

25 Meril Subsidiaries Globally



FUTURE FORWARD

MISSO

ROBOTIC SYSTEM



Indigenous Inspiration, Transcending Borders

MISSO Robotic System: Empowering Innovation, Engineered in India. Discover the future of robotics with cutting-edge technology designed to meet global demands, proudly developed and manufactured right here in India.

MISSO Robotic System is the most advanced fully active surgical robotic technology assisting surgeons with personalised pre-planning and precise cutting for predictable and consistent results in joint replacement Surgeries.

It is dynamically equipped with optical tracking sensor, 6-axis articulated robotic arm and superior safety sensors. MISSO robotic system also helps surgeon to do real time gap check and intra-op modification of surgical plan.



At a Glance



01 Main Console

- System Monitor
- Optical Tracking System (OTS)



02 Robotic Arm

- Operating Software
- Main Controller
- Robot Arm
- Milling Tool
- Irrigation

03 Planner

- Surgical Planning Software

At a Glance

Product & Class

Automatic Robot Surgical System (Class 3)

Planning

3D CT Base Surgical Planning

Safety

Emergency stop & Manual guide

Detection

OTS (Optical Tracking System)

Robot Precision

Repeat precision
<.50 MM / positioning accuracy <1MM

Cutting

- Fully automatic cutting (Milling)
- No cutting guides (jigs) required
- Tibial cut including keel preparation
- Fully finished femur with all the cuts and peg holes

Robot Cutting

Max .50mm/sec

Other Features

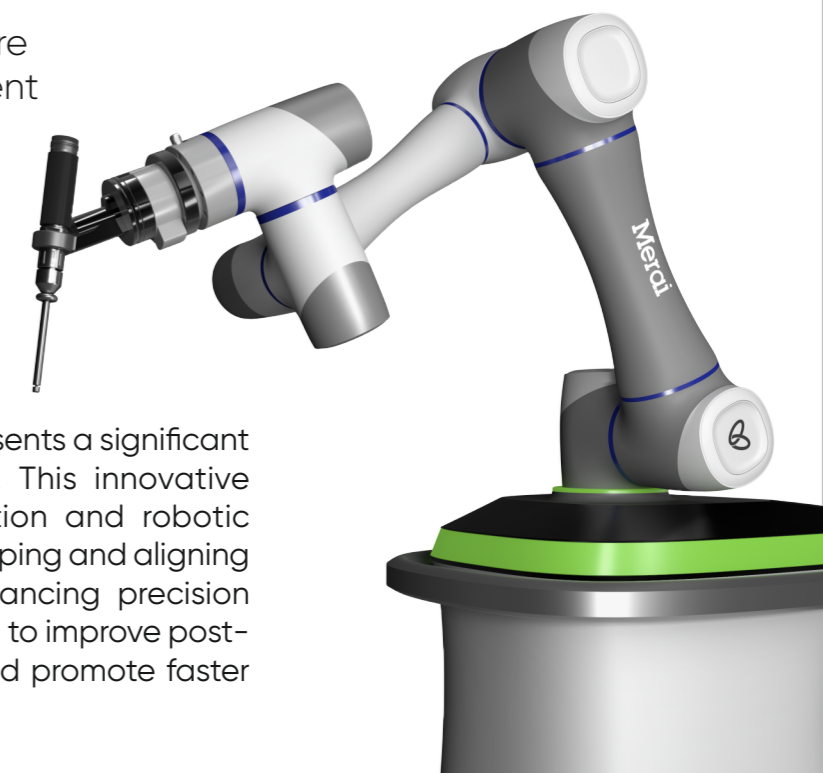
- Wide surgical space and high freedom (6 axis articulated robot)
- Patient-Robot Position Guide (surgical space check)
- Speed control during cutting
- Compact hardware, minimize product space

Key Features

- 1 Precision**
Precise cutting for sub millimetre accuracy for optimum alignment
- 2 Personalized**
Personalized 3D pre-planning
- 3 Agile**
Real-time assistance
- 4 Safety**
Emergency stop & less human intervention

1 Precision

Precise cutting for sub millimetre accuracy for optimum alignment



Precise cutting with MISSO robotic system represents a significant advancement in Joint replacement surgery. This innovative technology uses computer-assisted navigation and robotic assistance to ensure the utmost accuracy in shaping and aligning the artificial knee joint components. By enhancing precision during the procedure, MISSO robotic system aim to improve post-operative outcomes, reduce complications, and promote faster recovery for patients.

2 Personalized

Personalized 3D pre-planning

With MISSO robotic system surgeons can create customized surgical plans, allowing for optimal implant placement, alignment, and fit, tailored to each patient's unique anatomy.

This level of personalization not only enhances surgical accuracy but also contributes to better post-operative outcomes and reduced risks of complications. Patients can expect improved joint function and a quicker return to their daily activities, making knee replacement surgery a more patient-centered and effective solution.



CT SCAN OF PATIENT TRANSFORMED INTO 3D REPLICA



PERSONALIZED PLAN IS CREATED AND DISPLAYED BASED ON THE PATIENT-SPECIFIC BONE

3 Agile

Real-time assistance

MISSO Robotic System is a state-of-the-art technology which provide surgeons with real-time assistance during the procedure, enabling them to make precise adjustments and fine-tune implant placement with unparalleled accuracy. The robotic system's agility allows surgeons to adapt to unexpected challenges or variations in the patient's anatomy, ensuring optimal alignment and fit of the artificial joint components.



- **VARIOUS CUTTING OPTIONS**
 - Full and partial cutting
 - Change cutting order
- **INTRA-OPERATIVE GAP CHECK- PRE/INTRA/POS**
- **PLAN CHANGING, GAP BALANCING POSSIBLE**

Saves Time

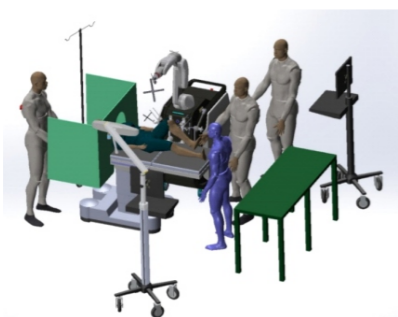
- Quick calibration, verification & registration
- Improved workspace check
- 3D bone model with fast and easy CT image data

4 Safety

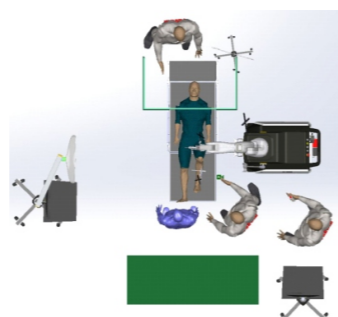
Emergency stop & less human intervention

MISSO Robotic System is enabled with Bone movement monitoring which ensures utmost safety during procedure . If patient's bone is moved more than 4 mm robot will stop automatically and post that the system is also equipped with auto recovery option for continuing with the procedure.

As MISSO robotic system is a fully autonomous system so, less human intervention is required during procedure. Hence reducing the risk of infection.



Bird View



Top View

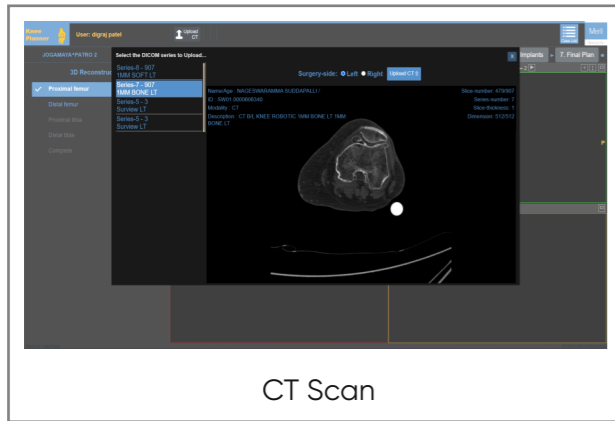
Automatic Milling Cutting

The Robotic Arm automatically and accurately moves based on the calculated values. It minimizes human errors such as slight vibrations caused while cutting. The milling tool moves precisely and cuts the surface smoothly, which leads to stable implant insertion. It can also easily cut even narrow surfaces such as the peg holes and box cut.

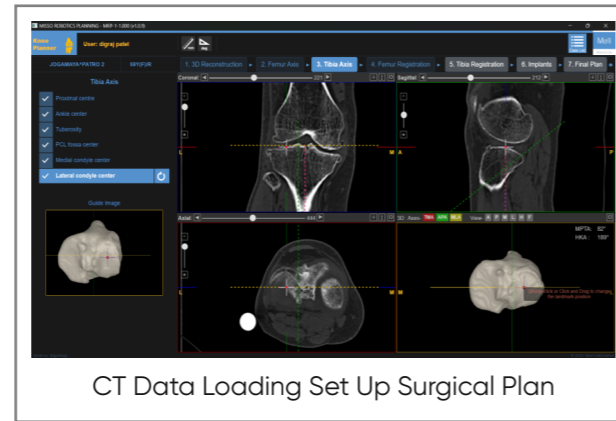


Surgical Process

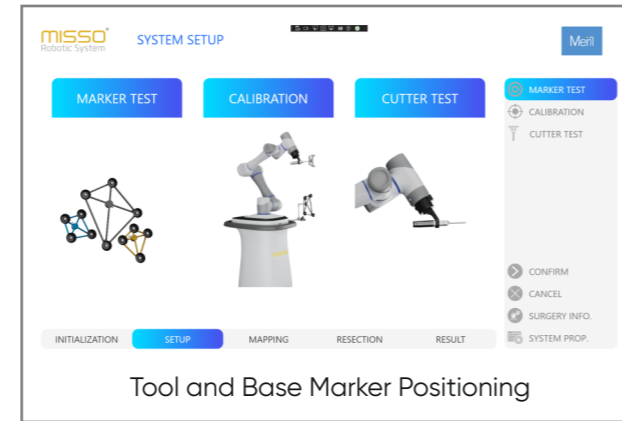
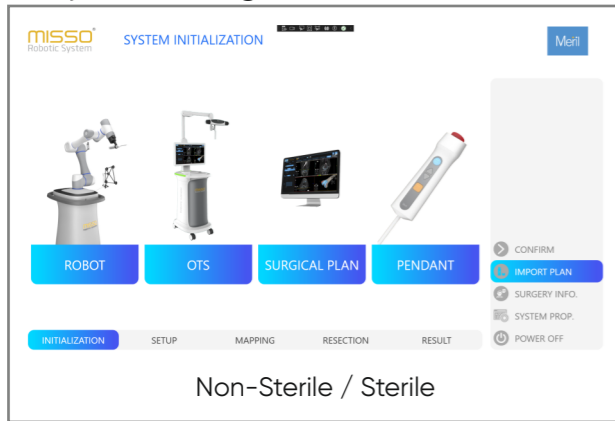
1. Scan



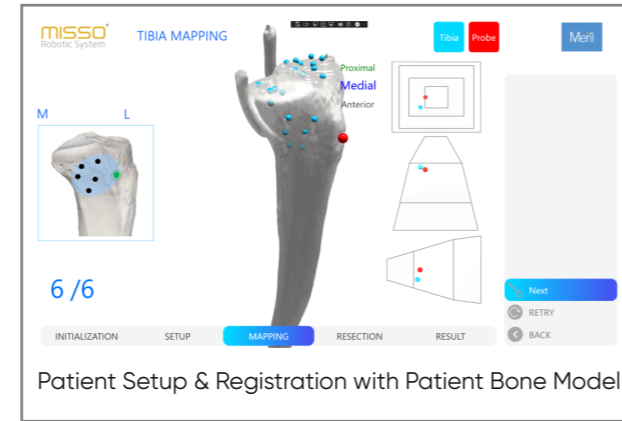
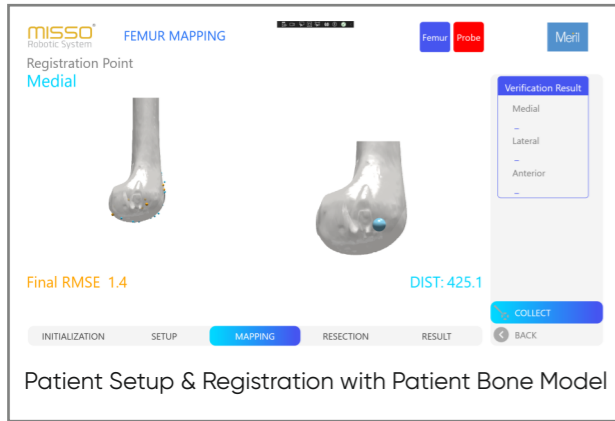
2. Surgical Planning



3. System Diagnosis



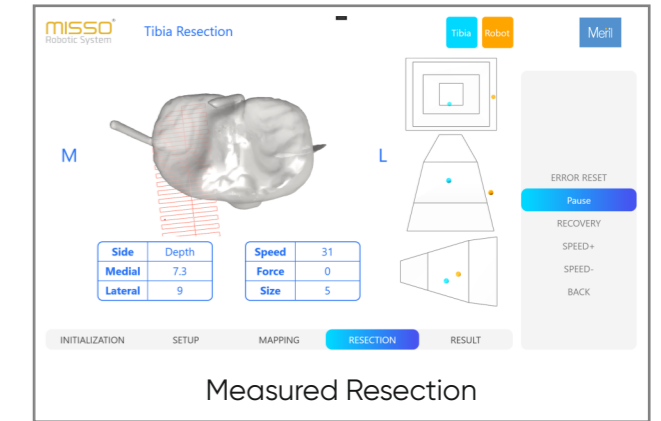
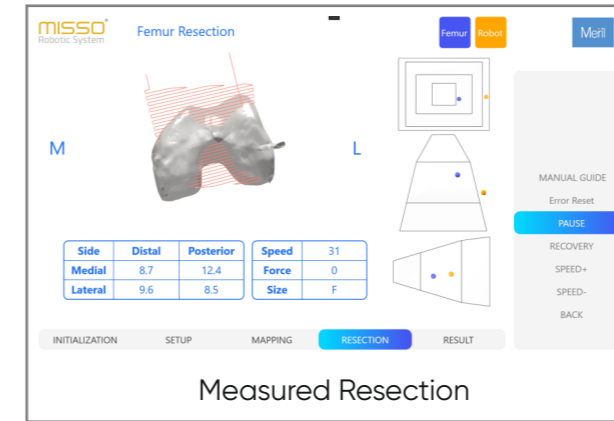
4. Registration



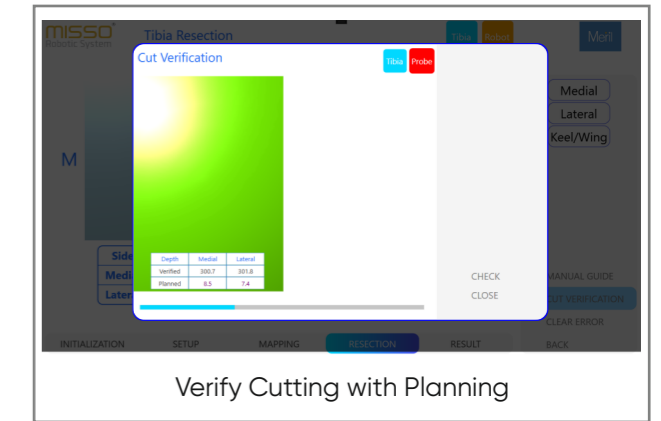
5. Gap Ckcek



6. Cutting



7. Surgery Result/Cut Verification



Intraoperative Assistance

1. Initial Planning

GAP CHECK

External 2 Valgus 0 Flexion 1

Posterior 12.4
Medial 13
Proximal 7.3

Posterior 8.5
Lateral 9
Proximal 9

IMPLANT PLANNING

FEMUR IMPLANT
TIBIA IMPLANT

RESET
HIDE IMPLANT
CAPTURE
NEXT
BACK

F/E	Bone	Dist Up/Down	Ant Up/Down	Var/Val	Int/Ext	Flex/Ext	Prox Up/Down
92							
Valgus							
5							

Gap	Medial Capt.	Max.	Lateral Capt.	Max.
Extension	0	0	0	0
Flexion	0	13	0	9

INITIALIZATION SETUP MAPPING RESECTION RESULT

2. Femoral Shift

GAP CHECK

External 2 Valgus 0 Flexion 1

Posterior 12.4
Medial 13
Proximal 7.3

Posterior 8.5
Lateral 9
Proximal 9

FEMORAL SHIFT

DISTAL 1mm UP
DISTAL 1mm DOWN
ANTERIOR 1mm DOWN
ANTERIOR 1mm UP
CLOSE

F/E	Bone	Dist Up/Down	Ant Up/Down	Var/Val	Int/Ext	Flex/Ext	Prox Up/Down
92							
Valgus							
4							

Gap	Medial Capt.	Max.	Lateral Capt.	Max.
Extension	0	0	0	0
Flexion	0	13	0	9

INITIALIZATION SETUP MAPPING RESECTION RESULT

3. Femoral Rotation

GAP CHECK

External 2 Valgus 0 Flexion 1

Posterior 12.4
Medial 13
Proximal 7.3

Posterior 8.5
Lateral 9
Proximal 9

FEMORAL ROTATE

Varus 1°
Valgus 1°
Flexion 1°
Extension 1°
Internal 1°
External 1°
CLOSE

F/E	Bone	Dist Up/Down	Ant Up/Down	Var/Val	Int/Ext	Flex/Ext	Prox Up/Down
92							
Valgus							
4							

Gap	Medial Capt.	Max.	Lateral Capt.	Max.
Extension	0	0	0	0
Flexion	0	13	0	9

INITIALIZATION SETUP MAPPING RESECTION RESULT

4. Femur Implant Size

GAP CHECK

External 2 Valgus 0 Flexion 1

Posterior 12.4
Medial 13
Proximal 7.3

Posterior 8.5
Lateral 9
Proximal 9

IMPLANT SIZE

Size H
Size G
CLOSE

F/E	Bone	Dist Up/Down	Ant Up/Down	Var/Val	Int/Ext	Flex/Ext	Prox Up/Down
92							
Valgus							
4							

Gap	Medial Capt.	Max.	Lateral Capt.	Max.
Extension	0	0	0	0
Flexion	0	13	0	9

INITIALIZATION SETUP MAPPING RESECTION RESULT

5. Tibia Shift

GAP CHECK

External 2 Valgus 0 Flexion 1

Posterior 12.4
Medial 13
Proximal 7.3

Posterior 8.5
Lateral 9
Proximal 9

TIBIAL SHIFT

PROXIMAL 1mm UP
PROXIMAL 1mm DOWN
CLOSE

F/E	Bone	Dist Up/Down	Ant Up/Down	Var/Val	Int/Ext	Flex/Ext	Prox Up/Down
92							
Valgus							
4							

Gap	Medial Capt.	Max.	Lateral Capt.	Max.
Extension	0	0	0	0
Flexion	0	13	0	9

INITIALIZATION SETUP MAPPING RESECTION RESULT

6. Tibia Rotation

GAP CHECK

External 2 Valgus 0 Flexion 1

Posterior 12.4
Medial 13
Proximal 7.3

Posterior 8.5
Lateral 9
Proximal 9

TIBIAL ROTATE

Varus 1°
Valgus 1°
Flexion 1°
Extension 1°
Internal 1°
External 1°
CLOSE

F/E	Bone	Dist Up/Down	Ant Up/Down	Var/Val	Int/Ext	Flex/Ext	Prox Up/Down
92							
Valgus							
4							

Gap	Medial Capt.	Max.	Lateral Capt.	Max.
Extension	0	0	0	0
Flexion	0	13	0	9

INITIALIZATION SETUP MAPPING RESECTION RESULT

7. Tibia Implant Size

GAP CHECK

External 2 Valgus 0 Flexion 1

Posterior 12.4
Medial 13
Proximal 7.3

Posterior 8.5
Lateral 9
Proximal 9

IMPLANT SIZE

Size 6
Size 4
CLOSE

F/E	Bone	Dist Up/Down	Ant Up/Down	Var/Val	Int/Ext	Flex/Ext	Prox Up/Down
92							
Valgus							
4							

Gap	Medial Capt.	Max.	Lateral Capt.	Max.
Extension	0	0	0	0
Flexion	0	13	0	9

INITIALIZATION SETUP MAPPING RESECTION RESULT

8. Re-planning

GAP CHECK

External 2 Valgus 0 Flexion 1

Posterior 12.4
Medial 13
Proximal 7.3

Posterior 8.5
Lateral 9
Proximal 9

IMPLANT PLANNING

FEMUR IMPLANT
TIBIA IMPLANT

RESET
HIDE IMPLANT
CAPTURE
NEXT
BACK

F/E	Bone	Dist Up/Down	Ant Up/Down	Var/Val	Int/Ext	Flex/Ext	Prox Up/Down
92							
Valgus							
4							

Gap	Medial Capt.	Max.	Lateral Capt.	Max.
Extension	0	0	0	0
Flexion	0	13	0	9

INITIALIZATION SETUP MAPPING RESECTION RESULT

Why Robotic Surgery?

- Greater flexibility | Small scars | Less pain | Less blood loss
- Less tissue damage | Faster overall recovery time
- Shorter hospitalization time | Reduced risk of infection
- Quicker return to normal activity | Micro precision



