



VEYRUM ROBOTICS STANDARD



VRS-SVC-201

Service & Public — AR Assessment Protocol

How the Service & Public Application Rating letter is determined — sector criteria SVC-1...SVC-10, contributing intrinsic criteria, letter bands, tier ceilings and class applicability, with evidence by tier and underwriting use.

VEYRUM RESEARCH INSTITUTE

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Foreword. This Assessment Protocol determines the **Service & Public Application Rating (AR)** letter for a robot model in a declared service application class. It scores a **pool** of criteria — the ten sector criteria of Clause 6 (SVC-1...SVC-10, 100 points) plus the named intrinsic criteria of Clause 5, each scored once under its own standard and counted here — and expresses the earned points as a percentage of the applicable pool, which maps to a letter **C < B < A < AA < AAA (AAA best)** by the bands of VRS-GEN-006 §4. Every criterion is bounded by an evidence tier — Unverified, Verified, Certified — so the best attainable letter rises with substantiation, not assertion. This edition supersedes the re-weighted- mean model of the 0.x drafts: no weighting, no separate grade bands, no separate modifiers — the tier limits fall out of the per-criterion ceilings of Clause 6. Bystander safety among uninstructed persons — the sector-defining risk — is scored by demonstrated bystander-protection behaviour (SVC-2...SVC-4), not by trained-subject evidence. A Service & Public AR is an opinion above the compliance floor, not a certification, and nothing here implies that any real robot holds a Veyrum rating (ratings are not published). Requirements use “shall”; recommendations use “should”.

1 Scope

1.1 This Protocol defines, for the **Service & Public** sector Application Rating: the determination method (Clause 4); the contributing intrinsic criteria drawn into the pool (Clause 5); the ten sector criteria SVC-1...SVC-10 with their point ladders and tier ceilings (Clause 6); the letter bands, pool ceilings and class applicability (Clause 7); the evidence admissible at each tier (Clause 8); underwriting and credit use (Clause 9); result recording (Clause 10); and the assessor checklist (Clause 11). A worked example is at Annex A.

1.2 The AR shall be issued **per application class**. The service application classes are **mobile service** (delivery, cleaning, guidance, retail), **stationary interactive** (kiosk and reception robots) and **telepresence**, per VRS-SVC-001 §4. Sector applicability, the public-exposure hazard taxonomy and the anchor regime are defined in VRS-SVC-001 and are not restated here.

1.3 The AR shall be assessed at one of three **tiers** — Unverified, Verified, Certified. Each criterion states the maximum points reachable at each tier (Clause 6); the AR tier is the tier whose evidence bar the assessed evidence meets and shall not exceed the model’s Intrinsic Rating tier (VRS-GEN-006 §7). The underlying point aggregation and the letter bands are defined in VRS-GEN-005/006 and are not restated here.

2 Normative references

- **VRS-SVC-001**, Service & Public — Sector Standard — applicability, application classes, public-exposure hazard groups and the service-robot anchor regime.
- **VRS-GEN-005**, Intrinsic Rating — Methodology — point aggregation, tiers, cold-start parity and the company-wide fallback rule (§6).
- **VRS-GEN-006**, Application Rating — Scheme — the letter bands, the applicable-pool percentage and the tier rule.

- **VRS-GEN-009**, Robot Risk Passport and Registry Schema — the record that carries the AR result.
- **VRS-GEN-012**, Evidence Grades and Data Requirements — evidence kinds and the tier evidence bars.
- **VRS-GEN-101 ... VRS-GEN-106**, IR Category Standards — the intrinsic criteria contributed under Clause 5.
- **ISO 13482:2014** (under revision as ISO/FDIS 13482), Robots and robotic devices — Safety requirements for personal care / service robots — international service-robot anchor.
- **ANSI/CAN/UL 3300:2024**, Service, Communication, Information, Education and Entertainment (SCIEE) Robots — North American service anchor.
- **ISO 3691-4:2023**, Industrial trucks — Driverless industrial trucks and their systems — mobile-service / delivery-platform anchor.
- **IEC 62443-4-2:2019**, Security for industrial automation and control systems — component requirements.
- **ISO 14224:2016**, Collection and exchange of reliability and maintenance data for equipment.
- Data twin: **VRS-SVC-501** (generated from this Protocol, never hand-edited).

3 Terms and definitions

Terms per VRS-GEN-001 (aligned to ISO 8373:2021) and VRS-SVC-001. Locally:

- **pool** — the set of criteria whose points determine the AR letter: the ten sector criteria of Clause 6 together with the contributing intrinsic criteria of Clause 5.
- **applicable pool** — the pool for a given application class after criteria not applicable to that class are removed from both the earned points and the pool range (Clause 4; VRS-GEN-006 §6).
- **contributor** — an intrinsic criterion scored once under its own IR category standard and counted again in the sector pool at the same points (Clause 5).
- **tier** — the evidence stringency at which a criterion is assessed: **Unverified** (public evidence only), **Verified** (manufacturer evidence pack examined), **Certified** (behaviour witnessed).
- **ceiling** — the maximum points a criterion awards at a given tier; points earned are capped at the ceiling of the assessed tier.
- **evidence bar** — the minimum evidence a criterion requires before any points are awarded; below it the criterion scores 0.
- **company-wide fallback** — the substitute points a criterion allows from manufacturer-wide evidence when model-specific evidence is unavailable (VRS-GEN-005 §6).
- **worst-case bystander population** — the most vulnerable person class (child, reduced-mobility person) admitted by an application class's exposure envelope, recorded for severity weighting (VRS-SVC-001 §5.3).

4 Method of assessment

4.1 The Service & Public AR shall be determined as a percentage of the **applicable pool** and mapped to a letter by the bands of VRS-GEN-006 §4 (Clause 7.1). The pool is the ten sector criteria of Clause 6 (SVC-

1...SVC-10, 100 points) together with the contributing intrinsic criteria of Clause 5, each scored once under its own standard and counted here at the same points. For an application class the assessor shall add the points earned across the applicable criteria and divide by the sum of the point ranges of those same criteria; a criterion not applicable to the class (Clause 6 Applicability row; VRS-GEN-006 §6) shall be removed from both the earned points and the pool range. No weighting is applied – each criterion's point range sizes its own importance – and no separate modifiers operate on the letter: the tier limits follow from the per-criterion ceilings of Clause 6 (Clause 7.2; VRS-GEN-006 §8).

4.2 Evidence shall be attributable to the declared **application class** of the assessed envelope (mobile service, stationary interactive or telepresence; Clause 1.2) and to public-context operation (declared maximum crowd density in persons/m², maximum operating speed in m/s, supervision and hours-of-day conditions); the AR letter covers only the assessed classes and envelopes.

4.3 Letters shall be issued **per application class** where evidence diverges materially between classes; the displayed sector letter shall be the **lowest issued class letter**. A class for which no letter can be issued shall be displayed as *not covered*, and the assessed envelope shall contract to the classes and exposure envelopes the evidence covers.

4.4 Evidence obtained outside a declared application class and its exposure envelope shall be **inadmissible** as support for that class; the letter shall not be extended to conditions never observed. Bystander-protection performance (SVC-2...SVC-4) shall not be inferred from trained-test-subject evidence alone: the uninstructed-bystander behaviour is the risk being rated, so the bystander case for a class shall rest on uninstructed-person trial or public-context incident evidence for that class (VRS-SVC-001 §5.2).

5 Contributing IR criteria

5.1 The sector pool consists of the sector criteria of Clause 6 and the following intrinsic criteria, scored once under their own standards and counted again here at the same points:

IR CRITERION	SCORED UNDER
SF-1	VRS-GEN-101 §6.1
SF-2	VRS-GEN-101 §6.2
SF-4	VRS-GEN-101 §6.4
SF-5	VRS-GEN-101 §6.5
SF-8	VRS-GEN-101 §6.8
RL-3	VRS-GEN-102 §6.3
SV-1	VRS-GEN-103 §6.1
SV-6	VRS-GEN-103 §6.6
CY-2	VRS-GEN-105 §6.2
CY-4	VRS-GEN-105 §6.4
CY-6	VRS-GEN-105 §6.6
MS-1	VRS-GEN-106 §6.1
MS-7	VRS-GEN-106 §6.7
SI-2	VRS-GEN-104 §6.2
SI-6	VRS-GEN-104 §6.5

5.2 No other intrinsic criterion contributes. Points, ceilings and applicability of a contributing criterion are those of its own standard; where a contributing criterion is not applicable to the assessed application class it is removed from the pool for that class (VRS-GEN-006 §6).

6 Sector criteria

6.0 Summary. Points and tier ceilings per criterion; totals reproduce by addition.

§	CRITERION	POINTS	UNVERIFIED CEILING	VERIFIED CEILING	CERTIFIED CEILING
6.1	SVC-1 Anchor conformity (ISO 13482 / ISO 12100)	0–15	12	13	15
6.2	SVC-2 Bystander detection and stop – children and reduced-mobility profiles	0–15	8	12	15
6.3	SVC-3 Contact force / toppling protection	0–10	7	8	10
6.4	SVC-4 Adversarial-interaction behaviour	0–10	6	8	10
6.5	SVC-5 Egress and crowd-flow discipline	0–8	6	7	8
6.6	SVC-6 In-service failure and recovery	0–10	6	8	10
6.7	SVC-7 Bystander data capture and privacy	0–10	8	8	10
6.8	SVC-8 Venue network exposure	0–8	7	7	8
6.9	SVC-9 Public-context field record	0–8	5	8	8
6.10	SVC-10 Premises-liability support	0–6	5	6	6
Total		100	70	85	100

6.1 6.1 SVC-1 Anchor conformity (ISO 13482 / ISO 12100) (0–15)

ROW	
What is measured	.
Ladder	15 = third-party-assessed conformity + functions validated for uninstructed-bystander conditions · 13 = pack-evidenced (documents), not demonstrated · 12 = third-party-assessed conformity ((public certificate)) · 10 = self-declared + internal validation · 5 = self-declaration only · 0 = none
Unverified — evidence & ceiling	Public DoC; certificate registers. Ceiling 12.
Verified — evidence & ceiling	DoC + certificates + validation reports. Ceiling 13.
Certified — evidence & ceiling	Witnessed bystander-protection steps (SVC-2...4) confirm validation. Ceiling 15.
Company-wide fallback	n/a
Evidence bar	DoC or equivalent for the rated version.
Applicability	mobile service (delivery, cleaning, guidance, retail) · stationary interactive (kiosk/reception robots) · telepresence. All criteria apply to all classes unless stated.

6.2 6.2 SVC-2 Bystander detection and stop — children and reduced-mobility profiles (0–15)

ROW	
What is measured	Detection/stop with test obstacles at child height and low-contrast/slow-moving profiles at declared max speed.
Ladder	15 = all declared profiles witnessed · 12 = pack-evidenced (documents), not demonstrated · 10 = adult profile at limits · 8 = certified with published data · 5 = nominal only · 0 = not established
Unverified — evidence & ceiling	Public third-party test; certificate. Ceiling 8.
Verified — evidence & ceiling	Validation evidence for declared profiles. Ceiling 12.
Certified — evidence & ceiling	Witnessed with child-height and low-contrast test obstacles; floor marks. Ceiling 15.
Company-wide fallback	n/a
Evidence bar	Detection envelope declared incl. minimum object size.
Applicability	mobile service (delivery, cleaning, guidance, retail) · stationary interactive (kiosk/reception robots) · telepresence. All criteria apply to all classes unless stated.

6.3 SVC-3 Contact force / toppling protection (0–10)

ROW	
What is measured	Contact energy limits on collision; anti-topple at declared speed with declared payload/height.
Ladder	10 = witnessed · 8 = certified ((public)) · 7 = publicly evidenced only (no pack, no demonstration) · 6 = validation report · 3 = documented · 0 = not established
Unverified — evidence & ceiling	Datasheet/manual; certificate. Ceiling 7.
Verified — evidence & ceiling	Force/topple test evidence. Ceiling 8.
Certified — evidence & ceiling	Witnessed contact on compliant target with force reading; push/stop topple test. Ceiling 10.
Company-wide fallback	n/a
Evidence bar	Mass, CoG height and max speed declared.
Applicability	mobile service (delivery, cleaning, guidance, retail) · stationary interactive (kiosk/reception robots) · telepresence. All criteria apply to all classes unless stated.

6.4 6.4 SVC-4 Adversarial-interaction behaviour (0–10)

ROW	
What is measured	Response to deliberate obstruction, tampering, riding/leaning, blocked path: declared safe behaviour (stop, retreat, alert) every time.
Ladder	10 = witnessed all declared cases · 8 = pack-evidenced (documents), not demonstrated · 6 = documented + certified/tested · 3 = documented · 0 = not established
Unverified — evidence & ceiling	Manual; public tests. Ceiling 6.
Verified — evidence & ceiling	Behaviour specification + test evidence. Ceiling 8.
Certified — evidence & ceiling	Witnessed: obstruct, lean, block, tamper with covers. Ceiling 10.
Company-wide fallback	n/a
Evidence bar	Adversarial-interaction behaviours documented.
Applicability	mobile service (delivery, cleaning, guidance, retail) · stationary interactive (kiosk/reception robots) · telepresence. All criteria apply to all classes unless stated.

6.5 6.5 SVC-5 Egress and crowd-flow discipline (0–8)

ROW	
What is measured	Robot never blocks declared egress routes; yields in dense crowds; stranded-robot state is movable/alerting.
Ladder	8 = witnessed · 7 = pack-evidenced (documents), not demonstrated · 6 = documented + tested · 3 = documented · 0 = not established
Unverified — evidence & ceiling	Manual; venue guidance. Ceiling 6.
Verified — evidence & ceiling	Behaviour spec + fleet configuration evidence. Ceiling 7.
Certified — evidence & ceiling	Witnessed in a marked mock egress corridor with people. Ceiling 8.
Company-wide fallback	n/a
Evidence bar	Egress/crowd behaviours documented.
Applicability	mobile service (delivery, cleaning, guidance, retail) · stationary interactive (kiosk/reception robots) · telepresence. All criteria apply to all classes unless stated.

6.6 6.6 SVC-6 In-service failure and recovery (0–10)

ROW	
What is measured	Fault → declared safe stop with alert; recovery by venue staff per manual within declared time.
Ladder	10 = witnessed · 8 = pack-evidenced (documents), not demonstrated · 7 = documented + repair record · 6 = publicly evidenced only (no pack, no demonstration) · 4 = documented · 0 = not established
Unverified — evidence & ceiling	Manual. Ceiling 6.
Verified — evidence & ceiling	Fault-response spec + repair record (model or company). Ceiling 8.
Certified — evidence & ceiling	Witnessed induced fault → alert → staff recovery, timed. Ceiling 10.
Company-wide fallback	Repair record company-wide → 7
Evidence bar	Fault behaviours documented.
Applicability	mobile service (delivery, cleaning, guidance, retail) · stationary interactive (kiosk/reception robots) · telepresence. All criteria apply to all classes unless stated.

6.7 6.7 SVC-7 Bystander data capture and privacy (0–10)

ROW	
What is measured	What sensors capture of the public, on-device vs cloud, retention, signage guidance, opt-out.
Ladder	10 = shown on console + matches disclosure + third-party privacy audit · 8 = evidenced by documents alone (public or pack), not demonstrated · 7 = documented in detail · 4 = partial disclosure · 0 = undisclosed
Unverified — evidence & ceiling	Privacy notice; public documentation; audits. Ceiling 8.
Verified — evidence & ceiling	Data-handling description. Ceiling 8.
Certified — evidence & ceiling	Console shows capture/destinations matching disclosure. Ceiling 10.
Company-wide fallback	n/a
Evidence bar	Privacy disclosure exists.
Applicability	mobile service (delivery, cleaning, guidance, retail) · stationary interactive (kiosk/reception robots) · telepresence. All criteria apply to all classes unless stated.

6.8 6.8 SVC-8 Venue network exposure (0–8)

ROW	
What is measured	Operates on segmented guest/venue networks; remote access controlled; updates signed.
Ladder	8 = shown · 7 = documented + public security audit · 4 = documented · 0 = not established
Unverified — evidence & ceiling	Security documentation. Ceiling 7.
Verified — evidence & ceiling	Network/update/access documentation. Ceiling 7.
Certified — evidence & ceiling	Witnessed on console (offline mode, update, remote-access toggle). Ceiling 8.
Company-wide fallback	n/a
Evidence bar	Network model documented.
Applicability	mobile service (delivery, cleaning, guidance, retail) · stationary interactive (kiosk/reception robots) · telepresence. All criteria apply to all classes unless stated.

6.9 6.9 SVC-9 Public-context field record (0–8)

ROW	
What is measured	Incidents involving the public over the window.
Ladder	8 = none above near-miss (model-specific) · 6 = company-wide record in place of model-specific data · 5 = remediated · 3 = null-result rung · 0 = unremediated major
Unverified — evidence & ceiling	Recall/incident databases, press. Ceiling 5.
Verified — evidence & ceiling	Model-specific register + exposure. Ceiling 8.
Certified — evidence & ceiling	— (from Verified evidence). Ceiling 8.
Company-wide fallback	Company-wide → 6
Evidence bar	Exposure declared or null search recorded.
Applicability	mobile service (delivery, cleaning, guidance, retail) · stationary interactive (kiosk/reception robots) · telepresence. All criteria apply to all classes unless stated.

6.10 6.10 SVC-10 Premises-liability support (0–6)

ROW	
What is measured	Operator guidance, signage kit, incident-reporting process and insurance-relevant documentation provided to venues.
Ladder	6 = all provided · 5 = publicly evidenced only (no pack, no demonstration) · 4 = guidance + reporting · 2 = guidance only · 0 = not established
Unverified — evidence & ceiling	Public operator guidance. Ceiling 5.
Verified — evidence & ceiling	Full venue support package. Ceiling 6.
Certified — evidence & ceiling	— (documentary). Ceiling 6.
Company-wide fallback	n/a
Evidence bar	None.
Applicability	mobile service (delivery, cleaning, guidance, retail) · stationary interactive (kiosk/reception robots) · telepresence. All criteria apply to all classes unless stated.

7 7 Letter bands, tier ceilings and class applicability

7.1 Bands (VRS-GEN-006 §4). AAA ≥ 90 % · AA ≥ 75 % · A ≥ 60 % · B ≥ 45 % · C below 45 % of the applicable pool.

7.2 Pool ceilings. Sector criteria alone: Unverified 70/100 (70 %) · Verified 85/100 (85 %) · Certified 100. With the contributing criteria of Clause 5 the pool ceilings are as recorded in VRS-SVC-501; in both forms the best attainable letter is A at Unverified, AA at Verified and AAA at Certified (VRS-GEN-006 §8).

7.3 Application classes. mobile service (delivery, cleaning, guidance, retail) · stationary interactive (kiosk/reception robots) · telepresence. All criteria apply to all classes unless stated... A criterion whose Applicability row excludes the assessed class is removed from both the numerator and the denominator; the letter is issued per class and the displayed letter is the lowest (Clause 4).

7.4 No modifiers, caps or gates operate on the letter other than the ceilings of Clause 6 and the tier rule of VRS-GEN-006 §7.

8 Evidence by tier

8.1 Unverified. The assessor works only from evidence obtainable without the manufacturer’s cooperation: datasheets, manuals and public safety documentation, published declarations of conformity and the standards they cite, public certificate registers, published test summaries, public privacy notices and audits, and — for the field-record criterion (SVC-9) — public recall and incident databases and press records. Each criterion’s Unverified ceiling (Clause 6) is the most an honest reading of such evidence shall earn; the AR tier is **Unverified**.

8.2 Verified. The assessor additionally examines a manufacturer evidence pack and shall accept, by mapping, the conformity artefacts the manufacturer already holds: the ISO 13482:2014 (or ISO/FDIS 13482) risk assessment with ISO/TR 23482-1:2020 test methods and the ANSI/CAN/UL 3300:2024 evaluation report (SVC-1); bystander detection, contact-force/topple and adversarial-interaction validation reports (SVC-2...SVC-4); the ISO 3691-4:2023 verification report for delivery/mobile platforms; the fault-response specification and ISO 14224:2016 repair records (SVC-6); the data-protection impact assessment (GDPR 2016/679-class), the AI Act (EU) 2024/1689 Article-5 admissibility record where biometric identification is performed, and the IEC 62443-4-2:2019 evaluation of the venue link/update plane (SVC-7/SVC-8); the venue support package (SVC-10); and the model-specific public-context incident register (SVC-9). Adoption is therefore a mapping, not new testing. Verified ceilings apply only to criteria whose pack items are present and examined; the AR tier is **Verified**.

8.3 Certified. The assessor witnesses the declared behaviour on the robot and its own console: bystander detection and stop with child-height and low-contrast test obstacles (SVC-2); contact on a compliant target with a force reading and a push/stop topple test (SVC-3); adversarial obstruction, leaning, blocking and tampering (SVC-4); egress and crowd-flow discipline in a marked mock corridor with people (SVC-5); an induced fault with alert and timed staff recovery (SVC-6); the privacy console showing capture and destinations against the disclosure (SVC-7); and the network console showing offline mode, a signed update and the remote-access toggle (SVC-8). The documentary criteria (SVC-1, SVC-9, SVC-10) carry their Certified points from the Verified evidence. The AR tier is **Certified**.

8.4 Evidence bar. Each criterion states an **evidence bar** (Clause 6). Where the bar is not met the criterion shall score **0** — no evidence is 0 points, never a discard from the pool. A manufacturer self-declaration shall not earn points above the rung its independent corroboration supports.

8.5 Null-result rule. For SVC-9 a recorded search of the public recall and incident databases, with its coverage stated, shall earn the criterion’s null-result rung where no adverse record is found; an unrecorded search shall not.

8.6 Company-wide fallback. Where a criterion offers a company-wide fallback (SVC-6, SVC-9) and model-specific evidence is unavailable, manufacturer-wide records shall earn the stated fallback points (VRS-GEN-005 §6); the substitution shall be recorded per Clause 10.

8.7 AR tier. The AR tier is the lowest tier among the criteria that determined the letter, and shall not exceed the model’s Intrinsic Rating tier (VRS-GEN-006 §7).

9 Underwriting and credit use

9.1 The letter is an opinion above the compliance floor, not a certification, and shall not be published or imply that any real robot holds a Veyrum rating.

9.2 The per-class letters and the recorded exposure envelopes are the underwriting hooks: the letter informs rate relativity, and the covered classes and envelopes inform coverage scope, so that operation outside the assessed envelope is an exclusion or a condition rather than an implied covered risk. Three loss drivers shall be surfaced separately so an underwriter can weight them independently of the letter: the **third-party bystander bodily-injury severity** driver (SVC-2...SVC-4, recorded with the **worst-case bystander population** the exposure envelope admits — child or reduced-mobility person — because a single public-contact event can generate a premises-liability claim far exceeding the unit's own value); the **bystander-privacy exposure** driver (SVC-7 public data capture, retention and disclosure); and the **correlated cyber-catastrophe** driver (SVC-8 venue network exposure, recording whether the shared venue-network/update plane holds an IEC 62443-4-2:2019 evaluation, so that a per-fleet accumulation limit can be set). The SVC-10 premises-liability support posture informs the host operator's coverage conditions.

9.3 For credit, the reliability, recoverability and residual drivers shall be readable from the recorded per-criterion points to inform LTV, residual curves and end-of-support assumptions: SVC-6 informs in-service recovery and public-space duty-cycle wear, and the intrinsic reliability, serviceability and support criteria drawn into the pool (Clause 5) inform the obsolescence assumption.

10 Result recording

The rating record shall carry, per VRS-GEN-009: the displayed sector letter and the per-class letters with the exposure envelope each was issued at; the **per-criterion points** earned across the sector criteria (Clause 6) and the contributing intrinsic criteria (Clause 5); the **not-applicable set** removed for each class and the resulting applicable-pool range; the contributing intrinsic criteria used; the AR **tier**; the **edition** (VRS 2026); the VRS-SVC-501 data-twin version; the **worst-case bystander population** attribute (SVC-2...SVC-4); and the cyber-accumulation attribute (SVC-8; VRS-SVC-001 §8.5). Recording flows to the Passport per VRS-GEN-009; no personal information shall be stored (VRS-GEN-012 §5.2).

11 Assessor checklist

An assessor with this Protocol and the evidence shall reach the same result by executing the following in order; no step admits an unrecorded judgement call, and any deviation shall be recorded with its basis:

- [] Application class(es) confirmed (mobile service / stationary interactive / telepresence) with each exposure envelope (Clause 1.2; VRS-SVC-001 §4).
- [] Assessment tier fixed (Clause 8); the not-applicable set recorded per class and the applicable-pool range computed (Clause 4).
- [] Contributing intrinsic criteria drawn from their source standards at their own points and tiers (Clause 5).
- [] **SVC-1** anchor conformity scored; a declaration of conformity exists for the rated version (evidence bar).

- [] **SVC-2** bystander detection and stop scored; detection envelope with minimum object size declared (evidence bar); bystander case rests on uninstructed-person or field evidence (Clause 4.4).
- [] **SVC-3** contact-force / toppling protection scored; mass, CoG height and max speed declared.
- [] **SVC-4** adversarial-interaction behaviour scored.
- [] **SVC-5** egress and crowd-flow discipline scored.
- [] **SVC-6** in-service failure and recovery scored; company-wide fallback recorded if used.
- [] **SVC-7** bystander data capture and privacy scored; privacy disclosure exists (evidence bar).
- [] **SVC-8** venue network exposure scored.
- [] **SVC-9** public-context field record scored; null-result search applied per Clause 8.5; company-wide fallback recorded if used.
- [] **SVC-10** premises-liability support scored.
- [] Points added and divided by the applicable-pool range; letter read from the bands (Clause 7.1).
- [] Letters issued per class; the lowest displayed (Clause 4.3); each award held at its assessed-tier ceiling (Clause 6).
- [] Result recorded to the passport: per-criterion points, not-applicable set, contributors, tier, edition, twin version and the worst-case bystander population (Clause 10).

12 Annex A (informative) — Worked example

FICTIONAL EXAMPLE — not a real product; illustrates mechanics only.

A fictional wheeled hospitality-service robot, model code **SVC-HR-01**, is assessed for the **mobile service** application class at the **Verified** tier: a manufacturer evidence pack is examined and no behaviour is witnessed. All ten sector criteria apply to the mobile-service class, and the fifteen contributing intrinsic criteria of Clause 5 are drawn from their source standards at their own Verified points. The declared exposure envelope (maximum crowd density 1.5 persons/m², maximum speed 1.2 m/s, attended hours) admits children, so the worst-case bystander population is recorded as *child*.

Sector criteria (Verified tier).

§	CRITERION	VERIFIED CEILING	POINTS EARNED
6.1	SVC-1	13	13
6.2	SVC-2	12	12
6.3	SVC-3	8	8
6.4	SVC-4	8	8
6.5	SVC-5	7	7
6.6	SVC-6	8	8
6.7	SVC-7	8	8
6.8	SVC-8	7	7
6.9	SVC-9	8	6 (company-wide record)
6.10	SVC-10	6	6
Sector subtotal		85	83

Contributing intrinsic criteria (Verified tier). Drawn at their own points, the fifteen criteria of Clause 5 have a combined range of 150 points and a Verified ceiling of 121; this model earns **115** of them (each at its Verified ceiling except the primary protective function SF-4, earning 9 of 11; the field failure rate RL-3, earning 10 of 12; and the headline-claims criterion SI-2, earning 17 of 19).

Letter. The applicable pool for the mobile-service class is the sector range 100 plus the contributor range 150 = **250 points**. Points earned = 83 (sector) + 115 (contributors) = **198**. As a percentage of the pool, $198 \div 250 = 79.2\%$, which falls in the **AA** band ($\geq 75\%$, below AAA's 90 %). The result is **Service & Public AR: AA (VRS 2026) – Verified**.

Tier ceiling by construction. At the Verified tier the pool's own ceiling is $206 \div 250 = 82.4\%$, so AA is the best letter attainable without a witnessed demonstration (Clause 7.2); AAA would require Certified-tier evidence. No separate modifier is applied — the ceiling does the work.

Loss-driver read. SVC-2...SVC-4 feed the third-party bystander bodily-injury severity driver, recorded with the *child* worst-case population (Clause 9.2); SVC-7 feeds the bystander-privacy exposure driver; SVC-8 records that the venue update plane carries an IEC 62443-4-2:2019 evaluation for the correlated cyber-catastrophe accumulation limit; SVC-10 records the premises-liability support posture for the host operator's coverage conditions.

Refusal variant. Had **SVC-HR-01** held no ISO 13482:2014, ANSI/CAN/UL 3300:2024 or ISO 3691-4:2023 conformity for the mobile-service class, SVC-1 would score at its low no-evidence rung (5 for self-declaration only, 0 for none) rather than 13, and the letter would fall out of the reduced total — there is no separate safety-floor modifier. Numbers illustrate mechanics only.

13 Bibliography

The full SVC anchor regime is verified in VRS-SVC-001; the following are the anchors this Protocol's criteria and evidence tiers (Clauses 6 and 8) rest on, dated at point of use:

- ISO 13482:2014 — Robots and robotic devices — Safety requirements for personal care robots (iso.org/standard/53820.html); under revision as ISO/FDIS 13482, renamed *Robotics — Safety requirements for service robots* (iso.org/standard/83498.html) — SVC-1 international service-robot floor; re-date when it publishes.
- ISO/TR 23482-1:2020 (safety-related test methods) and ISO/TR 23482-2:2019 (application guidelines) (iso.org) — informative companions to ISO 13482, SVC-1 test-method source.
- ISO 12100:2010 — Safety of machinery — General principles for design — risk assessment and risk reduction (iso.org/standard/51528.html) — SVC-1 risk-assessment basis for classes without a recognised anchor.
- ANSI/CAN/UL 3300:2024 — Standard for Service, Communication, Information, Education and Entertainment (SCIEE) Robots (webstore.ansi.org/standards/ul/ansiul33002024; ULSE 2024) — SVC-1 safety floor (US/CA).
- ISO 3691-4:2023 — Industrial trucks — Safety requirements and verification — Part 4: Driverless industrial trucks and their systems (iso.org/standard/83545.html) — mobile-service / delivery-platform evidence lane.
- IEC 62443-4-2:2019 (edition 1.0; COR1:2022) — technical security requirements for IACS components (webstore.iec.ch/publication/34421) — SVC-8 venue-link cyber lane.
- ISO 14224:2016 — Collection and exchange of reliability and maintenance data for equipment (iso.org/standard/64076.html) — SVC-6 reliability and repair lane.
- AI Act, Regulation (EU) 2024/1689 (in force 1 August 2024; Art. 5 public-space biometric restrictions) (eur-lex.europa.eu/eli/reg/2024/1689) — SVC-7 biometric-capture admissibility lane.
- GDPR, Regulation (EU) 2016/679 (eur-lex.europa.eu/eli/reg/2016/679) — SVC-7 data-protection lane.
- ISO 8373:2021 — Robotics — Vocabulary (iso.org/standard/75539.html) — robot-term basis.
- VRS-SVC-501 — machine-readable data twin of this Protocol (Clause 5/6/7 values).

14 Change history

DATE	VERSION	STATUS	CHANGE	AUTHORITY
2026-09-16	1.0.0	Draft	VRS 2026 rewrite: replaced the re-weighted-mean scoring (Clauses 4–8) with a point-summed pool — ten sector criteria SVC-1...SVC-10 (100 points; Clause 6) plus the named contributing intrinsic criteria (Clause 5), expressed as a percentage of the applicable pool and mapped to a letter by VRS-GEN-006 §4; added per-criterion tier ceilings, the letter-band/pool-ceiling/class-applicability clause (Clause 7), evidence-by-tier (Clause 8), a regenerated Verified-tier worked example (Annex A) and a per-criterion checklist (Clause 11); replaced the venue-class taxonomy with the sector application classes (mobile service / stationary interactive / telepresence); re-anchored the former §7 caps into criterion rungs and evidence bars (7.1 safety-floor → SVC-1; 7.2 undocumented public data-capture → SVC-7, 0 = undisclosed; 7.3 uninstrumented field-return → SVC-9 evidence bar); retired confidence bands, provisional flags, renormalisation, weighted-mean, assessed-unrated and stage- prior markers; dropped GEN-201/GEN-202 references; VRS-SVC-501 data twin regenerated by the dispatcher from Clauses 5–7; see GEN-005 §6.	VRS 2026 rewrite Stage 4
2026-09-14	0.2.0ε1	Draft	COHERENCE: corrected stale exposure cross-reference in §8.1 — “VRS-GEN-012 §4.1” (evidence-grade scale) → §7 (Exposure and denominators). Editorial only; no requirement, weight, band, or constant changed; twin VRS-SVC-501 payload value unchanged (citation mirrored).	Curator Run #183; charter COHERENCE
2026-09-12	0.2.0	Draft	DEEPEN: brought to publishable depth on the HAZ/FLD/DOM-201 v0.2.0 exemplar. Added service-op-hours exposure denominator (§8.1), evidence-lane conformity-artefact reuse (§8.2, dated anchors re-verified 2026-09-12), per-criterion loss-driver mapping incl. third-party bystander bodily-injury severity (§5.2), admissibility/refusal gates (§4.3/§4.4/§7/§8.4), underwriting/credit use (§9, GEN-009), passport recording (§10), assessor checklist (§11), worked example producing per-class letters (Annex A), Bibliography with dated anchors. Retired all bare pending markers → stage prior labels (VRS-GEN-202). No weight, band or sufficiency-constant value changed. Twin VRS-SVC-501 regenerated to 0.2.0.	Curator Run #53; charter DEEPEN

DATE	VERSION	STATUS	CHANGE	AUTHORITY
			Net +≈2,450 words; shall 3→~29. No requirements deleted.	
2026-09-05	0.1.0	Draft	Initial draft — SVC rubric first statement; data twin planned as VRS-SVC-501	CEO goal 2026-09-05

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