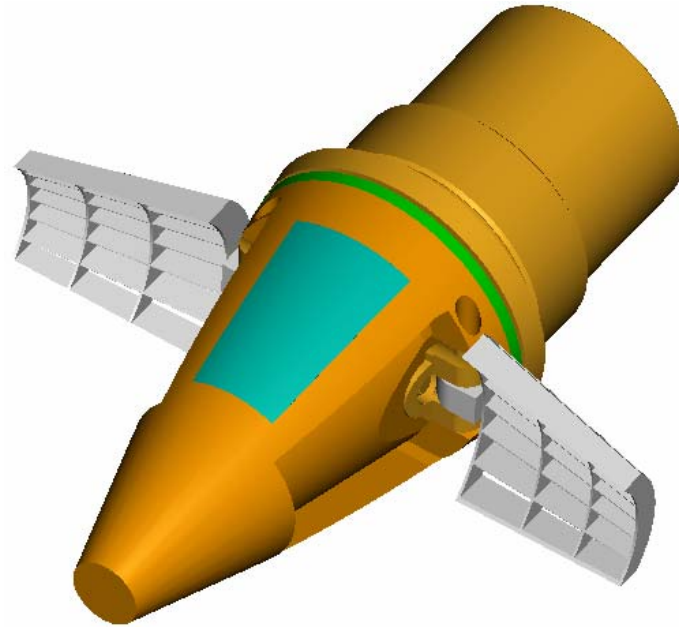


*NDIA 48th Annual Fuze Conference
NSWC / Dahlgren Division*



Mark Engel

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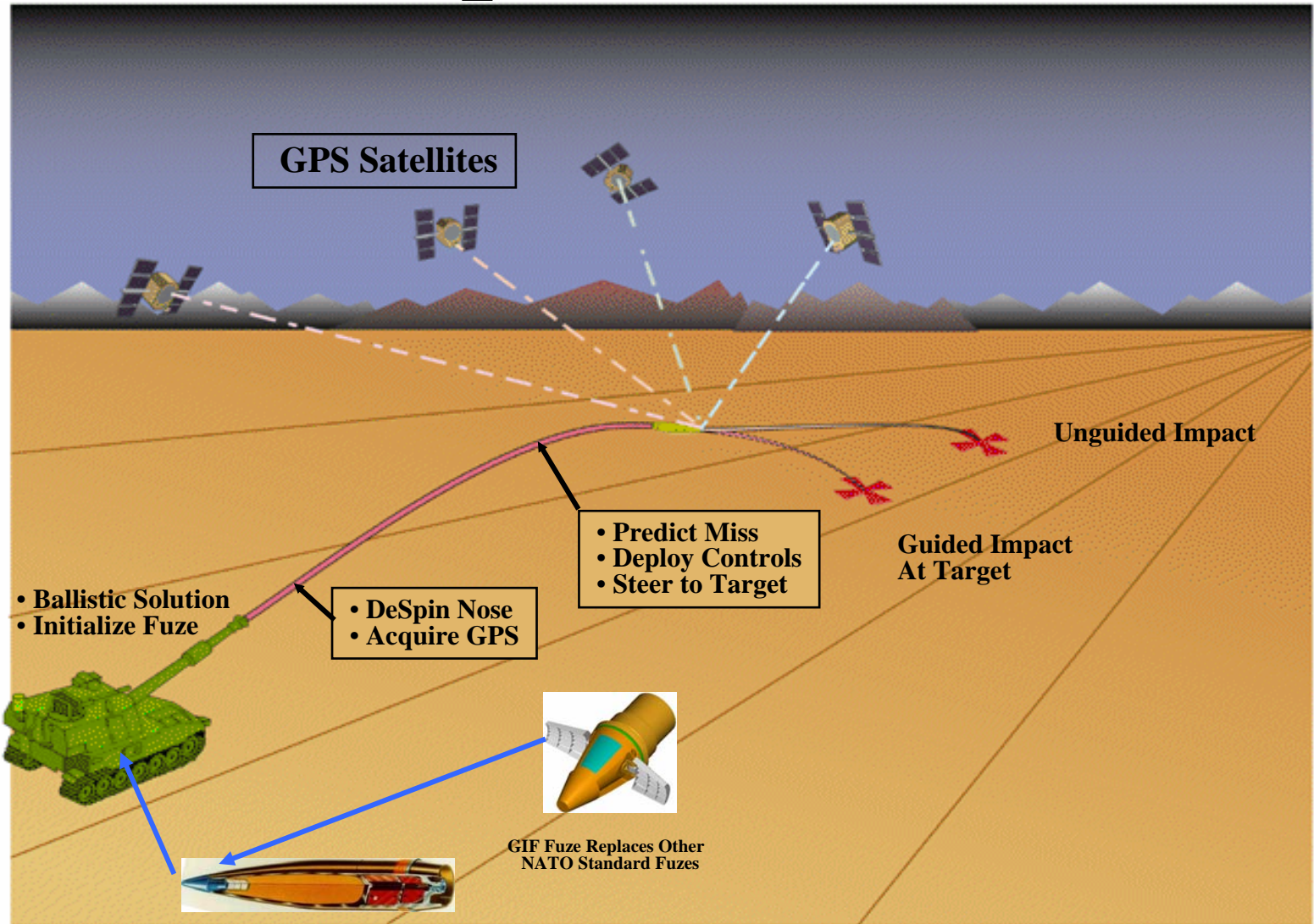
Agenda

- Background
- Mechanical / Electronic Packaging
- Gun Hardening Efforts
- Test Program

Background - Concept

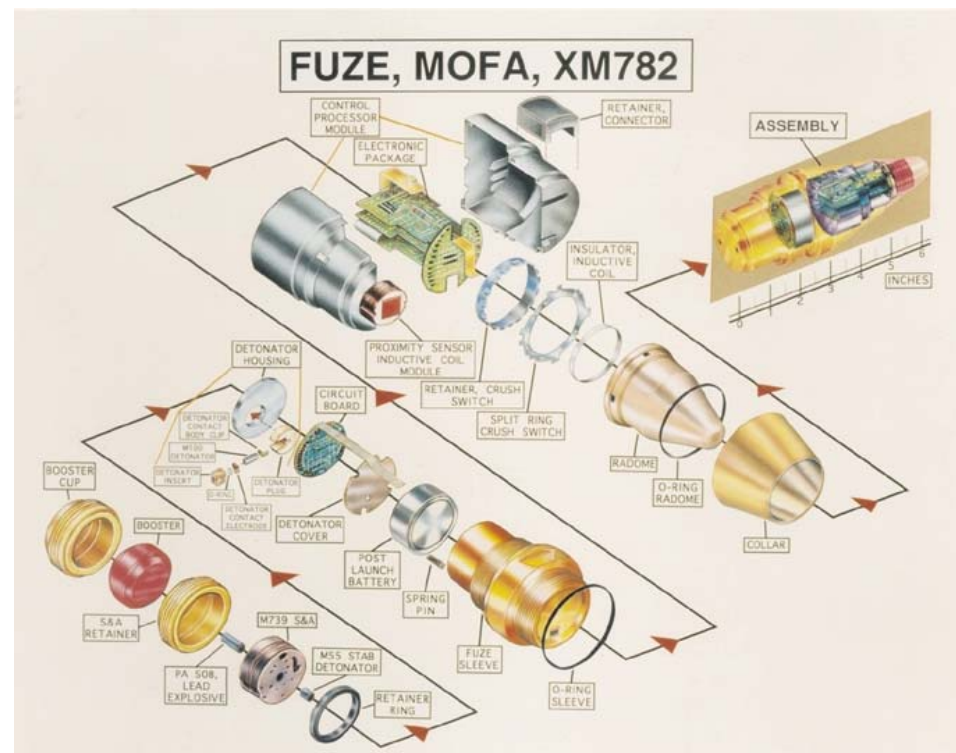
- **What is GIF ?** GIF is a low-cost, fuze-sized module that is intended to replace a “NATO standard” fuze on existing stockpiled Army and Navy Ammunition.
- **What Does it Do ?** GIF corrects the ballistic trajectory of the projectile, resulting in a small terminal miss distance. GIF provides **“First Round - Steel on Target”**.
- **What Difference Will It Make ?**
 - GIF Technology will greatly reduce the number of rounds (20:1) required to defeat a given enemy threat.
 - GIF is applicable to **literally millions** of existing projectile, mortar and rocket systems.
 - GIF will enhance **“Maneuver Warfare”** by reducing the time required to neutralize threats while minimizing logistic and re-supply burdens.

Background - Function

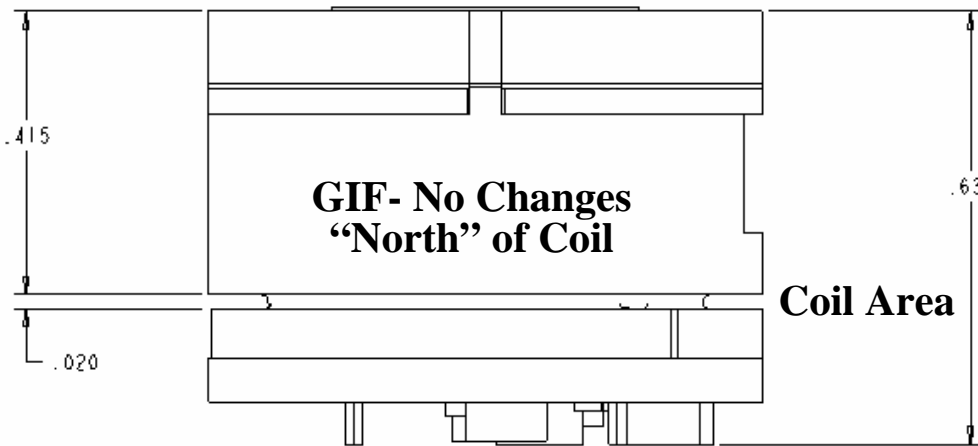


Design – Departure Point

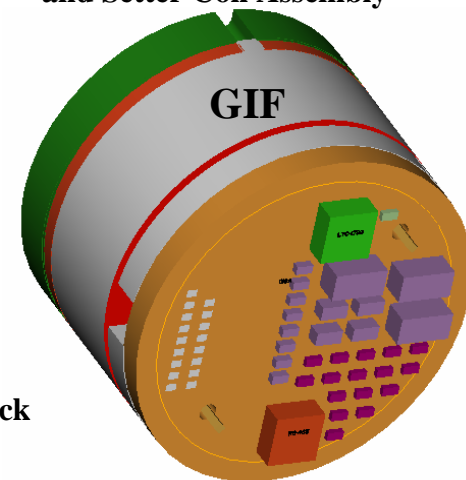
- Start with Army **MOFA Fuze**.
- Retain Radar, S&A, Primer / Initialization Components “as is”.
- **Minimize Changes to Existing Tactical Procedures:**
 - Aimed, Initialized, Rammed and Fired like Existing Ammo.
 - No Aim Offsets or Biases Needed (Improved Danger-Close Safety)
 - No Decrease in Rate of Fire.
 - Fail-Safe/Fail-Operational (Guidance Failures Still Allow Standard MOFA Fuze Functions).
- “QSC” (Quick, Simple, Cheap) Design Philosophy. COTS Components. Add Complexity Begrudgingly, as a Last Resort.



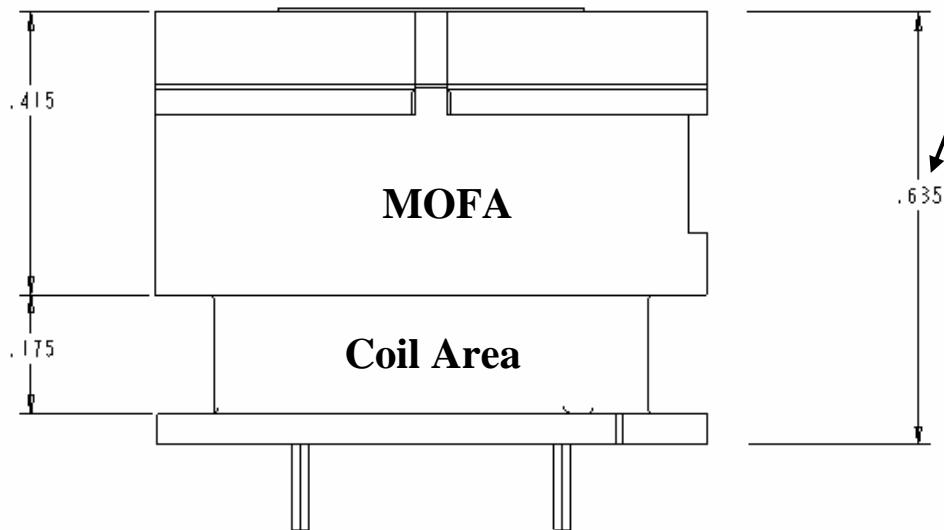
Fuze Modifications



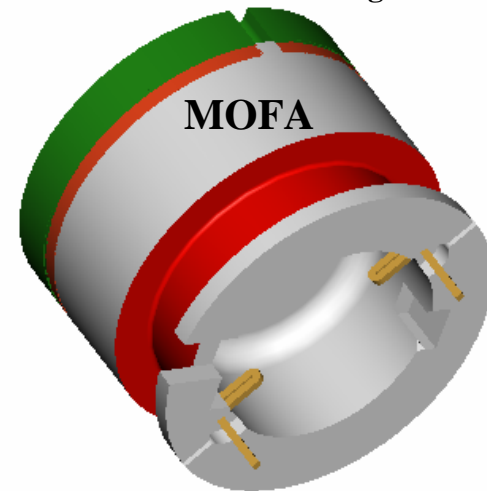
Self-Contained Fuze and Setter Coil Assembly



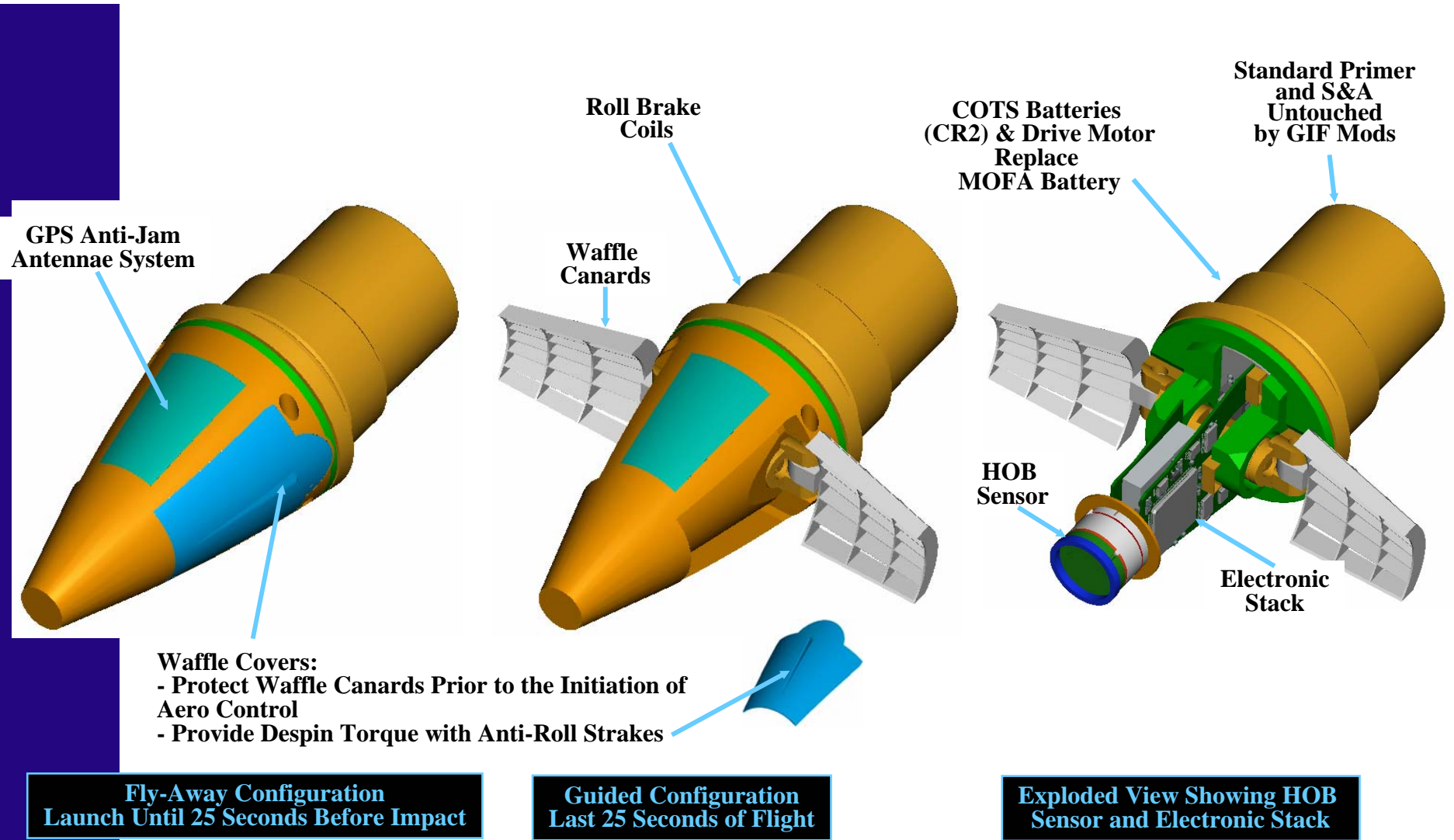
Same Stack Height



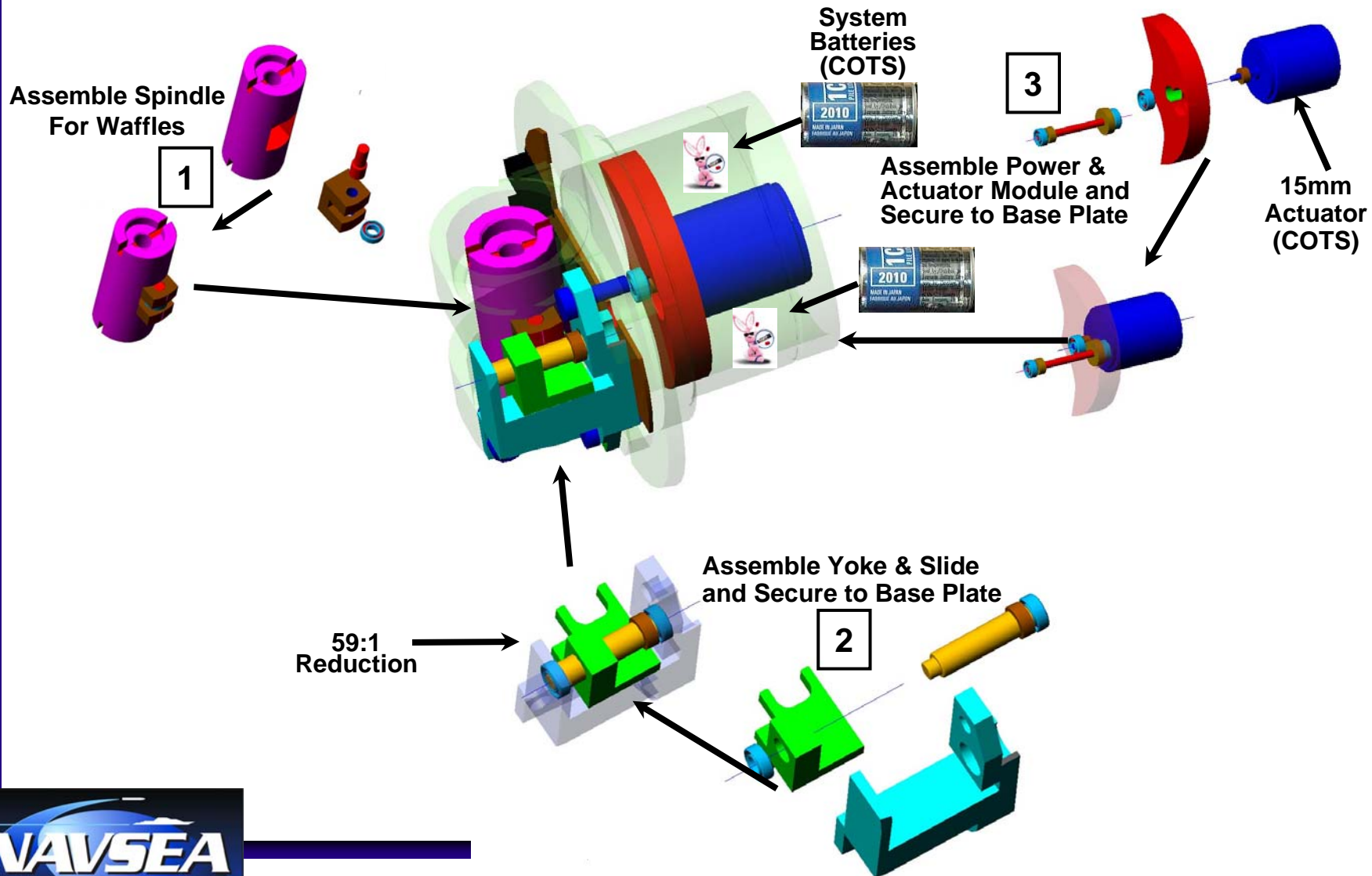
Standard MOFA Design



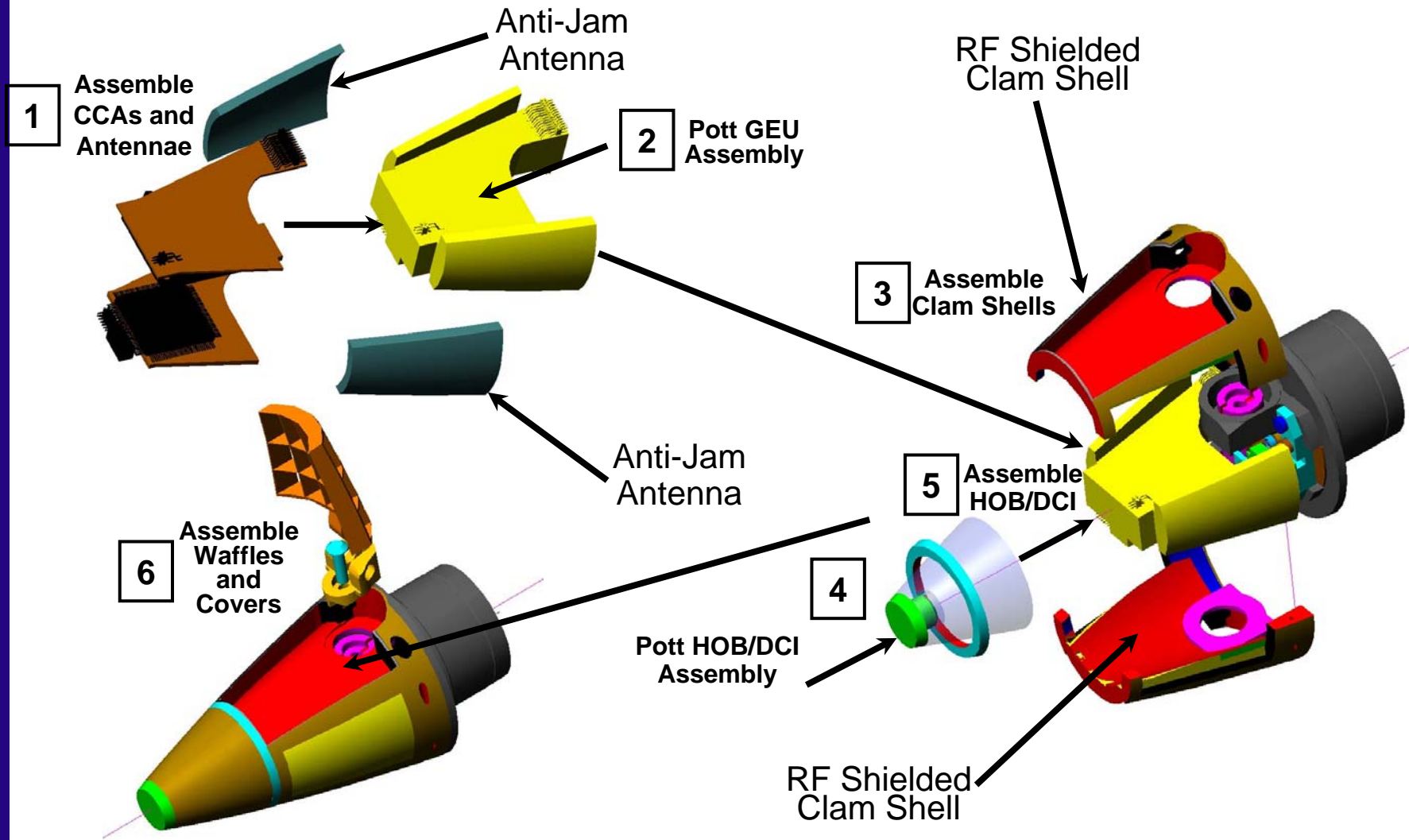
“Onion Peels”



CAS and Power Assembly



Assembly – Forward Section

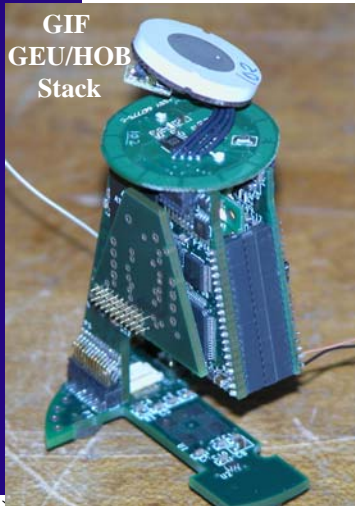


Demo / Spiral 1 EE Functions

Optional Daughter Board to Board 3 for Regulation of Roll Brake Power for Cold Temp (-45 deg F) Operations.

3) Large Vertical Board

- Magnetometer
- Pitch Rate Gyro
- Squib Fire Circuitry
- Power Regulation



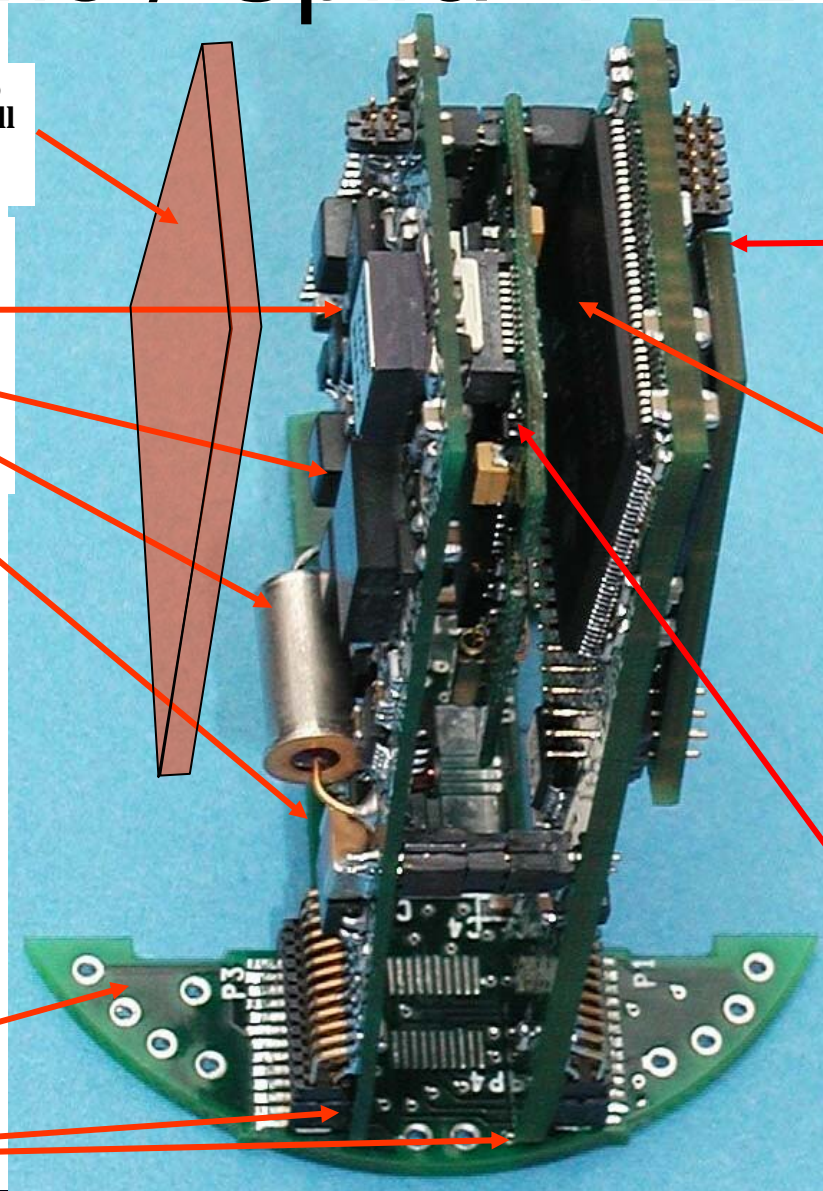
1) Bottom 1-Board:

- Roll Rate Gyro
- Manchester Encoding
- Backplane for #2 & #3

5) Daughter Board to Board 2
- Stepper Motor Controls

2) Large Vertical Board:
- DSP, PIC and Memory
- Flight Code EPROM
- DCI/Setter Functions
- Motherboard for board 5

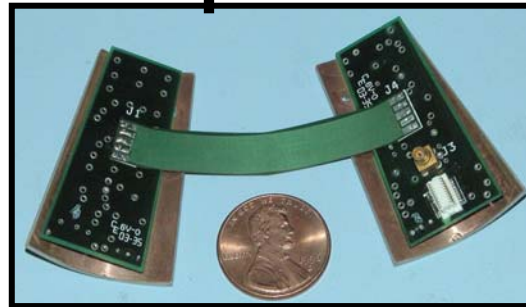
4) Daughter Board to Board 3
- Leadtek GPS Receiver



Demo / Spiral 1 Hardware



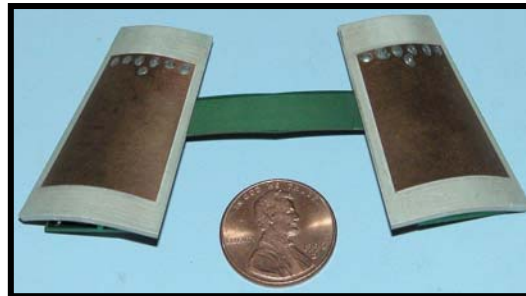
Roll Bearing Test Fuze with Tactical Strakes



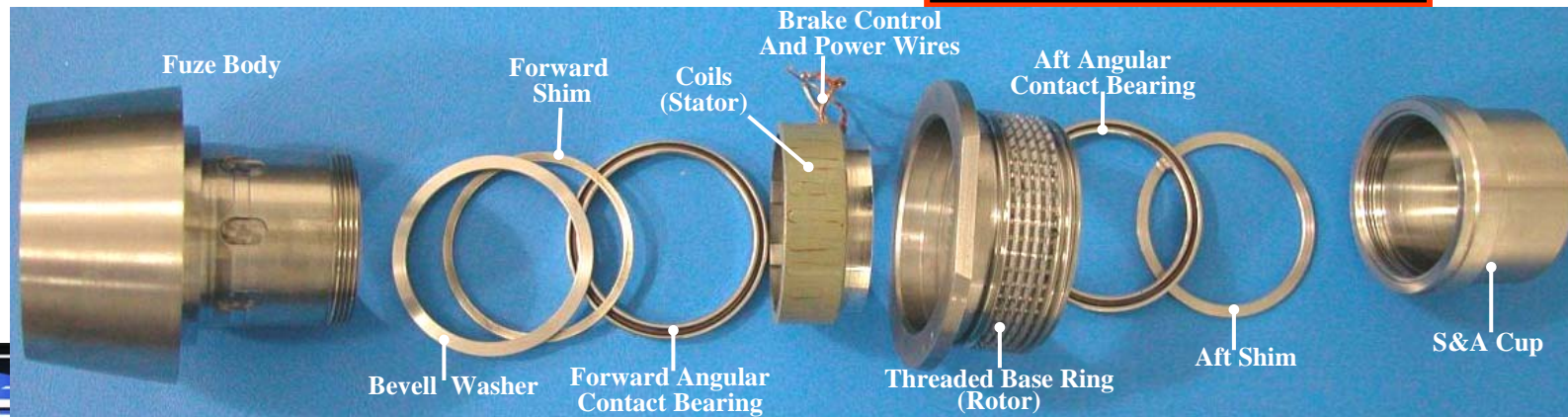
GPS Antennae System



Re-Packaged HOB/DCI Module



Roll Brake and Bearing Assembly



Complete Roll Brake and Bearing Assembly Including Fuze Body and S&A Cup

Gun Hardening Efforts

- Todate:
 - 15mm actuator motor to 20 kG's
 - HOB / DCI sensor puck to 20 kG's
 - Roll bearing subsystem flight tested
- Planned:
 - All-up Demo fuze assembly at 8S levels in Picatinny ballistic railgun (BRG) prior to flight

Test Schedule

- All-up fuze BRG: spring 2004
- Pathfinder flight test: summer 2004
- Additional flight tests: through summer 2005