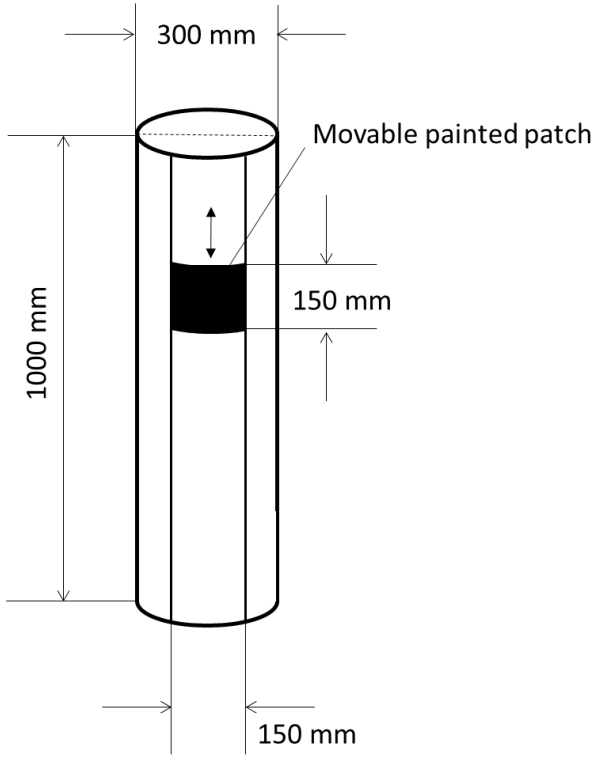
Updates and discussion points for reversing motion

2019.6.18 (VRU-Proxi IWG #10)

JAPAN

Updates

- ✓ Update detection system test methods
- ✓ Communize FoV requirement and test requirement
- ✓ Update pole figure
- ✓ Deletion
  - ✓ CMS Back sunlight requirements
- ✓ Move to right chapter
  - ✓ Requirement of detection system
- ✓ Word correction
- ✓ Renumbering



Key discussion points

- ✓ Scope exemption
- ✓ Exemption for direct vision
- ✓ Device requirements
  - ✓ Interior/Exterior device strength
  - ✓ CMS
    - ✓ Compatibility with FMVSS
    - ✓ View modification
      - ✓ Safety related camera view
      - ✓ Safety related screen
    - ✓ Overlay
  - ✓ Off switch for camera or detection (relation with GRB)
- ✓ Requirements
  - ✓ Pole visibility and height

Materials

Discussion points

- ✓ **Test methods**
  - ✓ **Detection system**

Alternative test method of detection system

■ Homework

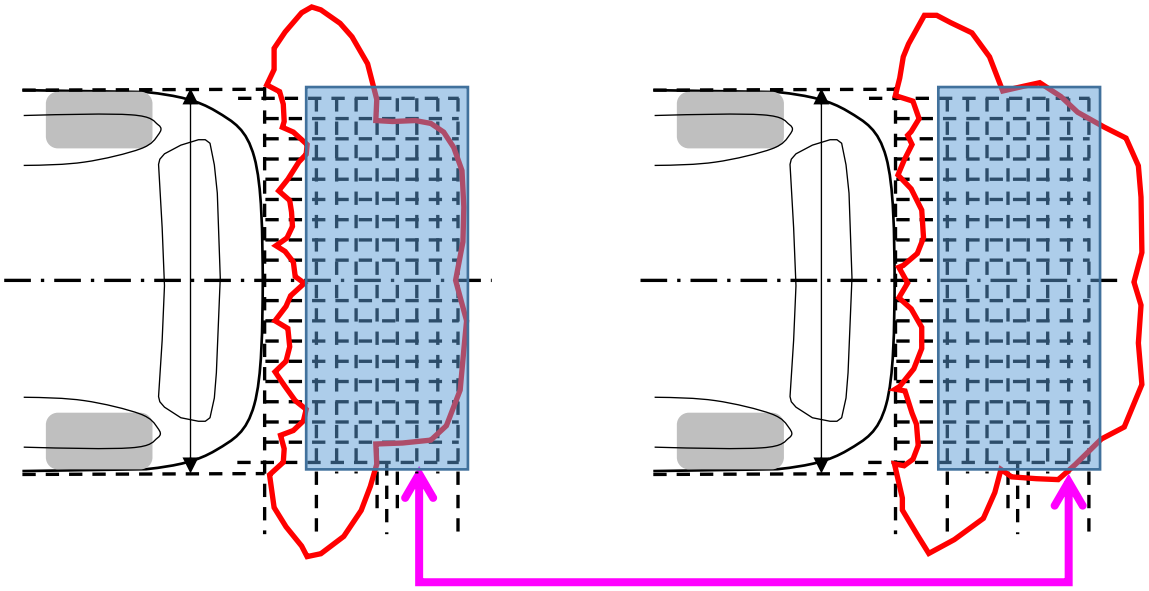
Check needed compatibility between ISO test and proposed pole test.

■ Results

Simulation results shows proposed pole test is less strict than ISO test.

Φ75 pole (ISO test)

Φ300 pole (Proposed)



Detection range was much expanded due to reflectivity increase by thicker pole.

New proposal of alternative test

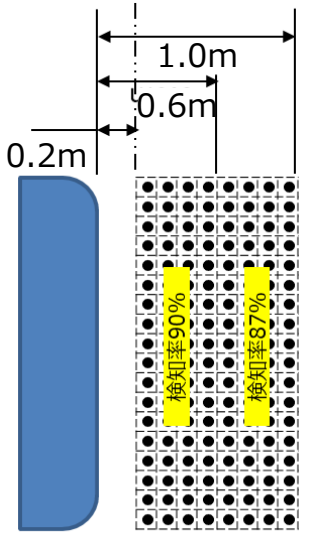
■Concept

・Don’t change pole diameter in order to keep reflection rario (detection performance).

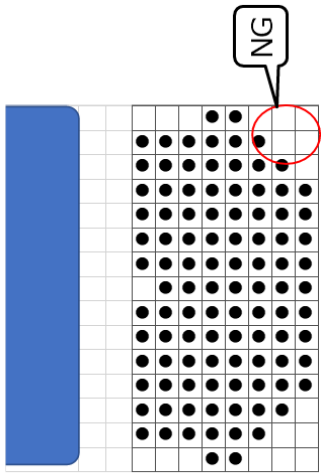
・Decide corner pole position in order to keep detection ratio or detection error as same level.

Method (ISO base)

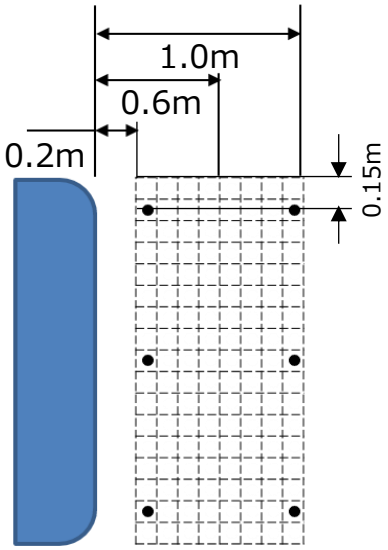
1) Over the detection ratio defined each zone



2) Not exist 2×2 non-detection hole



Alternative method (New)

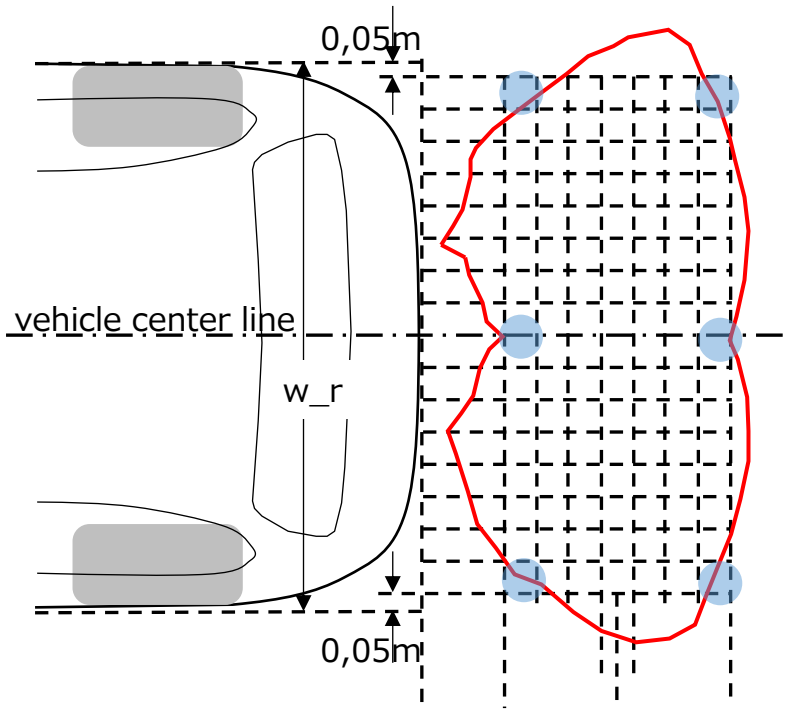


Compatibility of new proposal

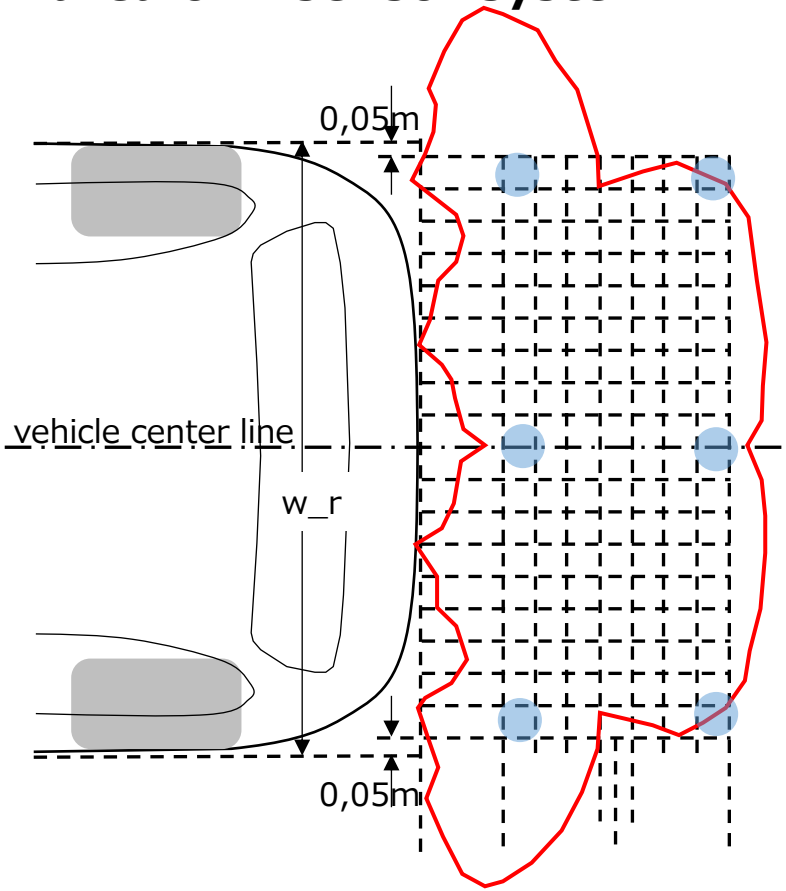
■ Pole location

Vehicle center and edge of corner area are hard position to detect due to sonar always equipped symmetric position on the vehicle.
→If the system can detect the area, it seems that the area between poles can be detected.

Example of detection area of 2 sensor system



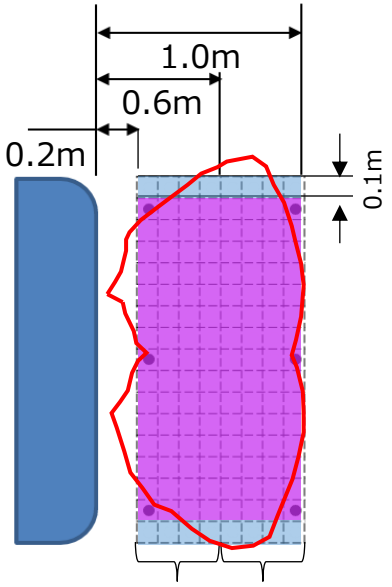
Example of detection area of 4 sensor system



Compatibility of new proposal

■ Pole location

If it assumed new method can detect between the poles, it achieve the same detection ratio of ISO based test.

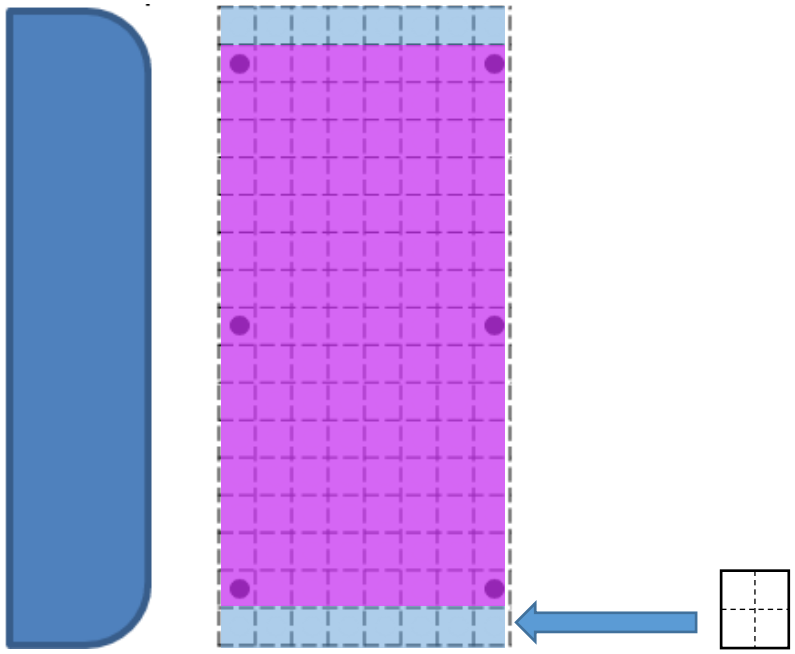


		A1/A2
Vehicle width 1.7m	All area	0.4m × 1.7m=0.68m^2
	Detection area	0.4m × 1.5m=0.6m^2 **(Detection ratio 88.2%)**
Vehicle width 1.8m	All area	0.4m × 1.8m=0.72m^2
	Detection area	0.4m × 1.6m=0.64m^2 **(Detection ratio 88.9%)**
Vehicle width 1.9m	All area	0.4m × 1.9m=0.76m^2
	Detection area	0.4m × 1.7m=0.68m^2 **(Detection ratio 89.5%)**

Compatibility of new proposal

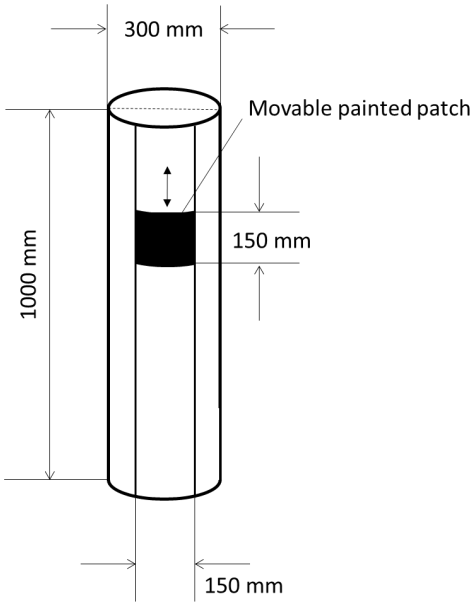
■ **Pole location (Grid detection 1 row inside for vehicle width direction)**

Can satisfy 2×2 detection hole requirement



Even if blue zone can not detect, no 2×2 area exists.

Pole height discussion

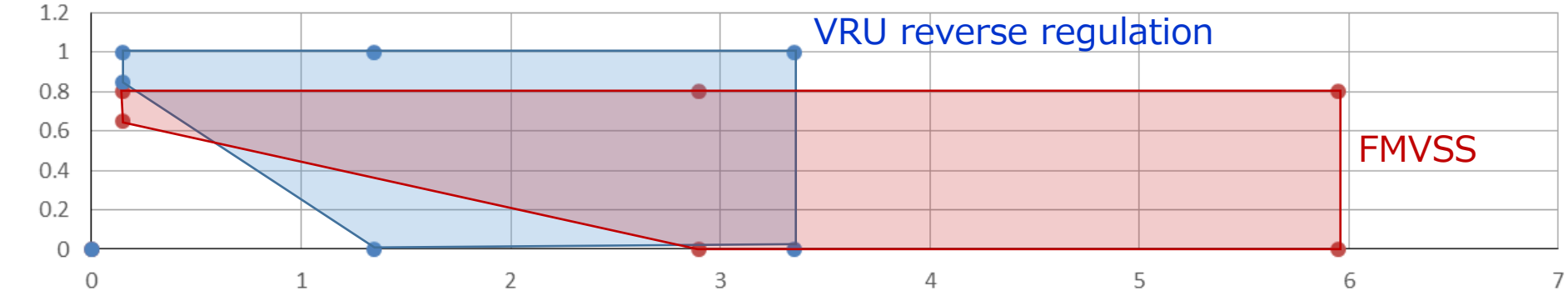


Proposal: 1m
→5 years old child
(Freely walk around vehicle on-road)

FMVSS: 0.8m
→1.5 years old child
(Not seemed to frequent freely walk around vehicle on-road, Seemed to freely walk off-road in US???)

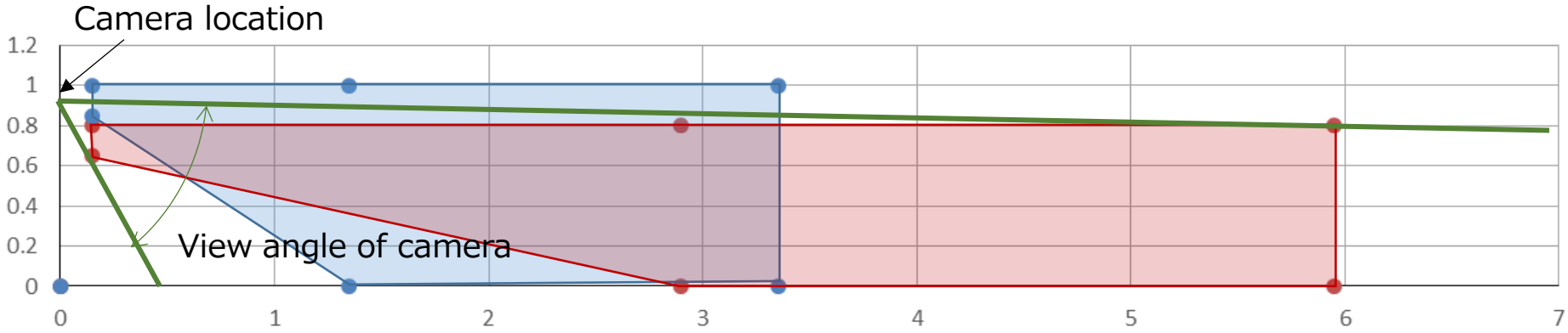
Pole visibility requirement

Minimum requirement of pole visibility



Vehicle rear-end

Example of NG for VRU, OK for FMVSS (depends on camera location and view angle)



VRU is not floating.

Why FMVSS require all height? Is it mandatory to see all height of poles in 2nd and 3rd row ?

Visibility of ground is important.

Ref. R-125 Pole height

Based on Japanese regulation.
It assume preceding bike visibility.
Regarding eye point height difference between UN and Japan, pole height corrected to 1.2m.