

I Am a Systems Engineer and I Do...

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Why did you choose to be a Systems Engineer ?

During my time as an Engineering Officer in the Royal Air Force (RAF) I started to recognise the importance of systems engineering as a key influencer in defence capability. Projects and programmes that had a strong contingent of Systems Engineering expertise seemed to deliver the best quality output in terms of command and control (C2) information services capabilities. With the right mission analysis, robust stakeholder needs and coherent system requirements and system architecture, delivery of complex information services was far easier. So, although I did not start my career as a systems engineer, I made it my personal mission to develop my own skills and knowledge of processes, standards and techniques associated with the field. Towards the end of my Royal Air Force career, I had an opportunity to complete a funded PhD in systems engineering with the University of Bristol and a highly accomplished industrial partner, and this proved to be an opportunity too good to turn down. As a systems engineer, I can provide a valuable perspective to organisations delivering digital transformation and complex projects and programmes using the

techniques, processes and skills of the field. This systems perspective, that spans the micro and macro, the technical and the enterprise, can deliver considerable value to organisations and allows me to exert a differential influence, far above what I feel I could offer if I stayed within a more narrow engineering field.

What education/qualifications do you have for Systems Engineering?

My original degree, a Bachelor of Engineering (BEng), was in Electro-mechanical Engineering from the University of Southampton and provided me with a sound technical foundation for joining the RAF as an Engineering Officer. During my time in the Royal Air Force I also gained qualifications in project management (Association for Project Management Professional, APMP and Management of Programmes (MoP) Practitioner) and IT Service Management (Information Technology Infrastructure Library, ITIL). After my time in the RAF I began a PhD within the school of aerospace engineering. My thesis was entitled: "Coping with Complexity: Approaches, Tools and Frameworks for Systems Engineering". My research as a PhD student included developing novel approaches for the evaluation of system architectures, alongside a novel framework and tool for technical risk management. My research has been published in the INCOSE/Wiley Systems Engineering Journal and has been presented at various academic and industrial conferences.

I am a firm believer in the synergy between Systems Engineering and Project Management for delivering capability. So while studying for my PhD I completed my Associate Systems Engineering Professional (ASEP) certification and continued to refine my Project and Programme Management skills by completing my Management of Risk (MoR) Practitioner certification. At the time of writing, I am a registered Incorporated Engineer (IEng). However, I am awaiting my professional registration interview for Chartered Engineer (CEng) and remain hopeful for successful award soon.

What is it about Systems Engineering that you find so compelling?

For me, it is all about influence. There is no denying the importance of deep, technical expertise in delivering complex engineered systems. Nor is there any denying the importance of strong project management for successful delivery within time, cost and quality constraints. However, Systems Engineering finds itself uniquely positioned to offer strong, technically astute, project and programme leadership that can differentially contribute to outcomes. Whether early in a systems lifecycle, by ensuring the rationale for an engineered system is fully teased out during the concept stage, or by the creation of a rich and design agnostic system architecture during the development stage, or later in the production and utilisation stages, systems engineering encourages the kind of holistic, through-lifecycle thinking that can prevent significant issues from occurring. Further, the transferability of the skills, knowledge and techniques that a systems engineer develops should not be overlooked. Whether working on the development of a cutting-edge sensor system, a C2 system, an enterprise information services capability, or aiding digital transformation, a systems engineer can add tremendous value. Earlier in my career, I believed that systems engineers were well suited to technical translation, an ability to arbitrate between the technical and non-technical community, but more recently I see the role of systems engineers as playing a key leadership role in setting a global vision across these two communities.

What advice would you give a Systems Engineer just starting out in their career?

I only have three pieces of advice; (i) keep a copy of the Systems Engineering Handbook close to hand when working, (ii) dig into the published standards of the International Standards Organisation (ISO), and (iii) engage with the community. I have only had my physical copy of the Systems Engineering Handbook on my desk for the past year, if I could talk to my younger self I would tell them to get a hold of it straight out of training. It is clear, concise, and has a fantastic ability to put typical engineering activity in context. I used to find International Standards rather unwieldy; they are often very long, with what can sometimes feel like unnecessarily technical language. However, if you can get into the heart of these documents and become familiar with their content you can often aid an organisation in improving their practice. Finally, with respect to engagement with the community. Since moving to the Bristol area around four years ago, I have thoroughly enjoyed and relished engagement with the INCOSE Bristol Local Group; informative talks, brilliant networking, opportunities to get involved and present, this local community has helped me a lot. Consider getting involved with your local systems engineering community, whether it is your workplace community or through one of the many INCOSE groups, and you will likely reap the rewards. Do not be put off if you feel "junior" in your career, these communities will always give you a warm welcome.