

**INTERNATIONAL
COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENT
FOR
BASIC SCIENCE COOPERATION
(HEREINAFTER "CRADA") NO. 23-9007-CR**

BY AND AMONG

**THE BOARD OF TRUSTEES OF THE
LELAND STANFORD JUNIOR UNIVERSITY
("CONTRACTOR")
acting under its
U.S. Department of Energy Contract (DOE),
No. DE-AC02-76SF00515 ("PRIME CONTRACT"),
for the management and operation of the
SLAC NATIONAL ACCELERATOR LABORATORY
(hereinafter "LABORATORY"),**

AND

LABORATÓRIO INTERINSTITUCIONAL DE E-ASTRONOMIA

(HEREINAFTER "PARTICIPANT")

LABORATORY AND PARTICIPANT COLLECTIVELY REFERRED TO

AS THE "PARTIES" AND SEPARATELY AS A "PARTY"

This CRADA is being entered into by the Parties in order to carry out the cooperative activities for the Vera C. Rubin Observatory set forth in the Task Orders added as attached Annexes.

ARTICLE I: DEFINITIONS

“DOE” means the Department of Energy, an agency of the United States of America.

“Facility” means the Laboratory or its collaborating institutions to which materials or equipment are delivered or installed in accordance with the Project and a location in which cooperative activities as set forth in an applicable Task Order are conducted.

“Filing Party” means the Party filing patent application(s) on a Subject Invention in a jurisdiction the Inventing Party decides not to file a patent application.

“Generated Information” means information produced in the performance of this CRADA.

“Government” means the government of the United States of America and the government of Participant’s country and agencies of each.

“Intellectual Property” means patents, copyrights, and other forms of comparable property rights protected by the laws of one of the Parties’ countries.

“Inventing party” means the Party employing or sponsoring the inventor(s) of a Subject Invention.

“Project” means the cooperative activities set forth and further defined in the applicable Task Order attached hereto.

“Proprietary Information” means information which is developed at private expense outside of this CRADA, is marked as Proprietary Information, and embodies (1) trade secrets or (2) commercial or financial information which is considered privileged or confidential under the laws of one of the Parties’ countries, i.e., the United States of America or Participant’s country, whichever affords the lesser standard of protection.

"Protected CRADA Information" means Generated Information which is marked as being Protected CRADA Information (PCI) by a Party to this CRADA and which would have been Proprietary Information had it been obtained from a non-federal entity.

“Subject Invention” means any invention of the Laboratory or Participant conceived or first actually reduced to practice in the performance of work under this CRADA.

“Unlimited Rights” means the right to use, disclose, reproduce, prepare derivative works, distribute copies to the public and perform publicly and display publicly, in any manner and for any purpose, and to have or permit others to do so.

ARTICLE II: STATEMENT OF WORK, TERM, FUNDING AND COSTS

A. The Parties will define the objectives and scope of work for this CRADA through a series of individual Project specific (and subproject specific) Task Orders that will each have a statement of work to be performed, a budget (including costs and payments), net benefits statement, and any additional or modified terms in the CRADA applicable to each Project. Each Task Order will be required to be executed by the Parties and approved by DOE. Once fully executed and approved, Task Orders will become legally binding parts of the CRADA and will be added as Annexes (e.g. A-1, A-2, A-3 etc.).

B. [RESERVED]

C. Notices: The names, postal addresses, telephone, and email addresses for the Parties are provided in the attached Task Orders. Any communications required by this CRADA, if given by postage or other

verifiable means addressed to the Party to receive the communication, shall be deemed made as of the day of receipt of such communication by the Party, or on the date given if by email. Address changes shall be made by written notice and shall be effective thereafter. All such communications, to be considered effective, shall include the number of this CRADA.

- D. The effective date of this CRADA shall be [the latter date of (1)] the date on which it is signed by the last of the Parties [or (2) the date on which it is approved by DOE].

Note: the bracketed language can be removed with DOE Contracting Officer approval when local procedures are in place that require DOE approval of the final agreement prior to execution by the Parties.

- E. The term of this CRADA shall be five (5) years from the effective date unless terminated in accordance with the terms set forth herein. Upon mutual written agreement, the Parties may renew this CRADA for successive terms of five (5) years per renewal term.

- F. Costs and Payments are specified in the executed and approved Task Orders attached hereto.

ARTICLE III: FORMS OF COOPERATION

This CRADA is a cooperative effort in scientific research for the Vera C. Rubin Observatory. The DOE and the United States National Science Foundation (NSF) partnered on the construction of Rubin Observatory. The DOE and the NSF continue this partnership to carry out the experimental operations phase, including planning, data-taking for the 10-year Legacy Survey of Space and Time (LSST), and the final data production phase.

The Contractor, through the Laboratory, manages and carries out the DOE roles and responsibilities for the Rubin Observatory in all phases under DOE Office of Science Contract No. DE-AC02-76SF00515. During the construction phase, the Laboratory designed, developed, and commissioned the LSST Camera (LSSTCam). During the operations phase, the Laboratory (1) participates in the overall operations management, (2) operates and maintains the LSSTCam, (3) hosts and manages the United States Data Facility (USDF), (4) carries out data studies, and (5) hosts the Dark Energy Science Collaboration (DESC). The Association of Universities for Research in Astronomy (AURA) carries out the NSF roles in phases under Cooperative Agreement No. 1258333.

The forms of cooperation under this CRADA may include:

- A. scientific research and development;
- B. visits by scientists, engineers, and other experts to participate in commissioning activities, and/or to conduct research and development;
- C. exchange of scientific and technical information and personnel;
- D. seminars and other meetings;
- E. a contribution of equipment, instruments, materials, software, and/or data to the Laboratory or Facility;

- F. operation and maintenance of, and improvements to the Laboratory or Facility, and supporting research and development;
- G. other related activities as mutually agreed and necessary for the proper development of the Project.

ARTICLE IV: EQUIPMENT/MATERIALS

The Participant is not planning to supply equipment or materials under this Project. If the Parties anticipate that the Participant will provide substantial equipment or materials under the Project, the Parties will follow the approved standard property management plan developed for that Project by incorporating the plan into the applicable Task Order. Or, if a standard property management plan for the Project has not yet been developed, the Parties shall develop a suitable property management plan for the Project.

ARTICLE V: DISCLAIMER

THE PARTIES' RESPECTIVE GOVERNMENTS, PARTICIPANT, AND LABORATORY MAKE NO EXPRESS OR IMPLIED WARRANTY AS TO THE CONDITIONS OF THE RESEARCH OR ANY INTELLECTUAL PROPERTY, GENERATED INFORMATION, OR PRODUCT MADE, OR DEVELOPED UNDER THIS CRADA, OR THE OWNERSHIP, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE RESEARCH OR RESULTING PRODUCT. NEITHER THE PARTIES' RESPECTIVE GOVERNMENTS, PARTICIPANT, NOR LABORATORY SHALL BE LIABLE FOR SPECIAL, CONSEQUENTIAL OR INCIDENTAL DAMAGES OR COMPARABLE DAMAGES PROVIDED BY THE LAWS OF THE PARTICIPANT'S COUNTRY.

ARTICLE VI: LIABILITY

Unless otherwise agreed by the Parties, a Party shall not be responsible to the other Party for any indirect or consequential loss or similar damage such as, but not limited to, loss of profit, loss of revenue or loss of contracts, provided such damage was not caused by wilful act. The provisions of this CRADA shall not be construed to amend or limit the Party's statutory liability.

In cases where the personnel of one Party works on the premises of the other Party, such personnel shall comply with the internal regulations and the technical instructions of the host Party.

ARTICLE VII: ASSIGNMENT OF PERSONNEL

- A. Each Party may assign personnel to the other Party's facilities as part of this CRADA to participate in or observe the research or other activities to be performed, under this CRADA. Such personnel assigned by the assigning Party shall not during the period of such assignments be considered employees of the receiving Party for any purpose.
- B. The receiving Party shall have the right to exercise routine administrative and technical supervisory control of the occupational activities of such personnel during the assignment period and shall have the right to approve the assignment of such personnel and/or to later request their removal by the assigning Party.

- C. Unless otherwise agreed to by the Parties, the assigning Party shall bear any and all costs and expenses with regard to its personnel assigned to the receiving Party's facilities under this CRADA. The receiving Party shall bear facility costs of such assignments.
- D. The Parties shall use their best efforts to ensure that their personnel working under this CRADA conform to the rules for conduct and safety in force at the facility where the work is being performed.

ARTICLE VIII: RIGHTS TO INTELLECTUAL PROPERTY

The Parties agree that a purpose of this CRADA is to provide substantial benefit to the economies of the United States of America and Participant's country. Project specific plans for providing a net benefit are included in each Task Order attached hereto. In exchange for the benefits received under this CRADA, the Parties agree to the following:

- A. While the Parties do not anticipate the creation of Intellectual Property under this CRADA, the Parties shall take appropriate steps, in accordance with the national laws and regulations of their respective countries, with a view to realizing the following arrangement of Intellectual Property:

Rights to Subject Inventions between the Parties

- (1) Subject Inventions made solely by persons employed or sponsored by one Party shall be owned by that Party. Subject Inventions made jointly by persons employed or sponsored by both Parties shall be jointly owned by the Parties.
- (2) Each Party grants each Government, and the other Party, a nonexclusive, transferable, irrevocable, paid-up license to practice all of its Subject Inventions arising out of this CRADA throughout the world, with a right to grant sublicenses to third parties.
- (3) For each Subject Invention made in performance of or under this CRADA, the Inventing Party shall disclose the Subject Invention promptly to the other Party together with any documentation and information necessary to enable the other Party to establish any rights to which it may be entitled.
- (4) The Parties agree that the Inventing Party of any Subject Invention shall have the first opportunity to file for patent protection. If there is more than one Inventing Party, the Inventing Parties shall agree among themselves as to who will file patent applications on any joint Subject Invention.
- (5) The Inventing Party shall reasonably cooperate and assist the Filing Party, at the Filing Party's expense, in executing a written assignment of the Subject Invention to the Filing Party and in otherwise perfecting the patent application, and the Filing Party shall have the right to control the prosecution of the patent application.

B. Facilities License (RESERVED)

- C. Laboratory shall be bound by the U.S. Industrial Competitiveness provisions in accordance with its Prime Contract with respect to any licensing and assignments of Intellectual Property arising under this CRADA.

- D. Given the collaborative and basic science nature of this CRADA, Participant agrees that the non-exclusive disposition of intellectual property rights allocated in this CRADA is equitable and will best enable the Parties to fulfill the activities outlined in the attached Task Orders. Therefore, while Participant acknowledges that it has an option to choose an exclusive license for a pre-negotiated field of use for reasonable compensation for any Subject Invention made in whole or in part by a Laboratory employee, the Participant is declining such an option.
- E. A Net Benefit Statement is included in each attached Task Order to justify waiving the standard U.S. Competitiveness provision.

ARTICLE IX: RIGHTS IN DATA

A. GENERATED INFORMATION

Each Party shall have Unlimited Rights in all Generated Information produced by or provided to the Parties under this CRADA, except for information which is disclosed in a Subject Invention disclosure being considered for patent protection, which is marked as being Proprietary Information, or which is marked as PCI. The Parties agree to abide by the terms of the provisions delineated in the document "Rubin Data Policy," disseminated by the Vera C. Rubin Observatory and dated July 22, 2021, with any updates to the document as provided by the Rubin Observatory management.

Each Party may assert copyright in its Generated Information. However, the unlimited rights of the other Parties are not changed by copyright assertion. Furthermore, all Parties have a right to use, reproduce, prepare derivative works, perform, and display publicly, and distribute to other Parties, any Intellectual Property the Party developed during, or originating from, this CRADA for any use, including but not limited to uses necessary to ensure successful design, construction, commissioning, operation, and upgrades of/to the Project and Facility, and permit others to do so same.

B. PROPRIETARY INFORMATION

Each Party agrees to not disclose Proprietary Information provided by the other Party to anyone other than the Parties to this CRADA without the written approval of the providing Party, except to employees of the respective Governments that are required to protect the Proprietary Information.

C. PROTECTED CRADA INFORMATION:

Laboratory may designate and mark as PCI any qualifying Generated Information produced by its or Participant's employees. For a period of two (2) years from the date it is released to Participants, but no longer than five (5) years after it is produced, the Parties agree not to further disclose such PCI except as necessary to perform activities under this CRADA or as requested by the DOE Contracting Officer to be provided to other DOE facilities for use only at those DOE facilities with the same protection in place and marked accordingly. Government employees who are subject to 18 USC 1905 may have access to PCI.

D. CESSATION OF OBLIGATIONS REGARDING PROPRIETARY INFORMATION

The obligations relating to the disclosure or dissemination of Proprietary Information shall end if any such information becomes known without fault or if such information is developed independently by a Party's employees who had no access to the Proprietary Information.

E. SHARING GENERATED DATA WITH OTHERS

The Parties also agree to share all Generated Information with each other and any other entity or Party identified in the applicable Project in compliance with the Rubin Data Policy as identified in Article IX.A of this CRADA.

F. FACILITIES DATA CLAUSE (RESERVED)

ARTICLE X: COMPLIANCE WITH EXPORT CONTROLS AND REGULATIONS

If goods and/or technology are transferred, the Parties shall comply with the export control laws and regulations of the United States of America and Participant's country. The Parties shall obtain export licenses for goods and/or technology to be transferred for cooperative activities conducted under this CRADA when such export licenses are required by the export control laws and regulations of the United States of America or Participant's country. Each Party is responsible for its own compliance with such laws.

ARTICLE XI: REPORTS AND ABSTRACTS

- A. The Parties agree to produce the following deliverables: an initial abstract suitable for public release; interim reports as reasonably requested; and a final report including a list of Subject Inventions.
- B. Use of the name of the other Party or its employees in any promotional activity, with reference to this CRADA, requires written approval (responses to customer survey forms and solicitations for success stories are considered written approval) of the other Party.

ARTICLE XII: HARDSHIP/FORCE MAJEURE

Neither Party will be liable for unforeseeable events beyond its reasonable control.

ARTICLE XIII: DISPUTES

The Parties will attempt to resolve any disputes between them which may arise during the course of this CRADA. In the event that a dispute cannot be resolved between the Parties and upon mutual agreements of their respective Governments, the dispute shall be submitted to an arbitral tribunal for binding arbitration in accordance with the applicable rules of international law. Unless the Parties otherwise agree in writing, the arbitration rules of UNCITRAL shall apply.


ARTICLE XIV: ENTIRE CRADA, MODIFICATIONS AND TERMINATION

This CRADA with its Annexes represent the entire agreement between the Parties in performing the research and other activities described in this CRADA will be effective as defined in Article II paragraph (D). Any agreement to materially change any terms or conditions of this CRADA shall be valid only if the change is made in writing and executed by the Parties hereto.

This CRADA may be terminated by either Party with ninety (90) days written notice to the other Party. Each Party will be responsible for its own costs as a result of this termination. *The confidentiality, use, and/or non-disclosure obligations of this CRADA shall survive any termination of this CRADA, as well as provisions of this CRADA which would naturally survive termination or expiration of this CRADA.*

IN WITNESS WHEREOF, the Parties have caused this CRADA to be duly executed in their respective names by their duly authorized representatives.

FOR LABORATORY:



Name: John Sarrao
Director, SLAC National Accelerator Laboratory
Title: June 20, 2024

Date: _____

FOR PARTICIPANT:

ASSOCIACAO Digitally signed by
LABORATORIO ASSOCIACAO

Name: LABORATORIO
INTERINSTITU INTERINSTITUCIONA
Title: L DE E
AS:3666221200181
AS:366622120 Date: 2024.06.19
00181 14:16:07 -03'00'
Date: _____

ANNEX A
Model Project Specific Task Order
In-kind Contributions to the Rubin Observatory Legacy Survey of Space and Time
(HEREINAFTER “Project”)

23-9007-CR

PROJECT DESCRIPTION: In-kind Contributions to the Rubin Observatory Legacy Survey of Space and Time (“Project”)

This Task Order is subject to and governed by CRADA No. 23-9007 (“CRADA”) between the Parties and all the terms, conditions, definitions, and provisions of said CRADA are hereby incorporated by reference. The Parties agree to perform their respective obligations related to this Project in accordance with the terms and conditions of this Task Order and other documents attached or incorporated by reference, which together constitute the entire Task Order. In the event of any conflict between the provisions of this Task Order and the provisions of the CRADA, the CRADA shall control.

STATEMENT OF WORK (“SOW”)

A. PURPOSE

1. Parties

Participant: LIneA: Laboratório Interinstitucional de e-Astronomia, AV PASTOR MARTIN LUTHER KING JR, 126, BLC 9 SAL 817 TOR 3, Del Castilho, Rio de Janeiro, RJ, Brazil CEP 20.765-000

Participant’s Program Lead: Luiz da Costa <ldacosta@linea.org.br>

SLAC: The Board of Trustees of the Leland Stanford Junior University (Stanford) and SLAC National Accelerator Center (SLAC), Stanford, CA 94305 USA

SLAC Oversight: Phil Marshall <pjm@slac.stanford.edu>

Rubin International Program Coordinator: Aprajita Verma

The Director of Rubin Observatory Operations, or their designate, is authorized to take action related to the implementation of this agreement.

2. Relationships

LIneA scientists have a long-standing interest in astronomy and astrophysics with wide-field surveys in general, and with Rubin Observatory's LSST in particular.

SLAC National Accelerator Laboratory is one of the managing organizations for Rubin Observatory, and is operated for the US Department of Energy by Stanford University. It is also an operating partner for Rubin, having led the construction and commissioning of the LSST Camera. Vera C. Rubin Observatory provides international research infrastructure, analogous to how the LHC at CERN supports a number of large science collaborations.

3. Background of project

Rubin Observatory hosts a wide-field-of-view 8-meter survey telescope located in Chile which is designed to provide a very deep imaging of a large fraction of the Southern sky, with multiple

scientific goals. This iCRADA seeks to promote collaboration between LIneA and SLAC via 3 specific in-kind contributions made by LIneA to Rubin Observatory and the LSST science community as detailed in this statement of work, in return for SLAC granting rights to access the LSST data for a named list of principal investigators (PIs) and junior associates. The context for LIneA's in-kind contributions is as follows:

- Laboratório Interinstitucional de e-Astronomia manages and operates its computational infrastructure inside a supercomputing facility used to process DES data and hosts a number of large astronomical datasets (SDSS, DES in addition to other datasets). LIneA believes that hosting a LITE-IDAC would be a valuable addition to the currently planned set of LSST data centers.
- LIneA has a long-standing experience in software development and maintenance for astronomical surveys and it is offering directable work to LSST-DESC TJP from skilled members which are active members of DESC and are already endorsed as Pipeline Scientists.
- LIneA has a long-standing experience developing software for astronomical projects, especially for large photometric surveys such as DES, and key LIneA staff are already members of the LSST community and have been studying ways to scale LIneA's science platform developed for DES to meet the LSST requirements.

4. Expected goals and accomplishments

As detailed in the Project Agreements below, LIneA expects to provide 3 key deliverables, one from each of its defined in-kind contributions, as follows:

- LIneA proposes to deliver hardware upgrade to their Data Center at the level of 500 dedicated CPU cores, 5 Petabytes of storage and 500 TB of database space all under warranty - conforming to the guidelines specified in <https://rtn-003.lsst.io/> - plus provide 0.25 FTE of a scientist, 0.25 FTE of operators and 0.5 FTE of IT professionals who would be responsible for the oversight, maintenance and data curation of the LSST data at LIneA's IDAC, for the duration of the LSST survey.
- LIneA plans to provide skilled software development effort to the LSST DESC at the level of 0.5 FTE per year for four years.
- LIneA plans to provide computer cycles and skilled software development effort at the level of 3.8 FTE-year over a 4- year period, and 0.3 FTE-year, per year, to cover operation, maintenance and upgrades of photo-z codes for the period of survey releases (total of 7.8 FTE in the whole period).

The total estimated equivalent value of this program of in-kind contributions is \$4.4M over the full period of Rubin/LSST operations. In return, SLAC will grant LSST data rights to 16 LIneA PIs (including 1 PI in recognition of program management effort at LIneA). All contribution delivery schedules may be adjusted by mutual agreement. Program performance will be evaluated annually, and reported to the Rubin Resource Forum.

Note that in the event that a PI or JA undergoes a change in their institutional affiliation to one outside the BRA-LIN program, that person will no longer be listed as one of the BRA-LIN data rights holders but they will retain data rights as an individual for a period of two (2) years from the time of the change (their "Grace Period"). Grace Periods are contingent upon the aforesaid relocation being to an institution that is eligible to host researchers with Rubin data rights. If a JA

is promoted to a permanent position at a BRA-LIN program institute, they will also retain data rights under a corresponding 2-year Grace Period before transitioning to PI status. Extension requests to the Grace Period may be made to the Data Policy Committee, as identified in the Rubin Data Policy. Participants in the in-kind program are expected to abide by the Rubin codes of conduct.

5. Reason for cooperation

SLAC and LIneA have a mutual interest in maximizing the scientific exploitation of the LSST data. This can be achieved in part by enlarging the LSST science community to include scientists affiliated with LIneA, while the in-kind contributions made by LIneA will expand the resources available to US astronomical and HEP communities.

6. Public Abstract (per Article X)

LIneA will make in-kind contributions to Rubin Observatory and the LSST science community, in return for SLAC granting rights to access the LSST data for a named list of principal investigators (PIs) and junior associates (JAs). The context for LIneA's in-kind contributions is as follows:

- Laboratório Interinstitucional de e-Astronomia manages and operates its computational infrastructure inside a supercomputing facility used to process DES data and hosts a number of large astronomical datasets (SDSS, DES in addition to other datasets). LIneA believes that hosting a LITE-IDAC would be a valuable addition to the currently planned set of LSST data centers.
- LIneA has a long-standing experience in software development and maintenance for astronomical surveys and it is offering directable work to LSST-DESC TJP from skilled members which are active members of DESC and are already endorsed as Pipeline Scientists.
- LIneA has a long-standing experience developing software for astronomical projects, especially for large photometric surveys such as DES, and key LIneA staff are already members of the LSST community and have been studying ways to scale LIneA's science platform developed for DES to meet the LSST requirements.

Specifically:

- LIneA proposes to deliver hardware upgrade to their Data Center at the level of 500 dedicated CPU cores, 5 Petabytes of storage and 500 TB of database space all under warranty - conforming to the guidelines specified in <https://rtn-003.lsst.io/> - plus provide 0.25 FTE of a scientist, 0.25 FTE of operators and 0.5 FTE of IT professionals who would be responsible for the oversight, maintenance and data curation of the LSST data at LIneA's IDAC, for the duration of the LSST survey.
- LIneA plans to provide skilled software development effort to the LSST DESC at the level of 0.5 FTE per year for four years.
- LIneA plans to provide computer cycles and skilled software development effort at the level of 3.8 FTE-year over a 4-year period, and 0.3 FTE-year, per year, to cover operation, maintenance and upgrades of photo-z codes for the period of survey releases (total of 7.8 FTE in the whole period).

In return, SLAC will grant LSST data rights to 16 LIneA PIs (including 1 PI in recognition of program management effort at LIneA).

B. SCOPE

Project Agreement S1: Serving LSST Catalogs from the LIneA Lite IDAC

S1.1 Technical Objectives

LIneA proposes to establish a “LITE IDAC” at the site of its computing center located at the LNCC, aimed at providing a subset of the LSST catalog data to the scientific community in Brazil as well as other LSST users and to federate datasets resulting from user-generated products to the LSST international community; this would be via a dedicated infrastructure, conforming to the guidelines specified in RTN-003 document with 0.25 FTE of a scientist to oversee the operation, and responsible for the coordination with NOIRLab and the IDAC network, and 0.75 FTE of IT professionals during the lifetime of the survey.

S1.2 Division of Responsibilities

LIneA will ensure that this contribution is delivered as defined, with progress reported as required by the Rubin In-kind Program Coordinator. SLAC will grant LSST data rights to 5 LIneA PIs and their junior associates.

S1.3 Deliverables

LIneA proposes to deliver hardware upgrade to their Data Center at the level of 500 dedicated CPU cores, 5 Petabytes of storage and 500 TB of database space all under warranty - conforming to the guidelines specified in <https://rtn-003.lsst.io/> - plus provide 0.25 FTE of a scientist, 0.25 FTE of operators and 0.5 FTE of IT professionals who would be responsible for the oversight, maintenance and data curation of the LSST data at LIneA’s IDAC, for the duration of the LSST survey. Rubin's estimate of the equivalent value of this contribution is \$1.5M. LIneA will follow the annual cycle of progress reporting and contribution management as laid out in the Rubin Manual for In-kind Contributors and Recipients, including providing a final report on the completion of the contribution.

S1.4 Key Personnel

Phil Marshall <pjm@slac.stanford.edu> at SLAC will oversee the SLAC activity for this contribution. The Program Lead will oversee the LIneA activity for this contribution. Their email address is ldacosta@linea.org.br

S1.5 Schedule

The collaboration under this agreement shall begin when this agreement is signed by all parties and is intended to continue through September 30, 2038. There will be regular reviews of the progress of the contribution with at most annual frequency, organized by Rubin Observatory. The Key Personnel will coordinate on this reporting process.

Project Agreement S3: Contributions to Science Pipeline Development in the LSST- DESC TJP Working Group

S3.1 Technical Objectives

LIneA will provide directable software development and support effort to the LSST-DESC TJP working

group.

S3.2 Division of Responsibilities

LIneA will ensure that this contribution is delivered as defined, with progress reported as required by the Rubin In-kind Program Coordinator. SLAC will grant LSST data rights to 2 LIneA PIs and their junior associates.

S3.3 Deliverables

LIneA plans to provide skilled software development effort to the LSST DESC at the level of 0.5 FTE per year for four years. Rubin's estimate of the equivalent value of this contribution is \$0.6M. LIneA will follow the annual cycle of progress reporting and contribution management as laid out in the Rubin Manual for In-kind Contributors and Recipients, including providing a final report on the completion of the contribution.

S3.4 Key Personnel

Phil Marshall <pjm@slac.stanford.edu> at SLAC will oversee the SLAC activity for this contribution. The Program Lead will oversee the LIneA activity for this contribution. Their email address is ldacosta@linea.org.br

S3.5 Schedule

The collaboration under this agreement shall begin when this agreement is signed by all parties and is intended to continue through September 30, 2038. There will be regular reviews of the progress of the contribution with at most annual frequency, organized by Rubin Observatory. The Key Personnel will coordinate on this reporting process.

Project Agreement S4: Infrastructure and data sets to support photo-z generation

S4.1 Technical Objectives

LIneA will provide directable software development effort and computer cycles to the LSST Project complementing DM generated photometric catalog with standardized photo-z training and validation sets, photo-z validation, photo-z and galaxy properties estimates based on codes and configurations recommended by the Science Collaborations.

S4.2 Division of Responsibilities

LIneA will ensure that this contribution is delivered as defined, with progress reported as required by the Rubin In-kind Program Coordinator. SLAC will grant LSST data rights to 7.8 LIneA PIs and their junior associates.

S4.3 Deliverables

LIneA plans to provide computer cycles and skilled software development effort at the level of

3.8 FTE-year over a 4- year period, and 0.3 FTE-year, per year, to cover operation, maintenance and upgrades of photo-z codes for the period of survey releases (total of 7.8 FTE in the whole period). Rubin's estimate of the equivalent value of this contribution is \$2.3M. LIneA will follow the annual cycle of progress reporting and contribution management as laid out in the Rubin Manual for In-kind Contributors and Recipients, including providing a final report on the completion of the contribution.

S4.4 Key Personnel

Phil Marshall <pjm@slac.stanford.edu> at SLAC will oversee the SLAC activity for this contribution. The Program Lead will oversee the LIneA activity for this contribution. Their email address is ldacosta@linea.org.br

S4.5 Schedule

The collaboration under this agreement shall begin when this agreement is signed by all parties and is intended to continue through September 30, 2038. There will be regular reviews of the progress of the contribution with at most annual frequency, organized by Rubin Observatory. The Key Personnel will coordinate on this reporting process.

SECTION 2 – AMENDMENTS TO CRADA TERMS AND CONDITIONS

For the purposes of work performed under this project specific Task Order the following amendments apply.

ARTICLE I: DEFINITIONS N/A

ARTICLE II: STATEMENT OF WORK, TERM, FUNDING AND COSTS

The following terms are added to Article II:

- B. The purpose of this project specific Task Order is to provide the Parties with a legal framework for scientific and technical cooperation related to: scientific and technical contribution related to the operations of Vera C. Rubin Observatory and the support of its LSST science community (see Annex A, Statement of Work).
- E. The Participant's total In-Kind estimated contribution for this Task Order is \$4.4M over the full period of Rubin/LSST operations, of which is \$0.00 funds-in to the Laboratory. The Participant's Government is not contributing.

Unless otherwise agreed to by the Parties in the form of a written modification to this Task Order, each Party shall bear the cost of its participation, which shall be subject to the availability of funds.

SECTION 3 – NET BENEFITS STATEMENT

The following Net Benefits Statement (NBS) applies:

The U.S. Department of Energy (DOE) supports basic and fundamental research increasingly in collaboration with international partners that can facilitate the optimal sharing of costs for large-scale

activities as well as add valuable capabilities and expertise that may not exist within the United States. For programs such as the Vera C. Rubin Observatory, the international community realizes that the next generation of cosmological sky surveys would require previously independent efforts to converge in way that harnesses the unique capabilities of dozens of collaborations around the world. Often, these partnerships begin with the exchange and support of students, faculty, and other research personnel.

Develop the next generation of scientists and engineers

The participation by students in international science programs is essential as they bring fresh perspectives, ask tough questions, and are committed to learn and challenge and thereby grow. These aspects represent the very basic principles of undertaking successful research.

Improve research quality and productivity


Through this CRADA, researchers will have access to unique research facilities and capabilities that are not available in their home country or institution. By collaborating with researchers with different skills sets and national backgrounds, the resulting research will be more effective and more successful.

Net Benefit Determination

A primary goal of this CRADA is to enable enhanced international basic science collaborations while ensuring such collaborative efforts mutually benefit the economies of the United States and the international collaborators in a way that advances all Parties involved. To achieve this result, this CRADA incorporates a balanced and commensurable approach to the copyright and licensing of generated intellectual property, and in particular to software, to maximize the benefits to the economies of both Parties.

Given the collaborative and basic science nature of this CRADA, DOE has determined that a non-exclusive disposition of rights achieved through the licensing provisions will best enable the Parties to fulfill the activities outlined in the SOW while concurrently providing a net benefit to the economies of both Parties.

FOR LABORATORY:



Name: John Sarrao
Title: Director, SLAC National Accelerator Laboratory

Date: June 20, 2024

FOR PARTICIPANT:

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