



R O M E

A Jacobs Technology Group

Acoustic Microphone Traverse 14-by 22-Foot Subsonic Tunnel

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Key Words: Modifications / Upgrades



OUTLINE

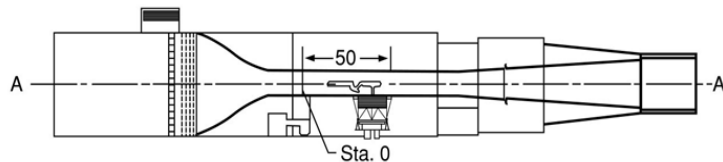
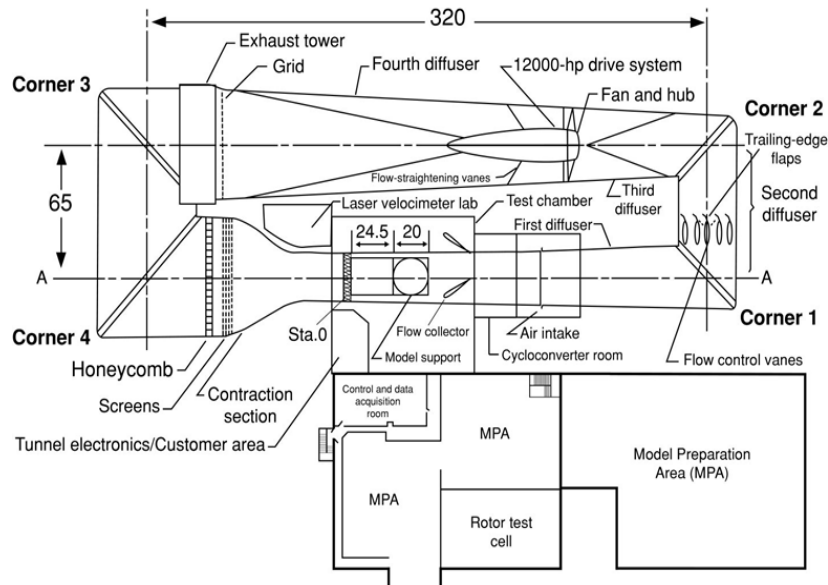


- 14x22 Overview
- Original Traverse System
- Special Considerations
- Objectives of New System
- Design
- Fabrication
- Installation / Checkout
- Capability

14X22 OVERVIEW



Test Section	14.5 x 21.75 x 50 Feet (4.4 x 6.6 x 15.2 meters)	
	Closed Jet	Open Jet
Speed	348 ft/sec (106 m/sec)	275 ft/sec (84 m/sec)
Reynolds No. Max	2.2×10^6 / ft (7.2×10^6 / m)	1.7×10^6 / ft (5.6×10^6 / m)

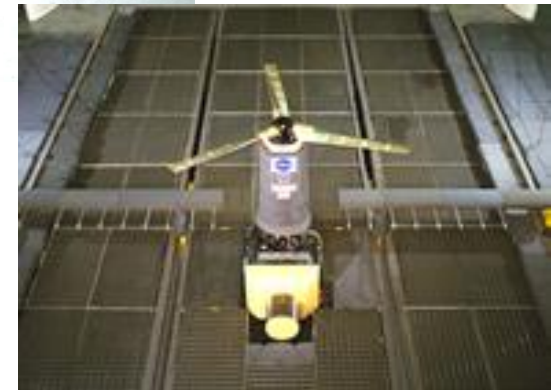


Schematic of 14-by 22-Foot Tunnel (dimensions in feet)

ORIGINAL TRAVERSE SYSTEM



- Four parallel rails
 - Assembled from 10-foot sections (16 total)
- Approximate setup time was 3 weeks
- Extensive alignment and assembly
- Special rigging and personnel
- Microphones installed on single or split-wing



SPECIAL CONSIDERATIONS



- Model Carts
 - Multiple carts
 - Various installations
 - Imprecise surface
 - Difficult to adjust
- Equipment Reuse
 - Acoustic treatment
 - Microphone “wings”
 - Microphones
- Thermal Effects on Tunnel



OBJECTIVES OF NEW SYSTEM



- Increased Wind Tunnel and Model Setup Productivity
- Reduce Installation Time to Three 8-hour Shifts
- Removal Time of Two 8-hour Shifts
- Drive Rail Units to be Lifted Into Test Section by Existing 5-ton Crane
- No Special Installation Equipment
- Minimize Manpower Required for Installation
- Simplify Operation

OBJECTIVES OF NEW SYSTEM (CONT'D)



- Performance Requirements
 - 44 Foot (13.4 meter) traverse distance
 - Operate at tunnel dynamic pressure up to 150 psf
 - 0.1 – 6.0 in/sec (2.5 - 152 mm/sec) traverse speed
 - 0.25 in (6.4 mm) positional accuracy
 - Mechanical noise < 45 dBA during operation
 - Electrically shielded (no EMI in microphone signals)

DESIGN



- Contractors
 - ROME (Prime)
 - Aerotech (Sub)
- “Turn-Key” System
- Single Piece Section Rail Assemblies (4)
- Positioned in Pre-Drilled Locations on Model Carts and Test Section Floor
- Pendant and Console Controllers



FABRICATION

- Major Assemblies by Aerotech in England
- Installation Assemblies by ROME in Virginia (Onsite at 14x22)



FABRICATION (CONT'D)



- Shipping
 - Specialized packing / storage
 - Truck
 - Airlift
- Receiving
 - Aerotech (onsite at 14x22)



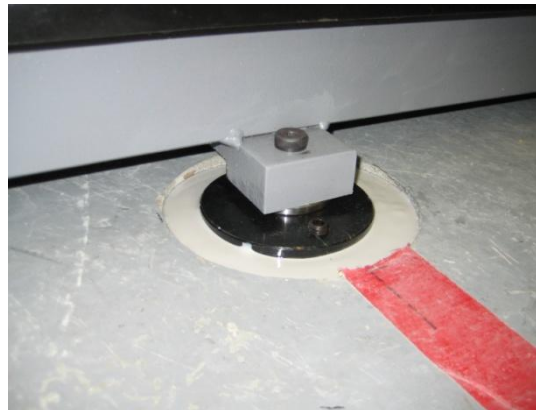
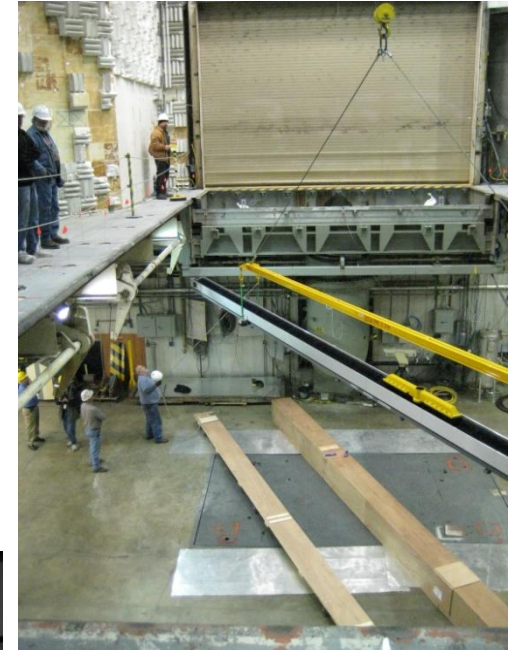
INSTALLATION / CHECKOUT



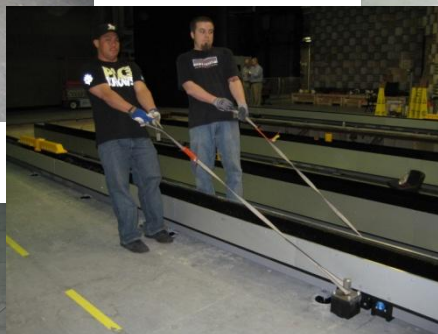
■ Initial Installation

- Receiving
- Inspection
- Lifting procedure development
- Setting anchor “pucks”
- Drilling attachment holes
- Surveying / alignment
- Acceptance testing
- Training

■ Two week duration



INSTALLATION / CHECKOUT (CONT'D)



CAPABILITY



- All Design Objectives Met
- All Performance Criteria Met
- Customer (NASA) Satisfied
 - Facility
 - Researcher
 - Project Manager
- Eager to Utilize System

