



Technical Challenges and Opportunities

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June 10, 2012



Getting into Space is too Expensive

We need either cheaper rockets or some other way to
get there.

We are too risk adverse

Risk is a cost/benefit ratio. If the benefit is big, we can endure a lot of risk.

Use What Works

Earn a profit, then innovate.

Defy the Experts

They are always wrong in the long run



The small boat - Columbus 85 feet
The large boat - Zheng He 400 feet

Zheng He's flag "treasure ship" was four hundred feet long - much larger than Columbus's. In this drawing, the two flagships are superimposed to give a clear idea of the relative size of these two ships. Columbus's ship St. Maria was only 85 feet long whilst Zheng He's flag ship was an astonishing 400 feet.

Contract between the
King of Spain and
Columbus, April 17, 1492

"That of all and every kind of merchandise, whether pearls, precious stones, gold, silver, spices, and other objects and merchandise whatsoever, of whatever kind, name and sort, which may be bought, bartered, discovered, acquired and obtained within the limits of the said Admiralty, Your Highnesses grant from now henceforth to the said Don Cristóbal [Christopher Columbus] ... the tenth part of the whole, after deducting all the expenses which may be incurred therein."

Following Columbus' discovery, Pope Alexander VI issued a May 4, 1493, papal bull granting official ownership of the New World to Ferdinand and Isabella. To these monarchs, the Pope declared:

"We of our own motion, and not at your solicitation, do give, concede, and assign for ever to you and your successors, all the islands, and main lands, discovered; and which may hereafter, be discovered, towards the west and south; whether they be situated towards India, or towards any other part whatsoever, and give you absolute power in them."



On March 22, 1518, King Charles approved Magellan's plan. Under the contract, Magellan and Faleiro, as joint captains-general, would receive one-twentieth of all profits and they and their heirs would gain the government of any lands discovered

18 members of the crew and one ship of the fleet returned to Spain in 1522, having circumnavigated the globe.

The expedition made a profit.



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Engage. Explore. Inspire.



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International Space Development Conference

May 2012



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**Royal Aeronautical Society
3rd European Space Tourism Conference**

London – June 19, 2012

www.excaliburalmaz.com

We are working with NASA on Commercial Crew



The slide features the NASA logo in the top right corner. The title "Commercial Crew Program" is centered at the top. Below the title is a grid of seven images, each with a vertical label on its right side. The images and labels are: 1. Blue Origin capsule; 2. Boeing Starliner capsule; 3. Sierra Nevada Dream Chaser; 4. Space X Dragon capsule; 5. ATK rocket; 6. Excalibur rocket; 7. ULA Atlas V rocket. A satellite is also visible on the left side of the grid. The background of the slide is a view of Earth from space.

Commercial Crew Program

Blue Origin

Boeing

Sierra Nevada

Space X

ATK

Excalibur

ULA

Almaz Capsule Size Comparison



Almaz Cockpit Size Comparison





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Excalibur Almaz's success will enable Great Britain to leverage past investments in aerospace and science infrastructure through participation in lunar and Lagrange Point 2 (L2) missions. The exploration discoveries, scientific advances and educational opportunities resulting from the missions will advance Great Britain to the forefront of the international space race. The associated expansion of technology, science and aerospace industries will create a major positive economic impact.



EXCALIBUR • ALMAZ™



EXCALIBUR • ALMAZ™
SPACE STATION
OR SPACE STATION
OR SPACE STATION
OR SPACE STATION
OR SPACE STATION



Since its founding in 2005, Excalibur Almaz has made great progress in developing its commercial space program:

- Purchased four Reusable Return Vehicles (RRV's) and two Space Station pressure vessel frames
- Teamed with NPO Mashinostroyeniya to modernize the spacecraft for flight
- Performed numerous technical feasibility and design studies related to the Reusable Return Vehicles and their subsystems, as well as launch vehicle compatibility and overall program architecture
- Acquired U.S. Department of State licenses for the hardware and technical services
- Acquired Russian Federation export licenses to utilize the hardware in space



OUR MISSION

ENGAGE, EXPLORE, INSPIRE.

Excelsior Almaz Lunar Exploration Missions are opening new horizons in commercial space travel and science. This bold step into the future not only involves the scientific community but also explorers, adventurers and visionaries from all walks of life. They will travel farther in our solar system than anyone has gone before.

Excelsior Almaz owns four flight-proven Reusable Return Vehicles (RRV's) for crew transportation to Low Earth Orbit. EA also owns two Soyuz-Class spacecraft to serve as orbital and cis-lunar transportation for a crew of up to six. These components will dock and accomplish the most ambitious private space mission ever to the Moon and beyond. Exploration missions will travel the limitless cyclical orbital pathways that lead to a vast array of destinations. In addition to Low Lunar Orbit, we could travel to gravity-stable destinations called Lagrange Points and near-Earth asteroids. These orbits will take travelers further than any human being has gone before. Excelsior Almaz will explore the Moon using robotics and remote sensing technology. Lunar payloads can be deployed to the surface. Asteroids could be visited, explored and eventually mined. These exciting missions will inspire humanity in a new era of living, thriving and profitably working in space.

To learn more, visit: <http://www.excelsioralmaz.com>

EXCELSIOR • ALMAZ LUNAR CYCLER

LUNAR & L2 MISSIONS

EXCELSIOR • ALMAZ
Space Adventure Solutions



Excelsior Almaz human and cis-lunar spacecraft are versatile enough to launch on most available heavy-launch vehicles depending on the selected scenario including Japan's H-II, Russia's Proton, SpaceX's Falcon 9 and Ukrainian Zenit rockets.



Multiple crew configurations and the option for using two stations docked in tandem provide the means for long-duration crewed missions far beyond Low Earth Orbit.



Once the mission configuration is complete, the spacecraft is ready to leave Earth's orbit and begin its Lunar and/or Lagrange Point 2 orbit.



Excelsior Almaz lunar missions will make use of gravity-stable destinations beyond Low Earth Orbit called Lagrange Points as possible staging areas for construction, fueling and extended exploration of the Moon, asteroids and other destinations.



Lunar missions will provide near-before-then views of the Moon and allow extremely close observations, lunar surface experiment delivery and even tether-enabled sample gathering on the Moon's surface.



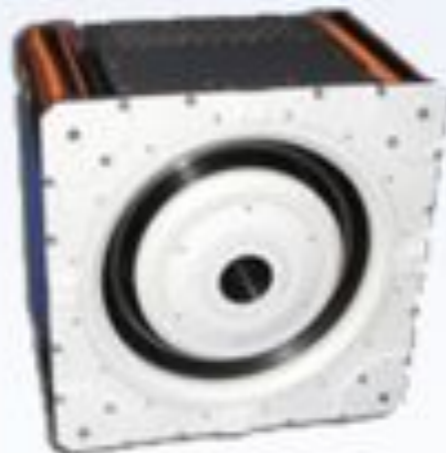
Our missions will also include near-Earth asteroid observation and exploration. Asteroids can be analyzed for mineral composition, mined and eventually mined to supply for planet's critical resource and energy needs.

Busek 20kw Hall Thruster Manufactured in USA



Dual-mode 20kW Hall Effect Thruster BHT-20K operating at 20kW output power. Over 170 Hall Thrusters have flown with 100% success, no failures.

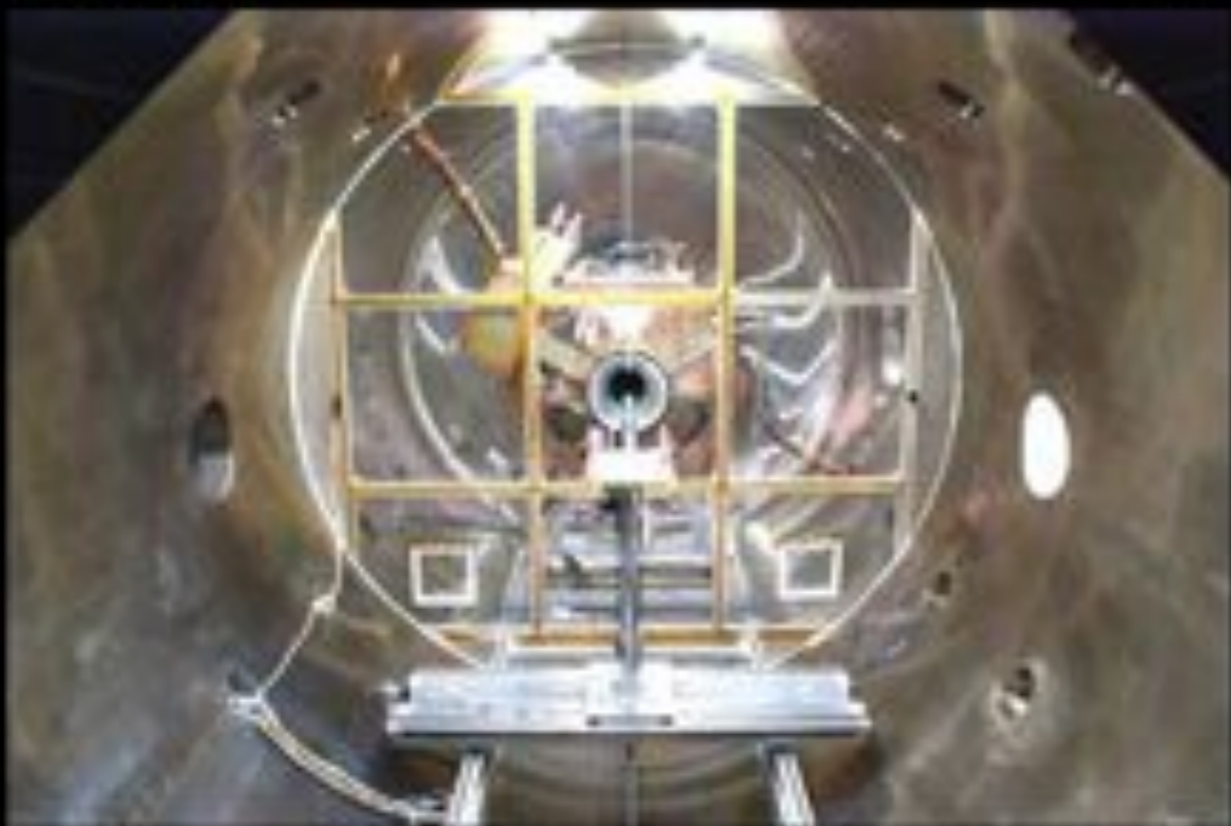
BHT-20k



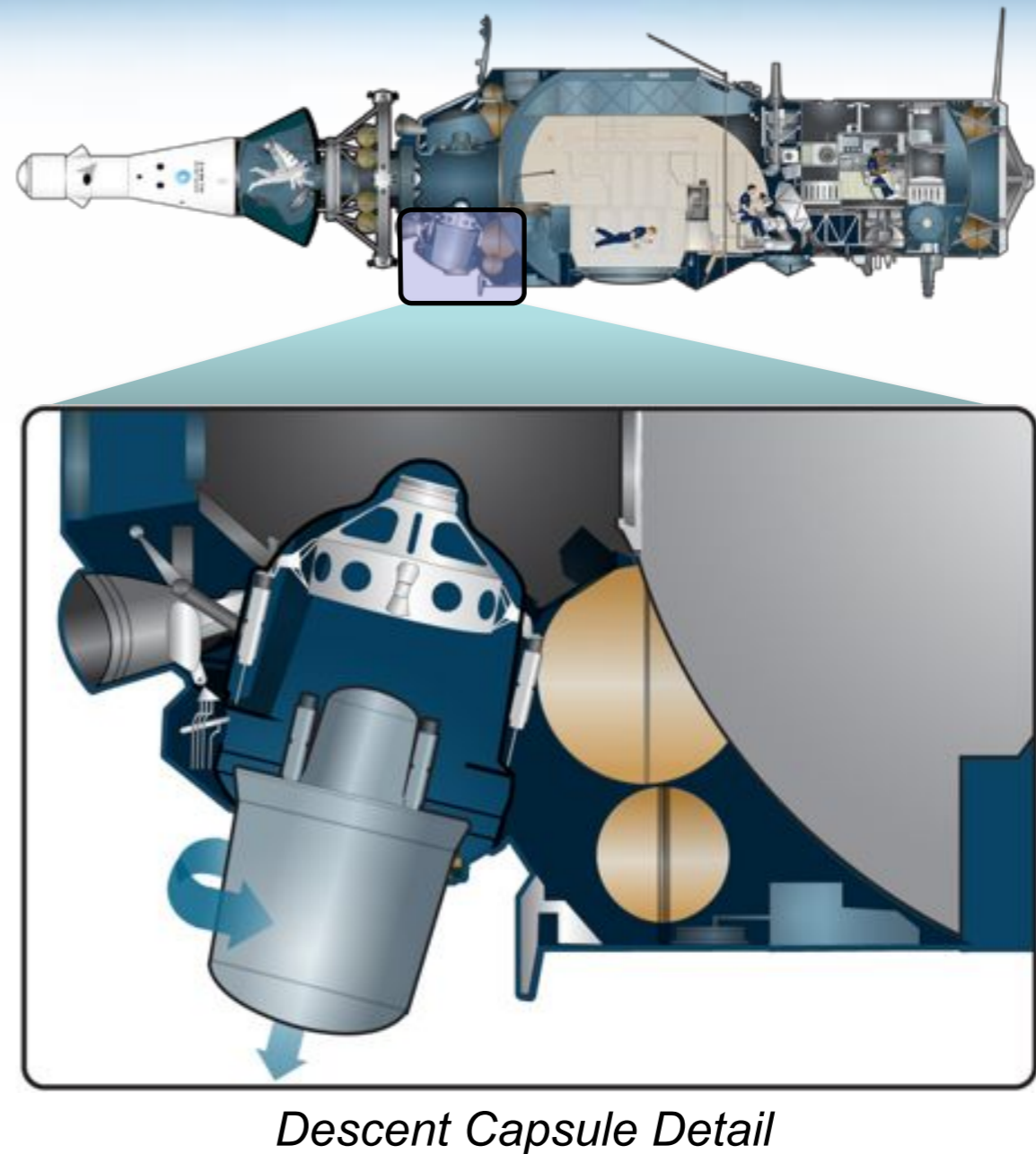
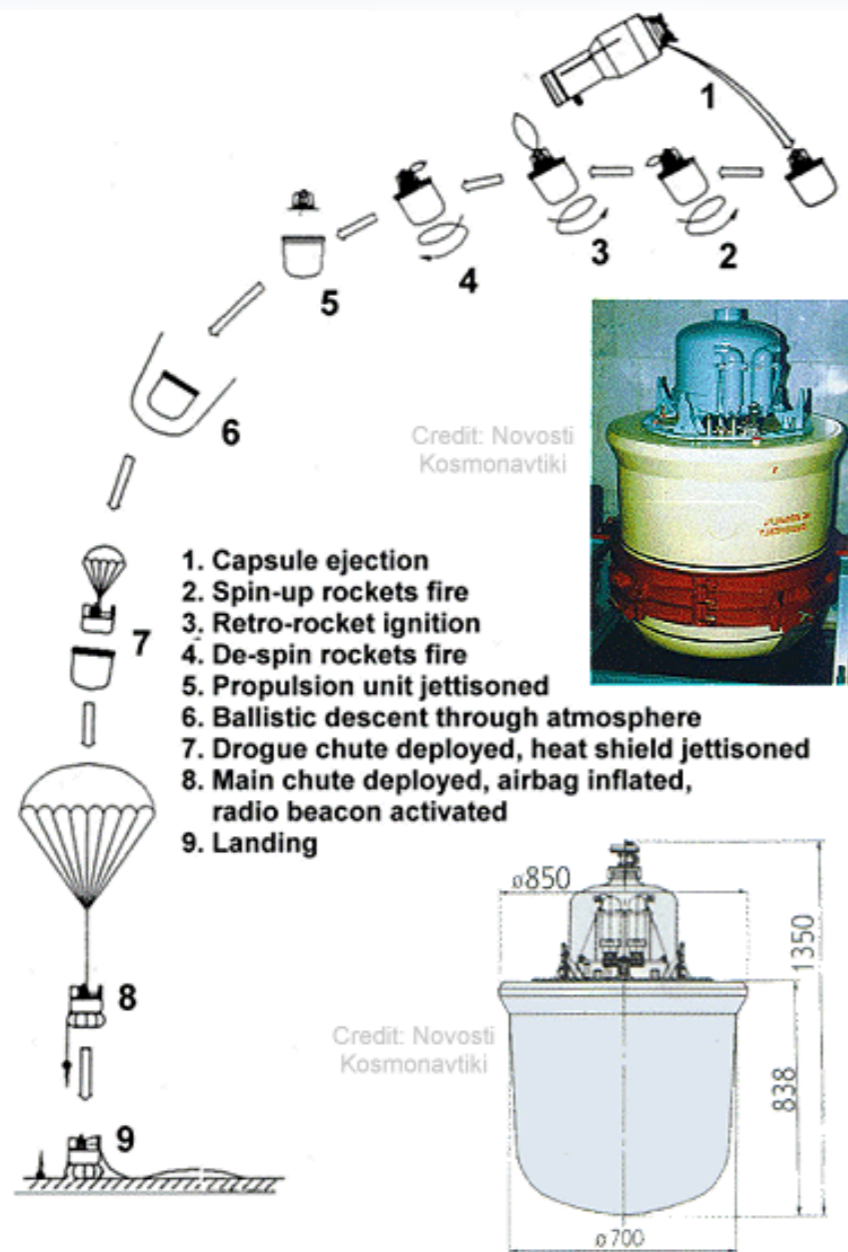
Discharge Input Power	20 kW
Discharge Voltage	500 V
Discharge Current	40.5 A
Propellant Mass Flowrate	40.0 mg/sec
Thrust	1.08 N
Specific Impulse	2750 sec
Propulsive Efficiency	70.0%



VX-200 full power Integrated Testing



128kg Cargo Descent Capsule



Experimental results and other cargo could be returned to Earth for analysis using this space proven ejection and recovery system.



***Feasibility Study
of Block E Production Restoration
and its Adaptation for Payload
Commercial Transportation
to the Moon***









“Leadership is the art of accomplishing more than the science of management says is possible.”