



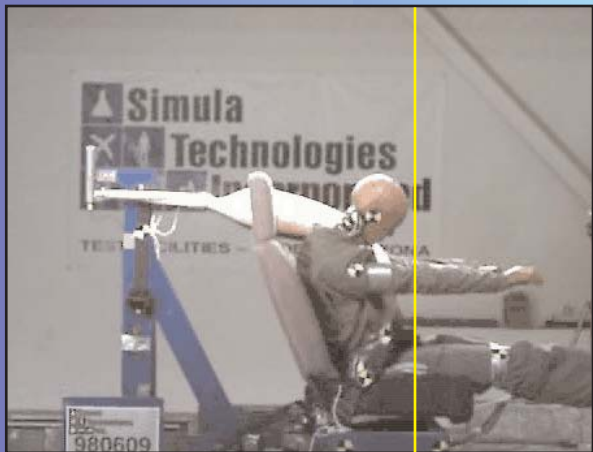
SIMULA

Safety Systems
Applied Technologies Division

Inflatable Tubular Torso Restraint For General Aviation Aircraft

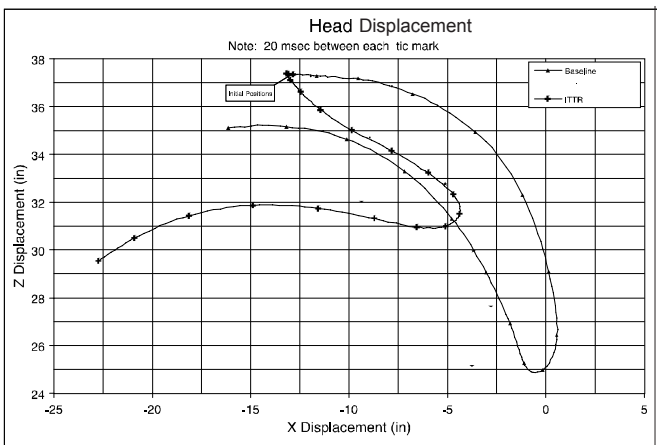


Baseline Test *without* ITTR



Identical Test *with* ITTR.

Figure 1



General ITTR Information Forward-facing Seat Application

Simula's patented Inflatable Tubular Torso Restraint (ITTR™) is an inflatable restraint system originally developed for the automotive industry.



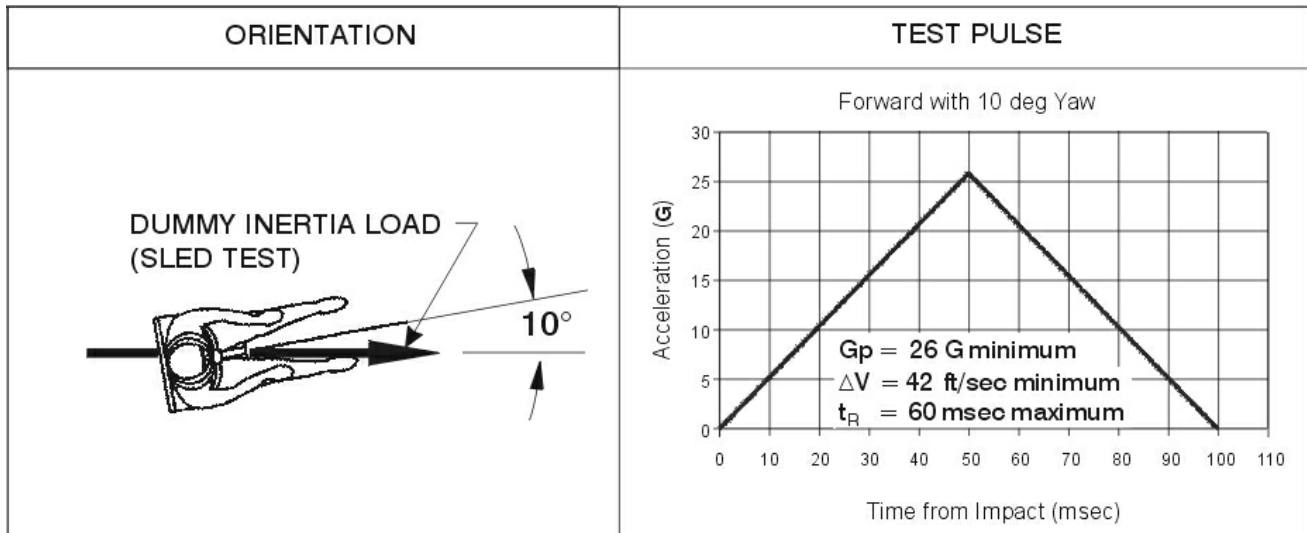
Automotive Industry ITTR™

The ITTR™ integrates an inflatable tubular device in the shoulder harness of a conventional three point restraint. It acts as a pre-tensioner to reduce forward motion of the head and torso.

Recent testing of the ITTR™ in a forward-facing fixed-wing aircraft seating configuration has demonstrated that the inflatable belt significantly reduces head excursion in dynamic simulated crash testing. When compared to the baseline 3-point restraint under the same test conditions, the occupant's overall head motion was reduced by **38 percent**, and lap and shoulder belt loads were reduced by **36 percent** with the ITTR™. *Figure 1* shows both the baseline head motion and the dramatically reduced head motion with an ITTR™.

ITTR Information (continued)

The crash pulse used for all of the tests was based on FAR Part 23.562(b)(2), which is a horizontal impact with a 26-G peak deceleration minimum and a maximum rise time of 50 msec. The total velocity change of this impact is 42 ft/sec.



For more information, contact:

Steven A. Smith, Product Manager
Inflatable Restraint Systems
Simula Safety Systems, Inc.
7822 South 46th Street
Phoenix, Arizona 85044 USA
Tel: 602-643-SAFE (7233)
Fax: 602-643-7698
E-mail: smiths@sssi.simula.com