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SpaceX | North America

Blades & Vanes: SpaceX Tackles Time to Power

SpaceX has identified one of the biggest supply chain bottlenecks in terrestrial AI and is set to apply its brand of extreme vertical integration to alleviate the problem. We take a closer look at SpaceX's foundry in Bastrop, Texas and what it means for future SpaceAI datacenter scale.

If a Datacenter is built in the woods and there's no power to run it... did it compute? SpaceX's [job postings page](#) offers some valuable clues to the company's strategic direction. In the world of converting energy into intelligence at Giga-scale, unlocking the bottlenecks of power is a major factor. There are currently 4 postings on SpaceX's career page for positions related to the Blades and Vanes Foundry in Bastrop, Texas (Automation Engineer, Sr. Automation Engineer, Sr. Operations Engineer, Sr. Materials Engineer).

Intelligence-per-watt-per-dollar-per-second: $((i/w)/\$)/t$. This quotient measures the energy density, capital density and temporal density of intelligence. Imagine you had 3 companies with identical intelligence-per-watt-per-dollar. All else equal, the one that could deliver their $((i/w)/\$)$ in the least amount of time would create the most value. Can SpaceX achieve superior time to convert 'e to i' vs. its peers with the least amount of capital deployed? Drivers include vertical integration amplified by pervasive physical and digital networks.

In the race for 'AI Supremacy' those who can create efficient intelligence for the lowest price at the right place at the right time - persistently, redundantly, reliably (and at scale) will be advantaged.

SpaceX has a history of attacking whatever constrains scale most. As the company builds its moat in compute time and cost-to-power, it appears to have found its next target: turbine blades and vanes. We can identify 3-4 GW of likely accessible gas turbine power by YE27 through a mix of purchase agreements and Musk's personal acquisition of mobile-power provider APR Energy, with total reported commitments closer to 8 GW under any timeline, and likely more that has not been publicly disclosed. Given the scale of its terrestrial compute ambitions, we would expect that number to keep climbing (we see terrestrial compute peaking at ~15 GW in 2031, with upside if orbital compute is delayed). However, the practical constraint on adding more sits in the hot-section blades and vanes inside each machine, a market controlled by a handful of casters already backlogged for years. Job postings point to a greenfield foundry in Bastrop, TX aimed at solving that for both datacenter turbines and Raptor turbopumps, potentially opening the door to partnerships with existing turbine manufacturers for SpaceX's own longer-term industrial gas turbine supply. Although, ramping production may take multiple years given the process complexity, equipment lead times, and workforce build-out

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SpaceX (SPCX.O, SPCX US)

Space Technology | United States of America

Stock Rating	Overweight
Industry View	Attractive
Price target	\$300.00
Shr price, close (Aug 13, 2026)	\$141.29
52-Week Range	\$225.64-104.83

Fiscal Year Ending	12/25	12/26e	12/27e	12/28e
EPS (\$) **	(1.69)	0.54	2.45	6.36
Prior EPS (\$) **	-	-	-	-
P/E	NM	261.4	57.7	22.2
EPS (\$) §	-	(0.05)	1.73	4.97
Div yld (%)	-	0.0	0.0	0.0

Unless otherwise noted, all metrics are based on Morgan Stanley ModelWare framework

** = Based on consensus methodology

§ = Consensus data is provided by Refinitiv Estimates

e = Morgan Stanley Research estimates

QUARTERLY EPS (\$)

Quarter	2025	2026e Prior	2026e Current	2027e Prior	2027e Current
Q1	(0.18)	-	(0.84)a	-	0.59
Q2	(0.34)	-	(0.09)a	-	0.56
Q3	(0.36)	-	0.21	-	0.62
Q4	(0.80)	-	0.55	-	0.67

e = Morgan Stanley Research estimates, a = Actual Company reported data

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involved in single crystal casting.

- **Why should investors care?**

- After the exclusivity agreement with NVIDIA, we would think chip supply for SpaceX is mostly secured, at least up to the 10 GW given by Elon Musk on the 2Q call.
- However, both lack of clarity in access to off-grid power and aggressive time-to-deploy is the reason we model just 5 GW by YE27 vs. the 10 GW suggested by Musk. Our SpaceXAI estimates beyond 2027 will depend on ability to tackle this critical bottleneck.
- Securing large-scale turbine access is incredibly important for SpaceX's chances to scale compute to compete more directly with hyperscaler and large AI lab peers. Industrial gas turbines for terrestrial compute + turbopumps for Raptor Engines for orbital compute (>50% of launches beginning in 2029).
- Each GW of SpaceXAI compute represents an opportunity of upwards of \$50bn in annual revenue.
- SpaceXAI's moat = $f(\text{Intelligence/Watt/Dollar/Second})$. Vertically integrating a bottleneck reduces both cost and time-to-deploy which leads to a faster flywheel that improves intelligence per unit of energy.

What to do with the stock? Backing out the value of Space + Connectivity (\$127/share) from the current share price (\$140) implies just \$13 per share for Consumer + Enterprise AI, roughly 1x 2028 EV/Sales and below even neocloud peers. **We expect investors will learn much more on SpaceX's path to securing the power needed to make Elon Musk's 10GW terrestrial compute goal more plausible (MS is at 5GW by YE27). In our view, the lock-up expiry overhang offers an attractive entry-point for a generational compounder converting energy into intelligence at scale. Overweight, PT \$300, bull case \$600.**

Key color from CEO Elon Musk from his February interview with Dwarkesh Patel and John Collison on the Cheeky Pint podcast:

- Dwarkesh Patel: "What is the reason to think those challenges [of orbital datacenters] which have never had to be addressed before will end up being easier than just building more turbines on Earth? There are companies that build turbines on Earth. They can make more turbines, right?"
- Elon Musk: "Again, try doing it and then you'll see. The turbines are sold out through 2030."
- John Collison: "Have you guys considered making your own?"
- Elon Musk: **"In order to bring enough power online, I think SpaceX and Tesla will probably have to make the turbine blades, the vanes and blades, internally."**
- John Collison: "But just the blades or the turbines?"
- Elon Musk: **"The limiting factor... you can get everything except the blades. [...] The limiting factor is the vanes and blades. There are only three casting companies in the world that make these, and they're massively backlogged."**

Why would SpaceX want to in-source key gas turbine supply? There is precedent

for Elon Musk's willingness to vertically integrate to alleviate supply bottlenecks driven by a number of considerations. To be clear, we do not think this is principally about whether megawatts are available. Beyond 2030, there is very possibly adequate turbine capacity, and smaller equipment (aeroderivatives, reciprocating engines, fuel cells) is available even earlier. The argument for in-sourcing is also optionality, flexibility, and cost, i.e. the ability to add power on SpaceX's own schedule rather than an OEM's slot calendar, to co-design the airfoil around the machine and the site, and to capture economics in a value chain where pricing has tripled and OEMs are now recognizing mid-30% EBITDA margins on new orders.

- **Optionality over schedule - "control our long term destiny"**. Turbine order books now stretch to the end of the decade. Even where megawatts can be procured, they arrive on the supplier's timeline, in the supplier's configuration.
- **Improvement in end-product design and function - "we can make a better product"**. First-principles process control (the language in SpaceX's own job posts) is aimed at improving yield, performance, and cost.
- **Design freedom - "co-design the blade with the machine"**. Alloy, cooling scheme, and turbine architecture get developed as one problem rather than sequenced across a supplier interface.
- **Internal dual-use scale - "one foundry, two customers"**. Raptor turbopump castings and datacenter turbine airfoils draw on the same alloys, furnaces, and trained workforce, letting a single foundry spread fixed cost across the space and AI businesses.

SpaceX needs a lot of blades and vanes. Both the SpaceX space and AI businesses consume the same difficult-to-produce hot section castings:

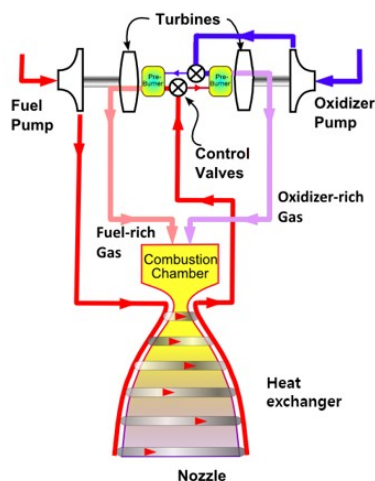
1. **Natural gas turbines for terrestrial AI datacenters:** Per its S-1, SpaceX has committed roughly \$2.8bn to AI-infrastructure turbines: an \$805mn purchase agreement through 2029 (March 2026) plus a ~\$2.0bn mobile gas turbine "Turbine Acquisition" to power its data centers. That second deal potentially corresponds to Musk's acquisition of mobile-power specialist APR Energy, which an [FTC notice dated May 14, 2026](#) named him personally as buyer of, bringing a mobile fleet of over [1.1 GW](#). Every one of these turbines is gated by the same scarce vanes and blades the Bastrop foundry targets.
2. **Turbopumps for Starship Raptor engines:** SpaceX's Raptor is a full-flow staged-combustion engine in which an oxygen-rich turbine drives the oxygen turbopump and a fuel-rich turbine drives the methane turbopump, with turbomachinery already cast from an [Inconel-like custom "SX500" superalloy](#), the same class of nickel-superalloy, single-crystal/directionally-solidified casting the Bastrop foundry is chartered to produce. *We note that it is unclear whether SpaceX currently casts the Raptor turbopump blades or if there are any other external suppliers.* Each V3 Starship requires 39 Raptor engines (33 for booster, 6 for ship)- with SpaceX likely to eventually require [hundreds or even thousands](#) a year.

Exhibit 1: Cross Section of a Mobile Natural Gas Turbine, Showing Turbine Blades



Source: Solar Turbines (subsidiary of Caterpillar)

Exhibit 2: Full Flow Staged Combustion Engine Diagram (Similar Engine Design as Starship's Raptor) Showing Turbines Used to Pump LOX and Liquid Methane to the Combustion Chamber.



Source: Wikipedia (exact author unknown)

Little has been formally announced, but we can piece together details from job postings. Most details on the Bastrop, TX "Blades and Vanes Foundry" are from roles posted back in April (see: [materials](#), [automation](#), and [operations engineers](#)) that describe a greenfield, fully in-house vertically integrated casting operation (the operations role seeks the "extreme owner of the construction, buildout, and operational ramp-up" of a new foundry). The foundry would produce the equiaxed, directionally solidified, and single crystal nickel superalloy castings that for both Raptor engines and the industrial gas turbines for its datacenters.

What does the blades and vanes market look like today? The market is remarkably concentrated. A handful of independent merchant casters dominate the hot-section blade and vane supply: Precision Castparts (Private), Consolidated Precision Products (Private), Howmet Aerospace (HWM) and Doncasters (DPC), the latter two covered by Kristine Liwag. Others participate around the edges while many of the major engine OEMs also cast single crystal airfoils in-house for their own turbines (although a large % still sourced from casters). But the practical reality is a handful of specialists, each backlogged for years, sitting on a highly specialized process that has become the true chokepoint on scaling gas power. EBITDA margins for blades and vanes can be ~15-20%+ (based on DPC which is the cleanest public pure play today).

Single crystal casting is widely described as the most technologically demanding casting process in the world. It may be 2-3+ years before the first volume production for SpaceX.

- The process for creating turbine blades ([a modified Bridgman-Stockbarger process inside a vacuum furnace](#)) requires simultaneous control of dozens of variables (casting temperature, crystal seeding angles, metal flow rates,

viscosity, orifice sizes, differential cooling, etc.) across a 40-50 step manufacturing sequence.

- The alloys involved must survive temperatures exceeding 3,000 degrees Fahrenheit or nearly 800 degrees above their own melting point while spinning at 12,000-15,000 RPM under pressure ratios of 40:1. The single crystal structure (a blade grown from a single grain with no internal boundaries) is the only known solution to surviving these conditions at scale.
- Making a single blade in a lab can be relatively straightforward, but making thousands per week at acceptable yields is a precise art that generally requiring decades of accumulated process know-how that cannot be easily recreated, large-scale and highly-specialized capital equipment with lead times of up to three years, and a large trained workforce.
- Vertical integration is a major prerequisite: the established players control their own superalloy supply, shell systems, coatings, and furnace designs in-house.
- On top of the process complexity, for aerospace, every part must clear stringent OEM qualification and NADCAP certification, approvals that themselves take years to obtain and lock in suppliers at the part-number level, making switching operationally dangerous for engine makers.
- The result is that from a greenfield commitment to first qualified production, the minimum timeline is two years, and full run-rate output typically takes three or more, which would potentially mean any new entrant, including SpaceX, faces a multi-year gap between breaking ground and delivering certified parts at volume.
- Sources: *Howmet 2026 Investor Day and 2Q26 Earnings Call, Doncasters S-1*

Exhibit 3: Current Competitive Landscape for Gas Turbine Blades & Vanes



Source: Morgan Stanley Research

Where is SpaceX sourcing turbines currently, and how much is under contract?

Based on various reports, SpaceX may have sourced from a number of different suppliers potentially including, but not publicly confirmed to be, [Doosan Enerbility](#) (covered by Heewon Choi), Caterpillar Solar Turbines via [Solaris Energy Infrastructure](#) (SEI, covered by David Arcaro), [FTAI](#) (FTAI, covered by Kristine Liwag), [APR Energy](#) - recently personally acquired by Elon Musk - and potentially others. While we have no knowledge of any specific transaction, piecing together reports, we can potentially identify 3-4 GW of power that SpaceX could reasonably access by YE27, possibly with more undisclosed. Adding up all turbine agreements reported to be associated with SpaceX under any timeline would come closer to 8 GW. Given the

scale of SpaceX's terrestrial compute ambition and the potential multi-year lead time to produce turbine blades & vanes at scale, we would still expect the number of turbines under contract by SpaceX to continue rise for the foreseeable future.

Note that SpaceX has not commented directly on any of the aforementioned reports.

Could SpaceX partner with turbine providers to supply blades and vanes? Yes - for internal SpaceX supply. While we can't pinpoint specific potential partners, hot-section castings are the chokepoint for the turbine OEMs themselves, and incremental merchant capacity is additive in a market where incumbents are backlogged for years and AI-driven demand has outrun casting capacity additions. However, we would not expect SpaceX to be a material supplier of blades & vanes for supply outside of SpaceX use.

Exhibit 4: Reported (Not Confirmed) Turbine Supply for SpaceX

Potential Supplier	MW	Type	Confirmed?	Details	Timing	Source
 DOOSAN	4,560	Permanent Turbines	FTC says Elon Musk confirmed purchase of initial 5 on X. Additional 7 reported by local media, but not confirmed.	Reported 12x 380 MW permanent turbines	First 2 units due by end-2026; remainder thereafter	SemiAnalysis (Jan 2026), Yonhap (March 2026)
 APR ENERGY	1,100	Mobile Gas Turbines	Acquisition by Elon Musk (personally) confirmed by public FTC filings. SpaceX connection inferred, but not confirmed by company or Elon Musk.	Fleet of 1,100 of MGT's per APR website. Presumably relates to \$2bn "Turbine Acquisition" disclosed in 8-K	FTC early termination notice dated May 14, 2026; deal closed	FTC
 SOLARIS	1,140	Mobile Gas Turbines	Widely reported. No confirmed, but public images show Solaris turbines at Colossus	Reported 900 MW JV w/ xH + 240 MW for Colossus 1	Reported 240 MW installed for Colossus 1; new 900 MW phased 2026-2029	Bloomberg, Company, SemiAnalysis
 FTAI AVIATION	> 1,000	Mod-1 CFM56 Aerodrive Units	No. FTAI names only "a leading international cloud service provider" and has not disclosed the customer. SpaceX link is inferred, not stated.	\$1.465bn Order with unidentified "International Cloud Service Provider" (Assume \$1-1.5bn)	Order signed Jul 22, 2026; deliveries in batches through Nov 2027	Company, FundaAI

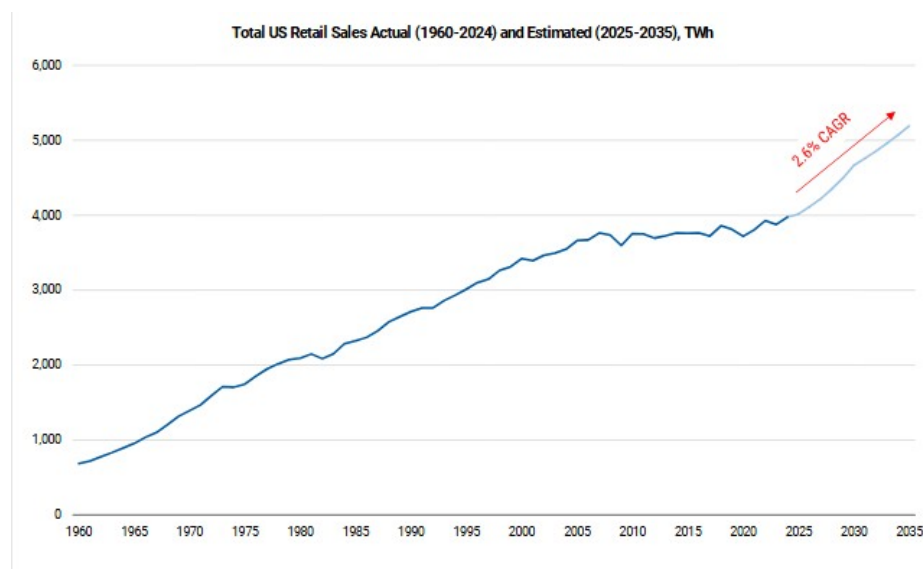
Source: FTC, Bloomberg, Company Filings, SemiAnalysis, Morgan Stanley Research

Please see here for our SpaceX Initiation: [SpaceX: AI's Final Frontier; Initiate at Overweight, PT \\$300 \(7 Jul 2026\)](#)

Industrial Gas Turbine Market Overview

Secular Gas Turbine Trends from AI. The gas turbine market has inflected to support growing power demand, largely from powering AI. In the US, the largest market for turbines, we are forecasting power demand will grow ~2.6% annually through 2035 (vs. just ~0.5% annually the past two decades) to support this growth in data centers, reshoring, and electrification. Globally, data center power demand is set to 4x between 2023 and 2028 from ~55 GW to 210 GW. That demand flows directly through to the hot-section supply chain, as every frame shipped by the major power generation OEMs (GEV, ENR, Doosan, and Ansaldo) is gated by vanes and blades sourced from a small set of merchant casters and captive in-house lines. Turbine pricing has increased by as much as 3x to \$3,000/kW and OEMs are set to recognize mid-30% EBITDA margin on newly placed OE turbine orders, compared to 0-5% historically. To that end, turbine backlogs/lead times have also increased and now extend out ~3-5 years with next available delivery slots for most manufacturers being 2029 or 2030. Put together, the urgency of power demand has forced OEMs and end buyers alike to lock in upstream casting supply years in advance, the same constraint Musk described when he said turbines are sold out through 2030.

Exhibit 5: Meaningful inflection ahead in US power demand

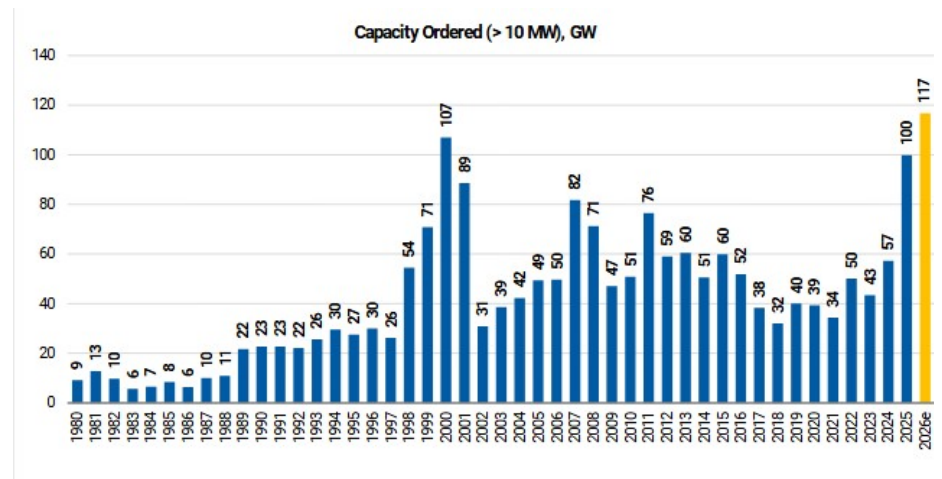


Source: U.S. Energy Information Administration (EIA), Morgan Stanley Research estimates

Buyers are paying up, and paying early. Driven by a need for firm baseload power for data centers, of which our thematic team estimates 150 GW of new US data center demand through 2030, customers placed 100 GW of gas turbine orders in 2025, the second largest year of orders ever. Annualizing 1Q bookings, in 2026 the industry will recognize the all-time largest number of orders (117 GW), across all frame sizes. We believe the cycle has more room to run as utilities and developers have shown an insensitivity to price increases and an interest in signing multi-year 2030 frame agreements to lock in slots to support its build out of generation. To that end, GE Vernova (GEV) has noted that they have yet to reach a price ceiling for turbines, with it now charging customers ~\$3,000/kW for heavy duty CCGTs (vs ~\$1,000/kW for plants

commissioned in the 1H of the 2020s) and ~25% down payments for slot reservations. These data points underpin the durability of the market and, in our view, reinforce the growth outlook for the entire IGT value chain, including the airfoil casters sitting at its narrowest point.

Exhibit 6: Gas turbine order - 2025 full year order intake landed at 100GW (single cycle), which is the second highest order level in history (since 2000). We expect a record year in order intake in 2026, and 1Q26 is annualizing at 117 GW



Source: McCoy, Morgan Stanley Research estimates

Supply is responding, but not evenly. In parallel with the rising demand, supply is also increasing materially from both legacy suppliers and new entrants to help address a potential power shortfall and capture share of the market. From a baseline of ~50-60 GW in 2025, the turbine industry will nearly double to ~97 GW of nameplate capacity by 2030, before considering ~35 GW of alternative engine and fuel cell supply. Casters are supporting that expansion through new long-term supply agreements with key IGT customers, though adding qualified airfoil capacity is slower and harder than adding frame assembly capacity. While oversupply remains a concern, we expect legacy suppliers with heavy-duty frame options will be the most derisked solution longer term given they have the lowest levelized cost of electricity (LCOE), a major consideration for cost conscious utilities. Furthermore, in the near term, online hyperscalers have become creative and are now purchasing/deploying smaller, less economic turbines that historically did not provide 24/7 baseload power (i.e., aeroderivative and industrial gas turbines), the same class of asset behind SpaceX's mobile turbine acquisitions. These smaller frames consume the same superalloy castings as heavy duty units, so both near- and long-term demand trends converge on the same bottleneck.

Source: Company Filings; Morgan Stanley Research estimates

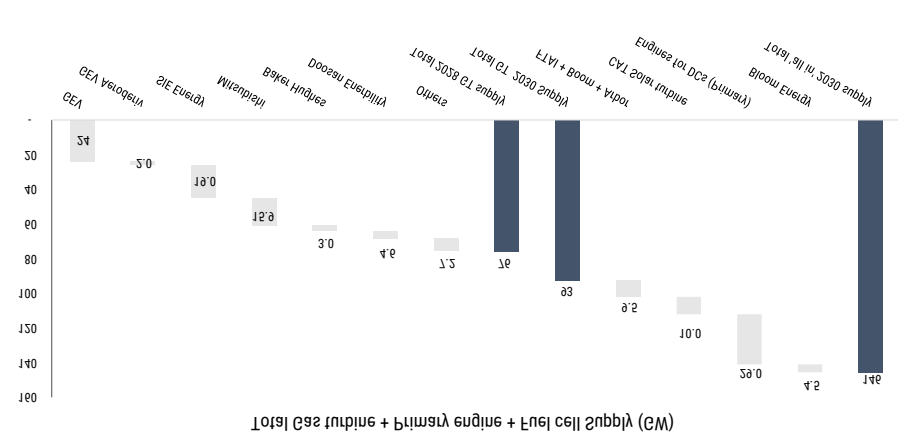


Exhibit 3: Annual Global Base-load Gas Manufacturing Capacity

Valuation Methodology and Risks

SpaceX (SPCX.O)

Sum-of-the-Parts by Segment: Space, Connectivity, AI (Divided into X & Grok and Enterprise AI)

- \$300 Price Target = sum of Space (\$8), Connectivity (\$118), X & Grok (\$8), Enterprise AI (\$165)

2040 ending forecast period

6/30/2027 valuation date

11.1% WACC; 11.9% Cost of Equity.

50% Enterprise AI valuation discount for execution risk

TGR of: 4.0% Space, 4.5% connectivity, 3.0% X & Grok, 5.0% Enterprise AI

Equates to 0.46 EV/EBIT/Growth

Risks to Upside

- Faster Starship reuse progress
- Faster Starlink capacity growth
- Stronger DTC / enterprise adoption
- More neocloud wins
- Cursor ARR acceleration
- Lower AI infrastructure time to power and cost

Risks to Downside

- Slower Starship reuse cadence
- Slower Starlink subscriber growth
- Weaker enterprise AI monetization
- Higher capex / cost per watt of compute
- Longer time-to-power
- Greater funding needs / dilution
- Regulatory delays

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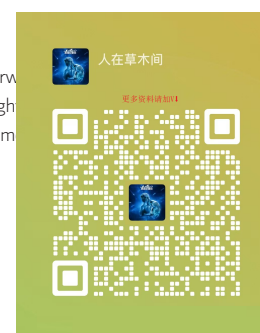
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(as of July 31, 2026)

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Coverage Universe			Investment Banking Clients (IBC)			Other Material Investment Services Clients (MISC)	
Stock Rating Category	Count	% of Total	Count	% of Total IBC	% of Rating Category	Count	% of Total Other MISC
Overweight/Buy	1529	42%	442	47%	29%	750	43%
Equal-weight/Hold	1582	43%	396	42%	25%	773	44%
Not-Rated/Hold	3	0%	1	0%	33%	1	0%
Underweight/Sell	560	15%	97	10%	17%	217	12%
Total	3,674		936			1741	

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Analyst Stock Ratings

Overweight (O). The stock's total return is expected to exceed the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Equal-weight (E). The stock's total return is expected to be in line with the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Not-Rated (NR). Currently the analyst does not have adequate conviction about the stock's total return relative to the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Underweight (U). The stock's total return is expected to be below the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Unless otherwise specified, the time frame for price targets included in Morgan Stanley Research is 12 to 18 months.

Analyst Industry Views

Attractive (A): The analyst expects the performance of his or her industry coverage universe over the next 12-18 months to be attractive vs. the relevant broad market benchmark, as indicated below.

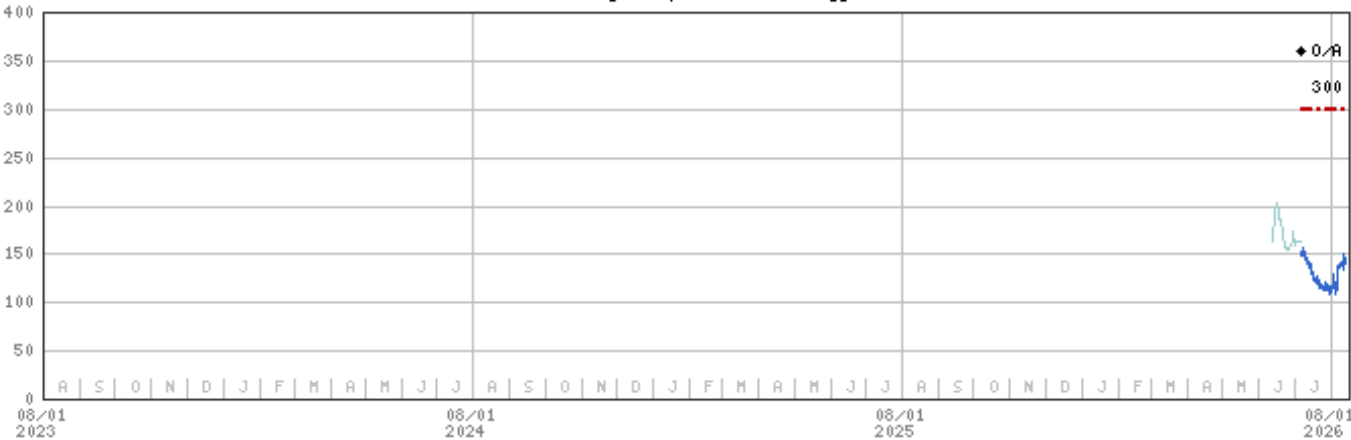
In-Line (I): The analyst expects the performance of his or her industry coverage universe over the next 12-18 months to be in line with the relevant broad market benchmark, as indicated below.

Cautious (C): The analyst views the performance of his or her industry coverage universe over the next 12-18 months with caution vs. the relevant broad market benchmark, as indicated below.

Benchmarks for each region are as follows: North America - S&P 500; Latin America - relevant MSCI country index or MSCI Latin America Index; Europe - MSCI Europe; Japan - TOPIX; Asia - relevant MSCI country index or MSCI sub-regional index or MSCI AC Asia Pacific ex Japan Index.

Stock Price, Price Target and Rating History (See Rating Definitions)

SpaceX (SPCX.O) - As of 08/16/26 GMT in USD
Industry : Space Technology



Stock Rating History: 7/7/26 : O/A

Price Target History: 7/7/26 : 300

Source: Morgan Stanley Research Date Format : MM/DD/YY Price Target --- No Price Target Assigned (NA)
Stock Price (Not Covered by Current Analyst) — Stock Price (Covered by Current Analyst) —
Stock and Industry Ratings (abbreviations below) appear as ♦ Stock Rating/Industry View
Stock Ratings: Overweight (O) Equal-weight (E) Underweight (U) Not-Rated (NR) No Rating Available (NA)
Industry View: Attractive (A) In-line (I) Cautious (C) No Rating (NR)
Effective January 13, 2014, the stocks covered by Morgan Stanley Asia Pacific will be rated relative to the analyst's industry (or industry team's) coverage.
Effective January 13, 2014, the industry view benchmarks for Morgan Stanley Asia Pacific are as follows: relevant MSCI country index or MSCI sub-regional index or MSCI AC Asia Pacific ex Japan Index.

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INDUSTRY COVERAGE: Space Technology

COMPANY (TICKER)	RATING (AS OF)	PRICE* (08/14/2026)
Adam Jonas, CFA		
SpaceX (SPCX.O)	O (07/07/2026)	\$140.00
Justin M Lang		

Gogo Inc (GOGO.O)	E (08/14/2025)	\$2.83
Iridium Communications Inc (IRDM.O)	E (01/16/2026)	\$50.20
MDA Space Ltd (MDA.TO)	O (01/16/2026)	C\$48.86
Viasat Inc (VSAT.O)	E (12/15/2017)	\$82.87
Kristine T Liwag		
Firefly Aerospace Inc (FLY.O)	E (09/02/2025)	\$26.67
HawkEye 360 Inc (HAWK.N)	O (06/01/2026)	\$22.78
Planet Labs PBC (PL.N)	E (01/22/2023)	\$24.69
Rocket Lab USA Inc (RKL.B.O)	O (01/16/2026)	\$80.25
Virgin Galactic Holdings Inc (SPCE.N)	U (11/22/2023)	\$3.32
Voyager Technologies Inc (VOYG.N)	U (07/15/2026)	\$42.98

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