

Integrated Management of Malaysian Road Network Operations Through ITS Initiatives: Issues, Potentials and Challenges

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Outline

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- Overview of Klang Valley Regional Highway Transport
- Existing ITS in Klang Valley Region
- Towards Integrated Network Operation with ITS
 - Institutional and Capacity building
 - Integrated Operation Issues
- Potentials of Network Operation Tools
 - Ramp Metering
 - Adaptive Signal Control
 - Emergency/Incident management
 - Route Guidance
 - Speed Enforcement



Overview

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- Rapid Urbanization and Industrialization in Malaysia
- Large Regional Units Of Transport Demand Base
- Growth of Private car and Truck traffic
- Demand driven growth of a world class highway network
- What's next?



Overview: Klang Valley

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- Home to about 5 mill people with 2 mill cars
- About 260 thousand trucks
- 24 major and many minor industrial estates/parks
- Two major sea ports, and several major distribution centers/warehouses
- About 300km of expressways within /or running through Klang Valley [KV-Roads-Is](#)
- City arterials feeding to/collecting from highways
- Two city councils DBKL, MPPJ and number of local councils
- Two public operation regulators and a number of private operators
- Some highways/sections are tolled



Overview: Klang Valley

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- Passenger trips dominated by private cars (about 86%)
- Freight trips also dominated by truck trips (%?)
- Increasing demand outpaces whatever new supply
- Annual Congestion Loss of about RM10 bill in Klang Valley alone
- Annual Excess fuel consumption of 1900 mill litres
- Accident and air pollution problem are also major concerns
- Drivers need seamless travel between places
 - Irrespective of
 - **Expressway/arterial/secondary roads**
 - **Administrative Jurisdictions**
 - **Road operators**
 - **Tolled/Untolled roads**
- But our agencies/operators are constrained to consider that view
- Can ITS offer the platform for integrated seamless travel?



Existing ITS in Klang Valley Region

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- **MHA TMC**
 - **To manage and monitor highways**
 - **Connected to information gathered by Individual private highway operators**
 - **Uses CCTV, Vehicle detection stations and VMS**

- **Individual Highway CC**
 - **Owned by individual operators**
 - **Uses emergency telephone, CCTV and VMS boards**
 - **Connected to MHA TMC**

- **KL ITIS**
 - **TMC Mainly to manage KL arterials**
 - **Uses CCTV, AID cameras, GPS mounted probe vehicles, VMS boards**
 - **Interface with MHA TMC and Highway CCs not clear**

- **Other ITS technologies**
 - **ETC**
 - **EFC**
 - **Internet/SMS based transit/travel information**



Integrated Network Operation with ITS

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- Collaboration and Coordination of agencies
- Integration of Services provided by them
- A proactive network/corridor management focus
- Creation of consensus based on knowledge about the system
- ITS installations can provide the data for dynamic knowledge base
- Design and Implementation of dynamic analysis tools
- An effective interface for communications among agencies



Integrated Network Operation with ITS

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- How to bring agencies under one umbrella?
- Options/Mean
 - Central/Regional Transport Commission
 - Central ITS data repository
 - Seamless data communication technologies
 - Data rights and acts
 - A virtual interface agency
- CARTESIUS architecture [Op Iface Arch](#)
- Consensus created under a win-win situation
- Individual vs. societal benefits



Potentials of Network Operation Tools: Ramp Metering

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- Higher Capacity Efficiency for the main corridor e.g. FH of PJ corridor
- Evaluation through heuristic (e.g. linear programming) approach or simulation model e.g. MITSIM, VISSIM [PJ-Corridor](#)
- Evaluation Study in Boston network showed 10.8% and 9.8% for ALINEA and FLOW algorithms
- Salt lake city: average mainline delay decreased from 151.2 seconds/veh to 97.2 seconds/veh
- Cost: Signal and sensors, 24 RM cost \$5.75 mill



Potentials of Network Operation Tools: Adaptive Signal Control

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- Increase Speeds and Decrease Total Traffic Delay
- Average and Variance of Bus Delays Decreased With Bus Priority At Signal

- Tucson, AZ system with bus priority option: Reduction of TPD of 18.5% on main line and 28.4% on cross streets

- City of Syracuse:
 - Vehicular delay 14-19% reduction
 - Fuel consumption 7-14% reduction
 - Speed 7-17% increase
 - Travel time 0-35% reduction
 - \$8.3 mill for a network of 145 traffic signals



Potentials of Network Operation Tools: Emergency/Incident management

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- **To reduce non-recurring congestion**
- **Algorithm/Model installation for quick detection**
- **Logistics for quick response**
- **Utah salt Lake valley: IMT installation for 120 miles of freeway costing 0.6 mill plus 0.4 mill annual op cost**
 - **Results 12-36% reduction in incident duration**
- **Maryland CHART program saved about 47.6 million vehicle hours of delay in 1999 and 2000**
- **In a 450 miles long system several hundred million dollars in terms of time saved, reduced fuel consumption**
- **How much can be saved in 300km in KV?**

Potentials of Network Operation Tools: Route Guidance

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- **To achieve close to optimum assignment**
- **To utilize the capacity of all routes in a corridor**
- **Need DRG model installation**

- **PJ corridor RG:**
 - **Involves multi-agencies**
 - **Tolled/Untolled roads PJ ALT RG**

- **M8 corridor of Glasgow, Scotland project showed 13% reduction in overall travel time**
- **Integrated RG strategy in San Antonio, Texas was 25 % more effective than segregated RG**



Potentials of Network Operation Tools: Speed Enforcement

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- **Auto detection of over speeding and recording of registration plate**
- **Speed and Lane Violation of heavy vehicles/lorries**
- **Amsterdam Case:**
 - **reduced the “overall accident rate” by 23%**
 - **“serious accident rate” by 35%**
 - **“secondary accident rate” by 46%**
- **Germany Case:**
 - **Accident Rate Fell By 20%**
 - **Estimated Payback Within 2 To 3 Years After Deployment**
- **A Lower Payback period for Malaysia??**



Summary

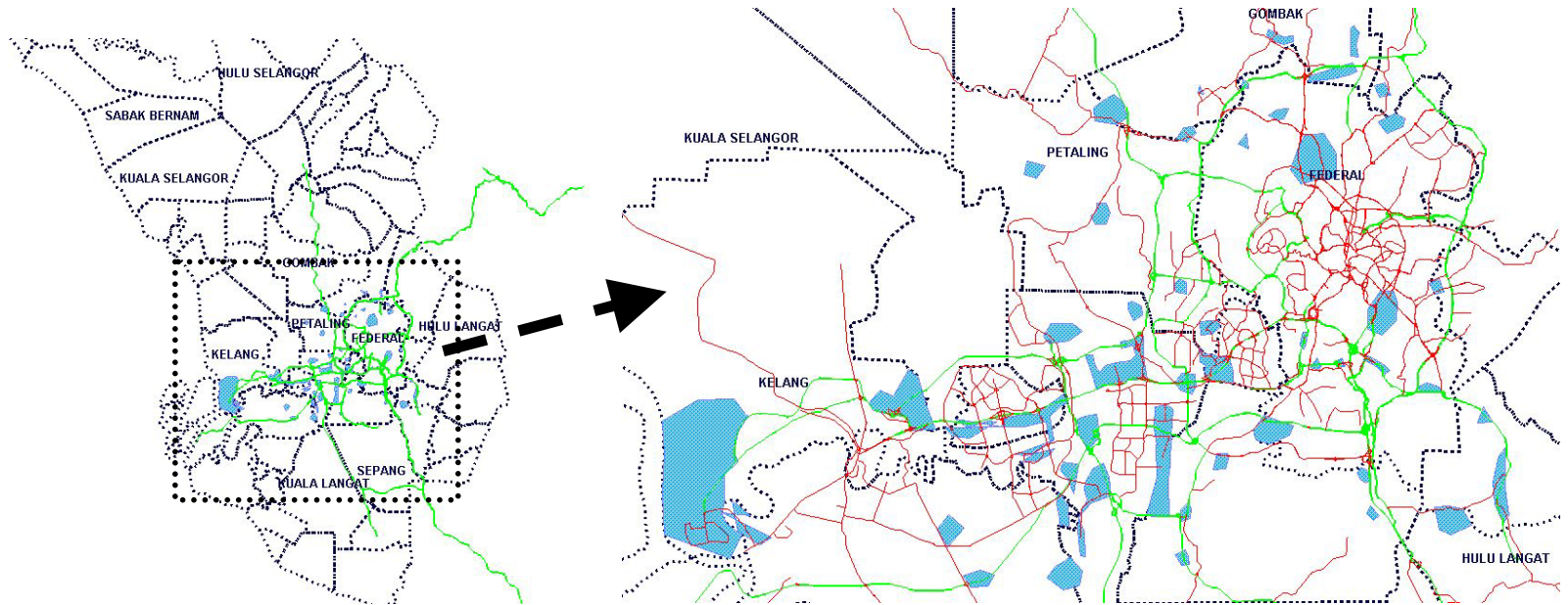
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- **Institutional And Operation Level Collaboration Among Stakeholders**
- **Common Platform For Multi-agencies Collaboration**
- **Knowledgeable Agents Interfacing The Agencies**
- **Under such condition huge potential for ITS assisted network operation in KV**
- **But who takes the initiatives??**



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Thank You

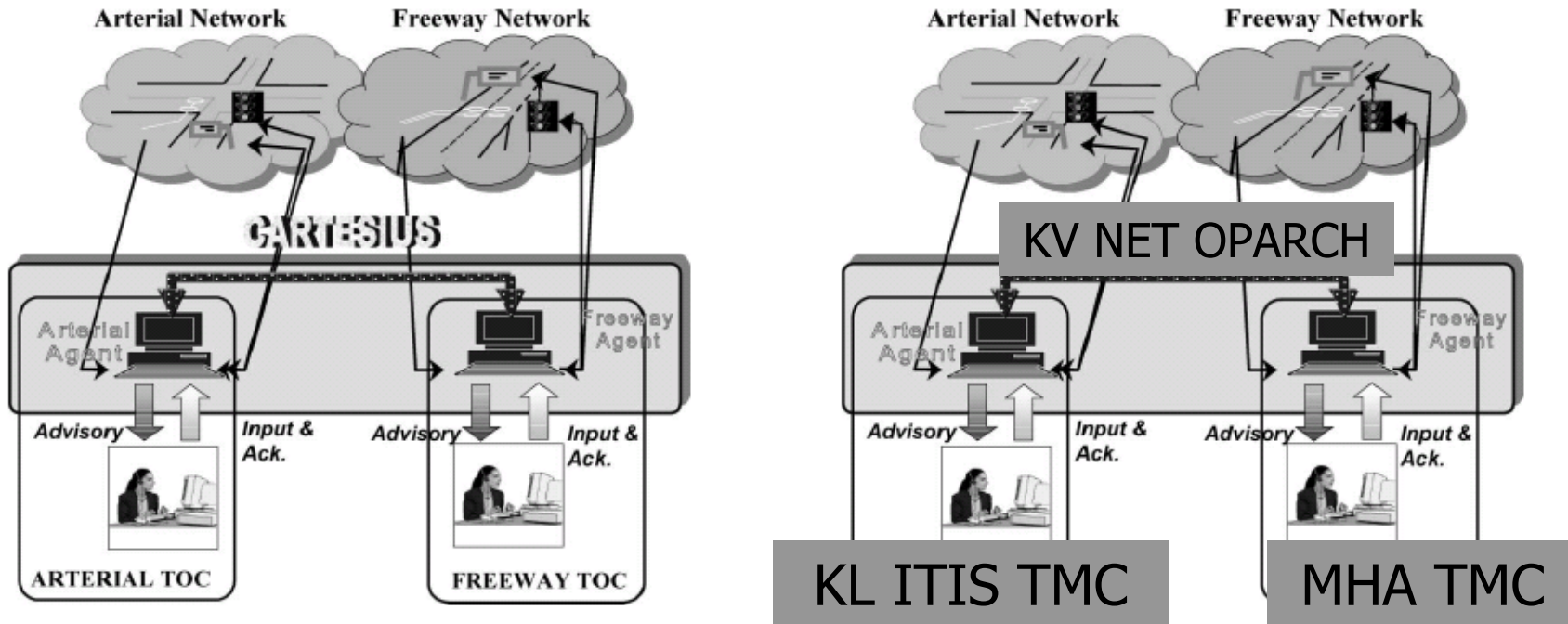


Industrial estate and Highway network development in Klang Valley



A2

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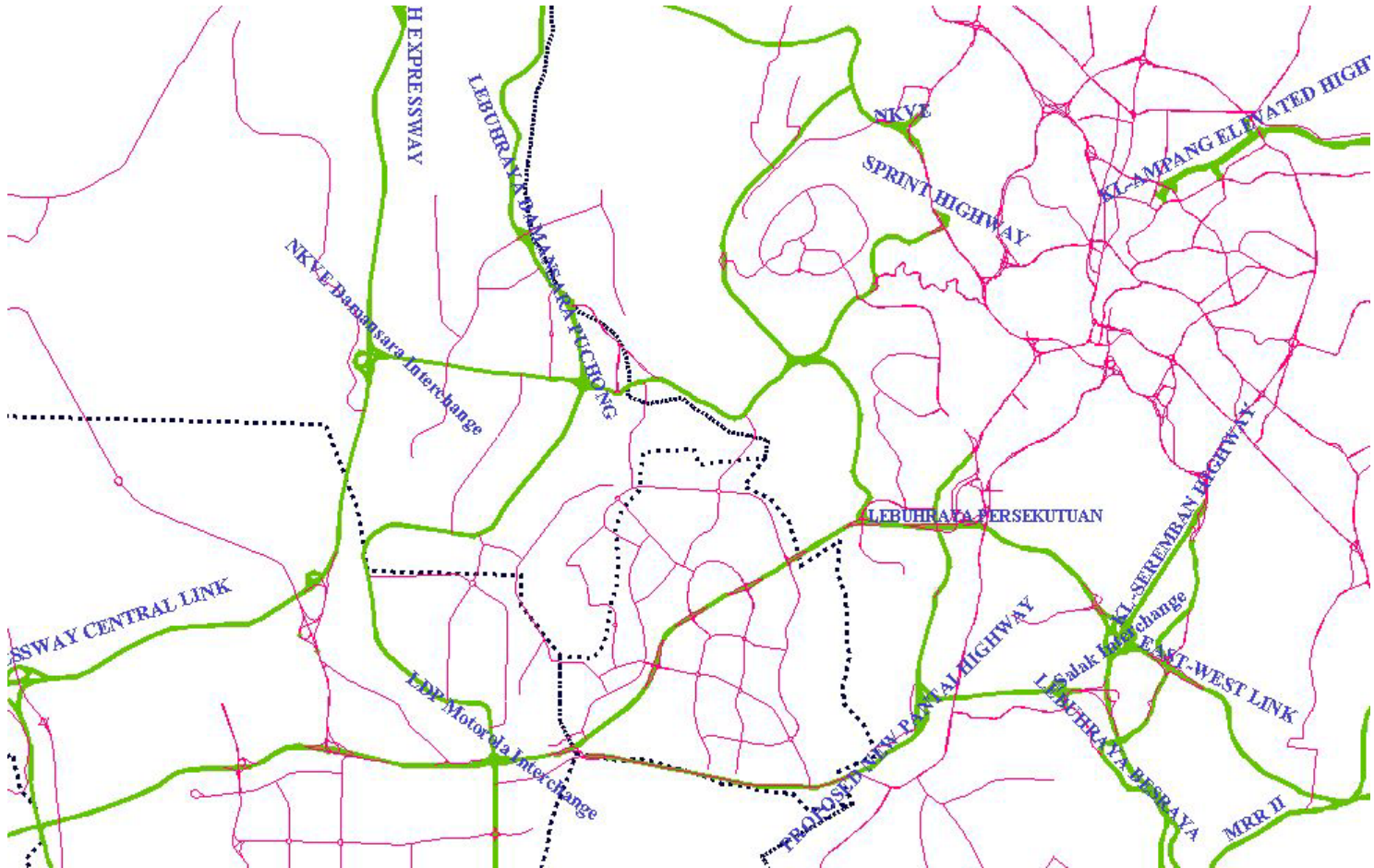


SCHEMATIC OF A COLLABORATIVE OPERATION INTERFACE



A4

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Alternative routes in PJ corridor