

# Application Form of EASTS IRG

Date of Submission: 2020/08/06

1. Name of IRG:

## Guidelines for implementing bus priority measures in Asian Cities: A simulation-based approach

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4. Keywords (Maximum: 5 words)

Bus Priority Measures, Bus Priority Lanes, Bus Rapid Transit, Road Capacity, Microsimulation Modeling

5. Purpose and Mission of IRG:

**Background**

Public transport is important in making cities more livable by improving the mobility of people and the accessibility of places. In cities of transitional economies, the share of private transport modes continues to increase rapidly. For example, the passenger transport in Sri Lankan cities also observes a similar trend with private vehicle ownership doubling from 2006 to 2014 while the supply for public transport (buses) has remained stagnant (NTC, 2015). As a result, by 2017, the average speed of an arterial road corridor in Colombo has been reduced from 19 kmph (2013) to 16 kmph. This continuing shift for private transport modes will further reduce the performance of the network and is likely to accelerate the deterioration of transport in post COVID-19 situation.

Similar is true with a major metropolitan area such as Metro Manila, Philippine which is currently reeling from a lack of public transport services coupled with rising private vehicle ownership with an average year-by-year growth rate of 8% for new car registrations between 2000 and 2016 (Philippine Statistics Authority 2017). Very recently, the Philippine government has started implementing both rationalization and modernization programs that favor buses and modern jitneys. The rationalization program prioritizes the deployment of buses along major corridors. Meanwhile, exclusive bus lanes were established on EDSA, which is among the busiest corridors in Metro Manila with the objective of providing much-needed capacity for public transport users. With space and funding limitations for adding additional road capacity, it is important to determine what measures of bus priority can be implemented on different roads.

Bus priority measures include Bus Priority Lanes (BPL) and to a fuller extent, Bus Rapid Transit (BRT). They are a practical solution suitable for urban centers where it is hard to provide an additional and exclusive right of ways for buses. Successful implementation of such priority measures should improve the service attributes of the bus service without impacting negatively the access and mobility needs of other transport system users (Schutter et al. 2009; Agrawal et al. 2013). A 40 km stretch of

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BPL was first tested out in Colombo in 2017 and it was found out that the average speeds for buses have been improved to 21 kmph, at almost no expense to the travel times of other vehicular traffic. This was seen as a low cost and quickly implementable approach to improving travel speed for bus passengers who make up between 40-50% of commuter travel to Colombo, Sri Lanka. A Stated Preference Survey conducted in Sri Lanka in 2006 on BRT as a new mode of transit revealed that conducting such a user opinion survey is feasible and more preferable towards BRT (Sivakumar et al, 2006). Nakamura et al (2017) indicated also based on Curitiba's history, the multimodal/intermodal along with consideration on planning, management and operation is important for success of BRT in developing countries.

**The purpose** of this IRG is to continue to work on the BPL concept and to develop guidelines and policies for planning and designing appropriate bus priority measures for improvements/suitability on roads with different geometry and traffic mix. This will use microsimulation models with the aim of increasing passenger throughput in peak periods.

**Objectives:**

- To develop an exhaustive reference list of bus priority measures in high-density cities in transitional and developed economies.
- To develop guidelines on the suitability of selecting urban road corridors for developing bus priority measures based on experience in Japan and Indonesia, and other economically transitional and developed countries where studies have been concluded.
- To evaluate/quantify the suitability of implementing bus priority measures including BPL and BRT in Colombo and Kandy in Sri Lanka, and Metro Manila in the Philippines using simulation-based approaches
- To use a simulation-based modeling approach to examine various design options and to select the best implementations for candidate corridor
- To include such simulation-based approaches in the ongoing projects in Colombo, Kandy, and Metro Manila to improve travel time reliability for buses and to monitor the performance under controlled conditions.
- To conclude by finding the best practices for bus priority design to achieve optimum traffic conditions and to make recommendations to:
  - Set up a monitoring system for bus priority implementation
  - Identify and regulate other transportation modes which can be allowed the use of the BPLs during the operational period (e.g., Ambulances, School Vans, and other high occupancy vehicles)
  - Enforcement mechanisms (e.g., Fines, Patrol based enforcements, Video Cameras, etc.)

6. Target year for completion (Research period is suitable within four years.):  
August 2022 (or two years from the award)

7. Research plan:

**Year 1 (Sep 2020 - Aug 2021):**

- Research Group (Virtual) meetings to finalize the project details/ Scopes (depth and breadth of the research)/ Study area
  - Check and promote to expand the IRG by inviting any new interested members
- Literature review
  - Understand the measures of effectiveness which are suitable for the study
  - Understand the limitations of microscopic simulations
- Selection of study area(s)

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- Narrow down potential corridors in Colombo, Kandy and Metro Manila
- Finalize modeling area, software, and related hardware setup
- Finalize required data and identify additional data sources required
- Data collection
  - Survey-based/automated data collection
  - Maintain data repositories
  - Data compilation and formulation of the problem
- Stakeholder meetings to confirm the problems identified and a Questionnaire survey to identify possible solutions (scenarios) purely from Stakeholders' opinions.

**Year 2 (Sep 2021 – Aug 2022):**

- Submission of the Activity Report of IRG (Sep 2021)
- Model creation
- Apply automated calibration methods (Jayasinghe, 2020) to calibrate the model based on observed data, and model validation
- Test identified scenarios with simulations and evaluate results
- Prepare guidelines for implementations
- Present papers at the EASTS Conference 2021 at Hiroshima, Japan (Sep 2021)
  - A special session at 14th EASTS Conference
- Stakeholder meeting for sharing the findings and evaluate their acceptance
- Further fine-tuning the simulation model/guidelines based on stakeholder meeting
- Papers for the annual Conference R4TLI 2022 of SLSTL, Sri Lanka (Aug 2021) and TSSP Annual Conference in July 2021
- Finalizing and publishing “Guideline for implementing BPM in Asian Cities”

**8. Research funds:**

Source of research funds(*)	Approximate amount (US\$)
EASTS - ICRA-A	10,000
NSF1	11,000
DOST-PCIEERD 2	20,000

\*: (ex.) ICRA (Research grant of EASTS), Grants-in-aid for Scientific Research of Ministry of Education, Culture, Sports, Science and Technology (Japan), and etc..

1: Research grant by the National Science Foundation (NSF) of the Ministry of Higher Education, Technology and Innovation of Sri Lanka is a Competitive Research Grants expecting to facilitate and support basic and applied scientific research for the advancement of knowledge and socio-economic development of the country while promoting capacity building of S&T personnel. But now it is stopped due to COVID 19 situation and not certain when that will be reinstated.

2: DOST-PCIEERD - Philippines is one of the three sectoral planning councils of the Department of Science and Technology (DOST). It is mandated to serve as the central agency in the formulation of policies, plans, and programs as well as in the implementation of strategies in the industry, energy, and emerging technology sectors through the following S&T programs: a) Support for Research and Development; b) Human Resource and Institution Development; c) S&T Information Dissemination and Promotion; d) Support for Technology Transfer and Commercialization, and e) Policy Development and Advocacy that regularly calls for proposals for programs and projects to be funded through research grants.

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## 9. References

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**All applications are to be delivered to:**  
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