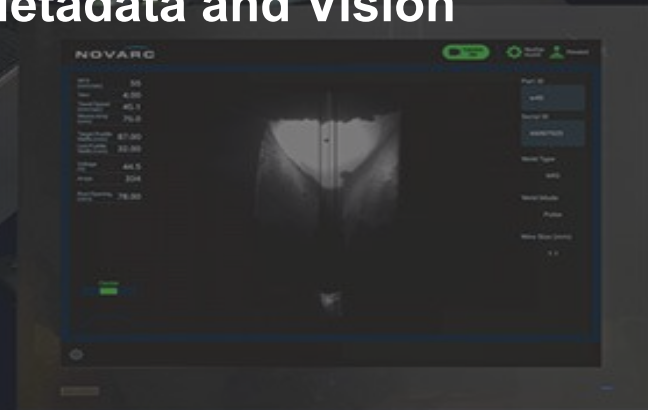


NOVARC

Scalable Journey to Intelligent Welding Automation and Human-Machine Collaboration with Metadata and Vision

Mahyar Asadi

PhD PEng PMP IWE, Deputy CTO



Overview of Innovation at Novarc Technologies

To lead the innovation of AI and Automation in Welding.

Our Global HQ: Vancouver, BC

- Other offices and Reps: TX, Aus, EU, ME

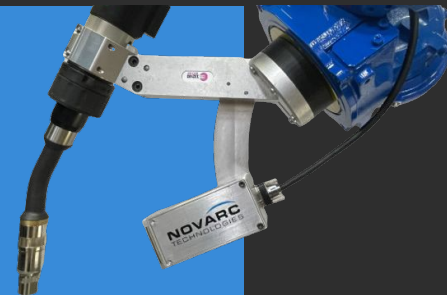
Innovation Team: Welding, AI, Vision, and Robotic experts

Novarc Products:

- **SWR** - Collaborative welding robot
- **NovEye** - Autonomous SWR
- **NovSync** - Analytics dashboard
- **NovAI** - Adaptive Welding Computer Vision AI
(Capture, Control & Autonomy)

NovAI™

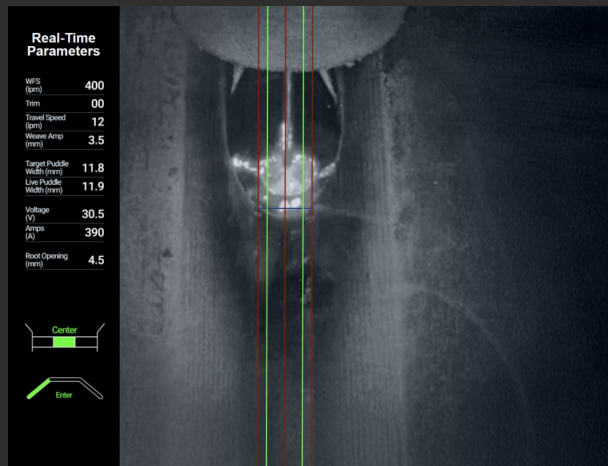
Bringing Perception and AI to Robotic Welding



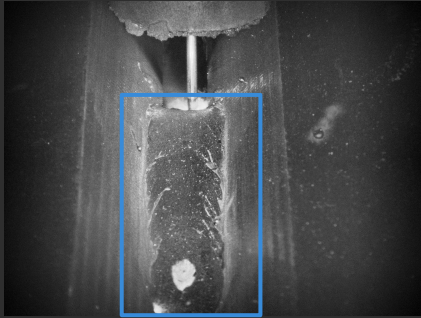
Fit-Up Adaptation
Live with no Prescanning
Eliminates Program Maintenance

Seam Tracking
Adapts to Seam and Weld Distortion
No Changes to Programmed Path

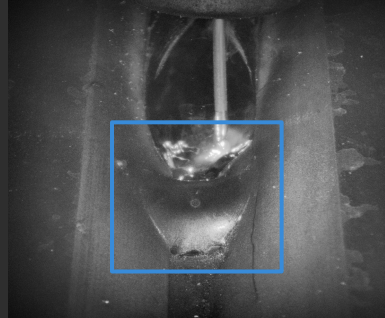
Tack Adaptation
Adapts to tacks of varying size
No time consuming grinding



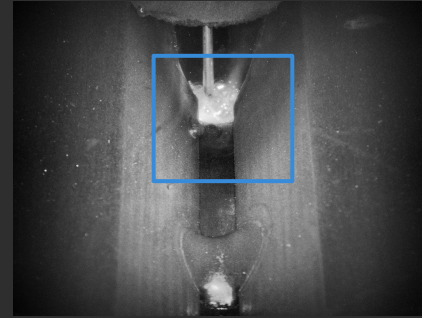
Tack Adaptation



Stitch Tack



Button Tack



Root

Detect and fuse over the tack

Throughput: No Stop over tacks to grind

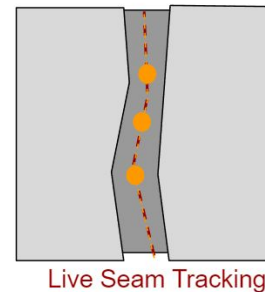
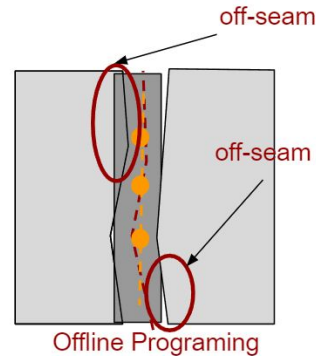
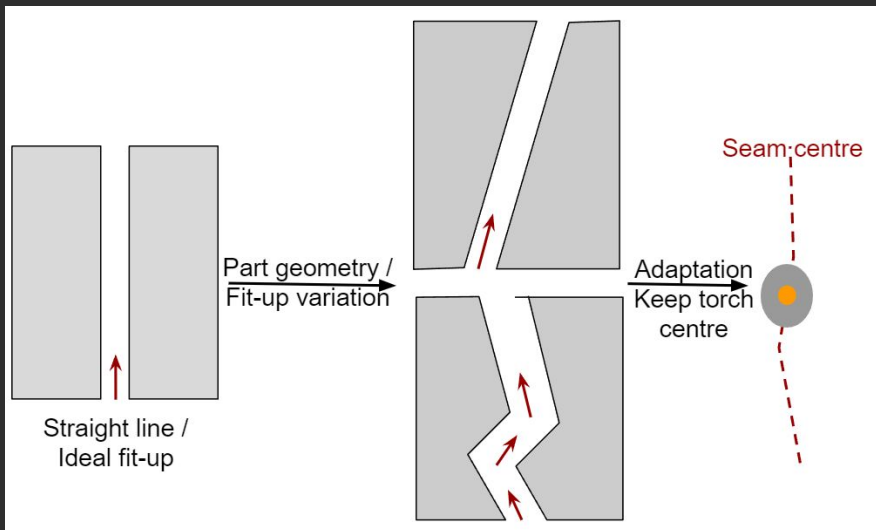
Quality: proper fusion on tacks

Accuracy: actually detects, not estimates which affects seam tracking, or confuses with defect

Seam Tracking

Live Seam Tracking Control

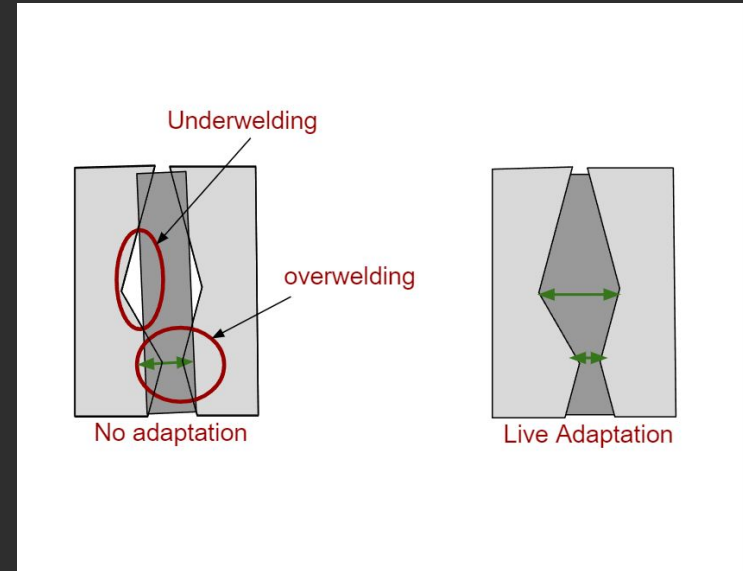
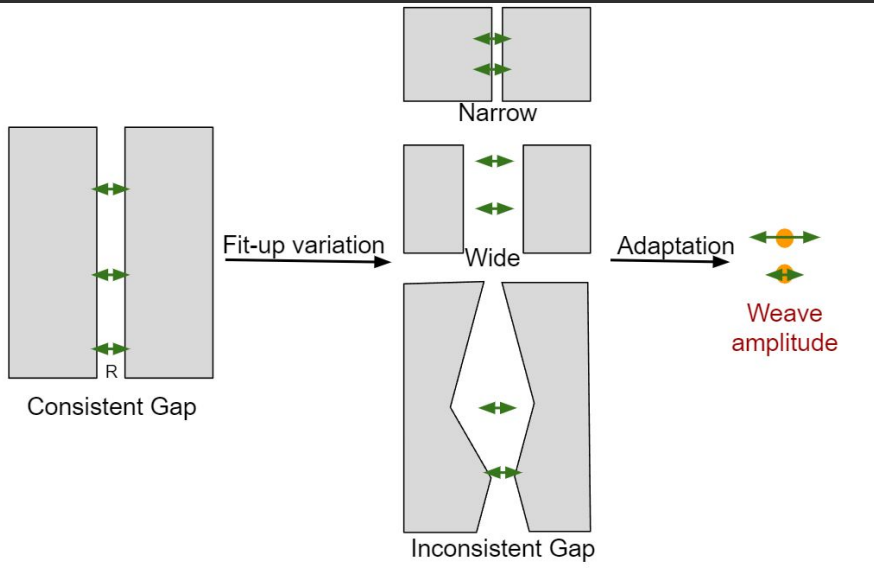
- Adapting to real condition of seam
- Adapting to welding distortion during welding
- Defining the correction to the off-line path program



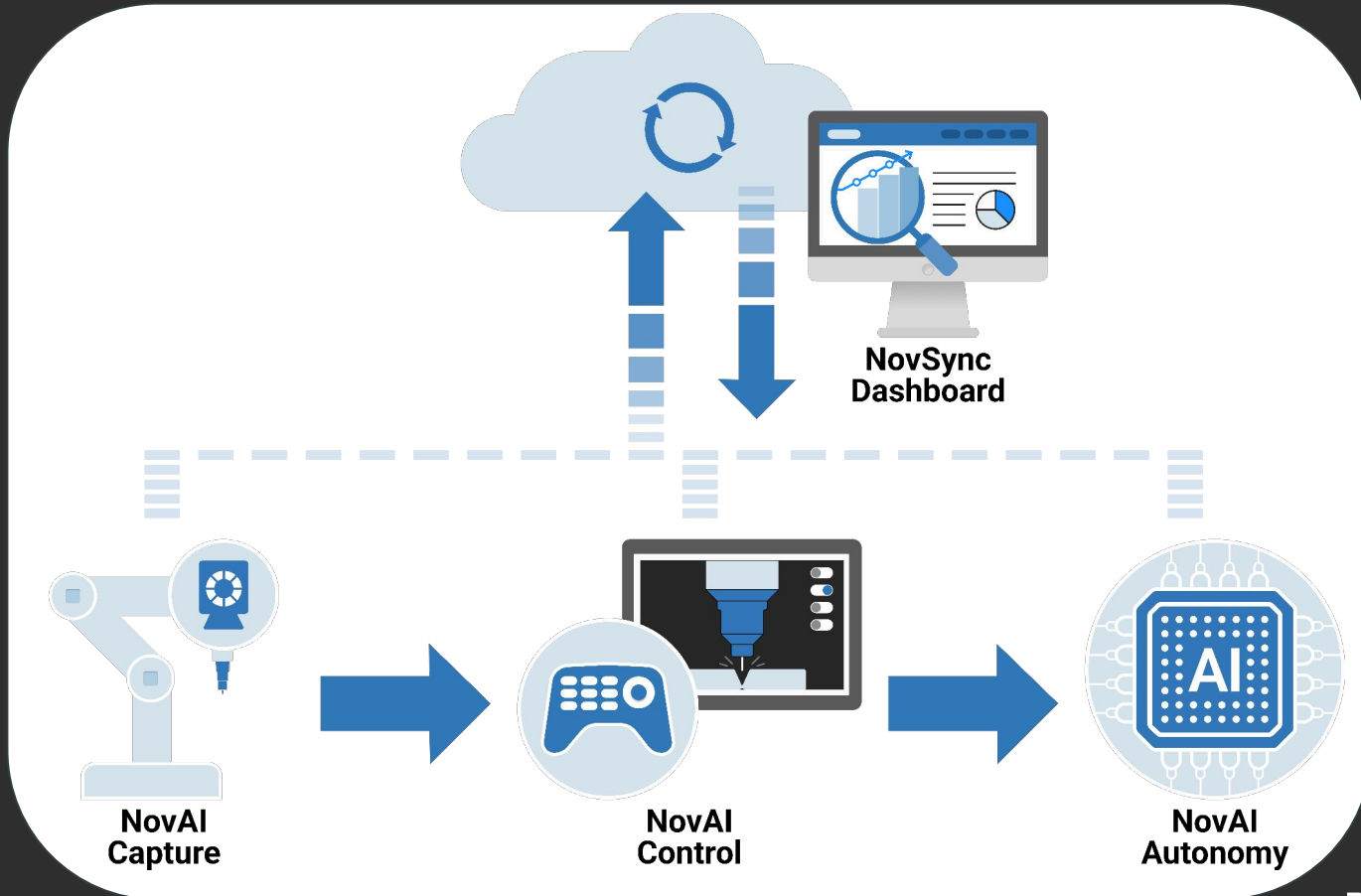
Fit-up Adaptation

Live Fit-Up Variation Control

- Adapting to fit-up tolerance during loading



Journey from manual welding to intelligent, automated welding



NovAI Capture

- Watch the weld as it occurs and review it after.
- Troubleshooting aid to see process issues.
- Review essential weld variables utilized on each weld.
- Data to help with quality containment



NovAI Control

- Pendant + Vision
 - Dual control over power source and robot
 - Human in the loop
 - Applications: High mix, low volume



Data Collection



Seam Tracking (Motion Control)

Tack adaptation

Weldment adaptation
(WFS, Volt, TS, Weave)

Changes:
Process parameters
Motion parameters



Robotic Welding

NOVARC

NovAI Autonomy

Fully autonomous

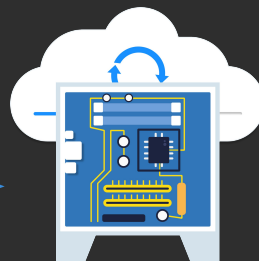


Welding Image

Autonomy

Control
(Data Collection)

Robotic Welding



Changes:
Process parameters
Motion parameters

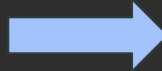


AI Models
Trained on collected data

NovSync - Track and Trace

All weld parameters are tracked, complete with videos and **synced** logs. Welding parameters can then be compared to specifications.

- Date & Time
- Part ID
- Serial ID
- Weld ID

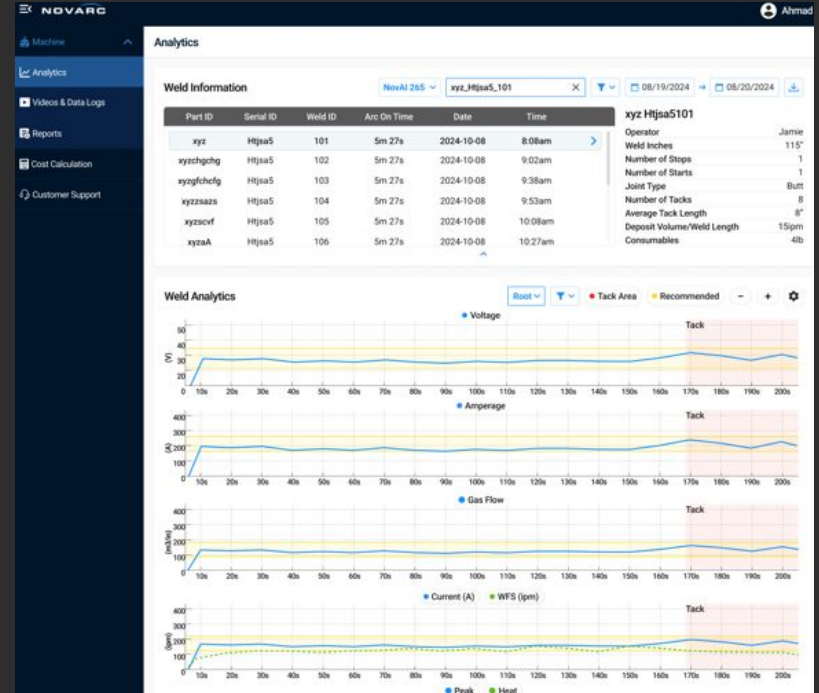


Parameter Calculations
Define range of parameters based on procedure values used at your shop.

Ahmad
Enter email ☐ Notify me with out-of-range parameters

Weld Pass	Amperage (A)	WFS (ipm)	Voltage (V)	Travel Speed (ipm)
Root Pass	95-200	90-175	12-20	2-9
	95-220	95-175	12-23	2-9
Remaining Passes	95-255	110-265	13-28	2-14
	95-300	115-300	13-30	2-16

Cancel Save Changes



Summary

