

# CASE STUDY

## LDS shakers – expertise, technology and passion

Brüel & Kjær's LDS shakers and vibration test systems are designed and built with a unique blend of global experience, the latest advanced technologies, and a highly motivated workforce that prides itself on making the best vibration test systems in the world.



## History and location

*Royston facility  
commissioned in 2008*

The origins of LDS can be traced back to 1962. The company was acquired by Spectris plc in 2008 and is a fully-integrated operation within Brüel & Kjær Sound & Vibration.

The production facility is located about 40 miles north of London at Royston, and extends to some 40,000 ft<sup>2</sup>. Here, 120 members of staff are based, and Royston is also the headquarters for Brüel & Kjær Sales in the UK and Ireland. R&D and project management focusing on vibration test solutions are all based in Royston.



## Product range and focus markets

The LDS product range includes:

- Power amplifiers for new shakers and replacement
- Vibration controllers
- Low, medium and high force shakers
- Slip tables and fixtures

Dependent upon size and requirements, LDS shakers can be either air- or water-cooled.

Brüel & Kjær provides solutions for applications as diverse as laboratory testing, modal and structural analysis, squeak and rattle, package testing, and durability testing of objects ranging from sub-assemblies through to complete systems. Markets include automotive, aerospace and defence, electronics, electrical, and machinery production. Brüel & Kjær currently delivers the industry standard vibration test system for testing of complete satellites around the world.

### LDS force range

*LDS shakers range from the smallest with about 9N force to the largest to date which is a Quad 984 system of 640 kN used for satellite testing*

*A shaker on the  
Royston production line  
in the final stages of  
assembly*



## Committed workforce

Left to right: Mike Jeffs, David Auty and Richard Oakley



**Richard Oakley** has worked at Royston since 2007. Richard comments, "I really enjoy my job and there is great satisfaction when we conquer new challenges. I get a huge kick out of knowing that something I have put together tests a satellite before it's launched." He adds, "Seven of my B.A.R.N. projects have been adopted to date – the management really listen to us – and we have terrific pride in what we do."

**Mike Jeffs** has also been with Brüel & Kjær since 2007 and is responsible for the mechanical assemblies of LDS shakers. Mike says, "I have seen a huge improvement since the Brüel & Kjær acquisition. I also find the B.A.R.N. project very motivating and I, like my colleagues, am really proud of what we do. Seeing the Mars rover video really demonstrated how important shakers are in testing the reliability of high-tech systems."

*A V994 field coil coated in clear epoxy resin – any blemishes or bubbles would be immediately apparent*

**Paul Truran** has been at Royston for 2½ years and has just been awarded his NVQ Level 3 qualification. Paul says, "I'm responsible for coil winding of armatures." Armatures are wound with enamelled copper wire, some as thin as 0.5 mm and up to 9 mm, which are wound around copper-coated aluminium tubing. Paul continues, "The field coils of our shakers have a clear coating which improves their performance and reliability so you can see that there is no porosity or bubbles. We want our customers to see the quality and workmanship in our products." The resin used by Brüel & Kjær is produced to a unique formula and has been validated and tested by an external test house.



"In my department," explains Paul, "we're focusing especially on reliability. We have a short meeting every morning to review the status of all orders. We focus on health and safety, quality, and delivery. Our aim is always 'on-time delivery' and we can fast-track if necessary." He concludes, "I'm currently responsible for a pilot project which will soon be rolled out to all other departments. Having just been awarded OHSAS 18001, we carefully follow the procedures and guidelines."

**"We want our customers to see the quality and workmanship in our products"**

**Paul Truran**

**Left to right:**  
Andrew Turner, Head of Operations; Alex Williamson, Head of Engineering and Brüel & Kjær's Strategic Marketing Director, Lawrence Grasty



Andrew Turner (left) has been with Brüel & Kjær for four years and is responsible for a staff of 60. Andrew gained a BSc in Product Engineering at Manchester University, and for 15 years has been involved in factory management and logistics, including at Airbus. "I thoroughly enjoy my job as I have an excellent team around me, and any manager is only as good as his people. The team spirit and company culture are first class and we're committed to continuous change – especially in the areas of health & safety, quality, delivery, and the environment – we want Brüel & Kjær to be a safe, great place to work."

**"Global service and support is a major part of our value proposition, and our organisation provides on-site, customised training courses to ensure maximum productivity, reliability and safety"**

Andrew states, "Global service and support is a major part of our value proposition to our customers and Brüel & Kjær has a dedicated Global Service and Support organisation who, in addition to ensuring continued operation, are able to provide solutions to any customer requirement."

**"We manufacture about 900 shakers a year and this number is rapidly increasing. About two thirds of our shakers are customised, and our ability to tailor to customer-specific requirements gives Brüel & Kjær a great competitive advantage"**

Alex Williamson (middle) is Head of Engineering. He is responsible for a team of 30 people and joined LDS 10 years ago. He gained his BSc in Mechanical Engineering from Nottingham Trent University, and prior to joining LDS worked for Bosch, in its consumer products division. Alex explains, "We manufacture about 900 shakers a year and this number is rapidly increasing. About two thirds of our shakers are customised, and our ability to tailor a shaker to customer-specific requirements gives Brüel & Kjær a great competitive advantage."

A standard shaker can be delivered in two to four weeks, while an advanced and customised solution may take many months. Alex continues, "All project management that relates to customised solutions is based in Royston, which facilitates very easy communication. In addition, vibration test system R&D is based here and is my responsibility."

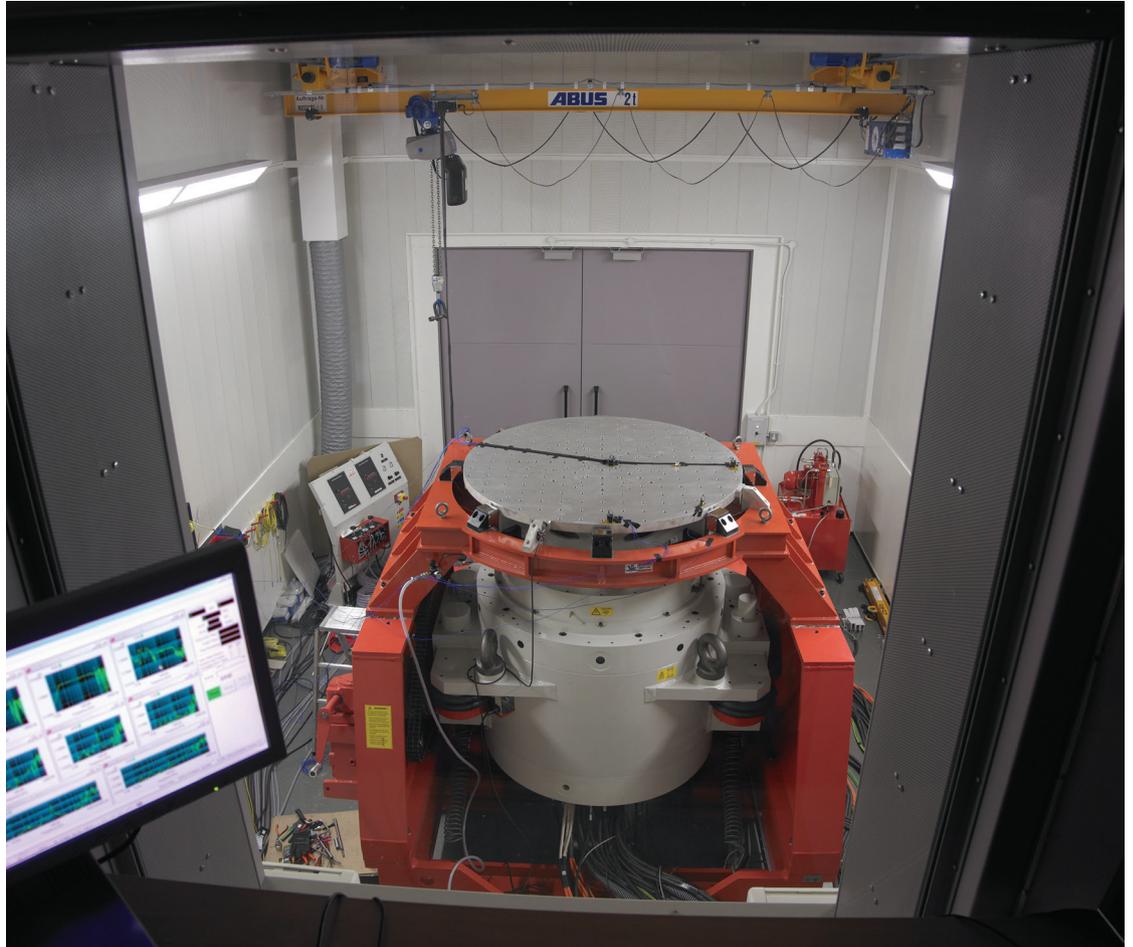
"Our sole aim is to focus on solving customers' problems. We're currently investing heavily in exciting new technical developments with strategic partners, which will result in even greater operating efficiency and reliability. You'll see the results in 2013." Alex concludes. "We also see huge growth in the aftermarket for our amplifiers and vibration controllers."

Lawrence Grasty (right) joined LDS 20 years ago and is now Brüel & Kjær's Strategic Marketing Director. He gained a BSc in Mechanical Engineering from Birmingham University and has a PhD from King's College, Cambridge where he researched advanced technologies for aircraft wing forming. Lawrence says, "Our focus markets are aerospace and defence, the automotive industry, telecom and audio, and environmental monitoring and measurement. We also have a strong position in electronics testing and the associated packaging industries. Brüel & Kjær focuses on supplying the complete test and measurement chain and all the links within it." He continues, "If required, we can supply a complete turnkey solution with dedicated project management." Lawrence comments, "Space is an especially interesting area. We have an excellent position in this market and as the number of space launches and satellites increase, we foresee an exciting future."

"With the integration of LDS into Brüel & Kjær, we have a company that is a world leader in testing and data acquisition. In fact, LDS and Brüel & Kjær Sound & Vibration Measurement is the perfect match."

## Testing

LDS V994 undergoing testing



The testing team comprises seven people. A typical test takes 12 hours. Alex Williamson says, "The goal of the test is to prove the performance of the shaker according to the published specifications, but we go much further than that as we set tough internal standards." Durability is highly important and the longevity of the shakers is an important part of the value proposition. Alex adds, "Of course every new product is extensively evaluated prior to launch. The process starts with extensive CAE and lifetime simulation followed by physical testing to destruction. I've seen some positive changes since the integration with Brüel & Kjær, especially in R&D, where we inherited some process tools from Brüel & Kjær that have helped enormously to improve design efficiency."

**Terry Crump** is Quality and Improvement Manager. He says, "We've just been awarded the health and safety standard OHSAS 18001, and we believe we are unique among shaker manufacturers in being granted both the ISO 14001 environmental standard, and the ISO 9001 quality standard." External assessment audits are conducted every six months for all three standards.

## Health and safety

Trevor Aldrich supports the OHSAS 18001 Standard



**Steven Jones** has been with Brüel & Kjær for 19 months and is the Safety, Health and Environmental Officer. Steve says, "Our commitment to safety, health and the environment starts at the highest level. Our aim is continual improvement and this includes advanced waste segregation, disposal, and a commitment to reducing landfill."

**Trevor Aldrich** joined LDS 25 years ago, and now works within the Safety, Health and Environmental Team. He focuses on risk and hazardous substance assessments.

## Best Factory Award

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Andrew Turner says, "The Best Factory Award is promoted by Works Management Magazine and Cranfield School of Management. Its aim is to benchmark best practice." He adds, "About 70 companies entered, and in early 2011 we were one of 25 that led the shortlist. In September 2011 we received a Highly Commended Award for Best Factory in the Electrical and Electronics category."

## B.A.R.N. awards

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"The B.A.R.N. awards are public recognition of positive changes," says David Auty, who has worked for Brüel & Kjær since June 2011, when he introduced the concept. David, who has worked with motion and control products throughout his career in the manufacturing industry, focuses on Continuous Improvement, Lean and Production Engineering with his team.

"My job is highly motivating because we have the skills, we know our business, and our staff are all highly motivated and contribute to making a positive difference in the safety, quality and reliability of our products," he says.

B.A.R.N stands for:

**B:** Before – what was the status like before the project?

**A:** After – what you want to change and improve

**R:** Result – the result, the benefits and improvement

**N:** Next – what's next?

"We encourage input from anyone," says David. "My role is to coordinate and guide the process. We're hoping to reach a major milestone shortly, our 100th B.A.R.N."

Lawrence Grasty, Brüel & Kjær's Strategic Marketing Director presents about nine B.A.R.N. awards every month.



**"We encourage input from anyone. My role is to coordinate and guide the process"**

*David Auty, Lean and Production Engineering Manager*

## A winning team

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Lawrence Grasty comments, "Our business is run by people, and due to high levels of motivation and product flow in Royston, we see the results in greater productivity. It's great to be part of a winning team."

Andrew Turner concludes, "The LDS brand is the ultimate in vibration test systems. Our job is to keep it there by demonstrating the value of our solutions to our customers."