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CLASSIFICATION: Unclassified

FROM: Air National Guard (ANG)

SUBJECT: Final: On-Duty, Class C, 20 FEB 2019, Aviation, Aircraft Flight/Manned, Aircraft/F-15C, Portland IAP ANG, Event Report # 802428
Privacy Act Statement

Authority: Title 5, U.S.C. 552a, The Privacy Act of 1974, Title 10, U.S.C. 8013, and E.O. 9397, Numbering System for Federal Accounts Relating to Individual Persons.

Principal Purposes: Safety Event Reporting.

Routine Uses: Safety Event Reporting.

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1. GENERAL INFORMATION

AFSAS Report Number: 802428

Unit Control Number: --

One Liner: F-15C LANDING GEAR MALFUNCTION AFTER TAKEOFF; DAMAGE UPON LANDING; NO INJURIES

Convening Authority: Air National Guard

Accounting MAJCOM, DRU or FOA: Air National Guard

Accounting Wing: 142 Fighter Wing

Accounting Base: Portland IAP ANG

Accounting Office Symbol: --

Event Duty Status: On-Duty

Event Type:

Tier 1: System Failure or Malfunction (Non-Powerplant)

Tier 2: Landing Gear/Skids

2. EVENT DATE/TIME

Event Date, Local: 20 FEB 2019

Event Time, Local: 1255

3. EVENT LOCATION

Location Description: --

Event Country: United States (USA)

US State: Oregon

On Base: Yes

Nearest Base: Portland IAP ANG

Latitude: 45 34.954 N

Longitude: 122 35.359 W

4. NARRATIVE

4.2. MISHAP OVERVIEW

4.2.1. HISTORY OF EVENT

On 20 Feb 2019 the mishap flight (MF) was scheduled as a two-ship F-15C alert practice scramble for a Continuation Training (CT) sortie with two other flights of four F-15Cs. The MF accomplished mission planning the day prior to the mishap sortie. The alert F-15Cs were each loaded with four live AIM-120C missiles, two live AIM-9X missiles, 48 MJU-10 flares and 940 rounds of 20 mm ammunition. The mission briefing and scramble ground operations were unremarkable and the MF performed an afterburner takeoff at 0828L.

After takeoff the Mishap Pilot (MP) raised the landing gear (LG) control handle. At 280 knots, the MP recognized the landing gear warning light and the left main gear (LMLG) light was green, indicating it had not retracted. The MP notified the Mishap Flight Lead (MFL) of the landing gear problem and the MFL coordinated with Air Traffic Control (ATC) for a block altitude to troubleshoot the problem. The MFL gave the navigation lead to the MP and transitioned to a chase position behind the Mishap Aircraft (MA).

The MFL notified the Supervisor of Flying (SOF) of the malfunction and requested assistance reading the checklist. The MP informed the MFL and SOF that with the LG control handle in the up position, the light in the handle was on, the LMLG light was green, and he had an anti-skid light. Upon initial inspection the MFL noted that the LMLG appeared to be down and locked, with the forward doors in the open position. In accordance with (IAW) the Landing Gear Fails to Retract checklist the MP lowered the LG control handle and obtained normal gear down indications of three green gear lights, the red warning light in the handle was out, and the anti-skid light extinguished. The MFL observed all gear appeared to be down and locked. IAW TO 1F-15A-1CL-1, the MP raised the LG control handle and received the same indications as before, the LMLG light remained green with the forward doors open and the nose and right main gear retracted normally, resulting in a red light in the LG control handle and an anti-skid light.

Given these indications, the SOF and MF concluded the TO 1-F-15A-1CL-1 directs the pilot to suspect a jury link failure, leading to an approach end arrestment. The MF declared the inflight emergency (IFE) with ATC and began coordination with the SOF and Operations Supervisor (OPS SUP) for the landing gear emergency landing. The MFL directed the MP to lower the arresting hook IAW the Approach End Arrestment checklist. The Landing Gear Emergency-Landing checklist directed the aircrew to "Jettison armament and chaff / flares..." The MF obtained a clearance to the overwater airspace to prepare for the armament jettison. Once the external fuel tanks were dry the MP lowered the LG control handle.

The OPS SUP directed the Chief of Stan/Eval (OGV) to make the Conference Hotel (CH) phone call to Boeing to discuss the IFE. The CH concurred with OGV's decision to suspect jury link failure based on the information provided, and the TO 1-F-15A-1CL-1.

While the MF was awaiting assistance from the CH the MFL obtained approval from the SOF and then directed the MP to expend all of the flares once they were established in the airspace. The flares were dispensed uneventfully.

While still awaiting information from the CH the MF and SOF coordinated a rendezvous with Expo 91, a KC-135 from a nearby track, to conduct aerial refueling in order to allow additional time to gather plans surrounding the potential missile jettison prior to the approach end arrestment.

Approximately 10 minutes after expending all flares the SOF directed the MP to cycle the landing gear for the CH. After the MP lowered the LG control handle, the MFL observed no movement on the left side and a puff of hydraulic fluid on the right side. Additionally, the MFL observed the right main gear was now covered in hydraulic fluid and directed the MP to check the hydraulic pressures to ensure there were no abnormal indications. The MP verified that there were no abnormal indications and tested the cockpit warning lights to ensure that no lights were burned out - all indications appeared normal when the LG control handle was lowered. Due to normal hydraulic indications, no further troubleshooting regarding the hydraulic fluid observation was accomplished.

While still awaiting the armament jettison plan, the MF conducted its first aerial refueling. The MFL lowered his landing gear in order to determine if it would be possible to refuel in that configuration at an airspeed of 230 knots. Both the MFL and MP were able to refuel uneventfully.

During coordination with the CH line, the Boeing representative informed OGV that they were pretty certain the LMLG would collapse upon landing. The Director of Ops (DO) coordinated with Weapons System Evaluation Program (WSEP) experts on the best way to mitigate risk during the jettison and firing of live missiles. They determined, and relayed to the MF, that they would need a 40 nautical mile (NM) long by 12 NM wide "shooting lane" at the lowest possible altitude. The squadron weapons officer relayed the procedures to jettison and fire the missiles to the MF.

After establishing the procedures to jettison and fire the missiles (but retain the 20 mm ammunition) the MF refueled uneventfully a second time and prepared for the jettison and firing. The MFL attempted a range sweep and determined that the initial shooting lane was obscured by clouds and was unable to verify the lane was clear of ships. The MFL coordinated with the SOF and WADS (Western Air Defense Sector) to shift the lane 25 NM to the southwest. The SOF and OPS SUP verified the area was clear by obtaining shipping lane traffic data while the MFL performed a range sweep of the entire shooting lane. The MFL coordinated with ATC to verify no civilian air traffic was a factor.

The MP conducted three passes to expend the armament. On the first pass the MP selectively jettisoned the AIM-120C located on station 3 (left side of fuselage), followed by the AIM-120C on station 7 (right side of fuselage). The MFL observed the missiles separate from the MA and impact the water, marking the coordinates and observing that they appeared to break apart upon impact.

The MP conducted two more passes firing the AIM-120Cs on the second pass and the AIM-9Xs on the third pass. After the third pass was complete the MF proceeded to the tanker for the third and final aerial refueling, receiving fuel uneventfully. The MF and SOF discussed the approach end arrestment procedures and accomplished all checklist items. The MP lowered the arresting hook and began his

return to base (RTB).

The MP flew an Instrument Landing System approach to runway 28L with the MFL in chase position. IAW the TO 1F-15A-1CL-1, to counter potential wing drop after touchdown, the MP maintained an 18 CPU (cockpit unit of AOA) approach, approximately 180 knots calibrated airspeed, and landed approximately 1,300 feet beyond the threshold, 700 feet prior to the Barrier Arrestment Kit (BAK)-12B cable. Upon touchdown, the LMLG did not collapse and the MP lowered the nosewheel to the runway. The nosewheel rose off the runway again, resulting in a slightly nose high engagement attitude with the nosewheel approximately one foot above the runway and with the control stick in the neutral position. Immediately upon engaging the cable at 152 knots (eight knots below the maximum engagement speed of 160 knots based on aircraft weight), the MA's arresting hook immediately moved to the full up position. The cable impacted the left horizontal stabilator, left tail cone, left engine exhaust, right engine exhaust, and the right tail internal countermeasures set (ICS) antenna. After the cable slowed the MA to a stop, fire and maintenance response crews shut the MA down uneventfully. The MA was pinned and towed to a maintenance hangar for evaluation.

4.2.2. INVESTIGATOR CONCLUSIONS



4.3. BACKGROUND INFORMATION

4.3.1. MISHAP PERSONS

4.3.1.1 MISHAP PILOT (MP)

Duty History:

Student JSUPT, Vance AFB, OK.....Jul 14 - Nov 15
IFF, Sheppard AFB, TX.....Jan 16 - Feb 16
FTU Student, Kingsley Field, OR.....Apr 16 - Nov 16
F-15C Pilot, Portland ANGB, OR.....Nov 16 - Present

Time Totals:

F-15C Total.....398.7
Overall Career Total...611.2

F-15C 30/60/90 Day History:

30 Day: 15.3 hrs 9 sorties

60 Day: 26.0 hrs 16 sorties

90 Day: 44.0 hrs 26 sorties



4.3.1.2 MISHAP FLIGHT LEAD (MFL)

Duty History:

Student ENJJPT, Sheppard AFB, TX.....May 00 - Jun 01
IFF, Randolph AFB, TX.....Aug 01 - Sep 01
FTU Student, Kingsley Field, OR.....Oct 01 - Apr 02
F-15C Pilot, Elmendorf AFB, AK.....Jun 02 - Mar 05
Air Liaison Officer (ALO), Nellis AFB, NV.....Apr 05 - Apr 07
F-15C Pilot, Tyndall AFB, FL.....May 07 - Aug 07
F-15C Pilot, Eglin AFB, FL.....Aug 07 - Mar 11
F-15C Pilot, Kingsley Field, OR.....Apr 11 - Nov 17
F-15C Pilot, Portland ANGB, OR.....Nov 17 - Present

Time Totals:

F-15C Total.....2166.9
Overall Career Total...2496.9

F-15C 30/60/90 Day History:

30 Day: 10.1 hrs 6 sorties
60 Day: 16.2 hrs 10 sorties
90 Day: 29.0 hrs 15 sorties



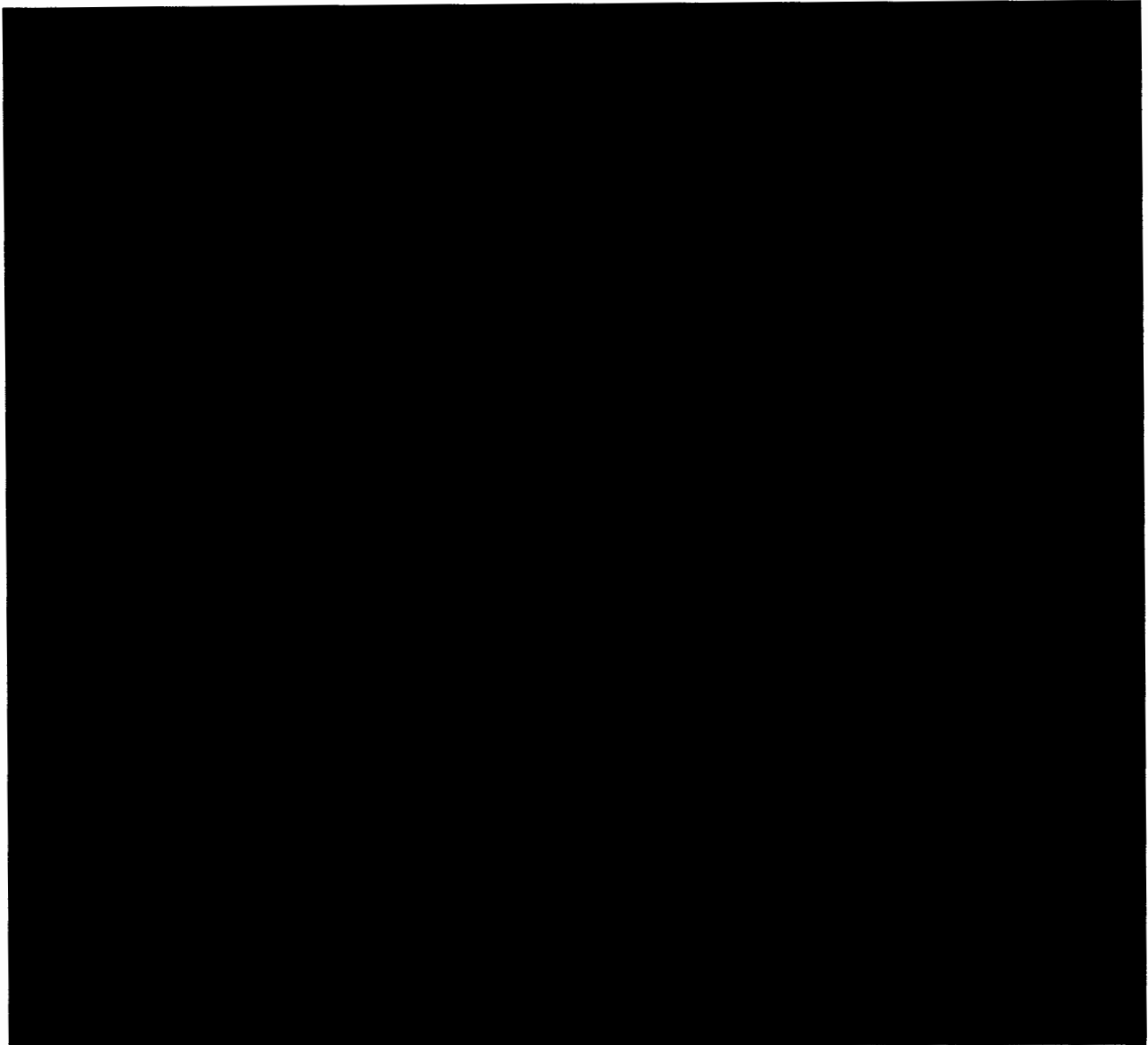
4.3.2. MISHAP AIRCRAFT (MA)

The SIB reviewed all aircraft records for unusual trends, discrepancies, or circumstances. Historical records show that the LMLG, serial number 3168041623, received new internal packings on 18 Mar 2015 (LMLG re-packed), and was re-installed on 07 Apr 2015. This specific LMLG was modified by Time Compliance Technical Order (TCTO) 1F-15-1680 on 07 Jul 2017, to receive a newly manufactured upper jury link, replacing the previous jury link that was prone to failure. The MA's last major hourly post flight (HPO) inspection was completed on 31 Jul 2018 at 8495.9 operating hours.

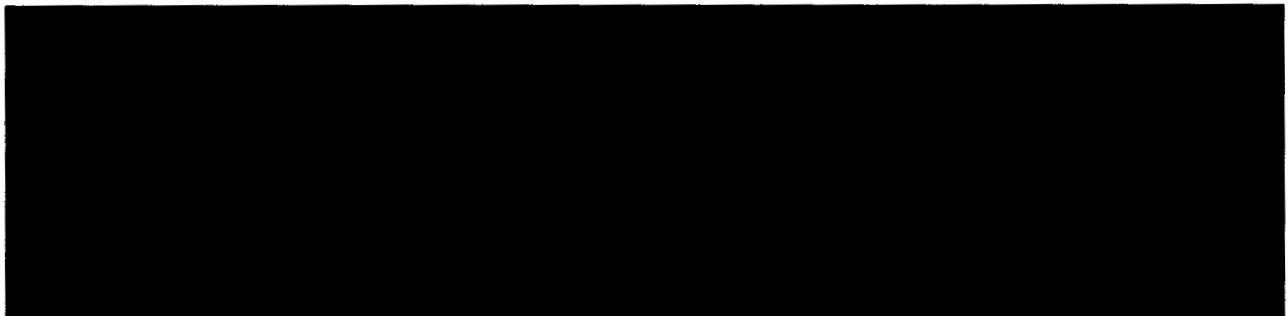
The phase was the last major inspection that the door open limit switch and the arresting hook actuator were functionally tested, 143.8 flying hours prior to this mishap. This actuator was also serviced due to low pressure on 06 Feb 2019, 14 days prior to the mishap.

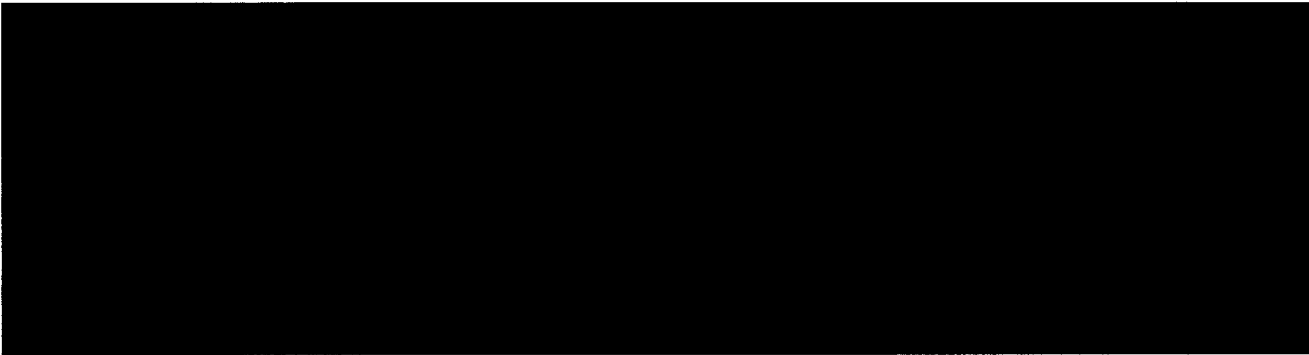
4.3.3. GENERAL BACKGROUND INFORMATION

4.3.3.1. LANDING GEAR AND ANTI-SKID LIGHT OPERATION

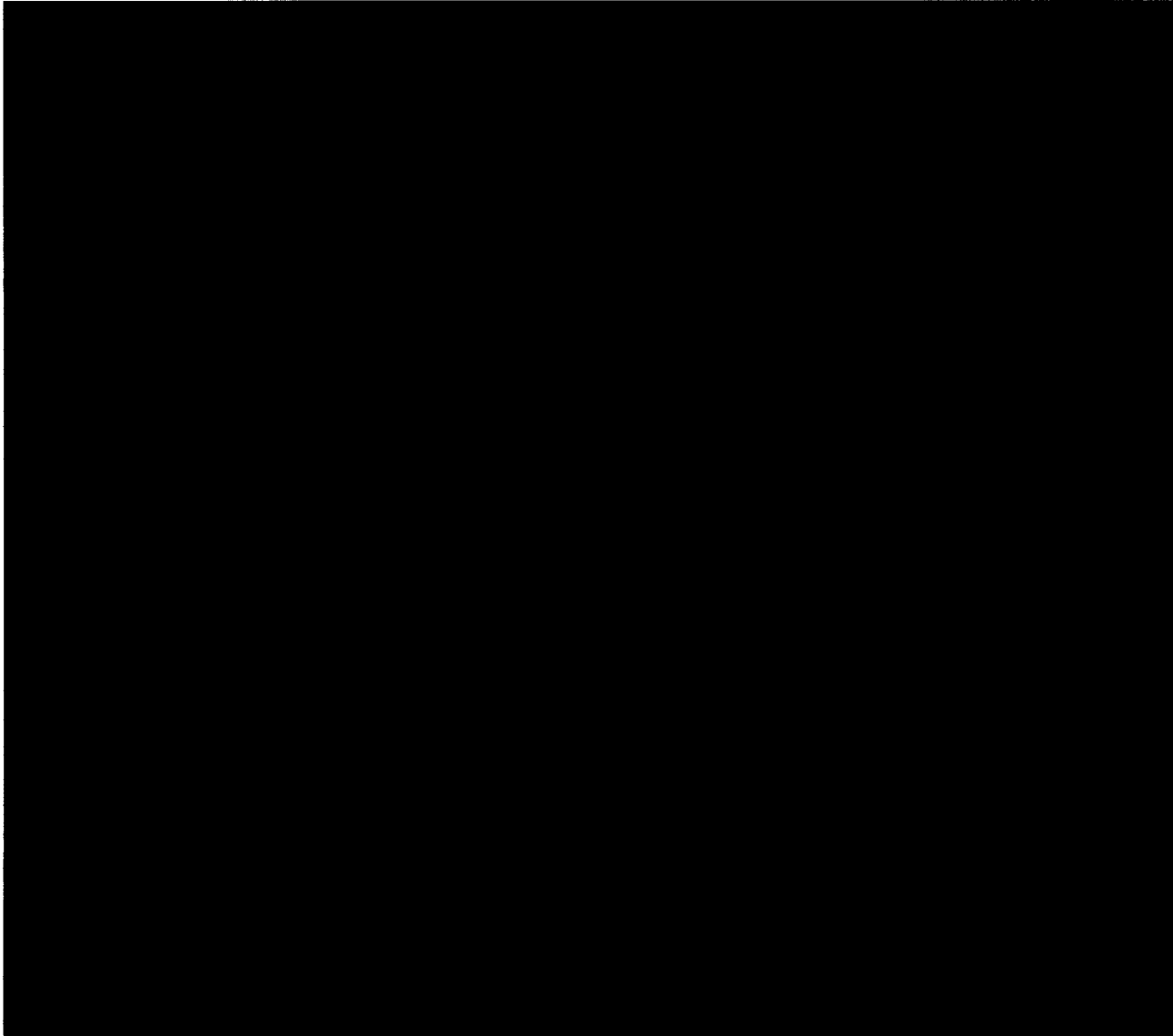


4.3.3.2. JURY LINK HISTORY

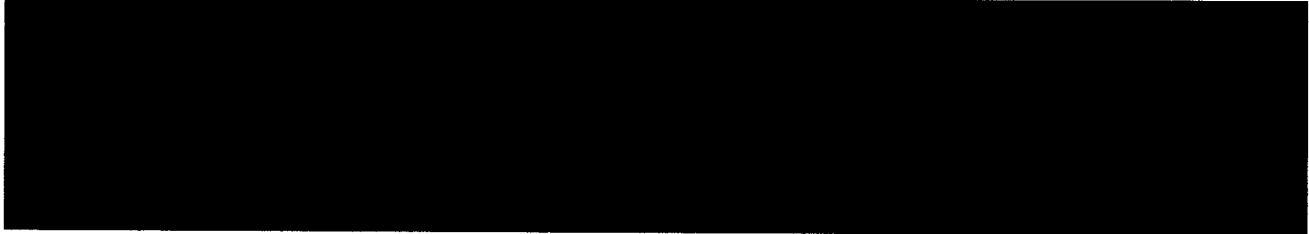




4.3.3.3. F-15C/D ARRESTING HOOK OPERATION



4.3.3.4. CONFERENCE HOTEL





9. EVENT COST

Environmental Cost: \$0.00
Non-DoD Damaged/Destroyed Property: \$0.00
DoD Damaged/Destroyed Property: \$418,280.00
Total Event Cost (Excluding Injury Cost): \$418,280.00
DoDI Injury Cost: --
Total Event Cost with Injuries: \$418,280.00

10. PERSONNEL INFORMATION

PERSON NUMBER: 1

Gender: Male

Age: ■

Grade: O3

Employment Status:

Tier 1: US Air Force

Tier 2: Regular

Duty Status:

Tier 1: On

Tier 2: No Further Status

AFSC/Job Series: Fighter Pilot (11F)

Assigned MAJCOM: Air Combat Command

Assigned Numbered Air Force: United States Air Forces Central Command

Assigned Group: 495 Fighter Group (Active Associate)

Assigned Base: Dane County RAP (Truax Field) ANG

Role in Event: Pilot

Functional Area: Operations - Aircrew

Injuries:

No injuries

Person Associated with Object(s):

Object Number: 1

Object Type: Aircraft; F-15C

Assignment Type: Operator / Handler / Maintainer

Object Number: 2
Object Type: Aircraft/RPA Component; Airframe; Tail Hook; No Further Break Down
Assignment Type: Operator / Handler / Maintainer

Object Number: 3
Object Type: Aircraft/RPA Engine; F100-PW-220
Assignment Type: Operator / Handler / Maintainer

Object Number: 4
Object Type: Aircraft/RPA Component; Engines-Turbine (Prop/Jet/Fan); Afterburner Section;
Exhaust Nozzle
Assignment Type: Not Assigned

Object Number: 5
Object Type: Aircraft/RPA Engine; F100-PW-220
Assignment Type: Operator / Handler / Maintainer

Object Number: 6
Object Type: Aircraft/RPA Component; Engines-Turbine (Prop/Jet/Fan); Afterburner Section;
Exhaust Nozzle
Assignment Type: Not Assigned

Object Number: 7
Object Type: Aircraft/RPA Component; Flight Controls; Elevator/Stabilator; Elevator/Stabilator
Structure
Assignment Type: Operator / Handler / Maintainer

Object Number: 8
Object Type: Aircraft/RPA Component; Airframe; Fixed Tail Structure; Undetermined
Assignment Type: Not Assigned

Object Number: 9
Object Type: Aircraft/RPA Component; Landing Gear; Landing Gear Miscellaneous Systems
Assignment Type: Operator / Handler / Maintainer

Object Number: 10
Object Type: Aircraft/RPA Component; Warning Systems; Other Warning Systems
Assignment Type: Not Assigned





13. OBJECTS INFORMATION

OBJECT NUMBER: 1

Object Type:

Tier 1: Aircraft

Tier 2: F-15C

Unique Object Identifiers:

Tail Number: 78-000473

Damage Description: No Damage

Owning Service: Air Force

Owning MAJCOM: Air National Guard

Owning Wing: 142 Fighter Wing

Owning Base: Portland IAP ANG

OBJECT NUMBER: 2

Object Type:

Tier 1: Aircraft/RPA Component

Tier 2: Airframe

Tier 3: Tail Hook

Tier 4: No Further Break Down

Unique Object Identifiers:

National Stock Number: --

Part Number: 68A481300-1005

Serial Number: --

Damage Description: Repairable

Owning Service: Air Force

Owning MAJCOM: Air National Guard

Owning Wing: 142 Fighter Wing

Owning Base: Portland IAP ANG

OBJECT NUMBER: 3

Object Type:

Tier 1: Aircraft/RPA Engine

Tier 2: F100-PW-220

Unique Object Identifiers:

National Stock Number: --

Serial Number: PWOE682095

Damage Description: No Damage

Owning Service: Air Force

Owning MAJCOM: Air National Guard

Owning Wing: 142 Fighter Wing

Owning Base: Portland IAP ANG

OBJECT NUMBER: 4

Object Type:

Tier 1: Aircraft/RPA Component

Tier 2: Engines-Turbine (Prop/Jet/Fan)

Tier 3: Afterburner Section

Tier 4: Exhaust Nozzle

Unique Object Identifiers:

National Stock Number: 2840 - 01 - 455 - 9504

Part Number: 4082986

Serial Number: --

Damage Description: Repairable

Owning Service: Air Force

Owning MAJCOM: Air National Guard

Owning Wing: 142 Fighter Wing

Owning Base: Portland IAP ANG

OBJECT NUMBER: 5

Object Type:

Tier 1: Aircraft/RPA Engine

Tier 2: F100-PW-220

Unique Object Identifiers:

National Stock Number: --

Serial Number: PWOE703715

Damage Description: No Damage

Owning Service: Air Force

Owning MAJCOM: Air National Guard

Owning Wing: 142 Fighter Wing

Owning Base: Portland IAP ANG

OBJECT NUMBER: 6

Object Type:

Tier 1: Aircraft/RPA Component

Tier 2: Engines-Turbine (Prop/Jet/Fan)

Tier 3: Afterburner Section

Tier 4: Exhaust Nozzle

Unique Object Identifiers:
National Stock Number: 2840 - 01 - 455 - 9504
Part Number: 4082986
Serial Number: --
Damage Description: Repairable
Owning Service: Air Force
Owning MAJCOM: Air National Guard
Owning Wing: 142 Fighter Wing
Owning Base: Portland IAP ANG

OBJECT NUMBER: 7

Object Type:
Tier 1: Aircraft/RPA Component
Tier 2: Flight Controls
Tier 3: Elevator/Stabilator
Tier 4: Elevator/Stabilator Structure
Unique Object Identifiers:
National Stock Number: --
Part Number: 68A210001-1039
Serial Number: --
Damage Description: Repairable
Owning Service: Air Force
Owning MAJCOM: Air National Guard
Owning Wing: 142 Fighter Wing
Owning Base: Portland IAP ANG

OBJECT NUMBER: 8

Object Type:
Tier 1: Aircraft/RPA Component
Tier 2: Airframe
Tier 3: Fixed Tail Structure
Tier 4: Undetermined
Unique Object Identifiers:
National Stock Number: --
Part Number: 68A335009-1005
Serial Number: --
Damage Description: Repairable
Owning Service: Air Force
Owning MAJCOM: Air National Guard
Owning Wing: 142 Fighter Wing
Owning Base: Portland IAP ANG

OBJECT NUMBER: 9

Object Type:
Tier 1: Aircraft/RPA Component

Tier 2: Landing Gear
Tier 3: Landing Gear Miscellaneous Systems
Unique Object Identifiers:
National Stock Number: --
Part Number: M8805/100-017
Serial Number: --
Damage Description: Repairable
Owning Service: Air Force
Owning MAJCOM: Air National Guard
Owning Wing: 142 Fighter Wing
Owning Base: Portland IAP ANG

OBJECT NUMBER: 10

Object Type:
Tier 1: Aircraft/RPA Component
Tier 2: Warning Systems
Tier 3: Other Warning Systems
Unique Object Identifiers:
National Stock Number: --
Part Number: 68A901100-1002
Serial Number: --
Damage Description: Repairable
Owning Service: Air Force
Owning MAJCOM: Air National Guard
Owning Wing: 142 Fighter Wing
Owning Base: Portland IAP ANG

14. SAFETY INVESTIGATION BOARD PERSONNEL
POSITION: BOARD PRESIDENT

Name: George Downs
Grade: O6
Organization: HQ FLANG/A236
DSN: [REDACTED]
Commercial USA: [REDACTED]
Email: [REDACTED]

POSITION: INVESTIGATING OFFICER

Name: [REDACTED]
Grade: O5
Organization: 187 FW/SE
DSN: [REDACTED]
Commercial USA: [REDACTED]
Email: [REDACTED]

POSITION: MAINTENANCE MEMBER

Name: [REDACTED]
Grade: E8
Organization: 104 MXG/MXMT
DSN: [REDACTED]
Email: [REDACTED]

POSITION: AIR FORCE SAFETY CENTER REPRESENTATIVE

Name: [REDACTED]
Grade: O4
Organization: AFSEC/SEFF
DSN: [REDACTED]
Commercial USA: [REDACTED]
Email: [REDACTED]

POSITION: RECORDER

Name: [REDACTED]
Grade: E7
Organization: 169 FW/SEG
DSN: [REDACTED]
Commercial USA: [REDACTED]
Email: [REDACTED]

POSITION: TECHNICAL EXPERT

Name: [REDACTED]
Grade: GS/GG - 14
Organization: AFSEC/SEFE
[REDACTED]
Commercial USA: [REDACTED]
Email: [REDACTED]

POSITION: TECHNICAL EXPERT

Name: [REDACTED]
Grade: GS/GG - 9
Organization: AFSEC/SEFE
DSN: [REDACTED]
Commercial USA: [REDACTED]
Email: [REDACTED]

POSITION: TECHNICAL EXPERT

Name: [REDACTED]
Grade: GS/GG - 13
Organization: AFSEC/SEFE
DSN: [REDACTED]
Commercial USA: [REDACTED]

Email: [REDACTED]

15. RELEASING OFFICIAL