
WP23_25: Geodesy for the Sendai Framework

1435,201

Basic Information

Full title of the Initiative

Geodesy for the Sendai Framework

Short Title or Acronym

Geodesy4Sendai

Current category in the 2020-2022 GWP

Community Activity

Proposed category in the 2023-2025 GWP

Pilot Initiative

Points of Contact

First Name	Last/Family Name	Email
Allison	Craddock	allison.b.craddock@jpl.nasa.gov

Purpose

Objective

Supporting policy and advocacy for geodetic contributions to disaster risk reduction and resilience

Please provide a short description of the Initiative

Geodetic observations have a clear role in helping to reduce the risk of disasters, as well as contribute to disaster preparedness with better mitigation and response.

- Supporting geodetic development and capacity building for disaster risk reduction and resilience
- Identifies existing resources and stakeholder communities, and makes connections
- Identifies geodetic elements of targets and indicators of the Sendai Framework for Disaster Risk Reduction
- Provides opportunity for other GEO efforts to interact with geodesy community
- Integration with UN Sustainable Development Goals and UN-GGIM World Bank Integrated Geospatial Information Framework

Why is this Initiative needed?

We recognize unique value proposition of GEO as the best possible forum to connect our technical work in geodesy to policy, advocacy, and capacity sharing.

What evidence is there to support this need?

Wide support throughout the IAG to partner with GEO to identify and support synergies; successful contribution to UN DRR GAR 2019 and 2022 noting the unique benefits of geodetic (GNSS) data in enhancing tsunami early warning systems and air quality monitoring

Is this Initiative open to participation by representatives of any GEO Member, Participating Organization, and GEO Associate?

Yes

Are you aware of other projects or initiatives at a global or regional scale (both in GEO and externally) that provide similar products or services?

No

Please identify the most important actual and/or intended outputs (products, services, etc.) produced by the Initiative, along with their intended and/or actual users. This list does not need to be comprehensive but should identify the outputs which are most used and are expected to have the greatest potential impact.

Output	Status	Users	Additional info
Collaboration with ITU/WMO/UNEP on AI for Natural Disaster Management	Regularly updated		
Policy briefs	In development	policy makers in tsunami prone regions	
Targeted improvement and support for geodetic infrastructure colocated with other EO instrumentation	In development	small island developing states, IAG technical services, atmospheric analysis community	
Contributing paper to UN DRR GAR	Occasionally updated	UNDRR, policy makers	members have made contributions to UN DRR GAR 2019 (tsunami) and 2022 (wildfires/air quality)

If needed, please provide additional comments or explanation to accompany the outputs table

Political advocacy for geodesy and support for geodetic capacity building

What kinds of decisions are the outputs of this Initiative primarily intended to support?

Including geodetic infrastructure and capacity building in national and local DRR strategies (Sendai Target E); enhancing international geodetic cooperation in developing countries (Sendai Target F); increasing access to (and enhancing) multi-hazard early warning systems (Sendai Target G)

How will these decisions benefit from the outputs of this Initiative?

Engaging with policymakers and other members of the EO community to inform them of the benefits of sharing geodetic data and improving/maintaining geodetic infrastructure co-located with other EO instrumentation.

What kinds of impacts (for example, reduced loss of life, monetary savings,

conservation of biodiversity, etc.) are anticipated as a result of the use of the outputs of this Initiative?

reduce the costs (including the adverse effects such as injury, mortality, displacements, damage to property (including cultural heritage) and infrastructure) and enhance the preparedness for (and response to) natural disasters

Has this Initiative been asked to provide specific information (for example, reports, data, services) on an ongoing basis to an international convention, organization, or other multilateral body?

Yes

Please identify the requesting organization.

ITU/WMO/UNEP Focus Group on AI for Natural Disaster Management

Describe the nature of the request.

Use cases of using AI in geodetic enhancements of tsunami early warning systems

Please provide supporting documentation of the request.

- fgai4ndm_i_024_tg_tsunami_final.pdf ([link](#))

Technical Synopsis

Please provide a brief description of the methods used by the Initiative to produce its (actual or planned) outputs.

Geodesy4Sendai to uncover the possibilities that ever-improving geodetic data, information, and other resources may provide to a broadening trans-disciplinary suite of Earth observation tools, as well as opportunities in capacity building and advocacy for traditional knowledge resources. We look to support geodetic contributions to forward-thinking interdisciplinary programs as a catalyst to serving our global community.

Advanced Global Navigation Satellite System (GNSS) real-time processing for positioning and ionospheric imaging provides significant enhancements to tsunami disaster early warning. GNSS is used in seismology to study the ground displacements as well as to monitor the ionospheric total electron content (TEC) perturbations following seismic events. Through collaboration with the ITU/WMO/UNEP Focus Group AI4NDM, Geodesy4Sendai seeks to explore the feasibility of using AI for novel decentralized domestic processing of GNSS data in countries where exporting of real-time GNSS data is either prohibited by law, or restricted by limited internet bandwidth capacity.

If you would like to provide further details on the technical methods, you may upload one or more documents here.

- no supporting documents provided -

Are there any significant scientific or technical challenges that need to be resolved by the Initiative during the 2023-2025 period?

Yes

Please describe these challenges and the steps being taken to solve them.

Feasibility study and beta testing decentralized GNSS data processing and integration with other tsunami early warning systems; this will require extensive consultation with policy makers and other EO political organizations/agencies on a country/national level.

Does the Initiative expect to complete any key new outputs, improvements to existing outputs, or improvements to the methods of producing outputs, in the 2023-2025 period?

Yes

Please describe these new outputs or improvements.

Policy briefs and future GAR contributing papers.

Please identify the key tasks that must be implemented to ensure delivery of these changes, with target dates for completion.

Task	Task description	Expected completion (month/year)
Policy Brief	develop policy brief to explain the benefit of GNSS to tsunami early warning systems	late 2022/early 2023
Policy Brief	develop policy brief to explain the usage of GNSS to enhance or supplement air quality measurement	late 2022/early 2023
GAR contributing paper(s)	submit contributing papers to the next GAR	

Resources

Have all resources required to implement the Initiative's planned work in the 2023-2025 period been secured?

- Gap in financial resources
- Gap in access to data

What is the estimated funding gap for the 2023-2025 period?

50,000 USD

What data sets are needed by the Initiative but are not currently available?

real-time GNSS data

What actions is the Initiative taking to obtain the required resources?

- advocacy for the value/benefit of sharing real-time GNSS data
- innovation in developing decentralized (domestic) processing capabilities to share export-permitted information derived from export-prohibited real-time GNSS data.

Please list all financial and non-financial contributions to the Initiative (other than in-kind, voluntary participation by individual contributors) having a value of more than USD 50,000.

- no answer given -

Lessons from the 2020-2022 Period

Were all planned activities for the 2020-2022 period implemented as expected?

- no answer given -

Were there any key challenges faced by the Initiative in the 2020-2022 period?

- no answer given -

Were there any impacts or changes to operations due to COVID-19?

Yes

Please describe.

Group was unable to move forward with planned in-person collaborative workshops.

Please describe the key changes proposed for the 2023-2025 period, for example, new projects, new areas of focus, or adjustments to the activity governance.

The activity will include both tsunami and air quality/wildfires as DRR focus areas

The activity will add partnership with a future International GNSS Service Pilot Project

Does the Initiative have outputs (products, services, etc.) available to users now, even if only on a pilot or testing basis?

No

Do you have evidence of any impacts that have occurred in part as a result of using the outputs of the Initiative (for example, policy decisions taken, behaviour changes by users, risks mitigated)?

No

Have there been any internal or external reviews or evaluations of the Initiative since 2019?

No

Please indicate any GEO Work Programme activities with which you have ongoing collaboration.

- GEO Engagement Priorities Coordination - GEO Engagement Priorities Coordination
- GEO Secretariat Operations - GEO Secretariat Operations
- GEODESY4SENDAI - Geodesy for the Sendai Framework

Please indicate any additional GEO Work Programme activities with which you would like to establish new collaborations.

- AOGEO - Asia-Oceania Group on Earth Observations
- DE-PACIFIC - Digital Earth Pacific
- EO4SENDAI-MONITORING - Earth Observation and Copernicus in support of Sendai Monitoring
- EO4DRM - Earth Observations for Disaster Risk Management
- EO4SDG - Earth Observations for the Sustainable Development Goals
- GEO Engagement Priorities Coordination - GEO Engagement Priorities Coordination
- GEO-EV - GEO Essential Variables
- GEO Work Programme Support - GEO Work Programme Support
- BLUE-PLANET - Oceans and Society: Blue Planet

Stakeholder Engagement and Capacity Building

Are there specific countries or organizations that your Initiative would like to engage?

Yes

Please list these countries, regions or organizations.

Kingdom of Tonga, Fiji, other PICTs
Jamaica and possibly other islands in the Caribbean

What are your plans to engage them?

Capacity building in the use of geodesy for disaster risk reduction, collaborating on policy briefs for communicating to policy/funding decision-makers.

Does your Initiative engage users in the work of the Initiative (for example, consultation, testing, co-design)?

Yes

Please briefly describe the Initiative's approach to engaging users.

consultation, co-design of concepts, advocacy, collaboration with regional groups such as UN GGIM Asia Pacific, collaboration with UN GGIM Subcommittee on Geodesy

Does the Initiative have a user engagement strategy or similar kind of document?

No

Are there categories of users that are not represented at this time, but you would like to engage?

No

Does the Initiative have a documented capacity development strategy?

No

Please describe the approach to capacity development that is being implemented by the Initiative?

collaboration and co-design of policy briefs, hosting webinars

Are there any commercial sector organizations participating in this Initiative?

No

Are there opportunities for commercial sector uptake of the outputs of the Initiative?

Yes

Please describe these opportunities.

Commercial sector regularly uses geodetic data made freely and openly available by IAG technical services.

Is there already commercial uptake occurring?

Yes

Please describe the nature of this uptake and the relevant commercial sector organizations.

Commercial sector regularly uses geodetic data made freely and openly available by IAG technical services, this includes GNSS infrastructure manufacturers such as Trimble and Leica.

Are there opportunities for further commercial sector participation in the Initiative?

Yes

Please describe these opportunities.

Cloud computing; improved internet connectivity with remote islands; mapping and data visualization.

Does the Initiative have a plan for commercial sector engagement?

No

Governance

Please describe the roles of each of the key leadership positions, as well as any team structures involved in day-to-day management.

Activity is co-chaired by representatives of the (IAG) International GNSS Service, (IAG) Global Geodetic Observing System, (IUGG) Union Commission on Geophysical Risk and Sustainability. Team structures are ad-hoc based on best efforts and available funding.

Is there a steering committee or other governance bodies that advise the Initiative but are not involved in day-to-day management?

No

What methods does the Initiative use to communicate with its participants?

- Email / e-newsletters
- Regular conference calls
- Regular events

Please describe the key risks that could delay or obstruct the completion of the planned activities and outputs of the Initiative, along with any actions taken to mitigate these risks.

- no answer given -

What methods are used by the Initiative to monitor its effectiveness?

- Informal discussions with users / beneficiaries
- Consultations or events

Would the Initiative be interested in assistance from the GEO Secretariat for developing an impact plan?

Yes

How are the results of the monitoring and evaluation activities shared with participants and the wider GEO community?

Presentations at key events hosted or organized by IAG and IUGG; side event at GEO week 2019; side events at UN GGIM meetings.

Are any monitoring or evaluation activities required by funders/contributors?

No

Participants

Please list the active individual participants in the Initiative

First name	Last name	Email address	Member	Org
Allison	Craddock	allison.b.craddock@jpl.nasa.gov	IAG - International Association of Geodesy	IAG - International Association of Geodesy
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Other information

Please provide any other comments or information that was not included in the previous sections, but you would like to appear in the Implementation Plan.

As climate change and human behavior contribute to unprecedented occurrences of severe wildfires and other exceptional events, constituting significant threat to life, it will be important to understand how previously unused or underutilized technologies (such as those derived from GNSS analysis) may be applicable in the transdisciplinary understanding of disaster risk. This research conducted by contributors to Geodesy4Sendai has been published in both the 2019 and 2022 UN DRR GAR, where we addressed global navigation satellite systems as a tool for understanding disaster risk. Participants and contributors to Geodesy4Sendai look forward to the potential social benefits of these novel applications, especially in instances where it can be used to enhance or supplement air quality measurements to improve public health and well-being, tsunami early warning systems, as well as contribute to calibration and validation of existing air quality and tsunami monitoring and detection instrumentation.

- no supporting documents provided -

Co-Editor Management

List of co-editors for this initiative

- no answer given -