Layered Architecture

Data Exchanged

Bioprinting System

Motor control — **Bioink Dispensing Control**

Volume sensing — **Bioink Management**

(7)

(8)

Robotic System

Controllers — **Visual Servoing & Control**

(6)

Time | Speed | Acceleration | Path — **Trajectory Definition**

(5)

ZigZag | Parallel Lines | Grid — **Path Planning**

(4)

Position | Area | Perimeter | Mesh — **Spatial Data Processing**

(3)

Vision System

Position | Area | Perimeter | Mesh — **Spatial Data Processing**

(2)

Filters | Segmentation — **Wound Detection & Segmentation**

(1)

RGB | IR | Depth | Point Cloud — **Image Capture**
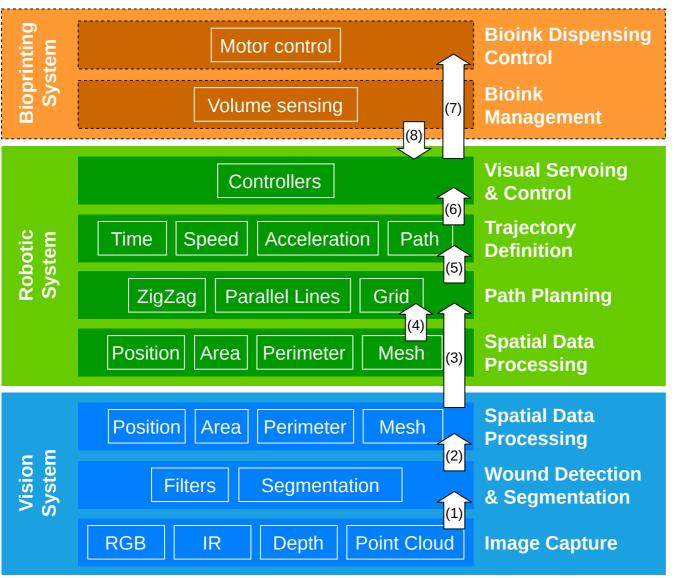
(1) RGB image (3 channels)
 IR image (1 channel)
 Depth image (1 channel)
 Point cloud (3D points)

(2) Wound contours (2D points)
 Point cloud (3D points)

(3) Wound contours (2D points)
 Wound contours region (3D poses)
 Camera to Robot transform (4x4 matrix)

(4) Wound contours (2D points)
 Wound contours region (3D poses)
 Camera to Robot transform (4x4 matrix)

(5) Wound filling path (3D poses)
 Bioprinting actions (commands)

(6) Wound filling trajectory (3D poses, bioprinting actions)

(7) Bioprinting actions (commands)

(8) Bioink volume state