Systems Integration

Our Systems Integration Capability

The complex and system of systems nature of Defence programmes means that they regularly present challenging systems integration problems between disparate stakeholders that can have a significant impact on successful programme delivery, often resulting in reduced system performance or increased time and cost. Atkins plans, designs and enables a best practice systems engineering and integration approach from programme outset in order to provide project and programme managers better technological control of their deliverables, aiming to avoid such problems before they appear and underpinning successful delivery of Defence equipment and services.
We provide a complete Systems Integration capability that is compliant with ISO/IEC 15288, the Systems Lifecycle standard and combines experienced systems engineers and industry best practice tools and procedures with a detailed knowledge of the Defence environment in complex programme delivery across C4ISTAR, land, ships, submarines and air domains.

- Professional systems engineers, architecture modellers and domain experts, qualified to degree standard and chartered with IMechE or IET
- Experienced in the use of a range of systems tools including DOORS, MOOD, Enterprise Architect and others
- Best practice systems engineering procedures, drawn from cross-industry sectors including the International Council on Systems Engineering (INCOSE), where we proudly lead the way on the latest issues, standards and debates
- 30 year heritage of providing independent advice and support to the MoD and the Defence Industry and a proven track record of project delivery

Our Systems Integration Services

Our aim is to enable our clients to implement robust, practical and commonly understood systems integration procedures within their programmes through leveraging our skills and depth of experience to achieve effective interface management, test and evaluation planning, technical maturity and quality reviews and stakeholder governance and decision making. Our aim is backed up by our track record of delivery across a range of complex Defence programmes.

Our Systems Integration capability consists of providing a consistent and integrated process to manage all of the activities described below so that the resulting system is truly integrated per design and is fit for purpose. This allows the project and programme manager to achieve better technological control and have the information available to make informed performance, cost, time and risk decisions.

System Architecture Development

Atkins can draw upon cross-industry experience including Aviation (e.g. Heathrow Terminal 5) and Rail domains to address the challenges of System Wide Information Management.

Systems and “System of Systems” architecture development uses an approach based upon:

- Understanding key systems engineering drivers and architecture structuring principles
- Focus on the architecting process and the resolution of legacy and migration issues
- Tailored governance and consensus formation constructs;
- Standard frameworks for capturing architectural products

Operational Analysis and Modelling

We have a strong capability in Operational Analysis and modelling with a proven track record in delivering this capability to clients within the MoD and Industry. We are able to produce operational models in accordance with recognised architectural frameworks including MoDAF and models of system architecture in UML and SysML. Our Operational Analysis capability allows us to take a whole system view and address the operational requirement in terms of outcomes over the whole lifecycle of complex projects.

Requirements Development

We have excellent requirements engineering capability that incorporates both the derivation and management of requirements. We have developed several methods to assist in the elicitation and management of requirements, in equipment and service-based environments. We use various soft systems engineering techniques to elicit User, System and Service Requirements including the development of causal models, using the Decision Explorer tool, to allow stakeholders to explore the requirements landscape they are helping define, whilst providing an easy to understand graphical representation. We regularly manage complex requirements databases and documents both at a stakeholder and system level and are able to produce high quality requirement sets with accompanying satisfaction arguments showing rich traceability between stakeholder and system requirements.

Concept and Design Assessment

We provide physical and functional design services, including weight, space and power budgeting, CAD modelling, interface and service orientated architecture design, as well as communications and software architectures. In addition we offer analysis and technical assurance for the integration of cutting edge technology into design, prototyping and manufacture.

Test and Evaluation

We provide test, evaluation and acceptance services with the development of ITEA plans and verification methodologies as well as supporting evaluation and technical assurance. We also offer human factors and supportability services to complete the systems engineering capability of the organisation.
Our Track Record in Systems Integration

Niteworks Technical Director and Head of INCOSE

Atkins Lead Systems Engineer at a group level, Mike Wilkinson, is the Technical Director of Niteworks. Mike also holds the position of Head of INCOSE (UK and International). These appointments give Atkins the technical direction and access to stakeholders and information in the systems engineering domain that can be of direct benefit to our clients’ programmes.

Global Information Infrastructure & Defence Core Network Services

Atkins has been providing consultancy support to the MoD on communications technologies and methodologies for many years on contracts such as the Global Information Infrastructure (GII) for SEIG (2005 – 2009) and our current (2007 – present) direct support contract through the existing ICS catalogue to DIS Solutions around communications technologies and architectures supporting the Defence Core Network Services (DCNS) programme.

In assessing potential technical solutions to DCNS networks, infrastructures and interoperability of telephony over IP, Atkins has undertaken in-depth technical analysis of current and proposed logical and physical networks using proven best practise architecture principles and methodologies, such as the TOGAF and the Open Group’s “Archimate” enterprise architecture modelling language. This has been further supported through our knowledge of OSI layers 1-4 and has enabled Atkins to provide recommendations with appropriate evidence to the DIS Head of Solutions in order that an assessment of a significant IS and networks proposal could be completed.

Specialist Vehicle (Scout) Programme MoDAF Modelling and Requirements Development

The Specialist Vehicle (SV) programme is the MoD’s £10 bn acquisition to deliver a fleet of medium weight, armoured fighting vehicles to replace obsolescent in-service vehicles deployed on operations, and to fulfil future expeditionary roles. The SV programme is critical to success in the land environment, and will be the cornerstone of the Army’s Reconnaissance Capability.

Atkins was selected to support the Medium Armoured Tracks Team (MATT) to deliver the Assessment Phase of the SV programme, in particular to help MoD develop an independent view of the current and future capability within the armoured fighting vehicle domain and provide support to determine the optimum system solution. The tasks undertaken by Atkins included cross project coherency through high level project and systems engineering management, requirements development, architecture modelling, industry study assessment, stakeholder workshops and supplier management.

Atkins’ approach has provided pull-through from the SV CONEMP to the URD and SRD using a modelling based rich-picture that enabled the Users and Capability Customers to understand the problem and hence make informed option decisions regarding performance, cost and time. We provided the broad range of Systems Engineering SMEs needed to develop complex System Requirements and the required project and architectural products that support it.

A particularly challenging requirement subset was for the integration of MoD Information and Communications systems (such as BCIP) into SV vehicles. These requirements were derived through a process of stakeholder workshops supported by MoDAF compliant modelling products. The MoDAF views identified SV activities needed to support operational vignettes in the SV CONEMP. Communication need-lines and IERs associated with these operational activities were also developed.

As part of the Specialist vehicle Assessment Phase, Atkins produced a military task analysis to assess the operational activities that the Scout, Protected Mobility and Repair and Recovery vehicles are required to perform. This was developed using a System of Systems approach and included development of MoDAF functional breakdowns and system element connectivity views that helped to identify system boundaries and interfaces between internal and external systems to the Specialist Vehicles.

Atkins’ in-house architecture and modelling team developed the understanding of the operational use of these vehicles and how this affects the system requirements, and communicated this understanding to the User. To be able to achieve this, the architecture and modelling team developed MoDAF operational and system views, and developed a MOOD publishing strategy. For the development of the MoDAF views a range of techniques were used including UML and SysML.

NEADS Industrial Concept Study – System of Systems architecture in MoDAF

Network Enabled Airspace Defence and Surveillance (NEADS) is a programme to acquire integrated sensor, weapon and BMC4I system-of-systems in the Air Defence area. Atkins provided requirements management and MoDAF architecture development for this complex capability. MoDAF views were used in this project to represent and model the requirements and provide coherency between CONEMP, URD and SRD development. The MoDAF architectural views were used to allow easy interpretation of options and their overall impact to the project.

Through a modelling driven approach, Atkins developed a system-of-systems view to bring together legacy and new capabilities across a complex architecture. Atkins’ work included architectures definition and MoDAF views for effects, sensors and C4I systems and using Operational Analysis to support requirements development.
JMATS Output Based Specification – Options analysis for MoD/Industry delivery responsibilities

Atkins has supported the Joint Military Air Traffic Services (JMATS) project since September 2008 in the role of lead author of the Output Based Specification (OBS - in lieu of multiple SRDs) and the Integrated Test Evaluation and Acceptance Plan (ITEAP). The development of the OBS is highly complex as the MoD wishes to explore alternative options for the boundary between MoD delivered and Industry delivered elements of the capability during the Assessment Phase.

Atkins provided requirement management for a new capability that involved disparate systems and nodes, communications and networked information, human interaction and the use of policy and doctrine to drive operational behaviours.

Atkins has also been responsible for technical assurance of architectural products including conducting independent and impartial reviews of the JMATS User Requirements Document (URD), the MoDAF Enterprise Architecture and Information Exchange Requirements (IERs).

Our ability to quickly and successfully document, manage and interpret the requirements and architecture into a meaningful format, coupled with effective stakeholder management, across a diverse stakeholder group, was demonstrated in this project.

ITIL and Service Management Support for DII and DFTS

Atkins has been providing support to the DII and DFTS Delivery Teams over a number of years specifically in relation to service management. As a result Atkins has an excellent knowledge of the existing ITIL-based services being delivered and the framework through which they are managed for both DII and DFTS.

Council Information and Communications Technology Systems

Continuing from an earlier Atkins scoping study to provide statements of requirements for the Information and Communications Technology (ICT) systems, Atkins was retained to develop the ICT (voice and data) requirements for a council’s new HQ offices, run a tender competition, provide co-ordination services (e.g. server room design) and project manage the successful ICT contractor on site.

As the independent partner of choice in Defence & Security, we pride ourselves on finding the right solution whatever the challenge. Our expertise spans land, sea and air as well as information and communications and we work throughout the lifecycle of a platform, system or facility.

For more information please visit: www.atkinsglobal.com/defence or contact defencecommunications@atkinsglobal.com