SECOND ENDORSEMENT on CAPT [REDACTED], USN, Ltr of 23 May 17

From: Commander, Naval Air Force, Pacific
To: File

Subj: COMMAND INVESTIGATION REGARDING THE CLASS ALPHA AVIATION MISHAP INVOLVING THE EJECTION OF A PILOT OF ONE F/A-18E AIRCRAFT THAT OCCURRED 21 APRIL 2017 OVER THE CELEBES SEA

Ref: (a) JAGIST 5800.7F

1. Upon thorough review of the investigation, I concur with the Investigating Officer's findings of facts, opinions, and recommendations, as endorsed by Commander, Carrier Strike Group ONE (CCSG-1). I concur with CCSG-1 that any injuries suffered by CAPT [REDACTED], USN, during this mishap were incurred in the line of duty and not as a result of misconduct.

2. Per reference (a), Section 0222 (c) and Section 0223 (b), CCSG-1 is directed to ensure all required entries are made into CAPT [REDACTED]'s service and medical records.

3. The point of contact regarding this matter is CDR [REDACTED], JAGC, USN, who can be reached at [REDACTED] or by e-mail at [REDACTED].

T. M. SHOEMAKER

Copy to:
CCSG-1
CAPT [REDACTED]
FIRST ENDORSEMENT on CAPT. Ltr of 23 May 17

From: Commander, Carrier Strike Group ONE
To: Commander, Naval Air Force, U.S. Pacific Fleet

Subj: COMMAND INVESTIGATION REGARDING THE CLASS ALPHA AVIATION MISHAP INVOLVING THE EJECTION OF A PILOT OF ONE F/A-18E AIRCRAFT THAT OCCURRED 21 APRIL 2017 OVER THE CELEBES SEA

1. Upon thorough review of the investigation and all relevant circumstances, I concur with the findings, opinions, and recommendations of the investigating officer subject to the following:

   a. I modify recommendation 2 to read, “I recommend that no adverse disciplinary action be taken against the pilot, CAPT. , or the tower representative, LT. , in this matter. While certain aircrew errors and a lack of experience in the tower precipitated the ejection, none were intentional or due to culpable negligence.”

2. Note that this command investigation incorporates the line of duty investigation into any known or latent injuries suffered by CAPT. as a result of this incident. I concur with the investigating officer that any such injuries are in the line of duty and not as a result of misconduct.

3. The findings of fact, opinions, and recommendations of the investigation as modified above are hereby approved. My point of contact for this matter is LCDR. JAGC, USN. She may be reached at or for any questions regarding this matter.

Copy to:
C3F (LEGAL)
C7F (LEGAL)
NAVAIR
From: CAPT (b) (3) (A). (b) (6) USN
To: Commander, Carrier Strike Group ONE

Subj: COMMAND INVESTIGATION REGARDING THE CLASS ALPHA AVIATION MISHAP INVOLVING THE EJECTION OF A PILOT OF ONE F/A-18E AIRCRAFT THAT OCCURRED 21 APRIL 2017 OVER THE CELEBES SEA

Encl: (1) COMCARJSTRKGRUONE ltr 5800 Ser N02/033 of 26 Apr 17 (Appointing Order)
(2) CAPT (b) (3) (A). (b) (6) Official Orders
(3) USS CARL VINSON (CVN 70) Approved Air Plan dtd 21 Apr 17
(4) CAPT (b) (3) (A). Logbook Data
(5) CAPT (b) (3) (A). NATOPS Training Jacket
(6) CAPT (b) (3) (A). Aviation Physiology Record
(7) Summary of Interview with CDR (b) (3) (A). (b) USN dtd 19 May 17
(8) Summary of Interview with LT (b) (3) (A). (b) (6) USN dtd 19 May 17
(9) Summary of Interview with LT (b) (3) (A). (b) (6) USN dtd 19 May 17
(10) VFA-137 Flight Schedule dtd 21 Apr 17
(11) Statement of CAPT (b) (3) (A). (b) (6) dtd 2 May 17
(12) USS CARL VINSON (CVN 70) Weather Observation Report
(13) NAVAIR 00-80T-105 (CVN NATOPS)
(14) Statement of CDR (b) (3) (A). (b) USN dtd 7 May 17
(15) Statement of LT (b) (3) (A). (b) (6) USN dtd 3 May 17
(16) Statement of LCDR (b) (3) (A). (b) (6) USN dtd 2 May 17
(17) Summary of Interview with LCDR (b) (3) (A). (b) (6) USN dtd 19 May 17
(18) Summary of Interview with LCDR (b) (3) (A). (b) (6) USN dtd 18 May 17
(19) Statement of ATCS (b) (3) (A). Gaines, USN dtd 10 May 17
(20) BUNO 165904 Maintenance Records
(21) Statement of AT (b) (3) (A). (b) (6) USN dtd 10 May 17
(22) Statement of AT3 (b) (3) (A). (b) (6) USN dtd 10 May 17
(23) Summary of Interview with CAPT (b) (3) (A). (b) (6) USN dtd 20 May 2017
(24) NAVAIR JAG Investigation Question Tracker dtd 10 May 17
(25) Deployable Flight Incident Recorder Set (DFIRS) Data
(26) Tower Launch Log
(27) Statement of LT (b) (3) (A). (b) (6) USN dtd 2 May 17
(28) Flight Event Communications for the Event 5 recovery
(29) Flight Event Summary for BUNO 165904
(30) NAVAIR A1-F18EA-NFM-500 (F/A-18E/F Pocket Checklist (PCL))
(31) NAVAIR A1-F18EA-NFM-000 (F/A-18E/F NATOPS)
(32) Statement of LT (b) (3) (A). (b) (6) USN dtd 1 May 17
(33) Strike Fighter Squadron ONE THREE SEVEN msg P 211941Z Apr 17
Subj: COMMAND INVESTIGATION REGARDING THE CLASS ALPHA AVIATION MISHAP INVOLVING THE EJECTION OF A PILOT OF ONE F/A-18E AIRCRAFT THAT OCCURRED 21 APRIL 2017 OVER THE CELEBES SEA

(34) Summary of Interview with LTJG USN dtd 19 May 17
(35) Summary of Interview with CDR USN dtd 19 May 17
(36) Flight Visual Analysis BUNO 165904 final Scene
(37) Aircraft Procurement Investment Data
(38) Summary of Interview with Mr. USN dtd 11 May 17
(39) Statement of CDR USN dtd 10 May 17
(40) Statement of CDR USN dtd 2 May 17

Preliminary Statement

1. This Command Investigation is convened to investigate the circumstances surrounding a Class Alpha aviation mishap in compliance with 10 U.S.C. § 2255. Pursuant to enclosure (1), this investigation was conducted to inquire into the facts and circumstances surrounding the Class Alpha aviation mishap involving the ejection of a pilot on 21 April 2017 during blue water flight operations in the vicinity of the Celebes Sea, and resulting in the loss of one F/A-18E aircraft.

2. The proximate cause of this mishap was the pilot’s failure to maintain on-speed angle of attack (AOA), allowing the aircraft to get slow and depart from controlled flight. Contributing factors to this mishap include: degradation in the mishap pilot’s visual scan due to compound emergencies, a breakdown in Crew Resource Management (CRM), an inexperienced tower representative (TR), and a perceived rush to land the aircraft.

3. All reasonably available evidence and information has been collected, and all requirements of enclosure (1) have been satisfied. LCDR USN, served as my technical advisor and assistant investigator. Additionally, LCDR AGC, USN, was consulted as legal advisor.

4. I encountered no evidentiary issues in the course of this investigation. Most of the mishap aircraft was lost in the Celebes Sea; however, the Deployable Flight Incident Recorder Set (DFIRS) Data was successfully recovered.

5. The line of duty determination for injuries sustained by the mishap pilot, CAPT USN, is included as part of this investigation.

6. To better familiarize myself with the emergencies in this report, I conducted a 1.0 hour F/A-18E/F simulator at NAS Oceana, Virginia Beach, VA, in which I flew the final five minutes of this mishap. This experience enabled me to better understand the flight conditions and “feel” of the aircraft as it approached the departure from controlled flight.

7. All times given are Zulu. Local times were Z+09.
Subj:  COMMAND INVESTIGATION REGARDING THE CLASS ALPHA AVIATION MISHAP INVOLVING THE EJECTION OF A PILOT OF ONE F/A-18E AIRCRAFT THAT OCCURRED 21 APRIL 2017 OVER THE CELEBES SEA

Findings of Fact

1. CAPT [b] (3) (A). [b] (6) currently serves as the [b] (3) (A). [b] (6) Carrier Air Wing TWO embarked with USS CARL VINSON (CVN 70), which is deployed to the Western Pacific. He reported to CVW-2 on 30 Dec 2016. [Encls (2), (3)]

2. CAPT [b] (3) (A). is an active duty Naval Aviator who is designated an F/A-18C/E/F/G Pilot in Command, Strike Fighter Weapons and Training (SFWT) Level IV Division Lead, and CVW-2 designated Strike Lead. His logbook indicated approximately 4100 total flight hours with approximately 3800 in the F/A-18. He is current in all qualifications to include NATOPS check, Instrument Check, Egress Training, Swim and Physiology, and Crew Resource Management. He has a current medical upshot. [Encls (4), (5), (6)]

3. Prior to the events on 21 April 2017, CAPT [b] (3) (A). [b] (6) medical record contained no remarkable entries. [Encl (6)]

4. CAPT [b] (3) (A). is well-known and respected in the Naval Aviation community, and is highly regarded by his fellow CVW-2 aviators. [Encls (7), (8), (9)]

5. CAPT [b] (3) (A). had received adequate crew rest and had no apparent stressors or factors that would impact his ability to accomplish his flight duties. [Encl (6)]

6. Prior to event 5B1 on 21 April 2017, CAPT [b] (3) (A). last flew on 18 April 2017 and logged 2.3 hrs. During the three months prior to this event, CAPT [b] (3) (A). averaged 23.5 flight hours per month with 25.9 flight hours logged in the last 30 days. [Encl (4)]

7. On 21 April 2017, CAPT [b] (3) (A). was scheduled to fly on Event 5B1 as Dash Three of a six plane Red Air event supporting a mixed division Strike Fighter Weapons Tactics (SFWT) flight of 10 planes total. CAPT [b] (3) (A). assigned wingman was LT [b] (3) (A). USN, a non-division lead Naval Aviator assigned to Strike Fighter Squadron ONE THREE SEVEN (VFA-137). LT [b] (3) (A). had over 320 total flight hours in the F/A-18. Scheduled take off time was 08:15:00Z. Scheduled land time was 09:30:00Z. The flight was authorized by the Commander USN, Commanding Officer of VFA-137. [Encls (3), (9), (10)]

8. The brief, preflight, and flight were in accordance with NATOPS and uneventful prior to the mishap. The weather was few clouds at 1,500 ft., scattered clouds at 20,000 ft., 10 statute miles visibility, temperature 86 degrees Fahrenheit, altimeter 29.78. CASE 1 launch and recovery. [Encls (11), (12), (13)]

9. Initially, Aircraft 200 and Aircraft 203 were assigned for event 5B1. However, Aircraft 203 was in a down status and would not be available. After discussion with VFA-137 Maintenance and the VFA-137 Commanding Officer, CAPT [b] (3) (A). was assigned Aircraft 205, an F/A-18E Super Hornet bureau number 165904, which had just been reported to be in an UP status following a Functional Check Flight Profile A (FCF-A). All involved felt CAPT [b] (3) (A). experience was better suited for Aircraft 205, since it is common for a long time down, post
FCF-A aircraft to have minor issues following a successful FCF. LT [b](3)(A) [A] was assigned Aircraft 200. [Encls (11), (14), (15)]

10. Aircraft 205 had just completed a FCF-A on Event 3. The aircraft had been in a down status for 98 days due to a fuel cell replacement. Prior to the FCF-A competition, several ground attempts were made to complete the FCF-A, starting on 13 April 2017. LCDR [b](3)(A) [A] USN, the VFA-137 Maintenance Officer, was the FCF-A pilot for each attempt, as well as the completed flight. The following discrepancies were noted post FCF-A completion: 1. Multifunctional Information Distribution System (MIDS) worked on deck but fell out of the link airborne and would not get back in. 2. The CVN TACAN was not operable until overhead the ship. 3. The DUMP SWITCH would not electronically stay in the “dump” position. 4. AV AIR HOT caution displayed after takeoff, clearing in approximately 15 seconds. [Encls (11), (16), (17), (18), (19), (20)]

11. CAPT [b](3)(A) [A] [b](3)(A) [A] [b](3)(A) [A] briefed with LCDR [b](3)(A) [A] and a VFA-137 Quality Assurance representative prior to the flight. CAPT [b](3)(A) [A] was informed of the discrepancies and that Aircraft 205 was UP and FCF complete. [Encls (11), (16), (19), (21)]

12. AT3 [b](3)(A) [A] USN, was the VFA-137 Plane Captain for Aircraft 205. She performed a turnaround inspection post-FCF flight and found no major discrepancies. The right hydraulic system was serviced and she noticed the right engine took more hydraulic fluid than normal, but nothing that was excessive or out of limits. [Encl (22)]

13. CAPT [b](3)(A) [A] stated preflight checks were normal, but felt “a noticeable dead spot or hitch in the stick during CAS checks.” Numeric values during CAS Checks were normal. CAPT [b](3)(A) [A] did not note the “stick hitch” during catapult checks. Engineering data from the Deployable Flight Incident Recorder Set (DFIRS), recorded in the last 20 minutes of flight, did not indicate a hitch in the control stick at that time. Furthermore, based on stick positioning and associated forces recorded in the data, the control stick was operating normally and did not have any effect on flying qualities. [Encls (11), (23), (24), (25)]

14. CAPT [b](3)(A) [A] launched off Catapult one at 08:17:00Z. CAPT [b](3)(A) [A] stated the TACAN was intermittent. [Encls (11), (26)]

15. CAPT [b](3)(A) [A] executed the Red Air mission as briefed and without incident. [Encls (9), (11)]

16. After the Red Air mission, but prior to flying overhead the ship, CAPT [b](3)(A) [A] smelled something burning with great intensity, but then it quickly dissipated. He stated it did not smell electrical. [Encl (11)]

17. CAPT [b](3)(A) [A] led the section back overhead the ship at an altitude of 3000 ft. for the CASE 1 recovery. CAPT [b](3)(A) [A] and LT [b](3)(A) [A] USN, in Aircraft 200 were the first section to arrive for the recovery. [Encls (9), (11), (13), (15)]
Subj: COMMAND INVESTIGATION REGARDING THE CLASS ALPHA AVIATION MISHAP INVOLVING THE EJECTION OF A PILOT OF ONE F/A-18E AIRCRAFT THAT OCCURRED 21 APRIL 2017 OVER THE CELEBES SEA

18. CAPT [b] was not receiving MIDS Link 16 information and was focusing more attention than normal to visually see other aircraft entering the overhead stack. [Encls (11), (23)]

19. At 09:20:46Z, CAPT [b] aircraft, Aircraft 205, indicated a HYD 2A caution. Initially, LT [b] did not see any indications of a leak coming from the right engine. CAPT [b] opened his NATOPS Pocket Checklist (PCL) to page E138 and contacted the F/A-18E/F tower representative (TR), LT [b], USN, from VFA-192. CAPT [b] reported a HYD 2A caution and, when queried by the TR, reported there were no X’s in any flight control surfaces. LT [b] had 237 hours in the F/A-18E/F and had successfully completed two F/A-18E/F NATOPS Evaluations in his career. This was his first emergency as a TR. [Encls (8), (11), (15), (23), (25), (27), (28), (29), (30)]

20. While circling overhead, the sun angle shifted and the wingman noted a steady stream of fluid coming from underneath Aircraft 205 near the right main landing gear door. Cockpit indications in Aircraft 205 showed 3000 psi, which was a normal reading. At 09:22:37Z, the HYD 2A caution cleared. [Encls (11), (15), (25), (28), (29), (31)]

21. At 09:22:38Z, Aircraft 205 indicated a HYD 2B caution and CAPT [b] notified the TR. When queried by the TR, he reported no X’s in any flight control surfaces. CAPT [b] and the TR discussed the NATOPS recommendations for a straight in approach and the potential to extend the landing gear if the aircraft continued to lose HYD 2 fluid. [Encls (8), (11), (23), (25), (27), (28), (29), (31), (32)]

22. Aircraft 205’s loss of hydraulic fluid was following the hydraulic reservoir level sensing system (RLS) design. Each hydraulic reservoir incorporates an RLS system, designed to isolate a leak in either system circuit. When reservoir fluid level drops to approximately 50%, RLS shuts off circuit A (HYD 2A caution in this case). If fluid level continues to deplete to approximately 30%, RLS restores circuit A and shuts off circuit B (HYD 2B caution in this case). If alternate circuit shutdown fails to isolate the leak, RLS restores circuit B (no cautions) at approximately 15%, providing hydraulic pressure to both systems until fluid depletion (HYD 2A and HYD 2B caution in this case). [Encl (31)]

23. After the emergence of the HYD 2B caution, CAPT [b] began to exit the overhead stack aft of the ship. Due to the high volume of aircraft entering low holding and a lack of MIDS supplied situational awareness information, CAPT [b] was consciously looking for aircraft traffic in a “see and avoid” mindset. [Encls (11), (23), (28)]

24. On 21 April 2017, the Carrier Air Wing was conducting Blue Water Operations. The nearest suitable divert field for Event 5 was 174 nautical miles away. [Encls (3), (33)]

25. CAPT [b] emergency extended the refueling probe in accordance with the NATOPS recommendation. [Encls (11), (23), (27), (30)]

26. At 09:23:55Z the HYD 2B caution cleared. [Encls (11), (23), (25), (28), (29)]
Subj: COMMAND INVESTIGATION REGARDING THE CLASS ALPHA AVIATION MISHAP INVOLVING THE EJECTION OF A PILOT OF ONE F/A-18E AIRCRAFT THAT OCCURRED 21 APRIL 2017 OVER THE CELEBES SEA

27. Cycling HYD 2A and HYD 2B cautions are expected when the F/A-18E/F loses hydraulic pressure due to the function of the RLS system. [Encl (31)]

28. At 09:26:43Z, Aircraft 205 indicated a HYD 2A and HYD 2B failure, and CAPT(b) noted the decreasing HYD 2 pressure needle was not smooth and did not stabilize at zero psi. This observation indicated that the HYD 2 loss of pressure was NOT caused by a HYD pump shaft shear. [Encls (11), (23), (25), (28), (29), (30), (31)]

29. CAPT(b) completed the F/A-18E/F NATOPS Steps 1 through 7 for a HYD 2A/ HYD 2B failure. This was not verbalized to the TR. [Encls (11), (23), (27), (28), (30)]

30. At 09:26:53Z, CAPT(b) secured the right engine on Aircraft 205 in accordance with NATOPS. A CAUTION in the NATOPS Pocket Check List (PCL) states that prolonged use of a failed hydraulic pump without the pump shaft shearing as indicated by the needle not stabilized at zero will generate considerable heat and may result in an Airframe Mounted Accessory Drive (AMAD) bay fire. [Encls (11), (23), (25), (28), (29), (30), (31)]

31. Discussions between the TR and the Air Boss inferred the necessity to land CAPT(b) at the beginning of the recovery. This was communicated to CAPT(b) by the Air Boss when the Air Boss said “looks like we are tracking to you wanting to get on deck pretty soon”, and “proceed aft of mom and we’ll get you in first.” CAPT(b) fuel state was 7,900 pounds. [Encl (11), (28)]

32. At 09:27:49Z, an FCS and FLAPS OFF caution was set with both the right Leading Edge Flap (LEF) and right RUDDER X’d out, indicating a failure of both those control surfaces. [Encls (11), (23), (25), (28), (29), (31)]

33. At 09:28:11Z, CAPT(b) notified the TR he had X’s in the right LEF and right RUDDER and asked the TR to “back me up.” The TR read from Step 7 of the F/A-18E/F NATOPS PCL for a HYD 2A/2B caution to push the FCS reset button multiple times if required. The FLAPS OFF caution was never communicated by the pilot to the TR. [Encls (8), (11), (23), (27), (28), (29), (30)]

34. CAPT(b) misheard “FCS” for “SDC”. The signal data computer (SDC) is unrelated to the flight control system and not a part of the HYD 2A/2B emergency procedure. Although he was not familiar with using the SDC reset as a FCS troubleshooting technique, he thought the TR may be getting the information in the NATOPS Manual. There had been several times in his career where maintenance personnel had told him to do “unfamiliar” troubleshooting techniques. Based on his knowledge of the SDC, he felt it would not hurt the situation to do an SDC reset. CAPT(b) performed an SDC reset, along with several FCS resets of the system. [Encls (11), (23), (31)]

35. The F/A-18E/F NATOPS recommends to cease maneuvering and push the FCS RESET button for a FLAPS OFF caution. It also provides the following general restrictions: AOA below 10° in flaps AUTO, on-speed in flaps HALF/FULL, 2g maximum, minimum sideslip, HALF
lateral stick maximum. It further recommends a Flaps - HALF controllability check for a LEF failure and recommends to fly on-speed throughout the approach. This was not verbalized by the TR. [Encls (28), (30), (31)]

36. The F/A-18E/F NATOPS states the LEF failure can be caused by a switching valve failing to switch to the backup circuit following a HYD circuit failure. If the LEF is locked near 21° leading edge down (±5°), Flaps HALF handling qualities will be normal. When operating shipboard, the waveoff window for all LEF failure conditions should be moved farther out and the LSOs should be made aware of the degraded glideslope performance. This was not verbalized by the TR. [Encls (28), (30), (31)]

37. The right LEF in Aircraft 205 was locked at 20 degrees leading edge down, matching the left LEF, and had no effect on flying qualities. This was not verbalized to the TR. [Encls (23), (25), (28), (30), (31)]

38. The F/A-18E/F NATOPS emergency procedure for a rudder failure recommends a Flaps - HALF Controllability Check. Additionally, it states to fly an "on-speed AOA to touchdown. (DO NOT EXCEED ON-SPEED AOA)". This was not verbalized by the TR. [Encls (28), (30), (31)]

39. The F/A-18E/F NATOPS states a RUDDER failure (X's) may be caused by a switching valve failing to switch to the backup circuit following a HYD circuit failure. It states to counter any roll-off with rudder. Countering a roll-off with lateral stick alone increases adverse yaw and aggravates the roll-off. To ensure balanced flight, minimize sideslip by the early use of the operating rudder. Additionally, it provides a warning – WARNING: Full opposing rudder may not be sufficient to prevent a departure when single engine if MAX power selected. Large single engine throttle transients can cause significant yaw and roll. Finally, it states departure resistance is degraded above on-speed AOA. This was not verbalized by the TR. [Encls (28), (30), (31)]

40. In the F/A-18E/F, hydraulic switching valves are utilized to provide backup hydraulic power to actuators that are not powered simultaneously by both systems. Two hydraulic circuits, a primary and a backup, provide power to each switching valve. Both the F/A-18E/F LEF and Rudder flight control surfaces utilize switching valves. In the event an engine is experiencing a HYD leak, the fluctuation in pressure can postpone the switching valve from switching to the good HYD system. Pressure fluctuations on the failing HYD circuit can move the switching valve away from the failed engine, blocking the good HYD circuit from providing control of the surface and causing X's in the control surfaces. Assuming proper working switching valves, a single pump is capable of powering the entire flight control system in the event of a single system failure. [Encls (24), (30), (31)]

41. At 09:27:59Z, 09:28:45Z, and 09:28:59Z, CAPT [09:27:59Z] performed FCS resets. However, the right LEF and right Rudder remained X'd out. [Encls (11), (23), (25), (29)]
Subj: COMMAND INVESTIGATION REGARDING THE CLASS ALPHA AVIATION MISHAP INVOLVING THE EJECTION OF A PILOT OF ONE F/A-18E AIRCRAFT THAT OCCURRED 21 APRIL 2017 OVER THE CELEBES SEA

42. At 09:29:22Z, the TR recommended restarting the right engine for landing and informed Ca[4](b)(3)(A)pt[4] he was ready to read the emergency landing gear extension procedure. Capt[4] stated he still had X’s in the right LEF and right RUDDER. [Encls (11), (23), (27), (28)]

43. F/A-18E/F NATOPS procedures state, if a HYD2 HOT caution was never displayed, to consider engine restart for landing if required. However, the F/A-18E/F NATOPS does not give guidance for what to consider when making the decision. F/A-18E/F aircrew from across Carrier Strike Group ONE (CSG-1) were divided on whether they would choose to restart the engine or not. [Encls (7), (8), (9), (30), (31), (34), (35)]

44. F/A-18E/F NATOPS HYD 2A/2B emergency procedure Step 8 – Read remarks for AIL, RUD, and/or LEF X’s (p. E135) and Step 9 – Execute Controllability check procedure (p. E45) were not verbalized by the TR. [Encls (8), (23), (28), (30)]

45. At 09:30:32Z, with the assistance of the TR, Capt[b](b)(3)(A) began the emergency gear extension procedure by placing the FLAPS SWITCH to half and executed the procedure according to the F/A-18 E/F NATOPS. [Encls (8), (11), (23), (25), (27), (28), (29), (30), (31), (32)]

46. At 09:30:59Z, Aircraft 205 successfully emergency extended the landing gear. [Encls (11), (23), (25), (28), (29)]

47. Capt[b](b)(3)(A) stated the on-speed check showed 147 knots. [Encl (23)]

48. The F/A-18E/F NATOPS states the following regarding single engine flying qualities with flaps in half or full with normal flight controls (no X’s):

The rudders are the primary flight control surface used to counter the yaw caused by the operating engine. Using too much rudder pedal is not harmful, but using too little rudder pedal may not counter the yaw and cause controllability problems. In addition to yawing into the failed engine, the aircraft also tends to roll into the failed engine. The natural pilot reaction is to oppose the roll with lateral stick, but the resulting differential aileron deflection generates adverse yaw and increases the demand on the rudders to maintain directional control. As AOA increases above 10° AOA, the aircraft becomes less directionally stable and rudder control effectiveness deteriorates. In this instance, the rudders may become saturated (surfaces against the stops). When saturated, the rudders cannot counter any additional adverse yaw, resulting in an increase in sideslip and the potential for an adverse yaw departure. If airspeed is too slow, the rudders cannot generate enough control power to oppose the yaw toward the failed engine. For some situations, controllability alone will not guarantee flyaway (e.g., excessive rate of descent), but may only ensure controllability for a long enough period of time to complete the requisite immediate action procedures and make a timely ejection decision, if warranted.
Subj: COMMAND INVESTIGATION REGARDING THE CLASS ALPHA AVIATION MISHAP INVOLVING THE EJECTION OF A PILOT OF ONE F/A-18E AIRCRAFT THAT OCCURRED 21 APRIL 2017 OVER THE CELEBES SEA

WARNING – When single engine with the operating engine at MAX, the possibility of an adverse yaw departure increases as AOA exceeds on-speed.

Note
- In straight and level flight, a small amount of lateral and/or directional trim is required to maintain balanced flight. Trim inputs should be set prior to entering PLMs, since lateral trim inputs are inhibited with a PLM engaged.
- Loss of either HYD 1 or HYD 2 due to engine failure or hydraulic pump failure does not affect flight control with flaps AUTO; however, failure of either HYD 1 or HYD 2 with flaps in HALF or FULL may cause uncommanded but controllable yaw and roll transients as the switching valves cycle. These yaw and roll transients may last 3 to 6 seconds.
- To prevent repeated switching valve cycling, avoid stabilized flight where engine windmill rpm results in hydraulic pressure fluctuations between 800 and 2,000 psi.

This was not verbalized by the TR. [Encls (28), (31)]

49. At 09:32:16Z, CAPT applied left yaw trim equaling 20% of full authority. He stated that a lot of rudder trim was required to keep the aircraft in balanced flight. He also stated he felt the refueling probe might be causing additional yaw to the right. [Encls (11), (23), (25), (29)]

50. An extended refueling probe will cause a nominal yaw force to the right. There is no flight test data as to the amount in a single engine or RUDDER failure condition. [Encl (24)]

51. At 09:33:01Z, an FCS reset was performed by CAPT and the FLAPS OFF caution cleared. The Right LEF and Right Rudder were restored (no X’s). [Encls (11), (23), (25), (29)]

52. Since the right LEF and RUDDER X’s were cleared and he intended to restart the right engine for landing, CAPT felt a FLAPS-Half controllability check was no longer required. This was not verbalized to the TR. [Encls (23), (28)]

53. CAPT passed the lead to LT in Aircraft 200 due to a lack of MIDS, intermittent TACAN, and environmental conditions preventing him from seeing the ship and other aircraft entering low holding. [Encls (9), (11), (15), (23), (28)]

54. CAPT advised the TR he was ready to start the right engine and wanted the TR to back him up with the PCL. He intended to start the right engine to provide additional thrust at the current fuel weight and to counter the large amount of right yaw the single engine configuration was creating. He never stated his intention was to leave the throttle at idle. [Encls (8), (11), (23), (27), (32)]

55. CAPT was concerned about restarting the right engine, given the compound emergencies (X’s in the LEF and RUDDER) had cleared. However, he felt additional thrust
would provide a greater safety margin when landing. He assumed since the TR suggested to restart the right engine for landing, the TR felt the same. [Encl (23)]

56. At 09:34:08Z, the right throttle on Aircraft 205 was placed to idle, successfully starting the right engine at time 09:34:10Z. [Encls (25), (29)]

57. At 09:35:14Z, CAPT(b)(3), attempted to enter Precision Landing Mode (PLM). At time 09:35:17Z, the paddle switch was depressed to disengage PLM. [Encls (25), (29)]

58. At 09:35:43Z, HYD 2A and HYD 2B cautions are set. From time 09:35:43Z to 09:36:53Z, the HYD 2A and HYD 2B cautions set and clear several times, each time for approximately one second. [Encls (11), (23), (25), (29)]

59. In the F/A-18E/F, each time a caution is set, such as FCS, FLAPS OFF, HYD 2A and/or HYD 2B cautions, an audible noise is broadcasted on the internal communication system (ICS) of the pilot and causes the Master Caution light to illuminate. The audible sound takes priority over any exterior communications. [Encl (31)]

60. At 09:36:44Z, the landing signals officer (LSO) asked CAPT(b)(3) to confirm half flaps, dual engine. CAPT(b)(3) replied the right engine was at idle because of cycling HYD 2A/2B cautions. [Encls (25), (28), (29)]

61. At 09:37:08Z, the FCS caution was set on Aircraft 205 and the right RUDDER was X’d out. [Encls (11), (23), (25), (29)]

62. At 09:37:09Z, CAPT(b)(3) selected left Yaw trim, set at 45% of full knob throw. [Encls (11), (23), (25), (29)]

63. At 09:37:14Z, the FLAPS OFF caution was set and the right LEF was X’d out. The LEF was at 20 degrees leading edge down and did not affect flying qualities. [Encls (11), (23), (25), (29), (31)]

64. At 09:38:14Z, CAPT(b)(3) selected additional left Yaw trim, set at 55% of full knob throw. [Encls (11), (23), (25), (29)]

65. Upon seeing the right LEF and right rudder X’d out, CAPT(b)(3) informed the Landing Signal Officer (LSO) his right LEF and right RUDDER were X’ed out. He intended to secure the right engine again. He stated he intended to climb to handle the flight control X’s. [Encls (11), (23), (28)]

66. Starting at time 09:38:17Z, AOA increased from 8.5 to 9.3 degrees and the left engine was moved toward MIL power. [Encls (23), (25), (29), (36)]

67. The cycling HYD cautions were very distracting and CAPT(b)(3) became overwhelmed with flying the jet. CAPT(b)(3) found himself looking at the FCS page a lot trying to glean
Subj: COMMAND INVESTIGATION REGARDING THE CLASS ALPHA AVIATION MISHAP INVOLVING THE EJECTION OF A PILOT OF ONE F/A-18E AIRCRAFT THAT OCCURRED 21 APRIL 2017 OVER THE CELEBES SEA

info about why the jet was struggling to fly so much. He was focusing all his attention on flying the jet. Despite over 4000 flight hours, he never had a situation where the jet was fighting him so much. He thought the cycling HYD cautions might be affecting other flight controls. He had AOA in his scan and did not feel slow, although flying with the probe out produced a lot of noise and a different site picture. He said it felt as if the refueling probe was pointing 15 degrees in reference to the horizon. [Encls (4), (5), (11), (23)]

68. DFIRS data provides airspeed data in increments of 4 knots. If airspeed was 139.5 knots, it would show 136. If the airspeed was 143.5 knots, the data would display 140. [Encl (24)]
69. At 09:38:31Z, Aircraft 205 AOA reached 9.4 degrees and the aircraft began to depart controlled flight. Aircraft 205 was at 1280 ft and 132 knots. [Encls (11), (23), (25), (29), (36)]

70. Engineers at NAVAIR have been unable to replicate a 9.4 degree AOA departure in a similar configuration. Each time it was tested, departure occurred at 12 degrees AOA. [Encls (24), (37)]

71. At time 09:38:34Z, CAPT [b] (3) [A] [b] [o] [o] brought both throttles to MAX. The left engine entered afterburner at 09:38:35Z for approximately 1.5 seconds. The right engine, which was at idle, never enters afterburner due to spool up time. [Encls (25), (29), (36)]

72. At time 09:38:36Z, both throttles are reduced below MAX (approximately 28 degrees Throttle Handle Angle (THA)). [Encls (25), (29), (36)]

73. At time 09:38:36Z, the aircraft departed controlled flight with an aggressive pitch-up, right yaw and right roll. [Encls (11), (23), (25), (29), (36)]

74. At time 09:38:39Z, CAPT [b] (3) [A] [b] [o] [o] applies full left stick and left rudder. [Encls (25), (29), (36)]

75. At 09:38:44Z, the last DFIRS information is available and presumed to be ejection. Ejection parameters are as follows: Airspeed: 140 kts (+/- 4 knots), Altitude: 932 feet, Sink Rate: 9,120 ft/min, Pitch Attitude: -21 degs (nose down), Roll Attitude: 39 degs right wing down. Aircraft 205, valued at $88.5 Million, was in the ejection envelope at ejection and impacted the water in the vicinity of N 04 21, E 123 55. [Encls (25), (29), (31), (33), (37), (36)]

76. CAPT [b] (3) [A] [b] [o] [o] stated the ejection sequence was immediate. He saw the canopy impact the water and began counting while he attempted to find his KOCH fittings to prepare for water entry. He was able to count to five before his feet hit the water. He went underwater momentarily then popped up above the water. He attempted inflate his inflatable life preserver unit (LPU) via the beaded handles, and after the second attempt successfully inflated. [Encl (23)]

77. CAPT [b] (3) [A] [b] [o] [o] was tangled in the parachute and struggled to get free of the parachute cords. At one point, he stated he thought he might drown due to being dragged under the water.

However, he successfully disentangled after removing his seat pan and right lower leg strap. [Encl (23)]

78. Bullet 100 of Strike Fighter Squadron TWO (VFA-2) took initial responsibility as the immediate on-scene commander (OSC). [Encl (39)]

79. Black Knight (BK) 616 of Helicopter Sea Combat Squadron (HSC-4) was the plane guard for the event 5 recovery. The pilot in command was HSC 4’s Commanding Officer, CDR [b] (3) (A). [Encl (39)]

80. At 09:39Z, a “jet in the water was made” on tower frequency. BK 616 was 8.5nm off the bow and immediately was directed to 4.5nm astern. [Encls (39), (40)]

81. At 09:43Z, BK 616 was on scene and began survivor search. Bullet 102 took OSC responsibilities from Bullet 100. Bullet 102 had visual contact with CAPT [b] (3) (A). [Encl (39)]

82. At 09:58Z, BK 616 also saw CAPT and deployed the search and rescue (SAR) swimmer. At 10:00Z the SAR swimmer reached CAPT. CAPT told the SAR swimmer he had no injuries. [Encl (39)]

83. At 10:06Z, the litter is deployed into the water. CAPT is secured, and the litter is hoisted to the cabin at 10:19Z. At 10:22Z, CAPT was secured in the cabin of BK 616. [Encl (39)]

84. At 10:33, BK 616 recovered onboard CVN 70 at spot 6. CAPT is turned over to medical. He was able to walk normally. [Encl (39)]

85. CAPT suffered soreness from the ejection, but no other physical injuries were noted. He was emotionally affected when later talking about the water entry and feeling of drowning. [Encl (23)]

Opinions

1. CAPT was fully qualified to perform the flight duties he was assigned on 21 April 2017 and was in compliance with crew rest and flight currency requirements. [FF (2), (3), (5)]

2. Aircraft 205 was mechanically sound when CAPT accepted the aircraft on 21 April 2017. [FF (9), (10), (11), (12)]

3. There was a breakdown in Crew Resource Management (CRM) between CAPT and the TR resulting in essential procedures (Controllability Check), recommendations (Single engine landing considerations, Landing with a LEF failure, Landing with a rudder failure), and pilot intentions (Restarting the right but keeping the engine at idle) NOT being verbalized, resulting in a lack of relevant Warnings and Notes listed in NATOPS not being verbalized. Even though there was a point where the right LEF and right RUDDER X’s cleared, there was time to
verbalize the information just in case the failures returned. Additionally, knowledge by the TR that the intention was to keep the right engine at idle could have spurred discussion on that decision, as well as influencing the TR to read NATOPS recommended Single Engine Landing Considerations. [FF (21), (29), (33), (34), (35), (36), (37), (38), (39), (42), (44), (48), (52), (54), (55)]

4. The TR was not experienced enough to handle the emergency situation and provide the necessary F/A-18E/F NATOPS information to make key decisions. [FF (19), (35), (36), (38), (39), (48)]

5. Based on CAPT’s experience level, he should have been more proactive and authoritative with the TR to ensure key NATOPS information was verbalized. Even though he was busy handling compound emergencies, he should have had the ability to guide the TR to the necessary NATOPS items to read to ensure he had the important information. [FF (2), (4)]

6. There was a perceived rush to get the jet on deck that was initiated with the TR and communicated through the Air Boss. However, as the pilot in command with over 4000 flight hours, CAPT should have been more directive and slowed down the situation to give time to properly handle the various emergencies. [FF (2), (4), (31)]

7. Restarting the right engine, which was previously secured for a HYD 2A and HYD 2B caution caused by a hydraulic leak, resulted in the Flight Control Computers locking the right LEF and isolating the right Rudder to a faired position. This was due to no HYD pressure detected on the pressure switch downstream of the switching valve. Fluctuating pressure in the right HYD system most likely exceeded 800 psi, causing the switching valve to remain in test mode resulting in X’s on both the LEF and Rudder on the right side with multiple FCS and FLAPS OFF cautions as the switching valves moved back and forth. [FF (40), (48)]

8. The loss of right RUDDER due to restarting the right engine resulted in a reduction in available directional control authority to balance the yawing moment produced by the engine asymmetry. Had the right engine remained off with full operation of the RUDDER and LEF, the aircraft would have executed a safe single engine recovery because the pilot would have had adequate directional control for engine thrust asymmetry up to MAX power on-speed condition. Restarting the engine per NATOPS recommendation started the chain of events that isolated the right RUDDER and right LEX resulting in a reduction of available directional control power to counter the asymmetric condition—and eventual departure from controlled flight. [FF (39), (48), (51), (67), (69)]

9. Once the decision to restart the right engine was made, keeping it at idle added enough adverse yaw to prevent the flight controls from balancing the yawing moment produced by the engine asymmetry. If the right engine would have been matched with the left engine and used normally, the adverse yaw would have been reduced to the point the flight controls would counter the asymmetric load. The aircraft would have landed safely on board the ship, even with the right LEF and right Rudder X’s. [FF (39), (48), (61), (67), (69)]
Subj: COMMAND INVESTIGATION REGARDING THE CLASS ALPHA AVIATION MISHAP INVOLVING THE EJECTION OF A PILOT OF ONE F/A-18E AIRCRAFT THAT OCCURRED 21 APRIL 2017 OVER THE CELEBES SEA

10. As a result of compound emergencies the pilot's instrument scan was degraded, and this, combined with unfamiliar flying characteristics, resulted in CAPT. (b) (3) (A). failing to maintain on-speed AOA. This led to a buildup of additional side forces, which was incorrectly countered with lateral stick. [FF (47), (55), (58), (59), (61), (63), (64), (65), (67), (69)]

11. Upon departure from controlled flight, CAPT. (b) (3) (A). inadvertently went to asymmetric afterburner on the left engine, further adding to the adverse yaw, which added to the intensity of the departure from controlled flight. [FF (48), (71), (73)]

12. Despite his experience level and focus on flying the aircraft in the critical last moments, CAPT. (b) (3) (A). was unable to maintain control of the aircraft. NATOPS discusses the fact that departure resistance is degraded above on speed AOA with right RUDDER X's, that saturation of the RUDDERs can occur, and that single throttle transients can cause significant yaw and roll when single engine. There is no available data to determine the additional yaw or roll from an extended refueling probe. It is my opinion all of this contributed to a departure that occurred at 9.4 degrees, which NAVAIR has been unable to explain or replicate. At this point in the emergency, I am confident any aviator in a similar position would have struggled to keep the jet from departing. [FF (2), (39), (48), (67), (68), (69), (70)]

13. CAPT. (b) (3) (A). made a very timely and correct decision to eject. The surprise and intensity of the departure, which I saw first-hand in the simulator, could have easily caused a less experienced pilot to delay ejection, resulting in a loss of life. [FF (75)]

**Recommendations**

1. Based on the facts and opinions above, I recommend that any known or latent injuries suffered by CAPT. (b) (3) (A). as a result of this incident be found to have occurred in the line of duty and not as a result of misconduct.

2. I recommend that no adverse disciplinary action be taken against CAPT. (b) (3) (A). in this matter. While certain aircrew errors precipitated the ejection, none were intentional or due to culpable negligence.

3. I recommend Naval Air Systems Command (NAVAIR) examine conditions in which aircrew should restart an engine with a HYD failure due to leak or loss of pressure (non-PTS shaft related). Additionally, NATOPS should give specific guidance on the use of the engine if restarted. In this instance, if the engine was not restarted or matched with the left (not kept at idle), the yaw forces would have been reduced to a point where the aircraft could have safely recovered aboard the ship.

4. I recommend Naval Air Systems Command (NAVAIR) examine the aerodynamic effect of the refueling probe extended with the right engine secured and X's in the right RUDDER. At sea, a malfunction of the right engine (HYD or engine failure) will lead the pilot to extend the refueling probe. Although the added yaw will not have an appreciable effect on flying qualities
Subj: COMMAND INVESTIGATION REGARDING THE CLASS ALPHA AVIATION MISHAP INVOLVING THE EJECTION OF A PILOT OF ONE F/A-18E AIRCRAFT THAT OCCURRED 21 APRIL 2017 OVER THE CELEBES SEA

in most cases, additional malfunctions that contribute to an adverse yaw condition, such as RUDDER X’s, could have a severe effect on the departure resistance of the FA-18 E/F/G, potentially causing a departure below previous tested AOA’s.

5. I recommend CAP lead and brief a CRM refresher to Commander, Carrier Strike Group ONE. It should use this mishap as an example and stress the importance of communication at all ranks and experience levels. Despite compound and concurrent emergencies, very little information was passed to the single seat pilot of Aircraft 205. Instead, it appears decisions were made internally to Aircraft 205 with little to no backup of the designated tower representative (TR). This refresher should include both CVW-2 and CVN 70 personnel who interact and are within the “safety chain” of shipboard operations.

6. I recommend Carrier Air Wing TWO reevaluate TR qualification prerequisites and determine if more experience in the Tower is required for complex emergencies.