L'excellence technologique

VENTANA
Partageons nos talents

DIGITAL FOUNDRY

THE SOLUTION FOR COMPLEX PARTS

Presented by :
VINT'AIR

A REVOLUTIONNARY OFFER FOR FOUNDRY PARTS

Foundry parts are amongst the most challenging problems that passionate collectors can face when they need replacing. Having these parts re-manufactured often leads to creating expensive tooling and a complicated process where numerous and costly trials are necessary before obtaining the desired parts. This can be prohibitive when it comes to small quantities.

Through a close cooperation with the **VENTANA** aerospace company, we can now offer a global manufacturing solution for rare complex foundry parts in Aluminum and Magnesium alloys.

Ventana Arudy (Foundry plant)

Our process is based on innovative technologies recently developed by **VENTANA** and the reverse engineering and design skills of VINT'AIR.

With the progress made in digital technology, we can now propose to vintage car, airplane and motorcycle collectors and workshops the means to re-manufacture those highly coveted parts!

We are capable of rapidly manufacturing **rare foundry parts without expensive tooling**. This has become possible by the extensive use of digital technology from acquiring geometrical data to machining.

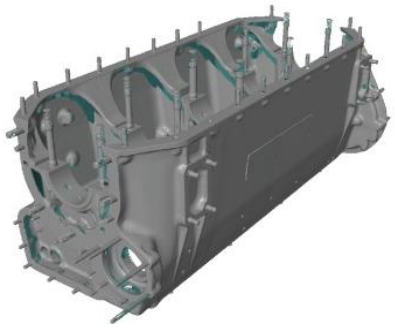
Here is a typical process:

- **1-DIGITAL SCAN OF AN ORIGINAL PART**

The geometry of your part is digitalized using a state of the art **optical scanner** with an accuracy of 0.01mm. If necessary this scan can be completed by an integral X-Ray with an industrial tomography (internal details). For areas where a high precision is required the use of a 3D Coordinate Measuring Robot is possible.

Dedicated software allows us to accurately extract the required dimensions and sections from the XYZ digital image generated.

Should reliable drawings be available from you, they would be used prior to any other operation.



Engine crankcase digitalization

- **2-REVERSE ENGINEERING**

The results of this scan leads to the development of a **true digital model** on a Computer-Aided Design software (CAD). This step involves a functional analysis of the part, for example gear shaft spacing, clearances, tolerances…

At this point there is a great opportunity to **improve** the parts through re-engineering. We can correct known weaknesses, add sealing devices, improve maintenance, and standardize old threads for example.

Doing this will add value for **a longer lasting part**. An opportunity not to be missed!

This phase ends with the production of manufacturing drawings including all dimensions and tolerances.

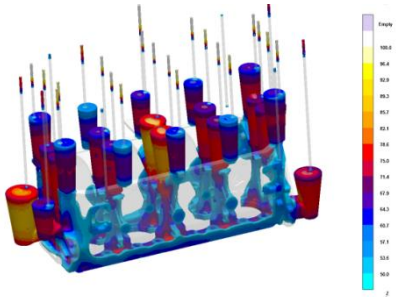
- **3-MATERIAL ANALYSIS**

Should the original metal be unknown, a mass spectrometer would be used to accurately determine its composition and yield tests performed on samples to obtain the mechanical properties.

- **4-CASTING AND SOLIDIFICATION SIMULATION**

Another great tool we are using in this process is a very new, powerful **simulation software**, which helps to predict molten metal flow in the mould, temperature gradients and metal shrinkage thus avoiding real life testing and dramatically **reducing development cost and time**.

This phase ends with the sand casting mould design, where all the foundry know-how is necessary, especially for parts with thin walls or important variations in wall thicknesses.



Casting simulation

- **5-3D PRINTING OF SAND CORES**

Once conceived, the cores which constitute the mould are « **printed** » on a 3D S15 **sand printing machine**. One layer of sand after another is polymerized to obtain the required form. The loose sand is then taken away and the different cores are assembled to make the final mould.

Printed sand cores

- **6-CASTING**

Molten metal is poured into the mould on a **low pressure casting** station via a complex feeding network that ensures the integral filling of the mould.

Once the mould has cooled down, it is shot blasted to remove the remaining sand from the part, and the feeding network is cut away. The part then follows an inspection process that includes geometrical digital scanning, radiography and other checks. The process is similar to the one used for the aeronautical jet engine parts manufactured by Ventana.

To achieve the desired mechanical properties, light alloys are **heat treated**.

- **8-MACHINING**

Still in a fully digital process, the part is machined on a high precision CNC machining center at the **VENTANA** facility in Narcastet.

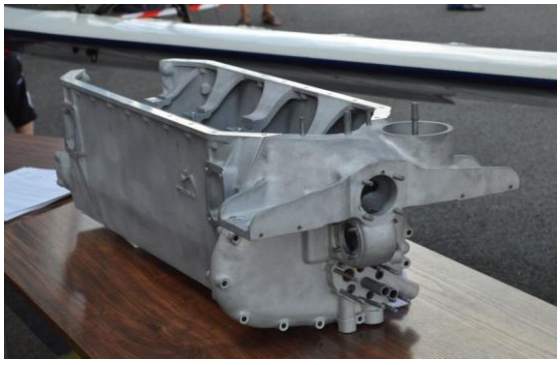
Concerning crankcases, VINT'AIR can perform the high precision line boring in its own classical engine machining shop. This can include main and rod bearings boring.

5 axis machining

KEY ADVANTAGES!

The best of Industry brought to you by enthusiasts:

- **Metallurgical quality to the best aeronautical standards.**
- **Reduced delivery times even for large complex parts.**
- **Digital casting without tooling.**
- **Improved parts (metallurgical and engineering)**
- **Available for small quantities!**



In line 4 cylinder crankcase made with our process

Tell us about your project! VINT'AIR *Laurent STUCK : lf.stuck@gmail.com*

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