**PiGalileo benchmark:**

What is PiGalileo?

PiGalileo is a navigation system with a computer assisted cutting guide.

How does PiGalileo work?

PiGalileo works by computing the necessary cuts and alignments from the data inputted captured from an infra-red navigation camera into the navigation system using optical alignment tools. The computer then controls a 5-in-1 cutting block which a surgeon inserts a saw to make cuts to the bone. A ligament balancer apparatus is used to align the implant to ensure equally distributed loads. The surgeon is in control the entire time of the surgery (no active components).

**Functions:**

User Interaction

- installation/mounting – The computer-guided cutting block is mounted onto the bone using pins.

- Model input – This is an imageless system. Reference points captured from the infra-red cameras are projected onto generic bone models.

- User connection – The surgeon uses the “robot” as a cutting guide. It is similar to Praxiteles.

- Tool connection – The “robot” only positions a 5-in-1 universal cutting block. The surgeon inserts a saw through slots in the block.

- Device motion – The device allows only planar cuts restricted by the cutting block.

- on/off functionality – yes

- Sterilization – From pictures of the device being used in surgery, it is in direct contact with the patient and is not covered. All connections appear to be sealed.

- Maintenance – no information about this is available.

- Positioning calibration – The system is calibrated by palpating anatomical landmarks using the optical apparatus.

- Positioning awareness/updating – no information available.

AUTONOMOUS

- Provides tool-position constraint – Yes. The slots in the cutting block restrict the saw blade. The positioning robot can shift in 0.5mm steps.

- Monitoring/awareness of tool position - Yes. The position is constantly updated and displayed on the screen for the surgeon’s viewing.

- How allows 3D movement (3 DOF) – The cutting block positioning robot has two joints that allows it to move the block in only two degrees of freedom.

- Convert input into traceable surface – No. The input is only used to position the cutting block.

MODES OF OPERATION

-On - present

-Off - present

- Idle – not present