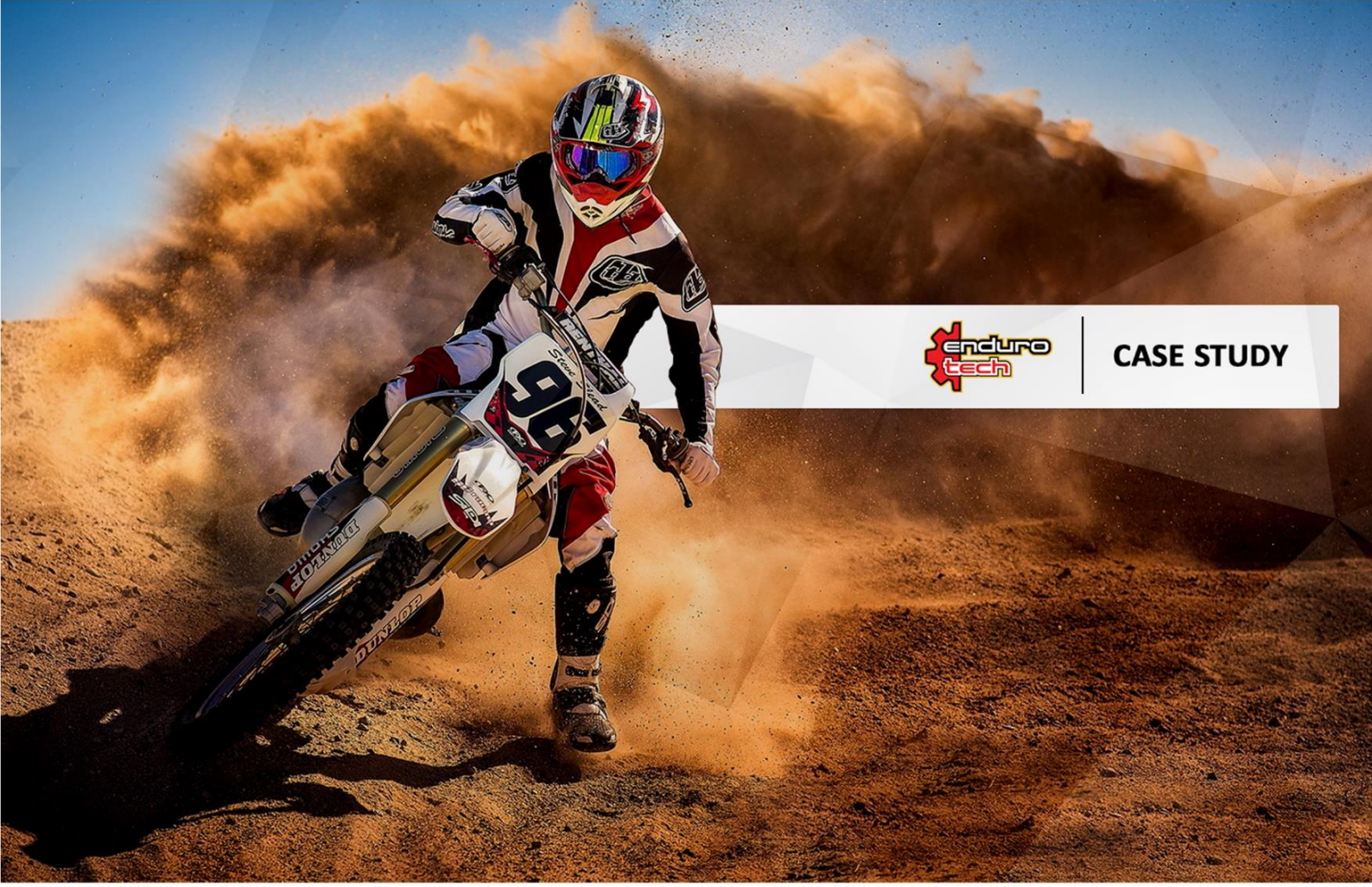
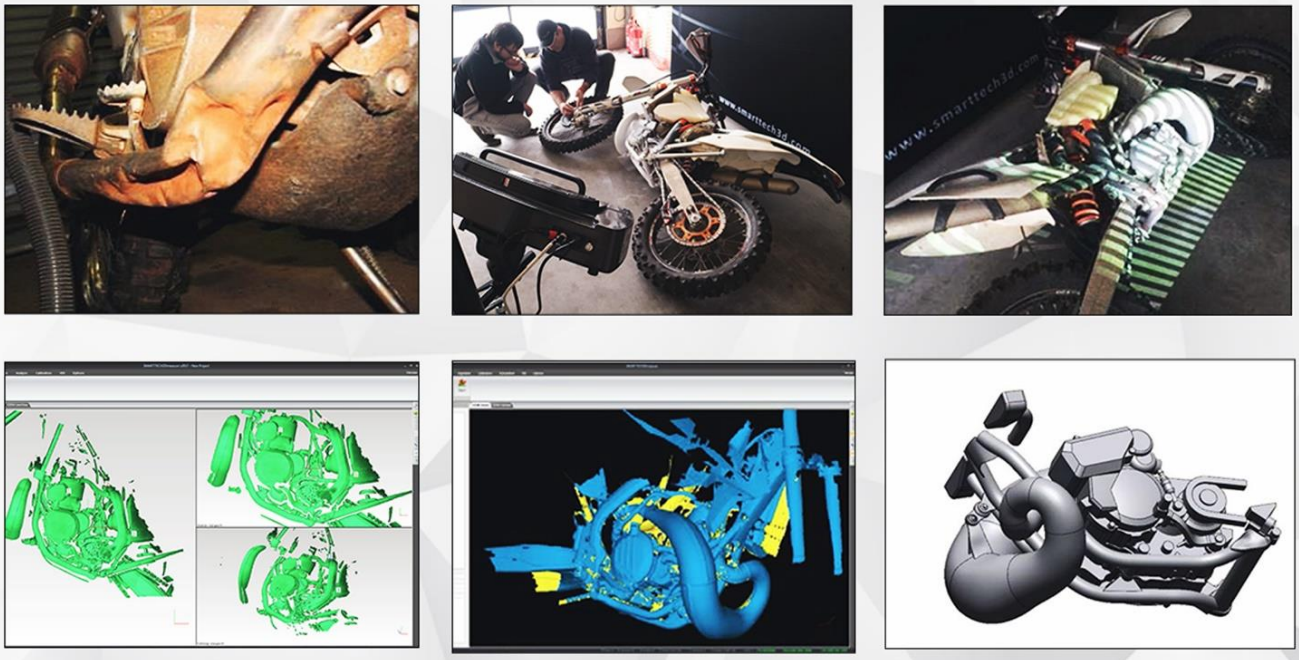
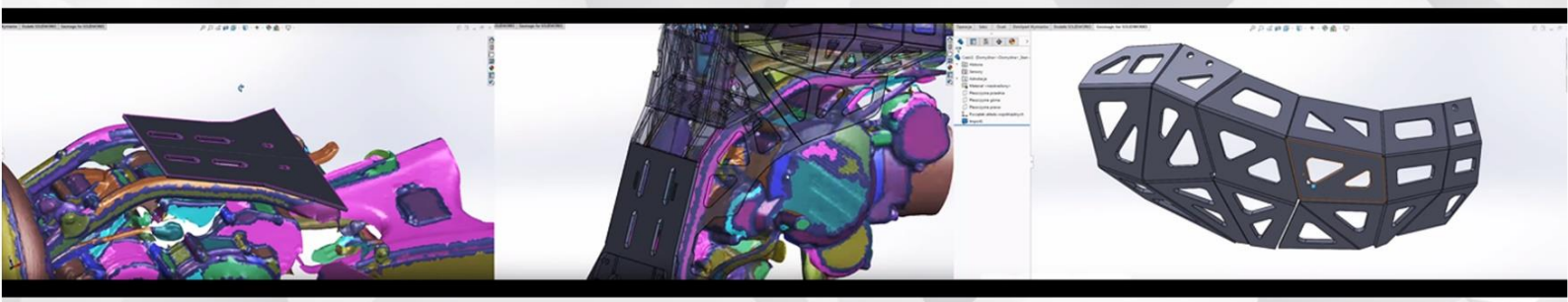
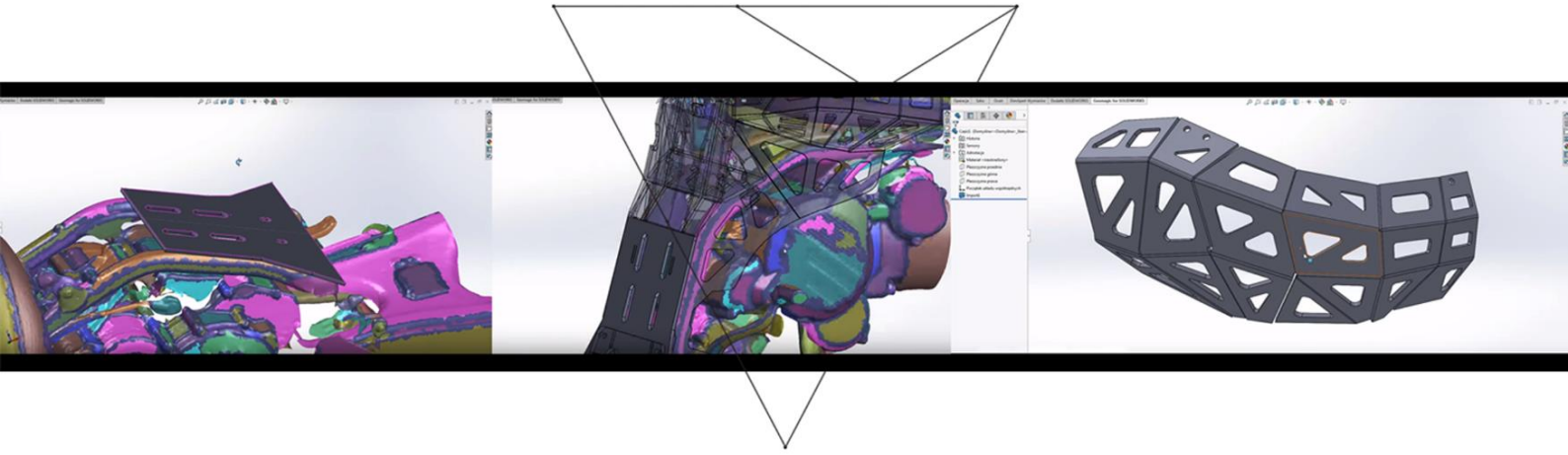


Enduro-Tech is a company that manufactures accessories for enduro motorcycles. It was founded in 2012 and within a year it became one of the best known brands in the market of companies manufacturing motorcycle accessories. Its success is due to the company's extensive knowledge of the industry and the use of the newest technologies allowing it to both design and manufacture parts.
The company Enduro-Tech uses a **SMARTTECH3D** scanner in order to obtain the geometry of the motorcycle engine for which it is planning to manufacture a dedicated casing.







During off-road rides motorcycles of this type are exposed to repeated impacts by obstacles on rough terrain. The high speed and off-road environment often surprise a rider with an unexpected obstacle, which hits the engine. Constant impacts to the exhaust pipe and the engine can severely damage a motorcycle.

The company Enduro-Tech, which specializes in the design and manufacturing of dedicated engine casings was founded in order to meet the high market demand for additional casings.

Thanks to **SMARTTECH3D** scanners it is possible to obtain the geometry of the engine and then to design the casing in such a way that not only does it perfectly fit the engine but is also lighter and – which is very important for a lot of customers – it perfectly matches the aggressive look of the motorcycle. The entire design process is carried out on a computer giving the engineers responsible for the project complete freedom.

The measured surface consists of glossy metal elements. That's why the underside of the engine is firstly covered with a non-invasive anti-glare solution, which allows for a clear capture of the geometry by an optical measuring device.

The solution does not affect the measured surface and is easily cleaned with a pressure washer or a brush. Next, the measuring head projects fringes, which appear geometrically distorted once displayed on the object – that is due to the surface shape of the object. It is this distortion that is captured by a detector implemented in the measuring head of the 3D scanner. The information from that distortion is then provided to the proprietary software **SMARTTECH3Dmeasure.**

The model of the 3D scanner used in the Enduro-Tech's workshop is a **MICRON3D** with 800 x 600 x 310 mm volume, a 5MPix detector and 0.07 mm accuracy. It means that the maximum size of the surface that can be scanned with a single scan is 80 x 60 cm. The result of a single scan is a five million point cloud that corresponds to the 5 megapixel resolution of the camera and represents the measured surface with a 0.07 mm accuracy.

The former method of modelling parts used by Enduro-Tech, which relied on manual cutting and folding of cardboard and then fitting it, was completely computerized.

The 3D digitization of an object has many benefits.

The digital method of measurement not only reduces the cost and time needed to design a fairing but it also gives full freedom when modelling without the need to lengthen and fit it. Furthermore, it allows us to predict and adjust the production method of the casing.

The problem often faced by Enduro-Tech during the prototyping period is the poor repeatability of the bending machine. Despite having a very accurate model of the 3D scanned engine there were instances where the real prototype did not perfectly fit to the motorcycle. Focusing on developing the highest quality engine guard Enduro-Tech was forced to adjust the part many times and cover all expenses of every prototype.

The complex geometry of the accessory meant that even the smallest error in bending, because of how difficult it is to track when it occurred, might become a major problem after the entire prototyping process.

Thanks to establishing the cooperation with the British company Croft Additive Manufacturing – specialising in rapid prototyping by using the most advanced 3D printing technology based on melting stainless steel powder – the company Enduro-Tech accelerated and optimised the process of creating a prototype.

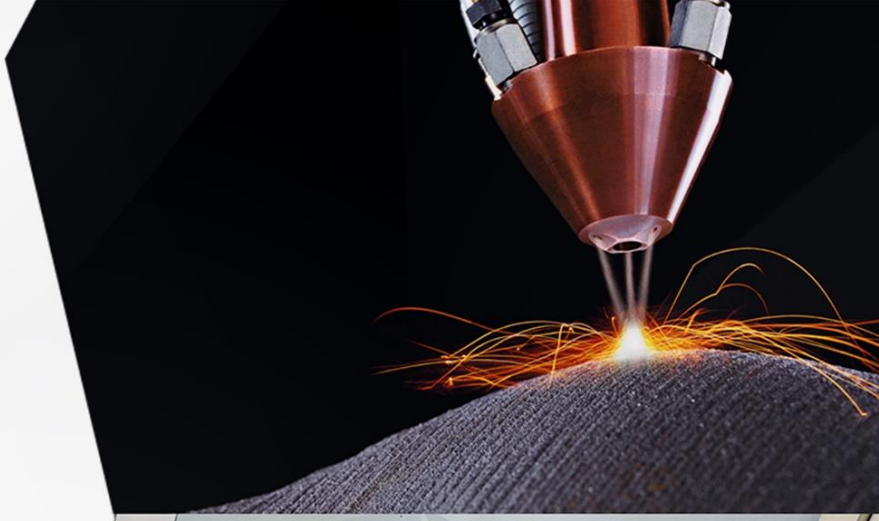
A very thin layer (about 0.1 mm) of metal powder is distributed on the 3D printer's workspace and then the laser melts the powder in such a way that it creates the first "layer" of the desired virtual geometry within 20 microns of accuracy. After melting the powder from the first layer the 3D printer distributes the second layer which is melted in the same way. That way the printer creates the object layer by layer accurately providing the complete geometry of even the most complicated object.

Having a very accurate prototype that is almost indistinguishable from the virtual model allows Enduro-Tech to identify the origin of the problem, thus significantly reducing the prototyping time. Because the prototype is made of stainless steel it can be quickly tested directly on a motorcycle.

The ability to comprehensively verify the protoype improves the quality of the serial production of parts. Enduro-Tech can be sure that using the latest 3D scanning and 3D printing technologies they will distribute a product that passes the most difficult requirements of the Enduro motorcycle riders.

The use of the **SMARTTECH3D** scanner by Enduro-Tech is not only concentrated on scanning engines to design additional casings. Enduro-Tech also specializes in the production of ancillary halogen lamps, and thanks to the numerous connections in the world of motorcycles, it also provides the service of scanning for other motorcycle workshops that manufacture motor vehicles like Café Racer or Custom Choppers.

Thanks to the **SMARTTECH3D** scanner the company Enduro-Tech can accurately digitize motorcycle parts in order to design dedicated, additional or replacement parts. The 3D scanner also raises the quality of the products that the company offers, making it one of the best known suppliers of parts in the off-road racing motorcycle industry.



FINAL RESULT