HAWKEYE

4SIGHT Akshay Thakker / Brian Jordan / Keegan Rehfeldt
Marie Higdon / Juan Durán

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4SIGHT

INTRODUCTION

Team 4Sight is composed of Akshay Thakker, Brian Jordan, Keegan Rehfeldt, Marie Higdon, and Juan Durán and are from Electrical Engineering, Graphic Design, Industrial Design, Accounting, and Marketing backgrounds respectively. During the course of this project, we hope to create a sustainable communications product design utilizing flexible display technology which will be of value to our user group – firefighters.

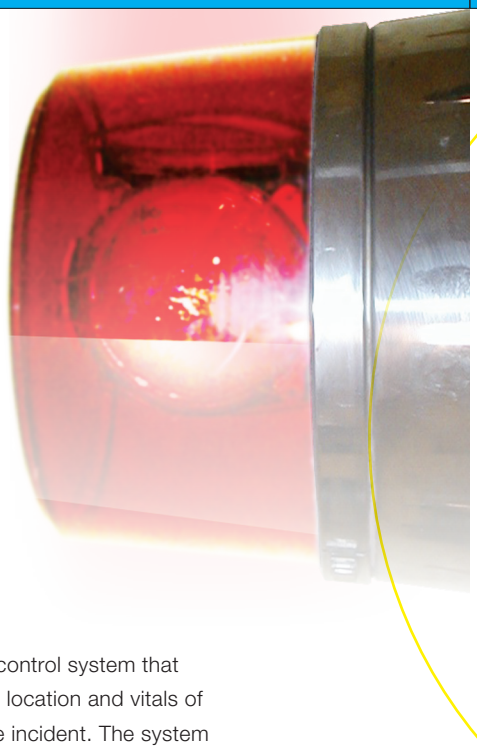
4Sight was initially challenged to design a product for first responders in emergency situations by incorporating flexible display technology. The company has partnered with different research facilities and organizations, such as the Flexible Display Center (FDC) at Arizona State University, to creatively develop advanced solutions for emergency responders. The "FDC provides comprehensive flexible electronics capabilities that bridge the high risk, resource intensive gap between innovation and product development in an information-secure environment."

OUR SPONSOR:

The Flexible Display Center (FDC) at Arizona State University is a collaborative effort of the university, the government, and industry. The FDC's objective is to develop and refine full color flexible display technology and manufacturing to make it commercially feasible. The facility at Arizona State's Research Park was officially opened during a ribbon cutting ceremony conducted by the US Army Research Lab in February 2005. Since its inauguration, the FDC has formed key alliances with materials manufacturers, toolset manufacturers, R&D labs, display manufacturers and system integrators across the world.

The FDC is the only university based facility that has a pilot line fabrication facility for flexible display. In February 2004, ASU received a $43.7 million award from the US Army to further develop flexible display technology. The army wanted to develop a compact, lightweight, rugged and low-powered display, all features of flex. With its incredible facility, competent staff and partners, the FDC is well on its way to realize its mission of creating and delivering manufacturable flexible display technology for military, security, space, medical and consumer applications.

Audience:	User Perspective:	Needs:
Rookie < 5 yrs Experience > 18 yrs of age	Accustomed to technology devices Different Levels of Training Unfamiliar with using some Tools By the Book - Follow Training Continued Training for Advancement High Risk Situations	-Direction from Chief -knowledge of danger -distress signal
Veteran/ High Ranking > 20 yrs Experience > 38 yrs of age	Appreciate New Technology - Must be Easy to Use Lots of Experience Enjoy Simplicity Emergencies are Routine Responsible for Units at Risk	-Knowledge of units - safety, location on fireground -mass communication - with other departments in mass casualty incidents

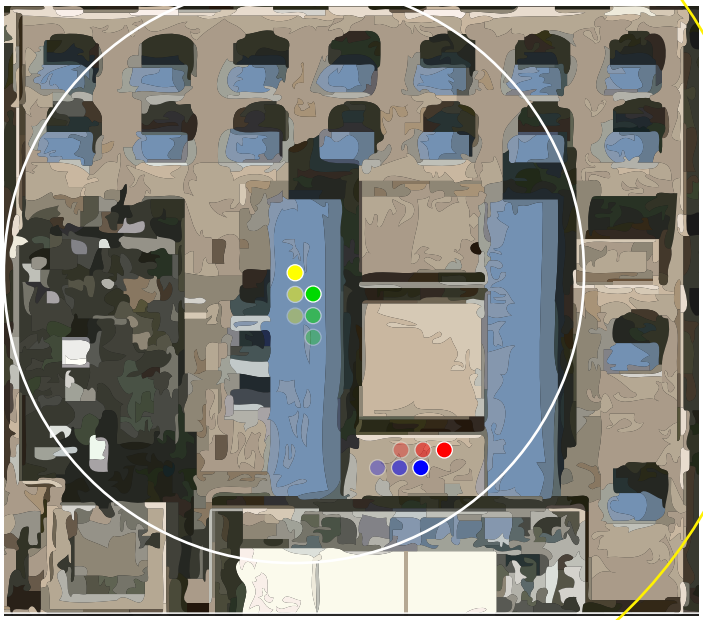


On December 3, 1999, “six firefighters were killed in a fire in an abandoned cold storage warehouse in Worcester, MA. Firefighters were searching for two homeless individuals known to live in the building when they became disoriented and trapped. Other firefighters searching for their missing colleagues also became trapped and perished in the blaze. The fire was caused by a candle that had tipped over.” Had they had a way to navigate through the fire, the trapped fire fighters might have gotten out of the building and the six firefighters might have never perished.

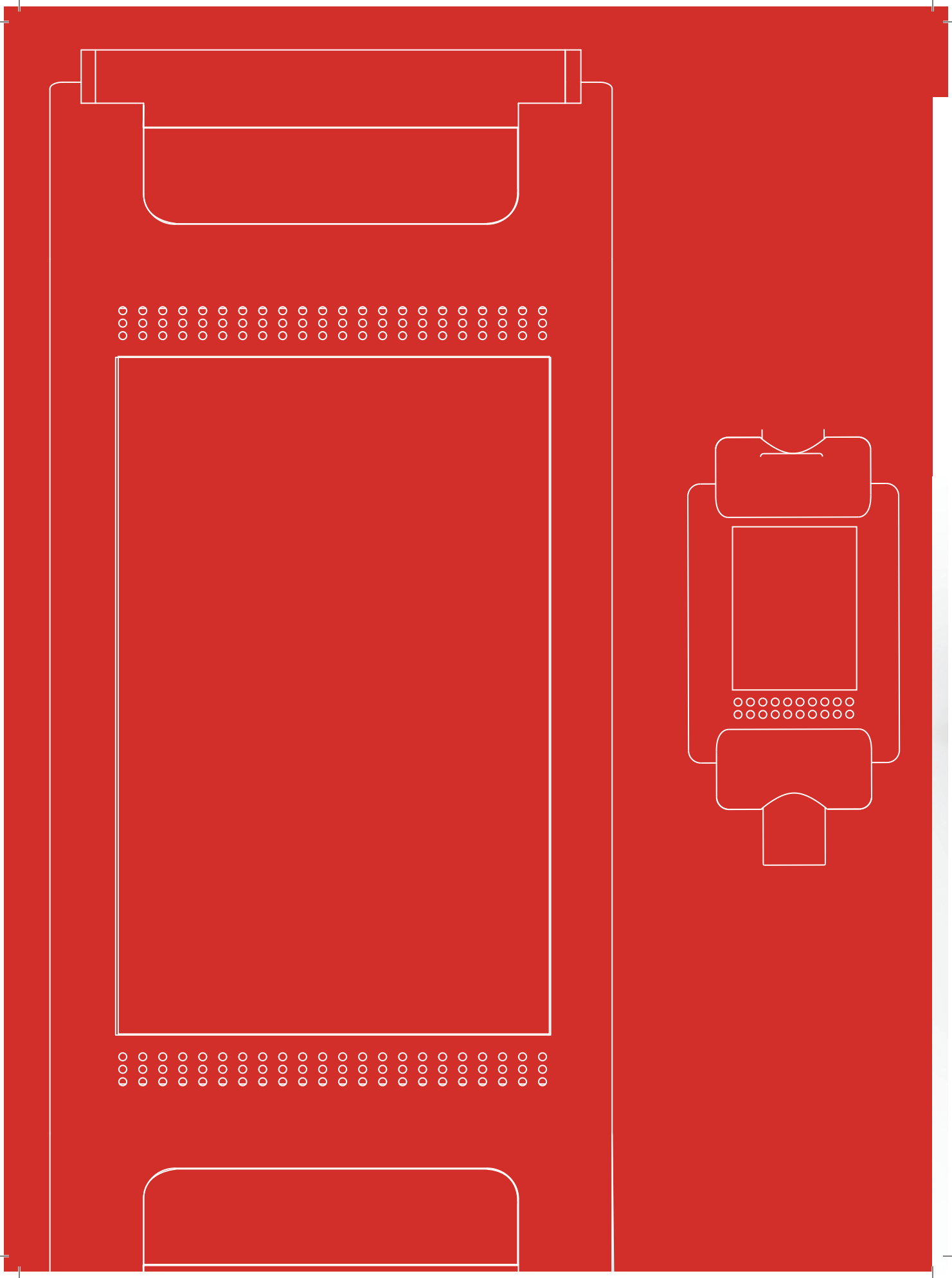
In 2004, 11.7% of firefighter deaths were the result of being caught or trapped during an emergency operation. Hawkeye attempts to address the third leading cause of death for firefighters by providing the necessary tools for locating and accounting for firefighters.

Hawkeye is a mobile control system that monitors the real time location and vitals of firefighters within a fire incident. The system consists of a central command component to be used by the chief on the ground, and monitoring devices to be worn by each firefighter entering the scene. The monitoring devices track the firefighters’ locations as well as their air tank pressure. This information is then relayed to the chief so that he or she may make more informed decisions on crew placement and task delegation.

Hawkeye will showcase a flexible display screen as a part of the central command component. Using flexible display technology will increase the ease in which information can be displayed and will also increase the portability of this information. Moreover, flexible display screens use extremely low amounts of energy, making them more sustainable than any competition.



HAWKEYE



PRODUCT CONCEPT

PRE-OPERATION

Charge the monitor
Place the monitor in the truck

OPERATION

Take the monitor from its storage location inside the truck
Carry the device to command central
Press the power button to turn on the unit
Navigate through software to start tracking
Monitor the status of the firefighters during the emergency
Turn Hawkeye off after the emergency is over
Carry the device back to the truck
Place the device back into storage

POST-OPERATION

Recharge the monitor

9 10

6

2

4 1

5

3

7

These are two words that can be used to describe any firefighter. With so many variables in emergency situations, firefighters need to have complete confidence in the tools that they are using.

RUGGED CONFIDENCE

1 Confidence

2 Simple clean lines

3 Quality materials

4 Functional

5 Strong and Aggressive

6 Durable

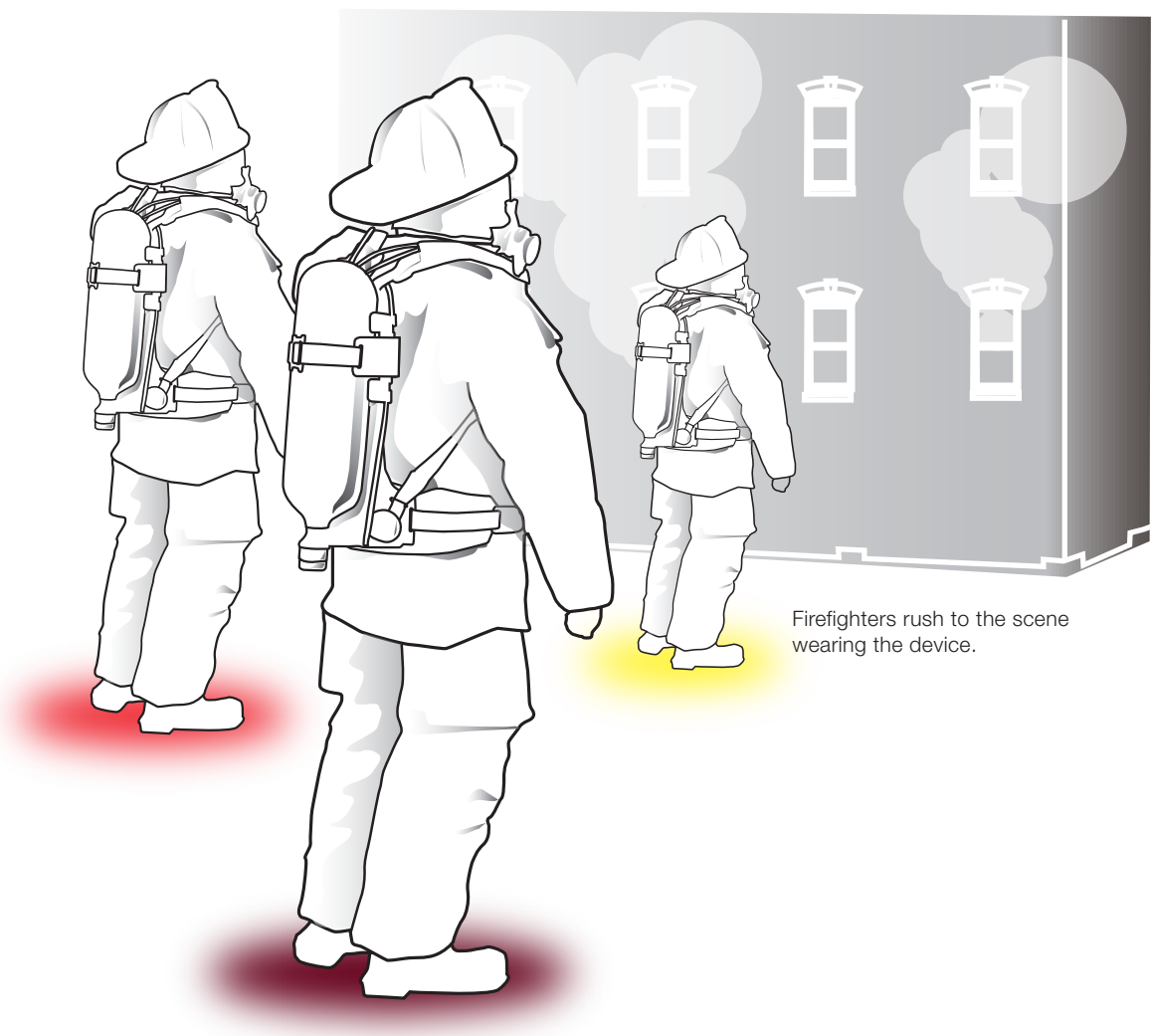
7 Performance driven

8 Rugged

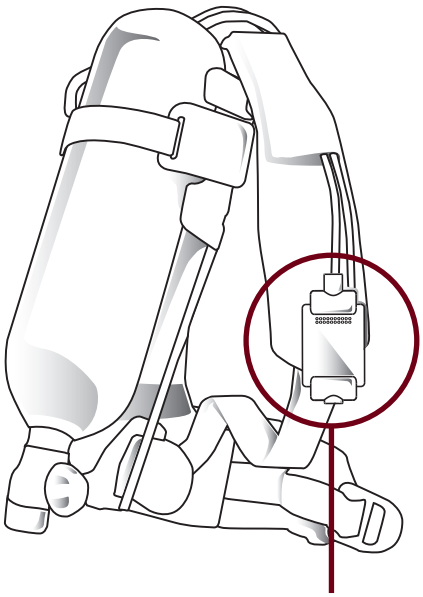
9 Modern

10 Sleek

HAWKEYE

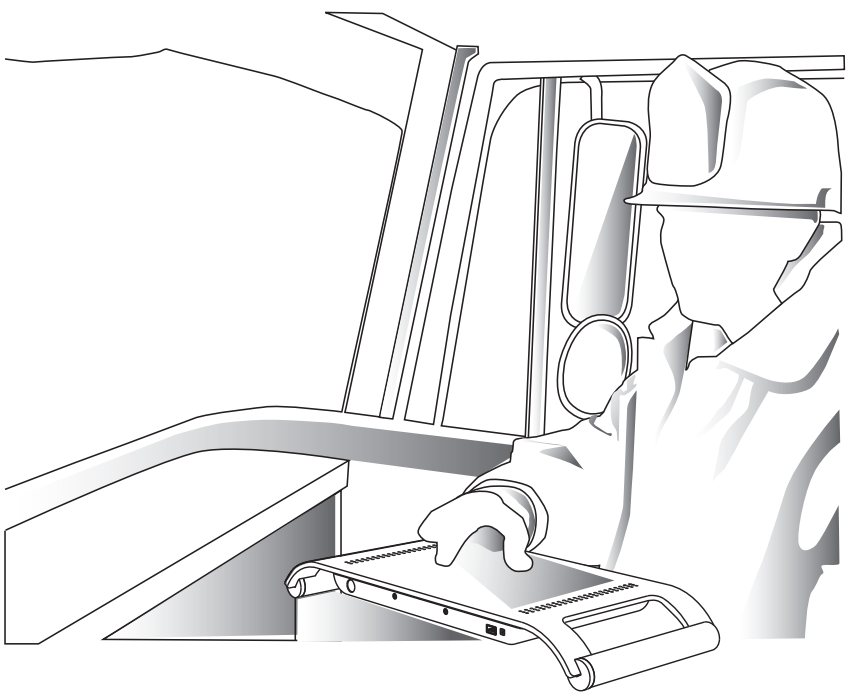


Firefighters rush to the scene wearing the device.



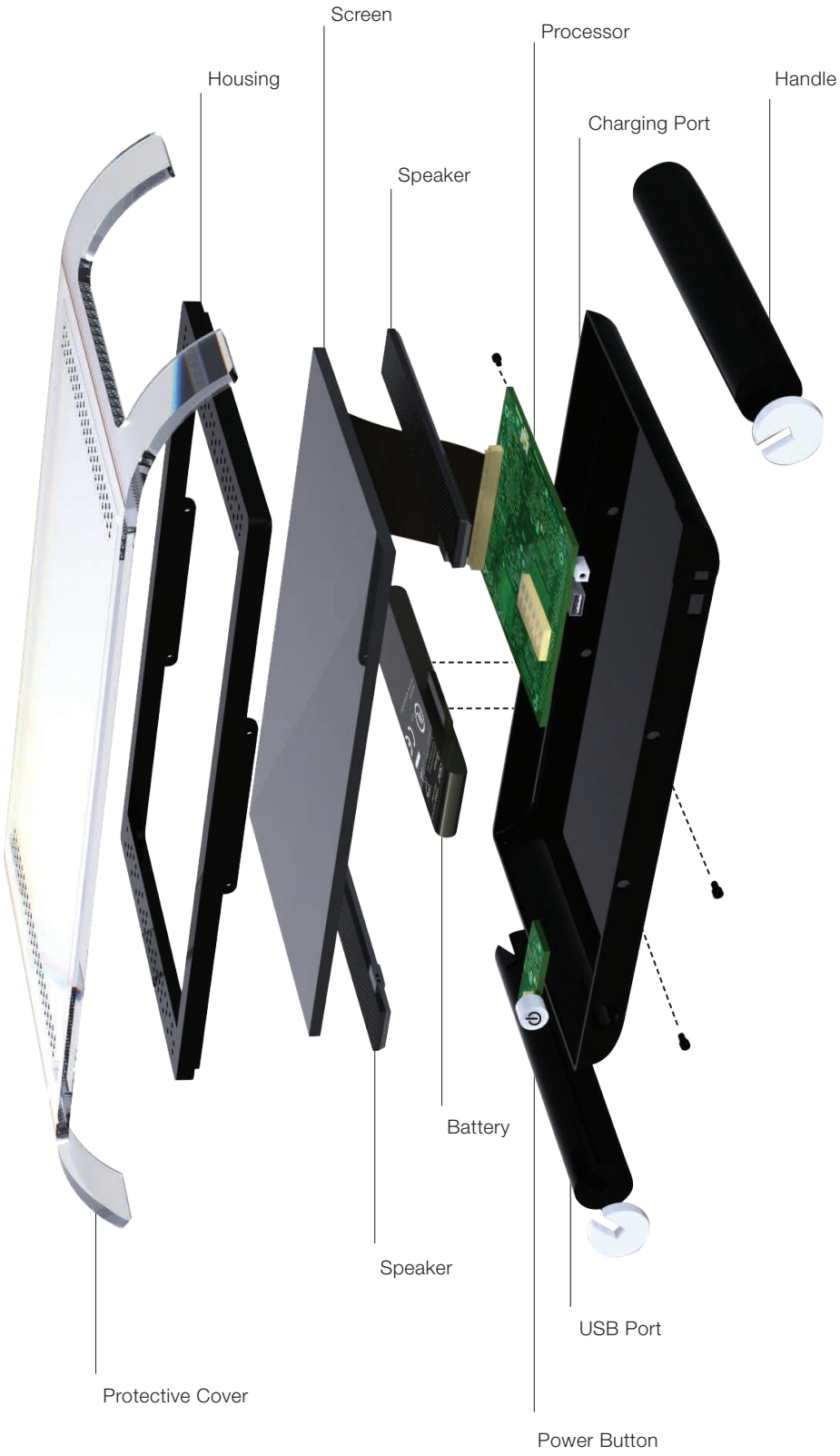
The firefighters SCBA's are outfitted with the Hawkeye tracking device. The device tracks each firefighter and displays their oxygen levels.

Each person on staff has their own device that is coded with their information.

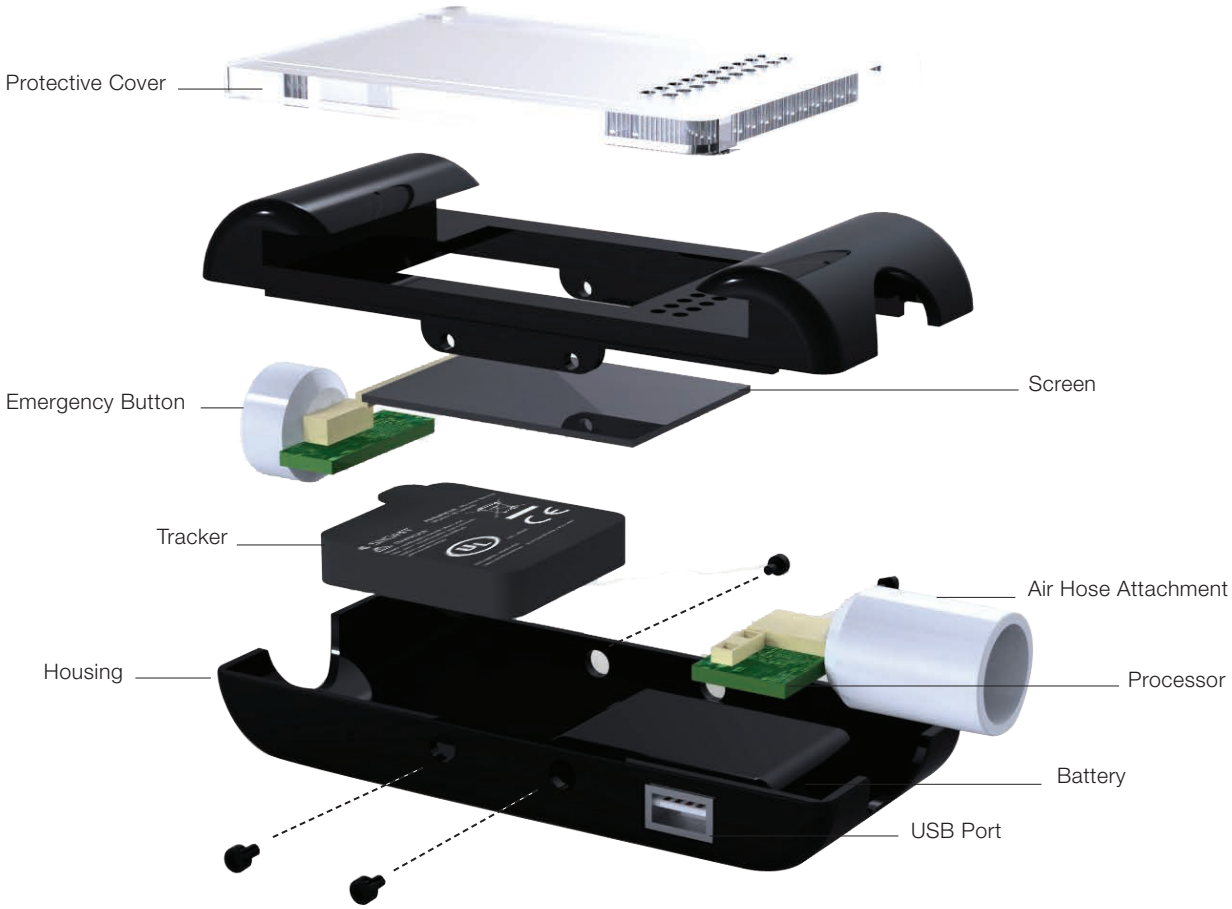


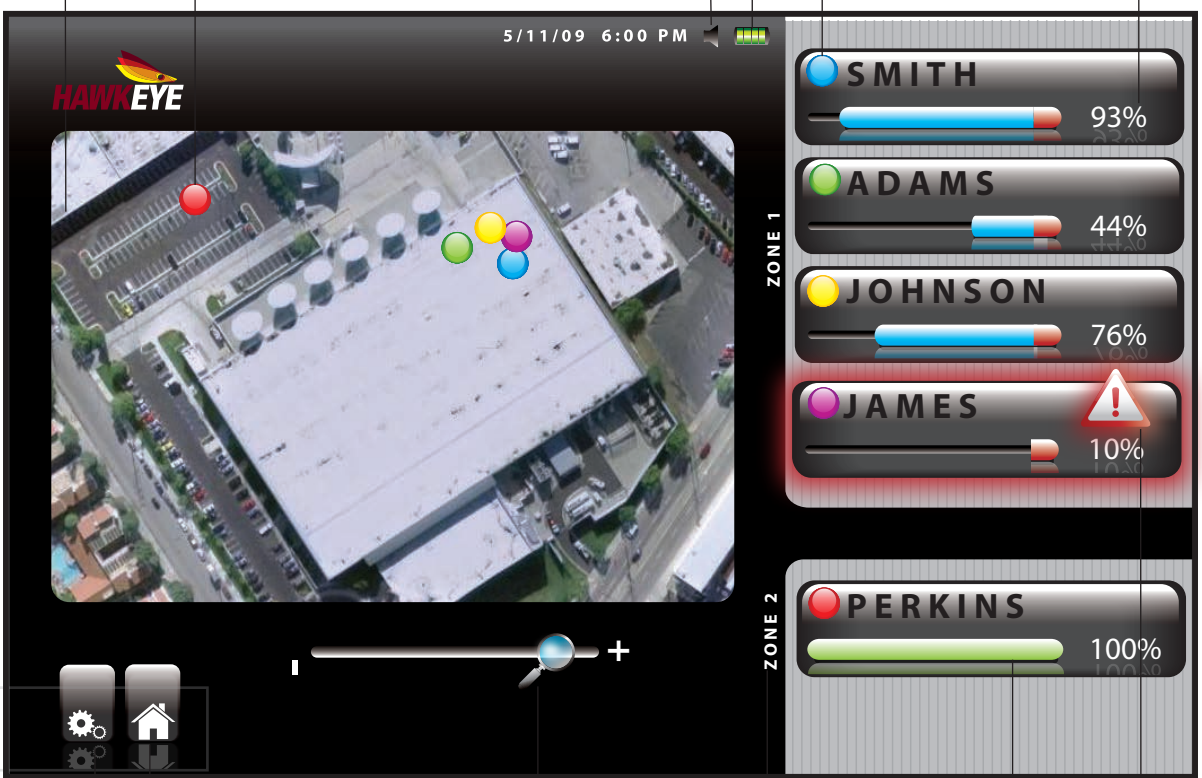
The chief can monitor the air tank status and location of the firefighters at all times.

They are able to track the firefighters incase of any emergency. If a firefighter is in danger the device will send a signal to the chief who can organize a rescue mission.


Screen
Processor
Housing
Handle
Charging Port
Speaker
Battery
Speaker
USB Port
Protective Cover
Power Button

Tracker: Exploded View





Satellite Image

Tracking Icons

Volume

Battery

Tracking Icons

Air Tank Level

Settings

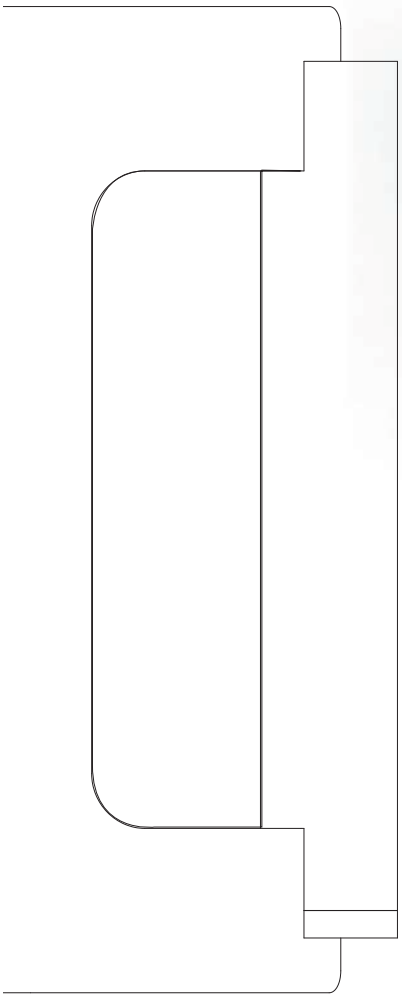
Menu

Zoom

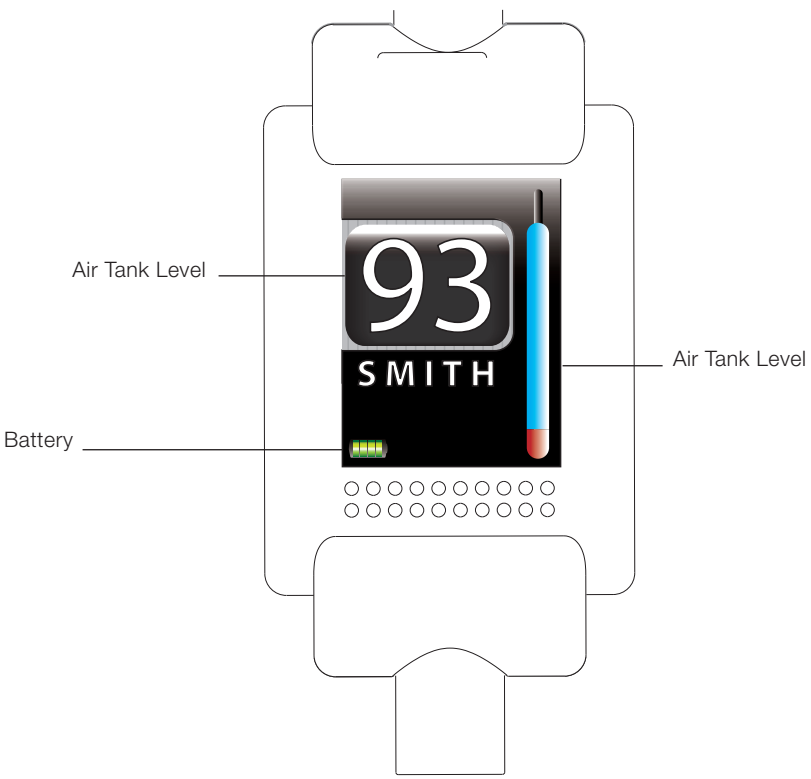
Location at the Scene

Air Tank Level

Alarm Signal




93
SMITH

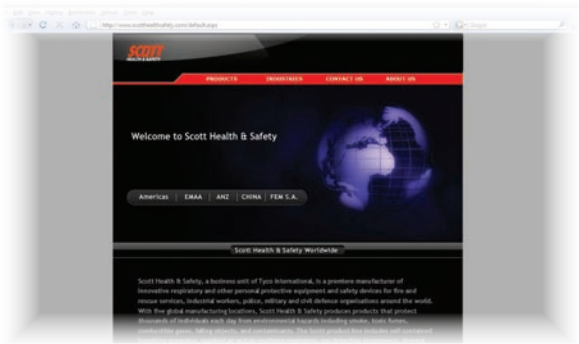

Air Tank Level
Battery
93
SMITH
Air Tank Level

When I first began using biomimicry early in the design process I was looking for solutions about how nature was able fold, bend, flex, roll up, and protect. After doing some research I found that nature has already found solutions and can do all of these functions quite well. The answers I found came from a wide range of plants and animals such as the lobster tail, beetle wings, manta rays, the Venus fly trap and even the fern leaf. This provided me with many potential design solutions. I explored each of these options through sketching to try and see if they could have any influence on the final design.

Later in the semester after an interview with a firefighter, my design changed and none of those potential solutions would have any influence my design. This time though I looked to biomimicry for materials that would help aid my design. One of the large issues with a flexible display is that there are not many materials that compliment the flexible nature of the screen. The solids that house the display are very strong and stiff but if dropped or placed under pressure they cannot withstand a large amount of force before breaking. I looked towards nature to see how it is able to remain rigid and solid while at the same time have the ability to flex. One of the solutions that I found through AskNature.com was the architecture of the vine. The vine is created from alternating segments of soft tissues for flexibility with segments of harder wood like tissues that provide strength. If a material could be created that would replicate the alternating layers of solid and flexible segments of the vine it would work great with the flexible display. It would provide the display a housing with the rigid structure needed to support it while at the same time allow it to flex and bend if it is dropped or crushed.

BRAND IDENTITY

RUGGED:
Rugged conforms to the ergonomic factors of the user in a time-critical situation. It is a ready-to-go all-weather solution. Form is a secondary to function in every situation.



EYE-CANDY:
This is an object of desire and art to the user. It has a glossy shell with interface features that are full-color and eye-catching. It employs an innovative use of backlit buttons and pleasurable textures. Despite these values, the style and technology quickly fade into obsolescence. Additionally, It lacks promise of durability .

PERSONALITY:
Personality is something more than a sans serif logotype. It differentiates the brand from others in the market and conveys a feeling. In a technology product, this can mean thoughtful design that establishes trust in the company's core values.

PRECISION:
It was decided that Hawkeye is about location, confidence and excitement in new technology, and of course firefighters. Precision is the slick styling and bright colors of the eye-candy style without the excess chrome. It has enough personality of its own, while staying true to the serious nature firefighter safety. Motion, grain and stark realism can be inserted into ads for added effect.

GRAPHIC STANDARDS MANUAL

HAWKEYE

INTRODUCTION

To ensure the ongoing success of the *HAWKEYE* brand, it is crucial to ensure a commitment to consistent visual communication standards. This means that Whenever an official communication is made via official stationery, business cards, web sites, products, publications and collateral materials the *HAWKEYE* brand can be visually identified.

As an innovative product for the Fire Service Industry, the identity of *HAWKEYE* is similarly designed to be bold, distinct and memorable. Communications should include imagery that is compelling, graphics that are supportive, and typography that is clear and informative.

This book was made not to limit the creativity of design professionals but to establish a consistent visual language from which to start your creative endeavors. Good luck creating the continued visual branding success of *HAWKEYE*!

VERBAL ELEMENTS

PITCH: Making decisions on the fireground can be challenging, even for the most experienced fire chiefs. Decisions can mean life or death, information most likely will be limited at first and slow to evolve, and time will create the pressure of urgency. Every decision the chief makes will be scrutinized after the fact, under much calmer conditions, by anyone and everyone who thinks they could have done it better. In order to make the process of command easier, a specialized team for saving lives through technology, is introducing HAWKEYE.

HAWKEYE is a mobile control system that monitors the location and the vitals of firefighters within a fire incident. The system consists of a central command component to be used by the chief on the fireground, and monitoring devices to be worn by each firefighter entering the scene. The monitoring devices track the firefighters' locations as well as their heart rate, which is important in detecting fatigue and possible dehydration. This information is then relayed to the chief so that he or she may make more informed decisions on crew placement and task delegation.

VOICE/TONE: The HAWKEYE brand is bold, dependable, clear, and to the point. This is reflected in all color palette and type considerations. Any additional graphic elements should also evoke boldness and poignancy relevant to the given message.

TAG LINE: Supreme Incident Control

NOMENCLATURE: communicate, locate, pinpoint, identify, organize, facilitate, overview, clarify, arrange, manage, specify, calculate, coordinate, compose, adapt, immediate, active, in control, ready, dependable, responsive, robust, rigid, precise

LOGOS

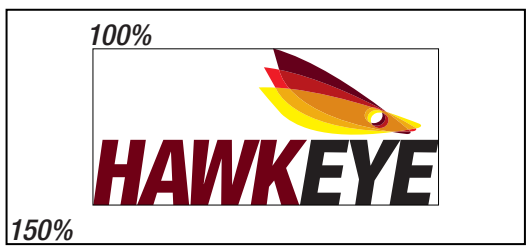
One of the logos below must be used on the front of all official stationery, business cards, web sites, products, publications and collateral materials.

	REVERSED	REGULAR / B&W
BACKGROUND:	BLACK	WHITE

LOGO USAGE

All usages of the *HAWKEYE* logos must preserve the original color value settings contained within the original eps files. In addition, care must be taken to preserve adequate white space surrounding the logo. Below are examples of white space to be used as a guideline for minimum space surrounding the logo.

WHITE SPACE



boundary space

150% boundary space minimum

MINIMUM SIZE

Minimum size can be measured from the baseline of the type to the top of the logo graphic.

minimum height
4/10 in.

logo graphic top

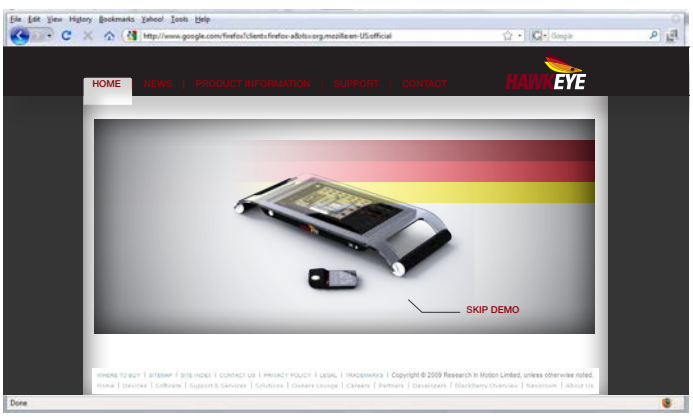
baseline

COLOR PALETTE

The following colors may be used in addition to black and white to divide and organize the layout of official stationery, business cards, web sites, products, publications and collateral materials of the *HAWKEYE* brand.

	CMYK
RED	C=0, M=100, Y=65, K=65
GRAY	C=100, M=100, Y=100, K=85
ORANGE	C=100, M=80, Y=100, K=100
YELLOW	C=100, M=10, Y=100, K=100

	RGB
RED	R=112, G=0, B=23
GRAY	R=77, G=77, B=79
ORANGE	R=241, G=90, B=34
YELLOW	R=255, G=221, B=0



Example usage of Palette for web application with 3-color motion blur.

OFFICIAL STATIONARY

Use only approved stationary especially when communicating outside of the *HAWKEYE* community. The layouts below are all examples of approved stationary.

HAWKEYE
SUPREME INCIDENT CONTROL

T 480.968.9550 | F 480.968.9555 |1490 E Idea Dr. Tempe, AZ 85282 | www.hawkeyecontrol.com

Date

Addressee's Name
Title or Position
Company or Office Name
Number & Street Address
City, State 12345

Salutation:
Em adigna consequat, consequis nostin utpatum velesequipit eros nullaore dolenit, con eummodigna autetum volesecte magna faci blandre ea feugiat ut am, quat lan ut nonsequis aut lut nummodip ea aut ing essequat dolobor peraest ionsequat venim zzriliquam zzrit dolorpero et, quis dit acing ercing erat. Ut irit lore consectem verit lam quam, quipsum doloborem atet, quat, quisi etum dit, velesequip eliquisim duisciduipit lore enit nis alis ad diat, corperaesto conse dolut wisl ip ea corpero odolor iriusto digniamet amet in esed tat.

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Complimentary close,

Name of Sender
Title (optional)

Business Cards

John Smith
President

T 480.900.9000
F 480.908.9000

HAWKEYE

www.hawkeyecontrol.com

John Smith
President

T 480.900.9000
F 480.908.9000

HAWKEYE

www.hawkeyecontrol.com
Number & Street Address
City, State 12345

Envelope

HAWKEYE

Department Name
Number & Street Address
City, State 12345

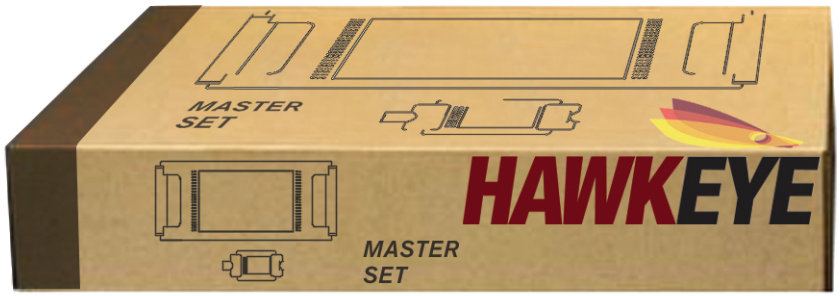
Presorted
First-Class
US Postage
Paid
Permit No. 2

Department
Company or Office Name
Number & Street Address
City, State 12345

Exhibit Design

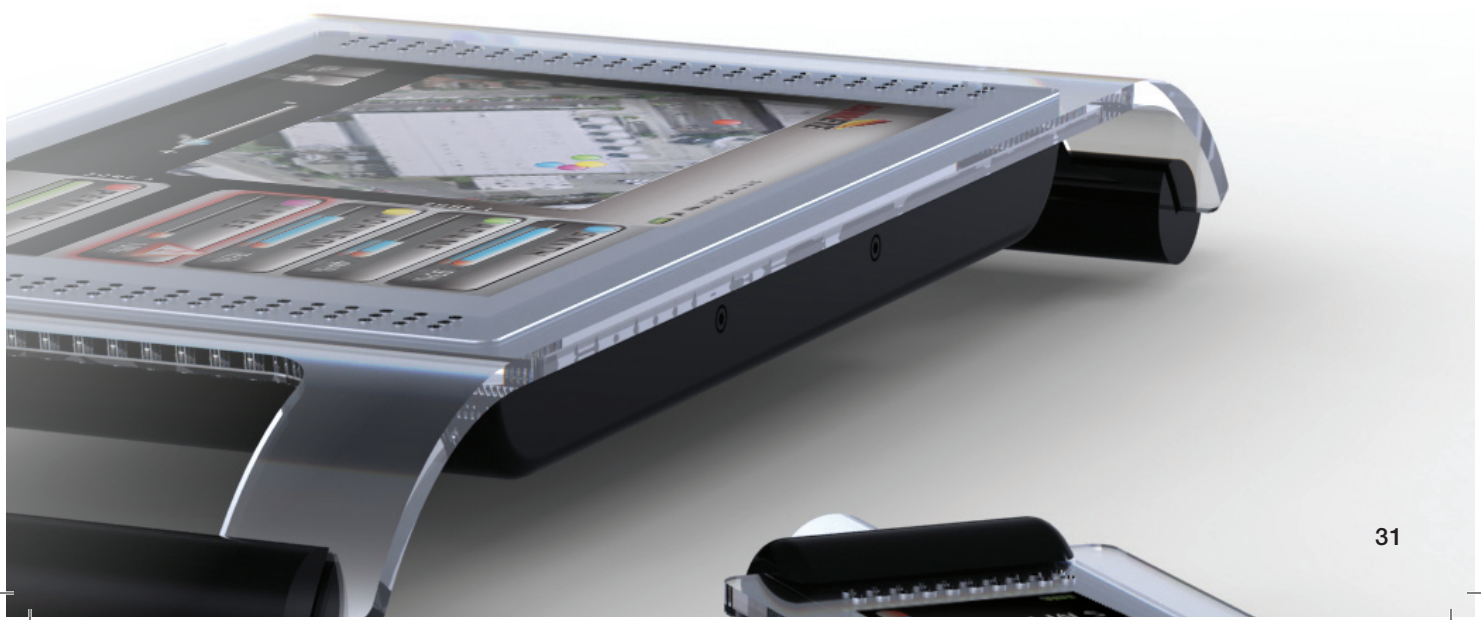
Video Presentation

Web Site



Package Design

Poster Series



Implementation Timeline (1yr)

ITS COMING!
This phase is about refinement, development, and fitting the sales force with materials they need when they need them. Well-placed magazine features will excite firefighters about the technology to come.

MARKET RESEARCH
DEPARTMENT TESTING/
OBSERVE USER INTERACTION
RESEARCH FOCUS GROUPS

1st Quarter

TRADE SHOW COLLATERAL
BUSINESS SYSTEM
VISUAL DISPLAYS
PROMOTIONAL ITEMS
MOTION GRAPHICS

2nd Quarter

AD CAMPAIGN
MAGAZINE FEATURE ADS
WEB SITE COMPLETION TARGET
GUERILLA ADVERTISING

3rd Quarter

COME GET IT!
This phase is about materializing the product and continued fueling of the ad campaign.

PRODUCT ROLLOUT
PACKAGING
WEB BANNER ADS
MAGAZINE HALF SHEET ADS

4th Quarter

Everyone knows that bright colors in nature are often a warning signal for humans to stay away. Hornets, wasps, spiders, and even frogs communicate a potential for harm to us this way.

The Hawkeye interface is designed to similairly warn by using color indicators to notify the fire Chief of impending danger when one of his or her units is in danger. Color


4SIGHT

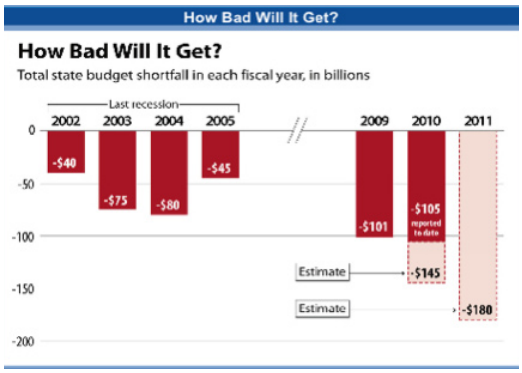
BUSINESS PLAN

(for a more in-depth [illegible] please consult the business repo[illegible]

External Environment

Political/Legal

After a historic win over Republican nominee John McCain, Democratic nominee Barrack Hussein Obama was sworn in on January 20th, 2009 to become the 44th president of the United States. With the Obama Administration comes the much talked about “change” that has been promised. This change that the new president has promised will supposedly affect many things in our nation, and public safety services will be no exception.



Economic

Currently, the world is battling the worst financial and economic crisis since the Great Depression in the 1930’s. Many of the biggest banking and financial institutions have seized to exist, the stock market has drop about 40% since its high on October 2007, and many countries are recording contractions in their GDP for the first time in many years. On top of that, millions of people have lost their jobs within the last year, and many more will do so in the coming year.

Sociocultural

There are several sociocultural trends that shape the business climate as it pretends to Hawkeye. First, the growing sustainability movements that have arisen in the past few years are affecting every business as the push for more environmentally friendly processes becomes stronger. Second, the post-9/11 glorification of firefighters provides an opportunity for innovative products that increase the safety of the firefighters.

Industry/Competitive

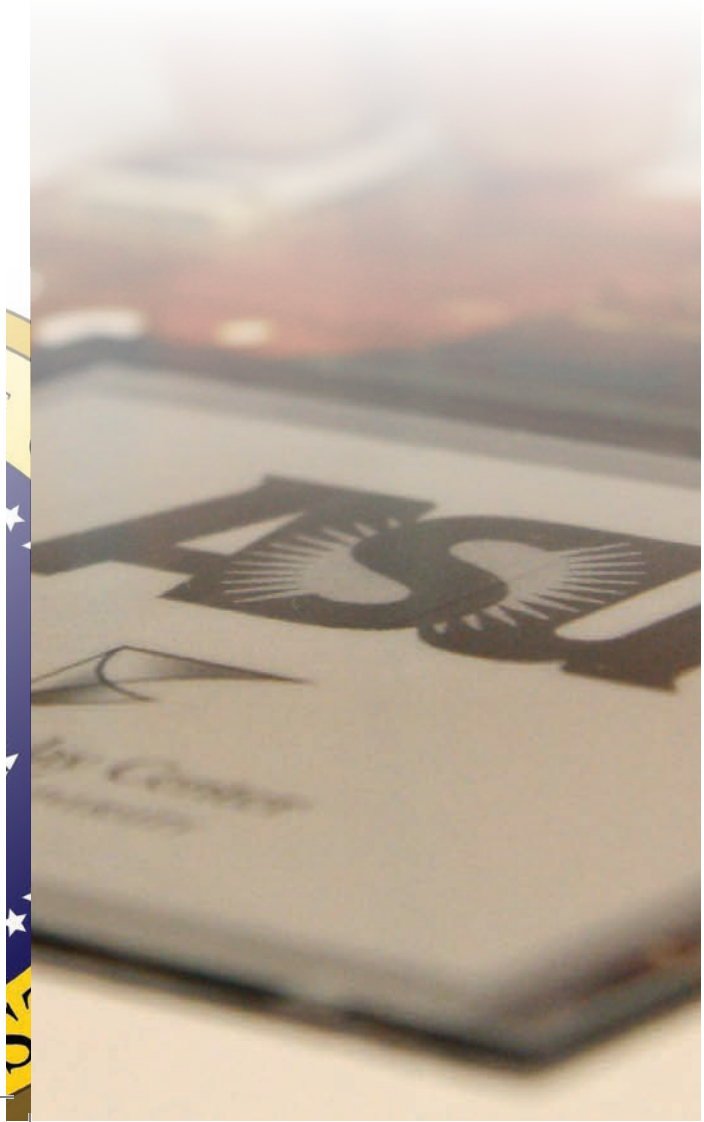
Because Hawkeye is a new technology being developed, there are no competitors or substitutes in the current market. However, there are several companies working on developing similar technologies to our product designed that could become competitors in the future.

Technology

A great deal of the technology needed for the product design is in its development stages. Flexible displays will not be available for commercial use for another few years. This has to be kept in mind when planning for the production of the product design. In addition, with indoor positioning technology several field tests need to be carried out before the technology can be used commercially.

Suppliers

Currently, manufacturing overseas, specifically in China, seems to be the most cost-efficient method when discussing product development. This has no specific impact on product design itself, but is a very important consideration when considering the latter portion of the supply chain. In choosing distributors, those distributors that can afford us the greatest amount of exposure should be considered, especially in the initial period. This is very important in order to raise product awareness.



Internal Environment

History

4Sight Innovative Technologies is a company first established by a group of students in the Innovation Space Program at Arizona State University. 4Sight was initially challenged to design a product for first responders in emergency situations by incorporating flexible display technology.

Financial condition

4Sight enjoys a unique financial position. By partnering up with the Flexible Display Center at Arizona State University, 4Sight has eliminated much of the cost involved in developing the technology needed in order to bring the flexible display technology into the market. In addition, the Department of Homeland Security Science and Technology Directorate (S&T) has established two grant programs in which 4Sight could potentially draw financial assistance from.

Management/Organization Structure

4Sight believes that the best way to structure its business is as a Corporation. In addition, 4Sight will chose to incorporate in the state of Delaware. Incorporating in Delaware offers unique benefits for companies

Technical

4Sight faces great technical challenges as it continues to develop Hawkeye. For Starters, flexible display technology is still in its infancy and no commercial applications are available in the market yet. In order to overcome the challenges imposed by the flexible display technology we will use other display technologies, such as LCD and non-flexible OLED, until flexible display technology becomes commercially available in the beginning of the next decade.

Market Opportunity Analysis

Potential Customers

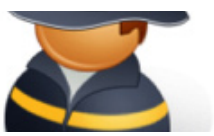
Across the U.S. there are over 30,600 fire departments of varying sizes and capabilities75. The majority (87%) of these fire departments are small and largely volunteer-staffed fire departments76. The remaining 13% of fire departments are exclusively or mostly staffed by non-volunteer, career firefighters77. However, those departments that are all career or mostly career protect 62% of the U.S. population, while the other 87% of the departments that are mostly volunteer or all volunteer and protect 38% of the population.

There are a wide variety of local sources for funding of fire and emergency service departments. The most common source of funding for fire and EMS is taxes. They include property tax, sales tax, local income tax, special taxes, and property transfer taxes. Purchasing Process:

Step 1: A group of Firefighters form a committee dedicated to a specific product that they have seen in a trade publication, a class they have been to, or any other way.

Step 2: Committee must propose item to the City for approval. If the item is a big budget item, the Chief must get approval from the City Council.

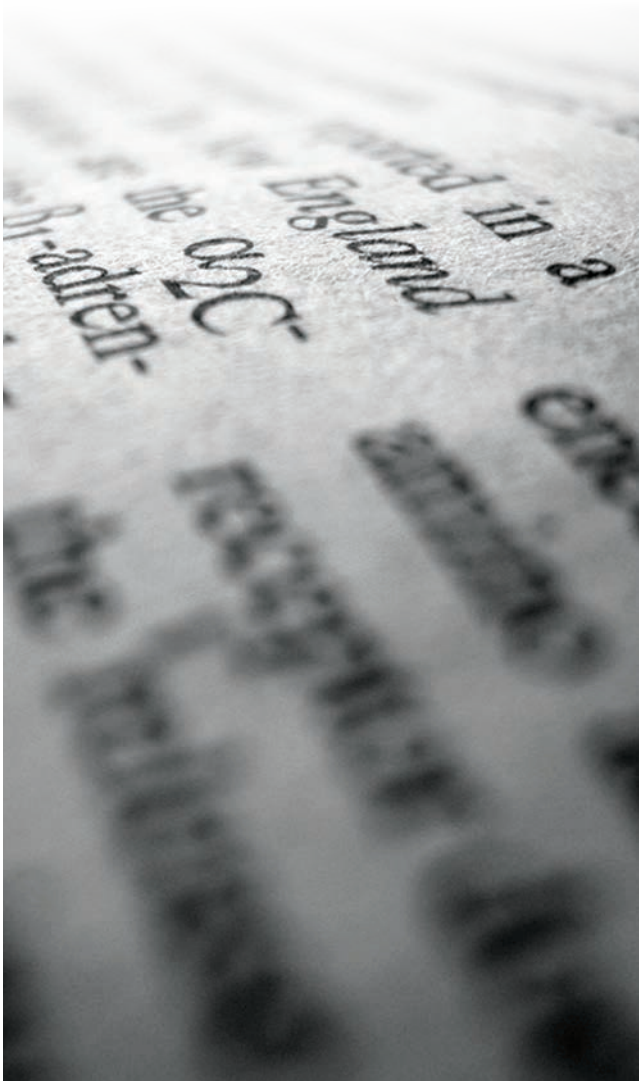
Step 3: Once item is approved, funds will be allocated to the budget for this item. Purchasing is then carried out.



Step 4: Department purchasing specialist or Chief is responsible for physically ordering the products

Step 5: Department purchaser will find the best product / deal from various sources including trade magazines, online directories and stores.

Step 6: Budget money is allocated to the purchase of specific item.



Mission Statement and Objectives

Mission Statement

To increase the ease and efficiency of rescue operations and to increase the safety of those involved through the thoughtful use of new technology

4Sight is in the business of savings lives through the extension of technology. Our goal is to select the technological opportunities with the most potential and build upon them so that we may increase the efficiency of first response. First responders, specifically firefighters for our purposes, are a vital part of society, and we believe that the most appropriate way to give back to them is to make their jobs easier.

Tag Line

Keeping safe those who keep us safe

We want to deliberately select and use any new technology which we believe could be of great value to firefighters. We want to take this technology and improve the way in which firefighters do their jobs.

Mantra

Saving Lives Through Thoughtful and Sustainable Technology

We choose to produce using specific types of technology because through research and conscious thought, we know that it will work, and that it will work for a long time. Any technology that we introduce to firefighters will never be excessive. It will always be carefully researched in terms of its ability to improve efficiency and sustainability.

Ultimately this will allow our consumers to differentiate 4Sight from the competition. 4Sight will be known for producing quality; performance-improving products that effectively and efficiently use the latest technology, without being excessive.

Strategies and Tactics:

Organizational Structure

Creativity and innovation are key drivers that allow companies to successfully launch products that lead to financial stability. In order to promote creativity and innovation the organizational structure of a company has to be such that it fosters or inhibits creativity and innovation. We will implement the several actions points in order to create an organizational structure that will foster and inhibit creativity and innovation

Manufacturing

Because 4Sight is dealing with very high technology products, the manufacturing process is somewhat complicated. We believe that the best strategy is to outsource the manufacturing process to a contract manufacturing (CM) company who has greater experience in manufacturing the technology that we need.

Quality Control

We will implement ISO 9001 by the end of year 3. ISO 9001 is used when you are seeking to establish a quality management system that provides confidence in your organization's ability to provide products that fulfill customer needs and expectations.
Environmental Management
In order to have a greater impact on our environment we will seek to become ISO 14001 by year 5.

Marketing and Sales

In order to constantly deliver value to our customers, 4Sight needs to develop a strong relationship with fire departments. By creating this lasting relationship we can learn and adapt to the changing needs of firefighters. In addition to providing a product, 4Sight needs to assure that the right service combination accompanies Hawkeye. This includes technical support, as well as periodical software and hardware updates. We will implement an aggressive marketing campaign that will include

FINANCIAL PERSPECTIVE

CUSTOMER PERSPECTIVE

INTERNAL PERSPECTIVE

LEARNING AND GROWTH

LONG TERM SHAREHOLDER VALUE

Productivity Strategy

Manage Total Life-Cycle Costs

Include Sustainable Strategies/Technologies

Revenue Growth Strategy

Maintain and Increase Customer Relationships

Revenue from New Products

CUSTOMER VALUE PROPOSITION

IMAGE

Reliability

Sustainability

Relationship

Customer Service

Customer Relations

Supplier Relations

Product/Service Attribute

Locates Firefighters Inside Buildings

Tough & Durable to Withstand Extreme Environments

Accompanying Service & Technical Support

Operations Management

Development Relationships with Suppliers

Find Contract Manufacturer that is ISO 9001 Certified
Work with Contract Manufacturing firm that allows flexibility for changes

Innovation

Increase R&D Budget

Understand Customer Needs in order to Identify new Opportunities

Capture Customer Ideas for New Product Services

Manage development cycle time and cost

Regulatory & Social

Work with Suppliers and manufacturers that have high environmental standards

Incorporate environment friendly processes and strategies

achieve ISO 14001 Certification by year 3

Customer Management

Understand Target Market

Communication Value Proposition

Educate Customer about Complex New Product/ Services

Maintain a Positive Brand Image??

Provide Service Excellence

INFORMATION CAPITAL

Acquire Detail Market research Data
Increase Knowledge Sharing

Create Enhanced information technology across departments

provide adequate technology to develop new product concepts

HUMAN CAPITAL

Attract and retain top talent
Develop leadership and management talent
Develop strength in core competencies

ORGANIZATION CAPITAL

create environment that supports innovation and creativity

encourage teamwork

ensure alignment with mission, vision, and goals

INCOME STATEMENT

	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue					
Total Revenue	$3,380,248	$4,760,889	$5,705,628	$6,276,191	$6,590,001
COGS					
Mfg.	2,028,149	2,856,534	2,852,814	3,138,096	2,636,000
Logistics (10% of mfg.)	202,815	285,653	285,281	313,810	263,600
Customs (5% of mfg.)	101,407	142,827	142,641	156,905	131,800
Distribution (20% of mfg.)	405,630	571,307	570,563	627,619	527,200
Catalogs	2,000	2,000	2,000	2,000	2,000
General Mktg. Materials	5,000	5,000	5,000	5,000	5,000
Web Site Design/Maint.	10,000	2,000	2,000	2,000	2,000
Total COGS	2,755,001	3,865,320	3,860,299	4,245,429	3,567,600
Gross Profit	625,247	895,569	1,845,329	2,030,762	3,022,400
GENERAL & ADMINISTRATIVE					
Total G&A	853,380	853,380	853,380	853,380	853,380
OPERATING PROFIT	-228,133	42,189	991,949	1,177,382	2,169,020
Depreciation	0	0	0	0	0
Interest	0	0	0	0	0
Taxes	0	14,766	347,182	412,084	759,157
NET INCOME	-$228,133	$27,423	$644,767	$765,298	$1,409,863

STATEMENT OF CASH FLOWS

Cash Flow from Operations	Year 1	Year 2	Year 3	Year 4	Year 5
Income from Operations	-228133	27423	644767	765298	1409863
Add Depreciation	0	0	0	0	0
Net Cash from Operations	-228133	27423	644767	765298	1409863
Cash Flow from Investing					
(Increase) Decrease Machinery	0	0	0	0	0
Net Cash from Investing	0	0	0	0	0
Cash Flow from Financing					
(Decrease)Increase LTD	0	0	0	0	0
(Decrease)Increase LTD	0	0	0	0	0
(Redemption) Issuance Common Stock	500000	0	0	0	0
Net Cash from Financing	500000	0	0	0	0
Net Increase (Decrease) in Cash	271867	27423	644767	765298	1409863
Beginning Cash	0	271867	299290	944057	1709355
Ending Cash	$271,867	$299,290	$944,057	$1,709,355	$3,119,219

BALANCE SHEET

	Year 1	Year 2	Year 3	Year 4	Year 5
Assets					
Cash	271,867	299,290	944,057	1,709,355	3,119,219
Equipment	0	0	0	0	0
Less Depreciation	0	0	0	0	0
Total Equipment	0	0	0	0	0
Total Assets	271,867	299,290	944,057	1,709,355	3,119,219
Liabilities					
Notes Payable	0	0	0	0	0
Less Principal Paid	0	0	0	0	0
Equity					
Owner's Equity	500,000	500,000	500,000	500,000	500,000
Retained Earnings	-228,133	-200,710	444,057	1,209,355	2,619,219
Total Liabilities + Equity	271,867	299,290	944,057	1,709,355	3,119,219
Correction	0	0	0	0	0

Product & Price

4Sight will offer Hawkeye as a bundle or as standalone parts.
The price for our offering is the following:

Hawkeye Product Line

Bundle

$5,000

Standalone Personal Locator

$800

Standalone Command Unit

$2250

CONSUMER BEHAVIOR MODEL

Need Recognition
Firefighters' safety is compromised each time they fight fire

Fire Chief faces challenges for tracking his men inside a burning structure

Search
Internal -
Any past experience that could be useful to solve the problem?

External -
Fire Departments seek outside information in order to solve the problem at hand
Window of opportunity for us to market our product

Pre-Purchase Evaluation of Alternative
What product best addresses our needs?
Cost/Benefits in line with our expectations?

Purchase & Consumption

Post-Purchase Evaluation
Did the product meet the consumer's expectations?
Could any improvements be made?

Organisms
Red-billed Hornbills
Red-billed Hornbill (Tockus erythrorhynchus) is a species of hornbill found in the savanna and woodlands of sub-Saharan Africa. The red-billed hornbill is the most commonly seen hornbill in Kenya. This species has mainly whitish underparts and head and grey upper parts. It has a long tail and a long curved red bill, which lacks a casque. Sexes are similar, but the female has a smaller bill. It is a large bird, at 42cm in length, but is one of the smaller hornbills. This species is omnivorous, taking insects fruit and seeds. It feeds mainly on the ground and will form flocks outside the breeding season. These social birds gather in small groups or pairs.

Dwarf Mongoose
The Common Dwarf Mongoose is a typical mongoose: it has a large pointed head, small ears, a long tail, short limbs, and long paws. The species can be distinguished from other mongooses by its size. It is much smaller than most other species (18 to 28 cm, 210 to 350 grams). The soft fur is very variable in color, ranging from yellowish red to dark brown. The limbs and belly are lighter colored. The back is usually speckled. The Common Dwarf Mongoose is primarily found in dry grassland, open forests, bush land, up to 2,000 meters high. The diet of the Common Dwarf Mongoose consists of insects (mainly termites, grasshoppers and crickets), spiders, scorpions, small lizards, small birds and rodents, supplemented with fruit.

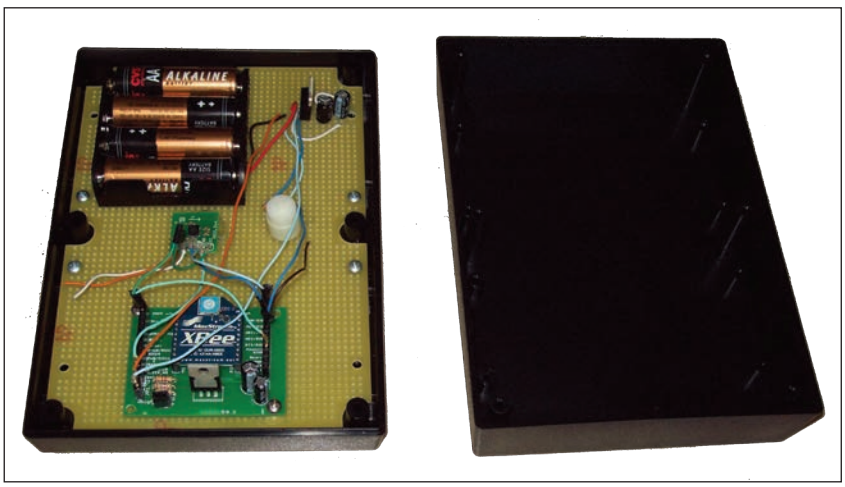
Relationship among Organisms
In Kenya, the red-billed hornbills partner with the dwarf mongoose by waking them up for breakfast. The mongoose will then spend hours hunting for insects, scratching up the ground like chickens looking for food. This produces too many insects for the mongooses to eat by themselves. The hornbills will then follow closely behind feasting on the leftovers. And with their heads down, the mongooses are vulnerable to predators looking for food. However, the hornbills make excellent look out, alerting both groups of any danger.

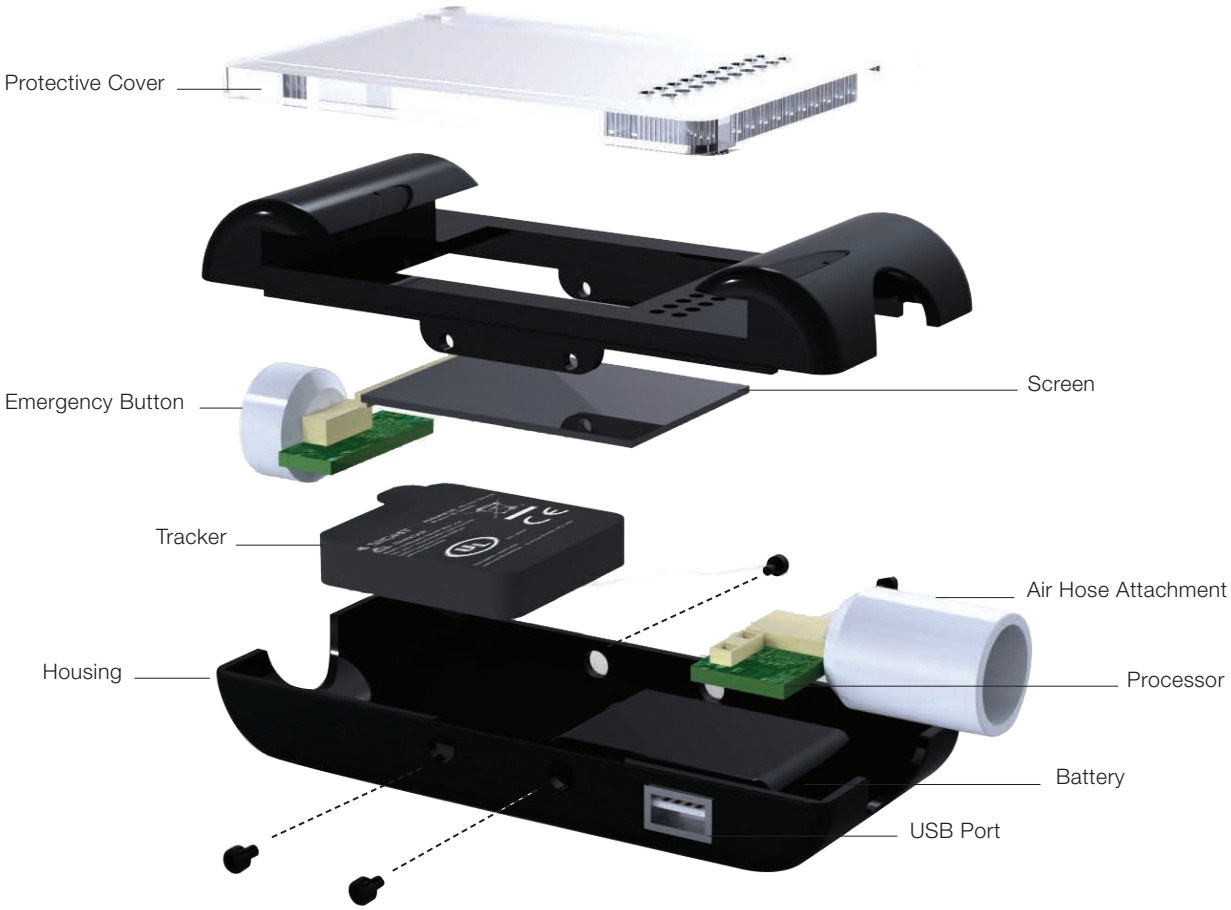
Business Process –
Strategic Partnership (Outsourcing)
The red-billed hornbill and the mongoose have a mutualistic relationship with each other. The hornbill relies on the mongoose to provide enough food for both species and in return the hornbill wakes up the mongoose and keeps them alter of any danger. Just like the hornbill did with the mongooses, it might be worthwhile for businesses to outsource certain business processes. Outsourcing is an arrangement in which one company provides services for another company that could also be or usually have been provided in-house. In our case we have chosen to outsource the manufacturing process to another company, a contract manufacturer, which can do it cheaper and more efficiently.

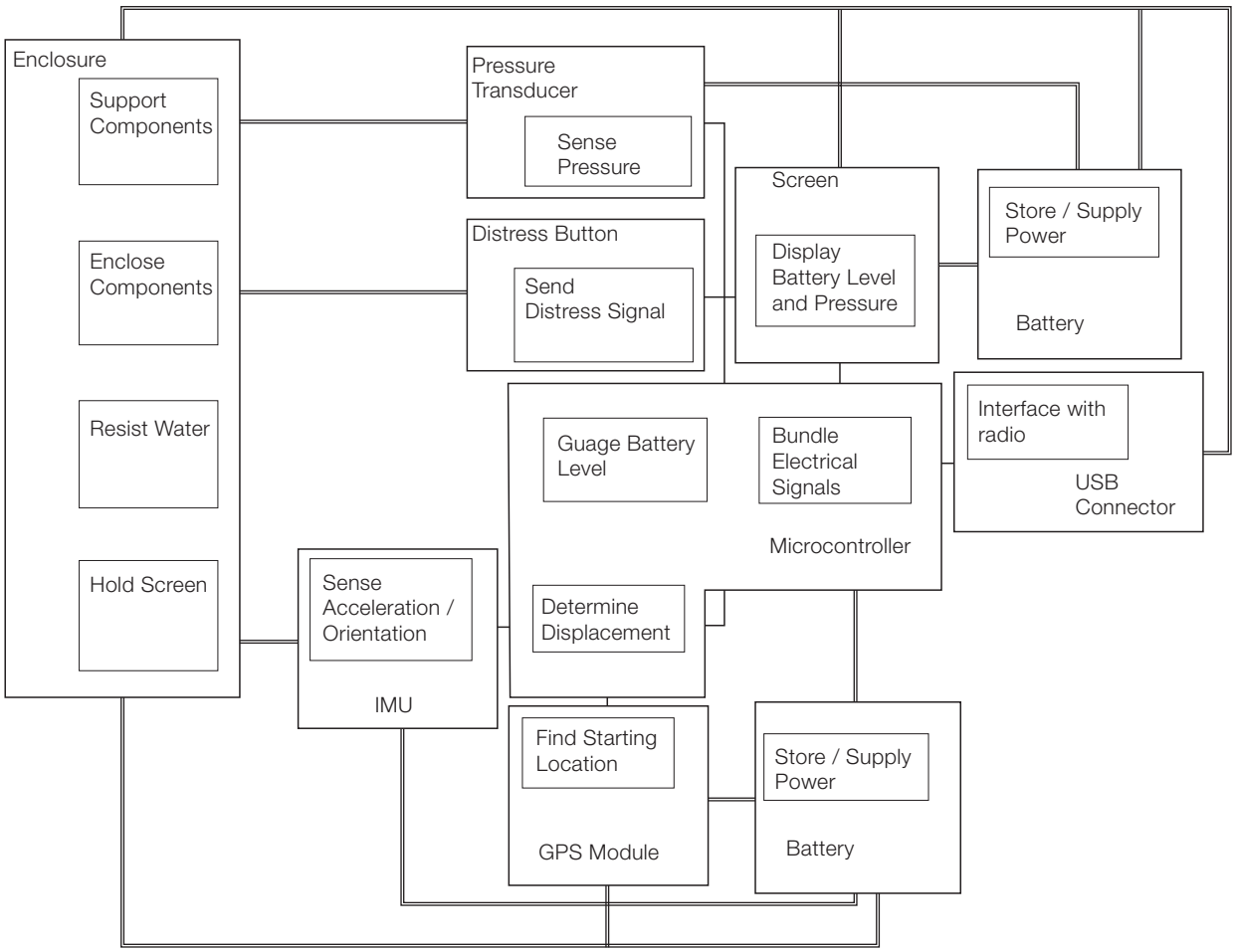
Concept Prototype
Closed

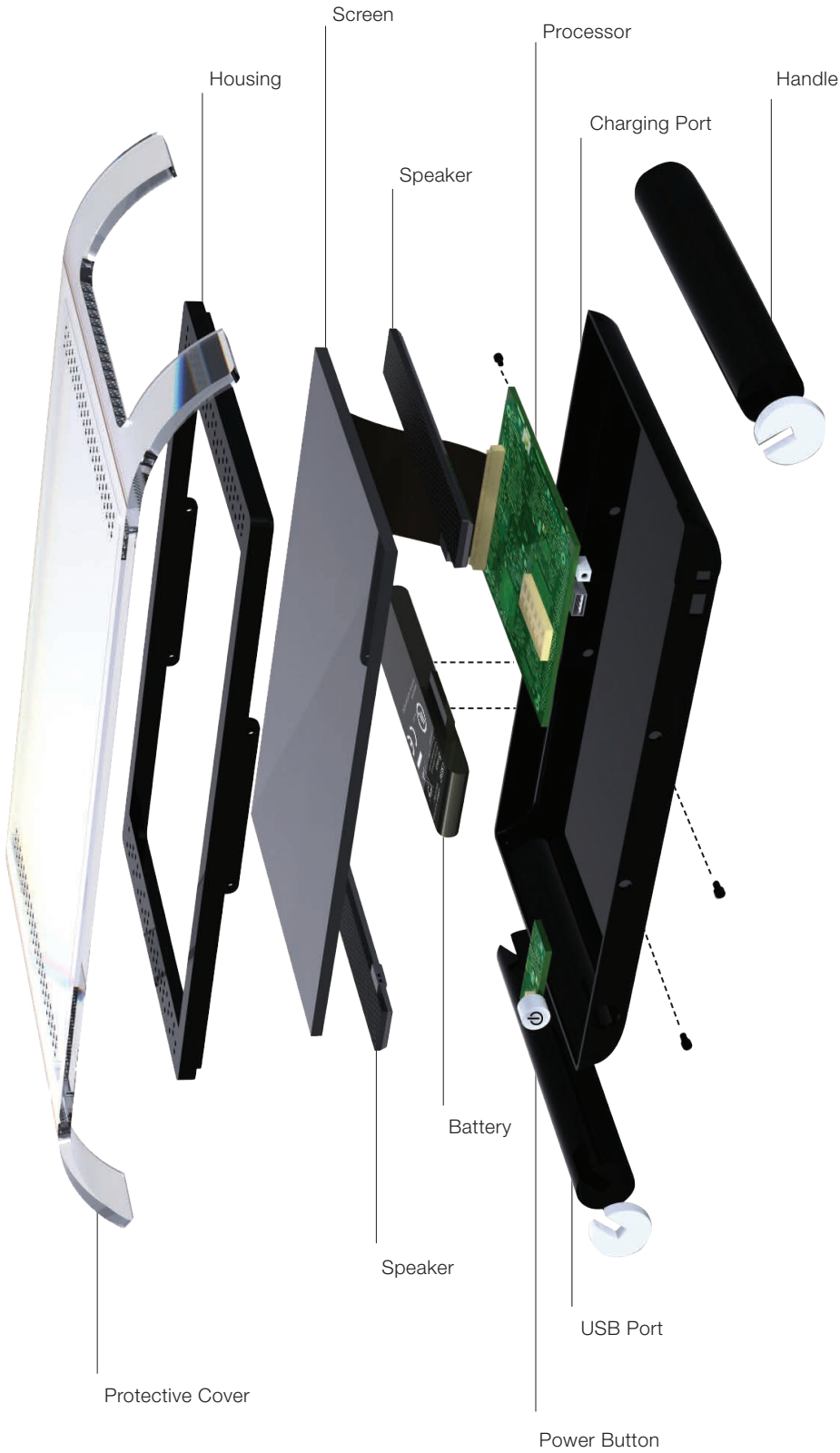
ENGINEERING

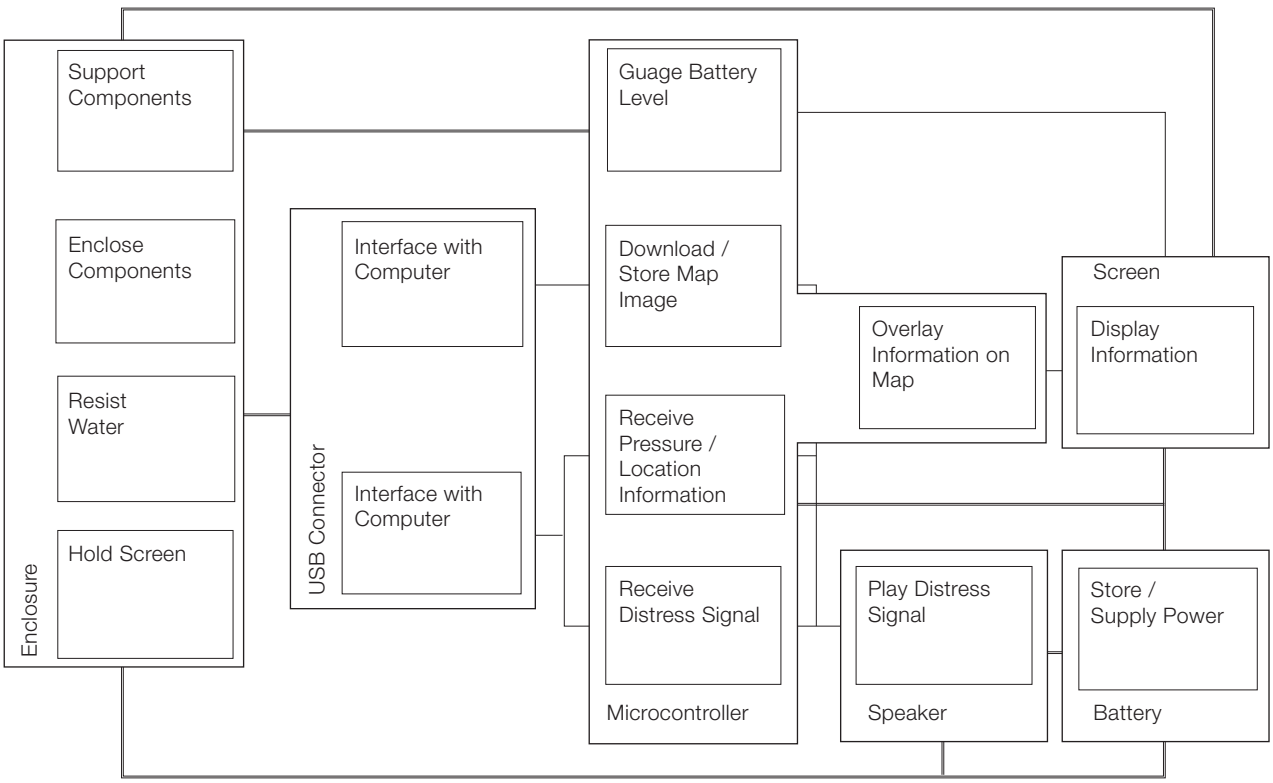
Concept Prototype Open




Protective Cover
Screen
Emergency Button
Tracker
Air Hose Attachment
Housing
Processor
Battery
USB Port


Enclosure
Support Components
Enclose Components
Resist Water
Hold Screen
Pressure Transducer
Sense Pressure
Distress Button
Send Distress Signal
Screen
Display Battery Level and Pressure
Store / Supply Power
Battery
Guage Battery Level
Bundle Electrical Signals
Microcontroller
Interface with radio
USB Connector
Sense Acceleration / Orientation
IMU
Determine Displacement
Find Starting Location
GPS Module
Store / Supply Power
Battery

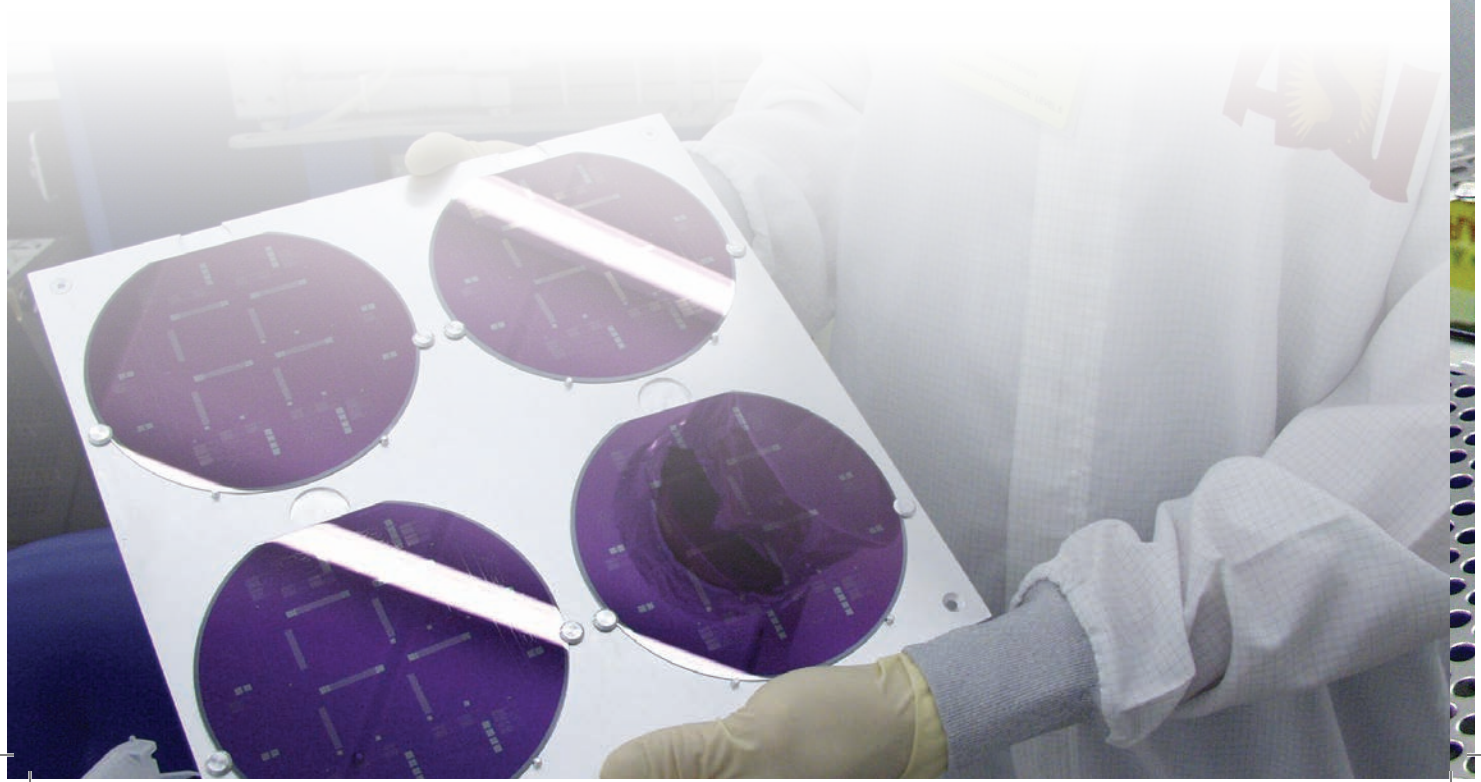

Screen
Processor
Housing
Handle
Charging Port
Speaker
Battery
Speaker
USB Port
Protective Cover
Power Button


Support Components
Enclose Components
Resist Water
Hold Screen
Enclosure
Interface with Computer
Interface with Computer
USB Connector
Guage Battery Level
Download / Store Map Image
Receive Pressure / Location Information
Receive Distress Signal
Microcontroller
Overlay Information on Map
Screen
Display Information
Play Distress Signal
Speaker
Store / Supply Power
Battery

Bill of Materials

The table below is a bill of materials for the final design. The vendors and manufacturers of some of the components is subject to change based on further procurement research. Some of the vendors listed here are possible sources for parts and services. Some costs are based on the research of costs of similar products.

Item	Quantity	Cost	Vendor	Make/Model	Lead Time
Inertial Measurement Unit	1	$1,400	Honeywell	Honeywell (DRM 4000)	10 Weeks
Li-ion Battery	2	$15	Gold Peak Industries	Gold Peak Industries	4 Weeks
Pressure Transducer	1	$225	Omega	Omega (PX-309)	4 Weeks
GPS Receiver	1	$42	SparkFun Electronics	Trimble (Copernicus)	2 Weeks
Screen and Controller (L)	1	$1,000	Flexible Display Center	Flexible Display Center	-
Screen and Controller (S)	1	$400	Flexible Display Center	Flexible Display Center	-
Screws	16	$0.05	ABE Solutions	ABE Solutions	-
Speaker	2	$20	Misco	4Sight	4 Weeks
Rocker Switch	1	$3	Digi-Key	C&K Components	-
Push Button Switch	1	$1	Digi-Key	APEM Components	-
Barrel Power Connector	2	$0.50	Digi-Key	CUI Inc	-
USB Connector	1	$1	Digi-Key	Tyco Electronics	-
Microcontroller	1	$30	TSMC	4Sight	6 Weeks
Printed Circuit Board	1	$18	Gold Phoenix	4Sight	6 Weeks
Casing	1	$20	Wabash Plastics	4Sight	6 Weeks



As of this book, three components will be custom built for the final design. The micro controller will be used to accept the readings from the firefighter unit, overlay it over a map of the incident site, prepare the data to be displayed and send that information to the display controller. The fabrication of the micro controller will be outsourced to the Taiwan Semiconductor Manufacturing Company (TSMC). 4Sight does not expect this chip to be larger than 4 cm2. The chip will be manufactured using photo lithography on a silicon substrate. The firefighter unit will have an emergency distress button. This button will raise an alarm on the commander unit. The commander unit will have a small speaker to raise audible alarms. The printed circuit board will be used on the firefighter unit (approx 5 cm x 8 cm) will be used to connect the battery, the GPS unit, the inertial measurement unit, the micro controller, the distress button, etc. They will be manufactured through a vendor like Gold Phoenix. The PCB will be manufactured on FR-4 – an epoxy resin bonded glass fiber. The casing will be manufactured using high density polyethylene through injection molding. HDPE is hard, resists abrasion and can resist moderate heat – sufficient for this application. It is also easy to recycle.

Technical Specifications Document

Effective design involves asking the right people the right questions and analyzing the answers to reach the right conclusions. 4Sight has researched its customers and has come up with a list of customer needs. It has interpreted those needs and converted them into specifications. The table below shows the target technical specifications for Hawk Eye. These specifications are based on engineering judgment, customer needs and comparisons with existing products that have similar functions.

Metric	Units	Value
Accuracy (pressure sensor)	%	>95
Accuracy (location sensor)	%	>97
Accuracy (GPS unit)	ft	1
GPS start-up time (cold start)	s	10
Handle pressures within all SCBA tanks	psi	>5000
Transmit information over long distances	ft	>2500
Large screen (base unit)	in	8 x 12
Survive drops from normal usage heights	ft	>10
Long battery life	hrs	>5
Low power consumption	W	<1
Resists water under typical usage conditions	ft	>5
Is light weight (Firefighter unit)	lbs	<0.8
Is compact (Firefighter unit)	in	2 x 4 x 0.75
Works in typical usage temperatures	oC	-40oC to 80oC

Engineering Cost Estimation

The cost of manufacturing a product is comprised of three broad categories: component costs, assembly costs and overhead costs.

Component costs are the costs of standard components that will be purchased directly from a vendor. It also includes the cost material, tooling and assembly costs of custom built products.

Assembly costs are incurred to cover labor and any equipment rentals needed to assemble the product from its components. This analysis assumes that labor costs $15 per hour.

Overhead costs are generally independent of the quantity of products being manufactured. They cover property rentals, electricity and telecommunication bills, salaries of full time employees, etc. In this analysis it is assumed that the overhead cost is equal to the sum of 10% of the cost of purchased components and 80% of the cost of assembly labor.

Estimating cost of manufacturing is not exact. The table below shows a breakdown of costs and estimates the total cost per unit. It assumes that, for the first phase, 5,000 units will be built.

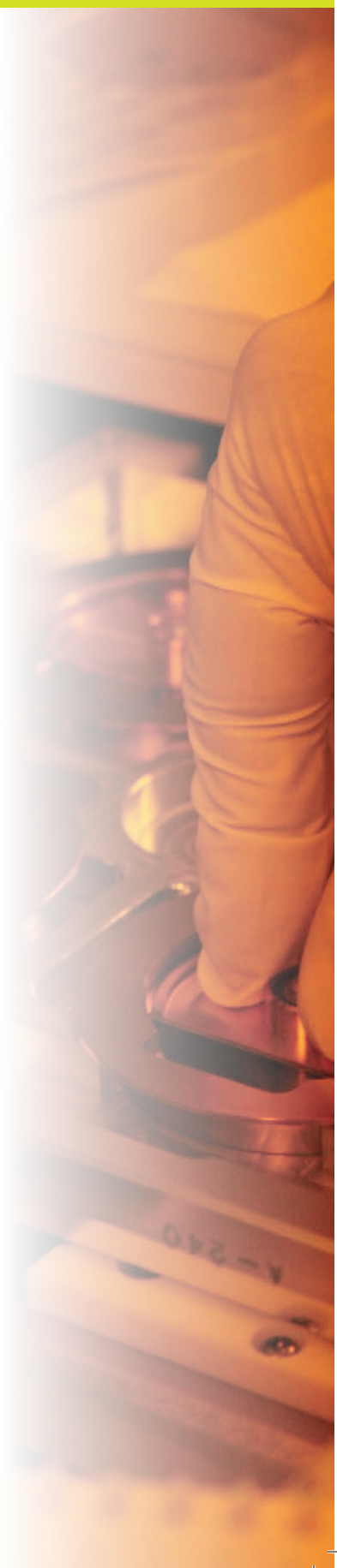
Item	Qty	Cost	Labor (sec)	Labor Cost	Total Cost
Inertial Measurement Unit	1	$1,400	4	$1.00	$1,401.00
Li-ion Battery	2	$15	7	$1.75	$16.75
Pressure Transducer	1	$225	6	$1.50	$226.50
GPS Receiver	1	$42	4	$1.00	$43.00
Screen and Controller (L)	1	$1,000	7	$1.75	$1,001.75
Screen and Controller (S)	1	$400	7	$1.75	$401.75
Screws	16	$0.05	160	$40.00	$40.05
Speaker	2	$20	4	$1.00	$21.00
Rocker Switch	1	$3	4	$1.00	$4.00
Push Button Switch	1	$1	4	$1.00	$2.00
Barrel Power Connector	2	$0.50	4	$1.00	$1.50
USB Connector	1	$1	4	$1.00	$2.00
Micro controller	1	$30	8	$2.00	$32.00
Printed Circuit Board	1	$16	10	$2.50	$18.50
Casing	1	$20	25	$6.25	$26.25
Total		$3,174		$65	$3,239
				Overhead	$367.96
				Total	$3,606.96

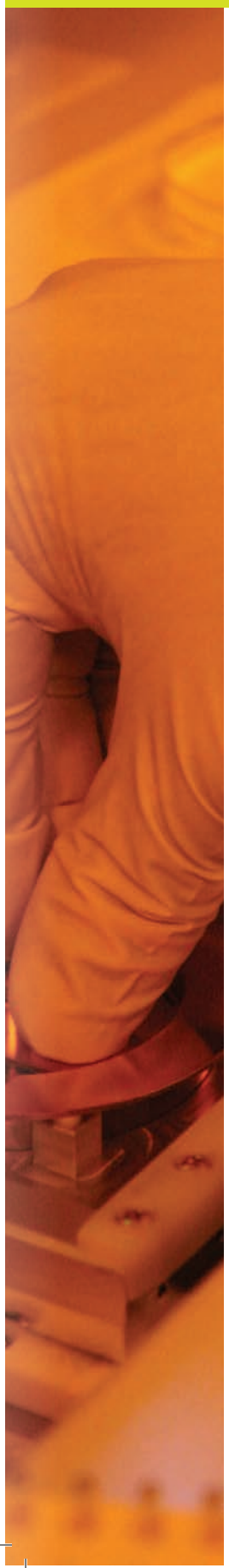
Design for Manufacturability/Assembly Document

4Sight will employ design for manufacturability and design for assembly principles in the production of HawkEye to reduce expenses and speed up production time. Successfully applying DFM and DFA principles can also help automate many processes and minimize errors. Below is a list of some of the components that have been designed using DFA/DFM techniques.

Command Unit

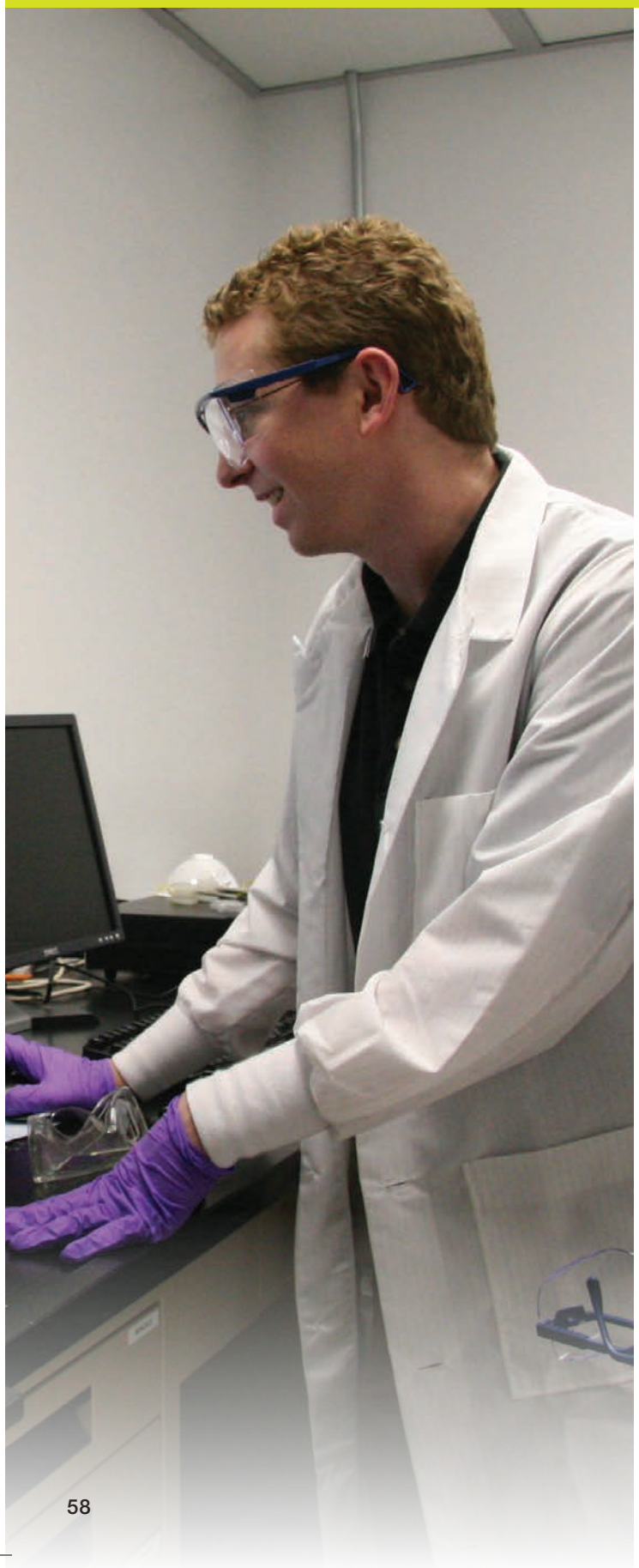
COMPONENT	TECHNIQUE
Outer casing	The outer casing will be manufactured using injection molding and will be held together with just four screws. The casing will not have any moving parts. The upper part of the casing will have a lip and will be designed to fit inside the lower part of the casing to ensure a perfect fit.
Screen	The screen and the controller will be one integrated unit and will snap fit into the upper casing, eliminating the need for screws.
Speakers	The custom designed speakers will occupy the space to the left and right of the screen and will snap fit into place.
Circuit Board	The main circuit board will be attached to the lower part of the casing with two screws. The circuit board will interface with the display controller, the micro controller, the on/off power switch, the battery, the speakers and the USB connector. This reduces the number of wires that need to be soldered.
Battery	The battery will only be accessible by removing the four screws that hold the outer casing together. This eliminates the need for a battery cover and helps speed up assembly.
Clear plastic top and handles	The clear plastic top will snap on to the casing and the handles will snap fit onto the clear plastic top.





Navigation Module

COMPONENT	TECHNIQUE
Outer casing	The outer casing will be manufactured using injection molding and will be held together with four screws. The casing will not have any moving parts. The upper part of the casing will have a lip and will be designed to fit inside the lower part of the casing to ensure a perfect fit. The casing will also snap fit into place to create a watertight seal.
Screen	The screen and the controller will be one integrated unit and will snap fit into the upper casing, eliminating the need for screws.
Pressure transducer wire tube	The pressure transducer wire tube will have a lip that will prevent it from sliding out of the outer casing. This will hold the tube in place without any screws or glue.
Circuit Board	The main circuit board will be attached to the lower part of the casing with two screws. The circuit board will interface with the display controller, the micro controller, the on/off power switch, the battery, the inertial measurement unit, the GPS unit, the pressure transducer and the USB connector. This reduces the number of wires that need to be soldered.
Battery	The battery will only be accessible by removing the four screws that hold the outer casing together. This eliminates the need for a battery cover and helps speed up assembly.
Clear plastic top	The clear plastic top will snap on to the casing.



Ecological Impact Factor Assessment

In addition to being technically sound, a new design must have as little an impact on the environment as possible. In order to help designers estimate the ecological impact of their designs, Arizona State University faculty member Philip White developed the Okala impact factors. 'Okala' means 'life sustaining energy'. Okala impact factors gives designers a means to convert the impact of many different materials, manufacturing processes, transportation methods and disposal methods into a standard baseline so that they may be compared with each other. 4Sight has employed the Okala technique to judge the impact of HawkEye.

This impact factors study was carried out assuming that the product will be used for 3 hours a day everyday for 3 years. All parts manufactured in the US are assumed to need about 3000 miles of transportation and all parts manufactured overseas about 8000 miles. Weights of certain components were picked out of data sheets while the others were estimated based on similar products. This assessment does not consider the impact of the energy used to assemble or operate the device.

A similar analysis was carried out on the proof-of-concept prototype. A comparison of the impacts shows that the prototype is much more sustainable. However, the prototype is not fully functional. Additionally, the prototype uses a laptop computer as its display. The impact of the laptop computer is not included in this analysis.

Final Design

Bill of Materials	Amount	Unit	Okala Factor	Unit	Okala Impact
Inertial Measurement Unit					
PCB	0.05	lb	9200	/lb	460
Landfill	0.05	lb	6.4	/lb	0.32
Truck 28 ton	0.075	ton-mi	1.9	/ton-mi	0.1425
Li-ion Battery					
Battery	12	AA	2.7	/AA	32.4
Truck 28 ton	0.9	ton-mi	1.9	/ton-mi	1.71
Pressure Transducer					
Steel	0.34	lb	25	/lb	8.5
Casting	1.34	lb	28	/lb	37.52
Truck 28 ton	0.51	ton-mi	1.9	/ton-mi	0.969
GPS Receiver					
PCB	0.01	lb	9200	/lb	92
Landfill	0.01	lb	6.4	/lb	0.064
Truck 28 ton	0.015	ton-mi	1.9	/ton-mi	0.0285
Screen and Controller					
PCB	0.625	lb	9200	/lb	5750
Landfill	0.625	lb		/lb	0
Truch 28 ton	0.94	ton-mi		/ton-mi	0
Screws					
Steel	0.14	lb	25	/lb	3.5
Casting	0.14	lb	28	/lb	3.92
Truck 28 ton	0.02	ton-mi	1.9	/ton-mi	0.038
Speaker					
Aluminum	0.4	lb	90	/lb	36
Casting	0.4	lb	18	/lb	7.2
Truck 28 ton	0.6	ton-mi	1.9	/ton-mi	1.14
Switches					
LDPE	0.08	lb	10	/lb	0.8
Injection molding	0.08	lb	10	/lb	0.8
Truck 28 ton	0.12	ton-mi	1.9	/ton-mi	0.228
Power/USB Connector					
LDPE	0.06	lb	10	/lb	0.6
Injection molding	0.06	lb	10	/lb	0.6
Truck 28 ton	0.09	ton-mi	1.9	/ton-mi	0.171
Micro controller					
Integrated circuit	0.05	lb	9600	/lb	480
Landfill	0.05	lb	10	/lb	0.5
Air Freight	0.225	ton-mi	23	/ton-mi	5.175
Printed Circuit Board					
Integrated circuit	0.05	lb	4800	/lb	240
Landfill	0.05	lb	10	/lb	0.5
Air Freight	0.225	ton-mi	23	/ton-mi	5.175
Casing (Black)					
HDPE, secondary	0.6	lb	8	/lb	4.8
Injection molding	0.6	lb	10	/lb	6
Truck 28 ton	0.09	ton-mi	1.9	/ton-mi	0.171
Casing (Clear)					
Polycarb	0.4	lb	36	/lb	14.4
Injection molding	0.4	lb	10	/lb	4
Truck 28 ton	0.06	ton-mi	1.9	/ton-mi	0.114
				Impact/Lifetime	7199.49
				Lifetime Hours	3285
				Impact/Hour	2.19

Functional Prototype

Bill of Materials	Amount	Unit	Okala Factor	Unit	Okala Impact
Accelerometer					
PCB	0.05	lb	9200	/lb	460
Landfill	0.05	lb	6.4	/lb	0.32
Truck 28 ton	0.018	ton-mi	1.9	/ton-mi	0.0342
Alkaline Battery					
Battery	4	AA	1.5	/AA	6
Truck 28 ton	0.02	ton-mi	1.9	/ton-mi	0.038
Wireless Module					
PCB	0.3	lb	9200	/lb	2760
Landfill	0.3	lb	6.4	/lb	1.92
Truck 28 ton	0.105	ton-mi	1.9	/ton-mi	0.1995
Screws					
Steel	0.06	lb	25	/lb	1.5
Casting	0.06	lb	28	/lb	1.68
Truck 28 ton	0.01	ton-mi	1.9	/ton-mi	0.019
Battery Holder					
LDPE	0.1	lb	10	/lb	1
Injection molding	0.1	lb	10	/lb	1
Truck 28 ton	0.02	ton-mi	1.9	/ton-mi	0.038
Wires					
Copper	0.02	lb	320	/lb	6.4
Injection molding	0.02	lb	29	/lb	0.58
Truck 28 ton	0.01	ton-mi	1.9	/ton-mi	0.019
Compass					
Integrated circuit	0.05	lb	9600	/lb	480
Landfill	0.05	lb	10	/lb	0.5
Truck 28 ton	0.05	ton-mi	1.9	/ton-mi	0.095
Perforated Board					
Integrated circuit	0.1	lb	4800	/lb	480
Landfill	0.1	lb	10	/lb	1
Truck 28 ton	0.1	ton-mi	1.9	/ton-mi	0.19
Casing					
HDPE	0.6	lb	8	/lb	4.8
Injection molding	0.6	lb	10	/lb	6
Truck 28 ton	0.02	ton-mi	1.9	/ton-mi	0.038
				Impact/Lifetime	4213.37
				Lifetime Hours	3285
				Impact/Hour	1.28

Is it Good?

In addition be being technically and financially feasible to be successful, any new product must be good for society and environment. It is important to make sure that a new design promotes positive feelings in society and improves the life of mankind in general. HawkEye has been designed with some positive social and environmental impacts in mind.

HawkEye is a device that promotes the safety of firefighters. By moving the burden of monitoring air pressure levels to the fire chief, firefighters at a site can focus on their primary task – saving lives. HawkEye gives the fire chief the ability to constantly monitor his team and make the operation more efficient. It carries out simple functions effectively and helps victims from all walks of life.

4Sight will strive to purchase as many materials and components from local vendors as possible. This will help grow the local economy, keep jobs in the US and rely on American laws to ensure that workers are not exploited. We will conduct through vendor research to ensure that any part or component that is imported from a foreign land is manufactured in a facility that treats its employees fairly, pays them a suitable pay, employs safe manufacturing techniques and is conscious of the environment.

HawkEye's casing will be manufactured using recycled HDPE. Soldering will only be done using lead free solder and all materials used will be RoHS compliant so that the product can be marketed in the European Union as well as North America. By using fewer circuit boards with efficient designs, the amount of material required will be kept at a minimum. 4Sight will offer low cost repairs and incentives to customers who return damaged units back for recycling. Recyclable materials will be recycled and working but unusable electronic components will be donated to educational institutions.

HawkEye will be assembled locally and most of the components will be purchased from local manufacturers. All local transportation will be done by road or train to minimize cost and environmental impact. Since this product uses a display manufactured by the Flexible Display Center, it will be low power consuming, light and robust, thus minimizing energy and material consumption.

4Sight will carry out a through life cycle analysis to extend the usable life of HawkEye. In case the technology used in HawkEye becomes outdated, old devices will be taken back and donated or sold to secondary markets such as assisted living communities and orphanages.

Minimizing the negative impact on society and the environment is a major concern for 4Sight. Even though there are some aspects of HawkEye that are not entirely sustainable, 4Sight will strive to offset its effect by improving other aspects. The best way to have a positive impact on the environment is to have no impact at all and 4Sight will strive to achieve that.

Engineering Biomimetic Solution

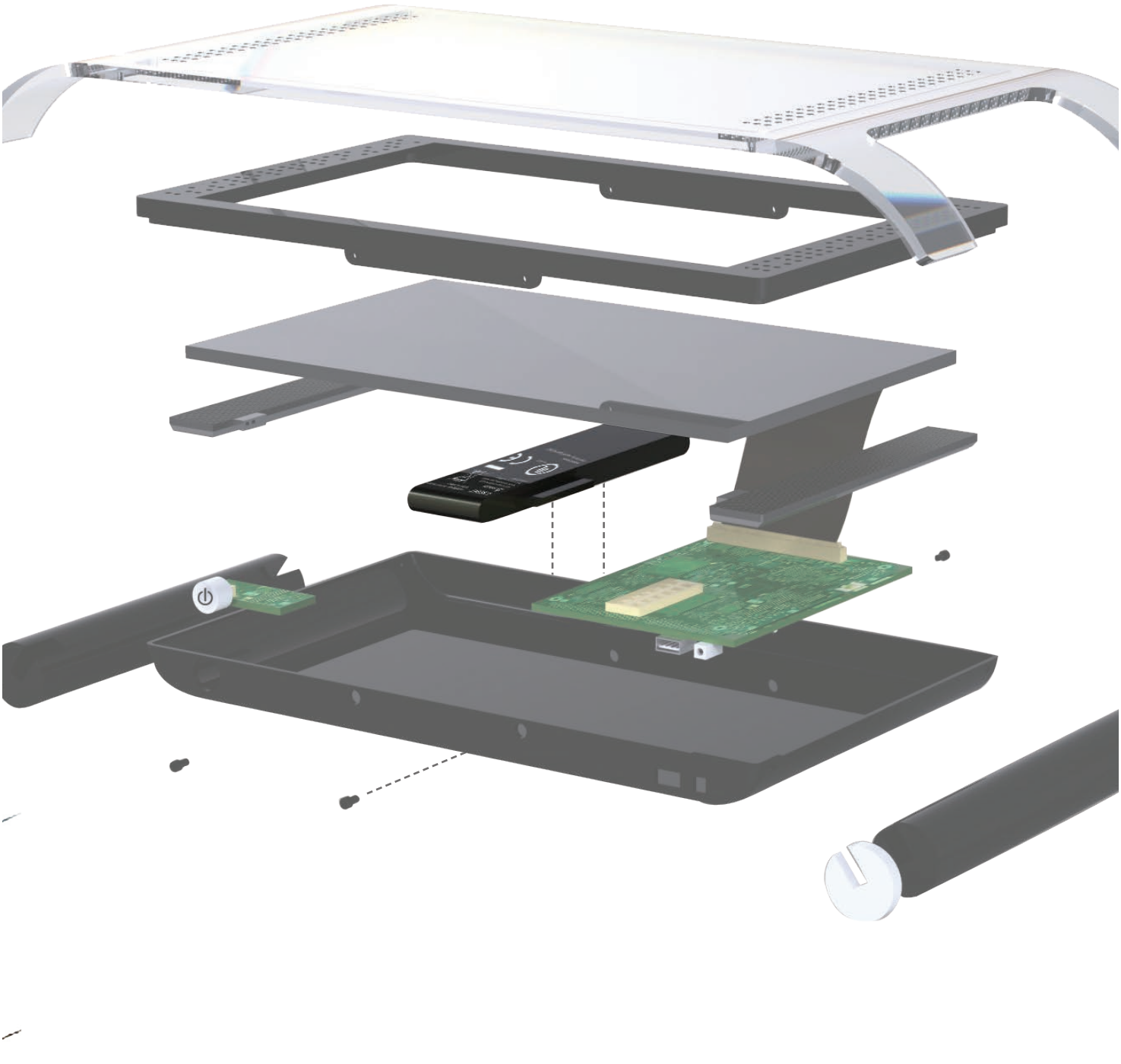
Animals and plants are extremely efficient in resource management. These resources could be in the form of food, water, warmth, etc. In the event that vital resources become scarce, plants and animals compensate by consuming lesser. This is primarily achieved by shutting off functions that are not critical to the existence of the organism. This shut-off mechanism sometimes is reversible but at other times, can leave permanent damage.

Sunlight, which is vital for photosynthesis is scarce in the winter. Plants produce food in the day and consume food through the night. Since the days are short in winter, they consume more than they can produce. In response to this scarcity, trees shed their leaves and go into a dormant state through the winter. While they are unable to produce any food they also consume significantly lesser. The trees produce new leaves and flowers through the spring and summer months and store food for the following winter.

Advanced animals such as humans have many complex body functions. When the human body runs out of food, the brain starts shutting down unimportant functions such a motion. In extreme cases, it shuts down consciousness. However, critical functions such as breathing and blood circulation still continue and keep the animal alive.

Advanced animals are also adapted to deal with extremely cold ambient temperatures. In order to conserve heat, animals cut blood circulation to the extremities. Although extended periods without blood can render these organs useless, the animal is able to survive. This is because it minimized heat loss and continued blood circulation to the core to maintain a safe core temperature.

HawkEye will employ a similar resource management system. In case the battery in the firefighter unit starts running low on power, HawkEye will shut of the air pressure monitoring system. The chief will still be able to track the location of the firefighter but will not have any air tank pressure level data available. This will significantly cut down power consumption and keep the location sensing mechanism running longer.



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