

MAEEp

Motion Assisted Environmental Enclosure
for Painting

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NSRP SPC&ET
Joint Panel Meeting

[MA] [EEp]

- Modular System to Enhance Productivity
- Two components:
 - Motion Component
 - Motion Assistance
 - Tool Component
 - Environmental Enclosure for Painting

Motion Assistance

- Derived from NIST's Coordinated Aerial Work Platform (CAWP)
- CAWP “robotized” a telescopic boomlift
- Developed between 1995 and 2002
- Funded by Navy ManTech, NSWC-CD, ONR and NIST with cooperation from Snorkel

CAWP Mods

- Replaced solenoid valves with proportional valves



- Added position sensors to actuators



- Added uControllers to servo each actuator



- Added computer to coordinate servos

CAWP Capabilities

- Moved in intuitive directions (up, down, ...)
- Followed taught trajectories
- Followed mathematical trajectories
- Coordinated with another manipulator
- Maintained specific speeds
- Followed Surface

Surface Following

- Boomlift adjusts position to maintain standoff while moving up or down.
- Frees operator from having to relocate the basket
- Only function at this level of Motion Assistance



Strap-on Retrofit

- Modifications are temporary
 - No drilling, cutting, welding, etc
 - Can be removed
- Can be used with leased equipment



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- The tool takes advantage of the motion
- The tool guides the motion
- “Motion Assisted” tools can be developed for many surface oriented activities

Current Tool Development

- Environmental Enclosure for Painting
 - Maintains surface pitch
 - Captures paint overspray
- Inspired by the Spider from Flo Int'l
 - NIST mounted a Spider on CAWP in 2002 to create SAPOCS

SAPOCS

- Spider drew air from containment-hull gap through a vent fan in bottom
- Enclosure was too heavy and too lopsided to be moved by boomlift, and too tall to maintain a seal on hull curves



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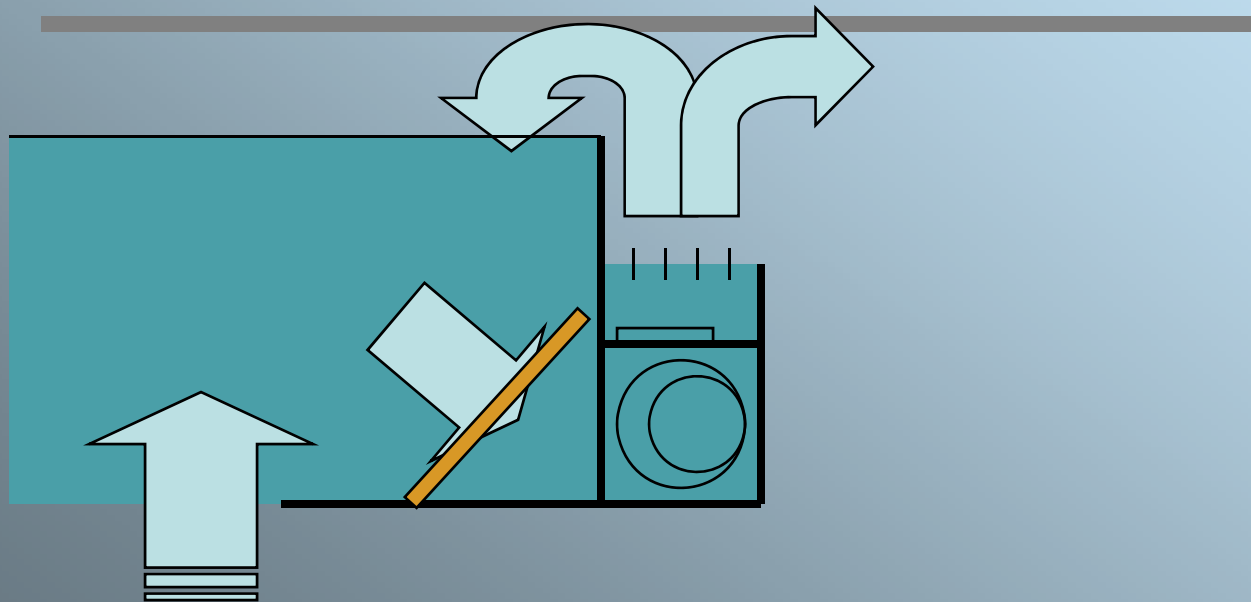
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New Enclosure

- Lighter
 - <200 lbs
- Balanced
 - Center of Gravity within Basket
- with Superior Seal
 - Uses positive pressure to form seal

Positive Pressure

- Series of air curtains seal enclosure
- Portion of air returns, entraining overspray



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Static Prototype



- Design verification
- Parameter adjustment
- Filter selection

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