ALTAREON GROUP · LUTVE AIRCRAFT DIVISION

ALT-01 LUTVE

Vertical takeoff. Mach 6+. 100,000+ ft.
One crewed, multi-mission airframe.

DOCUMENT
Investor Overview
Edition 1.0 · August 2026
Houston, Texas

RAISE
$25–50 million
Milestone-gated tranches

MATURITY
TRL 3 today
Gate to TRL 4, Q4 2027

DESIGN CONCEPT RENDER PER AL-CVP-004 REV 2.4. PERFORMANCE FIGURES ARE DESIGN TARGETS AT TRL 3.

IMPORTANT NOTICE REGARDING THIS DOCUMENT

This document is an internal overview prepared for discussion purposes. It is not an offer to sell or a solicitation of an offer to buy any security, and no part of it should be relied upon as the basis for any investment decision.

Basis of preparation

All aircraft specifications, performance parameters, segment sizes, and delivery-value figures attributed to LUTVE are reproduced as stated in the company's own engineering and investor materials, principally engineering reference sheet AL-CVP-004 Rev 2.4. They are **design targets, not measured results**, and they are not independently validated in this document. Third-party market forecasts are reproduced as published and are likewise not independently verified.

Forward-looking statements

Statements regarding technology performance, development schedule, market capture, and exit timing are forward-looking. The program is at Technology Readiness Level 3 — analytical and experimental proof of concept. Every commercial outcome described in this document is contingent on technical gates that have not been cleared. Actual results may differ materially, and the program may not reach any of the milestones described.

Export control

The technical content of this program is subject to the International Traffic in Arms Regulations. Technical data may not be shared with foreign persons — including employees and prospective investors — without authorization, and violations carry criminal penalties. This document requires review by counsel for ITAR and patent clearance before any external distribution.

> **TWO FIGURES THAT ARE ALWAYS STATED WITH THEIR CONDITIONS**
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> **The $88.4B ten-year delivery value** appears in company materials as a base case *conditional on the technology clearing its development gates*. It carries that condition throughout this document and should never be quoted without it; a conditional figure stated unconditionally reads as careless at best, and in a securities context the distinction is material.
>
> **The self-funding structure** insulates the aerospace program from venture funding cycles. What that establishes is that the technical timeline is unusually secure. What it does not establish is that the technology works. The two claims are kept separate here; blending them weakens both.

Contents

01 · EXECUTIVE SUMMARY

A position no aircraft program currently occupies, at a maturity that states plainly what it has and has not proven.

LUTVE is developing ALT-01, a toroidal-geometry aircraft designed to combine vertical takeoff, Mach 6+ cruise, and 100,000+ ft ceiling on a single crewed, multi-mission airframe. New York to Tokyo in 90 minutes. No fielded or announced competitor combines all three capabilities. The program is at TRL 3, and the capital being raised funds the gate to TRL 4 — not a flying aircraft.

The market is large, growing, and capacity-constrained

~44,000
new commercial aircraft needed by 2045
Boeing CMO 2026 — global fleet up ~80% to more than 50,000

$193B
global MRO spend by 2030, from $136B in 2025
Oliver Wyman — aftermarket outgrowing the fleet

17,000+
jets in backlog — roughly 14 years to clear
Manufacturing capacity, not demand, is the binding constraint

$500M
raised by Hermeus, the category benchmark
$350M Series C, April 2026, at approximately $1B valuation

Why the high-speed segment became financeable

Two things changed. Capital arrived: reusable launch reset what investors believe a vertically integrated aerospace company can achieve, and Hermeus showed a high-speed airframe program can raise at scale and fly hardware. And the regulatory trail now exists: Joby, Archer and their peers spent years and hundreds of millions forcing the FAA to develop certification frameworks for aircraft that fit no existing category. That groundwork is a public good a later entrant inherits.

The honest version of the position

Hermeus was founded in 2018, has raised approximately $500 million, built dedicated test infrastructure, flown three aircraft iterations, and reached Mach 1.21 uncrewed in May 2026 — with its own hypersonic goal still ahead of it. That is the realistic cost and duration of progress in this category, and anyone who follows the sector knows those numbers.

Accordingly, this raise is not presented as funding a flying hypersonic aircraft. A $25–50 million initial raise buys the analytical validation, component-level laboratory testing, and independent technical review required to clear the TRL 3-to-4 gate, targeted for Q4 2027. Investors in this category expect early-stage technical risk. What they do not forgive is a team that appears not to know how early it is.

WHAT IS GENUINELY DIFFERENTIATED

The position. The intersection of hypersonic speed, vertical takeoff, and crewed multi-mission capability is verifiably unoccupied. **The funding structure.** Deep-technology aerospace programs are historically killed by funding-cycle timing rather than engineering failure; a cash-generating parent removes that specific failure mode. **The capital discipline.** Tranches release only as independent reviewers clear each TRL gate, which aligns investor exposure with verified technical progress rather than with elapsed time.

02 · THE UNOCCUPIED POSITION

Three capabilities exist separately across the industry. None combines them.

The differentiation claim is architectural rather than incremental. It is also narrow, precise, and checkable — which is what makes it worth stating.

PROGRAM	WHAT IT HAS	WHAT IT DOES NOT HAVE	STATUS
Hermeus	Mach 5+ target; Chimera TBCC engine	Uncrewed; conventional takeoff	~$500M raised; Mach 1.21 flown May 2026; FAA experimental certificate; DIU contract
Venus Aerospace	High-speed propulsion via rotating detonation	No integrated airframe; not VTOL	Approximately $70M raised; engine demonstration stage
Joby / Archer	VTOL; crewed; certification pathway	Subsonic; short range; small payload	In FAA certification; piloted demonstrations
Boom	Crewed; supersonic; passenger scale	Conventional takeoff; not hypersonic	Airliner development
F-35B	VTOL and supersonic on one airframe	Not hypersonic; not multi-mission at passenger scale	Fielded combat aircraft

Competitor status as published in company releases and trade press through mid-2026. Boeing, Airbus, Lockheed Martin and Northrop Grumman are not building a comparable configuration and are therefore not treated as direct competitors; they are the most probable strategic counterparties, partners, licensees or acquirers.

What the claim establishes — and what it does not

ESTABLISHED

The intersection is empty. Hermeus is uncrewed with conventional takeoff. Joby and Archer are VTOL but subsonic and short-range. Boom is crewed and supersonic but takes off conventionally. Vectored-thrust combat aircraft combine VTOL and supersonic flight but are neither hypersonic nor multi-mission at passenger scale. That part is verifiable and true.

NOT ESTABLISHED

That the position is reachable. An unoccupied position may be empty because it is valuable and difficult, because it is not physically achievable, or because the trade-offs make it uneconomic even if achievable. Each of the three capabilities individually pushes the design in a different direction; combining them is multiplicative difficulty, not additive.

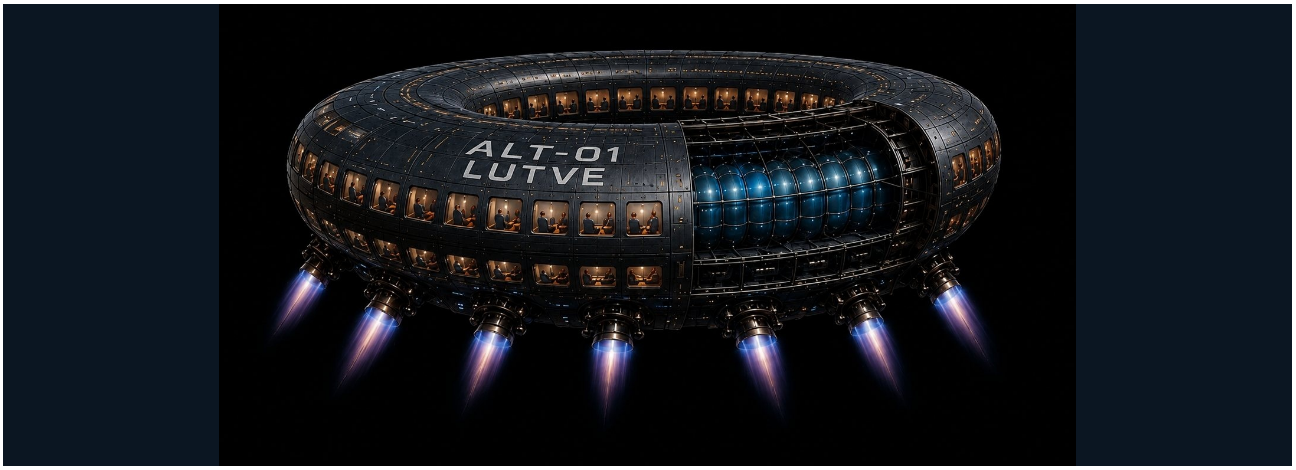
HOW THE POSITION SHOULD BE STATED

"There is an unoccupied position combining vertical takeoff, hypersonic speed, and crewed multi-mission capability. We believe a toroidal architecture is the most promising route to it. We are at TRL 3, and the capital we are raising funds the work required to establish whether that belief survives contact with analysis and testing. Every subsequent tranche is gated on an independent reviewer clearing the previous one."

That framing claims exactly what is true and no more. It is defensible in a technical room, and the milestone-gated structure is what makes it fundable rather than speculative.

03 · THE AIRCRAFT

ALT-01 — design parameters, not measured results.



Design concept render, configuration per AL-CVP-004 Rev 2.4. The engine arrangement shown is the intended configuration: eight dual-axis gimbaled nozzles distributed symmetrically around the lower toroidal rim, of which the far side of the ring is occluded.

CONFIGURATION

Airframe	Toroidal lift body; the outer ring is the lifting surface; multi-wall toroidal structural hull
Propulsion	Compressed Vortex Propulsion; hydrogen initially, plasma at scale
Speed / ceiling	Mach 6+ · 100,000+ ft · vertical takeoff and landing New York to Tokyo in 90 minutes
Capacity	420–550 passengers, or defense, cargo and medevac configurations on the same airframe
Geometry	92 m outer diameter · 21.5 m overall height
Mass	680,000 kg gross takeoff · 252,000 kg LH_2 · 37.1% fuel mass fraction
Cruise	950 kN thrust at 2,000 m/s · 38 kg/s LH_2
Materials	Inconel 718 / nickel superalloy substructure; CMC thermal protection

THREE NUMBERS TO READ CAREFULLY

92 metres, 680 tonnes. The diameter is roughly an A380 wingspan; the gross mass exceeds the heaviest aircraft ever flown. That scale follows from the passenger count and hydrogen's volume penalty, not from ambition.

37.1% fuel mass fraction. Just over a third of takeoff mass is fuel — the most useful single number for explaining why the airframe is sized as it is.

2,000 m/s cruise. At altitude, where the speed of sound is far lower than at sea level, this is approximately Mach 6.8 — consistent with the Mach 6+ claim. Converting at the sea-level figure gives the wrong Mach number. It is also what puts New York to Tokyo at 90 minutes: a 10,850 km great circle at 2,000 m/s is 90.4 minutes of cruise, with climb, acceleration and descent outside that figure.

HYDROGEN — THE REAL TRADE

Excellent energy per kilogram — roughly three times jet fuel. Poor energy per litre: even liquefied, about four times the volume for the same energy. That drives large cryogenic tankage and an airport supply chain that does not yet exist at scale.

04 · TRANSITION — AND THE TWO-PART ANSWER

The central engineering question.

"How does it transition?" is the first question any aerospace engineer asks about a VTOL concept. Most VTOL programs that have failed, failed at transition — the handover from vertical to horizontal flight, where airspeed is too low for control surfaces to bite but the aircraft is no longer hovering.

Why the problem is structural

Hover and cruise want opposite things. Hover wants large, slow-moving disc area to move a great deal of air gently, which is why helicopter rotors are enormous. Efficient high-speed cruise wants small frontal area and minimal drag. Any design that does both must carry two propulsion arrangements or use one that reconfigures — and every prior approach pays for that in a different currency.

APPROACH	HOW IT WORKS	THE PENALTY
Tiltrotor V-22, V-280	Rotors tilt from vertical to horizontal in flight	Mechanical complexity at the tilt mechanism; heavy; long and costly development
Vectored thrust Harrier, F-35B	Engine exhaust redirected downward for lift	Very high fuel burn in hover; severe payload and range penalty; ground erosion
Lift + cruise Most eVTOL designs	Separate rotors for lift, separate propulsion for cruise	Dead weight — lift rotors are carried, unused, through the entire cruise
Ducted / annular Closest published analogue	Lift fans enclosed within a duct or ring structure	Duct weight; complex internal flow; a long record of promising wind-tunnel results and disappointing flight programs

The architectural answer

Distributing thrust around a circumference gives differential control authority in every axis without relying on aerodynamic control surfaces — which is precisely what fails during transition. A tiltrotor solves this with heavy mechanical reconfiguration; a lift-plus-cruise design solves it by carrying dead weight. A ring solves it geometrically.

Eight dual-axis gimbaled nozzles	Distributed symmetrically around the lower toroidal rim
Sub-5 ms gimbal response	High-speed electro-hydraulic actuation — fast enough to matter in a regime where the flow field changes quickly
Active vortex stabilisation	Micro-actuator array along the upper rim, injecting vorticity forcing to hold the vortex structure stable through the handover

AND THE SECOND HALF, VOLUNTEERED RATHER THAN EXTRACTED

What the above establishes is that the design has a coherent control strategy. What it does not establish is that the strategy holds in a real flow field. The control approach is **designed, not demonstrated**, and validating it through the transition regime is the core of the TRL 3-to-4 program.

05 · PROGRAM MATURITY AND THE FUNDING GATE

TRL 3 today. This raise buys the gate to TRL 4.

Technology Readiness Levels are the shared language for program maturity across aerospace and defense. Every technical and government counterparty will locate the program on this ladder before anything else.

TRL 1	TRL 2	TRL 3	TRL 4	TRL 5	TRL 6	TRL 7	TRL 8	TRL 9
		LUTVE TODAY		SERIES A GATE · Q4 2027				

TRL 3 is analytical and experimental proof of concept. TRL 4 is component validation in a laboratory environment. Most programs that fail, fail between TRL 4 and TRL 6 — the interval in which laboratory results must survive a real environment.

Calibration against the category benchmark

Hermeus was founded in 2018, has raised approximately $500 million, built dedicated test infrastructure, flown three aircraft iterations, and reached Mach 1.21 uncrewed. Its own hypersonic goal remains ahead of it. Presenting a $25–50 million raise as funding a path to a flying hypersonic VTOL aircraft would be immediately and obviously wrong to anyone who has followed the sector. Presenting it as funding the TRL 3-to-4 gate is accurate, and it is what the company's own materials say it does.

What each phase must produce

PERIOD	TARGET	REQUIRED OUTPUT
Now – Q4 2027	TRL 3 → 4	Analytical validation of the propulsion concept; component-level laboratory testing; independent technical review; certification-basis conversation opened with the FAA; first defense research contract
2028 – 2030	TRL 4 → 6	Component validation in a relevant environment; subscale demonstrator; experimental airworthiness certificate; supply chain qualification begun
2030 – 2033	TRL 6 → 8	Full-scale prototype in an operational environment; production certificate path; a launch customer
2033 – 2036	Exit window	IPO or strategic sale, per company materials

Phase content beyond the Q4 2027 gate follows standard aerospace program structure; milestone definitions past TRL 4 are set by the technical program.

WHY GATING IS THE RIGHT STRUCTURE FOR THIS CHART

Capital releases only as independent reviewers clear each gate. That aligns investor exposure with verified technical progress and removes the well-documented pattern in which a program raises against a milestone, misses it, and spends the money anyway. Many investors in this category have been on the wrong side of that pattern, which is why the structure is worth explaining explicitly rather than leaving in the term sheet.

06 · PATH TO MARKET — SEQUENCED BY PROXIMITY TO REVENUE

One airframe. Four markets.

Structural modularity is what makes four markets reachable from one certification effort. The sequence below is set by how close each market sits to revenue, and each entry point is tied to a funded program phase rather than to a calendar date alone.

MARKET	STATED TAM	ENTRY	REVENUE MECHANISM
Military & tactical	$20–40B	Phase 3 2031+	DoD and NATO procurement; per-unit sales, MRO, and licensing; Future Vertical Lift alignment
Commercial hypersonic	$250B+	Phase 3–4	The largest market; per-unit sales, carrier licensing, and royalties
Humanitarian & medevac	$500M+/yr	Phase 3–4	UN and NATO logistics; ESG impact-bond co-investment
Extreme environment & space	$100B+	Phase 4 2032+	Joint venture with energy majors; polar, lunar, and asteroid long-range upside

Phase 1 (2027–28, $12M) functional prototype and patent filing · Phase 2 (2029–30, $13M) contracts negotiated, factory infrastructure, TRL 6 validated · Phase 3 (2031, $950M) 30 units/yr capacity, first commercial and defense deliveries · Phase 4 (2032–36, $600–700M/yr) 50–60 aircraft/yr. Market figures are total-addressable estimates, not LUTVE revenue.

What the sequencing is worth

Four revenue lines from one certification effort. The irreducible cost in a new aircraft program is proving the airframe. Modularity designed in — rather than bolted on later — amortizes that one proof across military, commercial, humanitarian, and extreme-environment demand. A conventional airframer earns the cost back from one customer class; this platform is structured to earn it back from four.

Military first because it tolerates immaturity. Defense buys progress toward capability; commercial aviation buys certified aircraft with published performance. Military airworthiness is a separate and faster path than civil certification under special conditions, so the first operational customer is reachable years earlier — and the organizations funding the run-up (DARPA, AFRL, DIU, NASA SBIR/STTR) do so with non-dilutive capital.

Each phase funded against the last. Capital scales with demonstrated progress rather than resting on a single binary bet on the full production build. Phase 3's $950M is committed only after TRL 5/6 validation and at least one signed letter of intent, which means the largest deployment in the plan is the one most protected by evidence.

> HOW TO PRESENT THE MARKET FIGURES
>
> The four totals are total-addressable estimates, and scope definitions for them are not specified in the source. Published forecasts in adjacent categories diverge by orders of magnitude — four eVTOL forecasts for the same year span roughly 744 times, entirely on scope. State the figure, the source, and what it includes.

07 · THE OFFERING AND USE OF PROCEEDS

$25–50 million, released only as independent reviewers clear each gate.

TERM	AS STRUCTURED
Initial raise	$25–50 million, milestone-gated
Gate	TRL 4, targeted Q4 2027 — the Series A gate
Release mechanism	Capital unlocks as independent reviewers clear each TRL gate
Sponsor funding	Program self-funded through ALTAREON's cash-generating energy platform
Stated base case	$88.4B in ten-year delivery value, *conditional on the technology clearing its gates*
Exit	IPO or strategic sale, targeted 2033–2036

What the first tranche must produce

- Analytical validation of the propulsion concept
- Component-level laboratory testing
- Independent technical review at the gate
- Certification-basis conversation opened with the FAA
- First defense research contract

How share-of-market questions are answered

Share of a $250 billion commercial hypersonic market is not a meaningful question for a company at TRL 3, and saying so is a strength rather than an evasion. What is meaningful is the addressable value of defense research and prototyping contracts over the next three to five years, and a target win rate against a named list of programs — a number that can be built bottom-up, defended line by line, and held to. Where a capture assumption is used for internal planning, it is applied to the beachhead band rather than to the total addressable market, and marked as a planning assumption wherever it appears.

WHAT THE STRUCTURE REMOVES

Dependence on venture funding cycles — the failure mode that historically kills deep-technology aerospace programs more often than engineering failure does.

WHAT IT DOES NOT REMOVE

Exposure itself. The program's funding capacity is now tied to energy cash flow. That is a better exposure than venture sentiment, but it is not the absence of exposure, and it is modelled as a downside scenario rather than described away.

08 · PRINCIPAL RISKS

Raised here before a counterparty raises them.

In this category, a team that names its own risks reads as competent; one that does not reads as naive or evasive. The following are the risks the program considers material, with the mitigation actually in place rather than the mitigation that would be convenient.

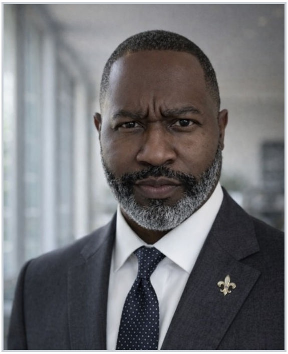
RISK	DESCRIPTION	MITIGATION
Technical — propulsion	Compressed Vortex Propulsion is unproven at TRL 3. No air-breathing engine covers takeoff through Mach 6 without a combined-cycle or novel architecture.	Milestone gating; independent technical review at each gate; capital released only on clearance
Technical — transition	VTOL-to-forward-flight transition is where most VTOL programs have historically failed.	Priority focus of the TRL 3–4 analytical work
Certification	No existing certification basis fits this configuration. Special conditions development is a multi-year program in itself.	Defense-first sequencing; open the FAA conversation early rather than late
Capital	The category benchmark suggests hundreds of millions of dollars to reach a flying high-speed demonstrator.	Energy platform cash flow; staged raises tied to gates; defense contract revenue
Schedule	Aerospace programs routinely overrun. The 2033–36 exit window assumes gates clear roughly on time.	Publish milestone dates and report against them; treat slippage as information rather than embarrassment
Supply chain	Qualified aerospace suppliers are capacity-constrained, and qualifying new ones takes years.	Design around existing certified subsystems wherever possible
Regulatory / ITAR	Defense configurations restrict who may receive technical data, including investors and employees.	Counsel review of all external materials; documented information-handling procedure
Talent	Hypersonics and VTOL expertise is scarce and concentrated in a handful of organizations.	Partnerships and advisory relationships; realistic hiring timelines in the plan
Correlation	The energy platform funds the aerospace program, so a sustained energy downturn would affect both simultaneously.	Funding capacity treated as scenario-dependent; downside case modelled explicitly

THE RISK MOST EASILY MISSED

The final row deserves particular attention, because it is the one that disappears when the self-funding structure is presented as a strength. The structure removes dependence on venture funding cycles and replaces it with dependence on energy cash flow. That is a better exposure — energy cash flow is more predictable than venture sentiment — but it is not the absence of exposure, and describing it as such invites a correction that is easily avoided by getting there first.

09 · LEADERSHIP

Who is building this.



Nathan F. Lee

CHIEF EXECUTIVE OFFICER · ALTAREON GROUP

Nathan F. Lee began his career in the United States Navy, working on top secret naval intelligence and counter-intelligence systems.

In the twenty-five years since, he has worked at the intersection of engineering, energy, and technology — advising corporations, engineering organizations, and institutional clients on technology transformation, capital programs, operational performance, and energy infrastructure.

That work spans digital transformation, engineering and technology consulting, capital program development, production optimization, and the development of AI technologies applied to industrial and engineering problems — a range covering technical development, corporate strategy, operations, investment, and executive leadership.

What connects the sequence is a single motivation: bringing innovation and creativity to bear on the problems that matter most, and building solutions to the world's most complex challenges.

What is being asked for

- A first-tranche commitment against the Q4 2027 TRL 4 gate
- Introductions into DIU, AFRL, and SBIR program offices
- Technical advisors with hypersonics or VTOL program experience

WHY THE STRUCTURE MATTERS AS MUCH AS THE TEAM

Deep-technology aerospace programs are historically killed by funding-cycle timing rather than by engineering failure. A cash-generating parent removes that specific failure mode, and the milestone gates keep every subsequent tranche tied to independently verified progress.

COUNSEL AND INFORMATION HANDLING

The program retains dual JD/MBA counsel covering ITAR and intellectual property. Export-control and patent questions are routed there rather than resolved by judgment call, and all external materials are cleared before release.

SOURCES AND HANDLING

Where the third-party figures come from.

Boeing Commercial Market Outlook 2026 (July 2026) — approximately 44,000 new airplanes needed by 2045; global fleet growing approximately 80% to more than 50,000; single-aisle fleet above 36,000; widebody above 8,000; traffic doubling.

Oliver Wyman, Global Fleet & MRO Market Forecast 2026–2036 — MRO demand $136B in 2025, up 8% from $126B in 2024, approaching $193B by end of decade; average fleet age 13.4 years in 2025; backlog above 17,000 jets; Airbus 49% and Boeing 38% of order book.

IATA / Oliver Wyman — approximately 716,000 maintenance technicians needed by 2042; annual shortfall of 12,000–18,000.

Hermeus company releases, Aviation Week, AeroMorning, Aerotime — $350M Series C April 2026 led by Khosla Ventures; approximately $500M total raised at approximately $1B valuation; FAA experimental certificate March 2026; Quarterhorse Mk 2.1 Mach 1.21 flight May 2026; Chimera TBCC engine; DIU contract.

Mordor Intelligence — hypersonic weapons market $8.24B (2025) to $14.78B (2030); propulsion approximately 30% of subsystem spend. **The Business Research Company / Research and Markets** — hypersonic missiles market $159.02B (2026) to $217.66B (2030); cited only to illustrate scope divergence between published forecasts.

LUTVE / ALTAREON investor materials and engineering reference sheet AL-CVP-004 Rev 2.4 — all aircraft specifications, segment sizes, TRL position, raise size, delivery-value base case, and exit window.

> **HANDLING**
>
> Internal use only. Third-party forecasts are as published and not independently verified. All LUTVE specifications and market figures are as stated in company materials and are not independently validated here. Forward-looking statements regarding technology performance are contingent on technical gates that have not been cleared. Nothing in this document is an offer to sell or a solicitation of an offer to buy securities, and no part of it should be reused in investor materials without review by counsel — including ITAR review before any external distribution. AL-CVP-004 is marked confidential and patent pending; the source sheet is not a document to forward.