< MORNING SESSION >

Session 1: Panel Discussion session - "Safe and Smart Cities"

Morning Session-(10.00-12.00), Lebua at State Tower (Main room : Aravinda)
Session 1: Panel Discussion session - "Safe and Smart Cities" **Moderated by Prof.Dr. Paibul Suriyawongpaisal, Mahidol University, Thailand**
"The Smart Cities Challenges: Achieving meaning, impact and engagement" **By Mr. Martin Venzky-Stalling, Senior Advisor Science and Technology Park, Chiang Mai University (CMU Step)**
"Smart mobility and Smart Cities of the Future" **By Prof. Dr. Atsushi Fukuda, Nihon University, Japan**
"Smart City: Thailand and Hong Kong Cases" **By Prof.Dr. Agachai SumaleeHong Kong Polytechnic University**
"Khon Kaen Smart City (Phase:1) LRT North-South Line, ***Infrastructure funds from private Alternative urban development Model for Thailand and Beyond"*** **By Mr. Suradech Taweesaengsakulthai,CEO of Khon Kaen City Development (KKTT) Co.,Ltd. Thailand**

Moderator of <Session 1>

Prof.Dr.Paibul Suriyawongpaisal
Community Medicine Center
Faculty of Medicine, Ramathibodi Hospital, Mahidol University
E-mail: paibul.sur@mahidol.ac.th; paibulss@gmail.com

Brief Biography:

Education
-MD, Siriraj Mahidol University in 1979
- Master of Medical Science, University of Western Australia in 1991

Relevant academic records
- 23 international publications of road safety related topics
- Chairman of a task force for national road safety action plan
- Technical advisor for a national policy forum on road safety from 2006-2012

Award & Grants
-Ford Foundation scholarship from 1989-1990
-WHO research grants for studies
-Thailand Health Research Institute
-Thailand Research Fund
-University of Sydney
-Ministry of Public Health
-Thai Health

First Speaker of <Session 1>

Mr. Martin Venzky-Stalling
Senior Advisor of *Science and Technology Park,*
Chiang Mai University (CMU Step)

E-mail: martin@step.cmu.ac.th

Brief Biography:

Mr. Venzky-Stalling is a senior management consultant and ICT expert from Germany with over 20-years of consulting, policy, and management experience. Since 2009, he worked as a German Government sponsored consultant on regional economic development, innovation, and smart cities in Thailand. He is a Senior Advisor at the Chiang Mai University Science & Technology Park and consults governmental and private organizations across Asia and Europe. Out of the work on regional science parks in Thailand other projects evolved including smart city pilots, Creative Chiang Mai, and the Southeast Asian Creative Cities network. He has worked on smart city initiatives since 2009 working with governments, cities, regulatory, solution providers, telecoms operators, and associations. He previously was a Director with PricewaterhouseCoopers Consulting, a Senior Vice President for International Projects (PCCW/Hong Kong Telecom), and Director for all consulting activities at Ovum, ICT and e-government project consultant for the World Bank, advisor to Amata, IEAT, TOT, and MICT. He is a member of the Joint Foreign Chamber of Commerce (JFCCT) ICT Group in Thailand and is fluent in written and spoken Thai.

"The Smart Cities Challenges: Achieving meaning, impact and engagement"
By Mr. Martin Venzky-Stalling,

Summary:

Most ATRANS members will have some or even a very clear understanding of what Smart Cities programs are and the benefits that they can create. But more general audiences often find the concept abstract, out of reach, or even consider it hype. Whilst some countries in Asia strong have significant Smart City initiatives (e.g. China, India, …), others, particularly Southeast Asia (excluding Singapore) including Thailand, do not (Bandung is new rising star in this regard).

How can we create Smart City initiative that address real problems, create impact, and engage with different communities (from business, startups, citizens)? What is the difference between secondary cities and capitals / megacities. How can we create wide-scale smart city programs involving many cities, not just a few. And how could we put more Southeast Asian cities on the global smart city map?

Second Speaker of <Session 1>

Prof. Dr. Atsushi Fukuda
Professor of Department of Transportation Systems Engineering, College of Science and Technology, Nihon University
E-mail: fukuda.atsushi@nihon-u.ac.jp

Brief Biography:

Professor Atsushi FUKUDA has served in the academic field for 26 years teaching and doing research in the field of transportation systems analysis and transportation planning. He was seconded by the Japan International Cooperation Agency (JICA) as Assistant Professor to the Asian Institute of Technology for two years. He has also fulfilled his responsibility as Chairperson of the Advisory Committee for many ODA projects such as the study on improvement of road traffic environment in Chiang Mai City, Thailand.

Prof. Fukuda has led various feasibility studies on the Clean Development Mechanism, Nationally Appropriate Mitigation Actions (NAMAs) and Joint Crediting Mechanism (JCM) studies in the transport sector in the ASEAN region.

Education:

1978-1982: B.Eng. (Transportation Engineering) Nihon University
1982-1984: M.Eng. (Transportation Engineering) Nihon University
1984-1988: Dr.Eng, (Transportation Engineering) Nihon University

Honors and Awards:

1988	IATSS Dissertation Award, IATSS
1997	Best Presenter Award, 52th Annual Meeting of JSCE
2003	Best Paper in the Decision Technologies Track Award, 36th Annual Hawaii International Conference in System Sciences
2006	Excellent Practice Paper Award, the 3rd National Transport Conference, Ministry of Transport, Engineering Institute of Thailand, Khonkean University
2009	International Activity Incentive Award, Japan Society of Civil Engineers (JSCE)

Smart mobility and Smart Cities of the Future

By Prof.Dr. Atsushi Fukuda, Nihon University, Japan

Summary:

The concept of Smart City drew the attention after year 2010 in Japan. In the past, similar concept with Smart City such as compact city, eco-city, sustainable city, etc. have been proposed. However, in corresponding to energy constraint which occurred by Great East Japan Earthquake, urban problems including the aging society, etc., the new concept which will provide energy-efficient society and high quality of life society was required. Recent innovation of ICT and promotion of IoT made the Smart City possible by providing efficient and integral management of infrastructures.

Thus, most of efforts to realize Smart City in Japan concentrate to develop new technologies regarding ICT for management and apply them to an existing city, while the most of Smart City in developing nation concentrated to develop well-designed new city with efficient infrastructures such as road network, transit line, water supply, etc.
Through Smart City projects in Japan, many applicable technologies regarding Electric Vehicle, Smart Grid, Renewable Energy, etc. were developed with huge financial support from the government.

Since the period of trial of Smart City is over, each city has to finance themselves. However, many cities have financial collapse in Japan and investment cost for Smart City is still expensive. On the other hand, private firms and the government try to export our experience and developed technologies as a package for Smart City development in Asian counties.

Third Speaker of <Session 1>

Professor Agachai Sumalee, PhD
Director of Smart City Research Center,King Mongkut's Institute of Technology Ladkrabang
Professor, Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University
E-mail: asumalee@gmail.com (www.agachai-sumalee.com)

Brief Biography:

Prof. Agachai Sumalee holds B.Eng in Civil Engineering (King Mongkut's Institute of Technology Ladkrabang, KMITL), MSc (Eng) and PhD in Transportation Planning and Engineering (ITS, Leeds University). He was previously Senior Research Fellow at University of Leeds, Associate Professor at Hong Kong Polytechnic University, and Visiting Professor at University of Tokyo. He is currently the Director of Smart City Research Center at KMITL. He is also a Professor at Hong Kong Polytechnic University. His research areas are intelligent transport system (ITS), network modelling, transport economics, and transport policy. Dr. Sumalee has published more than 90 journal papers in top peer-reviewed journals. In 2014 he is ranked as the second most influential researcher in the world in the field of transportation engineering in the last five years by the Microsoft Academic Research Database. He has received several prizes and awards including the 2014 APEC Science Prize for Innovation, Research and Education ("ASPIRE") awarded by Asia Pacific Economic Cooperation (APEC), Hans Jürgen Ewers Prize for outstanding research in infrastructure economics, Annual best paper award by Hong Kong Institute of Engineer, the Smeed Prize, and twice outstanding paper awards at the EASTS conferences in Fukuoka and Bangkok. He is currently the Editor in Chief of SCI journal Transpormetrica B: Transport Dynamics, Associate Editor of Networks and Spatial Economics, and Editorial Board Member of Transportation Research Part B, Transportation, Transportmetrica A, and Journal of Advanced Transportation.

Dr. Sumalee has served on several government committees. He is currently the Vice-Chair and Secretary General of Railway Committee of Engineering Institute of Thailand, member of the US Transportation Research Board Network Modelling Committee, and member of Hong Kong Transportation Road Safety Board. He served as a member of sub-committee of Railway System of the State Railway of Thailand, sub-committee of Land Development Committee (Expressway Authority of Thailand), Business Development Committee (Mass Rapid Transit Authority of Thailand), and Innovation and Information Technology Committee (National Housing Authority of Thailand). Dr. Sumalee is an active and leading developer of the Intelligent Transportation System in Thailand in which he led the deployment of the first fully automated ITS system for expressway corridor in Thailand and development of the ITS for Motorway network of Department of Highway. He also led the team to develop the ITS solution for the All Thai Taxi for automatically operating the whole 550 fleet of taxis. Recently he also led the team to develop the national data centre for GPS data from commercial and public vehicles in Thailand which was designed to receive and analyse the GPS data from up to 1 million vehicles on the real-time basis. This system is now the national system for Department of Land Transport.

Smart City Development: Case Study of Thailand and Hong Kong
By Professor Agachai Sumalee, PhD

Summary:

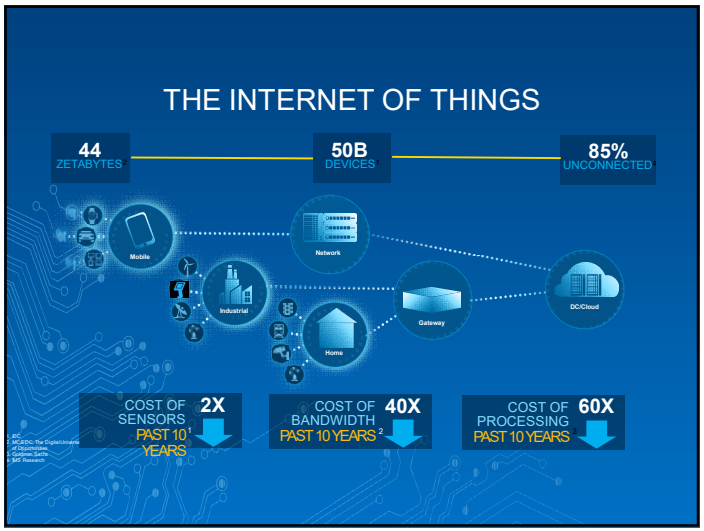
Smart City is the emerging concept for urban development in which the information technology (IT) can be used to integrate infrastructure and city management. The deployment of Smart City will involve the implementation of system to collect information about the city, the back office system for storing analyzing the data, and the interaction system for providing the service to citizen. The computational power and amount of data will allow for a better planning and management of city infrastructure and service. Different domains of services can be included in the smart city development ranging from smart mobility, smart energy, smart government, to public security. Apart from providing the traditional city service with a better technology the deployment of smart city will also enable the new services for citizen, e.g. on-demand transportation, smart health monitoring, or personalized social service.

This presentation will provide information on the current development of smart city concept in Thailand and Hong Kong. For Thailand the concept of Smart City has been raised as one of the potential economic development within the framework of Thailand 4.0 strategy. The presentation will provide an overview on Thailand 4.0 and current plan for smart city development. Particular case studies on current applications and development of smart city including the case of smart mobility and Bangsaen smart city development will also be presented. For the case of Hong Kong the concept of digital government has already been in the city development plan for decades. The government services in several sectors have already been digitized. In this presentation the current plan and application of smart city platform for Hong Kong will be explained including the current intelligent transportation system implementation, the smart data portal of government, and smart water project.

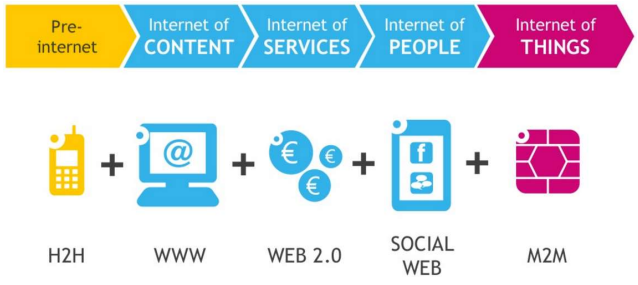
ศูนย์วิจัยนครอัจฉริยะ
Smart Cities Research Center

SMART CITY:
Thailand and Hong Kong Cases

Prof. Agachai SUMALEE
Smart City Research Center, King Mongkut's Institute of Technology Ladkrabang



The next step in
Internet Evolution



THAILAND 4.0

Thai Economy 4.0 :
Transforming towards Value-Based Economy

More for Less	Less for More
Industries	Technology
Commodities	Innovation

New economic paradigm where commercialization of innovative ideas lead to new startups & new industries, and, hence value-based economy

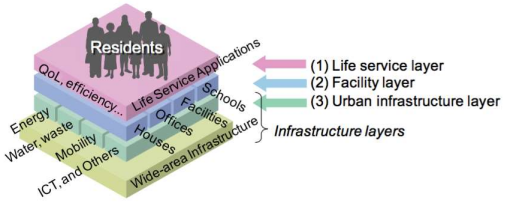
เอกสารจาก ดร.สุวิทย์ เมษินทรีย์ รมช.กระทรวงพาณิชย์

Thai Economy 4.0

Comparative Advantage		Competitive Advantage
Nature		
	Bio - Diversity	• Food Agriculture & Bio-tech • Health, Wellness & Bio-Med
		• Smart Devices, Robotics & Mechatronics
		• Digital, IOT & Convergence
Culture	Cultural - Diversity	• Creative, Culture & High Value Services

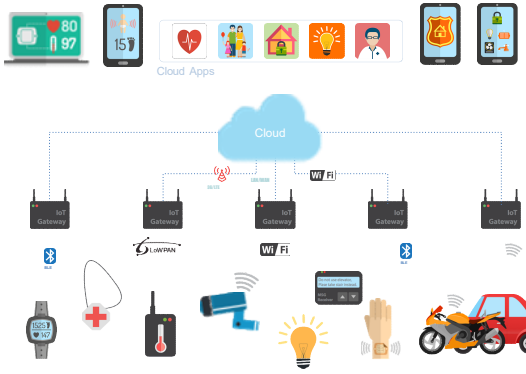
เอกสารจาก ดร.สุวิทย์ เมษินทรีย์ รมช.กระทรวงพาณิชย์

Thailand IoT
Smart City

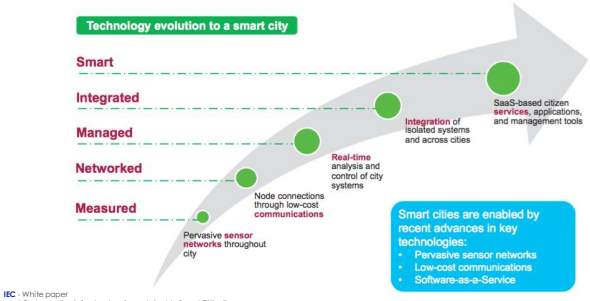


ศูนย์วิจัยนครอัจฉริยะ
Smart Cities Research Center

SMART CITY :
มิติใหม่ของการจัดการท้องถิ่นยุคไอที



Step-by-step approach to
becoming smarter



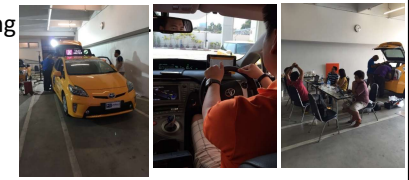
IEC - White paper
"Orchestrating infrastructure for sustainable Smart Cities"

Case Study

- Smart Mobility in Thailand
- Smart City Bangsaen
- Smart City Hong Kong

To Make Long

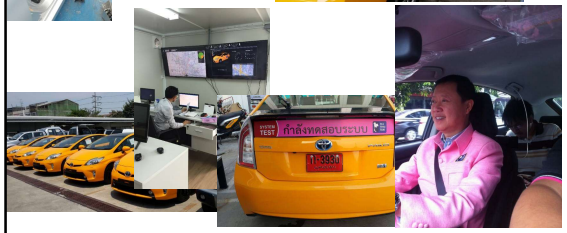
Inception of idea Nov 2014



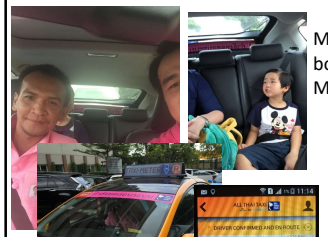
First Prototype Jan 2015

PR Feb 2015

Production
March 2015



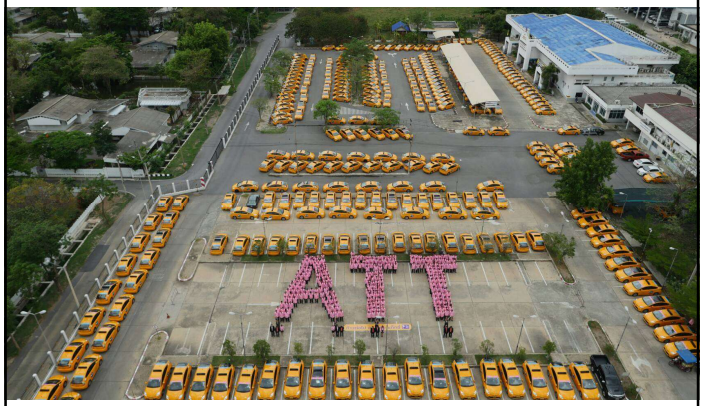
Soft Launch
April 2015



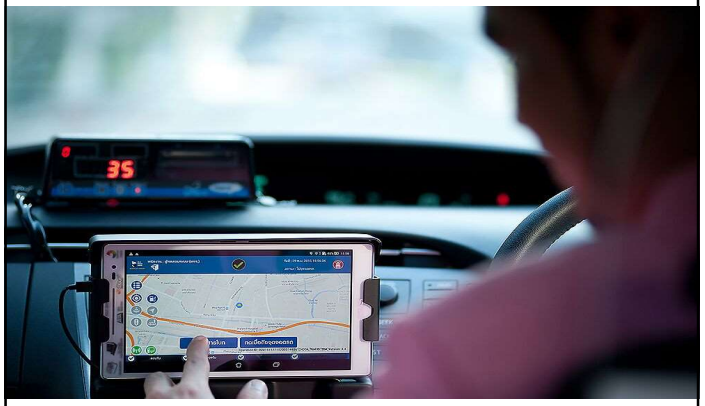
My family on board!
May 2015

VIP on board
July-Aug
2015


ALL THAI TAXI
ALL THAI TAXI เปิดให้บริการอย่างเป็นทางการแล้ววันนี้
550 Fleets
Taxi Services as a fleet
All Drivers are Employees
Transc<>de


ATT


TAXI-METER
6
1624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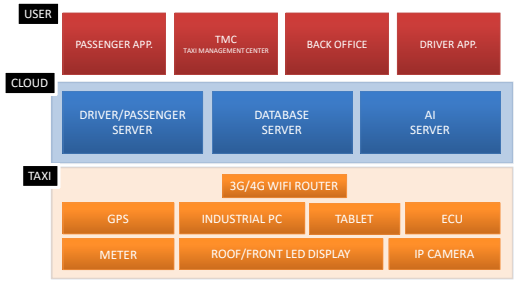
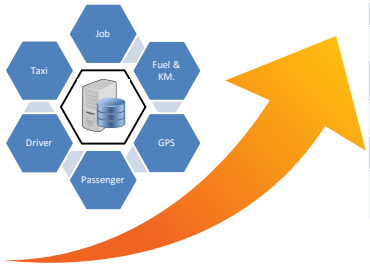
Back

Front

SYSTEM OVERVIEW



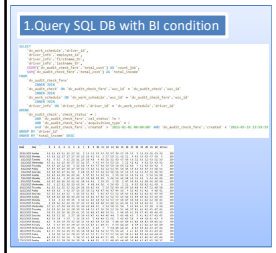
Data collection

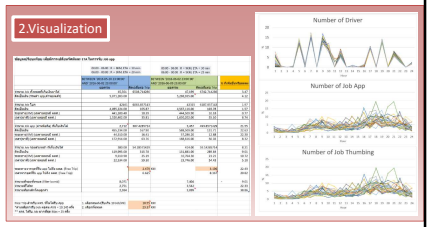


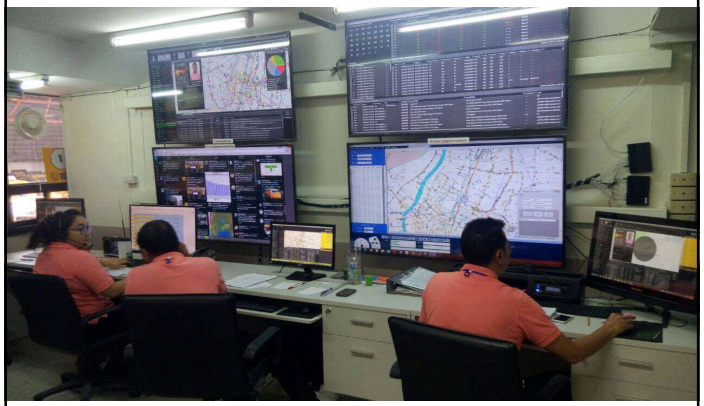
DATA TYPE	NUMBER
TAXI	556
DRIVER	737
MEMBER	238,759
SERVED(JOB)	1,746,678
DRIVER EVENT	132,660,483
GPS POINT	7,4012,177
DISTANCE(KM.)	46,727,532
FARE	Over 200million

BASIC ANALYSIS EXAMPLE

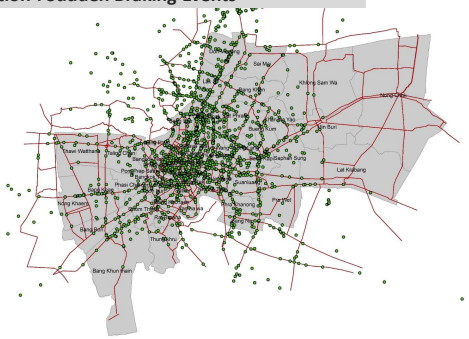
“Bi question”



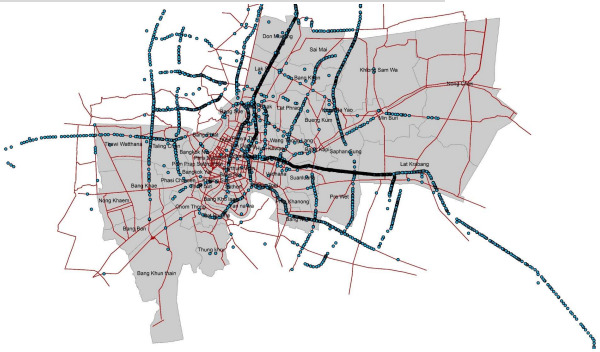




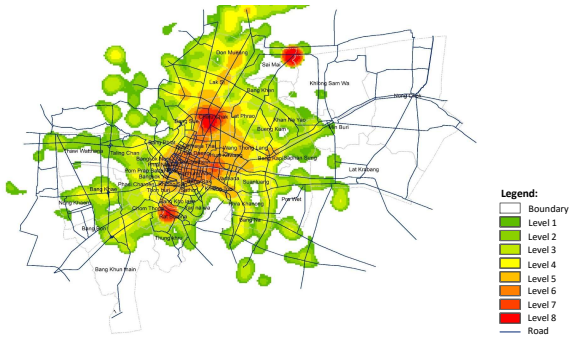
Data Collection : Sudden Braking Events



Data Collection : Exceed Speed Events



Hotspots Location : Sudden Braking Events



Departme nt of Land Transport

โครงการวิจัยและพัฒนาระบบบริหารจัดการเดินรถด้วยระบบกำหนดตำแหน่งบนโลก (GPS) สำหรับพัฒนาการเดินรถโดยสารสาธารณะและรถบรรทุกเพื่อความปลอดภัย

Research and Development of GPS Vehicle Controlling Management System for Autobus and Truck Routing Safety Improvement

Research and Development of GPS Vehicle Controlling Management System

King Mongkut's Institute of Technology Ladkrabang

Departme nt of Land Transport

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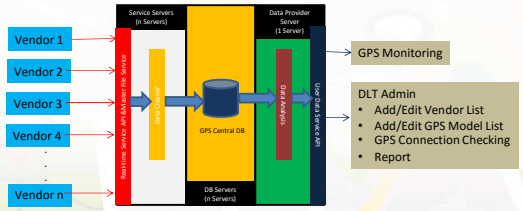
Research and Development of GPS Vehicle Controlling Management System for Autobus and Truck Routing Safety Improvement

System Architecture



King Mongkut's Institute of Technology Ladkrabang

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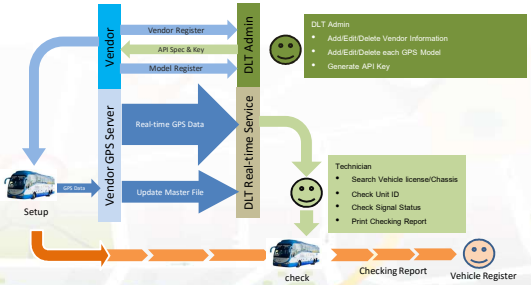
Research and Development of GPS Vehicle Controlling Management System for Autobus and Truck Routing Safety Improvement

Work Flow



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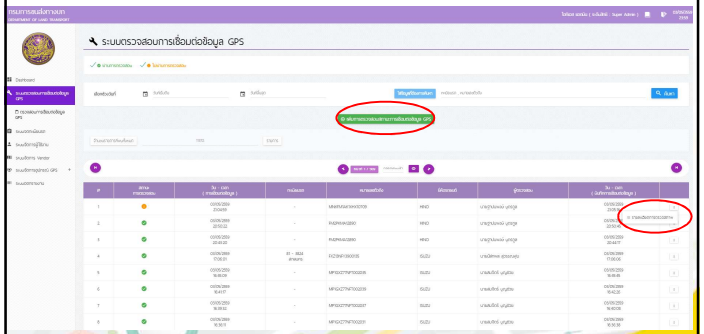
Research and Development of GPS Vehicle Controlling Management System for Autobus and Truck Routing Safety Improvement

GPS Connection Monitoring System



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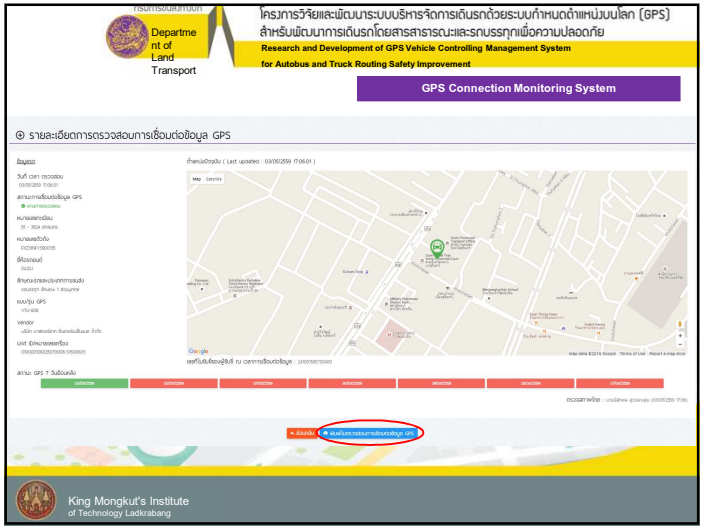
Departme nt of Land Transport
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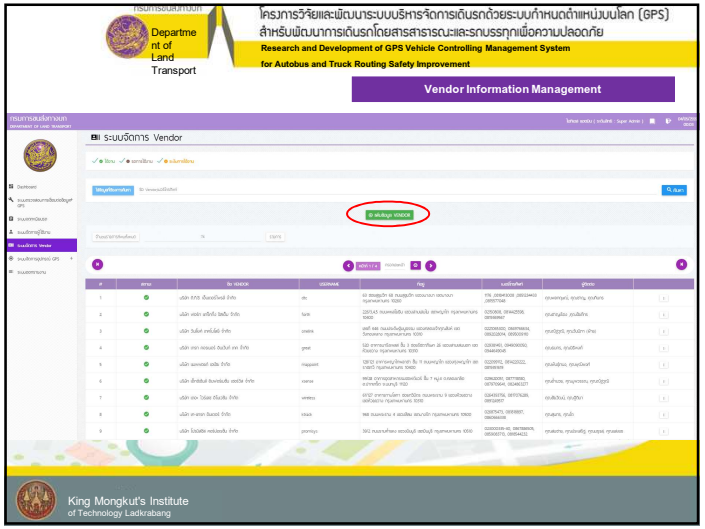
Research and Development of GPS Vehicle Controlling Management System for Autobus and Truck Routing Safety Improvement
GPS Connection Monitoring System
รายละเอียดการตรวจสอบการเชื่อมต่อข้อมูล GPS
King Mongkut's Institute of Technology Ladkrabang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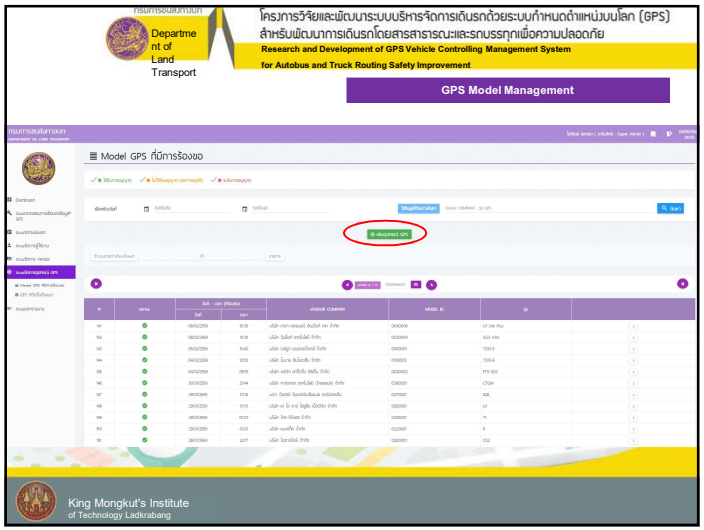
Research and Development of GPS Vehicle Controlling Management System for Autobus and Truck Routing Safety Improvement
Vendor Information Management
ระบบจัดการ Vendor
King Mongkut's Institute of Technology Ladkrabang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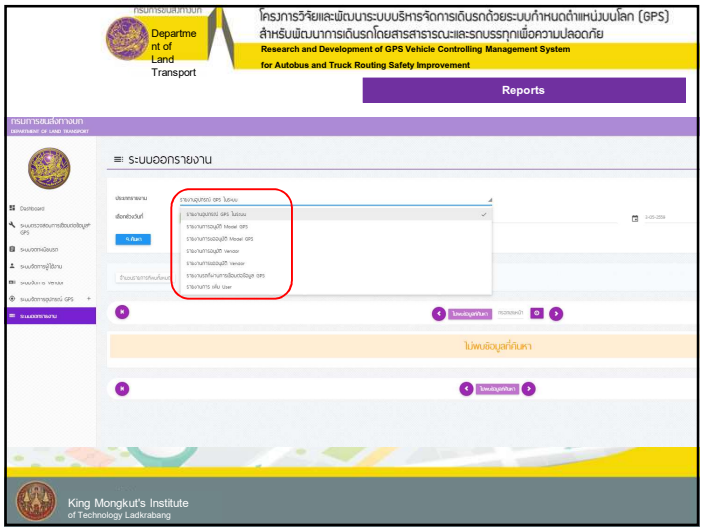
Research and Development of GPS Vehicle Controlling Management System for Autobus and Truck Routing Safety Improvement
GPS Model Management
Model GPS ที่มีการร้องขอ
King Mongkut's Institute of Technology Ladkrabang

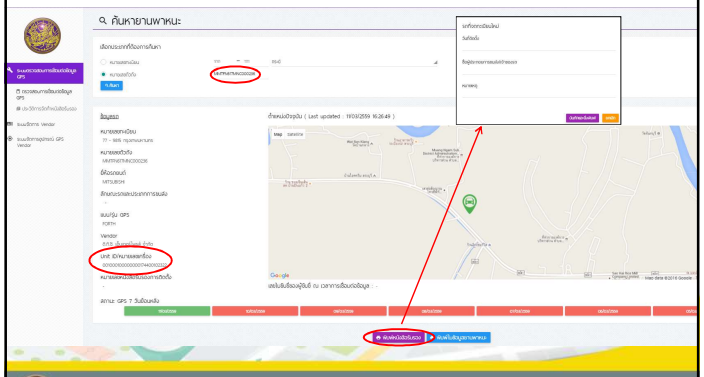

Departme nt of Land Transport
โครงการวิจัยและพัฒนาระบบบริหารจัดการเดินรถด้วยระบบกำหนดตำแหน่งบนโลก (GPS) สำหรับพัฒนาการเดินรถโดยสารสาธารณะและรถบรรทุกเพื่อความปลอดภัย
Research and Development of GPS Vehicle Controlling Management System for Autobus and Truck Routing Safety Improvement
Reports
ระบบออกรายงาน
ไม่พบข้อมูลที่ค้นหา
King Mongkut's Institute of Technology Ladkrabang

Departme nt of Land Transport

โครงการวิจัยและพัฒนาระบบบริหารจัดการเดินรถด้วยระบบกำหนดตำแหน่งบนโลก (GPS) สำหรับพัฒนาการเดินรถโดยสารสาธารณะและรถบรรทุกเพื่อความปลอดภัย

Research and Development of GPS Vehicle Controlling Management System for Autobus and Truck Routing Safety Improvement

Certification of GPS Installation System



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Vehicle number

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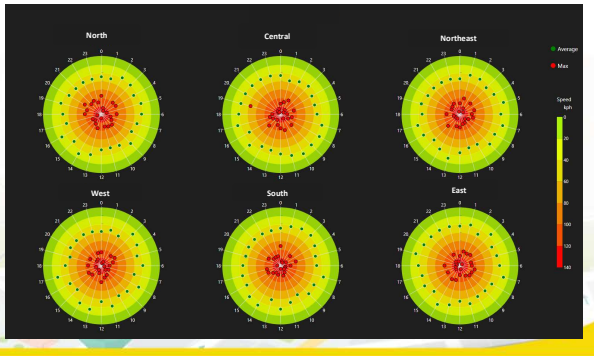
Research and Development of GPS Vehicle Controlling Management System for Autobus and Truck Routing Safety Improvement

Clock speed



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Departme nt of Land Transport

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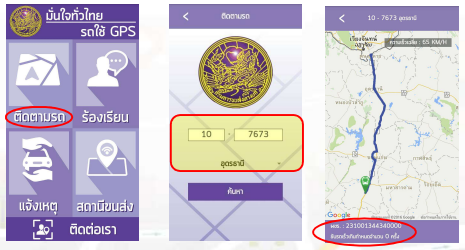
Research and Development of GPS Vehicle Controlling Management System for Autobus and Truck Routing Safety Improvement

Vehicle Tracking Mobile Application



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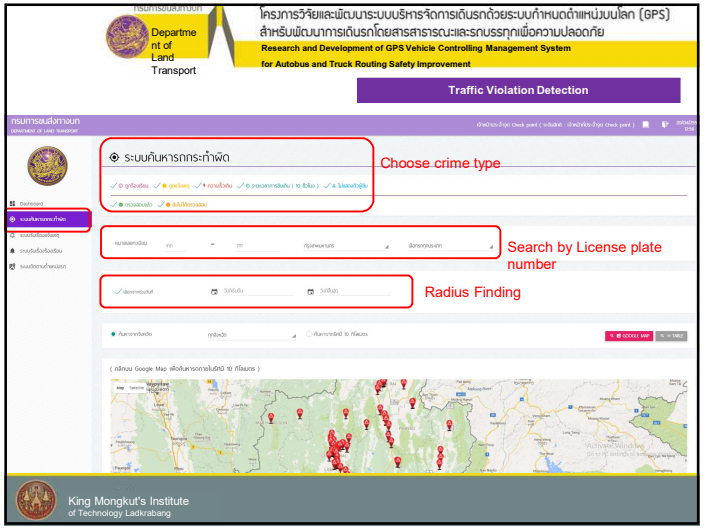
Departme nt of Land Transport
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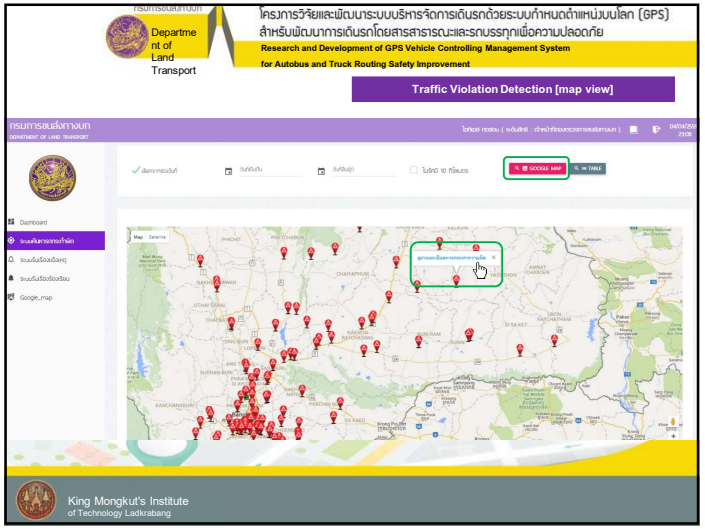
Research and Development of GPS Vehicle Controlling Management System for Autobus and Truck Routing Safety Improvement
Traffic Violation Detection
Choose crime type
Search by License plate number
Radius Finding
King Mongkut's Institute of Technology Ladkrabang


Departme nt of Land Transport
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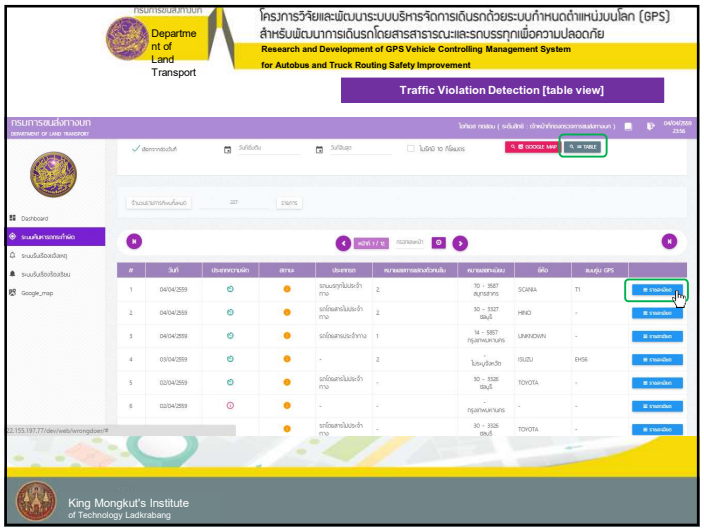
Research and Development of GPS Vehicle Controlling Management System for Autobus and Truck Routing Safety Improvement
Traffic Violation Detection [map view]
King Mongkut's Institute of Technology Ladkrabang


Departme nt of Land Transport
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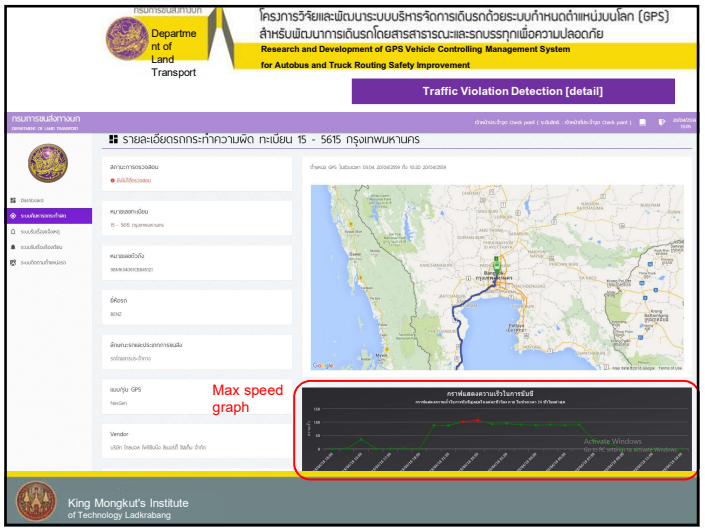
Research and Development of GPS Vehicle Controlling Management System for Autobus and Truck Routing Safety Improvement
Traffic Violation Detection [table view]
King Mongkut's Institute of Technology Ladkrabang


Departme nt of Land Transport
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Research and Development of GPS Vehicle Controlling Management System for Autobus and Truck Routing Safety Improvement
Traffic Violation Detection [detail]
Max speed graph
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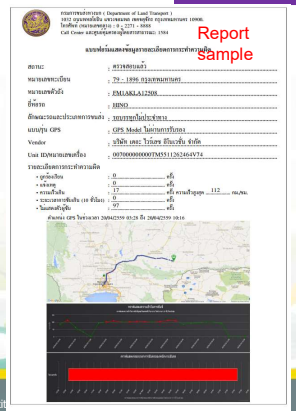
Departme nt of Land Transport

โครงการวิจัยและพัฒนาระบบบริหารจัดการเดินรถด้วยระบบกำหนดตำแหน่งบนโลก (GPS) สำหรับพัฒนาการเดินรถโดยสารสาธารณะและรถบรรทุกเพื่อความปลอดภัย

Research and Development of GPS Vehicle Controlling Management System for Autobus and Truck Routing Safety Improvement

Traffic Violation Detection [report]

Report sample



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Departme nt of Land Transport

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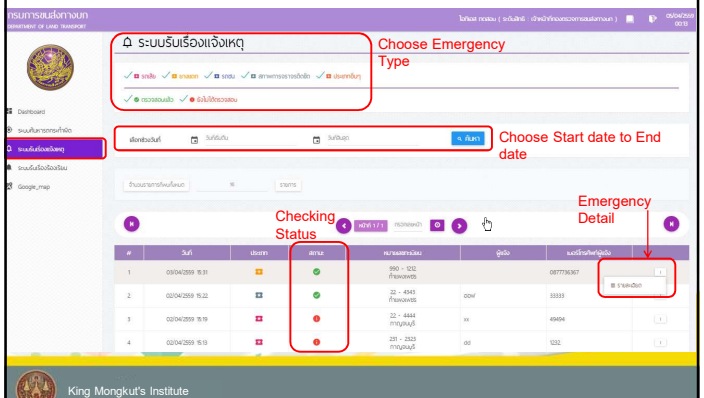
Research and Development of GPS Vehicle Controlling Management System for Autobus and Truck Routing Safety Improvement

Emergency System



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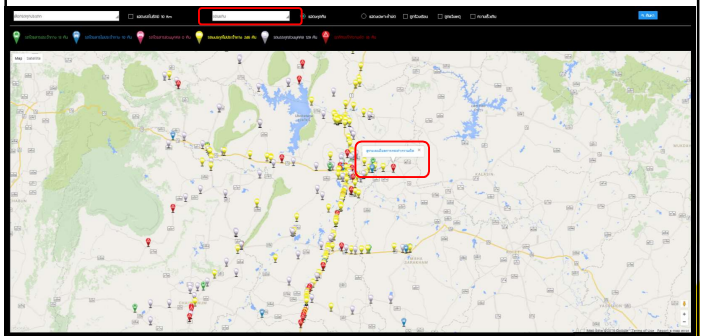
Research and Development of GPS Vehicle Controlling Management System for Autobus and Truck Routing Safety Improvement

GPS Tracking System



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Departme nt of Land Transport

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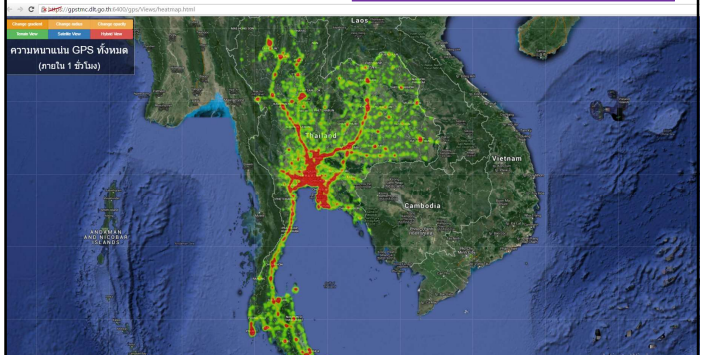
Research and Development of GPS Vehicle Controlling Management System for Autobus and Truck Routing Safety Improvement

GPS Density Map View



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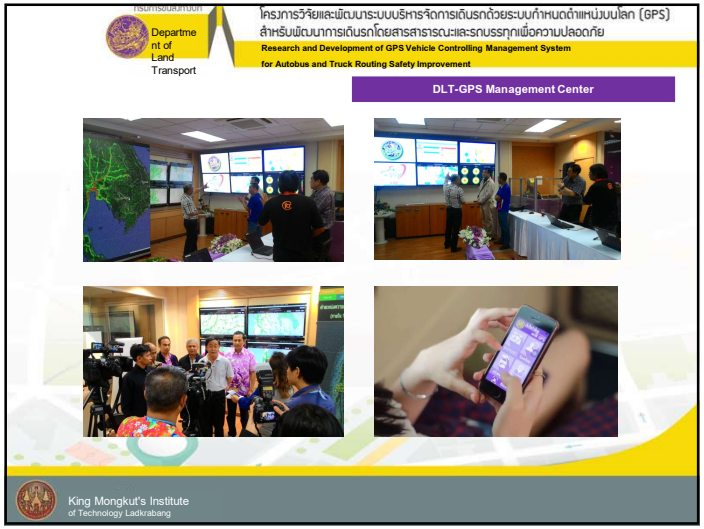
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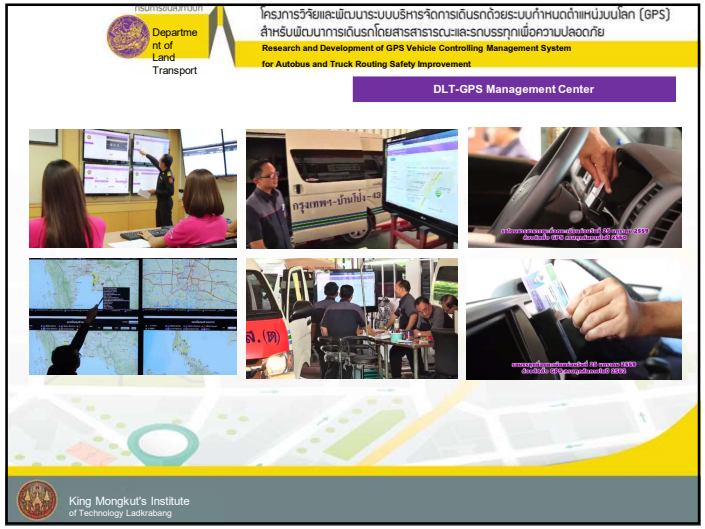
Research and Development of GPS Vehicle Controlling Management System
for Autobus and Truck Routing Safety Improvement
DLT-GPS Management Center
King Mongkut's Institute
of Technology Ladkrabang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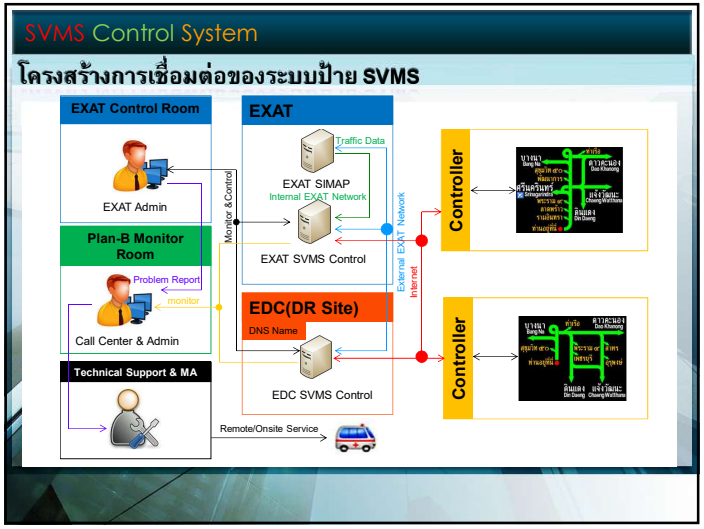
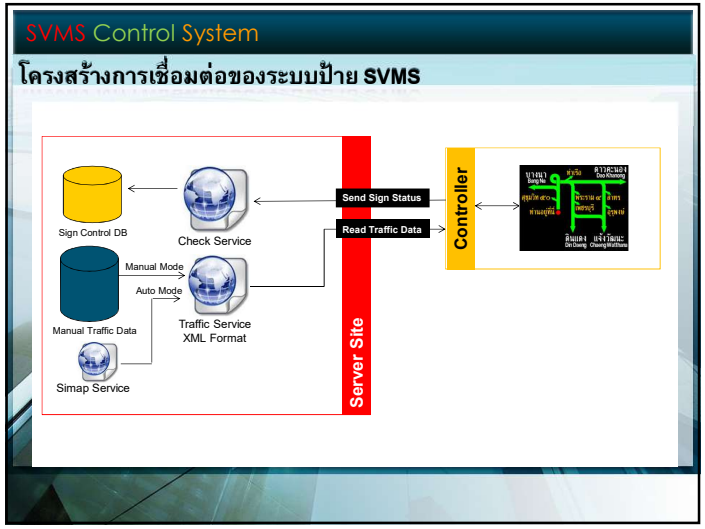
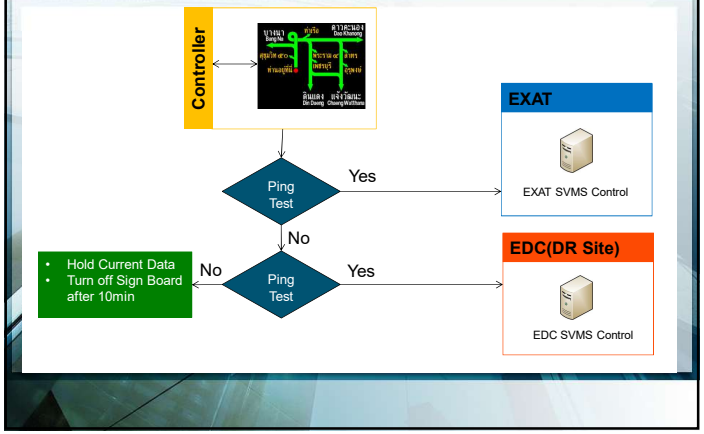

SVMS Control System
โครงสร้างการเชื่อมต่อของระบบป้าย SVMS
EXAT Control Room
EXAT Admin
Plan-B Monitor Room
Problem Report
monitor
Call Center & Admin
Technical Support & MA
Remote/Onsite Service
Monitor & Control
EXAT
Traffic Data
EXAT SIMAP
Internal EXAT Network
EXAT SVMS Control
EDC(DR Site)
DNS Name
EDC SVMS Control
External EXAT Network
Internet
Controller
Controller


SVMS Control System
โครงสร้างการเชื่อมต่อของระบบป้าย SVMS
Sign Control DB
Check Service
Send Sign Status
Read Traffic Data
Manual Mode
Auto Mode
Manual Traffic Data
Traffic Service
XML Format
Simap Service
Server Site
Controller

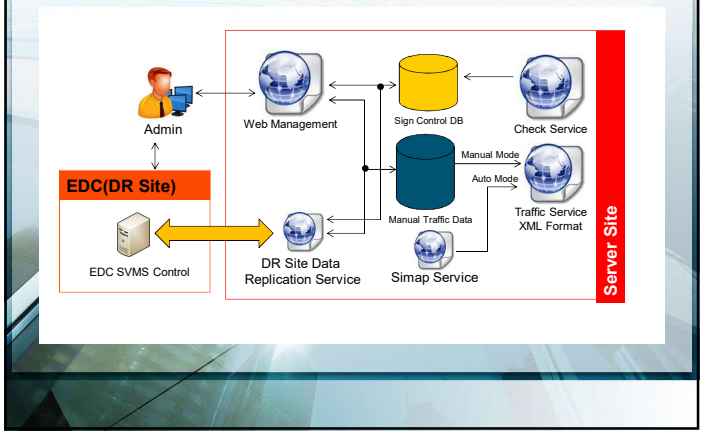
SVMS Control System

รูปแบบการควบคุมการทำงานของป้าย



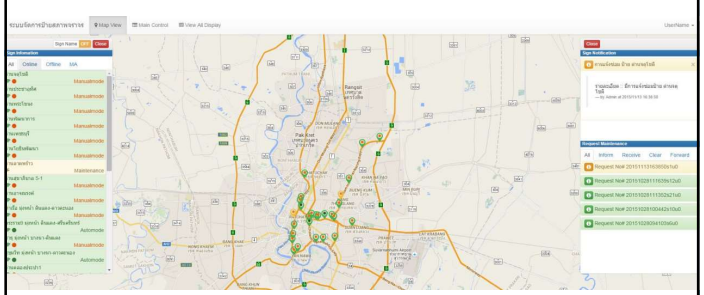
SVMS Control System

รูปแบบการควบคุมการทำงานของป้าย



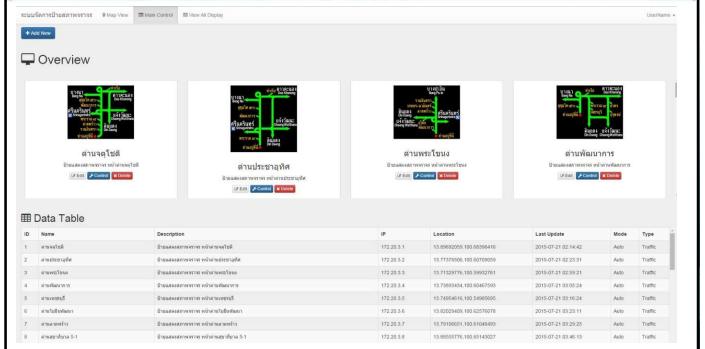
SVMS Control System

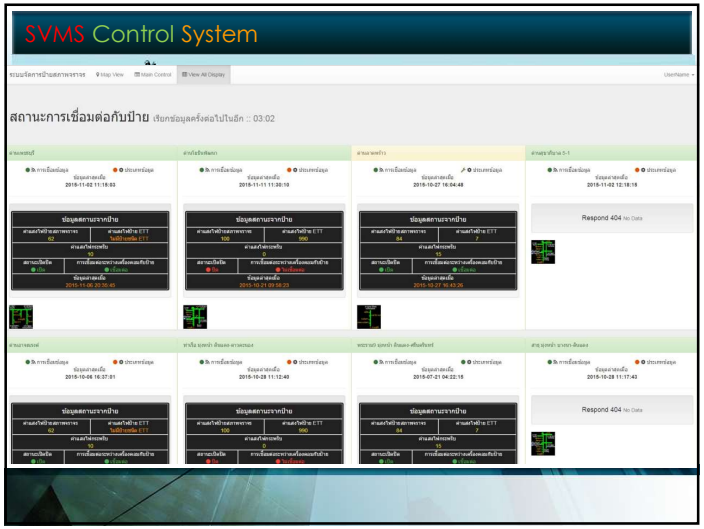
ระบบควบคุมป้าย



SVMS Control System

ระบบควบคุมป้าย




SVMS Control System
สถานะการเชื่อมต่อกับป้าย

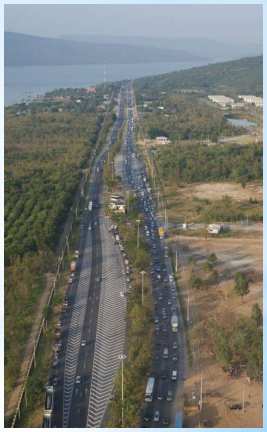

โครงการบริหารจัดการจราจรเพื่อควบคุมการใช้ช่องทาง
บนทางหลวงหมายเลข 2 ช่วงสระบุรี – นครราชสีมา


ลักษณะเส้นทางหลวงหมายเลข 2 สระบุรี-นครราชสีมา
พื้นที่ศึกษาในโครงการ ถนนมิตรภาพช่วงสระบุรี-นครราชสีมา
กม. 00+000 ถึง 150+000


สภาพปัญหาบนทางหลวงช่วงสระบุรี-นครราชสีมา
ในบริเวณพื้นที่ภูเขาลาดชันมีโค้งผสมระหว่างโค้งแนวดิ่ง (Vertical Curve) และโค้งแนวราบ (Horizontal Curve) อยู่เป็นจำนวนมาก และอาจก่อให้เกิดอันตรายหากผู้ขับขี่ใช้ความเร็วโดยเฉพาะอย่างยิ่งในเวลากลางคืน

สภาพปัญหาบนทางหลวงช่วงสระบุรี-นครราชสีมา

- ยวดยานใช้ความเร็วสูง
- รถบรรทุกขนาดใหญ่ไม่ชิดซ้าย
- เส้นทางโค้ง พื้นที่ลาดชันเพราะเป็นภูเขา
- มีสถิติการเกิดอุบัติเหตุสูง
- สภาพจราจรติดขัดในช่วงเทศกาล
- เป็นแหล่งอุตสาหกรรมมีรถบรรทุกนาดใหญ่เยอะ



การพัฒนาระบบในโครงการ

โปรแกรมแบ่งออกเป็น 2 ส่วน

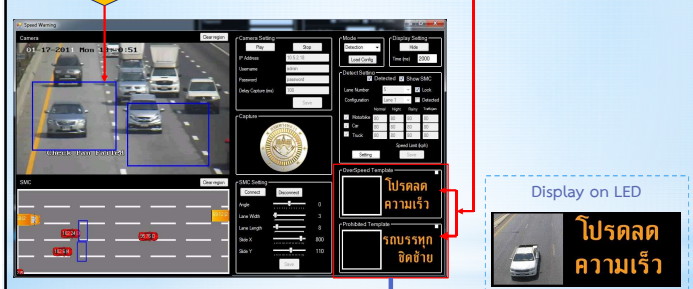
1. ระบบการแสดงผลบนป้าย
2. ระบบการตั้งค่าข้อมูลจาก Sensor

VMS

MS

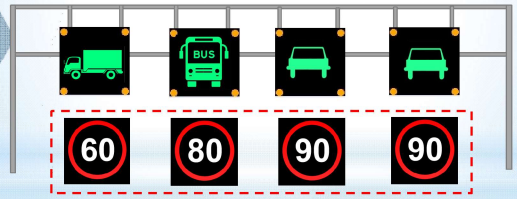
การพัฒนาระบบในโครงการ (ต่อ)

การพัฒนาระบบในโครงการ (ต่อ)



การพัฒนาระบบในโครงการ (ต่อ)

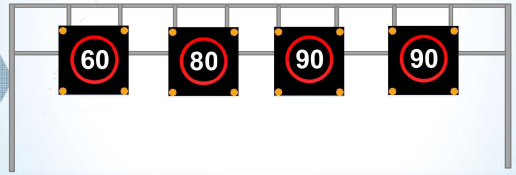
Speed Warning



Automatic Warning

การพัฒนาระบบในโครงการ (ต่อ)

MS Speed Warning

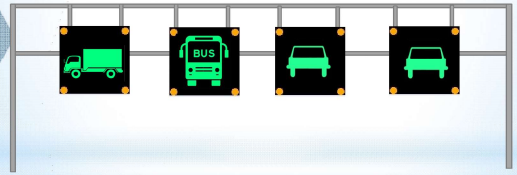


- Free Flow
- Congestion
- Day
- Night
- Rain

Automatic Warning

การพัฒนาระบบในโครงการ (ต่อ)

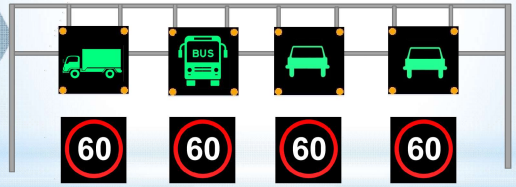
Truck Lane Warning



Automatic Warning

การพัฒนาระบบในโครงการ (ต่อ)

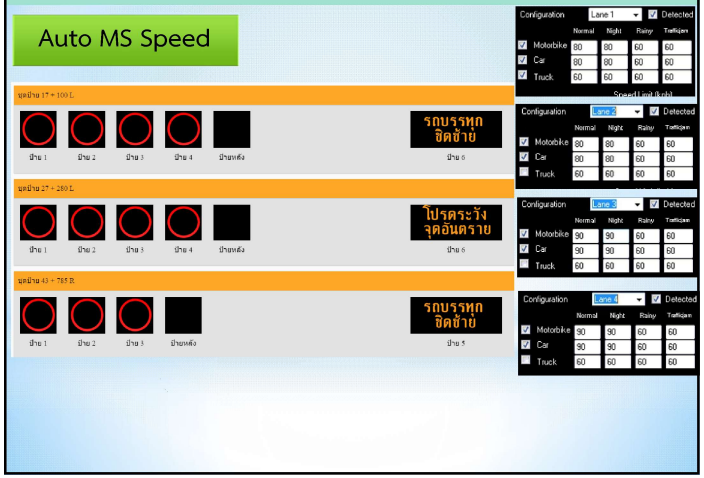
Incident Warning
: Rainy



Automatic Warning

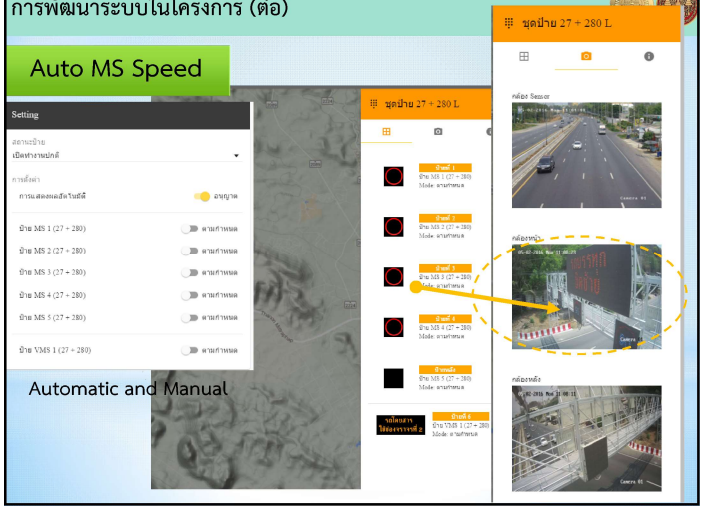
การพัฒนาระบบในโครงการ (ต่อ)

Auto MS Speed



การพัฒนาระบบในโครงการ (ต่อ)

Auto MS Speed

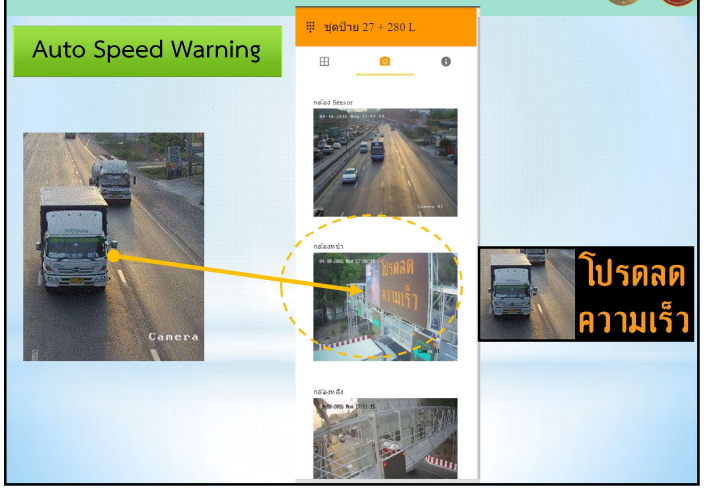


การพัฒนาระบบในโครงการ (ต่อ)

Auto MS Speed

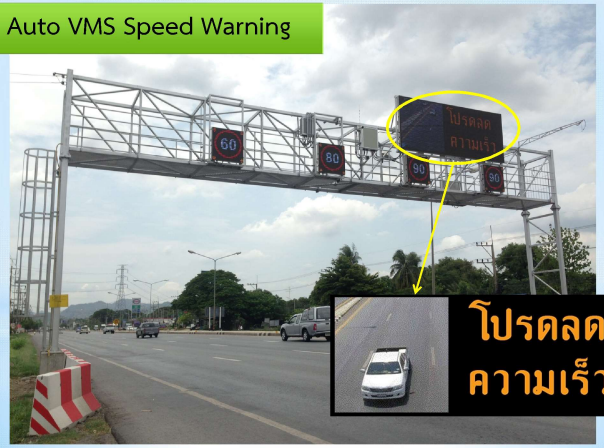
การพัฒนาระบบในโครงการ (ต่อ)

Auto Speed Warning



การพัฒนาระบบในโครงการ (ต่อ)

Auto VMS Speed Warning

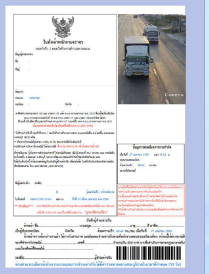


การพัฒนาระบบในโครงการ (ต่อ)

Report

Sensor and CCTV Detection

VMS Display

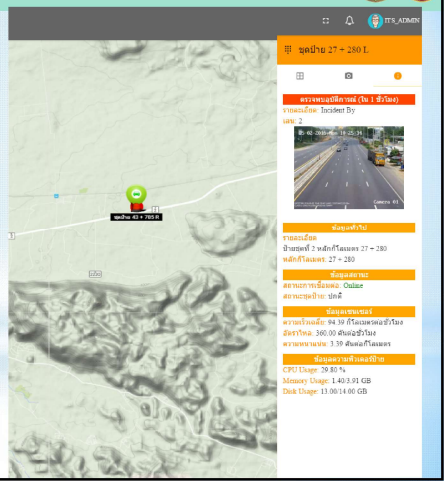


Report

การพัฒนาระบบในโครงการ (ต่อ)

Incident Detection

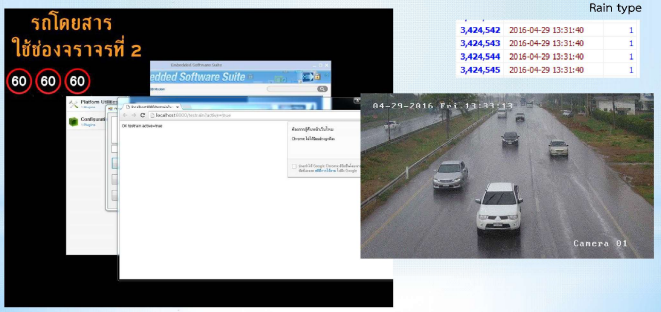
Stopped Vehicle



การพัฒนาระบบในโครงการ (ต่อ)

Rainy

การแจ้งเตือนที่ได้จากระบบ Rain type =1 คือ ฝนตก Rain type = 0 คือ ฝนไม่ตก

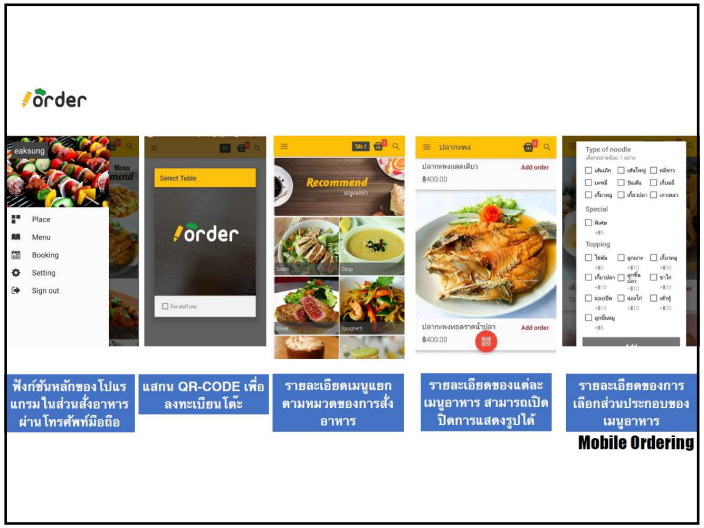


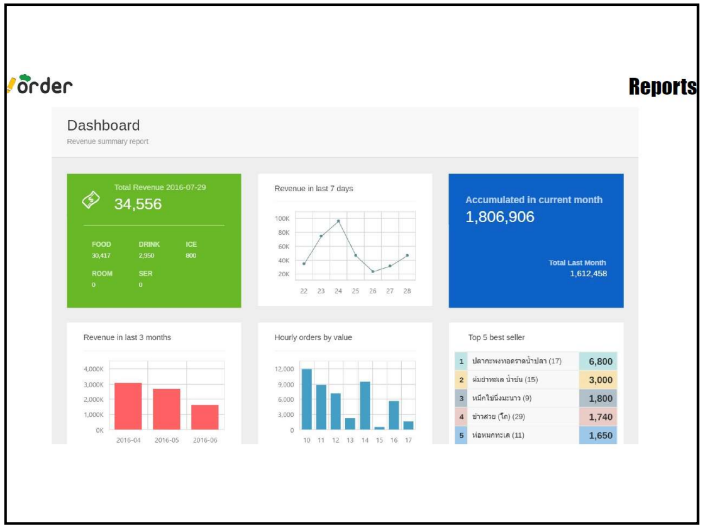

การวิเคราะห์แผนแม่บทสำหรับติดตั้งระบบเพื่อควบคุมการใช้ช่องทางบนทางหลวง
แผนเพื่อเพิ่มความปลอดภัยทางถนนบนทางหลวงหมายเลข 2 (ถนนมิตรภาพ)
กม. 0+000 ถึง กม. 150+000
สระบุรี
นครราชสีมา


BANGSAEN Smart City
HEALTH MONITORING
EMERGENCY NOTIFICATION
ENVIRONMENTAL SENSING
PERSONAL FOLLOWING
HOME MONITORING

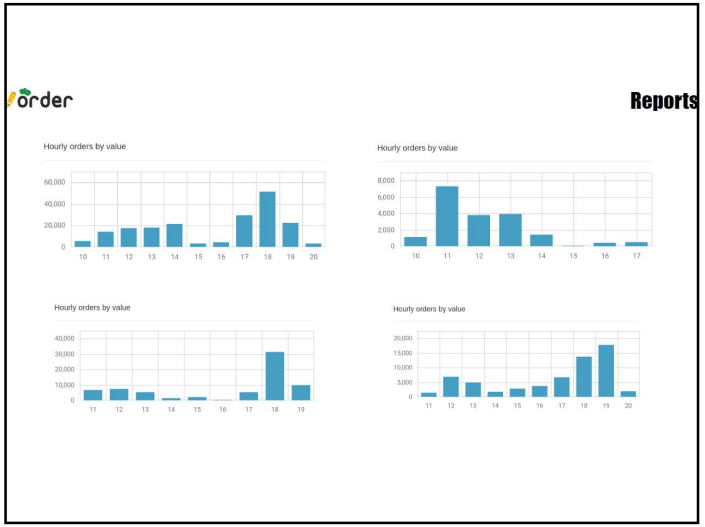

1. Smart Tourism City
Smart Tourism
2. Public Care (HomeCare, Security, Surveillance)
3. การแจ้งเตือนต่างๆ (Crime Alert, Emergency Call)
CrimeAlert
Your Monitoring Center
4. ปัญหาอื่นๆที่เมืองบางแสนประสบอยู่


/order
Smart Restaurant Supply Chain
Place
NAMON
ก๋วยเตี๋ยวหน้ามั่น
/order
Cafe (Demo)
อิ่มอุ่น ณ ชลบุรี
Restaurant
01
02
03
04
05
Customer


order
Place
Menu
Booking
Setting
Sign out
Select Table
Recommend
ฟังก์ชันหลักของโปรแกรมในส่วนสั่งอาหารผ่านโทรศัพท์มือถือ
แสกน QR-CODE เพื่อลงทะเบียนโต๊ะ
รายละเอียดเมนูแยกตามหมวดของการสั่งอาหาร
รายละเอียดของแต่ละเมนูอาหาร สามารถเปิดปิดการแสดงรูปได้
รายละเอียดของการเลือกส่วนประกอบของเมนูอาหาร
Mobile Ordering


order
Reports
Dashboard
Revenue summary report
Total Revenue 2016-07-29
34,556
FOOD
DRINK
ICE
ROOM
SER
Revenue in last 7 days
Accumulated in current month
1,806,906
Total Last Month
1,612,458
Revenue in last 3 months
Hourly orders by value
Top 5 best seller
1 6,800
2 3,000
3 1,800
4 1,740
5 1,650


order
Reports
Sales Report
Daily revenue within the set date range
Total Revenue 2016-02-29
135,417
From
2016-03-01
To
2016-03-30
Submit


order
Reports
Hourly orders by value
Hourly orders by value
Hourly orders by value
Hourly orders by value

Elderly Care System

ระบบดูแลผู้สูงอายุ

จำนวนผู้สูงอายุในประเทศไทยมีมากกว่า **10 ล้านคน**

ซึ่งคิดเป็นร้อยละ **14.9** ของประชากรทั้งประเทศ

ประเทศไทยจึงกำลังก้าวสู่

สังคมผู้สูงอายุ

Phase I

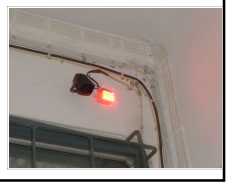
(2010 - 2013)

- The prototypes for elderly people who are living in the urban area



- By pressing the button on portable device, and then the siren sound will be alerted





Elderly Care System

Phase II

(2015 - NOW)

Activity Analysis
SMS Alert and Emergency Call

CLOUD

IoT Gateway

Smart Tag

ALERT

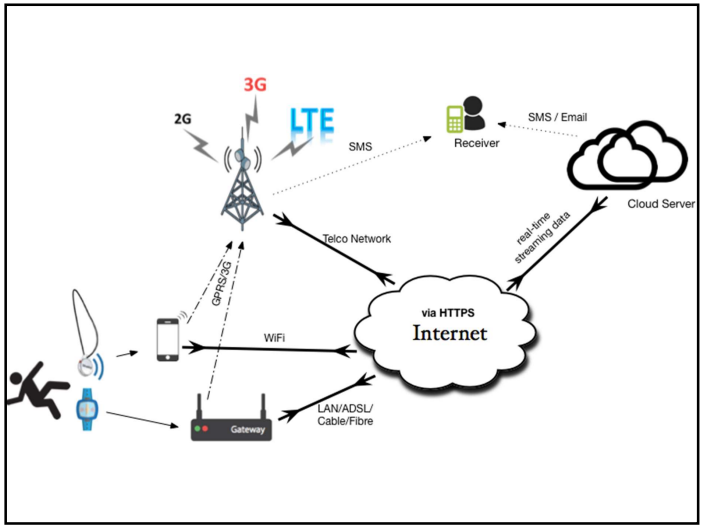
Monitoring and Alert System

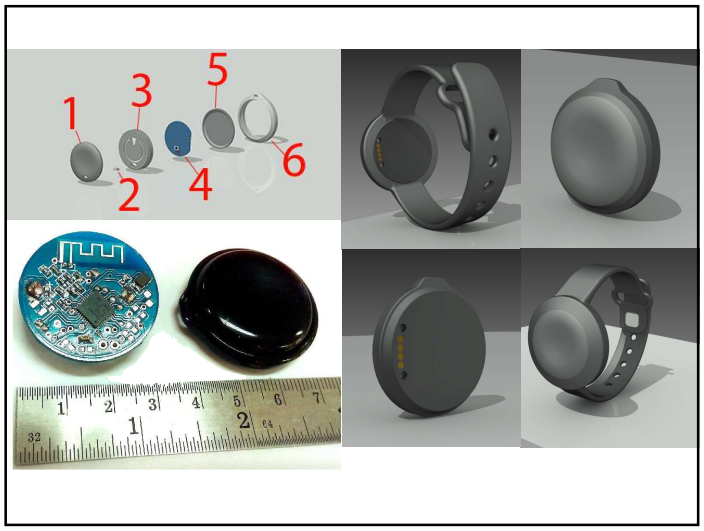


Phase II

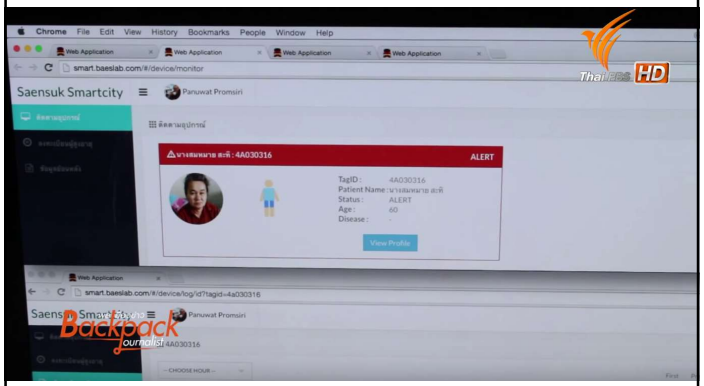
(2015 - NOW)



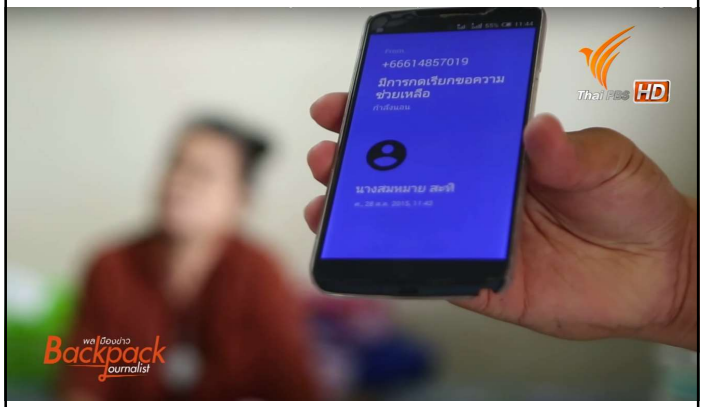




Emergency Call



Emergency Call



SAMITIVEJ@HOME Chonburi

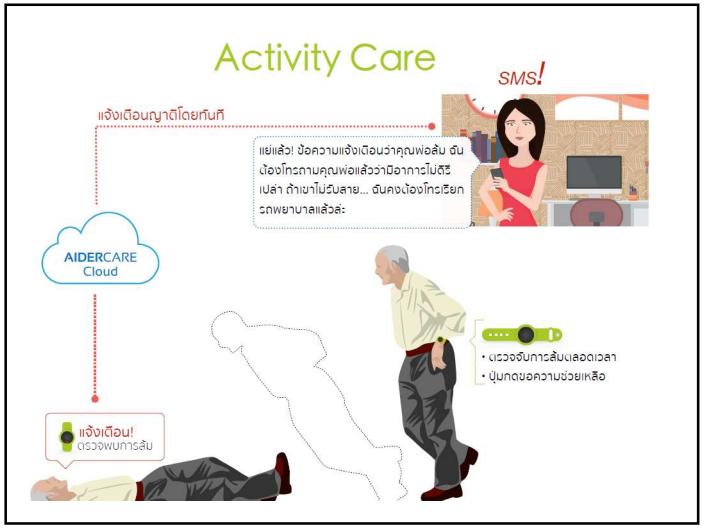
PHASE I

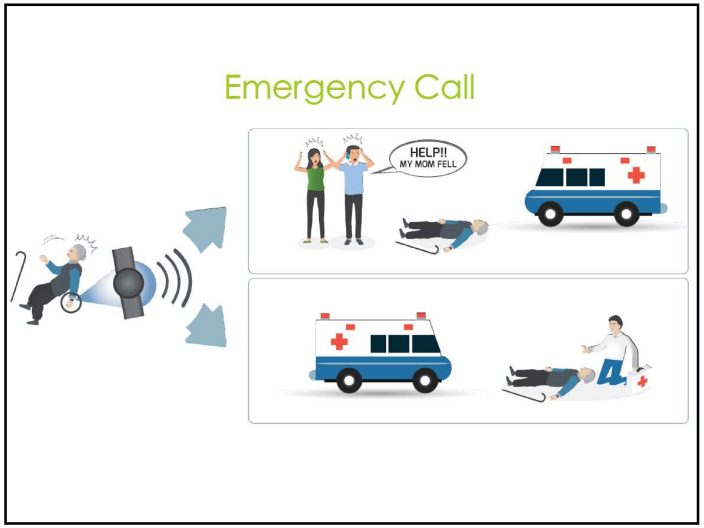
Wristband Model A
1. Push Emergency
2. Fall Detection
3. Activity Monitoring

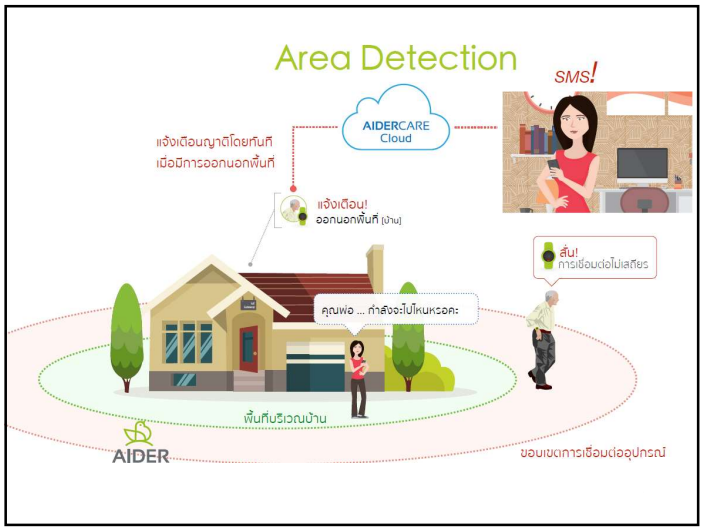
Cloud Services

Mobile App (Android/iOS)
Personal Gateway

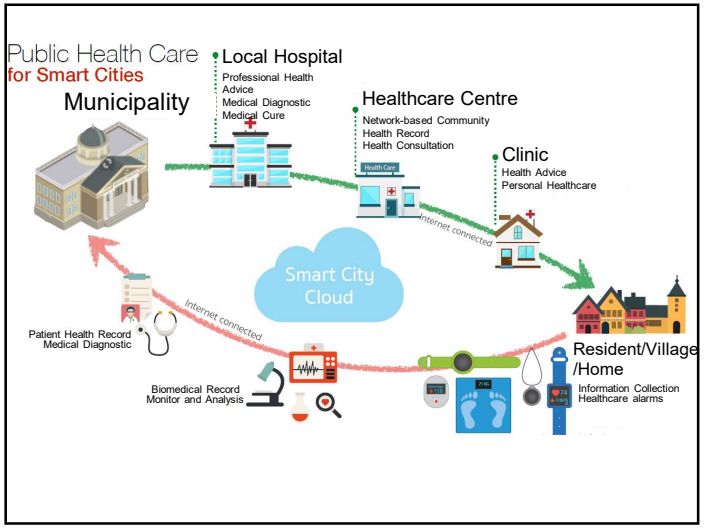
Activity Monitoring

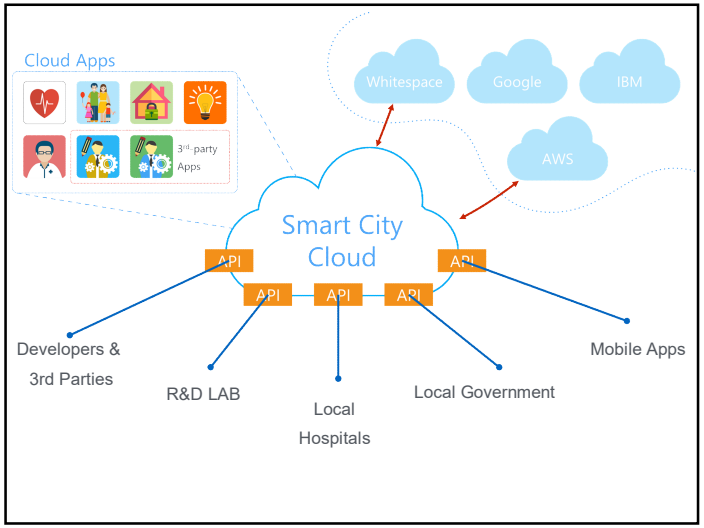

Activity Care
SMS!
แจ้งเตือนญาติโดยทันที
แย่แล้ว! ข้อความแจ้งเตือนว่าคุณพ่อล้ม ฉันต้องโทรถามคุณพ่อแล้วว่ามีอาการไม่ดีรึเปล่า ถ้าเขาไม่รับสาย... ฉันคงต้องโทรเรียกรถพยาบาลแล้วล่ะ
AIDERCARE Cloud
• ตรวจจับการล้มตลอดเวลา
• ปุ่มกดขอความช่วยเหลือ
แจ้งเตือน! ตรวจพบการล้ม


Emergency Call
HELP!! MY MOM FELL


Area Detection
SMS!
AIDERCARE Cloud
แจ้งเตือนญาติโดยทันที เมื่อมีการออกนอกพื้นที่
แจ้งเตือน! ออกนอกพื้นที่ [บ้าน]
สัน! การเชื่อมต่อไม่เสถียร
คุณพ่อ ... กำลังจะไปไหนหรอคะ
พื้นที่บริเวณบ้าน
AIDER
ขอบเขตการเชื่อมต่ออุปกรณ์


SAMITIVEJ@HOME
24/7 Monitoring and Services
READY AND STANDBY
FOR YOU CALL
by Emergency department





Benefits

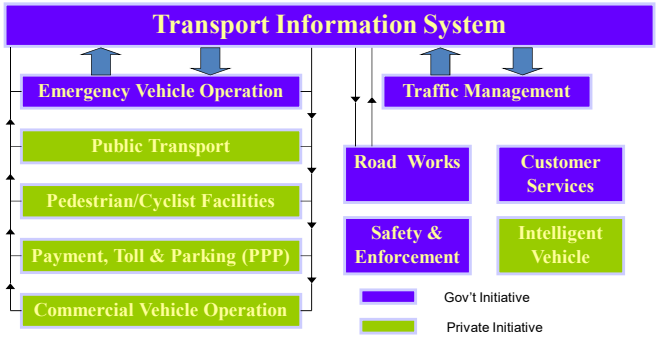
- Member Engagement — สร้างความเชื่อมโยงอย่างใกล้ชิดกับสมาชิก
- Quality-of-Life — ยกระดับคุณภาพชีวิตที่มีการดูแลอย่างใกล้ชิด
- Efficient Services — เพิ่มประสิทธิภาพในด้านบริการต่างๆ
- Personal Health Record — ระบบสุขภาพส่วนบุคคลออนไลน์
- Added Value — สร้างมูลค่าโดยรวมให้กับธุรกิจ
- Creation of new Opportunities — สร้างโอกาสใหม่ทางธุรกิจและบริการ

VAN / SCHOOL BUS

STOLEN VEHICLE ALERT SYSTEM
FOR CONDOMINIUM / VILLAGE

PUBLIC SAFETY

ITS Framework



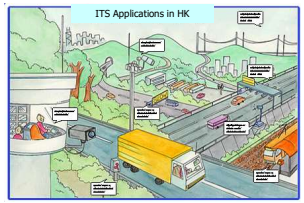
Existing ITS Applications

Government Departments

- Area Traffic Control
- Traffic Control and Surveillance
- Emergency Transport Incident Management
- CCTV images, snapshots & speed map on Internet
- Journey Time Indication
- Speed Enforcement & Red Light Cameras
- Vehicles and Drivers Licensing Integrated Data System IV
- 3rd Generation Mobilization System – FSD
- Digital Map – Lands Department
- Electronic Parking Meters

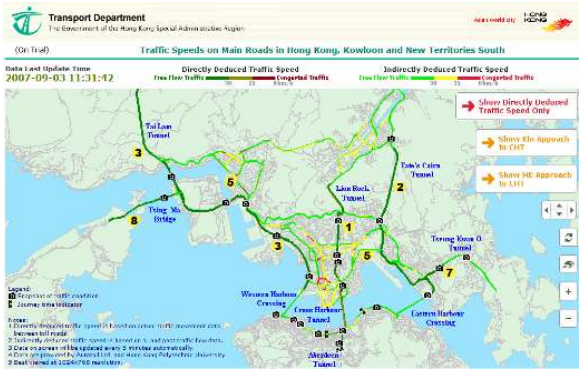
Private Sector

- Automatic Toll Collection
- Octopus Card
- Public Transport Route Information

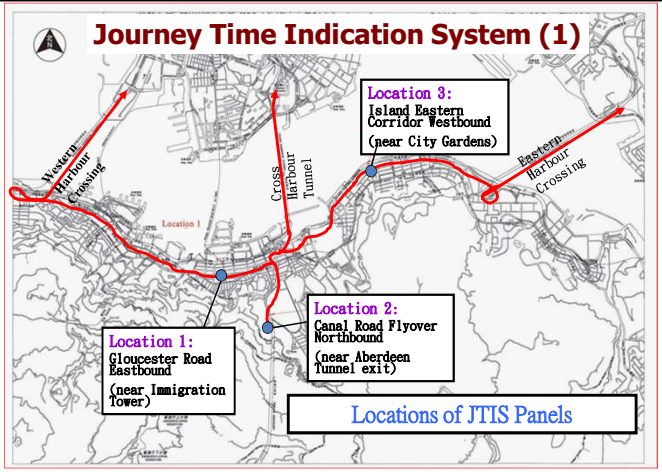


Services on Internet

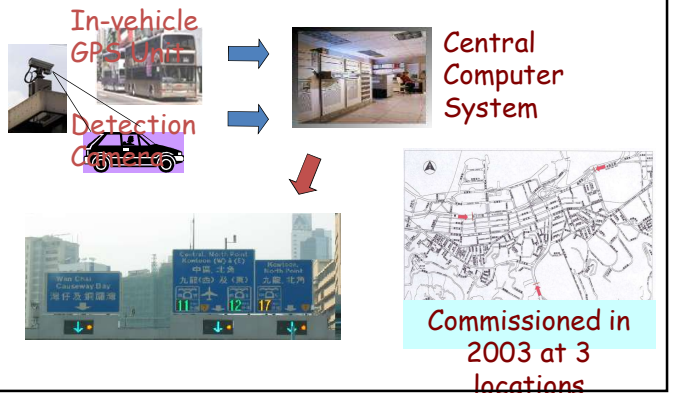
Speed Map



Journey Time Indication System (1)



Journey Time Indication System (2)



Speed Enforcement & Red Light Cameras

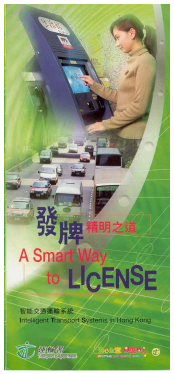
- *131 red light camera sites (red light jumping reduced by 43-55%)*
- *85 speed enforcement camera sites (speeding reduced by 50%)*
- *Overall accidents reduced by 40%*

Red Light Camera

Speed Enforcement

VALID IV
(Vehicles and Drivers Licensing Integrated Data System IV)

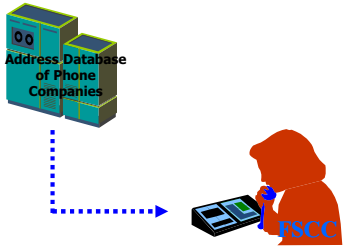
- *Launched in early 2007*
- *Greater customer convenience – "anytime, anywhere" licensing renewal services*
- *Enables collaboration with private sector in delivery of licensing services (insurance companies, car testing centres, financial institutions)*
- *Will benefit 1.7m driving licence holders & 0.6m vehicle licence holders*



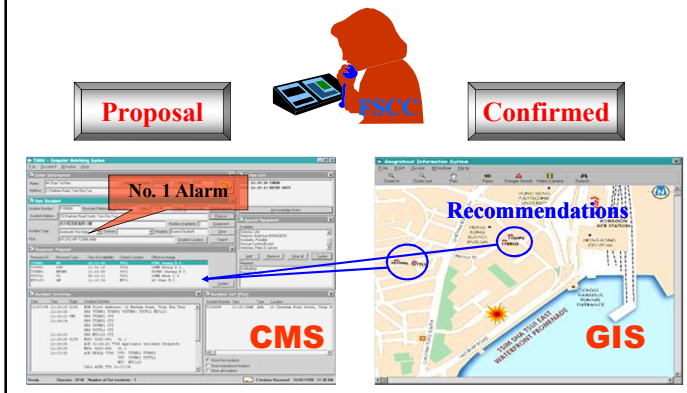
FSD Third Generation Mobilisation System – Sub-systems

- Computerized Mobilizing System
- Remote Control Terminal
- Console System
- Geographic Information System
- Automatic Vehicle Location System
- Mobile Data Terminals
- Wireless Digital Network
- Information Management System
- Digital Communication Recording System
- Calling Line Identification System
- Video Projection System
- Intercom System
- Access Control System
- Closed Circuit Television System
- Master Time Generation System
- Uninterruptible Power Supply System
- Infrastructure Backbone Telecommunication Network
- Fault Indication Management System
- CAD Interface System
- Automatic Call-out System / Telephone System

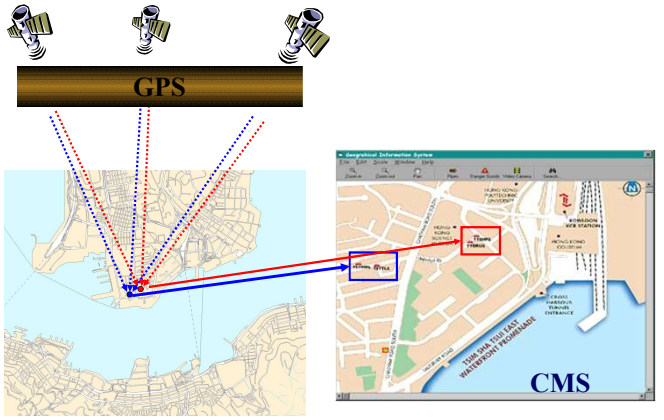
TGMS – Call Taking



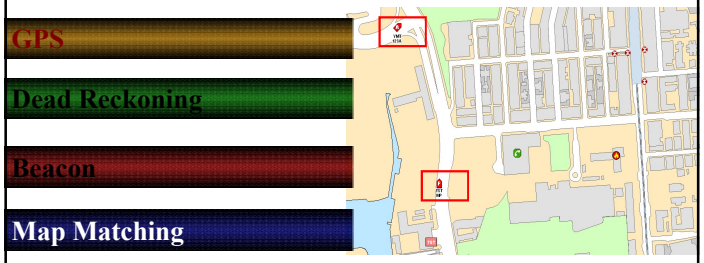
TGMS – Call Taking



TGMS – Automatic Vehicle Location System



TGMS – Automatic Vehicle Location System



Lands Department – Digital Map

- Digital Map
- Geodetic Survey Information
- Metadata from BD, CEDD, HyD, PlanD & WSD

Electronic Payment

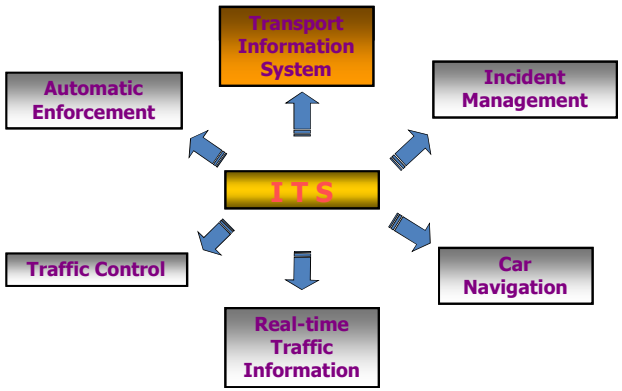
Autotoll introduced in 1993 & used by about 40% vehicles

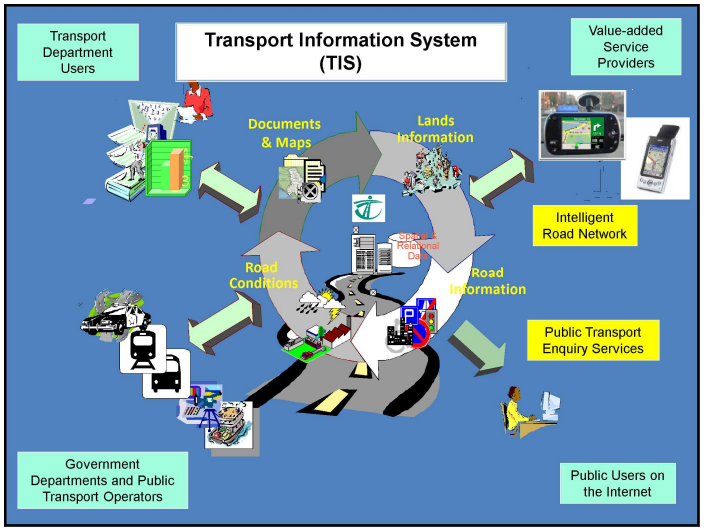
Electronic Parking Meters launched in 1998

14 m Octopus Cards with 10.5 m daily

Public Transport Route Information

6 New Initiatives

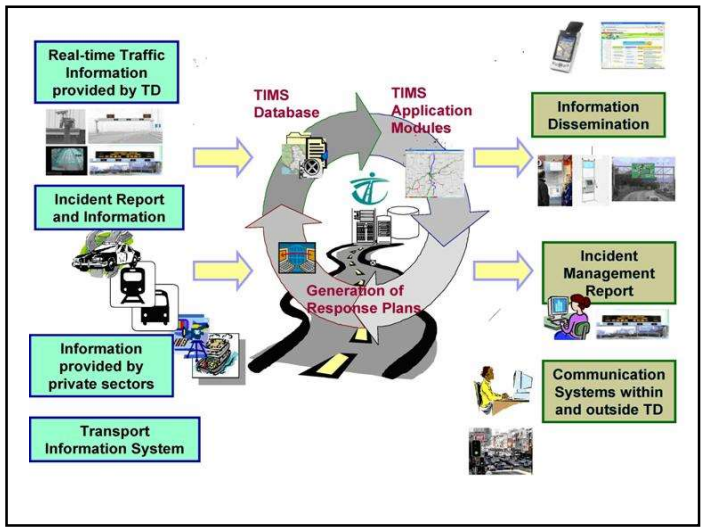




Transport Information System

Central data warehouse

Data/Information		Transport Information System	Services	
Road network	→	→	Public - direct	Free
Public transport	→	→	Public - thro' media	Free
Real-time traffic condition	→	→	Service providers	Value-added
Traffic Control Centre	→	→	Government Departments	Internal
Transport Department	→	→	Transport Department	Internal



Fourth Speaker of <Session 1>

Mr. Suradech Taweesaengsakulthai
CEO of Khon kaen City Development (KKTT) Co.,Ltd., Thailand
E-mail: suradech@cho.co.th

Brief Biography:

Education

1992	Diploma in Business Administration,Sanno University
1990	Diploma in Automotive Engineering,Yomiuri Rikosem College, Japan
1988	High School ,Khonkaenwittayayon School, Khon Kaen, Thailand
1985	Secondary School ,Assumption Sriracha School, Chonburi, Thailand

Current Position

1994	President, Chief Executive Officer & Director ,Cho Thavee PLC
2015	Managing Director ,Khon Kaen City Bus
2015	Founder ,Khon Kaen City Development (KKTT)
2012	Deputy Dean ,College of Local Administration Khon Kaen University
2005	Managing Director ,Cho Thavee Thermotech Co., Ltd.

Awards:

2016	Thailand Top Company Award 2016 from UTCC&ARiP
2015	Thailand Sustainability Investment From The Stock Exchange of Thailand (SET)
2015	Top SMEs in Asia at the Asia Corporate Excellence & Sustainability Awards (ACES) from MORS Group
2015	Outstanding Investor Relations Awards Company list on mai From The Stock Exchange of Thailand (SET)
2015	STI Award 2015 (Science Technology and Innovation)

Khon Kaen Smart City (Phase:1) LRT North-South Line, Infrastructure funds from private Alternative urban development Model for Thailand and Beyond
By Mr. Suradech Taweesaengsakulthai

Summary:

The Khon Kaen Smart City (Phase I) is the initiative project to develop infrastructures of Khon kaen Province. This smart city development project has planned to invest in mass transit, urban design, green energy, digital economy, financial hub, water management, and smart agro industry. The project has well collaborated between public, private, and education sectors. The Smart City in our terms refers to smart economy, smart environment, smart government, smart living, smart mobility, and smart people.

The benefits of this investment and development project are the capital market is prioritizes for local people. It also minimizes the dependence from government in terms of allocation the budget to the province. It enables to decentralization to local, increasing market capital and transparency in all processes and operations. Moreover, it would be to create the domestic economic of the country as well.

Khon Kaen Smart City (Phase:1)
LRT North-South Line, Infrastructure funds from private
Alternative urban development Model for Thailand and Beyond

Khon Kaen urban development (KKTT) Co,.Ltd.
Associate with Khon Kaen University and 6 local Governments

What is the Project

- **To construct 23 Km. LRT North-South Line**
- **First TOD on Public and Private Land**
- **Project costs about $ 500 Million**
- **Initial Investment comes from Private Sector**
- **The project will be listed in stock market after 2 years of operation.**

WHY we have to do OURSELVES?
Because National Budget Allocated Mostly to BANGKOK




Thailand is Stuck in 2 Vicious Traps

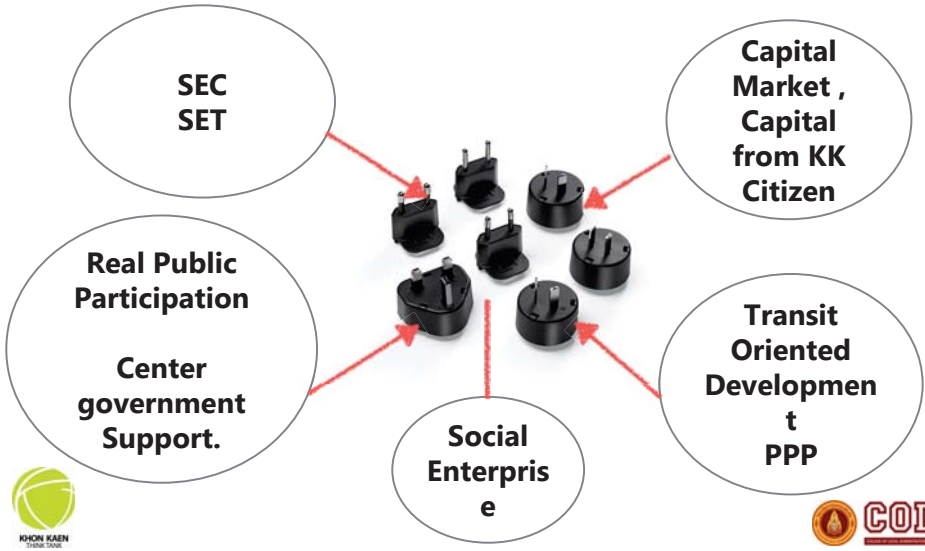
1 Middle income Trap

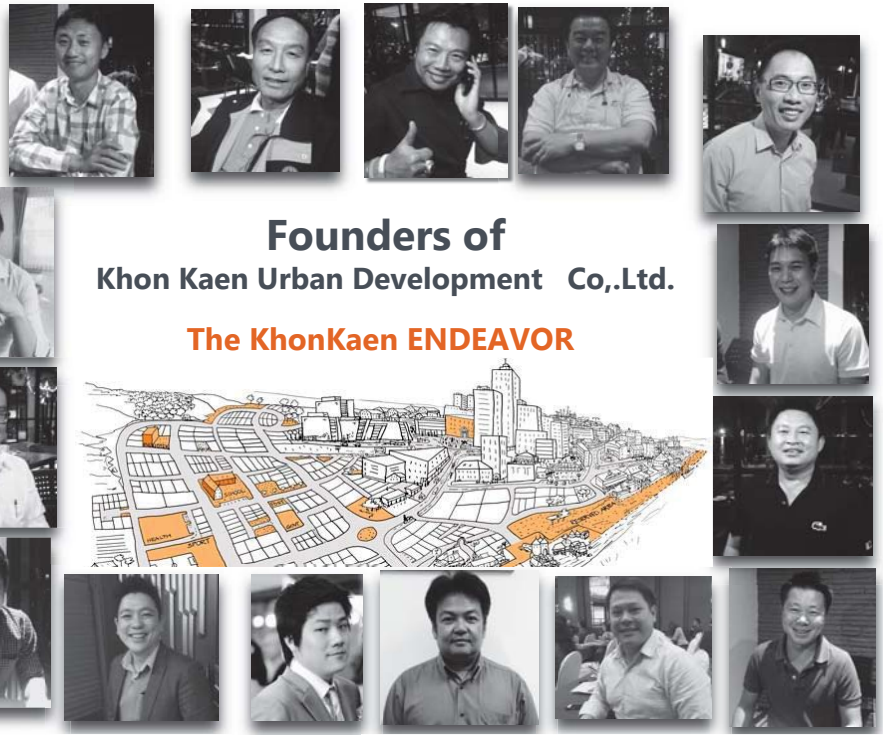
2. Thinking Trap (dependent on government budget and instructions)

Khon Kaen Infrastructure Fund is the Adapter

Between

Byzantine Bureaucracy and Sustainable Development





Founders of

Khon Kaen Urban Development Co,.Ltd.

The KhonKaen ENDEAVOR

Khon Kaen Is Bellwether Province

Center for
Education
Logistics
Health
MICE
Goverment
Administration
ICT

Heart of the Northeast

Human Capital

Citizen Engagement

Vision

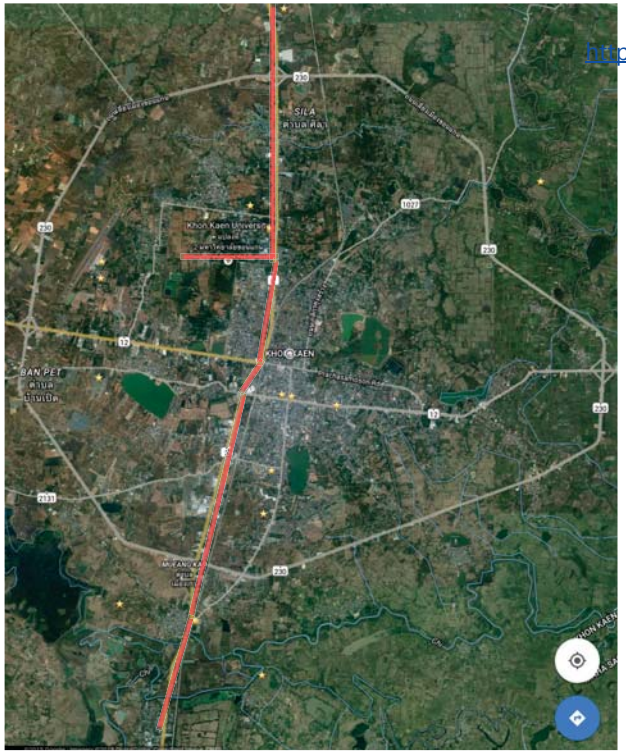
Compact City , Smart City , livable City

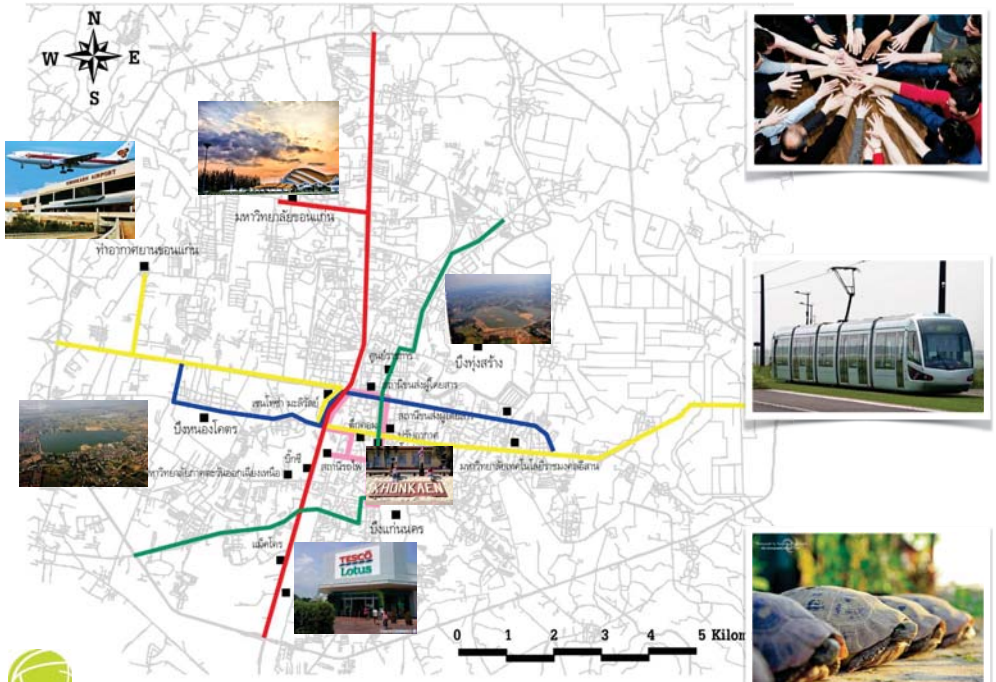
We Propose a New Paradigm of Citizen led Urban Development

Local government is a foundation of national development

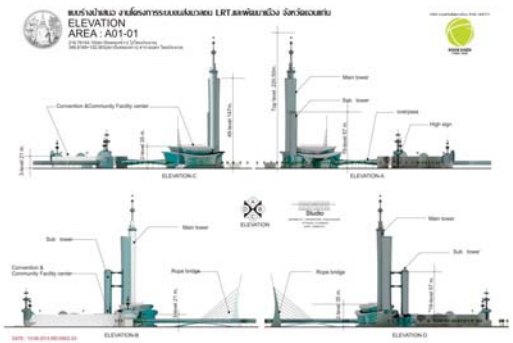
There is a positive relationship between local government advancement and economic development

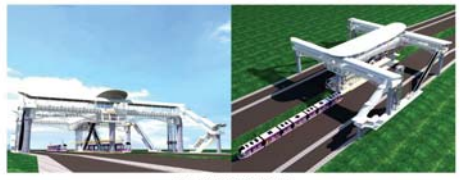
http://youtu.be/HCvrTOvvgI



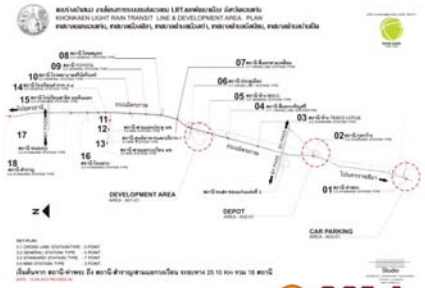


รูปที่ 4.3.1-1 สถานที่สำคัญที่อยู่ในเส้นทางการให้บริการของระบบขนส่งมวลชนแต่ละสาย





EXTERIOR PERSPECTIVE



Not the project to fix traffic jam but it also fix many many things

- Trans Disciplinary
- Sustainability growth for the province
- Real participation
- Other Provinces able to use this model
- To change THAI's Mindset

Thai Prime Minister has approved the project

The Chairman of the NCPO has graciously approved the proposed activity and added that "There should be no conflict resulting from the activity, with consideration and approval by the Ministry of Transport and Ministry of Interior, and Air Chief Marshall Prachin Jantong, Chief of the Economic Section, should review the proposed activity of many provinces such

Thai NCPO (Saw Kaw)
113

Economic Section
National Council for Peace and Order
Don Muang, Bangkok 10210

18 March 2016

Subject: Khon Kaen 'Smart City' Project (Phase 1): Building a model north-south rail mass transit system in Khon Kaen Province coupled with urban development and establishment of a basic infrastructure funded with private investment to create a trend-setting and sustainable urban environment

To: Mr. Suradej Taweesaengkulthai, Deputy Dean, College of Local Administration, Khon Kaen University and Representative of the Khon Kaen Urban Development Group

Attachment: Letter from the Secretariat of the NCPO data February 29, 2016

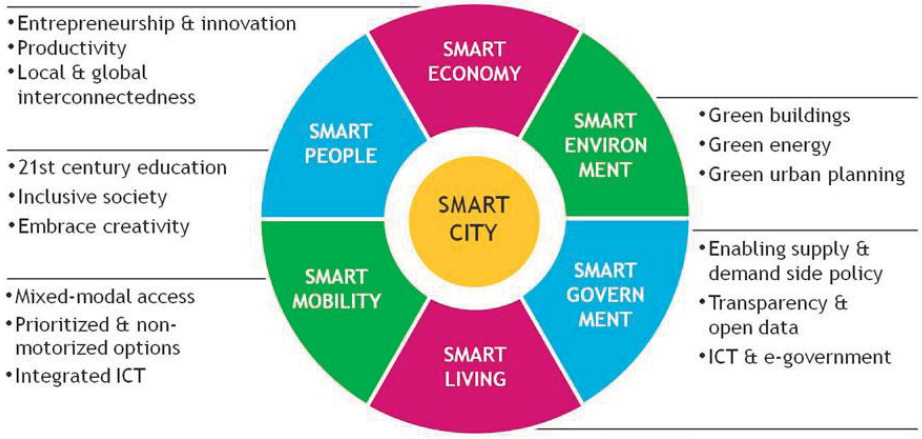
Pursuant to the approval by the NCPO dated March 8, 2016, regarding the Khon Kaen 'Smart City' Project (Phase 1): Building a model north-south rail mass transit system in Khon Kaen Province coupled with urban development and establishment of a basic infrastructure funded with private investment to create a trend-setting and sustainable urban environment:

The Chairman of the NCPO has graciously approved the proposed activity and added that "There should be no conflict resulting from the activity, with consideration and approval by the Ministry of Transport and Ministry of Interior, and Air Chief Marshall Prachin Jantong, Chief of the Economic Section, should review the proposed activity of many provinces such as Chiang Mai and others, in which the business sector and the people plan to collaborate in urban mass transit programs."

In order that the advice of the NCPO is adhered to in full, there will be further consideration of implementation. The collaborating government agencies will submit names of their representatives assigned a coordinating role for the activity to the Economic Section of the NCPO.

This is submitted for your consideration and further action.

smart city



https://techzine.alcatel-lucent.com/smart-cities-are-built-smart-networks

Khon Kaen's development investment plans

1 Logistics, Mass Transit, and Urban Design
2 Green Energy
3 Eco industrial estate
4 Digital Economy
5 Financial Hub
6 Water Management
7 Smart Agro Industry
8 Education and Human Capital Development

We make the life of Khon Kaen people better

KHON KAEN THINK TANK

COLA

Thank You

KHON KAEN THINK TANK

COLA

Benefits

- Real participation from people in the City.
- Increase Thai 's Market Capital.
- Increase Transparency.
- Not public debt.

<AFTERNOON SESSION >

< 1st AFTERNOON SESSION >

<Session 2A> Parallel Session on "Traffic Safety"

Session 2: Parallel Session of Main Symposium (and AYRF Session)
Session2A: Traffic Safety **Moderated by Prof. Dr. Pichai Taneerananon, Prince of Songkla University, Thailand**
"Innovation Development 4.0 Model" ***By Dr. Sakda Panwai*** ***Director of Expressway Engineering System Research and Development, Expressway Authority of Thailand***
"Road Safety: Australian Best Practice" **Assoc. Prof. Dr. Jennifer Oxley, Monash Univ.,Australia**
"Engineering Solutions on Road Accidents in Japan" **Assoc. Prof. Dr. Shigeru Tominaga, Nihon University, Japan**
"Thailand Road Safety Problems and its Direction" **Dr. Witaya Chadbunchachai, WHO Representative and Khon Kaen University**
"How did Phuket reduce road traffic injury and become the best practice in Thailand?" **By Dr. Wiwat Sitamanotch, Vice President of Traffic Accident Prevention Advocate**

Moderator of <Session 2A>

Prof. Dr. Pichai Taneerananon
Professor of Faculty of Engineering, Prince of Songkla University
E-mail: 2007tao@gmail.com

Brief Biography:

Dr. Taneerananon is a well-known professor in the area of road safety in Thailand where he has been involved in the study of road crashes and black spot identification and development of countermeasures, conducting road safety audits and training of road safety auditors for over 20 years. He first published a paper 'Road Accidents in Thailand' in 1981. He was credited for introducing road safety audit to Thailand and published the first paper on the subject in Thai, and currently a senior road safety auditor accredited in Western Australia. In2005, he led a team of highly qualified academics and professionals to complete a 2-year study on the cost of traffic accidents in Thailand. The outcomes from study now form the basis for costing road accidents in Thailand. He is currently a member of the National Sub – Committee in charge of development of accident database and research to identify long-term countermeasures. He is also widely known in Asian countries through his contribution as a member of International Scientific Committee for the Eastern Asia Society for Transportation Studies (EASTS) since 1996 and chairing of 3 of the Road Safety sessions in the last 4 EASTS conferences. He is an author of the soon to be published book on Asian Transportation, in which he writes about traffic safety. He is the present chief of topic group: road safety and traffic accident for the 2009 EASTS conference in Surabaya.

Education:

1969-1972:	B.E. (Second Class Honours Division A) Civil Engineering, University of Western Australia. Holder of a Columbo Plan Scholarship
1975-1976:	M.Eng.Sc. (Highway and Transportation Engineering) University of New South Wales. Holder of UNSW University Postgraduate Fellowship in Highway Engineering.
1977-1981:	Ph.D., (Civil Engineering) University of New South Wales. Holder of UNSW University Postgraduate Scholarship.

Membership in Professional Societies:

-Professional Engineer (registered with the Royal Thai Government)
-Member of the Engineering Institute of Thailand
-Member of Road Association of Thailand
-Founding Member of Thai Society for Traffic and Transportation Studies
-President of Thai Society for Traffic and Transportation Studies 2006- present
-Member of The Road Engineering Association of Asia and Australasia
-Member of The Institution of Highways and Transportation, UK (1992 – 2000)

First Speaker of <Session 2A>

Sakda Panwai, Ph.D., P.E.
Director of Expressway Engineering System Research and Development, Expressway Authority of Thailand
E-mail: sakda.duk@gmail.com

Brief Biography:

Dr. Sakda Panwai received B.Sc. Ind. Ed. (Civil Engineering) (First Class Honours) in 1996 from King Mongkut Institute of Technology Thonburi, Thailand, M. Eng (Transportation) in 1998 from Asian Institute of Technology, Thailand, and Ph.D. (Intelligent Transport System) in 2007 from the University of Queensland, Australia. He also obtained his M.B.A. (Marketing) degree in 2015 from Ramkhamhaeng University, Thailand. He has been working in the Expressway Authority of Thailand since 1998. At present, he is the Director of Expressway System Engineering Research and Development Division. He also holds a state license as a Professional Engineer (P.E.).

Dr.Panwai has over 15 years of experience in Public-Private-University (PPU) partnership. His specific interest lies in the areas of Intelligent Transport System (ITS), Traffic Engineer (Modelling and Application), Transport Engineer, Intelligent Transport System (ITS) Applications, Artificial Intelligence (AI), Transport Emission Modelling, Intelligent Agent Technology, Microscopic Traffic Simulation, Evaluation of new application and system, Traffic Safety Modelling and Applications, and Business Administration and Marketing Research.

Innovation Development 4.0 Model
By Dr. Sakda Panwai

Summary:

Innovation Development 4.0 Model has been recently implemented by Expressway Authority of Thailand (EXAT) which governs traffic demand on urban expressways of 207.9 km. The expressway system has been constructed since 1972 and can be categorized into four generations:

Generation 1.0 Model (Supply-centered), this generation provides infrastructure, superstructure, pavement with necessary road furniture e.g. signs, road markings. These are a basic requirement/standard of expressways. Generation 2.0 Model (Technology-centered), this means both hardware and software, is based on technology development, availability, maturity, and accountability. For instance, matrix signs which indicate lane use and changeable speed limit are implemented. Amber Variable Message Signs (VMS) is also implemented in this generation.

Generation 3.0 Model is where the needs of mobile technology and customers (Customer-centered) have been becomingly very important. EXAT performs its mission according to the customers' needs (customers mean all stakeholders e.g. end-users, staff, shareholders, suppliers). Accordingly, VMS turns into Smart VMS which provides more features e.g. speed map, travel time are presented on the VMS. Automatic payment system (i.e. Easy Pass) has been introduced in this generation. The development has been continuously maintained for over 40 years, some projects are successful, but not for the others.
Thailand 4.0 Model has recently promoted by Thai government to move Thailand from middle-income country to high-income country. Research and development as well as innovation development have been used as a key driven strategy. However, various issues must be elaborated and thoroughly focused.

Regarding the Innovation Development 4.0 Model consists of various success factors. They can be simplified into 4 parts: input, process, output, and outcome. For instance, importance of input materials in process plays a vital role for innovation development. The agency needs to critically consider McKinsey's 7s model or internal resources. In addition, collaboration and integration can be considered in the process part. This presentation describes the approach of Innovation Development 4.0 Model. Practical cases made in EXAT are presented and findings are also reported.

Innovation Development 4.0 Model

Dr. Sakda Panwai
Director of Expressway System Engineering Research and Development Division,
Expressway Authority of Thailand

Introduce the Speaker

- **Sakda Panwai, Ph.D.**
- **Education**
  - Ph.D. (Intelligent Transport System), The University of Queensland, Australia
  - M.B.A. (Marketing), Ramkhamhaeng University, Thailand
  - M. Eng (Transportation), Asian Institute of Technology, Thailand
  - B.Sc. (Civil Eng., 1st Class Honors), KMITT
- **Job**
  - Director of Expressway Engineering System Research and Development Division, Expressway Authority of Thailand

Outline

- History of EXAT
- Thailand Innovation Development
  - Thailand Model
  - Innovation Life Cycle
- EXAT Innovation Development
  - EXAT Model
  - Best Practice

History of Expressway Authority of Thailand

1. Expressway Authority of Thailand (EXAT) is state-owned enterprise under Ministry of Transport, established since 1972 (B.E. 2515)
2. Core mission is to solve traffic problems by using the expressway in order to support and enhance efficiency on logistics development and service of the country.

Mr. Narong Gieddech
Governor of Expressway Authority of Thailand

Expressway Authority of Thailand
(EXAT)

History of Expressway Authority of Thailand

Vision

A High Performance

Organization of Expressway

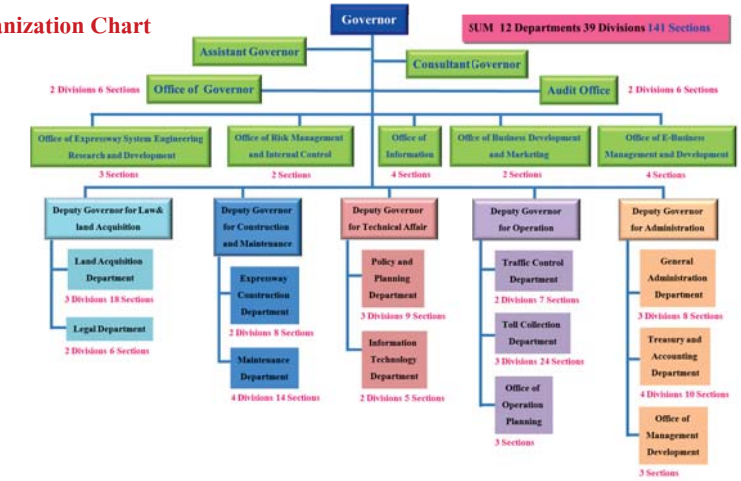
Business and Sustainable

Growth with Social and

Environmental Accountability

History of Expressway Authority of Thailand

EXAT Organization Chart



Expressway Network

Existing Expressway Network 207.9 km.+16.7 km.

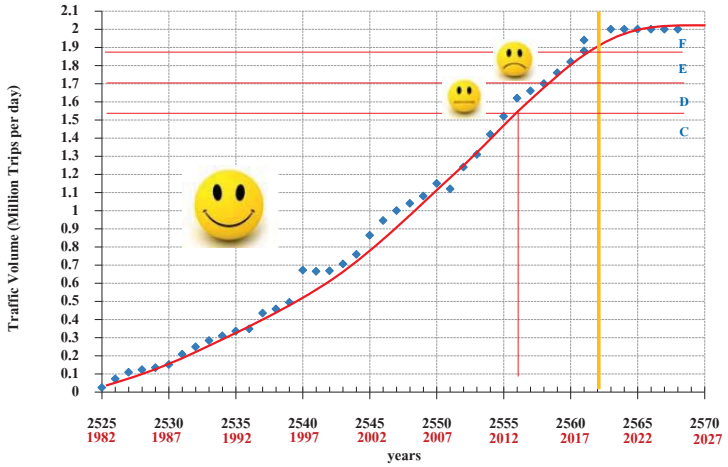
- Chaloem Maha Nakorn 27.1 km. (1981-1987)
- Sri Rat 38 km. (1993-1998)
- Chalong Rat 18.7 km. (1996)
- Udon Ratthaya 32.0 km. (1998-1999)
- Burapha Withi 55.0 km. (1998-2000)
- Bang Na-At Narong (S1) 4.7 km. (2005)
- Kanchanapisek (Bang Pli-Suksawad) 22.5 km. (Mar 23, 2009)
- Ramindra-Outer Bangkok Ring Road 9.5 km. (same system as Chalong Rat) (Mar 23, 2009)
- The Elevated Road Connecting the Southern Part of the Suvarnabhumi Airport with Burapha Withi (Mar 23, 2009)
- The Access Road Links Kanchanapisek (Bang Pli-Suksawad) to Burapha Withi (Dec 30, 2009)
- The Access Road Links Bang Pli-Suksawad to Industrial Ring Road (Dec 23, 2011)
- Sri Rat-Bangkok Outer Ring Road 16.7 km. (2013-2016)

Expressway Network

Traffic Volumes

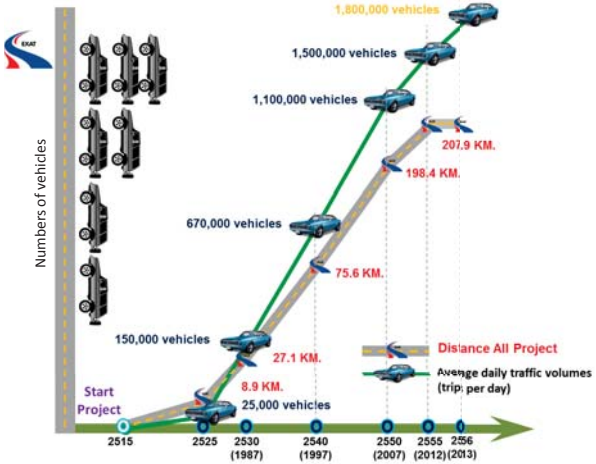
Expressway	Average Daily Traffic (Vehicles/Day)
Chaloem Maha Nakorn	358,108
Sri Rat	652,763
Chalong Rat	184,196
Burapha Withi	134,339
Udon Ratthaya	68,295
Kanchanapisek (Bang Pli-Suksawad)	203,340
Total	1,601,041

Expressway Network



Expressway Network

Traffic vs. Network



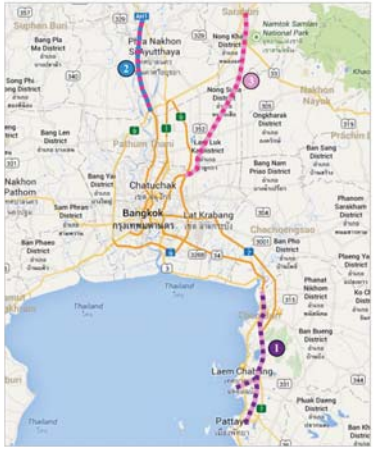
Expressway Network

Future Network (Metropolitan Expressway Projects)

1. **Sri Rat-Outer Bangkok Ring Road**
   (16.7 km.)
   Under Construction (PPP)
2. **The Third Stage Expressway System**
   (40.9 km.)
   Under Feasibility Study & Detailed Design
3. **Rama 3-Dao Kanong-Outer Bangkok Ring Road (16.9 km.)**
   Under EIA Approval

Expressway Network

Future Network (Intercity Expressway Projects)



1. **Burapha Withi-Pattaya**
   (68 km.)
   Under Feasibility Study
2. **Udon Ratthaya-Ayutthaya**
   (41 km.)
   Under Feasibility Study
3. **Chalong Rat-Saraburi**
   (63 km.)
   Under Feasibility Study

Expressway Network

Future Network (Regional City Expressway Project)

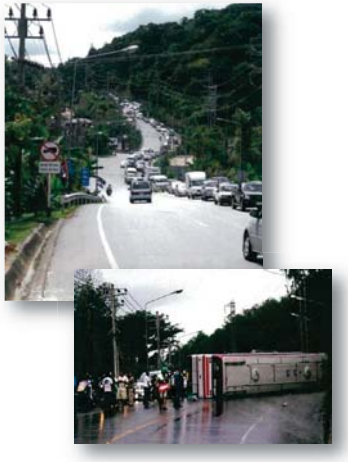
According to the traffic congestion problem in the regional cities, EXAT planed to F/S of expressway system in the regional cities as follows:

- Phuket — Under FS & DD
- Chiang Mai — Master Plan & FS
- Khon Kaen — Master Plan & FS

Expressway Network

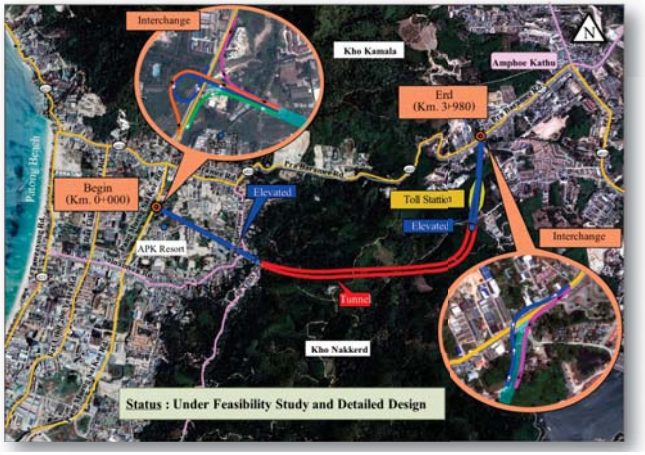
Phuket Tunnel

Patong beach is one of the recreation areas in Phuket of which its world class beauty and reputation is well known among Thai and foreign tourists. The existing road transportation to Patong beach is via 2-lane Highway Route No. 4029 that is the only one primary road directly from Kathu to Patong beach. The traffic volume on this highway is considerably high all the times and accident occurrences always arise especially during heavy rain caused by the winding and steep road between Kho Kamala and Kho Narkkerd.



Expressway Network

Phuket Tunnel



Expressway Network

Phuket Tunnel

Expressway Network

Phuket Tunnel

Thailand Innovation Development

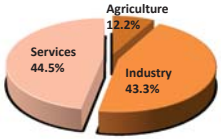
Background

Thailand Context

GDP: US$ 397.48 billion (12,000 billion Baht)

(IMF, 2015 estimate)

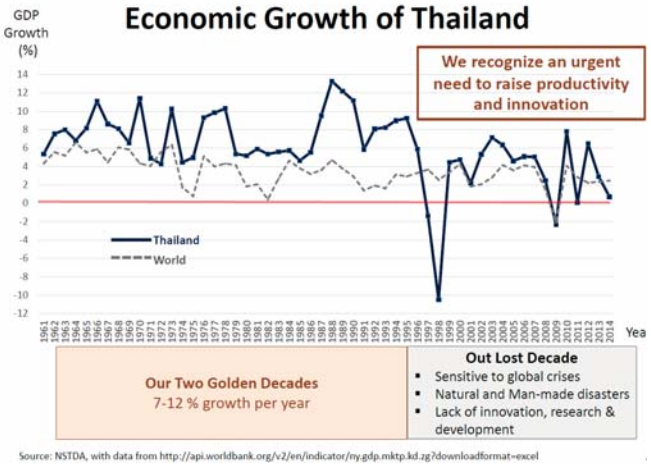
- An upper middle income economy
- ASEAN's 2nd largest economy
- Total population of 67.2 million (2014)
- GDP per capita (nominal) US$ 5,771 (IMF, 2015 estimate)
- World's largest natural **rubber** producer and exporter (WTO, 2013)
- World's largest exporter of **cassava** products (FAO, 2013)
- World's 2nd largest **rice** exporter (WTO, 2013)
- World's 2nd largest **sugar** exporter (WTO, 2013)
- World's 2nd largest **hard-disk drive** exporter
- **Automotive manufacturing** hub of Southeast Asia



Source: http://www.thaiembassy.org/permanentmission.geneva/contents/files/news-20150508-203416-400557.pdf
Presented at The 18th Annual Session of the United Nations Commission on Science and Technology for Development (CSTD) 6 May 2015

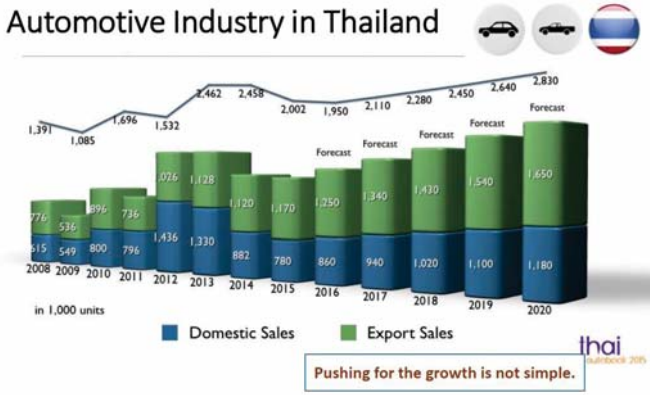
Background

Economic Growth of Thailand



Source: NSTDA, with data from http://api.worldbank.org/v2/en/indicator/ny.gdp.mktp.kd.zg?downloadformat=excel

Background



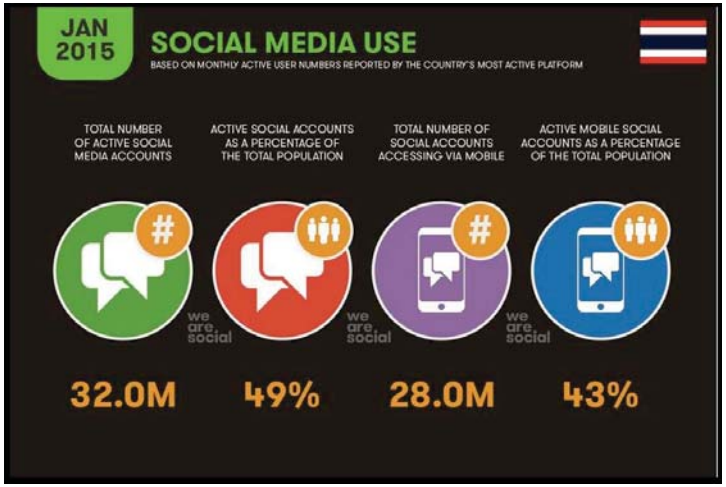
Source: https://en.wikipedia.org/wiki/Automotive_industry_in_Thailand#/media/File:Thailand_Automotive_Sales_2008-2020.jpg
By Ulikaiser - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=44492240

Background

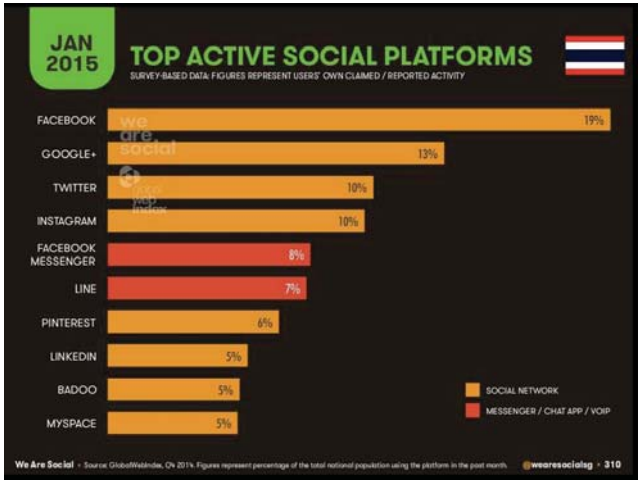
Today's Trend

Today's Trend

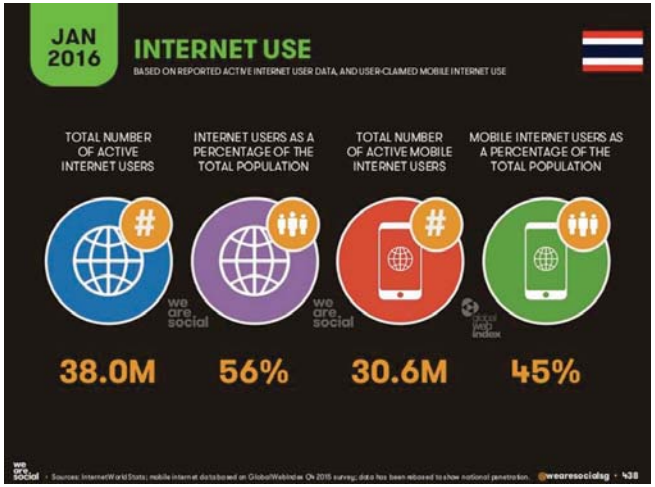
Today's Trend



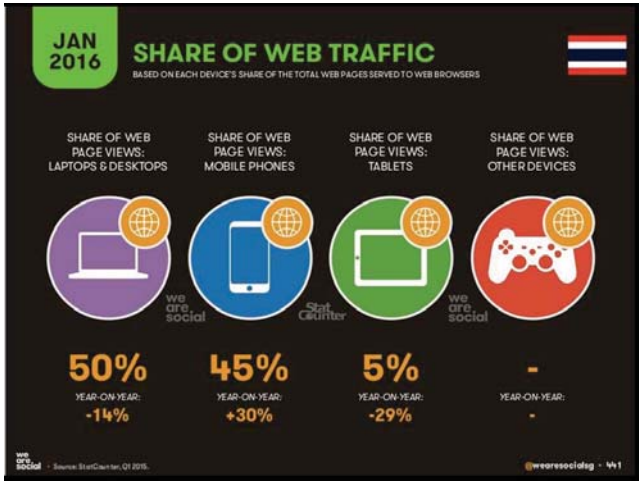
Today's Trend



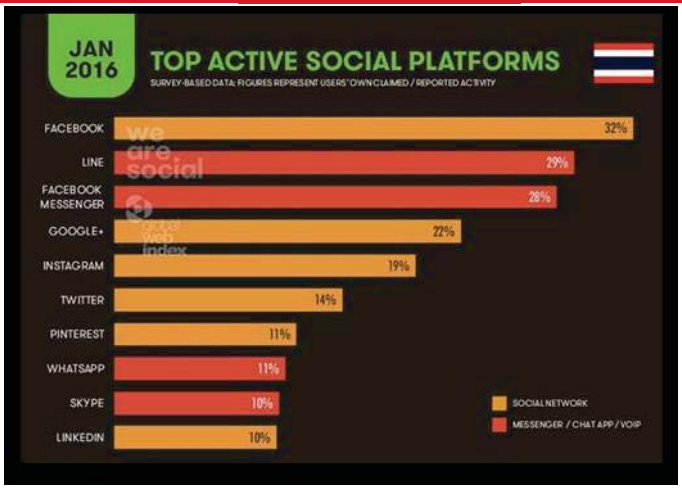
Today's Trend



Today's Trend



Today's Trend



Thailand Model

Thailand Model

Thailand 1.0

Agriculture

Thailand 2.0

Light Industry

Low Wages

Thailand 3.0

Heavy Industry

Advanced Machine

Thailand Model

Thailand 4.0

Creativity + Innovation

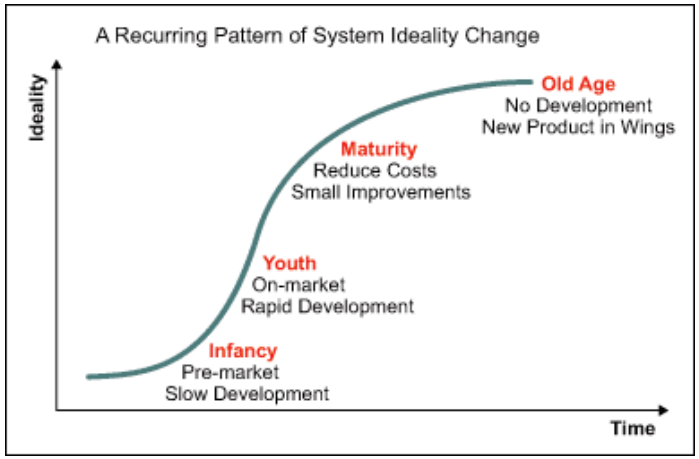
Smart Thailand

Thailand Model

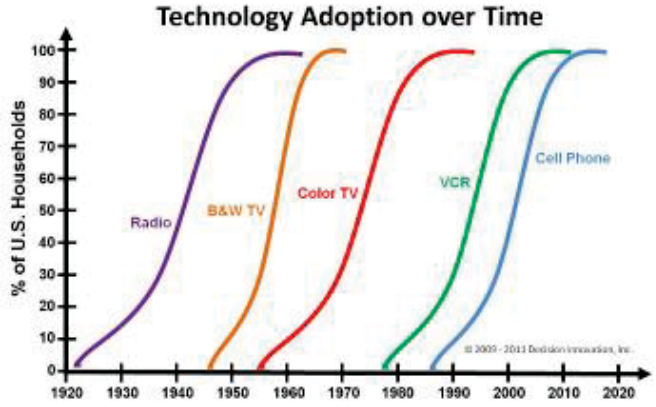
Source: http://www.bangkokbanksme.com/article/5992
http://www.thansettakij.com/wp-content/uploads/2015/08/1mp39-3083-a.jpg

Innovation Life Cycle

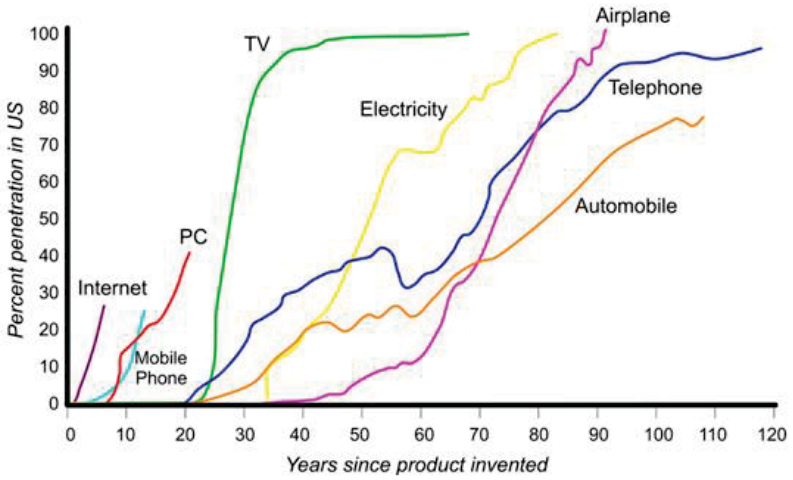
Product Life Cycle (PLC)



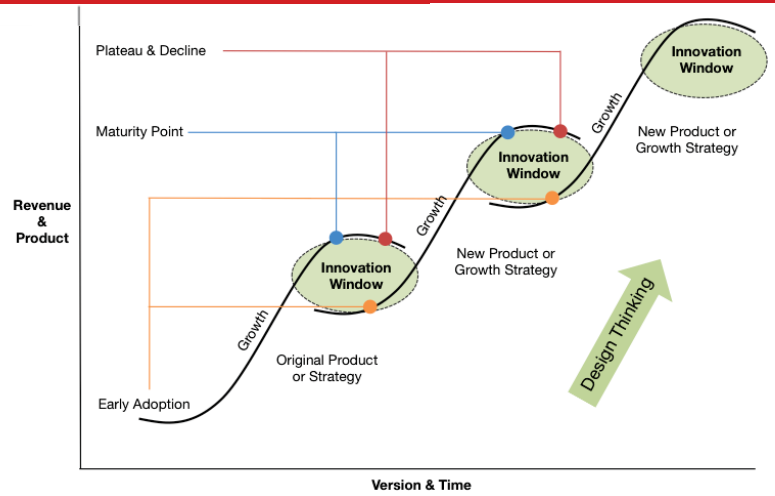
History of PLC



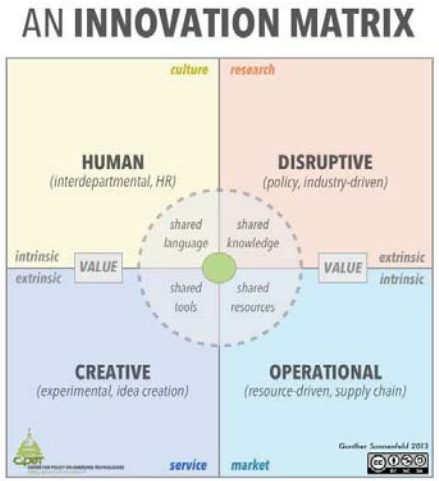
History of PLC



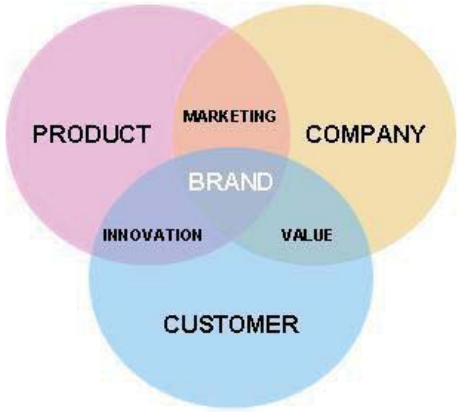
Opportunity for Innovation



Innovation Matrix

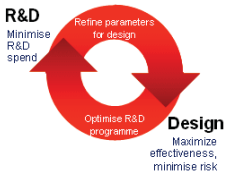


Brands create customers



EXAT Innovation Development

EXAT Innovation Development



Innovation

3 ways to innovation

Problem

Same methods/tools cannot solve the problems. New methods/tools needed in order to solve problems more efficiently.

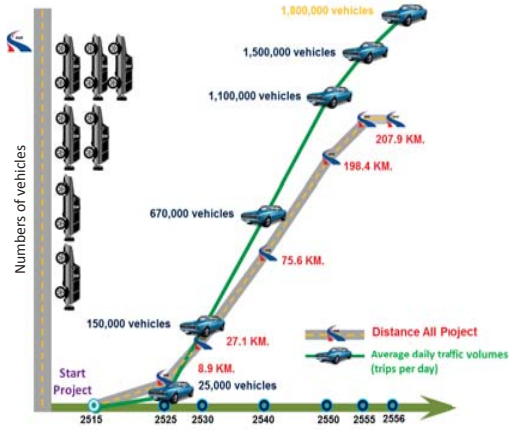
Improvement

constantly think … how to make everything better … until getting a new method/tool to manage everything more efficiently.

Knowledge Management

provide more information / knowledge until find the way to create new stuff/method to make related operations improved

Background Problem



- High Traffic Volume
- Limitation of Expressway Network
- Waste Time on Expressway
- Road User need Traffic Information
- Expressway staff need a tool to increase efficiency

Congestion on Thailand's Expressways

Recurrent Congestion

- Main Line / Toll Plaza Congestion
- Time of day (Peak Period)

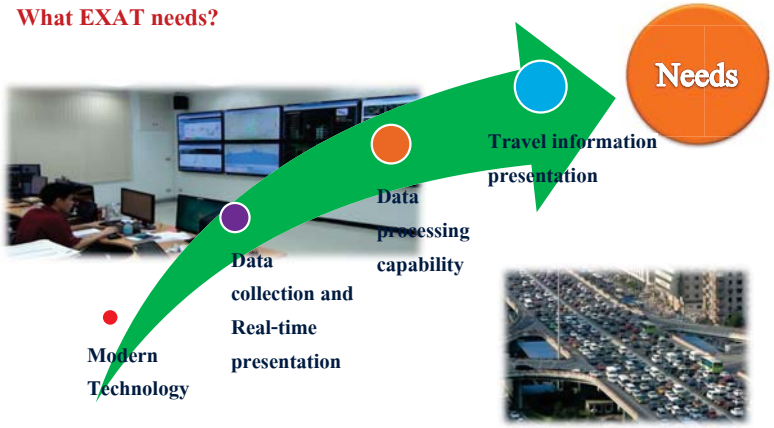
Non-Recurrent Congestion

- Incident
- Accident

How to manage these situations ?

EXAT Innovation Development

What EXAT needs?



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EXAT Model

EXAT 1.0

Expressway Construction

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EXAT Model

EXAT 2.0

Technology

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EXAT Model

EXAT 3.0

Advance Device

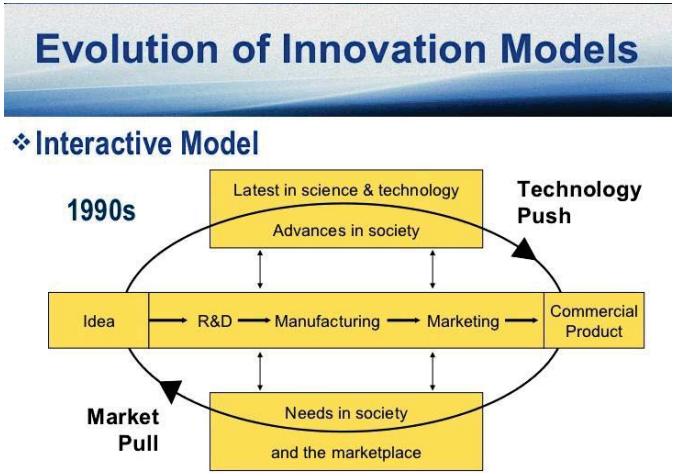
EXAT Model

EXAT 4.0

Moving towards Smart Expressway

How to Create EXAT 4.0

How to Create EXAT 4.0



How to Create EXAT 4.0

7-S Framework

- **S1** → **Structure**
- **S2** → **Strategy**
- **S3** → **Systems**
- **S4** → **Style**
- **S5** → **Staff**
- **S6** → **Skills**
- **S7** → **Shared Values**

How to Create EXAT 4.0

Suppliers Inputs Process Outputs Customers (SIPOC)

Receive organization policies	review and study existing product's innovation
Start to study and develop	1. review from Best Practice 2. provide technical trainings
Development stage	1. arrange study plans to fit budget 2. define framework, objectives, and goal 3. study and develop product's innovation
Presentation of the product to get feedbacks	1. users 2. experts

- Conduct MOU with organizations
- Dispatch staff to study product's development

- Collect knowledge and provide Knowledge Management
- Submit and present academic articles/papers to national and international conferences

Need improvement

Collection of Feedbacks

Analysis of results

inappropriate

Present outcomes to executives for approval

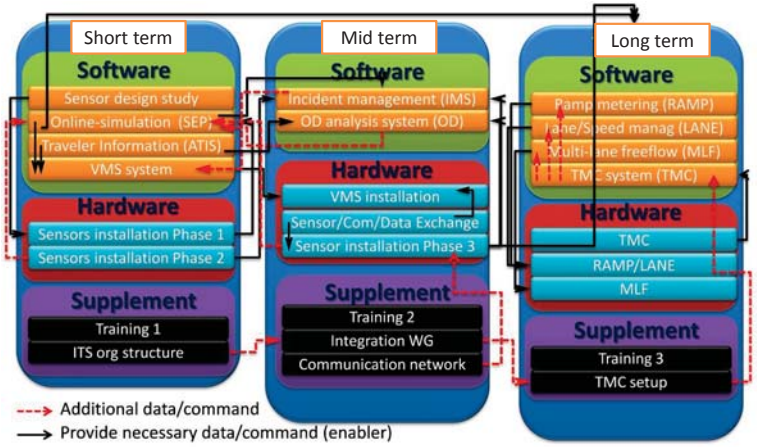
appropriate

Knowledge transfer

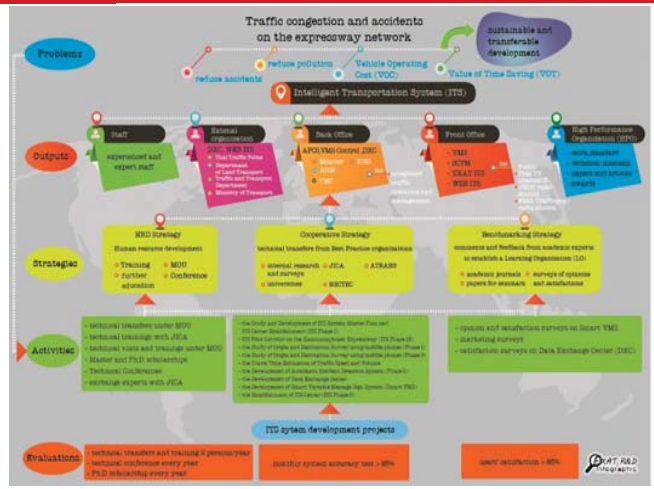
feedbacks

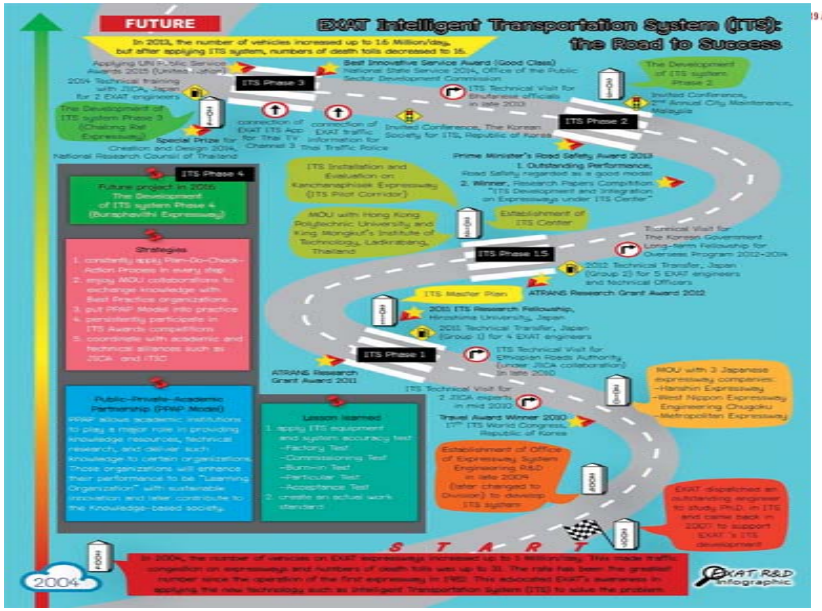
Product implementation

Example of Master Plan



Best Practice





Prizes






Model: Innovation-Marketing Thailand 4.0

Thank you very much

First Speaker of <Session 2A>

Associate Professor Jennifer Oxley
Associate Director, Graduate Research (MUARC) and
Deputy Director, Curtin-Monash Accident Research Centre (C-MARC),
Curtin University, Perth
E-mail: mailto:Jennie.Oxley@monash.edu

Brief Biography:

Associate Professor Oxley is a leading internationally renowned academic in injury prevention research, particularly addressing injury amongst vulnerable populations. Her main research interests are in health promotion, injury prevention and trauma and investigating the role of human behaviour and performance in injury occurrence, focusing on the assessment and management of risk and a human factors approach to understanding the human machine interface in safety systems. Jennie also has a keen research interests in promoting healthy lifestyles, injury and health outcomes following crashes, assessment of performance, as well as evaluations of behavioural and technological interventions and has made a significant contribution to the safe mobility of vulnerable population. She has published widely, receives frequent invitations to speak to the media and various conferences and seminars, review manuscripts, evaluate competitive grant proposals, consult on national and international project with prominent organizations (e.g., Swedish Road Administration, the French National Institute for Transport and Safety Research, Transportation Research Board, etc), and provide expert advice to government, key stakeholders and community organizations. Some of her research findings have made a substantial contribution to licensing policy both in Australia and overseas and include the development of innovative and practical assessment, management and education strategies to improve safety.

She is also responsible for managing major projects in the areas of assessment of risk of learner and novice drivers, pedestrians and cyclists, elderly road users, child injury prevention, and unlicensed and offender drivers. Her studies address human factors and safety issues relevant to ITS technologies and development of innovative measures to improve safety, mobility and quality of life amongst these populations. Jennie is currently supervising eight postgraduate students in vulnerable road user safety, falls prevention, child injury and unlicensed driving.

Prof. Oxley is also actively involved in a number of road safety committees and partnerships including Malaysia Global Road Safety Partnership (member) Transportation Research Board (Chair, sub-committee on older women's extended safe mobility), Association for the Advancement of Automotive Medicine (member), Australasian College of Road Safety (member). Jennie takes an active role in a number of conferences including the Transportation Research Board Annual Meeting, the Australasian Road Safety Conferences, AAAM Annual Meetings and International Conference on the Safety and Mobility of Vulnerable Road Users, as a member of Scientific Committees, chairing sessions, and presenting papers.

Previous Appointments:
Associate Director, Regional Engagement, Monash University Accident Research Centre, Clayton,2011-2014
Associate Director, Monash University Accident Research Centre (MUARC) Malaysia, 2008-2011
Senior Research Fellow, Monash University Accident Research Centre, Clayton, 2004-2008
Research Fellow, Monash University Accident Research Centre, Clayton, 2000-2004
Research Assistant, Monash University Accident Research Centre, Clayton, 1992-2000
Research Assistant and Senior Tutor, School of Studies in Disability, Deakin University, Burwood, 1992-1994

Qualifications:
PhD (Monash University, 2000)
BSc (Hons) (Monash University, 1990)

Road Safety: Australian Best Practice

By Associate Professor Jennifer Oxley

Summary:

Australia has achieved significant gains in reducing deaths and serious injuries on their roads over the last 30-40 years and many strategies, initiatives and multi-sectorial commitment have contributed to this success. This presentation will discuss the successes and challenges of achieving 'best-practice' in road safety, particularly the introduction of the Safe System approach, initiatives addressing safer speeds, safer roads and roadsides, safer vehicles and safer people, and the importance of partnerships.

Third Speaker of <Session 2A >

Associate Professor (Ph.D) Shigeru Tominaga
Department of Mechanical Engineering, College of Science and Technology, Nihon University
E-mail: tominaga.shigeru@nihon-u.ac.jp

Brief Biography:

Qualifications:
Ph.D., M. Eng., B.Eng. in 1998, 2000, 2008 from Nihon University, Japan

Work Experience:

2015-Present	Associate Professor, Nihon University
2009-2015	Assistant Professor, Nihon University
2008-2009	Research Associate, Nihon University
2006-2008	Visiting Researcher, Institute for Traffic Accident Research and Data Analysis (ITARDA)
2000-2008	Researcher, Crash Safety Research Division, Japan Automobile Research Institute (JARI)

Specialised Areas:

Crash safety mechanics, Injury prediction, In-depth crash investigation, Statistical analysis of road accident data, Accident reconstruction using drive-recorder/event data recorder, Driver's distraction

Professional Affiliations

Member of Committee for Technical Standards, Society of Automotive Engineers of Japan

Engineering and enforcement Solutions on Road Accidents in Japan
Associate Professor (Ph.D) Shigeru Tominaga

Summary:

Fatalities on road accident has been decreasing in Japan. However, there are still 4373 people killed on road accident in 2013. To reduce fatalities on road accident, it is necessary to collaborated with engineering and medical team.

In this presentation, in-depth accident investigation collaborated with engineering and medical team is introduced. Engineering data (e.g. vehicle deformation, crash direction) and medical record data (Abbreviated Injury Scale (AIS), Revised Trauma Score (RTS)) are collected. In addition, emergency medical service activity on accident scene is investigated. Location of accident, hospital arrival time are collected. Elderly belted occupant's with serious chest injury at low speed impact case is analyzed. Distribution of chest and abdominal injury in frontal impact is analyzed. Probability of Survival (PS) as an index of emergency trauma care is able to calculate by using RTS data. Ps on elderly occupant's decrease compared to non-elderly occupants'. Age effect is important for life saving on emergency medical care.

Advanced Automatic collision notification (AACN) is expected to reduce fatalities. AACN has a good possibility for time saving by automatic 119 call and select suitable hospital by injury prediction. Injury prediction algorithm was developed by using real accident data. Risk of sever injury is modeled by logistic regression analysis with six accident risk factors. AACN pilot study was conducted in March in Japan.

In summary, in-depth accident investigation collaborated with medical and engineering team has a good possibility for traffic safety research. AACN is expected to reduce time between accident and doctor-contact, and improve survival rate. We should continue to challenge for saving lives against traffic accidents

Engineering and enforcement Solutions on Road Accidents in Japan

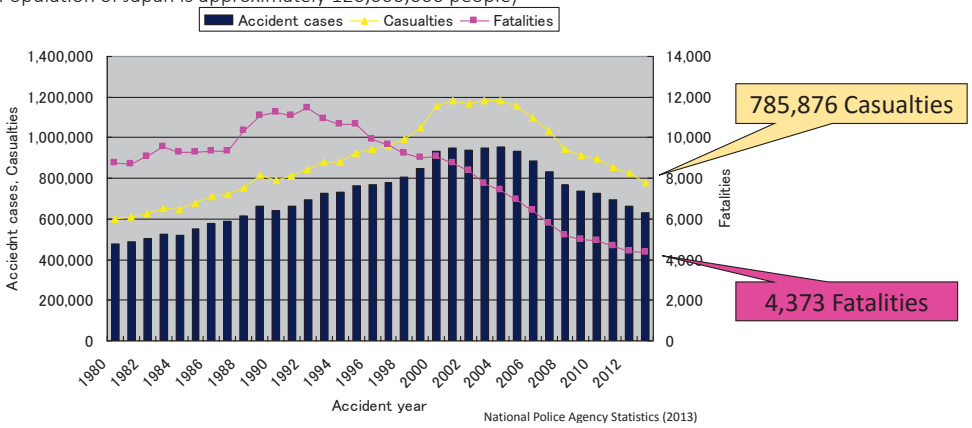
Shigeru Tominaga
Department of Mechanical Engineering,
College of Science and Technology, Nihon University, Japan

The 9th ATRANS Symposium on Transportation for a Better Life
August 19, 2016, Bangkok

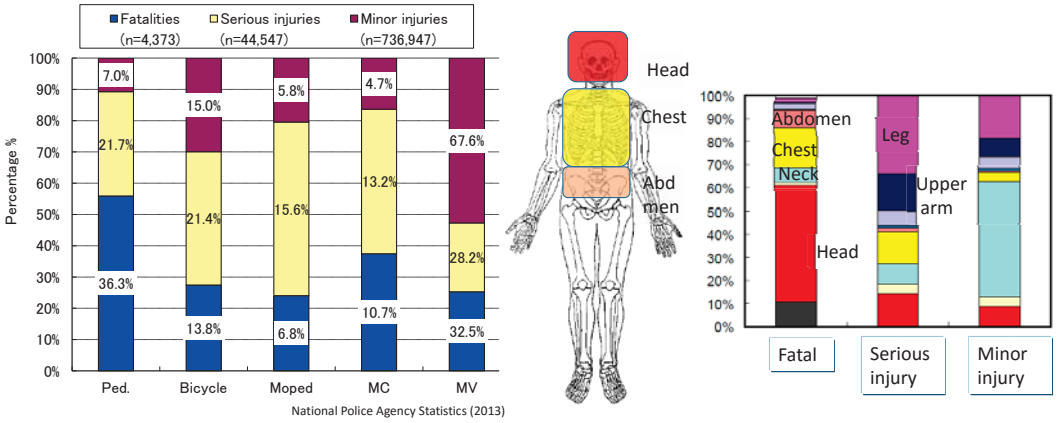
Accident case, Casualties and Fatalities in Japan

- Fatalities on road accident has been decreasing
- However, there are still 629,021 road accidents, with 785,876 people injured in 2013

(Population of Japan is approximately 120,000,000 people)

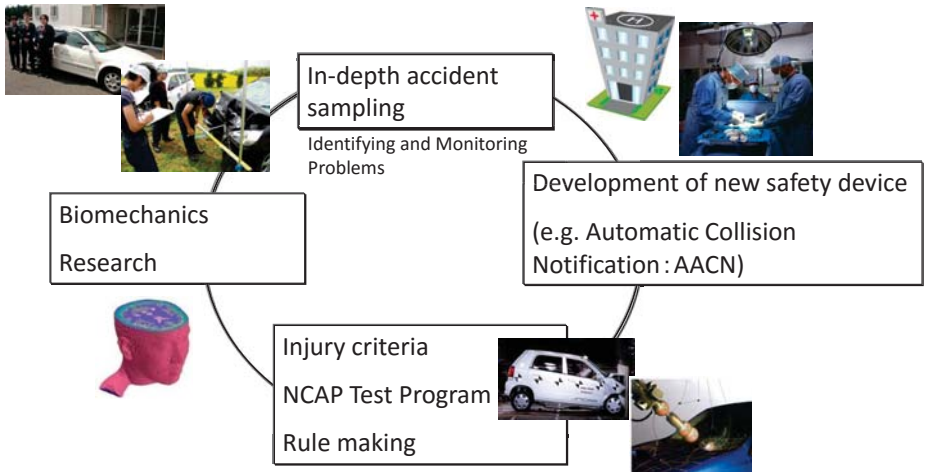


Fatalities, serious and minor injuries by road user type



It is necessary to challenge the new methodology for reducing motor vehicle victims

Research activities for real-world safety collaborated with engineering and medical network

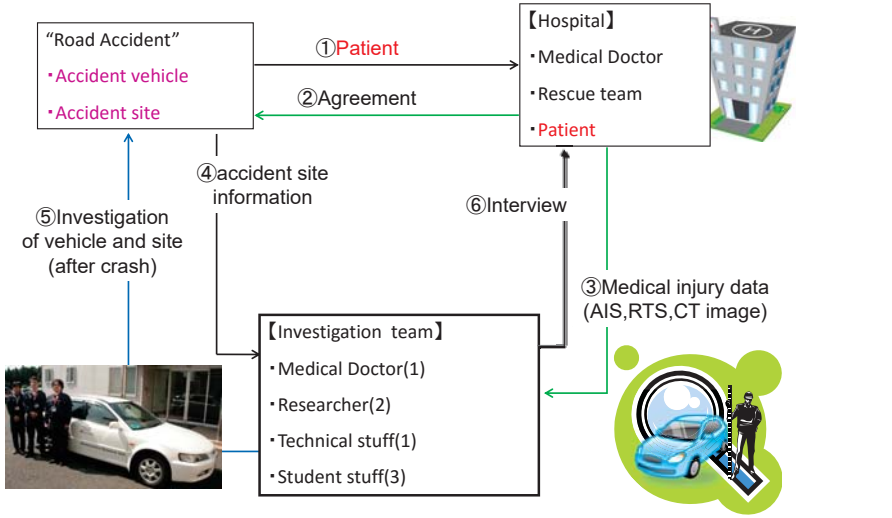


Topic

1 . In-depth accident investigation collaborated with engineering and medical network

2. Pilot study of Advanced Automatic Collision Notification(AACN)

Scheme for In-depth accident investigation



Data items for engineering research(1)

Vehicle deformation

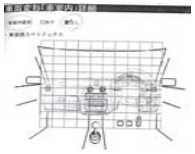
Compartment intrusion and restraint system use

Accident site location (after crash)

Injury source

Data items for engineering research(2)

Vehicle deformation
Equivariant Barrier Speed(EBS, km/h)
Direction of collisions(force)
Compartment Intrusion
Usage of safety equipment and operating condition(Seat belt % air bag)
CHASSIS No.
ABS, TCS, ESC equipment
Injury source



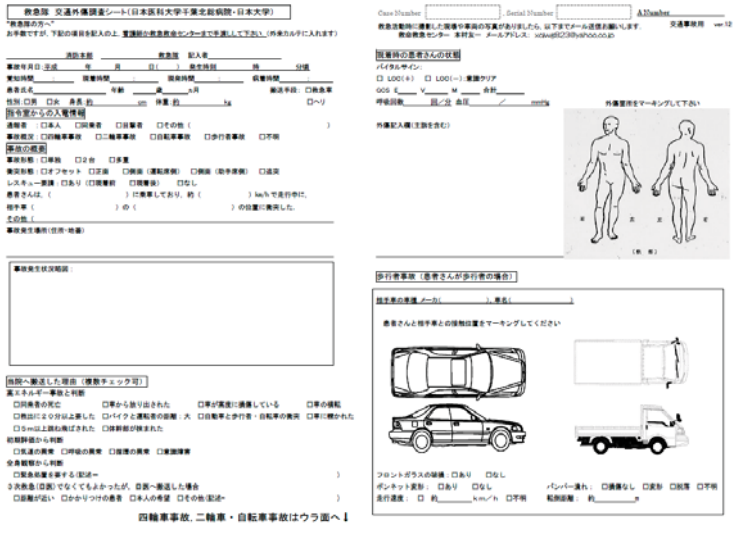
Medical record data for Injury research

- Diagnosis
- AIS score,
- Maximum AIS, ISS
- RTS
- Medical interventions,
- Cause of injury
- Course after admission
- CT scan image data
- Interview

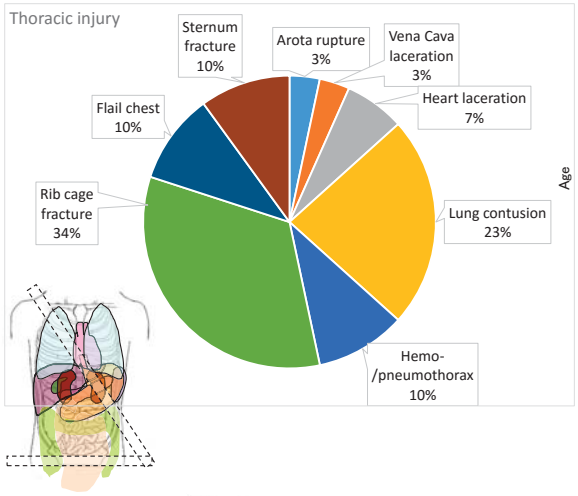
AIS: Abbreviated Injury Scale
RTS: Revised Trauma Score
GCS: Glasgow Coma Scale, BP: Blood Pressure, RR: Respiratory Rate

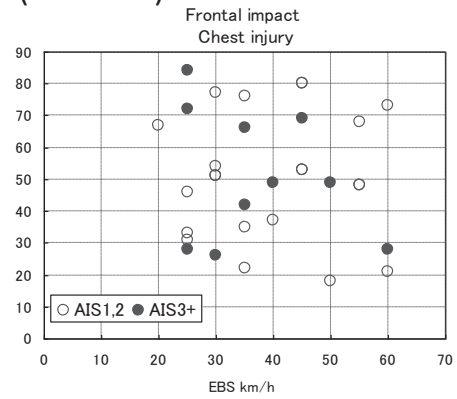
Investigation of EMS pre-hospital activity

- Date, Time, Location
- Patiants's Gender, Age
- Type of accident
- Type of car
- Vehicle deformation(estimated)
- Seat position,
- Seat belt use, Air bag deployment
- 119 call notification time
- Scene arrival time
- Scene treatment time
- Hospital arrival time
- Vital sign(GCS, RR,SBP)
- Field triage factors
- Injury body region
- Patient's symptoms

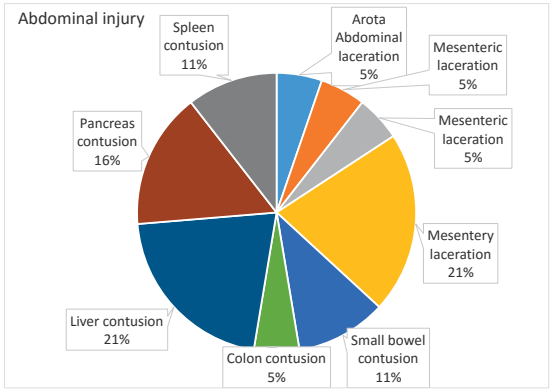


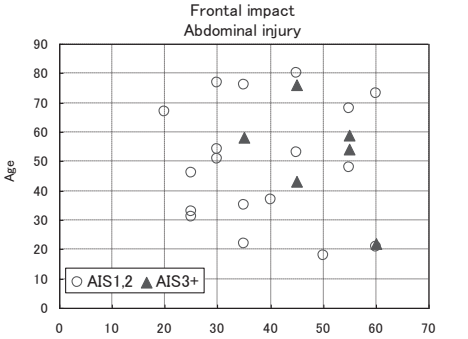
Thoracic injury (AIS 2+)

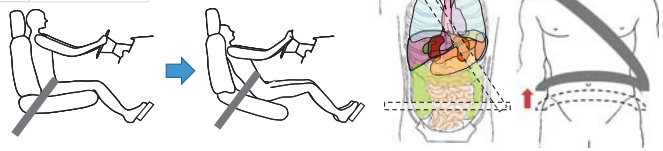




Abdominal injury (AIS 2+)







Probability of survival : Ps

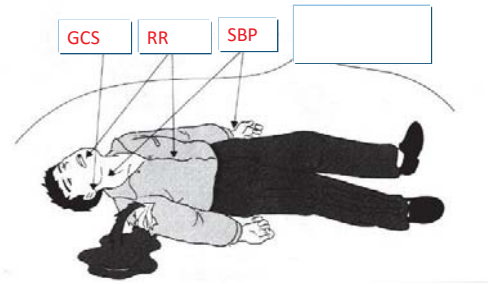
Ps is calculated by anatomic(ISS score), physiologic(RTS), and age characteristics

$$Ps = \frac{1}{1+e^{-z}}, \quad z = \beta_0 + \beta_1 \cdot (RTS) + \beta_2 \cdot (ISS) + \beta_3 \cdot (Age\_group)$$

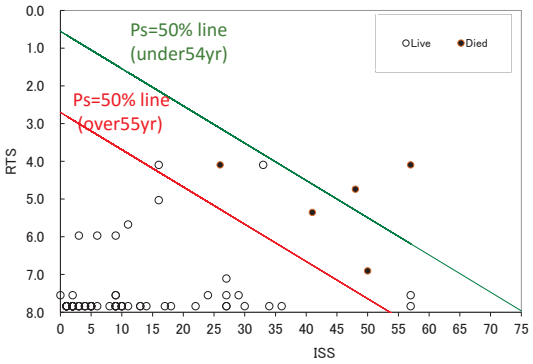
Table 2 Revised Trauma Score (RTS)

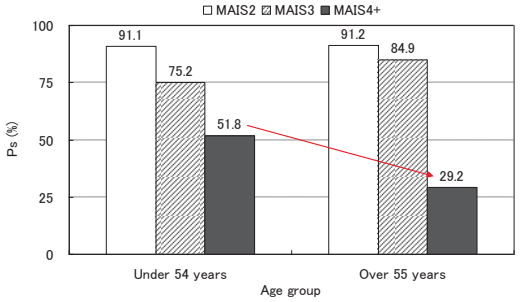
Glasgow Coma Scale (GCS)	Systolic Blood Pressure (SBP)	Respiratory Rate (RR)	Coded Value
13—15	>89	10—29	4
9—12	76-89	>29	3
6—8	50-75	6—9	2
4—5	1-49	1—5	1
3	0	0	0

$$\begin{cases} RTS = 0.9368 \cdot (GCS) + 0.7326 \cdot (ISS) + 0.2908 \\ ISS = [AIS_{\max}(region_1)]^2 + [AIS_{\max}(region_2)]^2 + [AIS_{\max}(region_3)]^2 \\ Age = \begin{cases} 0 & : \quad under\,54\,yr \\ 1 & : \quad Over\,55\,yr \end{cases} \end{cases}$$



Ps analysis, age effect

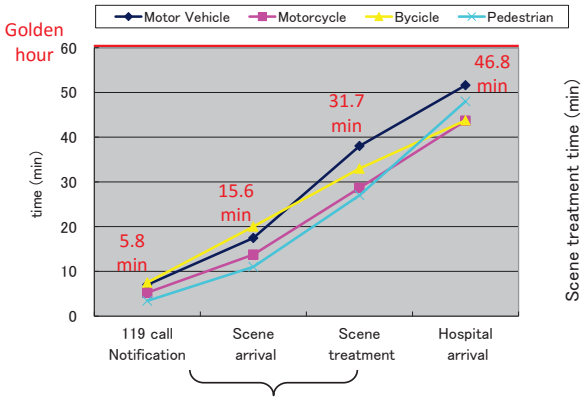




Ps=50% line in over 55yr patient's decrease compared to under 54yr patient's

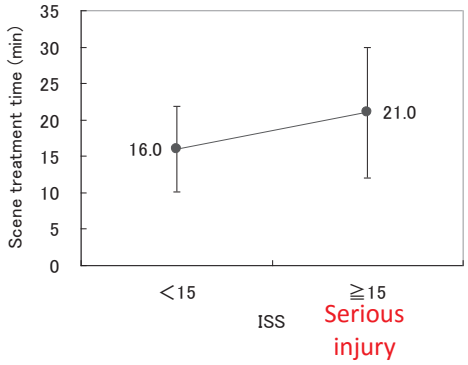
Ps in over 55yr patient's decrease compared to under 54yr patient's in MAIS4+(serious injury)

Investigation of EMS activity on scene



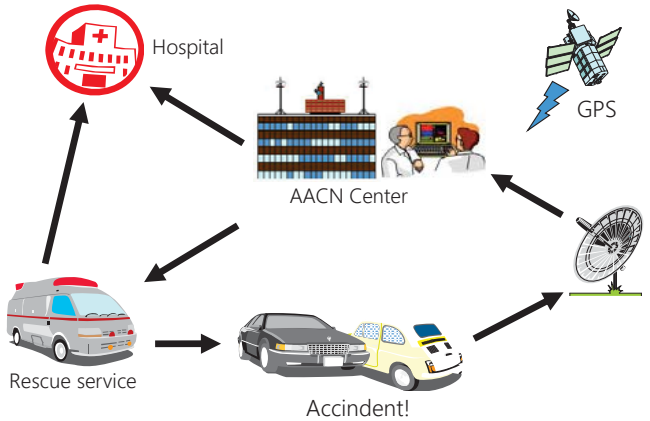
EMS treatment at scene

13.0 min～20.6 min.



Advanced Automatic Collision Notification system(AACN)

1. Time saving by automatic 119 call(EMS)
2. Select suitable hospital(ER) by injury prediction



Injury prediction algorithm based on real accident data

Logistic regression Model

$$p(z) = \frac{1}{1+e^{-z}}$$

Here,

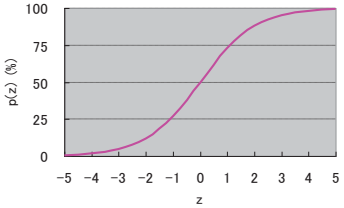
p: Driver's Serious Injury Risk

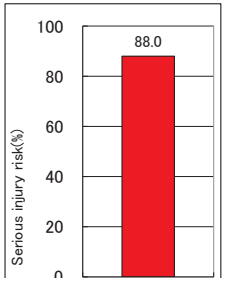
z: Multipule liner risk factors

x_i: *response variables*

β_i: *regression coefficients*

$$z = \beta_0 + \sum_{i=1}^{n} \beta_i \cdot x_i$$





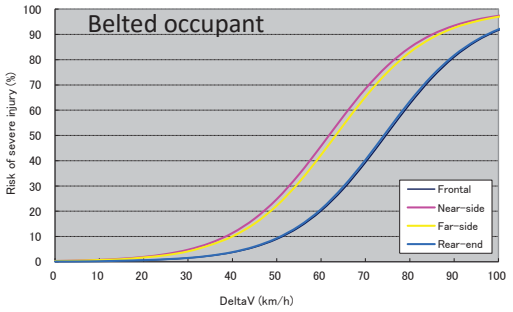
Injury prediction result

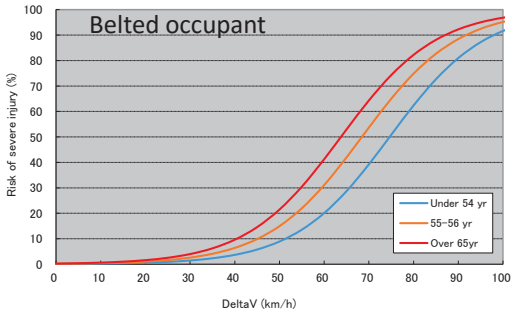
Exsample:
1. Delta: 55 km/h
2. Side impact
3. Belt use: No
4. Multiple crash: No
5. Occupant's age: Over 65yr
6. Passenger car

A thermometer for trauma

Injury prediction Algorithm by using six risk factors on accident data

Relation between crash severity(DeltaV) and crash direction, age

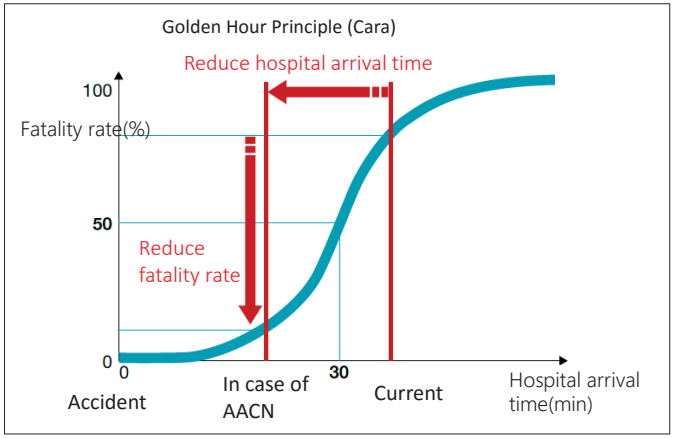




- Risk of sever injury increases with increase in DeltaV
- Near/Far side impact is high risk factor compared to Frontal/Rear impact
- Over 65yr age is high risk factor compared to under 54 yr age

Effects of AACN

AACN is expected to reduce time between accident and doctor-contact, and improve survival rate



Summary

1 . In-depth accident investigation collaborated with medical and engineering team has a good possibility for traffic safety research

2. AACN is expected to reduce time between accident and doctor-contact, and improve survival rate

We should continue to challenge for saving lives against traffic accidents

Thank you for your attention

Fouth Speaker of <Session 2A>

Dr. Witaya Chadbanchachai
ATRANS Board Committee and WHO Expert Advisory Panel for Injury Prevention & Control
E-mail: buncha96@yahoo.com, dr.bunchachai@gmail.com

Brief *Biography*:

Education:

1983: Fellow of Royal College, Surgery, Faculty of Medicine, Khon Kaen
1977: MD, Medicine, Mahidol University, Thailand

Position:

- Senior Deputy Director, Khon Kaen Regional Hospital
- Director of Trauma and Critical Care Center, Khon Kaen Regional Hospital
- Director of WHO Collaborating Center on Injury Prevention and Safety Promotion
- Member in WHO Trauma and Emergency Care Services Advisory Group
- Member in Board of National Institute for Emergency Medical Service
- Chairman of Trauma Committee, Royal College of Surgeon of Thailand
- Chairman of Provincial Technical Support for Traffic Injury Prevention Project, Thai Health Promotion Foundation
- WHO Expert Advisory Panel on Injury and Violence Prevention and Control

Honour, Award Received:

1992: Topnotch Physician Award, International College of Surgeon of Thailand
1994: Topnotch Physician Award, Medical and Disaster Institute, Medical Department
1995: Bronze prize in Paper Presentation Annual Academic Conference, Ministry of Public Health
1995: Golden prize in Paper Presentation Annual Academic Conference, Ministry of Public Health
1997: Mahidol – B Braun Award
2003: Personal excellent award in Traffic Injury Prevention, National Safety Council
2008: Gold Medal in UC Partnership Award, National Health Security Office
2010: Personal excellent award, Royal College of surgeon of Thailand
2012: Physician excellent award, Medical Council of Thailand
2015 Robert Danis Prize, International Society of Surgery

Thailand road safety problems and its direction
By Dr. Witaya Chadbanchachai

Summary:

For Thailand, more than 20,000 people died from RTI each year, which mean that every 24 minute will has 1 people died from RTI, and around 1 million people getting injured. Even the problem was recognized by the present government and raised higher in priority but still many road traffic injury prevention, and countermeasures are still need to be seriously planned and implemented. The present situation are:

The assigned focal organization (DDPM, MI) was not well authorized and supported enough to cope with the large, complex problem as traffic injuries. The national traffic injury data system was fragmented. Data from different departments were different resulting in questionable reliability of national report. There are National Plan for Decade of Action but the implementation mechanism of the plan was still inadequate.

Law enforcement which was the most important mechanism to control risk behavior was in adequate and not strong enough. Vehicle and road safety standard needed revision. Licensing system was out of date.

Financial budget support to implement the program according to the National Action Plan was inadequate. The monitoring system in each pillar of Decade of Action were not well designed and not implemented effectively.

Public concern and customer protection mechanism was still not strong enough. All responsible Department have to strongly concern about the forecast situation and have to have action plan for road traffic injury prevention before the ASEAN connectivity.

Fifth Speaker of <Session 2A>

Dr. Wiwat Seetamanotch
Deputy Chairman of Thai road safety network **and**
Senior advisor of National Institute for Emergency Medicine
E-mail: swiwat2@yahoo.com

Brief Biography:

Education

-Doctor of Medicine, Mahidol University
-Bachelor of Law, Sukhothai Thammathirat University
-Bachelor of Public Administration, Sukhothai Thammathirat University
-Master of Public Health, Institute of Tropical Medicine , Antwerp, Belgium
-Board of Preventive Medicine
-Board of Family Medicine

Short course Training and study visit

-Hospital Administration and Health Service Management, National Institute of Health Services, Tokyo, Japan
-Caring For Frail Elderly People, Hiroshima, Japan
-Evidence Base Medicine, Sweden
-Chief Executive Training Program, Thailand
-Emergency/Disaster Medicine, Osaka, Japan

Work Experience

-Hospital Director, Ban Fang Hospital, Khonkean 1983-1987
-Hospital Director, Thalang Hospital, Phuket 1987-2004
-Deputy Provincial Chief Medical Officer, Phuket 2004-2013

How did Phuket reduce road traffic injury and become the best practice in Thailand?
Dr. Wiwat Seetamanotch

Summary:

Phuket is a major international tourist destination in Thailand. However, road traffic accident mortality rate in Phuket was very high comparing to other provinces. In 2006, it was the third highest of the country.

Description of the problem

Mortality from road traffic accident has been monitored in all Phuket's hospitals since 1997. In 2008, the lack of solution of the problem prompted the development of a strategy to address the complex challenges arising from **WHO Safe Community principle**. There are five key elements in the strategy i.e. 1) information system 2) community participation 3) multidisciplinary approach 4) priority problem focused 5) comprehensive, practical and cost effective intervention. Information system is the starting point and essential to social capital mobilization and community participation. During regular meetings among various sectors, key summary of evidence and emotional story telling were communicated and discussed among multidisciplinary stakeholders e.g. number of injury and death in black spots, risk behaviors situation, and evidence-based solutions from other countries. The identified risks factors focused on problem in priority were corrected by comprehensive, practical and cost effective intervention by the participants themselves or advocated to the local authorities.

Results

Since 2008, there were monthly regular meetings among the key stakeholders such as police, transportation authority and public health officer. Outcomes of the meeting included improvement of 60 black spots by the transportation authority and local governments, 5 local regulations by local governments and helmet enforcement campaign by police which increased Phuket's helmet wearing rate to be the top five of Thailand. The number of road traffic accident mortality reduced 30 % from 192 deaths/year during 1997-2007 to 134 deaths/year during 2008-2015.). In 2016, the governor of Phuket declared "Phuket vision 50 in 2020" to move all the key stakeholders and local authorities to involve in his accident reduction vision.

Conclusion

This leverage strategy is effective and practical to solve the complex, interconnected and challenging problem such as road traffic accident especially in the low and middle income countries.

"How did Phuket reduce road traffic injury and become the best practice in Thailand?"

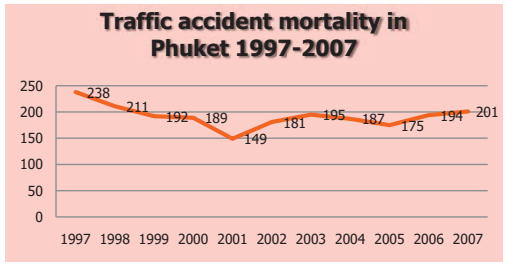
Dr. Wiwat Seetamanotch
Deputy chairman of Thai Road Safety Network
Senior advisor of National Institute for Emergency Medicine
swiwat2@yahoo.com

BACK GROUND

- Phuket
  - Thailand's largest island
  - A major international tourist destination.
  - Population ~ 350,000
  - Tourist ~ 10 millions/year

Traffic accident situation 1997-2007

- The traffic accident mortality rate very high for more than 10 years.
- It was the third rank of the country in 2006.



"New paradigm" in RTA

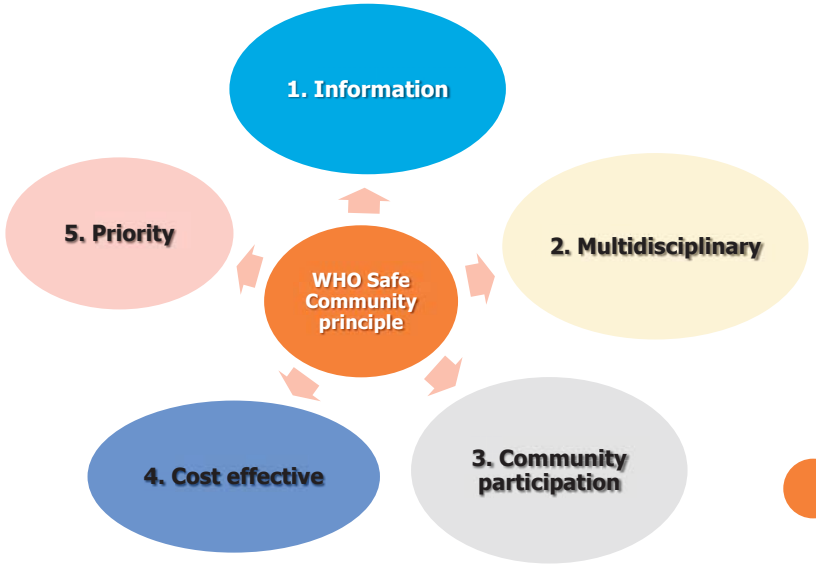
(Miroslava, 2012)

- From "an inevitable outcome of road transport" to "largely preventable and predictable".

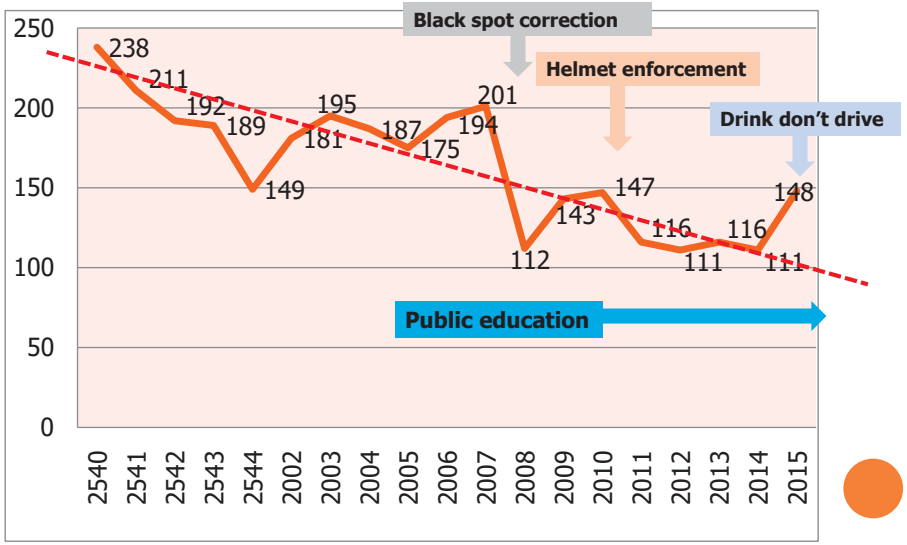
THE CORE COMPONENT OF THIS "NEW PARADIGM" (MIROSLAVA, 2012)

- Road safety is a **multi-sectoral issue** and **a public health issue**
- All sectors need to be fully engaged in **responsibility, activity and advocacy** for road crash injury prevention.

WHO SAFE COMMUNITY PRINCIPLE



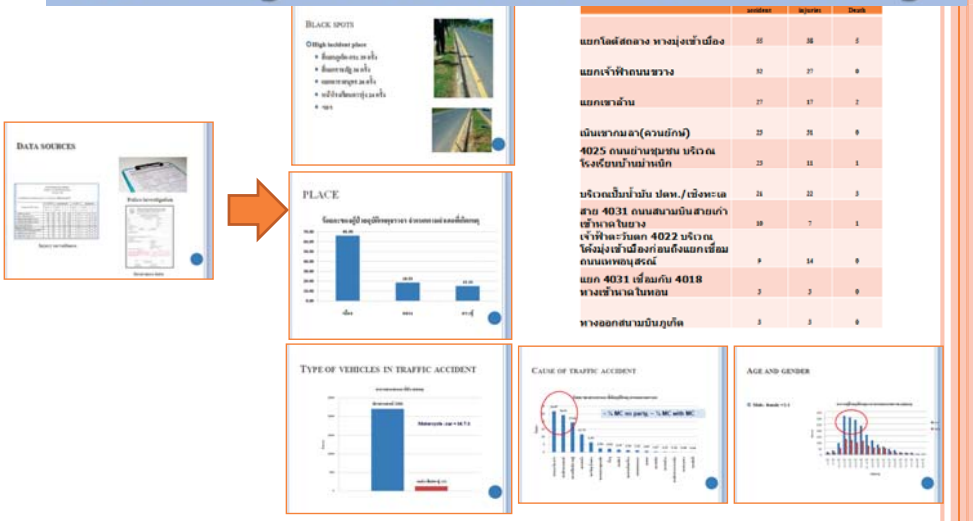
CHRONOLOGY OF INTERVENTION



MULTIDISCIPLINARY & COMMUNITY PARTICIPATION

INFORMATION

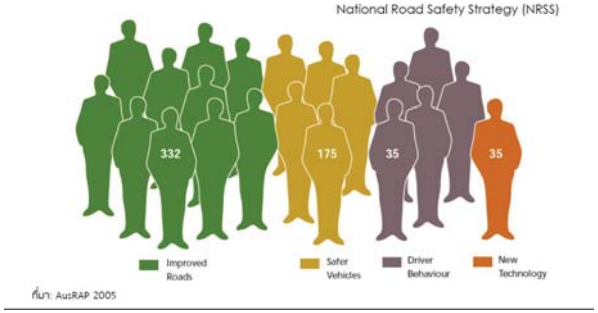
Processing data to Information & knowledge

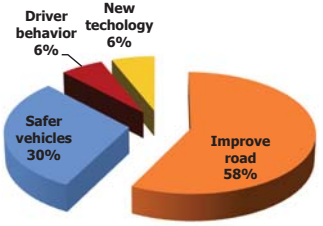


IMPROVE ROADS

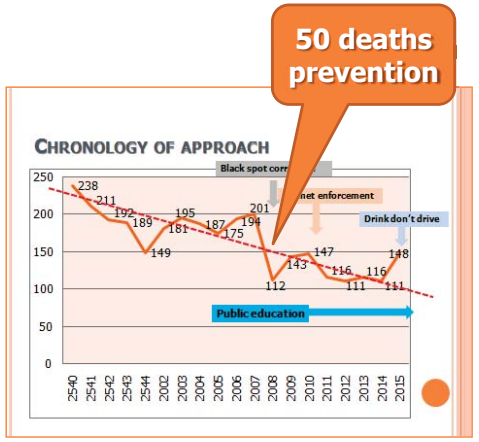
COST EFFECTIVENESS AND PRIORITY

"Improving the safety of roads is the single most significant achievable factor in reducing road trauma"



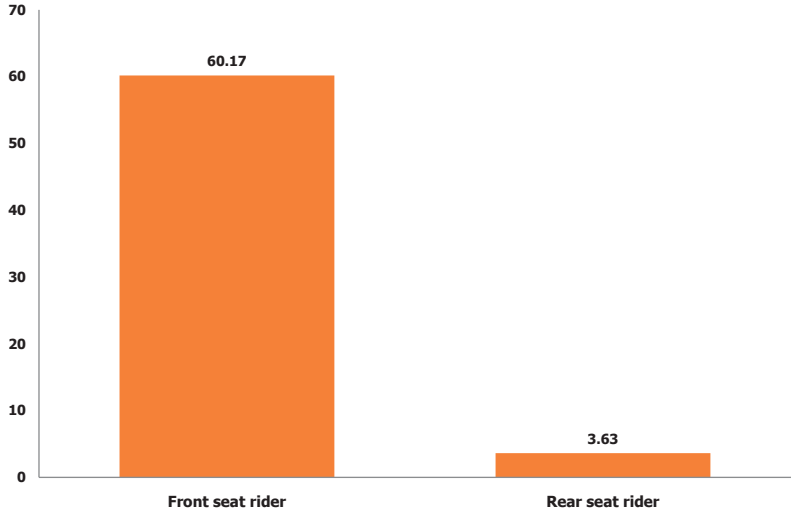


> 60 BLACK SPOTS CORRECTION SINCE 2008



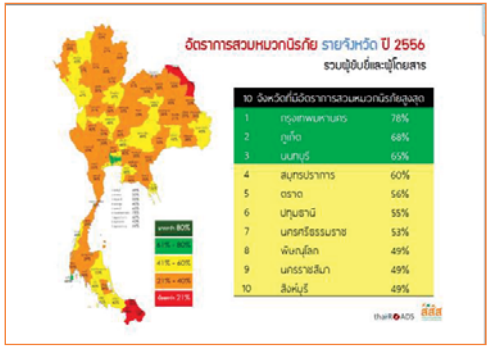
Driver Behavior

Helmet wearing rate in 2010



Helmet enforcement

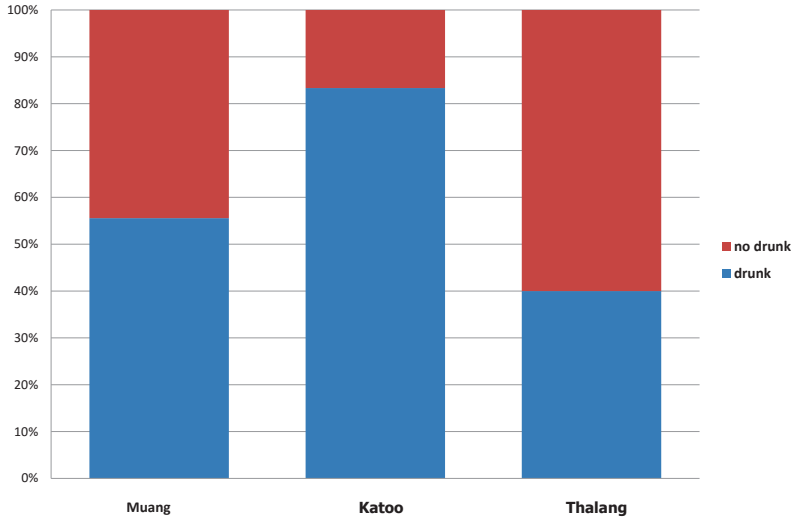
3 months Public campaign then Enforcement in 2011



Since 2011 Phuket has been ranged as top 5 of helmet wearing in Thailand

Motorcycle fatality rate reduced

Drink driving among injured cases 2008-2011



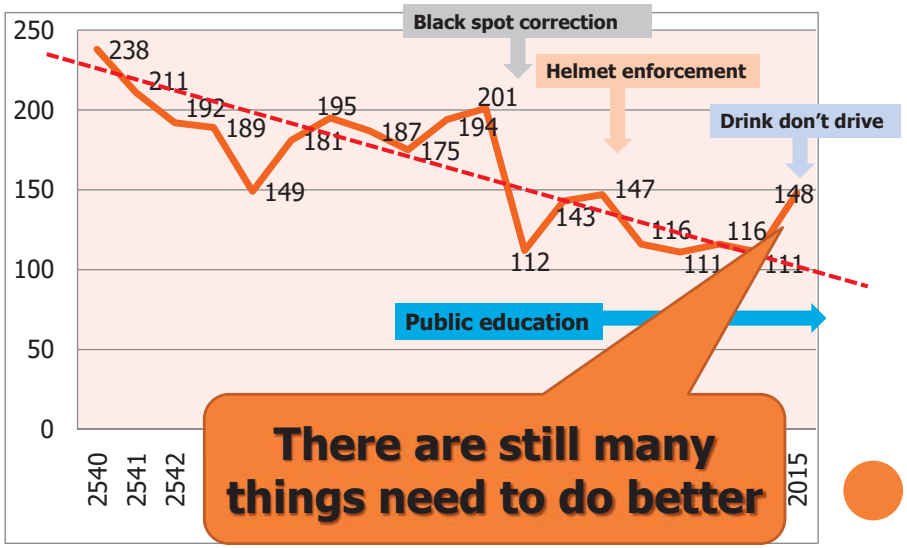
Safer Roads Foundation(SRF) supported equipment

Outcome of Alcohol enforcement

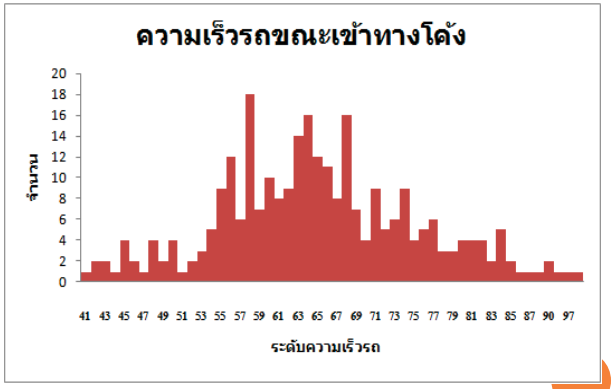
25% reduction of +ve alcohol driver

20% reduction of +ve alcohol injured cases

CHRONOLOGY OF INTERVENTION



SPEEDING PROBLEM

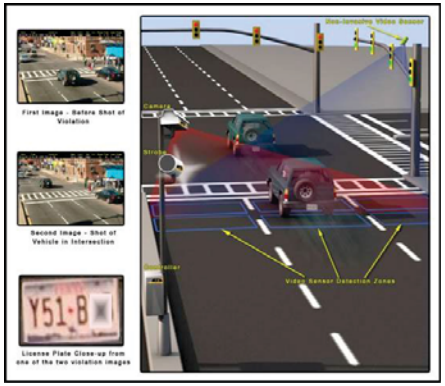


Heavy truck and bus accident on Phuket hill

	Number of incident	Number of injury	Death
2011	1	40	1
2012	1	35	0
2013	7	61	4
2014	2	32	2
2015	1	17	3
Total	12	185	10

SRF SUPPORT 2 SPEED GUNS AND MOBILE WEIGHT MEASUREMENT

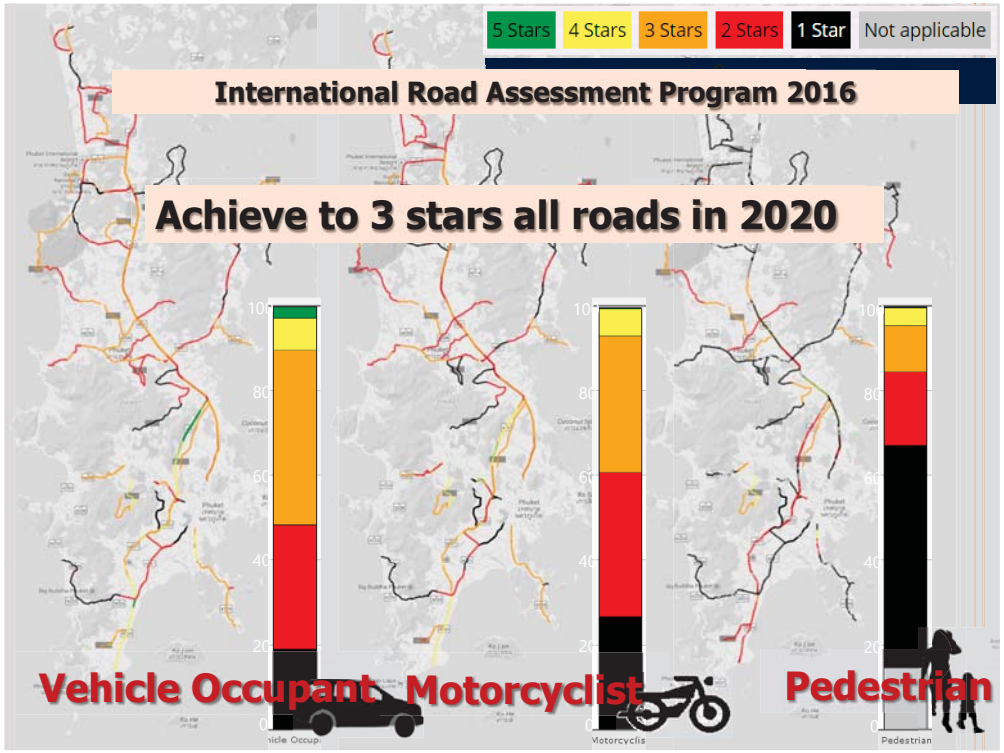
Red light Camera and new control technology



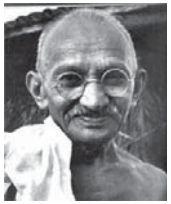
Phuket vision 50 in 2020

"Phuket vision 50 in 2020" declare on 7 July 2016

All the rotary clubs in Phuket support traffic accident reduction project



"Be the change that you wish to see in the world."



Mahatma Gandhi

THANK YOU

< 2nd AFTERNOON SESSION >

<Session 3A> Parallel Session on *Transport infrastructure and Transit Oriented Development (TOD)*

Session 3A: Parallel Session of Main Symposium ***Transport infrastructure and Transit Oriented Development (TOD)*** **Moderated by Prof. Dr. Atsushi Fukuda, Nihon University, Japan**
"Real Estate Development along Mass Transit: Private Sector Perspective" **By Mr. Andrew Gulbrandson,** **Associate Director, Head of Research and Consulting Jones Lang LaSalle (TH) Limited**
"Safe and Smart Cities: Japan Perspective" **By Mr. Toru Ishikawa, Director for International Affairs Office, City Bureau, MLIT, Japan**
"Area Development for Mass Transit System in Philippines" **By Dr. Tetsuji Masujima, Senior Consultant of ALMEC CORPORATION, Japan**
"Creative solution to Obtaining Land for Mass Transit Project" **By Mr. Surachet Laophulsuk, Assistant Governor, Mass Rapid Transit Authority of Thailand (MRTA)**
"Transit-Oriented Development in Bangkok: the Efficiency-versus-Equity Dilemma" **By Asst. Prof. Dr. Apiwat Ratanawaraha,, Chulalongkorn University, Thailand**

Moderator of <Session 3A>

Prof.Dr. Atsushi Fukuda
Professor of Department of Transportation Systems Engineering, College of Science and Technology, Nihon University
E-mail: fukuda.atsushi@nihon-u.ac.jp

Brief Biography:

Professor Atsushi FUKUDA has served in the academic field for 26 years teaching and doing research in the field of transportation systems analysis and transportation planning. He was seconded by the Japan International Cooperation Agency (JICA) as Assistant Professor to the Asian Institute of Technology for two years. He has also fulfilled his responsibility as Chairperson of the Advisory Committee for many ODA projects such as the study on improvement of road traffic environment in Chiang Mai City, Thailand.

Prof. Fukuda has led various feasibility studies on the Clean Development Mechanism, Nationally Appropriate Mitigation Actions (NAMAs) and Joint Crediting Mechanism (JCM) studies in the transport sector in the ASEAN region.

Education:

1978-1982: B.Eng. (Transportation Engineering) Nihon University
1982-1984: M.Eng. (Transportation Engineering) Nihon University
1984-1988: Dr.Eng, (Transportation Engineering) Nihon University

Honors and Awards:

1988	IATSS Dissertation Award, IATSS
1997	Best Presenter Award, 52th Annual Meeting of JSCE
2003	Best Paper in the Decision Technologies Track Award, 36th Annual Hawaii International Conference in System Sciences
2006	Excellent Practice Paper Award, the 3rd National Transport Conference, Ministry of Transport, Engineering Institute of Thailand, Khonkean University
2009	International Activity Incentive Award, Japan Society of Civil Engineers (JSCE)

First Speaker of <Session 3A>

Mr. Andrew Gulbrandson
Associate Director, Head of Research and Consulting Jones Lang La Salle (TH) Limited
E-mail: andreas.lettner@daimler.com.

Brief Biography:

Real Estate Development along Mass Transit: Private Sector Perspective
By Mr. Andrew Gulbrandson

Summary:

Second Speaker of <Session 3A>

Mr. Toru ISHIKAWA
Director for International Affairs Office,
General Affairs Division, City Bureau,
Ministry of Land, Infrastructure, Transport and Tourism
E-mail:

Brief Biography:

Education: Faculty of Law, Kyoto University

1996/4	Ministry of Construction
2003/7	Deputy Director for Environmental Strategy Division, Environmental Policy Bureau, Ministry of the Environment
2005/4	Deputy Director for Planning and Control Division, Land Water Bureau, MLIT
2006/9	Private Secretary to Parliamentary Secretary for Land, Infrastructure and Transport, MLIT
2008/7	Deputy Director for General Affairs, General Affairs Division, Minister's Secretariat, MLIT
2009/8	Deputy Director for Regional Development Policy Division, National and Regional Planning Bureau, MLIT
2012/4	Director for Urban Development Division, Urban Planning Bureau, Transportation Infrastructure Department, Shizuoka Prefecture
2014/4	Director for Urban Planning Bureau, Transportation Infrastructure Department, Shizuoka Prefecture
2015/7	Director for General Affairs, General Affairs Division, Minister's Secretariat, MLIT
2016/6	Director for International Affairs Office, General Affairs Division, City Bureau, MLIT

Safe and Smart Cities: Japan Perspective
By Mr. Toru ISHIKAWA

Summary:

Transit Oriented Development in Japan

Toru ISHIKAWA

Director. International Affairs Office, General Affairs Division

City Bureau,

Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

Ministry of Land, Infrastructure, Transport and Tourism

Contents

- ➢TOD Model in Japan
- Suburban Area
- City Center Area

- ➢Examples of TOD Project in Japan

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- ➢TOD Model in Japan
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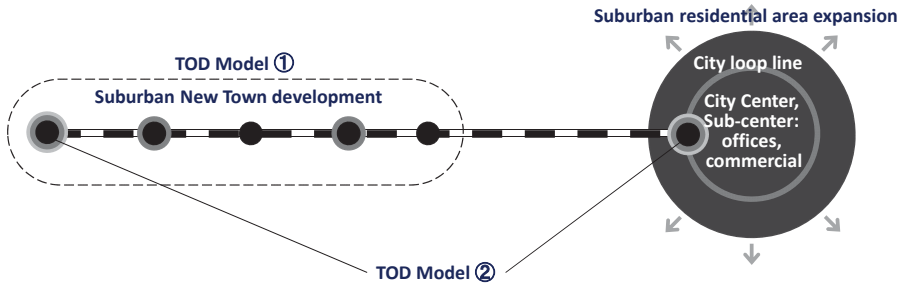
Transit Oriented Development : TOD

Model①：Development synchronized with railway infrastructure construction

Model②：Hub station oriented highly integrated complex development



Source: Architecture and Urbanism October 2013 Special Issue

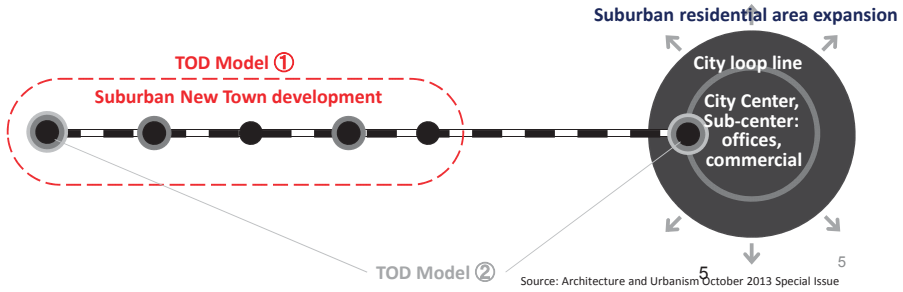
Contents

- ➢TOD Model in Japan
- Suburban Area
- City Center Area
- ➢Examples of TOD Project in Japan

Transit Oriented Development : TOD

Model①: Development synchronized with railway infrastructure construction

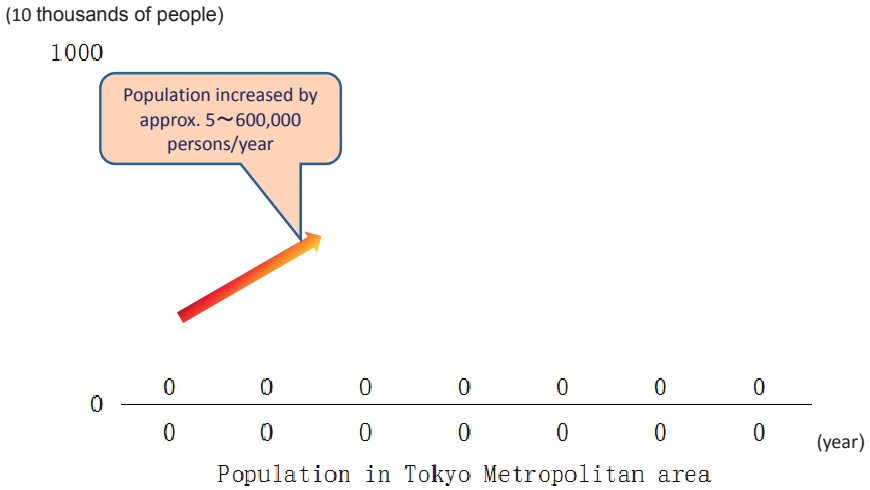
- Stimulate ridership
- Provide a stable revenue source for the railway by increasing the number of permanent residents
- Preserve and enhance the value of the route by managing overall development along the entire route



Source: Architecture and Urbanism October 2013 Special Issue

High Economic Growth in Japan

Progress of industrialization and urbanization during the high economic growth period(FY1960-FY1970) in Tokyo metropolitan area.



Congested Roads and Railways in the High Growth Economic Period

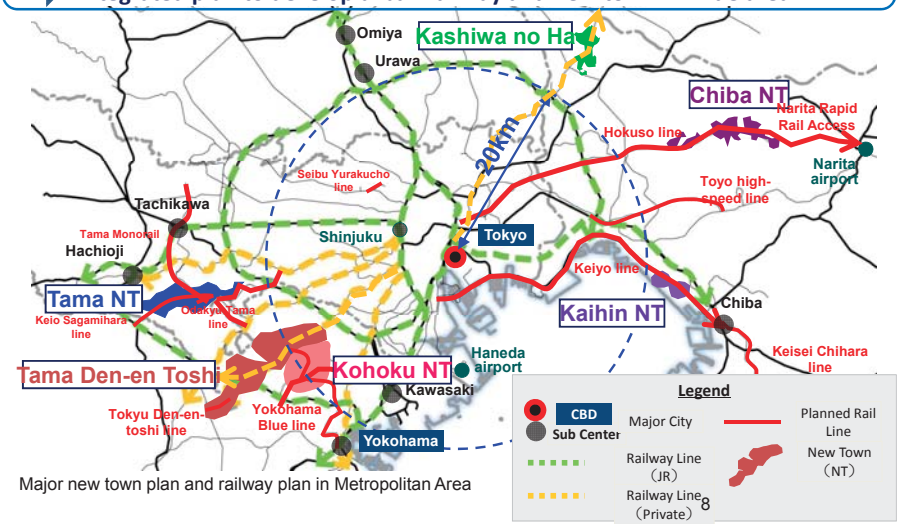
During the high growth economic period, roads and railways became severely congested due to the increase in population and vehicle ownership and to the concentration of the population in urban areas.

Roads in the Tokyo metropolitan area during the high growth economic period

Congested railways during the high growth economic period

Transit Oriented Development : TOD

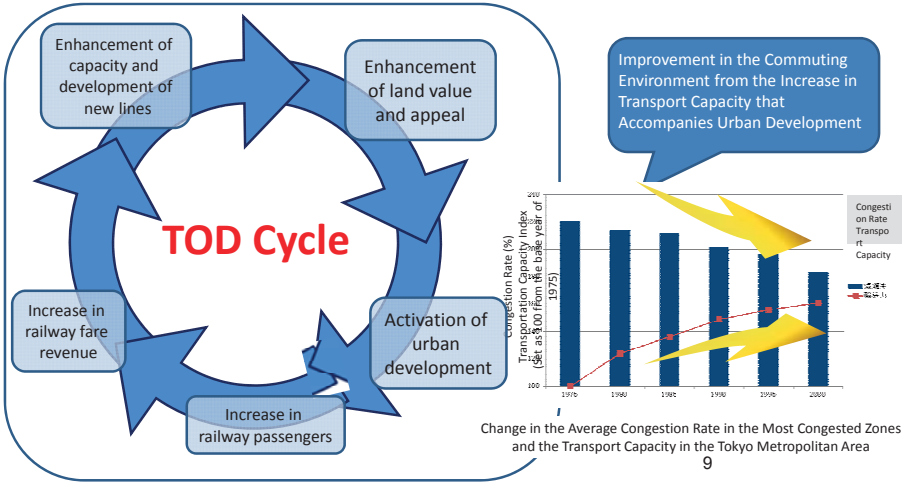
The Plan for National Capital Region Development to control sprawl of the city and urban development.
➡ Integrated plan to develop urban railway and new town in wide area.



Major new town plan and railway plan in Metropolitan Area

Mechanism of TOD

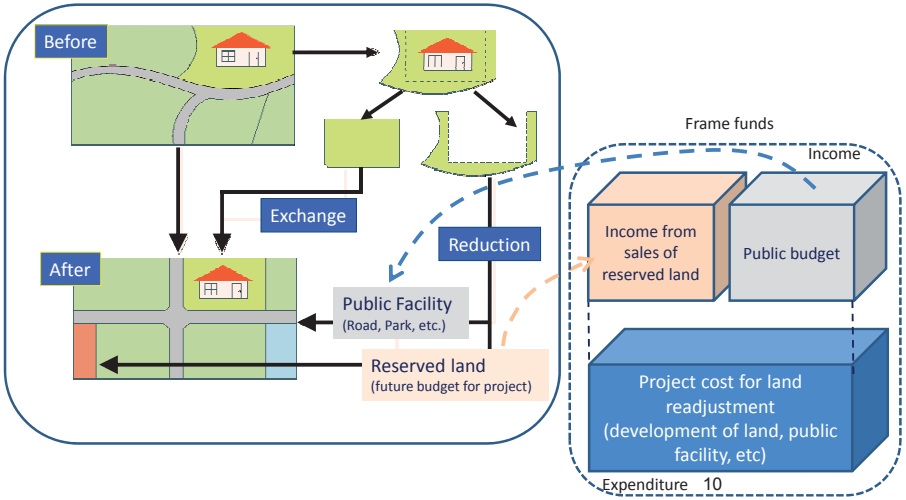
○ **By implementing urban development integrated with railway, railway passengers will increase. Thereby fare revenue will increase. On the other hand, improvement of convenience by the railway development will contribute to enhance the value and appeal of the land.**



Change in the Average Congestion Rate in the Most Congested Zones and the Transport Capacity in the Tokyo Metropolitan Area

Land Readjustment Project

○ **Comprehensive infrastructure development by utilizing reserved Land from land readjustment project**
➡ Compared to the project by purchase of land, enable to reduce public budget



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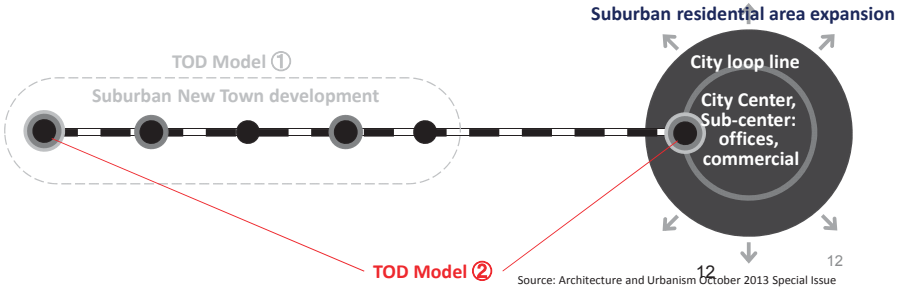
Transit Oriented Development : TOD

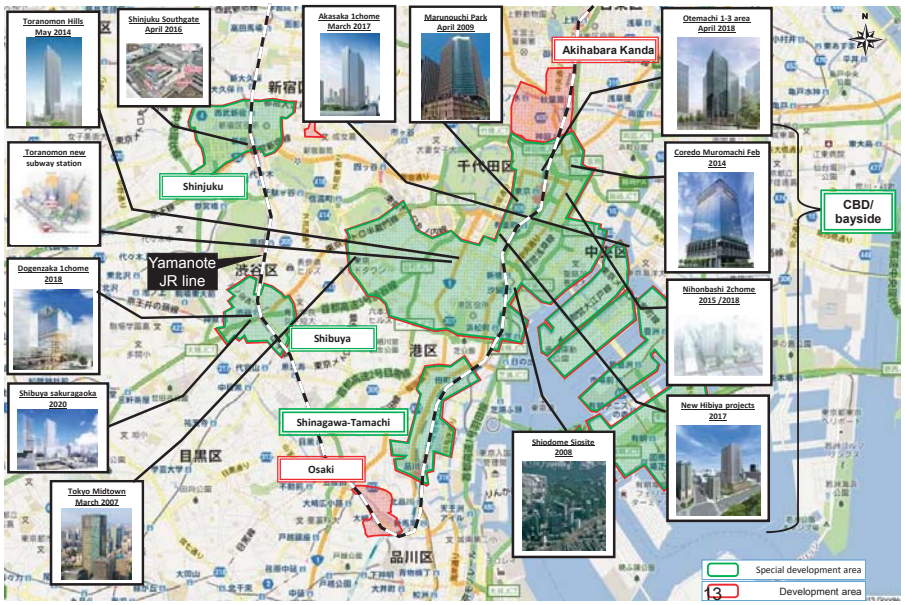
Model②: Hub station oriented highly integrated complex development

- Highly and multi functional (Office, Commercial etc) development intended to enhance the potential value of the land
- Face of the city
- Exploit the value of surrounding district
- Environmentally-friendly
- Communicates a positive image of the city in Japan and abroad



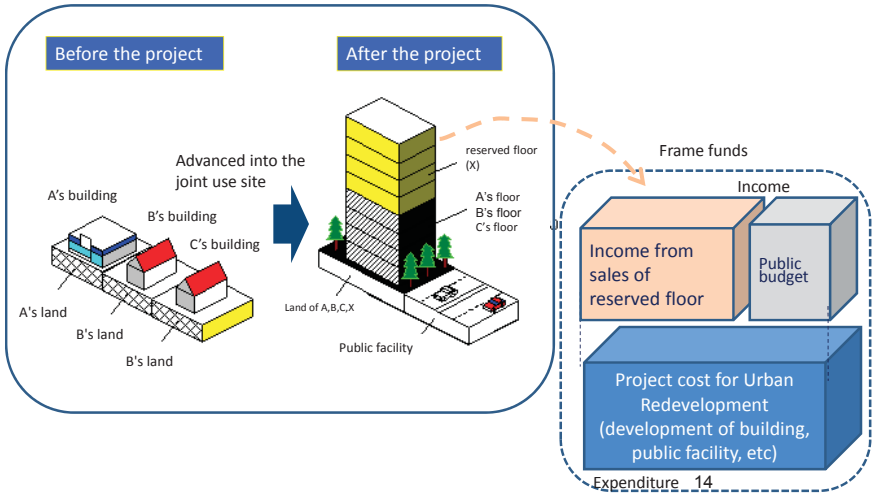
Source: Architecture and Urbanism October 2013 Special Issue

Transit Oriented Development : TOD



Urban Redevelopment Project

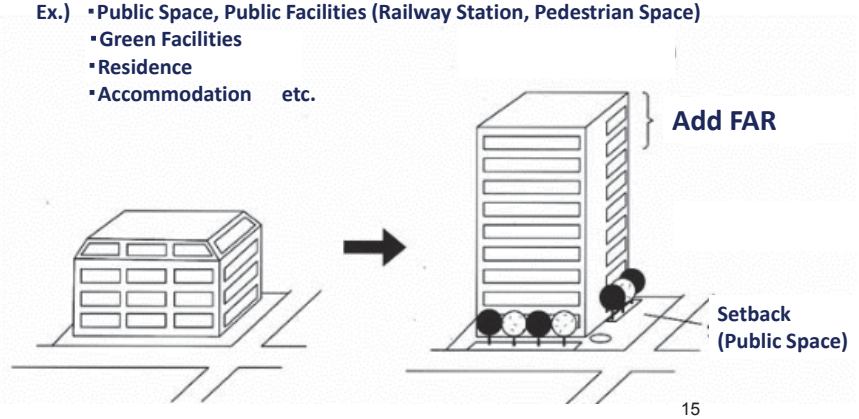
○ Promote the development of public facilities by utilizing advanced by development interests into a joint site by urban redevelopment project.



Floor Area Ratio Bonus System

If developers establish the more efficient infrastructure than one subscribed by an urban plan, they can use more floor area than designated floor area ratio without traffic congestion and environment problems.

Ex.) ▪Public Space, Public Facilities (Railway Station, Pedestrian Space)
▪Green Facilities
▪Residence
▪Accommodation etc.



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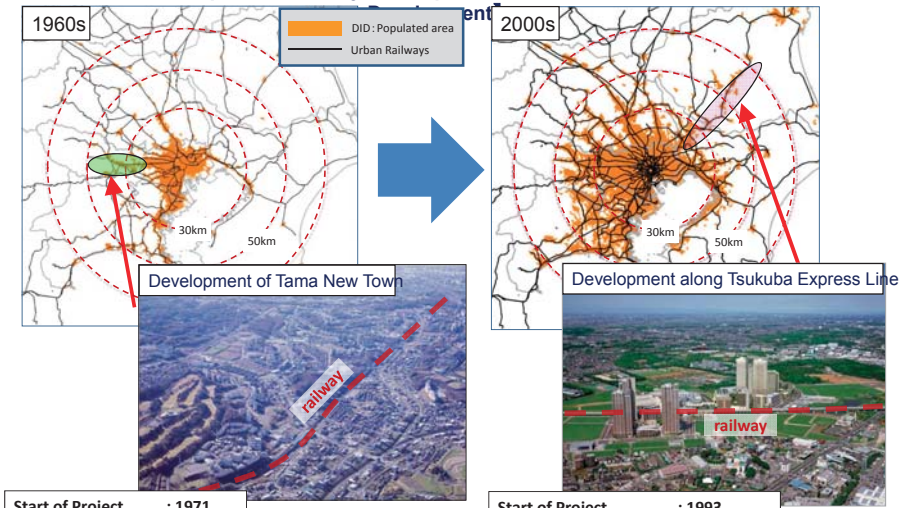
Examples of TOD Projects : New Town Development

【Expansion of Tokyo Metropolitan Area and New Town



Start of Project	: 1971
Planned area	: 2,892ha
Projected population	: 340,000

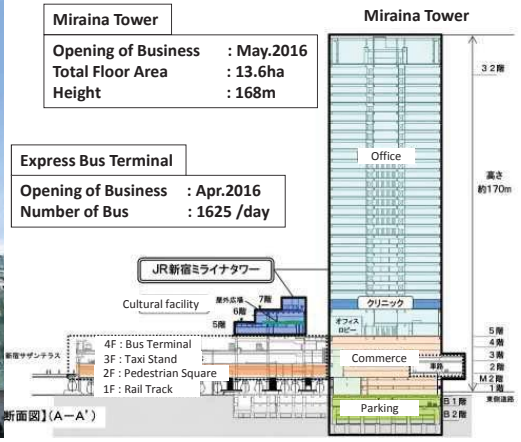
Start of Project	: 1993
Planned area	: 3,000ha
Projected population	: 250,000

Examples of TOD Projects : Shinjuku Station

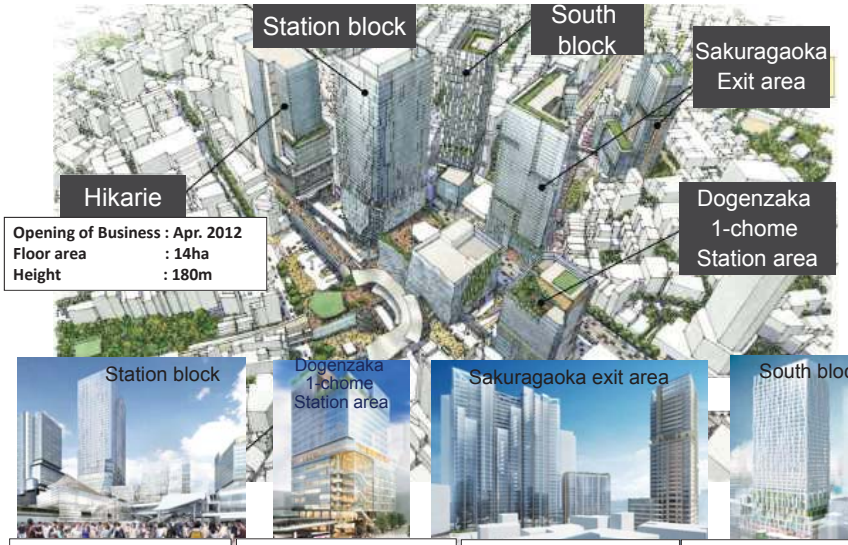
- Developed pedestrian square, bus terminal, taxi stand, the commercial and office buildings on artificial foundation(1.47ha) over rail track
- Integral development of station facilities and public facilities (Collaboration of public and private sectors)

Miraina Tower	
Opening of Business	: May.2016
Total Floor Area	: 13.6ha
Height	: 168m

Express Bus Terminal	
Opening of Business	: Apr.2016
Number of Bus	: 1625 /day



Examples of TOD Projects : Shibuya Station Area



Hikarie	
Opening of Business	: Apr. 2012
Floor area	: 14ha
Height	: 180m

Opening of Business	: 2027
Total Floor area	: 27ha
Height	: 230m

Opening of Business	: 2018
Total Floor Area	:0.3ha
Height	: 110m

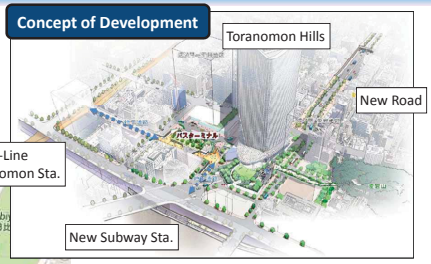
Opening of Business	: 2020
Total Floor Area	: 24ha
Height	: 180m

Opening of Business	: 2018
Total Floor Area	: 12ha
Height	: 180m

Examples of TOD Projects : Toranomon Hills

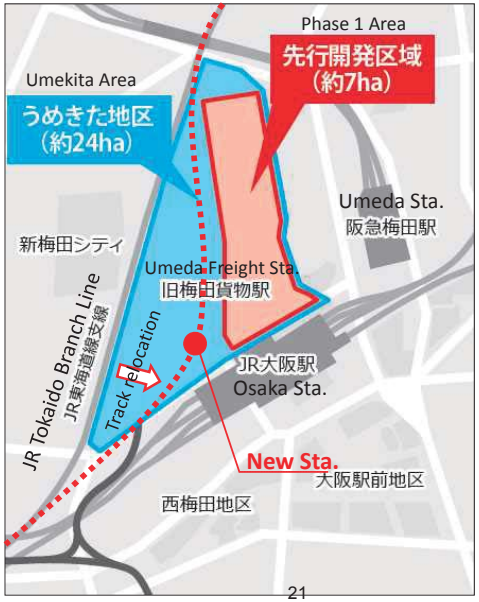
Urban renewal project integrated with roads, the new subway station and underground passage connected with the existing subway station.

[Overview of New Connectivity Improvement]
➢ Under Planning (Scheduled for about 2020)



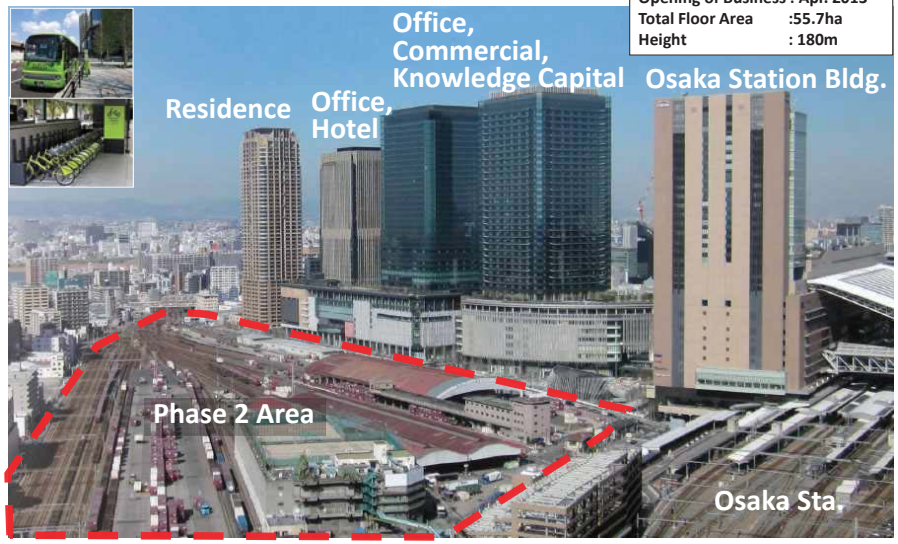
Opening of Business : May 2014
Total Floor Area :24.4ha
Height : 250m

Examples of TOD Projects : Umekita



Examples of TOD Projects : Umekita

Phase 1
Opening of Business : Apr. 2013
Total Floor Area :55.7ha
Height : 180m



Thank you for your attention!

Third Speaker of <Session 3A>

Dr.Tetsuji MASUJIMA
Director, ALMEC Corporation
E-mail:masujima@almec.co.jp

Brief Biography:

Education:

1994 PhD in Civil Engineering, Nihon University
1991 MSc in Civil Engineering, Nihon University
1989 BSc in Civil Engineering, Nihon University

Employment Record:

2013 – Present	Director, ALMEC Corporation
1995 – 2013	Transport Planner/Senior Consultant, ALMEC Corporation
1994 – 1995	Research Associate, Department of Transportation & Civil Engineering, NIHON University

Membership in Professional Societies:

-Japan Society of Civil Engineers
-Japan Society of Traffic Engineering
-Eastern Asia Society for Transportation Studies

Key Qualifications:

Dr. Masujima has more than twenty years' experience as transport planner for various transport and urban planning projects in developing countries especially Vietnam and the Philippines. He is very much experienced in planning transport systems including road, public transport such as bus and rail, sea and inland waterway, etc. as well as in forecasting transport demand and evaluating project feasibilities.
Dr. Masujima has a wide-ranging knowledge and long experience which was cultivated through involved in formulating many master plans and project feasibility studies in the transport sector of Asian countries. Those key projects are listed as follows:

- Project on Improvement of Urban Transit Corridor in Danang City (TMF. 2015-2018)
- Project on Improvement of Urban Transportation in Danang City (JICA, 2013-2016)
- Project for Comprehensive Urban Transport Plan of Greater Yangon (JICA, 2012-2014)
- Study on JABODETABEK Public Transportation Policy Implementation Strategy (JICA, 2011-2012)
- Long Thanh International Airport Master Planning (MOT Vietnam, 2009-2010)

- Project for Traffic Safety Human Resource Development in Hanoi (JICA 2006-2009)
- Study on Domestic Shipping Development Plan in the Philippines (JICA, 2004-2005)
- Study on the Urban Transport Master Plan and Feasibility Study in HCM Metropolitan Area (JICA, 2002-2004),
- Port Development Study in South Vietnam (JICA, 2001-2002),
- Study on the National Transport Development Strategy Study (JICA, 1999-2000),
- Metro Manila Urban Transportation Integration Study (JICA, 1996-1999)

Dr. Masujima is also sharing his experiences and knowledges as lecturer for JICA's training programs, university classes and academic events.

Area Development for Mass Transit System in the Philippines
By Tetsuji Masujima

Summary:

The major output of the JICA Study in the Philippines is presented in the Session 3A to share the idea and opportunity of the area development for mass transit system.

"The Preparatory Survey on Promotion of TOD (Transit Oriented Development) for Urban Railway in the republic of the Philippines" (funded by JICA, 2014-2015) is outlined as follows:

The population of Metro Manila in the Philippines increased dramatically due to rapid urbanization. Metro Manila generates 37% of the country's gross domestic product (GDP) as the nation's largest economic center. Even though the transportation network in the metropolis has gradually improved, the serious problem of traffic congestion has not been solved yet. Such congestion results in significant economic losses and constraints to environmental sustainability.

In order to solve the traffic congestion, it is essential to develop a mass transit system in the north-south direction as a core infrastructure axis to cover the expanding commuter demand. Currently, the Philippine National Railways (PNR) operates the commuter line in the southern part of Metro Manila, between Manila City and Calamba City in Laguna Province. Meanwhile, railway operation has not been started in the northern part of Metro Manila. Residential areas between Caloocan and Malolos have been expanded without sufficient modes of public transportation. Therefore, the development of a mass transit system in this section is urgently required.

In response to the conditions previously described, the Japan International Cooperation Agency (JICA) is currently implementing various cooperation projects associated with the commuter rail between the suburbs and Metro Manila. In order to enhance the outcomes of the North South Commuter Rail (NSCR) project, this Study was conducted. The Study aims to promote a modal shift to public transportation and integrated development along the NSCR through the improvement of transport access, development for the improvement on the socioeconomic and environmental aspects that will lead to sustainable urban development. These objectives are attained through the preparation of the following study outputs:

(1) Concept plan indicating the general guidelines to implement TOD for all 10 stations in the section of Phases 1 and 2-A of the NSCR project;

(2) Transportation access improvement plan for Caloocan, Solis and Tutuban Stations; and

(3) Concept design for Tutuban area redevelopment including detailed access improvement plan and integrated development plan, and assistance in project implementation planning.

Fourth Speaker of <Session 3A>

Mr. Surachet Laophulsuk

Assistant Governor/ Chairman of land adjustment committee,

Mass Rapid Transit Authority of Thailand (MRTA)

E-mail: parn73@gmail.com

Brief Biography:

Education:

-Suankularb Wittayalai School

-Bechelor of Engineering Program in Civil Engineering, Chulalongkorn Universit

-Master of Engineering (Project Management), Lamar University, Texas, USA

-Master of Engineering (Structure), Texas Tech University, USA

-License of Professional Practice: Professional Engineer ,Civil Engineering No. 6664

Work Experience

1996-1998 J. Muller International (JMI) Company, U.S.A.

Proceed with Design Proposal of JFK LRT System Project

Design Launching Girder on Bangna – Bang Pakong Expressway

Design Siam Station)Central Station(, BTS SkyTrain Project

Design runway of 2nd stage expressway Project, Sector D

1998-Present Mass Rapid Transit Authority of Thailand (MRTA)

-Project Management of MRT Blue Line Project (Contract 1)/ MRT Purple Line Project (Contract 1)/ MRT Blue Line Extension Project (Contract 1, 2) /MRT Green Line (South) Project (Contract 1, 2) /MRT Green Line (North) Project (Contract 1-4)

Submit a tender of MRT Blue Line Project/ MRT Blue Line Extension Project/ MRT Green Line (North) Project

Control the Design Work of MRT Purple Line Project/ MRT Blue Line Extension Project/ MRT Orange Line (East) Project

A Creative Solution to Obtaining Land for Mass Transit Project
By Mr. Surachet Laophulsuk

Summary:

One of the most difficult processes in implementing a megaproject like mass transit system in Bangkok is land expropriation. With the brilliant idea of responding agency pushed the Law concerning Land Readjustment Act 2004 into effect. The law is considered to be one of the most important changes in urban development in Thailand. Since then, efficient instruments have been employed to enable the development of areas that follow the framework of city planning. In that past Thailand had only a limited of numbers of instrument for the development of such area, for example, land expropriation by the States as a means of opening up development areas for mass transit project. By implementing land expropriation as usual, it will create those with good luck and bad luck at the same time. To create a win-win situation, the enactment of the Land Readjustment Act in 2004 was deemed to be the moment to increase opportunities for the development of areas for Thai society. By employing land readjustment, both government sector and private sectors will be in the win-win situation. There is no particular sector suffered from leaving their properties while government is being released from both blame and expropriation.

Fifth Speaker of <Session 3A>

Asst.Prof.Dr.Apiwat Ratanawaraha
The Department of Urban and Regional Planning,
Chulalongkorn University
E-mail: rapiwat@gmail.com

Brief Biography:

Apiwat Ratanawaraha teaches at the Department of Urban and Regional Planning, Chulalongkorn University, and serves as an advisor to the Urban Design and Development Center in Bangkok. He was a Visiting Assistant Professor at the MIT Department of Urban Studies and Planning, and a Visiting Scholar at the Harvard-Yenching Institute. He is specialized in urban planning and development, technology and innovation policy, and strategic foresight. His recent research includes projects on city innovations in Southeast Asian megacities, land and inequality issues in Thailand, and the informal sector in Bangkok. He was involved in the global research networks "Informal City Dialogues" and "Catalyzing the New Mobility in Cities" of The Rockefeller Foundation, and currently in the "Open and Collaborative Science in Development" network of the IDRC. His publications include journal articles on motorcycle taxis, passenger vans, and bus rapid transit systems in Bangkok, a book entitled "The Land Economy of Thailand: A State of Knowledge", two co-authored volumes entitled "Scenarios of Thai Life in 2033" and "Embracing Informal Mobility in Bangkok." He recently started a citizen science project to create a "noise map" of Bangkok.

"Transit-Oriented Development in Bangkok: the Efficiency-versus-Equity Dilemma"

Asst.Prof.Dr.Apiwat Ratanawaraha

Summary:

Transit-oriented development is taking shape in Bangkok. Various policy instruments are being adopted to promote higher-density development around transit stations and greater transit ridership. Such efforts are laudable, as they aim to enhance land use efficiency and environmental sustainability. But there is currently little discussion here on the implications of transit-oriented development for social equity and justice. In this talk, I will highlight these issues, and suggest policy measures that should be implemented.

< 2nd AFTERNOON SESSION >

Session 3B: Parallel Session of Logistics & Disaster Management

Session 3B: Logistics & Disaster Management moderated by Asst. Prof. Dr. Pongrid Klungboonkrong, Khon Kaen University
"Logistics Safety in Thailand: Private Sector Perspective" By Mr. Sombat Suwanjandee, National EH&S Manager Linfox M Logistics (Thailand) Ltd.,
"Logistics and Disaster Management Through Navigation Technology" By Mr. Tomiji Sugimoto Chief Technical Adviser, TMG Consulting, Japan
"Trucking Standard Quality Development in Thailand" Asst. Prof. Dr. Varameth Vichiensan, Kasetsart University, Thailand
"A modelling framework for building the redundant logistics networks" By Dr. Sarawut Jansuwan, Director of Logistics Management Program, National Institute of Development Administration (NIDA), Thailand

Moderator of <Session 3B>

Asst. Prof. Dr. Pongrid Klungboonkrong
Deputy Director Sustainable Infrastructure Research and Development Center, Khon Kaen University
E-mail: kku.sirdc.17@gmail.com

Brief Biography:

Education:

1999: Ph.D. (Transport Systems Engineering), Transport System Centre (TSC), School of Geoinformatics Planning & Building, University of South Australia, AUSTRALIA
1989: M.Eng. (Transportation Engineering), University of Manitoba, CANADA
1984: B.Eng. (Civil Engineering), Khon Kaen University, THAILAND

Positions & Experiences:

2014:	World Bank International Consultant
2013-present:	Director of Excellent Center of Traffic and Transportation System Management in the Upper Northeastern region of Thailand, Khon Kaen University
2007-Present:	Deputy Director for Administrative Affairs, SIRDC, Khon Kaen University
2004-2005:	Associate Dean for Research and International Affairs, Faculty of Engineering, Khon Kaen University

Scholarship and Prize awarded:

-In 2009, Dr Pongrid Klungboonkrong received the best paper prize)Practical Paper(awarded by The Engineering Institute of Thailand under H.M. the King's Patronage at the 6th National Transport Conference, Thailand.

-In 2003, Dr Pongrid Klungboonkrong received the Thailand Transportation and Traffic Innovation Award 2003 form the Prime Minister organized by the Office of Transport and Traffic Policy and Plan)OTP(, Ministry of Transport.

-In 1999, Dr Pongrid Klungboonkrong was awarded the Yasoshima's Prize for the best paper at the 3rd Eastern Asia Society for Transportation Studies)EASTS (Conference, Taipei, Taiwan.

First Speaker of <Session 3B>

Mr.SOMBAT SUWANJANDEE
National Environment Health and Safety Manager,
Linfox M Logistics (Thailand) Co. Ltd.
E-mail: Sombat_Suwanjandee@linfox.com

Brief Biography:

Education: Bachelor degree in Public Health majoring in Occupational Health and Safety at Mahidol University. Master degree in MBA at Mahanakorn University of Technology.

Sombat is a "National Environment Health and Safety Manager" at Linfox M Logistics for 8.5 years. He worked with many kinds of business in safety field since I graduated i.e. Telecommunication, Construction, Building Admins, Security, Retail and Logistics. He started work with safety officer role in 1994 and expand his career to be in charge of country's role since 2004 until now.

Sombat has certified with "Safety Officer at Professional Level" and has responsibility for safety implementation at all Linfox operational sites in Thailand. He is in charge of planning, organizing, implementing and auditing the safety program across all sites. He has worked with all managements and operations team to ensure compliance with safety standards i.e. corporate, legal and customer safety standards. Linfox aims to achieve the safety commitment which is "Vision Zero".

His success on works,

-Be the OHSMR and lead the OHSAS18001 at CEVA Logistics until it's certified
-Work with all parties to put in place the Linfox safety management program which resulting in the reduction of the Lost Time Injury Frequency Rate (LTIFR) from 20.7 to 2.0 (2006 to 2015) across Asia Pacific and Motor Vehicle Incident Frequency Rate (MVIFR) from 7.0 to 2.5 (2010 to 2015) across Thailand.
-Implement Road Safety Management Program with transport contractors
-Built up sustainable safety structure and driver trainer at Linfox
-Receive National Safety Award for 6 years consecutively at Linfox - Unilever
-Establish and roll out the fatigue policy and driver log book at Linfox

He has passed the plenty of training such as

-Management Development Program (Industrial relations, Maximizing performance, Financial skill, Project management and Safety leadership)
-Leadership Skills for Manager
-Management Leadership Skill for Manager
-Multimodal transport of DG
-Chemical safety and transportation

Logistics Safety in Thailand
By Mr. SOMBAT SUWANJANDEE

Summary:

Safety is the cornerstone of Linfox business and we are the leader in safety of logistics and supply chain. Linfox has founded since 1956 by the founder who commence his business with only one milk delivery truck and Linfox has more 5,000 base fleets which travelling across 9 countries, manages 4.2 million m2 of warehousing and 23,000 employees who work with Linfox.

Linfox implemented safety strategy which called "Vision Zero" since 2006 and we initiated many safety activities, implementation program, inspection and audit program. Linfox currently has improved the safety performance since 2006 to now by reducing the number of injuries in business from 20.7 to 2.0 in 9 years and we aim to achieve our safety commitment "Vision Zero".

Our Vision Zero strategy has been known by all employees and contractors who works with Linfox. It is our safety culture and is represented the safety ownership of everyone.

Key success to achieve our safety performance is to engage our people with 3 things which are ;

- Leadership : Policy, Strategy, Clear expectation on safety
- Behavior : Cultural change to better safe i.e. activity to support are SWAT, Toolbox, NM/HZ reporting
- System : Linfox OHSMS, Risk management, Inspection/Audit and management review (PDCA)

Beside from 3 things above, Linfox also use the technology to support, facilitate and monitor on our safety practice which are GPS tracking in transport operations, all parameters of safe driving practice such as HA, HB, Speed, Turning Angle, Turning light, Steering wheel control etc….

For warehouse operations, Linfox has tracking system at all MHEs for safety purpose and we do the analysis from receiving data to improve our safe practice in warehouse.

As all above, Linfox will maintain to keep up our safety to achieve our safety commitment "Vision Zero".

vision ZERO
ZERO Fatalities
ZERO Injuries
ZERO Motor Vehicle Incidents
ZERO Net Environmental Emissions
ZERO Tolerance of Unsafe Behaviour & Practices

Second Speaker of <Session 3B>

Mr. Tomiji Sugimoto
Deputy Director, Honda Motor, Japan
E-mail: Tomiji_Sugimoto@hm.honda.co.jp

Brief Biography:

Mr. Tomiji Sugimoto serves as an Executive General Manager with Honda Motor Co., Ltd. in Tokyo, Japan. He is charged with Environment and Safety Planning in Corporate Planning Division at Headquarter of Honda Motor Co., Ltd.Prior to this position, Mr. Sugimoto was an Executive Chief Engineer at the Automotive R&D Center in Honda R&D Co., Ltd. in Tochigi, with responsibility for technology PR by October 2009,Mr. Sugimoto was a Vice President with Honda R&D Americas, Inc. (HRA) based in Southfield, Michigan, with responsibility for the Automobile Technology Research Division from 2005 to March 2009. Prior to joining HRA, Mr. Sugimoto was a Senior Chief Engineer with Honda R&D Co., Ltd., in charge of safety technology for Honda since 2001. In that role, he also had oversight of Honda's state-of-the-art Omni-directional Crash Test Safety Facility in Tochigi, Japan. Mr. Sugimoto first became engaged in Honda's crash safety technology development efforts in 1978. He joined Honda Motor Co., Ltd. in 1977 and transferred to Honda R&D Co., Ltd. in 1978.

For the next six years he played a major role in the research and development of Honda's air bag technologies. From 1985-89 Mr. Sugimoto worked at Honda R&D North America (Now Honda R&D Americas) in Torrance, California where he was actively involved in the effort to develop and introduce airbag technology in Honda and Acura automobiles in North America. Returning to Honda R&D Co. in Japan in 1989, he continued work in the safety area. In 1992 he was promoted to Chief Engineer in 1992 and became Manager of the Crash Safety Research Division 1994, where Honda has focused much of its efforts to improve passive safety technologies and including air bag systems and body structure developments.

Mr. Sugimoto received the Pathfinder Award from Automotive Safety Council in 2012 due to his effort for Safety Activity.

Mr. Sugimoto was appointed as a Society of Automotive Engineers (SAE) Fellow at the SAE World Congress in 2008 for his role in the development of Honda's advanced body structure and airbag systems. His research earned the Award for Safety Engineering Excellence from the National Highway Traffic Safety Administration (NHTSA) at the Amsterdam ESV Conference in 2001. He also has won the Japan Society of Automotive Engineers (JSAE) Award. He has played a major role in industry efforts to establish the SAE Pedestrian Dummy Standard.

His published articles with the JSAE include "Research of occupant injuries in frontal collisions between passenger cars"; "Innovative Body Structure for the Self Protection of a Small Car in a Frontal Vehicle-to-Vehicle Collision"; "Study of the test procedure for offset crash"; and "A Trend of SRS Air Bag System".

He also served in a number of important industry organizations, including as chairman of the Traffic Accidents Analysis Experts Group of the Japan Automobile Manufacturers Association (JAMA) and executive member of the board of directors General Affairs and Standardization of the Society of Automotive Engineers of Japan, Inc. (JSAE). Now he is serving in several sub-committees under Environment Committee and Safety, Environment Technical Committee of JAMA as co-chairman, also General Affairs of JSAE as executive member of the board of directors. Mr. Sugimoto graduated in 1977 from Aoyama Gakuin University with a B.S. degree in Mechanical Engineering.

Logistics and Disaster Management Through Navigation Technology

By Mr. Tomiji Sugimoto

Summary:

This presentation shows how Service Structure of Transportation Support System which road could use during Disaster was established rapidly and practically.

Cooperative Activities with Government and Private Sector through Navigation Technology such as using Floating Data is important so that realizing Secured Automotive Society.

Logistics and Disaster Management Through Navigation Technology

Tomiji Sugimoto
Independent Technology Adviser
TMG Consulting
Former Deputy Director, Honda Motor Company
Former Executive General Manager, Honda R&D Co., Ltd.

9th ATRANS Symposium on "Transportation for a Better Life: Safe and Smart City"
2016・08・19 Bangkok

Announcement from Honda

- **Great East Japan Earthquake Traffic Information Maps Based on Honda Internavi Data Win 2011 Good Design Grand Award**
- With the goal of helping victims and those assisting them travel around the affected region more smoothly and efficiently, on the day after the disaster, March 12, 2011, at 10:30 a.m., Honda publicly released the applicable floating car data. Then, to help as many people as possible in the region understand which roads were passable, Honda partnered with Google and Yahoo! JAPAN on information solutions. Google began offering the "Google Passable Automobile Route Map"[2] on March 14, and Yahoo! JAPAN began offering the "Passable Road Confirmation Map" on its Loco Maps[3] page on April 21. Starting April 27, again using Honda data, both companies added information about traffic jams to their information about passable roads.
- We members of the Judging Committee unanimously give this initiative our highest praise in recognition of Honda's many years of effort in this area and its service after the disaster."

Function of Honda Internavi System

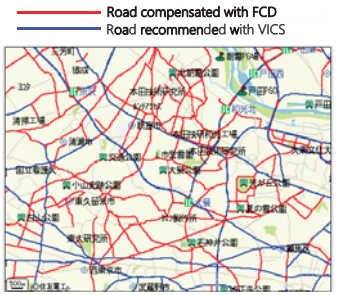
Car Navigation System for
- Root Search and Guidance
- Navigation
- Parking Lot Information
- Fuel Consumption Information
- Maintenance Record

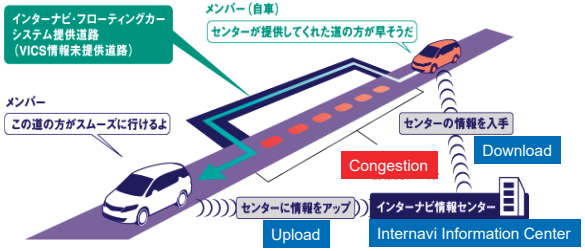
On Demand Traffic Jam, Weather & Disaster Information Delivery

Internavi Floating Data

Optimized Root with Floating Car Data(FCD)

Compensation of VICS Information with Communication among Members
Guide the Fastest Root to Target
Preventing from Traffic Congestion

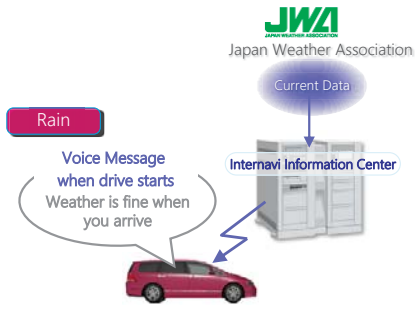




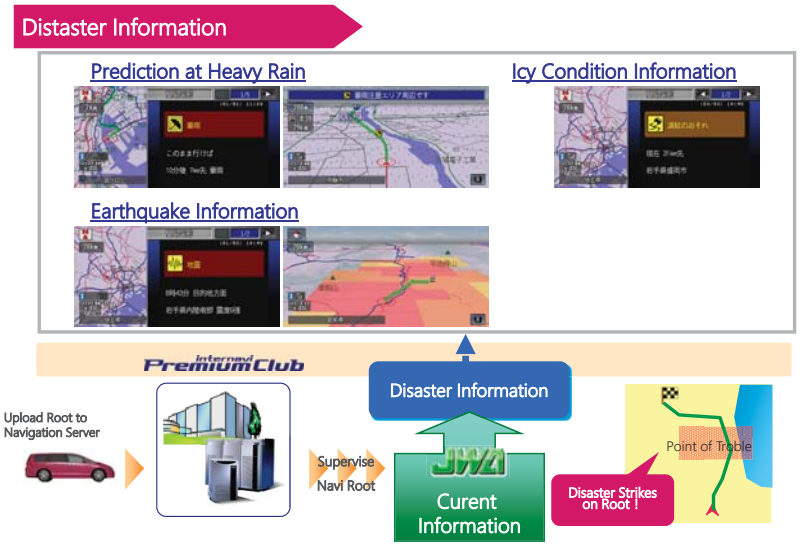
Remarks) Floating Data = Prove Data

Weather & Disaster Information

- Heavy Rain Information
- Icy Road Information
- Big Earthquake Information
- Tsunami Information
- Typhoon Information
- Whiteout Information
- Warning/Alert Information

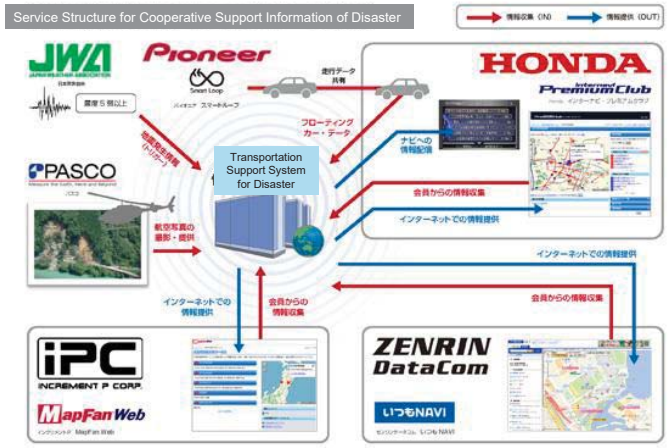


Internavi Weather



Service Structure of Transportation Support System during Disaster

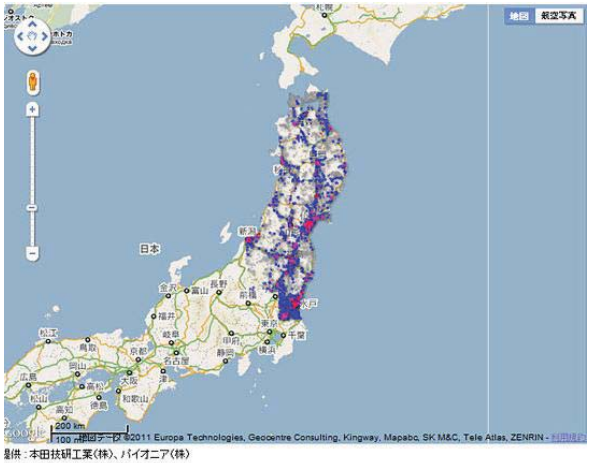
Cooperative Activities through Honda Internavi



Actual Available Road Map

Blue Line: Able to pass

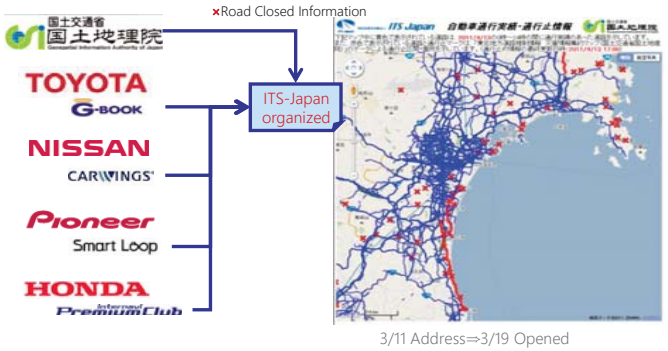
Red Line: Not able to pass



提供：本田技研工業(株)、パイオニア(株)

Cooperative Activity for East Japan Disaster

ITS-Japan organized 4 companies to get Data
Disclose the information where are available to drive and pass through



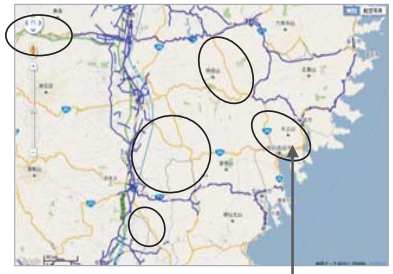
3/11 Address⇒3/19 Opened

On Google Map

Integrated Data

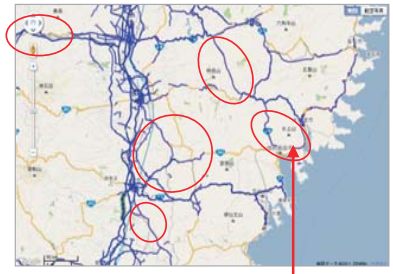
Integrated Floating Data makes Map Information more precise

One Company



No recorded

4 Companies



Recorded

Ref. ITS Japan

With Government Information

Combined with the information from Government

Only Floating Data

Not Clear it is available to use

With Governmental Data

Clear it is NOT available

Ref. ITS Japan

Goal

Construct Common Base
between Government and Private Sector for Traffic Information

Realizing the system whenever, wherever it connects with anybody

内閣府

Realizing Secured Automotive Society With Government and Private Sector by using Floating Data

Thank you for your attention!

Tomiji (Tommy) Sugimoto

TMG Consulting

tomiji.sugimoto@tmg-n.com

Third Speaker of <Session 3B>

Assistant Professor Varameth Vichiensan
Faculty of Engineering,Department of Civil Engineering
Kasetsart University
E-mail:fengvmv@ku.ac.th

Brief Biography:

Education:

- **B.Eng.** (Civil Engineering)
  Thammasat University, Thailand
  (SIIT Scholarship)
- **M.Eng.** (Civil Engineering)
  Asian Institute of Technology, Thailand
  (Royal Thai Government Scholarship)
  (Outstanding Academic Record Award)
- **Ph.D.** (Civil Engineering)
  Tohoku University, Japan
  (Japanese Government Scholarship)

Academic Society:

- Scientific Committee, World Conference on Transport Research (WCTR)
- Co-Chair of Special Interest Group H5: Transport in Developing Countries, World Conference on Transport Research Society (WCTRS)
- Research Committee, Asian Transportation Research Society (ATRANS)
- Sub-Committee on Transport & Traffic Eng., Engineering Institute of Thailand (EIT)
- Executive Committee, Thai Association for Town Planning (TATP)

Areas of Interest:

- Integrated Land Use/Transportation Modeling
- Discrete Choice Analysis
- Spatial Analysis
- Freight Transport
- Driver Education and Licensing

Trucking Quality Standard Development in Thailand

By ***Assistant Professor Varameth Vichiensan***

Summary:

Freight transport sector in Thailand is dominated by road. So enhancement of truck operations with respect to fuel efficiency, safety, and the environment protection will be crucial for logistics as well as supply chain enhancements, i.e., the key to reduce logistics cost. In addition to the general ISO standard, many countries have developed specific schemes to support truck operators, to name a few, Australian Trucking Association's TruckSafe standard in Australia, Japan Trucking Association's G-Mark safety standard in Japan, as well as US-EPA's SmartWay partnership program in the United States, etc. These are similarly aiming at more efficient, safer operation, and better service quality. This study presents Thailand's national truck operation standard for truck operator. It has been incrementally recognized not only among trucking companies but also customers or shippers. The standard has been developed since 2009 by Department of Land Transport (DLT) in corporation with Kasetsart University and usually called "Q-Mark" after its Q-symbol representing Quality. As of August 2016, there are more than 300 trucking companies having been Q-Mark certified. It requires a certain trucking company to comply with various requirements regarding truck operations, i.e., 44 requirements. These fall into 5 categories: (1) organization, (2) transport operation, (3) personnel, (4) vehicles, and (5) customer responsibility. Among them, 24 requirements are compulsory that are the main subject of the audit while the rest 20 requirements are guidelines for more advanced operation and development. Presently DLT is acting as the standard's regulator and does certification while audit is carried out by third-party auditing organizations, so-called Inspection Body (IB) that must be authorized by DLT. Each individual auditor, who actually does the audit, must be trained, tested, and authorized by DLT as well. Such audit and certification procedures are designed in order to ensure that every audit is transparent, professional, and standardized. A certification for each operator is valid for a maximum of 5 years by not exceeding the validity of trucking operator license, which is 5 years. The latter part of the paper presents a result of feedback survey of Q-Mark certified companies. It is found that several plans and operations toward safety are substantially implemented. Such activities as medical health check of drivers and alcohol and drug tests are carried out. Staff training and safety measures are more realized. With work procedures specified, records of operation are kept more systematically. Once occurred, accidents are investigated and mitigation plan is developed. And many more improvements become evident after the companies have been certified. These findings provide a good signal of improvement in trucking operation and management in Thailand toward safer, cleaner, and more efficient road freight transport.

Trucking Quality Standard
Development in Thailand

Varameth Vichiensan, Ph.D.
Kasetsart University

Outline

- Background
- Aims of the development
- Trucking standards around the world
- Development of our own standard
- Requirements
- Survey of the Certified Operators

Motivation

- **Safety**
- **AEC Integration**
- **Environment**

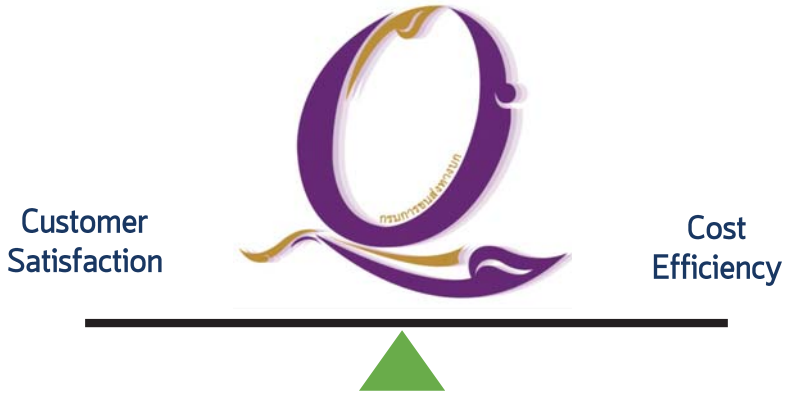
Department of Land Transport

- **Enhance Road Transport Service**
- **Vehicle Regulation**
  - Vehicle Design
  - Vehicle Registration
  - Vehicle Tax
- **Licensing**
  - Driving License
  - Private Operator License
  - Public Operator License: Taxi, Bus, Truck
- **Promotion of Road Transport**
  - Multi-modal Integration
  - International Integration

Trucking Standards around the World

G-Mark Standard in Japan

Development of Public Truck Operators



Q-Mark Symbol

Certified Operator

Awarding Ceremony

2011

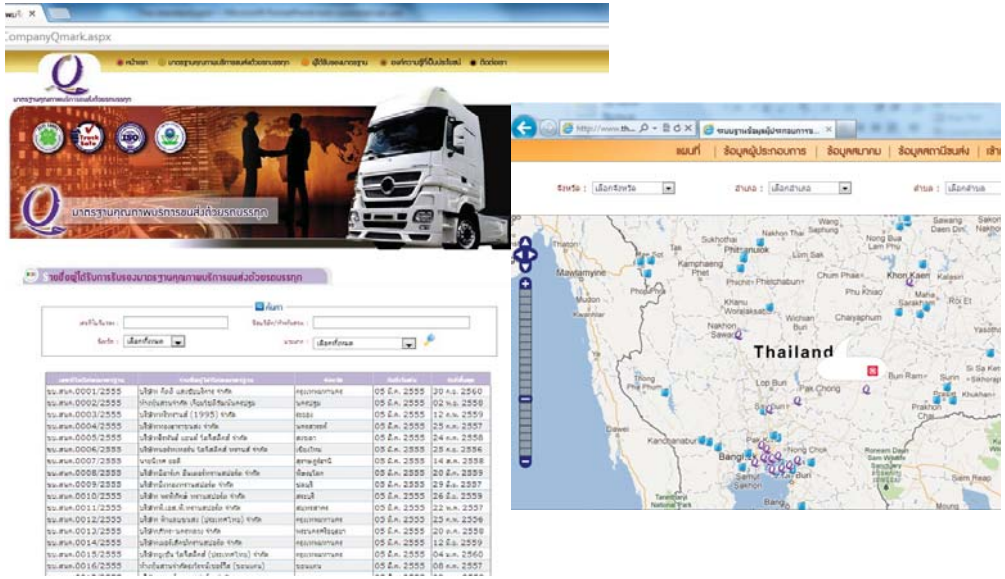
2012

2013

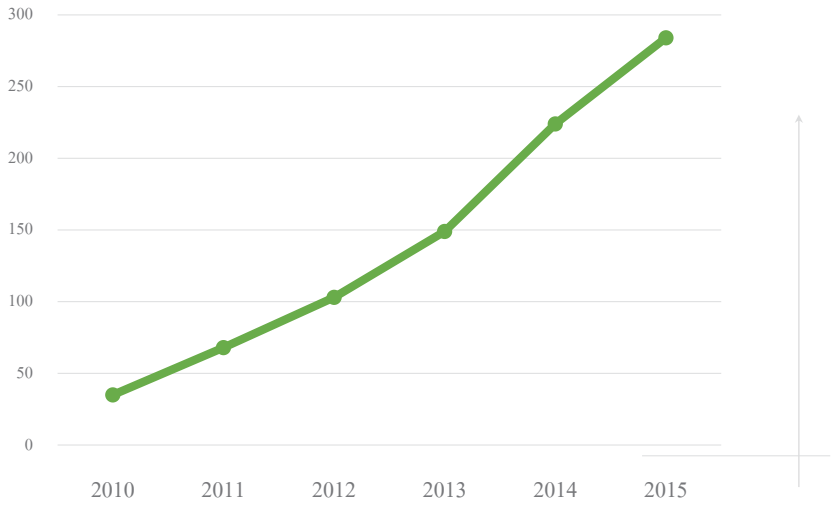
2014

2015

http://www.thaitruckcenter.com



Accumulated Number of the Certified Operators



How to Apply?

1. Self-evaluation Application
2. • Audit
   • Correction if required
3. • Accreditation
   • Surveillance Audit

Requirements

1) Organization
2) Operation
3) Personnel
4) Fleet
5) Customer & Externality

44 requirements
>> 24 compulsory
>> 20 optional

1.2 Policy (on Safety)

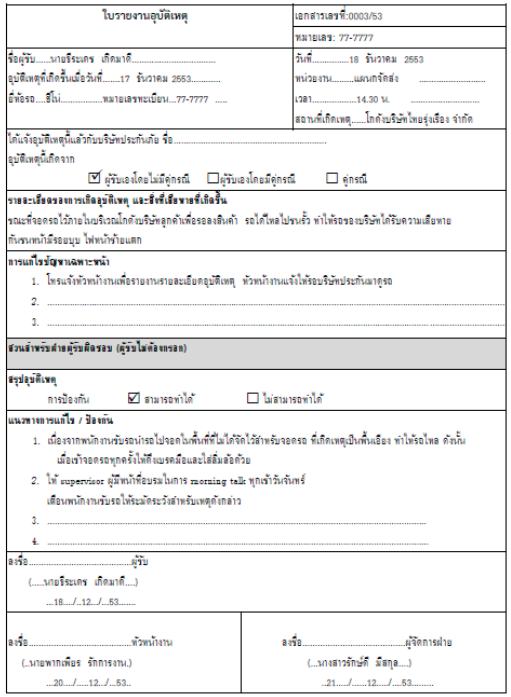
❖State specific policies on transport issues such as drugs, alcohol and safety.

2.6 Emergency Measure

Have an emergency handbook that clearly shows the procedures and information needed so that staff can handle any event quickly and appropriately.

2.7 Accident Records

Have an accident and incident record with details of the accident, causes, damage, the resolution, and report to the agencies involved.



ใบรายงานอุบัติเหตุ | เอกสารเลขที่:0003/53 | หมายเลข: 77-7777

ชื่อผู้ขับ.....นายธีระเดช เกิดมาดี.....
อุบัติเหตุที่เกิดขึ้นเมื่อวันที่.....17 ธันวาคม 2553.....
ยี่ห้อรถ.....ยี่ไม่.....หมายเลขทะเบียน....77-7777 .....

วันที่.....18 ธันวาคม 2553
หน่วยงาน.....แผนกจัดส่ง .....
เวลา.....14.30 น. .....
สถานที่เกิดเหตุ.....ใกล้บริษัทไทยรุ่งเรือง จำกัด

ได้แจ้งอุบัติเหตุนี้แล้วกับบริษัทประกันภัย ชื่อ.....
อุบัติเหตุนี้เกิดจาก
☑ ผู้ขับเองโดยไม่มีคู่กรณี ☐ ผู้ขับเองโดยมีคู่กรณี ☐ คู่กรณี

รายละเอียดรวมการเกิดอุบัติเหตุ และขีดที่เกิดขึ้น
ขณะที่จอดรถไว้ภายในบริเวณใกล้บริษัทลูกค้าเพื่อรอลงสินค้า รถได้ไหลไปชนครั้ง ทำให้รถของบริษัทได้รับความเสียหาย กันชนหน้าเสียอย่างมาก ไฟหน้าข้างแตก

การแก้ไขปัญหาเฉพาะหน้า
1. โทรแจ้งหัวหน้างานเพื่อรายงานรายละเอียดอุบัติเหตุ หัวหน้างานแจ้งให้รีบบริษัทประกันมาดูรถ
2. .....
3. .....

ส่วนสำหรับฝ่ายผู้รับผิดชอบ (ผู้รับไม่ต้องกรอก)

สรุปอุบัติเหตุ
การป้องกัน ☑ สามารถทำได้ ☐ ไม่สามารถทำได้

แนวทางการแก้ไข / ป้องกัน
1. เมื่อจากพนักงานขับรถบ่อยรถไปรอคในพื้นที่ที่ไม่ได้จัดไว้สำหรับจอดรถ ที่เกิดเหตุเป็นที่เนื่อง ทำให้รถไหล ดังนั้น เมื่อเข้าจอดรถทุกครั้งให้ดึงเบรคมือและใส่เกียร์ด้วย
2. ให้ supervisor ผู้มีหน้าที่อบรมในการ morning talk พูดเข้ารับจันทร์ เตือนพนักงานขับรถให้ระมัดระวังสำหรับเหตุดังกล่าว
3. .....
4. .....

ลงชื่อ.....ผู้ขับ
(.....นายธีระเดช เกิดมาดี.....)
...18.../..12.../...53.....

ลงชื่อ.....หัวหน้างาน
(..นายพากเพียร รักการงาน.)
...20.../...12.../...53..

ลงชื่อ.....ผู้จัดการฝ่าย
(...นางสาวรักษ์ดี มีสกุล....)
..21.../...12.../...53.....

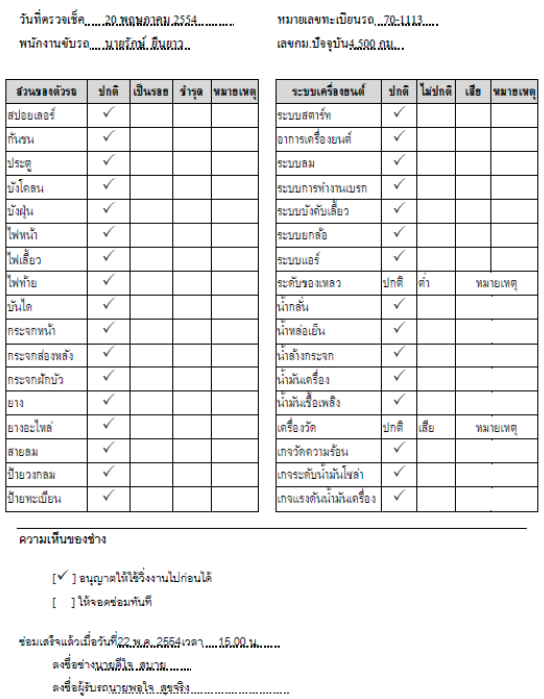
3.6 Driver Recruitment

❖ Recruitment procedures for drivers

- Criminal record check
- Driving test

3.7 Vehicle Readiness

Training on daily vehicle checks and basic truck maintenance for drivers



วันที่ตรวจเช็ค.....20 พฤษภาคม 2554.....
หมายเลขทะเบียนรถ...70-1113.....
พนักงานขับรถ.....นายรักดี ดีพนาวา..
เลขกม.ปัจจุบัน4,500 กม...

ส่วนของตัวรถ	ปกติ	เป็นรอย	ชำรุด	หมายเหตุ
สปอยเลอร์	✓			
กันชน	✓			
ประตู	✓			
บังโคลน	✓			
บังฝุ่น	✓			
ไฟหน้า	✓			
ไฟเลี้ยว	✓			
ไฟท้าย	✓			
บันได	✓			
กระจกหน้า	✓			
กระจกส่องหลัง	✓			
กระจกฝักบัว	✓			
ยาง	✓			
ยางอะไหล่	✓			
สายลม	✓			
ป้ายวงกลม	✓			
ป้ายทะเบียน	✓			

ระบบเครื่องยนต์	ปกติ	ไม่ปกติ	เสีย	หมายเหตุ
ระบบสตาร์ท	✓			
อาการเครื่องยนต์	✓			
ระบบลม	✓			
ระบบการทำงานเบรก	✓			
ระบบบังคับเลี้ยว	✓			
ระบบยกล้อ	✓			
ระบบแอร์	✓			
ระดับของเหลว	ปกติ	ต่ำ		หมายเหตุ
น้ำกลั่น	✓			
น้ำหล่อเย็น	✓			
น้ำล้างกระจก	✓			
น้ำมันเครื่อง	✓			
น้ำมันเชื้อเพลิง	✓			
เครื่องวัด	ปกติ	เสีย		หมายเหตุ
เกจวัดความร้อน	✓			
เกจระดับน้ำมันไฮดรา	✓			
เกจแรงดันน้ำมันเครื่อง	✓			

ความเห็นของช่าง

[✓] อนุญาตให้ใช้รถงานไปก่อนได้
[ ] ให้จอดซ่อมทันที

ซ่อมเสร็จแล้วเมื่อวันที่22 พ.ค..2554 เวลา....15.00 น.....
ลงชื่อช่างหมดใจ..สมาส.....
ลงชื่อผู้รับรถนายพอใจ..สุขสิริง.....

3.8 Defensive & Eco-Driving

❖ Provide training on safe and fuel-efficient driving

3.9 Annual Medical Check

Have a regular medical check focusing on diseases that reduce driving ability. The results shall be recorded and kept it appropriately.




3.10 Vehicle Logbook

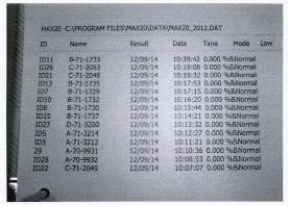
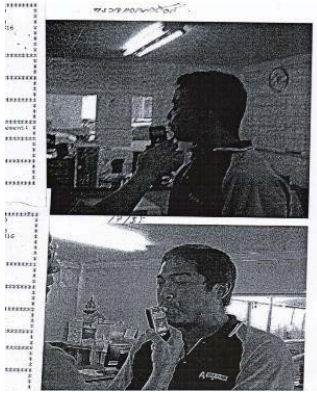
❖Record of vehicle & drivers on trip details: destination, cargo, travel time, fuel, en route incident, etc.

สมุดประจำรถ

(1) ชื่อผู้ได้รับใบอนุญาตประกอบการขนส่ง..... (2) ประเภทการขนส่ง.....
(3) ใบอนุญาตประกอบการขนส่ง..... (4) สำนักงานเลขที่.....
(5) หมายเลขเส้นทาง (ถ้ามี)..... (6) หมายเลขทะเบียนรถ..... (7) หมายเลขข้างรถ (ถ้ามี).....

(8) ชื่อและสกุลของผู้ขับรถ	(9) เลขที่ใบอนุญาตขับรถ	(10) วัน เดือน ปี	เวลาที่ทำการขนส่ง		สถานที่ปฏิบัติงาน		หมายเลขมาตรวัดระยะทาง		(17) ระยะทางรวม (กม.)	(18) ชั่วโมงการทำงานรวม (ชม./นาที)
			(11) เวลาออก	(12) เวลากลับ	(13) จาก	(14) ถึง	(15) ออก	(16) ถึง		

3.11 Alcohol Check

❖Regular check of alcohol content

3.12 Drug Test


❖Regular test of drug usage of drivers

4.2 Vehicle Maintenance Record

Maintain vehicle operation records in the driver or vehicle log book.

ทะเบียนรถ 70-1114
รุ่น VOLVO
ซื้อเมื่อวันที่ 1 มี.ค. 2553
รายละเอียดที่สำคัญ
.....รถบรรทุก 10 ล้อ แบบมีฝาปิดด้านหลัง.....
.....
.....
.....

วัน/เดือน/ปี	รายการซ่อมบำรุง	ผู้บันทึก	หมายเหตุ
20 ก.พ.2554	เปลี่ยนแบตเตอรี่	นายอดทน จริงใจ	
20 มี.ค.2554	เปลี่ยนยาง	นายอดทน จริงใจ	
20 พ.ค.2554	เปลี่ยนแบตเตอรี่	นายอดทน จริงใจ	

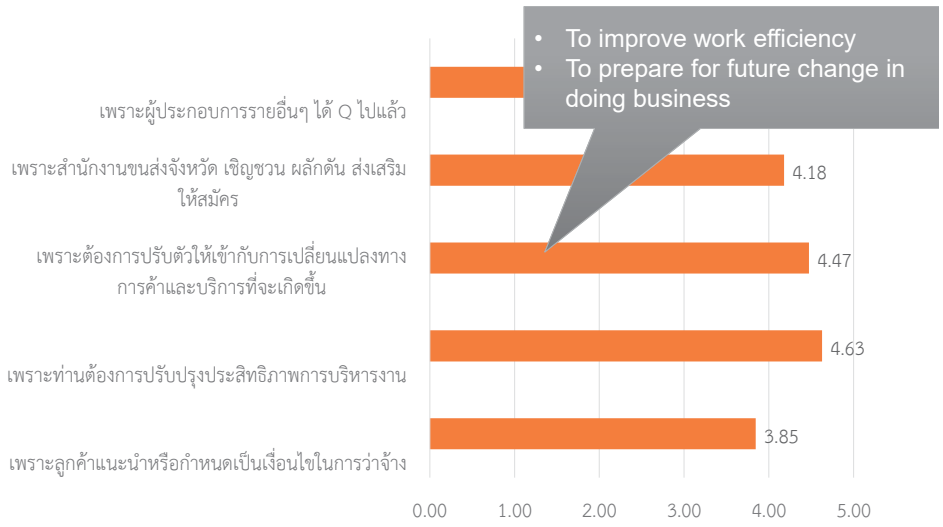



Audit

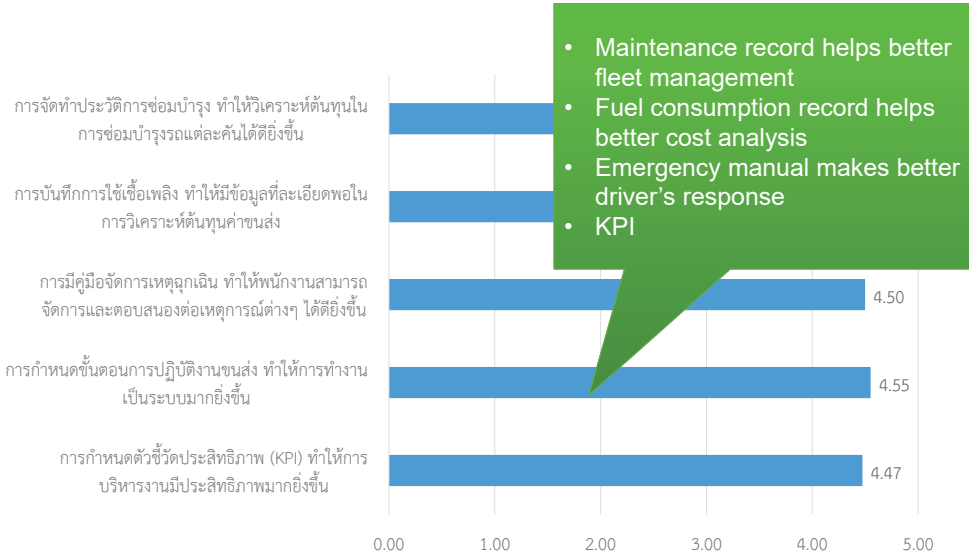




Reason of Certifications

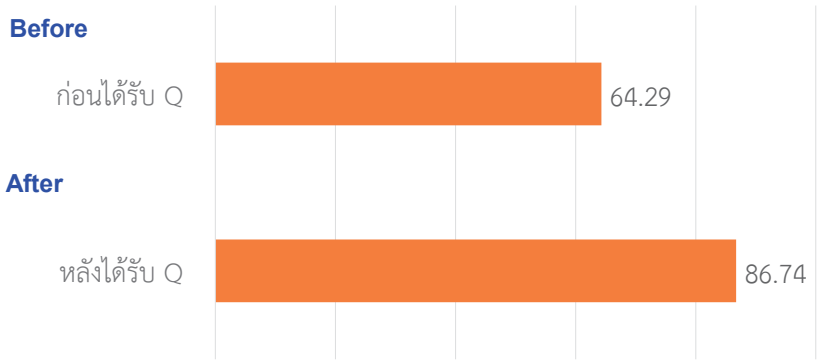


Benefit of Complying with the Requirement



What has changed after having been certified?

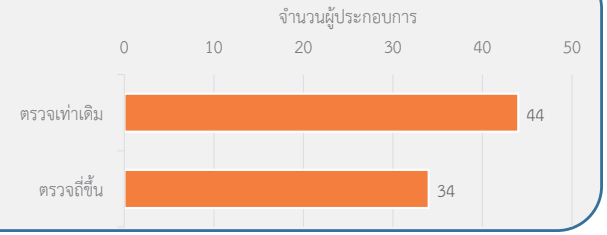
>> Annual driver health check ...



Alcohol & Drug Test

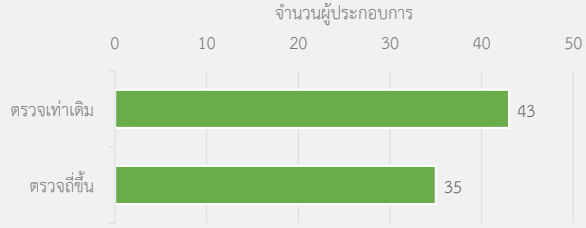
Alcohol check

More frequent

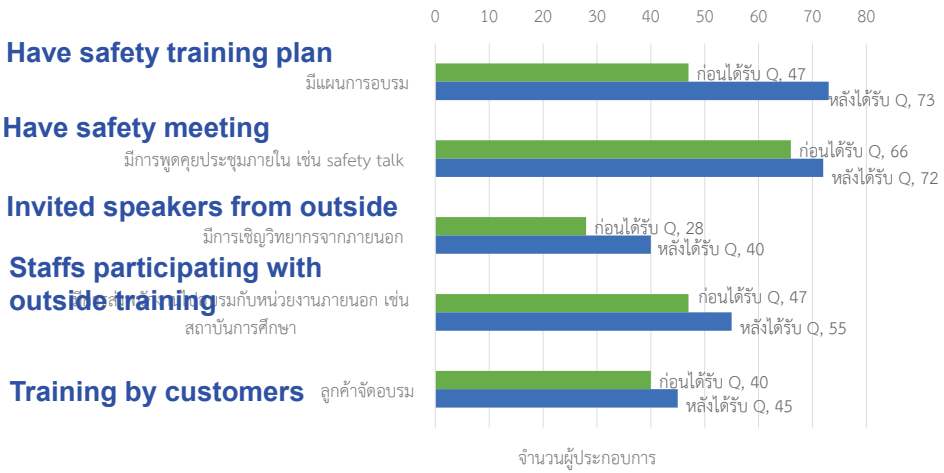


Drug check

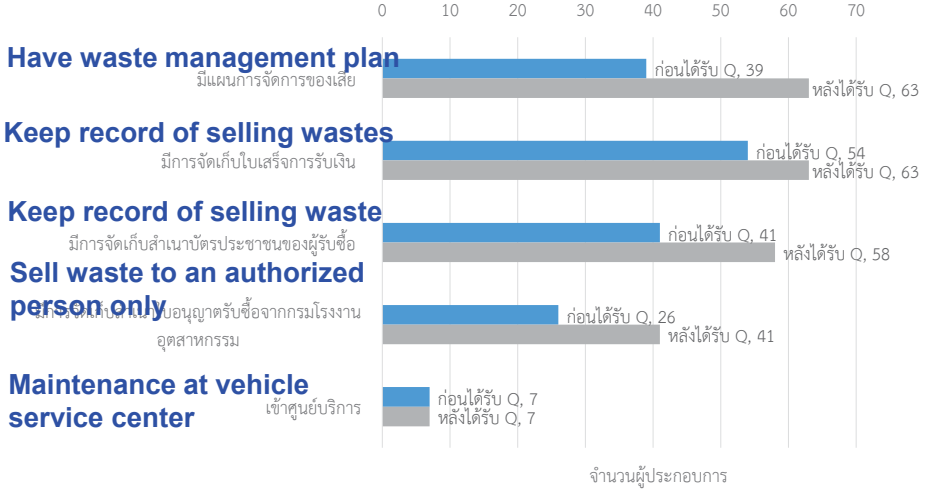
More frequent



Safety Training



Waste Management



Northeastern Transport Association

Eastern Transportation Association

Fourth Speaker of <Session 3B>

Dr. Sarawut Jansuwan
Director of Logidtics Management Program,National Institute of Development Administration(NIDA)Thailamd
E-mail:sarawutj@gmail.com

Brief Biography:

Dr. Sarawut Jansuwan is a lecturer of Logistics Management at Graduate School of Applied Statistics, National Institute of Development Administration. He earned his B.Eng in Civil Engineering from Chiang Mai University, his M.Eng in Civil Engineering from Chulalongkorn University, and his Ph.D. in Transportation Engineering from Utah State University. His research interests are freight transportation, logistics system, vulnerability and redundancy analysis of transportation network. He was previously a researcher, PI, and Co-PI of various transportation projects funded by government agencies including UDOT, CALTRAN, Mountain-Plains Consortium (MPC) in the US., Department of Highway (DOH), and Thailand Research Fund(TRF) in Thailand. He is also the author of: transportation research record, Journal of Urban Planning and Development (ASCE), and Transportmetrica A.

Dr. John McWhorter is Associate Professor of English and Comparative Literature at Columbia University. He previously was Associate Professor of Linguistics at the University of California, Berkeley. He earned his B.A. from Rutgers University, his M.A. from New York University, and his Ph.D. in Linguistics from Stanford University. Professor McWhorter specializes in language change and language contact. He is the author of The Power of Babel: A Natural History of Language; The Word on the Street, a book on dialects and Black English; and Doing Our Own Thing: The Degradation of Language and Music in America and Why We Should, Like, Care. A Contributing Editor at The New Republic, he has also been published in The New York Times, The Wall Street Journal, The Washington Post, The Chronicle of Higher Education, Time, and The New Yorker. Frequently sought after by the media, Professor McWhorter has appeared on Dateline NBC, Politically Incorrect, Talk of the Nation, Today, Good Morning America, The Jim Lehrer NewsHour, Up with Chris Hayes, and Fresh Air.

A modelling framework for building the redundant logistics networks
By Dr. Sarawut Jansuwan

Summary:

Freight transportation network is an essential backbone for supporting the industrial activities and economic developments of the nation and global trade. In this study, we develop a quantitative approach for assessing the redundancy of freight transportation networks, one of the four "Rs" (Robustness, Redundancy, Resourcefulness, and Rapidity) for calculating the resiliency triangle. Redundancy is characterized by two main dimensions: route diversity and network spare capacity. The route diversity dimension is to evaluate the existence of multiple efficient routes available for freight users or the degree of connections between a specific origin-destination (O-D) pair. The network spare capacity dimension is used to quantify the network-wide spare capacity of multimodal freight transportation networks with an explicit consideration of congestion effect. These two dimensions can complement each other by providing a two-dimensional characterization of freight transportation network redundancy. For illustration purpose, a hypothetical network is employed first to demonstrate the complementary effects of the two main dimensions. Two case studies of the Utah statewide and multimodal coal transportation networks are provided to demonstrate the features of the two-dimensional approach as well as the applicability of the evaluation methodology.

A modelling framework for building the redundant logistics networks

Dr. Sarawut Jansuwan
Graduate School of Applied Statistics
National Institute of Development Administration (NIDA), Thailand

9th ATRANS Symposium on
"Transportation for a Better Life: Safe and Smart
August 2016

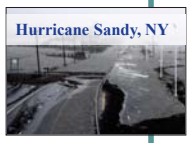
NIDA WISDOM for Change

Disasters to Transportation Networks

Disasters (Natural or Manmade)

- **Natural Disasters:** Earthquake, Tsunami Avalanche, Flood, Wildfire, Volcano
- **Terrorist/ Man Made:** 9/11 Attack, Riot

Disruption to Transportation Network: Congestion, Economic Impact



(Thailand Mega Flood in 2011)
Estimates of economic losses =
1,425 billion THB (~$ 45.7 billion)
(World Bank, 2012)

NIDA WISDOM for Change

Redundancy in Engineering Disciplines

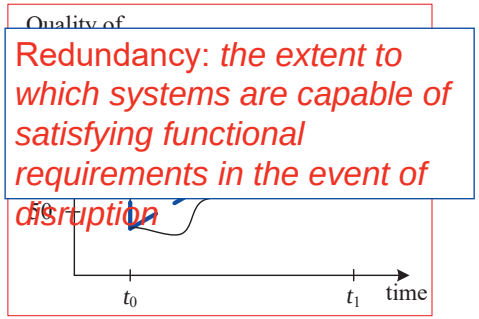
- **Water Distribution System**: the **existence of alternative pathways** from the source to demand nodes or **excess capacity** in normal operating conditions when some components of the system become unavailable (*Kalungi and Tanyimboh, 2003*)
- **Structural Engineering**: the **ability** of a structural system **to redistribute stresses** to its members/connections and thereby **ensuring the safety of structural systems**. (*Fang and Fan, 2011*)
- **Power System/Supply Engineering**: **Excess capacity or backup system to reduce impact of component failures**
  (e.g., Power failure scenario in the ER!!)

NIDA WISDOM for Change

Redundancy in Earthquake Engineering

The Multidisciplinary Center for Earthquake Engineering (MCEER) provided the **four "Rs" concept** to characterize resiliency:

- Robustness
- Rapidity
- Resourcefulness
- Redundancy



NIDA WISDOM for Change

Redundancy in Transportation Network

- Redundancy is an important indicator in the development of an emergency response and recovery plan (FHWA, 2006)
- Redundancy is important concept to reduce freight transportation network vulnerability as well as enhance resiliency during disastrous events
- There is very little research on redundancy in transportation (no formal definition, and lack of quantitative measure)

A Two-Dimensional Approach for Assessing Redundancy

Develop *two quantitative measures* for assessing freight transportation network redundancy :

i) Route Diversity, and

ii) Network Spare Capacity

- Have ***different characterizations*** on network redundancy *from different perspectives*
- ***Complement each other*** by providing meaningful information to both freight carriers and planners

Efficient Routes

Efficient routes

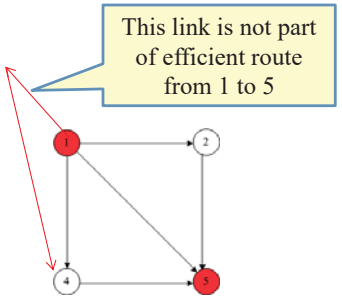
The definition of efficient routes is a route that includes only links that make the users *further away from the origin and/or closer to the destination*.

This concept adopts Dial's method (Dial, 1971) to identify the efficient routes according to the logit model. Mathematically, a route $r \rightarrow n1 \rightarrow n2 \rightarrow \ldots \rightarrow nk$ is an efficient route, if and only if $i=1, 2, \ldots, K-1$,

$$l_r(n_{i+1}) > l_r(n_i),\ i=1, 2, \ldots, K-1,$$

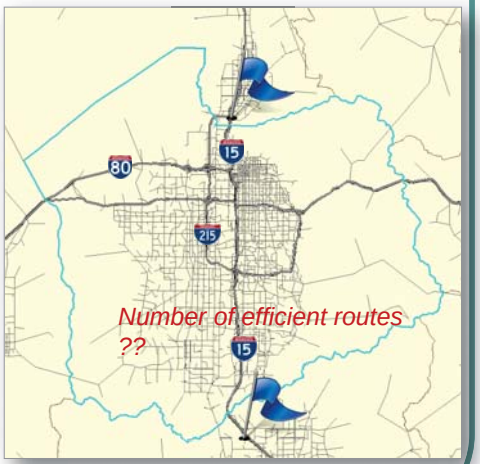
where is the shortest route cost from origin r to node ni , and K is the number of the intermediate nodes.

Route Diversity: Counting Efficient Routes



Simple network

How to Count Efficient Route?
Not an Easy Task

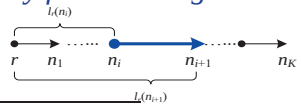


Real-world transportation Network (Salt Lake City)

Route Diversity: Counting Efficient Routes

- Efficient routes (Dial, 1979): *a route that consists of links that take network users further away from the origin and closer to the destination.*

$$l_r(n_{i+1}) > l_r(n_i),\ i = 1, 2, \cdots, K-1$$



Constructing the sub-network $G_r=(N_r, A_r)$

For each origin r,
  Perform a shortest route algorithm to find the minimum cost from origin r to all nodes, $l_r(n)$, $n \neq r$
  For all nodes $n \neq r$
    If $l_r(n)=\infty$, then $N_r=N_r\backslash\{n\}$
  For all links a
    If $l_r(tail_a) \geq l_r(head_a)$ (where $tail_a$ and $head_a$ are the tail and head of link a), then $A_r=A_r\backslash\{a\}$

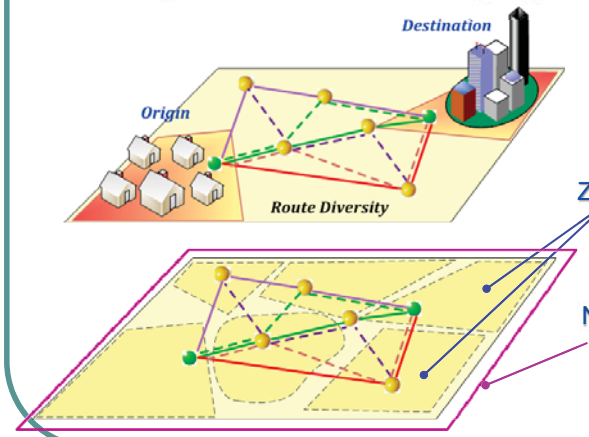
Counting the number of efficient routes from origin r to all nodes

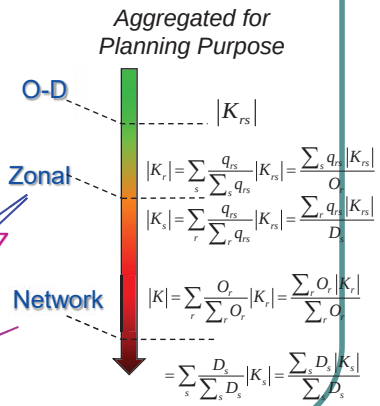
Step 1 Initialization:
  $\mathbf{u}=\mathbf{0}(|N_r|, |N_r|)$
  For all links $a \in A_r$
    $u(tail_a, head_a)=1$
Step 2 Matrix Operations:
  For all nodes $j \in N_r$
    For all nodes $m \in N_r \backslash j$
      For all nodes $n \in N_r \backslash j \backslash m$
        $u(m, n) := u(m, n) + u(m, j) \times u(j, n)$

Algorithm for Counting Efficient Routes (Meng *et al*., 2005)

Dimension I: Route Diversity

- **Route diversity dimension** characterizes the existence of *multiple routes* available for *freight carriers.*

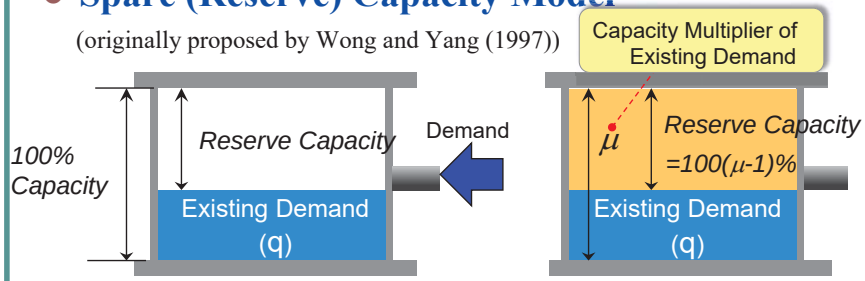




Dimension II: Network Spare Capacity

- **Spare (Reserve) Capacity Model**

(originally proposed by Wong and Yang (1997))



Finding the network reserve capacity multiplier μ using bi-level programming:

Upper level : Maximize Multiplier μ

Lower level: Traffic Assignment Problem

Network Spare Capacity

Network Spare Capacity

$$\max\ \mu,$$

s.t.

$$v_a(\mu\mathbf{q}) \leq \theta_a C_a,\ \forall a \in A,$$

Maximize Capacity Multiplier

Link Capacity Constraints

where $v_a(\mu\mathbf{q})$ is obtained by solving the lower-level UE problem under a given μ:

$$\min_{\mathbf{v}(\mu\mathbf{q})} \sum_{a \in A} \int_0^{v_a} t_a(w)\,dw,$$

s.t.

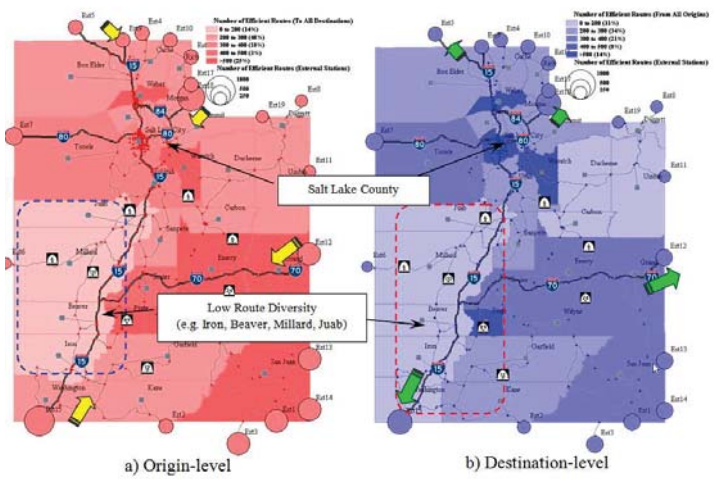
$$\sum_{k \in K_{rs}} f_k^{rs} = \mu \cdot q_{rs},\ \forall r \in R, s \in S,$$

$$v_a = \sum_{r \in R} \sum_{s \in S} \sum_{k \in K_{rs}} f_k^{rs} \delta_{ak}^{rs},\ \forall a \in A,$$

$$f_k^{rs} \geq 0,\ \forall k \in K_{rs}, r \in R, s \in S,$$

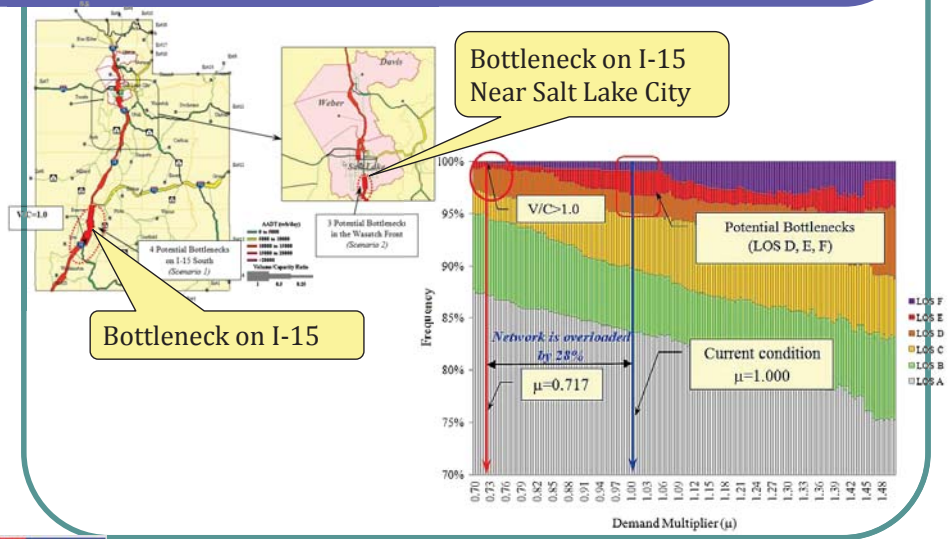
User Equilibrium (UE)

Statewide Freight Transportation Network: Route Diversity Results



NIDA WISDOM for Change

Statewide Freight Transportation Network: Spare Capacity Results

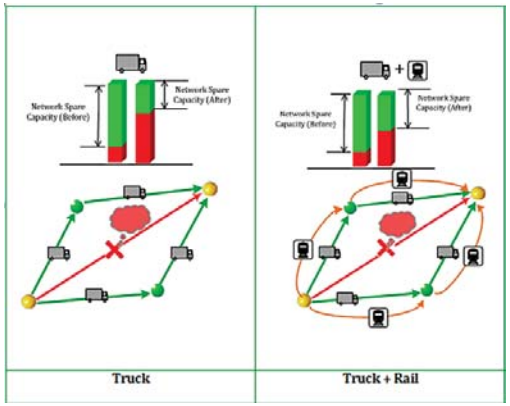


NIDA WISDOM for Change

Redundancy: Bi-modal Network Spare Capacity

Reserve (Spare) Capacity for Bi-modal Transportation Networks

- Consider capacity of bi-modal freight transportation networks (i.e., truck-rail
- Consider capacity of freight operations at origin and destination nodes



NIDA WISDOM for Change

Network Spare Capacity (Bi-modal network)

- **Network Spare Capacity (Truck-Rail Network: Bi-modal networks)**

Upper-Level Problem: ***Maximize network capacity multiplier***

Maximize Network Capacity Multiplier

s.t.

- Link capacity (truck)
- Link capacity (rail)
- Capacity at origin (truck + rail)
- Capacity at destination (truck + rail)
- Non-negativity constraints

Lower-Level Problem: Bi-modal User Equilibrium Traffic Assignment

User Equilibrium of Bi-modal networks

s.t.

- Scaled-up total O-D demand
- Demand conservation constraints
- Definitional constraints of truck path flow
- Definitional constraints of truck link flows
- Non-negativity constraints of truck path flows
- Non-negativity constraints of total O-D demand

NIDA WISDOM for Change

Network Spare Capacity: Ultimate Capacity

- **Network Spare Capacity (Truck-Rail Network: Bi-modal networks)**

Upper-Level Problem: ***Maximize O-D throughputs***

Maximize O-D throughputs

Link capacity (truck)

Link capacity (rail)

Capacity at origin (truck + rail)

Capacity at destination (truck + rail)

Non-negativity constraints

Lower-Level Problem: Bi-modal User Equilibrium Traffic Assignment

User Equilibrium for Bi-modal networks

Demand conservation constraints

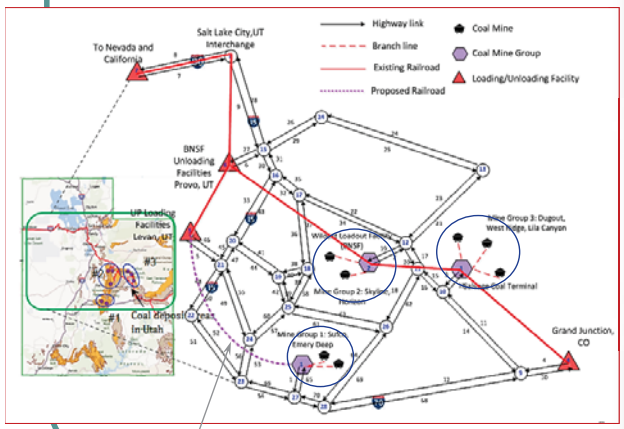
Definitional constraints of truck path flow

Definitional constraints of truck link flows

Non-negativity constraints of truck path flows

Non-negativity constraints of total O-D demand

Bi-modal Transportation Networks: Coal Transportation Networks



Proposed New Railroad Project by Six County Association of Government (SCAOG)

Coal Transportation Demand/Capacity

Coal Demand (1,000 tons per day)

derived from FAF and Utah Department of Natural Resource databases

Coal O-D Demand (KTon/day)	Grand Junction (Node 4)	Levan (Node 5)	Provo (Node 6)	Nevada/California (Node 7)
Mine Group 1 (Node 1)	0.00	25.87	0.00	0.00
Mine Group 2 (Node 2)	0.00	0.00	19.13	7.47
Mine Group 3 (Node 3)	3.54	0.00	17.66	6.90

Note: 300 working days/year

Railway link Capacity (1,000 tons per day)

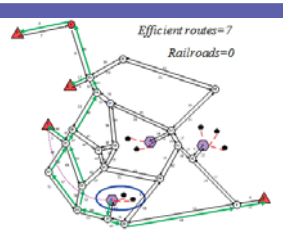
calculated from Multimodal Corridor and Capacity Analysis (by Transportation Research Board, 1998)

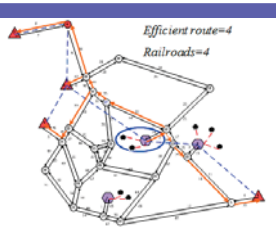
Railroad Link Capacity (KTon/day)	Grand Junction (Node 4)	Levan (Node 5)	Provo (Node 6)	Nevada/California (Node 7)
Mine Group 1 (Node 1)	0.00	**(185.00)***	0.00	0.00
Mine Group 2 (Node 2)	54.11	0.00	142.56	45.58
Mine Group 3 (Node 3)	56.38	0.00	136.41	45.58

Capacity of the proposed

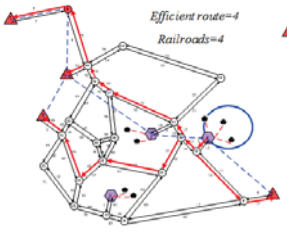
*Note: *capacity of the proposed railroad*

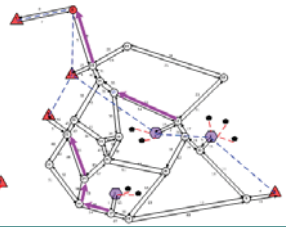
Efficient Routes of Bi-modal Networks





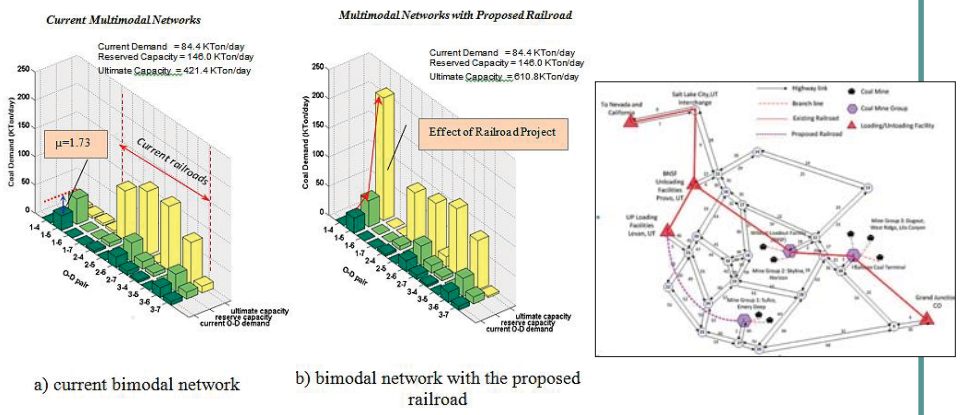
a) Efficient routes from mine group 1 b) Efficient routes from mine group 2





c) Efficient routes from mine group 3 d) Potential bottlenecks (top 5 links)

Bi-modal Network Capacity



a) current bimodal network

b) bimodal network with the proposed railroad

Capacity increases due to proposed railroad projects (Mine Group1-> Levan)

Conclusion

Major Contributions :

- ✓ Develop a quantitative approach for assessing redundancy of transportation networks:
  - ✓ Route Diversity
  - ✓ Reserved Capacity
- ✓ The measure is practical to apply for the real transportation network
- ✓ Develop an alternative mode choice as redundancy

Acknowledgement & Development Team

Thank you

Prof. Anthony Chen

Dr. Sarawut Jansuwan

Assoc. Prof. Dr. Xiangdong Xu

Research Team

< 2nd AFTERNOON SESSION >

Session 3C: Parallel Session of Main Symposium

Session 3C: *Transportation, Energy and Environment* **Moderated by Assoc.Prof.Dr. Chumnong Sorapipatana, ATRANS Board Committee**
"GIZ project on fuel economy initiative in ASEAN" **By Mr. Tali Trigg, Project Director at Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)**
"MRV of GHG emission reductions of EV projects" **By Dr. Yasuki Shirakawa, President of Climate Consulting, LLC, Japan**
"Newly developing Multi-Purpose Mobility (mPm) for Everyone" **By Dr. Yoshinori Kondo,** **Manager and Mr. Junichi Yasu, Visiting ResearcherNational Institute for Environmental Studies, (NIES), Japan**
"EV current status in Thailand" **By Asst.Prof.Dr. Yossapong Laoonual President of Electric Vehicle Association of Thailand (EVAT)**

Moderator of <Session 3C>

Assoc. Prof. Dr. Chumnong Sorapipatana
Retired
E-mail: chumnong.jgsee@gmail.com

Brief Biography:

Current Position:
(a) Member of the Board Committee, Asian Transportation Research Society.
(b) Member of Advisory Board, Future Urban Development Plan,Mega City and Town Research Center, Rangsit University.
(c) Member of the Advisory Board, National Strategy and Policy Research Institute, Rangsit University.
(d) Guest Lecturer in Energy and Environmental Policy at Joint Graduate School of Energy and Environment, King Mongkut's University of Technology Thonburi.

Former Position:
The Chairman of Energy Division Joint Graduate School of Energy and Environment, King Mongkut's University of Technology Thonburi.

Working Experiences:
Served as a top executive in several companies in industry for more than 20 years, prior joined the Graduate School of Energy and Environment in 2001, and retired on 31st December,2014. His past research specialization was:
(a) Sustainable transport policy
(b) Energy and environmental policy

Research publications:
More than 40 research papers were published in local and international journals and conferences, engaged in several national research projects of Thailand in the field of energy and environment.

First Speaker of <Session 3C>

Mr. Tali Trigg
Project Director at Deutsche
Gesellschaft fur Internationale Zusammenarbeit(GIZ)
E-mail: tali.trigg@giz.de

Brief Biography:

Mr. Tali Trigg joined GIZ in 2015 and is the Project Director of its *Transport and Climate Change* project, a partnership with ASEAN, which is based in Bangkok, Thailand. His work focuses on fuel economy, green freight, Nationally Appropriate Mitigation Actions (NAMAs) and Measurement, Reporting and Verification (MRV). This entails working with ASEAN countries to develop national action plans on sustainable transport, as well as engaging with the ASEAN Secretariat and its Working Group to develop and implement an over-arching transport plan for the region.

Previously, Mr. Trigg worked at the International Energy Agency (IEA) as an Energy Analyst between 2010-2015. At the IEA, he conducted energy modelling, technology policy analysis (lead author of *Energy Technology Perspectives 2014*), and spearheaded its efforts on the intergovernmental Electric Vehicles Initiative (EVI), working on data collection and research collaboration, culminating in the EV City Casebook (launched in May 2012) and more recently the Global EV Outlook (launched in April 2013). His focus was on transportation issues and technologies, with an emphasis on smart growth policies, bus rapid transit (BRT), and electric vehicles (EVs). He conducted energy modelling to assist with IEA's efforts to better understand the implications of an improved vehicle technology adoption scenario, as well as a modal shift scenario, one wherein vehicle ownership and driving patterns "shift" downward due to 1) better public transit options as well as 2) reduced demand. He was also the Desk Officer for the Implementing Agreement for Co-operation on Hybrid and Electric Vehicle Technologies and Programmes (HEV IA) (www.ieahev.org). On BRT, he has worked closely with EMBARQ (www.embarq.org) to successfully launch the first ever globally encompassing BRT Database (www.brtdata.org).

Prior to working in the transportation field, Mr. Trigg was a journalist working on business and energy topics. He eventually moved to the cleantech sector working for the Institute for Transportation and Development Policy (ITDP) (www.itdp.org) as well as the Rocky Mountain Institute (RMI (www.rmi.org). After that he worked as a research associate for the Center on Globalization, Governance & Competiveness (CGGC) (www.cggc.org) conducting value chain analyses focusing on the cleantech sector, including a study on lithium-ion batteries for electric vehicles. He received a Bachelor's degree in Political Science from Georgetown University and a Masters of Environmental Management at Duke University.

Transport and Climate Change GIZ project on fuel economy initiative in ASEAN

By Mr. Tali Trigg

Summary:

In recent years, the transport sector's energy demand and consumption in ASEAN have been on the rise, largely due to ASEAN countries' economic growth. This trend is reflected in an increasing motorisation rate, and growing freight transport activity. In 2012, the transport sector's share of energy consumption made up 27% of ASEAN's total energy consumption (APEC, 2013).

While mobility growth can lead to social and economic development, negative externalities such as traffic congestion, air pollution, road accidents, and greenhouse gas emissions can also ensue, if not managed sustainably – all of which can be seen in varying degrees across ASEAN Member States. With minimal shares of electricity and renewable energy sources in the generation of fuel, ASEAN's transport sector is dominated by oil-derived fuel. This dependence on oil produces substantial amounts of total transport CO2 emissions in Indonesia, Thailand, Malaysia, Vietnam, and the Philippines - 115, 58, 43, 33, and 23 million metric tons, respectively (World Bank, 2011).

On a global level, ASEAN currently has the third largest population and vehicle fleet, and shows the fifth highest level of annual car, truck and bus sales, as well as the fifth highest expected GDP growth by 2018 (Economist Intelligence Unit, 2014). In terms of the transport sector specifically, the policy aim should be to decouple the almost-linear positive correlation between GDP and CO2 emissions, i.e. increase GDP per capita without increasing -- and rather reducing -- CO2 emissions.

Road transport, as opposed to sea, rail and air transport, makes up about 80% of the world's transport sector's total energy consumption. Although trucks make up as little as 5% of national vehicle numbers, they generate about 60% of transport emissions (Clean Air Asia, 2014). In a business-as-usual (BAU) scenario, the transport sector's contributions to global CO2 emissions are further expected to rise by 5% annually. According to the IEA (2012), passenger car travel is projected to quadruple until 2050 in the ASEAN region, and sales of passenger cars are projected to increase by 500% in a BAU scenario between 2010 and 2050. In light of these alarming forecasts, road transport CO2 emission reductions through *fuel efficiency policies and measures* (in short: fuel economy) can be considered a low-hanging fruit that should be pursued sooner rather than later.

Fuel efficiency policies and measures include fuel economy standards, tyre standards, labelling, carbon taxation, and eco-driving, among other concepts. Further, fleet management is important to consider, as fleets are quicker to recoup higher upfront costs from lower fuel outlays.

The GIZ regional project, *Energy Efficiency and Climate Change Mitigation in the Land Transport Sector in the ASEAN Region* (in short: Transport and Climate Change; TCC; 2013-2018), is commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ) and implemented in cooperation with the ASEAN Secretariat. TCC's partner countries include Vietnam, Thailand, the Philippines, Malaysia, and Indonesia. While Vietnam and Thailand have fuel economy policies in place, the remaining countries are still in the process of developing them. Based on the strategies set forth by the ASEAN Transport Strategy (KLTSP; 2016-2025), TCC engages partner countries to implement sustainable transport measures and improve data and MRV systems including fuel economy by applying the Avoid-Shift-Improve/Fuel (ASI/F) approach

9th ATRANS Symposium on "Transportation for a Better Life: Safe and Smart Cities"

19 August, 2016
Bangkok, Thailand

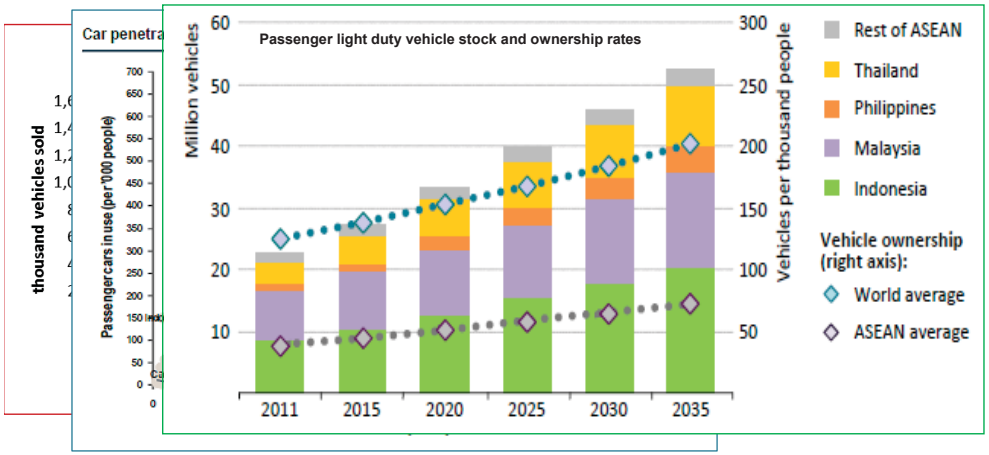
Transport and Climate Change Project: Fuel Economy

Tali Trigg, Project Director (Thailand)
GIZ

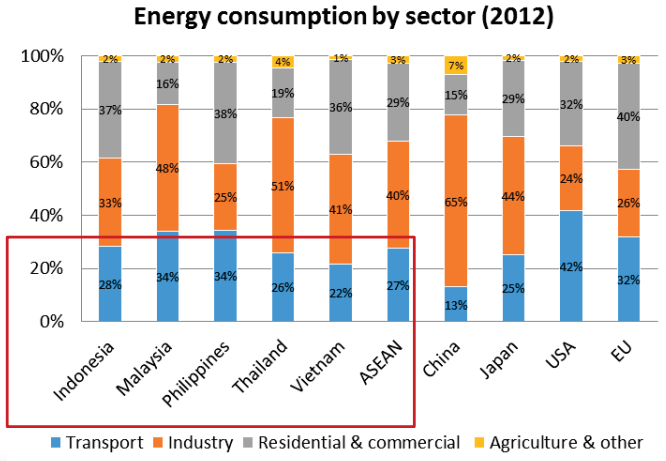
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

- Owned by the Federal Republic of Germany
- Organised as a private-sector entity
- Supports the German government in achieving its objectives in the field of international cooperation for sustainable development
- Operations in **130 countries** and employs **17,000 staff**
- Commissioned by public and private sector bodies inside and outside Germany
- GIZ is active in a variety of sectors, including e.g. education, health care, agriculture, and infrastructure (water, energy, transport)

Motorisation is increasing rapidly



Transport is at least ¼ of energy consumption in ASEAN countries and other parts of the world



- Transport is no 1 oil consumer
- Road transport accounts for 80% of consumption
- Freight transport 40% of consumption

Source: GIZ, based on APEC data

New Paradigm: Avoid – Shift - Improve:

Holistic approach to transport energy efficiency

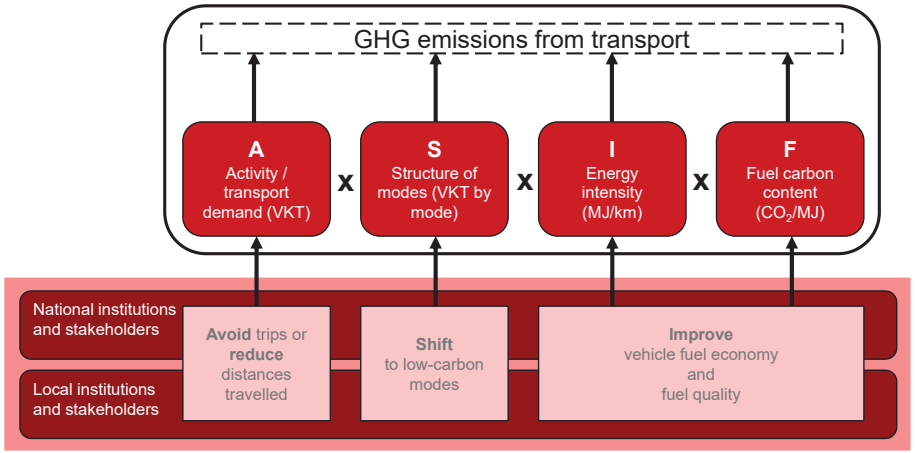
AVOID unnecessary trips

REDUCE km

SHIFT modes

IMPROVE vehicles low carbon fuels

ASI(F) approach

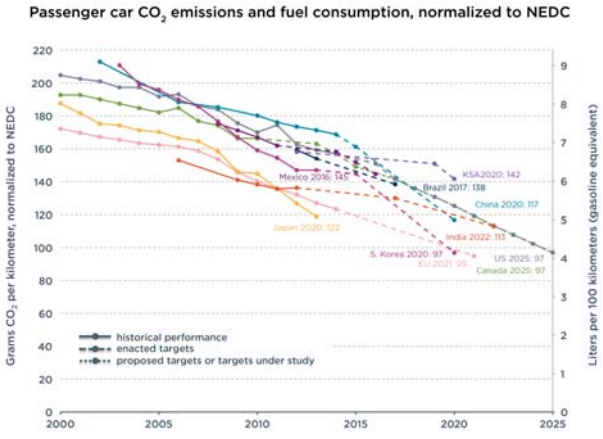


Source: Bongardt et al. (2015): Low-carbon Land Transport – Policy Handbook

Fuel economy policies & instruments

- **Regulatory – Fuel economy/CO_2 emission standards**
- **Monetary – Fiscal instruments and road pricing**
- **Consumer information**

Fuel economy/CO_2 emission standards



Source: ICCT 2016

Regulation of **corporate average** fuel economy/CO_2 emission **of new cars** - based on sales weighted average (EU) or harmonic mean (US)

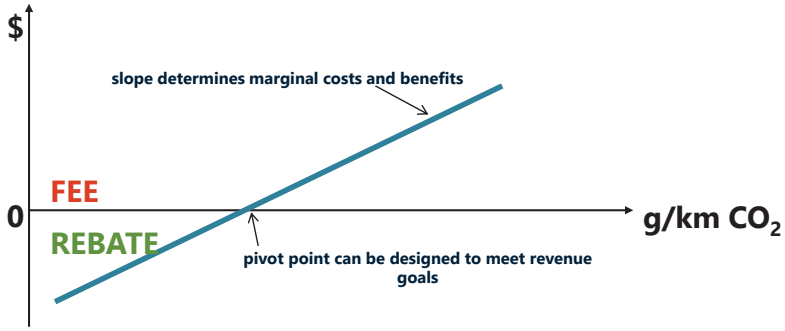
Inclusion of super-credits for alternative fuel vehicles – e.g. multiplier on BEVs sales

Standards are an efficient measure for countries with own car manufacturing and/or a big LDV market

Monetary measures

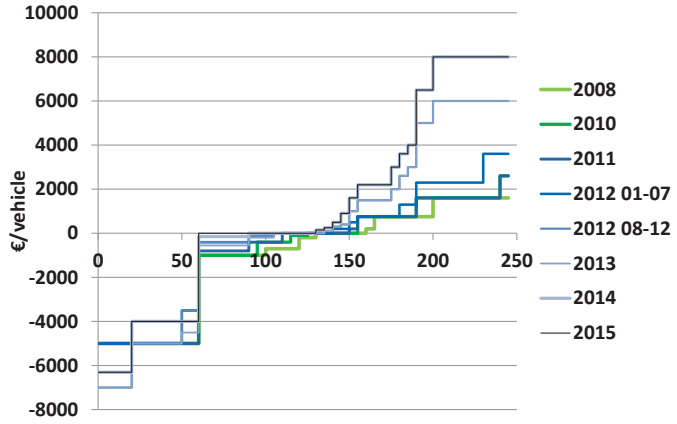
Fiscal policy type	Characteristics
Vehicle purchase tax/feebates	Paid at time of purchase; can be differentiated by fuel economy or CO_2
Vehicle circulation tax	Typically paid at annual registration; can be CO_2-adjusted
Fuel tax	Set by fuel type; paid upon refueling
Other monetary measures	
Road pricing	Paid by km of driving or when passing a cordon line

Feebate = Fee + Rebate



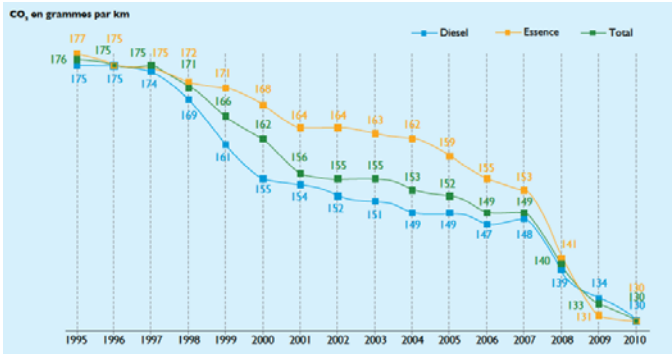
- **Market-based policy that shifts consumer purchases (and potentially manufacturer production) to lower emission vehicles by placing a fee on higher-emitting vehicles and providing a rebate to lower-emitting vehicles**
- **Based on fuel economy or CO_2 differential between vehicles**
- **Could also take into account vehicle attributes like size or weight**

Case study: France



Fees have risen and the rebates declined over time in order to achieve cost neutrality

French feebate system led to significant drop in CO_2 emissions

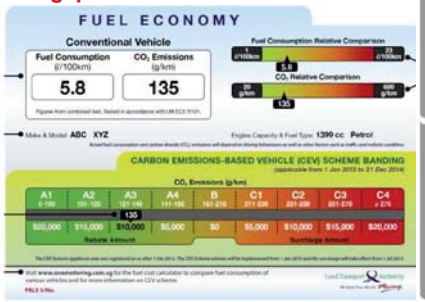


- 2001–2007 avg. reduction new vehicle CO_2 = 1 g/km per year
- 2008: emissions drop 9 g/km and 2009 by 7 g/km, Ministry of Transport attributes to introduction of bonus/malus system
- Cost 2008: 225 Million EUR – not cost neutral! → Changed 2010/2011

Source: Les véhicules particuliers en France (Ademe), March 2011

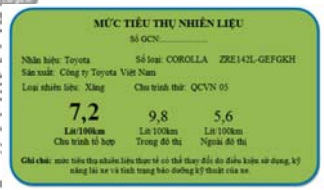
Labelling

Singapore



Thailand

Vietnam



- **Data is a prerequisite for emission/fuel economy based policy measures**
- **Information should be shown to consumers to guide their purchase decision**
- **FE labelling is compulsory in many countries/regions: Brazil, Canada, Chile, China, EU, Japan, Korea, New Zealand, Singapore, Thailand, United States, Vietnam**

Data – development of fuel economy baseline

- Effective fuel economy policies need to be based on good knowledge of the average fuel consumption (L/100km) of the current vehicle fleet
  - In a first step: vehicles entering the market (i.e. new sales or used imported)
  - In second step: entire rolling vehicle stock
  - **Possible barriers**
    - → *Availability*: What data is available – national car registration? What institutional framework is needed to continuously collect and develop data?
    - → *Accessibility:* Who is in charge of the data? Can the data be shared?
    - → *Vehicle market structure*: Is the share of used imported vehicles significant?
    - → *Data gaps:* How to get FE data? How to convert FE data based on different test cycles?

Energy efficiency and climate change mitigation in the land transport sector in the ASEAN region

In Short: Transport and Climate Change (TCC)

Objective: The region has strategies and action plans with which it can enhance energy efficiency in the transport sector and reduce the emission of greenhouse gases (GHG).

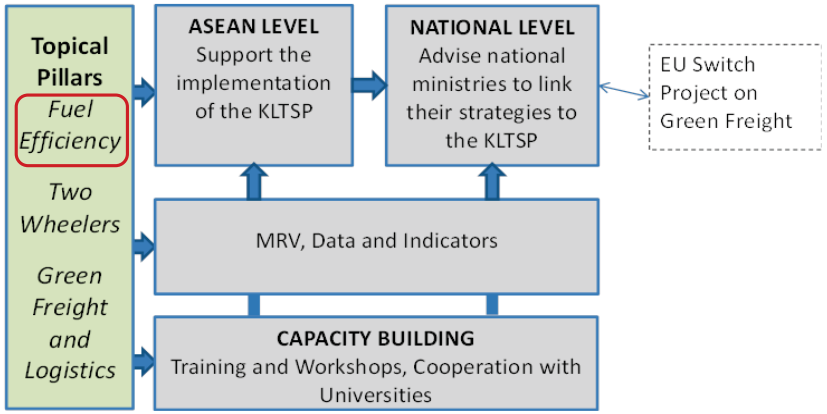
Overall term: 2013 – 2015 (phase I); 2016 – 2018 (phase II)

Budget: € 2.5 million for phase I; € 3.5 million for phase II

Commissioned by: German Federal Ministry for Economic Cooperation and Development (BMZ)

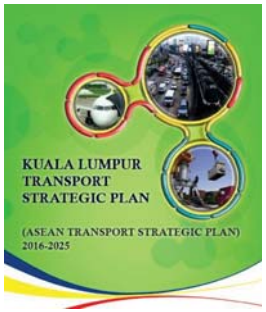
Partner countries: Indonesia, Malaysia, Thailand, the Philippines, Vietnam

Transport and Climate Change II – Workpackages and Key Topics



KLTSP

- **ASEAN's Regional Transport Strategy (2016-2025)**
- **Successor of the Brunei Action Plan**
- **Has a chapter on sustainable transport**
  - **Includes objectives and milestones on fuel economy, green freight and sustainable transport indicators**
- **Key reference for TCC Phase II activities**
- **Supports alignment of national policies with regional guidance**



Fuel Efficiency Policies & Measures

- Fuel economy standards, labelling and fiscal instruments
- A lack of clear ownership within the governments and at ASEAN level
- A topic for both energy and transport policy community as well as ministries of trade, industry and finance → promote inter-ministerial coordination.
- Increasing momentum in countries, yet fragmented approach
- TCC Activities: Regional FE expert group, regional roadmap development, national studies, training and support for policy development, training courses, regional research network

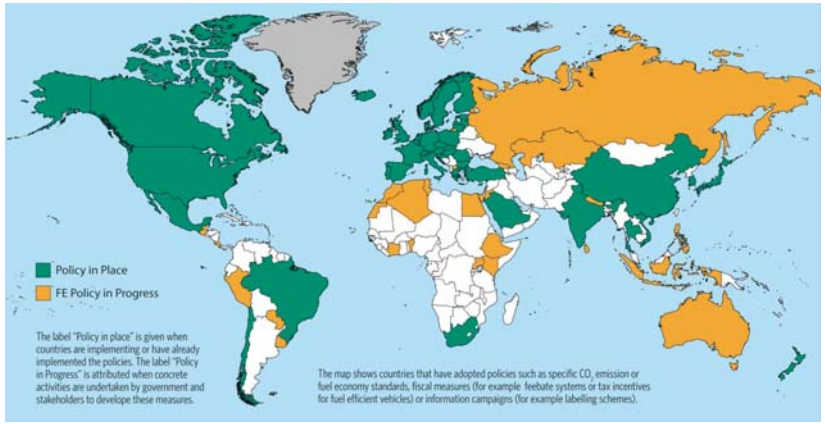
TCC Fuel Efficiency activities in Thailand

1. Study on "Fuel Efficiency Policies in the Land Transport Sector in Thailand"
   - studying current situation of FE policies/measures by stocktaking of data and existing policies/measures in Thailand
2. Workshops on fuel efficiency policy
   - create a common understanding of fuel efficiency (FE) policies among stakeholders,
   - share international experiences of implementing fuel efficiency policies,
   - set up a sector network for fuel efficiency policy in Thailand.

TCC Fuel Efficiency (FE) Activities in Vietnam

- Viet Nam stocktaking report
  - Bottom-up data review (e.g. emissions factors)
  - Existing policies on energy efficiency
- FE study
  - Data for fuel consumption (FE) of new passenger cars and motorcycles
  - Inventory of existing policies, strategies, and plans related to vehicle fuel efficiency
  - Gap analysis of the existing and planned fuel efficiency policies / Policies recommendations
- FE workshop
  - Common understanding of fuel efficiency policy among stakeholders
  - International experience sharing on FE
  - Recommendations/suggestions from the participants on how to move forward fuel efficiency in Vietnam

Fuel economy policies around the world



- More than 80% of the global PLDV market is regulated
- Vietnam, Thailand have fuel economy policies in place, Philippines, Malaysia, Indonesia are on the way to develop FE policies

Source: GFEI State of the World 2016

Effective policy package for the ASEAN region

Harmonised fuel economy standard in the ASEAN region

- Fuel economy standards especially suitable in big car markets
- Bundling forces throughout the standard setting process
- Saving resources through uniform test procedures
- Coordinated enforcement increases pressure on car manufacturers

Differentiated vehicle taxation

- Based on CO_2 emissions (gCO_2/km) or fuel consumption (L/100km)
- Feebate schemes, registration tax, circulation tax – uniform application across vehicle segments, use of continuous functions

Balanced fuel taxation

- Removal of subsidies

Thank you for your attention!

For information/ inquiries, please contact:

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Energy Efficiency and Climate Change Mitigation in the Land Transport Sector in the ASEAN Region

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In cooperation with

Second Speaker of <Session 3C>

Dr. Yasuki Shirakawa
President of Climate Consulting, LLC, Japan
E-mail: yasuki@climate-c.co.jp

Brief Biography:

Yasuki Shirakawa has around 20 years of professional experience as a consultant in the field of climate change mitigation, air pollution, environmental impact assessment. In the field of climate change, he has been working for support making climate change mitigation policies and measures, e.g. planning of national/local government policies/measures, project development for crediting mechanisms, development of GHG emission reduction estimation methodologies for mitigation projects. And also support formulating local/national climate change mitigation action plans such as in Thailand and Vietnam.

His counties of work experiences cover Thailand, Vietnam, Lao PDR, Cambodia, Myanmar, Indonesia, China, Korea, Sri Lanka, Tanzania, Mozambique, Chile, Peru, Moldova etc.

EDUCATION

2010	Doctor of Agriculture Life cycleassessment of Biofuel, The University of Tokyo
1995	Master of Science Geophysics(Carbon cycle,Climate change), Tohoku University
1993	Bachelor of Science Geophysics ,Tohoku University

EMPLOYMENT RECORD

2007-present	President, Climate Consulting, LLC.
2009 – present	Lecturer, Faculty of Environmental and Information Studies, Keio University
2008 – present	Senior Consultant, ALMEC Corporation
2010 – 2014	Project researcher, Graduate School of Agricultural and Life Sciences, The University of Tokyo
2009 – 2013	Project researcher, Asia Natural Environmental Science Center, The University of Tokyo
1995 – 2007	Chief engineer, Solution Department, Japan Weather Association

MRV of GHG emission reductions of EV projects

By Dr. Yasuki Shirakawa

Summary:

Recently, necessity to quantify the effects of GHG (Greenhouse gases) mitigation actions, such as GHG emission/emission reductions, is increasing specifically under international framework, i.e. UNFCCC (The United Nations Framework Convention on Climate Change). Not only the quantification but the concept of MRV (Measure, Reporting and Verification) is key element in assessing the effects of climate change mitigation actions. MRV has been applied for various GHG mitigation schemes/mechanisms such as national GHG inventories, Clean Development Mechanism (CDM), Nationally Appropriate Mitigation Actions (NAMA), or other policy/project based GHG mitigation actions, carbon credit/non-credit projects, carbon financing, etc. The level of simplicity/difficulty of project based MRV depends on these schemes especially rely on whether it is carbon credit scheme or not.

In the transport sector, many MRV methodologies have been proposed such as CDM methodologies for BRT, MRT, freight mode switch, replacement of existing vehicle with low emission vehicles, biofuel, eco-driving etc. And based on these methodologies, these are simplified and used for other scheme such as JCM (Joint Crediting Mechanism). JCM is a new market mechanism which has been proposed by Japanese government to facilitate global actions for GHG emission reductions or removals.

The author had proposed MRV methodology of electric vehicle (EV) for JCM, based on a feasibility study in Lao PDR. In this presentation, the outline of the MRV methodology is introduced

Scheme	Title	Objective	Ex-ante/ex-post	Level of simplicity
CDM methodology	AMS III.C. Emission reductions by electric and hybrid vehicles	Carbon credit (international)	both	+
JCM methodology	Emission reduction by electric vehicles	Carbon credit (international)	both	++
J-Credit	EN-S-012 Introduction of electric vehicles	Carbon credit (domestic)	both	++
JBIC J-MRV	Methodology for urban transport projects	Assess emission reductions of JBIC GREEN projects	both	+++
GEF methodology	Vehicle replacement	Assess emission reductions of projects in general	Mostly for ex-ante estimation	N.A.

Table Example of MRV methodologies for EV projects

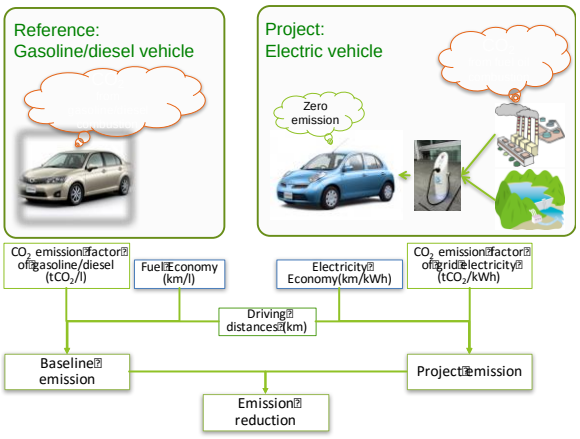


Figure Concept of the emission reduction estimation of EV project

MRV of GHG emission reductions of EV projects

Yasuki Shirakawa

Climate Consulting, LLC

August 19th 2016, 9th ATRANS SYMPOSIUM: Transportation for a Better Life: Safe and Smart Cities

Table of Contents

1. Background

Outline

- Necessity to quantify GHG emission/emission reductions (MRV) is increasing.
- National/city level GHG emission inventory, policy/project based GHG emission reductions, etc.
- The major purpose is reporting for UNFCCC: To report national GHG emission inventory, project based GHG emission reductions, etc.
- GHG emissions/emission reductions are used as an assessment indicator for financing some GHG mitigation projects such as in JBIC GREEN projects.

UNFCCC: The United Nations Framework Convention on Climate Change
JBIC: Japan Bank for International Cooperation
GREEN: Global action for Reconciling Economic growth and Environmental preservation

1. Background

What is MRV?

- MRV: Measurement, Reporting and Verification of GHG mitigation actions.
- Measurement: Collect/measure relevant information/data on progress and impact of mitigation action.
- Reporting: Report collected/measured information/data in a transparent manner.
- Verification: Assess the completeness, consistency and reliability of the reported information through an independent process.

1. Background

Examples of MRV

Scheme	Implementing body	Level	Objective of M(RV)
National Communication (NC)	UNFCCC	National	To report the accurate circumstances of each party regarding such issues as GHG emissions, mitigation measures and other aspects of climate change to COP.
Biennial Update Report (BUR)			To report the accurate circumstances of each party regarding such issues as GHG emissions, mitigation measures and other aspects of climate change to COP more frequently than NCs.
National GHG inventory			To estimate GHG emissions and removal at the national level.
Nationally Appropriate Mitigation Actions (NAMA)			To understand the effects of mitigation actions by developing countries and the level of support provided for the actions to be taken.
Clean Development Mechanism (CDM)		Project	To determine/monitor GHG emissions reduction and removal through CDM project activity.
Joint Crediting Mechanism (JCM)			To determine/monitor GHG emissions reduction and removal through JCM project activity.
City level GHG inventory	World Resources Institute, C40 Cities Climate Leadership Group, and ICLEI – Local Governments for Sustainability	City	To determine the emission levels, identify reduction opportunities, facilitate the design of mitigation actions, and to track progress toward reductions.

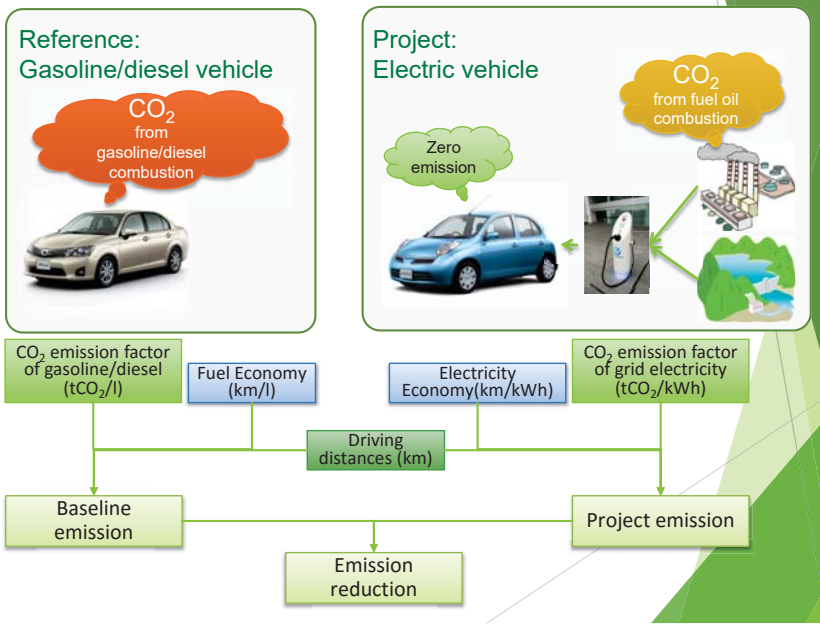
Source: Based on "One hundred questions & answers about MRV in developing countries, November 2015, IGES"

2. Example of MRV methodologies for EV projects

Scheme	Title	Objective	Ex-ante/ex-post	Level of simplicity
CDM methodology	AMS III.C. Emission reductions by electric and hybrid vehicles	Carbon credit (international)	both	+
JCM methodology	Emission reduction by electric vehicles	Carbon credit (international)	both	++
J-Credit	EN-S-012 Introduction of electric vehicles	Carbon credit (domestic)	both	++
JBIC J-MRV	Methodology for urban transport projects	Assess emission reductions of JBIC GREEN projects	both	+++
GEF methodology	Vehicle replacement	Assess emission reductions of projects in general	Mostly for ex-ante estimation	N.A.

3. JCM draft methodology for EV projects

Concept



Calculation of reference emissions

- Reference scenario: Operation of the comparable vehicles that would have been used to provide the same level of transportation service.

$$RE_y = \sum_i \left(SFC_i \times NCV_{RF,i} \times EF_{RF,i} \times DD_{i,y} \times N_{RF,i,y} \right)$$

RE_y	Total reference emissions in year y (tCO_2/year)
SFC_i	**Specific fuel consumption of reference vehicle category i (l/km)**
$NCV_{RF,i}$	Net calorific value of fossil fuel consumed by reference vehicle category i (MJ/l)
$EF_{RF,i}$	Emission factor of fossil fuel consumed by reference vehicle category i (tCO_2/MJ)
$DD_{i,y}$	Annual average distance travelled by project vehicle category i in the year y (km/year)
$N_{RF,i,y}$	Number of reference vehicles in category i in year y

Calculation of project emissions

- Project emissions are from the electricity consumption associated with the operation of project vehicles.

$$PE_y = \sum_i \left(SEC_{PJ,i,y} \times EF_{elect,y} / (1 - TDL_y) \times DD_{i,y} \times N_{PJ,i,y} \right)$$

$PE\ y$	Total project emissions in year y (tCO_2/year)
$SEC_{PJ,i,y}$	Specific electricity consumption by project vehicle category i per km in year y in urban conditions (kWh/km)
$EF_{elect,y}$	CO_2 emission factor of electricity consumed by project vehicle category i in year y (tCO_2/kWh)
TDL_y	Average technical transmission and distribution losses for providing electricity in the year
$DD_{i,y}$	Annual average distance travelled by the project vehicle category i in the year y (km/year)
$N_{PJ,i,y}$	Number of operational project vehicles in category i in year y

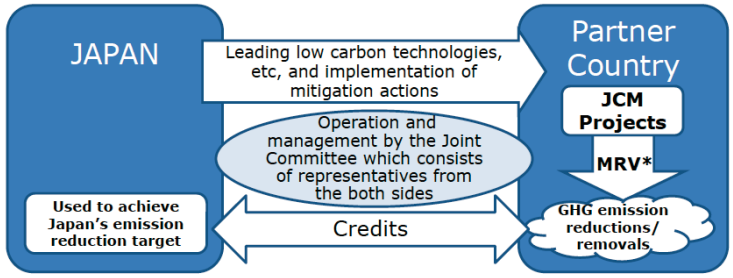
Monitoring parameters

Parameter	Description of data	Source / Monitoring method/item
$DD_{i,y}$	Annual average distance travelled by project vehicle category i in the year y (km/year)	Monthly distances travelled of sample vehicles for each vehicle category are monitored every month. The average value is applied as the average monthly distance travelled by the vehicle category.
$SEC_{PJ,i,y,}$	Specific electricity consumption by project vehicle category i per km in year y in urban conditions (kWh/km)	Monthly electricity consumptions of sample vehicles for each vehicle category are monitored every month. The average value is applied as the average monthly electricity consumption by vehicle category.
$N_{RF,i,y}$	Number of reference vehicles in category i in year y	Basically equal to $N_{PJ,i,y}$.
$N_{PJ,i,y}$	Number of operational project vehicles in category i in year y	Based on annual sales records or official data on registered project vehicles.
$EF_{elect,y}$	CO_2 emission factor of electricity consumed by project vehicle category i in year y (tCO_2/kWh)	Calculated based on CDM Methodological tool "Tool to calculate the emission factor for an electricity system, Version 03.0.0".
TDL_y	Average technical transmission and distribution losses for providing electricity in the year	Official value of the electric power company.

4. Brief introduction of JCM

Basic Concept of the JCM

- Facilitating diffusion of leading low carbon technologies, products, systems, services, and infrastructure as well as implementation of mitigation actions, and contributing to sustainable development of developing countries.
- Appropriately evaluating contributions from Japan to GHG emission reductions or removals in a quantitative manner and use them to achieve Japan's emission reduction target.
- Contributing to the ultimate objective of the UNFCCC by facilitating global actions for GHG emission reductions or removals.



*measurement, reporting and verification

Source: Recent development of the Joint Crediting Mechanism (JCM), June 2016, Government of Japan

Progress of the JCM in each partner country as of June 10th 2016

Partner countries	Start from	No. of JC	No. of registered projects	No. of approved methodologies	Pipeline (JCM Model & demonstration projects in FY13-15)
Mongolia	Jan 2013	3	2	2	4
Bangladesh	Mar 2013	3		1	5
Ethiopia	May 2013	2		1	1
Kenya	Jun 2013	2		1	3
Maldives	Jun 2013	2		1	2
Viet Nam	Jul 2013	4	4	5	14
Lao PDR	Aug 2013	1			2
Indonesia	Aug 2013	5	6	10	22
Costa Rica	Dec 2013	1			
Palau	Apr 2014	3	1	1	3
Cambodia	Apr 2014	2		1	2
Mexico	Jul 2014	1			
Saudi Arabia	May 2015	1			1
Chile	May 2015	1			
Myanmar	Sep 2015	1			1
Thailand	Nov 2015	1			7
Total	16	33	13	23	67

Source: Recent development of the Joint Crediting Mechanism (JCM), June 2016, Government of Japan

JCM Promotion Scheme by METI

JCM Demonstration Projects (Budget for FY2016: 2.4 billion yen)

■JCM Demonstration Projects are implemented by NEDO (New Energy and Industrial Technology Development Organization), which supports the project costs necessary to verify the amount of GHG emission reduction in line with JCM rules and guidelines.

■Coverage of project cost: Cost of the JCM Demonstration Projects necessary for MRV
e.g. Cost of design, machines, materials, labor, travel, etc.

■Eligibility for the JCM Demonstration Projects:
- Concrete Projects to demonstrate the effectiveness of leading Japanese technologies and/or products installed and operated in the projects, and the amount of their GHG emission reduction with MRV methodology by actual operation
- Project Participants consist of entities from both countries, only the Japanese entities can apply for the JCM Demonstration projects. The projects shall be completed within 3 years.

JCM Feasibility Study (FS)

■The study to promote potential JCM projects and to survey their feasibility as well as to check the practicality of the MRV methodology.

MRV Application Study

■ By applying MRV methodology to the facility with low-carbon technologies that have already been installed or will certainly be installed in any JCM signatory country; 1) to obtain verification by third party entity under the JCM; and 2) to conduct review and feedback on efficiency and applicability of MRV.

Capacity Building Programmes

■Variety of capacity building activities to increase technical experts
e.g.,) Experts on measuring amount of emission reductions by introducing low carbon technologies and products in the host country.

Source: Recent development of the Joint Crediting Mechanism (JCM), June 2016, Government of Japan

JCM Model Projects by MOE

The budget for projects starting from FY 2016 is 6.7 billion JPY (approx. USD 56 million) in total by FY2018

※Budget will be fixed after approval by the Parliament

Government of Japan

Finance part of an investment cost (less than half)

Conduct MRV and expected to deliver at least half of JCM credits issued

※Includes collaboration with projects supported by JICA and other governmental-affiliated financial institute.

International consortiums (which include Japanese entities)

- Scope of the financing: facilities, equipment, vehicles, etc. which reduce CO_2 from fossil fuel combustion as well as construction cost for installing those facilities, etc.
- Eligible Projects : starting installation after the adoption of the financing and finishing installation within three years.

Source: Recent development of the Joint Crediting Mechanism (JCM), June 2016, Government of Japan

Thank you very much!

Yasuki Shirakawa
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Third Speaker of <Session 3C>

Dr.Yoshinori Kondo
Manager,National Institute for Environmental Studies,(NIES),Japan
E-mail: kondos@nies.go.jp

Brief Biography:

Yoshinori Kondo has around 28 years of professional experience as a researcher in the field of environmental issues related to internal combustion engine and electric vehicles, solar energy utilization and analysis of greenhouse gases emission structure, especially including development of onboard emission measurement systems for clarifying actual emission conditions.

His current main jobs include clarifying gaseous and particulate matters emission from engine vehicles and estimating resultant future atmospheric environment, evaluating low carbon transport system (LCTS) and proposing new universal-ญdesigned mobility connecting to LCTS in seamless and smooth way.

EDUCATION

1996	Doctor of Engineering Analysis of CO_2 Emission Structure and LCCO_2 for Motor Vehicles, Kobe University
1988	Master of Engineering Instrumentation Engineering (Control of Biped Locomotive Robot), Kobe University
1986	Bachelor ofEngineering Instrumentation Engineering (Control of Biped Locomotive Robot), Kobe University

EMPLOYMENT RECORD

2015-present	Concurrent Duties on Manager in International Coordination Office, Planning Department, NIES
2013-2014	Concurrent Duties on Manager in Research Coordination Office, Planning Department, NIES
2011-present	Professor, University of Tsukuba, Japan (Cooperative Graduate School)
1998-present	Senior Researcher, NIES, Ministry of the Environment, Japan
1988-1997	Researcher, National Institute for Environmental Studies(NIES), Japan Environment Agency

Third Speaker of <Session 3C>

Mr.Junichi Yasu
Researcher,National Institute for Environmental Studies,(NIES),Japan
E-mail: junichi_yasu@hotmail.com

Brief Biography:

Junichi Yasu has around 25 years of professional experience as an engineer in the field of test and measurement at Sony/Tektronix. In the field of power electronics for EV/HEV, he and his member had produced the IGBT (Insulated Gate Bipolar Transistor) tester with several patented key technologies of IGBT. Especially, he had supported for the first commercial HEV in the world.

And he worked as a field engineer of new glow plug with pressure sensor for Diesel engine.he supported almost Japanese car maker to catch up the clean diesel technology of Europe.Recently, he is supporting NIES (National Institute for Environmental Studies) as a visiting researcher to create the newly low carbon transport system (LCTS) and proposing new universal society of terminal transportation system.That is multi-Purpose mobility (mPm) of SMILE-First Project.

EDUCATION

1982	Bachelor of Engineering Mechanical Engineering (Exhaust and combustion efficiency of the 4-cycle engine) Meisei University of Tokyo

EMPLOYMENT RECORD

2015-present	Head of Innovation Center, Acurate Systems INC.
2014-present	Visiting Researcher of NIES
2013-2015	Manager of Diesel Tech, Hidria Corporation.
2012 -present	Director of the Advanced Technology Group, K.K. Ranet
2009-2013	Manager of Production/Customer Service/Procurement/IT, MTS Sensors Technology Corp.
2002-2009	Senior Engineer, Tektronix Japan, Ltd.
1982-2009	Project Manager, Sony/Tektronix Ltd.

Newly developing Multi-Purpose Mobility (mPm) for Everyone

By *Dr.Yoshinori Kondo and Mr.Junichi Yasu*

Summary:

Introduction

In Japan, aiming at a low carbon society, a recycling society, and security/safe society, we mention industrial, administrative and academic sectors, and various researches and development, and investigation are conducted. For example, as a measure towards a low carbon society, vehicles with few carbon-dioxide emissions, such as an electric vehicle and a plug-in hybrid vehicle, are marketed from some automakers, and the recorded number is increasing gradually. Moreover, although it is little, and a super-compact electric vehicle has also come to be used for an individual's movement or delivery of a product, we have produced difficulties from the size, safety, and its performance in coexistence with former type vehicles.

On the other hand, in Japan where low birthrate and longevity are progressing, the automobile accident from which elderly people become a cause is increasing. In order to realize simultaneously security/safe society and low carbon society, it is required to secure elderly people's safe movement independently and to reduce the automobile accident by elderly people. Based on these situations, we are developing the new terminal transportation which realizes seamless connection with public transportation smaller than a micro electric vehicle and in which elderly people can realize movement securely/safely.

Proposal of new transportation tool and its system

Many kinds of usage scenes were taken into account. The relation between a user and mobility speed summarized in Table 1. Based on these, the development target is set up for realizing low carbon traffic and aim at the realization.

On the other hand, to meet super-aged society, we propose the concept that Symbiotic Mobility with Intelligent watching (MIMAMORI) system makes everyone Laugh Every time and Everywhere (SMILE -1st) which system can watch not only the user both directly with integrating biosensors and remotely with cloud service but also local residents by the user safely and securely.

Table 1 Classification of relation between user and mobility

Category (Item)	Speed / Power	User	Moving Area	Weight /Price (approximation)	Condition into Public Transportaion
Walker (Shopping Trolley)	2km/h Man-Power	Elder	Sidewalk	5kg 20,000JPY	○
Senior Car (Mobility Scooter)	～6km/h Electric Motor	Elder	Sidewalk	100kg 400,000JPY	△ (Assistance required)
Portable Multi-Purpose Mobility	～6km/h Electric Motor	Young ～ Elder	Sidewalk	15kg 150,000JPY (Target)	○ (Folding Type)
Next-generation personal mobility	～10km/h Electric Motor	Young ～ Middle	Special Robot Area	20kg 250,000JPY	△ (Need to fold)

Future Plan (Future Tasks)

The prototype of the portable extremely-ultra-compact mobility which suited now the concept described previously is under development (Fig. 1). the questionnaire survey to the test user has carried out, providing the prototype for the test-ride event. Aiming at the realistic introduction to society, development is still under continuation based on the analysis of the data from the survey about public acceptance, functions required, and price matter.

And we will survey strongly about the usage of wheelchair with multipurpose mobility with elder person and physically disabled person, also helper. Because, Multi-Purpose Mobility for Everyone.

Fig. 1 Photos of mPm

Newly developing Multi-Purpose Mobility (mPm) for Everyone

SMILE– First Project

Kondo Yoshinori, NIES (National Institute for Environmental Studies)
Junichi Yasu, RANET / Accurate Systems / Visiting-Researcher of NIES
Mitsutoshi Kano, TOYODA IRON WORKS

Aug. 19 2016

Agenda

1. Introduction: About SMILE-First Project
2. Background: Current situation in Japan
3. Concept of Multi-Purpose Mobility (mPm)
4. Research Result: Test ride
5. Conclusion: Future Function

1. Introduction: SMILE-First Project

What is "SMILE-First Project"?

SMILE-First

First of all, Symbiotic Mobility robot with Intelligent watching (MIMAMORI) system makes happy Life Everyone and earth, which system can watch not only a robot User both Directly with Integrating Biosensors and Remotely with Cloud Service but also Local Residents by the User Safely and Securely.

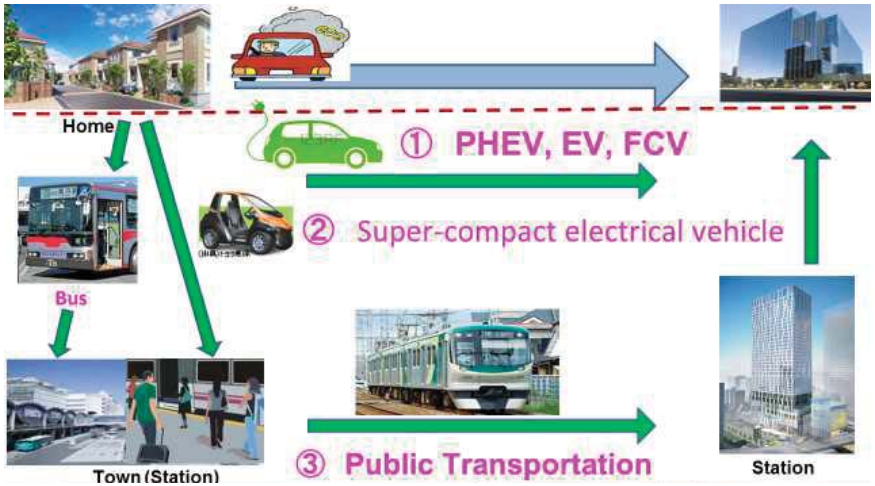
By Dr. Kondo, NIES
(NIES: National Institute for Environmental Studies)

2. Background: Current situation in Japan

1. Approximately 20% of CO_2 emission from transportation, 90% of those from vehicle (passenger car) ≒18%
2. The key issue of the recently transportation in the low-carbon society
   - ① Extremely high efficiency low-carbon vehicle such as **PHEV, EV, FCV**
   - ② Super-compact electric vehicle
   - ③ **Cooperation with public transport (Train, Bus, , , ship)**
3. We do not use even the situation that is available to public transport
   - ① The terminal transportation with public transportation is very poor
   - ② Use a car having high environmental load continuously
4. Furthermore, for super-aging society
   - ① Traffic accident by elderly person increasing ⇒ Almost vehicles are automatic transmission, then easy to drive
   - ② If return the driver's license, they can't go out easily. It means no way to go out
   - ③ However there are some burrier that is bad image regarding as for current conventional mobility scooter Especially, elder gentleman has a pride in Japan.

Then, we have planed that adapting to a super-aging society, men and women of all ages can choose smart mobility as a moving way.

Background: Current situation in Japan



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3. Concept of Multi-Purpose Mobility (mPm)

◆**Basic Concept:**

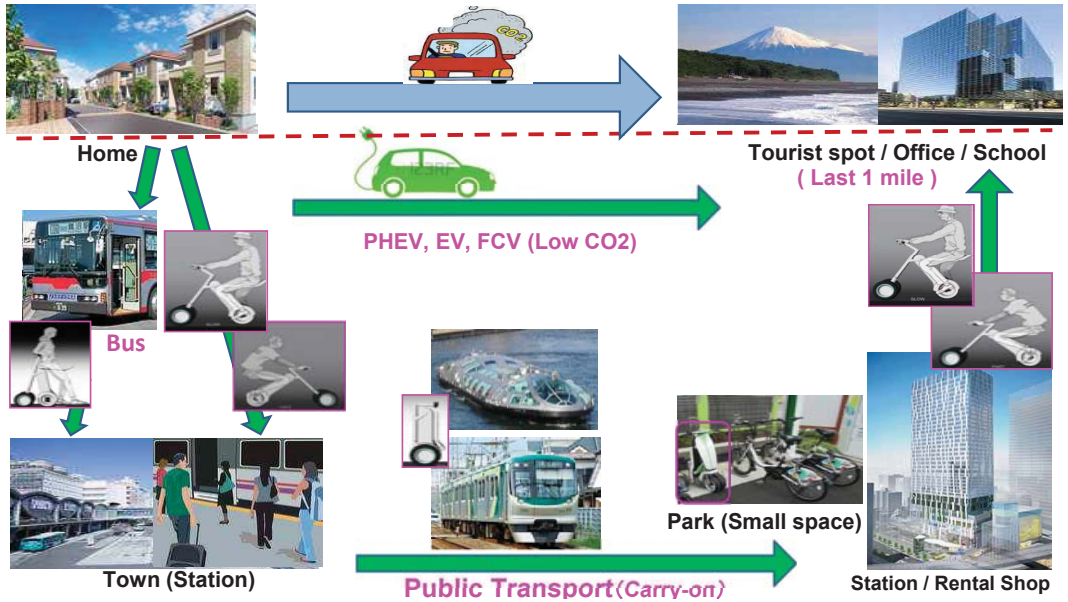
CO_2 emission would be reduced before you notice it!

◆**Realization of environmental, social and human friendly "Multi-Purpose Mobility"**

- Adapting to a super-aging society, men and women of all ages choose smart mobility and then spend healthy and wonderful life
- The mobility meets the current road traffic law and coexists with pedestrians
- People can move in seamless and smooth ways under good connection with public transportation

As the result,

- **CO_2 emission can be reduced, thus global warming will be prevented**
- Car accidents and social welfare costs can be reduced



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Concept for Everyone (Basic Mode)

Walker
(～2Km/h)

Mobility Scooter
(Max 6Km/h)

Skateboard
(10Km/h and Make Energy)

Concept for Everyone (Wheelchair & mPm)

- General wheelchair acceptable
- Good for Care receiver & Caretaker
- Compact & Lightweight

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4. Research Result : Test ride

Test-ride event

The test-ride event was conducted for 3 days from 28th to 30th July 2015 in “Toyota Ecoful Town”, Japan.

67 elderly people who are over 65 years old participated in this events.

Left : conventional mobility scooter
Middle and Right : Multi-Purpose Mobility

Some elderly people said that
“I don’t want to ride on a conventional mobility scooter, because of neighbors’ eyes that they think I became old-age or physically-disabled.”

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Research Result: Need to break the barrier

Everyone wants to choice smart & cool mobility

Let’s break the barrier that is negative image!

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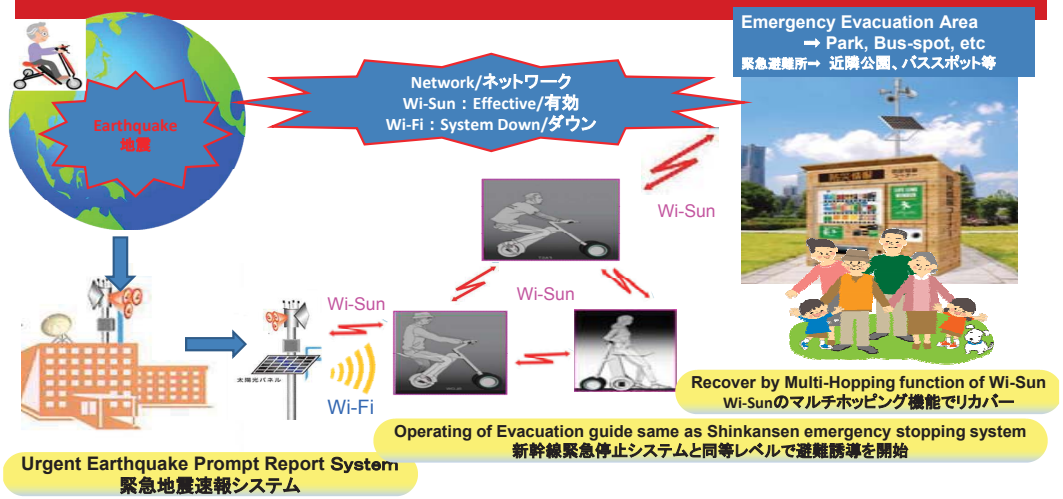
5. Conclusion:

Future Category Plan of Terminal Transportation

Category (Item)	Speed / Power	User	Moving Area	Weight /Price (approximation)	Condition into Public Transportaion
Walker (Shopping Trolley)	~2km/h Man-Power	Elder	Sidewalk	5kg 20,000JPY	○
Senior Car (Mobility Scooter)	~6km/h Electric Motor	Elder	Sidewalk	100kg 400,000JPY	△ (Assistance required)
Multi-Purpose Mobility (Transformable、Portable、Compact)	~2km/h Walker ~6km/h Mobility Scooter ~10km/h Personal Mobility Wheelchair & mPm (Joint System)	Young ~Elder & physically disabled person	Sidewalk Special Robot Area Sidewalk	15kg 150,000JPY (Target)	○ (Folding Type)
Next-generation personal mobility	~10km/h Electric Motor	Young ~ Middle	Special Robot Area	20kg 250,000JPY	△ (Need to fold)
Bicycle	~20km/h Man-Power	Young ~ Elder	Roadway (Sidewalk)	10-20kg 20,000JPY~	△ (Need Carring-Bag)
ELECTRIC ASSIST BICYCLE	~20km/h Electric Assist	Young ~ Elder	Roadway (Sidewalk)	20kg 60,000JPY~	△ (Need Carring-Bag)
Super-compact electric vehicle	~60km/h Electric Motor	Young ~Elder (Need Licence)	Roadway	約400kg 600,000JPY	×

Future Function: In a disaster



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Thank you for your attention

Let's try together!

First Design

New Prototype(No.4)

Kondo Yoshinori, NIES (National Institute for Environmental Studies)
Junichi Yasu, RANET / Accurate Systems / Visiting-Researcher of NIES
Mitsutoshi Kano, TOYODA IRON WORKS

Fourth Speaker of <Session 3C>

Asst.Prof.Dr.Yossapong Laoonual
President of Electric Vehicle Association of Thailand(EVAT)
E-mail: yossapong@gmail.com

Brief Biography:

Yossapong Laoonual studied his first degree in Mechanical Engineering at Sirindhorn International Institute of Technology (SIIT), Thammasat University, Thailand. He continued his master's degree in Mechanical Engineering at the University of Manchester Institute of Science and Technology (UMIST), now University of Manchester, followed by Imperial College London to gain his Ph.D. in Mechanical Engineering. He is currently an assistant professor at the Department of Mechanical Engineering, Faculty of Engineering, King Mongkut's University of Technology Thonburi (KMUTT). He has produced and contributed to a number of research papers in connection with the Powertrain, Alternative Fuels and Policy for Road Transport Technology. In 2013-2014, he held the position as an expert at Thailand Automotive Institute. In addition, he has taken seats on a number of committees in both national level and professional society. In 2015, he was an advisor for sub-committee on alternative and renewable energy, and energy efficiency under the committee on energy reform, National Reform Council in 2015 where he was one of key person to draft the government reform proposal on the national electric vehicle policy in Thailand. For professional society, he is a founding member and the first president of Electric Vehicle Association of Thailand (EVAT) and committee in the Thai Society of Mechanical Engineers (TSME), Asian Transportation Research Society (ATRANS), Thai Society for Transportation and Traffic Studies (TSTS).

Electric Vehicle (EV) Current Status in Thailand

By Asst.Prof.Dr.Yossapong Laoonual

Summary:

Since August 2015, National Innovation System Development Committee chaired by Prime Minister has approved the 5 year EV Promotion Roadmap (2015-2019) as shown in Figure 1 with emphasis on various type of electric vehicles (electric bus, passenger car, electric motorcycle and modified electric vehicle) as well as industrial standard and R&D supports on related main component parts. However electric bus seems to be one of the main focuses in this roadmap with the target to build the annual manufacturing capability to 1,000 electric buses by the end of 2019. Currently Bangkok Mass Transit Authority (BMTA) is planning to purchase 200 electric buses in their fleet.

Later Electric Vehicle Action Plan under Energy Efficiency Development Plan (EEDP) 2015-2036 has been approved by the National Energy Policy Committee chaired by Prime Minister as shown in Figure 2, which comprises of three phases as demonstration (2016-2017), deployment (2018-2020) and expansion (2021-2036). Currently the first phase focuses on EV support and demonstration program which the ministry of energy would like to support and promote the electric bus and minibus as well as preparation of charging stations for passenger car. A long-term target of 1.2 Million PHEV and BEV is set for passenger car by 2036 based on 1% estimated growth of EV market share after 2018.

Recently Ministry of Industry has proposed the production plan of electric vehicle and major components in Thailand which the cabinet has been approved on 2 Aug 2016. Three types of electric vehicle will be promoted for production namely electric cars, mini electric cars and electric buses.

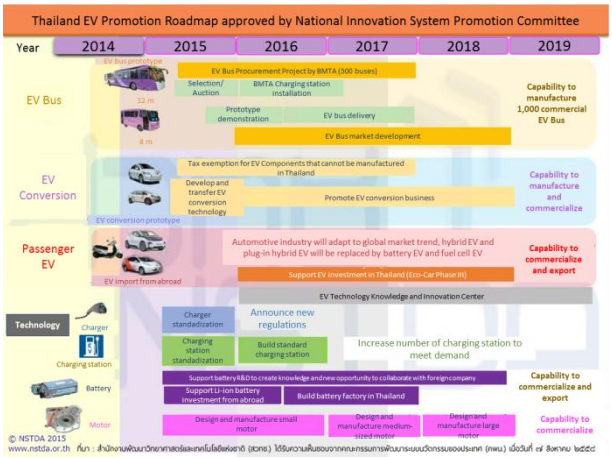


Figure 1 Thailand EV Promotion Roadmap

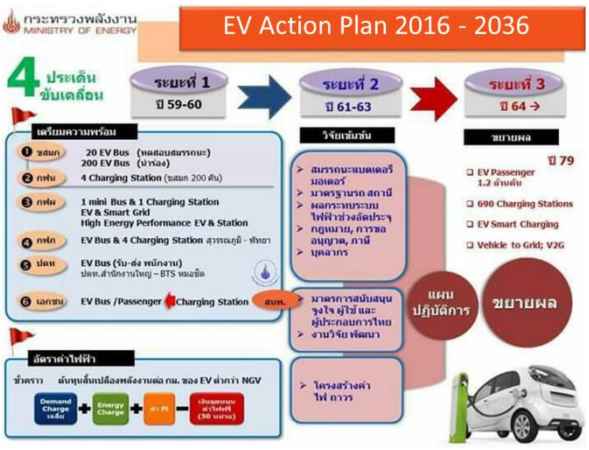


Figure 2: EV Action Plan 2016 - 2036

< 2nd AFTERNOON SESSION >

Session 3D: Parallel Session of ITS and Safety

Session 3D: Intelligent Transportation System (ITS) and Safety Moderated by Prof. Dr. Agachai SumaleeHong Kong Polytechnic University
"Transition Towards Innovative Mobility with Car Sharing" By Mr. Krit Vichaiwatanapanich, Managing Director, HaupCar, Thailand
"Innovation Development 4.0 Model" By Dr. Sakda Panwai, Director of Expressway Engineering System Research and Development Division, Expressway Authority of Thailand
"Development of vehicle management and monitoring method for motorcycle by RFID" By Assoc.Prof.Dr. Tetsuhiro Ishizaka, Nihon University
"ATRANS Safety Map Applica for Accident Database Development" By Asst.Prof.Dr. Saroch Boonsiripan, Faculty of Engineering, Kasetsart University

Moderator of <Session 3D>

Professor Agachai Sumalee, PhD
Director of Smart City Research Center,King Mongkut's Institute of Technology Ladkrabang
Professor, Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University
E-mail: asumalee@gmail.com (www.agachai-sumalee.com)

Brief Biography:

Prof.Dr.Agachai Sumalee (www.agachai-sumalee.com) holds B.Eng in Civil Engineering (King Mongkut's Institute of Technology Ladkrabang, KMITL), MSc (Eng) and PhD in Transportation Planning and Engineering (ITS, Leeds University). He was previously Senior Research Fellow at University of Leeds, Associate Professor at Hong Kong Polytechnic University, and Visiting Professor at University of Tokyo. He is currently the Director of Smart City Research Center at KMITL. He is also a Professor at Hong Kong Polytechnic University. His research areas are intelligent transport system (ITS), network modelling, transport economics, and transport policy. Dr. Sumalee has published more than 90 journal papers in top peer-reviewed journals. In 2014 he is ranked as the second most influential researcher in the world in the field of transportation engineering in the last five years by the Microsoft Academic Research Database. He has received several prizes and awards including the 2014 APEC Science Prize for Innovation, Research and Education ("ASPIRE") awarded by Asia Pacific Economic Cooperation (APEC), Hans Jürgen Ewers Prize for outstanding research in infrastructure economics, Annual best paper award by Hong Kong Institute of Engineer, the Smeed Prize, and twice outstanding paper awards at the EASTS conferences in Fukuoka and Bangkok. He is currently the Editor in Chief of SCI journal Transpormetrica B: Transport Dynamics, Associate Editor of Networks and Spatial Economics, and Editorial Board Member of Transportation Research Part B, Transportation, Transportmetrica A, and Journal of Advanced Transportation.

Dr. Sumalee has served on several government committees. He is currently the Vice-Chair and Secretary General of Railway Committee of Engineering Institute of Thailand, member of the US Transportation Research Board Network Modelling Committee, and member of Hong Kong Transportation Road Safety Board. He served as a member of sub-committee of Railway System of the State Railway of Thailand, sub-committee of Land Development Committee (Expressway Authority of Thailand), Business Development Committee (Mass Rapid Transit Authority of Thailand), and Innovation and Information Technology Committee (National Housing Authority of Thailand). Dr. Sumalee is an active and leading developer of the Intelligent Transportation System in Thailand in which he led the deployment of the first fully automated ITS system for expressway corridor in Thailand and development of the ITS for Motorway network of Department of Highway. He also led the team to develop the ITS solution for the All Thai Taxi for automatically operating the whole 550 fleet of taxis. Recently he also led the team to develop the national data centre for GPS data from commercial and public vehicles in Thailand which was designed to receive and analyse the GPS data from up to 1 million vehicles on the real-time basis. This system is now the national system for Department of Land Transport.

First Speaker of <Session 3D>

Mr.Krit Vichaiwatanapanich
Co-founder, Managing Director Haupcar Company Limited
E-mail:krit.vichaiwatanapanich@haupcar.com

Brief Biography:

Krit Vichaiwatanapanich is a Co-founder and the Managing Director of Haupcar, the first carsharing operator in Thailand. At Haup, he is responsible for leading the operations and the engineering team to build user platform and the system supporting carsharing users. He also works with the universities and research partners to co-develop the other projects related to carsharing in Thailand.

Prior to starting Haupcar, Krit has over 2 years of experience working at Fidelity Investments in the states, where he has involved in the projects related to cross-platform integration between Fidelity Investments and its partners.

Krit graduated from Georgia Institute of Technology with a Bachelor degree in Computer Engineering in 2012, and later he graduated from Imperial College with a Master degree in Sustainable Energy in 2015.

Transition Toward Innovative Mobility with Car Sharing

By Mr.Krit Vichaiwatanapanich

Summary:

Due to unmet demand of urban transportation, private modes of transport remains one of the most essential ways to travel within the Bangkok Metropolitan Region (BMR). In 2016, statistics has shown that 60 percent of commuters still used private transport in Bangkok (Bangkok Post). Despite high cost of vehicle ownership, the registered private vehicles have continued to grow for the past 10 years, and recently reached its peak at 7.4 million as of June 2016 (Department of Land Transport). Popularity of private vehicles subsequently results in traffic congestion - where commuters spend an average of three hours a day in traffic, a large opportunity cost to the economy as a whole (Thailand Future Foundation).

World Resources Institute's (WRI) research has shown that carsharing has proved a success in many developed countries, but has been introduced in few emerging markets. However consistent reports have suggested that carsharing has an overall positive impact on the community. For society, the benefits of carsharing may come in the form of improved access to urban amenities and opportunities, reduced vehicle-travel distance, and reduced emissions. For individuals, it can reduce the cost of car ownership while providing the comforts of personal transportation.

Haupcar introduces Thailand's 1st Car Share platform with the aim to understand the extent of impact carsharing will have on individuals, local communities and larger cities. In the upcoming months, we plan to have carsharing available at various communities such as university campus, office complex, high-density residential spaces and public transit hubs.

Haup recently launched its first location at Thammasat University Rangsit Campus, with two vehicles in two parking spots (on campus, and off campus) and have acquired 100 student members within the first week of opening registration. Furthermore, Haupcar in collaboration with Sirindhorn International Institute of Technology at Thammasat University is also launching a research project that will be focused on telematics that can help analyze driving behaviors and solving parking congestion. With multiple users on Haupcar's system, we expect to obtain a large dataset and deep analytics on these characteristics. Carsharing as provided by Haupcar disrupts current mobility options like standard car rental by providing flexibility and ease of access to customers. In addition, the financial burden on the end user is typically less.

Since carsharing has never been introduced publicly in Thailand, many potential users are not aware of the service. User education usually includes introducing the concept of carsharing, information about the system, and the positive externalities it has such as social and environmental benefits. Dedicated parking spots for car share is a critical enabler for many carsharing operators in emerging markets like India and China (WRI). In many success cases such as in London, local boroughs allocate dedicated parking bays to support carsharing operators. On the contrary, regulated on-street public carparks in Bangkok is often difficult to find. In order to acquire carparks, Haupcar currently works with the private sector such as private parking management companies and office buildings. Haupcar has found that, in the long term, support from local authorities and government officials will be crucial for the effective and fast expansion of carsharing services.

Transition toward Sustainable Mobility with Carsharing

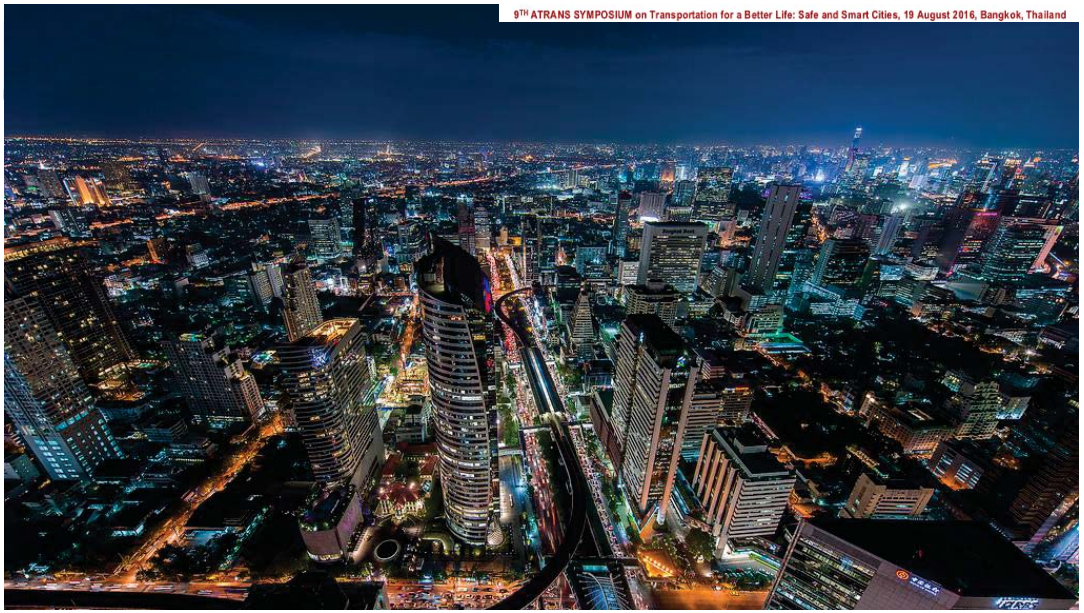
By Krit Vichaiwatanapanich, Co-founder of Haupcar
19 August 2016
Le Bua (State Tower), Bangkok, Thailand

Drive here today?

Have a car at home but didn't drive?

Transition toward Sustainable Mobility

1. Traffic is a major problem in Bangkok
2. Shifting away from private cars to mass transit
3. Rail Mass Transit cannot keep up with the demand
4. Car-Sharing with the Transition



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Traffic Worsen in Bangkok

*"*During morning rush hour in Bangkok, a city that can accommodate around ***2 million vehicles*** in transit, there are an estimated ***5 million vehicles*** plying the street at an average speed slower than horse-drawn carriage at the turn of the 20th century: around ***16 kilometer per hour"***
-Sustainable Development Sourcebook, United Nations

=

3 hours

37 Vacation Days

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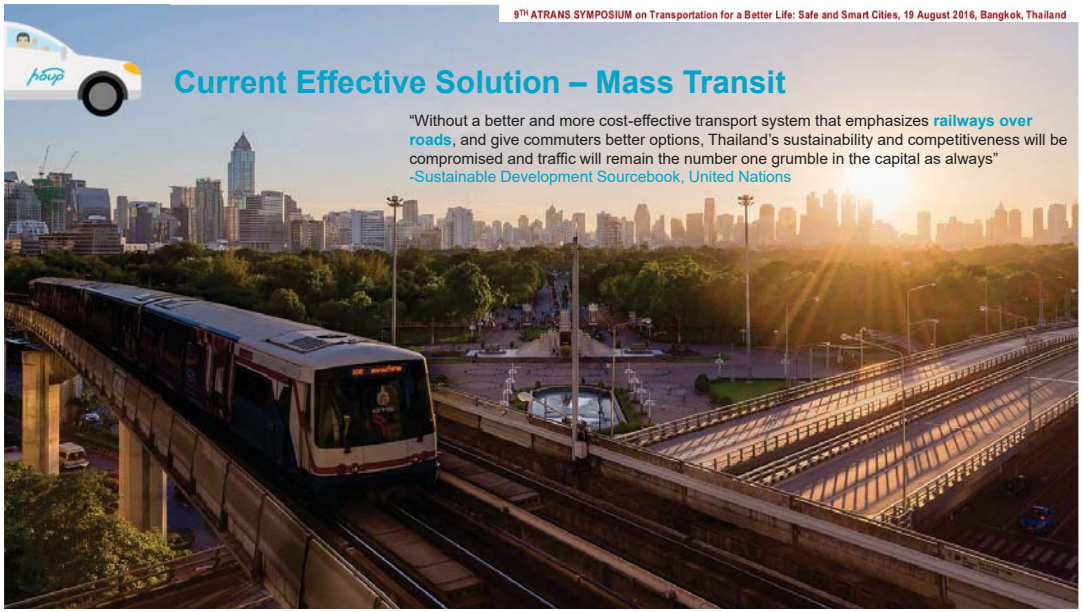
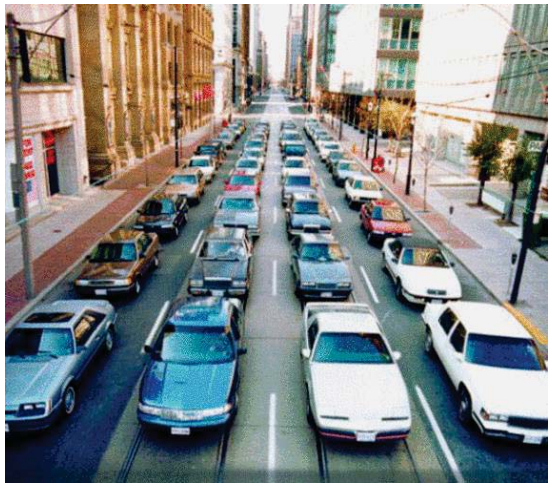
Current Effective Solution – Mass Transit

"Without a better and more cost-effective transport system that emphasizes **railways over roads**, and give commuters better options, Thailand's sustainability and competitiveness will be compromised and traffic will remain the number one grumble in the capital as always"
-Sustainable Development Sourcebook, United Nations



Current Effective Solution - Mass Transit



1 cargo

It will require the whole road filled with 36 cars if each individuals drive their own cars

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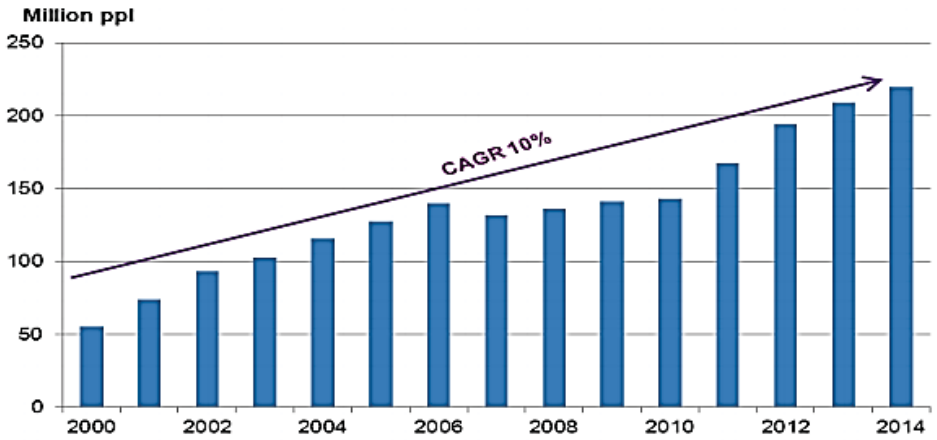
Sign of Improvement in Urban Mobility



Source: BTS Group

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Sign of Improvement in Urban Housing

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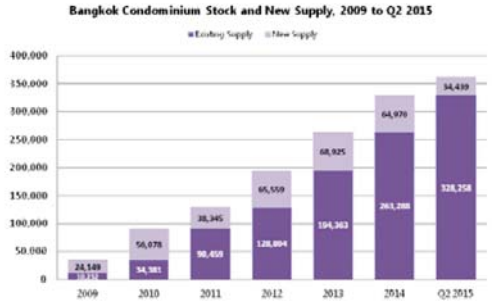
Sign of Improvement in Urban Housing – 9x Condo Units



SOURCE : KNIGHT FRANK THAILAND RESEARCH AND CONSULTANCY DEPARTMENT

9x increase in Condo Supply since 2009

Bangkok sees a significant growth of condominium units

Drawback Rail Mass Transit #1 – Limited Reachability

Source: BTS Group

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Drawback Rail Mass Transit #2 – Limited Capacity

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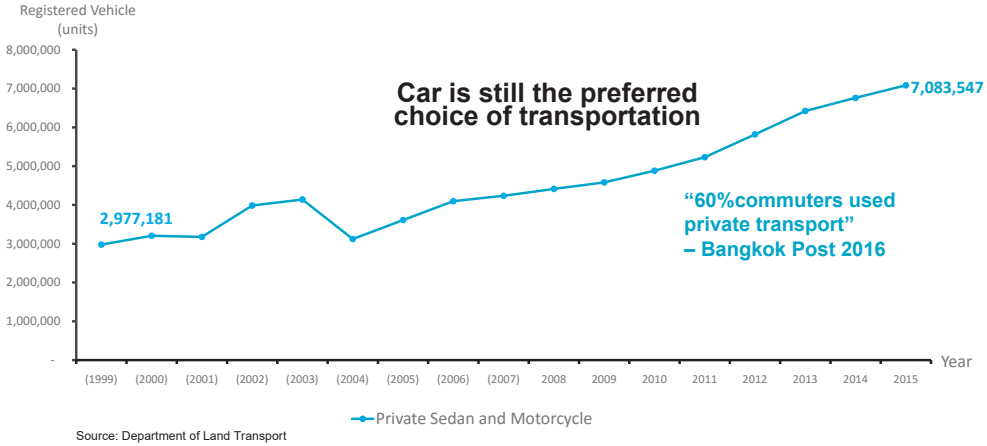
Increase in Private Vehicles Since 1999



Source: Department of Land Transport

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Bangkok in the Transition Period

Rail Mass Transit will continue to improve

"In the next **10 years**, **80 percent** of investments in public transport in Thailand will go to **railways**"

(Pichet Kunadhamraks, Senior Civil Engineer at Office of Transport and Traffic Policy)

Car will be Less Needed

You don't need a car all the time, you **NEED A CAR SOMETIMES.**

CAR OWNERSHIP will not be necessary for daily commute

Car Sharing Provides "ACCESS" to Cars

ACCESS FLEETS IN JUST A FEW TAPS. → ***HOP IN AND GO*** →

Various Locations

PLACING A VEHICLE WHERE PEOPLE NEED IT

High-Density Residential
(e.g. Condo, Dorm.)

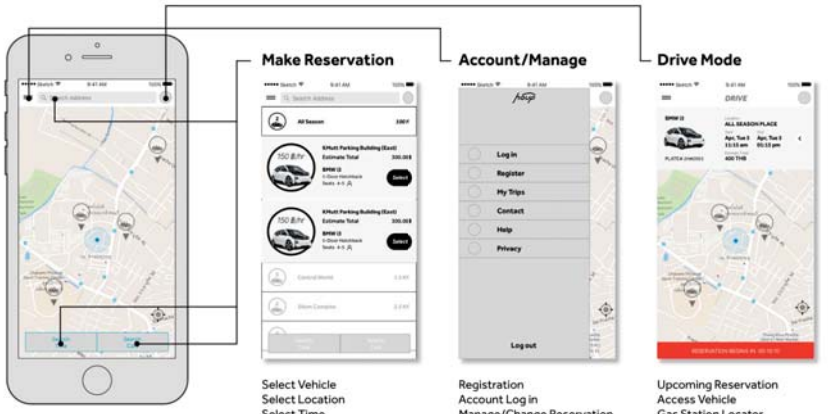
Remote College
(e.g. TU, KMutt, Mahidol)

Corporate Office
(e.g. All Season)

Hotel Accommodation
(e.g. Hotel Chain)

Mass Transit Stations
(e.g. BTS, MRT)

Reliable Mobile Platform



Apps V.2 (Late 2016)

Select Vehicle
Select Location
Select Time

Registration
Account Log in
Manage/Change Reservation
Reservation History
Payment

Upcoming Reservation
Access Vehicle
Gas Station Locator

Barriers to Introduce Car Sharing

Strong aspiration toward car ownership

"Thais love their cars"

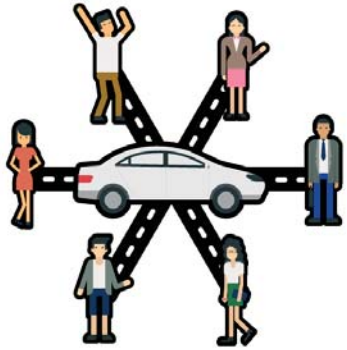
Current: Educate users about the benefits of carsharing

High capital investment

"20% higher in car price"

Solution: Work with existing fleet business

Social Benefit – Reduce # of Car in a Community



Combine Use

Reduce number of cars

100 users signup within 2 weeks

Social Benefit – Reduce Parking Congestion

Less Parking

Reduce parking congestion
Reduce investment costs

Environmental Benefit – Reduce Car Usage

Pay for "ownership"

Car-Owner

Default means of travel

Unaware of cost of this trip?

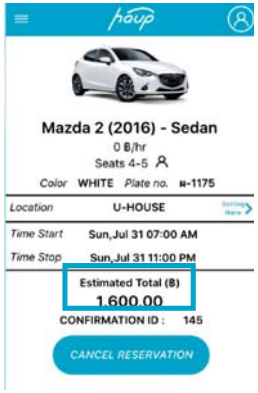
Prefer to drive even if there are the other alternatives

Environmental Benefit – Reduce Car Usage

Pay for "access"

Car-sharing Tariff

PAY PER USE (HOURLY)



Decrease the use of cars
***less pollution, congestion**

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Societal Benefit – Increase Accessibility

Accessibility for every one

Enhance Public Transport Network

Options: Mobility as a Service, First-mile, Last-mile

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Transition toward Sustainable Mobility

A lot of cars being registered in Bangkok

"Access" to car

Now

Gearing toward Sustainable Mobility

and in the Future

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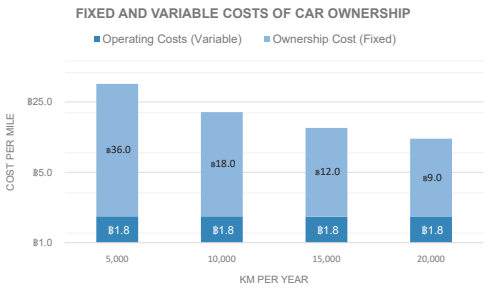
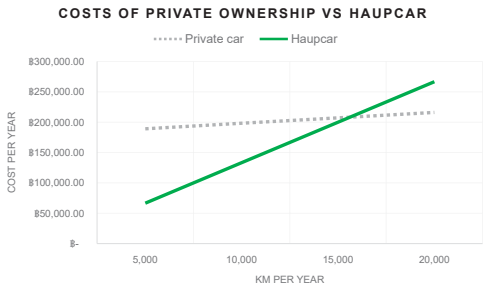
THANK YOU

contact us at

HAUPCAR.COM

Backup





Backup

Individuals

Save Money
Don't have to buy a car.

Use-As-Needed
Hourly or Daily.

Convenience
Locations.

Communities

***Less Parking**
Reduce parking congestion.

Save Money
Compared to leased vehicles.

Local Business

Support
More visitors.

City

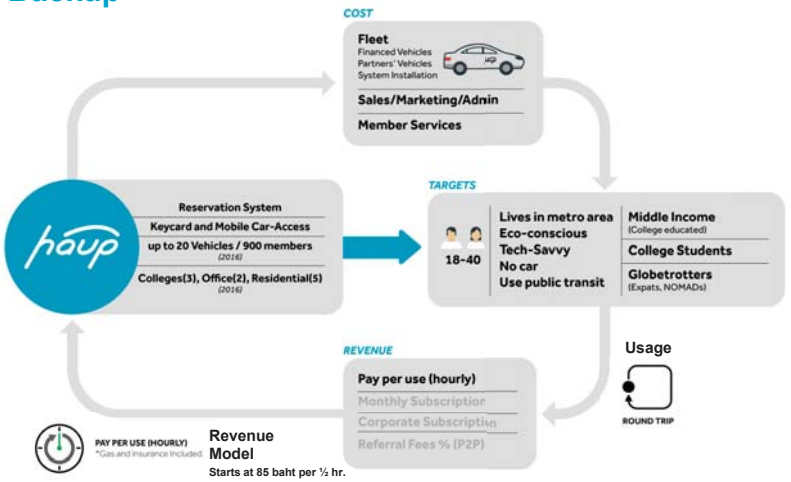
***Less Cars**
Slow down car-ownership.

***Increase Public Transport Users**
Last mile, or Intermediate.

Backup

ACCESSIBILITY (Locations)	FLEXIBILITY (Hourly up to 24 hrs)	CONVENIENCE (Mobile Platform)	24/7 AVAILABILITY (24/7, No Wait time)	COST	MULTI-STOPS (Can make multiple stopes)
DIRECT COMPETITION: **Conventional Car Rental** (e.g. ThaiRentACar, Avis, Hertz, Sixt)			INDIRECT COMPETITION: **On-Demand Ride** (e.g. Grab, UBER, AllThaiTaxi)		

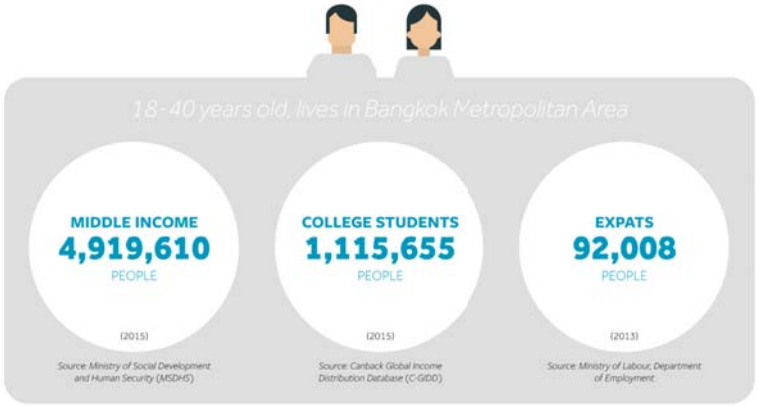
Backup

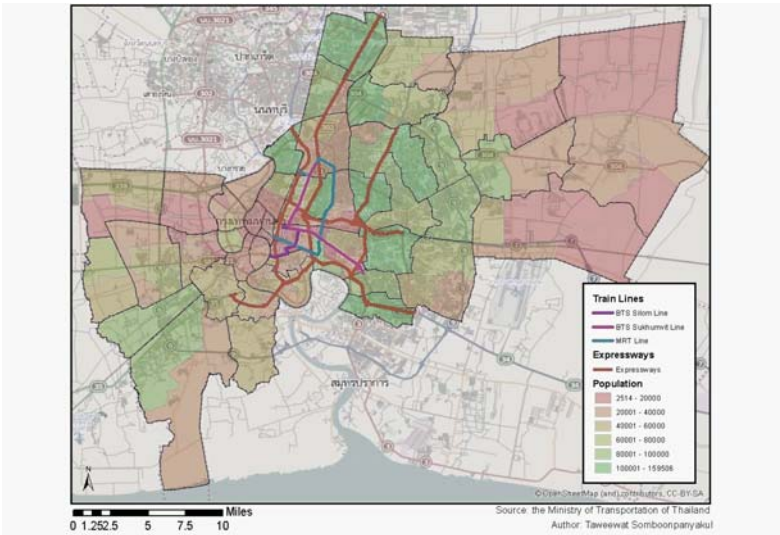


Backup

Low Energy Consumption Cars

Backup





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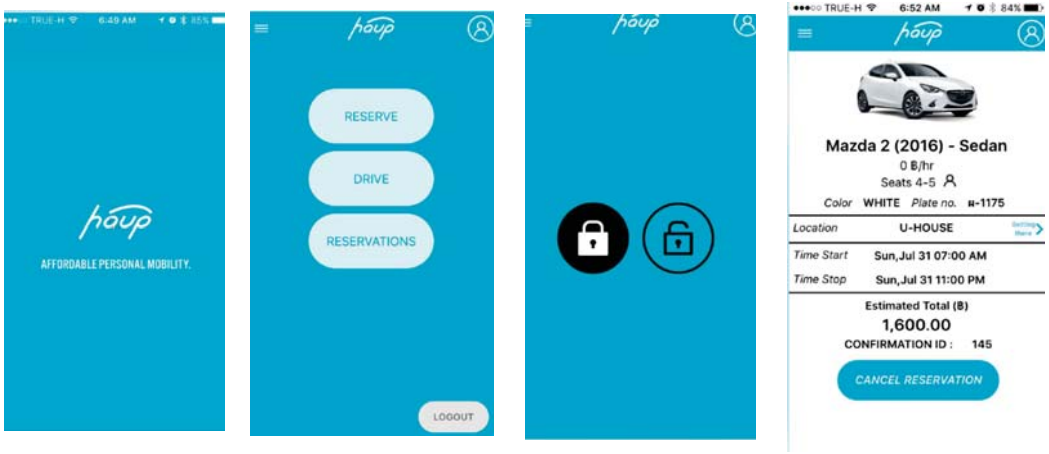


Backup

EXHIBIT 4 | Approximately 35 Million Drivers Will Use Car-Sharing Services by 2021

	Living in large urban areas	18+ years old with a valid driver's license	Registered with a car-sharing provider	Multiple uses per month
WORLD	385 million	153 million	35 million	3.5 million
EUROPE	81 million	46 million	14 million	1.4 million
NORTH AMERICA	50 million	31 million	6 million	0.6 million
ASIA-PACIFIC	253 million	75 million	15 million	1.5 million
GERMANY	13 million	7 million	2 million	0.2 million

Sources: Statista; BCG analysis.

Second Speaker of <Session 3D>

Associate Professor Tetsuhiro ISHIZAKA
Department of Transportation Systems Engineering,College of Science and Technology, Nihon University,JAPAN
E-mail: ishizaka.tetsuhiro@hihon-u.ac.jp

Brief Biography:

EDUCATION:

1） Dr of Eng. in Transportation Engineering, Nihon University of Japan 2007.3
2） M.Eng'g in Transportation Engineering, Nihon University of Japan, 2004.3
3） B.Eng'g in Transportation Engineering, Nihon University of Japan, 2002.3

THESIS TITLES:

Dr of Eng.	Study on Reliability of Travel Time Estimation by Probe Vehicle System
M.Eng'g	Study on Traffic Information Collection System using Probe Vehicles in Developing Countries –Focusing on Travel Time in Bangkok–
B.Eng'g	Estimation Origin-Destination Flows from Traffic Counts –Focusing on Chiang Mai–

WORK EXPERIENCE

Aug 2010-Aug 2011. Visiting Researcher at Center for Environmental Technology and Research, College of Engineering, University of California, Riverside,

PROFESSIONAL ENGAGEMENTS

2014 – present	Editorial Committee Member: Journal of JSTE (Japan Society of Traffic Engineering)
2011 – 2014	Journal Editorship International Science Committee Member: Journal of Eastern Asia Society for Transportation Studies (EASTS)

Development of vehicle management and monitoring method for motorcycle by RFID
By *Associate Professor Tetsuhiro ISHIZAKA*

Summary:

Development of vehicle management and monitoring method for motorcycle by RFID

Tetsuhiro ISHIZAKA
Dr., Asssociate Professor
Nihon University
College of Science and Technology
Department of Transportation Systems Engineering

Contents

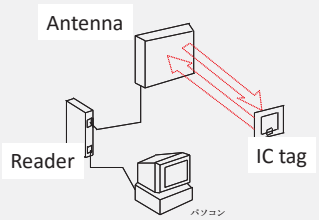
- Proposal of motorcycle management and monitoring system by RFID
- Objective
- Research methodology
- Preliminary experiment at Nihon University, Japan
- Future vision and research
- Conclusion

RFID for monitoring motorcycle

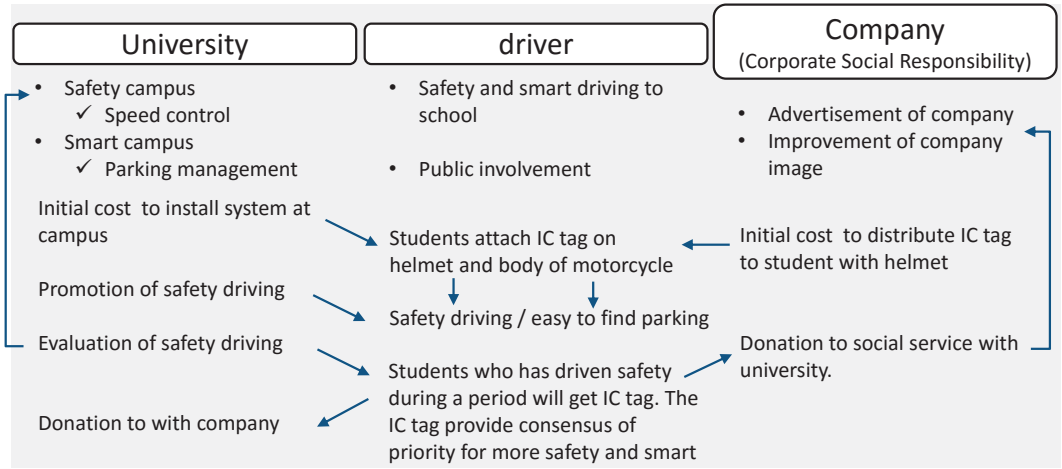
- RFID（Radio Frequency Identification）

RFID automatically identifis and tracks tags attached to objects. Passive tags collect energy from a nearby RFID reader's interrogating radio waves. As you know well, RFID is used as electronic toll collection, logistics et al.

Advantage of RFID	Possibility for Motorcycle
・Contactless identification	Detection without realizing
・Multiple identification	Possibility to catch several running vehicles at the same time.
・Easy to attach (if	Easy to distribute many motorcycles at the same time.
・Cheap	



Proposal for campus



Objective

- To design the strategy to promote it for more usage at many campus and
- To confirm the following technical problems of the motorcycle monitoring system by RFID
  - To develop the estimation method to calculate speed by using two antenna or one antenna
  - To verify the fundamental ability regarding on coverage area from antenna and acquisition rate
  - To verify accuracy of estimated speed.

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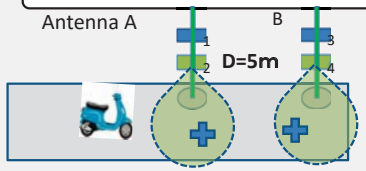
Research methodology

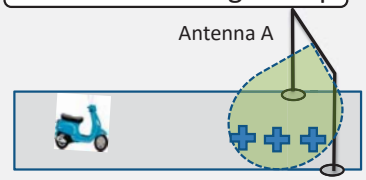
- System architecture was designed and developed by Denso Co.ltd and Denso wave Co.ltd.
- Estimation method for speed is designed as followings.

Two antennas on sidewalk



Actual position when RFID was detected, cannot be identified.
Only time on detected antenna was observed and travel speed is estimated if distance between two position assumed to be 5 m

One antenna on gate-top



How many times RFID detected under the coverage area?
Because the interval of scanning from antenna is constant, travel speed is estimated by no of detections and distance of coverage area

- The feasibility regarding on above estimation would be verified based on the preliminary experiment in Japan. And then demonstration experiment would be conducted in Thailand

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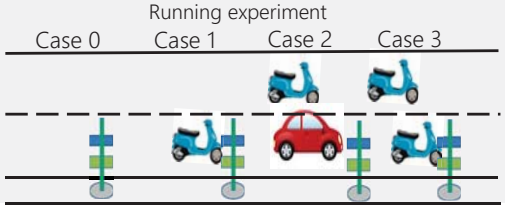
Preliminary experiment

Two antennas on sidewalk

UHF-RFID Reader and Antenna

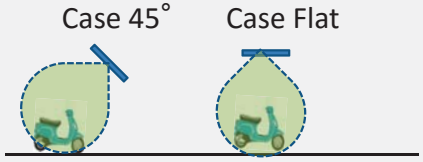
Running experiment



One antenna on gate-top

Antenna
Height:4m, 5m
Angel :45 and flat

Height of IC tag
helmet:1.62m
Motorcycle:0.92 m



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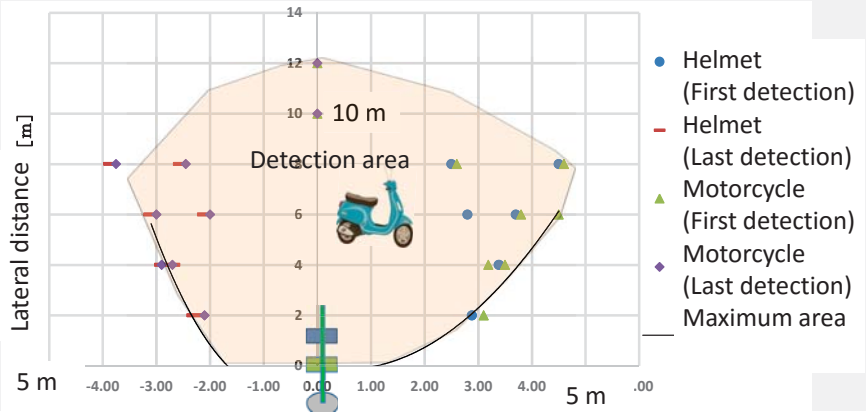
Situation of experiments

Coverage Area from on-sidewalk antenna

- First and second lane from sidewalk can be covered by antenna



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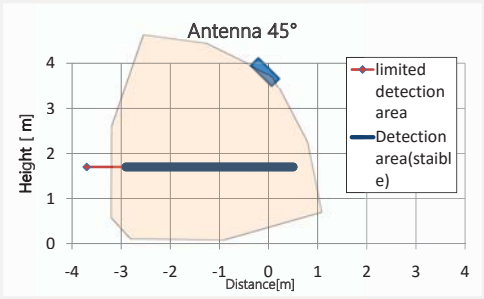
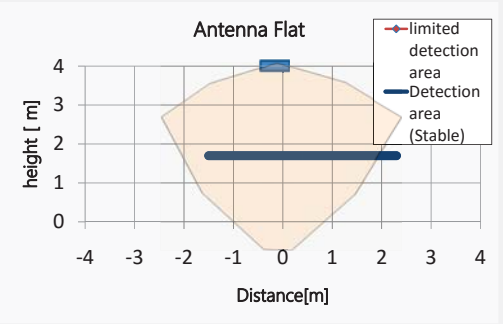
Coverage Area from gate-top antenna

- The IC tag which attached on helmet 1.7 m height could be stably detected under the area approx. 3m long.





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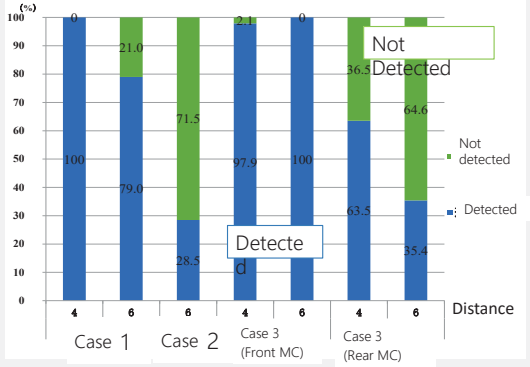
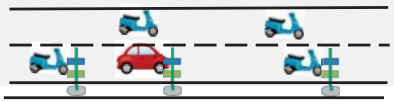
Motorcycle detection from on-sidewalk antenna





- The acquisition rate on first lane (case 1 and case 3 front MC) is approx. 100%
- The acquisition rate of rear motorcycle on second lane cannot reached 100% because of obstruction by front motorcycle/vehicle on first lane.
- If number of lane at entrance and exit of parking is narrow, antenna can be install on sidewalk.

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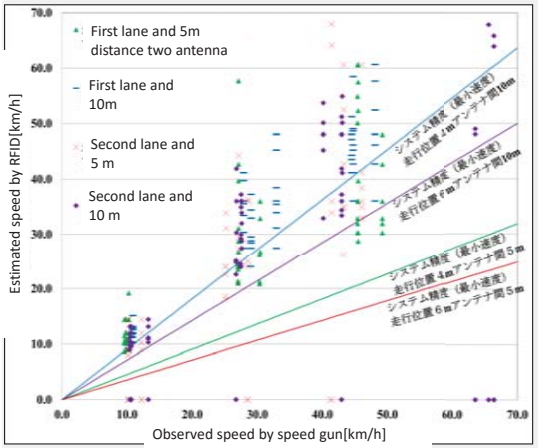
Motorcycle detection from gate-top antenna

	4m(45° &Flat)					5m(45° only)					5m(45° only)				
Speed(km/h)	20	30	40	50	60	20	30	40	50	60	20	30	40	50	60
IC tag on Helmet	✔	☐	✔	✔	☐	✔	☐	☐	☐	☐	✔	☐	☐	80%	☐
IC tag on motorcycle	✔	☐	✔	✔	☐	✔	☐	☐	80 %	☐	✔	☐	☐	☐	☐

✔ 100% acquisition rate for 20 runnings , ☐for five runnings

If height is 4m, acquisition rate is ensured as 100%. The RFID was almost detected even if 5m ,although intensity (signal strength) was reduced as increase of speed in the height 5m

Speed estimation through two antenna



	RFID	MOVATRA
10km/h	±1.4	
30km/h	±5.2	±10
50km/h	±12.1	±10
70km/h	±26.2	±10

- The desirable standard error was achieved in speed less than 30 km/h

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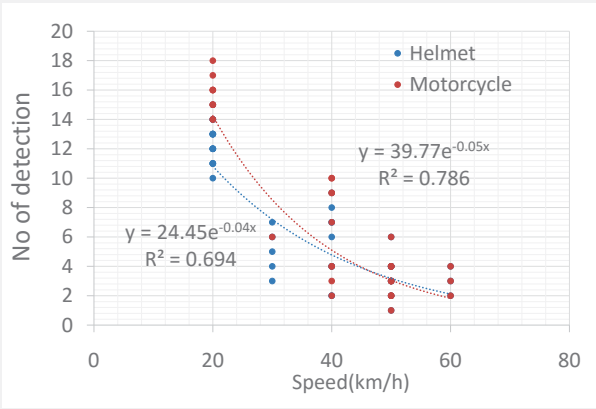
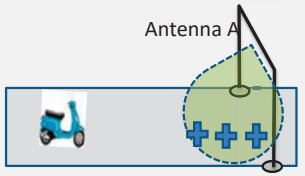
Speed estimation through one gate-top antenna





Based on the methodology by counting number of detection under the coverage area, the estimation might be large variation on each speed.
Therefore, actual reaction on IC tag and its condition will be confirmed.

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Speed classification through one gate-top antenna

- In order to identify under/ over limited speed, the classical analysis was conducted and the result is shown in below table.
- The limited speed is assumed 50 km/h and this is classified by number of RFID detection under the coverage area and intensity of signal(signal strength)

	Estimated speed			
		Under limited speed	Over limited speed	% of hit
Observed Speed	Under limited speed	25	15	62.50%
	Over limited speed	1	19	95.00%
				73.33%

- 38 % was classified into wrong side(The observed speed under limit was identified into over limited speed.)
- It should be improved regarding on performance of antenna and reader

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Conclusion

- The monitoring and management system by RFID was proposed to provide “win-win solution” on university, students and company
- The feasibility of technical problems was confirmed by the experiments
  - Coverage area :
  - Acquisition rate : 100% in first lane from sidewalk antenna and by gate-top antenna 4m height. In the case of occlusion(second lane), rate cannot reach 100%.
  - Speed estimation: Low speed can be estimated with high accuracy but performance of reader and antenna should be improved for high speed.
- The demonstration in Thailand would be conducted concurrently with above improvement.

Third Speaker of <Session 3D>

Dr. Saroch Boonsiripant
Faculty of Engineering, Kasetsart University
E-mail: boonsiripant@gmail.com

Brief Biography:

Saroch Boonsiripant is a lecturer in the Department of Civil Engineering at Kasetsart University. His research focus is in the area of Intelligent Transportation System (ITS), especially applications in freeway management, public transportation, and automated traffic enforcement system. Before joining Kasetsart University in 2011, he was the Chief of Transport System Research and Development Section, Office of Expressway System Engineering Research and Development, Expressway Authority of Thailand. His roles involved the Intelligent Transportation System (ITS) initiatives to enhance EXAT' expressway network. He is also a board committee member of the ITS Thailand Association.

Dr. Boonsiripant received the Bachelor Degree in Civil Engineering from Chulalongkorn University in 2001, the M.S. and Ph.D. Degrees in Civil Engineering from Georgia Institute of Technology, USA in 2003 and 2009, respectively. From 2003 to 2004, he worked as a Transportation Engineer at Grice and Associates, a transportation consulting firm in Atlanta, Georgia. At his workplace, he received the 2004 Grice's Gold Star Employee Award.

Dr. Boonsiripant is the recipient of the Dwight David Eisenhower Fellowship in 2008. His paper, "Determining Acceleration and Deceleration Zones at Traffic Controlled Intersections Based on GPS Data", received the 2008 Best Paper Award from the Institute of Transportation Engineers (ITE) Georgia Section. His following paper, "Measurement and Comparison of Acceleration and Deceleration Zones at Traffic-Controlled Intersections" also received the 2010 Best Paper Award from the Operational Effect of Geometrics Committee at the 89th Transportation Research Board Annual Conference. The National Transport Academic Committee recently awarded him the Best Technical Paper Award for the paper, "Smart Pass: Evaluation of ETC Operations for Truck Traffic", in the 7th National Transport Conference, Bangkok, Thailand in 2010.

ATRANS Safety Map Applica for Accident Database Development
By Dr. Saroch Boonsiripant

Summary:

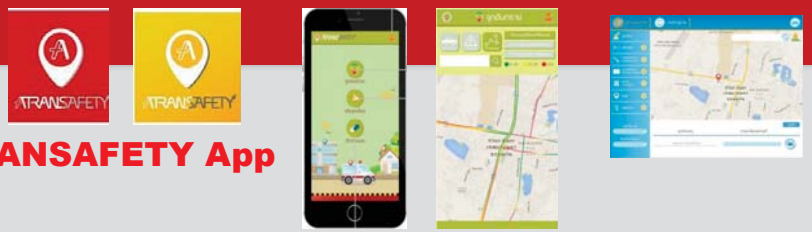
In 2013, World Health Organization (WHO) reported that Thailand has the third highest road fatality rate in the world. Since then, Thai government is putting a lot of efforts and budget to save more lives from road accidents. Eighteen billion baht of budget is allocated to the road accident prevention each year. Many activities have been deployed such as raising public awareness on driving safely through public events and media, improving road geometries, and law enforcement.

However, the latest statistics indicates that our efforts have not yet reach the goal of saving lives. In 2014, Thailand has been ranked the second highest in road traffic fatality rate in the world according to the World Health Organization (WHO), with 44 deaths per 100,000 population.

Regardless of the road safety situation in Thailand, local governments such as municipalities and Subdistrict Administrative Organizations (SAOs) are unable to access historical crash database such as police reports. Other databases are also difficult to access and understand/interpret. Early this year, Khon Kaen Hospital agreed to provide the Injury Surveillance database, i.e., patient injury data actively collected from the Emergency Room (ER), to the Khon Kaen local authorities. Municipalities and SAOs can analyse this data to determine the black spots on their road network. However, the injury data is rather different from the road accident data from police report. Accident type, cause of accident, number of vehicles involved, and road conditions are not included in the database. Therefore, there is a need to quantify the patient's injury severity into the road safety index so that the local authorities can use this information to determine sites with promises. Afterward, in-depth site investigation can be conducted to determine the main causes of the hazardous location and propose the safety measures.

Currently, local authorities do not have a routine road safety inspection/audit. With a limit number of staff, the authorities do not have sufficient engineers to inspect all the road network. The local authorities usually fix the road when someone from the community report or file a complaint. Black spot analysis cannot be conducted since police reports cannot be accessed easily. With the development of the road safety index based on the ER's patient data, agencies can screen the road network with promising sites. The local authorities can only need to visit a small number of sites to investigate the major causes of accident and propose solutions. This will help the local governments to spend limited budget on the most dangerous locations so that the overall road safety can be improved.

ATRANS Safety Map Applica for Accident Database Development



ATRANSAFETY App

By Saroch Boonsiripant, Kasetsart University

19 August 2016

Le Bua (State Tower) Hotel, Bangkok, Thailand

Road Safety Situation in Thailand

Rank	Country	Rate(Road fatalities per 100,000 inhabitants per year)
1	Namibia	45
2	Thailand	44
3	Iran(Islamic Republic of)	38
4	Sudan	36
5	Swaziland	36
6	Venezuela	35
7	Democratic Republic of the Congo	34
8	Malawi	32
9	Dominican Republic	32
10	Iraq	32

(WHO, 2014)

Rank	Country	Rate(Road fatalities per 100,000 inhabitants per year)
1	Libya	73.4
2	Thailand	36.2
3	Malawi	35
4	Liberia	33.7
5	Democratic Republic of the Congo	33.2
6	United Republic of Tanzania	32.9
7	Central African Republic	32.4
8	Iran(Islamic Republic of)	32.1
9	Rwanda	32.1
10	Mozambique	31.6

(WHO, 2015)

How we tackled the problems

Road Safety Improvement Process in Thailand

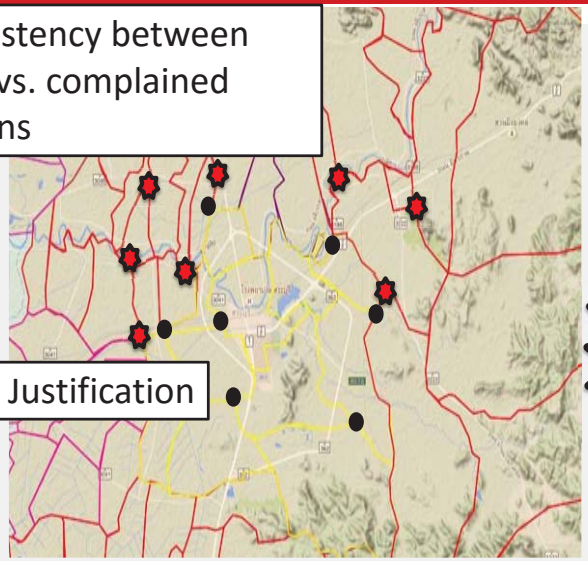
Resident files complaint for an unsafe location.

Local agency conducts site investigation.

Local agency proposes remedies.

Limitations

Inconsistency between actual vs. complained locations



Funding Justification

Black Sports

Hazardous Location

Road Safety Improvement Process

Crash Data Collection

Road Network Screening

Site Investigation

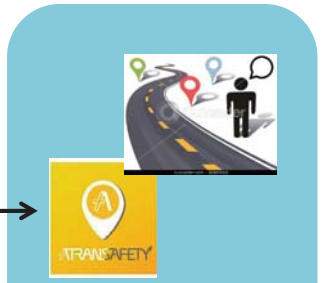
Site Prioritization

Design Framework

Injury Data

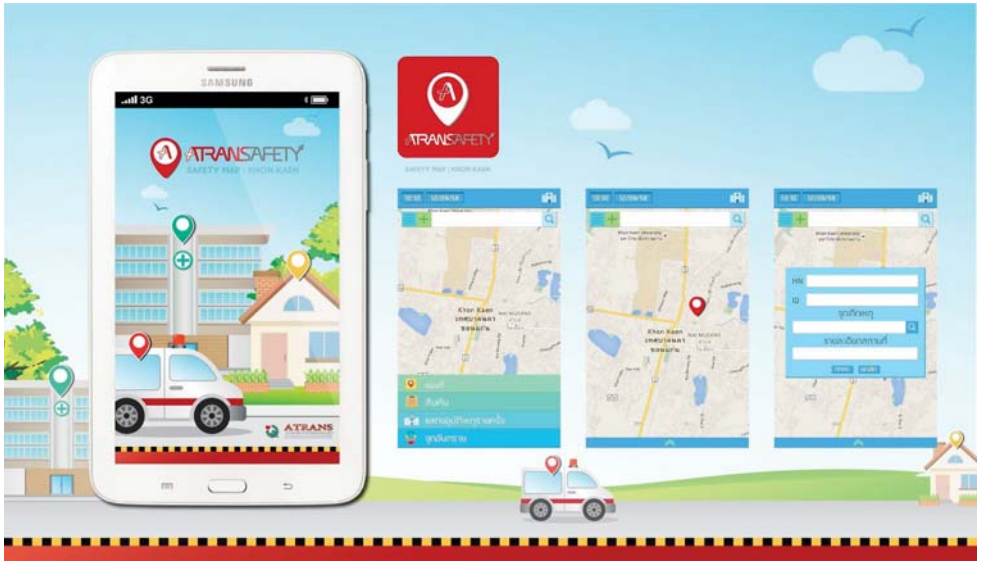
Hiyari Hatto (Public Report)

Road Safety Database

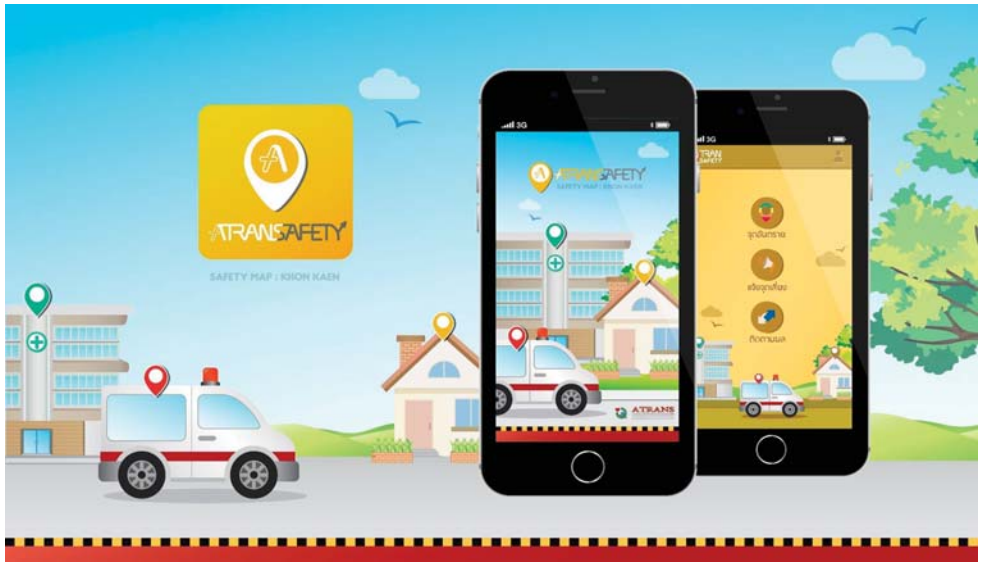


Road Screening

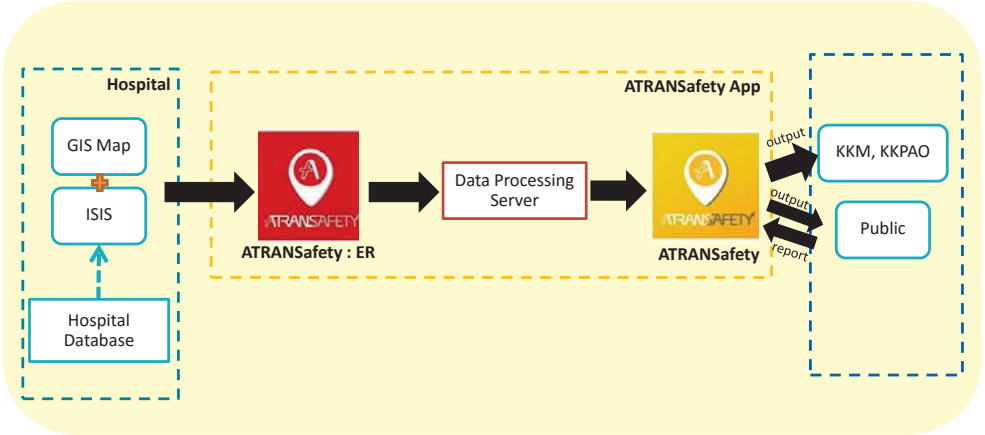
#1 IS App (Input)



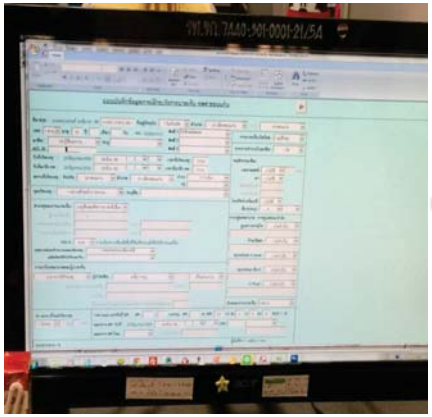
#2 Public App (Output + Input)



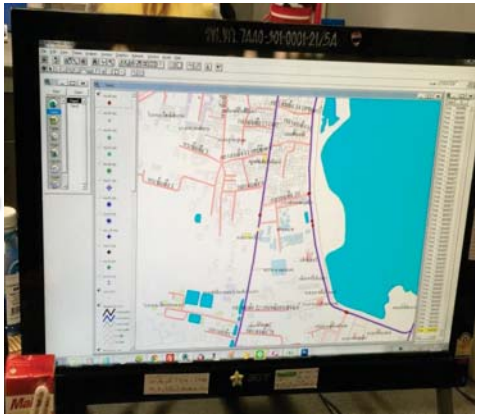
System Architecture



Hospital Database



IS



GIS

Existing ER Data Entry Process

Step I:
Interview

Step II:
IS Form Data Entry

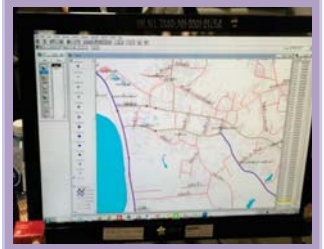
Step III:
PC Data Entry

Accident Location Identification

Step IV: Accident Form

Step V: Accident Map

Step VI: GIS Map



System Evaluation

Stage I: Interview

Stage II: IS Form

Stage III: PC Data Entry

00:00 TIMER

4.58 min

Tablet Data Entry

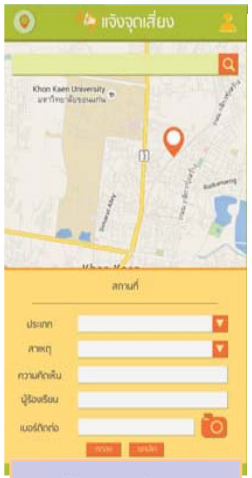
00:00 TIMER **4.40 min**

Accident Database Facts

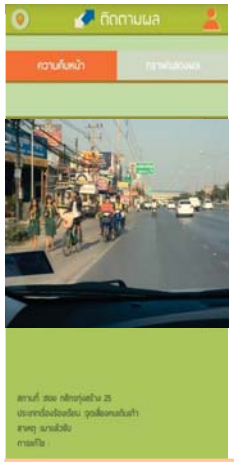
- Hospital data entry **Dairy** since May 1, 2016.
- Total records = 1,900+ cases from May 1 – June 22.
- Total accident locations = 100 points (Municipality only).

ATRANSafety Functions

Accident Location



Hazardous Location Report



Follow - Up

Q/A