



Customer Case Study: **Reaction Engines**



REACTION ENGINES



Project overview

Reaction Engines Ltd is a UK-based company formed in 1989 to design and develop the technologies needed for a new class of innovative hypersonic propulsion system – the Synergetic Air-Breathing Rocket Engine (SABRE).

With the complexity of SABRE engine components increasing and the tolerances becoming more demanding, manual inspection process became too time consuming for workshop staff. So when Reaction Engines was awarded OxLEP funding in 2015,

this was used to set up a Quality Assurance department at its sister company Brite Precision.

Their aim was to not only meet the increasingly demanding tolerances and British ISO 9002 standards, but also to increase productivity and precision across the board.

In a fully-tailored solution, ZEISS worked with Brite Precision to integrate the ACCURA bridge-type CMM and customised CALYPSO software into their new Quality Assurance department.



We have purchased the best possible CMM by investing in the ZEISS ACCURA

Why partner with ZEISS?

Bob Harris, General Manager at Brite Precision, was tasked with sourcing a state-of-the-art CMM system to equip their new measurement facilities.

"Accuracy was the most important thing we were looking for when considering which inspection technology provider to partner with. Repeatability, ease of use, capability and customer service were also key factors."

Peer recommendation

"ZEISS was recommended to us by the Chief Inspector of one of our customers, who found in their experience that the ZEISS systems were user-friendly and easy to use. We were new to the concept of CMMs so we needed to rely on peer recommendations like this."

Future-proof capabilities

"At the time we were not fully aware of what was going to be designed by Reaction Engines, so on this basis we decided to invest in a CMM with capabilities to cope with large, complex parts if necessary.

By taking this approach, we were future-proofing our inspection facilities. The ZEISS ACCURA CMM met this criteria perfectly, with a 3m bed and advanced capabilities for measuring large and complex components."

Quality and value

"At the start of the process we visited the ZEISS demonstration facility in Rugby and supplied a sample component for testing on the CMMs. The results that came back were exactly the same as our independent inspection data so we

knew that the machine met our requirements.

We wanted to get the best value for money but without having to compromise on quality – and this was something that ZEISS could deliver. In our eyes, we have purchased the best possible CMM by investing in the ZEISS ACCURA."

Customer service

"Customer service from a supplier is extremely important – if I contact our Account Manager from ZEISS, I know that I will get a call back. I cannot fault their service.

ZEISS also have a very good online system in place for ordering Styli - we simply request the part and two days later it's delivered."

User experience

Mike Fedtschyschin is the dedicated CMM Inspector based at the Brite Precision site, responsible for carrying out the inspection processes on all parts being manufactured for the SABRE project.

"As a user of the system I would definitely recommend ZEISS because of its capabilities. In my opinion, ZEISS provides the best solution on the market."

Time-saving

"Some of the components we produce for Reaction Engines require us to use a CAD model. This is not something we can do using manual inspection processes, because you are checking theoretical points. With ZEISS CALYPSO software, you can do this using the CNC mode by programming theoretical points from the CAD model, whereas it would be impossible for us to locate these manually. This saves me a huge amount of time when running a large, complex part.

Easy reporting

"The reports that I get from CALYPSO provide everything that is required for Reaction Engines and the other commercial clients and even gives me the option to



send over the raw data for further interrogation.

Compared with other systems I have used in the past, the ZEISS CALYPSO solution is far superior in terms of usability and capability - there are far more options and the software is much more intuitive."

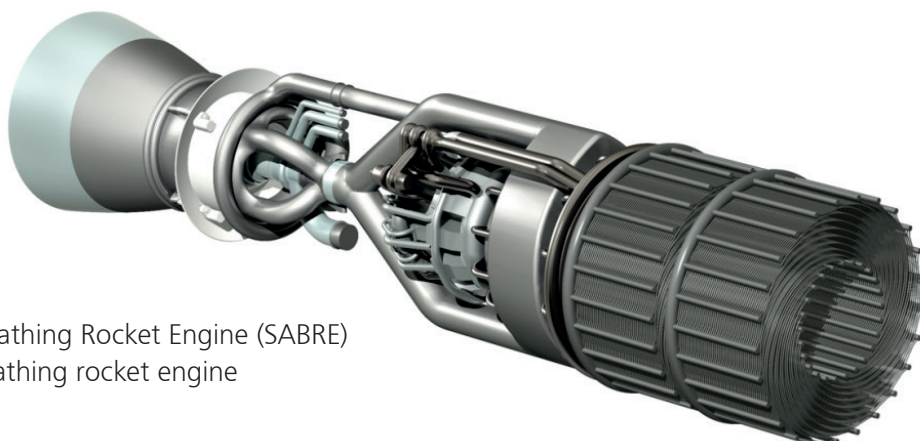
Training and support

Mike received the basic and advanced training from the ZEISS

The ZEISS solution is far superior in terms of usability and capability

applications team at the dedicated facility in Rugby: "The more I used the machine, the more I was able to put the skills I had learnt during training into practice. Now a year down the line, it is almost second nature for me and I'm even training our technician on the system who has no previous experience of using CMMs."

As a user of the system I would definitely recommend ZEISS



Synergetic Air-Breathing Rocket Engine (SABRE)
- a hybrid air-breathing rocket engine

Customer perspective

Stuart Giles heads up the department responsible for producing the SABRE engine heat exchanger at Reaction Engines. He has been able to experience the benefits of the new ZEISS inspection technologies first-hand:

"From my perspective as a customer, I have seen that over the last 12 months we haven't had one concession at all. This is thanks to the expertise at Brite Precision and now also the new inspection processes with the ZEISS Accura CMM."

A measurable difference

We asked General Manager Bob Harris from Brite Precision how their business has changed since the ZEISS installation:

Increased efficiency

"Since implementing the ZEISS ACCURA CMM system, I am pleased to say we have had no parts returned.

Furthermore, our productivity has now increased as we are no longer having to carry out our inspection processes manually. This has released more time for our workforce and given us much higher capacities to cope with any additional commercial work."

Repeatability and traceability

"As the complexity and tolerances for the Reaction Engines parts increase, we know that the ZEISS ACCURA can deliver the accuracy and repeatability we need. Having

Confidence

"Before the ZEISS CMM system was installed, we had to go through a process of checking the part ourselves, but now that they have the facility to do this at their own site this has taken a huge workload away from us.

It gives me confidence as a customer knowing that the parts Brite Precision produce are always checked using the ZEISS ACCURA CMM."

Supporting Documents

Everything that Brite Precision manufactures now has an

inspection report to accompany the component, which gets signed off by their CMM Inspector.

"The accompanying documentation that Brite Precision provides is great from our perspective, as the SABRE project now requires us to produce reports on accuracy, conformance and material spec sheets.

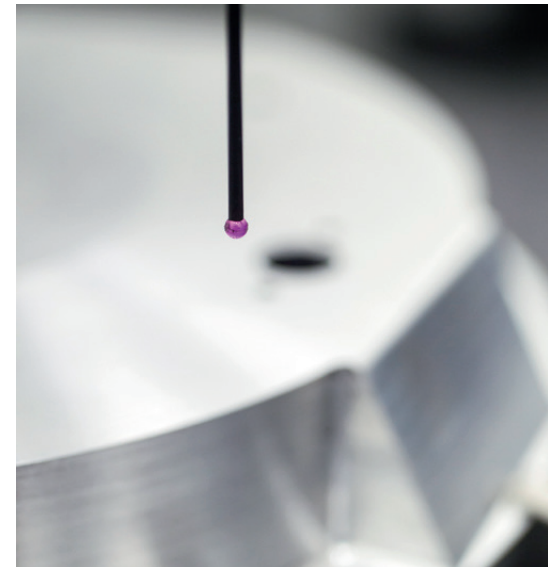
Once the project progresses into space or flight mode, the level of documentation and traceability required will increase even further. Therefore the more information we can gather now, the more helpful it will be to us in the future."

the system installed gives me more confidence in knowing that when a part leaves the factory it will be correct because it has been checked on the CMM."

New revenue opportunities

"We are now at the stage where we would like to start promoting the fact that we have the ZEISS ACCURA CMM measurement facility here and start offering this as a service to new commercial clients. This will provide another source of revenue for us."

Tom Scrope, CFO for Reaction Engines, also commented on how the new Quality Assurance department has made a difference to their business: "We were able to demonstrate high quality standards which were instrumental in forming the partnership between us and BAE systems."



Learn More

If you are interested in learning more about ZEISS, Reaction Engines or Brite Precision, please visit:

www.zeiss.co.uk/industry
www.reactionengines.co.uk
www.briteprecision.co.uk