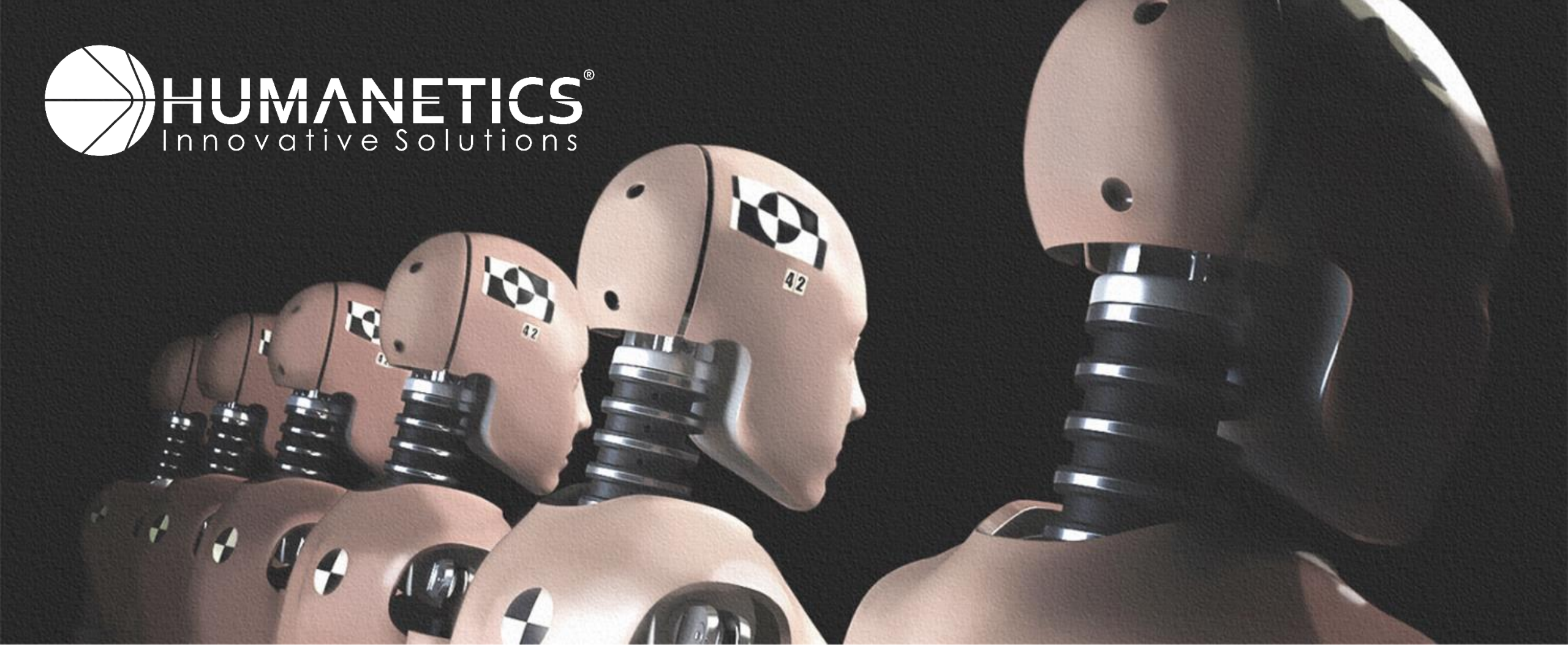


BioRID POT A Test Corridor

Agenda

- Background
  - Bumper Control
  - GTR 7 Status
- POT A Corridor Problem
- Test Corridors in General
- Corridor Reassessment Project Proposal

HUMANETICS® Innovative Solutions

Bumper Control

- Working with GTR 7 informal working group several years ago developing a regulation, we made changes to improve ATD repeatability and reproducibility (R&R):
  - Added jacket impact test;
  - Added pelvis impact test;
  - Changed to compression test to control bumper stiffness instead of durometer;
  - Recommend changing bumpers on a schedule to deal with elastomer aging;
  - User's manual on Humanetics website includes all of these improvements;
  - Technical bulletin notified customer of change.

GTR 7 Status

- Work on GTR 7:
  - GTR7 IWG trying to finalize all documentation
  - Humanetics appreciates that work is going to be finalized;
  - Compression specification instead of durometer need added to drawings in UN Mutual Resolution 1 or to certification procedures as part of final documentation
- Developed bumper corridors based on R&R dummies used in GTR 7 development process:
  - Tested bumpers used on those dummies;
    - These bumpers were made using durometer and then compression tested;
  - Set +/- 10 % corridors around mean of bumpers in those dummies.

Bumper Compression Test

- To be run on new bumpers before they are installed in a dummy
  - Just during manufacturing or also if they have sat on a shelf?
- Test Definition
  - 20% compression test
    - » Measure actual bumper height with 1 N load and calculate 20% strain from that
  - Record average peak force from 3 cycles of compression
  - Speed 10 mm/min
  - Platens
    - » both cleaned with acetone before each test
    - » Top platen
      - › Teflon sheet bonded to aluminum support
    - » Bottom platen
      - › Hard coated aluminum surface for ARA-220, -227, -381-30, -381-37
      - › Nickel plated steel surface for ARA-520, -521

Bumper Compression Test

- Corridors at 20% compression
  - ARA-220: 65.4 to 80.0 N
  - ARA-227: 42.3 – 51.7 N
  - ARA-381-30: 72.5 – 88.6 N
  - ARA-381-37: 118.3 – 144.7 N
  - ARA-520: 784 – 958 N
  - ARA-521: 410.9 – 502.3 N
- Evaluation
  - HIS is currently running a lab to lab repeatability and reproducibility (R&R) test series with 3 customer labs and 2 HIS labs to evaluate the test and corridors

BioRID POT A Test Corridor

- New test corridors were developed and adopted for use beginning ***Jan. 2011 by the BioRID TEG*** with respect to GTR 7 for head restraints.

- The corridors were derived from a population of tests conducted at labs around the world using a ***small group*** of new tracks with dummies on hand locally.

HUMANETICS®
Innovative Solutions

BioRID POT A Test Corridor

- The new corridors have functioned with relatively consistent accuracy, with the ***exception of the first portion of POT A rotation***, which is a forward rotation of the head about the occipital condyle pin.

BioRID POT A Test Corridor

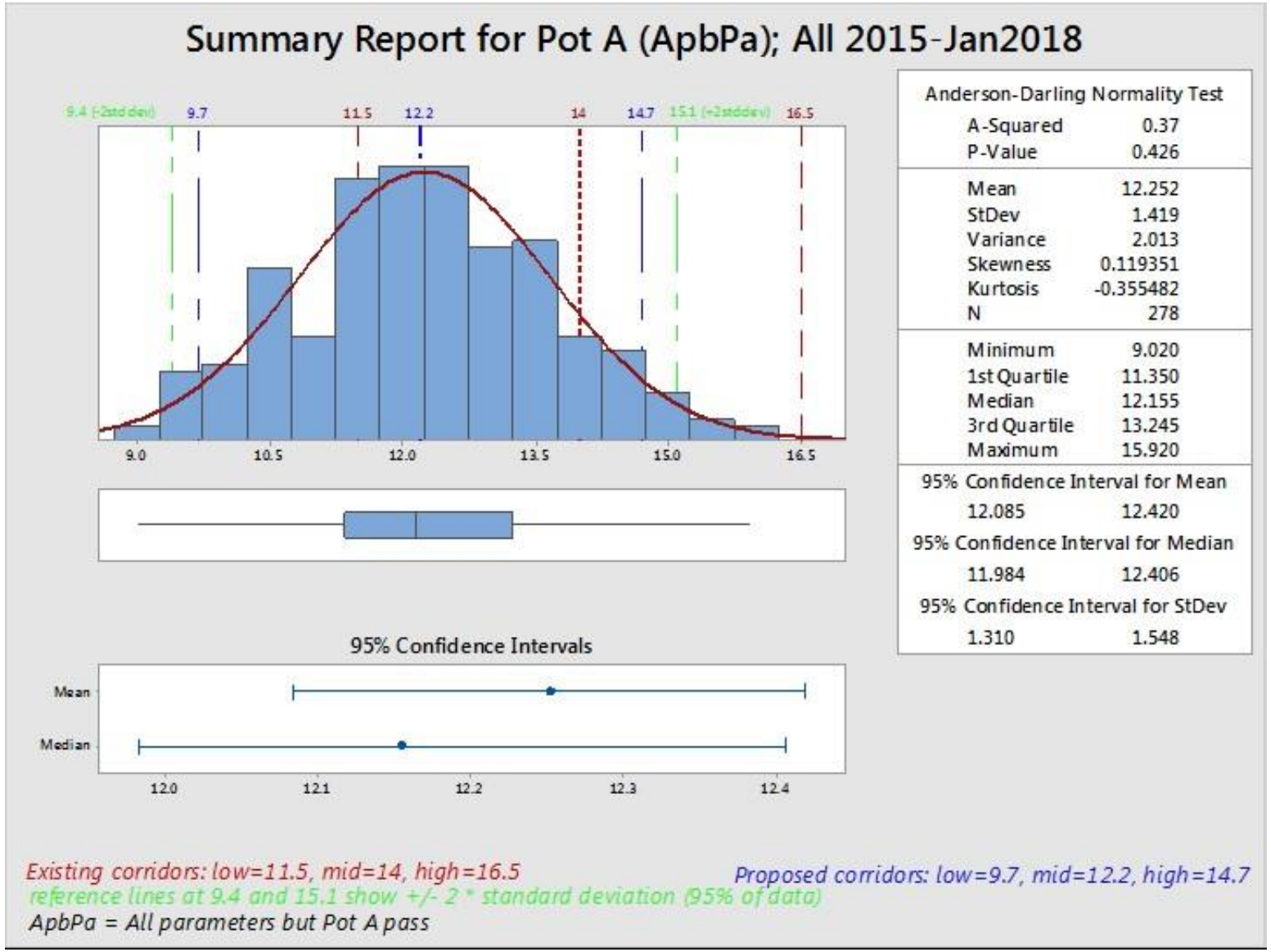
- Anecdotal reports have concluded that this test parameter has been problematic to pass for years.

- A re-examination of the Pot A test corridor ***based on a much larger population of dummies*** was undertaken to assess how well a large, current population of dummies fits to the corridors.

HUMANETICS®
Innovative Solutions

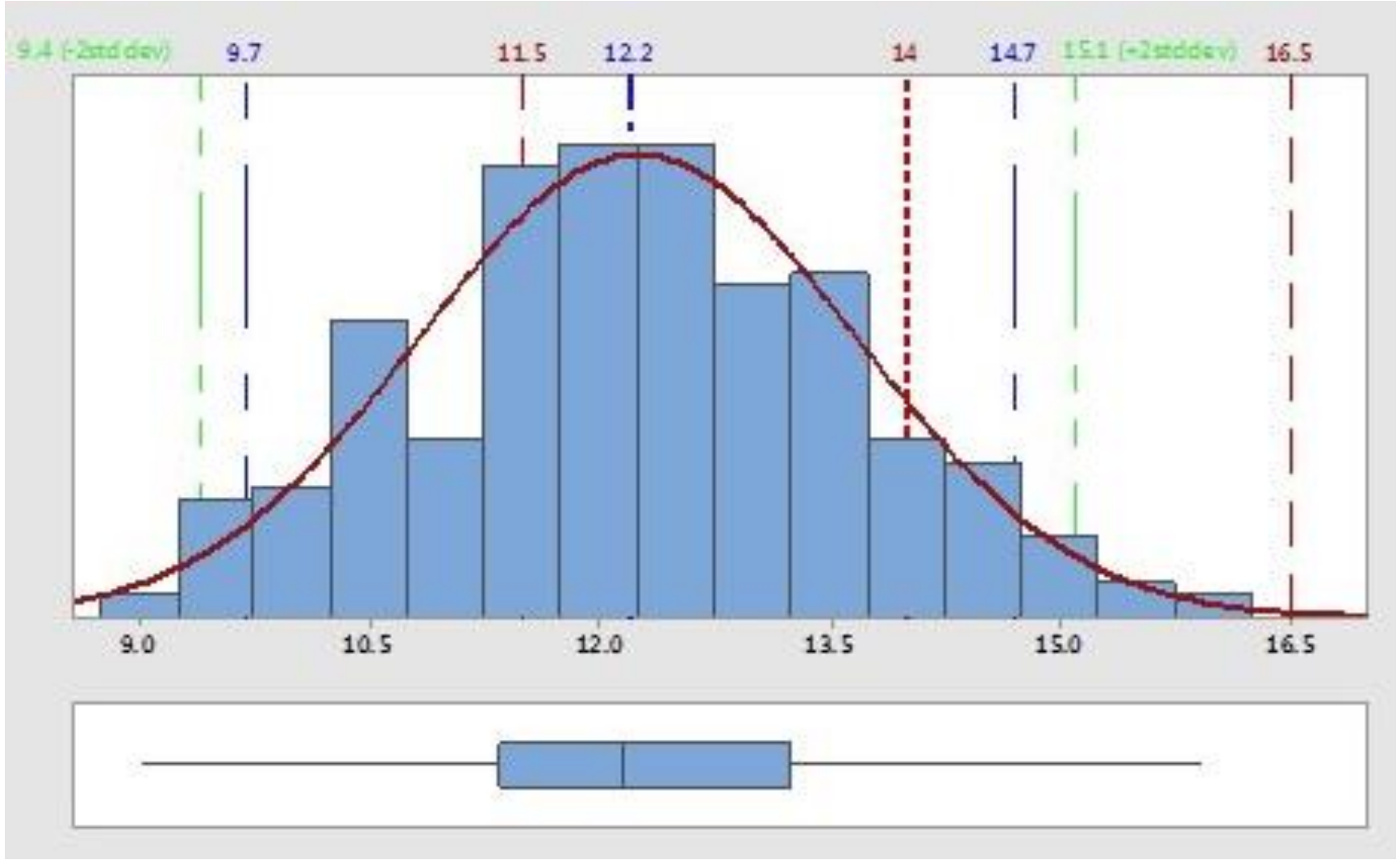
BioRID POT A Test Corridor

The data show a population of 278 tests collected from 3 labs on both, new and used dummies where they have first had the cables and damper adjusted to pass all test parameters other than the Pot A requirement.



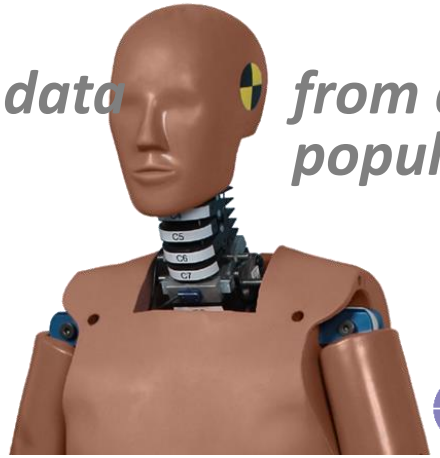
BioRID POT A Test Corridor

- As can be seen, a reduction of the POT A peak rotation control box at 25-70 ms, down from the current 11.5-16.5 degree limits, is needed.



BioRID Test Corridors in General

- New limits fit well to the large population of dummy tests performed at three Humanetics Test Labs from 2015 through 2017 as seen in the peak rotations.
- Humanetics would like to take action to revise the POT A corridor to implement a new, lower forward peak rotation control box effective immediately.
- Overall fit of all corridors?
  - Do other labs see a similar issue with Pot A?
  - Are other corridors an issue?
  - ***Should the TEG carry out a quick project to collect data from around the world and reset all corridors based on the overall population of dummies?***



HUMANETICS® Innovative Solutions

Corridor Reassessment Project Proposal

- All labs submit data from their BioRID II dummies
  - 2015 (?) through present
  - Send jacket, pelvis, dummy certification without headrest, sled and track certification
  - Jacket must be tested per current corridors before dummy certification without headrest tests
    - » Identify jacket test results test number to allow jacket correlation
  - Document latest change of ALL bumpers in dummy (not just neck)
    - » Changed per the current recommendations in the Humanetics manual (see website)?
  - Test run and calculated according to current Humanetics manual
    - » If not calculate this way, reprocess before sending
  - Only send tests with final adjustments
    - » Does not need to pass, but don't include test before final adjustments made

Corridor Reassessment Project Proposal

- Submit data by end of May 2019? Later?
  - Data summary of results
  - Time history curves in CSV format
    - » Both filtered and unfiltered
    - » Details on specifications of anti-aliasing filter used
- Humanetics volunteers to
  - Collect all data
    - » Send to Paul Depinet (pdepinet@humaneticsatd.com)
  - Summarize all data
  - Analyze
  - Propose corridors
  - Request 1 month after receiving all data before having meeting
- GTR7 TEG meeting via WebEx to agree on and finalize corridors

Thank You!

Questions?