

Building Block Approach to Systems

**PDV Workshop
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Building Block Approach to Systems

- ▶ System Design
- ▶ Logical Blocks
- ▶ Interconnect
- ▶ Additive Manufacturing
- ▶ Testing
- ▶ Serviceability
- ▶ Interface
- ▶ Take Away





System Design

This was after multiple Generations of MPDV

► System Design

■ Concept – Requirements

■ Electrical

- Schematics – PCB, Interconnect, Label Convention, Wire gauge, Color Code
- Power Requirements – Max Load, Surge, Filtering
- PCB – Communication, Drivers, Read Outs

■ Optical

- Schematics
- Connectors – Choose wisely and stick to it
- Termination or Fusion Splicing; Where and Why

■ Mechanical

- GET DRAFTING involved on day one



Logical Blocks

Building Block Approach to Systems

► Logical Blocks

- Decide what parts go together. MODULE A, etc.
- Design Modules
 - Mechanical – 3D CAD, Print, Test fit
 - Electrical – Standard Connector, Power, Communication
 - Optical – MT, Fusion Splice or Individual Connector



Building Block Approach to Systems

► Logical Blocks



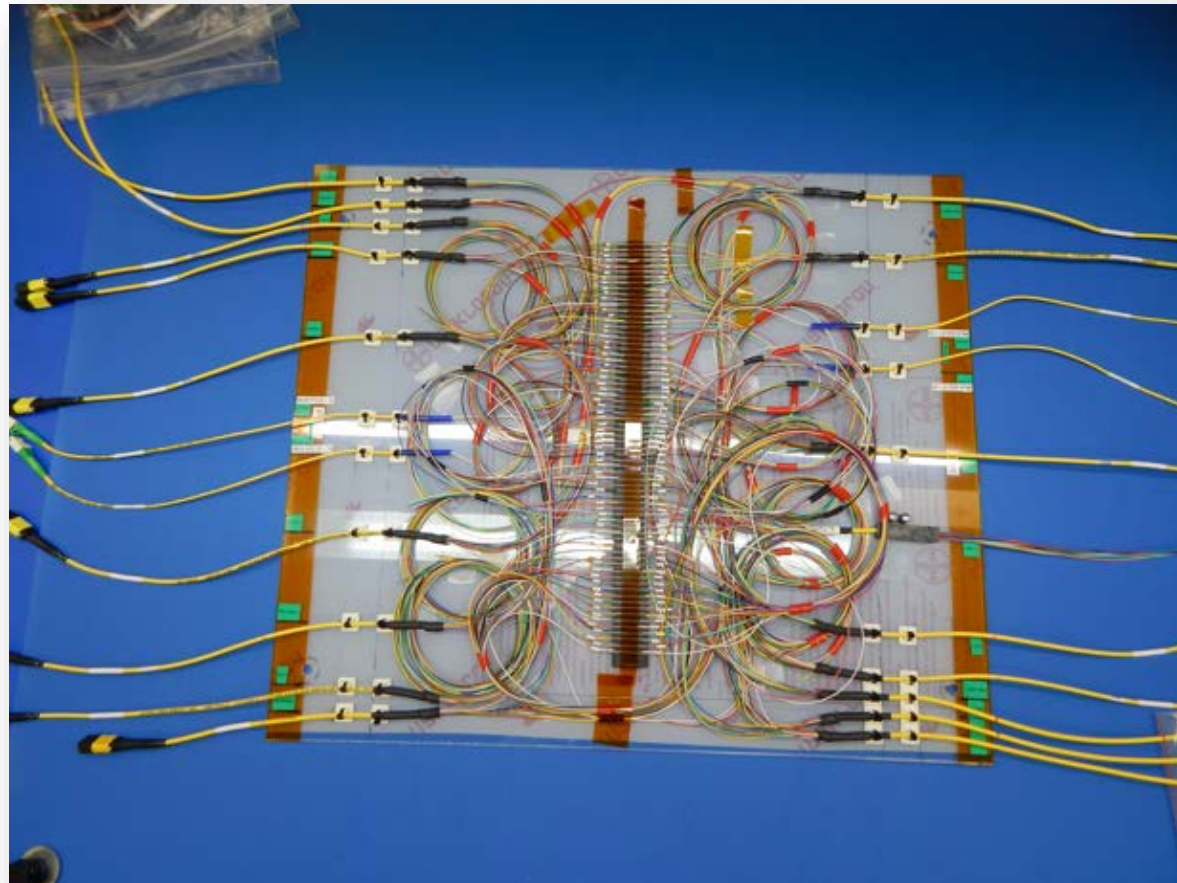


Interconnect

Building Block Approach to Systems

► Interconnect

- Electrical wiring harness: Straightforward to standard connector.
- Optical fiber centralization: Need a well-thought-out “Road Map.”



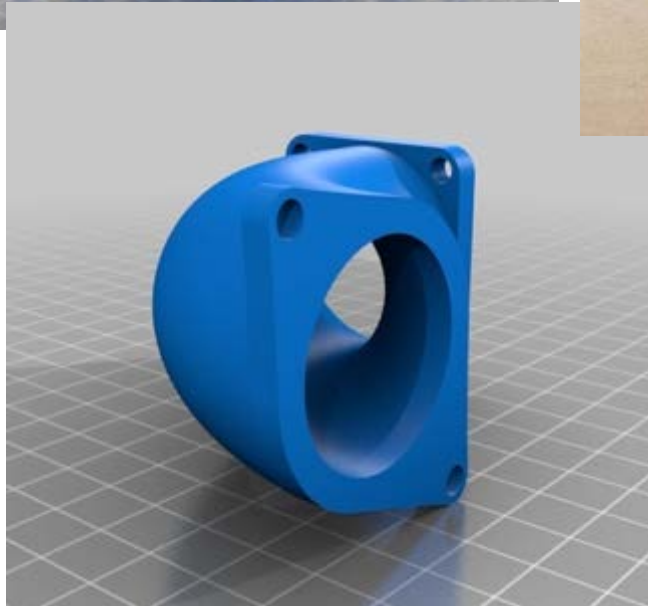
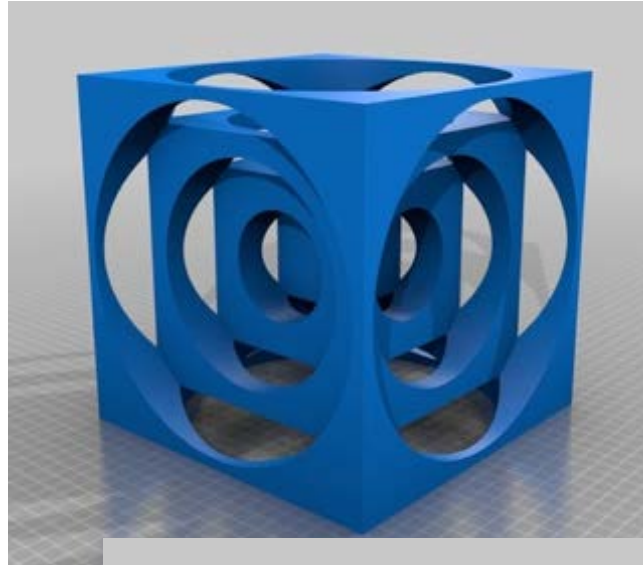


Additive Manufacturing

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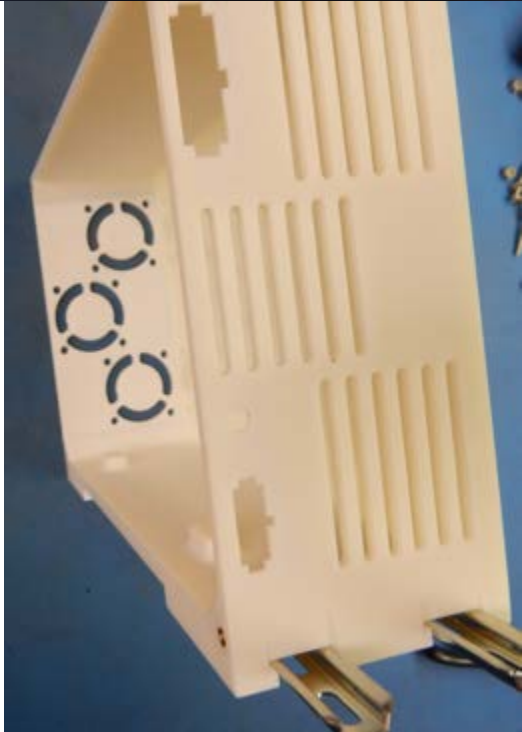
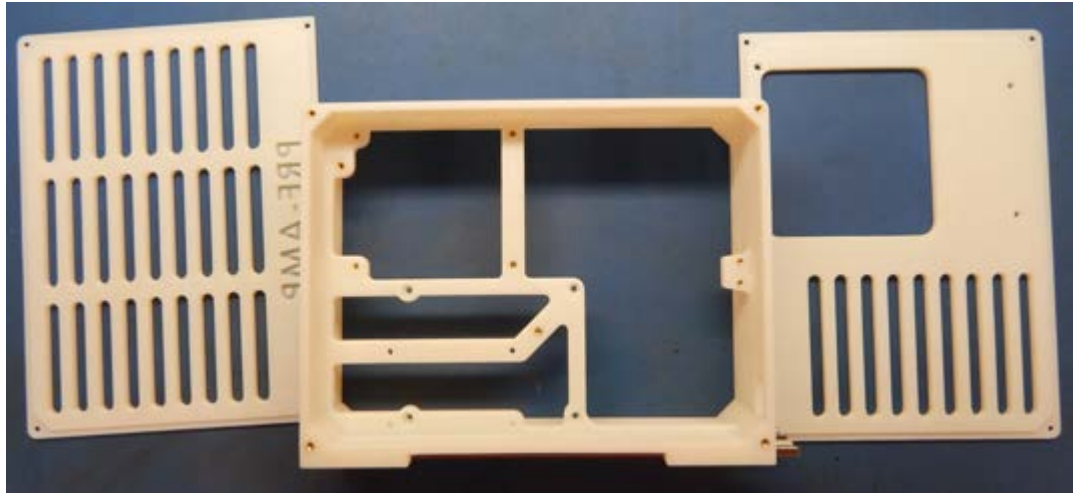
► Additive Manufacturing

- Learning Curve
- Material / Cost
- Design Module – Get Drafting involved early
- Trial & Error
- Initial Cost



Building Block Approach to Systems

► Additive Manufacturing





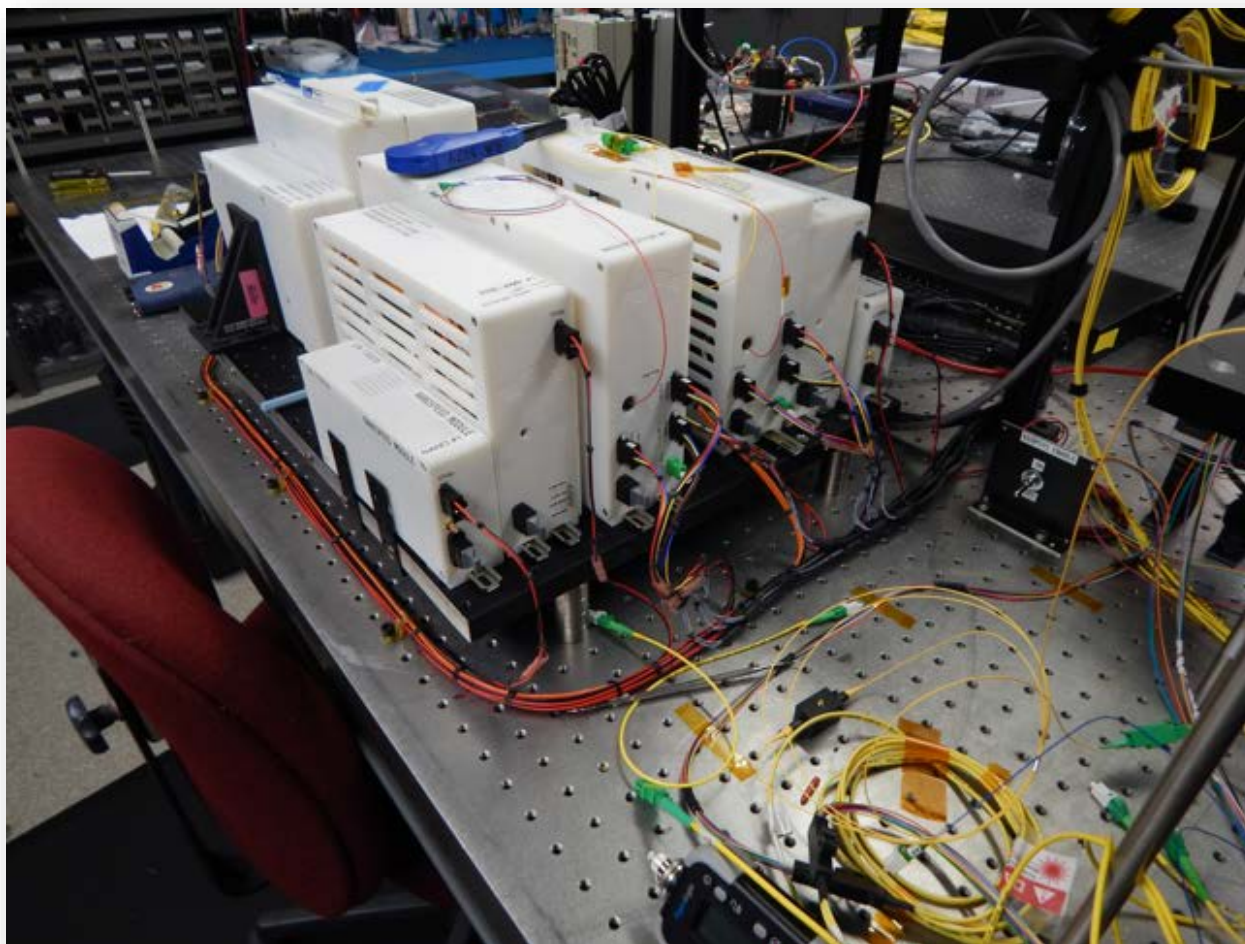
Testing

► Testing

- Test Bed
- Test Procedures
- Individual Module
 - Power up with lab power supply
 - VI, need programing to test functionality, also needed for parameter tests
- Multiple Modules
 - Same needs for Individual Module, but the need to test portions of system comes into play. The need for operational modes when working with more than one module.
- System
 - Static
 - Dynamic

Building Block Approach to Systems

► Test Bed





Serviceability

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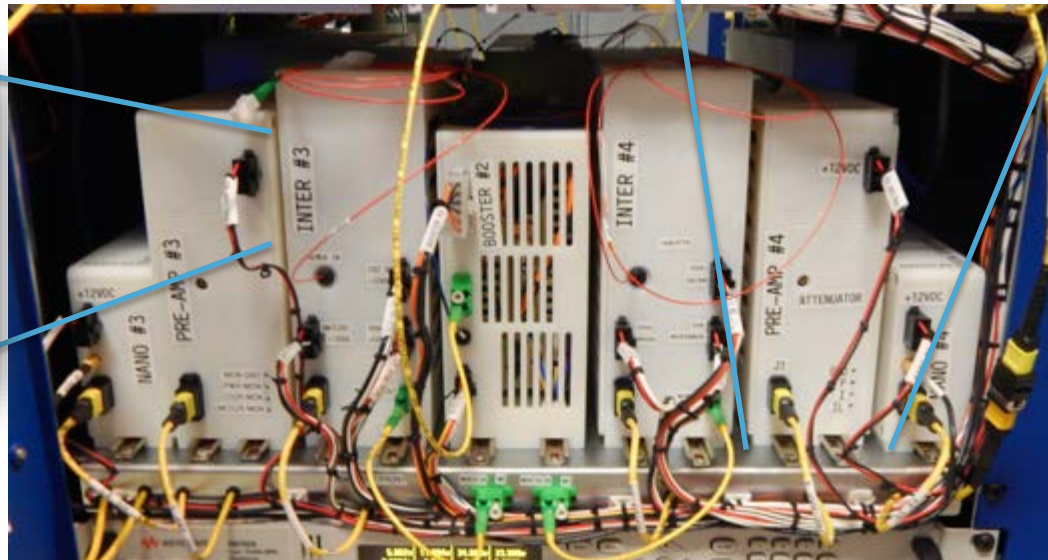
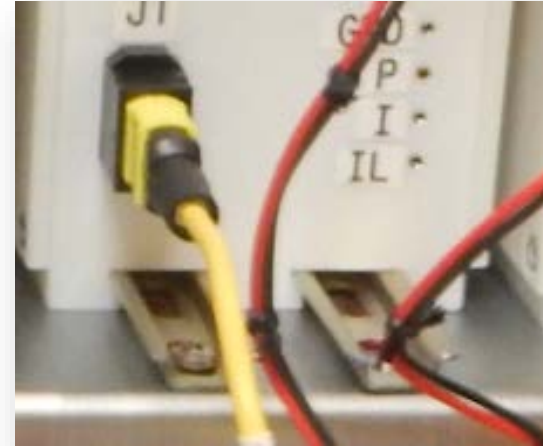
► Serviceability

- Modules
 - Spares
 - Manageable complexity
- Installation
 - Repair time
- Spares
 - Tested and ready to use
- Complexity
 - Ease of fabrication
- K.I.S.S



Building Block Approach to Systems

► Serviceability





Take Away

Building Block Approach to Systems

► Take Away

- Serviceability
 - Spare blocks
 - Repair time
 - Need for an SME reduced

- Fabrication
 - Manageable complexity
 - Need for an SME reduced

- Is it right for you?



Pros	Cons
Modular design fits customer need	Up-front cost
Spare blocks for quick replacement or repair	Engineering expense
Drafting involved early	Up-front design time
Fabrication and repair can be done by non-SME	Design must be mature*
Long-term serviceability and sustainability	
* Frozen design of interconnect does not easily allow changes	