GENERAL DYNAMICS

Ordnance and Tactical Systems

Low Cost Course Correction (LCCC) Demonstration Program

NDIA 40th Annual Armament Systems:
Guns – Ammunition – Rockets – Missiles

Conference Presentation

Session: Mortars and Artillery

28 April 2005

Presented by:

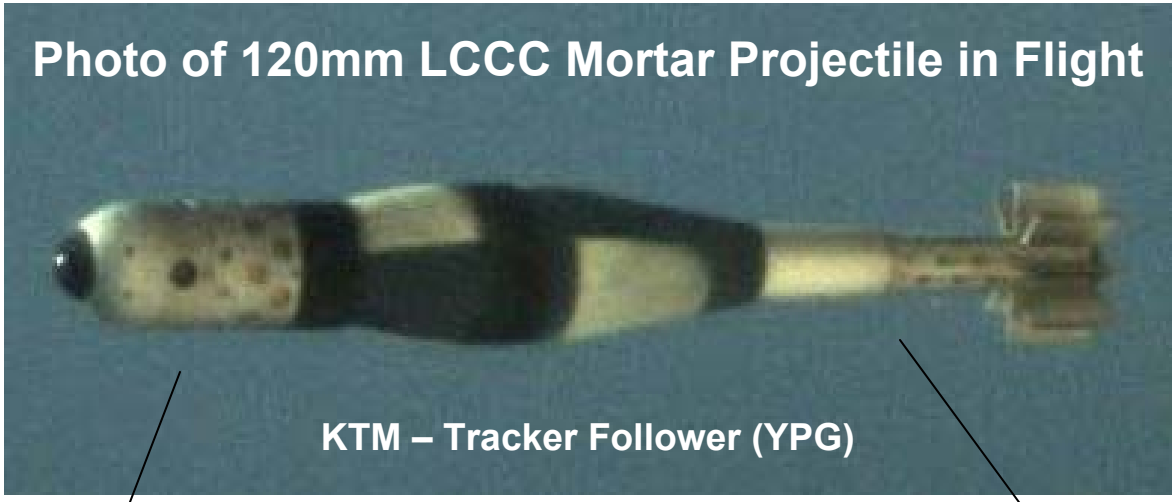
George Barnych **Daniel Davis**

Objectives

- Develop an Ultra Low Cost Semi-Active Laser (SAL) Seeker Compatible with All Currently Fielded Laser Designators
- Develop an Ultra Low Cost Projectile Maneuvering Mechanism
- Implement Autopilot Control Without the Use of Inertial Sensors or Other IMU Related Technology
- Design the System for Retrofit to Existing Projectiles
- Use COTS Electronic Components – No ASIC or Other Large Scale Integration (LSI) Effort

Achieve Lowest Possible Unit Cost

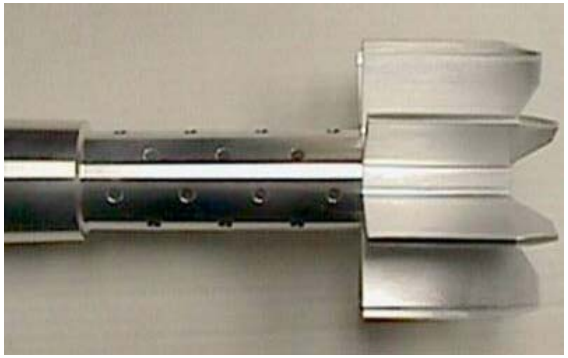
Resulting System



Seeker Electronics

Divert Control

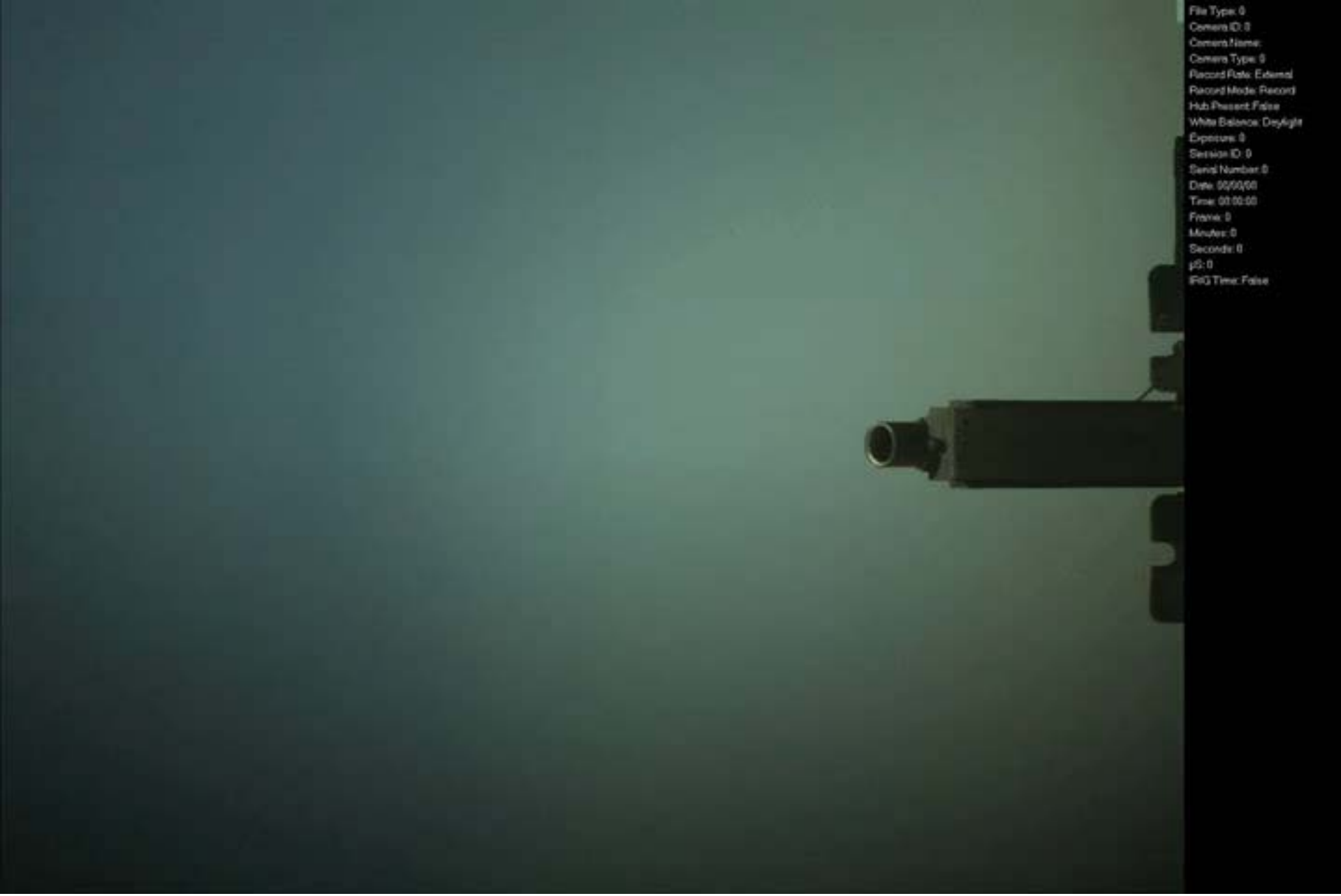
1° Fin Cant & Boom Extension



Test Setup

- **7km Test Range @ Yuma Proving Grounds (YPG)**
  - Gun Position 8, KOFA Firing Range, Yuma Test Center
- **Lanyard Initiated 120mm Mortar Tube**
  - Cannon, M298 120 mm Mortar MANN Barrel, Serial Number 01
  - Carriage, 105 mm Towed Howitzer, M101, (modified for 120 mm Mortar System)

- **KTM Cameras**
- **Mortar Tracking System (MTS) Radar, Weibel Radar**
- **On-Board Impact Survivable Recorder**
- **AN/TVQ-1 Laser Designator**
- **Stationary 16’ x 16’ Target**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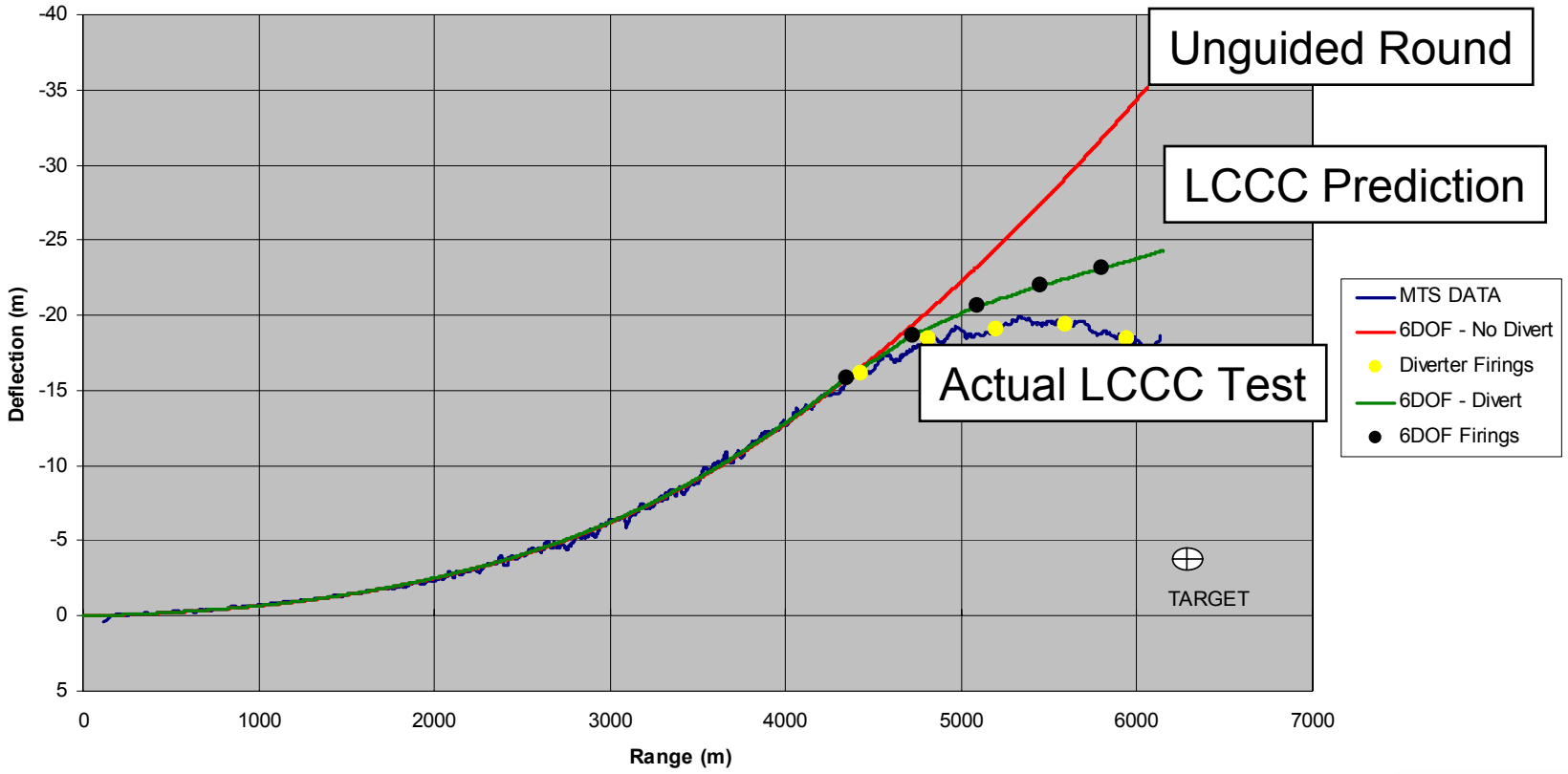
Test Results

3.3 LCCC Lofted Ballistic Evaluation (Task 3)
LCCC Test #1834

Single Pulse Mode LCCC Diverter Test

- 23m Deflection Achieved with 5 of 16 Diverters



Summary

- **Most Objectives of the Project Were Achieved**
  - **System Successfully Survived Zone 4 Gun Launch**
  - **A Very Low Cost SAL Seeker Technology Was Developed and Demonstrated Successfully**
  - **Diverters Were Able to Move the Projectile Towards the Laser Target Spot**
- **Issues Uncovered**
  - **Only 5 of 16 Available Diverters Were Fired**
    - Glass Beads Alone Deemed not Adequate to Protect Divert Fire Set Electronics During Multiple Shock Events – No Potting Was Used
    - Neglected to Conduct Sufficient Electronics Reliability Tests Against Multiple Divert Shock Impulses

Follow-On Demonstration Efforts Due in CY05