# TEAM BEBAS

PROCESS BOOK

## INTEGRATED PRODUCT DESIGN

BABSON - OLIN - MASSART

## TEAM BEBAS


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# - Design Brief -

# **Wellness** | in the world of "the Internet of Things"

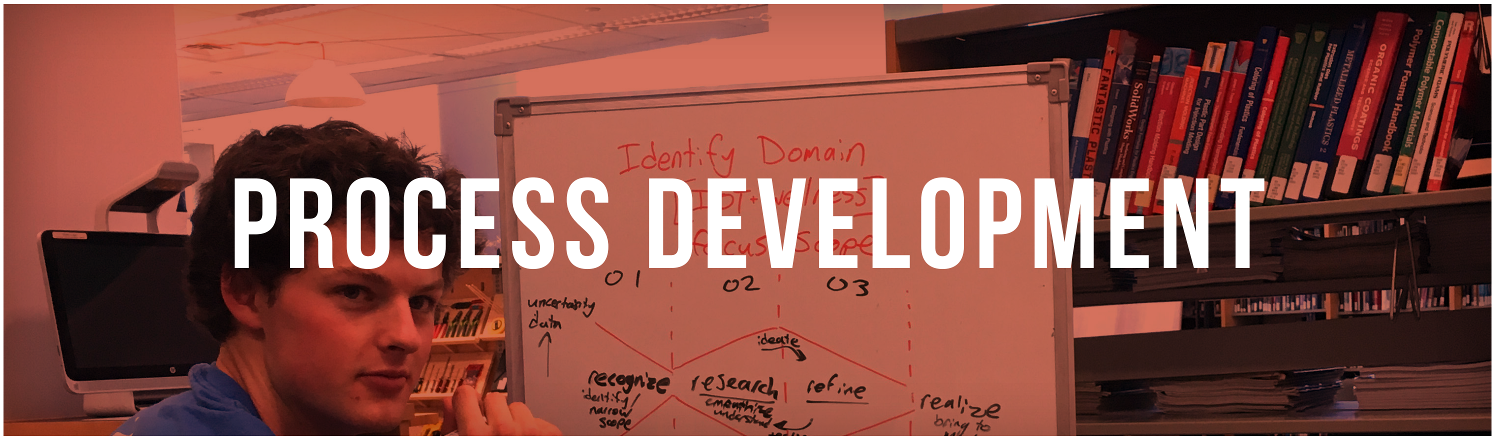
The Internet is on the verge of an expansion that will affect our lives in extraordinary ways. Artifacts in our live of all types will be acquiring IP addresses assuming their own identity integrating though omnipresent connectivity. This is quickly becoming a commercially viable opportunity space. Your team's project will be to design product solutions to issues of wellness in North America, with an underlying goal of developing solution that promote wellness through a business opportunity lens of the Internet of things. "Human beings are social creatures by nature. Their objects express who they are, how they would like others to see them, but also express who they aspire to be. They share and interact on many different levels, and in various fashions. Examining social constructs and looking closely at relationships as well as behavior patterns can aid in developing and innovating new product solutions that solve real problems and provide advantages and appeal to the user on a visceral level". - jmr

## With this in mind:

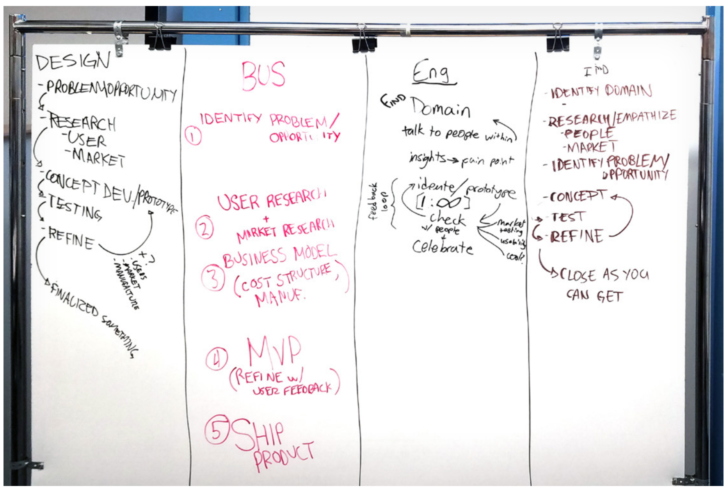
Consider the Meaning of wellness, examine wellness broadly, for example how it might relate to personal safety or defense. Look at wellness in the context of interpersonal relationship. You should consider **what are contemporary issues that are around perception of wellness versus health?**

Consider the lifestyle, goals and aspirations of the people as they relates to wellness, in a world of ubiquitous connectivity. **Who are they? How are they different or alike? What unique problems do they face?**

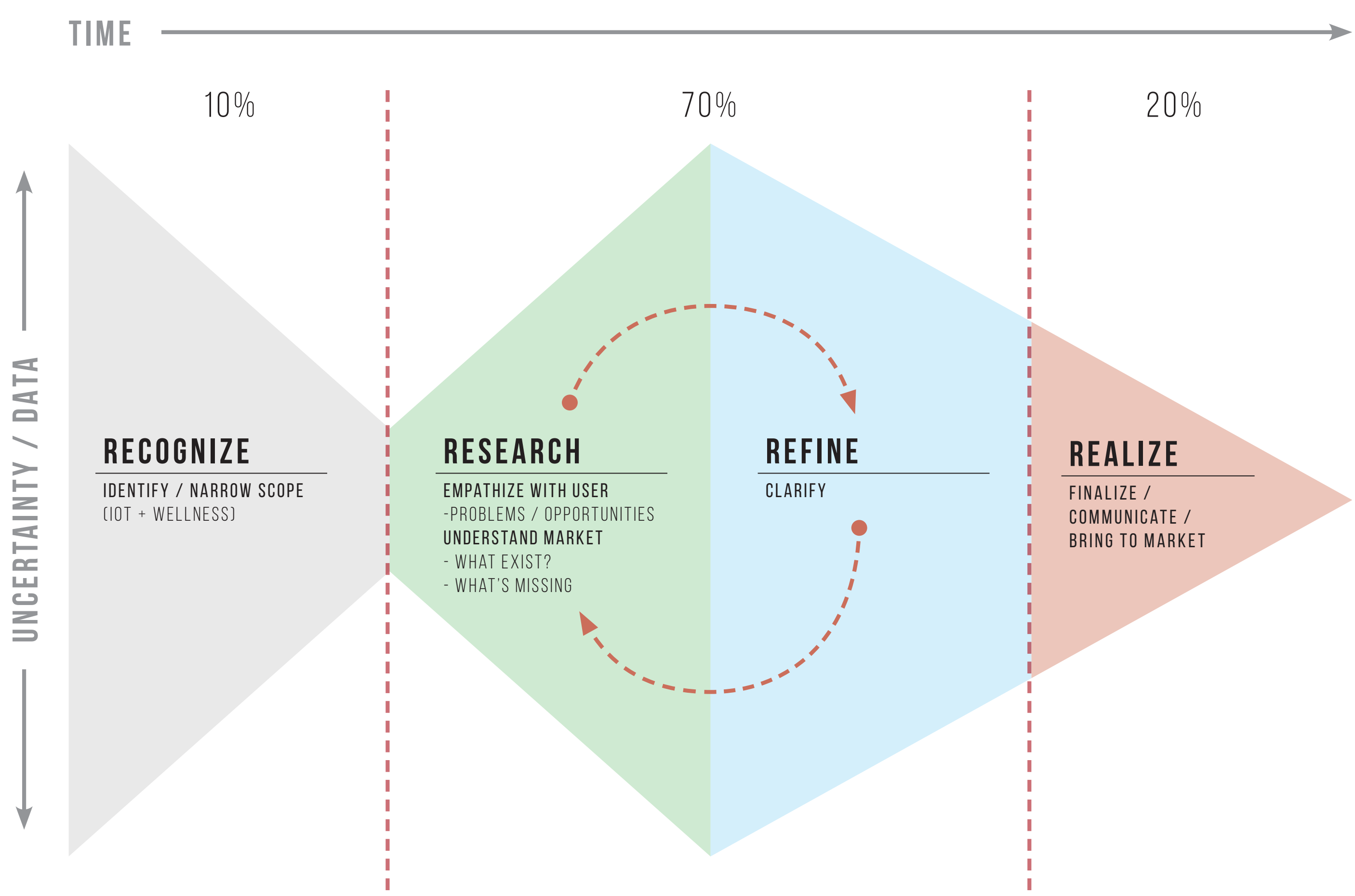
**You should start with identifying and the using specific problems or aspiration people have in relationship to the potential of the Internet of thing develop products that have potential to mitigate those issues.**



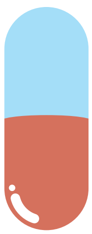

# PROCESS DEVELOPMENT




| DESIGN | BUSINESS | ENGINEERING | INTEGRATED PRODUCT DEVELOPMENT |
|---|---|---|---|
| **PROBLEM / OPPORTUNITY** | **IDENTIFY PROBLEM / OPPORTUNITY** | **FIND DOMAIN** | **IDENTIFY DOMAIN** |
| **RESEARCH** (MARKET, USER) | **RESEARCH** (USER + MARKET) | **TALK TO PEOPLE WITHIN** | **RESEARCH / EMPATHIZE** (INDIVIDUALS, MARKET) |
| **IDEATION** | **BUSINESS MODEL** (COST STRUCTURE, MANUFAC-TURING) | **INSIGHTS** | **IDENTIFY - PROBLEM / OPPORTUNITY** |
| **CONCEPT DEVELOPMENT / PROTOTYPE** | **MVP** (REFINE W/ USER FEEDBACK) | **PAIN POINT** | **IDEATE** |
| **TESTING** | | **IDEATE / PROTOTYPE** | **CONCEPT** |
| **REFINEMENT** | FEEDBACK LOOP | **CHECK WITH PEOPLE** (MARKET TESTING, USABILITY, COOL) | **TEST** |
| **FINAL PRODUCT** | | **CELEBRATE!** | **REFINE** |
| | | | **BRING TO MARKET** |



# DOMAIN SELECTION



## PHARMACEUTICALS

**STRENUOUS INTERACTION BETWEEN CONSUMER OF MEDICATION & CAREGIVER**

**RELATIONSHIP IMPLICATIONS OF PHRASE: "DID YOU TAKE YOUR PILLS"**

ACCUSATORY / BUILDS SENSE OF DISTRUST

### PROJECT DIRECTIONS

**"SMART" PILL BOTTLE CAP**

**PILL BOTTLE LID SENSOR THAT SENDS TEXT ALERT TO CAREGIVER EVERY TIME CONSUMER TAKES THEIR MEDS.**

EASE OF COMMUNICATION

TRANSPARENCY

**PILL PLATE**

**TABLET THAT YOU PLACE PILL BOTTLES ONTO WHICH KNOWS WHEN YOU'VE TAKEN PILLS AND ALERTS YOU AS TO WHEN TO TAKE MORE**

INDEPENDENCE

ROUTINE BUILDING

## EMERGENCY MEDICINE

**MASSIVE WASTE OF RESOURCES IN EMERGENCY DEPARTMENTS**

### PROJECT DIRECTIONS

**SHELTER BED FINDER**

**THE HOMELESS POPULATION** - CREATION OF A NETWORK OF AVAILABLE SHELTER BEDS

Doctors / Nurses not wanting to release homeless patients back onto the streets end up calling multiple shelters to find beds for them.

**DISCHARGE MONITORS** (72 HOURS)

**READMITTED PATIENTS TO THE ED - (3% OF PATIENTS MAKE A REVISIT TO THE ER IN THE FIRST 3 DAYS)**

REDUCE POST TREATMENT OBSERVATION TIMES / INCREASING BED TURNOVER TIMES

MONITORING "AT-RISK" PATIENTS POST DISCHARGE

MITIGATING REFUSAL OF TREATMENT

EMERGENCY RESPONSE TO FUTURE EVENTS

EASING ED CROWDING / EFFICIENT USE OF RESOURCES

ENABLING CROSS COMMUNICATION BETWEEN PCD AND ED DR'S

**MEDICAL PROFESSIONALS WASTING TIME ON NECESSARY NON-MEDICAL TASKS**

*OPPORTUNITY TO SHADOW ED DOCTORS TO DETERMINE INSTANCES OF TIME WASTE



## WATER CONTAMINATION

**POTABLE WATER CONTAMINATION IS A SERIOUS PROBLEM NOW AND WILL LIKELY CONTINUE TO BE A GROWING ISSUE IN OUR NEAR FUTURE.**

### PROJECT DIRECTIONS

**STORM DRAINS**

EPA WANTS TO CATCH SPILLAGE - ($250,000 FINE) (WAL-MART ALONE HAS PAID MORE THAN $110MIL)

By Placing sensors on storm drains the EPA could detect contaminants before there is devastation and determine the source more accurately in order to identify and prosecute the offenders.

REAL-TIME HAZARDOUS WASTE SENSORS INSTALLED NETWORKED STORM DRAINS

*POTENTIAL FOR REGULATORY AND COMMERCIAL USE

**WELL-WATER AT THE TAP**

NO CONTINUOUS TESTING FOR MULTIPLE CONTAMINANTS

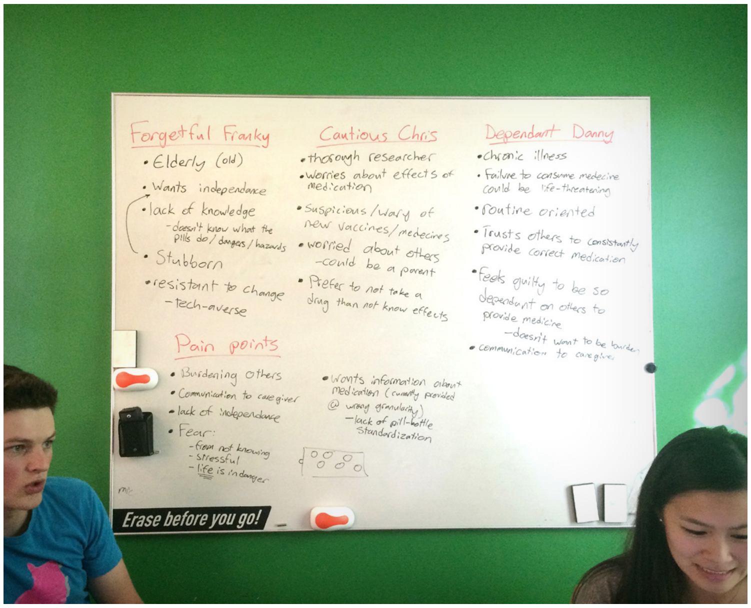
UNCERTAIN / FLUCTUATING WATER QUALITY

15% OF US POPULATION USES UNREGULATED WELL WATER (USGS)

**MOUNTED TAP SENSORS**

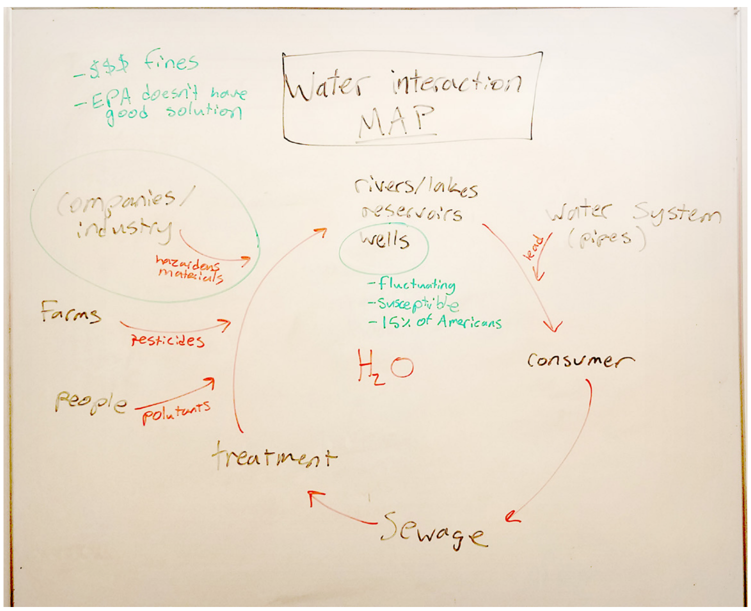
TARGETING ODORLESS/COLORLESS CONTAMINANTS

# INITIAL DOMAIN RESEARCH




## PERSONA BUILDING

PHARMACEUTICAL USERS




## INTERACTION MAP

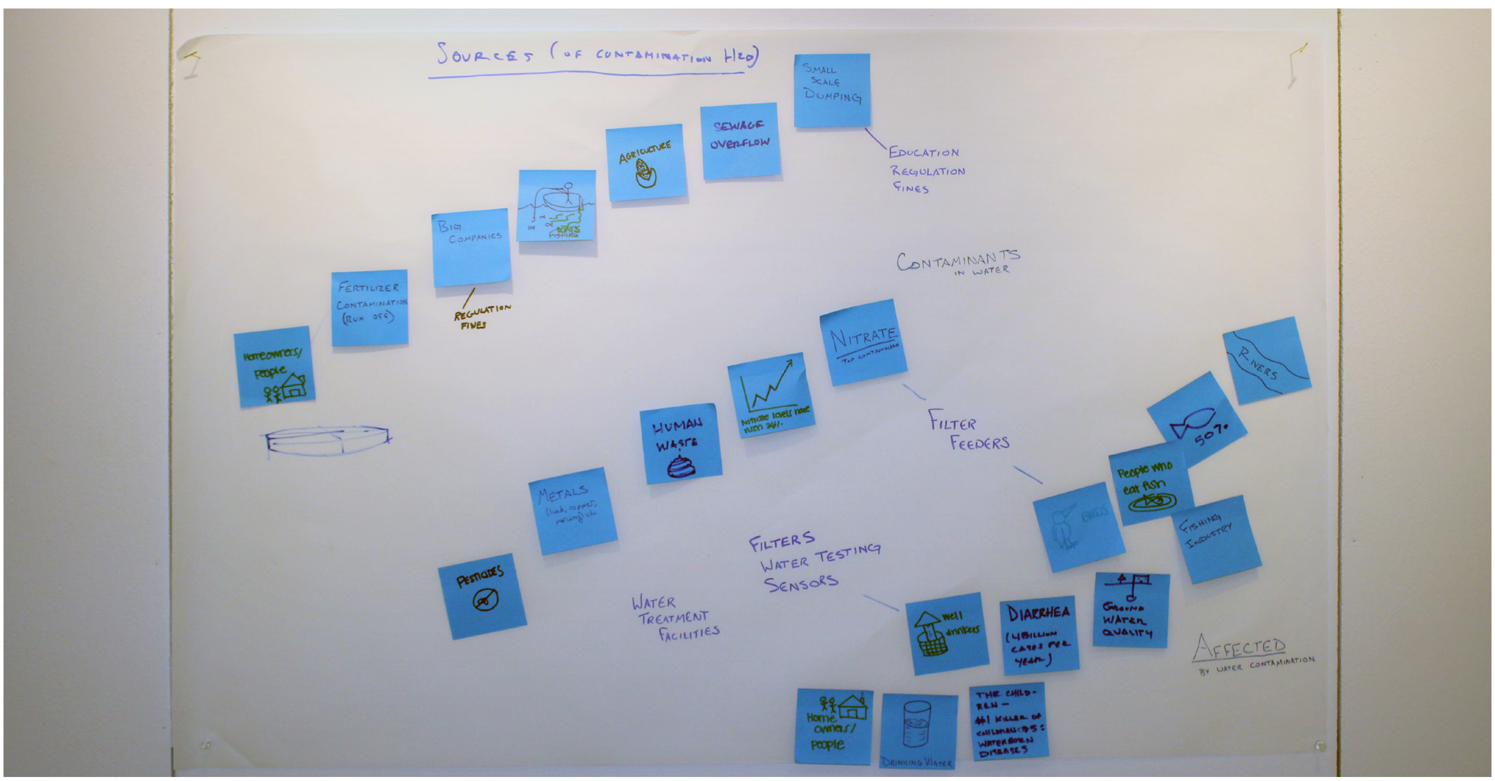
WATER CONTAMINATION

## INTERVIEW

DR. SHIRLEY BOCHMAN (EMERGENCY MEDICINE RESIDENT)

# DOMAIN SELECTION


## FURTHER RESEARCH



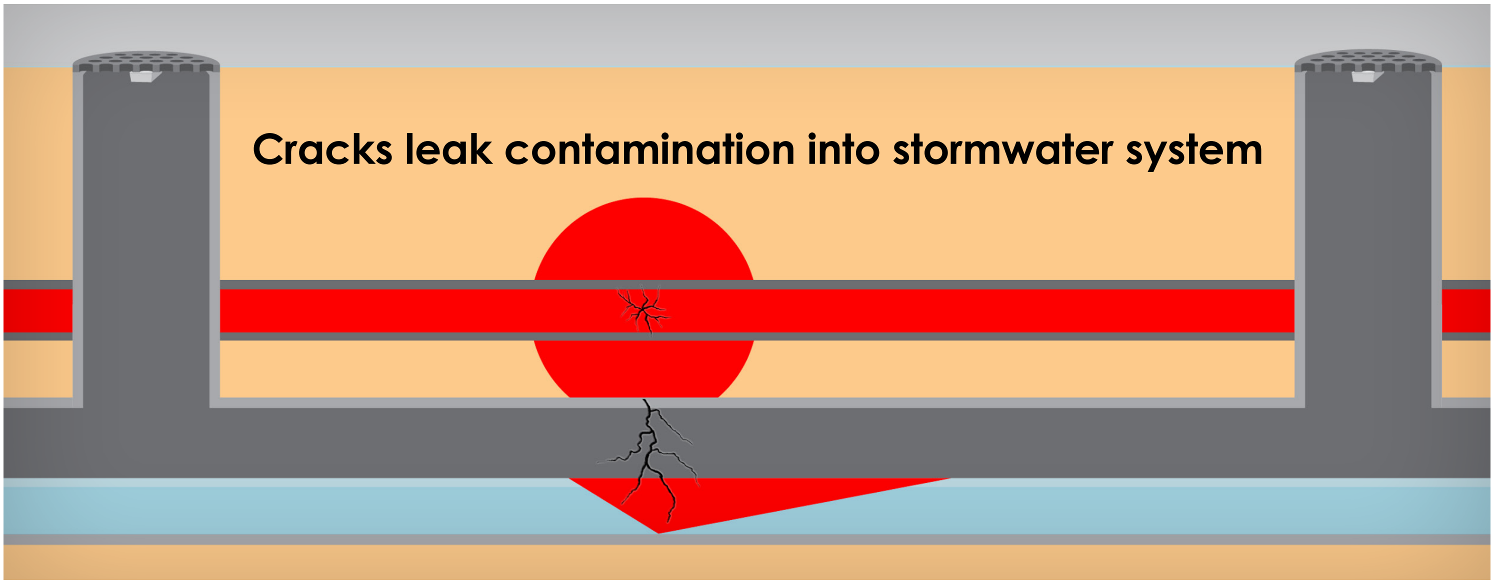




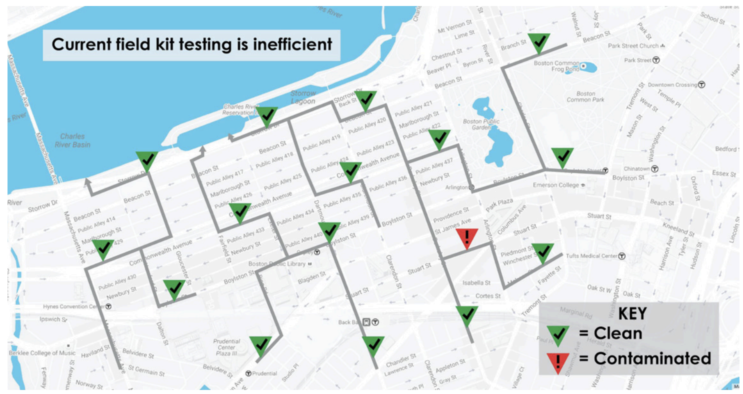
Water Infrastructure is Aging

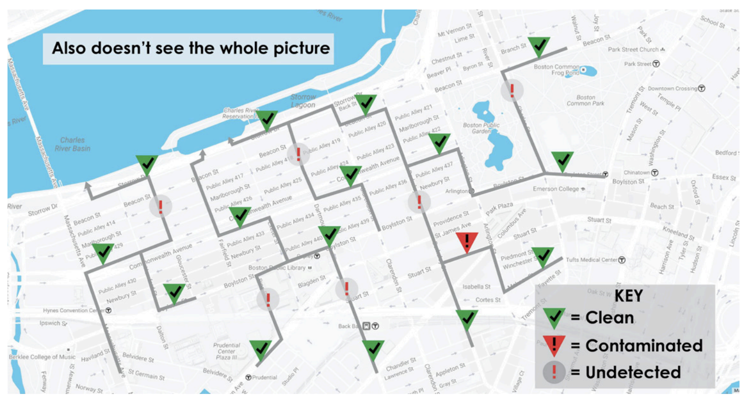

Aging Water Infrastructure
Contamination Enters Stormwater System
Ends up in Public Water


Medical Hazards from Contamination Entering Public Water
1 Campylobacteriosis
2 Giardia
3 Salmonella
4 Cryptosporidium
5 E. Coli
6 Shigella







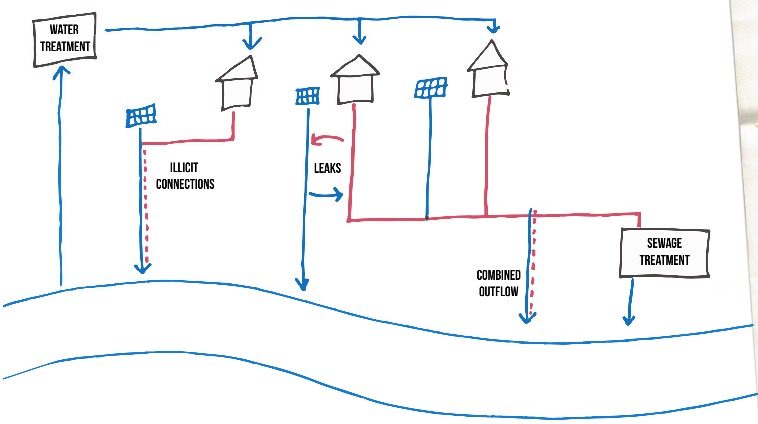

CURRENT STORMWATER CONTAMINATION TESTING KITS = INEFFICIENT


# OUR SOLUTION

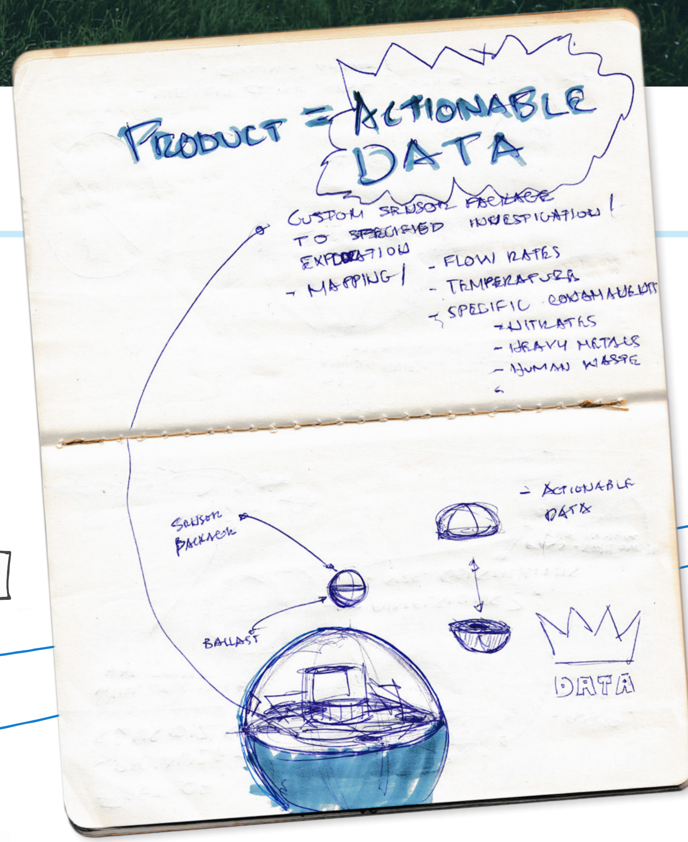
A network of storm water sensors that proactively detect and locate sources of contamination

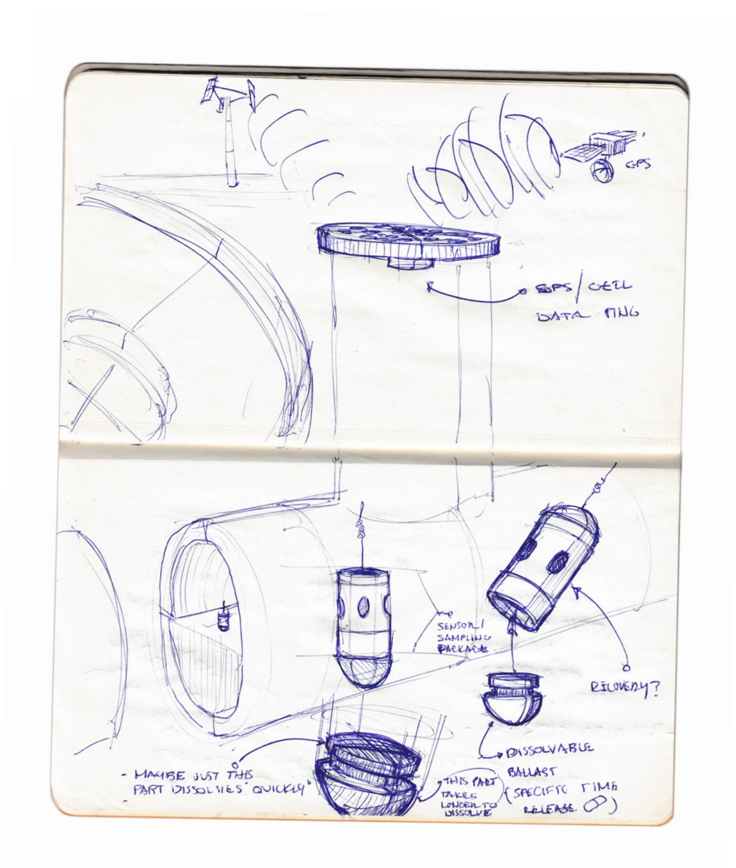
## DESIGN EVOLUTION

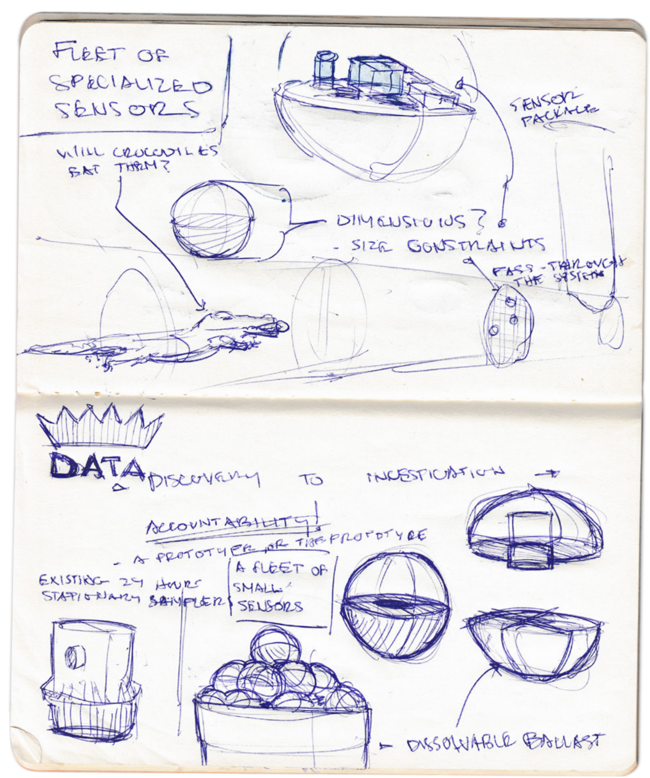
### INTERACTION PROTOTYPE

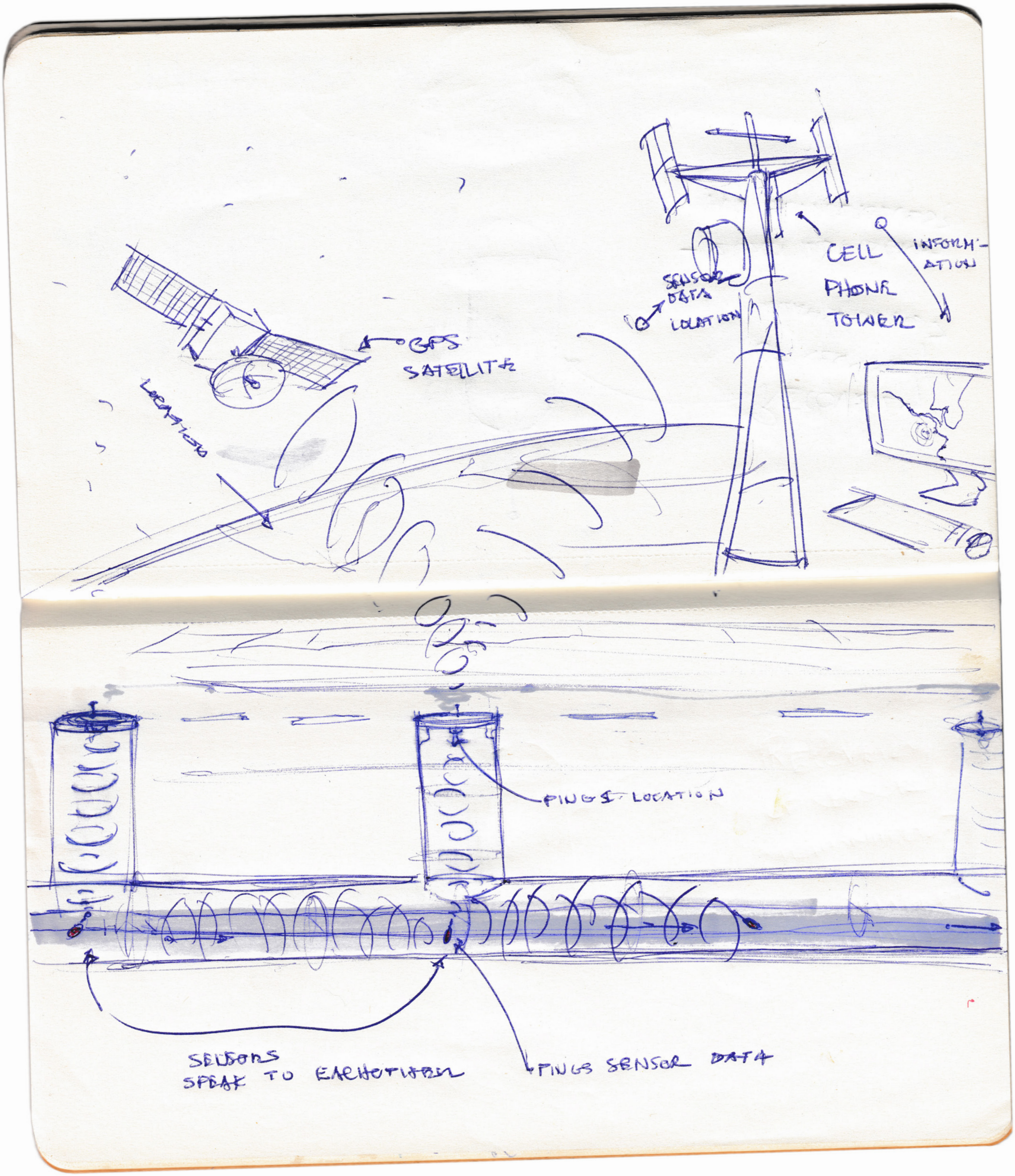



MAPPING THE MUNICIPAL WATER SYSTEM



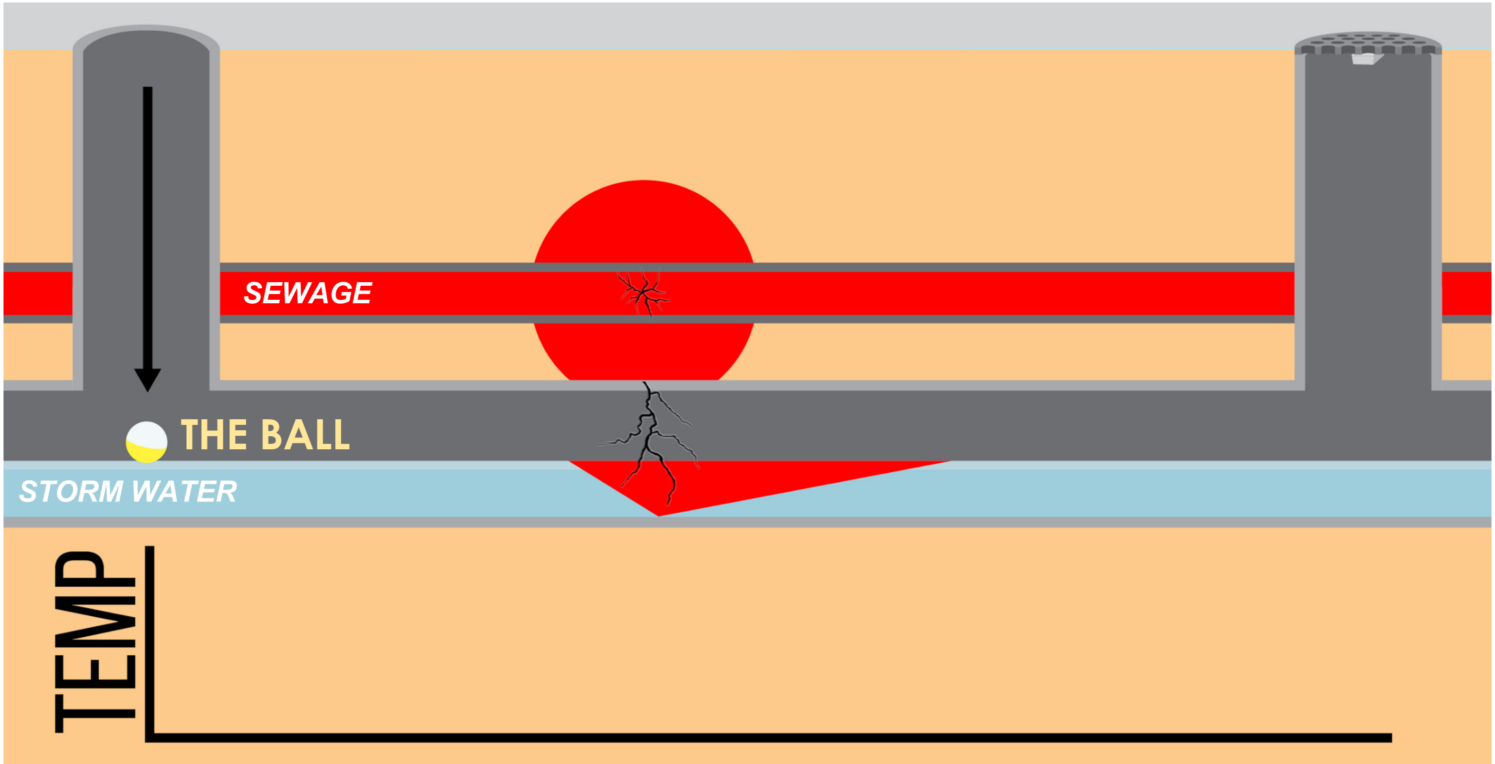



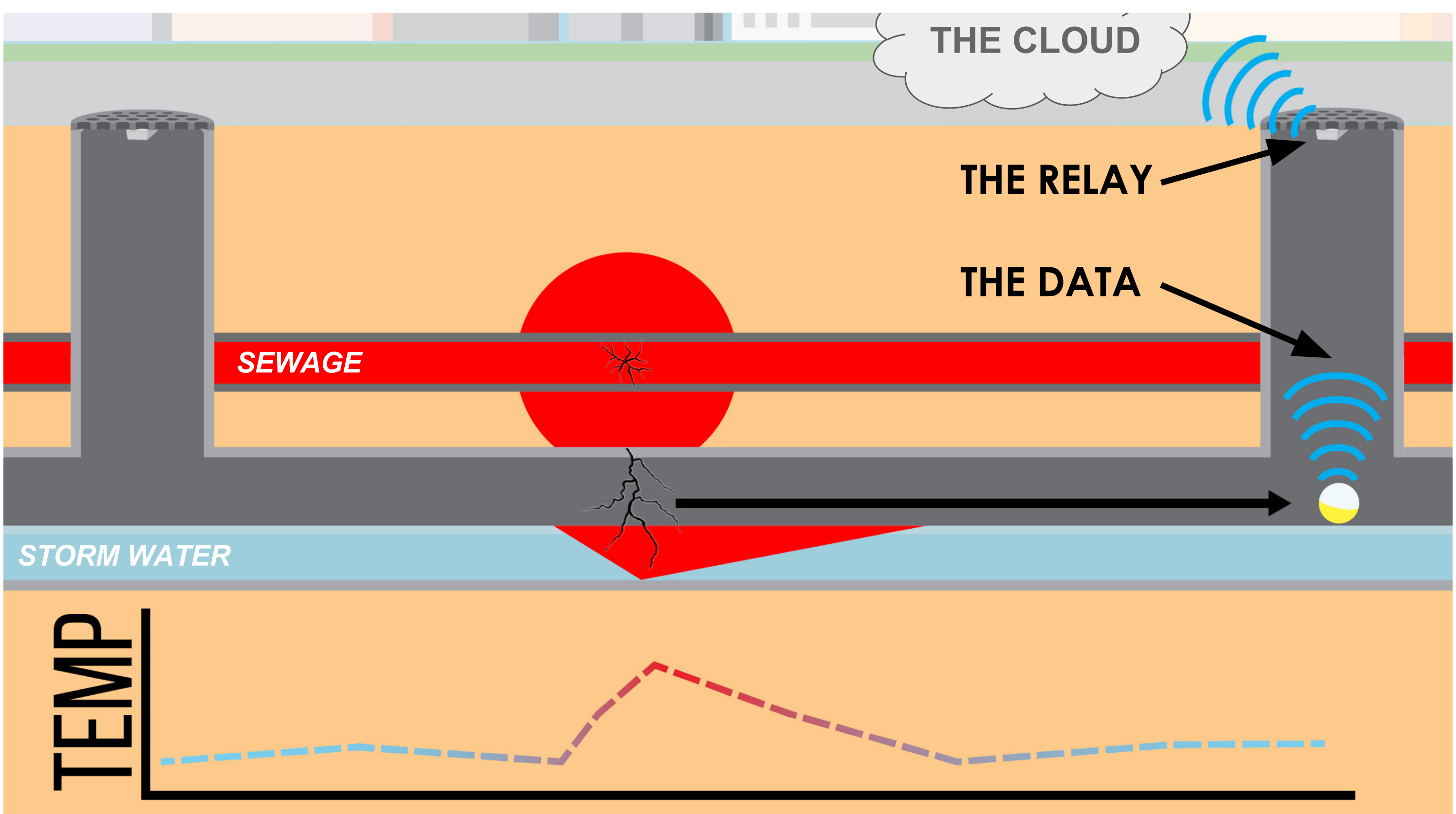



SKETCH MAPPING THE DATA NETWORK

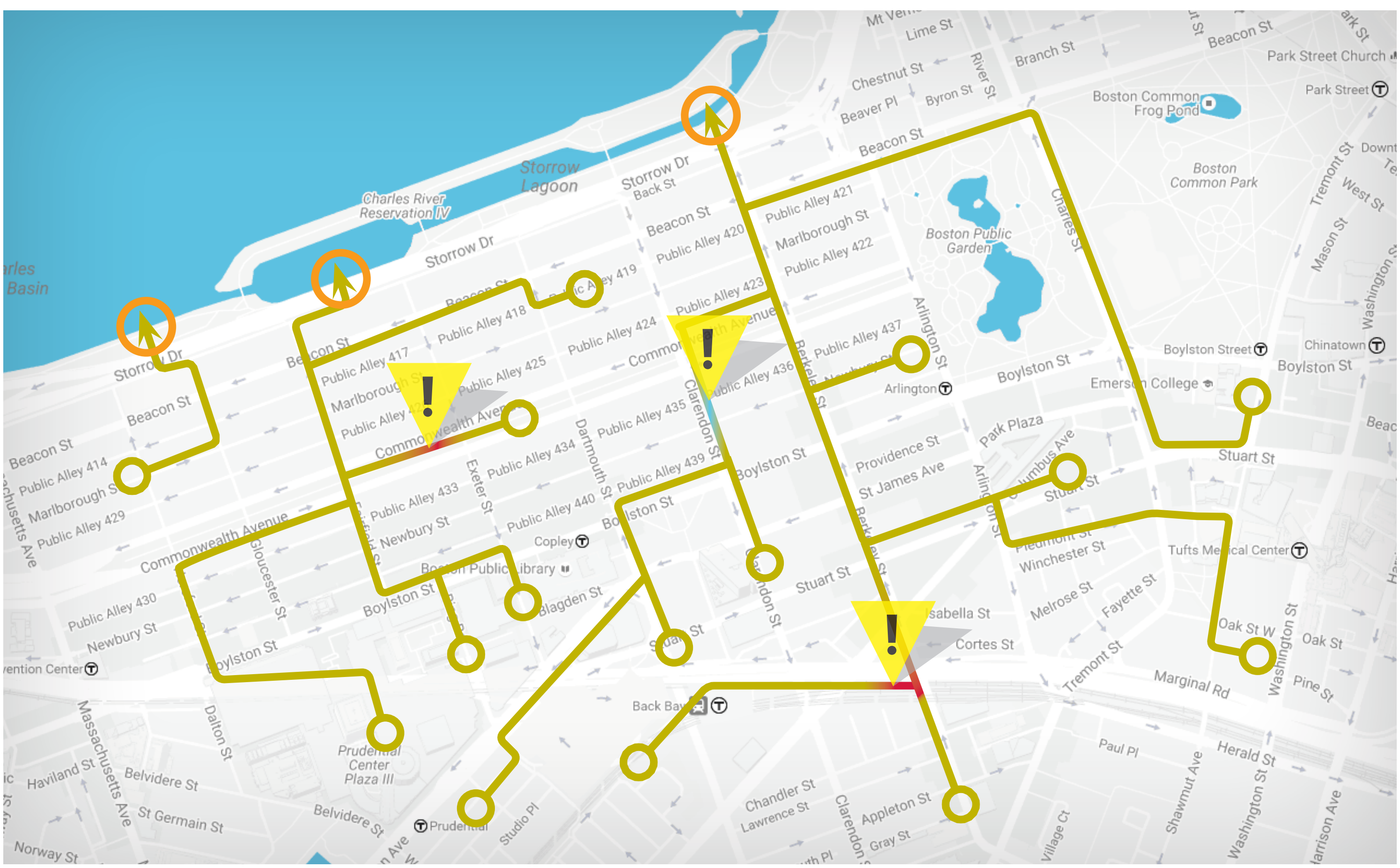
# HOW IT WORKS



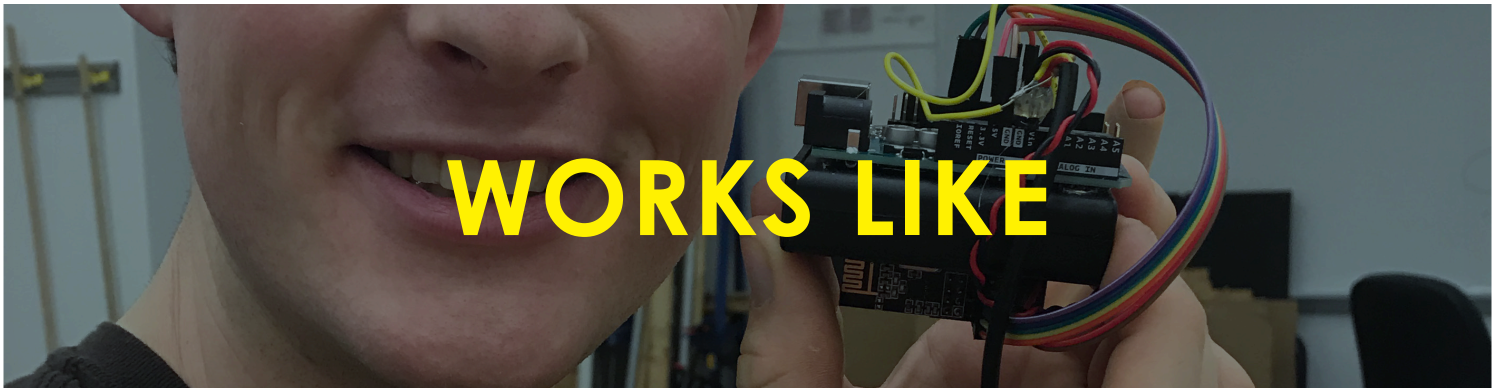

The balls are dropped into the stormwater system and they begin collecting temperature data. As they flow through the system they will record temperature spikes, indicating the potential for contamination, because the contents of sanitary sewers are much warmer than that of stormwater mains.

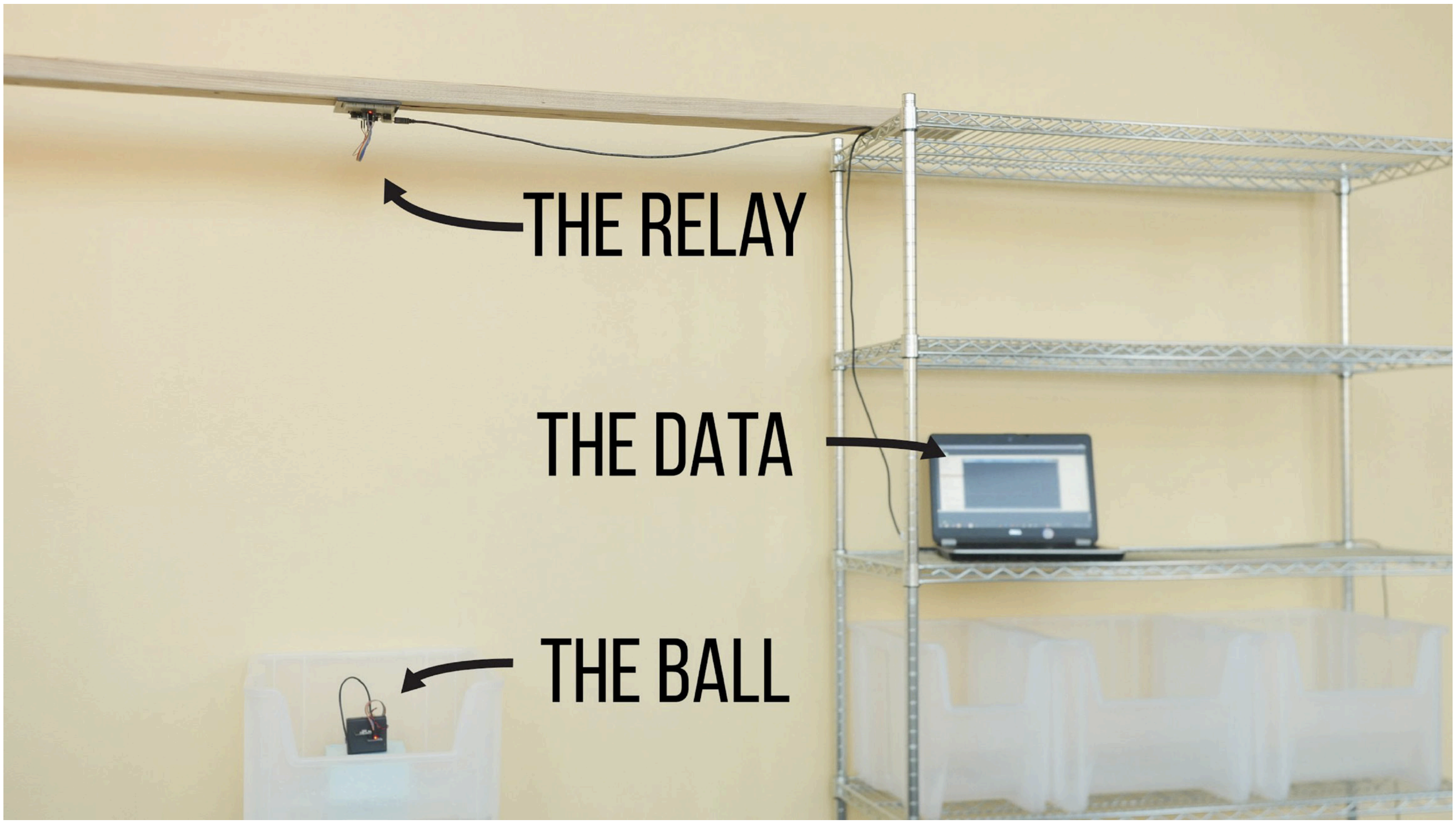


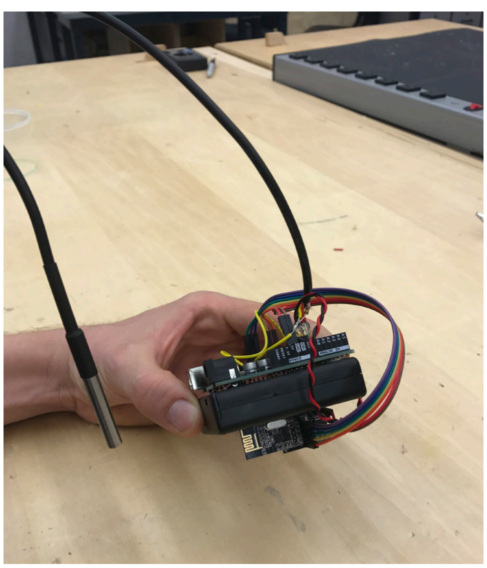

The balls wirelessly transfer the temperature data to manhole mounted relays placed throughout the system. The relays then send the data to the cloud. The balls continue to flow through the system until they are collected at the outflows.


Because the sensor balls flow through the system we have access to DATA that is simply unattainable by the current sensing protocol. Mapping the thermal profie of a city enables the municipality to pro-actively replace or repair damaged pipes before it ruptures, creating greater medical and ecological consequences.

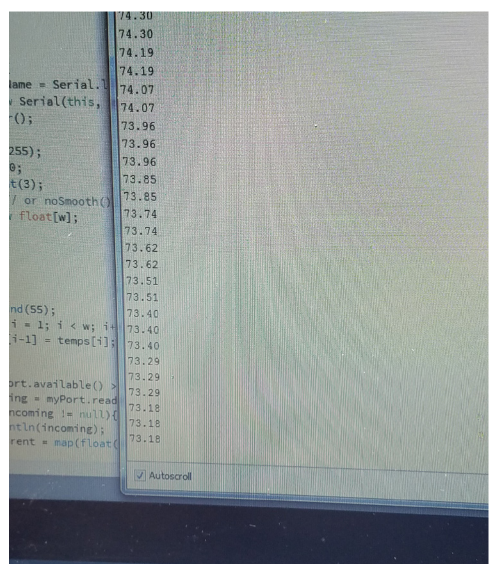


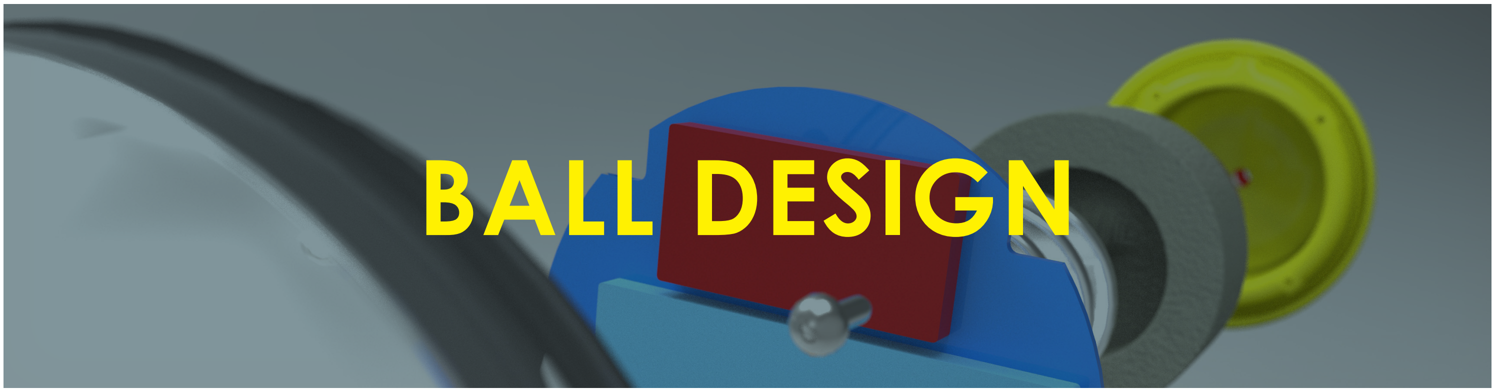
COMPONENT CONFIGURATION / PACKAGE SIZE

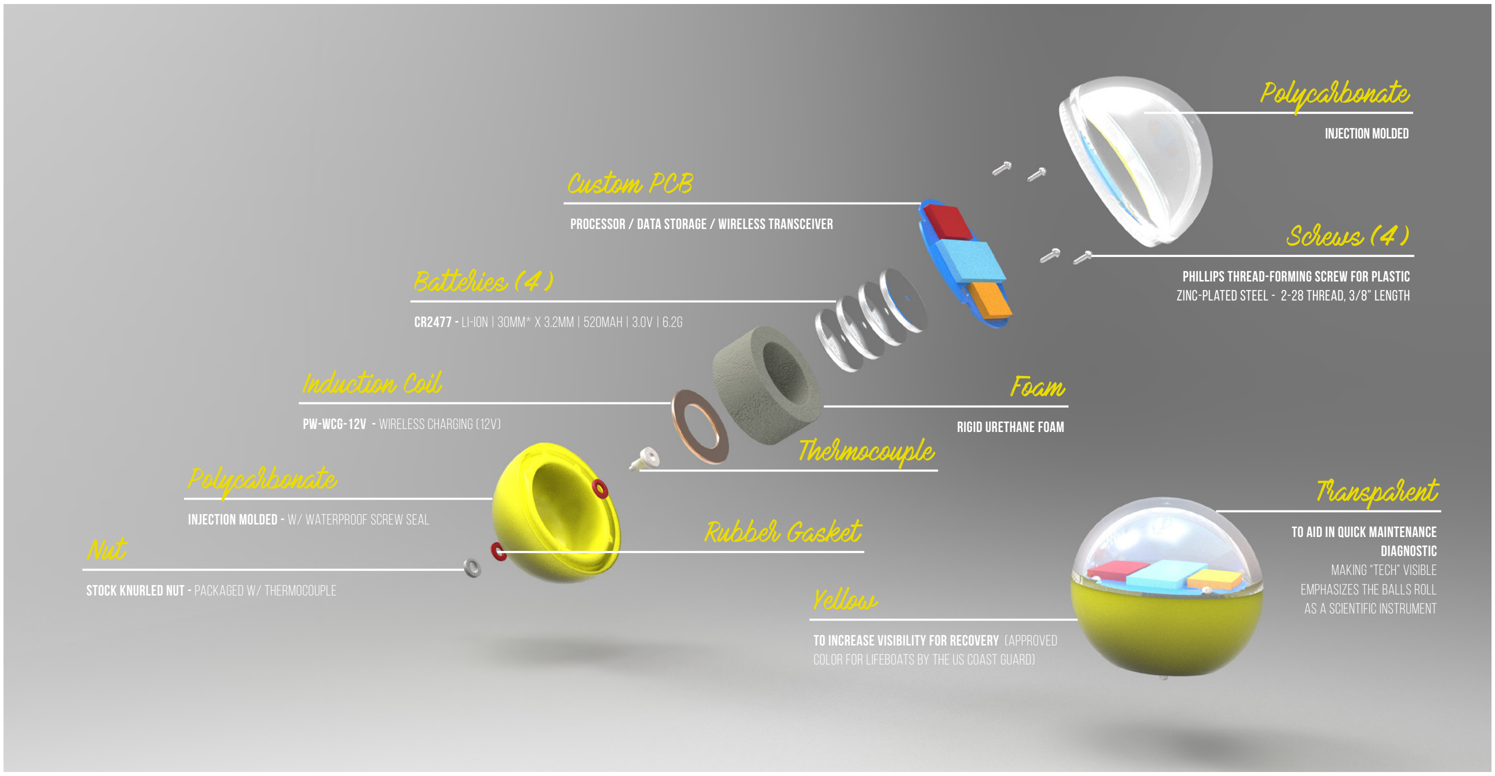
FIELD TESTING / WIRELESS COMMUNICATION



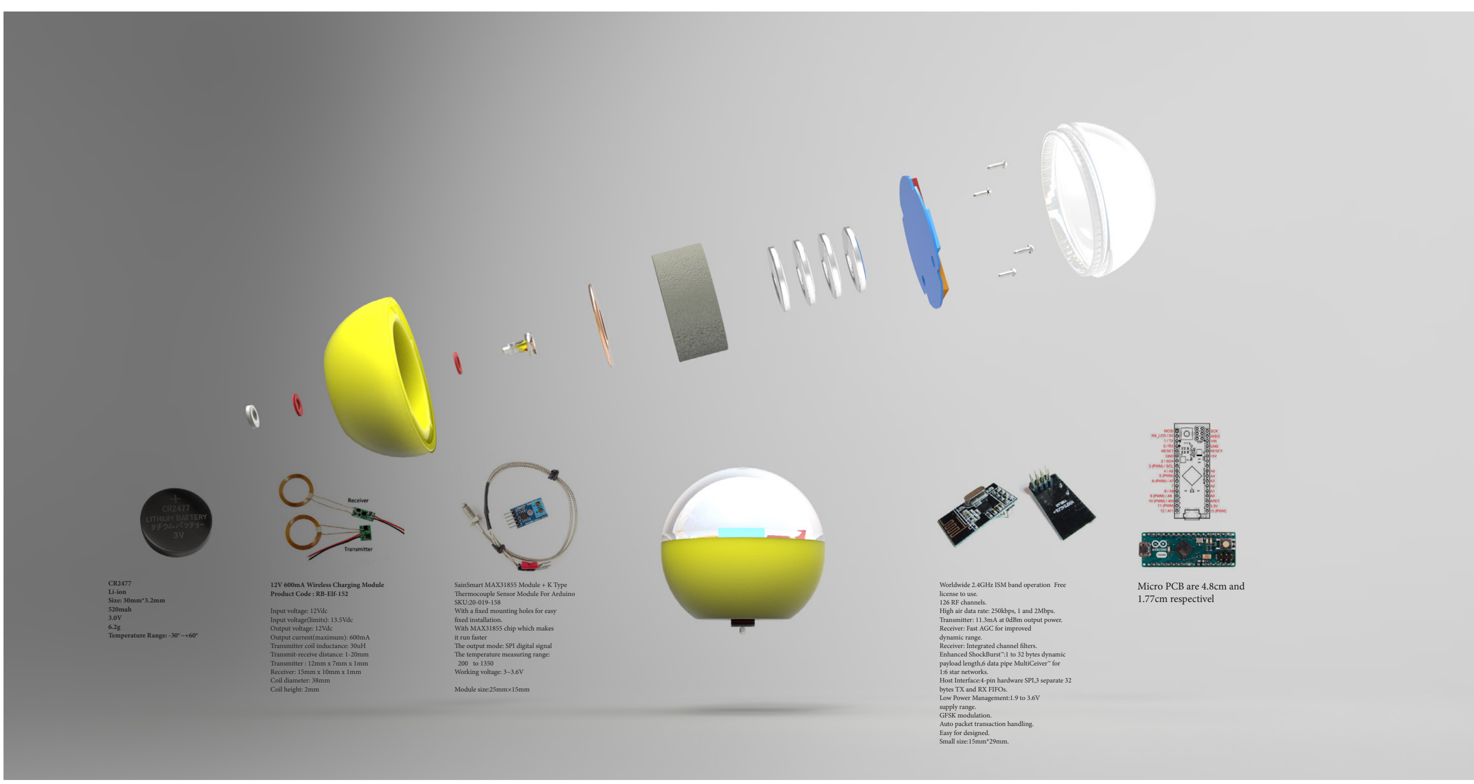
CONTINUOUS TEMPERATURE READING

# BALL DESIGN





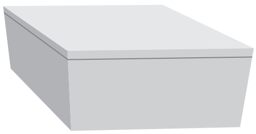
Polycarbonate
INJECTION MOLDED
Custom PCB
PROCESSOR / DATA STORAGE / WIRELESS TRANSCEIVER
Screws (4)
PHILLIPS THREAD-FORMING SCREW FOR PLASTIC
ZINC-PLATED STEEL - 2-28 THREAD, 3/8" LENGTH
Batteries (4)
CR2477 - LI-ION | 30MM* X 3.2MM | 520MAH | 3.0V | 6.2G
Induction Coil
PW-WCG-12V - WIRELESS CHARGING (12V)
Foam
RIGID URETHANE FOAM
Thermocouple
Polycarbonate
INJECTION MOLDED - W/ WATERPROOF SCREW SEAL
Transparent
TO AID IN QUICK MAINTENANCE
DIAGNOSTIC
MAKING "TECH" VISIBLE
EMPHASIZES THE BALLS ROLL
AS A SCIENTIFIC INSTRUMENT
Nut
STOCK KNURLED NUT - PACKAGED W/ THERMOCOUPLE
Rubber Gasket
Yellow
TO INCREASE VISIBILITY FOR RECOVERY (APPROVED
COLOR FOR LIFEBOATS BY THE US COAST GUARD)

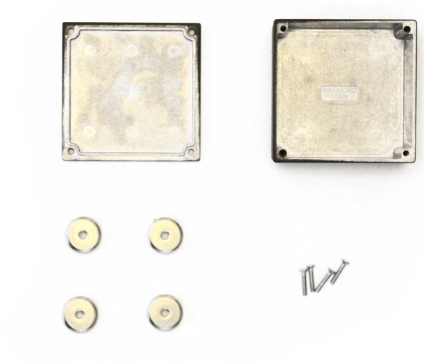



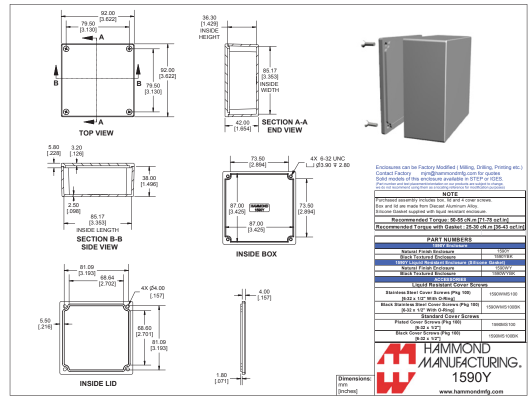
CR2477
LITHIUM BATTERY
3V
Receiver
Transmitter
CR2477
Li-ion
Size: 30mm*3.2mm
520mah
3.0V
6.2g
Temperature Range: -30°~+60°
12V 600mA Wireless Charging Module
Product Code : RB-Elf-152
Input voltage: 12Vdc
Input voltage(limits): 13.5Vdc
Output voltage: 12Vdc
Output current(maximum): 600mA
Transmitter coil inductance: 30uH
Transmit-receive distance: 1-20mm
Transmitter : 12mm x 7mm x 1mm
Receiver: 15mm x 10mm x 1mm
Coil diameter: 38mm
Coil height: 2mm
SainSmart MAX31855 Module + K Type
Thermocouple Sensor Module For Arduino
SKU:20-019-158
With a fixed mounting holes for easy
fixed installation.
With MAX31855 chip which makes
it run faster
The output mode: SPI digital signal
The temperature measuring range:
200 to 1350
Working voltage: 3~3.6V
Module size:25mm×15mm
Worldwide 2.4GHz ISM band operation Free
license to use.
126 RF channels.
High air data rate: 250kbps, 1 and 2Mbps.
Transmitter: 11.3mA at 0dBm output power.
Receiver: Fast AGC for improved
dynamic range.
Receiver: Integrated channel filters.
Enhanced ShockBurst™:1 to 32 bytes dynamic
payload length,6 data pipe MultiCeiver™ for
1:6 star networks.
Host Interface:4-pin hardware SPI,3 separate 32
bytes TX and RX FIFOs.
Low Power Management:1.9 to 3.6V
supply range.
GFSK modulation.
Auto packet transaction handling.
Easy for designed.
Small size:15mm*29mm.
Micro PCB are 4.8cm and
1.77cm respectivel

# SENSOR SUPPORT PRODUCTS

## THE RELAY BOX







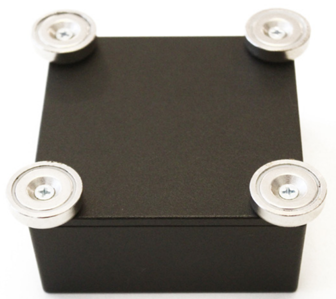

**MANHOLE MOUNTED**

DIE-CAST ALUMINUM

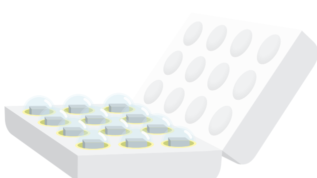
MAGNETIC

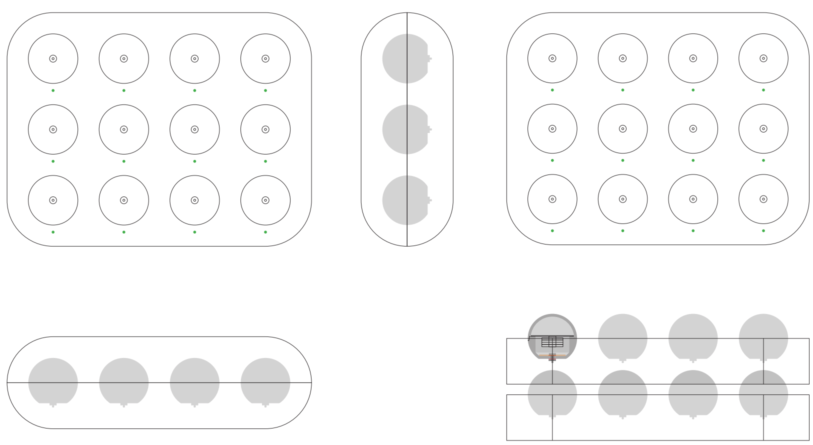
RECEIVER

GPS / LTE CONNECTION



## THE CARTON





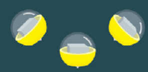
**CHARGE & TRANSPORT**

INDUCTIVE CHARGER

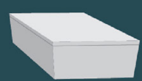
USE EXISTING HARD-CASE DESIGN?

12 PACK?

# OUR PRODUCT BUNDLE



Sensor Balls



Manhole Relays

**Starter Pack**

**$7,500**

Balls (x120) : $2,280
Relays (x500): $2,500
Cost per Set: $4,780

Software & Data

**Subscription Plan**

**$5,000** Per Month

## WHO DO WE SELL TO?

1. Municipalities
2. Water Consultants


## Breakeven

Selling to 1-2 clients per month, we will be able to breakeven within 9 months

## Funding

We are seeking funding of $800,000 to cover our upfront software development & and initial inventory costs

## Rollout

After receiving our funding, we are planning on launching our business within 6 months

# COSTS

| Per Unit | | |
|---|---|---|
| Cost of Good Sold Per Unit | Lower end | Higher End |
| Thermocouple | $3.89 | $11.30 |
| Induction Coil (Wireless Charging Module Couple 12V) | $5.21 | $7.90 |
| Batteries (4) - (CR2477 - Li-ion \| 30mm* x 3.2mm \| 520mah \| 3.0V \| 6.2 g) | $0.63 | $1.20 |
| Foam Rigid Urthane Foam | $0.09 | $0.09 |
| Polycarbonate (1 sphere) | $5.73 | $7.25 |
| Screws (Philips Thread-Forming Screw for Plastic) | $0.12 | $0.20 |
| **TOTAL COGS** | **$15.67** | **$27.94** |

| Per Month | | |
|---|---|---|
| **Monthly Fixed Costs** | | |
| *Service Costs* | | |
| Lawyer | $3,000.00 | $5,000.00 |
| PR Firm | $2,000.00 | $4,000.00 |
| AWS | $4,000.00 | $5,000.00 |
| Github | $100.00 | $100.00 |
| Docker | $200.00 | $200.00 |
| Marketing (MailChimp) | $100.00 | $100.00 |
| Accounting | $800.00 | $2,000.00 |
| | | |
| *Office Costs* | | |
| Renting Space | $3,000.00 | $4,000.00 |
| Office Supplies | $50.00 | $200.00 |
| Cleaning | $50.00 | $400.00 |
| Utilities | $1,000.00 | $1,500.00 |
| | | |
| *Employee Costs* | | |
| Co-Founder Salaries (4) | $26,666.67 | $26,666.67 |
| Employee Salaries (4) | $33,333.33 | $33,333.33 |
| | | |
| Total Non-COG Costs | $74,300.00 | $82,500.00 |
| | | |
| **TOTAL COSTS** | **$74,315.67** | **$82,527.94** |

| 6- 8 Month Period | | |
|---|---|---|
| **Upfront Startup Costs** | Lower End | Higher End |
| 10-16 Software Engineers (6 - 8 months) | $500,000 | $800,000 |
| Fixtures and Equipment | $20,000 | $50,000 |
| Patent Fee | $800 | $1,000 |
| Initial Deposits | $500 | $10,000 |
| Liability Insurance | $400 | $600 |
| Unanticipated Expenses | $52,170 | $86,160 |
| Total Non-Inventory Upfront Costs | $573,870 | $947,760 |
| | | |
| **Initial Inventory** | | |
| Balls (12 per case) - 120 balls total | 1880.4 | 3352.46875 |
| Case - 10 | 120 | 200 |
| Box - 500 | 2500 | 5000 |
| Total Initial Inventory Costs | 4500.4 | 8552.46875 |
| | | |
| **Total Upfront Costs** | $578,370 | $956,312 |

### Identifying Cost of Field Kits for Municipalities

| Field Kit Testing | Cost | Number of Tests | Cost per Unit |
|---|---|---|---|
| Surfacants | 150.9 | 25 | 6.04 |
| Ammonia Test Strips | 23.85 | 25 | 0.95 |
| Chlroine Tests | 81.25 | 100 | 0.81 |
| | | Total | 7.80 |

| Assumption Testing<br>Field Trips / Month | Field Trips / Week | Monthly Cost |
|---|---|---|
| 200 | 50 | $0.00 |
| 400 | 100 | $0.00 |

## Breakeven Analysis - Aggresive Estimations

| | July | August | September | October | November | December | January | February | March | April | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***City Pack (120 balls & 500 boxes)*** | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 |
| Monthly Data Plan | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 |
| # of New City Clients | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| # of Returning Customers | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 4 |
| Upfront Revenue | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 |
| Recurring Revenue | $ 5,000 | $ 5,000 | $ 5,000 | $ 10,000 | $ 10,000 | $ 10,000 | $ 15,000 | $ 15,000 | $ 15,000 | $ 20,000 | $ 20,000 | $ 20,000 |
| Total City Pack Revenue | $ 12,500 | $ 12,500 | $ 12,500 | $ 17,500 | $ 17,500 | $ 17,500 | $ 22,500 | $ 22,500 | $ 22,500 | $ 27,500 | $ 27,500 | $ 27,500 |
| *City Pack Variable Cost* | | | | | | | | | | | | |
| Balls + Case (x120) | $ (2,280) | $ (2,280) | $ (2,280) | $ (2,280) | $ (2,280) | $ (2,280) | $ (2,280) | $ (2,280) | $ (2,280) | $ (2,280) | $ (2,280) | $ (2,280) |
| Manhole Boxes (x500) | $ (2,500) | $ (2,500) | $ (2,500) | $ (2,500) | $ (2,500) | $ (2,500) | $ (2,500) | $ (2,500) | $ (2,500) | $ (2,500) | $ (2,500) | $ (2,500) |
| Total Cost per Starter Pack | $ (4,780) | $ (4,780) | $ (4,780) | $ (4,780) | $ (4,780) | $ (4,780) | $ (4,780) | $ (4,780) | $ (4,780) | $ (4,780) | $ (4,780) | $ (4,780) |
| ***Town Pack (72 balls & 200 boxes)*** | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 |
| Monthly Data Plan | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 |
| # of New Town Clients | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| # of Returning Customers | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Upfront Revenue | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 |
| Recurring Revenue | $ 5,000 | $ 10,000 | $ 15,000 | $ 20,000 | $ 25,000 | $ 30,000 | $ 35,000 | $ 40,000 | $ 45,000 | $ 50,000 | $ 55,000 | $ 60,000 |
| Total Town Pack Revenue | $ 10,000 | $ 15,000 | $ 20,000 | $ 25,000 | $ 30,000 | $ 35,000 | $ 40,000 | $ 45,000 | $ 50,000 | $ 55,000 | $ 60,000 | $ 65,000 |
| *Town Variable Cost* | | | | | | | | | | | | |
| Balls + Case (x72) | $ (1,368) | $ (1,368) | $ (1,368) | $ (1,368) | $ (1,368) | $ (1,368) | $ (1,368) | $ (1,368) | $ (1,368) | $ (1,368) | $ (1,368) | $ (1,368) |
| Manhole Boxes (x200) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) |
| Total Cost per Starter Pack | $ (2,368) | $ (2,368) | $ (2,368) | $ (2,368) | $ (2,368) | $ (2,368) | $ (2,368) | $ (2,368) | $ (2,368) | $ (2,368) | $ (2,368) | $ (2,368) |
| **Total Variable Costs** | $ (7,146) | $ (7,104) | $ (7,104) | $ (7,104) | $ (7,104) | $ (7,104) | $ (7,104) | $ (7,104) | $ (7,104) | $ (7,104) | $ (7,104) | $ (7,104) |
| **Gross Profit** | $ 29,646 | $ 34,604 | $ 39,604 | $ 49,604 | $ 54,604 | $ 59,604 | $ 69,604 | $ 74,604 | $ 79,604 | $ 89,604 | $ 94,604 | $ 99,604 |
| | | | | | | | | | | | | |
| **Monthly Fixed Costs** | | | | | | | | | | | | |
| Lawyer | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) |
| PR Firm | $ (2,000) | $ (2,000) | $ (2,000) | $ (2,000) | $ (2,000) | $ (2,000) | $ (2,000) | $ (2,000) | $ (2,000) | $ (2,000) | $ (2,000) | $ (2,000) |
| AWS | $ (4,000) | $ (4,000) | $ (4,000) | $ (4,000) | $ (4,000) | $ (4,000) | $ (4,000) | $ (4,000) | $ (4,000) | $ (4,000) | $ (4,000) | $ (4,000) |
| Github | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) |
| Docker | $ (200) | $ (200) | $ (200) | $ (200) | $ (200) | $ (200) | $ (200) | $ (200) | $ (200) | $ (200) | $ (200) | $ (200) |
| Marketing (MailChimp) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) |
| Accounting | $ (800) | $ (800) | $ (800) | $ (800) | $ (800) | $ (800) | $ (800) | $ (800) | $ (800) | $ (800) | $ (800) | $ (800) |
| *Office Costs* | | | | | | | | | | | | |
| Renting Space | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) |
| Office Supplies | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) |
| Cleaning | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) |
| Utilities | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) |
| *Employee Costs* | | | | | | | | | | | | |
| Co-Founder Salaries (4) | $ (26,667) | $ (26,667) | $ (26,667) | $ (26,667) | $ (26,667) | $ (26,667) | $ (26,667) | $ (26,667) | $ (26,667) | $ (26,667) | $ (26,667) | $ (26,667) |
| Employee Salaries (4) | $ (33,333) | $ (33,333) | $ (33,333) | $ (33,333) | $ (33,333) | $ (33,333) | $ (33,333) | $ (33,333) | $ (33,333) | $ (33,333) | $ (33,333) | $ (33,333) |
| **Total Monthly Fixed Costs** | $ (74,300) | $ (74,300) | $ (74,300) | $ (74,300) | $ (74,300) | $ (74,300) | $ (74,300) | $ (74,300) | $ (74,300) | $ (74,300) | $ (74,300) | $ (74,300) |
| | | | | | | | | | | | | |
| **Net Income** | $ (44,654) | $ (39,696) | $ (34,696) | $ (24,696) | $ (19,696) | $ (14,696) | $ (4,696) | $ 304 | $ 5,304 | $ 15,304 | $ 20,304 | $ 25,304 |

## Breakeven Analysis - Conservative Estimations

| | July | August | September | October | November | December | January | February | March | April | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***City Pack (120 balls & 500 boxes)*** | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 | $ 7,500 |
| Monthly Data Plan | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 |
| # of New City Clients | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| # of Returning Customers | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 4 |
| Upfront Revenue | $ 7,500 | $ - | $ - | $ 7,500 | $ - | $ - | $ 7,500 | $ - | $ - | $ 7,500 | $ - | $ - |
| Recurring Revenue | $ 5,000 | $ 5,000 | $ 5,000 | $ 10,000 | $ 10,000 | $ 10,000 | $ 15,000 | $ 15,000 | $ 15,000 | $ 20,000 | $ 20,000 | $ 20,000 |
| Total City Pack Revenue | $ 12,500 | $ 5,000 | $ 5,000 | $ 17,500 | $ 10,000 | $ 10,000 | $ 22,500 | $ 15,000 | $ 15,000 | $ 27,500 | $ 20,000 | $ 20,000 |
| *City Pack Variable Cost* | | | | | | | | | | | | |
| Balls + Case (x120) | $ (2,280) | $ (2,280) | $ (2,280) | $ (2,280) | $ (2,280) | $ (2,280) | $ (2,280) | $ (2,280) | $ (2,280) | $ (2,280) | $ (2,280) | $ (2,280) |
| Manhole Boxes (x500) | $ (2,500) | $ (2,500) | $ (2,500) | $ (2,500) | $ (2,500) | $ (2,500) | $ (2,500) | $ (2,500) | $ (2,500) | $ (2,500) | $ (2,500) | $ (2,500) |
| Total Cost per Starter Pack | $ (4,780) | $ (4,780) | $ (4,780) | $ (4,780) | $ (4,780) | $ (4,780) | $ (4,780) | $ (4,780) | $ (4,780) | $ (4,780) | $ (4,780) | $ (4,780) |
| ***Town Pack (72 balls & 200 boxes)*** | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 |
| Monthly Data Plan | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 |
| # of New Town Clients | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| # of Returning Customers | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Upfront Revenue | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 |
| Recurring Revenue | $ 5,000 | $ 10,000 | $ 15,000 | $ 20,000 | $ 25,000 | $ 30,000 | $ 35,000 | $ 40,000 | $ 45,000 | $ 50,000 | $ 55,000 | $ 60,000 |
| Total Town Pack Revenue | $ 10,000 | $ 15,000 | $ 20,000 | $ 25,000 | $ 30,000 | $ 35,000 | $ 40,000 | $ 45,000 | $ 50,000 | $ 55,000 | $ 60,000 | $ 65,000 |
| *Town Variable Cost* | | | | | | | | | | | | |
| Balls + Case (x72) | $ (1,368) | $ (1,368) | $ (1,368) | $ (1,368) | $ (1,368) | $ (1,368) | $ (1,368) | $ (1,368) | $ (1,368) | $ (1,368) | $ (1,368) | $ (1,368) |
| Manhole Boxes (x200) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) |
| Total Cost per Starter Pack | $ (2,368) | $ (2,368) | $ (2,368) | $ (2,368) | $ (2,368) | $ (2,368) | $ (2,368) | $ (2,368) | $ (2,368) | $ (2,368) | $ (2,368) | $ (2,368) |
| **Total Variable Costs** | $ (7,147) | $ (2,368) | $ (2,368) | $ (4,736) | $ (2,368) | $ (2,368) | $ (4,736) | $ (2,368) | $ (2,368) | $ (4,736) | $ (2,368) | $ (2,368) |
| **Gross Profit** | $ 29,647 | $ 22,368 | $ 27,368 | $ 47,236 | $ 42,368 | $ 47,368 | $ 67,236 | $ 62,368 | $ 67,368 | $ 87,236 | $ 82,368 | $ 87,368 |
| | | | | | | | | | | | | |
| **Monthly Fixed Costs** | | | | | | | | | | | | |
| Lawyer | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) |
| PR Firm | $ (2,000) | $ (2,000) | $ (2,000) | $ (2,000) | $ (2,000) | $ (2,000) | $ (2,000) | $ (2,000) | $ (2,000) | $ (2,000) | $ (2,000) | $ (2,000) |
| AWS | $ (4,000) | $ (4,000) | $ (4,000) | $ (4,000) | $ (4,000) | $ (4,000) | $ (4,000) | $ (4,000) | $ (4,000) | $ (4,000) | $ (4,000) | $ (4,000) |
| Github | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) |
| Docker | $ (200) | $ (200) | $ (200) | $ (200) | $ (200) | $ (200) | $ (200) | $ (200) | $ (200) | $ (200) | $ (200) | $ (200) |
| Marketing (MailChimp) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) | $ (100) |
| Accounting | $ (800) | $ (800) | $ (800) | $ (800) | $ (800) | $ (800) | $ (800) | $ (800) | $ (800) | $ (800) | $ (800) | $ (800) |
| *Office Costs* | | | | | | | | | | | | |
| Renting Space | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) | $ (3,000) |
| Office Supplies | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) |
| Cleaning | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) | $ (50) |
| Utilities | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) | $ (1,000) |
| *Employee Costs* | | | | | | | | | | | | |
| Co-Founder Salaries (4) | $ (26,667) | $ (26,667) | $ (26,667) | $ (26,667) | $ (26,667) | $ (26,667) | $ (26,667) | $ (26,667) | $ (26,667) | $ (26,667) | $ (26,667) | $ (26,667) |
| Employee Salaries (4) | $ (33,333) | $ (33,333) | $ (33,333) | $ (33,333) | $ (33,333) | $ (33,333) | $ (33,333) | $ (33,333) | $ (33,333) | $ (33,333) | $ (33,333) | $ (33,333) |
| **Total Monthly Fixed Costs** | $ (74,300) | $ (74,300) | $ (74,300) | $ (74,300) | $ (74,300) | $ (74,300) | $ (74,300) | $ (74,300) | $ (74,300) | $ (74,300) | $ (74,300) | $ (74,300) |
| | | | | | | | | | | | | |
| **Net Income** | $ (44,653) | $ (51,932) | $ (46,932) | $ (27,064) | $ (31,932) | $ (26,932) | $ (7,064) | $ (11,932) | $ (6,932) | $ 12,936 | $ 8,068 | $ 13,068 |

# HOW TO SCALE?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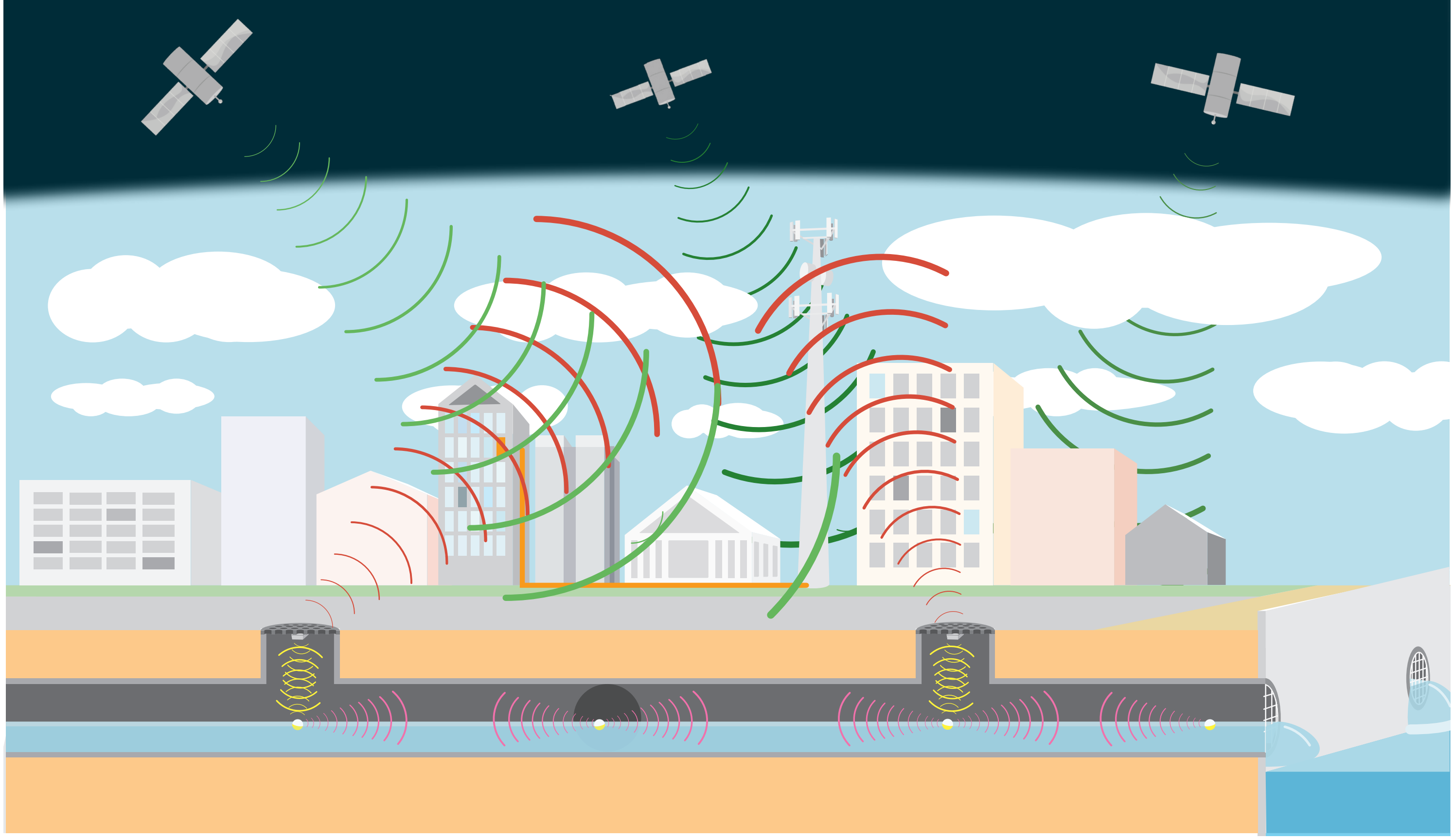
# DATA AQUISITION SYSTEM



THANKS FOR READING!

## INTEGRATED PRODUCT DESIGN

BABSON - OLIN - MASSART

## TEAM BEBAS


CHRISTINA GEE // BABSON

MICHAEL PANG // BABSON

SCOTT MACKINLAY // OLIN

CECILIA DIEHL // OLIN

DAVID MEYERS // MASSART