



Project IRIS

High-Altitude Imaging System

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FYDP Proposal Presentation

Presented by Alexander Fefer
Scott Kuo
Alexandru Roman
Miron Vranješ

Supervisor Andrew J. Heunis

The Motivation



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An aerial photograph showing a complex landscape. The majority of the area is covered in a dense, irregular patchwork of green and brown rectangular fields, suggesting agricultural land. A winding river or stream flows through the lower right portion of the image. In the center, there is a more densely built-up area, possibly a town or city, with a grid-like street pattern. The overall scene is captured from a high altitude, providing a broad perspective of the terrain.

See the world differently

Do something special



And have fun



Goals

- Aerial imaging and real-time surveillance
- In-air camera stabilization and targeting
- Long range radio communication
- Low cost system
- Innovative target acquisition and management
- Support scientific payload extensions



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Challenges and Risks

- Scope
- Low temperature
- Long distance
- High accuracy stabilization feedback
- Position and tracking
- Safety
- Cost



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IRIS I

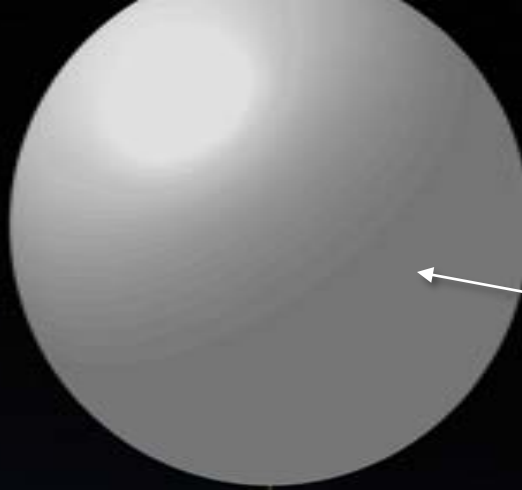
Main Assembly



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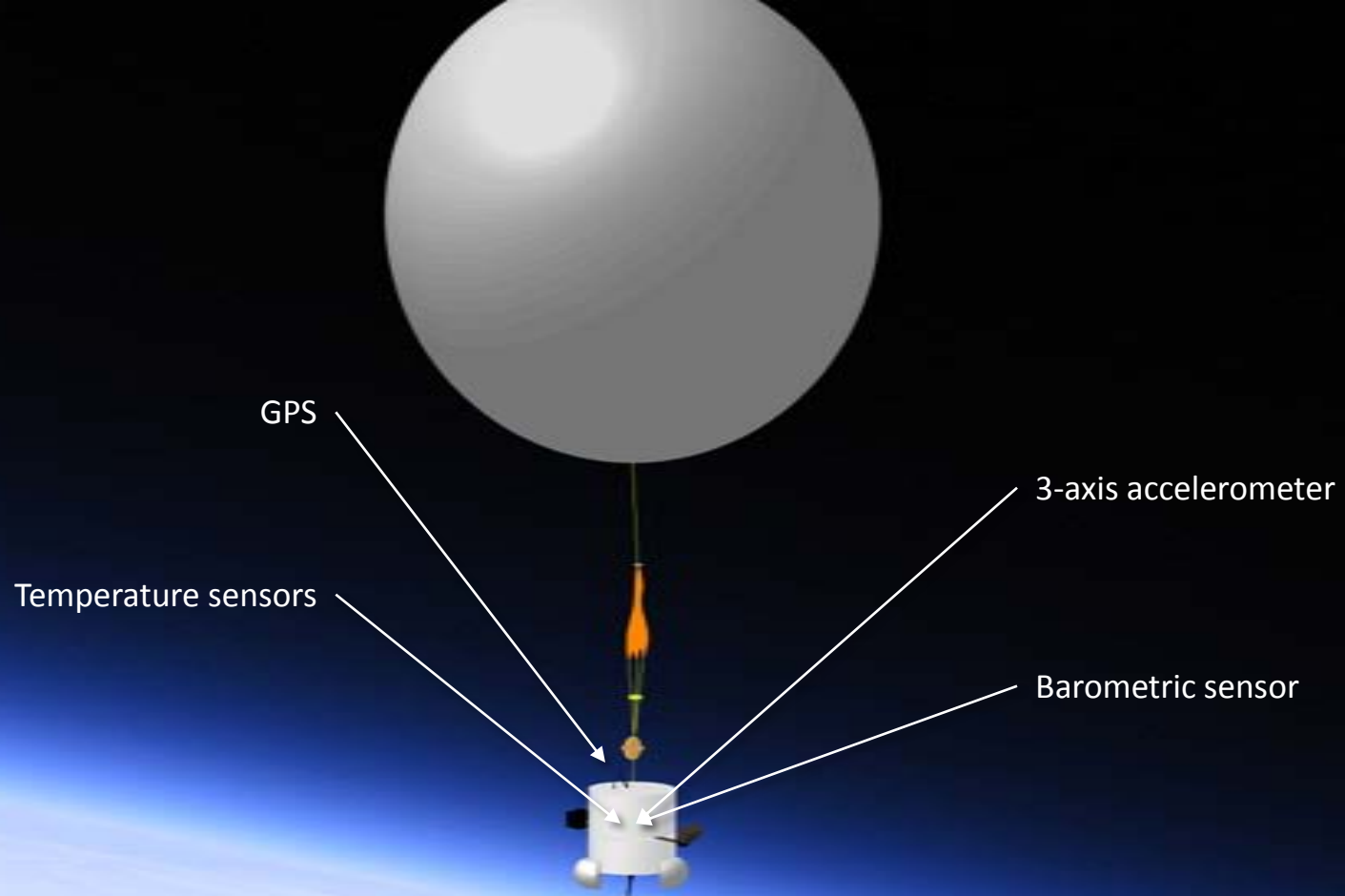
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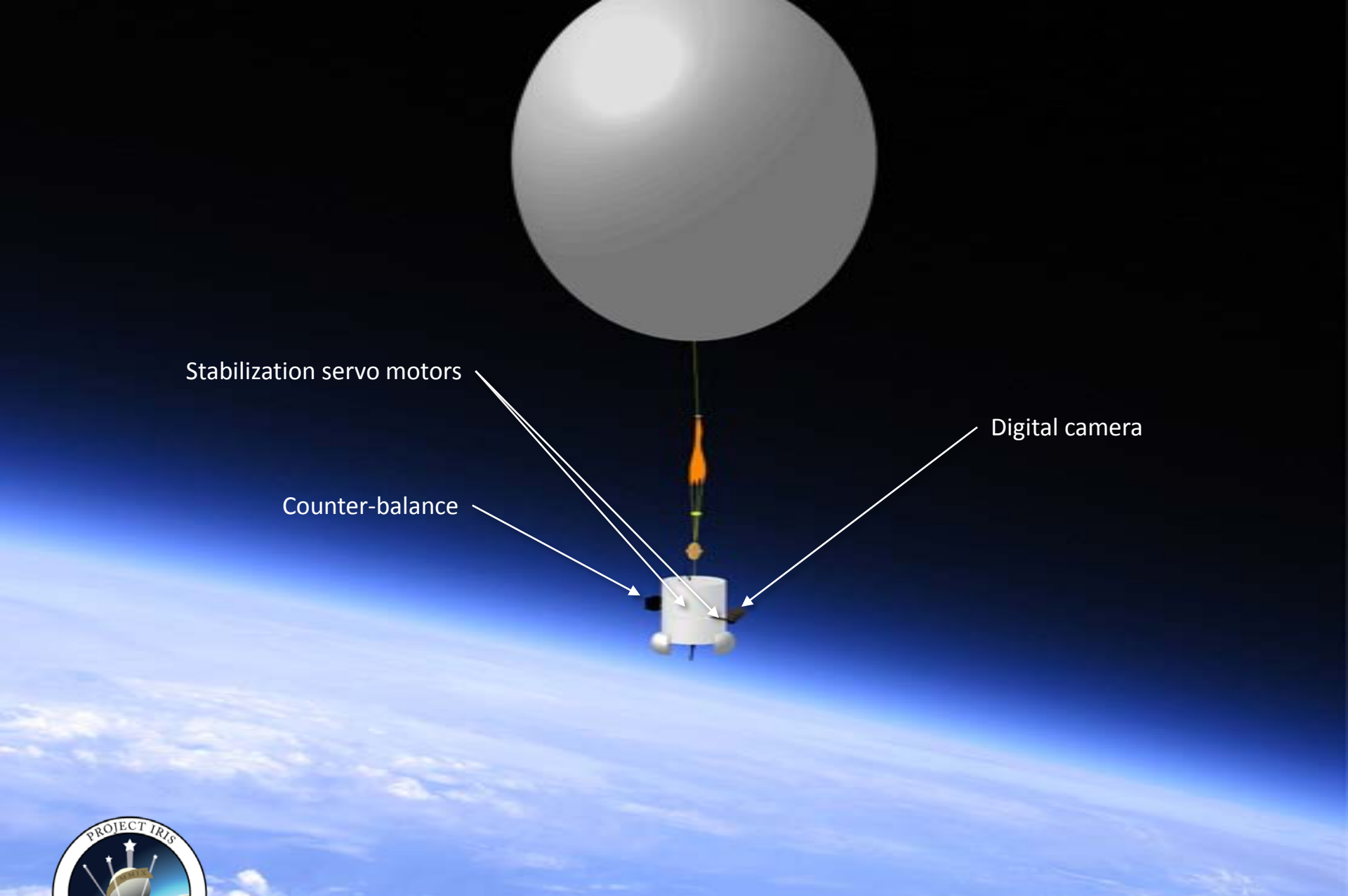
High-altitude weather balloon



Ascent Stage



Instrumentation Module



Stabilization servo motors

Digital camera

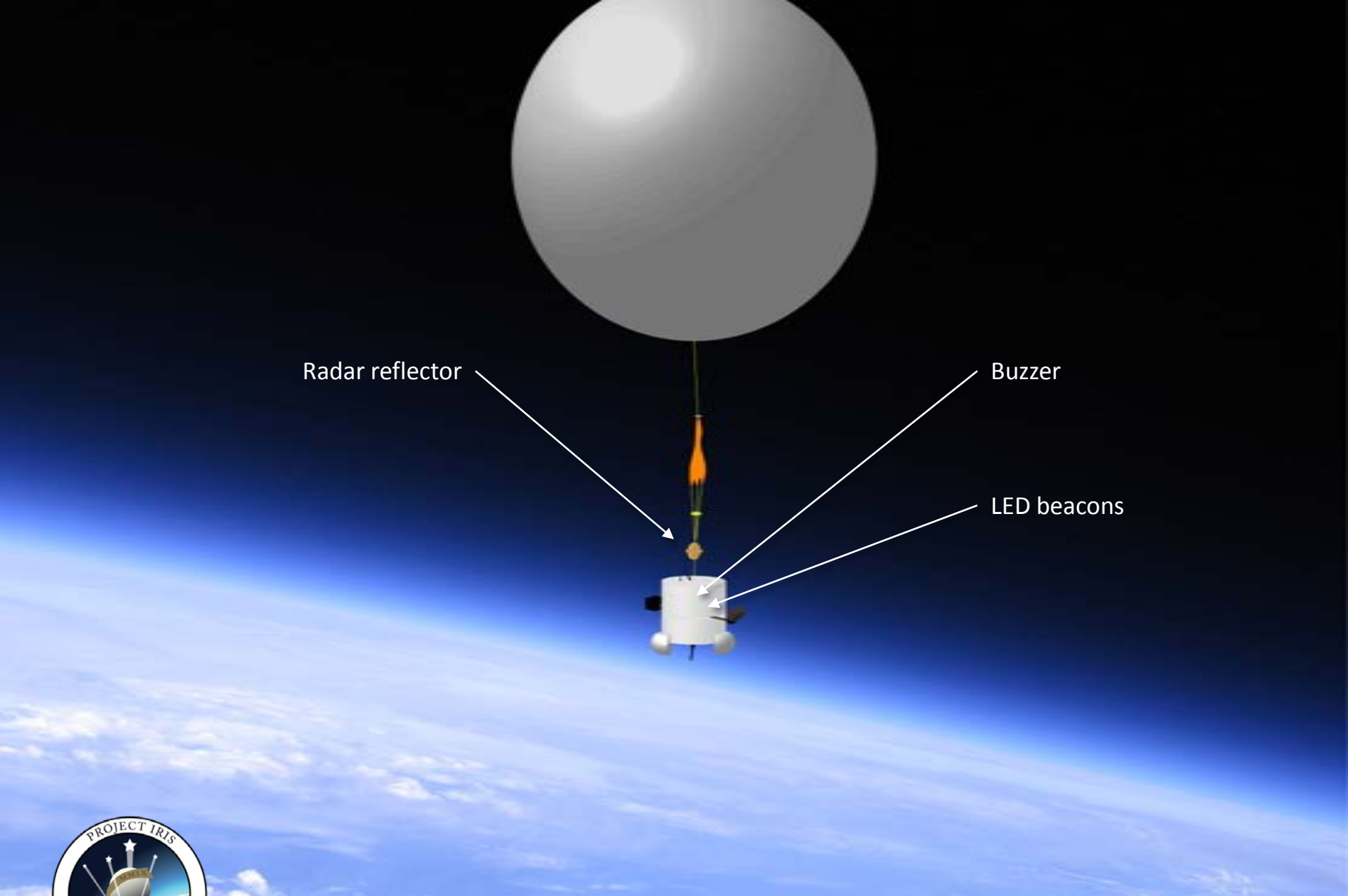
Counter-balance



Imaging Module



Communications Module



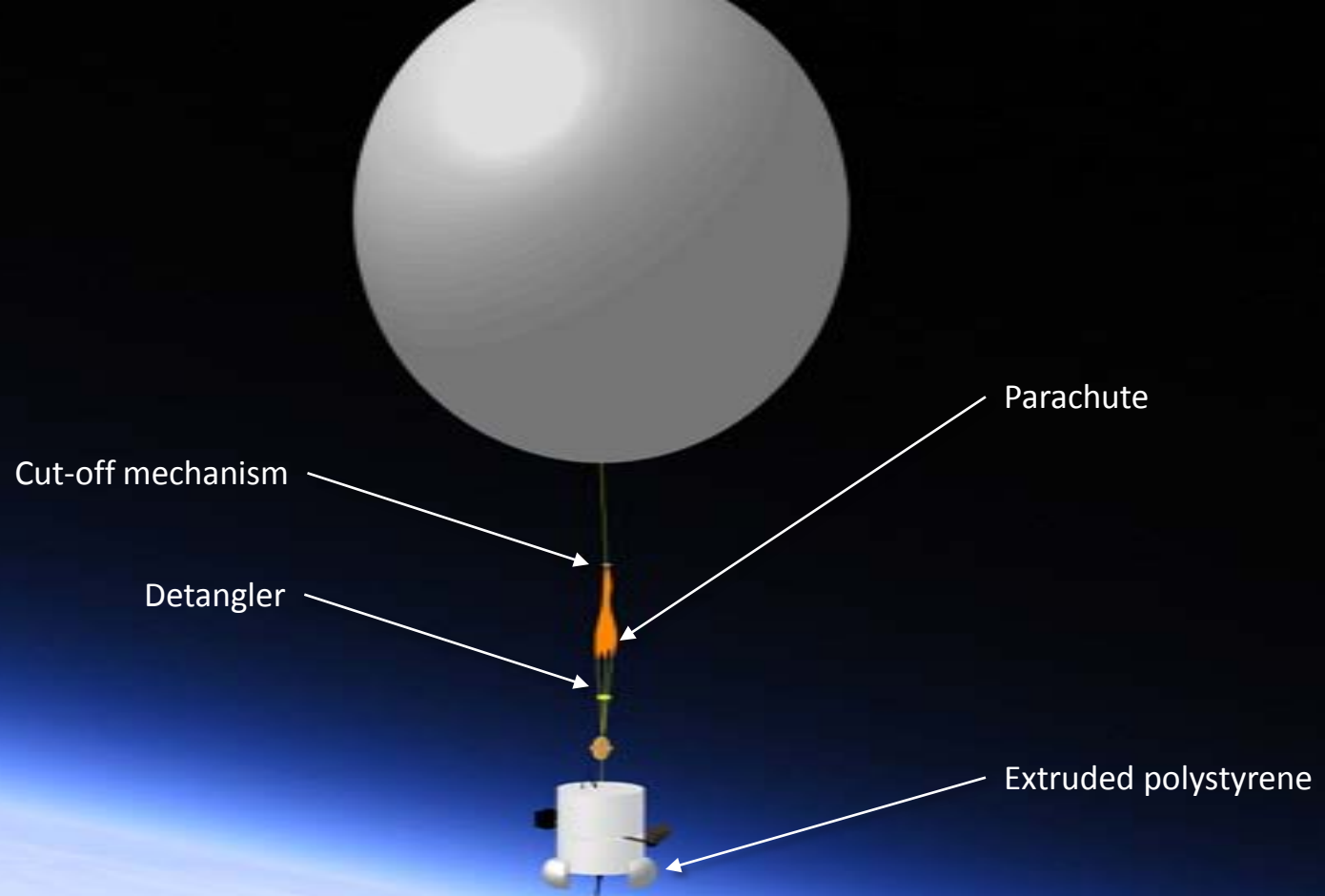
Radar reflector

Buzzer

LED beacons



Collision Avoidance System



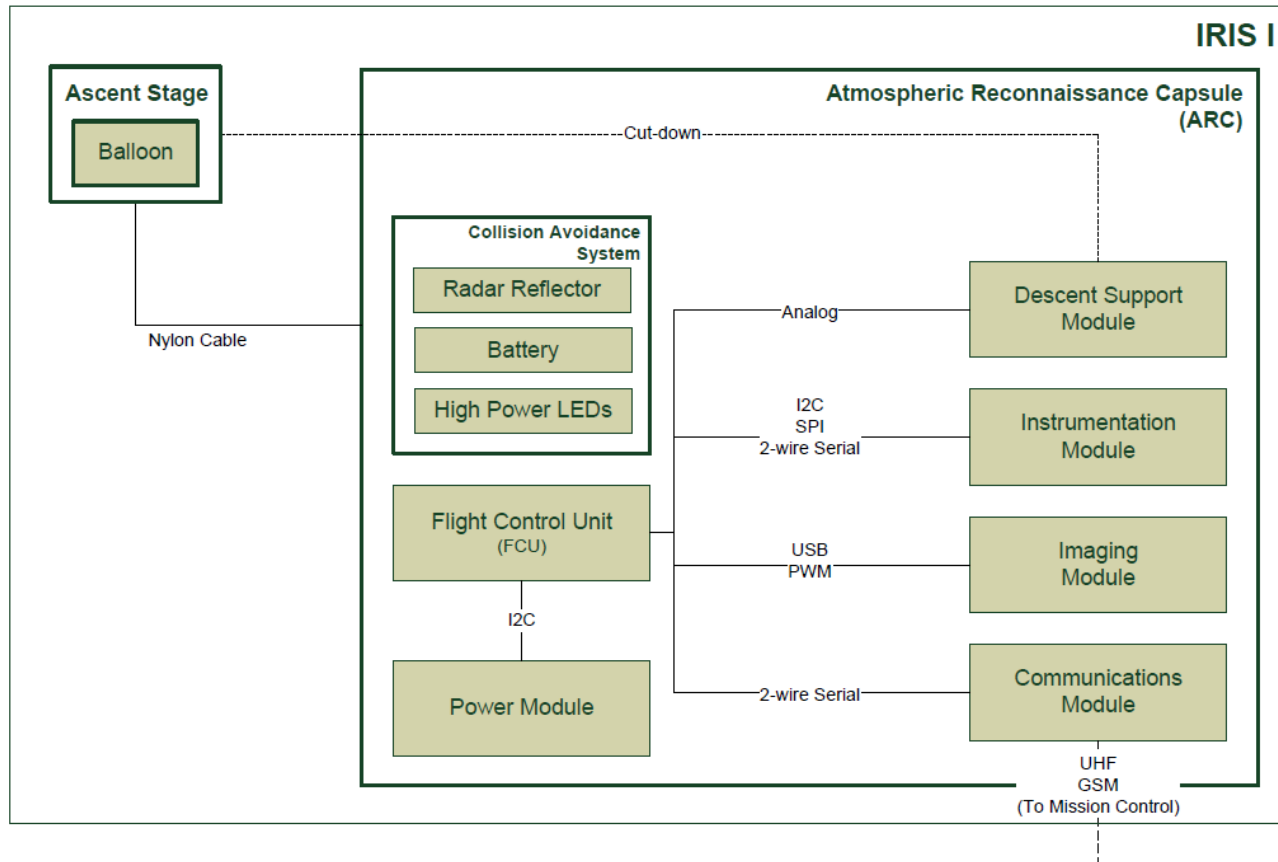
Descent Support Module

System Interfaces



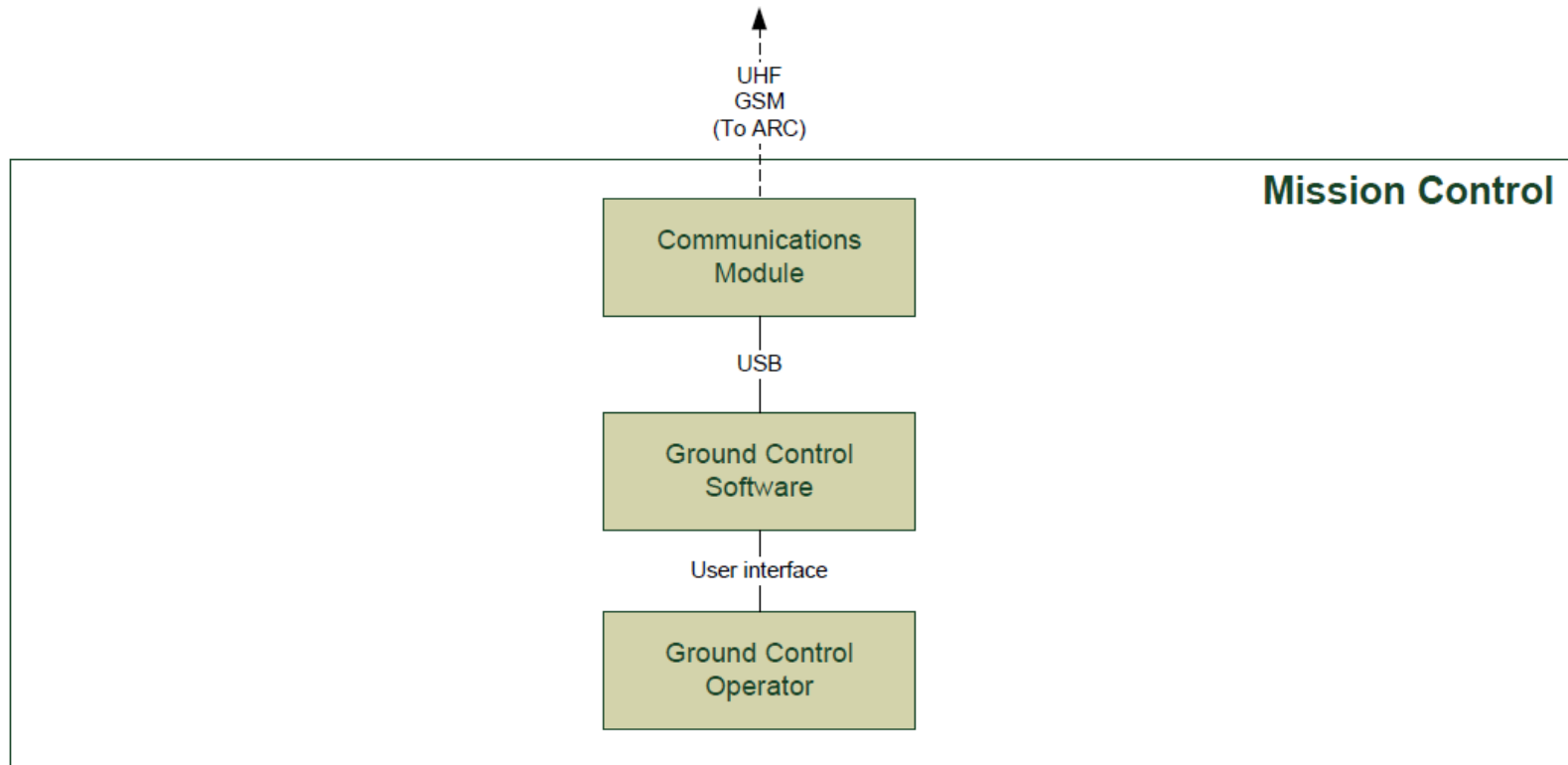
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IRIS I Interfaces



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Mission Control



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Budget



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Engineering Costs

Assembly	Qty	Unit Cost	Total
Flight Control Unit	1	1,123.76	1,123.76
Descent Support Module	1	162.39	162.39
Instrumentation Module	1	385.28	385.28
Imaging Module	1	517.56	517.56
Communication Module	1	893.28	893.28
Power Management Module	1	345.17	345.17
Collision Avoidance System	1	39.48	39.48
Ascent Stage	3	176.77	530.32
Mechanical Assembly	1	21.47	21.47
Ground Control Software	1	0	0
			\$4,018.71



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Note: Costs are based on currency exchange “ask” rates at market-close on March 20th, 2009 plus a 2.5% estimated premium charged by the financial institutions and 15% for tax, import duty and brokerage fees. USD:CAD @ 1.2408 EUR:CAD @ 1.6882

Cost Breakdown (1 of 3)

Parts Description	Qty	Cost	Funding Source
Flight Control Unit			
AP Circuits Custom Printed Circuit Board	1	477.25	SPF
Toradex Colibri XScale PSA230IT 806 MHz (v1.2b)	1	296.50	WEEF
Toradex Orchid Carrier Board (v1.0b)	1	226.30	WEEF / Team
FCI SODIMM connector	1	11.99	Team
Keystone Coin Battery Holder (20mm)	1	1.23	Team
Sanyo 20mm Coin Battery	1	0.48	Team
Descent Support Module			
Rocketman 8 Feet Standard Parachute	1	95.07	SPF
18-gauge NiChrome high temperature wire	1	8.82	SPF
MOSFET	1	58.50	Inventory



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Cost Breakdown (2 of 3)

Parts Description	Qty	Cost	Funding Source
Instrumentation Module			
Analog Devices 3-Axis Accelerometer	1	477.25	SPF
Analog Devices 10-Bit ADC	1	296.50	In-kind
PNI Vector Compass Module	1	226.30	SPF
Trimble Lassen iQ GPS Receiver, Connector, and Antenna	1	113.86	SPF
VTI Barometric Pressure Sensor (High-altitude)	1	54.95	SPF
Imaging Module			
Canon PowerShot A590 IS, adapter, and standard lens filters	1	302.31	SPF
HiTec servo motor(x2), connectors, and tilt mechanism	1	102.26	SPF
Carbon fibre tube	1	112.99	SPF
Communication Module			
Digi 9XTend Development Kit (UHF Modem and accessories)	1	731.15	SPF
Telit GM862 Quad-Band GSM Module and Accessories	1	162.13	SPF



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Cost Breakdown (3 of 3)

Parts Description	Qty	Cost	Funding Source
Power Module			
Thunder Power Li-Pol 6Ah 7.4 V (2 cell)	1	219.32	SPF
Thunder Power Li-Pol Battery Charger (does not incl. power supply)	1	73.06	SPF
Linear Tech Voltage Regulator	5	52.80	SPF
Collision Avoidance System			
High power LEDs	-	-	Inventory
Davis Industrial Echomaster Radar Reflector	1	39.48	SPF
Ascent Stage			
Totex 1500 Meteorological sounding balloon	1	131.63	SPF
Praxair Pressurized H2 Industrial Gas (5.4 cubic metres)	1	33.64	SPF
Nylon cable	1	11.50	SPF
Assembly			
270457 CodeBord Extruded Polystyrene Rigid Insulation	1	21.47	SPF



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Operational Expenditures

Description	Qty	Cost	Funding Source
Printing – System Requirements, System Design	6	351.02	Vendor/Team
Printing – Poster	1	115.00	Team
Cellular service plans	1	460.00	Team
Truck rental (per day)	6	690.00	Team
Diesel fuel (per L)	150	155.25	Team
NavCan Aeronautical Charts and Publications	1	86.25	Team
Perforce SCM Standard License	4	5,265.33	In-kind
Liability Insurance (Based on estimations by Mr. Charles Edward Spike)	1	1,150.00	SPF
Various Agilent power supplies	1	1,016.18	Inventory



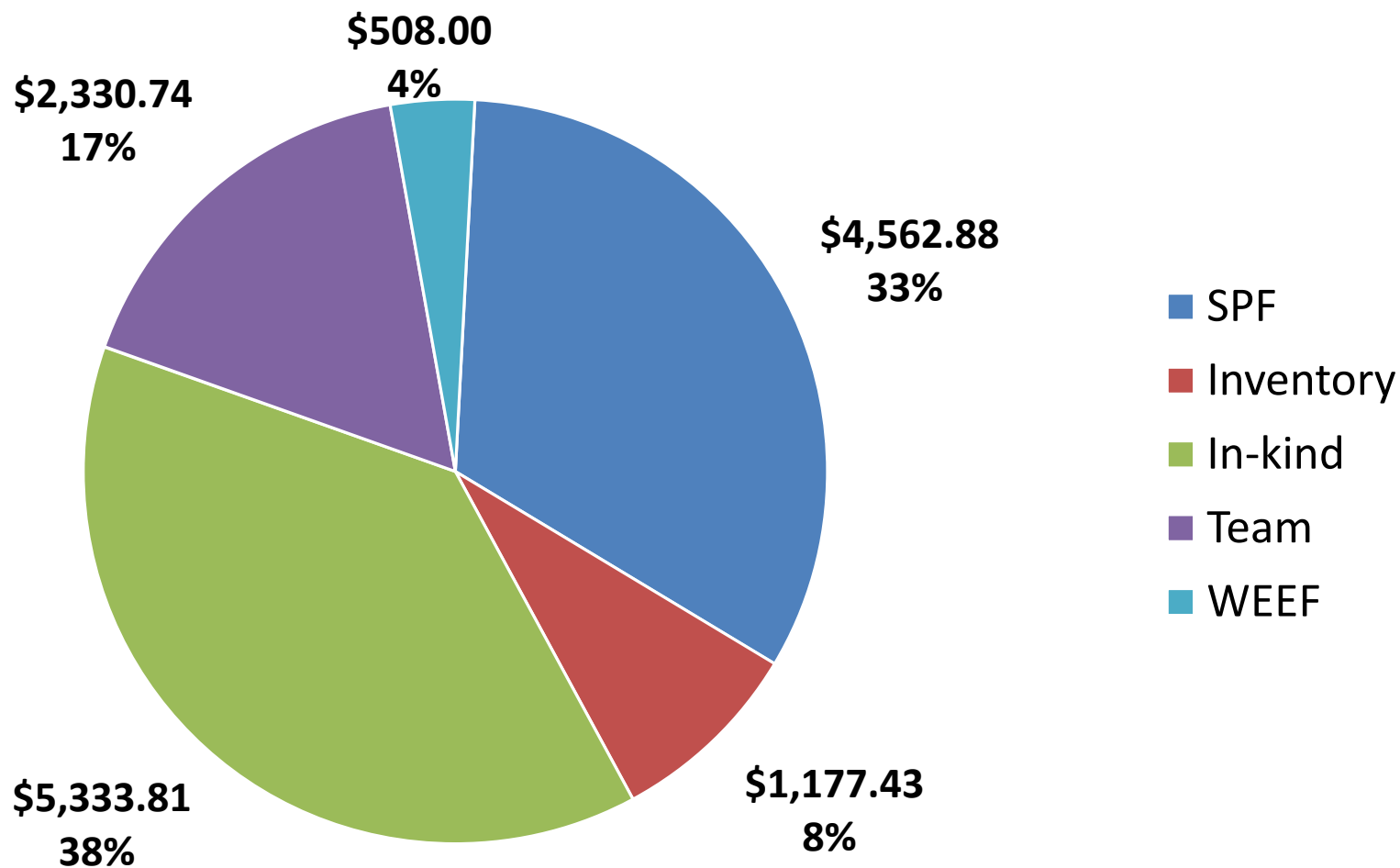
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Sponsors



Funding Breakdown





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