Military Air System Certification: Awareness Training Day 1

Rules of Engagement

[MASC Awareness Home Page – AtkinsRéalis Technical Training Services (atkinsglobal.com)]

Slides

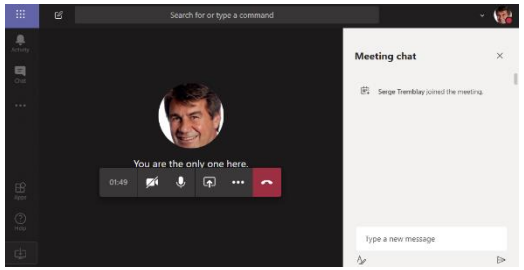
Security

Breaks

Safety Moment

Headphones

Turn on Camera



Chat

Scope

Introductions

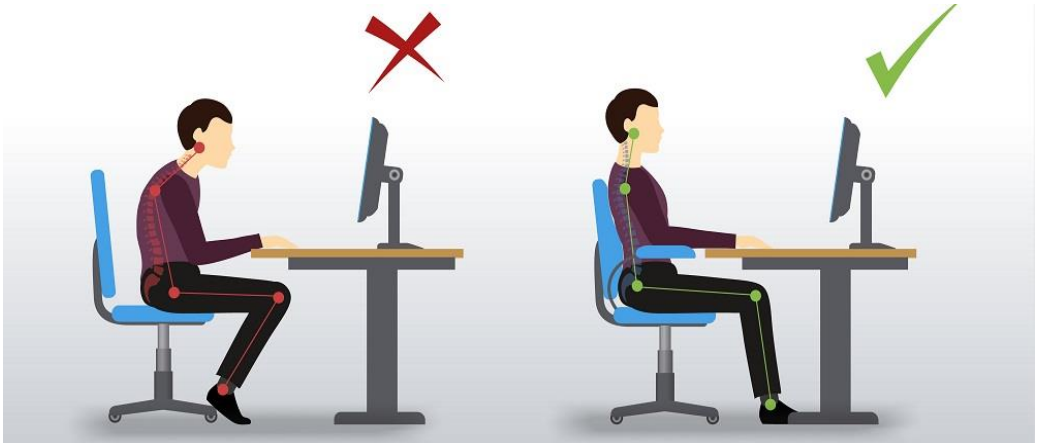
- Wg Cdr MAC Wilson HEA (Air) Certification Lead
- Tutors
- Overview of AtkinsRéalis – Slides at end of pack

Course Schedule

Assessment

Resource materials (website links):

- Manual of Military Air System Certification
- MAA02
- ASPIRE AET Tools
- MASC Website: MASC Awareness Home Page – Atkins' Engineering & Services Training Academy (atkinsglobal.com)



MACP – An overview

Ministry of Defence

de&s

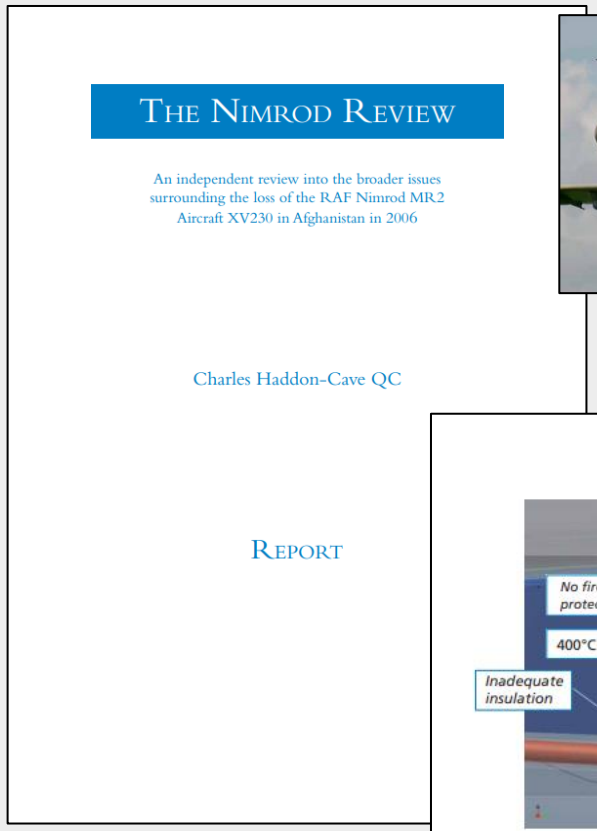
MASC-A Welcome

Wg Cdr MAC Wilson (Andy)

Head of Engineering Authority (Air) Certification Lead

Why am I here?

- Haddon-Cave: Nimrod MR2 breached design standards applicable in 1969 and 1979 – AvP 970.
  - 7 Tank Dry Bay not designated as a Fire Zone.
    - AvP 970, Ch 715, Para 3.1 defined Fire Zones as: *Any region in which a single failure of an installation or any part of it could result in a fire or break out of existing controlled fire (e.g., combustion chamber) into the aeroplane.*
  - Fuel able to pool in corrugated panel at base of 7 Tank Dry Bay.
    - AvP 970, Ch 715, Para 2.2.2: *Any compartment in which inflammable fluids may be liable to accumulate accidentally or from a drain on or in the aeroplane shall either drain automatically in flight or be capable of being drained as a servicing operation.*
- **Military Air System Certification Process kicked-off ~2011.**



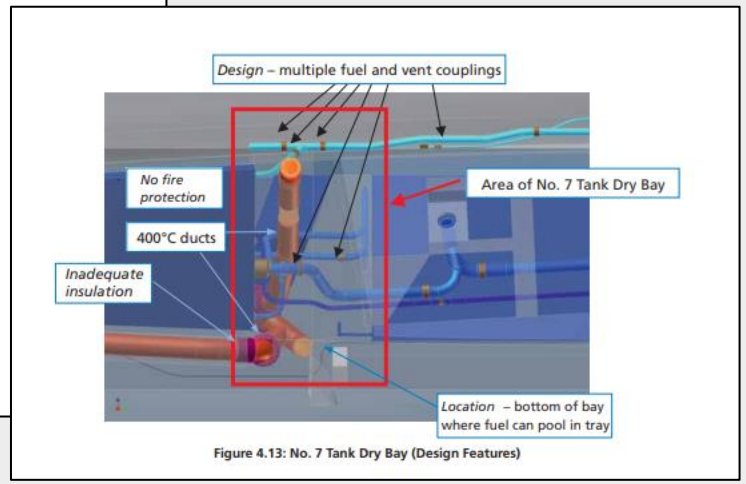
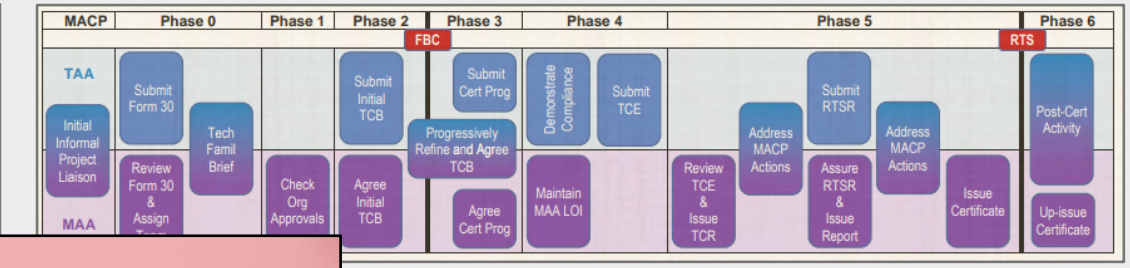


Figure 4.13: No. 7 Tank Dry Bay (Design Features)

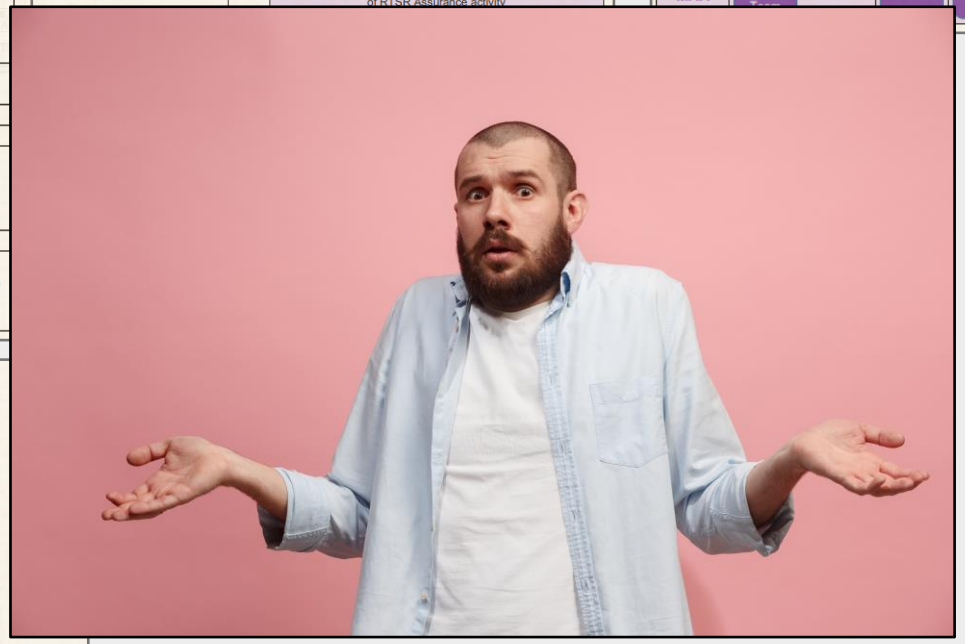
Recommendation 21.E.6: The Regulator shall undertake a review of the certification process for military aircraft in order to align the Airworthiness assurance processes used by the three Services and to establish clear lines of accountability for the design, manufacture of aircraft types, and continued Airworthiness of specific platforms.

Aim (According to Andy)

	TAA	Flow	MAA
D_{TCB}	**Submit** Initial TCB (iTCB) for MAA agreement	→	
D_{TCB} + 1 mth		←	**Agree iTCB**
D_{CP}	**Submit** CP for MAA agreement	→	
D_{CP} + 1 mth		←	**Agree CP**
D_{TCE}	**Submit** TCE for MAA Assurance review	→	
		←	**Review** TCE and release TCR detailing outcome of TCE Assurance review
	e MAA's satisfaction, ns detailed in TCR	→	
	Submit for MAA Audit	→	
		←	**Assure** RTSR and issue Audit Report (AR) detailing outcome of RTSR Assurance activity



Type of compliance	MC	Associated compliance documents
Engineering evaluation	**MC0**: (a) Compliance statement (b) Reference to design data (c) Election of methods, factors, etc (d) Definitions	(a) Design data (b) Recorded statements
	MC1: Design review	(c) Descriptions (d) Drawings
	MC2: Calculations / analysis	(e) Substantiation reports
	MC3: Safety Assessments	(f) Safety analysis
Tests	**MC4**: Laboratory tests **MC5**: Ground tests on related product(s) **MC6**: Flight tests **MC8**: Simulation	(g) Test programmes (h) Test reports (i) Test interpretations
Inspection	**MC7**: Design inspection / Audit	(j) Inspections or Audit reports
Equipment qualification	**MC9**: Equipment qualification	**Note:** Equipment qualification is a process that may include all previous means of compliance at equipment level.

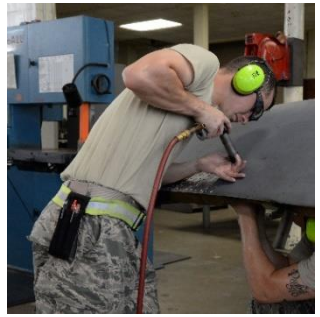


Requirement	Compliance	Guidance
UK25.33a CS 25.33 shall not apply; it is inappropriate for Part 1 Air Systems. *[this shows that EASA CS 25.33 (Propeller speed and pitch limits) is inappropriate for jet-powered Combat FW Air Systems and therefore will not be considered for inclusion in the Type Certification Basis]*	INTENTIONALLY BLANK	INTENTIONALLY BLANK
CS 25.509 Towing Loads *[this shows that EASA CS 25.509 is appropriate for a Part 1 Air System and will be considered for inclusion in the Type Certification Basis]*	AMC 25.509 *[this shows that CS 25.509 has corresponding AMC in EASA CS25 Book 2]*	INTENTIONALLY BLANK *[this shows that CS 25.509 has no GM; indeed, no EASA CS Part has GM]*
UK25.509a When any approved towing arrangement does not incorporate appropriate load limiting devices, the Proof and Ultimate factors of 1.5 and 2.0 respectively shall be applied to the loading conditions of CS 25.509 along with consideration for any likely loading conditions not specified in CS 25.509 such as operation at sea. *[this shows that there is an additional MilΔ Requirement to EASA CS 25.509 that is applicable to Part 1 Air Systems and will be considered for inclusion in the Type Certification Basis]*	For ship-borne Aircraft a load limiting device is not permitted. The maximum loads should consider the sea states as detailed in the Air System specification. In particular, the case of sudden brake application on a pitching, rolling deck should be considered. *[this is the AMC to the UK25.509 MilΔ Requirement]*	Loading conditions not specified in CS 25.509 include those derived from approved towing arrangements when embarked at sea when ship motion may be in combination. *[this GM to the UK25.509 MilΔ Requirement explains why a MilΔ was required]*
CS 25.511 Ground load: unsymmetrical loads on multiple-wheel units *[this shows that EASA CS 25.511 is applicable to Part 1 Air Systems and will be considered for inclusion in the Type Certification Basis]*	INTENTIONALLY BLANK *[this shows that CS 25.511 does not have any corresponding AMC in EASA CS25 Book 2]*	INTENTIONALLY BLANK *[this shows that CS 25.511 has no GM]*

De-mystifying the Military Air System Certification Process

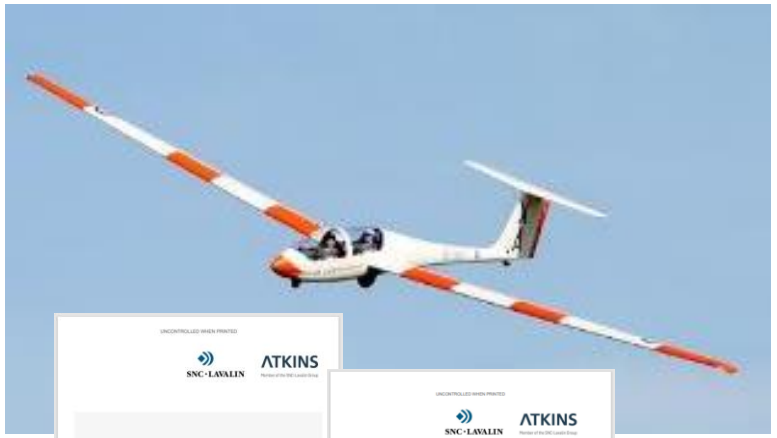
Lynne Aston

ROYAL AERONAUTICAL SOCIETY

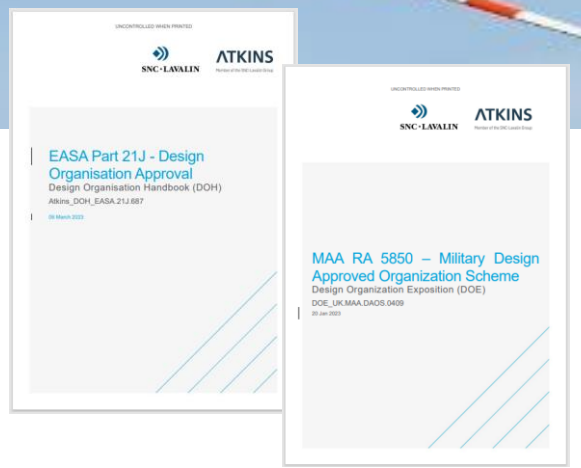


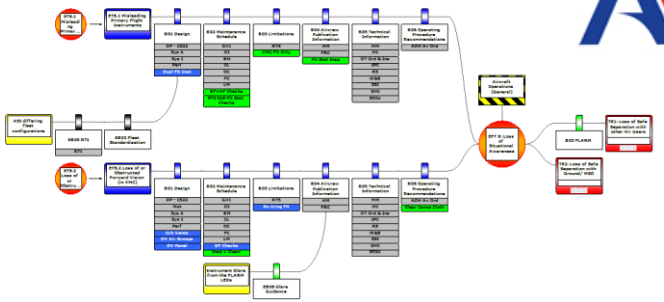
Alex Nicholls

DESG
DEFENCE ENGINEERING AND SCIENCE GROUP



ASMT





ADS

Military Air System Certification Training (MASC)

Awareness Level (MASC-A)

- Day 1 Knowledge Check
- Day 2 Knowledge Test

Supervised Practitioner Level (MASC-SP)

- Day 1 Knowledge Test
- Day 2 Knowledge Test
- Day 3 Knowledge Test

Additional Short Modules (approx. 2.5 hours)

- Foreign Military Sales (FMS)
- CAA Oversight of Military Registered Air Systems (COMRA)

Awareness Day 1: Schedule

09:00	**Welcome and Introductions**
	5 Minute Break
9:45	MACP Introduction
10:45	Break
11:00	MACP Phase 0 - Planning
	5 Minute Break
12:20	Introductions \ Phase 0 Exercise
12:45	Lunch
13:30	MACP Phase 1 - Authorisations
	5 Minute Break
14.30	MACP Phase 2 - Type Certification Basis
15:30	Break
15:45	Phase 2 Exercise Part A
16:20	**End of Day Test Instructions**

Awareness Day 2: Schedule

09:00	**Review of Day 1 Test**
09:15	Phase 2 Exercise Part B and C
	5 Minute Break
10:00	MACP Phase 3 Part 1 - Certification Programme
10:45	Break
11:00	MACP Phase 3 Part 2 and Exercise
	5 Minute Break
11:45	MACP Phase 4 - Demonstrate Compliance
12:45	Lunch
13:30	MACP Phase 4 Exercise
13:50	MACP Phase 5 – MAA Review
14:45	Break
15:00	MACP Phase 6 – Post Certification Activities
15:30	Consolidation Exercise
16:00	**Course Summary and End of Course Test Instructions**

MASC Course Assessment: Awareness Training Day 1

- **Take part in the learning activities throughout the course**

- **Undertake a Test at the end of Day 1**
  - *To check understanding; not part of the course assessment*
  - *10 Multiple choice questions; 35 minutes*
- **Pass a knowledge Test at the end of the course**
  - *Pass mark is 80%*
  - *15 Multiple choice questions; 50 minutes*
    - One attempt and not possible to pause
    - Open slide packs before the exam; the answers are on the slides!
    - Read the question and note number of answers expected
  - *If you experience technical difficulties, take a screenshot and let us know*
  - *You will need to pass the Awareness Course to register for the Supervised Practitioner Course*
  - *If you are required to complete both courses for your role, advised to do so within a year.*

All Tests are ‘open book’

MASC Course Assessment: Awareness Training Day 1

- ***Please advise us if there are any concerns or specific learning needs to take into consideration throughout this training and utilisation of digital tools***

- ***Please advise us if there are any concerns about the content of the course which might impact your mental well being***

- Send us a private email so that we can address either issue:
  - lynne.aston@atkinsrealis.com
  - Alex.Nicholls@atkinsrealis.com

Awareness Training – Course Resources

[MASC Awareness Home Page – AtkinsRéalis Engineering & Services Training Academy (Atkins Réalis .com)]

TITLE

- Main text

- Supporting diagram or punchy aircraft picture.

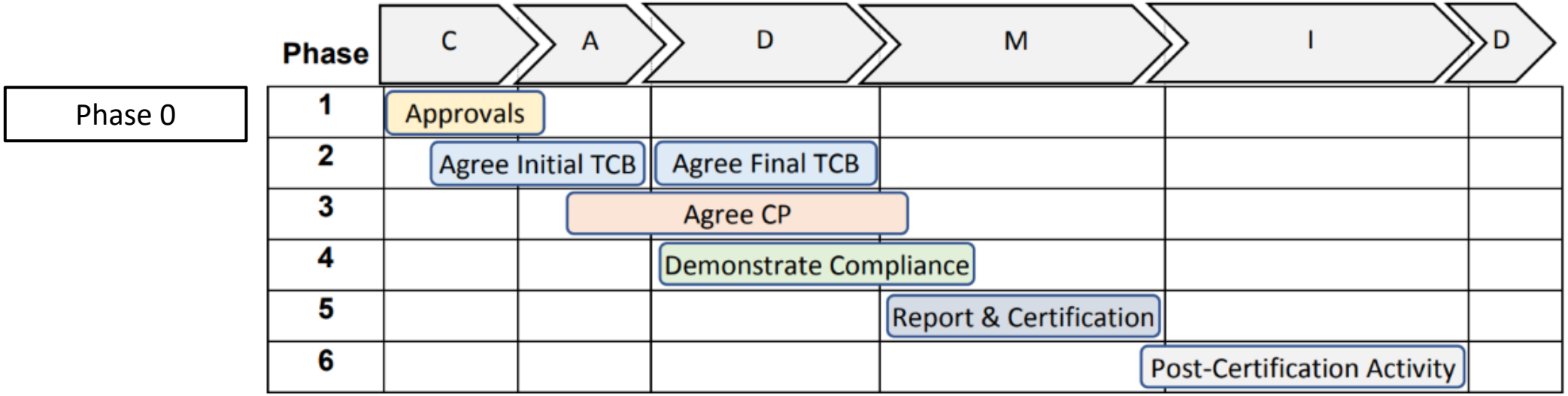
References will be linked when sources are “open source”.
We are unable to link to AET tools or Defence Standards which are held on MODNet.

RA References
MAA Section X Para Y
MAA Figure/Table Z

AET Tool Number & Title

So what is Certification?

- A quick overview prepared by the MAA.



Manual of Military Air System Certification (MMAC) - GOV.UK (www.gov.uk)
Figure 2: MACP Phase within the CADMID Cycle

Break

AtkinsRéalis Overview

AtkinsRéalis employs:

- Over 36,000 employees
- In 50 Countries
- With 130 nationalities

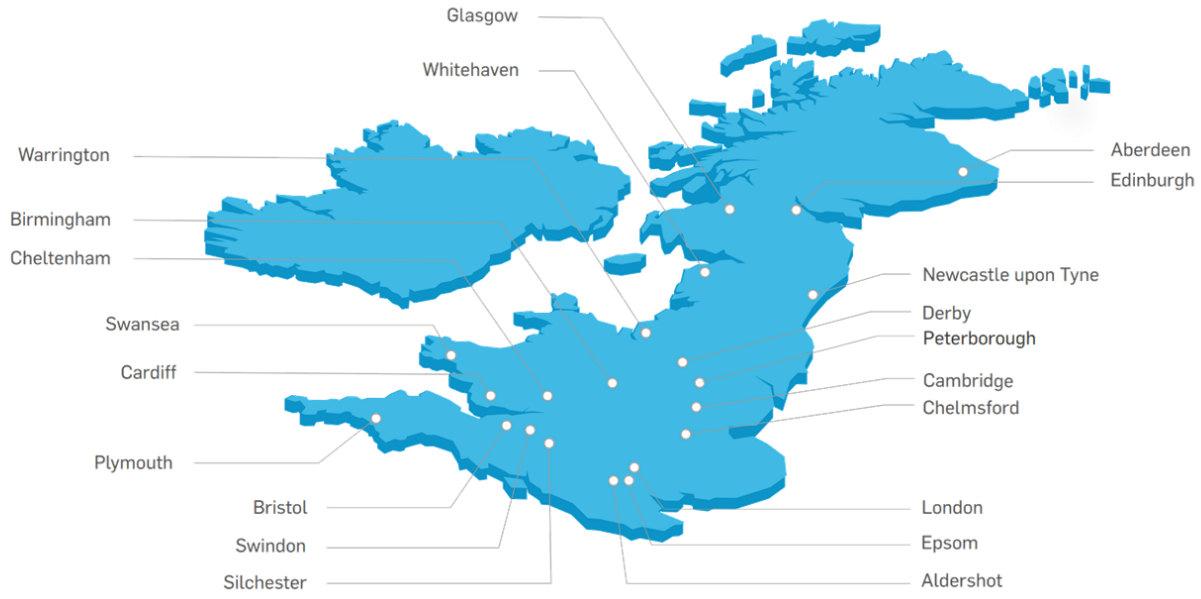
AtkinsRéalis UK

AtkinsRéalis is UK's largest engineering consultancy; 9,000 staff across more than 40 locations in the UK.

Other locations not shown on the map include:
Belfast; Derry; Exeter; Leeds; Liverpool; Manchester; Nottingham; Oxford; Sheffield and Southampton.

Our UK clients include major private companies and large public-sector bodies.

We provide engineering services across aerospace, defence, transportation, infrastructure and energy industries.



AtkinsRéalis Overview

Military Air

- Airworthiness and Certification
- Safety and Environmental
- Systems Integration
- Training and Human Factors
- Integrated Logistics Support
- Availability, Repairability and Maintenance
- Weapons
- Requirements Engineering