

Multi-Syringes E-Jet Process Development

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Goals

- Develop multiple-ink E-Jet printing capability.
- Address integration, testing, and characterization of the system with existing E-Jet capabilities.
- Integration with E-Jet desktop system.

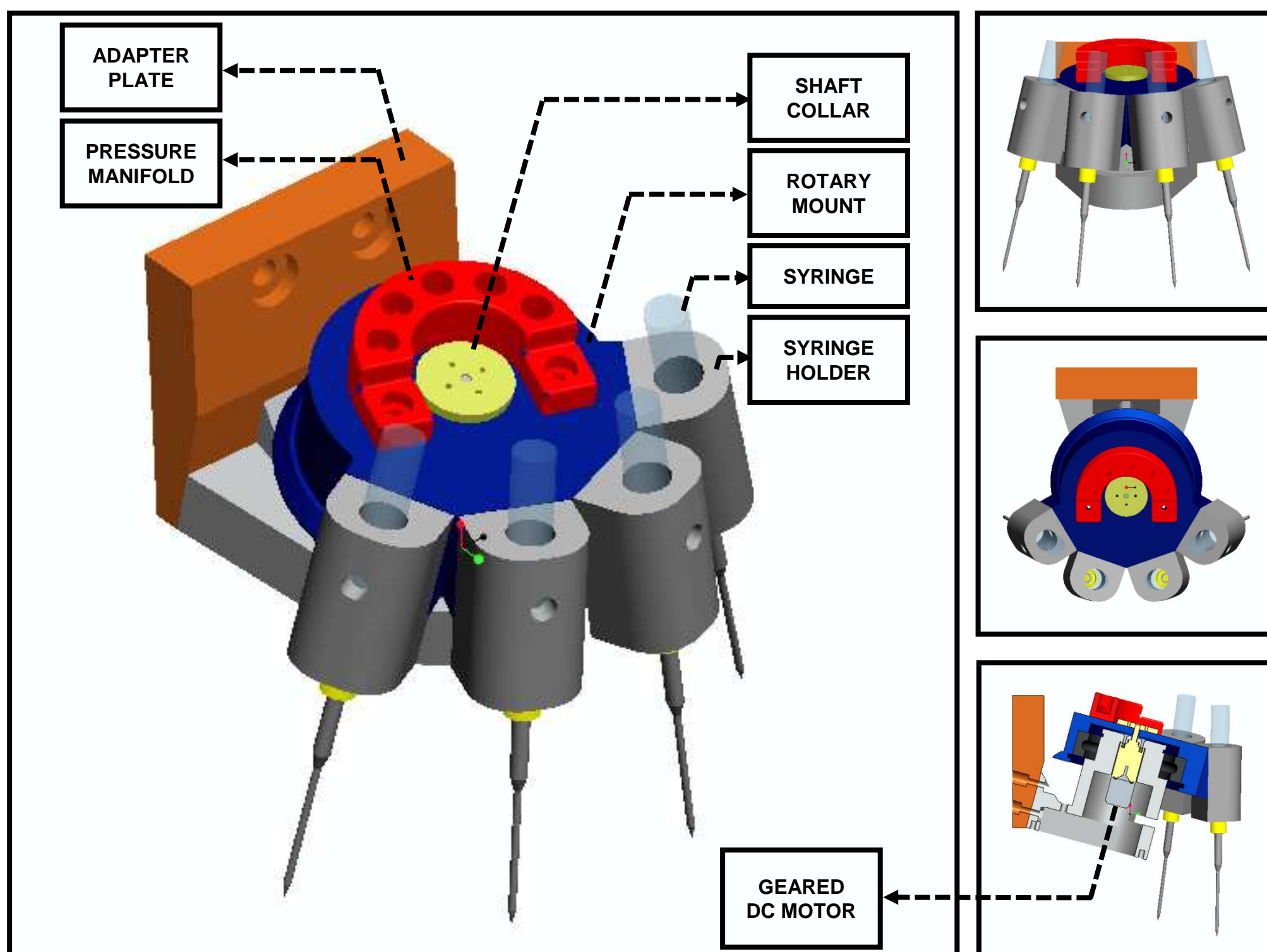
Mapping to Center's Objectives

- Enables direct heterogeneous integration using E-Jet process.
- Development of commercially viable desktop nano-manufacturing processes.

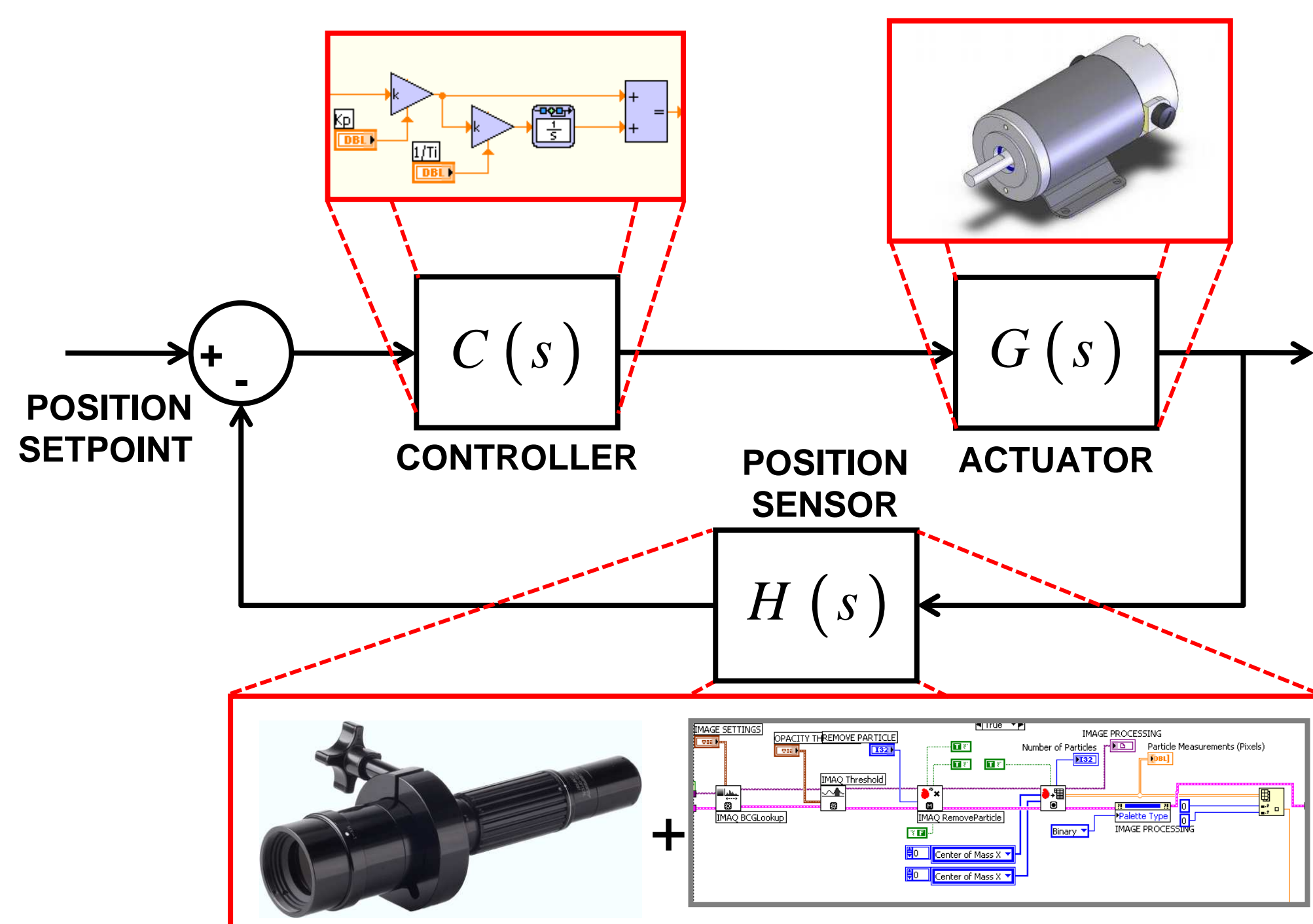
Challenges

- Variation on printing conditions; i.e: lighting condition, nozzle diameter, ink properties, etc.
- Development of a compact and fully integrated multi-syringes design for E-Jet desktop system.
- Nanopositioning in the presence of stick-slip friction.

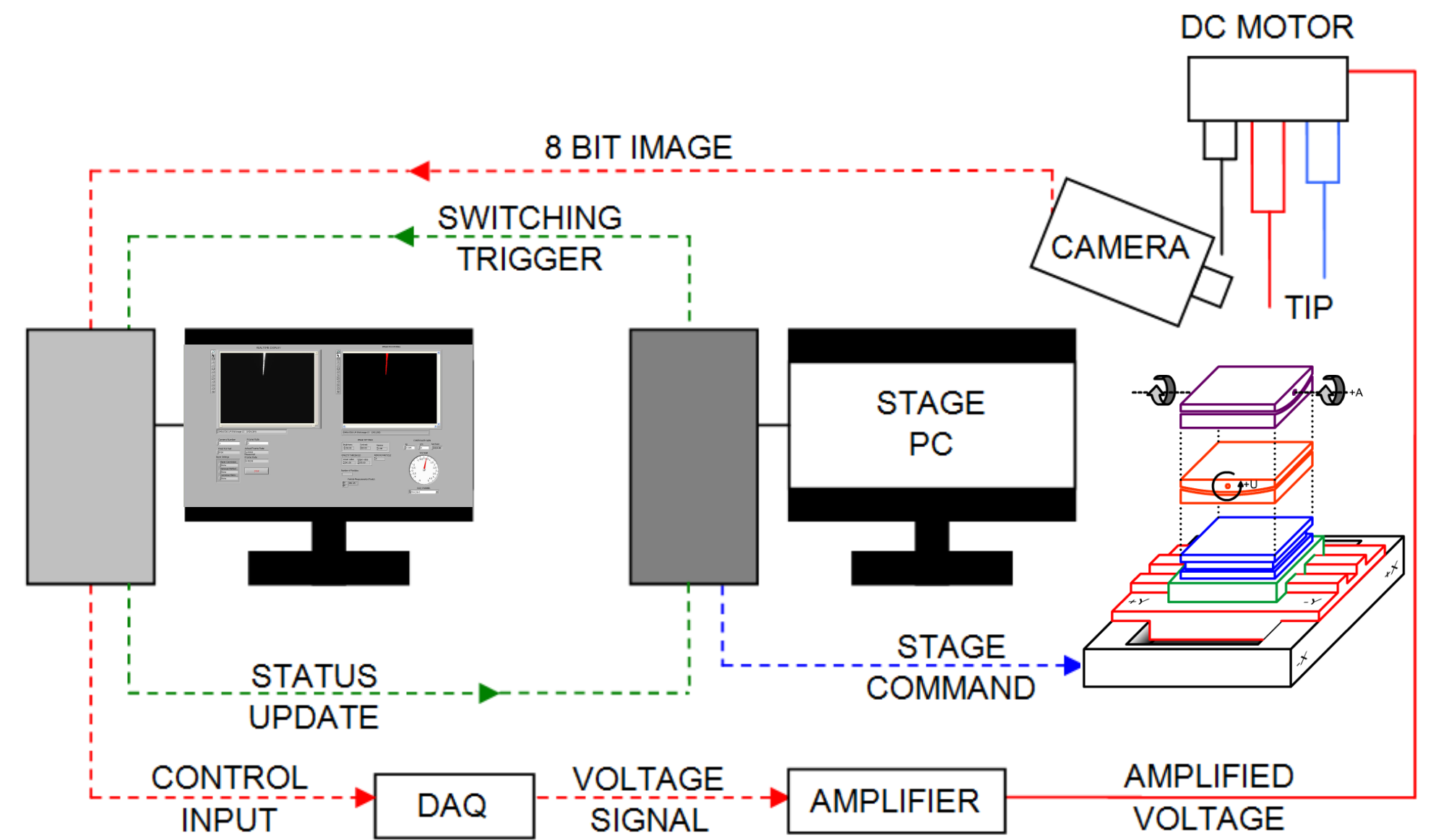
CAD Design



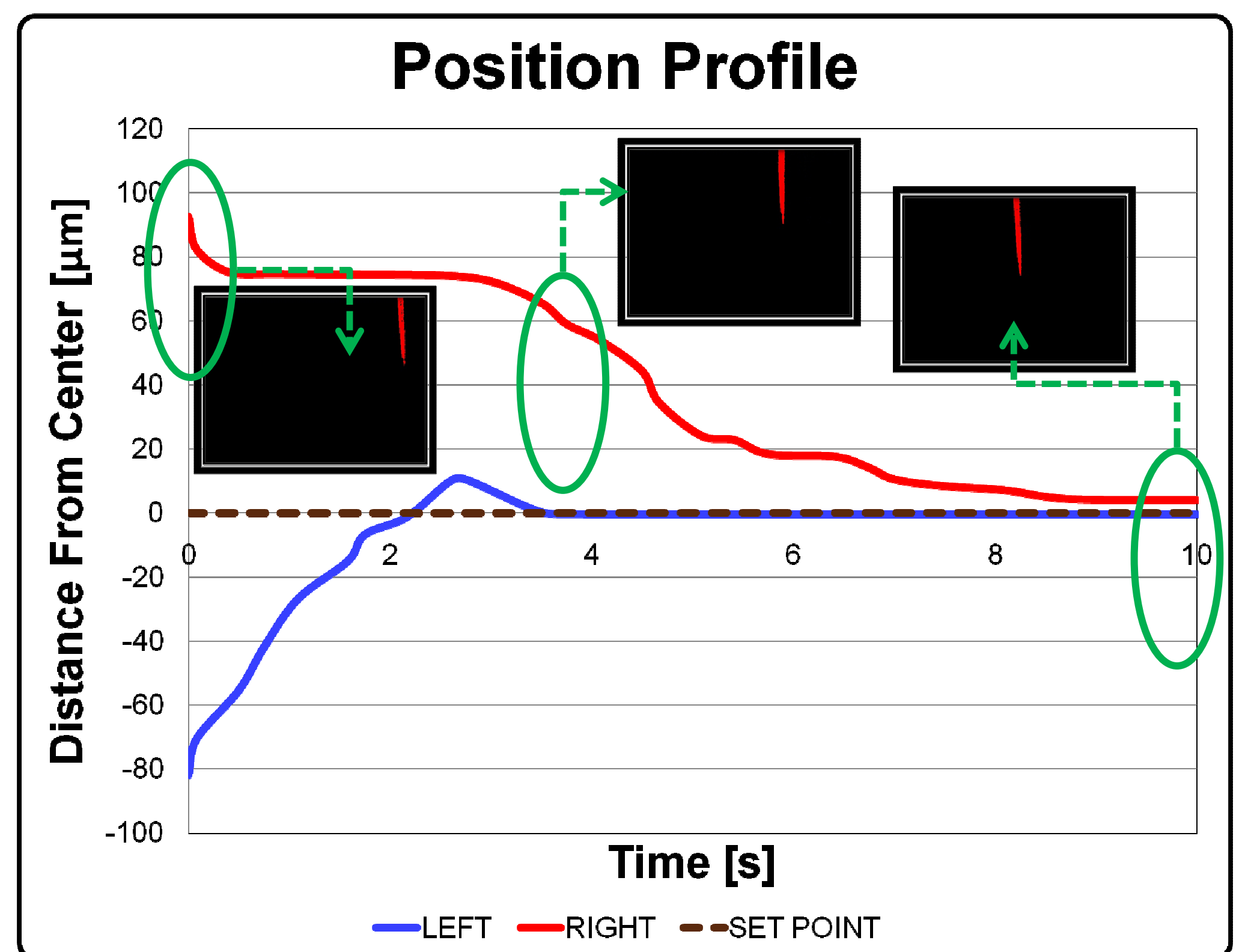
Control Block Diagram



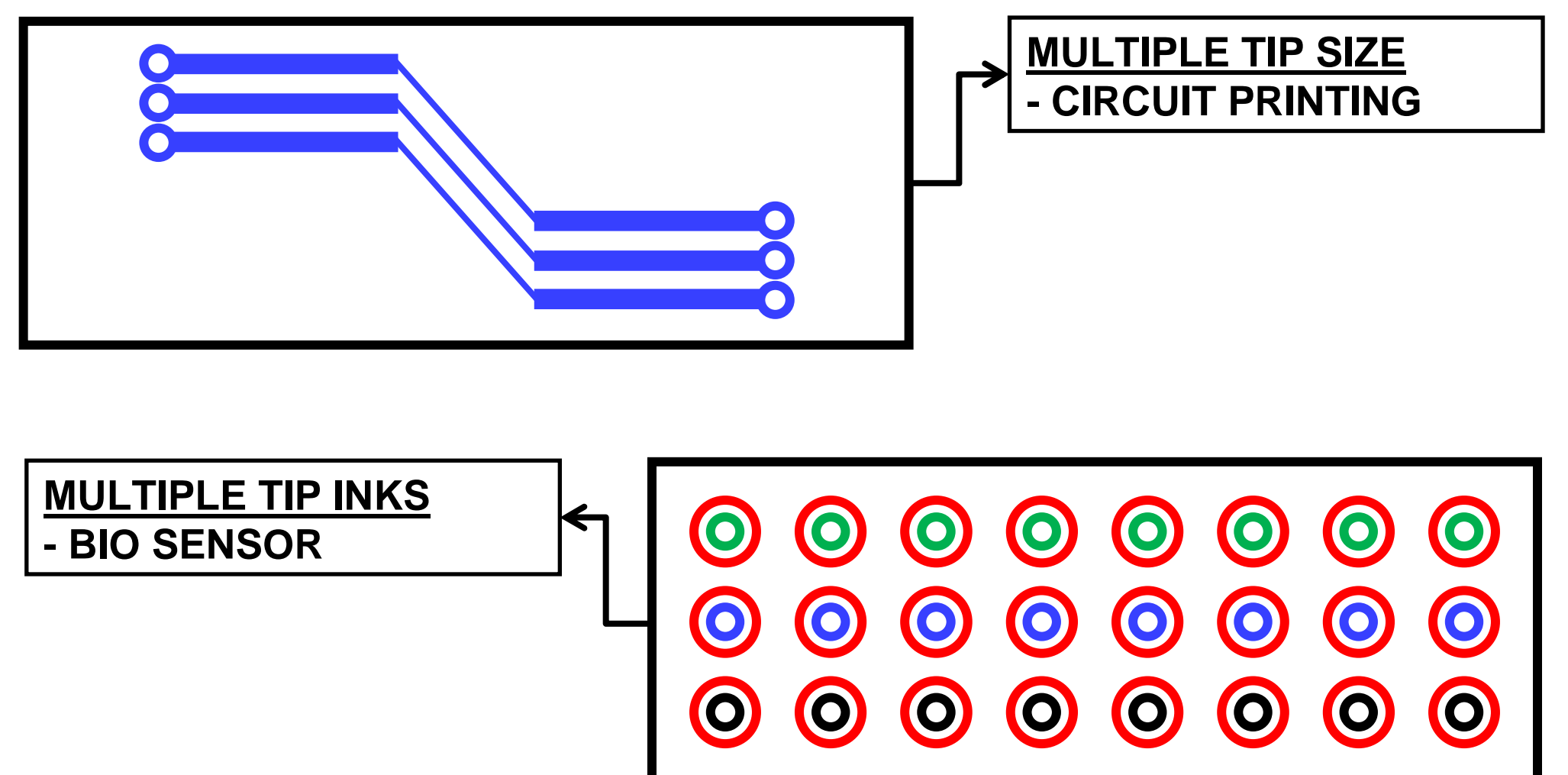
System Schematic



Vision Based Positioning System



Potential Application



Research Plans

- Develop a more robust adaptive image processing and user friendly interface.
- Integrate a more compact design for E-Jet desktop system.
- Develop conversion algorithm from multi-layer vector image to a fully automated multi-material deposition system.
- Integrate pulse control into multi-syringes design.
- Generate more printing results.