Autonomous Snowplow Competition



ION North Star Section
Outreach Program

Autonomous Snowplow Committee



Preliminary Design Review
Presentation Information & Outline
2016 Competitors

October 2015

PDR Presentation Rules

- PDR presentation slides must follow the provided outline
 - Standardize judging for all Teams
- PDR presentation slides held in confidence
 - PDR slides will not be made public
- PDR presentation slides submission deadline: final version
 - 9 pm (central); 12 November 2015 (Thursday)
 - Email submission to Vibhor and Suneel:
 vibhor.bageshwar@honeywell.com & sheikh@asterlabs.com
 - Please submit a PDF version of the presentation to minimize file size
 - CD submission (not necessary if you email the presentation slides)

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PDR Presentation Rules

- PDR presentation day: 14 November 2015 (Saturday)
 - Presentation medium: teleconference call and screen sharing
 - ASC Committee will call each Team 2 minutes before your PDR presentation time
 - Teams provide a call-in number by 12 November 2015
 - Email call-in number: <u>vibhor.bageshwar@honeywell.com</u>
- PDR presentation time: each Team is allotted 35 minutes
 - Teams provide their 1st, 2nd, and 3rd choices of time slots starting 9
 November 2015 (please see slide 9)
 - Email time selections: <u>vibhor.bageshwar@honeywell.com</u>
 - ASC Committee will make every effort to assign Teams with their first choice
 - First Team presentation begins on 14 November 2015 at 9:00 am (Central time)
- Feedback to Teams will be provided by the Judges during the 35 minute PDR

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PDR Presentation Rules

35 minute presentation time breakdown

Student presentation: 20 minutes maximum

Q&A with Judges: 5 minutes maximum

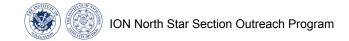
Judges internal discussion: 5 minutes maximum

Team feedback: 5 minutes maximum

- Team scoring and reviews
 - Team scoring will be returned to Team contacts: 21 November 2015
 - Team scores will be updated on website in December 2015
 - www.autosnowplow.com
- PDR Presentation Outline: ASC Committee Hints
 - Judge's scoring form follows the outline exactly
 - If a particular Section is not addressed, then the Team will not score any points for that Section
 - Use Figures and Tables to convey requirements, strategy, designs, and costs

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- 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 metric that indicates when a design satisfies an objective
 - Ex: Vehicle heading angle accuracy: 0.50°
- 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.



- Snowplow Vehicle Description (please follow the given order)
 - Snowplow vehicle design (minimum 1 slide)
 - Snowplow vehicle and blade designs
 - Snowplow vehicle and blade physical dimensions
 - Sensor + processor component housing
 - Hint: address temperature control
 - Navigation system design (minimum 1 slide)
 - Concept
 - Sensors
 - Navigation augmentation system
 - Location of navigation aids in competition field
 - Guidance system design (minimum 1 slide)
 - Way-point selection concept
 - <u>Hint</u>: given navigation system, describe how snowplow vehicle will generate its plowing path, avoid obstacles, and perform its functions

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- Control system design (minimum 1 slide)
 - Concept & available actuators
- Processor & Software design (minimum 1 slide)
 - Timing and action sequence flowchart
- Use figures to describe the vehicle systems and design

- Safety System (1 slide)
 - System description
 - Emergency shut-off options
 - Physical and remote
 - Stopping distance from maximum speed
 - Identify surface
 - Include figure
- 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



- 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
 - Highlight the design challenges the Team will face adapting the vehicle and its systems to this year's Competition and weather conditions
- Commercialization and Implementation (2 slides)
 - Identify components and their cost
 - Identify snowplow vehicle and navigation aid cost for sale to the general consumer
 - <u>Hint</u>: 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
 - <u>Hint</u>: convey the ease or difficulty the consumer would encounter setting up the snowplow vehicle and navigation aids
 - Table or Figure formats



PDR Presentation Schedule

Team	Presentation Time (Central)
	9:00 am
	9:40 am
	10:20 am
	11:00 am
	11:40 am
	1:00 pm
	1:40 pm
	2:20 pm
	3:00 pm
	3:40 pm
	4:20 pm

PDR Presentation Scoring

PDR presentation scoring: 10% of the total Competition score

Category	Scoring
Quality of Presentation Slides / Technical Presentation	80
Ability to Engage Audience	20
Total Points	100