Payload Purpose: Choose a predetermined altitude to attempt to hover at for a limited amount of time and then pop the balloon.

Payload Mechanics: Payload will be located inside the hoop that holds the command module. Flexible tubing from the end of the balloon will go through the parachute with slack to get to this point. Once a desired altitude is reached, load will release air until it hovers at about that altitude.

Sensors: GPS sensor will be used to determine height, and an external pressure sensor will corroborate the readings. This will assemble a table of pressure and height values (yay data), which we will use to judge when to release air (predetermined point based on eight point average of pressures). We will release air, potentially in small bursts or via continuous slow flow until a stable hover is reached, possibly by decreasing altitude a little. A potential pressure sensor is <https://www.parallax.com/product/29124>

Tubing: Likely two parts, the hanging part will be flexible, the part in the balloon must be more rigid so we can seal it, and have no sharp edges. [insert name] will look at existing flexible tubing solutions to be tested in cold environment. If not feasible, we will try McMasterCarr Product 50375K41. For the rigid section, we will test heat molded tubing and a 3D printed support.

Valve: Look at Parker Miniature Solenoid Valves, preferably the 5 volt variety.

Logger: Will use the GPS Shield for this as well - <http://www.adafruit.com/products/1272>

To Test: We would like to test a 3D printed support for flexible tubing inside the neck of a previously popped balloon to see if rubbing from it poses a danger to balloon integrity. We will also test the heat molded tubing in low temperature to see if we can use it. Finally, when complete, we will test the design in a previously inflated balloon to ensure product will function in a low temperature/pressure environment.

Extras: Other useful data that our experiment lends itself to is pressure inside the balloon. This is currently not part of the primary system, but if we can add a pressure sensor in line with the flexible tubing before the valve without too much interference, it would be great to measure the pressure inside the balloon. By comparing this with the outside pressure, we can get a better idea of when the balloon will pop in the future and how the volume of the balloon changes with altitude.