource: free text
- Download URL

- License: e.g. GNU General Public License
- Date of creation
- Date of the last modification

The complete encoding the metadata is reported in section Annexes.

The integration of the metadata into the JERICO-CORE has been completed by including the metadata file in the following folder as resulting by the T7.5 activities:

<https://github.com/socib/jerico-core-metadata>

### 3.B - Conclusion

The software package containing the intelligent services was developed and installed on the cEGIM and the installation instructions and some examples of use are accessible through the GitLab platform. The metadata that allow the access to the software package were defined and encoded in a JSON file according to the indications of the T7.5 results. The JSON file was integrated into the JERICO-CORE infrastructure according to the T7.5 instructions.

#### 3.1. Annexes

The following is the complete encoding of the metadata in the JSON file:

```
{
  "_class": "Software",
  "alias": "https://gitlab.com/epoisson/cegim",
  "abstract": "Python scripts for the automatic detection of the phytoplankton algal bloom to be
executed as intelligent service onboard the coastal EGIM (cEGIM)",
  "author": {
    "_class": "Organization",
    "alias": "https://lisic-prod.univ-littoral.fr/"
  },
  "created": "2022-06-21",
  "contributor": [
    {
      "_class": "Person",
      "name": "Emilie Poisson Caillault <emilie.poisson@univ-littoral.fr>"
    },
    {
      "_class": "Person",
      "name": "Enoc Martínez <enoc.martinez@upc.edu>"
    },
    {
      "_class": "Person",
      "name": "Jérôme Blandin <jerome.blandin@ifremer.fr>"
    },
    {
      "_class": "Person",
      "name": "Andrés Cianca <andres.cianca@ploca.eu>"
    }
  ]
}
```

```

    {
      "_class": "Person",
      "name": "eric.delory@plocan.eu <eric.delory@plocan.eu>"
    },
    {
      "_class": "Person",
      "name": "Alain LEFEBVRE <Alain.Lefebvre@ifremer.fr>"
    },
    {
      "_class": "Person",
      "name": "Simone Marini <simone.marini@sp.ismar.cnr.it>"
    }
  ],
  "description": "The algorithm take as input the chlorophyll-a and the nitrates concentration
  acquired by the BBE moldaenke Fluoroprobe and the SATLANTIC MBARI-ISUS sensors,
  respectively and, returns as output a flag value about the bloom status. In particular If the
  output flag is equal to the value +1, the cEGIM have to increase sensors' sampling frequency; if
  the output flag is equal to the value -1, then the cEGIM has to decrease the sensors' sampling
  frequency; finally if the flag is equal to the value 0, then the sensors' sampling frequency
  remains unchanged.",
  "distribution": {
    "_class": "Distribution",
    "accessURL": "https://gitlab.com/epoisson/cegim"
  },
  "downloadURL": "https://gitlab.com/epoisson/cegim",
  "keywords": ["R", "ocean-sciences", "data-preservation", "automated algal bloom detector",
  "intelligent services", "coastal EGIM", "automated data processing", "edge computing"],
  "language": ["English"],
  "license": "GNU General Public License V3",
  "modified": "2023-06-21",
  "name": "cEGIM Algal bloom detection",
  "organization": {
    "_class": "Organization",
    "alias": "https://www.jerico-ri.eu/projects/jerico-s3/"
  },
  "owner": {
    "_class": "Organization",
    "alias": "https://lisic-prod.univ-littoral.fr/"
  },
  "published": "2023-06-21",
  "programming_language": ["R"],
  "url": "https://gitlab.com/epoisson/cegim",
  "version": "v1.0"
}

```