Transcript

ASTUTE 2020's collaboration with TWI

Time	Audio	Video
00:00:00	ASTUTE 2020 (Advanced Sustainable Manufacturing Technologies) is a multi-university partnership of five Welsh Higher Education Institutions, part-funded by the European Regional Development Fund through the Welsh Government. ASTUTE 2020 is designed to stimulate growth in the manufacturing sector across Wales, by applying advanced engineering technologies to manufacturing challenges, driving cutting-edge research, development and innovation.	Instrumental music in the background. ASTUTE 2020 (Advanced Sustainable Manufacturing Technologies) logo. Drone footage of Swansea University Bay Campus. ASTUTE 2020 Higher Education Institution Partner logos - Aberystwyth University, Cardiff University, Swansea University, University of South Wales and University of Wales Trinity Saint David. European Regional Development Fund logo. Footage of the facilities at University of Wales Trinity Saint David SA1 Campus.

		Swansea University, College of Engineering building leading onto an ASTUTE 2020 Project Officer looking at a computer screen with computational modelling simulations on it. ASTUTE 2020 project officer looking down a microscope and a Kuka industrial robot moving about in sequence.
00:00:31	Hi my name's Ian Cooper, I'm a Technology Fellow at TWI. TWI is a global company, we specialise in welding and joining, non-destructive testing and other allied technologies.	Footage and Introduction of Professor Ian Cooper, Technology Fellow at TWI in front of ASTUTE 2020 banner and TWI banner. ASTUTE 2020 case studies, brochures and 3D printed items on the desk. External footage of the TWI building with TWI logo.
00:00:43	Our Engineering Research Materials Institute put together a project known as "IntACom". The idea was to solve some of the bottlenecks that occurred during manufacturing that are a result of the NDT process by developing an automated NDT system that would	Footage of two six-axis Kuka robots at the TWI manufacturing facility and a shot of the TWI logo. Footage of Prof. Ian Cooper explaining the support that was required.

	enable faster inspection of composite and other complex geometry curved parts.	
00:01:04	The heart of the system are two six-axis robots and at the end of each robot is a phased array system that uses ultrasound to inspect the part. The challenge here is that in order to get the ultrasound from the transducer into the component we need to use a jet of water and the challenge of producing a cohesive laminar flow of water that enables effective transmission of the ultrasound was proving too difficult for us, we simply did not have the skills in-house. We found that through the ASTUTE program we were able to access these levels of expertise and they were able to do modelling for us in order to improve the water flow through the nozzles.	Footage of the large two six-axis robots moving along a track behind a glass barrier. Footage of Prof. Ian Cooper describing TWI's manufacturing challenge. Footage of the water jet in the Phased Array Ultrasonic system. Water is used as a couplant to transmit the ultrasonic wave from in-built ultrasonic transducer onto the surface of the part. Footage of the automated robotic inspection system for complex composite structure. A Project Officer looking at computational fluid dynamics simulations on a computer screen.

00:01:42	The support that we got from Swansea University in the modeling aspects, in the CFD aspects of the work and the simulations were invaluable. And UWTSD have been partnering TWI for the last 15 years and their support again was invaluable and gave us the confidence then to do the 3D printing and produce the optimised nozzles.	Footage of Prof. Ian Cooper describing the support received from Swansea University and University of Wales Trinity Saint David (UWTSD) including the expertise. CFD simulations of the trajectory of the water jet from the nozzle.
00:02:06	I was thrilled that this collaboration showed the power of two Universities working together sharing their complementary expertise. The partnership between Nathan Hartley from TWI, Dr Fawzi Belblidia from Swansea University who brought his expertise in computational fluid dynamics. Professor Peter Charlton brought his expertise from UWTSD in non-destructive test and evaluation.	Footage and Introduction of Professor Kelvin Donne, ASTUTE 2020 UWTSD Principal Investigator sitting in front of two ASTUTE banners describing the expertise that each of the project partners had to offer for this industrial collaboration. TWI staff member conducting small scale Phased Array Ultrasonic Testing experiment with another probe prototype. The goal of the experiment is to reduce the noise generated by the water jet. TWI staff member evaluating the results obtained from the experiments.

00:02:36	There have been several benefits and key to all of this has been really the working relationship that has been developed between TWI and two of Wales' top universities. The advances that we have been able to make in the nozzle design has removed significant barriers to the advancement of the "IntACom" program and consequently we have been able to generate two high quality jobs directly as a result of this intervention.	Footage of Prof. Ian Cooper describing the benefits as a result of this collaboration. Footage of the equipment used to conduct the experiment Two TWI staff members programming one of the robots using a handheld remote.
00:02:59	It's fantastic to see that our Advanced Division Materials Research Institute has been able to collaborate with A2020 to deliver such a fantastic project and merge together two amazing EU funded projects.	A close up shot of the robot moving back to its original position. Footage of Prof. Ian Cooper mentioning the collaboration between the Advanced Engineering Materials Research Institute (AEMRI) and ASTUTE 2020.
00:03:16	And it really does demonstrate I think where industry can benefit from two Universities working in partnership	Footage of Prof Kelvin Donne describing the partnership.

	where the whole is greater than the sum of the parts.	A panning shot of TWI's robots and the tracks.
00.03.29	Instrumental music	ASTUTE 2020 partner logos – Aberystwyth University, Cardiff University, Swansea University, University of South Wales and University of Wales Trinity Saint David. ASTUTE 2020 and the European Regional Development Fund Logo. ASTUTE 2020 website link.