



WELCOME TO SERVO-ROBOT

NSRP Panel Portable Multiple Process Robot Project Review Meeting – March 31, 2009

Guests:

Mr. Jim House

Mr. Dan Roland



PRESENTATION INDEX

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Goals & Deliverables

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Summary, Conclusions & Recommendations

GOALS

- **Develop a portable multi-process (welding, cutting and gouging) 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 for seam tracking & inspection**



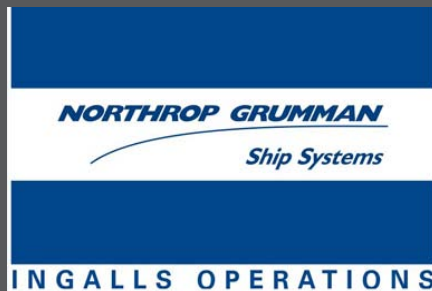
DELIVERABLES

- **Portable robot designed (electrical and mechanical) for North American build**
- **Prototype portable robot built**
- **Demonstration of the prototype robot March 31, 2009 to three participating yards and ATI at Servo Robot Inc.**



TEAM Members

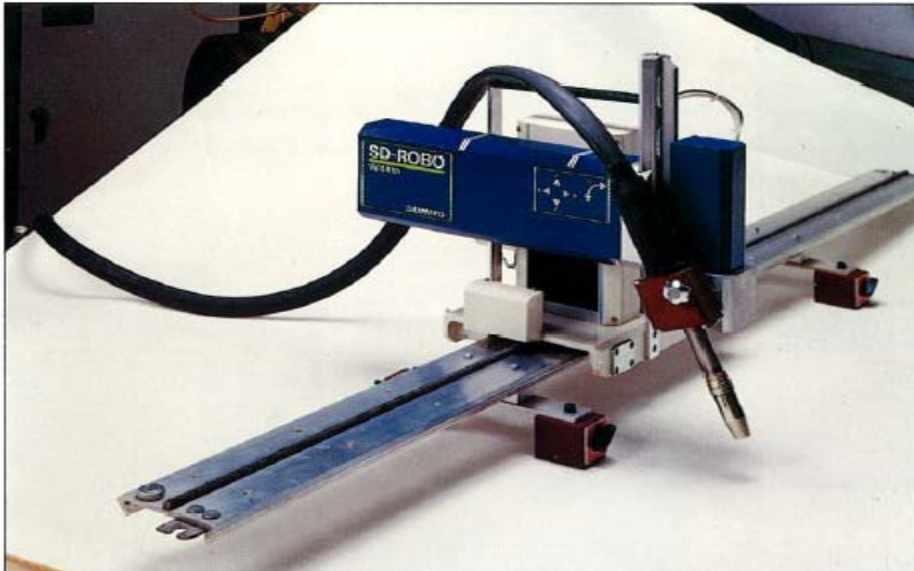
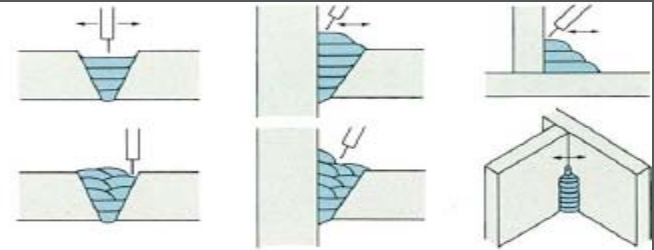
- **ATI – Luke Blessing**
- **GDEB – Lee O’Connell**
- **NGSS – Lee Kvidahl**
- **Marinette Marine – Bruce Halverson (Program Technical Representative)**
- **Servo-Robot Inc. and Servo Robot Corp. (USA)**



ADD-ON OF MULTI-PASS CAPABILITY

- Add-on of Multi-Pass Functions

Portable Multipass Welding Robot
SD-RoBo W4410



EXISTING PORTABLE ROBOTS CAPABILITIES

- What worked
 - Durable
 - Fairly light and easy to maneuver
 - Interfaced to most standard CV power sources
 - Adaptable to different rail types
 - Flexible weaving functions
- What did not work
 - Not truly user friendly
 - Not made for larger hands of the typical lesser trained welder in North America
 - Due to not being made in North America, it is more difficult to get improvements made in a timely manner
 - The inability to save programs limited usage in some applications
 - Vision capability was an add-on and not integrated seamlessly into the basic robot



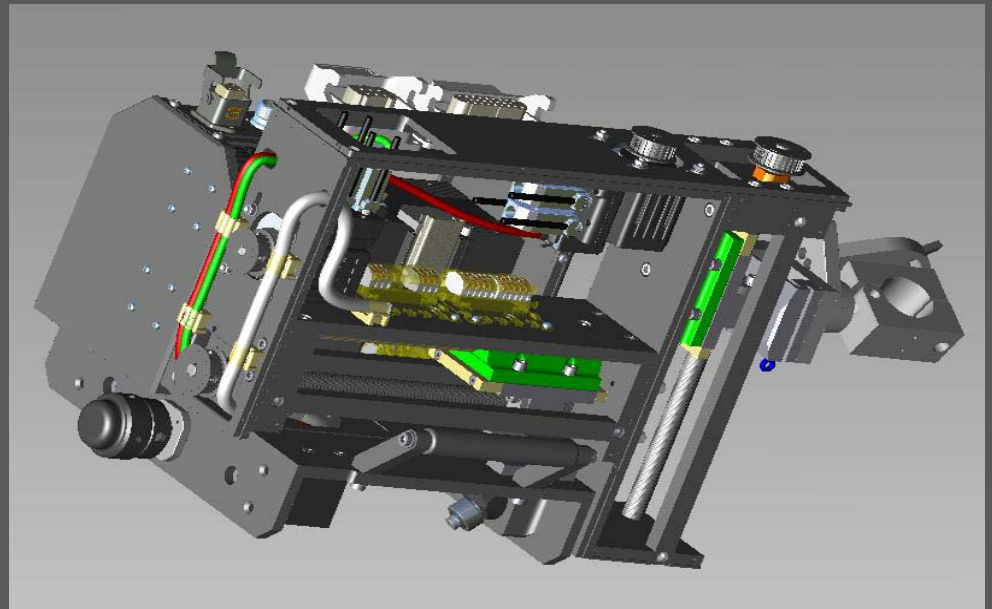
FUNCTIONAL REQUIREMENTS

- Robot body weight less than 25 pounds
- Increased maximum traverse speed
- Increased Z (vertical) axis stroke
- Increased adjustment range of manual 4th and 5th axes
- Ability to save programs – position points and parameters
- Back-lit teach pendant
- Improved start and stop welding sequence
- Much easier to use



ROBOT BODY

- Weight: 35lbs
- Dimensions: 368mm L x 345mm H x 445mm W
- Smart Motor (DC motor, motion controller, encoder, amplifier = better immunity, less cables, longer distance)
- Safety Circuits meet std 6 axis robot RIA, AWS codes



ROBOT TEACH PENDANT

- A 800 x 600 pixel color LCD touch screen
- 64 MB of main memory
- 64 MB of flash memory
- StrongARM CPU
- Windows CE



ROBOT TEACH PENDANT SCREENS (Con't)

- Robot Teaching





Robot Programming User Friendly Teach Pendant



SUMMARY

- **Successful portable robot prototype was designed, built and demonstrated**
- **Servo Robot introduced an unique drive system (Smart Motors) and a very friendly teach pendant**
- **Basic capabilities are present, but much more can be done to make the robot ideal for shipyard use to achieve greater acceptance and success**
- **Sensors like an accelerometer and inclinometer are already built into the system. Sensors for torch and work angle will be added as well as a real time webcam viewer for programming & remote viewing.**



CONCLUSIONS

- **To remain competitive with Asian and European shipyards, the United States shipyards need to adopt portable programmable robots now for their welding and cutting needs**
- **Savings can be immediate and substantial, because each welder will be able to not only weld faster with less defects, but will also be able to be free to do other tasks**
- **Servo Robot is positioned well to be the provider of portable robots due to our extensive experience and our ability to quickly upgrade the systems in response to feedback from the shipyards**

