Memorandum of Understanding

for Collaboration in the Construction of the CMS Detector

between

The EUROPEAN ORGANISATION FOR NUCLEAR RESEARCH,

hereinafter referred to as CERN, Geneva, as the Host Laboratory

on the one hand,

and

an Institution/Funding Agency of the CMS Collaboration

on the other hand.

Preamble

(a) A group of Institutes from CERN Member and non-Member States, and CERN, has agreed to collaborate to form the CMS Collaboration (Annex 1). This Collaboration has proposed to CERN an experiment to study particle interactions at the highest possible energies and luminosities to be reached with the Large Hadron Collider (LHC). These Institutes have secured the support of their Funding Agencies to enable them to participate in the CMS Collaboration.

(b) Agreement to this Collaboration is effected through identical Memoranda of Understanding (hereafter referred to as MoU) between each Funding Agency or Institute, as appropriate, in the Collaboration and CERN, as the Host Laboratory. These MoUs define the Collaboration and its objectives, and the rights and obligations of the collaborating Institutes.

(c) On the basis of a Technical Proposal submitted in December 1994 (CERN/LHCC/94-38) and a detailed review of the scientific merits, the technological feasibility and estimates of the needed resources, the LHC Committee (LHCC) recommended approval of the experiment to the CERN Research Board, subject to a set of milestones to be met by the experiment in its initial phase (CERN/LHCC 95-76).

(d) Based on the recommendation by the LHCC and in agreement with the list of milestones, the Research Board recommended to the Director General of CERN to approve the project, together with plans, including milestones, leading to the sub-detector Technical Design Reports.

(e) The Director General accepted the Research Board recommendation and approved the project to build the detector for the CMS experiment within a cost ceiling not exceeding 475 MCHF (in 1995 prices).

(f) Before proceeding to the final construction phase, each sub-detector (cf. Article 4.1) will be subjected to a technical, financial, and manpower review (CERN/DG/RB 95-234) by the LHCC based on the Technical Design Reports. This process will be completed during 1997 and 1998 for most of the sub-systems.

(g) A Resources Review Board (RRB) has been constituted which comprises the representatives of all CMS Funding Agencies and the managements of CERN and the CMS Collaboration. It is chaired by the CERN Director of Research.

The role of the RRB includes :

- reaching agreement on the Memorandum of Understanding
- monitoring the Common Projects and the use of the Common Funds
- monitoring the general financial and manpower support
- reaching agreement on a maintenance and operation procedure and monitoring its functioning
- endorsing the annual construction and maintenance and operation budgets of the detector.

The management of the Collaboration reports regularly to the RRB on technical, managerial, financial and administrative matters, and on the composition of the Collaboration.

(h) These Memoranda of Understanding replace the existing Interim Memoranda of Understanding (IMoU) which were valid for the period 1 January 1995 to 31 December 1997.

(i) This MoU is not legally binding, but the Institutes and Funding Agencies recognize that the success of the Collaboration depends on all its members adhering to its provisions. Any default will be dealt with, in the first instance, by the Collaboration and if necessary then by the RRB.

Article 1 : Parties to this MoU

1.1 The Parties shall be all the collaborating institutes as listed in **Annex 1** and their Funding Agencies, and CERN as the Host Laboratory. **Annex 2** lists the Funding Agencies and their duly authorized representatives. The Funding Agency may be an Institute or an established institution acting on behalf of one or more Funding Agencies.

1.2 The collaborating institute(s) and the CMS Collaboration will hereinafter be referred to as "Institute(s)" and "Collaboration", respectively.

Article 2 : Purpose of this MoU

2.1 This MoU defines the construction phase of the CMS detector. Its purpose is to define the programme of work to be carried out for this phase and the distribution of charges and responsibilities among the Parties for the execution of this work. It sets out organisational, managerial and financial guidelines to be followed by the Collaboration.

2.2 The construction phase comprises the engineering design, final prototyping, preproduction, construction, calibration, transportation, assembly, installation and commissioning of the elements which will be part of the CMS detector in the experimental area.

2.3 The CMS project is executed in the normal framework of the CERN scientific programme, approved by the CERN Council, and subject to the bilateral Agreements and Protocols between CERN and non-Member States.

2.4 In case of conflict between Agreements or Protocols and the present MoU, the former prevails.

Article 3 : Duration of this MoU and its Extensions

3.1 This MoU is valid for the construction period of the CMS detector, from 1 January 1998 to a date not earlier than 31 December 2005. The actual termination date will be set by the RRB no later than 31 December 2003.

3.2 This MoU may be extended at any time by mutual agreement of its Parties, or by their appointed successors.

3.3 Any Funding Agency may withdraw its support from the Collaboration by giving not less than eighteen months notice in writing to the Collaboration and the Director General of CERN. In such an event, reasonable compensation to the Collaboration will be negotiated through CERN and confirmed by the RRB.

3.4 Any Institute may withdraw from the Collaboration according to the procedures agreed by the Collaboration, the conditions as set out in the current document "General Conditions for Experiments Performed at CERN", (cf. Art. 7.1 of this MoU), and by giving notice in writing to its Funding Agency.

Article 4 : The CMS Detector and Collaboration

4.1 The detector for the CMS experiment has been described in the Technical Proposal submitted to the LHCC in December 1994 and in the subsequent sub-detector Technical Design Reports. It consists of a number of sub-detector units as listed in **Annex 3.**

4.2 The names of the scientists presently participating in the Collaboration are listed in **Annex 4** by country and by Institute.

4.3 The current federal management structure of the Collaboration is described in the attached CMS Constitution (**Annex 5**).

4.4 The technical participation of the Institutes in detector construction is set out in **Annex 6**.

4.5 **Annex 7** gives an overview of the construction schedule.

4.6 Following the recommendations of the LHCC Cost Review Committee (CORE) the manpower and financial resources needed for the CMS experiment are grouped into three headings:

4.6.1 R&D work on the various detector elements;

4.6.2 costs for infrastructure in the Institutes, and costs for personnel, travel, etc. of the Institutes arising from their participation in the Collaboration;

4.6.3 engineering design, final prototyping, preproduction, construction, calibration, transportation, assembly, and installation costs for the complete detector.

The resources needed for work under the headings 4.6.1 and 4.6.2 are the responsibility of the Institutes supported by their respective Funding Agencies. These resources are neither accounted for in detector construction costs, nor monitored centrally by the Collaboration.

The resources needed for work under the heading 4.6.3 cover the costs of the detector construction. These costs have been evaluated by the Collaboration and verified by CORE. Only these costs are monitored centrally by the Collaboration.

4.7 Any Institute that wishes to join the Collaboration during the period of validity of this MoU will be expected to make an appropriate contribution to the funding of the detector construction including the Common Projects. This will be negotiated by the Collaboration and endorsed by the RRB.

In the event that the detector construction is already fully funded the new Institute will have to make a special contribution which will be negotiated by the Collaboration and endorsed by the RRB.

4.8 The individual sub-detector CORE costs, expressed in Swiss Francs, are contained in the CMS Cost Review Estimate, Version 9, dated 15 April 1998.

4.9 Unless explicitly mentioned otherwise, all cost figures are expressed in 1995 Swiss Francs based on estimates valid on 15 April 1998. The calculated CERN index for materials cost variations (investments) will be used for cost monitoring purposes throughout the lifetime of the project.

Article 5 : Programme of Work for the Construction Phase of the CMS Detector and Sharing of Responsibilities for its Execution

5.1 The total construction work for the detector, which includes the work executed under the terms of the IMoU, is divided into:

5.1.1 Sub-detector construction, which will be the responsibility of individual Institutes, or groups of Institutes, and

5.1.2 Common Projects, comprising those elements of the detector construction which the Collaboration has agreed are to be provided at the common expense of the Collaboration, cf. Article 6.

5.2 **Annex 8** shows the value of the deliverables, by Funding Agency and sub-detector, to which the Funding Agencies are committed and for which they have foreseen the appropriate funding.

5.3 **Annexes 9.1 to 9.8** list, by sub-detector, the deliverables to be provided by the Institutes, the estimated costs of these deliverables (Annexes 9.nA) and the assigned funding vs. the estimated costs (Annexes 9.nB).

5.4 **Annex 10** lists, by Funding Agency, the Institutes they support and their funding for these Institutes to provide their deliverables to the sub-detectors.

5.5 The Institutes, supported by their Funding Agencies, will make their best efforts to design, to produce final prototypes, to preproduce, to construct, to calibrate, to transport, to assemble, to install and commission all the deliverables listed in Annexes 9.1 to 9.8, within the limits of their funding.

5.6 In the event of cost overruns, these will first be brought, by the Institute(s) concerned, to the attention of the Collaboration and then to the RRB if solutions have not been found. The Collaboration will propose ways of accommodating such overruns within the overall cost ceiling of the CMS detector, including descoping or staging if other ways cannot be found, and seek the endorsement of the RRB.

Article 6 : Common Projects

6.1 Contributions to the Common Projects will be made in three ways :

6.1.1 by taking responsibility to supply a Common Project item or parts of it, in agreement with the CMS Finance Board and endorsed by the RRB. This option is referred to as "in-kind contribution";

6.1.2 by payment of invoices for procurement contracts for Common Project items which were placed by one or more Institutes or Funding Agencies following agreement by the CMS Finance Board. This option is referred to as "payments to contracts";

6.1.3 by cash payments to a dedicated Common Fund which will be established for the Common Projects through dedicated accounts at CERN. The Common Fund will be managed and operated by the CMS Resource Manager, taking advice from the CMS Finance Board and the Common Project Managers, together with the CERN Finance Division.

All Common Project operations will be monitored by the RRB. The Common Fund will be maintained and managed in the currency of the CERN Budget.

6.2 Contributions to the Common Projects are due in proportion to the funding of the CMS detector construction as set out in Annex 8.

The CMS Finance Board may also recommend to the RRB to update the level of contribution to the Common Projects, for example due to a major change in the level of participation of an Institute or due to an Institute joining or leaving the Collaboration.

6.3 The value of contributions to the Common Projects, provided in accordance with Articles 6.1.1 and 6.1.2, will be established:

6.3.1 as the price quoted in the lowest technically acceptable bid, obtained through international, competitive tendering, or

6.3.2 as the lowest cost estimate obtained through an international price inquiry, subject to the agreement of the CMS Finance Board, or

6.3.3 in exceptional cases where paragraphs 6.3.1 or 6.3.2 are not applicable, by assessment of the CMS Finance Board.

6.4 Contracts for Common Projects will be placed either by CERN in accordance with document "Financial Guidelines for LHC Collaborations" (CERN/FC/3796), or by other Institutes, in accordance with their own purchasing rules and regulations.

6.5 The responsibilities for the maintenance and operation of the CMS detector will be laid down in a separate MoU on maintenance and operation procedures. This will be prepared by the Collaboration together with CERN, in consultation with the RRB and will be signed by all the Parties.

Article 7 : Obligations of CERN as the Host Laboratory, and of the Institutes

7.1 The general obligations of CERN as host laboratory and of the Institutions are contained in the current document "General Conditions for Experiments Performed at CERN". This document is regarded as an integral part of this MoU and is attached as **Annex 11.**

7.2 All equipment brought to the CERN site must comply with CERN's safety regulations. If relevant, the design, test criteria and testing of equipment should be discussed well in advance with CERN's safety officials. All equipment brought to CERN must be accessible for inspection by the Group Leader in Matters of Safety.

Article 8 : Rights and Benefits of Institutes

8.1 The Institutes participating in the Collaboration are entitled to join the operational phase of the project and to participate in the scientific exploitation of the data acquired. Further details are set out in the current document "General Conditions for Experiments Performed at CERN".

Article 9 : Administrative and Financial Provisions

9.1 General financial matters and purchasing rules and procedures for the LHC experiments, including the rules which apply for Common Fund operations, are dealt with in accordance with the "Financial Guidelines for the LHC Collaborations" (CERN/FC/3796).

9.2 Under the provisions of the CERN basic Convention dated 1st of July 1953 and revised on 17 January 1971, any Institute's staff and property located at CERN shall be subject to the authority of the CERN Director-General and shall comply with the CERN regulations.

Article 10 : Amendments

10.1 This MoU may be amended at any time by mutual agreement of its signatories or of their appointed successors. Any such amendments will be subject to the prior agreement of the RRB.

Article 11 : Disputes

11.1 Any dispute between Funding Agencies shall be resolved by negotiation or, failing that, by arbitration through the President of the CERN Council, who may, at his or her discretion, adopt any form of arbitration process.

Any dispute between a Funding Agency and CERN will be resolved using standard CERN procedures for the resolving of such disputes.

Any dispute between Institutes will be resolved according to Collaboration procedures.

Article 12 : Annexes

12.1 All the Annexes are an integral part of this MoU. They are understood to be the planning basis for the construction of the CMS detector.

ANNEXES

Annex 1 :

Institutes in the Collaboration and Names of Their Contact Persons

Annex 2 :

List of Funding Agencies and Their Representatives

Annex 3 :

Sub-detector Structure of the CMS Detector

Annex 4 :

Current Participants in the Collaboration by Country and Institute

Annex 5 :

The CMS Constitution

Annex 6 :

Overview of the Technical Participation of Institutes in Detector Construction

Annex 7 :

CMS Construction Schedule

Annex 8 :

(A) Summary Table of Contributions

(B) The Match of Cost and Funding

Annex 9.1 to 9.8 :

(A) Deliverables to be Provided by the Institutes for the Individual Sub-detectors (including Estimated Costs)

(B) Deliverables and Assigned Funding for the Individual Sub-detectors by Funding Agency (including Estimated Costs)

Annex 10 :

Funding assigned by the Funding Agencies to Their Institutes for the Deliverables and the Common Projects

Annex 11:

General Conditions for Experiments Performed at CERN.

The European Organization for Nuclear Research (CERN)

and

declare that they agree on this Memorandum of Understanding for the CMS Experiment.

Done in Geneva, Switzerland

on 30th April, 1998

For CERN

R J Cashmore
12 11 99

European Organization for Nuclear Research CERN

Lorenzo Foà
Director of Research

Done in Budapest, Hungary

on 8th November, 1999

For OMFB
National Committee for Technological Development

Ádám Török
President

The European Organization for Nuclear Research (CERN)

and

National Committee for Technological Development, Budapest

declare that they agree on this Memorandum of Understanding for the CMS Experiment.

Done in Geneva, Switzerland

on 30th April, 1998

For CERN

European Organization for Nuclear Research
CERN

Lorenzo Foà
Director of Research

Done in _____

on _____

For _____

_____

ANNEX 1

Institutes in the Collaboration and Names of Their Contact Persons

Country	Code	Institute	Contact Person
Armenia	AR1	Yerevan Physics Institute, Yerevan	Albert M. Sirunyan
Austria	AT1	Institut für Hochenergiephysik der ÖAW, Wien	Claudia-Elisabeth Wulz
Belarus	BY1	Byelorussian State University, Minsk	Nikolai Shumeiko
	BY2	Research Institute for Nuclear Problems, Minsk	
	BY3	National Centre for Particle and High Energy Physics, Minsk	
	BY4	Research Institute of Applied Physical Problems, Minsk	
Belgium	BE1	Université Catholique de Louvain, Louvain-la-Neuve	Ghislain Gregoire
	BE2	Université de Mons-Hainaut, Mons	Philippe Herquet
	BE3	Université Libre de Bruxelles, Brussels	Catherine Vander Velde
	BE4	Universiteit Antwerpen (UIA), Antwerpen	Frans Verbeure
	BE5	Vrije Universiteit Brussel, Brussels	Walter Van Doninck
Bulgaria	BG1	Institute for Nuclear Research and Nuclear Energy, BAS, Sofia	Vladimir Genchev
	BG2	University of Sofia, Sofia	Leander Litov
[CERN]	CERN	CERN, European Laboratory for Particle Physics, Geneva, Switzerland	Tejinder Virdee
China	CN1	Institute of High Energy Physics, Beijing	Weiguo Li
	CN2	University for Science and Technology of China, Hefei, Anhui	Zuhe Bian
	CN3	Peking University, Beijing	Yanlin Ye
Croatia	CR1	Technical University of Split, Split	Josip Tudoric-Ghemo
	CR2	University of Split, Split	Mile Dzelalija
Cyprus	CY1	University of Cyprus, Nicosia	Panos A. Razis
Estonia	EE1	Institute of Chemical Physics and Biophysics, Tallinn	Endel Lippmaa
Finland	FI1	Department of Physics, University of Helsinki, Helsinki	Jorma Tuominiemi
	FI2	Helsinki Institute of Physics, Helsinki	
	FI3	Department of Physics, University of Jyväskylä, Jyväskylä	
	FI4	Digital and Computer Systems Lab., Tampere Univ. of Technology, Tampere	Jarkko Niittylahti
	FI5	Dept. of Physics & Microelectronics Instrumentation Lab., Univ. of Oulu, Oulu	Tuure Tuuva
	FI6	Laboratory of Advanced Energy Systems, Helsinki Univ. of Techn., Helsinki	Pertti Aarnio
France	FR1	LPNHE, Ecole Polytechnique, IN2P3-CNRS, Palaiseau	Jean Badier
	FR2	Lab. d'Annecy-le-Vieux de Phys. des Particules, IN2P3-CNRS, Annecy-le-Vieux	Jean-Pierre Peigneux
	FR3	DSM/DAPNIA, CEA/Saclay, Gif-sur-Yvette	John Rander
	FR4	IReS Strasbourg, IN2P3-CNRS-ULP, LEPSI Strasbourg, UHA Mulhouse	Jean-Marie Brom
	FR5	Institut de Physique Nucléaire de Lyon, IN2P3-CNRS, Univ. Lyon I, Villeurbanne	Gérard Smadja
Georgia	GE1	High Energy Physics Institute, Tbilisi State University, Tbilisi	Kamazi Kvataadze
	GE2	Institute of Physics Academy of Science, Tbilisi	Vladimir Roinishvili
Germany	DE1	Humboldt-Universität zu Berlin, Berlin	Thomas Hebbeker
	DE2	Institut für Experimentelle Kernphysik, Karlsruhe	Thomas Müller
	DE3	RWTH, I. Physikalisches Institut, Aachen	Demetrios Pandoulas
	DE4	RWTH, III. Physikalisches Institut A, Aachen	Siegfried Bethke
	DE5	RWTH, III. Physikalisches Institut B, Aachen	Günter Flügge
Greece	GR1	Institute of Nuclear Physics "Demokritos", Attiki	Anna Vayaki
	GR2	University of Athens, Athens	Leonidas Resvanis
	GR3	University of Ioánnina, Ioánnina	Frixos Triantis
Hungary	HU1	KFKI Research Institute for Particle and Nuclear Physics, Budapest	Gyorgy Vesztergombi
	HU2	Kossuth Lajos University, Debrecen	Laszlo Baksay
	HU3	Institute of Nuclear Research ATOMKI, Debrecen	Jozsef Molnar
India	IN1	Bhabha Atomic Research Centre, Mumbai	Sushil Kumar Kataria
	IN2	Institute of Physics, Bhubaneswar	Durga P. Mahapatra
	IN3	Panjab University, Chandigarh	J.M. Kohli
	IN4	Tata Institute of Fundamental Research - EHEP, Mumbai	Som N. Ganguli
	IN5	Tata Institute of Fundamental Research - HECR, Mumbai	V.S. Narasimham
	IN6	University of Delhi South Campus, New Delhi	R. K. Shivpuri
Italy	IT01	Università di Bari, Politecnico di Bari e Sezione dell' INFN, Bari	Giuseppe Iaselli
	IT02	Università di Bologna e Sezione dell' INFN, Bologna	Antonio Rossi
	IT03	Università di Catania e Sezione dell' INFN, Catania	Renato Potenza
	IT04	Università di Firenze e Sezione dell' INFN, Firenze	Ettore Focardi
	IT05	Università di Genova e Sezione dell' INFN, Genova	Pasquale Fabbricatore
	IT06	Università di Padova e Sezione dell' INFN, Padova	Gianni Zumerle
	IT07	Università di Pavia e Sezione dell' INFN, Pavia	Sergio P. Ratti
	IT08	Università di Perugia e Sezione dell' INFN, Perugia	Giancarlo Mantovani
	IT09	Università di Pisa e Sezione dell' INFN, Pisa	Rino Castaldi
	IT10	Università di Roma I e Sezione dell' INFN, Roma	Marcella Diemoz
	IT11	Università di Torino e Sezione dell'INFN, Torino	Cristiana Peroni

Country	Code	Institute	Contact Person
Korea	KR01	Chonnam National University, Kwangju	Jae Yool Kim
	KR02	Dongshin University, Naju	
	KR03	Seonam University, Namwon	
	KR04	Wonkwang University, Iksan	
	KR05	Gyeongsang National University, Jinju	Sungkeun Park
	KR06	Korea University, Seoul	
	KR07	Cheju National University, Cheju	Juna-Tak Rhee
	KR08	Chungbuk National University, Chongju	
	KR09	Kangwon National University, Chunchon	
	KR10	Kon-Kuk University, Seoul	
	KR11	Seoul National University of Education, Seoul	Dongchul Son
	KR12	Pohang University of Science and Technology, Pohang	
	KR13	Kyungpook National University, Taegu	
	KR14	Kangnung National University, Kangnung	Do Won Kim
Pakistan	PK1	Quaid-i-Azam University, Islamabad	Hafeez R. Hoorani
	PK2	Ghulam Ishaq Khan Institute of Engineering Sciences and Techn., Topi [1]	Jamil Ahmad
Poland	PL1	Institute of Experimental Physics, Warsaw	Jan Krolikowski
	PL2	Soltan Institute for Nuclear Studies, Warsaw	Maciej Gorski
Portugal	PT1	Laboratório de Instrumentação e Física Experimental de Partículas, Lisboa	Joao Varela
Russia	RU1	Budker Institute for Nuclear Physics, SB RAS, Novosibirsk	Alex Bondar
	RU2	Institute for High Energy Physics, Protvino	Nicolai E. Tyurin
	RU3	Institute for Nuclear Research, RAS, Moscow	Viktor Matveev
	RU4	Institute for Theoretical and Experimental Physics, Moscow	Vladimir Gavrilov
	RU5	Moscow State University, Institute for Nuclear Physics, Moscow	Ludmila Sarycheva
	RU6	P.N. Lebedev Physical Institute, RAS, Moscow	Sergei Rusakov
	RU7	Petersburg Nuclear Physics Institute, RAS, St Petersburg	Alexei Vorobyov
[JINR]	JINR	Joint Institute for Nuclear Research, Dubna	Igor Golutvin
Slovak Republic	SK1	Slovak University of Technology, Bratislava	Jozef Lipka
Spain	SP1	Centro de Investigaciones Energéticas Medioambientales y Tecnológicas, Madrid	Manuel Aguilar-Benitez
	SP2	Universidad Autónoma de Madrid, Madrid	Teresa Rodrigo
	SP3	Universidad de Oviedo, Oviedo	Teresa Rodrigo
	SP4	Instituto de Física de Cantabria (IFCA), CSIC-Univ. de Cantabria, Santander	Teresa Rodrigo
Switzerland	SW1	Institut für Teilchenphysik, Eidgenössische Technische Hochschule (ETH), Zürich	Hans Hofer
	SW2	Paul Scherrer Institut, Villigen	Hans Christian Walter
	SW3	Universität Basel, Basel	Ludwig Tauscher
	SW4	Universität Zürich, Zürich	Claude Amsler
Turkey	TR1	Cukurova University, Adana	Gulsen Onengut
	TR2	Middle East Technical University, Ankara	Perihan Tolun
Ukraine	UR1	Institute of Single Crystals of National Academy of Science, Kharkov	Pavel V. Sorokin
	UR2	National Scientific Center, Kharkov Inst. of Physics and Technology, Kharkov	
	UR3	Kharkov State University, Kharkov	
United Kingdom	UK1	Brunel University, Uxbridge	Stephen J. Watts
	UK2	Imperial College, University of London, London	Geoffrey Hall
	UK3	Rutherford Appleton Laboratory, Didcot	Robert M. Brown
	UK4	University of Bristol, Bristol	Greg P. Heath
USA	US01	University of Alabama, Tuscaloosa, Alabama	Laszlo Baksay
	US02	Boston University, Boston, Massachusetts	Lawrence Sulak
	US03	University of California at Davis, Davis, California	Winston Ko
	US04	University of California at Los Angeles, Los Angeles, California	Katsushi Arisaka
	US05	University of California, Riverside, California	John G. Layter
	US06	University of California San Diego, La Jolla, California	James G. Branson
	US07	California Institute of Technology, Pasadena, California	Harvey Newman
	US08	Carnegie Mellon University, Pittsburgh, Pennsylvania	Thomas Ferguson
	US09	Fairfield University, Fairfield, Connecticut	David R. Winn
	US10	Fermi National Accelerator Laboratory, Batavia, Illinois	Dan Green
	US11	University of Florida, Gainesville, Florida	Guenakh Mitselmakher
	US12	Florida State University-HEPG, Tallahassee, Florida	Vasken Hagopian
	US13	Florida State University-SCRI, Tallahassee, Florida	Martyn Corden
	US14	University of Illinois at Chicago, (UIC) Chicago, Illinois	Mark Adams
	US15	The University of Iowa, Iowa City, Iowa	Yasar Onel
	US16	Iowa State University, Ames, Iowa	E. Walter Anderson
	US17	Johns Hopkins University, Baltimore, Maryland	Chih-Yung Chien
	US18	Lawrence Livermore National Laboratory, Livermore, California	Craig R. Wuest
	US19	Los Alamos National Laboratory, Los Alamos, New Mexico	Hans Zlock
	US20	University of Maryland, College Park, Maryland	Andris Skuja
	US21	Massachusetts Institute of Technology, Cambridge, Massachusetts	Paraskevas Sphicas
	US22	University of Minnesota, Minneapolis, Minnesota	Roger Rusack
	US23	University of Mississippi, Oxford, Mississippi	Jim Reidy
	US24	University of Nebraska-Lincoln, Lincoln, Nebraska	Gregory R. Snow
	US25	Northeastern University, Boston, Massachusetts	Steve Reucroft
	US26	Northwestern University, Evanston, Illinois	Bruno Gobbi
	US27	University of Notre Dame, Notre Dame, Indiana	Randal Ruchti
	US28	The Ohio State University, Columbus, Ohio	Ta-Yung Ling
	US29	Princeton University, Princeton, New Jersey	Pierre Piroué
	US30	Purdue University, West Lafayette, Indiana	Virgil E. Barnes
	US31	Rice University, Houston, Texas	David Adams
	US32	University of Rochester, Rochester, New York	Arie Bodek
	US33	Rutgers, the State University of New Jersey, Piscataway, New Jersey	Steve Schnetzer
	US34	University of Texas at Dallas, Richardson, Texas	Ervin J. Fenyves
	US35	Texas Tech University, Lubbock, Texas	Richard Wigmans
	US36	Virginia Polytechnic Institute and State University, Blacksburg, Virginia	Luke Mo
	US37	University of Wisconsin, Madison, Wisconsin	Wesley Smith
Uzbekistan	UZ1	Institute for Nuclear Physics of the Uzbekistan Academy of Sciences, Ulugbek	Bekhzad S. Yuldashev

[1] Subject to approval by the CMS Collaboration Board

ANNEX 2

List of CMS Funding Agencies and Their Representatives

Austria	Federal Ministry of Science and Transport	Vienna	H. Schacher, H. Borns
Belgium	Fonds voor Wetenschappelijk Onderzoek (FWO)	Brussels	J. Traest, J. Lemonne
	Fonds National de la Recherche Scientifique (FNRS)	Brussels	M.J. Simoen, J. Sacton
[CERN]	European Laboratory for Particle Physics	Geneva	V.G. Goggi
China	Chinese Acadamy of Sciences (CAS)	Beijing	X. Zhu
	National Natural Science Foundation (NNSF)	Beijing	C. Zhang
Croatia	Ministry of Science and Technology	Zagreb	I. Kostovic
Cyprus	University of Cyprus	Nicosia	N. Vakis
Estonia	Estonian Academy of Sciences	Tallinn	E. Lippmaa
Finland	Helsinki Institute of Physics (HIP)	Helsinki	E. Byckling
France	Commissariat à l'Energie Atomique (CEA) - Saclay	Gif-sur-Yvette	C. Cesarsky
	Institut National de Physique Nucléaire et de Physique des Particules (IN2P3-CNRS)	Paris	C. Détraz
Germany	Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie (BMBF)	Bonn	H. Schunck
Greece	General Secretariat for Research and Technology	Athens	E. Floratos
Hungary	National Committee for Technological Development	Budapest	L. Nyiri
India	Department of Atomic Energy	Mumbai	R. Chidambaram
Italy	Istituto Nazionale di Fisica Nucleare (INFN)	Rome	L. Maiani
Korea	NN	Seoul	NN
Pakistan	Pakistan Atomic Energy Commission	Islamabad	M. Ahmad
Poland	State Commission for Scientific Research	Warsaw	J.K. Frackowiak
Portugal	Instituto Cooperação Cientifica e Técnica Internacional (ICCTI)	Lisbon	A. Trigo Abreu
RDMS Russia	Ministry of Science and Technologies of Russian Federation	Moscow	G.V. Kozlov
RDMS DMS (*)	Joint Institute for Nuclear Research (JINR)	Dubna	A.N. Sissakian
Spain	Oficina de Ciencia y Tecnologia	Madrid	F. Aldana
Switzerland	Rat der Eidgenössischen Technischen Hochschulen ETH Zürich Universities Basel and Zürich	Zürich Zürich	S. Bieri O. Kübler
	Paul Scherrer Institut (PSI)	Villigen	M.K. Eberle
Turkey	Scientific and Technical Research Council (TÜBITAK)	Ankara	D. Ulku
United Kingdom	Particle Physics and Astronomy Research Council (PPARC)	Swindon	I.F. Corbett
USA	US Department of Energy (DOE)	Washington	J.R. O'Fallon
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ANNEX 3

Sub-detector Structure of the CMS Detector

The CMS detector is structured into the following sub-detector units which are used throughout this document:

Sub-detector	Sub-system
1. Magnet (Common Project)	1.1 Barrel Yoke and Vacuum Tank 1.2 Endcap Yokes 1.3 Coil 1.4 Magnet Installation
2. Tracker	2.1 Pixel Detector 2.2 Silicon Detector 2.3 MSGC Detector 2.4 General Mechanical Infrastructure
3. ECAL	3.1 Barrel 3.2 Endcaps
4. HCAL	4.1 Barrel 4.2 Outer Barrel 4.3 Endcap 4.4 Outer Endcap 4.5 Forward
5. Muon Detector	5.1 Barrel Drifttubes 5.2 Forward ME 1/1 5.3 Endcap CSC 5.4 Barrel RPC 5.5 Forward RPC 5.6 Alignment
6. Trigger/DAQ	6.1 Trigger 6.2 Data Acquisition 6.3 Detector Controls
7. Offline Computing (Common Project)	7.1 Offline Infrastructure
8. Infrastructure	8.1 Access and Survey 8.2 General Installation 8.3 Cooling and Ventilation 8.4 Safety 8.5 Fixed Cranes 8.6 Shielding Systems

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