

# **ENSURING THE FUTURE WORK FORCE – A ROYAL AIR FORCE PERSPECTIVE**

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## **ABSTRACT**

The paper is an exploration of a strategic response to the under-representation of females in technical occupations, including flying, within a military environment through working in partnership.

The Royal Air Force (RAF) is a public sector organization operating at the leading edge of technology with a 41,000 strong workforce deployed at locations pan-UK and overseas. Around 50% of its personnel are technically employed and 40% of annual vacancies are for the technically competent. Currently 13.5% of the workforce is female. Historically, the RAF has recruited mainly males between the ages of 16 and 24 years. Demographic change has seen this cadre decrease in numbers; at the same time technical skills are also declining. Currently 8% of RAF Engineer Officers and circa 5% of technicians are female (DASA, 2011). The business case to improve technical recruitment from the largest of the under-represented cadres, i.e, females, is clear. In late 2007 the RAF developed a 5 year Gender Recruitment Strategy designed to improve the number of females recruited into technical vacancies by raising Science, Technology, Engineering and Mathematics (STEM) awareness within the target audiences and their influencers, and by challenging existing gender stereotyping. The programme focuses on the need for initial engagement with girls no later than age 13 followed by regular but sustainable contact to deepen their interest in STEM careers in the RAF (EOC, 2001; Murphy and Whitelegg, 2006). Specifically, the RAF has developed innovative engineering and logistics hands-on work experience courses for girls and also a primary and early secondary schools engineering road show and work shops in conjunction with its external partner, BAE Systems. The strategy makes extensive use also of successful role models. The programme has now been extended to include specific ethnic groups.

This paper explores the rationale for development of the strategy and how senior management buy-in was achieved. It outlines how the culture of the organization has been acknowledged when planning achievable interventions to create a critical mass of young people from diverse backgrounds into technical trades and professions within the Service. The success achieved through working with corporate partners is acknowledged and plans to embed good practice into other areas of the organization are discussed.

Keywords: (*STEM, work experience, equality and diversity, gender equality, organisational culture* )

## **INTRODUCTION**

The shortage of young people choosing STEM subjects and careers is well documented (CBI 2010) and the implications for organisations such as the RAF and others in the defence industry are well understood. STEM related sectors such as engineering and manufacturing struggle to recruit technically able (and trainable) young people (Engineering UK, 2011) and the added eligibility criteria such as medical and physical fitness and the lifestyle' implications of a career in the Armed Forces complicate the recruitment effort for the RAF by further reducing the candidate pool.

The longstanding issue of the lack of women and girls choosing STEM subjects and careers has already impacted on organisations actively seeking to increase recruitment to technical trades and professions. Employers such as the RAF have therefore undertaken additional activities to encourage more females to apply for STEM related careers and more specifically, engineering which has traditionally attracted more male applicants (Engineering UK, 2011) and which has been a skills shortage area for many years. Efforts to appeal to the 51% of the population which is female (Home Office, 2011) who are currently under-represented in technical trades and professions seemed a logical step for the RAF to take.

The specific activities covered by this paper are the development and delivery by the RAF of innovative engineering, hands-on work experience courses for girls, and the development of school educational road shows and workshops in partnership with external organisations.

## BACKGROUND

In recent years there have been a number of initiatives and programmes of activity which have focused on encouraging females and those from Black and Minority Ethnic (BAME) communities to consider STEM subjects and careers. WISE (Women in Science, Engineering and Construction) was established as the 'WISE Campaign' in 1984 and was the result of a collaboration between Baroness Platt (then Lady Platt) and the Engineering Council "*in response to the extremely low representation of women in science and engineering careers*" (UKRC, 2009). Since that time WISE has provided schools, colleges, employers, careers advisers and other organisations support in promoting STEM to science, engineering and (latterly) construction.

The JIVE Project, was a large UK and trans-national partnership funded by the European Social Fund between 2004 and 2007, that created and tested a wide range of innovative products and resources designed to increase the number of girls and women choosing and progressing in STEM and built environment subjects and careers (JIVE, 2007). The interventions tested during the JIVE Project included: development of the Wider Horizons work experience programme (Brodie and Collins, 2006), mentoring, effective use of role models and offering taster days for women and girls in male-dominated trades and professions (for example, engineering and construction). The outcomes from the JIVE Project provided a useful backdrop for future activities to encourage more females into STEM. Alongside this, the publication of the SET FAIR report (Greenfield et al, 2002, p72)) and the government response the following year led to the creation of a national centre to "*provide an infrastructure for women in SET...It will be aimed at raising the profile and the numbers of women in SET at all levels, and at ensuring sustainability of projects, by working with all stakeholders*". The UKRC (UK Resource Centre for Women in SET) was established in 2004 in Bradford with Sheffield Hallam University as one of its core partners.

A key issue in the development of gender equality programmes to promote SET was the lack of female role models. If young women do not *see* females working in male dominated areas then it can be difficult for them to imagine themselves in a similar situation. The UKRC recognised this and created the GetSET database of women who were prepared to act as role models, in person, on publicity materials or in other ways. Clearly, girls and women are not a homogenous group and care needs to be taken not to assume that simply because a speaker, case study or mentor is female, this will act as a panacea and generate interest in SET from all girls and women (Morton, 2011).

In addition to the programmes explicitly designed to encourage more females in STEM, there has been huge investment in STEM education by government aimed at bridging the skills gap in this significant sector of the UK economy. The STEM Action programme presented (DfES/DTI, 2006) a range of education based interventions designed to improve the delivery of STEM initiatives and address the declining numbers entering STEM subjects and careers post 16, to be led by different organisations in partnership with government. Target areas included the improvement of teaching and the curriculum, bringing real world contexts to young people through STEM enrichment activities and improving careers awareness (CSE, 2011). Equality and diversity was not directly addressed within the STEM Action programme. A key message of the campaign was that a decision to study STEM subjects leads to a very wide range of interesting and well-paid jobs, both inside and outside the STEM arena (DfE 2011). Sheffield Hallam University who led the careers programme decided that equality and diversity should be a key element of the STEM Subject Choice and Careers Project, woven into the different strands of delivery as well as explicitly being covered in the STEM Equality and Diversity Toolkit ([www.stem-e-and-d-toolkit.co.uk](http://www.stem-e-and-d-toolkit.co.uk)). The project ran from 2008-2011 and resources are still available through the National STEM Centre ([www.nationalstemcentre.org.uk](http://www.nationalstemcentre.org.uk)).

During the same period, the London Engineering Project (LEP) was developed as part of the Higher Education Funding Council for England (HEFCE) approach to tackle STEM subjects that were 'at risk' in Higher Education. The LEP was "*led by the Royal Academy of Engineering to encourage girls, students with no family history of higher education, adult learners and black and minority ethnic (BME) students into higher education after school, and in particular to consider engineering as a career*" (London Engineering Project, 2009). The project did this through embedding equality and diversity in much of its publicity and activities, including working alongside the UKRC who provided gender inclusion training and the expertise of a UKRC field worker.

Sheffield Hallam University and the Women in SET (WiSET) team at the Centre for Science Education (CSE) led on the development of the award winning Wider Horizons work experience programme under the JIVE Project. The team was also responsible for the equality and diversity and work experience strands of the STEM Subject Choice and Careers Project (DfE, 2010; DfE, 2011i). The WiSET team has worked with some key organisations promoting STEM to under-represented groups, including the Royal Academy of Engineering, the Women's Engineering Society and Engineering UK, it therefore made sense for WiSET to work with WISE, the RAF and

the UKRC in the creation of a range of activities to support the recruitment and retention of women in technical trades and professions.

## **RAF STRATEGY DEVELOPMENT**

The RAF is a public sector organisation, 41,000 strong at the time of writing and operating at the leading edge of technology. The work force is deployed at locations pan UK and overseas. Over 50% of the current manpower is technically employed and around 40% of all annual vacancies are for the technically competent. The organisation has a strong brand identity which has focused historically on the male cadre of the candidate pool. Currently 13.5% of the workforce is female (DASA, 2011) However, the majority of women are employed in traditional roles for women (Woodward and Winter, 2004). Only 8% of graduate engineers, less than 5% of technicians and 3% of pilots are female. Although the RAF has the highest percentage of females of all 3 Armed Services, these percentages when combined with increased shortages of the technically skilled are potentially doubly injurious to an organization so heavily reliant on technology. Of course, the RAF is not alone in this dilemma and many employers in the Science, Engineering and Technology sector are already deploying significant resources in order to attract, recruit and retain more females. Relentless and continuing fiscal constraint together with the unique employment proposition that is military service complicates an already significant challenge. These factors meant that committed high-level support and a general buy-in within the organization were essential prerequisites to change.

A study entitled 'Gender Representation- the Next Recruitment Challenge' (Dean, Guy and Cullen, 2007) was written by an in-house team and presented to the RAF Personnel Board in 2007. The study articulated that the RAF's life blood is a steady flow of the most talented young people the country has to offer and that it must seek to remain an employer of choice in order to continue to attract the best. This is particularly relevant in the context of technical skills and qualifications where the year on year requirement to recruit remains significant. It makes clear business sense that the broader the culture of the organisation the better its chance of recruiting success. Whilst striving to maintain a culture that recognizes and values the differences between individuals and providing an organizational framework that encourages initiative and rewards diligence, there is recognition that amongst women and some minority ethnic communities the RAF's commitment to achieving a truly diverse work force is not yet well understood. As the traditional recruitment pool of predominantly white males aged between 16 -24 years reduces and the role of women in the

employment marketplace expands, fierce competition for the technically competent is also anticipated as the UK comes out of recession. The RAF has recognised the need to find affordable ways of engaging both women and BAME communities at the same time as promoting actively the importance of studying maths and science in order to expand the technically skilled candidate pool of the future.

The study concluded that although headline numbers of females entering the Service were improving, there was growing evidence of gendered occupational segregation and recommended the development of a 5 year strategy with the primary objective of improving female recruitment into those under represented occupations. Specifically, the study recognised the implications of gender stereotyping in schools and its consequent examination subject choices, and from the reinforcement of such stereotyping in the home and in school (Francis et al, 2005), all leading to the notion of 'Jobs for the Boys' and 'Jobs for the Girls'. It was noted that challenging this widespread stereotyping would require early engagement and the delivery of consistent key messages about females and their career options. Any programmes should therefore deliver initial engagement with girls by no later than age 13 followed by regular but sustainable contact to deepen their interest in STEM careers within the organisation (EOC, 2001; Murphy and Whitelegg, 2006). This meant that success could not be judged by the traditional method of measuring recruitment achievement against annual targets numbers alone and other effects would need to be identified in order to evidence value for money.

The Board accepted the study recommendations and directed the development of a detailed and costed action plan. The Plan was endorsed subsequently and a modest uplift in funding approved. Limited manpower and financial resources have continued to underscore the 'value for money' imperative and drive the need to maximise the impact of all activities beyond the female target audience to include where possible other under-represented cadres, parents, teachers and other influencers, and also to maintain engagement with and support from the internal audience. The combination of ongoing fiscal constraint and an initial lack of in-house experience generated from the outset the need to look for partnerships with external organizations in order to deliver a cost-effective, innovative series of measures designed to encourage females into non-traditional (mostly technical) occupations.

## **COLLABORATION/PARTNERSHIP**

The RAF was clear about its desire to work with experts in the field of gender diversity within STEM and, following initial discussions with STEMNET, contacted two of the best known national organisations, WISE and the UKRC. At that time (2008) WISE focused on encouraging girls and younger women to progress into STEM Careers whilst the UKRC worked predominantly with women over 18 and helped organisations make the culture change needed to recruit and retain females.

The model of bringing about change within organisations through an internal champion or 'driver for change' has been tried and tested successfully within the JIVE project and with UKRC (2007). Other organisations such as Leicester City Council (LCC) have achieved success over time in efforts alongside the UKRC (and formerly JIVE) as well as WISE in order to redress the gender imbalance in construction trades. One individual driver for change within LCC has been largely responsible for recruiting and maintaining an above average percentage of women in construction trade apprenticeships.. The staff at LCC also publicise the programme of interventions so that stakeholders and their supply chain are also clear about the Council's commitment to equality and diversity. Lessons have also been learned from gender equality interventions of other large organisations such as British Gas and BT Openreach. Previous experiences have been used by both the UKRC and WISE in developing support for the Royal Navy (RN) and the RAF.

In 2007-2008, WISE had developed a work taster project (Navy-WISE) with the RN aimed at encouraging 14-19 year old girls to consider STEM Careers in the armed forces ([http://www.wisecampaign.org.uk/parents\\_and\\_teachers/work\\_experience.cfm](http://www.wisecampaign.org.uk/parents_and_teachers/work_experience.cfm)). Together with the UKRC and WiSET, WISE created a programme which supported the instructors and other personnel involved to provide an inspiring suite of activities for the girls to engage in. A 'work experience week' with hands-on activities and exposure to female role models was established. In the early stages it was decided that RN staff who would come into contact with the schoolgirls should participate in the UKRC gender equality training so that they were aware of the barriers which often serve to deter young women who might be interested in STEM Careers and to suggest ways that these obstacles can be overcome (London Engineering Project, 2009). Lessons learned from the RN experience provided a useful platform from which to develop the RAF programme.

## **First Case Study: Engineering Work Experience**

Osgood et al (2006, p307) opined “*work experience placements have a potentially important role in providing pupils with broader, diverse and/or non-traditional experiences and ideas about the adult workplace*”. Gender stereotyping in STEM work experience, in apprenticeships and most recently in the Diploma (OFSTED, 2011) has done little to redress the issue. The comparative rarity of quality STEM work experience (Morton and Collins, 2010) opportunities seemed to offer an affordable and achievable starting point for the RAF given the existing expertise in WISE and the UKRC in this field and the availability of appropriate engineering environments. The prime objective of the RAF engineering work experience model is to provide a unique, exciting and relevant experience which will engage Year 10 girls interested in technical careers. The week-long residential programme has enabled participants to engage with both theory and hands on engineering and technical activities and to participate in teamwork and leadership exercises. The inaugural course was developed in conjunction with WISE and was delivered at the Defence College of Aeronautical Engineering at Cosford in 2009 to 24 Yr 10 girls. The programme content was developed in an innovative and progressive manner and is an inventive mix of team building, leadership and engineering hands-on experience and strategically planned pastoral care set in the challenging military context where students live alongside their work colleagues and are obliged to wear uniforms and participate in physical education and other disciplines essential to the military way of life. The week’s activities aim to build skills and develop personal qualities and confidence and culminate in the delivery of 10-minute, team presentations in which students share their experiences of the week with an invited audience of parents, teachers and RAF instructors and mentors. The girls are chaperoned throughout the week by female role models who are able to share experiences and answer questions as required. The first course was underpinned by some bespoke gender awareness training delivered by the UKRC and the development in partnership with WiSET of a work book for use during the week and as future portfolio evidence for participants. Students are encouraged to offer continuous feedback and participating schools to allow the returning girls to present to their peers. In this way a multi-faceted viral effect is generated among all target groups. Much has rested on early success, not least to ensure continuing high level support but also to underpin the case for ongoing funding against the backdrop of global recession, and to maintain enthusiasm in the schools.

The courses are delivered and supervised by RAF instructors and female role models and provide an opportunity for the students to engage directly with technicians and representatives from a wide range of technical disciplines in the Service.

## **Model Development**

In the early stages of the work experience programme development it was decided to learn as much as possible from the lessons learned from the Navy-WISE project which had taken place previously. Working alongside the WiSET and UKRC staff and drawing on the outcomes from the JIVE Project, the response to the RAF decision to create a 'work experience week' for 24 girls was to look at (a) the environment the participants would be in; (b) the activities which could be adapted to ensure that they were as hands-on as possible, within the limits of health and safety; (c) whether gender equality training should be delivered to instructional staff (d) if a bespoke workbook could be created to support the learning of the young women on the programme; (e) how to ensure that there were adequate numbers of positive female role models (in STEM roles) present during the week and (f) what type of feedback would be most useful so that RAF (as well as WISE, WiSET and UKRC staff) could assess the programme's success and revise it if necessary.

In order to support the RAF team's success in achieving management buy-in to the development of a work experience week, it was agreed that one of the UKRC's Gender Equality training days would be offered to senior managers at RAF Cranwell in November 2008. The training helped delegates to identify some of the barriers which can present themselves to young women who are interested in STEM courses and careers and gave participants an opportunity to suggest ways in which the RAF could address some of these issues. The feedback from the day indicated that delegates found the input useful and had generated ideas about how the RAF could promote STEM subjects and careers to the female talent pool. It was agreed that training would be delivered to the training instructors at RAF Cosford so that they would be aware of the ways they could support the young women who would be attending their workshops the following year.

During the early part of 2009 there were several 'walk-through' visits at RAF Cosford and meetings where the activities which the girls would undertake were discussed. It was agreed that the practical tasks the young women would undertake would include removing the flaps from a jet provost aircraft and conducting some basic electronics diagnostics. Time was also allocated for team-building/icebreaker activities and a visit to an operational RAF base.

From the outset, the intention was to give the girls on work experience as much exposure as possible to positive female role models. A female engineer officer acted as the focal point at RAF Cosford, putting many of the practical arrangements into place as well as making herself available

as a role model during the work experience week. Alongside this the RAF Cranwell team were present (including 2 senior females) and a group of women from the recruitment arm of the RAF added their expertise and support.

A key feature of the programme was the presentation morning on the final day. This provided an opportunity for the girls to work in teams and give a power point presentation about their experience, highlighting the most enjoyable elements as well as identifying the main challenges. Parents, teachers, RAF Cosford staff and other interested individuals (eg the local STEMNET team) were also invited to give the girls an opportunity to share their stories with others. This provided a valuable feedback loop about the week as well as a chance for those present to learn more about what the week involved.

### **Programme Evaluation**

Ambitiously, the course was independently evaluated at the outset so as to identify without unnecessary delay any weakness as well as highlight strengths.

The evaluator recorded

*“The RAF Engineering week was overwhelmingly successful in meeting its objectives, both strategically and operationally, in employing successful approaches to engaging girls in exploring engineering as a potential career. The project has been an effective implementation of strategies WISE identified in its action research, proving the RAF’s outstanding capacity to further expand its vision to engage girls.”* (Russo, 2009)

The detailed focus on two engineering activities rather than brief encounters with several ensured that participants were challenged significantly. The greater degree of learning had notable and positive impact on confidence levels and aspirations. Activities with such high levels of challenge also helped the students to visualise themselves in the various roles presented. There was strong correlation between context and highlighted activities and the structure of the week overall was planned to build context that culminated in a visit to an operational flying station where the RAF could be seen in action for real. The pastoral aspects of the week were also approached with similar strategic intent and contributed enormously to the success of the week. Team cohesion was maintained out of hours with the introduction of high quality personal development and team building activities and also the need to build a presentation. Female staff remained on hand throughout the evenings and also overnight.

The programme has proved a big success both for the girls and in generating organizational buy in and is heavily showcased in the WISE 25<sup>th</sup> Anniversary film. The course was run again in 2010 and in July 2011 only this time the British Science Association CREST Award Scheme was added to the programme. All 24 attendees were successful in gaining the Bronze award in 2010 and the Silver award in 2011, based on an investigate, design, build and test project woven through the week and requiring each team of 4 girls to produce a model glider with a 2 metre wingspan.

### **Wider Application**

It was quickly recognized that the model, based as it was on best practice, had the potential for wider application in the RAF. In July 2010 it was used for an engineering/flying work experience week for Generating Genius (Sewell, 2011), an out-of-school programme for black and minority ethnic boys that aims to develop talent in groups traditionally under-represented in higher education, particularly in science subjects. The programme was successfully repeated in July 2011. In October 2010 it was also used to deliver a logistics course at RAF Halton, near Aylesbury, at the end of which all 21 attendees gained silver CREST Awards. The Logistics Course will run again in October 2011 and the RAF is currently assisting with the planning of mechanical engineering and avionics engineering work experience courses for the Air Cadet Organisation. The majority of these additional programmes contain sufficient evidence also to earn participating students CREST awards. Future plans include the development of a joint model with external partner BAE Systems and a programme for female Generating Genius students.

### **The Workbook**

To underpin the work experience programme and to ensure best practice the RAF has worked in partnership with WISE, UKRC and WiSET to produce a range of workbooks. Drawing on the Wider Horizons (Brodie and Collins, 2006) work experience booklet as a template, a new and different workbook was developed for the girls to use to record their thoughts and store information about the week. An innovative approach was taken and it developed into a 'diary' aimed at encouraging the participants to keep a reflective account of their own experience as well as providing some useful information about STEM/RAF careers and how to enter them. The first version of the workbook was quite different to the usual style distributed by schools and work experience organisers (NHS Yorkshire and Humber, 2004) and was deliberately designed to encourage the girls to think about what a career in the RAF/STEM areas would mean for them,

where they would probably be in a male-dominated field. There were two distinct sections. The first was fairly informal and encouraged the girls to record their thoughts and feelings about the week; while the second contained information designed to help the young women in their career planning with a CV section and details about where to find labour market information.

The organisations involved took slightly different approaches to the development of the workbook. WISE's role was to create a product which appealed to young women, both in style of language and in the overall design. WiSET input focussed on the career learning aspects of the workbook, ensuring that it was sequential and fitted with other activities which students may have been undertaking at school (such as creating a CV) and underpinning the associated career related learning (Barnes et al, 2011). The RAF had overall editorial control and embarked upon this different approach during the first year or so with gradual amendments which suited the culture of the organisation. The UKRC's role was to support the work by giving their partner (WiSET at Sheffield Hallam) the authority to develop the product in line with the UKRC ethos of supporting women and organisations.

APPENDIX 1 shows how the workbook was divided and the purpose of each section:

Throughout the booklet there are examples of how the information students collate might be used, for example, in career planning, CV preparation, or as part of the final presentation. The purpose of the workbook is explained and students are informed of how they might make best use of it. One of the main aims of the booklet is to provide the young people participating with an opportunity to consider the experiences they have, the people they meet and the challenges they overcome, and to relate this information to themselves, to think about the context and content of the week and to consider what it means for them. If an outcome of that is that the individuals decide to explore opportunities in engineering and careers in the RAF then that is a positive.

The booklet is designed in a sequential fashion, with fairly informal language in the introductory section, aimed at welcoming participants and highlighting how they might get the most from the experience. The 'diary' pages are intended to give an opportunity for students to reflect on what it feels like to be on work experience with the RAF and what they are learning from it. The following pages become progressively more 'serious' and move into a more formal style of language and presentation, encouraging students to record information for future use, with examples of how they can use details stored there in the future. An example of this is a section on 'Making the most of the

evidence!' which contained a table showing 'What you did' and 'What it means' (e.g. 'doing a hands-on activity = problem solving and working accurately, paying attention to detail'). The latter stages of the booklet have more careers information with examples of CVs and websites for further research.

During the process of developing the work experience programme and creating a workbook, it was recognised that there was potential for achieving accreditation so that students could receive certification for their efforts. Several options for accreditation were considered and it seemed logical and relevant to link the week's activities to the British Science Association CREST Awards (Grant, University of Liverpool, 2006). Subsequently, the CREST Award pages have been added as an integral part of the workbook, this is a practical solution in that it puts all the paperwork in one place and it sends a clear message that the RAF placement is worthy of a STEM related qualification. This applies to the participants on the 'logistics' work experience week as well as the girls into engineering and the Generating Genius programmes, with the activities adjusted to ensure that they include enough STEM content to justify a CREST Award.

The workbook is a tangible product which can serve to give RAF staff an understanding of what the work experience week hopes to achieve. It is RAF branded and has logos for equality and diversity and STEM organisations, which also sends a clear message about the purpose of the work experience activities. An outcome of the production of a bespoke workbook is that it drives activity (once the daily activities are printed in the workbooks they have to be delivered) and encourages commitment to the programme.

The generic base version can be edited to produce a bespoke version for each of the different disciplines whilst ensuring the integrity of the key diversity and STEM messaging. The workbook has been shared with other work experience providers. Overall, the work experience programmes and workbooks have drawn significant praise from participants and influencers and several former students have joined RAF sponsorship schemes with one individual already in the Service.

## **2nd Case Study: RAF/BAE Systems Schools Road Show**

The second case study focuses on the RAF/BAE Systems School Road Show which has been running a programme since 2010 and is already planning its 3<sup>rd</sup> iteration. The RAF was looking for a vehicle which could deliver the STEM careers message to girls at an appropriate age to influence

choices. The Gender Strategy hinged on the principle of early engagement (EOC, 2001), ie. first contact at no later than age 13, which was outside the customary parameters for schools engagement ( focused mostly on the over 16s with some contact with 14 and 15 year olds). BAE Systems already had contact with the target audience and was also keen to promote the STEM/gender message. An informal approach by the RAF quickly morphed into a dynamic partnership with the shared objective of engagement with late primary/early secondary students.

The Road Show comprises a short theatrical performance which showcases a young girl who wants to become an engineer like her father and is followed by 2 workshops (delivered by ambassadors from the RAF and BAE) in which the children experience hands-on STEM activity either by utilising Lego Mind Storm kits or building a model with a bio-mimicry theme. Following its initial success, the show is in its second year, is massively over subscribed, and is supported by extensive and positive evaluation from students and teachers alike. The show has reached over 53000 young people since its inception. It is designed to generate enthusiasm among children and inculcate in them with the idea that STEM subjects are fun and can lead to new and exciting careers. It seeks to break down gender stereotyping of all kinds and make sure that children realise that all careers are open to them. Since 2010 the road show has used bio-mimicry (the scientific link between nature and engineering) as an exciting development concept to influence young people in a non-traditional way. The main character in the show is female and this has had the greatest impact on the shift in perception that engineering is not “just for boys”. The bio-mimicry theme is continued in the curriculum support material left behind in each school visited and also placed on the BAE Systems Education website, and by the running of 2 design challenge competitions with prizes that money cannot buy, such as a day with the Red Arrows.

The show enables the partner organizations to enthuse the students about science and engineering as a career in a way that supports their curriculum studies; to inform and involve teachers towards a better understanding of engineering; to challenge gender and other stereotyping and to enhance the reputation of both organizations at local level. The ability to continue the relationship, albeit on the less personal, e-based level, is also much valued. The success in engagement with some ethnically diverse schools led in the Autumn of 2010 to the delivery of a second project. This involved delivering 64 engineering bridge building workshops to 32 schools with high numbers of BAME students. The project reached over 2,000 pupils in the North West, Bristol and Medway and will be delivered again in the Autumn of 2011. The use of drama with young people to increase pupils' understanding of education, qualifications and work opportunities, whilst also challenging gender

stereotypes has been recognised in evaluations of careers work at Key Stage 2 with 7-11 year old pupils ( Wade et al, 2010).

The RAF/BAE partnership has also expanded to include joint representation at the Big Bang Science and Engineering Fair and plans to run a joint work experience programme.

## **IMPACT/OUTCOMES**

### **Organizational Impact**

There is growing awareness amongst the internal RAF audience of the need to address the gender imbalance in the technical workforce and an acceptance that an element of gender specific action will be necessary if they are to succeed. The need to persuade girls to study maths and science to at least GCSE is crucial to the success of the Strategy and the increasingly competitive war for talent is already evident to the manpower planners. There is a greater willingness to participate in gender friendly activities and firm support for the growing number of external partnerships. There is an improved understanding of the impact of gender stereotyping and its resultant occupational segregation both in society at large and also how it ultimately affects the organization. There is also ongoing support to continue and improve the gender programmes despite severe fiscal pressure. The need to engage positively with girls and to promote the notion of non traditional careers by early engagement with them is now also entrenched in RAF strategic plans for the next 10-15 years. Finally, in publishing the rationale underpinning the gender recruitment strategy it has been possible to improve understanding of the principles of diversity amongst some key personnel groups, specifically those engaged in youth outreach and recruiting and selection activities.

The most important generic lesson arising from the strategy is that diversity does not mean treating everyone the same, thereby removing the confusion between equality and fairness in the selection process and providing fair access to the organization and its opportunities in the first place. The business case for improving gender balance and in doing so addressing future technical needs are clearly understood at the highest levels in the RAF. Gender messaging is also being incorporated in outreach marketing activity. The implementation of the Gender Recruitment Strategy is also demonstrating that properly inclusive programmes are attractive to multiple cadres of the young target audience, thus further underpinning the value for money imperative. The early successes of the work experience programme and the RAF/BAE Systems Road Show have afforded scope to

expand the initial objectives of the Strategy and to demonstrate effectively the importance of consistent and quality early engagement.

Yet the programme would have been an impossible dream without Board level commitment to the diversity objectives and to continued financial support despite worsening public sector financial constraints. There is intellectual commitment to the programme throughout the organisation. Senior members of staff attend key external events and also articulate the diversity message to the internal audience and to society in general. Diversity objectives are incorporated into all top level plans and form part of formal reporting requirements.

### **Wider Impact**

The external evaluation of the work experience programme has described it as being enormously successful in meeting its objectives both strategically and operationally and has employed effective approaches to engage girls in exploring engineering as a potential career. Both the work experience schemes and the Schools Road Show have helped underpin the RAF's very public commitment to improving the diversity balance of its workforce which is also well recognized amongst organisations such as the UKRC, WISE, Opportunity Now and Race for Opportunity as well as academic institutions promoting STEM careers. The early signs are encouraging with improved recruitment of girls into the Defence Sixth Form College and interest following the work experience courses also translating into applications for sponsorship. The organization's commitment to diversity across the piece is well documented and was rewarded in 2010 by the Santander Award for Inspiring the Future Work Force, the placement in the Stonewall Top 100 for the first time and inclusion in the Times Top 50 Employers of Women, also for the first time, alongside the award of a Gold Standard in the Opportunity Now Benchmarking exercise earlier in 2011 (the only UK organization to hold both awards concurrently) and a short listing in the National Careers Award by the Institute of Career Guidance. Other organisations are now approaching the RAF for advice on how to put a gender equality action plan in place. Since the early stages of development, the RAF has had case studies published by the UKRC and presentations at the National Work Experience Conference in 2010 and at the DfE STEM Subject Choice and Careers Equality and Diversity event in March 2011 (DfE, 2011i).

## CONCLUSION

The need to improve awareness of RAF careers becomes increasingly critical as skills shortages, particularly technical skills increase. The importance of quality work experience and engaging effectively in the schools cannot be over-stated. The early successes of the gender activities have raised the RAF's profile and gained recognition and support from external organisations. The partnerships with WISE, UKRC, WiSET and BAE Systems have enabled the organization to adopt a shared approach to education, to excite more young people about careers in the Defence Sector and appeal more directly to girls and ethnic minorities. Working together they have adopted best practice, achieved value for money and delivered quality services to the target audiences.

Importantly they have also influenced at a strategic level the positioning of diversity in the RAF's people strategies. The activities above have been key in enthusing both recruitment practitioners and higher management about the value of early engagement whilst also underlining the need to develop strategies to address future skills shortages in the context of recruitment. At a time of unprecedented financial constraint the RAF diversity programme continues to attract support. Whilst the effects of the strategy are not short-term, the business case and the requirement for continued funding are recognised at the highest level. Senior commitment remains evident in both allowing the investment of staff time and effort and in personal attendance at selected activities.

In short, partnership has been an essential element in developing and implementing this strategy. Not only has it offered access to best practice, it also provided us with significant force multipliers. It delivers value for money, a conduit for creating and exploiting new ideas, and if the feedback is anything to go by will deliver the diversity objectives. In these days of reduced manpower and dwindling financial resources, diversity could easily become an unwitting casualty. The RAF believes partnership to be the key to 'keeping the train on the track'.

Alongside this, pre-16 work experience placements are under threat following the publication of the Wolf Review earlier this year (Wolf 2011). The new All Age Careers Service is still to take shape (Watts 2011) and careers education, information, advice and guidance provision in schools varies regionally and nationally. The RAF programme of work experience provides a platform for individuals to undertake placements pre-16 outside of school and has career related learning embedded within it, regardless of external policy changes.

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## APPENDIX 1

### THE WORKBOOK CONTENT

<b>Element</b>	<b>Purpose</b>
Page outlining daily activities	To give participants an idea of what to expect each day
Explanation of gender equality and the pay gap	To give students an opportunity to consider why gender equality is important to the RAF and why the 19.8% (Home Office 2011) gender pay gap persists
Overview of engineering in the RAF	To introduce some careers information and highlight potential for progression in the RAF
Comments about successful RAF personnel (in 'bubbles' throughout the booklet)	To highlight variety of backgrounds (mainly gender and ethnicity) of individuals who have succeeded in RAF
Questions relating to each day's activities	To encourage the participants to reflect on their experiences and indicate what the activities meant for them
Setting personal targets	To relate the learning to their own preferences. Fairly standard in most work experience books, the RAF version has examples of how each activity might match targets - e.g. "Solving problems - through the low ropes (exercise) or other team activities"
A mock 'blog' page	To encourage students to think about how they would describe their experience to others
Record of what student did and why it is important	To help participants relate their experience to potential strengths and preferences
Identifying the people the career paths of RAF staff	To highlight vocational and academic routes and to identify whether that might be an option they might consider
Potential Curriculum Vitae (CV) content	To give an overview of the information participants of the RAF work experience might use in their CV

