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## **Research Consortium for Crashworthiness in Automated Driving Systems (RCCADS) - Updates**

# RCCADS Mission



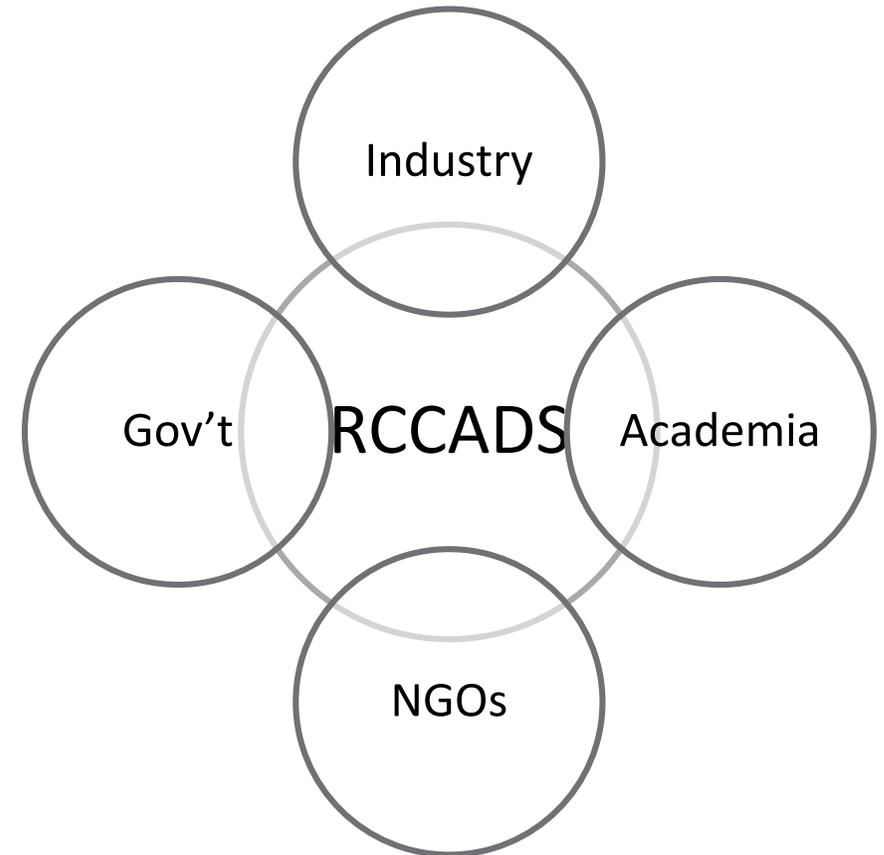
*From Automated Driving Systems 2.0: A Vision for Safety*

New seating layouts → broader range of occupant postures → implications for occupant protection

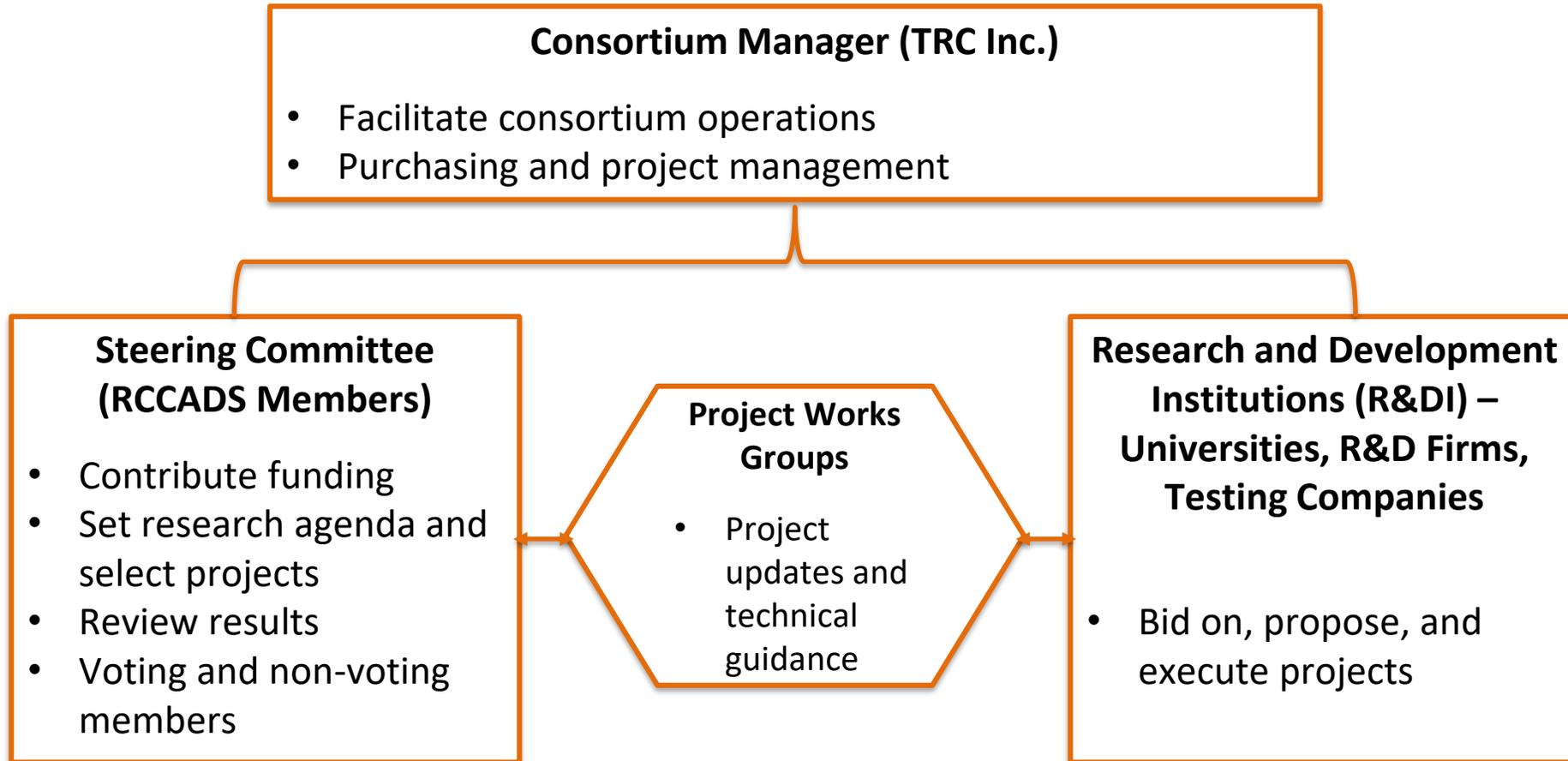
# RCCADS Mission

To collaboratively develop a foundation of information that will inform interested parties who seek to develop validation methods for automated driving systems.

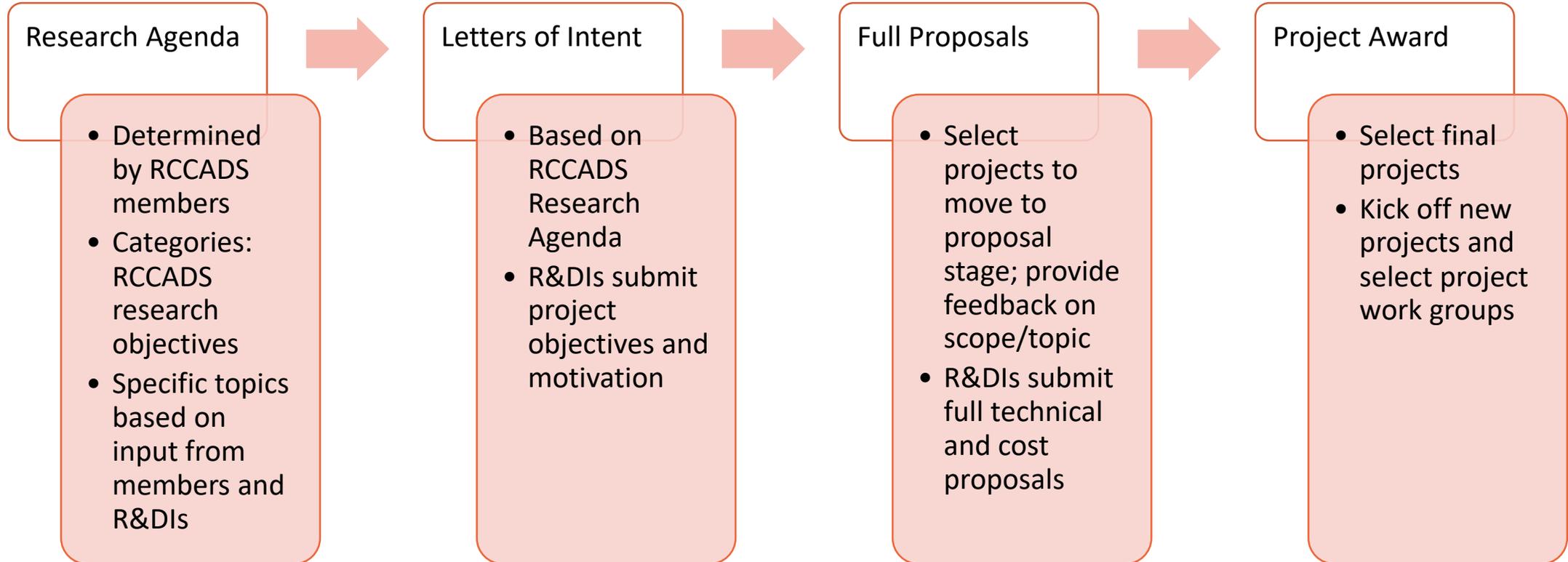
The mission is to be accomplished through pre-competitive research engaging industry, trade associations, NGOs, government, and academia.



# Consortium Structure



# Project Selection Process



# Research Areas

- Future crash modes
- Non-standard seating and restraints
- Biomechanical data
  - Define injury risk
  - Evaluate, update, & develop tools
- Research & literature review



From Östling et al., 2019



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# RCCADS Project Status (2019-2020)

## Supporting the Development of Pelvis Injury Criteria

PI: Jason Kerrigan, PhD | University of Virginia

- Aim to provide the first step in understanding how the lap belt loads the pelvis, replicates loading scenarios that caused fracture in sled tests in static belt load on 2 PMHS
- Completed
- Presented at 2021 RCCADS Public Workshop
- Published at IRCOBI IRC-21-36

A Methodology to Replicate Lap Belt Loading Conditions from a Sled Impact Test in a Non-Impact Dynamic Environment on Whole-Body Postmortem Human Subjects

Moreau, D., Donlon, J.P., Chebbi, A., Jayathirtha, M., Sochor, S., Overby, B., Richardson, R., Gepner, B., Forman, J., Östling, M. and Kerrigan, J.

# RCCADS Project Status (2020-2021)

## Evaluating Biofidelity of THOR-50M in a Reclined Frontal-Crash Sled Tests

PI: Jason Kerrigan, PhD | University of Virginia

- Perform a detailed biofidelity evaluation of the THOR-50M ATD in a reclined frontal crash environment
- Completed
- Presented at 2021 RCCADS Public Workshop (Methodology only)
- Presented at 49<sup>th</sup> NHTSA Workshop on Human Subjects for Biomechanical Research  
Presenter: Jeessoo Shin
- Drafted for publication

# RCCADS Project Status (2020-2021)

## Characterization of Subcutaneous Pelvic Adipose Tissue for Enhancement of Human Surrogate Model

PI: Scott Gayzik, PhD | Wake Forest University

- Analyze subcutaneous adipose tissue (SAT) in medical imaging scans to develop relationships between subject characteristics and quantitative measures of SAT
- Completed
- Presented at 2021 RCCADS Public Workshop (Preliminary data)
- Presented at 49<sup>th</sup> NHTSA Workshop on Human Subjects for Biomechanical Research  
Presenter: Austin Moore
- Submitted for publication

# RCCADS Project Status (2020-2021)

## Validation of FE Model during Ramping up in Rear-Loading Conditions

PI: Costin Untaroiu, PhD | Virginia Tech

- Aim to improve and validate a 50<sup>th</sup> male THUMS model in postero-anterior loading in reclined postures.
- On-going
- Presented at 2021 RCCADS Public Workshop (Methodology only)

# RCCADS Project Status (2021-2022)

## **Critical Factors Influencing Pelvis Motion and Lap-Belt to Pelvis Interaction for Occupants of Automated Vehicles**

- Investigate the effects of intrinsic occupant factors and extrinsic factors on pelvis motion and belt-to-pelvis interaction using multiple occupant models in order to assess relative sensitivities and identify which factors have a universal effect.

## **Lumbar Spine Mechanical Response to Combined Flexion/Compression: PMHS and THOR**

- Investigate the mechanical response of the lumbar spine to combined loading using female and male specimens, and a THOR-50M lumbar spine.

## **PMHS Responses and Injuries in a Continuous Rear-Facing Seat Condition at a High-Speed Frontal Impact:**

- Investigate biomechanical responses and injuries of PMHS seated in a continuous seat back during high-speed, rear-facing frontal impact

# RCCADS Project Next Steps (2022-2023)

- Project proposal and selection process will begin in June
  - Application to be added as an RCCADS R&DI Due: **May 29, 2022**
  - Request for letters of intent: **June 13, 2022**
  - Letters of intent due: **June 24, 2022**
- For more information, contact Allison Kender: [kendera@trcpg.com](mailto:kendera@trcpg.com)