



KM3NeT

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MEMORANDUM OF UNDERSTANDING

KM3NeT-PHASE1

Draft 11.3

11/1/2013



**MEMORANDUM OF UNDERSTANDING
FOR COLLABORATION IN THE IMPLEMENTATION OF
THE FIRST PHASE OF THE KM3NeT RESEARCH INFRASTRUCTURE**

between

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE, a public scientific and technological institution established in 3, rue Michel-Ange, PARIS, 75794, France, represented by Professor Jacques MARTINO, Director of IN2P3

Hereinafter referred to as “**CNRS**”

and

FRIEDRICH-ALEXANDER UNIVERSITÄT ERLANGEN-NÜRNBERG, established in Schlossplatz 4, 91054 Erlangen, Germany, represented by Dr. Th. A.H. SCHÖCK, chancellor of FAU

Hereinafter referred to as “**FAU**”

and

STICHTING VOOR FUNDAMENTEEL ONDERZOEK DER MATERIE, established in Van Vollenhovenlaan 659, 3527 JP UTRECHT, The Netherlands, represented by Professor Frank LINDE, Director of the FOM Institute Nikhef

Hereinafter referred to as “**FOM**”

and

L'ISTITUTO NAZIONALE DI FISICA NUCLEARE, established in Piazza dei Caprettari, 70, Roma 00186, Italy, represented by Professor Fernando FERRONI, president of INFN

Hereinafter referred to as “**INFN**”

and

MINISTRY OF NATIONAL EDUCATION, established in 21-25 Mendeleev Street, Bucharest, RO-010362, represented by Tudor Prisecaru, State Secretary

Hereinafter referred to as “**MEN**”

Hereinafter collectively referred to as “Parties” and individually as “Party”

PREAMBLE

CONSIDERING THAT:

(a) The OECD Mega Science Forum and the IUPAP Neutrino Telescope committee (HENAP) have strongly recommended the construction of a Neutrino Telescope with dimensions of at least 1 km³ in the Northern Hemisphere and more specifically in the Mediterranean Sea.

(b) The ESFRI of the EU has placed this future Research Infrastructure on the Road Map of major European Research Infrastructures.

(c) The EC has supported a Design Study for the KM3NeT Research Infrastructure through FP6 (KM3NeT, Contract No. 011937) and the Preparatory Phase of KM3NeT through FP7 (KM3NeT-PP, Grand Agreement No. 212525).

(d) The feasibility of the KM3NeT Research Infrastructure has been demonstrated in the Conceptual Design (ISBN 978-90-6488-031-5) and the Technical Design Report (ISBN 978-90-6488-033-9) delivered to the EC in the context of the KM3NeT Design Study.

(e) The Scientific Standing Committee of the KM3NeT-PP project recommended undertaking joint actions to consolidate the optimal choices in terms of siting and technical design of KM3NeT neutrino detector.

(f) The Parties concerned have established the baseline technology for the KM3NeT Detection Unit, which is described in the KM3NeT Technical Design Report as the flexible string option.

(g) The Parties concerned have demonstrated that the optimal configuration for detection of neutrinos from Galactic sources consists of several instrumented volumes.

(h) The Parties concerned have initiated joint actions to validate by means of field tests of Pre-Production Models the basic KM3NeT Detection Unit of the neutrino telescope.

(i) The Strategic Project Board of the KM3NeT-PP Consortium and the Administrative Standing Committee of the KM3NeT-PP project consisting of high level representatives of the Parties' funding authorities have recommended the adoption of a Memorandum of Understanding by the Parties in order to facilitate and coordinate the necessary joint actions and to prepare for the establishment of a European Research Infrastructure Consortium (ERIC).

RECOGNIZING:

(j) The wide interest in the KM3NeT Research Infrastructure as expressed by the ESFRI, ASPERA and ASTRONET Road Maps.

(k) The availability of funding to start implementation of the first phase of the KM3NeT Research Infrastructure.

(l) The need to establish an international framework to coherently employ the available funds for implementation of the first phase of the KM3NeT Research Infrastructure.

(m) The need of additional partners and additional funding to realize the multi-cubic kilometre scale neutrino telescope described in the KM3NeT Technical Design Report and required to achieve the major scientific objective of the discovery of a Galactic neutrino source within a few years of observation.

(n) The interest of the worldwide neutrino astroparticle community to create a Global Neutrino Observatory with distributed locations.

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- (o) The interest of the community of Earth and Sea Sciences in distributed cabled observatories.
- (p) The interest of institutes involved in the KM3NeT Design Study and the KM3NeT Preparatory Phase to form an international collaboration in order to build, install and operate the first phase of the KM3NeT Research Infrastructure in the Mediterranean Sea which houses a neutrino telescope and instrumentation for Earth and Sea science research as an essential step toward a second phase of extension of the neutrino telescope volume to several cubic kilometres.
- (q) The intention of the Funding Authorities involved in the KM3NeT Preparatory Phase to establish a European Research Infrastructure Consortium (ERIC) as the legal framework for KM3NeT.

THE PARTIES HAVE AGREED AS FOLLOWS:

ARTICLE 1 – Purpose of this Memorandum of Understanding

1.1 This Memorandum of Understanding (MoU) defines the first phase of the KM3NeT Research Infrastructure. Its purpose is to define the programme of work to be carried out for this phase and the distribution of charges and responsibilities among the Parties and Institutes for the execution of this work. It sets out organizational, managerial and financial guidelines to be followed by the Collaboration and the external scientific and technical review processes.

1.2 The first phase includes the preparation for the next phase of the KM3NeT neutrino detector with an instrumented volume of several cubic kilometres

1.3 The first phase comprises the final prototyping and preproduction, engineering, construction, calibration, transportation, assembly, installation and commissioning of the elements which form the basis of the KM3NeT neutrino detector and the seafloor and shore station infrastructures as well as the operation of the installed neutrino detectors.

1.4 The first phase includes the installation of a user port for connection of instrumentation for Earth and Sea Sciences (ESS) at the KM3NeT installation sites, which will be included in the intended EMSO¹ network of cabled observatories.

1.5 The first phase will be referred to as KM3NeT-phase1 or ‘KM3NeT-phase1 project’ hereinafter.

1.6 This MoU shall be complemented by addenda defining each contribution pledged to the Collaboration in terms of time schedule, money, facilities, equipment and other items.

1.7 This MoU is the first step toward the intended establishment of a KM3NeT-ERIC (European Research Infrastructure Consortium), of which this MoU will form the basis for its statutes.

ARTICLE 2 – Parties and Institutes

2.1 The Parties are the Funding Agencies or Funding Authorities which have agreed to this MoU for Collaboration in the Implementation of the First Phase of the KM3NeT Research Infrastructure.

2.2 The Parties are listed with their duly representatives in the Resource Review Board (Article 5) in Annex 1. They are referred to as ‘Parties’ or ‘Party’ hereinafter.

2.3 New Parties can join the MoU with the agreement of the Institute Board (Article 7.1) and with the permission of the Resource Review Board (Article 5.1). New Parties will be expected to make an appropriate financial or in-kind contribution to the implementation of KM3NeT-phase1. Their inclusions will be affected by means of Addenda to this MoU.

2.4 The Institutes are research institutes or University groups collaborating in the implementation of KM3NeT-phase1 under the auspices of this MoU.

2.5 The Institutes are listed with their duly authorized representatives are listed in Annex 2. They are referred to as ‘Institute(s)’ hereinafter.

2.6 New Institutes can join the Collaboration, with the agreement of the Institute Board (Article 7.1). New Institutes are expected to make an appropriate financial or in-kind contribution to the implementation of the KM3NeT-phase1. Their inclusion will be effected by means of Addenda to this MoU.

2.7 In special cases an observer status may be granted to Institutes. Observers are exempt from financial contributions to KM3NeT. Their representatives can participate in meetings of the Institution Board (Article 7.1) without voting rights. Scientists of observer institutes will not sign papers, unless

¹ EMSO - European Multidisciplinary Seafloor Observatory; it is expected that the ESS community will establish an ERIC for a network of cabled observatories, e.g. EMSO-ERIC.

they are the main author. This restriction does not apply to their PhD students.

ARTICLE 3 – The Collaboration

3.1 The collaborating Institutes will be referred to as ‘Collaboration’ hereinafter.

3.2 The names of the scientists presently participating in the Collaboration are listed in Annex 3 by country and by Institute.

3.3 The oversight, governance and management breakdown structure of the Collaboration is described in Article 7 and Annex 4.

ARTICLE 4 – The Research Infrastructure

4.1 The KM3NeT Research Infrastructure implemented in KM3NeT-phase1 comprises seafloor networks, neutrino detectors and user ports for connection of Earth and Sea Science instrumentation at several locations in the Mediterranean Sea. It will be referred to as KM3NeT-phase1 RI hereinafter.

4.2 The locations of the KM3NeT-phase1 RI are referred to as Installation Site(s) hereinafter. They are listed in Annex 5.

4.3 The major subsystems of the KM3NeT-phase1 RI are described in Annex 6.

ARTICLE 5 – The Resource Review Board for oversight of the KM3NeT-phase1 research infrastructure

5.1 A Resource Review Board (RRB) shall be set up by the Parties to supervise the work for KM3NeT-phase1. Parties appoint their representatives. A representative of the consortium for Earth and Sea Science that may share facilities of the KM3NeT-phase1 infrastructure is invited as an observing member of the RRB to form the liaison with the highest governing board of the ESS Consortium. The RRB elects a chairperson, who becomes *supra parte* and leaves its delegation. The Party affected by this departure appoints another representative in the RRB. The role of the RRB includes:

- Monitoring the general financial and human resource support;
- Endorsement of the annual budget;
- Liaise with the highest governing board of the Earth and Sea Science Consortium that share the infrastructure with KM3NeT-phase1;
- Endorsement of observational campaigns and experiments of scientists which are not a member of the Collaboration;
- Oversight of ethical issues and endorsement of corresponding measures in due consideration of the recommendations of the Ethics Board;

ARTICLE 6 – The Scientific and Technical Review Committee

6.1 A Scientific and Technical Advisory Committee (STAC) is setup by the RRB. The STAC monitors and evaluates the progress in the definition of scientific objectives, priorities and output, and technical decisions related to these issues. The STAC installs an Observation Committee (OC) for evaluation of observational campaigns and experiments of scientists which are not a member of the Collaboration. The STAC reports to the RRB and makes recommendations to the Collaboration. The members of the STAC are listed in Annex 7.

ARTICLE 7 – Governance and management of the KM3NeT-phase1 research infrastructure

7.1 The Institutes set up an Institute Board (IB) as the governance body of the KM3NeT-phase1 research infrastructure. The IB defines the work programme of KM3NeT-phase1 and monitors its progress. The IB shall meet as often as necessary but at least three times per year in person or by teleconference in such places as it shall decide. Each Institute is entitled to appoint one representative to the IB. The IB Chairperson shall be elected by the IB from the members of the

Collaboration by simple majority vote for a term of two years with the possibility of extension with one more term of two year. The Chairperson becomes supra parte and leaves its delegation. The Institute affected by this departure appoints another representative in the IB. The Chairperson shall represent the Institutes in relation with the RRB and the STAC.

7.2 In the IB for all ordinary business each Institute has one vote, regardless of the financial value of its contributions. Proxies are allowed with a maximum of three per person. In these cases, the decisions shall be taken by consensus but where that is not feasible, decisions shall be taken by 2/3rd majority of the votes cast. Failure by a Party to deliver its pledged commitment shall result in the suspension of the voting rights of its associated Institutes until such obligation is fulfilled.

7.3 Exceptional circumstances may occur when the 2/3 majority is not reached. At this point the chair of the IB is to act as intermediary between the dissenters in the board and the management, in order to seek a way to achieve the 2/3 majority. Only after he/she fails the circumstance will be declared exceptional either by simple majority vote of the IB or by the Chairperson of the IB, and a decision shall be taken by extraordinary vote of the IB. In this case, per Party one Institute shall be attributed voting rights in proportion to the total value of the contribution of the Party, on the basis of the cumulative contributions actually committed and put at the disposal of the Collaboration until December 31st of the year preceding the year in which the extraordinary vote is held. To this end, each Party shall provide the Chairperson of the IB before January 31st of each year with the total value of its contributions and the Chairperson shall then inform the Institutes before March 31st of each year of the cumulative contributions actually committed by them. Decisions shall be taken by simple majority of the votes cast.

7.4 Any dispute between any of the Institutes which cannot be resolved within three months by the IB shall be submitted to a special meeting of the RRB. Their decision in case of dispute shall be binding and final and there shall be no recourse.

7.5 After consultation with the Collaboration and as a responsibility of the IB, a Spokesperson, a Deputy Spokesperson, a Technical Project Manager and a Physics and Software Manager shall be elected for a term of two years with the possibility of one more term of two years by the IB by simple majority vote with a casting vote of the Chairperson of the IB in case of a tie.

7.6 The Spokesperson (SP) shall direct and supervise all activities of the Collaboration. The SP shall represent the Collaboration in relations with the scientific community. The SP reports to the IB and the RRB on technical, managerial, financial and administrative matters and on changes in the composition of the Collaboration. The SP reports to the IB and the STAC on issues related to science objectives, priorities and output and technical decisions for optimal science output.

7.7 The Deputy Spokesperson (DSP) shall replace the Spokesperson whenever and wherever required.

7.8 The Technical Project Manager (TM) shall direct and supervise the technical preparation, the construction and the commissioning of the KM3NeT-phase1 RI.

7.9 The Physics and Software Manager (PSM) shall direct and supervise the definition and execution of the scientific programme of the neutrino telescope of the KM3NeT-phase1 RI. This includes the coordination of simulation and reconstruction software developments and production of the Collaboration.

7.10 For each installation site, the responsible Party shall appoint a Site Manager (SM) to execute the tasks formulated in Article 9. The SM shall be the responsible leader of the KM3NeT-phase1 project at the Host Institute.

ARTICLE 8 – Deliverables and Cost sharing

8.1 The technical participation as in-kind contributions of the Parties and Institutes to the KM3NeT-phase1 RI project is listed in Annex 8.

8.2 The foreseen implementation schedule of KM3NeT-phase1 RI is described in Annex 9.

8.3 The values of the deliverables to which the Parties and Institutes are committed and for which they have foreseen the appropriate funding is defined in Annex 11.

8.4 The Institutes will make their best efforts to produce final prototypes and preproduction models, construct, calibrate, transport, assemble, install and commission all the deliverables listed in Annexes 8 and 11 within the limits of their funding. In the event of significant cost variations with respect to the estimate, these will first be brought, by the Institute(s) concerned, to the attention of the IB and, if solutions have not been found, then to the RRB. The IB will propose ways of accommodating such variations within the overall cost ceiling of the KM3NeT-phase1 project and seek the endorsement of the RRB.

ARTICLE 9 – Responsibilities of the Host Institutes

9.1 An Institute in charge of an installation site of the KM3NeT-phase1 RI will be referred to as Host Institute hereinafter. They are listed in Annex 5.

9.2 A Host Institute shall, in addition to the responsibilities defined in this MoU, provide: (i) office space, equipped with standard infrastructure facilities; (ii) a shore station with an infrastructure for the supply of main electricity, cooling water, and broad band connectivity to the internet; (iii) coordination of the construction, installation and commissioning of a seafloor network infrastructure; (iv) coordination of the sea operations required to install the neutrino telescope components and the instruments for Earth and Marine research at the installation site; (v) coordination of the removal of equipment after closure of the research infrastructure.

9.2 In case of transfer of materials from an Institute to a Host Institute, ownership of these materials shall remain with the providing Institute, unless otherwise agreed upon on a case-by-case basis. The Institute providing the materials may be required to remove them after completion of the working programme of KM3NeT-phase1 as defined by the RRB.

ARTICLE 10 – Responsibilities of the Institutes of the Collaboration

10.1 An Institute supplying equipment or other items to a Host Institute shall ensure their safe delivery conform the European safety rules, regulations and standards, augmented by those of the Host Institute. To this end, the Host Institute shall provide all necessary information related to such rules, regulations and standards.

ARTICLE 11 – Status at a Host Institute

11.1 While at a Host Institute, the personnel shall be placed under the functional authority of the Host Institute and shall comply with the rules of conduct and safety of the Host Institute as well as the latter's staff rules and regulations. Nevertheless, it shall remain under the line authority of the providing Institute.

11.2 While at a Host Institute, the Institute providing the personnel shall remain the employer of this personnel and shall provide for the payment of its salaries and allowances.

11.3 The employing Institute shall ensure that allocated personnel and its family is provided with valid social insurance coverage against the economic consequences of illness, professional or non-professional, maternity, accidents, whether professional or non-professional, and disability. The employing Institute shall be liable to the Host Institute for any cost or expense in case any part of such insurance coverage is not provided for.

ARTICLE 12 - Confidentiality

12.1 Except as expressly authorized by, and subject to any obligations of this MoU, each Party agrees to keep confidential any information, document or other material which is communicated to it as confidential or the disclosure of which may be clearly prejudicial to any other Party. Each Party shall limit the circle of recipients of confidential information on a need-to-know basis and shall ensure that the recipients are aware and comply with the obligations as defined in this confidentiality clause.

Notwithstanding the above, a Party is entitled to disclose confidential information which it is required by law to disclose or which, in a lawful manner, it has obtained from a third party without any obligation of confidentiality, or which it has developed independently of confidential information, or which has become public knowledge other than as a result of a breach by that Party of its obligations under this confidentiality clause.

12.2 All information to be made public is regulated by the KM3NeT Publication Rules and the KM3NeT Conference Rules which are set forth in Annex 12.

ARTICLE 13 – Human Resource Policy

13.1 The Collaboration will ensure equal treatment and opportunities to personnel, support mobility between the Institutes, Parties and beyond and act to attract junior staff for training.

13.2 In general, the staff needed for carrying out the programmes of this MoU shall be seconded by the Parties.

13.3 The cost related to this seconded staff shall be borne by the seconding Party and wherever necessary shall be accounted for as part of its in-kind contribution. Secondments related to specific projects or for training purposes are also possible and will be accounted according to the specific projects.

13.4 The possible policy and internal rules for direct hiring of staff by the Collaboration will be defined by the RRB based on fixed term contracts.

ARTICLE 14 – Intellectual property rights

14.1 Proprietary information, including any information protected by trademark, patent or copyright, whether pre-existing or developed during the execution of this MoU, contributed to the Collaboration by an Institute for the execution of this MoU, shall not create any right in respect of that information for the other Institute, other than a free, irrevocable and non-exclusive license to use (which term in this Article 14 shall include any integration, modification, enhancement and redistribution) such information in so far as required for the execution of this MoU.

14.2 An Institute contributing proprietary information to the Collaboration in the execution of this MoU, shall warrant and ensure that it has or has procured the rights to contribute such proprietary information for the use defined in Article 14.1. Where the use of such proprietary information is subject to restrictions, the contributing institute shall disclose them in writing prior to making its contribution available to the Collaboration.

14.3 Without prejudice to Articles 14.1 and 14.2, the Institutes shall strive to agree to publish and make publicly available all proprietary information contributed to the Collaboration in the execution of this MoU. In particular, they shall consider making any software available under Open Source license conditions.

14.4 Except as provided for in Article 14.2, the Institutes provide no warranties or representations of any kind to each other. They shall have no liability to each other with respect to the subject matter, of this Article 14.4 and each Institute shall be exclusively liable for the consequences of its use of proprietary information contributed to the Collaboration.

ARTICLE 15 – User Access Policy

15.1 The Collaboration shall offer free open access for external users to the KM3NeT-phase1 RI through a common entry point and selection based on an international peer-review system, using solely the criteria of scientific quality of their proposed observational campaign or experiment.

15.2 Users requiring and accessing technical and/or scientific services on a proprietary basis and/or for training and education will also be accepted if not in conflict with the open access policy and will pay the appropriate cost of the services.

15.3 The RRB shall endorse the strategies and procedures related to the User Access Policy for both non-proprietary and proprietary research.

15.4 In Annex 13 procedures and rules for user access are described.

ARTICLE 16 – Procurement Policy

16.1 The procurement and pre-procurement policy of the Collaboration shall be based on the principle of transparency, non-discrimination and competition, taking in any case into full account the need of insuring that bids fulfil the best technical, financial and delivery requirements, while providing advanced notification to industry about required specifications for realisation of advanced components and systems.

16.2 Procurement and pre-procurement of components for KM3NeT-phase1 will follow European and national rules where and whenever required.

ARTICLE 17 – Liability

17.1 Except as provided in Article 14.4, the Parties shall have no liability toward each other in the execution of this MoU.

ARTICLE 18 – Duration of this MoU and its Extension

18.1 This MoU enters into force at the time of the last signature of the Parties. It remains in force until an ERIC is established which will supersede this MoU or until KM3NeT-phase1 is declared finished by the IB, whatever comes first. The maximum duration of this MoU is three years.

18.2 This MoU may be extended or terminated at any time by mutual agreement of the Parties involved, following a 2/3 majority approval by the Institute Board.

ARTICLE 19 - Withdrawal

19.1 Any Party or individual Institute may withdraw its support from the Collaboration by giving notice in writing to the SP, to the Chairperson of the IB and to the RRB abiding by a six month advance notice. In such an event, a reasonable plan of disengagement from the Collaboration will be negotiated through the RRB in cooperation with the IB.

19.2 Except for Articles 9, 10, 11 and 12 which are binding and which shall continue to bind each Institute after KM3NeT-phase1 is declared finished or after its withdrawal from the Collaboration, this MoU is not binding, it being understood however that, through their signature of this MoU, Parties recognize that the success of the Collaboration depends on each Institute adhering to its provisions.

ARTICLE 20 – Amendments/Addenda

20.1 This MoU may be amended at any time with the agreement of the Institutes, following approval by the IB by a 2/3 majority vote. Any such amendments will be subject to the agreement of the RRB.

20.2 All Addenda to this MoU form an integral part of it.

Annexes

- Annex 1** – List of Funding Authorities and names of their representatives in the Resource Review Board
- Annex 2** – List of Institutes in the KM3NeT-phase1 Collaboration and names of their representatives to the Parties
- Annex 3** – Present members of the KM3NeT-phase1 Collaboration by Country and Institute
- Annex 4** – Oversight, governance and management breakdown structure of the KM3NeT-phase1 project
- Annex 5** – Facilities of the KM3NeT-phase1 RI
- Annex 6** – Subsystems of the KM3NeT-phase1 Research Infrastructure
- Annex 7** – List of members of the Scientific and Technical Advisory Committee
- Annex 8** – Technical Participation of the Parties and Institutes in the KM3NeT-phase1 project
- Annex 9** – Implementation schedule and milestones
- Annex 10** – Definition of cost categories and Common Fund
- Annex 11** – Values of Deliverables and Commitments of the Parties
- Annex 12** – Publication Strategy and Conference Policy
- Annex 13** – User Access Policy
- Annex 14** – List of Acronyms

Annex 1 – List of Funding Authorities and names of their representatives in the RRB

With reference to Article 2 of the main text of the MoU, the Parties, at the time of this writing, are listed with their duly authorized representatives in the Resource Review Board.

Country	Party	RRB-Representative
France	CNRS	G. Chardin
Germany	FAU	U. Katz
Greece	T.B.D.	N.N.
Italy	INFN	A. Masiero
The Netherlands	FOM	F. Linde
Romania	MEN	V. Vulturescu
Spain	T.B.D.	N.N.

Annex 2 – List of Institutes in the KM3NeT-phase1 Collaboration and names of their representatives to the Funding Authorities

With reference to Article 2 of the main text of the MoU, the Institutes of the KM3NeT-phase1 Collaboration, at the time of this writing, are listed with the names of their representatives to the Funding Authorities. They form the Institute Board.

Country	Institute	Representative
Cyprus	University of Cyprus	P. Razis
France	IN2P3/APC	A. Kouchner
	IN2P3/CPPM	V. Bertin
	GRPHE	C. Racca
	IN2P3/IPHC	Th. Pradier
	IN2P3/LPC	P. Gay
	INSU-MIO	D. Lefevre
	INSU-DT	C. Gojak
Germany	University Erlangen/ECAP	R. Lahmann
	Remeis Observatory Bamberg	J. Wilms
	University Tübingen/Keppeler Centre for Astro and Particle Physics	A. Santangelo
	University Würzburg	M. Kadler
Greece	NCSR-D/INP	P. Rapidis
	HOU	S. Tzamarias
	University of Athens	E. Anassontzis
	Aristotle University Thessaloniki	A. Liolios
	Technological Education Institute of Pireaus	K. Zachariadou
Ireland	DIAS	F. Aharonian
Italy	INFN/University Bari	M. Circella
	INFN/University Bologna	A. Margiotta
	INFN/University Catania	S. Aiello
	INFN/University Genova	M. Taiuti
	INFN/LNS	P. Sapienza
	INFN/LNF	A. Martini
	INFN/University Napels	P. Migliozzi
	INFN/University Pisa	M. Morganti
	INFN/University La Sapienza	A. Capone
	University of Salerno/INFN Napoli Gruppo Collegato di Salerno	C. Bozza
INGV	P. Favali	
Netherlands	Nikhef/FOM	A. Heijboer
	Nikhef/University of Amsterdam	E. de Wolf
	Nikhef/Utrecht University	P. Kooijman
	Nikhef/Leiden University	D. Samtleben
	KVI/Groningen University	A. van den Berg
	NIOZ	H. van Haren

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Country	Institute	Representative
Romania	ISS	V. Popa
Spain	University Valencia/IFIC	J.J. Hernandez-Rey
	UPV	M. Ardid
UK	University Sheffield	L. Thompson

Annex 3 – Present Members of the KM3NeT-phase1 Collaboration by Country and Institute

With reference to Article 3 of the main text of the MoU, the members of the KM3NeT-phase1 Collaboration, at the time of this writing, are listed. They form the Collaboration.

CYPRUS

University of Cyprus, Nicosia, Cyprus:

P. Razis

FRANCE

APC, Université Paris Diderot, CNRS/IN2P3, CEA/IRFU, Observatoire de Paris, Sorbonne Paris Cité:

B. Baret, S. Baron, C. Champion, S. Colognes, A. Creusot, C. Donzaud, A. Kouchner, V. Van Elewycyk

CPPM, Aix-Marseille Université, CNRS/IN2P3, Marseille:

M. Ageron, V. Bertin, S. Beurthey, M. Billault, J. Brunner, J. Busto, L. Caillat, A. Cosquer, P. Coyle, J.-J. Destelle, D. Dornic, F. Gallo, S. Henry, P. Keller, P. Lamare, J. Royon, M. Solazzo, D. Tesier, S. Théraube

DT INSU (CNRS/INSU/DT INSU):

C. Gojak

LPC (CNRS/IN2P3, Université Blaise Pascal):

P. Gay

IPHC (CNRS/IN2P3/IPHC):

Th. Pradier

GRPHE (Université de Haute Alsace, IUT de Colmar):

A. Albert, C. Racca, D. Stubert-Drouhin

Mediterranean Institute of Oceanography (CNRS/INSU/MIO):

D. Lefevre

GERMANY

University of Tübingen, Tübingen:

J. Jochum, G. Pühlhofer, A. Santangelo

University of Würzburg, Würzburg:

D. Elsaesser, M. Kadler, K. Mannheim,

ECAP/University of Erlangen, Erlangen:

G. Anton, L. Classen, Th. Eberl, A. Enzenhöfer, F. Folger, T. Gal, K. Geyer, K. Graf, B. Herold, J. Hofestädt, J. Hößl, C. James, O. Kalekin, A. Kappes, U. Katz, R. Lahmann, J. Reubelt, R. Richter, Th. Seitz, D. Stransky, M. Tselengidou, S. Wagner

ECAP/Dr. Remeis Observatory Bamberg, Bamberg:

I. Kreykenbohm, J. Wilms

GREECE

Aristotle University Thessaloniki, Thessaloniki:

Ch. Eleftheriadis, A. Ioannidou, G. Kitis, A. Liolis, M. Manalopoulou, A. Nicolaidis, S. Stoulos, I. Tsiafis, K. Kostas, Ch. Petridou, I. Savvidis, S. Siskos

National and Kapodistrian University of Athens, Athens:

E. Anassontzis, K. Manopoulos, A. Manousakis-Katsikakis, L. Resvanis

NCSR-Demokritos, Athens:

A. Belias, E. Drakopoulou, Ch. Markou, P. Rapidis, D. Sampsonidis, I. Siotis, G. Stavropoulos, E. Tzamariudaki

HOU (Hellenic Open University):

G. Bourlis, N. Gizani, A. Leisos, D. Lenis, A. Tsirigotis, S. Tzamaras

University of Patras, Patras:

A. Birbas

Aegean University:

K. Papageorgiou

Technological Education Institute of Piraeus, Piraeus:

K. Zachariadou

University of Patras, Patras:

B. Christopoulou, A. Papaikonomou

IRELAND

DIAS The Dublin Institute for Advanced Studies:

L. Drury, F. Aharonian

ITALY

Dipartimento Interateneo di Fisica "Michelangelo Merlin" ed INFN - Sezione di Bari (Bari):

E. Barbarito, A. Ceres, M. Circella, M. Michelangelo, M. Mongelli, I. Sgura

Dipartimento di Fisica dell'Università ed INFN - Sezione di Bologna (Bologna):

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Dipartimento di Fisica dell'Università ed INFN - Sezione di Genova (Genova):

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INGV, Rome:

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INFN – Laboratori Nazionali Frascati, Frascati:

R. Habel, A. Martini, L. Trasatti

INFN/University of Naples, Naples:

G. Barbarino, F.C.T. Barbato, G. De Rosa, N. Deniskina, F. Garufi, P. Migliozzi, C. M. Mollo, D. Vivolo

Dipartimento di Fisica dell'Università ed INFN - Sezione di Pisa (Pisa):

S. Bianucci, F. Raffaelli

Dipartimento di Fisica dell'Università "La Sapienza" ed INFN - Sezione di Roma (Roma):

F. Ameli, V. Bouché, A. Capone, G. De Bonis, P. Fermani, R. Masullo, C. A. Nicolau, Ch. Perrina, F. Simeone

University of Salerno/INFN Napoli Gruppo Collegato di Salerno:

C. Bozza, G. Grella

THE NETHERLANDS

Nikhef, Amsterdam:

H. Band, E. Berbee, A. Berkien, H. Boer Rookhuizen, M. Bouwhuis, D. Gajana, M. Gebyehu, E. Heine, A. Heijboer, M. van der Hoek, P. Jansweijer, M. de Jong, G. Kieft, E. Koffeman, H. Kok, J. Koopstra, A. Korporaal, T. Michael, H. Peek, J-W. Schmelling, J. Steijger, P. Timmer, V. van Beveren, J. Vermeulen, P. Werneke, L. Wiggers

KVI, Groningen University, Groningen:

A.M. van den Berg, M.A. Hevinga, H. Löhner, R.H.L. van Wooning

University of Amsterdam, Amsterdam:

R. Bruijn, E. de Wolf

Leiden University, Leiden:

R. Bormuth, D. Samtleben

Utrecht University, Utrecht:

P. Kooijman

NIOZ (Royal Netherlands Institute for Sea Research):

H. van Haren

ROMANIA

Institute of Space Sciences, Bucharest:

L. Caramete, O. Maris, G. Pavalas, V. Popa

SPAIN

UPV, Gandia - Valencia:

M. Ardid, J.A. Martínez-Mora, M. Saldaña

IFIC, CSIC – UVEG, (Valencia, Spain):

D. Calvo, J-J. Hernandez-Rey, D. Real, J.D. Zornoza, J. Zúñiga

UK

University of Aberdeen, Aberdeen:

M. Priede

Sheffield University, Sheffield:

L. Thompson

Annex 4 – Oversight and organizational structure of the KM3NeT-phase1 project

The oversight and organizational breakdown of the KM3NeT-phase1 project is structured according to the chart in Figure 1.

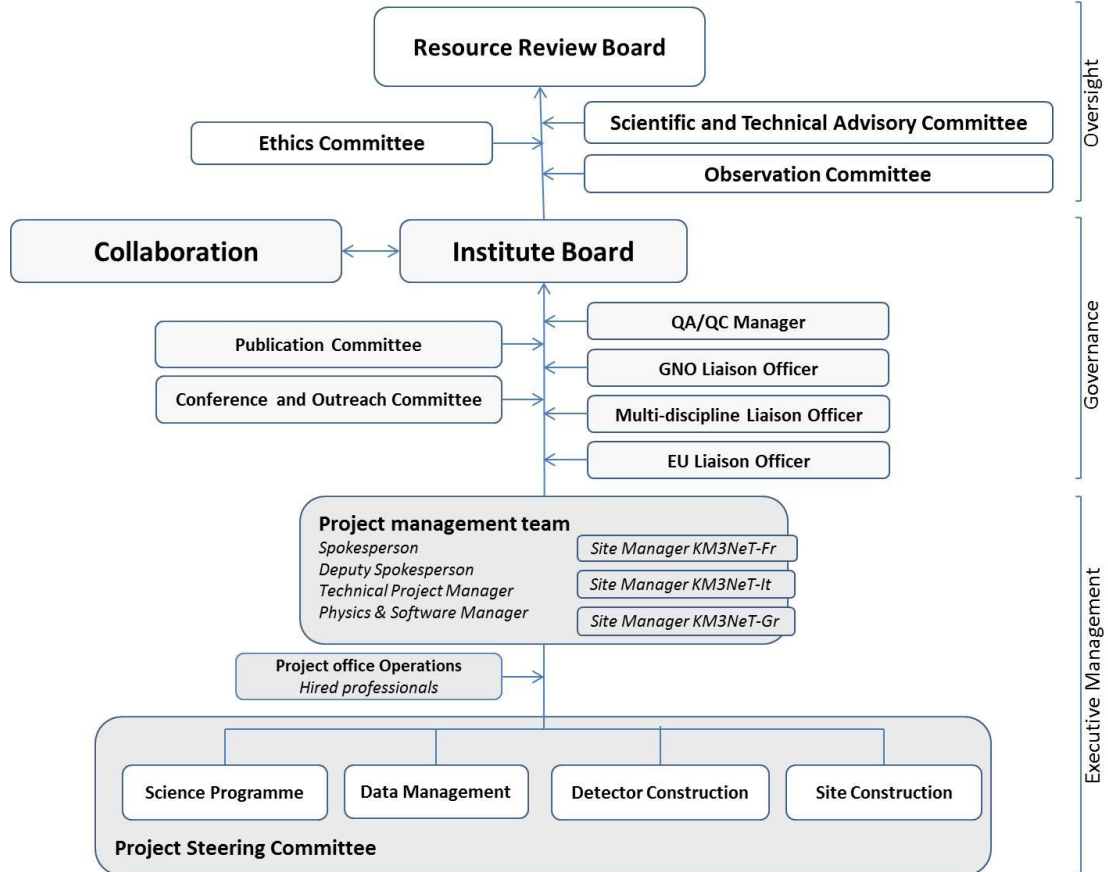


Figure 1 Oversight, Governance and Management Breakdown of the KM3NeT-phase1 project.

4.1 Collaboration

The composition of the Collaboration is described in Article 3 of the MoU main text. All physics and technical issues related to the KM3NeT-phase1 RI, as well as the strategy of component validation and engineering and construction, installation, commissioning and operation of the RI are discussed during Collaboration meetings. Each year there shall be a number of ordinary collaboration meetings decided at the end of the previous year.

4.2 Resource Review Board

The composition and charges of the Resource Review Board (RRB) are described in Article 5 of the MoU main text. The RRB is the body for oversight of the KM3NeT-phase1 organization and of the financial management of the KM3NeT-phase1 project. It approves major scientific decisions implicating resources and ethical issues related to construction, operation and decommissioning the KM3NeT-phase1 Research Infrastructure. After an evaluation of the Observation Committee, the RRB endorses observational campaigns and experiments of scientists outside the Collaboration. The RRB endorses measures addressing recommendations of the Ethics Board. The RRB is assisted by the external Scientific and Technical Advisory Committee.

4.3 Scientific and Technical Advisory Committee

The charges of the Scientific and Technical Advisory Committee (STAC) are described in Article 6 of the MoU main text. The STAC is nominated by the RRB. The STAC evaluates both the science progress and technical solutions and formulates recommendations for the Collaboration. The STAC proposes

the membership of the Observation Committee. The STAC is assisted by the Ethics Board. The STAC reports to the RRB and gives advice to the IB.

4.4 Observation Committee

The RRB installs an Observation Committee (OC) of which the charge is to evaluate proposals for observational campaigns and experiments using the KM3NeT-RI by scientists that are not a member of the Collaboration. The Collaboration will reserve about 50% of the available observation slots (i.e. of the corresponding online computing resources) for its own priority science purposes. Proponents of accepted proposals will have free access to all data related to their proposal. Rules for user access are defined in Annex 12. The STAC is charged to nominate membership of the Observation Committee. The Observation Committee reports to the RRB and the IB.

4.5 Ethics Board

The Collaboration will adhere to all relevant national and international rules and regulations regarding the environment, during construction, operation and decommissioning of the infrastructure. The RRB will install an Ethics Board (EB) to actively review and monitor the compliance with these rules and any other ethical issues related to the construction, operation and decommissioning of the KM3NeT-phase1 Research Infrastructure. The Ethics Board reports to the RRB and the IB.

4.6 Institute Board

The composition and charges of the Institute Board (IB) are described in Article 7 of the MoU main text. All Collaboration decisions are formally made by this body. The IB is convened by its Chairperson as frequently as required, but at least on the occasion of each Collaboration meeting. The possibility is foreseen of institutes participating in the IB as observers without voting rights. Members of the Collaboration or members of other institutes may be invited to IB meetings. The tasks of the IB are:

- The IB monitors the major technical, financial and strategic issues related to the validation and engineering of components and construction, installation and operation of the KM3NeT-phase1 RI to ensure that the scientific objectives are being met. Technical decisions requiring prompt actions may be made by the project management team as described in this Annex 4 and ratified by the IB. Prompt communication of such decisions must be given to all members of the IB.
- The IB guides and governs the scientific programme of the Collaboration and the strategies for publications, conference contributions and communication.
- The IB elects the Spokesperson (SP), the Deputy Spokesperson (DSP), the Technical Project Manager (TM) and the Physics and Software Manager (PSM) for a two year term of office with the option for one additional two year term.
- The IB endorses and ratifies the appointment of managers and coordinators for specific tasks as proposed by the SP.
- The IB decides on the admission of a new Institute or Party to the Collaboration.
- The IB reports to the Collaboration and the RRB.

4.7 GNO Liaison Officer

The IB installs a GNO Liaison Officer who will be charged to establish and maintain a firm link with the community of the Global Neutrino Observatory and in particular the ANTARES Collaboration with the objective to (i) jointly attract, train and educate younger scientists in neutrino astroparticle physics in an international environment; (ii) establish a bilateral program for exchange of junior staff members; (iii) jointly represent the community of neutrino astroparticle physics using a telescope in the Mediterranean sea; (iv) have joint meetings to share results and expertise; (v) share technical facilities where and whenever useful, appropriate and to the benefit of both Collaborations. The GNO Liaison Officer reports to the IB and the Collaboration.

4.8 Multi-discipline Liaison Officer

The IB installs a Multi-discipline Liaison Officer with the charge to actively explore the interest for usage of the KM3NeT-phase1 research infrastructure by scientists which are not a member of the KM3NeT Collaboration. In particular, the contribution of the KM3NeT-RI to the multi-messenger observation of the Universe and to the field of neutrino particle physics shall be addressed by this officer. Proposals for use of the KM3NeT RI resulting of these explorations must be directed to the Observation Committee for review.

4.9 EU Liaison Officer

The IB installs an EU Liaison Officer to establish and maintain the link with the bodies and programmes of the ERA relevant for the KM3NeT-RI, in particular those of ESFRI.

4.10 QA/QC manager

The QA/QC manager (QM) is appointed by the IB to coordinate and supervise the QA/QC procedures for the construction and operation of the KM3NeT RI. The QM shall monitor the conformity of the detector components at the production sites. The QM is explicitly invited to all meeting of the Project Management Team and those of the Project Steering Committee (SC). The QM reports to the Collaboration, the IB and the RRB.

4.11 Publication Committee

A Publication Committee (PC) is set up by the IB as described in Annex 12.

4.12 Conference and Outreach Committee

A Conference and Outreach Committee (COC) is setup by the IB as described in Annex 12.

4.13 Project Management Team

The Project Management Team (MT) is the central executive body for the implementation and operation of the KM3NeT-phase1 project. The MT consists of the SP, DSP, TM and PSM and the Site Managers (SMs), working on full-time bases for the KM3NeT-phase1 project. The MT takes the overview of all aspects of the KM3NeT-phase1 project, of which the details of the organizational breakdown structure is shown in figure 1 and 2. The MT is assisted by a Project Office at the Headquarters of KM3NeT-phase1. The MT has the following tasks:

- The MT takes the overview of validation, engineering and integration of components, construction, installation, commissioning of the KM3NeT-phase1 RI.
- The MT administrates the construction and operation budgets.
- The MT establishes the quality control and safety procedures, steers the early involvement of industry where needed and possible and liaise with Institutes to use their infrastructure and expertise.
- The MT takes the overview of the effort of the Collaboration in the areas of neutrino physics analysis, simulation software development and production, event reconstruction software development and production, signal calibration and data storage and distribution.
- The members of the MT are ex-officio members of all internal executive committees and expert working groups.
- The MT reports to the IB.

Spokesperson

The Spokesperson (SP) chairs the MT and is responsible for the execution of the tasks of the MT as defined above and reports to the IB and the RRB. The SP has the oversight of all day-to-day activities in the KM3NeT-phase1 project. Specific tasks of the SP are:

- The SP arranges and chairs the Collaboration meetings.
- The SP represents the Collaboration in matters of cooperation with other neutrino telescopes or Research Infrastructures, interaction with the scientific community or the general public.
- The SP actively searches for additional Parties and/or Institutes to join the Collaboration.
- The SP supervises access to the data of the neutrino detectors of the KM3NeT-phase1 RI by non-Collaboration members.
- The SP presents a written annual progress report to the Collaboration and the IB.
- The SP nominates persons to be installed by the IB for the position of coordinator of specific tasks or convenor of specific working groups of experts.
- The SP chairs the Project Steering Committee.

Deputy Spokesperson

The Deputy Spokesperson (DSP) replaces the SP where and whenever needed. The SP and DSP define sharing of tasks among themselves.

Technical Project Manager

The Technical Project Manager (TM) is the technical project leader of KM3NeT-phase1. The TM directs a technical project coordination team with competences in system engineering, quality control and risk management and legal and administrative issues, logistics and procurement. Specific tasks of the TM are:

- The TM directs the validation, engineering and integration of components of the KM3NeT-phase1 detectors.
- Together with the SP, TM prepares and administers the construction and operation budgets.
- The TM organises production readiness reviews, establishes procurement specifications, industrial relations and internal system qualification and integration reviews.
- Together with the SMs, the TM supervises the deployment and connection of detection units at the Installation Sites.
- The TM ensures compatibility of ESS instruments with KM3NeT operation.

Physics and Software Manager

The Physics and Software Manager (PSM) directs a scientific coordination team with competences in scientific simulations, reconstruction and data analysis algorithms in particular in the field of neutrino astroparticle physics. Specific tasks of the PSM are:

- The PSM directs the execution of the scientific programme of the Collaboration.
- The PSM maintains a database with internal KM3NeT reports and KM3NeT PhD theses.
- The PSM directs the development of Collaboration software tools for calibration, simulation, reconstruction and data access.
- The PSM directs the production of and access to simulated and reconstructed data.
- The PSM directs the scientific programme for the next phase of KM3NeT with an instrumented volume of several cubic kilometres.
- The PSM presents a written annual science and software plan to the Collaboration and the IB.

Site Managers

The Site Managers (SMs) are the project leaders responsible for the KM3NeT activities at the Host Institutes. These include the installation at the respective Installation Sites of a seafloor network and a shore station infrastructure compliant with the requirements for connection of KM3NeT neutrino detectors and instrumentation for ESS. The SMs are responsible for the sea operations required for the deployment and connection of the detection units of the neutrino detectors in KM3NeT-phase1 at the respective Installation Sites.

4.13 Project Office Operations

The MT is supported by a Project Office at the Headquarters of the KM3NeT-phase1 project. The office shall deliver support in the field of project management, such as financial and human resource management, budget preparation and control, maintenance of data bases with vital project information, maintenance of the project schedule, organization of meetings etc. The personnel of the office is hired on project basis, financed from the Common Fund.

4.14 Project Steering Committee

The Project Steering Committee (SC) is composed of the coordinators of the subtask as defined by the MT and endorsed by the IB. The SC shall meet as frequently as necessary and possibly once per month. In general, technical issues will be presented to and discussed by the full Collaboration during the regular meetings. Only decisions regarding major technical aspects will be considered by the SC and the IB. Most decisions will be made by the coordinators shown in the project breakdown structure and the members of their teams. The composition of the SC shall evolve following the progress of the construction and operation of the KM3NeT-phase1 RI.

Annex 5 – Facilities of the KM3NeT-phase1 RI

Headquarters

In preparation of the establishment of KM3NeT as an ERIC, a Headquarter with a Project Office will be setup in Amsterdam to support the Project Management Team in the field of project management, QA/QC, organizing meetings and financial and human resource management. The Headquarters will be partially financed from the Common Fund.

Installation Sites and Host Institutes

The KM3NeT-phase1 RI is a distributed RI with several locations in the Mediterranean Sea. These Installation Sites are:

1. **KM3NeT-Fr** is located about 40 km off the coast of Toulon in the South of France at a depth of about 2500 m. The seafloor network will be connected with a main electro-optical cable to shore. The shore station is located in La Seyne sur Mer. The Host Institute is the CPPM institute of IN2P3/CNRS and Université Aix-Marseille. The KM3NeT-Fr infrastructure is financed by the KM3NeT-MEUST project.
2. **KM3NeT-It** is located about 100 km off the coast of Sicily, Italy at a depth of about 3400 m. The seafloor network is connected with a main electro-optical cable to shore. The shore station is located in Porto Palo di Capo Passero. For connection of the KM3NeT Detection Units the off-shore cable end will be extended. The Host Institute is the LNS institute of INFN. The KM3NeT-It infrastructure is financed by the KM3NeT-Italia PON project. In addition to the KM3NeT-phase1 neutrino telescope, the KM3NeT-It deep-sea infrastructure also comprises a number of tower structures for neutrino detection. These tower structures will be independently built and operated. Whenever possible and appropriate, the results from the analyses of the KM3NeT-phase1 data and the data from the tower structures will be presented in combination.
3. **KM3NeT-Gr** is located off the coast of Pylos. A suitable installation site is available to expand the KM3NeT Research Infrastructure for phase2. This expansion is subject to future funding.

Computing and Data centre

The central computing and data centre (**KM3NeT-CC**) with services for the construction and operation of the KM3NeT-phase1 RI will be set up at the Centre de Calcul de l'Institut National de Physique Nucleaire et de Physique des Particules (CC-IN2P3) in Lyon, France. The use of additional computer centres will be considered whenever appropriate.

Annex 6 – Subsystems of the KM3NeT-phase1 Research Infrastructure

The KM3NeT-phase1 RI comprises the following major subsystems:

1. KM3NeT-Detection Units (KM3NeT-DUs) described in the KM3NeT TDR as the flexible string with multi-PMT Digital Optical Modules (DOMs). The KM3NeT-DU consists of a structure of two parallel ropes supporting 18 DOMs, a Vertical Electro-Optical Backbone Cable (VEOC) running the full length of the DU, a buoy and an anchor with an electronics base container and cable for connection with the seafloor network. Each KM3NeT-DOM consists of a pressure resistant 17 inch glass sphere housing 31 photomultipliers of 3 inch diameter, calibration instrumentation, readout electronics and power electronics and an optical line terminator for connection to the electro-optical seafloor network.
2. KM3NeT-Calibration Units (KM3NeT-CUs) with instrumentation for calibration of the neutrino detector.
3. KM3NeT-Instrumentation Units (KM3NeT-IUs) with instrumentation for Earth and Sea Science research.
4. Shore and deep-sea infrastructures:
 - a. KM3NeT-Fr Installation Site: The seafloor network has the ring geometry described in the KM3NeT TDR with one main electro-optical cable (MEOC) to shore with 36 fibres and one node for connection with the capacity for connection of at least 20 KM3NeT-DUs, 2 KM3NeT-CUs and 1 KM3NeT-IU. During KM3NeT-phase1, 7 KM3NeT-DUs, 1 KM3NeT-CU and 1 KM3NeT-IU will be connected. The capacity of the MEOC allows for future extension of the seafloor infrastructure with up to three nodes. The shore infrastructure comprises facilities to power the subsea detectors, a shore station with control room and an interconnecting cable between these two facilities. For control and operation of the subsea detectors, the control room comprises a computer farm and storage facilities for on-line processing and storage of the data. The control room is connected to the KM3NeT data and computing centre via a high bandwidth connection to the internet.
 - b. KM3NeT-It Installation Site: The seafloor network has the star geometry as described in the KM3NeT TDR with a main electro-optical cable (MEOC) to shore with 20 fibres and two Secondary Junction Boxes (SJBs) for connection of in total 24 KM3NeT-DUs, 4 KM3NeT-CUs and 1 KM3NeT-IU. The shore infrastructure comprises facilities to power the subsea detectors and a shore station with a control room. The shore station comprises the same facilities as that for KM3NeT-Fr.
 - c. KM3NeT-Gr Installation Site: At present, it is used for validation and qualification. A new seafloor network should be deployed for phase2 of the KM3NeT Research Infrastructure. A shore station is available which requires new facilities for power and computing.
5. A fleet of vessels and ROVs either proprietary or by company contract with dedicated tooling installation or recovery of components of the KM3NeT-RI.
6. Services of the KM3NeT computing and data centre comprising software systems for simulations, event reconstruction, data bases and a data archive.
7. Services of the project office comprising support for accounting, organization of Collaboration meetings, maintenance of the public KM3NeT website, press releases and providing open access to scientific data.

Annex 7 – List of members of the Scientific and Technical Advisory Committee

With reference to Article 6 of the main text of the MoU, the members of the STAC, at the time of this writing, are listed.

STAC member	Affiliation
G. Bignami	Instituto Nazionale di Astrofisica (INAF), Italy
P.O. Hulth	Stockholm University, Sweden
V. Lykousis	Hellenic Centre for Marine Research (HCMR), Greece
P. Mantsch	Fermilab (FNAL), USA
G. Massion	Monterey Bay Aquarium Research Institute (MBARI), USA
E. Resconi	Technical University of Munich (TUM), Germany
S. Sarkar	Oxford University, UK
C. Spiering	DESY, Germany
M. Spiro (chair)	IN2P3/CNRS, France
G. v.d. Steenhoven	University of Twente, The Netherlands

Annex 8 – Technical Participation of the Parties and Institutes in the KM3NeT-phase1 project

The technical participation of the Parties and Institutes in the KM3NeT-phase1 project is shown in Table 1. PBS numbers refer to the PBS for KM3NeT-phase1 project of October 2013. Financial contributions are shown in Annex 10.

PBS number	Subsystem Description	IN2P3	INSU	INFN	INGV	FOM	NIOZ	ISS	ECAP	IFIC	NCSR-D	HOU
1	Onshore infrastructure											
1.1	Shore Station											
1.1.1	Civil infrastructure	X ²		X ³								
1.1.2.1	Telescope DAQ hardware			X		X						
1.1.2.2	Telescope DAQ software			X		X			X	X	X	
1.1.3	ESS DAQ and processing	X ²	X	X								
1.1.4	RI-Monitoring, Control, Configuration	X ²		X		X			X	X		
1.1.5.1	Onshore Optical network components					X						
1.1.5.2	Electrical shore station					X				X	X	
1.1.6	Access and Security Service	X ²		X ³								
1.1.7	Main power system	X ²		X ³								
1.2	Power feed station	X ²		X ³								
1.3	Onshore interconnection cable	X ²		X ³								
2	Seafloor network											
2.1	Link sea-shore	X ²		X ³								
2.2	Inter-node/JB link (Fr) or PJB-SJB link (It)	X ²		X ³								
2.3	JB/Node or PJB/SJB	X ²		X ³								
3	Detection Unit											
3.1	Interconnection cable	X ²		X ³								
3.2	DU base and anchor	X ²		X ³		X	X					
3.3	VEOC					X						
3.4	DOM											
3.4.2	Lens, PMT, PMT-base			X		X			X			
3.4.3	CLB, Octopus, Power Board, OLT			X		X				X		
3.4.4	Nano-beacon, Compass, Tilt-meter, Acoustic-Piezo			X					X		X	
3.5	Top buoy system					X	X					
3.6	DOM mechanical support					X	X					
4	Calibration and ESS instrumentation											
4.1	Interconnection cable	X ²		X ³								
4.2	Calibration Unit	X ²		X ³								
4.2.1	CU base	X ²		X ³								
4.2.2	CU instrumentation	X ²		X						X	X	
4.3	ESS IU		X ²		X ³		X					
5	Sea operation system	X ²		X								
6	Production and Assembly											
6.1	Logistics	X ²		X ³		X						
6.2	Acceptance/Calibration test setups	X		X		X						
6.3	Junction Box production	X ²		X ³								
6.4	CU production	X ²		X ³								
6.5	DOM production			X		X			X			
6.6	DU production	X ²		X		X						
7	RI Operation	X		X								
8	Data and Computing centre	X		X		X			X			
8.1	Reconstruction software and production	X		X		X		X	X	X	X	X
8.2	Simulation software and production	X		X		X		X	X	X	X	X
8.3	Calibration DB, Detector components DB	X		X		X		X				X
8.4	Data archive	X		X								
9	QA/QC support	X		X		X						
10	Headquarters project office											
10.1	Personnel/Contractor					X						
10.2	Office					X						
11	Maintenance	X		X		X						
12	Validation and upgrade projects											
12.1.1	PPM-DOM	X		X		X			X	X	X	
12.1.2	PPM-DU	X		X		X	X		X	X	X	X
12.2	Component upgrade	X		X		X	X	X	X	X	X	

Table 1 Technical participation of the Parties and Institutes in the KM3NeT-phase1 project

² Earmarked for KM3NeT-Fr

³ Earmarked for KM3NeT-It

Annex 9 – Implementation schedule and milestones

KM3NeT-Fr Installation Site

Milestones for the construction of the KM3NeT-Fr Installation Site are as follows:

- Power station with transformer and UPS	September	2013
- MEOC delivery	November	2013
- MEOC deployment	June	2014
- Node design ready	September	2013
- Start integration first node	January	2014
- Deployment and connection first node	June	2014
- KM3NeT-Fr ready for connection of DU/CU	Summer	2014

KM3NeT-It Installation Site

Milestones for the construction of the KM3NeT-It Installation Site are as follows:

- Design of network ready	December	2013
- Deployment and connection of first and second SJB	Summer	2014
- KM3NeT-It ready for connection of DU/CU	Summer	2014

KM3NeT-Gr Installation Site

- At present, the site is operated as qualification and validation site.

DU validation and production

- PPM-DOM connected to ANTARES	April	2013
- PPM-DU deployed and connected at KM3NeT-It	March	2014
- Start DOM integration for engineering DU (DU1)	May	2014
- DU1 deployed and connected at KM3NeT-Fr	October	2014
- Start DOM production for DU2-DU31	September	2014
- Start DU production and installation at KM3NeT-It ⁴	Autumn	2014
- Start DU production and installation at KM3NeT-Fr ⁴	Spring	2015

CU production

- Design ready	December	2013
- Start CU production and installation at KM3NeT-It ⁴	Autumn	2015

Instrumentation Unit (IU)

- Design ready	December	2013
- IU installation at KM3NeT-Fr	Autumn	2014

RI-control and operation

- RI-control system ready in the laboratory	Spring	2014
- RI-control system installed at the Installation Sites	Summer	2014

RI construction

- KM3NeT-Fr construction completed	end	2016
- KM3NeT-It construction completed	end	2016

⁴ The DUs and CUs funded by the Parties associated to the Installation Sites will be deployed on their respective Installation Sites.

Annex 10 – Definition of cost categories and Common Fund

Budget headings

Following the highest level headings in the PBS for KM3NeT-phase1, the financial resources for KM3NeT-phase1 are grouped into the following budget headings:

Budget nr.	Description	PBS nr.
1	Engineering, construction and installation of the shore infrastructures at the Installation Sites of the KM3NeT-phase1 RI	1
2	Engineering, construction and installation of the seafloor infrastructures at the Installation Sites of the KM3NeT-phase1 RI	2
3	Engineering and construction of components for Detection Units (DUs)	3
4	Engineering and construction of components for Calibration Units (CUs)	4
5	Sea operations and tools for installation of KM3NeT-DUs, CUs and IUs	5
6	Production of DOMs, DUs, CUs including tooling, test benches and logistics	6
7	Control and operation of the Research Infrastructure excluding data processing and data storage at the data and computing centre	7
8	Computing and data storage at the Data Centre, including off-line processing software and production, database systems, data archiving and simulation software and production	8
9	Cost related to QA/QC procedures of the KM3NeT-phase1 project	9
10	Cost for the activities of the STAC and the Project Office at the headquarters of KM3NeT-phase1 project	10
11	Maintenance of the KM3NeT-phase1 RI	11
12	Cost for R&D and validation for the KM3NeT-phase1 RI	12
13	Engineering and construction of ESS Instrumentation Units (IU)	4

Table 2 Budget headings of KM3NeT-phase1.

Expenditures arising from the agreement in Annex 7 are the responsibility of the Institutes supported by their respective Funding Authority. It is the responsibility of the IB supported by the project management team and the project office to monitor these expenditures at the highest level and report annually to the RRB.

Costs for local overhead for technical resources and cost for personnel, travel etc. of the Institutes as arising from their participation in the Collaboration are the responsibility of the Institutes supported by their respective Funding Authority. These resources are neither accounted for in the construction of the KM3NeT-RI nor monitored by the Collaboration.

Common Fund

A Common Fund will be established for budgeting and accounting of those activities that can be identified as common projects. The IB and the project management team have the responsibility for the annual budget and accountancy of the Common Fund after endorsement by the RBB.

The common projects may include:

- Support of the activities of the STAC such as cost related to its meetings (budget nr. 10);
- Central services for the setup and execution of the QA/QC for KM3NeT-phase1 (budget nr. 9);
- Services of the Project Office at the KM3NeT-phase1 headquarters such as support for accounting and organization of Collaboration meetings (budget nr. 10);
- Sea operations for installation of DUs and CUs (budget nr. 5);
- Maintenance of the KM3NeT-phase1 RI (budget nr. 11);
- Providing open access to scientific data;

Parties and Institutes contribute to the Common Fund annually as agreed in Annex 11.

Annex 11 – Values of Deliverables and Commitments of the Parties and the Institutes

Overview of cost distribution for KM3NeT-phase1

In Table 3 the financial contribution and commitments of the Parties and Institutes for engineering, construction and installation of the KM3NeT-phase1 Research Infrastructure as described in Annex 5, 6 and 8 are summarized. Contributions are specified in 2013 €.

Budget nr.	Party	CNRS	INFN	FOM				Total	Common Fund allocated
	Institute				NCSR-D	ECAP	IFIC		
	Country contribution	Fr	It	NL	Gr	De	Es		
		[k€]	[k€]	[k€]	[k€]	[k€]	[k€]	[k€]	[k€]
1	Construction KM3NeT-Fr shore infrastructure	530		150				680	
2	Construction KM3NeT-Fr seafloor infrastructure	4,170						4,170	
1	Upgrade KM3NeT-It shore infrastructure		1,000	305				1,305	
2	Upgrade KM3NeT-It seafloor infrastructure		6,500					6,500	
12	Construction PPM-DU		48	226	25	14	3	316	
3	Construction engineering DU (DU1)	180		469		36	14	699	
3	Construction DU2-DU25		5,804	2,047				7,851	
3	Construction DU26-31	70		2,054		30		2,154	
4	Construction CU1 KM3NeT-Fr	50		50				100	
4	Construction CU2-CU5 KM3NeT-It		400					400	
13	Construction IU1 KM3NeT-Fr	1,000						1,000	
13	Construction IU2 KM3NeT-It		800					800	
5	Installation DUs and CUs KM3NeT-Fr	300		150				450	
5	Installation DUs, CUs and IU KM3NeT-It		1,500	450				1,500	
6	DOM assembly for KM3NeT-phase1 RI		100	50		58		208	
6	DU integration for KM3NeT-phase1 RI	50	50	50				150	
7	Control and operation KM3NeT-phase1 RI							p.m.	
8	Computer Centre services KM3NeT-phase1 RI							p.m.	
10	Project office KM3NeT-phase1 RI								25
11	Maintenance KM3NeT-phase1 RI							p.m.	
12	R&D for KM3NeT-phase1 RI	650	400	2,700				3,750	
9	QA/QC for KM3NeT-phase1 RI								75
10	STAC for KM3NeT-phase1 RI								25
	Common Fund contribution KM3NeT-phase1 RI	150	150	150				450	
	Total KM3NeT-phase1 RI	7,150	16,752	8,401	25	138	17	32,483	
	<i>Total Common Fund allocated</i>								125

Table 3 Summary of the financial contributions of Parties and Institutes to engineering, construction and installation of KM3NeT-phase1.

KM3NeT-phase1 RI-operation and maintenance

Costs for the operation and maintenance of the KM3NeT-phase1 RI have not been evaluated in detail yet, but is estimated at the level of 2-3% of the total investment cost.

Annex 12 – Publication strategy and Conference Policy

Publication Committee

A Publication Committee (PC) is set up by the IB to organize the writing of paper for refereed journals following the rules for publication attached to this Annex 12. The members of the PC shall be appointed by the IB on the basis of specific competences without consideration to their parent Institute. Specific tasks of the PC are:

- The PC shall maintain the list of authors provided by the Institutes on the basis of the regulations approved by the Collaboration.
- The PC shall maintain the list of publications and a database with official plots, drawings and numerical results approved by the Collaboration for use outside the Collaboration.
- The PC shall review publications in proceedings of conferences and workshops.

The PC reports to the Collaboration and the IB.

Procedure for publications in refereed journals:

The procedure for publications in refereed journals is as follows:

- Members or groups of members having worked on a specific item and wishing to publish will write an internal report on the subject and submit it to the attention of the PC. These will be referred to in the following as “authors”.
- The PC will discuss the subject and, should it be considered a valid starting point for a publication, will appoint a small subcommittee (Editorial Committee), including at least one of member of the PC and a few Collaboration members external to the PC, chosen on the basis of their specific competence in the field.
- The PC appoints a principal author or editor and an internal contact person.
- The Editorial Committee may in simple cases just consist of the principle author.
- The Editorial Committee will interact with the authors in defining the layout of the paper and in the subsequent writing process. The actual writing process will be carried out by the authors.
- The principle author organizes the drafting process and reports to the PC concerning progress.
- The contact person adopts a special role in critically and constructively following the preparations of the paper and reports in the PC on the status.
- A draft approved by the Editorial Committee is circulated in the PC to check for general approval and with the request for comments. The draft should be complete and include the title, abstract, the intended author list as well as the name of the proposed journal.
- The Editorial Committee takes care of the received comments and prepares a new draft. If there are drastic changes the new version is circulated again.
- The paper, once finalised and approved by the PC, will be circulated in the Collaboration by the principle author for comments/suggestions.
- Once a reasonable period of time has elapsed (15 days approx.), the PC will appoint a reading session of the paper at which, paragraph after paragraph, the PC will approve or modify the paper and/or the changes proposed by the Collaboration. The authors, and possibly also the Editorial Committee members external to the PC, shall attend this reading session.
- The manuscript, as approved in the reading session, will be submitted for publication by the principle author and the Collaboration will be notified.
- The principle author will take care of comments by the editors of the journal.
- Once the paper has been accepted/rejected by the journal, the principle author informs the Collaboration.

Procedure for publications in conference proceedings:

The procedure for publication in conference proceedings is as follows:

- On request of the COC, the PC assigns a contact person for the conference paper prior to the start of the conference or prior to the deadline for contributions, whatever comes first.
- The speaker and the people directly involved in the work presented prepare a draft of the paper, that is sent to the PC contact person by the speaker for reviewing.

- A draft approved by the PC contact person is circulated by the speaker in the PC for endorsement.
- A draft approved by the PC is circulated by the speaker in the Collaboration.
- Once a reasonable period of time has elapsed (1 week approx.), the speaker submits the paper to the editors of the conference.

Publication Categories

Different categories of publications in refereed journals are foreseen to which different rules apply. The PC decides on the categories of papers. The different categories of publications envisaged are:

General journal papers

These are refereed journal papers on physics results or on main instrumentation. The general author list as described above is used.

Technical or specialized papers

These describe technical equipment or methods of a specialized nature. Only people directly involved in the described work are supposed to sign them.

Conference proceedings

These are papers refereed by the responsible editors of the conference. Only the speaker and people directly involved in the described work are supposed to sign them with the phrase 'On behalf of the KM3NeT Collaboration'. In case of a plenary overview talk, the contribution to the conference proceeding is signed only by the speaker with the phrase 'On behalf of the KM3NeT Collaboration'.

General rules of membership and authorship

Based on information from the representatives of the participating institutes the Executive Management maintains the 'Collaboration Names List' with their date of entry (and exit if applicable) of the members of the Collaboration. Authorship for Collaboration publications is given *by default* to members of the Collaboration with a contribution in at least one of the following ways:

- preparation of the experiment,
- runtime operation, shifts, etc.,
- execution or supervision of analysis work,
- hardware or software maintenance,
- other work to be judged by the PC or the IB.

Members of the Collaboration can be authors starting at the date of their entry, and ending twelve months after they have left the Collaboration. The IB can decide underpinned with written arguments to add, delete or replace author names for a specified period or for specific publications, thereby deviating from the default list. An author may also withdraw for a specific publication.

For each publication the Project Management Team can request the IB to allow the signature of the publication by one or more authors who are not a member of the Collaboration. The request for endorsement by the IB must be accompanied by a written report describing the credentials and the unique contribution to the publication of each proposed author.

The authors for general publications are listed alphabetically by name. Deviations from this rule can be defined by the Project Management Team for individual publications and need to be approved by the IB.

Rules for Earth and Sea Sciences papers

For publications concerning data from an 'Earth and Sea Sciences' instrument installed in the KM3NeT-phase1 RI, the author list may be different, but shall obey the following rules:

- It is the task of the PC to classify a publication as an Earth and Sea Science publication.
- All papers must be approved by the PC and be made available for public scrutiny by the full Collaboration before submission for publication.

- Earth and Sea Science papers may be authored by a restricted author list with prioritized order. Acknowledgement of the full Collaboration must be included. If the principal author wishes he/she may invite the full collaboration to sign, in which case the order will be alphabetical.
- In case of problems in the implementation of these rules the IB will decide through an IB vote.

Conference and Outreach Committee

A Conference and Outreach Committee (COC) is setup by the IB to actively coordinate the presentation of the KM3NeT-phase1 project at relevant international scientific conferences and coordinate outreach activities of the Collaboration.

The members of the COC will be appointed by the IB on the basis of specific competences without consideration to their parent Institute. One of the members of the COC shall act as the chair of the committee. The COC reports to the Collaboration and the IB.

The tasks of the COC are:

- The COC actively identifies conferences, workshops and international technical meetings of possible relevance for the Collaboration.
- The COC assigns speakers for such conferences and workshops and reviews the content of abstracts, talk material prior to submission following the COC rules attached to this Annex.
- The COC request the PC to assign a contact person for the reviewing process of the paper for conference proceedings prior to the start of the conference or prior to the deadline for submission, whatever comes first.
- The COC maintains a list of conferences, a data base of assignments and a data base with information provided by the Institutes about competences and priority of their members.
- The COC actively reviews the contents of the Collaboration website and information distributed via press releases and social media.
- The COC actively addresses the media with information about KM3NeT-phase1.
- The COC reports to the Collaboration and the IB.

Speaker assignment rules

Priority in the choice for assignment of speakers at conferences and workshop will be:

1. Collaboration members having given an important contribution to the given subject;
2. Younger members;
3. Members who have not presented results in the previous year;
4. Members who are planning to attend a Conference where no other members plan to go;

For each assigned talk, a referee will be chosen by the Conference and Communication Committee (COC) among its members or within the Collaboration. Task of the internal referee will be that of reviewing the abstract and talk material and the contribution to proceedings prior to submission as applicable for the conference or workshop. The Collaboration material shown on behalf of the Collaboration should have been already presented to - and approved by - the Collaboration. In rare cases of extreme urgency where this approval has not yet been granted at least approval of the Spokesperson is required. Relevant deadlines will be set by the COC in each case. Review of contributions to conference proceedings is the task of the PC.

As a rule, a draft conference presentation should be submitted to the whole Collaboration by the speaker at least 3 working days before the start of the conference. Draft written proceedings contributions should be submitted to the whole Collaboration by the author at least 3 working days before the deadline imposed by the conference organisers. It is the responsibility of the referee to help ensure that these deadlines are respected.

Members of the Collaboration that have been approached directly by organizers of conferences and workshop to present KM3NeT related work should inform the COC. The COC will usually not interfere on such personal invitations, but any KM3NeT material to be presented is subject to the rules here stated.

Annex 13 – User Access Policy

User access to the KM3NeT-phase1 Research Infrastructure

Users of the KM3NeT-phase1 research infrastructure with a neutrino telescope and nodes for connection of ESS instrumentation can be grouped in the following user communities:

1. Members of the KM3NeT-phase1 Collaboration; they are recorded in the Collaboration Names List which is maintained by the MT.
2. The wider neutrino astronomy community. Currently, a global network of neutrino astronomers – the *Global Neutrino Observatory (GNO)* – is being formed, which will provide a forum for the neutrino astronomy community and an organizational framework for the access to neutrino astronomy data world-wide.
3. The wider community of astro- and astroparticle physicists, who will have the opportunity to propose observation priorities implemented by online filters providing enhanced sensitivity for particular celestial directions. Access will be evaluated by the Observation Committee and endorsed by the IRB in accordance by the IB.
4. The Earth and Sea science communities (environmental sciences, geology, geophysics, marine biology, oceanography etc.) who will use the KM3NeT-phase1 infrastructure for performing long-term, real-time deep-sea measurements, but are not a member of the Collaboration. Access will be evaluated by the Observation Committee and endorsed by the RRB in accordance with the IB.
5. It is conceivable that the infrastructure will also be used for public security purposes, such as tsunami warnings. This would imply the involvement of the responsible national authorities.
6. The general scientific community and the general public will have open access to all data from the infrastructure. This access will be provided with a certain latency required to perform appropriate data reconstruction and calibration and to secure priority scientific data access to the KM3NeT-phase1 Collaboration and the proponents of observational campaigns (see point 2).

A commercial use of the infrastructure is currently not envisaged but would not be excluded if desired by commercial entities. If so, they will be subjected to the same rules and regulations as academia and publicly funded research institutes.

Data access policy

Members of the KM3NeT-phase1 Collaboration obtain free, unrestricted and real-time access to all data of the neutrino telescope. Publication of data analysis results are subject to the Publication and Conference Rules of Annex 12.

Members of the KM3NeT-phase1 Collaboration have priority rights for the scientific exploitation of the neutrino telescope data. The priority rights are restricted to a period of time of about 2 years. After that period, the data will enter the public domain, with the exception of data taken during the engineering and commissioning period.

Access to data of the ESS instrumentation connected to the ESS-nodes in the KM3NeT-phase1 RI, are not subject of this MoU.

Proposals for observational campaigns by external users will be evaluated by the Observation Committee and endorsed by the IB and the IRB. The KM3NeT Collaboration will reserve about 50% of the available observation slots (i.e. of the corresponding online computing resources) for its own priority science purposes. Proponents of accepted external proposals will have free access to all data related to their proposal. Publication of results is subject to the Publication and Conference Rules in Annex 12.

Data for public security purposes may be taken and used under authority of national or international institutions. The contractual situation has not yet been explored.

All data will be made available to the general public through a dedicated web interface, with appropriate latency as discussed above. Since the analysis of raw neutrino telescope data requires detailed expert knowledge of the detector that is not present outside the KM3NeT-phase1 Collaboration, these data will be provided at the level of reconstructed events including calibration, appropriate quality parameters and experimental uncertainties. Software for accessing and analysing these data and corresponding documentation will be provided.

Annex 14 – List of Acronyms

CC	– Computing and Data Centre
CLB	– Central Logic Board
COC	– Conference and Outreach Committee
CU	– Calibration Unit
DAQ	– Readout and Data Acquisition system
DB	– Data Base
DOM	– Digital Optical Module
DSP	– Deputy Spokesperson
DU	– Detection Unit
EC	– European Committee
EB	– Ethics Board
ERIC	– European Research Infrastructure Consortium
ESS	– Earth and Sea Sciences
GNO	– Global Neutrino Observatory
HQ	– Headquarters
IB	– Institute Board
IS	– Installation Site
IU	– Instrumentation Unit
JB	– Junction Box
MEOC	– Main Electro Optical Cable
MoU	– Memorandum of Understanding
MT	– Project Management Team
OBS	– Organisation Breakdown Structure
OC	– Observation Committee
OLT	– Optical Line Terminator
PBS	– Product Breakdown Structure
PJB	– Primary Junction Box
PC	– Publication Committee
PMT	– Photo Multiplier Tube
PSM	– Physics and Software Manager
QM	– QA/QC Manager
RI	– Research Infrastructure
ROV	– Remotely Operated Vehicle
RRB	– Resource Review Board
SC	– Project Steering Committee
SJB	– Secondary Junction Box
SM	– Site Manager
SP	– Spokesperson
STAC	– Scientific and Technical Advisory Committee
TM	– Technical Project Manager
VEOC	– Vertical Electro Optical Cable