



Joint European Research Infrastructure network for Coastal Observatory – Novel European eXpertise for coastal observaTories - JERICO-NEXT	
Deliverable title	The “JERICO Label”, Version 2
Work Package Title	WP2: Harmonization of technologies and methodologies - technical strategy
Deliverable number	D2.7
Description	Overview of the outcomes of the work carried out on the JERICO Label in task 2.6 (“The JERICO Label Technical Committee”) of WP2 of JERICO-NEXT.
Lead beneficiary	OGS, HZG
Lead Authors	R. Nair, I. Puillat, L. Delauney.
Contributors	S. Sparnocchia, A. King, J. Seppala, L. Laakso, K. O. Moller, G. Petihakis, W. Petersen, A. Blauw.
Submitted by	R. Nair
Revision number	V1.0
Revision Date	09/09/19
Security	Consortium and Public





History			
Revision	Date	Modification	Author
V0.0	19/02/2019	First release.	R. Nair
V1.0	09/09/2019	Revision and update of content.	R. Nair

Approvals				
	Name	Organisation	Date	Visa
Coordinator	P. Farcy	Ifremer	15/09/2019	PF
WP Leaders	R. Nair W. Petersen	OGS HZG	09/09/2019	R. Nair W. Petersen

PROPRIETARY RIGHTS STATEMENT

THIS DOCUMENT CONTAINS INFORMATION, WHICH IS PROPRIETARY TO THE **JERICO-NEXT** CONSORTIUM. NEITHER THIS DOCUMENT NOR THE INFORMATION CONTAINED HEREIN SHALL BE USED, DUPLICATED OR COMMUNICATED EXCEPT WITH THE PRIOR WRITTEN CONSENT OF THE **JERICO-NEXT** COORDINATOR.







Table of contents

1. Executive Summary.....	5
2. The JERICO Label at the end of the FP7 JERICO project	Erreur ! Signet non défini.
3. The development of the JERICO Label in JERICO-NEXT	Erreur ! Signet non défini.
3.1. The JERICO Label Committee	7
3.2. Description of a possible structure for a “technical” descriptor for the JERICO Label, and the potential manner of its application.....	7
3.3. Next steps	12
4. Outreach, dissemination and communication activities	13
5. Conclusions	13
6. References	14





1. Executive Summary

This document summarizes the work done on the JERICO-Label in JERICO-NEXT, from the perspective mainly of the development of some of its “technical” aspects. The activity reported on forms part of Work Package 2 (“Harmonization of technologies and methodologies - technical strategy”) of the project – specifically, Task 2.6 (“The JERICO Label Technical Committee”). This task gathered together 16 partners from 11 European countries (Italy, Finland Germany, France, Norway, UK, Greece, Sweden, Spain, Sweden, and the Netherlands), and was co-led by two of them, OGS and HCMR.



2. The JERICO Label at the end of the FP7 JERICO project

During the FP7 JERICO project, the precursor to JERICO-NEXT, it was envisioned that the then newly constituted transnational network of coastal observatories would progress towards greater and greater harmonization with respect to technologies, methodologies and procedures, leading to continuing improvements in operational transparency, and thus to more uniform services and products. The possibility of introducing a “JERICO Label” to showcase these qualities of the JERICO RI to the outside world was therefore debated, and a scoping study on the characteristics of a similar construct was completed by the end of the project (JERICO-FP7 deliverable D1.4: http://www.jerico-ri.eu/download/filebase/jerico_fp7/deliverables/D1.4_Jerico-Label-V3_0.pdf).

According to the study, the Label had to accomplish the following:

- acknowledge the consensus on guidelines for best practices in the design, implementation, maintenance, data policy and valorization of the coastal observing elements of the JERICO RI;
- allow fair recognition of the quality of the managed observatories within the JERICO RI;
- help stakeholders to become aware of the European interest in the development of high quality coastal observatories;
- foster a wider market for industry in the fields of sensor technology and platforms based on agreed recommendations.

And, it needed to be able to do all of the above without neglecting:

- the heterogeneity of the coastal observing systems in the JERICO RI, and their abilities to address the multiple space and time scales characterizing environmental variability;
- the necessity to comply with other normative efforts in marine observing (e.g. EU initiatives such as SeaDataNet & MyOcean, EMODnet, etc.);
- the specificities of the coastal marine environment;
- the heterogeneity of coastal processes, and the many interacting scales that they can encompass;
- ongoing advancements in instrumentation, platforms and data management technologies;
- ongoing progress in scientific knowledge relating to marine ecosystem processes.

The Label itself was specified as “... a set of criteria defined to ensure some standardization and interoperability, and the quality of data for coastal observatories”. Three qualities were chosen as yardsticks:

- **Sustainability:** intended, essentially, as funding for keeping a system running in the long-term (5 years);
- **Operationality:** intended, essentially, as the level of efficiency of the process taking acquired data from raw to quality-assured and available for use in real-time and/or delayed mode;
- **Observing/research purpose (“fitness for purpose”):** intended, essentially, as the completeness of the list of parameters handled by a system in relation to scientific and/or other operational goals.

Finally, based on the above criteria, a classification scheme to regulate the implementation of the Label was also proposed, and is summarized in the figure 1 below.



Figure 1. The classification of observing systems in the JERICO-Label scheme from the EU FP7 JERICO project: [1] New Entry, [2] Standard level, and [3] Full level.



3. The development of the JERICO Label in JERICO-NEXT

In JERICO-NEXT, the work on the JERICO Label from the preceding FP7 JERICO project was carried forward, identifying drawbacks and weaknesses, with a view towards:

- supporting the continuing consolidation of harmonization efforts within the network of JERICO observatories;
- aiding in standardizing operations and relative practices across this network.

The specific questions regarding the Label tackled in this project were the following:

- How to frame a composite “technical” descriptor to condense the information relating to the characteristics of a coastal observatory in an objective way?
- How to apply a similar descriptor for network management purposes?

3.1 The JERICO Label Technical Committee

The JERICO Label Committee was the body established to oversee the furtherance of the work on the JERICO Label in JERICO-NEXT. The Committee is constituted by representatives of the various partners participating in task 2.6 (“The JERICO Label Technical Committee”) of Work Package 2 (“Harmonization of technologies and methodologies - technical strategy”) of the project (table 1).

Table 1. The composition of the JERICO Label Committee in JERICO-NEXT.

Organization	Role	Representative/s
OGS	Lead	Rajesh Nair
HCMR	Co-lead	George Petihakis
HZG	Participant	Wilhelm Petersen Klas Ove Moller
CNR-ISMAR	Participant	Stefania Sparnocchia
AZTI	Participant	Julien Mader
NIVA	Participant	Andrew King
Ifremer	Participant	Patrick Farcy Ingrid Puillat Laurent Delauney
SOCIB	Participant	Joaquin Tintoré
CNRS	Participant	Antoine Grémare
FMI	Participant	Lauri Laakso
IMR	Participant	Henning Wehde
SMHI	Participant	Bengt Karlson
SYKE	Participant	Jukka Seppala
UPC	Participant	Joaquin del Rio
DELTARES	Participant	Anouk Blauw
CEFAS	Participant	Naomi Greenwood

These representatives collaborated actively in all discussions relating to the task (via both in-person and virtual meetings), and generously provided precious expertise and input which served to develop the present document. Following a decision taken during the last General Assembly of JERICO-NEXT, the JERICO Label Committee has been reorganized into three working groups, one dealing with matters relating to observing platforms, a second dealing with matters relating to measurements, and a third dealing with matters relating to data management.





3.2 Description of a possible structure for a “technical” descriptor for the JERICO Label, and the potential manner of its application

In the FP7 JERICO project, the following 3 criteria were defined for the JERICO Label:

- 1) sustainability;
- 2) operational viability;
- 3) Fitness-for-purpose.

In JERICO-NEXT, we have attempted to use these criteria to lay down the foundation of a workable system for implementing the Label within the JERICO RI in the future. A general outline of the main elements of this system is presented in table 2.

Table 2. The JERICO Label criteria defined in the FP7 JERICO project, and their practical “expressions” as established in JERICO-NEXT.

Criterion	Sustainability	Operational viability	Fitness-for-purpose
Expressed as:	Strategic Operational Plan	Description of the infrastructure	Infrastructure classification
	Gaps identification	Cost Statement	Measured variables
	Sustainability Analysis		Measurement goals
			Best Practices

Sustainability

The Strategic Operational Plan

The Strategic Operational Plan (SOP) will be a high-level document delineating how an infrastructure is managed and operates. It is envisaged that this Plan will evolve as the infrastructure matures, new technologies become available, priorities and funding levels change, and new users and stakeholders are identified. The function of the SOP will be to describe the operations relating to the infrastructure - including any relevant subsystems - as either an individual element or as a part of a broader regional/national coastal ocean observing network (see box below).





Some of the main topics expected to be dealt with in the Strategic Operational Plan

1. Background and context:
 - the role of the infrastructure in the area/region where it is located, and more generally within the EU;
 - the primary assets of the infrastructure, and the partners involved;
 - the procedures envisioned to update and maintain the Strategic Operational Plan, itself.
2. Goals and Objectives:
 - the main mission of the infrastructure, and how this relates to the goals of the JERICO RI;
 - the benefits the infrastructure will bring to the JERICO system, and vice versa - e.g., in relation to data acquisition and management, the development of products and services, research, education and outreach, etc.
3. Infrastructure operation:
 - the strategies and means adopted to ensure that the infrastructure is run as an integrated system, where the different activities come together in a coherent way generating uniform services and products of established quality;
 - the strategies and means adopted to ensure that observations are being made and data are being delivered successfully in the manner explicitly declared;
 - the implementation of sound management principles;
 - the employment of Best Practice doctrine in all aspects of routine operation (wherever possible).
4. Data management:
 - the strategies and means adopted to ensure data accessibility and usability, including policy, documentation, quality assurance, and preservation and archival.

Gaps identification

This will take the form of a document identifying, in the context of the Strategic Operational Plan:

- existing gaps in observation coverage in the area/region where the infrastructure is located;
- needs for capital improvements of the infrastructure;
- other recommendations to address specific scientific and societal priorities.

Sustainability Analysis

This will be a document presenting an analysis on the sustainability of the infrastructure in the long-term (at least five years ahead) using appropriate tools, e.g. a business plan, that will highlight among other things:

- the current and projected sources of funding and in-kind support;
- the plans and strategies for diversifying the funding base;
- the apportionment of funding across all the infrastructure-related activities;
- future funding shortfalls and associated risks.

Operational viability

Description of the infrastructure

This will be a document recounting the details of the infrastructure (components, organization, output, products, etc.), demonstrating its eligibility for incorporation into the JERICO RI system.





Cost Statement

This will be a document presenting an asset inventory and a cost statement (including capital and running costs) for the infrastructure, containing up-to-date information.

Fitness-for-purpose

Infrastructure classification

For the purposes of the JERICO Label, infrastructure will be classified into three categories (as shown in table 3), depending on the end-use attributes of the measurements that they are providing.

Table 3. The JERICO classification scheme for integrated coastal observing infrastructure.

Group	Class	Description
1	Regulatory	Measurements supporting assessments of compliance with predetermined criteria (e.g. those established within the frameworks of the MSFD or regional conventions like HELCOM, OSPARCOM, etc.).
2	Routine	An enhanced suite of measurements that promote understanding of the mechanisms (including biologically mediated mechanisms) governing coastal processes; Measurements of quality sufficient to identify relative spatial patterns and short-term variation in the coastal environment.
3	Research	Opportunistic or experimental measurements that may offer enhanced insights into coastal processes and impacts; Measurements of quality sufficient to assess long term trends in coastal processes with a defined level of confidence; Measurements under development that may be later adapted to Group 2.

The categories are not mutually exclusive, in the sense that an infrastructure can fall into one, two or all three of them, depending on the conditions met.

Measured variables

Table 4 lists the JERICO network’s current set of observables (space-time variables not included).

Table 4. JERICO RI: list of observables.

Physical Oceanography	Biological Oceanography/Marine Biogeochemistry	Other measured variables
Pressure	Fluorescence (Chlorophyll a)	Underwater noise
Temperature	Turbidity	Vibration/motion (Seismometry)





Conductivity (salinity)	Photosynthetically Active Radiation (PAR)	CDOM (Colored Dissolved Organic Matter)
Currents	Nitrates	EC (Eddy Correlation) flux
	Phosphates	Air temperature
	Silicates	Atmospheric pressure
	Ammonia	Relative humidity
	Dissolved oxygen	Wind speed and direction
	pH	CO2 concentration in air
	pHT (pH on the total hydrogen ion concentration scale)	Fluorescence (Phycocyanin and phycoerythrin)
	Total Alkalinity	
	pCO2 (partial pressure of CO2)	
	TCO2 (DIC - Dissolved Inorganic Carbon)	
	DOC (Dissolved Organic Carbon)	
	TOC (Total Organic Carbon)	
	POC (Particulate Organic Carbon)	

Measurement goals

This will be a report showing that the following three critical measurement requirements are being met by the infrastructure.

- a) Observations (whether measured, estimated, or calculated) must be associated with an uncertainty; the term “uncertainty” should be taken to mean the standard uncertainty of measurement, that is, with the associated confidence interval equivalent to that for a standard deviation.
- b) Observations must be calibrated to a community-accepted set of reference materials, when available, and documented and reported; similarly, when any other kind of material is used for calibration, this must be documented and reported.
- c) All constants applied in the derivation of calculated parameters must be documented and reported, along with the units and scale; the uncertainties of such constants must be incorporated into the estimate of the uncertainty of each derived parameter.

Best Practices

A basic requirement to enable efficient monitoring and streamlined services by an observing infrastructure - especially when it has to operate as part of a network - is defining and following Best Practices (either developed in-house or recommended methods and procedures) for managing and running it. This is particularly true in the context of instrumentation and measurement, maintenance, data acquisition, data flow, data integration and data product generation. Acknowledging this fact, the JERICO RI places a lot of importance on Best Practices, and has done considerable work in this area during both the JERICO (FP7) and JERICO-NEXT (H2020) projects (table 5).

An observing infrastructure wishing to be part of the JERICO system will be asked to produce a report detailing the efforts it is undertaking to ensure that Best Practices are an integral part of its operation, including any relevant documentation that could be shared within the JERICO network first and possibly with the community-at-large later.

Table 5. JERICO RI: Best Practice documentation produced during the JERICO (EU FP7) and JERICO-NEXT(EU H2020) projects.





Title of document	Link to document
JERICO-NEXT: Report on new network systems: status of HF-radar systems and cabled coastal observatories (Deliverable D2.1)	http://www.jerico-ri.eu/download/jerico-next-deliverables/JERICO-NEXT-Deliverable-2.1.pdf
JERICO-NEXT: Report on Best Practice for new network systems: HF-radar /cabled coastal observatories (Deliverable D2.4).	http://www.jerico-ri.eu/download/jerico-next-deliverables/JERICO_NEXT_Deliverable_2.4_final.pdf
JERICO-NEXT: Report on Best Practice for new network sensors (Deliverable D2.5).	JERICO-NEXT website (available by the end of the project).
JERICO-NEXT: Report on project activities relating to calibration and assessment (Deliverable D2.6).	JERICO-NEXT website (available by the end of the project).
JERICO-FP7: Ferrybox Best Practices - 2014 (Deliverable D3.1)	http://www.jerico-ri.eu/previous-project/deliverables/d3-1-ferrybox-best-practices/
JERICO-NEXT: Report on first methodological improvements on retrieval algorithms and HF radar network design (Deliverable D3.3).	http://www.jerico-ri.eu/download/jerico-next-deliverables/JERICO-NEXT-Deliverable_3.3_v1.0.pdf
JERICO-NEXT: Report on final assessment of methodological improvements and testing on infrastructures (Deliverable D3.4).	http://www.jerico-ri.eu/download/jerico-next-deliverables/JERICO-NEXT_Deliverable_3.4_180719_final.pdf
JERICO-FP7: Report on Calibration Best Practices (Deliverable D4.2)	http://www.jerico-ri.eu/previous-project/deliverables/d4-2-report-on-calibration-best-practices/
JERICO-FP7: Report on best practice in conducting operations and maintaining (Deliverable D4.4)	http://www.jerico-ri.eu/download/filebase/jerico_fp7/deliverables/D4.4_Report%20on%20best%20practices%20in%20conducting%20operations%20and%20maintaining.pdf
JERICO-NEXT: Recommendations on a free and open data access policy (Deliverable D5.1).	http://www.jerico-ri.eu/download/jerico-next-deliverables/JERICO-NEXT_Deliverable_5.1_v1.3.pdf
JERICO-NEXT: Specifications for a European FerryBox data management system (Deliverable D5.3).	http://www.jerico-ri.eu/download/jerico-next-deliverables/JERICO-NEXT_Deliverable_5.3_v1.1.pdf
JERICO-NEXT: Best practices for quality control of sensor based biochemical data (Deliverable D5.11).	http://www.jerico-ri.eu/download/jerico-next-deliverables/JERICO-NEXT_Deliverable-5.11_v1.3.pdf
JERICO-NEXT: Recommendation Report 1 for HFR data implementation in European marine data infrastructures (Deliverable D5.13).	http://www.jerico-ri.eu/download/jerico-next-deliverables/JERICO-NEXT-Deliverable-5.13_V1.pdf
JERICO-NEXT: Recommendation Report 2 on improved common procedures for HFR QC analysis (Deliverable D5.14).	http://www.jerico-ri.eu/download/jerico-next-deliverables/JERICO-NEXT-Deliverable_5.14_V1.pdf
JERICO-NEXT: Guideline for the calibration of Glider data (Deliverable D5.15).	http://www.jerico-ri.eu/download/jerico-next-deliverables/JERICO-NEXT-Deliverable_5.15_Final.pdf
JERICO-FP7: Real Time Data Management Handbook V1 (Deliverable D5.2).	http://www.jerico-ri.eu/previous-project/deliverables/d5-2-rt-data-handbook/
JERICO-FP7: Delayed-mode Data Management Handbook V2 (Deliverable D5.6).	http://www.jerico-ri.eu/download/filebase/jerico_fp7/deliverables/D5.6_Delayed-mode%20Data%20Management%20Handbook-V2.pdf
JERICO-FP7: (Near) Real-time Data Management Handbook V2 (Deliverable D5.8).	http://www.jerico-ri.eu/download/filebase/jerico_fp7/deliverables/D5.8_Real-time%20Data%20Management%20Handbook-V2.pdf





3.3 Next steps

The rationale underlying the JERICO Label is the need to try and set up a kind of distinguishing "identity" for observing systems constituting the JERICO RI, bringing to the forefront their distinctiveness in relation to similar systems operating outside the network. The reason for incorporating observables and measurement goals into the Label was, to a great degree, dictated by the need to find some practical way to assess an observing system from the perspective of its basic functionality: its ability to produce useful observations. "Usefulness", of course, is relative to end-use, which has been broadly classified as: regulatory, routine, and research.

It will therefore be necessary to draw up a "core" list of variables and target measurement goals for them under the three mentioned categories to use as a reference for comparison purposes when evaluating eventual requests by operators of observing infrastructure to obtain the JERICO-Label. This is easier said than done because there are very few community-backed guidelines explicitly establishing measurement goals for marine observables in general. The situation is further complicated by the fact that what constitutes "essential" variables for the coastal ocean still remains an open question. Furthermore, estimating measurement uncertainties under real conditions is a very difficult task, more so when instrumentation are being employed remotely and/or are operating autonomously as they often are. The debate on the selection of the core variables and the values to assign as measurement goals for them within the JERICO RI is heated and ongoing. The results from the discussions carried out thus far have been summarized in table 6. Note that, at the present stage, the values shown are very preliminary and are being presented here as useful indications for further deliberation only.

Table 6. Preliminary indications of possible target measurement goals for some JERICO RI observables in the three measurement end-use scenarios described earlier in the text: regulatory, routine, and research.

Variable	Regulatory	Routine	Research
Temperature, °C	±0.5	±0.2	±0.05
Salinity, PSS-78	±0.1	±0.1	±0.05
Pressure, dbar	±0.2	±0.2	±0.1
Waves, m	±0.2	±0.2	±0.1
Currents, ms ⁻¹	±0.05	±0.05	±0.03
Photosynthetically active radiation (PAR), μmol m ⁻² s ⁻¹ (PPFD)	±25/±10% of reading	±5/±10% of reading	±1/±10% of reading
Wind direction, °	±5	±5	±2
Wind speed, ms ⁻¹	±1/±10% of reading	±1/±10% of reading	±1/±10% of reading
Secchi depth, m	±0.5	±0.5	±0.2
Dissolved oxygen (% saturation)	±6	±2	±0.5
pCO ₂ , μatm	±50	±30	±10
pH	±0.1	±0.05	±0.02
Nitrates, μmolL ⁻¹	±1	±0.5	±0.2
Phosphates, μmolL ⁻¹	±1	±0.5	±0.2
Silicates, μmolL ⁻¹	±1	±0.5	±0.2
Ammonia, μmolL ⁻¹	±1	±0.5	±0.2
Total nitrogen, μmolL ⁻¹	±1	±0.5	±0.3
Total phosphorus, μmolL ⁻¹	±1	±0.5	±0.3
Hydrogen sulphide, μmolL ⁻¹	±15	±10	±5
Chlorophyll a, μgL ⁻¹	±0.5	±0.3	±0.1
Turbidity, NTU	±0.3	±0.2	±0.1
Colored Dissolved Organic Matter (CDOM), m ⁻¹ (@ 350 nm)	±0.5	±0.2	±0.1



Another important aspect to consider is the need to continue to maintain, in one way or another, the activities of the RI relating to Best Practice. Regarding sensor types, measurement methods, and quality assurance procedures, quite a bit of information has already been compiled in various JERICO and JERICO-NEXT deliverables, but these will require updating. Also, as new technologies enter to form part of the network, fresh procedures and documentation will have to be drawn up and maintained.

A further question to tackle is that of the assessment system for determining the final status of an infrastructure in the context of the Label. This is the subject of ongoing discussion within the JERICO community, and is something that still needs to be defined. An idea would be to try and create some kind of grading system with scores to be assigned for defined characteristics (e.g. completeness and quality of submitted documentation, ability to meet measurement goals for specific variables, etc.), and a scale for evaluation. Such a system would make the whole evaluation process more objective and transparent, and therefore easier to manage.

Finally, there is the matter of setting up the administrative framework that will be necessary for managing the Label to deal with. Some of the main issues here will be:

- the definition of the application “form”, and the terms used therein;
- the conditions for accepting an application (eligibility);
- the formalization of an application;
- the review of an application;
- the rules governing assent to and compliance with affiliation requirements;
- the duration and renewal of an affiliation;
- the procedure for derecognition, if the conditions of a granted affiliation are not being met.





4. Outreach, dissemination and communication activities

2nd General Assembly Week of JERICO-NEXT, Galway, Ireland, 24 - 27 September, 2018; targeting mainly the JERICO-NEXT community, but with the participation of representatives from EuroGOOS (European Global Ocean Observing System).

9th Steering Committee Meeting of JERICO-NEXT, Helsinki, Finland, 27 February - 01 March, 2019; targeting mainly the JERICO-NEXT community, but with the participation of representatives from EuroGOOS (European Global Ocean Observing System).

Final General Assembly Week of JERICO-NEXT, Brest, France, 02 - 05 July, 2019; targeting mainly the JERICO-NEXT community, but with the participation of representatives from EuroGOOS (European Global Ocean Observing System) and EMSO (European Multidisciplinary Seafloor and water column Observatory).

5. Conclusions

At the present time, the JERICO Label is an attempt by the JERICO community to give itself some organization and rules, both as a network and as a research infrastructure. The Label is not meant to “exclude” anything or anyone in any way. In the short term, its function can be viewed as a “technical” descriptor that can serve as a management tool for the JERICO RI. However, the wider goal is, of course, to try and establish a kind of consensus-based “benchmark” for characterizing the capabilities of coastal research infrastructures in European waters that can be freely adopted by any interested party on a purely voluntary basis, provided compliance with the set requirements are met.

6. References

JERICO (2015). JERICO Label Definition. Deliverable, Project JERICO (Towards a Joint European Research Infrastructure network for Coastal Observatories; EU-FP7), JERICO–WP1-D1.4-31_03_2014-V2.0.

FixO³ (2016). Deliverable D3.3: FixO³ Label. Deliverable, Project FixO³ (Fixed-point Open Ocean Observatories; EU-FP7).

