

TEXAS SPACE COMMISSION



Request for Information

Environmental Control and Life Support System (ECLSS) Test Capability for Emergent Human Spaceflight Missions

Number: 358-26-003

BOARD-AUTHORIZED SCOPE:

- Identify environmental control and life support systems (ECLSS) for emergent human spaceflight missions.
 - This request for information (RFI) seeks to obtain examples about facilities with proper capability and capacity that support an important step in the spaceflight process.
- This is not:
 - a general aerospace infrastructure exercise or a greenfield construction interest
 - a general commercial testing-service or real-estate development response
 - a university research-only oriented objective or generic laboratory modernization task
- This is intentionally narrow for respondents that can clearly demonstrate:
 - The capability and technical maturity needed to identify ECLSS technologies that can specifically support test capability for emergent human spaceflight missions.
 - The experience and expert controls needed to identify, acquire, and deploy ECLSS technologies that can support environmental verification and hardware-development testing (at facilities in Texas) aligned with NASA-class mission requirements.
- Interest is respondents that have successfully performed previous work with NASA, or on a NASA program or NASA-approved/accepted test campaign, involving one or more of the following:
 - Environmental verification facilities or test campaigns for NASA spacecraft, payloads, subsystems, instruments, components, or ground support equipment.
 - NASA mission assurance, environmental test readiness review, verification compliance, or technical authority support directly related to ECLSS testing.
 - NASA payload test requirements, including qualification, acceptance, prototype/flight, environmental exposure, or functional demonstration testing.
 - NASA-class test support, test facility modification, or test-data acceptance.
 - ECLSS hardware design, upgrade, commissioning, operation, qualification, calibration, or test-readiness support.
- Understand locations of existing facilities in Texas, including the availability and technical characteristics of special test equipment by distinguishing:
 - Capabilities available within specific periods of time
 - Capabilities requiring expansion or enhancement through minimal new construction
 - Capabilities requiring upgrades
 - Currently operational capabilities
- Market research and information gathering to improve the State's understanding of:
 - Anticipated cost and schedule
 - Barriers to meeting contemplated requirements
 - Developmental systems
 - Existing chamber assets
 - Industry capability
 - Technical readiness
- NASA mission assurance, environmental test readiness review, verification compliance, or technical authority support directly related to ECLSS testing.

Public Notice / Document Control Summary:

Item	Provision
Issuing Entity	Texas Space Commission (TSC)
Document Type	Request for Information (RFI) - nonbinding market research and information gathering notice; <u>NOT</u> a current or pre-determined funding opportunity.
Draft RFI Number	358-26-003
Subject	Environmental Control & Life Support Systems (ECLSS)
Board Direction	Open-session, public meeting adoption on 30 June 2026.
Submission Deadline	11 September 2026 at 2:00 p.m. Central Time
Submission Method	Email to TSCRFI@space.texas.gov
Primary Posting Location	Electronic State Business Daily (ESBD)
Single Point of Contact	TSCRFI@space.texas.gov ; no telephone inquiries.
Future Award Status	NO award, grant, contract, lease, site selection, or funding commitment is made through this RFI. A response does <u>NOT</u> constitute an offer, and the State is not obligated to issue a future procurement or grant.
NASA Experience Requirement	Respondents must provide documentary evidence of successful prior NASA environmental verification or test-infrastructure work. Accordingly, a respondent that cannot clearly demonstrate such experience is not eligible for their submission to be reviewed, regardless of its general involvement in the aerospace, aeronautics, research, construction, real estate, laboratory, or economic-development sectors. TSC will not evaluate general commercial aerospace experience as a substitute for NASA-relevant environmental verification experience. Prior work must be directly relevant to the identified upgrade of an existing Texas facility for NASA-class environmental testing.
Respondents must report	<u>Respondents must clearly identify:</u> 1. A “facility or facilities” with standardized commercial access. 2. A common test-standard and data-management framework. 3. Construction within an operating research or test environment. 4. Design and construction sequencing. 5. Final test reports suitable for spacecraft qualification or troubleshooting. 6. How multiple, unrelated users – including academia, commercial businesses, government, and nonprofits – can follow a structured, documented intake processes for scheduling, safety, security, data-protection, and pricing or cost-allocation procedures. 7. Long-lead equipment. 8. Secure handling of proprietary, export-controlled, and customer test data. 9. Site-access constraints. 10. Utility dependencies. The information received must outline ECLSS capability suitable for NASA-class spacecraft, payload, subsystem, instrument, component, or ground support equipment testing.

A. Summary.

1. **Type of Document.** Request for Information (RFI).
2. **Deadline for Responding.** 11 September 2026 at 2:00 p.m. Central Time. Respondents are solely responsible for ensuring receipt at the designated address. TSC may disregard late, corrupted, inaccessible, or incomplete transmissions.
3. **Texas Space Commission (TSC) Point of Contact (POC).** TSCRFI@space.texas.gov. TSC may designate additional contact by addendum.
4. **Method of Submission.** Material must be submitted electronically in accordance with Section I. Do not submit classified or unapproved controlled information through ordinary email.
5. **Addenda and Updates.** TSC may post written amendments on the Electronic State Business Daily (ESBD) and the TSC website, as applicable. Respondents are responsible for monitoring the posting locations.
6. **Clarifications, Presentations, and Site Visits.** TSC may request written clarification, invite a presentation or technical exchange, conduct a public workshop, or conduct a voluntary site visit. These activities are fact-finding only and do not create a preference or selection.

Schedule of Events:

Date / Time	Event
August 21, 2026	Issuance of RFI
September 11, 2026 / 2:00 p.m. CT	Deadline for submission of Responses; late submissions may be disregarded
11-18 September 2026	TSC completeness review and written clarification period, if used

SCHEDULE CONTROL:

- Texas Space Commission (TSC) may revise this schedule by written addendum.
- Respondents are responsible for monitoring the Electronic State Business Daily (ESBD) and the official TSC website for updates.

B. Background and Board Direction.

Texas Space Commission (TSC). Established under Chapter 482, Texas Government Code, to strengthen Texas leadership in civil, commercial, and military space activity and to promote innovation, commercial space opportunities, research, workforce development, and integration of the space and aeronautics industries into the Texas economy. This Request for Information (RFI) is an information-gathering activity and not an exercise of grant-award or procurement authority.

30 June 2026 action. At a public meeting, the appointed TSC board of directors approved an information-gathering action intended to collect relevant input. The Board-authorized scope for this RFI is stated on the cover page and below.

BOARD-AUTHORIZED SCOPE:

- Identify environmental control and life support systems (ECLSS) for emergent human spaceflight missions.
 - This request for information (RFI) seeks to obtain examples about facilities with proper capability and capacity that support an important step in the spaceflight process.
- This is not:
 - a general aerospace infrastructure exercise or a greenfield construction interest
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 - The experience and expert controls needed to identify, acquire, and deploy ECLSS technologies that can support environmental verification and hardware-development testing (at facilities in Texas) aligned with NASA-class mission requirements.
- Interest is respondents that have successfully performed previous work with NASA, or on a NASA program or NASA-approved/accepted test campaign, involving one or more of the following:
 - Environmental verification facilities or test campaigns for NASA spacecraft, payloads, subsystems, instruments, components, or ground support equipment.
 - NASA mission assurance, environmental test readiness review, verification compliance, or technical authority support directly related to ECLSS testing.
 - NASA payload test requirements, including qualification, acceptance, prototype/flight, environmental exposure, or functional demonstration testing.
 - NASA-class test support, test facility modification, or test-data acceptance.
 - ECLSS hardware design, upgrade, commissioning, operation, qualification, calibration, or test-readiness support.
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- Market research and information gathering to improve the State's understanding of:
 - Anticipated cost and schedule
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Coordinated architecture. TSC uses definitions, administrative provisions, facility data sheet, demand questions, cost and schedule fields, shared-user operating-model questions, risk register, and follow-through framework. This RFI has a discipline-specific technical annex.

C. Purpose and Scope.

Texas Space Commission (TSC) seeks information concerning environmental control and life support systems (ECLSS) technologies, laboratories, analog environments, integrated testbeds, human-in-the-loop or simulator capabilities, component and subsystem testing, long-duration endurance testing, demand, shared-user access, cost, schedule, workforce, and gaps relevant to emergent human spaceflight missions.

Responses may address existing assets, upgrade concepts, distributed test networks, or demand for a future shared capability as per authorization by the Board regarding ECLSS infrastructure in Texas.

TSC is interested in credible Texas-based testing, evaluation, and training facilities for ECLSS.

- Compare shared-user ownership, governance, access, scheduling, rate, security, and sustainability models.
- Distinguish verified current capability, upgradeable capability, and conceptual or greenfield capability.
- Document present and future demand by user sector, hardware class, mission type, test campaign, duration, and timing.
- Identify cost ranges, schedule, permitting, utilities, workforce, standards, safety, security, and material risks.
- Identify federal, state, local, academic, nonprofit, and private contributions or partnership opportunities without creating a commitment.
- Map existing Texas capabilities; relevant out-of-state capabilities may only be referenced (specifying location of asset) as a comparable datapoint while clearly identifying the Texas nexus.
- Support a later TSC synthesis report and Board presentation for consideration of any separately authorized future actions.

NOT TECHNICAL SPECIFICATION:

- Performance values, standards, and test methods referenced in this RFI and its annex are information requests and planning examples. They are not final specifications, acceptance criteria, grant eligibility conditions, procurement requirements, or representations that TSC or another governmental entity will use or approve a particular standard.

Statutory and Program Alignment. TSC may solicit information regarding:

- Development of emerging technologies required for spaceflight or space exploration activities.
- Economic development through commercial space companies.
- Infrastructure useful or necessary for spaceports in Texas and commercial space activities.
- Research involving spaceflight, space exploration, or aeronautics.
- Workforce training regarding spaceflight or space exploration, including verification and engineering and operations or calibration and mission assurance as well as hardware development.

D. Common Definitions.

The following definitions are identical for this Request for Information (RFI) from Texas Space Commission (TSC). Technical terms not defined here have their ordinary industry meaning in context. A respondent should define any specialized term or acronym used in its response.

Defined Term	Meaning for This RFI
Academic User	An accredited institution of higher education in Texas, including public or private research university, university-affiliated research entity, community college, technical college, or other educational organization using a facility for research, education, workforce development, or sponsored test activity.
Acceptable Evidence	Includes: • Evidence of facility commissioning, calibration, validation, or mission-assurance acceptance for NASA test use • NASA contract, subcontract, task order, grant, cooperative agreement, Space Act Agreement, purchase order, or equivalent award documentation • NASA facility-upgrade, test-support, or test-readiness deliverables • NASA program or prime-contractor confirmation of the respondent's role • NASA technical acceptance, final report acceptance, closeout documentation, contractor performance assessment reporting system (CPARS) rating, past-performance questionnaire, or reference letter • Other documentation TSC determines sufficient as acceptable evidence • Redacted statements of work showing TVAC, acoustic/vibroacoustic, payload test, EMI/EMC, chamber, instrumentation, calibration, facility, or environmental verification scope • Test readiness review, pre-test review, post-test review, verification compliance, or final test report documentation
Addendum	A written change, clarification, correction, or supplement issued by TSC for this RFI. Only a written addendum may modify the RFI.
Advanced Technology Hardware	Spaceflight, spacecraft, payload, launch, in-space, surface, habitation, propulsion, power, avionics, communications, sensing, life-support, or related hardware, components, subsystems, systems, support equipment, and integrated test articles requiring research, development, characterization, qualification, acceptance, verification, validation, or troubleshooting.
Candidate Facility, Site, or System	An existing or planned fixed facility, mobile test capability, distributed network, equipment system, or combination of assets described by a respondent for possible inclusion in TSC planning.
Commission or TSC	The Texas Space Commission, per Texas Government Code (Chapter 482).
Committed Demand	A prospective use supported by an executed agreement, funded work order, awarded contract or grant, approved program plan, customer authorization, or other documentary basis that makes the use reasonably certain.
Commercial or Industry User	A for-profit or nonprofit entity engaged in space, aerospace, defense, advanced manufacturing, research, engineering, testing, or related commercial activity.
Current Capability	A capability that is installed, commissioned, safely operable, and available as of the response deadline, with any qualifications or limitations clearly disclosed.
Demand Category	Committed, forecast, or speculative demand. Respondents must not combine these categories without identifying assumptions.
ECLSS	Environmental Control and Life Support Systems (ECLSS), including atmosphere, water, waste, thermal, pressure, fire-safety, monitoring, and related functions used to sustain humans or biological payloads.
EMI/EMC	Electromagnetic interference (EMI) and electromagnetic compatibility (EMC), including conducted and radiated emissions and susceptibility, grounding, bonding, electrostatic discharge, shielding effectiveness, and related test practices.

Defined Term	Meaning for This RFI
Facility	A building, site, range, chamber, laboratory, test stand, support area, mobile platform, distributed test capability, or associated utilities and equipment used to perform test, evaluation, research, development, integration, or verification.
Forecast Demand	Prospective use is supported by a customer forecast, budget request, documented product roadmap, proposal, nonbinding letter of interest, or other identifiable planning basis, but not yet committed.
Government User	A federal, state, local, tribal, or foreign governmental entity, including a governmental laboratory or federally funded research and development center, subject to applicable law and access controls.
GSFC-STD-7000	General Environmental Verification Standard.
GSFC-STD-7001	Payload Vibroacoustic Test Criteria, or successor NASA vibroacoustic/acoustic standards.
GSFC-STD-7002	Payload Test Requirements, or successor NASA payload test standards.
MIL-STD-461	Equivalent requirements were incorporated into NASA, launch-provider, spacecraft, or customer test plan.
MIL-STD-464	DOD interface standard defining system-level electromagnetic environmental effects (E3) interface requirements and verification criteria for airborne, sea, space, and ground systems -- including associated ordnance.
Minimum Viable Capability	The smallest technically credible and safely operable initial capability that addresses a documented gap, can open on a realistic schedule, preserves shared access, and can be expanded without stranding the initial investment.
Mission-Applicable or NASA-Class	Alignment with National Aeronautics and Space Administration (NASA), U.S. Department of Defense/War, launch-provider, spacecraft-customer, consensus, or equivalent mission-assurance requirements for the specific test campaign. Use of this term does not mean that TSC confers NASA or federal approval, certification, endorsement, or acceptance.
Mobile Capability	Test equipment and support systems are designed to be transported, installed, calibrated, operated, and removed at a host site.
NASA-approved or NASA-accepted	Accepted, required, approved, endorsed, incorporated, or relied upon by NASA, a NASA center, a NASA program, a NASA prime contractor, a delegated NASA technical authority, or a NASA-approved test plan, verification plan, contract, cooperative agreement, grant, Space Act Agreement, purchase order, or subcontractor.
NASA-class environmental verification	Test infrastructure, test procedures, verification documentation, facility controls, calibration, instrumentation, safety, configuration control, and data products sufficient to support NASA, NASA-center, NASA-contractor, launch-provider, or equivalent mission-assurance requirements for spaceflight hardware.
NASA GEVS	General Environmental Verification Standard
NASA-STD-7001	Payload Vibroacoustic Test Criteria, or successor NASA vibroacoustic/acoustic standards.
NASA-STD-7002	Payload Test Requirements, or successor NASA payload test standards.
Order-of-Magnitude or ROM	A planned-level estimate based on stated assumptions and a documented basis of estimate. A rough order-of magnitude (ROM) is not a bid, offer, quote, or binding price.
Prospective or Speculative Demand	A potential use that is not yet supported by a funded program, agreement, customer forecast, or documented roadmap. Respondents must clearly label speculative demand.
Proprietary Information	Information for which a respondent asserts a lawful basis for protection from public disclosure, including trade-secret, commercial, financial, technical, security-sensitive, or export-controlled information. Marking information does not determine whether the information is protected under law.
Qualified User	A user that satisfies an operator's lawful technical, safety, security, insurance, export-control, scheduling, and financial requirements, applied on fair and nondiscriminatory terms to similarly situated users.

Defined Term	Meaning for This RFI
Respondent	A person or entity that submits information in response to this RFI, including a team or consortium acting through an identified lead respondent.
Response	All information submitted to TSC in response to this RFI, including appendices, attachments, supplemental information, and clarifications.
RTCA DO-160	Environmental Conditions and Test Procedures for Airborne Equipment
Shared-User or Common-Use	A facility or capability made available to more than one unaffiliated user and structured to serve government, academic, nonprofit, and commercial users through documented intake, scheduling, safety, security, data-protection, and pricing or cost-allocation procedures.
Site Control	Ownership, leasehold, operating agreement, interlocal agreement, license, easement, memorandum of agreement, or other documented authority sufficient to use and, where proposed, modify a site or facility.
Successful Previous Work with NASA	Completed or substantially completed work, performed as a prime contractor, subcontractor, cooperative-agreement recipient, grant recipient, Space Act Agreement partner, university-affiliated performer, federally funded research participant, or documented team member, where the respondent's role involved NASA environmental verification, test-facility infrastructure, test operations, test planning, mission assurance, or qualification support. To qualify, respondents must demonstrate past work was materially accepted, completed without uncured default, and relevant to the project purpose.
Technical Annex	The discipline-specific addendum that a respondent must complete for each facility, system, mobile capability, demand-only submission, or development concept included in its response.
Test Article	Hardware, software-enabled hardware, subsystem, payload, spacecraft, engine, thruster, habitation element, component, fixture, simulator, or other item subjected to a test campaign.
Test Campaign	The complete sequence of planning, readiness review, article receipt, preparation, installation, instrumentation, test execution, anomaly response, removal, data reduction, reporting, and closeout.
TVAC	Thermal vacuum (TVAC) testing or a thermal vacuum chamber used to expose a test article to controlled vacuum and thermal conditions, including powered operation, thermal cycling, steady-state operation, or related environmental verification. For the purposes of this RFI, the TVAC facility identified by a respondent must be capable of an upgrade or expansion for spacecraft, payload, subsystem, instrument, or component testing. The facility must be capable of supporting NASSA-class environmental verification/testing, including: • Contamination control • Data acquisition • Powered functional testing • Safety controls • Temperature plateau testing • Test article health monitoring • Test reporting • Thermal cycling • Vacuum operations All facilities should be located within one-half mile to minimize transportation and integration into common facilities is encouraged.
Upgrade or Development Concept	A nonbinding planning concept for modifying, expanding, integrating, relocating, constructing, commissioning, or operating a facility or capability.
Vibroacoustic Environment Evaluation	Vibration, acoustic, shock, modal, sine, random, transient, direct-field acoustic, reverberant acoustic, or related dynamic-environment testing and evaluation, including associated fixtures, instrumentation, controls, and data analysis.
Voluntary Site Visit	A fact-finding visit conducted under uniform written procedures that do not create a preference, prequalification, selection, commitment, or entitlement.

E. Who May Respond and Participation Eligibility.

Texas Space Commission (TSC) seeks broad, cross-sector information received only from respondents that demonstrate successful previous work with NASA, per definitions provided in this Request for Information (RFI), including acceptable evidence.

Only acceptable evidence, per definition provided in this RFI, will be accepted from respondents categorized below intended to describe who may respond to this RFI; they are not eligibility criteria for a future grant, procurement, lease, partnership, or other opportunity.

- Businesses, including startups, small businesses, prime contractors, subcontractors, original equipment manufacturers, facility operators, test-service providers, systems integrators, engineering firms, and infrastructure developers.
- Consortia, public-private partnerships, joint teams, distributed networks, or informal respondent teams, provided that one lead respondent is identified, and each member's role is stated.
- Federal, state, local, tribal, and other governmental entities, subject to their authority to respond and applicable restrictions.
- Nonprofit entities, research institutes, industry associations, economic-development organizations, standards bodies, and workforce organizations.
- Owners, lessees, authorized operators, or sponsors of existing facilities or mobile systems; equipment manufacturers and technical service providers with relevant information; and prospective users submitting demand-only information.
- Public or private institutions of higher education, university-affiliated research entities, public laboratories, community colleges, and technical colleges.
- Texas and non-Texas entities: a non-Texas respondent should clearly describe the Texas relevance, prospective Texas location, Texas partners, reciprocal access, or national capability gap that makes its information useful to TSC.

E.1. Team and Authority to Respond:

- A demand-only respondent need not own a facility but must identify the type of capability needed and the basis for the demand.
- A manufacturer or consultant may describe technology and cost information without site control but must clearly label the response as technology-only or advisory.
- Do not represent that a partner, customer, governmental agency, NASA, a military service, or another third party supports the response unless authorized.
- Identify facility owners, operators, landlords, equipment owners, and parties with site control or modification authority.
- Identify the lead respondent and the person authorized to submit the response.

E.2. Participation Does Not Establish Future Eligibility:

TSC has not determined the form, funding source, eligibility rules, evaluation criteria, Texas-presence requirements, matching requirements, access period, contracting method, or other terms of any future action. Any competitive future opportunity will state its own requirements. TSC may use this RFI to help develop those requirements, subject to Board action and applicable law.

E.3. Ineligible Respondents:

1. Entities unable to demonstrate successful prior NASA-environmental verification, NASA-test infrastructure, NASA-payload test, or NASA-ECLSS work.
2. Entities proposing exclusive-use or captive-use infrastructure.
3. Entities acting only as brokers, pass-through administrators, landlords, grant writers, or financial sponsors without direct technical responsibility.
4. Entities barred, suspended, debarred, delinquent, or otherwise ineligible to receive state funds.

F. Administrative Process and Communications.

- 1. Single Point of Contact.** All communications concerning this Request for Information (RFI) must be directed to TSCRFI@space.texas.gov unless Texas Space Commission (TSC) identifies another contact by addendum. Respondents should not seek nonpublic guidance from TSC Board members, Texas Aerospace Research & Space Economy Consortium (TARSEC) executive committee members or liaisons/participants, or other TSC personnel.
- 2. Proprietary Clarification.** A respondent seeking to discuss information it believes requires special handling must first submit a nonproprietary written request describing the topic and legal or security concern to TSCRFI@space.texas.gov unless TSC identifies another contact by addendum. Respondents should not seek nonpublic guidance from TSC Board members, TARSEC executive committee members or liaisons/participants, or other TSC personnel. TSC chief compliance officer will determine whether and how a clarification may occur.
- 3. Addenda.** Only a written addendum issued by TSC may change the RFI, schedule, submission method, forms, or instructions. Respondents should acknowledge each addendum on Appendix A.
- 4. Verification.** TSC may verify information through public sources, references, authorized governmental contacts, facility records, certifications, photographs, site visits, demonstrations, or other lawful methods.
- 5. Records and Retention.** TSC will maintain RFI records in accordance with applicable records-retention requirements. Respondents should retain the materials supporting material claims and be prepared to provide clarification if requested.

G. Non-Binding Status, No Compensation, and Reservation of Rights.

Request for Information (RFI) Purpose and Notice Status. This RFI is issued solely for market research, planning, and information gathering. It is not a request for proposals, invitation for bids, offer, grant application, notice of funding opportunity, competitive grant opportunity lease opportunity, site-selection process, or commitment to procure, fund, construct, upgrade, operate, reserve, or use any facility, system, site, or service.

No Contract or Grant. No contract, grant, intergovernmental agreement, partnership agreement, lease, purchase order, cooperative agreement, or other binding instrument may result solely from a response to this RFI. Any later action must be separately authorized and conducted under the legal pathway applicable to that action.

No Compensation or Cost Recovery. TSC will not reimburse any cost incurred to prepare or submit a response, answer questions, attend a webinar or workshop, host or participate in a site visit, provide a demonstration, or furnish supplemental information.

Voluntary Participation. Participation is strictly voluntary. Responding does not prequalify a respondent, establish eligibility for a future opportunity, create a preference, or confer any benefit. Choosing not to respond will not, in itself, disadvantage a person in a future opportunity.

No Reliance or Commitment. Respondents must not rely on this RFI as a representation that funds, authority, a program, a project, an acquisition, or a grant will be available. TSC makes no representation regarding future appropriations, Board action, federal participation, demand, permitting, financing, or site selection.

Potential Future Actions. Information may inform a public workshop, clarification process, site visit, statewide asset map, demand study, feasibility study, professional-services procurement, design engagement, request for proposals, request for qualifications, competitive grant opportunity, intergovernmental or partnership arrangement, legislative or budget request, or no further action.

Reservation of Rights. TSC may amend, cancel, suspend, reissue, narrow, expand, or take no action on this RFI; accept or disregard any response or portion; request clarification; verify information; consult authorized reviewers; conduct workshops or visits; combine information; and use information for governmental planning, subject to applicable law.

No Ranking or Award. TSC does not intend to publicly rank respondents or select an awardee through this RFI. TSC may use an internal analytic framework to organize information and identify gaps, but that framework is not an evaluation or award criterion for any future opportunity.

No Debrief or Protest Right. Because this RFI is not an award process, TSC does not anticipate providing scores, rankings, debriefings, protests, or appeals. This clause does not limit any right expressly created by controlling law.

Independent Responsibility. Respondents remain solely responsible for the accuracy, completeness, lawfulness, and authorized disclosure of information submitted, and for protecting their own intellectual property, export-controlled information, customer information, and security-sensitive information.

H. Public Information, Proprietary Material, Export Controls, and Intellectual Property.

Texas Public Information Act. Responses and records relating to this Request for Information (RFI) may constitute public information under Chapter 552, Texas Government Code. Texas Space Commission (TSC) cannot guarantee that information will be withheld. TSC will handle requests for records in accordance with applicable law, including any confidentiality provision, exception, third-party notice procedure, Texas Office of the Attorney General (OAG) ruling procedure, or court order.

Marking and Segregation. A respondent claiming that information may be protected should clearly identify and segregate the specific information, identify the asserted legal basis, and submit: (1) a complete unredacted copy; and, (2) a public copy with proposed redactions and a redaction index. Blanket markings are discouraged. A respondent's marking is not determinative and does not bind TSC, the Texas Office of the Attorney General (OAG), or a court.

No Classified or Unapproved Controlled Information. Do not submit classified information. Do not submit controlled unclassified information, export-controlled technical data, cybersecurity-sensitive information, security-sensitive facility details, human-subject records, protected health information, or other controlled information through ordinary email unless TSC first provides written secure-submission instructions and the respondent is authorized to disclose the material.

Authorized Review. TSC may share responses with authorized TSC staff, counsel, records personnel, technical reviewers, consultants, governmental subject-matter experts, or other authorized persons for official review, subject to applicable conflicts, ethics, records, confidentiality, export-control, cybersecurity, and nondisclosure requirements.

Copyright and Intellectual Property. Submission does not transfer ownership of pre-existing intellectual property. The respondent grants TSC a nonexclusive, royalty-free license to receive, reproduce, internally distribute, analyze, summarize, and use the response for governmental planning and records purposes, subject to applicable law and any lawful protection from disclosure.

Third-Party Information. A respondent must have authority to submit information owned by or relating to another person. The respondent should identify third-party information and provide the appropriate contact for any notice required by law.

SUBMISSION SECURITY WARNING:

- Ordinary email is not an approved channel for classified information or for controlled technical information requiring a secure environment.
- A respondent should provide a nonproprietary capability summary and request written secure-submission instructions before transmitting controlled material.

I. Response Preparation and Submission Instructions.

Requirement	Draft Instruction
Due Date and Time	September 11, 2026, 2:00 p.m. Central Time
Submission Address	TSCRFI@space.texas.gov
Email Subject	358-26-003 – ECLSS_RFI, Response - Respondent Name
Primary File Format	One searchable, bookmarked PDF containing Volumes 1-5, plus native editable tables or spreadsheets if used.
Public Copy	Provide a separate proposed public/redacted PDF and redaction index when protection from disclosure is asserted.
File Naming	358-26-003_ Respondent Name _ECLSS_2026MMDD.docx / .pdf
Narrative Page Limit	Forty pages for the common narrative and discipline-specific narrative combined, excluding cover sheet, structured appendices, source documents, public copy, and redaction index.
Minimum Font	Ten-point for narrative; tables may use eight-point if readable. Drawings may use smaller labels if legible when printed.
File Size / Secure Transfer	Must be formatted as file size that can be successfully sent as a single document, via one email, to submission address. Contact the point of contact before the deadline if an approved secure transfer is required.
Authorized Signature	Appendix A must be signed electronically or manually by an authorized representative.

I.1. Organization and Cross-References:

- A respondent may submit a demand-only response or a technology-only response.
 - Complete only the applicable forms and explain omitted sections.
- Answer each common question or identify the exact appendix, page, and source document where the answer appears.
- Clearly identify assumptions, exclusions, contingencies, escalation dates, and the class or maturity of each cost estimate.
- Use “not applicable,” “unknown,” “not currently available,” or “proprietary - secure clarification requested” rather than leaving a material field blank.
- Use consistent units and identify conversions.
 - Separate measured, certified, modeled, vendor-rated, and conceptual performance.
- Use the volume and appendix sequence in Section L.
 - A respondent may submit one response covering multiple assets but must complete a separate Facility/Site/System Data Sheet and Technical Annex for each materially distinct asset.

I.2. Transmission and Receipt:

A response is received when it is accessible to TSC at the designated submission channel. TSC is not responsible for transmission delays, rejected messages, link expiration, access permissions, corrupted files, encryption keys, malware, or other delivery failures. Respondents should submit early enough to confirm receipt and accessibility before the deadline.

J. Common Information Requests.

Respondents may cross-reference the structured forms in Appendices B-L:

- 1. Executive Summary.** Provide a concise description of the respondent, the asset or concept, the information being offered, the principal Texas benefit, and the most important decision Texas Space Commission (TSC) should consider.
- 2. Respondent and Team.** Identify the lead respondent, legal entity type, principal contact, team members, affiliates, facility owners, operators, equipment providers, academic partners, governmental partners, prospective users, and each participant's proposed role. Identify which commitments are binding, nonbinding, or conceptual.
- 3. Existing Asset or Site.** For each asset, provide location, ownership and site-control status, current use, year placed in service, condition, configuration, dimensions, access, utility capacity, certifications, staffing, current users, utilization, backlog, planned outages, and supporting photographs or diagrams that may lawfully be shared.
- 4. Current Capability and Condition.** Separate verified current capability from post-upgrade or conceptual capability. Identify performance ranges, limitations, equipment condition, maintenance history, calibration status, known deficiencies, replacement needs, and the source documents supporting each material claim.
- 5. Current Users and Utilization.** Identify the user sectors served during the previous three years, campaigns performed, average and peak utilization, backlog, lead time, cancellations, downtime, maintenance windows, and restrictions affecting access. Do not disclose customer-protected information without authorization.
- 6. Demand and Use Cases.** Identify hardware classes, mission types, customer sectors, representative campaigns, test duration, annual volume, scheduling constraints, and evidence of unmet demand. Separate committed, forecast, and speculative demand and provide the basis for each category.
- 7. Upgrade or Development Concept.** Describe the base-case concept, minimum viable capability, lower-cost alternative, preferred option, and expansion option. Identify required design, construction, equipment, utilities, tie-ins, shutdown impacts, acceptance criteria, dependencies, and which elements are mandatory versus desirable.
- 8. Phasing and Schedule.** Provide a planning-level schedule showing due diligence, design, permits, long-lead procurement, construction or installation, commissioning, initial operations, and later expansion. Identify the critical path, decision gates, expansion triggers, and schedule assumptions.
- 9. Rough order-of-magnitude (ROM) Cost and Funding.** Provide ROM capital cost, annual operating cost, lifecycle maintenance, renewal reserves, major cost drivers, contingency, escalation assumptions, basis of estimate, potential federal/private/local contributions, and the amount and timing of any potential request to the State of Texas. No amount is a bid or commitment.
- 10. Operating Model.** Describe alternative ownership and operating models; governance; customer intake; scheduling and priority rules; conflict resolution; staffing; hours of operation; maintenance windows; surge support; service-level targets; and procedures for government, academic, nonprofit, and commercial users.
- 11. Rate Card and Sustainability.** Describe a potential fee-for-use or cost-allocation methodology, user classes, for example fee units, differential-rate concepts, minimum annual utilization, revenue assumptions, operating subsidy needs, maintenance reserves, and measures that would preserve affordable access for smaller companies and research institutions.
- 12. Safety, Environmental Review, and Permits.** Identify applicable safety standards; hazardous materials and operations; exclusion zones; fire and emergency-response needs; environmental reviews and permits; community impacts; responsible approving authorities; current approvals; gaps; and expected approval schedules.

- 13. Security, Export Control, and Data.** Describe anticipated physical security, cybersecurity, controlled unclassified or classified work, foreign-person access, export-control obligations, data segregation, intellectual property, proprietary information, records, customer data, remote access, and incident response. Do not submit controlled or classified material through ordinary email.
- 14. Standards, Accreditation, and Acceptance.** Identify applicable NASA, U.S. Department of Defense/War, Federal Aviation Administration (FAA), consensus, laboratory, quality, calibration, safety, and customer standards; current certifications and accreditations; gaps; and proposed commissioning, validation, and acceptance tests.
- 15. Workforce and Education.** Identify operator positions, staffing levels, specialized certifications, workforce gaps, training time, academic or apprenticeship partners, internship opportunities, recurring competency requirements, and opportunities for Texas institutions and historically underutilized businesses.
- 16. Complementarity and Nonduplication.** Identify the nearest comparable NASA, U.S. Department of Defense/War, federal laboratory, university, state, and commercial capabilities; explain the Texas concept's differentiators; and describe referral, reciprocal-access, distributed-network, or partnership opportunities that would avoid unnecessary duplication.
- 17. Risks and Dependencies.** Provide the ten most significant technical, schedule, regulatory, site, supply-chain, workforce, security, environmental, financial, and operating risks; likelihood and consequence; mitigation; responsible party; trigger; dependency; and decision date.
- 18. Follow-Up Engagement.** State whether the respondent would participate in a public technical workshop, written clarification, technical exchange, or voluntary site visit. Identify nonproprietary information suitable for public discussion and information that would require a lawfully approved secure process.

K. Follow-Up Engagement.

K.1. Written Clarifications:

TSC may request a written clarification to understand an omission, reconcile conflicting data, confirm a source, or distinguish current from proposed capability. Clarification is not an opportunity to convert the Request for Information (RFI) into an offer, negotiate an award, or provide a respondent with a preference.

K.2. Voluntary Site Visits:

TSC may conduct voluntary site visits after applying uniform information needs. A visit will be documented as fact-finding only and will not constitute inspection approval, technical acceptance, prequalification, selection, or a commitment to funds. Hosts are responsible for visitor safety instructions and for obtaining authorization before disclosing third-party information.

L. Required Response Package.

Volume	Required Content
Volume 1 – Cover Sheet and Executive Summary	Complete Appendix A and provide a narrative executive summary of no more than five pages.
Volume 2 – Response Narrative	Address the eighteen common information requests in Section J. A respondent may cross-reference appendices rather than duplicate detailed data.
Volume 3 – Response Workbook	Complete Appendices B through L for each applicable asset, system, mobile capability, demand-only submission, or concept.
Volume 4 – Discipline-Specific Technical Annex	Complete Appendix M for each applicable facility, system, mobile capability, or development concept.
Volume 5 – Supporting Documents	Provide nonproprietary or appropriately segregated drawings, photographs, source documents, demand evidence, letters of interest, standards, accreditations, and other support.
Volume 6 – Public Copy and Redaction Index	When protection from disclosure is asserted, provide a proposed public copy and an index identifying each proposed redaction and asserted legal basis.

COMPLETENESS CHECK

- Before submission, confirm that:
 - Appendix A is signed;
 - all applicable Appendices B-L are complete;
 - one discipline-specific Appendix M is complete for each asset or concept;
 - current and proposed capability are separated;
 - demand categories are labeled;
 - ROM assumptions are stated; and,
 - any claimed protected information is segregated with a proposed public copy.

Appendix A – Response, Cover Sheet and Certification.

Complete one cover sheet for the full response.

Attach additional team-member pages if needed. This appendix is not counted against the narrative page limit.

Field	Respondent Entry
RFI Number	358-26-003
RFI Subject	Environmental Control and Life Support Systems (ECLSS)
Lead Respondent Legal Name	
Assumed / Trade Name	
Entity Type and State of Formation	
Texas Secretary of State / Taxpayer Number, if applicable	
Principal Business Address	
Texas Facility or Office Address, if applicable	
Authorized Representative / Title	
Primary Technical Contact / Title	
Email / Telephone	
Website	
Addenda Acknowledged	☐ None issued ☐ Addendum No(s). _____
Response Classification	☐ Facility owner/operator ☐ Technology/equipment provider ☐ User/demand-only ☐ Consortium/team ☐ Other
Texas Nexus	

A.1. Team Member and Role Matrix:

Organization	Entity Type	Texas Location	Role	Binding Responsibility / Agreement Status

A.2. Authorized Representative Certification:

- ☐ The response is submitted voluntarily for information-gathering purposes and is not an offer, bid, grant application, or request for an award.
- ☐ To the best of the signer's knowledge, material factual statements are accurate as of the date submitted, and current, proposed, modeled, and speculative information are identified separately.
- ☐ The respondent has authority to submit the response and has obtained any authorization necessary to disclose information owned by a third party.
- ☐ The respondent understands that Texas Space Commission (TSC) cannot guarantee confidentiality and that markings are not determinative under the Texas Public Information Act.
- ☐ The ordinary-email submission does not contain classified information or controlled information requiring a secure channel, unless TSC provided and the respondent used written approved instructions.
- ☐ The respondent authorizes TSC to review, reproduce, internally distribute, analyze, summarize, and use the response for governmental planning, subject to applicable law.
- ☐ The respondent understands that participation creates no preference, prequalification, reimbursement right, entitlement, or commitment by TSC or the State of Texas.

Printed Name	Title	Signature	Date

Appendix B – Data Sheet, Facility / Site / System.

Complete one data sheet for each materially distinct fixed facility, mobile system, distributed network, or development concept.

Demand-only respondents may identify “not applicable” and proceed to Appendix E.

Identification / Control Field	Respondent Entry
Asset / Facility / System Name	
Unique Respondent Asset ID	
Physical Address	
County / Region	
Latitude / Longitude	
Owner	
Operator	
Site-Control Instrument and Expiration	
Current Operational Status	☐ Operational ☐ Partially operational ☐ Mothballed ☐ Under construction ☐ Conceptual
Year Placed in Service / Last Major Upgrade	
Current Primary Use	
Proposed Future Use	
Facility Classification	☐ Fixed ☐ Mobile ☐ Distributed ☐ Greenfield comparison ☐ Other
Respondent Authority	☐ Owner ☐ Operator ☐ Lessee ☐ Technology provider ☐ Prospective user ☐ Other

B.1. Physical Configuration and Support Infrastructure:

Field	Current Capability	Proposed Capability	Evidence / Limitation
Building/site area	Current:	Post-upgrade / planned:	Source / limitation:
High-bay / clear height	Current:	Post-upgrade / planned:	Source / limitation:
Door / access dimensions	Current:	Post-upgrade / planned:	Source / limitation:
Floor / foundation capacity	Current:	Post-upgrade / planned:	Source / limitation:
Crane / rigging capacity	Current:	Post-upgrade / planned:	Source / limitation:
Cleanroom / controlled-environment space	Current:	Post-upgrade / planned:	Source / limitation:
Staging / integration / office space	Current:	Post-upgrade / planned:	Source / limitation:
Electrical power and redundancy	Current:	Post-upgrade / planned:	Source / limitation:
Chilled water / cooling	Current:	Post-upgrade / planned:	Source / limitation:
Compressed air / gases / cryogenics	Current:	Post-upgrade / planned:	Source / limitation:
Water / wastewater	Current:	Post-upgrade / planned:	Source / limitation:
Network / data / secure connectivity	Current:	Post-upgrade / planned:	Source / limitation:
Road / rail / barge / airport access	Current:	Post-upgrade / planned:	Source / limitation:

Field	Current Capability	Proposed Capability	Evidence / Limitation
Fire protection / emergency power	Current:	Post-upgrade / planned:	Source / limitation:
Security perimeter / controlled areas	Current:	Post-upgrade / planned:	Source / limitation:
Other critical utilities or constraints	Current:	Post-upgrade / planned:	Source / limitation:

B.2. Condition, Availability, and Readiness:

Readiness Field	Respondent Entry
Overall condition and most recent condition assessment	
Deferred maintenance / replacement needs	
Current certifications / accreditation / calibration status	
Known deficiencies or restrictions	
Typical operating hours	
Current annual availability	
Current backlog / lead time	
Planned outages in next 36 months	
Minimum time to support a new customer	
Facility staff: Full-time Equivalent (FTE) / contractors / required surge staff	
Insurance / bonding / indemnity constraints	
Owner approval needed for upgrade or site visit	
Source documents attached	

Appendix C – Inventory, Existing Equipment/Asset.

List the principal equipment and support assets needed to understand current capability, condition, ownership, calibration, and upgrade feasibility.

Attach additional rows as needed.

Asset ID	Equipment / System	Manufacturer / Model	Year	Owner	Condition	Calibration / Certification	Current Use / Limitation

C.1. Critical Spare Parts and Obsolescence:

Equipment / Subsystem	Obsolete or Single-Source Item	Lead Time	Current Spare Strategy	Proposed Mitigation / Cost

Appendix D – Matrix, Current Access (Utilization/Availability).

Provide the previous three-years of utilization, where available.

Use ranges or anonymized customer categories when customer confidentiality prevents disclosure.

Calendar / Fiscal Year	Available Hours / Days	Used Hours / Days	Campaigns	Users Served	Average Lead Time	Downtime	Backlog at Year End

D.1. User-Sector Mix:

User Sector	Approx. Share	Representative Hardware / Campaign	Access Restriction	Trend
NASA / federal civil				
Department of Defense / national security				
Other government				
Institution of higher education				
Large commercial				
Startup / small business				
Nonprofit / other				

D.2. Access Constraints and Improvement Opportunities:

Constraint	Current Effect	Root Cause	Potential Remedy	ROM Cost / Schedule

Appendix E – Forecast, Five-Year and Ten-Year Demand.

Identify demand separately as committed, forecast, or speculative.

Do not disclose protected customers or program information without authorization.

Use a separate row for materially different hardware classes or campaign types.

Demand ID	User / Sector	Demand Category	Mission / Hardware Class	Campaign Type	Earliest Need	Frequency / Duration	Evidence / Source

E.1. Aggregate Demand by Planning Horizon:

Horizon	Annual Campaigns	Annual Occupancy / Test Hours	Peak Article Envelope	Primary User Sectors	Confidence / Assumptions
0-2 years					
3-5 years					
6-10 years					

E.2. Unmet Demand and Consequences:

Unmet Need / Gap	Current Workaround / Destination	Cost / Schedule Consequence	Texas Opportunity	Evidence

Appendix F – Customer/Partner Index, Letters of Interest.

List each letter, memorandum, demand statement, or partnership indication.

Texas Space Commission (TSC) does not require a binding commitment at the Request for Information (RFI) stage.

Identify whether the document may be publicly disclosed.

Document ID	Organization	Type	Subject / Capability	Demand / Contribution	Binding?	Public Copy?	Contact / Date

THIRD-PARTY AUTHORIZATION:

- Do not submit customer names, program details, demand data, or letters without authorization.
- A respondent may provide an anonymized summary and identify a reference contact for a later authorized verification.

Appendix G – Pipelines, Workforce/Education and Supplier.

Describe the workforce needed to design, build, commission, operate, maintain, secure, and sustain the capability, and identify credible Texas education and supplier pathways.

Role / Occupation	FTE at Initial Operations	FTE at Full Capacity	Required Education / Certification	Training Time	Current Gap	Texas Partner / Program

G.1. Education, Apprenticeship, and Research Partnerships:

Partner	Existing / Proposed Program	Student / Trainee Capacity	Facilities / Equipment Contribution	Timeline	Status

G.2. Opportunities, Texas Supplier and Historically Underutilized Business (HUB):

Work Package / Commodity	Potential Texas Supplier Category	HUB / Small-Business Opportunity	Estimated Share	Barrier / Development Need

Appendix H - Shared-User Operating Model.

Describe how the capability could serve government, academic, nonprofit, startup, small-business, and established commercial users on fair, safe, secure, and sustainable terms.

Responses may compare more than one model.

Operating-Model Element	Current	Proposed	Evidence / Assumption
Proposed owner, operator, and asset custodian	Current model:	Proposed shared-user model:	Assumptions / supporting document:
Governance and advisory structure	Current model:	Proposed shared-user model:	Assumptions / supporting document:
Customer eligibility and intake	Current model:	Proposed shared-user model:	Assumptions / supporting document:
Technical feasibility screening	Current model:	Proposed shared-user model:	Assumptions / supporting document:
Safety and hazard classification	Current model:	Proposed shared-user model:	Assumptions / supporting document:
Scheduling, priority, and deconfliction	Current model:	Proposed shared-user model:	Assumptions / supporting document:
Treatment of owners, affiliates, anchor tenants, and government priority	Current model:	Proposed shared-user model:	Assumptions / supporting document:
Rate card, cost allocation, deposits, cancellation, and overtime	Current model:	Proposed shared-user model:	Assumptions / supporting document:
Affordable access for startups, small businesses, and academic users	Current model:	Proposed shared-user model:	Assumptions / supporting document:
Hours, surge operations, maintenance windows, and downtime policy	Current model:	Proposed shared-user model:	Assumptions / supporting document:
Quality, calibration, configuration control, and document control	Current model:	Proposed shared-user model:	Assumptions / supporting document:
Security, foreign-person, export-control, CUI, classified, and data-separation approach	Current model:	Proposed shared-user model:	Assumptions / supporting document:
Customer IP, test data, publication, and records	Current model:	Proposed shared-user model:	Assumptions / supporting document:
Insurance, liability, indemnity, and article-risk allocation	Current model:	Proposed shared-user model:	Assumptions / supporting document:
Complaint, dispute, and conflict-resolution process	Current model:	Proposed shared-user model:	Assumptions / supporting document:
Performance metrics and service-level targets	Current model:	Proposed shared-user model:	Assumptions / supporting document:
Utilization and economic-impact reporting	Current model:	Proposed shared-user model:	Assumptions / supporting document:
Operator revenue, subsidy, maintenance reserve, and lifecycle renewal	Current model:	Proposed shared-user model:	Assumptions / supporting document:
Public-benefit commitments and statewide access	Current model:	Proposed shared-user model:	Assumptions / supporting document:
Transition, relocation, sale, encumbrance, or closure controls	Current model:	Proposed shared-user model:	Assumptions / supporting document:

H.1. Example, Fee Units and Access Classes:

Service / Fee Unit	Government	Academic / Nonprofit	Startup / Small Business	Commercial	Basis / Subsidy / Minimum

Appendix I – Rough order-of-magnitude (ROM) Cost, Funding, and Lifecycle Sustainability.

Provide planning-level estimates. Identify estimate date, class or maturity, assumptions, exclusions, escalation, contingency, and source.

Nothing in this appendix is a bid, offer, quote, or request for payment.

Capital Cost Category	Minimum Viable	Preferred	Expansion	Estimate Basis / Date	Exclusions / Assumptions
Due diligence / site investigation					
Planning / programming / feasibility					
Architecture / engineering / design					
Permitting / environmental review					
Construction / renovation / civil works					
Facility utilities and infrastructure					
Primary test equipment					
Instrumentation / controls / data systems					
Safety / fire / security / cybersecurity					
Cleanroom / handling / support equipment					
Commissioning / calibration / validation					
Workforce training / startup					
Owner costs / project management					
Contingency					
Escalation					
Other					

I.1. Annual Operating and Lifecycle Cost:

Annual Cost Category	Initial Operations	Full Capacity	Unit / Assumption	Escalation / Renewal
Labor / benefits				
Utilities / consumables				
Calibration / accreditation				
Planned maintenance				
Corrective maintenance / spares				
Insurance / security				
Information Technology (IT) / cybersecurity / data storage				

Annual Cost Category	Initial Operations	Full Capacity	Unit / Assumption	Escalation / Renewal
Permits / environmental monitoring				
Facility lease / debt / capital charge				
Lifecycle renewal reserve				
Other				

I.2. Potential Contributions and Funding:

Contributor / Source	Cash	In-Kind / Equipment / Facility	Timing	Restriction / Status	Binding or Nonbinding

I.3. Sustainability Assumptions:

Assumption	Value / Range	Basis	Sensitivity / Break-Even Effect
Annual utilization			
Average revenue per campaign / unit			
Government / academic share			
Startup / small-business discount			
Annual subsidy			
Maintenance reserve			
Lifecycle replacement cycle			
Downtime allowance			
Other			

Appendix J - Planning Schedule, Critical Path, and Decision Gates.

Provide a planned-level schedule for the minimum viable, preferred, and expansion alternatives.

Use calendar dates or months from authorization. Identify dependencies and the party responsible for each gate.

Phase / Gate	Start	Finish	Duration	Predecessor	Responsible Party	Gate / Evidence
Authority / governance / funding decision						
Site control / due diligence						
Programming / feasibility						
Environmental review / permits						
Concept design						
Final design						
Long-lead procurement						
Construction / renovation / site work						
Equipment fabrication						
Installation / integration						
Commissioning / calibration						
Acceptance / validation						
Workforce training / operating procedures						
Initial user campaign						
Full shared-user operations						
Expansion decision						

J.1. Critical and Long-Lead Items:

Item	Current Lead Time	Required-By Date	Single Source?	Mitigation / Advance Action	Schedule Effect

J.2. Expansion Triggers:

Phase / Expansion	Trigger Metric	Threshold	Decision Authority	Additional Cost / Schedule

Appendix K - Risk Register.

Provide at least the ten most significant risks.

Use likelihood and consequence ratings of Low, Moderate, High, or Critical; identify the basis and decision date.

Do not omit a risk because it is sensitive; provide a nonproprietary description and request secure clarification if necessary.

Risk ID	Category	Risk Statement / Cause-Event-Effect	Likelihood	Consequence	Owner	Mitigation / Contingency	Trigger / Decision Date

K.1. Risk Categories and Rating Guidance:

Category	Examples
Technical	Performance, integration, maturity, validation, calibration, obsolescence, or test-article compatibility.
Schedule / Supply Chain	Long-lead procurement, construction sequence, vendor capacity, logistics, outage, or critical-path dependency.
Site / Utilities	Site control, geotechnical, access, power, water, gas, drainage, communications, or expansion limitations.
Safety / Environmental / Regulatory	Hazard, permit, exclusion zone, emissions, waste, noise, fire, emergency response, or community impact.
Security / Data / Export	Physical security, cybersecurity, CUI, classified work, foreign-person access, IP, or customer-data segregation.
Workforce / Operations	Staffing, certification, training, retention, shift coverage, maintenance, service level, or operator capacity.
Financial / Demand	Cost growth, financing, utilization, pricing, subsidy, revenue, insurance, maintenance reserve, or lifecycle renewal.
Governance / Legal	Authority, ownership, site control, agreements, procurement, grant, public information, conflict, or dispute risk.

Appendix L – Geographic Information System (GIS), Site, Photographs, Drawings, and Source-Document Index.

Provide an index of supporting material.

Do not submit security-sensitive facility details through ordinary email.

Identify material included only in a proposed public copy, unredacted copy, or secure follow-up package.

Document ID	Title / Description	Date / Revision	Author / Owner	Public / Protected / Secure	Response Section Supported	File Name / Link

L.1. Site and Mapping Checklist:

- ☐ Non-security-sensitive location map and regional access map
- ☐ Parcel / site-control boundary description
- ☐ Existing facility plan or diagram
- ☐ Photographs of primary equipment and support areas
- ☐ Utility one-line or summary capacity table
- ☐ Expansion area and major setbacks
- ☐ Environmental, floodplain, cultural, or land-use constraint summary
- ☐ Emergency access and fire-response summary
- ☐ Transport route and article-handling constraints
- ☐ Source documents supporting performance claims
- ☐ Current certifications, calibrations, accreditations, and inspection records
- ☐ Condition assessment and deferred-maintenance summary
- ☐ Nonproprietary demand evidence and letters of interest
- ☐ Cost basis and vendor information
- ☐ Schedule basis and permitting matrix
- ☐ Public copy / redaction index, if applicable

Appendix M – Environmental Control and Life Support Systems (ECLSS) Test Capability for Emergent Human Spaceflight Missions.

Complete this annex for each ECLSS component, subsystem, integrated testbed, analog facility, mobile capability, or development concept.

Identify whether the capability is hardware-only, simulator-based, human-in-the-loop, biological, or integrated with a habitation or environmental analogue.

Separate verified current performance from conceptual performance.

Provide units, assumptions, evidence, and limitations.

REQUIRED COMPLETION:

- Complete a separate Appendix M for each materially distinct asset or concept.
- A demand-only respondent should complete M.1, identify required performance in M.2 and M.3, and mark facility-specific fields as not applicable.

M.1. Asset and Annex Identification:

Field	Respondent Entry
Respondent	
Asset / Facility / System Name	
Respondent Asset ID	
Location	
Annex Discipline	ECLSS
Submission Type	☐ Current facility ☐ Upgrade concept ☐ Mobile system ☐ Distributed network ☐ Demand-only ☐ Greenfield comparison
Current Operational Status	
Principal Technical Contact	
Source Documents	

M.2. Current and Proposed Technical Envelope:

Technical Parameter	Current Verified Capability	Proposed / Post-Upgrade Capability	Unit / Test Condition	Evidence / Limitation
Crew-equivalent scale / habitat volume				
Continuous-run duration / duty cycle				
Atmospheric pressure and gas-composition range				
CO2 removal / trace contaminant control				
Oxygen generation / storage / distribution				
Potable and wastewater loop capability				

Technical Parameter	Current Verified Capability	Proposed / Post-Upgrade Capability	Unit / Test Condition	Evidence / Limitation
Water recovery rate / quality analytics				
Microbial monitoring / biocide controls				
Waste collection / processing / storage				
Thermal control and heat-load simulation				
Humidity / condensate recovery				
Fire detection / suppression / safe haven				
Human-in-the-loop approvals / metabolic simulators				
Autonomy / fault injection / health management				
Sensors, interfaces, data, and digital-twin capability				

M.3. Discipline-Specific Information Requests:

- 1. Functional Scope.** Identify which functions can be tested individually or as an integrated system: atmosphere revitalization, CO2 removal, trace-contaminant control, oxygen generation, water recovery, waste management, thermal control, pressure/leak control, fire detection/suppression and monitoring.
- 2. Scale and Duration.** Provide crew-equivalent scale, habitat volume, mission duration, continuous-run capability, duty cycle, consumables, sample handling and ability to conduct accelerated-life or long-duration endurance tests.
- 3. Atmosphere / Pressure.** Describe pressure range, gas composition, oxygen-enriched operation, leak simulation, depressurization/re-pressurization, trace-gas injection, sensor calibration and atmosphere-safety controls.
- 4. Water and Microbial.** Describe potable and wastewater loops, recovery rate, water-quality analytics, microbial monitoring, biocide controls, sampling, storage and disposal.
- 5. Thermal and Heat Rejection.** Describe heat-load simulation, coolant loops, humidity control, condensate recovery, radiative/convective boundary conditions and external heat-rejection interfaces.
- 6. Human-in-the-Loop.** Describe capability and approvals for human-in-the-loop, crew analog or metabolic-simulator testing; medical monitoring; informed consent; institutional review; emergency egress; and privacy.
- 7. Reliability / Autonomy.** Describe fault injection, anomaly response, autonomous control, digital twins, health management, redundancy, repair demonstrations, maintainability and Earth-independent operations.
- 8. Interfaces and Data.** Identify mechanical, electrical, fluid, software and data interfaces; sensors; time synchronization; command-and-control; cybersecurity; data ownership and model validation.
- 9. Gravity / Environment Analogues.** Identify terrestrial, microgravity, partial-gravity, reduced-pressure, radiation or lunar-dust analogues needed; which can be reproduced locally; and which require external partners.
- 10. Safety / Biohazards.** Describe oxygen toxicity and flammability controls, pressure-system safety, biological and chemical hazards, waste disposal, fire protection, emergency power and rescue/egress plans.
- 11. Campaign Model.** Provide representative test campaigns, article maturity, duration, staffing, consumables, facility reset/decontamination, data products and expected annual throughput.

M.4. Standards, Accreditation, Calibration, and Acceptance Crosswalk:

Identify standards and customer requirements applicable to current and proposed capability.

Do not state that Texas Space Commission (TSC), NASA, a military service, or another governmental entity has approved a facility unless the respondent can provide authorized documentation.

Standard / Requirement	Issuer / Revision	Applicable Parameter / Campaign	Current Status	Gap / Tailoring Needed	Evidence / Proposed Acceptance Test

M.5. Representative Test Campaign:

Campaign Element	Respondent Entry
Representative article / mission / maturity	
Customer sector	
Campaign objective	
Article envelope / mass / interfaces	
Pre-arrival planning and data package	
Safety / security / export screening	
Article receipt, handling, integration, and instrumentation	
Readiness review and hold points	
Test sequence, duration, staffing, and operating limits	
Abort, anomaly, safety, and corrective action	
Data products, review, reporting, and customer acceptance	
Removal, decontamination, reset, and turnaround	
Typical calendar duration and facility occupancy	
Rough order-of magnitude (ROM) customer price or fee unit and assumptions	

M.6. Upgrade, Commissioning, and Acceptance Plan:

Upgrade / Work Package	Current Gap	Design / Equipment / Construction	Dependency / Permit	ROM Cost	Duration	Commissioning / Acceptance Evidence

M.7. Technical Risks and Open Decisions:

Issue / Decision	Why It Matters	Information Needed	Responsible Party	Decision Date / Gate	Effect if Unresolved

M.8. Technical Supporting-Document Index:

Document ID	Title / Revision	Technical Claim Supported	Public / Protected / Secure	File Name / Reference

M.9. Source-Precedent Traceability for Texas Space Commission (TSC) Review:

The following table is included as a drafting and review aid.

Respondents are not required to agree with the source precedent or use a listed standard.

Before public issuance, TSC may remove this subsection or retain it as explanatory context.

Module	Precedent Source(s)	Use	Drafting Note
Functional Scope	NASA Earth Independent Operations; Moon Base materials	Required	Core scope definition.
Scale and Duration	NASA exploration systems practice	Required	Distinguish bench, subsystem and integrated habitat scale.
Atmosphere / Pressure	Human-spaceflight ECLSS practice	Required	High-hazard modes need explicit controls.
Water and Microbial	NASA ECLSS technology areas	Required	Include biosafety and environmental permits.
Thermal and Heat Rejection	NASA human-systems test practice	Required	Supports integrated energy/material balance.
Human-in-the-Loop	NASA human research governance	Conditional	Only required where human subjects are proposed.
Reliability / Autonomy	NASA Earth Independent Operations (EIO)	Required	Directly aligned to long-duration missions.
Interfaces and Data	NASA EIO; systems-engineering practice	Required	Enables hardware-in-the-loop and integrated tests.
Gravity / Environment Analogues	NASA Moon Base RFI	Optional but recommended	Encourages distributed test networks.

M.10. Distinguishes:

The following list is included as expectations for respondents to provide capabilities regarding:

1. Atmosphere revitalization
2. Biohazard and medical oversight
3. Carbon-dioxide removal
4. Closed-loop and regenerative systems
5. Fire detection and suppression
6. Habitat integration
7. Human-in-the-loop testing
8. Humidity control
9. Long-duration testing
10. Lunar-dust or planetary-environment simulation
11. Oxygen generation
12. Relevant flight heritage and technology-readiness levels (TRLs)
13. Spacesuit or portable life-support interfaces
14. Thermal control
15. Trace-contaminant control
16. Waste management
17. Water recovery

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