"What a Drag!"

From *Approach* magazine
October 1971

AN EKA-3B was launched from a CVA at 2040 local time as a combat tanker. The mission proceeded normally until return to the ship. A Case III CCA to the ship ended with a fouled deck waveoff. The pilot then entered the waveoff/bolter pattern for another Case III approach. After a fuel state of 6,000 pounds was reported on the ball at three-fourths mile, the aircraft was observed going below glidepath. The pilot responded to an LSO power call, the aircraft went flat in close and boltered. CATCC then directed a bingo to a shore station due to low fuel.

The crew had flown a two-and-one-half hour tanker-mission earlier in the afternoon. Because of this they were instructed to attempt a turn-around and return to the ship for a 0015 recovery only if the pilot and crew were not tired. If tired, the pilot and crew were instructed to RON at the shore station and expect an overhead time in about 24 hours. The pilot acknowledged these instructions and added that he "probably" would be back.

The bingo flight to the shore station was uneventful. The pilot pushed the drag chute circuit breaker in during the prelanding checklist. (It was squadron policy to have the drag chute circuit breaker out for operations off the ship.) After touchdown, the pilot actuated the drag chute but the chute failed to deploy. However, the aircraft was easily brought to a stop with brakes alone. After turning off the runway, the pilot taxied to the hot refueling pits. Upon arrival at the pits, the pilot remained in the aircraft but sent his two crewmen outside to assist in the refueling and to determine why the drag chute failed to deploy. The crewmen observed that the chute doors were closed. They also checked and determined that a drag chute was installed. After being informed of these facts, the pilot pulled out the drag chute circuit breaker and moved the drag chute to the jettison/stowed position. No further action was taken by either the pilot or the crewmen relative to the drag chute failure.

Taxi from the refueling pits, takeoff and return flight to the ship were uneventful. Upon arrival overhead at about 0025, the tanker assumed duty as overhead tanker for the recovery which was in progress. At the end of the recovery, a Case III CCA approach was commenced and excess fuel dumped. The approach proceeded normally to OLS transition and LSO control. Fuel state was reported at 6,100 pounds.

At "meatball," the aircraft went below glidepath and remained below. The LSO made several power calls as the aircraft settled in close. The pilot overcontrolled power and the Skywarrior crossed the ramp a little low and flat. Touchdown was forward of the crossdeck pendants, resulting in a bolter. The drag chute fell out of the aircraft on touchdown and was fully deployed as the aircraft left the angle deck. The CATCC controller immediately began transmitting bolter pattern instructions as the aircraft began to settle toward the water. The second seat crewman called, "Power, boards," which is normal procedure. He then repeated, "Boards, boards," as he observed that the aircraft was not accelerating or climbing. The pilot rechecked the speedboard switch "in" several times, then raised the landing gear.

The pilot transitioned to instrument flight immediately following the bolter and, maintaining wings level, assumed the proper climbing attitude. When he observed that the aircraft was not accelerating or climbing, he increased the angle-of-attack to 16 units and held this attitude to impact. The rate of descent was about 100 fpm. Neither the pilot nor second seat crewman knew that the drag chute had deployed and was the cause of the altitude loss.

Although the LSO saw what appeared to be a drag chute drop from the aircraft, he could not observe the aircraft as it left the deck because of the parked aircraft to the left of the landing area. The LSO platform on this ship is located 36 inches below flight deck level, which precluded the LSO from moving rapidly to a better vantage point where he might have observed the drag chute in time to warn the pilot. However, 12 seconds after the aircraft left the angle deck, Pri-Fly called, "Get your chute, your chute." Even though this call was heard by the crew, its meaning was not understood and the aircraft impacted the water about two minutes later.

Following the impact, the aircraft remained essentially intact and afloat. None of the crewmembers were injured and they left the aircraft with only minor difficulty. They were rescued by helicopter a short time later.

During the subsequent investigation, it was brought out that the drag chute had failed to deploy on three out of the last 10 field landings over a period of 45 days. On all three occasions, the drag chute doors had failed to open. On the first malfunction, the doors were found to be sticking. After the second malfunction, maintenance personnel replaced the drag chute actuator (Airborne Electronics PN R584M801). Thorough analysis of the actuating arm movement adjustment tolerances was made and revealed that there is only .031 of an inch excess travel of the actuator arm beyond that required to trip the spring-loaded doors open. Although the system was run through and functionally checked, as previously stated, the exact adjustments were not checked on the actuating mechanism. The Maintenance Instruction Manual, NAVAIR 0l-40ATA-2-13, does not include the specific requirements for insuring proper adjustment of the actuator after installation. It should he noted that several successful chute landings were made following the first and second drag chute malfunctions. On the night of the accident, the third malfunction occurred but was not investigated by maintenance personnel to determine or correct the malfunction of the drag chute system.

A thorough study of the statements and interviews with the pilot and crewmen revealed:

- **After the pilot pulled out the drag chute circuit breaker and moved the drag chute switch to the jettison/stowed position, the circuit breaker was never placed in for the takeoff or at any time during the flight to the ship.**
- **The pilot was very busy checking fuel coming into the aircraft and insuring proper fuel distribution in the refueling pit at the shore station. When informed by the crewmen that the drag chute doors had not opened and that the drag chute was still in the aircraft, the pilot, in an attempt to "safe" the drag chute, pulled the circuit breaker first, then placed the drag chute switch to the jettison/stowed position and immediately returned his attention to managing fuel distribution.**
- **The second crewman was aware of the pilot's actions in attempting to safe the drag chute and concurred, having no doubt that the chute was safe.**
- **The pilot did not feel the need for maintenance assistance because he thought he had adequately safed the drag chute system and did not consider a need**

for an operable chute on the field takeoff for possible abort considerations.

- **At no time did the pilot consider that the need for an expeditious turnaround, to make the 0015 overhead time, had influenced the method he used to safe the drag chute or actions required to insure a safe chute. The pilot stated that the idea of removing the chute from the aircraft briefly crossed his mind but was discarded since he felt sure that his safing actions were adequate.**
- **The pilot and crewmen were not aware of a safety feature incorporated in the drag chute system which allows the chute to separate from the aircraft with a minimal load (250-pound load to shear a Monel rivet) when the drag chute and locking mechanism is in the stowed position. Also, they were not aware that the actuation of the drag chute switch to the deploy position caused an electrically operated mechanism to move, locking the drag chute to the aircraft and increasing the load required to separate the chute from the aircraft to about 25,000 pounds. This is obtained at an airspeed estimated to be in the range of 170 to I80 knots. The crew believed that separation of the chute from the aircraft could be obtained only by cycling the drag chute switch to the jettison/stowed position, if the drag chute deployed as a result of mechanical failure which allowed the doors to open.**
- **The pilot and both crewmen denied that they were tired. They stated that they felt up to returning to the ship.**
- **The pilot's actions in deploying the drag chute on landing at the shore station and subsequently pulling out the drag chute circuit breaker prior to returning the drag chute switch to the jettison/stowed position, placed the drag chute locking mechanism in the lock position. A 25.000-pound load would be required to shear the pin connecting the riser link to the drag chute. However, it is noted that a possibility exists that the actuator could have failed after locking the riser link. In this event. The only method available to the crew to safe the drag chute system would be to remove the chute from the aircraft.**

The Board's analysis of NATOPS requirements and the pilot's actions indicates there was no violation of NATOPS procedures in this accident. Aircrew training programs are oriented around the areas emphasized in the NATOPS manuals. In the case of the EKA-3B NATOPS Manual, the coverage of the drag chute actuating mechanism and the safety features incorporated were inadequate (at the time of the accident) and is the primary reason why sufficient aircrew knowledge of the system was lacking. The aircrewmen's training records indicate that they were current in their NATOPS requirements and that they had received sufficient training commensurate with current directives. The inadequacy of the NATOPS manual has since been remedied by the addition of certain changes to pages 1 -88A and 3-30 of the EKA-3B NATOPS Manual.

There is evidence that both pilot fatigue and material malfunction (failure of the drag chute doors to open upon landing at the shore station) were important factors in this accident; however, one of the most important lessons learned is that knowledge is power. Had the pilot been fully aware of all the ramifications of the operation of the drag chute system, this accident might not have occurred (fatigue and material failures notwithstanding). As the board pointed out, the pilot did act in accordance with NATOPS insofar as it went. Therefore, accidents such as this provide a strong impetus for all concerned to review NATOPS manua1s to insure

they are sufficiently detailed to enable pilots to understand the operation of essential systems.