

A diagnostic on the implementation of DAOS for a supplier of design solutions to the UK MoD



Baines Simmons was invited to provide an independent evaluation of whether DAOS had been applied efficiently and optimally for the scope of work conducted by the client.

The review examined the quality management system (QMS) and found that there was widespread misunderstanding as to what “DAOS” meant for sub-system/component providers, what its scope includes and the terminology associated with its execution in the international market.

Due to the significance of the findings, Baines Simmons was requested to prepare a formal presentation which was successfully delivered to the client’s Board of Directors. The presentation was supported by a detailed report on findings and an action plan of recommendations.

Background

MoD Policy [RA1005(2)] is to only procure from design organisations that have been assessed as competent under the Design Approved Organisation Scheme (DAOS). One of the “Four Pillars¹ of Airworthiness” is the use of competent organisations. The Design Approved Organisation Scheme is a mechanism by which competence of design organisations can be assessed.

Key requirements for a DAOS organisation [was in RA5101, now refer RA1014 and RA5850] included:

- ▶ A recognised Quality System: BS/EN/ISO 9001:2008 (now BS/EN/ISO 9001:2015 or AQAP2110 accreditation or recognised equivalent)
- ▶ The right people in the right places: Organisational chart and named senior members of staff responsible for design, development and signature of the Certificate of Design. This includes the board members who have the overall responsibility for the availability of resources for the design
- ▶ DAOS Processes and Procedures: Who does what and when to satisfy the standards applicable to the contract

The purpose of the DAOS Exposition is to articulate these three points to both the Regulator (in this case the MAA) and to the Design Organisation (who needs to both use and follow it).

¹ The Four Pillars are [refer MAA01 Issue 3 Ch 3 para 17]:

Pillar 1: A Safety Management System (SMS), throughout the life cycle with feedback from some sort of Fault Reporting & Corrective Action Systems (FRACAS).

Pillar 2: Use of recognised standards (e.g. Def Stans, Mil-Stds or civil S/W standards such such as RTCA/DO-200 & 20)

Pillar 3: Competence (i.e the DAOS Scheme)

Pillar 4: Independence (i.e. advice, independent of the designer, aimed a judging the extent to which airworthiness has been demonstrated)

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Client Profile

This is a medium sized Design Organisation (more than 150 employees) who provide a novel solution to multiple platform types. The solution is contained in a Line Replaceable Unit (LRU) and is integrated into the platforms by the other design organisations (i.e. the system integrators). Although contracted by the UK MoD for the solution, the client acts as a component supplier to the system integrators.

The client was concerned that the manner in which DAOS has been implemented in their organisation is constraining the organisation by over burdensome processes, leading to disproportionate elapsed time and manpower required to meet project milestones.

The Challenge

Baines Simmons was invited by the client to conduct a DAOS Diagnostic to:

- ▶ Evaluate whether the client had applied DAOS efficiently and optimally for the scope of work conducted.
- ▶ Provide independent, unbiased, impartial evidence-based view of the current set-up when compared to the intent of DAOS.
- ▶ Determine whether the current procedures are proportionate when compared to the activity undertaken.

The Approach

The diagnostic was undertaken as an independent assessment of the manner in which the DAOS requirements had been implemented in the organisation. It was accomplished by conducting interviews with relevant staff and an audit of selected procedures to determine their understanding of the intent of DAOS and its application in the design and certification processes.

Note: In 2014 we relied mainly on the skills and experience of our personnel to provide diagnostics services. Since 2016 this has now been supplemented with a SMARRT MAP™ model which is used as a proven methodology to evaluate and improve performance of an organisation's safety, airworthiness and compliance management system.

The Findings

This paper will not contain the complete scope of evidence uncovered, but the following topics are extracted because our experience has shown that is symptomatic in many other DAOS organisations in our industry:

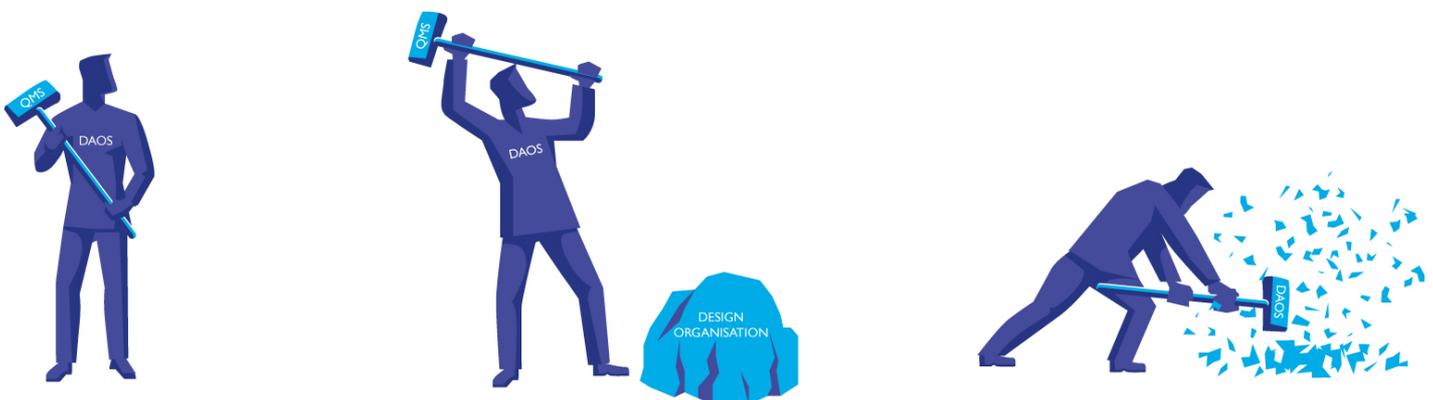
- ▶ **Contract:** The MoD's contract on the supplier contained several standards which were either obsolete, not appropriate to the level of system integration, or which were duplicated and/or contradicting. This added an unnecessary level of bureaucracy and uncertainty at various stages of the programme lifecycle.
- ▶ **Leadership:** The Leadership team was being held ransom by the quality department (i.e. reactive to frequent audit findings) instead of pro-actively setting themselves up for success.
 - ▶ The Design Organisation's structure organigram was evolving (not mature), driven by personalities, compromised by power play and did not reflect the fact that the business was actually operating under a matrix structure.
 - ▶ The Exposition (and referenced processes) did not clearly articulate who had the Command & Control authority in the Design Organisation, and the enabling and independent Certification and Quality Assurance support available to him/her to execute that authority.
 - ▶ The quality department (and nor the process owners) compiled the procedures and often wrote additional procedures in response to audit findings.

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- ▶ **Design Organisation Exposition:** The Exposition was considered to be a policy document and was not being used as a basic [21.A.265(b)] working document:
 - ▶ The Exposition duplicated, contradicted and was out of sync with other policy documents, particularly the Roles and Responsibilities Document, the Organisation Chart, Approval and Authorisation Signatories and the Qualification Policy. This causes a lot of confusion, with resulting frustrations.
 - ▶ The Exposition was written to satisfy the MAA only. It was not a useful reference guide for the engineers to guide them through the design and qualification process. It did not reflect the size or complexity of the Design Organisation
 - ▶ Many key terms and concepts (such as Validation, Verification, Qualification, Certification and Release to Service) were not defined or understood and thus not appropriately managed.
- ▶ **Processes:** Design procedures were burdensome and difficult to use:
 - ▶ There was no clarity/consistency in understanding how the Design Organisation does pro-active requirements management (i.e. validation and verification) to achieve certification at the appropriate level of system integration.
 - ▶ Procedures generated to be compliant with contracted standards often did not include a reference to the standard (and thus easily evolve away from the original intent as they were amended to address audit findings).
 - ▶ Procedures were put in place to act as blockers (i.e. preventing things from going wrong) and not enablers. The organisation only measure compliance and not adequacy or effectiveness of the procedures
 - ▶ Many procedures were disconnected, contradicting and duplicating.
- ▶ **The Quality Management System:** The QMS was impenetrable, with few in the organisation able to use it pro-actively.
 - ▶ It lacked clear ownership.
 - ▶ It was out of date in many cases.
 - ▶ It contains duplicate data in multiple documents.
 - ▶ It was restrictive (i.e. not enabling) causing the organisation to become “prisoners of process”.

The illustration below was successfully used to communicate the problem to the Board of Directors, who all recognised the symptoms:



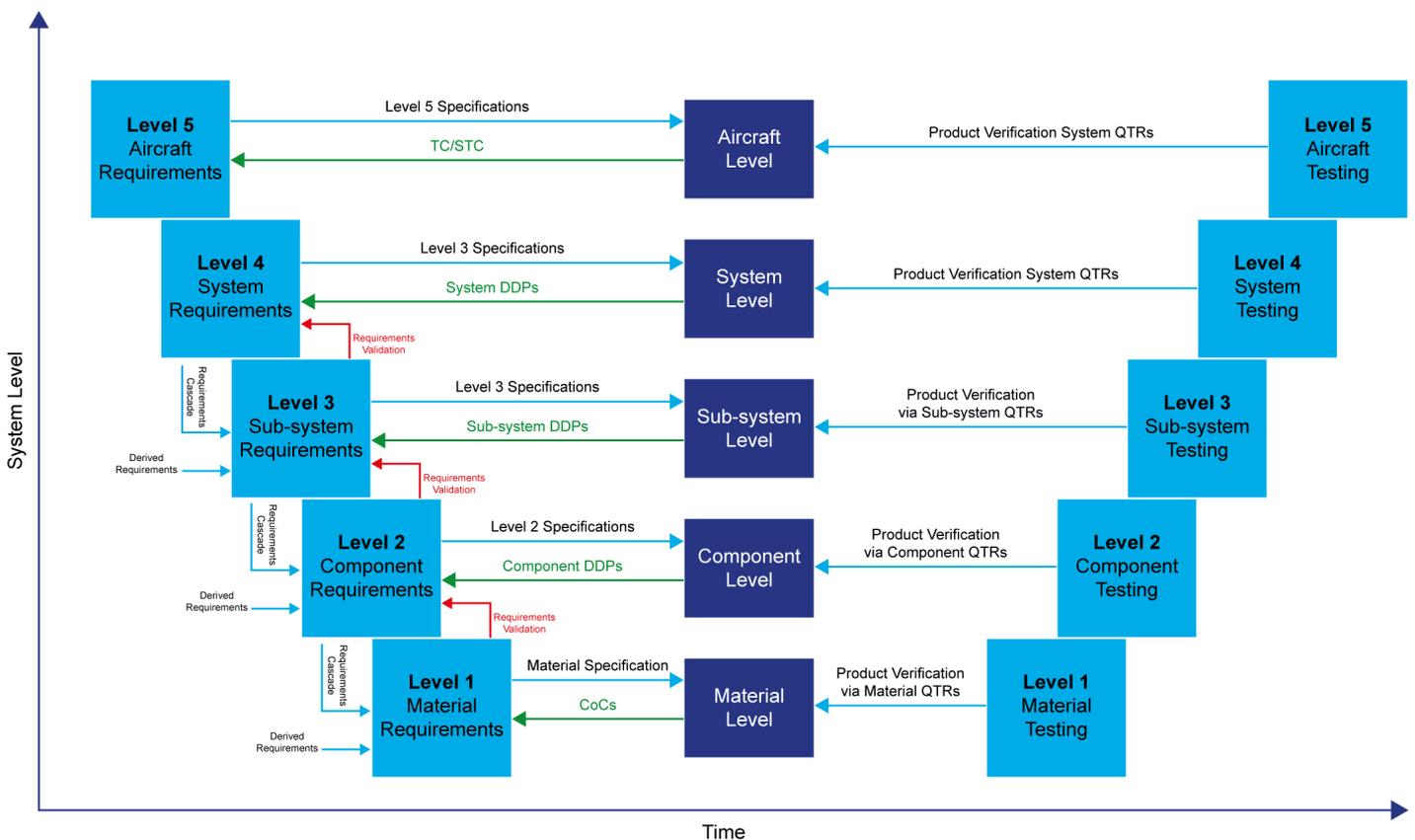
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The Recommendation

A detailed report was provided to the customer with recommendations and a suggested action plan. Some of the recommendations worth highlighting included:

- ▶ Redraft the Exposition to become a useful guide (i.e. basic working document) consolidating all the which the competent Design Organisation needs to operate to do business in the international market processes (i.e. not just those called up by the RAs). The recommendation included a detailed content list, key definitions and an enabling organigram with clearly allocated roles, accountabilities and responsibilities.
- ▶ Key engineering development procedures need to be more process orientated (i.e. who does what and when within the DOA, as well as the TAA and the external system integrators) and need to clearly define the system level of integration (i.e. the client did not modify aircraft, but was an LRU provider only). See V-model below for a useful illustration of the concept:



- ▶ The QMS needed to be improved to be less impenetrable and more user friendly. Ownership of process to be allocated to the users of the process (i.e. not to the Quality Manager).

Following submission of this report, a formal presentation was prepared by Baines Simmons and successfully delivered to the client's Board of Directors.

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Baines Simmons services available to repeat this service

Consulting support

SMARTT® Quality Management Diagnostic Tool and Methodology
Executive Leadership Development – Coaching workshops to cover Effective QMS Principles, Error Management Fundamentals, Safety Management Fundamentals and Understanding and Applying the Intent of the Regulations

Training courses

TR24 EASA Part 21 Subpart J – Understanding and Optimising your DOA

TR81 EMAR 21 Subpart J - Successfully Applying the Requirements (includes comparison to RA5800 series)

TQ02 Practical Skills for Quality Auditor

TQ11 Audit Master Class