

QINETIQ

# The Trust Factor

The role of trust in training and  
in generating defence capability



September 2021

# Introduction

QinetiQ operates within and across some of the most mission-critical activities for defence and security. Our work in integrating, assuring and operating complex military capability – the latter comprising people, equipment and readiness – involves managing significant operational and operating risk.

Why should our customers trust us with assuring mission-critical outcomes? How do we build trust in the skills and judgment of our people, in the processes and technologies we use, and in the partners we engage with? How do we overcome mistrust between government and industry, and how do we sustain and revitalise trust within a fast-changing environment?

In an effort to elicit more debate on the concept of trust as it relates to the generation and deployment of defence capability, QinetiQ is launching a series of thought pieces, discussions and interventions. This series of short essays introduces the concept of trust and its importance to defence capability in general and to military training in particular.

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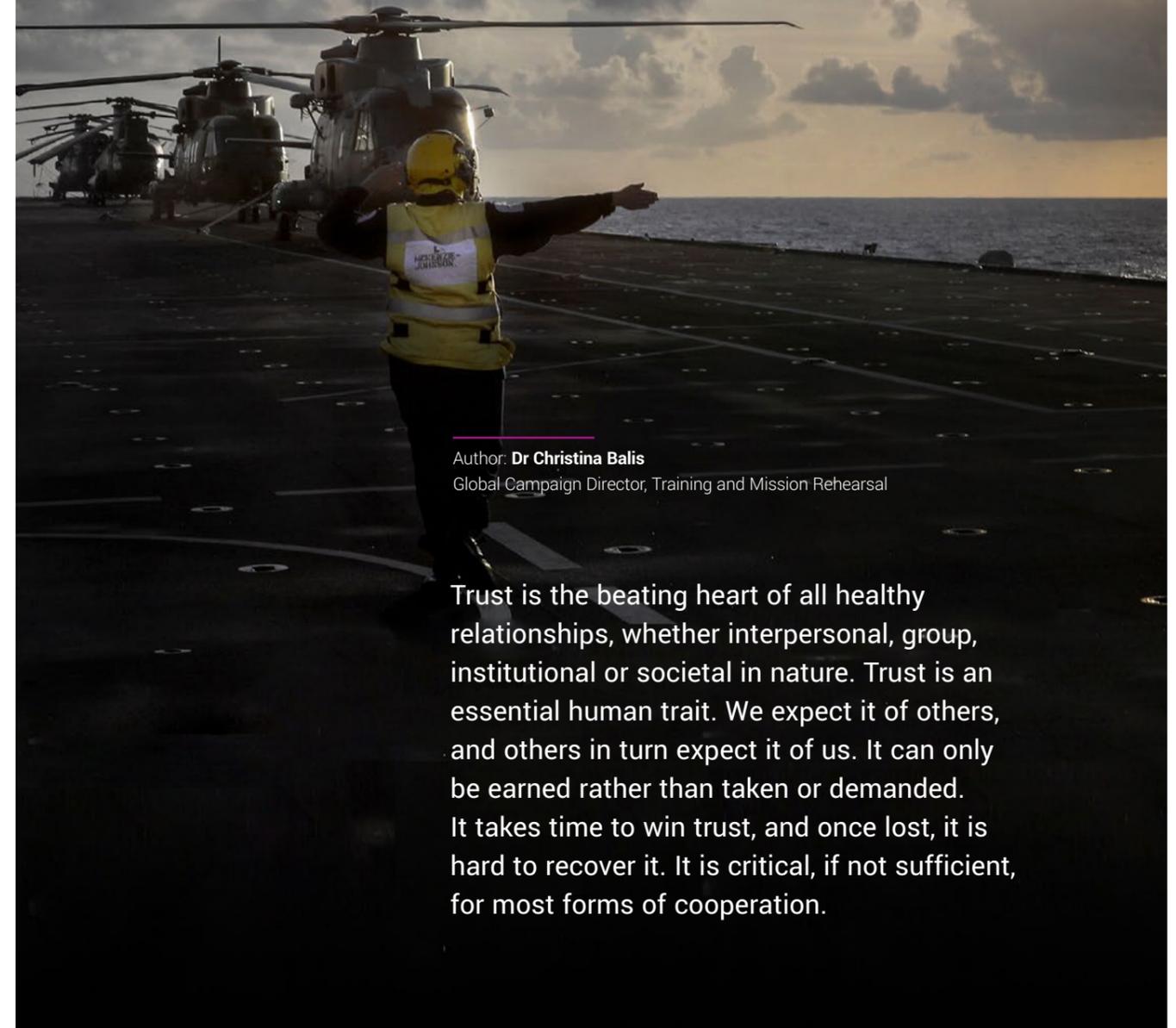
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# Defining trust



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Trust is the beating heart of all healthy relationships, whether interpersonal, group, institutional or societal in nature. Trust is an essential human trait. We expect it of others, and others in turn expect it of us. It can only be earned rather than taken or demanded. It takes time to win trust, and once lost, it is hard to recover it. It is critical, if not sufficient, for most forms of cooperation.



High-performance individuals and teams require empowerment, which in turn depends on trust. Trust assumes its most complete form when it is mutual; when consistently upheld on all sides, trust turns any relationship – personal or professional, individual or collective, charitable or commercial – into a shared experience, nurturing understanding and creating a virtuous circle of mutually reinforcing behaviours.

Despite it being so pervasive a concept (or possibly because of that), trust lacks an established definition.

For sociologists, the motivation of the trustee (the one being trusted) is a critical consideration – belief in one's honesty or fairness is accordingly a precondition of trust.

For psychologists, who have long researched and modelled trust, it is significant how trust is built and sustained as teams get to know each other – building shared understanding of goals, roles and responsibilities; understanding individual styles and preferences; supporting essential co-ordination, monitoring and back-up behaviours; and reinforcing effective leadership and followership.

For philosophers, what distinguishes trust from mere reliance is the acceptance of vulnerability or risk on the part of the trustor (the one trusting). In that sense, trust that cannot be betrayed does not constitute true trust.

Modern management theory underscores the importance of trust as a precondition for the commitment of today's knowledge workers – a social contract of sorts, not unlike what Sovereigns and Governments have had to rely on in various ways since the Age

of Enlightenment. In the so-called Second Machine Age – with its focus on automating cognitive rather than manually intensive tasks – traditional notions of human trust seem both urgent and inadequate when contemplating our future relations with increasingly 'intelligent' machines.

Probably no other profession or institution relies more on trust than the military. Contrary to public perception, trust rather than control shapes modern military command philosophies. In the words of a former US Army Chief of Staff, 'without trust we do not have a profession'.<sup>1</sup> In truth, without trust, no profession, organisation or business can adapt and survive in a changing world.

### Rethinking trust between Defence and Industry

It is easy to be cynical when it comes to the relationship between the public and private sectors. News of lobbying scandals, the high public profile of failed outsourcing initiatives, the delays and cost escalations that afflict nearly every complex government procurement – all contribute to a fundamental erosion of trust in the institutions we work in, interact with, or rely on for essential services.

Lack of competition, transparency, or both, is often stated as a reason for the relative inefficiencies of government contracting. Limited competition, conventional wisdom says, begets complacency and inhibits innovation. Yet, the failures of public procurement we repeatedly observe are not merely a function of choice and competition. Nor is the absence of rules or poor compliance with

them what contributes to mistrust between government and industry. Indeed, it is often the regulations' perceived rigidity or rigid adherence to them that hinders the development of mutually beneficial relationships in support of the taxpayer's interest. The reasons for the existence or absence of trust are much more complex than the headlines suggest.

It is exactly ten years since the release of the independent Levene report on UK defence reform. Among the many proposals put forward, the report sought to formalise the concept of 'Whole Force' in an effort 'to ensure that Defence is supported by the most cost-effective balance of regular military personnel, reservists, MOD civilians and contractors'.

Coming on the heels of the 2007-2008 global financial crisis and foreshadowing the 'age of austerity', the Whole Force concept was seen as a way to drive efficiencies for the UK Ministry of Defence. At a time of significant cuts in defence spending, equipment, and armed forces' size, reliance on a more optimal blend of civil service and contractor personnel was seen as critical to preserving front-line military capability.<sup>3</sup>

Since then, many analysts have pointed to a failure to fully operationalise the Whole Force. Despite its evolution from a mere 'concept' to an 'approach', and notwithstanding a growing recognition of industry's role as an essential component of a broader Defence Enterprise, traditional conceptions of outsourcing as primarily a source and a driver of cost efficiencies remain.

The concept of 'partnership', though not new, has only recently started to be embraced. As a recent study concluded, 'if the potential of the Whole Force is to be realised, the Defence-Industry relationship needs to evolve into a partnership model ... The key to improving the relationship is the development of trust and incentives to work collaboratively'.<sup>4</sup> Offering official backing for such an approach, the UK government's 2021 defence industrial strategy specifically calls for a 'deeper, more sophisticated, and strategic relationship between government and industry which is more direct, trusted, and transparent'.<sup>5</sup>

The challenges of building trust among buyers, providers, and users of defence capability are well known. They include, among others, cultural differences between military and civilian organisations, inflexible acquisition processes and an innate risk-aversion bias characteristic of all parties involved in government procurement. As many of these challenges are deeply ingrained, rethinking the importance of trust and how it can be built, rebuilt, and sustained – across the Whole Force as a team – is fundamental to a future effective Defence Enterprise.

### The importance of trust in defence training

As an essential crosscutting component of all defence capability, training presents a special case when considering the notion of trust. To man, organise, train and lead forces has always been the military's core function. Training is so fundamental to the military's success in battle that its execution has long been seen as the exclusive preserve of men and women in uniform – an activity too important to be left to the profit-making private sector.

Consequently, responsibility for military training can never be fully 'outsourced' just as the task of learning – at personal, team and organisational level – cannot be simply handed over to a third party. No professional organisation would willingly choose to give up control over the preparation and continuous development of its human capital.

However, the demands of modern military training are such that an exclusively institutional approach is no longer tenable. Systems have become too complex, resources (and personnel) are too constrained, and the pace of change is too unpredictable to justify time-consuming development of in-house skills that cannot be sustained at the typical high turnover rates of military staff. These challenges are compounded where armed forces have significantly downsized and/or have increased their operational tempo.

Training effectiveness depends on a combination of factors, including the degree of immersion and realism of the training environment, the tailored adaptation of challenge to a training audience's skills and experience, and the ability (as well as willingness) to make objective assessments of performance as the basis for further improvement. Fundamentally, though, training effectiveness is a function of how well the trainee is able to apply learning – with the right balance of brawn and brain – for operational effect. Unlike other aspects of defence capability, technology is not what defines the quality of training. All training requires some level of intellectual engagement. The cognitive dimension of training becomes particularly critical in complex scenarios involving numerous actors, when decisions at tactical, operational or strategic level must be made under time pressure and amidst competing signals.

The answer to all these challenges is long-term collaborative partnerships with external providers. Trust more than anything else is the key ingredient of such successful partnerships. Trust cannot flourish in transactional settings driven by short-sighted needs or short-term returns. The success of training partnerships will depend on building and maintaining trust across all stakeholders of the Defence Training Enterprise and on greater openness to challenging how training can support effective future force generation.

<sup>2</sup> Ministry of Defence, *Defence Reform: An Independent Report into the Structure and Management of the Ministry of Defence* (London: The Stationery Office, June 2011), p. 71.

<sup>3</sup> While a British term, the concept of 'Whole Force' has resonance in other countries that have embraced public-private partnerships and greater industry integration into defence activities.

<sup>4</sup> John Gearson, Philip Berry, Joe Devanny and Nina Musgrave, *The Whole Force by Design: Optimising Defence to Meet Future Challenges* (London: Serco Institute/King's College, October 2020), p. 5.

<sup>5</sup> HM Government, *Defence and Security Industrial Strategy* (London: The Stationery Office, March 2021), p. 79.



The importance of

# trust

within teams

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Over the last 30 years or so, scientists have conducted hundreds of studies exploring the role of trust in teams. This huge research effort has led to almost universal consensus about the important role trust plays in team performance.

## The importance of trust within teams

“The importance of trust as a moderator of teamwork effectiveness is recognised in many of the most prominent teamwork models.”

Conversely, when trust is high, teams are far more likely to share feelings of vulnerability and work through any differences they have – resulting in higher quality outputs. This is also a finding QinetiQ’s researchers observed when supporting the selection and assessment of personnel applying for Ammunition Technician roles. We consistently saw that those personnel who had a natural tendency (or preference) to seek-out and build deep relationships with others based on mutual trust were likely to face fewer challenges in the role.

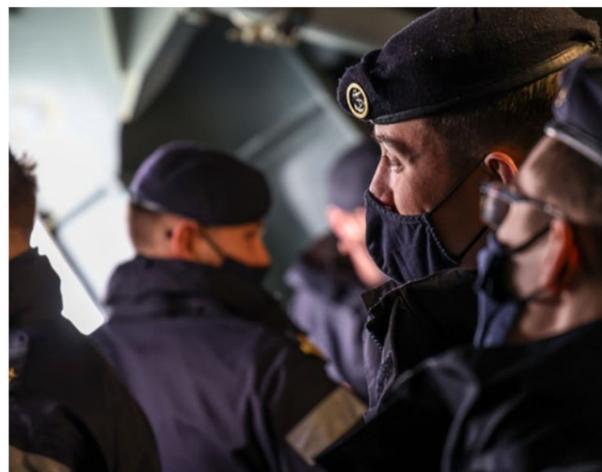
De Jong et al’s study was also important for two other reasons. Firstly, the analysis the authors conducted allowed them to review whether the structure of a team changes the relationship between trust and performance. They found that the greater the interdependence between team members (i.e. the more they have to rely on others to get the job done because they share common goals) the more trust matters. Secondly, they found that if team members have high autonomy and can complete a task without input from other team members (i.e. they can do the job themselves) then trust matters a lot less – reflecting the importance of trust in military training and operations.

Trust is also important for virtual teams. In the last year, we have seen many more teams work virtually than ever before. But even prior to COVID-19, researchers had found that trust remains a key component of team effectiveness. Breuer, Hüffmeier and Hertel (2016) conducted a meta-analysis of 52 studies that investigated the role of trust in virtual teams. They found a strong and positive relationship between trust and virtual team effectiveness, particularly in relation to the extent to which individuals are willing to share information and knowledge.

A main finding from the literature is that trust is one of the critical factors considered to underpin both effective team behaviours and effectiveness outcomes (e.g. Costa et al, 2018).<sup>1</sup> In fact, the importance of trust as a moderator of teamwork effectiveness is recognised in many of the most prominent teamwork models in the team science literature. For example, world-leading teamwork expert, Eduardo Salas – who developed the ‘Big 5’ model of teamwork used in many organisational team training initiatives – argued that mutual trust within the team was essential for mutual team monitoring and for overall team effectiveness.<sup>2</sup>

In 2016, De Jong et al<sup>3</sup> published a meta-analysis looking into the relationship between trust and team performance. The study drew on data from 112 studies and represented over 7,700 teams. It found there is a positive relationship between intra-team trust (how much team members trust one another) and team performance. This relationship still existed, even when factors such as team leadership and performance history were taken into account.

The authors also discovered that when there is a lack of trust in a team (i.e. feelings of vulnerability and uncertainty are high), personal interests are much more likely to be a focus and a priority for individual team members.



## The importance of trust within teams



## Trust and team performance – why it matters

History is replete with examples from many domains where high levels of trust and cohesion have contributed to incredible team successes. Equally, there are many instances where a failure of trust within a team has led to disaster.

A famous example of team success where trust played a critical role was the rescue of the 1970 Apollo 13 mission crew, following a significant explosion on-board after its launch. Faced with a seriously damaged flight capsule and unprecedented circumstances, urgent repairs to on-board systems were required to keep the crew alive and get the astronauts back home safely.

Crucially, NASA’s Flight Director, Gene Kranz, demonstrated deep trust in his various ground teams of technical experts, handing over control to allow them to generate highly adaptive solutions without interference. Similarly, the crew aboard the NASA capsule developed high levels of swift trust and mutual respect with the mission teams on the ground, with each demonstrating deep faith in the other’s capabilities and solutions.

The aviation sector offers many past examples of team trust failures. Many of these have their origin in so-called perceived cockpit hierarchies and the associated power imbalances that they create within the team. This can lead senior flight personnel to have a lack of trust and respect for the views of more junior colleagues and make these less-experienced team members feel they cannot speak-up.

A classic example from 1978 involved United Airlines (UA) Flight 175, which circled Portland airport for more than an hour, while the flight-crew tried to resolve a (minor) landing-gear problem. As time went on, the plane simply ran out of fuel and crashed, killing several aboard. Among the causal factors cited for what seemed at first an inexplicable incident, were the captain’s failure to act on the communicated concerns of the flight crew on the fuel situation and the lack of assertion in how the flight crew communicated their concerns to the captain. This accident led directly to the development of Crew Resource Management (CRM) training, which made teamwork effectiveness a critical training imperative.

<sup>1</sup> Ana Cristina Costa, C. Ashley Fulmer and Neil R. Anderson, ‘Trust in Work Teams: An Integrative Review, Multilevel Model, and Future Directions’, *Journal of Organizational Behavior* (Vol. 39, No. 2, February 2018): pp. 169-184.

<sup>2</sup> Eduardo Salas, Dana E. Sims and C. Shawn Burke, ‘Is there a “Big Five” in Teamwork?’, *Small Group Research* (Vol. 36, No. 5, October 2005), pp. 555–599.

<sup>3</sup> Bart A. Jong, Kurt T. Dirks, and Nicole Gillespie, ‘Trust and Team Performance: A Meta-analysis of Main Effects, Moderators, and Covariates’, *Journal of Applied Psychology* (Vol. 101, No. 8, April 2016): pp. 1134-150.

## Types of teams and the differing challenges they face

Not all teams are the same and it is important to understand how different types of teams develop trust. In the future, there will be far more ad-hoc, hybrid, and even non-human teams. It is also likely that we will see the increased creation of teams from different cultures all over the world.

Ad-hoc teams are those whose team members are typically completely unfamiliar with each other. These have also been labelled Swift Starting Action Teams (STATs).<sup>4</sup> Examples might include a cross-organisation procurement team, brought together to develop a technology design, or a multinational team of military personnel, supplemented by civilian SMEs, to staff a NATO Command and Control (C2) headquarters.

Hybrid teams are those defined by their fluid membership, which may result in a partial or a complete variation in their composition and size across (and during) different organisational tasks. For example, an emergency trauma team brought together rapidly to provide urgent treatment for a patient – composed of consultants, anaesthetists, nurses and other clinical staff. Often, many of these staff, typically supplemented by agency personnel, have not worked together previously.



Ad-hoc and hybrid teams can face significant challenges in working together effectively. The lack of awareness of the knowledge, attitudes and ways of working of other team members can potentially result in problems, such as misunderstandings of other team member roles and responsibilities, and breakdowns in communication and situation awareness. They can also lead to gaps in understanding of how to best co-ordinate and support others, and, not surprisingly, difficulties in developing trust and cohesion because of the lack of team familiarity.

Team performance in these type of groups is also likely to be shaped by potential organisational and national cultural differences relating to ways of working. An example team might be an agile allied military force formed from entities from different nations (who may also be distributed).

It has been suggested that multinational teams can find teamwork challenging if individuals hold in-group / out-group biases, or stereotypes and biases about diverse groups that may impact trust calibration. In addition, they may also hold mistaken, shared perceptions and assumptions for anticipated ways of working, which may trigger more failures in core teamwork leadership and support activities. This is also likely to be exacerbated in those structures where the team is composed of multiple sub-teams, each bringing their own organisational culture, processes and expectations. A number of trust misunderstandings are noted with virtual teams linked to culturally diverse approaches to implicit versus explicit communication styles.

<sup>4</sup> Jessica L. Wildman, Marissa L. Shuffler, Elizabeth H. Lazzara, Stephen M. Fiore, C. Shawn Burke, Eduardo Salas and Sena Garven, 'Trust Development in Swift Starting Action Teams: A Multilevel Framework', *Group & Organization Management* (Vol. 37, No. 2, March 2012), pp. 137–170.

## Creating trust within teams

Given the importance of trust to team performance and the critical role relationships play in establishing that trust, how do we go about building the necessary competencies to create trust in teams? Many people assume, incorrectly, that an effective way to achieve this is through team-building events and exercises.

Professor Adam Grant of Wharton Business School suggests instead that the best way to build trust quickly between team members is to hold events that provoke 'deep fun'. These are the kind of events that lead to lasting relationships and meaningful connections (i.e. where people trust one another). 'Deep fun' occurs when people try to solve hard problems with high stakes. It is this type of exercise that is used to train multi-national astronauts assigned to work together on the International Space Station.<sup>5</sup>

Although trust in teams can potentially be achieved quickly, it often takes time to build. In a standard team development lifecycle, it has been argued that teams should have access to larger solid blocks of time together to undertake tasks that also contain high-levels of uncertainty. Astronauts do this by 'going into the wilderness' together, requiring them to spend considerable collective time in an environment with high-levels of task uncertainty.

According to Professor Adam Grant<sup>6</sup>, this activity means they cannot rely on small talk, and have to get to know each other on a deeper (and more authentic) level. This type of event also gives them shared problems to solve, which helps build shared mental models that will support effective teamwork and the development of deeper levels of trust.

As Morgan and colleagues identified in their well-known team development framework from the 1960s,<sup>6</sup> a team will become increasingly integrated as it travels through forming, storming and norming phases, among others. Trust plays a key role during these development phases. As team members get to know each other, trust-development facilitates the shared understanding of team goals, roles and responsibilities; a gradual shared understanding of individual styles and preferences; the support of essential co-ordination, monitoring and back-up behaviours; and the reinforcement of effective leadership and followership relations. As the team matures, by focusing teamwork training on the specific attitudes and behaviours associated with each developmental stage, trust will be reinforced through normative processes of social exchange and leadership.

A study<sup>7</sup> looking at international capacity-building teams found that strong trust culture came from early successful practice of particular behaviours, including: demonstrating technical competence; openness with information; reciprocity of support; and perceived integrity in decision-making and other actions. Later, deeper trust came from actions around benevolence and inclusion. These highlight potential themes to incorporate into teamwork training that could be of relevance across other examples of cross-cultural teams.



<sup>5</sup> What Your Startup Can Learn from Astronauts, The Daily Show, and the Coach of the Boston Celtics', *First Round Review*, accessed 10 August 2021.

<sup>6</sup> Bruce W. Tuckman, 'Developmental sequence in small groups', *Psychological Bulletin* (Vol. 63, No. 3, June 1965), pp. 384-399.

<sup>7</sup> Castleton Partners / TCO International Diversity Management, *Building Trust in Diverse Teams*, Scoping Study Report, February 2007.

The importance of trust within teams



**The role of team leader**

What can team leaders do to help engender and accelerate a sense of trust within their teams? Researchers suggest that the leaders of STATs can best facilitate the fast-paced formation and performance of agile adaptive teams by setting the tone for trust norms and by the early shaping of a positive social climate (e.g. identifying and resolving any signs of conflict). Leaders should also demonstrate trust in team members, as this has an important behaviour modelling impact on the emergent perceptions formed by other (new) team members.<sup>8</sup>

Others have identified a range of practical leadership guidance implications when trying to build early trust in virtual teams.<sup>9</sup>

These included the need for leaders to:

- establish strong communication norms
- develop an appropriate hierarchy that creates a sense of procedural justice
- form stable team interdependencies arranged through flexible, but explicit, shared working contracts.

Team leaders also need to ensure that a positive team climate is created where individuals are treated consistently and equitably to support team trust formation. Once again, these are all teamwork approaches that can be rehearsed in training settings by those adopting leadership roles.

**How teams will look in the future**

In the future, there are likely to be increasing examples of organisational teams (including military groups) whose configuration and membership do not necessarily reflect the type of mature stable team structures that have often been the beneficiaries of traditional teamwork training support.

Instead, these ad-hoc and hybrid teams may be composed of individuals and capabilities brought together in agile ways to meet adaptively specific organisational objectives, before rapidly disbanding. These teams may also draw on personnel originating from multiple organisational entities and from across national and cultural boundaries. Further, with the support of increasingly advanced and media-rich communications channels, these teams may also co-ordinate their tasks in distributed and potentially virtual structures.

Such teams will likely:

- be harder to lead
- find core teamwork feedback and back-up behaviours more difficult to successfully implement
- suffer disruption to their shared situation awareness
- challenge the development of effective levels of team trust and cohesion.

<sup>8</sup> Dora C. Lau, and Robert C. Liden, 'Antecedents of Coworker Trust: Leaders' blessings', *Journal of Applied Psychology* (Vol. 93, No. 5, October 2008): pp. 1130-1138.  
<sup>9</sup> Cristina B. Gibson and Jennifer A. Manuel, 'Building Trust: Effective Multicultural Communication Processes in Virtual Teams', in Cristina B Gibson and Susan G. Cohen (eds), *Virtual Teams That Work* (San Francisco, CA: Jossey-Bass, 2003), pp. 59-86.

The importance of trust within teams

**What part can training play in building a good team?**

Trust is central to team performance and is something that may be built up over time, or potentially more swiftly. Trust can also differ according to the team context. Not all teams are equal, and in the future a greater number of ad-hoc and hybrid teams will be created. It's also likely that we will see an increased creation of multi-national teams spanning different cultures.

A number of ideas have been explored when thinking about trust development in these team structures. One of the best known is the concept of 'swift trust'.<sup>10</sup> In swift trust theory, it is suggested that a rapidly formed team, which has had little previous time to socialise, needs to be open to trust initially and then later seek to verify and adjust those early trust beliefs based on 'social proof' and interactions with others. This swift trust is often founded on obtaining initial confirmation of technical (role) competence, with deeper teamwork-based trust potentially forming later. Nootboom (2002)<sup>11</sup> suggests that, for virtual teamwork, organisations should seek to reduce 'cognitive distance', achieving sufficient alignment of mental models to use complementary capabilities in achieving a common goal – effectively operating with 'just enough' trust.

Teamwork training should therefore help ad-hoc and hybrid teams understand swift trust mechanisms and practice more generic teamwork skills. These include providing open forums for communication and internal feedback, as well as approaches for managing any emerging team conflicts. Training should also help team leaders tune into the indicators of potential deteriorating or dysfunctional teamwork performance – particularly when operating in virtual structures.

Innovative team training approaches may be needed that increasingly focus on reinforcing the teamwork behaviours and attitudes associated with practicing swift-trust mechanisms. In addition, team training will need to help team leaders and team members understand and recognise the particular challenges of these emergent teamwork environments and to practice the behaviours required to be effective within them – both in synthetic and real-world training environments.



“We will see an increased creation of multi-national teams spanning different cultures.”

<sup>10</sup> Debra Meyerson, Karl E. Weick and Roderick M. Kramer, 'Swift Trust and Temporary Groups', in Roderick M. Kramer and Tom R. Tyler (eds), *Trust in Organizations: Frontiers of Theory and Research* (Thousand Oaks, CA: Sage Publications Inc., 1996), pp. 166-195.  
<sup>11</sup> Bart Nootboom, *Trust, Forms, Foundations, Functions, Failures and Figures* (Cheltenham, UK, and Northampton, MA: Edward Elgar, 2002).

# Trust in action

## a personal case study of misplaced trust

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Psychologist Team Lead, Psychology and Systems

Several years ago, I worked on a team project where I was given the opportunity to work with a highly renowned and respected individual. At the time I was very excited to be working in a team with this person. I considered it a career highlight and the creation of this team was, in truth, the reason we won the business. I had never worked with either this person or their organisation before, but because of their expertise I immediately trusted them to be competent and to deliver a high-quality piece of work.

Over time the project progressed and we moved towards the delivery date. In the weeks leading up to the deadline I began to have concerns about the quality of work that was being produced. Each draft was poorly written and contained multiple errors. When I challenged the individual about this it became clear that they had delegated large parts of the task to a more junior person within their team. They promised to ensure that the final draft was well written and error free. I accepted this reassurance because I trusted them to deliver.

When the deadline finally arrived, the work they produced was simply not up-to-scratch. It was nothing short of a disaster! With insufficient time left to correct this, I was forced to have a very honest conversation with my customer. Fortunately, the relationship with my customer had been built on several years of successful delivery and so they trusted me to make it right.

I've reflected on this project a few times since and I've thought long and hard about why my trust was misplaced and why the trust from my customer and colleagues was not. Put simply, I had trusted someone for the wrong reasons and hadn't dedicated time and effort towards building that trust. I was guilty of trusting someone too much, based solely on my perception of their competence

and ability and not on my own experience of working with them. Conversely, while these events could have led to a total breakdown in trust between myself and my customer, I was fortunate to have an existing relationship with them that was based on integrity as well as on my technical competence. This helped them make the decision to give me the time and freedom I needed to 'make things right', and, in the long run, it may have strengthened our relationship even more, because we ultimately became part of the team that delivered what they needed.

According to the literature covering trust in teams, trusting the individual concerned to do a great job solely because of how we perceive their competence is a huge, and common, mistake. Mayer et al (1995)<sup>1</sup> found that when people evaluate the trustworthiness of others, they often focus on three things: competence, benevolence (motivation to do good) and integrity (adherence to acceptable principles).

I was a living example of doing just that! I also didn't dedicate enough time to developing my relationship with the individual. As the research shows, we should spend time with people we need to trust. If we have to build trust quickly then we must work together on problems that matter, and that also contain high levels of uncertainty. In my case, the way the work was divided up at the outset didn't support that level of collaboration and instead of solving problems together we mostly worked on separate tasks.

Luckily for me, all was well in the end, and I'm now far more aware of how easy it is to misplace trust. With hindsight, it's an experience I don't regret having. As Henry Ford famously said "The only real mistake is the one from which we learn nothing".



"The only real mistake is the one from which we learn nothing."

Henry Ford

<sup>1</sup> Roger C. Mayer, James H. Davis and F. David Schoorman, 'An Integrative Model of Organizational Trust', *Academy of Management Review* (Vol. 20, No. 3, July 1995): pp. 709-734.



# The future of teams

The move towards human /  
machine teams and how this  
impacts on trust

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The use of Robotic and Autonomous Systems (RAS) is a significant growth area, widening in scope of application to deliver greater effect – particularly for those dull, dirty and dangerous tasks.

This brings a range of associated Human Factors (HF) issues, which can have significant safety, security, and legal / ethical implications. The development of trust in the use of RAS is a critical element in their acceptance and appropriate use / deployment to meet mission goals in a safe, secure and legal way.

An Autonomous System (AS) is capable of understanding higher-level intent and direction. From this understanding, and its perception of its environment, such a system is able to take appropriate action to bring about a desired state or achieve goals. It is capable of deciding a course of action, from a number of alternatives, without being dependent on human oversight and control, although humans may still be present. At this higher end of the autonomy spectrum an AS can select multiple possible actions in order to achieve its goals. The actions chosen may depend on the current situation (in relation to both the internal system state and external factors, such as environment) together with pre-defined criteria and rules.

The focus here is on the trust-related issues associated with more sophisticated AS, extending to those that incorporate artificial intelligence and machine learning, rather than systems that may be controlled remotely by human users, such as Uncrewed Vehicle (UxV) Ground Control Stations. In our experience, the development of trust, and building operator confidence, will be more relevant as AS become orientated towards the higher end of the autonomy spectrum; designed to perform mission-critical tasks as an independent member of the team. However, in failure and reversionary mode situations, there will be a need to bring the human user back into the control loop, which can bring its own set of complications, as the user may not have maintained sufficient Situation Awareness (SA) to have a sufficient understanding of the situation and undertake an informed intervention.

### Teaming humans and machines

Given the limited degree of full autonomy implementation today – particularly in the military context – in the near-term, much can be done to ease the operator's challenge of managing multiple heterogeneous systems / vehicles undertaking complex missions. In this context, full autonomy will tend to be limited to very specific aspects of task execution, and a toolset of integrated applications will be required if users are not to be overloaded. The domain environment will also affect the degree of autonomy that may be feasible; for example, in the sub-surface domain, there are very few constraints and rules and so sub-surface vehicles can work in a more fully autonomous mode of operation.

Looking to the longer term, where the scope and scale of autonomy can be expected to rise dramatically, a different approach is required as the AS becomes more of a collaborative team member. For high performing collaborative human teams within mission-critical situations, the development and maintenance of trust is crucial to deliver effective performance. Therefore, it will be important to design and implement features and functionality that enable a symbiotic collaborative relationship between the human element and a higher-end AS that could be capable of intelligent thought.

Even further in the future, and while we are not there yet, there is an aspiration for fully autonomous systems. Indeed, some wish to remove the human from the loop completely, a decision which brings significant ethical and legal implications – especially where the use of lethal effects may be involved, potentially leading to loss of life. In this situation one could argue that there is no teaming, as there is no human in the loop. An alternative perspective is that, given these ethical considerations, there will continue to be a need for personnel with the ability and resourcefulness to respond effectively to surprise / unplanned situations to be involved in the decision-making cycle at some point.

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**“The development of trust and building the operator's confidence in AS will become more relevant as they become orientated towards the higher end of the autonomy spectrum.”**



An alternative approach to human / machine teaming, which we have explored in studies and experimental investigations, is that of adaptable / adaptive autonomy, where the level of autonomy varies dependent on the situation. This means that as the scenario progresses there is a switch as to whether the operator undertakes a particular task or the machine (autonomy), dependent on the circumstances.

With respect to this approach:

- adaptable autonomy is where the user tailors the level of automation / initiates the switch;
- adaptive autonomy is where there is an automatic re-balancing of tasks.

We found that the concept of adaptable / adaptive autonomy had considerable merit from a user perspective. Furthermore, there was a definite preference for the human user to be in control of triggering shifts in level of autonomy that bought with it a greater reported level of trust.

### Trusting in RAS

The development of trust and building the operator's confidence in AS will become more relevant as they become orientated towards the higher end of the autonomy spectrum. With greater functionality and more frequent use, user acceptance and trust will increase. However, maintaining that trust will be dependent on the system functioning as expected.

In order for operators to build and maintain faith in AS, a key aspect will be having visibility of the inner workings of a system and developing a solid understanding of how it is arriving at its recommended courses of action.

On the other hand, once autonomous functionality is enabled successfully, with predictable and reliable outcomes / actions, there is a risk that if users have blind-faith they will rely too heavily on autonomous functionality and therefore over-trust the system. Over-trust brings a different set of complications as the user may then feel disinclined to maintain SA and so not be in a position to intervene in critical situations.

## The future of teams

## Enhancing trust through design

Drawing on recent work, QinetiQ has developed a construct that helps identify which design features should be incorporated within highly autonomous systems to enhance trust. According to this approach, the system should be understandable, transparent, humanised and intuitive. Additional AS features, capabilities and performance found to enhance trust cover aspects such as reliability, predictability, and repeatability.

This construct is associated with two compatible approaches:

Firstly, anthropomorphism – an inference process involving the attribution of human-related characteristics to machine equipment, such as the ability for rational thought and conscious feeling rather than a human-like face or body. It is the incorporation of these features into the AS that results in the development of greater trust.

Secondly, a three-layered model covering dispositional trust, situational trust and learned trust. This model provides a new lens for conceptualising the human-related aspects in trust development and can be used as a basis for the design of autonomous vehicles.

### Dispositional trust

Relates to an individual's pre-disposed tendency to trust, influenced by culture, age, gender and personality traits.

### Situational trust

Relates to the context – including environmental setting, task difficulty and user workload.

### Learned trust

Relates to the design features that may affect perceptions of performance and level of trust, and as such is particularly relevant.

The incorporation of design features in five areas, in conjunction with higher levels of anthropomorphism, can engender a higher degree of trust, as has been found in trials with UxVs. These five areas are described below.

### 1. Transparency

The explicit portrayal of the inner workings and logic of the AS, including traceability of the reliability of the AS and explanations for any errors that might be made. This aspect is key, as being able to interrogate an automated function to understand why it did something is crucial. The user needs to understand what is going on 'underneath the hood', in terms of what the algorithms are doing and how they are arriving at their decisions.

### 2. Appearance

The provision of a well-designed interface that is aesthetically pleasing, with anthropomorphic features including name, gender and appropriate essential characteristics. For example, an AS intended for lethal action should appear menacing and sinister.

### 3. Ease of use

The provision of enhanced system usability and visual clarity of data, with ongoing salient feedback on such aspects as: progress with respect to task execution; system state; and potential hazards. Layers of tote pages or pull-down windows should be avoided as this will detract from the task in hand and likely result in a reduction in SA for the operator.

See 'ticker tape; example below

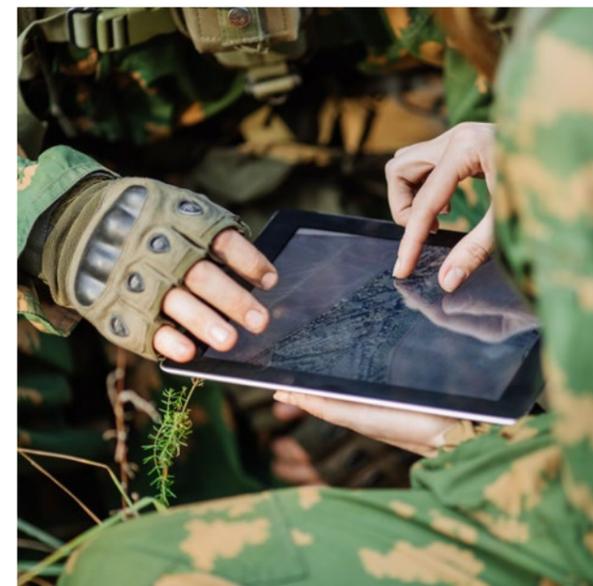
### 4. Communication style

The use of verbal communication, instead of text, with human voice rather than synthetic speech. The impact of the use of human voice can be further enhanced by using accents reflecting those of the individual user. Verbal interrogation and response can minimise loss of focus in the task and is the natural means by which humans already relate and exchange information with one another. In addition, demonstrating good etiquette and politeness by adopting behaviours such as not interrupting and being patient are important.

### 5. Level of operator-control

For highly autonomous systems, the operator could potentially be taken out of the loop altogether, but trust may be more effectively maintained if ongoing information is provided to them. Keeping the operator in the loop in some way can be useful in building confidence. For example, knowing that should an operator glean information that the AS does not have, the operator can still influence the AS to achieve the tasks, auto-destruct or auto-home.

## The future of teams



“The potential of emerging training technologies such as Virtual Reality (VR) and Augmented Reality (AR), to enhance understanding of a system's plan, decision or action, should be harnessed and used to help develop operator trust and acceptance of new technology.”

## Data considerations

There is a growing number of AS and, in particular, a plethora of increased data being provided into the Command and Control (C2) system from numerous UxVs. These systems have the ability to generate huge amounts of data, which the human user has to assimilate in order to understand the information and make effective decisions. This vast amount of data needs to be received, handled, managed, processed, analysed and exploited for the human user. This indicates a clear need for automatic data processing to reduce the totality of the data into manageable data sets. There are also legal and ethical considerations for data collection and analysis. It may be necessary to pre-define how long different types of data should be stored, dependent on its sensitivity, and what data can actually be stored, for example people's faces.

Building operator-confidence in AS / UxVs and the data they provide is crucial, particularly in challenging environmental conditions where the human user needs to be able to trust the data provided. It may be important to decide in advance what an appropriate level of trust in the data should be, and then provide training to develop familiarity and ensure the required level of trust is gained.

## Building trust through training

In our experience, from trials and experiments, users need to be trained in how the AS works and understand its functionality before it can be trusted. Without appropriate training, users will be unable to comprehend how autonomous capabilities operate, and therefore will not trust the functionality. However, once AS are in service and reliable the issue may be that users become complacent and develop a tendency to over-trust the systems.

The potential of emerging training technologies such as Virtual Reality (VR) and Augmented Reality (AR), to enhance understanding of a system's plan, decision or action, should be harnessed and used to help develop operator trust and acceptance of new technology.

In the military context, with respect to UxVs, they can be considered as another asset to be deployed to undertake missions / collect data and information. In this context, a large proportion of the training gap can be considered as very much limited to capabilities and limitations specific to different UxV types – in the same way as a new helicopter or Rigid Inflatable Boat (RIB). As such, this gap can be addressed as on-the-job acquisition of knowledge in the same way as capabilities and limitations would need to be learnt with respect to a new RIB or Helicopter.



# The triangle of trust

Building trust among buyers, providers and users of defence training capability

Author: **Alan Whittle MBE**  
Director of Strategy and Plans, Inzpire

## The triangle of trust



## The evolving role of industry in defence training

### Then and now...

For a long time, simulators and synthetic training devices were built to simply allow procedures to be trained and practiced. How to stop and start engines; how to deal with emergencies, etc. Whether it be sea states, weather, or flight models, the synthetic environment was always briefed as a close approximation of the 'real thing' which mattered little, as the primary aim was not to use the device as an emulation of real life, but as a mere approximation of real-world conditions. This could be achieved safe in the knowledge that an hour in the simulator every six months would be underpinned by operating in the actual machine just about every working day. Differences were known, understood and accepted.

Fast forward to the current era, and using flight simulation as an exemplar, 5th and 6th generation aircraft are not only expensive to operate, but the equipment- and the aircraft-associated signatures can't be used in their operational modes during training because space-based and other intelligence, surveillance and reconnaissance (ISR) assets could be watching and recording everything. Tactics, Techniques and Procedures (TTPs) will be learned and understood by our adversaries and counter-TTPs developed.

In addition, aircraft are now being designed to minimise the challenges faced by flying them, with those skills being largely automated. This allows the crew to train and develop skills in operating the multitude of sights, sensors and weapons on board and using them to best effect to achieve the optimum operational outcome.

In short, the individual and team training objectives are being enhanced with an operational imperative in mind and – as much as is technically feasible – the synthetic environment is being designed to more closely replicate the real world rather than simply simulate it. Across every domain, synthetic environments are now essential to all aspects of training, mission rehearsal, and debrief.

## The triangle of trust

### The importance of trust

It goes without saying that the operators of complex military platforms must have complete trust in the devices that train them, and in the instructors or White Force designing and inputting the training content – as they are becoming the prime source of all training matters. Operatives' lives literally depend on them. A bad day on Operation HERRICK would become known as a 'Mountain Dragon' day, based on the name of the exercises delivered as part of pre-deployment training to Afghanistan for the Land and Air community. The Whole Force team that delivered these events so successfully consisted of a blend of industry partners – including Inzpire and QinetiQ, military staff, DSTL and commercial personnel – who worked tirelessly and efficiently as a true team to achieve results that would genuinely save lives.

These training domains are by their nature manifested by technically complex, inter-operable, inter-dependable, synthetic training devices that depend on a deep and tacit understanding of the technology involved, in concert with a profound understanding of the training and enabling objectives required of them.

### The benefits of a Whole Force approach

The environment described above does not suit a wholly military training force that is transient by its very nature, as the training output would be perpetually fettered by a training cadre constantly reinventing itself, whilst coming to terms with the complex training environment.

Instead, a Whole Force approach should be implemented, based on a deeper, more effective integration by all parties. Clearly, there must be total trust between industry partners and their military counterparts; based not solely on previous experience of designing, developing and delivering effective training, but also on a proven and demonstrable history of engendering truth, honesty, and humility – with an esprit de corps grounded in shared experiences and an understanding of the importance of a positive training outcome.

In concert with the increased drive for efficiencies in the numbers of uniformed military personnel, the diversity in the training outcomes required has increased. Disparate branches of the different military domains are routinely operating together in order to create the most potent and effective outcomes.

It makes sense, therefore, that the focus of uniformed personnel turns to front line tasking, leaving more of the training outcomes to be delivered by a well-trained and committed industry personnel cadre, most of whom have a military background in specialist areas and can therefore be trusted to have the necessary levels of commitment, honour, humility and experience. This should be viewed as a force for good, where the Whole Force is simply seen as a normal and necessary extension of military capability.

This commitment to establishing and maintaining a Whole Force structure with front line military personnel, the reserves, the Civil Service, and industry being trusted to deliver their part in the enterprise, should in turn offer cost efficiencies through lower staff turnover rates, along with the savings that can be made through the provision of third-party assets and services.

If we accept that future force reductions will necessarily increase the reliance on contracted third-party training provision – with a commensurate increase in the trust required of the military/ industrial relationship – then the increase in autonomy through Artificial Intelligence (AI) and Machine Learning (ML) will also serve to challenge that paradigm. Decision support and situational awareness, especially in a multi-domain environment, will be aided by algorithms designed to gain information advantage through the exploitation of a myriad of data sources. These will pose a challenge to the design of future training as the efficacy of any such solutions will have to be based on a deep and tacit understanding of the complex environments the information is gathered from. This notion will only serve to further challenge the trust in the training provider selected.



# Building trusted training partnerships

Training, especially collective training, is wholly geared towards preparing war fighters and operators from all domains to conduct effective operations across the entire military spectrum of operations. In many instances, service personnel will be sent into harm's way in order to achieve military objectives, using the knowledge, skills and experiences gained during training to achieve a successful outcome. To this end, the relationship between the trainers and the trainees transcends the transactional and becomes a shared enterprise, where both parties are professionally and emotionally attached to a common, positive outcome.

Contracted industry trainers, military staff, military trainees, and the commercial agencies that bring the parties together, should act as a team where trust is a vital component. Without trust they are simply a group of people who contractually work together. Necessarily, for reasons of cost, availability of live assets, support for the drive to net carbon zero, and the protection of TTPs, there is an increasing shift towards training in synthetic or Live Virtual Constructive (LVC) settings, where it will become increasingly efficient to use a blended team of industry expertise and military colleagues working in unison to provide the optimal training solutions. Without trust, there would be no team.

Cultural barriers – based on a deep-seated suspicion of the motives that drive a commercial partner – should be broken down, and integrated working practices developed by including industry counterparts in a wide range of military exercises and collective training events. Mission-essential competencies are gained not only through the learning of new skills and knowledge sets, but through acquiring and amalgamating relevant, quality experiences. Military exercises can provide all of these facets, and a sharing of those experiences by both military personnel as well as contractors engaged in training, only serves to build trust in the training regime by all stakeholders. Trust is gained slowly, but eroded quickly, due to the turnover of both trainers and trainees, which leads to short corporate memories. Consequently, it is thought essential that military training events should be viewed as a joint enterprise between the military and industry wherever possible. Our understanding of the human science of trust in teams can help build and foster trust through shared experiences, even outside of the training need, and with diverse team backgrounds.

By accepting that any contract to involve industry in the military training enterprise will be, by any measure, transactional, it is important to understand the currencies involved in forming that transaction. Clearly, there is a need for industry to sustain itself through the making of profit, otherwise the enterprise fails to the detriment of all stakeholders. Additionally, it is important to understand the non-monetised requirements of the military, and one of the most important of these is trust.

Inspire has always appreciated that trust is most likely to be built when kindred spirits are involved in the training pipeline – people who have actually 'walked the walk' by putting themselves in harm's way and developing shared experiences with their military brethren. An understood shared ethos leads to common empathy and a willingness to understand the requirements of all parties. The building of trust can still be viewed as a process, based on predictable consistent interactions over time, and these interactions can have both positive as well as negative outcomes.

The measure of success towards building and maintaining trust would be the willingness to adapt to achieve a better outcome; the ability to demonstrate that lessons identified have been learned; and evidence that a better training outcome has been achieved. Industry can be seen as a force for good and an essential part of the training pipeline, rather than a simple marriage of convenience based on availability of suitably qualified and experienced persons (SQEP) and suitable infrastructure.

They who make no mistakes will learn nothing, and trust-based training can set the right conditions to expose vulnerabilities, both personal as well as institutional. Challenges to the perceived norms can be made through the testing and experimentation of new ideas. Failure on operations is not acceptable, but failure in training should be the norm, as failing will often identify lessons to be learned, leading to excellence. Training hard should guarantee success on operations, with trust as the common currency of the whole training enterprise.

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**“Failure on operations is not acceptable, but failure in training should be the norm, as failing will often identify lessons to be learned, leading to excellence.”**



Whilst many companies see the clear benefits of employing Service-leavers to import currency and relevance into an organisation, the trust this engenders across the entire training regime is limited to the personal level. Companies as a whole must be trusted to deliver on their contractual promises, which brings the whole enterprise into the trust equation. All too often military training outcomes are adversely affected by a disconnection between those delivering the desired outcomes and those monitoring contracts.

As in operations there are no perfect solutions and things can, and often do, go wrong. The war fighter can't simply stop and wait for perfect conditions, so has to improvise, adapt and overcome problems. The same can be said of commercial solutions, and training cannot simply be turned off whilst waiting for the optimum contractual solution. Unfortunately, it often is, and this in turn leads to frustration and a total breakdown of trust. It is essential therefore that the entirety of a commercial entity buys into the vision of any company where the aim is to deliver excellence to a Defence customer.

Trust, however, and the building and maintenance of it, cannot be unilateral. It should be viewed as a mutually essential aspiration on the part of both industry and the customer.

The pace of change in military training varies from the glacial to the frenetic, and solutions will often have to be adjusted to meet the training outputs required.

Commercially, industry gets the best return on its investment by selling the same, or similar, thing over and over again, but for good reason this isn't always possible in the Defence arena, as often the pace of change precludes this.

To encourage investment in the very best training, industry requires a long-term trusting partnership in order to make the venture viable to its stakeholders. When this commitment is given the results can be outstanding.

For trust to flourish in a Whole Force environment, the contractual arrangements put in place must have the concept of trust at the heart of their ambition. Whilst it would be impossible to contract for trust, due to the very subjective nature of it, there is scope to contract for collaboration, co-creation and ideation between the end-user customer and the commercial partner. Otherwise the opportunities to share the risks and benefits of a trust-building collaborative venture become fettered by a transactional approach. This results in very little flexibility on both sides to walk the extra mile towards the delivery of excellence.

## The triangle of trust

**In conclusion**

Trust is a vital facet of military training as well as of military operations. It is gained through the nurturing of relationships over time and can be built through the actions of individuals or teams, but is owned by the parent organisations and shared across the entire training enterprise. This fragile, yet important commodity can only survive when all of the stakeholders hold to a communal picture of success. At its best, this can help to make what might seem impossible, possible.

Once trust starts to break down, it is lost quickly, to the detriment of the whole enterprise, although this breakdown of trust can be wholly avoidable through a shared ethos, vision and common purpose. However, a shared picture of success can only occur when there is a shared understanding of the factors affecting all of the stakeholders.

In the Whole Force, and especially where exceptionally high-quality training outcomes are expected, transactional relationships have no place. There must be a fully understood, agreed and approved set of requirements provided – which leave no room for doubt that they will lead to the desired training outcome for the end user. The end user must have total confidence in their training providers, and this can be assisted by allowing high-quality experiences to be shared, leading to common understandings.

That said, just as on operations, not everything will go as planned, whilst the military outcome remains the same. All stakeholders in a professional and committed Whole Force must be capable of recognising problems, analysing the causes, prioritising the next steps, deciding on the best course of action, and acting with pace, before reviewing the new outcomes. Commercial contracts should be flexible enough to allow this to happen, as whilst it is impossible to contract for trust, it is possible to contract for a flexible, yet predictable outcome.

Whilst contracted, technically brilliant solutions – blended with a cadre of trainers and a cohort of trainees committed to achieving excellence – are essential for successful outcomes, trust and the gaining and maintenance of it should be considered the glue that holds everything together.

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“Contracted industry trainers, military staff, military trainees, and the commercial agencies that bring the parties together, should act as a team where trust is a vital component. Without trust they are simply a group of people who contractually work together.”

## The triangle of trust



## Contributors

**Dr Christina Balis**

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Christina Balis is Global Campaign Director for Training & Mission Rehearsal. She is responsible for leading the development and implementation of the company's strategy and long-term business winning activities in the areas of individual and collective defence training, exercises and mission rehearsal.

Prior to this, she was QinetiQ's Director of Services and Products Strategy, responsible for leading the development of Group-wide understanding of global defence and security markets and evolving strategies in response, and for providing leadership, engagement and support to specific business strategies, M&A activities, and more significant business development initiatives.

Before joining QinetiQ in August 2016, Christina was the Paris-based head of European operations of Avascent, a management consulting firm specialising in aerospace, defence and government-driven markets. Prior to and in-between her consulting career, she worked as vice president for strategy and corporate development at Serco Inc. in Reston, Virginia, and as a fellow in the Europe Programme of the Center for Strategic and International Studies in Washington, DC.

**Simon Bowyer**

BSc (Hons), MSc, MBA, CPsychol, AFBPsS

Psychologist Team Lead  
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Simon is a Chartered Psychologist with the British Psychological Society and Principal Consultant for QinetiQ. He is an Associate Fellow of the British Psychological Society and the current Chair of their Defence and Security Psychology Section.

He has over 18 years' experience of enhancing the performance of personnel and organisations within mission critical systems, primarily with UK Defence customers. During the course of his career Simon has worked on a number of projects where trust has been an important factor in the effective performance of individuals, teams and the organisation.

**Raphael Pascual**

BSc (Hons), PGCert, MLitt, CPsychol, AFBPsS

Principal Psychologist  
Human Behaviour and Systems  
QinetiQ

Raphael is a psychologist in QinetiQ who has led multiple research programmes with defence, security and commercial clients addressing the analysis and support of expert decision-making, teamwork, and behavioural influence. This research has included the design and application of: alternative planning approaches for Army HQs; teamwork evaluation frameworks for military search and crisis management teams; innovative teamwork debriefing tools for surgical teams; and decision-making training for Olympic sailing coaches.

He has also provided the UK national lead on a number of international C2 and teamwork military research panels. His career has included the growth and leadership of a number of technical capability groups and the operational management of larger groups of distributed social scientists.

Raphael is currently the Industry Research Theme Lead (RTL) for the Human Social Science Research Capability (HSSRC), providing technical assurance for Influence research contracted and delivered to the MoD and other customers.

His work includes conducting behavioural assessments of personnel undertaking dangerous or mission critical roles and organisational research to enhance the effectiveness of policies and systems. More recently, his work has extended to investigating the organisational and behavioural factors associated with cyber security and the role that trust plays in creating effective security systems.

## Contributors

**Dr Caren Soper**

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Principal Human Factors Specialist  
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Caren has over thirty-five years' experience in military human factors with extensive experience in leading programmes and providing technical input, guidance and consultancy in a wide range of human factors areas. She has worked on a number of collaborative and multi-disciplinary programmes including studies, experiments, trials and demonstrations.

Over the last five years, she has led the human factors and experimental investigations of a research project, focussed on the Command and Control of maritime unmanned vehicles. This has included the definition, conduct and analysis of experimental trials to explore levels of autonomy, multiple assets and adaptable / adaptive autonomy, as well as data collection during live trials. This work has included the assessment of operators' trust, along with other human factors measurement techniques.

Caren is an innovative thinker with a proven record in analysing and solving complex problems. Her fellowship stipend at QinetiQ enables her to continue exploring the issue of trust in relation to enhanced autonomy.

**Alan Whittle MBE**Director of Strategy and Plans  
Inzpire

Al joined Inzpire in 2008 following a 32-year career in Army Aviation. This includes tours with the Special Forces as a Lynx Flight Commander and the last 10 years dedicated to Apache Attack helicopter operations where he had tours as the Force Senior Electronic Warfare Officer, Senior Weapons Instructor, Senior Flying Instructor until finally commanding the Apache OCU.

On joining the company he formed the Helicopter Services Division winning the company its first international training contract and the first live flying training contract.

At the time, Inzpire was a SME with the emphasis on the 'S' and everyone had to multi-task and use their previous skills to best effect. Al also taught on international aviation train-the-trainer courses, collective training at the Air Battlespace Training Centre, Human Factors foundation courses to ab initio helicopter pilots. It wasn't unknown for Al to climb back into the Apache cockpit to provide live EW training, as happened most recently in the Middle East.

Al was invited to join the Board in 2013 as the Managed Services Director before becoming the Chief Operating Officer in 2017. Since 2019 Al has been the Director of Strategy and Plans responsible to the Board for future direction and growth.

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