



# Payload Adapters and Separation Systems

[Launchers](#) | [Mission Hardware](#) | [Separation System](#) | [Payload Adapters](#) | [Low Shock Separation](#) | [Dispensers](#) | [Separation Nuts](#)

Beyond Gravity Payload Adapter Systems provide you with a complete solution for your mission. With our long experience in supporting the space industry we can provide a range of off-the-shelf products as well as tailor made solutions, all based on our high performance components.

## Adapters & separation systems for your successful mission

### Three decades of experience

Beyond Gravity is the world's leading supplier of payload adapters and separation systems for commercial launch vehicles. Beyond Gravity has been developing and producing Payload Adapter Systems for more than three decades. A period during which we have accumulated vast experience, and supplied our products to an ever-growing number of satisfied users that today are market leaders.

### Compatible with virtually any launcher/satellite combination

Modular adapters from Beyond Gravity enable fitting most satellites on the market to any launcher. Beyond Gravity is supplier to Ariane, Atlas, Delta, Falcon, Land Launch, Proton, Sea Launch, Soyuz and Antares launchers.

We offer a broad spectrum of Payload Adapter Systems compatible with all commercial satellite buses used in the world today. Our services include support to our customer through all program phases up to the successful separation of the satellite in orbit. The Payload Adapters

are tailored to customers' needs and manufactured out of aluminum or carbon fiber composite technologies to impressive performance.

### Low shock separation systems with outstanding flight record

Beyond Gravity separation systems keep satellites safely attached to their launchers during the tough journey to orbit and then with precision delivers the precious loads in orbit with the specified relative velocity, roll and spin.

Beyond Gravity offers standard systems and dedicated system for special applications like in-orbit separation of return-to-earth capsules. Beyond Gravity offers clamp-band as well as hard point separation systems. The Beyond Gravity low-shock clamp-band separation system is the industry standard for commercial payloads.

Our Payload Adapter Systems have an outstanding flight record. More than 1000 in-orbit separations have been carried out with a success rate of 100%!

This gives launch vehicle operators and satellite builders/operators confidence when planning for future missions together with us.

## 100% mission success – for more than three decades

Diameter (mm/inch)	Ariane	Atlas	Delta	Sea Launch	Proton	Others
937/37	101	13	4		7	17
1194/47	100	45	6	17	55	6
1666/66	36	30	6	3	11	2
2624/104	6	0	0		1	
2800/110	0	0	0			
4-point nut (1663)	4	2	3	11		4
	247	90	19	31	74	29

## A versatile range of separation systems

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Developed over 30 years, the Beyond Gravity product family to date includes a broad range of Separation Systems, spanning diameters of 14 to 103 inch / 360 mm to 3100 mm.

### Small System Family

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- 381S (15 inch)
  - 610S (24 inch)
  - 818S (32 inch)
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### Medium System Family

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- 937S (37 inch)
  - 1194VS (47 inch)
  - 1575S (62 inch)
  - 1666S (62 inch)
  - 1666MVS (66 inch)
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### Large System Family

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- 2624VS (104 inch)
  - 3100SX (122 inch)
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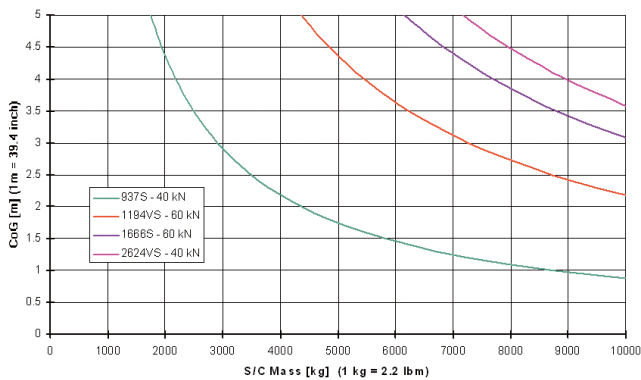
- in production | • in development

## Compatibility with launchers and satellites around the world

Our Payload Adapter Systems can support a broad range of missions, from single launches of heavy spacecraft to missions with multiple, small-sized spacecraft. With our CBOD™ Separation System Release Mechanism we can provide the unique combination of high load capability and a low shock release.

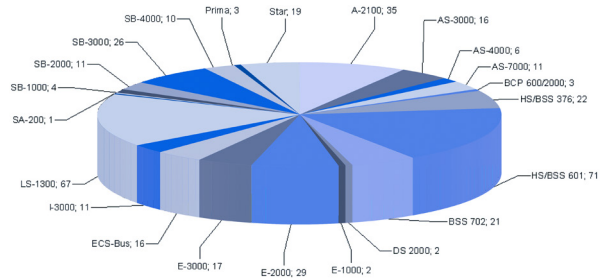
### High load capability

S/C Mass - CoG Envelope (2g lateral)



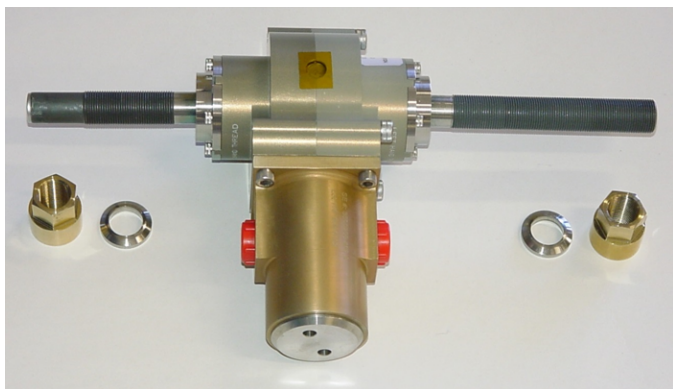
Separation system line load capability

### Spacecraft interfaces are our daily business

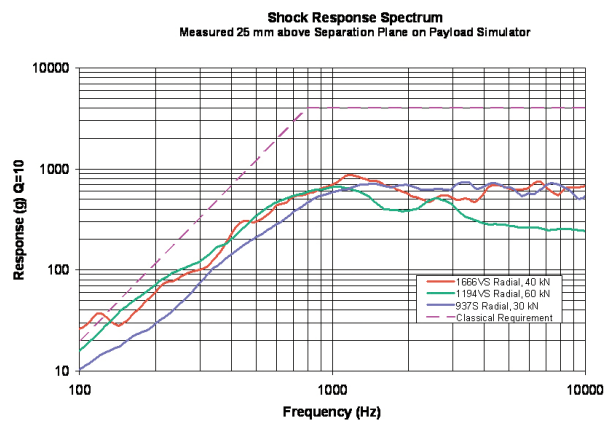


Launch record by spacecraft interfaces (December 2011)

### Low shock release



CBOD Separation System



Shock response spectrum from separation system release

## Payload Adapter Systems components:

### Low Shock Separation Systems

- Clamp band or discrete point release systems easibility studies
- Separation Spring Set

### Aluminum/Composite Adapters

- Mission specific S/C adapter structures
- Launch vehicle adapter structures

### Harness

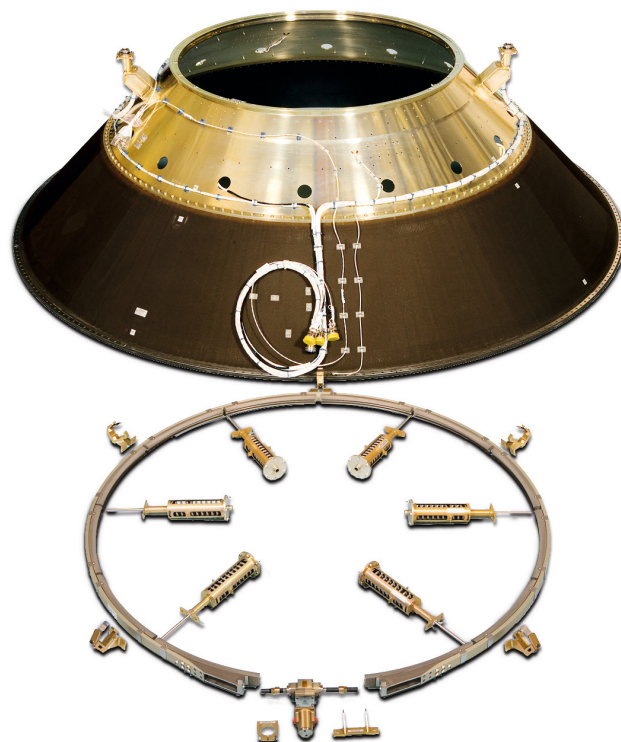
- Separation System Harness
- S/C Harness
- Instrumentation Harness
- Umbilical Supports

### Ground Support Equipment

- Installation GSE
- Handling Clamp Bands
- S/C Stands

### Support Services

- Beyond Gravity Installation support during AIT
- Beyond Gravity support at fitcheck & launch



Separation of two Galileo satellites from the Soyuz upper stage. Image: ESA

## Satellite dispensers

### Dispensers for the European satellite navigation system Galileo

Based on the long experience of structures and systems for carrying and separating satellites, Beyond Gravity has developed and qualified the Dispenser for the European navigation system Galileo family of satellites.

The Dispenser – with a structural mass of less than 150 kg – carries and separates two 700 kg satellites into orbit. The system was flight proven with the successful maiden launch of a Soyuz ST-B from the European spaceport in French Guiana, in October 2011.

## For a successful launch. We build reliable products.

Beyond Gravity products are chosen by today's leading launch service providers. We have equipped every Ariane rocket with payload fairings since the very first launch in 1979, and our composite structures feature onboard American Atlas rockets. Beyond Gravity adapters and separation systems ensure there is a safe connection between satellite and rocket.

### Payload Fairings and Launch Vehicle Structures

Beyond Gravity is the world's leading supplier of composite technology payload fairings. Payload fairings are mounted at the tip of the launch vehicle to protect the satellites during the ascent and to make the shape of the rocket more aerodynamic.

Beyond Gravity produces the payload fairings for the European launch vehicles Ariane 5 and Vega and the American Atlas-V-500, and supplies the smaller Atlas-V-400 with the Interstage-Adapter ISA-400, a composite structure that connects the main stage and upper stage of the rocket. Our payload fairings have been used in over 220 rocket launches to date, and have never failed.

### Payload Adapters and Separation Systems

Beyond Gravity is the world leader for payload adapters and separation systems used on commercial launch vehicles. Our separation systems ensure that satellite and rocket remain securely attached to one another during the tough journey into space, and then deliver the valuable payloads into orbit with precision. Our modular adapters mean that nearly all satellites can be fitted to almost every type of launcher.

Beyond Gravity equips Antares, Ariane, Atlas, Delta, Falcon, Proton, Souyz and Zenit rockets. To achieve optimum performance, payload adapters are manufactured, as required, from aluminum or carbon fiber composites. Over 1000 separations have been carried out in orbit using Beyond Gravity systems, with a 100 percent success rate.

### Sounding Rocket Guidance

Beyond Gravity offers a range of products for sounding rocket guidance and for sounding rocket payload attitude control. Beyond Gravity systems are also currently used by NASA for their sounding rocket projects as well as on board ESA Maxus rockets.



## Precision on earth. Reliability in space.

Beyond Gravity is the leading supplier of products for the space industry in Europe. Experience, outstanding reliability, customer focus and a comprehensive, clearly structured product portfolio all make Beyond Gravity the partner of choice for manufacturers of satellites and launchers across the globe.

### **Our vision: Number one space product supplier**

Beyond Gravity's vision is to be the leading supplier of space products. We laid the foundations for realizing this vision as a partner in institutional European space programs from the very beginning. Beyond Gravity has played a part in all major European missions, where we have acquired know-how that benefits our customers all over the world today.

### **Our values: Collaboration, high performance, visionary thinking**

Our corporate culture is based on the values of collaboration, high performance, visionary thinking. These values determine our actions and characterize our relationships with our customers and partners. For more than four decades Beyond Gravity has been an industrial partner to national and European space agencies. And we have been supplying our products to the manufacturers of satellites and launchers for just as long.

Outstanding product performance and consistency in meeting delivery deadlines are the yardsticks by which we measure success. And above all else we are focused on reliability, as there is no scope for failure in space. At the heart of Beyond Gravity's strategy is a

clearly structured product portfolio, which we expand according to a definite plan. In expanding the portfolio, we place particular emphasis on space products that are attractive in growth markets outside the institutional European sphere.

### **The cornerstone of our success: Our employees**

In Switzerland, Sweden and Austria, more than 1,600 employees of Beyond Gravity develop, manufacture and test products for satellites and launchers. Teamwork, trust and respect characterize the work environment at Beyond Gravity. Our employees work in close cooperation with customers and partners. The success of Beyond Gravity is based on the skills and commitment of our staff, on the accuracy and reliability of our mechanics, and on the creativity and know-how of our engineers.

### **Beyond Gravity: Part of an international technology group**

Beyond Gravity is a dedicated division within Beyond Gravity, an international technology group for aerospace and defense. Beyond Gravity has its sites in Switzerland, Germany, Austria, Hungary, Sweden and the USA. Beyond Gravity employs 1,600 people worldwide.

#### **Product areas**

Launcher Structures & Separation Systems

Satellite Structures, Mechanisms & Mechanical Equipment

Digital Electronics for Satellites and Launchers

Satellite Communication Equipment

Satellite Instruments

#### **Product lines**

Launcher Fairings & Structures  
Payload Adapters & Separation Systems  
Sounding Rocket Guidance

Satellite Structures  
Satellite Mechanisms  
Sliprings  
Mechanical Ground Support Equipment  
Thermal Systems

Satellite & Launcher Computers  
Navigation Receivers & Signal Processing

Receivers & Converters  
Antennas  
Optical Communication

Satellite Instruments