Gridless Wireless Network
Responsibilities, Roles, & Elements Tables

Team name:
Off the Grid

Team members:
Ian Schneier
Linda Palacios
Weikang Zhang
Xucheng You
Jingwen Luo
Alec Motazedi

Project Sponsor:

Prof. Alan Mickelson

Responsibilities, Roles, Elements

Use Case 1: Restore Communications

Responsibilities	**Subsystem**	**HW or SW**
Be powered for 72 hrs	Power System	HW: efficient battery to provide the power at least one week
Scan for other devices	Communications	SW: Automatically search for Wi-Fi enabled devices in coverage area
Create a local area network	Communications	SW: People can use the network if they are in the range of the network
G.W.N devices connect with each other and with users as well, creating a mesh network	Communications	SW: Signal process
Provide a 2.4 GHz signal	Communications	SW: Frequency should be 2.4 GHz
The network connects with the GMS network	Wireless	SW: People can communicate with others who are not in the network

Use Case 2: Power Management

Responsibilities	**Roles**	**HW or SW**
Convert battery voltage to different value to power various submodules	Power System	HW: DC/DC converter
Modify power consumption of components to maximize battery life.	MCU	HW: PMU
Transmit the Wi-Fi signal up to 1W (30dBm)	Communications	HW: Antenna Amplifier
Provide a omnidirectional coverage area up to 1 Km distance	Communications	HW: Omnidirectional Antenna
Transmit up to 5 Km distance	Communications	HW: Directional Antennas

Use Case 3: Service Applications

Responsibilities	**Roles**	**HW or SW**
Get the location of devices connected to the device created network	Wireless	SW: The government can use the machine to locate individuals
Provide a VOIP service for people to communicate with rescuers	Wireless	SW: Transceiver
Messaging service to receive media and other information from network users	Wireless	SW: Transceiver

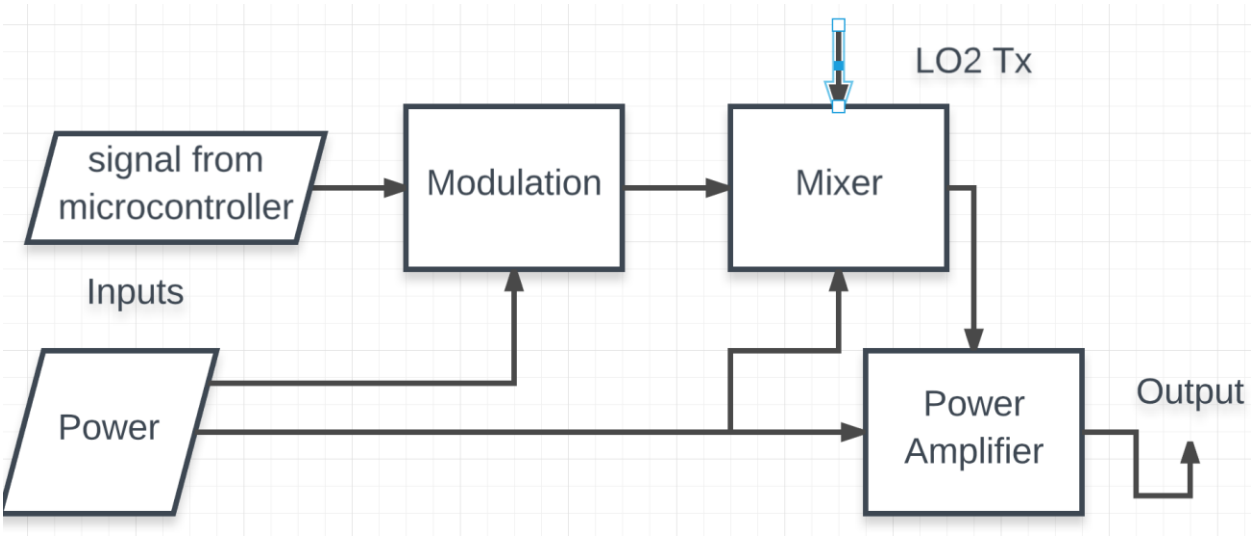
Use Case 4: Quick Deployment

Responsibilities	**Roles**	**HW or SW**
Device successfully powers on	Power Manager	HW: PMU
Device generates network	Communications	HW/SW: Antenna and

signal for devices to connect to		Transceiver
Detect and connect to another Wi-Fi network to provide internet access through the device	Communications	SW: Transceiver

Functional Decomposition

Transceiver mode



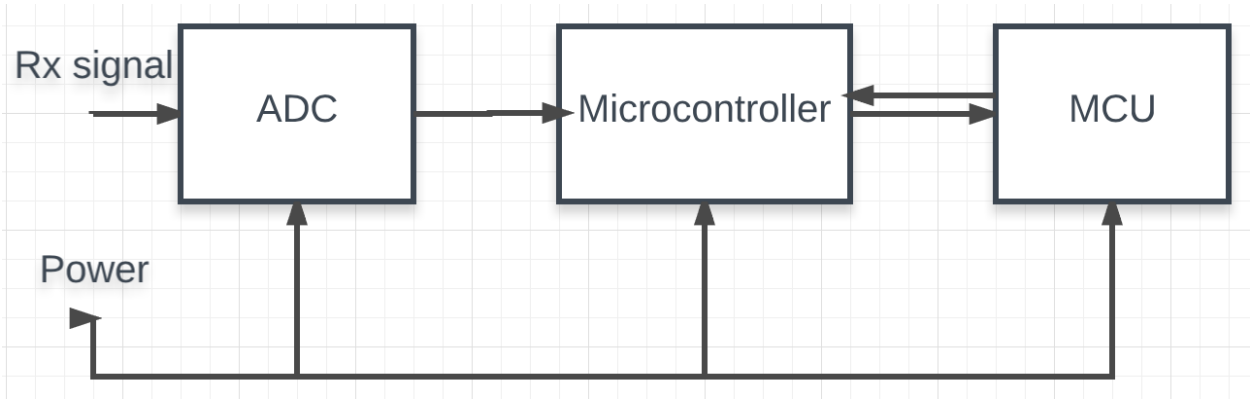
Module	Modulation
Inputs	Signal from microcontroller
Outputs	Signal on certain frequency (2.4GHz)
Functionality	Phase shift to frequency shift conversion

Module	Mixer
Inputs	Modulated signal

Outputs	The difference of original signals
Functionality	Creates new frequencies from two signals applied to it.

Module	Power amplifier
Inputs	Mixed signal
Outputs	High power output signal
Functionality	Converts a low-power radio-frequency signal into a higher power signal.

Embedded system mode



Module	ADC
Inputs	Rx analog signal
Outputs	Converted Digital signal
Functionality	Analog to digital conversion

Module	Microcontroller
Inputs	Digital signal
Outputs	Processed digital signal
Functionality	Digital signal processing to be ready for MCU

Module	MCU
Inputs	Processed digital information
Outputs	Stored digital data to microcontroller for communication
Functionality	Store digital information for later transmitting.