

STATEMENT OF UNDERSTANDING

AMONG

The Canada-France-Hawaii Telescope Corporation

And

Australian Astronomical Optics

Association of Canadian Universities for Research in Astronomy

Centre National de la Recherche Scientifique, France

Indian Institute of Astrophysics

National Astronomical Observatories, China, and

University of Hawaii

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STATEMENT OF UNDERSTANDING

This STATEMENT OF UNDERSTANDING (“SOU”) is effective on the _____ day of _____, 2018, by and between The Canada-France-Hawaii Telescope Corporation (“CFHT”), located at 65-1238 Mamalahoa Hwy, Kamuela, HI 96743, USA, and the following organizations, hereinafter collectively referred to as the “Participants”:

- Australian Astronomical Optics (AAO), Macquarie University, NSW 2109, Australia
- Association of Canadian Universities for Research in Astronomy (“ACURA”), located at 4409 - 2350 Health Sciences Mall, Vancouver, BC, V6T 1Z3, Canada
- Centre National de la Recherche Scientifique (“CNRS”), located at 3 Rue Michel Ange, Paris 75794 Cedex 16 France
- Indian Institute of Astrophysics (IIA), located at 2nd Block, Koramangala Bangalore 560034 India
- National Astronomical Observatories of China, Chinese Academy of Sciences (“NOAC”), located at A20 Datun Road, Chaoyang District, Beijing, China; and
- University of Hawaii (“UH”), located at 2444 Dole Street, Honolulu, HI 96822, USA

W I T N E S S E T H T H A T:

WHEREAS, the CFHT desires to redevelop its summit facility in accordance with the approved Maunakea management plans, and sees the Maunakea Spectroscopic Explorer (MSE) facility as the future of CFHT; and

WHEREAS, the Participants desire to engage in and take an active part in the establishment of MSE and specifically at this time to establish the principles by which the participants will work together on the MSE during the Preconstruction phase of the MSE Project, during which they will collectively generate the principles that will guide the next phase of the MSE Project; and

WHEREAS, the Participants recognize that new organizations may wish to join this Collaboration, and Participants may wish to leave the Collaboration, during this Preconstruction phase; and

WHEREAS, the Participants desire to establish non-binding and therefore flexible guidelines to guide the Participants through this Preconstruction phase of the MSE Project; and

WHEREAS, the Participants intent is to presently proceed with the establishment of the MSE in accordance with this SOU;

NOW THEREFORE, upon the execution of this SOU, the Participants confirm their respective understanding and intent to proceed with the MSE Project in accordance with the following:

ARTICLE A. RECITALS

Section A.1. The above recitals are hereby incorporated herein and made a part of this SOU.

ARTICLE B. MSE PROJECT

Section B.1. The MSE Project is a project initiated by Canada-France-Hawaii Telescope Corporation (“CFHT”) to redevelop the CFHT site on Maunakea. The MSE Project seeks to engage partners to design, build, operate and ultimately to decommission a large aperture dedicated multiobject spectroscopic telescope for the science and educational benefits of the Participants. The scope of the work provided in this Preconstruction SOU is to a) complete the preliminary design of MSE, b) develop the documents needed to justify a decision whether or not to proceed with construction, and c) prepare the recommended legal entity and the developmental and operational guidelines to govern the MSE Project which will be for the next phase of the MSE Observatory.

Section B.2. Background of MSE Project.

Section B.2.1 In September 2013, CFHT’s Scientific Advisory Council recommended that the CFHT Board support the creation of an ngCFHT (now MSE) Project Office. In December 2013, at the 83rd meeting, the CFHT Board of Directors approved launching the MSE Project Office “using limited development funds and to the maximum extent possible staff the office with contributions from CFHT staff and partner countries’ resources, including those who could be potential full partners in this endeavor”.

Section B.2.2 On 7 October 2014, the National Astronomical Observatory of China, through its Collaborative Agreement with CFHT, agreed to participate in the development of the design of MSE. On 8 December 2014, the Indian Institute of Astrophysics stated an interest in participating in the planning and design of the MSE Project. On 28 May 2015, the Australian Astronomical Observatory and CFHT signed a Collaboration Letter acknowledging their mutual interest MSE.

ARTICLE C. GOVERNANCE/THE MSE COLLABORATIVE BOARD

Section C.1. The Participants acknowledge and agree that this SOU creates rights and obligations upon the Participants and Affiliates, all of which collectively are designed and intended, *inter alia*, to afford each Full Participant and Associate Participant a say in decisions made hereunder by the governing MSE Collaborative Board, to ensure the effective operation of the Board, to ensure that the use of the Participants’ and Affiliates’ contributions is transparent and accountable, and to reflect how the contributions of Participants and Affiliates made will be recognized in the calculation of the Beneficial Interest.

However, this SOU does not in any way obligate any Participant or Affiliate to make any (further) contributions to the MSE Project, to continue participation in the Preconstruction Phase, or participate in any further phases of the MSE Project.

Section C.2. The Collaboration. For definitional purposes only and therefore nonbinding on the Participants, the Participants acknowledge their desire to continue their collaboration originally established under other instruments for the purpose of funding and completing the Preconstruction phase of the MSE Project and to further define their common understanding and intentions for their participation in the MSE Observatory. The continuance of this collaboration through the Preconstruction phase of the MSE is hereinafter referred to as the "Collaboration". The Participants consist of Full Participants and Associate Participants. A "Full Participant" is a signatory to this SOU, or a new member added per the terms in Section C.4.8.1, that is participating in the MSE project per the terms in Section C.4.4 herein. An "Associate Participant" is a signatory to this SOU, or a new member added per the terms in Section C.4.8.1, that is participating in the MSE project per the terms in Section C.4.8.2 herein.

Section C.3. The MSE Collaborative Board. The MSE Collaborative Board will be the governing body responsible for guiding the Collaboration under this SOU (the "Board"). Specifically, except as otherwise specified herein, the Board shall have overall responsibility for the activities described in this SOU.

Section C.3.1 The Board is comprised of two (2) members to represent each Full Participant, appointed by each respective Full Participant, one of whom shall be designated as the representative of the Full Participant with appropriate executive authority to represent the Full Participant in all aspects of this agreement, and one (1) member to represent each Associate Participant, appointed by each respective Associate Participant, with the appropriate executive authority to represent the Associate Participant in all aspects of this agreement. The CFHT Executive Director is an ex officio non-voting member of the Board.

Section C.3.2 CFHT shall not provide members to the MSE Board but rather is represented by the CNRS and UH members on said Board. The NRC, as a Member of CFHT, will have the status of an Affiliate as per the terms in Section C.4.8.4 and provide an Observer to said Board.

Section C.3.3 The Board members will appoint a Chair and Vice Chair of the Board, each to serve a two-year term which may be renewed once.

Section C.3.4 The Board will appoint a spokesperson to act as point of contact for external interactions by the Board as a whole.

Section C.4. Exclusive Authority of the MSE Collaborative Board

Section C.4.1 Notwithstanding anything to the contrary herein, in order to ensure a cohesive and organized development of the MSE, the Participants understand and agree that the Board must have Exclusive Authority on certain matters which are expressly agreed to by CFHT and the Participants and as referenced in Section C.1 of this SOU.

Section C.4.2 MSE funds as defined in Section D.1.2, herein below, shall be disbursed pursuant to the authority of the Board who shall direct CFHT in the disbursement of such MSE Funds. CFHT shall segregate MSE Funds to allow standalone reporting and accounting. In exercising its Executive responsibilities under Section D.1.1 herein below, CFHT shall act in compliance with the CFHT Board approved policies and procedures.

Section C.4.3 The Board shall approve and cause the MSE Project Office to keep a record of all contributions of each Participant and Affiliate. In this regard, the Participants have made the following contributions to the MSE Project as of December 31, 2017; each Participant or Affiliate has expended in time and in US Dollars the amounts reflected in this Section C.4.3.

Participant	In-Kind Effort (hours)	Other In-Kind Expenditure (\$)	Cash Budget (\$)
AAO (Australia)	1281	16,150	
CNRS (France)	8536	10,327	1,545,240
IIA (India)	1204	11,500	
NAOC (China)	8254	200,497	
NRC (Canada)	5680	256,949	1,545,240
University of Hawaii	1061	0	545,379
Spain	5560	99,678	
Total Contribution	31576	595,101	3,635,858
Component of the above totals that were contributed via CFHT	7070	0	3,635,858

Section C.4.4 As of the Effective Date of this SOU, the Participants agree that in order to qualify as a Full Participant under this SOU, the minimum cumulative threshold contribution anticipated to be made through the end of the Preconstruction phase of the MSE Project by a Full Participant shall be: US\$1,000,000.00 in cash or effort or both combined, where for the purposes of this Section C.4.4 an hour of direct effort is valued at (One Hundred Ten and No/100 Dollars, U.S. \$110.00 U.S.). The University of Hawaii, due to their unique position as the sublessor of the CFHT site, shall be a Full Participant irrespective of the size of their contribution toward the MSE Preconstruction phase. NRC, due to its Membership in CFHT, shall be an Affiliate.

Section C.4.4.1 Accordingly, upon the Effective Date the Participants collectively state their intent to make the contributions listed in Annex 2, which is attached hereto and incorporated herein. Such contributions are intended to be in addition to those listed in Section C.4.3, but similarly for the MSE Project during the Preconstruction phase and earmarked for the Preconstruction phase; i.e., the dollar amounts reflected in this Section C.4.4 represent the amount each Participant intends, but is not bound, to contribute to the MSE Project.

Section C.4.4.2 As long as the contributions listed in Annex 2 in addition to contributions already made and confirmed by the Board in Section C.4.3 meets the minimum threshold, the Participant's intended Preconstruction contributions shown in Annex 2 may change from time to time at said Participant's discretion and with written notice to the Board. The Participants each agree to use their best efforts to raise the funds needed to provide their intended contributions. The Participants will coordinate their strategies and efforts to seek external funding for the Preconstruction phase through the Board. While the delivery of an approved work package or cash contribution is credited as a contribution to the project, the cost borne by a Participant in enabling, establishing funding and administering the contribution will be borne solely by that Participant and not the MSE Collaboration. Similarly, the cost of promoting MSE Project within the Participant's community will be borne solely by that Participant and not the MSE Collaboration.

Section C.4.5 Board Authority Regarding Cash Contributions. Any cash contributions made pursuant to Section C.4.4.1, hereinabove, will be subject to approval by the Board for purposes of authorizing and recognizing such contributions under the Collaboration.

Section C.4.6 Board Authority Regarding In-Kind Contribution ("Work Packages"). For purposes of this SOU, in-kind contributions are defined as those costs which are incurred by each Participant for efforts that have been recommended by the MSE Project Manager and approved by the Board ("Work Packages"). Each Work Package will include a budget and project plan (with milestones and delivery dates).

Section C.4.6.1 The Board, subject to the recommendation of the Project Manager, shall determine the value of the in-kind contribution for each approved Work Package completed. Such value shall be recorded as the sum of the amount of direct expenditures and amount of direct effort, with the value of such direct effort to be calculated using a single project-wide hourly rate, which shall be set forth in the Development and Operations Agreement as provided for in Section C.4.9, herein below.

Section C.4.6.2 The Participant claiming recognition of its costs of in-kind contributions shall submit a claim to the Board on a quarterly basis, with details required by the Board to determine its accuracy and reasonableness. The Board shall seek the assistance of CFHT to maintain the accounting and official records for all approved contributions. The costs associated with this assistance will be a defined contribution by CFHT to the MSE project.

Section C.4.6.3 CFHT and such third persons as it may designate, will have the right to examine all records and other evidence reasonably appropriate to verify all costs claimed to have been incurred by the Participants as in-kind contributions. Any such examination is at the MSE Project's cost. The Participants shall cause to be provided to CFHT and to such third persons as it may designate access to the appropriate records and other information on reasonable notice and at reasonable times for that purpose.

Section C.4.6.4 The Participants, and such third persons as they may designate, will have the right to examine and audit all records and other evidence reasonably

appropriate to verify all costs claimed to have been incurred by the CFHT in the Project. Any such examination and audit is solely at the Participant's cost.

Section C.4.6.5 The Board shall monitor the progress of approved, in-kind Work Packages and shall be authorized to take reasonable remedial action in the event of significant delays where such delays will or has adversely impacted on the progress of the MSE Project. The intent of this Section is to take action to mitigate consequences of delays, where such delays may prevent other in-kind contributions or Work Packages from being completed in a timely and cost effective manner.

Section C.4.6.6 Currency of Record. All contributions made under this SOU shall be recorded in hours of direct effort, together with direct expenditures in US Dollars. The US Dollars are calculated as follows:

[The US Dollar (USD\$) amount of a Participant's contribution will be determined by the Participant's contribution in its native currency translated to USD\$ amounts at the Board of Governors of the Federal Reserve System exchange rate in effect at the end of the month in which the Participant's contribution was made and published at <http://www.federalreserve.gov/datadownload>.]

Section C.4.6.7 Fixed Year Recording of Contributions. All contributions will be converted to a Base Year for Valuation using the Consumer Price Index for Wage Earners and Clerical Workers (CPI-W) factors published by the U.S. Department of Labor's Bureau of Labor Statistics.

Section C.4.8 New and Departing Participants and Affiliates. The Board shall set minimum thresholds and guidelines for admitting new Participants and new Affiliates to the MSE Project.

Section C.4.8.1 New Full Participant. In the event an entity or consortium of entities desires to participate in the MSE project as a new Full Participant, minimum contribution thresholds along with specific guidelines and/or conditions shall be established by the Board as a prerequisite for the admittance of a new Participant to the MSE Project.

Section C.4.8.2 Associate Participant. In the event an entity or consortium of entities desires to participate in the MSE Project but cannot find resources to qualify as a Full Participant, that entity or consortium can be granted Associate Participant status. To qualify as an MSE Associate Participant, an entity must anticipate contributing at least US\$500,000.00 in cash or effort or both combined through the end of the Preconstruction phase. Each Associate Participant will have one vote on the MSE Collaborative Board. In all other respects, Associate Participants will be treated as Full Participants.

Section C.4.8.3 Any new Participant, as a condition to admittance to the MSE Project, shall agree to be bound by this SOU, as amended, in the manner that Participants are so bound.

Section C.4.8.4 Affiliate. In the event an entity or consortium of entities desires to participate in the MSE Project in a status other than as a Participant as defined herein, that entity or consortium can be granted Affiliate status. Affiliates will have observer status only on the Board. Minimum contribution thresholds along with specific guidelines and/or conditions shall be established by the Board as a prerequisite for the admittance of a new Affiliate to the MSE Project.

Section C.4.8.5 Departing Participants. In the event any Participant wishes to cease its participation in the MSE Project for any reason, the departing Participant must deliver written notice to the Board setting out (1) its intention to cease participation; (2) the effective date of termination; and (3) the Participant(s) or Affiliate(s) (if any) to whom the departing Participant wishes to allocate the contribution the departing Participant has made to the MSE Project to date. If the departing Participant does not allocate their contribution, their contribution shall thereafter the contributions will be dealt with in the manner approved by the Board. The departing Participant shall be deemed released from any obligations and shall have no ongoing rights pursuant to this SOU, effective on the effective date indicated on their notice of termination, provided that section D.1.6 Waiver of Claims shall survive.

Section C.4.9 Functional Entity for the Construction, Operation and Decommissioning of the MSE Observatory The Board shall be tasked with investigating and developing a recommended Development and Operations Agreement pursuant to which the construction, operation and decommissioning of the MSE shall occur.

Section C.4.9.1 Beneficial Interest in the MSE Observatory. Each Participant shall accrue a Beneficial Interest in the MSE Observatory. The Beneficial Interest accrued by a Participant will result from the value of that Participant's contributions to the MSE Project during each of the Preconstruction, Construction, Operations and Decommissioning phases of the Project. The share of Beneficial Interest accrued by any Participant during this Preconstruction phase will be in proportion to the share of total value contributed by all Participants during Preconstruction.¹

Section C.4.9.2 Each Participant with a Beneficial Interest in the MSE Observatory shall have access to a share of the MSE Deliverables that is in proportion to its respective Beneficial Interest in the MSE Observatory.

Section C.4.9.3 The Board shall be responsible for developing principles and methods by which the MSE Deliverables are accessible to those entities with a Beneficial Interest in the MSE Observatory based, among other things, upon their respective Beneficial Interests.

Section C.5. The MSE Board Decisions

¹ In this Understanding, the University of Hawaii would probably accrue very little Beneficial Interest during the Preconstruction phase. The University of Hawaii's Beneficial Interest resulting from their role as lessor of the site will be established as part of the Development and Operations Agreement.

Section C.5.1 Board Meetings. Meetings of the MSE Board and the CFHT Board will be coordinated, and two MSE Board members will be designated by mutual agreement between the MSE Board and the CFHT Board to have observer status at CFHT Board meetings. Additional MSE Board meetings may also be convened upon request and agreement of a simple majority of Participants.

Section C.5.1.1 Quorum. A simple majority of Participants must have one or both members present to constitute a quorum to convene a meeting of the Board.

Section C.5.1.2 Voting Rights. Upon committing the relevant minimum threshold for Associate Participant or Full Participant status, each Full Participant shall have two (2) votes and each Associate Participant shall have one (1) vote.

Section C.5.1.3 The Board shall make reasonable efforts to make decisions by means of consensus.

Section C.5.1.4 To the extent a consensus cannot be achieved, as determined by the Board Chair, Board decisions shall be based on a majority vote of the members present, including the proxy votes described in C.5.1.5 herein below, provided said majority vote represents a vote of the majority of the Participants. However, in the event of a split vote between the two (2) voting members of any one Full Participant, for purposes of this Section C.5.1.4, the split vote of any such Full Participant shall be counted as if the Full Participant voted, "No".

Section C.5.1.5 Full Participants shall be able to exercise their second vote via proxy.

Section C.5.2 If the need arises, the Board Chair may take action on behalf of the Board, without convening a meeting of the Board, provided the Board Chair receives the written consents for such action from at least one voting member of each of the Participants represented on the Board.

ARTICLE D. ROLE OF CFHT

Section D.1. The Participants acknowledge and understand that CFHT is the legal entity under which the MSE Project was initiated and is now being developed; and is also the lessee of the land and owner of the facility upon which the MSE is intended to be constructed.

Section D.1.1 CFHT, shall have executive responsibility, and financial and regulatory authority, over the MSE Project for purpose of this SOU and specifically during the Preconstruction phase of the project.

Section D.1.2 MSE Project Funds. Any monies transferred to CFHT and expressly earmarked for the MSE Project shall be held by CFHT (“MSE Funds”) but restricted strictly for use at the direction of the MSE Board.

Section D.1.3 The MSE Board as established herein below shall have Exclusive Authority to request the disbursement of such MSE Funds.

Section D.1.4 CFHT shall retain an MSE Project Manager, who shall report to and be accountable to the CFHT Executive Director. The Project Manager will be appointed by the CFHT Executive Director. The Project Manager will be made available to the MSE Board at all meetings of the MSE Board.

Section D.1.5 CFHT shall establish an MSE Project Office which shall be headed by the MSE Project Manager. Staffing of the MSE Project Office may include personnel delegated and assigned by Participants to the MSE Project Office for the purpose of fulfilling the needs of the Participant in accomplishing its responsibilities in the Preconstruction phase of the MSE Project.

Section D.1.5.1 Such MSE Project Office staff delegated by Participants shall be under the direct supervision of the MSE Project Manager who shall be responsible for coordinating the Participant’s needs with the work to be performed by the Participant’s delegated personnel. The MSE Project Manager shall thereafter assign the work and monitor the performance including the preparation of an annual performance evaluation to be provided to the appropriate Participant who assigned the personnel to the MSE Project. Such MSE Project Office staff delegated by Participants shall be subject to CFHT personnel policies if they are working on CFHT premises.

Section D.1.6 Waiver of Claims. Notwithstanding anything to the contrary herein, by executing this SOU, CFHT, each Participant, and the Participants collectively, agree that neither CFHT nor any Participant shall have any liability to CFHT or any other Participant for any claims, debts, liabilities, judgments, causes of action, losses, damages, demands, costs and expenses, arising in any way out of and/or related directly, indirectly or otherwise, to the MSE Project, beyond each Participant’s respective contributions (both cash and in-kind contributions) pursuant to Article C, herein.

ARTICLE E. RIGHTS OF PARTICIPANTS

Section E.1. Undisputed Rights of Participants. Notwithstanding the limited authority granted to the Board under this SOU, Participants shall retain the rights and authority, in their own discretion, with respect to, inter alia, the following:

Section E.1.1 Apply for and seek approval for Work Packages they are qualified to produce and to make changes to said Work Packages, subject to the recommendation of the Project Manager and approval of the Board.

Section E.1.2 Direct their own efforts and strategies to raise funds needed for their contributions to the MSE Project.

Section E.1.3 Retain the ultimate control of their facilities and assets related to their Work Packages and other in-kind contributions toward the MSE Project during this Preconstruction phase.

Section E.1.4 Reject any unilateral attempt by the Board to commit resources of the Participants without their prior consent.

Section E.1.5 Reject any unilateral attempt by the Board to act as their agent or to otherwise contractually commit such Participants unless prior authorization is granted by any such Participant.

Section E.1.6 Retain all such intellectual property rights and interests in their respective intellectual properties, subject, however, to Article E, herein.

ARTICLE F. INTELLECTUAL PROPERTY RIGHTS OF PARTICIPANTS

Section F.1. Each Participant shall retain ownership of all rights in and to that Participant's conceptions, innovations, inventions, articles of manufacture, processes, equipment, components, designs, software, computer code, data, confidential information, work product, and know how, of whatever nature or kind, including all copyrights, patents, industrial designs, trademarks, service marks, trade secret rights, and other proprietary or intellectual property rights therein and thereto, in all countries of the world, created, constructed or contributed by Participant in furtherance of the MSE Project (collectively the "MSE IPR") provided, that each Participant shall grant CFHT a perpetual, non-exclusive, royalty free, fully paid up, irrevocable, sub-licensable and transferable worldwide license in the MSE IPR for use solely for MSE construction, commissioning, maintenance and operation. The non-exclusive license being granted by each Participant hereinabove shall become effective immediately upon the MSE IPR's creation, construction or contribution, and shall continue irrespective of Participant's continued participation in the MSE Project.

ARTICLE G. MISCELLANEOUS PROVISIONS

Section G.1. Counterparts/Facsimile/Electronic Transmission. This SOU may be executed in one or more counterparts, each of which shall be deemed to be an original but all of which shall constitute one and the same instrument, and in making proof of the SOU, it shall not be necessary to produce or account for a copy of more than one such counterpart and the signature pages of the remaining counterparts. This SOU may also be executed by transmission of the signed signature page of any counterpart by facsimile or other electronic transmission

including electronic pdf format. Such facsimile or electronic transmission will be deemed to be an original.

Section G.2 Governing Law. This SOU shall be governed by, and construed in accordance with, the internal laws of the State of Hawaii, and all disputes involving this SOU shall be resolved in the federal and state courts of Hawaii.

Section G.3 Severability. Should any of the provisions of this SOU be declared or be determined by any court of competent jurisdiction to be illegal or invalid, the validity of the remaining parts, terms, or provisions shall not be affected thereby and said illegal or invalid party, term, or provision shall be deemed not to be part of this SOU.

Section G.4 Entireties Provision. This SOU constitutes the entire understanding of the parties hereto with respect to the subject matter hereof, and cannot be altered, amended, or modified except by their written agreement.

IN WITNESS WHEREOF, the parties have caused this understanding to be signed by their duly authorized representatives.

Canada France Hawaii Telescope Corp

Date _____

By Doug Simons _____
Title Executive Director _____
Date _____

India Institute of Astrophysics

Australian Astronomical Optics

By _____
Title _____
Date _____

National Optical Observatories of China

By _____
Title _____
Date _____

By _____
Title _____
Date _____

Centre National de la Recherche
Scientifique

Association of Canadian Universities for
Research in Astronomy

By _____
Title _____

By _____
Title _____
Date _____

Title _____
Date _____

University of Hawaii

By _____

Annex 1: Definitions and Acronyms

Within this document, certain capitalized words have explicit definitions that may be at variance with the common English usage of the word. Such capitalized words are defined here for the purposes of this Statement of Understanding document.

The Base Year for Valuation is the calendar year to be used as the single reference point for currency value.

Beneficial Interest is the benefit or advantage that a Participant enjoys from contributing to the MSE Project without actual ownership of assets in the MSE Observatory.

The Collaboration is the collective work of the Participants through the Preconstruction phase in the furtherance of the MSE project.

Construction is understood to mean the activities required to complete the final design, construction and commissioning of the MSE observatory.

The MSE Deliverables. It is envisaged that the MSE Observatory will be operated under a model in which the observatory's main function is to gather observational data for large survey programs that will take years to conduct, such programs being defined and guided by teams with membership taken from many of the entities with an interest in the MSE Observatory. With such a model the Beneficial Interest of the Participants will not result in a share of science observing time, but rather, may provide the opportunity to make use of the survey data for a proprietary period before the data becomes public, the opportunity to participate in and to influence the definition of the survey programs, and other opportunities that provide science or educational benefits to those entities with a Beneficial Interest in the MSE Observatory. The definition of the benefits enjoyed by those with a Beneficial Interest in MSE will be developed through this Preconstruction phase, and are, collectively, the “MSE Deliverables”).

The Development and Operations Agreement will be signed by those entering the Construction phase of the project. It governs the construction, operation and decommissioning of the MSE Observatory

The Effective Date is the date stated in the first paragraph of this SOU.

Exclusive Authority over an area means no other party may act independently on matters in that area.

MSE Funds are any monies transferred to CFHT and expressly earmarked for the MSE Project.

The MSE Observatory is the functional entity that will construct, operate and decommission MSE.

The next generation CFHT (ngCFHT) project is the original name of MSE and was used during feasibility studies of the concept that became MSE.

A Full Participant is a signatory to this SOU, or a new member added per the terms in Section C.4.8.1, that is participating in the MSE project per the terms in Section C.4.4 herein.

An Associate Participant is a signatory to this SOU, or a new member added per the terms in Section C.4.8.1, that is participating in the MSE project per the terms in Section C.4.8.2 herein.

Collectively, the signatories to this SOU are referred to as the Participants.

An Affiliate is an entity which is not a signatory to this SOU, but which is participating in the MSE project per the terms in Section C.4.8.4 herein.

Preconstruction is understood to mean the phase of the project that develops the design as well as the observatory partnership, context and framework, to prepare for a Development and Operation Agreement for the MSE Observatory, as well as for the formation of a legal entity for the MSE Observatory. Preconstruction activities should take the design and management plan through preliminary design phase.

The following acronyms are defined for use in this memorandum.

ACURA	Association of Canadian Universities for Research in Astronomy
AAO	Australian Astronomical Optics
CFHT	Canada France Hawaii Telescope
CNRS	Centre National de la Recherche Scientifique
IIA	Indian Institute of Astrophysics
MSE	Maunakea Spectroscopic Explorer
NAOC	National Astronomical Observatories of China
NRC	National Research Council of Canada
SOU	Statement of Understanding
UH	University of Hawaii

Annex 2: Table of Contributions

The intended new contributions by the Participants, under this SOU, are:

Participant	In-Kind Effort equivalent of the estimated PDP cost (\$)	Other In-Kind Expenditure (\$)	Cash Budget (\$)
AAO (Australia)	1,084,620	0	0
CNRS (France)	1,871,519	0	1,207,801
IIA (India)	1,308,608	0	0
NAOC (China)	3,161,000	0	0
NRC (Affiliate, Canada)	0	0	1,207,801
ACURA (Canada)	2,762,341	0	0
University of Hawaii	389,850	0	426,283
Spain	0	0	0
Total Contribution	\$1,0577,938	\$0	\$2,841,884
Component of the above totals that were contributed via CFHT	0	0	2,841,884

The cumulative sum of the value of previously made contributions under C.4.3 and the intended new contributions in the table above, is shown herebelow. In this table direct effort is valued at the hourly rate stated in C.4.4.

Participant	Contributed Value as of end of 2017*	Contributed Value under this SOU	Combined Contributed Value
AAO (Australia)	\$157,060	\$1,084,620	\$1,241,680
CNRS (France)	\$2,494,499	\$3,079,320	\$5,573,819
IIA (India)	\$143,940	\$1,308,608	\$1,452,548
NAOC (China)	\$1,108,437	\$3,161,000	\$4,269,437
NRC (Affiliate, Canada)	\$1,875,790	\$1,207,801	\$3,083,591
ACURA (Canada)	\$551,199	\$2,762,341	\$3,313,540
University of Hawaii	\$662,034	\$816,133	\$1,478,166
Spain	\$711,278	\$0	\$711,278
Total Contribution	\$7,704,264	\$13,419,821	\$21,124,085
Component of the above totals that were contributed via CFHT	\$4,413,558**	\$2,841,884	\$7,255,442

*Labor hours converted into Contributed Values using a rate of \$110 USD.

**\$3,635,858 + (7070 hours x \$110/hour)