

ISTITUTO NAZIONALE DI FISICA NUCLEARE
CONSIGLIO DIRETTIVO

DELIBERAZIONE N. 12013

Il Consiglio Direttivo dell'Istituto Nazionale di Fisica Nucleare, riunito a Roma in data 29 e 30 settembre 2011, alla presenza di n 33 suoi componenti su un totale di n. 33:

- premesso che la Collaborazione ANTARES, attiva dal 2000, è finalizzata alla costruzione di un rivelatore sottomarino localizzato a 2.500 mt. di profondità nel Mare Mediterraneo per la ricerca nel campo dei neutrini ad alta energia e che l'INFN è parte della suddetta Collaborazione;
- visto il Memorandum of Understanding stipulato tra le Istituzioni partecipanti alla Collaborazione ANTARES per le fasi di costruzione e avvio del rivelatore ANTARES approvato dal Consiglio Direttivo dell'Istituto con deliberazione n. 8190 del 25 luglio 2003;
- visto il Memorandum of Understanding stipulato successivamente tra le Parti della suddetta Collaborazione per il completamento e utilizzo a scopi scientifici del rivelatore ANTARES approvato dal Consiglio Direttivo dell'Istituto con deliberazione n. 10227 del 20 luglio 2007;
- ravvisata la necessità di estendere le attività della suddetta Collaborazione per un ulteriore quadriennio per la successiva definizione delle fasi di funzionamento, manutenzione e dismissione del rivelatore ANTARES, nonché per la prosecuzione delle attività di presa e analisi dei dati già in corso da tempo;
- visto lo schema di "Memorandum of Understanding for Collaboration in the Operation and Maintenance of the ANTARES Detector and for its Exploiting for Scientific Purposes", allegato alla presente deliberazione e di essa parte integrante;
- tenuto conto che il testo di MoU ha già ottenuto parere favorevole da parte dell'Institute Board e del Financial Review Board della Collaborazione ANTARES;
- viste le note del Direttore della Sezione di Genova, Prof. Sandro Squarcia del 1 luglio u.s., prot. n. 11443 e del Presidente di Commissione Scientifica Nazionale 2, Prof. Roberto Battiston, del 3 settembre 2011 u.s.;
- su proposta della Giunta Esecutiva;
- in data 30 settembre 2011 con n. 33 voti favorevoli;

DELIBERA

- E' approvato lo schema di "Memorandum of Understanding for Collaboration in the Operation and Maintenance of the ANTARES Detector and for its Exploiting

for Scientific Purposes”, allegato alla presente deliberazione e di essa parte integrante. Il Presidente è autorizzato a perfezionarlo e a sottoscriverlo.

- Gli oneri finanziari a carico dell'INFN, pari a complessivi 500.000,00 Euro come contributo al Common Fund della Collaborazione per il periodo 2012-2016 e pari ad uno stanziamento annuo di circa 100.000,00 Euro, trovano copertura per il 2012 sul capitolo 130120 (consumo) dell'esperimento ANTARES presso la Sezione di Genova.

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4 May 2011

Memorandum of Understanding

For Collaboration in the Operation and Maintenance of the ANTARES Detector and for its

Exploitation for Scientific Purposes

between

the Participating Funding Agencies

Preamble

- (a) The present Memorandum of Understanding (MoU) is an extension of the existing MoU, signed by the ANTARES collaboration in 2007, whose period of validity ends on 31 December 2011.
- (b) A group of Institutes have formed a Collaboration, named ANTARES (Astronomy with a Neutrino Telescope and Abyss environmental RESearch) that, as one of the steps towards a km^3 detector in the Mediterranean Sea, has constructed an undersea neutrino telescope with an effective area of the order of 0.1 km^2 , to search for high-energy cosmic neutrinos.
- (c) The Institutes have secured the support of their Funding Agencies (hereafter referred to as the "Parties") to enable them to participate in the ANTARES Collaboration. The detector construction has been completed in 2008 and its operation has proceeded smoothly since then.
- (d) The ANTARES Collaboration is continued on the basis of this MoU between the participating Parties.
- (e) This MoU defines the Collaboration and its objectives, as well as the rights and obligations of the Institutes and their corresponding Institutions/Funding Agencies.
- (f) This MoU is not legally binding, but the Institutes and their supporting Funding Agencies, recognise that the success of the Collaboration depends on all its members adhering to its provisions. Financial contributions are subject to availability of budgetary funds. Any defaults will be dealt with, in the first instance, by the Collaboration through its Institute Board and, if necessary, by the Financial Review Board (see Article 5). The withdrawal of any Party or individual Institute from this agreement, its renewal or its termination before the end of its validity period will be carried out following an established procedure (Article 3).

Article 1: Institutes and Parties to this MoU

- 1.1 The Parties are all the Funding Agencies or legal entities acting on behalf of one or more Funding Agencies and are listed in Annex 1
- 1.2 The Institutes participating in the Collaboration are those listed in Annex 2.
- 1.3 New Institutes can join the Collaboration, with the agreement of the Institute Board and of the Financial Review Board.
- 1.4 In special cases an observer status may be granted to some Institutes. Observers are exempt from financial contributions to ANTARES. Their representatives can participate in meetings of the ANTARES Institution Board (see Article 4) without voting rights. Scientists who are members of observer institutes will not sign papers as authors. This restriction does not apply to their PhD students.

Article 2: Purpose of this MoU

- 2.1 This MoU defines the phases of operation, exploitation, maintenance and decommissioning of the ANTARES detector, as well as those of data taking, data analysis and publication of results. Its purpose is to define the program of work to be carried out for these phases and the distribution of the charges and responsibilities among the Institutes for the execution of this program of work. It sets out organisational, managerial and financial guidelines to be followed by the Collaboration.

Article 3: Duration of this MoU and its Extension

- 3.1 This MoU is valid for the operation of the ANTARES detector, from 01/01/2012 until 31/12/2016. Data taking and detector maintenance is expected to cover the first three years of this MoU, while the last two years will be limited to data taking and analysis, with only a reduced detector maintenance.
- 3.2 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 (IB, see Article 4). In any case, the Institutes and Parties will remain responsible for the proper decommissioning of the detector.
- 3.3 Any Party or individual Institute may withdraw its support from the Collaboration by giving notice in writing to the spokesperson (see Article 4.2), to the chairperson of the Institute Board (IB, see Article 4) and to the Financial Review Board (FRB) (see Article 5) abiding by a six month advance notice. In such an event, a reasonable plan of disengagement from the Collaboration will be negotiated through the FRB, following a majority vote agreement by the Institute Board (see Article 4).

Article 4 : The ANTARES Institute Board and Spokesperson

- 4.1 The Institutes set up an Institute Board (IB) (see Annex 5). Each Institute will be represented in the IB by its authorised representative (see Annex 2). Members of the other executive committees of the Collaboration may be invited to participate without voting rights in the IB meetings. The IB Chairperson shall be elected by the IB from the members of the Collaboration for a period of three years. The representatives of all of the Institutes listed in Annex 2 have equal voting rights. Decisions are normally taken by the IB through a simple majority vote, except for decisions concerning major detector modifications or extensions, amendments and termination of this MoU, for which a 2/3 majority approval is needed.
- 4.2 A spokesperson (SP) will coordinate the activities of the Collaboration. The SP will also represent it in relations with the Scientific Community, with the Financial Review Board (see Article 5.2) and the External Review Committee (see Article 6.1). The spokesperson will be elected by the IB for a three year term, by a simple majority vote, with a casting vote of the chairperson in case of a tie.
- 4.3 The Executive Management, consisting of the aforementioned Spokesperson plus a Deputy Spokesperson and a Technical Coordinator will be elected by the IB for a three year term. The remaining organizational structure is defined by the regulations of the ANTARES Collaboration in Annex 5.

Article 5 : The ANTARES Resource Manager and Financial Review Board

- 5.1 A Resource Manager (RM) will be appointed by the IB. The RM will handle the financial resources allocated by the Parties to cover maintenance, operating and analysis costs. These contributions will constitute the Common Fund of the experiment.
- 5.2 A Financial Review Board (FRB) is constituted by representatives of the Parties (Annex 1). The FRB endorsement is required for all decisions related to ANTARES finances. The spokesperson reports to the FRB on technical, managerial, financial and administrative matters and on changes in the composition of the Collaboration.

Article 6 : The ANTARES External Review Committee

- 6.1 The External Review Committee (ERC) consists of members nominated by the participating Parties. The ERC follows the progress of the project, advises the FRB and sends recommendations to the IB which in turn passes them on to the steering bodies set up in Annex 5.

Article 7 : The ANTARES Detector and Collaboration

- 7.1 The names of the scientists and engineers currently participating in the Collaboration are listed in Annex 4 by country and Institute. The IB must be informed of any changes in this list by

the Institute concerned.

- 7.2 The regulations, organisation and rules are listed in Annex 5. They may be changed at any time following a decision of the IB. Any such change must be reported to the ERC and the FRB.
- 7.3 The ANTARES detector consists of a number of sub-system/detector units as listed in Annex 3.
- 7.4 The major milestones in the phases of detector maintenance, data taking and data analysis are defined in Annex 6.
- 7.5 The Funding Agencies supporting the Institutes participating in the Collaboration are expected to make an appropriate contribution to the maintenance, operation and decommissioning of the experiment. This also applies to funding Agencies/Institutes which want to join the collaboration during the period of validity of this MoU. Details are given in article 9.

Article 8: Programme of Work for the sharing of responsibilities during the operation, maintenance, data taking and data analysis

- 8.1 The total maintenance work for the detector is divided into that of its sub-systems, each under the responsibility of an individual Institute or a group of Institutes, as shown in Annex 3
- 8.2 All the Institutes agree to contribute to the data taking shifts and to the calibration and analysis effort.

Article 9: Maintenance and Operation Common Fund and Decommissioning

- 9.1 Contributions to maintenance and operation costs will be made by fund transfer to a dedicated Common Fund (CF), which is established through a dedicated account. The CF will be managed and operated by the RM (see Article 5.1). All CF operations will be monitored by the FRB. The table in Annex 7 shows, as an example, the different items contributing to the 2010 CF.
- 9.2 The financial resources needed for the ANTARES experiment refer to the cost for Maintenance, Operation and Decommissioning. These have been evaluated by the Collaboration and will be monitored by the FRB. The human and financial resources needed for Data Taking, Data Analysis and Meetings will in addition be provided by the participating Institutes.
- 9.3 All cost figures in this MoU are expressed in Euro, based on estimates valid in November 2010
- 9.4 The rules for the sharing of the CF among all participating Parties are specified in Annex 7.
- 9.5 The responsibilities for operation of the ANTARES detector will be shared by the Collaboration.

- 9.6 The Parties are committed to the decommissioning of the detector to be completed by the end of 2016. Earlier decommissioning might take place in case of major detector failure. Possible extensions of the running period will have to be agreed upon by the IB and by the FRB. The related costs and detailed planning will be dealt with by the FRB, following the recommendations of the IB. The current estimate of the decommissioning costs is of the order of 700 k€ over a two-year period. These will be covered by the CF of the last two years of validity of this MoU.
- The equipment/instrumentation initially provided by each Institute/Party will be returned to the same Institute/Party after decommissioning, unless otherwise decided by the IB. The main detector infrastructure (main ElectroOptical cable, Junction Box) may be left in place after decommissioning for use by groups active in sea-science research, following agreements with all Institutions involved and after an agreement with the ANTARES IB.

Article 10: Access to the ANTARES infrastructure by external users

- 10.1 A secondary Junction Box has been installed by IFREMER, in order to allow for access to the ANTARES infrastructure by external users for both scientific and technological purposes. An agreement regulating such access has been setup and is attached to this MoU (Appendix A).
- 10.2 The collaboration offers access to the ANTARES infrastructure to external users for R&D of scientific and technical issues. Any such project will be subject to approval by the ANTARES Institute Board.

Article 11: Access to the ANTARES infrastructure for R&D aimed at future neutrino telescopes

- 11.1 The ANTARES Collaboration offers to the neutrino telescope community (the KM3NeT Consortium in particular, and also IceCube and BAIKAL Collaborations) the possibility to make use of the ANTARES infrastructure for in situ R&D tests for future neutrino detectors. Any such project will be subject to approval by the ANTARES Institute Board.

Article 12 Access to ANTARES data and multimessenger analyses

- 12.1 The Collaboration aims at a maximum scientific exploitation of ANTARES data. Different stages of access to the data and analysis support are defined in the following paragraphs.
- 12.2 Scientists are welcome to analyse ANTARES data. They should submit an application to the IB explaining the scientific case. Such analyses will be supported by members of ANTARES. Any publication resulting from such an activity must follow the ANTARES publication rules, as summarised in Annex 5. In this case an authorship financial contribution may have to be paid by the external scientists or supporting Party.
- 12.3 Collaborations with other experiments may be formed to enable multimessenger analyses. A contract will be negotiated in each single case. Such collaborations already exist with several experiments.

- a) Agreement with the ROTSE telescopes for an optical follow-up of "special" neutrino events from the ANTARES detector as described in Appendix C.
- b) Agreement with the TAROT telescopes for an optical follow-up of "special" neutrino events from the ANTARES detector as described in Appendix D
- c) Agreement with the LIGO and VIRGO Laser Interferometer Gravitational Wave Experiments as described in Appendix E

12.4 An agreement has been reached with the IceCube Collaboration on common software developments and a memorandum of understanding has been signed. This is attached in Appendix F.

12.5 The final aim of the collaboration is to make the ANTARES data public. A procedure on which information and how it is made public will be worked out. The scheme suggested within the HEAP-MM proposal is a plausible solution.

Article 13: Intellectual Property Rights (IPR)

13.1 Each Institute shall promptly disclose in confidence to the other Institutes all resulting IPR during the term of this agreement and all Institutes and Parties shall cooperate in relation to any preparation and prosecution of any IPR applications.

13.2 Each Party supporting an Institute shall own the resulting IPR generated by this Institute under the project. In the event that Institutes from different Parties are jointly responsible for generating resulting IPR, such resulting IPR shall be jointly owned by such Parties in accordance with the contribution made by each Institute to such resulting IPR. Joint owners of resulting IPR shall agree between themselves on who will be responsible for the timely prosecution and maintenance of all such resulting IPR.

13.3 Each Party grants to the other Parties a non-exclusive, royalty-free licence to:

- use its resulting IPR for their own internal research and development purposes but not for the purposes of commercial exploitation;
- subject to any existing third Party obligations, use its pre-existing IPR for the purpose of undertaking the project and enable the use of the resulting IPR but not for the purposes of commercial exploitation.

13.4 In the event that any Party wishes to exploit commercially resulting IPR owned by another Party, the owner of the resulting IPR shall grant to such Party a non-exclusive licence to use such resulting IPR for that purpose, subject to the agreement of appropriate terms in relation thereto, including royalty.

Article 14: Rights, Benefits and Obligations of the Parties

- 14.1 The Institutes are entitled to join the operational and analysis phase of the project and to participate in the scientific exploitation of the data acquired.
- 14.2 Rules and regulations regarding the safety of personnel and the insurance of damage are set forth in Annex 8.
- 14.3 All equipment must comply with the corresponding local and national safety regulations and with those applicable in France. If relevant, the design, test criteria and testing of equipment should be discussed well in advance with the safety officer in the Laboratory where such equipment is to be used.

Article 15: Confidentiality

- 15.1 All information to be made public is regulated by the ANTARES Publication Rules. Publication rules as assessed by the Collaboration are set forth in Annex 5.

Article 16: Amendments

- 16.1 This MoU may be amended at any time with the agreement of the Parties, following approval by the IB by a 2/3 majority vote. Any such amendments will be subjected to the agreement of the FRB.
- 16.2 Future inclusion of additional participating Institutes and their Funding Agencies or legal entities acting on behalf their Funding Agencies in this Memorandum of Understanding will be effected by means of Appendices.

ANTARES COLLABORATION

The participating Institutions/Funding Agencies declare that they agree on the present Memorandum of Understanding for the ANTARES experiment.

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Done in _____

On _____

By _____

Y. Caristan, Director CEA/DSM, FRANCE

Done in _____

On _____

By _____

Jacques Martino, Director CNRS/IN2P3, FRANCE

Done in _____

On _____

By _____

J-F. Stéphan, CNRS/INSU, FRANCE

Done in _____

On _____

By _____

Alain Brillard, President Univ. de Haute Alsace,
FRANCE

Done in _____

On _____

By _____

T.A.H. Schöck, Chancellor, Friedrich-Alexander
Universität Erlangen-Nuremberg, GERMANY

Done in _____

On _____

By _____

R. Petronzio, President Istituto Nazionale di
Fisica Nucleare (INFN) ITALY

Done in _____

On _____

By _____

F. Linde, Director Nikhef, Stichting voor Fundamenteel
Onderzoek der Materie (FOM) THE NETHERLANDS

Done in _____

On _____

By _____

Prof. Dr. H. Ridderinkhof, deputy-director
Royal Netherlands Institute for Sea
Research (NIOZ), THE NETHERLANDS

Done in _____

Done in _____

On _____

On _____

By _____

By _____

Dumitru Hasegan, ISS Director, Insitute of Space

Carlos Martínez Riera

Sciences ROMANIA

Director General de Cooperación Internacional y
Relaciones Institucionales

Ministerio de Ciencia e Innovación SPAIN

Future inclusion of additional participating Institutions/Funding Agencies and Institutes in this Memorandum of Understanding will be effected by means of Appendices.

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List of Annexes and Appendices

Annex 1:

List of Parties and their Representatives.

Annex 2:

Institutes of the ANTARES Collaboration, Names of their Contact Persons and supporting Institutions.

Annex 3:

Responsibilities for hardware of the ANTARES detector

Annex 4:

Present Participants in the ANTARES Collaboration by Country and Institute

Annex 5:

Regulations, Organisation and Publication Rules of the ANTARES Collaboration

Annex 6:

ANTARES Major Milestones for the final Operation and Maintenance Phase.

Annex 7:

Maintenance and Operation/Common Fund

Annex 8:

Regulations regarding safety of personnel and insurance of damage.

Appendix A:

There is a separate protocol between CNRS and IFREMER, regulating the implementation of user access to the site and the ANTARES infrastructure. For information this protocol is appended in Appendix A. The ANTARES Institution Board should be promptly informed of any eventual modifications to such agreement and, should these have an impact on the Scientific aims of ANTARES or on the construction or operating costs, ask for amendements.

Appendix B:

There is an agreement between CEA, CNRS and IFREMER, that is described in a separate protocol. This agreement concerns sea operations and developments related to undersea technologies. For information this Protocol is appended in Appendix B. The ANTARES Institution Board should be promptly informed of any eventual modifications to such agreement and, should these have an impact on the Scientific aims of ANTARES or on the construction or operating costs, ask for amendements.

Appendix C:

The ANTARES Institution Board has signed an agreement with the ROTSE Experiment, that is described in a separate protocol. This agreement concerns optical follow-up of neutrino events detected by the ANTARES experiment. For information this Protocol is appended in Appendix C.

Appendix D:

The ANTARES Institution Board has signed an agreement with the TAROT Experiment, that is described in a separate protocol. This agreement concerns optical follow-up of neutrino events detected by the ANTARES experiment. For information this Protocol is appended in Appendix D.

Appendix E:

The ANTARES Institution Board has signed an agreement with LIGO-VIRGO gravitational wave interferometres, that is described in a separate protocol. This is a joint research program for coincident cosmic sources of gravitational waves (GW) and high-energy neutrino (HEN) events. For information this Protocol is appended in Appendix E.

Appendix F: Memorandum of understanding between the IceCube and the ANTARES Collaborations on shared software development

COPIA CONFORME

Annex 1: Parties and their Representatives

FRANCE

CEA/ Direction des Sciences de la Matière
Represented by Yves Caristan, Director

CNRS/IN2P3
Represented by Jacques Martino, Director

CNRS/INSU
Represented by Jean-Francois Stéphan, Director

Université de Haute Alsace
Represented by Alain Brillard , President

GERMANY

Friedrich-Alexander Universität Erlangen-Nürnberg
Represented by T.A.H. Schöck, Chancellor

ITALY

Istituto Nazionale di Fisica Nucleare (INFN)
Represented by R. Petronzio, President

THE NETHERLANDS

Stichting Fundamenteel Onderzoek der Materie (FOM)
Represented by F. Linde, Director Nikhef

Royal Netherlands Institute for Sea Research (NIOZ), THE NETHERLANDS
Represented by Prof. Dr. H. Ridderinkhof, deputy-director

RUSSIA

ITEP
Represented by M. Danilov

SPAIN

Ministerio de Ciencia y Innovación - Director General de Cooperación
Internacional y Relaciones Institucionales
Represented by Carlos Martínez Riera

Annex 2: Institutes participating in the ANTARES Collaboration, Names of their Contact Persons and Supporting Institutions

FRANCE:

APC (CNRS/CEA) (A. Kouchner referred to as APC)	(CNRS/CEA)
SPP (CEA/DSM/IRFU, Saclay) (Th. Stolarczyk referred to as SPP)	(CEA/DSM)
SEDI (CEA/DSM/IRFU, Saclay) (P. Lamare referred to as SEDI)	(CEA/DSM)
CPPM (CNRS/IN2P3) (V. Bertin referred to as CPPM)	(CNRS/IN2P3)
GRPHE (Universite de Haute Alsace) (C. Racca referred to as GRPHE)	(GRPHE/UHA)
Geosciences Azur (CNRS/INSU/GeoAzur) (A. Deschamps referred to as GeoAzur)	(CNRS/INSU/GeoAzur)
Centre d'Océanologie de Marseille (CNRS/INSU/MIO) (C. TAMBURINI referred to as MIO)	(CNRS/INSU/MIO)
LAM (CNRS/INSU/LAM) (S. Basa referred to as LAM)	(CNRS/INSU/LAM)
DT INSU (CNRS/INSU/DT INSU) (C. Gojak referred to as DT INSU)	(CNRS/INSU/DT INSU)
LPC (CNRS/IN2P3, Univ. Blaise Pascal) (C. Carloganu referred to as LPC)	(CNRS/IN2P3)

GERMANY :

ECAP/University of Erlangen (G. Anton referred to as Erlangen)	(ECAP/Univ. Erlangen - BMBF)
ECAP/Dr. Remeis Observatory Bamberg (M.Kadler referred to as Bamberg)	(ECAP/Bamberg - BMBF)

ITALY:

Dipartimento Interateneo di Fisica "Michelangelo Merlin"
ed INFN - Sezione di Bari (Bari) (INFN)
(M. Circella referred to as Bari)

Dipartimento di Fisica dell'Università
ed INFN - Sezione di Bologna (Bologna) (INFN)
(A. Margiotta referred to as Bologna)

Dipartimento di Fisica ed Astronomia dell'Università
ed INFN - Sezione di Catania (Catania) (INFN)
(G.V. Russo referred to as Catania)

Dipartimento di Fisica dell'Università
ed INFN - Sezione di Genova (Genova) (INFN)
(M. Anghinolfi referred to as Genova)

INFN - Laboratori Nazionali del Sud (Catania) (INFN)
(R. Coniglione referred to as LNS)

Dipartimento di Fisica dell'Università
ed INFN - Sezione di Pisa (Pisa) (INFN)
(V. Flaminio referred to as Pisa)

Dipartimento di Fisica dell'Università "La Sapienza"
ed INFN - Sezione di Roma (Roma) (INFN)
(A. Capone referred to as Roma)

The NETHERLANDS:

Nikhef (Amsterdam) (FOM)
(M. de Jong referred to as Nikhef)

Univ. of Utrecht / Nikhef (Utrecht) (FOM)
(P.Kooijman referred to as Utrecht)

Univ. of Amsterdam/Nikhef (Amsterdam) (FOM)
(E. de Wolf referred to as Amsterdam)

Univ. of Groningen / KVI (Groningen) (FOM)
(H. Löhner referred to as Groningen)

NIOZ (Royal Netherlands Institute for Sea Research) (NIOZ)
(H. van Haren referred to as NIOZ)

ROMANIA

(ISS)

Institute of Space Sciences (Bucharest)
(V. Popa referred to as ISS)

SPAIN:

IFIC (CSIC and University of Valencia, Valencia) (CSIC, Univ. Valencia)
(J.J. Hernández-Rey referred to as IFIC)

IGIC - Institut d'investigació per a la Gestió Integrada de les Zones Costaneres
Univ. Politècnica de València (UPV, Gandia - Valencia)
(M. Ardid referred to as UPV)

LAB - Laboratori d'Aplicacions Bioacústiques (UPC - Universitat Politècnica de Catalunya,
Barcelona)
(M. André referred to as LAB)

Observer Institutes

FRANCE

IFREMER
(Toulon/La Seyne sur Mer and Brest)
(V. Rigaud referred to as IFREMER)
(The relationship of IFREMER with ANTARES is defined in a
separate protocol between CEA, CNRS and see Appendix A)

RUSSIA:

Itep (Moscow, Russia)
(A. Rostovtsev referred to as Itep)

MSU (Moscow State University)
(E. Shirokov referred to as MSU)

Annex 3: Responsibilities for hardware of the ANTARES detector

MECHANICS

Local Control Module (LCM), String Control Module (SCM) and String Power Module (SPM)	CPPM
Optical Module Frame (OMF), OM support structures, buoy	CPPM
Electro Mechanical Cable (EMC)	SACLAY
Bottom String Structure (BSS)	CATANIA
Line Acoustic Release	CPPM
Line wet-mateable connector	SACLAY
Junction Box (JB), JB Acoustic Beacon, JB wet-mateable connector, power electrode	CPPM
Interconnecting Link Cable	SACLAY

OFFSHORE ELECTRONICS

Crates	BARI
Backplanes	BARI
Local Power Box (LPB)	NIKHEF
ARS, ARS-motherboard	SACLAY
String Power Module (SPM)	NIKHEF
JB Electronics,	CPPM
Clock System	CPPM
Acoustics	CPPM
(M)LCM/SCM DAQ, Master LCM (MLCM) Ethernet switch	SACLAY
MLCM DWDM transceiver, SCM DWDM transceiver	NIKHEF
SCM DWDM (de) multiplexer	NIKHEF

ONSHORE ELECTRONICS

On-shore DWDM system	NIKHEF
On-shore gigabit switch	NIKHEF
Computer Farm	NIKHEF
JB Control	CPPM
Clock System	CPPM

OPTICAL MODULES

Photo Multiplier (PM), PM Base, Mu-metal cage, Glass Sphere, LED in OM, Link OM-LCM	SACLAY
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INSTRUMENTATION

Positioning: Acoustics	CPPM
Tiltmeter, Compass	IFIC
LED beacon, Laser beacon	IFIC

AMADEUS system

Acoustic sensors	ECAP
Acoustic storey infrastructure	ECAP
Acoustic DAQ	ECAP
Acoustic onshore computer farm	ECAP

INFRASTRUCTURE

Main Electro Optical Cable (MEOC), MEOC connector	CPPM
Electrical Power System, Power Hut, Shore station, Ethernet link	CPPM

XCM INTEGRATION

LCM/MLCM/SCM assembly tables, LCM/MLCM/SCM test benches	BARI
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LINE INTEGRATION

Assembly Hall, onshore line calibration, Equipment, Transport	CPPM
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SEA OPERATIONS

Navigation system, JB deployment/recovery, line deployment, submarine connection	CPPM
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Annex 4: Members of the ANTARES Collaboration

FRANCE

APC, Université Denis Diderot-Paris VII, CNRS/IN2P3, Observatoire de Paris, Paris, France:
B. Baret, C. Donzaud, A. Kouchner, V. Van Elewyck

SPP (CEA/DSM/IRFU, Saclay): S. Ferry, S. Loucatos, K. Payet, F. Schussler, J.-P. Schuller, Th. Stolarczyk,
B. Vallage, P. Vernin

SEDI (CEA/DSM/IRFU, Saclay)
S. Anvar, P. Lamare

LPC (CNRS/IN2P3, Univ. Blaise Pascal)
C. Carloganu, Pascal Gay

CPPM, Aix-Marseille Université, CNRS/IN2P3, Marseille, France: J.J. Aubert, V. Bertin, J. Brunner, J. Busto, J. Carr,
H. Costantini, P. Coyle, C. Curtil, J.P. Ermenwein, C. Rivière, S. Escoffier, G. Hallewell, C. Vallée, M. Vecchi

GRPHE (Université de Haute Alsace, IUT de Colmar)
A. Albert, D. Drouhin, C. Racca

Geoazur (CNRS/INSU/Geoazur)
A. Deschamps, Y. Hello

Mediterranean Institute of Oceanography (CNRS/INSU/MIO):
Richard Sempéré, D.Lefevre, C.Tamburini

LAM (CNRS/INSU/LAM)
S. Basa, M. Marcelin, E.Nezri

DT INSU (CNRS/INSU/DT INSU)
C.Gojak

GERMANY

ECAP/University of Erlangen
G.Anton, T.Eberl, J.Hoessl, K. Graf, O.Kalekin, A.Kappes, U.Katz, R.Lahmann, R.Shadnize

ECAP/Dr. Remeis Observatory Bamberg
M. Kadler, I. Kreykenbohm, J. Wilms

ITALY

Dipartimento Interateneo di Fisica "Michelangelo Merlin" ed INFN - Sezione di Bari (Bari)
M. Circella, T. Montaruli

Dipartimento di Fisica dell'Università ed INFN - Sezione di Bologna (Bologna)
S.Cecchini, T. Chiarusi, G. Giacomelli, A. Margiotta, M. Spurio

Dipartimento di Fisica ed Astronomia dell'Università ed INFN - Sezione di Catania (Catania)
D. Lo Presti, G.V. Russo

Dipartimento di Fisica dell'Università ed INFN - Sezione di Genova (Genova)
M. Anghinolfi, M. Taiuti

INFN - Laboratori Nazionali del Sud (Catania)
R. Coniglione, C.Di Stefano, E. Migneco, P. Piattelli, G.Riccobene, P. Sapienza

Dipartimento di Fisica dell'Università ed INFN - Sezione di Pisa (Pisa)
A. Bigi, V. Flaminio

Dipartimento di Fisica dell'Università "La Sapienza" ed INFN - Sezione di Roma (Roma)
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M.C. Bouwhuis, M.P. Decowski, M. de Jong, A.J. Heijboer, D. Samtleben

University of Amsterdam (Amsterdam, The Netherlands)
E. de Wolf

Utrecht University (Utrecht, The Netherlands)
P. Kooijman

KVI, Univ. of Groningen (Groningen, The Netherlands)
H. Löhner

NIOZ (Royal Netherlands Institute for Sea Research)
H. van Haren

ROMANIA
Institute of Space Sciences (Bucharest, Romania)
G. Pavalas, V. Popa, M. Rujoiu

SPAIN
IFIC, CSIC – UVEG, (Valencia, Spain)
J. J. Hernández-Rey, J. Zúñiga.

IGIC (UPV, Gandia - Valencia)
M. Ardid, F. Camarena, J.A. Martínez-Mora

LAB (Universitat de Catalunya, Barcelona)
M. Andrè

Observer Institutes

France

IFREMER
(Toulon/La Seyne sur Mer and Brest)
C. Compère, J.F. Drogou, D. Festy, , Y. Le Guen, C. Leveque, F. Mazéas, V. Rigaud, J.F. Rolin, P. Valdy, G. Damy, P. Chauchot.

RUSSIA

ITEP (Moscow, Russia)

M. Daniilov, V. Lyashuk, A. Rostovtsev

MSU (Moscow, Russia)

V. Kulikovsky, E. Shirokov

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Annex 5: Regulations, Organisation and Publication Rules of the ANTARES Collaboration

The Collaboration regulations, the definition of the Collaboration organisation and the other rules are gathered in this Annex. They may be changed at any time after approval by the IB. Prompt communication must be given of any change to the FRB, the ERC and SC.

Regulations of the ANTARES Collaboration (part of Annex 5)

1 Scope of the Collaboration

As a step toward a cubic kilometre size undersea neutrino telescope for particle astrophysics investigations, the ANTARES Collaboration has constructed and is exploiting a detector having an effective area of 0.1 km². The experimental project is defined in the ANTARES proposal (CPPM-P-1999-02, DAPNIA 99-01, IFIC/99-42, SHEF-HEP/99-06, astro-ph/9907432).

2 Organisation of the Collaboration

The project is structured according to the organisation chart shown at the end of this annex. This reflects the situation at the end of 2010.

2.1 Collaboration Meetings

All physics and technical issues, as well as the strategy of the execution of the project are extensively discussed during the Collaboration meetings. Each year there will be a number of ordinary collaboration meetings decided at the end of the previous year. One of such meetings per year will be hosted, on a rotation basis, by one of the collaborating Institutes.

2.2 The Institute Board

See article 4 in the main text of the MoU. The Institute Board (IB) is composed of one member per participating Institute. The possibility is foreseen of some institutes participating in the IB as observers, without voting rights. Members of the ANTARES executive committees or members of other Institutions may be invited, without voting rights, to IB meetings. The IB has the task of discussing major points related to the conduct of the experiment, of software or hardware modifications, of rules to be followed and schedules to be adopted by the Parties in relation to data-taking periods, of financial aspects related to the maintenance, operation and decommissioning of the detector. The IB meets on the occasion of each Collaboration meeting and on other occasions if needed. As stated in the MoU main text, the IB will be chaired by a member of the Collaboration elected by the IB. The IB elects the executive management of the project for a 3 year term of office. The executive managers are:

The Spokesperson (SP)

The Deputy Spokesperson (DSP)

The Technical Co-ordinator (TC)

The SP proposes and the IB appoints all the members in the organisational structure. The nomination will be effective starting from the date of the IB meeting immediately following the one in which the appointment has taken place. The IB can revoke any appointment at any time. The IB decides on the admission of a new Institute or Party in the Collaboration. In the exceptional case when a consensus cannot be reached, decisions are taken by a vote which will be carried by a simple majority. Only the representatives of institutes with voting rights in the IB participate in the vote. In case of a tie the opinion of the Chairperson of the IB decides. The IB can modify this regulation.

2.3 The Steering Committee

The Steering Committee (SC) is composed of the Executive Management and the sub-project coordinators as defined in the organisational chart. The SC meets as frequently as necessary and possibly once per month. The Spokesperson chairs the SC. On the request of the SC other Collaboration members are invited by the Spokesperson to attend SC meetings when required to do so. The SC monitors all aspects of the Project and in particular the construction, maintenance and exploitation of the detector. The organisation chart and therefore the composition of the SC shall evolve following the evolution of the experiment.

2.4 The Financial Review Board

See article 5 in the main text of the MoU. The Financial Review Board (FRB) is composed of one representative per Party. Members of the Collaboration attend if invited by the FRB. The FRB meets at least once per year to review expenditures in the previous year and to discuss the provisional budget for the coming year.

2.5 The External Review Committee

See article 6 in the main text of the MoU. The External Review Committee (ERC) consists of members nominated by the participating Institutions. The ERC follows the progress of the project, advises the FRB and sends recommendations to the IB.

2.6 The Publication Committee (PC)

The Publication Committee organises the writing of papers for refereed journals.

The Publication Committee maintains moreover a database of drawings, plots and numerical results for free use by all Collaboration members.

Rules for publications are defined in the annex appended to the present document.

The PC will consist of a small number (6-8) of Antares members, to be elected by the IB on the basis of specific competences in given subfields, without any consideration to their parent Institution. Examples of subfields may be: Dark matter, Astrophysical neutrino sources, Offline Software, Data Acquisition, Electronics, Mechanics, Sea Operations, etc.. Each PC member is appointed for a two-year period and may be re-elected only once.

The PC committee will be chaired by one of its members, elected by the PC itself on a rotation basis (two years).

The ANTARES Spokesperson, Deputy Spokesperson and Technical Coordinator are ex-officio members of the PC, without voting rights.

2.7 The Conference Committee (CC)

The CC will consist of one member for each participating Party, designated by the Party itself for a period of two years (renewable only once) with the exception of very small Parties. The ANTARES Spokesperson, Deputy Spokesperson and Technical Coordinator are ex-officio members of the CC, without voting rights.

The CC will be chaired by one of its members, elected by the CC itself, on a rotation basis (two years). The CC chairman will be assisted by a secretary, who will collaborate with him in contacting Conference Organisers, maintaining the Conference Web page, informing speakers of assigned talks, etc.

Task of the CC will be that of pointing out Conferences of possible relevance for Antares and of assigning speakers for such conferences. Priority in the choice will be given, in the order, to:

- a) Antares members having given an important contribution to the given subject
- b) Younger members
- c) Members who have not presented results in the previous year
- d) Members who are planning to attend a Conference where no other members plan to go

In the process of making such choice full responsibility will be left to the CC, free from rigid rules, but keeping in mind the above recommendations (a-d).

For each assigned talk, a referee will be chosen by the CC among its members or, if not possible within the collaboration. Task of the internal referee will be that of reviewing the talk before it is given. Should the talk have to appear in proceedings, the final version of the paper will be circulated among all CC members for approval, before submission. Relevant deadlines will be set by the CC in each case.

ANTARES Organisation Chart (part of Annex 5)

Institute Board

See article 4 in the main text of the MoU. The governing body of the collaboration is the Institute Board (IB) consisting of one representative from each Institute, with the proviso given above for Institutes present as observers. The IB will be chaired by a member of the Collaboration elected by the IB. All Collaboration decisions are formally made by this body according to the Collaboration Regulations. Technical decisions requiring prompt actions in the phase of detector operation and maintenance may be made by the management structure described below and ratified by the IB. Prompt communication of such decisions must be given to all members of the IB.

Executive Management

The project is managed by a Spokesperson assisted by a Deputy Spokesperson (DS) and a Technical Coordinator (TC). The Spokesperson has overall responsibility for all aspects of the Collaboration program of work. The TC has executive responsibility for all technical aspects of the project and if necessary organises internal reviews to aid in the assessment of these aspects. The Deputy Spokesperson has executive responsibility concerning the scientific programme of the Collaboration, organises the scientific analyses within the Collaboration and appropriate workshops. The Executive Management will also maintain the list of authors for publications and for the evaluation of the yearly CF contributions.

Sub-project Coordinators

The full scope of the programme is divided into sub-projects each having a coordinator. The sub-project coordinators take responsibility for all significant decisions in their area. They are responsible for following the subproject schedule and tracking milestones. The sub-project coordinators report at regular intervals to the Spokesperson, SC and collaboration.

Resource Manager

See article 5 in the main text of the MoU. A group of organisational tasks are linked under the responsibility of the Resource Manager (RM). He is responsible for the handling of the Common Fund and the Budget in contact with the SP. The RM will also take care of all the aspects related to the renewal or amendment of the Memorandum of Understanding. The RM will report on these matters to the IB and to the FRB.

Quality Control Manager

The Quality Control Manager (QCM) is the coordinator of the Quality System Project. The QCM defines the Quality Control procedures to be followed during the detector assembly and test phases, in collaboration with the local Quality Coordinators to be appointed by each Party, and with the coordinators of the various technical projects. The QCM reports to the IB and participates in the meetings of the SC.

Steering Committee

See section 2.3 of the Regulations in this annex. The sub-project coordinators plus the executive management form the project Steering Committee (SC) that meets frequently enough to properly follow the project progress in all aspects. The SC assists the SP in managing the ANTARES project.

Technical Decisions

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 IB. Most decisions will be made by the sub-project coordinators and members of their teams. The TC has a control responsibility for all technical decisions of the project.

ANTARES Publication Rules (part of Annex 5)

Publication Committee (PC)

- appoints principal authors or editors, drafting groups and/or referee(s) for forthcoming publications.
- maintains a database of material (tables, drawings, etc) approved by the Collaboration to be presented outside the Collaboration.

Antares 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 subcommittee (Editorial Committee: EC), including a small number of PC members and integrated by a few members external to the PC, chosen on the basis of their specific competence in the field.

Together with the EC, the PC will appoint a principal author or editor (PA) and - internally - a contact person. The EC may in simple cases just consist of the PA.

The EC 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 PA 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 as to report in the PC on the status. A draft approved by the EC 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, and author list as well as the name of the proposed journal. The EC deals with the received comments and prepares a new draft. If there are drastic changes the new version is circulated again. If minor or no changes are proposed, the PC submits the manuscript for publication or delegates this to the PA.

The paper, once finalised and approved by the PC, will be circulated among all Antares members 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 EC members external to the PC, must attend this reading session.

Different categories of publications are foreseen to which different rules apply. The PC decides on the categories of papers. For each of the publications in preparation, the PC appoints a drafting group (EC) with a principal author or editor (PA) and - internally - a contact person. 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.

Other publications

Any information provided by ANTARES members with the aim of being made public, for example in newspapers, or material presented on open web sites, is subject to approval by the IB. Concerning urgent contacts with the news media the IB should be notified, if possible in advance, although some flexibility should be allowed.

Conference Committee (CC)

The CC points out Conferences of possible relevance for Antares, appoints ANTARES speakers at international scientific and technical meetings and maintains an archive of the presentations. Together with the speaker the CC appoints internally a CC-contact person to assist the author in optimising the presentation and a corresponding conference paper for the proceedings. As a rule, a draft conference presentation should be submitted to the whole

Collaboration at least 7 working days before the start of the conference. Draft written proceedings contributions should be submitted to the whole Collaboration at least 7 working days before the deadline imposed by the conference organisers. It is the responsibility of the CC-contact person to help ensure that these deadlines are respected.

The CC welcomes wishes and indications of priorities among speakers from representatives of the various teams. ANTARES members that have been approached by organizers of such meetings to present ANTARES related work should inform the CC. The CC will usually not interfere on such personal invitations, but any ANTARES material to be presented is subject to the rules here stated. The ANTARES material shown in an official talk 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 SP is required.

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 ANTARES publications is given *by default* to members of the Collaboration with a visible contribution in at least one of the following ways and during at least one year

- 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.

General author list and procedures

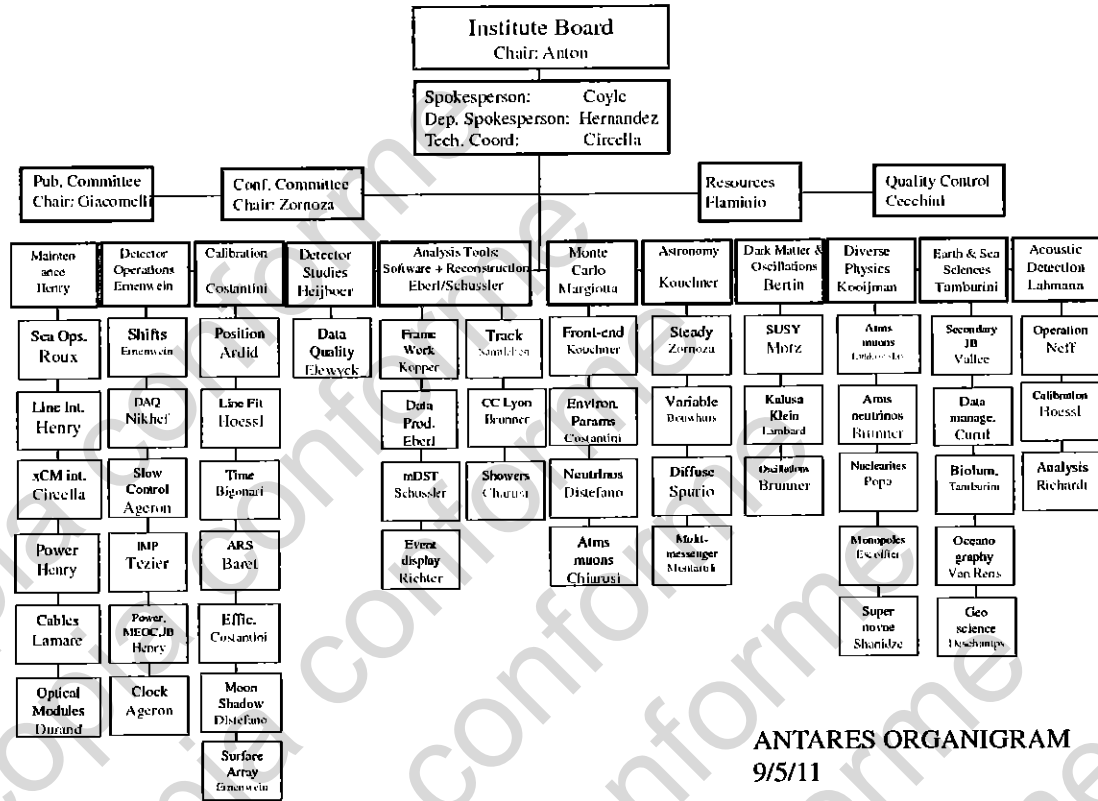
The Executive Management maintains a default author list for general papers containing names given by the corresponding team leaders. Collaborators can be authors starting twelve months after their entry, and ending twelve months after they have left the Collaboration. The IB can decide for a specified period or for specific publications to add/delete/replace author names, thereby deviating from the default list. For example, names of persons that have contributed substantially to a publication but are not on the current list can be proposed to the IB to be included. An author may also withdraw for a specific publication. Normally the thus obtained author lists for general publications are presented alphabetically according to a sorting criterion concerning institute names, city names, author names, etc., which may change from time to time and from publication to publication, as defined by the Executive Management and approved by the IB.

Rules for Earth and Sea Sciences papers

For publications concerning data from an 'Earth and Sea Sciences' instrument installed on the ANTARES infrastructure the order of the authors is not necessarily alphabetic. The first signatures in the list of authors can be those that have made a 'special' contribution to the contents of the paper. The names and order of these first signatures is defined by the principal author, according to the usual conventions adopted within the Earth and Sea Sciences community. Following these first signatures, the other ANTARES authors will be listed in alphabetical order.

The Publication Committee has the role to recommend whether a publication is classified as an Earth and Sea Sciences publication. The final author list will be reviewed and approved by the IB.

ANTARES Organigram



ANTARES ORGANIGRAM
9/5/11

Annex 6: ANTARES Major Milestones for the final Maintenance Operation and Analysis Phases

January 2012-December 2014 Maintenance operations, data taking, data analysis

January 2015-December 2016 Data taking and analysis. Reduced detector maintenance.

January 2012-December 2016 Operations related to R&D projects aimed at the construction of large underwater neutrino detectors, as defined in Article 11 of this MoU.

Support for access to the ANTARES infrastructure by external users, as defined in article 10 of this MoU.

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Annex 7: Maintenance and Operation Common Fund

Consumables and services of a general-purpose nature, indispensable for the operation of the ANTARES detector, are as a general rule jointly financed by the Institutions in the form of fund contributions to a Common Fund. Components of the Common Fund are: Sea Operations, Repairs and Operations in La Seyne. The Common Fund will be managed and operated by the Resources Manager.

1. Sea Operations and Repairs

Sea operations include all activities necessary to recover, repair and deploy the lines and eventually for the MEOC maintenance and repairs to the Junction Box..

2. Operations in La Seyne

These include all costs related to rental of buildings and installation space, electricity, maintenance contracts, consumables and repairs to computers and facilities.

The estimate as of year 2010 of the annual Maintenance and Operation cost is 500 k€. This estimate assumes the recovery, repair and deployment of one line. The breakdown of these costs as percentage of the total is shown as a reference in the following table:

Activity/Item	Percentage
Maintenance Sea Operations	38%
Spare parts/Replacements	9%
Quality Control	2%
Line and electronics integration and maintenance	18%
Operations in La Seyne	33%
Total	100%

The precise amount of the CF for each of the years from 2012 on will be agreed upon by the FRB at the end of the previous year. The sharing of the CF contribution among the different Institutions will be calculated proportionally to the number of "authors" in each Institution. Authors will be all Antares members signing physics papers, with the exception of students. The situation will be accordingly reviewed at the end of each year.

A review will additionally take place in the event of a new Institute joining the Collaboration.

The CF sharing among the different Institutions in 2010 is given in the following table:

Institution	Contribution (%)
INFN	18.8
IN2P3	18.8
GRPHE	3.4
INSU	9.3
BMBF	12.1
MICINN	11.3
CEA	10.0
ANCS	1.7
KVI	1.7
FOM	12.1
NWO	0.8

Annex 8: Regulations regarding safety of personnel and insurance of damage.

Agreement to the ANTARES collaboration is effected through this Memorandum of Understanding between the Parties.

Responsibilities and Insurance

Damage suffered by personnel:

Each Party assumes responsibility for its personnel according to applicable law in the domains of Social Security, work accidents and, if applicable, professional illness. Similarly, each Party is responsible according to the rules of common law for damage of any kind, inflicted by its personnel during the execution of the experiment on any other person participating in the ANTARES experiment or to a person belonging to a third Party.

Damage to goods:

Each Party assumes sole responsibility, except in cases of intentionally inflicted damage, for the repair of damage suffered by its own goods until the moment that its goods, as part of the detector, have been positioned at the offshore or onshore target site of the detector. From that moment on, the repair of damage of the goods provided will be financed by the Common Fund constituted by the Collaboration.

Personnel working on the premises of another Party

During the execution of the ANTARES experiment, a Party may host on its premises personnel of another Party of ANTARES.

Personnel participating in an activity that is part of the ANTARES experiment maintain their status of employee of the organisation of their employer.

Personnel of Parties participating in an activity that is part of the ANTARES experiment are obliged to respect the rules and procedures concerning discipline, hygiene and safety applicable on the premises of the host. Such rules and procedures are made available by the host to personnel upon their first entry on the premises of the host.

Appendix A: Agreement between IN2P3/CNRS and Ifremer for the implementation of user access to the site and ANTARES infrastructure

BETWEEN

Le CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE, hereinafter referred to as CNRS/IN2P3, a public institution of scientific and technological value, headquartered at 3, rue Michel Ange, 75794 Paris Cedex 16, SIREN n°180089013 represented by Michel SPIRO, Director of l'Institut National de physique nucléaire et de Physique des Particules, acting in his own name and on behalf of this institute, hereinafter referred to as CNRS/IN2P3,

on one hand,

AND:

L'INSTITUT FRANÇAIS DE RECHERCHE POUR L'EXPLOITATION DE LA MER, hereinafter referred to as Ifremer, a public institution of an industrial and commercial nature, SIRET n°330 715 368 00297, headquartered at 155 rue Jean-Jacques Rousseau 92138 ISSY-LES-MOULINEAUX, and represented by its Chief Executive Officer or its representative,

on other hand,

Hereinafter referred to individually as the "Party" or collectively as the "Parties."

Taking into consideration

The Memorandum of understanding entitled "Collaboration in Completing the construction of the ANTARES Detector and Exploiting it for Scientific Purposes between the Participating Institutions/Funding Institutions/Funding Agencies" concluded for period from January 1st, 2007 till December 31st, 2011.

The co-operation agreement for the participation of Ifremer to the project ANTARES concluded on December 12th, 2007 between CNRS/IN2P3, CEA and Ifremer

The Contract region PACA – carrying out of secondary junction box concluded on July 23rd, 2007.

The Agreement of cooperation for the carrying out of the project BJS ANTARES.

PREAMBLE

The international consortium of partners, hereinafter referred to as ANTARES collaboration, is currently operating the infrastructure of the neutrinos telescope ANTARES under conditions and procedure previously defined. The deployment of 12 lines constituting the first stage of the telescope is planned to be finished by the end of 2008.

This infrastructure is an unique equipment in France and one of very few such infrastructures in the world giving access to measures permanently onto the deep-sea. The interest to use the site and the infrastructure ANTARES for tests of equipments in the deep sea site was declared since the beginning by the project.

The infrastructure ANTARES with its twelve lines of detectors is situated off the islands of Hyères by 2500 m of depth and is interfaced via a junction box to a control room situated in the Institut Michel Pacha de la Seyne-sur-mer, and is connected via a high bandwidth link to the CPPM.

A jumper allowing to deplace the connection interface of the junction box by 400 metre is foreseen. The secondary junction box, defined in common by both parties, will be installed by Ifremer on this jumper, under the control of the ANTARES Collaboration. This secondary junction box offers connectors (from 4 to 6) for the connection of equipments in conditions of shared time, power and bandwidth; a connector remains reserved, on request, for the ANTARES Collaboration.

Ifremer participated to the ANTARES project as operator for installation of the deep-sea infrastructure and anticipated a possible extension for the use of this infrastructure. It will fabricate the secondary junction box to be connected to the ANTARES infrastructure. The Parties wish to collaborate for the implementation of an access for third parties to the secondary junction box.

The ANTARES Collaboration has appointed the CNRS / IN2P3 to follow up the managing and the coordination of the operations allowing the use of the infrastructure ANTARES for the purposes of experiments by external users and in particular to conclude with Ifremer an agreement for the implementation of user access to the site and to the ANTARES infrastructure.

THE FOLLOWING HAS BEEN LAID DOWN :

1 – DÉFINITIONS

ANTARES: means the site and the infrastructure of the neutrinos telescope ANTARES,

BJ: means the ANTARES junction box,

BJS means the ANTARES secondary junction box,

CTA : means the Technical Access Committee to ANTARES,

ANTARES Collaboration: means the partners' international Consortium in charge of the project of the deep-sea telescope, the infrastructure and the scientific experiments under the naming of ANTARES,

Experiment ANTARES: means scientific experiments conduct within the framework of ANTARES,

CPPM: means the Marseille Centre for Particle Physics,

Operator: means the operator in charge of all or part of the installation and implementation of an experiment for a User ANTARES,

GUASA: means User Guide refers to the Access to ANTARES,

IB: means the Institution Board of ANTARES Collaboration as defined in the Memorandum of Understanding,

MOB / DEMOB: means to the length of mobilization and demobilization of equipment Ifremer for each operation.

SAI: means the access service infrastructure, in charge of managing the ANTARES access by Users, for the ANTARES Collaboration,

Rates 'commercial': means pricing applied by Ifremer to Users whose operation is a commercial purpose,

Rates 'partnership': means pricing applied by Ifremer to Users whose operation is a purpose of research,

Results common: means the research results obtained by the Parties in the framework of this agreement,

Third parties: means any person or entity called upon to intervene in the framework of this agreement in

connection with at least one of the Parties: subcontractor, temporary staff, client or user, guest, etc...,

User: means the applicant and client wishing to use ANTARES for testing equipment on deep site.

2 - PURPOSE

The purpose of this agreement is to define the modalities under which the CNRS/IN2P3 and Ifremer will cooperate to open the use of ANTARES, for purposes of experimentation, to Users.

To that end, this agreement:

- defines the principles, techniques and procedures for implementing this type of operation for Users. These principles are supplemented by GUASA, and are updated by the head of the SAI, and indicate the conditions and procedures for implementation and use of services offered,
- presents the organization of the Parties to allow the use of ANTARES for the purpose of testing for Users,
- defines operating rules of the BJS and distribution of revenue,
- specifies the ownership of the joint achievements of the Parties within the framework of this agreement, excluding results obtained by Users during testing equipment made by either Party.

3 - ORGANIZATION OF THE COLLABORATION

The organization and the role of various organs of the collaboration are as follows:

3.1. INSTITUTION BOARD

I. B. gives its final agreement for access to ANTARES by a User.

3.2. Operational entities for access to ANTARES

3.2.1 SAI

The function of SAI is assumed by the CPPM of the CNRS/IN2P3, who appoints the chairperson.

The SAI is in charge of defining and developing the technical modalities and procedures for access to ANTARES in the GUASA, investigate requests from users, manage the implementation of the activities on behalf of the ANTARES Collaboration and ensuring that the ANTARES experiment is not disturbed by the implementation of the User experiments.

It can create a CTA to investigate cases and managing operations related to the implementation of experiments requested by Users.

It presents an annual report summarising the activities operations to the IB.

3.2.2 CTA

The CTA is a technical committee meeting at the request of the head of the SAI. The SAI selects the members of this committee among the partners in the ANTARES Collaboration and Ifremer.

The CTA is responsible to investigate a request for access to ANTARES, to express an opinion on the technical feasibility and operational access, on the economics of the project and control the risks incurred by ANTARES. It is based on the rules specified in the GUASA.

The CTA may make use of external experts if needed and ask a user proposing an experiment for further information in order to qualify the request.

The CTA delivers its report to the head of the SAI who validates it.

3.2.3 OPERATOR

The Operator is responsible for the deployment and installation of all or part of the equipment concerned by the request for use of ANTARES, its connection to the BJS, and the implementation of experimentation.

It is in charge of setting up the equipment and any maintenance operations, surveillance, stopping and removal of equipment.

It takes the necessary contractual commitments with Users.

The ANTARES Collaboration and Ifremer agree that Ifremer will be the Operator for access to ANTARES.

In this context:

- Ifremer is the exclusive Operator with regard to:
 - connection to the BJS and its control surface, the equipment concerned by the request,
 - benefits facilities surface (Configuration, control, monitoring ..) and the operation of setting up the panel command,
 - monitoring the risks involved in the operations,

- Ifremer is the non exclusive Operator with regard to installation in the sea of the equipment necessary for experimentation.

As such, Ifremer agrees to accept, subject to the analysis of the risks involved in the operation and validation by the SAI, the intervention of other operators designated by the IB for the installation at sea of equipment necessary for a future experiment except connection to the BJS.

4 - CONDITION OF ACCESS TO USERS OF ANTARES EQUIPMENT

4.1 Principles

The installation, the connection of equipment, the activity of Users must be closely controlled by

the SAI in order to avoid causing disturbance to the ANTARES experiment.

4.2 Process acceptance of applications

User Applications should be addressed to the chairperson of the SAI. They are reviewed by a CTA established for that purpose by the person in charge. After reviewing, a report is prepared by the CTA and delivered by the chairperson of the SAI for approval of the IB.

User applications are drafted in accordance with the provisions set out in the GUASA.

The application outlines the objectives of the project, its technical perimeter, and especially helps to validate compliance with the constraints of implementation and use of ANTARES. It incorporates the elements, non exhaustive, listed in annex no. 1.

4.3 Operational Implementation

Ifremer carries out, directly or under his control, any manoeuvre near ANTARES for the User. Any installation and connection of equipment to ANTARES is carried out by Ifremer. The same is true for de-installation and disconnection.

During phases of activity, Ifremer is responsible for overseeing the risks involved in the operations. It provides a periodic reporting to the SAI, assures the notification of alerts, provides for the escalation in case of grave peril or not immediately treatable with the SAI, following the planned and validated procedures.

5 - COMMITMENTS OF PARTIES IN THE MATTER OF COMMUNICATIONS, PUBLICATIONS AND PUBLIC DATA

The Parties shall respect the rights and obligations defined in the Memorandum of Understanding ANTARES, communicate these obligations to Third parties and ensure their compliance. Parties, Users and third parties should in particular commit in writing to the following:

Citing "ANTARES Collaboration" in any communication and publication.

All data collected during experiments related to the use of ANTARES, and the results deduced from their salaries, are free for the partners of the ANTARES Collaboration when they are published,

Ifremer undertakes to grant the partners of the ANTARES Collaboration a license, free, non-exclusive and worldwide on software and processes used to access ANTARES for their own research for non-commercial exploitation.

6 PROVISIONS RESOURCES MADE BY THE PARTIES

6.1 Equipment and premises

The CPPM, as SAI, provides:

- A room and equipment for connection tests and supervision computer access to infrastructure,
- Upon request, an users office ,
- disk space on a backup server and interfaces with the network.

The room and corresponding control equipment may in a second phase be installed at the European Centre for Technology Sub-Marine (CETSM) Brégaillon.

6.2 Main Line

The CPPM has installed the principal liaison from the control station Michel Pacha to the BJ. It provides one of the connectors of this BJ, with the interfaces foreseen and the infrastructure cited in 6.1.

6.3 BJS

The CPPM and Ifremer ensure the definition of the specifications of the BJS and test equipment interfaces.

Ifremer has supplied the line of interconnection between BJ and BJS, conducts the research and manufacture of the BJS, and ensures under the supervision of the SAI the installation of all at sea.

The line of interconnection and the BJS are property of Ifremer, which has responsibility for their maintenance.

7 - OPERATING INCOME

7.1 As part of its operator function, Ifremer pledges to the ANTARES collaboration a variable fee payable for each operation authorized by the IB. The fee calculated on the cost of reviewing the User application, on the operations at sea and on the operating costs.

7.2. The variable fee due to the collaboration ANTARES will be the sum of the charges resulting from the formulas set out in sub-sections 7.2.1, 7.2.2 and 7.2.3 below:

7.2.1. Charge for the costs of examining applications for operation

Ifremer undertakes to pay the ANTARES Collaboration for each case treated an amount equal to 2/3 of the lump sum paid as User fees (entrance fee, feasibility study...).

7.2.2 fees related to operations at sea

7.2.2.1 Provided that the operation requested by a user is coupled with a maintenance operation of ANTARES requested by the ANTARES Collaboration, Ifremer undertakes to pay the ANTARES Collaboration, for each coupled operation, a sum equivalent to half the amount of the MOB/DEMOB related to the maintenance operation for ANTARES.

7.2.2.2. In the event that the operation requested by a user is not coupled with a maintenance operation of ANTARES requested by the ANTARES Collaboration and the commercial pricing of Ifremer is applied to the user, Ifremer undertakes to pay the ANTARES Collaboration for each operation, an amount equal to half the profit margin made by Ifremer on the operation.

7.2.2.3. In the event that the operation requested by a user is not coupled with a maintenance operation of ANTARES requested by the ANTARES Collaboration and the partnership pricing of Ifremer is applied to the user. Ifremer will have no fee to pay to the ANTARES Collaboration for the operation at sea.

7.2.2.4. In the event that the operation requested by a user is not coupled with a maintenance operation of ANTARES requested by the ANTARES Collaboration and the partnership pricing of Ifremer is applied to an ANTARES partner or party proposed by the ANTARES collaboration, Ifremer will have no fee to pay to the ANTARES Collaboration for the operation at sea.

7.2.3 fees related to operating expenses of the BJS

Ifremer retains all amounts received under operating expenses of the BJS until the full amortization of costs advanced by Ifremer for the establishment of the BJS.

After complete depreciation of the BJS, Ifremer undertakes to pay the ANTARES Collaboration a share of 50% of money received under the operating revenues of the BJS net of annual operating costs.

Regarding the pre-tests conducted by any party to the benefit of a user, it does give rise to any charge for the benefit of the other Party.

7.3. Terms of the settlement fee

7.3.1. Not later than January 31 of this year No 1, Ifremer will address the CNRS/IN2P3 mandated by the ANTARES Collaboration, a statement of fees payable to the ANTARES Collaboration under this agreement.

7.3.2. The invoices settlement fees are to be sent to Ifremer at the following address:

Ifremer
Agency principal accounting
155, rue Jean-Jacques Rousseau
92138 Issy-les-Moulineaux Cedex
France
and bear the reference 08/1217136/T

Ifremer frees itself of sums due under the settlement of charges by transfer into the account opened on behalf of the Delegation Paris Michel ange CNRS as detailed below: Bank code: 10071 - Bank Code: 75000 - No Account: 00001000505 -- Key 20.

7.4. The CNRS/IN2P3 has the right to terminate this agreement in the event of non payment of fees for the past year. A warning of non-payment and declaration by the CNRS/IN2P3 of making use of this clause must be given one month in advance of this termination.

8 - PRIVACY - PUBLICATIONS

8.1. Each Party recognizes that confidential information provided by the other Party under this agreement, are reserved solely for use by the receiving Party and the latter undertakes to use exclusively in the framework of this agreement.

8.2. Any publication on ANTARES will be subject to prior written approval of the ANTARES Collaboration. In any publication or communication, each Party will make mention of the other Party in a form approved by the latter.

9 - OWNERSHIP OF RESULTS

For any transaction that could generate results commonality between the Parties, they are deemed co-owners of the results. In case of industrial and commercial exploitation common results, the Parties agree on the modalities owners operating in a specific agreement specifying in particular, the purpose of collaboration, the contributions of the Parties, the conditions for allocating expenses, how publication and exploitation of results. All the conventions must respect, except express waiver, the terms and conditions of this agreement.

10 - LIABILITY

10.1 Each Party is responsible for following the rules of common law damages of any kind caused by its personnel staff and / or property of third parties in connection with the implementation of this agreement.

10.2 Each Party shall provide coverage of the consequences of civil liability imposed upon it under the provisions of Article 10.1 above.

10.3 Each Party waives all claims against the other for any damage caused during the execution of this agreement, equipment or suffered by its own staff subject to formal in the latter case of rights, their beneficiaries, Social Security or any other body treated.

10.4 Each Party expressly declares that no commitment on how implemented in the framework of this agreement. The commitment of each Party does not affect the results to be provided. Accordingly, each Party may be liable for direct or indirect result of the failure to obtain results.

11 - PERIOD - TERMINATION

11.1 This agreement shall enter into force after notification of the commissioning of the BJS by Ifremer the CNRS/IN2P3 for a period of 4 years.

11.2 A year before the arrival of the term, Ifremer and the CNRS/IN2P3 undertake to enter into discussions to renew the agreement and decide on the modalities of rehabilitation and pollution, use of the BJS at the end of this agreement.

11.3. This agreement may be terminated by either Party by giving six months notice. The Parties agree then how to terminate. Neither Party shall be entitled to compensation as a result.

12 - CONCILIATION - DISPUTES

12.1. If difficulties arise in connection with the interpretation or execution of this agreement, the parties will resort to conciliation before any court.

12.2. To this end, the most diligent of both parties will seize the other in writing, the purpose of the difficulty in offering him the name of a conciliator. The other Party shall, within fifteen days indicate whether to accept the conciliator and, in case of refusal, will make a proposal against which he should be responded within fifteen days of notification.

12.3. This exchange of correspondence will be by letter with acknowledgement of receipt.

12.4. If the Parties fail to agree, the conciliator will be appointed at the request of the Party's most diligent by the President of the Tribunal de Grande Instance de Paris, acting as a matter of relief.

12.5. The conciliator appointed or chosen will have full powers to recover all indications of any kind and to seek explanations from any Parties it deems necessary.

12.6. Its mission is to establish and notify the parties by registered letter with acknowledgment of receipt within one month after its designation, a report analysing the origin and nature of the problem occurred and proposing an objective and comprehensive solution in law and equity.

12.7. Failing agreement, the dispute will be brought before the Tribunal de Grande Instance de Paris.

Article 13 – LANGUAGE OF THE AGREEMENT

Two versions of the Agreement shall be drafted, to wit in French and in English. In the event of a difficulty in interpretation, the French version shall be deemed legally binding..

Made in Paris
The

for CNRS/IN2P3

for Ifremer

For CPPM

Annexe n°1

Liste non exhaustive du dossier de demande d'utilisation

- Objectifs du projet, organisation et planification,
- Liste des intervenants, rôles et responsabilités,
- Présentation générale du système, ses composants fixes et mobiles, ses interfaces,
- Procédures de mise en œuvre du système, de la mise en place à la désinstallation et récupération des éléments; en cas de mise en œuvre donnant lieu à des manœuvres multiples durant la vie du projet global, l'ensemble de ces manœuvres sera décrit,
- Interfaces avec les opérateurs et avec l'environnement,
- Descriptif technique des interfaces avec ANTARES et principes retenus pour opérer l'équipement via la connexion aux interfaces dédiées par ANTARES,
- Identification des perturbations potentielles et propositions de solutions pour les éviter ou les amener à un niveau acceptable: On retiendra comme principe de base que si les nuisances générées sont supérieures à celles prévues, le SAI pourra « stopper » à tout moment l'utilisation « secondaire », et ce avec un préavis très court, et que l'utilisation du service d'accès ne pourra être repris que si les expériences ANTARES n'ont pas été perturbées et si les sources de perturbations ont été corrigées. Afin d'être accepté, le dossier de demande devra notamment satisfaire aux critères suivants:
 - Sécurité énergétique: L'isolement et la sécurité de l'alimentation Antares seront assurés dans tous les cas en amont au niveau de la BJ. La gestion et les sécurités des réseaux « secondaires » seront assurées au niveau des équipements
 - Signaux acoustiques acceptés
 - Signaux lumineux acceptés
 - Perturbations dues au soulèvement de particules
 - Signaux électromagnétiques
- Dossier d'analyse de risques et sûretés mises en oeuvre pour le système et vis-à-vis d'ANTARES (infrastructure et expériences),
- Dossier de tests préalables,
- Engagement du respect des contraintes données par la Collaboration ANTARES,
- Couverture des assurances prises
- Le dossier présenté pour acceptation au I.B. comprend :
 - le dossier de demande rempli par l'Utilisateur suivant le cadre précité, signé par le(s) responsable(s) à même d'engager la responsabilité juridique et financière de la ou des entreprises soumettant le projet,
 - le rapport de la Commission Technique d'Accès,
 - le rapport de l'Ifremer, en qualité d'Opérateur, concernant la coordination de l'opération,
 - la copie des assurances de l'Utilisateur (assurance responsabilité civile)
 - les retours financiers et scientifiques attendus, sous réserve de la confidentialité demandée par les Utilisateurs,
 - l'avis et la signature du responsable du SAI, avec indication des plages calendaires autorisées pour les opérations.

Appendix B: PROTOCOL between CEA, CNRS and IFREMER

C5140

Réf. IFREMER : 00/1213526

**ACCORD – CADRE DE COLLABORATION
POUR LA PARTICIPATION
DE L'IFREMER AU PROJET ANTARES**

ENTRE

Le COMMISSARIAT à l'ENERGIE ATOMIQUE, établissement à caractère industriel et commercial, ci-après dénommé "CEA", dont le siège est au CEA Saclay, 91191 Gif-sur-Yvette, représenté par Monsieur Yves CARISTAN, Directeur des Sciences de la Matière (DSM), de première part,

ET

LE CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE, INSTITUT NATIONAL DE PHYSIQUE NUCLEAIRE ET DE PHYSIQUE DES PARTICULES, établissement public à caractère scientifique et technologique, ci-après dénommé "CNRS/IN2P3", dont le siège social est au 3, rue Michel Ange 75 794 PARIS Cedex, SIREN n° 180089013, représenté Monsieur Jean-Jacques AUBERT, Directeur de l'IN2P3,

de seconde part,

ET

L'INSTITUT FRANÇAIS DE RECHERCHE POUR L'EXPLOITATION DE LA MER, établissement public à caractère industriel et commercial, SIRET n° 330 715 368 00297, ci-après dénommé l'IFREMER, dont le siège social est 155, rue Jean-Jacques Rousseau 92138 ISSY-LES MOULINEAUX Cedex, représenté par Jean-François MINSTER, Président Directeur Général,

de troisième part,

ci-après dénommés individuellement "Partie" et collectivement "Parties",

IL EST EXPOSE CE QUI SUIT :

PREAMBULE

ATTENDU que le CEA et le CNRS/IN2P3 collaborent en vue de réaliser un observatoire permanent au fond de la mer qui permettra l'installation d'un détecteur de neutrinos de très haute énergie, ci-après dénommé le Projet ANTARES,

ATTENDU que l'objectif proche de ce projet est d'instrumenter une surface de 0,1 km² d'une matrice tridimensionnelle de photomultiplicateurs pour aboutir à un détecteur de neutrinos opérationnel à partir de 2003 pour une durée minimale de 10 ans.

ATTENDU que IFREMER dispose de moyens navals et humains et d'un savoir-faire reconnu en matière d'intervention sous-marine et de mise en œuvre d'appareils et d'instrumentations scientifiques.

ATTENDU qu'en outre IFREMER a participé depuis le début de l'année 1998 à des études sur site, à la conception d'une ligne expérimentale du futur détecteur de neutrinos, à la qualification d'équipements, et à la définition des procédures d'installation et de récupération.

ATTENDU que IFREMER, le CEA et le CNRS/IN2P3 ont décidé de conclure un accord de collaboration pour fixer les conditions de participation d'IFREMER au projet ANTARES.

IL A ETE CONVENU ET ARRETE CE QUI SUIT :

ARTICLE 1 – DEFINITIONS

- 1.1 ACCORD : l'ensemble constitué par le présent accord et ses Annexes.
- 1.2 PROJET : le projet ANTARES tel que décrit en Annexe 1,
- 1.3 RESULTATS : les connaissances brevetées ou non, issues des accords d'application visés à l'article 4 ci-après,
- 1.4 BREVETS : les brevets, certificats d'utilité, modèles d'utilités ou tout autre titre de propriété industrielle concernant les RESULTATS, demandés ou délivrés en tous pays pendant la durée de l'ACCORD ou postérieurement, protégeant des inventions effectuées dans le cadre des accords d'application précités.
- 1.5 CONNAISSANCES : tous savoir-faire, logiciels, données, spécifications, connaissances ou toutes autres informations brevetables ou non dans les domaines visés à l'article 3 ci-après appartenant à une Partie avant la signature de l'ACCORD ou obtenues par elle en dehors de l'ACCORD.

ARTICLE 2 – OBJET DE L'ACCORD

L'ACCORD a pour objet de définir les conditions et modalités selon lesquelles IFREMER participera au PROJET.

ARTICLE 3 – DOMAINE D'INTERVENTION DE IFREMER

IFREMER apportera son concours dans les deux domaines suivants détaillés en Annexe 1 :

- intervention marine et sous-marine,
- développements en matière de technologies sous-marines.

ARTICLE 4 – ACCORDS D'APPLICATION

Toute action de collaboration fera l'objet d'un accord d'application écrit séparé signé par les Parties. Chaque accord d'application définira notamment le programme de recherche, les CONNAISSANCES de chaque Partie, les délais, le rôle de chaque Partie et les modalités d'exécution des tâches mises à leur charge, le montant du budget affecté à ce programme et la participation financière des Parties aux moyens de contributions en numéraires ou de contributions en nature sous forme de prestations de main-d'œuvre ou de mise à disposition de moyens ou de personnel.

ARTICLE 5 – COMITE TECHNIQUE

- 5.1 Afin de permettre une bonne exécution de l'ACCORD et des accords d'application, il est créé un Comité Technique, composé d'un représentant de chaque Partie impliquée dans l'ACCORD, chaque représentant pouvant être assisté le cas échéant des experts de son choix.

Dans le délai d'un mois à compter de la signature de l'ACCORD, les Parties se notifieront le nom de leurs représentants. Tout changement ultérieur dans leur représentation sera notifié de même.

Le Comité Technique se réunira à la demande des Parties et en tous les cas au moins une fois par semestre.

Les décisions du Comité Technique sont prises à l'unanimité.

Chacune des réunions fera l'objet d'un compte rendu rédigé par l'une des Parties et communiqué aux autres Parties. Sans remarques de la part des autres Parties dans un délai de quinze jours, le compte rendu sera réputé accepté par les trois Parties.

5.2 Le Comité Technique sera notamment chargé :

- de veiller de façon générale au bon déroulement de l'ACCORD et des accords d'application et de s'efforcer de résoudre à l'amiable les différends éventuels qui pourraient survenir à l'occasion de l'exécution de l'ACCORD et des accords d'application ;
- de favoriser les échanges d'informations utiles entre les Parties dans le cadre de l'ACCORD et des accords d'application ;
- de préparer l'insertion optimale dans le Programme des Moyens Navals de l'IFREMER des affrètements des engins sous-marins de l'IFREMER dans le cadre du PROJET, puis de décider du lancement des accords d'application ;
- de donner son accord préalable et écrit aux publications sur les RESULTATS par les Parties conformément à l'article 10 de l'ACCORD ;
- d'analyser les opportunités de collaboration entre les Parties sur des thèmes nouveaux et de déterminer le cas échéant les nouveaux domaines de collaboration.

ARTICLE 6 - COMMUNICATION DES CONNAISSANCES

- 6.1 Le Comité Technique veillera à ce que chacune des Parties soit informée des RESULTATS développés par les autres Parties au fur et à mesure de leur obtention ainsi que de leurs perfectionnements (y compris le dépôt de demandes des brevets).
- 6.2 En tout état de cause, les communications de RESULTATS ne devront pas affecter la protection des inventions brevetables conformément à l'ACCORD.
- 6.3 Si nécessaire, les Parties se communiqueront leurs CONNAISSANCES respectives selon des modalités à déterminer dans les accords d'application. Ces informations seront traitées comme des informations confidentielles.
- 6.4 D'une manière générale les informations transmises par l'une des Parties à l'autre dans le cadre de l'ACCORD et des accords d'application seront exactes au mieux des connaissances de la Partie émettrice mais la dite Partie ne garantit pas que les informations transmises soient appropriées à une application particulière ou un usage quelconque qui en serait fait par la Partie réceptrice.
- 6.5 En conséquence, chaque Partie sera seule responsable des dommages de toute nature résultant, directement ou indirectement de l'utilisation par elle des informations communiquées par une autre Partie, des CONNAISSANCES d'une autre Partie et des RESULTATS.

ARTICLE 7 - PROPRIETE INDUSTRIELLE

- 7.1 Chacune des Parties reste propriétaire de ses CONNAISSANCES.
- 7.2 Les RESULTATS, sous réserve de l'article 7.7 ci-dessous, seront réputés appartenir conjointement aux Parties à parts égales, sauf dispositions contraires prévues dans les accords d'application et les éventuels BREVETS en découlant seront déposés d'un commun accord aux noms conjoints des Parties. Les formalités de dépôt seront accomplies par le CEA. Les frais de dépôt, d'obtention et de maintien en vigueur seront partagés à parts égales entre les Parties. Chaque brevet qui sera pris en commun fera l'objet d'un règlement de copropriété conforme aux dispositions de cet ACCORD.

- 7.3 Les Parties se concerteront au plus tard trois mois avant l'expiration du délai de priorité prévu à l'article 4 de la Convention de Paris pour la Propriété Industrielle pour établir d'un commun accord la liste des pays dans lesquels elles déposeront conjointement les BREVETS étrangers correspondants aux BREVETS prioritaires qu'elles détiendraient en co-propriété.
- 7.4 Si l'une des Parties renonce à déposer, à poursuivre une procédure de délivrance ou à maintenir en vigueur un ou plusieurs BREVETS, en France ou à l'étranger, elle devra en informer les autres Parties en temps opportun pour que celles-ci puissent déposer à leurs seuls noms et à leurs seuls frais, ou à poursuivre la délivrance ou maintenir en vigueur un ou plusieurs BREVETS. La Partie qui s'est désistée s'engage à signer toutes les pièces pour permettre aux autres Parties de devenir seules titulaires du ou des BREVETS en cause.
- 7.5 En cas de contrefaçon d'un BREVET détenu en co-propriété, les co-propriétaires décideront d'un commun accord s'il y a lieu de poursuivre le ou les contrefacteurs. En cas d'accord, ces poursuites pourront être engagées par l'une des Parties pour compte commun et à frais partagés. Si l'un des co-propriétaires renonce expressément à engager les poursuites, les autres pourront les entreprendre à leurs seuls frais, risques et profits.
- 7.6 Si l'une des Parties désire céder sa quote-part sur un BREVET, elle notifiera au préalable et par écrit son intention aux autres Parties qui bénéficieront d'un droit de préemption pendant un délai de deux mois à compter de la notification.
- 7.7 Les droits d'auteur sur les créations et notamment sur les logiciels, plans et documentations appartiennent à la ou les Parties qui les ont développés.

ARTICLE 8 - DROIT D'USAGE- EXPLOITATION

- 8.1 Droits d'usage
- 8.1.1 Chaque Partie pourra mettre à la disposition des autres Parties à titre gratuit des logiciels dont elle est propriétaire lorsque ces logiciels s'avéreront nécessaires pour la bonne exécution de l'ACCORD ou des accords d'application. Préalablement à toute mise à disposition, un accord spécifique de licence d'utilisation de logiciels devra être conclu entre les Parties.
- 8.1.2 Les Parties auront un droit d'usage gratuit des RESULTATS pour leurs propres activités de recherche et développement, en dehors toute exploitation commerciale.
- 8.2 Exploitation commerciale
- Chaque accord d'application définira les conditions d'utilisation par les Parties à des fins commerciales des RESULTATS.

ARTICLE 9 - CONFIDENTIALITE

- 9.1 Chaque Partie s'engage à conserver confidentielles les CONNAISSANCES appartenant aux autres Parties et à ne les utiliser que pour l'exécution de l'ACCORD et/ou des accords d'application.
- A cet effet les Parties s'engagent à ne pas communiquer à des tiers les CONNAISSANCES appartenant aux autres Parties, sauf autorisation préalable et par écrit de la Partie propriétaire de celles-ci.
- 9.2 Le présent engagement de secret s'applique pendant toute la durée de l'ACCORD et des accords d'application, et pendant les cinq (5) années qui suivront leur expiration ou leur résiliation pour quelque cause que ce soit. Il ne s'applique cependant pas aux connaissances :
- pour lesquelles la Partie en cause pourra prouver qu'elles étaient en sa possession à l'époque où elles lui ont été communiquées,

- qui, à l'époque de sa communication à la Partie en cause, étaient publiquement connues,
- qui, après communication à la Partie en cause, sont venues à la connaissance du public par suite de divulgation sans qu'il y ait faute de la Partie concernée,
- communiquées à la Partie en cause sans obligation de secret par un tiers, qui en est le détenteur légitime.

ARTICLE 10 - PUBLICATIONS – COMMUNICATIONS

Aucune publication se rapportant spécifiquement aux travaux exécutés dans le cadre des accords d'application portant sur les RESULTATS, ne pourront être effectuées par l'une des Parties sans l'accord écrit et préalable du Comité Technique. L'accord ne sera pas refusé sans motif légitime, notamment si les informations devant faire l'objet de la publication n'offrent pas un intérêt stratégique de nature industrielle, commerciale ou de défense pour les activités de l'une des Parties.

ARTICLE 11 - MISE A DISPOSITION DE PERSONNEL

- 11.1 Pendant la durée de l'ACCORD et pour l'exécution des accords d'application, chaque Partie pourra être amenée à recevoir dans ses locaux du personnel des autres Parties.
- 11.2 Les personnels des Parties participant à une action de collaboration conservent le statut de leur organisme d'origine qui assure à leur égard sa responsabilité d'employeur et les gère selon ses règles et procédures propres.
- 11.3 Les personnels de l'une des Parties intervenant dans les locaux d'une autre Partie sont tenus de respecter les règles en vigueur dans ces locaux en matière de discipline, d'hygiène et de sécurité. Ces règles leur sont notifiées à leur entrée en fonction.
- 11.4 Conformément aux dispositions du décret n° 92.158 du 20 février 1992, les Parties analyseront ensemble les risques pouvant résulter de l'interférence entre les activités, les installations et les matériels de chacune des Parties. Le cas échéant, un plan de prévention sera établi par écrit conformément au décret visé ci-dessus.

ARTICLE 12 – RESPONSABILITES - ASSURANCES

- 12.1 Responsabilité à l'égard des tiers :

Chacune des Parties reste responsable dans les conditions du droit commun des dommages que son personnel pourrait causer aux tiers à l'occasion de l'exécution de l'ACCORD.

- 12.2 Responsabilités entre les Parties

- 12.2.1 Dommages au personnel :

Chacune des Parties prend en charge la couverture de son personnel conformément à la législation applicable dans le domaine de la sécurité sociale, du régime des accidents du travail et des maladies professionnelles dont il relève et procède aux formalités qui lui incombent. La réparation des dommages subis par ces personnels du fait ou à l'occasion de l'exécution de l'ACCORD s'effectue donc à la fois dans le cadre de la législation relative à la sécurité sociale et au régime des accidents du travail et des maladies professionnelles éventuellement applicable et dans le cadre de leur statut propre.

Chaque Partie est responsable suivant les règles du droit commun des dommages de toute nature causés par son personnel au personnel de l'autre Partie.

- 12.2.2 Dommages aux biens :

Chacune des Parties conserve à sa charge sans recours contre les autres Parties, sauf dans le cas de faute intentionnelle, la réparation des dommages subis par ses biens propres, du fait ou à l'occasion de l'exécution de l'ACCORD.

ARTICLE 13 – NULLITE

En cas de nullité de l'une des dispositions de l'ACCORD, les autres dispositions resteraient en vigueur et les Parties se concerteraient pour remplacer ladite disposition et la mettre en conformité avec les textes, en préservant l'esprit de l'ACCORD.

ARTICLE 14 - DUREE – RESILIATION

14.1 L'ACCORD entre en vigueur à compter de sa signature par les Parties pour une durée de cinq ans. Il pourra être renouvelé par voie d'avenant pour une période équivalente. Les Parties se concerteront à ce effet dans les trois (3) mois précédant la date d'expiration.

14.2 Chaque Partie pourra résilier l'ACCORD de plein droit, sans formalité judiciaire quelconque et sans avoir à verser d'indemnité à quelque titre que ce soit à l'autre Partie en cas de survenance de l'un des faits suivants :

- désaccord durable affectant le bon fonctionnement de la coopération,
- violation par l'une des autres Parties d'une des obligations essentielles de l'ACCORD et si les autres Parties ne souhaitent pas se substituer ou substituer un tiers à la Partie défaillante.

La Partie demandant la résiliation devra notifier sa décision aux autres par lettre recommandée avec accusé de réception en visant la disposition contractuelle et le motif fondant sa demande.

La résiliation deviendra effective si les Parties ne trouvent pas de solution amiable ou s'il n'est pas remédié à la faute par la Partie défaillante dans les trois (3) mois suivant la réception de la lettre par cette dernière.

14.3 Nonobstant les dispositions ci-dessus, les droits et obligations des Parties au titre des accords d'application en vigueur à la date d'expiration ou de résiliation de l'ACCORD survivront jusqu'à leur propre terme.

14.4 En outre, les dispositions des articles 7, 8, 9, 10, 12 survivront pour la durée des droits et obligations qu'ils contiennent en cas de résiliation ou d'expiration de l'ACCORD.

ARTICLE 15 – LITIGES (Preliminary – version June 2001)

Les Parties s'efforceront de résoudre à l'amiable tout différend découlant de l'ACCORD. Si elles n'y parvenaient pas, le litige serait porté devant les Tribunaux compétents de Paris.

Fait en 3 exemplaires originaux

A Paris, le

Pour le CEA
YVES CARISTAN
Directeur de DSM

Pour CNRS/IN2P3
M. SPIRO
Directeur de l'IN2P3

Pour IFREMER
J. F. MINSTER
Président Directeur Général

ANNEXE 1

Définition du PROJET ANTARES et des modalités de participation de IFREMER

A – PROJET ANTARES

Le Projet ANTARES (Astronomy with A Neutrinos Telescope and Abyss environmental RESearch) a pour but de démontrer qu'il est possible de construire un détecteur immergé en Méditerranée et capable d'étudier les Neutrinos Cosmiques de Haute Energie.

Il s'agit d'une collaboration internationale dont les partenaires principaux sont le CNRS/IN2P3 et le CEA/DAPNIA-Saclay. Elle associe une centaine de scientifiques provenant de cinq pays européens.

Le Projet ANTARES prévoit au final la construction d'un détecteur de grandes dimensions (environ 1km^3), comportant une matrice tridimensionnelle de capteurs de lumière (modules optiques).

La première phase du projet, qui a débuté en 1996, a consisté à mesurer des paramètres sur site, à 40 km au sud de Toulon par environ 2 400 m de profondeur, et à développer la technologie nécessaire pour réaliser un dispositif de détection sur le fond de la mer : mise au point des procédures de déploiement et de récupération, caractérisation du site, développement et essais de matériels divers (modules optiques, photomultiplicateurs, électronique, courantomètres, systèmes acoustiques de positionnement...) et mesure des paramètres d'environnement essentiels pour le fonctionnement des détecteurs optiques (propriétés optiques du milieu, courants).

Cette première phase est considérée comme presque terminée. Une ligne prototype destinée à prouver la performance du détecteur in situ a été immergée au large de Marseille en Décembre 1999.

Néanmoins plusieurs études sont en cours et les développements et essais de matériels se poursuivent.

La seconde phase du projet est une étape intermédiaire de démonstration qui comporte la construction d'un détecteur comportant un nombre limité de lignes (13), avec au total environ 1000 modules optiques, couvrant une surface d'environ $0,1\text{ km}^2$. Une 14ème ligne spécifique sera dédiée à d'autres mesures contributives.

Ce détecteur sera entièrement modulaire et il pourra être déployé en mer par étapes.

Le planning prévoit la mise à l'eau de 2 lignes en 2003, avec des tests en continu et des déploiements partiels aux étapes intermédiaires.

La mise en place de l'ensemble du dispositif (10 lignes) devra être achevée en 2004.

Cette seconde phase comportera un travail important d'intervention sous-marine. Cependant des essais complémentaires de comportement de matériels et de sous-ensembles pourront être réalisés sur site ou en simulation en laboratoire.

B - PARTICIPATION DE IFREMER

Dans le cadre de l'ACCORD, IFREMER apportera son concours dans les deux domaines ci-après.

I INTERVENTION MARINE ET SOUS-MARINE

I-1 Recherche et développement

- *Conseils pour l'architecture marine du détecteur*

Recherche de solutions, spécifications et propositions sous la forme d'avant-projets pour la configuration du champ, la boîte de jonction, la connectique, les embases de lignes largables, les modules optiques. Ces propositions seront essentiellement axées sur les aspects déploiement et intervention sous-marine.

- **Conseils pour la définition d'un système de positionnement base longue dédié et opérationnel pendant toute la phase de développement du projet ANTARES**
- **Conseil pour la pose et la maintenance du câble électro-optique**
- **Recherche de solutions alternatives pour l'intervention sous-marine**

Des solutions mettant en œuvre des moyens téléopérés pourront être proposées dans le cadre du projet en remplacement de l'intervention habitée.

I-2 Opérations à la mer

Les opérations à la mer envisagées sont les suivantes :

- pose du câble électro-optique ;
- pose et relevage de la boîte de jonction ;
- pose et relevage des lignes ;
- déploiement et connexion des câbles d'interconnexion.

L'IFREMER apportera son concours au PROJET pour ces opérations aux niveaux :

- Ingénierie opérationnelle
- plan d'installation bord et suivi des modifications du navire Castor ;
- étude et suivi de réalisation d'équipements à bord nécessaires ;
- étude et suivi de réalisation d'outillages et de déploiement nécessaires ;
- préparation des procédures opérationnelles générales et sécurité.

Ces procédures seront mises au point avec l'armateur du Castor et Genavir pour les opérations prévoyant de mettre en œuvre un engin sous-marin de l'IFREMER.

• **Opérations et affrètements d'engins sous-marins de l'Ifremer**

Les opérations envisagées peuvent faire appel ou non aux moyens d'intervention de l'IFREMER.

D'une façon générale, les opérations feront l'objet d'accords d'application qui préciseront la participation et la responsabilité de l'IFREMER.

Par ailleurs, pour tenir compte des impératifs de préparation du Programme des Moyens Navals de l'IFREMER, les besoins estimés en opérations pour l'année suivante seront confirmés en janvier de chaque année par le CEA et le CNRS.

Dans le cas éventuel de l'utilisation d'engins habités, IFREMER prendra également l'avis de sa Commission de Sécurité des Engins Habités (CSEH).

II DEVELOPPEMENTS TECHNOLOGIQUES

• **Hydrodynamiques**

Des essais de tractions des supports de module optique et de ses câbles sont nécessaires pour mesurer les efforts sur les structures, et les phénomènes vibratoires sur les câbles.

L'IFREMER apportera son soutien en réalisant des calculs et en donnant son avis sur le comportement hydrodynamique probable des structures, ainsi que des conseils pour les modifier.

- **Qualification en environnement marin**

L'IFREMER apportera son concours pour, à la fois définir les programmes d'essais et réaliser les tests de tenue à l'environnement : essais en caisson hyperbare, tests climatiques et mécaniques, sur les différents composants, notamment les sphères, les enceintes et les câbles et connecteurs.

Une zone du dispositif, connectée à la boîte de jonction avec la terre, sera affectée à des travaux expérimentaux : mesures, essais de matériels en vue de les qualifier pour une immersion en grande profondeur sur une longue durée.

- **Effet des implosions :**

Des essais d'implosions seront réalisés en collaboration entre IFREMER et le CPPM. Ils ont pour objectifs d'évaluer les risques pour les structures, les lignes, les conteneurs et les risques d'implosion en série. L'implosion d'une sphère au fond sera provoquée à l'aide d'un percuteur, et l'énergie dégagée au cours du temps sera mesurée au moyen d'une acquisition rapide.

- **Assurance qualité/fiabilité**

Des procédures de contrôle qualité et des études de fiabilité sont requises pour la conduite du PROJET. L'IFREMER participera à une action de formation sur le sujet.

- **Matériaux composites**

Des études et des développements des matériaux composites sont à envisager pour la réalisation d'enceintes résistantes à la pression, compte tenu de leur faible coût par rapport notamment au Titane. Des essais seront réalisés sur site et en caisson hyperbare.

- **Salissures**

Les mesures optiques peuvent être perturbées par le dépôt de salissures sur les modules. Des essais sur site avec du matériel approprié sont nécessaires pour évaluer l'importance des dépôts et leur influence sur les mesures. L'IFREMER contribuera à cette évaluation en apportant ses connaissances sur la formations des biofilms et son soutien pour la réalisation d'essais et la définition de moyens de prévention.

Appendix C

Memorandum of Understanding

TAToO

Telescopes - ANTARES Target of Opportunity

Optical follow-up of "special" neutrino events
from the ANTARES detector with the ROTSE telescopes

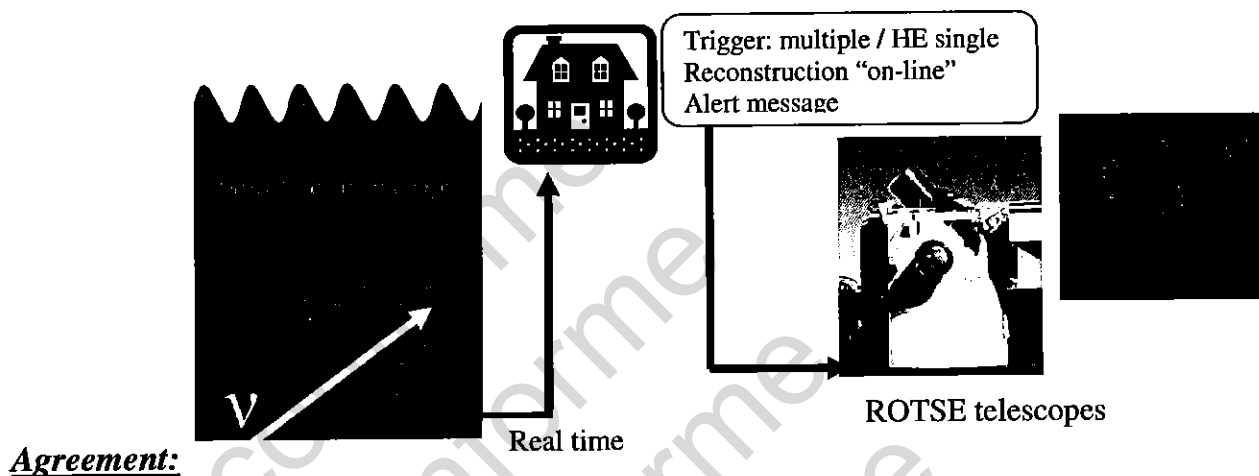
The ANTARES telescope has the potential to detect transient sources emitting high energy neutrinos, such as gamma-ray bursts (GRBs), core-collapse supernovae (SNe), flares of active galactic nuclei (AGNs)... To enhance the sensitivity to these sources, a new detection method based on the coincidence of neutrino signal and an optical detection has been developed. The ANTARES Collaboration has implemented a fast on-line track reconstruction with a good angular resolution. These characteristics allow triggering an optical telescope network in order to help identify the nature of the neutrino sources. This Memorandum of Understanding formalizes the agreement between the ANTARES and ROTSE Collaborations to assure the optical follow-up of the neutrino alerts. The project is named TAToO (Telescopes - ANTARES Target of Opportunity).

Introduction:

The search for HE neutrinos from transient sources can be performed using two different approaches: the triggered search method and the rolling search method. The first method is based on the search for neutrino candidates in conjunction with accurate timing and positional information provided by an external trigger: the triggered search. The second method is based on the search for "special neutrino events" originating from the same location within a given time window: the rolling search. The purpose of this Memorandum of Understanding is the use of the ROTSE telescopes for the optical follow-up of ANTARES neutrino alerts resulting from the rolling search. The ROTSE network is comprised of four 45 cm optical robotic telescopes located in USA, Turkey, Namibia and Australia. The main advantages of these instruments are their large field of view of $1.93^\circ \times 1.93^\circ$ and their very fast positioning time. These telescopes are well suited for such a follow-up program.

The advantages of the rolling search method rely both on the high duty cycle and on sky coverage of the ANTARES telescope: the detector is continuously taking data (24 hours per day), with a sky coverage of a full hemisphere if considering only upgoing neutrino events. The rolling search method implies no assumption on the source nature, the observation not being limited to GRBs as in the case of the triggered search, making this method efficient for all kind of transient sources such as SN, micro quasars, AGN flares, etc. Moreover, this method requires no hypothesis on the delay between the optical flash and the neutrino emission, a parameter not well constrained by current theoretical models. The main drawback of this technique is the fact that a neutrino

candidate event is not necessarily associated to an astrophysical source: this is the main motivation for the organization of an optical follow-up program.



Agreement:

The ROTSE Collaboration will assure the follow-up of the ANTARES alerts with the four telescopes for an average rate of about two alerts per month. The treatment of the alert will be done as soon as possible after reception of the alert; this response time is conditioned by the availability of the telescope. The optical images taken after one ANTARES alert by any of the four ROTSE telescopes will be available as soon as possible but within a maximum delay of a few days (in case there is transmission problem with the servers).

The ANTARES Collaboration will assure that its selection setting of alert events do not exceed an average of about two alerts per month.

The ROTSE Collaboration agrees to treat as confidential the data received from ANTARES and will not use that data for any other purpose than this joint analysis, nor disclose to any third party. The ROTSE Collaboration remains free to perform any analysis or use of its own data triggered by an ANTARES alert. In such a case, no reference to the ANTARES alert should be made. Special request for an ANTARES member to participate to a ROTSE meeting can be obtained from the ROTSE Spokesperson.

The ANTARES Collaboration agrees to treat confidential the data received from ROTSE , agrees it shall be used only for improving ANTARES data analysis and will not be used for any other purpose, nor disclosed to any third party. The alert information and the corresponding optical data will be stored in a private repository. The access to these data will be controlled via a web site or an e-log secured by password. The ANTARES Collaboration will give free access to the neutrino alert data to the ROTSE Collaboration. Special request for ROTSE members to participate to an ANTARES collaboration meeting can be done via the ANTARES Spokesperson.

The ROTSE optical data triggered by an ANTARES alert will be available by both Collaborations for analysis, either independently or in common, according to their will.

*** Rules for the utilisation of these common data (neutrino alert and optical data) for a joint analysis:**
 In a first phase, the ANTARES and ROTSE Collaborations can only use these data internally. No result, positive or negative, can be communicated beyond the two collaborations without the agreement of the TAToO coordinator and the ANTARES and ROTSE Managements.

In a second phase (when the alert system will be fully operational), the ANTARES Collaboration agrees that those alerts which are confirmed by the optical follow-up will be sent to the GCN (Gamma-ray burst Central Network) via a circular. This will allow crucial information of the source (redshift, environment...) to be obtained. To go to this second step, the TAToO coordinator should have the agreement of the ANTARES and ROTSE Managements. This circular will be sent as early as possible after the optical data analysis by the TAToO coordinator. For example, the header of the GCN circular could be:

TITLE: GCN Circular
NUMBER: 9000
SUBJECT: TAToO/ROTSE alert
DATE: 09/03/01 00:00:00 GMT
FROM: Name and email address of the TAToO coordinator

The ANTARES Collaboration and XXXX on behalf of the ROTSE Collaboration¹

.....
..... text

(1) The rule for the author list of GCN circulars will be agreed upon.

*** Rules for publication and communication of a joint analysis:**

Any conference presentations making use of the data of TAToO will need the agreement of the TAToO coordinator, as well as the ANTARES and ROTSE Managements. The presentation should state:

Xxx on behalf of the ANTARES and ROTSE Collaborations

The goal of cooperation between the ANTARES and ROTSE Collaborations is joint publication of shared results. Any publications based on the TAToO data will be signed by the whole ANTARES and ROTSE Collaborations. The list of authors and their appearance order will be defined by each Collaboration. The publication will follow the standard internal refereeing procedures adopted by the ANTARES and ROTSE Collaborations.

The ANTARES Collaboration retains the right to publish independently an analysis of its own data without using ROTSE data.

The ROTSE Collaboration retains the right to publish independently an analysis of its own data without using ANTARES data.

*Signed on behalf of the
ANTARES Collaboration by
Paschal Coyle*

*Signed on behalf of the
ROTSE Collaboration by Carl
Akerlof*

Date:

Date:

Appendix D

Memorandum of Understanding

TAToO

TAROT ANTARES Target of Opportunity

Optical follow-up of "special" neutrino events
from the ANTARES detector with the TAROT telescopes

The ANTARES telescope has the opportunity to detect transient sources emitting high-energy neutrinos, such as gamma-ray bursts (GRBs), core-collapse supernovae (SNe), flares of active galactic nuclei (AGNs)... To enhance the sensitivity to these sources, we are developing a new detection method based on the coincidence of neutrino signal and an optical detection. The ANTARES Collaboration is implementing a fast on-line reconstruction with a good angular resolution. These characteristics allow triggering an optical telescope network in order to identify the nature of the neutrino sources. This Memorandum of Understanding formalizes the agreement between the ANTARES and TAROT Collaborations to assure the follow-up of the neutrino alerts. The project is named TAToO (TAROT ANTARES Target of Opportunity).

Introduction:

To detect transient sources, two different methods can be used. The first is based on the search for neutrino candidates in conjunction with an accurate timing and positional information provided by an external trigger: the triggered search. The second is based on the search for "special neutrino events" coming from the same location within a given time window: the rolling search. The purpose of this Memorandum of Understanding is the implementation of the rolling method in the ANTARES experiment in collaboration with the TAROT telescopes.

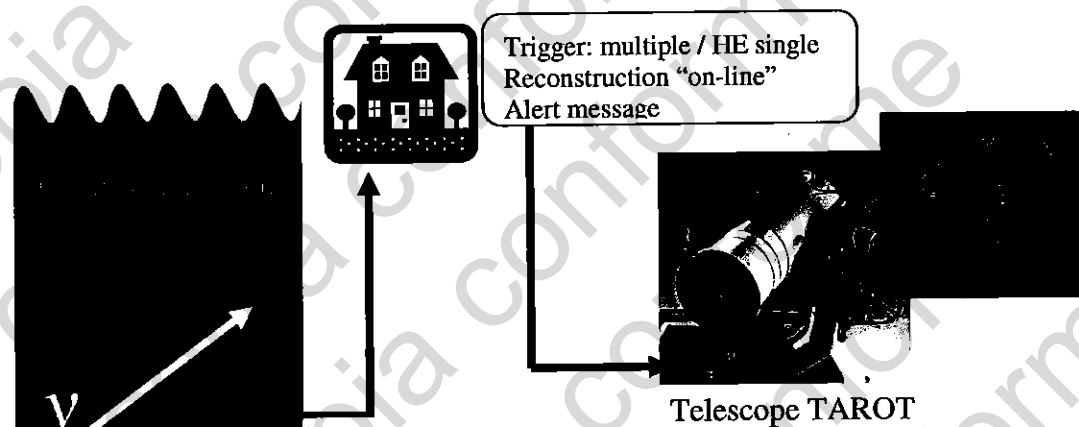
The TAROT (*Télescope à Action Rapide pour les Objets Transitoires* / Rapid Action Telescope for Transient Objects) network comprises two 25cm optical telescopes located at Calern (South of France) and La Silla (Chile). The main advantages of these instruments are the large field of view of $1.86^\circ \times 1.86^\circ$ and their very fast positioning time (less than 10 s). These telescopes are well suited for such a program.

Two different neutrino alert strategies have been implemented in ANTARES: the detection of neutrino doublets and the detection of single high-energy neutrino. The detection of a neutrino doublet is almost statistically significant; the number of doublet due to atmospheric neutrinos is of the order of 0.05 per year within a temporal window of 900 s and a directional cone of $3^\circ \times 3^\circ$. For the search for a single high-energy neutrino event, the reconstructed muon energy is required to be higher than a given energy threshold (typically above few TeV), in addition a more restrictive quality cut on the muon track reconstruction is applied.

In contrast to the current gamma-ray observatories, a neutrino telescope covers at least a half hemisphere if only up-going events are analyzed and even 4π sr if down-going events are considered. Moreover, this method requires no hypothesis on the period during which the neutrinos are emitted with respect to the optical flash, a parameter not well constrained by the various theoretical models. More importantly no assumptions are made on the nature of the source and the internal acceleration mechanisms. This approach is therefore efficient for all types of transient sources: GRB, SN, μ quasars, flare of AGN, etc.

Description of the project (status 2009):

The ANTARES Collaboration has implemented an on-line event reconstruction (named BBfit). This analysis strategy contains a very efficient trigger based on local clusters of photomultiplier hits and a simple event reconstruction. The two main advantages are a very fast analysis (between 5 and 10 ms per event) and a quite good angular resolution ($\sim 1^\circ$). The requirement for an event to be reconstructed is a minimum of six storeys triggered on at least two lines. To select a high purity sample of up-going neutrino candidates, a quality cut is applied to the result of the χ^2 minimisation of the muon track reconstruction based on the measured time and amplitude of the hits associated with the track. In order to obtain a fast response, the on-line reconstruction does not use the dynamical reconstructed geometry of the detector lines.



Two programs have been implemented in real time by the ANTARES Collaboration in order to create the neutrino alert and send it to the TAROT telescopes. The BBalert program is an application which includes the on-line reconstruction (BBfit), the "special neutrino events" selection and the creation of the alert message in the GCN format. A quality criterion, coded between 1 and 4, is attributed to each alert (4 correspond to the best quality events and 1 to the worst ones). This criterion is computed from the quality criterion of the reconstruction, the number of lines and the energy estimators. This program is connected to the ANTARES data stream after the data filters (used for the trigger) before writing the data to disk. The "TAToO run control" is a stand-alone QT control application which channels the alerts generated by BBalert to the TAROT servers. The main functions are:

- Control the BBalert application (run, stop and monitor)
- Subscribe and monitor ligier i.e. the link between BBalert and the ANTARES run control (ligier)
- Wait for new alerts
- Connect and monitor the connections to the different TAROT servers
- Filter the alerts (time, trigger rate)
- Log all events and alerts

The CPPM is responsible for the maintenance of these two programs.

In order to increase the chance to observe an optical counter part of the ANTARES alert, we have adopted the following observation strategy with TAROT:

- One real time acquisition (at T_0) of 6 images of 3 minutes. The real time treatment of the alert will depend on the availability of the telescope; it may be delayed by few minutes.
- Acquisition of 6 images of 3 minutes at $T_0 + 1$ day, $T_0 + 3$ days, $T_0 + 9$ days, $T_0 + 27$ days. These four steps are just indicative and depend on the availability of the telescope: it can be delayed or advanced in order to fit in the TAROT observation program or to have the possible source at the optimal position in the sky.

This observation program can be reviewed in order to optimize the detection sensitivity.

Agreement:

TAROT will assure the follow-up of the ANTARES alerts, essentially with the Chile telescope. The alert message will be sent by the TAToO run control in real time with a quality criterion. The treatment of the alert will be done as soon as possible after reception of the alert; this response time is conditioned by the availability of the telescope. The ANTARES alerts will have priority over the routine program and this observation priority is a function of the quality of the neutrino alert. The Swift alerts have the highest priority in the TAROT observation program.

TAROT will give pre-analyzed optical images to the ANTARES Collaboration corresponding to the ANTARES alert. TAROT will give the optical images as soon as possible but within a maximum delay of one day (in case there is transmission problem with the servers).

ANTARES will give free access to the neutrino alert data to the TAROT Collaboration and assure the maintenance of the software. Special request for the TAROT members to participate to an ANTARES collaboration meeting can be done via the ANTARES Spokesperson.

The alert information and the corresponding optical data will be stored in a private repository. The access to these data will be via a web site or an e-log securized by a password.

* Rules for the utilisation of these common data (neutrino alert and optical data):

In a first phase, the ANTARES and TAROT Collaborations can only use these data internally. No result, positive or negative, can be communicated beyond the two collaborations without the agreement of the TAToO coordinator and the ANTARES and TAROT Managements.

In a second phase (when the alert system will be fully operational), the ANTARES Collaboration agrees that those alerts which are confirmed by the optical follow-up will be sent to the GCN (Gamma-ray burst Central Network) via a circular. This will allow crucial information of the source (redshift, environment...) to be obtained. To go to this second step, the TAToO coordinator should have the agreement of the ANTARES and TAROT Managements. This circular will be sent as early as possible after the optical data analysis by the TAToO coordinator. For example, the header of the GCN circular could be:

TITLE: GCN Circular
NUMBER: 9000
SUBJECT: TAToO alert
DATE: 09/03/01 00:00:00 GMT
FROM: Name and email address of the TAToO coordinator

The ANTARES Collaboration and XXXX on behalf of the TAROT Collaboration¹

.....
..... text
.....

(1) The rule for the author list of GCN circulars will be agreed upon.

*** Rules for publication and communication:**

Any conference presentations made using the data of TAToO will need the agreement of the TAToO coordinator, as well as the ANTARES and TAROT Managements. The presentation should state:

Xxx on behalf of the ANTARES and TAROT Collaborations

Any publications made using the TAToO data will be signed by the whole ANTARES and TAROT Collaborations. The list of authors and their appearance order will be defined by each collaboration.

The publication will follow the standard internal refereeing procedures adopted by the ANTARES and TAROT Collaborations.

*Signed on behalf of the
ANTARES Collaboration by
Paschal Coyle*

*Signed on behalf of the
TAROT Collaboration by
Michel Boer*

Date:

Date:

Appendix E

Memorandum of Understanding (LIGO-M0900278-v1, VIRGO-XXXX)

between the

ANTARES Collaboration

and the

Laser Interferometer Gravitational Wave Observatory (LIGO) Scientific Collaboration

and

VIRGO

August 15, 2009

This Memorandum of Understanding (MOU) establishes a collaboration among the Laser Interferometer Gravitational-Wave Observatory and its associated scientific collaboration (LIGO), the European Gravitational Observatory and Virgo Collaboration (EGO/Virgo), and the High-Energy Neutrino telescope operated by the ANTARES Collaboration (Astronomy with a Neutrino Telescope and Abyss environmental RESearch), to perform a joint research program for coincident cosmic sources of gravitational waves (GW) and high-energy neutrino (HEN) events.

1. The ANTARES Collaboration (Astronomy with a Neutrino Telescope and Abyss environmental RESearch) was formed in 1996 with the objective of building a neutrino telescope in the Mediterranean Sea. After several sea campaigns dedicated to site survey and R&D, the installation of the detector in its final design took place between March 2006 and May 2008, at a depth of 2450m, 40 km away from the French Mediterranean coast, near Toulon. The detector comprises a three-dimensional array of about 884 photomultiplier tubes (PMTs) distributed on 12 lines anchored to the sea bed and connected to the shore through an electro-optical cable. The current detector, with an effective area of about 0.1 km^2 , is intended as the first step towards the construction of a km^3 -sized Neutrino Telescope in the Mediterranean Sea.

The Collaboration gathers about 150 physicists, engineers and technicians from (Astro)particle physics, Astronomy and Sea Science Institutes in France, Italy, Spain, Romania, Germany, and the Netherlands. The project is currently regulated by a MoU signed in 2006 by the participating institutions and their funding agencies, which is an extension of the original MoU signed in 2001. It describes the final phases of construction and installation of the detector and the phase of its operation and exploitation, including the tasks of commissioning, maintenance and running of the detector, data taking and analysis, publication of results and detector decommissioning. The present MoU is scheduled to last for three more years; it will be renewed in 2011.

The governing body of the collaboration is the Institute Board (IB), consisting of one representative per participating institute. It discusses major points regarding the conduct of the experiment, including financial aspects related to the construction, operation and maintenance of the detector. It also elects the Executive Management of the collaboration (Spokesperson, Deputy Spokesperson and Technical Coordinator).

The ANTARES collaboration is represented by its Spokesperson, who is responsible for obtaining the approval of the ANTARES Institute Board for collaborative MoUs. The Spokesperson coordinates the activities of the Collaboration and represents it in relations with the Scientific Community, the Financial Review Board and the External Review Committee which supervises the progress of the project. She/He has overall responsibility for all aspects of the Collaboration program of work. The Technical Coordinator and the Deputy Spokesperson have executive responsibility respectively for all technical aspects of the project and for its scientific program.

2. The Laser Interferometer Gravitational-Wave Observatory (LIGO) Laboratory is aimed at opening the field of gravitational-wave astrophysics through the direct detection of gravitational waves. LIGO detectors are using laser interferometry to measure the distortions of the space between free masses induced by passing gravitational waves. Scientists, engineers, and staff at the California Institute of Technology (CALTECH) and the Massachusetts Institute of Technology (MIT) are carrying out the operation of LIGO, and are participating in the development of Advanced LIGO and future interferometer enhancements.

Caltech has prime responsibility for the LIGO Project under the terms of a Cooperative Agreement¹ with the National Science Foundation (NSF). LIGO is a national facility for gravitational-wave research, providing opportunities for the broader scientific community to participate in detector development, observations, and data analysis. LIGO welcomes the participation of outside scientists at any of these levels.

LIGO includes the LIGO Laboratory and the LIGO Scientific Collaboration (LSC). The Charter of the LIGO Scientific Collaboration (LSC) establishes the functions, organizational structure and responsibilities of the LSC as well as its role in the research of the LIGO Laboratory, and the release of scientific results. The LIGO Leadership includes the Laboratory Directorship and the LSC Spokesperson. The German/British Collaboration for the Detection of Gravitational Waves (GEO600) is part of the LSC.

The LSC is composed of approximately 690 individuals from about 61 institutions worldwide, including scientists and engineering personnel from the LIGO Laboratory. It is the policy of the LSC that all LIGO participants who have earned authorship rights be included as authors on any scientific publication arising from the analysis of LIGO data.

¹ Cooperative Agreement No. PHY-0107417 between the National Science Foundation, Washington D.C. 20550 and the California Institute of Technology, Pasadena, CA 91125, dated October 2001

The LIGO Project holds several bi-lateral data exchange agreements with other gravitational wave detector and data analysis groups. Access of data or any other information from non-LIGO detectors is not covered by this agreement.

1 The German/British Collaboration for the Detection of Gravitational Waves (GEO) has built a detector of arm length 600m (GEO600) near Hannover in Germany, with the purposes of joining in a worldwide search for gravitational radiation from astronomical sources and of developing advanced interferometric and suspension technologies for Advanced LIGO. The design, construction and operation of the GEO600 system is being carried out by scientists and technologists at the University of Hannover, the University of Glasgow, and the Max Planck Institute for Gravitational Physics (Albert Einstein Institute) in Hannover and Golm. Data acquisition and analysis are managed by the Albert Einstein Institute (AEI), Cardiff University, and Birmingham University. The project is funded in Germany by the State Government of Niedersachsen, the Max Planck Gesellschaft (MPG), and the Bundesministerium fuer Bildung und Forschung (BMBF) in Germany, and by the Science and Technology Facilities Council (STFC) in the UK.

2 VIRGO denotes the Virgo Collaboration and the European Gravitational Observatory (EGO) consortium.

CNRS and INFN signed an agreement on 27 June 1994 concerning the realization of a three kilometer Fabry-Perot interferometric antenna aimed at the detection of gravitational waves in the frequency range 10-10 000 Hz, named Virgo, located at Cascina, Italy. This agreement was superseded by the Agreement between CNRS and INFN, founding the "European Gravitational Observatory" Consortium under Italian law (EGO), signed on 11 December 2000.

The main purpose of EGO is to ensure the end of the construction of the Virgo antenna, its commissioning, its operation and its upgrade, as well as to promote an open co-operation in R&D. The Consortium is supervised by the EGO Council. The implementation of the above is performed via the involvement of the Virgo collaboration in the framework of the Memorandum of Agreement between the Virgo Collaboration and EGO Consortium, signed on 20 November 2002.

The Virgo collaboration is composed of approximately 200 scientists and technicians coming mainly from CNRS and INFN laboratories and from EGO, which have signed an Agreement on 19 December 2001. Decisions are taken by its steering committee. The overall scientific exploitation of the Virgo antenna is under the responsibility of the Virgo Collaboration.

In this MOU the Virgo collaboration is represented by the spokesman appointed by the Virgo steering committee and the EGO Consortium by the director of EGO appointed by the EGO council.

5. Attachment No.1 to this Memorandum of Understanding defines the terms and conditions governing the joint analysis of LIGO, VIRGO and ANTARES data collected during LIGO's S5 science run (covering the period from November 4, 2005 through September 30, 2007) and S6 science run (covering the period from July 7, 2009 through December 31, 2010), Virgo's VSR1 science run (covering the period from May 18, 2007 through September 30, 2007) and VSR2 science run (covering the period from July 7, 2009 through December 31, 2010), and Antares 5L science run (covering the period from 29 Jan 2007 through 7 Dec 2007) and 12L science run (covering the period from 30 May 2008 through the end of ANTARES charter (end of 2011)).

6. In entering into this Memorandum of Understanding, the LIGO Laboratory will carry out its responsibilities following the requirements of the Cooperative Agreement.

7. The LIGO Laboratory is responsible for obtaining NSF approval of all collaborative Memoranda of Understanding with international partners, or involving NSF costs exceeding \$100,000. All Memoranda of Understanding will be provided to NSF for their information.

8. Each party to this agreement continues to be responsible for all support of its staff including travel costs associated with the activities under this agreement. Exceptional support of travel may be allowed for travel requested by that institution.

9. This MOU does not prevent the parties from establishing other agreements on data exchange or external collaborations. The existence and general terms of any other agreements that are scientifically related will be freely shared among the parties of this MOU.

10. Cessation of any data exchange may take place at the request of either ANTARES, LIGO or VIRGO. Data exchanged under the terms of this agreement (prior to its cessation), on-going analyses of them, and any publications and presentations using them are governed by the terms of this MOU and its attachments indefinitely, unless all ANTARES, LIGO and VIRGO agree to a change. This MOU may be extended by mutual agreement between ANTARES, LIGO and VIRGO.

Jay Marx
LIGO Laboratory Executive Director

Paschal Coyle
Antares Spokesperson

David Reitze

Albert Lazzarini

Appendix F

Memorandum of understanding between the IceCube collaboration and the ANTARES Collaboration on shared software development

The IceCube collaboration and the ANTARES Collaboration, hereafter called partners, agree to share and jointly develop software for their respective experiments. This agreement will initially cover the following software packages:

- The IceTray base framework
- The Gulliver log-likelihood reconstruction framework
- The GLShovel configurable event display
- The Neutrino Generator monte carlo package
- The MMC muon propagator
- The Photonics light propagation monte carlo

The last three projects are already freely available from the corresponding authors on the Internet, but are included in this memorandum covering jointly developed bug fixes and improvements. This list may be extended on mutual agreement in the future. The dissemination of software is limited to the members of each partner and this memorandum implies no wider distribution of the software.

The partners agree to use a common software configuration management (SCM) system for this development, which includes a common software repository, common bug tracking system and a joint mailing list. Each partner will provide access to the joint SCM system to selected individuals based on their respective policies. This common SCM will only be used for the common software and each partner will maintain its own system for specific software that is not shared.

Both partners will continuously submit enhancements, extensions and bug fixes to the common repository. To guarantee a high level of code quality both partners will make best attempts to adhere to the coding standards written down at:

<http://software.icecube.wisc.edu/OFFLINE-SOFTWARE-V02-02-01/codingstandards.html>

They will setup internal code reviews for new projects added to the software packages (these can be internal to one partner or include members of the corresponding other partner) and provide documentation and tests for the projects.

Both partners will jointly own submitted code and individuals working for any partner are encouraged to improve the jointly owned code. All submitted code will be freely available to both partners.

Both partners agree to use only released versions of the common software packages for their production data processing, which will be extended, by own software packages of the individual partner. The trunk of the software repository is a development environment and no promises of the functionality and usability of that software are made.

During the software release process a software board of three representatives will decide the features and enhancements, which will be added to new releases. This software board will consist of the lead IceTray software architect, who will be responsible for the software architecture, and one representative of each partner representing the interest of the corresponding physics users.

Each partner organization will cover their own costs occurring in the framework of this memorandum of understanding.

No partner will take any liability for the documentation and software provided in the common software repository covered by this memorandum of understanding.

COPIA CONFORME

List of Acronyms used

CC	Conference Committee
CF	Common Fund
DS	Deputy Spokesperson
EC	Editorial Committee
ERC	External Review Committee
FRB	Financial Review Board
IB	Institute Board
MoU	Memorandum of Understanding
PA	Principal Author
PC	Publication Committee
QCM	Quality Control Manager
RM	Resource Manager
SC	Steering Committee
SP	Spokesperson
TC	Technical Coordinator

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