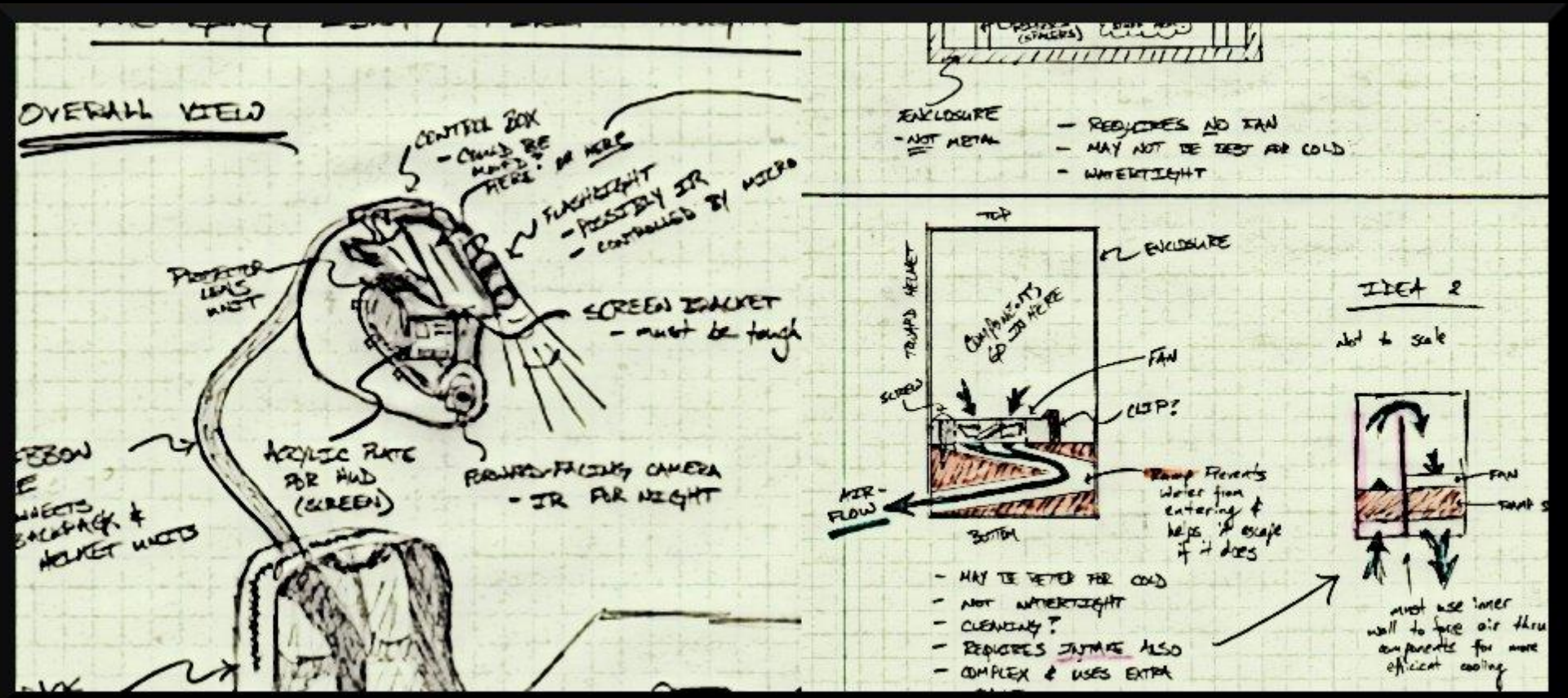
THE INCREDIBLE HUD



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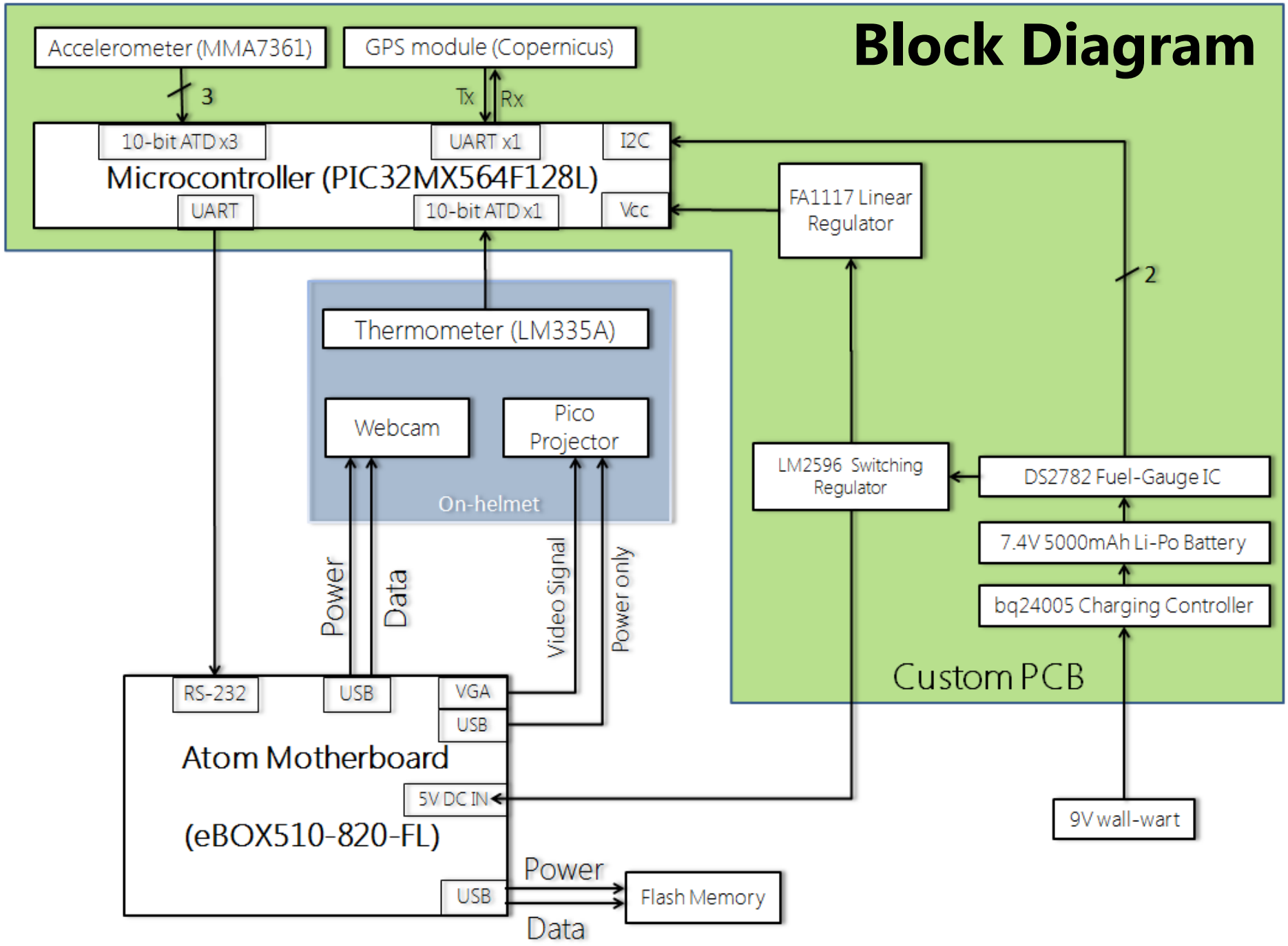
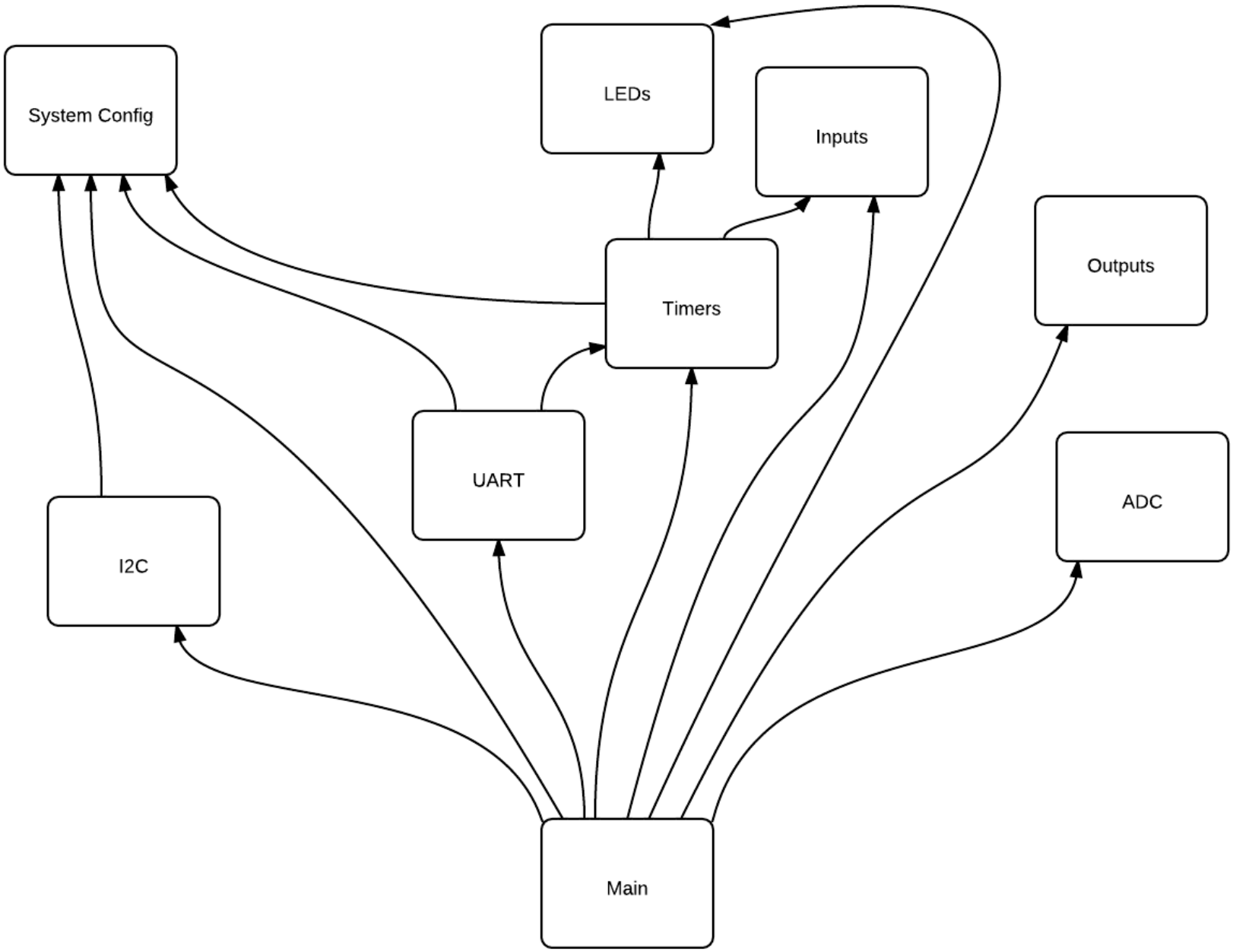
Project-Specific Success Criteria

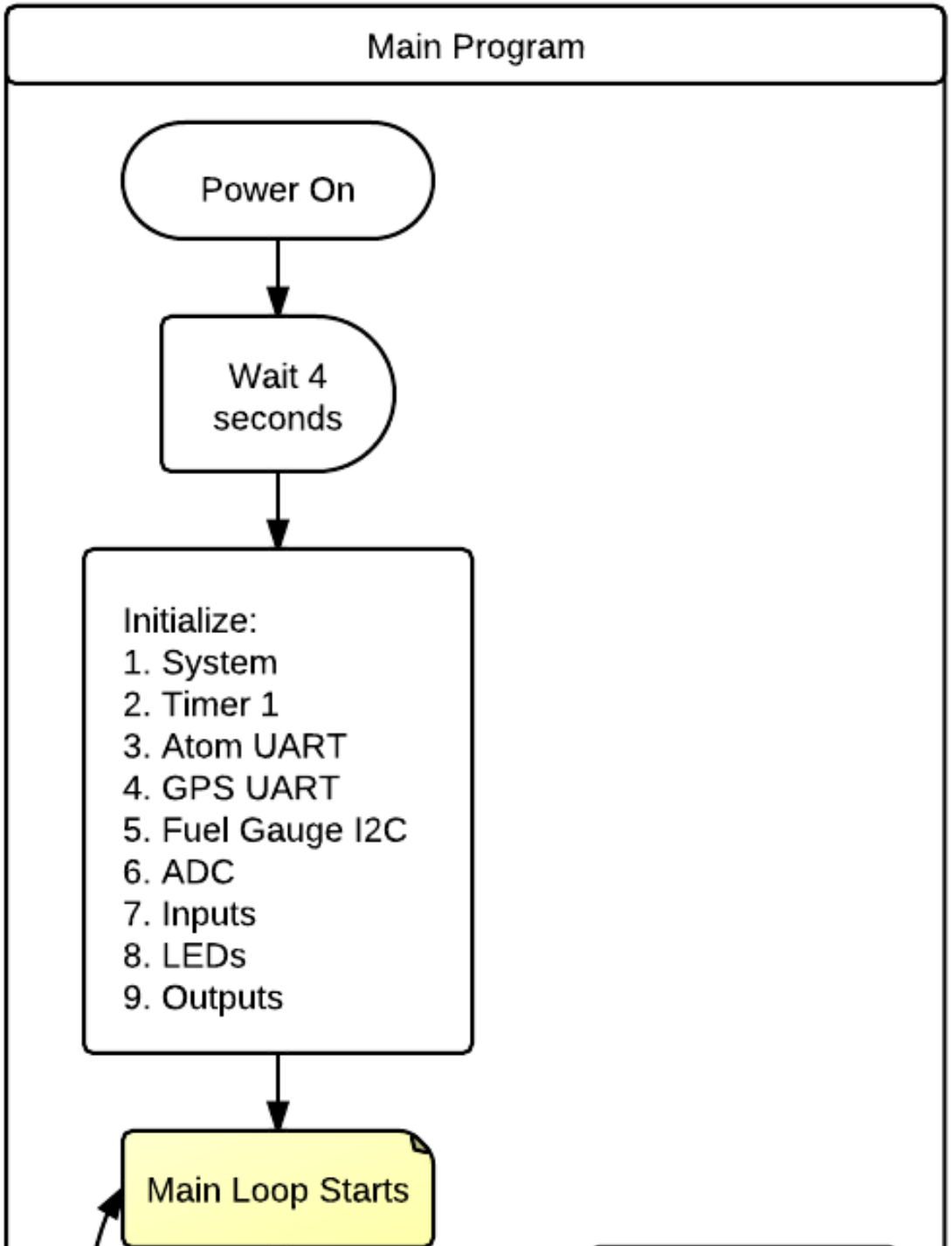
1. An ability to display critical system information via a heads-up-display (HUD).
2. An ability to measure telemetry information (speed, acceleration, temperature, and GPS) and store it to flash memory.
3. An ability to maintain portability through the use of a rechargeable battery system.
4. An ability to enable/disable important features within the display (full information, minimal, on/off).
5. An ability to plot recorded GPS data on a map while overlaying telemetry information on a computer.


Block Diagram
Accelerometer (MMA7361)
GPS module (Copernicus)
3
Tx
Rx
10-bit ATD x3
UART x1
I2C
Microcontroller (PIC32MX564F128L)
UART
10-bit ATD x1
Vcc
FA1117 Linear Regulator
2
Thermometer (LM335A)
Webcam
Pico Projector
On-helmet
LM2596 Switching Regulator
DS2782 Fuel-Gauge IC
7.4V 5000mAh Li-Po Battery
bq24005 Charging Controller
Custom PCB
Power
Data
Video Signal
Power only
RS-232
USB
VGA
USB
Atom Motherboard
5V DC IN
(eBOX510-820-FL)
9V wall-wart
USB
Power
Data
Flash Memory

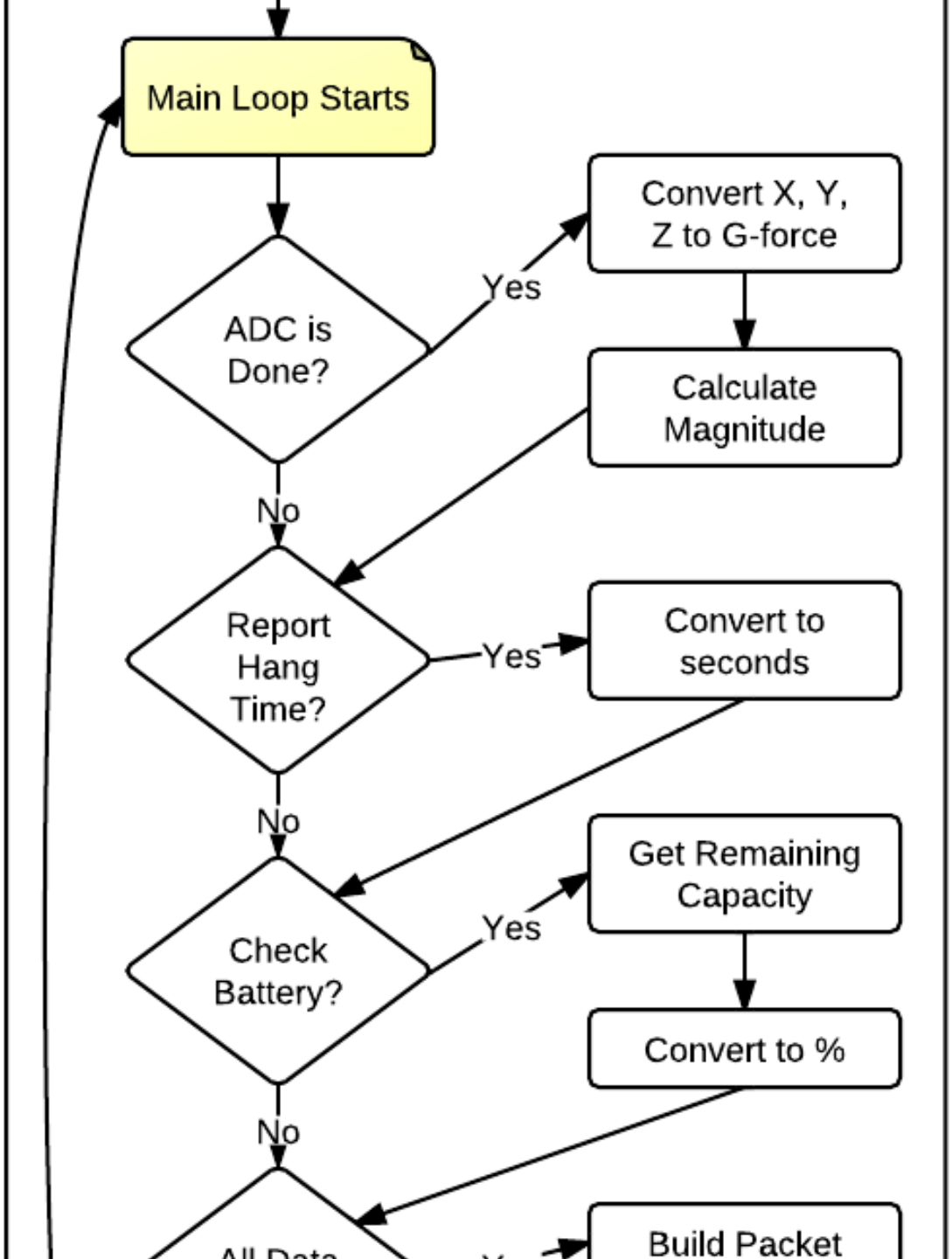


Code Hierarchy

Code Flowchart

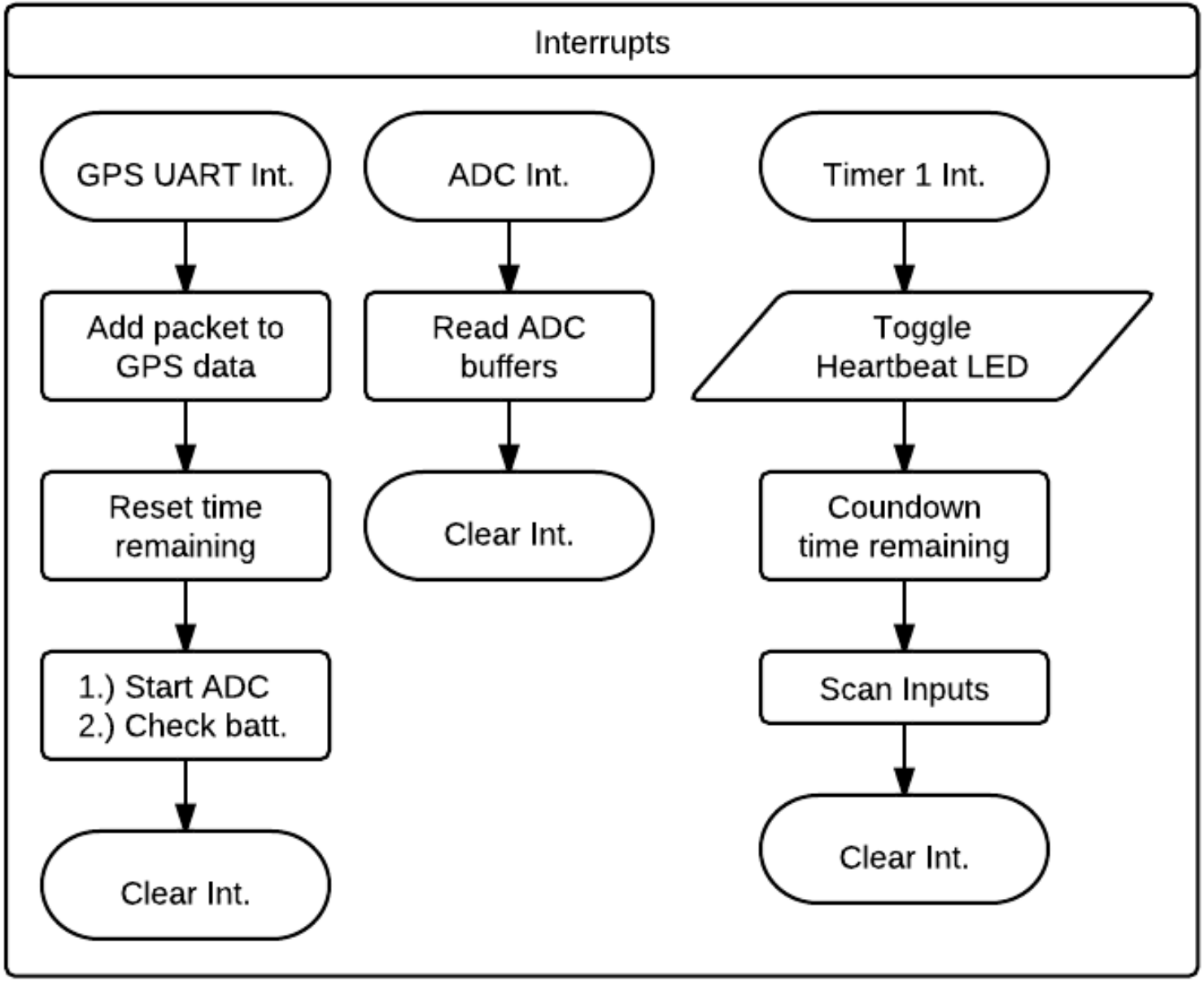


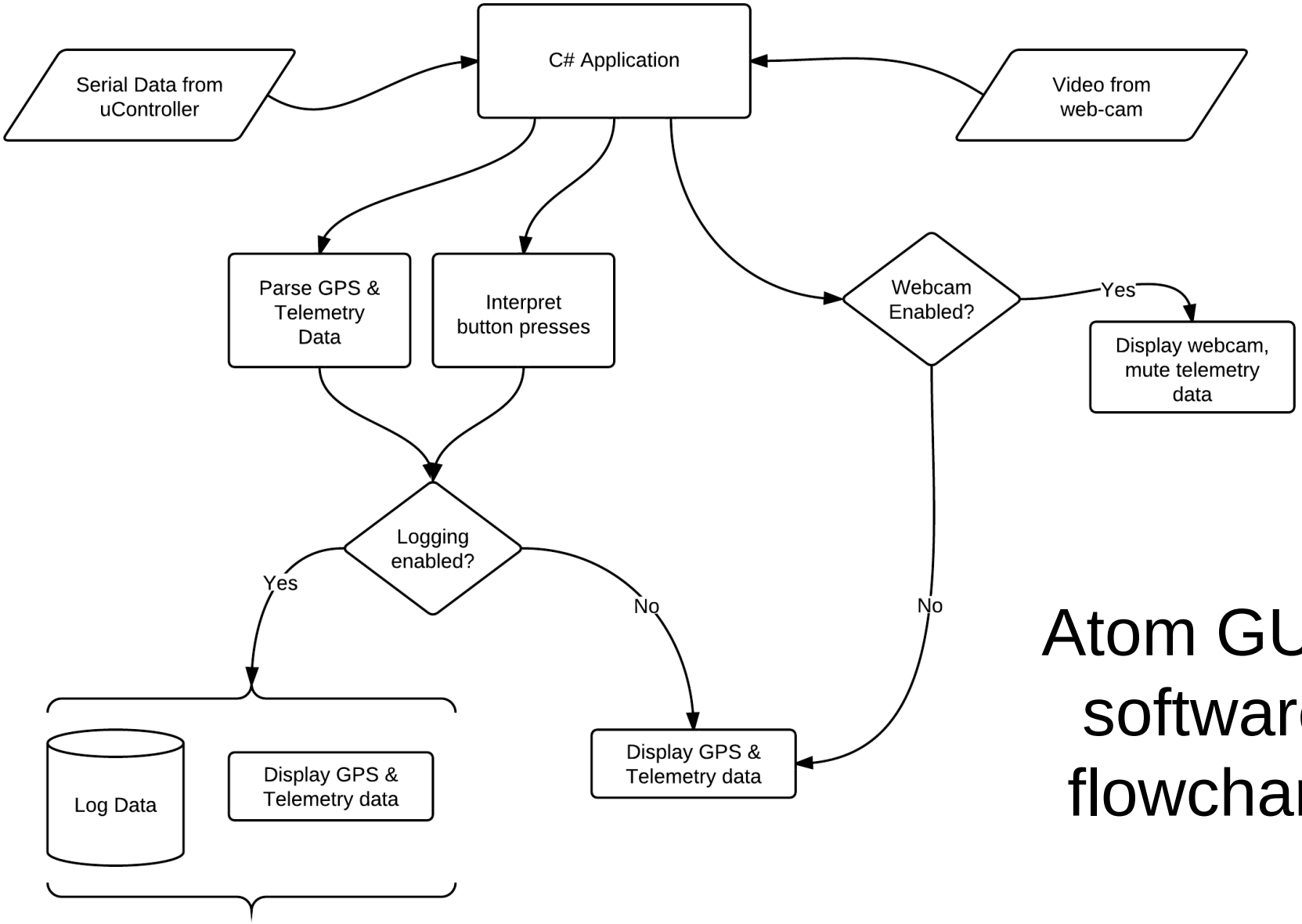
Code Flowchart



Code Flowchart

Code Flowchart





Atom GUI software flowchart

Software Design / Development Status

Peripheral Name	Comm. Status	Algorithm	Algorithm Status
PC RS232 Comm.	1xUART **Tested OK**	Functions to send data packets and receive interrupt	**Implemented** **Tested OK**
GPS	1xUART **Tested OK**	Interpretation of packets received + config if necessary	**Unimplemented**
Accelerometer	3xADC **Tested OK**	Conversion of data into g-force measurements	**Implemented** **Tested OK**
Thermometer	1xADC **Untested**	Conversion of data into temperature measurement	**Unimplemented**
Charge Counter	1xI^2C **Tested OK**	Configuration setup and interpretation of sent packets	**Partially impl.**
Buttons	7xGPIO **1 Tested**	Sampling of buttons + assignment to actions	**1 Implemented** **Tested OK**
GUI elements on Atom	1xRS232 **Untested**	Display GUI, receive/interpret packets from PIC32	**Unimplemented**

Questions?

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