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# SBIR PHASE II

## APPLICATION OF FLEX CIRCUITRY AND MULTIFUNCTIONAL STRUCTURES (MFS) TECHNOLOGIES INTO THE RESE PROGRAM

6 Sep 2006

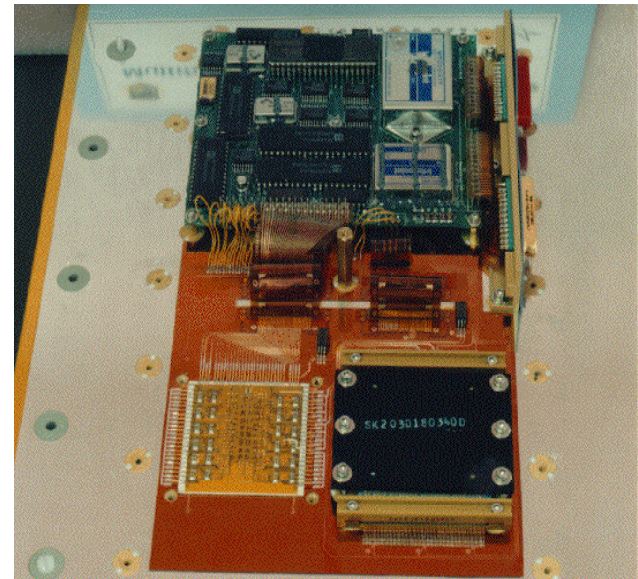
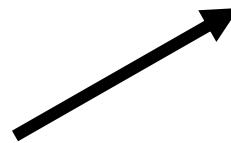
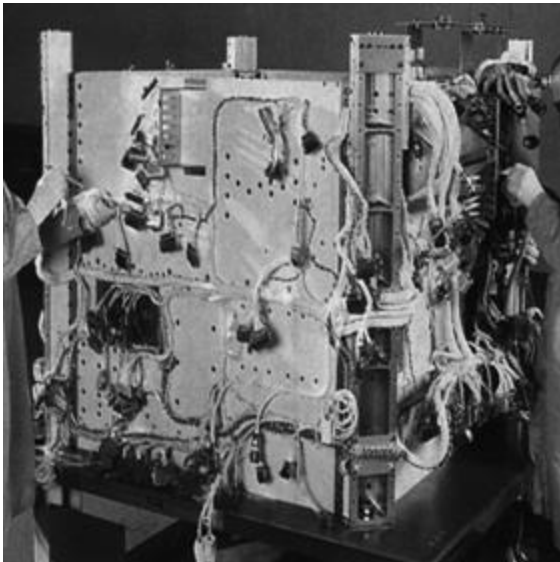
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# Current and Future Flex Usage Overview

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- Multifunctional Structure heritage
  - Spacecraft panels, integral thermal control, circuit “patches”, interconnects, multi-chip module interfaces



# Flexible Circuit Application – General Advantages

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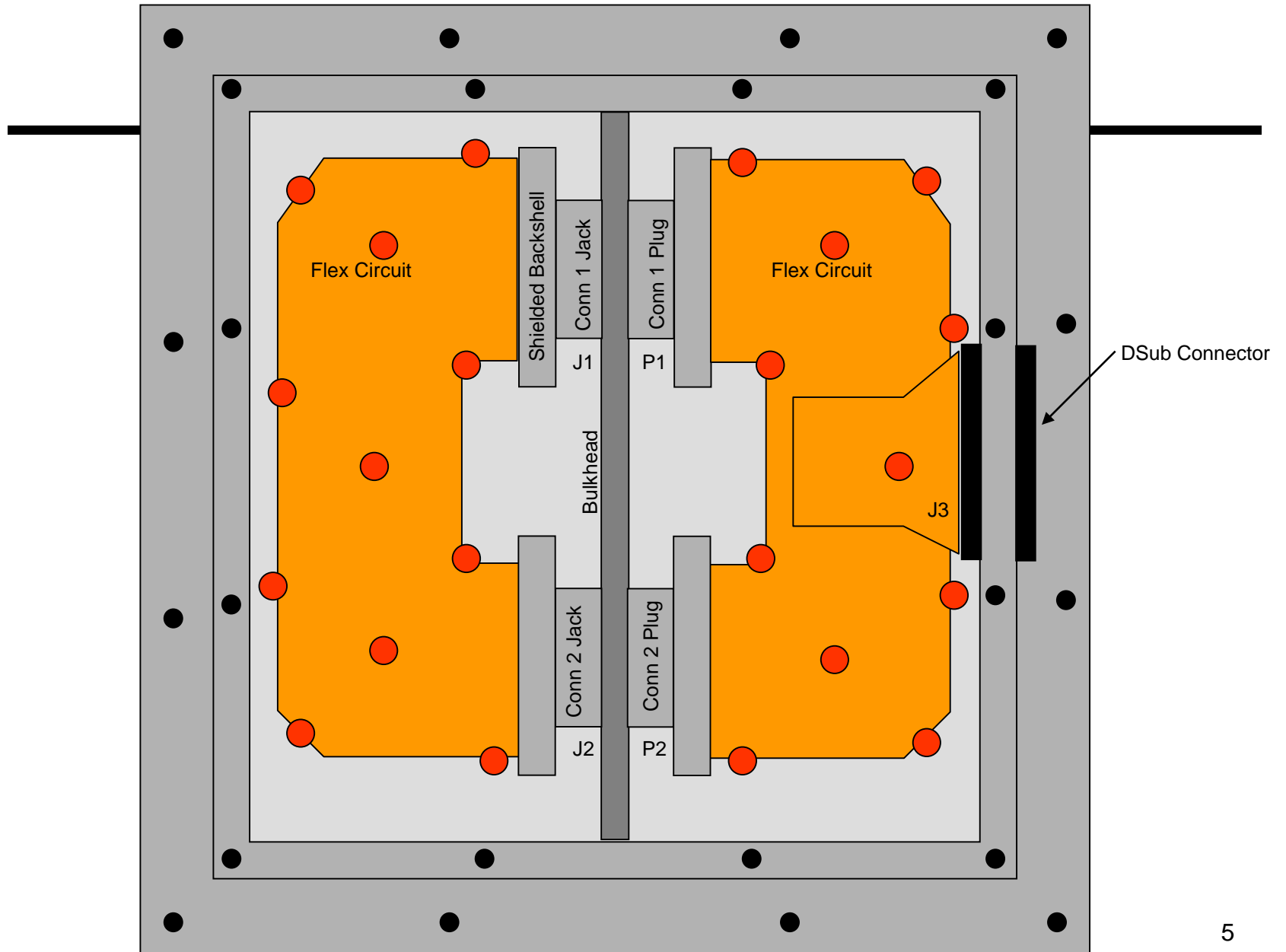
- Weight and volume reduction
  - Majority of material in a round wire cable is either insulation or jacketing
- Conductors sized to current/voltage drop
- Customize shielding to the signal type
- Minimize touch labor and mass-produce interconnects
  - Eliminate tooling and related calcs and certs
- Eliminate need for a contiguous, shielded chassis
  - Can use open/composite structures

# Experiment Description

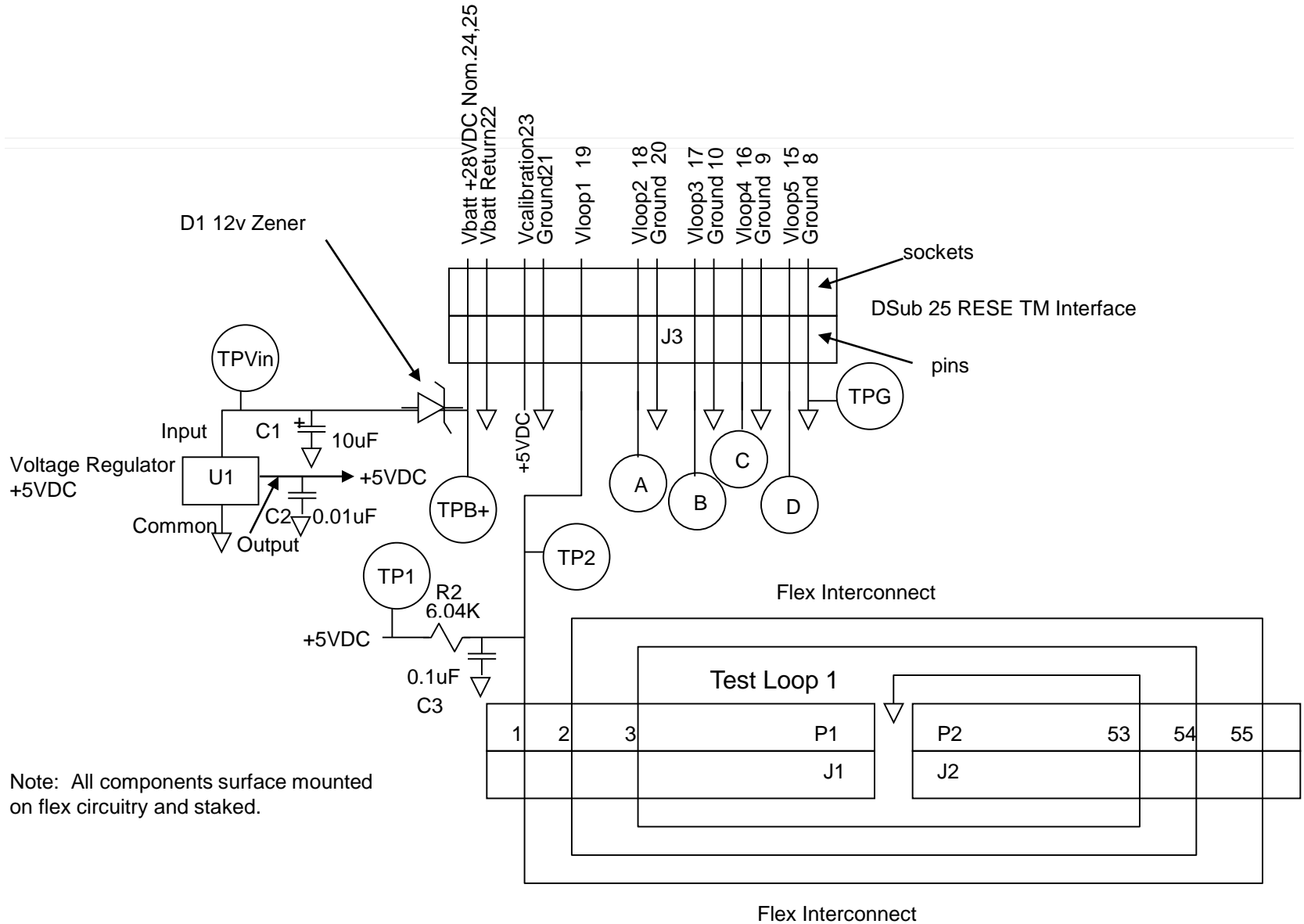
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- Design a cabling system that demonstrates the flex-to-circular enclosed backshell system in a flight environment
- Use multiple conductor loops to provide electrical path verification through numerous flex and plug/jack conductors (5 loops used)
- Minimize power and signal count; use commonly available external connectors with support

# First Concept



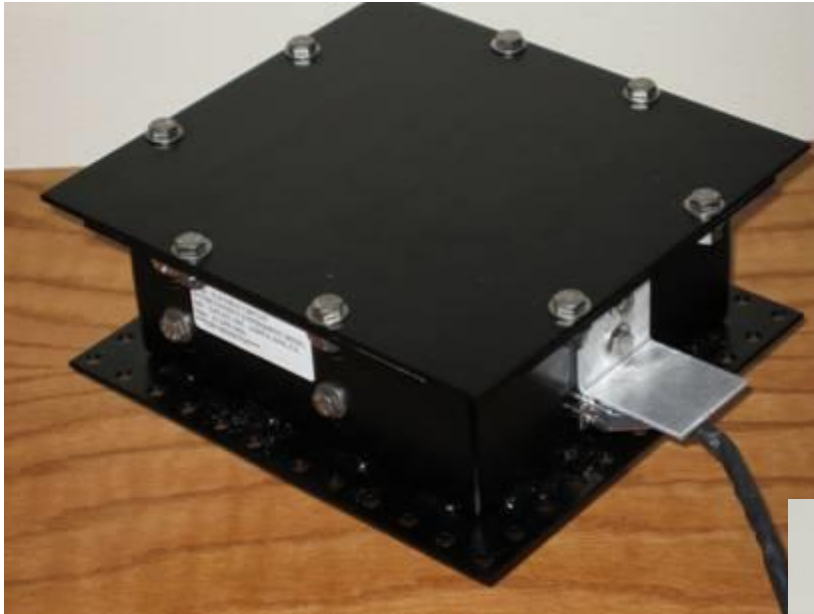
# Partial Schematic (Only 1 Loop Shown)



Note: All components surface mounted on flex circuitry and staked.

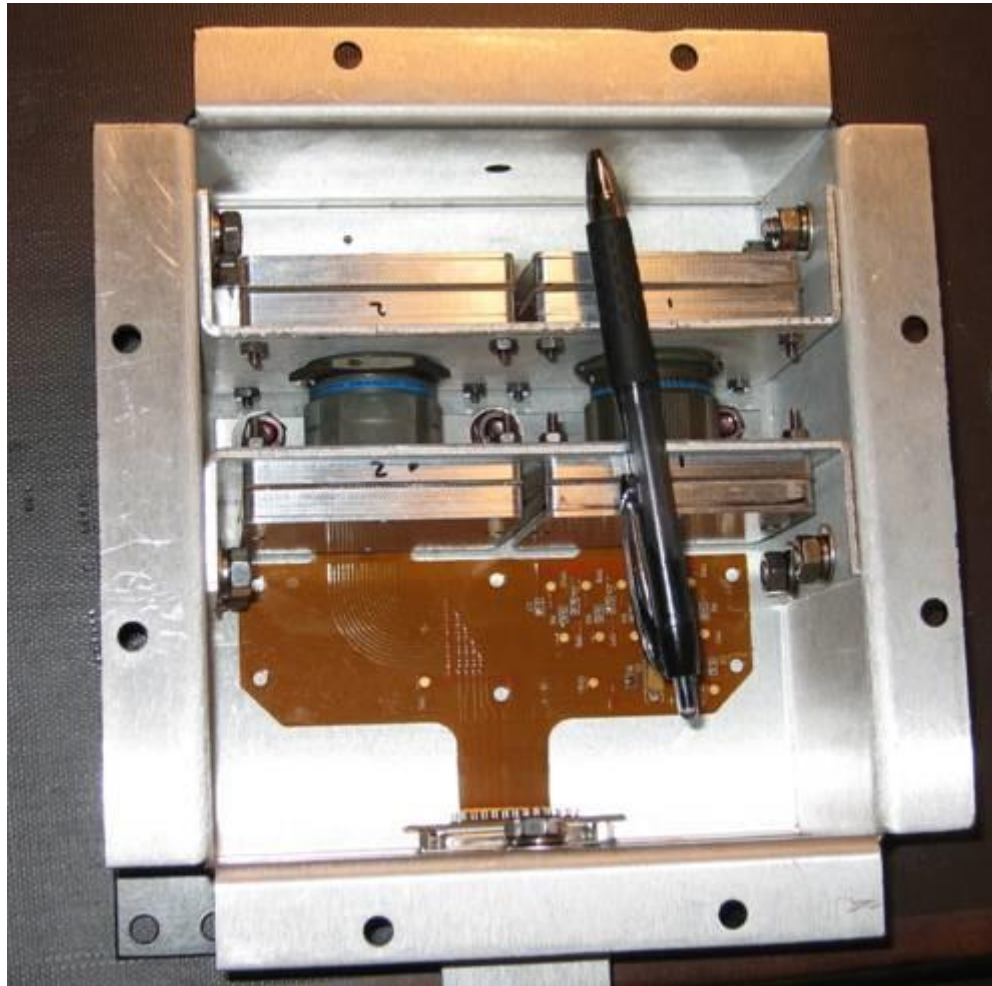
# External Views of Experiment

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# Internal View

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# Comments

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- Test flight should provide good test data showing the flex-circular backshell technology can survive launch and flight environments
- Experiment is low risk and the chassis is robust
- Experiment does not present any electrical/electronic risks to the rest of the vehicle
- Test points and cal signal permit verifying operation of chassis during assembly and test
- Quick turn experiment received ok in Feb 06 and was delivered 1 May 06