Electric Propulsion Pointing Mechanisms

RUAG Space delivers qualified Pointing Mechanisms for Electric propulsion Thrusters, which are increasingly used on commercial satellite platforms and scientific spacecrafts due to their advantages in fuel mass efficiency.

Features

The Pointing Mechanism supports the Electric Propulsion Thrusters in their nominal position during launch, by means of a dedicated Hold-Down and Release Mechanism and reduces the mechanical loads on the thrusters via dedicated damper elements.

Upon its release, the Thrusters can be tilted around two axes. This motion is facilitated by two actuators, which drive the platform either via a strut-linkage around a spherical joint or a cross gimbal type arrangement.

Together ahead. RUAG

Technical Data

Applicaton	Mechanism Designation	Thruster	Supported Mass	Mechanism Mass	Pointing Angle	Eigen-Frequency (stowed)
Telecom Satellites	Thruster Pointing Mechanism TPM	PPS 1350 or ROS 2000 or SPT 100 (2 off)	14 kg	10.6 kg	±6.5° half cone	80 Hz
	Thruster Orientation Mechanism TOM-100	SPT 100B (2 off)	11 kg	16 kg	-15°…35° ±15°	60 Hz
	Thruster Orientation Mechanism TOM-140	SPT 140 (1 off)	11 kg	16 kg	-15°…35° ±15°	60 Hz
	Electric Propulsion Pointing Mechanism EPPM	QinetiQ T6 (2 off)	18 kg	21 kg	0° (depl) ±15° ±15°	75 Hz
Scientific Satellites	Ion Thruster Alignment Mechanism ITAM	RIT and EIT	7.5 kg	4.3 kg	±6° half cone	85 Hz
	Electrical Propulsion Mechanism EPMEC	PS-1350	5 kg	10 kg	±9.5° half cone	40 Hz
	Thruster Pointing Assembly TPA	QinetiQ T6 (4 off)	9 kg / TPM (4 off)	11.6 kg / TPM (4 off)	±15° half cone	55 Hz

Applications

RUAG Electric Propulsion Mechanisms are used for:

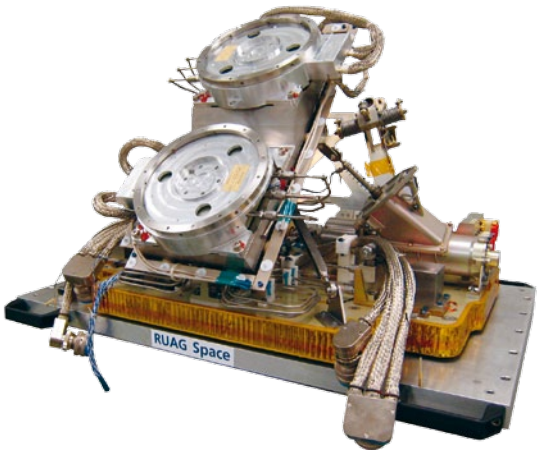
- North South Station Keeping,
- Orbit Topping,
- Momentum Dumping,
- East West Station Keeping,
- Orbit Raising,
- De-Orbiting and
- Interplanetary Propulsion

Thrusters

RUAG Space can deliver Pointing Mechanisms for any thruster available on the market, for the following thrusters the mechanisms are qualified:

- Fakel SPT 100 (Plasma),
- Fakel STP 140 (Plasma),
- Snecma PPS 1350 (Plasma),
- EADS ROS 2000 (Plasma),
- QinetiQ T6 (Ion),
- MMS/QinetiQ EIT (Ion) and
- EADS RIT (Ion).

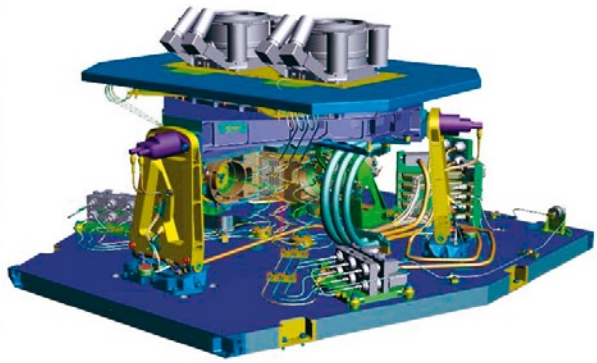
EP Pointing Mechanisms for Telecom Satellites



TPM

Thruster Pointing Mechanism (TPM)

The TPM, developed for the Eurostar 3000 LX, supports two Electric Propulsion Thrusters PPS 1350 and/or ROS 2000 and/or SPT100 in their nominal position of approximately 45° during launch, by means of a dedicated Hold-Down and Release Mechanism. Upon its release, the Pointing Mechanism Platform can be tilted around two axes. This motion is facilitated by two linear actuators, which drive the platform via a strut-linkage around a spherical joint



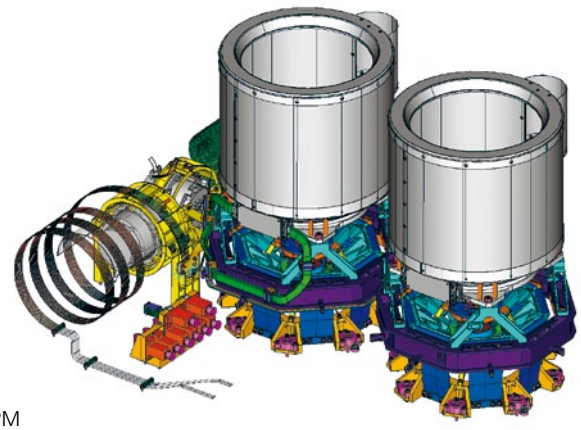
TOM-100

Thruster Orientation Mechanism (TOM-100 and TOM-140)

The TOM, developed with EDB Fakel, is compatible with two thrusters SPT100B but also with one SPT140. It considers one TOM for transfer orbit mounted on the bottom of the spacecraft and two TOMs for the station keeping mounted on the side of the spacecraft. The motion of the Platform is facilitated by two rotary actuators in a cross gimbal type arrangement.

Electric Propulsion Pointing Mechanism (EPPM)

The EPPM supports one or two Electric Propulsion Thrusters QuinetiQ T6 in stowed position during launch, by means of a dedicated central release actuator Hold-Down and Release Mechanism. Upon its release, the Pointing Mechanism Platform can be tilted around two perpendicular axes. This motion is facilitated by two geared rotary actuators. A boom may distance the thrusters from the S/C in deployed configuration.

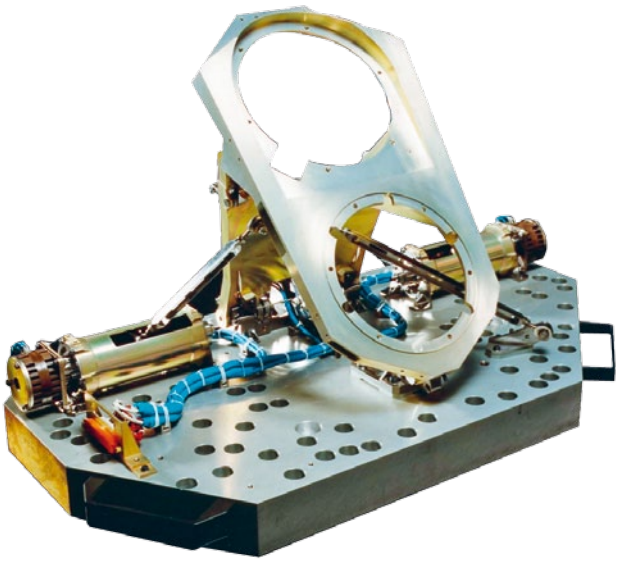


EPPM

Future Development

RUAG plans to develop an extendable electro-propulsion pointing mechanism, which improves the geometric efficiency of the thrusters subsystem. This allows the use of heritage thrusters on larger spacecrafts.

EP Pointing Mechanisms for Scientific Spacecraft and Technology Demonstrators



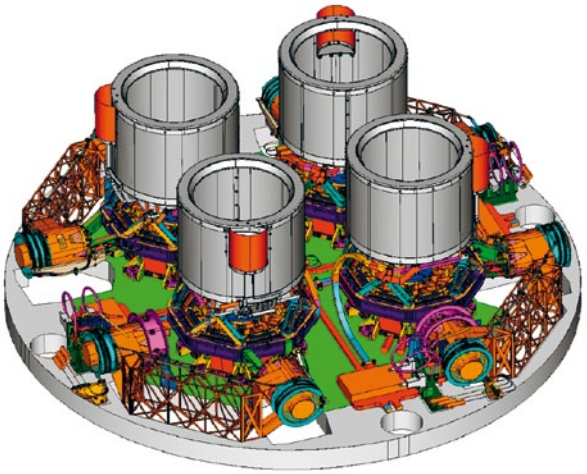
IATM

Ion Thruster Alignment Mechanism (ITAM)

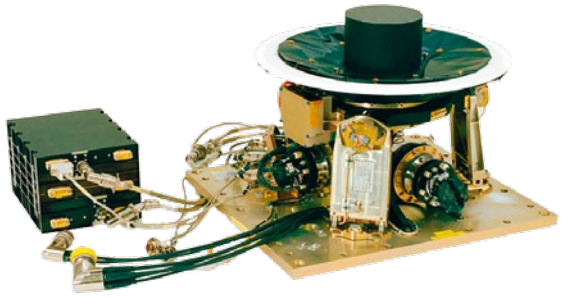
Mission: Artemis, launched 2001 The ITAM supports two Electric Propulsion Thrusters, one RIT and one EIT, in their nominal position of approximately 45° during launch, by means of a dedicated Hold-Down and Release Mechanism. Upon its release, the Pointing Mechanism Platform can be tilted around two axes. This motion is facilitated by two linear actuators, which drive the platform via a strut-linkage around a spherical joint.

Thruster Pointing Assembly (TPA)

Mission: Bepi Colombo, planned launch 2014 The TPA consists of the drive electronics TPE and 4 thruster pointing mechanisms TPM. Each supports an Electric Propulsion Thruster QinetiQ T6 in stowed configuration during launch, by means of a single release actuator Hold-Down and Release Mechanism. Upon its release, the Pointing Mechanism Platform can be tilted around two perpendicular axes. This motion is facilitated by two geared rotary actuators.



TPA



EPMEC

Electrical Propulsion Mechanism (EPMEC)

Mission: SMART-1, launched 2003 The SMART-1 Spacecraft was developed by the Swedish Space Corporation for the European Space Agency. It was used as a demonstration test bed for various new technologies needed for interplanetary missions, one of which is to use an Electric Propulsion System as the main thruster power source for the mission. The EPS system that has been selected for the SMART-1 Mission is the PPS-1350 from SNECMA.

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