Wayfinder
IoT Enabled Keg Tracking

Rachael Davidson, Eli Dzurino, Jimmie Hinkle, Daniel Mendoza

Client: Diana Manning
Director: Andrew Morton
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A Brief Introduction to the Wayfinder IoT Tracking System

Every year, the loss and damage of kegs cost craft brewers up to $1.37 per barrel of beer shipped. When you consider that craft brewers ship about 26.1 million barrels in the US annually, this results in up to $32.6 million in lost, stolen, and vandalized beer kegs. Kegs are widely known across the brewing industry as one of the riskiest, but also the most necessary investments that a small brewer can make. Our product aims to take that risk out of the equation for only a marginal increase in cost. By affixing a GPS beacon to the chime of a keg, its location can be tracked by a brewer or distributor in real-time, ensuring an efficient supply chain and no more lost kegs. In addition, our keg will be equipped with an onboard fill sensor that will notify brewers and distributors when kegs are getting low, allowing them to better plan for deliveries and return trips of kegs. With the new adaptations brought by COVID to the business world companies are striving for less contact.

Customer relationship management (CRM) is exactly what our product can do for the brewers and distributors. CRM is a technology for managing all your company’s relationships and interactions with customers and potential customers. With the IoT Chime, they can see in real-time the whereabouts of their kegs and the fill levels. This then gives them the ability to skip the face-to-face conversations with the wholesaler and know all the information they need for restocking, pickup, and quantity.
Our target market is breweries who self-distribute and will therefore get the most immediate benefit from the weight savings and trackability of our keg. Initially, we will be focusing on Colorado and California brewers producing between 250 and 5000 barrels of beer annually and actively scaling. These states were chosen based on the prevalence of craft breweries as well as existing connections of the founding team.

Beachhead Market

$25M

Total Addressable Market

$5.5B
Customer Feedback

Our team talked with brewers and distributors to be able to guide our design. This feedback was critical in helping to develop requirements to meet the needs of brewers and distributors. The Fiberlite keg aims to solve brewers’ top problem while the Wayfinder looks to solve their #1 priority.

We talked to 128 experts about kegs...

We’ve talked to over 100 keg experts, and found the biggest complaints about kegs to be their weight, safety of working with kegs, and the quality of the product that goes in them. We also found one of the biggest problems that every brewer has had to deal with is: Keg loss. It is such a big problem that brewers and distributors almost accept it as inevitable.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery Life</td>
<td>1 week to 3 months</td>
</tr>
<tr>
<td>Weight Sensor Accuracy</td>
<td>+/- 1 lb up to +/- 15 lbs</td>
</tr>
<tr>
<td>Data Refresh Times</td>
<td>1 to 8 times per day</td>
</tr>
<tr>
<td>Dashboard</td>
<td>Integrated with current software</td>
</tr>
<tr>
<td>Price</td>
<td>$200-300</td>
</tr>
</tbody>
</table>

Top problem  

#1 Priority  

#2 priority  

Weight  

Safety  

Beer Quality
The Wayfinder was designed to adequately address the problems of our end users. We incorporated customer feedback into our design process, and we did upfront customer discovery to ensure we fully understood the needs of potential users. This ensured we were addressing real problems in a reasonable manner. This feedback, as well as industry standards, provided the necessary boundaries to design our product inside of.

**Requirements:**
- Measure contents with an accuracy of at least 1lb
- Withstand drops from 4ft in multiple orientations
- Survive and function at temperatures between -10°F and 120°F
- Measure location accurate to 1km
- Provide location and level updates 3 times daily
- Battery life of 1 week

**Design Considerations:**
- Manufactured using FDM 3D printing to provide low cost, short lead time prototyping
- Load cells measure weight via transfer pins that pass through the chime structure
- Housings assembled using threaded thermal inserts to provide modular, easy-to-assemble design
- Designed around KS FiberLite 1/6 bbl keg
Our Wayfinder system integrates perfectly with the revolutionary FiberLite COPV (Composite Overwrapped Pressure Vessel) beer keg, providing a solution that is 40% lighter than traditional kegs while offering the benefit of comprehensive keg tracking. With the combination of these products, we will be the standard-bearer for efficient logistics in the beverage industry.

The beer market is just the beginning. Our use of COPV technology can be applied across the beverage industry.
The FiberLite Beer Keg is revolutionizing the logistics game in the brewing industry. We are using space-grade technology to decrease shipping costs, reduce workplace injuries, and create a greener supply chain for brewers, restaurants, and distributors.

By utilizing COPV technology originally used to build rocket fuel tanks, we can give the beer keg its first facelift in almost 100 years, all while lowering costs and making life easier for keg users.

Save
+$2.50 per barrel of beer shipped
Cost

$140

per 1/6 barrel

+ $30

Monthly, up to 100 kegs

Scaled Cost Savings:

Injection Molding vs. ABS 3D Printing (-$375.57)
Bulk Hardware Purchasing (-$24.24)
Bulk Electronics Purchasing (-$46.08)

With these costs brewers and distributors will save

$3.50 per keg shipped

For a brewery like Upslope, that’s $44,000/year.
Conclusion

Where we are now

This project was focused on proof of concept and initial validation. This prototype proved our ability to track location and fill level. Currently, Kegstand is using its full resources to continue to work on the Fiberlite COPV Beer Keg. We plan to start implementing our Wayfinder technology three years out.

Our ask

Kegstand is looking for early adopters of the Fiberlite and connections in the brewing industry. If you or anyone you know is interested in connecting, please check us out below. Thank you!

info@kegstand.us
www.kegstand.us
Learn more about our business.
Meet the Team

Rachael Davidson
Project Manager
B.S Mechanical Engineering

I joined Kegstand this year in ESI Senior Design. I am passionate about diversity and women in STEM. I hope to use my engineering, problem-solving, and leadership skills to overall improve the environment.

Jimmie Hinkle
Financial Manager
B.S Engineering Plus

I am a co-founder of Kegstand with a background in Mechanical Engineering and small business operations. I’m passionate about finding efficient and effective processes.

Daniel Mendoza
Systems & Test Engineer
B.S Mechanical Engineering

I joined Kegstand this year through the ESI section of Senior Design. I am passionate about understanding and building mechanical systems and hope to continue working with these in the engineering field.

Eli Dzurino
Mfg Engineer, Logistics Manager
B.S Engineering Plus

I am a co-founder of Kegstand with a strong background in manufacturing, logistics, and leadership. I’m passionate about engineering the solutions to the problems of the 21st century.