EUROPEAN ROBOTIC ARM (ERA)

Large relocatable symmetrical robotic arm with 7 degrees of freedom

ERA acts as a tool for: Installation, deployment and replacement of elements of the Russian Segment of the Space Station, inspection of the Russian Segment, support/transfer of EVA cosmonauts, transfer of Orbital Replacement Units and other assembly tasks.

The arm consists of 2 End Effectors, 2 Wrists, 2 Limbs and 1 Elbow joint together with electronics and cameras. Both ends act as either a “hand” for the robot or the base from which it can operate.
European Robotic Arm

Dimensions
- Total length: 11,300 mm
- Reach: 9,700 mm
- Tip position accuracy: 5 mm
- Maximum tip speed: 100 mm/s

Mass budget
- Launch mass: 630 kg
- Max. P/L handling capability: 8,000 kg

Communications infrastructure
- Power, data and video signals cabling and special fixtures on End Effector and Base Point.

Electrical power
- Average operation power: 475 W (120 V DC)
- Peak operation power: 800 W (120 V DC)

Main construction materials
- Limb: Carbon fibre tube and aluminium interfaces
- Wrist, Elbow and End Effector: Composed of many different materials
- Thermal Protection: Beta Cloth Blankets

Main contractor
- Dutch Space (Leiden, The Netherlands), leading a consortium of many subcontractors

Specifications
- ERASMUS User Centre and Communication Office
## Specifications

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### LAUNCH CONFIGURATION
- Launched in so called «Charlie Chaplin» configuration with power off

- **Launch vehicle:** Proton
- **Launch site:** Baikonur
- **Launch date:** 2012

### ON-ORBIT CONFIGURATION
- Attached to different locations on the Russian Segment
- Home base: Permanent Multipurpose Module (PMM)

### FLIGHT HARDWARE
- End Effector with electronics box (2)
- Base Points (2 on launcher interface and multiple on ISS)
- Wrist (comprising roll, yaw and pitch joints) with joint electronics (2)

### CLU:
Camera and Lighting Units (4) are provided for proximity control and overviews

### IMMI:
Intra Vehicular Activity Man Machine Interface via a laptop computer

### EMMI:
Extra Vehicular Activity Man Machine Interface via a control panel

### CONTROL INFRASTRUCTURE
- From the inside of the station with the IMMI via a laptop computer and the Control Post Computer
- From the outside of the station with the EMMI via a control panel and the Control Post Computer

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### Diagram

- **Elbow**
- **Joint Electronics**
- **End Effector 2 (EE)**
- **Wrist 2**
- **Limb 2**
- **Central Control Computer**
- **Limb 1**
- **Base Point with alignment target**
- **End Effector 1 (EE)**
- **Wrist 1**
- **Roll Joint**
- **Pitch Joint**
- **Yaw Joint**
- **Camera and Lighting Unit (CLU)**

### Illustrations

- [Website](http://erasmus.spaceflight.esa.int)