APPLICATIONS OF GNSS TECHNOLOGY IN THE MANAGEMENT OF ROAD TRANSPORT IN VIETNAM

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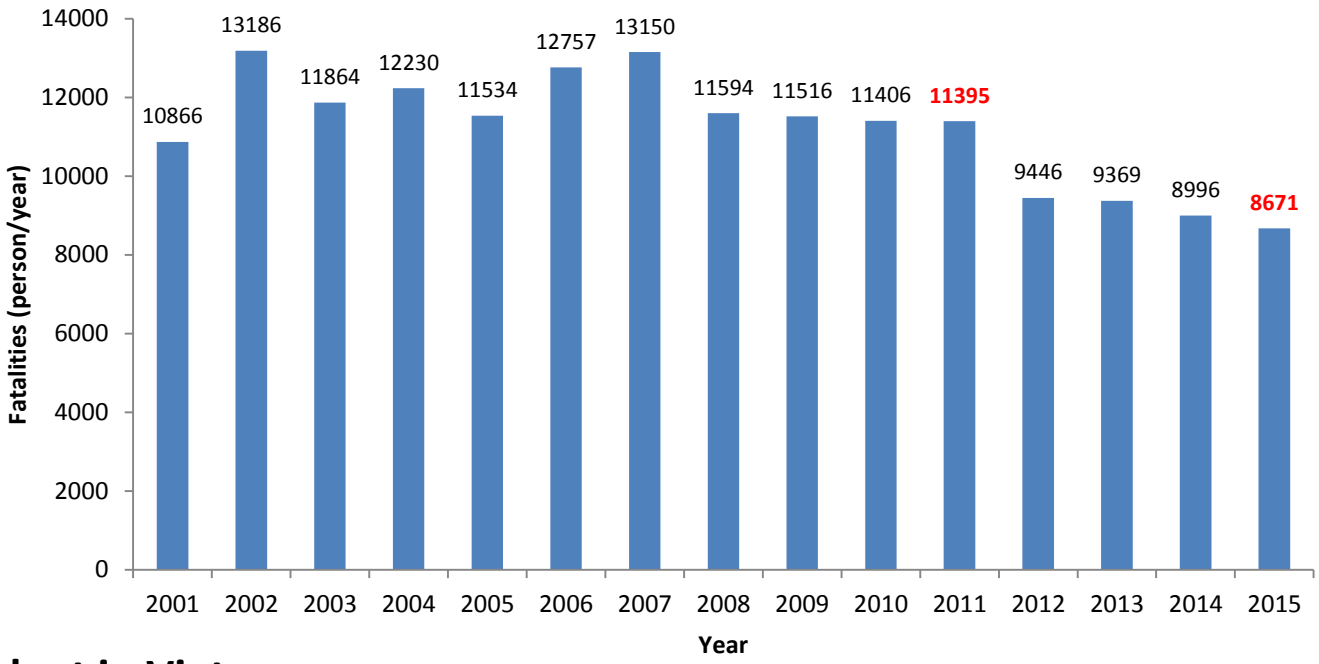
Organization: Directorate for Roads of Vietnam, Ministry of Transport

Traffic Safety Situation in Vietnam



Traffic accident in Vietnam:

- Road accidents share about 99% of total cases and 98% of fatalities
- 10 fatalities per 100.000 people
- Accident cost per year: 5-12 billion USD, total traffic accident cost 2015-2030 period: 130 billion USD.

Regulations on vehicle tracking, tracking devices, tracking data

- According to Decree no. 86/2014/ND-CP dated 10/9/2014: by July 1st 2018, all vehicles used for transport business have to be equipped with tracking devices.
- In 3/2011, MoT issued the Circular No. 08/2011/TT-BGTVT, which proclaims the national conformity standard on tracking devices, named QCVN-31: 2011 (updated in 2014 QCVN-31: 2014)
- In 8/2013, MoT issued the Circular No. 18/2013/TT-BGTVT obliges all transport business companies (i) to install the "black boxes" in their vehicles, and (ii) to provide the data to the authorities for management and control;

- In 8/2013, MoT issued the Circular No. 23/2013/TT-BGTVT on regulations for providing, managing, and using travel monitoring data. This Circular also states the implementation of the National Monitoring Data Centre managed by the Directorate for Roads of Vietnam ;
- In 12/2013, MoT issued the Circular No. 55/2013/TT-BGTVT to define the penalty mechanism in case there is a company or a driver violating the traffic based on the analysis of the black-box monitoring data.

Mandatory information sent to National Data Centre

- According to QCVN 31:2014 - BGTVT, tracking devices have to send the following information to Directorate for Roads of Vietnam (DRV):
  - Route itinerary.
  - Speed: measured by GPS chipset, and countermeter.
  - Continuous driving time
  - Working time of drivers in a day
- Per day: 2 billion data packets ~ 1.4TB data.

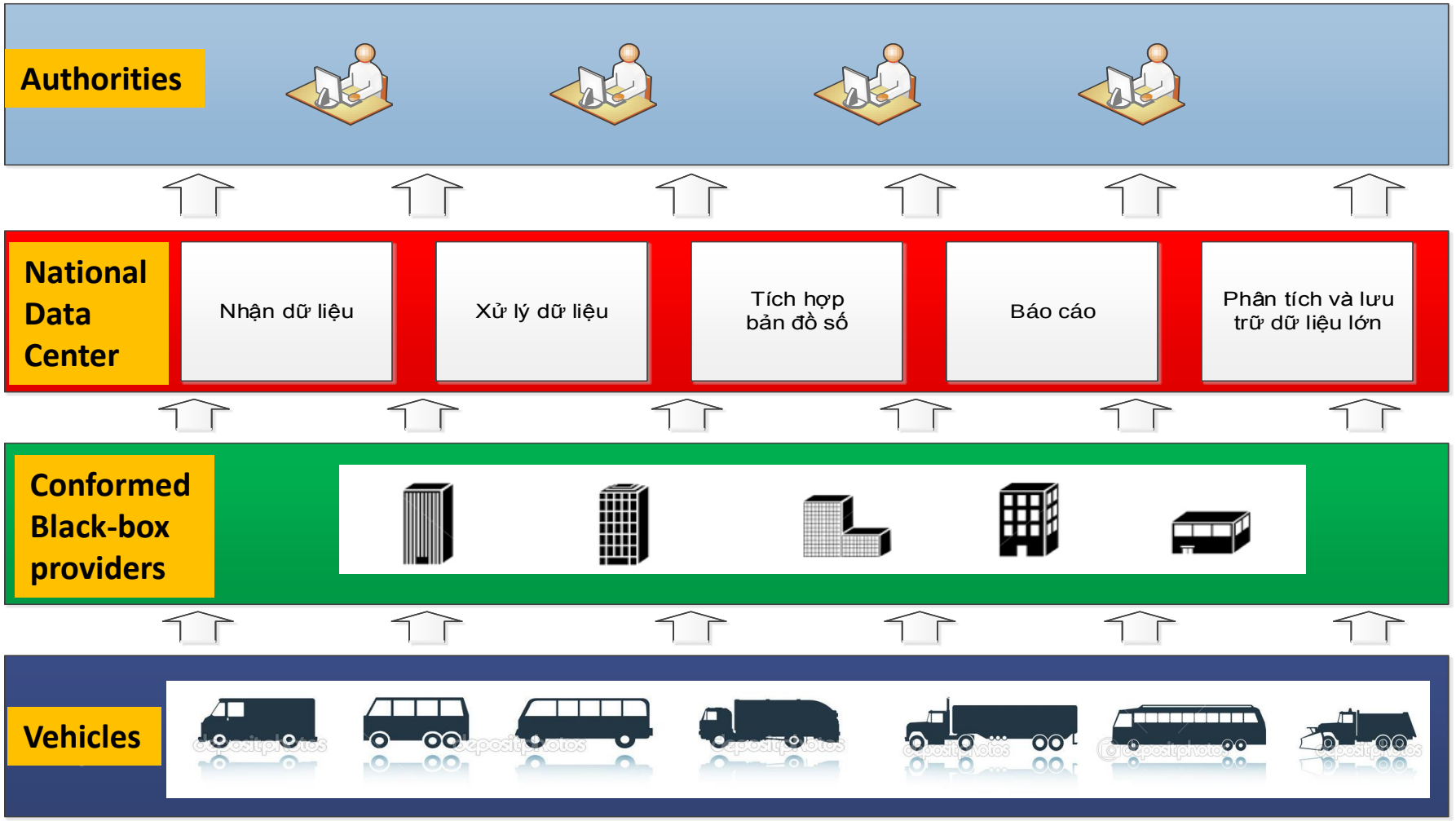
Regulation on monitoring data usage

- Ministry of Transportation enforced Circular no. 09/2015/TT-BGTVT on using the monitoring data:
  - Level 1: the Directorate for Roads of Vietnam builds the system and exploits the database of all vehicles in the country.
  - Level 2: the Department of Transportation (DOT) of provinces and cities exploits the data of those vehicles, which belong to the transport companies registered to the Department.
  - Level 3: Bus stations exploit the data from the system for their operation and management.
  - Summary reports on the violations of tracked vehicles of all provinces/cities as well as transport comapnies are produced and made available to the public.

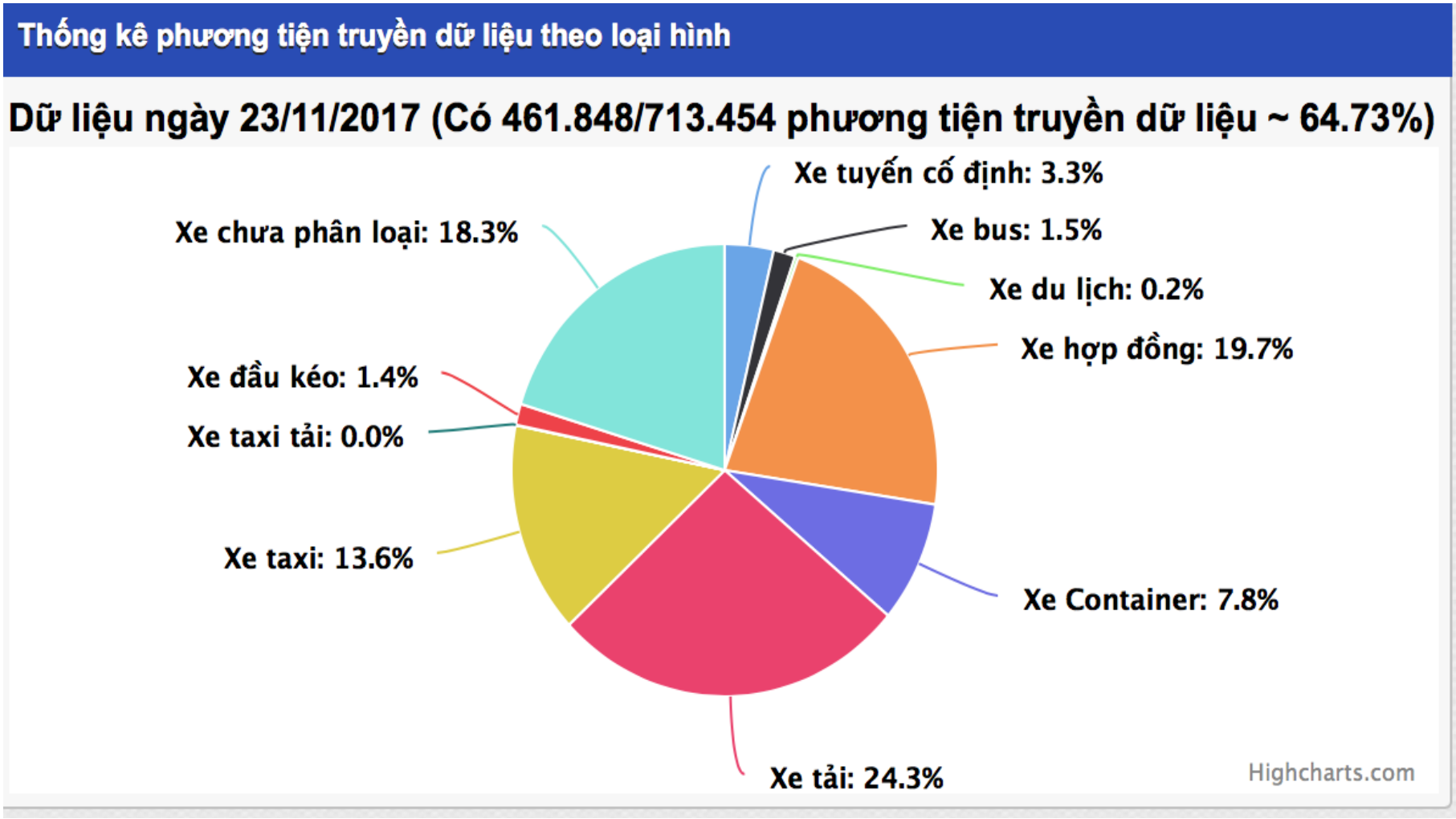
Data integration status

- Total number of the tracking device providers : 68.
- The data must be forwarded from the servers of the tracking device providers to the Nationa Data Centre within 2 minutes.
- As of 9/2018:
  - 900.000 vehicles registered to the system, and
  - 600.000 vehicles transmit data regularly to the system.

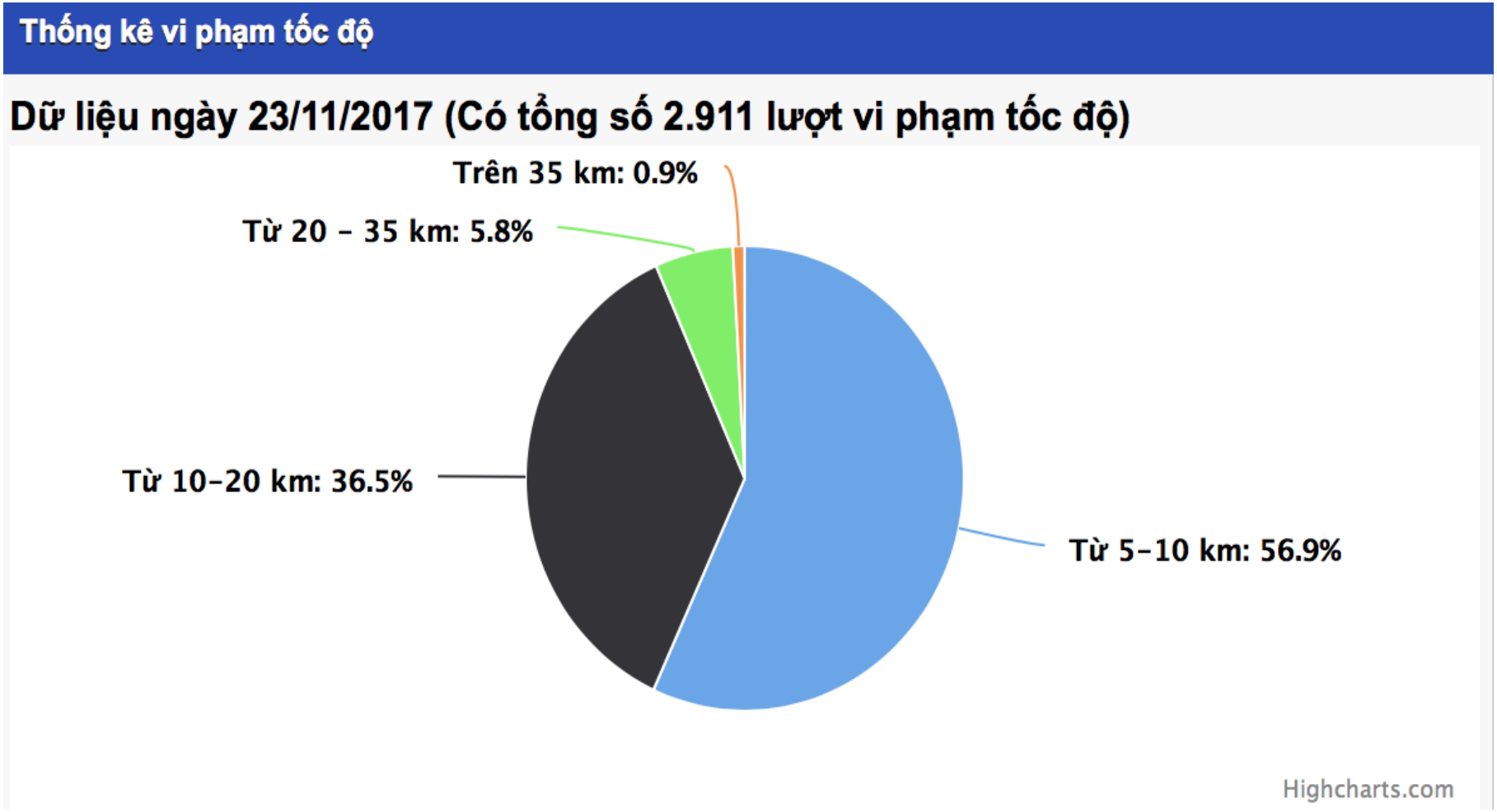
The overall model of the system



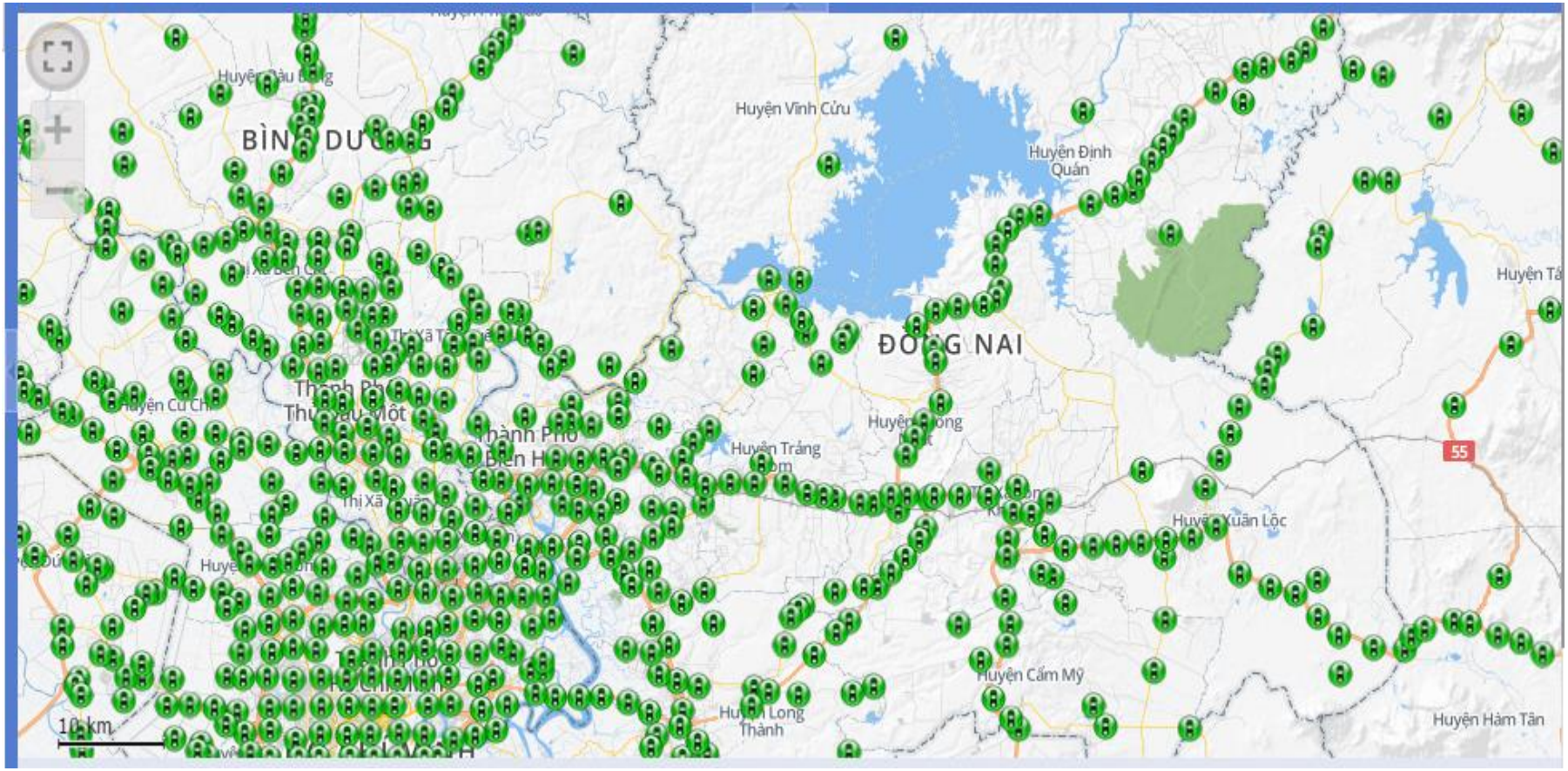
Types of Vehicles transmitting data to the Centre



Current status of speed violation reported by the Centre



On-line monitoring



TRANG CHỦ | GIÁM SÁT HÀNH TRÌNH | BÁO CÁO | DANH MỤC | THÔNG TIN CẦN BIẾT

Ngày bắt đầu 24/11/2017 00:00 Ngày kết thúc 24/11/2017 23:59 Biển số xe cần xem 15A05149

Lịch sử hành trình

Hải Phòng

Công ty TNHH Phát triển công nghệ điện tử Bình Anh

CÔNG TY CP TMXD ANH CƯỜNG

15A05149

Loại xe: Taxi

Nhanh | Báo cáo chi tiết

Địa chỉ	Tốc độ	Thời gian
Thị Trấn Vĩ…	33 km/h	00:02:53
Thị Trấn Vĩ…	33 km/h	00:03:08
Xã Tân Hư…	51 km/h	00:03:23
Xã Tân Hư…	55 km/h	00:03:39
Xã Tân Hư…	54 km/h	00:03:54
Xã Tân Hư…	61 km/h	00:04:08

Kinh độ - Vĩ độ: 106.468956 - 20.684668

Tên đường: Xã Tân Hưng, Huyện Vĩnh Bảo, Thành Phố Hải Phòng,

Tốc độ: 61 km/h **Hướng:** 0

Thời gian: 24/11/2017 00:04:08

Lớp bản đồ

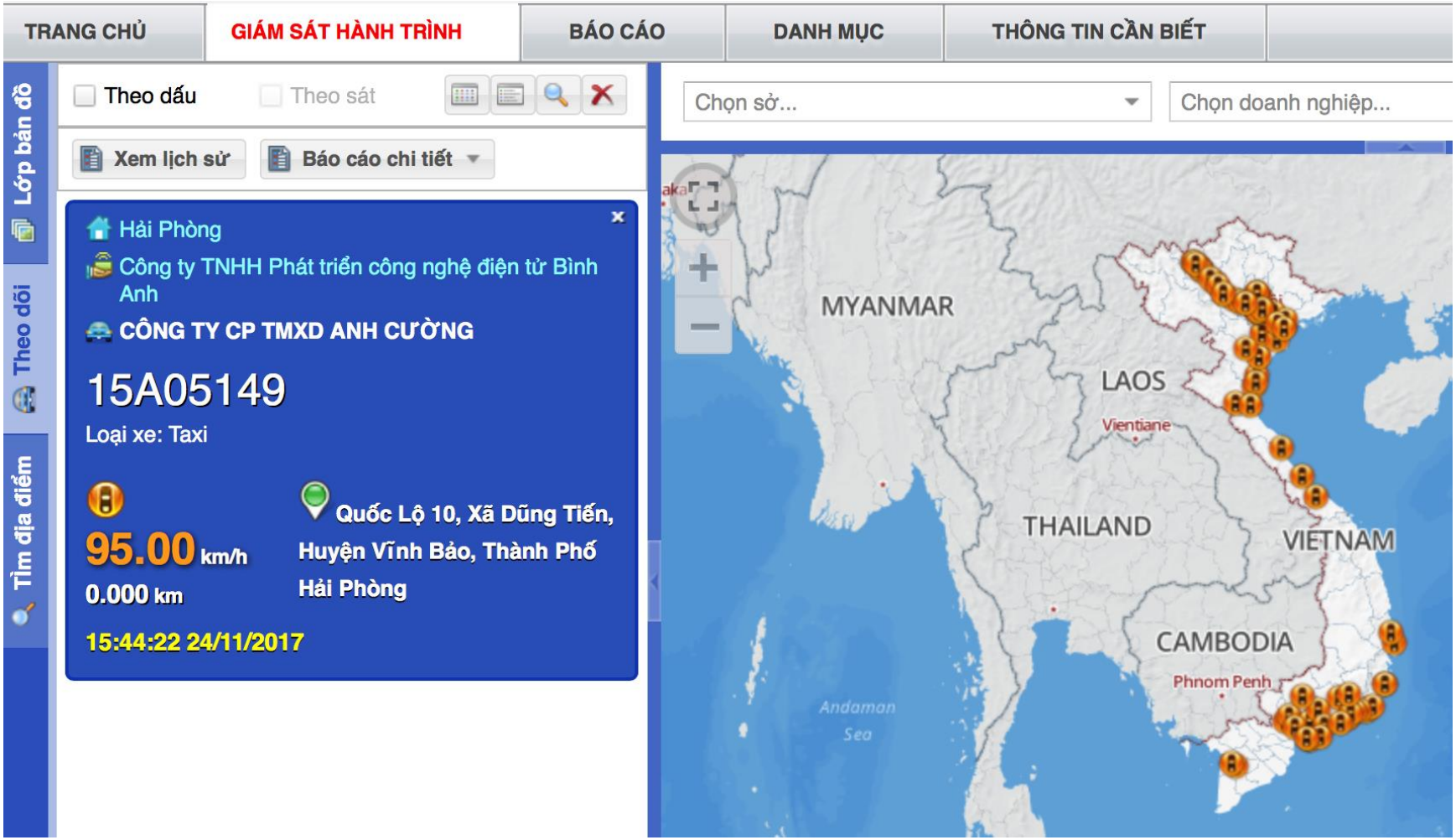
Theo dõi

Tìm địa điểm

- Giám sát hành trình
  - Tốc độ
    - Xe quá tốc độ > 35km/h (1)
    - Xe quá tốc độ <=35km/h (96)
    - Xe đúng tốc độ (0)
    - Xe dừng (0)
    - Xe mất tín hiệu (0)
  - Loại phương tiện
    - Xe khách (26)
    - Xe bus (6)
    - Xe hợp đồng (22)
    - Xe du lịch (0)
    - Xe taxi (3)
    - Xe tải (8)
    - Xe taxi tải (0)
    - Xe container (11)
    - Xe đầu kéo (2)

Chọn sở...

Chọn doanh ngh


TRANG CHỦ
GIÁM SÁT HÀNH TRÌNH
BÁO CÁO
DANH MỤC
THÔNG TIN CẦN BIẾT
Lớp bản đồ
Theo dõi
Tìm địa điểm
Theo dấu
Theo sát
Xem lịch sử
Báo cáo chi tiết
Chọn sở...
Chọn doanh nghiệp...
Hải Phòng
Công ty TNHH Phát triển công nghệ điện tử Bình Anh
CÔNG TY CP TMXD ANH CƯỜNG
15A05149
Loại xe: Taxi
95.00 km/h
0.000 km
Quốc Lộ 10, Xã Dũng Tiến, Huyện Vĩnh Bảo, Thành Phố Hải Phòng
15:44:22 24/11/2017
MYANMAR
LAOS
Vientiane
THAILAND
VIETNAM
CAMBODIA
Phnom Penh
Andaman Sea

Reports generated by the Centre

- Violation reports:
  - Report on the number of speed violations by province, transport agencies, and each vehicle.
  - Report on the number of violations of continuous driving time (more than 4 hours).
  - Report of the number of violations of the working time of drivers on a day (more than 10 hours).
  - Report on data transfer from the units to the system of the Directorate of Roads.
- Also reports on:
  - 10 provinces with highest number of violations/1000 km,
  - 10 provinces with lowest number of violations.

Impacts of the Centre

- Report on the statistics of speed violations by province

  Results of data analysis in 10/2015 (the 10 highest provinces)

No	Province	10/2015		Compare to 09/2015		Accumulating for 10 months	
		Numbers of violations	Numbers of violations /1000 km	Numbers of violations	Numbers of violations /1000 km	Total numbers of violations	Total numbers of violations /1000 km
1	Kon Tum	5.427	2,83	3.804	1,35	17.996	1,55
2	Gia Lai	6.143	2,79	3.027	1,11	114.084	6,30
3	Tây Ninh	11.060	2,74	10.746	2,64	134.288	3,81
4	Sóc Trăng	3.816	1,93	-2.073	-1,62	67.812	1,74
5	Quảng Trị	1.379	1,61	449	0,18	44.065	3,73
6	Bình Phước	2.667	1,58	2.398	1,39	199.372	7,90
7	Hậu Giang	2.715	1,49	-2.099	-1,93	50.722	2,98
8	Bà Rịa-Vũng Tàu	11.391	1,35	6.335	0,59	509.449	8,95
9	Bình Định	8.899	1,29	-4.096	-1,30	243.013	5,21
10	Ninh Thuận	2.596	1,22	-2.638	-2,13	102.757	6,98

The number of speed violations per 1000 km decreased dramatically (from 5.0 times/1000 km in 1/2015 to 0.26 times/1000 km in 10/2015)

Violation handling

- 2015: 5,698 vehicles were revoked transport right token;
- 2016: 11,362 vehicles were fined:
  - 9,799 vehicles were revoked transport right token in 1 month
  - 1,553 vehicles were refused to get transport right token,
  - 10 companies were revoked the business permit;
- 2017: 28,005 vehicles were fined:
  - 26,505 vehicles were revoked transport right token;
  - 1,477 vehicles were refused to get the token
  - 23 companies were revoked the business permit.

Remaining problems

- Quality of the tracking devices in the market
- Reliability of the data reported from the blackboxes
- Driver behaviours:
  - Turn off the device for driving over the speed limit or for driving continuously more than 4 hours.
  - Use the GPS jammer to avoid the management of the authorities.
- Quality of the digital map and data on it
- Data sharing with other transport management systems.

Future development

- More reports:
  - On each transport mode (fixed routes, rental vehicles, tourist cars, buses,…).
  - Daily for public media, such as: 10 areas having the highest number of violation, 10 transport companies having the highest number of violation, 100 highest over-speed vehicles.
- Digital map improvement by adding more data layers: traffic signs, speed limits…
- Jamming detection, and jamming localization
- Exploit the tracking data of the National Data Centre:
  - Location based services, eg. live traffic information…
  - Applications of data science techniques (big data processing, AI, machine learning…)

Thank you very much!