Design Review

Team (May 15-03)

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Client

HGST

Advisor

Mr. Harker

Agenda

Problem Statement	System Overview	Hardware Design	Software Design	Project Management
• Background • Requirements • Literature Review	• Concept Explanation • Concept Sketch	• Existing Technology • Custom Parts	• File Parsing • Server-Client • Robot Control	• Risks • Cost • Schedule

PROBLEM STATEMENT

Background

Malfunctioning HDD

Send HDD to engineer

- Shipping costs
- High turn around time

Find via using chart

- Time consuming
- Easy to make mistakes

Manually probe via

Probot

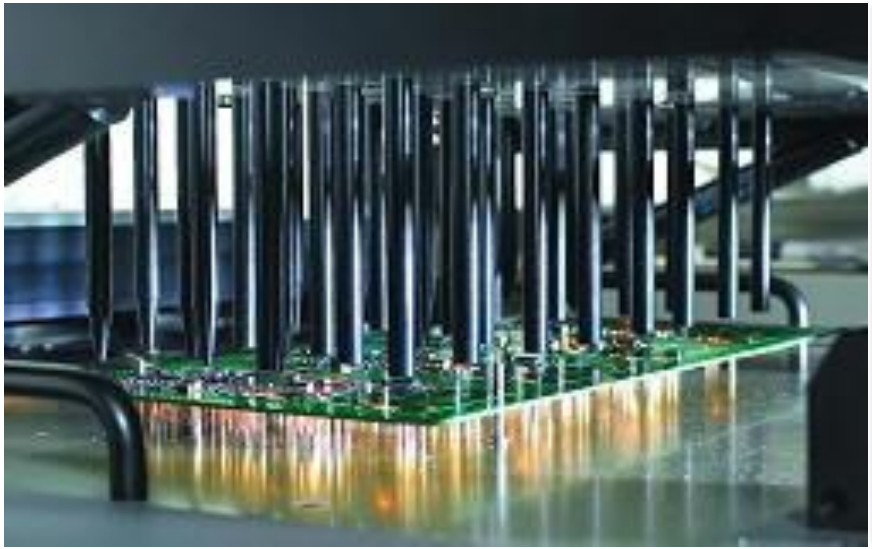
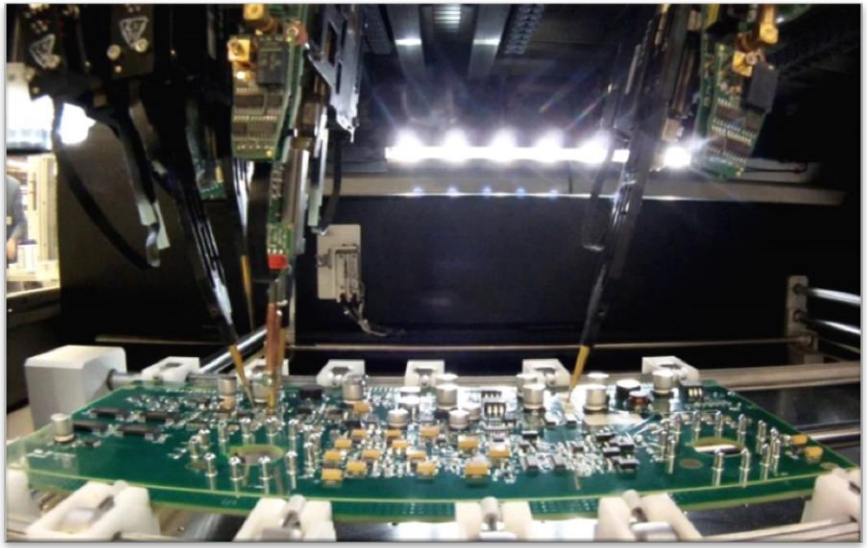
Functional Requirements

Objective	• Control system for oscilloscope probe • LeCroy Oscilloscope Probe
Contact	• Enough pressure to make good electrical contact with PCBA
Control	• Execute commands from remote user

Non-Functional Requirements

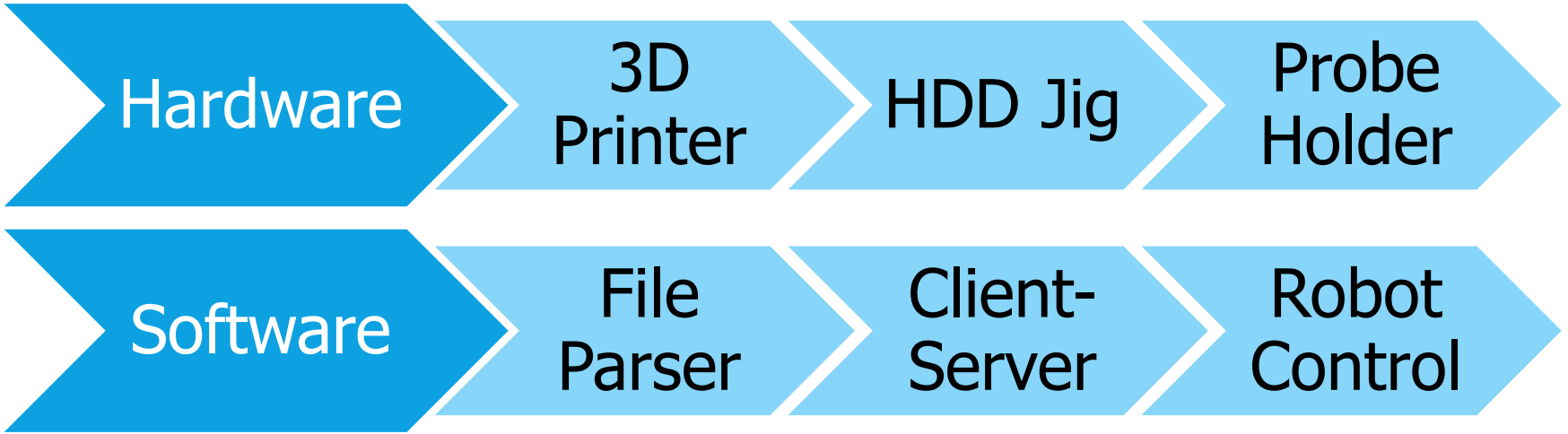
Time	• Move to test point within 60 seconds
Indicators	• LEDs and LCD display to show operational status
Communication	• Provide status feedback to the user
Size	• System should be limited to 4 cubic feet

Market Survey

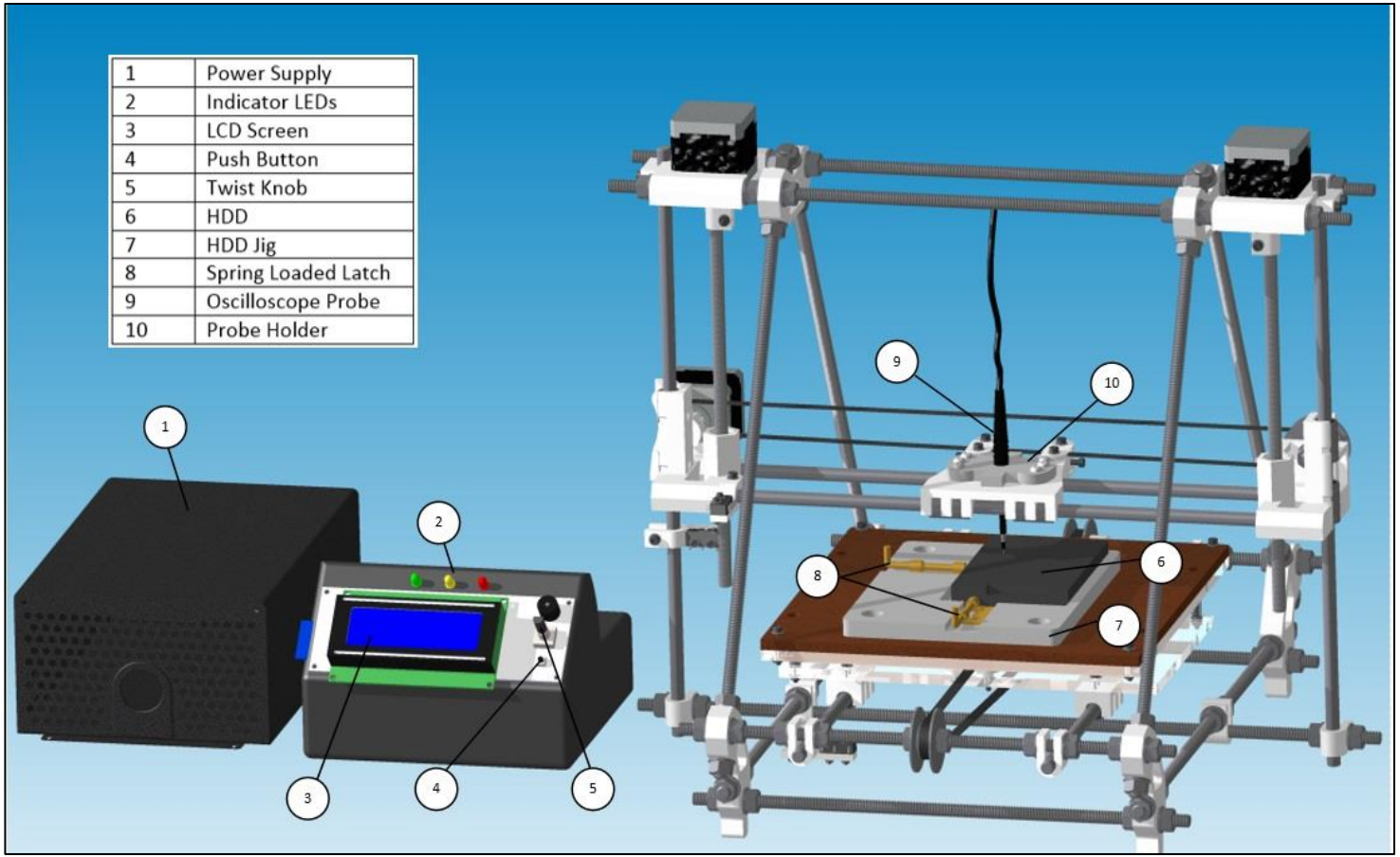
Bed of Nails	Flying Probe
	

SYSTEM OVERVIEW

Concept Explanation

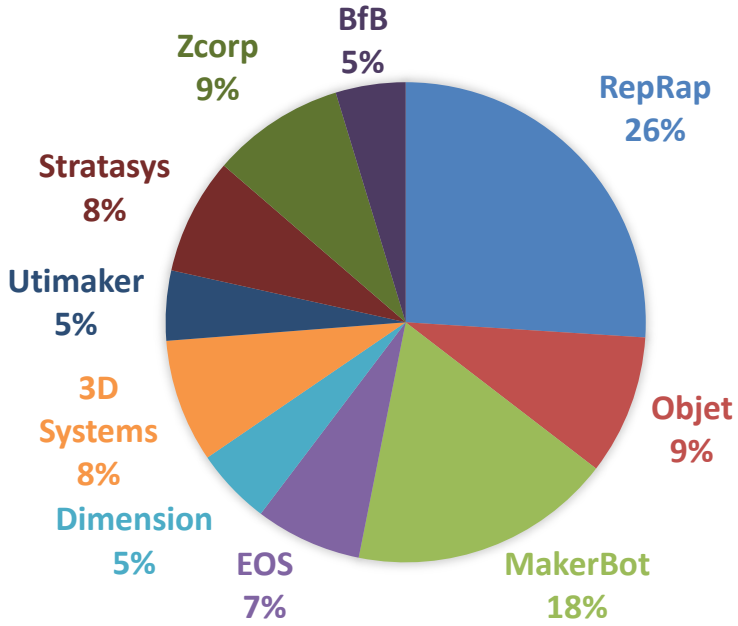


Concept Sketch



HARDWARE DESIGN

Existing Hardware



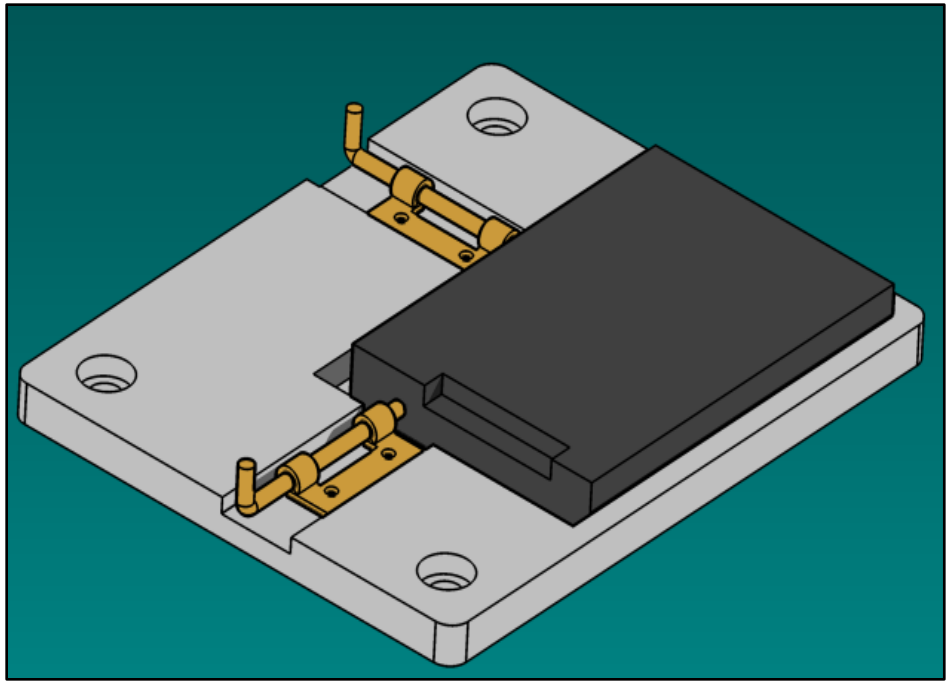
RepRap Prusa Mendel I2

Custom Hardware – HDD Jig

Material: Aluminum

Supports 2.5” HDD

Secured using latches



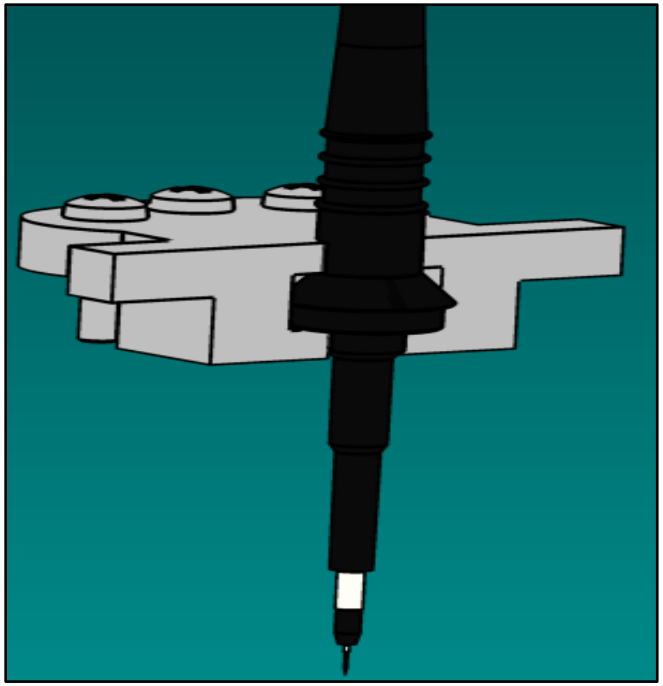
Custom Hardware – Probe Holder

Material: ABS Plastic

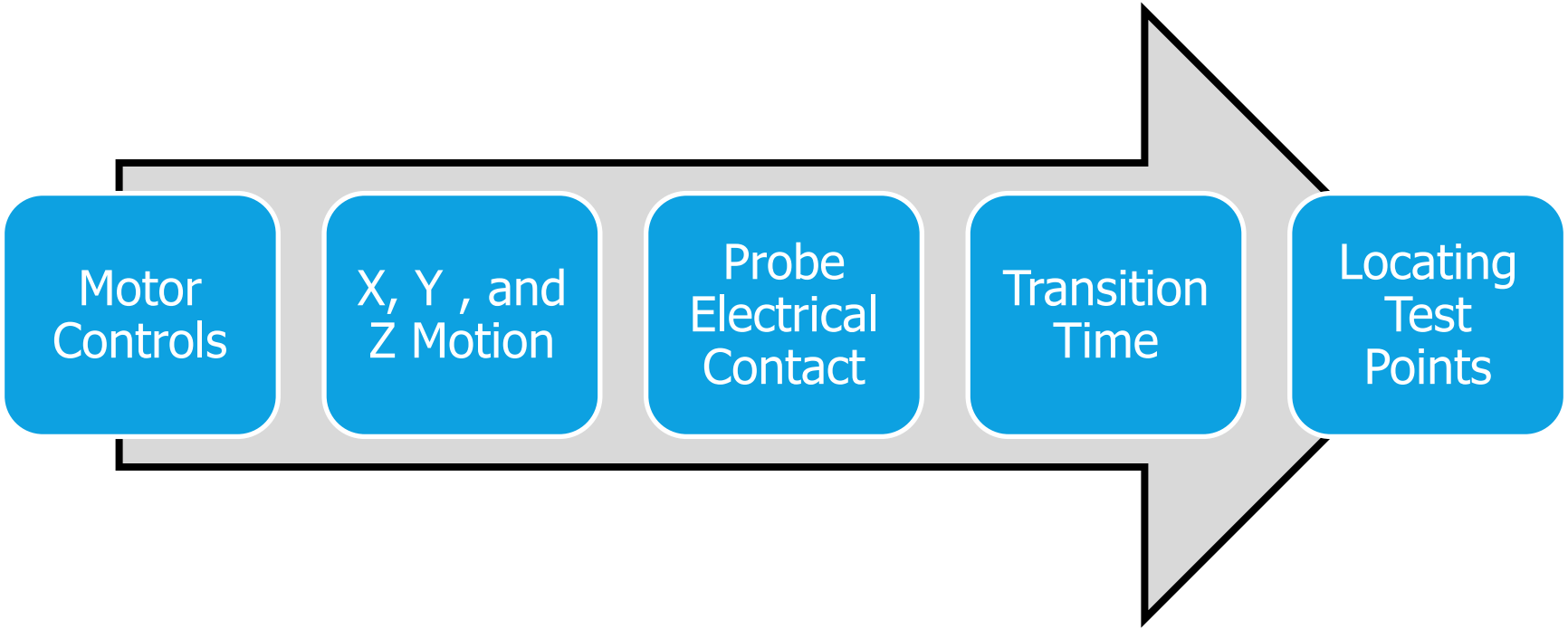
Supports LeCroy PP007 Probe

Fastens into 3D printer carriage

Spring loaded tip



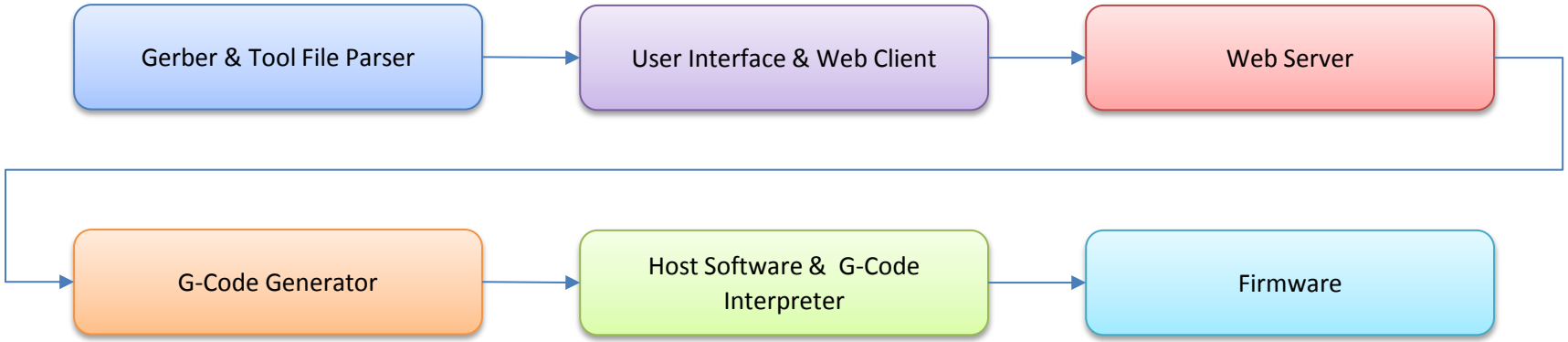
Hardware Testing



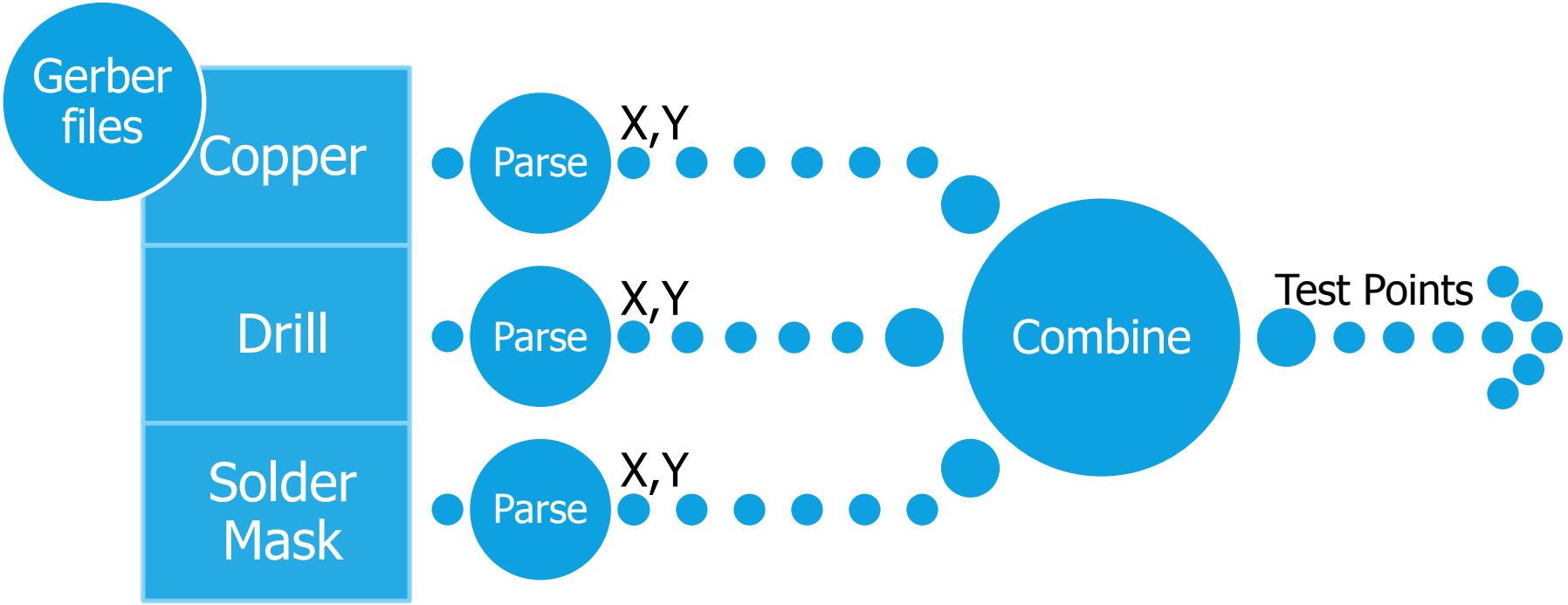
SOFTWARE DESIGN

Overview

Software is broken up into three main modules: client, server, and robot.

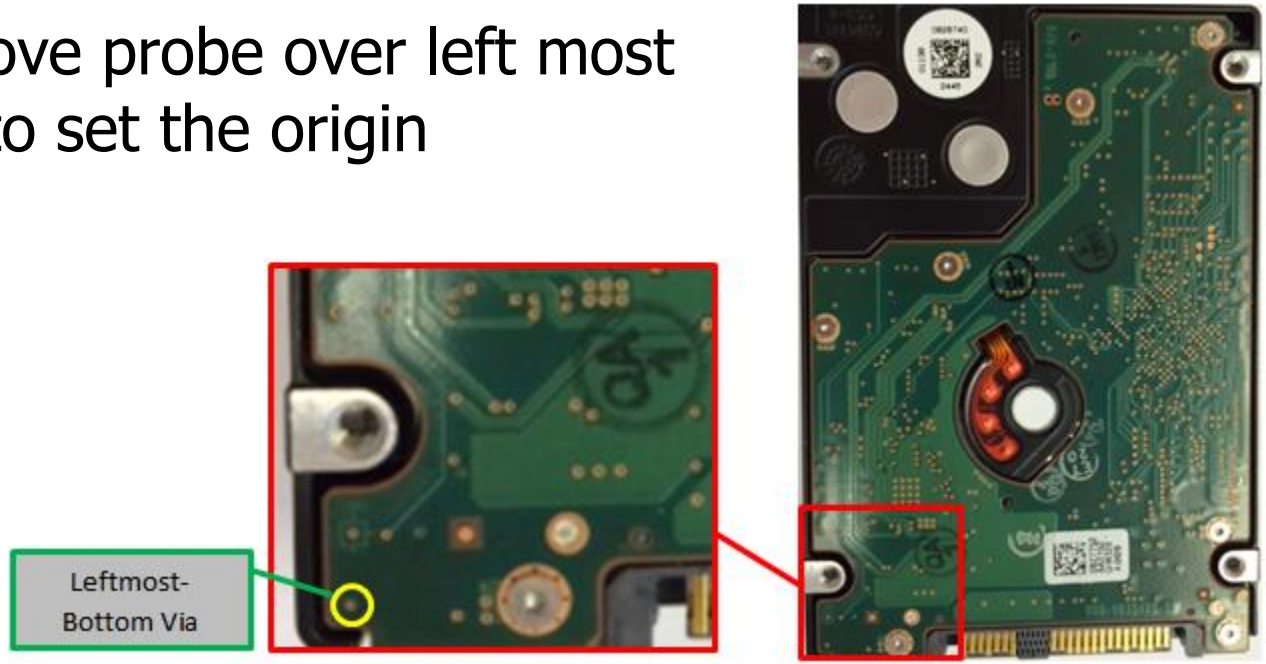


File Parsing



Calibration

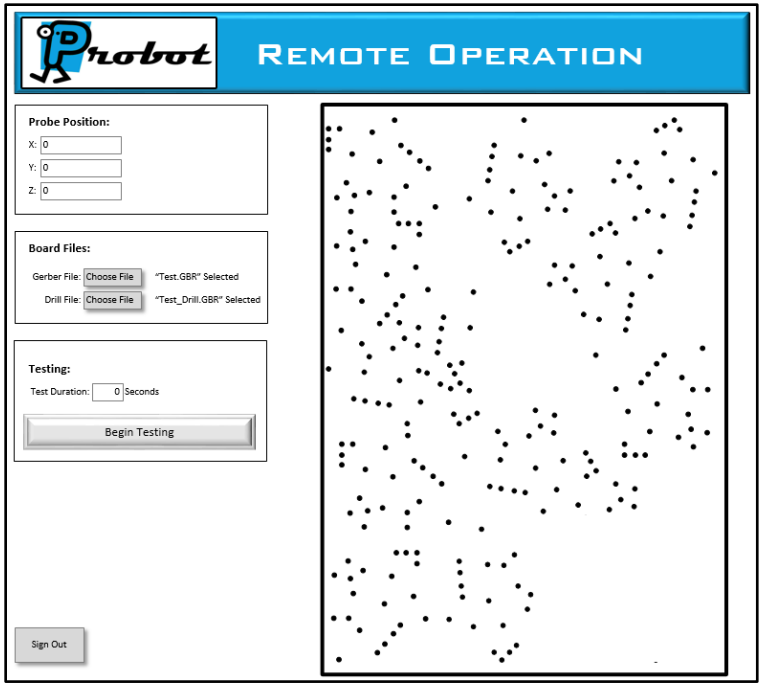
Manually move probe over left most bottom via to set the origin



Server-Client

The client software allows for control by the user and communication with the server.

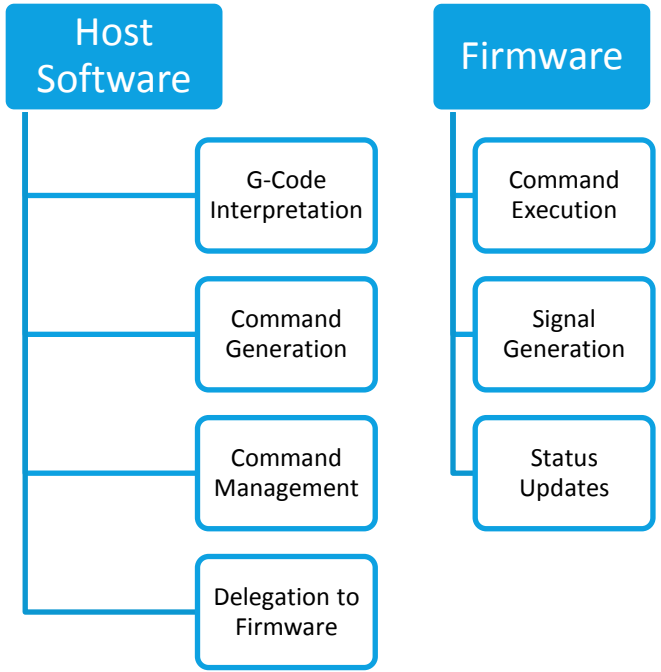
The server is a point of communication for the client for management and delegation of actions to the robot.



Robot Control

A source (server) inputs G-Code…

…Then the host software & firmware outputs electrical control signals which manipulates the robot.



Software Testing

Operational Tests of GUI

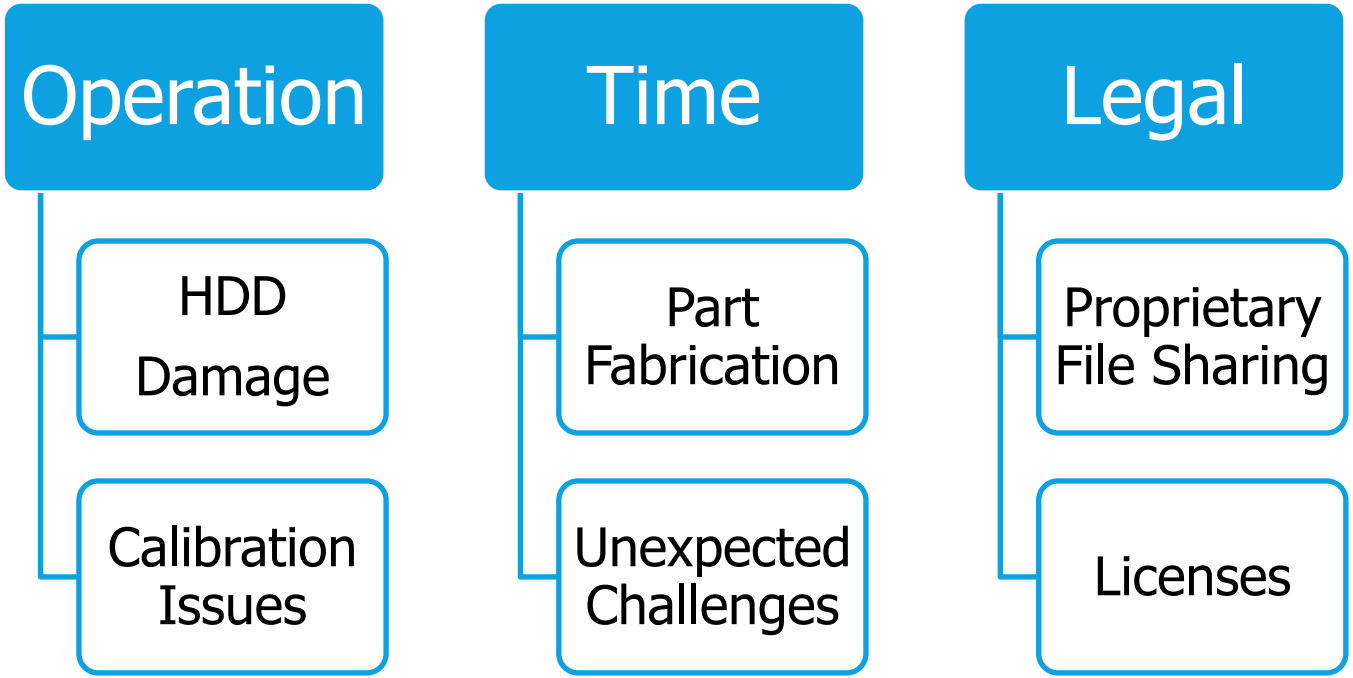
- Navigation to Points
- File Management

Unit Tests

- Via Selection Module
- File Selector Module
- Embedded Communication Module

PROJECT MANAGEMENT

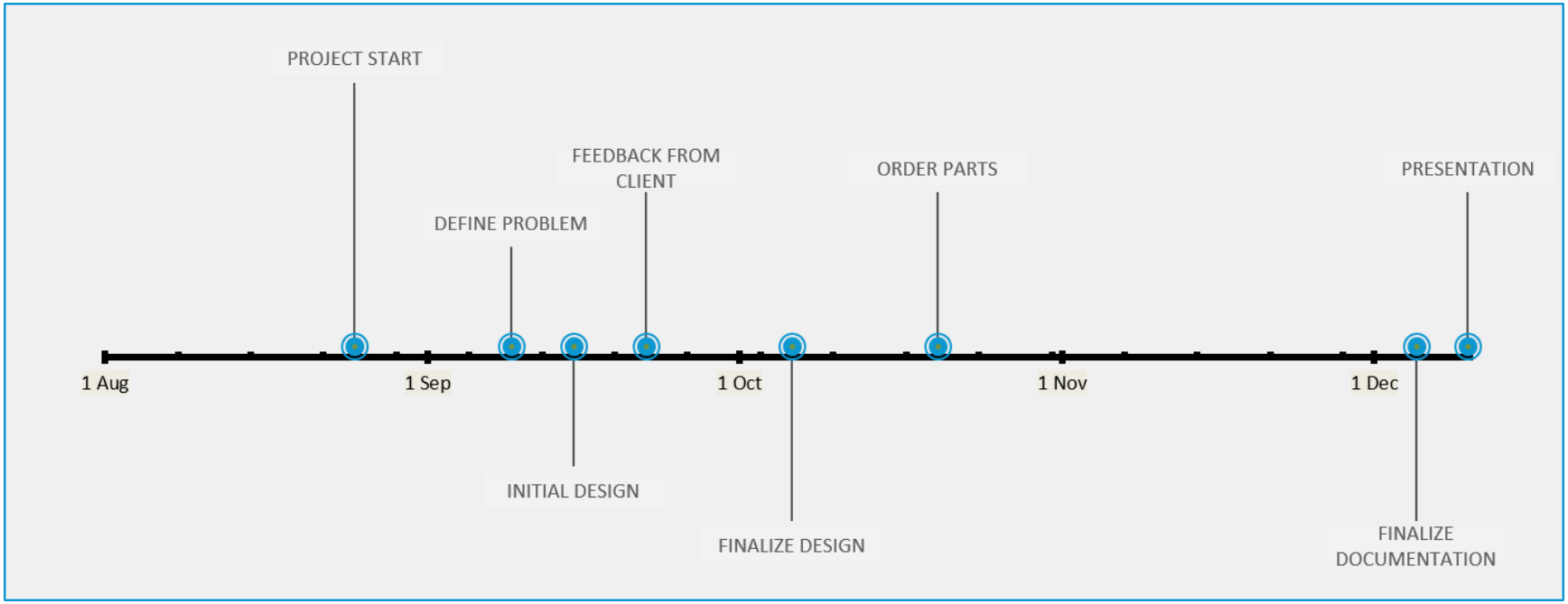
Risks


Operation
HDD Damage
Calibration Issues
Time
Part Fabrication
Unexpected Challenges
Legal
Proprietary File Sharing
Licenses

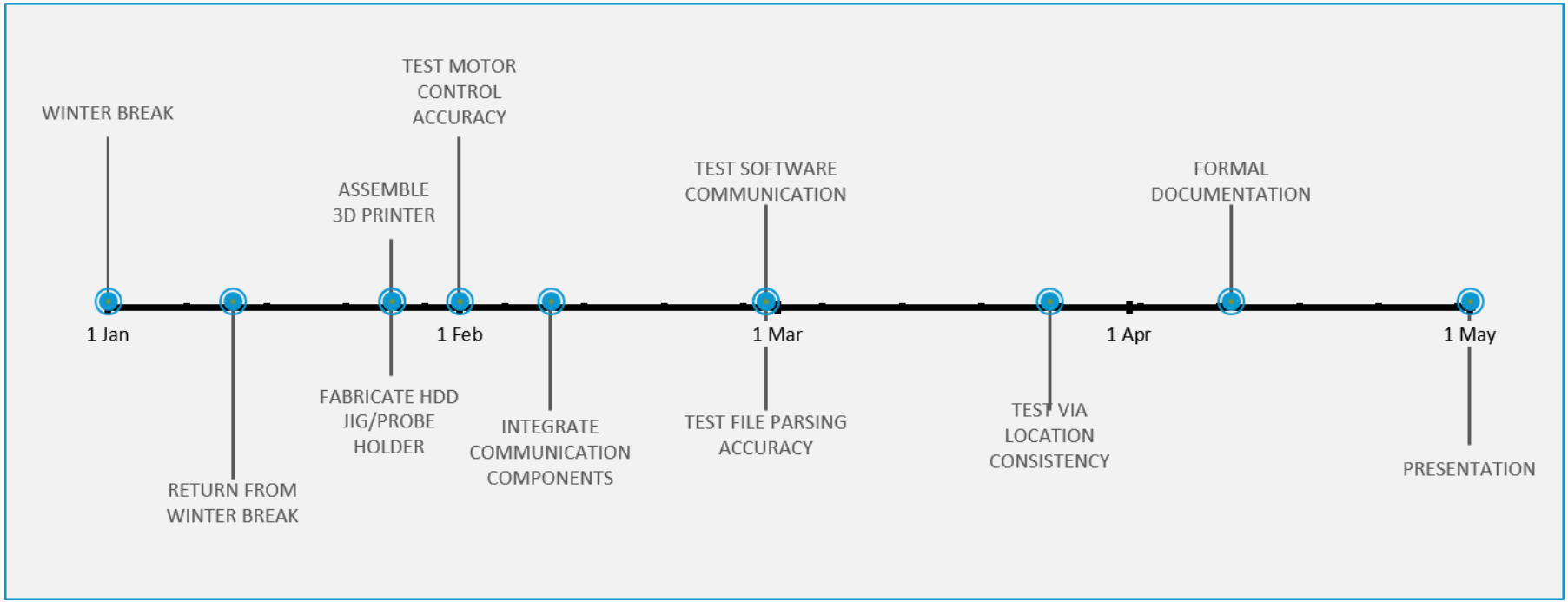
Costs

Cost	Description
$619.37	RepRap Prusa i2 3D Printer Kit
$40.00	Raspberry Pi B+ w/ 8GB NOOBS microSD card
$5.99	AC to DC 5V 2A international to microUSB
$32.00	SainSmart LCD Control Panel
$5.05	Locked Spring Loaded Metal Security Barrel Bolt Latch 5.5cm
~$10.00	Probe Holder (3D Printed) at $5/$in^3$
~$100.00	HDD Jig
~$863 / $1500	Total / Budget

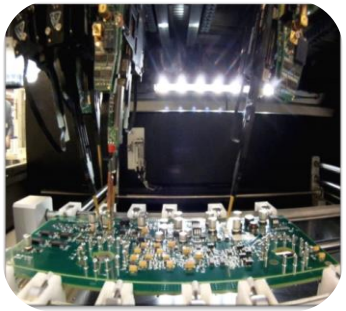
Schedule – Fall



Schedule – Spring

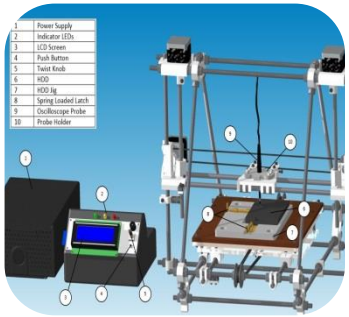


Summary



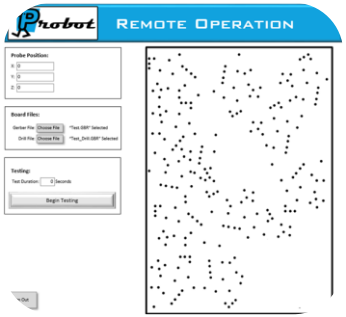
Problem

Remote HDD Testing



Hardware Solution

Modified 3D Printer



Software Solution

Web + Python + Printer

Cost

~$863 / $1500

Delivery

May 2015

QUESTIONS?

Block Diagram