

KDI Precision Products, Inc.

An ISO 9001 Registered Company

45th Annual Fuze Conference

"The Evolving Nature of Value Added Fuzing"



Presented by: Mr Ted Lewis

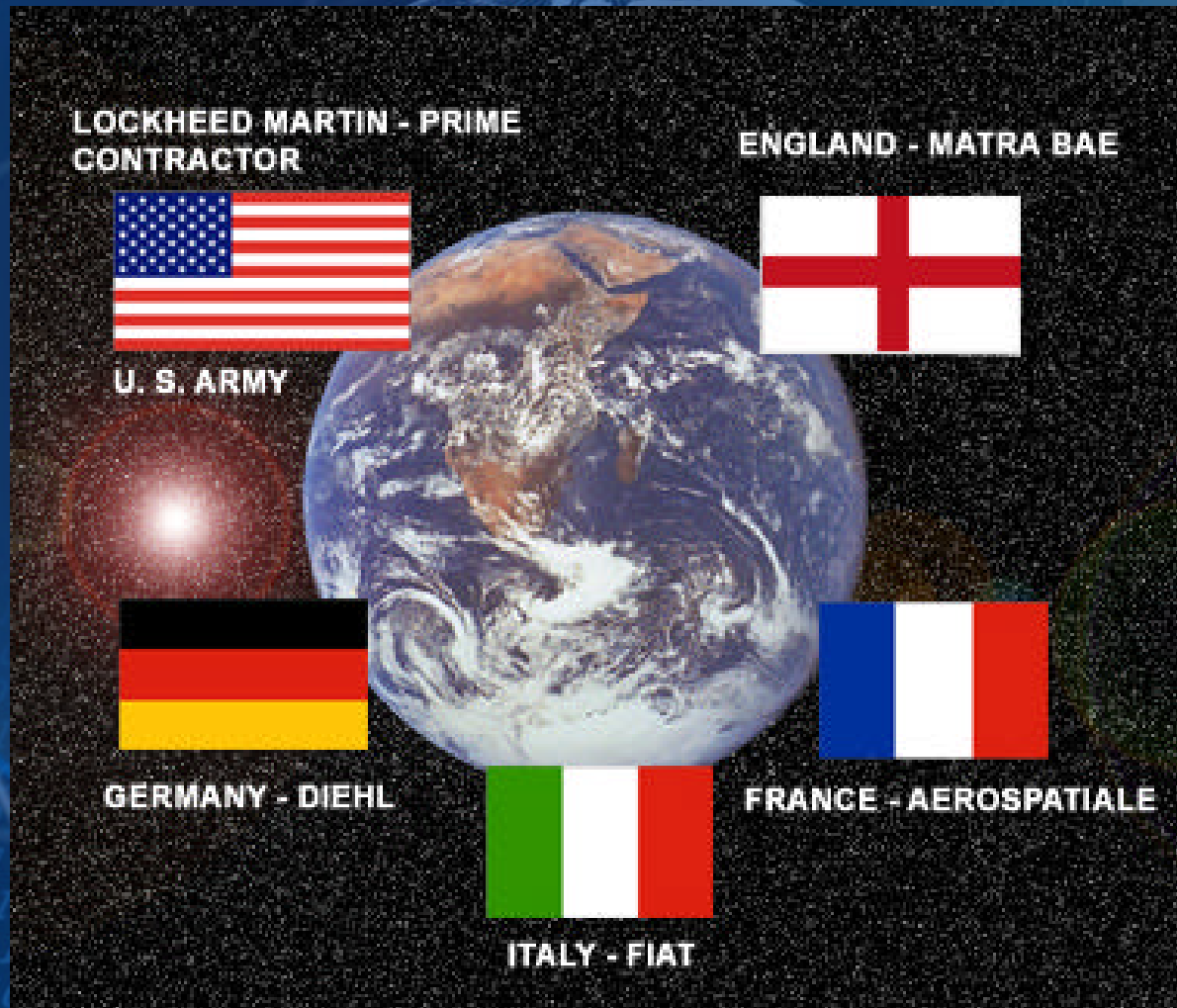
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GUIDED MLRS USA AND FOREIGN PARTNERS



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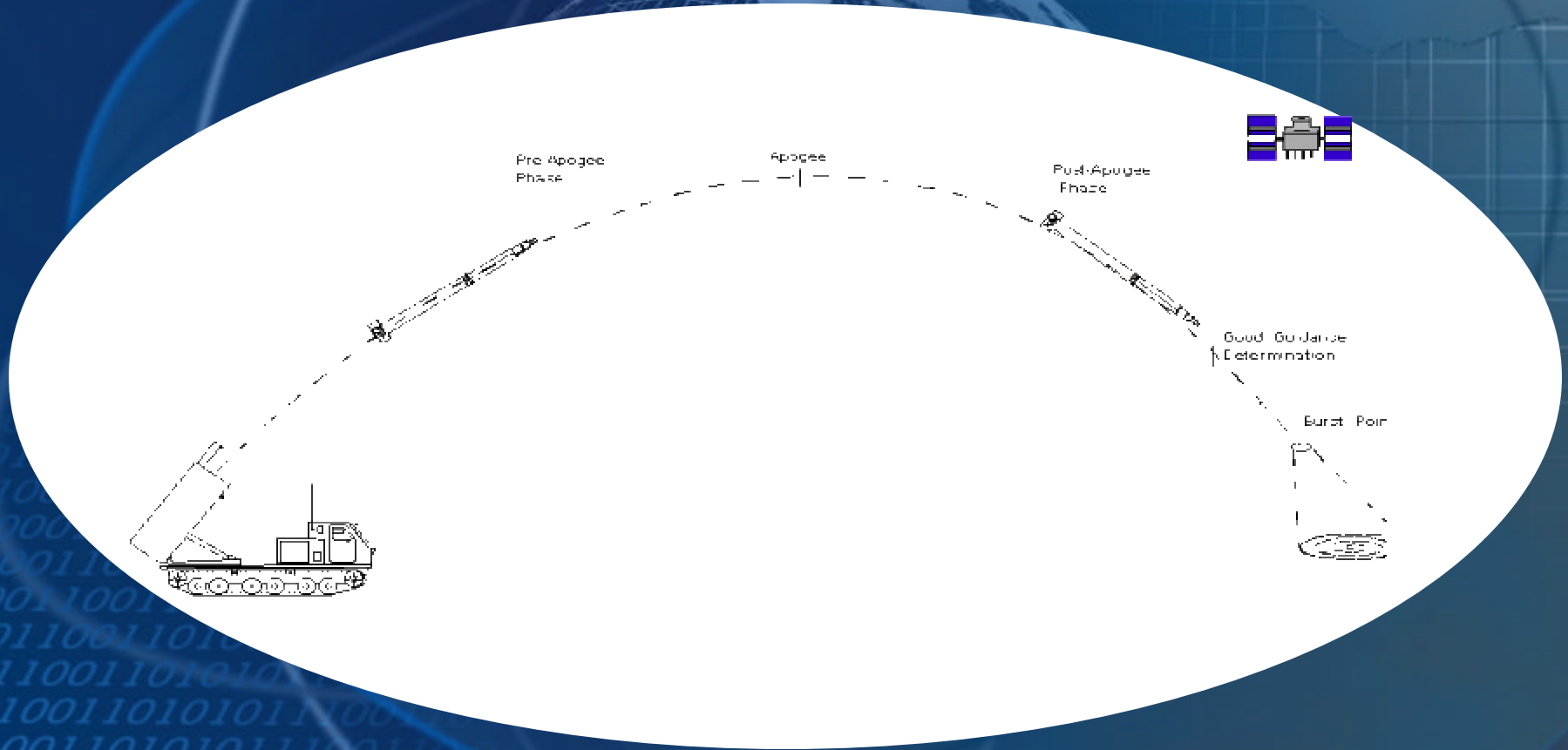


KDI PROGRAM TEAM

- Mike Buckhanan - Program Manager
- Ted Lewis - Electrical Project Engineer
- Cory Hatch - Electrical Engineer
- Tony Zucker - Mechanical Project Engineer
- Mike Sowder - Test Equipment Electrical Engineer
- Steve Gemperline - Quality Engineer, CQE
- Bob Garrett - Reliability Engineer
- Tom Moore - Manufacturing Engineer
- Bob Butts - Configuration Management

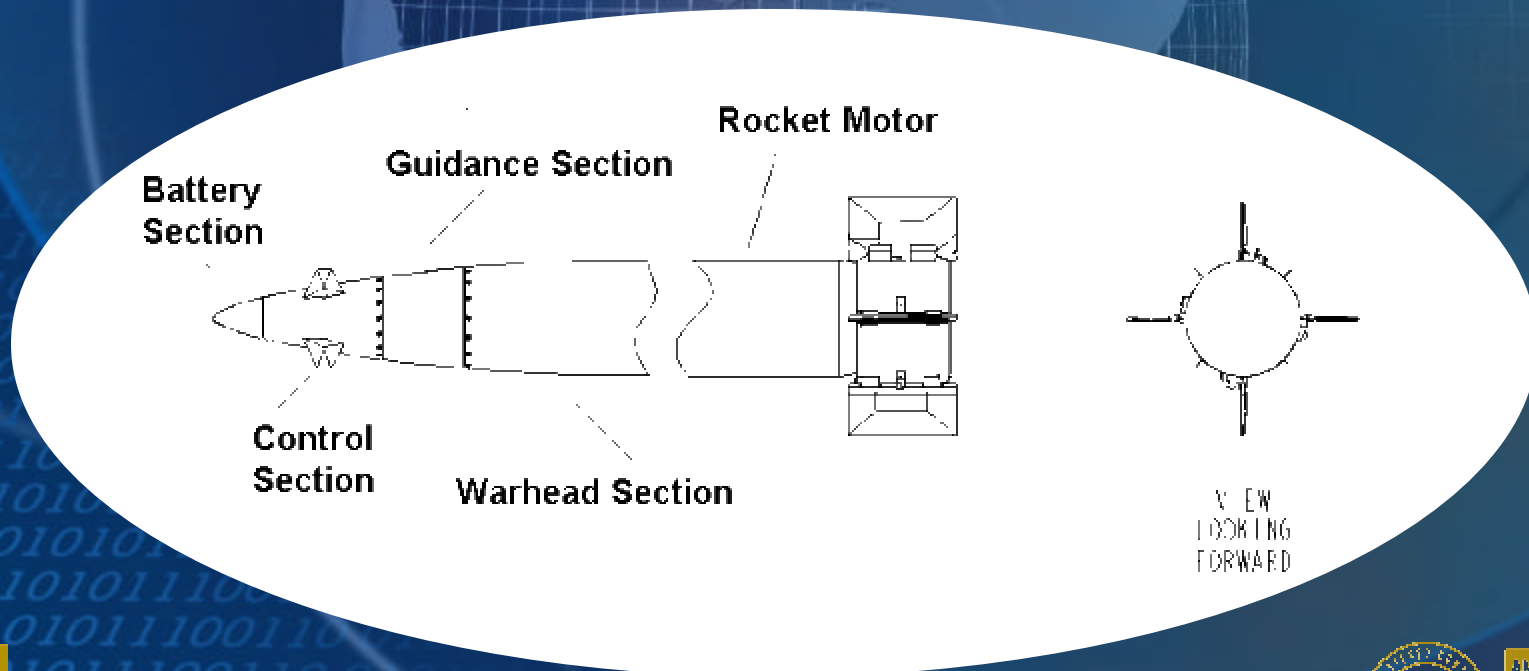


GMLRS OPERATION

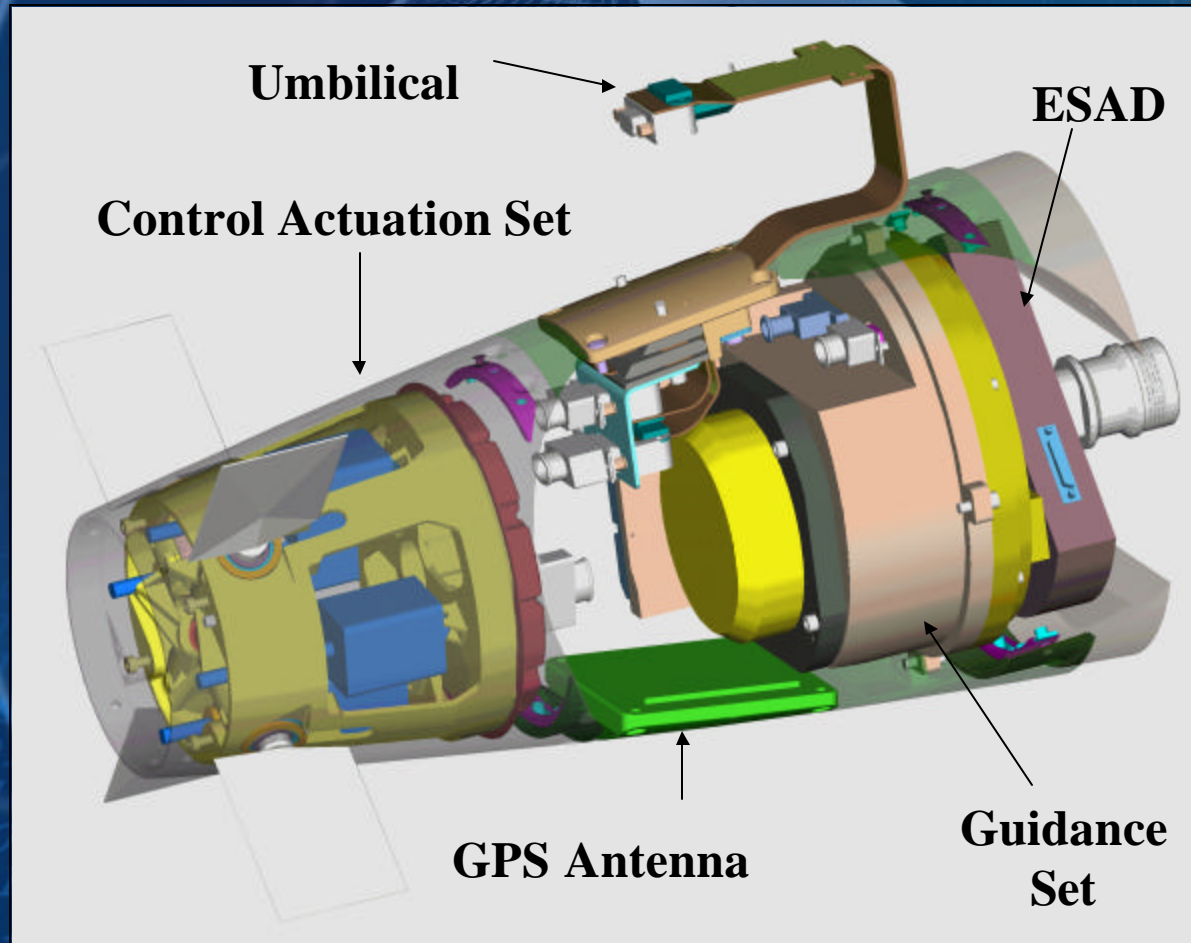


GMLRS ROCKET

- The GMLRS Rocket Is Nominally a Ballistic Round
- The Maximum Off-axis Shot Is 4° Degrees
- The Canards Are Used Only for Trimming the Trajectory During the Flight



GUIDANCE AND CONTROL SECTION



HOUSING

- Material: 304L Stainless Steel
- Function
 - Interfaces to LEEFI Adapter Assembly
 - Interfaces With Rocket
 - Alignment Feature Incorporated
 - Hermetic Environment
 - Supports Printed Wiring Board (PWB)

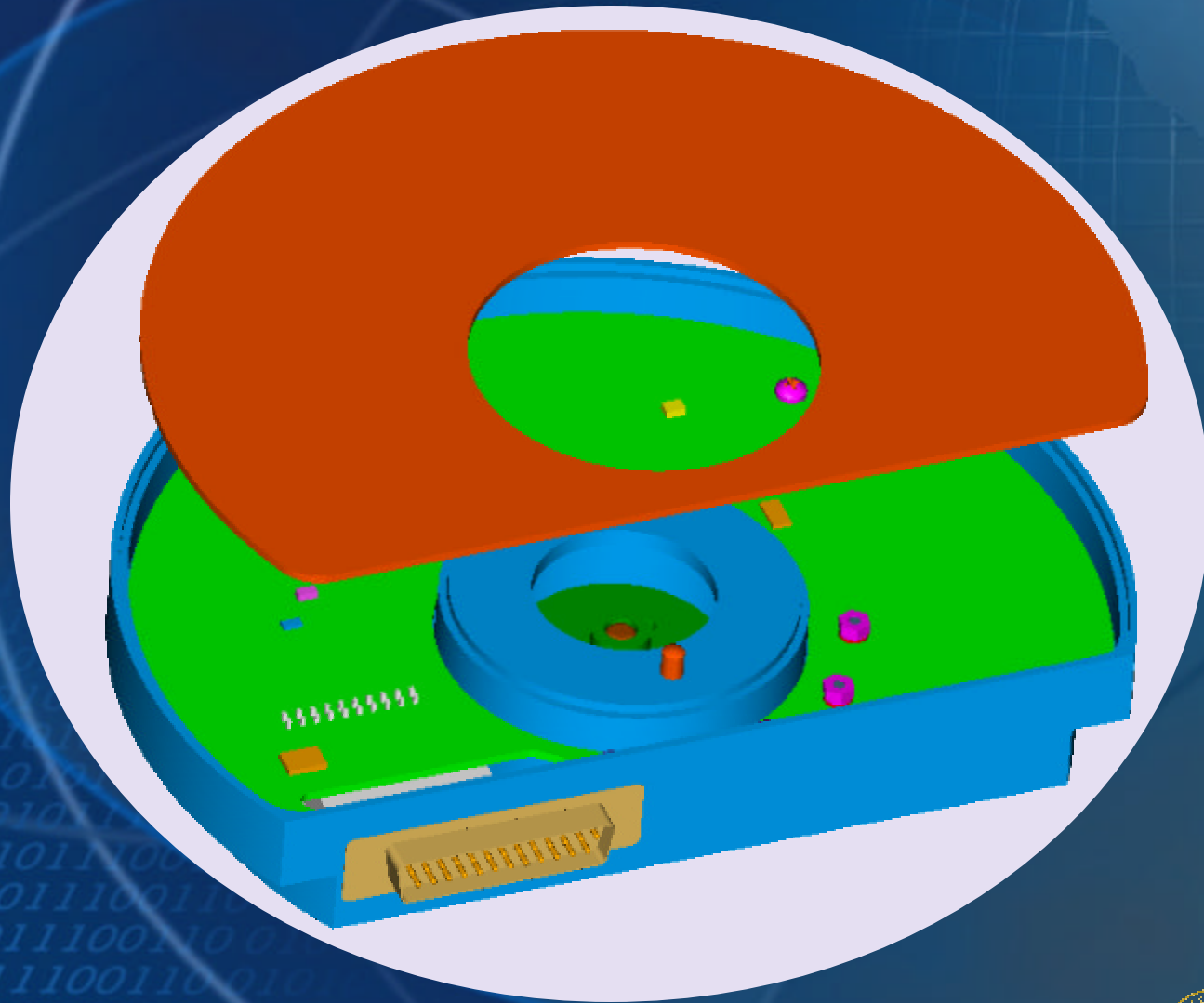


SEALING

- The ESAD Will Be Hermetically Sealed and Tested to Meet a Leak Rate of 1×10^{-6} cc/sec He/Mass Spectrometer at 1 Atmosphere Pressure Differential
- Laser Welding Will Be Used to Seal the Housing, Similar to the Other Qualified Programs at KDI
- The GMLRS ESAD Will Be Back-filled With Nitrogen With A Trace Of Helium Through A Fill Plug



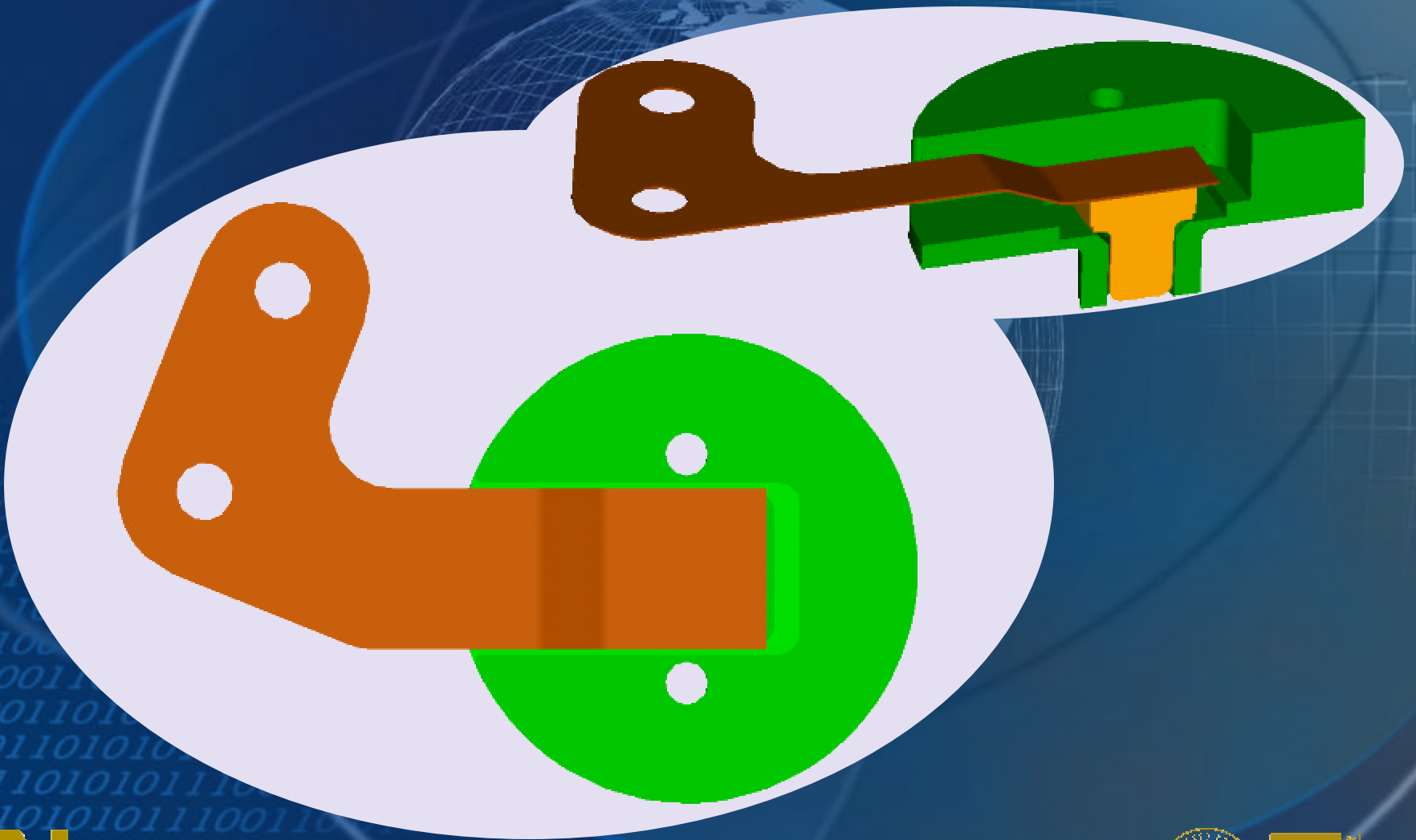
EXPLODED VIEW



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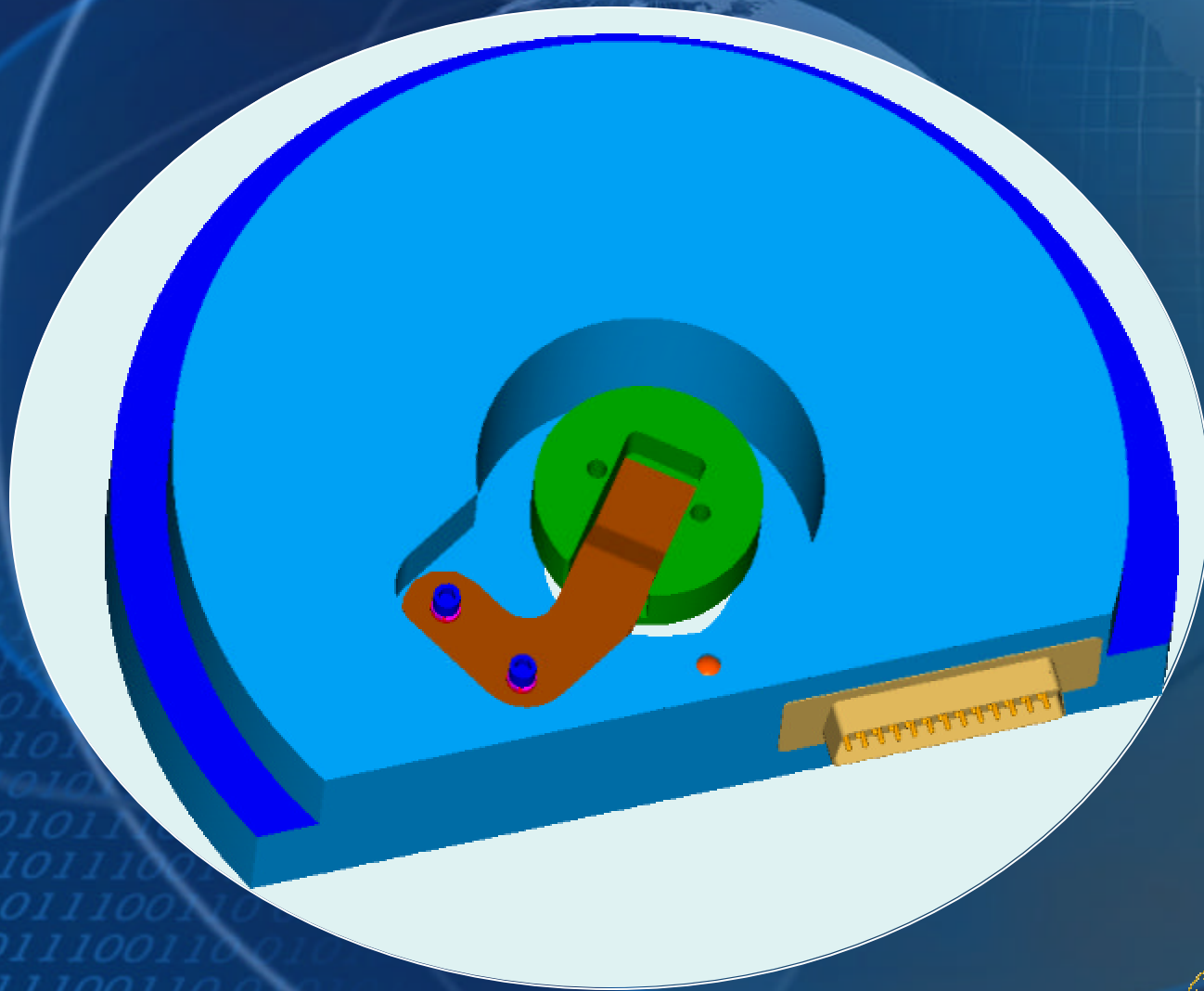
LEEFI ADAPTER ASSEMBLY



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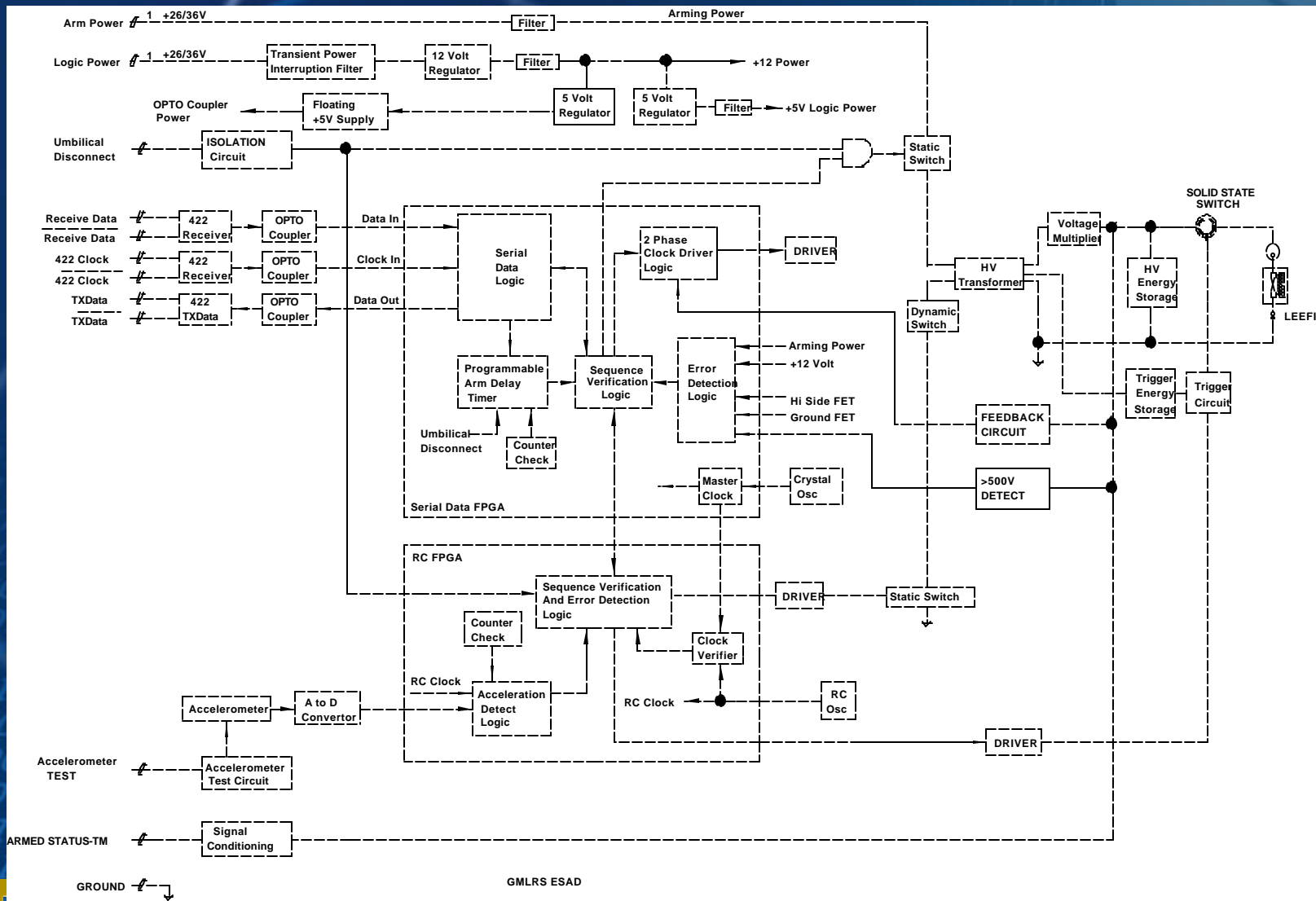
GMLRS ESAD WITH LEEFI ADAPTER ASSEMBLY



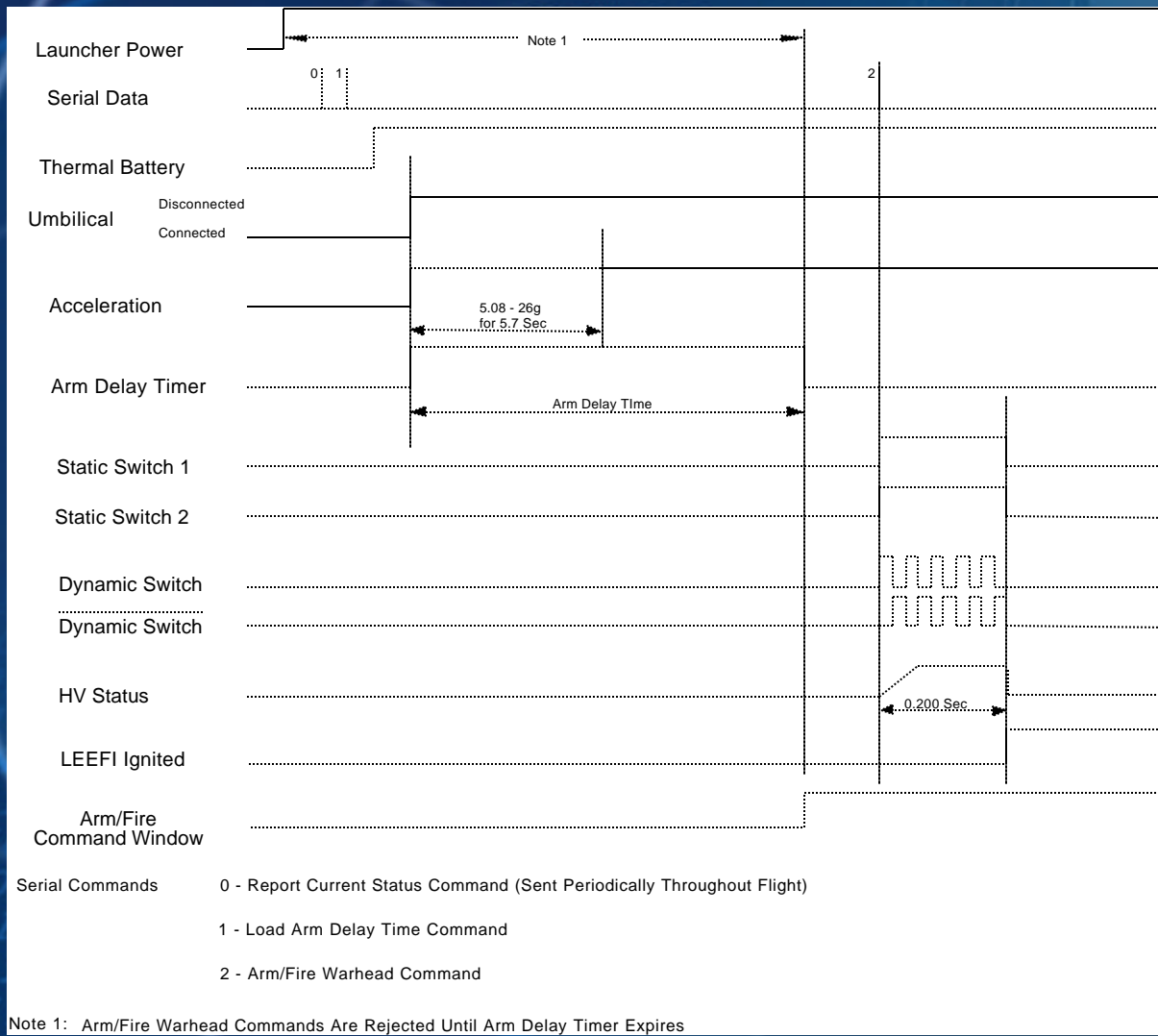
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DETAILED BLOCK DIAGRAM



TIMING DIAGRAM



SERIAL INTERFACE

- 442 Drivers/Receivers
- SDLC Message Formats

Guidance to ESAD
Message

48 BITS

- 8 BIT Start Word
- 8 BIT Command Word
- 8 BIT Delay Time
- 16 BIT CRC
- 8 BIT Stop Word

ESAD to Guidance Message
64 BITS

- 8 BIT Start Word
- 20 BIT Command Word
- 4 BIT Delay Time
- 8 BIT Timer Status
- 16 BIT CRC
- 8 BIT Stop Word



ACCELERATION PROCESSING

- Motorola MMA1201P Analog Accelerometer
 - $\pm 40g$ Capacitive, Micromachined Accelerometer
 - Output Sensitivity = 50 ± 2.5 mV/g
- Accelerometer Readings Are Taken Every $340\mu S$
- Accelerometer Output Level Checked During BIT
- Accelerometer Output Level “Nulled” When Battery Power is Applied
- Specification Requirements:
 - 1st Motion = $5.08g$ for 6 msec Within 0.5s From Umbilical Disconnect
 - Safe Separation = $5.08g$ for 5.7 ± 0.1 Seconds



LEEFI ASSEMBLY

- Designed in Unison by China Lake, Reynolds Systems and Silicon Designs
- The LEEFI Has Been Qualified by China Lake IAW MIL-STD-331, Test G1
- Specific Tests Designed to Demonstrate the Initiator Meets a Reliability of 0.99 at a 95% Confidence Level Were Performed



MCT SEMICONDUCTOR DISCHARGE SWITCH

- N-Type MOS-Controlled Thyristor
- 1400 Volt
- 4ka Surge Current
- Silicon Power Corporation
- Tested in KDI IRAD Program
 - > 20,000 Discharges



PROGRAM STATUS / SCHEDULE

- Initial AFSRB Presentation - Completed 19 Dec 2000
- PDR - Completed 1-2 Feb 2001
- Engineering Tests - 15 Nov 2000 To 31 Mar 2001
- CDR - 27-28 Mar 2001
- Qualification - 30 May 2001 To 17 Jul 2001
- Flight Hardware Delivery 1 June -28 Sept 2001



QUALIFICATION TESTING

- Twenty ESADS Will Be Subjected to Qualification Testing
- The Qualification Test Environments Will Consist Of:
 - Thermal Shock
 - Tactical Vibration
 - Launch Shock
 - High Temperature Operation
 - Low Temperature Operation
 - Acoustic Noise and Flight Simulation
- Electromagnetic Environment

