

GRSG/VRU-Proxi Informal Working Group

Japan Proposals for Technical Requirements on Sonars

November 21th 2017
Tokyo

Table of Contents

1. Basic Ideas for Developing Technical Requirements on Sonars under GRSG
2. Proposals for Technical Requirements on Sonar system for VRUs detection

1. Basic Ideas for Developing Technical Requirements on Sonars under GRSG

- ISO 17386 (MALSO^(*)) is a technical requirements on sonar system.
- As ISO 17386 is aimed for assisting driver to understand the distance to various objects, such as wall, thin pole, luggage carrier of truck, etc. in parking scene , some modification is necessary for the purpose of VRUs detection.
- Our proposal is to make new requirement based for the purpose of VRUs detection by modifying ISO 17386.

*: MALSO: Maneuvering Aids for Low Speed Operation

Reference: ISO 17386 MALSO

○Outline of ISO 17386

- Requirements on sonars and other sensing technologies
- Detection areas: Front, rear, corner
 - Requirements specified for each area (detection area, response time, etc.)
- Main rearward detection requirements
 - Detection area: 1 m max. in the rear
 - Detection area requirement:
The area shall be divided into 0.1 x 0.1 m grids and a target (φ75 mm, H 1000 mm) shall be located there. Testing shall determine whether or not each grid can be detected.
 - Detection latency:
The detection latency standard for when the target appears within the area is also specified.

Detection areas

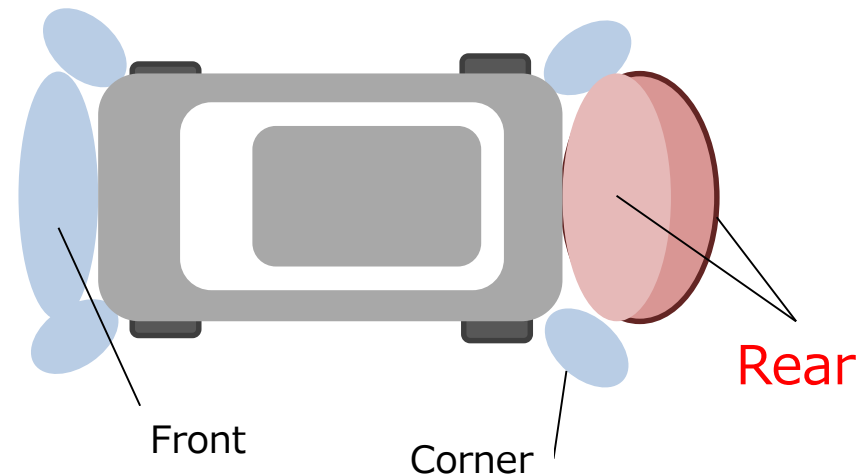
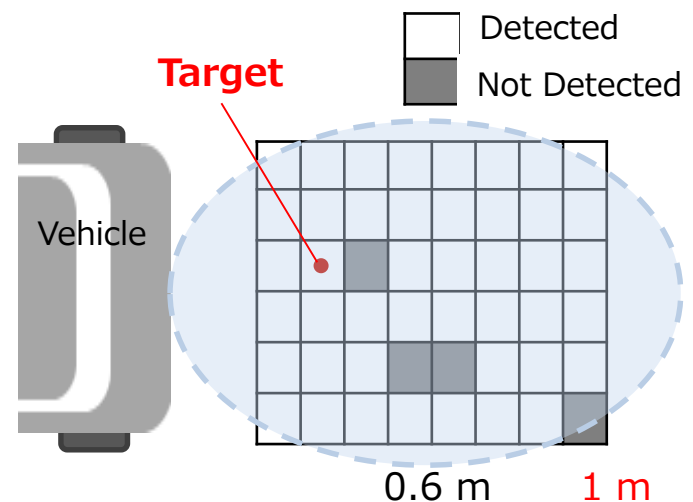


Image of a test in the rear horizontal area



2. Proposals for Technical Requirements on Sonars

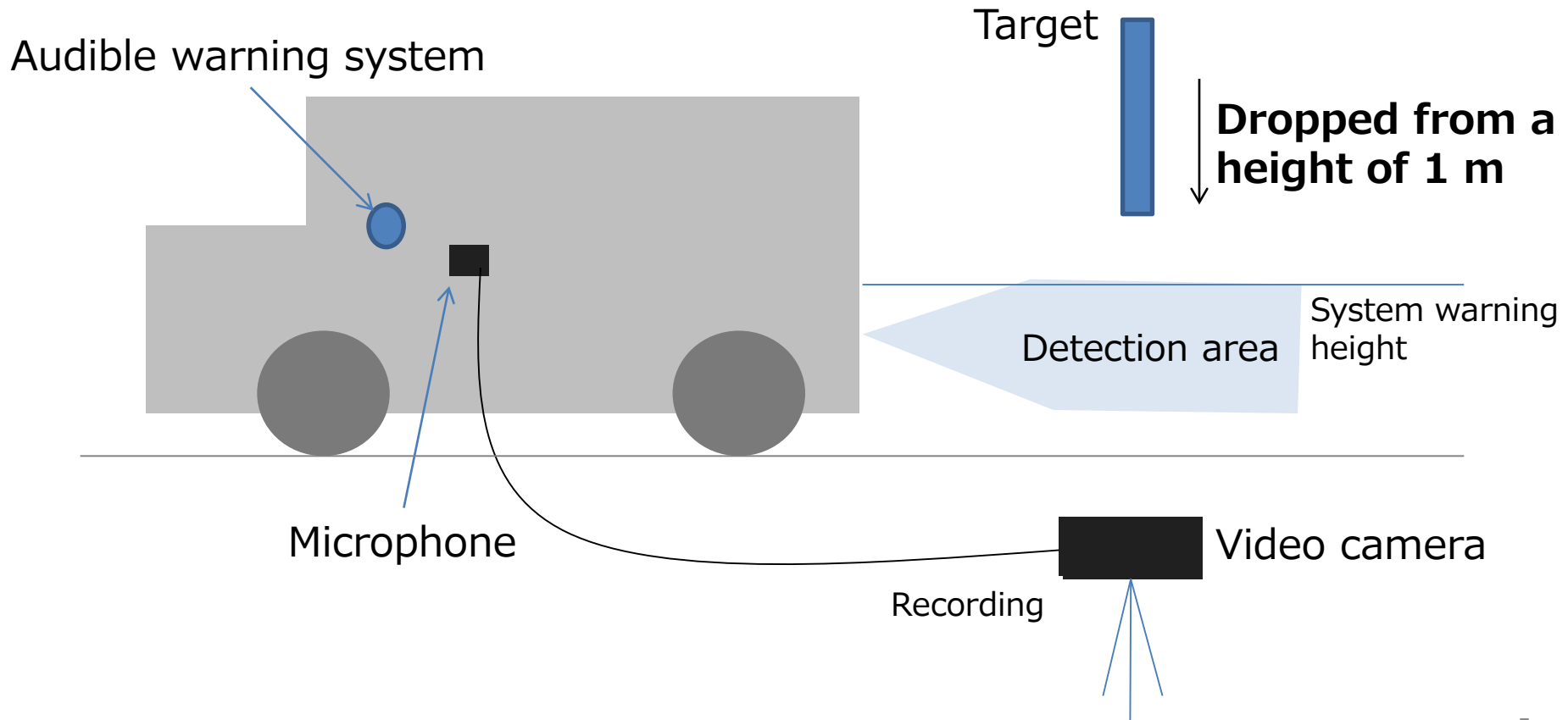
Modification points of ISO17386 for the purpose of VRUs detection

ISO 17386 (Clause 5)		Issue, etc.	Proposals for technical requirements on sonar system for VRUs detection
5.1 System activation		The automatic activation requirement is unnecessary except for reversing.	Delete provisions except those related to reversing.
5.2 Driver interface and information strategy		-	(As per ISO's requirements)
5.3 Dynamic performance of object detection	5.3.1 Relative velocity of objects	-	(As per ISO's requirements)
	5.3.2 Start-up detection delay	-	Add definition.
	5.3.3 Detection latency	The specified test procedures are not appropriate (unrealistic situation for VRUs detection). The average detection latency requirement is unnecessary (because its purpose is to ensure merchantability).	Newly specify realistic test procedures. (See 2.1) Delete the average detection latency requirement.
5.4 Monitoring range coverage	5.4.1 Sections of the monitoring range	Two sections of the rear detection area (0.6 m or 1 m)	Choose the 1-m section.
	5.4.2 Horizontal areas of relevance	This clause is unnecessary for VRUs detection (with many items that are redundant with Clause 5.4.3).	Delete (and incorporate into Clause 5.4.3).
	5.4.3 Rear horizontal area	-	(Use Clause 7 for test procedures.)
	5.4.4 Front horizontal area	This requirement is unnecessary for VRUs detection (because it concerns areas other than the rear field of vision).	Delete.
	5.4.5 Corner horizontal areas	This requirement is unnecessary for VRUs detection (because it concerns areas other than the rear field of vision and its purpose is to avoid property damage).	Delete.
	5.4.6 Minimum coverage ratios	The requirement "no more than two contiguous detection holes" needs to be modified for VRUs detection.	Relax the requirement to the size equivalent to that of a person. (See 2.2.)
	5.4.7 Vertical areas of relevance	This requirement is unnecessary for VRUs detection (because its purpose is to avoid property damage) .	Delete. (See 2.3.)
5.5 Self-test capabilities and failure indication		-	(As per ISO's requirements)
5.6 Operation with trailers		-	(As per ISO's requirements)

2.1. Detection Latency Test Procedures

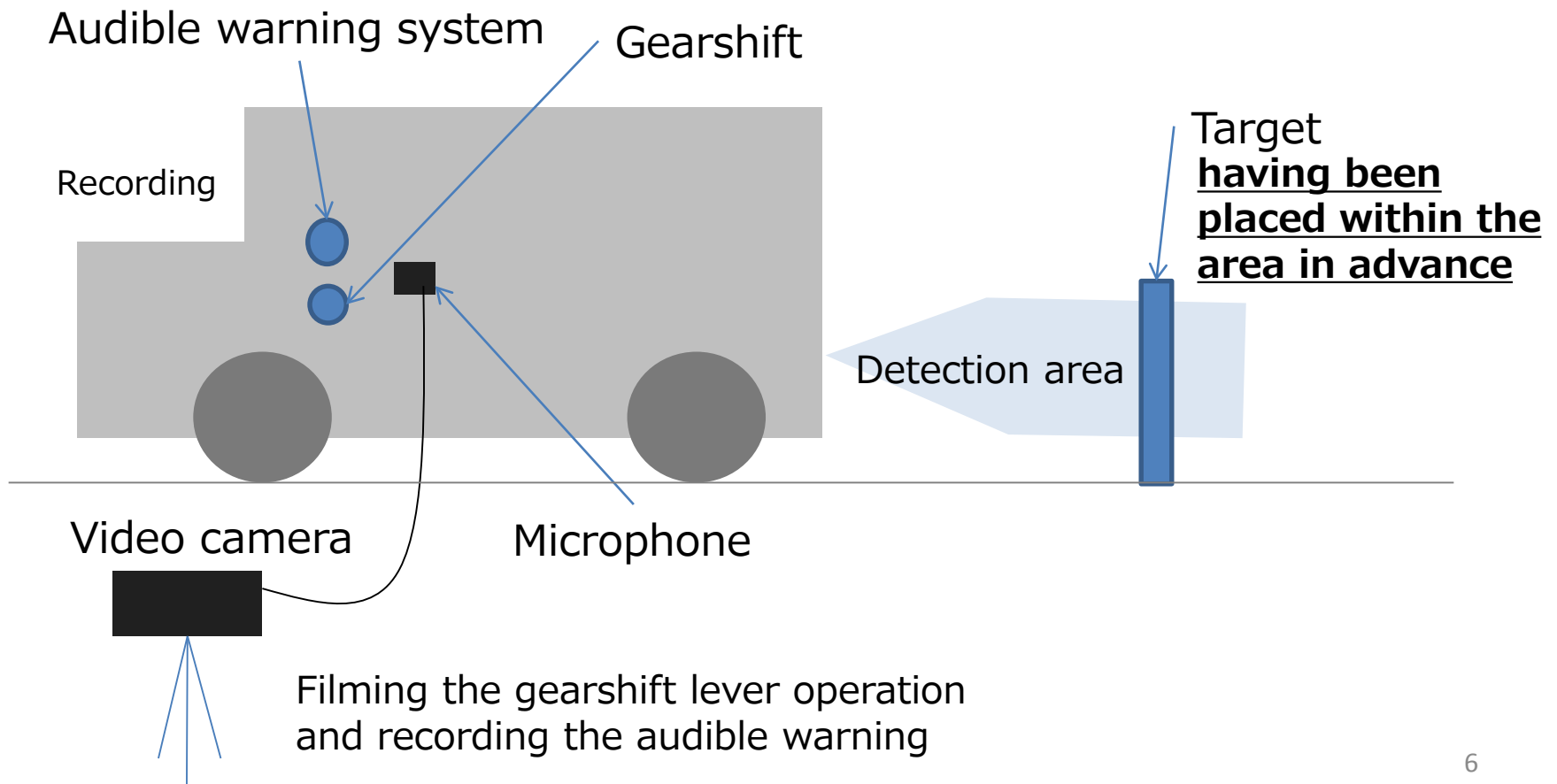
(1) ISO 17386

- The target is dropped from a height of 1 m and the response time is measured (video camera image ↔ audible warning).
- A situation where the detection target is landing from above is unrealistic for VRUs detection



(2) Proposal for the response time measurement

- The system response time should be measured with the time duration from selecting the reverse gear to the warning activation for a stationary target placed in valuation area.



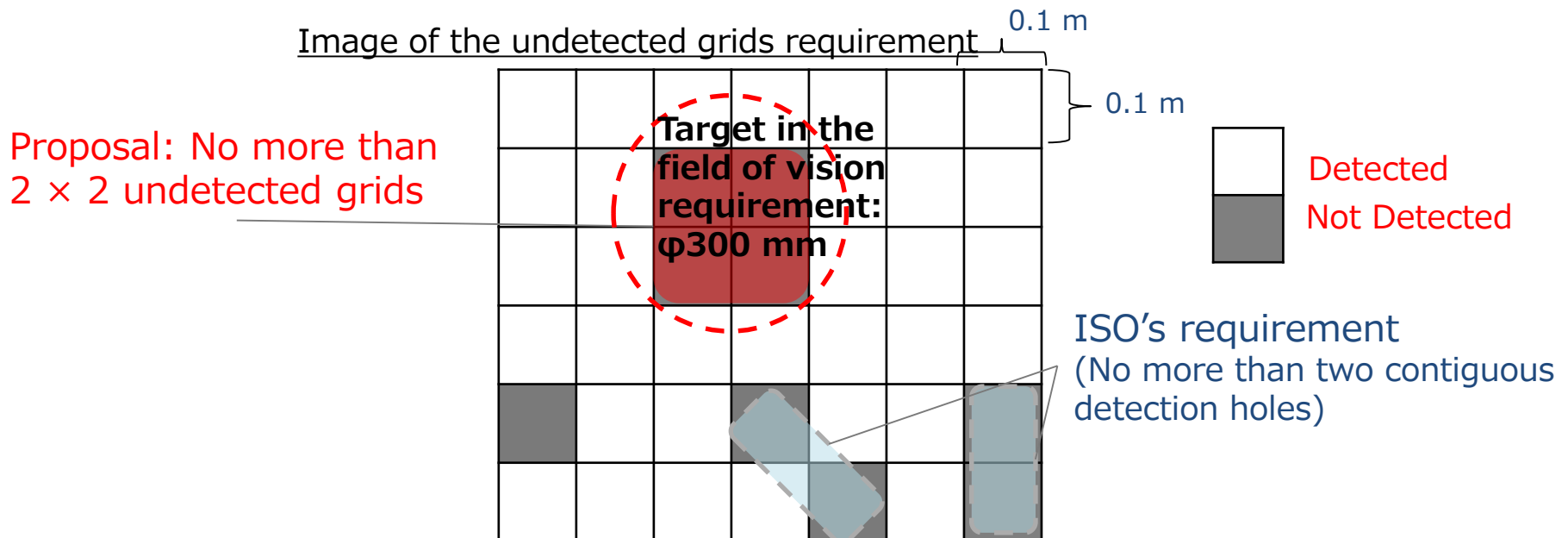
2.2. Minimum Coverage Ratios

(1) ISO17386

- ISO's requirement "there shall be no more than two contiguous detection holes"(*1) is to avoid property damage by thin object such as pole.

(2) Proposal for minimum coverage

- It is sufficient if the target covers grids equivalent to the size of a person for VRUs detection.
- Change to **"no more than 2 x 2 undetected grids" which considered** as equivalent to the size of a pedestrian.



*1: Within the whole monitoring range, there shall be no more than two contiguous detection holes in a straight line, either horizontally, vertically or diagonally in the horizontal plane.

*2: VRU-Proxi-02-03

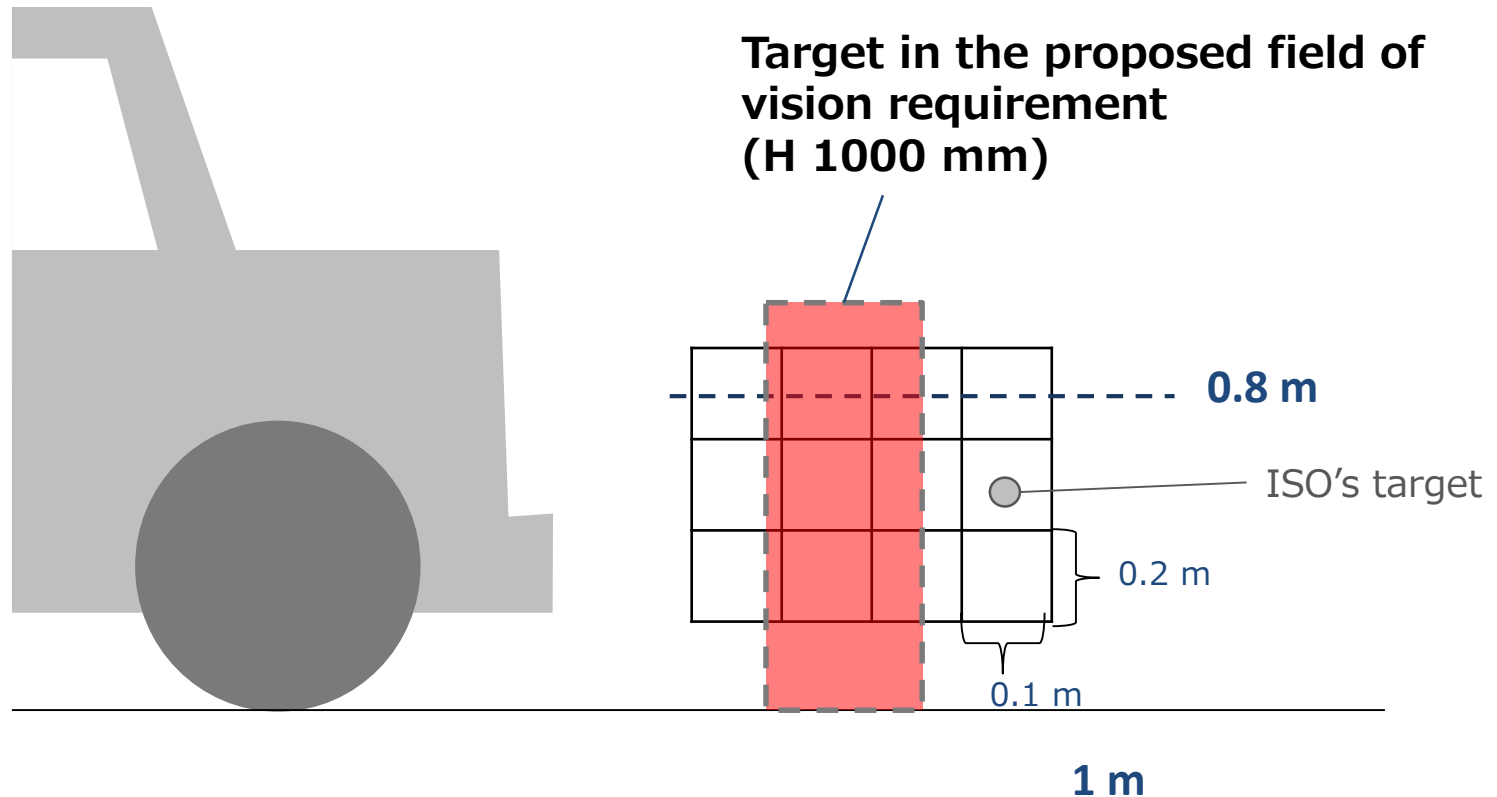
2.3. Vertical Range Requirement

(1)ISO 17386

- Vertical range requirement (see below) is defined to avoid property damage by various object, such as luggage carrier of truck.

(2)Proposal

- Delete vertical range test



Supplementary Information

Reference: Reversing Speed Models Studied by ISO

