

Progress Update

2/4

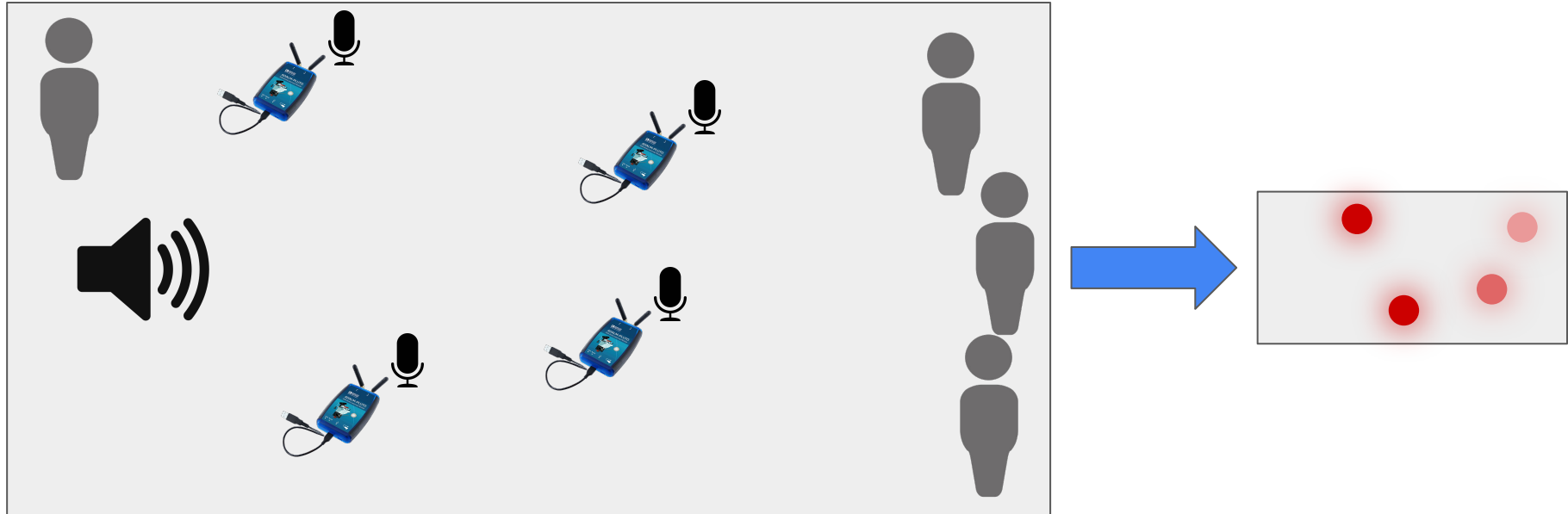
Requirements analysis

- Tried to answer open questions from last time:
 - What sensor?
 - Accuracy goal?
- Both tied to operational goals
 - Want final demo to be “human-scale”, i.e. audience can see it in-person
 - Rules out climate-level measurements like temperature/atmospheric pressure
 - Light may be difficult to set up (e.g., a brightly lit presentation hall may saturate sensors)
 - **Sound levels (i.e. volume)** seems like a good fit

[illegible]

End goal demo mockup

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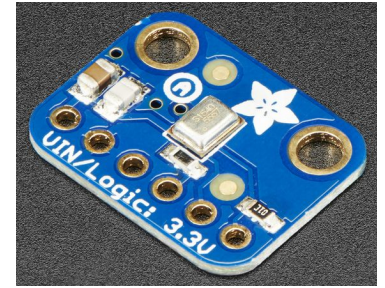


Sensor evaluation

- Goals:
 - Logistical:
 - Cheap
 - Accessible (leadtime)
 - Performance
 - Matches human perception ranges in freq / volume
 - approx 20 Hz - 20 kHz
 - human sensitivity is tricky to define, but 0 dB SPL is the most commonly cited metric
 - Low power consumption
 - Interfaces
 - Must be digital
 - Pluto doesn't have analog ports, and best way to hook up a sensor seems to be through another embedded system, e.g. a Raspberry Pi, which does support I2S

Sensor evaluation cont'd

- Decided on Adafruit's I2S MEMS Microphone Breakout - SPH0645LM4H
- Goals:
 - Logistical:
 - Cheap - only \$7
 - Accessible (leadtime) - in stock
 - Performance
 - Matches human perception ranges in freq / volume
 - approx 20 Hz - 20 kHz - 50Hz - 15KHz, acceptable
 - human sensitivity is tricky to define but sensor recommended
 - Low power consumption - ?
 - Interfaces
 - Must be digital
 - Pluto doesn't have analog ports, and best way to hook up a sensor seems to be through another embedded system, e.g. a Raspberry Pi, which has no analog inputs - sensor supports I2S
- Should have enough RaspPi 3Bs from work to avoid mass ordering them



TODO

- Get project approval
- Formalize reqts, finish system architecture + interfaces (now w/ Pi)
- Prep Plutos
- Basic algorithmic checks (to help drive link accuracy reqts)

		Quarter 1	
		Jan	Feb
Category	Task		
Project Management	Project scoping		
	Project approval by dept heads		
	Final presentation		
Systems Engineering	Requirements analysis		
	System/Sub-System Specifications		
Development	Sensor evaluation		
	Pluto bringup		
	Link distance measurement		
	Algorithmic development (simulation)		
	Algorithmic implementation		
Test and Evaluation	Network setup		
	Small scale indoor tests (+ debug)		
	Large scale field tests (+ debug)		