KM3NeT INFRADEV – H2020 – 739560

The KM3NeT Outreach and Communication Strategic Plan

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Abstract

This document presents the Outreach and Communication Strategic Plan of KM3NeT.

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I. DELIVERY SLIP

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II. DOCUMENT LOG

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III. 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.

IV. TERMINOLOGY

A complete project glossary is provided:

MoU: Memorandum of Understanding
OCC: Outreach and Communication Committee
ARCA: Astroparticle Research with Cosmics in the Abyss
ORCA: Oscillation Research with Cosmics in the Abyss

V. LIST OF FIGURES

none

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VII. 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. 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, the KM3NeT-INFRADEV project 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. The KM3NeT-INFRADEV is funded by the European Commission's Horizon 2020 framework and its objectives comprise, amongst others, support for Outreach and Communication (work the preparation package 3).

VIII. EXECUTIVE SUMMARY

The KM3NeT Outreach and Communications Strategic Plan intends to guide the development and implementation of the KM3NeT Communications and Public Outreach Programme. The document outlines one key objective with five key priorities and identifies audiences, messages and channels, which will meet these priorities and deliver on the key objective.

The key objective of the plan is to grow financial, political and public support for the international KM3NeT project by communicating its value to stakeholders and the general public. Five key priorities are to: 1) Communicate the value of the KM3NeT project to all its stakeholders; including the public; 2) Ensure that stakeholders and the public understand KM3NeT to be a single coherent project; 3) Increase communication activity in all partner countries; 4) Ensure that all stakeholders are engaged with the project at the national and international level 5) Support KM3NeT managers to attract new member nations to the project.

Six high-level programme elements – or channels – that implement these strategic activities are defined and described: 1) Branding; 2) Online Outreach; 3) Networking; 4) Media; 5) Material and publications; 6) Events and conferences.

The KM3NeT Outreach and Communications Strategic Plan aims at positioning KM3NeT as one of the top scientific and technological projects of the 21st century. It is a cooperative effort led by the KM3NeT Outreach and Communication Committee in close collaboration with communication and outreach offices in the KM3NeT member countries.

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1. Introduction

This document outlines the KM3NeT Outreach and Communication Strategic plan, for the period 2017-2020. This plan was approved by the KM3NeT Institute Board the 20 December 2017.

In any organization, the role of communication and outreach is to be planned strategically in order to enhance the organisation's ability to operate and achieve its strategic goals. Through communications, an organization manages and sustains relationships with key audiences and takes responsibility for its reputation.

Communications consists of the dissemination of information by a variety of specialists and generalists in an organisation. So it is that many people communicate about KM3NeT, for different reasons and with different target audiences, in many different ways and using different media.

The strategy plan presented here focuses mainly on external communication and is underpinned by the KM3NeT scientific and operational goals for 2017-2020, as defined in the KM3NeT Letter of Intent and the KM3NeT MoU. It is also informed by the communication and outreach teams of the partner funding agencies.

The KM3NeT Outreach and Communication Committee (OCC) will take the lead on the development and execution of the plan, in close collaboration with the KM3NeT management and the KM3NeT Institute Board.

2. Background

The main objectives of the KM3NeT Collaboration are i) the discovery and subsequent observation of high-energy neutrino sources in the Universe and ii) the study of fundamental neutrino properties. To meet these objectives, the KM3NeT Collaboration is building a new Research Infrastructure consisting of a network of deep-sea neutrino telescopes in the Mediterranean Sea. A phased and distributed implementation is pursued which maximises the access to regional funds, the availability of human resources and the synergetic opportunities for the earth and sea sciences community. Three suitable deep-sea sites are identified, namely offshore Toulon (France), Capo Passero (Italy) and Pylos (Greece).

The KM3NeT neutrino telescope infrastructure will comprise several detector building blocks. Each building block constitutes a three-dimensional array of photo sensors that can be used to detect the Cherenkov light produced by relativistic particles emerging from neutrino interactions. Two building blocks will be configured to fully explore the neutrino Universe with improved resolution and complementary field of view, including the Galactic plane, as compared to existing telescopes. Collectively, these building blocks are referred to as ARCA (Astroparticle Research with Cosmics in the Abyss). A single building block will be configured to precisely measure atmospheric neutrino oscillations. This building block is referred to as ORCA (Oscillation Research with Cosmics in the Abyss). ARCA will be realised at the Capo Passero site and ORCA at the Toulon site. Future upgrades may extend the instrumented volume to several cubic kilometres of seawater.

The deep-sea sites are linked to shore with a network of cables for electrical power and high-bandwidth data communication. On site, shore stations are equipped to provide power, computing and a high-bandwidth internet connection to the data repositories.

To match the funding profile, a phased implementation of the Research Infrastructure has been adopted. Following the successful deployment and operation of a series of prototypes, the construction of the first phase (Phase-1) of the KM3NeT Research Infrastructure is in progress at the sites in Italy and France, and all relevant technologies have been validated. Funding for Phase-2 is becoming available and the current planning anticipates a single building block installed at each of the French and Italian sites before the end of 2021.

The current KM3NeT Collaboration comprises more than 250 scientists in over ten countries and 53 institutes. Its modus operandi is defined in a Memorandum of Understanding. In the future it aspires to establish a legal entity via a European Research Infrastructure Consortium (ERIC).

3. Goals of the Outreach and Communication Plan

The key objective of the plan is to grow financial, political and public support for the international KM3NeT project by communicating its value to stakeholders and the general public. Value is defined here as embracing not only the science and technology aspects of the project, but also societal value demonstrated through economic impact (at local and global scales), local development, capacity building, and educational initiatives.

Five key priorities are to:

- Communicate the value of the KM3NeT project to all its stakeholders; including the public
- Ensure that stakeholders and the public understand the KM3NeT to be a single coherent project
- Increase communications activity in non-host countries
- Ensure that all stakeholders are engaged with the project at the national and international level
- Support KM3NeT managers to attract new member nations to the project

This document lays out the communications strategy and identifies key audiences, messages and channels, which will meet these priorities and deliver on the key objective.

4. Communications Architecture

An organisation's vision and mission derive from its strategic goals. In KM3NeT's case, we divide these into scientific and "beyond science" goals.

KM3NeT's **scientific goals** are:

- to exploit the ARCA telescope to study the high energy neutrino Universe;
- to exploit the ORCA telescope to study the fundamental properties of neutrinos;
- to optimise the synergetic opportunities for the earth and sea science communities to benefit from the unique capabilities of cabled deep sea observatories.

KM3NeT's **"beyond science"** goals are:

- to be a politically neutral voice for science, advocating investment in fundamental research and evidence-based policy;
- to build further links with industry in terms of the transfer of knowledge from KM3NeT to industry;
- to train a new generation of scientists and engineers;
- to foster international collaboration;
- to inspire and nurture scientific awareness amongst all citizens.

KM3NeT's vision can be articulated as: to gain understanding of the most fundamental particles and laws of the Universe

KM3NeT's mission is:

- to provide a unique facility that enable research at the forefront of human knowledge;
- to perform world-class research in fundamental physics;
- to push the frontiers of science and technology for the benefit of all.

4.1 Themes

In the communications architecture, the following themes are the platform for KM3NeT to spread its messages and tell its stories.

1) KM3NeT is the next generation neutrino observatory:

- KM3NeT is an initiative to build and operate the next generation deep-sea neutrino telescope.
- KM3NeT will collect an unprecedented quantity of cosmic and atmospheric neutrinos
- KM3NeT will serve as an open observatory to a wide astrophysics and particle physics community.
- KM3NeT will provide open access to the earth and sea science community for real-time, continuous, long-term, high frequency monitoring and observation of the deep-sea environment.

2) KM3NeT's foundation is its exceptional scientific potential:

- KM3NeT is pushing both the low-energy and high-energy frontiers, where insight into some of the Universe's greatest mysteries may exist.
- KM3NeT's unique capabilities will help us to address some of the most perplexing questions in

astrophysics and particle physics.
    - Understanding the origin and role of relativistic cosmic particles
    - Probing extreme environments
    - Exploring frontiers in physics
- KM3NeT's broad energy coverage and unprecedented angular resolution will allow us to search for the sources of cosmic rays from our galaxy to the furthest reaches of the Universe.
- KM3NeT will measure the fundamental properties of neutrinos (oscillation parameters, mass ordering) paving the way to an understanding of the origin of the matter/anti-matter imbalance in the Universe.
- KM3NeT will scrutinize its data hunting for signs of new physics (sterile neutrinos, non-standard interactions, dark matter, magnetic monopoles, violation of Lorentz invariance, …).
- As a deep sea cabled observatory, KM3NeT offers unique opportunities for a plethora of marine science studies (oceanography, bioacoustics, bioluminescence, biodiversity, radioactivity, anthropologic impact, global warming, seismology, tsunami alerts, etc.)

3) **Technological innovation:**

- KM3NeT has innovated new technologies for photo-detection, deep-sea technology, time-synchronisation over large distances and computing.
- KM3NeT-based innovations have applications in other domains.

4) **Diversity of people:**

- People of many nationalities from across the globe are working for KM3NeT.
- Their academic and professional backgrounds are diverse (science, engineering, computing and others).

5) **Inspiration and education:**

- KM3NeT trains future scientists, engineers and technicians.
- KM3NeT inspires school teachers for modern and up-to-date science education.
- KM3NeT motivates school students to pursue the study of science.
- KM3NeT inspires scientific awareness among citizens.

4.2 Target audiences

KM3NeT is mandated by its stakeholders to regularly update the astroparticle community and its stakeholders on its activities.

It is in the interest of KM3NeT to communicate and engage with a range of different audiences that are vitally important for KM3NeT to achieve its mission. The following target audiences have been identified:

- Governments and policy-makers:

  - of the stake-holders
  - of potential new collaborators and associated collaborators
  - of the local communities hosting the telescope sites
  - of other international organisations
- The international particle physics community, including:
  - research institutes and universities
  - physicists and astronomers
- The broader international scientific community, especially earth and sea scientists
- The media and influencers
- Teachers and students (from pre-university to graduate)
- The local community
- The general public (citizens)
- The KM3NeT community (students, postdocs and contractors' personnel)
- Potential candidates (students, graduates and professionals)
- KM3NeT alumni
- Industry

4.3 Key messages

Here, we outline the overarching key messages (targeting all audience groups) that KM3NeT wishes to convey:

1. KM3NeT is a world leader in astroparticle and particle physics. This encompasses experimental research, engineering, data analysis techniques and computing.
2. Determination of the fundamental properties of the neutrino will have important implications on our understanding of the origin of the Universe, its matter/energy content and its ultimate fate.
3. The discovery of high-energy cosmic neutrinos opens a new window on the Universe, and will be a journey of discovery for the next decade and beyond.
4. To continue this journey of discovery, we need to enlarge the KM3NeT infrastructure. To build KM3NeT we push the boundaries of technology.
5. KM3NeT brings benefits to society. KM3NeT contributes to the human endeavour of acquiring knowledge and it has a strong positive impact on training future scientists and engineers, on driving innovation, on transferring knowledge and technology to society and industry, and on engaging citizens in the achievements of fundamental research.
6. KM3NeT is an open institution. KM3NeT's scientific results and data are available in open access and KM3NeT is committed to open innovation. KM3NeT is open to citizens and to the arts, humanities and other expressions of culture.

5. Partners

When developing activities and projects, KM3NeT will work closely with a range of internal and external partners to ensure the coherent coordination of communication channels and activities in line

with this KM3NeT Communications Strategy and with the communications strategies of our partners.

Partners within KM3NeT:

- KM3NeT Resources Review Board members
- KM3NeT Scientific and Technology Advisory Committee members
- The KM3NeT-ERIC management
- Collaborators of KM3NeT

Partners in the Stakeholder countries:

- National laboratories and institutes
- Universities
- Funding bodies
- Business incubation centres

Partners in the Host Sites:

- National, federal and local authorities

Partners in Europe:

- European Commission
- European Organization for Nuclear Research (CERN)
- European Strategy Forum on Research Infrastructures (ESFRI)
- Astronomy ESFRI and Research Infrastructure Cluster (ASTERICS)
- European Multidisciplinary Seafloor and water-column Observatory (EMSO)

Partners in the astroparticle and particle physics community:

- Astroparticle Physics European Consortium (APPEC)
- European Particle Physics Communication Network (EPPCN)
- International Union of Pure and Applied Physics (IUPAP) and the Astroparticle Physics International Committee (ApPIC)
- Global Science Forum
- International Particle Physics Outreach Group (IPPOG)
- European Physical Society (EPS)
- National physics societies

6. Channels

The KM3NeT Communication and Public Outreach Programme extends and intensifies the existing

outreach and communication structure. It is divided into several channels, which can be considered as venues or techniques for reaching our diverse audiences and fulfilling our priorities and delivering on the key objectives:

6.1 Branding

Branding is the trademark of any company, organisation or institution. It represents the organisation and defines the identity. The recognition and the use of a common and consistent brand across the partners is critical for the success of the KM3NeT. This includes a number of elements such as the visual identity, the adoption of high-level messages defining the project and the adhesion to a One Project concept. All these elements will be set in the early stages and should be agreed by all partners, as a way of ensuring its proper implementation over time. In particular, our key messages, which define the project and that ensures regional features and individual characteristics are preserved.

6.2 Online

Online outreach is a natural channel to reach thousands of people around the world. It is important that the online outreach will be intensified. The OCC Programme embraces a multimedia approach to public outreach, enhancing the presence of high-quality related visuals, artists' impressions, videos, animations, texts (including press releases and announcements) and presentations on the internet, allowing easy access to these resources. This effort is coordinated with the partners. In certain cases, translation of material into languages other than English will also be considered. A particular effort needs to be made on the website, both in terms of the content (very frequently) and the structure (from time to time). Constantly refreshing and updating the content with new material (visuals, texts, reports, etc.) reflects a dynamic project.

The KM3NeT presence on YouTube, Wikipedia and social media is also a critical parameter. Regular updates through new content, images, animations, information on construction, talks from KM3NeT collaborators reports, etc. is a good way to generate and enhance interest and support from the community at large.

6.3 Networking

We have limited resources for the outreach and communications programme but we have the privilege to be a large collaboration with many partners. Networking with as many people as possible worldwide across the partnership as well as with the science and engineering community will allow us to gain efficiency, expand the reach (also thanks to translation of material into other languages) and, as a consequence, the recognition of the project. Each institution involved in a consortium potentially opens a new communication channel to promote the KM3NeT and provides the opportunity for us to reach out to other audiences and significantly expand the number of KM3NeT enthusiasts.

A particular effort is required on moulding the corporate material into the local context. This includes translation but also the focus on particular subjects more relevant to a particular group, the re-phrasing and/or clarification of subjects which might be more sensitive in some countries, etc. In a nutshell, we must ensure the adaptation to the needs of all our particular audiences.

Science centres, museums and planetaria are also venues we need to connect with as much as possible

to reach science fans, educators, teachers and students. These are venues which can give access to a large number of people and linking with them does not necessarily imply a lot of effort on our side - panels, brochures and flyers can be provided and conferences can be arranged. Again, support from outreach colleagues across the KM3NeT partnership in this initiative is critical to expand the reach and efficiency. Similarly, the KM3NeT will seek to connect with programmes targeting educational communities such as Master Classes, Science In Schools or Galileo Teacher Training Programme in order to raise awareness of KM3NeT among students and research institutes.

6.4 Media

Media are our main gateway to the outside world, allowing us to reach millions of people around the world at relatively low cost. In addition to having appealing, high-quality material on the KM3NeT website as described previously, engaging the media has to be done in many different ways. Effective and prompt responses to media queries and arrangements of interviews with KM3NeT-related scientists, engineers and high-level managers is an important task of the OCC, to be done in collaboration with the communications colleagues at the partners' countries when needed. A proactive interaction is also fundamental to get a large number of media "on board" through the distribution of press releases relating key milestones and achievements, direct contact with journalists at conferences and symposia and a certain amount of lobbying.

Astonishing research infrastructures such as KM3NeT are likely to attract prominent broadcasters and arranging collaborations with them would ensure huge, worldwide visibility towards the general public. As the construction of the KM3NeT proceeds, it is critical to 'market' KM3NeT to media companies with scientific subject interest and appropriate production capability such as National Geographic, Discovery Channel, the BBC, ARTE, etc.

6.5 Material and Publications

The design and production of high-quality promotional and educational materials is another important branch of the KM3NeT communications strategy. Multiple targets and audiences imply different materials, tools and resources and multiple channels to reach these audiences. Both KM3NeT scientists and KM3NeT engineers will serve as advisors to the communications team to ensure accuracy of the generated material. This cooperative endeavour includes photographic and video documentation, to be archived on the KM3NeT online platforms and to be used in the production of materials. A non-exhaustive list of materials include videos and 3D animations to explain complex science phenomena, images and illustrations, brochures, leaflets, posters, books, comics, fact sheets, etc. Several resources already exist across the partnership. Of course this material must be regularly refreshed to reflect the rapid progress in the project.

6.6 Conferences

Engaging with industry, the engineering and science communities worldwide, the media and the general public is one of the main objectives of the KM3NeT Communications strategy. The participation of KM3NeT-related engineers, scientists, outreach staff and key managers in relevant meetings, science and technical conferences, science communication congresses and general public science events worldwide is a great opportunity to engage with our stakeholders groups and ensure a large visibility. Such participation is done through talks, presentation of posters, set up and staffing of booths

when appropriate.

Activity	Means
Social Media	Facebook, Twitter, Instagram, YouTube
Digital portfolio	KM3NeT External webpages KM3NeT Outreach webpage Wikipedia
Exhibitions	Permanent exhibitions at host sites, Project Office Travelling exhibitions for industry/EU Online resources for exhibitions
Public Events	Annual Fetes de la Science Open days at institutes Colloquia at partner institutes Colloquia associated with Collaboration Meetings Inauguration of the telescope sites
Audio-Visual	Photograph Gallery (online) Stock footage, edited videos 2D/3D event animations TV/radio emissions Virtual Reality Oculus Rift: KM3NeT Experience KM3NeT Augmented Reality App
Visual identity and print	Logo Branding materials Official letter header Brochures, Christmas cards Posters
Media Relations	Press releases On-site visits for journalists Background/media packs Media training
Art and Science	Collaboration with artists, e.g. Aganta Kairos (theatre), Archipelagos (schools) AIS3 installation

Table 1: Summary of the various activities and the means to achieve them.