

IRG Activity Report

Date of Submission: 23 / 08 /2010

1. IRG code and name of IRG

- 1) IRG code: IRG - 04 - 2010
- 2) Name of IRG: **Scale Free Characteristics of the Traffic Network (SCAFT)**

2. List of research members

1) Professor Ashok Kumar GWAL (Head of Research)

Head of Department
Department of Physics
Barkatullah University, INDIA
Fax: +917552491823
E-mail: ak_gwal@yahoo.co.in

2) Bahram Mojarrabi (Representative, Secretary)

Director of Research
Catt Systems,
Caboolture, QLD, Australia
E-mail: staff@cattsystems.com.au

3) Dr. Hussein DIA

ANZ ITS Technical Leader
AECOM
Fortitude Valley, QLD 4006
Email: Hussein.Dia@aecom.com

4) Dr. Bijan Mojarrabi

Director
Brisbane Institute of Advance Learning
Brisbane, Australia
Email: Bijan.mojarrabi@bitech.edu.au

5) Dr. Shourabh BHATTACHARYA

Lecturer
Department of Applied Physics
Madhav Institute of Technology and Science,
Gwalior- 474 005, M.P., India
E-mail: shourabhbhattacharya@gmail.com

3. Purpose and Mission of IRG

To apply the concepts and methods from the emerging science of complex network and superstatistics to the design and planning of a futuristic globally integrated transportation system.

4. Achievements of IRG in 2009-2010

1) Paper, report and book: (Title, Authors, Year, Name of journal etc.)

Journal paper

Dia, H. and Thomas, K. (2010). Development and evaluation of arterial incident detection models using fusion of simulated probe vehicle and loop detector data, *Informat. Fusion* (2010), doi:10.1016/j.inffus.2010.01.001

3) Eigenstructure and Exergy Calculations of Superstatistically Integrated Transport and Urban Systems. To be publish in forthcoming EASTS Journal.

Abstract: In the last few years, International research group IRG SCAFT has developed a superstatistical based integration framework in which the principle of Ever-Advancing Civilization mediates the synchronized and cooperative strategies of globally integrated transport and urban systems through introduction of an optimally integrated system of humanitarian hubs and cluster merging process of local populations.

As a part of on-going IRG research, we seek to answer two further formidable challenges we encounter as we continue to develop the common framework for integrated design of the various transport and urban structures, namely the existence and nature of eigenvalues required for dimensional calculations of humanitarian hubs and secondly the social capital exergy based core logistic activities required for cluster merging processes optimization, consistency and sustainability. Finally, here, we suggest the spiral growth pattern for cluster merging process and humanitarian hub integration process as another manifestation of First passage Time Anisotropy possibly identifying the most plausible growth model for integrated system design.

Conference Papers

Dia, H, Smit, R and Morawska, L (2010). Future Trends in Modelling Road-Based Pollutant Emissions and Fuel Consumption. Proceedings of the Australian Institute of Traffic Planning and Management (AITPM) National Conference 2010, 20-23 July, Brisbane, Australia

Dia, H. (2009). Evaluation of the Impacts of Traveller Information Systems. Invited presentation. Australian ITS Summit, Melbourne, Australia

Dia, H. (2009). Evaluation of Incident Management Strategies using Traffic Simulation. Invited presentation. QUT ITS Symposium, Brisbane.

Mojarrabi, B, Gwal, AK, Dia, H and Bhattacharya, S (2009). First Passage Time Anisotropy: Upgrading the Criterion for Superstatistical Framework of Social and Transport Network. Proceedings of the Eastern Asia Society for Transportation Studies, Vol.7

Tey, L, Ferreira, L and Dia, H (2009). Evaluating Cost-effective Railway Level Crossing Protection Systems. Proceedings of 32nd Australasian Transport Research Forum, Auckland, New Zealand.

Dia, H and Panwai, S (2009). Models of Driver Behaviour for supporting vehicle telematics and ITS simulations. Proceedings of the 10th ITS Asia Pacific Forum and Exhibition, 8-10 July 2009, QSNCC, Bangkok, Thailand.

Dia, H., Gondwe, W. and Panwai, S. (2009). Impact Assessment of Incidents and Incident Management Strategies. Proceedings of the 10th ITS Asia Pacific Forum and Exhibition, 8-10 July 2009, QSNCC, Bangkok, Thailand.

Dia, H and Panwai, S (2009). Evaluation of discrete choice and neural network approaches for modeling driver compliance with traffic information. Transportmetrica Online.

3) Group meeting: (Date, Venue & abstract)

4) Result of application for the research grants: (Name & result)

SACHI FOUNDATION awarded \$15000 to IRG SCAFT for contributing towards EASTS cooperative research on integrated transport and urban systems.

5) Promotional activities of your IRG: (Home page, Newsletter, Mailing list etc.)
We intend to make a home page later in the year.

Will you continue your IRG's activity after August 2010?

[YES / NO] Yes

→ If "YES", please answer the following questions.

5. Future research plan and including time frame with the following items:

The focus of our study is

1) To further study Exergy based objective optimization methods for large scale integrated transport systems.

2) To compare the dynamics of interacting local structures around the vicinity of two hubs, namely Flinders University and Marion shopping center in South Australia.

- Possibility to hold seminar and symposium in 2010. (Date & Venue)

We intend to hold a Seminar.

-