

# Application Form of EASTS IRG (International Research Group)

## IRG-04-2005

Date of Submission: 30/10/05

1. Name of IRG: <b>Scale Free Characteristics of the Traffic Network (SCAFT)</b>
2. List of research members 1) Dr Bijan Mojarrabi (PhD) Complex adaptive Traffic and Transport Systems (CATT SYSTEMS), Brisbane, Australia 2) Professor Ashok Kumar Gwal Dean of Faculty Sciences, Head of Physics, Department of Physics, Barkatullah University, INDIA 3) Mr Bahram Mojarrabi Complex adaptive Traffic and Transport Systems (CATT SYSTEMS), Adelaide, Australia
3. Purpose and Mission of IRG:  EASTS has given researchers a forum where collaborative research work is facilitated by the free exchange of ideas and techniques between industries, universities, government and non-government organization (NGO) and across many disciplines to look into the problem of design of optimal transportation systems that serve to secure a sustainable human future.  The mission of our proposed group is to harness the emerging science of complex network to the planning and design of a futuristic global integrated transportation system. It is evident that such a mission must integrate all current transportation networks in both the developed and developing countries. An important aspect of our proposed research enterprise is seeking the support of Japan International Cooperation Agency (JICA). Their vast and valuable databases, resources and expertise will help us to accelerate the achievement of our mission. Our envisioned research program has certain features as detailed below:  Firstly, <b>We aim to study the scale free properties of Gradient Induced Flow Entities (or Super nodes) within the traffic network.</b> This is a challenging and ambitious goal and is capable of revolutionizing the way we view and manage the traffic network. The details of method and techniques to conduct this part of our research have been explained in our ICRA proposal. We are now resubmitting our ICRA project under IRG as requested.  Secondly, <b>It promotes strong partnership between universities, industries, Government agencies and NGOs.</b> In fact, Our proposed IRG is a joint cooperation between private sector, university and EASTS community with H. Eshraghian, a well recognized member of South Australian NGO community as the liaison.  Thirdly, <b>It is a socially responsible project and in accord with principle of ever advancing civilization</b> as it helps communities to further develop an environmentally sound, economically feasible and technically robust, scalable and efficient local transportation system which can easily integrated to the rest of the global transportation.
4. Future research plan including time frame:  <b>Project (06-07):</b> To jumpstart our project, we plan to investigate the topological properties of traffic network around gradient induced flow entities such as Taj Mahal and Lotus temple in India and also a large shopping center in Brisbane Australia. We have already found one such entity around Marion shopping center in Adelaide. We will continue to map further the scale free properties of the traffic network within Adelaide Metropolitan areas. It is important to note that university of Queensland and CATT Systems have established certain joint research partnership to investigate further the topological characteristics of urban traffic around major infrastructures in Australia. An example of this important partnership is our joint proposal linkage grant with Australian research Council (ARC). The projected time frame for the completion of this phase of research is as follows and will be reviewed in the first report to EASTS authorities.  <b>First Quarter 2006:</b> Preparation & Data Collection <b>Second Quarter 2006:</b> Preparation & Data Collection <b>Third Quarter 2006:</b> Data Collection & analysis <b>Fourth Quarter 2006:</b> Analysis and modelling

**First quarter 2007:** First Report To EASTS

**Second Quarter 2007:** Modeling, Data Analysis & Stimulation

**Third Quarter 2007:** Result, Conclusion and second report submission To EASTS