

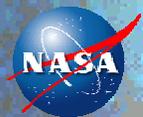
Instrument Synthesis and Analysis Laboratory

Orbiting Wide-angle Light-collectors (OWL)

Mission Success

Dick Bolt

18 January 2002



NASA GODDARD SPACE FLIGHT CENTER

Mission Success Summary

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- **Mission Success**

- **Full Stereo Operation**

- Determining Of Location & Direction Of Flash
 - Expect Low Reliability – Both Buses & Instruments Are Series String For Reliability Calculations
 - Estimate---For 3 Year Mission
 - 65% With 2 Fully Redundant Buses
 - 40% With 2 Single String Buses

- **Identifying Flash (Redundant By Having Two S/C)**

- Expect High Reliability – Both Buses Are In Parallel For Reliability Calculations – For 3 Year Mission
 - Estimate – For 3 Year Mission (Spread From Possibly Cold Sparing One S/C)
 - 95-99% With 2 Fully Redundant Buses
 - 86-92% With 2 Single String Buses

- **Instrument Reliability**

- Reduced Reliability Expected Based On Dependence On Multiple Deployments & Motors Operating

Note: No Consideration For Launch Vehicle Reliability In Above Numbers



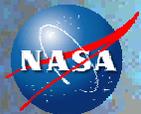
Photo Multiplier Tubes

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- **Photo Multiplier Tubes**

- **Hamamatsu PMTs Should Easily Make 3 Years Life**
 - Life Is However Based On Operating Current / Voltage
- **Present ISAL Design (1348 PMTs) Has A Very High PMT Margin**
 - Each PMT Has 400 pixels
 - Each Flash To Use At Most Two (2) PMTs – 300 pixels
- **Ability To Reduce Or Raise Voltage On PMTs**
 - **Allows Extension Of Mission Life**
 - Increase Voltage To Compensate For PMT Wear-Out
 - Reduce Voltage During Daylight Pass
 - Light Still Must Not Enter PMT Area !
- **QA & Test Screening Of PMTs To Reduce On-Orbit Failures & Increase Expected Sensor Life**



Deployments

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- **Instrument Deployment**

- **Multiple Deployments Reduce Reliability Of Instrument Deployment**

- **Large Amount Of Motors & Locking Devices In Design**

- Redesign To Reduce Complexity

- **Multiple Opening & Closing Of Lens To Reduce Reliability**

- Major Single Point Failure

- Possible Rotating Shutter Rather Than Locking Cap

- Design For Redundant Method Of Activation

- Alternate Could Be Jettison Cover & Put PMTs In Cut-Off

- **Peddle Deployment**

- Large Amount Of Motors & Locking Devices In Design

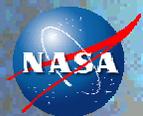
- Consider Tripod Deployment Actually Pulling Light Bag Out

- **Peddles Are Designed To Lock**

- Design Should Consider One Not Locking Or Deploying Properly

- **Solar Cells On Back Of Peddles**

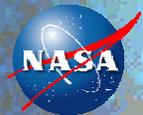
- Consider Using Thin Film (1.5 Mil) Solar Cells On Back Of The 8 Deployable Peddles



Back Up Slides



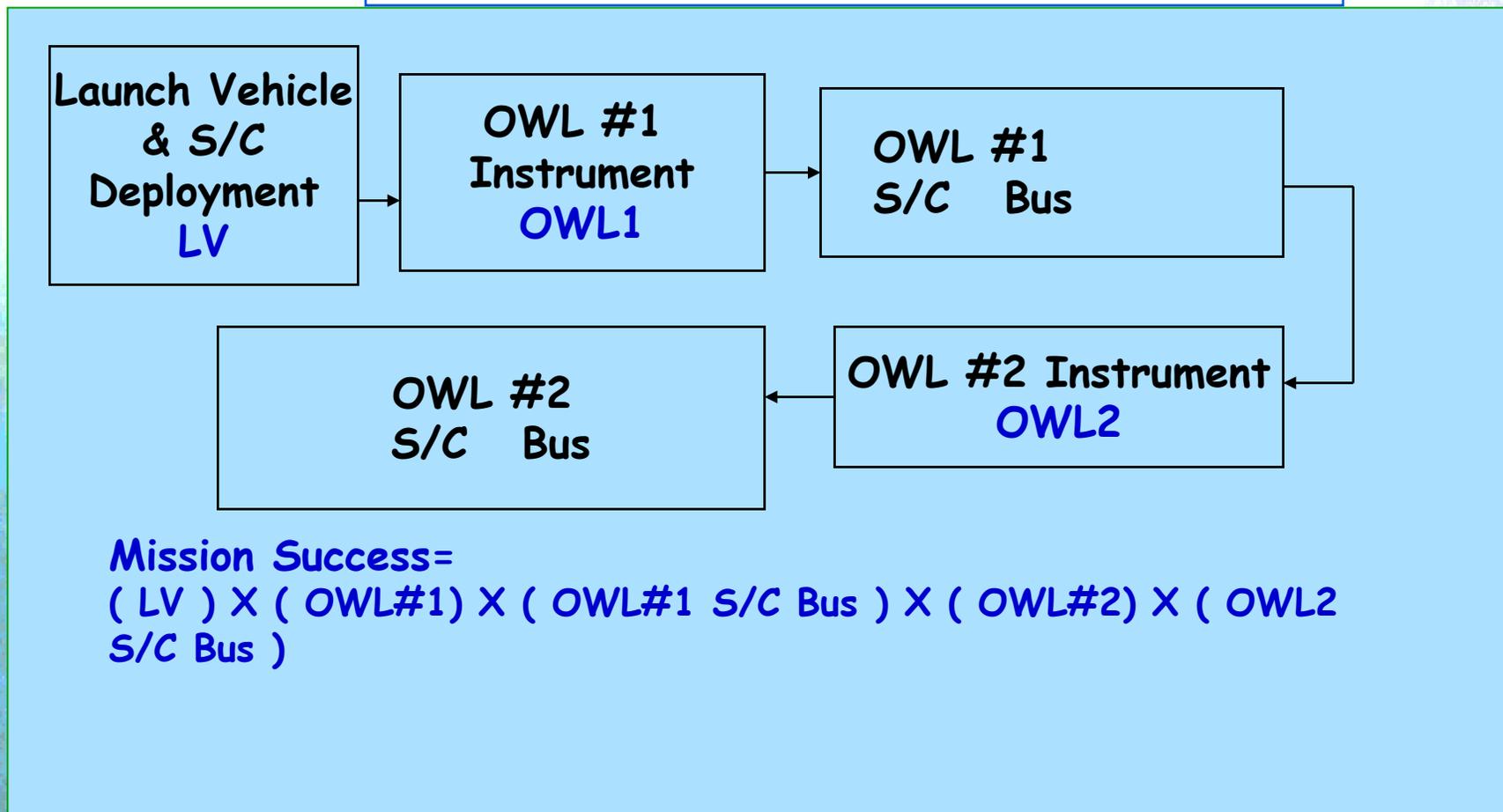
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Mission Success Reliability Block Diagram

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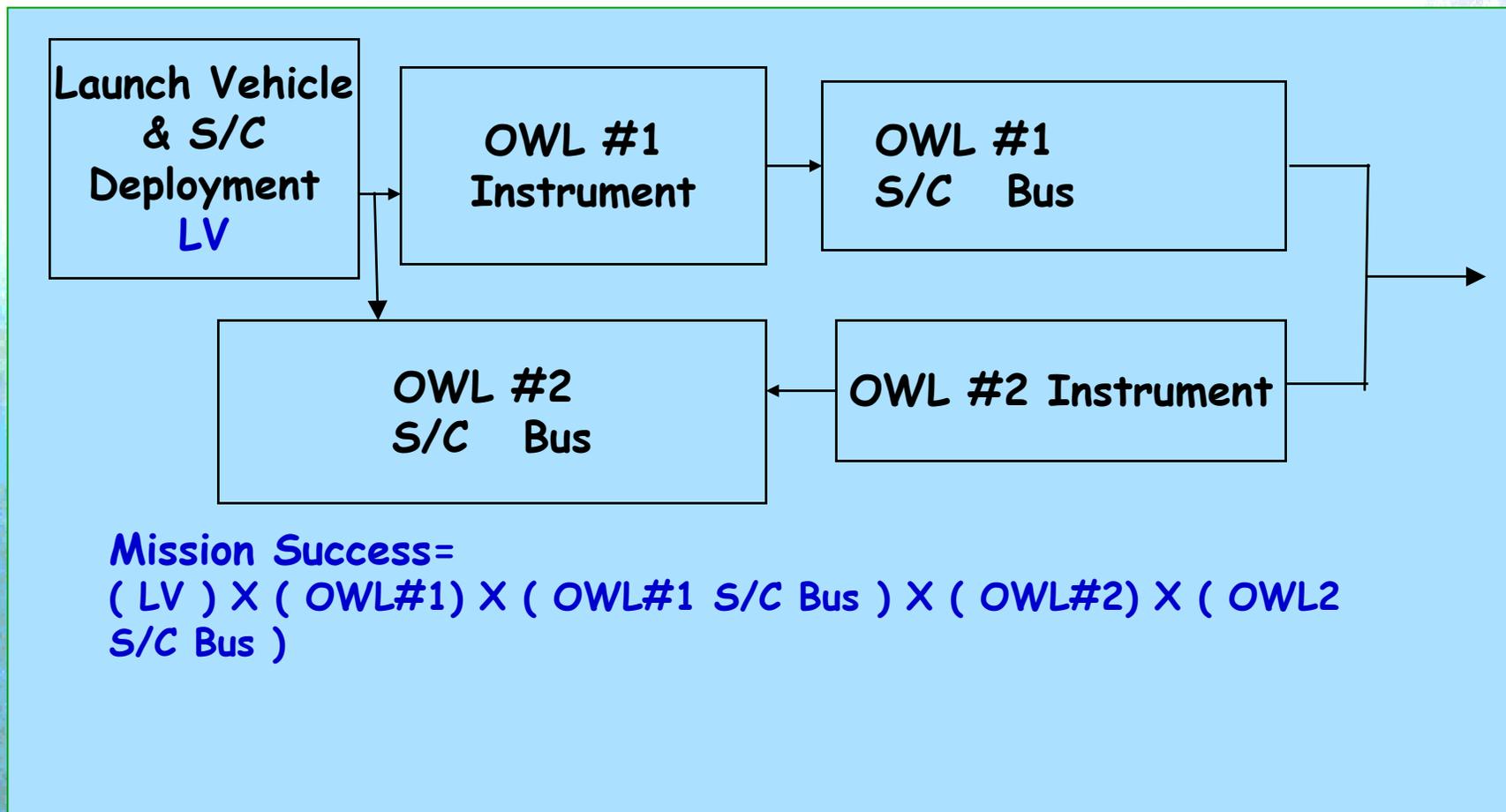
Reliability For Full Stereo Operation



Mission Success Reliability Block Diagram

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Reliability For Flash Detection



Single S/C 3 Year Bus Reliability

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3 Year Mission—Spacecraft Bus Only (Based On RSDO S/C Bus Reliability Info)

