# LSPM Platform User Access Guide : DRAFT VERSION

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## Summary

The aim of this document is to define the rules for teams wishing to perform experimentations in marine sciences and technologies on LSPM submarine infrastructure. It gives guidelines to potential users of the infrastructure on the procedures to be followed in order to apply for access, and the technical constraints which must be fulfilled in order not to interfere with the operation of the others experiments of LSPM, such as the KM3NeT neutrino detector.

## Document History

| Revision | Date | Comment | Verified by | Approved by |
|---|---|---|---|---|
| 0.1 | 06/05/2020 | **Draft** | | |

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# 1 Scope

## 1.1 Abbreviations

| Abbreviation | Description |
|---|---|
| BJS | Boite Jonction Secondaire (Secondary Junction Box) |
| CPPM | Centre de Physique des Particules de Marseille |
| CSTA | Commission Scientifique et Technique d'Accès |
| DMP | Data Management Plan |
| DPM | Domaine Public Maritime |
| DOM | Digital Optical Module |
| EMC | Electromagnetic compatibility |
| EEZ | Exclusive Economic Zone |
| FMECA | Failure Modes, Effects and Criticality Analysis |
| IMP | Institut Michel Pacha |
| KM3NeT | Kilometer Cube Neutrinos Telescope |
| LBL | Long Base Line |
| LSPM | Laboratoire Sous-marin de Provence Méditerrannée |
| NAAPS | Navigation Absolute Acoustics Positioning System |
| ORCA | ORCA : Oscillations Research with Cosmics in the Abyss |
| PMT | Photo Multiplier Tube |
| SVT | Sciences de la Vie et de la Terre (Node of Earth and Sea Sciences) |
| … | |

## 1.2 Documentation

**Caution**: The reader should ensure that he owns the latest available version of this document as well as the following documents:

| Id | Titre - *Title* | Référence - *Reference* |
|---|---|---|
| RD1 | Note d'organisation de la plateforme LSPM | ATRIUM-396973 |
| RD2 | Light pollution due to artificial light sources | ATRIUM-369370 |
| RD3 | LSPM User Request Form | ATRIUM-504970 |
| RD4 | Financial participation calculation note (to come) | ATRIUM-xxxx |
| RD5 | Human safety rules note (to come) | ATRIUM-xxxx |
| RD6 | Communication plan | ATRIUM-400428 |
| RD7 | Data Management Plan | ATRIUM-396513 |
| RD8 | Quality plan of the LSPM platform | ATRIUM-398132 |
| RD9 | Guide utilisateur pour application BJS KM3NeT | ATRIUM-331284 |
| RD10 | …. | |

### 1.3 Terminology

By convention, the “equipment” in the present document refers to any system (device, instrument, set of several devices, mooring line, ...), not already part of the LSPM infrastructure, that could potentially be installed on the LSPM platform by a user.

## 2 LSPM description

### 2.1 Organization

The global organization of the LSPM platform is given in [RD1]. A user committee of the platform, which meets regularly, allows interactions between LSPM and the various users.

### 2.2 Infrastructure

The LSPM site is located outside of the French territorial waters, in the Exclusive Economic Zone (EEZ), 40 km south of Toulon, at a depth of 2450 m in the Mediterranean Sea.
The infrastructure will be connected in the next future to the shore via two telecommunication cables that transmit the data via optical fibers and the power (3500 VAC, 9 Amps) via a single copper conductor (the return is via the sea). The cables arrive at the so-called “power station” close to the Les Sablettes beach, La Seyne-sur-Mer. The fibres of the cables are extended to the control room.
The control room is currently located on the first floor of the Institute Michel Pacha (IMP), La Seyne-sur-Mer. A remote control room is located in Marseille on the Luminy Campus.

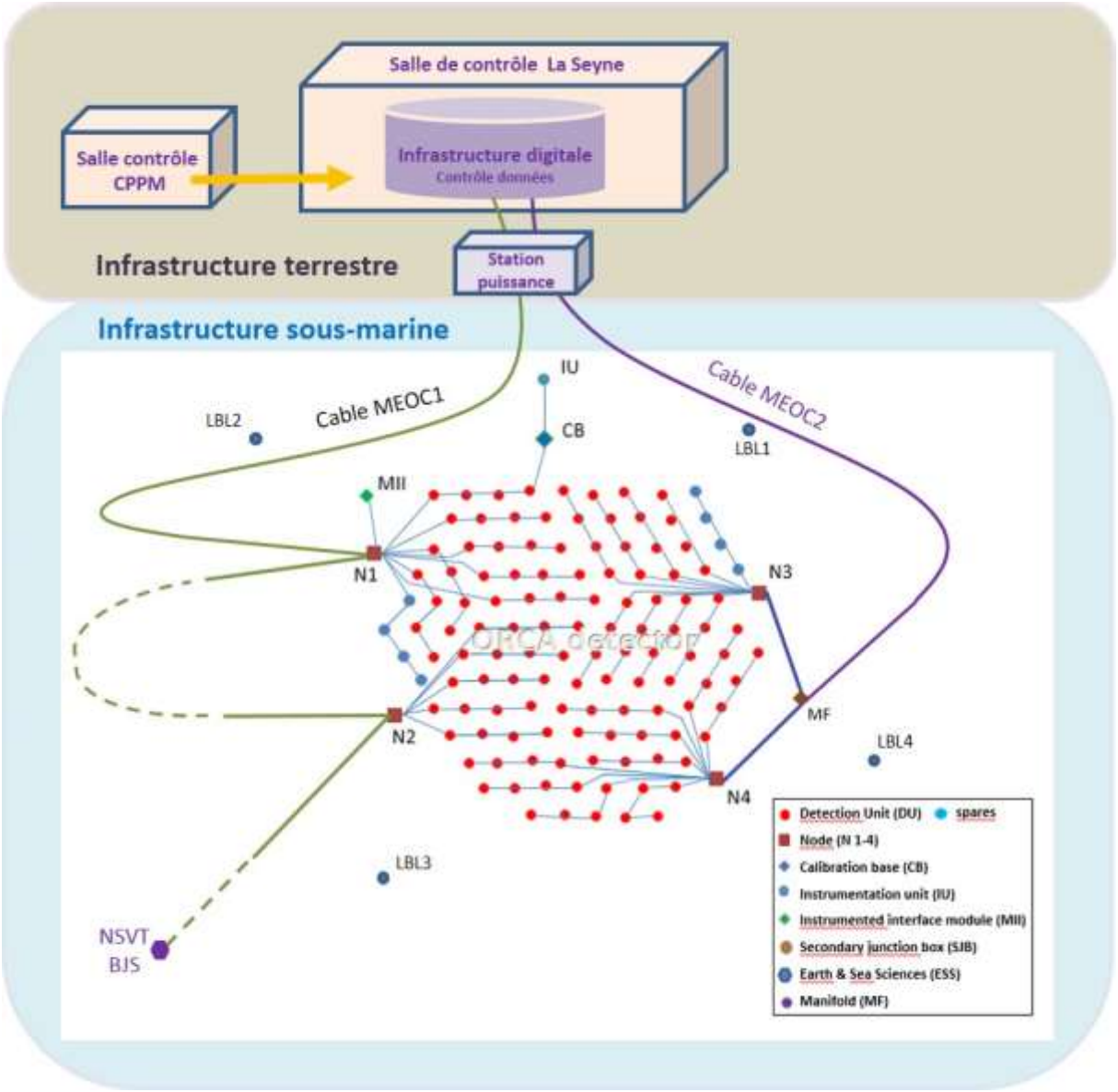


**Figure xx : Schematic of the complete LSPM infrastructure**

The current elements of the platform are:

- 1 Control Room at IMP: temporary data capture, storage equipment and shift room
- 1 Remote Control Room at CPPM: shift room, showroom and educational space
- 1 Main Electrical Optical Cable (MEOC1) for power and communication
- 2 Junction boxes (N1 and N2)
- 1 SJB secondary junction box (to come)
- 1 iXblue acoustic positioning system consisting of 4 reference Long BaseLine acoustic beacons (LBL1 to LBL4) permanently in place on the LSPM sea site, several mobile autonomous beacon, a RAMSES surface rangemeter coupled to an Hydrins inertial system

In the near future, the platform will see its capacities increased with the installation of a 2nd communication/power MEOC2 cable, 2 junction boxes dedicated to the KM3NeT detector (N3, N4) and 1 node dedicated to the Earth and Sea Sciences (ESS).

## 2.3 LSPM offer

LSPM offers for scientific or technical research or development, some access on the seabed to electrical power, up to a few kilowatts to connect and to operate in real time an equipment.
Real time control-command and data transfer to shore in the control room are possible through an optical network and then accessible from the outside world thanks to an Ethernet network connectivity.

The infrastructure hosts various sensors and experiences:
- The main project is the KM3NeT/ORCA detector (115 neutrino detection lines), which is the infrastructure flagship project, with absolute priority in terms of operation
- EMSO-France instrumentation
- On the secondary junction box (SJB) which will be installed soon 4 ports are already occupied (BathyBot, seismograph, radioactivity, biocam), 2 other ports are currently free
- A Distributed Acoustic Sensing (DAS) system using acoustic fibres of the main electro-optical network for seismic monitoring.

### 2.3.1 Locations

- The subsea site is located at about 40 km south from Toulon, France at a depth of about 2445 m. The geographic coordinates of the subsea site in the usual geodetic reference frame WGS84, are: 42° 48.31’ N; 6° 01.70’ E.

- The main control room is located in the Institut Michel Pacha,
1337 Corniche Michel Pacha
83500 La Seyne sur Mer, France

- The remote control room is located at CPPM,
Campus de Luminy
163 av. de Luminy
13009 Marseille, France

### 2.3.2 Outputs on the ORCA nodes

The global final LSPM main junction boxes infrastructure is presented in the following table.
The N3 and N4 junction boxes will be deployed in the next few years.

| **N1** | **User** | **Configuration** |
|---|---|---|
| Port 1 to 6 | KM3NeT | 400 Vrms (AC), 1 kVA ; 2 FO |
| Port 7 | EMSO (MII) | 400 Vrms (AC), 1 kVA ; 2 FO |
| Port 8 | available | 400 Vrms (AC), 1 kVA ; 2 FO |
| **N2** | **User** | **Configuration** |
| Port 1 to 5 | available before future KM3NeT connections | 400 Vrms (AC), 1,3 kVA ; 2 FO |
| **N3** (to come) | **User** | **Configuration** |
| Port 1 to 9 | available before KM3NeT connections | 400 Vrms (AC), 1,3 kVA ; 2 FO |
| **N4** (to come) | **User** | **Configuration** |
| Port 1 to 9 | available before future KM3NeT connections | 400 Vrms (AC), 1,3 kVA ; 2 FO |

**Figure xx : Listing of the ORCA nodes ports**

Some of the outputs are available during the full life of the platform.
The N2 to N4 outputs are available for shorter duration projects before KM3NeT Detection Units connections.

### 2.3.3 SJB

The SJB, is a secondary junction box, designed by Ifremer, which provides additional connections for interdisciplinaries marine sciences.
It provides Ethernet communication and power for marine scientist to design and test unique instrumentation. The equipment offers 6 electrical wet-mateable ODI ports for the users.
Currently, four of them will be connected to a benthic robot, a bio-camera, a radioactivity detector and a seismometer and two are available for new users.

| **BJS** | **User** | **Configuration** |
|---|---|---|
| Port 1 | EMSO (bathybot) | 300 Vdc, 1 kW ; 1 link 100 base T |
| Port 2 | EMSO (sismo) | 300 Vdc, 1 kW ; 1 link 100 base T |
| Port 3 | Radioactivity sensor | 300 Vdc, 1 kW ; 1 link 100 base T |
| Port 4 | BioCamera | 300 Vdc, 1 kW ; 1 link 100 base T |
| Port 5 | available | 300 Vdc, 1 kW ; 1 link 100 base T |
| Port 6 | available | 300 Vdc, 1 kW ; 1 link 100 base T |

**Figure xx : Listing of the SJB nodes ports**

The document *Guide utilisateur pour application BJS KM3NeT* [RD9] describes the procedure for using the SJB. The essential concepts necessary for the proper use of the web interface are developed in details there, as well as the requirement on ECM for a new equipment to be connected on the SJB. A trouble shooting section provide assistance to various users throughout the operational life of the SJB.

### 2.3.4 Node ESS

The ESS node will be dedicated to Earth and Sea Science projects.
Its design is currently ongoing.

### 2.3.5 Positioning system

The navigation and absolute acoustic positioning system (NAAPS) is a positioning system provided by the iXblue company. It is operated for all the sea operations of the platform and allows to measure the absolute position of the equipment (coupled with one autonomous acoustic beacon) on the seabed **within 1 meter** in real time.
The system is based on the use of a Low Frequency (LF) rangemeter system named RAMSES installed on the navigation boat and one LBL array composed by 4 fixed acoustic transponders permanently deployed on the seabed site, in association with a Differential Global Positioning System (DGPS) based on the operation ship. The system uses acoustic signals in the 8-16 kHz frequency range allowing slant measurements with transponders up to about 8000 m in optimal conditions.
The RAMSES is one integrated system that combines one rangemeter with embedded electronics and processing algorithms. It is coupled to one Inertial Navigation System (INS) to monitor the ship movement and determine in real time the accurate position of the RAMSES transducer with respect to the DGPS antenna.
Each object to be monitored (node, instrument, etc.) temporarily hosts one acoustic beacon to be positioned by the NAAPS (example below).

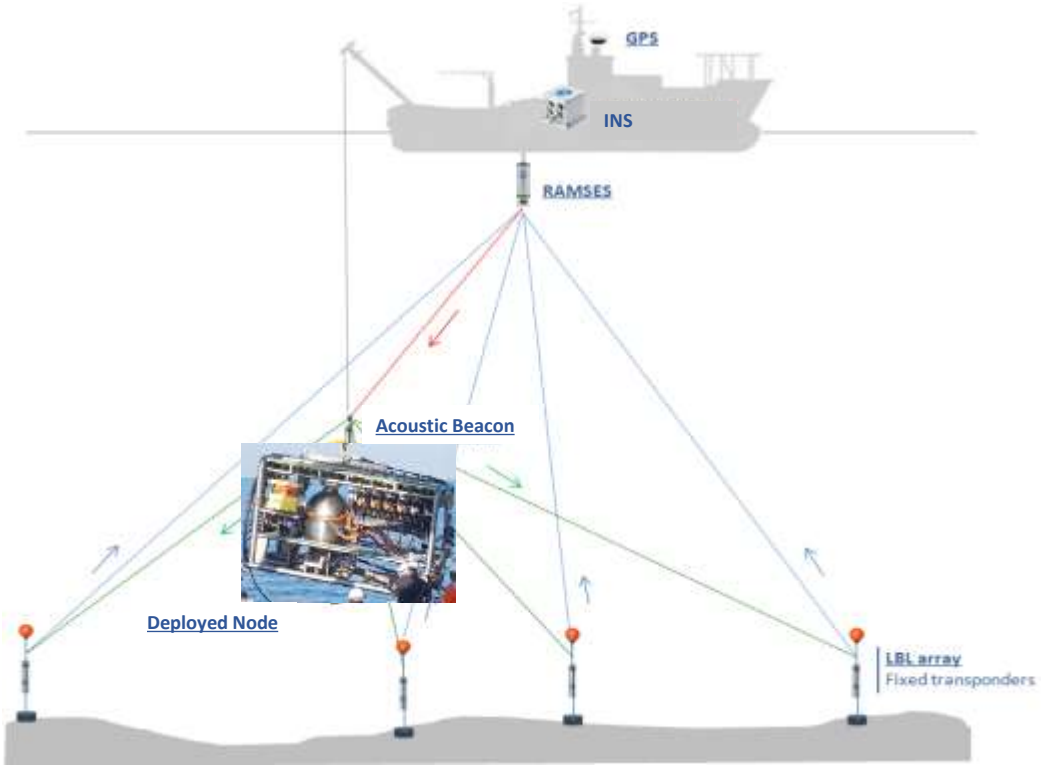


**Figure xx : schematic diagram of the NAAPS used in sea operations**

The technical information and data sheets of the system can be provided on demand.

The offer concerning the absolute acoustic positioning system could take different forms from the simple partial provision of a few elements (use of reference beacons, acoustic releases, etc.) to its integrality.
The operation of the complete system, as part of a deployment service of the user equipment on the LSPM site, could also be proposed.
A positioning service on an external site could also be considered depending on the context of the operation to be carried out, with restriction to the use of the permanently deployed reference acoustic beacons.
Any request for positioning service will be studied individually by the organization and under its supervision.
Any use of the positioning system on the LSPM site will be done under the supervision of the organization.

### 2.3.6 Non connected equipment reception site

The platform site offers the possibility of receiving passive or fully autonomous equipment within the LSPM framework for behavioral tests (aging, behavior in a deep marine environment, etc.) or for instrument testing (deep sea quality and reliability measurement tests, long-term tests, etc.).

Any request for testing service on the LSPM site will be studied individually by the organization.

### 2.3.7 Controls rooms

#### *2.3.7.1 Main Control Room*

The Institute Michel Pacha (IMP) houses the control room that hosts a computing farm for the processing of the raw data from the LSPM infrastructure and the necessary equipment needed to monitor the offshore connected equipment. It also hosts the equipment of users.
LSPM dataset is transferred daily to the computing centres of CC-IN2P3 at Lyon via one Renater 1 GB/s link.

The User proprietary interface PC will be connected to the LSMP via one RJ45 ethernet link.
Remote access to the User PC is possible via VPN connection or directly via one SSH/VNC link.

It is planned to relocate in 2024 the control room to a new CNRS building close to the Ifremer campus, Bregaillon, La Seyne sur Mer, once its construction is completed with a potential increase of the data rate from 1 to 10 GB/s. For limited periods of user data taking campaigns, a high bandwidth data transfer rate of 10-50TB per day should be achievable while the long term sustained transfer rate will be below 1TB per day.

First accesses for material installation will be done under the supervision of one LSPM member.

#### *2.3.7.2 Remote Control Room*

A remote control room located at CPPM in the TPR2 building of the Faculty of Sciences of Luminy is available on demand for shifts sessions, communication purpose as well as pedagogic trainings.

### 2.3.8 E-log

One elog is available for LSPM and all users in order to inform of all relevant information relative to data acquisitions, system and infrastructure operations, etc…

To be confirmed and detailed.

## 2.4 KM3NeT detector

The main objectives of the KM3NeT neutrino detector (https://www.km3net.org ) is the discovery and subsequent observation of high-energy neutrino sources in the Universe and the determination of the mass hierarchy of neutrinos. The detector is deployed on 2 sites : the namely KM3NeT-ORCA detector off-shore Toulon and ARCA off-shore Sicily in Italy. KM3NeT/ORCA detector will provide improved measurements of some of the neutrino oscillation parameters.

KM3NeT/ORCA will consist of 115 strings, each string comprises 18 optical modules and each optical module comprises 31 very sensitive photo-multiplier tubes (PMTs). Theses photo-sensors and the readout electronics are hosted within pressure-resistant glass spheres, so called digital optical modules (DOMs). The detection strings constitute a three-dimensional array of photo sensors used to detect the Cherenkov light produced by relativistic particles emerging from neutrino interactions.
The detection strings (figure xx) each host 18 DOMs. Each string is 200 m in height with DOMs spaced 9 m apart in the vertical direction, starting about 30 m from the sea floor.
The system provides nanosecond precision on the arrival time of single photons, while the position and orientation of the photo-sensors must be known to a few centimetres and few degrees, respectively. The DOMs are distributed in space along flexible strings, one end of which is fixed to the sea floor and the other end is held close to vertical by a submerged buoy.
The detection strings (figure xx) each host 18 DOMs. Each string is 200 m in height with DOMs spaced 9 m apart in the vertical direction, starting about 40 m from the sea floor.

Figure xx : Detection string shematic and DOM

The relative position of the DOMs is measured in real time by an acoustic positioning system produced at the same time by a high frequency acoustic base and a set of inclinometer and compass sensors installed in the lines.
The absolute geographical location of the detector is ensured by a low frequency acoustic base associated with a satellite tracking.
The time calibration of the detector is carried out by a system of optical beacons using LEDs and a laser regularly operated.

# 3 Availibility of LSPM

## 3.1 Lifespan

The forecasted LSPM lifespan is 15 years from year 2020.

## 3.2 Service interruptions

The LSPM platform operates permanently allowing a continuous power supply as well as a data transfer data in real time of the equipment connected to it.
The duty cycle of the LSPM platform is > 90% of time (tbc).

However, certain events can lead to a short-term temporary shutdown such as:

- interruptions required for some sea operations for installation of new equipment or maintenance
- break in the general supply of MEOC cables (EDF network)
-…

In cases of scheduled operations, users are warned in advance.

# 4 Cost

The cost for the use of the platform for users is detailed in the financial participation calculation note [RD4].

# 5 Technical constraints for users

## 5.1 Connections

### 5.1.1 ORCA nodes

Connection to one ORCA node N1 and N2 output is made with Teledyne ODI NRH APC, flying ROV Titanium connector.

### 5.1.2 SBJ

Connection to one SBJ output is made with Teledyne ODI, flying ROV Titanium connector, type ROV-161-01-12-4.

## 5.2 Electrical and optical fibers specifications

The user equipment must have a protection system to limit the current to the max allowed. A fuse disposed at the first level of an equipment could not be reloaded if the supply current of the equipment comes to exceed the acceptable value, in this case it will be declared out of work.

It is advised to have a surveillance protocol concerning the value of the supply current implemented inside the remote control software of the equipment connected. Finally, the user should ensure that

the equipment can handle the case of sudden cut of the general electric supply system of LSPM (for example EDF power cut).

The specifications of the ORCA nodes and SBJ are given in figure xx and xx.

The recommended values are as follows:

### 5.2.1 ORCA nodes

- The equipment must be able to operate over a voltage range between 350V and 400Vrms
- The inrush current must be compatible with a 4A circuit breaker having a type K tripping curve
- Timed start if possible (adjustable value according to need)

#### *5.2.1.1 Node 1 nominal current*

- The maximum admissible current is 2.6 Arms, corresponding to a maximum admissible power of 1.04 kVA @ 400 VACrms
- The maximum recommended current is 2.0 Arms (75% of the maximum admissible current), corresponding to a maximum admissible power of 800 VA @ 400 VACrms

#### *5.2.1.2 Node 2 and next nominal current*

- The maximum admissible current is 3.3 Arms, corresponding to a maximum admissible power of 1.31 kVA @ 400 VACrms
- The maximum recommended current is 2.5 Arms (75% of the maximum admissible current), corresponding to a maximum admissible power of 1 kVA @ 400 VACrms

#### *5.2.1.3 Optical fibers*

- The user will insure the compatibilty of the equipment optical fibers with the following standards used in the LSPM platform :
    - LEAF EP (NZDSF G655) with a negative chromatic dispersion
    - G 652 on the node outputs

### 5.2.2 SBJ

- Each output is limited to a maximum of 1000W @ 300 Vdc
- Specific starting current constraints as well as capacitive decoupling and insulation from the mechanical mass of the equipment are specified in document [RD9]

## 5.3 Electromagnetic compatibility

### 5.3.1 ORCA nodes

Considering the low power of the electromagnetic radiation that could be emitted and their strong attenuation in sea water, it is expected that electromagnetic interferences will be negligible. Nevertheless, perturbations in the power distribution network should be largely avoided. For example, converters, variators or such electrotechnical devices should be equipped with triggers. Finally, care should be taken to limit actions that could generate transients and reduce their levels. All the equipment will comply with CEM standards.

### 5.3.2 SBJ

The user equipment will respect specifications described in the SBS user manual [RD9].

## 5.4 Optical disturbances

### 5.4.1 Light emission

Overall, the objective is that the photo-detection while KM3NeT/ORCA is taking data is to be disturbed as little as possible by external light emissions. The rates of these artificial light sources have to be confronted with the natural background levels in the deep sea. From the $^{40}$K radioactive decays, each PMT sees a rate of about 6 kHz.
An increase of 1 kHz due to artificial light can be considered acceptable.
The document “Light pollution due to artificial light sources“ [RD2] provides a guide for the evaluation of optical disturbances.
Curves are given allowing to read the minimal acceptable distance for each wavelength, namely the distance at which the frequency drops below 1 kHz for a light source of 100 lm (or equivalently 10 Hz for the “standard candle” 1 lm).

In conclusion, the study demonstrates that the more favorable wavelength is red light with $\lambda$ > 600 nm. The other wavelengths must be considered with caution depending on the emission power, distances, which may lead to restrictions of use or sequencing or synchronization with respect to the KM3NeT/ORCA operation.

The design of the equipment will integrate any system leading to a reduction in the light flux by using filters, screens, orientation,... in order to be compatible with the operation of the KM3NeT detector.

### 5.4.2 Optical masking

The user equipment will avoid any permanent optical masking of the DOMs of the KM3NeT/ORCA.

## 5.5 Noise disturbances

The KM3NeT/ORCA detector uses one relative acoustic positioning system in order to monitor in real time the location of the PMTs. The system emits acoustic pulses during 1 minute in the 15-50 kHz bandwidth every 10 minutes.
Therefore special care has to be taken in order not to disturb the positioning process.
In case of user equipment acoustic emissions, the frequencies will be as far as possible out of the frequency range used by the KM3NeT detector. If possible, acoustic emissions should be directed on the opposite side of the detector.
Emission levels and frequency ranges of the systems that generate acoustics signals as well as the recurrence of the emissions must be specified by the user.
Note that systems other than sonar, such as electrical or hydraulic engines or pumps could also generate acoustic noise.
If the equipment could create acoustic disturbances, it is advised to incorporate an hydrophone in order to control the acoustic level and frequency of the emitted signals.

## 5.6 Uplift of particles

Some equipment deployment could generate uplift of particles. Similarly, movable equipment such as thrusters or impellers can raise clouds of dust during their operation.
If the equipment generates the suspension of sediment particles, the user should take the necessary measures to limit the effects.

## 5.7 Vibrations

Tbd

## 5.8 Other disturbances

All other potential risks of disturbances should be identified and analysed.
In particular implosion risk should be considered. For each specific case any action to reduce the risk should be detailed in the LSPM Access Request [RD3].

## 5.9 Distances

The user equipment will be deployed beyond the field of the outermost KM3NeT detection lines at a minimum distance that will depend on the eventual perturbations the user equipment.

## 5.10 In all cases, the precise location of the equipment will be validated in agreement with the management of the platform.Sea operation constrainst

These precautions will be detailed and discussed during the user access request procedure [RD3].

### 5.11 Equipement Recovery

The user will plan the necessary operations to recover its equipment at the end of the experiment or any maintenance intervention (if necessary) by taking all the security measures related to the LSPM platform and all devices which are connected to it.
These precautions will be detailed and discussed during the user access request procedure [RD3].

# 6 Regulatory constraints for users

## 6.1 Compliance with regulation

All users must comply with all applicable regulations at the time of the request.

## 6.2 Marine operation and installation authorizations

### 6.2.1 Authorization of installation

Prior to any installation of equipment on the seabed one user must obtain the appropriate authorization:

- If the installation is in the territorial waters so-called French marime public domain (DPM Domaine Public Maritime), the authorization is instructed by the DDTM (Direction Départementale des Territoires et de la Mer)
- If the installation is in the Exclusive Economic Zone (EEZ), the authorization is instructed by the Préfecture Maritime de la Méditerrannée.

In all cases, prior to initiate any regulatory process, the user will contact the LSPM headquarter. Be aware that the procedures typically require from 2 months to more than one year depending on which one is needed.

#### *6.2.1.1 EEZ*

The installation is governed by decree n ° 2013-611 of July 10, 2013 :

- Permanent equipment: if the equipment is within the framework of the MEUST procedure, the process consists of updating the MEUST authorization; otherwise a new authorization must be requested with a minimum instruction duration of 1 year.
- Temporary equipment <2 years: simplified procedure according to the same decree (last paragraph of article 3), the minimum duration of instruction is 2 months
- Temporary equipment> 2 years: procedure identical to the one for a permanent equipment
This authorization includes an environmental impact study

- A specific request is required in the case of installation of an acoustic passive listening system.

#### *6.2.1.2 DPM*

- The user must obtain a Temporary Occupation Authorization (AOT : Authorisation d'occupation Temporaire) governed by the article L2122-1 of the french CGPPP "General Code of the Property of Public Persons" in association with a declaration of works for the installation (ref R214-1 of the french "environmental code")
- A specific request is required in the case of installation of an acoustic passive listening system.

### 6.2.2 Authorization for marine operation

Prior to any marine operation an authorization has to be requested at least one week before to the CECMED of the Préfecture Maritime de la Méditerrannée.

# 7 Access Request Procedure for a new experiment/user

## 7.1 Organization

A new user's request for access to the LSPM platform and its implementation is carried out according to the following procedure.

Each request is studied by a Scientific and Technical Commission for Access to the LSPM Infrastructure (CSTA Commission Scientifique et Technique d'Accès).
This commission is made up of permanent members of the LSPM platform, a representative of the KM3NeT Collaboration as well as, if necessary, experts relating to the field in question.
In order to investigate the demand, the CSTA may organize meetings with the potential user and possibly ask him to carry out preliminary experiments.
At the end of the examination of the request, the CSTA draws up a confidential report submitted to the management of LSPM, which gives the agreement of access to the infrastructure for the realization of the experimental program presented by the user.

## 7.2 Working operation and surveillance

If a user program is accepted, CSTA manages the operations of implementing user equipment in order to insure that the KM3NeT experience, the main user of the platform, is not disturbed.
It should be remembered that the perturbations generated by the user equipment may be insufficiently known at the time of the request, or greater than those foreseen, so that LSPM management may interrupt within a very short notice, the use of the equipment at any time in the event of an unacceptable nuisance.
To this end, a specific protocol must be able to be implemented at the level of the supervisor software. The access keys, passwords, necessary procedures must be the subject of a conduct guide

provided by the user. In addition, the correspondents of the user in charge of the equipment must be clearly identified.
Finally, the history of the operating conditions of the equipment will be kept, in order to facilitate a possible adjustment with the operation of the KM3NeT experiment.

### 7.3 The Access request

The user will complete the access request form [RD3] in addition to a technical dossier which includes four documents:

1- Presentation of the project and its organization (name of the contact, …), general presentation and definition of the equipment or system using the interfaces offered by the LSPM infrastructure, if applicable.
2- Identification study of potential disturbances and the measures proposed to keep them below the acceptable level as described in the present document.
User Guide of the equipment with description of the devices selected to operate the equipment while ensuring the safety of the platform and its users.
3- Information on the procedure for operations at sea with the specific provisions for operational implementation (deployment, maintenance, decommissioning)
4- Authorization for a marine operation: this point is to be discussed in advance with the CSTA.

A user request framework for this dossier is proposed [RD3].

## 8 Data Management

The user should implement its own software interface to control its Equipment via the Ethernet connectivity provided by LSPM.
The LSPM will ensure the necessary bandwidth to transfer the data from the undersea location to the shore station.
User data are under the responsibility of the corresponding LSPM clients.
All acquired data are temporarily stored on the computer farm in the shore station before being transferred to their home institutes and/or to the CC-IN2P3 computer on demand. Here the data are inserted into a database structure. If required, the data are made available to external centers.

A Data Management Plan (DMP) [RD4] details the management of the data handled by LSPM.

# 9 Quality

The operation of the platform is carried out according to a quality plan detailed in the document "Quality plan of the LSPM platform [RD8].

# 10 Communication and publications

Any user who intends to submit a publication or communicate on facts or data resulting from their experience installed on LSPM have to inform the LSPM management.
A communication plan [RD6] defines the communication and publication rules for external users.

# 11 Safety rules

## 11.1 Human safety

The global human safety requirements to access the LSPM platform are detailed in the safety rules note [RD5].

## 11.2 Material safety

According to its complexity, protective electric or software devices should be implemented inside the equipment, in order to guarantee its safety as well as the safety of the LSPM platform.
Particularly, it will integrate an automatic system to shut down itself in case of over consumption.
These procedures will be well describe in the experiment user guide delivered with the LSPM Access Request form [RD3].

# 12 ANNEX

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