3rd SIP-adus Workshop on Connected and Automated Driving Systems 2016

Dynamic Map

Research for the advancement of driving support by utilizing traffic regulation information

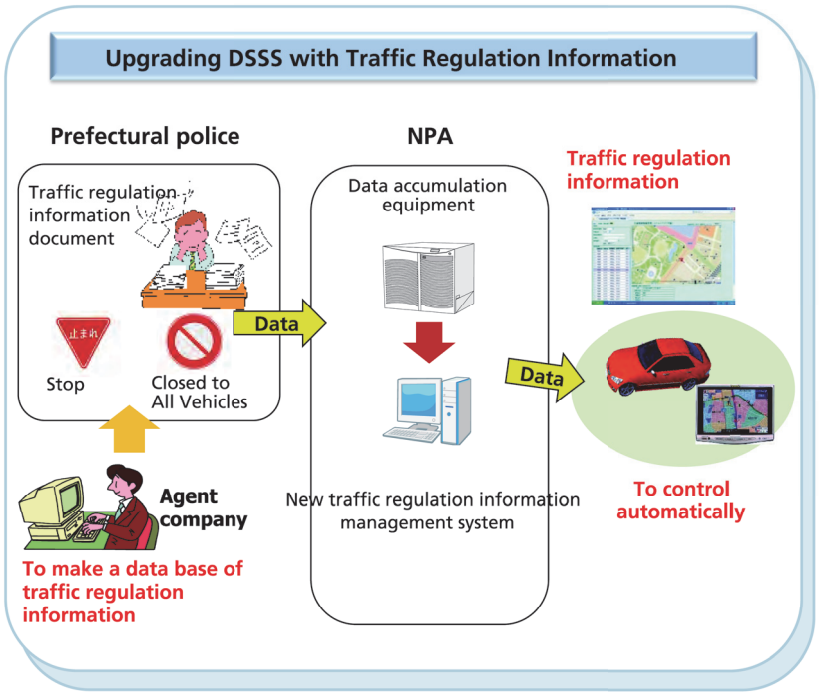
Object of the Project

To realize safe driving support and automated driving systems, it is considered crucial that the vehicle recognizes traffic regulations in real time and implements control. Therefore, with the aim of developing and verifying a system that integrates traffic regulation information managed by each prefectural police headquarters and provides it to vehicles, the following will be implemented to build a centralized database of traffic regulation information by gathering traffic regulation information managed by each prefectural police headquarters.

a) Establishment of criteria for the standardization of traffic regulation information.
b) Electronic conversion of traffic regulation information.
c) Standardization of traffic regulation information.
d) Examination on the development of a model system.

Project Summary

a) Establishment of criteria for the standardization of traffic regulation information: Based on the common formats developed during the research in fiscal 2014, an ideal form of a standard electronic data format (the standard format) that provides organized information items, codes, etc. was developed. Standard formats were also defined for traffic regulation information through detailed examination of the common formats, identification of common items such as types and forms of regulations, location information, regulation number and dates information, and through detailed checking of the expressions of information such as time, period and direction that vary among prefectures.
b) Electronic conversion of traffic regulation information: A database was built at the Kyoto Prefectural Police Department, by converting all of the traffic regulation information (about 57,000 items) which is managed with a paper ledger. In building the database, a field survey was also conducted for the installation status of traffic regulation signs (about 65,000).
c) Standardization of traffic regulation information: It was verified that, by using a conversion program, the electronic version of traffic regulation information of Kyoto Prefectural Police and the traffic regulation information of Tokyo Metropolitan Police Department, which had already been converted into its own electronic format, were both successfully converted into the standard format via the common format.
d) Examination on the development of a model system: In view of the above-mentioned conversion into electronic formats, "specifications for a model system" was developed with focus on more efficient traffic regulation work and maintaining fresh data, with an eye to the upcoming development of a model system for Kyoto Prefectural Police which is scheduled after fiscal 2016.



Future plan

By building and operating the model system, functions that need to be added and improved will be identified and specifications for a traffic regulation information management system that contributes to automated driving and safe driving support will be determined.

National Police Agency

SIP

Evaluation of GNSS for the realization of the autonomous car

Survey for effective utilization of satellite positioning technology

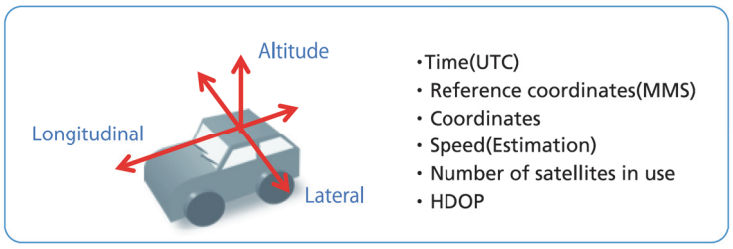
Survey for effective utilization of satellite positioning technology

This survey was conducted for the purpose of assessing the availability of satellite positioning technology for autonomous cruising.
Because preparation and updates of satellite positioning systems in various countries are promoted, it is considered that the improvement of satellite positioning accuracy by multi-GNSS is available for aoutonomous cruising.
In this research work, we conducted experiments on interurban expressway and in urban area in order to evaluate positioning rates and accuracy of each positioning method and satellite system. We also considered about effect of multipath and signal-blocking.

	Method
M1	1 Signal
M2	L1-SAIF
M3	DGPS
M4	2 Signal
M5	RTK
M6	CMAS
M7	MADOCA-PPP

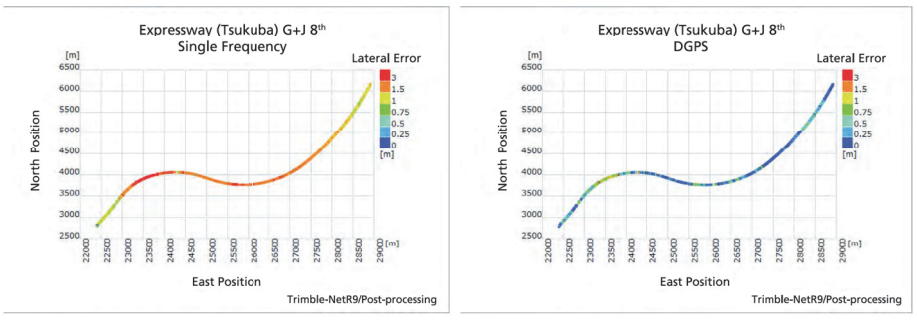
	System
S1	GPS
S2	GPS+QZSS
S3	GPS+QZSS+GLO
S4	GPS+QZSS+GLO+BDS +GAL

Combination of data analysis

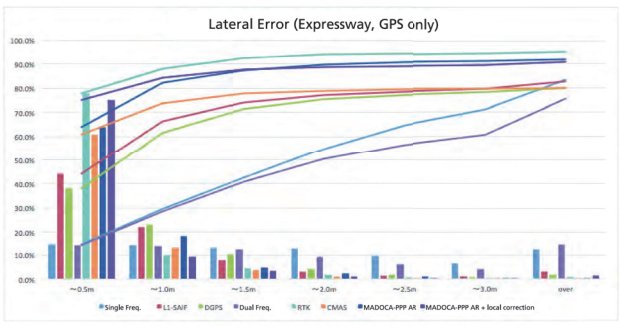


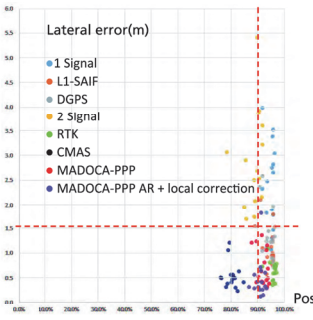
Target of evaluation

images of experiments



Heat map of lateral error on interurban expressway (Left:Conventional method/Right:using QZSS L1S)





Method	Positioning rate	RMS[m]
1 Signal	95.01%	2.3202
L1-SAIF	94.53%	1.1618
DGPS	94.48%	1.3290
2 Signa	88.01%	3.1317
IRTK	95.62%	0.6379
CMAS	80.27%	0.5282
MADOCA-PPP	92.12%	0.7149
MADOCA-PPP AR	91.01%	0.4617

※CMAS is Fix only

Positioning rate – Lateral error plot of each method

・Using Augumentation signals (L1-SAIF/DGPS) for conventional 1 signal method, lane recognition(about 1.5m accuracy) can be realized.
・It is necessary to using carrier phase positioning system to achive accuracy less than 1.0m. In this case, positioning rates decrease a little.

METI Ministry of Economy, Trade and Industry

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