



The MAT 6D (Master Arm for Telerobotics) is a 6 degrees-of-freedom haptic device or "master arm", equipped with a force-feedback handle. It is specifically designed for remote operation of robotic manipulators in hostile environments.

Thanks to its embedded Cartesian force control and the absence of singularities, it can be used with any kind of slave arm kinematics. With the help of force-feedback, the operator is able to control precisely the forces exerted by the remote manipulator, thus reducing the risk of tool breakage and environmental damage.

The Mat 6D is just as well easy to integrate inside a virtual reality environment for operator training and mission planning.

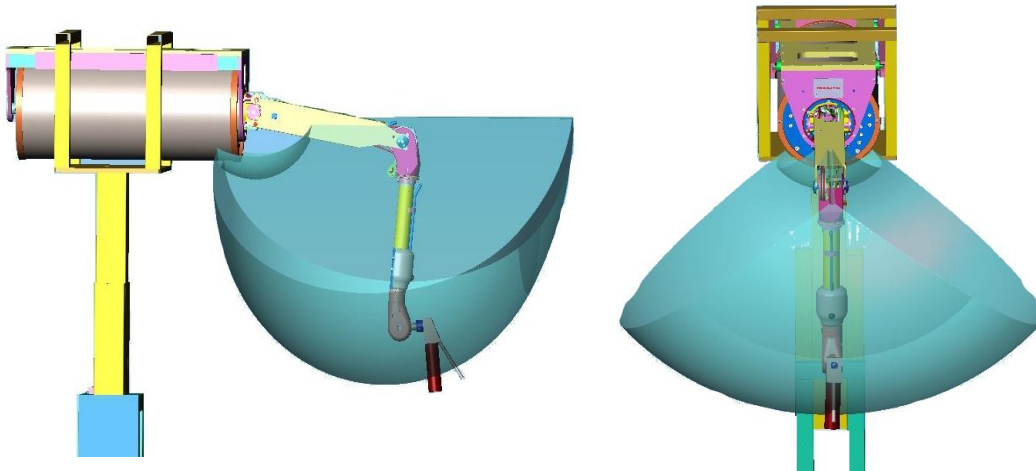


## Technical characteristics

The MAT 6D is the only force-feedback system of the market today, which offers the following characteristics:

- ✓ Force-feedback on all 6 degrees-of-freedom (3 translations and 3 rotations)
- ✓ Force-feedback handle
- ✓ Operational workspace corresponding to the movements of a human arm
- ✓ Length of the segments constituting the arm: 500 mm
- ✓ Maximum continuous force of 30 N (guaranteed inside a cube 40 cm in size)
- ✓ Maximum continuous torque of 3 N.m (guaranteed inside a cube 40 cm in size)
- ✓ Standard tele-operation handle equipped with programmable switches
- ✓ Highly dependable force transmission system (ball screws)
- ✓ Mechanical support adjustable in height (optional hydraulic assistance)
- ✓ Weight of 34 kg, transportable by two persons without specific equipment
- ✓ Development kit (API) available for the major operating systems
- ✓ Demonstrated compatibility with the major software applications on the market today, using dedicated plug-ins: Vortex™, Havok™, ODE, Virtools™, Catia™ V5, OpenMask, etc.
- ✓ Compatible with tele-operation software TAO2000™ V2

## Device workspace



The MAT 6D is composed of two main articulated segments fixed on a rotating base. The second segment ends with an articulated wrist, which can rotate around three concurrent axes. As a consequence, the haptic interface is a 6 degrees-of-freedom device, with force-feedback in all directions. The workspace of the MAT 6D is large enough to include a cube 40 cm in size. The resolution in position is 0.02 mm in translation, and  $1e^{-4}$  rad in rotation.

## Detailed specification

Axis nb	Clearance (°)	Continuous torque (N.m)	Max torque (N.m)	Max Force (N)
1	69	29 Nm	90 Nm	180 N
2	!	22 Nm	66 Nm	132 N
!	109	26 Nm	78 Nm	156 N
#	326	4 Nm	12 Nm	24 N
"	210	4 Nm	12 Nm	24 N
6	510	4 Nm	12 Nm	24 N



Courtesy of Areva

