



XQ-V1 Venture

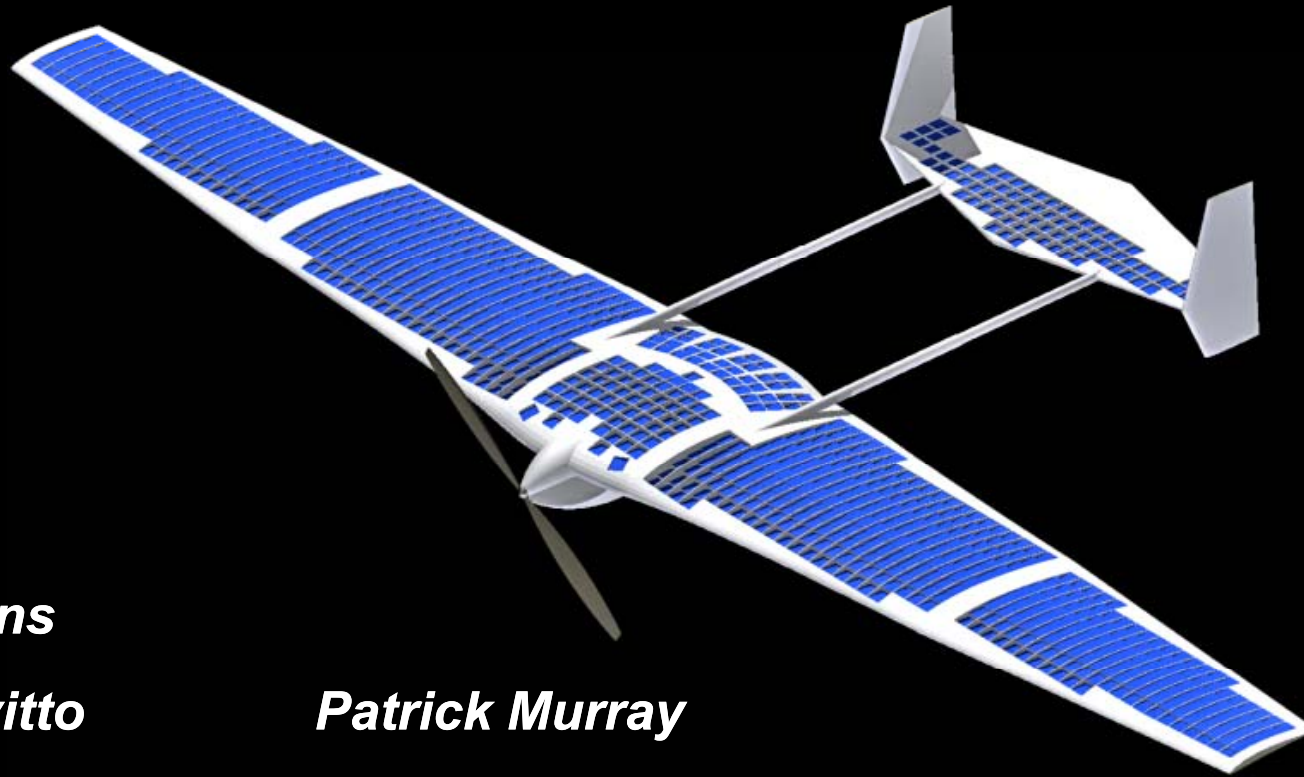
May 8, 2008



XQ-V1 Venture

***Solar-Powered Unmanned Research Aircraft
VEXAG 5 – May 8, 2008***

**Boston University Department of Aerospace and Mechanical Engineering
Presented by Greg Thanavaro
g.thanavaro@gmail.com**



Cathy Burns

Chris Calvitto

Jason Salazar

Patrick Murray

Greg Thanavaro



Flight on Venus

Application: **Science and Exploration**

Overall Design Goal:

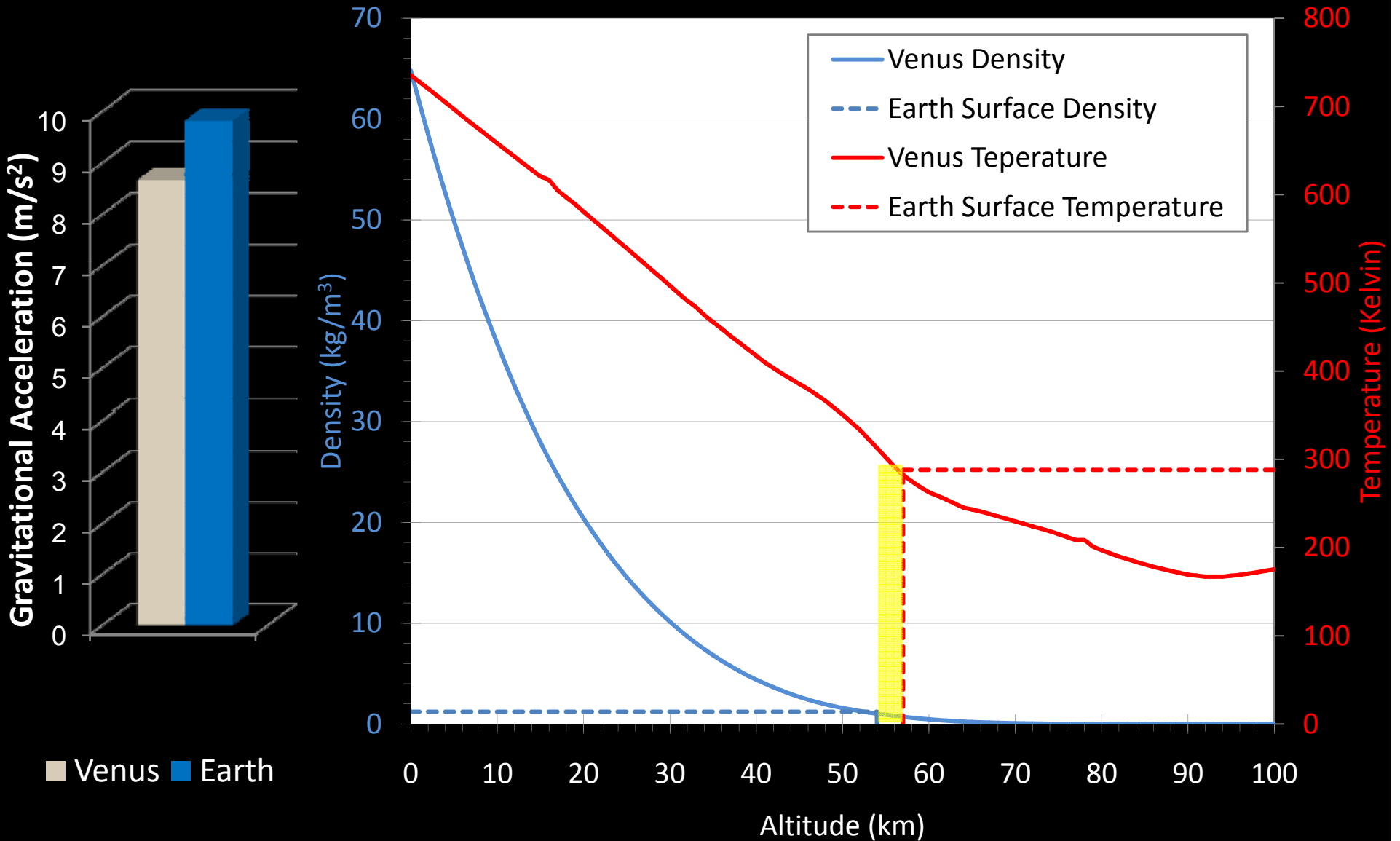
Demonstrate the Feasibility of Flight in the Venusian Atmosphere

Mission: **Fly continuously for 90 days**





The Venusian Flight Environment





Designing the XQ-V1: Unique Challenges

How is it configured?

Greg Thanavaro

How is it deployed?

Chris Calvito

How will it fly?

Patrick Murray

How will it be powered?

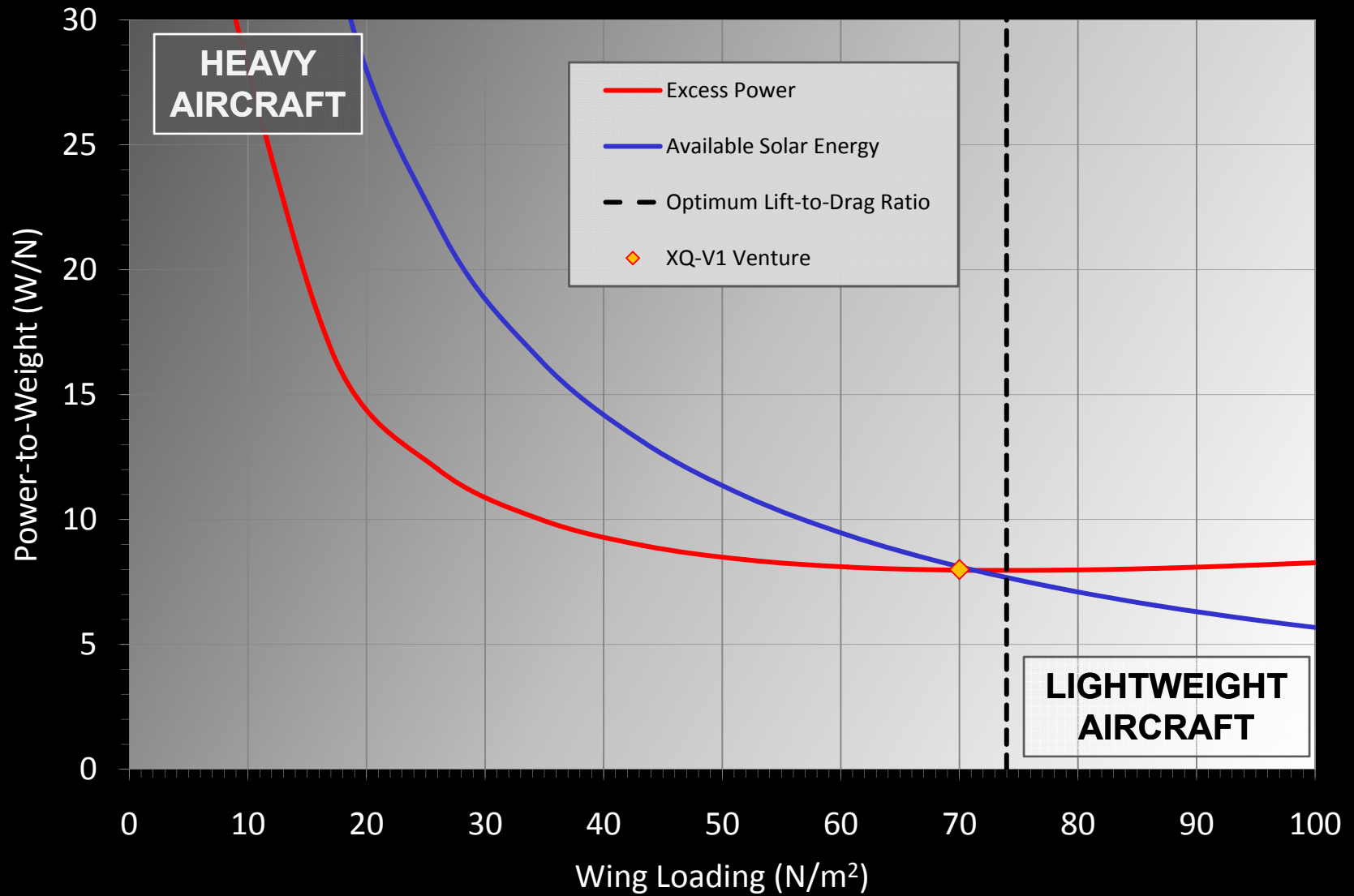
Jason Salazar

How will it be controlled?

Cathy Burns



Power-to-Weight and Wing Loading

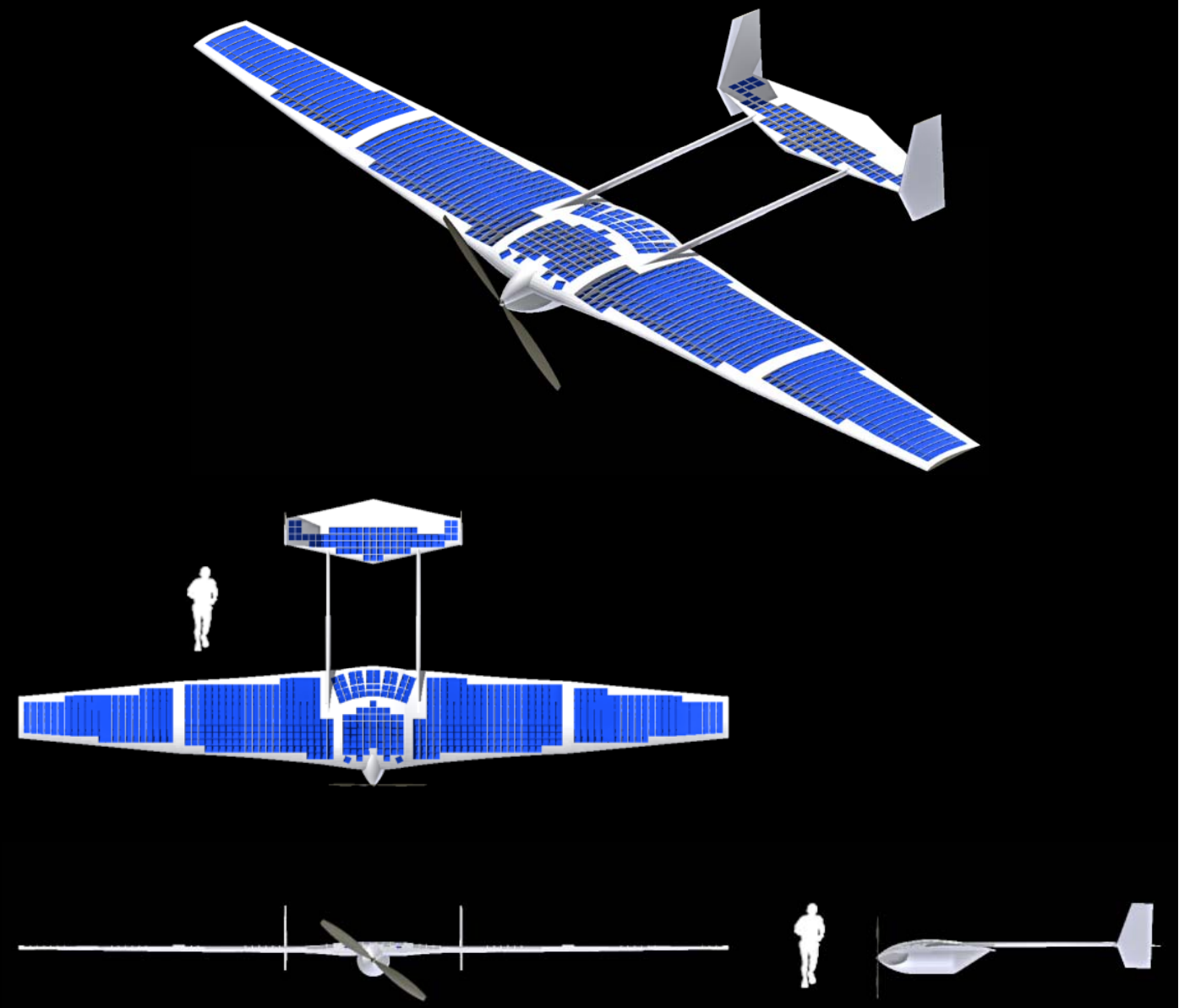
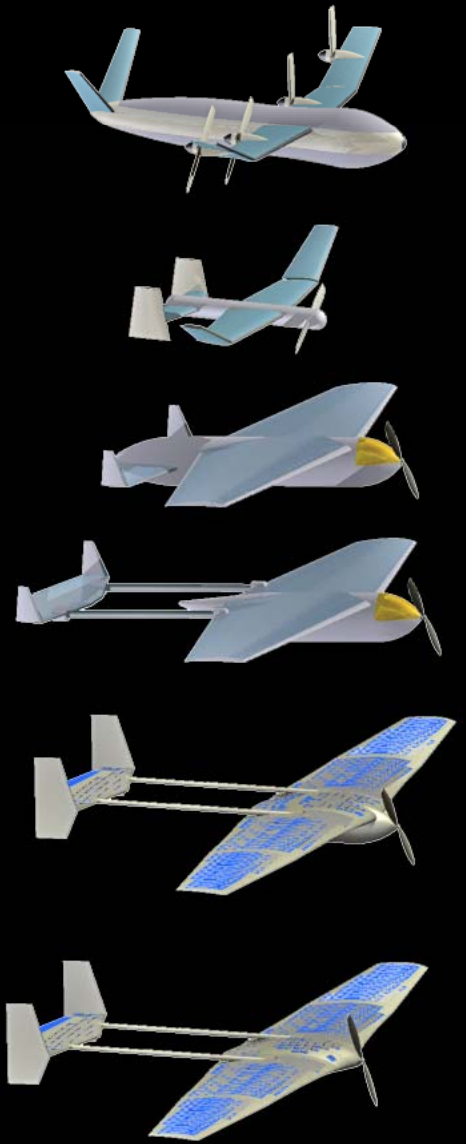




Configuration Part I: Layout

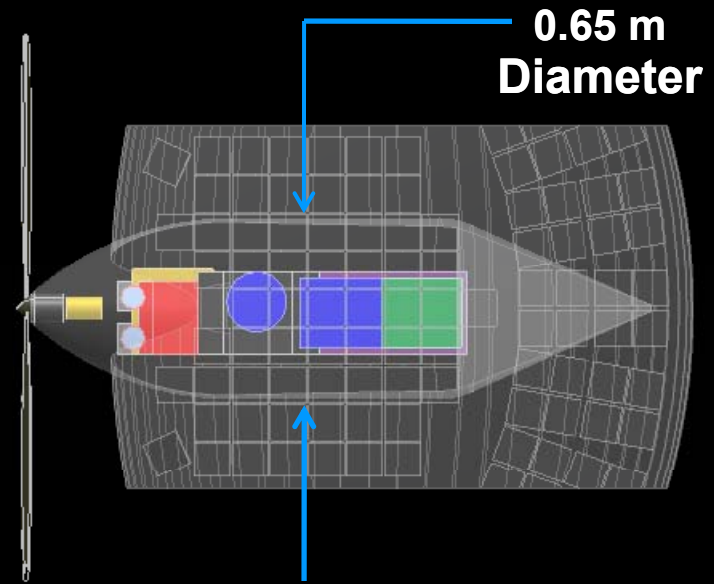
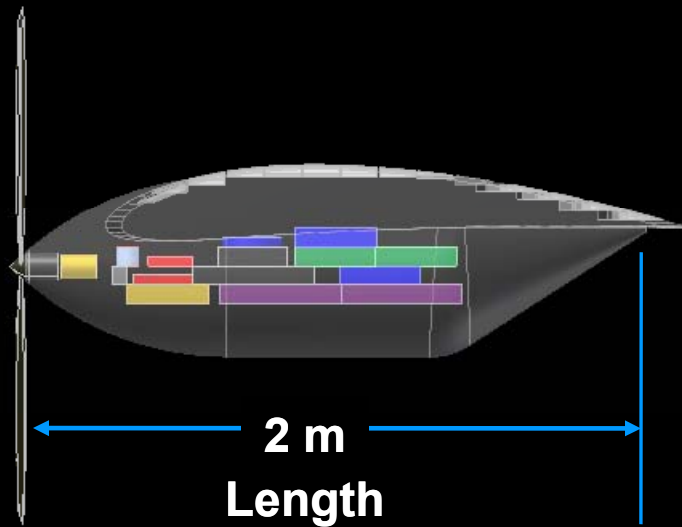
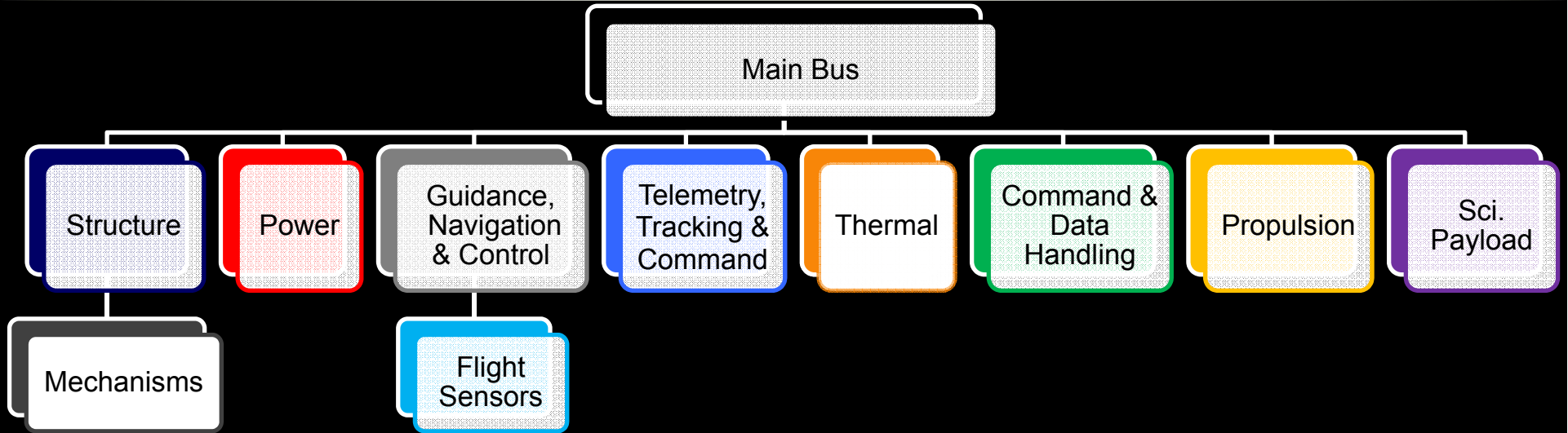


Evolution of the XQ-V1





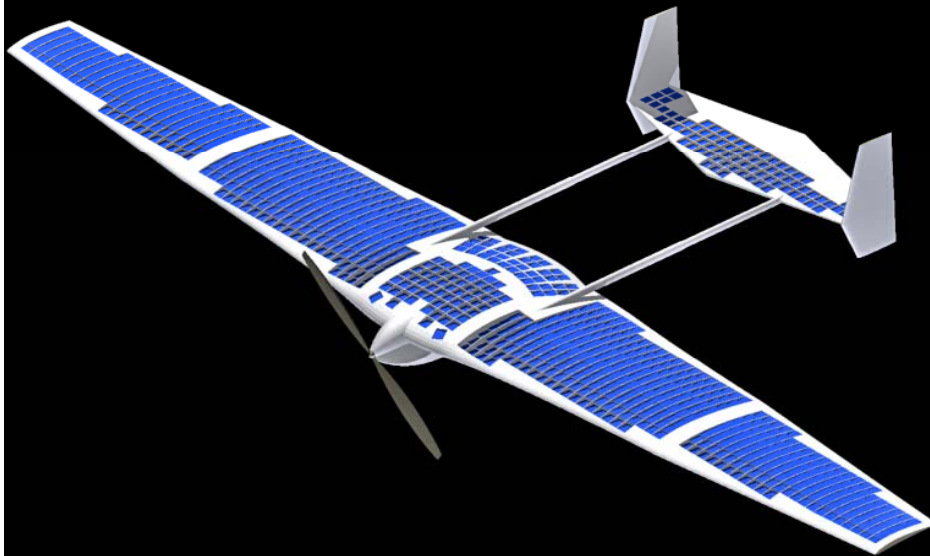
Configuration Part II: System



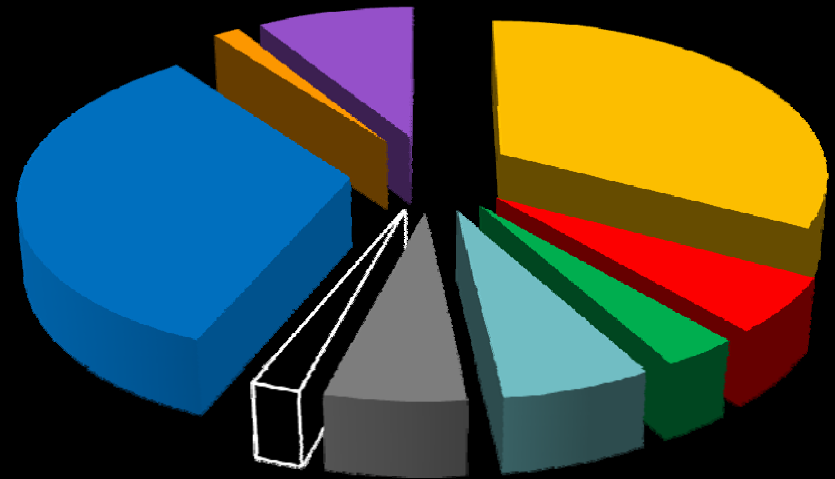


How is it configured?

Layout



System



Total Aircraft Mass
170 kilograms

- Propulsion System: 55.91 kg
- Power System: 9.85 kg
- Command & Data Handling: 5.5 kg
- Tracking, Telem. & Command: 10.85 kg
- Guidance, Nav. & Control: 10.25 kg
- Main Bus/PCI: 3.5 kg
- Structure: 57 kg



XQ-V1 Venture Specifications

<i>General</i>		
Planet	Venus	
Endurance	90 Days	
Altitude	75 km	246.1 kft
Mass	170 kg	374.8 lb
Scientific Payload	15 kg	33.1 lb
<i>Geometric</i>		
Solar Panel Area	14.84 m ²	159.7 ft ²
Wing Airfoil	NACA 4407-62	
Wing Aspect Ratio	9	
Wing Span	12.92 m	42.4 ft
Tail Airfoil	NACA 0007-02	
Tail Aspect Ratio	4	
Tail Span	3 m	9.8 ft
Tail Telescope Length		
Wing Folding Ratio	1/2	
Aeroshell Diameter	8.31 m	27.2 ft
<i>Performance</i>		
Power-to-Weight Ratio	8 W/N	4.8 x 10 ⁻² hp/lb
Wing Loading	70 N/m ²	1.5 lb/ft ²
Excess Power	1 m/s	196.9 fpm
Climb Rate	1 m/s	196.9 fpm
Solar Cell Efficiency	28 %	
Lift Coefficient at Cruise	48.1x	
Drag Coefficient at Cruise	3.31x	



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