

ROBOTIC ENGINEERING CHALLENGE

EXPERT RULES

GENERAL

1. Teams are not allowed to alter or interfere with a competing team's robot or programs. Violation of this rule will lead to immediate disqualification of the offending team.
2. Teams are not allowed to bring anything to the competition that would give their team an unfair advantage such as pre-constructed robots, books, notes or programming tools. Paper, pens, pencils, and instructions on programming will be provided to each team upon arrival at the competition. Students should bring a calculator to answer the Challenge questions.
3. Any situation not covered by the enclosed rules will be determined by a ruling from the appropriate Arena Judge. All Judges' rulings are final.

TEAM COMPOSITION

1. Each team is composed of a faculty sponsor and up to four (4) students. One student will act as the team leader.
2. Each student must attend the school that they are representing.
3. The faculty sponsor along with team representatives must attend the Robotic Engineering Challenge.
4. Faculty sponsors **are NOT allowed** to assist student teams with any part of a Challenge.

CHALLENGES

1. Team Kits are assigned at check-in. **Teams should check-in no later than 9:00 AM.**
2. The Challenge instruction packet will be in each team kit. Challenge packets will contain instructions for all Challenges and all Challenges Question Packet to be answered by the team. **Challenges may be completed in any order.**
3. The Challenge Question Packet **must be turned into the Judges stand no later than 12:00 PM.** Keep all question together in the Challenge Question Packet. Answer as many questions as possible.
4. Each team will be given access to the Challenge Area for test runs. A team performing a test run will have two (2) minutes to complete their testing.
5. Teams are allowed as many test runs as they desire, however upon completion of a test run they must re-enter the queue to await another run.
6. A team will have three (3) qualifying runs to perform the assigned challenge. Each team will **declare** to an Arena Judge that they are prepared to perform a timed run and provide the judge with their score sheet. The Arena Judge will then time the team's run. When all three runs are completed, the Arena Judge will retain the team's score sheet.

7. Teams **may** alter or modify their robots between runs of a challenge.
8. Each team will have fifteen (15) seconds to activate their robot at the beginning of each timed run. Failure to start within the specified time will void that timed run and reduce the number of timed runs available to the team by one (1).
8. All robot programs will be stored in **Program 5** for timed runs.
9. **Faculty sponsors are not to enter the Expert development area unless escorted by a judge. If any faculty sponsor is found at an expert team table between 9:00 AM and 3:00 PM, the team's current challenge will be voided.**
10. The Robotic Engineering Challenge will run from **9:00 AM until 3:00 PM**. During this time period, the teams will attempt to successfully complete as many challenges as possible. Scoring will be calculated by 3:15 PM with a brief awards ceremony held immediately following the scoring.
11. The competition ends at 3:00 PM. Only a team currently completing a challenge run (timed run) will be allowed to finish that run. All other runs are void. Any team in the queue at that time **will not** be allowed to run their robot.

SCORING

1. Base points are assigned to each Challenge. In addition to the awarding of these base points, the team will gain 20% of the points received from their Challenge Question Pack for each base point award on the Robotic Challenges (to a maximum of 100%).

Example: If a team receives 30 points from their Challenge Question Pack and get base points on three out of five of the Challenges – then they would receive 60% of the points awarded from their Challenge Question Packet:

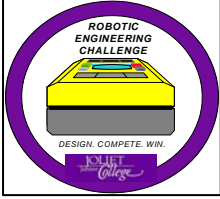
60% x 30 points = 18 points awarded to their final score.

2. Some Challenges may have bonus points added to the collected base points. Typically, bonus points are determined by taking the fastest run time accomplished by a team during their three (3)-timed runs and dividing it into an established point value for that Challenge. The team's score will be the addition of the base points plus the bonus points.

3. Awards will be based on the team's total point accumulation for all Challenges and Challenge Question Pack results.

DEFINITIONS

- Autonomous:** A self-contained, self-guided, mobile robot. No human interaction for control other than power application.
- Remote-Control:** A **tethered** control system between the robot and a control device. Examples of allowable control devices include touch sensors tethered to the RCX, a stationary RCX tethered to the mobile portion of the robot or other sensor combinations used to enhance Human-Machine-Interface (HMI).



ROBOTIC ENGINEERING CHALLENGE 2008

EXPERT CHALLENGE: SQUARE ROUTE

GOAL

Complete **ONE** lap around the black outlined square as fast as possible.

RESTRICTIONS and GUIDELINES

Control Mode: Autonomous

The RCX shall be placed on the starting 'T'.

The robot may travel clockwise or counter-clockwise around the track.

The robot may not crawl or crossover any barriers.

The clock is stopped when the leading edge of the RCX crosses the end of the starting 'T' as shown by the dotted line.

Only one robot on the track at a time.

All other rules apply.

Maximum Time Limit per Run: 60 seconds

SCORING

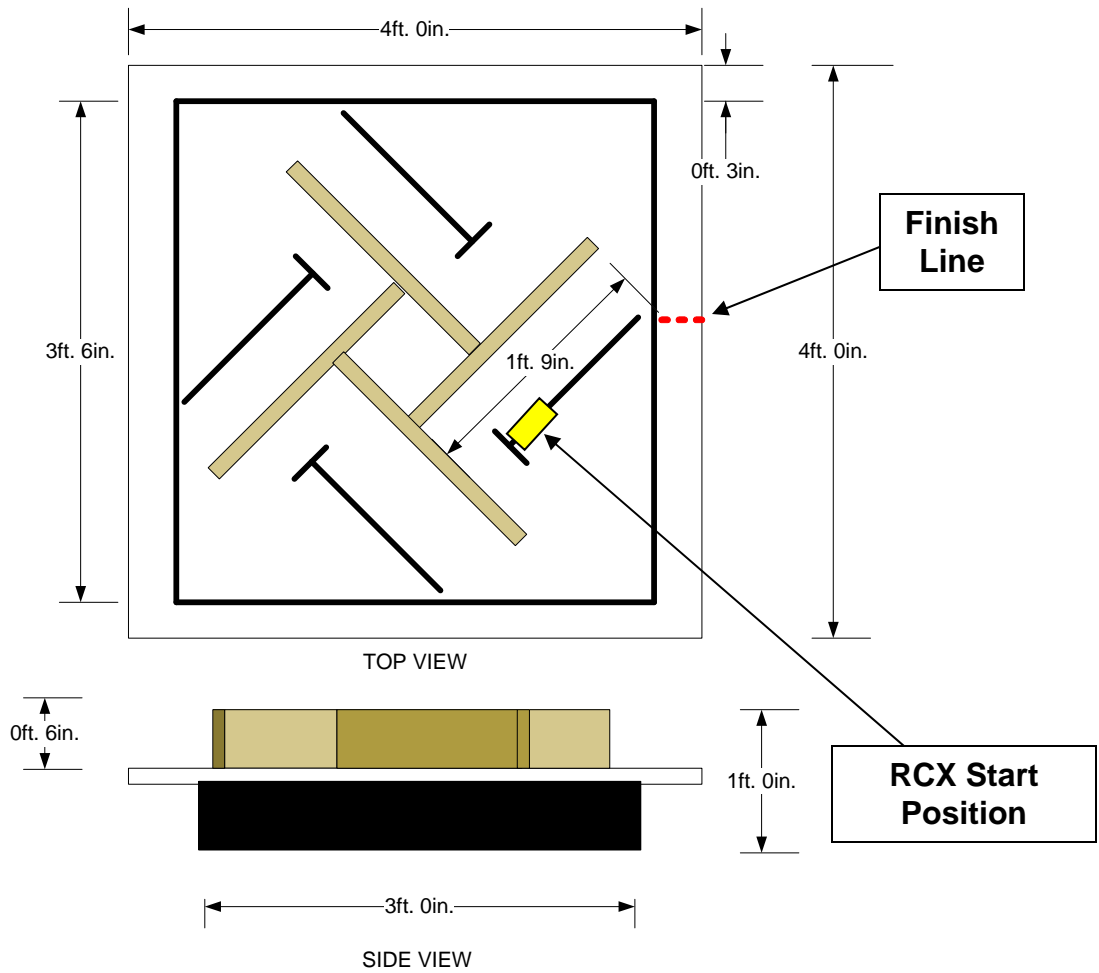
Bonus Points are added to the Base Points to determine the total score.

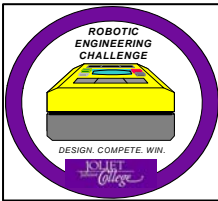
Base Points: complete ONE lap: 30 points.

Bonus Points: team's fastest time in seconds divided into 200 and rounded down.

Expert Challenge: Square Route

Last Update: Thursday, January 18, 2007





ROBOTIC ENGINEERING CHALLENGE 2008

EXPERT CHALLENGE: BOMB DISPOSAL ROBOT

GOAL

Place as many simulated explosives (clear globes) into the bomb disposal unit (cup array) as fast as possible.

RESTRICTIONS and GUIDELINES

Control Mode: Remote Control or Autonomous

The mobile portion of the robot must be placed completely within the starting semi-circle.

The clock is stopped when all globes have been placed in the cup array.

Any globe that falls from the game area is out of play for that run.

Only one robot on the track at a time.

All other rules apply.

Maximum Time Limit per Run: 90 seconds

SCORING

Bonus Points are added to the Base Points to determine the total score.

Base Points: First time pick up and holds globe: 50 points

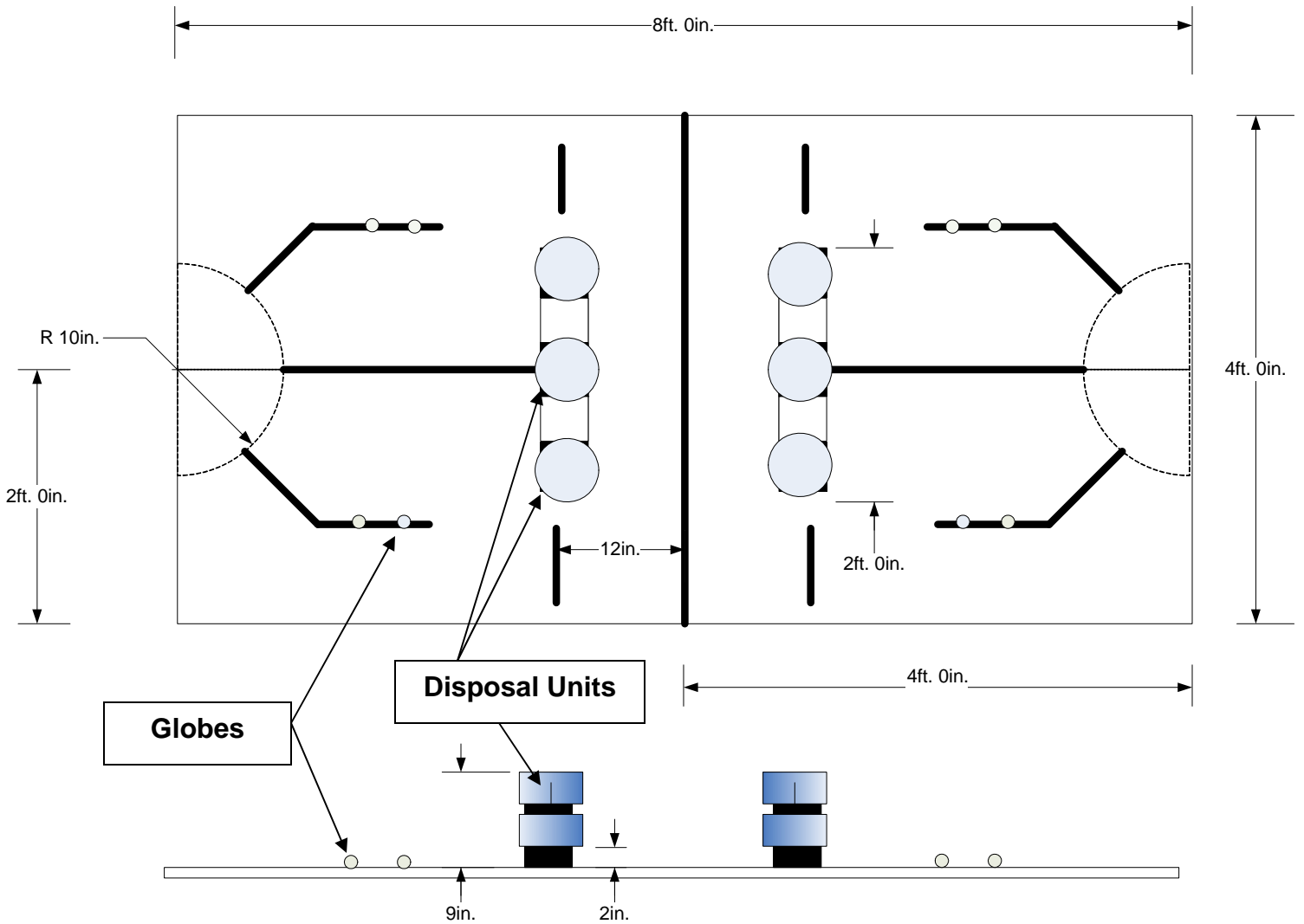
Bonus Points:

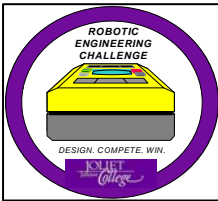
- Team's fastest time in seconds divided into [10 x (cup points)] and rounded down.
 - Globe in upper cup: 20 points each
 - Globe in lower cup: 5 points each

- Autonomous operation: times three (3) multiplier

Expert Challenge: Bomb Disposal

Last Update: Thursday, January 18, 2007





ROBOTIC ENGINEERING CHALLENGE 2008

EXPERT CHALLENGE: LAND NAVIGATION

GOAL

Get from the start area to the turn-around area and back to the start area as fast as possible. **Beware of the troll.**

RESTRICTIONS and GUIDELINES

Control Mode: Remote Control or Autonomous

The mobile portion of the robot must be placed completely within the starting area.

The clock is stopped when any part of the mobile robot breaks the plane of the start area at the end of the robots round-trip.

A robot may only cross a bridge once per run.

Only one robot on the track at a time.

All other rules apply.

Maximum Time Limit per Run: 60 seconds

SCORING

Bonus Points are added to the Base Points to determine the total score.

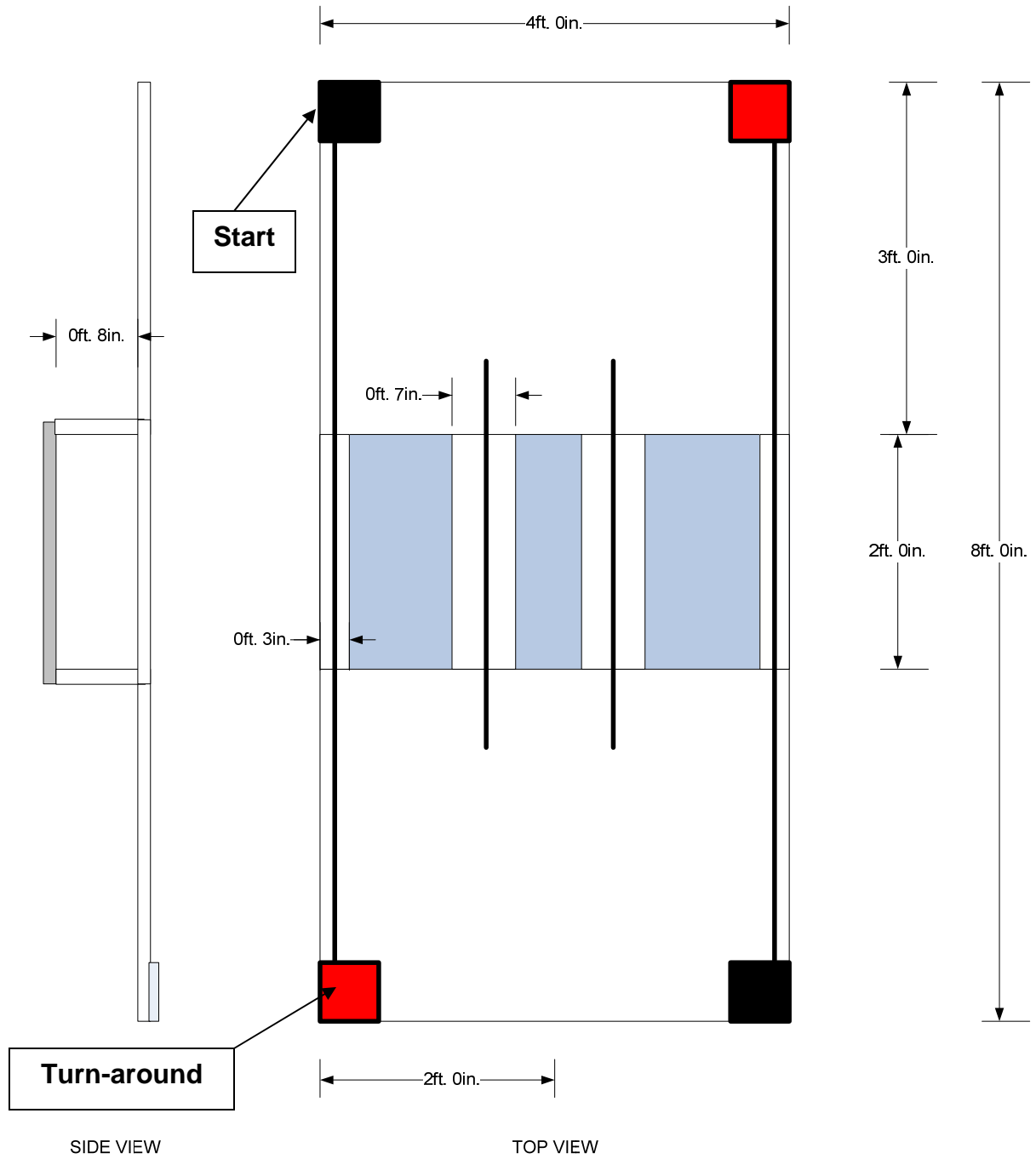
Base Points: Make it to turn-around: 40 points

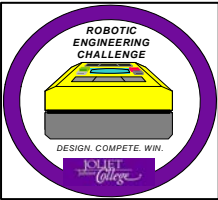
Bonus Points:

- Team's fastest round-trip time in seconds divided into 200 and rounded down.
- Autonomous operation: times three (3) multiplier

Expert Challenge: Land Navigation

Last Update: Saturday, January 20, 2007





ROBOTIC ENGINEERING CHALLENGE 2008

EXPERT CHALLENGE: SEARCH-AND-RESCUE

GOAL

Deliver a simulated medical supply payload to the finish area as fast as possible.

RESTRICTIONS and GUIDELINES

Control Mode: Autonomous

The RCX must be placed completely within the starting area.

The clock is stopped when the payload is placed within the finish area.

The payload may leave the finish area once the robot has placed it within the ring.

Only one robot on the track at a time.

All other rules apply.

Maximum Time Limit per Run: 90 seconds

SCORING

Bonus Points are added to the Base Points to determine the total score.

Base Points:

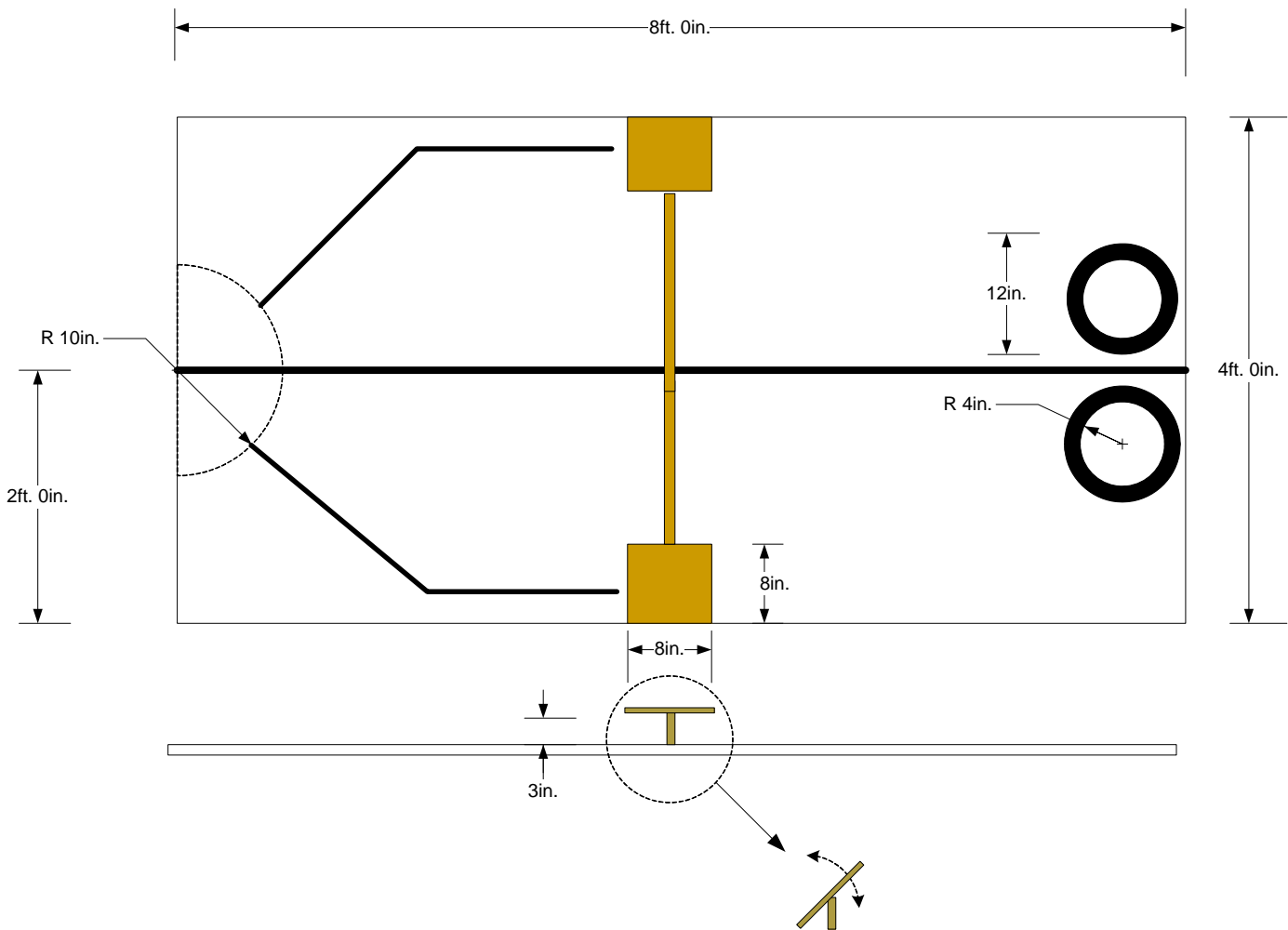
Make it across the barrier without loss of the payload: 50 points

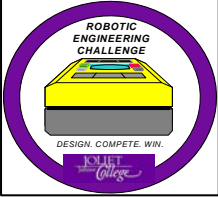
Bonus Points:

Team's fastest time in seconds divided into 200 and rounded down.

Expert Challenge: Search-and-Rescue

Last Update: Saturday, January 20, 2007





ROBOTIC ENGINEERING CHALLENGE 2008

EXPERT CHALLENGE: HAZMAT ROBOT

GOAL

Find the simulated hazardous material drum and return it to the start circle as fast as possible.

RESTRICTIONS and GUIDELINES

Control Mode: Autonomous

The RCX must be placed completely within the starting area.

The clock is stopped when the object is placed within the start circle.

The object may leave the finish area once the robot has placed it within the start circle.

Only one robot on the track at a time.

All other rules apply.

Maximum Time Limit per Run: 120 seconds

SCORING

Bonus Points are added to the Base Points to determine the total score.

Base Points:

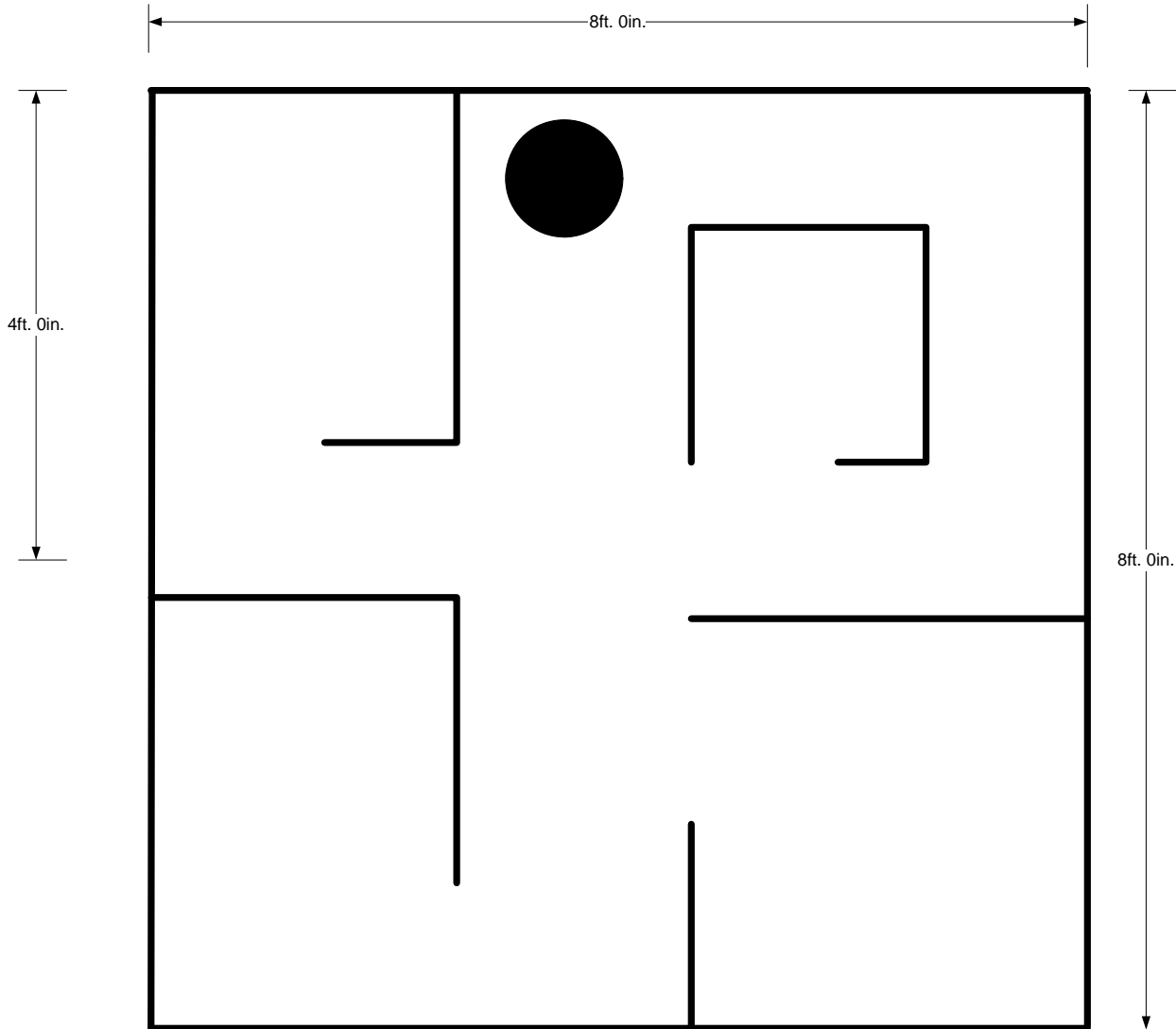
Make contact with object: 40 points

Bonus Points:

Team's fastest time in seconds divided into 1200 and rounded down.

Expert Challenge: HAZMAT Robot

Last Update: Thursday, January 18, 2007



TOP VIEW