

aerospace
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21ST
CENTURY
SUPPLY
CHAINS



FOURTH EDITION
**IMPLEMENTATION
GUIDE**

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PAUL EVERITT



PHIL CURNOCK

THE PRINCIPLES FOR SUCCESS

Welcome to the fourth edition of the SC21 implementation guide

The important contribution that the aerospace and defence sectors make to the UK economy is well recognised. Industry and Government have been working together through the Industrial Growth Partnerships to ensure that the UK retains and grows its position in these valuable wealth producing sectors. To achieve this ambition, it is crucial that UK companies at all levels throughout the supply chain are supported in making the most of significant global growth opportunities.

Through the Growth Partnerships, great strides have been made in identifying the opportunity for our sectors. The UK is home to world-leading high value manufacturing and continued innovation and technology exploitation throughout the supply chain is critical to success. Improving the competitiveness of UK suppliers and their interaction and collaboration with Prime manufacturers will cement the success of the Industrial Growth Strategies and the overall long term UK economic recovery.

The SC21 Programme is an important tool in supporting supply chains to improve operational efficiencies to increase productivity and profitability, and to free capacity to take advantage of growth opportunities. It has been designed to accelerate the competitiveness of industry through reducing suppliers' overheads, implementing leaner production methods, and lowering set-up times.

Since it was established in 2006, the programme has seen hundreds of companies from both the civil and defence aerospace sectors drastically improve their bottom lines. In

doing so, SC21 has established itself as a class-leader in achieving supply chain excellence – both here in the UK and internationally.

However, in the face of growing global competition and an ever faster rate of technological development, UK industry needs to keep up the momentum of continuous improvement.

I am extremely encouraged by the way the SC21 programme is assisting in the transformation of our world-leading sector. I encourage companies of all sizes to commit to SC21, to work with our team of SC21 experts to identify areas for improvement, and to implement practices to achieve this improvement. In doing so, individual companies will be best placed for growth, and our industries will support the delivery of a sustainable UK economic recovery.

Paul Everitt

Chief Executive of Aerospace, Defence and Security trade organisation, ADS Group.

I place ethics very high on my agenda, as does the SC21 programme. So, when signing up to SC21 companies commit to the seven principles of SC21, one of which is to commit “that all business is conducted in a principled manner, with the highest degree of personal and business integrity”.

As Head of Supply Chain of the SC21 programme I am delighted to have seen the programme evolve into a best practice framework, improve many businesses on the journey and achieve so many of its goals.

Today, several years after the launch of the SC21 Programme, the programme has established itself as a class-leader in enabling supply chain excellence. I am delighted to be able to say now that SC21 has, delivered millions of pounds worth of real benefits to all sizes of business across the Aerospace, Defence, Security and Space industry. The programme has also succeeded in raising awareness across the industry, communicating key messages such as the importance of first class performance and nothing less. This and many other critical success factors need our focus if the UK is to continue to build on its strengths and attract new business.

Since the last edition of the SC21 Implementation guide the programme has also seen a significant number of Bronze, Silver and Gold awards going to SC21 signatory companies, to meet SC21 performance criteria shows a significant achievement. SC21 is most definitely moving forward but we must ensure that this momentum is sustained and that the programme evolves to enable us to accelerate the already excellent work done by UK industry.

Ethics.....I place ethics very high on my agenda, as does the SC21 programme. So, when signing up to SC21 companies commit to the seven principles of SC21, one of which is to commit “that all business is conducted in a principled manner, with the highest degree of personal and business integrity”. Our industry recognises the importance of good practice in ethical issues and the need to demonstrate policies based on sound business ethics.

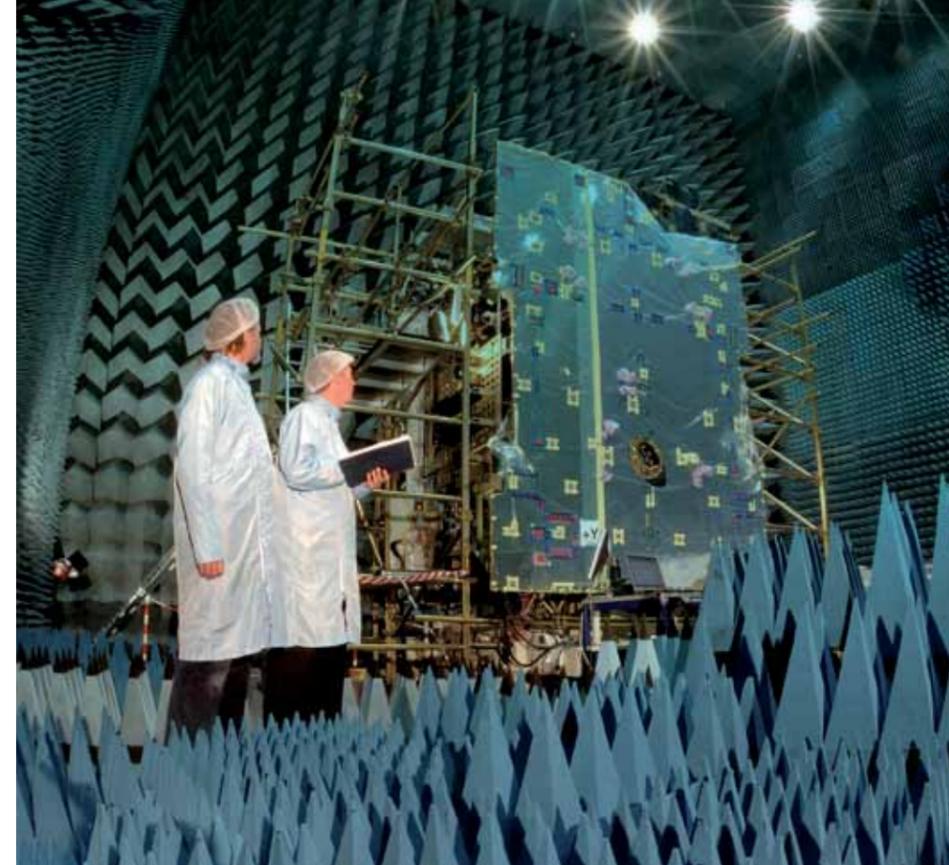
Finally, I just want to say that SC21 continues to assist in the transformation of our world-leading business sector. I encourage companies of all sizes to sign up to SC21, commit and therefore not only gain company benefits but also maintain the momentum of SC21 within UK industry.

Phil Curnock

Head of Supply Chain, ADS Group Ltd

MAKING US MORE COMPETITIVE

The Twenty First Century Supply Chains programme (SC21) was launched at the Farnborough International Airshow in 2006. It aims to boost the competitiveness of the UK aerospace, defence, security and space industry. With international competition increasing, and in response to changes in, for example, defence strategy, the participation of companies of all sizes throughout the UK supply chain is crucial to delivering real results to ensure the future competitiveness of the UK industry.



The programme is overseen by the Aerospace Innovation and Growth Team (AeIGT), which is responsible for the research and technology portfolio, the SC21 programme and the people and skills agenda. The overall programme, which is supported by the British government, is aimed at maintaining the UK as a global leader in the aerospace, defence, security and space industry.

All SC21 signatory companies are fully committed to achieving a revised working culture that includes focusing on accreditation, development and performance as well as relationships to improve efficiency, remove duplication where possible and lower overheads and costs in the supply chain.

This edition of the SC21 implementation guide aims not only to introduce the key approaches that have been designed by industry but to bring about a more responsive, focused and cohesive

UK supply chain. Also, to provide full information on collaborative working and regional support offered to industry.

Further information on how to sign up to SC21 and achieve supply chain improvement can be accessed, on the SC21 website at www.adsgroup.org.uk/sc21



HOW SC21 CAN BENEFIT US ALL



“Through the SC21 programme, we are making progress towards achieving a more competitive UK supply chain, but much still needs to be done if companies are to survive. More companies need to sign up and roll it out to the global supply chain”

Michael Ryan CBE
Vice President and General Manager – Bombardier, Belfast

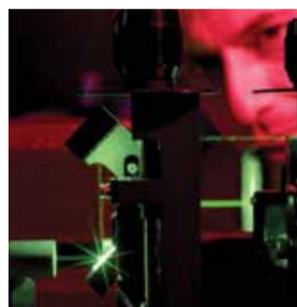
“One of the key determinants of the Babcock Marines efficiency and effectiveness is the way in which it engages with its extensive and diverse supply network. I am looking to the SC21 programme not only to provide a focus for continued improvement in our key suppliers’ performance but also to highlight how we might be a better customer”

Archie Bethel
Managing Director – Babcock Marine

WHY GET INVOLVED?

A growing number of customers, suppliers and competitors are committing to SC21.

It is therefore important that you understand this programme and consider whether your business should participate in order to maintain its competitive position.



What are the benefits of committing?

Your company could benefit from some specific savings such as reduced overheads, leaner shop floors and many, many other benefits all of which are invaluable when trying to offer the most competitive solution to your customer.

What does it cost to participate?

It costs nothing to join the SC21 programme, you don't even need to be an ADS member, although we would much prefer that you are reaping the benefits of being a part of the ADS community. To fully engage in the change programme will require the commitment of some resources, but the benefits accrued from SC21 will easily outweigh any resource allocations.

If my company chooses to sign-up, what will the SC21 community expect of my company?

As a signatory to SC21 you will become a member of the SC21 community and therefore invited to the SC21 Task Force events. The SC21 Task Force meets regularly to review the latest progress of SC21 and to hear of all the incredible work being done right now in industry as a result of the programme.

The SC21 community will also hope to see your involvement in other networking events, possibly collaborative working or indeed to become a member of special interest groups for example.

Basically the SC21 community will just expect each and every signatory to be enthusiastic about the journey and committed to, not just continuous improvement, but real progress to creating a world-class UK supply chain.

What will my company get out of SC21?

By participating in SC21 you are positioning your company as a proactive and potentially market-leading company which is willing to develop internal operations and long term relationships with your customers and suppliers. By applying SC21 principles you will be able to significantly improve your supply chain performance, but of course, only if the programme is implemented with an effective and committed approach.

What are the risks if I simply ignore SC21?

The more companies that join this initiative, the greater the benefit to the UK supply chain. The risk therefore, over time, is that those businesses that have not embraced SC21 (and developed their operations in line with the SC21 diagnostics and principles) will become less attractive as key suppliers.



HOW TO BECOME ENGAGED?

Signing up to SC21 is simple and easy and there are many forms of how to start your journey. Full instructions are available on the website: www.adsgroup.org.uk/sc21

To register your interest in participating in SC21 contact us with your details at sc21@adsgroup.org.uk and we will help you take the next steps that ensure you get the full benefits of participation.

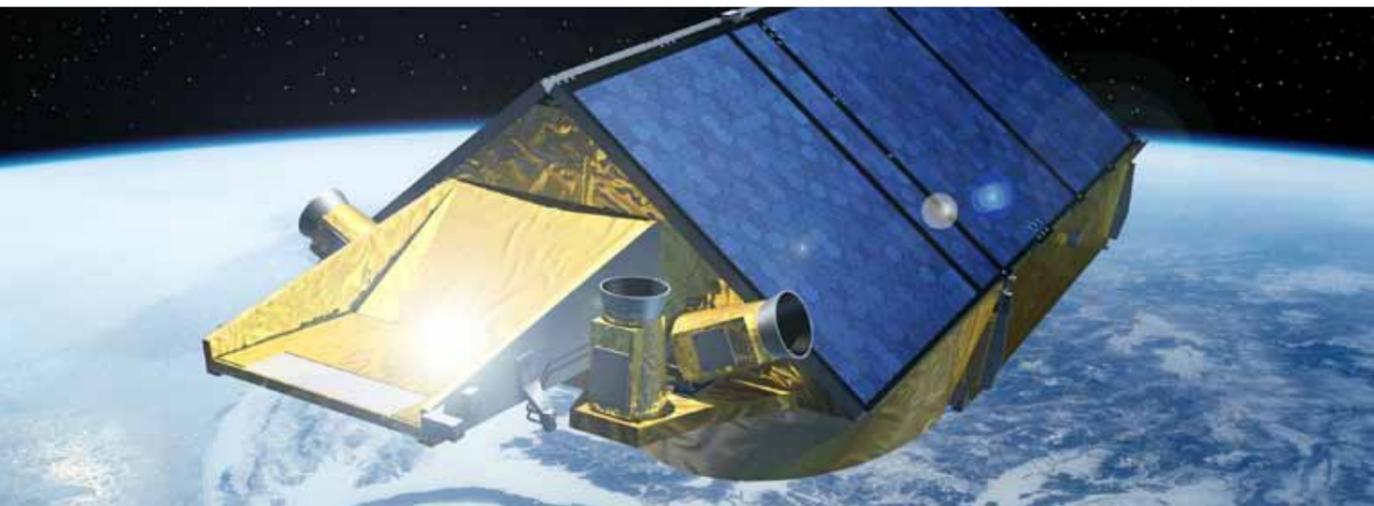


How do you implement SC21?

SC21 is a continuous improvement programme designed to transform the industry to be 'fit for purpose' for the twenty-first century. Initial implementation is focused upon the key streams of accreditation, development and performance and relationships. Any company signing up to SC21 can achieve improvement whether they implement the programme as a self-starter or as a key customer sponsored signatory.

In order to get quickly started, the 4 simple steps in the diagram above will support the implementation of the SC21 programme across your organisation.

SC21 ACTION COMMITMENTS



The SC21 action plan contains seven commitments which all signatories agree to implement.

Signatories are fully committed to:

- **A new SC21 business culture:** no matter what our role or position in a supply chain, we are determined to effect fundamental business transformation. We will work openly and transparently, through sharing information and working collaboratively, to deliver benefits across the industry. We will avoid duplication and waste
- **Delivering innovation:** we will build on success to enable our industry to be a leader in the development of competitive value chains. We will pursue the most competitive solutions for our customers, by accessing innovation and specialist expertise. We will encourage innovation and investment of all types throughout the supply chain, achieved through providing a more trusting and open environment
- **Through-life solutions:** total through-life cost is of paramount importance to our customers. We will involve all functions of the supply chain, for example: procurement, engineering and finance, throughout the project, product or service lifecycle. Transparency will be encouraged, with more planning and forecast data made available using bid conferences, project conferences and other means of communication
- **Delivering the SC21 plan:** as a signatory to this action plan, we accept that our adherence to the commitments will be tested annually and that our performance will be measured and published. We will help in the development of this plan by sharing experiences
- **Leadership:** we will encourage colleagues in the industry, including our customers and suppliers, to join SC21 as both signatories and active participants
- **Ethical practices:** we will ensure that all business is conducted in a principled manner, with the highest degree of personal and business integrity
- **Increased pace of change:** our rate of change and improvement will be at an accelerated pace. Signatories will work together to harmonise how supply chains are developed, how accreditation occurs, how performance is measured and how relationships are improved

PERFORMANCE AND DEVELOPMENT

Achieving improvements in performance that can be measured using common metrics, across the supply chain, is crucial to achieving the SC21 goals for industry.

The SC21 process has four elements: sustainable improvement (through the use of the diagnostics and the implementation of a CSIP), alignment to the SC21 performance metrics, improvement framework implementation and finally by following the formal recognition process when applying for an award.



1 sustainable improvement

To eliminate duplication SC21 companies have agreed that they will use SC21 as their core improvement programme, a programme that is relevant to all customers and suppliers in the UK supply chain. Joint customer/supplier plans will need to have a clear linkage with quality and delivery metrics.

The improvement journey must be driven by senior management to ensure the improvement plans are regularly reviewed and that the necessary resources are available to undertake the defined tasks as they are identified.

Inputs

- customer requirements
- on-going improvements
- existing programmes
- diagnostic outputs
- goals, targets and measures
- risks and dependencies

Sustainable improvement plan

- supplier owned
- focussed on business goals
- SMART objectives
- reviewed for progress/benefits
- flowed down to suppliers
- flexible to allow additional inputs

Customer specific key point indicators

- customer and supplier owned
- focussed on quality and delivery targets
- reviewed jointly for progress and benefits
- linked to recognition
- milestones driven/time-bound



2 performance metrics

SC21 companies have agreed to implement consistent quality and delivery measures to meet customer needs in a highly competitive global market. In addition, SC21 companies have set a target to achieve zero defects and 100 per cent on-time delivery.

Each SC21 company should use the following performance indicators for quality and delivery:

As well as implementing both the quality and delivery metrics, a suite of supportive metrics is being developed by for use by SC21 signatories which address typical customer requirements in terms of 'Through Life Capability Management' and 'Supply Chain Innovation'.

$$\text{Delivery} = \frac{\text{Number of 'On Time' deliveries}}{\text{Number of scheduled deliveries}} \times 100$$

(this shows the % of On Time Deliveries)

$$\text{Quality} = 1 - \left(\frac{\text{Number of rejects}}{\text{Number of deliveries}} \right) \times 100$$

(this shows the % right first time)

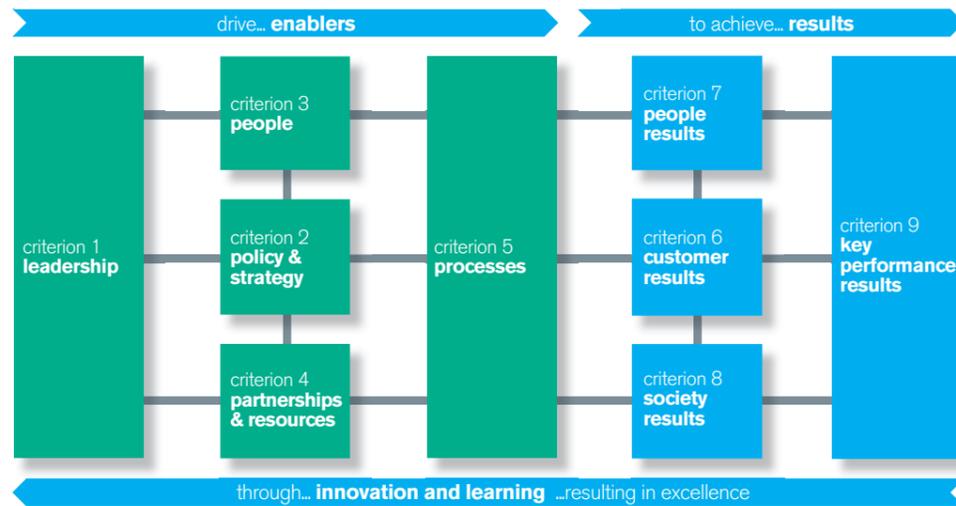
$$\text{Quality} = \frac{\text{Number of rejects}}{\text{Number of deliveries}} \times 100$$

(this shows the % of non-conformance)

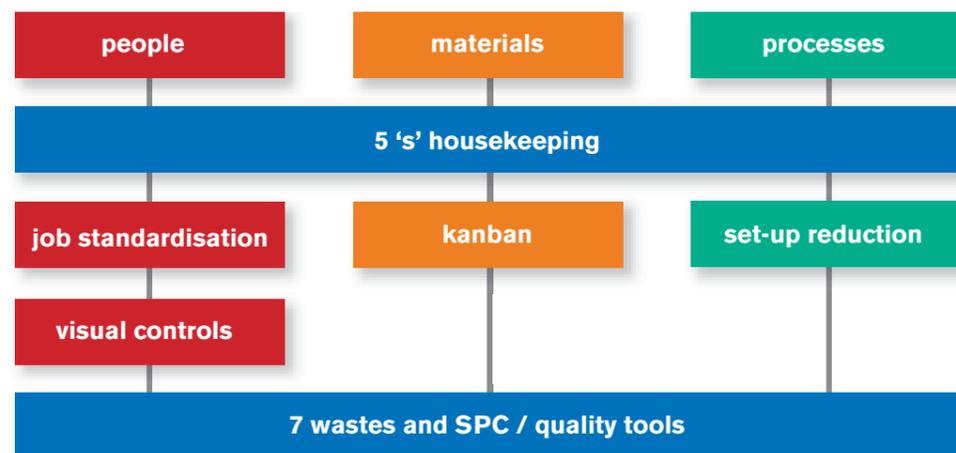
$$\text{Quality} = \frac{\text{Number of rejects} \times 1,000,000}{\text{Number of deliveries}}$$

(this shows the number of defects per million)

3.1 Determining excellence



3.2 Manufacturing excellence – a framework for lean operations...



...supported by design related improvement methodologies VE/VA or QFD

award level	delivery	quality	sustainable improvement programme	improvement framework
gold	>99 - 100%	99.9% - 100%	plan progressed regular reviews	excellence level > 500
silver	>95 - <99%	99.5% - <99.9%		excellence level > 400
bronze	>90 - <95%	98% - <99.5%		framework deployed

Levels for delivery and quality are based on rolling 12 months average

3 Improvement framework

Three improvement frameworks have been agreed by SC21 companies to form the basis of a standard approach to supply chain development, these are:

- Determining excellence: (derived from EFQM model of excellence)
- Manufacturing excellence
- Relationship excellence

3.1 Determining excellence – is the recommended SC21 approach for small to medium companies. Larger companies would be expected to use the EFQM model.

The determining excellence model's main aim is to achieve sustainable excellence in any organisation. The model is used to review and diagnose how an organisation performs against what is considered as best practice in order to deliver an excellent organisational culture. The model and its structure also serve as a useful common language for top management.

3.2 Manufacturing excellence – this approach has been developed from 'lean manufacturing' / 'just in time' philosophies.

The approach is equally applicable to large or small organisations in both high and low volume manufacturing environments. The approach should also be complementary to other Lean approaches being deployed within Industry.

Manufacturing Excellence is based on a set of widely established suite of tools and techniques, which together make up a framework for Lean Manufacturing.

3.3 Relationship excellence – the Relationship Excellence (RelEx) diagnostic is used to understand how the organisations senior management team are enabling collaborative working and deriving business results across the boundaries of the company to include its customers and suppliers.

Relationship Excellence (RelEx) has been designed to allow organisations to use it;

- as a joint tool with the customer
- as a self-assessment methodology
- used with 'clusters' within the supply chain
- used by a third party

All of the SC21 approved diagnostic models will be delivered through joint or self-assessment approaches. The output from the diagnostic activity should be used to input into the continuous sustainable improvement plan.

As well as identifying opportunities for improvement, all three of the models can also be used for benchmarking organisations, both against each other and the SC21 national averages.

4 recognition

SC21 companies have signed up to use the formal recognition process when applying for an award.

Organisations achieving the agreed criteria, in terms of performance metrics (delivery and quality), sustainable improvement and the associated improvement frameworks

(business and manufacturing excellence) will receive recognition in the form of a bronze, silver or gold award. This applies to companies that are sponsored by an SC21 company or applying as a self-starter.

WORKSTREAMS AND TRAINING

SC21 is based on industry intelligence, experience and best practice. As a result, ADS has been able to develop a strong base of experts to lead a number of SC21 Workstreams, they are the lynch-pin of the SC21 programme. The talented individuals involved, since 2006, have developed possibly the most important aspects of the SC21 programme, the toolsets.



Key Workstreams

In the initial phase implementation is focused upon two key streams:

- **Performance, Development and Quality** – SC21 companies are committed to achieving common industry development and performance plans which are derived from a common supply chain development framework. They are also committed to working together with suppliers to implement common, shared improvement plans. Standard metrics and an industry wide recognition mechanism is being deployed to more effectively understand, benchmark and deliver supply chain performance.

SC21 companies will work together to improve quality performance and thus reduce the number of duplicated quality interventions, in particular by adopting common standards such as AS/EN 91XX and Nadcap and fostering continuous sustainable best practices across the aerospace and defence supply chains.

- **Collaborative Working: Relationship Excellence** – SC21 companies recognize that sustained success in our industry requires inter company communication that promotes working together with openness, honesty, integrity, and trust. Using the RelEx and RMM toolkits companies can implement relationship excellence processes and practices to enable improvements to supply chain relationships.

Training

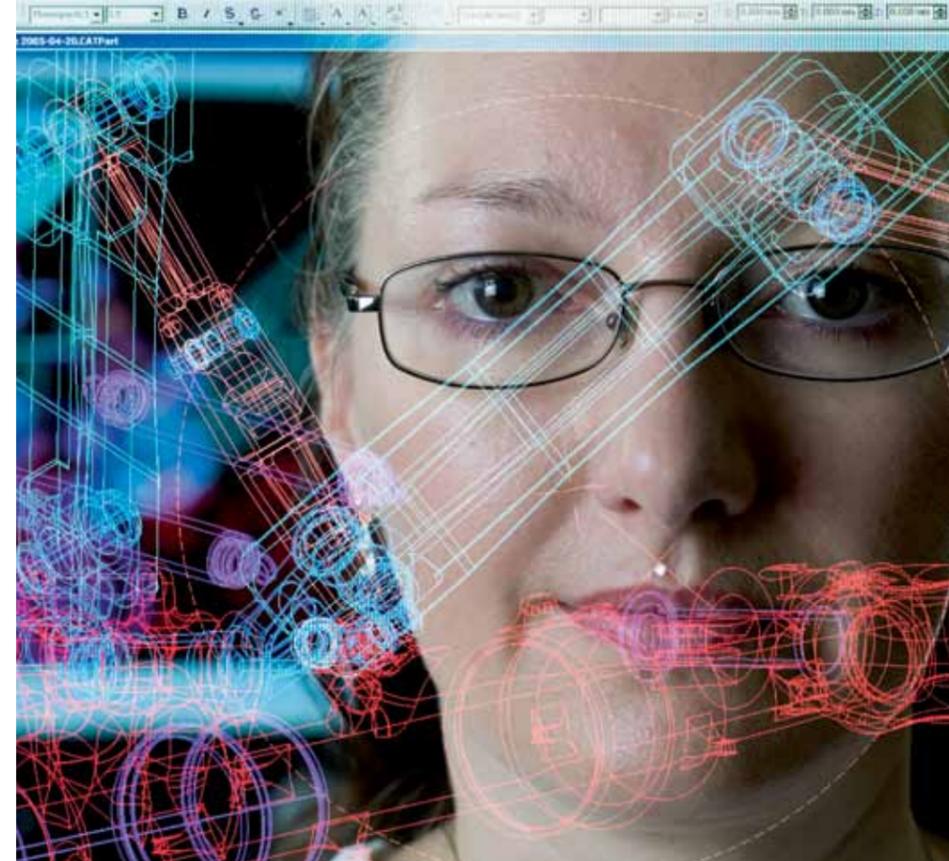
The approval of strategic and training practitioners is recognised as a key enabler to the successful deployment of SC21. These approvals are governed by the SC21 Special Interest Groups and the SC21 Steering Board.

A number of training companies have been assessed and approved to deliver SC21 training.

VITAL COMMUNICATIONS

SC21 is made up of the SC21 signatories who have committed to implementing supply chain improvements. The SC21 taskforce meets regularly and all participants play an active role in developing the approaches that will deliver a competitive UK supply chain. All signatory companies are welcome to provide representatives to participate in the taskforce. Implementation and reform of the supply chain is our goal and we recognize that not all companies will be able to devote resources to the task force.

Effective communications is integral to the success of SC21 and the programme is being supported through a range of approaches including direct marketing, presence at appropriate events, media relations and branding. These all help to establish SC21 in the mind of key audiences.



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SC21 Task force

As SC21 develops, the really good news will come from industry, from the signatories who are putting it into action and seeing the benefits. It is important we make the most of these opportunities. The communications team wants to hear your SC21 news. Any examples of SC21 in action, making a positive difference to your business, could be used to put together a case study or press release which will benefit the programme and can also provide good publicity for you.

Although the ADS communications team is the first point of contact for any communications issues, signatories are free to promote their involvement in the programme through their own channels. However this must be done in conjunction with the ADS communications team, so please get in touch if you have any good news. If necessary the team can offer advice with media relations, writing and branding and can help you get the most from your story.

The SC21 communications focus is on raising the profile and the aims of the programme with the key media and, in turn, with new and potential signatories. Activities include the creation of literature and a short video, a regular series of press releases, newsletter features in key trade and national press and continuous development of the SC21 website. As the programme gathers more momentum these will all be supplemented with examples, to be used both locally and nationally, of how SC21 is making a real difference to the businesses involved.

The ADS communications team is responsible for all collateral and approving all messaging so please make them your first call should you have some good news to tell or if you are approached by a journalist. In addition the team is responsible for all media enquiries and the handling of any interview opportunities/requests. Get in touch with them if you have any questions about communications.

SC21 logo available to signatory companies

Companies that are committed to the SC21 change programme can display their competitive advantage to other supply chain companies by using the SC21 logo on literature and web-site. The SC21 logo will be sent to you after you sign up to the programme via a confirmation email.



Achieving the highest levels of quality is of critical importance to the UK aerospace and defence supply chains.

Quality management system audits are an essential part of ensuring safety and reliability standards are maintained and in promoting consistency of approach across the industry.

A company supplying to more than one customer may face numerous audits, checks and interventions from these customers, resulting in considerable duplication.

SC21 companies have agreed, as a result, to work together to avoid that duplication by recognising quality management system certification to international standards, by adopting and developing common processes for product and process oversight and by seeking to improve the quality performance of the overall supply chain, using common techniques based upon international best practice.

1) AS/EN 9100, 9110 or 9120

The AS or EN 91XX standards were developed by the International Aerospace Quality Group (IAQG) as the recommended standards for quality management systems in the aerospace industry. The standards are supported by the large majority of aerospace manufacturers worldwide and are increasingly being accepted for defence applications. To achieve any of the standards an organisation needs to obtain approval from an accredited third party certification body. Certification bodies based in the UK are subject to an industry oversight programme administered by the ADS, with experienced quality audit professionals from UK aerospace companies undertaking oversight audits. This scheme is in turn subject to oversight as part of an international process directed by the IAQG to ensure worldwide consistency.

Organisations formally registered to AS/EN 9100, 9110 or 9120 are entered onto an international database, identified as the Online Aerospace Supplier Information System (OASIS), with more than 1100 UK sites already registered.

2) Nadcap

The internationally recognised Nadcap system of special process audits is the recommendation for special process assessment. A growing number of major primes are now requiring Nadcap approval(s), which is overseen by the Performance Research Institute (PRI, based in the US with an office in the UK) using experienced special process professionals. Processes covered by this approach include chemical processing, coatings, composites, elastomer seals, electronics, fasteners, fluids distribution, heat treatment, materials testing laboratories, non destructive testing, non-conventional machining and surface enhancement, sealants and welding, with other special processes being progressively added.

Relationships code of practice

The supply chain Relationships code of practice establishes a set of guiding principles, which promote the highest standard of supply chain relationships. It promotes working together with openness, honesty, integrity and trust and creating an environment in which teams understand and work towards their shared objectives whilst still meeting their individual targets.

The code of practice comprises five elements, focusing on;

- Communications
 - Information exchange
 - Understanding strategic aims
 - Timely dialogue
 - Throughout lifecycle
 - Defined structures
- Through life capability management
 - Through-life capability development
 - Earliest involvement of supply chain partners
 - Integrated multi function teams
 - Deployment of common processes
- Continuous improvements
 - Embed lean culture
 - Deploy best practice processes
 - Performance measurement
 - Process improvement
 - Product and process development
- Commercial agreements
 - Openness and clarity
 - Output focused
 - Risk and opportunity
 - Desired outcomes incentivised
 - Deliver on commitments
- Ethics
 - Respect confidentiality
 - Honour intellectual property rights (IPR)

- Maintain impartiality
- Personal integrity
- Clear and transparent selection processes

The highest standard of relationship management will be achieved through a structured engagement process involving all relevant functions with reviews at operational and strategic levels. The supply chain relationships code of practice is supported by the Relationship Measurement Matrix (RMM), which is used via a facilitated process, to assess and develop the relationship between organisations throughout the supply chain.

The Relationship Measurement Matrix allows teams to assess their relationships against the code of practice and to define and characterise their desired relationship to be delivered as part of a structured management process.

The supply chain relationships code of practice and the relationship management deployment process are detailed on the ADS website.

Governance of the programme



SC21 Steering Board

At the core of SC21's Governance sits the SC21 Steering Board, the individuals that make up the Board include a number of senior representatives from the Aerospace, Defence and Security industry including:

- UK Primes
- SMEs
- A Regional Trade Association
- Ministry of Defence



Regional support

Regional partners are actively engaged in SC21 and are playing a key role in supporting participating companies, especially SME's. They have teamed up with local delivery agencies, including the Manufacturing Advisory Service and Business Links. Importantly, they are in a position to offer hands on support in achieving accreditation, and in implementing performance and development and relationship development plans.

Contact your local regional partner, to let them know that you want to become involved in the SC21 supply chain improvement programme and they will help you take the next steps.

Aerospace Wales

01656 655210
www.aerospacewalesforum.com

Farnborough Aerospace Consortium (FAC)

01252 375600
www.fac.org.uk

Invest Northern Ireland

028 9023 9090
www.investni.com

Midlands Aerospace Alliance (MAA)

08452 250 503
www.midlandsaerospace.org.uk

Northwest Aerospace Alliance (NWAA)

01282 604 444
www.aerospace.co.uk

ADS Scotland

0131 343 8931
www.ADSgroup.org.uk/scotland

West of England Aerospace Forum (WEAF)

01275 872 353
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or contact ADS at sc21@adsgroup.org.uk



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