

## Electrical and Mechanical Systems for Aircraft Engines and Airframes

**UNISON**

Custom Engineered

Solutions That

Exceed Even

Sky High

Expectations

**Call Us.**  
**We have customer satisfaction down to a system.**

Unison has the knowledge and tools to optimize the configuration of your wiring harnesses and tube and duct systems.



Let Unison develop custom engineered solutions and systems integration for you. To place an order, learn more, or receive technical assistance, call Unison at (937) 426-0621 or visit [www.unisonindustries.com](http://www.unisonindustries.com).

Space



Defense



Industrial



General Aviation



Commercial Aviation



# Mechanical Systems



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# More Quality. More Customization. More, Period.

## Custom Engineered Engine And Airframe Systems Integration

At Unison, we've established a reputation as one of aviation's most trusted manufacturers for our ability to deliver customized solutions at unprecedented speeds. All this without compromising quality. From engineering design to testing, you can trust Unison for superior mechanical systems. We realize your needs are unique. Your deadlines are tight. Your quality standards are high. Unison understands. And we are passionate about delivering on every front.

Manufactured in Dayton, Ohio, Unison's precision tubes, ducts and manifold assemblies serve as the vital arteries that carry critical liquids and gases throughout the aircraft.

### Unison's tubes, ducts and manifolds supply:

- Fuel to engines
- Oil to bearings and VFSG/IDG cooling
- Air to engine starter
- Hot air to critical surfaces for anti-icing
- Fluid power to flight control surfaces and actuators
- Air to the aircraft environmental control system
- Oxygen to the passengers and flight crew

Ball Joints



Air Bleed Duct

Bellows



### Bellows Forming

- Capability ½" to 7" diameter
- Production
  - Micro plasma welding
  - Shear / roll / weld unique low quantity bellows
  - Multiple forming systems
- Materials
  - Stainless steel
  - Inconel
  - Titanium



Fuel Manifold

Concentric, Low Profile Valve



### Welding\* And Swaging

- Welding Special Processes
  - Gas tungsten arc welding (GTAW)
  - Resistance seam / spot welding (RSEW)

### Swaging

- Elastomeric
- Roller
- Permaswage
- Deuschlrite

### Tube And Duct Bending

- 1/8" – 6" OD bend capability
- 1D to unlimited bend radii
- Roll bending capability for hoops & large bend radii
- Materials
  - Stainless Steel
  - Inconel
  - Titanium
  - Aluminum

### Metal Cutting And Forming TRUMPF Laser Press\*

- Working range 98" X 50"
- Marking capability (Laser etch & dot peen)

### Press Brake

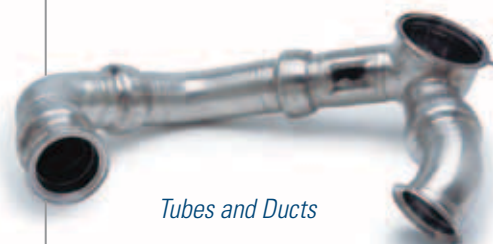
- NC programmable, 6-axis back gauge
- Air bending minimizes tool changes

### Laser Systems\*

- 400W YAG laser
  - 84" wide X 42" high X 30" deep
- 2000W CO2 laser
  - 36" wide X 20" high X 24" deep

### Hydro Forming

- 800 ton clamping
- 38,000 lbs. Internal
- Thickness – up to .080" wall
- Diameter – .375 – 4.0"



Tubes and Ducts

### Machining – Mill, Turn, Grind Concurrent Engineering and Rapid Prototyping

- Offline CNC programming and process modeling
- Unigraphics CAM software system

### Production

- 18 cellular manufacturing centers

### Materials

- Stainless steel, Inconel, Titanium, Cobalt
- Bar, castings, forgings

### Foundry – Investment Casting Casting

- Aerospace development
- Production investment castings
- Materials
  - Stainless steel
  - Cobalt
  - Inconel alloys

### Additional Process Capabilities

- Assembly
- Bracket manufacturing
- Boroscope inspection
- Chemical etch marking
- Chemical & ultrasonic cleaning\*
- Coating
- Surface treating\*
- Double & triple wall tube & duct fabrication
- EDM drilling & cutting\*
- FPI inspection\*
- Heat treating\*
- Hydraulic pressure testing
- Metallurgical lab\*
- Brazing\*
- Radiographic inspection\*
- Riveting
- UT thickness inspection
- Water jet cutting & drilling



## Some People Measure Production On A Calendar. We Use A Stopwatch.

There's fast and then there's Unison fast. We have designed and built simple parts within 24–48 hours and complex parts in as little as 6 weeks.

Solid modeling and integrated design tools are at the heart of Unison's efficient concurrent engineering process. The controlled electronic solid model is used for trade studies, clearance checks, analyses, drawings, bill of materials, machining programs, and assembly fixtures. This process allows the customer and the entire Unison design and manufacturing team to work in parallel and determine the optimum solution prior to final design and fabrication. The end result is a world-class design that exceeds customer requirements, delivers hardware on time and reduces costs.

## Discover What Happens When You Have A Customized Design, State of the Art Tools And An Experienced Team That Works With You.

### Advanced Design Tools

- TeamCenter Engineering
- Unigraphics
- TeamCenter Visualization
- CATIA & CATIA Viewer
- Theorem Solutions Software
- Live Collaboration
- WebEx, NetMeeting

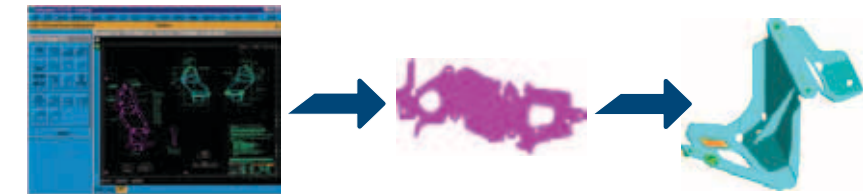


### Digital System Mockup

At Unison, we have extensive experience integrating our systems into customer digital system mockups. Concurrent with our product design, we determine optimum routings, check clearances, ensure maintainability, and coordinate interfaces using this tool. Additionally, the digital system mockup is linked to our product data management system, providing configuration control while allowing for instant updates.

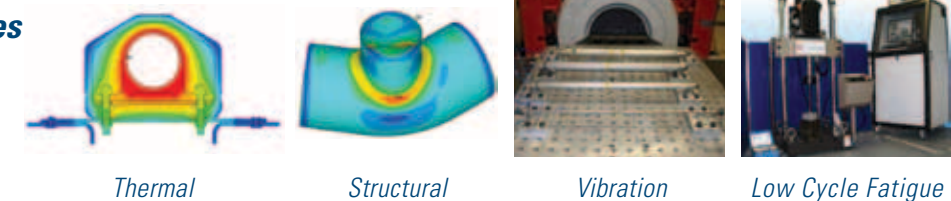
### Proprietary Tube And Bracket Design

- ICDS (Interactive Configuration Design System)
- Automates tube and bracket design and analysis
- Intelligent bracket unfold / fold and best manufacturing rules



### Full Analytical And Test Capabilities

- Computational fluid dynamics
- Thermal
- Vibration
- Structural



### Getting Your Project Off The Ground

Unison is proud to be a world leader in the design, manufacture and integration of mechanical components and systems for aircraft engines and airframes. Today we serve both original equipment manufacturers and aftermarket customers in the general, commercial and military aviation markets.

Unison is ISO 9001–2000 Certified and offers dedicated field sales & product support engineering. We also have in-house FAA repair capability.

No matter what you need, no matter when you need it, and no matter how much of it you need, Unison is there for you.