

Dated: 01/11/2017

Administrative Order

Sanction of the President is hereby accorded under the Rule 18 of the Delegation of Financial Power Rules, 1978 for the project **"Ocean Advisory & Information Services, Computational Infrastructure and Communication Systems (OASIS)"** as a continuing scheme and implemented by Director, Indian National Centre for Ocean Information Services (INCOIS), Hyderabad at a cost of Rs.147.47 Crores (Rupees One Forty Seven Crore Forty Seven Lakh only) during the period 2017-2020 on the terms and conditions detailed hereunder:

2.0 Project

2.1 Project Title

"Ocean Advisory & Information Services, Computational Infrastructure and Communication Systems (OASIS)"

2.2 Implementation

The project will be implemented by Indian National Centre for Ocean Information Services (INCOIS), Hyderabad, an autonomous body under the Ministry of Earth Sciences.

2.3 Project Objectives

i) Tsunami Early Warning System

The Indian Tsunami Early Warning System (ITEWS) has the responsibility to provide tsunami advisories to Indian Mainland and the Island regions. Acting as one of the Regional Tsunami Advisory service Providers (RTSPs) for the Indian Ocean Region, ITEWS also provide tsunami advisories to the Indian Ocean rim countries.

- Sustain and improvement of National Tsunami warning System.
- Sustain and improvement of Regional Tsunami Service for the Indian Ocean region.
- Sustain and maintain the existing core tsunami observation network.
- Enhance DSS application, sea-level data inversion, modelling and other associated elements for provision of services for Indian Domain and Global Domains.
- Utilization of real-time GNSS and SMA data for operational tsunami warning.
- Real-time tsunami modelling and inundation mapping for vulnerable Indian coasts.
- Capacity building, Education & Training.
- Conduct regular communication tests and mock drills.
- Operationalization of tsunami services for South China Sea through RIMES framework.
- Tsunami risk assessment for high vulnerable coasts.

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ii) Storm Surge Early Warning System

- Development and implementation of storm surge forecasting service to provide early warning advisory on storm surge heights and associated inland inundation extents along the Indian coasts.

iii) Ocean State Forecast Services

- To forecast the state of the ocean in a daily operational manner, and to disseminate the forecasts and ocean information to a wide range of user categories through different modes of dissemination.
- To sustain and improve the high resolution coastal and open ocean (regional-basis) daily operational forecasts, advisories and products.
- To deliver user-specific, impact-based and user-demanded forecasts and analysis products to the users.
- To obtain the validation of the forecasts and maintenance of the OSF-related real-time observational networks through decentralized funded projects.
- To deliver customized forecast products to industries and maritime users
- Spearhead in Ocean forecast services in the Indian ocean region

iv) Marine Fisheries Advisory Services

- Sustain and Improve PFZ and Tuna Fishery Advisories.
- Development of Species Specific fishery advisories for other species like Hilsa, Oil Sardine, etc.
- Improved dissemination mechanisms.
- New Initiatives towards Ecosystem based long-term Fishery Advisory Services (EFAS).

v) Multi Hazard Vulnerability Mapping Services

- Improvements/up gradation of the MHVM.
- Improvement and maintenance of 3D VAS application.
- Coastal risk assessment.

vi) Coral Bleaching Alert System

Objective of the service is to provide the satellite based coral bleaching alert, Geospatial services. The following activities are being proposed

- Sustain the service of Coral Bleaching Alert System.
- Improvement of the service by adding the feasible additional parameter.
- Up gradation of coastal geospatial database.
- Development of digital classification scheme for the coral reefs.
- Assessment of the extent of the bleaching impact using high resolution satellite data.

vii) Data Services

The aim of data services component of OASIS is to provide research quality data and derived products for performing high quality research on some of the active areas of research pertaining to Indian Ocean. Major objectives of the project are:

- Sustain the acquisition and distribution of data.
- Sustain the reception, processing and quality control of data from existing in-situ observing systems viz., Argo Floats, Moored Buoys, Drifting Buoys, XBT/XCTD, Current Meter Moorings, AWS, Wave Rider Buoys, Wave Height Meters etc.

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- Add data from new observations like Gliders, Bay of Bengal Observatories, Project Specific data sets, OMM cruises to the processing chain.
 - Set up Integrated Metadata portal for all the parameters and data generated through MoES institutes.
 - Sustain the existing ground stations and generate remote sensing products for all operational services.
 - Enhance the quality control methods for correcting the data and making them of research quality.
 - Digital Ocean visualization Lab for on the fly visualization of data and products.
 - Efficient tracking of data users by adopting Digital Object Identifier (DOI) methods.
 - Up-gradation of existing ground stations for future missions viz. Oceansat-3, NPP, JPSS etc.
 - Use Big data concepts to handle huge data from remote sensing and ocean models.
 - Implementing data analytics, e and m-commerce while catering data to users.
 - Setting up of private cloud to host and manage data.
 - Generate long term remote sensing products for climate studies from NOAA & OCM series.
 - Develop user preference time interval composite, high resolution (750m) operational physical and biological data products from JPSS series of satellites.
 - Development of value added products from all the data obtained from search and rescue operations.
 - Inject the data for generation of re-analysis products. Reach out to universities to bring about data awareness and effective utilization of data archived at INCOIS.
 - Reach out to users through ITCOO training programs.
 - Conduct theme based workshops targeting researchers and students from various organizations and universities. Fund data utilization projects for identified themes of use to INCOIS data management activities.
 - Carry out digitization activities of hand written old ship cruise records.
- viii) Computational Facilities, Web Based Services and Communication Facility:**
- Designing, Planning & Implementation and Maintenance of IT Projects for various Operational and R&D Projects.
 - Finalization of suitable specs, preparation of RFPs towards procurement of High end parallel computing cluster systems, Procurement and installation of other IT Infrastructure to support operational and R&D activities of INCOIS.
 - System administration and application porting/installations so as to ensure smooth functioning of various operational and R&D projects.
 - Network Planning, Procurement & installation of network components.
 - Design, Implementation and operations & maintenance of Networking including Wi-Fi, Internet Bandwidth.
 - Development, Hosting and Maintenance of INCOIS Website, Tsunami Website, ISGN Website etc.
 - Development and maintenance of application software and other web applications.
 - Designing, planning, implementation and maintenance of communication

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facilities required for various projects at INCOIS.

- Augmentation & Upgradation of INSAT Terminals & Associated equipment, VSAT terminals & associated equipment, Seaspac (SDAPS) Radome antenna & associated equipment including hardware & software, VPN-DMS terminal & associated video conferencing equipment, Oceansat-II terminal & associated ground station equipment etc.
- Procurement of new antenna terminals, electronics & communication components, related communication / control systems, INSAT based communication system for PFZ data, etc including establishment of electronics lab for attending first level trouble shooting activities of various communication systems

ix) Field Stations / Regional Centres

- Generate the regional specific customized ocean information and advisories including future forecasts.
- To carry out validation of the models / services / forecasts in the coastal regions.
- Establish the necessary lab facilities (infrastructure and technology platforms) to support the coastal and open-ocean observation platforms and to sustain and maintain the platforms.
- Enhance the coastal observation platforms, sustain of existing and new observation platforms and maintenance.
- Extend the laboratory facilities for all operational oceanography courses conducted under the ITCO ocean and produce strong and sustainable human resources in practical knowledge.
- Serve as the laboratory facility for academia and collaborative institutes for data analysis.
- To provide Capacity Building and awareness on Ocean services.

2.4 Time Schedule

The duration of the project is 3 years (2017-18 to 2019-2020).

2.5. Key Personnel /Staff

Apart from the existing manpower, additional manpower for realization of the proposed project under OASIS may be engaged on contract basis temporarily within the budget of the project till the permanent manpower is sanctioned. Details of the required manpower are given in **Annexure-I**. The creation of new permanent manpower and expenditure thereon shall be subject to the prior approval of the Government (Ministry of Finance, Dept. of Expenditure as per their OM No. F7(1)/E. Coord. 1/2012 dated (31.05.2012).

2.6. Equipment

The equipment required for the OASIS project is as indicated under Para 2.8 (project cost) of this Administrative Order.

2.7. Project Schedule

The detailed project schedule for three years 2017-2020 is placed at **Annexure II**.

2.8 Project Cost

Rs. 147.47 Crores (Rupees One Forty Seven Crores Forty Seven Lakh only) for 2017-2020.

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A summary of the financial requirement is as under and further details can be seen at **Annexure III**.

(Amount in Crore)

Sl No.	Services	2017-18	2018-19	2019-20	TOTAL
1	Tsunami Early Warning System	14.15	12.17	7.33	33.65
2	Storm Surge Early Warning System	0.67	0.16	0.10	0.93
3	Ocean State Forecast Services	2.86	4.21	4.48	11.55
4	Marine Fisheries Advisory Services	4.48	7.44	7.61	19.53
5	Multi Hazards Vulnerability Mapping Services	0.00	6.43	6.48	12.91
6	Coral Bleaching Alert System	0.43	0.43	0.43	1.29
7	Data Services	3.88	2.28	2.33	8.49
8	Computational Facilities, Web Based Services and Communication Facility	26.43	15.13	15.33	56.89
9	Field Stations	0.68	0.81	0.74	2.23
	TOTAL	53.58	49.06	44.83	147.47

2.9 Project Monitoring

Two committees will monitor the project regularly.

(i) A Project Management Council (PMC)- the following members will periodically (at least once a year) will review the progress of the Project.

Secretary MoES or his nominee	Chairman
Chairman, RAC, INCOIS	Member
Director, NIO, Goa	Member
Chairman, CAOS, IISc., Bangalore	Member
Chairman, CAS, IIT, N. Delhi	Member
Director, NCMRWF, N. Delhi	Member
Director, IITM, Pune	Member
Director, INCOIS	Member
Expert in Ocean Modeling	Member
Expert in Ocean Modeling	Member
Senior Scientist, INCOIS	Member Secretary

(ii) An internal committee chaired by Director, INCOIS - will consist of INCOIS scientists involved in ocean modeling and two external experts drawn from other institutes in India. This committee will monitor and evaluate the project at least twice a year and report the progress to Secretary, MoES.

3.0 The expenditure under the project would be met from the following Head of Account:

Major Head - 3403	Oceanographic Research
Minor Head - 00.101	Research and Development
08	Ocean Services, Technology, Observations, Resources Modelling and Science (O-STROMS)

4.0 Other Terms and Conditions

The terms and conditions governing this sanction are attached at **Annexure-IV**.

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- 5.0. This issues under the powers delegated to this Ministry and with the concurrence of IFD vide Dy. N. 3309/IFD/2017 dated 28/09/2017 and with the approval of Secretary MoES vide Dy. No. 3309/Secy/2017 dated 03/10/2017.

(Manjula Daniel)

Under Secretary to the Government of India

To

Director
Indian National Centre for Ocean Information Services (INCOIS),
"Ocean Valley"
Pragathinagar (BO), Nizampet (SO),
Hyderabad – 500 090, India

Copy to:

1. The Pay and Accounts Officer, Ministry of Earth Sciences, Prithvi Bhawan, Lodhi Road, New Delhi 110 003
2. Controller of Accounts MoES New Delhi
3. Director of Audit (Scientific Departments), AGCR Building, New Delhi.
4. PPS to Secretary/ PS to JS/ PS to Advisor (K. S.)/Scientist- C (E. Haque)
5. Account Section MoES
6. IFD/Guard File/ Hindi Section


(Manjula Daniel)

Under Secretary to the Government of India

Details of Manpower

Year	Requirement in each year			Cumulative strength		
	Scientists / Project scientists	Research Fellows/ Project Assistants	Office Assistants /Lab Attendants /Drivers	Scientists / Project scientists	Research Fellows/ Project Assistants *	Office Assistants/ Lab Attendants /Drivers**
2017-18	35	29	10	35	29	10
2018-19	9	12	0	44	41	10
2019-20	2	2	0	46	43	10

* & ** includes (3 Project Asstt. & 1 MTS) for MoES Headquarter under Project Mode also to handle the work related to INCOIS Projects/sub-projects.

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The year wise deliverables (Project Schedule) of the different services proposed is provided as under:

i) Tsunami Early Warning System

Year wise deliverables for the period 2017 - 2020.

Year	Deliverables
2017-18	• Detect, locate and determine the magnitude of potentially tsunamigenic earthquakes occurring in the Indian Ocean and provide timely advisories on 24 X 7 basis to India & Indian Ocean rim countries. • Sustain and maintain the existing core tsunami observation network. • Setting up of unit source parameters for global subduction zones based on subduction zone geometry and generate coastal forecast points & Zones for global domain. • Generation of open ocean propagation data base (OOPSDB) master simulation of for global domain • Maintenance and enhancements of the existing DSS application • Validation studies of sea level inversion mechanism. • Operationalization of sea level inversion using open ocean observations. • Enhanced Tsunami operational services using GNSS & SMA data • Setting up of models for Stand by Inundation modelling (SIM) & Real Time Inundation Modelling(RIMS) activities • Parallelization of Tunami N3 code using state of the art technology to achieve minimal and rapid computations • Tsunami Workshops for National/ International stakeholders • Conduct two Communication tests for validating the communication links/modes. • Tsunami awareness material in coastal languages
2018-19	• Detect, locate and determine the magnitude of potentially tsunamigenic earthquakes occurring in the Indian Ocean and provide timely advisories on 24 X 7 basis to India & Indian Ocean rim countries. • Operationalization of tsunami services for south China Sea through RIMES framework • Sustain and maintain the existing core tsunami observation network. • Utilization of coastal tide gauge GNSS data in tsunami operations. • Validation of Master simulations of global domains • Mount efforts for Parallelization of Tunami F2 • Continue to generate the OOPSDB • Modular decision support system Development to use in mobile workstations • Green functions for coastal SIMs • Sea level inversion using Coastal tide gauges data. • Real time inundation modelling (RIM) for Selected Indian vulnerable coastal regions • Website for tsunami awareness and preparedness • Tsunami Workshops, Sensitization workshops on tsunami preparedness for National/ International stakeholders • Conduct two Communication tests for validating the communication links/modes. • Tsunami Mock drills • Tsunami awareness material in coastal languages

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2019-20	• Detect, locate and determine the magnitude of potentially tsunamigenic earthquakes occurring in the Indian Ocean and provide timely advisories on 24 X 7 basis to India & Indian Ocean rim countries & South China sea countries. • Sustained maintain the existing core tsunami observation network. • DSS application maintenance and optimization for cloud environment • Sea level inversion using Coastal tide gauges data. • Operationalization of service level -III by including the inundation information in the bulletins • Enhancement of the tsunami website to serve for service level -III with inundation maps facility , loss estimate system, etc • Tsunami Workshops, Sensitization workshops on tsunami preparedness for National/ International stakeholders • Conduct two Communication tests for validating the communication links/modes. • Tsunami Mock drills • Tsunami awareness material in coastal languages
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ii) Storm Surge Early Warning System

Year wise deliverables for the period 2017 - 2020.

Year	Deliverables
2017-18	• Formulation of methodology for Probabilistic Storm Surge guidance system (P-Surge) will be completed. • Automated P-Surge guidance system is planned to complete here.
2018-19	• Automation of P-surge guidance will be done here if this part is pending. • Setting up of ADCIRC + SWAN Coupled model as part of the enhancement of the current storm surge early warning system.
2019-20	• Enhance the capabilities of current Decision Support System (DSS) with open source software's and platform. Inclusion of Population index and strategic coastal infrastructure impact information due to coastal inundation in surge bulletins.

iii) Ocean State Forecast Services

Year wise deliverables for the period 2017 - 2020.

Year	Deliverables
2017-18	• Maintained and improved (accuracy, spatio-temporal resolution and reliability) Ocean State Forecast Services. • User-demanded new products and Services (wave surge advisories, Port Information System, Offshore wind farm advisory GUI and Mobile App etc.) and any product based on time-to-time user requirement/demand. • Customized forecast services to offshore and costal industries.
2018-19	• Maintained and improved (accuracy, spatio-temporal resolution and reliability) Ocean State Forecast Services. • User-demanded new products and Services (like small craft advisories) and any product based on time-to-time user requirement. • Integrated ocean forecast services to Indian Ocean countries in collaboration with RIMES. • More validation programs to improve Services.
2019-20	• Maintained and improved (accuracy, spatio-temporal resolution and reliability) Ocean State Forecast Services. • User-demanded new products and Services (Interactive navigation tools, Navy-

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	specific encrypted forecast system etc.) and any product based on time-to-time user requirement. • Improved dissemination chain especially direct dissemination to Sea. • Customized forecast services to coastal tourism. • More User interaction meetings and awareness programs to strengthen the customer base.
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iv) Marine Fisheries Advisory Services

Year wise deliverables for the period 2017 - 2020.

Year	Deliverables
2017-18	• Daily Fishery advisories • Capacity Building and awareness workshops – 5 Nos. • Enhancement in the user base. • Experimental species specific advisories on Hilsa • Validation of experimental advisory services • R &D on fishery and primary productivity modelling.
2018-19	• Daily Fishery advisories • Capacity Building and awareness workshops – 5 Nos. • Enhancement in the user base • First out come on spawning/breeding ground (Hilsa) monitoring system, to define contribution on stock. • Validation of experimental advisory services. • R &D on fishery and primary productivity modelling.
2019-20	• Daily Fishery advisories • Capacity Building and awareness workshops – 5 Nos. • Enhancement in the user base • Validation of experimental advisory services. • R &D on fishery and primary productivity modelling.

v) Multi Hazard Vulnerability Mapping Services

Year wise deliverables for the period 2017 - 2020.

Year	Deliverables
2017-18	• Completion of the 3D GIS mapping for the remaining 3300 sq km • Fair weather condition and timely permissions are constraint for the survey
2018-19	• Improvements/upgradation of the MHVM along the west coast using the ALTM data from NRSC Phase-II project • Availability of input data is constraint.
2019-20	• Coastal risk assessment • Initiate the ALTM survey for Islands • MHVM Atlas for Indian Mainland with updated maps

vi) Coral Bleaching Alert System

Year wise deliverables for the period 2017 - 2020.

Year	Deliverables
2017-18	• Coral Bleaching Alerts • Collection of data from field and other collateral; sources, satellite data processing
2018-19	• Coral Bleaching Alerts • Collection of data from field and other collateral sources, satellite data processing • Improvements of coral bleaching alerts

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	• Availability of the data in near-real time is the constraint
2019-20	• Improved Coral Bleaching Alerts • Processing of satellite data, field data and other secondary data • Improvements of coral bleaching alerts • Coral reef classification scheme for the assessment of the changes

vii) Data Services

Year wise deliverables for the period 2017 - 2020.

Year	Deliverables
2017-20	• High quality data sets for operational and research use. • Value added products from in situ and remote sensing for operational and research purpose. • New ground station for OCM-3 and other future remote sensing missions like JPSS, NPP etc. • Awareness about data holdings and increase in usage of data and data products leading to increased publications and thesis. • State of art data and related services with the use of Digital Ocean and research coming out of funded projects. • Enhance the reach ability by using LAS, ERDAP and web based services. • Rescue and archiving of legacy data added to Indian Ocean Hydrobase. • Digitized records of old cruises data leading to enhancement data for climate studies.
2018 - 19	• High quality data sets for operational and research use. • Value added products from in situ and remote sensing for operational and research purpose. • New ground station for OCM-3 and other future remote sensing missions like JPSS, NPP etc. • Awareness about data holdings and increase in usage of data and data products leading to increased publications and thesis. • State of art data and related services with the use of Digital Ocean and research coming out of funded projects. • Rescue and archiving of legacy data added to Indian Ocean Hydrobase. • Digitized records of old cruises data leading to enhancement data for climate studies.
2019 - 20	• High quality data sets for operational and research use. • Value added products from in situ and remote sensing for operational and research purpose. • Awareness about data holdings and increase in usage of data and data products leading to increased publications and thesis. • State of art data and related services with the use of Digital Ocean and research coming out of funded projects. • Enhance the reach ability by using LAS, ERDAP and web based services. • Rescue and archiving of legacy data added to Indian Ocean Hydrobase.

viii) Computational Facilities, Web Based Services and Communication Facility

Year wise deliverables for the period 2017 - 2020.

Year	Deliverables
2017-18	Computing:

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2018-19	• Planning, Implementation, operations and maintenance of computing infrastructure (hardware, software, networking, application software etc) for various Operational and R&D projects of INCOIS. • Setting up of data centre for Installation and maintenance of new HPC (700-800TF with 4PB storage). • Procurement, Installation and maintenance of about 50TF with 500TB storage HPC. • Augmentation and up-gradation of hardware, software, networking etc. • Technology refreshment of Tsunami Data Centre. • Changing IP v4 based network to IP v6 network. • Establishment of DR Site for INCOIS data and services. • ISO Certification for CWG activities. • Central computing facility. • Implementation and maintenance of 3D VAS, Digital Ocean, Integrated Dissemination System etc. Web Based Services: • Continue to maintain INCOIS Website, ISGN Website, Tsunami Website, and IIOE-2 Website including various other web applications. • SSL Certification for INCOIS Website & Ocean Data Portal • Development of 2D and 3D Visualization, Analysis and Inundation Modeling Software Application (3DVAS). • Streamlining of Web application for Ocean Data Information System (ODIS) • Development of WebGIS Application to display the Cruise Information and IIOE-2 Metadata Portal. • Development of the Online Discussion Forums for IIOE-2 and INCOIS Intranet websites. • Mobile Applications for INCOIS Services • Restructuring the design for MoES Metadata Portal, Tsunami Website, Argo Floats Web Application and web mapping applications. • Login Based Online Recruitment Portal with various reports generation, screening of the applications facility. Communication Facilities: • Installation of 5 no's of new Radar based Tide Gauge systems for reception of real time tide gauge data. • Up gradation of INSAT MSS and DRT hub systems at INCOIS. • Up gradation of existing 21 Tide gauge systems (Data loggers & sensors). • Up gradation of 21 No's of INSAT MSS and UHF transmitters at Tide gauge locations. • Up gradation of INSAT Data processing systems at INCOIS. • Prototype demonstration of IRNSS/GAGAN based data dissemination system for INCOIS. • Prototype demonstration of INSAT based two ways Terminal for Ocean observation platforms. • Permanent communication lab setup at INCOIS for communication related activities.
2019-20	

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ix) Field Stations / Regional Centres

Year wise deliverables for the period 2017 - 2020.

Year	Deliverables
2017-18	• Establishment of Field stations • Development of Sampling Protocols and manuals on operation of equipments • Community Awareness on the existence, facilities and benefits • Extending the existing ocean services. • Training programmes • Field support to the observation programmes of INCOIS
2018-19	• Establishment of laboratory facilities for sample analysis • Development of Sampling Protocols and manuals on operation of equipments • Community Awareness on the existence, facilities and benefits • Extending the existing ocean services. • Field support to the observation programmes of INCOIS.
2019-20	• Training Manuals, Reports and Scientific Papers • Field support to the observation programmes of INCOIS.

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ANNEXURE - III**Budget details for each Sub-Project****i) Tsunami Early Warning System**

Budget proposed for the period 2017-2020 (in Crores)

S No.	Item	2017-18	2018-19	2019-20	Total
1	Salaries	0.90	1.95	2.15	5.00
2	Domestic Travel Expenses	0.05	0.05	0.05	0.15
3	Foreign Travel Expenses	0.20	0.20	0.10	0.50
4	Office Expenses	0.05	0.05	0.05	0.15
5	Publications	0.05	0.10	0.10	0.25
6	Other Administrative Expenses	0.50	0.10	0.10	0.70
7	Supplies & Materials	4.14	3.12	3.68	10.94
8	Advertising & Publicity	0.10	0.10	0.10	0.30
9	Minor Works	0.00	0.00	0.00	0.00
10	Professional Services	0.50	1.00	1.00	2.50
	Total (Revenue)	6.49	6.67	7.33	20.49
11	Machinery & Equipment	7.66	5.50	0.00	13.16
12	Major Works	0.00	0.00	0.00	0.00
13	Total (Capital)	7.66	5.50	0.00	13.16
14	Total (Revenue + capital)	14.15	12.17	7.33	33.65

ii) Storm Surge Early Warning System

Budget proposed for the period 2017-2020 (in Crores)

Sl No.		2017-18	2018-	2019-20	Total
1	Salaries	0.00	0.00	0.00	0.00
2	Domestic Travel Expenses	0.02	0.02	0.02	0.06
3	Foreign Travel Expenses	0.03	0.03	0.03	0.09
4	Office Expenses	0.00	0.00	0.00	0.00
5	Publications	0.02	0.02	0.02	0.06
6	Other Administrative Expenses	0.00	0.06	0.00	0.06
7	Supplies & Materials	0.50	0.00	0.00	0.50
8	Advertising & Publicity	0.01	0.01	0.01	0.03
9	Minor Works	0.00	0.00	0.00	0.00
10	Professional Services	0.00	0.00	0.00	0.00
	Total (Revenue)	0.58	0.14	0.08	0.80
11	Machinery & Equipment	0.09	0.02	0.02	0.13
12	Major Works	0.00	0.00	0.00	0.00
13	Total (Capital)	0.09	0.02	0.02	0.13
14	Total (Revenue + capital)	0.67	0.16	0.10	0.93

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iii) Ocean State Forecast Services

Budget proposed for the period 2017-2020 (in Crores)

Sl No.		2017-18	2018-19	2019-20	Total
1	Salaries	0.70	1.30	1.30	3.30
2	Domestic Travel Expenses	0.05	0.05	0.05	0.15
3	Foreign Travel Expenses (For training & instrument establishment plus DA etc.)	0.03	0.03	0.00	0.06
4	Office Expenses	0.03	0.03	0.03	0.09
5	Publications	0.05	0.05	0.05	0.15
6	Other Administrative Expenses (Dissemination charges, boat hiring charges etc.)	0.15	0.35	0.35	0.85
7	Supplies & Materials (Data & software purchase, AMC of hardware/software etc.)	0.30	0.20	0.50	1.00
8	Advertising & Publicity (User interaction, awareness & training workshop, outreach programme, publicity materials expense etc.)	0.10	0.10	0.10	0.30
9	Minor Works (Civil & Electrical Work)	0.00	0.00	0.00	0.00
10	Professional Services (Outsourced validation projects, training to in-house forecasting personnel etc.)	1.00	1.00	1.00	3.00
11	Integrated Ocean Information Services (OSF and Tsunami) to IO countries through RIMES	0.15	0.80	0.80	1.75
	Total (Revenue)	2.56	3.91	4.18	10.65
12	Machinery & Equipment (Hardware, Desktops, Laptop, storage, instrument/equipment, peripherals etc.)	0.30	0.30	0.30	0.90
13	Major Works	0.00	0.00	0.00	0.00
14	Total (Capital)	0.30	0.30	0.30	0.90
15	Total (Revenue + capital)	2.86	4.21	4.51	11.55

iv) Marine Fisheries Advisory Services

Budget proposed for the period 2017-2020 (in Crores)

Sl No.	Budget Item	2017-18	2018-19	2019-20	Total
1	Salaries (Existing: 2 Scientists, 4 Sci Assts. + 2 new Scientists & 3 new Sci Asst + 1 Lab Attendent as per 7th CPC)	0.48	1.08	1.25	2.81
2	Domestic Travel Expenses (Including DA, TA)	0.05	0.05	0.05	0.15
3.	Foreign Travel Expenses	0.00	0.00	0.00	0.00
4	Office Expenses (Stationery, Furniture, Meeting expenses etc)	0.10	0.20	0.20	0.50

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5	Publications (Cost towards publications publication in peer review journals)	0.00	0.01	0.01	0.02
6	Other Administrative Expenses (Overhead charges, , Boat hiring, warphase fee, cruise related expenses, port handling charges, dissemination charges, etc)	1.00	2.50	2.50	6.00
7	Supplies & Materials (Communication, calibration, data purchase, data maps and manuals, AMC (for Integrated Dissemination System (IDS)), maintenance of equipment, labware, chemicals, tags and its accessories, etc)	0.75	1.50	1.50	3.75
8	Advertising & Publicity (User interaction and awareness, market survey, outreach programs, publicity materials (brochures, palm plates, short films etc))	0.10	0.10	0.10	0.30
9	Minor Works	0.00	0.00	0.00	0.00
10	Professional Services (Consultancy projects, out sourced projects, training expenses, Integrated Dissemination System (IDS))	1.00	1.00	1.00	3.00
	Total (Recurring)	3.48	6.44	6.61	16.53
11	Machinery & Equipment: Hardware, Desktops, instruments, equipments, laptops, storage, peripherals, software, Hardware for IDS, servers, etc.	1.00	1.00	1.00	3.00
12	Major Works (land acquisition, building construction, etc.)	0.00	0.00	0.00	0.00
13	Total (Non-Recurring)	1.00	1.00	1.00	3.00
14	Total (Revenue + capital)	4.48	7.44	7.61	19.53

v) Multi Hazard Vulnerability Mapping Services

Budget proposed for the period 2017-2020 (in Crores)

Sl No.	Budget Item	2017-18*	2018-19	2019-20	Total
1	Salaries (2 sciC, 2 Ass.)	--	0.36	0.36	0.72
2	Domestic Travel Expenses	--	0.03	0.03	0.06
3	Foreign Travel Expenses	--	0.00	0.00	0.00
4	Office Expenses	--	0.02	0.02	0.04
5	Publications	--	0.02	0.02	0.04
6	Other Administrative Expenses	--	0.30	0.30	0.60
7	Supplies & Materials (Topographic /Satellite Data,	--	5.50	5.55	11.05
8	Advertising & Publicity	--	0.00	0.00	0.00
9	Minor Works	--	0.00	0.00	0.00

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10	Professional Services (3D GIS Mapping)	--	0.00	0.00	0.00
	Total (Revenue)		6.23	6.28	12.51
11	Machinery & Equipment (Hardware/Software)	--	0.20	0.20	0.40
12	Major Works	--	0.00	0.00	0.00
13	Total (Capital)	--	0.20	0.20	0.40
14	Total (Revenue + capital)	--	6.43	6.48	12.91

*Approved budget available from initial sanction (during previous FYPs - DOD/4/6/2005 - TC (part II) dated 3rd march, 2011 and corrigendum dated 17th April, 2014 and corrigendum dated September, 2016) and work will spill over to 2017-18 this is excluded in the current proposal for arriving at the total budget.

vi) Coral Bleaching Alert System

Budget proposed for the period 2017-2020 (in Crores)

Sl No.	Budget Item	2017-18	2018-19	2019-20	Total
1	Salaries (One SciC.)	0.12	0.12	0.12	0.36
2	Domestic Travel Expenses	0.01	0.01	0.01	0.03
3	Foreign Travel Expenses	0.00	0.00	0.00	0.00
4	Office Expenses	0.02	0.02	0.02	0.06
5	Publications	0.01	0.01	0.01	0.03
6	Other Administrative Expenses	0.05	0.05	0.05	0.15
7	Supplies & Materials (RS Data)	0.10	0.10	0.10	0.30
8	Advertising & Publicity	0.00	0.00	0.00	0.00
9	Minor Works	0.00	0.00	0.00	0.00
10	Professional Services (validation)	0.10	0.10	0.10	0.30
	Total (Revenue)	0.41	0.41	0.41	1.23
11	Machinery & Equipment (SW/HW)	0.02	0.02	0.02	0.06
12	Major Works	0.00	0.00	0.00	0.00
	Total (Capital)	0.02	0.02	0.02	0.06
	Total (Revenue + Capital)	0.43	0.43	0.43	1.29

vii) Data Services

Budget proposed for the period 2017-2020 (in Crores)

SNo.		2017-18	2018-19	2019-20	Total
1	Salaries (Existing 4 Scientist, 2 Sci Asst + 4 new Scientists & 2 new Sci Asst as per the 7th CPC.)	0.75	0.80	0.85	2.40
2	Domestic Travel Expenses (Including DA, TA)	0.05	0.05	0.05	0.15
3	Foreign Travel Expenses (Including DA, TA)	0.00	0.00	0.01	0.01
4	Office Expenses (Stationery, Furniture, Meeting expenses etc)	0.02	0.02	0.01	0.05
5	Publications (Cost towards publications publication)	0.01	0.01	0.01	0.03

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	in peer review journals)				
6	Other Administrative Expenses (Overhead charges, Seamen charges, Exercise duty, Boat hiring, warphase fee, cruise related expenses, port handling charges, dissemination charges etc)	0.00	0.00	0.00	0.00
7	Supplies & Materials (Communication (OCM-3 ground station, JPSS), calibration, data purchase, data maps and manuals, AMC (Digital Ocean annual maintenance), maintenance of equipment etc)	1.00	1.00	1.00	3.00
8	Advertising & Publicity (User interaction and awareness, market survey, outreach programs, publicity materials (brochures, palm plates, short films etc))	0.02	0.02	0.02	0.06
9	Minor Works	0.03	0.03	0.03	0.09
10	Professional Services (Consultancy projects, out sourced projects (Digital Ocean Development), training expenses)	1.00	0.25	0.25	1.50
	Total (Revenue)	2.88	2.18	2.23	7.29
11	Machinery & Equipment (Servers for Digital Ocean)	1.00	0.10	0.10	1.20
12	Major Works	0.00	0.00	0.00	0.00
13	Total (Capital)	1.00	0.10	0.10	1.20
	Total (Revenue + capital)	3.88	2.28	2.33	8.49

viii) **Computational Facilities, Web Based Services and Communication Facility**

Budget proposed for the period 2017-2020 (in Crores)

Sl		2017-	2018-	2019-	Total
1	Salaries	1.40	1.60	1.80	4.80
2	Domestic Travel Expenses	0.03	0.03	0.03	0.09
3	Foreign Travel Expenses	0.00	0.00	0.00	0.00
4	Office Expenses	--	--	--	0.00
5	Publications	--	--	--	0.00
6	Other Administrative Expenses	--	--	--	0.00
7	Supplies & Materials (CAMC)	5.00	5.50	6.50	17.00
8	Advertising & Publicity	--	--	--	0.00
9	Minor Works	--	--	--	0.00
10	Professional Service (Training)	0.00	0.00	0.00	0.00
	Total (Revenue)	6.43	7.13	8.33	21.89
11	Machinery & Equipment (Augmentation, Procurement and other new initiatives)	20.0	8.00	7.00	35.00
12	Major Works	--	--	--	0.00
	Total (Capital)	20.00	8.00	7.00	35.00
13	Total (Revenue + capital)	26.43	15.13	15.33	56.89

ix) **Field Stations / Regional Centres**

Budget proposed for the period 2017-2020 (in Crores)

Sl	Budget Item	2017-18	2018-	2019-20	Total
1	Salaries (Scientists – 2 Nos)	0.10	0.22	0.25	0.57
2	Domestic Travel Expenses	0.05	0.10	0.10	0.25

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3	Foreign Travel Expenses	0.00	0.00	0.00	0.00
4	Office Expenses (Stationery, Furniture, Meeting expenses, security, electricity, water and other operational maintenance costs, etc)	0.20	0.05	0.05	0.30
5	Publications	0.01	0.01	0.01	0.03
6	Other Administrative Expenses (Overhead charges, , Boat hiring, warphase fee, cruise related expenses, port handling charges, dissemination charges, etc)	0.05	0.20	0.20	0.45
7	Supplies & Materials (Communication, calibration, data purchase, data maps and manuals, AMC (for Integrated Dissemination System (IDS)), maintenance of equipment, labware, chemicals, tag accessories, etc)	0.04	0.10	0.10	0.24
8	Adverting & Publicity	0.00	0.00	0.00	0.00
9	Minor Works	0.03	0.03	0.03	0.09
10	Professional Service	0.00	0.00	0.00	0.00
	Total (Recurring)	0.48	0.71	0.74	1.93
11	Machinery & Equipment	0.20	0.10	0.00	0.30
12	Major Works	0.00	0.00	0.00	0.00
13	Total (Non-Recurring)	0.20	0.10	0.00	0.30
	Total (Revenue + capital)	0.68	0.81	0.74	2.23

Recurring and Non-recurring as under:

(Amount in Crore)

Budget for the period 2017-2020	Recurring	Non-recurring	Total
Tsunami Early Warning System	20.49	13.16	33.65
Storm Surge Early Warning System	0.80	0.13	0.93
Ocean State Forecast Services	10.65	0.90	11.55
Marine Fisheries Advisory Services	16.53	3.00	19.53
Multi Hazard Vulnerability Mapping Services	12.51	0.40	12.91
Coral Bleaching Alert System	1.23	0.06	1.29
Data Services	7.29	1.20	8.49
Computational Facilities, Web Based Services and Communication Facility	21.89	35.00	56.89
Field Stations	1.93	0.30	2.23
Total	93.32	54.15	147.47

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ANNEXURE - IV

TERMS AND CONDITIONS:

- a) The Principal Investigator (PI) shall be a permanent employee of the research Institutions/ University/ Laboratory/ Organization, and is expected to have sufficient exposure and prior experience in the proposed field. All basic facilities by way of accommodation, infrastructure etc. required for the project shall be provided by at the organization. The Co-investigator (or any other investigator) who is involved in the project and not receiving a salary will be paid out of the funds sanctioned as per Government of India Rules.
- b) Project will be sanctioned for a specific period and the first year grant will be released. The date of commencement of the project will be the date of receipt of cheque by the organization and such date is to be informed to MOES. The subsequent release of funds will be only against the submission of financial statement, progress report in the specified formats which will be supplied alongwith administrative approval of the project. Accounts should be maintained in a separate Register in the 'FORM' GFR-19 by controlling authority. This account shall be subjected to the audit and the report should be submitted periodically. If it is found expedient to keep a part or whole of the grant in bank account earning interest, the interest thus yielded should be reported to the MOES. This will be treated as credit to the Institution / University / Organization and will be adjusted in the subsequent releases of the grant. The final audited statement of accounts pertaining to the grant will be submitted within 3 months of the termination/completion of the project. And the audited accounts shall be submitted and the unspent balance if any shall be remitted to D.D.O, MOES. The Comptroller and Auditor General of India at his discretion shall have the right to access the books and audits of the Institution / University / Organization for the grants received from MOES.
- c) Allocation of funds for various budgetary items as specified in the Administrative approval shall be adhered strictly. Any deviation either in spending the money from the sanctioned amount for each head or after the lapse of time should be spent only after obtaining the Ministry's approval. No amount can be transferred from one head to other head without the prior permission of the Ministry.
- d) The Institution / University / Organization is not permitted to seek or utilize funds from any other organization (Government / Semi-Government / Autonomous or Private) for the same project.
- e) Research Associates / Fellows and Technical Supporting Staff, .e.g. Technician, Instrumentation Mechanics, etc. can be appointed as per guidelines stated earlier. The payment can be either on monthly basis or as lump sum. However, the PI shall engage the project of staff who are recommended by a duly constituted Appointment committee for this project, as per the Institution rules. Recruitment and payments to research staff shall be as per the guidelines provided for manpower recruitment in Annexure 1. In programme where there is a need to engage research personnel at a level higher than RF/RAS, and such need has to be accepted by the funding agency and the remuneration for such personnel may be fixed as indicated in para 2.5 of this order.. Project staff appointed under this project will be governed by Institution rules for purpose of administrative control and service rules. Staff, if any sanctioned for the project should be recruited within ninety days of issue of sanction order. The project staff shall not to be treated as employees of the MOES. The deployment of such staff after the completion/ termination of the project is not the concern / responsibility of the MOES.
- f) The PI shall submit 3 copies of the report of the progress of the project by second week of April of every year during the entire duration of the project.
- g) Cost for ship time for collection of samples from sea etc and any other expenditure which is considered appropriate depending upon the requirements of a specific purpose may be included under other costs. Proper justification shall be given for each item.
- h) Internal Travel can be included for participation in scientific conferences / symposia / work shops etc connected with the project.

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- i) The equipment not available in the nearby and expendable items to laboratory supplies, and cost of computer time etc., may be proposed. However, equipment should be ordered within ninety days.
- j) For permanent/semi permanent assets acquired solely or mainly out of the grant including books and furniture, etc., an audited record in the form of a register in the prescribed proforma (which will be supplied at the time of the approval of the project) shall be maintained by the Institution / University / Organization for the record purpose. The term Asset means (i) Immovable property or (ii) Movable Property of a capital nature where the value exceeds `10,000/-.
- k) All the assets including equipment, prototype acquired or fabricated out of project funds etc, will be property of the (MOES). They will remain with the Institution / University / Organization concerned unless or otherwise directed by the MOES. These should not be disposed off or encumbered or utilized for any purpose other than those for which the grant is sanctioned during the project period.
- l) At the conclusion of the Project, MOES will decide about the assets acquired under the project funding. (MOES has the discretion to give the assets to the Institution if it considers it appropriate. The money generated out of Sale proceeds, of assents of MOES if any, shall be remitted to the Government of India account). However, the Institution / University / Organization shall render necessary facilities for arranging the sale of assets or transfer them to other places as per the desires of this Ministry.
- m) The papers coming out of this research work for publication (any thing) shall be routed through Ministry for clearance. Published papers in triplicate shall be forwarded to the Ministry immediately after their release.
- n) The Institution / University / Organization shall submit all drawings pertaining to the products of the project at any time as desired by MOES. The know-how generated either from the project or the receipts by way of sale of know-how, royalty, etc. will be property of MOES. The MOES may, at its discretion allow a portion of such receipts to be retained by the organization. However, sale of know-how, collection and settling the rate of royalty etc. would be decided by the MOES.
- o) In case of change of PI to whom the project is sanctioned the PI shall submit an upto date status report of the project and accounts and shall hand over the same to the 1st co-investigator who will become PI (unless wages being paid from MOES funds or otherwise) after obtaining the necessary permission from the organization as well as from MOES.
- p) In case where the organization is unable to execute or complete the work, the entire amount received in the form of a grant shall be returned to MOES alongwith panel interest. In such case the organization shall not entrust this work to any other Institution / University / Organizations / centers for implementation.
- q) The Ministry shall terminate the grant at any stage if convinced either grant of the project is not being properly utilized or work is not progressing according to the milestones.
- r) The organization will furnish 10 copies of a detailed report on the outcome of the project to the MOES as per the enclosed proforma within the sanctioned period.
- s) In cases where there is violation of any of these conditions for the grant, closure or dissolution of the organization, the MOES shall take possession of all the assets of the organization, and use them in any manner deemed appropriate or to recover from the organization, to an extent the total value of the Project including paid interest.

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