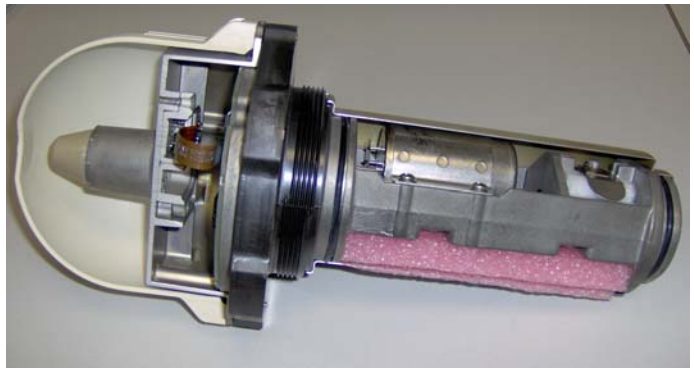


DSU-33C/B Proximity Sensor Design to Production Transition

Thursday, May 24, 2007

Jeff Capaul
ATK Tactical Systems
(304)726-7583

51st Annual
NDIA Fuze Conference
Nashville,TN

“I know the price of success: dedication, hard work, and an unremitting devotion to the things you want to see happen.’’

Frank Lloyd Wright

Agenda

DSU-33/B Product Description

DSU-33/B History

DSU-33C/B Manufacturability Workshop

- Team Members
- Goals/Result
- Lean Activity

Questions?

DSU-33C/B: Product Description

- Provide air burst proximity fuzing for general-purpose bombs and warheads, including M117 and MK80 series (also JDAM)
- Provide fire pulse signal to the FMU-139, FMU-152 electronic fuzes
- Weighs under 2.3 Kg (5 lb)
- Self powered by internal thermal battery after receipt of initiation signal
- Initiation signal provided by
  - FZU-48/FZU-55 (U.S. Air Force Aircraft)
  - Fuze Functional Control Set (FFCS) for U.S. Navy Aircraft
- 95% Reliability over 10 year storage life
  - HOB of 5 ft to 35 ft at 80%, 0 ft to 50 ft at 100%
  - All surfaces condition including water

DSU-33 History

1980's Motorola developed DSU-33A/B

1990-1995 Motorola produced DSU-33A/B for U.S. Air Force

1998 DSU-33B/B JDAM design upgrade is completed.

2000-2005 ATK produced DSU-33B/B for U.S. Air Force.

2003 ATK starts development of DSU-33C/B

2005 ATK completed qualification DSU-33C/B

2005- Present ATK in production DSU-33C/B

DSU-33: Supporting Freedom!

DSU-33C/B Production Team Members

Design For Manufacturability Workshop – Focused on Production

- US Government Participation
- ATK Design Engineering
  - RF
  - Electrical
  - Mechanical
- Production Engineer
- Quality Engineer
- Production Supervisor
- Surface Mount CCA Engineer
- Test Engineer
- Production Lead Operator

DSU-33C/B Goals/Results

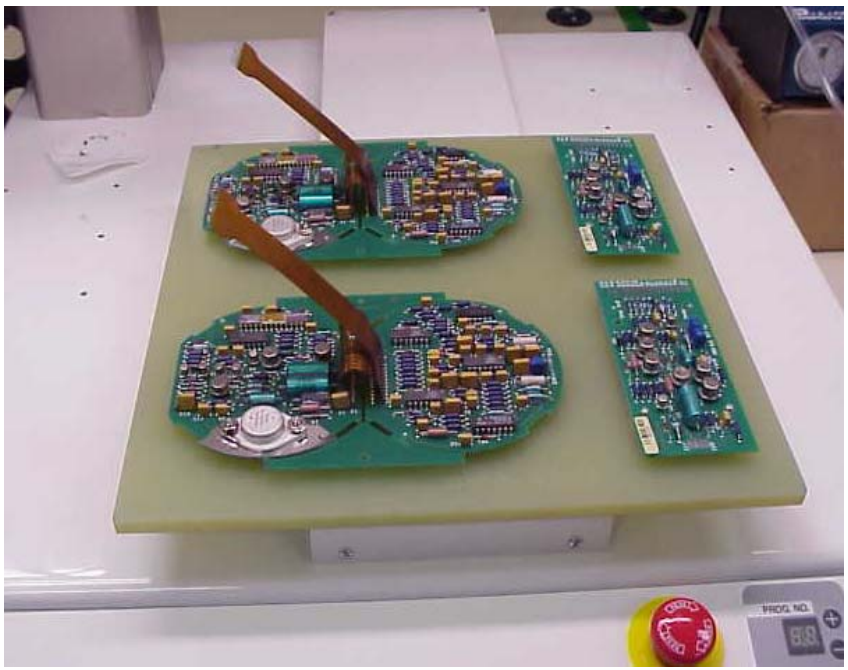
Eliminated epoxy staking of components on Circuit Card Assemblies

Through Hole to Surface Mount Technology (SMT)

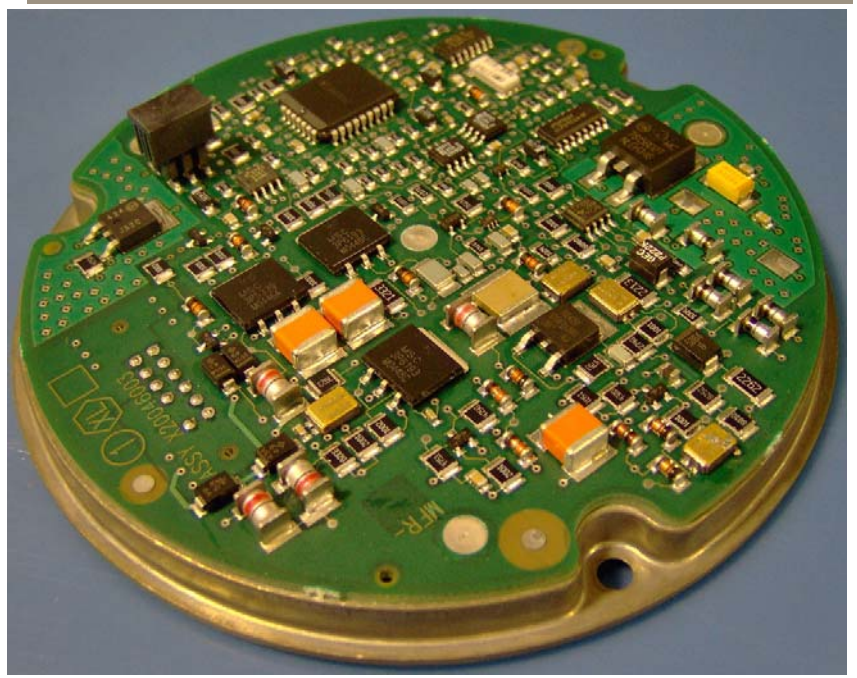
Brought SMT CCA Process in House

More Control / Lower Cost

B/B X-Y Table Application of Epoxy Required



C/B No Epoxy Required



DSU-33C/B Goals/Results

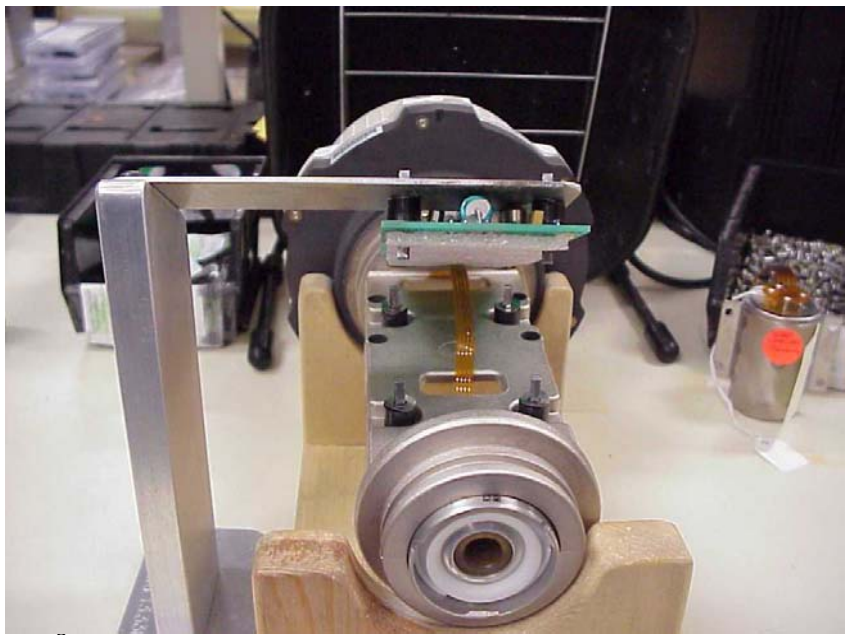
Eliminated embedded re-processing in build cycle

DSU-33B/B build process required:

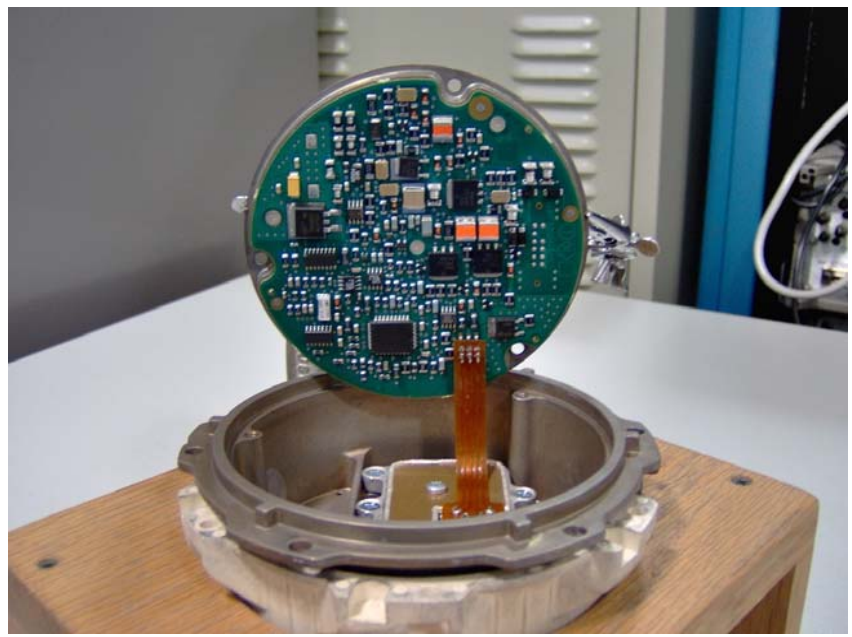
Assemble, test, disassemble prior to installing thermal battery

DSU-33C/B process flow has no disassembly required.

Disassembly Required



No Disassembly Required

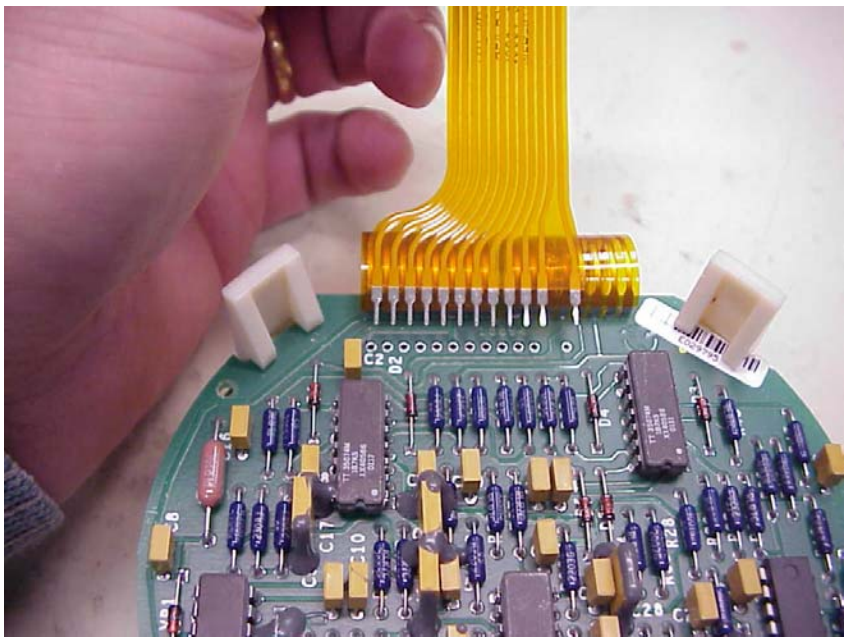


DSU-33C/B Goals/Results

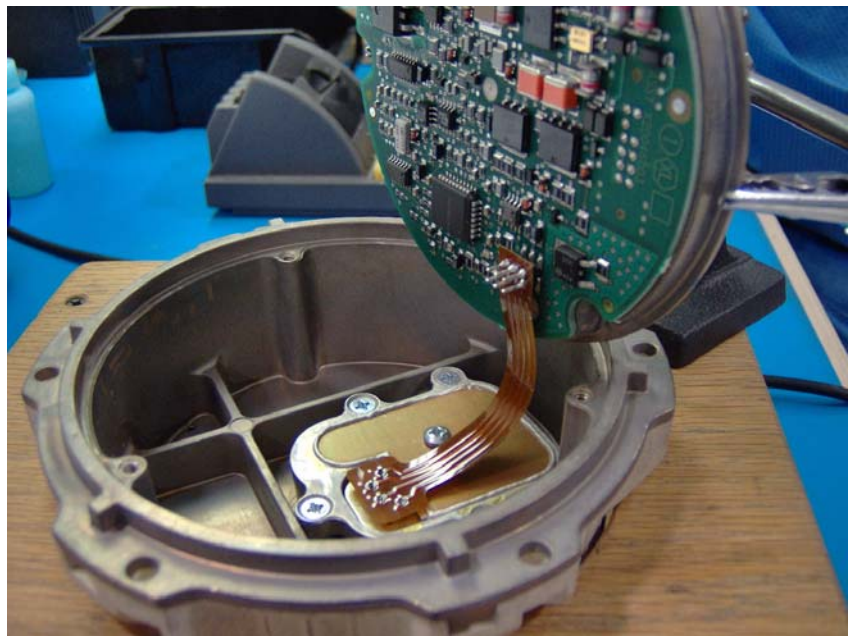
Eliminate hand soldered joints

- Eliminated two (2) flex cables and associated solder joints
- Reduced hand soldering by 21%

B/B Flex Cables



C/B Flex Cables



DSU-33C/B Goals/Results

Reduction of Process Steps by 24%

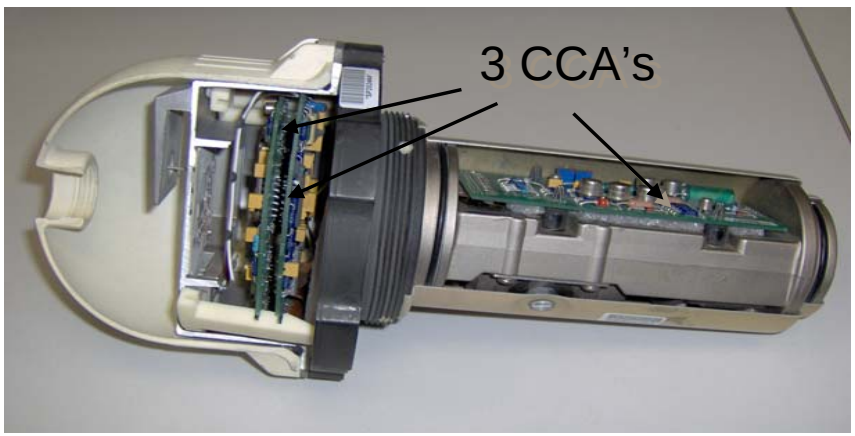
Eliminated laser welding operations

Eliminated mixed technology RF Assembly

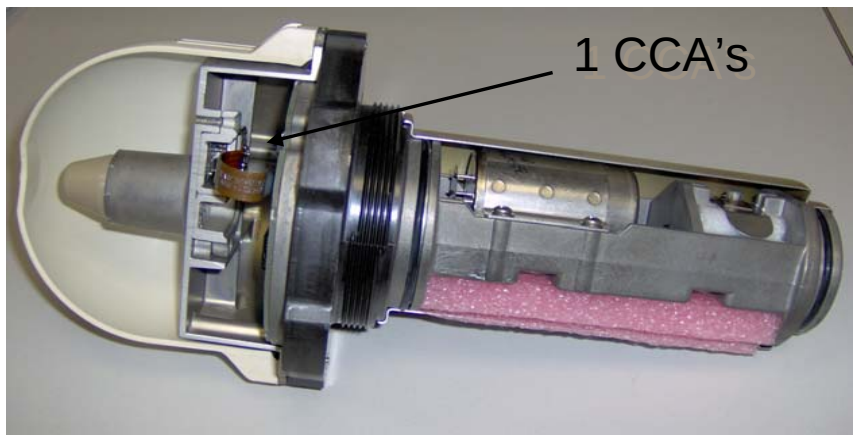
Reduced hand soldering operations by 21%

Test operations reduced by 25%

DSU-33B/B Cut Away



DSU-33C/B Cut Away



DSU-33C/B Designed for Testablility

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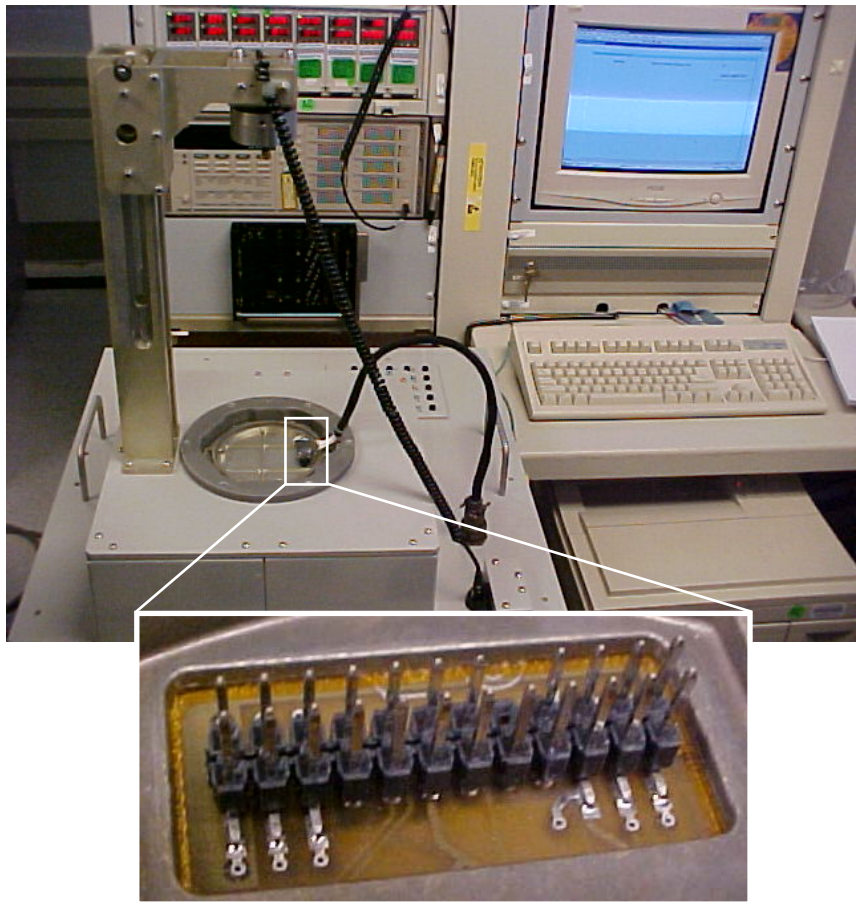
B/B Test Interface

C/B Test Interface



DSU-33C/B Test Interface is More Reliable and User Friendly.

DSU-33 System Test Yields Comparisons

Every DSU-33 Sensor is functionally tested at an ambient, cold and hot condition.

	First Pass Yields	
	DSU-33 B/B	DSU-33-C/B
	2004-2005	2005-2007
Sensor Ambient	96.90%	95.30%
Sensor Cold	69.30%	93.30%
Sensor Hot	82.40%	94.60%

Rolled Yield	55.33%	84.11%

Increase Rolled Yield by 29%

DSU-33C/B Producibility

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Decreased Touch Hours by 30%

- Improved rolled test yields by 29%
- Reduced process steps by 24%
- Reduced hand solder joints by 21%
- Increased capacity of factory by 34%

DSU-33C/B Lean Activities

Team Members

- Production Supervisor
- Production Engineer
- Quality Engineer
- Production Control
- Production Lead Operator

Goals

- Increases Quality – Real time issues surface faster
- Reduced Risk – Manufacturing problems are found earlier
- Reduced Cost – Eliminate unnecessary steps and labor

DSU 'Lean' – Current State

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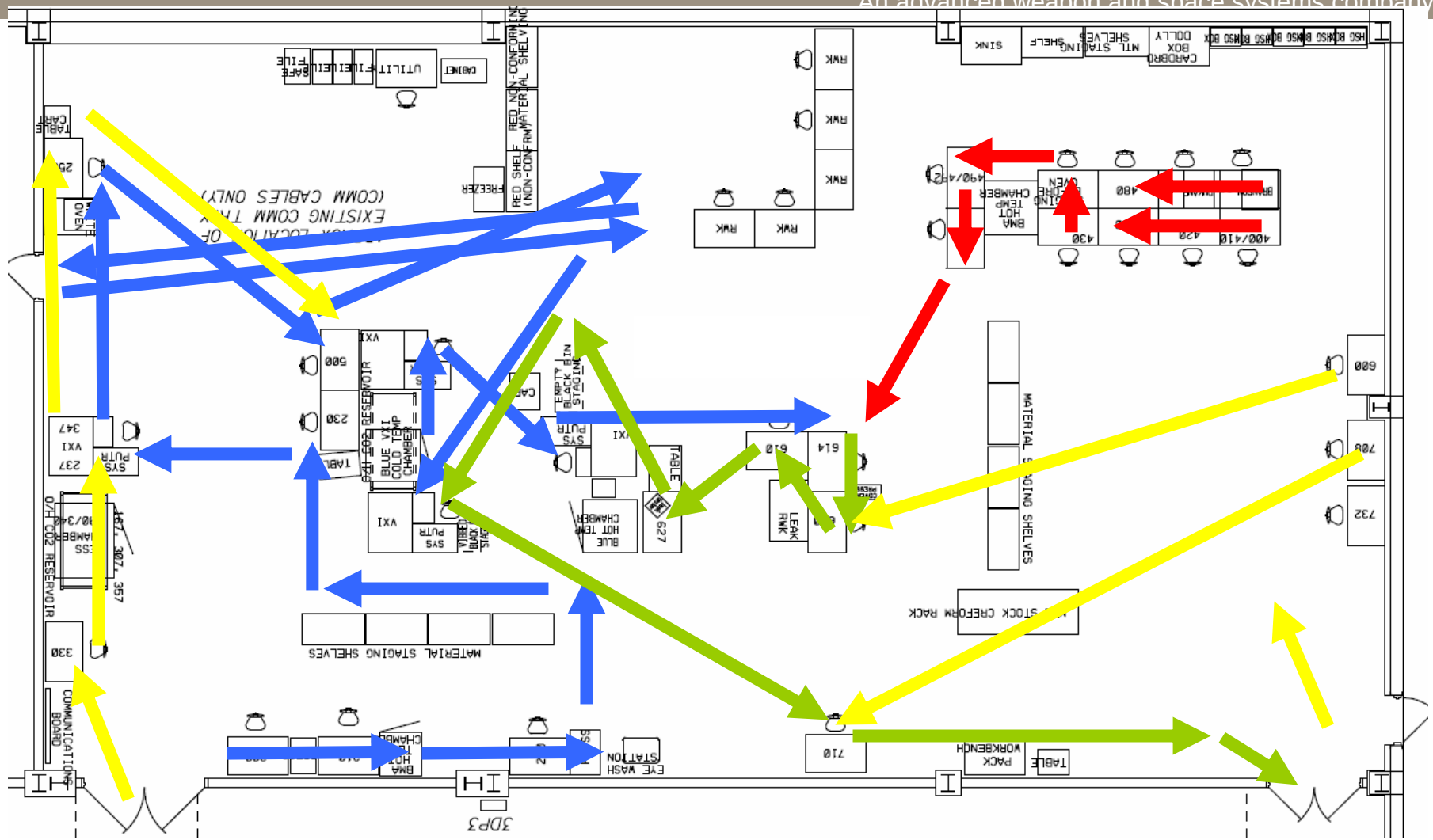

DSU 'Lean'- Future State

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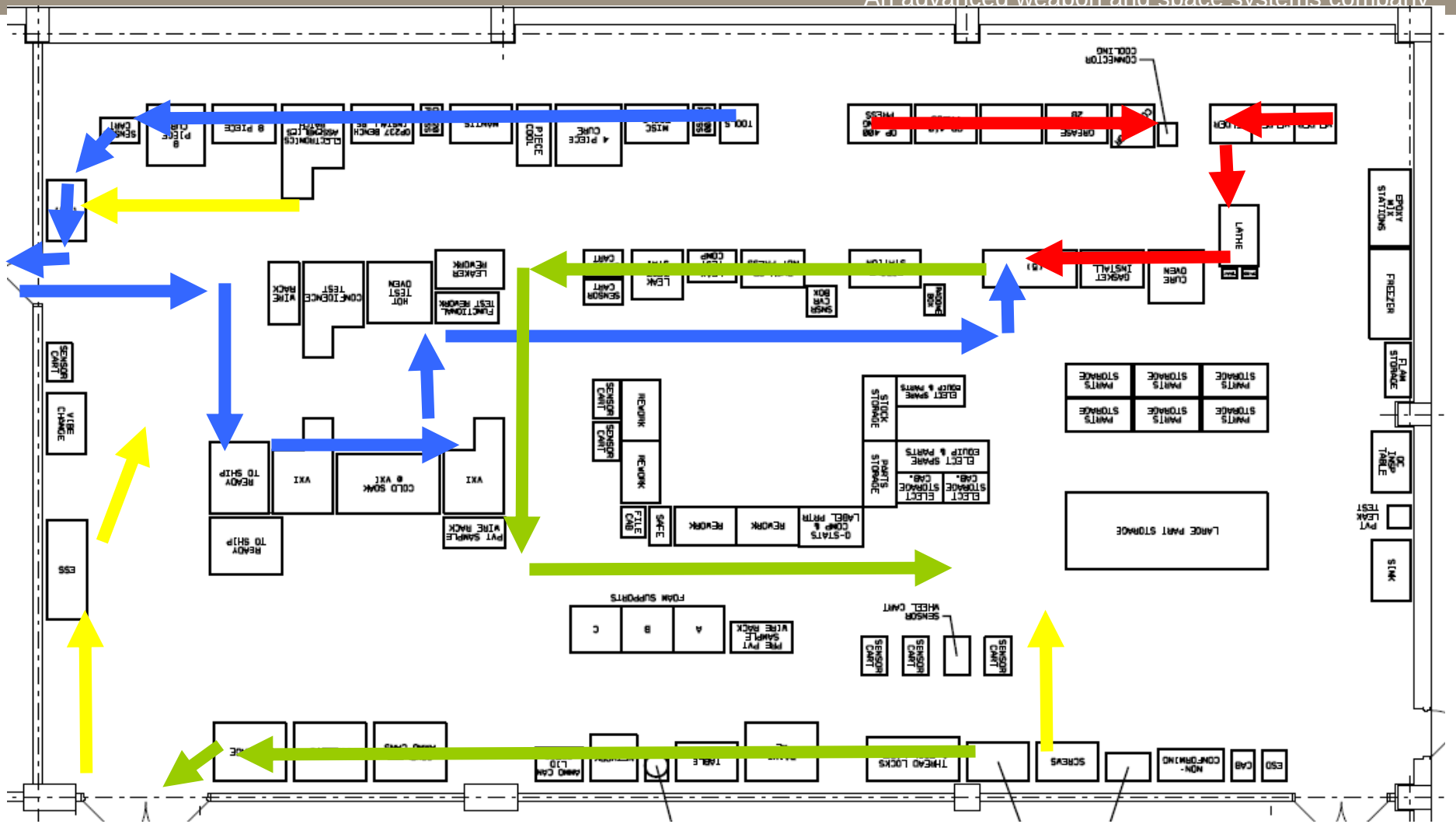

QUESTIONS