



# CiSTUP News Letter

Centre for Infrastructure, Sustainable Transportation and Urban Planning, Indian Institute of Science, Bangalore, INDIA

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## A Vehicle for Analytical Thinking to Improve the Unique Urban Issues



**MESSAGE BY**  
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Directorate of Urban Land Transport(DULT)  
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It is indeed a great pleasure to note that CiSTUP is bringing out its 3<sup>rd</sup> volume 1<sup>st</sup> issue of its NEWSLETTER in this month. Directorate of Urban Land Transport is now a permanent member of the Executive Council of CiSTUP and we look forward to a more fruitful association with CiSTUP in the urban land sector. We are already working with CiSTUP for setting up a Traffic Engineering and Transportation Cell (TETC) in Bangalore Metropolitan Land Transportation Authority (BMLTA) and this is just the beginning. I wish CiSTUP would continue to grow from strength to strength.



**MESSAGE BY**  
**PROF. T.G. SITHARAM**  
Chairman CiSTUP  
Indian Institute of Science  
Bangalore-560012

At the outset I would like to extend, once again, my warm welcome to all the New Members of the Executive Council of CiSTUP through the medium of this NEWSLETTER. The executive council in its meeting held on 3<sup>rd</sup> April 2012 has also given its approval to the New Members inducted into the RAAC of CiSTUP. My warm welcome to these new members and am sure that the centre will be immensely benefitted by the contributions/suggestions they make in carrying out the Various activities of the centre. Through this Newsletter I also extend a Warm Welcome to the new members who have joined the centre during the last few months.

I hope that those of you who regularly read the Newsletter from CiSTUP will be aware of the range and breadth of the activities that is being carried out in this centre. All this was possible with the active participation/suggestions/involvement of the earlier council members, Outgoing RAAC members & the entire Faculty associated with CiSTUP. I sincerely express my thanks to each and every one of them.

The Third and the last series of the Acatech & CiSTUP joint workshop & symposium was held on 24<sup>th</sup> & 25<sup>th</sup> April 2012. The workshop was held on 24<sup>th</sup> April 2012 at the TAJ WESTEND, Bangalore followed by the symposium titled "Smart cities as innovation drivers" which was held at the Satish Dhawan Auditorium, IISc. The symposium commenced with the inaugural address given by Dr. Sam Pitroda over the phone from Chicago, USA. Details are given in this NEWSLETTER

CiSTUP jointly with CEDT, IISc and Swiss Institute of Technology (EPFL), has organized four days course on Management of Development Projects (MaDePro) on February 27<sup>th</sup> & 28<sup>th</sup> and on March 8<sup>th</sup> & 9<sup>th</sup> 2012. The course target audiences were from professionals from Government, non- governmental organizations, international and inter-governmental agencies or the private sector. Details about this and many other activities held at our centre are given in the following pages of this NEWSLETTER.

A few of our centre's initiatives for the campus are NAMMA CYCLE & ELECTRIC MOBILITY which are in the final stages for implementation and will be the green initiatives within the campus.

Namma Cycle" under which bicycles, are managed by Ride A Cycle Foundation will be allowed to be hired by interested students and others in the Institute, for a nominal hiring fee which is charged in order to sustain the project.-MOU signed between IISc, Ride A Cycle Foundation, Bangalore, EMBARQ India, and Gubbi Labs on 16<sup>th</sup> February 2012.

Electric mobility in IISc campus along with NAMMA CYCLE Programme (rent a cycle system)-Running Electric Vehicles within the Institute Campus. Proposal – study report is under preparation -Various options are being explored.

Wishing you all a very happy reading and we welcome your feedbacks for improving further the activities at the centre.

### A FRAMEWORK FOR ACHIEVING SUSTAINABLE URBAN MOBILITY IN THE CITY OF BANGALORE

By:

Prof. T.G. Sitharam

Chairman

Centre for infrastructure, Sustainable Transportation and Urban Planning (CiSTUP) and

Professor in Civil Engineering

INDIAN INSTITUTE OF SCIENCE

BANGALORE.

**Brief Article:**

The migration of rural population to urban areas in search of better job prospects has made Indian cities densely populated. About 8.4 million people live in Bangalore city and an additional 200,000 people move into the Bangalore metropolitan area each year. Bangalore's population has become stable within the city and growth is concentrated mainly in the outskirts. As incomes of the resident rise, car loans proliferate and the auto industry churns out low-cost cars to nudge them off their motorcycles, Bangaloreans are rushing to get behind the four wheel. Bangaloreans bought about 1.0 Lakh cars out of 4.68 lakhs of vehicles registered in 2009 in Bangalore. Only 6000 Buses registered in the year 2009. The cumulative growth of the Vehicle registration shows about 3.65 million motorized vehicles were registered in Bangalore until 2009. Population growth in the outskirts will lead to increase in trip length. Advantage of Bangalore city, is still walk lengths are high and share of public transport is also very high when compare to other cities in the world. Improved Mobility of 'People' rather than 'Automobiles' should be the principle to reduce the traffic problem in the city. Improvement in footpaths, pavements and cycle paths are very essential and major budget needs to be allocated to develop footpaths, pavements and cycle paths to increase and sustain the walk lengths and use of NMT in our city. In addition, it is necessary to strengthen our road network by connecting arterial and sub-arterial roads and also improve the quality of roads by not having any potholes. The para-transit systems like autos in the city should be streamlined with free market registrations, separate RTO for autos in the city for better control, Installation of GPS in autos, clear marking of auto stands, introducing Green

autos (autos with LPG and CNG, electric autos), Complaint centre and encouragement for Autos association to get together on the format of "easy auto" for web booking and their availability through mobile phones.

"Excellent Public transport (road and rail based) is the only the solution for decongesting the traffic in our cities". Thus the goal shall be to increase the modal share of public transport system to 70% or double it by 2020. Creation of bus bays, marking of bus stops, display of bus routes, information to passengers regarding frequency of buses and bus routes at each bus stops along with a good mobile based Passenger information system will augment the accessibility of public transport to the citizens. Further, we should have inclusive growth in public transport making bus fares cheaper for poor people. Development of Bus priority lanes, bus rapid transit system lines along the ring roads, high density bus routes (like Old airport road, white filed, Hosur, Nelamangala roads, etc.) will attract the passengers from individual motor vehicle owners. Development of commuter rail services with more numbers of stations using the existing railway infrastructure, with higher frequency of trains towards Ramanagar, Tumkur, Doddaballapura, Chikaaballapura, Hosur, Whitefield, Anekal – doubling of lines, EMU's, AC cars, additional stations, higher frequency (atleast a train once in 40 minutes) will help decongest the city and central areas quickly. Parking needs to be managed well in the city with more privatized smaller parking areas closer to the central Business Districts (CBD) areas. Parking shall not be provided freely and parking fees should be variable depending on the busy areas and the needs. Other measures like improvement in traffic information to the road users with variable signs along with weather information, Creation of walking and bicycle only areas with no entry for private vehicles in CBD, real time traffic information system through mobiles and spoken web technologies, TV/paper advertisements to attract people to travel in public transport, removal of all the live animals from urban roads, awareness campaign against road rages, air and noise pollution effects and information about the air and noise pollution in our cities and public road users education and awareness programmes needs to be done on priority.

Symposium – Socio-Economic Challenges for Smart Cities in India-organized on 9th December 2011 at Faculty Hall, IISc.

The Symposium titled “Socio\*Economic Challenges for Smart Cities in India” jointly organized by CiSTUP with Acatech, Germany is part of the German Indian Partnership for IT Systems (GRIPIT) Project.

This project was initiated at the acatech in December 2009 with the funding from the German Federal Ministry of education and research (BMBF) within the Information and communication Technology topic field at acatech.

The project objectives are

- To act as catalyst for future research and development collaboration between India and Germany
- To bring together German and Indian partners from the world of academia and industry to a common platform for discussions on topics of common interest
- To set the platform for a joint research projects on topics of common interest with the participation of EU countries
- To Benchmark the innovation systems of both countries and identify potential areas for joint initiatives

Since the start of the project, the following initiatives have been undertaken jointly with CiSTUP, IISc which were focused on topics related to Smart cities with focus on mobility and energy and Information and communication technology. First joint symposium was held on 19th May 2011 on “Smart Mobility and Energy Concepts for Megacities”.



The symposium was inaugurated by the Honorable Chief Secretary of Karnataka Shri.S.V.Ranaganath, IAS in a simple but elegant inaugural function which was presided over by Prof.P.Balaram, Director IISc. The other distinguished guests were Mr. Hans-Günter Löffler, German Deputy General Consul, Bangalore, Prof. Dr. Otthein Herzog, Executive Board member, acatech, & Dr. A.Chakroborty, Director, IGSTC, Delhi.

The following Two (2) study reports were released by Prof.P.Balaram on this occasion:

1. User Needs Study: Living Lab on Bangalore Mobility and ICT Research for Smart City Solutions by CiSTUP. Authors: Prof. K. B. Akilesh, T. G. Sitharam Ms. Minakshi Goswami & Ms. D.Manjula

2. High potential research projects in India in the area of mobility-cooperative study by Prof.T.G.Sitharam, Chairman CiSTUP & Prof. Dr. Jörg Schönharting (TRC).

The inaugural was followed by the panel discussions and talks as follows:

Making Bangalore a Smarter City : – An Indo-German-research proposal First experiences and user expectations	Prof. Dr. Jörg Schönharting, CEO, TRC Transportation Research & consulting GmbH, Prof. Dr. T. G. Sitharam, Prof. Dr. K. B. Akhilesh
What are the socio-economic Challenges and Implications for Mobility Projects ?– a Social Sciences Perspective	Prof. Dr. K.R.S. Murthy, Chairman, Board of Governors - Institute for Social and Economic Change, Bangalore
Sustainable Governance in Indian Megacities – a challenge for Institutions and Citizens?	Dr. Jörg Himmelreich, Jacobs-University, Bremen
Urban Mobility in India– Policies and Governance	Mrs. V. Manjula IAS, Commissioner, Urban Land Transport & Urban Development Department, Govt of Karnataka
Indian Megacities - Drivers and Constraints in the Change Process	Prof. Dr. Reinhard Doleschal, Head of the Business School, Ostwestfalen-Lippe University of Applied Sciences, Lemgo; Germany Dr. H S Sudhira, consultant, Indian Institute for Human Settlements
Mobility Projects and Citizens Engagement – are we doing enough?	Mr. H.L. Shashidhara, India Urban Space Foundation Mr. Pranav Jha, co-founder – Praja.in, Bangalore Mr. Suresh Heblikar Founder, Eco-watch
Panel Discussion: Socio- Economic Challenges for Smart Cities – where do we go from here?	Moderator – Prof. Dr. Peter Sachsenmeier (CEO, IMAG), Prof. Dr. T.G. Sitharam, Dr.J.Himmelreich, Mrs. V. Manjula, Mr. S. Heblikar. Prof. Dr. N. Pani, National Institute of Advanced Studies, Mr. S. Schlebusch, Nextbike GmbH
Wrap up and Vote of Thanks	Prof. Dr. Otthein Herzog



# Activities at the Centre

## ROUNDTABLE DISCUSSION On 3rd Jan 2012

Roundtable Discussion on Mitigation of Air Pollution from Transportation Sources for the City of Bangalore-This was organized as a part of the Foundation Day celebrations of CiSTUP on 3rd January 2012. The following persons participated in the event which was held from 10.00 am till 2.00 pm.

1. Mr. Sadashivaiah, Chariman, Karnataka State Pollution Control Board
2. Mr. Paramesh, Technical Director, Bangalore Metropolitan Transport Corporation
3. Dr. Pranesh, Vice President, Karnataka Environmental Research Foundation
4. Dr. Madhusudanan, Scientist, Central Pollution Control Board
5. Dr. H.S. Puttanna, Professor, Don Boscoe Engineering College
6. Dr. Balagangadhar, Chief Scientific Officer, Karnataka State Pollution Control Board
7. Dr. Nagappa, Environmental Officer, Karnataka State Pollution Control Board
8. Ms. Seema Divisional Mechanical Engineer, Karnataka State Road Transport Corporation
9. Hemanth Kumar, Joint Commissioner, Regional Transport Office
10. Ms. Vanashree Vipin Singh, Deputy Conservator of Forests, EMPRI
11. Amit Kumar Gupta, Project Manager, ECE, IISc
12. Prof. Sitharam, Chariman, CiSTUP
13. Prof. Rajasekara Murthy, Visiting Scientist, CiSTUP
14. Mr. Mahesh Kashyap, Research Fellow, CiSTUP
15. Dr. Gururaja, Urban Planner, CiSTUP
16. Dr. Harish, Transportation Planner, CiSTUP
17. Prof. Anantharamaiah, Professor, CiSTUP
18. Prof. Ramanayya, Professor, CiSTUP
19. Dr. Rudraswamy, Research Scholar, ECE, IISc
20. Mr. Yasasvi, Research Associate, ECE, IISc
21. Dr. Palash Basu, Post Doctoral Fellow, ECE, IISc

### Brief Report on the Event:

A workshop on air pollution control strategies for metropolitan Bangalore was held at CiSTUP/IISc., on Feb. 28 2011. Following the workshop CiSTUP prepared a call to action report entitled "Mitigating Air Pollution from Transportation Sources" and widely circulated to all the participants and agencies of the Govt. of Karnataka who have a stake in abatement and control of air pollution in Bangalore from all transportation sources. As a follow up, on Jan 03 2012, this roundtable discussion was organized by CiSTUP to review and take stock of the actions initiated by all the stakeholders who participated in the Feb. 28 workshop.

The round table discussion was inaugurated by Shri. Sadashivaiah, Chairman, Karnataka State Pollution Control Board. In his inaugural address, Shri Sadashivaiah, highlighted several programs and actions currently proposed and

implemented by GoK in general and KSPCB in particular to improve air quality in Bangalore. He emphasized the need to control the dust and respirable particulate matter (PM2.5) concentrations in Bangalore as they have very serious health implications.

Prof. Sitharam, Chairman, CiSTUP, in his introductory remarks reviewed several R/D initiatives at CiSTUP and IISc as well as several collaborative projects CiSTUP has undertaken with GoK agencies. He further reiterated CiSTUP's commitment to promote "Mobility with clean air" for the people of Bangalore.

Prof. Rajasekara Murthy, Scientist Emeritus and visiting professor at CiSTUP presented some short term "win-win" measures such as a comprehensive inspection and maintenance protocol for poorly maintained vehicles contributing a disproportionate amount of air pollutants (almost 20 times) as compared to well maintained vehicles. He also promoted the concept, widely used in Europe, USA, Canada and several Latin American Countries, of dispersing the emissions from heavy duty vehicles including the transport buses through a vertical exhaust pipe located at the top of the vehicle as opposed to the present horizontal configuration, thereby diluting the pollutant concentrations considerably (by about a factor of 8) at the breathing level. He also emphasized the need to develop Bangalore Air Quality Management System (BAQMS) at CiSTUP by integrating inventories of vehicles and emissions, air quality monitoring data base, and climatic factors through scientifically developed air quality models which can forecast Bangalore air quality status in real time as well as 24-48 hours in advance.

During the roundtable discussions representatives from CPCB, DOT, KSPCB, BMTC, KSRTC, ECE/IISc., presented the actions proposed and undertaken since the Feb. 28 workshop. Besides participants academic institutions and NGO's also made very valuable contributions on several aspects such as strategic air quality monitoring, sensor development, air quality modelling and capacity building initiatives such as training/workshops/seminars/conferences conducted by CiSTUP as well as a public awareness campaign on health and air quality. An action oriented project proposals, scheduled implementation plans and the lead agency responsible was prepared. CiSTUP will coordinate and follow up and report the progress periodically.

## MOBILICITY 2012

CiSTUP jointly with DULT & Praja organized a one day workshop titled "MOBILICITY 2012" on 10th January 2012 in CiSTUP Conference Hall.

The inaugural event was attended by Prof. B. N. Raghunandan, Divisional Chairman Earth & Environmental Sciences, IISc, Ms. Manjula, Commissioner DULT/BMLTA. The function was well attended and the inaugural was followed by lectures and panel discussions. The following two study reports were released during the event:

1. Traffic Assessment Study @ Mantri Square Mall Malleshwaram-Report prepared by Ms. Radha Chanchani, & Fagun Rajkotia, Urban Planners CiSTUP.



2. Report On Travel Characteristics Of Commuters Using Two-Wheelers-Prepared by Ms. Minakshi Goswami & Ms. D. Manjula Planners in CiSTUP.



The various sessions and the people who made the presentations were:

- I. Session on URBAN PLANNING & DESIGN – focus on LAND USE and TRANSPORT PLANNING INTEGRATION
  - a. URBAN PLANNING & DESIGN – focus on LAND USE and TRANSPORT PLANNING INTEGRATION  
Case Study: Mantri Square Mall, Malleshwaram Ms. Radha Chanchani & Ms. Fagun Rajkotia, Urban Planners, CiSTUP
  - b. Landuse & Transport Integration - an afterthought? Ms. Sujaya Rathi, Transport Planner, CSTEP
  - c. Making Connections: Exploring Planning & Design Strategies to link Land Use with Public Transit - Ms. Brinda Sastry, Urban Designer and Planner, and Adjunct Faculty, R.V. School of Architecture

Panel Discussion – The panelists were Ms. Sujaya Rathi, Ms. Brinda Sastry, Dr. Robin King, Dr. Ashwin Mahesh & Representatives from BDA, BMRDA, BBMP Town Planning Depts.

- II. URBAN TRANSPORTATION/MOBILITY – focus on MULTI-MODAL INTEGRATION

- a. Multi-Modal Integration in Bangalore – Challenges & Solutions Members from Praja RAAG/CiSTUP

Panel Discussion - Representatives from BMRCL, BMTCL, DULT, BBMP, Easy Auto, Ride-A-Cycle Foundation, Traffic Police etc

### III. URBAN ENVIRONMENT/ECOLOGY-

- a. Urban Green Spaces of Bangalore: Biodiversity & Ecosystem Services including Air Pollution Mitigation - Dr. Harini Nagendra, Ramanujan Fellow, ATREE
- b. Air Pollution in Bangalore - Mr. Mahesh Kashyap, Research Fellow, CiSTUP
- c. Forgotten Functional Aspects of Blue Spaces in Bangalore - Dr. Gururaja KV, Urban Planner, CiSTUP
- d. Rain Water Harvesting Policies & the Ground Truth in Bangalore - Mr. Shivakumar AR, Senior Fellow, KSCST

Panel Discussion – Speakers and Representatives from Central and State PCB, LDA, & ESG.

### OPEN DAY 2012:

As part of IISc OPEN DAY celebration 2012, CiSTUP has organized a few events for public along with show-casing the research activities of the centre. The centre was open for public from 9AM till 5PM on 3rd March 2012.

Physical models showcased at the centre were

1. Electric Mailing Van, designed and developed indigenously at CPDM with the support of CiSTUP.
2. Traffic systems and flow in Bangalore
3. Remote sensing and GIS application in transportation



These models were highly appreciated by the public, especially from the graduate and undergraduate students who visited our centre.

To orient public towards non-motorized transport and public transport, movies were screened at the CiSTUP conference hall. Amsterdam bicycle project, JanMarg - Bus Rapid Transit System at Ahmedabad, Karnataka State Road Transport Corporation and Karnataka State Infrastructure Development project are few movies that were screened.

Bicycle Library, a unique initiative of CiSTUP, exclusively maintaining books pertaining to bicycle was kept open for public. Quiz programme with questions on Bangalore and neighboring cities, traffic signs and rules and general awareness about transport and traffic was running throughout the day. A gift was given to each correct answer from the participants.

Research highlights of the centre were showcased as posters. Eight new posters on the research carried out at the Centre in 2011-12 were kept on display.



## Activities at the Centre



With over 200 visitors and seven and half hours of interaction with public, we at CiSTUP really enjoyed the OPEN DAY. We have received few positive and constructive remarks by the public, indicating the reach of the programme to the public.

CiSTUP sponsored and hosted a workshop "Smart Transportation & Mobility Solutions for Airport Operations of BMTC" on Monday, March 5th, 2012 at CiSTUP Seminar Hall.

The workshop was well attended by about thirty technical experts representing Bangalore Metropolitan Transport Corporation (BMTC), IBM, CiSTUP, Robert Bosch Center (RBC), IISc Professors from various disciplines and other experts. Professor Sitharam, Chairman of the CiSTUP opened the workshop and Dr. Asokan, Chairman of RBC provided the closing remarks.

The goal of the workshop was to give an overview of the CiSTUP-IBM-BMTC collaborated Project to develop a Passenger Information System using the "Spoken Web Technology" for the Bangalore International Airport Operations of BMTC. Once completed, this project will significantly help the Airport passengers of BMTC by providing them with Real time Passenger Information System which they can access through their mobile phones.

It will also help to increase the ridership on BMTC buses due to improved Real Time information to bus users and increase the operational performance of BMTC through better resource mobilization, due to improved real time information on arrival and departure of buses. The initial pilot of this project will focus on 12 routes of Vayu Vajra Volvo buses of BMTC plying to the airport from various parts of Metropolitan Bangalore. This project has the potential of expanding Real Time Passenger Information System to all the Volvo buses that are being operated by BMTC in Bangalore Metropolitan area.

### Workshop on URBAN ACCESSIBILITY AND MOBILITY IMPROVEMENTS

held on 8.03.2012 at CiSTUP Seminar Hall.

Accessibility and Mobility are the two key issues in sustaining the growth rate of urban areas.

The growth in urban population, Urban sprawl and improved urban economic scenario resulted in increased trip distances and substantial increase in Travel Demand in terms of passenger kilometers. However, the supply of Transportation System and facilities have not been able to match the increased demand. The net effect is poor transportation system performance resulting in congestion, delay, accidents and pollution. CiSTUP has organized a one full day workshop to analyze this impact. The workshop was held on 8th March 2012 at the CiSTUP Seminar Hall. This workshop was co-ordinated by Prof. K.M. Anantharamiah & Prof. T.V. Ramanayya Senior Fellows at CiSTUP.



The main objectives of this workshop were -

- To highlight the recent advances in the field of transportation planning and management
- To consider economic and financial factors affecting the mass transport system
- To suggest Traffic Management Information System to Urban Local Bodies and Government for better Management of Transport Network.

This workshop addressed specific issues pertaining to urban mobility and accessibility. Transport network performance resulting from insufficient system capacity, poor conditions of public transport and pedestrian facilities were also discussed.

Specific topics covered in the workshop were

- ITS in Urban Transportation Urban Environment
- Urban Management Information Systems
- Mass Rapid Transit System
- Safe Mobility Management
- Junction Management
- Round Table Discussion on the Workshop theme

The speakers in the workshop were

Prof. T.G. Sitharam.

Prof. Rajsekhar Murthy.

Prof. K.M. Anantharamaiah.

Prof. T. V. Ramanayya.

Prof. M.N.Srihari.

Mr. V.M.Hegde .

Prof. C E G Justo.

There were 50 participants in the workshop from different field-students, policy makers, planners, Town planning officers etc.

Visit the web address for details of the presentations:  
[http://cistup.iisc.ernet.in/Urban Mobility 8th March 2012/](http://cistup.iisc.ernet.in/Urban%20Mobility%208th%20March%202012/)

## Management of Development Projects (MaDePro)

The Swiss Federal Institute of Technology (EPFL), Lausanne with the support of the CiSTUP & CEDT, Indian Institute of Science (IISc), Bangalore, organized a Certificate of Advanced Studies in Management of Development Projects (MaDePro) targeting the project managers, engineers, architects, social scientists, and other equivalent university graduates.

This programme proposed an integrated and interdisciplinary approach and targets professional in both Northern and Southern countries who would pursue a career in development or international cooperation and/or individuals from government, NGOs, IOs, IGOs, or the private sector who want to broaden their understanding of development issues; acquire tools to assess and manage development projects; who want to combine important elements of development and management.

The course was based on the North-South scientific partnership. It gave participants an opportunity to improve their knowledge in such aspects as Development, Technology and Project Management directly linked to the reality and actual experience of the field in such a "heterogeneous" country as India where poverty co-exists alongside vast scientific expertise and local know-how. The training provided a chance to share the different standpoints and experiences of Europe and Asia..

The course was structured in three parts, all of which were compulsory.

Part I (03 October 2011-19 February 2012) involved 19 weeks of e-Learning covering such aspects as: International Environment, Sustainable Development, Main Development

Issues, Technology for Development, Entrepreneurship and Innovation, Project Management

Part 2 (27 February 2012-11 March 2012), was full time, lasted 2 weeks and was held in India and was mainly focused on field activities. February 27th & 28th the programme was held in CiSTUP seminar hall followed by field trip to C.K.Pura village which is about 150 km away from Bangalore. The concluding sessions were held on March 8th & 9th at the CiSTUP seminar hall.

Part 3 (12 March-06 May 2012), consisted of a personal project.

The programme used a wide range of tools including: e-Learning, lectures, field trips, case studies, group work, individual project, etc.

The main Objectives of the programme were to help professionals to adapt to the situations and promote an interdisciplinary and multicultural approach to solve the problems. The participants were from various nationalities namely Austria, Bangladesh, Barbados, Cameroun, Ethiopia, Fiji, France, Germany, Ghana, Honduras, Italy, Kenya, Kosovo, Lebanon, Mexico, Papua New Guinea, Philippines, Switzerland & India.

The participants were given an insight to the various urban issues during the two days of their programme on 27th & 28th February 2012 at the CiSTUP seminar hall-which is as follows :

TITLE OF THE TALK	DELIVERED BY THE FOLLOWING FACULTY/PLANNERS.
Rain Water Harvesting Policy in Bangalore	Dr. A.R. Shiva Kumar
Framework For Achieving Sustainable URBAN MOBILITY IN THE CITIES	Prof. T.G. Sitharam
Emerging Trends in Solid Waste Management	Prof. Sivapullaiah P.V.
Rural and peri-urban Energy	Dr. H.N. Chanakya
Influence of Urban-Rural Gradient on wetlands of Bangalore: A case study using amphibians.	Dr. K.V. Gururaja
"Significance of Micro-level Planning & Design : Traffic Study @ Mantri Mall, Malleshwaram"	Ms. Radha Chanchani
Urban Air Pollution	Mr. Mahesh Kashyap
Challenges in understanding green buildings	Prof. Monto Mani
Need and functional aspects of wetlands in an urbanizing landscape"	Dr. T.V. Ramachandra
Water & Water Distribution Networks in Urban Areas	Prof. M.S. Mohan Kumar

Visit here for presentations:

<http://cistup.iisc.ernet.in/MaDeProFeb.html>



# Activities at the Centre

## ACATECH-2012

A Workshop titled – Indo-German Consortium for Living Lab Initiatives was held in Plumaria, Taj Westend, 25 Race Course Road, Bangalore 560001 on 24th April 2012 from 10.30 am. The workshop was organized by National Academy of Science and Engineering, Germany in co-operation with CiSTUP, IISc, Bangalore.



Prof. Dr. Otthein Herzog, Executive Committee International Affairs, acatech - National of Science and Engineering Prof. Dr. T.G. Sitharam, Chairman, CiSTUP, IISc welcomed the delegates and gave a brief introduction about the objectives of the workshop.

Smart Mobility in a Smart City: Preliminary Study on a Mobile Information Platform Bangalore	Prof. Dr. Hans-Jörg Schönharting, CEO TRC – Transportation Research and Consulting GmbH
Requirement analysis for last Mile connectivity in Bangalore	Prof. Dr. Stefan Edelkamp, TZI, University Bremen
Discussions on Studies	Lead – Prof. Dr. T.G Sitharam and Prof. Dr. Hans-Jörg Schönharting
Good Urban Governance and Smart Mobility in Bangalore – Initial results and discussion	Dr. Jörg Himmelreich, Jacobs University

This was followed by discussions on the future steps to be taken and was coordinated by Prof. Dr. Otthein Herzog, Executive Board Member ACATECH.



The Symposium titled “SMART CITY TECHNOLOGIES AS INNOVATION DRIVERS” was jointly organized by CiSTUP with Acatech, Germany as part of the German Indian Partnership for IT Systems (GRIP IT) Project.

This project was initiated at the acatech in December 2009 with the funding from the German Federal Ministry of education and research (BMBF) within the Information and communication Technology topic field at acatech.. This symposium is the third in the series of symposia which was organized together over the last two years with a focus on topics related to Smart Cities

The objective of the symposium was to integrate the Germany + India 2011-2012 Infinite Opportunities celebration initiatives. It brought together experts from German and Indian research institutions, industry and other related organizations under the subject of 'Smart Cities' in order to act as a catalyst to strengthen the research, technology transfer and development initiatives between the two countries.

The symposium commenced with the inaugural address given over phone by Dr. Sam Pitroda, the Honorable advisor to Prime Minister, Government of India. The other distinguished



guests were Mr. Hans-Günter Löffler, German Deputy General Consul, Bangalore, Mr. Clas Neumann, SAP AG and president Indo-German chamber of commerce, Mr. K. Jairaj, IAS, Additional Chief Secretary, Government of Karnataka. The Presidential address was given by Prof. B.N. Raghunandan, Divisional Chairman, Earth & Environmental Sciences & Dean of Engineering (Designate), Indian Institute of Science, The inaugural was followed by the deliberations by way of presentations by various dignitaries as given here under:



The symposium witnessed a very good participation from various fields and the media. The sessions went on till 6 in the

The City of Tomorrow and Energy Efficiency	Dipl.-Ing. Sebastian Herkal , Fraunhofer Institute for Solar Energy Systems, Germany
Smart City Technology as Innovation Drivers- The Indian Perspective	Prof.Dr.K.B.Akhilesh, Professor, Department of Management studies
Smart Innovation- Smart Cities	Mr.Tobby Simon,President- The Synergia Foundation
Zero+ Buildings-Energy Efficiency in Future Cities	Prof.Dr.Reinhard Doleschal, Head of the Business School, Ostwestfalen- Lippe University of Applied Sciences, Lemgo; Germany
Technologies for Smart Cities: Possibilities and Lesson Learned	Dr.Raguram Krishnapuram , Associate Director-Solution, IBM Research India
Sustainable Cities	Mr.V.S.Mani, Head, Marketing, Siemens information System Limited
Digital Life in Cities	Mr. Ram Prasad KR,Chief Technologist ,Wipro Limited
Connected Vehicles	Mr. Dattatreya Gaur, Vice President, Robert Bosch Engineering and Business Solution Ltd
Urban Structure and Safety	Prof.Dr.Dinesh Mohan, Volvo Chair Professor Emeritus, Transportation Research and Injury Prevention Programme, IIT Delhi
R& D Process Management for Smart City Technologies : Implications for Protection Strategy	Prof. Dr .Mary Mathew, Associate Professor, Department of Management Studies, IISc
Panel Discussion: Leapfrogging Technologies in India for Sustainable Development?!	Moderator: Prof. Dr. Peter Sachsenmeier, IMAG Information Management AG, Panel: Prof. Dr. T. G. Sitharam, Prof. Dr. Rishikesh T. Krishanan (IIMB), Prof. Dr. K. Kumar(IIMB), Mr. S. Herkal, Prof. Dr. R. Doleschal, Prof. Dr. H. J. Sconharting

evening and the concluding remarks were made by Prof.Dr.Otthein Herzog, Executive Board Member ACATECH.



### REPORT

**ENVIRONMENTAL INITIATIVES TAKEN BY BANGALORE METROPOLITAN TRANSPORT CORPORATION**  
Report from Mr. S.K. Paramesh, Director (Technical) BMTC.

#### Introduction:

BMTC has set up an Environmental cell during the year 2003. The cell is headed by Director (Technical & Environment) which is assisted by an Environment Officer.

#### Objectives of the Cell:

1. Achieve good Environmental performance in the Organization.
2. Establish environmental awareness across the organization.
3. Meet the goals of corporate Environmental vision.
4. Complying with the requirements of all Environmental laws and striving to comply with all Environmental laws.
5. Efforts to conserve natural resources by improving efficiency and reducing wastages.
6. Afforestation programme and development of landscape at Depots, Bus stations and Central Offices.
7. Implementation of new projects on Environment from time to time.
8. Obtaining ISO certification for depots and central workshops.

#### INITIATIVES TAKEN ON CONSERVATION OF ENVIRONMENT:

- Use of Ethanol blended diesel:  
BMTC has installed facilities in two of it's depots to use De-Natured Ethanol and Solubalizer to use them with HSD in BS 1 and 2 vehicles. It is proposed to extend the usage to other 7 depot vehicles.
- Proposal for using Bio-diesel:  
BMTC has planned to use Bio-Diesel (B 10 & B 20) in vehicles at 7 selected depots.
- Installation of Water re-cycling plants at depots:  
Depots are equipped with water re-cycling plants to re-cycle the water discharged during washing of buses and the contaminated water is being treated before discharging it to drainage system.

# Initiatives Taken

- Rain water harvesting:  
BMTC has taken steps to provide rain water harvesting facilities in all the depots, bus stations and the work is expected to be completed before march 2012.
- Installation of Solar lights in bus stations and Depots:  
3 lights each of 11 watts are installed in 23 Depots.
- Installation of LED lighting systems to conserve Electrical Energy:  
Trial fitment of LED lights in Shanthinagar Bus Station has been made. The proposal to install them in other bus stations is being examined.
- Management of Hazardous waste:  
Timely disposal of hazardous waste like waste oil, flammable material generated in depots is being done timely.
- Organizing planting of saplings at office, depots:  
The planting of sapling program at Depots, divisional offices is organized every year as per the stipulated Govt plans.
- Initiatives taken on trial operation of Electric Hybrid Vehicles:  
BMTC has taken action to procure two Diesel Hybrid Electric vehicles for trial operation.
- Introduction of Eco-Friendly BS-IV norms buses in to operation:  
As per the directives of the GoI, BMTC has placed Purchase Order for 825 Eco-Friendly BS-IV norms buses which has a SCR technology for reduction in emission of harmful gases.
- Emission test of vehicles at Depots:  
All the depots of BMTC are equipped with computerized smoke emission testing machines. All the vehicles are subjected for emission test every month as against the prescribed 6 months. The vehicles are sent on routes after ensuring the permissible smoke level.

## Environmental Policy

BMTC is committed to providing environmental friendly practices through:

- Involving of relevant stakeholders in planning and review of its EMS
- Motivate & train employees to contribute proactively for protecting the environment
- Adopt environment friendly transport operations through technology up gradation and pollution prevention measures on a continuously basis
- Adopt and practice resource optimisation measures on a continuous basis.

- I. **NAMMA CYCLE**-This is a joint project with Students Council, Ride-a-Cycle Foundation, Gubbi Labs & EMBARQ with the support of BSA. This is planned at the Institute with CiSTUP support.

Brief highlights of this project are:

1. BSA –the cycle manufacturing company donated 150 cycles.
2. Software development by Gubbi Labs for rental system which is mobile based (Ordinary Mobile) Personal insurance for the users.
3. Software development by Gubbi Labs for rental system which is mobile based (Ordinary Mobile) Personal insurance for the users.
4. The cycles can be taken out and used outside even though the scheme is being started within IISc.
5. Space for docking station measuring 2.5 by 3.5 mtrs. Within IISc campus to be identified and provided for parking the cycles.
6. One person at each docking station will be responsible and will man the scheme and the repairs/maintenance will be taken care of by this person.
7. The space on the containers will be allotted for admissible advertisements

- II. **Interactions with The Robert Bosch Centre (RBC) for Cyber Physical Systems to create cutting-edge technologies, intellectual properties, and products in various domains including healthcare, smart transportation, green infrastructure, sustainable energy, disaster management, water networks, sensor systems, etc.**

- III. **MOU with BMLTA – role of CiSTUP for the effective functioning of TETC (Traffic Engineering & Transportation Cell)-Assistance in recruitment of qualified manpower & fixing the remuneration. Supervision of the activities with Chairman CiSTUP and one other member from CiSTUP.**

- IV. **Living Lab in Bangalore, Mobility and ICT, Research for Smart City Solutions (Lilaban)-Proposal submitted to IGSTC with the Indian side partners-DULT, BMTC, IITB, ELCIA, & BOSCH and the German side partners being ITL University, TRC, Nextbike. The proposal is to find mobility solutions will be planned in detail and implemented in a "Living lab" in Bangalore. Using the findings in the proposal the transferability of the new solutions for the whole city is planned.**

This Indo –German cooperation is based on the task of developing new solutions in the areas of Mobility, ICT and to analyse and gain new scientific insights.

**CISTUP SUPPORTED PROJECTS UNDER PHASE III-2012 (Review Process tookplace on 20th March 2012. - Total proposal received - 11)**

SL.NO	TITLE OF THE PROJECT	INVESTIGATOR	DEPARTMENT	DURATION	AMOUNT (In Lakhs)
1	Benchmarking Bangalore city for sustainability	Dr. P. Balachandra / Prof. B. Sudhakara Reddy	Management Studies	1 Year	3.76
2	Retrofitting of masonry in compression, flexure and shear with FRP.	Dr. K S Nanjunda Rao	Civil	2 Years	5.28
3	Enhancing Productivity and Economics of Small-scale Biodiesel Units	Dr. H N Chanakya	CST	1 Year	5.40
4	Evaluation of Municipal Solid Waste (MSW) characteristics of a typical landfill in Bangalore	Prof. G L Sivakumar Babu	Civil	2 Years	4.98
5	Design and development of a constant switching frequency Hysteresis PWM controlled motor drive for variable speed electric vehicle applications , with fast dynamic performance.	Prof. K.Gopakumar/ Prof. L.Umanand	CEDT	2 Years	5.00
6	Mechanically Flexible Sensor Tape/Sticker with Analog Processor and Electronic Communication for Centralized Monitoring of Bus Diagnostics	Dr. Sanjiv Sambandan	ISU	2 Years	3.91
7	Development of a Robust, Low Cost Traffic Measurement System	Dr. G R Jayanth	ISU	2 Years	2.40
8	Carbon nanotubes based flame sensor	Dr. Abha Misra	ISU	2 Years	4.00
9	Assessing resource and energy demand attributed to modern urbanizing transitions in rural dwellings	Prof. Monto Mani Prof. B. V. Venkatarama Reddy Prof. H. I. Somashekar	CST	2 Years	5.32
TOTAL					40.05



### **MOST CRUCIAL SECTION OF THE BANGALORE METRO IS THE UNDERGROUND SECTION IN MAJESTIC AREA By:**

Prof. T.G. Sitharam

The Bangalore Metro weaves through the bustling commercial and residential areas of the city and in which the most crucial section of the Metro line is the underground Section. The first phase of Bangalore Metro, consisting of two corridors of double line electrified, will cover a total of 42.0 km. Out of the 42.0 km., 8.812 km is underground near City Railway Station, Vidhana Soudha, Majestic and City Market and most of the other section is elevated. The two corridors intersect at Kempegowda station which is a two level interchange station. A commuter who intends to travel from a station in one line (Purple line: East-west) to a station in another line (North-south- Green line) will have to change the train at Kempegowda station. The Kempegowda Metro station will come up right under the Kempe Gowda KSRTC bus stand in Majestic. One of the nerve centers that links our city to the rest of the country is the central bus stand area, Kempegowda Bus Station, also called Majestic Bus Stand, is a large bus station in central Bangalore and it is located opposite the Bangalore City Railway Station. This bus station provides connectivity to almost all the areas of Bangalore. One side of the bus station is used for intra-city buses by the Bangalore Metropolitan Transport Corporation while the other side is used by out-station buses operated by various state road transport corporations. The Majestic underground station falls in the north-south corridor of the Metro which will have 3.94 km long twin tunnels, ramps over 600m and three underground stations. While two underground stations will be located at Chikpet and City Market, the Majestic area will have the interchange station at the junction with the east-west corridor of the Metro, which will run over. This E-W corridor will include 4.87 km long twin tunnels, ramps over 450 meters and four underground stations at City Railway Station, Central College, Vidhana Soudha and the cricket stadium. Once the underground stations are ready, Kempegowda station will become the biggest intermodal transit centre of the city, offering inter-connectivity among different modes of transport like bus, rail and the Metro. The inter-modal transit centre shall also be linked in the future to LRT/Mono rail/ commuter rail/airport link and thus making the underground Kempegowda metro station a crucial link in the Bangalore Metro project. Passenger transport has always been intermodal and a major goal of modern intermodal passenger transport is to reduce dependence on the automobiles and individual motorization as the major mode of ground transportation and increase use of public transport.

Bangalore City will not be sustainable without better infrastructure and, in many cases, the best choice for much of this infrastructure will be a tunnel and underground space in the very dense CBD area. The hazards associated with the tunnel construction in Bangalore's very dense Majestic area include poor ground conditions, There are lot of constraints that these urban settings pose to any infrastructure construction, but there are also extremely demanding performance requirements for minimal disturbance to the public and to the surrounding utilities, structures and the environment. The world of underground engineering and construction has acquired a wide-ranging and high-level experience on tunnel construction with Tunnel Boring Machines (TBM), thanks to the remarkable increase in the number of tunnels that are becoming longer, going deeper, and growing larger in diameter. In urban areas, the acquired consciousness of preservation and care for the anthropogenic environment, accompanied by the improvement in the quality of life, has raised the level of difficulty and challenge in underground construction respecting the constraints deriving from people's presence and, therefore, the necessity for a technological and intellectual approach to respond appropriately to these constraints. TBM and the tunnel to be excavated, constitute a delicate and sensitive, unitary system, which will simply not just a fully mechanized tool, integrates the various operations of the conventional excavation method for excavating more rapidly, and overcoming all the well-known problems and uncertainties. BMRCL has demonstrated in the underground construction so far that the system is well managed rationally and scientifically, in a unified context of research and design of the tunnel, the machine, and the environment near the busiest area in majestic. Worldwide, there is already, and will be in the future, a great demand for tunnels to be constructed in difficult and crowded urban settings. The need for mechanized excavation of tunnels in urban environments has continuously increased in the last two decades, especially as a result of the global expansion in the number of tunnels being constructed for subways, railway underpasses, and urban highways. In particular, all the principal risk factors are found to be associated with tunnels in densely populated urban areas, including the properties and services subject to risk, poor geotechnical conditions of the ground, presence of and consequent interference with water table, and the small overburden with respect to the excavation diameter. Tunnel boring machines has brought fresh air to the conception of tunnels in urban areas, placing in the forefront the fight against the risks, supplying in this way a reliable instrument for making rational and transparent choices to the decision-makers.

1. RAAC meeting held on 13th January 2012.
2. EC meeting held on 3rd April 2012.

### Re-constituted Executive Council of CiSTUP

1. Prof. P. Balaram  
Director  
Indian Institute of Science
2. Shri. S.V. Ranganath  
IAS Chief Secretary Govt of Karnataka  
Vidhana Soudha
3. Prof T G Sitharam  
Chairman, CiSTUP  
Indian Institute of Science
4. Prof. N. Balakrishnan  
Associate Director Indian  
Institute of Science
5. Shri. Bharath Lal Meena  
Commissioner  
Bangalore Development Authority (BDA)
6. Shri P. B. Ramamurthy. IAS  
Principal Secretary to Government  
Transport Department  
Karnataka Government Secretariat
7. Mr M.A. Saleem, IPS  
IGP & Addl Commissioner of Police (Traffic)
8. Ms. V. Manjula, IAS  
Commissioner Bengaluru Metropolitan  
Land Transport Authority (BMLTA)  
Directorate of Urban Land Transport(DULT)
9. K.R. SREENIVASA, IAS  
Managing Director  
Bangalore Metropolitan Transport Corporation (BMTCL)
10. Prof. B N Raghunandan  
Divisional Chairman  
Division of Earth & Environmental Science  
Indian Institute of Science
11. Prof. C.S. Manohar  
Chairman, Dept of Civil Engineering  
Indian Institute of Science
12. Prof. Anurag Kumar  
Divisional Chairman  
Electrical Sciences, Indian Institute of Science
13. Prof. M.S. Mohan Kumar  
Professor, Department of Civil Engineering  
& Secretary KSCST, Indian Institute of Science
14. Shri. T.V. Mohandas Pai  
Chairman  
Manipal University Learning Pvt. Ltd.,
15. Prof. S.L. Dhingra,  
\*Institute Chair Professor & Emeritus Fellow\*  
Transportation Systems Engg,  
Civil Engineering Department, IIT
16. Dr. Ashwin Mahesh  
Member of the ABIDE Task Force,  
Co-founder of Mapunity.
17. Mr. Shinichi Yamanaka  
Transportation Expert,  
Japanese International Cooperation Agency  
(New Delhi Liaison Office)
18. Shri Prodyut Dutt  
Principal Transport Specialist  
Asian Development Bank (ADB),  
India Resident Mission (INRM)
19. Mr. Roperto Zheha  
Company Director  
The World Bank
20. Shri .N. Manjunath Prasad IAS  
Managing Director  
Karnataka Road Transport Corporation (K.S.R.T.C)
21. Shri Upendra Tripathy, IAS  
Additional Secretary,  
Cabinet s Secretariat
22. Shri N Sivasailam, IAS  
Managing Director  
Bangalore Metro Rail Corporation Ltd (BMRCCL)
23. Shri S K Lohia, IAS  
Officer on Special Duty (UT)  
E.O. Joint Secretary  
Ministry of Urban Development
24. Shri. Shankar Linge Gowda, IAS  
Commissioner BBMP  
N.R. Square
25. Sri.K.M. Shivakumar  
Additional Chief Secretary to Government  
Government of Karnataka  
Urban Development Department
26. Prof C.E.G. Justo  
Transportation Expert
27. Prof.K.M. Anantharamiah

## Other Activities

The Fraunhofer Innovation and Technology Platform (FIT ) held at New Delhi on March 5th & 6th 2012.

Fraunhofer is Europe's largest applied research organisation with 80 institutions, 20000 employees and a turnover of Euros 1.8 billion. The Fraunhofer Innovation and Technology Platform (FIT) was an exciting initiative of Fraunhofer which I showcased its competencies, latest technologies, innovative ideas and solutions.

The inaugural event was held for the first time as part of the on-going initiative of the Govt. of the Federal Republic of Germany: Germany and India 2011-2012 – Infinite Opportunities..

The 1st FIT Platform 2012 focused on Mobility and Logistics as thematic areas. The event kicked off on 5th of March 2012 with a high profile panel discussion on the subject “Technology as a driver to improve quality of life”. This was followed by the Awards Ceremony of the “German High Tech Champions”, where innovative and path-breaking ideas of young German research and industry practitioners, which have a strong business focus, were presented in the form of short presentations.

The second day, 6th of March was devoted to technical sessions on the sub-thematic areas of urban transportation, electrical mobility, light-weight design, smart solutions for multimodal transportation and logistics, biofuels and environmental impacts.



The event was attended by more than 200 delegates from India and abroad, mostly by CEOs, CTOs, and innovation experts from industry and research as well as government.

Mrs. Anandi Iyer Fraunhofer Representative and Senior Advisor India, Prof. Dr.-Ing. Uwe Clausen Director, Fraunhofer Institute for Material Flow and Logistics IML Chairman, Fraunhofer Transport Alliance and Managing Director, Institute of Transport and Logistics, TU Dortmund University of Technology & Dr. V. Sumantran Vice Chairman, Hinduja and Member of the Fraunhofer India Advisory Council were some of the prominent participants.

Some of the prominent Speakers were Mr. Cord Meier-Kloedt (German Acting Ambassador to India), Prof. Dr.-Ing Uwe Clausen (Chairman, Fraunhofer Transport Alliance), Dr. V. Sumantran (Vice Chairman Hinduja), Prof Dr. Alan McKinnon (Head of Logistics and Dean of Programmes, The Kuehne Logistics University), Mr. Arvind Kapoor (President ACMA), Prof. Dr.-Ing. Holger Hanselka (Director, Fraunhofer Institute for Structural Durability and System Reliability LBF), Mr. Axel Demmer (General Manager, Fraunhofer Production Group).

The Concluding Address was give by Mr. Sandilya (President SIAM), N.N. Prof. T. G. Sitharam attended this event at the invitation from FIT





Executive Council of CiSTUP meeting held on 03.04.2012.



BANGALORE – CAMBRIDGE NETWORK – Delegation Visit to Cambridge University and Other organization in UK during April 16th to 21st 2012



## News & Committees

Re-constituted Research & Academic Advisory Committee of CiSTUP

1. Prof B N Raghunandhan  
Divisional Chairman,  
Earth and Environmental Sciences  
Indian Institute of Science
2. Prof T G Sitharam  
Chairman, CiSTUP Indian Institute of Science
3. Prof C.S.Manohar  
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Dept of Civil Engineering  
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5. Prof.S.Asokan  
Professor  
Instrumentation & Applied Physics  
Indian Institute of Science
6. Dr.H.N.Chanakya  
Centre for Sustainable Technologies  
Indian Institute of Science
7. Mr. Vivek Menon, P.E.  
Managing Director, Invicus Engineering Co.,
8. Dr.Vijay Kovvali  
Regional Manager, IBI

Members from Organizations-

9. Sri.C.Manjappa,  
Engineer Officer – BDA
10. Sri. C. G. Anand  
Chief Mechanical Engineer BMTC
11. Sri. S. K. Paramesh  
Director (Technical) KSRTC
12. Mrs. Vanashree Vipin Singh, DCF EMPRI
13. Sri. Puroshtham Murali B.  
Urban Transport Specialist.  
DULT

ku·dos :

From : "Velaga, Nagendra .R"

I am a regular follower of CiSTUP newsletters. I have just seen the latest newsletter (2nd Vol and 3rd issue). It is really impressive and informative. This is the best way of disseminating information about the activities that are going on at the centre.

It seems a lot of activities are going on at CiSTUP. I have acknowledged the activities (such as MaDePro, Foundation day third annual lecture) in the current newsletter under the title of



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