How Do I Get Into Safety?

It is sometimes difficult to plan a career: so many things have to align together for each step on the ladder to take place, whether it is the correct training, organisation, job or assignment, or simply just being in the right place at the right time. We are sometimes asked: "how do I get into safety?"

The answer isn't straightforward. In fact, it is doubly difficult to plan a career in safety engineering, assurance, or consultancy as a solid background in the underlying technologies (such as software, architectures, or databases) and sector knowledge (eg. aviation, nuclear or rail), plus the right opportunities all have to be present.

Safety is often a second career, taken on by engineers or consultants who have already got several years of experience doing other things. Also, there is the issue that not many safety staff are required for most jobs: often there is only one safety engineer on smaller projects; if that role is already taken, there is little chance of a junior gaining relevant experience.

With this situation in mind, in this, the first of a series of articles to be published over the next few newsletter editions, some members of the SCSC Steering Group have shared their experiences of 'getting into safety'. Some of the routes taken are definitely not linear!

Please read and compare with your own 'safety story'. Of course, these experiences are based on events some time ago, and the situation has definitely improved as the industry has matured. For example, there are now courses (at post-graduate level) on safety-critical systems such as those at the University of York, there are competency frameworks for safety roles, and the SCSC has started a new programme called the "Safety Futures Initiative" with the aim of developing young and early-career staff so that they can take on full safety roles.

The messages that come out of these experiences however, are that sometimes you do just have to be in the right place at the right time, and with the right underlying characteristics. All safety roles require the ability to be able to assess risk, to understand some difficult technical arguments, to follow (and create) workable processes, rules and regulations, to know the standards and guidelines relevant to the job in hand, to be able to communicate well, work in a team with colleagues, and very importantly, to be assertive and take a strong position when needed.

Graham Jolliffe

Although it's an awful pun I got into safety by accident (groan). I was an Air Engineer in the Fleet Air Arm (FAA) posted to Boscombe Down to undertake some software integrity tasks on aircraft weapon systems. It was thought I would be good for this task because of my recent experience implementing IT systems. Of course, the two roles had little in common with each other as I soon found out. I subsequently spent a substantial amount of time arguing with industry to take software integrity seriously and not always successfully. I subsequently returned to the FAA for a few more years before retiring from the Royal Navy and accepting a civilian role back at Boscombe Down.

My new role had similarities to my previous experience, but I found that industry was now even less willing to incur the costs associated with high integrity software. What I needed was a systems approach to arguing for appropriate software integrity. The challenge closest to me at the time was being able to demonstrate that the Merlin digital Flight Control System (FCS) was fit for purpose. There had been a long running debate regarding whether Static Code Analysis should be used with no clear decision. It was at this time that I was introduced to Goal Structuring Notation (GSN). By using GSN it was easier to communicate the need for additional evidence to support the use of the FCS. There was some urgency as there was less than a year to go before the aircraft was due to become operational. However, GSN proved its worth and together with identifying an expedient means of conducting a limited analysis of the FCS code, we were able to provide a convincing argument that the FCS code was acceptably safe.

Realising the potential of GSN was like a light coming on, and when mixed with a degree of pragmatism, it enabled the communication of safety to be much better understood by those in authority. This was a turning point in my career, and I've not looked back.

Tom Anderson

My personal interest in safety issues was largely driven by an appreciation of causality with reference to accidents in the railway sector, initially triggered by reading LTC Rolt's lucid treatment in "Red for Danger". However, as an academic at Newcastle University my work was on the generic issues of system dependability, but with a focus on dynamically tolerating faults – especially faults in the design of a system. We established a connection with Bev Littlewood at City University, and that led to the establishment of the Centre for Software Reliability (CSR) in 1984. From the outset CSR actively engaged with industrial and commercial practitioners and this motivated the establishment of a UK industry-based Software Reliability and Metrics Club (which held its first meeting in October 1984).

At that time, the level of control of infrastructure and plant given to embedded computing devices was rapidly increasing and also becoming much more prevalent; this naturally gave rise to significant safety concerns. In response, government, institutions, industry and academia developed a number of initiatives with the aim of raising awareness and addressing the risks to safe operation. The (then) DTI (Department for Trade and Industry) and EPSRC (Engineering and Physical Sciences Research Council) issued a call for proposals to develop a UK community addressing the safety of computer-based systems. Working closely with the BCS (British Computer Society) and the (then) IEE (Institute of Electrical Engineers), CSR put forward a proposal for a Safety-Critical Systems Club; this proposal was awarded three years' funding, but the Club was required to be financially self-sufficient thereafter. A very successful inaugural meeting was held in Manchester in July 1991, attended by 256 delegates. Now, after having had oversight of 25 years of successful operation of the SCSC from its original base in CSR at Newcastle University, it is a pleasure to observe the Club's continued development and growth in recent years while based at the University of York, and now moving to a formally incorporated independent status as a Community Interest Company.

Mike Parsons

I worked on safety systems early in my career – but didn't know it! My first industrial job was a software developer on Gamma camera systems (body scanners used in hospitals looking at things like heart function), but this was way back in time when there was no mention of standards or a safety process. Around 1993, I decided I really wanted to work in the Space sector (my childhood dream was to be an astronaut!) and so joined Logica in 1995 on a very safety-critical project – trajectory monitoring for the Ariane space launcher, working on software quality, configuration management and installations. I wasn't doing safety as such, but was aware of some of the safety analysis being done, and was amused to see probabilities of component failures coming out as negative due to rounding errors!

I got my big break in safety on a space project producing a GPS (Global Positioning System) safety overlay in 2000; I was chosen by the then project manager to do safety as I "had the right attitude" – whatever that meant! I was sent on safety courses and learned the ropes; devising tools and techniques to automate analyses and metrics. It was about this time that I became aware of the SCSC and attended my first Symposium, which I thought was great! From then on it was more and more safety: taking on bid roles, further project safety roles, developing new safety processes, and finally managing all the safety projects in Logica UK, as well as looking after a safety team.

I took on some SCSC roles during this period: I was invited to join the Steering Group by Tom and Joan and later suggested the Data Safety Initiative was formed, becoming the Working Group Leader. I also took on the SCSC Events Coordinator role taking over from Chris Dale.

I had a 3-year spell at NATS (National Air Traffic Services) working on assurance of new cloud-based systems before returning to Logica to cover safety on various healthcare projects. When Tim Kelly left to take up his new life in the Church of England, I took on the SCSC Director role as well. My latest role is on the Assuring Autonomy International Programme at University of York.

Throughout my career I have found the SCSC an invaluable resource, the events interesting and relevant, and club members always helpful and willing to give advice and support. It is a really useful network of like-minded people! My one bit of career advice would be to take any openings you are presented with – you won't get a second chance!

Stories from other members of SCSC Steering Group will appear in future editions. See also Dr Emma Taylor's 60 second interview on page 43 for insight into her career journey.

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