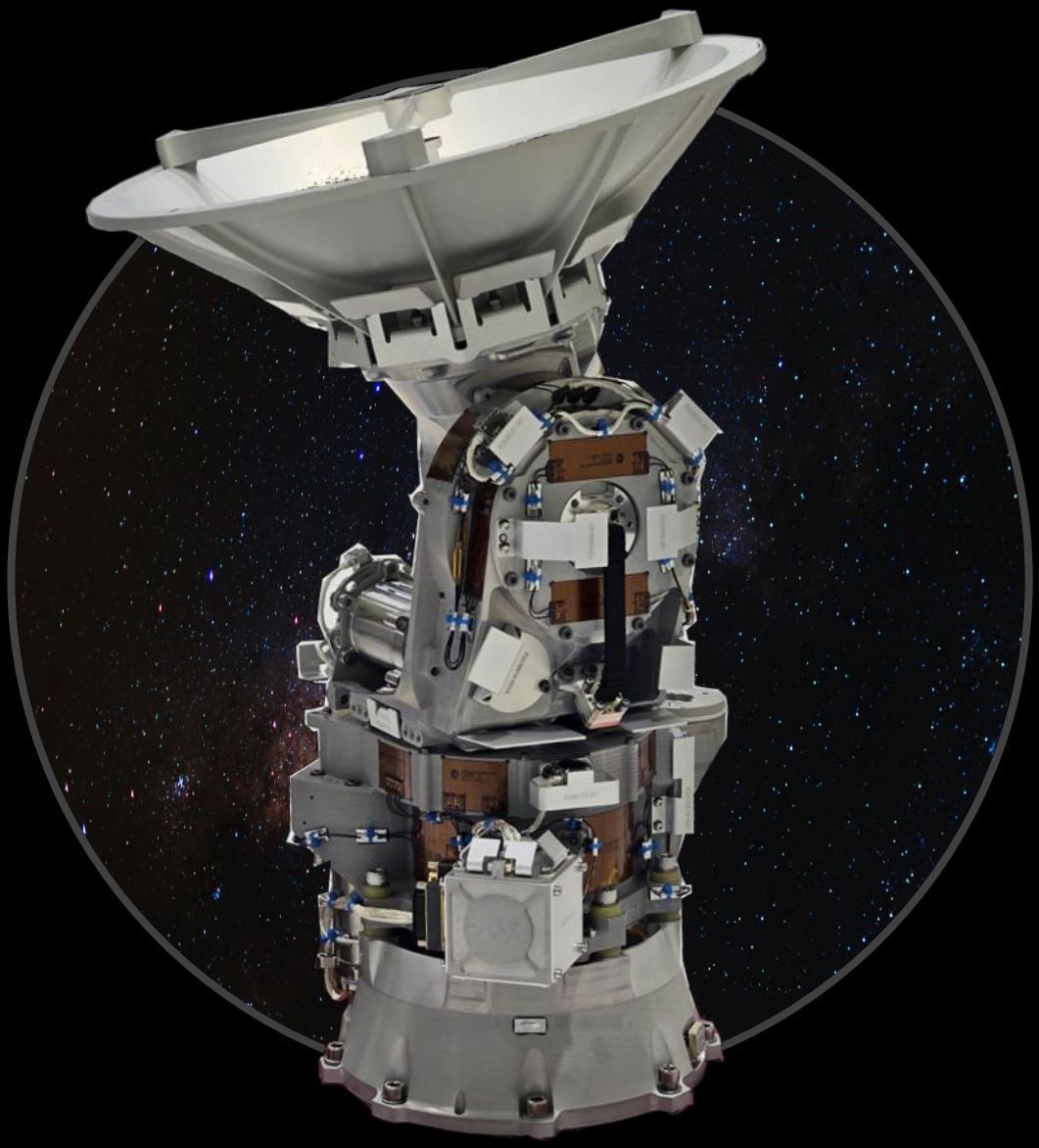
beyond gravity



APM

Adaptable Antenna Pointing Mechanism for diverse space RF communication needs.

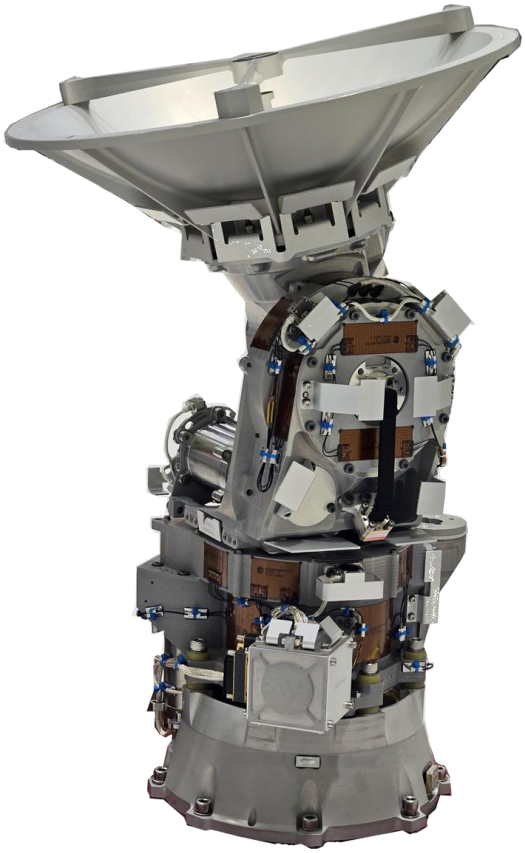
Beyond Gravity's Antenna Pointing Mechanism family is a fully space-qualified (TRL8) system customizable to any mission profile. Engineered for maximum flexibility, it features tailorable parameters for orbit, RF transmission frequency, speed, and pointing resolution. Proven combinations of Antenna Pointing Mechanism (APM), drive electronics (ADPME) and Antenna systems are available. Applications have included LEO, MEO and interplanetary missions including state of the art constellations.

Modular Antenna Pointing Mechanism (APM)

The APM comes with

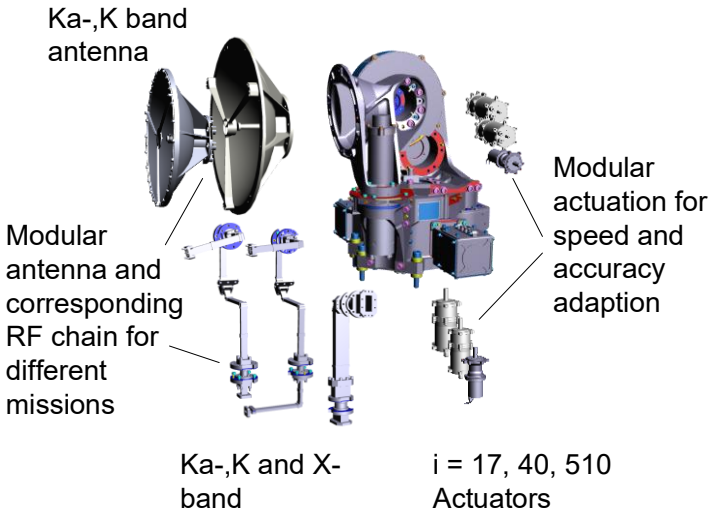
- Stable repeatable pointing accuracy across 800mio degree and 15mio start-stop events
- Extra large range in azimuth and elevation for full hemisphere coverage minimizing keyhole maneuvers
- Hollow shaft actuators interfacing waveguide rotary joints for maximum RF performance
- Integrated Launch Protection: HDRM integrated without additional S/C interface
- Fully qualified to ECSS standard for LEO and MEO/GEO (TRL8)





Tailored for you

- Flexible RF Interconnects: Supports various waveguides or coaxial cables, including X-band and Ka-band configurations.
- Mission-Tailored Hardware: Fully customizable antenna profiles, tracking accuracy, and angular velocity tailored to specific mission requirements.
- Integrated Launch Protection is optional: Available with or without a Hold Down and Release Mechanism (HDRM).
- Smart Control Architecture (optional): mechanism management electronics operated via standard spacecraft data buses (e.g. MIL-STD-1553, UART)



Engineered to request

- Tailoring of the APM to cover your requirements
- Extensive engineering expertise allowing adaptation for specific applications
- Adapted interfaces, test scope, modifications, are feasible on request.

Contact us: Beyond Gravity Schweiz AG | Nicolo Caretti, Sales Manager | nicolo.carletti@beyondgravity.com or sales-mss@beyondgravity.com

This document remains the intellectual property of Beyond Gravity Schweiz AG and may not be copied, or used without their prior written approval.

@ Beyond Gravity, 2026

		APM			Comments
Electromechanical characteristics					
Range of Motion	Azimuth Elevation	± 200° ± 100°			Elevation end stop limitation for any range within possible
Step Size		0.044°	0.1°	0.003°	Stepsize and speed are linked by modular gear ratio
Maximum output speed		0 – 15°/s	0 – 70 °/s	0 – 0.5°/s	
Pointing Error maximum (half-cone, without electronic correction)		0.21°			
Angle Feedback		Step-counting with Hall Sensor referencing			Optical incremental encoder possible
Endstops		Hall sensors as limit switches Hard stops			
Launch Lock					
Launch Lock (HDRM)		Lock of both axes by one HDRM			APM also available without HDRM
Separation Nut		Low Shock Separation Nut			
Separation Nut Activation		5A > 50 ms @ 1.2 Ω			
Operational Life					
Life Time		15 years			
Life Time Cycles (incl. margins)		> 8 mil. cycles			15 mil. start-stop actions
Life Time Angle (incl. margins)		> 800 mil. degree			
Drive chain (Az. & El.)					
Drive chain configuration		Stepper motor (redundant coils) with gearbox and output spur gear			Gearbox Planetary Gear or Harmonic drive
Gear ratio		41	17	510	Modular
Operating Current		0.6 A	0.7 A	0.4 A	Modular
Maximum peak current		1 A	1 A	0.6 A	Modular
Pow. Holding Torque (Az. & El.)		9.7 Nm @ 0.7 A			4.3 Nm @ 0.7 A
Running Torque		4.8 Nm @ 0.7 A and max. angular velocity			3.2 Nm @ 0.7 A and max. angular velocity
Nominal Motor voltage		25 V			
Phase resistance (± 10%)		7.5 Ω	7.5 Ω	12.2 Ω	Modular
Phase inductance (± 10%)		13.0 mH	13.0 mH	14 mH	Modular

Note: Some modular parameters cannot be combined indepedently and are subject to individual assessment. Get in touch with us!

This document remains the intellectual property of Beyond Gravity Schweiz AG and may not be copied, or used without their prior written approval.

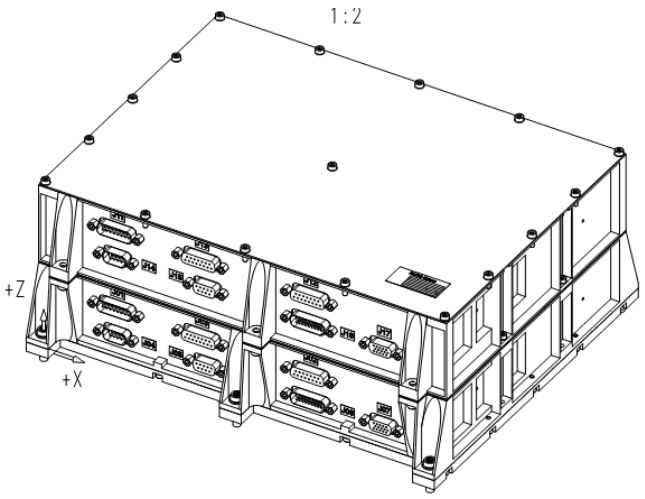
@ Beyond Gravity, 2026

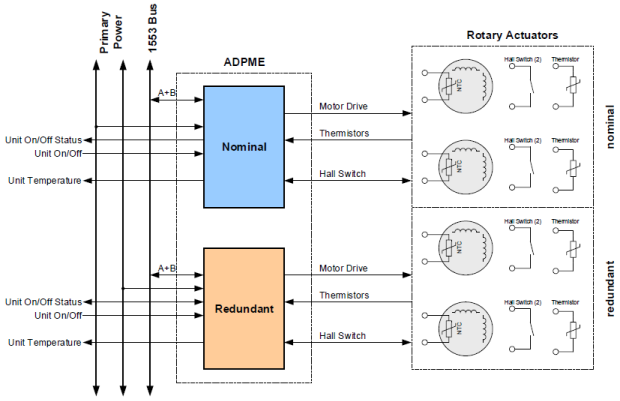
	APM			Comment
RF Chain including antenna				
Waveguide	WR-34	WR-42	WR-112	Modular, other on request
Frequency (GHz)	25.5 – 40 (Ka-Band)	18 – 23 (K-Band)	7 to 8.5 (X-Band)	Modular, other on request
VSWR max.	1.2			
Average power rating	70 Watt	11 Watt	116 Watt	Modular, other on request
Insertion Loss (@ 80°C)	< 0.8 dB	< 0.8 dB	< 0.35 dB	
Group delay variation (nspp within any 600 MHz bandwidth)	< 0.1 nspp	< 0.1 nspp	< 0.2 nspp	
Antenna diameter	0.22 m	0.4 m	-	Modular, other on request
Antenna gain	33 dBi	36dBi	-	Modular, other on request

Mechanical Dimensions & Mass APM		
Box dimension in stowed position Parallel to S/C interface Height	 320 mm x 375 mm 340 mm	
Mass (excluding margins)	< 15 kg	
S/C Interface	6 through holes for M8 on a circle D180 2 dowel pins D6 on a circle D180	
First mode frequency in stowed position	> 140 Hz	
Qualification Temperature Levels		
Ground Handdling / Testing	22 ± 5 °C	
Storage	20 ± 10 °C	
Operational	-50 °C to 85 °C (Antenna -150 °C to 150 °C)	
Non-Operational	-50 °C to 90 °C (Antenna -150 °C to 150 °C)	
Mechanical Qualification Levels (in and out of plane)		
High level sine vibrations:		Qualification Levels
	5 – 20 Hz	± 10 mm
	20 – 100 Hz	20 g
Random vibrations:	20 – 100 Hz	+ 6 dB / oct
	100 – 350 Hz	0.8 g^2/Hz
	350 – 2,000 Hz	– 6 dB / oct
Global	21.4 g_{rms}	
Shock	100 Hz	40 g
	800 Hz	900 g
	1,600 Hz	1800 g
	10,000 Hz	1800 g

This document remains the intellectual property of Beyond Gravity Schweiz AG and may not be copied, or used without their prior written approval.

@ Beyond Gravity, 2026





Control Electronics (Option)

Mass & Dimensions		
Mass (excluding margins)	< 5 kg	
Dimensions	300 x 250 x 122	
Electrical		
Power Supply	28 V unregulated	
S/C Interface	Power, MIL-STD-1553B for commands, discrete lines	
APM Interface	Stepper Motors, motors and mechanism temperatures, Hall sensors	
Max. Motor Current per motor	1 A	
Microstepping	Tunable up to 64	
Qualification Temperature Levels		
Ground Handdling / Testing	22 ± 5 °C	
Storage	20 ± 10 °C	
Operational	-25 °C to 65 °C	
Non-Operational	-30 °C to 65 °C	
Mechanical Qualification Levels (in and out of plane)		
		Qualification Levels
High level sine vibrations:	5 – 20 Hz	± 10 mm
	20 – 100 Hz	20 g
Random vibrations:	20 – 100 Hz	+ 3 dB / oct
	100 – 300 Hz	0.77 g²/Hz
	300 – 2,000 Hz	– 5 dB / oct
Global	21 g_{rms}	
Shock	100 Hz	40 g
	800 Hz	900 g
	1,600 Hz	1800 g
	10,000 Hz	1800 g

This document remains the intellectual property of Beyond Gravity Schweiz AG and may not be copied, or used without their prior written approval.

@ Beyond Gravity, 2026