UAS Challenge
Scenarios: Focus on Automated Tracking

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Challenge Overview

• UAS Challenge to consist of three difficulty levels
  – Student
  – Moderate
  – Difficult

• Participants to use small UAVs <100lbs GTOW
  – Fixed camera and gimbaled camera allowed

• Scenes can include urban or rural setting

• Date to be decided during Oct meeting
Student Challenge

• Automated endurance tracking of vehicle (e.g. pickup truck) in clutter-free environment, start track on human operator input

• Metric: Duration of accurate vehicle track with no gaps greater than 3 seconds

• Method: Vehicle driving on clear runways at speeds varying from 0 to 30 mph, frequent straight maneuvers

• UAV Altitude: ideally greater than 1k ft, expected 500 ft, min 300 ft

• Expected that UAV will utilize gimbaled camera, bonus points for avoiding nadir view
Moderate Challenge

• Automated endurance tracking of vehicle in urban setting, start track on human operator input
• Metric: Duration of accurate vehicle track with no gaps greater than 3 seconds
• Method: Vehicle driving through urban setting with frequent abrupt turns. Slow and stopping motion possible in cluttered areas. Tree lined roads if possible.
• UAV Altitude: ideally greater than 1k ft, expected 500 ft, min 300 ft
• Expected that UAV will utilize gimbaled camera, bonus points for avoiding nadir view
• Cooperative teams allowed
Difficult Challenge

- Automated multiple human-sized object tracking in urban terrain
- Metric: duration and accuracy of each track
- Method: 4-5 people exit building as group. UAV acquires group in view and begins surveillance. Event scatters group, each human runs in different direction eventually entering buildings
- UAV Altitude: ideally greater than 1k ft, expected 500 ft, min 300 ft
- Bonus: identify how many carry packages
Gradual Build-Up Challenge

• Vehicle carrying multiple passengers nominated for tracking

• UAV tracks vehicle and passengers through incrementally harder environments:
  – Straight, clear, constant speed movement of vehicle with few obstructions in rural setting
  – Vehicle enters urban setting and frequently turns and changes speed unexpectedly
  – Vehicle often occluded by shadows, buildings, trees in urban environment
  – Passengers exit the vehicles some carrying tools and packages and scatter to different locations
Gradual Build-Up Challenge

- Human operator allowed to reset tracker, but system is penalized for every instance of human involvement needed.
- Metric: percent completion of challenge with valid tracks minus penalty for operator input
- Metric: locations of passengers and which objects they were carrying
- UAV Altitude: ideally greater than 1k ft, expected 500 ft, min 300 ft
- Cooperative teams of UAVs allowed