National Aeronautics and
Space Administration

Space Technology Mission Directorate
Game Changing Development Program
FY2016 1st Quarter Review

Ocean Worlds Technology: Ultra Low Temperature Electronics

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Date: 4/7/2016

Please ensure that data is available for public release unless otherwise notated within the appropriate statements (ITAR) or form (SBU)

Publically Releasable Technology Charts

<These charts multiple GCD data requests and <u>all charts</u> are required. Please review questions on the next chart to ensure proper data control>

<Only update these charts if there have been changes since the STI review was completed>

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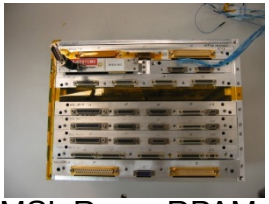
Ocean Worlds Technology: Ultra Low Temperature Electronics

STATUS QUO

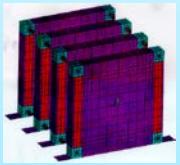
- Standard 6U cPCI design
- Backplane and chassis required.
- High SWaP



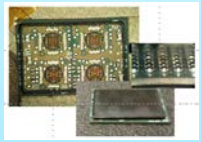
MSL Rover RPAM

NEW INSIGHTS

- Backplane free design
- Advanced packaging
- System on a Chip Processor
- CMOS tech can work cold



Backplane free chassis



Chip On Board Packaging

PROBLEM / NEED BEING ADDRESSED

Electronic assemblies take up a significant portion of spacecraft SWaP

PROJECT DESCRIPTION/APPROACH

- Decrease the volume and mass, of electronic assemblies through:
  - the use of advanced packaging.
  - Chip on board technology
- Reduce the power by:
  - the use of an efficient processor
  - on-board power management
  - minimizing power required for survival heaters.

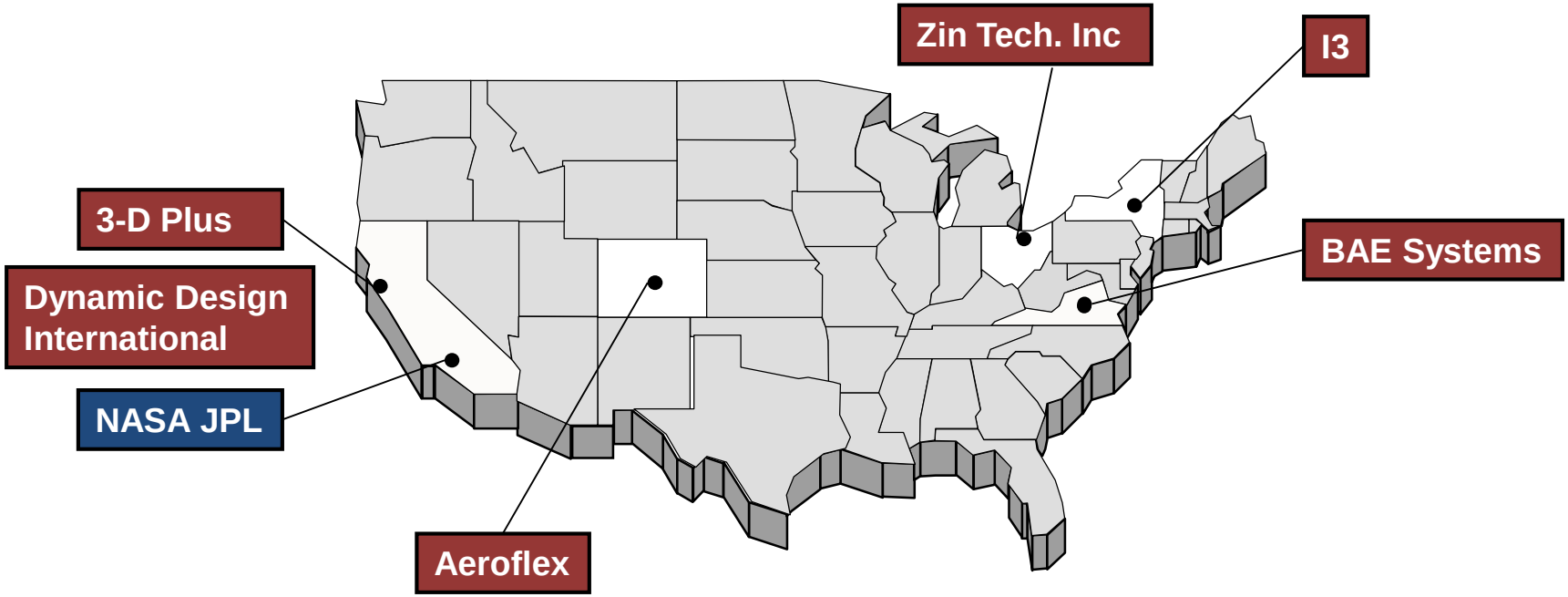
QUANTITATIVE IMPACT

- Reduced mass and volume allows for either:
  - More room for science instruments or
  - More room for batteries enabling longer mission life.
- Reduced survival and operating temperatures allow for longer mission life.

PROJECT GOAL

- Decrease the volume (10x), and mass (3x), power (2x) of electronic assemblies

Ultra Low Temperature Electronics Organization and Key Members



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