Need	Requirement	Solution	Justification	Tradeoff
Payload must be able to separate from balloon	Balloon must have cut down mechanism that severs the rope between the payload and the balloon	NiChrome wire mechanism wired to relay triggered by microprocessor	Most popular method for cut down; no moving parts; reliable as it only needs to be connected to ~2A;	chords can become tangled; can cause damage to parachute; can insufficiently melt the chord
Must be able to activate balloon cut down mechanism remotely	Payload must be able to receive/understand cut down code	Rx on payload		
Balloon cut down mechanism must trigger if mission exceeds saftey parameters, time, distance	Payload must be aware of comparison between saftey parameters and current state	code in microprocessor on payload		
	Payload must be aware of current state, height, distance	Altimeter, GPS	Height information for cut down mechanism; used on other balloon launches; allows for "floater" prevention; altitude redundancy with gps module	
User must be able to track payload for recovery	tracking device displays position	LED screen		
	payload must be able to transmit position	Tx on payload		
	tracking device must receive position from payload	Rx on tracking device		
User must be able to remotely activate cut down mechanism	tracking device must be able to receive user input	Button on tracking device		
	tracking device must be able to send cut down code	Tx on tracking device		
User must be able to retrieve data from payload	Payload must store data from attached sensors	SD card	flash drive is more expensive and less resistant to extreme conditions; allows user to set their own cut down values and retrieve detailed sensor/GPS information	
User must be able to operate the system without a radio license	The transmission power is less than the amount requiring a license	P<25mW @ 434Mhz	Does not require a license; very low power comsumption; cheaper than anything requiring a license	Short range; slow data rate;
System must be able to transmit position for enough time for the user to retrieve it. Time limit?	The payload must have enough power to run the GPS and transmit data for at least [time]	6 AA batteries	Readily available from stores; surplus power requirements; potential sponsorship; easily replaceable	Non-rechargeable
User must be able to track payload up to the maximum height	Payload must be able to track position up to 50km	U-Blox NEO 6m GPS tracks to 50km in flight mode	can be used up to 50km; will survive temperature conditions; used on many previous balloon launches; allows for tracking/recovery;	Expensive
User must be able to preset customized mission parameter values	A file must exist that can be modified easily by the user and read by the microprocessor	SETTINGS file on SD card		
System hardware must be controlled	A microprocessor must interface with the hardware components	Arduino Mini	easy to program; PCB custom design cost unknown; PCB design method unknown; powerful enough	Not very powerful; larger than custom build