

ORBITAL BOND

Delivering a disruptive solid-state bonding platform to join high performance materials for uncompromising markets.

Fastest process • Shortest ROIs • Easy to staff • Highest quality bonds attainable in the world

South Bend, Indiana

LEADERSHIP TEAM

World-leading technical expertise and proven operational leadership.

CO-FOUNDER, CTO

Steve Johnson

The world's leading expert on solid state bonding.

Former Chief Technical Officer at MTI, inventor of Orbital Friction Welding, and founder of APCI, ITW and CMM. Stephen Johnson is the world's leading solid-state bonding expert, with deep experience across linear, rotary, inertia, and orbital friction welding systems. Johnson has personally served clients like Boeing, NASA, SpaceX, Honeywell, Rolls-Royce, and other key manufacturers in their solid state bonding pursuits.

CO-FOUNDER, CEO

Eric Overbey

25 years as a CEO with proven hyper-growth scale.

As a business owner he transformed a 2 million dollar axle manufacturing company into a 150 million dollar enterprise in 10 years, becoming the 2nd largest in the world in his market. He has Managed 1200 manufacturing employees in the welding industry, with 9 production plants, and 60,000 part numbers across 14 markets.

TECHNICAL ADVISOR

Dr. John M. Starkey

Professor Emeritus of Mechanical Engineering at Purdue University.

Purdue annually honors his contributions through the John M. Starkey Prize given to the top engineering graduate. Directed one of the nation's premier engineering design and hardware prototyping programs for over three decades. Dr. Starkey combines deep technical expertise in mechanical systems with decades of experience vetting actionable, real world engineering solutions.

STRATEGIC ADVISOR, CO-OWNER

John P. Stupp Jr.

Chairman and CEO of Stupp Bros., founded in 1856.

John P. Stupp Jr. is Chairman and CEO of Stupp Bros., a sixth-generation industrial manufacturer founded in 1856. He has led the company's growth across bridge fabrication, energy infrastructure, and defense manufacturing, building on a 170-year legacy of innovation, quality, and American industrial leadership.

STRATEGIC DEFENSE ADVISOR

Colonel Darryl W. "Dee" Daugherty

Aerospace and clean energy consultant

Colonel Darryl W. "Dee" Daugherty served over 30 years in the U.S. Army, culminating as Chief of Staff of the 8th Theater Sustainment Command. An Officer Candidate School Hall of Fame inductee, he commanded forces during Operation Iraqi Freedom and led strategic Army logistics and prepositioned readiness programs. He has a vast knowledge of federal acquisition regulations and deep experience accelerating new business startups and industrial Mergers and Acquisitions.

Orbital Bond has more solid-state bonding IP than any other company in the world.

HOW WE DO IT - DUAL-TECH PLATFORM OF MACHINES

A Revolution in Solid-State Bonding

Friction Welding Technologies

Immediately Deployable Technology • CAPACITY AVAILABLE

Linear Friction Welding (LFW)

A solid-state bonding process in which one component undergoes high-frequency linear oscillation under compressive force, generating frictional heating to plasticize the interface and enables atomic diffusion across the joint without reaching the melting point of the parent materials. Producing the world's highest quality bonds in the fastest cycle times. Orbital Bond possesses more IP on this process than anyone else in the world.

U.S. FIRST-MOVER • Prototype in process

Orbital Friction Welding (OFW)

A proprietary next-generation process that utilizes orbital motion and pressure to produce precision molecular bonds, unlocking advanced geometries and material combinations previously unattainable through conventional methods while delivering unmatched bond quality, exceptional efficiency, and parent material strength.

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While titanium and dissimilar metals is our sweet spot, Orbital Bond can join any material to any material.

WHY NOW?

Orbital Bond is needed now because defense, aerospace, and power generation manufacturing must move faster, waste less, depend on fewer scarce resources, and bond advanced materials at a quality level that no other technology on earth can match.

DEFENSE DELIVERY PRESSURE

The Country needs faster production of submarines, aerospace systems, and munitions. Current methods are too slow and labor-intensive.

Orbital Bond turns hours into seconds and months into minutes.

A MACHINE-BASED SOLUTION

Traditional welding depends on highly skilled welders who are increasingly scarce. Orbital Bond removes this constraint by automating the critical joining process.

The Orbital Bond Solution doesn't require welders.

IMMEDIATE MODIFICATION

Standard mold modifications take months. Orbital Bond enables faster process changes and part development.

Mold modifications take 4-5 months. Modifications with Orbital Bond can be made immediately.

HIGHEST QUALITY, LOWEST COST

Creates zero-melt, parent-metal strength bonds with less waste and lower energy. No filler, no shielding gases, or defects from conventional fusion welding.

Orbital Bond Creates divine molecular structures from any cross section.

CRITICAL PARTNER TO ADDITIVE MANUFACTURING

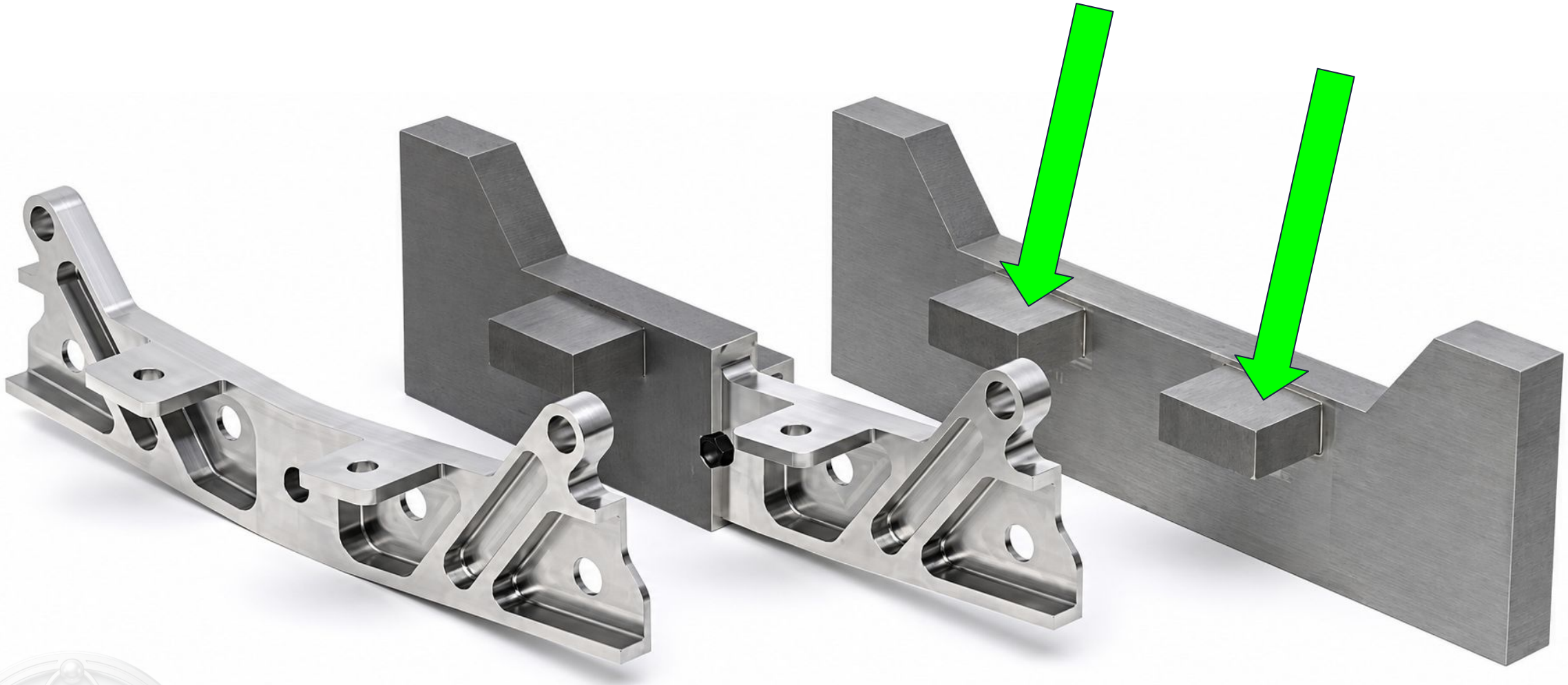
Orbital Bond serves as a critical post print joining partner to create parent-material strength assemblies ready for deployment.

It is a perfect complimentary technology to the additive manufacturing gold rush.

Aerospace, defense, and power generation are under extreme pressure to deliver faster, raise quality, and reduce dependence on scarce skilled labor and constrained supply chains.

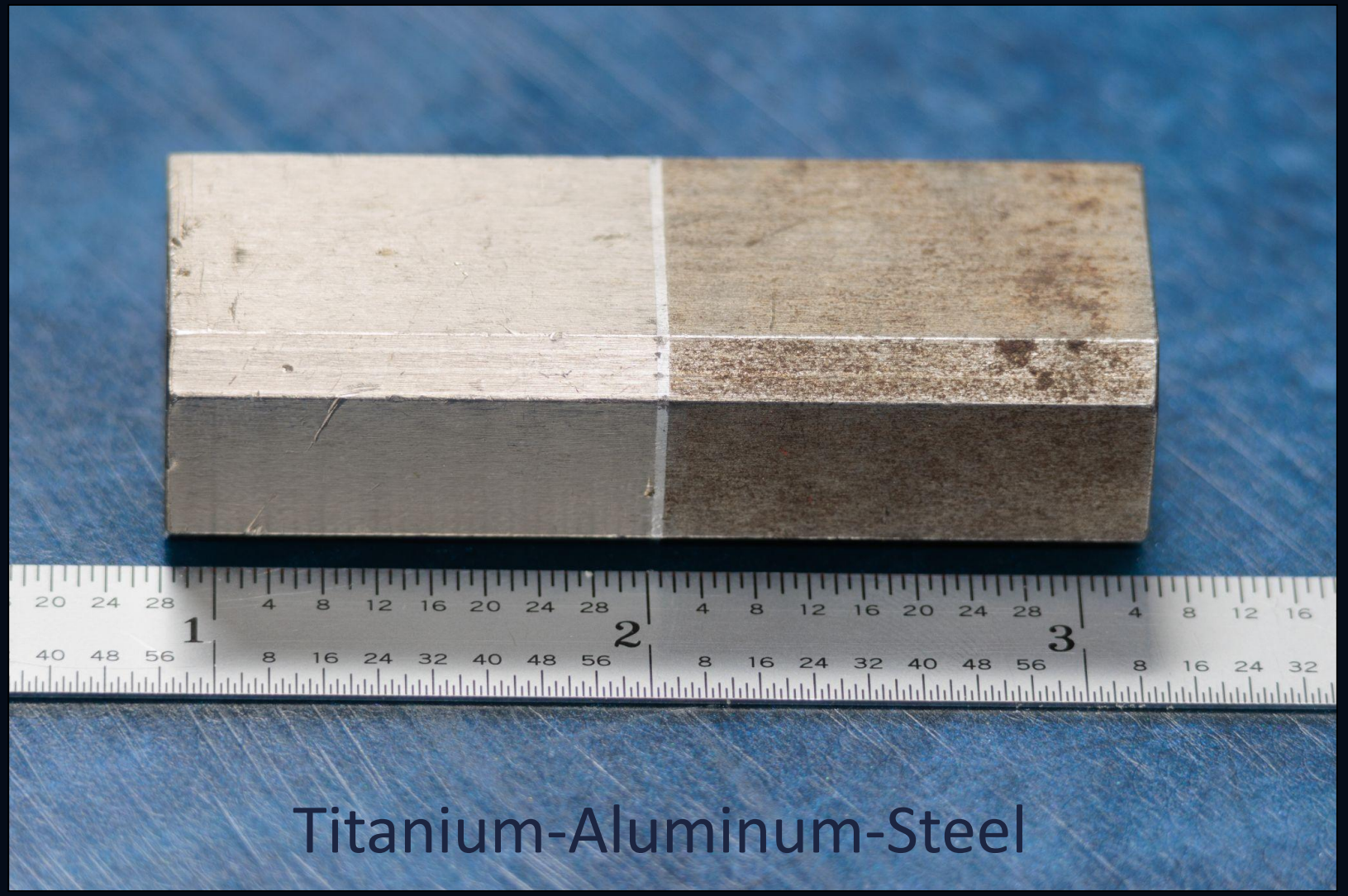
These are among the world's largest, best-funded industrial markets — and their programs are already funded, delayed, and actively searching for solutions now. **Orbital Bond answers that demand with a faster, higher-quality, lower-cost platform of machines built for the industries that cannot afford bottlenecks.**

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Near-net capable:
you don’t need to waste huge billets of expensive material. We can bond where you need it immediately ready for machining.

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Understanding Priorities

Identifying the highest-value opportunities

01. Bonding Needs

Where are titanium or other advanced-metal components creating the biggest joining challenges?

02. Material Options

Are there dissimilar-metal combinations—such as titanium with steel, inconel, or other alloys—where better joining options could improve design, manufacturing, or give you the ability to make an entire assembly?

03. Production Efficiency

Are there components where machining or material removal is adding unnecessary cost, lead time, or titanium waste? Near net forgings could solve this problem with Orbital Bond.

04. Process Improvement

Are there parts or assemblies where the current process creates added rework, inspection, scrap, or production difficulty?

05. Priority

If you could choose one component or interface for us to evaluate first, where could a solid-state bond create the most value for your company?

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CURRENT ENGINEERING WORK ENVELOPE

Each machine delivers the world's highest quality standards and the lowest operational cost.

Infrastructure Advantage: Identical process physics can be deployed across multiple machine sizes, enabling everything from prototype development to high-throughput production cells.

Machines	Bond Envelope	Examples of Real World Parts by Bond Envelope
OB 200	28 sq in	Submarine Hull-Ring Transition Segments, DDG-51 Gas-Turbine Mount Frames, Large Engine Case-to-Flange Sections, Reactor Pressure-Vessel Transition Rings, Launch-vehicle interstage ring splice segments, first-stage thrust structure ring sections, large engine bay frame-to-ring joints
OB 150	21 sq in	Sonar-Dome Support Rings, Propulsion Shaft Bearing Housing Nodes, Submarine Hull-Ring Stress Bridges, Large Airframe Bulkhead Splice Nodes, Upper-stage payload adapter ring sectors, launch-vehicle tank dome reinforcement rings, large rocket engine mount frame segments
OB 100	14 sq in	Landing gear trunnion housings, turbine blisk / rotor-stage sections, helicopter rotor hub yoke fittings, titanium pipe branch outlets, Rocket engine turbopump housing flange inserts, thrust-vector-control actuator mounting frames, upper-stage propellant-line manifold blocks
OB 60	8.4 sq in	F-35 wing-root load-transfer lugs, MQ-4C engine-mount insert blocks, hypersonic skin-to-frame stiffener ribs, titanium-steel pipe transition blocks, compact propulsion bearing housing lugs, turbine casing repair inserts
OB 30	4.2 sq in	MQ-4C wing-spar insert nodes, missile canard hinge blocks, aircraft fuel-line pressure bosses, sonar-array mounting tabs, Reaction-control thruster mounting bosses, small rocket engine injector mount blocks, avionics bay structural hardpoint lugs

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Example: The 100 ton machine size is 8′ x 6′ or 48 sq ft easily fits in any manufacturing environment to bond titanium or any other material without needing a clean-room environment.



OB 100 [Machine]

TRADITIONAL TITANIUM WELDING PROBLEMS
SLOW, EXPENSIVE, AND INFERIOR QUALITY

SECTION 1 — FUSION WELDING IS SLOW

CYCLE TIME

3-6 Hours per Joint

Joining a 3-inch titanium tube to another 3-inch titanium tube with 0.250-inch wall thickness can take 3-6 hours because of multiple steps and departments to ensure 96% expected quality.

PRE AND POST-WELD OPERATIONS

Lengthy Multi Department Processes

Requires hours of dedicated cleaning, chemical preparation, and precision fixturing to prevent gaps, misalignment, and heat-driven warping. After welding, each joint must be inspected for contamination or overheating. Failed welds create costly scrap and rework, often requiring sections to be cut out, re-welded, or fully replaced.

SECTION 2 — EXPENSIVE

OPERATING COSTS

High hourly cell rate

Up to $365 per hour (burdened) to complete all traditional certified titanium welding processes.

LABOR

High paid welders

Costing up to $100,000 per year. 450,000 available welding jobs go unfilled. Training is costly and takes months. Severe scarcity of AWS/ASME certified Titanium welders for Tier-1 defense.

CONSUMABLES/WELDING

gasses, chemicals, and fillers

Requires shielding gas, trailing gas, tertiary back-purge gas, titanium filler wire, rare-earth tungsten electrodes, large diameter- ceramic nozzles, and mesh screens for laminar gas flow.

THE ORBITAL BOND PROCESS SOLUTIONS
FAST, INEXPENSIVE, SUPERIOR QUALITY



FAST

CYCLE TIME

< 3 Seconds per Bond

A 3-inch titanium tube-to-tube bond can be completed in 3 seconds. By adding a 30 minute setup, plus the load and unload time, you are completing a perfect part in minutes instead of hours.
Traditional welding takes 3-6 hours with the five steps identified in the traditional welding process.

INSTANT IN-CYCLE QUALITY ASSURANCE
Bond inspection occurs within the bonding cycle time

NO PRE-WELD PREP

Eliminates hours long preparation to the workpiece before bond

NO POST-WELD INSPECTION PROCESS

Eliminates lengthy unneeded procedures

DIVINE MOLECULAR STRUCTURE
NO HEAT-AFFECTED ZONES

INEXPENSIVE

OPERATING COST

Orbital Bond machines outproduce traditional methods exponentially and at a fraction of the hourly burdened rates.

LABOR: NO WELDER REQUIRED

Requires a machine operator

Deployable with three weeks training.

PARENT-METAL STRENGTH RETAINED

Bonds performed below melting point

scrap part rates down to .5 percent

CONSUMABLES

Zero Gasses, fillers, or Consumables required.

ENVIRONMENT-Green Technology

Solid-state bonding is a green carbon-free bonding process and does not require a clean room.

ORBITAL BOND BUSINESS MODEL

What we can do for you

01. Machine Sales

Solid-state machine tool platform that can bond less than 4 sq inch cross sections to more than 28 sq inch cross sections.

02. Engineering

Research and validation contracts

-Orbital Bond has a PhD level staff with experience in serving Boeing, NASA, Rolls Royce, SpaceX, and many others.

03. Support

Service contracts for machines sold

04. Custom Add-ons

Tooling packages, and automation for existing machines

05. Job Shop

Job shop bonding services

-Actually making the parts with our machines in-house, for you.

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Thank you for your time. We look forward to the next steps.

Fastest process • Highest quality bonds attainable in the world • Easy to staff • With the shortest ROIs