

UAS Airworthiness Framework

Proposal

Regulation

tion-Regulations-2016.pdf (SECURED) - Adobe Acrobat Reader DC

View Window Help

Tools 1983 Effect of buoy... Civil-Aviation-Regu... x Sign In

183 / 336 141%

139. Technical approval by Director General

PART XVI

UNMANNED AIRCRAFT SYSTEM

140. Unmanned aircraft system

141. Aerial work involving unmanned aircraft system

142. Small unmanned aircraft

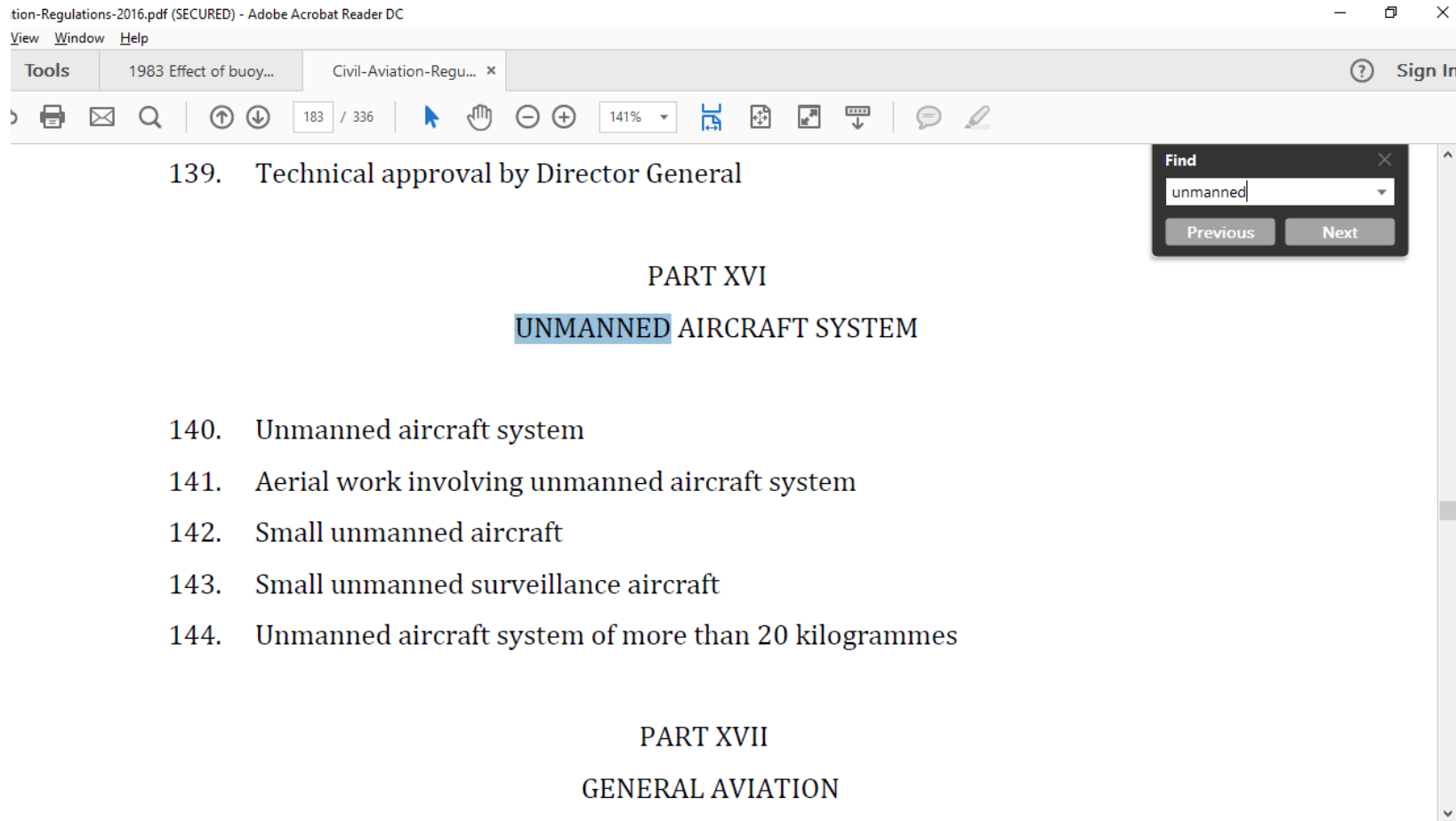
143. Small unmanned surveillance aircraft

144. Unmanned aircraft system of more than 20 kilogrammes

PART XVII

GENERAL AVIATION

Find
unmanned
Previous Next

The image shows a screenshot of the Adobe Acrobat Reader DC interface. The window title is "tion-Regulations-2016.pdf (SECURED) - Adobe Acrobat Reader DC". The top menu bar includes "View", "Window", and "Help". Below the menu bar, there are tabs for "Tools", "1983 Effect of buoy...", and "Civil-Aviation-Regu...". A "Sign In" button is visible in the top right corner. The main toolbar contains various icons for navigation and editing, including a search icon. The page number "183 / 336" and zoom level "141%" are displayed. The main content area shows a list of regulations, with "139. Technical approval by Director General" at the top. Below it, the section "PART XVI" is centered, followed by the heading "UNMANNED AIRCRAFT SYSTEM" where "UNMANNED" is highlighted in blue. A list of regulations follows: "140. Unmanned aircraft system", "141. Aerial work involving unmanned aircraft system", "142. Small unmanned aircraft", "143. Small unmanned surveillance aircraft", and "144. Unmanned aircraft system of more than 20 kilogrammes". Below this list, "PART XVII" and "GENERAL AVIATION" are centered. A "Find" dialog box is open on the right side, with "unmanned" entered in the search field and "Previous" and "Next" buttons below it.

Regulation

Civil-Aviation-Regulations-2016.pdf (SECURED) - Adobe Acrobat Reader DC

File Edit View Window Help

Home Tools 1983 Effect of buoy... Civil-Aviation-Regu... x Sign In

287 / 336 141%

any area which is used for residential, commercial, industrial or recreational pu

Unmanned aircraft system of more than 20 kilogrammes

144. (1) No person shall fly an unmanned aircraft system having a mass of more than 20 kilogrammes without its fuel, without the authorisation from the Director General.

(2) An application for the authorisation under subregulation (1) shall be made to the Director General in accordance with regulation 189.

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Find
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Previous Next

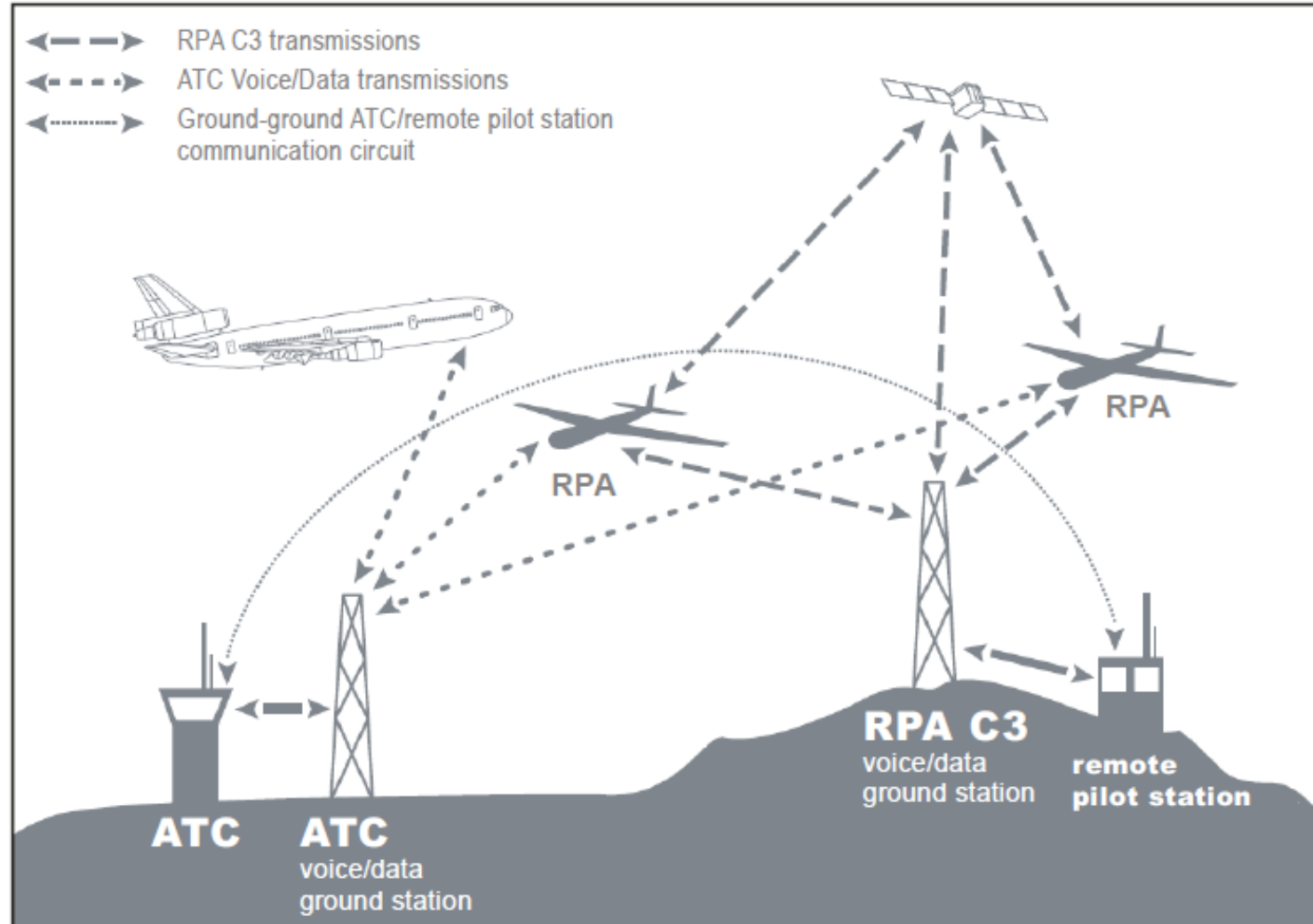


More than 20 Kg



But we are talking about a UAS with payload of 500 pound to fly as far as 20 miles.

Operating Environment



Expectation of us
flying next to an
UAS and
expectation of us
on the ground



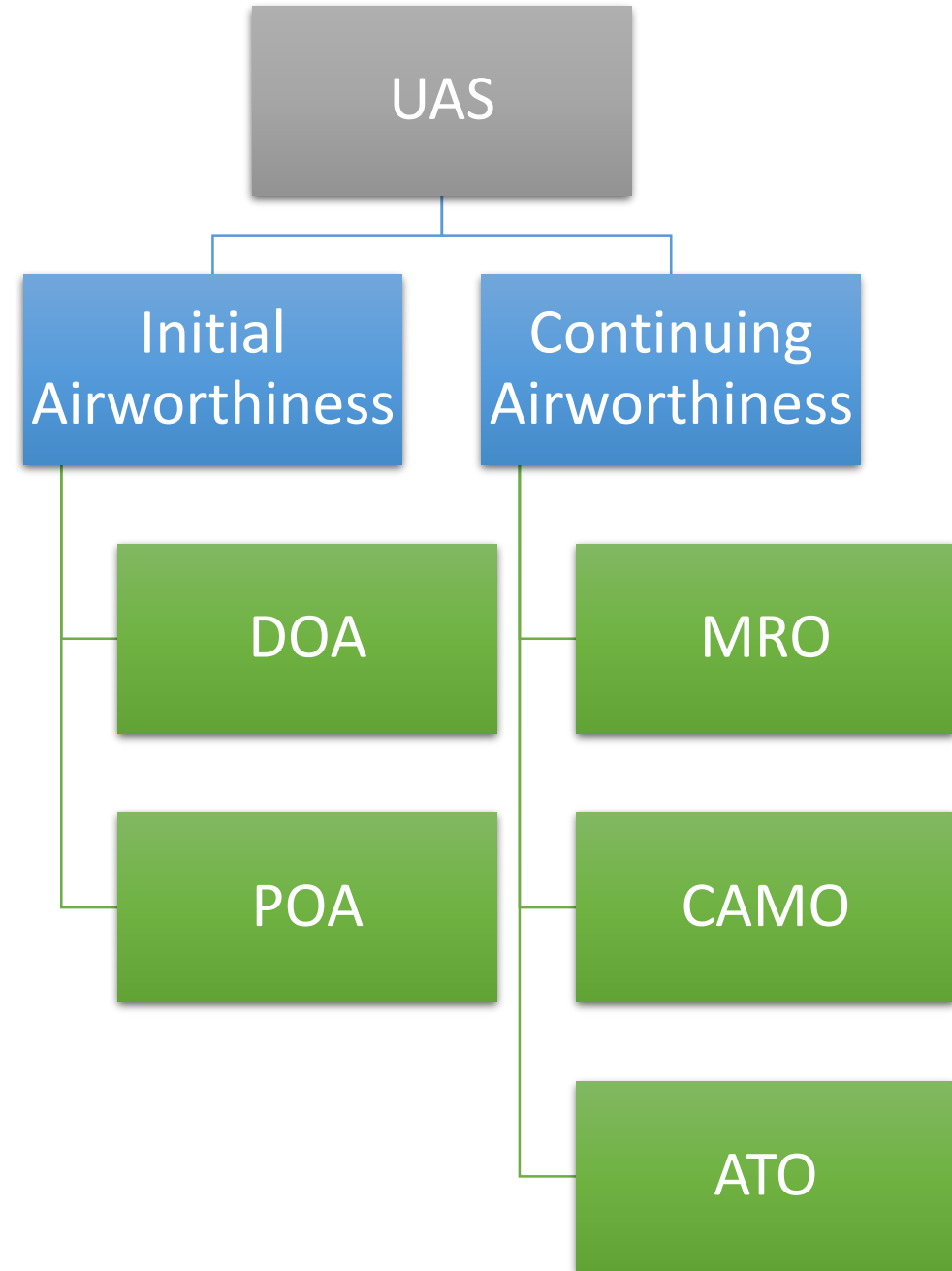
ICAO Circular No. 328

1.7 Unmanned aircraft (UA) are, indeed, aircraft; therefore, existing SARPs apply to a very great extent. The complete integration of UAS at aerodromes and in the various airspace classes will, however, necessitate the development of UAS-specific SARPs to supplement those already existing.

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- Annex 1 - Personnel Licensing
- Annex 2 - Rules of the Air
- Annex 3 - Meteorological Services
- Annex 4 - Aeronautical Charts
- Annex 5 - Units of Measurement
- Annex 6 - Operation of Aircraft
- Annex 7 - Aircraft Nationality and Registration Marks
- Annex 8 - Airworthiness of Aircraft
- Annex 9 - Facilitation
- Annex 10 - Aeronautical Telecommunications
- Annex 11 - Air Traffic Services
- Annex 12 - Search and Rescue
- Annex 13 - Aircraft Accident and Incident Investigation
- Annex 14 - Aerodromes
- Annex 15 - Aeronautical Information Services
- Annex 16 - Environmental Protection
- Annex 17 - Security
- Annex 18 - The Safe Transportation of Dangerous Goods by Air
- Annex 19 - Safety management

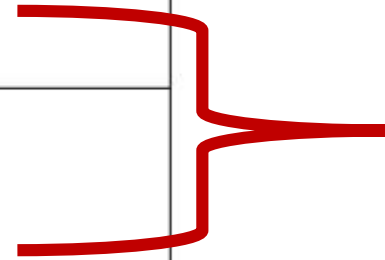
UAS(Unmanned Aircraft System) Airworthiness Framework



Fields 2 Identify the DOA category(ies) based on the following:

<i>DOA Categories:</i>	<i>Nature:</i>	<i>Cases:</i>
1A	Type Certificate applicant or holder of highly complex or large product(s)	<ul style="list-style-type: none"> • Large Aeroplanes • Small and Large Rotorcraft • UAVs (Large) • Turbine Engines
1B	Type Certificate applicant or holder of complex or small-medium product(s) TSOA APU (large)	<ul style="list-style-type: none"> • Small Aeroplanes • Very Light Rotorcraft • Gyroplanes • UAVs (small-medium) • Piston Engines • Large APU
1C	Type Certificate applicant or holder of less complex or very small product(s) TSOA APU (small)	<ul style="list-style-type: none"> • Sailplanes, powered Sailplanes • Very Light Aeroplanes • Airships • Balloons • Propeller • Small APU
2A	STC / Changes / Repairs, unrestricted	Scope including at least structure, installation of avionics, hydro-mechanical systems, electrical systems, cabin interiors,
2B	STC / Changes / Repairs, restricted (technical fields)	Scope with restricted technical fields
2C	STC / Changes / Repairs, restricted (aircraft size)	Scope limited to one category of product only
3A	Minor Changes / Repairs, unrestricted	Scope including at least structure, installation of avionics, hydro-mechanical systems, electrical systems, cabin interiors,
3B	Minor Changes / Repairs, restricted (technical fields)	Scope with restricted technical fields
3C	Minor Changes / Repairs, restricted (aircraft size)	Scope limited to one category of product only

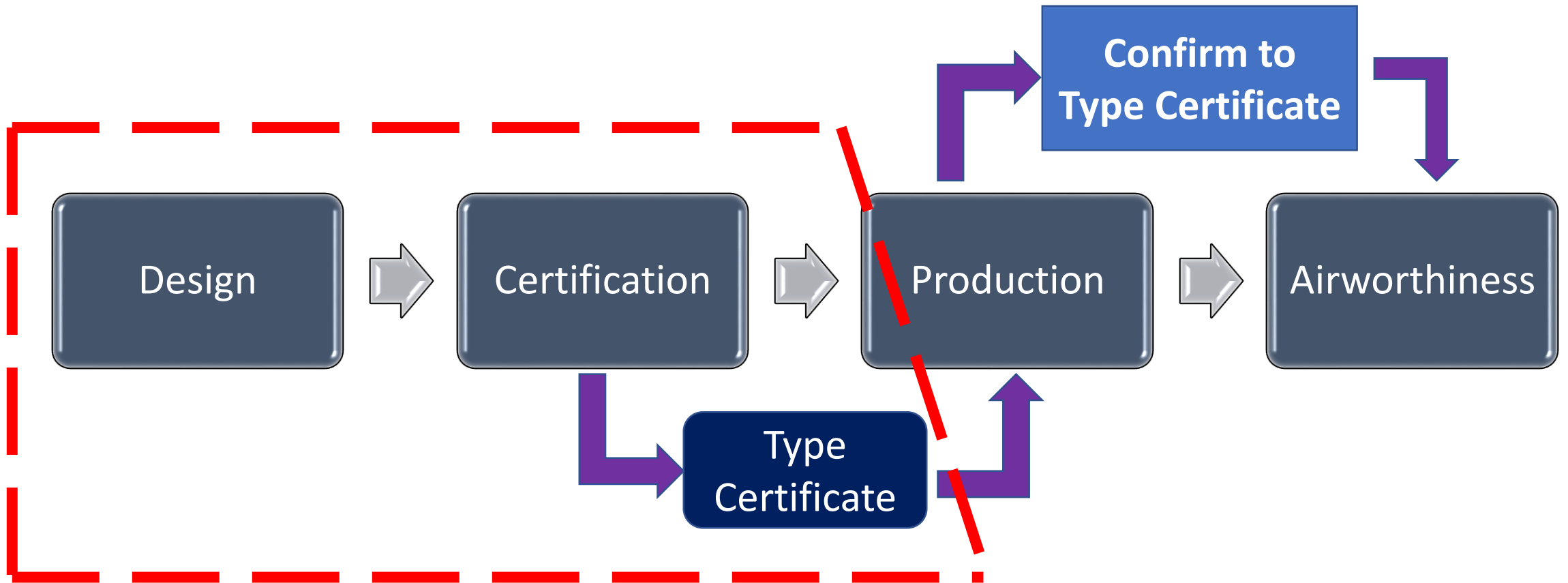
UAS is treated just like manned aircraft for TC application



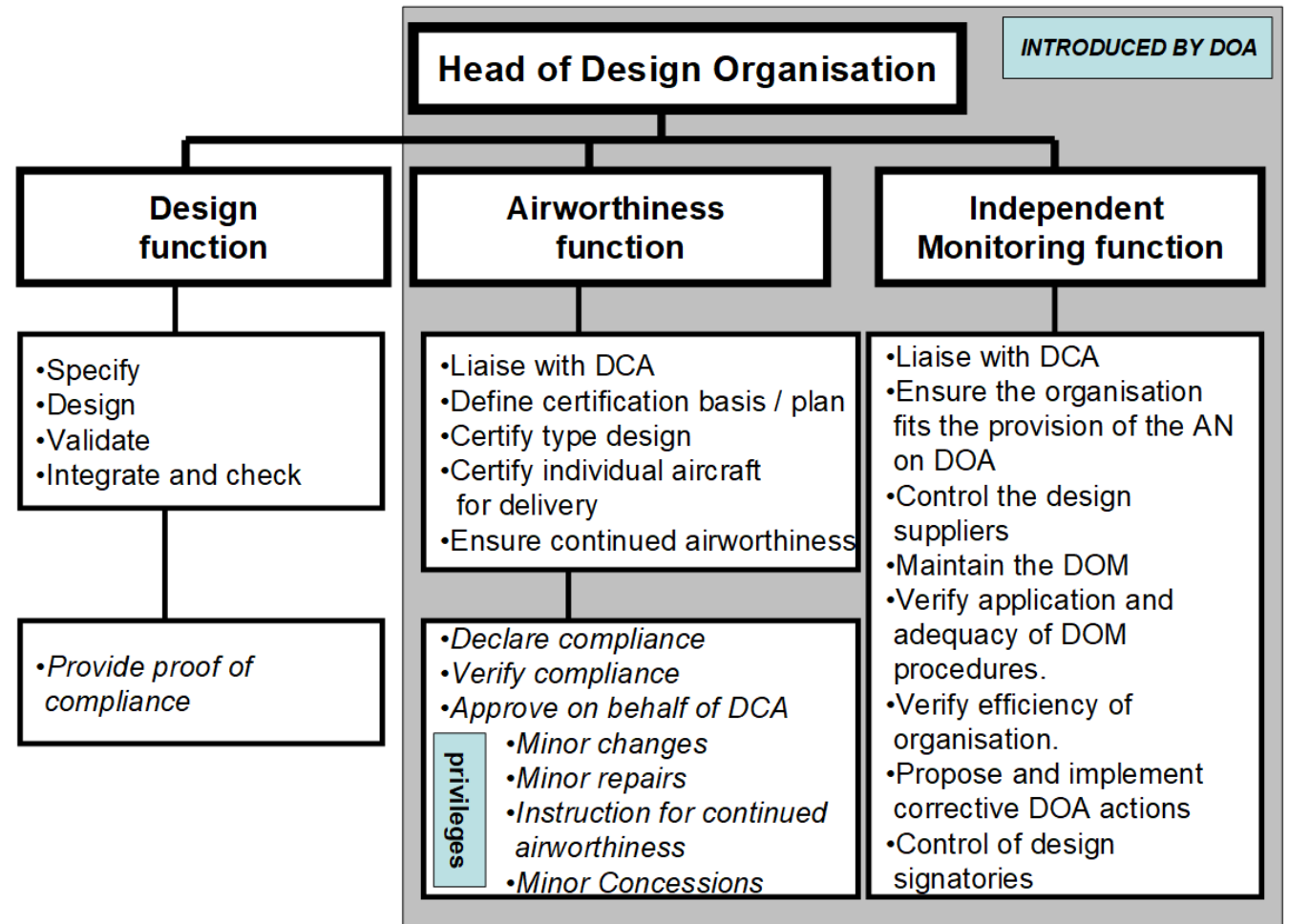
Design Organization Approval in accordance with Malaysia CAR 2016, Regulation 21

Fields 3 Identify the scope of design on Table A Specify as necessary appropriate product types, activity and technical fields such as listed in List 1, 2 and 3. Table A may be varied in size to allow entry of all required information.

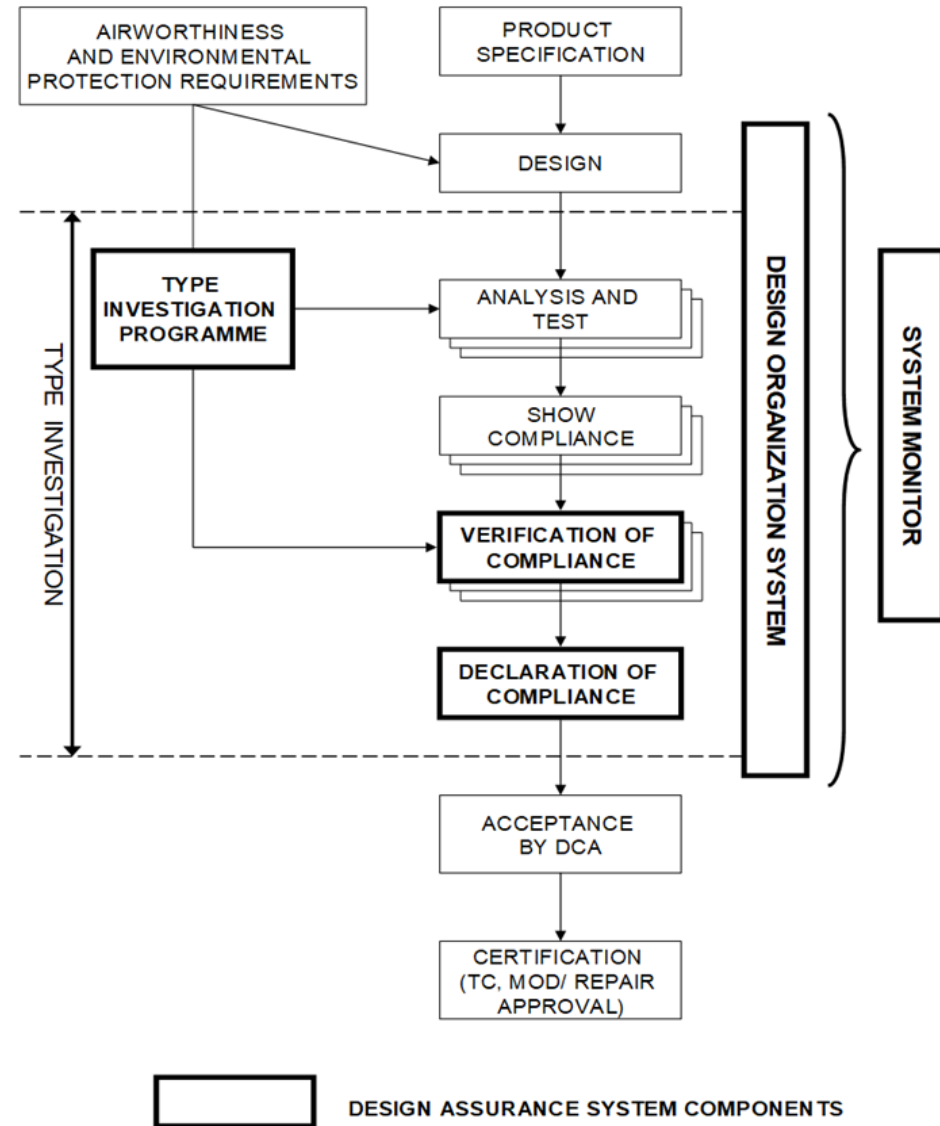
Aircraft Design, Certification, Production, Airworthiness



Design Organization



Certification Basis





**Joint Authorities for Rulemaking of Unmanned Systems
WG-3 Airworthiness**

**Certification Specification for
Light Unmanned Rotorcraft Systems
(CS-LURS)**

Version 1.0
30-10-2013





Certification Specification - Light Unmanned Multi Rotor Systems (CS-LUMRS)

Concept certification requirements



JARUS CS-LUAS
Recommendations for
Certification Specification for
Light Unmanned Aeroplane
Systems

EASA	Title	FAA	Title
CS-22	Sailplanes and Powered Sailplanes		
CS-23	Normal, Utility, Aerobatic and Commuter Aeroplanes	Part 23	AIRWORTHINESS STANDARDS: NORMAL, UTILITY, ACROBATIC, AND COMMUTER CATEGORY AIRPLANES
CS-25	Large Aeroplanes	Part 25	AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES
CS-27	Small Rotorcraft	Part 27	AIRWORTHINESS STANDARDS: NORMAL CATEGORY ROTORCRAFT
CS-29	Large Rotorcraft	Part 29	AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY ROTORCRAFT
CS-31GB CS-31HB	(Gas Balloons) (Hot Air Balloons)	Part 31	AIRWORTHINESS STANDARDS: MANNED FREE BALLOONS
CS-E	Engines	Part 33	AIRWORTHINESS STANDARDS: AIRCRAFT ENGINES
CS-P	Propellers	Part 35	AIRWORTHINESS STANDARDS: PROPELLERS
CS-LSA	Light Sport Aeroplanes		
CS-VLA	Very Light Aeroplanes		
CS-VLR	Very Light Rotorcraft		
CS-34	Aircraft Engine Emissions and Fuel Venting	Part 34	FUEL VENTING AND EXHAUST EMISSION REQUIREMENTS FOR TURBINE ENGINE POWERED AIRPLANES
CS-36	Aircraft Noise	Part 36	NOISE STANDARDS: AIRCRAFT TYPE AND AIRWORTHINESS CERTIFICATION

What are
common?

CONTENT

SUBPART A GENERAL

SUBPART B FLIGHT

SUBPART C STRENGTH REQUIREMENTS

SUBPART D DESIGN AND CONSTRUCTION

SUBPART E POWERPLANT

SUBPART F EQUIPMENT

SUBPART G OPERATING LIMITATIONS AND INFORMATION

SUBPART H Reserved for Detect and Avoid

SUBPART I CONTROL STATION

Appendix A INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

Appendix B ENGINES

Appendix C INTERACTION OF SYSTEMS AND STRUCTURES

Appendix D HIRF ENVIRONMENTS AND EQUIPMENT HIRF TEST LEVELS

Appendix to AMC 21.A.20(b) - Means of compliance codes

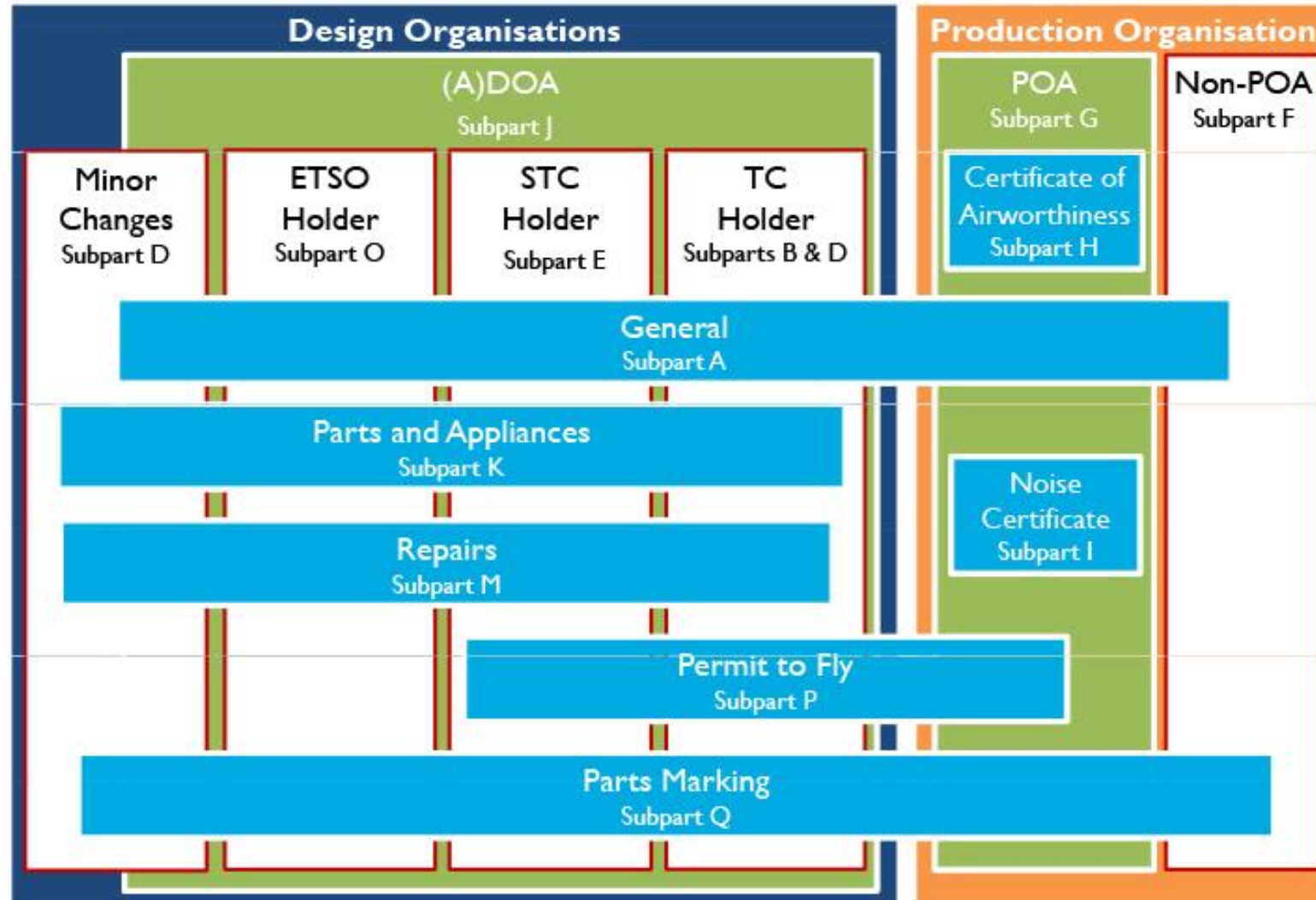
Type of Compliance	Means of Compliance	Associated Documents	Compliance
Engineering evaluation	MC0 : - Compliance statement - Reference to Type Design documents - Election of methods, factors - Definitions	- Type Design documents - Recorded statements	
	MC1: Design review	- Descriptions - Drawings	
	MC2: Calculation/ Analysis	- Substantiation reports	
	MC3: Safety assessment	- Safety analysis	
Tests	MC4: Laboratory tests	- Test programmes - Test reports - Test interpretations	
	MC5: Ground tests on related product		
	MC6: Flight tests		
	MC8: Simulation		
Inspection	MC7: Design inspection/ audit	- Inspection or audit reports	
Equipment qualification	MC9: Equipment qualification	Note : Equipment qualification is a process which may include all previous means of compliance.	

HELICOPTER : ALH (SKID VERSION)	FAR PART 29	REQUIREMENTS MET: YES NO	# 29.303 ISSUE : III DATE: 13-07-2004
REQUIREMENTS OF PARAGRAPH: 29.303 AMENDMENT No. :	COMPLIANCE		REMARKS
<p>Sec. 29.303 Factor of safety.</p> <p>Unless otherwise provided, a factor of safety of 1.5 must be used. This factor applies to external and inertia loads unless its application to the resulting internal stresses is more conservative.</p>	<p style="text-align: center;">“Complied.”</p> <p>Unless otherwise required, The Factor of Safety of 1.5 is used throughout.</p>		<p>Refer Structural Design Criteria Manual RC/ALHC/DAS/TR/085, Chapter 3.0.</p>

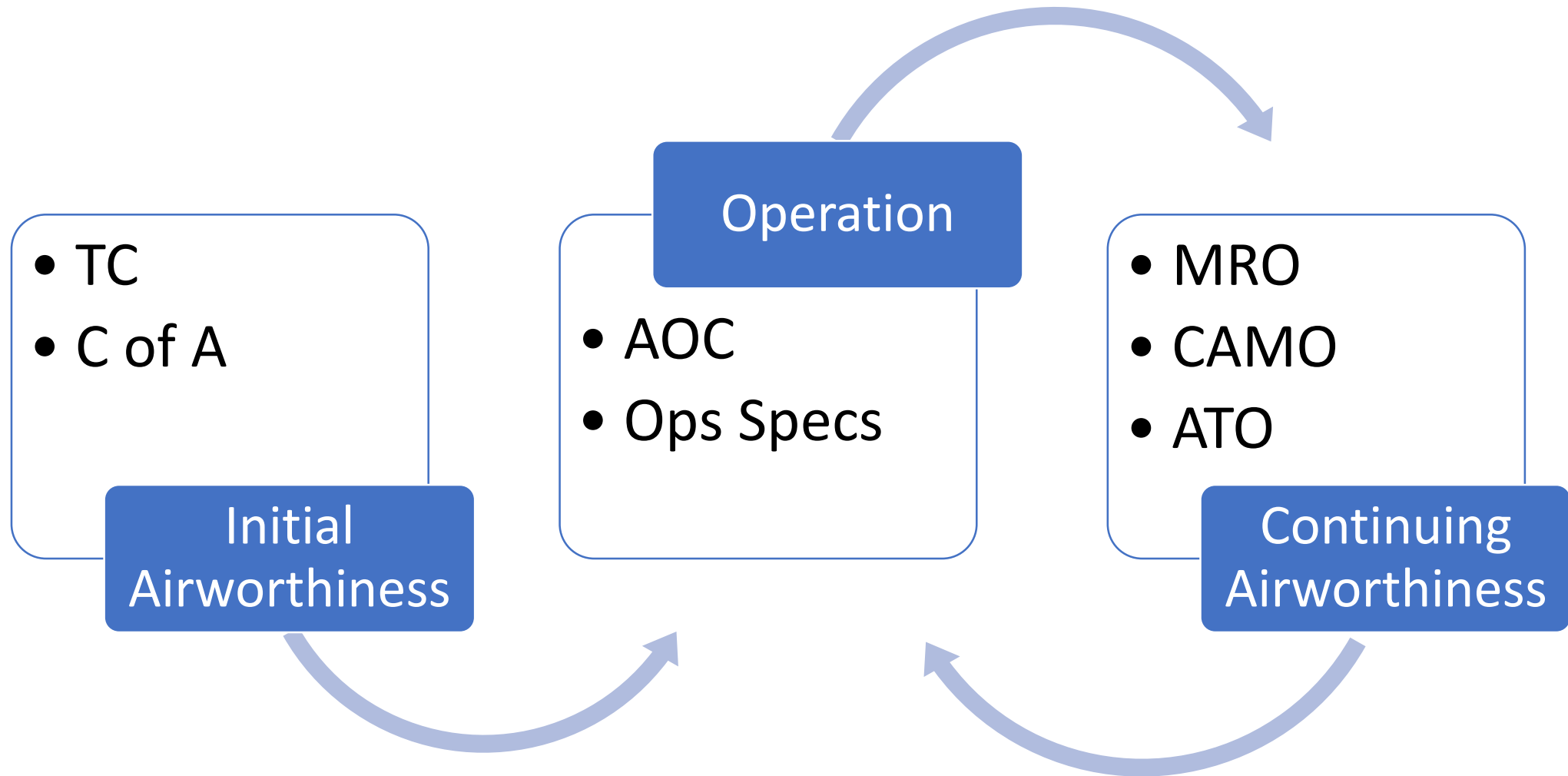
Korean Type Approval

		<p>대한민국 THE REPUBLIC OF KOREA 방위사업청 DEFENSE ACQUISITION PROGRAM ADMINISTRATION</p>	
<p>MILITARY AIRWORTHINESS CERTIFICATION AUTHORITY</p> <h2 style="text-align: center;">형식인증서</h2> <h3 style="text-align: center;">Military Type Certificate</h3> <p style="text-align: center;">(번호 No. MTC-2014-001)</p>			
<p>1. 항공기 분류 Aircraft Category 무인기</p>	<p>2. 설계/개발자 Designer/Developer ㈜ 대한항공</p>		
<p>3. 항공기 형식 Aircraft Type 시단성찰용 무인항공기</p>	<p>4. 항공기 등록번호/등록번호 Aircraft Serial Number/Registration Number</p>		
<p>5. 발행기준 및 조건 Issue and Conditions</p> <p>「군용항공기 비행안전성 인증에 관한 법률」 제 24조 제 2항 제 2호를 유인항공기제작에 설계가 운용제한조건을 포함한 기종별 규형인증기준을 만족함을 인증함. 상세 인증조건은 첨부된 형식인증자료에 명시되어 있음.</p> <p>According to the Act on the Airworthiness Certification, This certificate certifies that Type Design for Military Divisional Unmanned Aircraft System meets the Tailored Airworthiness Certification Criteria including the operating limitations. The detailed information on Airworthiness is described in the Type Certificate Data Sheet.</p>			
<p>6. 발행연월일 Issue Date</p>	<p>2014. 10. 20.</p>		
<p>방위사업청 Administrator of Defense Acquisition Program Administration</p> 			

**Certification of (1) aircraft and related products, parts and appliances,
& (2) of Design and Production Organisations**



UAS Operational Framework



Conclusion

- Design and vehicle certification just standard aircraft
- Air Traffic management no longer conventional
- Pilot on the ground with see and avoid capability

Malaysia

Pilot Study – UAS Cargo Operation serving Islands, Remote Places in Malaysia

