Fuels and lubricants: reducing cost of ownership

Up to £1 million is available for Phase 1 of this two phase competition funded by the Ministry of Defence (MOD)

The mission of the MOD’s Defence Equipment and Support (DE&S) is ‘To equip and support our Armed Forces for operations now and in the future.’ DE&S is responsible for procuring and supporting all the equipment and services for the UK Armed Forces.

There is a need to improve the energy consumption of UK MOD military assets through Sustainable Development. This MOD call seeks proposals for novel ideas to reduce the cost of ownership of military assets through innovative approaches to fuel and lubrication use.

The primary goal for this research is to meet reductions in operational energy usage targets. A secondary goal is to improve mechanical operation and maintenance techniques through smarter lubricant and fuel use.
**Fuels and lubricants: reducing cost of ownership**

This challenge is broken into two themes:

**Theme 1. Reduce fuel and lubricant consumption.**
MOD are looking for novel ways to reduce dependency on fuels and lubricants, in a way which reduces asset cost of ownership whilst maintaining or improving capability.

Areas of research not limited to: improving efficiency, smart energy management, improving dynamics, novel fuels, reducing lubricant waste, managing the effects of microbiological growth in fuel, waste regeneration and smarter asset employment.

**Theme 2. Enhanced operation and maintenance.**
MOD are looking for novel ways to improve mechanical operation and maintenance techniques of platforms through smarter lubricant and fuel use, in a way which reduces asset cost of ownership whilst maintaining or improving capability.

Areas of research not limited to: more effective lubrication, improving contamination detection, reducing contamination, lubricant condition based maintenance, detection and prediction of incipient component failure.

Phase 2 funding to develop working prototypes will be available for those projects that demonstrate the greatest potential at the end of the Phase 1 contract.

This competition opens on Monday 8th June and will close at 12 noon on Wednesday, 5th August, 2015.

A briefing event will be held in London on Tuesday 14 July 2015.

**Supporting documents**
- Invitation to tender
- Competition brief
- Guidance notes

**Application Process**
This competition is run by Innovate UK.
Open Date: 8th June 2015
Registration Closes: 29th July 2015
Close Date: 5th August 2015
Award: Up to £1 million

**Register & Apply**
For any queries related to the technical aspects this call please email: DESTECH-TDLand1b@mod.uk and DESTECH-TechOfficeLand1b@mod.uk
£250,000 of funding is available for this Phase 1 competition, with a further £2 million potentially available for Phase 2.

The Ministry of Defence’s (MOD) Centre for Defence Enterprise (CDE) proves the value of novel, high-risk, high-potential-benefit research sourced from the broadest possible range of science and technology providers, including academia and small companies, to enable development of cost-effective capability advantage for UK Armed Forces and national security.

MOD’s Information Systems and Services (ISS) vision is to deliver information capabilities by developing closer alignment with industry partners. Hence, this CDE themed competition seeks to develop a prototype solution to provide an unstructured and open-source data analytics platform for defence.

Proposed solution should:

• take in data from documents, raw files, scanned files and structured data sources
• analyse data and integrate with multiple analysis tools using information structures provided by ISS
• provide a configurable dictionary
• visualise the data and its dependencies
• allow further development of the platform
• demonstrate innovation and interoperability to open standards

ISS intends to take forward successful outputs of CDE-funded projects from this themed competition for phase-2 funding. Subject to exploitable solutions being delivered from phase 1, it’s anticipated that up to £2 million will be made available for phase 2.
Innovate UK - Smart 2015/16

Smart is a grant scheme which offers funding to small and medium-sized enterprises (SMEs) to engage in R&D projects in the strategically important areas of science, engineering and technology, from which successful new products, processes and services could emerge.

The scheme supports SMEs carrying out R&D which offers potentially significant rewards and that could stimulate UK economic growth.

Three types of grant are available:
- Proof of market
- Proof of concept
- Development of prototype.

Any UK SME undertaking research and development may apply; applications are accepted on a rolling basis for assessment by independent experts.

The new batch assessment dates for Smart scheme applications during the financial year 2015/16, which started on 26 March 2015, are:

<table>
<thead>
<tr>
<th>Smart Assessment Rounds 15/16</th>
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<tr>
<td>Round 1 - 15</td>
<td>21/05/2015 12:00</td>
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<tr>
<td>Round 2 - 15</td>
<td>16/07/2015 12:00</td>
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<td>Round 3 - 15</td>
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<td>Round 4 - 15</td>
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<td>Round 5 - 16</td>
<td>21/01/2016 12:00</td>
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<tr>
<td>Round 6 - 16</td>
<td>24/03/2016 12:00</td>
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Smart responsive mode is ‘always open’. However to assist Innovate UK in the processing of these applications, they are assigned into batches for final assessment and funding.

Register & Apply

Links for this competition
- Competition Brief
- Smart FAQs
- Guidance for applicants - Proof of Market
- Guidance for applicants - Proof of Concept
- Guidance for applicants - Development of Prototype
- Guidance for applicants - Smart project costs
- Access to registration and documentation
Wave Energy Scotland (WES) – funded by the Scottish Government - takes an innovative approach to supporting the commercialisation of the wave energy sector. Set up as part of Highlands & Islands Enterprise (HIE).

What makes Wave Energy Scotland unique is its long-term commitment to the sector: WES will take innovative technologies from concept to being ready for private sector investment.

Wave Energy Scotland’s SBRI competition is for novel wave energy converter devices, specifically focused on the prime mover and structure. WES can offer up to £300K (inc VAT) per Project for up to 12 months for this first stage. WES is flexible over the total budget of £2.4million, which will depend on the quality and number of the applications received.

Briefing event
An open Q&A facility will be available through the Public Contracts Scotland website which is hosting this call where all questions should be made.

How to apply
All bids should be made using the Application Form. Instructions on how to access this document and other competition material are available at http://www.publiccontractsscotland.gov.uk/search/show/search_view.aspx?ID=JUN211095

Register & Apply

Competition Open Date: 10/6/15

Competition Close Date: 12.00 noon 13/8/2015

Website: http://www.publiccontractsscotland.gov.uk/search/show/search_view.aspx?ID=JUN211095
Innovate UK - Innovation £5k vouchers

You can get an Innovation Voucher worth up to £5,000 to pay for an external expert to help your business grow. You can use this expert to get advice on a novel idea or to use design within your business. You can ask them to help you make the most of intellectual property (IP). You can also use Innovation Vouchers to buy time and support on specialist equipment or facilities.

• **Key features:** Up to £5k funding for start-up, micro, small and medium-sized enterprises to work with an external expert to gain the knowledge to innovate and grow.
• **Closing date:** 21 Jul 2015

Innovate UK can help you find and choose an expert from one of the following:

• Universities and further education colleges
• Research and technology organisations

• Technical consultancies
• Catapult centres
• Design advisers
• Intellectual property advisers

**Find out if you are eligible**

To qualify for an Innovation Voucher you must:

• Be starting up or running a micro, small or medium-sized UK business
• Have not worked with this expert before
• Need help with something that's a real challenge for your business, not just a small improvement or change
• Have not had an Innovation Voucher from Innovate UK or the Technology Strategy Board before

Unsure if your business is an SME? You can check the [European definition of an SME](#) here.

You cannot use an Innovation Voucher to fund:

• Staff training
• Equipment
• Off-the-shelf software
• Marketing or branding items
• Standard business advice

The [Guidance for Applicants](#) document will help you to decide if your project is eligible, or you can contact our helpline on 0300 321 4357 or by email: competitions@innovateuk.gov.uk
Innovate UK opens £3 million call for feasibility studies into technology projects across four key areas

Innovate UK is to invest up to £3 million in feasibility studies to stimulate innovation across four enabling technology areas that underpin future UK growth:

- advanced materials
- biosciences
- electronics, sensors and photonics
- information and communication technology (ICT).

The aim of this competition is to ensure that small and micro businesses in the UK are well positioned to respond to market opportunities across a range of economic sectors.

Studies must be led by a business. Projects are open to companies of any size, but must be led by a small or micro company, working in collaboration with one or more business or research partners.

Small or micro businesses could receive up to 70% of their eligible project costs, medium-sized businesses 60% and large businesses 50%.

The expectation will be for projects to last 6 to 15 months and to range in size from total costs of £50,000 to £150,000, although Innovate UK may consider projects outside this range.

This competition opened on 18 May 2015, and the deadline for applications is at noon on 9 September 2015.

The feasibility studies must be aligned closely with one or more of the four enabling technology areas, and Innovate UK are encouraging companies to submit proposals that bridge any of the four areas. Where a proposal cuts across more than one technology area, the application must indicate which of the four areas represents the major focus of technical innovation.

In addition, projects should concentrate on early-stage technical opportunities, where there is significant technical risk and some level of uncertainty about how the proposed approach will work in practice. The aim of these feasibility studies is to build an evidence base, identifying the strengths, weaknesses, opportunities and threats, as well as the resources required to develop an idea further. The outcome is expected to be a proof of principle that can enable the organisations to participate in further collaborative development on the journey to eventual commercialisation.

Further details including the specific areas of the four technologies in scope.
Grants for Exploratory Ideas 2015/16

On behalf of the UK Space Agency, the Centre for Earth Observation Instrumentation and Space Technology invites proposals under the rolling call for Grants for Exploratory Ideas (GEI) as part of the National Space Technology Programme. The Call will remain open until June 2016 with proposals assessed every 4 months. The next round closes on 6th October 2015.

Grants for Exploratory Ideas are mini studies which can receive a grant of up to £10K with a maximum duration of 6 months, aimed at innovative space technology activities. The total budget available for GEI projects in 2015/16 is £200K. The UK Space Agency would particularly like to encourage organisations (industry, academia and SMEs) new to space technology to participate in this Call. Details of projects funded in the first 3 rounds of GEI are contained in this file.

Acceptable activities are:
- Early TRL innovation
- New technology concepts
- Knowledge transfer
- Skills development
- Refining an idea
- Undertaking a market survey
- Proof of concept

The Call for proposals for Grants for Exploratory Ideas is open until June 2016. New applications will be reviewed at 4 month intervals. The closing dates for these reviews are:
- 6th October 2015
- 2nd February 2016
- 7th June 2016

All rounds will close at 12.00 noon. Any proposals received after this time will be considered in the following round.

Full details of the Open Call are contained in the ‘Announcement of Opportunity’ document together with the other bid documents:
- Announcement of Opportunity
- Application Form
- Draft contract

Note: Applications which do not provide all the information specified in the Call documents will be rejected.

For further information or to discuss any aspect of this call, please contact:
Mr Chris Brownsword (CEOI-ST Technology Director)
Tel: 01252 393918 (land line)
Mob: 07825 762527 (mobile)
Email: Chris Brownsword
The Oxford eHealth & Big Data, Isis Innovation & Oxford AHSN Technology Showcase, will highlight the most exciting opportunities and projects in this field. The Oxford Academic Health Science Network will co-host and partner the event.

Keynote speakers include:

Dr Paul Rice - Head of Technology Strategy in the Digital Health team in NHS England. Paul leads the team that is instrumental in delivering a digitally enabled and 'paperless' NHS.

Dame Fiona Caldicott - National Data Guardian for Health and Social Care and also Chair of the Oxford University Hospitals NHS Trust.

Professor Alistair Fitt - Vice Chancellor of Oxford Brookes University and the Executive Secretary of ICIAM, the worldwide organisation for Applied Mathematics.

Mr Andrew Walker - Commercial Director for McLaren Applied Technologies, responsible development & commercial strategy.

Expert panel session chair:

Professor Lionel Tarassenko - Head of the Department of Engineering Sciences and a founder director of four University spin-out companies.

Click here to reserve your place

A detailed List of Speakers and Posters can now be found at: http://isis-innovation.com/news/events/isis-technology-showcases/
Harwell Open Days - July 2015

This July, the Harwell campus, including STFC’s Rutherford Appleton Laboratory and partners, will be opening its doors to the public and schools.

This unique event will enable visitors to access all areas and learn about the UK’s involvement in space explorations, exciting experiments with powerful X-rays and neutrons, supercomputing and much more.

We’ll be running live link-ups with our partners at the Large Hadron Collider at CERN, Geneva, exploring the Vulcan laser – a laser so intense that it is similar to taking all of the sunlight shining on the Earth and focussing it onto a pin head, seeing the world in infra-red and lots more.

Organisations across the campus are taking part in the open days, which will see 1,500 schoolchildren and 10,000 members of the public visit the site in Oxfordshire, which contains some of the UK’s largest and most advanced scientific facilities.

This is an unprecedented opportunity to see behind the scenes of cutting-edge science and discovery at the UK’s largest science campus. A diverse range of facilities will be open, allowing you to plan your own visit and really explore the site. Whether you’re fascinated by lasers, space, medical research, or particle physics, there’s something for all the family.

Read more on our Open Days pages. More detailed programmes of events can be found on the For Schools and For Public pages.
Invitation to Home Office and US DNDO funding workshop at University of Surrey

There will be a Home Office and US DNDO funding workshop at University of Surrey on Thursday 16th July. This is an informal networking event to meet representatives from the UK Home Office OSCT (Office for Security and Counter Terrorism) and from the US DNDO (Domestic Nuclear Detection Office) to hear about their plans for jointly managed and funded research solicitations. The aim of the meeting is to facilitate UK industrial and academic partners with an interest in nuclear detection to find out about future funding opportunities through DNDO and OCST.

Background information on the DNDO: The DNDO is an office within the US Department of Homeland Security and is the primary entity in the U.S. government for implementing domestic nuclear detection efforts for a managed and coordinated response to radiological and nuclear threats, as well as integration of federal nuclear forensics programs. Additionally, DNDO is charged with coordinating the development of the global nuclear detection and reporting architecture, with partners from federal, state, local, and international governments and the private sector.

Date: Thursday 16th July, 10:00 - 14:00
Venue: Lecture Theatre M, Lecture Theatre Block, University of Surrey, Guildford

Further information about the workshop and directions to the venue are also available via the Eventbrite registration page.

Agenda
10:00 Registration and Coffee
10:15 Welcome
10:30 Presentations from Home Office OSCT and from DNDO, followed by Questions and Discussion
12:30 Lunch
14:00 Event Close

Please register to attend this event using this Eventbrite link.
Astronomy technology improves bedside tumour diagnosis and treatment in patients

UK scientists have used technology, originally designed for use in detectors on space satellite missions, to develop and commercialise a mini camera that will revolutionise identification and removal of tumours and lymph nodes, thanks to funding by the Science and Technology Facilities Council (STFC).

STFC’s Challenge Led Applied Systems Programme (CLASP), supports the application and commercialisation of scientific research in the key global research challenge areas – healthcare, security, environment and energy.

Researchers from the Universities of Leicester and Nottingham have developed a mini handheld camera that uniquely combines both optical and gamma imaging, that will not only improve the diagnosis of tumours and lymph nodes, but also the efficiency and accuracy of removing tumours during surgery.

The small mobile camera, which is currently being trialled with patient volunteers at the Queens Medical Centre in Nottingham, will advance nuclear imaging by allowing imaging procedures at a patient’s bedside, in operating theatres and intensive care units, as opposed to specialised imaging facilities within nuclear medicine departments. This will allow surgeons to localise and map tumours and nodes with greater accuracy during surgery. The cameras can also be used for small organ imaging, diagnosis, surgical investigation and visualisation of drug delivery.

Dr John Lees from the University of Leicester’s Department of Physics and Astronomy, said: “Our system will improve surgical cancer treatments, reducing mortality and morbidity by enabling surgeons to increase lymph or tumour removal efficiency while minimising damage to normal tissue.”

Grahame Blair, Director of Programmes at STFC, said: “This project is an inspirational example of how STFC’s CLASP funding can help world-class researchers take existing technology and develop innovative solutions to significant challenges facing our society today, in this case, in healthcare. This is looking very promising for patients and we are looking forward to seeing the next steps.”

As a result of the CLASP funding, the Universities of Leicester and Nottingham have since raised over £250K first stage venture funding for their spin-out company, Gamma Technologies Ltd (GTL). A variant on the camera will begin evaluation on patients in the operating theatre during autumn 2015.

The closing date for the next call for proposals for STFC’s Challenge Led Applied Systems Programme is 1 September 2015. Further information about the programme can be found here.
ESA invites ideas to cut space debris creation

Tomorrow’s satellites must evolve – because the space they operate in is changing. New regulations on cutting space debris are influencing satellite design, and ESA is reaching out to satellite builders.

ESA’s CleanSat technology programme is inviting European industry to submit ideas for ‘building blocks’ for next-generation low-orbit satellite platforms. They must comply with requirements for mitigating space debris while boosting platform performance and competitiveness.

Low orbits up to 2000 km above our world form the most highly congested region of space, widely used for Earth observation and some types of telecom satellites.

Growing populations of debris are a clear and present danger to valuable missions – moving at multiple kilometres per second, an incoming 1-cm nut can strike with the force of a hand grenade.

A growing number of countries have introduced regulations to limit the production of fresh debris within the protected low orbits, typically intending satellites to be brought down or boosted out of here within 25 years of the end of their working lives while reducing the risk to people on the ground to less than 1 in 10 000. They also need to be ‘passivated’, removing leftover propellant and powering down batteries to avoid explosions.

“To remain internationally competitive, future low-Earth orbit platforms will have to meet these national and international regulations,” explains Luisa Innocenti, heading ESA’s Clean Space initiative. “It has become obvious that achieving this in a systematic way implies wholesale evolution of low-orbiting satellite platforms. So what we plan through CleanSat is the development of new building blocks based on innovative technologies, carried out through a coordinated European approach to achieve economies of scale. This coordination is only possible by bringing together space agencies, satellite builders and their subsystem and equipment suppliers.”
ESA invites ideas to cut space debris creation

Approaches include propulsion for deorbiting or reorbiting, a ‘design for demise’ approach to ensure satellites will definitely burn up in the atmosphere without the need for targeted reentry, drag augmentation devices such as sails, and propulsion and power passivation.

A CleanSat workshop in March began the discussion with industry. Now this announcement invites industry to propose their own building blocks for follow-up study involving suppliers, ESA and the satellite integrators.

The results will be folded into a CleanSat plan for consideration by ESA’s Ministerial Council in late 2016.

ESA’s own missions will make early use of these building blocks once they are readied for space, in particular the Earth Explorers and Sentinels.

To participate, more information is provided at ESA’s tendering site.
£313 million boost for UK Big Data research

Universities and Science Minister Jo Johnson will today unveil a £313 million partnership with information technology leader IBM (NYSE: IBM) to boost Big Data research in the UK.

Following on from Government’s £113 million commitment in the Autumn Statement to expand the Science and Technology Facilities Council (STFC) run Hartree Centre at the Daresbury Laboratory in Cheshire over the next five years, IBM will further support the project with a package of technology and onsite expertise worth up to £200 million.

IBM’s contributions will include:

• access to the latest data-centric and cognitive computing technologies, including its world-class ‘Watson’ cognitive computing platform;
• at least 24 IBM researchers to be based at the Hartree Centre to work side-by-side with existing researchers;
• joint commercialisation of intellectual property assets produced in partnership with STFC, which runs the Hartree Centre.

Minister for Universities and Science Jo Johnson said: “We live in an information economy – from the smart devices we use every day to the super-computers that helped find the Higgs Boson, the power of advanced computing means we now have access to vast amounts of data. This partnership with IBM, which builds on our £113 million investment to expand the Hartree Centre, will help businesses make the best use of Big Data to develop better products and services that will boost productivity, drive growth and create jobs.”

Advanced data-centric and cognitive computing technologies enable non-computer specialists to gain insight from the vast amounts of data being generated today, and do so in a more natural, human-friendly way.
£313 million boost for UK big data research

David Stokes, Chief Executive for IBM in the UK and Ireland, said: “We’re at the dawn of a new era of cognitive computing, during which advanced datacentric computing models and open innovation approaches will allow technology to greatly augment decision-making capabilities for business and government. The expansion of our collaboration with STFC builds upon Hartree’s successful engagement with industry and its record in commercialising technological developments, and provides a world-class environment using Watson and OpenPOWER technologies to extend the boundaries of Big Data and cognitive computing.”

The Hartree Centre will directly benefit from breakthrough innovations rapidly emerging from the OpenPOWER Foundation, an open development community backed by IBM, NVIDIA, Mellanox and over 100 other organisations worldwide. The research programme will leverage OpenPOWER high-performance computing innovations to enable complex analytics on massive amounts of data.

The Hartree Centre is already helping businesses like Unilever and GSK use high-performance computing to improve the stability of home products such as fabric softeners and to pinpoint links between genes and diseases.

Professor John Womersley, Chief Executive of STFC, said: “Data intensive techniques are transforming every discipline of science, and connecting these capabilities to the needs of industry has the potential to revolutionise every business sector. The Government’s five-year investment in the Hartree Centre will deliver a step-change in capability in this area, and will bring in significant knowledge and expertise from IBM Research that will help ensure our science and industry remains at the very forefront of research and development.”

STFC and IBM will engage in collaborative projects with third parties and draw on the scientific excellence of UK universities to develop advanced software solutions to address real-world challenges in academia, industry and government.

More than two dozen IBM researchers will be based at the Hartree Centre at Sci-Tech Daresbury, and will work side-by-side with the Centre’s researchers to develop new tools, algorithms and approaches to Big Data that will help UK industry and commerce take greater advantage of the wealth of insights hidden in that data.
A new study published in IOP Publishing’s journal 2D Materials has proposed using graphene as an alternative coating for catheters to improve the delivery of chemotherapy drugs.

The research suggests that placing graphene – an extremely thin sheet of carbon atoms – on the internal surfaces of intravenous catheters commonly used to deliver chemotherapy drugs into a patient’s body will improve the efficacy of treatments, and reduce the potential of the catheters breaking.

The study indicates that damaging interactions can occur between the most commonly used chemotherapy drug, 5-Fluorouracil (5-Fu), and silver – one of the most widely used coating materials in medical applications. As a result of this damage the researchers believe the drug may not deliver the desired therapeutic effect in patients, and that chemotherapy treatment may be compromised.

Furthermore, the research indicates that a by-product of the reaction between 5-Fu and silver is hydrogen fluoride (HF), a strong acid. This raises concerns that silver and HF may be injected into the patient along with the treatment.

Co-author of the study Justin Wells, from the Norwegian University of Science and Technology, said: “As far as we know, nobody has ever looked at the chemical reaction between chemotherapy drugs and the materials they routinely come into contact with, such as catheters and needles and their coatings. It is just assumed that the drugs are delivered into the body intact. “We have shown that silver is catalytically degrading the chemotherapy drugs, which means they are probably not being correctly delivered into the patient. Our research indicates that one of the decay products of this reaction is HF, which would be a worrying thing to inject into a patient. “

As a solution to this problem, the international team of researchers have proposed using graphene as an alternative coating material for catheters.

In their study, the researchers used a technique known as x-ray photoemission spectroscopy (XPS) to study the chemical composition of 5-Fu, as well as the drug’s reactions with silver and graphene.

XPS is a technique used to measure the surface chemistry of a particular material by firing a beam of x-rays at it and collecting the electrons that are subsequently emitted from the very top layer of the material. The researchers performed these measurements at the Swedish national synchrotron laboratory – MAX IV Laboratory.

Their results showed that when 5-Fu comes into contact with silver, reactions occur in which there is a massive loss of the element fluoride from the drug, leading to the creation of HF. When the researchers repeated this experiment with 5-Fu and graphene, they found that these reactions completely disappeared and that graphene caused no damage to the drug.

Graphene is a biocompatible material with low toxicity that has already been suggested as an external coating for biomedical applications. The researchers state that the fabrication of thin graphene coatings is technological feasible and can even be grown on top of silver to maintain compliance with existing fabrication methods.

“Our findings are an important first step in this new field. Together with our collaborators and students, we are increasing our understanding of the critical interactions between drugs and medical coatings, with a view to making the knowledge freely available for all to use.” Wells continued.

“This study was a simplified version of real life chemotherapy treatment, so our future studies will look to mimic the processes more closely by examining real drug mixtures that contain other active ingredients as well as a salt solution. We will also look to extend our experiments to include other chemotherapy drugs.”

This paper can be downloaded from http://iopscience.iop.org/2053-1583/2/2/025004/article
Keeping energy clean and the countryside quiet

Thanks to expertise garnered building space telescopes powerful enough to see exoplanets, large wind turbines are now generating clean power without making a racket.

Last year, a European wind turbine maker found itself with an emergency: their new clean-energy turbines were efficient, effective and state-of-the-art – but they were too noisy. It turned out that ESA’s advanced Darwin planet-hunter study provided a smart answer: using the same approach that keeps multiple telescope mirrors precisely aligned to cancel out turbine vibration before it becomes noise.

"Certain countries set certain limits on the amount of noise a turbine can make." explains Nicolas Loix, CEO of Micromega Dynamics, a Belgian company whose main business includes controlling the vibrations produced by everything from machine tools to paper-making. Wind turbines produce two different kinds of noises. The first is the motorway-like drone from the blades. The other is ‘tonality’ – an irregular shriek from the gearbox.

Tonality is even more annoying than broadband whirring noises, so governments regulate these noises very strictly. Often, the only way to keep a shrieking wind turbine from disturbing the peace of an idyllic countryside is to operate the machine at less than full power. As a result, notes Nicolas, “Turbine manufacturers don’t like tonality. When customers face these kinds of problems, usually it’s late in the design phase. We have very little time to solve the problem.”

Luckily, Micromega could draw on their work with ESA to solve the problem quickly. In the case of the shrieking wind turbine, the company looked back to its work on Darwin. There, Micromega collaborated on a telescope designed to monitor exoplanets – no easy task, as Nicolas explains: “It’s like being in Paris and trying to see someone lighting a cigarette in New York while he is sitting next to all the harbour lights. "The fact is, if you want to see something very small you need a very, very large telescope."
Because it is not possible to build a giant telescope in space, Darwin came up with a different plan. Several smaller telescopes, flying in alignment, combine their power to create the effect of a much larger instrument. However, for this to work, the mirrors of each small telescope must be in constant alignment.

To move the mirrors, Micromega developed a high-precision mechanism using magnetic bearings. This mechanism would adjust the mirrors under the exacting circumstances of space, which required that the bearings work with high precision, zero friction and at very low temperatures.

Darwin was not selected to make it into space but the space simulations developed by Micromega came in handy as they set about designing an actuator to quieten the wind turbines. “The space project gave us confidence in our simulation tools.” says Nicolas. “We could not transpose the technology directly, but the knowledge we developed in space made us much faster.”

Generating a counter-vibration – with the same size as the vibration producing the tonality, but in the opposite direction – proved to be the answer: “We kill the vibration before it reaches the surface where it becomes sound.” However, the challenge did not end there: “Wind turbines are huge, and they have many parts. It’s like trying to seal a box full of water. If it has one hole, ok. But we have many, many holes, and we need to close them all.”

Within eight weeks, however, Micromega was able to develop a solution from scratch. “The confidence we had in the behaviour of the actuators and the confidence we had in our simulation tools came from developing magnetic bearings for space.” says Nicolas.

Sam Waes from ESA’s Belgian technology transfer broker Velhaert emphasises this as a good example of a space-to-Earth technology transfer: “It’s nice to see how ESA funding was later reused to learn more about research and development on Earth.”

The ESA Technology Transfer Programme network of brokers in 14 European countries supports industry in using technologies developed for space programmes to improve terrestrial applications.

Lucio Scolamiero, an ESA engineer who worked with Micromega on Darwin, agrees: “Micromega has been working on several ESA projects activities involving magnetic-bearing suspension systems, which has put them at the top level of European industry capability for such a complex technology.”

The turbine manufacturer appears to be happy, too. Last year, 24 large turbines retrofitted with Micromega’s technology were sold. This year, the contract is for 100 more.
STFC External Innovations and Global Challenges Funding Opportunities - Closing dates 2015

STFC Global Challenge Exploration Awards
Quarterly cut-off dates for assessment:
24th July 2015, 23rd October 2015 and 22nd January 2016

Knowledge Exchange: IPS, Mini IPS, Follow on Fund & IPS Fellowship
Call 9th September
(opens in JeS 1st August)

CLASP Outline (Security) Call
1st September
(opens on JeS 1st August)

CLASP Full (Security) Call
1st December
(opens in JeS 1st November)
External Innovations and Innovations Club

The External Innovations team manages the activities that aim to realise the impacts and benefits that flow from STFC’s investments in science and technology towards commercialisation through one to one brokering, events and a range of funding schemes.

If you wish to contact the teams for more information please see the following contacts and email addresses.

Innovations club: innovationsclub@stfc.ac.uk
IPS: ipsfunding@stfc.ac.uk
For Tender Opportunities: tenderopportunities@stfc.ac.uk

External Innovations – Global Challenges - International Tender Opportunities

Julie Bellingham Head of Business Opportunities for International Facilities
Tel: +44 (0)1793 442 060 Email: julie.bellingham@stfc.ac.uk

Allanah Bayliss International Business Opportunities Specialist
Tel: +44 (0)1793 442 056 Email: allanah.bayliss@stfc.ac.uk

Vlad Skarda Knowledge Exchange Manager
Tel: +44 (0)1793 442 051 Email: vlad.skarda@stfc.ac.uk

Katharine Hollinshead Global Challenge Programme Manager
Tel: +44 (0)1793 442 068 Email: katharine.hollinshead@stfc.ac.uk

Gayathri Eknath Impact Officer
Tel: +44 (0)1793 442 010 Email: gayathri.eknath@stfc.ac.uk

Administration

Andi Kidd Office Manager
Tel: +44 (0)1793 442 059 Email: andi.kidd@stfc.ac.uk

Tracey McGuire Grants Manager
Tel: +44 (0)1793 442 162 Email: tracey.mcguire@stfc.ac.uk

Julie Gilbert Administrative Officer
Tel: +44 (0)1793 444 532 Email: julie.gilbert@stfc.ac.uk

The Innovations Club newsletter contains a selection of articles drawn from our partner organisations that we think you will find interesting. We welcome your comments innovationsclub@stfc.ac.uk