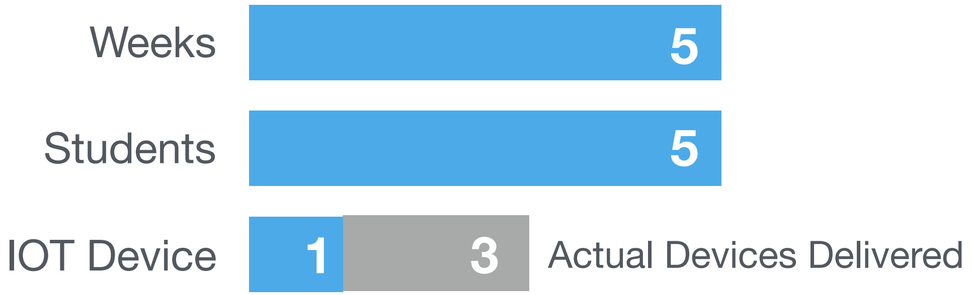

apollo

Design Brief



Our brief was to design a plastic housing containing internal features commonly used in the design of injection moulded parts, such as ribs, bosses, snaps and other features. We were tasked to design a next-generation IOT (Internet of Things) device or digital assistant, similar in size and functionality to the Amazon Echo or Google Home.

As part of the brief we also researched overall functionality and all required internal components in order to develop a comprehensive understanding of how the product would work and function.

Meet the Team

Anja Lukovic

Henry Bell

Isha Beniwal

Josh Hilty

Natalie Schade

Research Topics

Amazon Echo Hospitals IBM Watson NFC
Google Home Siri Diagnostics **Alexa**
Patient Data Hospitals of the Voice Activation
Internet of Things Future Patient Relations
Voice Recognition **Artificial Intelligence**
Doctor Interaction Google Assistant Third Party

Research Findings

- In 2012, 250 million mobile phone users downloaded health apps & is expected to increase at a rate of 33.5% between 2015 & 2020.
- 80% of physicians use smartphones and medical apps.
- 60% of daily notes taken by health care professionals are shown to have some form of error or mismatch.
- By 2018 30% of all interactions between humans and machines will happen through conversation.
- 72% of physicians access drug information from smartphones.
- 63% of physicians access medical research from tablets.
- 44% of physicians communicate with nurses and other staff through smartphones.
- There is a rising interest in Virtual Assistants (VA's) in hospitals.

Echo in Hospitals

Janice McCoy, Roswell Park hospital - “The Amazon Echo was a big help and a wonderful distraction”.

- Due to Amazon Echo’s simple and easy to use voice activated system, some hospitals around the US are already implementing them in their patients rooms and lobbies.
- Boston children's hospital created the KidsMD app.
- Nurses can ask the dosage of medications to give children.
- Parents and children can tell Alexa their symptoms.
- Elderly patients use Alexa as a form of entertainment.
- Elderly found it to be easy to use & form of 24/7 company.
- **However, the Amazon Echo is not HIPPA certified.**

Amazon Echo Dot Teardown

In order to get a better understanding of what was inside of the Amazon Echo Dot, and how it was composed, we decided to purchase one and take it apart, component by component.

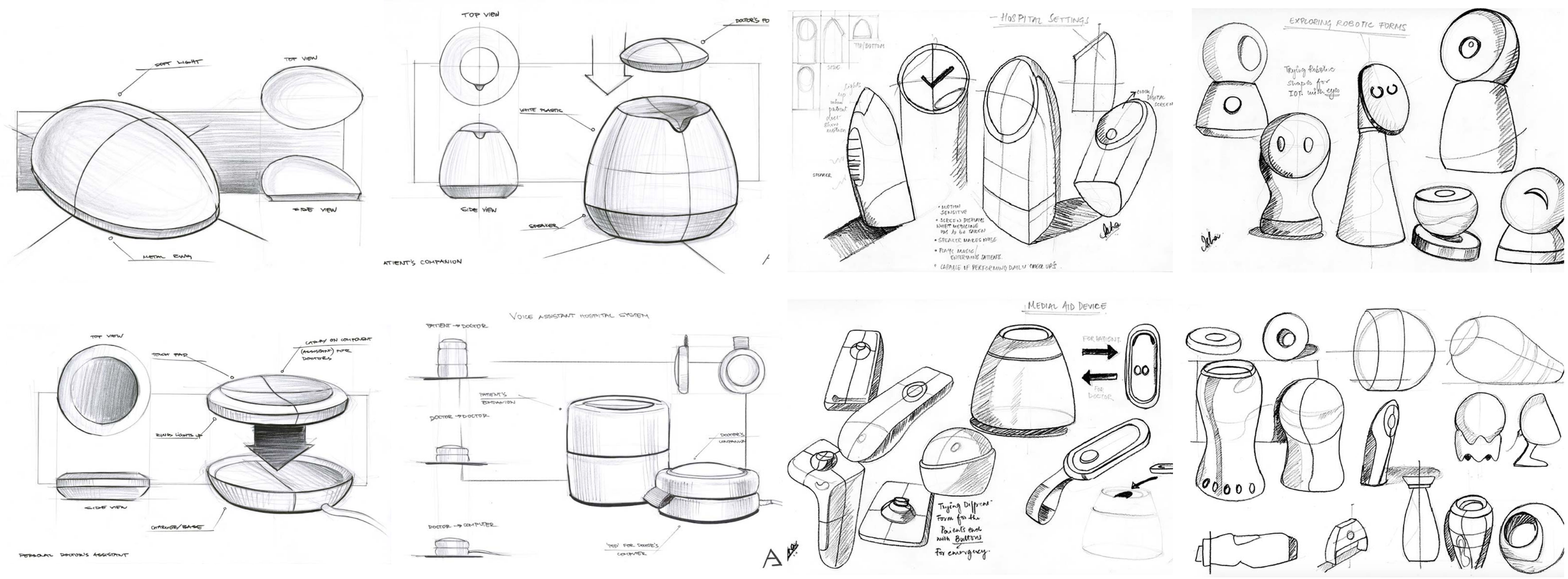
How Could We Make…

1. Transfer of Information Safer?
2. Data Input More Accurate?
3. Human - Human & Human - Machine Interaction Better?
4. Better access to Medical Research Reference?

We Could…

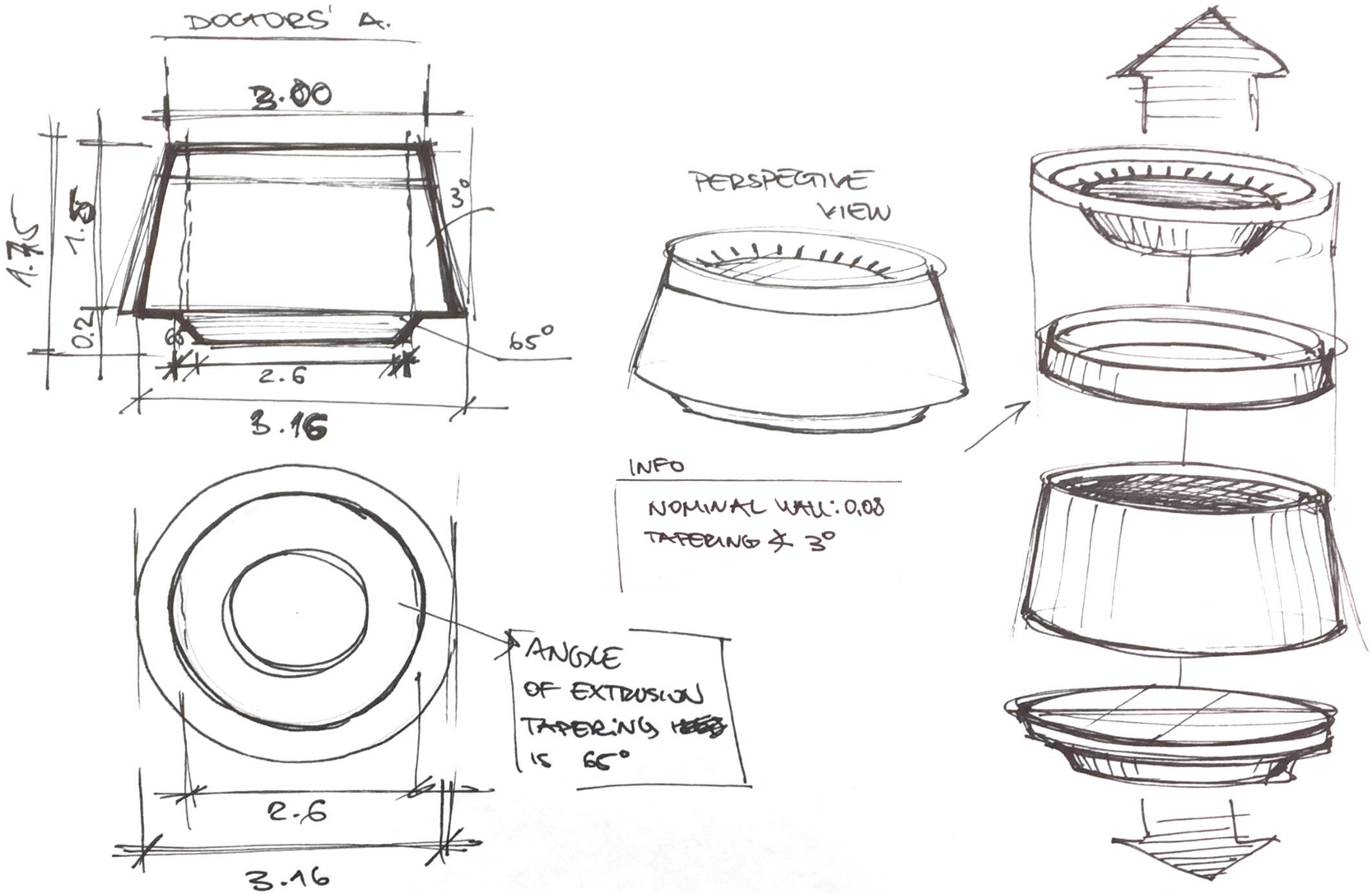
1. Encrypt and securely transfer data through Near Field Communication (NFC).
2. Use voice recognition technology so a device could accurately, and quickly transcribe what a medical professional is saying.
3. Use NFC to require a user to be within 1.6” of each other in order to conduct a data transfer. Voice activation would also allow for easier human to machine interaction.
4. Use IBM’s Watson, and other third party IOT apps, so a device could connect to millions of servers and reference research relating to the medical industry.

Ideation



After initially meeting to discuss and debate the possible uses and implications of a new IOT device, our team split up to work on numerous form sketches and ideations.

Assembly Sketches



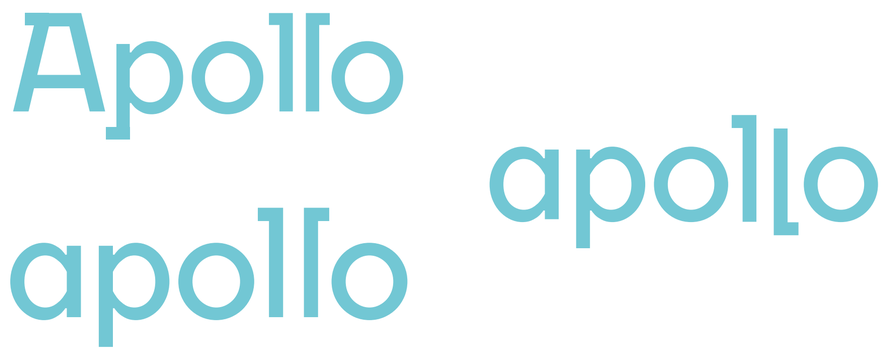
After deciding on a direction, we decided to design from the inside out, with the internal components and manufacturing process in mind.

Logo Design

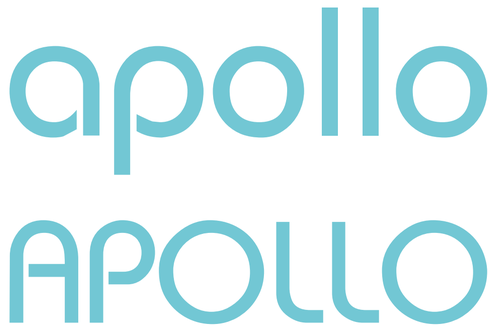
Apollo symbol

Simplified

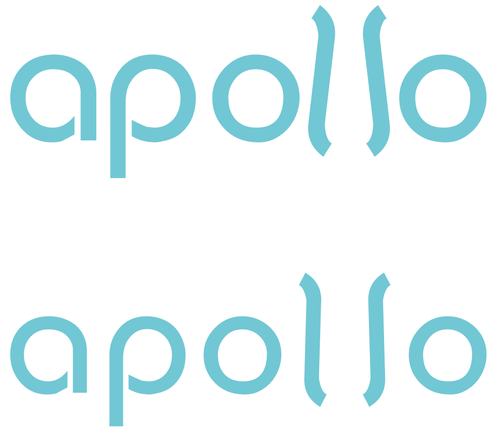
We wanted to name our product ‘Apollo’, after the Greek God of healing and medicine. We initially found that Apollo has its own symbol and wanted to see if we could incorporate this into our logo design.



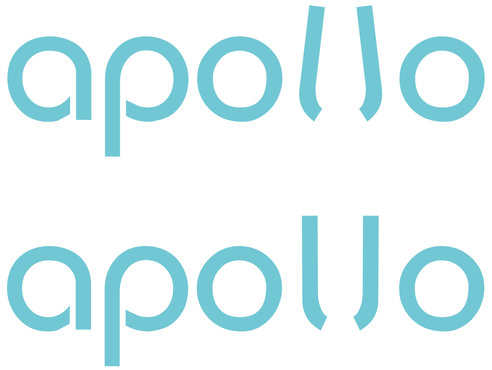
These concepts integrated the Greek pillar design into the logo after the Greek God Apollo. However after after research we found this to be too gimmicky, and unrelated to the product function, although it was a nice relation.



These logo concepts went for a simple, font based design.



Similar to the previous concepts, this also incorporated the Apollo symbol, but showed less of our design form.



These logo concepts tried to incorporate the initial Apollo symbol simplified down, but it also showed a likeness to our product’s design form.

Meet apollo ...

Patients Hub

The main Patients Hub would sit alone in a patients room. It is powered by plugging into a main power socket, connected via micro USB.

Doctors Hub

The Doctors Hub, smaller than the Patients Hub, is able to fit into a Doctors pocket. It is rechargeable using NFC technology, by sitting on top of either the Patients Hub or Computer Dock.

Computer Dock

The Computer Dock adds an extra layer of security when transferring data to an external computer outlet. It is connected via micro USB.

1 Safe Transfer of Data

Apollo’s NFC technology encrypts data and only allows the transfer of data by placing each Apollo device directly on top of each other, ensuring that only the proper staff can access the data, in person, resulting in maximum security.

Patient Hub to Doctors Hub

The Patients Hub and Doctors Hub is placed on top of each other

The Patients Hub and Doctors Hub is connected via NFC technology

The LED lights start pulsating when a secure data transfer is established

Doctor to Doctor Device Data Transfer

The two Doctor Hubs are placed on top of each other

The Doctor Hubs are connected via NFC technology

The LED lights start pulsating when a secure data transfer is established

Doctor to Computer Data Transfer

The Doctor Hub is placed on top of the Computer Dock

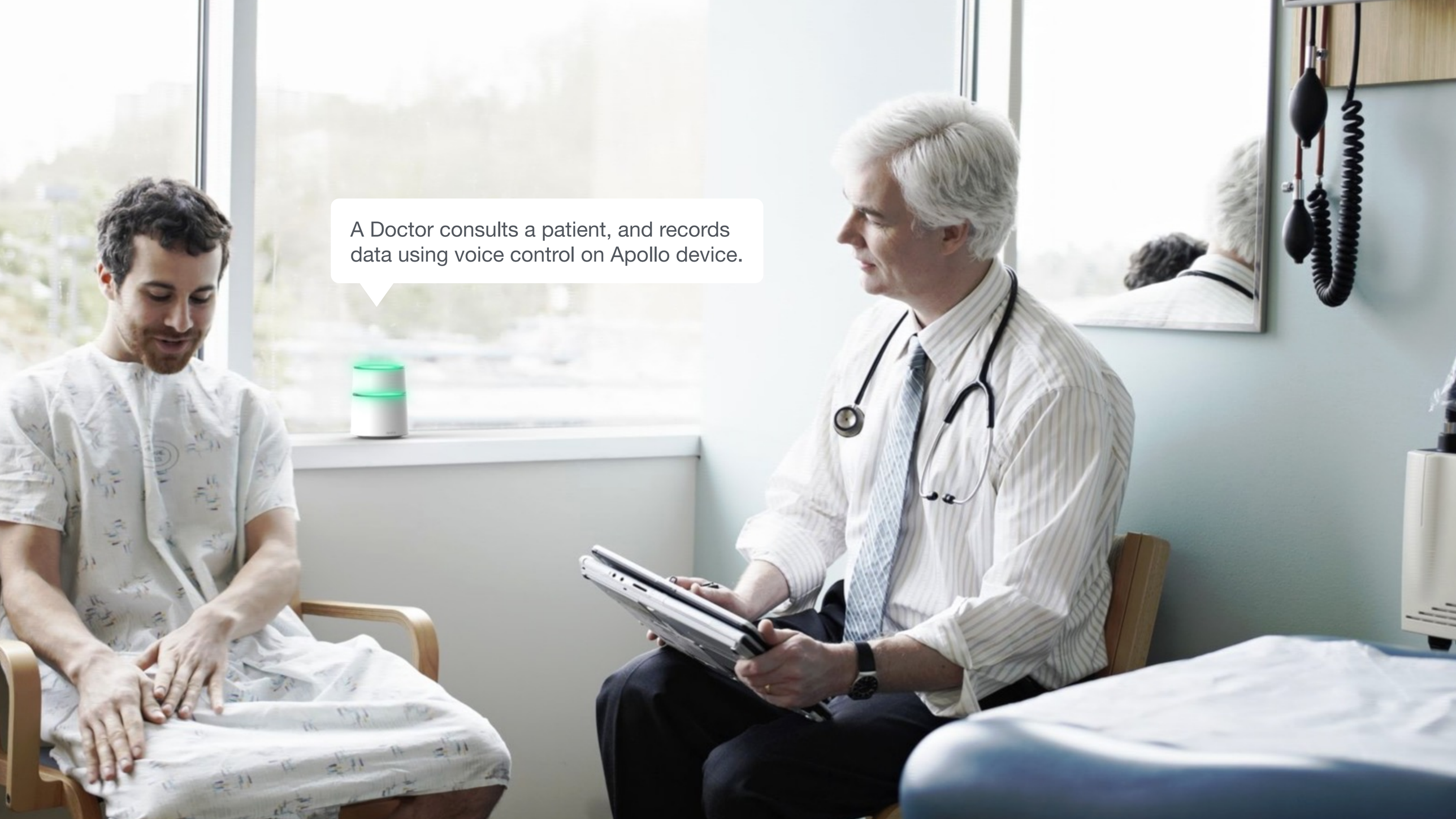
The devices are connected via NFC technology, allowing maximum security when transferring to an external computer

The LED lights start pulsating when a secure data transfer is established

Doctors meet to discuss and securely share data via Apollo’s NFC.

2 Accuracy of Data Input

Doctors and patients interact with Apollo using voice control. simply say “Apollo”, or set your own name for your Apollo device. Voice control allows Doctors to record patients vitals hands free, by simply speaking them out loud to Apollo. Similarly, patients with mobility issues or impairing injuries can simply activate Apollo just by using their voice.


A Doctor consults a patient, and records data using voice control on Apollo device.

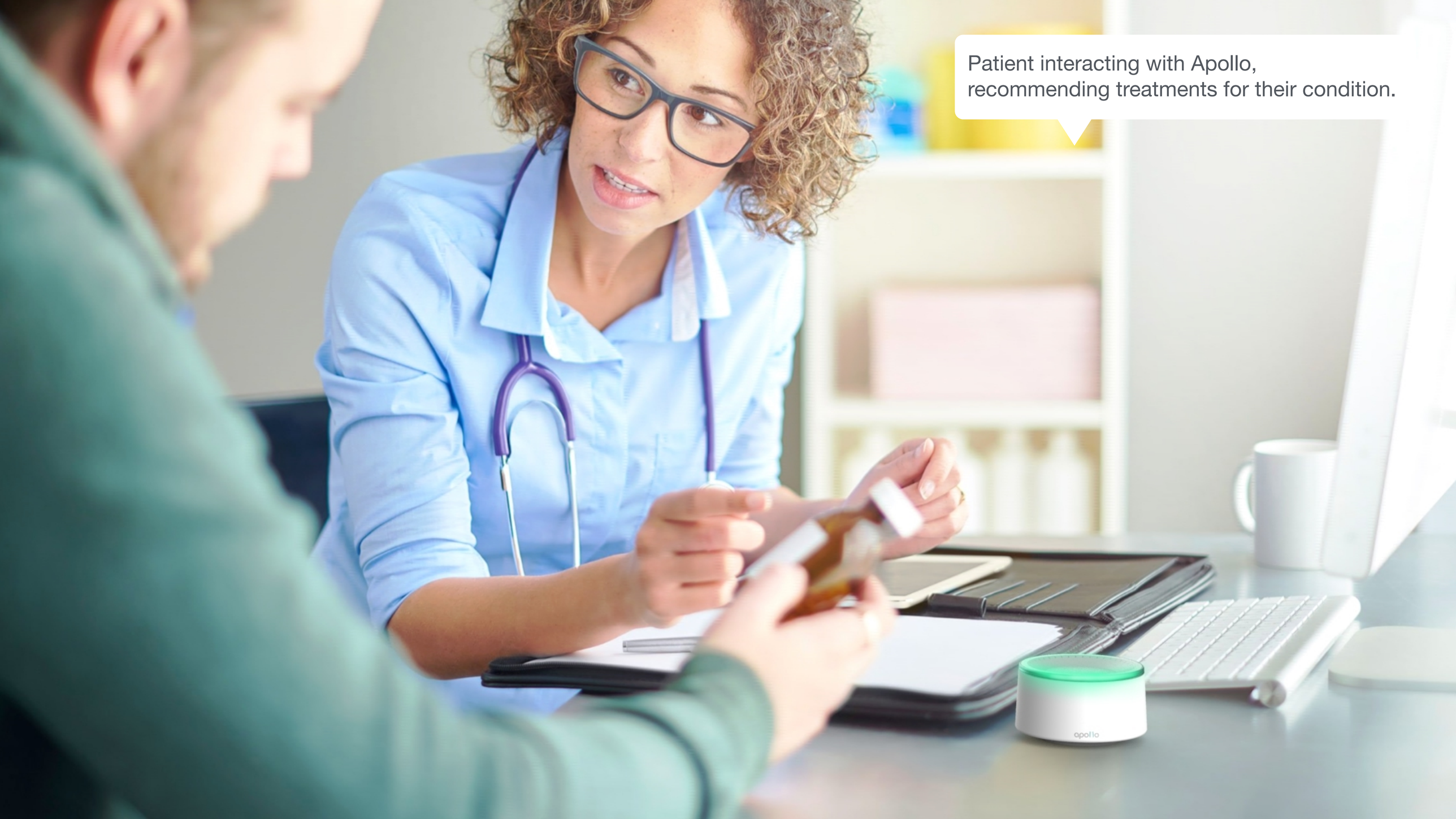
3 Human - Human & Human - Machine Interaction

Using NFC would require a user to be within 1.6” of each other in order to conduct a data transfer, resulting in a more personal human to human interaction. Simple voice activation would also allow for a user friendly and more personal human to machine interaction.


A patient connects with Apollo using voice activation. Apollo responds by lighting up.
GET
apollo

4 Access to Medical Research Reference

Apollo will store numerous first party apps / functions through its IOT function, these include a calendar where a patient or doctor can store their events or treatments, the weather, ask Apollo to search the internet and even play music. Third party apps will also be functional on Apollo, such as HealthTap's application "Dr. AI", which allows the user to explain their symptoms to the app, which will then diagnose and offer possible treatments to the user in real time, using its vast data bases as reference. Apollo will also be able to connect to external hardware such as heart rate, and blood pressure monitors to gain an accurate and personal data base of a patients condition.


Patient interacting with Apollo,
recommending treatments for their condition.

Patients Hub

2.70“

3.35“

Doctors Hub

1.86“

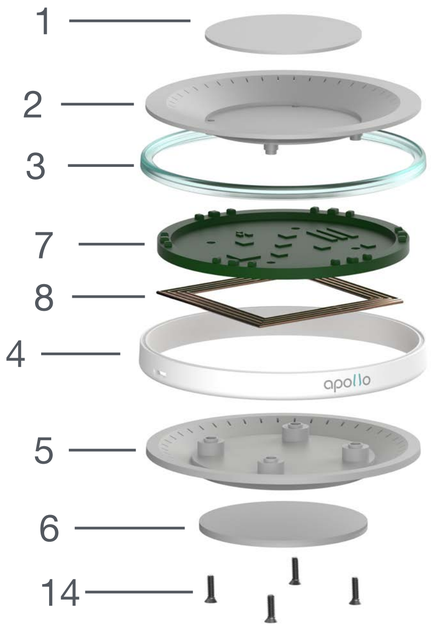
3.15“

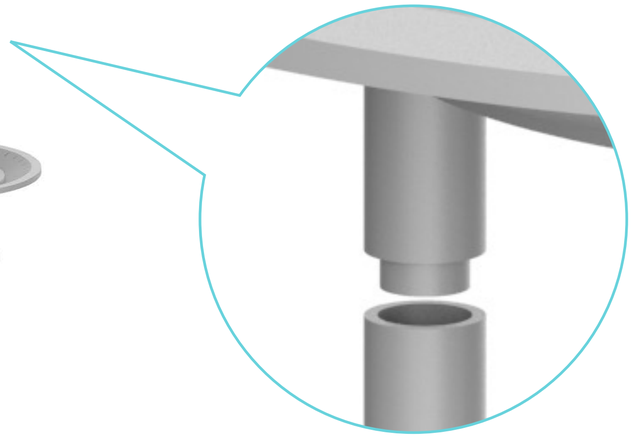
Computer Dock

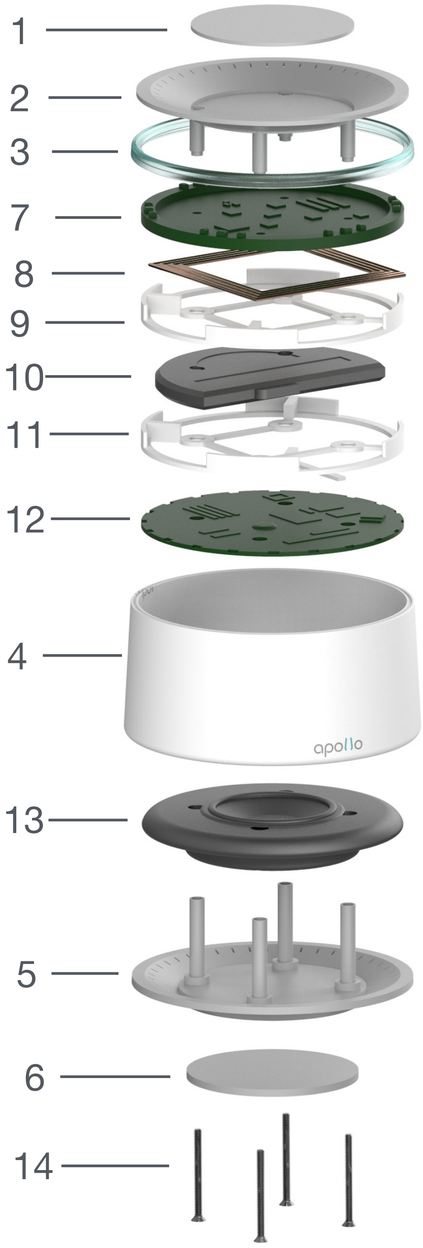
0.85“

3.2“

Bill of Materials

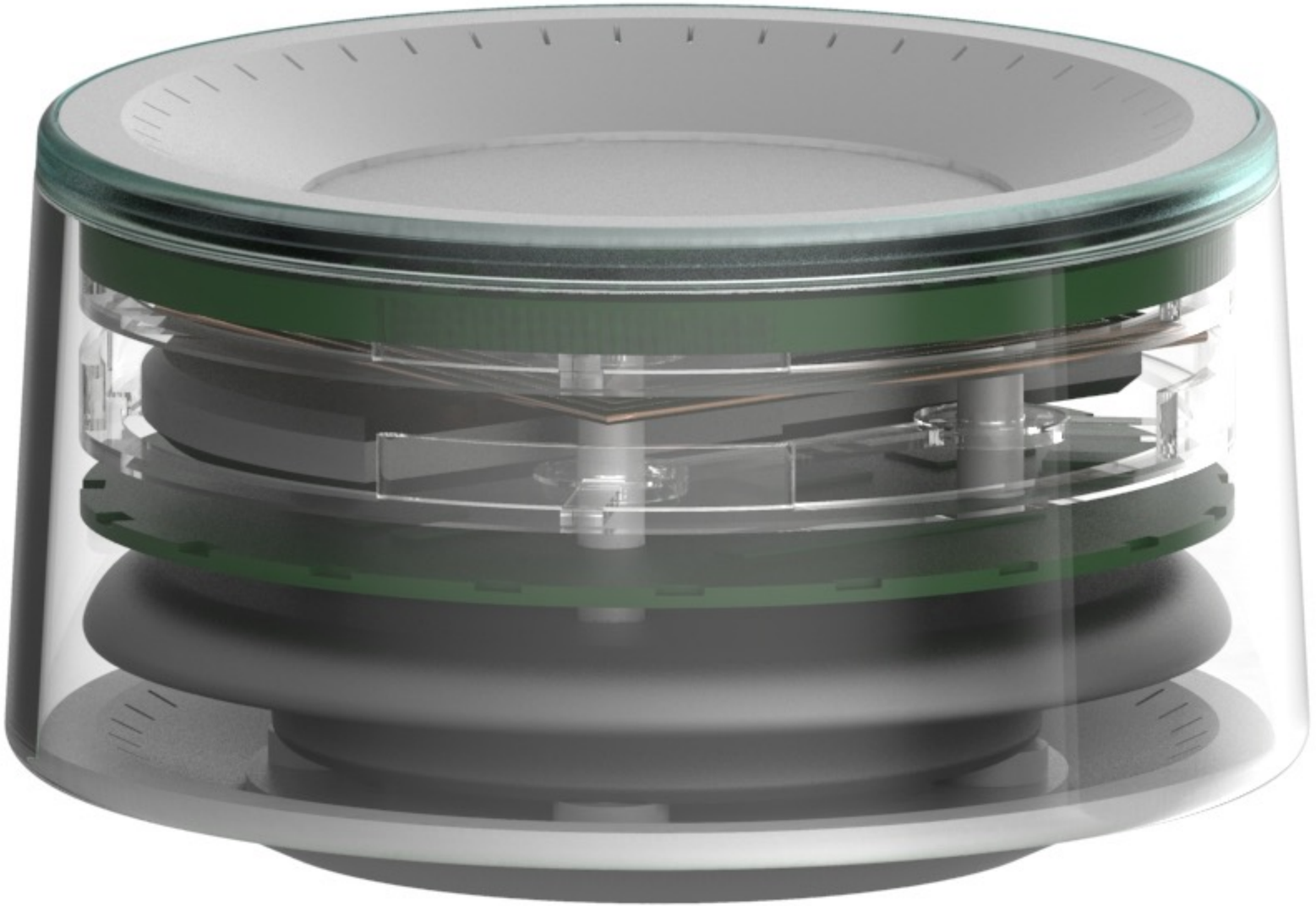






	External Components
1	Boss Cap
2	Housing Lid
3	Light Strip
4	Housing Shell
5	Housing Base
6	Rubber Foot
	Internal Components
7	LED Dressed Motherboard
8	Induction Coil
9	Top Spacer
10	Battery
11	Bottom Spacer
12	Motherboard
13	Speaker
14	Screws

Internal Component View




apollo


apollo