

Report

Two Day Workshop on
"ITS for Sustainable Transportation System and Choices"

Department of Civil Engineering
IISC, Bangalore
28th and 29th May 2013



Organized by:

Department of Civil Engineering, Indian Institute of Science, Bangalore



In association with:

Transportation Research Group of India



Intel Technology India Pvt Ltd.

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Workshop Report on

“ITS for Sustainable Transportation Systems and Choices”

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Summary of the Workshop

World over transportation systems are operating under constraints of energy, environment, resources, and other factors. In such a scenario, where supply centric approaches are no longer feasible, there is a growing need to manage the existing infrastructure by regulating the demand efficiently in a sustainable manner. Over the past decades, the advances in Information technologies (IT), electronics and telecommunication, internet, wireless, and mobile computing technologies, geo-informatics, information search, retrieval and visualisation, network sensing, analytics etc. (Collectively called as **Intelligent transportation systems (ITS)** technologies) have opened a new set of opportunities for developing sustainable transportation systems influencing the choices of people towards sustainable travel modes and practices.

However, presently the level of introduction of ITS and its use is still in nascent stage in India. Also, many of these technologies have been developed for conditions in Western countries, which are many ways quite different from Indian conditions, and therefore some degree of customization for Indian conditions is required to make ITS technologies effective in Indian conditions. The complexities of Indian traffic system and driver behaviour are much higher as compared to Western countries. Heterogeneous mix, no lane discipline, exponential growth of vehicles, bad roads, poor geometrics, conflicting movements of pedestrians and vehicles on the road, problems with the driver licensing system, poor traffic law enforcement etc., are factors that add to this complexity. While some of these could be improved by policy interventions and other measures from government and local bodies, the traffic conditions in India today are as such beyond the level of control by simple traffic management measures or human abilities and the use of technology is all the more important to manage traffic in India today. Considering this background, this workshop tried to bring out a concrete agenda for research in making ITS technologies effective in Indian conditions.

The Workshop was of two days. The 1st day had an open seminar where experts from countries like India, France, and Canada delivered talks on various sub-themes of the workshop.

Below are the details of the presentation:

1st Session	Dr. Ashish Verma, Asst. Prof. (Indian Institute of Science (IISc), Bangalore) and President (Transport Research Group (TRG) of India) – Role of TRG in promoting Transportation Research and Capacity Building India.
	Prof. Partha Chakroborty, Professor, Indian Institute of Technology (IIT) Kanpur – Role of ITS in building a Sustainable Urban Transportation System: Some Thoughts
	Dr. A Ravindra, IAS (Retd.), Advisor to the Hon'ble Chief Minister of Karnataka, Urban Affairs. – Issues in Sustainable Transport
	Mr. P. Ravikumar, and Mr. V. Murlidharan, Centre for Development of

	Advanced Computing (CDAC) - Current ITS Scenario in India and need for an integrated approach
	Mr. Rajiv Mongia, & Mr. Ranganathan Kumar, Intel labs - Intel collaborative research institute for sustainable and connected cities.
	Ms. Sujaya Rathi, Centre for Study of Science Technology and Policy (CSTEP) - ITS- a systems view
	Mr. Nataraju Vusirikala, Robert Bosch Engineering and Business Solutions Ltd., Bangalore - ITS for Road Safety
2nd Session	Mr. Srinivas Sessa Patchala, Tata Consultancy Services (TCS), Mumbai – Electronic Ticketing Machines Enabling User Friendly Bus Transport
	Dr. Espié Stéphane, l'Institut Rrançais des Sciences et Technologies Des Transports (IFSTTAR), France - Tools and methodology for ITS design and assessment
	Dr. Naveen Eluru, McGill University, Montreal, Canada – Analyzing Data from ITS Technologies
	Prof. Anurag Kumar, Electrical Communication Engineering (ECE), IISc Bangalore - Models for Delay at Traffic Lights
	Prof. Shalabh Bhatnagar, Computer Science and Automation (CSA), IISc Bangalore - Distributed Asynchronous Reinforcement Learning Algorithms for Traffic Signal Control
3rd Session	Dr. Soumyendu Raha, Super Computer Education and Research Centre (SERC), IISc Bangalore - Intelligent vehicle routing system
	Dr. E. Madhu, Central Road Research Institute (CRRI), New Delhi
	Dr. Ashish Verma, IISc Bangalore – Bangalore Public Transport Trip Planner

Altogether there were about 58 registered delegates on 1st Day of the Workshop covering, international and national stakeholders in ITS, government officials, consultants, academicians, and students.

Taking forward the experiences and views shared on 1st day of Workshop by experts and delegates, the 2nd day of the Workshop focused on structured round-table discussion among invited expert group members on developing a concrete agenda for development of Intelligent Transportation Systems (ITS) technologies in India. The proceedings and outcome of which are included in this Workshop report. Annexure-1 and Annexure-2 contains the list of attendees on 2nd day of the Workshop, and photographs of the workshop, respectively. It is expected that this report will serve as a useful reference and decision support to all related government and private stakeholders in India and abroad, in developing ITS technologies for India. **Prof. Partha Chakroborty from IIT Kanpur** moderated the discussions of the Expert Group Meeting on 2nd day of Workshop. The expert group members discussed and sequentially addressed the following questions in different break-up sessions on 2nd day of the Workshop:-

Session-1

1. What are the differences that exist with respect to traffic and transport in India and developed countries like USA, Europe etc.?
2. What are the technical sub-domains of traffic and transport in India that can benefit from ITS interventions?
3. What kind of ITS solutions can be developed to address these sub-domains?

Session2

1. Are there already available ITS solutions anywhere in the world that can be used in Indian conditions?
2. What type of ITS do we need but do not have?

Session3

1. What we need in India to promote ITS for efficient mobility?

The following are the outcomes of each session.

SESSION 1

Question 1

What are the differences that exist with respect to traffic and transport in India and developed countries like USA, Europe etc.?

1. Heterogeneous and non-lane based traffic
2. Driver behaviour
3. Diversity in terms of population
4. Device affordability is too low
5. Lack of information on road hassles (such as potholes, blockages etc.)
6. Non user-centric transport system
7. Loss of productivity – time lost in travel.
8. Unavailability of data about system parameters
9. Lack of scientific approach in Urban Transportation Planning.
10. Have not been catching up with technology as that in developed nations
11. Lack of technocrats in Urban Local Bodies (ULB)
12. Need automatic data collection
13. Issue related to hawkers and vendors on footpaths
14. Non-motorised Traffic (NMT) users safety on road
15. Unawareness among users about the developments
16. Lack of training and enforcements
17. Customisation of imported systems – still to be touched
18. Need for improvement in modelling tools
19. Rethinking provision of infrastructure
20. ITS solutions for cost effective public transport
21. Weak road markings
22. Lack of bus stops and shelters
23. Local languages on sign boards
24. Last mile connectivity
25. Use of Right to Information (RTI) for data procurement from agencies
26. Non-use of protection measures by motorists
27. Inadequate manpower for governance
28. Public Transport (PT) improvement and reduction in car use

Questions 2&3

What are the technical sub-domains of traffic and transport in India that can benefit from ITS interventions?

What kind of ITS solutions can be developed to address these sub-domains?

1. A decision support system for improving governance
2. Advance traveller information systems (for road users and PT users)
3. Scientifically characterise driver behaviour
4. Track hazard scientifically
5. Portal for information dissemination
6. Adaptive traffic control system
7. System for data gathering and sharing

8. Smartphone/camera related technologies
9. Technologies for overcoming human limitations
10. Periodic data collection
11. Tools for maintenance of roads
12. ITS for parking and Variable Message Signs (VMS)
13. Instrumented vehicles
14. Driving in adverse weather conditions and vehicular control
15. Logistics and Railways
16. Data collection template design
17. Accident data collection using ITS
18. Use of technology in Licensing system
19. Simulation and validation of results
20. Post traffic disaster management
21. Geo-informatics based decision support system for ULBs
22. Tapping cell-phone penetration for traffic parameters detection
23. Development of mobile apps
24. Crowd sourcing
25. Intelligent vehicle routing system
26. Intelligent travel planner
27. Open source data base
28. Techniques for identifying lateral and longitudinal distance
29. Measurement of tyre pressure
30. ITS solution for temporal distribution of demand
31. Speed adaptation system
32. Multimodal information system
33. Radio-frequency identification (RFID) for boarding and alighting measurement
34. Information about transit reliability
35. Instruments for detecting drowsiness and drunkenness
36. Bus priority measures
37. Bus drivers behaviour detection
38. Trusted data sharing platform
39. Smart license card for introducing credit point system for violations
40. Congestion charging/toll charging
41. Driver education
42. RFID for weight measures
43. ITS for emergency vehicles

SESSION 2

Question 1

Are there already available ITS solutions anywhere in the world that can be used in Indian conditions?

ITS Products developed of under development by C-DAC

1. Vehicle tracking System (VTS)
2. Variable Messaging System (VMS)
3. Station Name Display System (SMDS)
4. Distress Call Response Management System (DCRMS)
5. Vehicle Actuated Traffic Signal Controllers (UTCS)
6. Area Traffic Control System (ATCS)
7. Wireless Traffic Control System (WTCS)
8. Intelligent Parking Lot Management System (IPLMS)
9. Red Light Violation Detection System (RLVDS)
10. Traveller Information System

SESSION 3

Question 1

What we need in India to promote ITS for efficient mobility?
and

Session-2 - Question 2

What type of ITS do we need but do not have?

1. Understand transport user behaviour and try to influence it, and decongest the system
2. ITS to meet basic data requirements (volume, density, etc.)
3. Apply ITS for analysing/reporting hazards of transportation infrastructures
4. Speed adaptation system
5. Sensor based system for warning the driver about the obstacles
6. ITS to meet three pillars of sustainability – PT and NMT improvement using ITS. Application of ITS system for improving PT systems in terms of seamless fare payment, easy transfer, traffic information provision, comfortable drive and other instrumentation system and mainly to be seen acceptable to different groups of population.
7. Multi-modalism – to bring and take individuals from PT location
8. Trip planner incorporating environmental inputs.
9. Any technology improving the safety of private and public transportation system (over speed detection, drowsiness detection, gap maintenance)
10. Marketability of technology
11. ITS should cater to the different sections of the society
12. Work with a bench mark – using various indices available now, see how ITS can improve the system parameters.
13. Ways to improve our responses to incidents
14. Showcase case studies of ITS application to influence policy makers
15. Bring decision makers to what technocrats believe correct
16. ITS forum in India
17. User requirement studies
18. Educate policy makers, drivers and laymen
19. Can we do something related to railway visibility?
20. Educate traffic police.

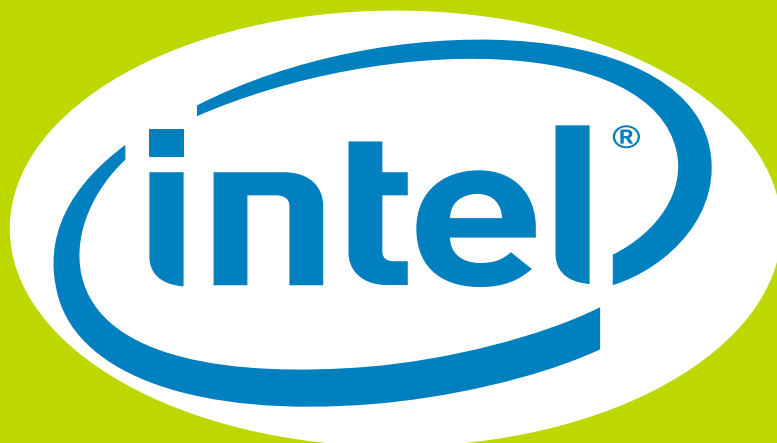
Annexure 1 : Expert Group Meeting Attendees.

S.No	Name	Affiliation
1	Ashish Verma	IISc Bangalore & TRG
2	Varun Raturi	IISc Bangalore
3	Malvika Dixit	IISc Bangalore
4	A Ravindra	Former Chief Secretary, GOK
5	E Madhu	CRRI, New Delhi
6	Anurag Kumar	ECE, IISc Bangalore
7	Sujaya Rathi	CSTEP, Bangalore
8	Nataraju Vusirikala	Bosch, Bangalore
9	Srinivas Patchala	TCS, Mumbai
10	I.Ravindranath	Task force for quality assurance in construction, GoK
11	S Raghuram	SERC, IISc Bangalore
12	V Muralidharan	CDAC, Hyderabad
13	P. Ravikumar	CDAC, Trivandrum
14	Sunil Sherlekar	Intel, Bangalore
15	Suresh B	IISc Bangalore
16	Deeshma M	IITM, Thiruvananthapuram
17	Nagaraja G	IISc Bangalore
18	Rejith R. G	IITM, Thiruvananthapuram
19	Annappayya Achari	IISc Bangalore
20	Niranjan Hiremath	IISc Bangalore
21	Pawan K Goel	NIT Silchar
22	K Raja	IISc Bangalore
23	Anusha C.S	IISc Bangalore
24	Rahul L Kadam	IISc Bangalore
25	Rahgavendra	Task force for quality assurance in construction, GoK
26	Rahul T M	IISc Bangalore
27	Manoj M	IISc Bangalore
28	ESPIE Stephane	IFSTTAR
29	Vijay Kesavan	Intel Corp.
30	Venkat Natarajan	Intel
31	Kumar Ranganathan	Intel
32	Samrat Mukhopadhyay	NIT K
33	M.J Pramod	NIT K
34	Shashank Srivastava	NIT K
35	Rishi Kumar Pai	NIT K
36	Gunashree K.S	Student, Bangalore
37	Rahul Chand AR	NIT K
38	Vivek Yadav	NIT K
39	Alpana Kumari	IIT Guwahati
40	Sanam Lakhwara	NIT K
41	Gopika Nandan	NIT K
42	Partha Chakroborty	IIT Kanpur & TRG
43	Naveen Eluru	Mc Gill University, Canada
44	Rajendra L	Intel Technologies



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