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Materiel Test Procedure 7-3-041
U. S. Army Air Defense Board

U. S. ARMY TEST AND EVALUATION COMMAND
COMMODITY SERVICE TEST PROCEDURE

DRONE GUIDANCE, CONTROL, TRACKING
AND PLOTTING COMPONENTS

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1. OBJECTIVE

The objective of this MTP is to describe the service test procedures required to determine the operational performance of drone mission control equipment, measured against the requirements specified in the applicable Qualitative Materiel Requirements (QMR) or Small Development Requirements (SDR), and the suitability of such items for use by the U. S. Army.

2. BACKGROUND

Army drone aircraft and supporting equipment may be used for proficiency training of air defense artillery and guided missile forces, or for surveillance of the battlefield or enemy territory. They may also be used for dissemination of chemical agents. Training drones must possess mainly maneuverability and transportability characteristics necessary to meet training support requirements; drones in the surveillance and dissemination categories must possess the full range of characteristics necessary for operation in battlefield environments as components of autonomous systems. Equipment used for controlling and monitoring drone flights must be subjected to service testing consistent in scope with the mission assignment of the drone or drone system to which they apply.

3. REQUIRED EQUIPMENT

- a. Item Maintenance Test Package.
- b. Applicable Handling Equipment.
- c. Suitable Maintenance Support Facilities.
- d. Communication Facilities, Radio and Wire.
- e. Meteorological Instrumentation
- f. Cameras and Film, Still and Motion Picture.
- g. Elapsed Time Recorders.
- h. Event Recorders.
- i. Voice Recorders and Recording Medium.
- j. Suitable Transport Vehicles.
- k. Suitable Transport Aircraft.
- l. Supply of Drones.

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4. REFERENCES

- A. Army Regulation 70-10, Test and Evaluation During Research and Development of Materiel.
- B. Army Regulation 70-38, Research, Development, Test, and Evaluation of Materiel for Extreme Climatic Conditions.
- C. Army Regulation 70-39, Criteria for Air Transport and Airdrop of Materiel.

STATEMENT #2 UNCLASSIFIED

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- D. Army Regulation 385-10, Army Safety Program.
E. Army Regulation 705-50, Army Materiel Maintainability and Reliability.
F. USATECOM Regulation 70-23, Equipment Performance Reports (EPRs).
USATECOM Regulation 385-6, Verification of Safety of Materiel During Testing.
USATECOM Regulation 750-15, Maintenance of Supplies and Equipment.
MTP 3-1-002, Confidence Intervals and Sample Size.
MTP 5-3-500, Preoperational Inspection and Physical Characteristics.
MTP 5-3-506, Compatibility with Related Equipment.
MTP 5-3-507, Human Factors Engineering (Compatibility of Man/Machine by observation).
MTP 5-3-510, Safety Hazards.
MTP 5-3-512, Transportability.
MTP 6-3-501, Pre-Test Inspection for Service Test.
MTP 6-3-505, Emplacement, Action, and March Order.
MTP 6-3-506, Durability.
R. MTP 6-3-524, Maintenance Evaluation.
S. MTP 10-3-501, Operator Training and Familiarization.
T. MTP 10-3-504, Maintenance Evaluation.

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5. SCOPE

5.1 SUMMARY

5.1.1 Technical Characteristics

The procedures outlined in this MTP provide general guidance for determining the degree to which items of drone guidance, control, tracking and plotting components (drone operating equipment) under test meet current military requirements relative to criteria expressed in respective applicable documentation. The cumulative test results, together with the results of appropriate Common Service Tests, will allow an estimate to be made of the operational performance of the items of drone equipment and their suitability for military use.

The specific tests to be performed, and their objectives, are described in the following paragraphs.

NOTE: These tests need not be conducted in the order as given: some may overlap, or be performed concurrently.

a. Preoperational Inspection and Physical Characteristics - The objectives of this subtest are to: (1) verify the completeness of the test item and any associated equipment, (2) compare the physical characteristics of the item with those stated in the materiel documents, and (3) determine whether the drone operating equipment and associated equipment are in condition for test.

b. Safety - The objectives of this subtest are to: (1) confirm the

safety of the test item, and (2) determine the effectiveness of the safety features.

c. Personnel Training - The objectives of this subtest are to: (1) determine the type of instruction required, and (2) determine whether the proposed program of instruction (POI) is adequate to ensure soldier proficiency in the use of the drone operating equipment.

d. Operational Characteristics - The objectives of this subtest are to: (1) evaluate the necessary crew activities and times required to emplace or otherwise situate the test item in readiness for operations, and to prepare it for movement to another location; and (2) evaluate the capabilities of the drone operating equipment for guiding, controlling, tracking, and plotting the mission profiles of applicable drone aircraft.

e. Transportability - The objective of this subtest is to determine the characteristics of the test item which are influential in preparation for shipment, handling, and transportation by applicable Army modes of transport.

f. Maintenance Evaluation - The objective of this subtest is to evaluate the reliability and ease of maintenance characteristics of the drone operating equipment, and to determine the adequacy of the maintenance package including suitability of maintenance literature.

g. Human Factors - The objective of this subtest is to determine whether factors exist between the test item and service personnel which cause undue confusion, stress, fatigue, and malfunctioning due to mental or physical errors.

h. Compatibility with Related Equipment - The objective of this subtest is to evaluate the drone operating equipment in conjunction with associated drone aircraft, and to determine its compatibility with all elements engaged in or supported by its mission.

5.1.2 Common Service Tests

Not included in this MTP are the following Common Service Tests which apply to these commodities:

- a. MTP 5-3-501, Battlefield Mobility, Tactical Flexibility and Portability.
- b. MTP 6-3-509, Effects of Weather.
- c. MTP 6-3-513, Qualitative Electromagnetic Interference.
- d. MTP 6-4-001, Desert Environmental Test of Communication, Surveillance, and Avionic Electronic Equipment.
- e. MTP 6-4-003, Tropic Environmental Test of Communication, Surveillance, and Avionic Electronic Equipment.
- f. MTP 7-3-512, Airdrop - Suitability of Supplies and Equipment for.
- g. MTP 7-3-515, Air Portability, Internal - Suitability of Supplies and Equipment for.
- h. MTP 7-4-008, Arctic Environmental Test - Aviation Support Equipment.

5.2 LIMITATIONS

This procedure is limited to service tests of drone guidance, control, tracking and plotting components. However, the tests described in this pro-

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cedure may be adapted to cover service testing of individual components of other equipment performing similar functions.

6. PROCEDURES

6.1 PREPARATION FOR TEST

a. Select and schedule suitable sites, maneuvering areas, and road courses at representative environmental locations as required by applicable test directive or other pertinent documents.

b. Upon establishing the scheduled availability of the test item(s), coordinate the availability of the following:

- 1) Engineering safety release or other safety statement.
- 2) Maintenance support facilities, spare parts, and personnel.
- 3) Equipment, special facilities, and instrumentation, with special attention to timely provision of additional supplies or special equipment not readily available at the test site. All test equipment and instrumentation selected shall be representative of the state-of-the-art, with calibrations traceable to the National Bureau of Standards.

c. Select test personnel (soldiers), with the exception of service test supervisors, who are representative of those expected to operate and maintain the test item in the field. Some should be left-handed, some should wear glasses, and some should represent the extremes of physical size.

d. Prepare record forms for systematic entry of data, chronology of test, test results, and such observations, measurements, and references to other records as will be of value in analysis and final evaluation of the test item.

e. Prepare a test item sample plan to ensure that enough samples of all measurements are taken to provide statistical confidence in final data, as covered in applicable sections of MTP 3-1-002. Provisions shall be made for sample plan modification during test progress as may be indicated by monitoring test results.

f. Ensure that appropriate security measures are instituted to safeguard classified information and data, as applicable, and that arrangements for supporting and participating agencies, activities, and facilities have been made.

6.2 TEST CONDUCT

NOTE: Performance assessment shall be accomplished throughout this test primarily by observers equipped with means for recording visual, aural, and judgemental observations and related time factors. Observer activities shall not interfere with or influence in any manner the functions of the test item operators.

6.2.1 Preoperational Inspection and Physical Characteristics

a. Upon receipt of the test drone operating equipment at the testing agency, carefully examine the equipment and associated items for completeness and obvious mechanical or electrical damage or deterioration such as cracked or broken parts, loose assemblies, bent fragile parts, corroded plugs and jacks, etc., using the Preliminary Operating and Maintenance Manual (POMM) as a guide. All defects shall be noted and corrected before proceeding with the test.

b. Determine the physical characteristics, and check the principal electronic technical characteristics of the drone operating equipment and associated items under test by photographing, weighing, and measuring the items, and checking output indications, in accordance with MTP 5-3-500 and MTP 6-3-501.

NOTE: Test item characteristics obtained during the Engineering Test should not be re-determined here unless there is evidence that the data is not valid or not representative of the test item.

c. Carefully align the drone operating equipment, if necessary, as specified in the draft technical manual, to ensure, insofar as possible, that it is representative of an average equipment in normal operating condition.

d. Record the following:

- 1) Completeness of inventory and damage to the test item(s) sustained in transit and/or handling.
- 2) Weights and measurements taken.
- 3) Output readings observed at appropriate settings.
- 4) Discrepancies in physical or technical characteristics.

6.2.2 Safety

a. Review all safety precautions and possible hazards associated with the drone operating equipment under test, together with potential hazards in the overall testing environment. The review shall include, but need not be limited to, the following:

- 1) Electrical shock or burn hazards, prevention, and emergency action required.
- 2) Microwave radiation hazards, necessary restrictions, and provisions for emergency measures.

b. Examine the drone operating equipment for the presence of necessary guards, shields, interlocks, safety fuses, and warning plates.

c. Verify the operation of all safety devices provided on or with the test item and associated equipment.

d. Record the following:

- 1) Non-operable safety features.
- 2) Inadequate warning statements.

e. Throughout the conduct of all testing as outlined in this MTP, monitor all safety aspects associated with the test item in accordance with MTP 5-3-510.

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f. In addition to the data required by MTP 5-3-510, record narrative comments concerning the following:

- 1) Confirmation of safety release under conditions as specified in USATECOM Regulation 385-6.
- 2) Any undue restrictions or limitations imposed on the tactical use of the drone operating equipment under test by Safety Statements and/or Safety Release(s).
- 3) Evaluation of the safety control(s) of the test item with reference to convenience of location, ease of identification of safe position by sight and touch, ease and quietness of operation, and design to prevent accidental shifting of position.
- 4) Evaluation of any safety hazards observed by test personnel during storage, transportation, operation, and maintenance of the test item, to include:
 - a) Electrical hazards.
 - b) Radiation hazards.
 - c) Sharp edges, corners, or projections.
 - d) Dangerous moving parts.
 - e) Insecure or dangerous footings.
 - f) Necessity for additional footings, handholds, or lifting handles to avoid injury to personnel.
- 5) Operating techniques which appear to present potential safety hazards.
- 6) Recommendations for additions to the drone operating equipment's safety program and/or safety features.

6.2.3 Personnel Training

a. Orient and instruct all test personnel (soldiers) in the mission applications, capabilities, limitations, and maintenance aspects of the drone operating equipment in accordance with the Preliminary Operating and Maintenance Manual (POMM) and the Proposed Program of Instruction (POI). If no proposed POI is provided, develop one in coordination with the agency concerned with training. The proposed POI should include personnel operational training in the nomenclature and characteristics of the equipment under test, as well as techniques of proper employment.

b. After training, require user personnel to perform all functional operations related to drone operating equipment usage as directed by the project officer.

c. Throughout the conduct of all testing as outlined in this MTP, monitor and evaluate all test item crew member training in accordance with the above POI and MTP 10-3-501.

d. In addition to the data required by MTP 10-3-501, record narrative comments concerning the following training factors:

- 1) Observations and analyses relating to the clarity, completeness, and general adequacy of the proposed POI and POMM.

- 2) For each member of the test team:
 - a) MOS.
 - b) Training time in MOS.
 - c) Experience in MOS.
 - d) Training time on test item.
 - e) Team experience in test item crew.
- 3) Extent of additional training required.

6.2.4 Operational Characteristics

- a. Conduct operational tests of drone operating equipment roles under both blackout conditions and during daylight hours.
- b. Ensure that operational tests include exposure to the full range of weather conditions prevailing at the test site. Testing shall not be interrupted by onset of adverse weather conditions unless hazards to test personnel are introduced.
- c. Record ambient conditions at start and finish of each phase of operational testing, and at appropriate intervals during test, to include:
 - 1) Date and time of day.
 - 2) Illumination (daylight, moonlight, starlight, darkness).
 - 3) Weather conditions (clear, overcast, rain, snow, sleet, icing).
 - 4) Atmospheric conditions (elevation in feet, temperature in degrees C, relative humidity in percent, wind velocity in knots).
 - 5) Atmospheric contaminants: (fog, dust, sand, smoke).

6.2.4.1 Emplacement

- a. With the test item in travelling configuration, approach a designated operational site.
- b. Utilizing an average trained, standard TOE crew, emplace the drone operating equipment in accordance with applicable sections of MTP 6-3-505 and other instructions.
- c. Observe and record the activities and times, as applicable, required to:
 - 1) Prepare the site.
 - 2) Dismount or otherwise make ready the test item, starting from the transportation configuration.
 - 3) Level and align the equipment.
 - 4) Interconnect power supplies and other components.
 - 5) Install and connect applicable communication equipment.
 - 6) Warm up, or otherwise prepare the test item for activation.

6.2.4.2 Functional Performance

Using appropriate tactical situation data from actual or simulated

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conditions, operate the test item. Observe and record the following:

a. Guidance and Control Capability - Determine the ability of averaged trained crews to control the drone in flight, including the following:

- 1) Conduct preplanned target or operational passes.
- 2) Initiate successful drone recovery operations.
- 3) Accomplish the functioning of primary airborne systems during flight.

b. Tracking and Plotting Capability - Determine the ability of averaged trained crews to perform tracking and plotting operations, including the following:

- 1) Track the flight of the drone.
- 2) Record plots of mission profiles with annotations of airborne systems functioning.
- 3) Capability for handling simultaneous flights.

6.2.4.3 March Order

a. Observe the activities required to march order the drone operating equipment as covered in MTP 6-3-505.

b. Record times of performance and comments concerning any difficulties or delays encountered.

6.2.4.4 Crew Size

a. As applicable, conduct emplacement, functional performance, and march order operations as specified in 6.2.4.1 through 6.2.4.3, adding or subtracting one crew member for each trial until the minimum and optimum crew sizes required to emplace, operate, and march order the drone operating equipment are established.

b. Record times for each trial, nature of delays introduced by crew size changes, and observations concerning the effects of adverse weather conditions on the determination of crew size.

6.2.5 Transportability

a. Utilizing average trained test soldiers (dressed in full field uniforms and personal equipment), transport the test item from a supply depot to a supply point by means of standard rail transportation, when this mode of transportation is applicable, in accordance with applicable sections of MTP 5-3-512.

b. Observe activities and in addition to data required by MIP 5-3-512 record the following:

- 1) Railway car configuration.
- 2) Ease of loading or unloading.
- 3) Times required for performance.
- 4) Estimated transportation speed.

c. Utilizing appropriate tactical motor vehicles and average trained test soldiers (dressed in full field uniforms and personal equipment), transport the test item from a supply point to an emplacement site under daylight conditions.

d. Observe activities and record the following:

- 1) Highway or tractor vehicle configuration.
- 2) Ease of loading and unloading.
- 3) Times required for performance.
- 4) Times required to traverse the following routes, as applicable, for the distances noted:
 - a) Pavement - 50 miles.
 - b) Secondary roads (including grades and curves) - 100 miles.
 - c) Cross-country terrain - 50 miles.

e. Repeat steps c. and d. above under conditions of darkness (black-out).

6.2.6 Maintenance Evaluation

a. Throughout the conduct of all testing as outlined in this MTP, monitor and maintain a record of performance of all scheduled and unscheduled maintenance in accordance with applicable sections of MTP 6-3-524 and MTP 10-3-504.

b. Compare all replacement parts and components provided with the test item with anticipated and actual requirements, evaluating spare parts requirements under actual operating conditions.

c. Compare the test and calibration equipment supplied with the test item with requirements for testing and calibration during the operation and maintenance of the drone equipment, and evaluate the completeness and adequacy of test and calibration equipment under actual operating conditions.

d. In addition to the data required by MTP 6-3-524 and MTP 10-3-504, record the following:

- 1) Numbers of service personnel assigned, and the degree of success or difficulty experienced in performing organizational maintenance tasks on the test item.
- 2) Observations concerning the maintenance capability of the field support unit.
- 3) Adequacy and correctness of maintenance level assignments in the Maintenance Allocation Chart (MAC), and whether tools and equipment provided and listed are compatible with actual requirements.
- 4) Adequacy of spare parts load lists to support repair requirements with minimum delay.
- 5) Maintenance time histories, including:
 - a) All specific corrective maintenance operations.
 - b) All scheduled maintenance performed.
 - c) Repair or replacement parts used.

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d) Man-hours and skill level required for each operation.

e. Throughout the entire test period, monitor the durability and reliability characteristics of the test item in accordance with applicable sections of MTP 6-3-506. Ensure that the test item has been subjected to at least the exposures noted, as applicable:

1) Vehicle transportation - as specified in 6.2.5d.

f. In addition to the data required by MTP 6-3-506, observe and record at the end of each exposure the damage or failure experience of the test item and its components, to include:

- 1) Inoperable electronic equipment (damaged enclosures, loose or broken connections, foreign material accumulations, damaged components, etc.).
- 2) Damaged or worn mechanical parts, to include component packaging, bent or broken handles and fasteners, defective seals, sluggish or restrained mechanical action, etc.
- 3) Areas of recurrent failure.
- 4) Mean time between failures (MTBF).
- 5) Mean time to repair (MTTR).
- 6) Availability of test item for mission operations.

g. Throughout the entire testing period, review all operation and maintenance manuals furnished with the test item for compliance with applicable Army Regulations. The manuals shall be used for classroom instruction and as references throughout the tests.

h. Record narrative comments and observations concerning the adequacy of manuals with respect to:

- 1) Accuracy.
- 2) Completeness.
- 3) Clarity.
- 4) Ease of use.
- 5) Effectiveness of prescribed methods.

6.2.7 Human Factors

a. Throughout the conduct of all testing as outlined in this MTP, monitor and appraise the item under test and its associated equipment with respect to human factors in accordance with applicable sections of MTP 5-3-507.

b. In addition to the data required by MTP 5-3-507, record narrative comments, obtained from all test personnel through observation, interview, and questionnaire, concerning the following man-machine compatibility factors:

- 1) Dials, meters, index marks, reticles, other indicators.
- 2) Objects requiring manipulation, including knobs, handles, pedals, fasteners, straps, cables, connectors.
- 3) Operations accompanied by fatigue, inconvenience, distress, or requiring undue time for accomplishment.

- 4) Accessibility of enclosed or interior components for adjustment and maintenance, including allowances for personnel wearing special or protective clothing.
- 5) Arrangement of compartments to accommodate operators and maintenance personnel with adequate work space and circulation.
- 6) Adverse influences on crew due to weather and terrain.

6.2.8 Compatibility with Related Equipment

a. Throughout the conduct of all testing as outlined in this MTP, monitor all operations in accordance with applicable sections of MTP 5-3-506, and record narrative comments, obtained from all test personnel through observation, interview, and questionnaire, regarding the suitability, compatibility, and functionability of the accessories and ancillary equipment furnished with the drone operating equipment, including adapter brackets, protective covers, environment controlling equipment, power supplies, etc.

b. Evaluate and record circumstances of constraints imposed on the tactical use of drone aircraft due to the drone operating equipment.

6.3 TEST DATA

6.3.1 Preparation for Test

Data to be recorded prior to testing shall include, but not be limited to:

a. Nomenclature, part number, serial number(s), manufacturer, and function of the item(s) under test.

b. Nomenclature, serial number, accuracy tolerance, calibration requirements, and date last calibrated, of test equipment and instrumentation selected for the tests.

c. Sufficient narrative comments pertaining to training, logistical requirements, statistical considerations, etc., to provide background information for use in the analysis of test results.

6.3.2 Test Conduct

Data to be recorded in addition to that specifically required for each subtest shall include:

a. A block diagram of the test setup employed in each specified test, where applicable. The block diagram shall identify by model and serial number all test equipment and interconnections (cable lengths, connectors, attenuators, etc.) and indicate control and dial settings where necessary.

b. Photographs and motion pictures, preferably using color film, sketches, charts, graphs, or other pictorial or graphic presentations which will support test observations or conclusions.

c. An engineering logbook containing, in chronological order, pertinent remarks and observations which would aid in subsequent analyses of the test data. This information may consist of descriptions of equipment or components, descriptions of functions, notes of deficiencies, theoretical

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bases for predictions or estimations, mathematical calculations, test conditions and test parameters, intermittent or persistent failures, and catastrophic failures encountered during the test.

- d. Test sample size (number of repetitions).
- e. Instrumentation or measurement system mean error and stated accuracy.

6.3.2.1 Preoperational Inspection and Physical Characteristics

The following shall be recorded:

- a. Completeness of inventory and damages to the test item(s) incurred during transit and/or handling.
- b. Weights and measurements taken.
- c. Discrepancies in physical or technical characteristics.

6.3.2.2 Safety

The following shall be recorded:

- a. Non-operable safety features.
- b. Inadequate warning statements.
- c. Data as collected under applicable sections of MTP 5-3-510.
- d. Confirmation of safety release under conditions as specified in the release and in USATECOM Regulation 385-6.
- e. Any undue restrictions or limitations imposed on the tactical use of the drone operating equipment under test by Safety Statements and/or Safety Release(s).
- f. Evaluation of the safety control(s) of the test item with reference to convenience of location, ease of identification of safe position by sight and touch, ease and quietness of operation, and design to prevent accidental shifting of position.
- g. Evaluations of any safety hazards observed by test personnel during storage, transportation, operation, and maintenance of the test item.
- h. Operating techniques which appear to present potential safety hazards.
- i. Recommendations for additions to the drone operating equipment's safety program and/or safety features.

6.3.2.3 Personnel Training

The following shall be recorded:

- a. Data as collected under applicable sections of MTP 10-3-501.
- b. Observations and analyses relative to the clarity, completeness and general adequacy of the proposed POI and POMM.
- c. For each member of the test team:
 - 1) MOS.
 - 2) Training time in MOS, weeks.

- 3) Experience in MOS, months.
- 4) Training time on test item, weeks.
- 5) Team experience in test item crew, weeks.

d. Extent of additional training required.

6.3.2.4 Operational Characteristics

The following shall be recorded for each test condition, as applicable:

- a. Data as collected under applicable sections of MTP 6-3-505.
- b. Times of performance required to:

- 1) Prepare the site.
- 2) Dismount, or otherwise make ready the test item.
- 3) Level and align the test item.
- 4) Interconnect power supplies and other components.
- 5) Install and connect applicable communication equipment.
- 6) Warm up or otherwise prepare the test item for activation.
- 7) March order the test item.

c. Observations, measurements, and records covering:

- 1) Time in minutes required to conduct preplanned target or surveillance passes.
- 2) Time in minutes required for crew to obtain control of the drone in flight.
- 3) Time in minutes required to successfully perform recovery operations.
- 4) Success in initiating timely functioning of airborne equipment.
- 5) Narrative description of difficulties or errors in tracking of drones in flight.
- 6) Narrative description and graphs of target mission profiles with annotations of functioning of airborne systems.

d. Ambient conditions at start and finish of test, and at appropriate intervals during test.

6.3.2.5 Transportability

The following shall be recorded:

- a. Data as collected under applicable sections of MTP 5-3-512.
- b. In addition, the following, as applicable:

- 1) Railway car configuration.
- 2) Ease of loading and unloading railway car.
- 3) Times required for loading and unloading.
- 4) Estimated transportation speed.

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- 5) Highway vehicle configuration.
- 6) Ease of loading and unloading highway vehicle.
- 7) Times required for loading and unloading.
- 8) Times required to traverse the following routes, as applicable, for the distances noted:
 - a) Pavement - 50 miles.
 - b) Secondary roads (including curves and grades) - 100 miles.
 - c) Cross-country terrain - 50 miles.

6.3.2.6 Maintenance Evaluation

The following shall be recorded:

- a. Data as collected under applicable sections of MTP 6-3-524 and MTP 10-3-504.
- b. Numbers of service personnel assigned, and the degree of success or difficulty experienced in performing organizational maintenance tasks on the test item.
- c. Observations concerning the maintenance capability of the field support unit.
- d. Adequacy and correctness of maintenance level assignments in the MAC, and whether tools and equipment provided and listed are compatible with actual requirements.
- e. Adequacy of spare parts load lists to support repair requirements with minimum delay.
- f. Maintenance time histories.
- g. Data as collected under applicable sections of MTP 6-3-506, and the damage or failure experience of the test item and its components.
- h. Narrative comments and observations concerning the adequacy of the technical literature furnished with the test item.

6.3.2.7 Human Factors

The following shall be recorded:

- a. Data as collected under applicable sections of MTP 5-3-507.
- b. Narrative comments and observations regarding man-machine compatibility factors.

6.3.2.8 Compatibility with Related Equipment

The following shall be recorded:

- a. Data as collected under applicable sections of MTP 5-3-506.
- b. Narrative comments and observations concerning the suitability, compatibility, and functionality of the test item and associated equipment.
- c. Narrative comments and observations concerning constraints and limitations on the use or operations of drone aircraft or the test item, arising from their use together.

6.4 DATA REDUCTION AND PRESENTATION

Data, including observations and comments of operators, obtained under each Test Conduct section (paragraph 6.2) of this procedure, shall be summarized, compared, and evaluated according to procedures described in the individual referenced MTPs, or equivalent current practice where not covered by MTPs. Appropriate charts, graphs, and tables shall be used to display summaries and comparisons of test data. Coordinates and other features of charts, graphs, and tables should be selected for clarity and uniformity with like presentations in other reports. Special consideration in data presentation shall be given to any condition or circumstance which may have significantly influenced test results. In the analysis for such conditions or circumstances, the influence of test personnel themselves will be considered.

Summaries should be included of deficiencies, shortcomings, suggested improvements, and failures as reported on STE Form 1025 in accordance with USATECOM Regulation 705-4.

Calculations shall be performed as specified by the individual referenced MTPs, or in accordance with equivalent current practice where not covered by MTPs. All photographs, motion pictures, audio tapes, and other records must be explicitly identified and referenced; significant frames, transcriptions, and samples will be selected for illustration purposes. All illustrations shall be completely identified.

All qualitative data accumulated shall be evaluated against requirements set forth in the applicable QMR or SDR and TC to determine the degree of fulfillment demonstrated, compared with performance requirements.

Data collected under adverse weather conditions should be separately compared with data collected during normal weather conditions.

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11. SUPPLEMENTARY NOTES -----	12. SPONSORING MILITARY ACTIVITY Headquarters US Army Test and Evaluation Command Aberdeen Proving Ground, Maryland 21005	
13. ABSTRACT This Army Service Test Procedure describes test methods and techniques for evaluating the performance and characteristics of Drone Control Equipment (Guidance, Control, Tracking and Plotting Components), and for determining their suitability for service use by the U. S. Army. The evaluation is related to criteria expressed in applicable Qualitative Materiel Requirements (QMR), Small Development Requirements (SDR), Technical Characteristics (TC), or other appropriate design requirements and specifications.		

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