

SBRI Information required for TSB

Competition Name/Year	SBRI Assistive Technology Competitions / 2013 / Phase 1	
	Ready steady STEM: increasing the accessibility of science, technology, engineering and maths subjects.	
Company name that won	Project title	Contract value
Alta Innovations Ltd	Accessible Chemical Diagrams	£18,408 (inc VAT)
Project Description (provided by Applicants on application form)		
<p>Chemical diagrams, in particular molecule depictions are a prevalent means of conveying information in chemistry and biosciences. However, they are commonly given in standard image formats leaving them inaccessible.</p> <p>Our technology will allow the generation of fully accessible chemical diagrams and their inclusion into electronic documents without the need for content providers to alter their authoring processes nor for readers to use specialist software to access information given in diagrams.</p> <p>Instead we provide fully automated software that will recognise molecule images and transform them into scalable vector graphics that will provide readers with the following accessibility features:</p> <ol style="list-style-type: none"> 1. Scaling and magnification of images. 2. Support for screen readers via auditory descriptions embedded into the diagrams. 3. Highlighting of components as visual indication of current reading position. 4. Interaction with diagrams to step-wise and recursively explore single components to allowing readers to engage with the content at their own pace. <p>Our software can be integrated into electronic documents via standard JavaScript ensuring compatibility with HTML5 and ePub3 standards. It can be used both as client software for permanent image transformation in electronic documents or as an online service for the transformation of images on the fly, thus making it possible to have fully accessible diagrams in any browser or ePub3 reader for online or offline reading.</p>		

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ECS Partners Ltd	STEMReader	£44,356.00 (inc VAT)
Project Description (provided by Applicants on application form)		
<p>STEMReader: hearing maths through technology.</p> <p>We understand mathematical ideas by making connections between language, symbols, pictures and real-life situations¹. Individuals who face barriers with reading, comprehending and/or seeing these connections, such as those with print disabilities, dyscalculia and learning difficulties always struggle with STEM subjects and professions. Hearing and seeing symbols together can help make those links. These connections are important whether learning numbers 1 to 10, dealing with calculations in the workplace or understanding maths at university. For up to 10 million individuals in the UK affected by print disabilities or dyscalculia, having a tool to read aloud mathematical language and symbols at an appropriate level could ameliorate many difficulties they experience when manipulating mathematical concepts. The lack of accessibility in mathematical notation is impacting the progress of students working at basic functional skills levels through to degree as well as in the workplace at all levels from apprentice through to professionals such as scientists and engineers.</p> <p>Development of accessibility tools for maths has concentrated on users with advanced mathematical skills (and language) and on website technology. This has not addressed the need of individuals who are striving to develop and use functional maths skills. It has not addressed the needs of the wider learning and working community. STEMReader aims to deliver a significant step forward in reading aloud maths for those working from functional to advanced levels. For the first time it will enable a broader range of publishers than educators to easily share accessible STEM materials that can be read and understood by all types of user and will be aid individuals who want to have maths notation read aloud while they read and as importantly write documents.</p>		

¹ Haylock, D. (2003). *Understanding mathematics in the lower primary years: A guide for teachers of children 3-8*. SAGE.

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Sheffield Hallam University Enterprises Ltd.	EQUS (Enhancing the Quality and Usability of Spreadsheets)	£50,665.44 (inc VAT)	
Project Description (provided by Applicants on application form)			
<p>There are an estimated 3 million people in the UK who are dyscalculiac and with 5% of school and higher education learners challenged by it. This group faces significant challenges when looking towards developing their education in numerate disciplines such as science, technology, engineering and maths (STEM). There are few approaches to addressing this apparent barrier. One tool common to establishing confidence and educational progress in STEM subjects is the spreadsheet. Widely used in work and education, at school level and in higher education the spreadsheet is a core generic tool to understanding in numerate subjects.</p> <p>To help address the difficulties that dyslexics and dyscalculics face in STEM subjects our innovation will aid the understanding of spreadsheets. Despite their popularity spreadsheets are surprisingly error prone. Users need to carefully study formulas on a computational level despite their representation in a textual form. The presentation of conditional behaviours within a single line illustrates this: =IF(B4<400,B4*7%,IF(B4<750,B4*10%,IF(B4<1000,B4*12.5%,B4*16%)))</p> <p>Our innovation aims to make the relationship between spreadsheet functionality and its visual display easier to understand than the default textual form. This will operate as an Microsoft Excel plug-in that automatically constructs more fit for purpose re-presentations of the formulae and processes being used.</p> <p>For dyslexics, and many others faced with having to learn with, spreadsheets, this will reduce barriers to understanding and develop more confident learners willing to face the STEM disciplines.</p> <p>Relevant literature sample</p> <ul style="list-style-type: none"> □ Saariluoma, P. & Sajaniemi, J. (1991). Extracting implicit tree structures in spreadsheet calculation. <i>Ergonomics</i>. □ Hendry, D., & Green, T. (1993). CogMap: a visual description language for spreadsheets. <i>Journal of Visual Languages & Computing</i>. □ Chambers, C., & Scaffidi, C. (2010). Struggling to excel: A field study of challenges faced by spreadsheet users. In <i>VL/HCC, 2010 IEEE Symposium</i>. 			

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Company name that won	Project title	Contract value
Plextek Limited	OSLO - Opening STEM Learning to Everyone	£41,005.00 (Inc VAT)
Project Description (provided by Applicants on application form)		
<p>A project to create an open source, modular accessibility suite that allows non-traditional user input methods and user set document styles. The initial aim of the project is to open science, technology, engineering and maths (STEM) learning to those who would typically struggle to use a computer; either because of visual impairments, learning difficulties or difficulties with using a keyboard and mouse.</p> <p>Plextek is putting the presentation of information back in the hands of the user. Typically websites do not have built in options to change their style, and when such options are provided it is normally limited to changing the background colour.. OSLO converts HTML documents and forms, including any embedded MathML code, into formatted document based on the user's style preferences, giving the user a consistent and unencumbered experience. For example, a user with dyslexia will be able to make every document conform to the British Dyslexia Association style guide.</p> <p>Leap Motion has been selected as the first device to be supported by OSLO. However, the software will be easily expanded to incorporate other non-traditional methods, such that any individual or company may write a module to add a new method. Plextek is seeking to challenge the keyboard and mouse monopoly, even for able-bodied users.</p> <p>To give even greater flexibility Plextek will be bringing OSLO to Android tablets.</p>		

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	Good to go: Increasing independence in unfamiliar environments or in accessing information.	
Company name that won	Project title	Contract value
Coventry University Enterprises Ltd	Work Buddy	£32,240.00 (inc VAT)
Project Description (provided by Applicants on application form)		
<p>Work Buddy is a joint venture between Coventry University's Serious Games Institute (Lead design), Hereward College (User requirements and evaluation) and Serious Games International (Technical development and commercialisation). It is a Cloud based application that allows workers to develop and adapt personal learning profiles based on their own requirements and their responsibilities to their employer. Once created, the profiles support workers during their daily work activities, giving them greater independence and reducing the support workload of their supervisors.</p> <p>Fundamental to its approach is the ability to break work activities down into the level of detail required for each user; to quickly illustrate and annotate each task; and to structure and restructure tasks over micro and macro timescales, providing a bespoke instructional diary for the workplace.</p> <p>Work Buddy is delivered in the form of an App that can be accessed either using a mobile device, or directly through a PC web browser. The design of the App focuses on simplicity of use and accessibility, whilst allowing users to create and view audio visual content and to quickly organise and adapt this into structures that match their (changing) work requirements.</p> <p>Work Buddy will be designed in consultation with students preparing for work or work based placements from Hereward College. The experience and requirements of the students will inform the development of an intuitive user interface that employs suitable input / output devices, and a user centred approach to the functionality and usability of the technology. Part of the feasibility study will involve assessing the suitability of voice control for the App, and the students will help in evaluating this. In a working population that includes disabled, elderly and migrants, there is no 'one size fits all' solution to continual and varied training requirements. Work Buddy engages workers in shaping their own personal learning resources.</p>		

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Company name that won	Project title	Contract value
Fundosa Technosite S.A.	VirtuAssist	£71,026.20 (excl VAT)
Project Description (provided by Applicants on application form)		
<p>Virtual Assistance for Independent Performance in a Changing Working Environment (VirtuAssist) People with learning difficulties and/or those with memory problems face barriers in the working environment due to the necessity of additional supervision, reminders, or real time technical instructions and information, especially in changeable tasks (very common in today's enterprise necessities), and with challenging or unfamiliar equipment.</p> <p>VirtuAssist provides guidance to operate working equipment, so end-users can work with minimal supervision in these challenging environments. By means of cutting-edge technologies (computer vision, pointing gesture recognition, machine learning and task modelling) and through popular wearable devices (smart-glasses), VirtuAssist provides personalised information and interaction according to the end-user needs and preferences in a fun and effective way.</p> <p>Through the smart-glass camera, the system recognises the equipment in front of the user (e.g. a printer). Then, through the smart-glass, VirtuAssist provides descriptions of the equipment, information of the function of each element (e.g. a button) in a sequential way or of the element that the end-user is pointing. Moreover, a set of pre-recorded tasks are available to guide the end-user, step by step, in each action on the equipment elements required to carry out a specific task in an optimal way. From the enterprise perspective, VirtuAssist reduces the additional supervision and support required by some people with learning difficulties and/or those with memory problems, which make them more cost efficient, thus increasing the enterprise's willingness to hire them.</p> <p>VirtuAssist improves the independence of the end-users, enhancing their competence and confidence, and consequently their life and career opportunities. Moreover, instead of the sense of stigma felt by some disabled people when wearing other Assistive Technologies (ATs) or requiring frequent support, it provides a sensation of being stylish.</p>		

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Company name that won	Project title	Contract value
NSF Trading Ltd	FlyCatcher	£54,750.00 (inc VAT)
Project Description (provided by Applicants on application form)		
<p>Have you approached a piece of equipment and wanted to know how it works or be clear about the safety instructions? Because you have a disability you may not be able to see or physically access the manual, if it's even there, or have time to process the instructions so find yourself having to ask someone to help you! You arrive at work on your first day, it is an unfamiliar environment and with so much to learn - How does the copier work? Who works in that office? What is the fire safety procedure? What if your mobile or tablet automatically presented the information to you without you having to ask for it?</p> <p>For someone with a physical or sensory disability access to information in unfamiliar environments using FlyCatcher, could become very easy. FlyCatcher is a downloadable application for smartphones and tablets that is able to 'catch information on the move (or on the fly!)' by using pre-programmed information read from triggers positioned in an environment and sending information directly to you when you come within range.</p> <p>The application presents information as sound, text or images according to user preferences. For example, a user approaches a piece of unfamiliar equipment in a workplace or enters an unfamiliar environment – as they come within 50cm to an object trigger the application picks up a signal and sends the information about that object to the device, either pre stored on the device or pulled from the web.</p> <p>This may be a sound file speaking to the user the safety instructions, or a video file with short video of how to use the equipment or a simplified text file with key information. All you do is say whether you want the information.</p> <p>FlyCatcher - Information that comes to you when you need it.</p>		

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Edinburgh Research & Innovation Ltd	Spatial Memories Framework	£80,114.40 (incl. VAT)
Project Description (provided by Applicants on application form)		
<p>Spatial Memories Framework:</p> <p>The goal is of <i>Spatial Memories</i> is to make learners with disabilities more independent as they do not have to rely on others to make reminders, hints and checklists on their behalf. The basic concept is a smartphone / tablet App Authoring framework, using bespoke maps and interfaces. Individual learners will be able to record oral instructions and make audio notes, capture written instructions and diagrams, and associate these with locations and activities (e.g. leaving or entering a building) using an App tailored with their preferences.</p> <p>This web-based authoring tool will allow learning and work placement providers with minimal technical knowledge to adapt and customize the App to meet the needs of individual learners. This should improve the learner's confidence in working unsupervised in different environments. The app interface design themes (layout, colour schemes) and interaction mechanisms (touch vs. voice) and map content (de-cluttering symbols and colours) can all be changed to meet the needs of an individual.</p> <p>We envisage <i>Spatial Memories</i> will support learners in a variety of learning environments: classrooms and libraries but also across campuses and workplaces, including parks, woodlands and gardens We also expect benefits for peripatetic workers where it is necessary to visit and perform tasks at a number of geographically distributed sites, e.g. schools, nursing homes etc. The project schedule focuses on iterative clusters of work with a group of learners in situ, and we will have developers on hand to make changes on the day and to re-test and re-work the learners' ideas. Our plan is to adopt a user-centred design approach given the focus for <i>Spatial Memories</i> is to assist learners to create their own set of reminders or hints using an App customized for them.</p>		