

# 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](mailto:vibhor.bageshwar@honeywell.com) & [sheikh@asterlabs.com](mailto: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: [vibhor.bageshwar@honeywell.com](mailto:vibhor.bageshwar@honeywell.com)
- PDR presentation time: each Team is allotted 35 minutes
  - Teams provide their 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> choices of time slots starting 9 November 2015 (please see slide 9)
    - Email time selections: [vibhor.bageshwar@honeywell.com](mailto:vibhor.bageshwar@honeywell.com)
    - 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*

# 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](http://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*

# PDR 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 metric that indicates when a design satisfies an objective
    - Ex: Vehicle heading angle accuracy:  $0.50^\circ$
- 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.

# PDR Presentation Outline

- 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
    - [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
  - Processor & Software design (minimum 1 slide)
    - Timing and action sequence flowchart
- *Use figures to describe the vehicle systems and design*

# PDR Presentation Outline

- 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*

# PDR 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
  - 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
    - **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**



# 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
<b>Total Points</b>	<b>100</b>