

# KARMA-7 FG



## KONGSBERG KARMA-7 FG

### KARMA-7 FG Antenna Pointing Mechanism

The KARMA-7 is a state-of-the-art space qualified Antenna Pointing System that consists of two main sub-systems, the mechanism with a traditional azimuth over elevation configuration, and the RF system. The RF system consists of the RF feed network (rotary joints and wave guides), and a 22 cm antenna with polarizer.

The mechanism is realised using two identical Small Rotary Actuators (SRA) based on the Kongsberg EuroKARMA drive-line. The mechanism has been developed to accept RF sub-systems with single or dual polarisation in Ka-band.

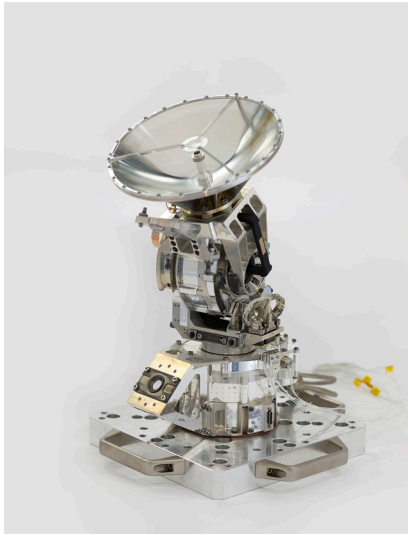
The development and qualification of the APM was performed under an ESA GSTP. In 2015 KARMA-7 was selected for the MetOp-SG Ka-band data downlink. Each of the 6 MetOp-SG satellites carries two APMs, one nominal and one redundant, for a total delivery to MetOp-SG of 12 Flight Models and one spare.

Two KARMA-7 will be delivered in each of the Copernicus programs for CHIME, ROSE-L and LSTM for a minimum total of 6 Flight Models (3 optional). ROSE-L will be equipped with a dual polarized RF-system. LSTM will be equipped with a larger 30 cm antenna.

#### FEATURES

##### General

- Long life
- European components
- High TX power capacity
- Low insertion loss
- Full hemispherical coverage
- Optional end stop proximity feedback
- Redundant position sensors and motors



## KARMA-7 FG TECHNICAL DATA

### Mechanism

|                                |   |
|--------------------------------|---|
| Motor type                     | Redundant two phase bipolar stepper                         |
| Coverage                       | $\pm 210^\circ$ in azimuth, $\pm 90^\circ$ in elevation     |
| Rotational speed capability    | 17 °/s  |
| Full step resolution           | 0.012°  |
| Qualification operational life | 7.5 years   |
| Qualification revolutions      | 200 000 Cycles (equiv. 180 000 revs az and 120 000 revs el) |
| Power requirements             | Typically 25 W peak (depending on speed)                    |
| Position feedback              | Redundant potentiometer                                     |

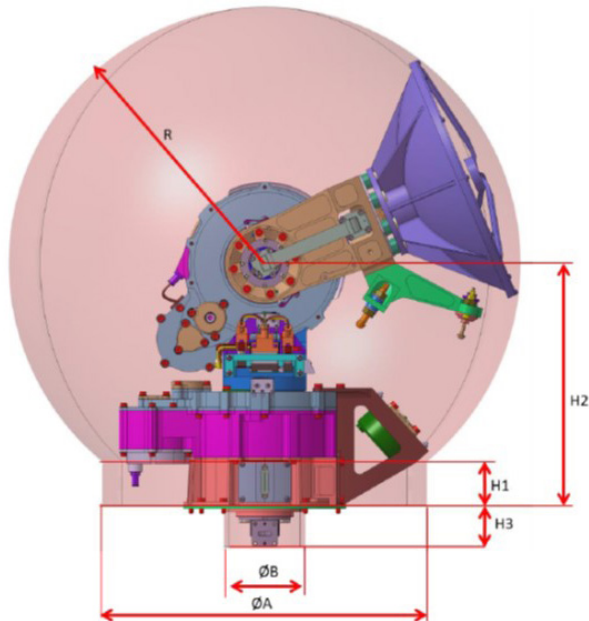
### Main RF characteristics (Ka-band)

|                  |                                |
|------------------|--------------------------------|
| Frequency        | 25.5 to 27 GHz                 |
| System Gain      | 31 dBi                         |
| Insertion loss   | < 0.8 dB                       |
| Power capability | 2x 70 W                        |
| Polarisation     | RHCP or LHCP or Dual Polarized |

### Qualification temperatures

|                 |                  |
|-----------------|------------------|
| Non-operational | -40 °C to +70 °C |
| Operational     | -30 °C to +60 °C |

|             |        |
|-------------|--------|
| <b>Mass</b> | 7.6 kg |
|-------------|--------|



### Dimension

|                                |                   |
|--------------------------------|-------------------|
| ØA                             | 280 mm            |
| ØB                             | 70 mm             |
| R                              | 221 mm            |
| H1                             | 37.5 mm           |
| H2                             | 208.5 mm          |
| H3                             | 36 mm             |
| Total height from SC IF = H2+R | 208.5+221=429.5mm |

### Contact:

Johan Mürer  
 Product Specialist / Manager Antenna Pointing  
 Email: johan.a.murer@kongsberg.com  
 Telephone: +47 924 41 062

