

Minutes of the Standing Committee of NMEICT, held on 16 March 2013

Participants:

SC Members:

1. Kannan Moudgalya
2. Pradeep Varma
3. Y. N. Singh
4. S. B. Deshpande
5. D. K. Singh
6. Jayashree Shinde
7. S. K. Singh
8. C. P. Srivastava
9. C. G. Mahajan
10. Karmeshu
11. Deepak Singh
12. H. C. Chaudhuri

1. Mobile IT vans  
 PI: Fr. Joby Joseph  
 Inst: IIT Rajasthan  
 Control No.: FMI 7081112126

In the last five years, they were bridging digital divide, reaching out. 10 villages covered. Students per batch 40-50nos. Instructors per batch 15-20/batch.

Want a bus, capital cost is Rs. 60 lakh. Recurring expenses for 5 years - Rs. 20 lakh. Bridging digital divide is the main objective of this project.

It will benefit a total of 4batches x 30 students per year x 12 months = 1440 x 5 = approx. 7,500 students. This is expensive for the number of people to be trained. Some members pointed out that the buses bought by IIT Roorkee can be transferred.

The deliverables are not clearly defined - bridging digital divide means different things to different people. The target audience is not clearly defined. Also, cost is not reasonable - Rs. 5 lakh salary for 5 years is not at all reasonable. We do not want the buses to idle at shillong.

The PI is asked to clearly define the target beneficiary and the deliverables and to come back to the SC again.

2. Virtual Labs  
 PI: Ranjan Bose  
 Inst: IIT Delhi  
 Control No.:

Request for an extension of pilot phase and the main phase with no additional funds. Extension for the new remote triggered labs till March 2014.

Release of the 3rd installment for new remote triggered labs. 80 labs promised vs. 115 labs completed. A total of 115 labs with 1071 experiments. Total number of nodal centres 67 - a nodal centre is a college that uses the virtual labs. 76,000 students have submitted feedback on the use of virtual labs. Students are using the lab from

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7am to 11pm, with substantial number. PRSG has recommended

Honorarium is to be given after discipline level expert committees review and agree that a virtual lab is effectively used by students.

Release of Rs. 6.8 crore awaited. Details have already been submitted to MHRD.

The Standing Committee recommends an extension for a period of one year, until 31 March 2014, for all components of Virtual Labs. The SC recommends the release of the next installment of the new remote triggered lab component of virtual labs.

3. Title: E-Resources for Geoinformatics applications, education and training

Control No. HE-11081011220

PIs: Prof. Mrs. P. Venkatachalam, G. Venkataraman, B. Krishna Mohan, Surya Durbha

Institution: IIT Bombay

Objectives:

- creation of multilayer, multiscale and multitheme geospatial databases
- creation of geospatial applications demonstrating use in planning, disaster mitigation, natural resource management, environmental planning and assessment.
- creation of e-content for geoinformatics education and training.

A total of 12 institutions are participating in this project, with IIT Bombay as the coordinator. The duration of the project is 30 months, with a financial outlay of Rs. 2.502 crore.

The SC went through the ten points in detail. There was a detailed discussion on the topic of purchase of data. The SC agrees that the purchase as proposed is reasonable.

The SC has already recommended this project. The SC recommends the ten point appraisal.

4. Title: e-kalpa, creating digital learning environment for design in India

Control no. POO 0600910120

PIs: Prof. Ravi Mokashi Punekar (IITG), Dr. Baral (NID, Bangalore), Prof. Ravi Poovaiah (IITB).

www.dsource.in is the website of this project.

The following are the deliverables:

- a. 60 design courses
- b. 60 resource documentation of fine examples of design, crafts and arts + workshops with experts
- c. 35 video lectures of eminent designers and case studies
- d. 95 case studies of good design projects by professions and students
- e. 250 documentation of design process and examples of design from around the country

PRSG has given a positive recommendation of this project. PRSG suggests that this project continue the good work that has already been done.

848 lakh is sanctioned.

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450 lakh is released so far  
The balance funds of Rs. 398 lakh has to be released.

The SC recommends the release of the balance funds of Rs. 398 lakh.  
The SC also recommends that the project be extended by 12 months.

5. Title: Adoption of Free and Open Source Software in Science and Engineering Education (FOSSEE)  
PI: Prabhu Ramachandran, Madhu Belur, Mani Bhushan, Kannan Moudgalya  
Institution: IIT Bombay  
Control No.: me-20021010551

As Prof. Kannan Moudgalya is a Co-PI of this project, he recused himself from the deliberations.

The SC, in a meeting held on 4 Dec. 2010, recommended a sum of Rs. 318.5 lakh and this was approved in the 18th Meeting of the PAB held on 24 Jan. 2011. Until now, Rs. 145 lakh has been released against the approved funds. The current proposal is for the release of balance funds of Rs. 173.5 lakh.

In the current presentation, the PIs proposed to extend their activities to five new open source software systems: COIN-OR, OSCAD, OpenFOAM, Open-CL and OpenFormal. This is in line with PAB's directive that the FOSSEE team covered more software systems and to replace them with appropriate open source software systems.

The FOSSEE team organised two PRSG meetings. The PRSG is satisfied with the progress made by the FOSSEE team. The PRSG has recommended the release of the balance funds of Rs. 173.5 lakh.

The SC is happy with the progress made by the FOSSEE team. It recommends the release of the balance funds of Rs. 173.5 lakh. It also recommends an extension of this project by one year, namely, until 31 March 2014.

6. Title: e-content generation and e-skill test in specialised areas of information technology  
PI: V. K. Sharma, Lakshmi Kalyani  
Control No.: Ve-25110910429  
Institution: CDAC Noida

The PIs were to develop 26 courses in the areas where CDAC functions. They developed a portal, elearn-mhrd.cdacnoida.in Followed a review process. Came up with a four quadrant model. 13 courses have been released to the public. The balance courses are in progress. They have held 13 PRSG meetings.

Out of 182 lakh sanctioned, Rs. 54 lakh (30%) has been released. The current presentation is for the release of the balance funds of Rs. 128 lakhs. The PIs also want an extension of six months from 1 April 2013.

The SC recommends the release of the balance funds of Rs. 128 lakh.  
The SC also recommends an extension of six months from 1 April 2013.

7. Title: e-Content Development  
Institution: CEC

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Kannan Moudgalya  
Prabhu Ramachandran  
Madhu Belur  
Mani Bhushan  
Control No.: me-20021010551  
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They were to develop e-content for 19 subjects. Out Rs. 18.5 crore sanctioned, Rs. 12 crore has been received. The current presentation is for the release of balance funds. They have not had a PRSG meeting yet. The SC asks the PI to convene their PRSG meeting at the earliest and to come back to the SC again.

8. Title: e-Yantra  
PI: Prof. Kavi Arya  
Control No.: KR 13200 99887  
Institution: IIT Bombay

Prof. Kavi Arya wanted an extension of one year from 1 April 2013. The SC recommends this extension.

Prof. Kavi Arya wanted to present his proposal for Phase II - this has been recommended by their PRSG. The SC recommends that they be invited to present their Phase II proposal in the next SC meeting.

9. Extension of all NMEICT projects

The SC recommends that all NMEICT projects that have shown good progress in their project be given an extension of one year.

10. As there were no representatives from UGC or NPTEL, their presentations could not be heard.

11. Utilisation Certificates:

The SC finds the utilisation certificates in the Annexure to be in order. It is, however, not possible for the SC to verify each and every transaction and to report whether right price is paid for each item. This should be the responsibility of the institution where the project is carried out.

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Assessment of Utilization Certificate.		
1	The Village Community Network: Technology Development and Pilot Roll out Plan for Low Cost Opportunistic Communication Networks for Rural Areas of India, IIT Rajasthan.	Utilization Certificate for the years 2010-11 and 2011-12.
2	Development of Analysis and Indexing Tools for Harnessing Educational Videos, IIT Rajasthan	Provisional Utilization Certificate for the period 15.3.2011 to 4.12.2012.
3	Creating Accessible study material for print impaired students, Indian Institute of Technology, Kharagpur	Utilization Certificate for the years 2010-11 and 2011-12.
4	Virtual Labs, IIT, Delhi	Utilization Certificate for period: <ul style="list-style-type: none"> <li>• 2009-12 (ending 31.3.2012) - Rs. 22,00,00,000/-.</li> <li>• 2010-2011 – Rs.56,00,00,000/-.</li> <li>• 2011-12 – previous year part amount Rs.1,62,18,202/-.</li> <li>• 1.4.2012 to 15.12.2012- Rs.24,00,00,000/-.</li> </ul>
5	Organizing Workshop, IIT, Delhi	Utilization Certificate for the year 2009-10 (Rs.2,00,000/-).
6	Up-gradation of ICT-enabled high voltage laboratory NIT, Durgapur- development of 1 experiment out of 7 in collaboration with IIT, Delhi, IIT Delhi	Utilization Certificate for the year 2009-10 (Rs.7,00,000/-).
7	Pilot Project pertaining to content generation for e-learning on open source VLSI and embedded systems tools, IIT Delhi	Utilization Certificate for the year 2009-10 (Rs.7,00,000/-).
8	Next Generation e-content for Numerical Methods and its applications, NIT, Patna.	Utilization Certificate for the year 2010-11 and 2011-12.
9	Development of Vocational Educational Modules and use of Haptic Devices: Virtual Laboratory in VLSI and embedded systems, IIT Delhi.	Utilization Certificate for the year 2009-10 (Rs.1,00,00,000/-).
10	INDEST-AICTE Consortium, IIT Delhi	Utilization Certificate for the year 2010-11 and 2011-12 [upto 27.3.2012) Rs.40,11,50,000/-].
11	Development of Low Cost Mobile Robots-Robotics for Education, IIT Rajasthan	Utilization Certificate for the period 15.3.2011 to 30.6.2012.
12	Learning-by-Doing (LBD)-based course content development, IIIT, Hyderabad.	Utilization Certificate for the period 3.3.2010 to 31.3.2010 (2009-10) and 3.3.2010 to 2.3.2011(2010-11).
13	Workshop organized by Indian Institute of Science	Utilization Certificate for the period 2009-10.
14	Production Management Systems, NIT Calicut, Kerala.	Utilization Certificate for the period 2009-10.
15	Establishing e-training environment for training technical teachers and students (creation of 4 courses) National Institute of Technical Teachers Training and Research, Chennai	Utilization Certificate for the year 2010-11 and 2011-12 and 2012-13 (upto Dec, 2012).
16	Development of Higher Education (Centrally Sponsored Plan Scheme of NMEICT) University Grants Commission, New Delhi	Utilization Certificate for the year 2011-12.
17	Development of e-content on ancient Indian metallurgy and modern process metallurgy. Indian Institute of Technology (BHU), Department of Metallurgical Engineering, Varanasi	Utilization Certificate for the year 2011-12.

Ten Point

## Appraisal by the Standing Committee

**Name of the Project** E-Resource for Geoinformatics Applications, Education and Training

**Control No.:** HE-11081011220  
(As uploaded on the sakshat portal)

**Name of the Institute(s):** INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

**Name of PI(s):** Prof. (Mrs.) P. Venkatachalam, Head, CSRE

**Name of CO-PIs:** Prof. G.Venkataraman, Prof.B. Krishna Mohan, and Prof. Surya.S. Durbha, CSRE

**E-mail ID of PIs/Co-PIs):** pvenk@csre.iitb.ac.in, gv@iitb.ac.in, bkmohan@csre.iitb.ac.in, sdurbha@iitb.ac.in  
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Fax:022-25723190 (Fax)  
Mobile: 98201 12043

**Participating Institutions:**

- National Institute of Rural Development, Hyderabad
- Indian Institute of Technology, Kanpur
- Indian Institute of Technology, Roorkee
- Indian Institute of Geomagnetism, Mumbai
- Maharashtra Engineering Research Institute, Nashik
- National Institute of Oceanography, Mumbai
- Central Institute of Fisheries Education, Mumbai
- SGS Institute of Technology, Indore
- Bundelkhand Institute of Engineering and Technology, Janshi, UP
- State Institute of Rural Development, Guwahati
- Snow and Avalanche Study Establishment, Chandigarh

**1. Objectives**

- Creation of multilayer, multiscale and multitheme geospatial databases
- Creation of geospatial applications demonstrating use in planning, disaster mitigation, natural resource management, environmental planning and assessment
- Creation of e-content for geoinformatics education and training

**2. Deliverables**

(Please give milestones with timelines linking with payments)

**Deliverables (Please give milestones with timelines linking with payments)**

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The deliverables can broadly be grouped under three categories:

- Geospatial benchmark databases
- Application modules
- **E-Learning Suite** for geospatial technologies

The details for the above are given below:

- Spatial databases covering a multitude of themes, at various spatial scales, organized in multiple layers that cover from macro-level to micro-level applications
- Applications will be demonstrated using free open source software that end users can download
- Primary focus for the usage of benchmarked spatial database is Undergraduate and postgraduate students of Geoinformatics in various engineering colleges across the country.
- Spatial databases can also be used by planners, decision makers and trainers for their application/algorithmic specific demonstrations, as well as for capacity building.
- Sample models for applications illustrating utility of geospatial technologies and databases for selected real life scenarios
- Documented case studies and teaching materials for geospatial technology applications
- **E-Learning Suite** for training in the area of geospatial technology tools and techniques as well as selected application areas.
- Broad areas for tools and techniques include
  - Remote Sensing
  - Satellite Image Processing
  - Geographic Information Systems
  - Global Positioning Systems

**Budget for Stage1 (6 months)**

Heads	Stage 1 (Rs)
Satellite Data Products	2400000
Hardware and Software	3750000
Manpower	3014000
Travel	500000
Consumables/Contingency	250000
Honorarium	-
<b>Total budget</b>	<b>9914000</b>

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**Stage-1 deliverables**

- Derived datasets from satellite imagery for one block will be ready
- Selected thematic datasets will be ready for selected study areas
- **E-Learning Content (that will be available at the end of six months)**
- E- content for Geospatial tools and techniques (Stage 1)
- Remote Sensing
- GIS
- Satellite Image Processing
- E-content Applications (Stage 1)
- Rural Development
- Snow Avalanche / Landslides Hazards
- Urban Infrastructure
- Terrain Evaluation
- Coastal and Marine Environment
  - Lecture notes of about 7-8 pages per lecture, and about 35-40 lectures per subject.
  - Informative lecture slides, about 25-35 per lecture, Question papers and model answers hands on exercises will be ready in Stage 2.
  - The content will also be refined in Stage 2 depending on the user feedback.
  - Six-monthly progress report, Presentation at meetings / conferences

**Budget (Stage 2)**

Heads	Stage 2
	Rs.
Satellite Data Products	1600000
Hardware and Software	1800000
Manpower	3878000
Travel	800000
Consumables/Contingency	1000000
Honorarium*	1500000
<b>Total budget</b>	<b>10578000</b>

\* Honorarium for the participating 10 institutions (excluding IIT Bombay)

**Stage-2 Deliverables**

**E-Learning Content that will be available at the end of Stage 2:**

- **E-content for Geospatial tools and techniques:**
  - Hyperspectral Satellite Image Analysis

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- o Global Positioning systems
- o LIDAR
- o Microwave remote sensing
- o **E-content for Geospatial Applications**
- o Watershed Management
- o Command Area Development
- o Agro-informatics
- o Mineral Potential Mapping
- o Drought and Desertification
- o Atmospheric Studies
- o Hilly Area Development

- Lecture notes of about 7-8 pages per lecture, and about 35-40 lectures per subject.
- Informative lecture slides, about 25-35 per lecture, Question papers and model answers
- Preliminary demo of E-Learning Suite functionality
- Progress reports, Presentation at meetings / conferences
- Training for selected teachers from various colleges
- Workshop with participating Institutes, publications in reputed educational journals

**Budget (Stage 3)**

Heads	Stage 3 Rs.
Satellite Data Products	NIL
Hardware and Software	NIL
Manpower	2028000
Travel	500000
Consumables/Contingency	500000
Honorarium*	1500000
<b>Total budget</b>	<b>4528000</b>

\* Honorarium for IITB faculty

**Stage 3 Deliverables**

- E-Learning Suite that consists of theory, hands on exercises, demo applications, and data sets for Geoinformatics education and training.
- Creation of multilayer, multi-scale and multi-theme geospatial databases
- Documented application modules

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- Training for selected teachers and other stakeholders from various institutions
- Hosting the full E-Learning suites and other resources on open access server(s)

3. Recommendation

(i) Arrangement for quality control

While creating spatial databases suitable scales would be adopted as required for applications. The e-content would be reviewed by faculty members of the Institute and other research students. Care will be taken similar to the case of spatial database generation during evaluating applications.

(ii) Accuracy

Accuracy will be limited by the capabilities of the instruments like GPS receivers and resolution of satellite imagery and other maps that may be collated from various national agencies. The maps prepared under the project will have the best possible accuracy subject to the above limitations.

(iii) Coverage

The coverage of the e-content will be exhaustive, suitable for semester long courses on a wide range of geoinformatics tools and techniques and their applications.

(iv) Updation mechanism

This has to be taken up as a future project.

(v) Testing by users

Students of IIT Bombay as well as other universities/colleges will be exposed to the content generated during the course of the project and their feedback will be utilized during finalization of the materials developed. In addition, selected users from government/ R&D institutions will also be involved for testing purposes.

4. Scaling up

a) Plan

The field of geospatial technology applications, database creation and educational content development can be very exhaustive running into several years. After the present project, in the next Stage the databases can be generated covering much larger areas, more applications covering all the agro-climatic regions and all the advances in geospatial technologies can be added to the instructional materials.

We can also work towards evolving a national Geoinformatics Core Curriculum involving all the national bodies such as IITs, representatives of UGC, ISRO, DST and others. This will help standardize the educational programmes in the country where there is considerable non-uniformity among different universities and colleges.

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- A signature in the middle-left.
- A signature in the middle.
- A signature in the middle-right.
- A signature in the bottom-right.
- A circled number '10' in the bottom-right corner.

## b) Strategy

- (i) **In-house** :-Future projects will be proposed to update spatial databases, as well as e-content
- (ii) **Out sourcing** :-Other organizations will be encouraged to contribute to the content by submitting independent proposals to NMEICT and their deliverables can be integrated at IIT Bombay into the content developed here.

## 5. Popularizing and extension activities and plans.

### a. Strategy for popularization :-

We propose to conduct several training programmes towards the end of this project to create awareness among potential endusers, from government, academic and research organizations and NGO's. We also propose to conduct one-day road shows at other institutions as well to popularize this development and better dissemination of the resource created.

### b. Extension activities and plans

- Maintenance mechanism

During the course of the project the materials developed will be shared with selected universities/colleges across the country and their feedback will be utilized in revising/refining the same.

- User feedback mechanism, its execution procedure and corrective measures.
  - (i) Regular meetings with selected user groups
  - (ii) Collection of feedback through email
  - (iii) Analysis of the feedback and preparation of action plans necessary for revising the content, as needed.

## 6. Review Mechanism

- **Frequency of review**

The entire project duration proposed is 30 months. The reviews can be held every six months.

- **List at least 10 Reviewers, who are eminent in fields of the projects :-**

1. Prof. V. Jayaraman, Prof. Satish Dhawan Professor, ISRO HQ. Bangalore

2. Prof. R.R. Navalgund, Prof. Vikram Sarabhai Distinguished Professor, ISRO HQ. Bangalore

3. Director, Indian Space Science and Technology (IIST),

Thiruvananthapuram (or his/her representative)

4. Director, Indian National Centre for Ocean Information Services (INCOIS), Hyderabad

5. Vice Chancellor, Gandhigram Rural University, Tamil Nadu (or his representative)

6. Director, Maharashtra Regional Space Applications Centre (MRSAC), Nagpur (or his/her representative)

7. Prof. P. Nag, Vice-Chancellor, Mahatma Gandhi Kashi Vidya Peeth, Varanasi (or his representative)

8. Prof. B. S. Prakasa Rao, Emeritus Professor, Department of Geo-Engineering, Andhra University, Visakhapatnam – 530 003

9. Director, Defence Terrain Research Lab (DRDO), New Delhi (or his/her representative)

10. Director, Centre for Artificial Intelligence and Robotics (DRDO), Bangalore (or his/her representative)

7. Budget

a. Capital Expenditure

i) Details to be captured item-wise

High end image processing and GIS workstations (4) for IIT Bombay	1000000	Process multi-resolution imagery and map data to generate benchmark datasets.
*Spectroradiometer for IIT Bombay	1200000	Collect field spectra for various terrain materials
*GPS receivers (2) for IIT Bombay	600000	Collect ground control points for georeferencing and validating various applications
LIDAR processing software	400000	Specialized software for IIT Kanpur
Hyperspectral data processing software	400000	Specialized software for IIT Roorkee
Software and hardware for spatial data processing	150000	Assets for Bundelkhand Institute of Engineering and

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INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

8. **Cost benefit analysis including cost effectiveness approach viz-a-viz other alternatives.**

Geospatial technology refers to technology used for visualization, measurement, and analysis of features or phenomena that occur on the earth. Application of geospatial technology is widespread, ranging from resources management to environmental monitoring, defence, planning, business and industry. This is an interdisciplinary field, overlapping computer science, mathematics, physics, civil engineering, earth sciences, forestry, agriculture and soil sciences, geomatics, and so on. While many universities offer education in geospatial technology in a piecemeal manner, like a course in remote sensing and GIS, or one in cartography, a comprehensive coverage of all the key elements of this technology is needed at most educational institutions. • High quality content that can be used nation-wide • Royalty-free spatial datasets usable by all educational institutions • Rich collection of applications • We may be able to set a standard like GEOSPATIAL TECHNOLOGY CORE CURRICULUM 2011-12 that may be adopted in India and elsewhere

9. **Social impact**

This is expected to significantly improve the education and research in geospatial technology and applications. Further, well trained students will be an asset for the industry that is rapidly expanding in the country.

10. **Outcome – Extent to which the project will realize the objectives of the Mission may be given explicitly.**

The project is about development of spatial databases for geoinformatics applications, demonstrable applications built around the databases, and e-content generation for geoinformatics tools, techniques and applications, for the benefit of administrators and decision makers, personnel in government line departments, NGO's, research institutes, teachers and students at undergraduate and postgraduate levels. To that extent, this project fully meets the objectives of the NMEICT under e-content generation scheme.

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Appendix I

Contact addresses of host and partner institutions

1. Prof. (Mrs.) P. Venkatachalam

Head, CSRE

IIT Bombay

Powai, Mumbai – 400076

Email: pvenk@iitb.ac.in

Contact Number: 9820112043

2. Prof. G. Venkataraman

CSRE, IIT Bombay

Powai, Mumbai – 400076

Email: gv@iitb.ac.in

Contact Number: 9920118686

3. Prof. B. Krishna Mohan

CSRE, IIT Bombay

Powai, Mumbai – 400076

Email: bkmohan@iitb.ac.in

Contact Number: 9820493406

4. Prof. Surya S. Durbha

CSRE, IIT Bombay

Powai, Mumbai – 400076

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Tel: 022-25767661;

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List of Collaborators

1. Prof. V Madhava Rao,

Head(C-GARD) & Prof & Head(CIT) I/C,

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4. Dr. Snehmani

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6 Dr. V.S. Naidu

Scientist E

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7. Dr. R.S.Biradar

Principal Scientist & Head

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9. Prof. Manoj Arora

Professor and Associate Dean (Academic Programmes)

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K. S. Ranga

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Ten point Appraisal by the Standing Committee

Name of Project:

Creating Digital Learning Environment for Design in India ('e-kalpa')

Control Number: POO06060910120

Name of Participating Institutions:

- 1. Industrial Design Centre, (IDC IIT Bombay), Indian Institute of Technology, Bombay
- 2. National Institute of Design, Ahmedabad, Bangalore (NID Ahmedabad)
- 3. Department of Design (DOD Guwahati), Indian Institute of Technology, Guwahati

Name of PI(s) and Co-PI's of the project:

1. Ravi Poovaiah, Professor, IDC, IIT Bombay,

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E-mail : ravi@iitb.ac.in

2. Dr. B. Baral, Head, Research, R & D Campus, National Institute of Design,

#12 HMT Link Road, Off Tumkur Road, Bangalore 560 022,

Mobile: 096322 42474, Phone: (080) 2357 9054, Fax: (080) 23373086,

E-mail : bibhudutta@nid.edu

3. Ravi Mokashi-Punekar, Professor and Past HOD, DOD, IIT Guwahati,

Mobile: 09954029136, Phone: (0361) 2582500, 2582451, Fax: (0361) 2690762,

E-mail : [mokashi@iitg.ernet.in](mailto:mokashi@iitg.ernet.in)

for  
Budget

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G. Srinivasan

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1. Objectives

The overall objective is the creation and development of new learning environments related to design that will provide greater access and enhancement to acquisition of critical knowledge, skills, and abilities for economic and social development in our country.

The proposal would focus on knowledge accumulation, storing and dissemination and education in four sectors - university, industry, government and the informal sector.

The four main focus areas undertaken under 'e-kalpa'

'e-kalpa' Focus Areas	Achievements so far:
1. Digital online content for learning Design with distance e-Learning programs on Design	Setting up of the web space 'Dsource.in' for access to content along with studio with equipment and support staff at each of the partner Institutes
2. Social networking for Higher Learning with collaborative Learning Space for Design for Synchronous and Asynchronous Interaction	Experimenting with the web space 'Dsquare.in' for access to content along with studio and support staff at each of the partner Institutes
3. Digital Design Resource Database including the craft sector	Documentation of resources in terms of process, methodology, case studios to create content undertaken at the partner Institutes
4. Design inputs for products of National Mission in Education through ICT	Support is being to other initiatives of NMICT - suggestions for websites, logo, naming, etc.

2. Deliverables

a) December 2012 is the date for completion of this stage of the project - we have already met the committed targets.

	Expected Deliverables for the Project	Completed till now
a. Design Courses	60 Courses	60 Courses
b. Resource documentation of fine examples of Design, crafts and arts + Workshops with Experts	60 topics	120 topics
c. Video Lectures of eminent designers and	35 lectures	35 lectures

Kand Budge

case studies		
d. Case Studies of good design projects by professions and students	90 topics	90 topics
e. Documentation of design process and examples of design from around the country each in 12 images x12 words	250 topics	300 topics

b) Studio set-ups:

Topic	IITBombay	NID Ahmedabad	IIT Guwahati
<b>Computer Equipment:</b> 10 Macs + 1 laptop 10 pc's	Done	Done	Done
<b>Video Equipment:</b> 3 cameras + 1 recorder 3 cameras + optical disk	Done	Done	Done
<b>Project staff:</b> 2 web developers + 4 content writers + 3 videographers + 3 designers + 5 office support + 2	Done	Done	Done
<b>Lab setup:</b> Space and furniture in place	Done	Done	Done
<b>Webspace:</b> Booking of web space and content creation	Done	Done	Done

3. Recommendations

The courseware was uploaded on a web site [www.dsource.in](http://www.dsource.in) to make it accessible to the target audience. All the resource learning material mentioned under 1 are available under this web site.

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4. Scaling Up

It is proposed to develop additional courseware during the period January 2013 to March 2014 by the partnering institutions. We shall be able to deliver this by March 2014.

	Additional Deliverables by March end 2014
a. Design Courses	40 Courses
b. Resource documentation of fine examples of Design, crafts and arts + Workshops with Experts	60 topics
c. Video Lectures of eminent designers and case studies	40 lectures
d. Case Studies of good design projects by professions and students	60 topics
e. Documentation of design process and examples of design from around the country each in 12 images x12 words	200 topics

5. Popularizing and Extension Activities and plans

The website www.dsourc.in was launched 14 months ago in December 2011. The different courseware and resource material uploaded on his site has gained much popularity. Details of the same are indicated below:

- 12.0 gb of content uploaded
- 8000 page views per day
- 240,000 page views per month
- 30% return viewers
- spends an average of 10 minutes
- 1100 facebook fans

*In addition a poster will be put up on facebook to popularize the site.*

6. Review Mechanism

PSRG was undertaken during the month of September 2012 (detailed report attached in Annexure 1) and their recommendations were the following:

1. The project has great potentials and the effort done till now needs to be

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continued with scalable options both in terms of content creation as well as dissemination.

- 2. Think of strategies to develop a system for outsourcing some parts of the project so that the output can be scaled up.
- 3. As mentioned before it is recommended that this project be scaled up so that more content can be made available. **Additional funds should be made available for this.**

**7. Budget**

The anchor institution which received the funding is Indian Institute of Technology Bombay

Details of grants received are given below:

Grants received in April 2010 - pilot project: 150 lakhs  
 Main Project sanctioned in 4<sup>th</sup> December 2010 for Rs 848 lakhs

Details of Funds received from MHRD:

Overall Project Approved: 848 lakhs  
 Grants received in May 2011 - 1<sup>st</sup> installment: 250 lakhs  
 Grants received in March 2012 - 2<sup>nd</sup> Installment 200 lakhs  
 Total grants received under main project: 450 lakhs

**8. Expenditure:**

Details of the expenditure are given below:

The fund position as of now:

Total amount spent: 399 lakhs  
 Funds committed to salaries and equipment: 40 lakhs  
 Remaining funds: 11 lakhs

It is requested that funds for the year 2013-2014:  $848 - 450 = 398$  lakhs (848 approved - 450 received = 398 lakhs) may be released for the duration to complete the planned deliverables for the project.

**9. Breakup:**

1. Consumables: 30 lakhs  
 2. Manpower: 250 lakhs  
 3. Faculty Inputs 50 lakhs  
 4. Travelling expenses 20 lakhs  
**Equipment:**  
 5. Media Production (video) 18 lakhs  
 6. Computers 20 lakhs  
 7. Digital Storage 5 lakhs  
 8. AC . etc. 5 lakhs  
**Total: 398 lakhs**

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G. Prasad

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K. S. Murthy

10. Social Impact

The design resource generated is very rich in visual content. It has both videos and images supporting the explanatory text making it very self-explanatory and accessible to both the educational institution and a very vast sector of the informal sectors, NGO's who can access the material for training and skill up gradation. The spread and reach is very vast and can influence various sectors of our talented pool of resource across the length and breadth of the country. The resource is "India' centric celebrating Design in India like never before.

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G. Srinivasan

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Ten Point Appraisal

Assimilation of Open Source Software in Science and Engineering Education

Prof. Prabhu Ramachandran  
Department of Aerospace Engineering  
and  
Prof. Mani Bhushan  
Department of Chemical Engineering  
and  
Prof. Madhu Belur  
Department of Electrical Engineering  
and  
Prof. Kannan M. Moudgalya  
Department of Chemical Engineering

March 16, 2013

Control number: me-20021010551

**Budget Approved:** The SC, in a meeting held on 4 Dec. 2010, recommended a sum of Rs. 318.5 lakh and this was approved in the 18th Meeting of the PAB held on 24 Jan. 2011.

**Funds Released and Utilised:** Rs. 145 lakh only has been released against the funds approved as above. All the funds have been utilised, leaving behind a balance of less than Rs. 1 lakh.

**Proposed budget for this proposal:** For the release of the balance of Rs. 173.5 lakh (=318.5-145) from the already approved amount.

1 Objectives

The overall aim of the project is to facilitate the absorption of existing free open source software (FOSS) alternatives to commercial packages such as Matlab, ORCAD etc. in science and engineering education across the country.

We are seeking for a one year extension and release of the remaining funding of Rs. 173.5 lakhs.

There are two components to this proposal:

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Kannan Moudgalya  
1  
G. Srinivasan  
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1. To continue the work on Scilab and Python, and to build up on the foundation laid in the previous years,
2. To extend successful initiatives of FOSSEE to other FOSS areas:
  - (a) To work on COIN-OR, for optimisation problems that arise in operations research, and an open source alternative to CPLEX.
  - (b) To work on OSCAD, an open source alternative to OrCAD, for electronic circuit designers.
  - (c) To work on OpenFOAM, for computational fluid dynamics, and an open source alternative to Fluent and StarCD.
  - (d) To work on OpenCL, an open framework for writing parallel programs on heterogeneous platforms, such as multi-core processors, GPUs and DSPs. Currently available software implementations require the use of the NVIDIA hardware platform.
  - (e) To develop and support OpenFormal, an open source suite of formal software verification tools. This is of great interest to researchers in sectors such as defense and ISRO, and also to the computer science postgraduate programmes.

In order to implement the second component we are introducing 4 new PIs who are experts in the respective projects:

- Prof. Shivasubramanian Gopalakrishnan (Mechanical), OpenFOAM, OpenCL.
- Prof. Ashutosh Mahajan (IE&OR), COIN-OR.
- Prof. Jayendran Venkateswaran (IE&OR), SimPy.
- Prof. Supratik Chakraborty (Computer Science), OpenFormal.

## 2 Deliverables

The following table lists the achievements of this project till date.

Item	upto Aug '12 (proposed)	upto Feb '13 (achieved)
Live Workshops	55	70
Remote, SELF, Workshops	-	1420
Conferences	6	6
Textbook Companions	100	151
Spoken Tutorials	40	61
Course Conversion	5	5
Lab Migration	-	6

For the next year we are proposing the following deliverables.

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	Item	Number	Rate	Amount in Lakhs-Rs
Scilab	Textbook Companions	150	30k	45
	Lab Migration	10	20k	2
	Support for self-workshops	400	1k	4
	Contact workshop/conference	1		5
	Software to establish wiki like environment for textbook companion	1		6
	Software for Links project			3
	Total			65

	Item	Number	Rate	Amount in Lakhs-Rs
Python & SimPy	Textbook Companions	40	30k	12.0
	SimPy: Lab migration	1	20k	0.2
	Support for self-workshops	300	1k	3.0
	Python/SimPy Conferences	1		5.0
	Postal campaign/popularisation (For all FOSS activities)	1		10.0
	Development/deployment of online interface for automatic evaluation of Python code	1		10.0
	SimPy: Course/lab development and support	1		3.0
	Total			43.2

	Item	Number	Rate	Amount in Lakhs-Rs
COIN-OR	Textbook Companions	2	30k	0.6
	Lab-migration	1	20k	0.2
	Course/Lab development (leading to TTT workshop, <i>but not TTT conducting expenses</i> )	1		4.0
	Establishing interface with LibreOffice/Python/Scilab	1		6.0
	Total			10.8

Table 1: Budget and Deliverables for Scilab, Python, COIN-OR

	Item	Number	Rate	Amount in Lakhs-Rs
OSCAD	Textbook Companions	10	30k	3
	Lab Migration	20	20k	4
	Support for self workshops	100	1k	1
	Contact workshop/conference	1		3
	OSCAD GUI Development	1		6
	Total			17

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	Item	Number	Rate	Amount in Lakhs-Rs
OpenFOAM	Textbook Companions	2	30k	0.6
	Lab-migration	10	20k	2.0
	Support for self-workshops	200	1k	2.0
	Contact workshop/conference	1		3.0
	Publicity / sponsorship (for all FOSS activities)	1		5.9
	OpenFOAM GUI using Python	1		6.0
	Total			19.5

	Item	Amount in Lakhs-Rs
OpenCL	Content creation (leading to TTT workshop, but not TTT conducting expenses)	5.0
	Summer School, curriculum inclusion, popularisation	2.0
	Total	7.0

	Item	Amount in Lakhs-Rs
OpenFormal	GUI and back-end development	6.0

Table 2: Budget and Deliverables for OSCAD, OpenFOAM, OpenCL and OpenFormal

The table above lists our deliverables and their relation to the cost is given below in section 7.

### 3 Salient features

#### 3.1 Arrangement for quality control

The respective PIs use the packages in question for their own research and as such ensure that the basic quality is solid. We constantly obtain feedback from the attendees of our workshops and training programs. This helps us refine our material. All of the textbook companions are vetted by an expert reviewer.

The material we generate is made openly available and we seek feedback and reviews from our readers. This helps improve the quality of our material.

In addition to this, periodic reviews of our work from the PRSG committee ensure good quality.

#### 3.2 Accuracy

All the focus areas, namely Python, Scilab, SimPy, COIN-OR, OSCAD, OpenFOAM, OpenCL and OpenFormal are within the expertise of the project investigators. For instance Profs. Kannan, Madhu and Mani have significant experience with Scilab. Prof. Prabhu

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has been contributing to Python in scientific computing for over a decade and is a member of the Python Software Foundation. Prof. Shivasubramanian has used and contributed to OpenFOAM for many years. Prof. Ashutosh is an expert in computational optimization and in the use of COIN-OR. Prof. Jayendran is an expert in discrete simulation and modeling. Prof. Supratik is an expert in formal verification and has been very involved in the development of a suite of open tools for formal verification.

### 3.3 Coverage

Through SELF workshops we train teachers and students all over India. A huge network covering the country is now setup and we can perform hundreds of workshops every month and provide training for multiple packages at the same time. We generate important training material in the form of slides, notes, exercises, documentation and spoken tutorials ([spoken-tutorial.org](http://spoken-tutorial.org)). We bundle the software into convenient DVD's/CD's so students and teachers are able to install the requisite software easily. We conduct online programming tests to ensure that participants are well trained and can actually write code. We consider common text books and solve the examples and problems supplied with open source software equivalents in order to demonstrate the effectiveness of FOSS and also provide users with a wide array of examples. This enhances the student learning process. We conduct international conferences in order to spread the word and popularize the use of open source software in education. We are also in the process of doing state-wide literacy drives to convert entire states to use FOSS in the curriculum.

Our websites, [fossee.in](http://fossee.in) and [scilab.in](http://scilab.in) are effective in maintaining an up-to-date calendar of activities. We employ the use of mailing lists for quick dissemination of important matters.

### 3.4 Updation mechanism

An online mercurial version control repository is used to manage the material we generate. This material is constantly updated and also freely available. The websites [fossee.in](http://fossee.in) and [scilab.in](http://scilab.in) are constantly updated with our calendar of activities and also other project related activities.

### 3.5 Testing by users

The developed material is made available for all to use. The material is also given to attendees who attend the training workshops. At the end of our training we obtain feedback from the attendees. The material is also updated based on our own perceptions of how the attendees received the material. We also conduct simple online tests during these workshops and also plan to conduct more sophisticated online tests in the near future. This gives us an objective mechanism to see how well the material was absorbed. Using this approach we are able to improve our material and approach. This enables the users themselves to judge if they have learned the material effectively and also allows us to assess the same.

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### 3.6 Testing by peer group

Much of the developed material aids instruction at various institutions and colleges (including IIT Bombay). The instructors are be in constant touch about the relevance of the developed material and the accuracy of the content. In addition, the developers of the free software are also in touch with the instructors and give us their feedback.

## 4 Scaling up

### 4.1 Plan

The objective is to assimilate open source packages in engineering and science curricula. This is done by generating relevant, high-quality, instructional material in the form of documentation of various kinds, organizing training workshops/conferences and developing spoken tutorials. The primary instructional material is in the form of spoken tutorials ([spoken-tutorial.org](http://spoken-tutorial.org)). This enables a student to easily learn how to use FOSS by himself/herself. This along with online certifications and tests enable scale-up. We have already conducted about 1420 SELF-workshops. This number can be sustained and further increased very easily. We plan to conduct state-wide literacy camps based on this approach.

The textbook companions are made by students all over the country and this too scales very well. More than 150 such text books have already been created.

### 4.2 Strategy

#### 4.2.1 In-house

The spoken tutorials, support for the SELF workshops, content development for lab migration and development work for the various packages is done in-house.

#### 4.2.2 Out sourcing

Most of the workshops are held outside the institution. The workshop is coordinated by another institution and the expenses are not borne by us.

For the textbook companions after the review of the book is complete and verified by our staff the payment is disbursed to the relevant parties. The standard auditing practices are adopted during settlement of accounts. The payments disbursement is according to the procedure followed within IIT Bombay.

#### 4.2.3 University syllabi

The steady increase in the number of universities that have been including Scilab and Python in their syllabi is resulting in increased adoption of FOSS. The project investigators are able to effect this change due to interaction with university professors who look into the syllabus update. This systematic strategy will result in achieving the objectives of assimilation of open source software in the engineering and science community.

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## 5 Popularizing and extension activities and plans

### 5.1 Strategy for popularization

Some of the strategies we adopt are as follows.

- Write articles about the mission and the initiative in various newsletters like the IEEE newsletter.
- At various conferences, a half-day or one-day workshop focusing on the project activities will be organized.
- Deliver talks at various relevant conferences about the project and our goals.
- Articles about the activities in newspapers.

### 5.2 Extension activities and plans

During the pilot project the major initiatives have already started. The full project will give adequate momentum to these initiatives. The plan is to make open source assimilation as a community activity due to which it will be self-sustaining.

Minimal funds would be sufficient to maintain the web server and update the material that has been developed and peer-reviewed during the project duration.

#### 5.2.1 Maintenance mechanism

Institutional infrastructure would suffice to maintain the webserver and other such maintenance activities.

#### 5.2.2 User feedback mechanism, its execution procedure and corrective measures

The portal that maintains the repository of developed material will have material organized on a wiki. This allows correction by users (in addition to regular backups to prevent loss of material). The written material will also be made available for online review by users. We already have a preliminary system of this form in place as seen at [fossee.in/review](http://fossee.in/review). The mailing list help in keeping the community abreast of modifications/upcoming issues.

## 6 Review Mechanism

### 6.1 Frequency of review

We plan to request four reviewers from those listed below to review our progress once every six months or at least once a year.


  
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6.2 Suggested reviewers who are eminent in fields of the project

- 1. Prof. M Ramakrishna  
Department of Aerospace Engineering  
IIT Madras  
krishna@ae.iitm.ac.in
- 2. Prof. Arun Tangirala  
Department of Chemical Engineering  
IIT Madras  
arunkt@iitm.ac.in
- 3. Prof. P. Sriram  
Department of Aerospace Engineering  
IIT Madras  
sriram@ae.iitm.ac.in
- 4. Prof. Venkatesh Choppella  
IIIT-Hyderabad,  
Hyderabad  
choppell@gmail.com
- 5. Prof. T. V. Gopal  
Dept. of Computer Sc. & Engineering,  
College of Engineering,  
Anna University, Guindy  
Chennai - 600 025  
gopal@annauniv.edu
- 6. Prof. William Stein  
Department of Mathematics,  
University of Washington,  
Seattle, WA 98195-4350 U.S.A.  
wstein@gmail.com
- 7. Dr. Eric Jones  
515 Congress Avenue  
Suite 2100  
Austin, TX 78701  
oliphant@enthought.com
- 8. Prof. Cornelis Praagman  
Department of Economics,  
University of Groningen, Postbox 800  
9700AV, Groningen, The Netherlands  
c.praagman@rug.nl
- 9. Prof. Navdeep Singh  
Department of Electrical Engineering  
VJTI, Matunga, Mumbai  
nmsingh@sify.com
- 10. Prof. Amit Patra  
Department of Electrical Engineering  
IIT Kharagpur  
amit@ee.iitkgp.ernet.in
- 11. Prof. Harishankar Ramachandran  
Department of Electrical Engineering  
IIT Madras  
hsr@ee.iitm.ac.in
- 12. Prof. Mashuq-Un-Nabi  
Department of Electrical Engineering  
IIT Delhi  
mnabi@ee.iitd.ac.in

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Top right: *Kanouda*

Middle right: *[Signature]*

Bottom right: *G. Prasad*

Bottom right: *(39)*

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13. Dr. Stéfan van der Walt  
Division of Applied Mathematics  
Engineering Building  
Banhoek Road, Stellenbosch 7602  
South Africa  
stefan@sun.ac.za

14. Dr. Claude Gomez  
CTO, Scilab Consortium  
Domaine de Voluceau  
Rocquencourt B.P. 105  
78153 Le Chesnay Cedex, France  
Claude.Gomez@inria.fr

15. Prof. Sumantra Dutta Roy  
Department of Electrical Engineering  
IIT Delhi  
sumantra@ee.iitd.ac.in

### 7 Budget

The budget below is for one year between 1st April 2013 – 31st March 2014.

	Item	Number	Rate	Amount in Lakhs-Rs
Scilab	Textbook Companions	150	30k	45
	Lab Migration	10	20k	2
	Support for self-workshops	400	1k	4
	Contact workshop/conference			5
	Software to establish wiki like environment for textbook companion			6
	Software for Links project			3
	Total			65

	Item	Number	Rate	Amount in Lakhs-Rs
Python & SimPy	Textbook Companions	40	30k	12.0
	SimPy: Lab migration	1	20k	0.2
	Support for self-workshops	300	1k	3.0
	Python/SimPy Conferences			5.0
	Postal campaign/popularisation (For all FOSS activities)			10.0
	Development/deployment of online interface for automatic evaluation of Python code			10.0
	SimPy: Course/lab development and sup- port			3.0
	Total			43.2

	Item	Number	Rate	Amount in Lakhs-Rs
COIN-OR	Textbook Companions	2	30k	0.6
	Lab-migration	1	20k	0.2
	Course/Lab development (leading to TTT workshop, <i>but not TTT conducting expenses</i> )			4.0
	Establishing interface with LibreOffice/Python/Scilab			6.0
	Total			10.8

Table 3: Budget and Deliverables for Scilab, Python, COIN-OR

	Item	Number	Rate	Amount in Lakhs-Rs
OSCAD	Textbook Companions	10	30k	3
	Lab Migration	20	20k	4
	Support for self workshops	100	1k	1
	Contact workshop/conference			3
	OSCAD GUI Development			6
	Total			17

	Item	Number	Rate	Amount in Lakhs-Rs
OpenFOAM	Textbook Companions	2	30k	0.6
	Lab-migration	10	20k	2.0
	Support for self-workshops	200	1k	2.0
	Contact workshop/conference			3.0
	Publicity / sponsorship (for all FOSS activities)			5.9
	OpenFOAM GUI using Python			6.0
	Total			19.5

	Item	Amount in Lakhs-Rs
OpenCL	Content creation (leading to TTT workshop, <i>but not TTT conducting expenses</i> )	5.0
	Summer School, curriculum inclusion, popularisation	2.0
	Total	7.0

	Item	Amount in Lakhs-Rs
OpenFormal	GUI and back-end development	6.0

Table 4: Budget and Deliverables for OSCAD, OpenFOAM, OpenCL and OpenFormal

The following table details the budget utilization:

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Item	Amount Rs. lakh
Salaries	77.6
Honorarium for textbook creators and lab migrators	35.0
Conferences and workshops	16.0
Travel	10.0
Contingency	4.0
Consumables	5.0
Equipment	5.0
Postal campaign <sup>1</sup>	10.0
Publicity and sponsorship	5.9
Coordinator honorarium	5.0
Total	173.5

Table 5: Budget Utilization

### 7.1 Capital expenditure

#### 7.1.1 Details to be captured

Ten computers for new initiatives = 5 lakhs: one time

#### 7.1.2 Focused comments on high cost equipment

No single equipment costing ten or more lakhs is foreseen at this point.

### 7.2 Revenue expenditure

#### 7.2.1 Details to be captured

As can be seen from Table 5, there are two major components to the expenses. The first is salaries and the second is honoraria. The details of many of these are provided in the complete report.

#### 7.2.2 Focused comments on pay/salaries

Most of the revenue expenses are payments to individuals. This is elaborated below.

#### 7.2.3 Total coordinator's honorarium to be paid in the project

The coordinator's honorarium does not exceed 3% of the total cost of the project.

<sup>0</sup>The amount budgetted for postal campaign includes the expense for all the FOSS packages we have listed above

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7.2.4 Salaries

- 1. Python group - 6 people at an average salary of 25k = 18 lakhs p.a.
- 2. SciLab group - 5 people at an average salary of 25k = 15 lakhs p.a.
- 3. COIN-OR group - 3 people at an average salary of 25k = 9 lakhs p.a.
- 4. OSCAD group - 3 people at an average salary of 25k = 9 lakhs p.a.
- 5. OpenFOAM group - 3 people at an average salary of 25k = 9 lakhs p.a.
- 6. OpenCL group - 2 person at an average salary of 25k = 6 lakhs p.a.
- 7. OpenFormal group - 2 person at an average salary of 25k = 6 lakhs p.a.
- 8. Administration and support - 2 people = 6 lakhs p.a.

7.2.5 Honorariums

These honorariums are to be given to various students and faculty all over India who are involved in generating the textbook companions and doing the lab migrations.

- 1. 204 text book companions - with Rs. 15k per book = 30.6 lakhs.
- 2. 42 lab migrations - with Rs. 10k per lab = 4.2 lakhs.

7.2.6 Total consultancy fee during the project

Nil

7.3 Anchor institution for funds

IIT Bombay.

8 Cost benefit analysis including cost effectiveness approach viz-a-viz other alternatives

The costs in this project are primarily salaries, workshops/conferences. The costs within content development are primarily salaries and honoraria. Since development of instructional material, code development and widening of use of the open source packages is the focus, these costs are inevitable.

The benefits from workshops is immediate: those who are trained are able to utilize these packages immediately. This is because the workshops also comprise of hands-on sessions with sufficient number of assignments. Moreover, the inclusion of these packages in university syllabi ensures that these packages are utilized by a large number of students at various colleges.

Handwritten signatures and notes at the bottom of the page. The word "Koushik" is written in the center. To the right, "12" is written above "CpSrivastava". A circled number "36" is in the bottom right corner. There are several other illegible signatures and scribbles.

## 9 Social impact

Due to the very high cost of commercial software like Matlab, Mathematica etc., our small and medium scale enterprises who cannot afford such packages, do not use any software for such purposes. As a result most small and medium scale enterprises are not able to be technologically competitive, and their productivity and returns are low. In this context, popularisation of the software systems proposed in this project is be a big boost to our industrial efficiency and output. Students are also unable to use such commercial software since they are very expensive. By training them to use FOSS equivalents, they are able to learn more effectively and able to freely use what they have learned.

Consequently, there will be more entrepreneurs who will create service oriented companies using open source software such as Scilab, Python and L<sup>A</sup>T<sub>E</sub>X. Open source software will thus enable entrepreneurs to be competitive and enable them to generate wealth and employment.

## 10 Outcome - extent to which the project will achieve the objectives of the Mission may be given explicitly

- Many more subject experts have been sensitized about the Mission due to interaction at various workshops/conferences. The number of subject experts contributing to the Mission is steadily growing.
- The shift to open source packages is being effected by more number of instructors across colleges and universities. This shift will gain additional momentum over two years.
- The number of universities that have Scilab and/or Python in their syllabus is steadily growing.
- Once there is a critical fraction of people who comfortably teach and program in these open source technical softwares, the objectives of the Mission will be achieved with little further funding towards this. The workshops are aiming to increase the number of people to this critical fraction. The inclusion in the syllabi is an important step for this.
- The situation in IIT Bombay is encouraging and will improve over the course of this project.

Ked
   
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 G. Srivastava
   
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ADDENDUM TO THE MINUTES OF STANDING COMMITTEE MEETING OF  
NMEICT HELD ON 16<sup>th</sup> MARCH 2013

Item No.12:

Project Title: "Development of Low Cost Mobile Robots: Robotics for Education"

Control No: SIN19061010920

PI: Dr Swagat Kumar

Issues: To resolve the change of PI, all three PIs [Dr.Deepak Fulwani (IIT Rajasthan), Dr. Indrani Kar (IIT-Guwahati) and Dr.Sandeep Ydav (IIT Rajasthan)] were requested to present before the SC.

As there was no representative from IIT Rajasthan, their presentation could not be heard. The IIT Rajasthan team is requested to attend the next meeting and present the clarifications that the SC has been seeking.



**Attendance of the Standing Committee held on 16<sup>th</sup> March, 2013 at 11.00 A.M. under National Mission on Education through Information and Communication Technology at Conference Room, CSL Library, Shastri Bhawan, New Delhi**

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