

NSPR Portable Welding Robot Panel Project Update SP-7 March 5, 2008

- Introduction
- Goals & Objectives
- Schedule

Background

- Project Approved Fall of 2007
- Officially started mid January after contract signed. Project ends December 2008
- Technical adviser is Bruce Halverson from Marinette Marine
- Three participating shipyards are Marinette Marine, NGSS and GDEB

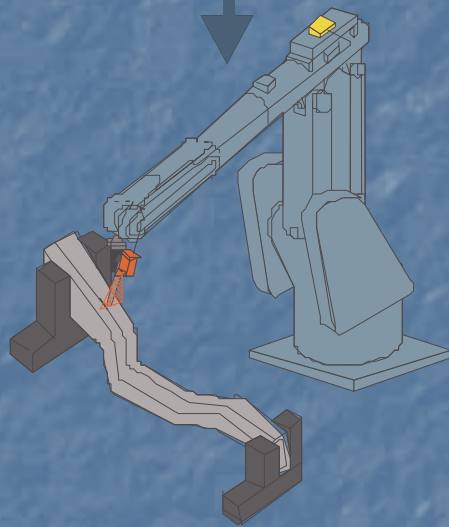
Goals and objectives

- Develop a portable multi-process robot **built in North America**
- Include the ability to upgrade from the standard “teach & play” programmable system without vision to one with laser vision sensing

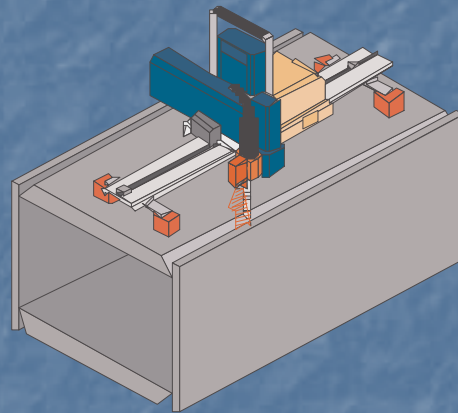
AUTOMATING ARC WELDING PROCESSES

CATEGORIES OF WELDING AUTOMATION METHODS

FLEXIBLE AUTOMATION

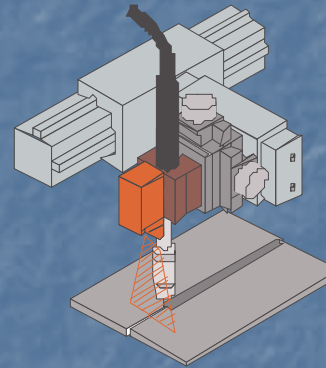


ARTICULATED
WELDING ROBOTS

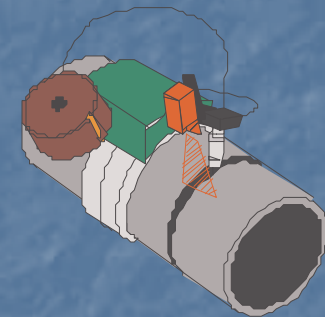


PORTABLE ROBOTS
OR WELDING
CARRIAGES

HARD AUTOMATION



SEAMERS
SIDE BEAM
WELDERS
BOOMS



ORBITAL
WELDING

WHAT IS A PORTABLE ROBOT?

- It's automatically controlled, reprogrammable, and a multi-purpose manipulation machine with several degrees of freedom which is mobile for use in industrial automation applications



Onsite Construction Welding

- Video of portable robot in action

What does multiple process mean?

- Welding with and without laser vision
 - Processes include GMAW, FCAW, SAW
- Plasma cutting and gouging
- Automatic weld inspection

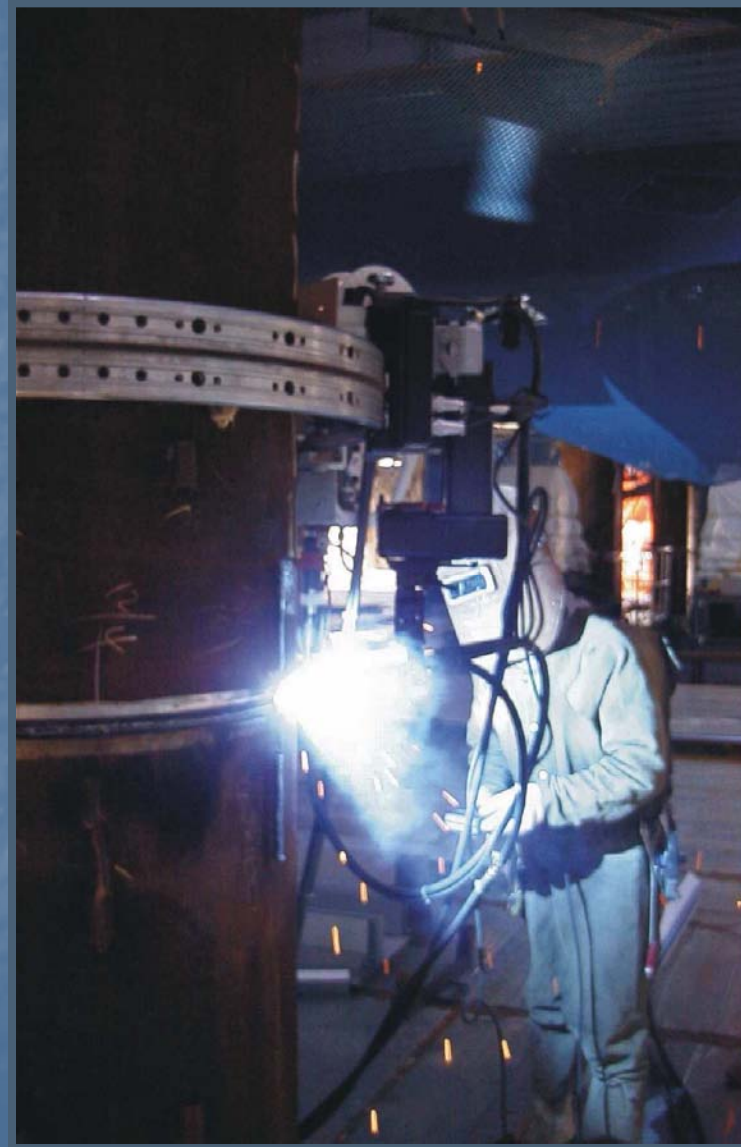
Shipyard Wish List

Feature/Function	GDEB Light	NGSS	Marinette Marine
3 cartesian axes (x,y & z) motion	X	X	X
Pull capability in pounds	100 POUNDS	100	100
Travel speed up to 3.5m/min	2m/min	2m/min	
Y axis stroke(mm)	X	50	100
Z axis stroke (mm)	X	50	100
X axis stroke(mm)	X	X	30000
4th axis manually adjusted torch work angle up to 15 degrees	0-90 DEG	X	X
4th axis automatically adjusted torch work angle up to 15 degrees	0-90 DEG		Helps to get access under angle flange

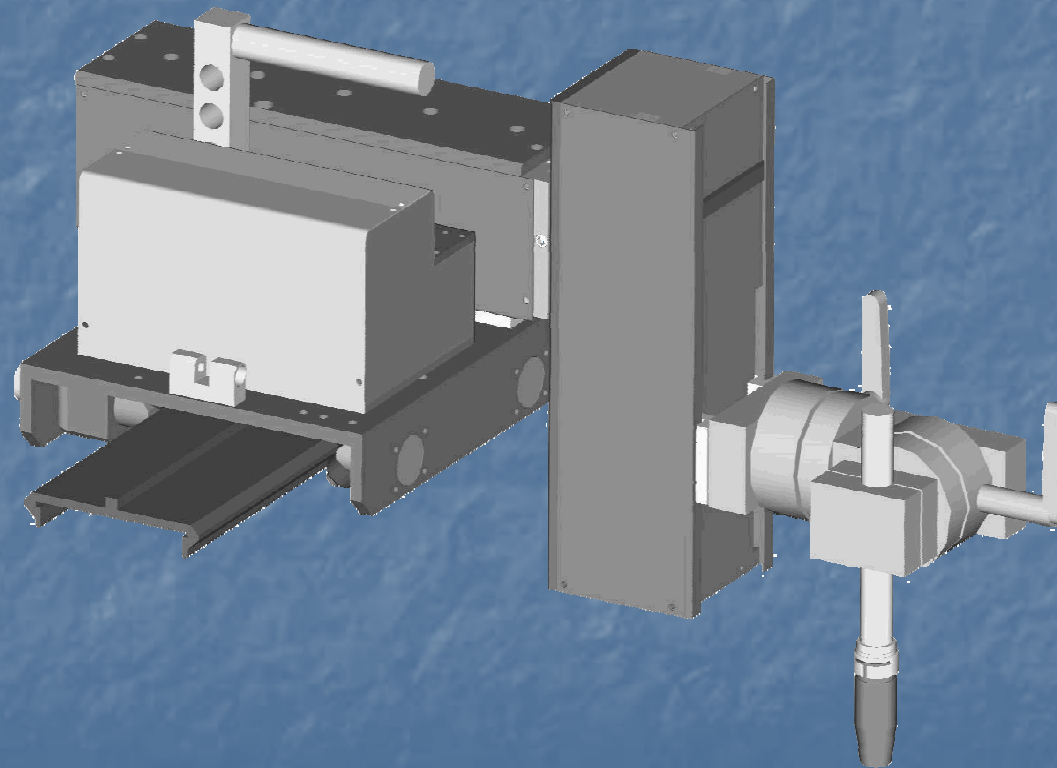
MULTIPASS ARC WELDING WITH PORTABLE ROBOT



Pipe Multi-pass Welding



NEW SHIPBUILDING MULTI-PROCESS PORTABLE ROBOT CONCEPT



MULTI-PROCESS

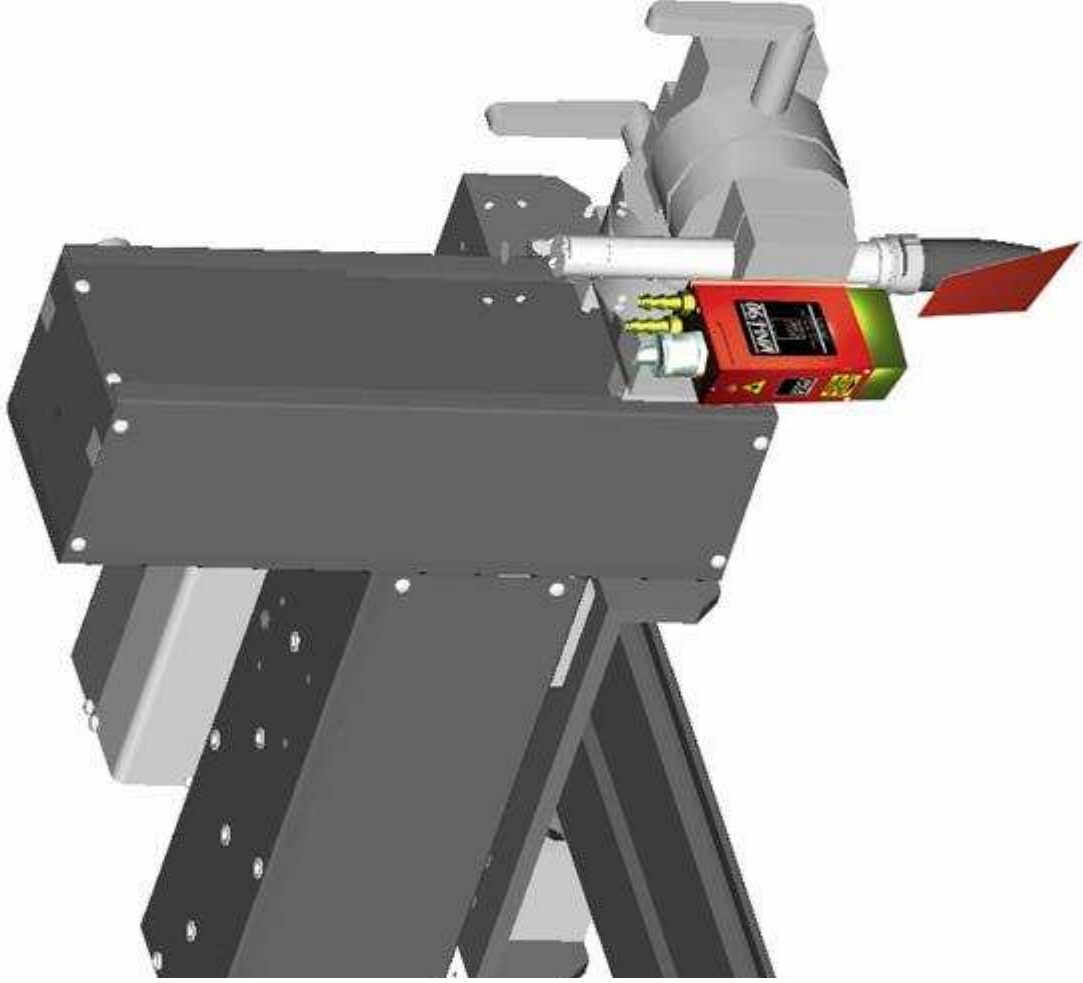
- Can be used with welding & cutting processes including: GMAW, GTAW, PAW, oxyacetylene & plasma gouging

FACTORY PROOF

- Very rugged design; ideal for industrial environments

COMPACT

- Small and portable as well as compatible with standard racks
- Very easy and quick to set-up



Deliverables

- Portable robot designed (electrical and mechanical) for North American build
- Prototype portable robot built
- Demonstration of the prototype robot December 2008 to three participating yards and ATI at Servo Robot Inc. in Montreal