

Final Design Review

Lockheed Martin #2

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Agenda

- Background Information
- Scope
- Decision Matrix
- Final Design
- Videos
- Conclusion
- Questions

Statement of Need

- Modification to Virtual Combat Convoy Trainer (VCCT)



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What is the VCCT?

- Virtual Combat Convoy Trainer is a HUMMMWV simulator
- Headquarters in Orlando and shipped to Army Bases all over the world.



Problem Definition

- A device needs to be designed that will raise and lower the roof of the VCCT.

Main Goals:

- Make the current process safer
- Decrease Personnel



Process of Lifting the Roof

Step 1: Trailer



Step 2: Initial Roof Lift



Step 3: Final Roof Height



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Product Requirements

- 2-3 men should be able raise/lower roof.
- Device cannot permanently add to height or width of trailer.
- Nothing can disturb the actual simulator.
- Design/Material of trailer cannot be altered.
- Electric motors cannot be used.

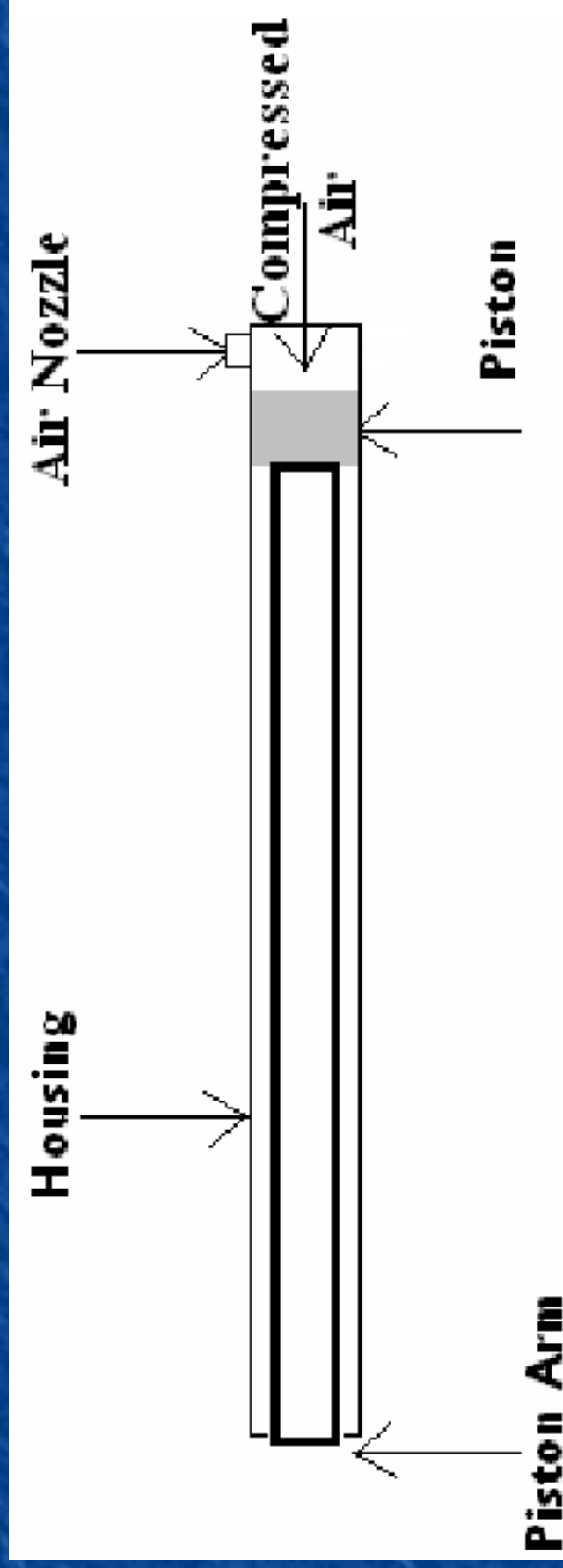
Scope

- Problems with Safety Inspections
 - Due to safety restrictions it is impracticable to build a full scale model.
- 1/5 Scale Model
 - A scaled down model and setup will be used to test our design idea.

Decision Matrix

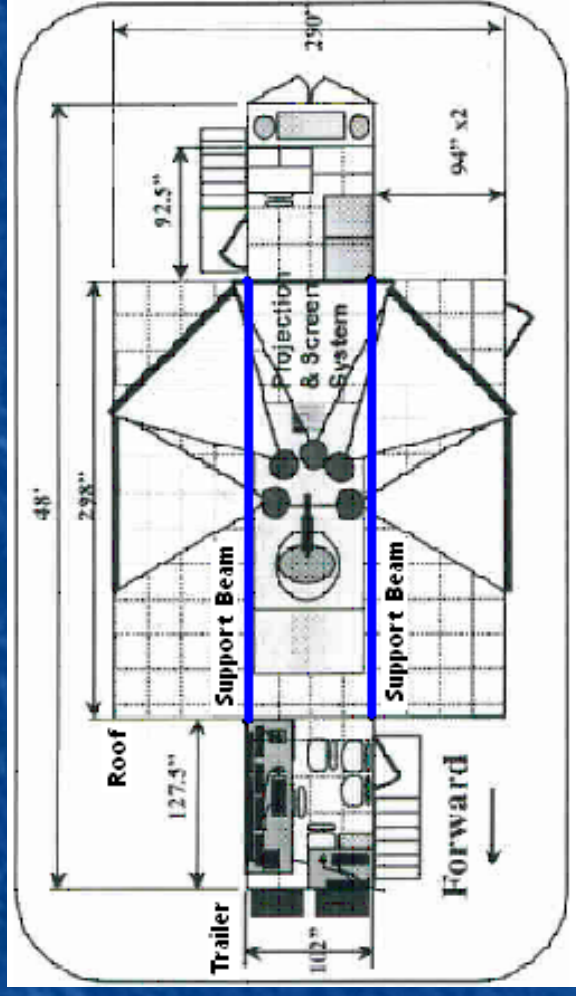
Concept	Personnel	Safety	Cost	Setup	Reliability	Total
1A. Mechanical Lift	0.3	0.3	0.2	0.1	0.1	1
1B. Hydraulic Lift	3	4	5	3	3	3.7
2. Pulley System	3	3	3	4	3	3.1
3. Pulley Lift	4	3	3	2	4	3.3
4. Four-Bar Pulley	5	4	4	4	4	4.3
5. Ground Based Cylinder	4	4	2	1	3	3.2
	4	5	3	3	4	4
6. Pneumatic Cylinder						
7. Cylinder w/Heat Source	5	4	3	4	4	4
8. Spring Hinge	4	3	4	4	3	3.6
9. Motor Lift	4	3	4	4	4	3.7
	5	3	4	3	3	3.8

Pneumatic Cylinder



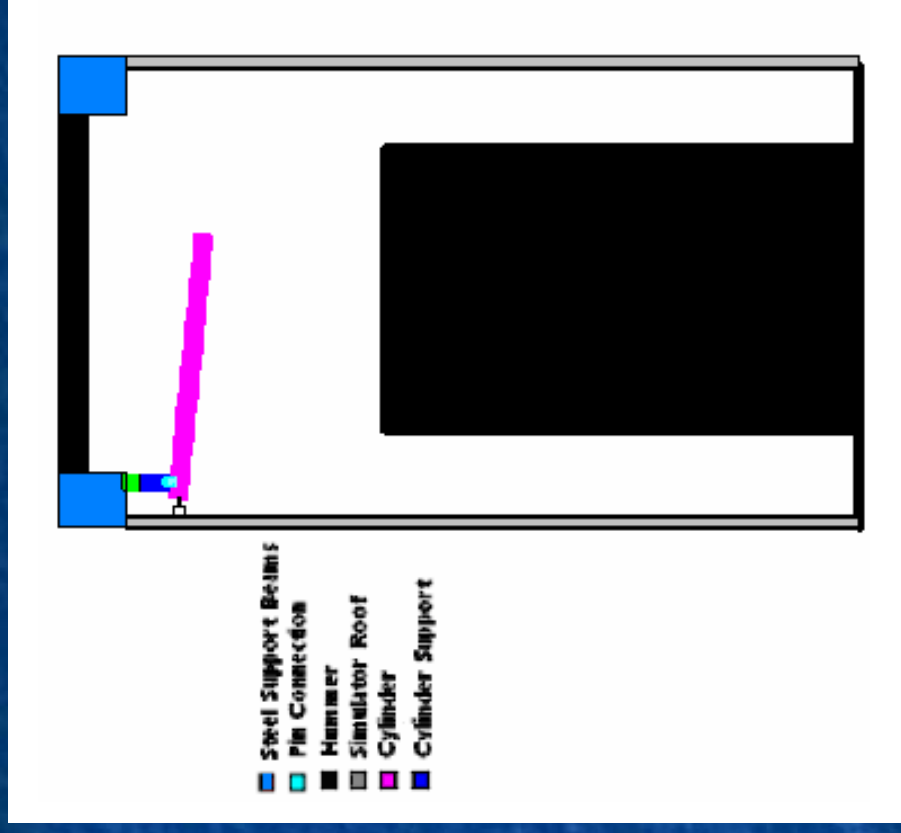
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Schematic of Trailer



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System Schematic (Closed)



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Positioning



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Final Design



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Scaled Frame and Roof

5ft x 1.5ft, 100lbs



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Pneumatic Cylinder

Bore: 2 in
Stroke: 8 in
Length: 13.5 in
Weight: 6 pounds



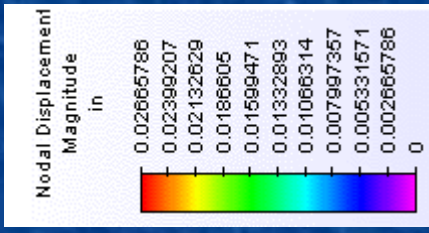
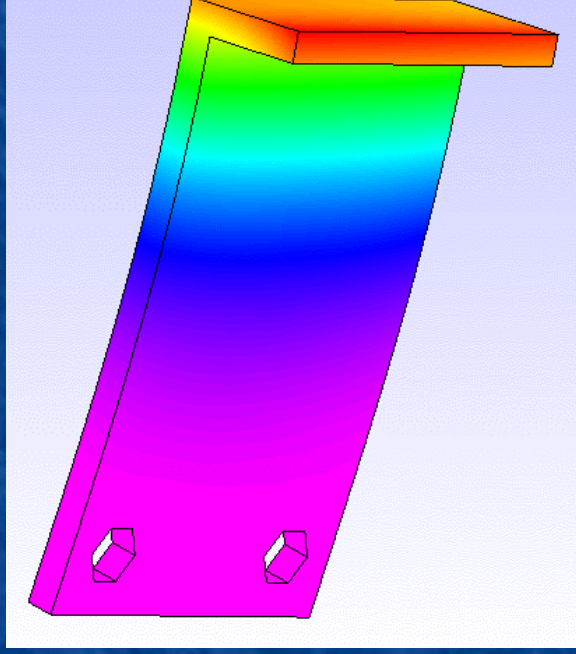
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Main Support Structure



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Support Bracket



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Main Support Connection

- Steel studs and cylinder support beam connected to main support beam



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Cylinder Connection

- Foot Bracket and hinge connect cylinder to support beam



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Roof Connection

- Triangular Connector and clevis rod connects roof to cylinder

Triangular Connector



Clevis Rod



Roof Connection



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Quick Connect

- Quick Release Safety Pins
- Reduce setup/teardown time



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Hose Connections



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Safety Hose Connections

- Safety Hose Fitting
 - Dampens outflow in case of inlet pressure loss



Hose Connections

- Quick Connect
- Reduces setup and teardown time



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Final Design Information

- Needed Pressure: 70 psi
- Total Cost: \$751.53



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Trailer Videos

Final Video



Safety Video



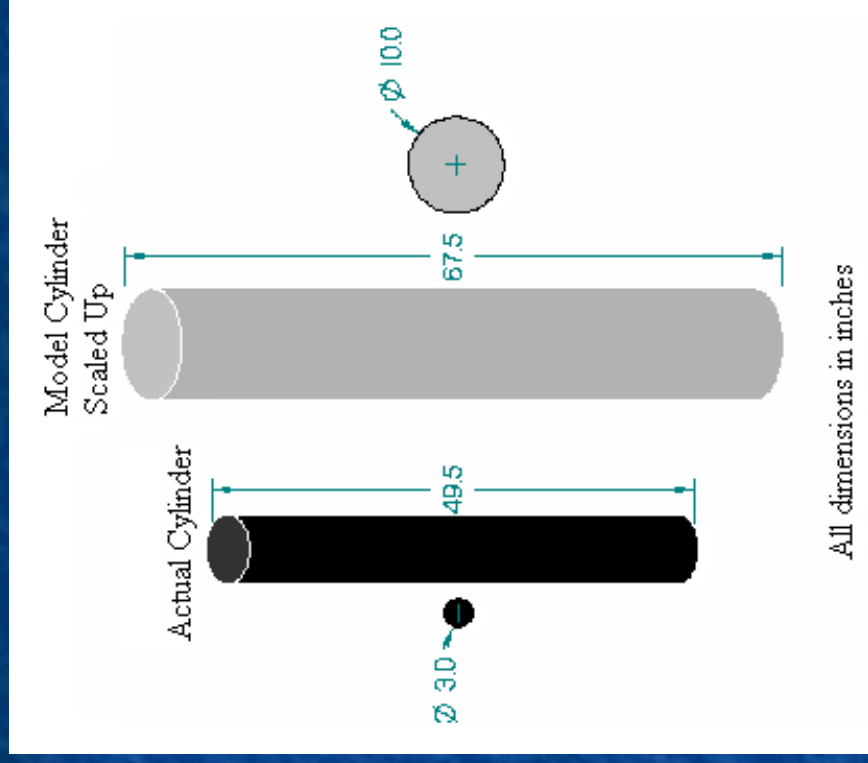
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Actual Cylinder

- Allenair
 - Stroke: 40 in
 - Total Length: 46 in
 - Bore: 3 in
 - Cost: \$372.58
 - FS: 1.5
 - Weight: 30 lbs
 - Total Weight: 45 lbs
 - (MIL-STD-1472: 56 lbs)



Cylinder Comparison



Conclusions

- 2 Main Goals:
 - Make the current process safer
 - Roof falls at a dampened rate
 - Decrease Personnel
 - Only 2 men required
- Enhancements
 - Reduce weight of system components
 - Use only 1 cylinder (increase bore/weight)

Questions?



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