

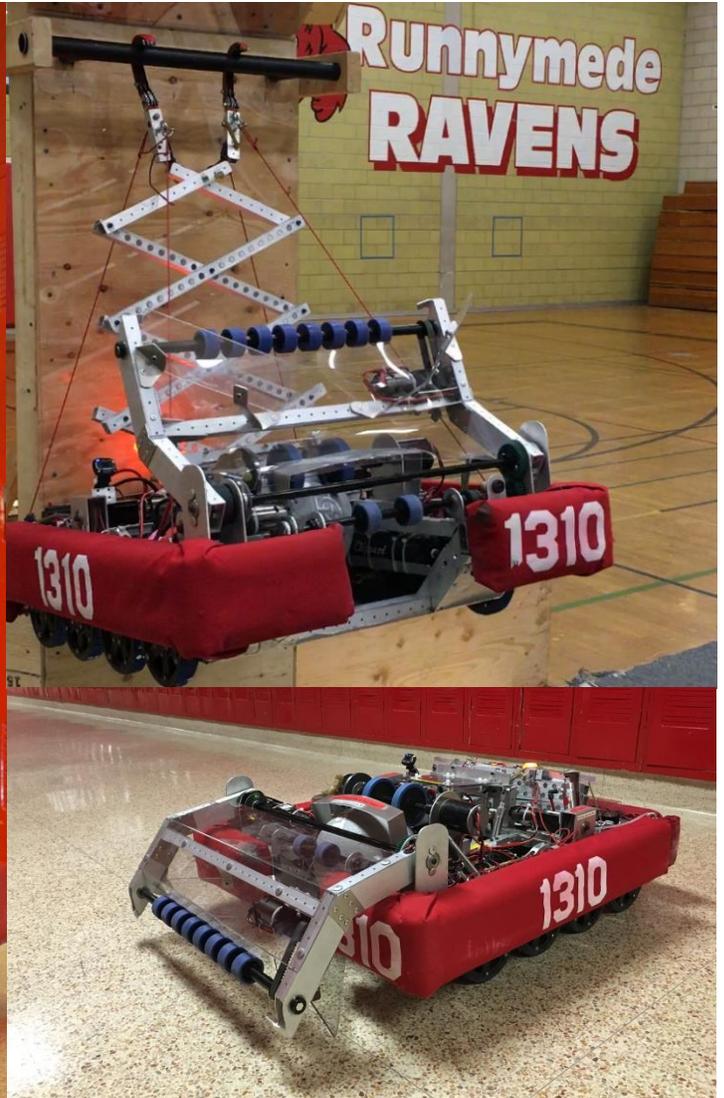
Runnymede



ROBOTICS
1310

Proudly Presents

The Red Scorpion



Runnymede Collegiate Institute
569 Jane Street, Toronto, Ontario, Canada

2016 North Bay Regional Champions
Industrial Design Award

Team1310.ca



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THALES



Team 1310 Runnymede Robotics

2016 Robot Fact Sheet

Runnymede



Design Overview

The Red Scorpion's compact design was optimized to **quickly traverse all 9 defences** and accurately score boulders in the high or low goal. Our **high goal autonomous** and **multiple high goal cycles** and **6 second tower scale** maximizes our offensive score and ranking points. The **speed, mobility and high traction wheels** make the Red Scorpion an **excellent defending robot**, if needed.

Drive Train

- Powered by 4 CIM motors
- 8 – 6" wheels with **Blue Nitrile tread** for maximum traction for climbing defences, standing ground / maintaining shooting and moving opponents if defending
- Front and back wheels slightly raised for improved maneuverability and grip when traversing defences
- Entirely gear driven to prevent loss of torque and fully contained in box frame to improve durability and safety and conserve space
- 2 speed gear box geared for 6 fps & 14 fps for **maximum offensive and defensive speed / mobility and quick cycles**

Articulating Intake Arm

- Quickly corrals boulders in a wide path and funnels them into the onboard intake wheels
- 180 degree articulation for lifting Portcullis, dropping Cheval de Frise and pushing Drawbridge or Sally Port

High Goal and Low Goal Shooters

- Direct drive mini-CIM high goal shooter with speed control
- Pneumatically controlled collapsible shooter for low bar passage and adjustable trajectory
- **High goal shooter with vision tracking assist and auto alignment for quick and accurate high goals**
- Consistent low goal shot option
- Boulder fully contained in between high goal and low goal shooter to prevent ball loss and allow for quick high or low goal shot option
- **Aiming laser** for additional visual assistance for shooter alignment

Tower Scaling Mechanism

- Compact scissor pneumatically **deploys stingers in 1 second**
- Scaling hooks accurately grip bar from front or back
- Dual motor winching mechanism with quad ropes and dual rope spools **raise the robot in 4 seconds**
- Passive rope cleat restraints keep robot safely suspended

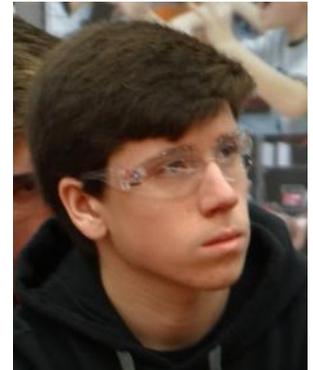
Programming & Controls

- Programmed in Java with dashboard interface for easy and flexible autonomous programming set-up
- Complex programming able to **autonomously cross multiple defences in varying positions and shoot in high or low goal**
- Gyro and drive train encoders for autonomous positioning
- Front and rear mounted ultrasonic sensors for sensing robot proximity to field wall in autonomous
- Encoders for automatic boulder intake with optical intake sensor to auto stop intake, hold the boulder neutral position or pull back boulder for high goal shot.
- Optical sensors to detect field lines and batter for autonomous navigation and shot alignment
- **Onboard camera with vision tracking for automatic alignment and accurate high goal shots**
- Optical sensors for controlling consistent shooter speed
- Holoflex sensors for pre-programmed PID based positioning of intake arm for intake of boulders and actuation of defences
- Magnetic limit switches for intake arm

Scouting Contacts



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