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14. ABSTRACT
This Test Operations Procedure (TOP) provides an overview of Unmanned Aircraft Systems (UAS) testing. It spans the technologies and sizes of modern UAS. Areas of concentration include command and control, weapons and sensor integration, targeting and navigation.

15. SUBJECT TERMS

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TEST OPERATIONS PROCEDURE

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Unmanned Aircraft Systems (UAS) Testing Overview

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1. SCOPE (RCC 1.2).

This Test Operations Procedure (TOP) is based on guidance provided in Range Commander's Council (RCC) 555-07[1*]. Specific RCC paragraphs are shown parenthetically in the Section headings.

The procedures in this TOP describe general considerations in testing the variety of Unmanned Aircraft Systems (UAS). UAS vary significantly in size, weight, type of fuel, type of payload (to include armament), launch and recovery methods, and control systems. They include fixed wing vehicles, rotary wing vehicles, and vehicles with novel propulsion systems. Since UAS are difficult to try to operate in National Airspace (NAS), if at all, UAS developers work with national ranges to do UAS testing. There are more than Defense Acquisition Systems testing UAS at the national ranges. Commercial and other government agencies come to the ranges to test; conducting early integration, virgin flight, safety check-out, weaponization and frequency testing.

This TOP does not describe UAS testing in detail; the intent is to describe UAS testing in generalities and to give the tester a better idea as to the considerations for UAS testing. Specific test procedures for specific types of testing will be detailed in other TOPs.

2. PRE-TEST ITEMS.

2.1 Overview.

The location of the air vehicle during testing is critical for test data and for range safety applications. The air vehicle operations area must support the required data collection and safety parameters. Careful consideration must be given to potential hazard areas if the air vehicle were to malfunction. Flight Termination System (FTS) activation must be planned for as well as potential armament malfunctions for air vehicles equipped with armament. This should include consideration of maximum weapon flyout distances in calculation of the hazard and Off Limits areas. Security considerations also play a role in the locations chosen to protect classified or sensitive information regarding the UAS, payloads, and its operations.

2.2 Safety (RCC 3.1).

The local Range Safety Officer (RSO) must certify the UAS as safe to operate on the range. The RSO will brief the UAS operators on range regulations identifying the areas of operation, altitude restrictions, and off-limit areas. In addition, the RSO will inspect tracking devices, FTS's, Identification Friend or Foe (IFF) transponders, and other safety devices of both the UAS and payloads where applicable.

[*] Superscript numbers correspond to those in Appendix B, References.

2.2.1 Safety Standard Operating Procedure (SOP).

Although the test officer is ultimately responsible for safety during the conduct of the UAS test, they should rely heavily on the installation safety office for guidance during testing. Local range safety SOPs should already be established and followed accordingly. Ensure safety in the areas of: explosive storage and handling; hazardous materials storage and waste disposal; driving on the test range; safety zone for nonessential personnel; rules for mission essential personnel; and other areas of concern. In addition, the test officer must be aware that military personnel require a DTC Safety Release to operate or maintain any equipment.

2.2.1.1 Soldier Use.

If civilian or military non-test personnel (e.g., borrowed soldiers) are used as test participants, the DTC Human Research Protection Program (HRPP) must review the detailed test plan to determine the level of risk to which test participants will be exposed. Military personnel (other than Soldier, Operator, Maintainer, Test and Evaluation (SOMTE)) rarely operate any UAS system equipment during developmental testing; if they are to do so, a safety release is required before testing may begin. Plan accordingly and provide new equipment training to test personnel prior to test conduct.

2.2.2 Safety Release.

Requirements for a safety release will vary depending on the type of test, the test range, and the requirements generated by DTC Headquarters (HQ). DTC HQ will task a DTC test center safety office to prepare a Safety Release Recommendation. Documents required to support a recommendation may include a Safety Assessment Report (SAR), Health Hazard Assessment Report, Technical Manuals, Maintenance Allocation Chart, Flight Safety Operating Procedure (FSOP), Explosive Hazard Classification Data and a U.S. Army Center for Health Promotion and Preventive Medicine report.

2.2.3 Accident Awareness/Emergency Recovery Plan.

In accordance with (IAW) AR 385-10[2] and DA PAM 385-90A[3], a pre-accident plan must be in place for accident awareness and emergency recovery operations. A crash investigation team will include representatives from the local test lead, UAS system developer, the test range, and the project manager. If armaments or explosive components are present at the crash scene, EOD representatives will be included. The plan should address recovery procedures and post-crash security for UAS with classified components or payloads. Identify the team leader, a mobilization point, the mode of transportation to the recovery site, and the recovery rules.

2.2.4 Safety Measurements.

2.2.4.1 Noise Measurements.

In order to determine hearing protection requirements for the UAS components and for detect ability of the UAS components from various locations and orientations, noise measuring instrumentation is required. Always ensure the proper personal protective equipment is used during testing.

2.2.4.2 Power Density Measurements.

Power density measurements may be required for antenna function checks and to calculate any exclusion zones for personnel, fuel or ordnance. Consider all emitters in this process including payload, relay, ground control stations, and (as needed) target emitters.

2.2.5 FTS Safety Testing.

Some testing or demonstrations may be required to confirm the safe operation of the UAS and that all range safety requirements are met. FTS checkouts will be required for those systems so equipped. FTS function should be checked with government witnesses present to the maximum extent possible both on the ground and, if possible, in the air. Armament carrying UAS missions may require a dress rehearsal flight with inert ordnance to demonstrate flight profiles, data and FTS link functioning, fire control procedures, target identification, and recovery prior to firing live ordnance. For FTS's using pyrotechnics, the UAS system developer may be able to connect a test light or siren in place of the actual pyrotechnic during the demonstration. Each test range has its own set of rules and regulations. The FTS is a long lead time piece of equipment and resources need to be brought to bear on it early in the process.

2.3 Risk Management.

Risk Management encompasses the above safety sections. In order to conduct a safe test, risks must be taken into consideration. Risk Management is an organized method for continuously identifying and measuring risk; developing mitigation options; and selecting, planning, and implementing the appropriate risk mitigations. Risk Management is a process that evaluates the likelihood, or probability of an undesirable event occurring; assesses the consequences, or severity of the event should it occur; evaluates the sources or root causes of the risk and identifies the available risk mitigations. Effective Risk Management depends on early identification and analyses of risk, Risk Management planning, early implementation of corrective actions, continuous tracking and reassessment, and communication, documentation, and coordination. Further aide in Risk Management can found in Appendix A of the MIL-STD-882D[4] as directed by AR 70-1[5] and DA PAM 385-16[6]. These documents include he Risk Assessment Matrix and Acceptance Levels.

2.4 Frequency Documentation (RCC 3.3.5).

Frequency coordination helps prevent interference between the UAS uplink and downlink signals, and local commercial or military emissions. Prior to UAS testing a DD Form 1494 must be submitted in writing with all of the planned operating frequencies for the UAS and any additional communication frequencies to the test center frequency manager. The area frequency coordinator must approve all operating and communication frequencies. The test officer ensures that all range communications are authorized. Upon approval, the area frequency coordinator will provide a Temporary Radio Frequency Authorization. The frequency coordinator may authorize the use of commercial frequencies for UAS operation on a non-interference basis. However, this is strongly discouraged.

Once a DD 1494 is approved, a JF 12 number is what is required to be on hand for a UAS test. The JF 12 number is used as a reference, not the DD 1494. However, if the JF 12 number is not available, a DD 1494 can be referenced but must be in the review process to be approved.

Reference the Range Commanders Council Frequency Management Group's "FREQUENCY MANAGEMENT GUIDELINES FOR NATIONAL AND SERVICE TEST AND TRAINING RANGES" Document 700-1 for information about the roles of the Department of Defense (DOD) Area Frequency Manager and the Range Frequency Manager (RFM) and the interaction the test officer has with the RFM.

2.5 Security (RCC 2.2).

The test officer will need to work with the local OPSEC and test IAW the customer provided security classification guide (SCG) to ensure the appropriate actions are taken for data collection, data storage, test reports, telemetry and/or other critical test components.

2.6 Environmental Documentation (RCC 2.4).

Detailed environmental plans and procedures must be available prior to testing to ensure local environmental guidelines are adhered to. Launch/recovery areas, target areas, fuel storage areas, etc. require environmental documentation. The test officer and the local Environmental Quality Coordinator should have or should develop an SOP to ensure the environment is not adversely affected during the test. Every test range will have cultural and biological resources that must be avoided. A Record of Environmental Consideration (REC) will be prepared if the UAS test is determined to be within the mission of a test center and within an existing Environmental Impact Statement (EIS) or Environmental Assessment (EA). An EA can take 3 to 18 months to prepare, while an EIS can take years to prepare.

2.7 Test Plan.

Test conditions will vary according to the size and mission of the UAS and the requirements set forth in the customer test plan. If testing will be conducted with an evaluated test program, then a Test and Evaluation Master Plan (TEMP) will be available to use. The test officer shall review the TEMP, the System Specification, the customer test plan and the System Evaluation Plan/Operational Test Agency (OTA) Test Plan to determine a strategy for providing the system evaluator the information required for analysis. The test officer must consult the appropriate support agencies within their organization for assistance in areas outside of their expertise [e.g., Electromagnetic Interference/Compatibility (EMI/EMC), Manpower and Personnel Integration (MANPRINT) and Reliability, Availability, and Maintainability (RAM), Emplacement/Displacement, Aural/Visual]. This ensures that all test requirements are adequately addressed for the local testing plan.

3. FACILITIES.

3.1 General.

Due to the varied nature of UAS types, testing will require a variety of facilities to support the testing effort to include targets, weapons, ground control stations and others. Testing may be required in the actual environments the system will operate in, for instance, desert, tropics, or arctic. The diverse testing environments will offer different wind speeds and directions, various temperatures and humidity levels, and even varying light conditions. UAV components, support equipment (mission planning), and payloads may be classified. If this is the case, adequate storage areas should be available or if appropriate, guards.

3.2 Storage and Maintenance.

Depending upon the type and size of the air vehicle, hangar space with close proximity to runways or the launch/recovery area are required. Larger UAS may require a tow vehicle or auxiliary power unit. For UASs that are heavily dependent on rechargeable batteries, adequate and appropriate battery charging facilities or areas will be required. Hazardous operations and procedures for batteries must also be followed. Grounding points will most likely be required. In order to support weight and balance measurements, engine changes or other heavy maintenance on the air vehicle or other large components of the system, maintenance facilities with the appropriate lift equipment will be needed.

UAS testing utilizing small pyrotechnic or other explosive items (squibs, parachute rocket motors, cutters, etc) require approved storage space at the hangar or maintenance area. Local range ammunition authorities can help with pyrotechnic SOPs. Fuel, epoxies, lubricants, flammable cleansers, etc., must be stored in a safe place. All hazardous materials must have a Material Safety Data Sheet that must be posted in a location where all personnel can consult them.

3.3 Office Space.

Office space with access to phone lines and internet will most likely be required. Provisions for storage of classified hardware and documents should be available as well as Secure Internet Protocol Router Network (SIPRnet) access, Secure Telephone Equipment (STE), Joint World Wide Intelligence Communication Systems (JWICS), and secure Video Teleconference (VTC) capabilities, when required.

3.4 Fueling.

Depending upon the fuel required for the components of the system (ground vehicles and generators, in addition to the air vehicle) fueling facilities will be required. Examples of UAS fuels include JP8 (large aircraft) and 100LL (Avgas). Unconventional fuel sources such as hydrogen require special considerations for fueling areas, facilities and procedures.

3.5 UAS Ground Control Station (GCS) Area.

UAS GCSs can range from a simple laptop computer to a mobile-home sized trailer(s) filled with computers and monitoring equipment. Some UASs will require an "external" operator with a hand-held control box to have visual observation of the air vehicle while controlling it prior to handing control to an "internal" operator in a ground control station without direct visual observation of the air vehicle. Placement of these control stations must be carefully planned both for safety and for ease of operations. A variety of antennas will be associated with the control stations. Antennas should be unobstructed and out of the flight path. Power sources must be considered and sited appropriately with accommodated back-up power sources in case of a main power failure. Safety precautions must be followed when dealing with the power sources.

3.6 Launch and Recovery Areas.

Consideration must be given to this aspect of the UAS operation so that launch and recovery do not endanger populated or sensitive areas or mission essential personnel such as UAS system operators and maintainers. A number of launch and recovery methods for UASs exist and the safety aspects must be considered to ensure personnel, facilities, and equipment are adequately protected. The operating range of a UAS will dictate where the launch and recovery tests flights can be performed. In addition to the runway, the launch/recovery area must provide space for GCS shelters, support equipment, video equipment, instrumentation van, generators (if commercial power is not available), a data collection area, and an observation area.

3.7 Test Stands.

Some UAS testing will require the use of test stands. These could range from a simple fixture to hold the UAS during engine runs to a high tower to secure an air vehicle for stationary weapons firing with engine power applied. Safety precautions must be followed while placing test stands. For instance, identify or construct a safety area in case a helicopter blade or other system component detaches from the UAS.

3.8 Operations Area (RCC 4).

All UAS flights require restricted airspace, unless a current government Certificate of Authorization (COA) or contractor experimental certification is issued by the Federal Aviation Administration (FAA) and is in place that supports the operation in NAS. Each installation has its own set of rules for the use of restricted airspace. Consult the local airfield base operations for specific restrictions.

Flights outside of the installation's restricted airspace require COAs. The FAA requires that UAS below 2500 feet have ground observers. Any UAS above 2500 feet require a chase aircraft for operations in NAS. The FAA usually requires an FTS. FAA regulations for UAS in NAS are an evolving process; therefore, consult with the FAA for the latest regulations. Depending on the amount of traffic in the area, the test officer should begin planning airspace requirements as early as possible.

Targets (for weapons and sensor testing) must be placed appropriately within restricted ground and airspace as required. The area must include a "return home" point for the UAS to recover to in the event of a loss of link (for those systems that incorporate that feature).

3.9 Armed UAS Facilities.

Armed UAS missions require proximity to authorized impact areas. Planning should be done to assure the armed UAS system is reliable. Special care must be taken to plan flight profiles of armed missions to avoid populated and sensitive areas. Considerations include the possibility of the UAS being lost in an ordnance impact area and how (if) recovery of the UAS will be accomplished. Other considerations are the flight profile of take off and landing, returning with ordinance and alternate landing points. Approved armament loading and unloading areas are necessary as well as an area(s) for dealing with misfires and other potential malfunctions. Armament storage and transportation facilities must be available to support these missions. Local range ammunition authorities can help with armament SOPs.

4. INSTRUMENTATION.

4.1 General.

UAS testing will require various instrumentation configurations depending upon the tests to be conducted. If instrumentation is required for UAS testing, the test officer should provide dimensions, power requirements, and weight to assist the UAS system developer with installation. The placement and connection of test instrumentation should not inhibit the operation of the UAS system. Data that is collected during testing doesn't always come directly off of the aircraft and is usually piped to the GCS. Testing could require that only meteorological data be available to support flight decisions to fully instrumented tests involving telemetry, on-board instrumentation, radars, optical trackers, etc. Samples of all data should be collected prior to testing to ensure all instrumentation is fully functional.

4.2 Time, Space, Positioning Information (TSPI) data.

TSPI data will be a key requirement whether to support sensor or weapons testing, or for range safety purposes in monitoring the air vehicle position. Range safety purposes will require the TSPI to be real time and in a format readily understood and acted upon by range safety personnel and the test officer. These data can be obtained through the use of radar(s), optical trackers, or Global Positioning System (GPS) mounted on the air vehicle. Visual observers can be used when only a general idea on position is needed or when the air vehicle is so small as to eliminate the other possibilities. Targets and other points of interest on the ground require surveys so their positions are known with great accuracy, for instance, takeoff and landing points and antenna locations.

4.3 Telemetry.

Telemetry may be required to get independent data from the UAS to a location for display and interpretation. Sometimes customer provided workstations are the only means of downloading, storing and displaying this data. One example is the CLAW workstation for the General Atomics Lynx II SAR/GMTI. Often the information on the data link of the system is adequate but there may be some cases where additional data are required. Other test data (imagery, etc) might be required to be sent to other locations in real time and recorded for later use. Planning should consider the potential for classified data on the links, customer equipment, and the appropriate handling and storage requirements.

4.4 Meteorological Data.

Weather data are particularly important for UAS testing. Accurate measurements of temperature, humidity, and barometric pressure are needed, most in real time. Wind speed and direction are also critical for takeoff and landing. Depending upon the location of fixed meteorological stations, these instruments may be required to be co-located with the launch and recovery area and/or the control area. For higher altitude flights meteorological balloons can be used.

4.5 Documentary Photography.

UAS testing will almost always involve the collection of documentary photography. Plan for adequate coverage from the use of a simple digital camera to still and motion imagery taken with a gyro-stabilized camera(s) from a chase aircraft. Remotely-operated cameras will be required for close coverage of hazardous situations and may be required for safety and situational awareness (monitoring of the launch and recovery area, arming area, etc). Laser spot cameras are used to ensure lasers are terminated on the correct target/area for laser designator testing. Video cameras, still photography cameras, and their operators should be located in an unobtrusive area outside the established safety zone.

5. OTHER TESTING CONSIDERATIONS.

5.1 Mission Plan and Flight Profile.

Mission plans provide a step by step explanation of events and show the area of operation, operational altitude, time of events, duration, and waypoint coordinates. A flight profile provides a map overlaid with the waypoints described in the mission plan.

5.2 Target Plan.

A plan for target deployment and operation should be made to meet the test requirements and coincide with the schedule outlined in the flight profile. Targets can consist of vehicles, personnel, and resolution boards. For vehicles and personnel, the plan shall describe for each mission the number of targets deployed, target locations, time on station, movement requirements, and any special instructions (e.g., camouflage, engines on for infrared sensors).

For target resolution boards, the plan shall include the size, pattern, angle with respect to the ground and board type (i.e., day television or infrared). Ensure that all target locations are surveyed to required system test accuracy criteria and included in the target plan. Locations are required to ensure the flight path covers the target area and for post-test analysis. Further consideration should be taken for targets and emitters for the testing of the SIGINT, MASINT, EA, RADAR/SAR, Nuclear, Biological and Chemical Detection, and LIDAR payloads.

5.3 Pre-Test Inventory/System Support Package.

The test officer must document all test items as they arrive. If it's an evaluated program, then a Test Incident Report can be used to document items. For the air vehicle, this documentation should include the configuration of the air vehicle, the serial number, dimensions, engine type and displacement, propeller size, and control surface design. All draft technical manuals and System Support Package documentation must arrive in time for review by the test officer and other support personnel. MANPRINT and RAM issues require this documentation for analysis.

6. TEST PROCEDURE INFORMATION.

6.1 Hardware Component Testing.

A variety of hardware testing could be required or desired prior to the UAS being tested as a system in the air. GCS testing, antenna testing, ground support equipment testing and ground testing of the air vehicle may be done in isolation or in varying combinations prior to actual flight testing with all the components in use. Such testing could include vibration testing, environmental testing, reliability testing, functional testing, or a combination.

6.2 Software Testing.

Most UAS are heavily dependent upon software. While much software testing can be done "in the lab" and on simulators, consideration should be given to conducting such testing in the environments that the items will be used in. The software in the various hardware components may be able to be tested much as the hardware components can be tested.

6.3 Data Link/Communications Testing.

Communications data link testing may be required to demonstrate that the UAS can operate at specified altitudes and distances from the control antenna, and that the data on the link is transmitted and received correctly. The control link, the payload data link (if separate) and any other data/communications links can be checked. The actions of the UAS upon loss of link should be demonstrated to ensure there is a good FTS signal. Additionally, air vehicle "hand offs" from one controlling station and antenna to another should be demonstrated to ensure that it can be accomplished as well as to help with line of site studies.

6.4 Flight Testing.

A number of tests can be conducted within this area, but in general the test(s) can confirm that the UAS can operate within a specified flight regime (altitude, speed, climb, descent, turns, etc) and complete the planned route. Planning a variety of routes then having the UAS fly that route can help confirm the operation of the navigation, flight controls, and software in the system. Changes in mission profiles and routes should be tested to confirm proper operation of the system when changes are made during the mission. Flight testing process is in accordance with range SOPs and includes mission briefs, pre-flight checks, FTS checks, post-checks and debriefs.

6.5 Payload Testing.

A variety of UAS payloads are in use or envisioned for use. These include:

a. SIGINT – Signals Intelligence

b. EA – Electronic Attack

c. MASINT – Measurement and Signatures Intelligence

d. RADAR/SAR – Synthetic Aperture Radar

e. Video – (EO/IR) Electro-Optical/Infrared, HDTV

f. Nuclear, Biological, Chemical Detection

g. LIDAR – Laser Detection and Ranging

h. Laser Range Finders/Laser Designators

There are numerous test methods and procedures that can be applied to testing payloads. The tester should refer to other documents that detail the specifics for each. A key requirement for many payloads and the associated components in the UAS will be the determination of the accurate location of a target or point of interest. Accurate TSPI data will be required for the both the UAS and the target or point of interest to determine location errors.

6.6 Armament Testing.

Weaponization of UAS is increasing and this poses some challenges for the tester. Safety planning becomes more difficult as FTS choice and operation, operations areas, impact point(s), loading and unloading procedures, target identification, fire controls, emergency procedures, etc. all must take into account the addition of the armament and the hazards that poses. Additional data collection efforts may be required to assess both the terminal effects of the armament at the target and the effects of the armament separating from the air vehicle.

7. DATA REQUIRED.

As noted in paragraph 4, there is a variety of instrumentation that can be used to gather data on UAS testing. The data required will be dependent upon the TEMP and test plan requirements, customer requirements, and test range requirements for safety and other purposes. Data requirements must be considered early in the test planning process to ensure that the required instrumentation is available and used appropriately. Those responsible for the data collection should be involved to plan for instrument locations and requirements. The majority of data required can be captured electronically. However, a data collection form is still useful to capture start/stop times, payload sensor, field-of-view and others, for specific test missions and observations of the test. Careful evaluation of the data requirements should be made to assure the combination of electronic and manual data collection captures all of the required data parameters.

7.1 Data Collection Forms.

The test officer with assistance from support divisions within their respective organization shall develop data collection forms. The system evaluator shall review the forms, recommend changes, and approve the final forms.

8. PRESENTATION OF DATA.

Data presentation will be dependent upon the data collected and required as discussed in paragraphs 4 and 7. As with any presentation of data, the important aspects will be timeliness and a clear, understandable format that readily provides the decision maker and other stakeholders with the data they need to make informed decisions. As always, data presentation and format should be considered early in the test planning process to ensure that the required data are both collected and presented in a relevant and easily understood manner.

The detailed TOPs that are to be developed below this overview TOP will be more specific and include more detail and examples on presentation of data.

APPENDIX A. ABBREVIATIONS.

COA	Certificate of Authorization
DTC	Developmental Test Command
DOD	Department of Defense
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMI/EMC	Electromagnetic Interference/Compatibility
EO/IR	Electro-Optical/Infrared
FAA	Federal Aviation Administration
FSOP	Flight Safety Operating Procedure
FTS	Flight Termination System
GCS	Ground Control Station
GPS	Global Positioning System
HQ	Headquarters
HRPP	Human Research Protection Program
IAW	In Accordance With
IFF	Identification Friend or Foe
JWICS	Joint Worldwide Intelligence Communication Systems
LIDAR	Laser Detection and Ranging
MASINT	Measurement and Signals Intelligence
MANPRINT	Manpower and Personnel Integration
NAS	National AirSpace
OTA	Operational Test Agency
RAM	Reliability, Availability, and Maintainability
RCC	Range Commander's Council
REC	Record of Environmental Consideration
RFM	Range Frequency Manager
RSO	Range Safety Officer
SAR	Safety Assessment Report
SCG	Security Classification Guide
SIGINT	Signals Intelligence
SIPRnet	Secure Internet Protocol Router Network
SOMTE	Soldier, Operator, Maintainer, Test and Evaluation
SOP	Standard Operating Procedure
STE	Secure Telephone Equipment
TEMP	Test and Evaluation Master Plan
TOP	Test Operations Procedure
TSPI	Time, Space, Positioning Information
UAS	Unmanned Aircraft System
VTC	Video Teleconference

APPENDIX B. REFERENCES.

1. Range Commanders Council (RCC) Document 555-07, User Guide for Unmanned Aerial System (UAS) Operations on the National Ranges, November, 2007
Current link as of December 2008 is: https://wsmrc2vger.wsmr.army.mil/rcc/manuals/555-07/555-07.pdf

2. Army Regulation (AR) 385-10, The Army Safety Program, 07 November 2008

3. Department of the Army (DA) Pamphlet (PAM) 385-90A, Army Aviation Accident Prevention Program, 28 August 2007

4. MIL-STD-882D, Department of Defense Standard Practice for System Safety, 10 February 2000

5. AR 70-1, Army Acquisition Policy, 31 December 2007

6. DA PAM 385-16, System Safety Management Guide, 13 November 2008

For information only:

a. TOP 6-2-040, Non-Lethal Unmanned Aerial Vehicles (UAVs), dated 15 June 1993

Forward comments, recommended changes, or any pertinent data which may be of use in improving this publication to the following address: Test Business Management Division (TEDT-TMB), US Army Developmental Test Command, 314 Longs Corner Road Aberdeen Proving Ground, MD 21005-5055. Technical information may be obtained from the preparing activity: Aviation and Air Delivery systems Division (TEDT-YP), US Army Yuma Proving Ground, 301 C. Street, Yuma, AZ 85365-9498. Additional copies are available from the Defense Technical Information Center, 8725 John J. Kingman Rd., STE 0944, Fort Belvoir, VA 22060-6218. This document is identified by the accession number (AD No.) printed on the first page.