

Rugged System Design Realization

Keeping pace with the new paradigm

The MOSA Impact and Chassis Design

- Two major subsets of activities
 - Functional design and test
 - Packaging for harsh environments design and test
- Functional system development timelines are getting shorter
- Most advancements are “inside the box”

Onus is on chassis designers to keep pace with the new delivery expectations

Functional design activities

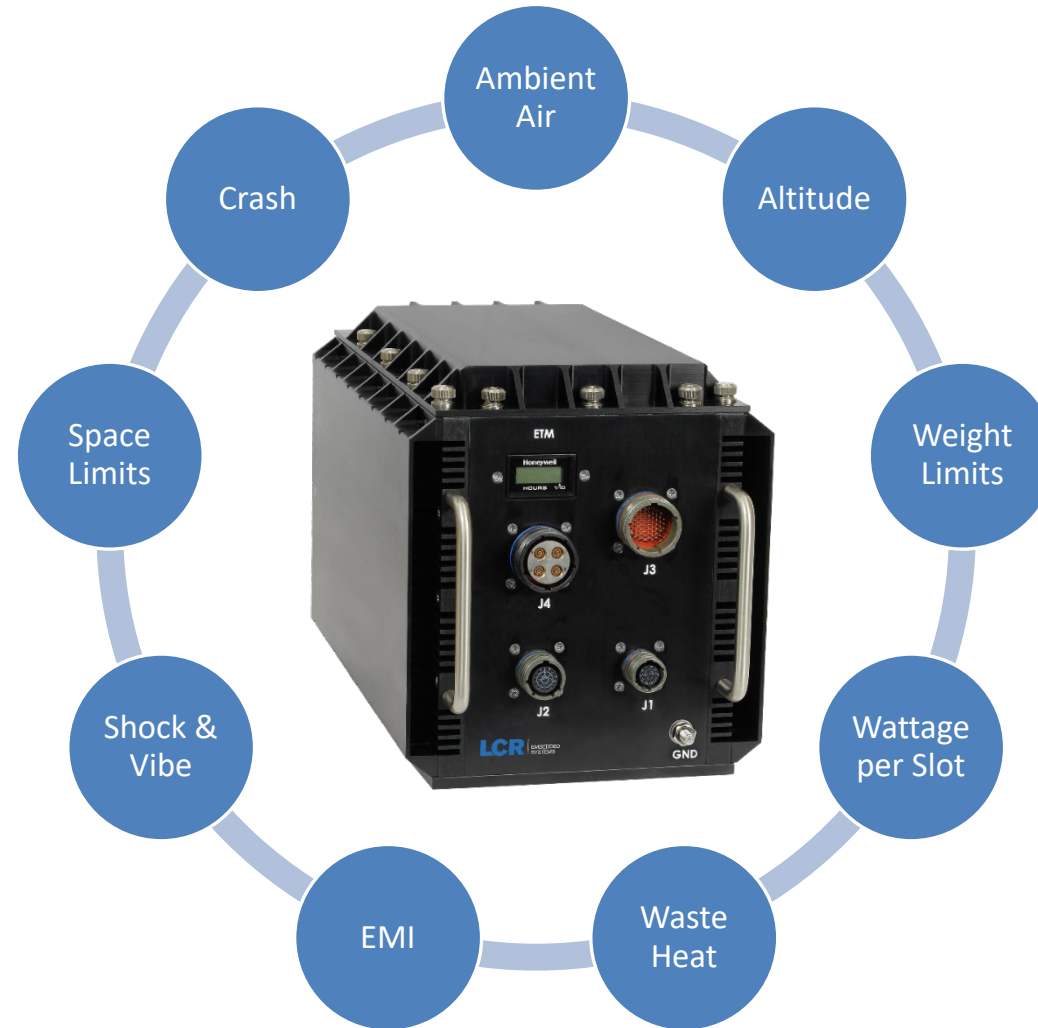
- System integration
- Application testing



Chassis design activities

- Ruggedization
- SWaP considerations

Holistic Approach to Rugged System Development

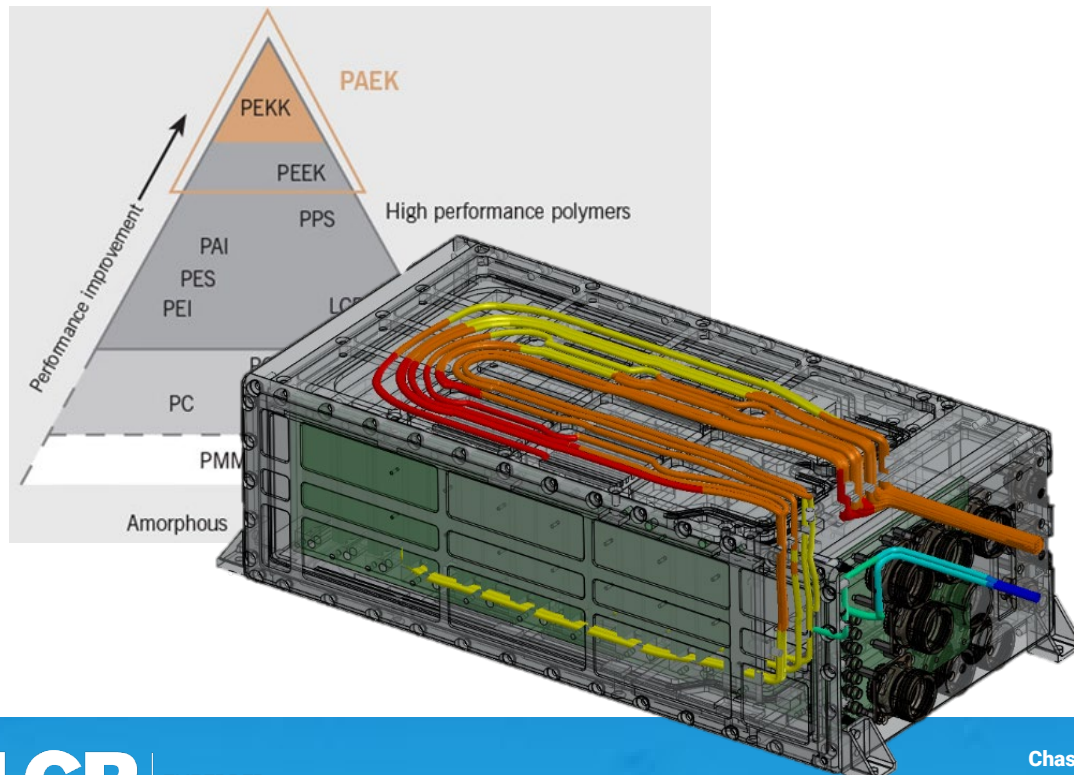


To be successful at the cutting-edge of COTS ruggedization, manufacturers need to employ a **critical blend of new technology & innovative engineering design to meet tomorrow's challenges.**

High-End Technology in Chassis Materials

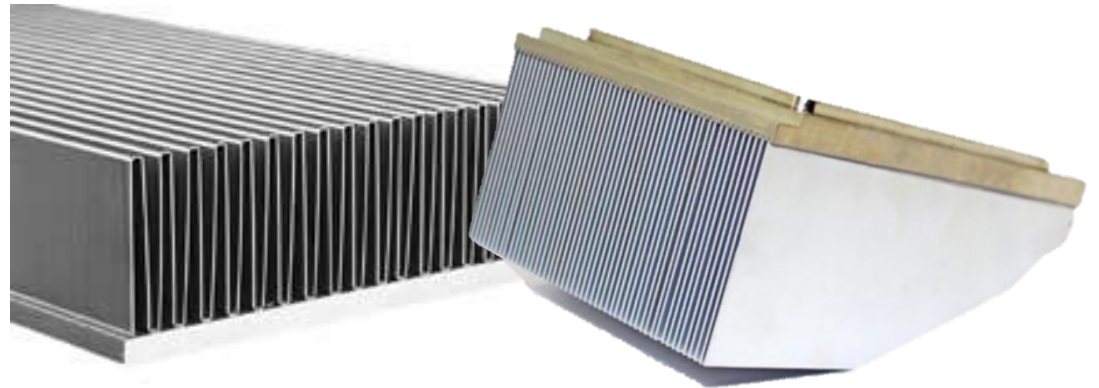
3D Printing (Metal & PAEK)

- **Metal:** Selective Laser Sintering (SLS) & Direct Metal Laser Sintering (DMLS)
- **High performance Polymers:** PEEK & PEKK



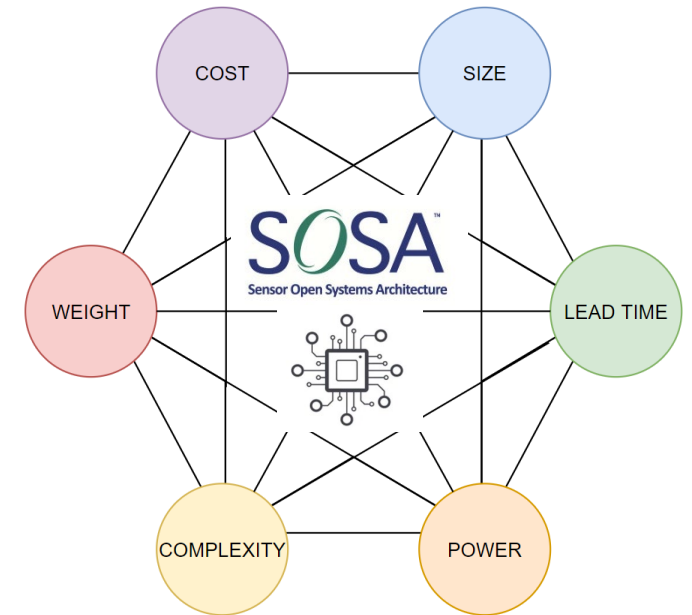
Advanced Fin Construction

- Bonded, brazed, and folded heatsinks offer improved thermal performance for equivalent mass. Higher fin densities and aspect ratios. Often complemented with heat pipes.



An Engineer's Take on Chassis Design Requirements

- The development environment has several linked design criteria
 - COTS contributions: **Cost, Lead Time, Complexity**
 - SWaP contributions: **Size, Weight, Power**
- The key lies in design and standards

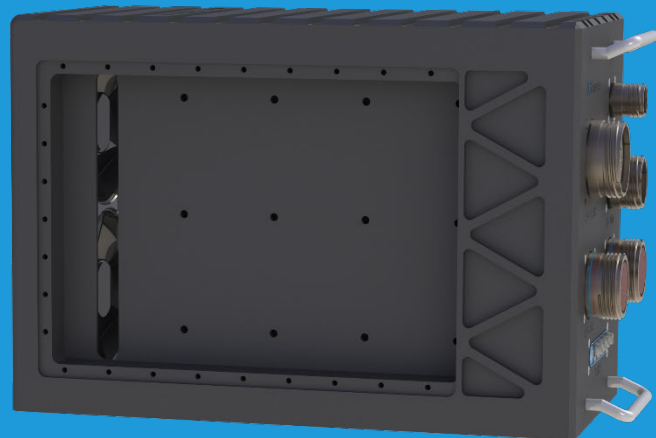


Intelligent Modularity

- What is Modularity?
 - Definition: A quality consisting of separate parts that, when combined, form a complete whole.
- Modular design principals reduces packaging reconfiguration time.

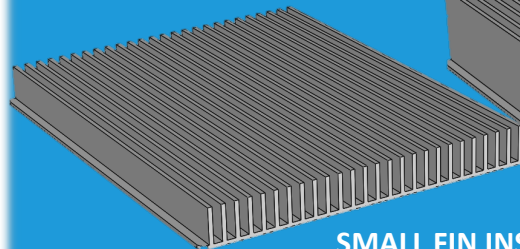


BASEMENT CONFIGURATION. SPACE UNDER BACKPLANE FOR VITA 67 RF CABLES

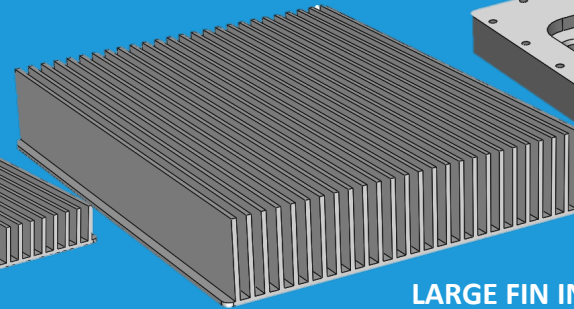


LOW PROFILE CONFIGURATION. FOR PAYLOADS WITHOUT NEED FOR RF CABLES.

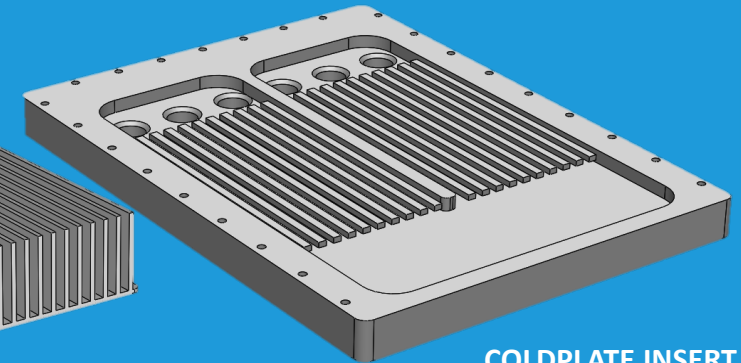
ANY FRAME SUPPORTS
ANY INSERT



SMALL FIN INSERT



LARGE FIN INSERT



COLDPLATE INSERT
MODULE

Reflecting Modular and Parametric Design Principals

Scalable designs for 2 to 14 payload slots



400 Series



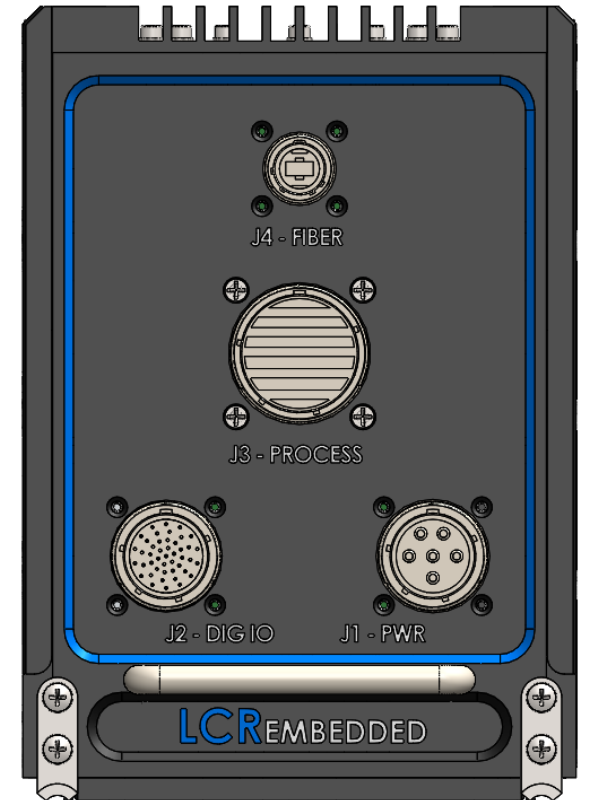
600 Series



800 Series

Parametric Design

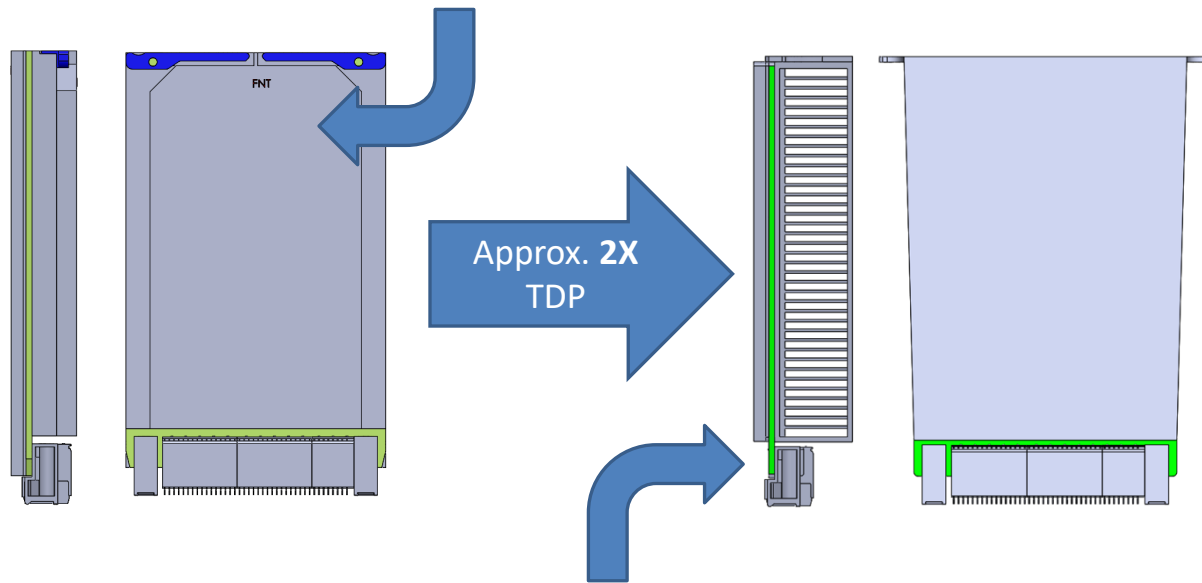
- What is a Parametric Design?
 - A design process where features are determined not by fixed values, but rather are shaped based on an algorithmic process
- Parametric Design allows easier chassis reuse & reconfiguration to reduce time and cost constraints



Future-Facing Design

VITA 48.2-2010 & 48.8-2017 Boards

- Up to **70W** per 3U Plug-in Module, **100W** per 6U Plug-In Module



- Up to **150W** per 3U Plug-In-Module and **200W** per 6U Plug-in Module

Hybrid VITA 48.2/48.8 Chassis

- Any Card compatible with Any Slot
- Configurations support 4 to 8+ Cards



Streamlining the Journey:
From initial design to the deployed system

VPX Lab Development Systems

Getting things going

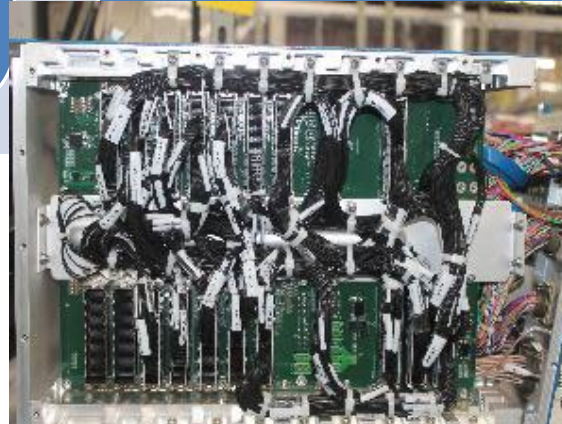


A Sample Journey

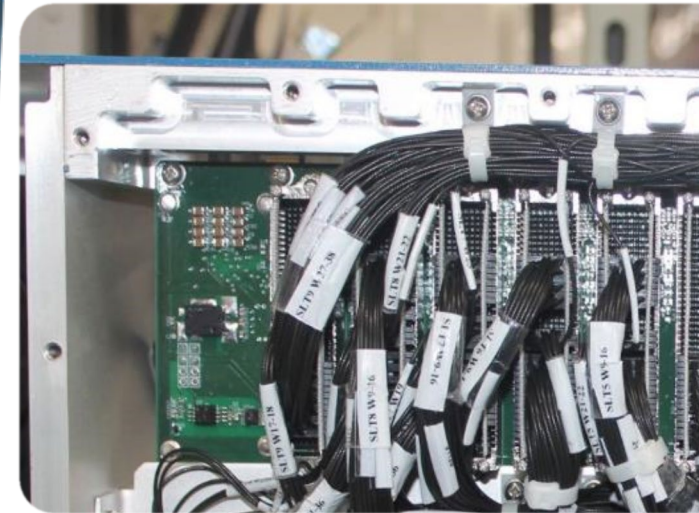
Integration and
Development



Field Demonstration



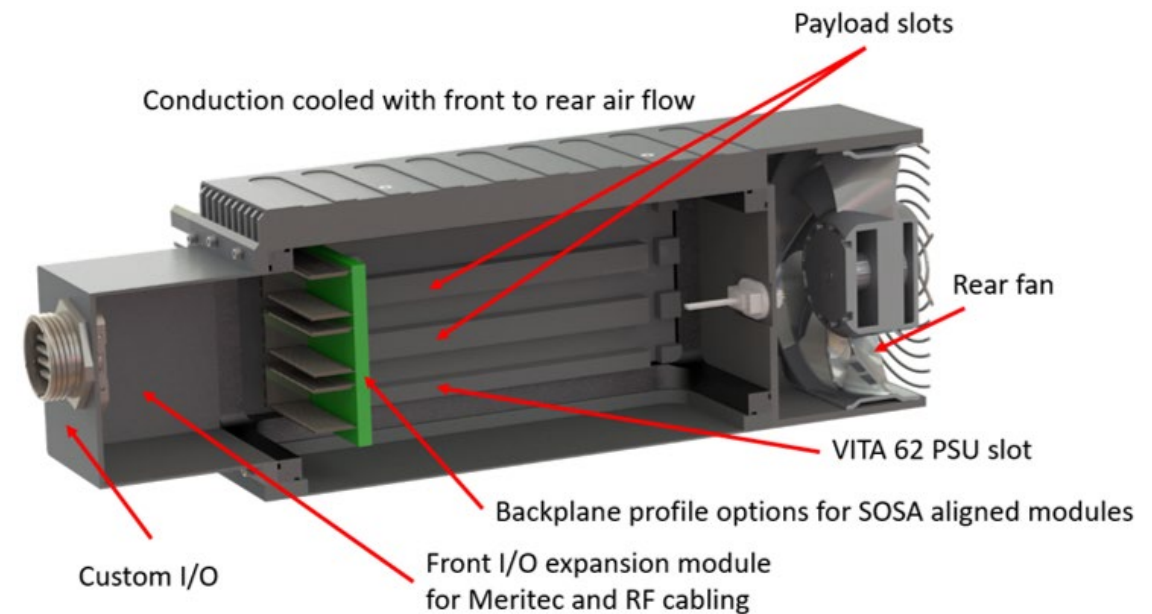
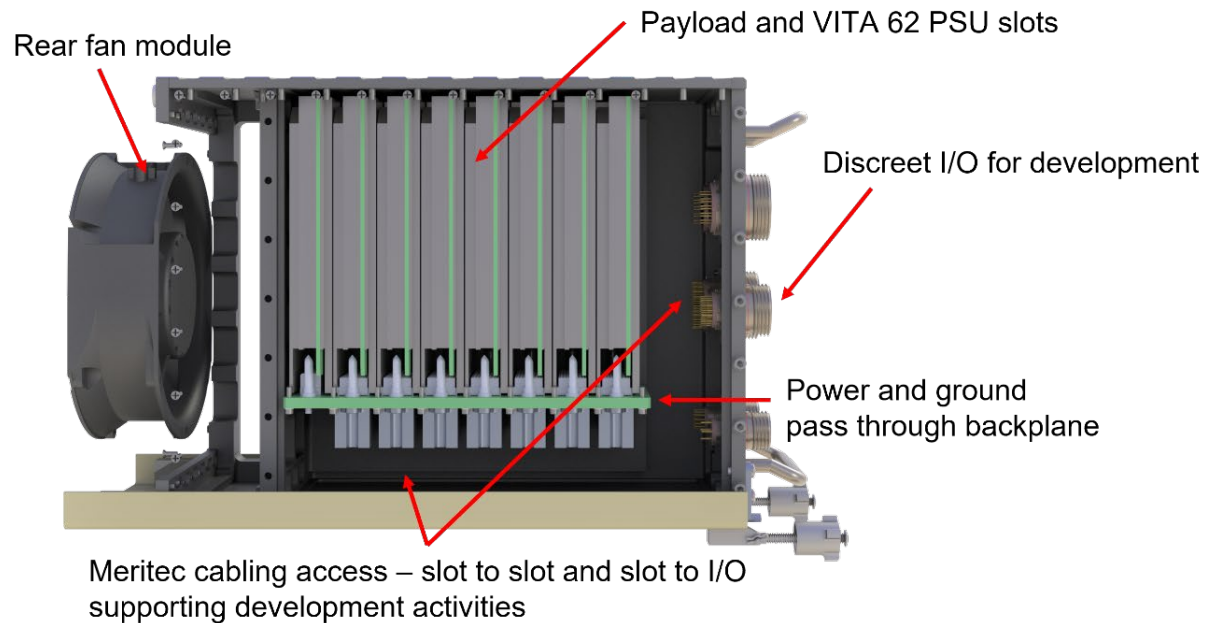
Deployment



Rugged Test Systems

Rugged testing enables transition from the lab to the field for advanced testing at or near application environments.

- Easy access for fast system reconfiguration
- Enables vehicle mounted testing
- Incremental testing levels within one chassis



Deployment Ready Systems



Summary

- Successful open standards like SOSA, enable shorter timelines for functional design in embedded systems
- Chassis and system manufactures must implement intelligent design strategies that keep pace with new end user expectations for time to deployment
- New technologies are constantly being employed to keep up with industry demands.
- Streamlining the path to the deployed system

Thanks very much

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