Challenge Two: *Dead Reckon/Dance*
ROBOTIC AUTONOMY
Summer 2002

This week you have begun performing open-loop robot programming. Congratulations!
Now itís time to show off the accuracy you can achieve for turning and moving a desired
distance. Then you can use those functions to exhibit your first robo-cha-cha.

Dead Reckon
Go-To (20 points)
Provide the Go-To button on your interface. The user types in a number, specifying the number
of centimeters for the robot to move straight ahead. The robot goes forward that many centimeters
and stops. We will test your Go-To by using it and measuring the actual distance with a tape
measure. *Extra credit: Your robot may travel faster when going longer distances. You can have
a second parameter where you specify for Go-To how fast you want the robot to move.*

Turn-To (20 points)
Provide the Turn-To button on your interface. The user types in a number, specifying the
degrees for the robot to turn in-place, with positive values specifying counter-clockwise rotation
and negative values specifying clockwise rotation. The robot rotates in place the specified
degrees and stops. We will test your Turn-To by using it and measuring the approximate
number of degrees turned. You may want to make the wheel steer faster. To do so, ask us for
the special command to set this up.

Polygon (10 points)
We will give your robot a sequence of Go-To and Turn-To commands, one after another, that
describe a polygon. After your robot has completed the sequence, we will measure where it
ends up and comparethe final position to the corresponding point on the test pattern.
Extra credit: The team that achieves the most accurate final position.

Dance (20 points)
Once you have written Go-To and Turn-To, make a new button called Dance. When this button is
clicked, your TrikeBot will do a dance that must be at least 60 seconds long. You may want music
to accompany the robot. Do not forget that you can also use the head motions, not just Go-To and
Turn-To. You may want to make the wheel steer faster. To do so, ask us for the special command
to set this up. A panel of judges will grade your dance based on creativity in putting together a
stylish, entertaining robo-cha-cha. Bust a Move!

Web Documentation (30 points)
You will be documenting the progress youíve made in Robotic Autonomy since last weekís
Challenge. Create a short write up that covers issues and developments youíve encountered to:

- build out your TrikeBot with itís electrical and computing systems to make it an
  electromechanical device, instead of just a mechanical one. How did you connect
  everything up? Did you make mistakes? Do you understand what each system does?

- calibrate your TrikeBot using the Java interface and then create programs that
  make your TrikeBot ìgo-toî and ìturn-toî accurately. What errors came up in your
  programs? What did you do to debug them?

- put together a series of commands that come together to form a coordinated movement.
  Did you choose music to suit the spirit of your team? Or match the TrikeBots moves to
  music?