

I Am a Systems Engineer and I Do...

Ivan Mactaggart

Why did you choose to be a Systems Engineer?

Entirely by accident and it was quite a long path. I started as an army apprentice qualifying as a technician specialising in Armoured Fighting Vehicles. After leaving the military I started a career in leading business and technical transformation in struggling automotive and construction plant businesses. My focus was understanding the systemic failures within these businesses and identifying the capability needed to transform and grow into a sustainable state (essentially, people characteristics, processes, and tools/technologies).

After 12 years and 8 different business units it was time for change, and I became a lecturer at the Defence College of Electro-Mechanical Engineering specialising in military automotive technology. It was at this time I started parallel academic studies, also gaining a teaching qualification. I also developed significant expertise in the MOD systems approach to training and became the lead for the Training Needs Analysis supporting entry into service of both the Panther Command Liaison Vehicle and the MAN Support Vehicle fleet. Following the Buncefield Oil Terminal fire, I led the role out of an Integrated Management System intended to mitigate some of the management issues that led to the disaster. By this time, I considered myself a systems practitioner in both an academic sense (having completed a Diploma in Systems Practice) and in employment.

In 2008, I joined the Atomic Weapons Establishment and 'discovered' systems engineering in the sense that INCOSE defined it. At AWE, I was lead systems engineer for the implementation of product lifecycle management and was lead systems engineer for a novel future capability concept before moving to Dstl as a Principal Engineer and team lead for Systems Concepts in the land platforms division as well as the technical authority for future land warfare capability concepts and Dstl's innovation autonomy programme, heading an

“A highlight in this time was directing a two week UK led NATO study into future land warfare concepts at the Defence Academy of the UK.”



Anglo-American study into autonomous military vehicle convoys. A highlight in this time was directing a two week UK led NATO study into future land warfare concepts at the Defence Academy of the UK.

By this time, I guess I was a fully-fledged systems engineer. I joined MBDA as Head of Systems Engineering & Design Capability in 2017, leading three systems teams across two sites and leading several international engineering improvement projects in MBDA's model-based engineering programme. I subsequently led the implementation MBSE in a hi-tech start-up and moved into the rail sector in 2021 when I joined East West Rail where I am the Head of Engineering for Systems, Digital, Performance and Safety Engineering. Reflecting on the last 40 years I guess my career has always been about systems in some sense, particularly those that involve developing capability.

What education/qualifications do you have for Systems Engineering?

Reflecting my broad range of engineering interests, I have a BSc in general engineering and completed a Diploma in Systems Practice with the Open University. I have a Cranfield University MSc in Systems Engineering for Defence Capability from studies at the Defence Academy of the UK at Shrivenham. Later, I gained CEng with the IET and was elected a Fellow of the IET in 2019. I am currently researching a self-funded PhD exploring challenges associated with system function and functional architecture in complex system design.

I am also a liveryman and Court Assistant of the Worshipful Company of Engineers, a Fellow of the Chartered Management Institute, and a member of the Institute of Directors. I also have a certificate in further education teaching. I also studied Strategic Leadership and Management at the Royal Military Academy at Sandhurst, and psychological operations planning whilst a member of the Army Reserve. I have a NEBOSH Certificate in Health and Safety Leadership and a Lean Six Sigma green belt.

My education continues daily, and I am lucky enough to work with several universities as a member of their industry advisory boards. I am also the External Advisor to the Engineering and Innovation Board of Studies at the Open University, as well as an external presenter on a unique MBA module on critical infrastructure at UCL.

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

Where to start, I have had the great fortune to work with incredibly talented people in some of the best engineering organisations some of them global leaders in their field. I have been lucky enough to have travelled extensively whilst working in an extremely diverse range of projects, from studies into future capability needs, strategic acquisition projects of several billions of pounds to complex weapon systems, hi-tech autonomous systems, and currently an infrastructure project considered as being of national significance. I have worked in several industry domains including Defence, Oil and Gas, Rail and Hi-tech and across national boundaries. The most compelling aspect without any doubt is the people I have met and worked with, I have learned from all of them and to me that is progress.

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

Be curious, seek to understand before acting. There is no single path, so keep a broad perspective and be open to opportunities which can come at the most unexpected times and conversations, get involved with what interests you. Following what others have said, speak with people, listen carefully, and engage. We have a world class systems engineering community in the UK and many opportunities to get to know what is happening at the cutting edge of our profession.

Learn to be, and actively become a facilitator. Systems engineering is fundamentally about people, you will find yourself facilitating multiple stakeholders across several different, sometimes conflicting threads. Above everything else, give yourself time to think, explore, learn, and enjoy what you do.