



Welcome to the 2025 RCCADS Workshop!

The workshop will begin at 8:30am (EDT)

Please mute your microphone and turn off your video.

The chat function can be used for any questions.

Event Logistics

- **Microsoft Teams:**

- Please stay muted and leave your video off, unless you're speaking or presenting
- Chat feature can be used at any time and is viewable by everyone in the meeting
- Q&A: use chat feature or hand raise feature in Teams

- **In-person:**

- Please raise your hand for questions after each presentation & a microphone will be brought to you

- **Workshop materials:**

- Some slides will be available after the workshop
- Workshop will **not** be recorded

Who is TRC?

**North America's most advanced
independent mobility testing
service provider**



1974



Grand Opening

The State of Ohio opens TRC as a state entity to drive economic development.

1976



NHTSA opens VRTC

NHTSA establishes onsite presence at TRC with the only Vehicle Research Test Center in the Country.

1988



State entity dissolved, nonprofit created

Honda purchases the property. TRC Inc. nonprofit created as affiliated entity of The Ohio State University.

2019



AV/CV Campus Opens

SMARTCenter AV/CV campus opens.

2021



TRC California Opens

TRC establishes presence in California to work with tech clients earlier in development cycles.

2024

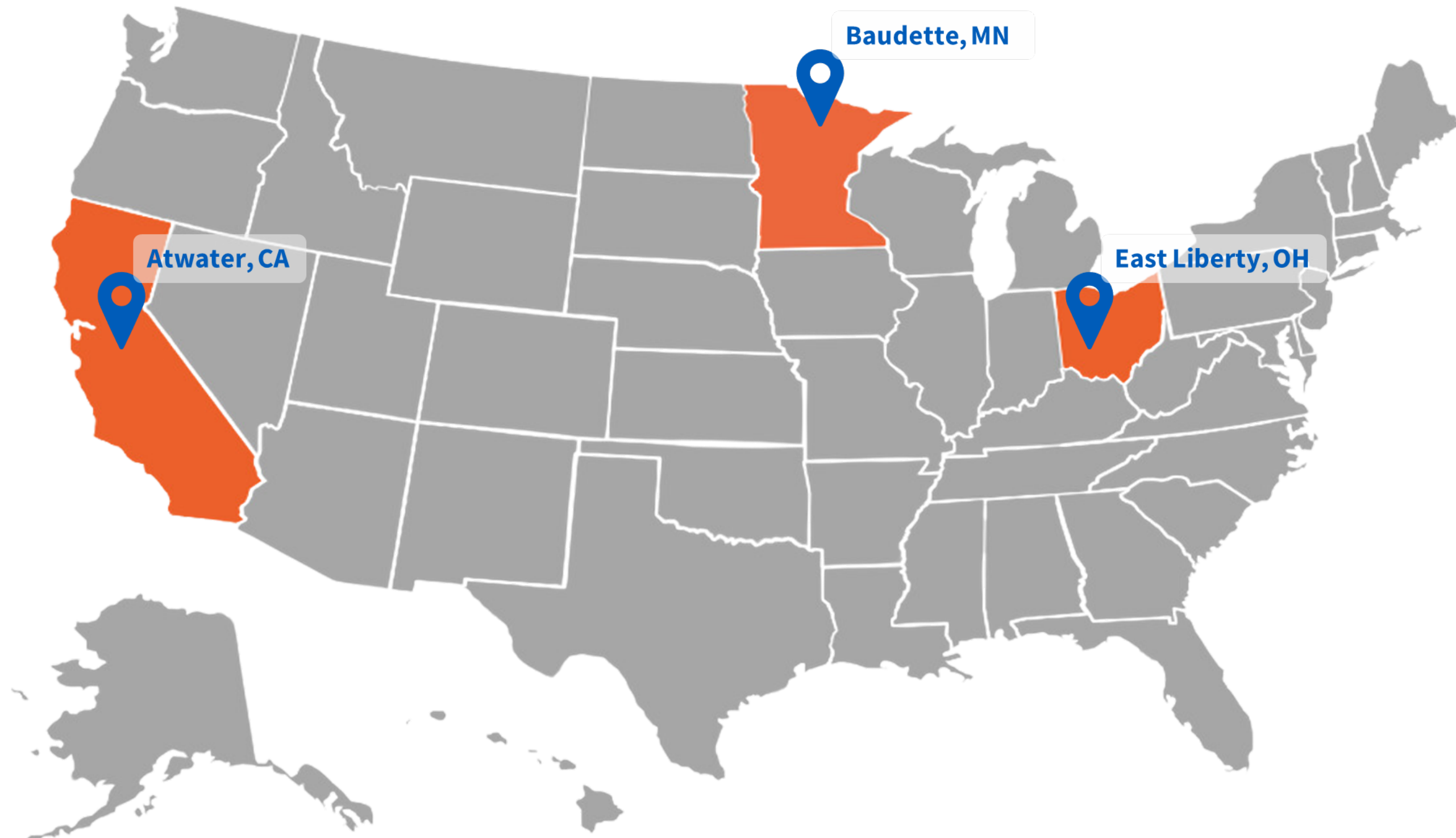


TRC Minnesota Opens

TRC establishes presence in Minnesota to further cold weather test capabilities.

Expert Facilities

TRC is the leading engineering services firm featuring **three** locations to serve all weather needs.



TRC Minnesota

Baudette, Minnesota

- **470** acres
- **20+** courses
- Conference Center
- Onsite lodging
- **5** cold chambers
- Heated garages



TRC California

Atwater, California

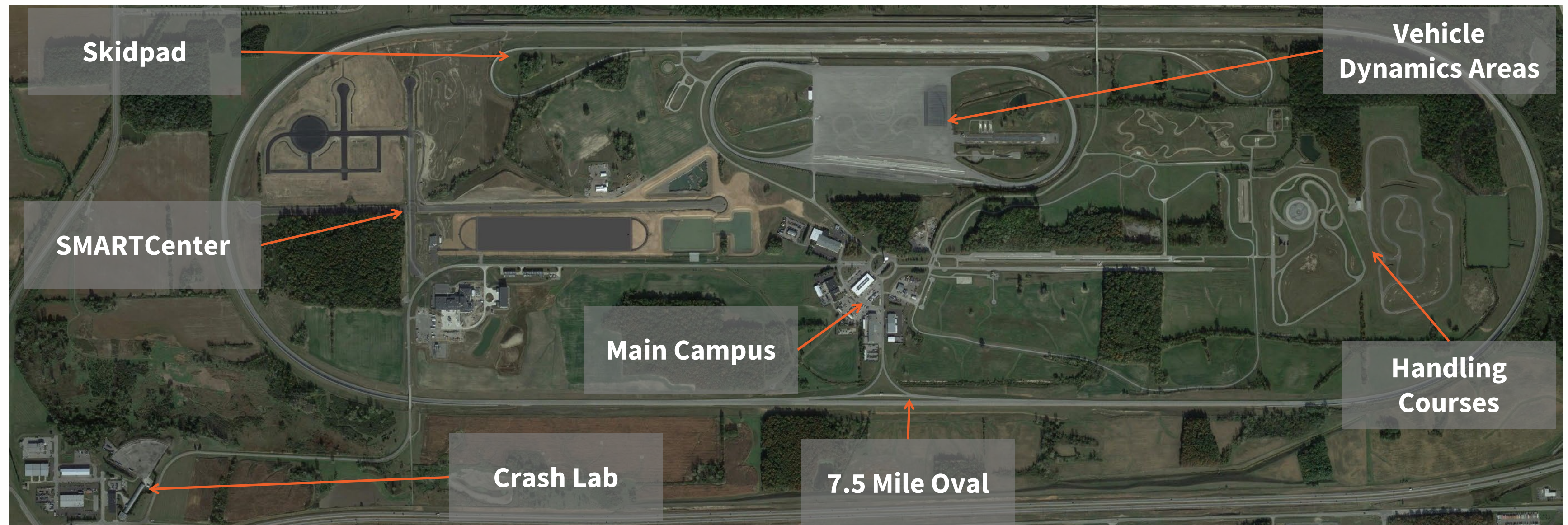
- **225** acres, **39+** acres of vehicle dynamic areas
- **2.2** mile Oval and **1** mile of intersections
- Planned durability course & off-road area
- Multi-lane roadways & intersections, highway on/off ramps
- Traffic signals, road signs, barriers & other roadside furniture



TRC Ohio

East Liberty, Ohio

- **4500-acre** full service independent proving ground
- **20+ Buildings, 4 Labs, and hundreds of individual test features**



SMARTCenter

- **540** acres dedicated automated & connected vehicle test facility
- **6** lane high speed intersection
- Configurable traffic signals
- Fiber network
- **V2X** communications
- High-speed wireless communications
- Facility monitoring cameras



Occupant Protection



TRC Ohio

Impact Lab Upgrade



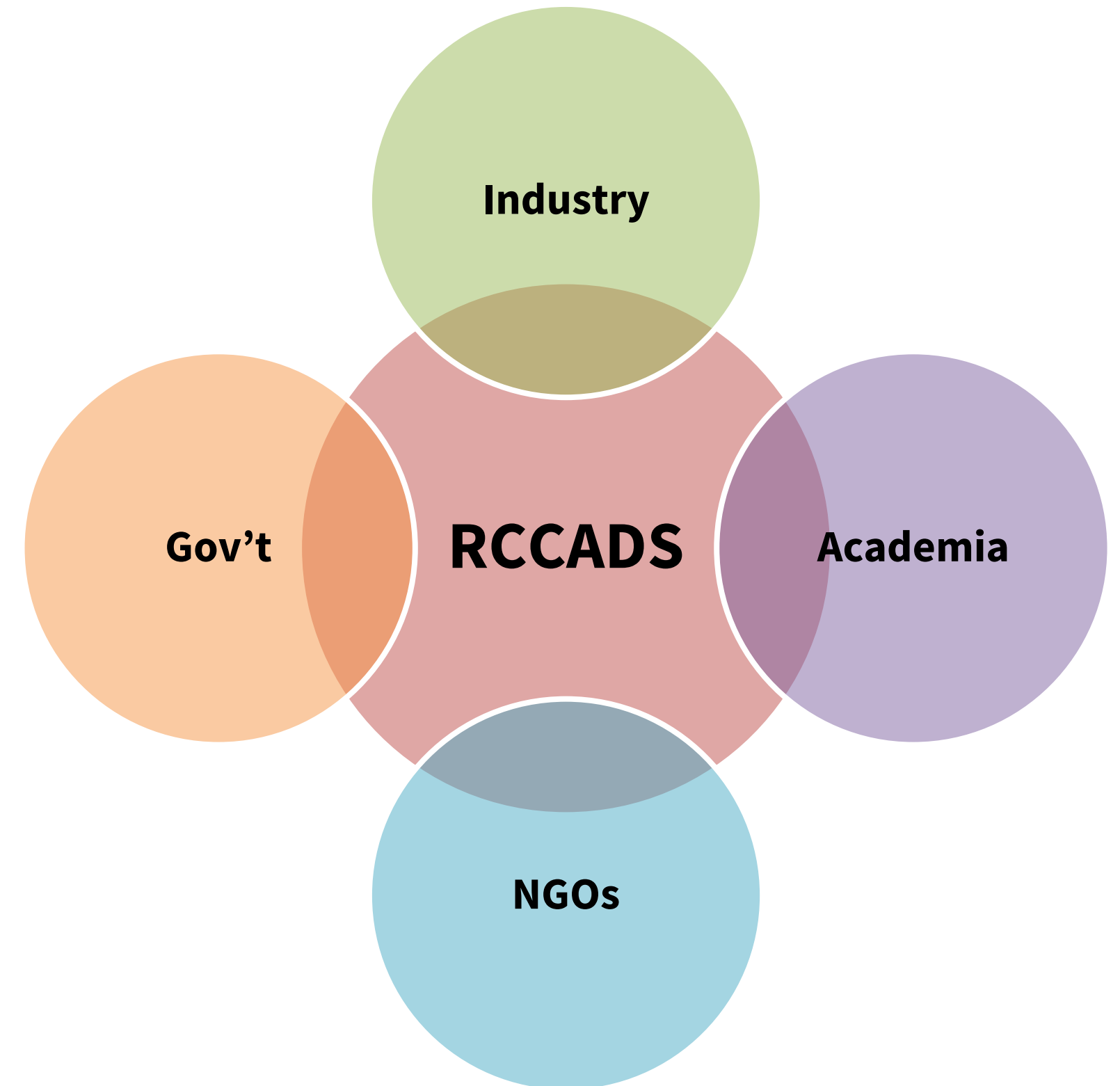
Research Consortium for Crashworthiness in Automated Driving Systems (RCCADS)



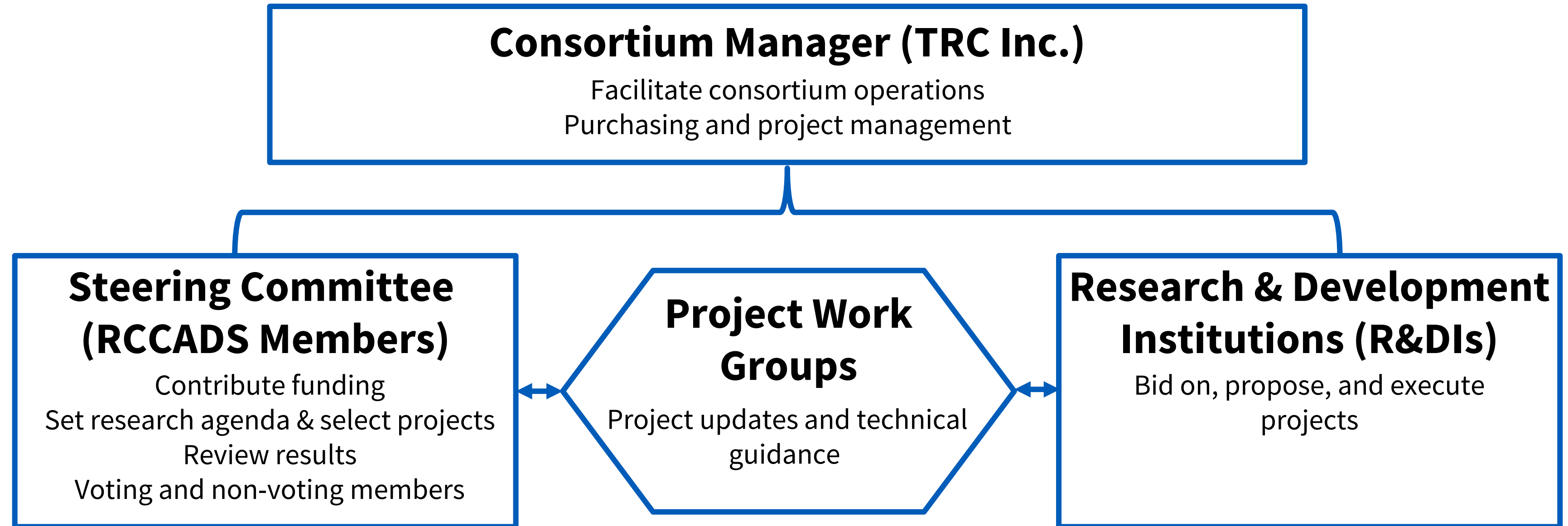
RCCADS Mission

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

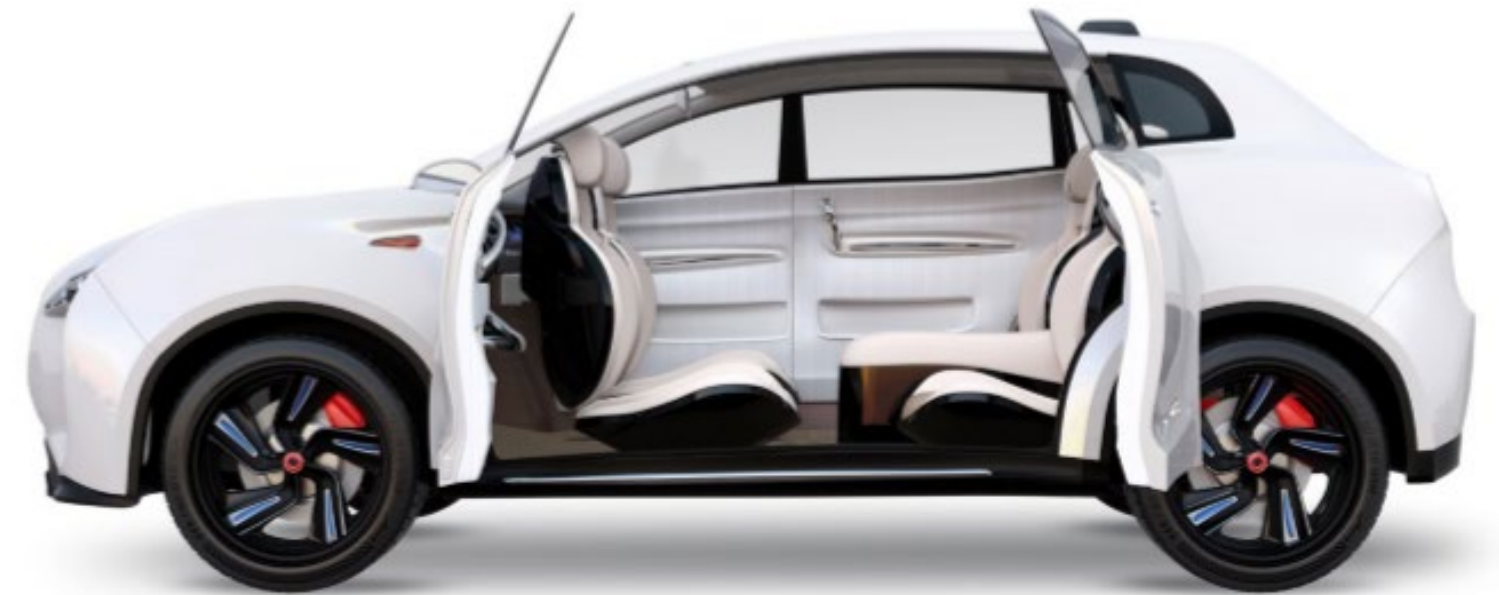


Research Areas



From Östling et al., 2019

- Future crash modes
- Non-standard seating and restraints
 - Define injury risk
 - Evaluate, update, & develop tools



From Automated Driving Systems 2.0: A Vision for Safety



Return on Investment

On average, access to ~6 times the amount of research paid for!

Year	Project	Project Cost	Total Annual Project Cost	Member ROI
2019	Project 1	\$ 136,000.00	\$ 136,000.00	2.7
2020	Project 1	\$ 95,000.00	\$ 214,000.00	4.3
	Project 2	\$ 69,000.00		
	Project 3	\$ 50,000.00		
2021	Project 1	\$ 117,000.00	\$ 511,000.00	10.2
	Project 2	\$ 99,000.00		
	Project 3	\$ 295,000.00		
2022	Project 1	\$ 120,000.00	\$ 345,000.00	6.9
	Project 2	\$ 135,000.00		
	Project 3	\$ 90,000.00		
2023	Project 1	\$ 151,000.00	\$ 260,000.00	5.2
	Project 2	\$ 109,000.00		
2024	Project 1	\$107,503.00	\$ 177,503.00	3.6
	Project 2	\$70,000.00		

Introductory Member Rate

Reduced rate for the 1st year, maximizing ROI!

- Introductory membership fee: \$25,000
- Membership benefits:
 - Opportunity to review draft deliverables
 - Access to all final deliverables and right to use internally
 - Options to nonexclusive, perpetual, nontransferable, royalty-free licenses
- Value proposition:
 - Acquire technical experience
 - Early access to information
 - Relatively small investment for a large amount of research
 - Trial year to evaluate RCCADS membership

Previous RCCADS Projects

2019

- Supporting the Development of **Pelvis** Injury Criteria

2020

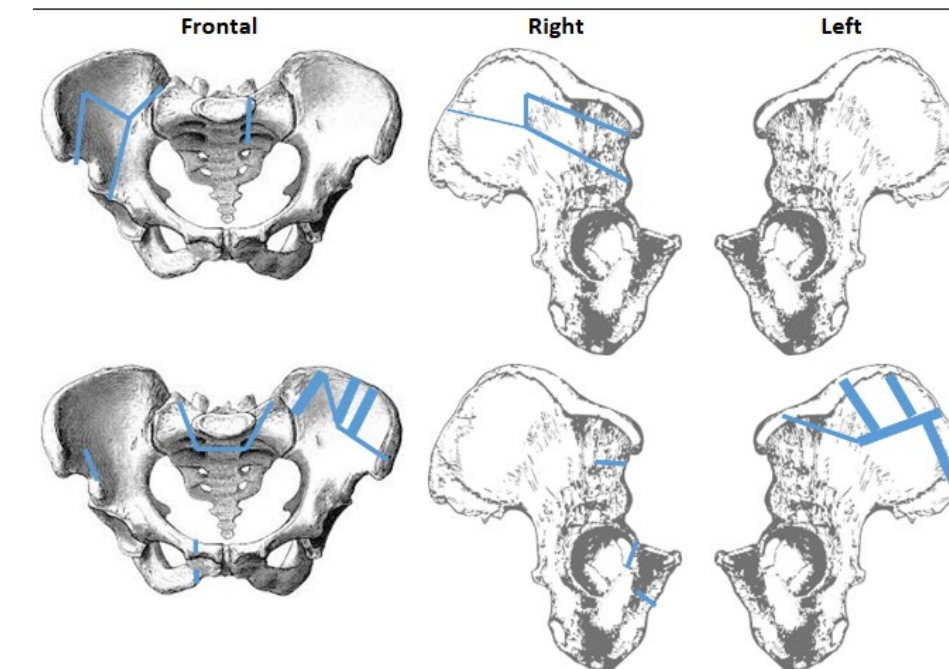
- Characterization of Subcutaneous **Pelvic** Adipose Tissue for Enhancement of Human Surrogate Models
- Evaluating **Biofidelity** of THOR-50M in a **Reclined** Frontal-Crash Sled Tests
- Validation of FE Model during **Ramping up** in Rear-Loading Conditions

2021

- PMHS Responses and Injuries in a Continuous **Rear-Facing** Seat Condition at a High-Speed Frontal Impact
- Critical Factors Influencing **Pelvis** Motion and **Lap-Belt to Pelvis** Interaction for Occupants of Automated Vehicles
- **Lumbar Spine** Mechanical Response to Combined Flexion/Compression: PMHS and THOR



From Automated Driving Systems 2.0:
A Vision for Safety

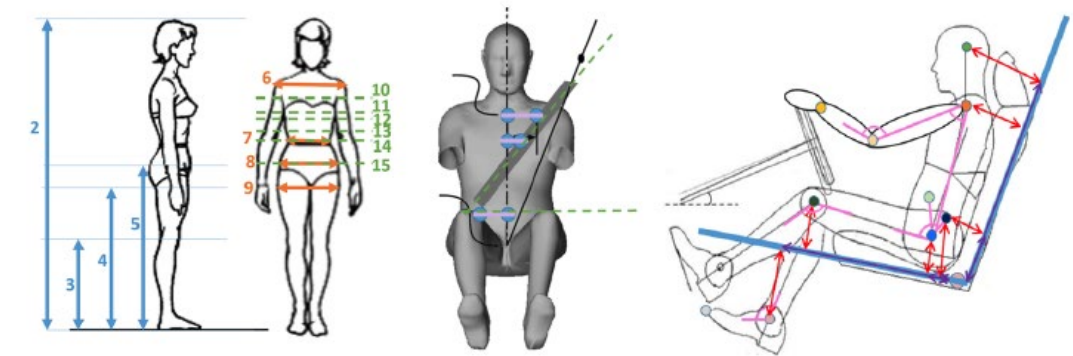


Moreau et al. 2021

Previous RCCADS Projects

2022

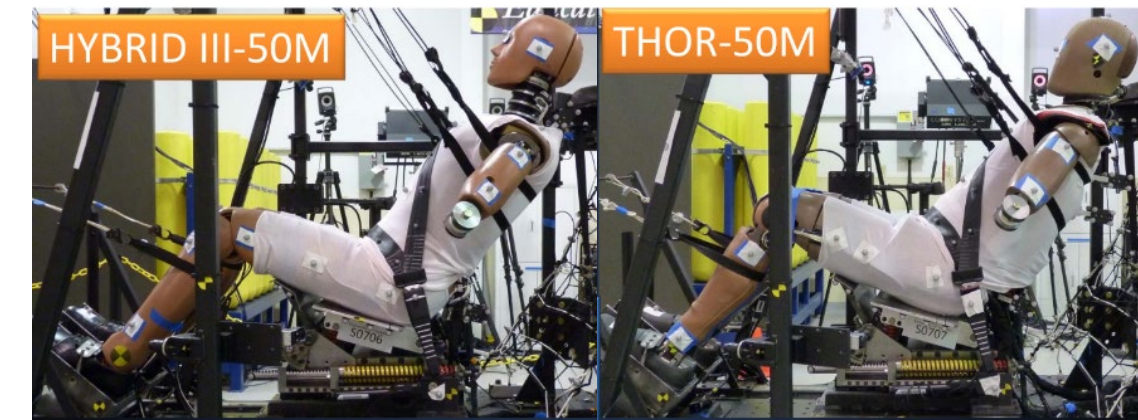
- Continuing Refinement of THOR for Reclined **Postures** – Testing to Evaluate Prototype Pelvis Modifications
- The effects of sex, body shape, posture, and **belt tension** on **belt fit** relative to the skeleton – continuing volunteer data collection with Open MRI
- **Submarining** and Rib Fracture Prediction Thresholds



Vakiel et al. 2023

2023

- Understanding of Non-Standard **Seating** Loadcases
- Tensile and Compressive **Material Properties** of Human Pelvic Cortical Bone



Kerrigan et al. 2022

2024

- Investigation of **submarining** risk in **reclined postures**
- State of Knowledge on **Upper Extremity** Injury Causation and Injury Prediction

Session 1



Francisco Lopez-Valdes
Director of MOBIOs Lab



Peifeng Wang
*Safety Test & Assessment
System Research Engineer*



Jerry Wang
Chief Technology Officer



Zhaonan Sun
Principal Scientist



An abstract graphic on the left side of the slide featuring swirling blue and white lines that create a sense of motion and depth, resembling a stylized tunnel or a dynamic light effect.

2025 RCCADS Workshop Break

BREAK 10:00 – 10:30 (EDT)

Please mute your microphone and turn off your video.

The chat function can be used for any questions.

Session 2



Karl-Johan Larsson
Senior Research Engineer



Devon Albert
Research Assistant Professor



Jason Forman
*Associate Professor
& Executive Director*




ENGINEERING



Jingwen Hu
*Associate Director
& Research Professor*



An abstract graphic on the left side of the slide featuring flowing, curved lines in shades of blue and white, creating a sense of motion and depth.

2025 RCCADS Workshop Closing Remarks

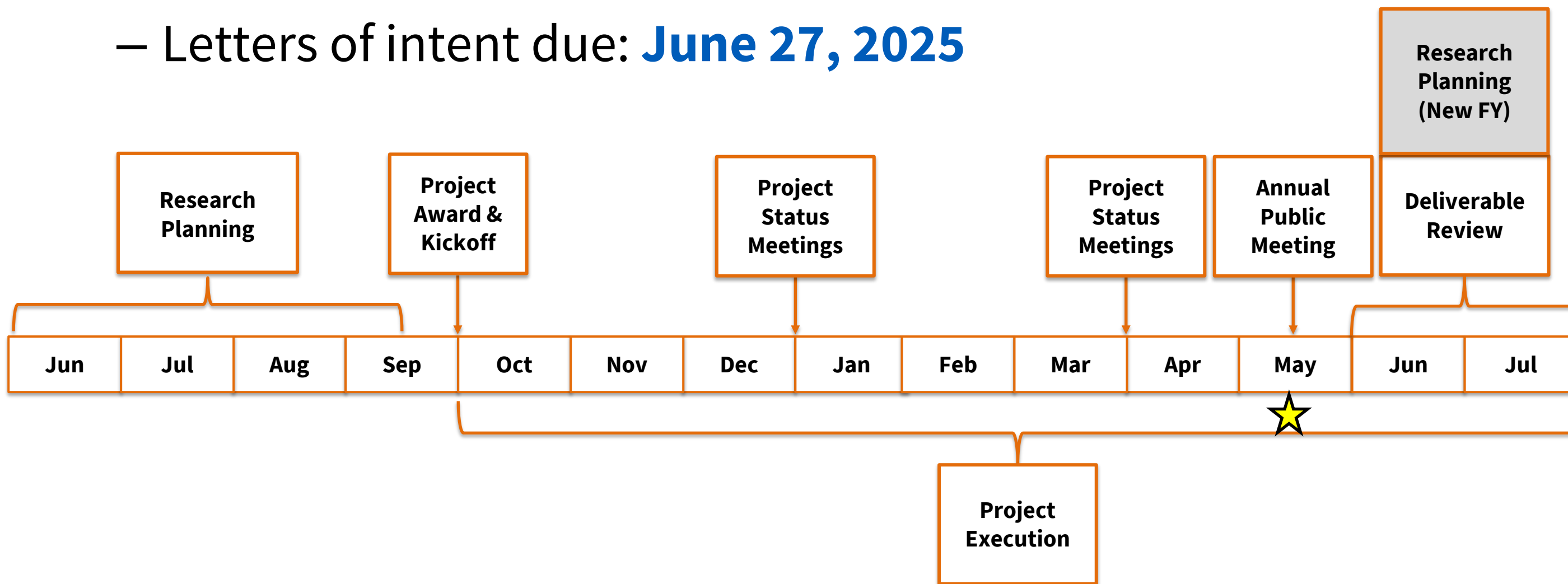
RCCADS Members include:



Future RCCADS Projects

Project proposal and selection process will begin in June!

- Application to be added as an RCCADS R&DI Due: **June 6, 2025**
- Request for letters of intent: **June 16, 2025**
- Letters of intent due: **June 27, 2025**



THANK YOU!

Thank you to today's speakers!

And, thank *you* for attending the 2025 RCCADS Public Workshop!

We want to hear your feedback – a survey link will be emailed next week

If you have questions, or want to learn more about RCCADS, contact:

Michelle Fowler: fowlerm@trcpg.com



Thank You
