TRUE POSITION ROBOTICS

GREEN AFFORDABLE ROBOTIC AEROSTRUCTURE ASSEMBLY

Solving Complex Manufacturing Challenges With Proven Technology

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THE PROBLEM

Aerostructure OEMs Need To Accelerate Automated Assembly

Global aerostructure and defence OEMs are under unprecedented pressure to increase rates, control costs, reduce concessions, overcome skilled-labour shortages and deliver flawless quality at scale.

Manual assembly processes are the bottleneck, and the **next competitive advantage** is clear…

- Automated Operations
- Realtime Digitised Process
- Manufactured To CAD
- Full Process Traceability
- Flexible & Agile Solutions
- Reduced Capital & Operating Costs

Aerostructure Assembly Transformation		
Fixed & Bespoke Applications	→	Modular & Mobile Solutions
High Load Machining	→	Low Force Processes
Offline Inspection	→	Inline Quality Control
Process & Data Silos	→	Realtime Digital Thread To CAD
High-Cost & Complex Fixtures	→	Low-Cost or Existing Fixtures
Complex Programming	→	OLP & Digital Twin
Uncontrolled Concessions	→	Guaranteed Zero Concession
High Energy Consumption	→	Low Energy

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THE CHALLENGES

Industrial Automations Most Difficult Application

Robotic aerostructure assembly is notoriously difficult with aerostructure primes spending millions of dollars over two-decades to fail.

Here are the known challenges…

- Low Structural Stiffness & Skidding
- Unacceptable Positioning Accuracy
- Overcoming Inconsistent Components & Frame Assembly
- Countersinking Accuracy & Skin-Frame Deformation
- Material Stack Anomalies
- Need For Manual Deburring
- Programming & Manual Adjustments
- Adoption Taking Years & Performance Concessions

Read - BOEING Scraps 6 Year FAUB Program Costing MM$



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TPR SOLUTION

Unique & Patented Technology To Solve The Problem

PATENTED ROBOT GUIDANCE	→	0.1mm Large Volume Robot True Position Accuracy
INLINE INSPECTION	→	3D Scanning & Digital Thread To CAD c/w PolyWorks Integration
PATENTED DRILL	→	0.2mm Accuracy c/w Auto Collet Changer & Anti-Slip Nose
MOBILE PLATFORM	→	Autonomous Mobile Robot Positioning Process & Metrology Robot
THIRD PARTY INTEGRATION	→	Integrate Fettling-Cleaning-Pre-Paint-NDT Applications
COMPLIMENTARY SERVICES	→	Application & Simulation Project Management & Technical Oversight Third Party Software Integration Installation & Commissioning SLAs & Upgrades

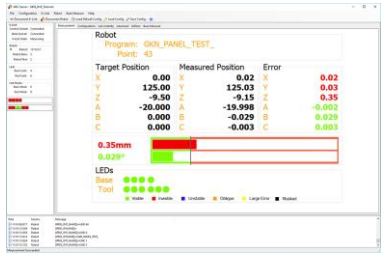
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PRODUCTISED TECHNOLOGY

Tried & Tested By Aerostructure OEMs

PATENTED ROBOT GUIDANCE



Adaptive Robot Control (ARC) integrates laser scanner, optical tooling and proprietary software to position then adjust the robot EoAT and fixture to 100-microns.

This overcomes robot backlash and robot control inaccuracies.

INLINE INSPECTION



3D scanner (CMM) integrated with PolyWorks facilitates in-line inspection and validation against CAD.

Maintain and predict quality whilst reducing overall takt time to overcome concessions after manufacture.

PATENTED DRILL



High speed vibration assisted spindle with auto collet changer, tool control unit, optical tooling and anti-slip nose to drill and countersink composite aerostructure materials.

MOBILE PLATFORM



Process robot (drill and countersink) and metrology mobility enables manufacturing flexibility and agility for aerostructure OEMs needing to manual handle the structure during assembly.

THIRD PARTY EoAT



Fettling & Sanding



Laser & Dry Ice Cleaning



Pre-paint Masking



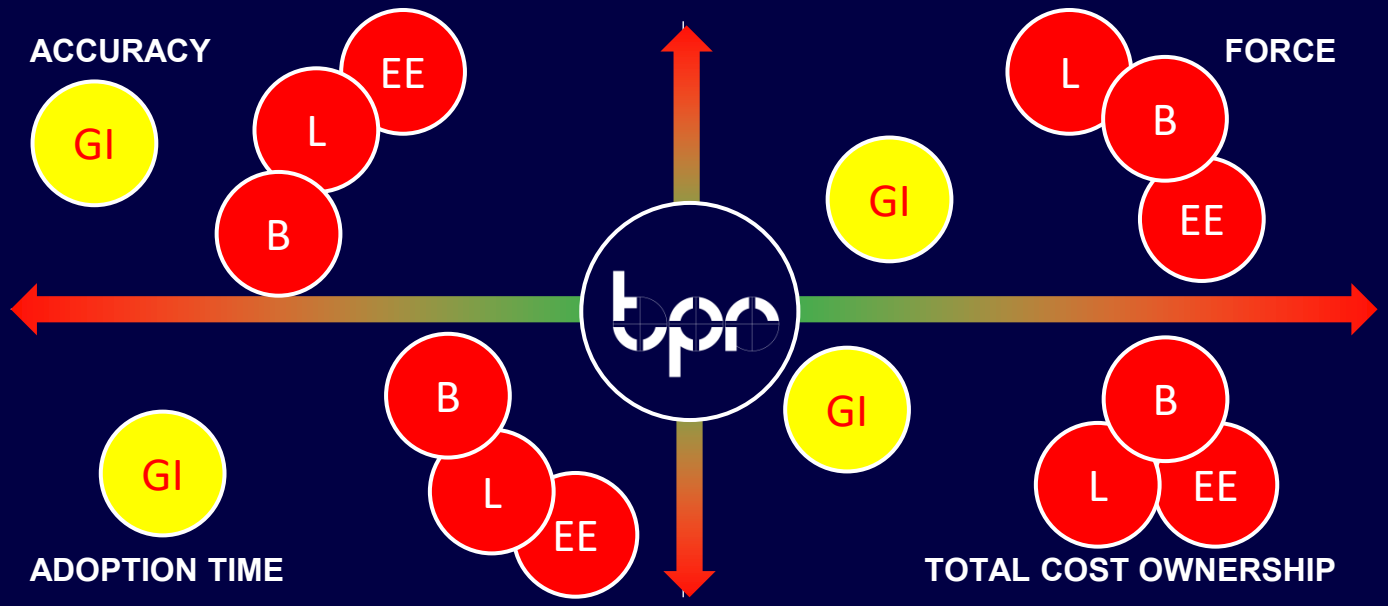
NDT
Ultrasonic
Radiographic
Shearograph
Eddy Current

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COMPETITIVE ADVANTAGE

Lighter Faster More-Accurate & Low-Cost



Competitor data refers to Broetje (B) Loxin (L)ElectroImpact (EE) and General Integrator (GI). Information herein is representative of information available in the public domain and TPRs 30-year experience in aerostructure manufacturing.

ACCURACY – TPRs three-frame-metrology solution means zero accuracy concessions.

FORCE – EoAT designed around small, affordable and low energy robots, not large and expensive gantries.

ADOPTION TIME – OLP to CAD then inherent accuracy means robot-jockeys are not needed.

TOTAL COST OF OWNERSHIP – significantly lower than traditional competitors.

GENERAL INTEGRATORS with bespoke EoAT often win on price, but encounter commissioning and production challenges that take years, then performance concessions to overcome.

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BUSINESS CASE

Why Aerostructure & Defence OEMs Choose TPR

CYCLE TIMES

CONCESSIONS

SKILL SHORTAGES

COST PER PART

TOOLING COSTS

DATA SILOS

DEBURRING

REWORK

NPI TIME

RATE

QUALITY

PROCESS CONTROL

EFFICIENCY

REALTIME TRACEABILITY

EMPLOYEE SATISFACTION

SHORT ROI

FLEXIBILITY & AGILITY

Trusted By

BOEING

HAL

BAE SYSTEMS

SPIRIT AEROSYSTEMS

Aerostructure and defence OEMs choose TPR to optimize manufacturing efficiency and scale production rates.

TPR delivers advanced process control that drives zero concessions, eliminates data silos, and achieves a short ROI.

By drastically reducing cycle times, rework, and tooling costs, TPR empowers manufacturers to overcome critical skill shortages and accelerate NPI timelines.

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