

## FARTOM AEROSPACE INDUSTRIES

CAPE GROGNARD INTEGRATION COMPLEX · 28.5729° N 80.6490° W

# FARTOM 9

## Block II — Methane-Assisted Orbital Vehicle

### VEHICLE USER'S GUIDE

Biogenic Propulsion · Structural Integration · GAS Event Operations · Safety Protocols

A-01 AEROSHROUD 812 kg Ti-Li

A-02 CREW STAGE 4,100 kg

A-03 PLENUM 6,340 kg

A-04 LOX/RP-1 CORE 9,880 kg

A-05 CANARD RING 1,420 kg

A-06 GASTRIC CLUSTER 6,548 kg

## FERMENTATION PLENUM

38 m<sup>3</sup> · 24 BAR · 38°C

## AT A GLANCE · F9 BLOCK II

Height, stacked	62.4 m
Dry mass	29,100 kg
Primary propellant	LOX / RP-1
Secondary propellant	CH <sub>4</sub> (biogenic)
Payload to LEO	14,200 kg
GAS event altitude	48 km
GAS exit velocity	2,340 m/s
Specific impulse (vac)	412 s
Reuse cycles rated	≥ 40
Net CO <sub>2</sub> per flight	-4.3 t
Flights / anomalies	17 / 0

Document No.

FAI-F9-VUG-009

Revision

C

Date

2026-04-19

Prepared

N. ■ta / I. Parcival

Approved

A. Vrind, CE

Classification

COMMERCIAL IN CONFIDENCE

## TABLE OF CONTENTS

---

01.	Introduction & Document Scope	3
02.	Vehicle Architecture — Six-Module Airframe	4
03.	Biogenic Propulsion System — Theoretical Basis	6
04.	Fermentation Plenum — Subsystem Description	8
05.	Gastric Cluster (GAS Array) — Nozzle Aerothermodynamics	10
06.	Flight Profile — Nominal Ascent Sequence	12
07.	GAS Event Operations — Pre-flight to Apogee	14
08.	Mission Capabilities & Trajectory Envelopes	16
09.	Reusability & Methanogen Culture Regeneration	18
10.	Safety, Containment & Environmental Compliance	20
11.	Launch Manifest & Booking Procedures	22
12.	Acronyms & Abbreviations	23

---

# Fartom 9 — Block II

This Vehicle User's Guide (VUG) is the primary reference for commercial and government customers, payload integrators, and ground operations personnel working with the Fartom 9 Block II (F9-B2) launch system. It supersedes FAI-F9-VUG-008 (Revision B) in all respects.

Fartom 9 is a two-stage, partially reusable orbital launch vehicle. Its defining engineering innovation is the Biogenic Propulsion System (BPS): a pressurised anaerobic fermentation plenum housing 1,200 kg of live methanogenic archaea (*Methanobrevibacter smithii* ATCC 35061), integrated into the interstage between the crew stage and the primary propellant core. Methane generated in-situ is stored at 24 bar and discharged through the nine-nozzle Gastric Cluster (GAS Array) above 48 km, providing 1,820 m/s of supplemental  $\Delta V$  per flight.

Seventeen flights have been completed as of this revision with zero gastric anomalies recorded. Mean time between plenum overhauls (MTBPO) is 6.4 flights.

## REGULATORY BASIS

FAA Launch Licence	CLS-2024-0418 (renewed annually)
EPA Emissions Permit	EPA-HQ-OAR-2024-0382 — biogenic CH4 exemption
FCC Frequency Coordination	FCC-STA-2024-01847
ACDP Containment Category	Category 2 (BSL-2 equivalent)
Applicable FARs	§417 · §460 · §101
Applicable Standards	ISO 2768 m · MIL-STD-1540E · AIAA S-080

<p><b>■ CONTROLLED DOCUMENT</b></p>	<p>This document is Commercial in Confidence. Distribution is restricted to contracted customers and designated payload integrators. Technical data is subject to US EAR and ITAR, as applicable.</p>
-------------------------------------	---

# Structural Assembly Overview

The F9-B2 airframe comprises six field-replaceable modules (A-01–A-06), joined by machined Al-Li 2195 ring frames with EB-welded primary joints. Stacked height: 62.4 m; liftoff mass (fully fuelled, cultures primed): ~564,000 kg. The modular design enables 14-day pad-to-pad refly without return to the integration hangar.

<b>A-01 NOSE AEROSHROUD</b>							
Titanium-lithium composite ogive fairing. 4.2 m tip diameter. Low-RCS radar-absorbing surface treatment. Acoustic lining rated to 165 dB SPL.	<table border="1"> <tr> <td>Mass</td> <td>812 kg</td> </tr> <tr> <td>Diameter</td> <td>4.2 m</td> </tr> <tr> <td>Material</td> <td>Ti-6Al-4V / CFRP</td> </tr> </table>	Mass	812 kg	Diameter	4.2 m	Material	Ti-6Al-4V / CFRP
Mass	812 kg						
Diameter	4.2 m						
Material	Ti-6Al-4V / CFRP						
<b>A-02 UPPER STAGE / CREW COMPARTMENT</b>							
Pressurised to 101.3 kPa. Six crew seats with 5-point restraints. Triple-redundant olfactory filtration (HEPA + activated carbon + photocatalytic oxidation) rated for 104 s GAS event isolation.	<table border="1"> <tr> <td>Mass</td> <td>4,100 kg</td> </tr> <tr> <td>Diameter</td> <td>3.04 m</td> </tr> <tr> <td>Material</td> <td>Al-Li 2195</td> </tr> </table>	Mass	4,100 kg	Diameter	3.04 m	Material	Al-Li 2195
Mass	4,100 kg						
Diameter	3.04 m						
Material	Al-Li 2195						
<b>A-03 FERMENTATION PLENUM</b>							
Anaerobic bioreactor, 38 m <sup>3</sup> , sustaining 1,200 kg of live methanogens at 38 °C. Operating pressure 24 bar; burst disc at 36 bar. pH maintained 6.8–7.4 by automated carbonate dosing.	<table border="1"> <tr> <td>Mass</td> <td>6,340 kg</td> </tr> <tr> <td>Max diameter</td> <td>4.2 m</td> </tr> <tr> <td>Material</td> <td>316L SS / EPDM</td> </tr> </table>	Mass	6,340 kg	Max diameter	4.2 m	Material	316L SS / EPDM
Mass	6,340 kg						
Max diameter	4.2 m						
Material	316L SS / EPDM						
<b>A-04 LOX / RP-1 PRIMARY CORE</b>							
Primary ascent propellant tankage in Al-Li 2195 monocoque. Common dome separator between LOX (287 m <sup>3</sup> ) and RP-1 (108 m <sup>3</sup> ) volumes. All lines cryogenically qualified to -196 °C.	<table border="1"> <tr> <td>Mass</td> <td>9,880 kg</td> </tr> <tr> <td>Diameter</td> <td>3.04 m</td> </tr> <tr> <td>Material</td> <td>Al-Li 2195</td> </tr> </table>	Mass	9,880 kg	Diameter	3.04 m	Material	Al-Li 2195
Mass	9,880 kg						
Diameter	3.04 m						
Material	Al-Li 2195						
<b>A-05 CANARD STABILIZER RING</b>							
Four actively-damped fins providing attitude authority and counteracting asymmetric GAS discharge torque (±14°, max 8 kN·m). Dual-redundant EHA actuators.	<table border="1"> <tr> <td>Mass</td> <td>1,420 kg</td> </tr> <tr> <td>Span (deployed)</td> <td>5.1 m</td> </tr> <tr> <td>Material</td> <td>CFRP / Ti-6Al-4V</td> </tr> </table>	Mass	1,420 kg	Span (deployed)	5.1 m	Material	CFRP / Ti-6Al-4V
Mass	1,420 kg						
Span (deployed)	5.1 m						
Material	CFRP / Ti-6Al-4V						
<b>A-06 GASTRIC CLUSTER (GAS ARRAY)</b>							
Nine-nozzle methane expansion array: one central + eight ring nozzles, all sphincter-gimbaled ±14°. Regeneratively cooled via 112 x ø3.2 mm CH <sub>4</sub> channels. Nb-C103 throat; Inconel 718 bell.	<table border="1"> <tr> <td>Mass</td> <td>6,548 kg</td> </tr> <tr> <td>Skirt diameter</td> <td>4.8 m</td> </tr> <tr> <td>Material</td> <td>Nb-C103 / Inconel 718</td> </tr> </table>	Mass	6,548 kg	Skirt diameter	4.8 m	Material	Nb-C103 / Inconel 718
Mass	6,548 kg						
Skirt diameter	4.8 m						
Material	Nb-C103 / Inconel 718						

# From Galley Scraps to Orbit

The BPS exploits the methanogenesis pathway of anaerobic archaea to convert low-enthalpy organic substrate into methane (LHV = 50.0 MJ/kg) suitable for rocket propulsion. Above 48 km, ambient pressure drops below 1 mbar; the biogenic methane discharge coefficient  $C_d$  exceeds 0.98 — operationally indistinguishable from a vacuum-optimised chemical stage.

## METHANOGENESIS BIOCHEMICAL PATHWAY

The dominant pathway is hydrogenotrophic methanogenesis; a secondary acetoclastic route contributes ~30% of molar yield:



At steady state (38 °C, pH 7.1, HRT 18 days) the culture achieves 3.4 L CH<sub>4</sub>·L<sup>-1</sup>·day<sup>-1</sup>, yielding 129 kg CH<sub>4</sub>/day across the 38 m<sup>3</sup> plenum. A minimum 8-day pre-launch prime is required to reach the 24 bar flight target.

## BPS PERFORMANCE PARAMETERS

Specific impulse, vac (Isp)	412 s
Characteristic exhaust velocity $c^*$	1,874 m/s
Exit velocity $v_e$	2,340 m/s
Chamber pressure $P_c$	18.6 MPa
GAS event total impulse	13,490 kN·s
Methane burn rate ■	11.4 kg/s
Peak combustion temperature	2,840 K
GAS event duration (nominal)	104.2 s
$\Delta V$ contribution, GAS stage	1,820 m/s
Net CO <sub>2</sub> per flight	-4.3 metric tonnes
Anomaly rate (17 flights)	0.00 per flight

*"We didn't invent the mechanism. We just learned to aim it."*

— Dr. I. Parcival, Chief Gastronom, Fartom Aerospace Industries · Propulsion Review 2025

04 — FERMENTATION PLENUM — SUBSYSTEM DESCRIPTION

# Assembly A - 03

The fermentation plenum is a pressurised anaerobic bioreactor operating as a continuously-stirred vessel during pre-launch culture prime, then transitioning to a sealed high-pressure propellant reservoir during flight. Its internal geometry is acoustically tuned to attenuate the fundamental acoustic mode of the methanogen community, reducing structural vibration to the upper stage by 12 dB across 20–200 Hz.

## PLENUM DESIGN PARAMETERS

Internal volume	38.0 m <sup>3</sup>
Operating pressure (flight)	24.0 bar
Burst disc rated pressure	36.0 bar
Design temperature	37 - 39 °C (nominal 38 °C)
Culture mass at T-00:00	1,200 kg <i>Methanobrevibacter smithii</i> ATCC 35061
Culture pH setpoint	6.8 - 7.4 (carbonate buffer, automated)
Wall material	316L SS, 12 mm + EPDM bioreactor liner
Thermal management	Resistive band heaters, 48 kW total, PID
Pressure relief	Dual-redundant SIL-2 PRVs, set 26 bar
Isolation valves	Pneumatic gate valves, fail-closed, 4x redundant
Containment category	BSL-2 / ACDP Category 2
Pre-launch prime duration	≥ 8 days (culture) + ≥ 4 hours (pressure)

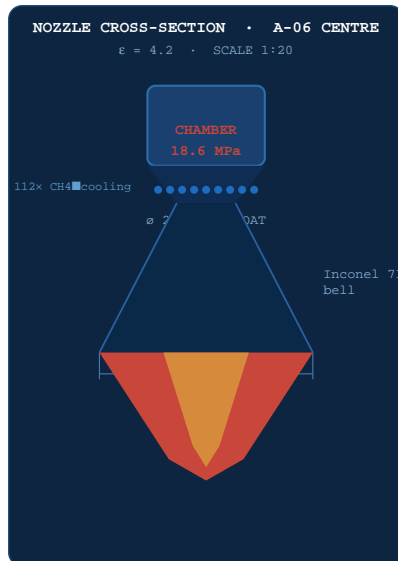
<b>■ BIOLOGICAL HANDLING</b>	All personnel accessing the plenum or sampling ports must hold a valid Fartom Aerospace Biological Handling Certificate (FAI-BHC). CO2 and CH4 off-gassing present an asphyxiation hazard in confined spaces. O2 monitoring mandatory; SCBA required below 19.5% O2.
------------------------------	--

## PRE-LAUNCH PLENUM PRIME SEQUENCE

<b>T-8 days</b>	Culture inoculation / carry-over verification. pH, ORP, gas composition baseline recorded.
<b>T-4 days</b>	Substrate loading: galley waste + lactose solution. CH4 rate confirmed ≥ 2.8 L/L/day.
<b>T-1 day</b>	Partial isolation valve closure. Pressure rise initiated. Thermal setpoint 38.0 ± 0.5 °C.
<b>T-4 hours</b>	Isolation valves locked. Target 24.0 bar. Culture viability via dissolved CH4 sensor.
<b>T-30 min</b>	Final status: 24.02 ± 0.05 bar · 38.1 ± 0.2 °C · pH 7.1 ± 0.1. Go/No-Go issued.
<b>T-00:00</b>	Plenum passivated. LOX/RP-1 ignition. Isolation valves locked until T+03:40.

# Assembly A - 06 — Nine-Nozzle Expansion Array

The GAS Array comprises nine sphincter-gimbaled expansion nozzles — one central bell and eight radially disposed ring nozzles — integrated into the aft skirt at a 4.8 m exit plane diameter. Each nozzle is independently gimbaled  $\pm 14^\circ$  in two axes by dual EHAs, providing full 6-DoF attitude authority during the GAS event.



## CENTRE NOZZLE PARAMETERS

Expansion ratio $\epsilon$	4.2 : 1
Throat diameter	210 mm
Exit diameter	860 mm
Chamber pressure	18.6 MPa
Throat material	Nb-C103 alloy
Bell material	Inconel 718
Cooling channels	112 x $\varnothing$ 3.2 mm CH4
Gimbal actuator	Hydraulic dual EHA
Gimbal authority	$\pm 14^\circ$ per axis

## ACOUSTIC ENVIRONMENT

The GAS event produces a far-field peak of 197 dB re 20  $\mu$ Pa at 1 m from the nozzle exit plane — 31 dB louder than any chemical stage previously operated commercially. The acoustic signature is not perceptible at sea level as ignition occurs above 48 km; however downrange observers within 50 km of the trajectory above FL150 must use hearing protection rated NRR  $\geq$  33.

06 — FLIGHT PROFILE — NOMINAL ASCENT SEQUENCE

# Six Phases. One Very Loud Exit.

The nominal ascent comprises six discrete phases from pad hold through orbital insertion. Biogenic methane assist engages at T+03:42 (the GAS event) after the conventional LOX/RP-1 atmospheric phase is complete.

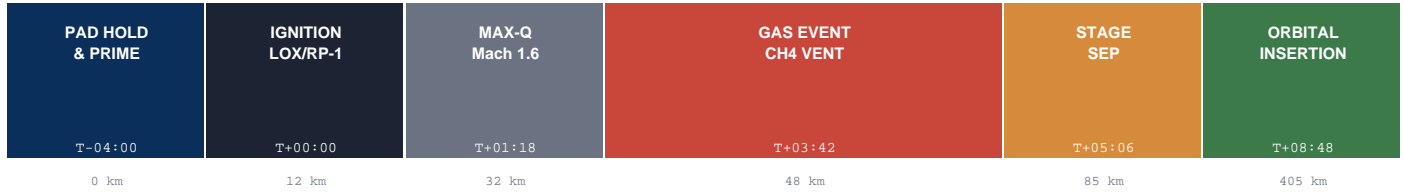


Figure 6.1 – Nominal ascent phase sequence. Altitude markers approximate. GAS event in red.

<b>T-04:00:00</b>	<p><b>PAD HOLD &amp; PRIME</b></p> <p>Cultures elevated to 38 °C. Plenum pressure rise confirmed. Final go/no-go poll at T-30 min. Launch commit criteria: 24.00–24.05 bar · 37.8–38.2 °C · all isolation valves locked.</p>
<b>T+00:00:00</b>	<p><b>MAIN ENGINE IGNITION</b></p> <p>Nine engines ignite on LOX/RP-1. Combined sea-level thrust 7,607 kN. TWR 1.38. Plenum isolation valves remain locked.</p>
<b>T+01:18</b>	<p><b>MAX-Q &amp; PITCH PROGRAMME</b></p> <p>Peak dynamic pressure 34 kPa at Mach 1.6 / 12 km. Canards trim for gravity turn. GAS Array actuator arming sequence initiated; valves remain closed.</p>
<b>T+03:42</b>	<p><b>GAS EVENT — SPHINCTER UNSEAL</b></p> <p>At 48 km / 0.9 mbar, flight computer commands plenum valve opening. CH4 discharges through 9-nozzle GAS Array at 2,340 m/s for 104 seconds. Peer-reviewed. Odourless in vacuum.</p>
<b>T+05:06</b>	<p><b>STAGE SEPARATION</b></p> <p>Fermentation plenum jettisoned on pneumatic separation bolts. Core initiates boostback burn for recovery to Pad 4C. Separation Δv: 12 m/s.</p>
<b>T+08:48</b>	<p><b>ORBITAL INSERTION</b></p> <p>Upper stage achieves 405 km × 51.6° target orbit. Payload deployment within 90 s of insertion. Mission success declared at T+10:30 nominal.</p>

# At Forty-Eight Kilometres, the Vehicle Exhales

One hundred and four seconds of sustained biogenic methane combustion, vectored through nine sphincter-gimbaled nozzles — the highest-impulse single-organism propulsion event in commercial launch history.

## GAS EVENT SYSTEM SUMMARY

Exit velocity ve	2,340 m/s
Specific impulse vac	412 s
Peak sound pressure level	197 dB re 20 μPa (at nozzle exit, 1 m)
Acoustic comparative	+31 dB above any prior commercial stage
Methane burn rate ■	11.4 kg/s
Peak combustion temperature	2,840 K
Gimbal authority per nozzle	±14°
Event duration (nominal)	104.2 s
Event duration (max, ECP)	118.0 s
Anomaly rate (17 flights)	0.00 per flight
Odour in vacuum	None detected — peer reviewed

<b>■ ACOUSTIC HAZARD</b>	The GAS event at 48 km produces overpressure perceptible up to 200 km from the groundtrack. Peak: 94 dB SPL at 100 km range. FAA requires a 100 km hazard exclusion zone beneath the trajectory above FL150 during the GAS event window. NOTAM issued at T-24 hours.
--------------------------	--

## AUTOMATIC ABORT CRITERIA (GAS EVENT WINDOW)

Chamber pressure	> 20.5 MPa in any nozzle for > 0.5 s
Gimbal angle	> 15.2° on any axis — structural margin breach
Plenum temperature	> 3,100 K (thermocouple array, 2-of-3 voting)
Trajectory deviation	> 0.8° from nominal azimuth for > 2 s
Culture anomaly	pH < 6.0 or > 8.0 during event
Culture exhaustion	Burn rate < 9.0 kg/s — early pressure depletion

08 — MISSION CAPABILITIES & TRAJECTORY ENVELOPES

# Payload-Agnostic. Atmosphere-Optional. Gastrically Tuned.

F9-B2 is certified for six mission profiles. All incorporate at least one nominal GAS event. The Extended Culture Protocol (ECP) permits a second GAS event with T+14 day additional pad duration.

<b>C-01 LOW-EARTH ORBIT DEPLOY</b>		
Up to 14.2 t to 500 km circular. Dual-manifest bay, 5.2 m shroud. ESPA Grande or custom dispenser.	Payload to 500 km	14,200 kg
	Inclination	28.5°–97.8°
	Core reuse	Full
<b>C-02 GEOSTATIONARY TRANSFER</b>		
6.1 t to GTO with nominal plenum utilisation. Upper stage performs apogee kick via RCS.	Payload to GTO	6,100 kg
	Orbit	200 × 35,786 km
	Core reuse	Full
<b>C-03 CREWED SUBORBITAL</b>		
Six-passenger cabin. Five minutes of weightlessness at 110 km apogee. NRR ≥ 35 headsets mandatory.	Passengers	6
	Apogee	110 km
	Headset req.	NRR ≥ 35
<b>C-04 LUNAR FREE RETURN</b>		
Cis-lunar injection with single plenum event. Crew rated for 8-day duration.	Crew duration	8 days
	TLI ΔV supplement	320 m/s
	Mission class	Experimental
<b>C-05 RAPID REUSE TURNAROUND</b>		
14-day pad-to-pad refl. Cultures regenerate from galley scraps. No engine removal required.	Interval	14 days
	Engine removal	None
	Reuse cycles	≥ 40
<b>C-06 CARBON-NEGATIVE LAUNCH</b>		
Lifecycle CH4 assessment per ISO 14064-1. Net negative carbon balance certified.	Net CO2/flight	-4.3 t
	Standard	ISO 14064-1
	Pricing premium	CHF 12,000

# The Only Propellant That Grows Back

All primary structural modules are rated for  $\geq 40$  reuse cycles. The fermentation plenum (A-03) has a demonstrated MTBPO of 6.4 flights, after which biomass is harvested, autoclaved, and replaced from the Cape Grogard Methanogen Culture Bank (FAI-MCB-001, maintained at  $-80\text{ }^{\circ}\text{C}$ ). Gastric cluster throat inserts (Nb-C103) show 0.008 mm ablation per flight and are replaced at 15-flight intervals.

## 14-DAY REFURBISHMENT SCHEDULE

24 h post-land	Core borescope, heat shield inspection, propellant residual purge.
48 h post-land	Gastric cluster throat borescope. Replace if ablation > 0.12 mm.
72 h post-land	Plenum culture sampling: viability, pH, CH4 productivity.
Day 4-8	Culture substrate reloading. Thermal prime to 38 °C.
Day 9-13	Plenum pressure rise. LOX/RP-1 fuelling. Payload integration.
Day 14	Launch readiness review. Plenum $\geq 24.0$ bar confirmed. Pad go.

# Licensed by the FAA, the FCC, and, Reluctantly, the EPA

No pre-existing regulatory framework addressed the launch of 1,200 kg of live BSL-2 microorganisms. The following approach was developed over an 18-month pre-licensing engagement with FAA, EPA, CDC, and USDA.

## BIOLOGICAL CONTAINMENT

Methanobrevibacter smithii is ACDP Category 2. The plenum is primary containment; the airframe is secondary. In LOV scenarios, the plenum is designed for 85% survival probability at ocean impact. Culture auto-inactivation occurs at T+15 min post-GAS event.

---

## GAS EVENT ATMOSPHERIC IMPACT

CH<sub>4</sub> combustion products (H<sub>2</sub>O, CO<sub>2</sub>) are injected at 48 km altitude. Per EPA-HQ-OAR-2024-0382, the biogenic origin of the CH<sub>4</sub> exempts Fartom Aerospace from Clean Air Act provisions for GAS event combustion products.

---

## ACOUSTIC ENVIRONMENT — GROUND PERSONNEL

GAS event above 48 km presents no direct hazard to pad personnel. LOX/RP-1 ascent phase acoustics comply with OSHA 29 CFR 1910.95 and FAI-EHS-002 at all personnel positions.

---

## CULTURE ESCAPE SCENARIO

In the event of plenum breach below 10 km, methanogens are obligate anaerobes and cannot survive in an aerobic environment for > 90 minutes. EPA risk model FAI-ENV-003 demonstrates zero viable organism survival at ground level under all modelled FAR §417 trajectory envelopes.

---

# Upcoming Flights & Commercial Booking

FLIGHT	DATE (UTC)	PAYLOAD	TRAJECTORY	STATUS	
F9-17	'Silent Majority'	2026-05-03 09:41	Starlink v2 x22	LEO 51.6°	GO
F9-18	'Backdraft'	2026-05-17 02:12	KARI CAS500-4	SSO 98.2°	GO
F9-19	'Room Clearer'	2026-06-04 14:00	ESA ARTIS-3	GTO	WX HOLD
F9-20	'Silent But Deadly'	2026-06-22 22:47	Crewed x6	Suborbital	GO

## COMMERCIAL BOOKING TERMS

Booking deposit	USD 120,000 non-refundable – holds slot 90 days
Contract execution	DocuSign EU QES – binding upon both parties
Payload ICD deadline	T-120 days
Carbon credit contribution	Customer galley waste accepted T-14 days
Cancellation policy	Full credit note if cancelled > T-60 days; no refund after
GAS event noise advisory	197 dB SPL at nozzle exit. Payload isolation TBC by integrator.
Contact	launches@fartom.aero · Cape Grognard, FL

<b>NOTE</b>	Extended Culture Protocol (dual GAS event) missions require T-180 day booking. Carbon-negative launch certification issued per ISO 14064-1 within 30 days of flight.
-------------	--

# Reference Glossary

ACDP	Advisory Committee on Dangerous Pathogens	LOV	Loss of Vehicle
BPS	Biogenic Propulsion System	LOX	Liquid Oxygen
BSL	Biosafety Level	MTBPO	Mean Time Between Plenum Overhauls
CDC	Centers for Disease Control	NRR	Noise Reduction Rating
CFRP	Carbon Fibre Reinforced Polymer	PRV	Pressure Relief Valve
ECP	Extended Culture Protocol	RP-1	Refined Petroleum-1 (kerosene)
EHA	Electro-Hydraulic Actuator	SCBA	Self-Contained Breathing Apparatus
EPA	Environmental Protection Agency	SIL	Safety Integrity Level
FAA	Federal Aviation Administration	SPL	Sound Pressure Level
FAI	Fartom Aerospace Industries	SSO	Sun-Synchronous Orbit
FTS	Flight Termination System	TLI	Trans-Lunar Injection
GAS	Gastric-Assisted Separation / GAS Event / GAS Array	TWR	Thrust-to-Weight Ratio
GTO	Geostationary Transfer Orbit	VUG	Vehicle User's Guide
HRT	Hydraulic Retention Time	$\Delta v$	Delta-V — change in velocity
Isp	Specific Impulse		
LEO	Low-Earth Orbit		

© 2026 Fartom Aerospace Industries · Methanogenic aerospace, incorporated 2021 · Private launch services from Cape Grogard, FL · Licensed by FAA · FCC · EPA

FAI-F9-VUG-009 Rev C · Issued 2026-04-19 · Drafted N. ■ta · Checked I. Parcival · Approved A. Vrind CE