An implementation of VICS/RTIC traffic information service in Thailand
- sharing of an experience -

2012/11/21
Toyota Tsusho Electronics (Thailand) Co, Ltd
A member of ITS Thailand

Many emerging countries in the Asia-Pacific region are tackling traffic problems of safety, congestion, environment as they face with the rapid growth of economy, concentration of population and increase of traffic demand in metropolis.

In this session, experts from Asia-Pacific countries with a step-ahead of ITS implementation will share the experiences and lessons learned from the various ITS policies and technologies such as traffic information system, signal control system, BRT, ERP, ETC and so on. And they will also discuss what contributes most to improve the current situation.

ITS in Thailand

- ITS-Thailand started 2008/2.
  Hosted ITS-AP 2009 in Bangkok.
  http://www.its-thailand.org/
  http://www.its.in.th

- iTIC Foundation founded in 2010/6.
  Providing traffic info online/mobile and RDS-TMC (Start from 2009)
  http://www.iticfoundation.org/

- Government bodies/agencies
  OTP/MoT, BMA, EXAT, NECTEC/NSTDA, …

- Private companies
  Navigations, maps, fleet/asset management, …

Thailand Traffic Information Providers

Traffic information providers

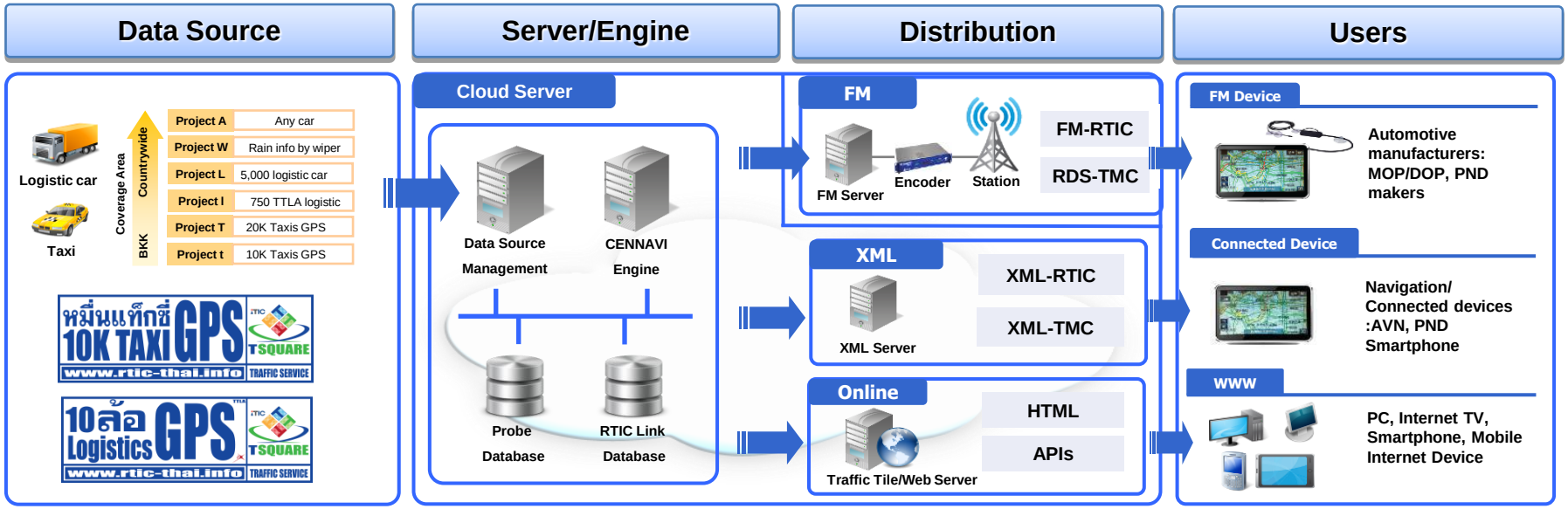
- iTIC Foundation:
  http://www.iticfoundation.org/
- Metamedia:
  http://traffic.longdo.com/
- Ministry of Transport:
  http://itsotp.net/
- National Electronics and Computer Technology Center:
  http://www.traffy.in.th/traffy/
- Google Map

- Apple/iOS6 (started but with no traffic for Thailand yet)

Most are rely on available **limited traffic data sources** and thus **accuracy is an issue**.

TTET starts “TSquare traffic information service from 2012/7~ based on 10K taxis GPS probes data and VICS/RTIC platform

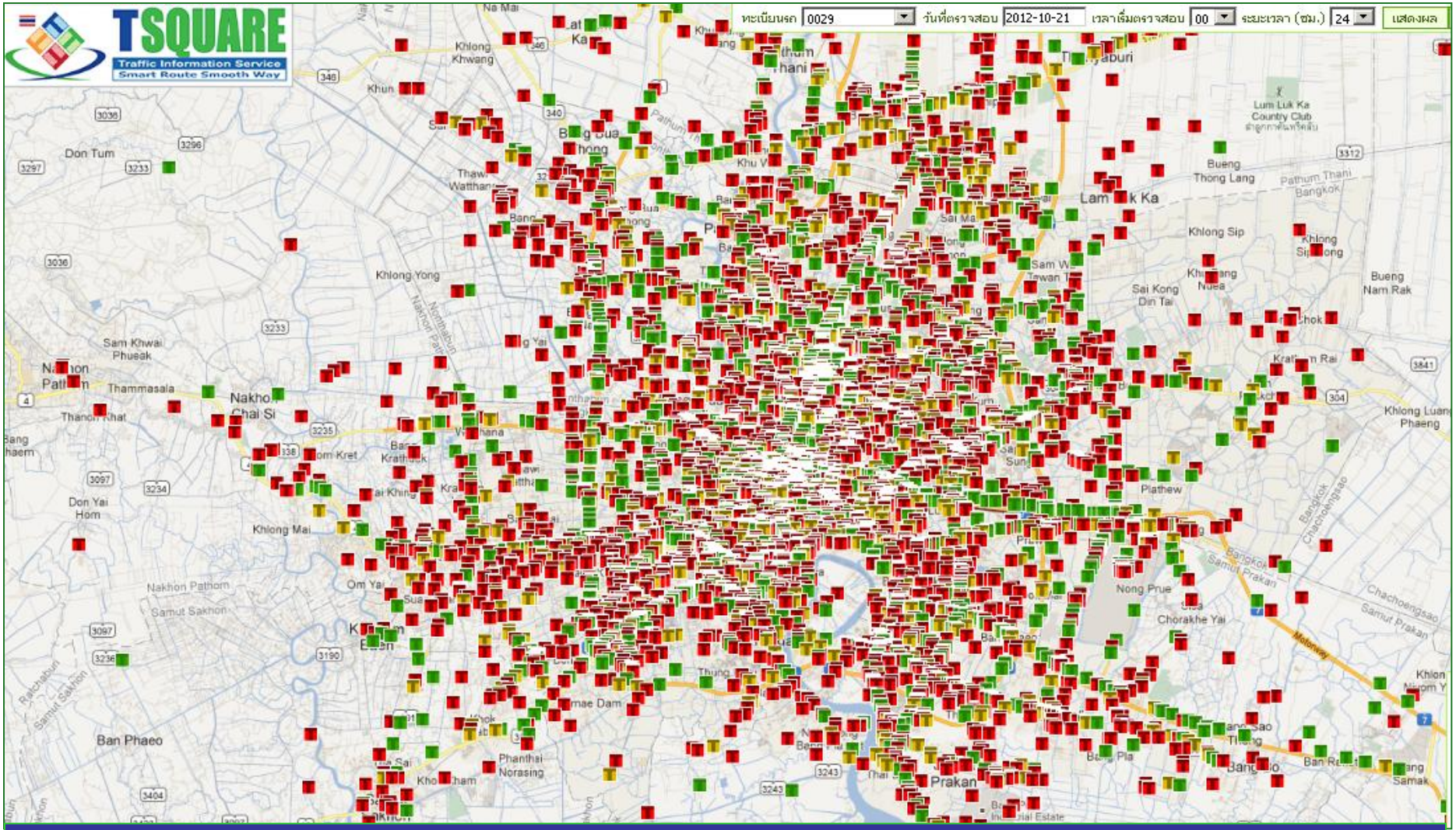
"TSQUARE" VICS/RTIC traffic service in Thailand



- **Traffic Data Sources: GPS from Taxi and trucks**
  - ★ Installed ~9,000 GPS into Bangkok taxis. every 3s/5s GPS data. 60millions data/day
  - ★ Also installed in 250 trucks running across the countries. To expand to >5,000.
- **Analytic Engine**
  - ★ RTIC traffic engine (from Cennavi, China)
- **RTIC/VICS platform**
  - ★ Developed ~25,000 links for Bangkok and 6 surrounding provinces
  - ★ Include not only main roads but also important short cuts and small roads
- **Distribution by FM (RDS-TMC, DARC) and internet/mobile**

G VALUE with you

"TSQUARE" VICS/RTIC traffic service in Thailand



Utilize GPS data from taxi probes as the main source. Capture data every 3 ~ 5 seconds. Combining with existing government data sources become the best data set for analysis.

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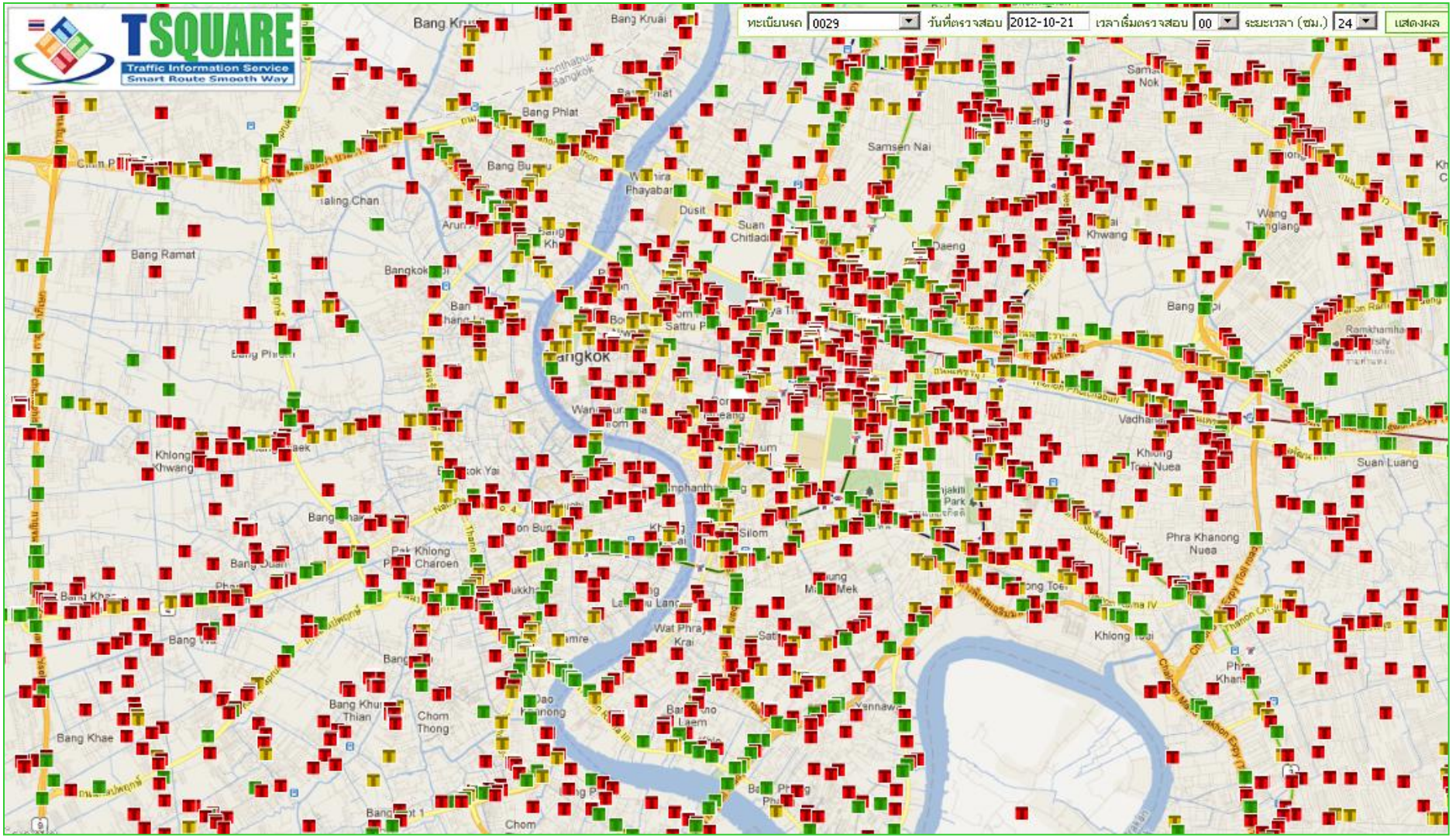
“TSQUARE” VICS/RTIC traffic service in Thailand



Taxis run all the times and everywhere on the streets of the city including small roads

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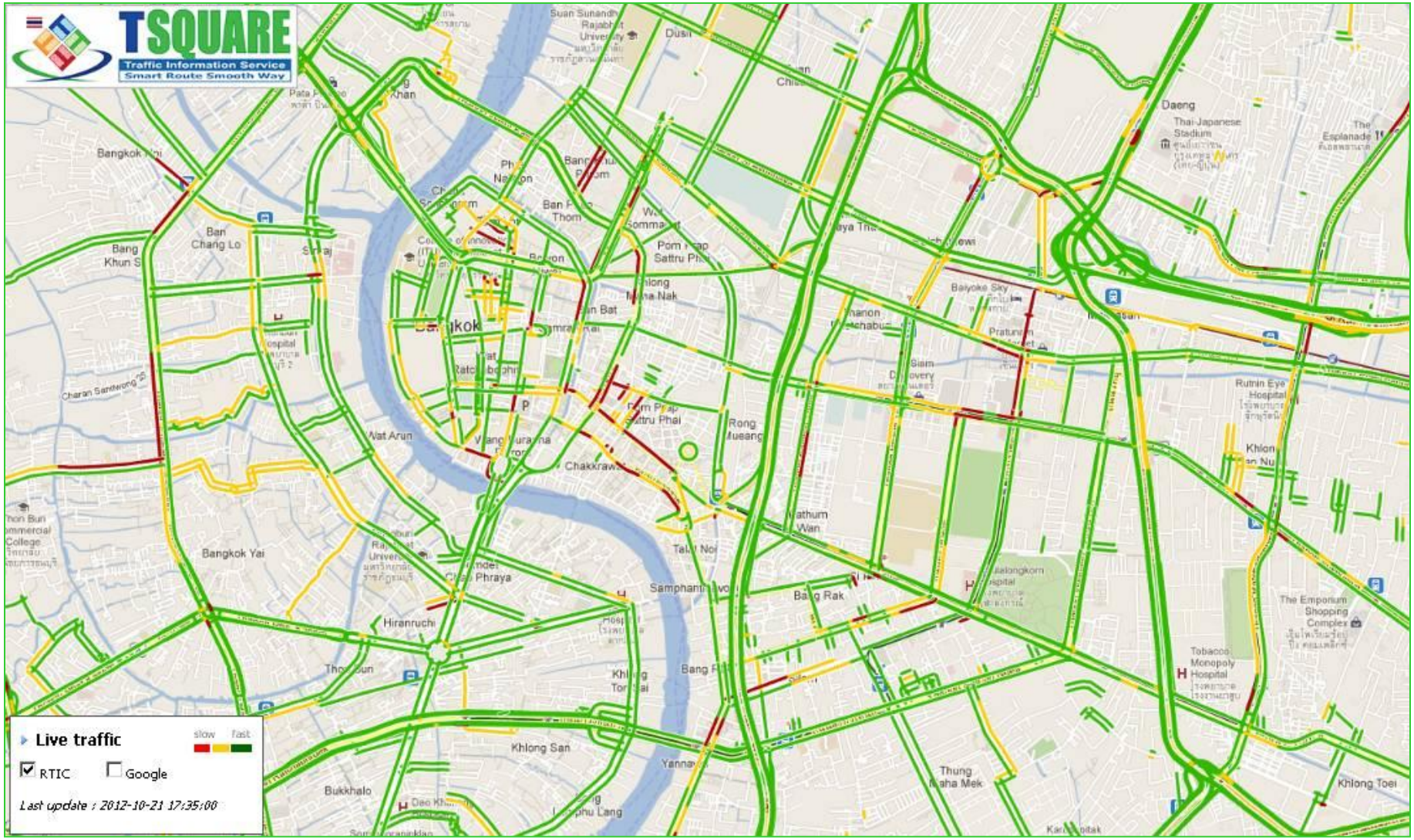
“TSQUARE” VICS/RTIC traffic service in Thailand

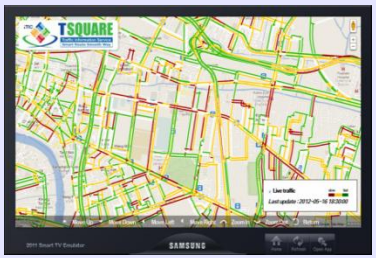


Compare to TMC, VICS/RTIC system can show traffic in big cities very efficiently.

G VALUE with you

"TSQUARE" Applications on Smart devices

TSquare Traffic on Smart TV



Samsung SMART TV

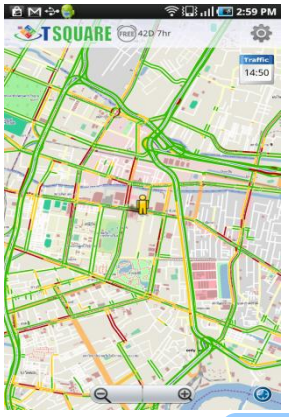
Smart G-BOOK

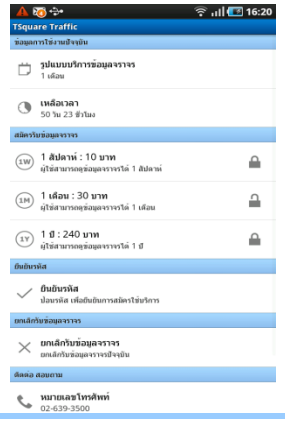
$31.99

Google play

Available on the iPhone App Store

TSquare Traffic





Google play

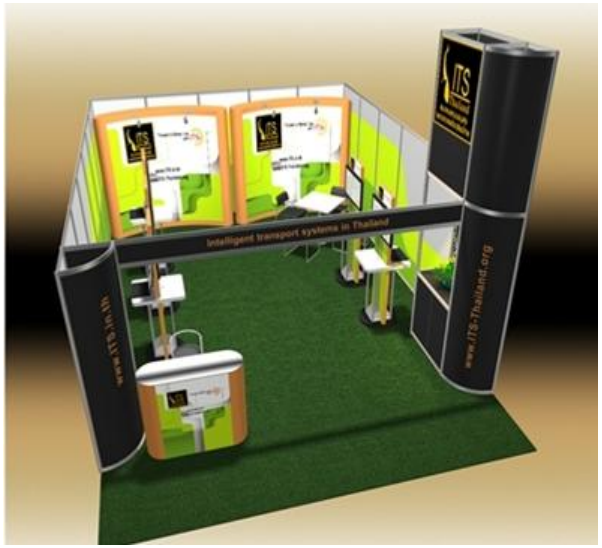
AIS truemove dtac

Longdo Traffic

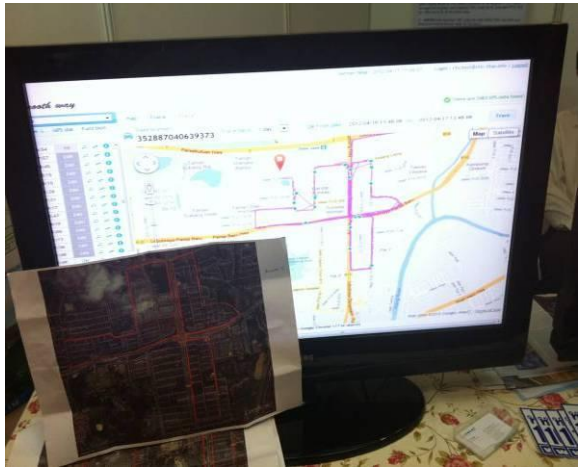
Available on the iPhone App Store

$3.99 for 90 days

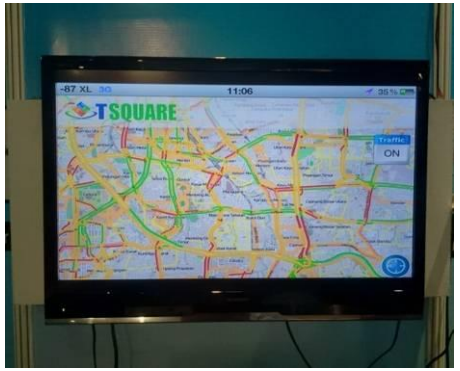
Demonstrated at Bangkok Motor Show 2012, 28 Mar – 8 Apr 2012



Cooperated with ITS-Malaysia on ITS-AP 2012, 16-18 April, Malaysia



Cooperated with ITS-Indonesia on Jakarta Motor Show 2012, 20-30 Sep 2012



G VALUE with you "TSQUARE" Service Roadmap

หมื่นแท็กซี่ 10K TAXI GPS
www.rtic-thai.info
RTIC TSQUARE TRAFFIC SERVICE

Conduct MOU with Taxi groups on 2011/12/09, Thailand

smart G-BOOK Thailand

Coverage: BKK + 6 surrounding provinces
Service: Online-RTIC

Pilot project at Philippines/Manila

FM

FM-RTIC in Bangkok

10K Taxi GPS Project

Start Online Service Bangkok

Philippines

FM-RTIC BKK

Q1 Q3 Q1 Q2 Q3 Q4 Q1 Q3 Q4~

2011 2012 2013

RTIC Pilot BKK

ITS-AP2012 Malaysia

Motor Show Indonesia

Move forward ...

THE BANGKOK INTERNATIONAL MOTOR SHOW 26 MARCH – 6 APRIL 2010

Demo on Motor show, April
Coverage: Center of BKK
Service: RDS-TMC, FM-RTIC, Online RTIC

The 12th ITS ASIA PACIFIC Kuala Lumpur . April . 2012

Demo on ITS-AP2012, April
Coverage: Kua la Lumpur
Service: RDS-TMC,, Online RTIC

ECO-MOBILITY THE 20TH INDONESIA INTERNATIONAL MOTOR SHOW

Coverage: Jakarta
Service: RDS-TMC, Online RTIC

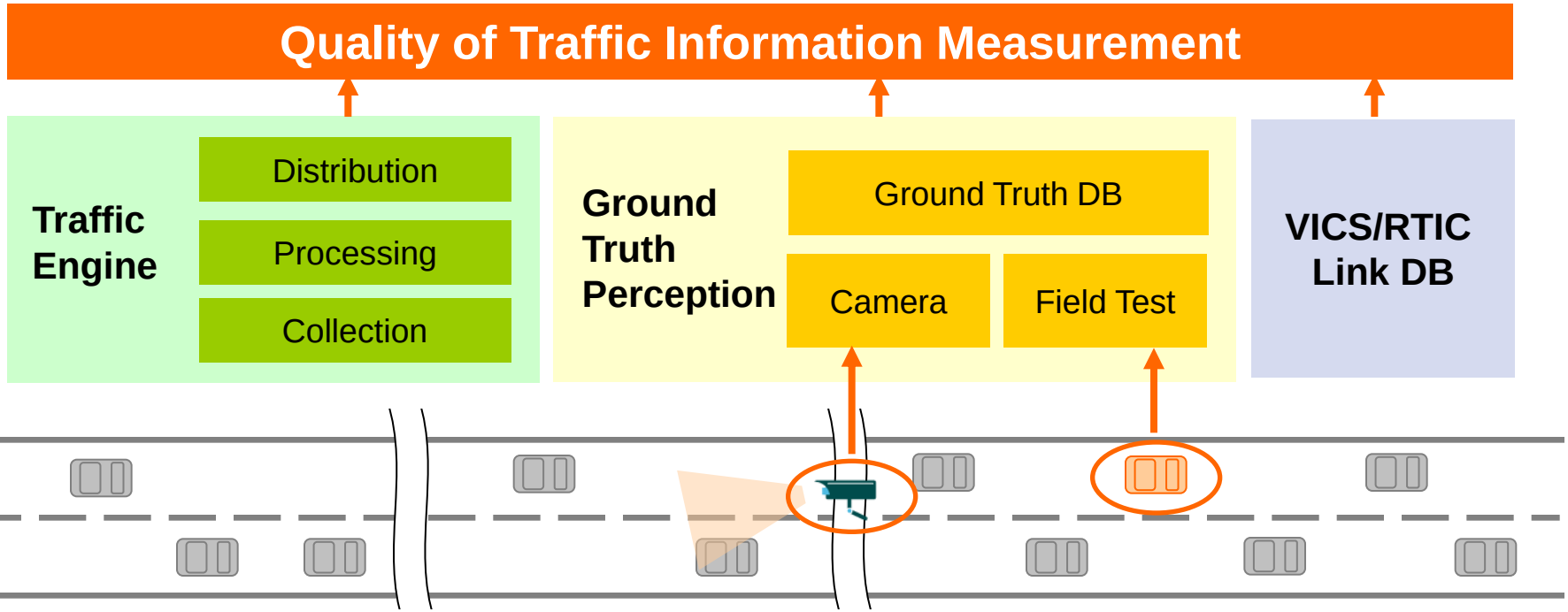
2011 2012 2013

Quality of Traffic Info Concept

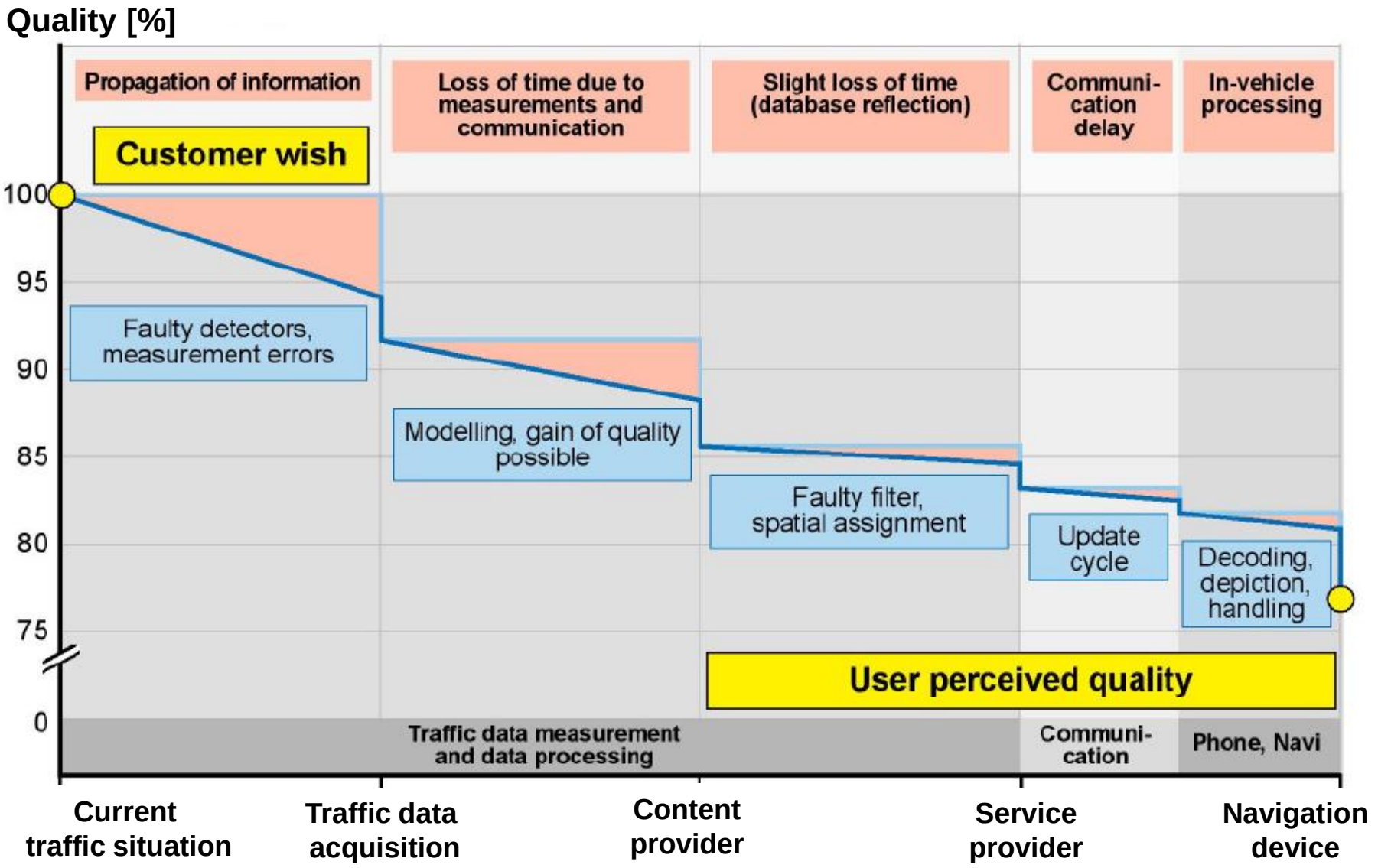
Quality of Traffic Information

Defined by how accurately the system produces traffic flow information which accurately reflects the traffic flow of real road situation known as the “Ground Truth”

Ground Truth Sources Field Test, Camera (be equivalent to)

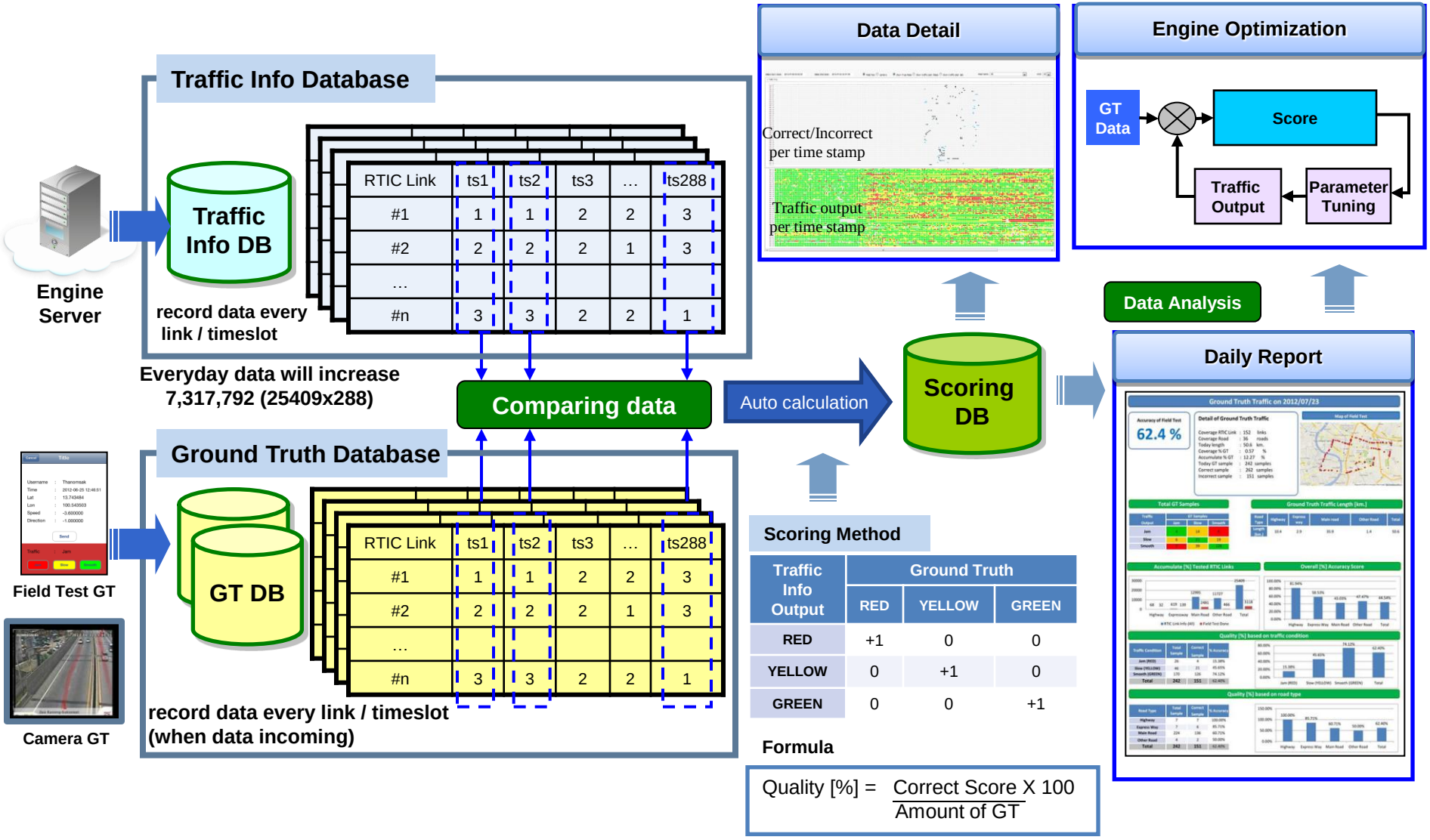


Quality Profile of Traffic Info Chain



Reference: *The quality of traffic information, Dr. Klaus Bogenberger, BMW Group; 2003*

Scoring System Diagram



Scoring Method

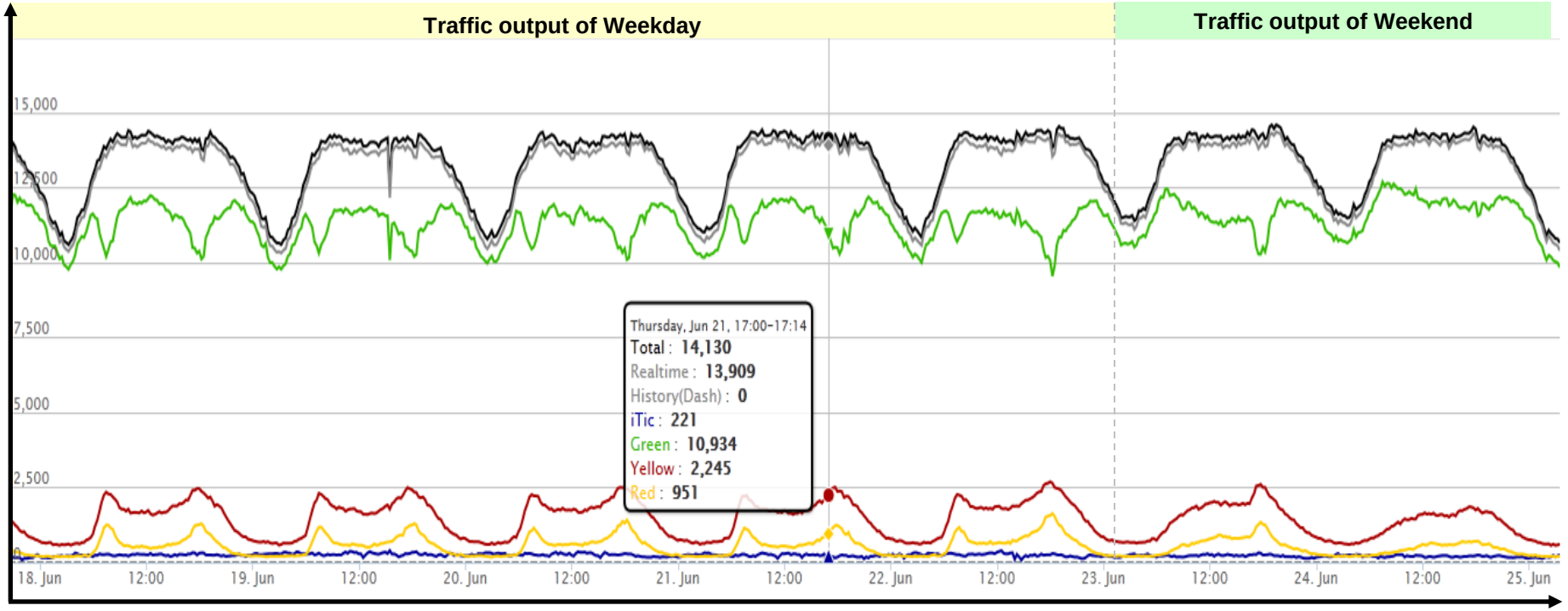
Traffic Info Output	Ground Truth		
	RED	YELLOW	GREEN
RED	+1	0	0
YELLOW	0	+1	0
GREEN	0	0	+1

Formula

$$\text{Quality [\%]} = \frac{\text{Correct Score X 100}}{\text{Amount of GT}}$$

Current Traffic Info Output Characteristic

Amount of RTIC Links Output



Road Type	Number of RTIC links	Avg Traffic Output		Number of RTIC Link (BKK)	Avg Traffic Output (BKK)	
		RTIC links	%		RTIC links	%
Highway	68	52.68	77.47 %	56	52.83	94.34 %
Expressway	619	504.553	81.51 %	565	514.05	90.98 %
Main Road	12,995	8,745.665	67.30 %	8,402	7,772.35	92.51 %
Other Road	11,727	3990	34.02 %	8,846	3993	45.14 %
Total	**25,409**	**13,292.9**	**52.32 %**	**17,869**	**12,332.23**	**69.01 %**

Summary

- No historical data
- Traffic output: ~ 13,293 links
- Plus iTIC: ~ 260 links
- 7,813 Taxies (@06/27)
- 1 Taxi covers 1.7 links

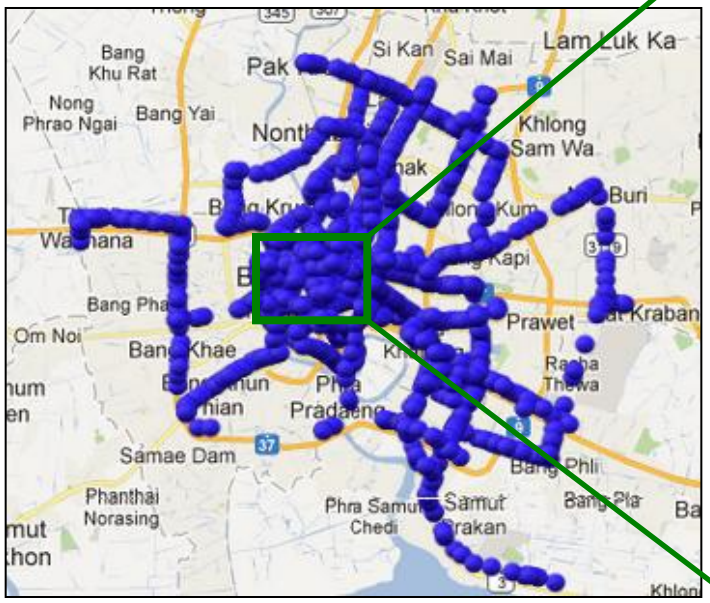
Field Test Plan [June-July 2012]

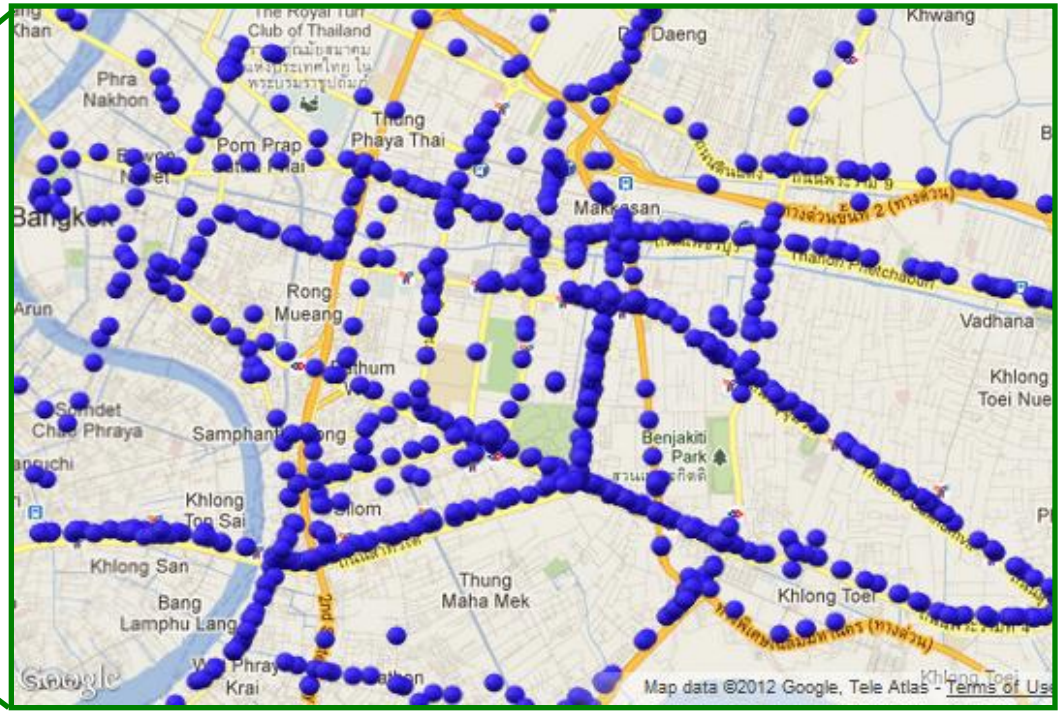
Field Test Plan Logics

- Consider the normal speed driving for daily test route selection, daily length → 60 – 100 KM/ day
- Prioritize congestion occur frequently road sections.
- Prioritize main road first.
- Prioritize the rush hour period first.

Field Test Plan Length

Road Type	Highway	Express way	Main Road	Other Road	Total
Length (KM)	74.3	170.3	1201.7	230.1	1676.5





Field Test Result Sample [07/21 – 07/22]

Period: 07/21 – 07/22

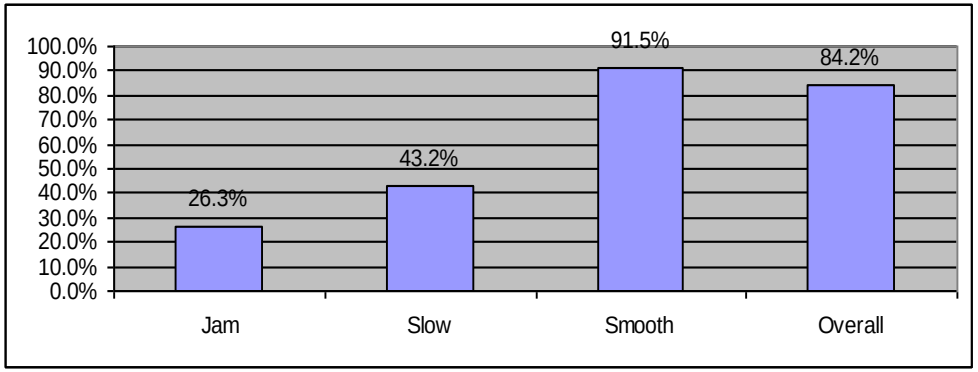
- Field test period (8:00 – 13:00, 16:00 – 22:00)
- Covered 391 RTIC Links → ~ 88 Roads
- Total GT 419 samples

Total GT Samples

Traffic Output	GT Samples		
	Jam	Slow	Smooth
Jam	5	10	4
Slow	1	16	20
Smooth	1	30	332

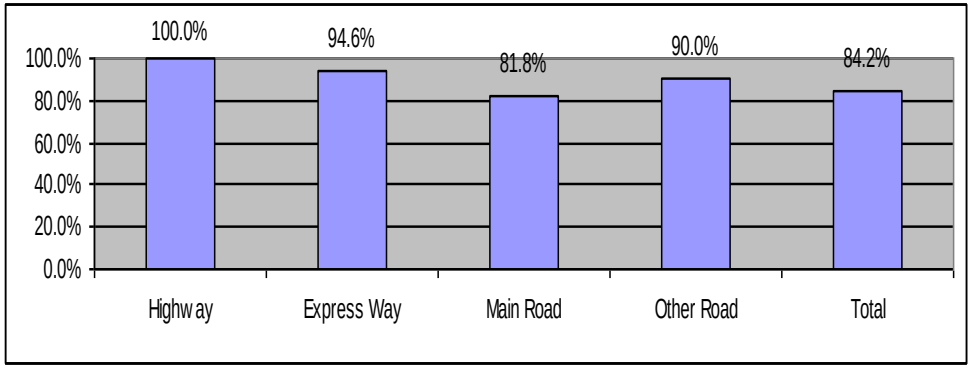
Quality[%] based on traffic condition

Traffic Condition	Total Sample	Correct Sample	% Accuracy
Jam (RED)	19	5	26.3%
Slow (YELLOW)	37	16	43.2%
Smooth (GREEN)	363	332	91.5%
Total	**419**	**353**	**84.2%**



Quality[%] based on road type

Road Type	Total Sample	Correct Sample	% Accuracy
Highway	8	8	100%
Express Way	37	35	94.6%
Main Road	324	265	81.8%
Other Road	50	45	90%
Total	**419**	**353**	**84.2%**



Social impacts from having good traffic info services

A. Road use efficiency	B. Energy Loss	C. Travel Time	D. Environment Impact
Increase road occupation rate	Decrease energy waste	Decrease travel time	Decrease pollution
↑ 10%	↓ 30%	↓ 15%	↓ 30%

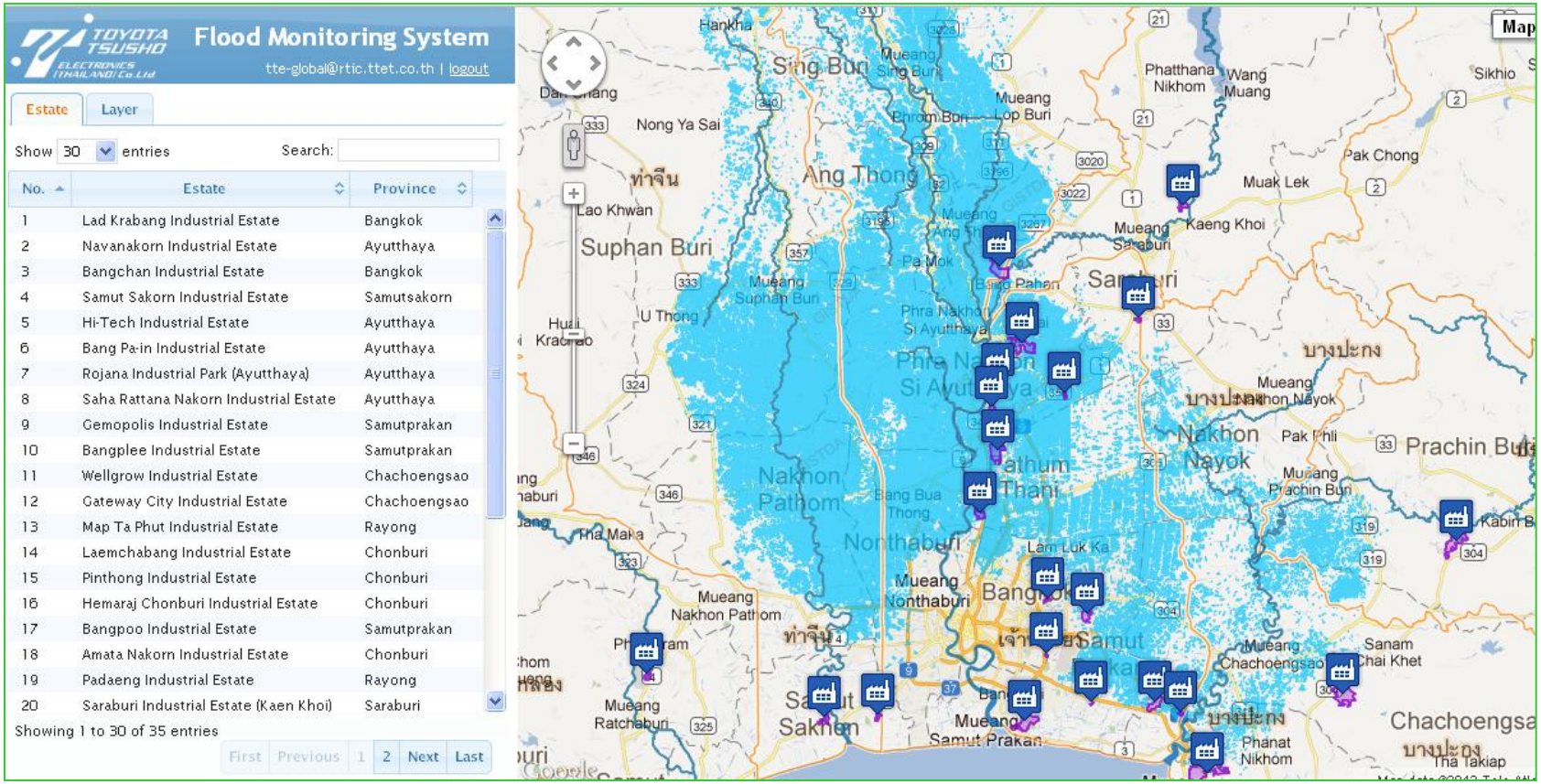
In 90’ s by the traffic police department in conjunction with other government agencies to build traffic information service system VICS in Japan, 20-year cumulative cost of 520 billion yuan of social savings, ease congestion and reduce accidents, the traffic police department to facilitate the creation of a great management

In 80's Europe and USA started traffic information services.Traffic information services now cover the vast majority of countries, have become the daily must. 2008 Los Angeles test: application of traffic information, reduce travel time by 16.2%, and the fuel mileage increased by 7.8%

LBS web app. for SCM and emergency response

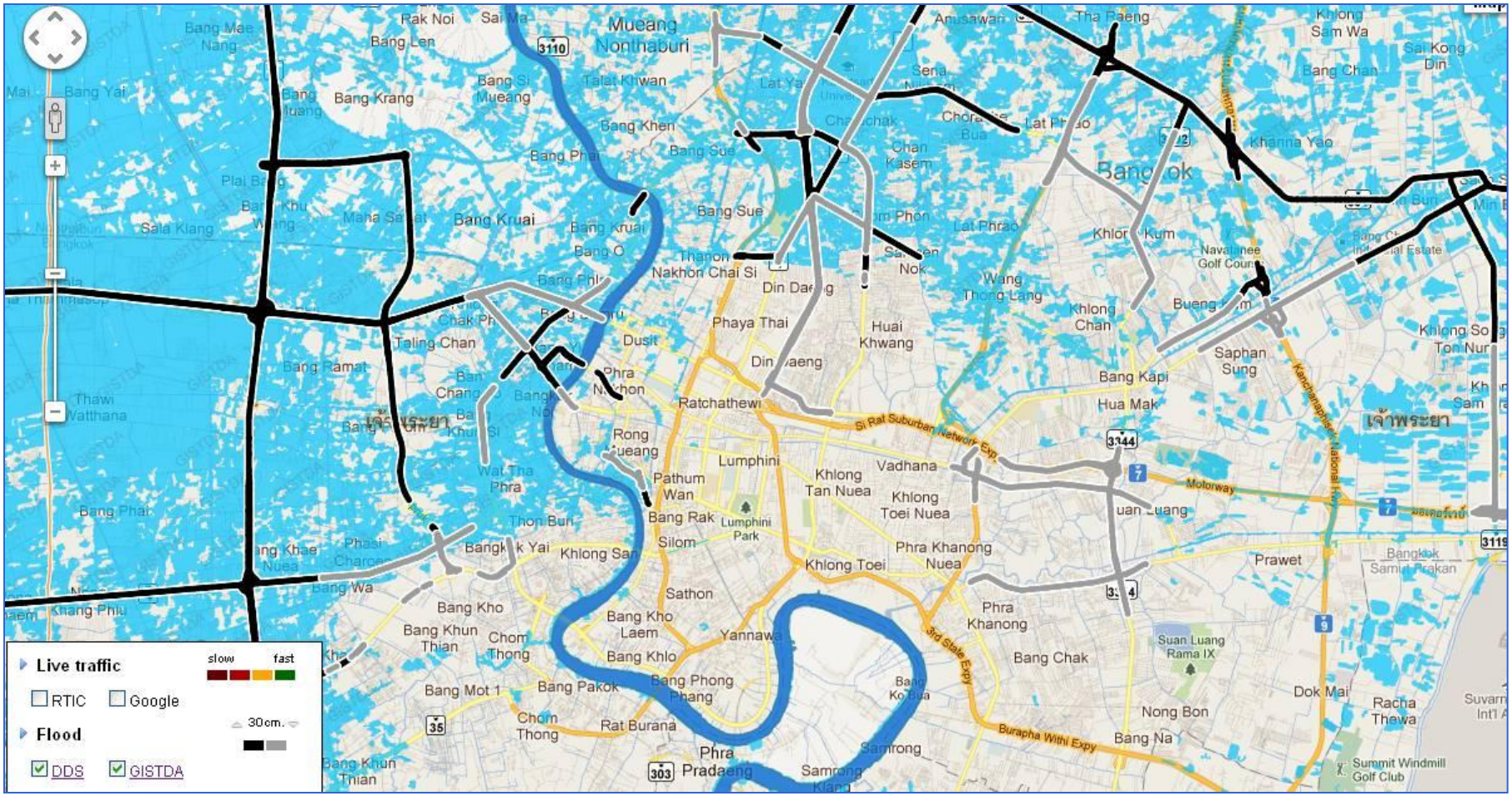
- With on-line database + web mapping technology, it is easily possible to make supply chain “visible.”
- This kind of system has been used to visualize the supply chain during the 2011 Thailand flooding
- It shall be very useful for wider implementation for both public and private use to be ready

for both normal business operation/management and also under the event of natural disasters.



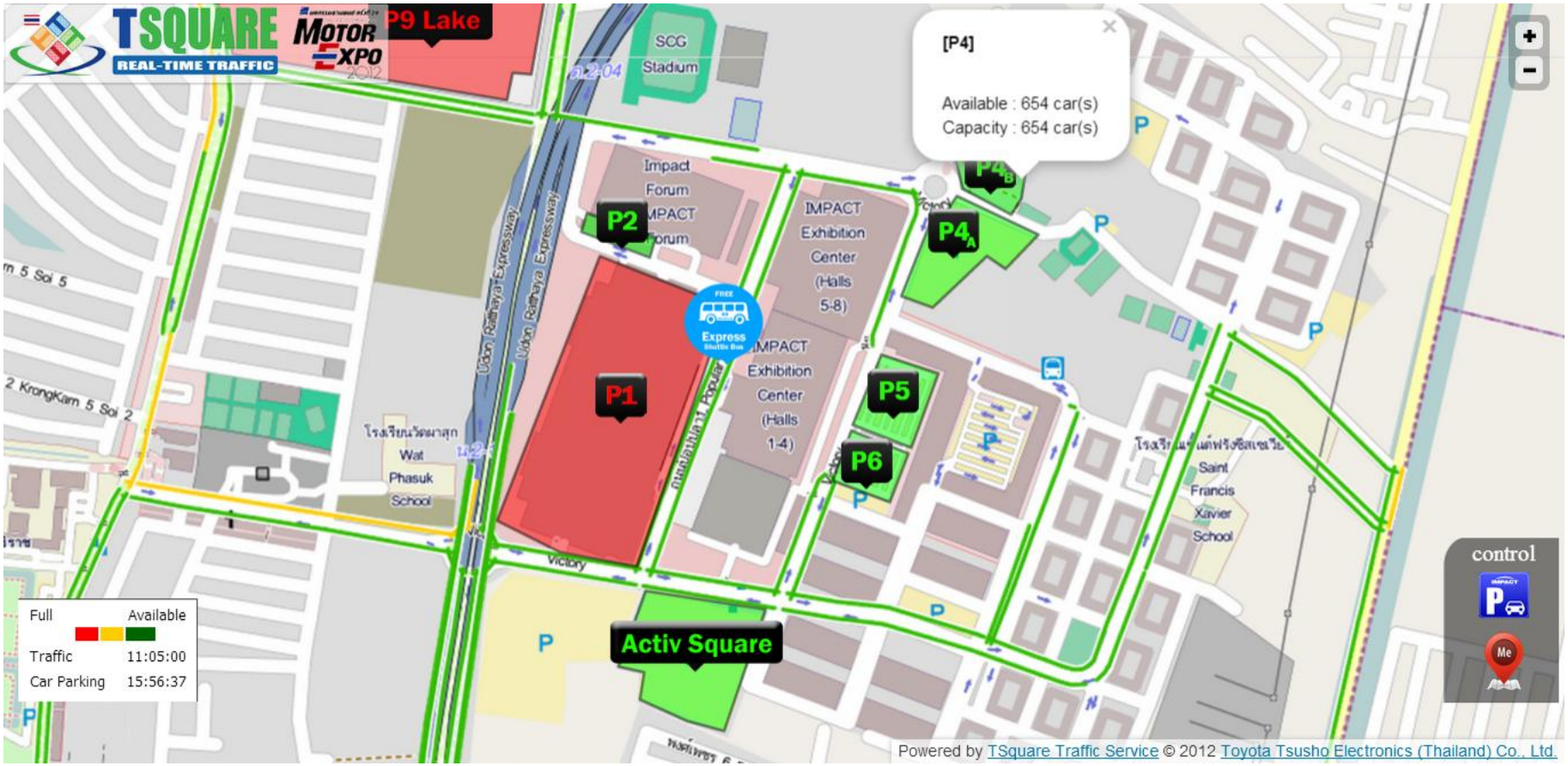
Use of VICS/RTIC Links for flood Information

Adding government flood data, we can utilize VICS/RTIC link to provide flooded roads to end users. In Thailand, 30cm criteria is used to display heavily flooded roads (black colored for water level above 30cm, gray for below 30cm.)



Add-in Parking Information

Add-in Parking Information for Thailand MotorExpo 2012 exhibition area,
29 Nov – 10 Dec 2012. Parking status shown by color and number annotation.



Taxi probes as traffic data source: Good enough?

Our views from implementation in Bangkok/Thailand

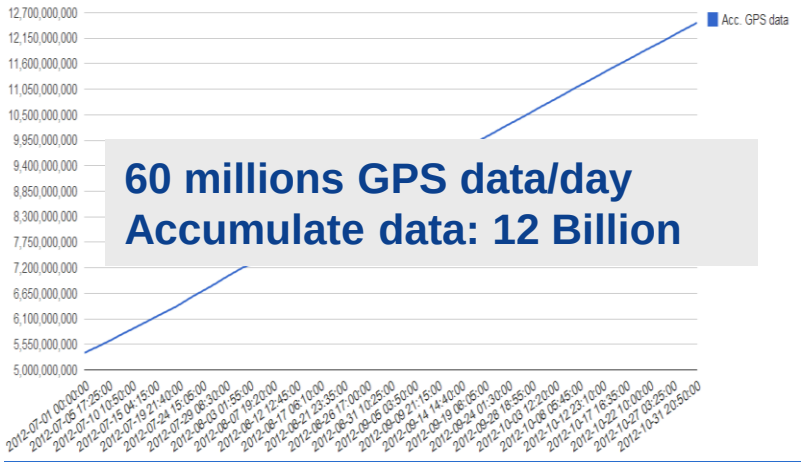
• In Asian mega cities where government sensors are not really enough/available now or ever, **Car probes can be a good candidate traffic data source**.

• Among various vehicles**,** **Taxi GPS probe is the best source. Run all the times, on all types of roads, and less privacy issues.**

Challenges: GPS in taxis are not mandatory in Thailand (yet), so huge investment is needed. Private sector initiative is not easily possible. Also **maintaining/sustaining the service quality** is a big challenge.

Expectation: GPS in taxis/public transportations become mandatory and data are accessible for traffic information service providers.

Moving forward …



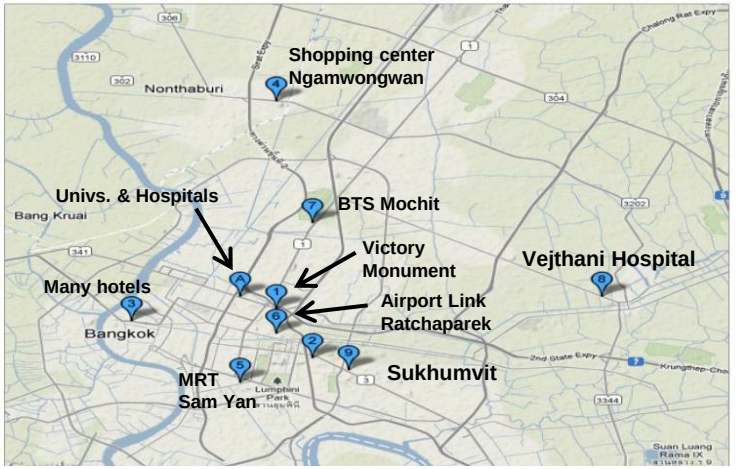
Having 60 millions GPS data/day, we are offering …

- **For taxis operators:** Real-time and historical tracking, taxi meter status monitoring, remote engine cut, taxi dispatching system.
- **For taxis users:** "TSquare Taxi Tracer" and "TSquare Family" app
- **For B2B:** Hstorical ETT, ETA statistics

Big Data Analysis

- Working with TCRDL (Toyota Central R&D Labs) for OD analysis, taxi demand predictions, ….
- Analyze data from Toyota Smart G-BOOK application users.

[Sample Result] Top 10 Hot Spots of Taxi demand on September 2012



We would like to welcome collaborations with ITS communities.

G VALUE
with you

THANK YOU FOR YOUR KIND ATTENTION