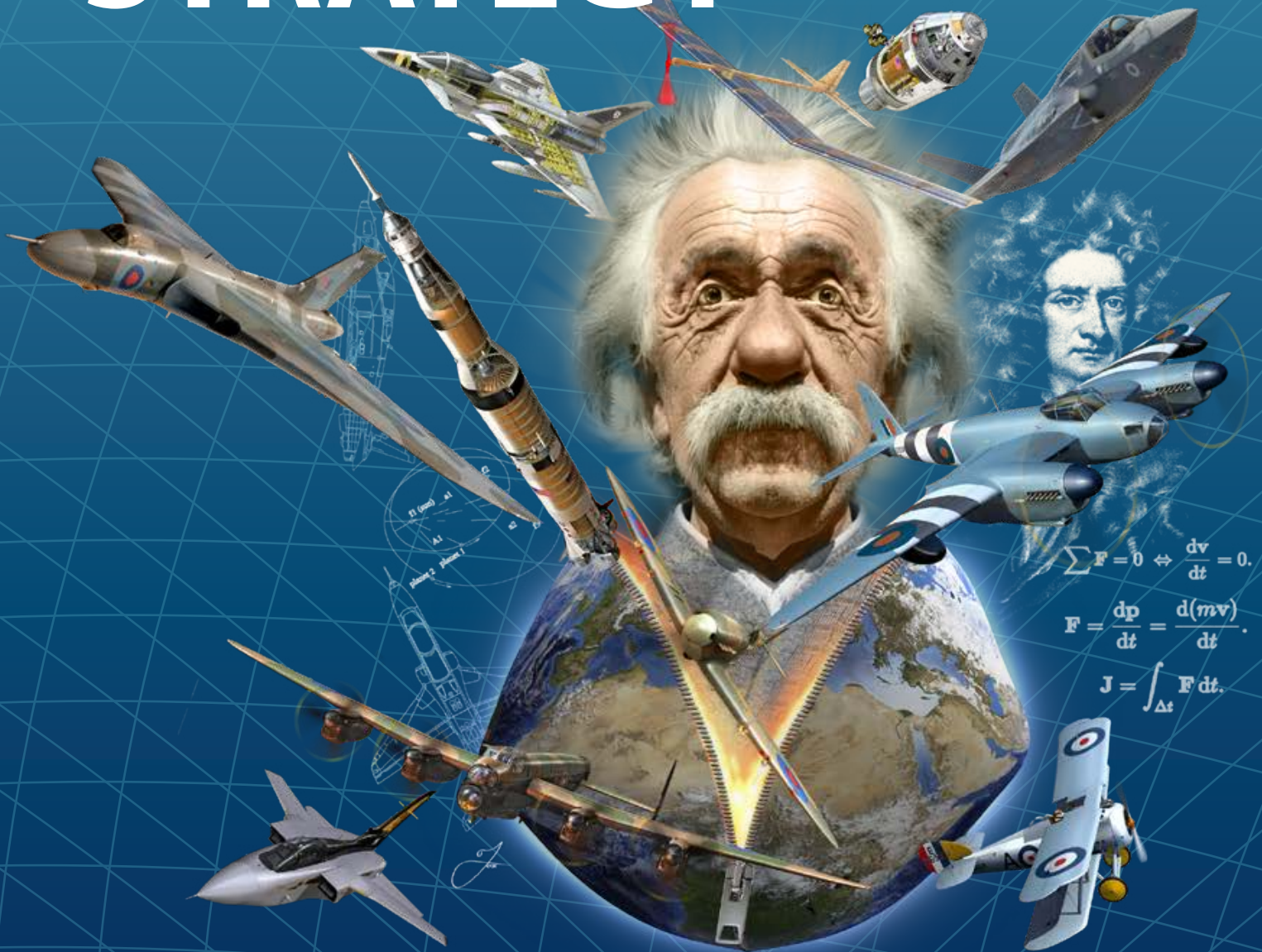


Issue 2.0
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 **ROYAL
AIR FORCE**
Youth & STEM Team

RAF YOUTH STEM ENGAGEMENT STRATEGY





Foreword

Group Captain
Gordon Bettington
MA BA MCIPD RAF
RAF OF5 STEM LEAD



The RAF is committed to growing the number of young people studying STEM subjects. This commitment was reflected in the hugely successful RAF 100 STEM Programme, inspiring and energising a massive 2 million students aged 9-14, through an exciting mix of residential courses, schools STEM Day activity, interactive roadshows, competitions, on-line learning resources and sponsorship of the Scouts. Our aim is to build on this success, extending our partnerships and Programme to build an enduring STEM legacy that will sustain the Royal Air Force into its second century.

It is widely recognised that the UK is facing a STEM skills shortage, our next generation are increasingly disengaged from STEM subjects, reducing the flow of STEM qualified people in to the workforce. We must find ways to attract our young people into STEM education and ultimately into STEM careers. Promoting STEM will lead to a larger more diverse STEM talent pool, sufficiently primed to meet future Defence needs. Stations have a crucial role to play in terms of improving the attractiveness of STEM subjects and highlighting the opportunities that exist in the aerospace sector for young people.

This RAF Youth and STEM Strategy sets out the future direction for RAF STEM activity and aims to inspire, empower and inform a wide audience across the Service. It builds on a range of activity already underway and aims to coordinate and target effort that will deliver greater engagement and attainment in STEM. Please take the time to read the Strategy and think of how you can contribute to this crucial area of activity. It is imperative that we grow an effective network of enthusiastic and engaging

STEM Ambassadors, who will not only support the National Programme but also develop STEM-focussed local engagement programmes.

Building STEM capacity is critical to developing the Next Generation Air Force. Consequently, I commend this Strategy to you. Please help us to create a culture where the importance of STEM is recognised and valued and do all within your gift to expose young people to STEM activity. Encourage those in your workplace to prioritise supporting the RAF's STEM Programme, supporting outreach activity across the UK. Your support will translate in to greater opportunity for all.

A handwritten signature in blue ink, appearing to read 'G Bettington', is positioned below the main text block.

This strategy is issued with the authority of AOC 22 Gp and replaces the RAF Youth STEM Engagement Strategy issued 23 Aug 2016.

Introduction

1. This strategy provides guidance for the delivery of Youth STEM activity and engagement across the RAF.

Context

2. The UK has an annual shortfall of 37,000 to 59,000 personnel to meet 'core' engineering roles requiring level 3+ skills¹. This position is exacerbated further when considering the demand against other technical roles, bringing the total estimated shortfall to between 83,000 and 110,000. Such a challenge has significant implications for the Ministry of Defence (MOD), which is a predominantly bottom fed organisation, which recruits, trains and employs circa 55,000 engineers and technicians, all of whom are drawn from a relatively smaller talent pool than that available to employers outside of the Defence sector. In response, the MOD has adopted a multi-faceted approach to address this business need, through collaboration with Industry, Government and Professional Institutions across a range of programmes. One such programme, is that of Youth STEM outreach activity, created to ensure that the STEM skills pipeline from early years to early careers is primed sufficiently to meet the National demand and within it the Defence need. Such an approach is fundamental if Defence outputs are to be sustained for the future.

Background

3. As a highly technical Service, the RAF continues to recognise the importance of high-quality Youth and STEM engagement. As a strand of the RAF Inspire programme, the RAF Youth STEM programme will support the wider RAF Strategy in engendering air, space, cyber and resilience awareness among youth across the UK's Defence Enterprise. Raising awareness of the value of STEM subjects and their links to future career opportunities is essential in delivering an RAF workforce that comprises more than 50% engineers and technicians². The programmes underpinning intent is to create a future talent pool with the right skills and motivation, that is more reflective of the society we serve, and that will ensure a sustainable RAF workforce. Key to successful delivery is access, at an early enough stage, to a more gender and ethnically diverse, and more socially deprived target audience. Early engagement (beginning at late primary/early secondary, i.e., students aged 9 - 14 years), which challenges embedded stereotyping and encourages young people to consider non-traditional career pathways, is imperative.

¹ The EngineeringUK report 2018.

² This does not include RAF Medical services that are also heavily STEM oriented.



4. Working with a range of external partners has been a critical enabler since the programme's inception in 2008. Drawn from industry, academia, professional institutions, educational establishments and the charitable sector, these collaborations have supported RAF activity and been an essential element in the delivery of the RAF Youth STEM programme. Such relationships will continue to underpin delivery as a part of the RAF Inspire programme.

5. The Defence STEM Youth Strategy³ aims to generate a cohesive pan-Departmental approach to addressing the existing and increasing STEM skills shortages in the UK. The strategy introduces 5 National Strategic Partners: STEM Learning, Engineering UK, Primary Engineer, the Scottish Schools Education Research centre (SSERC) and the Energy Skills Partnership (ESP) and directs the development of single-Service STEM Strategies that will support the Defence commitment for STEM engagement at both the national, regional and local level, as well as underpin the individual future manpower requirements.

³ Defence Science Technology Engineering and Maths (STEM) Youth Strategy Issue 2 – Feb 19.





Aim and Concept

6. **Aim.** This strategy aims to develop a sustainable, affordable platform for youth STEM activity that will widen the STEM skills talent pool sufficiently to meet the UK's future demand for STEM professionals and to close the national STEM skills gap with its attendant risks to the delivery of RAF output.

7. **Concept.** It is RAF policy that Youth STEM engagement is completely distinct from recruiting and is free at the point of delivery. The implicit link between youth engagement and recruiting is that the promotion of STEM skills across a wider population would inevitably have a positive impact on raising awareness of RAF careers and opportunities⁴. Consequently, our intent is to inform, inspire and enable young people to study STEM subjects through informed choices. Coupled with this is the promotion of careers awareness to help young people start to understand the breadth of opportunities available to them if they study STEM subjects, including those in the RAF. To achieve long-term success, we must build a larger, more diverse, STEM component future talent pool by:

- a. Influencing young people's parents, guardians, teachers and peers as to the importance of STEM subjects in future careers.
 - b. Supporting teachers in enriching learning and being aware of STEM careers, including those within the RAF.
 - c. Encouraging and enabling STEM-themed activities delivered through STEM ambassadors, engagement teams and youth organizations, including cadets.
8. **STEM Capital.** To provide young people the opportunity and inclination to pursue a STEM career it is important to build a child's STEM Capital. STEM Capital encompasses all the STEM related knowledge, social contacts, attitudes, skills and experiences a young person has and how those resources inform their engagement and choices. Building STEM Capital requires early introduction and continued engagement throughout the STEM talent pipeline as opposed to "one-hit" or uncoordinated interactions. As children progress through school it is important to re-engage, keep them inspired and provide timely guidance on which school choices would enable them to pursue their STEM career ambitions. Experience has demonstrated that engagement in the transition space, and before the selection of GCSE subjects, yields the greatest benefit; therefore, the target age range for engagement is 9-14 years⁵.

⁴ The 8 Gatsby Career Benchmarks are an integral part of the UK Government Careers Strategy and aim to give every young person high-quality career guidance to make informed decisions about their future.

⁵ The Defence STEM Youth Engagement strategy has a broader age range of 5-14 years, but regional and local engagement may extend beyond this age group..



Diversity and Social Mobility

9. To help meet the STEM skills challenge, it is vital that the RAF draws from the widest possible talent pool, irrespective of gender or ethnic backgrounds. Nationally the STEM community remains unrepresentative of the wider population with only 12% of women and 8% of BAME pursuing STEM careers; this situation is mirrored in Defence. If we are to ensure a sufficiently broad talent pool in the years ahead we must increase the take up of STEM subjects among 3 key groups:

a. **Females.** Females make up 51% of the school population and 47% of the overall UK workforce. If the RAF is to have a sustainable employment model in the medium to long term, we must encourage significantly greater numbers of girls to choose STEM subjects, and ultimately pursue STEM careers.

b. **Social Mobility.** Only 24% of those working in engineering come from lower socio-economic backgrounds; an underrepresentation that is largely a consequence of low participation and attainment in the engineering educational pipeline. Therefore, STEM outreach programmes should ensure they

reach geographic areas of lower socio-economic backgrounds with educational support that is free at the point of delivery. This approach is fundamentally about offering young people alternative options through STEM, thereby raising their understanding, expectations and offering potentially better outcomes.

c. **BAME.** The percentage of BAME personnel in the RAF is growing but remains significantly below the national average. If the RAF is to better represent the community we serve, we must, in particular, encourage more BAME students to pursue STEM careers. This can only be achieved as part of a consistent youth engagement programme that includes both students and their influencers.

10. Promoting STEM opportunities to all areas of society is not just a matter of delivering a persuasive message; the individual chosen to deliver the message has a significant effect on whether the message resonates. Clearly the messenger must be enthusiastic, positive and engaging, but if the messenger is also from the same gender or ethnic background as the audience then the impact is greater, and the audience can more easily identify with and relate to this role model. Therefore, the development and deployment of gender and ethnically diverse role models to conduct STEM engagement is encouraged.



Governance and Stakeholders

11. **Governance.** The delivery of the National RAF Youth STEM Programme is the responsibility of Comdt RAF College Cranwell, on behalf of AOC 22 Gp. The DComdt RAFC is the RAF OF5 STEM lead, whilst day to day management of the programme is vested in SO1 Youth and STEM.

12. **Stakeholders.** The stakeholders for Youth STEM engagement are:

a. **Defence Engineering Champion.**

Def Eng Champ is responsible for overarching Departmental Youth STEM Strategy.

b. **22 Gp.** AOC 22 Gp remains responsible for Youth Policy⁶.

c. **38 Gp.** AOC 38 Gp is the single-Service lead for all Engineering issues, including support to the Youth STEM Programme through the STEM Ambassador Network.

d. **COS Pers.** COS Pers is responsible for RAF Recruiting and Selection (R&S) assets⁷, which support and enable the National RAF Youth STEM Programme.

⁶ Recognising that Safeguarding policy rest with COS Pers.

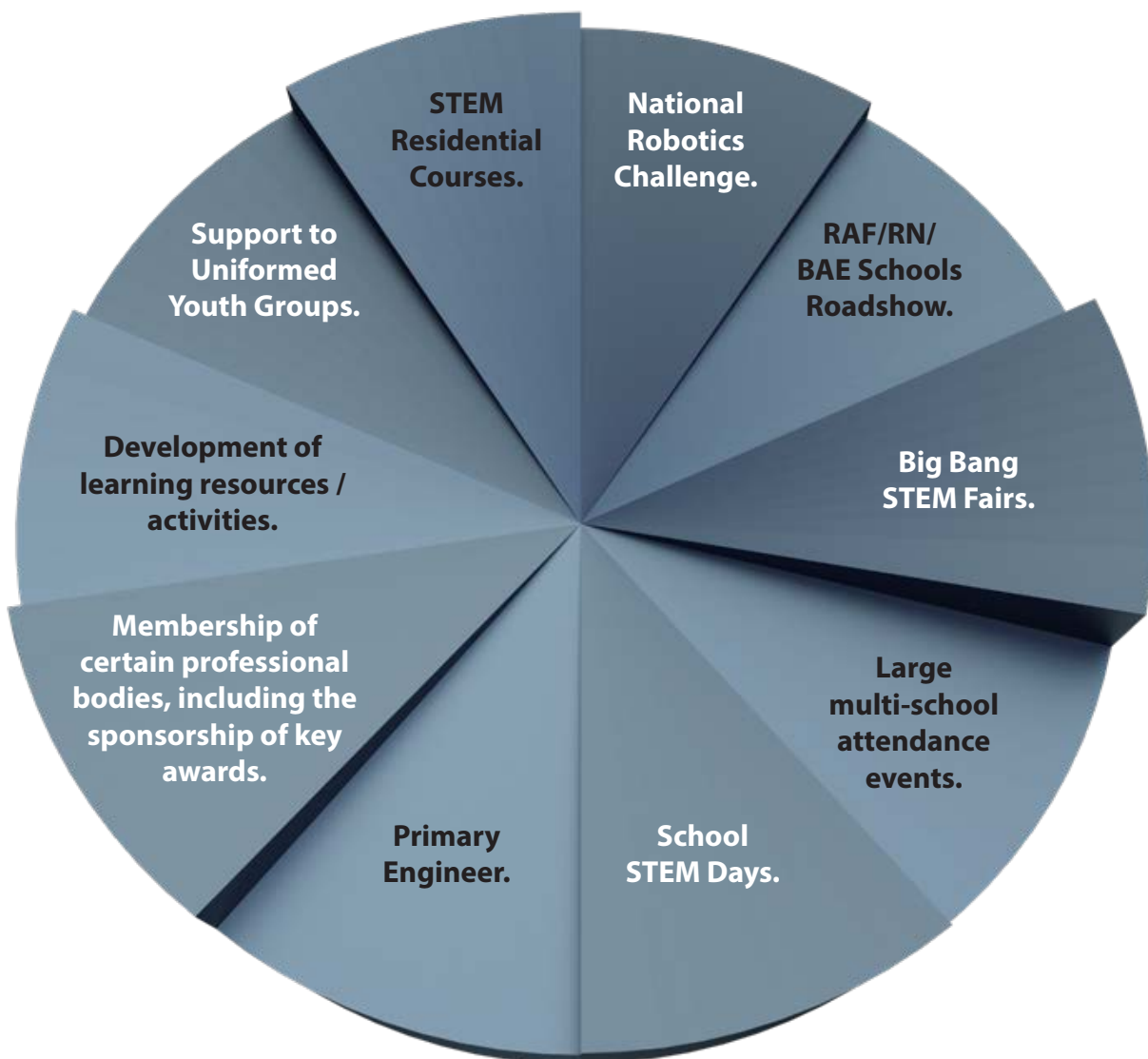
⁷ In particular, Specialist Engagement Teams.



Delivery Landscape

13. It is important to recognise the differences between the National Programme led by the RAF Youth STEM team, the efforts of the STEM Ambassador Network and Establishments as part of their normal Community Engagement Plans and those of R&S in the recruiting environment.

a. **National Programme.** The National RAF Youth STEM Programme is developed and led by the RAF Youth and STEM Team and underpinned by RAF inclusion and fair access objectives⁸. The programme is funded through the 22 Gp Youth Budget and supported by the wider RAF and STEM Ambassador Network. The programme includes the following key elements:



⁸ For gender, ethnicity and social deprivation.

b. **Regional/Local Programmes.** Establishment-based programmes are developed and delivered by local Units / STEM Ambassadors, in support of Establishment community support / engagement objectives. In order to deliver the widest possible effect on an issue vital to the future delivery of RAF capability, the support of Stn Cdrs across the Service will be essential. Consequently, Stn Cdrs will be asked to appoint a STEM lead for their unit and to develop a STEM-focused engagement programme as part of their wider youth engagement Programme.

c. **Recruiting and Selection.** Whilst youth engagement is necessarily separate from recruiting activity, the support of R&S Specialist Engagement Teams (SETs), through their community contacts, is vital to the delivery of a national programme that reaches all the target groups.

14. **Priorities.** Support for the National Youth STEM Programme will take precedence over regional / local events and activities.

15. **Weight of Effort.** The RAF Youth STEM effort will be delivered with a 70% focus on Secondary school activity for years 7-9 (ages 11-14 years) and a 30% focus on Primary school activity for years 5-6 (ages 9-10 years).

16. **Media and Communications Support.** It is essential that Establishment STEM leads have well developed relationships with their Media and Communications



Teams and that all messaging is correctly focused and consistent with this STEM engagement strategy. The RAF already has an international brand identity that is recognised by the general public including the young people that are the STEM outreach target audience. STEM engagement activity may benefit from this brand identity, but care must be taken to protect, promote and strengthen the branding in all engagement activity. However, whilst our brand is recognised, it should not be assumed that society has a detailed or accurate understanding of the RAF and the wider Armed Forces and many superficial and stereotypical views prevail; therefore, messaging will need to address these stereotypes and correct any skills or career-based myths. Additionally, some areas of society have a negative perception of Defence. STEM outreach in these areas is likely to add the most value but care must be taken to avoid political or diplomatic conflict.

Resources

17. **Manpower.** The RAF Youth STEM Engagement Programme is delivered by:

- a. **RAF Youth and STEM Team.** The RAF Youth and STEM Team⁹ will develop and facilitate the delivery of the RAF National Youth STEM Programme. They will also provide direction and guidance to Establishments and to the STEM Ambassador Network.
- b. **STEM Ambassador Network.** All RAF STEM Ambassadors are to be registered with STEM Learning and hold a valid DBS clearance; they are

then entitled to hold the associated JPA competency¹⁰. RAF STEM Ambassador delivery provides local contact around Establishments, whilst also supporting the National Youth STEM Programme. Direction and guidance¹¹ and access to resources will be provided by the RAF Youth and STEM team, in line with extant funding provision. The support of RAF STEM Ambassadors is essential to achieving the aim of this strategy and it is important that individual STEM Ambassadors, and their line managers, recognise that this engagement will also develop their own personal skill sets. It should be noted that STEM Ambassadors are not necessarily engineers and can come from any Branch or Trade.

⁹ Based at RAFC Cranwell.

¹⁰ Award of the JPA competency for STEM Ambassadors is controlled by the RAF Youth STEM Team, based at RAF Cranwell.

¹¹ Support provided to STEM Ambassadors is detailed in GAI 1027, Youth Engagement. A specific GAI for STEM Ambassador support is under development and will be issued idc.



- (1) **Dress.** The wearing of military uniform in schools does not always send the right message. RAF STEM Ambassadors are encouraged to wear appropriate branded clothing when attending events or activities in schools. The RAFC Youth STEM team can provide branded polo shirts on request. These should be worn with appropriate dark trousers and shoes. No2 SD trousers may be worn with branded polo shirts¹². **DPM clothing should not be worn in schools.**

- c. **Industrial / Academic Partners.** The availability of uniformed manpower is a significant limiting factor in delivery of the National Programme, particularly in those geographic areas where the RAF footprint is limited. Delivery is, therefore, dependent upon a range of industrial, academic and other delivery partners who act as a force multiplier and allow us to project the RAF Youth STEM Programme into areas and communities that would otherwise not be accessible to us.

18. STEM Infrastructure and Support.

- a. **STEM Hub.** An internet-based, fully accessible digital STEM hub for RAF STEM Youth engagement is recognised as essential to facilitating the necessary communications across the RAF STEM Ambassador Network, avoiding double-tapping of events and developing and sharing best practice. The STEM hub will provide; access to an interactive events calendar, store and share resources, channel information, gather data and satisfy reporting imperatives. The STEM Hub has been developed and is managed by the RAF Youth and STEM Team.

¹² Polo shirt can be worn tucked in or out.

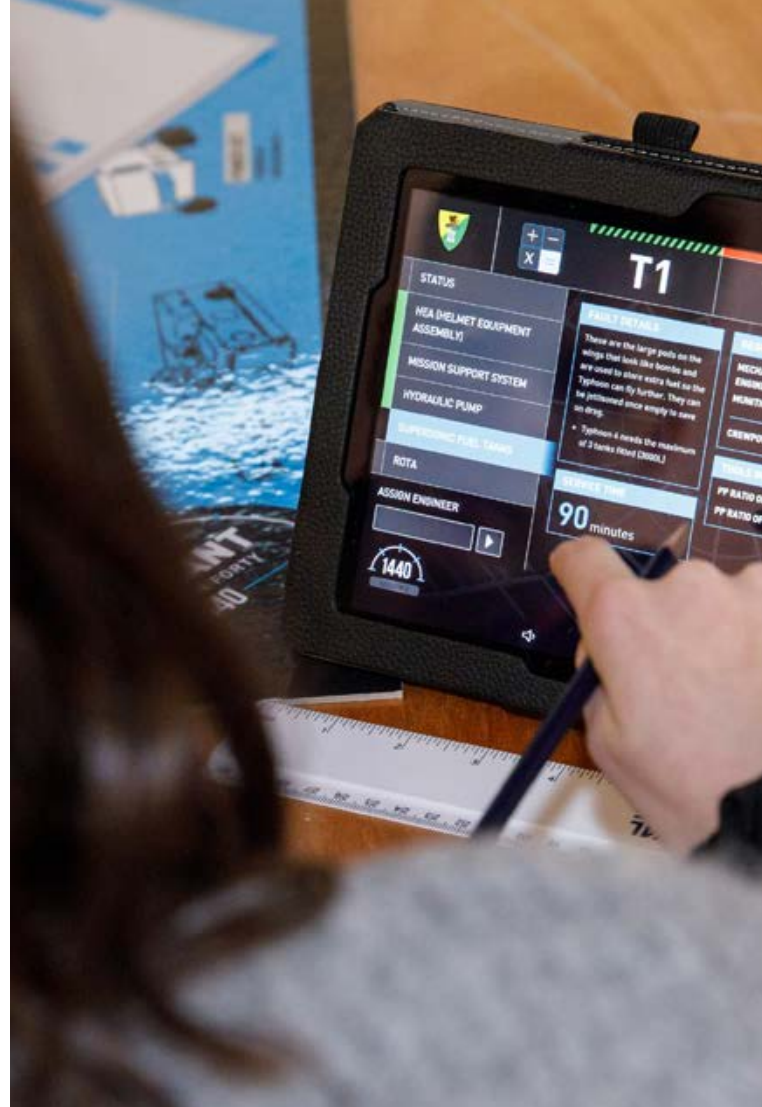




b. **Learning Resources.**

- (1) **On-Line Resources.** There are a range of STEM learning resources that have been developed for the use of STEM Ambassadors and educational providers. Additional resources will be added to this library periodically. New and existing resources will be loaded onto the STEM Hub to facilitate availability and share best practice. Individual STEM Ambassadors and Establishment STEM leads will be invited to publish and share locally produced resources.
- (2) **Physical Resources.** The RAF Youth STEM Team has a limited budget to purchase STEM resources for use by STEM Ambassadors. All requests must be supported by a robust business case that details the proposed use of the equipment, projected reach of engagement and how the equipment will be accounted for. Stn Cdrs are encouraged to support STEM Ambassadors through the funding of equipment to support regional and local engagements.

19. **Finance.** Delivery of the National Youth STEM programme will be funded through AOC 22 Gp's youth budget, with additional finance from AOC 38 Gp in support of the STEM Ambassador network. The costs of locally generated Station STEM activity will lie where they fall.



Measurement of Effect

20. Recording and Evaluation.

- a. **Recording.** It is essential that accurate records are maintained of all RAF Youth STEM engagement. In the longer-term reporting is to be conducted by RAF STEM Ambassadors, or Stn STEM leads, on the Understanding Civil Engagement (UCE) database, as mandated by the Defence Youth STEM Strategy¹³. However, until a formal data sharing protocol is established between MoD and STEM learning, all STEM Ambassador activity must also be recorded on the STEM Learning database. This includes
- b. **Evaluation.** Where possible, qualitative evaluation of all youth STEM engagement activity is to be undertaken with the appropriate teacher or adult supervisor, utilising the UCE PXR form.
- c. **Measurement of impact.** It is relatively easy to measure the number of interactions between STEM Ambassadors and the intended audience. However, measuring the impact of each interaction on individuals is difficult and the results of our efforts today may not be fully understood until the next generation enters the work place in 10 or 20 years.

¹³ Defence has developed a protocol for data exchange between UCE and STEM Learning to avoid the need for double entry. STEM Ambassadors will be notified once this work is completed. Until that time all activity is to be recorded on the STEM Learning database as well as UCE.

