

*Innovate **Build** Deliver*

INDUSTRY LEADER OF

**Carbon Fiber Fly-Away Parts
Composite & Metal Tooling
Prototypes
Engineering Services**

SERVING AEROSPACE | MARINE | ENERGY | ARCHITECTURE | TRANSPORTATION INDUSTRIES



ONE-STOP

Full Service, Engineering and Manufacturing Capabilities

Janicki Industries (Janicki) is a leading supplier of composite parts, molds and prototypes. Janicki excels at design/build projects that push the envelope in the use of advanced composite materials, metals and manufacturing processes. Janicki has production facilities in Washington and Utah. Janicki is known throughout the industry for proprietary, large-scale, high-precision 5-axis CNC mills. Janicki is a full service engineering company serving the Aerospace, Marine, Energy, Architecture and Transportation industries. Janicki is well equipped and uses SAP for enterprise resource management.

Give us your difficult challenges.



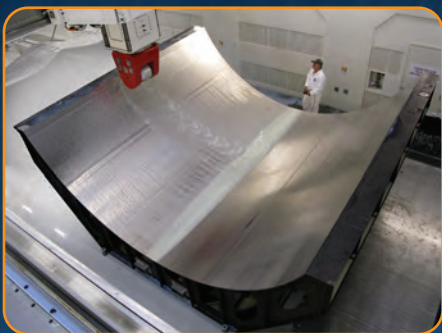
Founded 1993

by Peter Janicki

- ▶ 800+ employees
- ▶ 165+ engineers



SHOP



Core Capabilities

- ▶ Composite Fabrication
- ▶ Carbon Fiber and Fiberglass
- ▶ Metal Fabrication
- ▶ 5-Axis CNC Milling
- ▶ Engineering Services
- ▶ Project Management
- ▶ Finishing
- ▶ R&D and Testing
- ▶ Certifications
 - NADCAP

Products

- ▶ Parts
 - Fly-Away Aerospace Parts
 - Machined Metal Parts
- ▶ Tooling
 - Patterns, Plugs, Molds, Cauls, Mandrels
- ▶ Prototypes
- ▶ Automation Tooling
- ▶ Machining Services (Trim & Drill)
- ▶ Engineering Services

Processes

- ▶ Putty Patterns
- ▶ Lay-Up
- ▶ Pre-Preg
- ▶ Infusion
- ▶ Low-Temp 160°F Cure
- ▶ Mid-Temp 250°F Cure
- ▶ High-Temp 350°F Cure
- ▶ Autoclave and Out-of-Autoclave

Well Equipped

- ▶ 10 Large 5-axis CNC Mills
- ▶ Machine Shop
- ▶ Large Autoclave
- ▶ Annealing Furnace
- ▶ Curing Ovens
- ▶ Waterjet NC cutters
- ▶ Plasma Cutter
- ▶ 1,100 Ton Press
- ▶ Laser Trackers & Radars
- ▶ Paint Booth
- ▶ Grit Blasting Booth
- ▶ Core Sculpting Mill
- ▶ Non-Destructive Inspection

State-of-the-Art Facilities

- ▶ Plants in Washington and Utah
- ▶ 514,000 ft²
- ▶ Temp / Humidity Controlled
- ▶ Large Buildings, High Bays, Overhead Cranes
- ▶ Clean Room – 27,000 ft²
- ▶ Finish Shop
- ▶ Weld Shop
- ▶ Assembly Shops



UTILIZING **SAP**

FULLY CAPABLE



Zimmermann 5-Axis Mill

Large Autoclave (50' x 12')



Innovative, Creative and Persistent

Composites

Janicki is recognized for its innovative use of advanced composite materials including carbon fiber, fiberglass, core materials, metals of all types, and proprietary polymer resins. Janicki also has expert techniques for Vacuum Assisted Resin Transfer Molding (VARTM) and specialized finishes. Janicki will assist customers with selection of composite materials, processes and cure cycles based on their unique needs.

Well Equipped

Janicki specializes in very large scale, high precision composite and metal projects. Janicki's large factories, proprietary 5-axis mills and mill bays, large autoclave, fabrication equipment and assembly expertise support this capability.

The superior scale and precision of the Janicki 5-axis CNC mills are due to our custom design and development. We design and build the components, the software and the electronics/servo-control mechanisms. Janicki's machine capacities are among the largest and most accurate in the world. The CNC software is internally developed and uses error compensation algorithms to provide unprecedented accuracy on large projects.

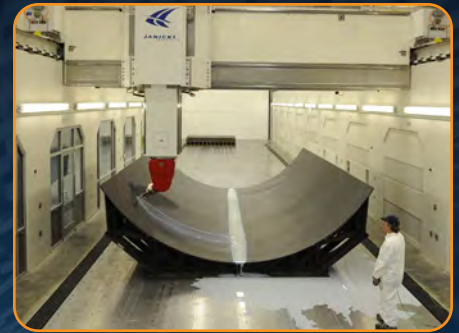
Recently, Janicki has added two Zimmermann mills increasing our 5-axis milling capacity for fly-away parts and production tooling.

Janicki Proprietary 5-Axis NC Mills

WASHINGTON

UTAH

	Envelope Size	Rotary Axes	RPM	Spindle Torque	Spindle Accuracy
1	68ft x 19ft x 8ft	$\pm 195^\circ / \pm 100^\circ$	11,000	27ft lbs	$\pm .015$ in
2	88ft x 19ft x 8ft	$\pm 203^\circ / \pm 106^\circ$	10,000	230ft lbs	$\pm .004$ in
3	40ft x 12ft x 5ft	$\pm 204.5^\circ / \pm 110^\circ$	30,000	27ft lbs	$\pm .006$ in
4	57ft x 14ft x 7ft	$\pm 224^\circ / \pm 101^\circ$	15,000	160ft lbs	$\pm .002$ in
5	100ft x 20ft x 8ft	$\pm 204.5^\circ / \pm 110^\circ$	24,000	64ft lbs	$\pm .002$ in
6	100ft x 20ft x 8ft	$\pm 204.5^\circ / \pm 110^\circ$	24,000	64ft lbs	$\pm .002$ in
7	18ft x 14ft x 6ft	$\pm 251^\circ / \pm 107^\circ$	30,000	40ft lbs	$\pm .002$ in
8	18ft x 14ft x 6ft	$\pm 251^\circ / \pm 107^\circ$	30,000	40ft lbs	$\pm .002$ in
9	80ft x 14ft x 6ft	$\pm 251^\circ / \pm 107^\circ$	30,000	40ft lbs	$\pm .002$ in
10	60ft x 8ft x 4ft 8in	$\pm 251^\circ / \pm 107^\circ$	30,000	40ft lbs	$\pm .002$ in
Utah Zimmermann FZ30					
	20ft 8in x 11ft x 4ft 11in	$\pm 360^\circ / \pm 110^\circ$	30,000	24ft lbs	$\pm .002$ in
Hamilton Zimmermann FZ400					
	161in x 63in x 26in	$\pm 225^\circ / \pm 110^\circ$	24,000	23ft lbs	$\pm .002$ in



Research & Development

Janicki has a dedicated laboratory, professionally staffed for research and development of new and innovative composite materials. Janicki's R&D lab continuously pushes the boundaries of composite fabrication materials and techniques seeking lighter, stronger, and more resilient materials. In addition to standard tests like hardness, durability and strength, we also test fly-away parts for mechanical properties to ensure they meet the rigorous requirements for the aerospace environment.



Project Management

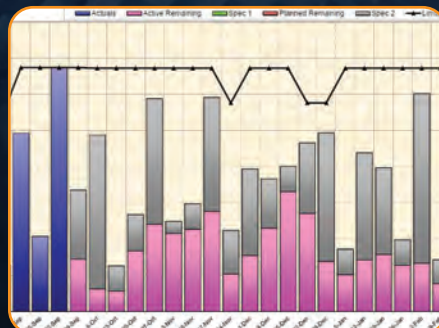
Janicki understands your need for exceptional project management services. Our enterprise-wide project management system using SAP software allows you to see every aspect of your project in real-time.

Engineering Services

Founded and run by engineers, Janicki has the depth of technical expertise to solve the challenges your project brings. Janicki's engineers have extensive experience solving the technical opportunities brought on by complex part and tooling projects. Janicki works together with customers to design solutions that meet project specific needs.

- ▶ CATIA V5
- ▶ NX (Unigraphics)
- ▶ Finite Element Modeling and Stress Analysis
- ▶ SAP-DMS Data Management System

At Janicki, an experienced project manager dedicated to your job will constantly examine schedules, facility resource capacity, labor and material resources and costs. You will have clear insight into the details of your project at every step.



Testing Instruments

- ▶ MTS Alliance RF/150 Load Frame
- ▶ TA Instruments Q400 TMA, Q20 DSC, DHR2 RDA/DMA
- ▶ Keyence VHX-2000 Digital Confocal Microscope
- ▶ Agilent Cary 630 FTIR
- ▶ Brookfield DV-II+ Pro Viscometers



SUPERIOR PRODUCTS



Machined Syntactic FRP Putty



Gel Coat Tooling

High Quality, Price Competitive and On-Time Delivery

Machined Syntactic Putty

Ideal for low temperature, low cycle prototyping for all industries. This Janicki proprietary product provides low cost tooling options for one-off or limited-life quality parts. The fiberglass reinforced composite foundation with the machined putty surface is mounted on a durable wood or steel substructure.

160°F Putty Patterns & Molds

Highly accurate, budget conscious tooling solutions with

fast turnaround. This is a basic putty mold originally developed for Marine and Wind Energy Industries for plugs, patterns and molds.

250°F Carbon/ Fiberglass Hybrid Mold

Solid solution for composites requiring low temperatures and Out-Of-Autoclave (OOA) processing. Made of proprietary hybrid composites, Janicki's 250°F tools utilize a durable infused face sheet mounted on a steel substructure. These tools are precision machined and remain stable during repeated cure cycles.



Pole Model
Machined Carbon
Composite

275°F Machined Carbon Mold

Used for aerospace products with low CTE requirements. Similar to the 250°F tools with a slip plane and rectangular welded steel substructure. Infused carbon face sheet is machined to high tolerance.



350°F Carbon Tool

Machined Carbon Tooling for high temperature parts typically used in aerospace applications where CTE and thermal mass are primary requirements. Tools are made of carbon fiber with either epoxy, benzoxazine, or BMI resin systems. They can be made for low to high cycle applications. Processes include infusion, autoclave cured prepreg, and OOA cured prepreg for very large parts.



350°F Invar Molds

High cycle tooling for CTE matched composite parts. The product is made from Invar 36 plate, billet or castings. These tools are machined to tight tolerances and can be used for many, repeated cure cycles.

350°F Steel Layup Molds

For non-CTE matched composite parts. Mid to high temperature, high cycle tooling or assembly jigs. Typically used in the aerospace industry for low contour parts.



Automation Tooling

Janicki brings demonstrated engineering and manufacturing experience to meet our customer's requirements with automation projects. We started over 25 years ago with the design and build of our own large-scale 5-axis CNC Mills. We have experience with multi-segment tools, large aerospace factory designs, pick-n-place tools, software engineering, and systems integration.

Machined Core Materials

Our capabilities and expertise with honeycomb core are undisputed. Large jobs requiring bond joints and precise machining are our specialty. Janicki uses proprietary cutters and processes to produce high quality surfaces on all core types.



Aerospace Fly-Away Parts

Janicki is a BAC and Nadcap qualified manufacturer of composite aerospace fly-away parts. Janicki's long experience with composites and machining provides a firm foundation to produce composite parts for prototype/one-off, short run, and long-term production. Janicki is also supporting the Urban Air Mobility (UAM) market with composite parts and tools.

**Sculpted &
Machined
Core Materials**

HISTORICALLY PROVEN

We expect ourselves to provide exceptional and personalized customer service.



Sikorsky Raider Helicopter

Aerospace projects have been a steady stream of work for Janicki, including tooling for the Raider helicopter fuselage. Janicki provided the 350°F epoxy tools to customer requirements, delivered in 60 days, and helped Sikorsky get the Raider into the air.

Oracle America's Cup 2013

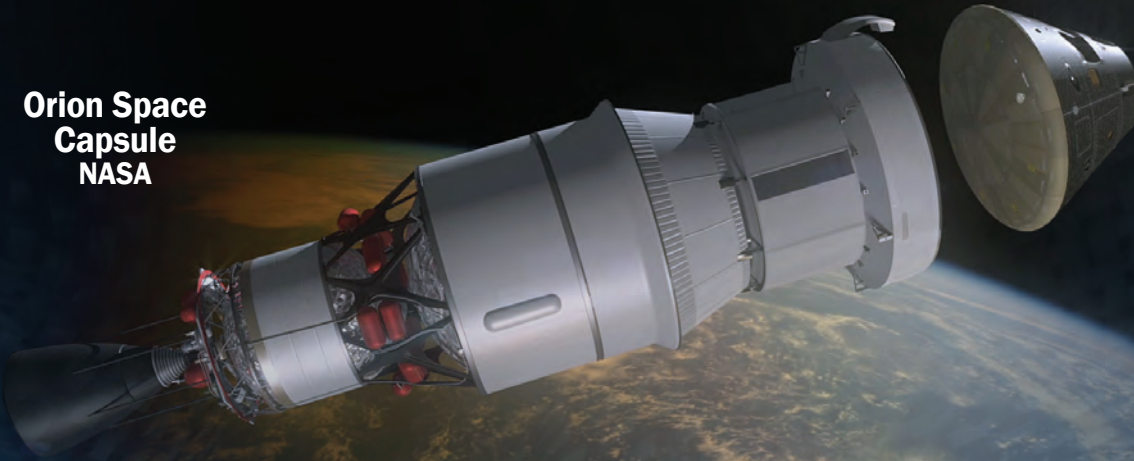
Janicki has supported the BMW ORACLE Racing team with the America's Cup competition for over 12 years. Janicki helped give the racing yacht technological breakthroughs in speed and maneuverability with its manufactured molds for the wing sail. Working with Core Builders in Anacortes, WA, Janicki has provided tooling for most of the carbon fiber components of the racing yacht.



Commercial Aerospace Production Tooling

Janicki has provided innovative solutions for 20+ years as an aircraft production tool supplier. Our 100% in-house production capability for all tooling types (metallic & composite), tool testing, and production part proofing of tools provides full service turnkey solutions. Our client base includes all the major aerospace manufacturers, who repeatedly rely on Janicki for new, legacy and rate tooling solutions.

Orion Space Capsule NASA



Betts Boat

Janicki provided Betts Boats with fabrication tooling for an observation platform. This was a putty mold offering Betts competitive pricing and quick delivery. This mold utilized Janicki's precision machined putty over fiberglass tooling technology with a room temperature cure resin system. The finished product was an observation platform/control station for their Motor Yacht "Steadfast."

"Boat building and composite parts manufacturing is all about tooling. The precision we can achieve with tooling provided by Janicki Industries is unparalleled, and critical for the success of our manufacturing operations."

Kellen Betts
President



NASA

Janicki supports NASA with many projects delivering both production tooling and fly-away parts. The Mass Volume Isolator (MVI) was designed by NASA Langley and fabricated in collaboration with Janicki. The MVI is a large diaphragm made of carbon fiber composite material, is 16.5 feet in diameter, was cured out-of-autoclave and weighs 340 lbs. The Janicki team received a notable congratulations and group achievement award from NASA for developing and delivering the MVI. The diaphragm is the largest OOA carbon fiber flight hardware ever built by NASA.

"Thanks for the accuracy and on-time delivery Janicki did for us."

Kevin Rivers
Manager NASA-Langley

AgriMarine Technologies

Janicki has over 25 years' experience designing and building precision molds, tools, and parts for the Marine industry. Janicki recently worked for AgriMarine Technologies to manufacture both tooling and tank sections for its proprietary floating tank technology, the AgriMarine System™, used for sustainable fish farming. AgriMarine's 24 meter tanks are built with composite materials to better withstand the challenging high energy marine environments. Janicki made the tooling and tank sections out of Fiberglass/vinyl-ester with a Duratec finish.

"We chose Janicki based on their reputation for very high quality control and solid engineering capacity. Also, their operation is highly professional, with well trained staff."

Robert Walker
President



EQUIPMENT



American GFM US-50 3D
Ultrasonic Cutting Machine



Genesis Non-destructive Testing (NDT) 115
Equipment Robotic Inspection Workcell



Messer Titan III Plasma Cutter
10ft x 20ft Bed x 2in Thick

Complete Machine Shop

- ▶ AGFM Core Sculpting Mill
- ▶ Doosan VM 960L Vertical Machine Center
- ▶ DMG Mori HHX 5000
- ▶ Haas SL-20 CNC Lathe
- ▶ Republic Lagun RL-14X40 Lathe
- ▶ Mazak VTC-300C Vertical Mill
- ▶ Bridgeport EZVISION Mill
- ▶ Mitsubishi 4-axis Horizontal Boring Mill
- ▶ CNC Komo Router #VR510TG 3-Axis
- ▶ Mazak I800 5-Axis Mill

Annealing Furnace

- ▶ 1600°F 72ft x 24ft x 11ft
- ▶ Heat distribution Delta T 35°F

Cure Ovens

- ▶ Portable Ovens
- ▶ Despatch Ovens

Weld Shop

- ▶ 8 configurable tables with surface laser trackers ±0.02in
- ▶ Automated TIG Welding
- ▶ Tube and pipe pinch/bend welding
- ▶ Laser & Robotic Welding

Water Jet Cutters

- ▶ Ward 2-Axis 12ft x 40ft x 10in
- ▶ Flow 2-Axis 6ft x 12ft x 10in



Press Brake

- ▶ 1,100 ton Forming Press
- ▶ 500 ton Accupress with 12ft bed



Autoclaves

- ▶ Production Autoclave 500°F 150psi, 12ft dia. x 50ft long
- ▶ Lab Autoclave 500°F, 150psi,



Grit Blasting & Paint Booth

- ▶ Paint & Grit Blasting Booth
- ▶ Permitted for Chromate - Utah Site

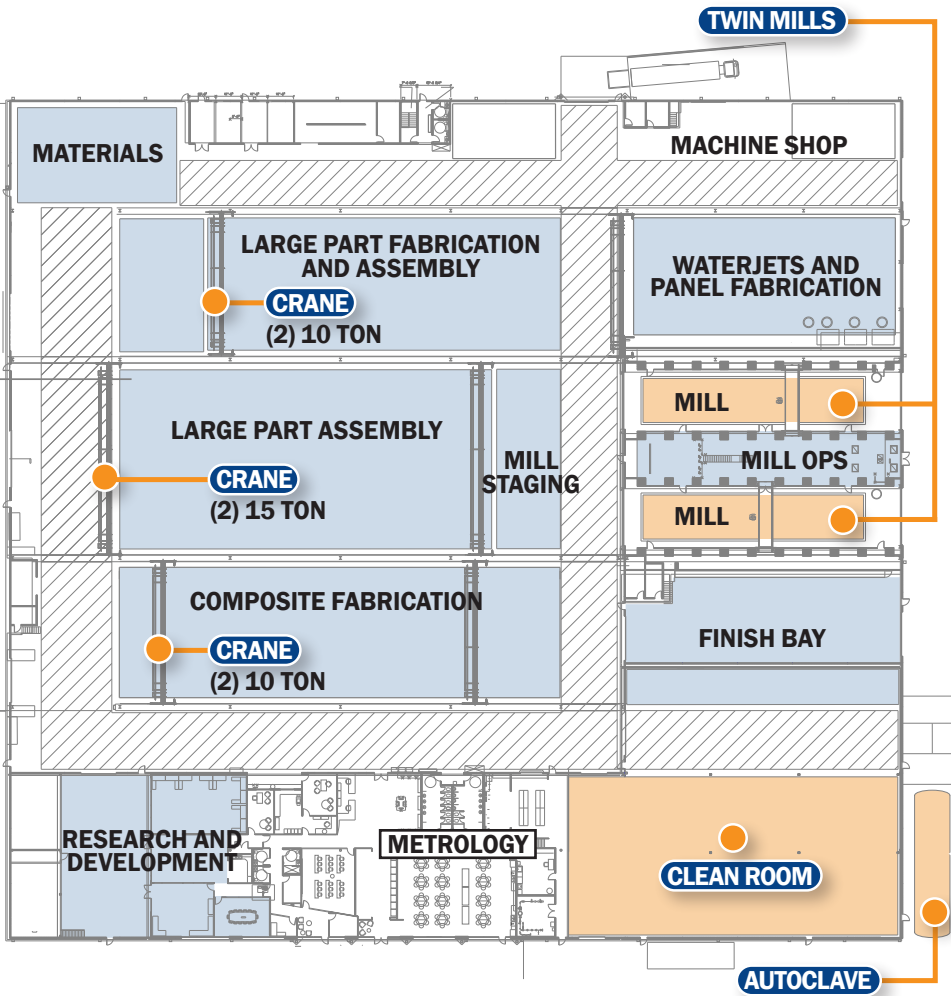
Cleanroom
27,000 ft²



FACILITIES

Hamilton, WA 160,000 sq ft

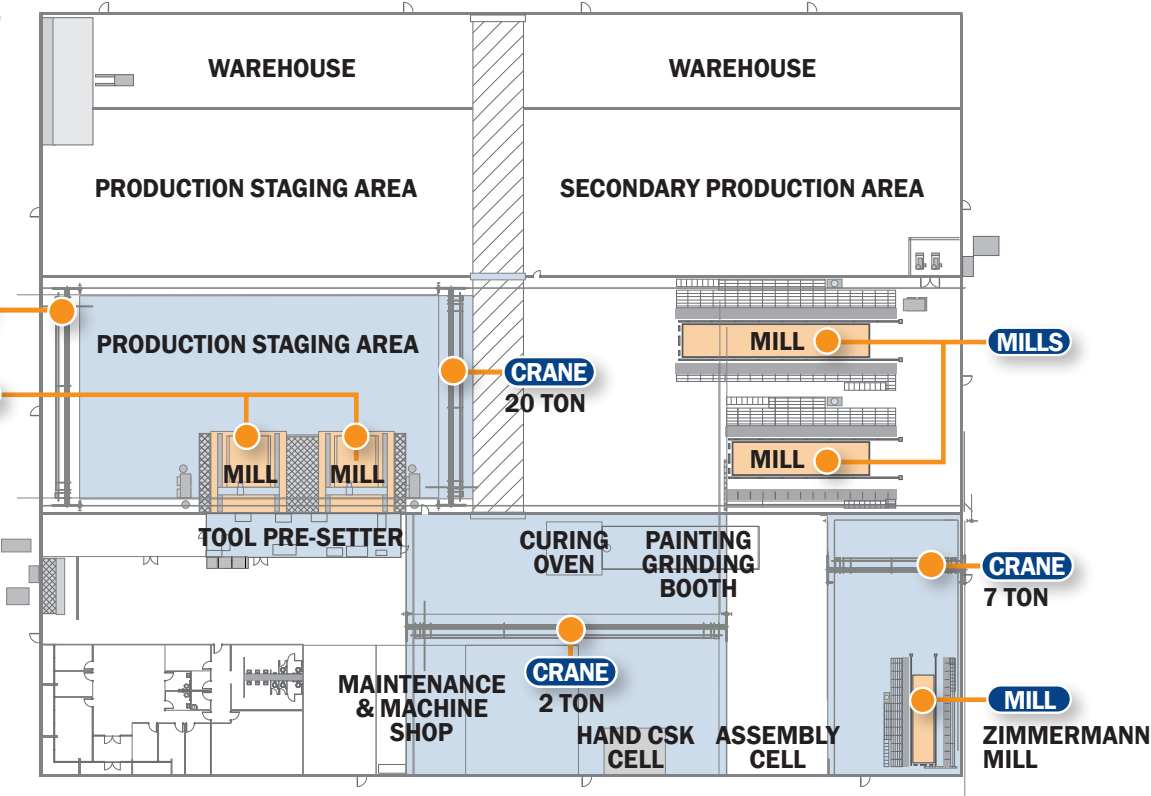
Janicki's facilities are designed to be highly flexible, adapting to a variety of project types, from prototypes and models to high-volume parts production. The buildings readily accommodate multiple processes, reducing transportation between sites. Throughout the Hamilton facility there are numerous work stations complete with gas, electrical power, communication lines and water which allows for highly-efficient parts production runs.



Layton, UT 100,000 sq ft

CRANE
7 TON

TWIN MILLS
18' X 14' X 6'
ACCURACY ±.002IN





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Quality Assurance & Certifications

- ▶ AS9100
- ▶ Nadcap Composites Certified
- ▶ ISO 9001
- ▶ Customer Aerospace Certifications
- ▶ Aerospace Prime Approvals & Certifications



Values

We are innovative, creative and persistent. Our goal is to provide exceptional and personalized customer service. We have a commitment to honesty and high ethical standards. We believe our most valued assets are the creative people, working together to solve customers' challenges.

Peter Janicki
FOUNDER & CEO

John Janicki
PRESIDENT

In Production September 2019
Special Emphasis on Fly-Away Aerospace Parts
New Building, 90,000 sq. ft.

