SICK Laser Component

ACE Project
Carnegie Mellon University

GM Visit
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Repository Layout

• All laser source code under
  ace/software/src/IO/SickLaser

• Can just run make in this directory
  – Watch for upcoming integration with “waf” build system

• General layout:
  – External dependencies
  – Laser libraries
  – Test, example, and calibration programs
  – Operational/control programs
Repository Layout

• External dependencies
  – external/*

• Laser libraries
  – liblaser/, liblaservisualizer/,
    libsickcms/, libvector/

• Test, example, and calibration programs
  – Control programs
Repository Layout

- Test, example, and calibration programs
  - tests/*, calibration/*
  - tests/sickcms_test
    - Read from laser and print out straight-line forward distance to nearest object
  - tests/sickcms_test_basic
    - Same, but using low-level C interface for laser (should be unnecessary)
  - calibration/calibrate_ctrsick
    - Calibrates position of laser on robot when run with a marker nearby (already performed, should be unnecessary)
Repository Layout

- **Operational/control programs**
  - `visualizer/`
    - Graphically displays continuous laser readings
      + and – keys to zoom, arrow keys to pan
    - Good example code for reading from laser
  - `markerdetector/`
    - Graphically displays laser readings with detected post marker locations overlaid
    - Use `-b` argument to program to display derived bar location
    - Good example code for localizing marked objects
Repository Layout

- Operational/control programs, cont.
  - pursue_bar/
    - Controller to approach bar marked with posts
    - Uses textbook “pure pursuit” algorithm (bar may move)
  - pursue_bar2/
    - Alternate controller to approach bar
    - Localizes bar, then performs fixed motions to place robot directly in front of bar (assumes bar doesn’t move)
  - pursue_bar_full/
    - Executes alternate controller and then returns to continuous application of first “pure pursuit” controller to follow a moving bar
Primary C++ Class Hierarchy

- Laser Reading

LaserReader
  Generic Laser Interface

  SickS300Reader
  Reader for laser in use here

  ___Reader
  Readers for any other laser

  ___Reader
  Readers for any other laser

  libsickcms
  Low-level C library for S300 laser

  (serial data from laser)

  (implement as/if needed)
Primary C++ Class Hierarchy

- Object Detection

**MarkerDetector**
Detector cylindrical markers

(LaserReader data)

**MarkedBodyDetector**
Detects a body with markers affixed

**MarkedBarDetector**
Detects a bar connecting two markers

(MarkerDetector data)