

AFFTC-PA-1110



Limited Evaluation of AIM-9 Control Surface Effects on F-16 LCO Characteristics

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War-Winning Capabilities ... On Time, On Cost



LCO on the F-16

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LCO on the F-16

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Major Anthony Massett

Major Robert Ungerman

Major Reinald Groult

Captain Jason Honabarger

Captain Jared Salk

First Lieutenant Pierluigi De Paolis

Lieutenant Colonel Timothy Jorris

Major Peter Vitt

Project Test Pilot

Project Test Pilot

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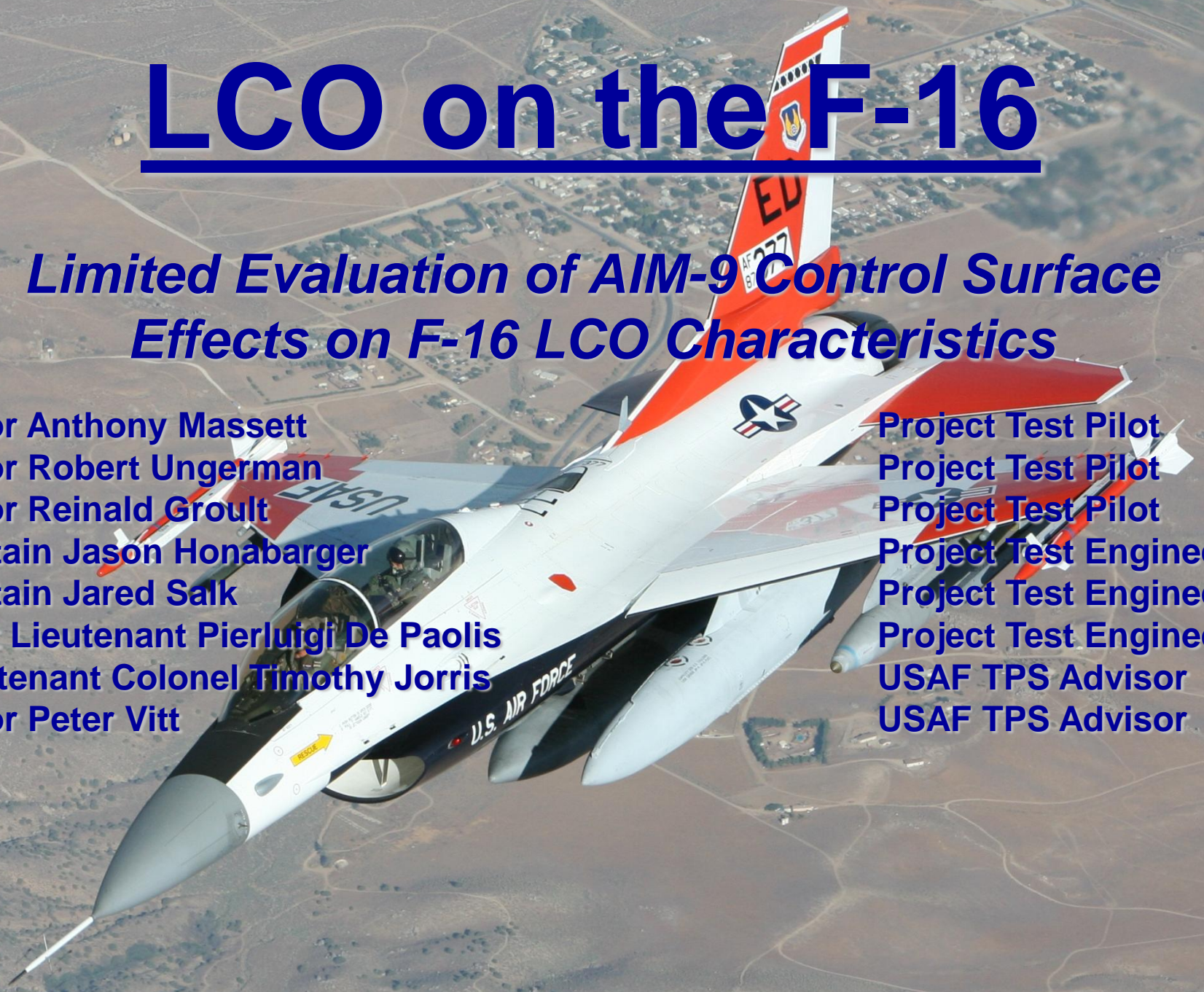
Project Test Engineer

Project Test Engineer

Project Test Engineer

USAF TPS Advisor

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LCO on the F-16

Overview



- Introduction
- Test Objectives
- Findings
- Statistical Analysis
- Conclusions





LCO on the F-16

Introduction



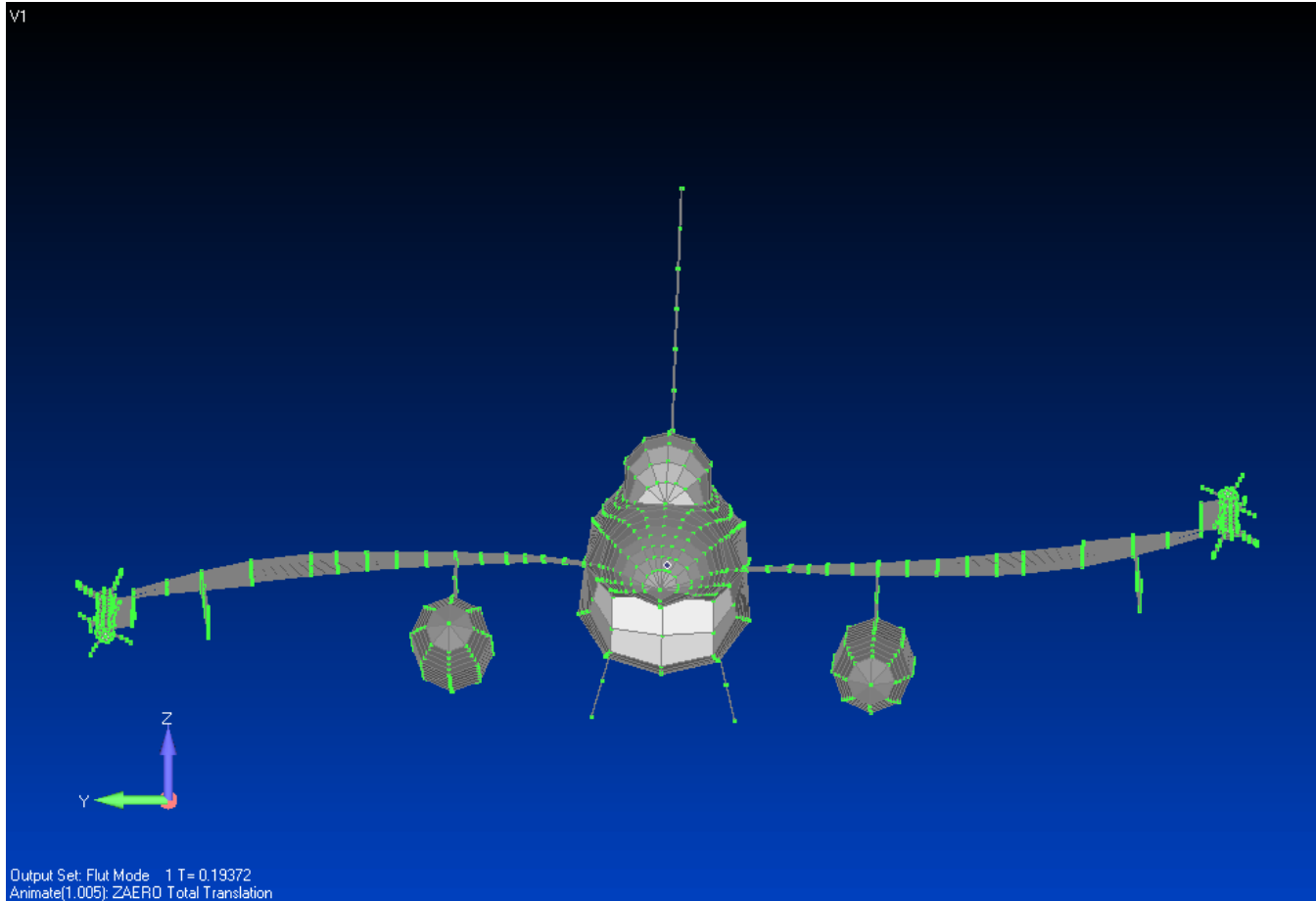
- **F-16 Limit Cycle Oscillation (LCO)**
 - Thin wings & external stores
 - Common for certain store loadouts

- **LCO operational impacts**
 - Pilot fatigue & workload
 - Weapons lock on & separation
 - Structural issues



LCO on the F-16

Introduction



- F-16 Zero LCO Analysis

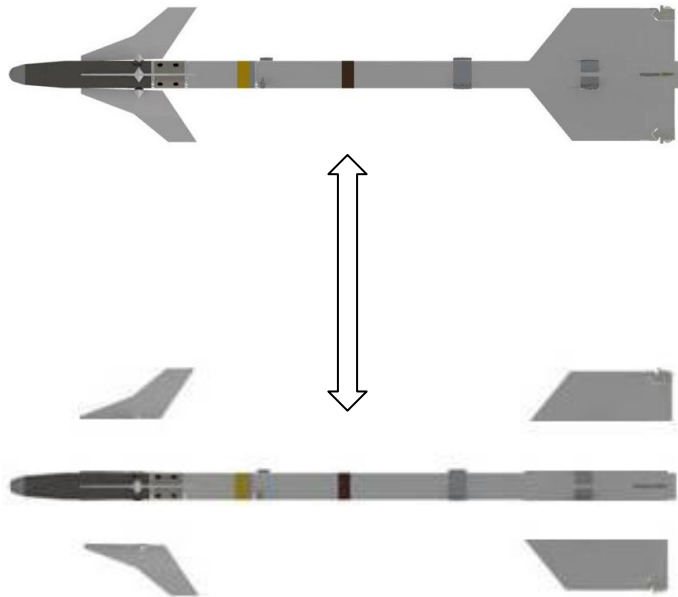


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General Test Objective



- Compare the LCO characteristics of common F-16 store loadouts, varying only AIM-9 aerodynamics





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Specific Objective 1



- **Observe LCO characteristics in test configurations with dummy AIM-9 control surfaces on and control surfaces off**
 - **Minimum LCO Mach Number**
 - **Wingtip Acceleration (LCO Amplitude)**
 - **LCO Frequency**

OBJECTIVE MET



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Specific Objective 2



- **Compare LCO characteristics in test configurations with dummy AIM-9 control surfaces on and control surfaces off**
 - **Minimum LCO Mach Number**
 - **Wingtip Acceleration (LCO Amplitude)**
 - **LCO Frequency**

OBJECTIVE MET



LCO on the F-16

Findings



- **Overall Findings:**
 - **YES – Control surfaces do matter**
 - **A quantifiable difference in minimum LCO Mach, and amplitude between fins on/off configurations was found**
 - **No quantifiable difference was found in frequency, however fins configuration was statistically determined to be a main factor**



LCO on the F-16

Conclusion



Bottom Line:

AIM-9 Control Surfaces DO Have an Effect on F-16 LCO Characteristics



Questions?