1 Executive Summary

3D scanning has a wide variety of applications, but the high cost of these scanners keeps the technology from being used in many potential applications. Bringing down the cost and complexity of accurate 3D scanning would enable the use of 3D scanning in many applications where it now is prohibitively expensive: research labs, hobbyist builders, 3D printing enthusiasts, artists, independent product designers, small manufacturers, etc.

We found that there is an academically popular method, structured light scanning, that maintains high scan accuracy, at lower costs. However, there is typically a large degree of complexity in setting up a structured light scanner; streamlining this service and packaging it into a plug-and-play device will enable us to sell the product to markets that currently cannot access or afford 3D scanning. Additionally, we have ways to make the product even less expensive than typical structured light scanners by substituting inexpensive components, such as smart phone cameras, in clever ways.

In short, we want to bring 3D scanning to a large group of users who cannot access it today. We will do this by building a low-cost, user-friendly, and high-accuracy, 3D scanner.

2 Market Overview

Our competitors can be separated into 3 categories:

The current lowest-cost high-accuracy options: The major competitors in this range would be the NextEngine scanner or Artec's 3D scanners. Our price ($500) will be significantly lower than these products, and our scanner will be easier to use than the NextEnginer scanner. The NextEngine costs over $3,000 (once you've purchased all the necessary software), and the least expensive Artec scanner costs $12,000. Our scanner's accuracy will be in the same range as these products. Unlike these products, however, our scanner will only be able to scan objects that are under a certain size. While the Artec scanners make scanning large objects fairly simple, scanning large objects with the NextEngine is very inconvenient, which is also true for other products in the their range.

The very low-cost (free) options: There are some options on the market that come in at a price lower than ours. AutoDesk as an free app called 123D Catch–you take a series of images of an object and then it performs image reconstruction to generate a 3D model. Some products (like Scanect) allow a customer to use a Kinect to perform 3D scanning, and Microsoft recently released KinectFusion, which turns the Kinect into a 3D scanner for anyone with the Windows Kinect SDK. These technologies, though, do not provide the level of accuracy we are seeking, or the ease of access. They have more difficulty with highly specular objects than we will, and require user participation during the entire scanning process.

The emerging competitors: There are a couple competitors that have announced products but don't have anything for sale yet. CADScan successfully completed a Kickstarter project for a desktop 3D scanner that will be similar to ours in terms of target specifications and customers. From the Kickstarter funding levels, it seems that they plan on charging at least 650 ($1000) for the scanner, a price we are planning to come in significantly below. MakerBot also just announced at SXSW that they will be producing a desktop 3D scanner called the Digitizer. The announcement was very nebulous on details, but given their 3D printer costs and their description of the Digitizer, we surmise that they will be charging over $1500.

We are targeting individual consumers and small enterprises.

The individual consumers we are targeting are hobbyists, enthusiasts, and artists. Many people have become excited about desktop 3D printing,

and will be similarly excited by desktop 3D scanning. There is evidence for this in CADScan's successful Kickstarter campaign, and the excitement surrounding MakerBot's SXSW Digitizer announcement. Though much of the popular focus has been on scanning objects in order to get a model to print, other uses of 3D scanners can be marketed. A sculptor may want to display his work online, or send an early version of a sculpture to a colleague; our scanner allows him to do so with ease.

The small enterprises we are focusing on include research labs, product designers, and small manufacturers. In research labs, it is often important to have models and measurements of objects being tested; while the 3D scanners available today would be an unaffordable luxury, ours would be low-cost enough to have a practical purpose. Product designers can make initial designs with physical materials, which are nicer to work with, and then scan them to get a usable CAD model. Small manufacturers and machine shops can use them in the same fashion that large manufacturers do: for automated verification of manufactured parts, as well as for designing parts with unknown dimensions.

3 Innovations

4 Lessons Learned

5 Plan of Action

Following are the actions we will plan on completing, with more emphasis on tasks to complete over the summer.

5.1 Customer Milestones

Milestone	Date
Estimate consumer market demand via a Google Consumer Survey (or equivalent technique)	6/20
Choose product name and create logo as a reflection of desired brand image	8/1
Secure list of prototype testing partners	8/15

5.2 Product Milestones

Milestone	Date
Finalize the low-cost projection method that will be used in the system	7/1
Develop an IP strategy to protect crucial design components of the system, and file for provisional patents is appropriate	7/15
Complete alpha prototype of the system	9/1
Complete 2^{nd} alpha prototype of the system	10/1
Develop a list of components for a beta prototype, and select manufacturing partners to source parts from	11/1
Complete beta prototype	12/1

Milestone	Date
Finalize team members' equity splits and vesting schedules, defining what will happen under different possible participation scenarios.	6/15
Bring in an additional team member with business experience to aid in business strategy, scaling, and marketing	9/1

5.3 Team Milestones

5.4 Financial Milestones

Milestone	Date
Finalize team members' equity splits and vesting schedules, defining what will happen under different possible participation scenarios.	6/15
Bring in an additional team member with business experience to aid in business strategy, scaling, and marketing	9/1

1) Identify projected unit manufacturing cost at various build volumes, using beta prototype component list. 2) Develop a high quality short and long pitch deck for financial presentations. 3) Apply to VCs, angels, or further accelerators as appropriate to secure funding for after the summer.

6 Risk Factors

7 Team

*Troy's Bio Troy is graduating this June with majors in 16-ENG (concentration in Robotics) and 8B (concentration in Computational Learning Systems), and a minor in 14. The majority of his experience is as a programmer, focusing on machine learning and web development. He plays tennis for MIT and is a Freshman Leadership Program counselor.

*Craig's Bio Craig is pursuing his degree in 2A-6, Mechanical Engineering with a concentration in Control, Instrumentation and Robotics. He has worked extensively with robotics and machine design. Craig is currently president of his fraternity, captain of the varsity Waterpolo team, and a member of the national varsity swim team.

*Gus's Bio Gus is receiving his BS in physics from MIT this June. His focus has been on ultra-cold atomic physics, and he has worked in 5 different labs ranging from condensed matter physics to plasma physics. He sings with the Logarhythms, is a Freshman Leadership Program counselor, is a (half) Iron Man, and cooks a mean pork roulade.

* How long have you known each other, and what have you worked on in the past? (Include past work done on this project, if applicable.) We have been working on this project together since January, as part of 6.S078, Entrepreneurship Project. We have been working with another student as well, Turner Bohlen. Unfortunately Turner won't be able to join us for the summer as he has previous commitments.

Troy and Gus have known each other since their freshman year, and have been co-counselors in the Freshman Leadership Program for the past 2 years. Craig and Troy took the same robotics class, 2.12 Intro to Robotics, in the Fall of 2012 where they both placed in the top 5 out of 70 students.

8 Financial Plan