The project will integrate the developed model with the da Vinci surgical system, using stereo endoscope to generate 3D spatial information of surgical instruments. The two-PC setup allows tasks to be executed more efficiently: the first PC is responsible for image processing tasks, including pose estimation, depth reconstruction, and 3D fusion, while the second PC, receiving processed signals via TCP/IP, controls the da Vinci robot in real-time. The dVRK-ROS bridge and CISST/SAW controller will be used to achieve real-time, dynamic control of the da Vinci robot based on the pose estimation outputs.