NHTSA THOR Update
September 30, 2013

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Human Injury Research Division
Test Device for Human Occupant Restraint

1992
TAD-50M Prototype Dummy

2001
THOR Alpha Prototype Dummy

2005
THOR-NT Dummy

2011-2013
Mod Kit THOR Evaluation

End 2013
THOR 50th NHTSA Agency Decision
Mod Kit Hardware History

<table>
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<th>2010</th>
<th>2011</th>
<th>2012</th>
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<td>THOR Mod Kit</td>
<td>THOR Mod Kit</td>
<td>THOR Metric</td>
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<tr>
<td>(n=1) Evaluation</td>
<td>(n=3) Consolidation and Fabrication</td>
<td>(n=1) Conversion and Fabrication</td>
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THOR Mod Kit (n=1)
Evaluation

THOR Mod Kit (n=3)
Consolidation and Fabrication

THOR Metric (n=1)
Conversion and Fabrication
THOR Research Plan

2012

THOR Metric Evaluation
Inspection Cert Testing

2013

Multi-Point Thoracic Injury Criteria Development

Fabricate Additional THOR Metric ATDs, Initiate Repeatability & Reproducibility

THOR Tasks

Hardware
Finalize Hardware, Release Technical Data Package

Biofidelity Evaluation

Hybrid III Comparison

Procedures
Injury Criteria
Certification
Seating

Parallel NHTSA Agency Needs

Oblique MDB Vehicle Testing
Advanced Adaptive Restraint Program
Rear Seat Advanced Restraints Program

THOR 50th NHTSA Agency Decision
Technical Data Packages

- **Mod Kit**
  - Allow users to upgrade THOR-NT

- **Metric THOR**
  - Allow users purchase or build complete THOR

- Status: Drafts provided by Humanetics, currently under revision

- Drawing package to include:
  - Bill of Materials (BOM)
  - Drawing Index
  - Drawing Specifications
  - 2D Drawings (in DWG and PDF formats)
  - 3D Parametric Database (in Autodesk Inventor and generic formats)

- Associated updates to documentation provided by Humanetics, more updates necessary

- **Does not include SD3 shoulder**
  - Out of scope of contract with Humanetics

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THOR 50th
- Complete, review technical data package
- Demonstrate biofidelity
- Fabricate additional Metric THORs (w/SD-3)
- Initiate thorough R&R

THOR 5th
- Assess anthropometry (UMTRI)
- Update biomechanical response requirements
- Update design with Mod Kit components
- Fabricate and evaluate
• THOR-NT FE model available for download from “Collab” website
  ▪ Feedback has been provided by industry

• Currently incorporating Mod Kit components into model
  ▪ Collaborative effort

• Still need:
  ▪ Certification simulations
  ▪ SD-3 shoulder