UNMANNED AIRCRAFT SYSTEM

UASAR

Use and Preparation Guide

Unmanned Aircraft System Accident Report

U.S.ARMY

READINESS THROUGH SAFETY

April 2015

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Unmanned Aircraft System Accident Report (UASAR) DA Form 2397-U

UASAR Use and Preparation

DA Form 2397–U (UASAR) is required for all UAS aviation accidents (flight, flight-related, and aircraft ground) including Aerostats, regardless of the class. The UASAR provides a report form that is specific to the characteristics and operational parameters of UAS. **Investigation and submission of the UASAR will be IAW AR 385-10 and DA Pam 385-40.** The UASAR is required for accidents involving an Unmanned Aircraft System with an engine in operation that results in injury or property damage. Aerostats are considered operational when the aerostat system platform or launch pad is manned and power is applied to winches and other safety release devices as part of the launching process. **If an engine is not in operation or the Aerostat is not operational at the time of the accident then the injury or property damage will be reported on the appropriate ground accident report (DA Form 285 or 285-AB).** If a manned aircraft is involved in the same accident as an unmanned aircraft the accident will be investigated and reported as a manned aircraft accident using the DA Form 2397 Technical Report or DA Form 2397-AB Abbreviated Aviation Accident Report (AAAR); the DA Form 2397-U will be added to the manned aircraft report as the other aircraft involved. The manned aircraft will always be the case aircraft.

DA Pam 385-10, Unmanned Aircraft (UA) Definition:
An Army aircraft, to include Aerostat balloons, operated without the possibility of direct human intervention from within or on the aircraft. It is operated by personnel on the ground or in a manned aircraft. It is the major component of an unmanned aircraft system (UAS). A UA carries a variety of payloads to include day/night cameras, weapons, and so forth.

Accident/Incident Classification Criteria

Class A accident. An Army accident in which—
(1) The resulting total cost of property damage is $2 million or more;
(2) An Army aircraft is destroyed, missing, or abandoned; or
(3) An injury and/or occupational illness results in a fatality or permanent total disability.
Note: Unmanned Aircraft Systems (UAS) accident classification is based on the cost to replace or repair the system. A totally destroyed UAS will not constitute a Class A accident unless the total cost to replace the system is $2,000,000.00 or more.

Class B accident. An Army accident in which—
(1) The resulting total cost of property damage is $500,000 or more but less than $2 million;
(2) An injury and/or occupational illness results in permanent partial disability; or
(3) When three or more personnel are hospitalized as inpatients as the result of a single occurrence.

Class C accident. An Army accident in which—
(1) The resulting total cost of property damage is $50,000 or more but less than $500,000;
(2) A nonfatal injury or occupational illness that causes 1 or more days away from work or training beyond the day or shift on which it occurred; or
(3) Disability at any time (that does not meet the definition of Class A or Class B and is a day(s)-away-from-work case).

Class D accident. An Army accident in which—
(1) The resulting total cost of property damage is $20,000 or more but less than $50,000;
(2) A nonfatal injury or illness results in restricted work, transfer to another job, medical treatment greater than first aid, needle stick injuries, and cuts from sharps that are contaminated from another person's blood or other potentially infectious material, medical removal under medical surveillance requirements of an OSHA standard, occupational hearing loss; or
(3) A work-related tuberculosis case.

Class E ground accident. An Army ground accident in which the resulting total cost of property damage is $5,000 or more but less than $20,000.

Class E aviation accident. An Army aviation accident in which the resulting total cost of property damage is $5,000 or more but less than $20,000.

Class F aviation incident. Recordable incidents are confined to aircraft turbine engine damage because of unavoidable internal or external foreign object damage, where that is the only damage (does not include installed aircraft auxiliary power units). These incidents will be reported using DA Form 2397–AB (Abbreviated Aviation Accident Report); check "F" in the "Accident Classification" block.
internal or external foreign object damage, where that is the only damage (does not include installed aircraft auxiliary power units). These incidents will be reported using DA Form 2397–U; check "F" in the "Accident Classification" block.

Types of aircraft accidents

Flight accidents. Those accidents in which intent for flight exists (as defined below), and there is reportable damage to the aircraft itself. (Explosives, chemical agent, or missile events that cause damage to an Army aircraft with intent for flight are categorized as flight accidents to avoid dual reporting.)

Flight-related accidents. Those aircraft accidents in which there is intent for flight and no reportable damage to the aircraft itself, but the accident involves a fatality, injury to aircrew, ground crew, passengers, or other injury or property damage. These accidents are not to be used in the calculation of flight accident rates. For example, unintentional cutting of a hoist cable; failure or malfunction of a hoist system to include related equipment; unintentional jettisoning of cargo hook load or external stores.

Aircraft ground accidents. Injury or property damage accidents involving Army aircraft in which no intent for flight exists and the engine(s) is in operation (an installed aircraft auxiliary power unit (APU) is not considered an aircraft engine). In the case of an Aerostat balloon accident there must no intent for flight and the system must be operational. See the definition of operational Aerostat balloon below.

UAS Intent for Flight Definition:
Intent for flight begins when power is applied and brakes released (if so equipped), or UA is hand released by the operator, or the launcher is released, for the purpose of moving an aircraft under its own power to commence authorized flight (including ground taxi/hover) by an authorized crew. Intent for flight ends when the aircraft is at a full stop and power is completely reduced and/or engine(s) stopped.

Note: Intent for flight begins for Aerostat balloons when all of the mooring lines are removed for the purpose of deployment and ends when all of the mooring lines are attached.

Operational Aerostat balloon Definition:
Aerostats are considered operational when the Aerostat system platform (or launch pad) is manned and power is applied to winches and other safety release devices as part of the launching process.

Accidents Involving a Manned and Unmanned Aircraft in the Same Accident:
If a manned aircraft is involved in the same accident as an unmanned aircraft the accident will be investigated and reported as a manned aircraft accident using the DA Form 2397 Technical Report or DA Form 2397-AB Abbreviated Aviation Accident Report (AAAR); the DA Form 2397-U will be added to the manned aircraft report as the other aircraft involved. The manned aircraft will always be the case aircraft.

Aviation Accident/Incident
Notification & Reporting Requirements & Suspenses

Table 3-1a
Aviation Accident/Incident notification, reporting requirements and suspenses

	PEACETIME				COMBAT [2, 3]	
ACCIDENT /INCIDENT CLASS	TELEPHONIC NOTIFICATION WORKSHEET	Abbreviated Report AAAR	Unmanned Acft System Accident Report UASAR	Full Report DA FORM 2397	TELEPHONIC NOTIFICATION WORKSHEET	AAAR ONLY By any Means Possible (on line tool, email, fax, hand carry, mail)
A & B	Manned/ Unmanned Immediately [1]	Manned Acft Ground Accidents 90 Days	IAI/CAI-90 Days	Manned Acft Flt/Flt Related IAI/CAI-90 Days	Immediately [1]	As time Permits (Not to Exceed 60 days)
C	Manned/ Unmanned Immediately [1]	Manned Acft W/in 90 days	W/in 90 days	Not Required	Immediately [1]	As Time Permits (Not to Exceed 60 days)
D, E, F	N/A (Unless SOF Issue)	W/in 30 days	W/in 30 days	Not Required	N/A (Unless SOF Issue)	As Time Permits (Not to Exceed 30 days)

NOTE: 1. USACR/SC must be notified IMMEDIATELY by phone at DSN 558-2660/3410 or COM (334) 255-2660/3410 (Required information on DA Form 7305).
2. When the senior tactical commander determined that the situation, conditions or time does not permit normal peacetime investigation and reporting.
3. Combat reporting requirements for UAS are the same as peacetime.
- All suspense days are calendar days.

Aviation Accident / Incident Reporting Requirements				**DA Form 2397-U**														
Accident/ Incident Class	Tele-phonic	AAAR	UASAR	2397	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14
UAS A, B C[2]	X		X	*		*	*	*	*	*			*		*	*	*	*
UAS D, E , F			X										*					

Legend:
* - As required by circumstances.
X- Mandatory.
- Immediately, if operational situation permits.
1 - For combat operations where normal investigation and reporting procedures are deemed not practical by the senior tactical commander.
2 - Combat reporting requirements for UAS are the same as peacetime.

UAS Accident Investigation Board Member Requirements

(AR 385-10 Chapters 3-13, 3-14 and 3-15)

UAS Class A and B Accidents

All UAS Class A and B accidents will be investigated in accordance with DA Pam 385–40 by a board consisting of a **minimum of 3 members**. Members will not be from the same unit that incurred the accident (that is, the same detachment, company or battalion).

The president of the board will be a field grade officer (W4/W5 is considered field grade) or an Army civilian, familiar with the type of operation, in the grade of GS–12 or higher.

One member will be appointed to act as recorder.

One member will be an Army aviator.

One member will be a qualified maintenance officer or technician if materiel is involved.

One member will be an E5 or above and will be UAS MOS qualified.

One member may be a qualified weather officer if/when weather is a suspected factor.

When an accident involves any of the following, a medical officer or flight surgeon (if a flight surgeon is not available, an Army medical officer may be appointed) is required to be a board member:

-Personal injuries.

-Issues (including injuries) associated with personnel protective equipment, egress from the aircraft, medical evacuation, rescue, or survival.

UAS Class C Accidents

Class C UAS accidents will be investigated by at least a board of one. When more than one individual is on the board, the president will be an Army officer, senior warrant officers (CW3 and above), an Army civilian in the grade of GS–11 or higher that directly manages an aviation safety program, or a full–time ARNG or USAR technician. In addition, a flight surgeon (if not available, an Army medical officer may be appointed) is required to be a board member for the reasons as stated in Class A and B accidents above.

Note: For one member boards, the board president must be senior in grade to the aircraft crewmembers.

Note: Class C UAS accidents do not require a rated Army aviator board member.

Note: The board member for Class C accidents may come from the unit incurring the accident if the board appointment authority approves.

The Following Personnel May Serve on Accident Investigation Boards

Army officers or warrant officers.

Department of the Army safety and occupational health specialist/manager/engineer, GS–018/803–9 or higher (for aircraft accidents, one who directly manages an aviation safety program).

Full–time technicians who hold current federally recognized officer or warrant officer status.

Department of Defense (DoD) medical officers or DoD contracted medical officers (flight surgeons are preferred for aircraft accidents).

Qualified DoD maintenance personnel.

Senior NCOs when they are considered subject matter experts for the equipment or operation involved.

E–5 and above who is UAS MOS Qualified (for UAS accident investigations only).

DoD weather officers.

Any other personnel approved by Commander, USACRC.

Class D, E, and F UAS Accident

While the following accidents do not require formal board appointment orders, they will be investigated by 1 or more officers, warrant officers, safety officers/noncommissioned officers (NCOs), supervisors, or DA safety and occupational health specialist/manager/engineer, in the grade of GS–018/803–9 or higher.
Flight accidents. Those accidents in which intent for flight exists (as defined in the glossary), and there is reportable damage to the aircraft itself. (Explosives, chemical agent, or missile events that cause damage to an Army aircraft with intent for flight are categorized as flight accidents to avoid dual reporting.)

Submission of Reports

Submit UASAR in legible hand-printed or typed copy via mail, FAX, courier, electronic mail, on line tool or other timely means. Working copies on plain paper are acceptable, but each data element must reference the respective block of the UASAR.

- **Mailing address:**
  Commander U.S. Army Combat Readiness Center
  ATTN: CSSC-O, Quality Control Support Branch
  Bldg 4905, 5th Ave
  Fort Rucker, AL 36362-5363

- **Electronic Mail: usarmy.rucker.hqda-secarmy.mbx.safe-accident-information@mail.mil**

- **FAX:**
  DSN 558-2266
  COM 334-255-2266

For questions pertaining to the completion or submitting the UASAR, contact Mr. Ron Underhill at (334) 255-3493 or DSN 558-3493, email ronald.l.underhill.civ@mail.mil or ron.underhill@us.army.mil

VISIT OUR HOME PAGE:
https://safety.army.mil

ELECTRONICALLY SUBMIT THE UASAR TO
usarmy.rucker.hqda-secarmy.mbx.safe-accident-information@mail.mil

REACH THE USACRC HELP DESK AT
usarmy.rucker.hqda-secarmy.mbx.safe-helpdesk@mail.mil

For Class A, B, and C accidents, **attach to the UASAR all substantiating documentation and supplemental forms required, or deemed appropriate**; e.g., witness summaries/interviews, expanded narrative, lab/CCAD/AAI reports, Product Quality Deficiency Report (PQDR), other DA Form 2397 series as needed.

An electronic copy of the DA FORM 2397-U in Pure Edge may be obtained by clicking on https://safety.army.mil/home/, then click on ACCIDENT REPORTING & INVESTIGATION, then FORMS, then AVIATION ACCIDENT INVESTIGATION & REPORTING FORMS & INSTRUCTIONS.

Supplemental Report Requirements

Follow-up data (e.g. Classification change, E/ACOD, CCAD/AAI, PQDR, AFMES, ASOAP or other analytical results) are to be submitted as required. Complete only UASAR block 1 (case number) and those blocks to which the supplemental data applies and the substantiating documentation. An ECOD will be submitted with all reports when an accident classification has been downgraded.

Instructions for Completion

Complete the entire form for all UAS accidents, regardless of accident class. The UASAR will be completed as follows:

Block 1, Accident Case Information.
Complete this block as follows:

- ***Block 1a, Date of Accident.*** Enter the year, month, and day of the accident in YYYYMMDD format.
- ***Block 1b, Time (Local).*** Enter the local time of the accident using the 24 hr clock.
- ***Block 1c, UA Tail Number.*** Enter the Unmanned Aircraft's (UA) tail number Exception: some UAS (for example, the Raven, RQ-11 SUAS) does not have a tail number. In that case enter the UA serial number. Accident case tail numbers normally contain seven digits; in those cases where the UA serial number is less than seven digits, insert zeros after the model year until seven digits are reflected. If there is not a model year insert XX in the model year (XX-00123).

Block 2, Accident Class/Category.
Complete this block as follows:

- ***Block 2a, Classification.*** Check the box corresponding to the appropriate accident classification per paragraph 3-4, AR 385–10.
- ***Block 2b, Category.*** Check the box corresponding to the appropriate accident category as defined in paragraph 1–9a(1)-(3) DA Pam 385-40.

Block 3, UAS MTDS. Enter the mission, type, design, and series (MTDS) of the UAS involved in the accident (example: RQ-7B, MQ-1C).

Block 4, Period of Day. Check the appropriate box. (Note: Dawn is between the beginning of morning nautical twilight (BMNT) and official sunrise; Day is between official sunrise and official sunset; dusk is between official sunset and the end of evening nautical twilight (EENT); and night is between EENT and BMNT).

Block 5, Aircraft Involved. Complete this block as follows:

- ***Block 5a, Number of UA Involved.*** Enter the number of UA involved in the accident. (Note: If more than one UA is involved, submit additional DA Forms 2397-U for each UA. When completing additional forms, do not duplicate data already provided on the case aircraft form. **Note:** If a manned aircraft is involved in the same accident as an unmanned aircraft the accident will be investigated and reported as a manned aircraft accident using the DA Form 2397 Technical Report or DA Form 2397-AB Abbreviated Aviation Accident Report (AAAR); the DA Form 2397-U will be added to the manned aircraft report as the other aircraft involved. The manned aircraft will always be the case aircraft.
- ***Block 5b, In Flight/Mid-Air Collision.*** Check the appropriate box to indicate whether or not this accident involved an in flight/mid-air collision.

Block 6, Nearest Military Installation. Enter the name of the military installation/facility nearest to the accident site.

Block 7, Accident Location. Complete this block as follows:

- ***Block 7a, On/Off Post.*** Check the appropriate box to indicate whether the accident occurred on or off post.
- ***Block 7b, On/Off Airfield.*** Check the appropriate box to indicate whether the accident occurred on or off an airfield. **Note:** Tactical landing zones under positive ATC for example: Corps' instrumented airfield, Division's VFR helipad, stage fields and support bases) are considered "on post" and "on airfield" for reporting purposes. Also, UA accidents occurring on joint-use civil

airports and on civilian airports with USAR component facilities are considered "on post" and "on airfield" when there is intent to use the military facilities on that airport.

- ***Block 7c, City.*** Enter the name of the city nearest to the accident site.
- ***Block 7d, State.*** Enter the state in which the accident occurred.
- ***Block 7e, Country.*** Enter the country in which the accident occurred.
- ***Block 7f, Grid and/or Lat/Long.*** Enter the Military Grid Reference and/or latitude/longitude for the accident site.
-

Block 8, Organization Involved. Complete this block as follows:

- ***Block 8a, Unit Designation.*** Enter the designation of the organization the UA is assigned.
- ***Block 8b, Unit Identification Code.*** Enter the unit's six-digit Unit Identification Code (UIC).
- ***Block 8c, Home Station.*** Enter the unit's home station.
- ***Block 8d, Army Headquarters.*** Enter the organization's Army Headquarters (the ACOM, ASCC, or DRU). *(Note* For Army Reserve or Army National Guard units on active duty status, if the unit of assignment is other than the Reserve or National Guard, enter the active duty unit information.

Block 9, Accountable Organization. Complete this block as follows. **Note:** If this organization is the same as block 8, leave blank.

- ***Block 9a, Unit Designation.*** Enter the unit designation of the organization most responsible/accountable for the accident.
- ***Block 9b, Unit Identification Code.*** Enter the organization's six-digit Unit Identification Code (UIC).
- ***Block 9c, Home Station.*** Enter the organization's home station.
- ***Block 9d, Army Headquarters.*** Enter the organization's Army Headquarters (the ACOM, ASCC, or DRU).

Block 10, Accident Cost Data. Do not include those items excluded from accident cost in para 1-10, DA Pam 385-40. Enter in blocks 10b-i, only the cost associated with the UAS/UA to which this form pertains. Complete this block as follows:

- ***Block 10a, UA Total Loss.*** Check the appropriate box to indicate whether the UA is a total loss. If "Yes", enter the replacement cost in block 10b and leave blocks 10c & d (man-hours) blank.
- ***Block 10b, UA Damage or Replacement Cost (excluding man-hours).*** If "Yes" is checked in block 10a, enter the current replacement cost (in whole dollars) for the UA. If "No" is checked in block 10a, enter the current cost (in whole dollars) to repair the UA to which this form pertains including component/part damage, but excluding man-hour cost. Cost to replace or repair the UA will be calculated at the current cost at the time of the accident. **Note:** Some UAS are contractually bound to receive ECOD/ACOD from the manufacturer who may not be required to break out man-hours cost. In that case, enter the cost to repair as provided by the manufacturer.
- ***Block 10c, Number of Man-Hours.*** If block 10a is "No", enter the number of man-hours required to repair the damaged UA. **Note:** Some UAS are contractually bound to receive ECOD/ACOD from the manufacturer who may not be required to break out the number of man-hours or man-hours cost. In that case, make no entry.).
- ***Block 10d, Man-Hours Cost.*** If block 10a is "No", enter man-hour cost (in whole dollars) pertaining to this aircraft's damage only, based on current cost criteria specified in this DA pamphlet. Other man-hour costs will be included in block 10e (Other Damage Military). **Note:** Some UAS are contractually

bound to receive ECOD/ACOD from the manufacturer who may not be required to break out the number of man-hours or man-hours cost. In that case, make no entry.).

- ***Block 10e, Other UAS Sub-Systems Cost.*** Enter the estimated/actual cost (in whole dollars) to repair or replace other UAS sub-systems (such as GCS, GDT, TALS, Arresting Gear, etc) as a result of the accident.
- ***Block 10f, Other Damage Cost-Military.*** Enter all costs (in whole dollars) to other military property resulting from the accident.
- ***Block 10g, Other Damage Cost-Civilian.*** Enter the damage costs (in whole dollars) to civilian property.
- ***Block 10h, Injury/Occupational Illness Cost.*** Enter the injury/occupational illness cost (in whole dollars) for all personnel.
- The total cost can be computed by sum totaling the dollar amount found in block 19 of each DA Form 2397–9 completed or by using the cost standards table in DA Pam 385-40, table 1–1. **Note:** A DA form 2397-9 is required to be submitted for each individual receiving an injury/occupational illness as a result of the accident. Instructions for completing DA form 2397-9 are in DA Pam 385-40, paragraph 3-31.
- ***Block 10i, Total cost (this UAS).*** Enter the total of the dollars in blocks 10b through 10h.
- ***Block 10j, Total Cost (All UAS).*** Leave blank unless block 5 indicates multiple UA are involved. Enter the total cost (in whole dollars) for all UA when multiple UA are involved.

Block 11, General Data. Complete this block as follows:

- ***Block 11a, Mission.*** Complete this block as follows:
- ***Block 11a(1), Type Mission.*** Enter the symbol for the mission as shown on the DA Form 2408-12 from AR 95-23 (para 2-5b) or page 17 this document.
- ***Block 11a(2), Aircraft Mode.*** Check the appropriate box to indicate if the mission was single-ship, multi-ship (more than one UA on same mission), or Manned/Unmanned Teaming. If Manned/Unmanned Teaming is checked, complete block 11a(3).
- ***Block 11a(3), Level of Interoperability (LOI).*** Check the appropriate box to indicate the LOI at the time of the accident. LOI refers to degree of manned aircraft control of the UAS during manned/unmanned teaming. There are 5 levels: 1=Reception of the secondary product, 2=Direct data receipt, 3=Payload control, direct data receipt, 4=Flight control, payload control, direct data receipt, and weapons system operations, 5=Full function and control (only authorized when performing emergency procedures). Refer to AR 95-23 (appendix C).
- ***Block 11a(4), Simultaneous UA Operation.*** Check the appropriate box to indicate whether or not multiple unmanned aircraft were being operated simultaneously from the same ground control station (GCS). If “YES”, specify the number, and MTDS, in the space provided.
- ***Block 11b, Flight Plan.*** Check the appropriate box to indicate the type flight plan (Military, Civil, or Operations Log) on file at the time of the accident. (Note: Units may be using a locally developed Operations Log or DA Form1594)
- ***Block 11c, Flight Rules.*** Check the appropriate box to indicate the flight rules (VFR or IFR) the UA was flying under at the time of the accident.
- ***Block 11d Mission Training.*** Complete this block as follows:
- ***Block 11d(1),*** *At what level was the mission/training conducted?* Check the appropriate box to indicate the level

at which the mission/training was conducted.

- ***Block 11d(2),*** *Who approved the mission/training?* Enter the Rank and Position of the individual that approved the mission/training.
- ***Block 11d(3),*** *Was a mission brief completed?* Check the appropriate box to indicate whether or not a mission brief was completed.
- ***Block 11d(4),*** *Who was in charge during the mission/training?* Enter the Rank and Position of the individual that was in charge during the mission/training.
- ***Block 11d(5),*** *Who was the senior leader present during the mission/training?* Enter the Rank and Position of the senior leader present during the mission/training.
- *Block 11e, Risk Management (RM).* Complete this block as follows:
- *Block 11e(1), RM Performed?* Check the appropriate box to indicate whether or not a risk management was performed. If "YES", complete blocks 11e(2) – 11e(7).
- *Block 11e(2), Who performed the RM?* Enter the Rank and Position of the individual that performed the risk management.
- ***Block 11e(3),*** *RM Approved?* Check the appropriate box to indicate whether or not the risk management was approved.
- ***Block 11e(4),*** *Who accepted the risk(s)?* Enter the Rank and Position of the individual that accepted the risk(s).
- ***Block 11e(5),*** *What was the level of risk after controls applied?* Check the appropriate block to indicate the level of risk after the controls were applied.
- ***Block 11e(6),*** *How was the RM process communicated?* Check the appropriate box (check all that apply) to indicate how the risk management process was communicated.
- ***Block 11e(7),*** *Accident event identified/considered during RM process?* Check the appropriate box to indicate whether or not the accident event was identified/considered during the risk management process. If "YES", complete blocks 11e(7)(a) – 11e(7)(d).
- ***Block 11e(7)(a),*** *What was the level of the identified risk?* Check the appropriate box to indicate the level of the identified risk.
- ***Block 11e(7)(b),*** *Was the control measure(s) applied?* Check the appropriate box to indicate whether or not the control measure(s) was applied.
- ***Block 11e(7)(c),*** *Who was responsible for implementing the control(s)?* Enter the Rank and Position of the individual responsible for implementing the control(s).
- ***Block 11e(7)(d),*** *Was the potential for the accident event accepted as residual risk?* Check the appropriate box to indicate whether or not the potential for the accident event was accepted as residual risk.
- ***Block 11f, Digital Source Collector (DSC).*** Complete this block as follows:
- ***Block 11f(1), Digital Source Collector (DSC) installed.*** Check the appropriate box to indicate whether or not a Digital Source Collector was installed. If "YES", specify the type of DSC in the space provided.
- ***Block 11(2), Was the data captured and preserved.*** Check the appropriate box to indicate whether or not the DSC data was collected and preserved. If "YES", specify the storage location of the DSC data in the space provided.
- ***Block 11g, Fire.*** Check the appropriate box to indicate if and when there was a fire during the accident sequence. If "Other", specify in the space provided.
- ***Block 11h, Hazardous Material Spillage.*** Check the appropriate box to indicate whether or not a hazardous material spillage occurred. If "Yes" and this was a Class A, B, or C accident, complete a DA Form 2397-6 (form completion instructions are in DA Pam 385-40) and attach it to the report and note the attachment in block 21. For

Class D, E, and F accidents explain the type and source of spillage in block 12, Summary.

- ***Block 11i, Did the accident occur while on an exercise:*** Check the appropriate box to indicate whether or not the subject UAS was participating in an exercise (FTX, NTC, JRTC, named event such as Desert Eagle, etc). If "Yes," enter the name of the exercise in the space provided.

Block 12, Summary. Enter a concise summary of events from the initial onset of the emergency until the aircraft is at rest, to include injuries/occupation illness resulting from the accident. Specify the actual errors/failures/effects and the root causes. The specified errors/failures/effects and root causes should be supported in the narrative of the summary. The summary should substantiate the findings entered in block 20. Enter the SF 368 PQDR number, category, and status when materiel deficiencies are involved. Use a continuation sheet(s) on plain bond paper as necessary .
Note: Include the following information in this block for all aerostat accidents.

- Nominal operating altitude of aerostat or amount of tether out.
- Specific altitude at time of incident (if known).
- Time since last tether maintenance.
- Tether tension history for last 30 minutes prior to anomaly.
- Time since last helium top-off.
- Aerostat fan and pressure data (include any available info).
- Age of envelope.
- Type of Flight Termination System used (applicable only if it didn't work).
- Describe location topography (altitude, distance from mountains, and other relevant info).

Block 13, Flight Data. Enter the flight parameters at the times indicated in the table. Flight parameters pertain to both flight and ground operations of the UA.

- ***Block 13a, At Emergency/Onset.*** Enter the listed flight parameters at the onset of the emergency. Note: The use of the term "emergency" in this guide refers to "any occurrence/situation wherein the personnel involved sense a need to take appropriate measures to reduce the effects of the occurrence/situation or prevent injury/occupational illness, property damage, or further materiel failure."
- ***Block 13a(1), Flight Duration.*** Enter the duration of the flight in hours and tenths of hours in the spaces provided.
- ***Block 13a(2), Phase of Operation:*** Enter a maximum of 3 codes from page 16 of this guide in the spaces provided or specify the phase of operation if there is no code for it in the table.
- ***Block 13a(3), Altitude MSL.*** Enter the UA's altitude (Mean Sea Level) in the space provided.
- ***Block 13a(4), Altitude AGL.*** Enter the UA's altitude (Above Ground Level) in the space provided.
- ***Block 13a(5), Airspeed KIAS.*** Enter the UA's speed (Knots Indicated Air Speed) in the space provided.
- ***Block 13a(6), UA Weight.*** Enter the UA's weight (pounds) in the space provided.
- ***Block 13a(7), UA Overgross Weight for Conditions.*** Check the appropriate box to indicate whether or not the UA was over gross weight limitations. If "YES", explain in block 12.
- ***Block 13b, At Impact/Accident or Termination.*** Enter the listed flight parameters at the time of the first major impact/accident or termination. Exception: in those cases where an in-flight strike occurred, resulting in a second impact, record the second impact in this block. This block may duplicate block 13a (At Emergency).

- ***Block 13b(1), Flight Duration.*** Enter the duration of the flight in hours and tenths of hours in the spaces provided.
- ***Block 13b(2), Phase of Operation:*** Enter a maximum of 3 codes from page 16 of this guide in the spaces provided or specify the phase of operation if there is no code for it in the table.
- ***Block 13b(3), Altitude MSL.*** Enter the UA's altitude (Mean Sea Level) in the space provided.
- ***Block 13b(4), Altitude AGL.*** Enter the UA's altitude (Above Ground Level) in the space provided.
- ***Block 13b(5), Airspeed KIAS.*** Enter the UA's speed (Knots Indicated Air Speed) in the space provided.
- ***Block 13b(6), UA Weight.*** Enter the UA's weight (pounds) in the space provided.
- ***Block 13b(7), UA Overgross Weight for Conditions.*** Check the appropriate box to indicate whether or not the UA was over gross weight limitations. If "YES", explain in block 12.
- ***Block 13c, Flight Control Malfunction.*** Check all boxes that apply. Flight Control System related accidents could be the result of Human, Materiel, and/or Environmental factors. In addition to this block, complete blocks 15a-c as applicable.

Block 14, Type Events. Using page 19 of this pamphlet enter up to a maximum of three event codes that best categorize the accident/incident. Enter the event code that best describes the accident/incident in the first space. If there is no code for the event in the table, specify the Type of Event(s) in the space(s) provided. If possible, the 3 codes should be entered in the sequence of occurrence.

Block 15, Accident Cause Factors. Indicate if Human Error, Materiel Failure, or Environment cause factors played a role in the accident/incident by entering "D" if definite, "S" if suspected, "U" if undetermined, or "N" if No/None in the appropriate block.

- ***Block 15a, Human Error:*** Indicate if Human Error was causal in the accident/incident by selecting D, S, U, or N. If block 15a is marked as D or S, complete blocks 15a(1)(a)-(e).
- ***Block 15a(1), System Inadequacies (SI).*** Using page 27 of this pamphlet and Table B-5 of DA Pam 385-40, determine the System Inadequacy(s) responsible for the Human Factor(s). An accident may have multiple human errors and, therefore, multiple system inadequacies. Include all identified system inadequacies. The form allows for the entry of up to three codes for each system inadequacy.
- **Note:** If more than 3 are identified, use a continuation sheet.
- ***Block 15b, Materiel Failure/Malfunction:*** Check the appropriate box (D, S, U, or N) to indicate if Materiel Factors played a role in the accident. If D or S is checked, complete blocks 15b(1) and 15b(2)(a)-(g).
- ***Block 15b(1), Type:*** Check the appropriate box(s) to indicate the type of materiel failure and/or malfunction. Check all that apply.
- ***Block 15b(2), Component and Part Data.*** Complete blocks 15b(2)(a)-(g) for the component and/or part that failed or malfunctioned. Enter the requested data for materiel failure and/or malfunction resulting from Fair Wear and Tear (FWT), maintenance error, manufacturing defect or error, and/or design deficiency. Component column data is required "only" for those items involving power and drive trains; for example, engine, transmission, gearboxes, and so forth. For maintenance error, over which the Army has control, block 19 must also be completed. This is a three column chart. Column 1 is for the UAS sub-system (UA, GCS, GDT, TALS, FTS, ATLS, etc), column 2 is for the component, and column three is for the part.

Note: If more than one UAS sub-system had a materiel causal factor, attach additional forms for each sub-system. An EIR/SF 368 (Product Quality Deficiency Report, PQDR) is required for all materiel accidents in accordance with paragraph 3–9b(1), AR 385–10 and paragraph 3–2, DA Pam 738–751. Attach a copy of the SF 368 to this report and note the attachment in block 21.

Block 15c, Environmental: Indicate if Environmental Factors played a causal role in the accident by selecting D, S, U, or N. Environmental cause factors will be substantiated in block 20, Findings and Recommendations, and block 12, Summary.

- ***Block 15c(1), General.*** This block identifies meteorological weather conditions at the time the accident occurred. Check all applicable boxes (more than one may apply).
  Note: VMC and IMC are NOT environmental "causal" factors if the conditions were forecast.
- ***Block 15c(2), Weather Factors.*** Enter up to three codes from page 23 of this pamphlet in the spaces provided to indicate weather factors that played a role in the accident. If there is no code(s) for the weather condition in the table, specify the factor(s) in the space(s) provided.
- ***Block 15c(3), Environmental Signal Factors.*** Check the appropriate box(s) to indicate the environmental signal factors/conditions at time of the accident. If "other" is checked, specify the signal factor(s) in the space provided.
  Note. If the "signal" problem was not environmental related, but rather the result of human error and/or materiel failure, DO NOT enter it in this block; enter it in block 15a and/or block 15b.
- ***Block 15c(4), Other Environmental Factors.*** Enter a maximum of three codes from page 23 of this pamphlet in the spaces provided to indicate other environmental factors that played a role in the accident. If there is no code(s) for the other environmental factors in the table, specify the factor in the space(s) provided.

Block 16, Loss of Link (LOL). Enter D (definite), S (suspected), U (undetermined), or N (none/no) as appropriate to indicate if Loss of Link played a role in the accident. If D or S is checked, complete blocks 16a-d. LOL can be the result of Human Error, Materiel Failure, and/or Environmental factors. In addition to blocks 16a-d, complete blocks 15a-15c as/if applicable.

- ***Block 16a, Type Link Lost.*** Check the appropriate box to indicate whether it was a loss of uplink, downlink, or unknown.
- ***Block 16b, Type of Link:*** Check the appropriate box to indicate the type of link lost. If "other" is checked, specify the type of link in the space provided.
- ***Block 16c, UA distance from GCS at time of LOL.*** Enter the distance (nautical miles) the UA was from the GCS at the time that the link was lost.
- ***Block 16d, LOL Factors.*** Check the appropriate box(s) to indicate LOL Factors. Check all that apply.

Block 17, *Take-Off/landing Data.* Complete block 17a if the accident occurred during the take-off phase or block 17b if it occurred during the landing phase. Accidents occurring during T/O or Landing could be the result of human error, materiel failure, and/or environmental factors. In addition to blocks 17a & 17b, complete blocks 15a-15c as/if applicable.
If the accident did NOT occur during the takeoff or landing phase, leave blank.

- ***Block 17a(1), T/O Method.*** Check the appropriate box to indicate the method of T/O. Examples of "manual" include joystick and hand launched.
- ***Block 17a(2), T/O Accident Factors.*** Check the appropriate box(s) to indicate T/O accident factors. Check all that apply.

- ***Block 17b, Landing Phase:*** Complete this block, if the accident occurred during the landing phase of flight, as follows:
- ***Block 17b(1), Landing Method.*** Check the appropriate box to indicate the method of Landing. Example of "manual" is joystick flown.
- ***Block 17b(2), Landing Accident Factors.*** Check the appropriate box(s) to indicate Landing accident factors. Check all that apply.

Block 18, Type of Strike. Check the appropriate box to indicate whether or not a "strike" occurred and the type. If "Other" is checked, specify the type of strike in the space provided.

Block 19, Personnel Data. Complete this block for Class A, B and C accidents for all crewmembers occupying a UAS flight crew station, regardless of the accident cause factor. Also, complete this block for all accident classes (Class A-E) for all personnel who had a causative role or had injury/occupational illness as a result of the accident. This block is not required to be completed for Class D and E materiel failure accidents if the only cause of the failure was FWT. If more than three personnel are involved, use and attach additional forms as necessary. Use the instructions for block 19a to complete blocks 19b and 19c.

- ***Block 19a, Name.*** Enter the individual's last name, first name, middle initial and complete (1)-(14).
- ***Block 19a(1) (SSN).*** Enter the individual's social security number.
- ***Block 19a(2), Grade.*** Enter the individual's pay grade. For example, O4, W3, GS–09, (see page 17 of this pamphlet).
- ***Block 19a(3) (Gender).*** Check the appropriate box to indicate the individual's gender.
- ***Block 19a(4), Duty Position.*** Enter the duty position/seat code as shown on the DA Form 2408-12 for the flight or in page 17 of this pamphlet.
- ***Block 19a(5), Service Code.*** Enter the personnel service code of the individual from page18 of this pamphlet.
- ***Block 19a(6), UIC Assigned.*** Enter the six position UIC of the unit to which the individual was assigned at the time of the accident.
- ***Block 19a(7), Contributing Role.*** Check D (definite), S (suspected), U (unknown), or N (no/none) to indicate the individual's contributing role in the accident.
- ***Block 19a(8), On Flight Controls.*** Check the appropriate box to indicate if the individual was on the UAS flight controls at the time of the accident or if his/her previous control input had any influence on the accident.
- ***Block 19a(9), Lab Testing***. Check the appropriate box to indicate the results of lab testing (testing required for class A, B and C accidents). If the test result was "positive", attach the Armed Forces Medical Examiner System (AFMES) results to this report and address it in block 20 (authorized medication excluded). Note the AFMES attachment in block 21.
- ***Block 19a(10)a, Hours Slept.*** Enter the total number of hours this individual slept during the 24-hour period preceding the accident.
- ***Block 19a(10)b, Hours Worked.*** Enter the total number of hours this individual worked during the 24-hour period preceding the accident.
- ***Block 19a(10)c, Hours Flown.*** Enter the total number of flying hours for this individual during the 24-hour period preceding the accident.
- ***Block 19a(11)a, Readiness Level (RL).*** If the individual is a UAS operator, check the appropriate box to indicate his/her RL.
  Note: Mission Preparation and Mission Qualification indicate SUAS operator status.
- ***Block 19a(11)b, Flight Activity Code (FAC).*** If the individual is a certified

UAS operator, check the appropriate box to indicate his/her FAC.
Note: FAC is not applicable to SUAS operators.

- ***Block 19a(11)c, Redeployment Date:*** Enter the date (YYYYMMDD) of the individual's last redeployment from a combat zone.
- ***Block 19a(12), Injury/Occupational Illness.*** Check the appropriate box to indicate if the individual was injured or had an occupational illness as a result of this accident. If "Yes" is checked, a DA Form 2397-9 (refer to paragraph 3-31 of DA Pam 385-40 for form completion instructions) is required to be submitted for each individual that was injured or had an occupational illness as a result of this accident (note the attachment in block 21). Accidents involving injury/occupational illness require a flight surgeon or an Army medical officer (if a flight surgeon is not available) to be a member/advisor of the board.
- ***Block 19a(13), MTDS Flight Hours.*** Enter the total number of flight hours the individual has accrued in the accident aircraft mission, type, design, and series (MTDS).
- **Block 19a(14), Total Flight Hours.** Enter the total number of flight hours the individual has accrued in all UAS.
- **Block 19b(1)-(14).** Complete as above for 19a(1)-(14).
- **Block 19c(1)-(14**). Complete as above for 19a(1)-(14).

Block 20, ***Findings and Recommendations.*** Instructions for writing findings and recommendations are contained on pages 24, 25, and 26 of this pamphlet and in paragraph 3–24 and table 3-1 of DA Pam 385-40. Use additional/continuation sheets as required. Accident causal/contributing factors identified in block 15 must be substantiated in this block and supported in block 12.

Block 21. List of Attachments. List all substantiating data (examples include continuation sheets, ECOD/ACOD, CCAD, PQDR, AFMES Results, RAW, Msn Brief, photos, maps, DA forms 2397-series, etc) submitted with this DA form 2397-U.

Block 22. Board President/ASO/POC. For Class A, B and C accidents, enter the Name, Signature, and Date of the investigation board president. For Class D, E and F enter the information for the safety officer or POC representative submitting the report.

- ***Block 22a, Grade.*** Enter the individual's Grade (not rank).
- **Block 22b, Branch.** Enter the individual's Branch.
- **Block 22c, E-mail:** Enter the individual's e-mail address.

Block 23. Command Review. Required for Class A, B and C accidents only. The reference for determining the individuals responsible for performing the Command Review is AR 385-10, para 3-17.

- ***Block 23a, Unit Commander.*** Enter the individual's organization, name (last, first, MI), rank, and signature. Indicate comment by checking the applicable box. Block 23a will be signed by the unit commander.
- ***Block 23b,*** **Reviewing Official.** Enter the individual's organization, name (last, first, MI), rank, and signature. Indicate comment by checking the applicable box. Block 23b may be signed by any higher level chain of command.
- **Block 23c, Approving Authority.** Enter the individual's organization, name (last, first, MI), rank, and signature. Indicate comment by checking the applicable box. The approval authority is either the ACOM, ASCC, or DRU commander.
- **Block 23d, DA Review.** To be completed by the USACR/SC.

Phase of Operation Codes

A Starting engine/run-up
B Stationary (engines running)
C Taxi
D Takeoff/Catapult/Launch
E Hover IGE
F Climb (after takeoff phase and a climb to altitude is established)
G Cruise
H Combat maneuver (masking, unmasking, gun run, evasive action, etc.)
I Descent (does not include approach)
J Approach or UAS Tactical Automated Landing System (TALS) (prior to landing/termination)
K Emergency auto-rotation
L Go-around or Tactical Automated Landing System (TALS) Abort above Decision Point (the intended landing/termination is aborted)
M Landing (aircraft touchdown until forward motion stops and aircraft clears runway)
N Low level (constant airspeed and altitude below 500 feet AGL)
O Contour (varying altitude, while maintaining constant height above the contour of the earth's surface and/or obstacle)
P NOE (varying airspeed and altitude, using the earth's contour or foliage for concealment)
Q Hover OGE
R Crash (crew has no control over aircraft altitude
S Aerobatics
T Termination with power (planned/attempted termination of an autorotation is to a hover)
U Undetermined or unknown
V Power recovery (the process of returning the aircraft to powered flight from an engine-out configuration)
W Training auto-rotation
X Formation
Y Preflight activity (any activity prior to the flight that caused or contributed to the accident; e.g., mission planning, crew assignment, training, preflight, etc.)
Z Refueling (to identify the type refueling being conducted, use an additional code preceding the Z code; e.g., in-flight refueling should be coded as GZ).
2 Turning
3 Deceleration
4 Level-off
5 Shut-down

Additional UAS Phase of Operation Codes

6 Flight Termination System (FTS) deployed (UAS)
7 Automatic Return Home Mode (UAS)
8 Holding pattern (includes UAS loitering on station to perform designated mission)
9 UAS crew hand-off (UA in-flight)
10 UAS crew hand-off (UA on ground, prior to take-off)
11 UA hand-off (manned/unmanned teaming, cooperative employment)

Additional Aerostat Phase of Operation Codes

12 Aerostat Moored
13 Aerostat Flight
14 Aerostat Recovery
15 Aerostat Launch
16 Altitude Adjustment (raising or lowering the Aerostats elevation)

UAS Mission Codes

T Training
C Combat
S Service
F Maintenance Test flight
A Acceptance Test Flight
X Experimental Test Flight
D Imminent Danger
R Relay Mission

Grade Codes

O1-O10: Commissioned **officers**
W1-W5: Warrant officer
E1-E9: Enlisted service members
GS1-GS15, SES1-5: DOD civilians
WG1-WG15 & WS16-WS19: Wage board employees
XN: Foreign National
X1: Foreign officers
X2: **F**oreign enlisted
CAC: Civilian Army contractor employee
CIV: Non-DOD civilian
DAC: Dept Army Civilian
KAD: USMA
ROTC: Reserve Officer Training Cadet
NRPT: Not reported
OC: WOC/OC
UNK: Unknown
UNKE: Unknown Enlisted
UNKO: Unknown Officer
OTH: Personnel other than above

Duty Position Codes

ABC Aviation battalion commander
AC Aircraft Commander
AC-A Aircraft Commander- Aircraft Seat
AC-P Aircraft Commander- Payload Seat
ADC Approach-departure controller
AMC Air mission commander
AO Unmanned Aircraft Operator
AO-A Aircraft Operator-Aircraft Seat
AO-P Aircraft Operator-Payload Seat
AOP Assistant Operations Officer
AOS Assistant Operations SGT
ART Armament/Arms Technician
AS AFTP Supervisor
ASO Aviation Safety Officer
AUC Aviation unit commander
AVT Avionics technician
CC Company Commander
CE Crew chief or flight engineer
CET Combat-equipped troops or jumpers
CP Copilot
DC Deputy Commander
DCO DA/DOD-level commander
DEP Design & engineer personnel
DS Direct Supervisor
E Electrician
EO External Operator
FAC FWD Air Controller
FC Flight Commander
FCO Flight Leader
FCT Weather personnel
FFT Crash rescue/firefighters
FI Flight Engineer instructor
FSP Flight service personnel
FTM Fuel team member
FTS Fuel team supervisor
G-3 G-3
GC Ground unit commander
GCA Final controller
GG Ground guide or ”Follow me” service
GM General mechanic
GO Ground Observer
GSY Other ground support personnel
IE Instrument flight examiner
IP Instructor pilot
IO Instructor Operator
IO-A Instructor Operator- Aircraft Seat
IO-P Instructor Operator- Payload Seat
JPM PARA Jump Master
LCO Supervisor or unit commander
LO Liaison Officer
MC Mission Coordinator
MCO Major commander/Supervisor
ME Maintenance test flight evaluator
MFP Manufacturing or rework personnel
MO Flight surgeon/medical officer/attendant
MP Maintenance test pilot
MPO Mission Payload Officer
MS Maintenance supervisor
OAY Others Aboard Aircraft
OGY Others not aboard aircraft
OP Operations Officer
OPN Operations Dispatcher, etc.
OR Gunner, Technical Observer, Aircraft Maintenance Personnel, Photographer
PAX Passenger
PC Pilot in command
PF Pathfinder
PI Pilot
PL Platoon Leader
PPM Power plant mechanic
PT Pilot trainee
PTM Power train mechanic
PTO Pilot trainee, observer
PTR Pilot trainee, rated
RAP Rappeller
RM Rappeller Master

RS Rappeller Safety
SI Standardization flight engineer instructor
SM Structure/airframe mechanic
SO Standardization Instructor Operator
SO-A Standardization Instructor Operator- Aircraft Seat
SO-P Standardization Instructor Operator- Payload Seat
SP Standardization instructor pilot
S3 **S3**
TI Technical Inspector
TWC Tower personnel
NR Not reported
UNK Unknown
UT Unit trainer
UT-A Unit trainer- Aircraft Seat
UT-P Unit trainer- Payload Seat
UAG Unmanned Aircraft System Ground Crewmember
UAO Unmanned Aircraft Observer
XO Executive Officer
XP Experimental test pilot
ZR Rated passenger

Personnel Service Codes

A Active Army
B Army Civilian
C Army Contractor
C1 Army Direct Contractor
D NAF employee
EO Other U.S. military personnel
E1 Navy
E2 Air Force
E3 Marine Corps
FO Foreign
F1 Foreign national direct hire
F2 Foreign national indirect hire
F3 Foreign national KATUSA
F4 Foreign military attached
G Dependent
M Government, Other
NO National Guard
N1 NG Tech
N2 NG inactive duty for training (IDT)
N3 NG annual training (AT)
N4 NG active duty special work (ADSW)
N5 NG active guard/reserve (AGR)
N6 NG active duty for training other than annual (ADT)
N7 NGB Activated to active duty
O Other
P Public
RO Reserve
R1 Reserve inactive duty training (IDT)
R2 Reserve annual training (AT)
R3 Reserve active duty training (ADT)
R4 Reserve full time manning (FTM)
R5 Reserve Tech
R6 Reserve activated to active duty
R7 Reserve active guard/reserve (AGR)
T ROTC
U Unknown
Z Not Reported

Accident/Incident Event Codes

The following terms and definitions categorize unmanned aviation accidents by the type of event(s) involved. Select the event(s) that best categorize the accident and enter the code (s) in block 14 on the UASAR. Always enter event 10 in the first event position to indicate UAS. Enter the event code that best describes the accident in the sequence of occurrence. Never enter condition events 14 (fratricide), 18 (Icing), 41 (IMC), 48 (brownout), and 65 (whiteout) in the first event position. When no listed event describes the accident, write the type event in block 14 in lieu of a selected event. UAS specific codes (including aerostat) are available on pages 23 and 24 of this booklet.

01 Precautionary Landing (PL). A landing resulting from unplanned events occurring while the aircraft is in flight that makes further flight inadvisable. This event is to be used for PLs where no other event applies. It may be used in conjunction with other events.

02 Forced landing or UAS FTS employment (FL). A landing caused by failure or malfunction of engines, systems, or other components that make continued flight impossible. This event is to be used in conjunction with other events.

03 Aborted takeoff. An unplanned event that occurs before liftoff that interrupts a planned flight. This event is to be used for aborted takeoffs where no other event applies or in conjunction with other events.

04 Human factor. A psychological, physiological, or pathological condition that results in the interference of a crewmember's duties, or mission that is delayed, diverted, or aborted.

05 Cargo. Injury or property damage resulting from internal or external cargo-related operations, e.g., intentional or unintentional jettisoning of cargo hook load.

06 Personnel-handling. Injury or property damage accidents/incidents that occur during hands–on handling of equipment or personnel.

07 External-stores. Injury or property damage involving external-stores operations, handling errors, or equipment failures.

08 Multiple-aircraft . Injury or property damage resulting from the interactions of two or more aircraft. To qualify as a multiple aircraft event, two or more active aircraft must be involved. An inoperative aircraft (engine not running) struck by an operating aircraft (engine running) does not qualify in this context.

09 Misappropriated aircraft/. An aircraft accident that occurs during the operation of an Army aircraft that has been misappropriated, regardless of aircrew designation. Intent to fly must exist.

10 Unmanned Aircraft Systems (UAS). Have a "Q" designator, are flown or operated by an Air Vehicle Operator (AO) or External Pilot (EO). When applicable enter in first position.

11 Contractor accident. An aircraft accident that occurs as a result of a Government contractor's operation in which there is damage to Army property or injury to Army personnel. Included is non-delivered equipment for which the Army has assumed responsibility in writing.

12 Aircraft ground accident. (When applicable, enter in first position.) Injury or property damage involving an Army Aircraft in which no intent for flight exists and an aircraft system is in operation. (UAS does not apply)

13 Laser induced/related. Personnel injury or property damage resulting from or related to laser operations.

14 Fratricide. Persons killed, wounded, or equipment damage, in military action, mistakenly or accidentally, by friendly forces actively engaged with the enemy, who are directing fire at hostile force or what is thought to be hostile force. Not to be entered in the first position.

15 Single engine landing. An unplanned single engine landing of a multi-engine aircraft.

16 Un-commanded control input. An un-commanded aircraft pitch, yaw, or roll motion (regardless of amount) that is not induced by the crew or adverse environmental conditions.

17 Cockpit Air Bags. Activation/deployment of the cockpit airbags either intentional or unintentional.

18 Icing. Accidents/incidents as a result of icing conditions other than structural icing captured in Event 69. Not to be entered in the first position.

19 Reserved for future use.

20 Refueling accident. Damage or injury incurred during refueling operations on the ground or in flight.

21 Midair collision. Two or more aircraft collide in flight. Hover is considered flight for this event.

22 Helocasting. Property damage or personnel injury occurring during helocasting operations.

23 Hard landing. Damage incurred due to excessive sink rate on landing touchdown. Includes auto-rotation landings when skids are damaged, main rotor blade flexing into tail boom; tire blowing on touchdown; landing gear driven in fuselage; fuselage, wing, etc., buckling. Note: The landing area must be suitable for a probable successful landing.

24 Wheels-up landing. Aircraft equipped with retractable landing gear lands with the wheels in the well. Includes intentional and unintentional gear-up landings.

25 Landing gear collapse/retraction. During takeoff roll, landing, or taxi, the gear collapses for any reason or the crew inadvertently retracts the gear (does not include gear shearing due to hard landing).

26 Undershoot. When an approach is being made to prepared area or field and the aircraft touches down short of the suitable landing surface. (Does not include wire, tree, or other strikes on approach, except an aircraft striking an airport boundary fence.)

27 Overshoot or overrun. Landing in which the aircraft runs off the end of the runway because of touchdown speed, short runway, touching down too long, or failure of brakes, or TALS, Arresting Gear (drum, strap, pendant or net) or Hook failure.

28 Ditching. Landing in a controlled attitude in water. (Does not include creeks, streams, etc., or those landings to ships or barges in which the aircraft crashes in the water.

29 Ground loop/swerve. Aircraft damage is incurred because absolute directional control is not maintained (intentional or unintentional). Includes FW ground loops; RW auto-rotational landings; RW running landings due to anti-torque failures; aircraft running off side of runway. May be used in conjunction with event 80 for RW aircraft.

30 Collision with ground/water. Accidents in which the aircraft strikes the ground or water unintentionally. Includes crashing into a mountain under IFR, IMC, or night; inadvertent flight into the ground or water, such as making a gun run and failing to pull up; low-level flight resulting in striking ground or water.

31 Aircraft collision on the ground. Accidents in which two or more aircraft collide on the ground. None of the aircraft can be in flight. (Used in addition to 08 multiple aircraft event.)

32 Other collisions. Accidents when an aircraft collides with something not accounted for by other type events listed.

33 Rotor over-speed. Main rotor rpm exceeds the allowable limits.

34 Fire and/or explosion on the ground. Accidents that are initiated by a fire or explosion. The fire must be prior to lift-off on takeoff and/or after touchdown.

35 Fire and/or explosion in the air. Same as on the ground except fire must be after lift-off and before touchdown.

36 Equipment loss or dropped object. Accidents in which some part of the aircraft or attached equipment is lost in flight, other than cargo or external stores.

37 In-flight breakup. Accidents in which aircraft begins to break up in flight. In these accidents, any type of landing is not expected.

38 Spin/Stall. Fixed wing only accidents resulting from entering a stall condition or spinning due to loss of airspeed or excessive angle of attack.

39 Abandoned aircraft. Accidents in which all flight crewmembers eject or parachute.

40 Flight-related accident. (When applicable, enter in first position). Damage to property or injury to personnel without damage to the aircraft. (UAS does not apply)

41 Instrument meteorological conditions (IMC). Aircraft must be in IMC conditions when the accident/incident occurs (not to be used in the first position).

42 Rappelling. Property damage or personnel injury occurs during rappelling operations.

43 Fast Rope. Property damage or property injury occurs during Fast Rope operations.

44 Overstress. Stress damage as a result of operating aircraft outside design limitations.

45 Turbine Engine foreign object damage. (When applicable, enter in first position.) Damage confined to a turbine engine, resulting from unavoidable external objects (excludes internal engine failures that produce damage)

46 Rotor/prop wash. Property damage or personnel injury resulting from rotor/prop wash (does not include damage incurred by event 75).

47 Engine over-speed/temp. Engine rpm or temperature exceeds the allowable limits.

48 Brownout. Loss of visual reference to the ground or horizon caused by rotor wash swirling dust around the aircraft (not to be used in the first position).

49 Bird strike. Any part of the aircraft collides with a bird while in flight.

50 Tree strike. Aircraft strikes vegetation during any phase of flight.

51 Wire strike. Aircraft strikes wire or power line during any phase of flight.

52 Mast bumping/In-flight breakup. Main rotor separates as result of mast bumping.

53 Missing aircraft. Aircraft does not return from a flight and is presumed to have crashed.

54 Foreign object damage (FOD). Damage as a result of objects foreign to the area of impact and the FOD damage is the only damage incurred (excludes turbine engine FOD).

55 Dynamic rollover. An uncontrolled aircraft rolling motion with some part of the landing gear in contact with a terrain feature (excludes tree/wire/object strikes that induce the rolling motion).

56 Maintenance operational check (MOC). Accidents that occur during a MOC while engine(s) is in operation and/or rotors turning.

57 Weapons related. Property damage or injury to personnel as a result of weapon operations.

58 Lightning strike. Damage or injury as a result of lightning striking an operational aircraft.

59 Rescue operations. Property damage or personnel injury occurs during rescue operations.

60 Object strike. Aircraft or aircraft component strikes object other than ground, trees, or objects included in other events.

61 Air to ground collision. Aircraft in the air collides with or strikes aircraft on the ground.

62 Stump strike. Aircraft contacts stump during routine landing.

63 Antenna strike. Aircraft damage caused by contact with an antenna.

64 Engine/Transmission over-torque/load. Engine/transmission is subjected to a torque load beyond specified limits, or an engine loses rpm because of over gross weight or environmental conditions.

65 Whiteout. Loss of visual reference to the ground or horizon caused by rotor wash swirling snow around the aircraft. (not to be used in the first position.)

66 Tie-down strike. Damage or injury as a result of a main rotor tie-down device attached to a main rotor during start.

67 Parachute. Accidents involving parachute/drop operations while inside the aircraft or static line still attached.

68 Mast bumping. Damage resulting from contact between the main rotor and mast but not resulting in rotor separation.

69 Structural icing. Formation of ice on an aircraft/UAS structure, to include the rotor systems. Does not include carburetor, induction, or pitot static system icing.

70 Engine failure. Engine fails to develop sufficient power to maintain flight and/or the internal failure of an engine (excludes fuel starvation, exhaustion, contamination, and turbine engine FOD.

71 Transmission failure. Internal failure of a main transmission and/or attached gearboxes.

72 Vertical fin strike. Damage caused by tail rotor blades coming in contact with vertical fin on single-rotor helicopters.

73 Spike knock. Damage occurs when the transmission spike contacts the striker plate with sufficient force to cause damage.

74 Seatbelt/restraint harness strike. Damage caused by unsecured seatbelt/restraint harnesses.

75 Blade flapping. Damage resulting from wind or rotor wash from other aircraft that causes the main rotor blades to flap to the extent that damage occurs.

76 Fuel exhaustion. Engine quits as a result of a lack of usable fuel aboard an aircraft.

77 Fuel starvation/contamination. Engine quits or loses power as a result of fuel ceasing to flow to the engine while usable fuel is still on board the aircraft. Example: The pilot fails to switch tanks when one runs dry or a blockage of fuel lines occurs because of contamination.

78 Animal strike. During takeoff or landing, an animal is struck by any part of the aircraft.

79 Battery fire/overheat. A fire in the battery compartment or overheated battery, usually resulting in electrical failure.

80 Excessive yaw/spin. May occur on the ground or in the air (helicopter only). A maneuver where the aircraft yaws excessively or spins when the power is added without adequate antitorque input, or a loss of antitorque control occurs.

81 Tail-boom strike. Main rotor contacts tail boom on the ground due to wind conditions. Excludes hard landings and damage caused by rotor wash.

Materiel Factor Events

In addition to events 70 and 71 listed above, the following terms and definition are used to categorize materiel factor related mishap events. The event applies regardless of the cause of the failure/malfunction.

82 Airframe. Failure or malfunction of any airframe structure to include doors, windows, fairings, canopies, etc., to include hardware.

83 Landing gear. Failure or malfunction of any part of the landing gear or Arresting Hook, exclusive of hydraulics.

84 Power train. Failure or malfunction of any part or component of the power train except when events 47, 64, 70, 76, and 77 apply.

85 Drive train. Failure or malfunction of any part or component of the drive train except when events 33, 64, 71 and 86 apply.

86 Rotor/propellers. Failure or malfunction of rotor or prop assembles, hubs, blades, etc. Excludes other power/drive train part failures; e.g. gearboxes, mast, etc.

87 Hydraulics system. Failure or malfunction of any hydraulic part. The failure of other systems resulting from hydraulic initiated will be coded as hydraulic.

88 Pneumatic system. Failure or malfunction of any pneumatic part. The failure of any other system resulting from pneumatic initiated will be coded as pneumatic.

89 Instruments. Failure or malfunction of any part of the instrument system that results in a faulty instrument indication.

90 Warning system. Failure of malfunction of any part of the warning system that results in a faulty warning indication.

91 Electrical system. Failure or malfunction of any part of the AC or DC electrical systems. Includes: current producing, transforming, converting, and amplifying parts; e.g., battery, generator, alternator, relay, etc.

92 Fuel system. Failure of any part of the fuel system. Does not include the fuel metering or fuel control units that will be reported as part of the engine.

93 Flight control. Failure of any part of the flight control system. Excludes hydraulic initiated control problems.

94 Utility/environmental control system. Failure of any part of the system. Includes auxiliary power units (APU)

95 Avionics. Failure of any part of the radio navigation or communication equipment.

96 Cargo-handling equipment. Failure of the cargo-handling equipment attached to the aircraft only.

97 Armament. Failure of any part to include the aiming and firing system.

98 Night vision system/device. Failure or malfunction of any part of the night vision system/device.

ADDITIONAL UAS EVENT CODES

A1 Launcher Malfunction. Any failure or malfunction of the aircraft launcher.

A2 Tactical Automated Landing System (TALS) Landing/Recovery. TALS failure or malfunction during landing/recovery.

A3 Arresting Gear Failure (Drum, Strap, Pendant). Failure or malfunction of the arresting gear (drum, strap, pendant, net, and so forth).

A4 Flight Termination System (FTS) Failure/Malfunction. Failure or malfunction of the FTS/parachute.

A5 Automatic Take Off and Landing System (ATLS) Failure/Malfunction Landing. ATLS failure/malfunction during the landing phase of flight.

A6 Automatic Take Off and Landing System (ATLS) Failure/Malfunction Take-Off. Automatic Take-off and Landing System (ATLS) failure/malfunction during the take-off phase of flight.

A7 Battery failure. Battery failed due to a loss of charge, received max number of recharges, and so forth.

A8 Flight Termination System (FTS) Deployment . Deployment of the FTS, either manually or automatically, to land the UA.

A9 Test Flight. Accidents occurring while a test flight (experimental or maintenance) is being performed.

B1 Ground Control System (GCS) Failure/Malfunction. A failure/malfunction of the Ground Control Station (including portable GCS) causing/resulting in the aviation accident.

B2 Ground Data Terminal (GDT) Failure/Malfunction. A failure/malfunction of the Ground Data terminal causing/resulting in the aviation accident.

B3 Ground Power Generation Equipment Failure/Malfunction. A failure/malfunction of the

Ground Power Generation equipment causing/resulting in the aviation accident.
B4 Loss of Downlink. Any loss of downlink regardless of cause (signal interference, materiel failure (hardware or software), and so forth.
B5 Loss of Link. If the type of Loss of Link (downlink or uplink) is unknown, use this code.
B6 Loss of Uplink. Any loss of uplink regardless of cause (signal interference, materiel failure (hardware or software), and so forth.
B7 Other UAS Equipment Failure/Malfunction. A failure/malfunction of any other UAS equipment causing/resulting in the aviation accident.

ADDITIONAL AEROSTAT EVENT CODES

C1 Excessive High Winds during Aerostat Operation. Accident as a result of excessive winds during Aerostat flight or when moored.
C2 Tether Strike. Accident as a result of a helicopter, fixed wind, or UAV colliding with the tether.
C3 Aerostat Blow Down. High vertical winds causing the Aerostat to severely reduce elevation whereby the tether either breaks during the elevation recover or snags on a ground object.
C4 Mooring Station. Failure Accident as a result of a Mooring Station failure. Malfunctioning equipment could cut the tether.

Weather Factor Codes

W1 Wind gusts
W2 Rain
W3 Lightning
W4 Thunderstorms
W5 Drizzle
W6 Hail
W7 Tornado/Cyclone/Waterspout
W8 Hurricane/Typhoon
W9 Freezing rain
W10 Ice
W11 Sleet
W12 Blowing/Swirling
W13 Snow
W14 Fog
W15 Mist
W16 Haze
W17 Cross wind
W18 High/Strong Winds
W19 Winds greater than forecast
W20 Density Altitude
W99 Insufficient information to identify environmental condition

Other Environmental Factors

X1 Wildlife (including fowl, animals)
X2 Moon Illumination (including bright, dark, glare, too little, too much)
X3 Sun Illumination (including bright, dark, glare, too little, too much)
X4 Contaminants (gases, smog, toxic materials, debris, fumes, chemicals, and so forth)
X5 Smoke
X6 Dust, Dirt, Sand
X7 Blowing/Swirling Dust, Dirt, Sand
X8 Noise
X9 Temperature
X10 Humidity
X11 Radiation
X12 Surface condition (including sloped, steep, gullies, rough, rocky, wet (excluding precipitation), slippery, rutted, pot holed
X13 Static electricity
X14 Structural impediments to line of site/ frequency interference
X99 Insufficient information to identify other environmental factors

Example Materiel Failure Finding

FINDING (Present and Contributing: Materiel Failure):	
Required Information	**Example**
1. Explanation of when and where the materiel failure/malfunction occurred in the context of the accident sequence of events.	During cruise flight on, a day surveillance mission, the RQ-7B
2. Name and part number (PN) or national stock number (NSN) of the part, component or system that failed.	engine oil pump (P/N AR73-0743) failed, reducing the oil flow to the aircraft's engine
3. Mode of failure (corroded, burst, twisted, decayed, etc.)(*see DA PAM 385-40, Appendix B, Table B-3 for definitions and examples)*	increasing internal engine friction, causing excessive operating temperature and engine seal wear
4. Performance that is contrary to common practice.	during cruise flight the aircraft's engine failed
5. Consequences of materiel failure	The aircraft descended with the parachute deployed impacting the ground causing major but repairable damage and no injuries.
6. Identification of reasons (root causes/system inadequacies) materiel failure/malfunction caused or contributed to accident.	The oil pump failure was caused by the manufacturer installing the oil pump after it failed the cold temperature testing (TP 38529-65073).
7. Brief explanation of how each reason (root cause/system inadequacy) contributed to materiel failure/ malfunction.	The sub-zero operating temperatures during the flight caused the oil pump's plunger alignment pin to disengage from the oil pump lift shaft alignment hole which resulted in a decreased or no oil flow to the engine.

FINDING 1 (Present and Contributing: Materiel Failure): During cruise flight, on a day surveillance mission, the RQ-7B engine oil pump (P/N AR73-0743) failed, reducing the oil flow to the aircraft's engine, increasing internal engine friction, causing excessive operating temperature and engine seal wear. As a result, during cruise flight the aircraft's engine failed. The aircraft descended with the parachute deployed impacting the ground causing major but repairable damage and no injuries.

The oil pump failure was caused by the manufacturer installing the oil pump after it failed the cold temperature testing (TP 38529-65073). The sub-zero operating temperatures during the flight caused the oil pump's plunger alignment pin to disengage from the oil pump lift shaft alignment hole which resulted in decreased or no oil flow to the engine.

Example of Human Error Finding

FINDING (Present and Contributing: Human Error – Individual Failure):	
Required Information	**Example**
1. Explanation of when and where the mistake/error occurred in context of the accident sequence of events.	While on final approach, performing a touch and go landing training at 30 feet AGL and 40 KIAS…
2. Aircraft and individual involved by duty position.	the Instructor Operator (IO) of the MQ-5B Unmammed Aircraft System (UAS)…
3. Identification of mistake made *(ref aviation-specific mistakes/errors in DA PAM 385-40, Table B-1)* and an explanation of how task/activity was performed improperly.	failed to estimate distance, rate of closure, and appropriate control input. That is, after the External Operator (EO) student allowed the aircraft to veer off the runway center line, the IO on the controls, failed to accurately judge the amount of control input required to properly maneuver the aircraft for a go-around…
4. Directive (ATM, SOP, FM, TM, etc.) or common practice governing performance of task/activity.	in contravention of TC 1-600, Task 1177 (Perform Go-Around)
5. Consequences of mistake/error.	As a result, the aircraft right wing tip made contact with the runway causing the IO to lose control of the aircraft. The aircraft incurred impact damage coming to rest in a ravine filled with light vegetation located 100 feet from the departure end of runway. There were no injuries.
6. Identification of reasons (root causes/system inadequacies) for the mistake/error {*ref System Inadequacies in Table B-5 of DA PAM 385-40}.*	The IO's actions were a result of overconfidence in her ability to adjust the aircraft back to the runway center line and excitement causing her to overcontrol the aircraft in an attempt to direct the aircraft's flight path away from her location.
7. Brief explanation of how each reason (root cause/system inadequacy) contributed to the mistake/error.	The IO allowed the aircraft to descend too close to the runway when making a turn resulting in aircraft damage.

FINDING 1: (Present and Contributing: Human Error- Individual Failure): While on final approach, performing a touch and go landing training at 30 feet AGL and 40 KIAS, the Instructor Operator (IO) of the MQ-5B Unmammed Aircraft System (UAS) failed to estimate distance, rate of closure, and appropriate control input. That is, after the External Operator (EO) student allowed the aircraft to veer off the runway center line, the IO on the controls, failed to accurately judge the amount of control input required to properly maneuver the aircraft for a go-around in contravention of TC 1-600, Task 1177 (Perform Go-Around). As a result, the aircraft right wing tip made contact with the runway causing the IO to lose control of the aircraft. The aircraft incurred impact damage coming to rest in a ravine filled with light vegetation located 100 feet from the departure end of runway. There were no injuries.

The IO's actions were a result of overconfidence in her ability to adjust the aircraft back to the runway center line and excitement causing her to overcontrol the aircraft in an attempt to direct the aircraft's flight path away from her location. The IO allowed the aircraft to descend too close to the runway when making a turn resulting in aircraft damage.

Additional Example –
Present and Contributing Finding: Environmental

FINDING (Present and Contributing: Environment):	
Required Information	**Example**
1. Explanation of when and where the environmental factor occurred in the context of the accident sequence of events.	While on final approach to runway 19, at an altitude of 100 feet AGL…
2. Aircraft and if applicable, the individual(s) involved by duty position.	the RQ-7B…
3. Description of environmental factor encountered (*see DA PAM 385-40, Appendix B, Table B-4 for definitions and examples).*	encountered an unforecasted sudden microburst with winds exceeding 70 knots.
4. Consequences of environmental effect.	As a result, the UA entered a nose-low attitude and uncontrollable rate of descent. The UA impacted the runway resulting in major damage, there were no injuries.
5. Explanation/identification of reason(s) environmental conditions caused the accident.	Microbursts are environmental events that cannot be seen or forecasted with present meteorological measuring equipment nor are they visible to aircraft crewmembers. They are normally a phenomenon associated with thunderstorms; however, there were no thunderstorms reported or visible in the vicinity.

FINDING 1 (Present and Contributing: Environment)

While on final approach to runway 19, at an altitude of 100 feet AGL, the RQ-7B encountered an unforecasted sudden microburst with winds exceeding 70 knots. As a result, the UA entered a nose-low attitude and uncontrollable rate of descent. The UA impacted the runway resulting in major damage, there were no injuries.

Microbursts are environmental events that cannot be seen or forecasted with present meteorological measuring equipment nor are they visible to aircraft crewmembers. They are normally a phenomenon associated with thunderstorms; however, there were no thunderstorms reported or visible in the vicinity.

Accident Errors/Failures/Effects/System Inadequacy(ies)/Recommendations

NOTE: Explanations/Definitions for Accident Errors/Failures/Effects/System Inadequacy(ies)/Recommendations are located in DA PAM 385-40 Appendix B.

Errors
P01 Scan
P02 Maintain/recover orientation
P03 In-flight planning
P04 Preflight planning
P05 Estimate distance/closure/control input
P06 Detect hazards/obstacles
P07 Diagnose or respond to an emergency
P08 Coordination
P09 Failed to use or follow checklist
P10 Failed to follow maintenance manual (TM, SOP, TB, etc.),instructions while servicing acft/equip
P11 Failed to follow instructions (TM, TB, MWO, etc.) while repairing, installing, or adjusting equipment
P12 Inadequate/improper Inspection
P13 Failed to read/follow available SOPs, notices, ARs, General rules/principles, etc
P14 Inadequate tool/equip accountability
P15 Failed to secure materiel/equip/cargo
P16 Inadequate/improper LZ/termination point selection
P17 Improperly prepared LZ
Supervisor—Specific Mistakes/Errors
P18 Improper mix/match/number of personnel
P19 Inadequate time allowed for pre–mission preparation
P20 Set/permitted inappropriate launch time for Environmental conditions
P21 Permitted selection of inappropriate LZ for intended training or crew experience
P22 Failed to ensure repairs/services/inspections/MWO are IAW appropriate TMs, TB, MWOs, etc.
P23 Failed to take appropriate/timely action to prevent or stop violation of procedures/unsafe acts
P24 Inadequate mission planning for risk–management, operational, and logistic decisions
P25 Failed to brief/provide information
P97 Insufficient information to determine mistake/error
Materiel Failure/Malfunction
M01 Overheated/burned/melted
M02 Froze (temperature)
M03 Obstructed/pinched/clogged
M04 Vibrated
M05 Rubbed/worn/frayed
M06 Corroded/rusted/pitted
M07 Overpressured/burst
M08 Pulled/stretched
M09 Twisted/torqued
M10 Compressed/hit/punctured
M11 Bent/warped
M12 Sheared/cut
M13 Decayed/decomposed
M14 Electric current action (short, arc, surge, etc.)
M97 Insufficient information reported to identify type of failure/malfunction
Environmental Effects/Condition
E01 Illumination (dark, glare, etc.)
E02 Precipitation (rain, fog, ice, snow, etc.)
E03 Contaminants (fumes, dust, chemicals, FOD, etc.)
E04 Noise
E05 Temperature/humidity
E06 Wind turbulence
E07 Vibration
E08 Acceleration/deceleration
E09 Radiation (sunlight, X–ray, LASER, etc.)
E10 Work surface/space (slippery floor, cluttered walkway, steep rough road, etc.)
E11 Air pressure (explosion, decompression, altitude effects,etc.)
E12 Electricity (lightning, arc, surge, short, shock, etc.)
E13 Animals (deer, birds, rodents, insects, etc.)
E97 Insufficient information reported to identify environmental conditions

System inadequacy(ies)/Root cause(s)/Readiness shortcomings

LEADER FAILURE
01 Inadequate/improper supervision by “Higher command”
02 Inadequate/improper supervision by “Staff officer” e.g., operations, safety, supply, etc.
03 Inadequate/improper supervision by “Unit command”
04 Inadequate/improper supervision by “Direct supervisor” e.g.,instructor, squad leader, aircraft commander, etc.
04A When a leader who is not in the individual chain of command fails to make an on-the-spot correction.
TRAINING FAILURE
05 Inadequate school training
06 Inadequate unit training

07 Inadequate experience
08 Habit interference

STANDARDS FAILURE

09 Inadequate written procedures for operation under normal, abnormal, or emergency conditions

SUPPORT FAILURE

10 Inadequate facilities or services
11 Inadequate/improper Equip/materiel design or equipment not provided
12 Insufficient type/number of personnel
13 Inadequate manufacture, assembly, packaging, or quality control
14 Inadequate maintenance (inspection, installation, troubleshooting, record keeping, etc.)

INDIVIDUAL FAILURE

15 Fear/excitement (inadequate composure)
16 Overconfidence (in self, others, equipment)
17 Lack of confidence (in self, others, equipment)
18 Haste/Attitude (motivation)
19 Fatigue (self induced)
20 Effects of alcohol, drugs, or illness
21 Poor attitude/indiscipline

22 Environmental conditions

97 Insufficient information reported to identify inadequacy/ shortcoming/cause

RECOMMENDATIONS/REMEDIAL MEASURES

01 Improve school training
02 Improve unit training
03 Revise procedures for operation under normal, abnormal, or emergency conditions
04 Ensure personnel are ready to perform (training, experience, psycho- physiological state, etc.)
05 Inform personnel of problems and remedies (meetings, publications, EIRs, etc.)
06 Positive command action (to encourage proper performance and discourage improper performance)
07 Provide personnel resources (number or qualifications) required for job
08 Redesign (or provide) equipment or materiel
09 Improve (or provide) facilities or services
10 Improve quality control
11 Perform studies to get solutions to system inadequacy(ies)

UNMANNED AIRCRAFT SYSTEM ACCIDENT REPORT *(UASAR)*
Use for all UAS Aviation Accidents
For use of this form, see DA Pamphlet 385-40; the proponent agency is OCSA.

REQUIREMENTS CONTROL SYMBOL
CSOCS-309

1. ACCIDENT CASE INFORMATION	a. Date *(YYYYMMDD)* 20120111	b. Time *(Local)* 1500	c. UA Tail Number XX-02001
2. ACCIDENT CLASS/ CATEGORY	a. Classification ☐ A ☐ B ☑ C ☐ D ☐ E ☐ F	b. Category ☑ Flight ☐ Flight Related ☐ Aircraft Ground	**3. UAS MTDS** RQ-7B
4. PERIOD OF DAY ☐ Dawn ☑ Day ☐ Dusk ☐ Night	**5. AIRCRAFT INVOLVED** a. Number of Aircraft Involved 1	b. In Flight/Mid-Air Collision ☐ Yes ☑ No ☐ Unknown	**6. NEAREST MILITARY INSTALLATION** Fort Douglle
7. ACCIDENT LOCATION a. ☑ On-Post ☐ Off-Post	b. ☑ On Airfield ☐ Not on Airfield	c. City Taborville	d. State TX; e. Country USA; f. Grid and/or Lat/Long 16U PJ12345678

8. ORGANIZATION INVOLVED

a. Unit Designation	b. Unit Identification Code (UIC)	c. Home Station	d. Army Headquarters
C Company 999 MI BN	WH6DAA	Fort Douglle	FORSCOM

9. ACCOUNTABLE ORGANIZATION *(If same as block 8 leave blank)*

a. Unit Designation	b. Unit Identification Code (UIC)	c. Home Station	d. Army Headquarters
MAT FAIL	WMATFA	HQDA	WODADA

10. ACCIDENT COST DATA	a. UA Total Loss ☐ Yes ☑ No	b. UA Damage or replacement Cost *(Excluding Man-hours)* $ 180,000	c. Number of Man-Hours	d. Man-Hours Cost $	e. Other UAS Sub-System Cost $
f. Other Damage Cost-Military $	g. Other Damage Cost-Civilian $	h. Injury/Occupational Illness $	i. Total Cost *(This UAS)* $ 180,000	j. Total Cost *(All Aircraft)* $	

11. GENERAL DATA	a. Mission	a(1). Type Mission T	a(2). Aircraft Mode ☑ Single-ship ☐ Multi-ship ☐ Manned/Unmanned Teaming	a(3). Level of Interoperability (LOI) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☑ NA
a(4). Simultaneous UA Operation? ☐ Yes ☑ No *(If Yes, specify number & MTDS)*			b. Flight Plan ☐ Military ☐ Civil ☑ Operation's Log	c. Flight Rules ☑ VFR ☐ IFR
d. Mission/ Training	d(1). At what level was mission/training conducted? ☐ Bde ☑ Bn ☐ Co ☐ Plt ☐ Sqd ☐ Team ☐ Crew			d(2). Who approved the mission/training? Rank & Position: LTC/ Battalion Commander
d(3). Was a mission brief completed? ☑ Yes ☐ No	d(4). Who was in charge during the mission? Rank & Position: 1LT/Platoon Leader			d(5). Who was the senior leader present during the mission/training? Rank & Position: 1LT/Platoon Leader
e. Risk Management (RM)	e(1). RM Performed? ☑ Yes ☐ No	e(2). Who performed the RM? Rank & Position: SSG/Platoon Sgt	e(3). RM Approved? ☑ Yes ☐ No	e(4). Who accepted risks? Rank & Position: 1LT/Platoon Leader
e(5). What was the level of the risk after controls applied? ☑ Low ☐ Moderate ☐ High ☐ Extremely High			e(6). How was the RM process communicated? *(Check all that apply.)* ☑ Worksheet ☐ Verbal Brief ☐ Order ☐ Not Communicated	
e(7). Accident event identified/considered during RM process? *If yes, complete blocks 11e(7)a thru 11e(7)d)* ☐ Yes ☑ No			e(7)a. What was the level of the identified risk? ☐ Low ☐ Moderate ☐ High ☐ Extremely High	
e(7)b. Was the control measure(s) applied? ☐ Yes ☐ No	e(7)c. Who was responsible for implementing the controls? Rank & Position:			e(7)d. Was the potential for accident event accepted as residual risk? ☐ Yes ☐ No
f. Digital Source Collector (DSC)	f(1). DSC installed? *(If yes, enter type of DSC)* ☑ Yes ☐ No MUSE Computer		f(2). Data captured and preserved? *(If yes, specify storage location)* ☑ Yes ☐ No Ground Control Station	
g. Fire ☑ None ☐ Inflight ☐ Postcrash ☐ Other *(Specify)*		h. Hazardous Material Spillage *If yes & a Class A, B or C accident, attach DA Form 2397-6)* ☐ Yes ☑ No	i. Did accident occur while on an exercise or at a training facility/center? *(If yes, enter the name)* ☐ Yes ☑ No	

12. SUMMARY *(Attach a continuation sheet(s) as needed)*

The AO successfully launched the aircraft with no problems detected. The UA was flying in Points Nav mode with engine RPM at 5750, airspeed of 70 kts, at an altitude of 4850 feet AGL. At 2.7 flight hours the engine RPM started decreasing and the UA began losing altitude. After an Ignition Failure appeared on the operator's warning panel, the Flight Termination (FTS) was initiated and the parachute was successfully deployed. The UA impacted the ground incurring major but repairable damage. There were no injuries. The aircraft's reduction in RPM and subsequent engine failure was caused by a propulsion failure resulting from a materiel failure of the engine oil pump P/N AR73-0743. The failure of the oil pump was caused by a manufacturing error which resulted in the oil pump being installed on the engine after it had failed the cold temperature testing (TP 38529-65073).

(see continuation sheet)

13. FLIGHT DATA	Flight Duration	Phase of Operation (Enter max of 3 codes from Table 3-4 of DA Pam 385-40 or specify the phase if there is no code for it in the table)	Altitude MSL	Altitude AGL	Airspeed KIAS	UA Weight	UA Overgross Weight for Conditions Yes	No	14. TYPE EVENTS (Enter max of 3 codes from Appendix F table F-3 of DA Pam 385-40 or specify the type event which best describes the accident/incident event if there is no code for it in the table.)
a. At Emergency/ Onset	Hours 2 Tenths 7	G	5850	4850	70	338	☐	☑	
b. At Impact/Acdt or Termination	Hours 2 Tenths 7	6 R	1000	0	0	338	☐	☑	U33

c. Flight Ctrl Malfunction — Check all that apply: ☐ Human ☐ Environmental ☑ Materiel ☐ Hardware ☐ Software ☑ Component/Part ☐ Not Applicable

15. ACCIDENT CAUSE FACTORS *(For blocks 15a-c, D=definite, S=Suspected, U=Undetermined and N=No/None)*

a(1). System Inadequacies *(Enter max of 3 codes in each block below from table B-5 (Additional codes in table B-1) DA Pam 385-40 or if there is no code in the table, write in that which best describes the failure)*

a. Human Factors *(Check box D, S, U or N. If D or S, complete blocks 15a(1)(a)-(e))* ☐ D ☐ S ☐ U ☑ N

a(1)a. Support Failure	a(1)b. Standards Failure	a(1)c. Training Failure	a(1)d. Leader Failure

a(1)e. Individual Failure	b. Materiel Factors *(Check box D, S, U or N. If D or S, complete blocks 15b(1)-(2))* ☑ D ☐ S ☐ U ☐ N	b(1). Type *(Check all that apply.)* ☑ Component/Part ☐ Hardware ☐ Software

b(2). Component and Part *(Part that initiated failure/malfunction)*

	UAS Subsystem *(UA, GCS, GDT, TALS, etc.)*	Major Component	Part
a. Nomenclature		1101 Engine	Oil Pump
b. Type, Design, and Series			
c. Part Number		38529-41600-10	AR73-0743
d. NSN/ Manufacturer's Number			
e. Manufacturer's Code			97384
f. Serial Number		383	FT73-6358
g. Cause of Failure/ Malfunction		☐ Materiel ☐ Maintenance ☐ Design ☑ Manufacture	*(Enter the applicable Failure Codes (max 2) using table 1-2, DA Pam 738-751 (TAMMS-Aviation))* 602

c. Environmental Factors *(Check box D, S, U or N, as appropriate.)* ☐ D ☐ S ☐ U ☑ N

c(1). General *(Check all that apply.)* ☑ VMC ☐ IMC ☐ Icing ☐ Turbulence

c(2). Weather Conditions *(Enter max of 3 codes from Appendix F table 3-26 of DA Pam 385-40 or specify the weather condition if there is no code for it in the table.)*

c(3). Environmental Signal Factors ☐ Uplink ☐ Downlink ☐ Interference ☐ E[3] ☑ NA ☐ Other *(Specify)*

c(4). Other Environmental Factors *(Enter max of 3 codes from Appendix F table 3-27 of DA Pam 385-40 or specify the weather condition if there is no code for it in the table.)*

16. LOSS OF LINK *(Check box D, S, U or N. If D or S, complete blocks 16 a-d)* ☐ D ☐ S ☐ U ☑ N

a. Type of Link Lost ☐ Uplink ☐ Downlink ☐ Unknown

b. Type of Link ☐ LOS ☐ BLOS ☐ C-Band ☐ Ku-Band ☐ Other *(Specify)*

c. UA distance from the GCS at time of LOL

d. LOL Factors *(Check all that apply.)* ☐ Human ☐ Environment ☐ Materiel ☐ Hardware ☐ Software ☐ Component/Part

17. TAKE OFF/LANDING DATA *(Complete block 17a if accident occured during take-off phase and block 17b if during landing phase.)*

a. Take-Off (T/O) Phase	a(1). T/O Method ☐ ATLS ☐ Launcher ☐ Manual	a(2). T/O Accident Factors *(Check all that apply.)* ☐ Human ☐ Environment ☐ Materiel ☐ Hardware ☐ Software ☐ Component/Part
b. Landing Phase	b(1). Landing Method ☐ ATLS ☐ TALS ☐ FTS ☐ Manual	b(2). Landing Accident Factors *(Check all that apply.)* ☐ Human ☐ Environment ☐ Materiel ☐ Hardware ☐ Software ☐ Component/Part

18. TYPE OF STRIKE

☐ Wire ☐ Bird ☐ Tree ☐ Object ☐ Lighting ☐ Antenna ☑ N/A ☐ Other *(Specify)*

19. PERSONNEL DATA *(Complete for each crew member with access to flight controls, personnel injured/occupational illness, personnel having a contributing role in the accident; use additional forms if needed.)*

a. Name *(Last, First, MI)*	(1) SSN	(2) Grade	(3) Gender	(4) Duty	(5) SVC	(6) UIC *(Assigned)*	(7) Contributing Role	(8) On Fit Ctrls	(9) Lab Test
Operator, John J.	234-45-6789	E5	☑ Male ☐ Female	AO	A	wh6daa	☐ D ☐ S ☐ U ☑ N	☑ Yes ☐ No	☐ Pos ☑ Neg ☐ Not Required

(10) Activity		(11) Individual Status	(12) Injury/Occupational Illness	(13) MTDS Flt Hrs	(14) Total Flt Hrs
(a) Hrs Slept	8	(a) RL ☑ 1 ☐ 2 ☐ 3 ☐ Msn Prep ☐ Msn Qual	*(If "yes" complete and attach DA Form 2397-9)*		
(b) Hrs Worked	8	(b) FAC ☑ 1 ☐ 2 ☐ 3 ☐ NA *(SUAS Operators)*			
(c) Hrs Flown	2.7	(c) Redeployed Date *(YYYYMMDD)* 20100111	☐ Yes ☑ No	225	225

b. Name *(Last, First, MI)*	(1) SSN	(2) Grade	(3) Gender	(4) Duty	(5) SVC	(6) UIC *(Assigned)*	(7) Contributing Role	(8) On Fit Ctrls	(9) Lab Test
Payton, Sandra I.	987-65-4321	E5	☐ Male ☑ Female	PO	A	wh6daa	☐ D ☐ S ☐ U ☑ N	☐ Yes ☑ No	☐ Pos ☑ Neg ☐ Not Required

(10) Activity		(11) Individual Status	(12) Injury/Occupational Illness	(13) MTDS Flt Hrs	(14) Total Flt Hrs
(a) Hrs Slept	8	(a) RL ☑ 1 ☐ 2 ☐ 3 ☐ Msn Prep ☐ Msn Qual	*(If "yes" complete and attach DA Form 2397-9)*		
(b) Hrs Worked	8	(b) FAC ☑ 1 ☐ 2 ☐ 3 ☐ NA *(SUAS Operators)*			
(c) Hrs Flown	2.7	(c) Redeployed Date *(YYYYMMDD)* 20110101	☐ Yes ☑ No	100	100

c. Name *(Last, First, MI)*	(1) SSN	(2) Grade	(3) Gender	(4) Duty	(5) SVC	(6) UIC *(Assigned)*	(7) Contributing Role	(8) On Fit Ctrls	(9) Lab Test
			☐ Male ☐ Female				☐ D ☐ S ☐ U ☐ N	☐ Yes ☐ No	☐ Pos ☐ Neg ☐ Not Required

(10) Activity		(11) Individual Status	(12) Injury/Occupational Illness	(13) MTDS Flt Hrs	(14) Total Flt Hrs
(a) Hrs Slept		(a) RL ☐ 1 ☐ 2 ☐ 3 ☐ Msn Prep ☐ Msn Qual	*(If "yes" complete and attach DA Form 2397-9)*		
(b) Hrs Worked		(b) FAC ☐ 1 ☐ 2 ☐ 3 ☐ NA *(SUAS Operators)*			
(c) Hrs Flown		(c) Redeployed Date *(YYYYMMDD)*	☐ Yes ☐ No		

20. FINDINGS AND RECOMMENDATIONS *(See instructions in DA Pam 385-40, para 2-24, for writing findings and recommendations. Use additional sheets if needed)*

Finding 1 (Present and Contributing: Materiel Failure): During cruise flight on a day surveillance mission, the RQ-7B engine oil pump (P/N AR73-0743) failed reducing the oil flow to the UA's engine, increasing internal engine friction, causing excessive operating temperature and engine seal wear. As a result, during cruise flight the UA's engine failed. The UA descended with the parachute deployed impacting the ground causing major but repairable damage and no injuries.

The oil pump failure was caused by the manufacturer installing the oil pump after it failed the cold temperature testing (TP 38529 -65073). The sub-zero operating temperatures during the flight caused the oil pump's plunger alignment pin to disengage from the oil pump lift shaft alignment hole which resulted in a decreased or no oil flow to the engine.

(see recommendations on continuation sheet)

21. LIST OF ATTACHMENTS *(ECOD/ACOD, CCAD, PQDR, DA Forms 2397-series, etc.)*

AAI Engineering Investigation Report, PQDR W25KYJ840001, Board Appointment Orders, ECOD

22. BOARD PRESIDENT/ASO/POC *(Name, Signature, and Date)*	a. Grade	b. Branch	Address and Tel No. *(DSN and Com)*
Andrew T. Byrd/Board President 15 Feb 2012 SIGNATURE	W3	AV	HHC 2-726th Aviation Fort Douglle,TX 36363 323-2121 919-224-2121
	E-Mail: email@us.army.mil		

23. COMMAND REVIEW *(Only required for class A, B & C)*

Reviewer	Organization	Name *(Last, First, MI)*	Rank	Comments	Signature
a. Unit Commander	C Company,999th MI	Leader, William E.	CPT	☑ Concur ☐ Non-concur	
b. Reviewing Official	1st Squadron 1 ACR	Reviewer, Roy M	LTC	☑ Concur ☐ Non-concur	
c. Approving Authority	FORSCOM	Approver, Glen D.	Gen	☑ Concur ☐ Non-concur	
d. DA Review	USACR/SC			Approved for entry into ASMIS *(YYYYMMDD)*	

DA FORM 2397-U, FEB 2010

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APD PE v1.00ES

DA Form 2397-U, block 12 (Summary) (Cont'd), -- 201201111500XX02001

The sub-zero operating temperatures during the flight caused the oil pump's plunger alignment pin to disengage from the oil pump lift shaft alignment hole which resulted in little or no oil flow to the engine, increasing the internal engine friction, causing high engine temperatures and engine seal wear. The worn seals resulted in loss of engine compression and performance. The accident investigation board's conclusions are supported by the attached AAI engineering investigation report. PQDR Number W25KYJ840001.

DA Form 2397-U, block 20 (Recommendations) (Cont'd), -- 201201111500XX02001

RECOMMENDATION 1:

a. Unit-Level Action: Commander, 14TH MI Company, 1-1 ACR ensure all personnel comply with TFN 09-02 dated 9 March 2008 directing all units to use the fuel/oil mix for all missions until further notice and directs the operator to carefully monitor engine temperatures during flight.

b. Higher Level Action: None

c. DA Level Action: PEO Aviation investigate a replacement pump capable of operating at all temperatures.

UNMANNED AIRCRAFT SYSTEM ACCIDENT REPORT *(UASAR)*
Use for all UAS Aviation Accidents
For use of this form, see DA Pamphlet 385-40; the proponent agency is OCSA.

REQUIREMENTS CONTROL SYMBOL
CSOCS-309

1. ACCIDENT CASE INFORMATION	a. Date *(YYYYMMDD)* 20120515	b. Time *(Local)* 1555	c. UA Tail Number XX-00104
2. ACCIDENT CLASS/ CATEGORY	a. Classification ☐ A ☑ B ☐ C ☐ D ☐ E ☐ F	b. Category ☑ Flight ☐ Flight Related ☐ Aircraft Ground	**3. UAS MTDS** MQ-5B
4. PERIOD OF DAY ☑ Dawn ☐ Day ☐ Dusk ☐ Night	**5. AIRCRAFT INVOLVED** a. Number of Aircraft Involved 1	b. In Flight/Mid-Air Collision ☐ Yes ☑ No ☐ Unknown	**6. NEAREST MILITARY INSTALLATION** Fort Brown
7. ACCIDENT LOCATION	a. ☑ On-Post ☐ Off-Post	b. ☑ On Airfield ☐ Not on Airfield	c. City Bisbee; d. State GA; e. Country USA; f. Grid and/or Lat/Long 17M PU12345678

8. ORGANIZATION INVOLVED

a. Unit Designation	b. Unit Identification Code (UIC)	c. Home Station	d. Army Headquarters
C Company, 999th MI BN	WAY7FF	Fort Brown, GA	INSCOM

9. ACCOUNTABLE ORGANIZATION *(If same as block 8 leave blank)*

a. Unit Designation	b. Unit Identification Code (UIC)	c. Home Station	d. Army Headquarters

10. ACCIDENT COST DATA	a. UA Total Loss ☐ Yes ☑ No	b. UA Damage or replacement Cost *(Excluding Man-hours)* $ 566,000	c. Number of Man-Hours 50	d. Man-Hours Cost $ 2,050	e. Other UAS Sub-System Cost $
f. Other Damage Cost-Military $	g. Other Damage Cost-Civilian $	h. Injury/Occupational Illness $	i. Total Cost *(This UAS)* $ 568,050	j. Total Cost *(All Aircraft)* $	

11. GENERAL DATA	a. Mission	a(1). Type Mission T	a(2). Aircraft Mode ☑ Single-ship ☐ Multi-ship ☐ Manned/Unmanned Teaming	a(3). Level of Interoperability (LOI) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☑ NA
a(4). Simultaneous UA Operation? *(If Yes, specify number & MTDS)* ☐ Yes ☑ No			b. Flight Plan ☐ Military ☐ Civil ☑ Operation's Log	c. Flight Rules ☑ VFR ☐ IFR
d. Mission/ Training	d(1). At what level was mission/training conducted? ☐ Bde ☑ Bn ☐ Co ☐ Plt ☐ Sqd ☐ Team ☐ Crew			d(2). Who approved the mission/training? Rank & Position: LTC/ Battalion Commander
d(3). Was a mission brief completed? ☑ Yes ☐ No		d(4). Who was in charge during the mission? Rank & Position: ILT/ Platoon Leader		d(5). Who was the senior leader present during the mission/training? Rank & Position: SFC/Platoon Sgt
e. Risk Management (RM)	e(1). RM Performed? ☑ Yes ☐ No	e(2). Who performed the RM? Rank & Position: SFC/Platoon Leader	e(3). RM Approved? ☑ Yes ☐ No	e(4). Who accepted risks? Rank & Position: ILT/Platoon Leader
e(5). What was the level of the risk after controls applied? ☑ Low ☐ Moderate ☐ High ☐ Extremely High			e(6). How was the RM process communicated? *(Check all that apply.)* ☑ Worksheet ☐ Verbal Brief ☐ Order ☐ Not Communicated	
e(7). Accident event identified/considered during RM process? *If yes, complete blocks 11a(7)a thru 11e(7)d)* ☐ Yes ☑ No			e(7)a. What was the level of the identified risk? ☐ Low ☐ Moderate ☐ High ☐ Extremely High	
e(7)b. Was the control measure(s) applied? ☐ Yes ☐ No		e(7)c. Who was responsible for implementing the controls? Rank & Position:		e(7)d. Was the potential for accident event accepted as residual risk? ☐ Yes ☐ No
f. Digital Source Collector (DSC)	f(1). DSC installed? *(If yes, enter type of DSC)* ☑ Yes ☐ No STAR		f(2). Data captured and preserved? *(If yes, specify storage location)* ☑ Yes ☐ No Ground Control Station	
g. Fire ☑ None ☐ Inflight ☐ Postcrash ☐ Other *(Specify)*		h. Hazardous Material Spillage *If yes & a Class A, B or C accident, attach DA Form 2397-6)* ☐ Yes ☑ No	i. Did accident occur while on an exercise or at a training facility/center? *(If yes, enter the name)* ☐ Yes ☑ No	

12. SUMMARY *(Attach a continuation sheet(s) as needed)*

On final approach to landing, the student External Operator (EO) control inputs resulted in the UA veering off the runway centerline toward the EO student and the Instructor Operator (IO) who were located on the south edge of the runway. The IO took control of the UA and adjusted the flight path of the UA away from their location back toward the runway centerline by banking the UA 30 degrees to the right, but misjudged the rate of closure and altitude above the runway. The UA's right wing scraped the runway causing the IO to lose control of the UA. The UA then left the runway and crashed in a lightly vegetated ravine.

(see continuation sheet)

13. FLIGHT DATA	Flight Duration	Phase of Operation (Enter max of 3 codes from Table 3-4 of DA Pam 385-40 or specify the phase if there is no code for it in the table)	Altitude MSL	Altitude AGL	Airspeed KIAS	UA Weight	UA Overgross Weight for Conditions Yes	No	14. TYPE EVENTS (Enter max of 3 codes from Appendix F table F-3 of DA Pam 385-40 or specify the type event which best describes the accident/incident event if there is no code for it in the table.)
a. At Emergency/ Onset	Hours 1 Tenths 0	J	30	30	40	1478	☐	☑	
b. At Impact/Acdt or Termination	Hours 1 Tenths 0	R	0	0	30	1478	☐	☑	U28 U24

c. Flight Ctrl Malfunction — Check all that apply: ☑ Human ☐ Environmental ☐ Materiel ☐ Hardware ☐ Software ☐ Component/Part ☐ Not Applicable

15. ACCIDENT CAUSE FACTORS *(For blocks 15a-c, D=definite, S=Suspected, U=Undetermined and N=No/None)*

a(1). System Inadequacies *(Enter max of 3 codes in each block below from table B-5 (Additional codes in table B-1) DA Pam 385-40 or if there is no code in the table, write in that which best describes the failure)*

a. Human Factors *(Check box D, S, U or N. If D or S, complete blocks 15a(1)(a)-(e))* ☑ D ☐ S ☐ U ☐ N

a(1)a. Support Failure	a(1)b. Standards Failure	a(1)c. Training Failure	a(1)d. Leader Failure

a(1)e. Individual Failure	b. Materiel Factors (Check box D, S, U or N. If D or S, complete blocks 15b(1)-(2))	b(1). Type (Check all that apply.)
15 16	☐ D ☐ S ☐ U ☑ N	☐ Component/Part ☐ Hardware ☐ Software

b(2). Component and Part *(Part that initiated failure/malfunction)*

	UAS Subsystem (UA, GCS, GDT, TALS, etc.)	Major Component	Part
a. Nomenclature			
b. Type, Design, and Series			
c. Part Number			
d. NSN/ Manufacturer's Number			
e. Manufacturer's Code			
f. Serial Number			
g. Cause of Failure/ Malfunction		☐ Materiel ☐ Maintenance ☐ Design ☐ Manufacture	(Enter the applicable Failure Codes (max 2) using table 1-2, DA Pam 738-751 (TAMMS-Aviation))

c. Environmental Factors *(Check box D, S, U or N, as appropriate.)* ☐ D ☐ S ☐ U ☑ N

c(1). General *(Check all that apply.)* ☑ VMC ☐ IMC ☐ Icing ☐ Turbulence

c(2). Weather Conditions *(Enter max of 3 codes from Appendix F table 3-26 of DA Pam 385-40 or specify the weather condition if there is no code for it in the table.)* W1

c(3). Environmental Signal Factors ☐ Uplink ☐ Downlink ☐ Interference ☐ E[3] ☑ NA ☐ Other *(Specify)*

c(4). Other Environmental Factors *(Enter max of 3 codes from Appendix F table 3-27 of DA Pam 385-40 or specify the weather condition if there is no code for it in the table.)*

16. LOSS OF LINK *(Check box D, S, U or N. If D or S, complete blocks 16 a-d)* ☐ D ☐ S ☐ U ☑ N

a. Type of Link Lost ☐ Uplink ☐ Downlink ☐ Unknown

b. Type of Link ☐ LOS ☐ BLOS ☐ C-Band ☐ Ku-Band ☐ Other *(Specify)*

c. UA distance from the GCS at time of LOL

d. LOL Factors *(Check all that apply.)* ☐ Human ☐ Environment ☐ Materiel ☐ Hardware ☐ Software ☐ Component/Part

17. TAKE OFF/LANDING DATA *(Complete block 17a if accident occured during take-off phase and block 17b if during landing phase.)*

a. Take-Off (T/O) Phase	a(1). T/O Method ☐ ATLS ☐ Launcher ☐ Manual	a(2). T/O Accident Factors *(Check all that apply.)* ☐ Human ☐ Environment ☐ Materiel ☐ Hardware ☐ Software ☐ Component/Part
b. Landing Phase	b(1). Landing Method ☐ ATLS ☐ TALS ☐ FTS ☑ Manual	b(2). Landing Accident Factors *(Check all that apply.)* ☑ Human ☐ Environment ☐ Materiel ☐ Hardware ☐ Software ☐ Component/Part

18. TYPE OF STRIKE

☐ Wire ☐ Bird ☐ Tree ☐ Object ☐ Lighting ☐ Antenna ☐ N/A ☑ Other *(Specify)* Runway

19. PERSONNEL DATA *(Complete for each crew member with access to flight controls, personnel injured/occupational illness, personnel having a contributing role in the accident; use additional forms if needed.)*

a. Name *(Last, First, MI)*	(1) SSN	(2) Grade	(3) Gender	(4) Duty	(5) SVC	(6) UIC *(Assigned)*	(7) Contributing Role	(8) On Flt Ctrls	(9) Lab Test
Martin, Mary T.	001-01-1111	CAC	☐ Male ☑ Female	IO	C	way7ff	☑ D ☐ S ☐ U ☐ N	☑ Yes ☐ No	☐ Pos ☑ Neg ☐ Not Required

(10) Activity			(11) Individual Status	(12) Injury/Occupational Illness	(13) MTDS Flt Hrs	(14) Total Flt Hrs
	(a) Hrs Slept	9	(a) RL ☐ 1 ☐ 2 ☐ 3 ☐ Msn Prep ☐ Msn Qual	*(If "yes" complete and attach DA Form 2397-9)*		
	(b) Hrs Worked	8	(b) FAC ☐ 1 ☐ 2 ☐ 3 ☐ NA *(SUAS Operators)*	☐ Yes ☑ No	2,273	3,292
	(c) Hrs Flown	1	(c) Redeployed Date *(YYYYMMDD)*			

b. Name *(Last, First, MI)*	(1) SSN	(2) Grade	(3) Gender	(4) Duty	(5) SVC	(6) UIC *(Assigned)*	(7) Contributing Role	(8) On Flt Ctrls	(9) Lab Test
Richard M. Cantos	000-10-0001	CAC	☑ Male ☐ Female	EO	C	way7ff	☐ D ☐ S ☐ U ☑ N	☐ Yes ☑ No	☐ Pos ☑ Neg ☐ Not Required

(10) Activity			(11) Individual Status	(12) Injury/Occupational Illness	(13) MTDS Flt Hrs	(14) Total Flt Hrs
	(a) Hrs Slept	8	(a) RL ☐ 1 ☐ 2 ☐ 3 ☐ Msn Prep ☐ Msn Qual	*(If "yes" complete and attach DA Form 2397-9)*		
	(b) Hrs Worked	8	(b) FAC ☐ 1 ☐ 2 ☐ 3 ☐ NA *(SUAS Operators)*	☐ Yes ☑ No	15	1,800
	(c) Hrs Flown	1	(c) Redeployed Date *(YYYYMMDD)*			

c. Name *(Last, First, MI)*	(1) SSN	(2) Grade	(3) Gender	(4) Duty	(5) SVC	(6) UIC *(Assigned)*	(7) Contributing Role	(8) On Flt Ctrls	(9) Lab Test
			☐ Male ☐ Female				☐ D ☐ S ☐ U ☐ N	☐ Yes ☐ No	☐ Pos ☐ Neg ☐ Not Required

(10) Activity			(11) Individual Status	(12) Injury/Occupational Illness	(13) MTDS Flt Hrs	(14) Total Flt Hrs
	(a) Hrs Slept		(a) RL ☐ 1 ☐ 2 ☐ 3 ☐ Msn Prep ☐ Msn Qual	*(If "yes" complete and attach DA Form 2397-9)*		
	(b) Hrs Worked		(b) FAC ☐ 1 ☐ 2 ☐ 3 ☐ NA *(SUAS Operators)*	☐ Yes ☐ No		
	(c) Hrs Flown		(c) Redeployed Date *(YYYYMMDD)*			

20. FINDINGS AND RECOMMENDATIONS *(See instructions in DA Pam 385-40, para 2-24, for writing findings and recommendations. Use additional sheets if needed)*

FINDING 1: (Present and Contributing: Human Error- Individual Failure): While on final approach, performing touch and go landing training at 30 feet AGL and 40 KIAS, the Instructor Operator (IO) of the MQ-5B Unmanned Aircraft System (UAS) failed to estimate distance, rate of closure, and appropriate control input. That is, after the External Operator (EO) student allowed the aircraft to veer off the runway center line, the IO on the controls, failed to accurately judge the amount of control input required to properly maneuver the aircraft for a go-around in contravention of TC 1-600, Task 1177 (Perform Go-Around). As a result, the aircraft right wing tip made contact with the runway causing the IO to lose control of the aircraft. The aircraft incurred impact damage coming to rest in a ravine filled with light vegetation located 100 feet from the departure end of runway. There were no injuries.

(see continuation sheet)

21. LIST OF ATTACHMENTS *(ECOD/ACOD, CCAD, PQDR, DA Forms 2397-series, etc.)*

DA Form 2397-4, ECOD, Weight and Balance Sheet, Board Appointment Orders, Engineering Investigation, Toxicology Reports, Continuation sheet for blocks 12 and 20

22. BOARD PRESIDENT/ASO/POC *(Name, Signature, and Date)*	a. Grade	b. Branch	Address and Tel No. *(DSN and Com)*
James T. Cluck Board President MY SIGNATURE 3 July 12	O4	AV	HHC, 3BCT, 1ID Fort Riley, KS 232-3333 919-255-3333
	E-Mail: email@us.army.mil		

23. COMMAND REVIEW *(Only required for class A, B & C)*

Reviewer	Organization	Name *(Last, First, MI)*	Rank	Comments	Signature
a. Unit Commander	C CO 999th MI BN	Leader, Samuel L.		☑ Concur ☐ Non-concur	
b. Reviewing Official	99th MI BDE	Jones, James L.		☑ Concur ☐ Non-concur	
c. Approving Authority	INSCOM	Approver, Glen B.		☑ Concur ☐ Non-concur	
d. DA Review	USACR/SC			Approved for entry into ASMIS *(YYYYMMDD)*	

1. History of Flight.

a. Pre-flight Phase. The accident aircraft was the MQ-5B Hunter, serial number (S/N) XX00104. It was designed for short range, medium altitude reconnaissance missions. The Hunter belonged to C Company (Co), 999th Military Intelligence (MI) Battalion (Bn) Aerial Exploitation (AE). The purpose of the mission was to train Northrop Grumman civilians in unmanned aircraft operator (AO) and external operator (EO) procedures to prepare for Capabilities Based Rotation (CBR) in support of the missions in Iraq. The mission commander (MC) for the day was David Bethel. The AOs in the One System Ground Control Station (OSGCS) were student, Ty Illalobos, and instructor operator (IO), Max Spaulding. The EOs were student, Richard Cantos, and IO, Mary Martin. Crew chief (CE) was Alex Alexander. All were Northrop Grumman contractors (NGC).

The crew was notified on 14 May 2009 of the training mission. There was no sense of urgency for this mission. The Hunter was one of two aircraft used for training at Sun Army Airfield (SAAF).

C Co, 999th MI Bn (AE) was among three MQ-5B Hunter companies in the U.S. Army. The 999th MI Bn (AE) falls under the 99th MI Brigade stationed at Fort Brown, GA. The U.S. Army Intelligence & Security Command (INSCOM) was the Major Army Command. C Co also had a working relationship with members at the Program Manager Unmanned Aircraft System (PM UAS). PM UAS assisted C Co with any maintenance related shortages in order to enhance operations. Northrop Grumman Corporation was the contractor who produced the Hunter System and trained support personnel in the field. Northrop Grumman Corporation was based out of Serria Vista, AZ.

There was a joint effort between INSCOM, PM UAS, and Northrop Grumman to provide the logistical and maintenance support required to sustain flight operations.

C Co's mission was to provide deployable aerial imagery intelligence to combat theaters in support of combatant commanders and other war fighters conducting worldwide contingency operations. Operated by both Army operators and NGC, the Hunter UAS was capable of flying up to 21 hours.

Currently, C Co conducts a CBR which includes split based operations between Sun Army Airfield, GA, and Iraq. Since January 2008, C Co has maintained two sorties per day, consisting of one 14 hour reconnaissance mission and one 17 hour reconnaissance mission six days a week in support of Operation Iraqi Freedom (OIF). Additionally, C Co continued to conduct training missions at SAAF, GA. These training missions included one or two sorties facilitating local and range flights, under a Federal Aviation Administration Certificate of Authorization and they averaged 11.6 hours a week. Both mission operations forward and training operations at SAAF incorporate NGC.

In November 2007, Northrop Grumman provided C Co a five-person Contractor Logistic Support (CLS) team. The CLS team was organic to the company and included one AO, one EO, one mechanic, one technician, and one quality control. One member of the CLS team was designated as the site lead and worked directly for the company commander. Throughout this deployment, numerous other NGC have filtered through SAAF because it was the primary training site for Northrop Grumman. Any NGC personnel co-located with C Co followed their own regulations and aircrew training program. However, because both organizations worked so closely and for such durations, many of the training plans and policies were mirrored between the organizations. With the flow of

personnel, both contractors and Soldiers, during split based operations, without the CLS team, operations would suffer at SAAF.

Between the C Co Standardization Operator, SSG Mentor, and the CLS team site lead, Mary Martin, a weekly flight schedule was created and given to the company commander, CPT Justice (Rear Detachment) on Wednesday before the following training week. The flight schedule included the take off and launch times, type of flight, mission commander, and all operators and their positions throughout the duration of the flight. Depending on what training was required by the majority of the operators, the standardization operator scheduled range or local flight operations. More recently, C Co had conducted a local flight in the morning and a range flight in the afternoon, affording more take-off/land procedures for EOs and AOs. A local flight included "touch and go's" or a simulated landing/pass-through. During local flights, a payload was not used and the training was primarily for EOs. However, AOs were always present in the primary shelter. During range flights, a payload was installed and operational and flights generally range 40 kilometers from SAAF.

On 15 May 2009, all (NGC) crew members arrived at SAAF by 0800. The mission commander for the day, David Bethel, completed his necessary planning and paperwork and conducted the mission briefing at 0830. The flight schedule was approved 14 May 2009 by the rear detachment commander for the 15 May mission. The initial mission was a range mission, but due to the weather forecast, the mission was changed to a local pattern training mission. At 0930, the mission commander called the rear detachment company commander, CPT Justice, and indicated that there was low level wind shear and light to occasionally moderate turbulence in the forecast that would restrict the flight until they were lifted. At that time, CPT Justice provided a verbal order of the commander for a low-risk operation, once wind shears and turbulence were lifted from the forecast. At 1235, the mission commander called weather and received a verbal briefing that removed the wind shears and moderate turbulence.

b. Flight Phase. The Hunter took off at 1500 to conduct student touch and go training. Reported flight conditions at the time were slightly gusty winds from 190 degrees at 10 knots, gusting to 15 knots.

At 1555 after the EO student had successfully completed four touch and go landings, with the EO student on the controls, on final approach to landing, the EO student's control inputs resulted in the aircraft veering off the runway centerline towards the EO student and the IO who were located on the south edge of the runway. The IO took control of the aircraft after noticing the aircraft's errant flight path, slower than normal airspeed and excessively shallow approach angle. The IO adjusted the flight path of the aircraft away from their location back toward the runway centerline by banking the aircraft 30 degrees to the right, but misjudged the rate of closure and altitude above the runway. The aircraft's right wing scraped the runway causing the IO to lose control of the aircraft. The aircraft, touching down on the main landing gear, impacted the departure end of Runway 24, bounced twice on the grass sod area, and then crashed into a ravine filled with light vegetation.

c. Post-accident Phase. The aircraft came to rest upright in the ravine, the nose area (front engine) was resting upward on an area of grass and other vegetation; the tail area (rear engine) was slanted downward in the ravine. The aircraft was intact, sustaining airframe structural damage, the wings were attached and the engines were not running. No post-crash fire occurred. The mission commander was immediately notified and the post-accident plan was initiated. The recovery vehicle, along with the crew and crew chief, proceeded to the crash site to secure the aircraft. The battalion safety officer arrived at SAAF and took control of the site.

2. Human Factors Investigation.

a. Personnel Background.

(1) Ms. Martin is employed by Northrop Grumman Corporation as an UAS instructor operator. She has an extensive background and knowledge of the UAS, which began during her eight years in the U.S. Army. She has flown a total of 3,292 UAS flight hours, of which 2,273 were in the MQ-5B Hunter and has no previous record of safety violations or accidents.

(2) Mr. Cantos is an EO employed by Northrop Grumman Corporation. He has flown a total of 15 flight training hours in the MQ-5B. Mr. Cantos was a noncommissioned officer in the U.S. Army from 2003 to 2008. He was previously assigned to 82d Airborne Division and has over 1800 flight hours in the RQ-7 Shadow 200 and has no previous record of safety violations or accidents.

b. Personnel Management.

(1) Ms. Martin is an UAS instructor operator employed by Northrop Grumman Corporation. Ms. Martin is the designated CLS team leader assigned to 999th MI Bn. She is responsible for the planning and implementation of flight training plans for the U.S. Army and civilian contractors in support of continued combat operations and CBR to Iraq and Afghanistan.

(2) Mr. Cantos is an EO employed by Northrop Grumman Corporation and is presently undergoing training as an EO.

c. Aircraft Suitability. The MQ-5B Hunter was designed as a multi-mission, medium altitude endurance tactical unmanned aerial system optimized to provide division and corps commanders with a dedicated reconnaissance, surveillance, and target acquisition capability (RSTA). The MQ-5B conducts surveillance using its multi-mission optronic payload. It gathers RSTA and battle damage information and then relays it via video link to commanders and Soldiers on the ground. The payload also broadcasts its sensor data to ground control and mission monitoring stations, providing commanders with enhanced situation awareness and the ability to proactively plan and execute decisive combat operations. Post- accident weight and balance calculations computed by the accident board indicated that the accident aircraft was within allowable gross weight and power requirements for the assigned mission.

d. Communications. Investigation revealed not a factor.

e. Meteorological Information. Detachment 12, 12th Weather Squadron (ACC), Sun Army Airfield, GA, provided the weather forecast and observation. Forecast temperature was 79ºF, winds were 210 at 8 knots, and visibility was 7 statute miles. The pressure altitude was -31 feet and the altimeter was 30.06 inches of mercury. Low level wind shear and light to occasionally moderate turbulence was reported in the early morning hours for Fort Brown, beginning on 15 May 2009 at 0002 and ending on 15 May at 1024.

f. Ground Support Services. After the Hunter UAS impacted the ground, the mission commander was immediately notified and the post-accident plan was initiated. The recovery vehicle, along with the crew and crew chief, proceeded to the crash site. The battalion safety officer arrived at SAAF and took control of the site. The battalion safety officer received an initial summary of the incident and directed the EO student and IO to Bosley Army Community Hospital for blood and urine testing.

g. Special Investigation. None conducted.

h. Witness Investigation. The Accident Investigation Board interviewed numerous personnel during the course of the investigation. Summaries of these interviews are located at Tab E.

3. Materiel Factors Investigation.

a. Aircraft Airworthiness. The accident aircraft, MQ-5B Hunter UAS, S/N XX00104, was assigned to C Co, 999th MI Bn (AE), Brown Army Airfield, GA. A review of the maintenance records indicated that the aircraft was airworthy prior to the accident. The aircraft maintenance crew and aircraft operators and instructors did not report any discrepancies that would have prevented the aircraft from being airworthy. A review of the aircraft logbook and historical maintenance records DA Forms 2408-12, 2408-13, 13-2, and 2408-18 were current to the aircraft time. The maintenance records revealed only minor discrepancies.

The aircraft historical records revealed the aircraft had accumulated a total of 1208.2 hours prior to the accident (1.0 flight hours the day of the accident). The aircraft historical records were maintained in the Army Enhanced Logbook Automation System (ELAS). The aircraft was maintained with the following logbooks:

(a) Aircraft: MQ-5B, S/N XX00104
(b) Engine: Fwd, P/N 13488670-1, S/N 0690689F; AFT, P/N 13488671-1, S/N 0693457A
(c) Launch Recovery Terminal: S/N 0306
(d) Ground Data Terminal: S/N 0311
(e) Primary One System Ground Control Station: S/N 1005
(f) Back-up One System Ground Control Station: S/N 1007

b. Airframe. The aircraft's underside fuselage was extensively damaged as a result of the accident sequence. The lower and upper fuselage doors were fractured but remained on its hinges.

The nose landing gear was fractured and separated from the aircraft fuselage mounting bracket. The gear assembly sustained deformation damages (vertical bracket was twisted).

The main landing gear fractured and separated from the aircraft fuselage. The right side tire assembly was flat as a result of the impact forces. The cross tube assembly itself was minimally damaged.

The forward avionics bay compartment was fractured from the impact forces in the ravine. The avionics bay compartment area sustained crushing and fracture damage from the accident sequence.

c. Systems.

(1) Electrical System. The electronic power control and electronic power distribution visual examination indicated limited damage. The Downsized Air Data Terminal and Downsized Air Data Relay were not visibly damaged in the accident sequence; however, during the recovery of the aircraft, the lifting device (H-bar) contacted the top dome area, causing crushing/buckling damage.

(2) Fuel System. The main (center) fuel cell was not damaged and a fuel spill did not occur. The data float sensor revealed the aircraft main fuel cell contained 100 liters of fuel prior to the accident sequence. The left and right side wing fuel cells were empty. The wings were not fueled for this particular training mission. The aircraft has a capacity of 300 liters (main/190, left side/55, right side /55) of JP-8.

(3) Wing and Wing Extension. The left and right wings sustained damage from high force sudden stoppage when the air vehicle crashed into a ravine at the end of the runway.

The left wing topside sustained a 6 inch gouge on the leading edge at the formation light area, and a 6.5 inch crack at the center wing attachment bolt. There was cracking and buckling damage 6 inches outward from the attachment bolt area to the flap.

The underside of the left wing sustained buckling and cracking damages 4.5 inches outboard from the attachment bolt area, extending 12 inches along the trailing edge. An 8 inch crack was sustained starting at the attachment bolt with buckling damage. The underside revealed damages extending from the leading edge to the trailing edge of the wing and flap, extending 9 inches towards attachment fittings. The leading edge revealed a 1 inch gouge, 20 inches from the formation light. There was a 4 inch crack and buckling damage 9 inches inboard towards the leading edge.

The right wing sustained a 10 inch crack and upward buckling on the top and bottom of the wing, near the wing attachment bolt area, from the leading to the trailing edge. There was a 5 inch tear in the trailing edge of the wing caused by contact with the flap during the accident sequence. The inboard side of the flap sustained an 8 inch fracture due to sudden impact with the ravine during the accident sequence. The leading edge of the wing sustained several puncture gouges at 12 inches, 39 inches, 44 inches, and 53 inches from the formation lights.

(4) Flight Controls. The flight controls operated normally and were not a factor in the accident.

d. Power Plant. The aircraft was equipped with two Mercedes Benz original equipment manufacturer fwd, P/N 13488670, S/N 0690689F; and aft, P/N 13488671-1, S/N 0693457A, 0.8 liter Heavy Fuel Engines (HFE). The damage revealed by the engines and its components suggest the engines were producing power at the time of the impact with the ravine.

The fwd and aft engines revealed only minor visible damage, but sustained internal damages to the crankshaft clutch shoes, clutch hub, clutch drum, and clutch torsional damper assembly.

Both engines were shipped to Sierra Vista, AZ, for disassembly and examination of the internal components.

e. Flight Support Equipment. The OSGCS, S/N 1005, manned by two operators, tracks, commands, controls, and communicates with the air vehicle and its payload. The OSGCS can control one air vehicle or two air vehicles in relay. There were no anomalies reported by the OSGCS in this accident

f. Crash Site Information. The accident site was located at SAAF, GA. The aircraft impacted the departure end of Runway 24, bounced twice, once on the asphalt, again on the grass, and

crashed 100 feet from the departure end of runway 24 coming to a stop in a ravine filled with light vegetation. The aircraft's nose area (front engine) was resting upward on a grassy knoll and the tail area (rear engine) was slanted downward in the ravine.

g. Laboratory Analysis. The engine's oil samples were submitted to the Army Oil Analysis Program, Fort Bragg, NC, for analysis.

A fuel sample (JP-8) from the main fuel tank was submitted to the CCAD Chemical Process Branch or analysis (contaminates/moisture). A visual test of the sample was conducted and did not reveal any water or sediment.

h. Fire. There was no post-crash fire.

4. Analysis. After analyzing the human, materiel, and environmental data collected during the investigation, the Board concluded the accident was caused by Human Error. Rationale for this conclusion is as follows:

a. Accident Sequence. The Board reconstructed the accident sequence using numerous witness statements, interviews, photographs, and the accident site. The accident sequence, as determined by the Board, is described below. For the purposes of this analysis, the data from the primary OSGCS shelter was used for the overall analysis. All indications are that the Ground Data Terminal (GDT) and primary OSGCS experienced no anomalies from power or data link and thus was a reliable source of information from the aircraft, both pre-crash and post-crash.

At 1500, the Hunter UAS took off to conduct flight maneuvers for one EO in training and one AO in training. Local training was going well although the winds presented a slight challenge for the EO student. At 1555 with the EO student on the controls, on final approach to landing, at an airspeed of 40 knots and an altitude of 30 feet above ground level (AGL) the EO student's control inputs resulted in the aircraft veering off the runway centerline headed directly toward the EO student and the IO who were located midfield to the south of the runway centerline on the edge of the runway. The IO took control of the aircraft after noticing a lower than normal airspeed and excessively shallow approach angle. The IO adjusted the flight path of the aircraft away from their location back toward the runway centerline by placing the aircraft in a 30 degree right bank. Due to the close proximity of the aircraft to the runway's surface the aircraft's right wing scraped the runway causing the IO to lose control of the aircraft. The aircraft, touching down on the main landing gear, impacted the departure end of Runway 24, bounced twice on the grass sod area, and then crashed into a ravine filled with light vegetation located 100 feet from the departure end of runway 24. The aircraft sustained moderate damage. No post-crash fire occurred.

The mission commander was immediately notified and the post-accident plan was initiated. The recovery vehicle, along with the crew and crew chief proceeded to the crash site to secure the aircraft. The battalion safety officer arrived at SAAF and took control of the accident site.

b. Environmental. The Board evaluated meteorological and non-meteorological environmental factors and determined they did not contribute to the accident.

(1) Meteorological. Detachment 12, 12th Weather Squadron (ACC), Sun Army Airfield, GA, provided the weather forecast and observation. Forecast temperature was 79ºF, winds were 210 at 8 knots, and visibility was 7 statute miles. The pressure altitude was -31 feet and the altimeter was 30.06 inches of mercury. Low level wind shear and light to occasionally moderate turbulence was reported in the early morning hours for Fort Brown, beginning on 15 May 2009 at 0002 and ending on 15 May at 1024.

(2) Non-meteorological. The Board evaluated non-meteorological factors and determined they did not contribute to this accident. In the vicinity of the OSGCS, there was only one other OSGCS and one GDT, both used as a backup and directly supporting the training mission. No interference was noted in the data.

c. Materiel Factors. After conducting interviews, aircraft inspections, and review of all available documentation, the Board concluded that this accident was not caused by a materiel failure.

The accident aircraft was a MQ-5B Hunter UAS, S/N XX00104, assigned to C Co, 999th MI Bn (AE), Sun Army Airfield, GA. The aircraft historical records revealed the aircraft had accumulated

1208.2 flight hours prior to the accident sequence (1.0 flight hours the day of the accident). During preflight, the aircraft maintenance crew and aircraft operators and instructors did not report any discrepancies that would have prevented the aircraft from being airworthy.

All damage to the aircraft can be attributed to the right wing strike with the runway and the result of the impact forces with the asphalt, grass sod and the ravine during the accident sequence.

The air vehicle's takeoff weight was 1,612 pounds and the aircraft's weight at the time of the accident was approximately 1,478 pounds. The maximum allowable gross weight for the air vehicle was 1,950 pounds. The Board concluded that the aircraft was within maximum gross weight and center-of-gravity limits at the time of the accident.

(1) Aircraft Systems. All aircraft systems were operating during the flight. Post-accident evaluation of the software, fuel system, electrical system, flight controls, power plant, and gear boxes were functioning at the time of the accident.

(a) Fuel System. The electronic data did not record any fuel anomalies prior to the accident.

(b) Electrical System. Post-accident evaluation of the electrical system did not reveal any indications of an electrical system failure.

(c) Power Plant. Post-accident evaluation revealed that the engines were producing power at the time of the accident. Examination of the engines confirmed that the engines were operating as designed.

(4) Forms and Records. The aircraft records were being maintained in the Army ELAS. A review of the aircraft logbook and historical records indicated that the aircraft was airworthy. A review

of the logbook entries on the contractor forms revealed no discrepancies in any logbooks except the LRT. The LRT logbook was missing and no historical data was available. The LRT paper logbook was also missing at the time of the accident. The LRT did have a problematic history and at one time was not in use for approximately six months. During this time, C Co used two GDTs.

(5) Digital Source Collection. Data from the entire mishap flight was captured from both the controlling OSGCS and the back-up OSGCS. Data from the back-up OSGCS was used for overall analysis due to the data integrity. All indications revealed that the GDT and back-up OSGCS experienced no anomalies from power or data link.

d. Human Factors Investigation.

(1) Support. The Board reviewed all issues relating to support and concluded they did not contribute to this accident. The Board discovered that all daily, monthly, semi-annual, and annual preventive maintenance checks & services were conducted throughout the system IAW regulations, TMs, and checklists.

(2) Standards. The standards, policies, and procedures were evaluated and determined to be adequate and did not contribute to this accident.

(3) Training. The Board reviewed all issues relating to training and concluded that training did not contribute to this accident. Through interviews, the Board determined that the majority of the civilians arrive for training with some military training and experience in their background. All of the personnel involved in this flight were qualified IAW Army Regulation (AR) 95-23 and AR 95-20 or approved for training by the Government Flight Representative in the Hunter UAS. The training being conducted was consistent with that expected for EO student training. Training being conducted inside of the OSGCS was also consistent with that expected for instruction of aircraft operator duties and responsibilities while in the local traffic pattern with the EO controlling the aircraft.

(4) Leader/Command. The Board reviewed leadership and command factors and determined that leader failures did not contribute to this accident. The board assessed unit status reports, quarterly training briefings and unit policy and procedures for Composite Risk Management, mission planning and briefings and determined that all were appropriate. Communications up and down the chain of command were effective and routine.

(5) Individual. The Board determined that individual human error was present and did contribute to this accident. After taking control of the aircraft from the EO student, the IO failed to properly perform a go-around IAW TC 1-600, Task 1177 by failing to arrest the rate of descent. The IO misjudged the amount of control input and the rate of closure between the aircraft and the runway when the IO turned the aircraft back toward the runway centerline, causing the right wing of the aircraft to make contact with the surface of the runway. The IO was overconfident in her ability to adjust the aircraft back to the runway centerline, coupled with her excitement caused her to over control the aircraft in an attempt to steer the aircraft away from her location.

The IO's actions were a result of overconfidence in her ability to adjust the aircraft back to the runway center line and excitement causing her to overcontrol the aircraft in an attempt to direct the aircraft's flight path away from her location. The IO allowed the aircraft to descend too close to the runway when making a turn, resulting in aircraft damage.

RECOMMENDATION 1:

a. Unit Level Action: Commander C Company, 99th MI Battalion, inform all assigned personnel of the facts and circumstances surrounding this incident.

b. Higher Level Action: Commander USAACE, convene a working group from the user community to assess stand-off distance for Hunter emplacement from centerline of runway. Currently there is no established standard for stand-off distance for runways of varying widths.

c. Army Level Actions: Commander AMCOM, direct PEO Aviation to rapidly field the Automatic Takeoff and Landing System to reduce the exposure of operator personnel to landing aircraft.

http://www.apd.army.mil/pub/eforms/pureedge/a2397_u.xfdl

UNMANNED AIRCRAFT SYSTEM ACCIDENT REPORT *(UASAR)*
Use for all UAS Aviation Accidents
For use of this form, see DA Pamphlet 385-40; the proponent agency is OCSA.

REQUIREMENTS CONTROL SYMBOL CSOCS-309

1. ACCIDENT CASE INFORMATION	a. Date *(YYYYMMDD)*	b. Time *(Local)*	c. UA Tail Number
2. ACCIDENT CLASS/ CATEGORY	a. Classification ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F	b. Category ☐ Flight ☐ Flight Related ☐ Aircraft Ground	**3. UAS MTDS**
4. PERIOD OF DAY ☐ Dawn ☐ Day ☐ Dusk ☐ Night	**5. AIRCRAFT INVOLVED** a. Number of Aircraft Involved	b. In Flight/Mid-Air Collision ☐ Yes ☐ No ☐ Unknown	**6. NEAREST MILITARY INSTALLATION**
7. ACCIDENT LOCATION a. ☐ On-Post ☐ Off-Post	b. ☐ On Airfield ☐ Not on Airfield	c. City	d. State / e. Country / f. Grid and/or Lat/Long

8. ORGANIZATION INVOLVED

a. Unit Designation	b. Unit Identification Code (UIC)	c. Home Station	d. Army Headquarters

9. ACCOUNTABLE ORGANIZATION *(If same as block 8 leave blank)*

a. Unit Designation	b. Unit Identification Code (UIC)	c. Home Station	d. Army Headquarters

10. ACCIDENT COST DATA	a. UA Total Loss ☐ Yes ☐ No	b. UA Damage or replacement Cost *(Excluding Man-hours)* $	c. Number of Man-Hours	d. Man-Hours Cost $	e. Other UAS Sub-System Cost $
f. Other Damage Cost-Military $	g. Other Damage Cost-Civilian $	h. Injury/Occupational Illness $	i. Total Cost *(This UAS)* $	j. Total Cost *(All Aircraft)* $	

11. GENERAL DATA	a. Mission	a(1). Type Mission	a(2). Aircraft Mode ☐ Single-ship ☐ Multi-ship ☐ Manned/Unmanned Teaming	a(3). Level of Interoperability (LOI) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ NA
a(4). Simultaneous UA Operation? ☐ Yes ☐ No *(If Yes, specify number & MTDS)*			b. Flight Plan ☐ Military ☐ Civil ☐ Operation's Log	c. Flight Rules ☐ VFR ☐ IFR
d. Mission/ Training	d(1). At what level was mission/training conducted? ☐ Bde ☐ Bn ☐ Co ☐ Plt ☐ Sqd ☐ Team ☐ Crew		d(2). Who approved the mission/training? Rank & Position:	
d(3). Was a mission brief completed? ☐ Yes ☐ No	d(4). Who was in charge during the mission? Rank & Position:		d(5). Who was the senior leader present during the mission/training? Rank & Position:	
e. Risk Management (RM)	e(1). RM Performed? ☐ Yes ☐ No	e(2). Who performed the RM? Rank & Position:	e(3). RM Approved? ☐ Yes ☐ No	e(4). Who accepted risks? Rank & Position:
e(5). What was the level of the risk after controls applied? ☐ Low ☐ Moderate ☐ High ☐ Extremely High			e(6). How was the RM process communicated? *(Check all that apply.)* ☐ Worksheet ☐ Verbal Brief ☐ Order ☐ Not Communicated	
e(7). Accident event identified/considered during RM process? *If yes, complete blocks 11a(7)a thru 11e(7)d)* ☐ Yes ☐ No			e(7)a. What was the level of the identified risk? ☐ Low ☐ Moderate ☐ High ☐ Extremely High	
e(7)b. Was the control measure(s) applied? ☐ Yes ☐ No	e(7)c. Who was responsible for implementing the controls? Rank & Position:		e(7)d. Was the potential for accident event accepted as residual risk? ☐ Yes ☐ No	
f. Digital Source Collector (DSC)	f(1). DSC installed? *(If yes, enter type of DSC)* ☐ Yes ☐ No		f(2). Data captured and preserved? *(If yes, specify storage location)* ☐ Yes ☐ No	
g. Fire ☐ None ☐ Inflight ☐ Postcrash ☐ Other *(Specify)*		h. Hazardous Material Spillage *If yes & a Class A, B or C accident, attach DA Form 2397-6)* ☐ Yes ☐ No	i. Did accident occur while on an exercise or at a training facility/center? *(If yes, enter the name)* ☐ Yes ☐ No	

12. SUMMARY *(Attach a continuation sheet(s) as needed)*

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13. FLIGHT DATA	Flight Duration	Phase of Operation (Enter max of 3 codes from Table 3-4 of DA Pam 385-40 or specify the phase if there is no code for it in the table)	Altitude MSL	Altitude AGL	Airspeed KIAS	UA Weight	UA Overgross Weight for Conditions Yes	No	14. TYPE EVENTS (Enter max of 3 codes from Appendix F table F-3 of DA Pam 385-40 or specify the type event which best describes the accident/incident event if there is no code for it in the table.)
a. At Emergency/ Onset	Hours Tenths						☐	☐	
b. At Impact/Acdt or Termination	Hours Tenths						☐	☐	

c. Flight Ctrl Malfunction — Check all that apply: ☐ Human ☐ Environmental ☐ Materiel ☐ Hardware ☐ Software ☐ Component/Part ☐ Not Applicable

15. ACCIDENT CAUSE FACTORS *(For blocks 15a-c, D=definite, S=Suspected, U=Undetermined and N=No/None)*

a(1). System Inadequacies *(Enter max of 3 codes in each block below from table B-5 (Additional codes in table B-1) DA Pam 385-40 or if there is no code in the table, write in that which best describes the failure)*

a. Human Factors *(Check box D, S, U or N. If D or S, complete blocks 15a(1)(a)-(e))* ☐ D ☐ S ☐ U ☐ N

a(1)a. Support Failure	a(1)b. Standards Failure	a(1)c. Training Failure	a(1)d. Leader Failure
a(1)e. Individual Failure	b. Materiel Factors *(Check box D, S, U or N. If D or S, complete blocks 15b(1)-(2))* ☐ D ☐ S ☐ U ☐ N	b(1). Type *(Check all that apply.)* ☐ Component/Part ☐ Hardware ☐ Software	

b(2). Component and Part *(Part that initiated failure/malfunction)*

	UAS Subsystem *(UA, GCS, GDT, TALS, etc.)*	Major Component	Part
a. Nomenclature			
b. Type, Design, and Series			
c. Part Number			
d. NSN/ Manufacturer's Number			
e. Manufacturer's Code			
f. Serial Number			
g. Cause of Failure/ Malfunction		☐ Materiel ☐ Maintenance ☐ Design ☐ Manufacture	*(Enter the applicable Failure Codes (max 2) using table 1-2, DA Pam 738-751 (TAMMS-Aviation))*

c. Environmental Factors *(Check box D, S, U or N, as appropriate.)* ☐ D ☐ S ☐ U ☐ N

c(1). General *(Check all that apply.)* ☐ VMC ☐ IMC ☐ Icing ☐ Turbulence

c(2). Weather Conditions *(Enter max of 3 codes from Appendix F table 3-26 of DA Pam 385-40 or specify the weather condition if there is no code for it in the table.)*

c(3). Environmental Signal Factors ☐ Uplink ☐ Downlink ☐ Interference ☐ E[3] ☐ NA ☐ Other *(Specify)*

c(4). Other Environmental Factors *(Enter max of 3 codes from Appendix F table 3-27 of DA Pam 385-40 or specify the weather condition if there is no code for it in the table.)*

16. LOSS OF LINK *(Check box D, S, U or N. If D or S, complete blocks 16 a-d)* ☐ D ☐ S ☐ U ☐ N

a. Type of Link Lost ☐ Uplink ☐ Downlink ☐ Unknown

b. Type of Link ☐ LOS ☐ BLOS ☐ C-Band ☐ Ku-Band ☐ Other *(Specify)*

c. UA distance from the GCS at time of LOL

d. LOL Factors *(Check all that apply.)* ☐ Human ☐ Environment ☐ Materiel ☐ Hardware ☐ Software ☐ Component/Part

17. TAKE OFF/LANDING DATA *(Complete block 17a if accident occured during take-off phase and block 17b if during landing phase.)*

a. Take-Off (T/O) Phase	a(1). T/O Method ☐ ATLS ☐ Launcher ☐ Manual	a(2). T/O Accident Factors *(Check all that apply.)* ☐ Human ☐ Environment ☐ Materiel ☐ Hardware ☐ Software ☐ Component/Part
b. Landing Phase	b(1). Landing Method ☐ ATLS ☐ TALS ☐ FTS ☐ Manual	b(2). Landing Accident Factors *(Check all that apply.)* ☐ Human ☐ Environment ☐ Materiel ☐ Hardware ☐ Software ☐ Component/Part

18. TYPE OF STRIKE

☐ Wire ☐ Bird ☐ Tree ☐ Object ☐ Lighting ☐ Antenna ☐ N/A ☐ Other *(Specify)*

19. PERSONNEL DATA *(Complete for each crew member with access to flight controls, personnel injured/occupational illness, personnel having a contributing role in the accident; use additional forms if needed.)*

a. Name *(Last, First, MI)*	(1) SSN	(2) Grade	(3) Gender ☐ Male ☐ Female	(4) Duty	(5) SVC	(6) UIC *(Assigned)*	(7) Contributing Role ☐ D ☐ S ☐ U ☐ N	(8) On Fit Ctrls ☐ Yes ☐ No	(9) Lab Test ☐ Pos ☐ Neg ☐ Not Required
(10) Activity (a) Hrs Slept (b) Hrs Worked (c) Hrs Flown	(11) Individual Status (a) RL ☐ 1 ☐ 2 ☐ 3 ☐ Msn Prep ☐ Msn Qual (b) FAC ☐ 1 ☐ 2 ☐ 3 ☐ NA *(SUAS Operators)* (c) Redeployed Date *(YYYYMMDD)*					(12) Injury/Occupational Illness *(If "yes" complete and attach DA Form 2397-9)* ☐ Yes ☐ No		(13) MTDS Fit Hrs	(14) Total Fit Hrs
b. Name *(Last, First, MI)*	(1) SSN	(2) Grade	(3) Gender ☐ Male ☐ Female	(4) Duty	(5) SVC	(6) UIC *(Assigned)*	(7) Contributing Role ☐ D ☐ S ☐ U ☐ N	(8) On Fit Ctrls ☐ Yes ☐ No	(9) Lab Test ☐ Pos ☐ Neg ☐ Not Required
(10) Activity (a) Hrs Slept (b) Hrs Worked (c) Hrs Flown	(11) Individual Status (a) RL ☐ 1 ☐ 2 ☐ 3 ☐ Msn Prep ☐ Msn Qual (b) FAC ☐ 1 ☐ 2 ☐ 3 ☐ NA *(SUAS Operators)* (c) Redeployed Date *(YYYYMMDD)*					(12) Injury/Occupational Illness *(If "yes" complete and attach DA Form 2397-9)* ☐ Yes ☐ No		(13) MTDS Fit Hrs	(14) Total Fit Hrs
c. Name *(Last, First, MI)*	(1) SSN	(2) Grade	(3) Gender ☐ Male ☐ Female	(4) Duty	(5) SVC	(6) UIC *(Assigned)*	(7) Contributing Role ☐ D ☐ S ☐ U ☐ N	(8) On Fit Ctrls ☐ Yes ☐ No	(9) Lab Test ☐ Pos ☐ Neg ☐ Not Required
(10) Activity (a) Hrs Slept (b) Hrs Worked (c) Hrs Flown	(11) Individual Status (a) RL ☐ 1 ☐ 2 ☐ 3 ☐ Msn Prep ☐ Msn Qual (b) FAC ☐ 1 ☐ 2 ☐ 3 ☐ NA *(SUAS Operators)* (c) Redeployed Date *(YYYYMMDD)*					(12) Injury/Occupational Illness *(If "yes" complete and attach DA Form 2397-9)* ☐ Yes ☐ No		(13) MTDS Fit Hrs	(14) Total Fit Hrs

20. FINDINGS AND RECOMMENDATIONS *(See instructions in DA Pam 385-40, para 2-24, for writing findings and recommendations. Use additional sheets if needed)*

21. LIST OF ATTACHMENTS *(ECOD/ACOD, CCAD, PQDR, DA Forms 2397-series, etc.)*

22. BOARD PRESIDENT/ASO/POC *(Name, Signature, and Date)*	a. Grade	b. Branch	Address and Tel No. *(DSN and Com)*
	E-Mail		

23. COMMAND REVIEW *(Only required for class A, B & C)*

Reviewer	Organization	Name *(Last, First, MI)*	Rank	Comments	Signature
a. Unit Commander				☐ Concur ☐ Non-concur	
b. Reviewing Official				☐ Concur ☐ Non-concur	
c. Approving Authority				☐ Concur ☐ Non-concur	
d. DA Review	USACR/SC			Approved for entry into ASMIS *(YYYYMMDD)*	

http://www.apd.army.mil/pub/eforms/pureedge/a7305.xfdl

WORKSHEET FOR
TELEPHONIC NOTIFICATION OF AVIATION ACCIDENT/INCIDENT
For use of this form, see AR 385-10; the proponent agency is OCSA

[redacted]

NOTE: ITEMS 24 AND 25 ARE NOT REQUIRED FOR CLASS C ACCIDENT

1. POINT OF CONTACT FOR ACCIDENT INFORMATION — a. Name

Duty ☐ Commander ☐ Safety Officer ☐ Other *(Specify)* — c. Phone Number DSN: Commercial:

2. ACCIDENT CLASSIFICATION ☐ A ☐ B ☐ C

3. TIME & DATE OF ACCIDENT — a. Year | b. Month | c. Day | d. Time *(local)*

4. AIRCRAFT SERIAL NUMBER

5. TYPE OF AIRCRAFT

6. PERIOD OF DAY ☐ Dawn ☐ Dusk ☐ Day ☐ Night

7. MISSION BEING PERFORMED — a. Type *(Training, Svc, etc.)* — b. Operation ☐ Single-Ship ☐ Multi-Ship

8. NOE ☐ Yes ☐ No

9. NIGHT VISION DEVICE — a. In Use ☐ Yes ☐ No — b. If Yes ☐ ANVIS ☐ FLIR ☐ AN/PVS-5 ☐ LLTV

10. UNIT OWING AIRCRAFT

11. MACOM

12. MILITARY INSTALLATION NEAREST ACCIDENT SITE

13. EXACT ACCIDENT LOCATION

CHECK "YES" or "NO" FOR QUESTIONS 14 THROUGH 19	Yes	No
14. EXPLOSIVE/HAZARDOUS/SENSITIVE MATERIALS INVOLVED?		
15. IF YES TO #14, ARE THEY SECURE?		
16. ACCIDENT SITE SECURED IAW AR 385-10?		
17. HAS ACCIDENT SCENE BEEN DISTURBED?		
18. IF YES TO #17, WERE PHOTOS, ETC. MADE BEFORE DISTURBING THE SCENE?		
19. FLIGHT DATA RECORDER INSTALLED?		

20. CLEARANCE WAS: ☐ VFR ☐ IFR

21. PERSONNEL INVOLVED — a. No. of Personnel by Rank/Category: ____ Officer ____ WO ____ Enlisted ____ Army Civilian ____ Non-Army Civilian — b. Total No. of Personnel — c. Highest Rank

22. INJURIES *(Enter # of each)* ____ Fatalities ____ Non-Fatal Injuries — As soon as possible, the following additional information is required on all injured personnel; name, personnel classification, degree of injury, and SSAN.

23. ACCIDENT SYNOPSIS *(What Happened)*

24. NEWS MEDIA AWARE OF ACCIDENT ☐ Yes ☐ No

25. NEAREST AIRFIELD — a. Nearest that can handle C-12 *(4,000 ft. min.)* — b. Nearest commercial airfield

26. WHO WILL INVESTIGATE? — a. Installation Level Accident Investigation *(IAI)* Board Appointed ☐ Yes ☐ No [redacted]

DA FORM 7305, AUG 2007 — DA FORM 7305, APR 94, IS OBSOLETE. — APD PE v1.00