NATO STANDARD

ATP-3.3.8.1

MINIMUM TRAINING REQUIREMENTS FOR UNMANNED AIRCRAFT SYSTEMS (UAS) OPERATORS AND PILOTS

Edition B Version 1

MAY 2019

NORTH ATLANTIC TREATY ORGANIZATION

ALLIED TACTICAL PUBLICATION

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NATO LETTER OF PROMULGATION

8 May 2019

1. The enclosed Allied Tactical Publication ATP-3.3.8.1, Edition B, Version 1, MINIMUM TRAINING REQUIREMENTS FOR UNMANNED AIRCRAFT SYSTEMS (UAS) OPERATORS AND PILOTS, which has been approved by the nations in the Military Committee Air Standardization Board (MCASB), is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 4670.

2. ATP-3.3.8.1, Edition B, Version 1, is effective upon receipt and supersedes ATP-3.3.8.1, Edition A, Version 1, which shall be destroyed in accordance with the local procedure for the destruction of documents.

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4. This publication shall be handled in accordance with C-M(2002)60.

Zoltán GULYÁS
Brigadier General, HUNAF
Director, NATO Standardization Office

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RECORD OF RESERVATIONS

CHAPTER	RECORD OF RESERVATION BY NATIONS
Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Document Database for the complete list of existing reservations.	

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RECORD OF SPECIFIC RESERVATIONS

[nation]	[detail of reservations]
ESP	- Spain will use the term Remotely Piloted Aircraft Systems (RPAS) when referring to UAS or UAV. - Spain will not implement totally the STANAG when referring to the training requirements for Basic UAS Qualifications (BUQ) II for NATO Class I Small RPAS and IV for NATO MALE/HALE Classes, until some adjustments are made to the current syllabus. - Spain will mutually recognize Basic UAS Qualification (BUQ) to operate specific classes in national airspace in accordance to the present STANAG, as well as in observance of the national laws and regulations, and with evidences of accomplished specific BUQ training.
FRA	France will not apply this STANAG to class I drones; class II drones requirements will apply to the future French Army's drone system (SDT), although its weight exceeds 600 kg. The French Navy will implement this STANAG as soon as it receives the training equipment needed for its implementation.
Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Document Database for the complete list of existing reservations.	

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CHAPTER 1 – INTRODUCTION

Section 1 – Aim

1.1   The aim of this publication is to establish:

1.1.1 A minimum set of training guidelines and skills required for operating an unmanned aircraft system (UAS) in the appropriate classes of airspace.

1.1.2 A minimum set of training guidelines and skills required for employing a UAS in combined and joint operations.

Section 2 – Scope

1.2   The UAS operator/pilot skill sets addressed in this document are:

1.2.1 Basic UAS Qualification (BUQ). BUQ defines four levels (I, II, III, and IV) of general aviation knowledge and skills for UAS operations based on airspace use (see Chapter 3).

1.2.2 Combined/Joint Mission Qualification (C/JMQ). C/JMQ defines three levels (A, B, and C) of mission knowledge and skills for UAS employment in NATO operations (see Chapter 4).

Section 3 - Purpose

1.3   As much as practicable, UAS should be operated in accordance with the rules governing the flight of manned aircraft as specified by the appropriate civilian air traffic service or military airspace authority in the airspace in which they are flown. The operators/pilots of these UAS must be able to show an equivalent level of competency and compliance with these airspace rules. To meet these competencies, certain basic aeronautical knowledge and skills have been identified as common to nearly all UAS operators/pilots. As well, for the employment of UAS in NATO operations, operators/pilots must also be competent in the appropriate mission sets in which they participate. These mission sets also include common skills and knowledge that are essential for effective operations.

1.4   For the effective integration of UAS into NATO operations, it is essential that UAS operators/pilots be well-trained and competent. To this end, this Allied Tactical Publication (ATP) codifies these basic UAS qualification and mission skills into standardized training sets. These minimum UAS qualification and employment skills are designed to standardize and streamline UAS training efforts for the NATO UAS community, thereby increasing efficiency, capabilities, and standardization of UAS operations for the combined/joint force commander.

Section 4 − Administration

1.5 **Terms and Definitions.** Terms used in this document are defined in the Lexicon section. Unless otherwise noted, they are for the purpose of this document only.

1.5.1 As included in the title and throughout this ATP, the terms "operator" and "pilot" are both used. Although all individuals who control a UAS are "operators," the term UAS "pilot" differentiates and highlights those who have been trained to equivalent standards as a manned aircraft pilot. Those trained to BUQ levels I and II and generally termed UAS "operators," whereas those trained to BUQ levels III and IV are generally termed UAS "pilots," as these latter training levels are considered equivalent to manned aircraft.

1.5.2 A UAS controlled by a pilot is also typically termed a "remotely piloted aircraft system (RPAS)," which is a subset of all UAS. However, for simplicity, the more general term UAS is used throughout this ATP regardless of the training level of the operator.

1.6 **Agreement.** Participating nations agree to adopt these guidelines as a basis for the training of UAS operators/pilots, adapting them where necessary to meet the specialist requirements of UAS type, and mission or role. Nations also agree to mutually recognize a UAS operator/pilot's qualification to operate a specific UAS type, if the operator/pilot is trained to the guidelines contained in this publication.

1.7 **Implementation.** This ATP is considered implemented when a nation ratifies it and issues the necessary orders and instructions putting the contents of this publication into effect.

1.8 **References.**

    a.   AAP-03, Directive for the Production, Maintenance and Management of NATO Standardization Documents, Edition K, Version 1, February 2018;

    b.   AJP-3.3, Allied Joint Doctrine for Air and Space Operations, Edition B, Version 1, April 2016;

    c.   Annex 1 to the Convention on International Civil Aviation, Personnel Licensing, 11th Edition, July 2011, International Civil Aviation Organization (ICAO);

    d.   Manual on Remotely Piloted Aircraft Systems (RPAS), 1st Edition 2015, ICAO;

    e.   Chairman, Joint Chiefs of Staff Instruction 3255.01, Joint Unmanned Aircraft Systems Minimum Training Standards, 4 September 2012 (USA);

** CHAPTER 2 − TRAINING ISSUES AND CONSIDERATIONS **

Section 1 – Training Overview

2.1   UAS characteristics and operations vary significantly. Some systems use only manual flight controls, while others may use a mix of manual and automated systems, while still others solely use fully automated control modes. Regardless of UAS type, the operator/pilot must be capable of competently and safely conducting UAS missions, including the expeditious and correct response to emergency situations. These skills are especially critical when operating in conjunction with, or in close proximity to, other manned and unmanned airborne systems.

2.2   Similarly, training requirements will vary significantly between UAS. Operators who control UAS that are limited to line-of-sight ranges and altitudes of a few hundred feet do not need the breadth of training of pilots of UAS that are capable of intercontinental ranges through international airspace using satellite relays for command and control and mission data. Training must be tailored to the actual UAS characteristics and its mission.

Section 2 – Training Considerations

2.3   Figure 2-1 depicts the NATO UAS classifications. In general, the progression from Class I to Class II to Class III shows an increase in unmanned aircraft size, expansion of operating parameters (altitude, speed), and an increase in overall system complexity. It is this schema that is used to provide the overall and typical progression for training requirements from BUQ Levels I through IV, and C/JMQ Levels A through C. By basing this training on the appropriate BUQ and C/JMQ criteria in Chapters 3 and 4, Nations can ensure a competent and standardized UAS operator/pilot force.

2.4   National UAS training programs should conform as closely as practicable to the requirements in this ATP. However, because UAS vary so greatly, it is incumbent upon National trainers to use sound judgement in developing UAS training programs, founded on the requirements in this ATP and any National requirements, to ensure the safe conduct of UAS operations based on actual UAS capabilities, mission employment characteristics, and specific airspace usage requirements. For example, some Class III UAS conduct remote split operations, where specific crews are trained to just launch and recover the unmanned aircraft (UA), and separate crews are trained to only execute in-flight missions. In this case, training requirements may be tailored to the specific skills and the missions crews actually execute.

2.5   In those cases where particular training items cannot be accomplished or are not applicable due to system capabilities, operating limitations, or mission requirements, those items may be omitted. Training programs should note, with rationale, when these deviations are made. Additionally, these training deviations should be made available to NATO commanders to assess potential impact on mission and safety when these crews are employed in NATO operations.

Section 3 – Flight Training

2.6   UAS operator/pilots will complete a Nationally approved practical flight training program, conducted under the direct supervision of trained and qualified flight instructors, and in compliance with this ATP as much as practicable. Flight training should enable operators/pilots to demonstrate safe and effective control of a specific UA throughout its performance parameters and potential operating conditions, as well as effective and proper mission employment.

NATO UAS CLASSIFICATION						
Class	**Category**	**Normal Employment**	**Normal Operating Altitude**	**Normal Mission Radius**	**Primary Supported Commander**	**Example Platform**
Class III (> 600 kg)	Strike/ Combat *	Strategic/ National	Up to 65,000 ft MSL	Unlimited (BLOS)	Theatre	Reaper
	HALE	Strategic/ National	Up to 65,000 ft MSL	Unlimited (BLOS)	Theatre	Global Hawk
	MALE	Operational/ Theatre	Up to 45,000 ft MSL	Unlimited (BLOS)	JTF	Heron
Class II (150 kg - 600 kg)	Tactical	Tactical Formation	Up to 18,000 ft AGL	200 km (LOS)	Division, Brigade	Watchkeeper
Class I (< 150 kg)	Small (>15 kg)	Tactical Unit	Up to 5,000 ft AGL	50 km (LOS)	Battalion, Regiment	Scan Eagle
	Mini (<15 kg)	Tactical Sub-unit (manual or hand launch)	Up to 3,000 ft AGL	Up to 25 km (LOS)	Company, Platoon, Squad	Skylark
	Micro ** (<66 J)	Tactical Sub-unit (manual or hand launch)	Up to 200 ft AGL	Up to 5 km (LOS)	Platoon, Squad	Black Widow

* Note: In the event the UAS is armed, the operator should comply with the applicable Combined/Joint Mission Qualifications in this ATP and the system will need to comply with applicable air worthiness standards, regulations, policy, treaty, and legal considerations.

** Note: UAS that have a maximum energy state less than 66 Joules are not likely to cause significant damage to life or property, and do not need to be classified or regulated for airworthiness, training, etc. purposes unless they have the ability to handle hazardous payloads (explosive, toxins, chemical/biological agents, etc.).

Figure 2-1: NATO UAS Classification

2.7   UAS training will include the appropriate academic (ground) and in-flight and/or simulator instruction comparable to that accomplished by aircrew of manned aircraft operating in similar airspace and conducting similar missions. Any simulated flight training should be conducted on Nationally-approved/certified simulation flight training devices. When developing UAS training programs, Nations should develop the appropriate proficiency knowledge and skill levels for both the qualification and mission training items listed in Chapters 3 and 4.

2.8   The minimum medical fitness for UAS BUQ III and IV is a Class 3 medical assessment, applicable to air traffic controllers, per Reference d.

Section 4 – Proficiency and Currency Requirements

2.9   In general, proficiency refers to an achieved level of competence, while currency refers to maintaining that level, typically through study and practice. UAS operators shall maintain proficiency and currency to conform to minimum National requirements similar to manned aircraft. All operators should be subject to periodic theoretical, practical, and medical examination by designated military service examiners. Nations will develop the appropriate frequency for operator/pilot periodic examinations and corresponding currency requirements for their various UAS types and missions.

Section 5 – Certification

2.10   The military services shall certify operators/pilots who successfully demonstrate satisfactory knowledge of ground and flight operations via examinations and flight checks in accordance with military service standards. The skills detailed here will be used as a baseline by the appropriate inspectors, such as a NATO Standardization Team, for appraisal of National UAS training programs to verify compliance with this publication. Nations hosting UAS operations from other Nations should accept the approved training certification program for operator/pilots similarly to current pilot certification agreements.

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Chapter 3 – Training Requirements for Basic UAS Qualification (BUQ)

Section 1 – UAS Operator / Pilot Skills

3.1   The knowledge and skills listed in this chapter are not intended to be comprehensive. They are generally accepted training items required for the safe conduct of flight operations in the appropriate airspace. Nations may need to augment these training items to meet specific UAS system and mission requirements (such as rotary wing UA), as well as National requirements. Although Nations should comply with these requirements as much as practicable, due to UAS diversity in design, missions, and technology, it is understood that some items may not be able to be accomplished, and training plans will need to be tailored as appropriate.

3.2   **Basic UAS Qualification**. BUQ levels provide the foundational skills and knowledge for UAS operator/pilots. They include a basic understanding of weather, aerodynamics, human factors, operational risk management, and flight regulations for the types of airspace in which the UA will operate. The defined BUQ Levels are:

      a.   **BUQ Level I**: Knowledge and skills required to operate in accordance with applicable Visual Flight Rules (VFR) in ICAO Class F and G, and Restricted/military-controlled airspace below 3000 ft (900 m) Above Ground Level (AGL). NATO Class I, Micro and Mini UAS operators are typically trained to BUQ Level I.

      b.   **BUQ Level II**: Knowledge and skills required to operate in accordance with applicable VFR in ICAO Class D, E, F, and G, and Restricted/military-controlled airspace below 5000 ft (1500 m) AGL. NATO Class I, Small UAS operators are typically trained to BUQ Level II.

      c.   **BUQ Level III**: Knowledge and skills required to operate under VFR in all ICAO airspace except Class A below 18,000 ft (5500 m) AGL or FL180. NATO Class II, Tactical UAS pilots are typically trained to BUQ Level III.

      d.   **BUQ Level IV**: Knowledge and skills required to operate under VFR and Instrument Flight Rules (IFR) in all airspace. NATO Class III UAS, medium altitude, long endurance (MALE)/high altitude, long endurance (HALE) and Strike/Combat UAS pilots are typically trained to BUQ Level IV.

3.3   The following BUQ training requirements reflect the training requirements detailed in both ICAO's Manual on Remotely Piloted Aircraft Systems and Annex 1, Personnel Licensing. Specifically, the training requirements for BUQ levels III and IV were developed to conform as closely as practicable to the Annex 1 requirements for Private Pilot License (BUQ III) and Instrument Rating (BUQ IV).

Section 2 − BUQ Training Requirements

Table 3-1. NATO BUQ Training Requirements
By Category and Level

TRAINING CATEGORY	BUQ LEVEL			
MISSION PREPARATION	**BUQ I**	**BUQ II**	**BUQ III**	**BUQ IV**
Aviation Weather	X	X	X	X
Crew Resource Management and Communications	X	X	X	X
Human Factors and Performance	X	X	X	X
Error and Threat Management	X	X	X	X
Inflight Emergency Equipment / Procedures	X	X	X	X
Aircraft Performance Data and Limitations	X	X	X	X
Publications	X	X	X	X
Departure and Arrival Planning	X	X	X	X
Computerized Flight Planning Systems	X	X	X	X
Mission Route Selection and Analysis	X	X	X	X
Aeronautical Charts-Sectional, Tactical, Global		X	X	X
Global Flight Operations Knowledge				X
COMMUNICATIONS	**BUQ I**	**BUQ II**	**BUQ III**	**BUQ IV**
Plan and Manage Communications	X	X	X	X
Functions of Airborne Communication Systems	X	X	X	X
Data Links	X	X	X	X
Satellite Communications				X
AIRCRAFT OPERATIONS	**BUQ I**	**BUQ II**	**BUQ III**	**BUQ IV**
Identify and Avoid Weather Hazards	X	X	X	X
General Flight Rules	X	X	X	X
Fuel Planning	X	X	X	X
Operate Integrated Navigation Systems	X	X	X	X
Aviation Principles	X	X	X	X
Time and Course Control	X	X	X	X
Basic Manual Navigation	X	X	X	X
Aircraft Systems and Directives	X	X	X	X

Emergency Procedures	X	X	X	X
Manual Flight Control Skills	X	X	X	X
Air Tasking Order / Airspace Control Order		X	X	X
Radio Aid Navigation		X	X	X
Radar Navigation/Fixing		X	X	X
Basic Instrument Flight			X	X
Instrument Flight Procedures				X
Global Navigation Procedures				X
(1) BEFORE FLIGHT CATEGORY	**BUQ I**	**BUQ II**	**BUQ III**	**BUQ IV**
Plan VFR Mission	X	X	X	X
Obtain Weather Data for Mission Planning	X	X	X	X
Obtain Operational Data for Mission Planning	X	X	X	X
Perform Mission Briefing	X	X	X	X
Prepare Maps for Use During Flight	X	X	X	X
Plan Route to Destination and Alternates	X	X	X	X
Select Enroute Altitudes per Flight Information Publications	X	X	X	X
File Appropriate Flight Plan	X	X	X	X
Review Maintenance Logs	X	X	X	X
Perform Exterior Inspection Check	X	X	X	X
Perform Appropriate Communications Checks	X	X	X	X
Perform Starting Engine(S) Checks	X	X	X	X
Perform Navigation/Global Positioning System/Position Check	X	X	X	X
Obtain Appropriate Clearances Before Flight	X	X	X	X
Perform Preflight Check	X	X	X	X
Perform Interior Inspection Check	X	X	X	X
Perform UAS Control Station Instrument Checks	X	X	X	X
Perform Before Launch/Takeoff Checks	X	X	X	X
Obtain Appropriate Flight Clearances	X	X	X	X
Compute Takeoff and Landing Data		X	X	X

Perform Before Taxi Check		X	X	X
Obtain Clearance to Taxi		X	X	X
Taxi To Runway		X	X	X
Obtain Clearance for Takeoff		X	X	X
Taxi Into Takeoff Position		X	X	X
Perform Line-Up Check		X	X	X
Check Operation of Navigation Systems		X	X	X
Operate Air Traffic Surveillance Equipment (IFF/SIF/TCAS/Sense and Avoid System)			X	X
Accomplish IFR Mission Planning				X
(2) CONTACT CATEGORY	**BUQ I**	**BUQ II**	**BUQ III**	**BUQ IV**
Perform Takeoff/Launch, Initial Climb and Associated Checks	X	X	X	X
Crosswind Takeoff/Launch	X	X	X	X
Accelerate to Climb Airspeed	X	X	X	X
Perform Tech Order Climb	X	X	X	X
Perform Basic Departure Procedures	X	X	X	X
Perform Level Off	X	X	X	X
Establish and Maintain Altitude	X	X	X	X
Perform Applicable In-Flight Checks	X	X	X	X
Set, Establish and Maintain Proper Altitude/Attitude Throughout Flight	X	X	X	X
Perform Level Off/Routine Checks	X	X	X	X
Establish Basic Area Orientation	X	X	X	X
Use Local Area Map For Orientation	X	X	X	X
Perform Clearing	X	X	X	X
Change Airspeed, Straight-And-Level As Required	X	X	X	X
Clear Airspace in Direction of Turn	X	X	X	X
Perform Slow Flight	X	X	X	X
Perform Basic Aero Manoeuvres	X	X	X	X
Perform Manoeuvres Within Assigned Airspace	X	X	X	X
Perform Turns, Climbs, Descents as Required	X	X	X	X
Recognize Unusual Attitudes and Perform Recoveries	X	X	X	X
Recognize Stalls/Approach to Stalls and Perform Recovery	X	X	X	X

Recognize Approach to Departure from Controlled Flight and Perform Recovery	X	X	X	X
Perform Before Descent Check	X	X	X	X
Perform Descent	X	X	X	X
Perform Approach To Field Check	X	X	X	X
Request and Receive Landing/Recovery Clearance	X	X	X	X
Analyze Wind Conditions	X	X	X	X
Respond to Traffic Conflicts as Appropriate	X	X	X	X
Perform Normal Traffic Patterns	X	X	X	X
Configure Aircraft to Land/Recover and Perform Appropriate Checks	X	X	X	X
Initiate Automatic Approach and Landing/Recovery	X	X	X	X
Fly Final Approach	X	X	X	X
Perform Approach to Landing/Recovery	X	X	X	X
Crosswind Landing/Recovery	X	X	X	X
Perform Go-Around on Final Approach/Flare	X	X	X	X
Perform Go-Around/Missed Approach Check	X	X	X	X
Perform Landing and Rollout, or Recovery	X	X	X	X
Demonstrate Airmanship, Judgment and Decision-Making	X	X	X	X
Perform and Demo UAS Control Station Safety Procedures	X	X	X	X
Perform Normal Overhead Pattern			X	X
Perform Closed Pattern			X	X
(3) INSTRUMENT CATEGORY	**BUQ I**	**BUQ II**	**BUQ III**	**BUQ IV**
Identify Weather Phenomena Which Affect Flight			X	X
React to Hazardous/Adverse Weather Conditions During Flight			X	X
Operate Aircraft Instruments and Navigation Equipment			X	X
Maintain Aircraft Control Under Instrument Conditions			X	X
Perform Aircraft Manoeuvres Under Instrument Conditions			X	X

Recognize Improper Nose Low Condition			X	X
Recognize and Recover from Unusual Attitudes Under Instrument Conditions			X	X
Recognize and Address Instrument Malfunctions			X	X
Obtain In-Flight IFR Clearance				X
Perform Auto/Instrument Takeoff, Climb And Departure				X
Perform Instrument Cross Check				X
Comply with ATC Procedures				X
Turn to and Maintain Directed Headings				X
Establish and Maintain Directed Altitudes				X
Maintain Proper Airspeed and Airspace				X
Perform Course Intercept				X
Determine Angle Of Intercept				X
Determine Intercept Heading				X
Determine Lead Point				X
Determine Rate Of Intercept				X
Complete Intercept				X
Perform IFR Navigation				X
Perform Fix-to-Fix Navigation				X
Maintain Selected Course Correcting for Wind				X
Intercept Arc				X
Establish Arc				X
Maintain Arc				X
Perform Radial Intercept from Arc				X
Receive and Understand Holding Instructions				X
Establish Proper Holding Configuration				X
Perform Proper Holding Pattern Entry				X
Maintain Position Within Holding Pattern Airspace				X
Perform Wind Analysis to Assist in Maintaining Position Within Holding Pattern Airspace				X
Depart Holding Pattern				X

Perform En Route Descent				X
Determine Descent Gradient				X
Perform Descent				X
Perform Instrument Meteorological Conditions Penetration				X
Comply With Standard Instrument Approach Plate Procedures				X
Perform Instrument Approach				X
Perform Procedure Turns				X
Remain Within Procedure Turn Airspace				X
Perform Radar Pattern				X
Perform Non-Precision Radar Approach				X
Perform Precision Radar Approach				X
Perform Gyro-Out Instrument Pattern				X
Perform Half Standard-Rate Turns on Final				X
Perform Gyro-Out Precision Radar Approach				X
Establish Landing Configuration				X
Maintain Glide Slope Control				X
Maintain Course Control				X
Calculate Visual Descent Point				X
Transition From Instruments to Visual				X
Transition from Minimum Descent Altitude to Runway				X
Transition from Glide Path to Runway				X
Perform Circling Approach				X
Comply with Missed Approach Procedures				X
Comply with ATC Missed Approach Clearance				X
Complete Missed Approach Check				X
(4) NAVIGATION CATEGORY	**BUQ I**	**BUQ II**	**BUQ III**	**BUQ IV**
Perform Map Reading	X	X	X	X
Identify Appropriate Visual Landmarks	X	X	X	X
Correlate Position with Map	X	X	X	X
Perform Visual Navigation	X	X	X	X

	BUQ I	BUQ II	BUQ III	BUQ IV
Perform In-Flight Navigation Planning	X	X	X	X
Calculate Actual Fuel/Power Consumption	X	X	X	X
Perform Time and Fuel/Power Management	X	X	X	X
Calculate / Compensate for In-Flight Winds	X	X	X	X
Make Position Reports	X	X	X	X
Perform Lost Comm / Lost Link Procedures	X	X	X	X
Compare Actual and Planned Rates of Fuel/Power Consumption	X	X	X	X
Compare Actual and Planned Ground Speeds	X	X	X	X
Perform Dead Reckoning Navigation		X	X	X
Calculate New Estimated Time of Arrival		X	X	X
Request In-Flight Clearances		X	X	X
Use Automated Terminal / Weather Information Services, Report Inflight Weather Conditions		X	X	X
Interpret Radio Weather Condition Report		X	X	X
Alter Navigation Based on Weather Report		X	X	X
Perform Strange Field Departure			X	X
Perform Strange Field Visual and Instrument Approaches			X	X
Perform Low-Level Navigation			X	X
(5) EMERGENCY CATEGORY	**BUQ I**	**BUQ II**	**BUQ III**	**BUQ IV**
Recognize Emergency Conditions	X	X	X	X
Maintain Aircraft Control During Emergency Conditions	X	X	X	X
Analyze Situation, Including Systems for Possible Emergency	X	X	X	X
Recognize and Perform All Applicable Emergency Procedures	X	X	X	X
Initiate Communications/Declare Emergency (If Required)	X	X	X	X
Recognize and Properly Respond to Unplanned Lost Link Events	X	X	X	X

Land as Soon as Conditions Permit	X	X	X	X
(6) AFTER FLIGHT CATEGORY	**BUQ I**	**BUQ II**	**BUQ III**	**BUQ IV**
Perform After Landing Check	X	X	X	X
Perform Engine Shutdown Check	X	X	X	X
Perform All Safety Procedures for Securing Aircraft	X	X	X	X
Perform Post-Landing Procedures	X	X	X	X
Complete Maintenance Logs	X	X	X	X
Complete Flight Time Logs	X	X	X	X
Taxi Clear of Runway		X	X	X
Taxi to Parking		X	X	X
Close Flight Plan with ATC		X	X	X
(7) INSTRUCTOR / TEST SYSTEM CATEGORY	**BUQ I**	**BUQ II**	**BUQ III**	**BUQ IV**
Demonstrate Understanding of Learning Theory	I	I	I	I
Demonstrate Effective Instructional Presentation Techniques	I	I	I	I
Demonstrate an Understanding of Courseware Theory Design	I	I	I	I
Demonstrate Subject Matter Expertise	I	I	I	I
Demonstrate Understanding of Test Plan	I	I	I	I
Demonstrate Proper Use of Training Aids	I	I	I	I
Perform System Test Procedures	I	I	I	I
Analyze Test Data	I	I	I	I

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Chapter 4 – Training Requirements for Combined / Joint Mission Qualifications (C/JMQ)

Section 1 – UAS Operator / Pilot Mission Employment Skills

4.1   The knowledge and skill levels in this chapter build upon the BUQ levels in Chapter 3. Listed here are generally accepted training items required for the effective conduct of the noted mission sets. Nations may need to augment these training items to meet specific UAS system and mission requirements, as well as National requirements. Although Nations should comply with these requirements as much as practicable, due to UAS diversity in design, missions, and technology, it is understood that some items may not be able to be accomplished, or required, and training plans will need to be tailored as appropriate.

4.2   **Combined/Joint Mission Qualification**. C/JMQ levels provide the general mission knowledge and skills UAS operator/pilots are expected to possess, and are critical to ensure they understand their role in accomplishing a larger military objective. Where applicable, similar qualification standards may also apply to other crew members participating in these UAS combined/joint missions. Nations should tailor their training appropriately. The defined C/JMQ levels are:

   a.   **C/JMQ Level A**: Support tactical-level intelligence, surveillance, and reconnaissance (ISR) and Fires tasks for the Combined/Joint Force Commander (C/JFC). NATO Class I, Micro, Mini, and Small UAS operators are typically trained to C/JMQ Level A.

   b.   **C/JMQ Level B**: Provide operational-level advanced ISR mission support for the C/JFC. NATO Class II, Tactical, and Class III, MALE/HALE UAS operator/pilots are typically trained to C/JMQ Level B.

   c.   **C/JMQ Level C**: Support strategic-level Fires and Joint Combat Search and Rescue/Personnel Recovery (JCSAR/PR) tasks for the C/JFC. NATO Class III, Strike/Combat UAS pilots are typically trained to C/JMQ Level C.

4.3   In the event a UA carries and employs lethal fires, regardless of its size or operating altitude, the operator/pilot should comply with the C/JMQ Level C training standards and the system will need to comply with applicable air worthiness standards, regulations, policy, treaty, and legal considerations.

Section 2 − C/JMQ Training Requirements

Table 4-1. NATO C/JMQ Training Requirements
By Category and Level

TRAINING CATEGORY	C/JMQ LEVEL		
BASIC ISR / FIRES SUPPORT	**C/JMQ-A**	**C/JMQ-B**	**C/JMQ-C**
Perform Mission Route Selection and Analysis	X	X	X
Understand and Apply Appropriate Grid Reference Symbols	X	X	X
Understand and Apply Fire Support and Airspace Coordination Measures	X	X	X
Perform Map Analysis of the Mission Operations Area	X	X	X
Submit Target Nomination	X	X	X
Execute Target Planning Checklist/Mission Card	X	X	X
Transmit a Tactical Report	X	X	X
Understand and Apply Air Tasking Order	X	X	X
Understand and Apply Training Rules / Rules of Agreement / Rules of Engagement / Law of War	X	X	X
Perform Aerial Observation	X	X	X
ADVANCED ISR / FIRES SUPPORT	**C/JMQ-A**	**C/JMQ-B**	**C/JMQ-C**
Perform Route Reconnaissance		X	X
Perform Zone Reconnaissance		X	X
Perform Area Reconnaissance		X	X
Apply Collection Requirements		X	X
Use All-Sensor System Capabilities		X	X
Conduct Mission Planning/ Briefing		X	X
Perform Target Surveillance		X	X
Track a Static Target		X	X
Track a Moving Target		X	X
Call For and Adjust Indirect Fire		X	X
Communicate Battle Damage Assessment Report		X	X
Be Familiar with Total Sensor Timeline and Target Location Error Analysis		X	X
JOINT FIRES & JCSAR/PR	**C/JMQ-A**	**C/JMQ-B**	**C/JMQ-C**
Joint Fires			
Know Communications for Employing Close Air Support (CAS)			X

Understand Theater Air Control System Coordination			X
Understand CAS Planning Process			X
Understand Joint Air Attack Team Briefing and Provide Necessary Elements of Information			X
Understand NATO Fighter Check-In Procedures			X
Perform Target Marking			X
Conduct Real-Time Battlespace			X
Perform Weapons Employment			X
Communicate a Battle Damage Assessment Report			X
Understand Aircraft Positioning			X
Understand Target Weather Information and Pass to Others			X
Perform Target Handover to Another Aircraft			X
Conduct Rendezvous			X
Understand Different Fire Support Request Nets			X
Perform Firing Techniques			X
Understand and Correctly Employ Laser Designation Capability			X
Understand and Conduct Weapons Delivery Procedures			X
Conduct Targeting of Time-Sensitive Target Decentralized to the Shooter			X
Know Capabilities and Limitations of Strike (Surface and Air) Assets			X
Conduct Joint Force Targeting			X
JCSAR/PR			
Support JCSAR/PR Tasks: Report, Locate, Support and Recover			X
Determine and Maintain Location of Isolated Personnel			X
Perform Authentication of Isolated Personnel			X
Perform Communication Relay			X

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Lexicon

Part 1 – Abbreviation and Acronyms

AAP	Allied Administrative Publication
AGL	Above Ground Level
AJP	Allied Joint Publication
ATC	Air Traffic Control
ATP	Allied Tactical Publication
BLOS	Beyond Line-of-Sight
BUQ	Basic Unmanned Aircraft System Qualification
C/JFC	Combined/Joint Force Commander
C/JMQ	Combined/Joint Mission Qualification
FL	Flight Level
ft	feet
HALE	High-Altitude, Long Endurance
ICAO	International Civil Aviation Organization
IFF/SIF	Identification Friend or Foe/Selective Identification Feature
IFR	Instrument Flight Rules
ISR	Intelligence, Surveillance and Reconnaissance
JCSAR/PR	Joint Combat Search and Rescue/Personnel Recovery
kg	kilogram
LOS	Line-of-Sight
m	meter
MALE	Medium-Altitude, Long Endurance
MSL	Mean Sea Level
NATO	North Atlantic Treaty Organization
RPAS	Remotely Piloted Aircraft System
TCAS	Traffic Collision Avoidance System

UA	Unmanned Aircraft
UAS	Unmanned Aircraft System
VFR	Visual Flight Rules

Part 2 – Terms and Definitions

Note: Unless otherwise annotated, the terms defined below are for the purpose of this document only.

Instrument Flight Rules. A set of procedures governing the conduct of flight under Instrument Meteorological Conditions. (ICAO)

Lost Link. The loss of command and control links between the control station and unmanned aircraft such that the aircraft cannot be controlled remotely.

Remotely Piloted Aircraft (RPA). An unmanned aircraft that is controlled from a remote pilot station by a pilot who has been trained and certified to the same standards as a pilot of a manned aircraft. (NATOTerm)

Remotely Piloted Aircraft System (RPAS). A remotely piloted aircraft, its associated remote pilot station(s), the required command and control links and any other components as specified in the type design. (ICAO)

Unmanned Aircraft (UA). An aircraft that does not carry a human operator and is operated remotely using varying levels of automated functions. (NATOTerm)
Notes:
     1. Unmanned aircraft can be expendable or recoverable.
     2. Unmanned aircraft may carry a lethal or non-lethal payload.
     3. Cruise missiles are not considered unmanned aircraft

Unmanned Aircraft System (UAS). A system whose components include the unmanned aircraft, the supporting network and all equipment and personnel necessary to control the unmanned aircraft. (NATOTerm)

Unmanned Aircraft System Control Station. A facility or device from which the UAS is controlled and/or monitored for all phases of flight.

Unmanned Aircraft System Operator. The individual responsible for controlling an unmanned aircraft system.

Unmanned Aircraft System Pilot. An unmanned aircraft system operator who has been trained and certified to the equivalent standards as a pilot of a manned aircraft.

Visual Flight Rules (VFR). A set of procedures governing the conduct of flight under Visual Meteorological Conditions. (ICAO)

ATP-3.3.8.1(B)(1)