



Cover Page for Proposal
Submitted to the
National Aeronautics and
Space Administration

NASA Proposal Number

TBD on Submit

NASA PROCEDURE FOR HANDLING PROPOSALS

This proposal shall be used and disclosed for evaluation purposes only, and a copy of this Government notice shall be applied to any reproduction or abstract thereof. Any authorized restrictive notices that the submitter places on this proposal shall also be strictly complied with. Disclosure of this proposal for any reason outside the Government evaluation purposes shall be made only to the extent authorized by the Government.

SECTION I - Proposal Information

| | | | | | |
|---|--|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Principal Investigator Genaro Carrasco Ozuna | | E-mail Address | | Phone Number | |
| Street Address (1) | | Street Address (2) | | | |
| City | State / Province | | Postal Code | Country Code | |
| Proposal Title : El presente proyecto propone validar experimentalmente un modelo predictivo de sismos basado en coherencia causal(~7 dias) derivado del formalismo fisico TCDS . El objetivo central es demostrar que el *Σ-locking* —medible entre variables geofisicas. | | | | | |
| Proposed Start Date 11 / 07 / 2025 | Proposed End Date 01 / 01 / 2026 | Total Budget 237,000.00 | Year 1 Budget 79,000.00 | Year 2 Budget 79,000.00 | Year 3 Budget 79,000.00 |

SECTION II - Application Information

| | | | | | |
|--|--|---|-----------------------------------|--|--|
| NASA Program Announcement Number NNH25ZDA001N-RRNES | NASA Program Announcement Title A.4 Rapid Response and Novel Research in Earth Science | | | | |
| For Consideration By NASA Organization <i>(the soliciting organization, or the organization to which an unsolicited proposal is submitted)</i> NASA , Headquarters , Science Mission Directorate , Earth Science | | | | | |
| Date Submitted | Submission Method Electronic Submission Only | | Grants.gov Application Identifier | Applicant Proposal Identifier NNH25ZDA001N-RRNES | |
| Type of Application New | Predecessor Award Number | Other Federal Agencies to Which Proposal Has Been Submitted | | | |
| International Participation No | Type of International Participation | | | | |

SECTION III - Submitting Organization Information

| | | | | | |
|---|------------------|-----------|---|-------------------|--|
| UEI | EFT | CAGE Code | Employer Identification Number (EIN or TIN) | Organization Type | |
| Organization Name (Standard/Legal Name) | | | | Company Division | |
| Organization DBA Name | | | | Division Number | |
| Street Address (1) | | | Street Address (2) | | |
| City | State / Province | | Postal Code | Country Code | |

SECTION IV - Proposal Point of Contact Information

| | | |
|-----------------------------|--|---------------------------------------|
| Name Genaro Ozuna | Email Address Geozunac3536@gmail.com | Phone Number 52-812-5989869 |
|-----------------------------|--|---------------------------------------|

SECTION V - Certification and Authorization

Certification of Compliance with Applicable Executive Orders and U.S. Code

By submitting the proposal identified in the Cover Sheet/Proposal Summary in response to this Research Announcement, the Authorizing Official of the proposing organization (or the individual proposer if there is no proposing organization) as identified below:

- certifies that the statements made in this proposal are true and complete to the best of their knowledge;
- agrees to accept the obligations to comply with NASA award terms and conditions if an award is made as a result of this proposal; and
- confirms compliance with all provisions, rules, and stipulations set forth in this solicitation.

Willful provision of false information in this proposal and/or its supporting documents, or in reports required under an ensuing award, is a criminal offense (U.S. Code, Title 18, Section 1001).

| | | |
|---|--------------------|--------------|
| Authorized Organizational Representative (AOR) Name | AOR E-mail Address | Phone Number |
| AOR Signature <i>(Must have AOR's original signature. Do not sign "for" AOR.)</i> Digitally signed by | | Date |

| | | | |
|---|--|--|--------------------------------------|
| PI Name : Genaro Carrasco Ozuna | | NASA Proposal Number TBD on Submit | |
| Organization Name : | | | |
| Proposal Title : El presente proyecto propone validar experimentalmente un modelo predictivo de sismos basado en coherencia causal(~7 dias) derivado del formalismo fisico TCDS . El objetivo central es demostrar que el *Σ-locking* —medible entre variables geofisicas. | | | |
| SECTION VI - Team Members | | | |
| Team Member Role PI | Team Member Name Genaro Carrasco Ozuna | Contact Phone | E-mail Address |
| Organization/Business Relationship | | UEI | EFT CAGE Code |
| International Participation No | U.S. Government Agency | | Total Funds Requested 0.00 |

| | |
|--|----------------------|
| PI Name : Genaro Carrasco Ozuna | NASA Proposal Number |
| Organization Name : | TBD on Submit |
| Proposal Title : El presente proyecto propone validar experimentalmente un modelo predictivo de sismos basado en coherencia causal(~7 días) derivado del formalismo físico TCDS . El objetivo central es demostrar que el Σ -locking* —medible entre variables geofísicas. | |
| SECTION VII - Project Summary | |
| <p> El presente proyecto propone validar experimentalmente un modelo predictivo de sismos basado en coherencia causal, derivado del formalismo físico TCDS (Teoría de la Cromodinámica Sincrónica). El objetivo central es demostrar que el Σ-locking —estado de coherencia medible entre variables geofísicas— presenta incrementos sistemáticos antes de eventos sísmicos mayores ($M_w \geq 5.5$). La propuesta se inscribe en la línea A.4 Rapid Response and Novel Research (RRANN) del programa ROSES-25, al enfocarse en un experimento de respuesta rápida con datos abiertos NASA y USGS. Se emplearán observaciones InSAR (Sentinel-1 y NISAR), GNSS (UNAVCO), gravedad GRACE-FO y óptico-térmicas VIIRS/MODIS, disponibles a través de EOSDIS DAACs. </p> <p> El método aplica métricas Σ —correlación $R(t)$, índice de locking LI, error RMSE_SL y tasa $\kappa\Sigma$— con umbrales de rendimiento $LI \geq 0.90$, $R > 0.95$, $RMSE_SL < 0.10$ y reproducibilidad $\geq 95\%$. Las series se procesarán en ventanas p:q pre-evento, evaluando curvas ROC y PR para obtener $TPR \geq 0.6$ a $FPR \leq 0.05$. El estudio combina validación retrospectiva (1985–2025) y corridas prospectivas de 6 meses con predicciones selladas (DOI/Zenodo). </p> <p> El equipo está liderado por Genaro Carrasco Ozuna (Proyecto TCDS / MSL México) con asistencia formal de GPT-5 Σ-Trace. El presupuesto estimado (USD 180 –250 k) cubre procesamiento en nube y validación estadística abierta. Todos los resultados serán de acceso público (CC BY 4.0) y se publicarán con trazabilidad reproducible bajo DOI 10.5281/zenodo.17505875. </p> <p> Este estudio busca aportar una nueva herramienta predictiva para la gestión de riesgo sísmico global, demostrando la utilidad de las observaciones NASA en la detección prospectiva de precursores geofísicos basados en coherencia cuantitativa Σ. </p> | |

| | |
|--|----------------------|
| PI Name : Genaro Carrasco Ozuna | NASA Proposal Number |
| Organization Name : | TBD on Submit |

Proposal Title : El presente proyecto propone validar experimentalmente un modelo predictivo de sismos basado en coherencia causal(~7 dias) derivado del formalismo físico TCDS . El objetivo central es demostrar que el Σ -locking* —medible entre variables geofísicas.

SECTION IX - Program Specific Data

Question 1 : Short Title:
Answer: Sistema Predictivo Sísmico TCDS

Question 2 : Type of institution:
Answer: Unaffiliated Individual

Question 3 : Carnegie Classification
Answer: Not a degree granting institution

Question 4 : Will any funding be provided to a federal government organization including NASA Centers, JPL, other Federal agencies, government laboratories, or Federally Funded Research and Development Centers (FFRDCs)?
Answer: No

Question 5 : Is this Federal government organization a different organization from the proposing (PI) organization?
Answer: N/A

Question 6 : Does this proposal include the use of NASA-provided high end computing (HEC)?
Answer: No

Question 7 : HEC Request Number
Answer: N/A

Question 8 : Research Category:
Answer: 9) Earth System Science applications and decision support

Question 9 : Flight Services
Answer: No

Question 10 : Team members not confirmed via NSPIRES
Answer:
Andrea Fuentes Flores
Asistente y Secretaria General Proyecto TCDS
C. A.Humboldt #1117, Centro Saltillo, Coahuila
México. C.P. 25000
Fufa3492@gmail.com
Análisis y diseño de datos.

Question 11 : Does this proposal contain information and/or data that are subject to U.S. export control laws and regulations including Export Administration Regulations (EAR) and International Traffic in Arms Regulations (ITAR)?
Answer: No

Question 12 : I have identified the export-controlled material in this proposal.
Answer: N/A

Question 13 : I acknowledge that the inclusion of such material in this proposal may complicate the government's ability to evaluate the proposal.
Answer: N/A

Question 14 : Does the proposed work include any involvement with collaborators in China or with Chinese organizations, or does the proposed work include activities in China?
Answer: No

The National Environmental Policy Act (NEPA) obligates NASA to consider the potential environmental effects of proposed projects, including those that NASA funds which are implemented by grantees. The majority of grant-related activities are categorically excluded as research and development projects that do not pose adverse environmental impacts. The following questions enable NASA to ascertain whether your proposal will require additional NEPA analysis if selected (e.g., filling out an Environmental Checklist) or the completion of NASA's Executive Order (EO) 12114 Checklist for an activity to be conducted abroad. "Yes" responses are not selection criteria, however, if a "Yes" response is marked, proposers should consider NEPA and/or EO compliance in cost and schedule estimates.

Question 15 : Would the proposal involve any activity that includes: a. Construction of new facilities or modification to the footprint of an existing-facility, or b. Ground disturbance (e.g., excavation, clearing of trees, installation of equipment, etc.), or c. Outdoor discharges of water (e.g., waste water runoff), air emissions (e.g., ozone-depleting substances) or generation of noise exceeding 115 dBA (excluding those associated with aircraft operations)?

Answer: No

Question 16 : Would the proposal involve any field activity that would: a. Release equipment (e.g., dropsondes, sensors, etc.) or chemicals (e.g., dyes, tracers, etc.) into the air, bodies of water or on the ground, or b. Release a parachute or use equipment that would not be recovered, or c. Involve equipment or a payload that contains hazardous (e.g., petroleum, hypergols, oxidizers, solid propellants, etc.) or radioactive materials?

Answer: No

Question 17 : Would the proposal involve the launch of a payload, equipment, or instrument (e.g., via launch vehicle, sounding rocket, balloon, etc.)?

Answer: No

Question 18 : Would the proposal involve any activity to be conducted outside the United States or its territories excluding travel for meetings or conferences?

Answer: No

Question 19 : Comments

Answer:

Question 20 : Does this proposal contain a citizen science component?

Answer: No

Question 21 : AI or ML?

Answer: Yes

Question 22 : Relevant Division(s)

Answers:

Earth Science

Question 23 : Interdivisional Explanation

Answer:

Sistema Predictivo Sísmico TCDS - Información de Apoyo

El sistema propuesto se fundamenta en el formalismo físico TCDS (Teoría de la Cromodinámica Sincrónica) y busca validar experimentalmente la hipótesis de que la coherencia causal entre variables geofísicas -denominada E-locking- constituye un precursor medible de sismos de magnitud moderada a alta ($M_w \geq 5.5$). La innovación central radica en trasladar un marco teórico a un pipeline reproducible, sustentado en datos abiertos de NASA y USGS, capaz de generar predicciones prospectivas con trazabilidad estadística y científica.

Objetivos

El sistema persigue cuatro metas principales:

1. Integración de observaciones multifuente (InSAR, GNSS, GRACE-FO, VIIRS/MODIS, GEOS-FP) en una malla común de 1 km para análisis coherente.
2. Detección de rampas de coherencia previas a eventos sísmicos mediante métricas E ($R(t)$, LI, RMSE_SL, tasas Ky).
3. Validación prospectiva con corridas de 3-6 meses, preregistro de reglas y publicación de predicciones selladas en Zenodo.
4. Evaluación operativa mediante curvas ROC/PR, métricas de decisión y control de falsos positivos con pruebas placebo.

Metodología

El sistema aplica un conjunto de métricas E que cuantifican la fracción coherente de las series geofísicas y su correlación temporal. Los umbrales de rendimiento se fijan en $LI \geq 0.90$, $R > 0.95$, $RMSE_SL < 0.10$ y reproducibilidad $\geq 95\%$. Una alerta se genera cuando las métricas superan el umbral D^* en ventanas pre-evento. La validación se realiza en dos fases:

- Retrospectiva: análisis estratificado de 10-15 eventos por región entre 1985-2025.
- Prospectiva: ejecución de predicciones preregistradas y publicación semanal de resultados.

El control de calidad incluye shuffling tests y simulaciones placebo para minimizar sesgos y sobreajuste.

Plan de trabajo

El cronograma de seis meses se organiza en cuatro etapas:

- Mes 1: ingesta de datos DAAC y definición de regiones de interés.
- Meses 2-3: calibración de métricas y ajuste regional.
- Meses 4-5: fase prospectiva con publicaciones semanales.
- Mes 6: análisis final y entrega del informe NASA.

Los entregables comprenden el pipeline reproducible, datasets derivados, cuaderno de predicciones con DOI y un informe final con guía de adopción.

Riesgos y mitigación

Los principales riesgos identificados son:

- Cobertura limitada de InSAR, mitigada con GNSS y GRACE-FO.

- Ruido hidrológico, corregido mediante mascones GRACE-FO y reanálisis GEOS-FP.
- Escasez de eventos, abordada ampliando el periodo o incorporando regiones espejo.
- Overfitting, prevenido con preregistro y separación estricta retro/prospectiva.

Presupuesto y ética

El proyecto opera bajo licencia CC BY 4.0, garantizando acceso abierto y reproducibilidad. Los resultados se depositarán en Zenodo bajo DOI 10.5281/zenodo.17505875. El presupuesto estimado para seis meses oscila entre USD 100-145k, cubriendo personal científico, infraestructura en nube y gestión de publicación reproducible.

Valor agregado

El sistema TCDS aporta una herramienta predictiva innovadora para la gestión de riesgo sísmico global. Al demostrar la utilidad de observaciones NASA en la detección prospectiva de precursores geofísicos, se abre la posibilidad de integrar métricas de coherencia en protocolos de alerta temprana y planificación de desastres. La propuesta se inscribe plenamente en la línea Rapid Response and Novel Research (RRANN), al ofrecer un experimento de respuesta rápida con impacto directo en la resiliencia social y científica.

Question 24 : 24: Primary Investigation Type (Division/program)

Answer: "Investigación aplicada". Justificación: La propuesta no se limita a explorar principios teóricos (investigación básica), sino que busca aplicar observaciones satelitales NASA y métricas Σ para generar predicciones sísmicas operativas y herramientas reproducibles de gestión de riesgo. En los términos de ROSES: Investigación básica: estudia procesos fundamentales sin propósito práctico inmediato. Investigación aplicada: usa esos procesos para resolver un problema específico. Desarrollo tecnológico: crea instrumentos o software nuevos para futuras misiones. El sistema predictivo TCDS entra en investigación aplicada, con un componente de validación tecnológica, pero no en desarrollo instrumental.

Question 25 : Relevant Program Manager Name(s)

Answer: Genaro Carrasco Ozuna

| PI Name : Genaro Carrasco Ozuna | | | NASA Proposal Number TBD on Submit | |
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| SECTION X - Budget | | | | |
| Cumulative Budget | | | | |
| Budget Cost Category | Funds Requested (\$) | | | |
| | Year 1 (\$) | Year 2 (\$) | Year 3 (\$) | Total Project (\$) |
| A. Direct Labor - Key Personnel | 60,000.00 | 60,000.00 | 60,000.00 | 180,000.00 |
| B. Direct Labor - Other Personnel | 14,000.00 | 14,000.00 | 14,000.00 | 42,000.00 |
| Total Number Other Personnel | 1 | 1 | 1 | 3 |
| Total Direct Labor Costs (A+B) | 74,000.00 | 74,000.00 | 74,000.00 | 222,000.00 |
| C. Direct Costs - Equipment | 2,000.00 | 2,000.00 | 2,000.00 | 6,000.00 |
| D. Direct Costs - Travel | 3,000.00 | 3,000.00 | 3,000.00 | 9,000.00 |
| Domestic Travel | 2,000.00 | 2,000.00 | 2,000.00 | 6,000.00 |
| Foreign Travel | 1,000.00 | 1,000.00 | 1,000.00 | 3,000.00 |
| E. Direct Costs - Participant/Trainee Support Costs | 0.00 | 0.00 | 0.00 | 0.00 |
| Tuition/Fees/Health Insurance | 0.00 | 0.00 | 0.00 | 0.00 |
| Stipends | 0.00 | 0.00 | 0.00 | 0.00 |
| Travel | 0.00 | 0.00 | 0.00 | 0.00 |
| Subsistence | 0.00 | 0.00 | 0.00 | 0.00 |
| Other | 0.00 | 0.00 | 0.00 | 0.00 |
| Number of Participants/Trainees | | | | 0 |
| F. Other Direct Costs | 0.00 | 0.00 | 0.00 | 0.00 |
| Materials and Supplies | 0.00 | 0.00 | 0.00 | 0.00 |
| Publication Costs | 0.00 | 0.00 | 0.00 | 0.00 |
| Consultant Services | 0.00 | 0.00 | 0.00 | 0.00 |
| ADP/Computer Services | 0.00 | 0.00 | 0.00 | 0.00 |
| Subawards/Consortium/Contractual Costs | 0.00 | 0.00 | 0.00 | 0.00 |
| Equipment or Facility Rental/User Fees | 0.00 | 0.00 | 0.00 | 0.00 |
| Alterations and Renovations | 0.00 | 0.00 | 0.00 | 0.00 |
| Other | 0.00 | 0.00 | 0.00 | 0.00 |
| G. Total Direct Costs (A+B+C+D+E+F) | 79,000.00 | 79,000.00 | 79,000.00 | 237,000.00 |
| H. Indirect Costs | 0.00 | 0.00 | 0.00 | 0.00 |
| I. Total Direct and Indirect Costs (G+H) | 79,000.00 | 79,000.00 | 79,000.00 | 237,000.00 |
| J. Fee | 0.00 | 0.00 | 0.00 | 0.00 |
| K. Total Cost (I+J) | 79,000.00 | 79,000.00 | 79,000.00 | 237,000.00 |
| Total Cumulative Budget | | | | 237,000.00 |

| | | | | | | | | |
|---|-------------------------------|-------------------------------------|--------------|---------------------------------|--------------------------|--|---------------------------------|-------------------------|
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| SECTION X - Budget | | | | | | | | |
| Start Date : 01 / 05 / 2026 | | End Date : 07 / 31 / 2026 | | Budget Type : Project | | Budget Period : 1 | | |
| A. Direct Labor - Key Personnel | | | | | | | | |
| Name | Project Role | Base Salary (\$) | Cal. Months | Acad. Months | Summ. Months | Requested Salary (\$) | Fringe Benefits (\$) | Funds Requested (\$) |
| Ozuna, Genaro | PI | 30,000.00 | | | | 30,000.00 | 30,000.00 | 60,000.00 |
| Total Key Personnel Costs | | | | | | | | 60,000.00 |
| B. Direct Labor - Other Personnel | | | | | | | | |
| Number of Personnel | Project Role | Cal. Months | Acad. Months | Summ. Months | Requested Salary (\$) | Fringe Benefits (\$) | Funds Requested (\$) | |
| 1 | Secretarial / Clerical | | | | 7,000.00 | 7,000.00 | 14,000.00 | |
| | | | | | | | | |
| 1 | Total Number Other Personnel | Total Other Personnel Costs | | | | | 14,000.00 | |
| Total Direct Labor Costs (Salary, Wages, Fringe Benefits) (A+B) | | | | | | | 74,000.00 | |

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| SECTION X - Budget | | | |
| Start Date : 01 / 05 / 2026 | End Date : 07 / 31 / 2026 | Budget Type : Project | Budget Period : 1 |
| C. Direct Costs - Equipment | | | |
| Item No. | Equipment Item Description | | Funds Requested (\$) |
| 1 | Servidor nube, almacenamientos virtual temporales | | 2,000.00 |
| Total Equipment Costs | | | 2,000.00 |
| D. Direct Costs - Travel | | | |
| | | | Funds Requested (\$) |
| 1. Domestic Travel (Including U.S. Territories and Possessions) | | | 2,000.00 |
| 2. Foreign Travel (Including Canada and Mexico) | | | 1,000.00 |
| Total Travel Costs | | | 3,000.00 |
| E. Direct Costs - Participant/Trainee Support Costs | | | |
| | | | Funds Requested (\$) |
| 1. Tuition/Fees/Health Insurance | | | 0.00 |
| 2. Stipends | | | 0.00 |
| 3. Travel | | | 0.00 |
| 4. Subsistence | | | 0.00 |
| Number of Participants/Trainees: | | Total Participant/Trainee Support Costs | 0.00 |

| | | | |
|---|-------------------------------------|---------------------------------|--|
| PI Name : Genaro Carrasco Ozuna | | | NASA Proposal Number TBD on Submit |
| Organization Name : | | | |
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| SECTION X - Budget | | | |
| Start Date : 01 / 05 / 2026 | End Date : 07 / 31 / 2026 | Budget Type : Project | Budget Period : 1 |
| F. Other Direct Costs | | | |
| | | | Funds Requested (\$) |
| 1. Materials and Supplies | | | 0.00 |
| 2. Publication Costs | | | 0.00 |
| 3. Consultant Services | | | 0.00 |
| 4. ADP/Computer Services | | | 0.00 |
| 5. Subawards/Consortium/Contractual Costs | | | 0.00 |
| 6. Equipment or Facility Rental/User Fees | | | 0.00 |
| 7. Alterations and Renovations | | | 0.00 |
| 8. Other: | | | 0.00 |
| 9. Other: | | | 0.00 |
| 10. Other: | | | 0.00 |
| 11. Other: | | | 0.00 |
| 12. Other: | | | 0.00 |
| 13. Other: | | | 0.00 |
| 14. Other: | | | 0.00 |
| 15. Other: | | | 0.00 |
| 16. Other: | | | 0.00 |
| 17. Other: | | | 0.00 |
| Total Other Direct Costs | | | 0.00 |
| G. Total Direct Costs | | | |
| | | | Funds Requested (\$) |
| Total Direct Costs (A+B+C+D+E+F) | | | 79,000.00 |

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| SECTION X - Budget | | | |
| Start Date : 01 / 05 / 2026 | End Date : 07 / 31 / 2026 | Budget Type : Project | Budget Period : 1 |
| H. Indirect Costs | | | |
| | Indirect Cost Rate (%) | Indirect Cost Base (\$) | Funds Requested (\$) |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| Cognizant Federal Agency: | Total Indirect Costs | | 0.00 |
| I. Direct and Indirect Costs | | | |
| | | | Funds Requested (\$) |
| Total Direct and Indirect Costs (G+H) | | | 79,000.00 |
| J. Fee | | | |
| | | | Funds Requested (\$) |
| Fee | | | 0.00 |
| K. Total Cost | | | |
| | | | Funds Requested (\$) |
| Total Cost with Fee (I+J) | | | 79,000.00 |

| | | | | | | | | |
|---|-------------------------------|-------------------------------------|--------------|---------------------------------|--------------------------|--|---------------------------------|-------------------------|
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| SECTION X - Budget | | | | | | | | |
| Start Date : 08 / 03 / 2026 | | End Date : 12 / 25 / 2026 | | Budget Type : Project | | Budget Period : 2 | | |
| A. Direct Labor - Key Personnel | | | | | | | | |
| Name | Project Role | Base Salary (\$) | Cal. Months | Acad. Months | Summ. Months | Requested Salary (\$) | Fringe Benefits (\$) | Funds Requested (\$) |
| Ozuna, Genaro | PI | 30,000.00 | | | | 30,000.00 | 30,000.00 | 60,000.00 |
| Total Key Personnel Costs | | | | | | | | 60,000.00 |
| B. Direct Labor - Other Personnel | | | | | | | | |
| Number of Personnel | Project Role | Cal. Months | Acad. Months | Summ. Months | Requested Salary (\$) | Fringe Benefits (\$) | Funds Requested (\$) | |
| 1 | Secretarial / Clerical | | | | 7,000.00 | 7,000.00 | 14,000.00 | |
| | | | | | | | | |
| 1 | Total Number Other Personnel | Total Other Personnel Costs | | | | | 14,000.00 | |
| Total Direct Labor Costs (Salary, Wages, Fringe Benefits) (A+B) | | | | | | | 74,000.00 | |

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|--|--|---|-----------------------------|
| PI Name : Genaro Carrasco Ozuna | | NASA Proposal Number | |
| Organization Name : | | TBD on Submit | |
| Proposal Title : El presente proyecto propone validar experimentalmente un modelo predictivo de sismos basado en coherencia causal(~7 dias) derivado del formalismo fisico TCDS . El objetivo central es demostrar que el *Σ-locking* —medible entre variables geofisicas. | | | |
| SECTION X - Budget | | | |
| Start Date : 08 / 03 / 2026 | End Date : 12 / 25 / 2026 | Budget Type : Project | Budget Period : 2 |
| C. Direct Costs - Equipment | | | |
| Item No. | Equipment Item Description | | Funds Requested (\$) |
| 1 | Servidor nube, almacenamientos virtual temporales | | 2,000.00 |
| Total Equipment Costs | | | 2,000.00 |
| D. Direct Costs - Travel | | | |
| | | | Funds Requested (\$) |
| 1. Domestic Travel (Including U.S. Territories and Possessions) | | | 2,000.00 |
| 2. Foreign Travel (Including Canada and Mexico) | | | 1,000.00 |
| Total Travel Costs | | | 3,000.00 |
| E. Direct Costs - Participant/Trainee Support Costs | | | |
| | | | Funds Requested (\$) |
| 1. Tuition/Fees/Health Insurance | | | 0.00 |
| 2. Stipends | | | 0.00 |
| 3. Travel | | | 0.00 |
| 4. Subsistence | | | 0.00 |
| Number of Participants/Trainees: | | Total Participant/Trainee Support Costs | 0.00 |

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| PI Name : Genaro Carrasco Ozuna | | | NASA Proposal Number TBD on Submit |
| Organization Name : | | | |
| Proposal Title : El presente proyecto propone validar experimentalmente un modelo predictivo de sismos basado en coherencia causal(~7 dias) derivado del formalismo fisico TCDS . El objetivo central es demostrar que el *Σ-locking* —medible entre variables geofisicas. | | | |
| SECTION X - Budget | | | |
| Start Date : 08 / 03 / 2026 | End Date : 12 / 25 / 2026 | Budget Type : Project | Budget Period : 2 |
| F. Other Direct Costs | | | |
| | | | Funds Requested (\$) |
| 1. Materials and Supplies | | | 0.00 |
| 2. Publication Costs | | | 0.00 |
| 3. Consultant Services | | | 0.00 |
| 4. ADP/Computer Services | | | 0.00 |
| 5. Subawards/Consortium/Contractual Costs | | | 0.00 |
| 6. Equipment or Facility Rental/User Fees | | | 0.00 |
| 7. Alterations and Renovations | | | 0.00 |
| 8. Other: | | | 0.00 |
| 9. Other: | | | 0.00 |
| 10. Other: | | | 0.00 |
| 11. Other: | | | 0.00 |
| 12. Other: | | | 0.00 |
| 13. Other: | | | 0.00 |
| 14. Other: | | | 0.00 |
| 15. Other: | | | 0.00 |
| 16. Other: | | | 0.00 |
| 17. Other: | | | 0.00 |
| Total Other Direct Costs | | | 0.00 |
| G. Total Direct Costs | | | |
| | | | Funds Requested (\$) |
| Total Direct Costs (A+B+C+D+E+F) | | | 79,000.00 |

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| PI Name : Genaro Carrasco Ozuna | | NASA Proposal Number | |
| Organization Name : | | TBD on Submit | |
| Proposal Title : El presente proyecto propone validar experimentalmente un modelo predictivo de sismos basado en coherencia causal(~7 dias) derivado del formalismo fisico TCDS . El objetivo central es demostrar que el *Σ-locking* —medible entre variables geofisicas. | | | |
| SECTION X - Budget | | | |
| Start Date : 08 / 03 / 2026 | End Date : 12 / 25 / 2026 | Budget Type : Project | Budget Period : 2 |
| H. Indirect Costs | | | |
| | Indirect Cost Rate (%) | Indirect Cost Base (\$) | Funds Requested (\$) |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| Cognizant Federal Agency: | | Total Indirect Costs | 0.00 |
| I. Direct and Indirect Costs | | | |
| | | | Funds Requested (\$) |
| Total Direct and Indirect Costs (G+H) | | | 79,000.00 |
| J. Fee | | | |
| | | | Funds Requested (\$) |
| Fee | | | 0.00 |
| K. Total Cost | | | |
| | | | Funds Requested (\$) |
| Total Cost with Fee (I+J) | | | 79,000.00 |

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|---|-------------------------------|-------------------------------------|--------------|---------------------------------|--------------------------|--|---------------------------------|-------------------------|
| PI Name : Genaro Carrasco Ozuna | | | | | | NASA Proposal Number TBD on Submit | | |
| Organization Name : | | | | | | | | |
| Proposal Title : El presente proyecto propone validar experimentalmente un modelo predictivo de sismos basado en coherencia causal(~7 dias) derivado del formalismo fisico TCDS . El objetivo central es demostrar que el *Σ-locking* —medible entre variables geofisicas. | | | | | | | | |
| SECTION X - Budget | | | | | | | | |
| Start Date : 01 / 04 / 2027 | | End Date : 07 / 31 / 2027 | | Budget Type : Project | | Budget Period : 3 | | |
| A. Direct Labor - Key Personnel | | | | | | | | |
| Name | Project Role | Base Salary (\$) | Cal. Months | Acad. Months | Summ. Months | Requested Salary (\$) | Fringe Benefits (\$) | Funds Requested (\$) |
| Ozuna, Genaro | PI | 30,000.00 | | | | 30,000.00 | 30,000.00 | 60,000.00 |
| Total Key Personnel Costs | | | | | | | | 60,000.00 |
| B. Direct Labor - Other Personnel | | | | | | | | |
| Number of Personnel | Project Role | Cal. Months | Acad. Months | Summ. Months | Requested Salary (\$) | Fringe Benefits (\$) | Funds Requested (\$) | |
| 1 | Secretarial / Clerical | | | | 7,000.00 | 7,000.00 | 14,000.00 | |
| | | | | | | | | |
| 1 | Total Number Other Personnel | Total Other Personnel Costs | | | | | 14,000.00 | |
| Total Direct Labor Costs (Salary, Wages, Fringe Benefits) (A+B) | | | | | | | 74,000.00 | |

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| Proposal Title : El presente proyecto propone validar experimentalmente un modelo predictivo de sismos basado en coherencia causal(~7 dias) derivado del formalismo fisico TCDS . El objetivo central es demostrar que el *Σ-locking* —medible entre variables geofisicas. | | | |
| SECTION X - Budget | | | |
| Start Date : 01 / 04 / 2027 | End Date : 07 / 31 / 2027 | Budget Type : Project | Budget Period : 3 |
| C. Direct Costs - Equipment | | | |
| Item No. | Equipment Item Description | | Funds Requested (\$) |
| 1 | Servidor nube, almacenamientos virtual temporales | | 2,000.00 |
| Total Equipment Costs | | | 2,000.00 |
| D. Direct Costs - Travel | | | |
| | | | Funds Requested (\$) |
| 1. Domestic Travel (Including U.S. Territories and Possessions) | | | 2,000.00 |
| 2. Foreign Travel (Including Canada and Mexico) | | | 1,000.00 |
| Total Travel Costs | | | 3,000.00 |
| E. Direct Costs - Participant/Trainee Support Costs | | | |
| | | | Funds Requested (\$) |
| 1. Tuition/Fees/Health Insurance | | | 0.00 |
| 2. Stipends | | | 0.00 |
| 3. Travel | | | 0.00 |
| 4. Subsistence | | | 0.00 |
| Number of Participants/Trainees: | | Total Participant/Trainee Support Costs | 0.00 |

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| PI Name : Genaro Carrasco Ozuna | | | NASA Proposal Number TBD on Submit |
| Organization Name : | | | |
| Proposal Title : El presente proyecto propone validar experimentalmente un modelo predictivo de sismos basado en coherencia causal(~7 dias) derivado del formalismo fisico TCDS . El objetivo central es demostrar que el *Σ-locking* —medible entre variables geofisicas. | | | |
| SECTION X - Budget | | | |
| Start Date : 01 / 04 / 2027 | End Date : 07 / 31 / 2027 | Budget Type : Project | Budget Period : 3 |
| F. Other Direct Costs | | | |
| | | | Funds Requested (\$) |
| 1. Materials and Supplies | | | 0.00 |
| 2. Publication Costs | | | 0.00 |
| 3. Consultant Services | | | 0.00 |
| 4. ADP/Computer Services | | | 0.00 |
| 5. Subawards/Consortium/Contractual Costs | | | 0.00 |
| 6. Equipment or Facility Rental/User Fees | | | 0.00 |
| 7. Alterations and Renovations | | | 0.00 |
| 8. Other: | | | 0.00 |
| 9. Other: | | | 0.00 |
| 10. Other: | | | 0.00 |
| 11. Other: | | | 0.00 |
| 12. Other: | | | 0.00 |
| 13. Other: | | | 0.00 |
| 14. Other: | | | 0.00 |
| 15. Other: | | | 0.00 |
| 16. Other: | | | 0.00 |
| 17. Other: | | | 0.00 |
| Total Other Direct Costs | | | 0.00 |
| G. Total Direct Costs | | | |
| | | | Funds Requested (\$) |
| Total Direct Costs (A+B+C+D+E+F) | | | 79,000.00 |

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|---|-------------------------------------|---------------------------------|-----------------------------|
| PI Name : Genaro Carrasco Ozuna | | NASA Proposal Number | |
| Organization Name : | | TBD on Submit | |
| Proposal Title : El presente proyecto propone validar experimentalmente un modelo predictivo de sismos basado en coherencia causal(~7 dias) derivado del formalismo fisico TCDS . El objetivo central es demostrar que el *Σ-locking* —medible entre variables geofisicas. | | | |
| SECTION X - Budget | | | |
| Start Date : 01 / 04 / 2027 | End Date : 07 / 31 / 2027 | Budget Type : Project | Budget Period : 3 |
| H. Indirect Costs | | | |
| | Indirect Cost Rate (%) | Indirect Cost Base (\$) | Funds Requested (\$) |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 |
| Cognizant Federal Agency: | Total Indirect Costs | | 0.00 |
| I. Direct and Indirect Costs | | | |
| | | | Funds Requested (\$) |
| Total Direct and Indirect Costs (G+H) | | | 79,000.00 |
| J. Fee | | | |
| | | | Funds Requested (\$) |
| Fee | | | 0.00 |
| K. Total Cost | | | |
| | | | Funds Requested (\$) |
| Total Cost with Fee (I+J) | | | 79,000.00 |