

# High performance components for innovative applications



**MANOIR INDUSTRIES**

Manoir Aerospace Business Unit



# Manoir Aerospace expanding services to its customers

## Manoir Industries: foundry and forging expertise

The group's activities cover highly demanding markets such as aerospace, petrochemical & nuclear, railway, civil engineering, oil & gas and defense with an international sales network including offices and representatives worldwide to meet customers' specific needs.

The Manoir Industries group is actively involved in high performance new alloys and processes to improve the mechanical and metallurgical properties for critical applications.



## A strong position in the aerospace supply chain and unique net shape forging know-how

As a significant part of Manoir Industries group, in 6 plants operating for more than a century, Manoir Aerospace has always offered high quality solutions supported by the widest range of technical expertise. Its experience in forging and machining of stainless steel, aluminium, nickel base, titanium, cobalt alloys, metal matrix composites and special processes enables Manoir Aerospace to provide the world's leading companies a comprehensive service from component supply to complete project management.

### Aerospace product applications:

- aero engines (aircraft, helicopters, missiles)
- equipment & aerostructures
- brakes, wheels and landing gear
- helicopters (blades, sleeves, rotating plates, gears)

## Supplier of major international aerospace key players

Manoir Aerospace is qualified for aircraft & engine applications and collaborates with leading worldwide manufacturers and equipment suppliers in applications for Airbus, Avic, Boeing, Bombardier, Dassault, Embraer, Eurocopter, General Electric, Hawker Beechcraft, Pratt & Whitney, Safran, Sikorsky, Sukhot...

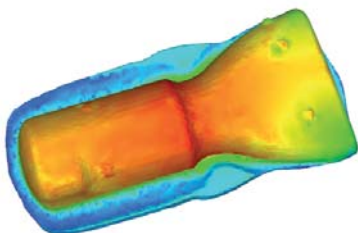
## R&D and engineering expertise

Manoir Aerospace is EN9100 and PRI NADCAP certified and has testing equipment according to the specificities of aerospace products (Ultra sounds, three-dimensional devices, etc...).

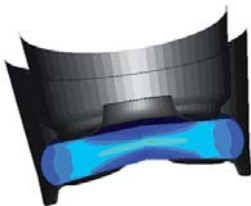
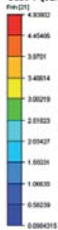
Manoir Aerospace has developed innovative metallurgy processes and continuously focuses on up-to-date technology developing processes to transform new generation alloys (TiAl, AlSiC, ALi...) to meet customer requirements.

To support such development programs, Manoir Aerospace leads initiatives in partnership with well-known worldwide universities and technical centers.

Manoir Aerospace provides unique co-engineering services at the earliest project phases to ensure short development planning and define together with customer teams the best cost and weight saving solutions.



View 1  
Case 1 [ozracing1-f1v2.don]



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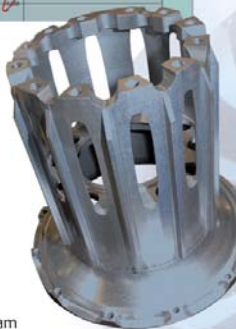
## Operational excellence to strengthen customer service

The aim of the Operational Excellence program, started in 2007, is to continuously improve customer service, achieving repeatable, on time deliveries.

The program, deployed in all locations, focuses on:

- standardizing efficient plant management
- improving critical equipment reliability
- optimizing flow management

Linked with strong safety and 5S procedures, Manoir Industries' Operational Excellence program has led to significant improvements in terms of on-time delivery and reactivity.



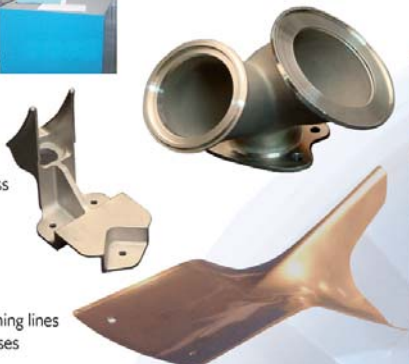
## State-of-the-art equipment and strong investment plan



Operating 2 forging and 2 machining plants for Manoir Aerospace and 1 forging and 1 investment casting for Manoir Specialties, Manoir Industries has well-adapted facilities for processing all aerospace alloys from 10 g to 400 kg. Manoir Industries keeps investing to develop innovative solutions, to meet the demands of highly sophisticated applications and to provide cost efficient solutions.

### End to End services

- Closed-die forging
- Open-die forging
- Automated forging press
- Investment casting
- Hydroforming
- Ring rolling mill
- Heat treatment
- CNC machining shops
- Painting & surface finishing lines
- Aerospace NDT processes



In order to better serve our US and Canadian customers, Manoir Aerospace started up machining operations in 2009 in Chihuahua, Mexico.

Moreover Manoir Industries has set up a significant investment plan enabling Manoir Aerospace to propose competitive and state-of-the-art processes:

- A new 6300t press production cell is designed for the most critical aerospace components, meeting the highest metallurgical requirements: engine discs, blades, vanes & fan blades, aircraft critical structure and equipment parts.
- A new 1500t press cell has been implemented, dedicated to manufacturing titanium components.
- Five Axis machining shop dedicated for complex structures and engine part machining (Blisks, Blades, Tracks).



## Aircraft engine applications



## Aircraft system & equipment applications



## Aircraft structure applications



## Helicopter specific applications





## Manoir Aerospace

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