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COVER NOTE

From:	European External Action Service (EEAS)
To:	European Union Military Committee (EUMC)
Subject:	Concept for the Contribution of Remotely Piloted Aircraft Systems to EU-led Military Operations

Delegations will find attached the EEAS document with reference EEAS 00099/14 Final.

Encl.: EEAS 00099/14 Final

EUROPEAN EXTERNAL ACTION SERVICE

EUROPEAN UNION
MILITARY STAFF

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NOTE

From:	European Union Military Committee
To:	European Union Military Committee
No. Prev. doc.:	EEAS 00099/3/14 REV3, dated 14 March 2014
Subject:	Concept for the Contribution of Remotely Piloted Aircraft Systems to EU-led Military Operations

Delegations will find attached the Concept for the Contribution of Remotely Piloted Aircraft Systems to EU-led Military Operations, which was agreed by the EUMC on 20 March 2014.

CONCEPT FOR

THE CONTRIBUTION OF REMOTELY PILOTED AIRCRAFT SYSTEMS TO EU-LED MILITARY OPERATIONS

TABLE OF CONTENTS

REFERENCES

A. European Security Strategy (ESS) (doc. 15849/03, dated 5 Dec 2003)

B. Headline Goal 2010 (doc. 6309/6/04 Rev 6, dated 4 May 2004)

C. Concept for Air Operations in support of the Common Security and Defence Policy (doc. 8569/11, dated 5 Apr 2011)

D. EU Concept for Military Command and Control (doc. 10688/08, dated 16 Jun 2008)

E. Roadmap for the integration of civil Remotely Piloted Aircraft Systems into the European Aviation system (Final report from the European RPAS Steering Group, dated Jun 2013)

F. Concept for Countering Improvised Explosive Devices (IED) in EU-led military operations (doc. 13839/12, dated 18 Oct 2012)

G. Requirements Catalogue (RC) 05 (doc. 13732/05, dated 7 Nov 2005)

H. ISTAR Concept for EU Crisis Management and EU-led Crisis Management Operations, (doc. 7759/07 Rev 1, dated 23 Mar 2007)

I. EU Concept for Military Intelligence Structures in EU Crisis Management and EU-led Military Operations/Missions, (doc. 01846/13 Rev 2, dated 15 Nov 2013)

A. INTRODUCTION

1. The development of Remotely Piloted Aircraft (RPA) and Remotely Piloted Aircraft Systems (RPAS)[1] - mistakenly called “drones” by the public - started in the 1950's. RPAS have been successfully used by armed forces for more than three decades. RPAS have experienced remarkable growth in military operations, providing one of the most "in demand" capabilities for military forces. Recent conflicts and peacekeeping operations around the world have demonstrated their operational capabilities and led to a quasi-exponential increase of military applications. In parallel, there are numerous examples of how RPAS can support civilian purposes, many of which are of similar character to the military ones. However, this concept will restrict itself to military usage.

2. RPAS can contribute with their broad spectrum of specific capabilities and missions to various aspects in EU-led military and civilian operations and missions thanks to their major advantage of persistence.

3. At all levels of command RPAS support the process of planning, conduct and evaluation of operations by providing data/information to facilitate continuous operational assessment and to enhance situational awareness.

B. AIM

4. This concept provides the conceptual framework for the use of RPAS in EU-led military operations and military missions with a focus on their contribution to Intelligence, Surveillance, and Reconnaissance (ISR) and Target Acquisition (TA). It replaces the "EU MALE/HALE UAV Concept of Employment" (Doc No 10832/05, dated 1 July 2005).

C. SCOPE

5. The scope of this document deals specifically with RPAS and their contribution to joint operations in EU-led military operations and military missions including basic guidelines on tasks and the environment in which to use RPAS, characteristics, capabilities and initial views for preparation and training requirements (including potential military support to civilian missions, such as described in Section J).

[1] In line with the International Civil Aviation Organization (ICAO) the terms of RPA and RPAS are used to highlight the fact that the systems involved are not automatic but have always a pilot in command responsible for the flight.

6. It focuses on the employment of RPAS in ISR and TA missions and roles within the Treaty on European Union (TEU) tasks for military forces in the remit of the CSDP, covering the whole spectrum of EU Crisis Management.

7. Furthermore, this concept identifies military requirements and provides elements of appreciation for civil-military synergies for the future development of RPAS, because of their intrinsic dual characteristics, and their possible dual use.

8. Smaller RPAS commonly known as Micro-, Mini- or Small-RPAS (Annex A) can contribute to a superior situational awareness up to the battalion level or maritime equivalent. Since their capabilities, contributions and employment are adjusted to the specific supported unit (i.e. infantry) and their special demands this concept appreciates the operations of Micro-, Mini- or Small-RPA but will focus more on the Medium Altitude Long Endurance (MALE) and Tactical RPAS.

D. ASSUMPTIONS

9. A RPAS is assumed as a set of configurable elements consisting of

- one or more RPA,
- payload(s),
- its associated remote pilot station(s), commonly referred to as Ground Control Station (GCS), accommodating the pilot and sensor operators (if applicable),
- the required line of sight (LOS) and beyond line of sight (BLOS) data links (i.e. command & control and mission),
- associated manpower and
- other system elements during flight operation such as the capability for ground based users to use the imagery and control the sensor.

10. A RPA is assumed to be an unmanned aircraft that is controlled from a remote pilot station by a pilot/ an operator who has been trained and certified to similar standards as a pilot or technical crew member of a manned aircraft. It does not operate autonomously by using artificial

intelligence. It is normally recoverable and can carry different payloads. Pilots and operators may work in shifts.

11. Payloads are assumed to be sensors, communication relays, laser guidance devices, cargo, guided weapons or other devices, carried internally or externally by the RPA.

12. Sensor types (Ref. H) include:

- Image Intelligence (IMINT: electro-optical (EO), infrared (IR)),
- Radar Intelligence (RADINT: synthetic aperture radars (I/SAR)), ground, surface, air and maritime Moving Target Indicators (MTI), maritime search radars,
- Signal Intelligence (SIGINT),
- Electronic Support Measures (ESM),
- Electronic Surveillance (ES),
- Laser Rangefinder (LRF) and
- other sensor types that may result from future technological developments.

E. CHARACTERISTICS OF RPA(S)

13. RPA are not technically limited by human performance or physiological characteristics. Therefore, extreme endurance[2]is the intrinsic benefit that can only be realized by RPA in dull, dirty and/or dangerous environments. A RPA can be a local tactical asset or operate for a prolonged period of time at long range, performing various tasks, and is therefore especially suitable to perform ISR and TA missions.

14. RPAS are well adapted assets to provide IMINT from an airborne platform. They can contribute to early warning, operational assessment, situational awareness and target intelligence thus supporting decision making planning activities. This is linked to the intelligence cycle and the associated Collection Coordination and Intelligence Requirements Management (CCIRM) procedure. Some RPA could have a low detection profile.

[2] Up to 30hrs in the air

15. If the RPA is lost due to an attack or failure, no aircrew is at risk (casualty, capture). The potential impact on public opinion is accordingly less important, including discussion of hostage risk. Some RPA may potentially also perform tasks in high threat environments or contaminated areas, where the use of manned aircraft would constitute unacceptable risk. The security of the ground segment and associated personnel must be taken into consideration since it represents a high value target, both in national and theatre locations. It should be noted that the current survivability characteristics of persistent RPAS do not necessarily fit with use in high-threat environments. Like traditional aircraft, RPAS equipment and procedures should be developed cognisant of expected threats.

16. RPAS may provide a good compromise between mass/payload, capabilities and costs. Most RPAS are flexible and adaptive concerning payloads and missions. They can be employed in multi-tasked roles in a single sortie and they can easily be re-tasked even if it was not planned before launch.

17. RPAs equipped with several sensors or multi-sensors or pods with dedicated ground segments could be an option for sharing ISR at a tactical level.

DATA LINKS

18. RPAS are constrained by data links which can be separated into the categories of line-of-sight (LOS) and beyond-line-of-sight (BLOS) operations. Data links include all means of communication with the RPA and the control station (ground or airborne) and are used for data transfer. Data links are needed for flight control and for payload operation. Data links are also needed to provide situational awareness of system (meaning down link information for the crew), creating situational awareness of RPAS location versus ambient traffic. Loss or interrupt of the data-link could result in degraded mission effectiveness or a mission failure. Data products may be transmitted directly to the user or to another network for further data exploitation.

19. The operational range of LOS data links are affected by location and altitude of the RPA and the Ground Control Station, terrain and atmospheric conditions. BLOS data links are dependent on complex communication structures based on RPA relay or satellite. RPAs operations using BLOS can be constrained by the available satellite bandwidth. Secure communication means are paramount for the employment of RPAS.

F. OPERATIONAL ENVIRONMENT

20. Air Power is defined in the EU as the capacity to project power from the air to shape and influence the course of Crisis Management Operations (CMO) (Ref C). It is an essential element in both civilian missions and military operations to be employed over the full range of EU-led CMO. A favourable air situation, as of yet, is a desirable and usually essential condition for flying RPAs.

21. Air Power exploits all aspects of the earth's atmosphere (height, speed and reach over land and sea, and overcoming most weather conditions). These core characteristics combined with increasingly capable technology enable Air Power to be a rapid, flexible, weather resistant, stand-off, 24/7 available tool to shape and influence the operating environment.

22. Support provided by air and space capabilities is essential for planning and conducting EU-led CMOs. This includes among others Air Traffic Control, Positioning, Navigation and Timing, Geographic Support, Meteorological Support (METOC) and Satellite Communications (SATCOM).

23. Information superiority has become a huge concern in crisis management. It encompasses information collection, analysis, exploitation and dissemination, protection of asset and Communications and Information System (CIS), as well as Electronic Warfare (EW). Obviously, information superiority is based upon the time relevant capabilities, the effectiveness and the complementarity of different sensors, as well as efficient exploitation capabilities.

24. Data has to be collected and transferred to the exploitation workstations for processing; in order to reduce data package size (i.e. preserving bandwidth), data could be enhanced[3] on-board the RPA before the transmission to the ground segments. For a timely and near real-time assessment of this data, a near real-time network architecture for information and distribution of data with secure data links is required. After processing the sensor data, the product is disseminated throughout the intelligence network (Ref. I). Data links in the RPA must be enhanced in order to shorten the information cycle time, allowing exploitation of data whilst the RPA is still airborne.

[3] For example, compressed, encrypted etc.

25. Shortfalls on information gathering and intelligence management could necessitate maintaining substantially high readiness forces to react to situations during CSDP operations. Therefore EU forces need airborne assets like RPAS that can act as a force multiplier by complementing other assets to provide a permanent and all weather coverage with high quality sensors. These RPAS are expected to operate over both land and sea used by forces ashore and at sea.

26. By deploying and operating RPAS, a new quality of information gathering in the field of surveillance and reconnaissance can be derived. Therefore, a common understanding/ common standards for planning and employment of RPAs might be developed. These standards could include procedures on how RPAs and manned aircraft can be integrated in air operations.

27. The use of RPAS is envisaged for a wide spectrum of military tasks. In accordance with the TEU tasks for military forces, in the remit of the CSDP shall cover the whole spectrum of Crisis Management (ranging from Peace Enforcement to Post Conflict Stabilization Operations). The EU has identified five illustrative scenarios (Ref. G) where it may consider using military means to address a crisis. The use of RPAS contributes to the decision-making and operational process in order to fulfil the overall goals of the EU Task Force in the five illustrative scenarios:

    a. Separation of Parties by Force;

    b. Stabilisation, Reconstruction and Military advice to third countries;

    c. Conflict Prevention;

    d. Evacuation Operations (non-permissive/segregated environment);

    e. Assistance to Humanitarian Operations.

28. Situational awareness in crisis management missions and operations requires clear and concise information and intelligence on all aspects of the air, ground and sea situation within an area of operation. This includes reliable, permanent and persistent surveillance. Rapid action against an adversary's force will depend on the ability to accurately detect and identify the opposing forces, to track their movements and swiftly react to threats.

G. RPAS MISSIONS

CONTEXT OF EMPLOYMENT

29. RPAS in EU-led military operations is able to be operated in a wide spectrum of conflicts, environments (including open and urban complex terrain) and weather conditions at day and night. The RPAS delivers a persistent, adaptable ISR capability across the area of operation by achieving access to specific information and distribute it in a timely manner.

30. The primary mission of RPAS is to contribute to the collection effort of ISR and TA in support of air, land, maritime and joint operations. With its sensors, the system enhances many aspects of ISR, increases the operational tempo and enhances target accuracy on steady or moving targets making a major contribution during each phase of the mission from detection to damage assessment.

INTELLIGENCE, SURVEILLANCE AND RECONNAISSANCE (ISR)

31. Especially long endurance RPAS able to carry out ISR missions in order to provide and/or contribute to situational awareness for the planning and execution of operations will detect, locate, identify and track land and maritime targets/spots of interest with sufficient resolution and details. This will provide improved knowledge of the environment, opposing forces and their intent, related to the current situation.

32. RPAS provide data and information gathering in order to contribute to IMINT activity. IMINT is based on the interpretation of imagery collected through IR, EO, Video, SAR. RADINT is based on the detection and recognition of fixed, movable and moving objects in aerial, terrestrial and maritime environment via SAR or MTI sensors; recognition of objects is often deeply connected to the quality of database libraries.

33. SIGINT and Electronic Warfare (EW) capabilities enable own forces to identify and locate emitters associated with potential targets, such as air defence sites, as well as to monitor hostile communication lines for the purpose of developing and maintaining an electronic operational picture, amongst others in order to provide a database of current threats. It includes Electronic Surveillance (ES), Electronic Intelligence (ELINT) and Communication Intelligence (COMINT) capabilities.

TARGET AQUISITION (TA)

34. This role combines detection, identification and location of targets. RPAS support the designation of targets by providing precise geographic coordinates or optionally illuminating targets with laser designation. The RPA's sensors can also aid pre- strike intelligence (Pattern of Life) to support avoidance of collateral damage and strike authorization and post-strike reconnaissance information to facilitate battle damage assessment.

STRIKE

35. Some RPAS are designed to carry out strike missions. Using these RPAS, the operator can acquire, identify and engage targets from one platform.

FORCE PROTECTION

36. EU-led military forces will increasingly face adversaries using asymmetric tactics and strategies. The increased use of Improvised Explosive Devices (IED) in conflicts worldwide is significantly impacting on the number of casualties of civilian personnel on missions, EU Member States' military force on operation as well as the indigenous civilian population (Ref F).

37. RPAS may be enhanced with specific sensors for the detection of IEDs and therefore contribute effectively to the protection of ground forces by providing vital information for countering IEDs.

38. RPAS have proved in operations as an effective mean to provide over the wall/horizon surveillance and force protection against IEDs for moving forces, bases and facilities.

COMMUNICATIONS RELAY

39. This function provides the capability to extend voice and data transmission via RPAS. Communications relay reduces reliance upon ground based communication structures and provides a range extension capability for information distribution. The RPAS acts as a relay facility between any assets in the area of operation, enabling communication between ground units without LOS. It can also relay a segment of ground-to-air communication for example to prolong the control of a RPA. Relay function can also be utilized, if functionally capable relay RPAS is transferring RPAS LOS data between the Ground Control Station and RPAS, which is in BLOS situation.

ELECTRONIC SUPPORT MEASURES (ESM)

40. ESM provide the ability to electronically survey, and locate the opponent's Electronic Order of Battle (EOB). An airborne ESM suite sharply reduces the geographical limitations of ground-based and maritime systems. RPA equipped with ESM payloads will provide deeper and more precise observations and determinations.

ELECTRONIC COUNTER MEASURES (ECM)

41. The payload may be supplemented with, or may consist solely of, ECM for defensive and/or offensive jamming, including self-protection for the RPA itself.

MARITIME SURVEILLANCE

42. Operating RPAS in the maritime domain is different than over land. The maritime environment challenges the RPA's and its sensor payload. The RPAS, when employed on maritime missions on and beyond the littoral, are dedicated to conduct reconnaissance and surveillance missions in support of naval operations (i.e. anti-terrorism and anti-piracy missions).

43. MALE RPAS in maritime missions carry and operate a specific maritime radar sensor payload and can contribute to the recognized maritime picture. Therefore a maritime surveillance radar is carried for detection and classification (ISAR), EO/IR sensors for identification and laser illumination/designation is the desired payload to adapt to the maritime environment. ESM can be used for detecting and classifying electronic transmissions in the maritime environment, enabling the RPAS to classify targets detected with the maritime radar. ESM also detects transmissions from targets that are not seen by the maritime radar (targets outside radar horizon, submarines using their radar). The RPAS can use the Automatic Identification System (AIS) for identifying and locating vessels by electronically exchanging data with ships and AIS base stations.

H. OPTIONAL MILITARY TASKS

CHEMICAL, BIOLOGICAL, RADIOLOGICAL AND NUCLEAR (CBRN) DETECTION

44. The RPAS payload can include sensors able to detect and assess chemical, biological, radiological and nuclear activity in the AOO. RPAS equipped with such payloads can contribute to a certain level to the detection, location and monitoring of CBRN contamination. RPAS are

ideally suited for these missions as human life is not endangered. In peace time, these assets also have the possibility to explore contaminated areas to collect necessary data without endangering human life.

SEARCH AND RESCUE / COMBAT SEARCH AND RESCUE (SAR/CSAR)

45. The search for missing persons or crews downed, either in peace time (e.g. SAR) or in combat (Combat Search and Rescue (CSAR) or Personnel Recovery (PR), both in hostile environment) can be assisted by RPAS, taking advantage of their endurance and, for CSAR/PR, low detection profile. Once an approximate location of the rescue area has been identified, EO/IR sensors provide exceptional support for search and rescue operations. Future RPAS could fulfil the role of the rescue part.

46. SAR/CSAR missions (and PR to a limited extend) require the implementation of pre-defined detection, location, identification and, especially for CSAR/PR, recovery procedures. RPAS can be utilized for contributing to the survivor detection, identification and location. In addition the RPAS can provide local tactical situational awareness and perform a supporting ISR role, as required.

CARGO / LOGISTIC REPLENISHMENT

47. Some RPA, especially rotary-wing RPA, have the capability to transport payloads for delivery or pickup of supplies and equipment. With the technological development of RPAS, cargo task could become more important for RPAS.

GEOGRAPHY, METEOROLOGY AND NAVIGATION

48. Available geographic information needs constant updates in order to remain current and usable. Many modern military attack systems need precise meteorological information in order to meet required levels of precision. RPAs, especially when equipped with advanced technology sensors (i.e. Laser Imaging Detection and Ranging) can enhance and complement existing satellite capability and provide additional data on geography and/or meteorology.

AIR TO AIR SUPERIORITY

49. On the long term perspective, some future RPAs might be allocated air to air combat missions acting as force multiplier controlled also from airborne manned platforms.

I. INTEROPERABILITY

50. Interoperability of RPAS must be taken into account in an ISTAR environment. A RPAS must be interoperable within EU armed forces and should be technically and procedural interoperable with governmental organizations. Therefore, it should reach at least an interoperability level comparable to level 2 according to NATO STANAG 4586 (unclassified)[4]. This would be beneficial concerning harmonized data links, standardized data format and real time reception of data provided via another system by direct data link. Effective spectrum management plays an important role.

51. The reception of missions' requests, systems usage planning and the data exploitation and dissemination via one or more systems (Collection Coordination and Intelligence Requirements Management process) are important issues as well. Battlespace Spectrum Management is a key (CIS) enabler to ensure that "electronic fragmentation" is avoided due to the number and bandwidth of links requested to integrate RPAS in operations. National restrictions considering bandwidth and frequencies have to be respected.

J. POTENTIAL MULTI-USE/ CIVIL APPLICATIONS

52. RPAS offer a wide range of civil applications. Being remotely piloted by personnel on the ground, RPAS can perform tasks that manned systems are not able to perform, either for security and safety or for economic reasons. RPAS can efficiently complement manned aircraft or satellites infrastructure used by governments in crisis management activities, border control, search and rescue, natural and industrial relief or firefighting.

K. USE OF AIRSPACE / CERTIFICATION

53. Today, military RPAS mostly operate in an AOO outside of European air space. They can be employed from a location outside the AOO and will have to use common airspace in order to reach it. They may also have to take off and land from or to the EU airspace. RPAS crews (operators, Intel officers, CIS technicians etc.) have also to be trained and certified outside of missions. Civilian regulations are not directly applicable to military RPAS since they are considered state aircraft, being operated as Operational Air Traffic (OAT). However, when military RPAS need to operate in an integrated manner with General Air Traffic, either

[4] http://nsa.nato.int/nsa/nsdd/listpromulg.html

compliance with civil aviation regulations or an equivalent level of safety will have to be demonstrated.

54. At present there are considerable limitations to the operation of RPAS in non-segregated airspace. The aim is to operate RPAS in a similar way to today's manned aviation in all classes of airspace in accordance with the regulations applied to state manned aircraft. The "Sense & Avoid" aspect is crucial to operate military RPAs in non-segregated airspace. RPAS must be certified and approved to fly by a competent authority.

55. RPAS are systems comprising[5] a RPA, one or more associated remote pilot station (RPS - also known as Ground Control Station), the required command and control (C2) links, including those supported by SATCOM, and any other components as specified in the design of the RPAS. The RPAS crew must hold valid RPAS certification, defined and issued by the competent authority of the operator's state; when RPA is flying outside national airspace, mutual recognition of certification and licensing will be detailed in technical agreements/accords with the host nation(s) where possible.

56. While underlining the role of national military airworthiness authorities in this domain, there are benefits in harmonizing airworthiness standards to the maximum extent possible. Bilateral/regional efforts can only be a first step, international standards are fundamental. EU Member States and industry are deeply involved in these efforts.

57. The integration of RPAS in European airspace is a complex task and requires close cooperation between civil and military actors. In the framework of the EU RPAS Steering Group (ERSG) the relevant stakeholder, European Aviation Safety Agency (EASA), Single European Sky Air (SES Traffic Management (ATM) Research Joint Undertaking (SESAR/JU), European Defence Agency (EDA), EUROCONTROL, European Space Agency (ESA), EU Member States and their civil aviation authorities, various standardization organisations and industry have prepared the roadmap for the integration of civil RPAS into the European Aviation System, addressing in particular regulatory aspects.

58. The framework setup by the ERSG could be used as a basis to integrate military and state RPAS into European airspace, while taking into account their specificities (e. g. the ability to use Operational Air Traffic rules). There is consequently the need to identify, plan, coordinate, and

[5] ICAOC Circular 328 and "*Roadmap for the integration of civil Remotely-Piloted Aircraft Systems into the European Aviation System*", Final report from the European RPAS Steering Group, June 2013

subsequently monitor the activities necessary to achieve the safe integration of RPAS into the non-segregated Air Traffic Management (ATM) environment. In the context of Single European Sky (SES) where the new generation of ATM systems and operations is being built, RPAS are likely to become some of the aircraft that SESAR systems will need to incorporate.

59. An agreed comprehensive regulatory framework is a key enabler for defining the parameters for the development of the future generation of RPAS and for effective peace-time operation for the military community.

L. TRAINING AND EDUCATION

60. Since RPAS playing an active role will have to transit in General Air Traffic and controlled airspace, it will be necessary to prove the reliability of the systems. Different expectations should stem from the use of Operational air Traffic (OAT) rules by RPAS. Furthermore, basic/mission-essential tasks and associated proficiency levels for RPAS crews must be achieved. The definition of such criteria and the requirements for crews has to be tackled within the context of airworthiness and certification of the systems of nations/organisations. A level comparable to NATO STANAG 4670[6](unclassified) is desirable.

61. To improve the level of interoperability and ensure reciprocal recognition of operators licencing, establishing a common RPAS training programme, for example in a common RPA operator centre of excellence, could be a mid-term aim. The crucial decision is to establish if, and in which balance, RPA pilots/operators need to maintain (manned) aircraft qualification and currencies.

62. RPAS have to be operated by appropriately trained personnel. Crew members, payload operators, intelligence/tactical coordinators and maintenance personnel are needed for flying the RPA, conducting the mission planning, execution and information/intelligence dissemination.

63. The RPAS personnel training should utilize existing operational information networks and occur in realistic (live, virtual and constructive) environments and conditions. Actual lessons learned from Member States should be included in the training in a timely manner.

64. RPAS training criteria must consider Crew Resource Management (CRM) techniques. CRM is essential for RPAS operations, facing especially the aspect of fatigue.

[6] http://nsa.nato.int/nsa/nsdd/listpromulg.html

M. LOGISTICS

65. RPAS require logistical support like manned aircraft. This support element includes all of the prerequisite equipment to deploy, transport, maintain, launch and recover the RPA and enable necessary communications. The logistical footprint depends on the size (class) and complexity of the RPAS.

66. Pre-deployment planning should consider basing locations that enable sustained operations and reflect other factors such as force protection and logistics re-supply.

ANNEX A

COMMONLY USED RPAS CLASSIFICATIONS

Class	Category	Normal employment	Normal Operating Altitude	Normal Mission Radius	Primary Supported Commander	Example platform
CLASS I (less than 150 kg)	MICRO <2 kg	Tactical Pl, Sect, Individual (single operator)	Up to 200 ft. AGL	5 km (LOS)	Pl, Sect	Black Widow
	MINI <15 kg	Tactical Sub-unit (manual Launch)	Up to 3K ft. AGL	25 km (LOS)	Coy/Sqn	Scan Eagle, Skylark, Raven, DH3, Aladin, Strix
	SMALL >15 kg	Tactical Unit (employs launch system)	Up to 5K ft. AGL	50 km (LOS)	Bn/Rgt, BG	Luna, Hermes 90
CLASS II (150 kg to 600 kg)	TACTICAL	Tactical Formation	Up to 10,000 ft. AGL	200 km (LOS)	Bde Comd	Sperwer, Iview 250, Hermes 450, Aerostar, Ranger
CLASS III (more than 600 kg)	MALE	Operational/Theatre	Up to 45,000 ft. MSL	Unlimited (BLOS)	JTF COM	Predator B, Predator A, Heron 1, Heron TP, Hermes 900
	HALE	Strategic/National	Up to 65,000 ft.	Unlimited (BLOS)	Theatre COM	Global Hawk
	Strike/ Combat	Strategic/National	Up to 65,000 ft.	Unlimited (BLOS)	Theatre COM	Reaper

NOTE:
Conflicts in RPAS classes are resolved with the respective weight class. For example, if a RPA weighs 15 kg and operates up to 6000 AGL, it would still be considered a Class I RPAS. National classification might differ.

ANNEX B

ACRONYMS

The following is a list of acronyms and abbreviations used in context with RPAS issues.

AGL	Above Ground Level
AIS	Automatic Identification System
AOO	Area of Operation
ATM	Air Traffic Management
BLOS	Beyond Line of Sight
C2	Command and Control
CBRN	Chemical, Biological, Radiological and Nuclear
CCIRM	Collection Coordination and Intelligence Requirements Management
CIS	Communications and Information System
CMO	Crisis Management Operation
COMINT	Communication Intelligence
CRM	Crew Resource Management
CSAR	Combat Search and Rescue
DOB	Deployed Operating Base
ELINT	Electromagnetic Intelligence
EO	Electro Optical
EOB	Electronic Order of Battle
ECM	Electronic Counter Measures
ELINT	Electronic Intelligence
ES	Electronic Surveillance
ESM	Electronic Support Measures
EW	Electronic Warfare
FOB	Forward Operating Base
GCS	Ground Control Station
HALE	High Altitude Long Endurance
ICAO	International Civil Aviation Organization
IMINT	Imagery Intelligence
IR	Infra-Red

ISAR	Inverse Synthetic Aperture Radar
ISR	Intelligence Surveillance Reconnaissance
ISTAR	Intelligence Surveillance Target Acquisition Reconnaissance
LRF/D	Laser Rangefinder/-designator
LOS	Line of Sight
MALE	Medium Altitude Long Endurance
NRT	Near Real Time
OAT	Operational Air Traffic
PG	Project Group
PR	Personnel Recovery
RPA	Remotely Piloted Aircraft
RPAS	Remotely Piloted Aircraft System
SAR	Synthetic Aperture Radar
SAR	Search and Rescue
SES	Single European Sky
SESAR	Single European Sky ATM Research
SATCOM	Satellite Communications
SIGINT	Signal Intelligence
TA	Target Acquisition
UCAV	Unmanned Combat Aerial Vehicle