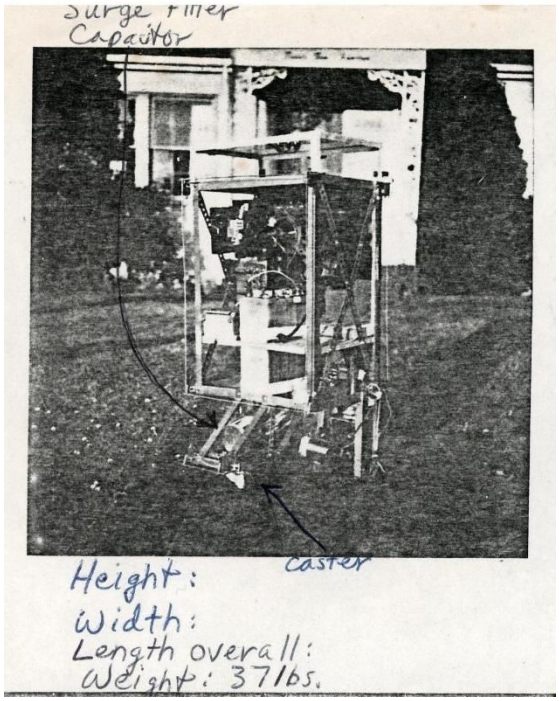
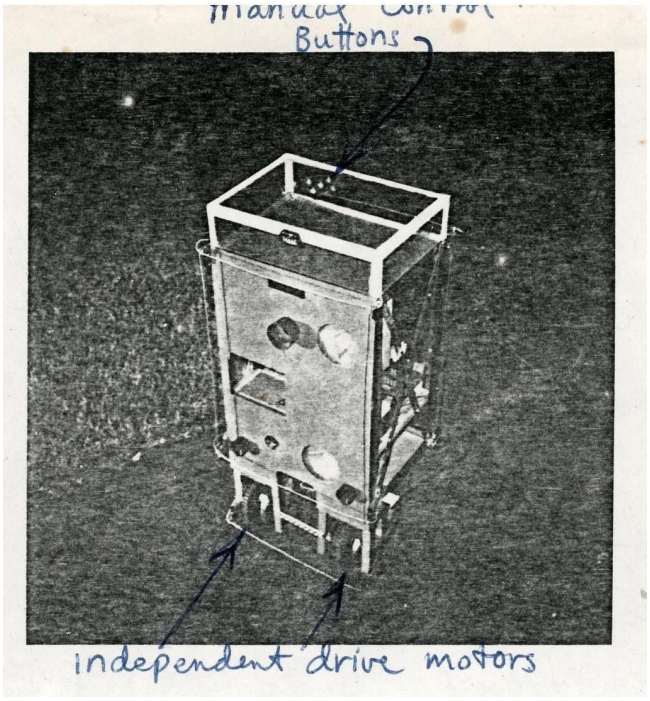
## Historical Information about Omicron3 and his Predecessors:

Omicron1,2,3 were a long-term project original started when I was a teenager. I was inspired by R2D2 at the time when STAR WARS first came out. I was also inspired by a book by Todd Loofbourrow called, "How to Build a Computer-Controlled Robot", which I still have. Since that time it has evolved considerably since I originally conceived the idea. The boxy frame has been rebuilt into a horizontal octagon, the potassium hydroxide nickel cadmium batteries were disposed of, the TTL digital logic controller removed, the sonic sensor (not ultrasonic) was removed, and the relay controls replaced. It was remotely controllable via a wired pennant or the buttons on top the Plexiglas panel. I intended to have some sort of computer ride on top but there weren't many to choose from at the time. Portable computing capability was expensive in the 70's and 80's.

The pictures were captured on a one of those Polaroid cameras that spit out the self-developing picture. These cameras had an amazing piece of technology that was interesting for robotics--their ultrasonic range sensor used to set the focus. The system sent out three sets of ultrasonic pulses in different ultrasonic frequency bands to ensure that an echo was received if there was something out there. These sensors are far more sophisticated than the inexpensive PING sensor one sees on robots today. Back in 2000 SRS member Dennis Clark wrote an Encoder article about hacking one of these system to use it with a microcontroller for very accurate distance measurement. I have several of these cameras which can sometimes be found at thrift stores or garage sales and someday hope to use one or more on Omicron.

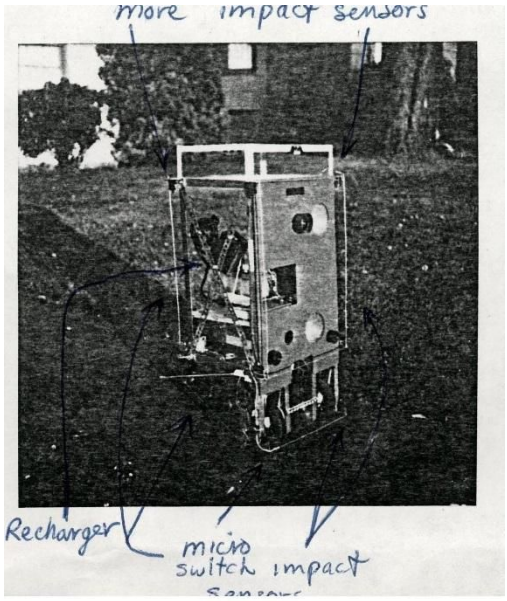


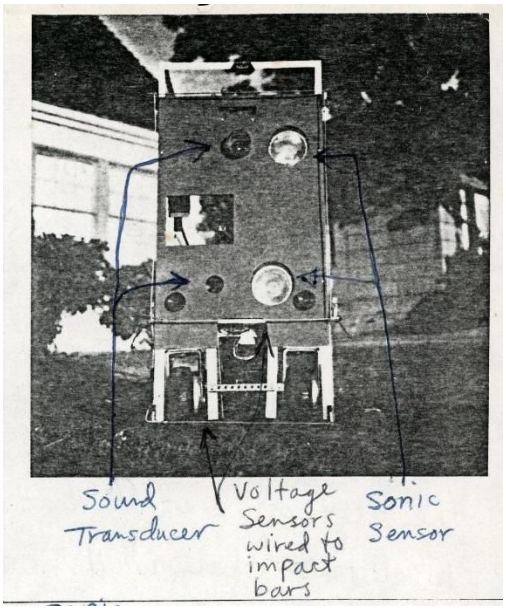



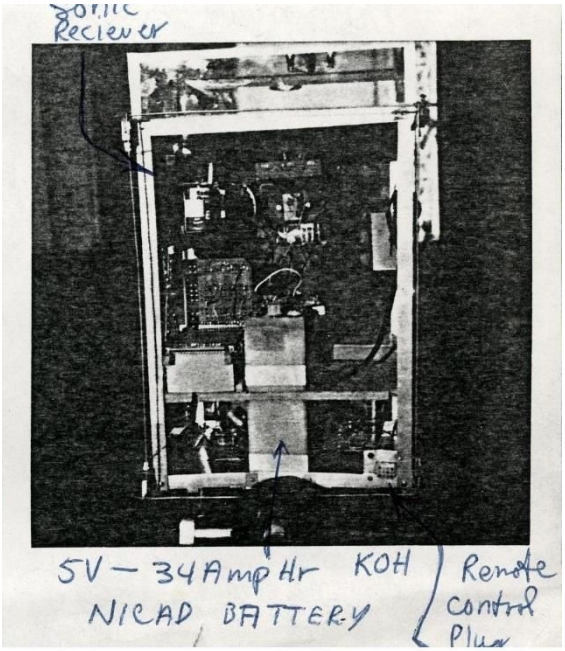

The two original components that are still there are the main drive wheels, intended for motorized wheelchairs, acquired from an electronic surplus house called Herbach and Rademan which still exists though this type of store is rare to find as brick-n-mortar!

Above are various old pictures of the mainframe and sensor systems of a robot that I am “presently” building, well sort of. Approximately $300, and 500-600 man-hours went into what’s pictured plus it two predecessors. At the time this was built, no processor had been installed as I was uncertain of the system to use.

Omicron3 had lots (22) of microswitches (from Radar Electric) wired into 10 sensor outputs lines, a sonic object detector, and a voltage sensor on the lower two front impact sensors intended for detecting a battery charger of sufficient potential. There were side feelers to detect close walls on either side.




The mainframe was constructed out of light ¾" aluminum "L" channel plus steel furnace duct strapping crisscrossing each side to add rigidity to the frame. My mechanical construction skills have never won awards and even with all I've learned aren't noteworthy today, but I get by. The drive motors were purchased from Herbach and Rademan as Todd Loofbourrow suggested in his book. Since I did not wish to use the Kim-1 Computer with MOS Technology's 6502 Processor (didn't have one, couldn't afford one) as he did, the book on served as a general guide for reference purposes. I also had no idea how to interface the logic I/O of this or any computer to run the power electronics of the robot.

The sonic sensors were solid-state piezoelectric oscillators which are pulsed at about 1.5Hz, making an annoying but tolerable (at least to me) chirp. The receivers were crystal microphone/earphone mounted at the focal point of a large flashlight reflector thus giving directional, amplified sensitivity. It fed a VOX circuit which closed a relay when it received a reflection.

The two binocular eyepieces near the bottom front corners above the wheels were cadmium photocells intended for some sort of light-following behavior. This function was never implemented so they were just there for looks and giggles.

Once I got Omicron to actually move, its behavior proved to be very hard on the hardware. In its original form, it went full speed ahead or not, running the motors forward until it bumped (crashed actually) into something which caused them to immediately reverse while turning (one motor ran backward) without any pausing between the direction changes or any sort of start-up or shut-down ramp. This meant that the mass of the robot, which was considerable, was thrown about rather violently as it responded to contact with objects. The motors, gearboxes, frame, and components were not going to last long if I kept this design unchanged. One can sort of get away with this if the robot is small and light but not when it weighs thirty pounds. These constraints caused me to back off on the robot, pulling some of this hardware apart with the hope of incorporating a more sophisticated motor control system. That never actually happened so Omicron3 went dormant for many years gathering dust in my garages until I got interested in doing something with it again. This lead to Omicron4 which will e described in the next document.