



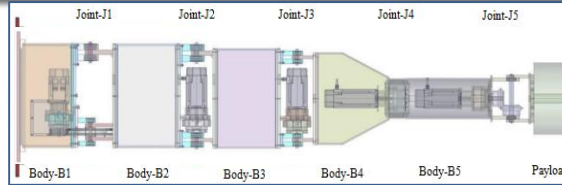
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## Development Challenges

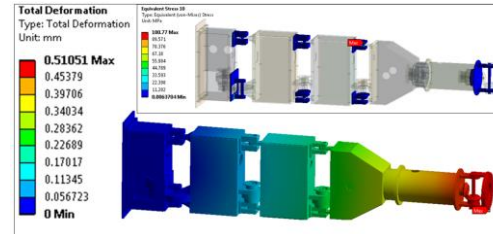
- 6 Axis System
- Positional Accuracy < 5mm
- Payload at TCP at 2m from Base > 25kg
- Real Time (RT) Controls
- RT tracking of system position during operation
- Design as per industrial standards

## System Specifications

- 6-DOF Articulated System with up to 25kg Payload
- Joint Axes: 1- Prismatic, 3-Yaw, 1-Roll & 1-Pitch/Yaw
- Control Platform: RT- OROCOS Based Control
- Control Modes
  - Parallel Motor Control
  - Teach and Play Control
  - VR based control
- VR based Control and Monitoring using VR4ROBOTS Platform
- Maximum Tip Linear Velocity - 0.2 m/s
- Positional Accuracy at Tip < 2mm



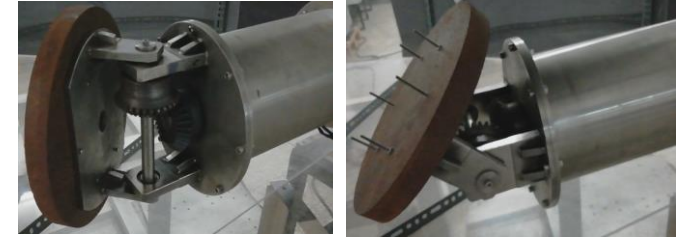
ARIA CAD Model



Structural assessment using FEA



ARIA on Linear Drive System, at IPR



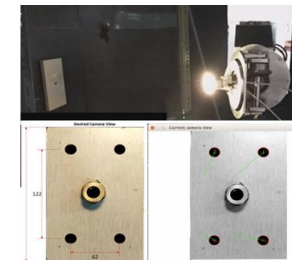
ARIA Payload (~25kg) demonstration for Yaw and Pitch

## Achievement

- The system can handle a payload of ~25kg at reach of 2m with positional accuracy of < 2mm
- The system proves the expertise of the IPR RHDTD Division, IPR to design and develop precise remote handling equipment with heavy payload capabilities, a major requirement for future tokamak devices
- The unique real time VR based control and monitoring system makes it easy to use the system in remote locations.



VR based controlling of ARIA arm



ARIA with camera for tile inspection

## Applications

- A VR assisted system that can be used to deliver high payloads within in-hospitable environments
- A VR assisted system that can be used to carry out tile inspections and cleaning at remote locations within tokamak environment