

## 2.01 TSGC NASA: Dual-Use Wideband Microphone Array

Our project is a proof-of-concept dual-use wideband microphone array system that relays voice communications and alerts users if ultrasonic anomalies (leaks, failing equipment, etc.) are detected. The system detects these voice communications and anomalies with MEMS (micro-electromechanical system) microphones. If a voice (200Hz – 6kHz) is detected, then that voice gets relayed. If an anomaly is detected (>20kHz), then audio and visual alerts will go off indicating the detected intensity of that anomaly. This product is important because it can serve as early automated leak detection for pressurized vessels such as spacecraft, airplanes, industrial equipment, etc.



Mason

Olivia

Jessie

Nick E.

Nick G.

Subsystem	Key Functions	DRI
MEMS Mic Array	Listen for voice communications and anomalies.	Olivia
Analog Amplification and Filtering	Filter out undesired frequencies and amplify the signals from the MEMS mic while normalizing them.	Nick E.
Digital Signal Processing	Interpret incoming signals and determine if the signals are ultrasonic anomalies or voice communications.	Mason
User Interface	Serves as a way for users to interact with the product and receive alerts.	Jessie
Audio	Serves as a way for a user to hear voice communications and determine the intensity of an anomaly if one is detected.	Nick G.
Power	Deliver clean constant power to all systems.	Olivia