

Automatic Applicator

Multiple Degree of Freedom Robot Arm for Controlled Paint Application

Overview

Manzi Zafar has asked Will Borzon, Design Engineering Consultant, to provide a proposal for the design development, design research support, and detailed design/drawings of an Automatic Applicator. Based on the overview and recent discussions with Munzir Zafar, it is understood that a proposal on the design of an Automatic Applicator will culminate in a prototype manufactured local to the painting facility in Pakistan. Design of the Automatic Applicator is focused on meeting the specifications as defined by Munzir Zafar. If there are setbacks in economic analysis or unknown technology constraints it is possible that this program could face significant delays and/or require additional resources. Delivery of a full model and drawings by July 15th is a very ambitious timeline – for this reason, a fixed budget and deliverables is not defined – Will Borzon will propose again for a second Phase of the project beyond July 15th for additional work that may be required. This proposal does not immediately take into consideration the programming or software necessary to the success of the Automatic Applicator. It is understood that Munzir Zafar will lead all aspects of the project not relating to the detailed design of the hardware itself. Considerations and affordances will be built into this design to mesh with work performed by Munzir Zafar or others (i.e. sensor type and placement, etc).

Statement of Work

This proposal outlines the general work to be completed over the next five weeks.

Week 1 (June 6 – 12): Proposal and Project Definition, Problem Definition and Research
During this week, an understanding of project deliverables and expectations is defined in a proposal submitted for review. All research performed and documented by Munzir Zafar is reviewed and considered in advance of Conceptual Design stages. Further research is performed to understand capabilities of local manufacturers, possible component suppliers and rough Bill of Materials generation, and current robotic applications relevant to the design of an Automatic Applicator.

Week 2 (June 13 – 19): Conceptual Design and Sketching
Rough sketches and concepts are generated in this phase of design, working out a number of variations on a suitable design that will optimize for cost and performance of the Automatic Applicator. Targets a general design direction by July 19.

Week 3 (June 20 – 26): Engineering Analysis and Components Sourcing
Components needed for the design direction chosen will be sourced and quoted during this phase, with engineering analysis performed on selected components such that they satisfy specifications while minimizing cost. An attempt will be made to source components local to Pakistan in order to further minimize cost and increase availability. A detailed understanding of local machining and manufacturing capabilities is required for successful completion of this step – detailed design and modeling phases will take into consideration these capabilities.

Week 4 (June 27 – July 3) + Week 5 (July 4 – 10): Detailed Design and CAD Modeling
Deliverables from these weeks include a full CAD assembly of the Automatic Applicator and renderings/images of the final design. CAD work will be performed in the software of choice by the designer.

Week 6 (July 11 – 15): Detailed Drawings

The final deliverable is a collection of pdf drawings of all parts included in the Automatic Applicator assembly, including exploded views and brief instruction on assembly of a prototype, as well as a Bill of Materials and contact information for suppliers from which parts are needed. All units will be in metric, and all text in English.

Terms of Engagement

Will Borzon will provide you with the proposed services outlined in the Statement of Work. All work completed in advance of July 15 will be handed over to Munzir Zafar. No work will be done beyond July 15 until a second proposal has been formed. All the rights to the work performed by Will Borzon are owned by the client, including rights of invention and patentable work. Design concepts that are not chosen for production or are not patented revert to Will Borzon's ownership one year after the date of this proposal. The client will be invoiced twice over the course of this project (during Week 3, and during Week 6), each for half of the agreed upon fees.

Limited Warranty and Allocation of Risk

You are responsible for adequately testing, certifying, approving and qualifying any product you elect to introduce into the marketplace, whether or not based on Will Borzon's deliverables. Although service will be performed by a Design Engineer, there is no claim to provide licensed Professional Engineering (PE) services. You are also responsible for information that you provide to Will Borzon. You agree that Will Borzon may rely on such information without independent verification. Therefore, you agree to indemnify Will Borzon for any liabilities in circumstances where a third party alleges that it has been damaged by a product defect or that a product infringes its intellectual property rights. These terms and conditions will be considered agreed to and effective by Munzir Zafar/client and Will Borzon if both parties initiate or pursue work on the services generally described in this document and Statement of Work.