



Reusable Launch Vehicles

Exos Aerospace is making SPACEavailable...™

The 4 FAA/AST  
Licensed Reusable  
Rocket Launch  
Providers



\$ <10% reuse cost



**BLUE ORIGIN**  
\$\$ reuse cost... % unknown



## EXOS AEROSPACE is...

**1** of **4** companies  
IN THE  
WORLD with a licensed  
reusable rocket.

**1** of **10** companies  
in the United  
States with an Active  
Launch License

# Access to space is too inflexible

## Air Launch

Provides for increased flexibility  
(Exos, Virgin Orbit, Lockheed Martin)

## Reusability

Enables increased ROI through  
cost reductions (Exos, SpaceX, Blue Origin)

The other 6 of 10  
“Non-Reusable  
Rocket” Launch Providers





## Apogee SARGE Flight 1



1- Ignition



2- Clean Lox Ethanol Engine (launch)



3- Drogue Return to reenter the atmosphere

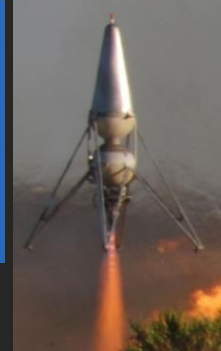


4.- Canopy Return from Rocket flight 3

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Our team has built hundreds of rocket engines and dozens of suborbital flying vehicles designed for reusability





TEAM'S PAST  
EXPERIENCE  
(20+ Years)

## Vehicle Evolution

Armadillo  
Aerospace  
Founded by  
John Carmack

Lunar  
Lander  
Challenge 1<sup>st</sup>  
Place

Rocket Racing  
League  
development  
program

Super Mod

4 Launches and 3  
recoveries on 1<sup>st</sup>  
SARGE vehicle

Aug 2018 – Oct 2019

Today

2000

2006

2008

2009

2010

2011

2015

2020

X-Prize  
Competition  
w/Pixel and  
Texel Round 1  
Winners

Lunar lander  
Challenge 2009  
Armadillo prize \$  
winner- NASA  
Morpheus Sale

2010-2013 Stig  
flies to 95km

Exos Aerospace  
acquires assets of  
Armadillo Aerospace  
and brings on the team  
with new management  
supporting commercial  
objectives

Apr 2020 Air Force  
Hypersonic  
Contract

Testing SARGE R2  
for return to flight  
post COVID 19



SARGE

SARGE-LW

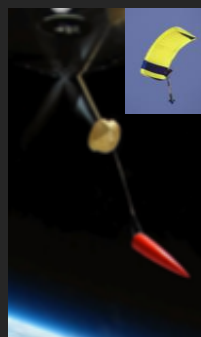
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60 DAYS  
Commence  
USAF HRLV  
Prototype under  
SBIR Phase II  
Award



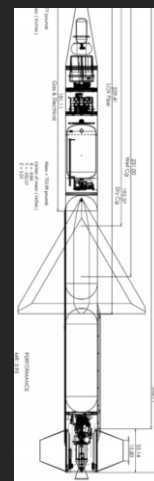
120 DAYS  
SARGE R2  
NASA IDIQ  
QUAL  
FLIGHT



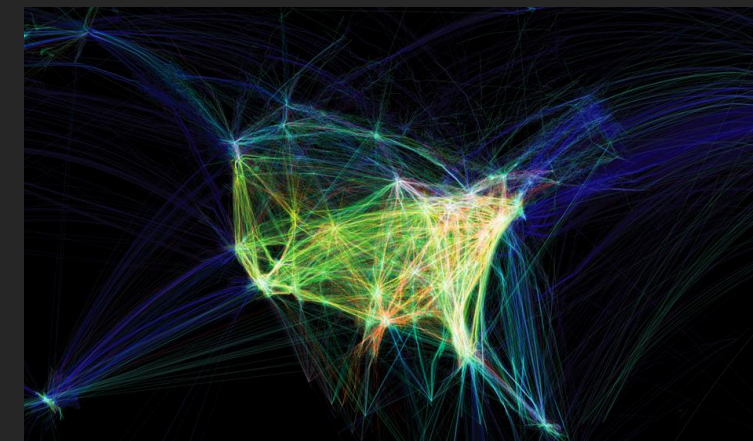
180 DAYS  
Start 600kg commercial  
Orbital Air Launcher  
Exos Aerospace Italia Srl



365 DAYS  
Hypersonic  
Reusable  
Launch  
Vehicle  
Pathfinder  
flight



Commercial Airline traffic map



In Progress



90 DAYS

Exos IT Srl  
Start 600kg  
Commercial  
Orbital launcher  
Establish  
Automated Tank  
and body tube  
Manufacturing  
facility – Torino  
Italy (grant TBD)

18 MONTHS

EXOSFENIX Air  
Launch vehicle  
development-  
commence  
build of LEO  
capable  
ExosWorx  
program 35kg-  
3 prototypes &  
Jaguar 600kg  
LEO Launcher

24 MONTHS

Tests of EXOSFENIX  
Air Launch Rocket  
propelled glider  
LEO AIR LAUNCH  
35kg to orbit flight  
1

36 MONTHS

Tests of EXOSFENIX  
2 Air Launch Rocket  
propelled glider  
LEO AIR LAUNCH  
600kg to orbit  
Jaguar flight 1

Advancing the  
state of the art

Daily flight operations to support  
Space manufacturing and  
hypersonic testing will have to avoid  
commercial airline paths above or  
face the challenges of competing for  
airspace  
UNLESS...



BUT, just for fun and to wake  
everyone up  
before we answer the UNLESS...  
– a riddle

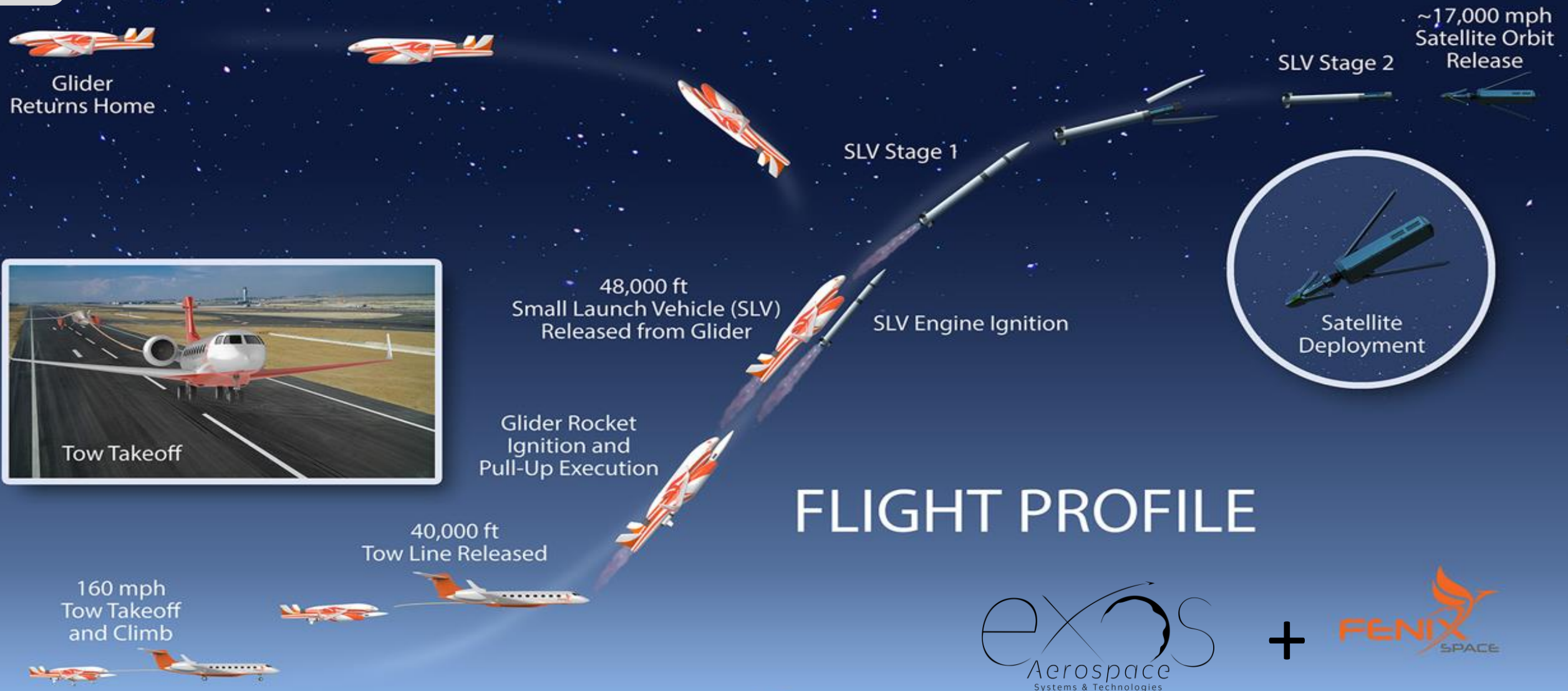
If a reusable Falcon 9 and Cosmic Girl had a baby, what would you get?



An Exos Reusable Towed Glider Air  
Launched LEO Launcher

Artist Rendition compliments of our JV partners as FENIX Space

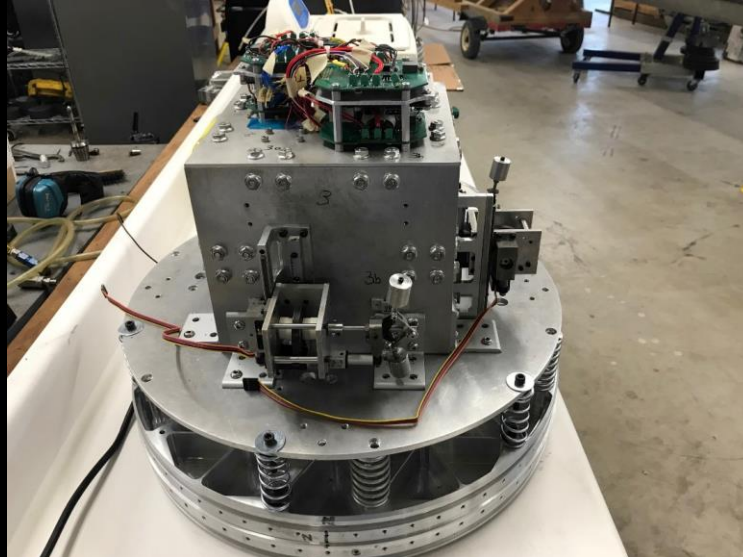
UNLESS you launch from 48,000 feet away from Commercial Air traffic corridors





# Enabling space research through:

- SPACEdu... Supporting STEM education
- SPACEbuild... Supporting space manufacturing
- SPACEaid... Supporting Biomedical and Heliophysics
- SPACEship... Delivery of Payloads to LEO





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Exos hereby surrenders any extra time to our viewers for

