

I Am a Systems Engineer and I Do...

Sam Williams



Why did you choose to be a Systems Engineer?

Like quite a few people I suspect, the label of 'systems engineer' only came many years after I'd been 'systems thinking' and 'systems doing' in many varied engineering roles.

I trained as an electronic/electrical engineer as part of a four-year Telecommunications Craft Apprenticeship in the dockyard. From this, I went on to be a Telecommunications Maintenance Engineer, a Combat Systems Installation Engineer, a major warship Platform Upgrade and Upkeep Installation Manager, a Weapons Systems Trials and Commissioning Officer, an ILS Manager for new defence sonar systems, an MoD-wide Acquisition Transformation Change Manager, a Systems of Systems Architect, a Capability Engineer and a Systems Engineering policy author, among others. All of which required me to apply systems

thinking and systems science to help understand and solve real world business problems; that's my expansive definition of Systems Engineering.

I never grew up with the notion that I wanted to be a systems engineer, or even an engineer for that matter. I did however, grow up with a perpetual curiosity, and a desire to understand why things were the way they were. I saw connections and patterns everywhere, had a vivid imagination of how things could be different, and a somewhat reckless sense of discovery to try new things.

This has led me on a 25-year journey backwards through the defence lifecycle, starting from the nuts and bolts of in service equipment support, through to now at the fuzzy front end of complex Capability Engineering and Organisational transformation.

Perhaps the question should be why have I stayed in Defence (as a Systems Engineer) for 25 years? It's because every day I can see the need to improve as an organisation in how we understand and deal with complexity, uncertainty and change. Applying systems thinking and doing in defence gives me rich opportunities to tackle those messy complex problems and make a difference. There's never the excuse of a dull moment as a systems engineer in defence, there's always challenging problems, room for improvement, and opportunities for learning somewhere if you choose to seek it out.

What education/qualifications do you have for Systems Engineering?

As an engineer, I have general engineering education and qualifications, 4-year Indentured Craft Apprenticeship, a HNC in Electrical/Electronic engineering, IEE qualified Electrician, Post Graduate Certificate in Supportability Engineering (ILS), Post Graduate Diploma in Systems Engineering. I'm a IET Chartered Engineer, and an INCOSE ASEP and CSEP.

I do not have a first degree, and have not quite finished two part-time MSc's through my career so far. (third time lucky perhaps?)

For me, the formal engineering / Systems Engineering education and qualifications only tell part of my story. For me, Systems Engineering is a team sport; we don't do Systems Engineering in isolation for the sake of it. Systems Engineering helps support a wider business need, therefore it needs to be applied in concert with all other parts of business to be useful and successful. Doing that well requires lots of soft and business skills, of which I have acquired a few of the years (portfolio, programme and project management, change management, negotiation, facilitation, emotional intelligence, to name a few).

Systems Engineering is also a practise and an art, it is the creative application of systems science to tackle real world problems... That requires real application, trial and error, reflection, continuous development, a sense of

adventure, and, in most cases, opportunities to put it into action for real more than once or twice. Often it is from our scars and failures we learn and grow the most as systems engineers!

So I've more learning to do. In order to support my current work in complex Defence Capability Coherence, I'm informally educating myself in behavioural psychology, decision science, eastern philosophy, and complex adaptive systems.

Finally, two other key qualifications spring to mind: having the skin of the rhino to cope with the impact of critical challenge, and endurance to keep going in face of failure, adversity and sometimes isolation. I'm continuously working on those ones!

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

Ahhhh great question! Interestingly, the choice of words presumes as system engineers we are compelled to be systems engineers and do Systems Engineering? That would be a fair description in my case!

"We are what we repeatedly do" Aristotle said (I think!). I can't help noticing connections and patterns that others in the team generally do not; I'm hopeless at detail most of the time. I search for the similarities in things that look different and differences in the things that look similar. I am compelled to ask 'why', to question assumptions, and explore the 'what ifs'. I often say 'I don't get it'... I am compelled to understand why I don't get it... often asking for people to "explain it to me like a 3-year-old". I always look for how it can be improved, or indeed made worse.

Systems Engineering offers lots of opportunities for exploring messy 'why' and 'I don't get it' situations; that interests me. My particular area of Systems Engineering is often very people-centric and stakeholder focussed activity based. As a compulsive 'people watcher', I find that aspect very interesting too.

I also have a belief that the pursuit of better understanding of problems - particularly complex, messy ones - will help improve our ability to implement better solutions and therefore add value, make a difference, and contribute to the greater good.

Applying Systems Engineering in complex defence problems situations satisfies a compulsion to contribute in a unique and fun way.

Systems Engineering is such a broad church and there are lots of ways to add value across the spectrum: from fuzzy front-end organisational-level problem structuring activities, to more traditional product focussed problem solving and integration activities. I enjoy the challenge of putting together diverse system approaches, methods, and techniques in different ways to help tackle complexity in defence. There is always lots of variety, lots of challenge, and every day is a school day for me.

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

Have fun and actively seek out the ambiguity. The field of Systems Engineering is so broad (and evolving) that there are many areas to work in. I would recommend not to treat it as a destination career, perhaps more like an intriguing and rewarding journey. My advice would be find something within Systems Engineering that resonates with you (or conversely jars with you) and start from there; keep an active open mind to potential new opportunities and remember to challenge your own mindset and assumptions from time to time. "Rule 1 is not to fool yourself and you are the easiest person to fool!"

Systems Engineering really is a team sport, so make time to span boundaries and build bridges with the other communities to understand and facilitate better collaboration; particularly with non-technical communities. Often, it is only the language that divides us, so learn to translate.

People in systems make them complex. So soft skills, collaboration, and communication are paramount! Prioritise that for development; seek out opportunities to facilitate, negotiate, present, and teach where possible - it will help you improve, and it needs practice.

Systems Engineering is a practical experience and a creative activity: go and explore, discover, experiment, try, fail, reflect, learn as often as you can. Often it is our experiential scars that makes us who we are, and our experiences shape our perspectives and how we sense make. Take time to deliberately step into other perspectives to gain insight; learn that no-one has the 'god's eye view', and that the need for diversity of perspective is really important.