

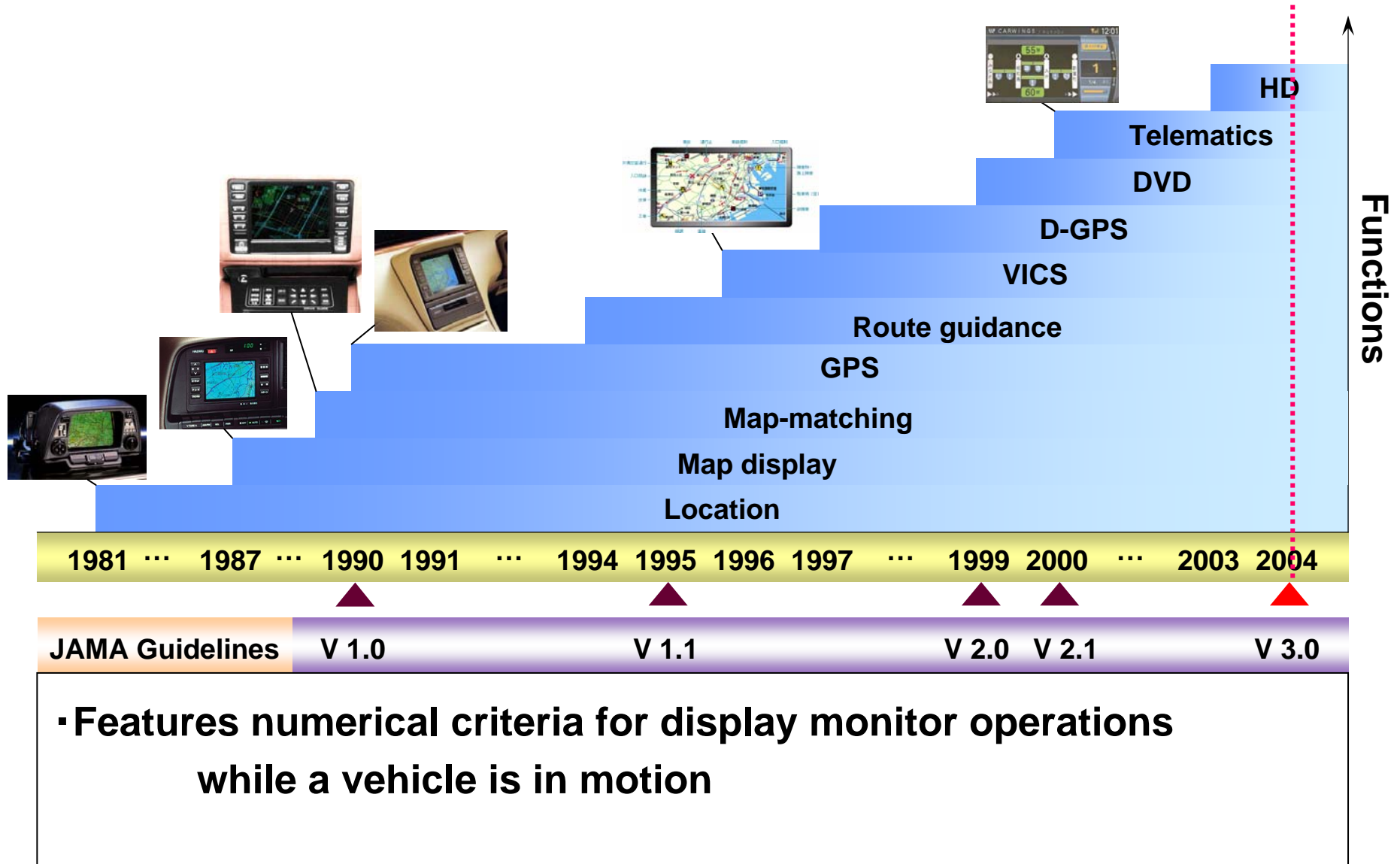
HMI WG
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JAMA Guideline for In-Vehicle Display Systems

Yukinobu Nakamura
HMI Experts Group, JAMA

Guideline Version 3.0



- Features numerical criteria for display monitor operations while a vehicle is in motion

Comparison of provisions between Versions 2.1 and 3.0

Version 2.1		Version 3.0
In the position at which the downward viewing angle of less than 30 degrees (Numerical criteria)	Display Monitor Location	Unchanged (already numerical criteria)
Prohibitions : • Minor roads/streets in urban areas • TV/VTR/DVD images • Addresses and telephone numbers • Number of letters not to exceed 30 • FM mpx. info. not driving- related : (Textual criteria)	Visual Information	Unchanged (still textual criteria)
Prohibitions : • Destination setting by cursor switch • Manual map scrolling • Map search by area name or POI • Cell-phone ten-key operation • Data input such as addresses • Area selection for dynamic info. • Searching descriptive information : (Textual criteria)	Display Monitor Operations	• Total glance time shall not exceed 8 seconds • Using the occlusion method, the total shutter opening time not to exceed 7.5 seconds (Numerical criteria)

Guideline Version 3.0

Principles

- (1) Preferably, a display system is so designed that its adverse effect on safe driving will be kept to a minimum.**
- (2) Preferably, a display system is installed in such an in-vehicle position that the driving operation and the visibility of forward field will not be obstructed.**
- (3) Preferably, the types of information to be provided by a display system are such that the driver's attention will not be distracted from driving; for example, entertainment types of information need to be avoided.**
- (4) Preferably, a display system can be operated by the driver without adversely affecting his or her driving work.**

Scope

- (1) This Guideline applies to display systems (whether factory-installed, or installed by a dealer who has been designated by the vehicle manufacturer) that are installed in vehicles but not including motorcycles and are located at a position visible from the driver.**
- (2) A "display system" in this Guideline means a system capable of displaying diagrams, letters, numbers and/or images that have been stored in memories in advance or are received through broadcasting or telecommunication.**

Basis of the Numerical Criteria for Display Monitor Operation

Test Conditions

Test Roads:

- Urban artery road (total 4 lanes /2 lanes each side, regulation speed 60km/h)
- Urban road (total 2 lanes /1 lane each side, regulation speed 60km/h)
- Joban Highway (total 6 lanes /3 lanes each side, regulation speed 100km/h)
- Urban expressway (total 4 lanes /2 lanes each side, regulation speed 80km/h)

Subjects:

- 10 males ranging in age from 26 to 52, with an average age of 34

Operation Taskes:

- Map scale change (2-step operation)
- Display of nearby facilities
- Destination setup (input of 3 to 7 characters)
- Destination setup (input of 10-digit telephone number)
- Continuous map scrolling
- Selection of text information from *VICS (8-step operation)
- Selection of text information from VICS (12-step operation)
- Page skip in text information (8-step operation)
- Page skip in text information (12-step operation)

Basis of the Numerical Criteria for Display Monitor Operation

Measurement Items and Measurement Method

Glance time:

- Time elapsed between the shifting of the driver's gaze from the front view to the monitor
- Individual glance times were added up to obtain a total glance time for each operation

Vehicle's lateral displacement:

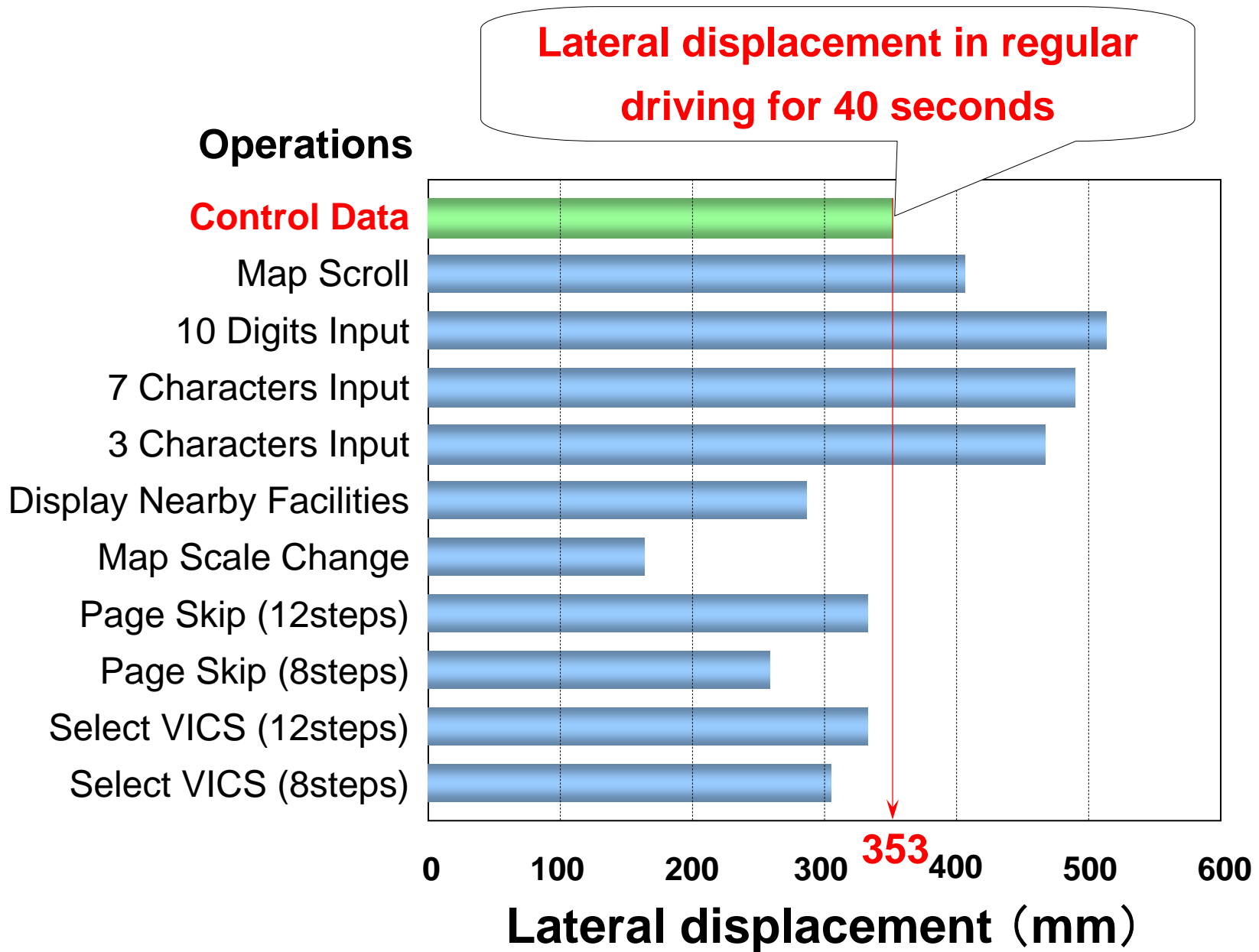
- Analyzed in relation to lane markings from the images taken by a rooftop video camera
- Control data was the data obtained from a 40-seconds span of regular driving

Driver stress evaluation:

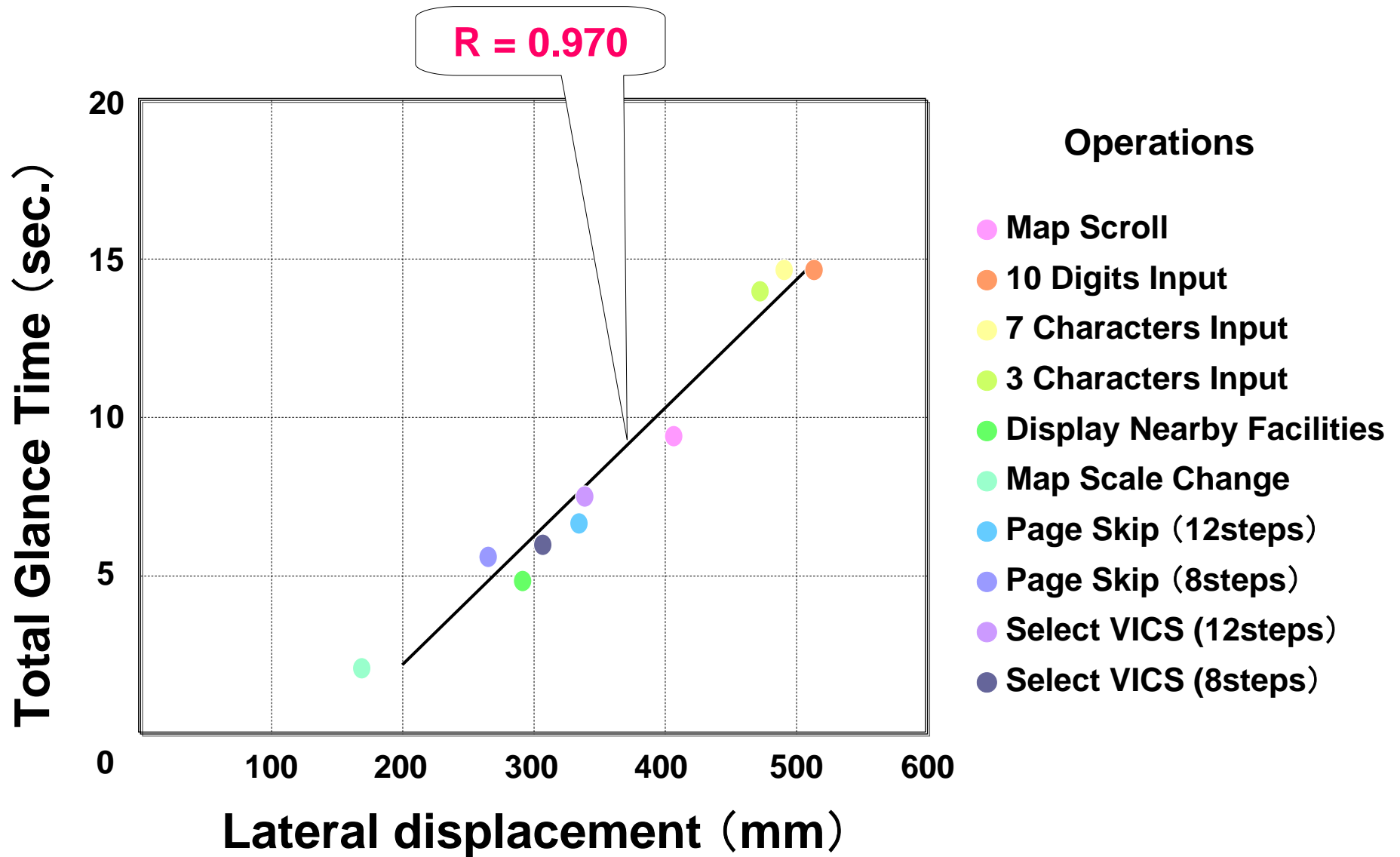
- After the test drive, the driver was asked to rate his stress level when operating each task
7: Very stressed, 6: Stressed, 5: Rather stressed, 4: Neutral,
3: Rather relaxed, 2: Relaxed, 1: Very relaxed



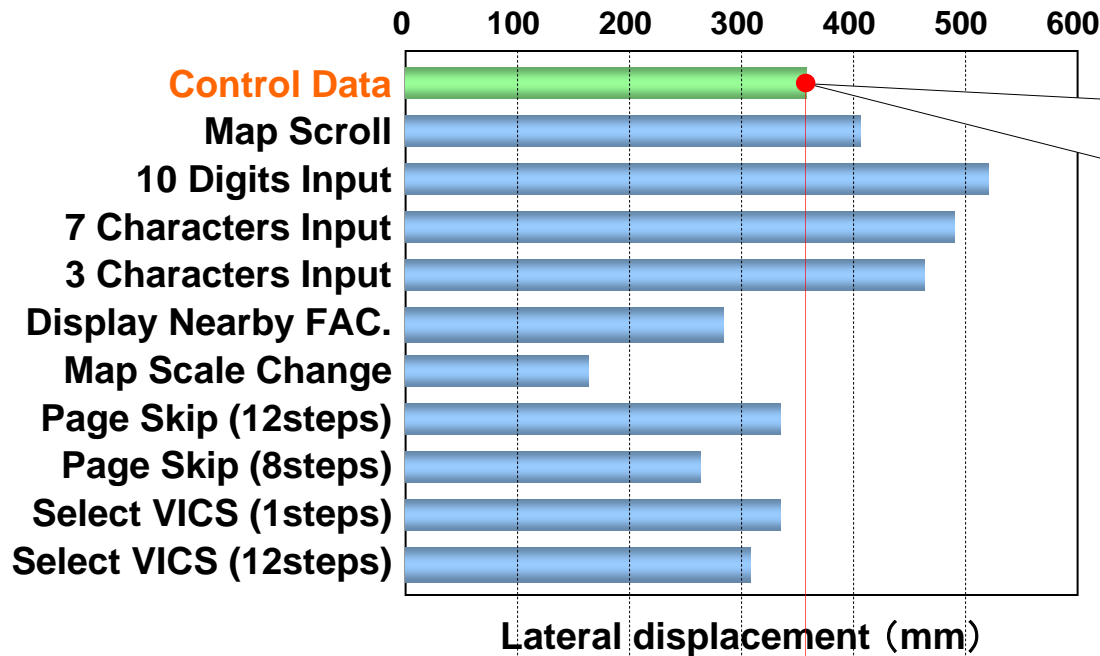
Basis of the Numerical Criteria for Display Monitor Operation



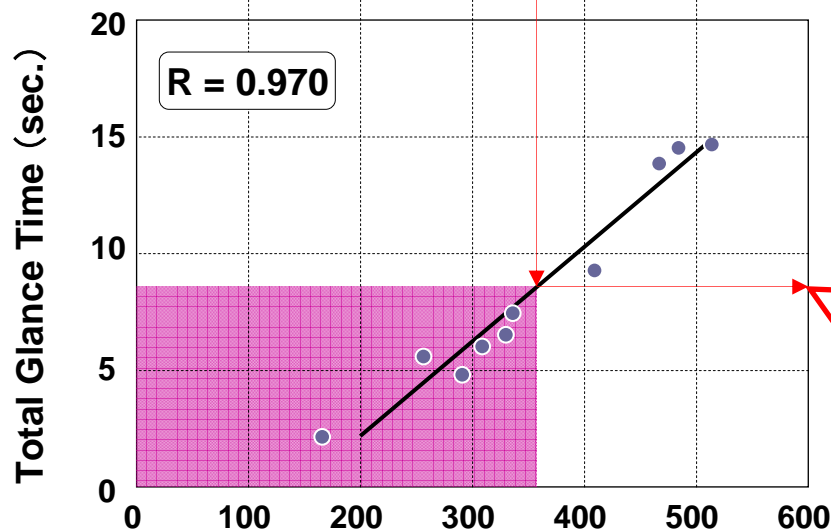
Basis of the Numerical Criteria for Display Monitor Operation



Basis of the Numerical Criteria for Display Monitor Operation

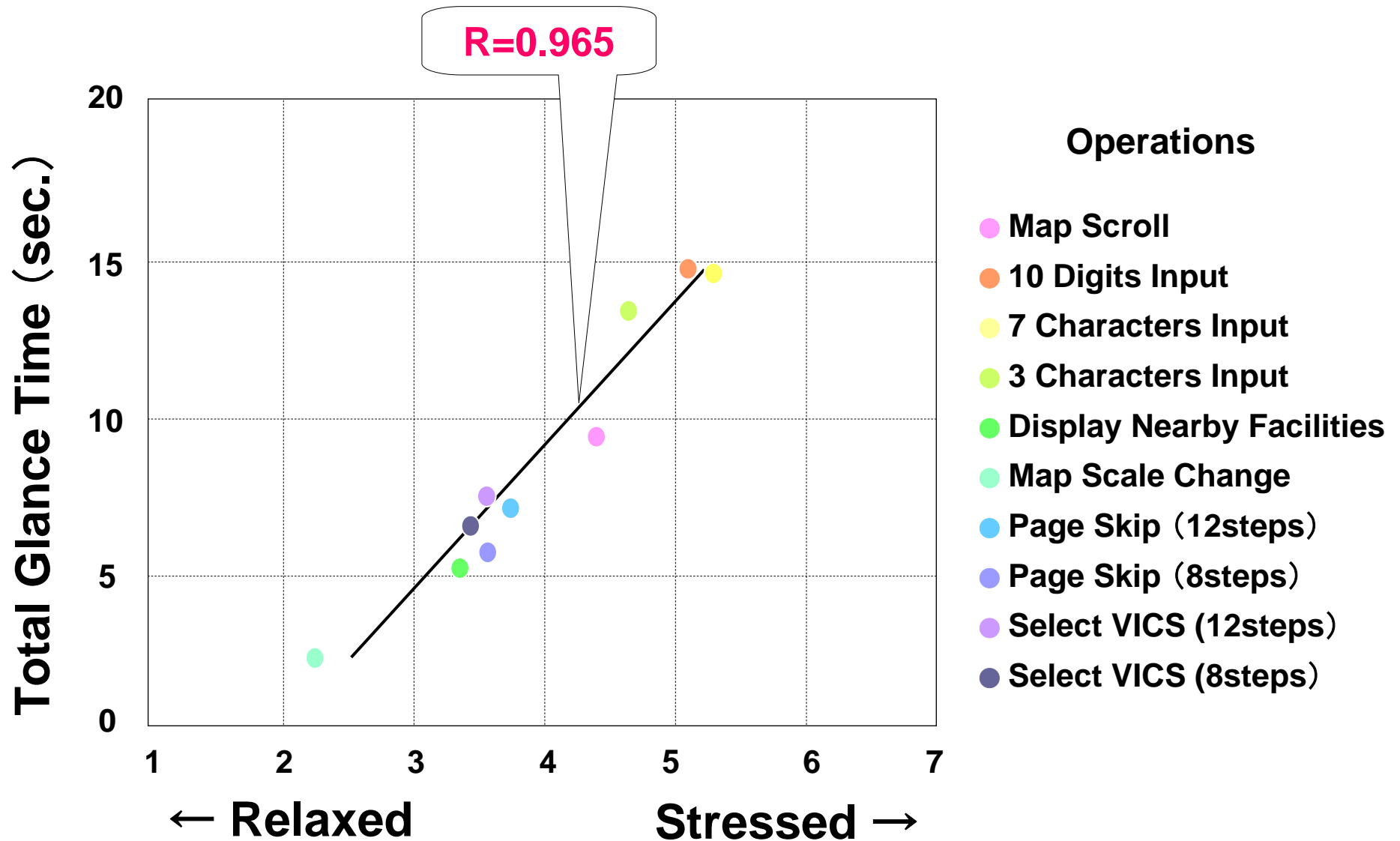


Lateral displacement
on regular driving
353 mm (mean value)

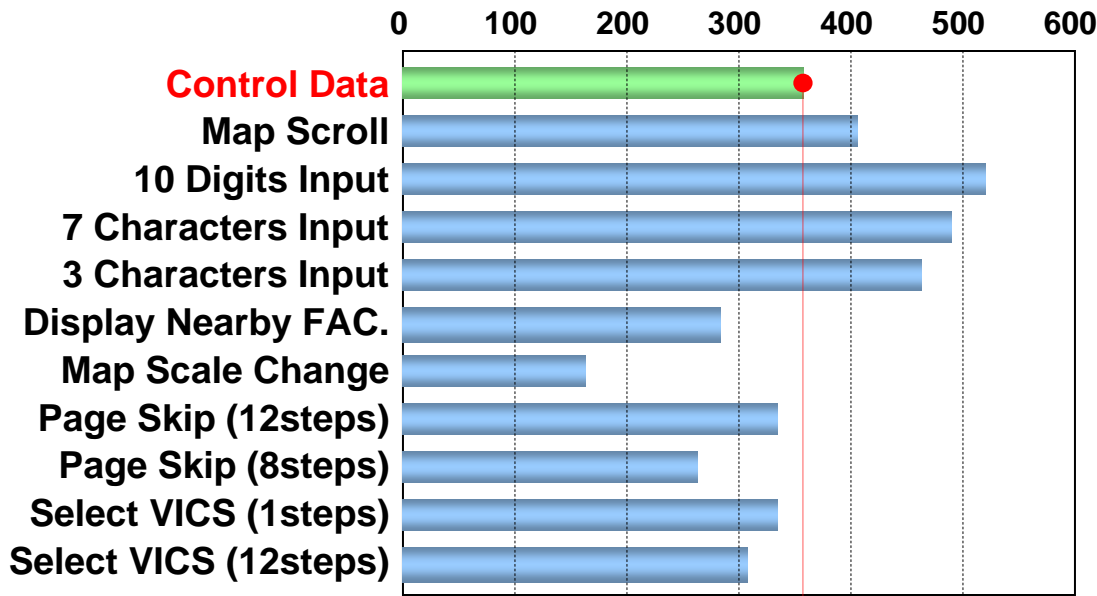


Lateral displacement
353 mm
||
Total Glance Time
8.35 seconds

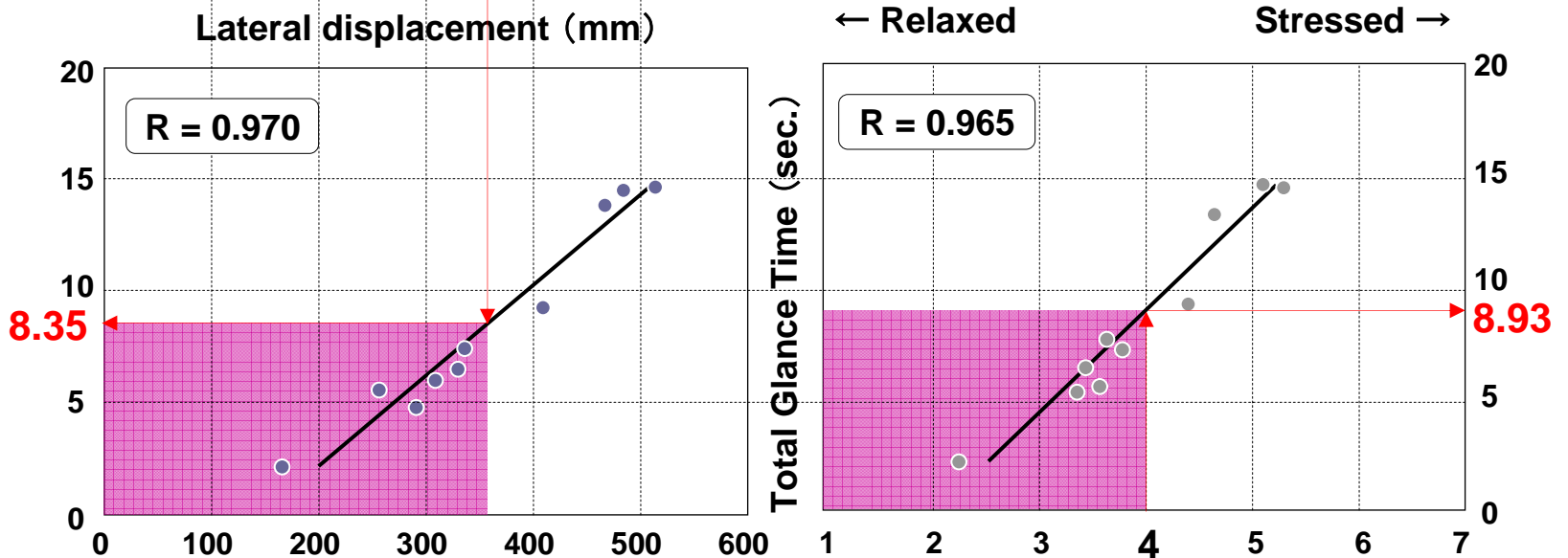
Basis of the Numerical Criteria for Display Monitor Operation



Basis of the Numerical Criteria for Display Monitor Operation



Glance times shorter than **8 seconds** cause no stress nor adversely affect vehicle behavior



Occlusion Method

A surrogate method to evaluate systems in a real-world driving environment

LCD Shutter Goggle



Glance at Display Monitor

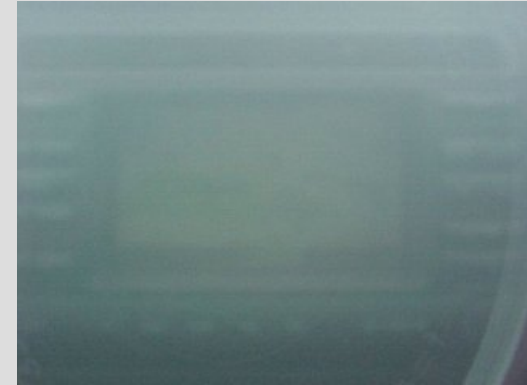
Shutter Open
(Transparency = 73%)



1.5 sec

Look at Front View

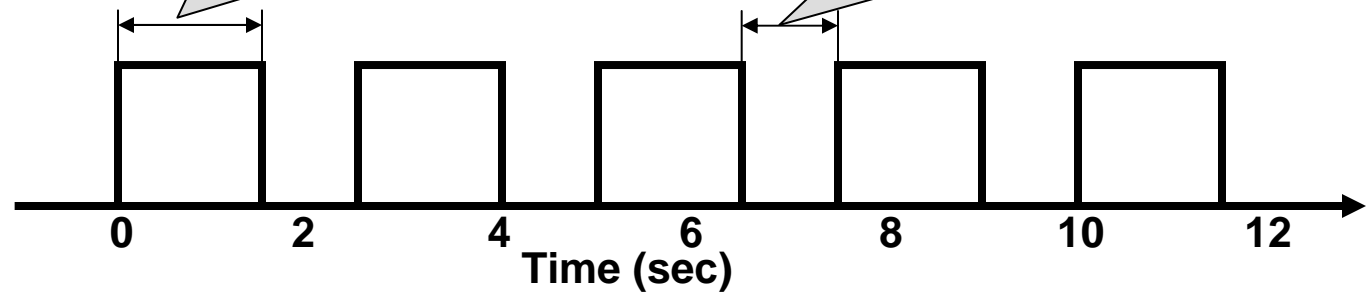
Shutter Closed
(Transparency = 8%)



1.0 sec

Shutter open

Shutter closed



Occlusion Method

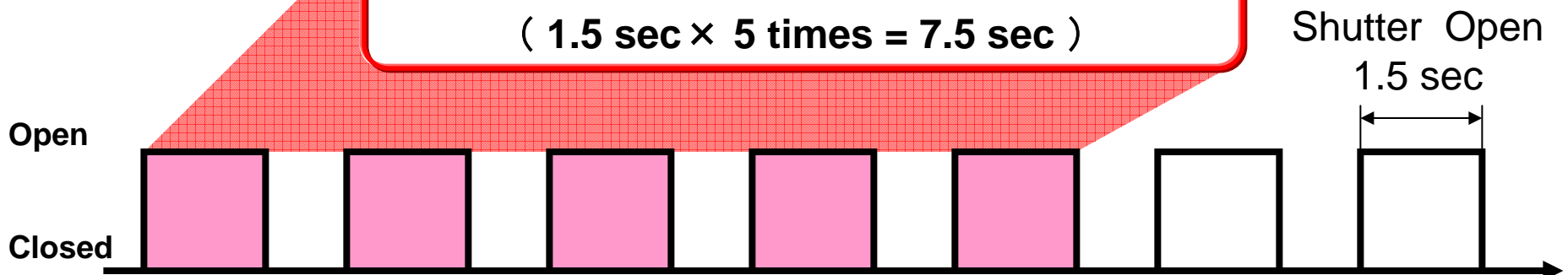
Correlation between “TGT” and “TSOT” = 0.893

TGT : Total glance time while driving

TSOT : Total shutter open time measured by occlusion method

TSOT correlated to 8 seconds of TGT = 7.53 seconds

TSOT shall not exceed 7.5 sec.
(1.5 sec × 5 times = 7.5 sec)



Numerical Criteria for Display Monitor Operation

The operation of a display monitor is prohibited if the driver's operation task fails to comply with the following standard:

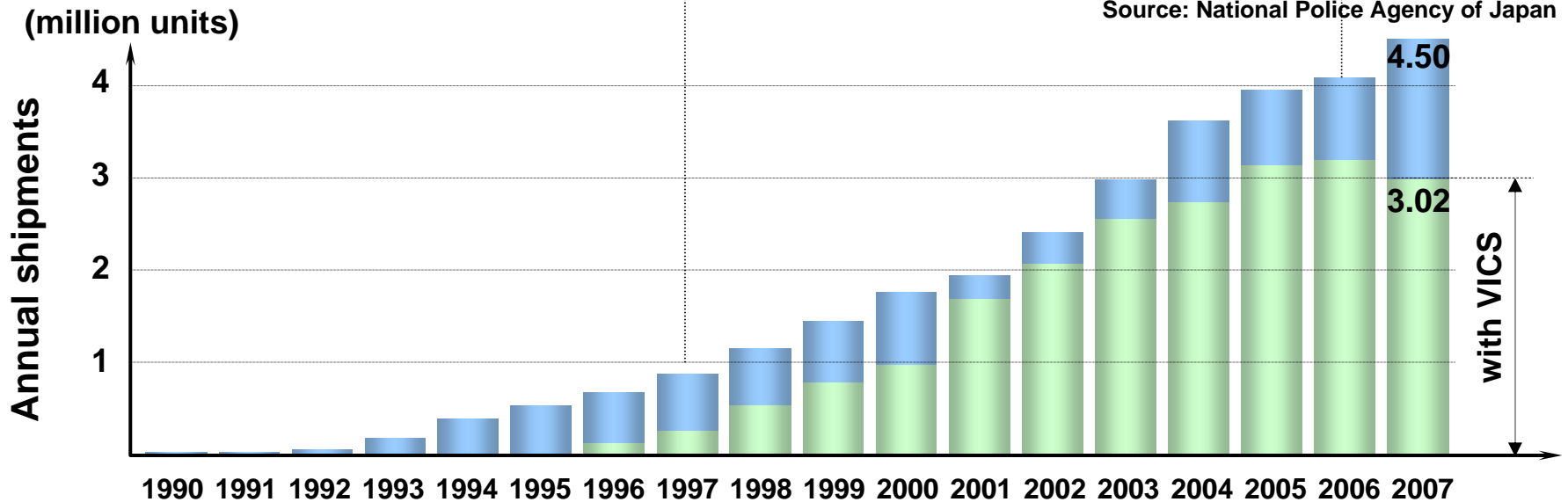
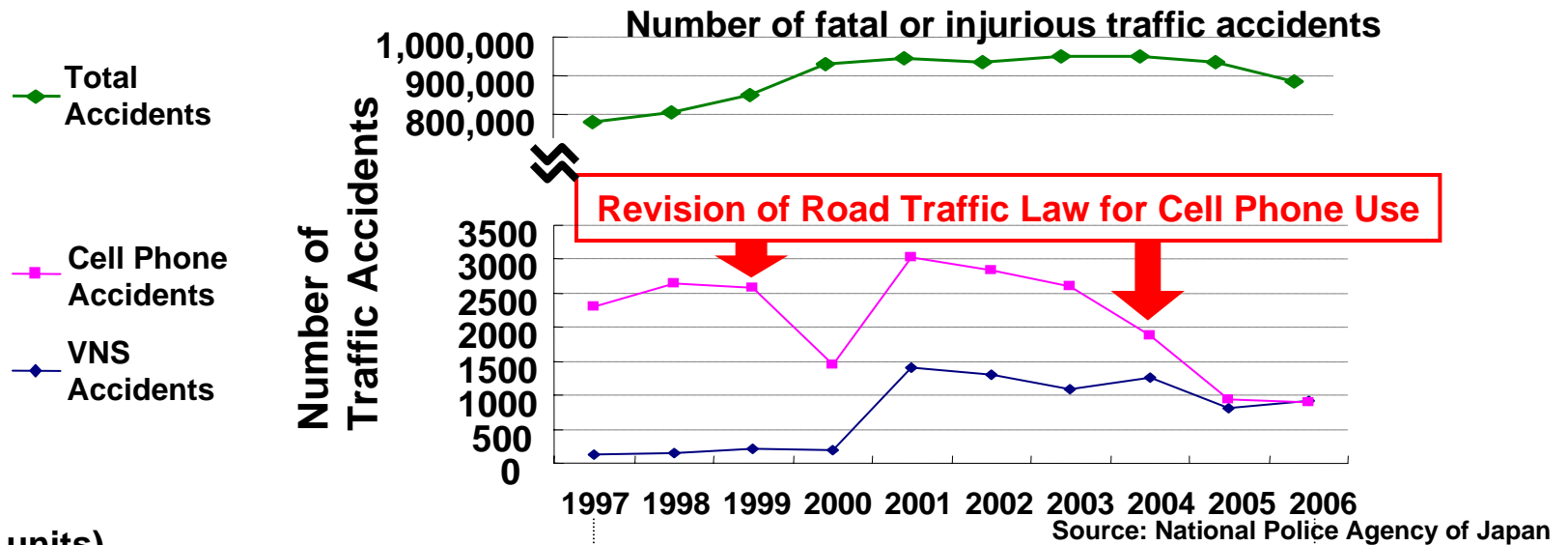
- (1) The total time of the driver's looking at the screen between the start and completion of operation task shall not exceed **8 seconds**.
- (2) When the above total time is measured by a bench test using the occlusion method, the total of shutter opening time shall not exceed **7.5 seconds**.

Road Traffic in Japan



Crowded and mixed

Number of Traffic Accidents caused by VNS



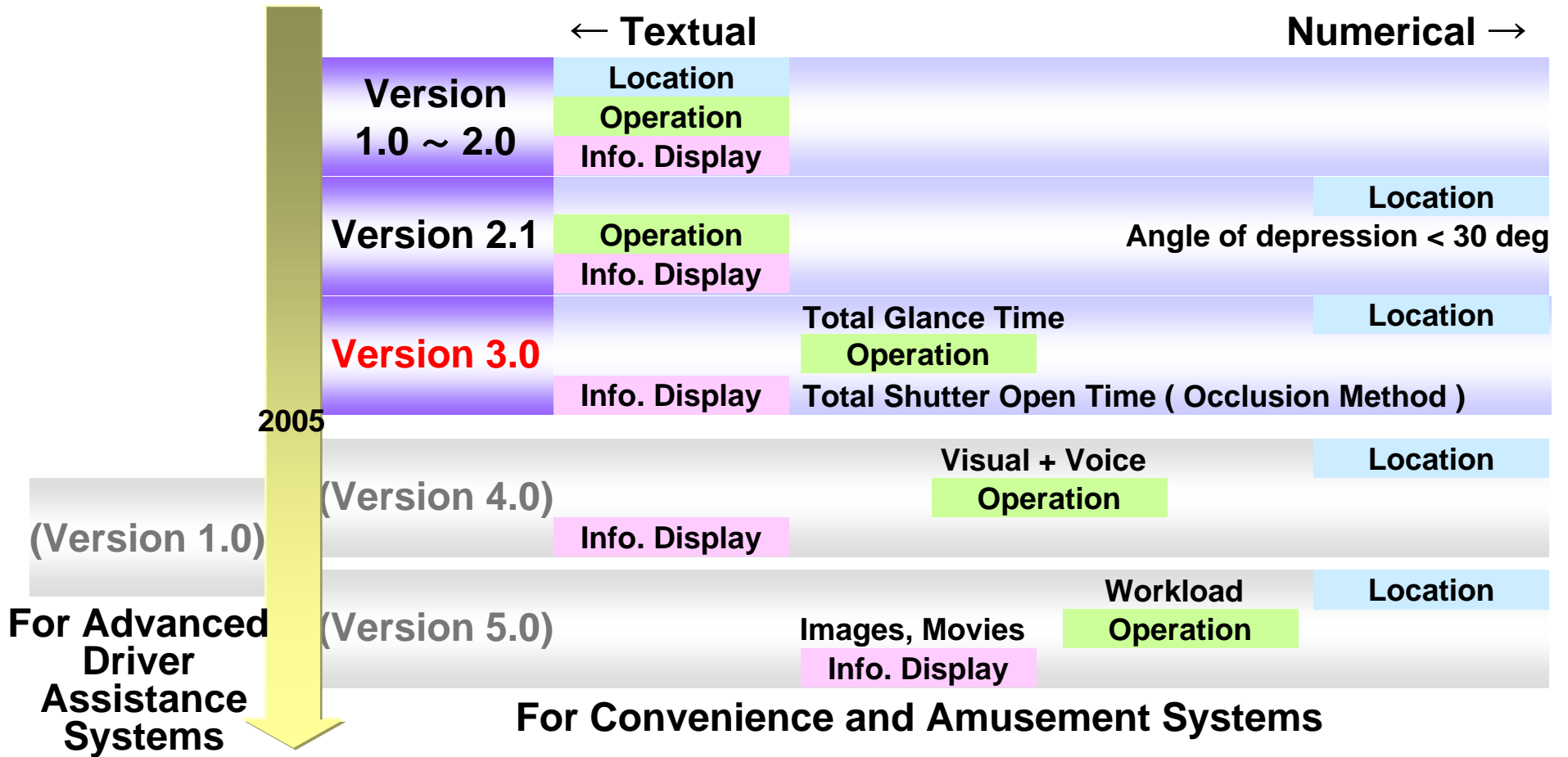
In Japan, the accident is reduced under cooperation of government and nongovernment

Is 8 seconds rule appropriate?

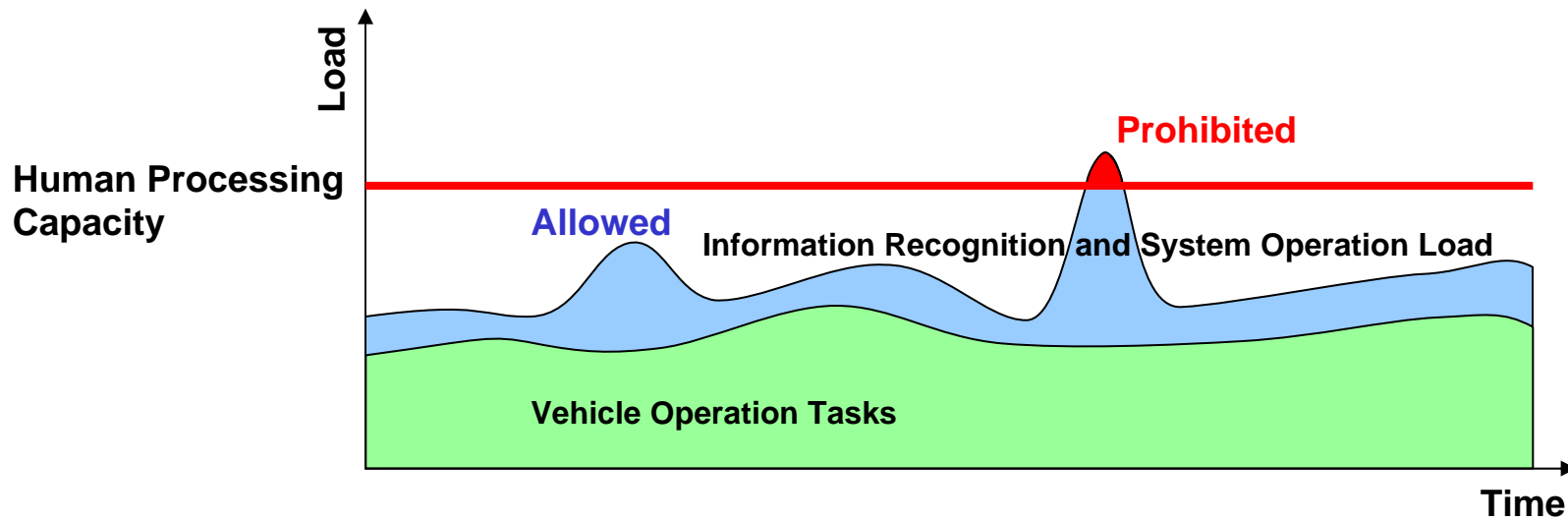
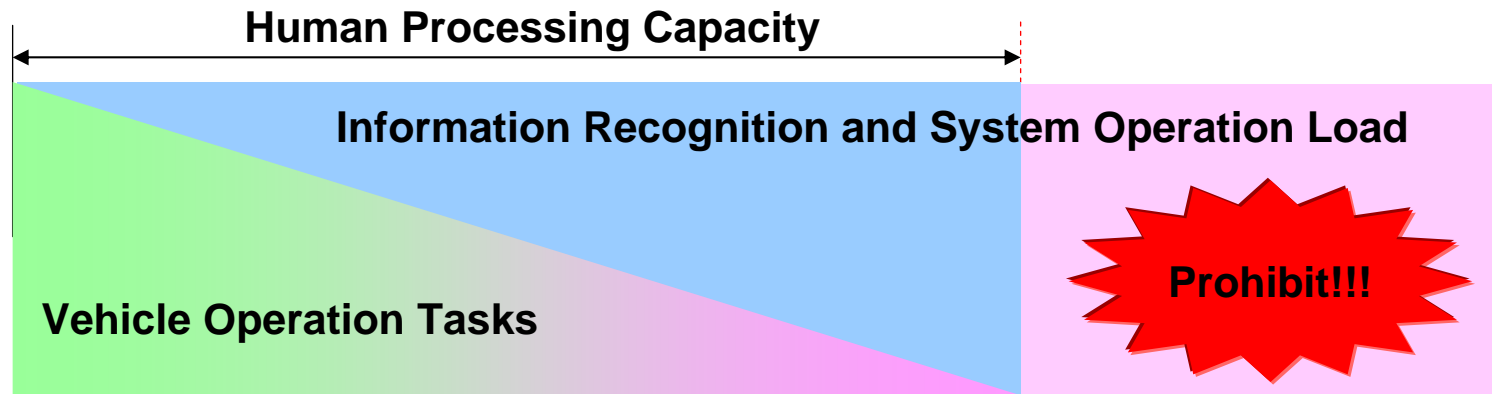
- **There are several arguments in the world that 8 seconds are very severe and 8 seconds are not enough for relaxed driving**
- **That is True**
- **If the system could detect relaxed driving, 8 seconds limit could be extended**
- **But we cannot estimate relaxed driving situation on-board in real time**
- **JAMA made a tentative rule of 8 seconds**

- **And there is an argument that 8 seconds is very dangerous for busy driving**
- **That is True**
- **JAMA has a standpoint of the ethical doctrine that human nature of drivers is fundamentally good**
- **Drivers can avoid danger by themselves**
- **Then drivers will not fix their eyes on the screens when they are very busy**
- **JAMA made a tentative rule of 8 seconds**

Roadmap Towards an Optimal Guideline



Optimal Guideline



Conclusion

- **JAMA has introduced the world's first numerical criteria for in-vehicle display monitor operation.**
 - **This is the first step in achieving complete numerical criteria.**
 - **JAMA will continue to work towards the optimal guideline.**
 - **We are not going to force you into this 8 seconds rule world wide.**
 - **You should fit a rule to the situation of each country.**
- * JAMA Guideline Version 3.0 can be downloaded from the following URL:
www.jama-english.jp/release/release/2005/In-vehicle_Display_GuidelineVer3.pdf