

Autonomous Snowplow Competition



**ION North Star Section
Outreach Program**

Autonomous Snowplow Committee



**Final Presentation Information & Outline
2015-16 Competitors**

December 2015

Final Presentation Rules

- Final Presentation slides must follow the provided outline
 - Standardize judging for all Teams
- ASC Committee hints:
 - Judge's scoring form follows the outline exactly
 - Slide titles should match outline titles
 - Address each section of the outline using at least one separate slide
 - Teams will not score points if sections of the given outline are not addressed
 - Example: presentations that do not address "Vehicle Design Challenges" will receive 0 points for that Section
 - **Use Figures and Tables to convey requirements, strategy, designs, and costs**

Final Presentation Rules

- Final Presentation slides (initial draft) submission deadline
 - 25 January 2016
 - Time: 12 pm (noon) Central
 - Email submission: vibhor.bageshwar@honeywell.com
 - Please submit a PDF version of the Presentation to minimize file size
- Final Presentation Day: 28 January 2016 (Thursday)
 - Final Presentation Venue: Science Museum, Saint Paul, MN
 - Final version of the Final Presentation slides must be delivered to Vibhor by 4:30pm on January 28 at the Final Presentation Venue
 - Final presentations will be hosted using the Science Center's A/V equipment and Vibhor's Laptop
 - Supported media: standard Microsoft applications or Adobe Acrobat format

Final Presentation Rules

- Final Presentation time: each Team is allotted 20 minutes
 - Team presentation order will be determined by random draw at 4:30 pm on 28 January 2016 at the Final Presentation Venue
 - First Team Presentation begins at 5:30 pm on 28 January 2016
 - Presentation time: 15 minutes maximum
 - Q&A time: 5 minutes maximum
- Team scoring
 - Final Presentation counts 15% toward the final Competition score
 - Team standings will be updated by 30 January 2016
 - ASC Scoring Board at the Competition Venue

Final Presentation Outline

- Title Slide *(1 slide)*
 - Team university/name/logo
- Objectives *(1 slide)*
 - Team objectives
 - Team composition
- Snowplow Vehicle Program Top-Level Requirements *(1 slide)*
 - Table format
 - *Hint: a requirement is a number that indicates when a design satisfies an objective*
 - *Hint: highlight the top-level requirements that indicate the snowplow vehicle design is completed*
- Snowplow vehicle plowing strategy *(minimum 1 slide)*
 - Single “I”; Triple “I”
 - *Hint: address vehicle strategy to plow snow, avoid obstacles, and return to garage*
 - *Hint: address plowing concept strategy – minimize plowing time, maximize snow removal, avoid or run over obstacles, etc.*

Final Presentation Outline

- Snowplow Vehicle Description (please follow the given order)
 - Snowplow vehicle design (*minimum 1 slide*)
 - Snowplow vehicle and blade design
 - Snowplow vehicle physical dimensions
 - Sensor & processor component housing
 - *Hint: address temperature control*
 - Navigation system design (*minimum 1 slide*)
 - Concept
 - Sensors
 - Navigation augmentation system
 - Placement of navigation aids in competition field
 - Guidance system design (*minimum 1 slide*)
 - Way-point selection concept
 - *Hint: given navigation system, describe how snowplow vehicle will generate its plowing path, avoid obstacles, and perform its functions*
 - Control system design (*minimum 1 slide*)
 - Concept & available actuators
 - Bandwidth & actuator response speed
 - Processor & Software design (*minimum 1 slide*)
 - Timing and action sequence flowchart
- *Use figures to describe the vehicle systems and design*

Final Presentation Outline

- Safety System (*minimum 1 slide*)
 - System description
 - *Figure format*
 - *Hint: show how power is cut off to the vehicle*
 - Emergency shut-off options
 - Physical and remote
 - Stopping distance from maximum speed
 - Identify surface
- Failure Modes and Recovery Actions (*1 slide*)
 - Identify failure mode and recovery actions
 - *Table format*
- Overall Risk Assessment Summary (*1 slide*)
 - Evaluate each subsystem
 - Identify known issues
 - *Table format*

Final Presentation Outline

- Snowplow Vehicle Design Challenges (*minimum 1 slide*)
 - Highlight vehicle or system design changes from the existing designs
 - Teams should indicate whether the vehicle or its systems are pre-existing or newly designed
 - *Hint: first year Teams should identify major design decisions*
 - *Hint: returning Teams should highlight the design challenges the Team faced adapting the vehicle and its systems to this year's competition*
- Commercialization and Implementation (*2 slides*)
 - Identify components and their cost
 - Identify snowplow vehicle and navigation aid cost for sale to the general consumer
 - *Hint: convey cost to a consumer buying the product at the local hardware store; companies charge more for products than material + labor cost*
 - Identify steps consumers would follow to set-up the snowplow vehicle and navigation aids in an operating environment
 - Operating environment example: garage and driveway
 - Identify time to set-up the snowplow vehicle and navigation aids in an operating environment
 - *Hint: convey the ease or difficulty the consumer would encounter setting up the snowplow vehicle and navigation aids*
 - *Table or figure formats*

Final Presentation Schedule

Team	Presentation Time (central)
University of British Columbia: “Snow Flake”	TBD: random draw at 4:30 pm on 28 January 2016
Case Western Reserve University: “OTTO X”	
Case Western Reserve University: “Snow Joke”	
Dunwoody: “Snow Devil 0110_2”	
North Dakota State University: “Snow Blight”	
North Dakota State University: “THUNDAR 2.0”	
University of Michigan-Dearborn: “Yeti 6.0:	
University of Michigan-Dearborn: “Zenith 2.1”	
University of Minnesota: “Ground Squirrel”	
University of Saint Thomas: “John Snow”	



Final Presentation Scoring

- Final Presentation scoring: 15% of the total Competition score

Category	Scoring
Technical and Quality of Presentation	200
Ability to Engage Audience	50
Total Points	250