



Global Future Cities Programme

ITS and Transport Planning - An Introduction on how ITS Helps in Transport Planning

25 March 2021 1.00pm – 2.00pm

Global Future Cities Programme



Introduction to the Speaker

Megat Qamarul Zaffi

- Traffic Modeller- Mott MacDonald
- More than 8 years of working experience in Transport Planning for both the private and government sectors.
- Developing transport models as part of the GFCP pilot projects in Iskandar Malaysia and Melaka.



M MOTT MACDONALD



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Learning Outcomes

By the end of this session, you should be able to:

- 1. Gain an understanding of basic ITS concepts;
- 2. Gain an understanding on how ITS plays a role in Transport Planning.

Transport, Planning....

Transport is essentially movement to a more desirable location:

- people
- commodities
- information
- energy
- waste

Transport system enables movement in a collection of networks, vehicles and hardware working in some form of concert (Hutton).

Transportation planning practice is defined as improving coordination between land use and transportation system planning; encouraging alternative modes of transportation that will enhance efficiency while providing high levels of mobility and safety (ITE Transport Planning Handbook)



.... & ITS

The term Intelligent Transportation Systems (ITS) refers to information and communication technology, applied to transport infrastructure and vehicles, that improve transport outcomes such as:

- Transport safety
- Transport productivity
- Travel reliability
- Informed travel choices
- Environmental performance
- Network operation resilience



Need for ITS

Implementation of systems stems from:

Need for management and control

- safety
- enforcement
- information

Transition from

- analogue to digital
- standalone to connected
- connected to centralised





Intelligent Transport System (ITS) is a system in which information and communication technologies are applied in the field of road transport, and in traffic management and mobility management, as well as for interfaces with other modes of transport.





Malaysian ITS Blueprint



110 0001010			User-Services	
ITS Sector No.1: Advanced	1	1.1	Urban Traffic Control	
Trailic Management Systems	2	1.2	Incident Detection and Management	
		1.3	Travel Demand Management	
		1.4	Environmental Conditions Management	
	5	1.5	Operations and Maintenance	
	6	1.6	Non-Vehicular Road User Safety	
		1.7	Multi-Modal Junction Safety and Control	
ITS Sector No.2:		2.1	Improved Accident Data Collection	
Safety Systems	9	2.2	Automated Dynamic Warning and Enforcement	
ITS Sector No.3: Advanced	10	3.1	Public Transport Operations Management	
Public Transport Systems	11	3.2	Public Transport En-Route Information	
	12	3.3	Demand Responsive Public Transport	
	13	3.4	Public Travel Security	
ITS Sector No.4: Advanced	14	4.1	Pre-Trip Traveller Information	
Systems	15	4.2	Route Guidance and Navigation	
,	16	4.3	Ride Matching and Reservation	
	17	4.4	Traveller Services and Reservations	
ITS Sector No.5: Electronic Payment Systems	18	5.1	Electronic Payment Services	
ITS Sector No.6:	19	6.1	Commercial Fleet Management	
Operations Systems	20	6.2	Commercial Freight Management	
	21	6.3	Commercial Vehicle Electronic Clearance	
	22	6.4	Automated Roadside Safety Inspection	
	23	6.5	On-board Safety Monitoring	
	24	6.6	Commercial Vehicle Administrative Processes	
ITS Sector No.7: Advanced	25	7.1	Vehicle-Based Collision Avoidance	
venicie Control Systems	26	7.2	Infrastructure-Based Collision Avoidance	
	27	7.3	Sensor-Based Driving Safety Enhancement	
	28	7.4	Safety Readiness	
	29	7.5	Pre-Collision Restraint Deployment	
	30	7.6	Automated Vehicle Operation	
ITS Sector No.8: Emergency	31	8.1	Emergency Notification and Personal Security	
Management Systems		8.2	Hazardous Material Planning and Incident Response	
		8.3	Disaster Response and Management	
		8.4	Emergency Vehicle Management	
ITS Sector No.9: Information Warehousing Systems		9.1	Weather and Environmental Data Management	
		9.2	Archived Data Management	

Transport planning requires information on travel supply and demand

Supply

- Road Network
 - Road and junction details (lanes,
 - speed, restrictions, etc)
- Traffic Signal (staging, time)
- Public Transport Service (service info, route geometry, timetable, fare)

Demand

- Land Use
 - Details of development (built-up
 - area, units, etc)
- Traffic count, speed
- Origin-Destination, Mode Choice
- Public Transport Ridership
- Commercial vehicle movement







Road inductive loop

• Unclassified traffic count

Traffic camera

Classified traffic count



RFID/ANPR

• Origin/Destination



CCTV

- classified traffic counting
- NMT counting





Fleet management & electronic ticketing

- Route geometry
- Timetable
- Passenger boarding/alighting



Navigation app

- Traffic speed
- Incidents



Integrating ITS into Transport Planning

- Ensure ITS strategies and technologies are an integral component of transportation plans and programmes.
- ITS requires thoughtful consideration of what projects can be implemented in the short-term, how they will complement the existing transportation infrastructure, and how they will work with other investments, both traditional and technology-based, in the medium-and-longer terms.
- "smart-planning" approach to ITS is vital to realizing the full potential of ITS.





Integrating ITS into Transport Planning

Summary of Transportation Problems, Conventional Approaches, and Operational Approaches with ITS

Problem	Solutions	Conventional Approach	Operational Approach with ITS
Traffic Congestion	 Increase roadway throughput 	New roadsNew lanes	 Advanced traffic control Incident management Corridor management Advanced vehicle systems
	 Increase passenger throughput 	 HOC lanes Carpooling Fixed route transit	 Real-time ridematching Integrate transit & feeder services Flexible route transit New personalised public transit
	Reduce demand	Flex time programmes	TelecommutingTransportation pricing
Lack of Mobility & Accessibility	 Provide user-friendly access to quality transportation services 	 Expand fixed route transit & paratransit services Radio & TV traffic reports 	 Multi-modal pre-trip & en route traveller information services Real-time response to changing demand Personalised public transportation services Enhanced fare card

Integrating ITS into Transport Planning (cont.)

Summary of Transportation Problems, Conventional Approaches, and Operational Approaches with ITS

Problem	Solutions	Conventional Approach	Operational Approach with ITS
Disconnected Transportation Modes	 Improve intermodality 	Construct inter-modal connections	 Regional transportation management systems Regional transportation information clearinghouse Disseminate multi-modal information pre- trip & en route
Budgetary Constraints	 Use existing funding efficiently Leverage new funding resources 	 Existing funding authorisations & selection processes 	 Public-private partnerships Barter right-of-way Advanced maintenance strategies Increased emphasis on fee-for-use services
Transportation Following Emergencies	 Improve disaster resource plan 	 Review & improve existing emergency plans 	 Establish emergency response centre Internet with law enforcement, emergency units, traffic control & transit

Integrating ITS into Transport Planning (cont.)

Summary of Transportation Problems, Conventional Approaches, and Operational Approaches with ITS

Problem	Solutions	Conventional Approach	Operational Approach with ITS
Crashes, Injuries & Fatalities	Improve safety	 Improve roadway geometry & sight distances Grade-separate crossings Driver training Sobriety check points Install street lights Reduce speed limits Post warnings in problem areas 	 Partially & fully automated vehicle control systems Vehicle conditions monitoring Driver condition monitoring Advanced grade-crossing systems Automated detection of adverse weather & road conditions, vehicle warning, & road view notification Automated emergency notification





Challenges and Opportunities in Implementing ITS

Challenges

- Institutional coordination and cooperation
- Technical compatibility between and among ITS projects
- Human resource needs and training
- Financial Constraints



Opportunities

- Increased road safety
- Reduce costs of road operations and generate revenues
- Better traffic management and traffic information
- Involvement of private sector in ITS arena
- Fully integrated smarter mobility

Case Study 1

Short term prediction of future traffic conditions – Land Transport Authority, Singapore.

PTV Group and Aimsun undertook a 12-month trial with the Land Transport Authority of Singapore (LTA). The aim of the trial was to evaluate the supplier's systems to provide real-time traffic decision support and microscopic traffic simulation in traffic monitoring and management.



Each supplier used their systems to simulate traffic conditions in real time, predict short-term forecasts of future traffic conditions, and allow the evaluation and recommendation of the best traffic response plans to deal with daily planned roadworks and incidents. The solutions included an integrated microsimulation environment evaluating varying traffic conditions and dependencies in the network.

The trial demonstrated that combined with real-time data provides short-term traffic predictions enabled operators to monitor the road network and make informed decisions about implementing the best possible traffic strategies.

Case Study 2

Sitraffic SiBike by Siemens, Marburg, Germany

Sitraffic SiBike provides coordinated 'green waves' for cyclists in the same way these are provided for motor traffic.

Cyclists carry a smartphone with the SiBike app installed on the phone. The app uses the smartphone GPS to understand the cyclist's location, speed and direction of travel. The app then reports when cyclists have passed virtual trigger points which is then reported back to a control centre. This control centre sends commands to the traffic light controller to automatically turn green or extend the green phase.



No construction costs are required other than adapting the programming of the traffic light system. Pilot projects for this have started in Marburg, Germany. The trial has shown this reduces the number of times cyclists have to stop, shortens the average travel time for cyclists and has no negative impact on public transport.

Recap of learning outcomes:

- 1. Gain an understanding of basic ITS concepts;
- 2. Gain an understanding on how ITS plays a role in Transport Planning.

Additional Resources

Welcome to ROSA P | (bts.gov) – ITS & Transport Planning: Putting the Pieces Together. Prepared by Transportation & Environmental Consulting, CA for the Federal Highway Administration, U.S. Department of Transportation.

perjalananku.app – PerjalananKu mobile app

<u>www.gov.uk/guidance/transport-analysis-guidance-tag</u> - UKTAG (Transport Analysis Guidance)

<u>www.globalfuturecities.org</u> – Global Future Cities Programme info