



## KM3NeT – INFRADEV – H2020 – 739560

### EPQ - Requirement No. 1

#### KM3NeT – INFRADEV GA DELIVERABLE: D11.1

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#### Abstract

In this report we address the special ethics request of the Commission at the Grant Agreement Preparation stage, 7.4. Details must be provided on the endangered species and/or protected areas involved in the research and, the relevant authorisations must be submitted.

## I. COPYRIGHT NOTICE

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## II. DELIVERY SLIP

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## III. DOCUMENT LOG

Issue	Date	Comment	Author/Partner
1	24-09-2018	first draft	R. van der Meer/ NWO-I
2	24-09-2018	updated draft	E. de Wolf / NWO-I
3	09-10-2018	final	R. van der Meer/ NWO-I
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## IV. APPLICATION AREA

This document is a formal deliverable for the GA of the project, applicable to all members of the KM3NeT INFRADEV project, beneficiaries and third parties, as well as its collaborating projects.



## V. TERMINOLOGY

NWO-I	Stichting Nederlandse Wetenschappelijk Onderzoek Instituten, coordinator in this project.
ARCA	Astroparticle Research with Cosmics in the Abyss (KM3NeT neutrino astroparticle physics telescope)
ORCA	Oscillation Research with Cosmics in the Abyss (KM3NeT neutrino particle physics detector)

## VI. PROJECT SUMMARY

KM3NeT is a large Research Infrastructure that will consist of a network of deep-sea neutrino telescopes in the Mediterranean Sea with user ports for earth and sea sciences. The main science objectives, a description of the technology and a summary of the costs are presented in the KM3NeT 2.0 Letter of Intent [1]. Following the appearance of KM3NeT 2.0 on the ESFRI roadmap 2016 and in line with the recommendations of the Assessment Expert Group in 2013, this proposal addresses the Coordination and Support Actions (CSA) to prepare a legal entity and appropriate services for KM3NeT, thereby providing a sustainable solution for the operation of the Research Infrastructure during ten (or more) years. During the EU-funded Design Study (2006 - 2010) and Preparatory Phase (2008-2012), a cost-effective technology was developed, deep-sea sites were selected and the collaboration was formed. This proposal constitutes a second Preparatory Phase. The project will be carried out within the context of the current KM3NeT collaboration which already has a provisional implementation of the management and governance of the Research Infrastructure in place. The resources provided by the EC will be complemented by collaboration funding.

## VII. EXECUTIVE SUMMARY

In this report, we address the special ethics request of the Commission at the Grant Agreement Preparation stage, 7.4. Details must be provided on the endangered species and/or protected areas involved in the research and, the relevant authorisations must be submitted.

We have addressed in the Grant Agreement Preparation stage that this was true for the KM3NeT infrastructure, but not for this project. The results of the environmental impact studies required for each of the three sites will be delivered at the end of the project. In this document, we report on the status of this research at this moment.



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# 1. Introduction

The KM3NeT – INFRADEV proposal described the KM3NeT infrastructure and its location deep in the Mediterranean Sea. These words triggered the Ethics committee. The project therefore was required to answer the following question:

7.4. Details must be provided on the endangered species and/or protected areas involved in the research and, the relevant authorisations must be submitted.

The KM3NeT – INFRADEV project is designed to create a legal entity for the KM3NeT infrastructure during construction and operation.

Indeed, for each of the sites environmental impact studies have to be conducted before the relevant authorities will give permission to install instruments at the seabed; this includes the deployment of the deep-sea cables required for electrical power and for data transmission between the detectors in the deep sea and the shore station.

Before the first equipment of the predecessors of KM3NeT was installed these environmental impact studies also were conducted and contacts with relevant authorities were established and relevant authorization was obtained. The responsibility was with the leading institutes installing the equipment. A new legal entity governing KM3NeT will also be responsible for the impact the detectors will have on the environment. Therefore one of the tasks in WP5 is:

Task 5.4: Prepare for environmental impact assessment of the KM3NeT installation sites (months 13-36) The locations of KM3NeT in the abysses of the Mediterranean Sea require assessment of the impact of KM3NeT on the environment of the deep-sea at the installation sites for official governmental permission for construction. For this, KM3NeT needs to present environmental studies taking into account regulations and procedures defined at the European and National level.

This task ends at months 36 and there are three deliverables (D5.4, D5.5, D5.6) for the three countries with installation sites due in month 36.

In the current KM3NeT – INFRADEV project itself there are no activities that will impact the environment or take place at places with endangered species. All work will take place in office environments. It is therefore not necessary and not possible to report in month 13 as requested for D11.1.

At the Grant Agreement Preparation stage we addressed the Ethics issue as follows:

Annex 1, Part B, section 5.1. Ethics

The ethics appraisal report requires to address the following issue: the applicant must provide further information about the possible harm to the environment caused by the research and state the measures that will be taken to mitigate the risks.

This is addressed as follows.

In general, the research that will be pursued in the framework of KM3NeT is based on the detection of the faint light caused by interactions of neutrinos from the cosmos. The envisaged



active time of the deep-sea infrastructure of more than ten years requires the materials used to be extremely inert (like titanium and glass). Last but not least, the decommissioning of the research infrastructure includes the recovery of the components deployed in the deep sea. The risk of a possible harm to the environment is therefore a priori small.

This specific project foresees in the preparatory work for the operation and utilization of the KM3NeT research infrastructure. In itself, this project does not directly impact the deep-sea environment. Any environmental impact that may result from this project will follow the same standards as those followed by the KM3NeT collaboration. In this, the institute/institution that requests permission for the deployment of an object in the deep sea is liable. Prior to a deployment, an environmental impact study is made by an independent institute and the deployment is subject to approval by the corresponding authorities.

Part of this project foresees in making the environmental impact studies needed for KM3NeT at large. These studies will be made public in due time (see Deliverables 5.4-5.6 in Table 3.1.c "List of deliverables" in this proposal). These reports will also be presented to the KM3NeT collaboration which manages the construction and operation of the infrastructure. Any undesired impact on the environment will not affect the outcome of this project but will be followed up by the KM3NeT collaboration. The list of measures to mitigate possible risks includes adjustments in the design or modes of operation of the infrastructure. These measures are subject to the approval of the "Resources Review Board" of KM3NeT, which is composed of representatives of the corresponding funding authorities. As a consequence, these possible risks are not listed as such in Table 3.2b.

We will address the question in a bit more detail than this general answer.

## 2. Plan

With this report, we plan to address the issue raised by the commission that we should provide details on the endangered species and/or protected areas involved in the research, and that the relevant authorisations must be submitted.

Since this is normally not asked in EC projects, we assume that the issue is raised because the KM3NeT Infrastructure is constructed at the bottom of the Mediterranean Sea.

Although the KM3NeT INFRADEV project itself only involves office and travel activities we will address some of the environment and endangered species issues linked to the KM3NeT infrastructure construction and maintenance.

We asked all partners to describe the locations where project activities are carried out by their employees or visitors and describe the activities already taking place to acquire the appropriate authorizations.



### 3. Information present at proposal stage

At the proposal stage of the KM3NeT – INFRADEV project we listed the information on the three installation sites as follows as part of the description of WP5:

Task 5.4: Prepare for environmental impact assessment of the KM3NeT installation sites (months 13-36) The locations of KM3NeT in the abysses of the Mediterranean Sea require assessment of the impact of KM3NeT on the environment of the deep-sea at the installation sites for official governmental permission for construction. For this, KM3NeT needs to present environmental studies taking into account regulations and procedures defined at the European and National level.

#### KM3NeT-Fr

The KM3NeT-Fr site is located in the Exclusive Economic Zone (EEZ). The site is shared with the EMSO European network of submarine observatories. Two main electro-optical cables connecting the site with the shore station in La Seyne sur Mer pass through French territorial waters. Applying for permission to build installations in the EEZ and in French territorial waters two procedures have to be followed. Each of them requires an environmental impact study including the use of public domain maritime and EEZ and the environmental aspect of the “loi sur l’eau”. Final authorization will be granted by the local “Préfet du Var and Préfet maritime de la Méditerranée” through an ‘arrêté préfectoral’. In addition, authorizations are required to re-route the ANTARES cable to the KM3NeT-Fr site. The responsibility for the delivery of the environmental studies will be in the hands of the KM3NeT-Fr Installation Manager. However, the complexity of the procedures requires the help of specialised companies to define the content of the study to comply with the law, to perform the study and publish the environmental impact report.

#### KM3NeT-It

The KM3NeT-It site is located in the Italian Exclusive Economic Zone (EEZ). The site is used by the EMSO project for the installation of the South-East node. An EMSO junction box is planned to be deployed before the end of the year 2016. For the implementation of KM3NeT 2.0 a new electro-optical cable to shore must be installed. For this, the Italian National procedures must be followed which include an environmental impact study to obtain permission from the Regional Environment Department, National Coast Guard and “Demanio Marittimo”. The procedures for the decommissioning of the deep-sea infrastructure must be approached and a decommissioning plan presented. The responsibility for the delivery of the environmental studies will be in the hands of the KM3NeT-Fr Installation Manager.

#### KM3NeT-Gr

An environmental study at the KM3NeT-Gr site will initially concentrate on the impact of the cable to shore in the Pylos area. In particular handling the cable layout in the shallow waters is of importance to allow for minimal interference between fishing and anchoring, especially in view of the fact that the area is under jurisdiction of the National Archaeological Agency. At the times of infrastructure deployment, best practice procedures must be observed for safety and minimal interference with general shipping in the area. As a general precaution, alerts and notifications to the appropriate authorities should be given well ahead of time to avoid any



unforeseen environmental issues. The above items constitute a study within this task to define the procedures for their handling. The responsibility for the delivery of the environmental studies will be in the hands of the KM3NeT-Gr Installation Manager.

## 4. Results

### *Laboratory environment*

Partner UVEG stated that for technology transfer activities in WP9 some work is performed in their laboratory. Employees are obliged to follow health and safety legislation described in Law 31/1995, 8 nov. These laboratories are not placed in protected areas and do not involve endangered species.

### *Office environment*

All partners confirm that all other activities in the KM3NeT – INFRADEV project only involve office work. Some partners mentioned the relevant rules and regulations. These offices are not placed in protected areas and do not involve endangered species.

### *Three installation sites*

The progress on the environmental study of WP5 has been reported in the Periodic Report, PR1. To reduce duplication of work, we show the WP5 progress results here.

The KM3NeT Installation Site Managers are responsible for conducting environmental impact studies at the three KM3NeT installation sites. In October 2017, this was confirmed in a meeting with the three Site Managers. Although the situation varies per site, the main items for the environmental studies can be identified as:

- Cultural heritage and the landscape;
- Flora, fauna and their balance in the ecosystem;
- Interaction with human activities (f.i. fishing);
- Natural resources (use of land, marine environment).

### **French site**

An environmental impact study was part of the documentation provided to the authorities to get the authorization of installation in the territorial waters (DPM) and Exclusive Economic Zone (EEZ) for the KM3NeT phase 1. The authorizations were obtained with a request of a follow-up of the environmental impact of the infrastructure mainly for the posidonia plant which is protected. The 1st survey after 2 years of installation was performed and the report sent to the authorities. The main conclusion is that there is no impact from the cable on the posidonia field.

The documentation including an environmental impact study for one ORCA building block (without the 2nd cable) was sent to the authorities for authorization of installation in the EZZ. It was unanimously approved in June 2018 during a meeting of Conseil Maritime de Façade de





Méditerranée (CMF). This committee is composed by local authorities, marine actors and associations for environment.

The procedure for the 2nd cable needed for the building block will start next year.

### Italian site

An environmental impact study was done during the installation of the first Main Electro Optical Cable (MEOC) in KM3NeT-IT ARCA site. The Istituto Nazionale di Fisica Nucleare / Laboratori Nazionali del Sud (INFN/LNS) has entrusted the ATI between ELETTRA TLC S.p.A and ALCATEL SUBMARINE NETWORK Ltd. to carry out a desktop study in order to provide the basic knowledge and determine a safe and suitable route for the proposed KM3NeT-IT cable which extends from the landing area of the city of Portopalo di Capo Passero (Southern Sicilia, Italy) for about 92 km towards the Ionian basin.

For the project above mentioned, ELETTRA/ASN have remitted to Coastal Consulting & Exploration s.r.l. the execution of the cable route study in order to provide all relevant and basic marine and landing data for the following cable route survey, manufacture, laying and installation of such system.

The collected data came from a full set of available research, numerous published scientific papers, marine charts and terrestrial maps together with the results supplied by the site visits made during this study. The studies were used by local authorities in order to release the authorisation.

### Greek (proposed) site

The necessity of a formal Environmental Impact Assessment (EIA) has been questioned for the scenario of an ARCA block connected to a shore station at Methoni with an electro-optical cable (EOC) that is submerged 2m beneath the seafloor for the first 3 kilometers.

The relevant environmental constraints and the corresponding regulating authorities have been identified:

- Cultural heritage: submerged settlements and shipwrecks of archaeological interest; permission from the Ephorate of Underwater Antiquities is obligatory for all operations in Methoni bay and offshore the nearby Sapienza island.
- - Natural heritage: Posidonia fields; endangered sea turtles and marine mammals that use the area for feeding, mating and nesting. As the entire area is classified in the NATURA 2000 network, its ecology has been extensively studied and documented. According to the Ministry of the Environment, a potential KM3NeT-GR infrastructure, having solely research purposes, will be a "class B" project, NOT requiring a thorough EIA. Instead, submission of a "standard environmental commitment" to the local authorities, with a timescale for authorization ~3 months, is required.

Past experience with cable and detector deployments by the "NESTOR" institute and consultation by the HCMR (Hellenic Institute of marine research), which also performs sea operations in the area regularly, were useful for conducting the aforementioned environmental impact study for the KM3NeT-GR site.



## 5. Deviations from the plan

This question could have been answered on the first day of the project with the same answer as given in the Grant Agreement, Annex 1 Part B, Section 5.1. As the deliverable was only due at month 13, it was postponed and keeping open the possibility that an updated answer would come along. Since WP5 was planned to address this in the second half of the project, we have waited for their progress report to report the current status. Three final deliverables on environment will be delivered as planned in month 36.

## 6. Lessons learned

It turns out to be difficult to make clear the difference between the KM3NeT infrastructure on-going work and the separate smaller projects that address special issues for the KM3NeT infrastructure, such as the KM3NeT – INFRADEV project, addressing the legal entity studies.

## 7. Next steps

WP5 is on schedule to finish the three final deliverables on environment as planned in month 36.

