



VEYRUM ROBOTICS STANDARD



VRS - AER - 501

Aerial / UAS — AR Rubric Data Twin

Machine-readable criteria, tier ceilings, contributors and bands of VRS-AER-201 (VRS 2026 (draft)); generated, never hand-edited.

VEYRUM RESEARCH INSTITUTE

DOCUMENT

VRS-AER-501

VERSION

1.0.0

STATUS

Draft

DATE

16 September 2026

Foreword. Data Artifact: the machine-readable twin of **VRS-AER-201** (VRS 2026 (draft)) — the sector criteria with their point ranges, rungs and tier ceilings, the contributing intrinsic criteria, the letter bands and the application classes — generated FROM the protocol's Clause 5–7 by `tools/vrs-twin-generate.py`. Consistency is by construction and re-verified on every build (conformance check 15). The JSON in Clause 4 is the normative payload; scorer tooling consumes it directly. A change to VRS-AER-201 and to this twin is one change instrument.

1 Scope

This Data Artifact carries the rubric data of the Aerial / UAS (AER) sector in machine-readable form: the 9 sector criteria of VRS-AER-201 Clause 6 with points, rungs and Unverified / Verified / Certified ceilings; the contributing intrinsic criteria of Clause 5; the letter bands and application classes of Clause 7. It states no independent requirements. Where this artifact and VRS-AER-201 could be read to differ, VRS-AER-201 governs and this twin is regenerated to match.

2 Normative references

- **VRS-AER-201**, *Aerial / UAS — AR Assessment Protocol* — source protocol twinned (Clauses 5–7).
- **VRS-AER-001**, *Aerial / UAS — Sector Standard* — application classes and hazard groups.
- **VRS-GEN-005**, *IR Methodology* — point sum, tier ceilings, no-evidence rule.
- **VRS-GEN-006**, *AR Scheme* — pool mechanics, letter bands, tier caps by construction.
- **VRS-GEN-002**, *Designation and Drafting Rules* — criterion layout (§6.5) and versioning.

3 Terms and definitions

The terms of VRS-GEN-001 and VRS-AER-201 apply. **data twin** — a machine-readable artifact regenerated one-to-one from a source protocol's normative clauses. **rung** — a named state of a criterion awarding a stated integer number of points (VRS-GEN-002 §3.9). **ceiling** — the maximum points a criterion awards at a stated tier (VRS-GEN-002 §3.10).

4 Payload

Sector criteria total **100** points; ceilings Unverified **70**, Verified **85**, Certified **100**.

```
{
  "_meta": {
    "description": "AER sector AR rubric data twin — machine-readable form of VRS-AER-201 Clause 5/6/7 (VRS 2026 (draft)). Generated by tools",
    "edition": "VRS 2026 (draft)",
    "source_protocol": "VRS-AER-201 v1.0.0",
    "generated": "2026-09-16",
    "conforms_to": "VRS-GEN-005 §6 (point sum, tier ceilings); VRS-GEN-006 §6-§8 (pool, bands, tier caps by construction)"
  },
  "sector_code": "aer",
  "bands_percent": {
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    "AA": 75,
    "A": 60,
    "B": 45,
    "C": 0
  },
  "application_classes": [
    "small UAS (< 25 kg)",
    "heavy-lift / delivery",
    "dock-based autonomous",
    "VTOL fixed-wing"
  ],
  "contributing_ir_criteria": [
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      "id": "SF-2",
      "document": "VRS-GEN-101",
      "clause": "6.2"
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    {
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      "document": "VRS-GEN-101",
      "clause": "6.5"
    },
    {
      "id": "SF-7",
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```

    "document": "VRS-GEN-101",
    "clause": "6.7"
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    "document": "VRS-GEN-101",
    "clause": "6.8"
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    "document": "VRS-GEN-102",
    "clause": "6.1"
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    "document": "VRS-GEN-102",
    "clause": "6.2"
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    "document": "VRS-GEN-102",
    "clause": "6.7"
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    "document": "VRS-GEN-103",
    "clause": "6.1"
  },
  {
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    "document": "VRS-GEN-103",
    "clause": "6.5"
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    "document": "VRS-GEN-105",
    "clause": "6.3"
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    "document": "VRS-GEN-105",
    "clause": "6.4"
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    "document": "VRS-GEN-105",
    "clause": "6.5"
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    "document": "VRS-GEN-106",
    "clause": "6.1"
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  {
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    "document": "VRS-GEN-106",
    "clause": "6.7"
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    "clause": "6.1"
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    "document": "VRS-GEN-104",
    "clause": "6.2"
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  "clause": "6.5"
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      "clause": "6.1",
      "id": "AER-1",
      "name": "Airworthiness / class-mark / operational-authorisation fit",
      "points_max": 14,
      "what_is_measured": ".",
      "rungs": [
        {
          "points": 14,
          "state": "class mark or type approval by notified body/authority + operational authorisations published"
        },
        {
          "points": 13,
          "state": "pack-evidenced (documents), not demonstrated"
        },
        {
          "points": 12,
          "state": "class mark/approval public"
        },
        {
          "points": 8,
          "state": "declared conformity with test reports"
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        {
          "points": 4,
          "state": "declared"
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        {
          "points": 0,
          "state": "not established"
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      "ceiling": {
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        "verified": 13,
        "certified": 14
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      "company_wide": null,
      "evidence_bar": "Class and operating category declared.",
      "applicability": "small UAS (< 25 kg) · heavy-lift / delivery · dock-based autonomous · VTOL fixed-wing. All criteria apply to all clas",
      "not_applicable_by_class": false
    },
    {
      "clause": "6.2",
      "id": "AER-2",
      "name": "Lost-link and fail-safe behaviour",
      "points_max": 14,
      "what_is_measured": "C2 loss → declared RTH/land/loiter; GNSS-degraded fallback.",
      "rungs": [
        {
          "points": 14,
          "state": "witnessed incl. GNSS-degraded"
        },
        {
          "points": 11,
          "state": "pack-evidenced (documents), not demonstrated"
        },
        {
          "points": 10,
          "state": "witnessed nominal"
        }
      ],

```

```

    {
      "points": 8,
      "state": "certified/independently tested"
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    {
      "points": 5,
      "state": "documented"
    },
    {
      "points": 0,
      "state": "not established"
    }
  ],
  "ceiling": {
    "unverified": 8,
    "verified": 11,
    "certified": 14
  },
  "company_wide": null,
  "evidence_bar": "Fail-safe behaviours declared.",
  "applicability": "small UAS (< 25 kg) · heavy-lift / delivery · dock-based autonomous · VTOL fixed-wing. All criteria apply to all clas",
  "not_applicable_by_class": false
},
{
  "clause": "6.3",
  "id": "AER-3",
  "name": "Airspace containment (geo-awareness, altitude/area limits, Remote ID)",
  "points_max": 12,
  "what_is_measured": ".",
  "rungs": [
    {
      "points": 12,
      "state": "witnessed refusal at boundary + Remote ID broadcast verified"
    },
    {
      "points": 10,
      "state": "pack-evidenced (documents), not demonstrated"
    },
    {
      "points": 9,
      "state": "documented + certified"
    },
    {
      "points": 8,
      "state": "publicly evidenced only (no pack, no demonstration)"
    },
    {
      "points": 6,
      "state": "documented"
    },
    {
      "points": 0,
      "state": "not established"
    }
  ],
  "ceiling": {
    "unverified": 8,
    "verified": 10,
    "certified": 12
  },
  "company_wide": null,
  "evidence_bar": "Geo-awareness declared.",
  "applicability": "small UAS (< 25 kg) · heavy-lift / delivery · dock-based autonomous · VTOL fixed-wing. All criteria apply to all clas",
  "not_applicable_by_class": false
},
{
  "clause": "6.4",
  "id": "AER-4",

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```

    "name": "Ground-risk mitigation",
    "points_max": 12,
    "what_is_measured": "Parachute/flight-termination, over-people class limits, impact-energy statements.",
    "rungs": [
      {
        "points": 12,
        "state": "witnessed termination/parachute + certified"
      },
      {
        "points": 10,
        "state": "pack-evidenced (documents), not demonstrated"
      },
      {
        "points": 9,
        "state": "certified ((public))"
      },
      {
        "points": 6,
        "state": "documented"
      },
      {
        "points": 0,
        "state": "not established"
      }
    ],
    "ceiling": {
      "unverified": 6,
      "verified": 10,
      "certified": 12
    },
    "company_wide": null,
    "evidence_bar": "Ground-risk mitigations declared.",
    "applicability": "small UAS (< 25 kg) · heavy-lift / delivery · dock-based autonomous · VTOL fixed-wing. All criteria apply to all clas",
    "not_applicable_by_class": false
  },
  {
    "clause": "6.5",
    "id": "AER-5",
    "name": "Propulsion and battery in-flight integrity",
    "points_max": 12,
    "what_is_measured": "Redundancy, battery health management, low-battery behaviour, thermal limits.",
    "rungs": [
      {
        "points": 12,
        "state": "witnessed low-battery + motor-out behaviour"
      },
      {
        "points": 9,
        "state": "validated"
      },
      {
        "points": 7,
        "state": "publicly evidenced only (no pack, no demonstration)"
      },
      {
        "points": 5,
        "state": "documented"
      },
      {
        "points": 0,
        "state": "not established"
      }
    ],
    "ceiling": {
      "unverified": 7,
      "verified": 9,
      "certified": 12
    }
  },

```

```

    "company_wide": null,
    "evidence_bar": "Battery/propulsion architecture declared.",
    "applicability": "small UAS (< 25 kg) · heavy-lift / delivery · dock-based autonomous · VTOL fixed-wing. All criteria apply to all clas
    "not_applicable_by_class": false
  },
  {
    "clause": "6.6",
    "id": "AER-6",
    "name": "Weather-envelope discipline",
    "points_max": 6,
    "what_is_measured": "Wind/precip/icing limits published; app warnings; launch refusal beyond limits.",
    "rungs": [
      {
        "points": 6,
        "state": "witnessed refusal"
      },
      {
        "points": 5,
        "state": "documented + independently tested"
      },
      {
        "points": 4,
        "state": "publicly evidenced only (no pack, no demonstration)"
      },
      {
        "points": 3,
        "state": "documented"
      },
      {
        "points": 0,
        "state": "not established"
      }
    ],
    "ceiling": {
      "unverified": 4,
      "verified": 5,
      "certified": 6
    },
    "company_wide": null,
    "evidence_bar": "Weather envelope declared.",
    "applicability": "small UAS (< 25 kg) · heavy-lift / delivery · dock-based autonomous · VTOL fixed-wing. All criteria apply to all clas
    "not_applicable_by_class": false
  },
  {
    "clause": "6.7",
    "id": "AER-7",
    "name": "Maintenance, inspection and fleet-firmware discipline",
    "points_max": 10,
    "what_is_measured": "Published maintenance programme with intervals; per-airframe logs; fleet firmware management.",
    "rungs": [
      {
        "points": 10,
        "state": "all shown"
      },
      {
        "points": 9,
        "state": "documented in detail (public programme)"
      },
      {
        "points": 8,
        "state": "publicly evidenced only (no pack, no demonstration)"
      },
      {
        "points": 5,
        "state": "partial"
      },
      {
        "points": 0,

```

```

    "state": "not established"
  }
],
"ceiling": {
  "unverified": 8,
  "verified": 9,
  "certified": 10
},
"company_wide": null,
"evidence_bar": "None.",
"applicability": "small UAS (< 25 kg) · heavy-lift / delivery · dock-based autonomous · VTOL fixed-wing. All criteria apply to all clas
"not_applicable_by_class": false
},
{
  "clause": "6.8",
  "id": "AER-8",
  "name": "Occurrence and incident record",
  "points_max": 10,
  "what_is_measured": "Authority occurrence databases over the window, normalised by disclosed fleet/flight hours.",
  "rungs": [
    {
      "points": 10,
      "state": "none attributable to the model"
    },
    {
      "points": 8,
      "state": "company-wide record in place of model-specific data"
    },
    {
      "points": 7,
      "state": "remediated"
    },
    {
      "points": 3,
      "state": "null-result rung"
    },
    {
      "points": 0,
      "state": "not established. · 0. Regime-full at Unverified"
    }
  ],
  "ceiling": {
    "unverified": 10,
    "verified": 10,
    "certified": 10
  },
  "company_wide": {
    "text": "Company-wide → 8",
    "ceiling": 8
  },
  "evidence_bar": "None.",
  "applicability": "small UAS (< 25 kg) · heavy-lift / delivery · dock-based autonomous · VTOL fixed-wing. All criteria apply to all clas
  "not_applicable_by_class": false
},
{
  "clause": "6.9",
  "id": "AER-9",
  "name": "C2-link and data security",
  "points_max": 10,
  "what_is_measured": "Encrypted C2 and video, local-data mode, account/remote controls, spoofing resistance.",
  "rungs": [
    {
      "points": 10,
      "state": "shown + third-party audit"
    },
    {
      "points": 8,
      "state": "documented in detail + audit"
    }
  ]
}

```

```

    },
    {
      "points": 7,
      "state": "publicly evidenced only (no pack, no demonstration)"
    },
    {
      "points": 5,
      "state": "documented"
    },
    {
      "points": 0,
      "state": "not established"
    }
  ],
  "ceiling": {
    "unverified": 7,
    "verified": 8,
    "certified": 10
  },
  "company_wide": null,
  "evidence_bar": "None.",
  "applicability": "small UAS (< 25 kg) · heavy-lift / delivery · dock-based autonomous · VTOL fixed-wing. All criteria apply to all clas",
  "not_applicable_by_class": false
}
],
"pool": {
  "sector_only": {
    "points": 100,
    "ceiling_unverified": 70,
    "ceiling_verified": 85,
    "ceiling_certified": 100,
    "best_letter": {
      "unverified": "A",
      "verified": "AA",
      "certified": "AAA"
    }
  },
  "with_contributors": "contributor ceilings are those of the cited IR standards; the combined pool sums are verified by the conformance ga",
  "rules": {
    "no_evidence": "0 points (VRS-GEN-005 §6, R3.3); the criterion stays in the pool at full range",
    "not_applicable": "criterion removed from numerator and denominator for that class (VRS-GEN-006 §6)",
    "tier_rule": "AR tier ≤ IR tier (VRS-GEN-006 §7)"
  }
}
}

```

5 Field dictionary

FIELD	MEANING
<code>sector_criteria[].clause</code>	VRS-AER-201 subclause (6.k) — the “Required by” reference used in derived packs and protocols
<code>sector_criteria[].points_max</code>	Upper end of the criterion's integer range
<code>sector_criteria[].rungs[]</code>	Every verifiable state and its points, highest first; the 0 state is implicit where not listed
<code>sector_criteria[].ceiling</code>	Maximum points at each tier; always equal to a rung value (VRS-GEN-002 §7.5.1)
<code>sector_criteria[].company_wide</code>	Field-record criteria only: the reduced ceiling when company-wide data substitutes for model data
<code>sector_criteria[].applicability / not_applicable_by_class</code>	Application classes the criterion applies to; excluded criteria leave the pool for that class
<code>contributing_ir_criteria[]</code>	Intrinsic criteria counted in the sector pool, with the standard and clause that score them
<code>pool.sector_only</code>	Sums over the sector criteria and the best attainable letter at each tier (A / AA / AAA by construction)
<code>bands_percent</code>	Letter thresholds as a percentage of the applicable pool (VRS-GEN-006 §4)

6 Verification

Regenerate with `python3 tools/vrs-twin-generate.py --sector aer --check`; a non-zero exit means the committed twin no longer matches VRS-AER-201 and shall be regenerated before publication.

7 Bibliography

- VRS-AER-201, *Aerial / UAS — AR Assessment Protocol*, v1.0.0, 2026 — the source of every number in Clause 4.
- VRS-AER-001, *AER Sector Standard*, 2026 — sector scope, hazard taxonomy and application classes.
- VRS-GEN-005, *Intrinsic Rating — Methodology*, 2026 — point aggregation and tier ceilings for the contributing IR criteria.
- VRS-GEN-006, *Application Rating Scheme*, 2026 — letter bands and pool mechanics reproduced in `bands_percent` and `pool`.
- VRS-GEN-002, *Designation and Drafting Rules*, 2026 — §6.5 criterion layout and §7.5.1 (ceilings equal rungs) that this twin verifies.
- VRS-GEN-004, *Change, Edition and Review Policy*, 2026 — how a twin regeneration is designated.
- VRS-GEN-009, *Robot Risk Passport and Registry — Data Schema*, 2026 — consumer of the payload.
- ISO/IEC 21778:2017, *Information technology — The JSON data interchange syntax*.

8 Change history

VERSION	DATE	CHANGE
1.0.0 (draft)	2026-09-16	VRS 2026 (draft) rewrite: regenerated from VRS-AER-201 Clause 5–7 (criteria, rungs, tier ceilings, contributors, bands, classes). Weights, modifiers, confidence and stage- prior fields removed.

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