Testing Inertial Guidance Devices
ACAMP Workshop, June 2013
Agenda

Ideal Aerosmith Overview

More on Inertial Sensor Testing

Partnering with ACAMP
Locations and Facilities

Domestic Locations

- GFK, ND
- EGF, MN
- MLP, CA
- PHX, AZ
- PIT, PA

Employees

- Production: 88
- Engineering: 47
- Sales: 2
- Admin/Finance: 9

Employees: Total 156

Growth

http://www.ideal-aerosmith.com
Worldwide Customer Base

Competitive Advantage to High-Tech Industry Leaders

Airlines and Avionics Repair Organizations

Major Aerospace and Defense Suppliers

Prime Aerospace and Defense Contractors

American Airlines
Air France
China Airlines
Delta
EVA Air
Lufthansa
United
AmeCO Beijing
Inertial Aerospace Services, Inc.
Freescale Semiconductor
Advanced EC Systems, Inc.
PVP
Ineractive Aerospace Services, Inc.
FAA CR# 196542

ATA
Applied Technology Associates
Honeywell
Applied Technology Associates
Honeywell

Curtiss-Wright
General Dynamics
Goodrich

TRW
STMicroelectronics

Northrop Grumman
Sandia National Laboratories

Sperry Marine
Connexion by Boeing

Crossbow
Draper Laboratory

Freescale
Advanced EC Systems, Inc.

Raytheon
Sikorsky

Boeing
EADS CASA

Northrop Grumman

Jet Propulsion Laboratory
California Institute of Technology

BAE Systems
HAL

Rockwell Collins
ROKETSAN

Prime Aerospace and Defense Contractors
Gyro-Automotive-Oil

Innovative Engineering for Reduced Time-to-Market
Ideal/ACAMP Timeline

- 3-Axis Table PO: March, 2010
- Table Installation: May, 2011
- WAVE Conference: October 2011
- Memorandum of Understanding: May, 2012
- IMU Test Solution: March, 2013
- WAVE Conference: May, 2013
Ideal/ACAMP
Project Objectives

- Flexibility for current and future UUTs
- Finalize the hardware architecture
- Define software architecture
- Implement Landmark and ADIS IMUs
Test Solution Description

Hardware:
• 3-axis table
• NI cRIO for UUT interface
• NI PXI chassis for data logging
• Time synchronization

Software:
• NI FPGA LabView for UUT interface
• NI RT LabView for data streaming
• NI LabView for data logging
• NI TestStand for test sequence control
Subject UUTs

Landmark 40
- 3-axis gyroscope + 3-axis accelerometer
- RS485 interface
- Low-noise, low-bias drift
- Applications:
  - Commercial automotive and motorcycle testing
  - Motorsports racing
  - Aircraft applications
  - Sea applications

ADIS 16375
- 3-axis gyroscope + 3-axis accelerometer
- SPI interface
- Applications:
  - Precision instrumentation
  - Platform stabilization and control
  - Industrial vehicle navigation
  - Downhole instrumentation
  - Robotics
Agenda

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Inertial Test Solutions

Motion Domain

Test Application Domain

Test Fixtures

Algorithms

Data Acquisition

Test Software

e etc.
Inertial Guidance
Test Applications

- Laboratory Testing
  - Variety of UUTs
  - Low Throughput
  - High Accuracy
  - Complex Testing
  - Flexible Test Profiles

- High-Volume Production
  - MEMS
  - High Throughput
  - Lower Accuracy
  - Multiple UUTs
  - Fixed Test Profiles

- Flight Motion Simulation
  - Higher Order Systems
  - Low Throughput
  - High Accuracy
  - Mission Critical
  - Hardware in the Loop
IMU Test System Example

- Position and rate table
- Data acquisition and processing
- Features that reduce cycle time
- Concurrent testing of up to 30 IMUs
- Innovative high-precision fixture design
Smart Weapons
Test System Example

• Flight motion simulation
• HIL (hardware in the loop)
• 3-axis motion
• High dynamic response
• Special geometry
• Controlled by UUT as response to external stimuli
Non-Magnetic Test System Example

• Automatic, non-magnetic
• 3-axis precision positioning
• High-temperature thermal chamber
• Directional drilling tool verification and calibration
• Gyroscopes, accelerometers and compasses