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INVITATION FOR INNOVATIVE RESEARCH PROPOSALS –37th INDIAN SCIENTIFIC EXPEDITION TO ANTARCTICA (37-ISEA)

National Centre for Antarctic & Ocean Research (ESSO-NCAOR), an Earth System Science Organisation under the Ministry of Earth Sciences (MoES), Government of India, is the nodal agency for implementation of the Indian Antarctic Programme. Hitherto, thirty sixth Scientific Expeditions to Antarctica have been successfully organized and preparations have begun for the thirty seventh Antarctic Expedition which is scheduled to be launched in November 2017.

The 37th Indian Scientific Expedition to Antarctica (37-ISEA) embarks on a new journey of scientific research. ESSO-NCAOR welcomes long term innovative scientific proposals in thematic areas and its subthemes in different disciplines. In addition to the ongoing programmes of different institutions, ESSO-NCAOR welcomes other scientific projects under the following broad areas:

I. Climate Processes and Linkages to Change

a) Antarctic ice sheet and Sea level rise
b) Sea ice monitoring and modelling
c) Antarctic Atmosphere / Southern ocean tele-connection to Tropics
d) Paleoclimate (Ice and sediment core)
e) Surface Processes and Landscapes

II. Crustal evolution

a) Reconstruction of sub-ice geology
b) Supercontinent configuration (Lambert-Mahanadi; EAO-Dronning Maud Land)
c) Early earth and evolution of earth
d) Heat flow modelling for EAIS behaviour

III. Environmental Processes and Conservation

a) Trends and sensitivity to change
b) Human interventions: Mitigation and prevention

IV. Ecosytem of Terrestrial and Nearshore

a) Lake biogeochemistry and productivity
c) Microbial diversity
d) Polar biodiversity
e) Wildlife

V. Observational Research

a) Atmospheric observations including climate reference stations
b) Coastal ocean Observatories (Prydz Bay) and deep ocean mooring
c) Ionospheric studies / space weather / Atmospheric electricity
d) GPS networks / Seismological observation
e) Hydrographic survey /Bathymetry
f) Topographical and geological mapping
f) Satellite Communication and Remote sensing
g) Stellar observations
g) Human Physiology

VI. Polar Technology

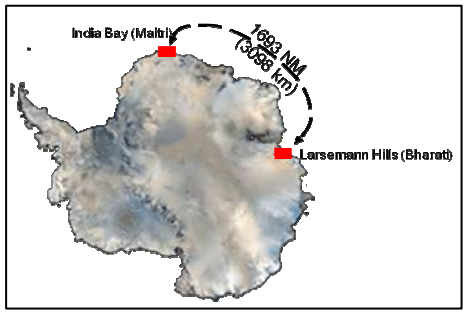
a) Development of autonomous vehicles, moorings, and platforms
b) Drilling technology
c) Communication and Energy conservation

VII. Capacity building

Student Participation Scheme

1. **Area of operation**

ESSO- NCAOR operates two year - round stations in Antarctica, which are ~ 3000 kms apart.



1.1. **MAITRI** ($70^0$45'58"S; $11^0$43'56"E), Schirmacher Oasis, Central Dronning Maud Land. Maitri research base is an inland station nearly 100km from the shelf (Indian Barrier for Ship)

1.2. **BHARATI** *($69^0$24".271'S; $76^0$12".147'E), Larsemann Hills, Ingrid Christensen Coast.* Bharati research base is near to the coast

1.3. **SHIP BOARD OPERATIONS** during the course of voyage from Cape Town - Bharati –Maitri-Cape Town transect.

[Considering the distance between two stations- Maitri & Bharati; and logistics involved, scientific proposals are expected to be well thought out that are viable.]

2.0 TRAVEL

Travel arrangements for all expedition members from Goa to Antarctica and back is taken care of by ESSO-NCAOR.

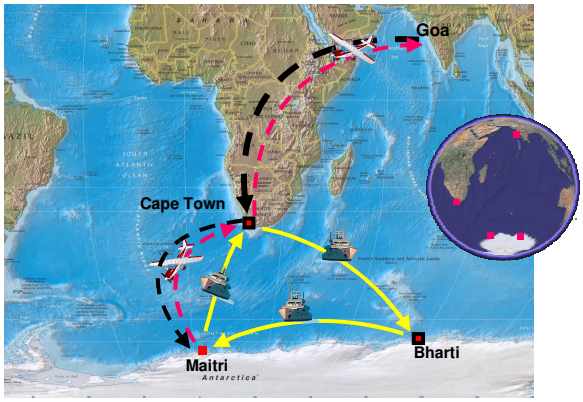
2.1 Mode of Travel

2.1.1 Goa to Cape Town is by air through commercial airlines.
2.1.2 Cape Town to Maitri – the passage could be by air through chartered flights under the aegis of DROMLAN initiative or by ship/s on ESSO-NCAOR charter.
2.1.3 Cape Town to Bharati-the passage is by Ship

[It's important to note that the mode of travel in not by choice but based on the time of travel, destination and nature of project.]

2.2 Travel Time

2.2.1 Travel by air between Cape Town to Maitri & vice versa takes around 5.5 hours by Ilyushin-76 (IL-76) aircraft. Flight timings and dates can be advanced or postponed subject to weather conditions in Antarctica.



2.2.2 Cape Town to Maitri (India Bay) & vice versa – by ship takes about 10 to 12 days.

2.2.3 Cape Town to Bharati by air- There are no direct chartered flights between Cape Town and Bharati.

2.2.4 Cape Town to Bharati and vice versa – Direct connection is only through ESSO-NCAOR's chartered ships that take 10 to 12 days depending on the weather and sea ice conditions.

2.2.5 Maitri to Bharati and vice versa- By ship it takes 5 to 7 days depending on the weather and sea ice conditions.

2.2.6 Maitri to Bharati and vice versa- By air it is possible only through chartered Basler / Twin Otter aircrafts which require midway refuelling and takes nearly 12 to 16 hours. It is very expensive and needs prior planning for availability of aircraft and midway refuelling.

2.3 Travel Season for Antarctica -November to March of succeeding Calendar Year.

2.3.1 Air operations Between Cape Town and Maitri and also between Maitri and Bharati are possible only in the summer season i.e. between November and February on select pre-decided days.

2.3.2 Ship operation between Cape Town and Bharati/ Maitri depending on the voyage plan for the season is possible from November to March of succeeding calendar year.

3.0 Infrastructure facility

3.1 Maitri

3.1.1 Living Capacity Winter– 25
Around 25 Expedition members for long term are accommodated in the main building of Maitri station.

3.1.2 Living Capacity Summer – 40
Expedition members for short term (15 numbers) are accommodated in the summer facility comprising of containerised living modules.

3.1.3 Laboratory space.
There is limited containerised/ modular laboratory space available. Members have to carry their items of equipment / chemicals/ sample collection, storage & transportation devices. In case of large space requirements for any instrumentation both in terms of logistics and power consumption, the same should be spelt out in detail and also presented and discussed during the presentation.

3.1.4 Inland transport

3.1.4.1 Helicopters –
Ship based helicopters are available for scientists working in the field. The helicopters are available only when the ship is around Maitri (at the Indian Barrier).Need based heli support shall be provided. Projects with intensive helicopter requirements should spell out the details in advance.

3.1.4.2 Snow Vehicles
Pisten bully vehicles, snow scooters are available round the year. However; requirement details need to be spelt out in advance.

3.1.4.3 Wheeled vehicle-
Toyota Hilux, a modified Toyota pickup truck for Antarctic conditions is available round the year however; requirement details need to be spelt out in advance.

[In view of the available infrastructure, the proposed scientific work should be confined within the logistic reach, ideally not exceeding 200 km from station in campaign mode.]

3.2 Bharati

3.2.1 Living Capacity – 47 - Summer & Winter
All expedition members stay in the main building of Bharati Station

3.2.2 Laboratory – 270 Sq feet of laboratory space is with regulated power supply. Laboratories are augmented with some basic equipment such as Laminar Air Flow, Milli-Q Ultra purification water system, Ultra-Sonicator, Autoclave, Hot Air Oven, Muffle Furnace, electronic weighing balance, thin section preparation device, rock cutting equipment etc.

3.2.3 Inland transport

3.2.3.1 Helicopters –
Ship based helicopters are available for scientists working in field. Projects with intensive helicopter requirements should spell out the details in advance.

3.2.3.2 Snow Vehicles
Pisten bully vehicles and snow scooters are available round the year. However; requirement details need to be spelt out in advance.

3.2.4 Water based – small fibre boat
A small fibre boat is available for doing some near coast work.

[In view of the available infrastructure, the proposed scientific work should be confined within the logistic reach, ideally not exceeding 200 km from station in campaign mode.]

3.3 Voyage based science

Some operations which can be done without stopping the ship can be carried out during the ship voyage. The ship is a chartered vessel and a separate lab space is not available.

The infrastructure support needed in Antarctica / during the voyage, should be spelt out in detail in the Project Proposal format and should be defended before the group of experts at the time of presentation of project proposal/s.

4.0 Duration of stay in Antarctica

ESSO-NCAOR operates two year-round stations Maitri and Bharati for scientists to mount research activities for duration necessary. Entry and exit to Antarctica due to its peculiar geographic position is restricted between November to March of the succeeding calendar year.

Scientists participating in the 37th Indian Expedition desirous of working only through the summer season can enter Antarctica in November' 17 and return by March' 18 and those desirous for longer durations can continue staying in Antarctica only to return between November'18 to March'19

Definition of Season for purpose of Hardship Allowance:
the shorter period (1st December to 28th/29th February) and
the longer period (1st March to 30th November).

5.0 Communication facility available with the stations

Internet connectivity and e-mail facility are available at the stations.

ESSO-NCAOR also provides limited time for calling your near and dear ones from on the station and the ship.

- Shorter duration (Summer period) – 6 minutes per month
- Longer duration (Winter period) – 20 minutes per month
- A common mail Id is provided on the voyage vessel to communicate with your family and friends.

6.0 Eligibility for participation in the 37th ISEA Expedition

For participating in the 37th ISEA the proposer of the scientific project i.e. the Principal Investigator (PI) - should be a regular employee, with an interest in the relevant field.

The proposed personnel indicated in the scientific proposal for participation in the 37-ISEA should mostly be from PI's organization/institute/department. In case of collaboration with other institute/department/organization, same should be explicitly mentioned. ESSO-NCAOR strongly encourages scientific collaboration with other organisations.

The proposals for the 37th ISEA should be submitted to ESSO-NCAOR through proper channel. In case of participation of two or more institutes, scientific proposal should have the consent from all the participating organizations/institute.

The research proposals for the mentioned scientific progammes have to be submitted in the Prescribed Format - for 37th ISEA (2017-2018) both as hard copy as also sent as a soft copy on email.

Proposals are invited for both short duration (summer) and longer duration (winter) both for Maitri and Bharati.

Preference will be given to long term programmes resulting in meaningful scientific research with tangible results. Programmes with capabilities for online data acquisition and transmission are encouraged.

7.0 Capacity building (Student Participation) in the 37-ISEA

ESSO-NCAOR encourages post graduate students to participate in the Indian Scientific Expedition to Antarctica. To be eligible, students with post graduate degree in any discipline of science or degree in engineering, technology or medicine (completed their post graduate degree **in the previous academic year or appearing for their final year exam in this year-degree awaited)** under the aegis of **STUDENT PARTICIPATION SCHEME**. Students should enclose a brief CV with details of academic qualifications with date of passing, marks obtained etc.

There are two approaches to apply for Student participation scheme

7.1 Interested students with requisite qualifications need to submit a research plan within the framework of the major themes mentioned above for summer period only under the guidance/ supervision of a permanent scientist of any institute/ department/ university.

The designated guide/supervisor shall be fully responsible for the participation of his/her student/s in the Antarctic Expedition.

7.2 Students desirous of becoming part of the ongoing projects in Antarctica can also apply with their study area being of interest to ESSO-NCAOR, along-with a request for a possible attachment with a programme of either ESSO-NCAOR or any other organization (based on the subject and student interest area). As the first step it will depend on acceptance of the student by the respective PI's of the programme @NCAOR.

8.0 Process of selection

The PI should defend his/her research proposal submitted to ESSO-NCAOR, before a panel of experts as and when invited and is currently scheduled for 18th & 19th May 2017. All proposals should be scientifically and logistically viable. **PI/Co-PI should invariably defend the proposal in person at their own expense.**

9.0 Things to do, on selection of the research proposal

9.1 Only those project proposal/s which get approved for 37-ISEA, will be informed on their provisional selection by 8th June 2017 for conveying the outcome, whether the project is approved/not approved/approved with modifications etc.

9.2 **All organisations to provide full personal details of participating individual within two weeks on receipt of the communication** (of being selected) from ESSO-NCAOR, on the prescribed **form numbered AL-1208 by 23rd June 2017 .**

9.3 The selected team members will have to undergo -

9.3.1 A detailed Medical Examination at the All India Institute of Medical Sciences (AIIMS), New Delhi

9.3.2 Snow acclimatization training at the Mountaineering & Skiing Institute (ITBP), Auli, Uttarakhand. Exact dates will be communicated, to medically fit members.

9.3.3 Members to make their own personal passport [for short term participation the passport should be valid until 30th September 2018 and for long term participation the validity should be 30th September 2019] with last date for submission to NCAOR-05th October 2017.

10. Team movement for Antarctica

Team Movement 37 ISEA (2017-18)
Air Travel to Maitri/ Bharati tentative schedule for season 2017-18

Departure Goa	Nov-17 to Dec-17
Departure Cape Town	Nov-17 to Dec-17
Arrival Maitri/Bharati	Nov-17 to Dec-17
Departure Maitri/Bharati	Dec-17 to Feb-18
Arrival Cape Town	Dec-18 to Mar-18
Arrival Mumbai/Delhi	Dec-18 to Mar-18

Expedition members shall be sent in and brought out of Antarctica in batches depending on requirements.

11. Cargo Movement:

The expedition cargo (including scientific cargo) is sent from Goa to Cape Town through commercial freight carriers/shipping lines. It takes nearly 45 days for the cargo to reach Cape Town including the lead time for customs formalities. For onward carriage to Larsemann Hills, Antarctica, the cargo will be shipped onboard the chartered expedition ship.

11.1 Organisations should make sure that the scientific cargo must reach ESSO-NCAOR, Goa in or before Tuesday **12th September 2017** else it could be left out and thus jeopardizing the programme.

11.2 Luggage dimensions for air transfer:

11.2.1 Members going directly to Maitri may carry their select scientific equipment/s by air (with prior intimation to the Logistic divison at ESSO-NCAOR).

11.2.2 The size and weight of individual packaging/box/baggage should not exceed 90 cm in length, 72 cm in height, and 45cm in width and 30 kg in weight.

11.2.3 Any requirement for hazardous cargo like gasses, chemicals fuel, oil etc needs to be intimated immediately upon approval of the project as the same cannot be transported by air and needs to be arranged at Cape Town.

12. Allowances for travel and stay in Antarctica

12.1 ESSO-NCAOR makes arrangements for travel to Antarctica from Goa and back, accommodation in the ship and Antarctica, food, special polar clothing requirements and personal insurance cover.

12.2 All other expenses including those related to procurement of scientific equipments, attending pre-Antarctic training, Hard Duty Allowance [Presently @ Rs. 1125/-and Rs. 1688/- per day for long term [winter] (1st March to 30th November) and short term [Summer] team (1st December to 28/29th February) members respectively as per ESSO-NCAOR's terms and conditions] etc. will have to be borne by the participating organisation. This may be taken into account while forwarding the nominations. However the HDA rates are subject to change in accordance 7th CPC recommendation and subsequent Government Orders".

13. Conduct of Members

Members have to maintain discipline at the station, ship and air transit. The orders from the Leader in prioritizing things and any disciplinary matter are final.

14. Do you aspire to be the Leader of the 37-ISEA at Maitri and Bharati

ESSO-NCAOR welcomes nominations from organisations for selection of the Leader for Maitri and Bharati
Candidates having leadership qualities with experience in Antarctic are preferred.

Letter of nomination addressed to The Director, ESSO-NCAOR along with bio-data and professional experience of the nominated candidate should be sent in a separate cover inscribed "Proposed Leader 37th ISEA- MAITRI and BHARATI(preference to be clearly indicated) by the Head of the organization.

15. Logistic Personnel

Retired defence personnel preferably from EME & Engineers/ITBP/Border Roads and allied Paramilitary services, may apply for summer and wintering component. Persons with Antarctic experience are preferred for a long term contractual re-employment. **The interested personnel may apply to Project Director, Logistics, ESSO-NCAOR at logistics@ncaor.gov.in with a copy to Director, NCAOR at director@ncaor.gov.in**

16. Data Policy

Data in general and that from the polar region is precious in particular. The true value of scientific data is often realized long after it has been collected, and to ensure the lasting legacy it is essential to ensure long-term preservation and sustained access to Antarctic data.

Being the member of the Antarctic treaty, the data policy of ESSO-NCAOR is governed by section III.1.c of the Antarctic Treaty 1959 and has been broadly adopted from IPY 2012-13 (http://classic.ipy.org/Subcommittees/final_ipy_data_policy.pdf) keeping in view the interests of national and international scientific community.

All data generated during the voyage and/ or from the Antarctic continent under the aegis of Indian Scientific Expeditions accompanied by a full set of metadata that completely documents and describe the data is to be given to ESSO-NCAOR for secured archival in the National Polar Data Centre, on return to mainland.
In order to promote the data management within the Antarctic scientific community in accordance to the spirit of the Antarctic Treaty, the metadata (data about data) will be made available through ESSO-NCAOR website without any access restrictions and will be shared on the network established by the SC-DAM – Standing Committee on Antarctic Data Management of the Scientific Committee on Antarctic Research/Council of Managers of National Antarctic Programs (SCAR/COMNAP).

However, the data will be treated as intellectual property of the owner / collector with a lock in period of 2 years from the date marking the end of the expedition season. This gives ample opportunity to the collector for digesting the data, making full use of the information and in translating it to knowledge base. The mandatory lock in period upon request is extendable to a maximum of five years depending on the nature, volume, sensitivity and reasonability of processing time required.

Upon the expiry of the mandatory or extended lock in period the data will be made available to the scientific community for full free and open access with a rider that the name of the owner / collector will be duly acknowledged in any sort of technical report/ publications / short note / scientific and or administrative communiqué.

As per the IPY norms, the only exceptions to this policy of full, free, and open access are:
• Where human subjects are involved, confidentiality must be protected
• Where local and traditional knowledge is concerned, rights of the knowledge holders shall not be compromised
• Where data release may cause harm, specific aspects of the data may need to be kept protected (for example, locations of nests of endangered birds or locations of sacred sites).

17. Care for the Antarctic environment

Antarctica is a pristine environment and needs to be protected and maintained to the best of our ability. This is as part of the international treaty for embracing and protecting the earth as also the strict guidelines for research in Antarctica. There is an

Environmental Policy in force and needs to be adhered in word and spirit. Details can be had from **www.ats.aq.**

18. Application Format for 37-ISEA

The application format may be downloaded from ESSO-NCAOR's website (www.ncaor.gov.in)

Deadline for receiving proposals

- **Three copies of the proposal along with all essential endorsement and certificates in the prescribed formats [available on our website] should be forwarded through proper channel and must reach the Director, Earth System Science Organization, National Centre for Antarctic & Ocean Research, Headland Sada, Vasco-da-Gama, Goa- 403 804 latest by 15th April 2017. The envelope should be clearly super scribed "37-ISEA PROPOSAL".**
- **If there is any other participating organization involved in the proposal, an endorsement from their institute as also for collaborations sought should be part of the proposal and be explicit.**
- **A soft copy in word file of the same should also be sent as an attachment by e-mail at antarctic-sci@ncaor.gov.in with the Subject:"37 ISEA Proposal". Nominations received after 15th April 2017, will not be entertained.**
- Details on our webpage **www.ncaor.gov.in**

19. Important Dates to remember OR Important Deadlines

19.1.1 Last date for receipt of application complete in all respect - 15th April 2017

19.1.2 Programme Presentation for evaluation of project for inclusion – 18th & 19th May, 2017

19.1.3 Communication from NCAOR conveying status of proposal– 8th June, 2017

19.1.4 Last date for receiving personal details of participating individuals in form AL-1208-23rd June, 2017

19.1.5 Last date for receipt of Nomination for Leadership -10th July,2017

19.1.6. Last date for receiving institutional/ individual cargo at NCAOR (scientific equipment/ accessories/chemical/glassware etc) necessary for successful completion of project in Antarctica/during Voyage with detailed declaration in form AL-1403-12th September, 2017.

19.1.7 Medical examination and Pre Antarctic Training for participating individuals-01st August-15th October 2017

19.1.8 Last date for submission of valid Personal Passport(s) of participating individuals-05th Oct 2017

19.1.9 Deputation for Antarctica-27th October 2017 onwards depending on the nature of the project and availability of flights/ship.