



Solutio Ut Opportunus!
Solutions That Fit!

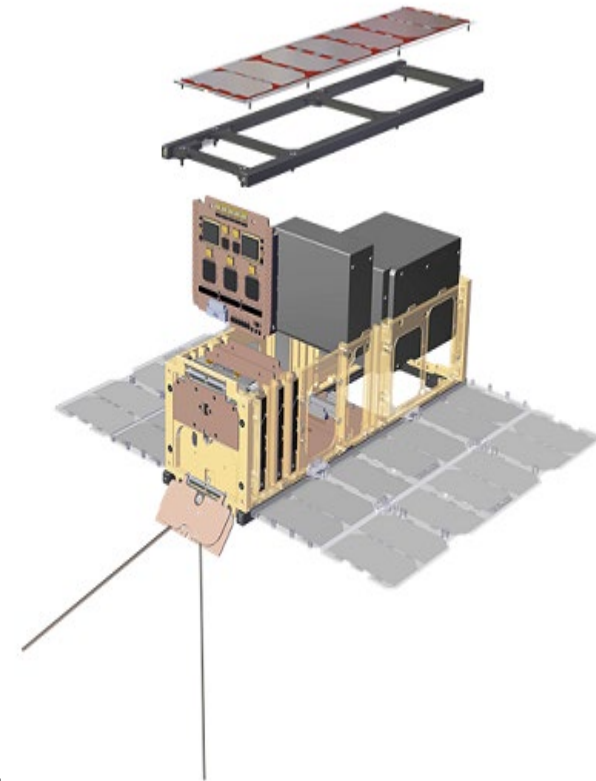
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2019 CUBESAT INNOVATION WORKSHOP

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Hi-Reliability Connectors In Cubesat Design

- Connectors are just bent bits of metal & plastic.
- They route signals between boards & through cables so the interesting stuff like data & images can happen.
- Connectors are an after-thought in the design process of most electronic devices.
- But here's why they shouldn't be & why are they so important: **HEAT, SHOCK, VIBRATION, ENVIRONMENT & RADIATION.**
- These factors make the choice of a Cubesat's interconnection system critical to mission success.
- A Hi-Reliability Connection System is vitally important – once your Cubesat or Rocket is launched you won't be able to repair or replace components.
- Losing contact integrity may mean losing control.



Challenges for Connectors in Space

HEAT

- Operating Temperature not be constant so Thermal Cycling Testing of components is important, to ensure reliable operation.
- Will your contacts within the connection system be maintained as the metal parts of the connector expand & contract with thermal changes?

SHOCK & VIBRATION

- From Take-off to Orbit there will be constant vibration & during the Cubesat's life, potential collisions with space junk will shock & stress the devices onboard.

ENVIRONMENT & RADIATION

- Connectors will need to operate within a vacuum withstanding the effects of radiation & the space environment including its effects on the metals, plastics & epoxies used in its construction.

.....and more challenges

WEIGHT

- Connectors need to meet all these challenges & be lightweight, so a high pin count/density in a connector may allow you to replace two connectors with one, reducing your weight.

SIZE

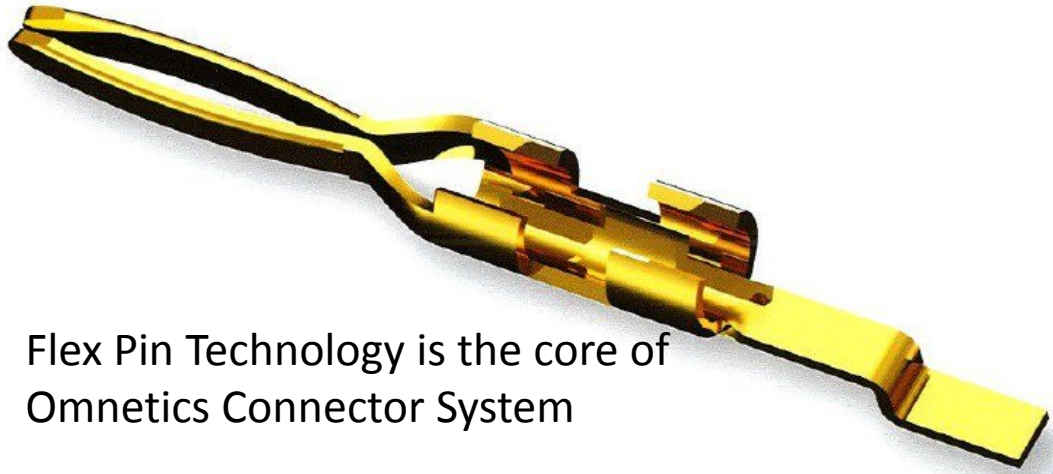
- Miniaturization & combining mixed signal technologies to form Hybrid connectors will reduce connector count & size.

Space Challenges Driving Development

- Advances in technologies allows combining Power, Signal & RF sources within a small connector shell.
- Developing small Nano-Coax cables for microwave or millimetre-wave communications, will see them incorporated in small connectors.

Connector Solutions

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Flex Pin Technology is the core of Omnetics Connector System

Developed in the USA by Omnetics 25 years ago the flex pin is a one piece BeCu design without points of failure, such as crimped or welded joints, used in other Twist Pins

The Spring Characteristic of the BeCu is ideal for withstanding high shock and vibration

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Datamate Contact a High Reliability 4 Finger BeCu Clip & Barrel Contact System

Datamate Contact Technology is the centre of Harwins Datamate Connectors. Developed in 1980 jointly by Harwin & McMurdo in the UK, the simple two piece design is without failure points ensuring Hi Reliability contact points.

Hi Rel Space Connectors

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Micro & Nano Strips



Micro-D

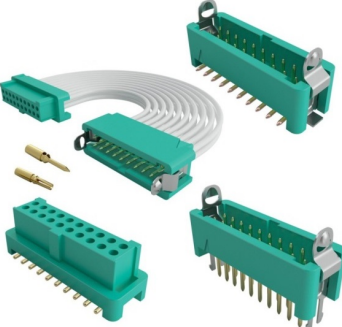


Hybrid Circular

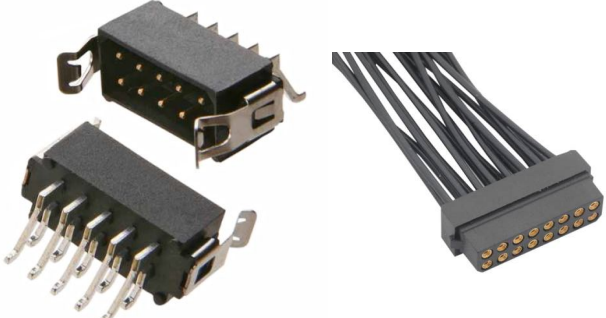


Hybrid Nano

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Gecko Connectors

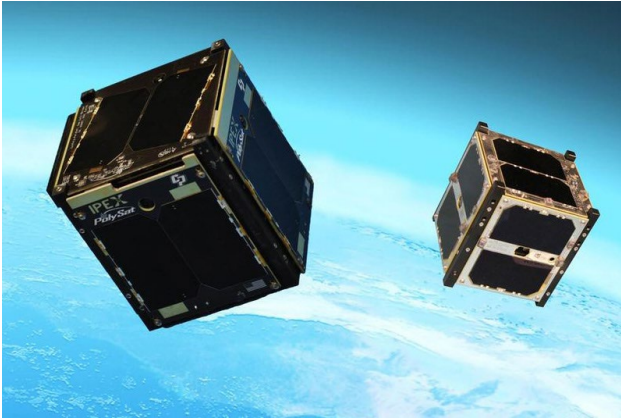


Datamate L-Tek



Datamate Mix-Tek

Omnetic's & Harwin's Space Heritage



Cube Satellites

Nano-D & Micro-D Connectors



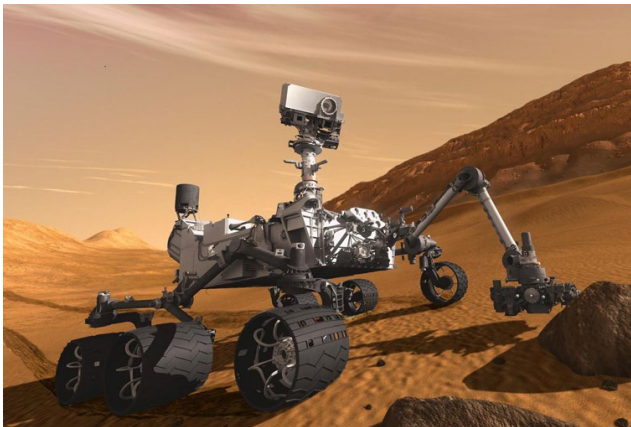
Hubble Telescope

Latching Micro-Strip Connectors



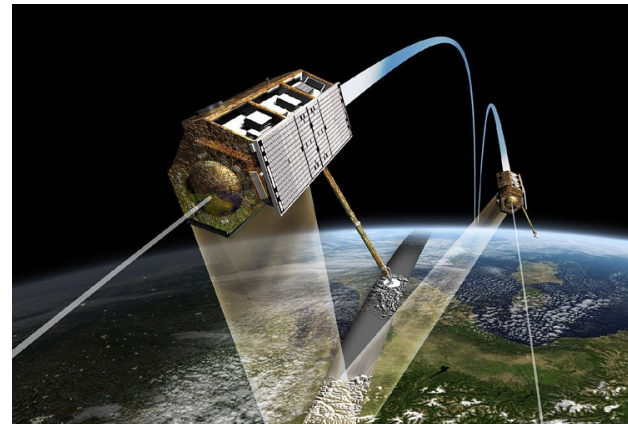
Virgin Orbit LauncherOne

Micro Circular & Hybrid Micro-D's



Curiosity Rover

Micro-D & Nano-D Connectors



TanDEM-X & TerraSAR-X Satellites

Nano-D Connectors



QB50

Gecko Connectors



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Thank you for watching
You can find us at www.clarke.com.au

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