

SPRIN-D

BUNDESAGENTUR FÜR SPRUNGINNOVATIONEN

DISCLAIMER - CONVENIENCE TRANSLATION

The English version in the right column of this Contract and its Annexes constitutes solely an informal translation with no binding legal content whatsoever. In any cases of disputes regarding the rights and obligations of the parties under this contract and the interpretation of the contract the only German version is relevant.

USAGE AND SUPPORT AGREEMENT

Infrastructure access for remote-controlled laboratory environments and technical support within the framework of the SPRIND Challenge

This Agreement is concluded between

Yuri GmbH

Wiesentalstr. 40

88074 Meckenbeuren

– hereinafter referred to as the “Provider” –

and the Participant selected by the Federal Agency for Disruptive Innovation (SPRIND)

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– hereinafter referred to as the “User” –

1. Legal classification and relationship to the main agreement

1.1 This Agreement governs access to a technical research infrastructure as well as the related technical and methodological support provided to the User by the Provider.

1.2 This Agreement supplements the contract for research and development services concluded between SPRIND and the Provider and serves to give that contract technical effect in relation to the User.

1.3 The parties agree that the Provider’s services have the character of supporting R&D services. The Provider does not owe the User any scientific, technical, or economic success. Responsibility for the scientific validity and usability of the results remains with the User.

2. Subject matter of the Agreement

2.1 The Provider grants the User access to a laboratory environment (infrastructure, hardware, and automated laboratory environment in accordance with the service description).

2.2 The Provider renders supporting R&D services in the course of the project implementation in accordance with the provisions of the R&D contract with SPRIND.

2.3 The Provider shall be obliged, to the best of its knowledge and belief, to support the operation of the hardware and software in such a manner that uninterrupted operation within the scope of the logistical requirements for LEO flights is pursued (best-efforts obligation).

3. Cooperation and allocation of roles

- 3.1 The User is the primary scientific decision-maker for its specific experiment.
- 3.2 The Provider's activities are defined in the service description (Annex II).
- 3.3 The Provider is free and not bound by instructions in rendering its services, but coordinates on substantive matters with the User and SPRIND.

4. Exclusion list (Annex I to this Agreement)

- 4.1 The Provider maintains a list of excluded materials (e.g. high-risk pathogens, unapproved GMOs, toxic substances).
- 4.2 The Provider is entitled to update this exclusion list at any time with immediate effect, in particular where new safety findings so require.

5. Responsibility for materials

- 5.1 The User bears sole responsibility for all materials introduced into the system.
- 5.2 The User warrants the legality, correct declaration, and suitability of the materials for high-risk operation.
- 5.3 Any clearance by the Provider is given purely from a safety perspective and does not constitute scientific validation.

6. Data security, data backup & retention

The Provider takes appropriate technical and organisational measures to protect the data stored by the User against unauthorised access, loss, manipulation, or other impairment. Nevertheless, the constant and complete availability of the data and of the services offered cannot be guaranteed. In particular, maintenance work, technical faults, force majeure, attacks by third parties, failures of communication networks, or other circumstances outside the Provider's sphere of influence may lead to temporary restrictions or data loss.

The Provider gives no assurance that the data stored by the User will remain available at all times, retrievable without error, or permanently stored. To the extent permitted by law, the Provider is not liable for the loss of data unless such loss is based on intentional or grossly negligent conduct on the part of the Provider.

The User is obliged to back up the data material relevant to it independently, on a regular basis and at appropriate intervals, and to create independent backup copies. Such data backup must be carried out in a manner that allows the data to be restored at any time in the event of loss, damage, or other impairment. The creation and retention of backups is the sole responsibility of the User.

In the event of data loss, the User is obliged to restore the affected data from its own backup copies. There is no claim against the Provider for the restoration of lost data unless expressly agreed otherwise.

7. Safety reservation

- 7.1 Safety considerations take precedence over all instructions of the User.
- 7.2 The Provider may suspend or terminate operation at any time if a risk to system integrity or safety is identified.

8. Liability and indemnification

8.1 The Provider is liable without limitation for intent, gross negligence, and damages arising from injury to life, body, or health.

8.2 In the case of simple negligence, liability is limited to the breach of material contractual obligations and is capped at a maximum amount of €100,000 per claim.

8.3 The User indemnifies the Provider against all third-party claims arising from the use of the materials or from the experimental design.

8.4 Liability for scientific failure, loss of profit, or loss of data is expressly excluded.

9. Intellectual property (IP)

9.1 Rights of the User

The User remains the owner of all rights to the ideas, concepts, data, materials, and other proprietary rights introduced by it (Background IP). The User is further entitled to the rights to the experimental designs generated in the course of its use of the infrastructure (without prejudice to the rights held by the Provider in the methodological expertise it has contributed), as well as to the scientific raw data and research results (Foreground IP).

9.2 Rights of the Provider

The Provider remains the owner of all rights to the infrastructure, software, control and operating systems, and other proprietary rights provided by it (Background IP). The Provider is entitled to the rights to developments and results that serve to improve, further develop, or optimise this infrastructure and these systems (Foreground IP).

9.3 Publications

The User shall inform the Provider at least 30 days before the publication of research results generated using the infrastructure. The Provider may require that confidential information or safety-relevant details concerning the infrastructure be removed from the publication or appropriately anonymised. The User's scientific freedom and right to publish its research results remain unaffected by this.

9.4 Special provision SPRIND

To the extent that the Provider is contractually obliged to the Federal Agency for Disruptive Innovation (SPRIND) to grant rights of use to certain results attributable to the Provider, the User acknowledges this obligation. The rights to which the User is entitled under these terms with respect to its research results remain unaffected by this.

10. Final provisions

10.1 The law of the Federal Republic of Germany shall apply.

10.2 Leipzig is agreed as the place of jurisdiction for any disputes arising from this Agreement.

10.3 Amendments to this Agreement require written form.

Yuri GmbH

Place, date, signature

.....

User

Place, date, signature

.....

Annex I Exclusion List

Annex II Subject matter of services pursuant to the service description, Annex 1 to the R&D Agreement

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Annex I

Hazard Exclusion Matrix pursuant to SSP 51721

Exclusion list / screening checklist for the Payload Data Package and Safety Data Package

Purpose: This matrix serves as a practical template for systematically assessing payload hazard categories under SSP 51721 as applicable / not applicable. A category may only be marked as N/A or excluded if the payload contains no credible source of that hazard or remains below the specified SSP screening thresholds.

Note: This matrix is a non-binding reference list only – the tables do not replace a final NASA/ISRP assessment. Some SSP 51721 values are genuine exclusion or exemption thresholds; others are triggers for a detailed classification and hazard-control definition.

Status legend

Status	Meaning / Usage / Typical PDP wording
N/A / Excluded	No credible hazard source term, or below SSP threshold. Usage: Mark as excluded in the Hazard Summary. Typical PDP wording: "No credible source for this hazard exists in the payload design."
Applicable	Hazard source present, or SSP trigger exceeded. Usage: Document the hazard together with causes, controls, and verification. Typical PDP wording: "Applicable; controls and verification are documented in the Safety Data Package."
TBD / Need Review	Data missing, or comparison against the threshold not yet possible. Usage: Track as an open action in the PDP/SDP. Typical PDP wording: "Applicability pending final design data / HMST / materials review."

A. Pressure, Electrical and Energy Storage

Category	Exclusion criteria / SSP thresholds / PDP wording
Pressure System / Sealed Container	<p>Excluded/N/A when: No enclosed or pressurised volume is present; or MDP is within the low-screening range.</p> <p>Genuine SSP values/triggers: MDP ≤ 22 psia: no additional analysis/testing required. >22 up to ≤100 psia with non-hazardous contents and stored energy ≤14,240 ft-lb is treated as a sealed container. Applicable in the case of a credible rupture/leakage release, >100 psia, or stored energy >14,240 ft-lb / 19,310 J.</p> <p>PDP wording: "No pressure system hazard: no pressurized volume / MDP ≤ 22 psia."</p>
Low Energy Pressure System	<p>May be treated as a low-energy, fail-safe pressure system if all criteria are met: DOT-compliant container, <100 psia, non-hazardous contents, stored energy <1,000 ft-lb. If not met: Pressure System Hazard is applicable; assess rupture/leakage.</p> <p>PDP wording: "Pressure system classified as low-energy fail-safe; no rupture/leakage Hazard Report required."</p>

<p>Electrical Shock</p>	<p>Excluded/N/A when: No crew-accessible or internally generated hazardous voltage is present.</p> <p>Trigger: Electrical shock is treated as a catastrophic hazard at ≥ 32 V dc/rms. End items with >32 V dc/rms require controls against crew shock. Applicable at ≥ 32 V dc/rms, hazardous generated voltage, or crew-accessible conductors.</p> <p>PDP wording: "Electrical shock hazard N/A: all voltages <32 V dc/rms and no hazardous generated voltage."</p>
<p>Touch / Leakage Current</p>	<p>Excluded/N/A when: No relevant voltage/EPCE interface is present, or leakage remains within SSP limits.</p> <p>Trigger: General EPCE without medical interface: touch current ≤ 0.5 mA. With direct medical interface: ≤ 0.1 mA. Isolation typically >1 MOhm. Applicable for EPCE ≥ 32 V dc/rms, medical interface, or unclear leakage/isolation status.</p> <p>PDP wording: "Leakage current within SSP 51721 limits; no shock hazard expected."</p>
<p>Exposed Conductors / Molten Metal</p>	<p>Excluded/N/A when: No accessible exposed power conductors, terminations, or unconnected power connectors are present.</p> <p>Trigger: Protective covers/double insulation required above 32 V dc/rms or at any voltage with >3 A. Insulation must withstand $>4x$ the available voltage. Applicable for crew-accessible conductors, terminals, or connector pins above the limits.</p> <p>PDP wording: "No exposed power conductors/terminations; molten metal hazard N/A."</p>
<p>Crew Mate/Demate Connectors</p>	<p>Excluded/N/A when: The crew does not mate/demate power connectors during operation, or the current/voltage capability is below the SSP triggers.</p> <p>Trigger: Connectors with >3 A current capability must be scoop-proof/shrouded. Mate/demate hazards: molten metal >3 A; shock >32 V dc/rms. Applicable for crew mate/demate of power connectors with >3 A or >32 V dc/rms.</p> <p>PDP wording: "No crew mate/demate of power connectors above 3 A / 32 V."</p>
<p>Wire Overheating / Wire Derating</p>	<p>Excluded/N/A when: Current loading and upstream protection have been verified against the SSP derating values.</p> <p>Examples: IVA Column A: AWG26 3.8 A, AWG24 5.4 A, AWG22 7.4 A, AWG20 10.0 A, AWG18 13.2 A. Crew-accessible Column C: AWG26 1.7 A, AWG24 2.7 A, AWG22 3.5 A, AWG20 4.8 A. Applicable where a derating analysis is missing or over-current potential exists.</p> <p>PDP wording: "Wire derating verified against SSP 51721 Table 4.3.1.2-1."</p>
<p>Batteries – Low BRC</p>	<p>Excluded/N/A when: The battery meets the criteria for Low Battery Risk Classification.</p> <p>Trigger: Low BRC: <4 Wh per battery pack, thermally/electrically isolated; alkaline primary <60 Wh; THL 1 or 2; not intentionally sealed. COTS Li-ion secondary: ≤ 1000 mAh. If above the Low-BRC limits: a Medium/High BRC assessment is required.</p> <p>PDP wording: "Battery classified as Low BRC; battery hazard controlled by manufacturer specification / acceptance checks."</p>
<p>Batteries – Medium / High BRC</p>	<p>Cannot be excluded if the battery exceeds the Low-BRC limits or is custom/high-energy/high-power.</p>

	<p>Trigger: Medium BRC: <80 Wh per battery pack, THL 1 or 2; Li-ion COTS >1000 mAh and ≤20 V. High BRC: anything not meeting Low/Medium. Thermal test margin: ±20 °F; vacuum margin 0.1 psi; pouch cells 8–10 psi. Applicable for Medium/High BRC, custom batteries, or unclear cell chemistry.</p> <p>PDP wording: “Battery hazard applicable: Medium/High BRC assessment required.”</p>
<p>Capacitors – Wet Electrolytic</p>	<p>Excluded/N/A when: Only solid-electrolyte capacitors are used; or no relevant capacitors are present.</p> <p>Trigger: Capacitors with only solid electrolyte are outside the SSP capacitor scope. Wet electrolytic is Low CRC if the largest individual capacitor case volume is ≤4,000 mm³. Unknown or >4,000 mm³ becomes Medium/High CRC. Applicable for wet electrolyte or unknown electrolyte.</p> <p>PDP wording: “Capacitor release hazard N/A: only solid electrolyte capacitors used.”</p>
<p>Electrochemical Capacitors / Supercapacitors</p>	<p>Excluded/N/A when: No electrochemical capacitors or supercapacitors are installed.</p> <p>Trigger: SSP energy formula: $J = 0.5 \times C \times (V_{max}^2 - V_{min}^2)$. The medium-risk energy threshold remains open in the baseline as TBR 4-8. Applicable where ECs/supercapacitors are present; assess energy content and failure modes.</p> <p>PDP wording: “No electrochemical capacitors installed; EC hazard N/A.”</p>

B. Materials, Fluids, Chemicals and Biological Hazards

Category	Exclusion criteria / SSP thresholds / PDP wording
<p>IVA Touch Temperature</p>	<p>Excluded/N/A when: All crew-accessible surfaces remain within the non-hazardous temperature range.</p> <p>Trigger: Non-hazardous for bare-skin contact: 0°C to 45°C. Above 45°C or below 0°C, the touch-temperature hazard must be controlled/analysed. Applicable for exposed hot/cold surfaces, heaters, TECs, or high-power electronics.</p> <p>PDP wording: "Touch temperature hazard N/A: all exposed surfaces remain between 0°C and 45°C."</p>
<p>Flammability – Material Configuration</p>	<p>Excluded/N/A when: All materials are A-rated/non-flammable, or the configuration prevents fire propagation.</p> <p>Trigger: Worst-case ISS internal environment: 14.7 psia / 24.1% O₂; airlock worst case: 10.2 psia / 30% O₂. Flammable propagation path other than hook-and-loop: <6 linear inches and max 12 in²; external items prior to launch max 12 linear inches. Hook-and-loop: max 4 in², max 4 linear inches, 2-inch separation.</p> <p>PDP wording: "Flammability hazard controlled by material rating/configuration; no fire propagation path."</p>
<p>Material Offgassing</p>	<p>Excluded/N/A when: Polymeric material mass is low and no excluded materials are present.</p> <p>Trigger: Exemption: polymeric material mass <20 lb and no excluded materials. Excluded: uncured adhesives, lubricants, cleaning wipes, markers, pens, uncontained liquids/gels, elevated-temperature processing hardware e.g. 3D printers; for custom items, additionally foams/foamed fluorocarbons. Test acceptance: toxic hazard index T <0.5.</p> <p>PDP wording: "Offgassing hazard N/A: polymeric mass <20 lb and no excluded materials."</p>
<p>Chemical Release / Toxicity</p>	<p>Excluded/N/A when: No chemicals, fluids, gels, greases, powders, or reaction products are present.</p> <p>Trigger: HMST Toxic Hazard Level: THL-0 marginal/minor irritation; THL-1 critical; THL-2 to THL-4 catastrophic. THL-4 requires ISSP approval for a habitable pressurised environment. Chemicals should have at least one control against release. Applicable for any chemical substance or any potential reaction product.</p> <p>PDP wording: "Chemical release hazard N/A: no chemicals or hazardous materials used; no THL assigned."</p>
<p>Flammable Liquids / Powders / Gases – FHL</p>	<p>Excluded/N/A when: FHL-0, or low relevance where the quantity is below the FHL-0 limits.</p> <p>Trigger: FHL-0: gas cloud <20 L. Liquids/powders by flash point: <120°F/49°C: <5 ml; 120–200°F/49–93°C: <25 ml; 200–300°F/93–148°C: <50 ml; >300°F/148°C: <250 ml. Applicable above the quantity/flash-point limits.</p> <p>PDP wording: "Flammability release hazard N/A/FHL-0: quantity below FHL-0 limit."</p>
<p>ECLSS Chemical Impact</p>	<p>Excluded/N/A when: The release causes no ECLSS performance degradation.</p>

	<p>Trigger: E0: no degradation, no maintenance change, operational capacity consumption <2%. E1: no degradation, capacity consumption >2% and <10%. From E2 at least marginal; E4–E6 critical. Applicable for substances that can affect ECLSS filters, adsorbers, or trace contaminant control.</p> <p>PDP wording: “ECLSS impact N/A/E0: no ECLSS performance degradation expected.”</p>
Biological Material Release	<p>Excluded/N/A when: No biological materials, cell cultures, organisms, rDNA/rRNA, viruses, toxins, allergens, or samples are present.</p> <p>Trigger: NASA in-flight BSL: BSL-1 = marginal, BSL-2M = critical, BSL-2H = catastrophic. BSL-3 and BSL-4 are prohibited on the ISS; prions are classed as BSL-3 and are not permitted. Human cell lines are typically BSL-2M unless rated higher. Applicable for all biological materials and biological waste.</p> <p>PDP wording: “Biological material hazard N/A: no biological material included.”</p>
Human / Animal Samples	<p>Excluded/N/A when: No crew/animal samples are used; or samples are clearly low-rated and controlled.</p> <p>Examples: SPF rodent waste BSL-1; in-flight blood BSL-1; saliva BSL-1; urine treated/frozen/freshly voided BSL-1. Urine untreated and at ambient/refrigerated conditions for >24 h: BSL-2M. Applicable for human/animal-derived materials, sample waste, or unclear storage/fixation duration.</p> <p>PDP wording: “Biological sample rating documented; no uncontrolled biohazard release.”</p>
Physical Particles / Dust	<p>Excluded/N/A when: No particle source is present, or the expected concentration remains below the acceptable level.</p> <p>Trigger: Inert/insoluble particles >10 µm: acceptable C ≤10 mg/m³. Particles ≤10 µm: acceptable C ≤3 mg/m³. Applicable for powders, dust, friable materials, particulates, abrasion, loose fibres, or aerosols.</p> <p>PDP wording: “Particle release hazard N/A: no dust/particle source or below acceptable level.”</p>
Shatterable Materials / Glass	<p>Excluded/N/A when: No glass/ceramic/brittle material is present; or permanent containment retains fragments.</p> <p>Trigger: Inert sharp particles: acceptable for particle size PS ≤50 µm. PS >50 µm is treated as catastrophic if released. Containment must prevent release of particles >50 µm. Applicable for glass, ceramics, brittle optics, vials, windows, lenses, cuvettes.</p> <p>PDP wording: “Shatterable material release hazard N/A: no shatterable material or contained to prevent >50 µm particle release.”</p>
THL-0 Fluid Release	<p>N/A only if no credible fluid release exists; otherwise classify by volume.</p> <p>Trigger: THL-0 fluid release R <1 gallon = marginal; R ≥1 gallon = catastrophic. This is not a complete N/A threshold but a severity classification. Applicable for free fluids, reservoirs, tubing, cartridges, bags, syringes, pumps, or wet-lab hardware.</p> <p>PDP wording: “Fluid release hazard N/A only if no credible release; otherwise classify by release volume.”</p>

C. Human Factors, EVA, RF/Optics and Commanding

Category	Exclusion criteria / SSP thresholds / PDP wording
<p>Acoustic Noise</p>	<p>Excluded/N/A when: No fan, motor, pump, speaker, or impulse-noise source is present.</p> <p>Trigger: Noise-producing components must be assessed. Sources above 80 dBA are review-relevant or, per IRD, not permitted. Impulse noise <140 dB peak SPL at the crew head location. Alarm hazard limit ≤95 dBA. Integrated continuous ISS limit NC~52: 63 Hz 73 dB; 125 Hz 66 dB; 250 Hz 60 dB; 500 Hz 56 dB; 1 kHz 53 dB; 2 kHz 51 dB; 4 kHz 50 dB; 8 kHz 49 dB.</p> <p>PDP wording: “Acoustic hazard N/A: no noise-producing component.”</p>
<p>Laser / Optical Radiation</p>	<p>Excluded/N/A when: No laser is present; or accessible emission remains Class 1 under all conditions.</p> <p>Trigger: Class 3R, 3B, 4 lasers must be crew-inaccessible or have three controls against exposure. Exposed Class 1M, 2M and above must remain under MPE even with optical magnification. Applicable for lasers, high-intensity LEDs, UV/IR sources, optical diagnostics, or exposed beams.</p> <p>PDP wording: “Laser hazard N/A: no laser source / fully contained Class 1 accessible output.”</p>
<p>RF Transmitter / RF Irradiation</p>	<p>Excluded/N/A when: No intentional RF transmitter is present.</p> <p>Trigger: Deployable end-items guideline at 1 m: 14 kHz–200 MHz: 1.58 V/m, 0.0066 W/m²; 200 MHz–8 GHz: 19 V/m, 0.955 W/m²; 8–10 GHz: 6.3 V/m, 0.106 W/m²; 13.7–15.2 GHz: 79 V/m, 16.58 W/m². Applicable for intentional RF emitters, radios, Wi-Fi/Bluetooth, or external deployables.</p> <p>PDP wording: “RF hazard N/A: no intentional RF emitter.”</p>
<p>EVA Entrapment Holes / Gaps</p>	<p>Excluded/N/A when: The payload is not EVA-accessible; or no critical openings/gaps are present.</p> <p>Trigger: Accessible holes in the range 0.5–1.4 inch/12.70–35.56 mm must be covered. Moving gaps >0.5 inch and <1.4 inch must prevent EVA entrapment. Applicable for external payloads, EVA-accessible hardware, handles, brackets, mechanisms, gaps, or holes.</p> <p>PDP wording: “EVA entrapment hazard N/A: payload not EVA accessible / no openings 0.5–1.4 inch.”</p>
<p>EVA Translation Path / Protrusions</p>	<p>Excluded/N/A when: The payload is not EVA-accessible; or does not protrude into EVA translation paths.</p> <p>Trigger: End items must not protrude into a 43-inch diameter translation path. Applicable for external payloads, protrusions, temporary configurations, or deployed appendages.</p> <p>PDP wording: “EVA translation path hazard N/A: no EVA access / no protrusion into 43-inch path.”</p>
<p>Radioactive Material</p>	<p>Excluded/N/A when: No radioisotopes, radioactive source material, or secondary emissions are present.</p>

	<p>Trigger: SSP treats all radioactive material as a catastrophic hazard. Emissions ALARA; reviewed via, among others, SRAG/JSC Form 44. Applicable for radioactive sources, activated materials, X-ray sources, ionising radiation, or secondary emissions.</p> <p>PDP wording: "Radiation/radioactive material hazard N/A: no radioactive material or radiation source."</p>
<p>Mechanisms / Moving Parts</p>	<p>Excluded/N/A when: No moving mechanical systems, springs, motors, actuators, flaps, sliding parts, or stored mechanical energy are present.</p> <p>Trigger: There is no blanket N/A numerical value in SSP 51721; assessment is design-specific, covering unintended actuation, pinch/crush/shear, clearances, stops, torque/force limits, and inhibits. Applicable for mechanisms, motors, pump heads, rotating equipment, spring-loaded components, or deployable elements.</p> <p>PDP wording: "Mechanism hazard N/A: no moving mechanical elements or stored mechanical energy."</p>
<p>Software / Commanding of Hazardous Functions</p>	<p>Excluded/N/A when: Software does not command, activate, inhibit, or monitor any hazardous functions.</p> <p>Trigger: There is no universal numerical value; SSP considers computer-based control systems and ground/onboard commanding relevant where hazardous functions are triggered or controlled. Applicable for software-controlled heaters, pumps, motors, valves, pressure, batteries, lasers, RF transmitters, or hazardous commands.</p> <p>PDP wording: "Software commanding hazard N/A: no software-controlled hazardous function."</p>

Recommended PDP columns: Hazard Area | Applicable? Y/N | Rationale for Exclusion or Applicability | Key SSP Threshold | Hazard Description | Cause(s) | Severity | Controls | Verification | SSP 51721 Reference.

Categories of particular relevance for bio-/life-science payloads: Biological Material, Chemicals/Fluids, Batteries, Electrical Shock, Touch Temperature, Offgassing, Flammability, Shatterable Materials/Optics, Pressure/Sealed Containers, Noise, and Software/Commanding.

Reference: SSP 51721 – ISS Safety Requirements Document, Baseline September 2019. Publicly available reference PDF: SSP 51721 Baseline PDF. Payload Data Package context: NASA Payload Developers Guide.

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Annex II

Service Description for the Microgravity Challenge “Orbital BioWorks”

[...]

3. Subject Matter of Services & Tasks of the [Provider]

The Science Shell platform provided by Yuri GmbH offers the teams¹ a foundation for carrying out the experimental work. [...]

The tasks apply to the entire campaign and – where relevant – to each individual mission. Yuri shall present a WBS structure in its offer that reflects at least the following tasks.

3.1 Management and Single-Responsibility Model

- [...]
- Management of all cross-mission dependencies between Challenge selection, hardware availability, safety, VAST integration, crew time, upload/download, data, experiment return, and post-mission evaluation.
- Ensuring that Mission 2 and Mission 3 build on the results, learnings, and decisions of the respective preceding mission.

3.2 Challenge and Selection Support

Where commissioned by SPRIND, Yuri supports the structuring of the Challenge prior to the final mission assignment. The aim is to transform open innovation ideas into a mission portfolio that is technically flight-capable, internally compatible, and application-oriented.

Activity	Description
Boundary Conditions	Definition of a mission envelope for size, mass, power, temperature, containment, crew time, duration, data, sample return, hazard level, and development effort.
Eligibility and Maturity Screening	Review of minimum information, TRL/MRL, scientific plausibility, sample/material data, safety risks, and fit-to-flight.
Feasibility and Interface Check	Comparison against Yuri hardware, Haven-1 interfaces, CONOPS, crew activities, data/return logic, and schedule.
Co-Manifesting Logic	Compilation of compatible experiments per mission based on environmental conditions, timing, resources, safety, and return requirements.
Recommendation Package	Recommendation as to which concepts fly on Mission 1, which mature for Mission 2/3, and where optional hardware development is advisable.

¹ This presentation reproduces an excerpt from the service description of the contract between SPRIND GmbH and Yuri GmbH that is relevant to the Usage Agreement.

² In this document, the terms “Team” and “Participant” replace the term ‘User’ within the meaning of the Usage Agreement.

3.3 Requirements Capture, ERD, and Mission Shaping

- Development of a cross-mission Experiment Requirements Framework as well as mission- and experiment-specific ERDs;
- Definition of scientific endpoints, success criteria, controls, timelines, temperature/light/fluidics profiles, crew activities, sample logistics, data products, and post-flight analyses;
- Assessment of which requirements can be met within existing Yuri hardware and which requirements call for adaptations, new development, or exclusion decisions;
- Documentation of the requirements, including traceability, within a requirements and verification approach.

3.4 Hardware Mapping, Science Taxi/Science Shell, and Optional Development

Yuri shall give priority to existing and flight-proven hardware building blocks in order to implement Mission 1 quickly, with low risk, and in a way that is useful for decision-making. Optionally necessary new developments are to be described and offered separately. The hardware selection is to be documented, traceably, per experiment and per mission in the ERD.

- ScienceTaxi Haven-1 as an incubation and mission facility with temperature control, commanding/monitoring, and suitable ScienceShell interfaces;
- ScienceShell portfolio for cell culture, tissue/organoid work, plant systems, tube-based assays, multi-chamber studies, and active or passive configurations;
- Optional adaptations: custom inserts, chamber geometries, fluidic sequences, tank/volume adjustments, sensors, LEDs, software sequences, and mission-specific interfaces;
- Provision of STM, GM, FM, and FM spare in accordance with the offer assumptions, including GSE, transport containers, and cleaning/sterilisation and handling concepts.

3.5 Experiment Preparation, Hardware Loan, and Training

Yuri shall provide the Challenge teams with representative hardware at an early stage, so that development takes place not on paper processes but on real systems. The STM-GM-FM maturity pathway is to be presented traceably in the offer.

Model	Purpose	Timing
STM	Early test and training model for filling, assembly, operation, cleaning, parameter setting, and minor experiment adjustments.	As early as possible after ERD/hardware mapping, typically month 2 per mission.
GM	Ground model with increased representativeness for sterile runs, ground references, procedure freeze, and science verification tests.	Typically months 4–6 per mission.
FM	Final flight configuration under configuration control, qualified/verified for the mission and handover.	Typically months 6–9 per mission.
FM Spare	Spare flight model or critical spare parts in accordance with the offer assumptions.	Availability for the launch campaign.

3.6 Mission Preparation of a Parabolic Flight Campaign

In preparation for the orbital mission, SPRIND plans, for Stage 2 of the Challenge, access to microgravity platforms. This is expected to take the form of parabolic flight campaigns. In this way, hardware and process parameters are to be validated ahead of the orbital mission. For the conduct of the parabolic flights, SPRIND is considering commissioning the service provider Novespace. Where commissioned by SPRIND, Yuri shall act as the interface between Novespace and the teams. In that case, Yuri would support the teams in the preparation and implementation of the parabolic flight campaign. This includes,

among other things, the necessary adaptations of experiment preparation and hardware, as well as the inclusion of relevant procedural and safety aspects.

3.7 Verification and Integration Sequence Test

Yuri shall ensure that the Challenge teams undertake adequate and comprehensive preparations and arrangements for the orbital mission.

- Definition of an AIVT plan including test objectives, acceptance criteria, responsibilities, test procedures, and test reports;
- Performance of functional, leak-tightness, performance, sterility/cleanliness, fluidics, software, data, science-verification, and transport/handling tests, as applicable;
- Demonstration of the fulfilment of the requirements in a Verification Control Document or an equivalent traceability matrix;
- Performance of an Integration Sequence Test with all relevant Challenge teams at a suitable location, including a rehearsal of filling, installation, crew-like procedures, laboratory equipment, clean bench, timelines, and handover.

3.8 Mission Integration, Launch Campaign, and Operations

Yuri shall provide comprehensive support throughout the entire mission implementation, including integrated mission preparation, the launch campaign, through to on-orbit operations and the secured return of data and samples.

- Coordination of VAST/Haven-1 mission integration, including interfaces, resources, crew time, upload/download manifest, safety reviews, and consent-to-ship/flight acceptance activities;
- Preparation and execution of the launch campaign, including a suitable laboratory at the launch site, support for final assembly, sample loading, functional checks, late load, and handover;
- Support for on-orbit operations, crew activities, remote commanding/monitoring, data access, anomaly handling, daily status, and operations logs;
- Ensuring the return of data, samples, and – where agreed – hardware, as well as handover to the Challenge teams or designated laboratories within the agreed time windows.

3.9 Post-Mission Evaluation and Programme Iteration

After each mission, Yuri shall conduct a post-mission review together with SPRIND and the Challenge teams. The aim is not only to document the flight, but to produce a concrete decision basis for the next stage of the campaign. This includes:

- Data and sample handover, including evidence of completeness, integrity, and chain of custody;
- A technical and operational lessons-learned report covering anomalies, deviations, improvements, hardware/software adjustments, and safety implications;
- An SPRIND Recommendation Report proposing which concepts should be escalated to Verify or Produce, adapted, deferred, or concluded;
- Updating of ERDs, ICDs, AIVT, PA/safety, and the schedule for the follow-on mission.

3.10 Export Control, Customs, Dangerous Goods, and Transport

Within the scope of the commissioned services, Yuri shall examine whether export control, re-export, customs, dangerous goods, biological/chemical transport, or other regulatory requirements are engaged. Any required licences, permits, evidence, and transport documents are to be described in the offer and tracked within the project. SPRIND and the Challenge teams shall provide the necessary material and origin information.

4. When the Services Are Rendered

The services rendered by Yuri shall be governed by the timeline of the Challenge:

4.1 Stage 1: July–Nov 2026 – 12 Teams

The teams validate their hypothesis in ground-based microgravity surrogates and generate robust reference data (ground truth) that serve as a baseline for later orbital results. In parallel, they prepare a first orbital mission: experiment design, hardware concept, and mission planning are advanced to the point that, by the end of the stage, a substantiated Flight Readiness Review is possible.

Yuri scope of services, Stage 1: provision of the ground-surrogate infrastructure, experimental advisory support, preparation of the orbital missions, and conduct of the Flight Readiness Reviews.

4.2 Stage 2: First Orbital Mission – Nov 2026–Dec 2027 – 4 Teams

The selected teams carry out their first orbital mission in Q4 2027 and thereby translate the ground-based results from Stage 1 into actual microgravity data. In preparation for the orbital flight, the fundamental feasibility of the experiments is to be verified during a parabolic flight campaign in Q2 2027.

Yuri scope of services, Stage 2: support of the parabolic flight campaign to test the Science Shells, Haven-1 mission integration, in-orbit execution, data collection and evaluation, and return of the samples.

4.3 Stage 3: Orbital Missions 2 and 3 (2028–2029)

The orbital missions of Stage 2 will be the first orbital mission for the selected teams. To meet the objective of the Challenge, additional orbital missions are required. Building on the findings from Stages 1 and 2, the up to four teams will be given the opportunity to iteratively further develop their approaches.

Yuri scope of services, Stage 3: integration of the findings from Stage 2 for Orbital Missions 2 and 3, Haven-1 mission integration, in-orbit execution, data collection and evaluation, and return of the samples.