



DIAMONDS IN THE SKY

The outstanding performance capabilities of the Almaz/RRV combination give it the potential to carry 'tourists' to the vicinity of the Moon and beyond.
Excalibur Almaz

WITH a mere \$100 million going spare, you could be the next human to orbit the Moon, courtesy of Excalibur Almaz Inc (EAI) based in Houston, Texas. Or, you might be lucky to get a contract from the US government to visit the International Space Station together with professional astronauts and a limited quantity of cargo. Either would be possible through an innovative scheme launched in co-operation with Russia's space manufacturing organizations through marketing activities in the USA and on the Isle of Man based on Russia's Almaz space hardware. Almaz means 'diamond' in Russian and participants see a cluster of such facilities bringing a new revenue stream capitalizing on technologies developed in the Soviet Union during the Cold War.

Almaz emerged from a Soviet response to development of the US Air Force Manned Orbiting Laboratory (MOL), which had been officially announced in 1963. Until cancelled in 1969, MOL was to have been a manned spy satellite using Gemini B spacecraft to launch and return military personnel operating powerful telescopes in the cylindrical 'laboratory' module. Interested in exploring the role for the military man in space, and partly in response to MOL, Vladimir Chelomey began work on the Almaz programme on 12 October 1964. At that time it was envisaged as a

manned space station, the FGB to which would be attached a cone-shaped, elongated crew capsule known as the VA incorporating a tractor launch escape motor.

A change of purpose

Over time the concept changed and the FGB element flew several times as the core of a space station, the first being Salyut 2 launched in April 1973, followed by Salyut 3 in June 1974 and Salyut 5 in June 1976. Salyut 1, 4, 6 and 7 were 'civilian' stations originating with the Korolev bureau. Eventually the continuation of the civilian Salyut and Mir programmes by NPO Energia brought about the demise of the manned Almaz only for it to reappear, albeit briefly, as an unmanned reconnaissance platform equipped with radar.

Core Almaz modules designated TKS reappeared yet again, this time in the Mir programme and it became the Zarya element of the International Space Station. The VA was never used to carry people, a vehicle which Almaz Excalibur now refers to as the Reusable Return Vehicle, or RRV. It is with this three-person crew vehicle, attached to an Almaz core block, that Excalibur Almaz see as a ready-made route to high adventure travel to Moon orbit and perhaps beyond. The RRV has been designed for land or water recovery and

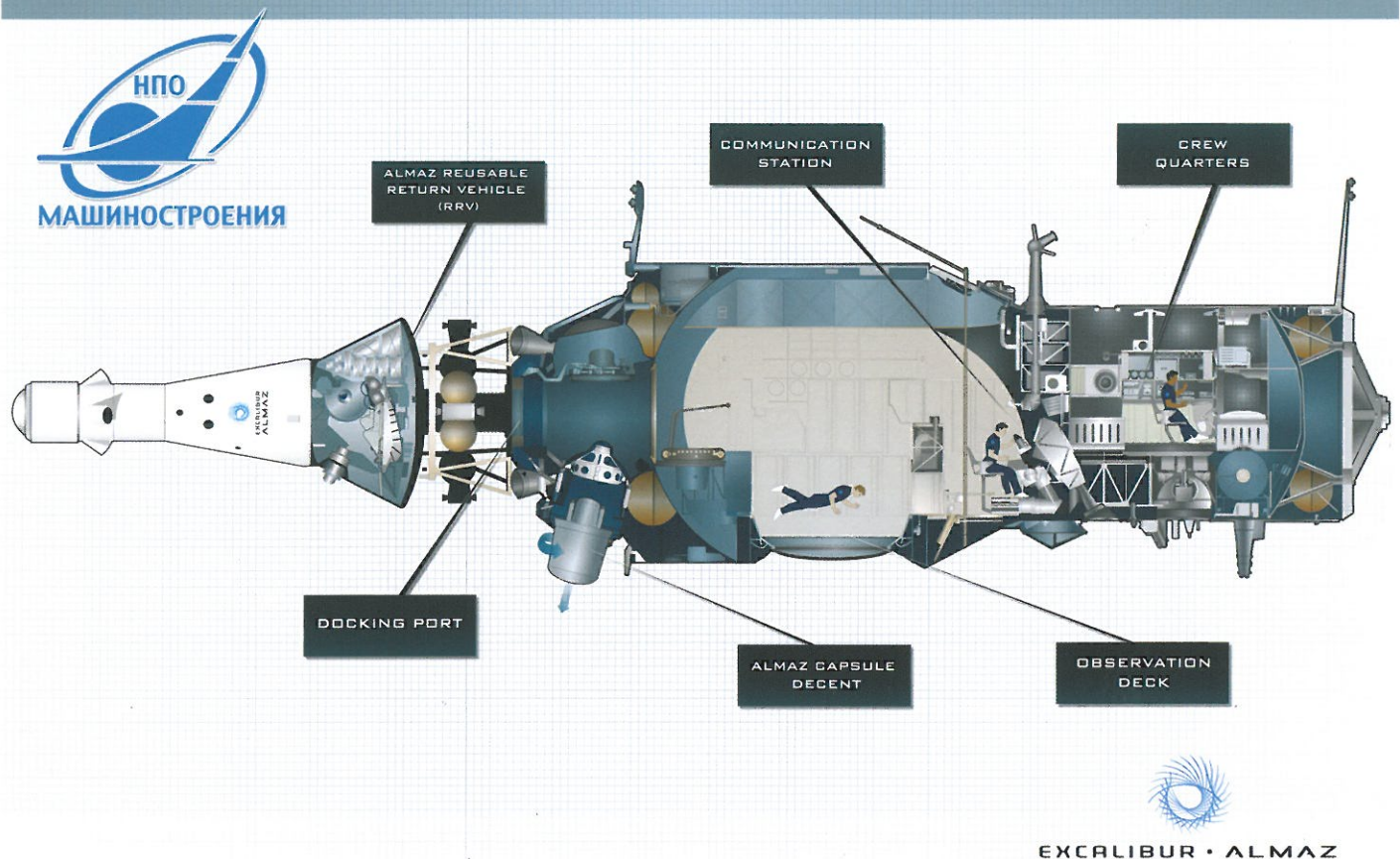
has been demonstrated to support long periods at sea prior to recovery.

When designed as part of the Almaz complex of modules, the VA and associated FGB were first flown together as Cosmos 929 (TKS-1) on 17 July 1977. Already tested on a single dual launch in 1976, the VA component of Cosmos 929 returned to Earth on 16 August while the FGB burned up in the atmosphere on 2 February 1978. This was followed by two more dual VA missions in 1978 and 1979 followed by Cosmos 1267 (TKS-2) on 25 April 1981, which docked to Salyut 6 after the VA capsule separated and returned to Earth leaving the FGB element to burn up along with Salyut 6 in July 1982.

Launched on 2 March 1983, Cosmos 1443 (TKS-3) carried its VA capsule to a docking with Salyut 7 but returned to Earth with 771 lb (350 kg) of experiments from the station. Cosmos 1686 (TKS-3) was to have hosted a crew launched by a second TKS vehicle but after docking with Salyut 7 in September 1985 control was lost with the core station. It had been hoped that this could have been visited by Russia's Buran shuttle but delays made that impossible and the complex burned up in the atmosphere in February 1991.

A new life

But Excalibur Almaz is interested in more than



With ample room for three in a spacious module with a large viewing area this is the ultimate tour bus for deep space.

Excalibur Almaz

just tourist traffic. In late June this year, EAI passed all the qualifying milestones for the second round of NASA's Commercial Crew Program (CCDev2), the first of the qualifying contenders to do so. Under the umbrella of a Space Act Agreement, CCDev2 is funding development of the first generation of spacecraft contracted by NASA to send people to the ISS. EAI see this government route as a way in to large scale commercial space station operations, both during and after the lifetime of the ISS. Based on the Isle of Man, Excalibur Almaz Ltd (EAL) has recently signed a memorandum with XCOR Aerospace to train astronauts for orbital and potentially deep-space missions by first familiarizing them through sub-orbital flights using the Lynx

vehicle.

The commercial side of space tourist/high adventure flights would begin with a launch on a Proton rocket and could include circumlunar or lunar orbit missions. Flexibility of operation is higher than any other manned spacecraft, the RRV being capable of remaining in space for at least six months and being reused at least 15 times. While the price is high, on a relative scale it is quite low and with existing and proven technology, already updated with the latest electronic systems, it just might be the ultimate high-ride of all that attracts not the rich, or even the very rich, but those super-rich individuals who spend a lot more money buying a very big boat.

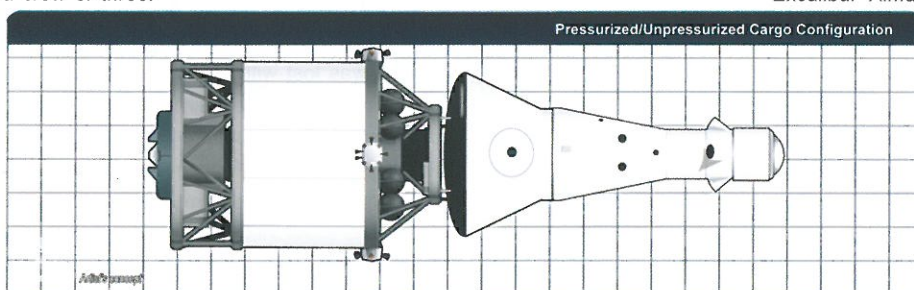
The RRV is an improved version of the VA modules attached to early TKS spacecraft and supports a crew of three.

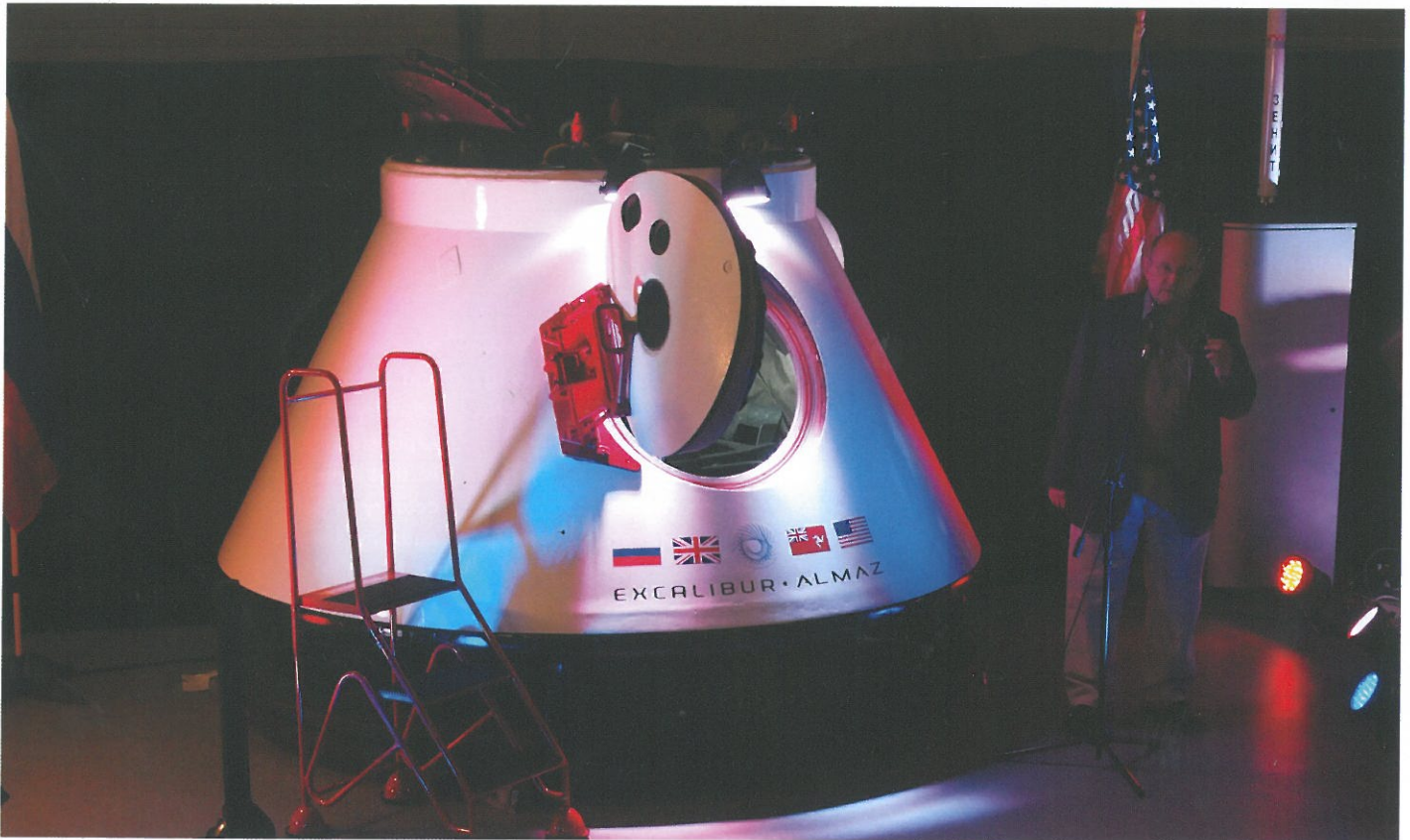
Excalibur Almaz



The Almaz collection of pressurized and unpressurized sections can be tailored to the widest variety of possible missions, from short duration (30 hr) orbital flight to circumlunar missions lasting a week. Both pressurized RRV and space station module are flight tested and qualified for long duration missions.

Excalibur Almaz



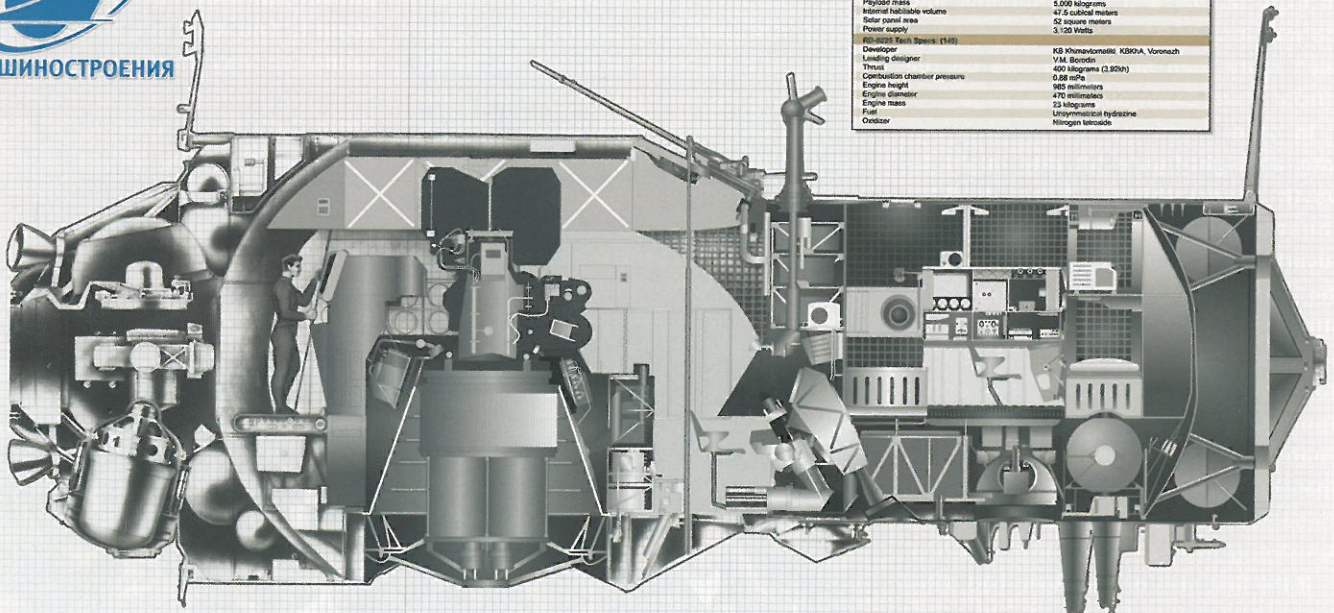


CEO Art Dula has taken to the road to promote the outstanding virtues of this classic example of Soviet-era military space hardware, bearing not a little resemblance to the Apollo Command Module.

Excalibur Almaz

Equipped as a scientific research station and with the ability to support up to 10 tonnes of equipment, this is the ultimate science research base for Earth orbit or cislunar activities.

Excalibur Almaz



Almaz Space Station Test Space, (M)	
Industrial Designation	1F71, 1F71B
Operational life time	1-2 years
Crew size	2-3 people
Launch mass	18,900 kilograms
Mass in orbit	17,800 kilograms
Mass of orbited propellant	1,800 kilograms
Length	11.81 - 14.55 meters
Maximum diameter	4.15 meters
Payload mass	5,000 kilograms
Internal habitable volume	47.5 cubic meters
Solar panel area	52 square meters
Power supply	3,120 Watts
R1-0225, Earth Spares, (145)	
Developer	KB Khimavtomat KBKhA, Voronezh
Leading designer	V.M. Bondin
Thrust	400 kilograms (3.92kN)
Combustion chamber pressure	0.88 MPa
Engine height	985 millimeters
Engine diameter	470 millimeters
Engine mass	23 kilograms
Fuel	Unsymmetrical hydrazine
Oxidizer	Nitrogen tetroxide



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