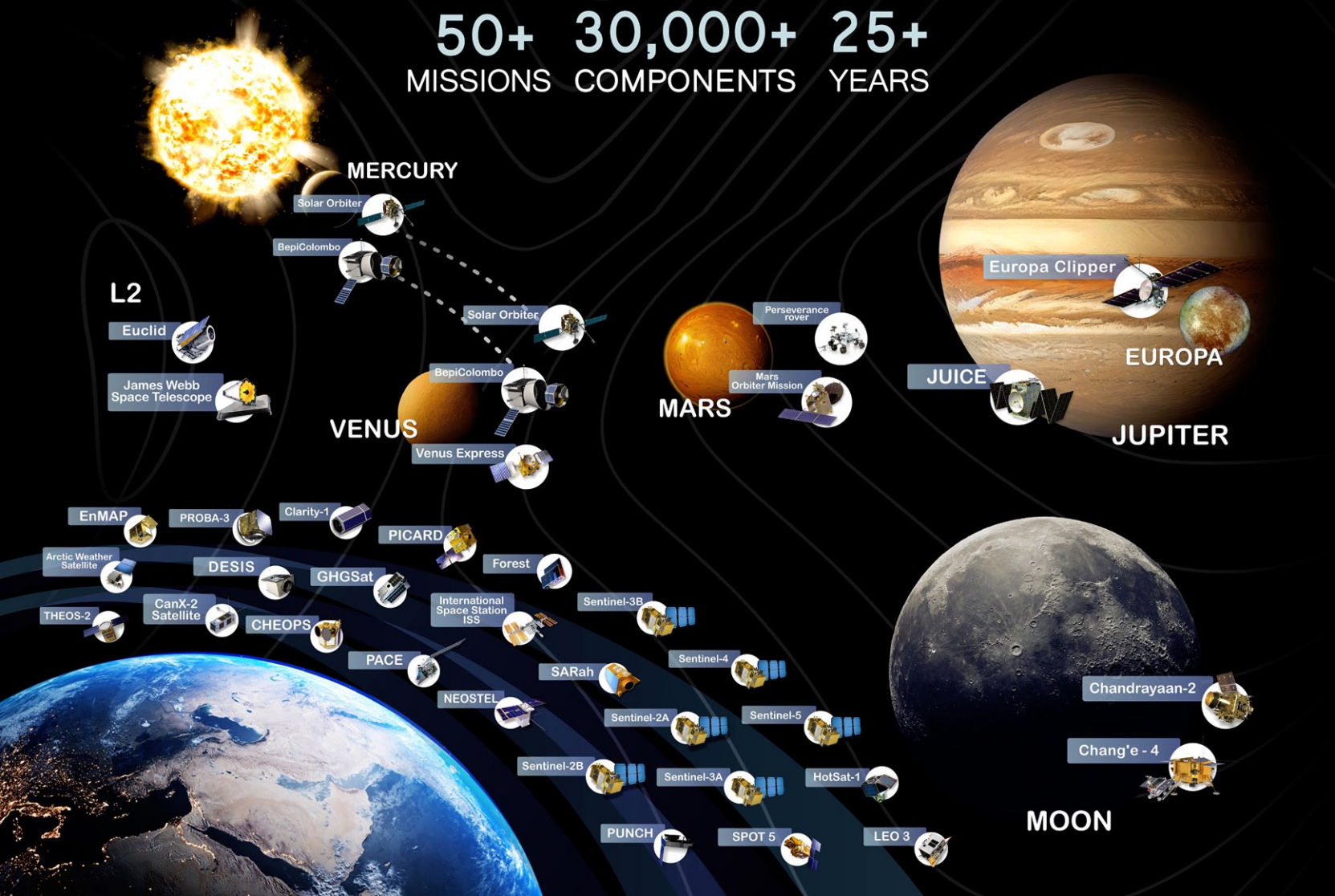
Acktar

Advanced Coatings

PROVEN IN ORBIT

SPACE HERITAGE

50+ MISSIONS **30,000+** COMPONENTS **25+** YEARS

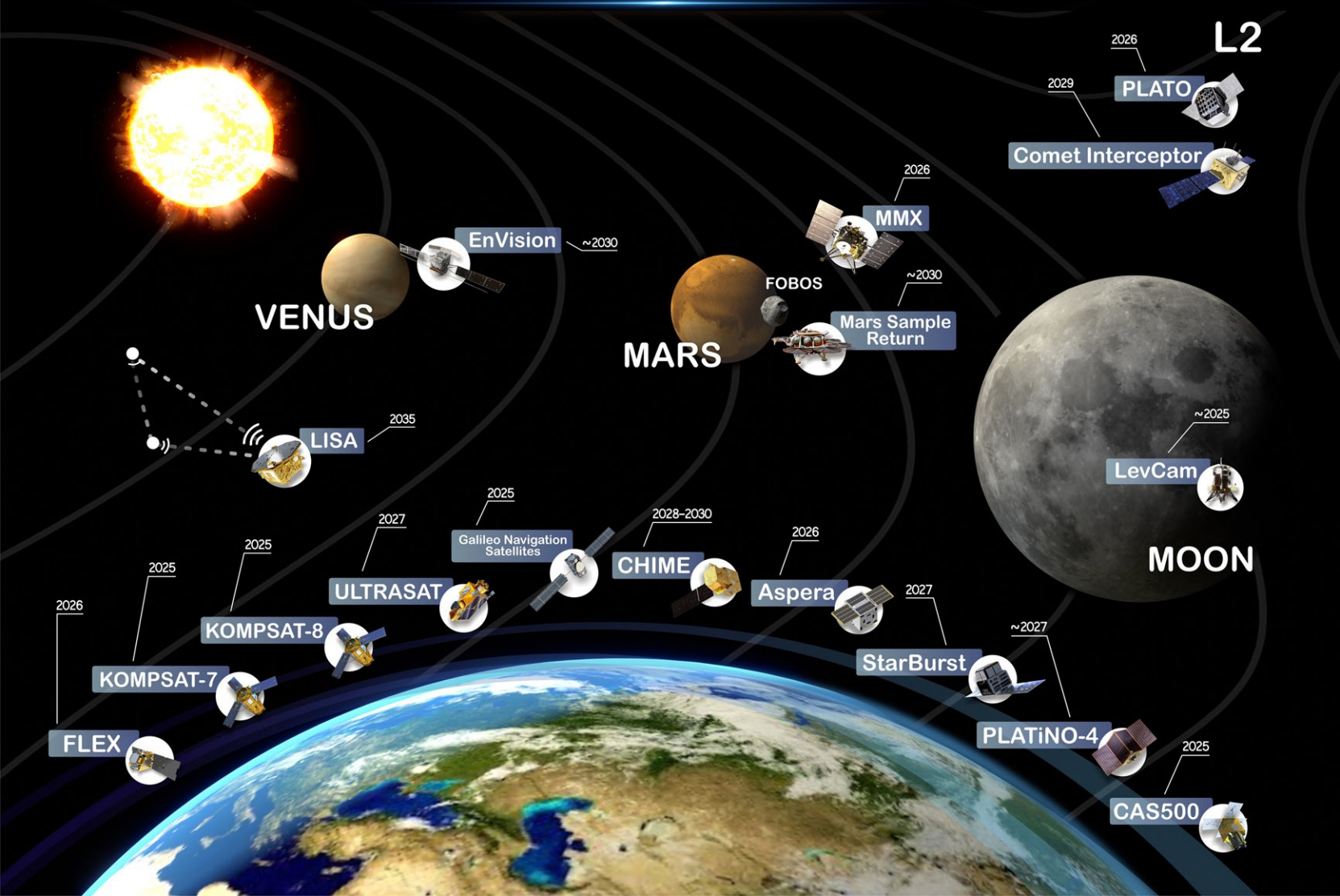


Acktar

Advanced Coatings

COUNTDOWN TO ORBIT

SPACE HERITAGE



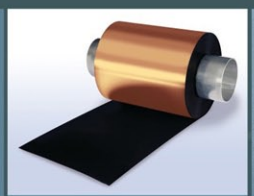
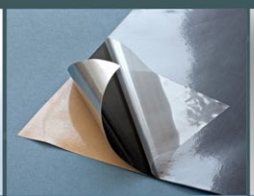
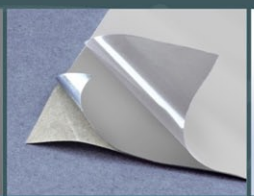
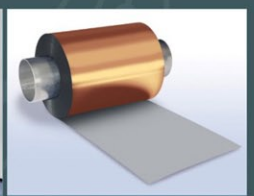
THERMAL MANAGEMENT

Acktar thermal management films and foils deliver a versatile range of emissivity and solar absorptivity values for passive thermal management in space applications. Space-qualified and engineered for high and low solar absorptance and emissivity ratios, these foils are ideal for use as an outer layer in multi-layer insulation (MLI) or as single-layer insulation (SLI). Available in sheets, rolls, and tapes, they are designed to meet the demanding requirements of space environments.

GENERAL PROPERTIES

SUBSTRATE MATERIAL	Polyimide / Aluminum
COATING	Thickness <5 µm, weight 1 mg/cm^2 100% Inorganic Surface resistivity in dissipative range
CERTIFICATES	RoHS, REACH, ISO 9001:2015, As9100

THERMO-OPTICAL PROPERTIES

					
	Maxi Black™	Nano Black™	White Standard™	Ultra White™	Customized
α	> 0.95	> 0.92	< 0.4	< 0.23	0.05-0.7
ε	> 0.85	< 0.17	> 0.7	> 0.85	0.03-0.9
Typical α/ε	~ 1.12	~ 5.41	~ 0.57	~ 0.27	Customized
Appearance	Diffusive	Specular	Diffusive	Semi diffusive	Customized

EXAMPLES OF HIGH-TECH APPLICATIONS OF ACKTAR'S INNOVATIVE MATERIALS IN RENOWNED SPACE MISSIONS

James Webb Space Telescope

The James Webb Space Telescope is the world's most advanced space observatory, designed to explore distant galaxies and study the origins of the universe. Acktar coated several optical components in the NIRSpec instrument to ensure exceptional light absorption and minimal stray reflection. Due to significant launch delays, these flight-hardware parts were stored in controlled conditions for over 12 years. Even after 18 years of storage, visual inspection and adhesion tests showed no degradation, demonstrating the long-term stability and storage resilience of Acktar's coatings for space-qualified optical systems.

Europa Clipper

NASA's Europa Clipper mission will investigate Jupiter's moon Europa, searching for evidence of conditions suitable for life. Acktar's ultra-black coatings play an indispensable role in ensuring the precision and effectiveness of the highly sensitive E-THEMIS thermal imager, delivering stable optical performance even in extreme cryogenic conditions. With high emissivity and excellent stability at very low tmperatures, the coatings enable accurate thermal measurements. Testing confirmed that a coating thickness of around 30 µm provides optimal results, making Acktar the preferred choice for demanding thermal imaging applications in space.

BepiColombo

The BepiColombo mission is a joint ESA-JAXA spacecraft traveling to Mercury to study its geology, magnetic field, and atmosphere. To withstand the intense solar radiation near Mercury, Acktar White coatings were applied to the MIPA instrument to manage thermal loads in the harsh inner-solar-system environment. Featuring low solar absorbance and high emissivity, the coatings reflect heat efficiently into deep space. Rigorous qualification testing verified long-term stability and resistance to degradation, ensuring reliable performance throughout cruise and Mercury-orbit operations.

STRAYLIGHT CONTROL

Our space-qualified coatings provide advanced solutions for stray light suppression and passive thermal management across a broad wavelength range, spanning UV, VIS, SWIR, and MWIR.

With participation in over 50 space missions and more than 30,000 coated parts currently in orbit, Acktar's space heritage is extensive and well proven. From LEO to L2, and from missions near the Sun to those exploring Jupiter, our technology consistently delivers reliable performance in the most demanding space environments.

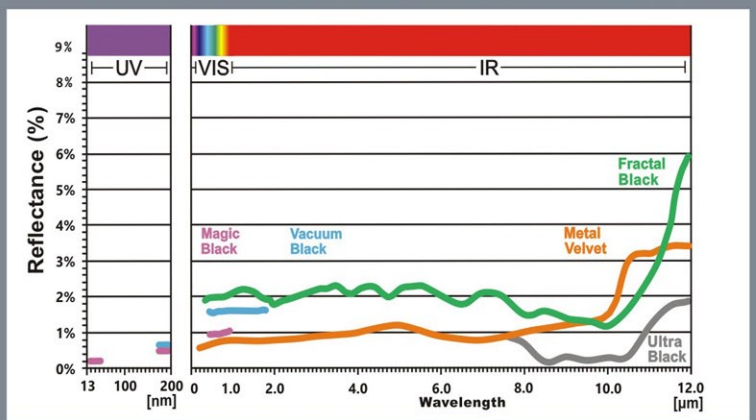
SPACE QUALIFICATIONS

- ATOX RESISTANCE
- CRYOGENIC TEMPERATURES
- ADHESION
- CONTAMINATION
- THERMAL VACUUM CYCLING
- RADIATION
- SURFACE RESISTIVITY
- OUTGASSING

CHARACTERISTICS OF ACKTAR BLACK COATINGS

	Magic Black™	Vacuum Black™	Fracktal Black™	Ultra Black™	Metal Velvet™ (foil)
Operational wavelength:	EUV-NIR	EUV-SWIR	VIS-FIR	MWIR-LWIR	EUV-FIR
Coating thickness, microns	3 - 5	4 - 7	5 - 14	13 - 25	5 - 7
Working temperature	- 269°C to + 450°C (4°K to 723°K)				
Weight of coating, mg/cm²	1.1 - 1.6	0.7 - 1.1	1.6 - 3.2	3.3 - 6.5	1.4 - 3.2
Abrasion resistance (ref MIL-C-48497A)	light	moderate	moderate	moderate	light
Adhesion to: Metals, Glass, Ceramics, Plastic (ref ECSS-Q-70-13C)	Coated pieces withstand scotch tape test (3M853 Crystal clear tape, strength of 13N per 25mm), without any evidence of coating removal.				
Outgassing	CVCM 0.001%, RML 0.2%				
Chemical content	100% inorganic				
Surface resistivity	Fully dissipative range				
Cleanability	Coated pieces withstand cleaning with ethanol, IPA or acetone with no change in optical and technical characteristics.				

HEMISPHERICAL REFLECTANCE



LISA

Space-based gravitational wave detector planned for launch in 2037, with Acktar coating parts used in the LISA prototype.

ULTRASAT

Ultraviolet space telescope revolutionizing the study of the hot transient universe through wide field-of-view observations.

Mars Sample Return

Mission returning Martian samples to Earth collected by NASA's Perseverance rover for advanced scientific analysis.

SOLAR ORBITER

Solar mission studying the Sun and its corona, with Acktar's coatings selected for the METIS coronagraph due to high-temperature resilience.

CHIME

Mission carrying a visible-to-shortwave infrared spectrometer for routine hyperspectral monitoring of agriculture, ecosystems, land use, and natural resources.

EUCLID

Space telescope investigating dark matter and dark energy, enabled by Acktar's coatings for highly precise optical measurements.

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