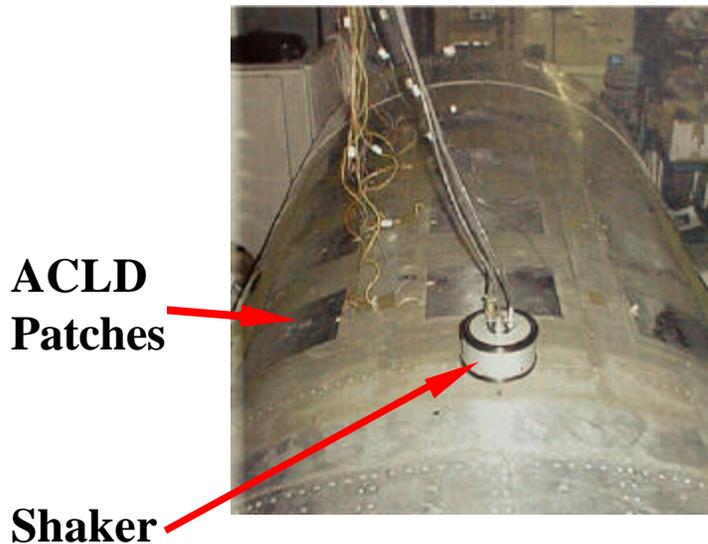


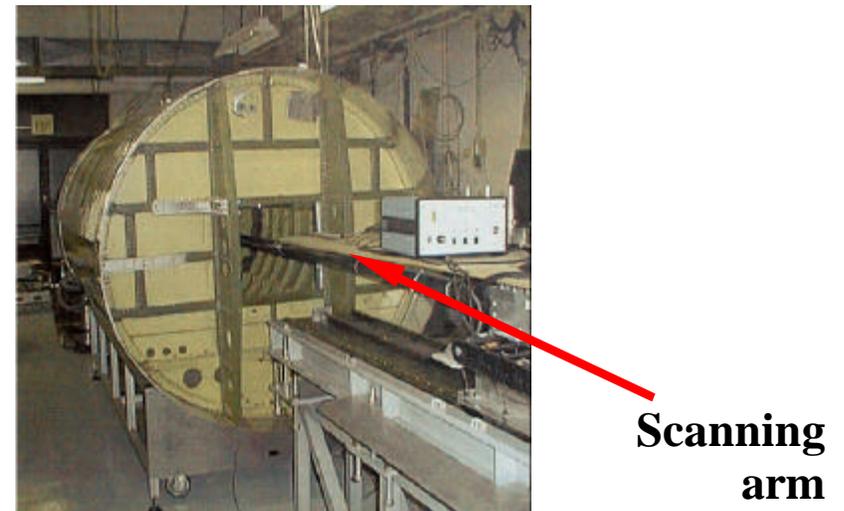


# ACTIVE & PASSIVE CONTROL OF SMART STRUCTURES

## EXAMPLE 1: Active Control of Interior Noise of Cessna Citation Fuselage



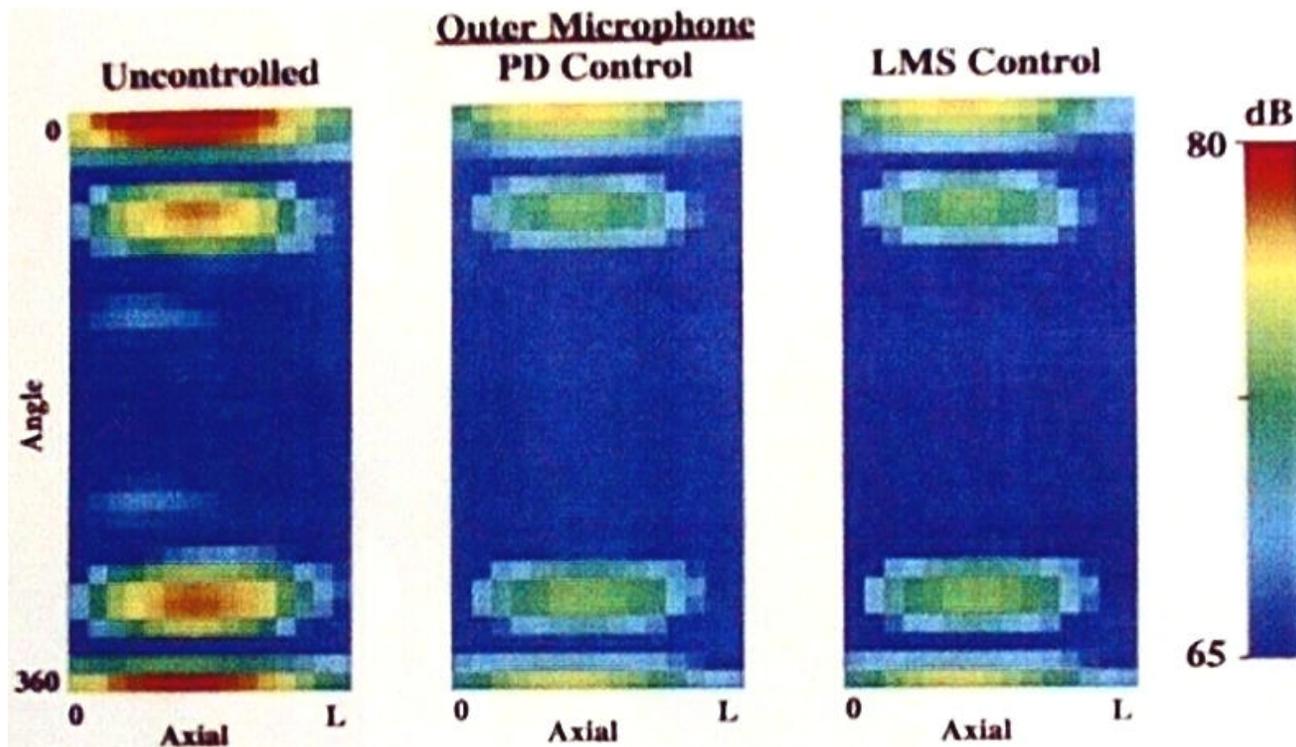
Fuselage, Shaker & Control Patches



Vibration & Acoustic Scanning

# ACTIVE & PASSIVE CONTROL OF SMART STRUCTURES

## EXAMPLE 1 (cont'd) : SOUND PRESSURE LEVEL INSIDE FUSELAGE WITH & WITHOUT CONTROLLER



# ACTIVE & PASSIVE CONTROL OF SMART STRUCTURES

## EXAMPLE 2: Vibration Isolation of A Gimbaled Camera System



Test Platform (ATI 496)



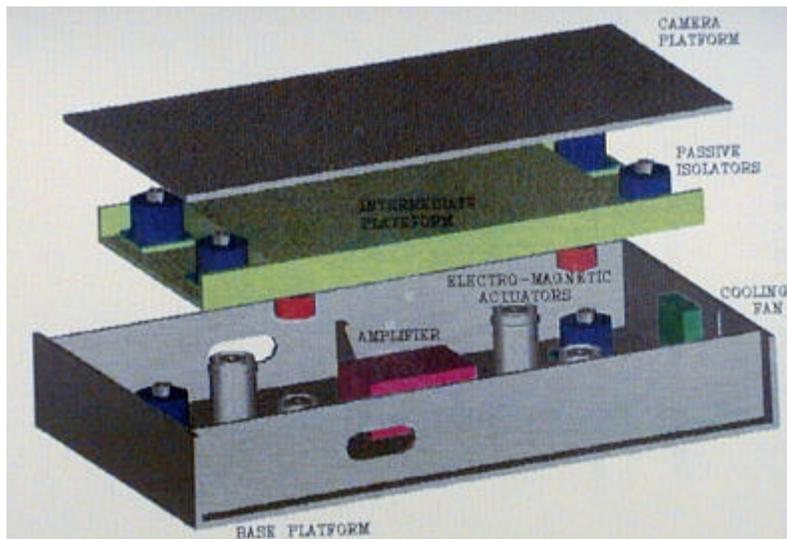
Camera System with Vibration Isolation

University of Maryland  
Vibration & Noise Control Lab.



# ACTIVE & PASSIVE CONTROL OF SMART STRUCTURES

## EXAMPLE 2 (cont'd): Vibration Isolation of A Gimbaled Camera System



CAD Drawing

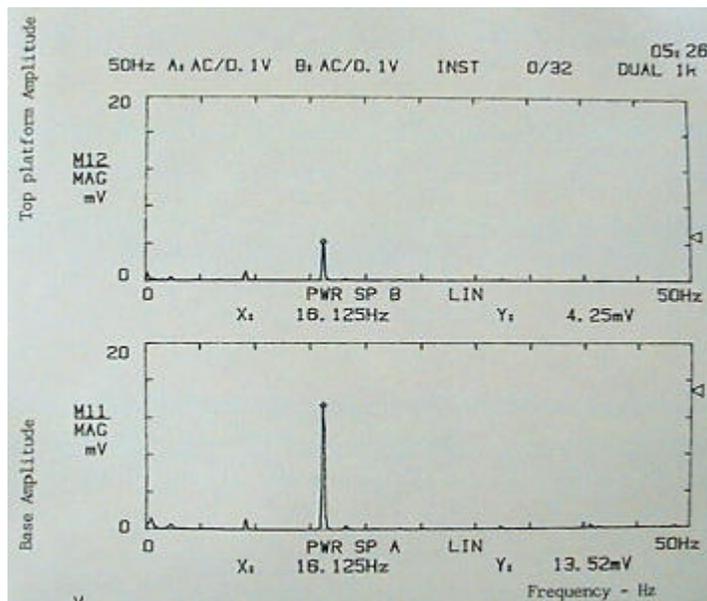


Hardware

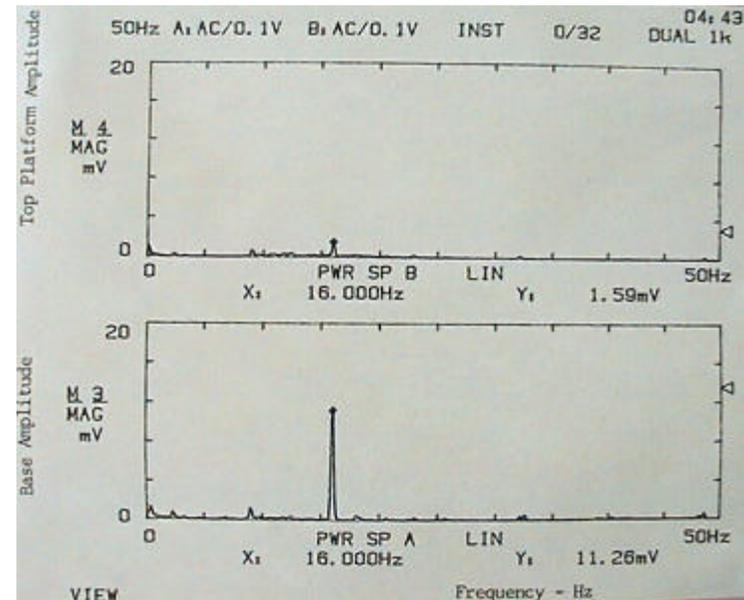
## Vibration Isolation Platform

# ACTIVE & PASSIVE CONTROL OF SMART STRUCTURES

## EXAMPLE 2 (cont'd): Vibration Isolation of A Gimbaled Camera System



Passive Control



Passive & Active Control

# ACQUIRED EQUIPMENT

## 2. ULTRASPORT HELICOPTER



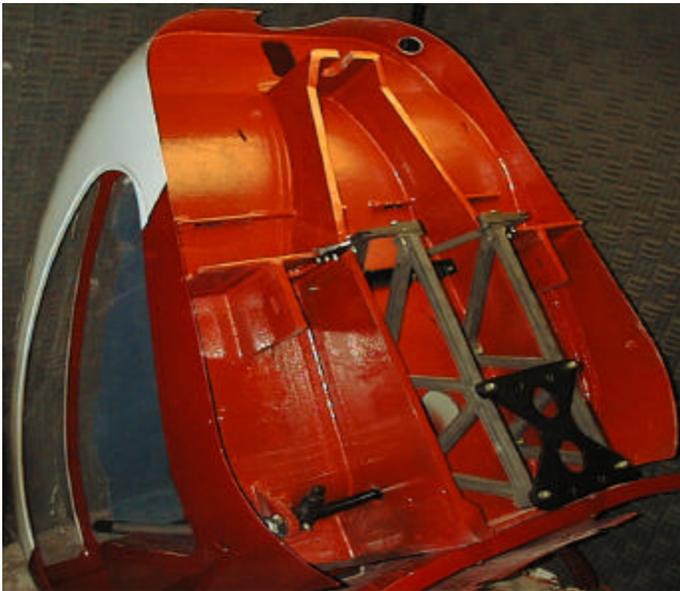
Engine



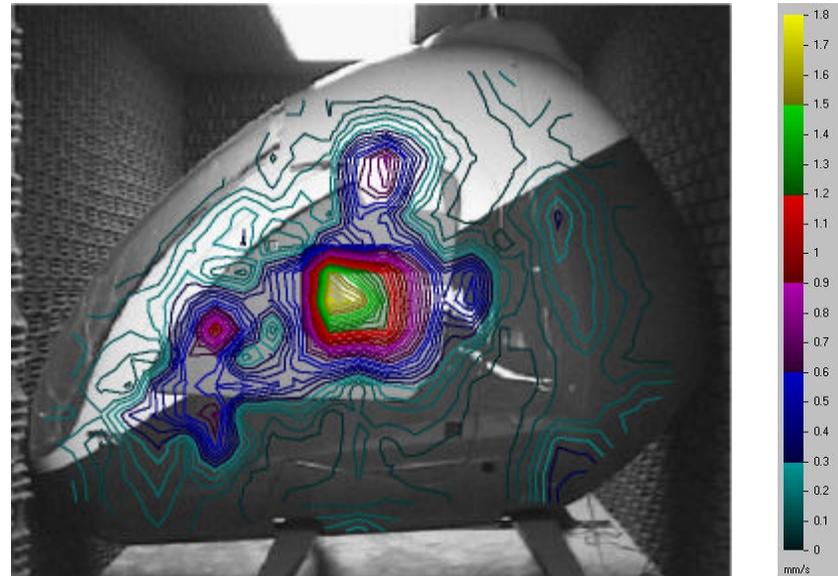
Sound level meter

# ACTIVE CONTROL OF HELICOPTER INTERIOR NOISE

Helicopter Cabin



Vibration Contours of Door

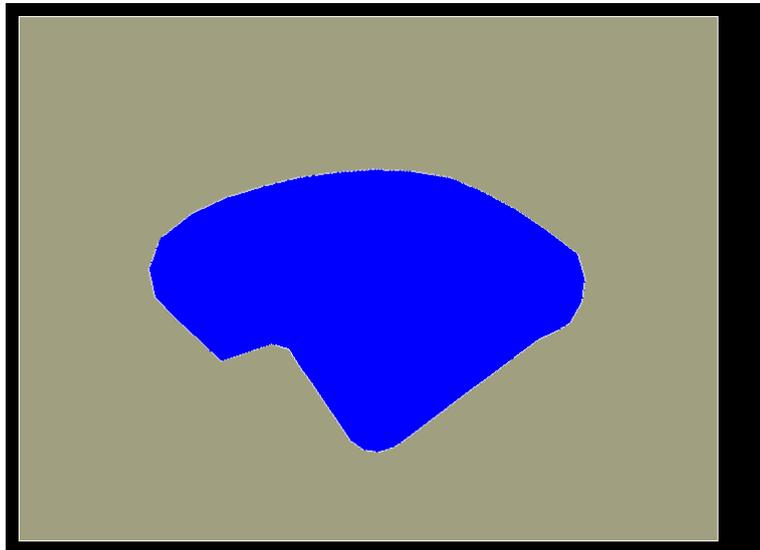


# MODE SHAPE OF HELICOPTER DOOR

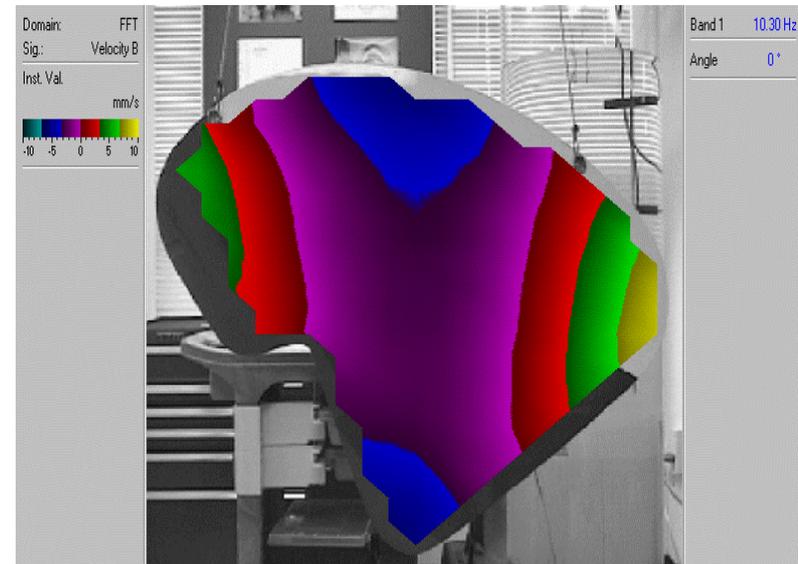
(1st Mode - 10.3Hz)



Finite Element



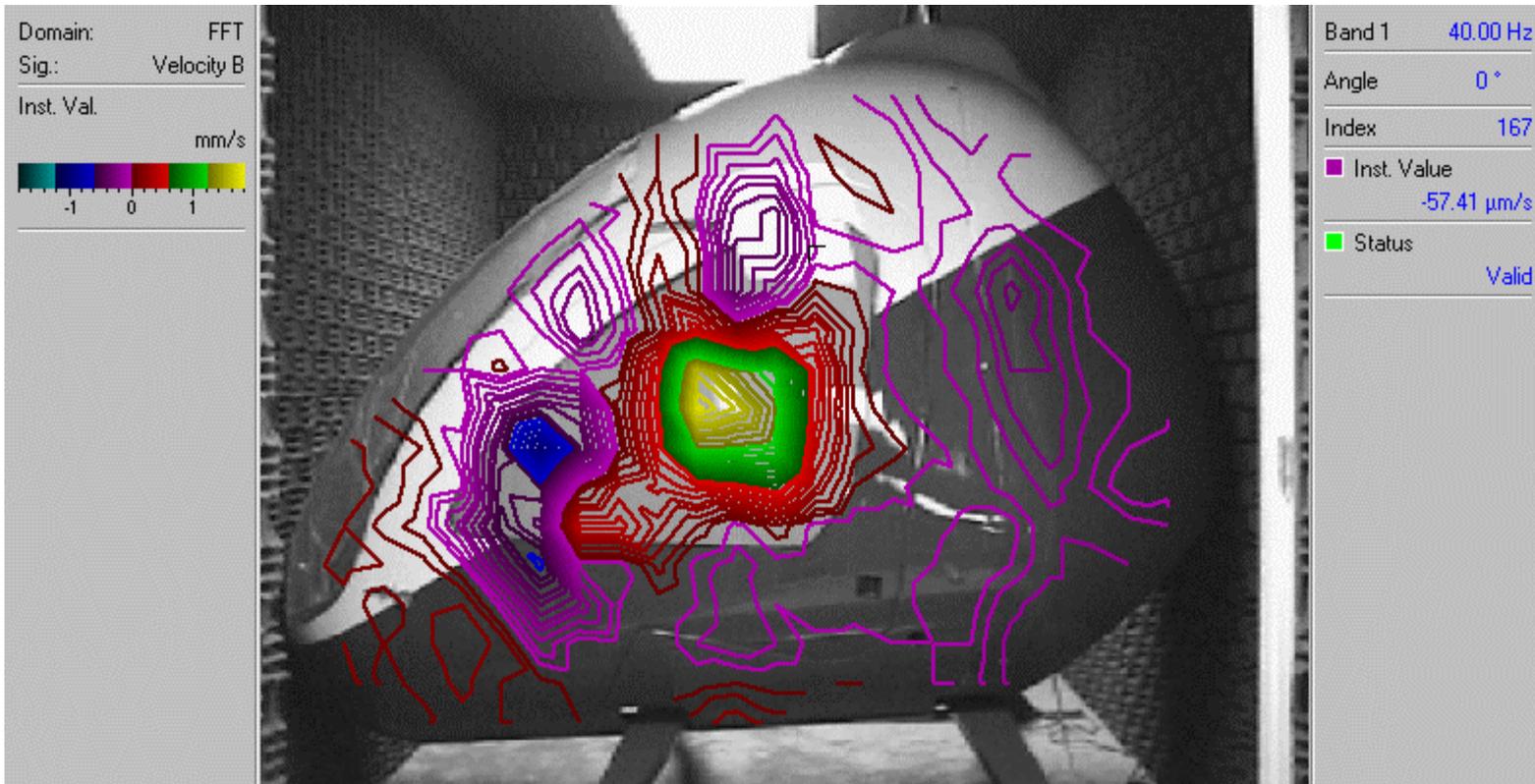
Experimental



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Vibration & Noise Control Lab.



# CABIN MODES OF VIBRATION (1ST MODE OF DOOR - 40 HZ)

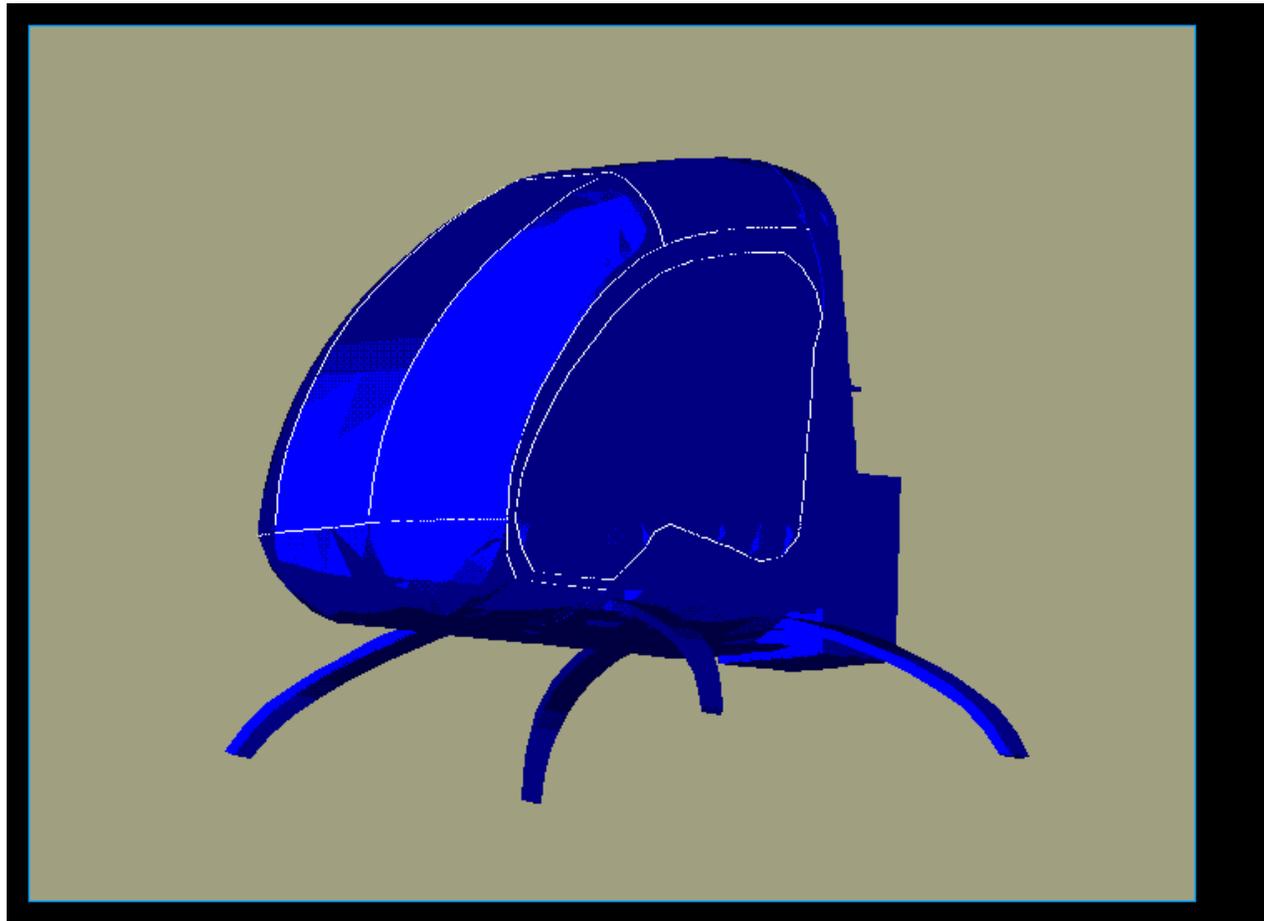


University of Maryland  
Vibration & Noise Control Lab.



# CABIN MODES OF VIBRATION

(1st MODE OF BOTTOM - 7.57 HZ)



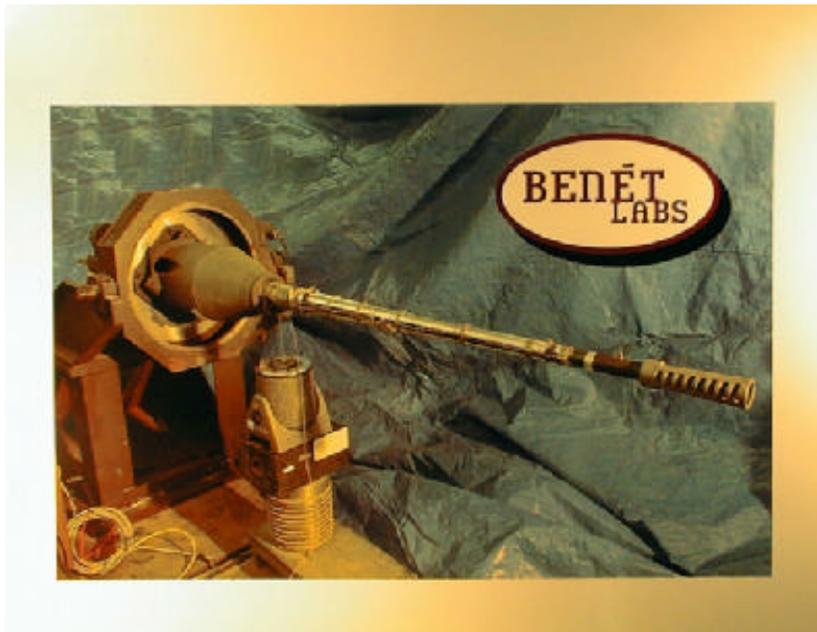
University of Maryland  
Vibration & Noise Control Lab.



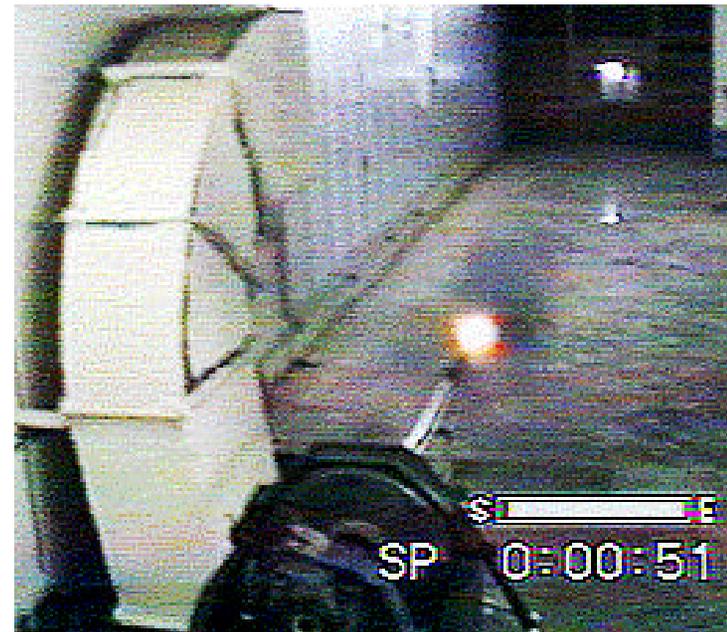
# ACTIVE CONTROL OF GUN BARREL VIBRATION

## OBJECTIVES

Enhance the firing accuracy of gun barrels using active controllers



**Dynamic Tests**

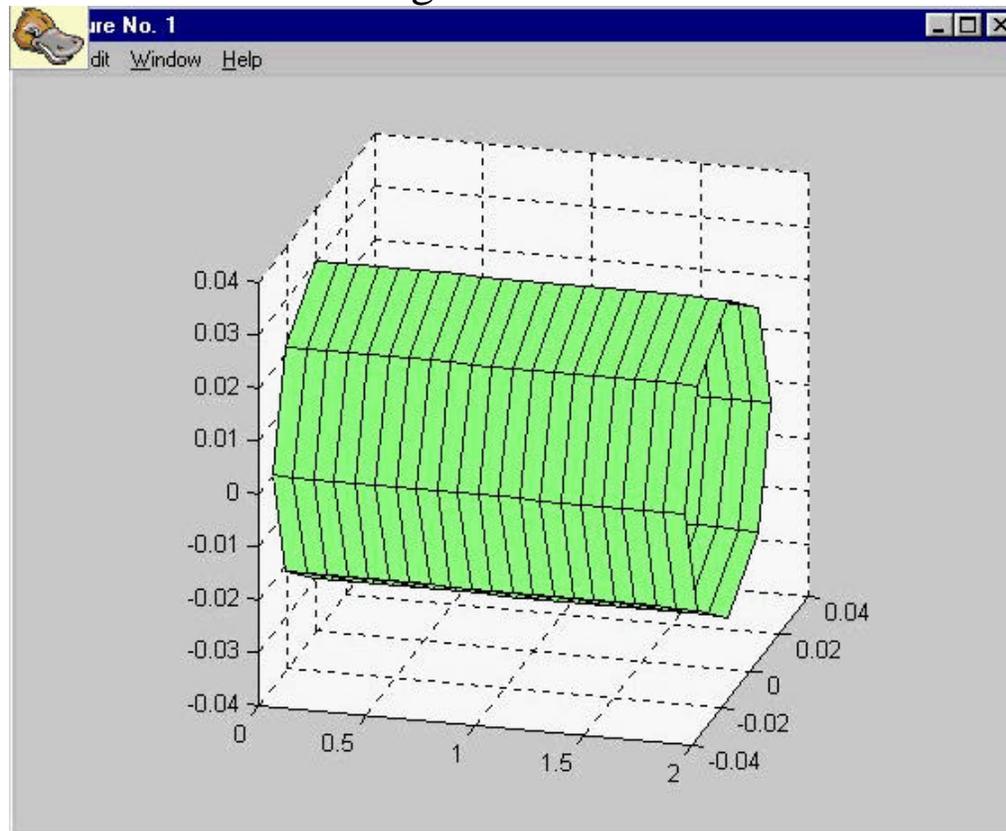


**Firing Tests**

# ACTIVE & REACTIVE SHELLS

## OBJECTIVES

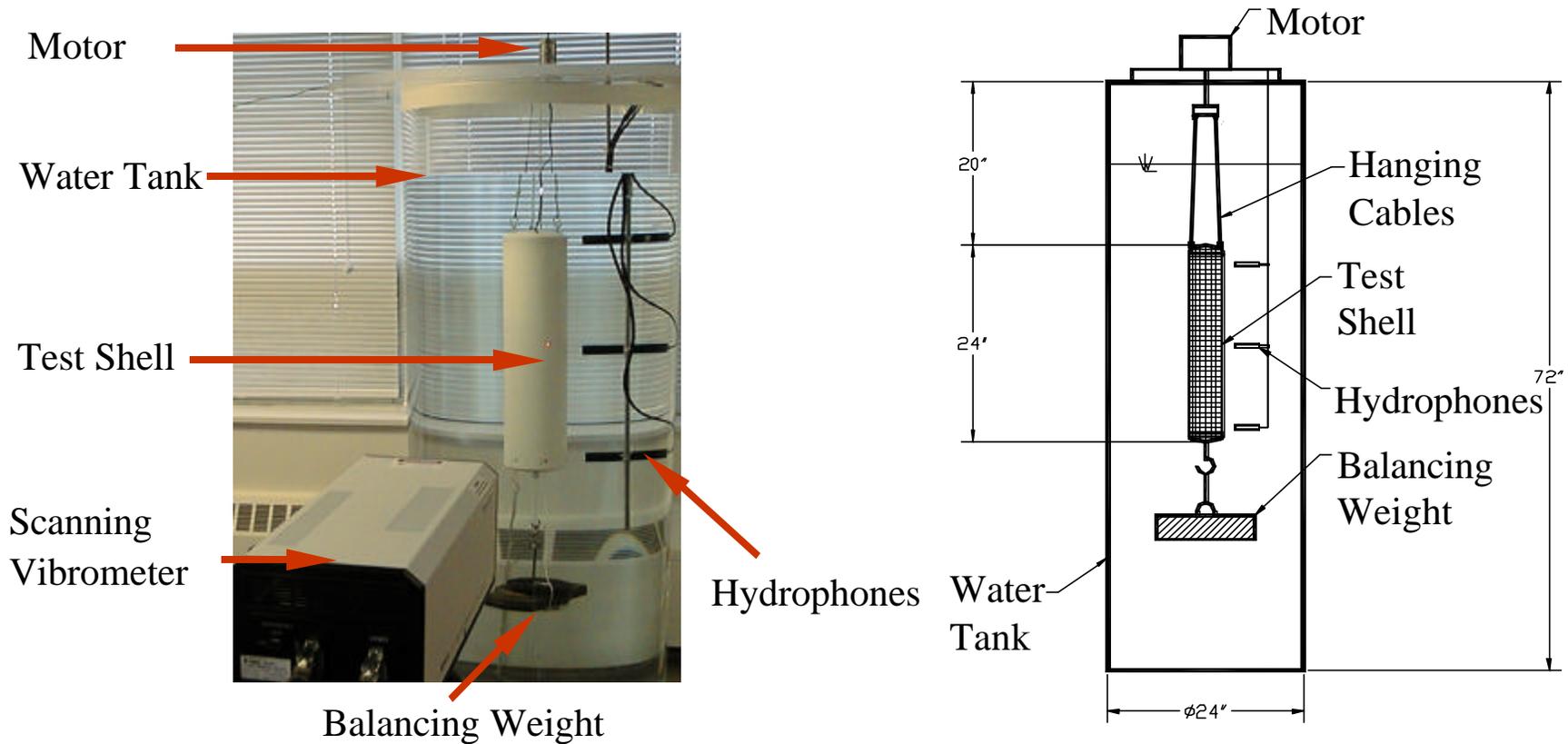
Enhance the critical firing speed of gun barrels by modeling & experimentation of new classes of active & reactive designs



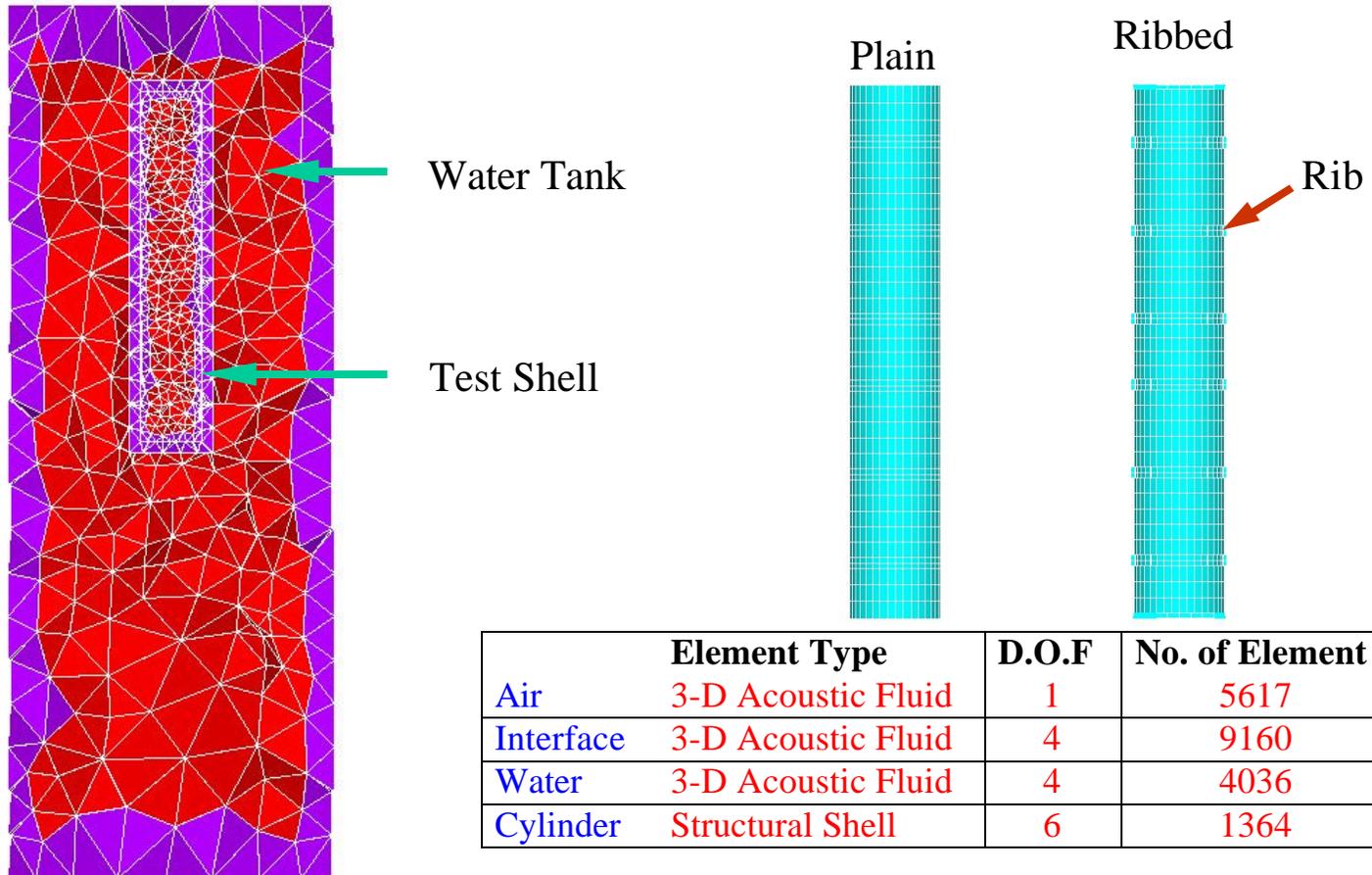
University of Maryland  
Vibration & Noise Control Lab.



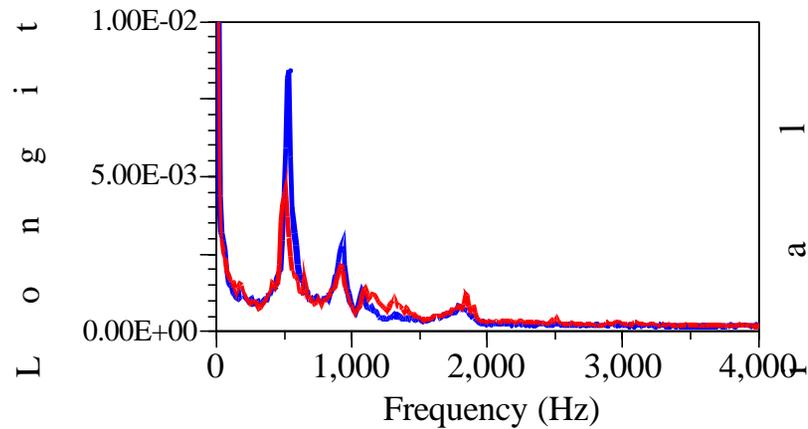
# EXPERIMENTAL FACILITY



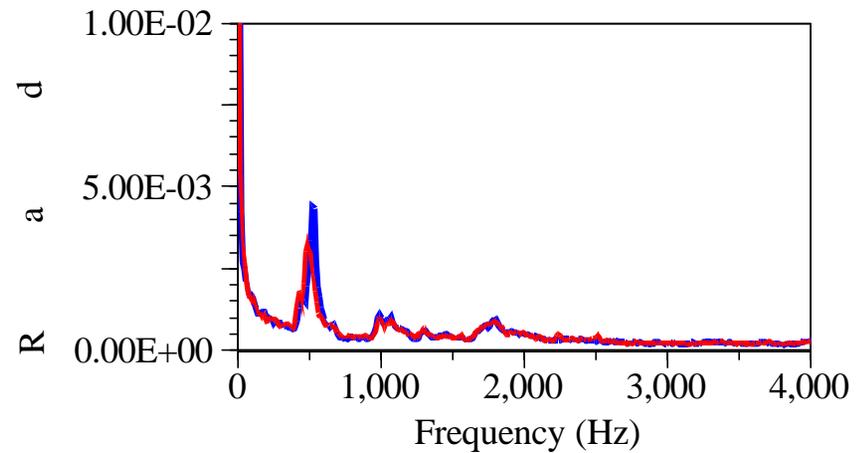
# FINITE ELEMENT MODEL



# VIBRATION CONTROL OF SHELL IN WATER



— Uncontrolled  
— Controlled



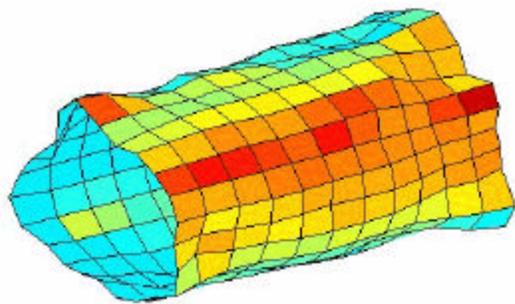
University of Maryland  
Vibration & Noise Control Lab.



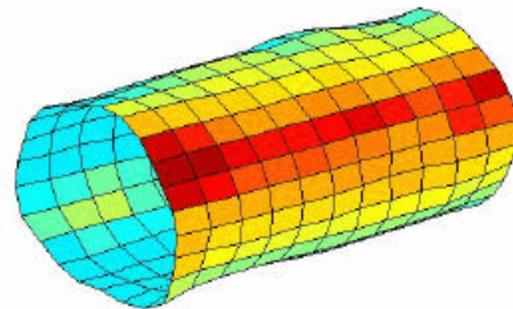
# LONGITUDINAL VIBRATION IN WATER



**Uncontrolled at 555 Hz**



**Controlled at 535 Hz**



**University of Maryland**  
**Vibration & Noise Control Lab.**

