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VEYRUM ROBOTICS STANDARD

VRS-SVC-110

Service & Public — Demonstration Protocol

The Service & Public sector's witnessed steps for a Certified rating — bystander profiles a venue actually contains, contact and toppling, adversarial interaction, egress and crowd flow, venue-staff recovery — run in the same session as the intrinsic protocol.

VEYRUM RESEARCH INSTITUTE

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VRS-SVC-110	1.0.0	Draft	16 September 2026

Contents

Foreword. This Test Protocol is new in the VRS 2026 edition and is the Service & Public sector's extension of VRS-GEN-203, the intrinsic demonstration protocol. It carries only the steps the sector criteria of VRS-SVC-201 require and the intrinsic steps do not already witness; where a sector criterion is fully witnessed by intrinsic steps — bystander data disclosure on the console, venue-network exposure controls — this Protocol says so and adds nothing. What it adds is what a robot among the public meets and a robot in a factory does not: children and people using walking aids as detection targets (built as test obstacles, never as people), deliberate obstruction and tampering, a crowd it must yield to, an egress route it must never block, and venue staff with only the venue manual who must be able to recover it. Steps run between Parts E and F of VRS-GEN-203, in the same session, on the same feed, into the same export. Standards carry no step identifiers; every step here names the VRS-SVC-201 subclause that requires it. As a protocol it is versioned vX.Y.Z (VRS-GEN-004 §5.4). Requirements use "shall".

1 Introduction

The Service & Public sector's anchor is ISO 13482:2014, the personal-care robot standard, read with ISO 12100:2010 for risk assessment: robots that share space with untrained people — in shops, hospitals, airports, hotels, on pavements — where the person nearest the robot has not read the manual and may be a child. The intrinsic protocol witnesses that the robot detects the declared minimum object and stops; this Protocol witnesses that it detects the objects a venue contains, at the heights and speeds and contrasts they present. It witnesses that when a member of the public leans on it, blocks it, opens a cover or stands in its way for fun, the robot does the declared safe thing every time, with a warning a bystander can perceive. And it witnesses the venue's side of the bargain: that the robot never becomes an obstruction in an egress route, and that a member of venue staff can put it right when it fails.

Because the venue, not the manufacturer, carries the premises liability, the sector's documentary criteria (field record, premises-liability support) have no steps; they are scored from the pack.

2 1 Scope

This Protocol specifies the Service & Public demonstration steps by which the criteria of VRS-SVC-201 Clause 6 are demonstrated at the Certified tier, for every application class of VRS-SVC-201 §7.3 (mobile service — delivery, cleaning, guidance, retail; stationary interactive — kiosk and reception robots; telepresence). It applies to every Certified Service & Public assessment, by every Certified route of VRS-GEN-003 §6.9.

It specifies: how this Protocol relates to VRS-GEN-203 (Clause 4); the envelope the manufacturer declares before the session (Clause 5); the steps (Clause 6); and a worked example (Clause 7). Annex A maps every VRS-SVC-201 criterion to its intrinsic steps, its sector steps, or neither.

It does not: repeat any session requirement, step, marking rule or record rule of VRS-GEN-203, all of which apply unchanged; define any criterion, point, ceiling or ladder (VRS-SVC-201); or define the Service & Public information pack (VRS-GEN-013). No step places a person in the robot's path as a detection target, in contact with the robot under power, or under a load; people take part only as the crowd of Part 4.

2 Normative references

- **VRS-GEN-203**, Demonstration Protocol — Intrinsic — session requirements (Clause 4), step rules (Clause 5), marks and scores (Clause 7), Session Record (Clause 8), all of which apply to this Protocol.
- **VRS-SVC-201**, Service & Public — AR Assessment Protocol — the criteria whose Certified rows this Protocol serves; application classes (§7.3).
- **VRS-SVC-001**, Service & Public Sector Standard — the declared envelope and class fields.
- **VRS-GEN-101**, Safety — the intrinsic safety criteria the Service & Public pool contributes to.
- **VRS-GEN-105**, Cyber Posture — the intrinsic steps that witness VRS-SVC-201 §6.7 and §6.8.
- **VRS-GEN-003**, Governance Charter and Independence — Certified routes and route parity (§6.9).

3 Terms and definitions

Terms defined in VRS-GEN-001 and VRS-GEN-203 apply. In addition:

3.1 bystander profile — a declared detection target representing a class of member of the public: the child-height profile (declared height and width), the low-contrast slow-moving profile (declared reflectivity, size and minimum speed) and the reduced-mobility profile (declared walking-aid or wheelchair footprint); each is built as a test obstacle.

3.2 adversarial interaction — a deliberate act by a member of the public on the robot: obstruction, leaning or riding, tampering with covers or controls, or enclosing it.

3.3 egress route — a marked route through the venue that must remain passable for people leaving it; in this Protocol, a mock route marked on the floor at the declared width.

3.4 stranded-robot state — the state of a robot that has stopped, faulted or de-energised where it stands and must be moved by a person.

3.5 venue staff — the venue's own personnel, without manufacturer training beyond the venue manual, who are expected to recover the robot in service; in this Protocol the demonstrator acting with the venue manual only.

3.6 venue channel — the declared means by which the robot alerts venue staff (screen, sound, message to a venue device).

3.7 riding or leaning threshold — the declared mass applied to the robot above which it refuses to move or alerts.

4 Relationship to the intrinsic protocol

4.1 This Protocol shall be run only as part of a session under VRS-GEN-203. Every requirement of VRS-GEN-203 Clause 4 applies to every step here without repetition or exception.

4.2 Position in the session. The steps of Clause 6 shall run after VRS-GEN-203 Part E and before VRS-GEN-203 Part F, so that one continuous recording and one export cover both protocols. The endurance sample opened in VRS-GEN-203 Part C continues to run through this Protocol.

4.3 Step identifiers. Steps shall carry identifiers of the form `SVC-110.nn`; they are Session Record step identifiers under the same rules as VRS-GEN-203 §5.1 and shall never be reused.

4.4 Required by. Every step shall name the VRS-SVC-201 subclause(s) whose Certified row it serves. VRS-SVC-201 carries no reference back to this Protocol.

4.5 Classes and declared subjects. Each step lists the application classes it applies to. A step whose class is not in the assessed envelope shall not be run. A step whose subject the manufacturer has not declared shall be marked *not declared* and has no effect on any score (VRS-GEN-203 §3.10). At least one step of Part 1 and one of Part 3 shall be run for every mobile-service or telepresence assessment; at least one step of Part 3 for every stationary-interactive assessment.

4.6 Bound. The sum of step bounds for one class shall not exceed 120 min. Marks, failure, declined steps, continuation sessions and the Session Record follow VRS-GEN-203 Clauses 5, 7 and 8.

4.7 Criteria witnessed by intrinsic steps. Where a sector criterion's Certified row is already witnessed by intrinsic steps, Annex A names them and the criterion is scored from those marks together with any sector steps listed. VRS-SVC-201 §6.1 (anchor conformity) has no step of its own: its Certified row is confirmed by the marks of the bystander-protection steps of Parts 1 to 3.

4.8 People in the session. People shall take part only as the crowd of Part 4, walking beside and around the robot in the corridor. No step shall use a person as a detection target, a contact target or a load; a step so performed shall be marked *not achieved* and the ground recorded.

4.9 Admissibility of a mark. A step's mark shall be inadmissible, and the step shall be marked *not achieved*, where the profile dimension, mass, speed or force it depends on was not shown on camera, or where the configuration demonstrated differs from the assessed one. The observer shall record the ground.

6 5 The declared envelope

5.1 Before the session the manufacturer shall have declared, in the information pack and per assessed application class: maximum speed (m/s); stopping distance (m) at that speed; the three bystander profiles (child-height profile height and width in mm; low-contrast profile reflectivity, size in mm and minimum detectable speed in m/s; reduced-mobility footprint in mm); the contact force or pressure limit (N, N/cm²) where the design relies on contact limiting; maximum payload (kg) and payload height (mm); the anti-topple disturbance (N) the robot withstands; the riding or leaning threshold (kg); the declared behaviour for each adversarial case of Part 3 and the time within which it occurs (s); the egress-route width (m) the robot respects; the stranded-robot release means and clearance time (s); the venue channel; and the venue-staff recovery time (min).

5.2 Every apparatus in Clause 6 shall be sized from those declarations and no other source (VRS-GEN-203 §4.7). A parameter not declared makes the steps that depend on it *not declared* (4.5); a manufacturer that declares a smaller envelope demonstrates a smaller envelope and is scored against it under VRS-SVC-201.

5.3 The declared envelope shall match the one recorded for the rating (VRS-SVC-001, VRS-GEN-009); a step demonstrated at a value other than the declared one shall be inadmissible (4.9).

7 6 The steps

Columns: **ID** — Session Record step identifier · **Step** — outcome to witness · **Classes** — application classes the step applies to (4.5) · **Witness** — means (VRS-GEN-203 §3.13) · **Apparatus** — manufacturer-supplied, at declared value · **Bound** — minutes · **Required by** — VRS-SVC-201 subclause(s) served.

7.1 6.1 Part 1 — Bystander detection profiles

The intrinsic detection step uses the declared minimum detectable object. Public spaces add the profiles a venue actually contains: children, slow and low-contrast movers, and people using walking aids or wheelchairs. Each profile is a manufacturer-built test obstacle at the declared dimensions — never a person.

ID	STEP	CLASSES	WITNESS	APPARATUS	BOUND	REQUIRED BY
SVC-110.01	**Child-height profile.** At the declared maximum speed a test obstacle built to the declared child-height profile (height and width as declared) enters the path from the side; the robot stops before contact and within floor marks set at the declared stopping distance; the feed shows the stop and its trigger.	mobile service · telepresence	CAM+FEED+APP	Test obstacle at the declared child-height profile; floor marks at the declared stopping distance	8 min	Required by VRS-SVC-201 §6.2; §6.1
SVC-110.02	**Low-contrast, slow-moving profile.** A low-reflectivity (dark, matt) test obstacle of the declared minimum detectable size crosses the path at the declared minimum detectable speed while the robot approaches at the declared maximum speed; the robot stops before contact.	mobile service · telepresence	CAM+FEED+APP	Low-contrast obstacle of the declared size on a slow trolley or line; floor marks	8 min	Required by VRS-SVC-201 §6.2; §6.1

ID	STEP	CLASSES	WITNESS	APPARATUS	BOUND	REQUIRED BY
SVC-110.03	**Reduced-mobility profile.** A low, wide test obstacle representing the declared walking-aid or wheelchair footprint (dimensions as declared) stands stationary in the path; the robot approaches at the declared maximum speed and stops before contact; repeated with the obstacle moving at the declared minimum speed.	mobile service · telepresence	CAM+FEED+APP	Obstacle at the declared reduced-mobility footprint; floor marks	8 min	Required by VRS-SVC-201 §6.2; §6.1

7.2 6.2 Part 2 — Contact and toppling

A service robot that cannot avoid contact must limit it, and a tall robot among people must not fall over. Contact is with a compliant target; the push uses a tool with a force reading.

ID	STEP	CLASSES	WITNESS	APPARATUS	BOUND	REQUIRED BY
SVC-110.04	**Collision contact energy.** The robot at the declared maximum speed contacts a compliant target placed in its path beyond the protective field’s response (or with detection deliberately defeated by the manufacturer’s own means where the design relies on contact limiting); the manufacturer’s force or pressure reading is shown on camera against the declared limit.	mobile service · telepresence	CAM+FEED+APP	Compliant target with the manufacturer’s force/pressure instrument — never a person	8 min	Required by VRS-SVC-201 §6.3; §6.1
SVC-110.05	**Anti-topple under push and stop.** Loaded to the declared maximum payload at the declared maximum payload height, the robot is pushed at the	all	CAM+FEED+APP	Load at the declared mass and height; push tool with force reading	8 min	Required by VRS-SVC-201 §6.3; §6.1

ID	STEP	CLASSES	WITNESS	APPARATUS	BOUND	REQUIRED BY
	declared disturbance (push tool with the manufacturer’s force reading shown) while stationary, and a protective stop is triggered from the declared maximum speed; in neither case does it tip.					

7.3 6.3 Part 3 — Adversarial interaction

Members of the public do things to robots that operators do not. Each case witnesses the declared behaviour, repeated, with the warning and alert shown.

ID	STEP	CLASSES	WITNESS	APPARATUS	BOUND	REQUIRED BY
SVC-110.06	**Deliberate obstruction.** A test obstacle is placed and held in the robot's path, removed, and replaced, three times; each time the robot performs its declared behaviour (stop, wait, reroute or alert) and the declared audible or visual warning is shown; the feed shows the state.	mobile service · telepresence	CAM+FEED+APP	Obstacle	6 min	Required by VRS-SVC-201 §6.4; §6.1
SVC-110.07	**Leaning and riding load.** A test mass of the declared threshold is applied to the top and to a side of the robot while stationary and again as it is commanded to start; the robot performs its declared behaviour (refuse to move, alert) and the load reading or state is shown on the feed.	all	CAM+FEED+APP	Test mass at the declared threshold — never a person	6 min	Required by VRS-SVC-201 §6.4
SVC-110.08	**Tampering with covers and controls.** A declared user-accessible cover is opened, a port	all	CAM+FEED	—	6 min	Required by VRS-SVC-201 §6.4

ID	STEP	CLASSES	WITNESS	APPARATUS	BOUND	REQUIRED BY
	or control is interfered with, and the HMI is held or repeatedly operated; the robot performs its declared behaviour (safe stop, alert, lock-out) each time; the tamper event appears on the feed.					
SVC-110.09	**Blocked path.** The robot is enclosed on all sides by test obstacles; it performs its declared behaviour (stop, alert, no attempt to force through) within the declared time; the alert appears on the feed or the declared venue channel.	mobile service · telepresence	CAM+FEED+APP	Obstacles sufficient to enclose the robot	6 min	Required by VRS-SVC-201 §6.4

7.4 6.4 Part 4 — Egress and crowd flow

Run in a marked mock egress corridor. People take part as the crowd the robot must yield to; detection targets remain test obstacles (VRS-GEN-203 §4.8).

ID	STEP	CLASSES	WITNESS	APPARATUS	BOUND	REQUIRED BY
SVC-110.10	**Egress corridor and crowd yield.** In a marked mock egress corridor, people walk through beside and around the robot as it performs its declared task (no person is placed in the robot’s path as a detection target); the robot never stops or waits within the marked egress route and yields to the flow; motion warnings are shown.	mobile service · telepresence	CAM+FEED+APP	Egress route marked on the floor at the declared width; people as crowd, not as targets	10 min	Required by VRS-SVC-201 §6.5
SVC-110.11	**Stranded-robot state.** With the robot faulted or de-energised in the corridor, one person clears it from the egress route using the declared manual release or push mode; the robot alerts while stranded; time from video against the declared clearance time.	mobile service · telepresence	CAM+FEED	—	5 min	Required by VRS-SVC-201 §6.5

7.5 6.5 Part 5 — In-service recovery

Extends the intrinsic fault-recovery step by requiring the alert to reach venue staff and the recovery to be done by venue staff, timed against the declaration.

ID	STEP	CLASSES	WITNESS	APPARATUS	BOUND	REQUIRED BY
SVC-110.12	**Venue-staff recovery, timed.** A fault is induced by the manufacturer's own procedure; the robot enters its declared safe stop and the alert reaches the declared venue-staff channel (shown on the feed or console); the demonstrator, acting as venue staff with the venue manual only, recovers the robot to service; time from video against the declared recovery time.	all	CAM+FEED	—	10 min	Required by VRS-SVC-201 §6.6

6.6 Timing budget. All twelve steps sum to 89 min. Per class, with every applicable step declared: mobile service 89 min · telepresence 89 min · stationary interactive 30 min. Every class is within the 120 min bound of 4.6.

8 7 Worked example (informative)

A manufacturer of a hypothetical hospital delivery robot (class: mobile service) declares: 1.2 m/s maximum speed with a 0.9 m stopping distance; a child-height profile of 900 mm × 250 mm; a low-contrast profile of 300 mm at 5 % reflectivity moving at 0.3 m/s; a reduced-mobility footprint of 700 mm × 1 100 mm at 300 mm height; contact limiting at 65 N; 40 kg payload at 1.1 m; a 150 N push withstood; a 15 kg leaning threshold; stop-and-alert within 3 s for every adversarial case; a 1.2 m egress width; a hand-release with 60 s clearance; alerts to the ward nurse-station display; and a 5 min venue-staff recovery time.

After VRS-GEN-203 Part E the sector steps run from 12:40. SVC-110.01: the 900 mm profile enters from the side at 1.2 m/s, stop at 0.8 m against the 0.9 m mark (achieved). SVC-110.02: the matt 300 mm cylinder crosses on a slow line at 0.3 m/s, stop before contact (achieved). SVC-110.03: the 700 × 1 100 mm low frame, stationary then moving, stop both times (achieved). SVC-110.04: with detection defeated by the manufacturer's service mode, contact with the compliant target reads 58 N on their gauge against 65 N (achieved). SVC-110.05: 40 kg at 1.1 m, 150 N push shown on the gauge, no tip; protective stop from 1.2 m/s, no tip (achieved). SVC-110.06: obstruction three times, stop-wait-warn each time within 3 s (achieved). SVC-110.07: 15 kg on the top, refuses to start and alerts (achieved). SVC-110.08: drawer opened mid-task, safe stop and nurse-station alert (achieved). SVC-110.09: enclosed, stops and alerts in 2 s, does not push (achieved). SVC-110.10: in the marked 1.2 m corridor with four people walking through, the robot waits outside the route and proceeds when clear; motion chime and light shown (achieved with

note: waited 40 s at one point — recorded for the reviewer, not a failure). SVC-110.11: de-energised in the corridor, one person releases the brake and clears it in 35 s against 60 s (achieved). SVC-110.12: lidar disconnected by the service procedure, safe stop, alert on the nurse-station display, recovery by the demonstrator with the ward manual in 3 min 40 s against 5 min (achieved). Sector time 82 min; VRS-GEN-203 Part F follows.

The reviewer scores VRS-SVC-201 §6.2 from SVC-110.01 to SVC-110.03 with GEN-203.09; §6.3 from SVC-110.04 and SVC-110.05 with GEN-203.11 and GEN-203.17; §6.1 is confirmed by those marks; §6.4 from SVC-110.06 to SVC-110.09 with GEN-203.08; §6.5 from SVC-110.10 and SVC-110.11 with GEN-203.25; §6.6 from SVC-110.12 with GEN-203.28; §6.7 and §6.8 from the intrinsic steps alone. No number in this example is a requirement; every apparatus value came from the manufacturer’s own declaration.

9 Annex A (normative) — Criterion coverage

Every criterion of VRS-SVC-201 Clause 6 appears once with the intrinsic steps (VRS-GEN-203) and the sector steps (this Protocol) that witness it, or the statement that it has none.

CRITERION	SUBCLAUSE	WITNESSED BY
SVC-1 Anchor conformity	VRS-SVC-201 §6.1	no step of its own — confirmed by the marks of SVC-110.01, SVC-110.02, SVC-110.03, SVC-110.04, SVC-110.05, SVC-110.06 (Clause 4.7)
SVC-2 Bystander detection and stop — children and reduced-mobility profiles	VRS-SVC-201 §6.2	intrinsic GEN-203.09; sector SVC-110.01, SVC-110.02, SVC-110.03
SVC-3 Contact force / toppling protection	VRS-SVC-201 §6.3	intrinsic GEN-203.11, GEN-203.17; sector SVC-110.04, SVC-110.05
SVC-4 Adversarial-interaction behaviour	VRS-SVC-201 §6.4	intrinsic GEN-203.08; sector SVC-110.06, SVC-110.07, SVC-110.08, SVC-110.09
SVC-5 Egress and crowd-flow discipline	VRS-SVC-201 §6.5	intrinsic GEN-203.25; sector SVC-110.10, SVC-110.11
SVC-6 In-service failure and recovery	VRS-SVC-201 §6.6	intrinsic GEN-203.28; sector SVC-110.12
SVC-7 Bystander data capture and privacy	VRS-SVC-201 §6.7	intrinsic GEN-203.37
SVC-8 Venue network exposure	VRS-SVC-201 §6.8	intrinsic GEN-203.33, GEN-203.35, GEN-203.36
SVC-9 Public-context field record	VRS-SVC-201 §6.9	no step — scored at the Certified tier from the Verified evidence (the criterion’s Certified row reads “from Verified evidence”)
SVC-10 Premises-liability support	VRS-SVC-201 §6.10	no step — documentary criterion

10 Bibliography

- ISO 13482:2014, *Robots and robotic devices — Safety requirements for personal care robots*.
- ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*.
- ISO 13855:2024, *Safety of machinery — Positioning of safeguards with respect to the approach of the human body*.
- ISO 13849-1:2023, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*.
- ISO 10218-2:2025, *Robotics — Safety requirements — Part 2: Industrial robot applications and robot cells* (collaborative-contact limit values, applied by analogy to contact limiting).
- ISO/TS 15066:2016, *Robots and robotic devices — Collaborative robots*.

- ISO 7010:2019, *Graphical symbols — Safety colours and safety signs — Registered safety signs*.
- IEC 62443-4-2:2019, *Security for industrial automation and control systems — Part 4-2: Technical security requirements for IACS components*.
- ISO/IEC 29134:2017, *Information technology — Security techniques — Guidelines for privacy impact assessment*.

11 Change history

DATE	VERSION	STATUS	CHANGE	AUTHORITY
2026-09-16	1.0.0 (draft)	Draft	Created for the VRS 2026 edition (rewrite Batch D; second sector demonstration protocol). Twelve steps in five Parts extending VRS-GEN-203 for the Service & Public criteria of VRS-SVC-201: three bystander detection profiles, contact energy and anti-topple, four adversarial cases, egress corridor and stranded-robot clearance, venue-staff recovery timed. People take part only as the crowd of Part 4. Annex A covers all ten criteria.	Rewrite instructions §6 (`VRS-XXX-110`); sector traceability matrix (SVC derived demonstration steps); CEO ruling 2026-09-15 that standards carry no catalogue identifiers

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