XCOR AEROSPACE

Founded in September of 1999

Our goal:
Safe and Reliable Hardware
XCOR ROCKET ENGINES

- Safe, Non-Toxic Propellants,
- Reliability, Maintainability
- Low Cost
XCOR ROCKET ENGINES

Testing, testing and more testing is our philosophy

XR-2P1 engines: 953 runs / 5686 seconds
XR-3B4 engines: 216 runs / 812 seconds
XR-4A3 engines: 558 runs / 6434 seconds

Our newest engine, the XR-4K5 has been run 10 times and 12 seconds
EZ-Rocket

We’ve shown multiple flights per day and multiple in-flight restarts

Low recurring cost per flight for a rocket powered vehicle - under $1000

Low development cost - $500,000 including engine development
The EZ-Rocket is not a high performance vehicle

- Maximum speed limited by homebuilt airframe
- Maximum altitude limited by propellant mass fraction
- Mass fraction limited by pre-existing airframe

An Operations Demonstrator
Why we built the EZ-Rocket

XCOR has proven the ability to design, build, test and fly rocket powered vehicles

Safe and reliable rocket engines are top priority for us

Safety and non-toxic propellants are integral to the design, not added on

But we still have blast shields and engine-out flight capability
Non-Toxic Propellants

XCOR is ONLY interested in non-toxic propellants

We have worked with $O_2$, $N_2O$ oxidizers $C_2H_6$, $C_3H_8$, $C_8H_{18}$ (kerosene) and $C_3H_7OH$ fuels

Engine development using non-toxic propellants costs less!

No breathing apparatus

no remote test site

no special spill containment
Why does the EZ-Rocket have a pilot?

Lower development cost -
  * no computers to buy or install
  * no software to develop and test

It is easier to get an FAA license
  * permission to fly at Oshkosh
    would not have been granted

It is less likely to crash
  * we had an in-flight failure that the pilot saved
What's Next:

- XERUS

www.xcor.com
Why is the Xerus next?

- it’s a small step in airframe dry weight
- it will use our engines currently in development
- it will be commercially competitive
- it lets us gradually test thermal protection
- it is a reasonable step for the EZ-Rocket development team
Our current development, the XR-4K5 8 kN engine

- Engine being developed with private investment money
- First test in pressure-fed mode was in March, 2003
- Pump-fed testing will start in 2004
The Xerus has bigger engines than the EZ-Rocket

This is a 22kN engine designed and built for the Rotary Rocket Company.

XCOR owns exclusive Rotary Rocket Intellectual Property Rights.

Xerus engine design is similar to 1.7 kN engine on the EZ-Rocket.

Xerus engine size is between these two previous developments.
Xerus engine development is under way

- XCOR has a DARPA contract to develop the piston pumps
- Photo is breadboard built and tested during phase one
- Now in phase two, building and testing a prototype

XCOR Piston Pump Prototype
Why will the Xerus have a pilot? Same reasons as the EZ-Rocket:

- Lower development cost
- Easier license approval
- Less likely to crash

Developing high reliability flight control computer hardware and software is an effort at least as large as everything else

An unpiloted vehicle could not make initial test flights out of Mojave, operations costs would be higher

Having a pilot increases the likelihood of saving the test vehicles

The pilot could be removed for later operational flights
Xerus is a “green” vehicle

No hydrazine
No nitrogen tetroxide
No solid rocket motors

The EZ-Rocket burned oxygen and alcohol

Xerus will use oxygen and kerosene

During an emergency abort, we will dump the heavier propellant, oxygen.

No environmental impact after flight abort
Pilot safety features

- Ejection Seats
- LOX dump
- Fail operational engines that are not making their first flight
- Very few ‘firsts’ on any flight. Flight hardware gets tested, tested, tested before manned flights
Alternate mission: “sounding rocket” flight mode

The Xerus animation showed a satellite launch mission
  · 10 kg payload to 30 degree 500 km circular orbit

In the sounding rocket flight mode:
  · There is no upper stage
  · Xerus can carry 250 kg payload on a four minute zero-g flight
  · A low mass experiment flight could also include the experimenter in a second seat
How and when can I get a ride?

- Xerus is being developed with mostly private money
- Letters of intent will help us raise the money
- XCOR is not looking for deposits
- Mojave airport is currently in process of becoming a spaceport

- Suborbital rides will be priced below $100k each
- Orbital flights with expended upper stage will be approximately $500K
- First revenue flight will be approximately 3 years from substantial funding
On the web: WWW.XCOR.COM

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