



# ACHIEVING AIRWORTHINESS THE ROUTE TO CERTIFICATION

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# INTRODUCTION



- Airworthiness – What is it?
- Design Approved Organisation Scheme
- Defence Standard 00-56 & 00-57
- Route to Product Service System Certification
- Through Life Support

# AIRWORTHINESS

*“The ability of an aircraft or other airborne equipment or system to operate without significant hazard to aircrew, ground crew, passengers (where relevant) or to the general public over which such airborne systems are flown”*

**YOUR MOST VALUABLE  
ASSET - PROTECTED**



# AIRWORTHINESS



## DESIGN

- Meets Specification
- Rigorously Tested
- Hazards/Risk are kept

ALARP

**MEET**



## MANUFACTURE

- Rigorous quality checks
- 100% Final Inspection
- Operator Competency

**ASSURE**



## LIFETIME SUPPORT

- LTC meetings
- Fault monitoring
- Safety Case update

**MAINTAIN**

# Design Approved Organisation Scheme

## THE MOD HAS ASSURANCE THAT:

The Company can produce designs on their behalf

Staff competency levels are appropriate to the task

Structured change management process is applied e.g. Delta qualification, safety implications, risk, integration



Subject to Regular Audit

## **SURVITEC GROUP ARE THE ONLY DAOS AIR CREW EQUIPMENT APPROVED SOLUTIONS PROVIDER**

# COMPLIANCE – DEF STAN 00 56

## Safety Management Systems Requirements

- **Safety Management** – The requirements for organisational and general processes to ensure that **Risk to Life** is managed effectively
- **Safety Engineering** – The requirements for guiding the design of a Product, Services and/or Systems so that it can be **operated safely**, on its own, as part of a wider system, or in a system of systems, and providing evidence that this has been done
- **Safety In-Service** – The requirements for **managing safety** where a Contractor is supporting the MOD by providing a service, which may include operating a Product, Service and/or System

Current update to Issue 5 – Increased emphasis on Human Factors

# COMPLIANCE – DEF STAN 00 56

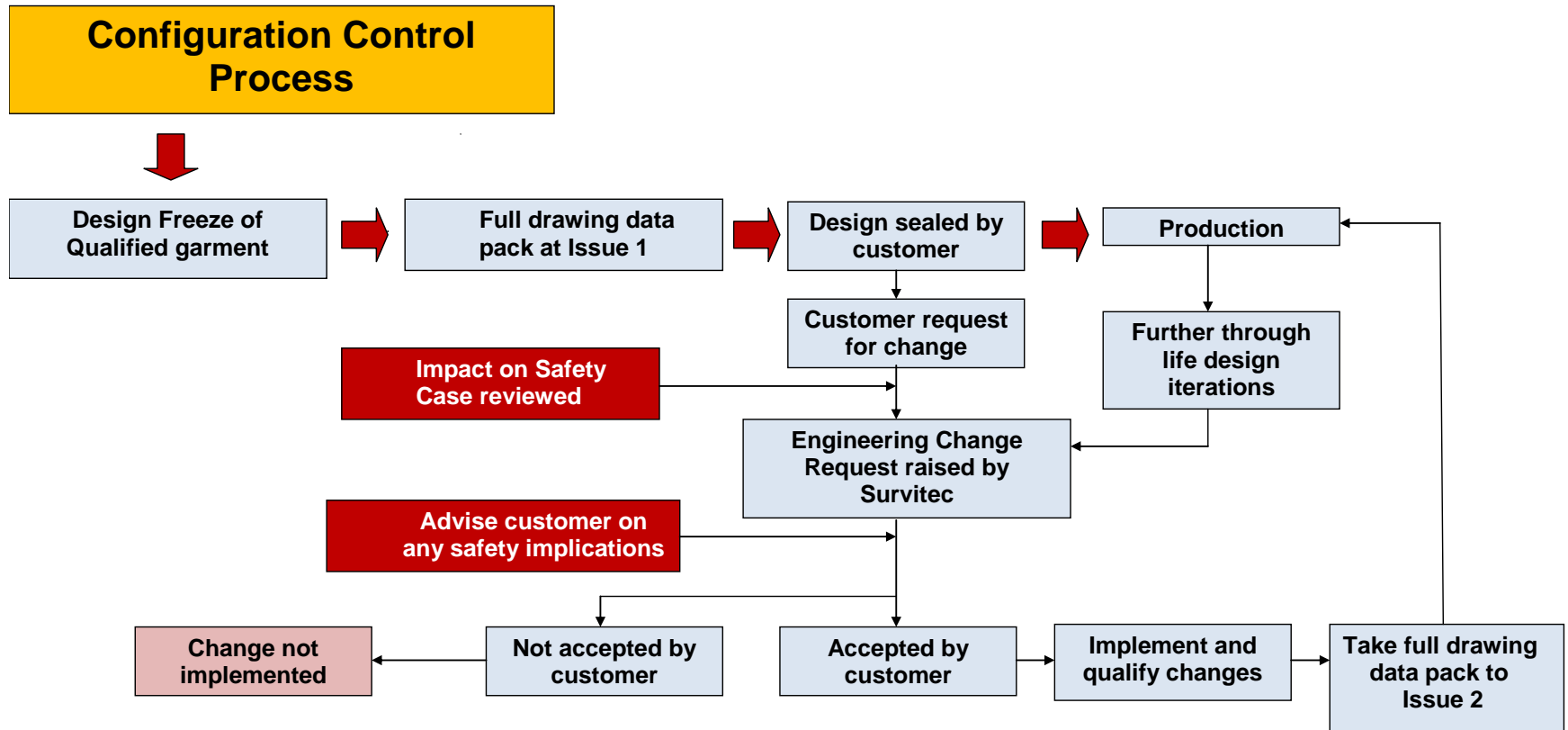
## Safety Management Requirements for Defence Systems

### Safety Management Plan Contents

- Safety Case Report
- Human Factors
  - Thermal Burden
- Hazard Logs
- Safety Analysis
- Failure modes
- Risk Estimation



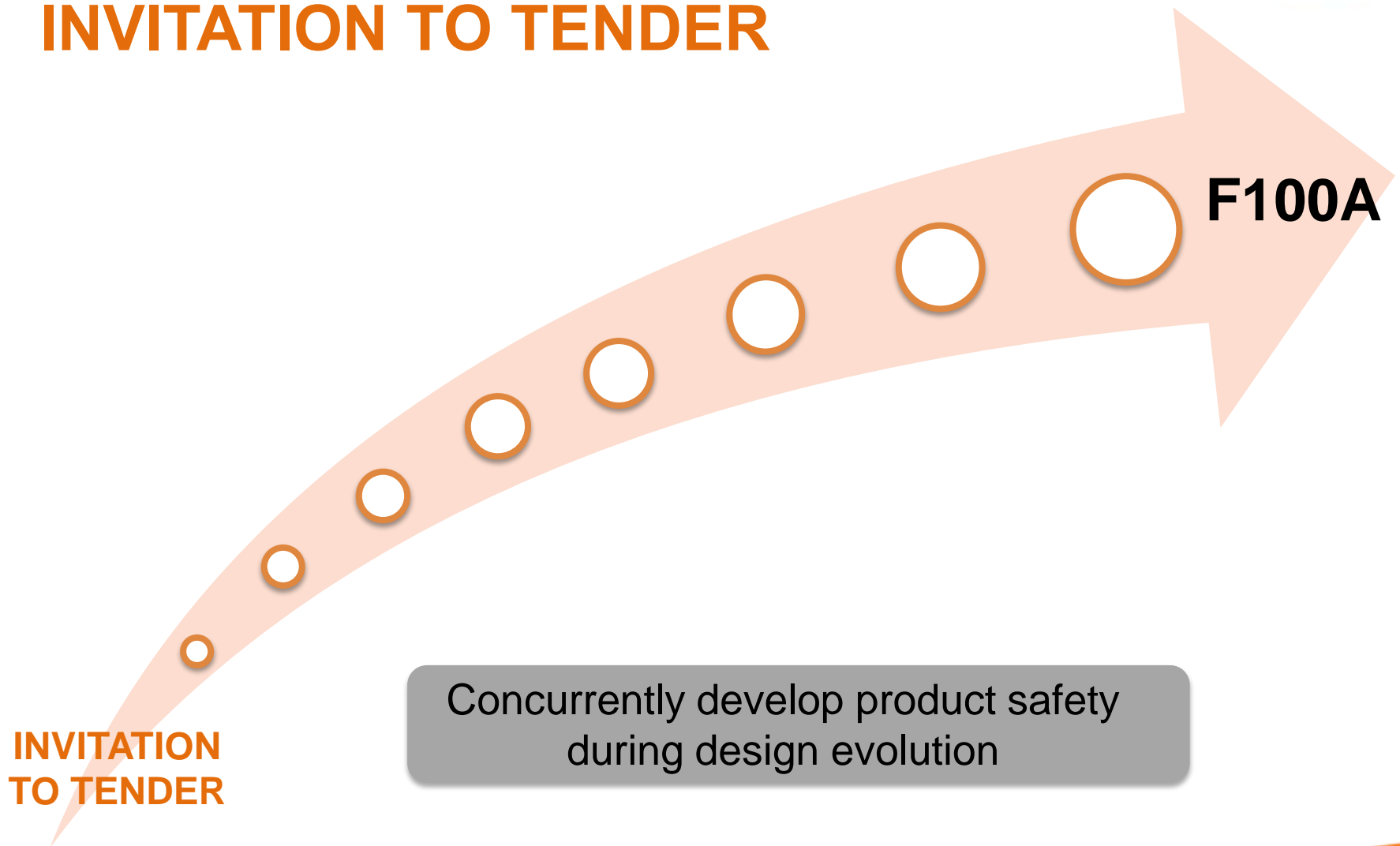
## Configuration Management





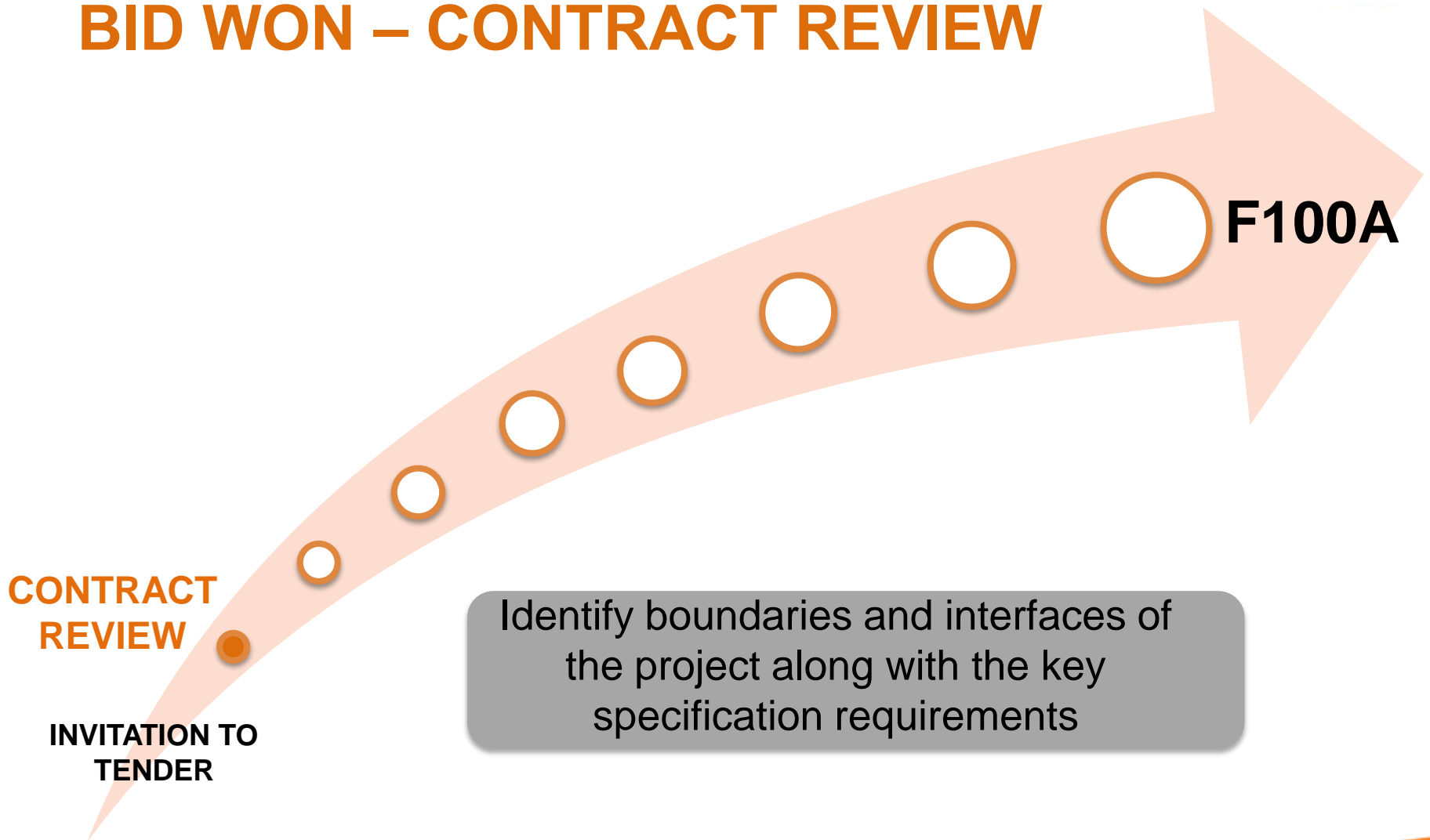
# ROUTE TO CERTIFICATION

## INVITATION TO TENDER



# ROUTE TO CERTIFICATION

## BID WON – CONTRACT REVIEW



# CONTRACT REVIEW

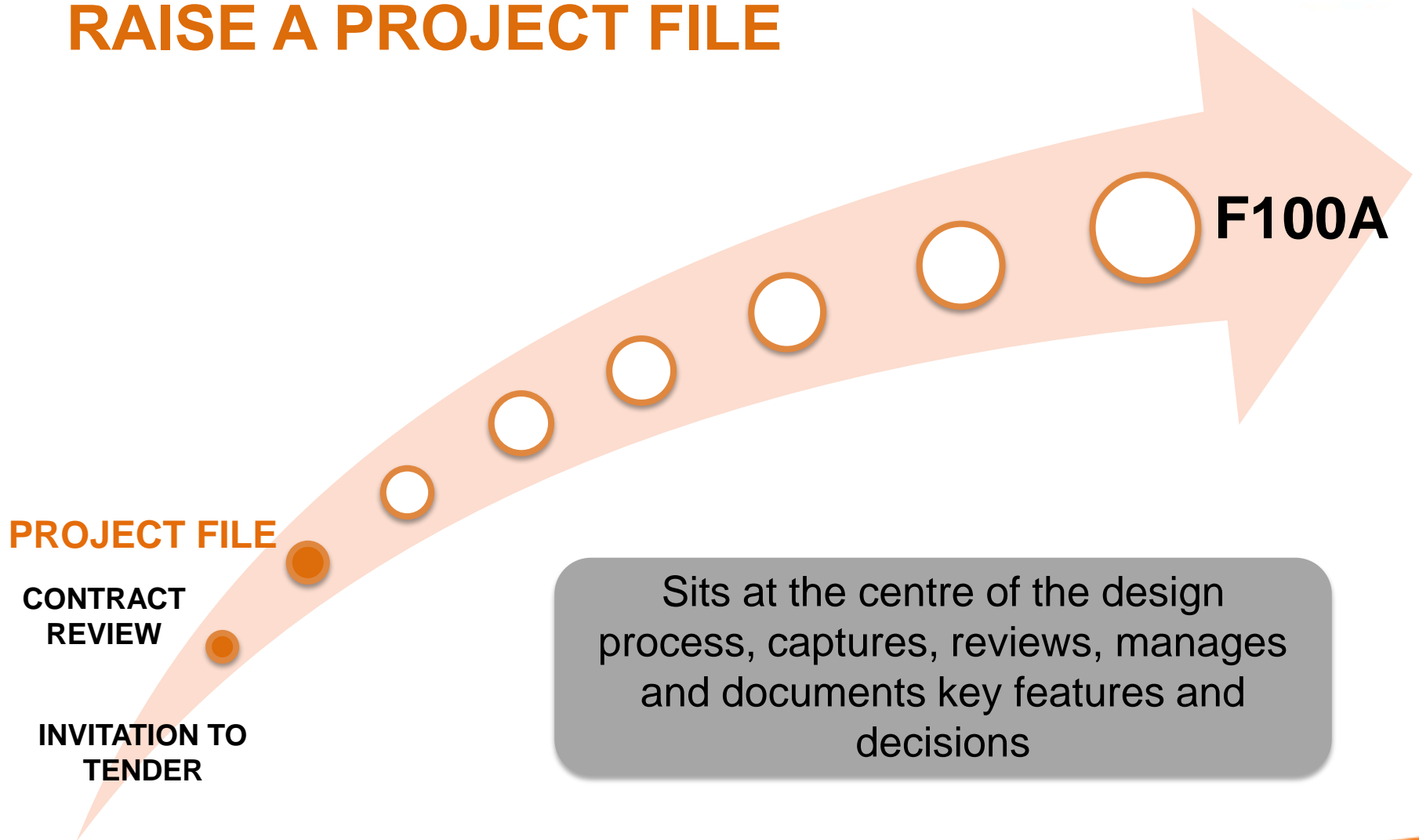
- Held for all our customer contracts
- Review of clauses – Liquidated damages
- Reviewed by all departments – Sales, Design, Operations, Quality, Accounts, Shipping.
- Additional review resources may be required
- Quality plan updates
- Risk to either party addressed

**survitecgroup** CONTRACT REVIEW / QUALITY PLANNING CHECKLIST

CONTRACT / ENQUIRY TENDER No:	DATE:			
CUSTOMER:	COMPLETED BY:			
	ACTION			
Complete the following:	Y/N	DRIVER	WHEN	COMMENTS
				COMPLETE Y/N
<b>SALES</b>				
Review Scope of Supply - Is the scope of supply clear?				
Final Security Classification is Applicable to the project?				
Review general contract conditions - are they clear, unambiguous and acceptable?				
Review Specific or Special contract conditions e.g. Quality Assurance, Delivery Safety & Configuration management - are they clear, unambiguous and acceptable?				
Are there any conditions that need to be flowed down to the sub-contractor/supplier?				
Is the product clear or a representative of an existing product?				
Is the product covered by any DOD/Defence or Government contracts?				
Are we required to handle any documents (e.g. from the English language)?				
What are the identified risks to successful completion (e.g. on-time, on-cost, on-quality) & a Risk Management Reg. established with acceptance criteria & processes?				
<b>TECHNICAL</b>				
Are the functional Objectives of the product defined, is there an adequate input specification or Statement of Requirements?				
How are the risks to achieving these Objectives identified and mitigated?				
Are drawings, MRs, etc. available to permit manufacture (incl. NATO stock numbers)?				
Are drawings and specifications requirements are appropriate?				
Are design or development certification and review stages planned?				
Are maintenance and support requirements appropriate?				
Is a formal Safety Case required?				
If a formal Safety Case is not required have the Safety requirements been discussed and agreed formally with the Customer?				
What is the process for signifying acceptance of the design to the customer?				
Are there any requirements to produce internal requirements test procedures?				
Is the required Design build electrical extent through a tested sample?				
Is a maintenance manual required?				
Are standards of acceptability/ workmanship standards clearly understood and accepted by manufacturing personnel?				
Is the IECN available?				
<b>OPERATIONS</b>				
Is there any special manufacturing process required?				
Is any special equipment or fixtures/tools required?				
Are any additional resources or skills required?				
Are Material and/or process capabilities to permit manufacture?				
Is there any Assembly assistance?				
Is any specific training required?				
Does any work require sub-contracting?				
Complete the following:				
	Y/N	DRIVER	WHEN	COMMENTS
				COMPLETE Y/N
Is the delivery requirement specified and can it be met?				
Are operational and/or maintenance requirements?				
Are operational and/or maintenance requirements covered as part of MRs etc?				
Do we have sufficient resources to fulfil manufacturing requirements?				
Can production commence?				
Are there any customer specific, dimensional or weight requirements for the final product?				
Can the SQA/ QA standard Operating Procedures in place?				
<b>QUALITY</b>				
Do we need to present a quality plan to the customer?				
Is there any requirement to produce internal reworked/returned quality plan-flow diagram?				
Is inspection and test equipment in place?				
Are there any special quality records to be provided or considered?				
Any special or process inspection to be completed?				
Is correct evidence to be maintained (IQC, CAP etc.)?				
Are electronic records from external suppliers (PMA, CQA, CEI etc.)?				
Are there any special technical/chemical specifications that are not stated above?				
Are there any special release conditions/authorities?				
Are any environmental standards contained in the contract?				
<b>ACCOUNTS</b>				
Contract terms agreed and currency clearly stated?				
Are there any special shipping, packaging or marking requirements?				
Are any Safety Data Sheets required?				
Note: All the required actions are to be completed by the agreed time. Actions to be followed up by the IPT Leader throughout the contract.				
<b>ATTENDEE &amp; CIRCULATION LIST</b>				
Attendee Name	Department	Signature		
	Sales			
	Accounts			
	Operations			
	Quality			
	Shipping			
	Technical			
Additional Circulation:				

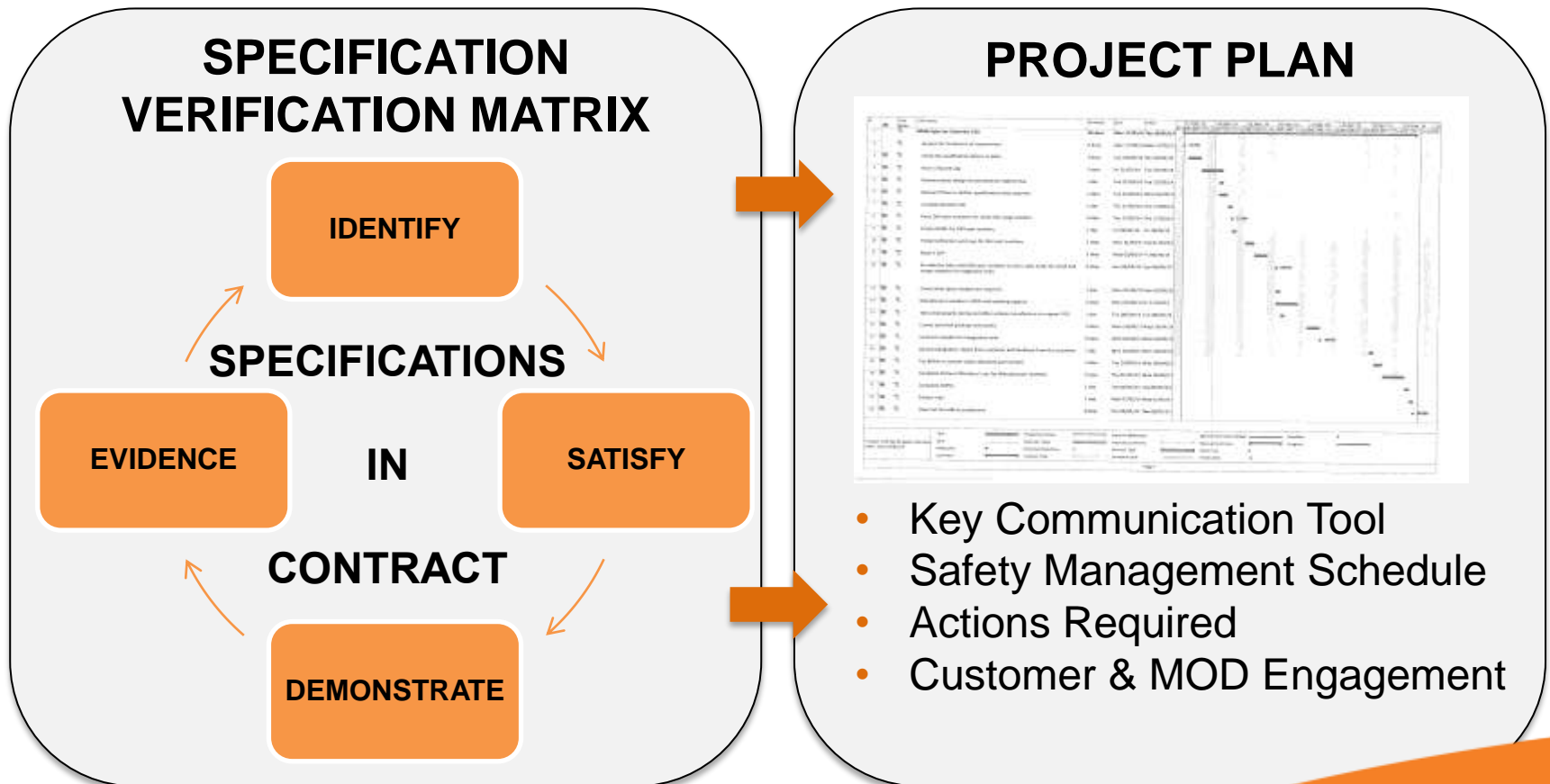
# ROUTE TO CERTIFICATION

## RAISE A PROJECT FILE

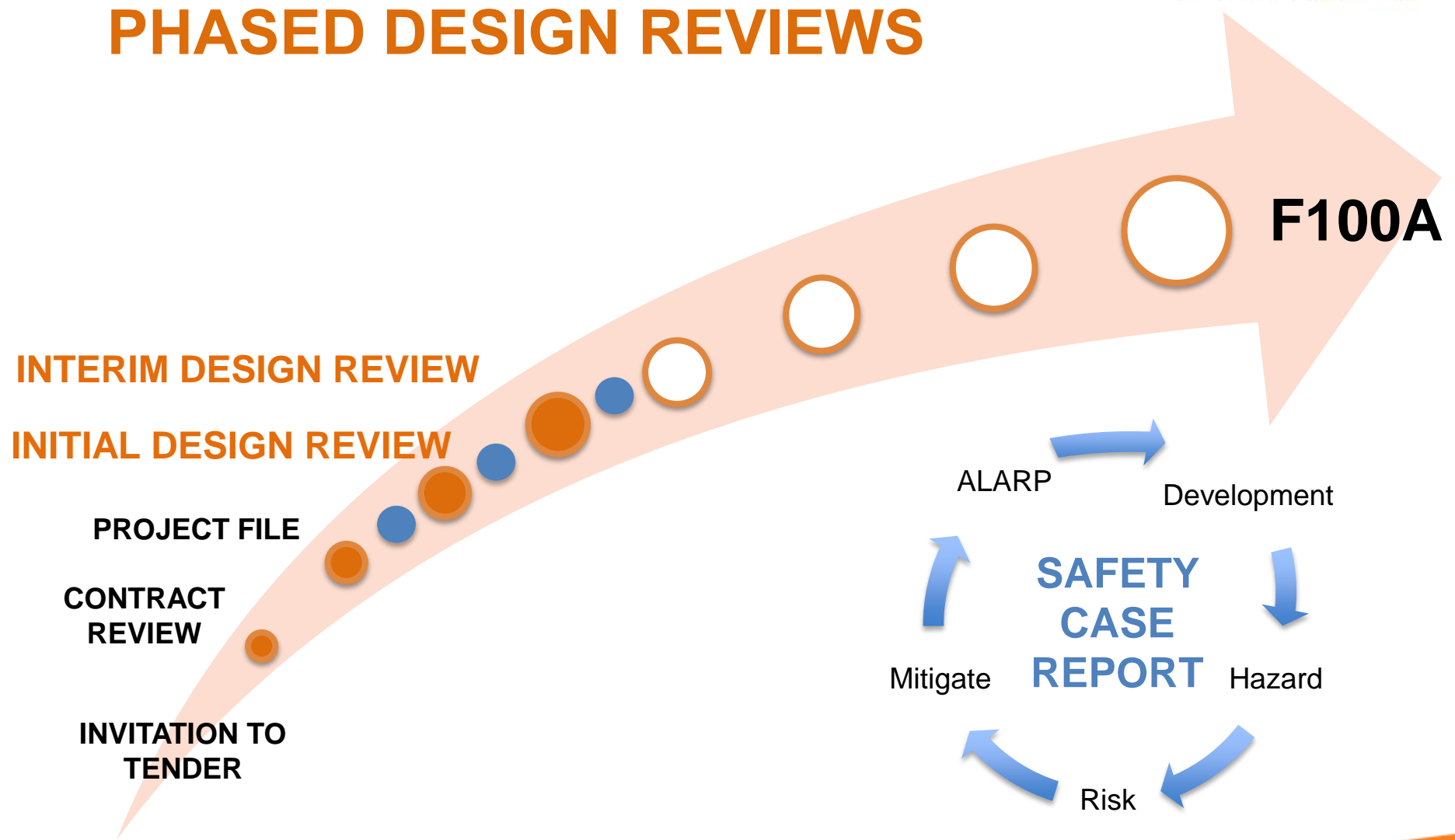


# PROJECT FILE

Post contract review a project file is raised to house all relevant documentation. Two of the most important pieces of documentation in this file are:

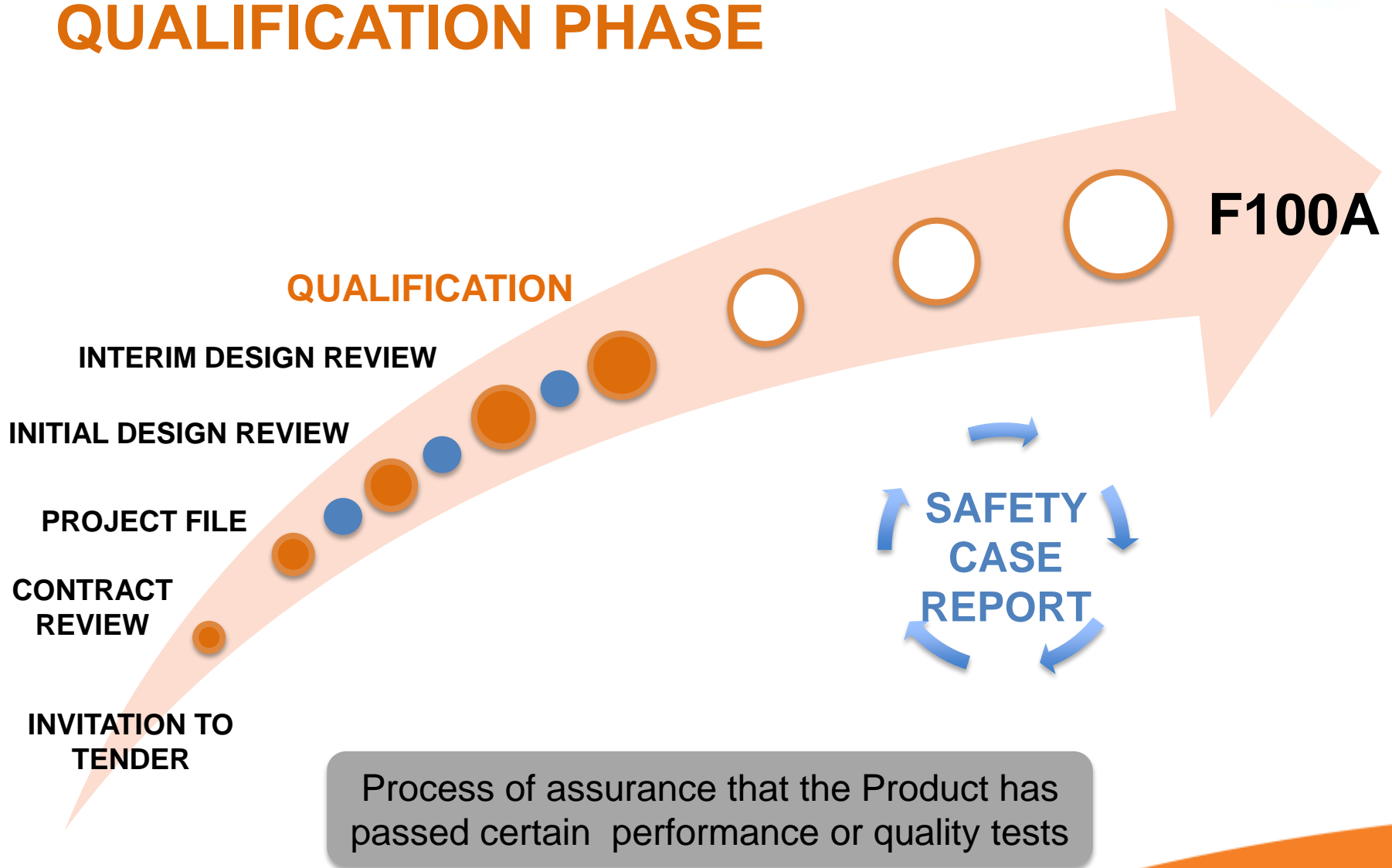


# ROUTE TO CERTIFICATION PHASED DESIGN REVIEWS



Formal Process in which the progress of a design is evaluated against requirements

# ROUTE TO CERTIFICATION QUALIFICATION PHASE



# QUALIFICATION PHASE

## STEPS 1 AND 2

### MATERIAL TESTING



solar Radiation  
Colour Fastness to Light  
Vibration  
Acceleration  
Fungus Resistance  
Salt Fog  
Rain  
Sand and Dust  
Temperature Shock  
Icing/Freezing Rain  
Leakage Immersion Straight CDV  
Mechanical Shock Test  
ARD Max Load  
Contamination Resistance

### SYSTEM TESTING



Ejection Trial  
Pool Trial  
Flame Trial  
Normal and Emergency Cockpit Operation  
Rescue Egress Trials  
Cockpit Habitability Trial  
Normal Ground Egress Trial  
Emergency Ground Egress Trial  
Man/Machine Interface Trial  
Parachute Suspension Trial  
Land Dragging Trial  
Sea Dragging Trial  
Man/Seat Inversion Trial  
Man/Seat Separation Trial  
Crash Declaration Trial



# QUALIFICATION PHASE

## STEP 3

### USER TRIALS

Requirements  
determined by  
customer



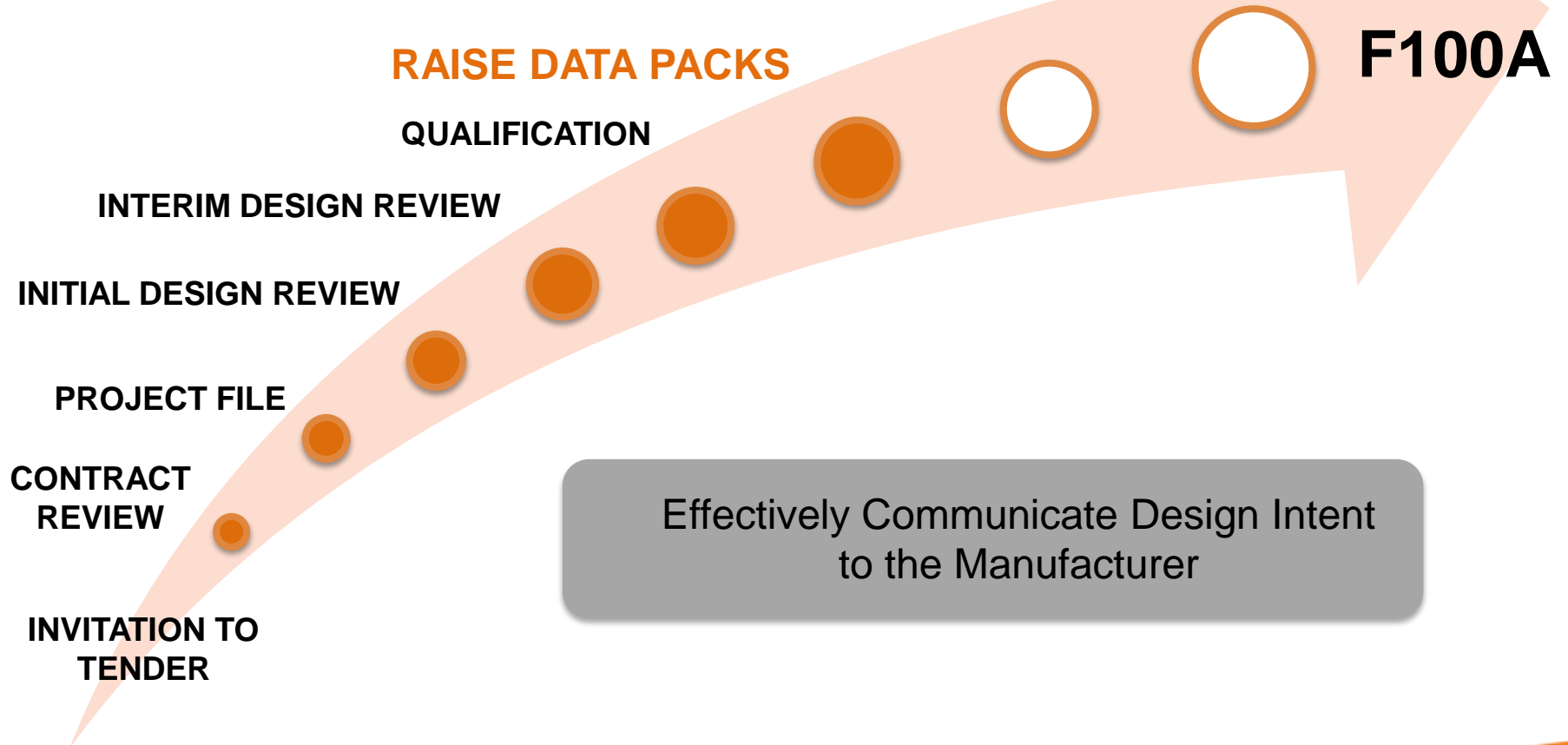
User feedback  
Performance in  
various  
environments

## AIRWORTHINESS

# YOUR MOST VALUABLE ASSET PROTECTED

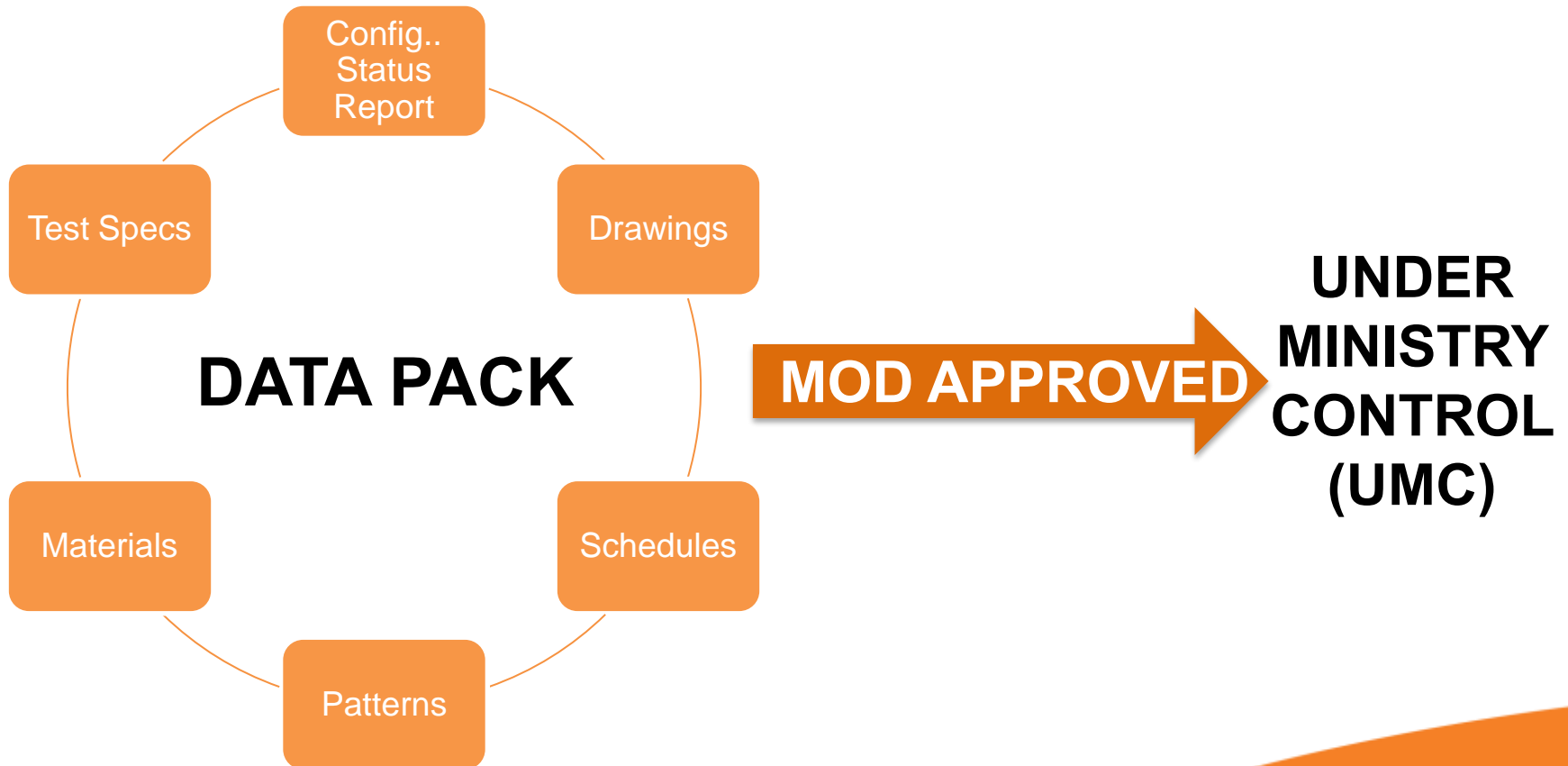
# ROUTE TO CERTIFICATION

## RAISE DATA PACKS



# DATA PACKS

This allows a qualified design to be handed over for production, whilst maintaining configuration control



# ROUTE TO CERTIFICATION

## FINAL DESIGN REVIEW

### FINAL DESIGN REVIEW

RAISE DATA PACKS

QUALIFICATION

INTERIM DESIGN REVIEW

INITIAL DESIGN REVIEW

PROJECT FILE

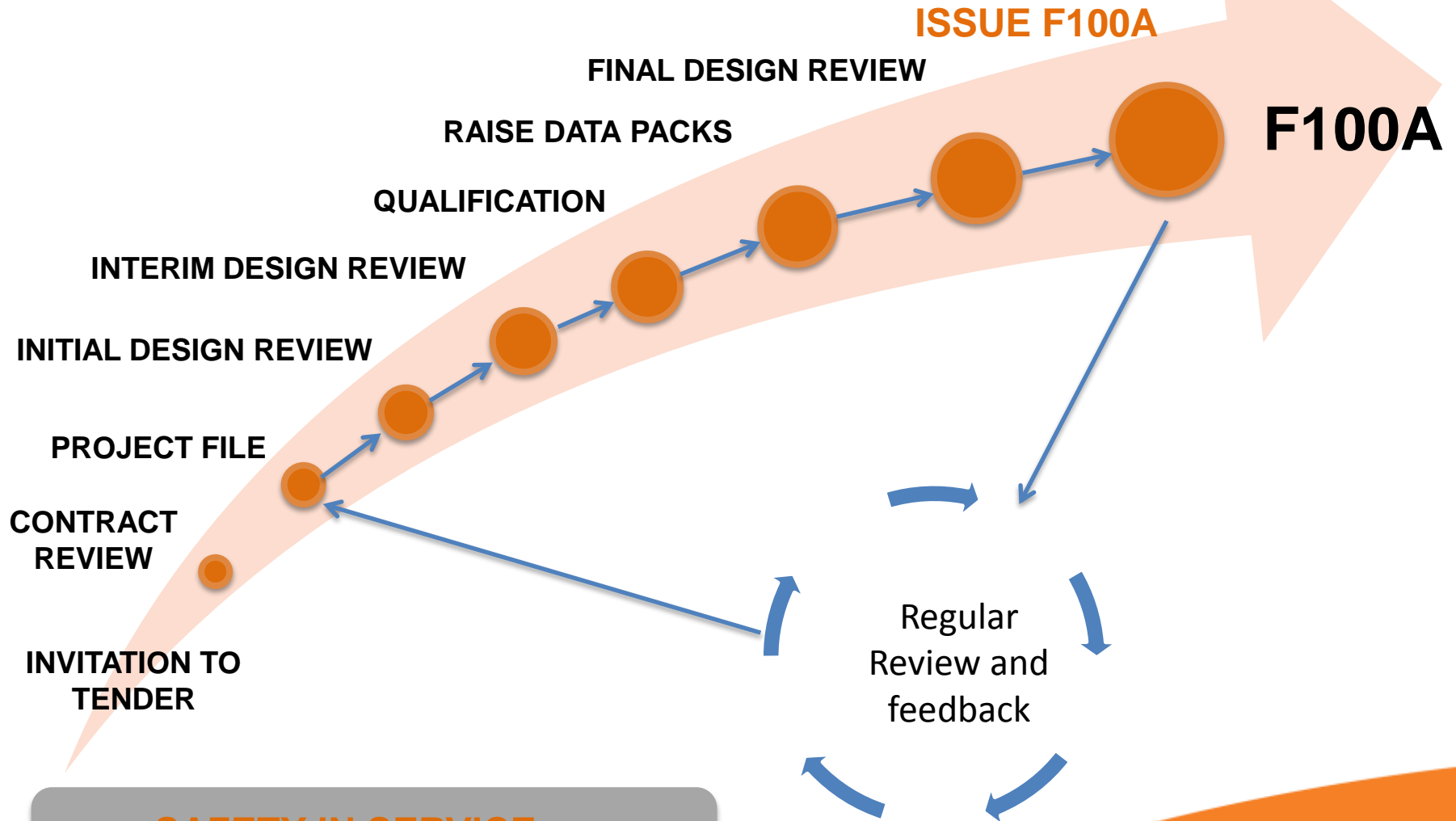
CONTRACT  
REVIEW

INVITATION TO  
TENDER

**F100A**

SIGNIFIES That the design is complete –  
back to the verification matrix, address,  
achieve, document and communicate

# ROUTE TO CERTIFICATION F100A SIGNED AND APPROVED



..... SAFETY IN SERVICE,  
CONTINUED AIR WORTHINESS

# ROUTE TO CERTIFICATION

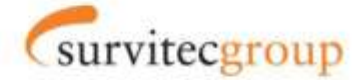
## SAFETY IN-SERVICE

*‘Safety In-Service – The requirements for managing safety where a Contractor is supporting the MOD by providing a service, which may include operating a Product, Service and/or System’*

### CONTINUED IN-SERVICE SAFETY MANAGEMENT:

- Updating Safety Case at periodic timescales as agreed with the Duty Holder but a minimum of one year.
- Monitoring Fault Investigations in Service
- Improvements in manufacturing processes
- Change control and any associated safety implications
- Service provision
- Managing Risk to Life .....

# DAOS DURING PRODUCT SERVICE



**Customers have an obligation that safety and duty of care are fully discharged.**

## **Through Life:**

- ✓ Regular review and analysis of faults and accidents in service
- ✓ Annual update of Safety Case
- ✓ Regular LTC meetings (MOD)
- ✓ Post design service support team

**This ensures:**

**RISK TO LIFE IS AS LOW AS REASONABLY  
PRACTICABLE DURING THE FULL PSS  
LIFECYCLE**

**SURVITEC GROUP**  
**CONTINUED AIRWORTHINESS**  
**DAOS COMPLIANT**  
**PROTECTING YOUR MOST**  
**VALUABLE ASSET**

Questions?





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