

SEH Symposium Presentation
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Water

Intelligent Water Management System

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The Collaboratory
for strategic partnerships and applied research.

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Unclean Water Sources





Handpumps





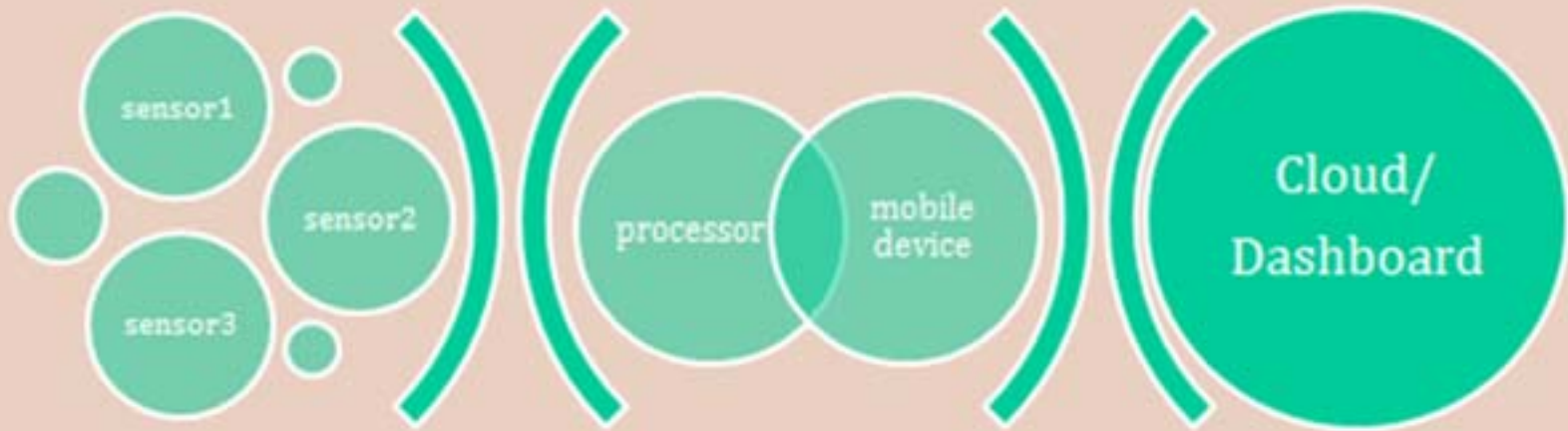
So What Can We Do?

World Vision





Solution: Remotely Monitor Pumps





How IWMS Will Monitor Pumps

Our system will obtain the following for each pump:

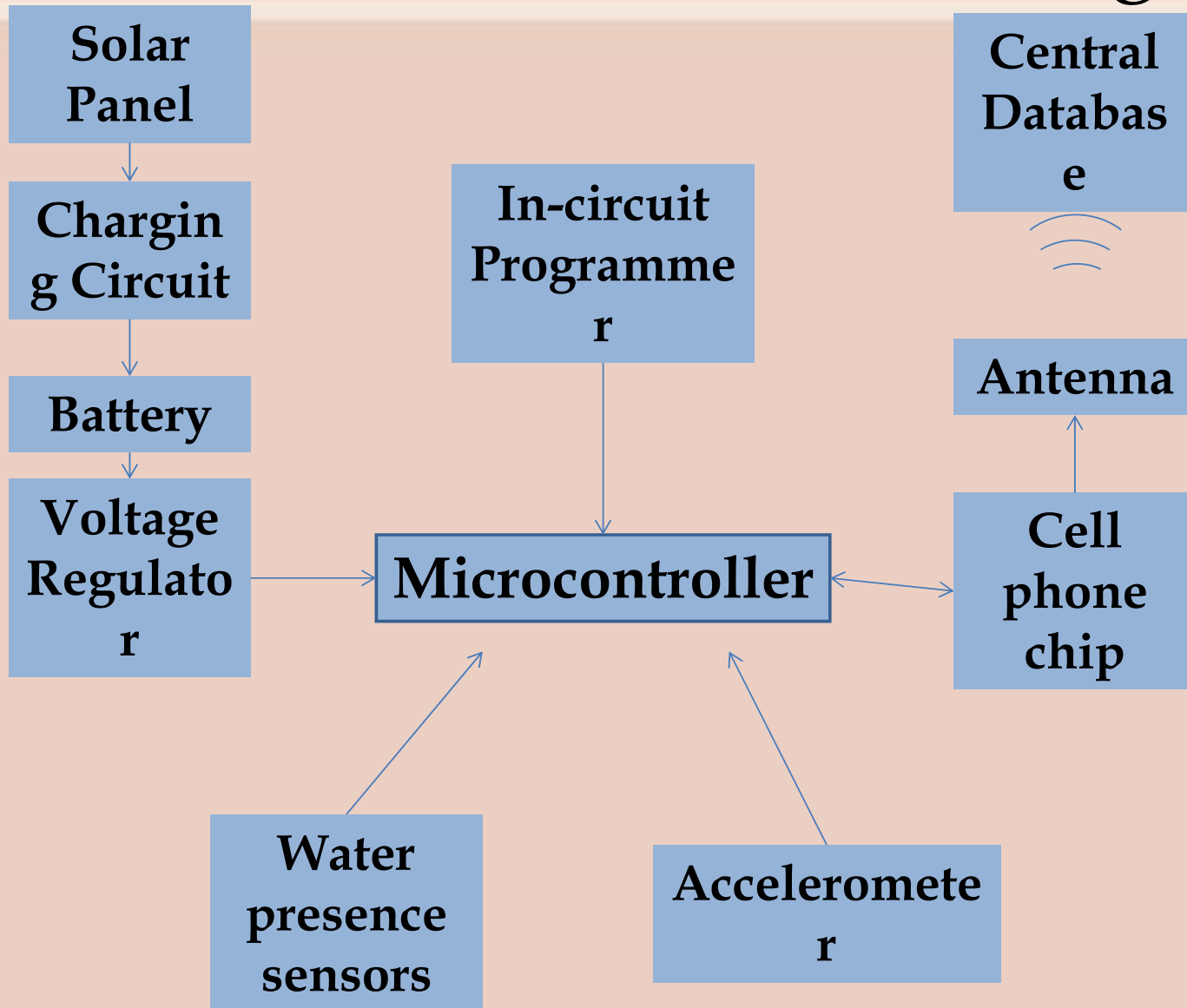
- *Bi-hourly volume extraction*
- *Longest priming time*
- *Leakage rate*

This system can warn us about the following problems:

- *High leakage rate*
- *Failure to prime*
- *Abandonment*



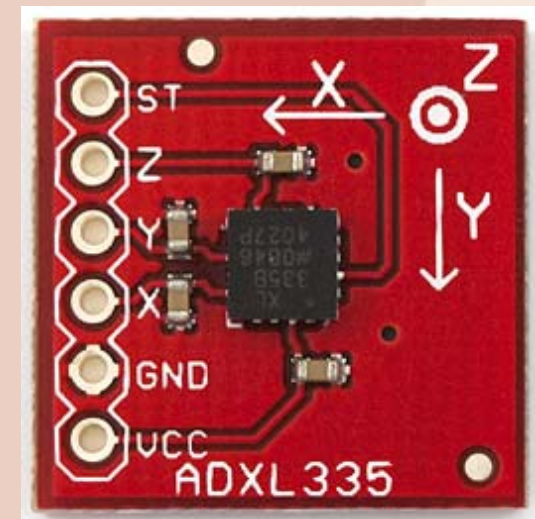
Block Diagram





Accelerometer

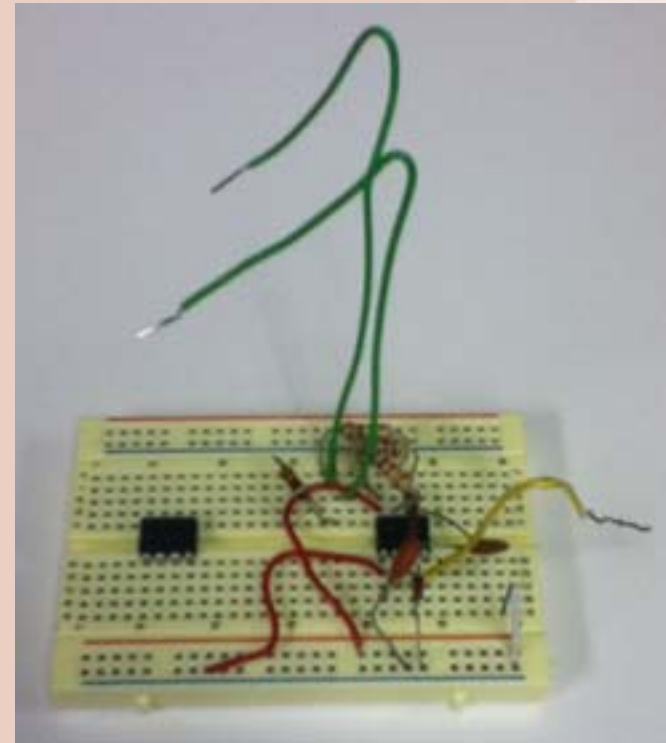
- Two axes of measurement
- Senses orientation and acceleration
- Used to calculate upstroke of pump handle





Water Presence Sensor

- High frequency = water present
Low frequency = no water
- Two sensors





Collecting the Data

- Volume extraction
 - *Measured indirectly*
- Leakage rate
 - *Time between two water presence sensors*
- Priming time
 - *Use both accelerometer and water presence sensor*



Microcontroller

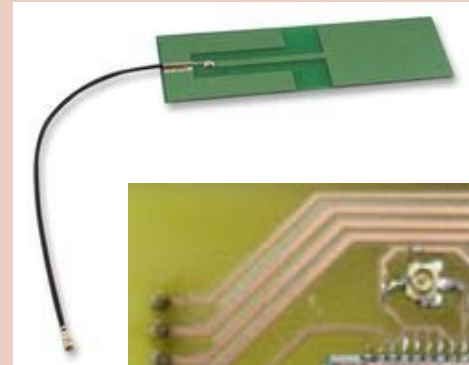
- Low cost
- Integrated peripherals
 - *Real time clock and calendar*
 - *Serial communication*
 - *Analog to digital converters*
- Low power modes
- Popular
- Free programming suite

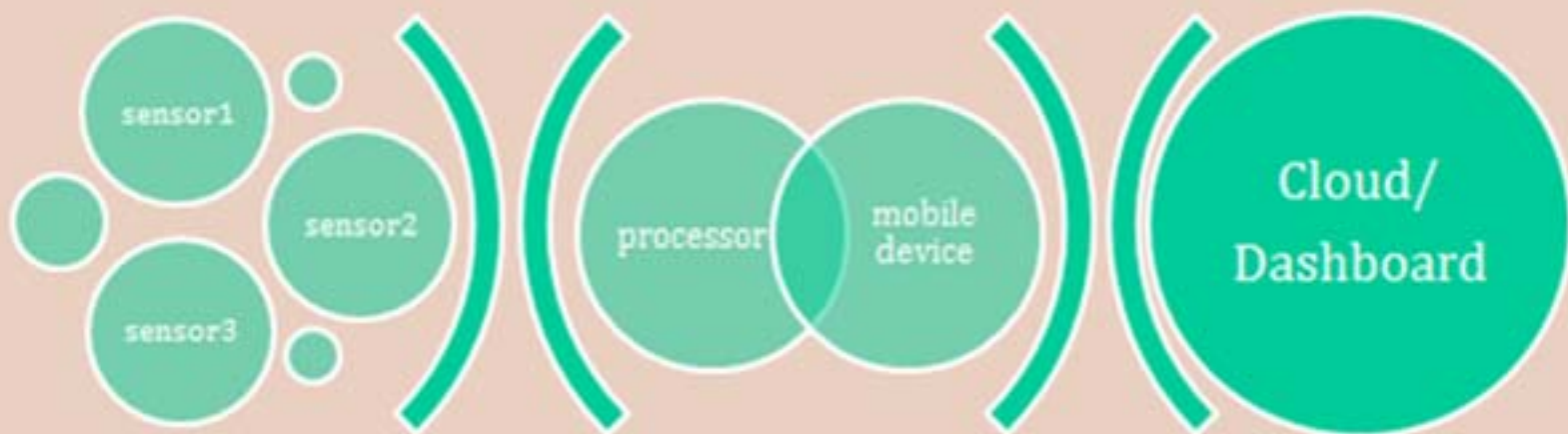




GSM module

- Sends data from the microcontroller to a central receiving hub via a text message
- SIM900 GSM module
- Sync the RTCC





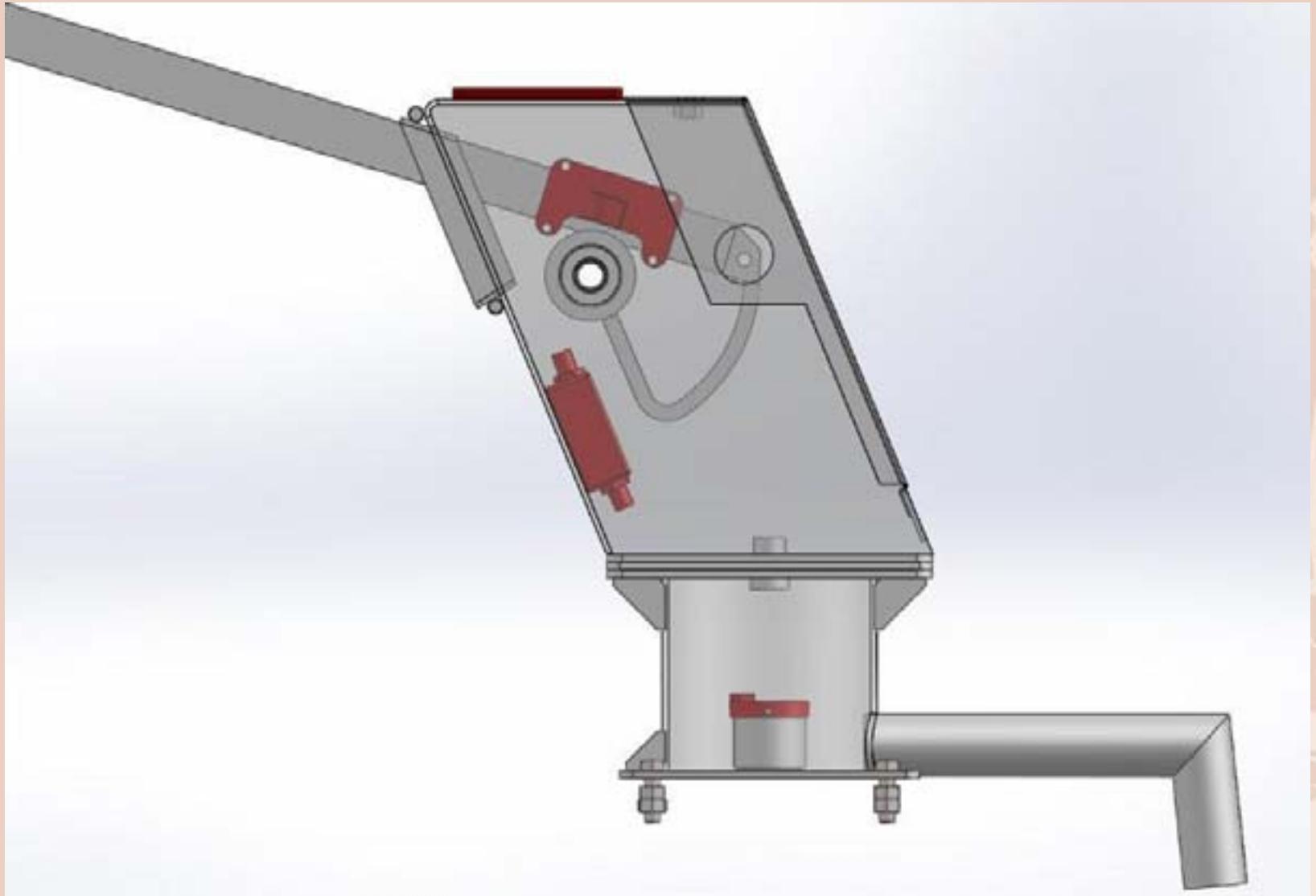


Data destination

- **Pump technicians** will have access to text message alerts that notify the event of a pump failure
- **Community Members** will receive text message alerts when a pump needs routine maintenance
- **Water resource planners and hydrologists** will be able to see daily pump extraction estimates on a webpage
- **Donors** will have access to water extraction and pump failure trends information

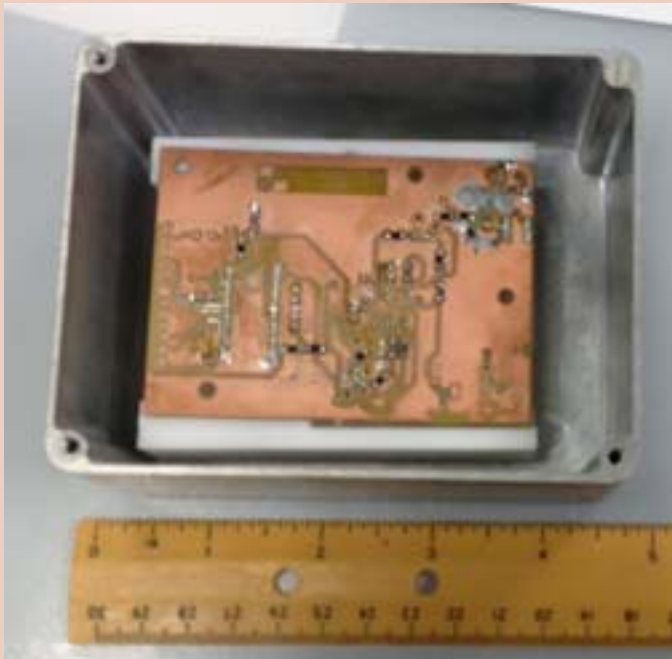
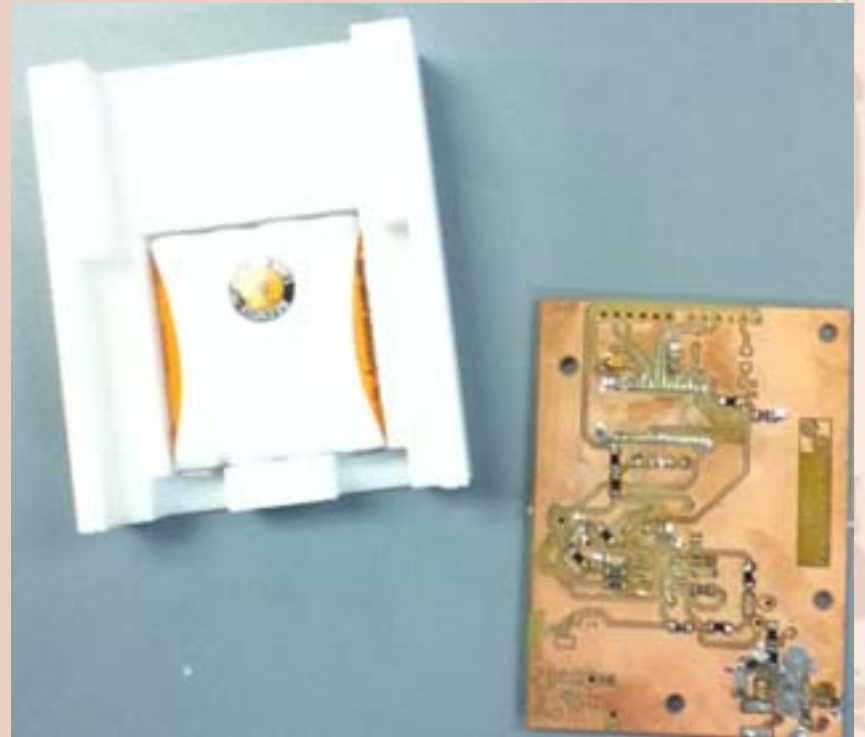


IWMS 6E¹⁻³æ





Primary Box



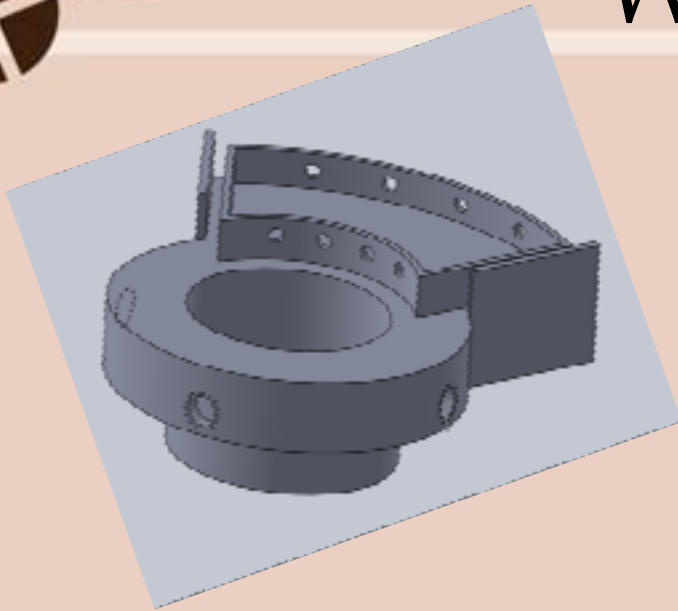


Accelerometer $0 \pm 1 -1$



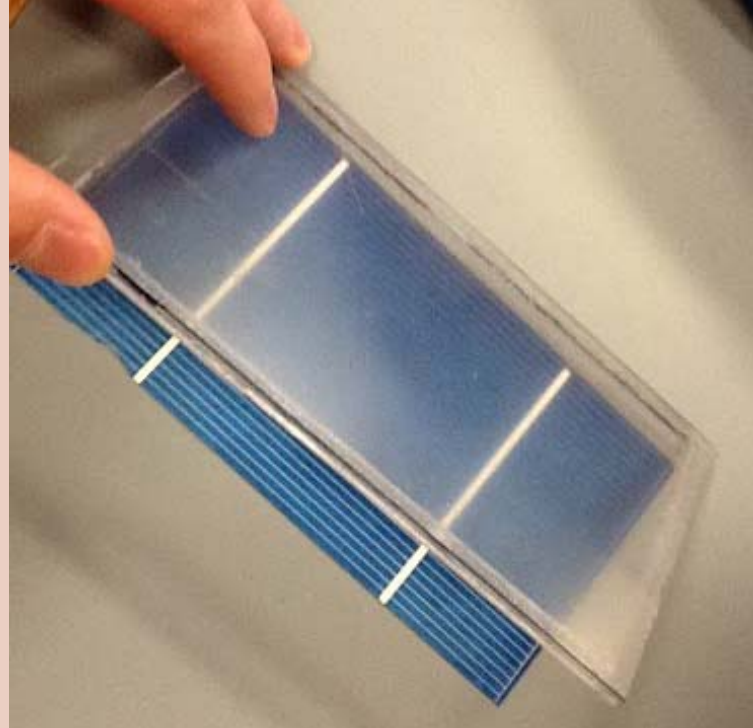


Water Presence Sensor





Solar Panel





Future Work

New Applications

- *Afridev pump*
- *LifePump*

New Features

- *Well level sensor*
- *Conductivity sensor*



Acknowledgements

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QUESTIONS

the Collaboratory
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Complete schematic

