

Call for Research Grant on Space Science, Technology and Application Projects

I. Background

Ethiopian Space Science and Technology Institute (ESSTI) is pleased to announce its second call for research and technology fund grant applicable as of the budget year of 2020/21(2013 E.C). In the previous call, the institute granted selected projects on a competitive basis. This year also planned to fund project proposals in line with identified thematic research areas.

The research projects should incorporate thematic areas which improve the way space science, technology and application being used for supporting innovation for the advancement of space science of the country. These projects will also build, strengthen, and develop the capacity of skilled engineers, scientists, and technologists to improve the countries technological competitiveness.

In this year's application, it is possible to team up from diverse disciplines from research institutes and universities for resolving challenges in space data usage in line with the sustainable development goals of the country.

Based on ESSTI's strategic plan, the following thematic areas have been identified for 2020/21(2013 E.C.) call for proposals:

1. **Ionospheric modeling** (ionospheric modeling using empirical, assimilation and mathematical/physics based methods on ionospheric parameters (TEC, Ne, foF2 etc...), mapping regional ionospheric anomalies, ionospheric irregularities/scintillation, EEJ and Sq currents)
2. **Geomagnetism and its application** (characterization and mapping of the low-latitude/equatorial magnetic field anomalies over the East African region; investigate geomagnetic pulsations over the low-latitude regions; model current systems (magnetospheric and ionospheric); coupling mechanisms of lower atmosphere and ionosphere and ionosphere-thermosphere- magnetosphere); numerical modeling and simulations of plasma for understanding of fundamental plasma phenomena; characterize MHD waves and instabilities)
3. **Space and Atmospheric Sciences** (Dynamical modeling, understanding, prediction, and assessment of climate variability, and underline physical mechanisms over Ethiopia and

East Africa; Ocean-atmosphere-land interaction across-scales influencing the East African weather and climate dynamics, variability, and change; Regional climate model simulation, projection, and impact modeling; perform state-of-the-art research focusing on urban heat islands, air quality, urban weather and climate modeling, and turbulence closure schemes for urban environments)

4. **Space science applications and infrastructure** (demonstrate the skill sets, capability (both engineering and workshop/lab) and clarity/practicality in its procedures to develop ground-based measuring instruments such as variometers/magnetometers, GIC (Geomagnetically Induced Currents) loggers, and to set up magnetic Helmholtz coils)
5. **Remote sensing of agriculture** (Remote sensing science, technology and applications services, products, and tools for improvement of crop production and management)
6. **Remote Sensing for water resource management** (Remote sensing science, technology and applications services, products, and tools for improvement of water resource management)
7. **Drought and Flood Disaster Monitoring** (remote sensing science, technology and applications-based services, products, and tools to develop drought and flood monitoring, forecasting and management systems in Ethiopia)
8. **Interferometry in Geodesy** (develop advanced algorithms (tools) for measuring crustal deformation or monitoring of infrastructures)
9. **GPS Geodesy and Multi-GNSS** (develop advanced algorithms and techniques for improving the estimation of GNSS signal delays and model errors in order to provide accurate positioning and navigation services, or extract useful environmental signals from radio-signal delays such as atmospheric water vapor, TEC as well as determination of NDVI from a measurement of reflection multipath signal of the GNSS)
10. **Atmospheric and Hydrological Loading** (develop advanced algorithms for modeling the elastic response of the Earth to atmospheric modeling and the deformation pattern induced by the hydrosphere loading effect on different climate scenario)
11. **Hydrological Mass Distribution and Transport** (develop advanced algorithm to model and localize spatial and temporal variation of hydrological water mass balance, assimilate gravity data into hydrological models to better understand groundwater resources and their

recharge and discharge mechanism, model hydrological sink terms-evaporation and runoff terms, model hydrological mass redistribution and transport at national or regional level)

12. **Aerospace engineering research** (Material characterization of locally available fibrous materials for aerospace application, Structural & Materials, Design, Modeling and Simulation of Autonomous Robotic Systems by using DRL for Aerospace Application, Avionics and Control of Aerospace Systems)
13. **Aerospace engineering product development** (Development of Unmanned Aerial Vehicle, Development of CubeSat)
14. Electronics, instrumentation development, systems design, and telescope customization
15. Big data and machine learning technologies (Data mining on satellite images)

II. **Objectives**

The main objectives of the grant are:

- To support excellent space science, technology, and application for sustainable development of the country
- To build the capacity of ESSTI's researchers and collaborators in using space data and technology.
- Strengthen collaborations among space data and technology users

III. **Funding Information**

The institute will support up to two million Birr per each project proposal. Grants are solely intended for payments related to the research activities but does not include any expenses associated to salary payments.

IV. **Duration**

Projects will be funded for a period of one to three years depending on project type and estimated project lifetime.

V. **Eligibility Criteria**

Applicants from different research institutes, universities and private companies who are willing to submit proposals in the identified thematic areas are eligible to apply for funding. It is also

advisable to collaborate with others including ESSTI staffs. The principal investigator (PI) of the research projects must have MSc and above and have significant research experience in the specific field in which he/she is applying for. However, the PI can also be a BSc holder in the case of technology projects depending on his/her experience and previous results.

VI. Content and submission format

The submitted proposal should contain:

1. Executive summary with maximum of 300 words
2. Proposal should also include:
 - a. Title
 - b. List of team members with their affiliation (Principal investigator title, contact details, co-principal investigator(s) title, contact details)
 - c. Duration of the project
 - d. Introduction including relevant references
 - e. Description of the proposal objectives
 - f. Significance of the study
 - g. Clear methodology and analysis
 - h. Work plan, budget breakdown, and timetable
 - i. Expected output,
 - j. Possible risk(s),

It is also mandatory to send Curriculum Vitae (CV) of the project PI with the proposal. Each applicant also must send cover letter that specifies for which thematic project they are applying. The maximum length of a proposal must be 10 pages (excluding references), MS word, Times New Roman and 12 font size.

VII. Selection Criteria

Project selection will be based on the following selection criteria:

- Alignment with thematic areas identified by ESSTI.
- Novelty and originality of the proposal

- Clarity of project objectives, outputs, and their indicators.
- Project activities are relevant, realistic and contribute to the desired outputs.
- The impact of the research proposal
- Project budget is in line with the listed activities.
- Experience and project management competences of the applicant(s).
- Project risks are properly evaluated, and solutions clearly stated.
- Interdisciplinary collaborations

VIII. Agreement

- A written agreement will be made between ESSTI and the principal investigator.
- ESSTI will administer the grant based on agreed detail agreements
- Principal investigators should submit a quarterly and final report to ESSTI.

IX. Date of submission

All applicant can send their application including cover letter and full proposal until **15 November 2020**.

X. Reports

The successful applicant is required to submit quarterly progress reports to ESSTI Research Committee. Upon completion of the project, ESSTI requires a final scientific and financial report. All publications and abstracts must acknowledge support from ESSTI.

XI. How to Apply

All interested applicant must submit their applications via email at the following e-mail address: research@essti.gov.et. For any further information, please send your request to the e-mail included in this call. Please also visit our website www.essti.gov.et.