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An Introduction to the Spaceport of the Future concept



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Image
Credit:
Blue
Origin

“Semper Supra”



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Image Credit:
SpaceX



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This is what full reusability looks like.

Fully reusable stage 2

Actively (regeneratively) cooled metallic re-entry heat shield with integrated modular LH2/LOX rocket engine is robust, resilient to damage, and operates with passive failure modes. Designed for minimal refurbishment between flights, unlocking rapid turnaround: Refit, Refuel, Refly.

- Direct access to GTO, TLI, and other high-energy orbits
- Return from orbit to launch site – precision, powered vertical landing
- Downmass capability

Fully reusable stage 1

- 7x LNG/LOX engines
- Return to launch site (RTLS) or downrange landing

Image Credit:
Stoke Space



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Image Credit:
SpinLaunch



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Spaceport of the Future in the news



Cape Congestion: World's busiest spaceport stretched to its limits
Jeff Foust March 24, 2023

The next space race starts at our spaceports
Bryce Kennedy and Greg Autry May 1, 2023

We must increase the productivity of our existing launch sites in a non-linear fashion to keep up.

Space Force identifying priorities for modernizing spaceports
Cape Canaveral launch chief Brig. Gen. Kristin Panzenhagen says discussions are moving forward on "what a spaceport of the future should look like"
Sandra Erwin October 23, 2023

Op-ed | Space Force launch strategy a step in the right direction
The Space Force's embrace of competition within the commercial launch market has been a slow and in many ways painful process.
Joshua C. Huminski November 1, 2023

References:
SpaceneWS

"Semper Supra"



SOTF Origins



Central Questions: What do we have? What do we need?

Image Credit:
ULA

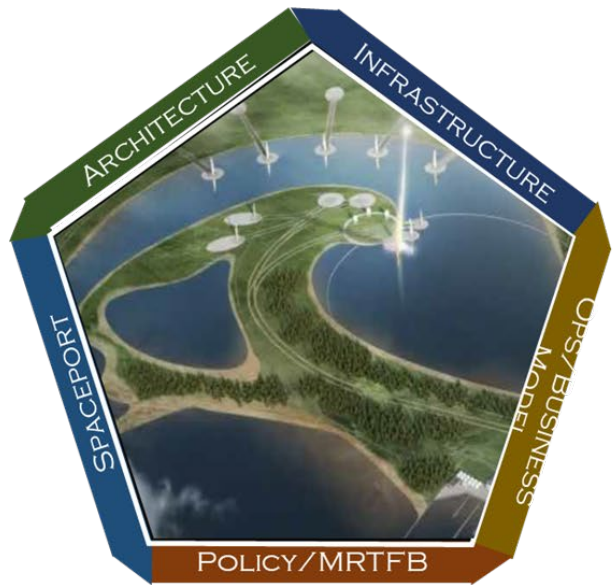


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Spaceport of the Future

Lines of Effort

Architecture	<ul style="list-style-type: none"> – Implement comm upgrades – Plug-and-play range applications – Transition to development, security and operations delivery
Infrastructure	<ul style="list-style-type: none"> – Invest across the Fiscal Year Defense Plan – Fix satellite vehicle processing bottleneck
Operations / Business Model	<ul style="list-style-type: none"> – Create spaceport business model – Build consistent Eastern & Western Range processes – Streamline governance/bureaucracy
Policy / Major Range & Test Facility Base	<ul style="list-style-type: none"> – Transition to Autonomous Flight Safety System – Champion legislative proposal – Enact policy changes
Spaceports	<ul style="list-style-type: none"> – Champion and support National Spaceport Interagency Working Group and Spaceport Directors Council



Globally Competitive, Responsive Spaceports with Unlimited Capacity on Demand

“Semper Supra”



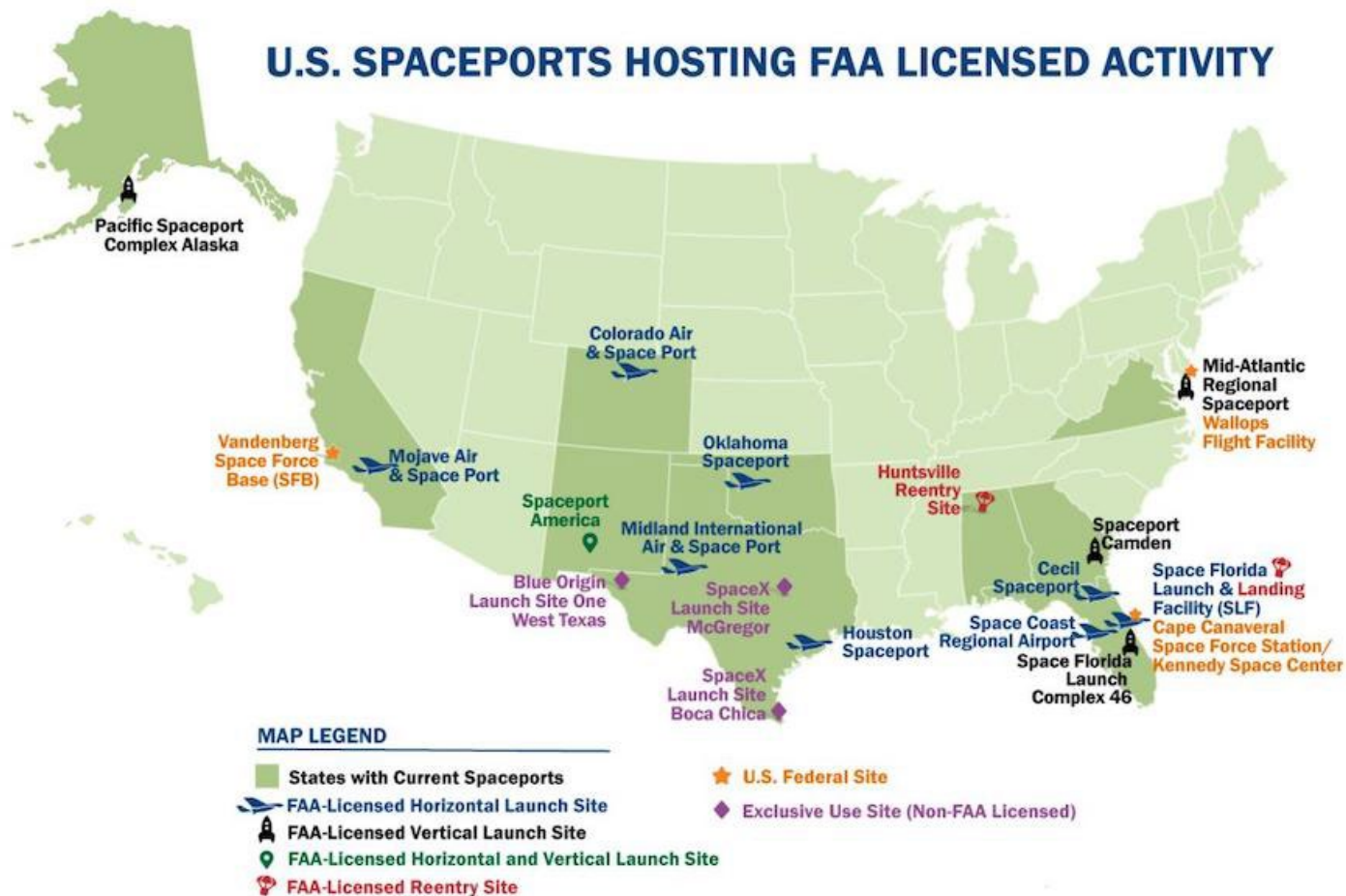
USSF Spaceport Vision



	Legacy Launch Base (Past)	Transition to SOTF (Present)	Space Access Transportation Hub (Future)
Spaceport Operations	<ul style="list-style-type: none"> USSF owns spaceport land and infrastructure USSF operates ranges; provides services for all launches Elected not to collect rents on leased launch sites Manpower funding constrained to DoD launch demand 	<ul style="list-style-type: none"> Spaceport of the Future (SOTF) effort transforms ops to accommodate Commercial launch surge <ul style="list-style-type: none"> Accommodating 200% launch increase since 2020 Spaceport working groups developing national strategy Independent studies assessing multiple spaceport models 	<ul style="list-style-type: none"> Optimized USSF spaceports with port-authority-like business models; lessening USSF transaction & investment costs Launch/range service providers compete for leases & contracts Fee-funded manpower flexes to meet demand
Infrastructure	<ul style="list-style-type: none"> Aging, underfunded base infrastructure (Power, Water, Communication, etc.) impacting all launch activity No model for commercial infrastructure investment 	<ul style="list-style-type: none"> Developing Infrastructure Development Plans & Roadmaps \$1.3B prioritized, time-phased infrastructure list enabling SOTF 	<ul style="list-style-type: none"> Infrastructure investment supported by spaceport revenue streams across USG and commercial Increased launch, landing, water transport sites at each port
Range Architecture	<ul style="list-style-type: none"> Antiquated structured; launch ranges as Weapon Systems Command destruct (flight safety) constrains capacity Materiel development focused on monolithic h/w & s/w 	<ul style="list-style-type: none"> Enforcing Autonomous Flight Safety System (AFSS) mandate <ul style="list-style-type: none"> Space launch users by 2025 Existing DOT&E users by 2030 Upgrading comm networks Developing web-hosted launch service applications 	<ul style="list-style-type: none"> AFSS required for all users - increased range capacity Modernized IP-based networks and cloud-hosted applications Range users may self-provision or utilize port web services
Funding	<ul style="list-style-type: none"> DoD funded 100% of range sustainment & modernization Limited recapture of infrastructure costs from users Limited authority to accept investment from other sources Infrastructure investment constrained to USSF funding 	<ul style="list-style-type: none"> Increased demand/competition for services & resources AFAA audit recommends updated charging guidance Business Case Analysis identifying optimal charging policies & business models 	<ul style="list-style-type: none"> Operations & infrastructure funded by equitable commercial contributions, modeled after commercial ports today Recoup direct AND indirect costs from users Fees/rents above-and-beyond retained in investment fund Partner with States (FL & CA) and industry to drive increased multi-source investment in spaceport infrastructure
Policy	<ul style="list-style-type: none"> Authorities lack explicit support for commercial users Limited to what is “not needed for public use” 	<ul style="list-style-type: none"> Submitted FY24 Legislative Proposal (#409) <ul style="list-style-type: none"> Allows USSF to recoup indirect costs & better plan for commercial support Broadens real property leasing options 	<ul style="list-style-type: none"> Legislation allows for planned & predictable commercial use Broadened availability of real property for commercial launch Receive cash or in-kind contributions for leases Authority to carry funds forward for recap/investments



Questions?



Source: FAA/AST June 2022

“Semper Supra”