



H. KOCH & SONS CO.



Development of a Mobile Aircrew Webbing Retractor System



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Report Documentation Page

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Background



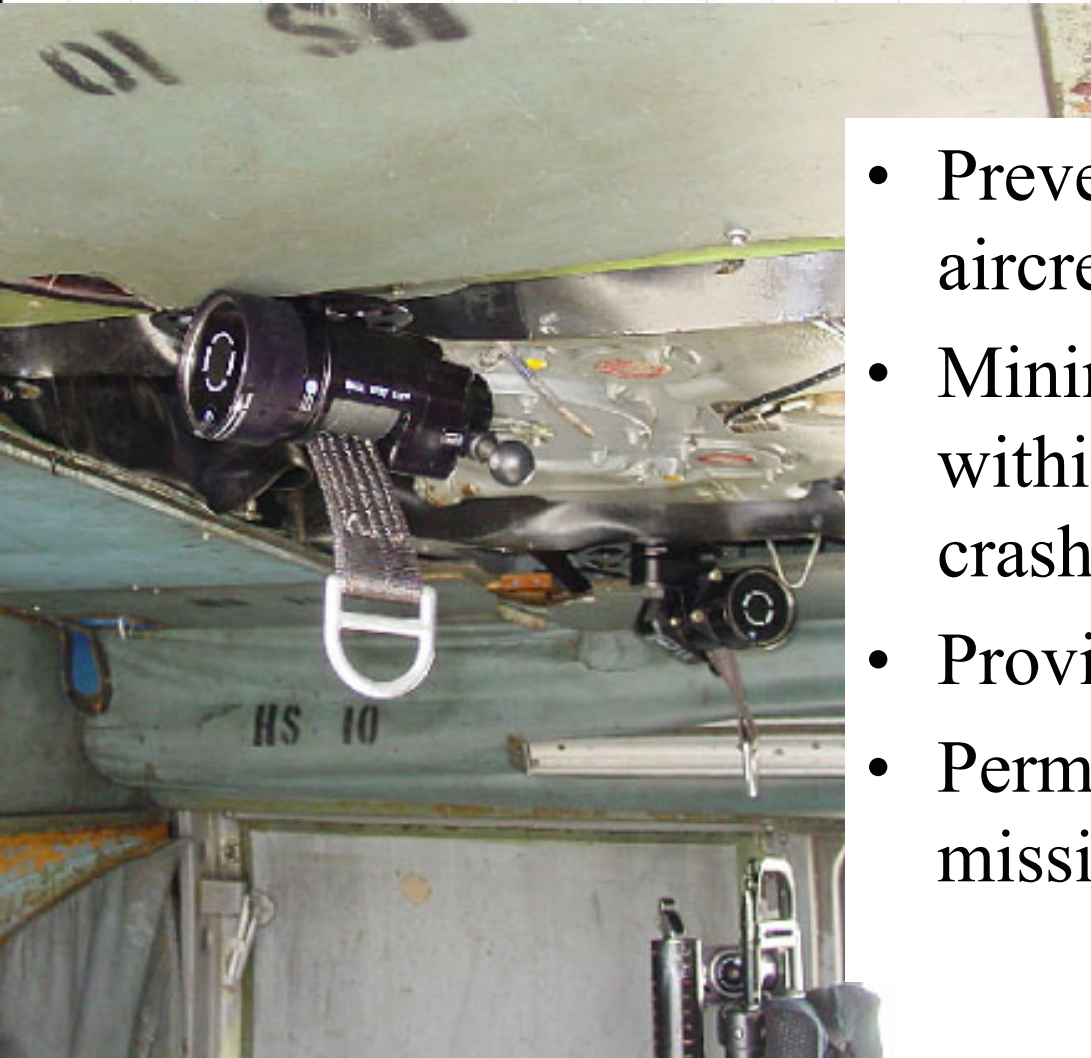
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System Requirements



- Prevent ejection of cabin aircrew in survivable crashes.
- Minimize strike envelope within cabin in survivable crashes.
- Provide in-flight fall protection.
- Permit aircrew mobility for mission duties.





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Two Systems



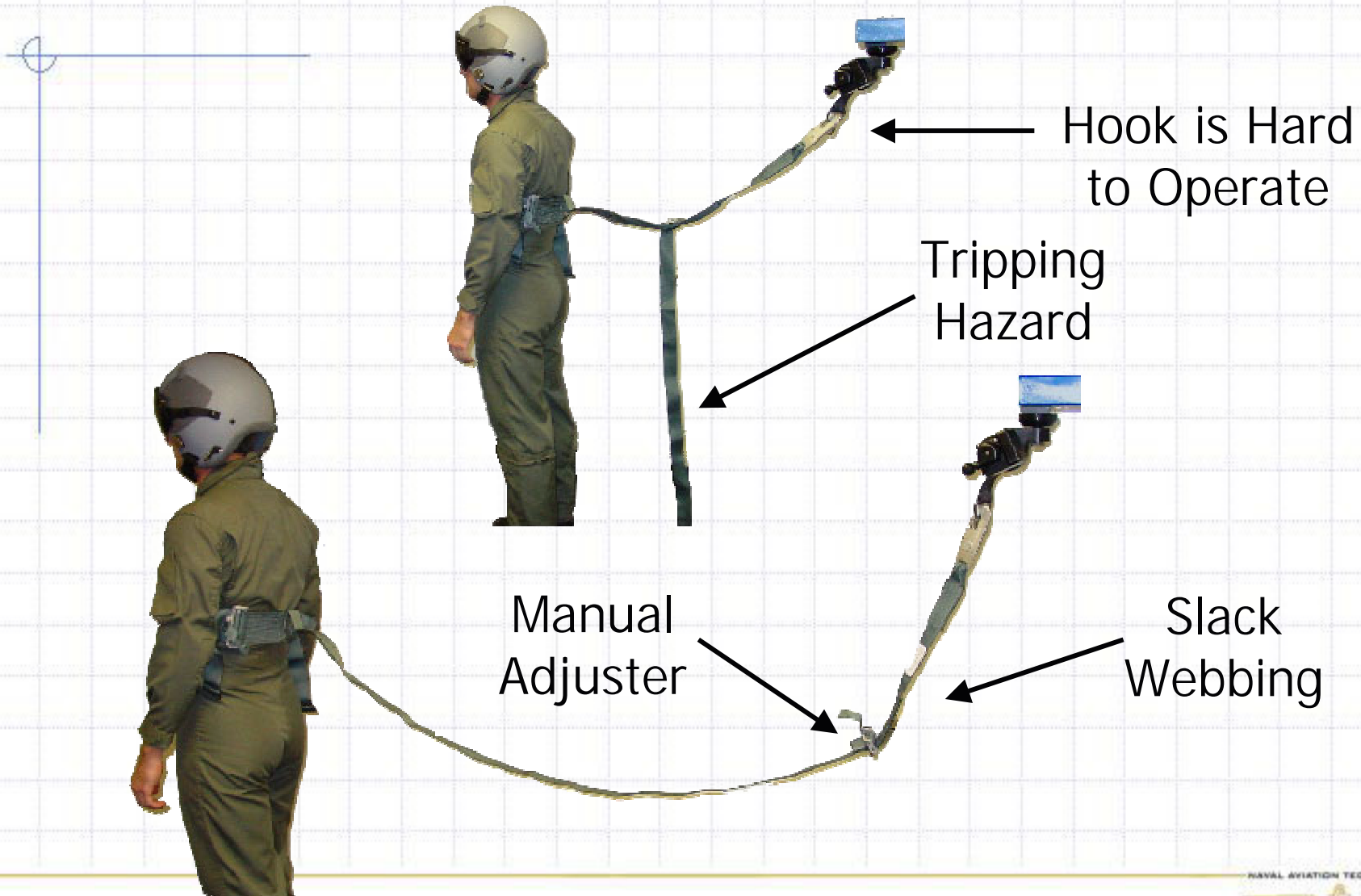
- H-60 MAWR
 - Interim solution
 - Modified gunner's belt
 - Modified webbing retractor
- Common System
 - Integration into AIRSAVE lifting harness
 - Accommodate large cabin aircraft





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Current System Disadvantages



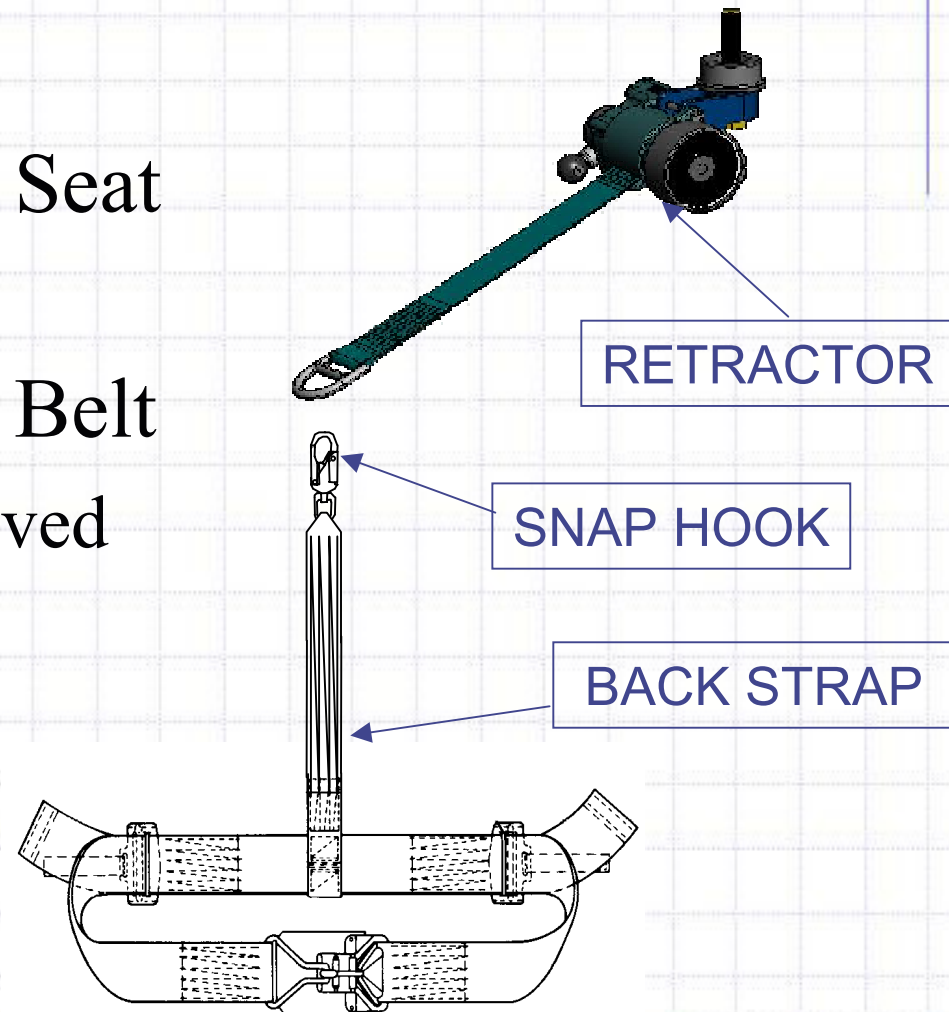


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System Components



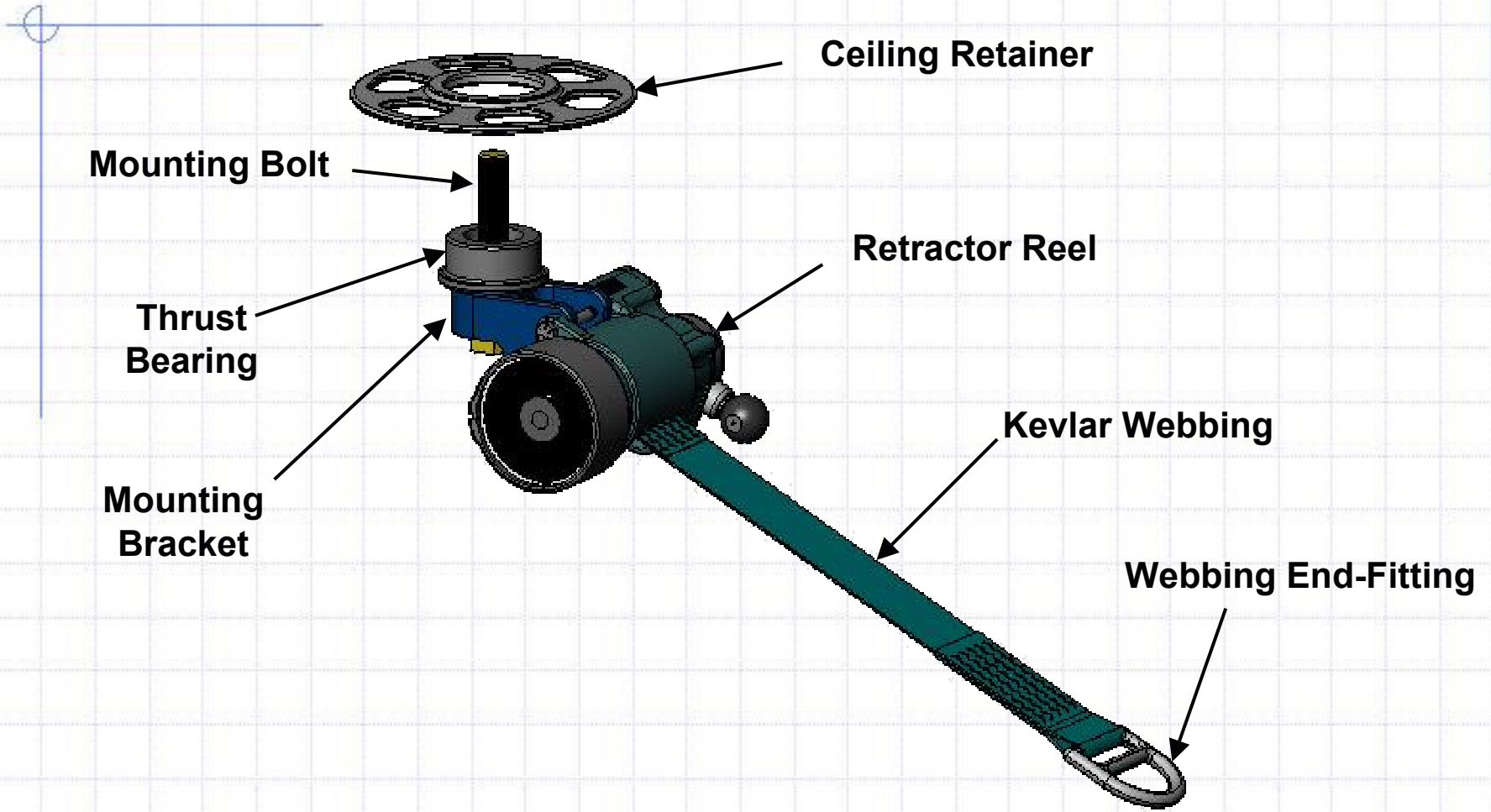
- Modified Gunner's Seat Webbing Retractor
- Modified Gunner's Belt
 - Slide adjuster removed
 - New snap hook





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Retractor Components



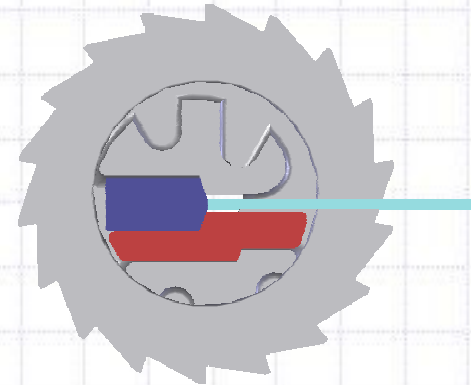


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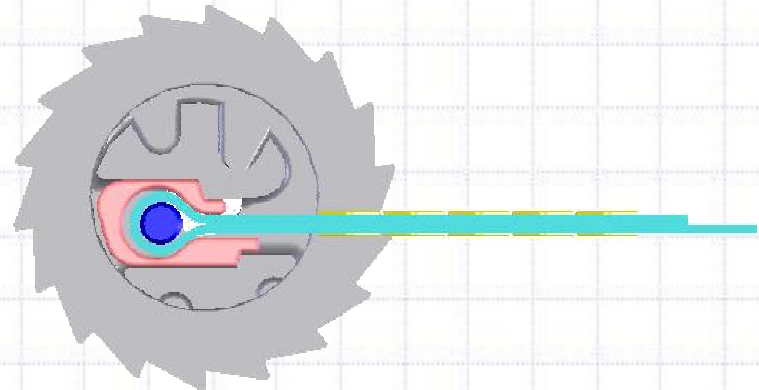
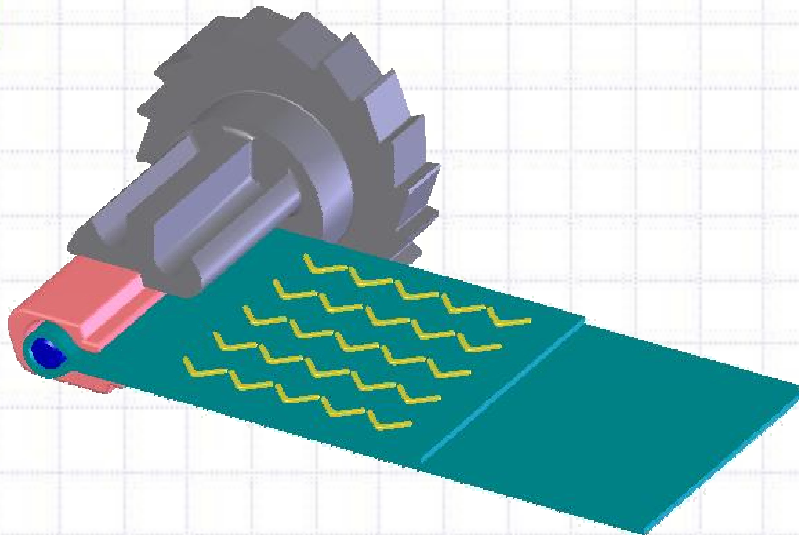


Webbing Retainer

- Replaces Molded End Design
- Aluminum Alloy Retaining Bar
- High Strength Kevlar Stitching
- Tensile Tested to > 6000 lb



MA-8/16 Design



MAWR Design

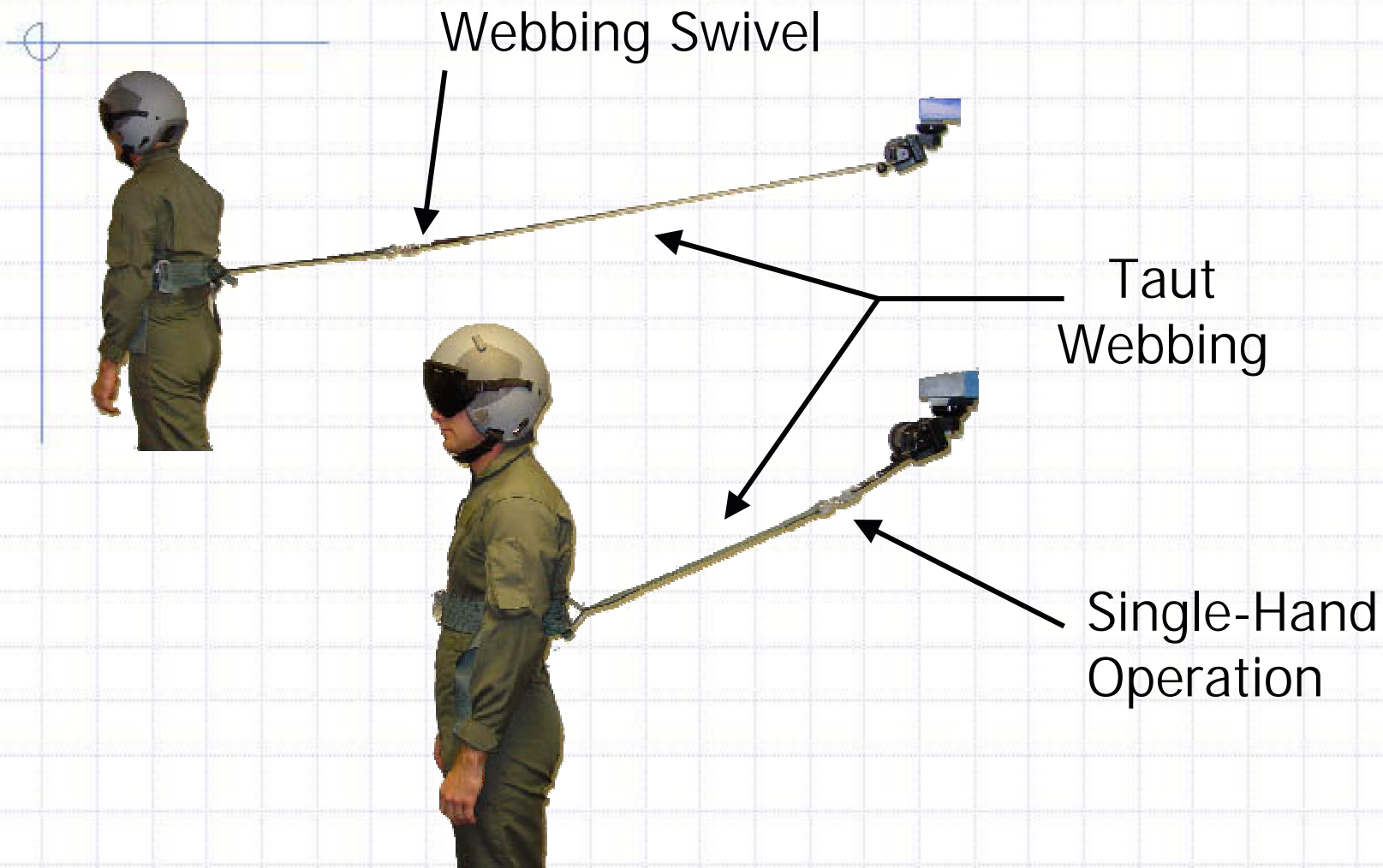




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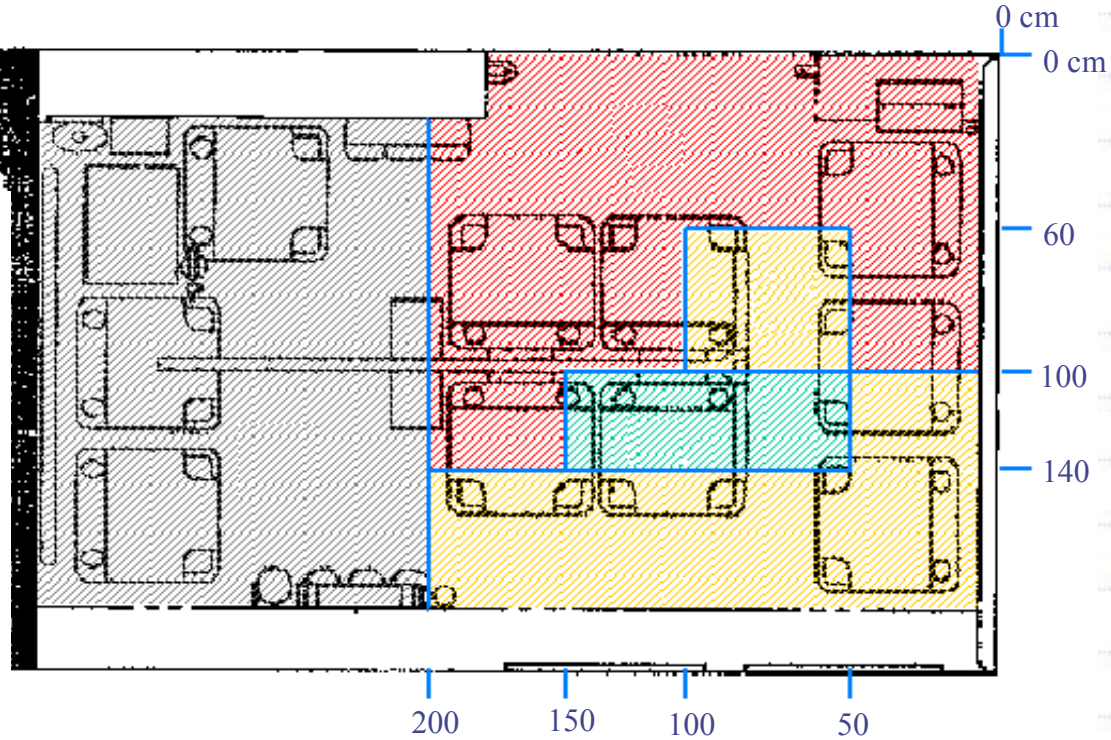
New System Advantages





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Computer Simulations



- Grid of 24 anchor points
- Several crash pulses applied to each point
- Kinematics of crewmember evaluated
- Each anchor point was scored
 - Good
 - Moderate
 - Unacceptable



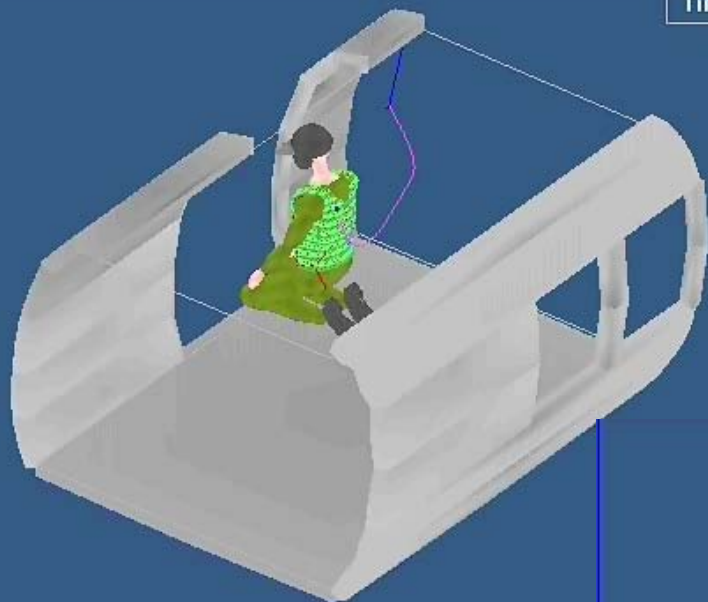


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Computer Simulations

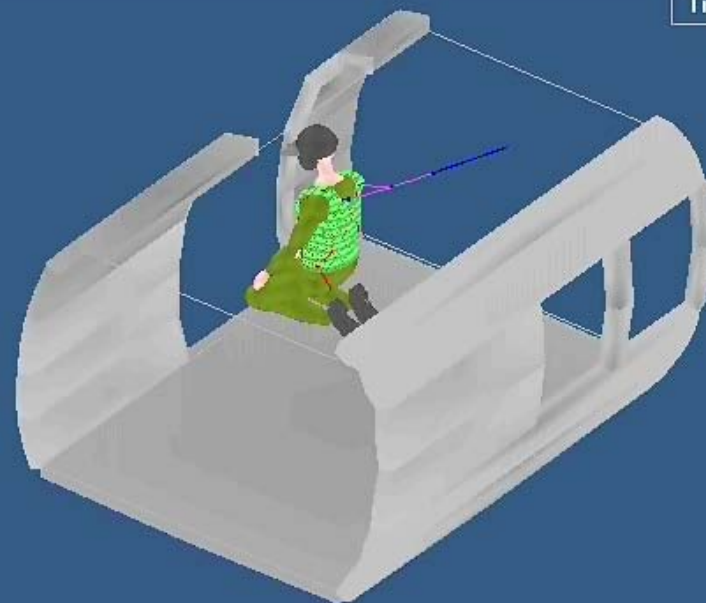
Time = 0.000000



Without MAWR



Time = 0.000000



With MAWR



Pulse: 20Gz, 10Gxy (at 45°)





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Dynamic Tests

- 12 Horizontal Accelerator Tests
 - 10G, 32 ft/sec pulse
 - Forward and sideward orientations
 - Upstream and downstream of retractor
 - 5% female and 95% male
 - Armor provided slight chest compression improvement





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Dynamic Tests

- 12 Drop Tests
 - 5% female and 95% male
 - 10.9" average payout to lock
(2" to 17" range)
 - Retractors of 3 different sensitivities used
 - Armor provided slight chest compression improvement



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Ground and Flight Testing



- Ground Evaluations
 - SH-60B, F, F+, HH-60H
 - No nuisance locking
 - Entanglement was reduced
- Flight Testing
 - System was nearly invisible to aircrew





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Thank You

Questions?



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