

Ref 6

Palomares

338913

SPECIAL HANDLING REQUIRED IAW AFR 127-4

R

I. HISTORY OF FLIGHT:

1. B-52C #58-256 (Tea 16), assigned to the 68th Bombardment Wing, Seymour-Johnson AFB, North Carolina, and KC-135 #61-273 (Troubadour 14), assigned to the 97th Bombardment Wing, Blytheville AFB, Arkansas (TDY at the time to the Spanish Tanker Task Force, Moron AB, Spain) collided and crashed at approximately 0920Z, 17 January 1966, while participating in cell air refueling operations in the Saddle Rock Air Refueling Area, Spain, 256<sup>0</sup> track. The mission was a scheduled indoctrination flight (SAC OPORD23-66, Chrome Dome Sorties 71 and 72), approximately 22+50 hours in duration for the B-52 and approximately 1+30 hours in duration for the KC-135. Two air refuelings were scheduled, the first in the Golden Spur and the second in the Saddle Rock Area. The crew of Tea 16 consisted of Captain [REDACTED] (aircraft commander); 1st [REDACTED] (copilot); Captain [REDACTED] (radar navigator); 1st Lt [REDACTED] (navigator); 1st Lt [REDACTED] (substitute electronic warfare officer, as the regular EWO was DNIF); TSgt [REDACTED] (gunner); and Major [REDACTED] (staff pilot). The crew of Troubadour 14, TDY to the Spanish Tanker Task Force from the 340th Bombardment Wing, 910th Air Refueling Squadron, Bergstrom AFB, Texas, were Major [REDACTED] (aircraft commander); Captain [REDACTED] (copilot); Captain [REDACTED] (navigator); and MSgt [REDACTED] (boom operator). A general Chrome Dome briefing was conducted at 1600Z, 24 December 1965, and pre-takeoff briefing at 2030Z, 16 January 1966, for the B-52 crew. The KC-135 crew received a general briefing at 0900Z, 15 January 1966, and pre-takeoff briefing at 0725Z, 17 January 1966. Tea 16 was scheduled to lead the two-ship formation the first half of the mission. Preflight of the B-52 was normal with the exception of number one UHF radio malfunction and an oil pressure transmitter malfunction. As a result of the radio maintenance, Tea 16 took off eleven minutes late. The mission progressed to the first air refueling with timing maintained within the prescribed block. Tea 16 reported that his autopilot would not maintain precise headings and exact altitude. The formation was on time for the Golden Spur ARCP at 0528Z. Tea 16 refueled using autopilot with Troubadour 13 and 11. Briefed on-load was taken without an inadvertent disconnect. End of air refueling track was approximately 0615Z. Captain [REDACTED] was in the left seat during this time. After completion of air refueling, Tea 16 changed from lead position to wing position. Captain [REDACTED] went aft for crew rest and Major [REDACTED] (a staff qualified pilot) came forward and occupied the left pilot seat. Prior to descent for the second air refueling, Captain [REDACTED] relieved the copilot, Lt [REDACTED], and occupied the right pilot seat. The second air refueling was to be in the Saddle Rock Area with two KC-135 aircraft operating out of Moron AB, Spain. The other B-52 (Tea 12) was still in the lead position and accomplished the rendezvous. The weather in the refueling area was clear with no turbulence. Number two tanker, KC-135 #61-273, suggested that a higher formation speed be used, and the tanker aircraft commander

[REDACTED]  
SPECIAL HANDLING REQUIRED IAW AFR 127-4

advised the B-52 Tea 16 that he would have limited breakaway capability due to a high gross weight. The crew reported that a good rendezvous was accomplished and the initial approach to the tanker was normal to approximately one-half mile. Both B-52 pilots, Major [REDACTED], left seat, and Captain [REDACTED], right seat, agree that as they approached the observation position, the rate of closure seemed to increase. B-52 throttles were retarded to idle. During closure, tanker boom operator said something to the effect of, "You're going to have a slight overrun." or, "Watch your rate of closure." This was said in a normal voice. The B-52 aircraft apparently continued to close and a collision resulted. The B-52 pitched down and left, followed by a large explosion. Ground observers state that the B-52 appeared to break up in the air following the explosion, but that the KC-135 continued ahead, shaking, for a very short distance. There was an explosion; then it pitched over into a descent and exploded again about 1600 feet above the ground and again on contacting the ground. Both B-52 pilots ejected successfully. The B-52 radar navigator ejected and was burned as he encountered a fireball immediately after ejection. Lt [REDACTED], crew copilot, riding in the IN seat, bailed out through the radar navigator's hatch. The B-52 navigator ejected at a very low altitude just prior to impact of the cockpit section, and was killed by impacting the ground approximately 25 yards away from the cockpit section. The B-52 radar navigator also failed to separate from the seat, but his chute deployed and he received a back injury from landing in his seat. The gunner and EWQ of the B-52 did not eject and were fatally injured in the crash. All three pilots of the B-52 landed in the sea and were picked up by fishing boats. Both the radar navigator and the navigator landed on shore. Most of the wreckage of both aircraft is on land; however, two large pieces of B-52 wreckage were observed to fall into the sea. All crew members of the KC-135 received fatal injuries as the result of fire or ground impact.

II. INVESTIGATION AND ANALYSIS:

1. AirCrew Qualification and Training:

a. Crew Number E-22, B-52G #58-256: Crew members involved in this accident were found to be current and qualified in accordance with applicable directives. The third pilot, Major [REDACTED], occupying the pilot's seat at the time of the accident, was current and qualified as a staff pilot. The aircraft commander, Captain [REDACTED], occupying the copilot's seat at the time of the accident, was current and qualified as a B-52 instructor pilot. The crew's assigned copilot, Lt [REDACTED], was occupying the instructor navigator's position. This crew configuration, for this phase of flight, is not in accordance with SAC OPORD 23-66, 8AF Supplement, "Chrome Dome", which states, "SAC numbered crew members or personnel qualified as instructors in specific model aircraft will occupy seats during takeoff, refueling, and other critical phases of flight." The aircraft commander, Captain [REDACTED], was assigned to the 68th Bombardment Wing as a B-52 copilot in early 1960. He was upgraded to aircraft commander on 26 May 1964 and to

SPECIAL HANDLING REQUIRED IAW AFR 127-4

instructor pilot status on 3 May 1965. Captain [REDACTED] has also completed the B-52 Central Flight Instructor Course, Castle AFB, California. Detailed review of all records reveals that he is a well-qualified B-52 pilot. Major [REDACTED] was assigned to the 68th Bombardment Wing as an aircraft commander in the spring of 1961. Detailed review of his standardization records reveals that he has never obtained less than qualifying grades on all proficiency or instrument flight evaluations. He received a staff qualification on 20 December 1965, obtaining qualified grades in all areas including air refueling. During the period 15 March 1965 to 11 May 1965, Major [REDACTED] was DMIF. Records did not indicate that he had been administered a requalification for loss of currency in accordance with AFM 60-1. He was assigned as a command post controller on 6 April 1964, and has remained in this assignment until the present time. The copilot, 1st Lt [REDACTED], was current and qualified. He received a formal proficiency evaluation on 15 September 1965 and a formal instrument evaluation on 30 September 1965. The radar navigator, Capt [REDACTED], was current and qualified. He received a formal evaluation on 18 October 1965. The lowest grade obtained was qualified. The navigator, 1st Lt [REDACTED], was current and qualified. He received a formal evaluation on 10 May 1965. The electronics warfare officer, 1st Lt [REDACTED], was current and qualified. He received a formal evaluation on 10 May 1965. The gunner, TSgt [REDACTED], was current and qualified. He received a formal evaluation on 17 December 1965.

b. Crew Number J-04, KC-135A #61-273: Primary crew members involved in this accident were current and qualified in accordance with current directives. The aircraft commander, Major [REDACTED] received a formal instrument and proficiency evaluation on 16 June 1965. His initial instructor pilot qualification evaluation flight was administered 15 January 1964. His records reflect no standardization evaluation failures. The copilot, Captain [REDACTED], was current and qualified. He was formally evaluated on 27 October 1965. The navigator, Captain [REDACTED], received an instructor-navigator proficiency evaluation 20 December 1965. He received a grade of "unqualified" in navigation for failure to cross-check N-1 compass heading against the J-4 compass after a turn. Recommended corrective action consisting of two hours of supervised study of proper grid steering procedures and one grid navigation flight to be flown under the supervision of an instructor navigator, were completed 5 and 11 January 1966, respectively. The inflight recheck, with a suspense date of 20 February 1966, had not been administered. The boom operator, MSgt [REDACTED] held a rating of instructor boom operator. He was current and qualified, having been formally evaluated on 16 June 1965.

2. Crew Rest: Crew rest for crew number E-22, B-52G #58-256, and crew number J-04, KC-135A #61-273, was not a factor in this accident. Investigation has shown that no activity was scheduled during the twelve hours preceding each crew's first activity prior to the accident. The KC-135 crew had flown a one hour and thirty minute refueling sortie earlier in the day on 17 January 1966. Scheduling two sorties per duty period is normal for Chrome Dome TDY personnel and is within crew rest criteria as required by SACR 51-3.

████████████████████  
SPECIAL HANDLING REQUIRED IAW AFR 127-4

3. Preparation for Flight: Flight preparations for both aircraft involved in the accident were conducted in accordance with applicable directives. With but one individual exception, the bomber and tanker crews attended both a general and pre-takeoff briefing rendered by respective bomber and tanker staff officers. Major ██████████, the B-52 pilot in the left seat at the time of the accident, did not attend the general briefing with the crew. This officer was given a general briefing by his supervisor, the wing command post senior controller. The B-52 and KC-135 aircraft commanders were instructor pilots in their respective aircraft and had flown the mission on at least one previous occasion. Review of mission packages was conducted by affected staff officer and portions of the packages pertinent to this report are included as attachments. Oral statements made before the accident board by surviving crew members reveal no inadequacy in respect to flight preparation. Although the B-52 aircraft commander expressed knowledge about the essentiality of occupancy of aircraft positions by primary crew members during critical phases of flight, this item was perhaps insufficiently emphasized at the general briefing. Briefing accomplishments are shown below:

	<u>B-52</u>	<u>KC-135</u>
General Briefing	1600Z/24 Dec 65	0900Z/15 Jan 66
Pre-takeoff Briefing	2030Z/16 Jan 66	0725Z/17 Jan 66

4. Aircraft Status: There is no evidence of any materiel malfunction, or failure, of either aircraft or their related systems which could be considered a cause factor in this accident.

5. Eye-Witness Testimony: On 17 January 1966, in the Saddle Rock Refueling Area, B-52 #58-256, and KC-135 #61-273, appeared to be forming as they usually do as observed by fishermen out of Aguilas, Spain, farmers out of Palomares, Spain, and a shepherd out of Herrerias, Spain. The B-52 was observed to underrun the KC-135 which was about two-thirds blanked out from view. The aircraft seemed to rub together and the B-52 immediately started to break apart and a violent explosion occurred. The KC-135 continued ahead and appeared to be shaking from side to side for what one observer estimated to be 75 to 80 meters. It then had a small explosion with some parts on fire, then nosed over and descended, as described by one group of witnesses, in a straight path, had a greater explosion about 1600 feet above the ground, hit the ground, and exploded again. Other witnesses described the KC-135 as descending in a straight path, banking or wallowing from side to side, exploding above the ground with parts being strewn a distance away, main portion inverting and contacting the ground with ensuing explosion. Numbers of parachutes observed by people in four different locations varied from three to eight. Colors of these parachutes varied from orange, olive drab, to white. All chutes were drifting in an easterly direction and landed on land and in the adjacent water. Three survivors landed in the water from three to eight nautical miles out, and one survivor landed on the ground approximately one kilometer due west of the shoreline and was still strapped in his

[REDACTED]  
SPECIAL HANDLING REQUIRED IAW AFR 127-4

ejection seat. Two large pieces of aircraft fell into the water from three to five miles offshore and appeared to be burning. Two parachutes were observed to land in the water at approximately five nautical miles offshore. These chutes sank almost immediately, and one, that was dark in color, appeared to be carrying what was described as the upper torso of a man with entrails hanging out. The other was carrying an object about the size of a man which was rigid and erect, a round cylindrical shape, light bluish in color (the object fell between the observer and the sun). The general orientation of the wreckage is from east to west as was the flight path of both aircraft. (Winds at refueling altitude, as measured by another KC-135 refueling another B-52, were 305 degrees at 60 knots.)

6. Analysis: a. The missions of both the B-52 and KC-135 were accomplished as briefed until the second air refueling for the B-52 aircraft Tea 16. Prior to arriving at the ARCP for the second air refueling in the Saddle Rock Area, the aircraft commander (IP) of Tea 16 exchanged seats with his crew's assigned copilot. From this portion of the flight until the accident, Major [REDACTED], a staff qualified pilot, occupied the left pilot's seat, and Captain [REDACTED], aircraft commander (IP), occupied the right pilot's seat. The crew's assigned copilot, Lt [REDACTED], moved to the instructor navigator's position because the IP seat had been removed prior to the mission to improve crew comfort. The rendezvous was accomplished in accordance with prescribed directives, except the tanker had confirmed with the receivers that the refueling airspeed would be 260 KIAS for the lead tanker/receiver, and 256 KIAS for the number two tanker/receiver. Each tanker also confirmed with his receiver that due to their heavy gross weight they would have a limited breakaway capability. Airspeeds and altitudes during the rendezvous were confirmed between the tankers and receivers and were normal during closure to approximately one-half mile. Both B-52 pilots (Tea 16) state that as they approached the precontact position, their rate of closure seemed to increase excessively. The boom operator stated in a calm voice, "Check your rate of closure." or, "Watch your rate of closure." The receiver pilot reduced power to idle in an attempt to control his rate of closure. He did not stabilize in the precontact position. A breakaway was not called on refueling frequency by either aircraft after it became apparent that underrunning would occur, and the receiver did not execute a breakaway maneuver. During the attempt to avoid collision with the tanker, both the receiver pilots recall noting a 300' per minute rate of descent, and the aircraft commander (IP), Captain [REDACTED] noted his altimeter read 225' below the refueling altitude. Testimony by the radar navigator of Tea 16 indicated that they closed to a point that he could hear the KC-135 engines and estimated that they were almost directly underneath the tanker. The instructor pilot, looking through the copilot's overhead escape hatch window, stated that he could see the trailing edge of the tanker wing at his last observation. The radar navigator described the initial unusual noise as a heavy crashing or crunching of metal, accompanied by a marked deceleration. Other crew members described the initial noise as explosion, impact, crash, crunch, etc. All surviving crew members agree that the aircraft entered a heavy left wing, nose-low attitude after the initial crunching, explosion, or impact noise. This was followed

PRIVACY ACT MATERIAL REMOVED

[REDACTED]  
SPECIAL HANDLING REQUIRED LAW AFR 127-4

by a violent explosion. The radar navigator ejected immediately after the initial crunching noise and immediately entered a fireball outside the aircraft. The pilot ejected either simultaneously with the radar navigator or immediately thereafter. After the violent explosion, Captain [REDACTED] (IP) ejected. Lt [REDACTED], occupying the instructor navigator's position, did not have his safety belt fastened and was thrown from a seated to a standing position during the initial impact. After the radar navigator ejected, and following a violent explosion and aircraft pitchdown, he was thrown forward against the radar navigator's panel and held in this position until the "G" forces reversed. He then bailed out through the radar navigator's hatch. When the navigator was last observed by the radar navigator, his parachute shoulder straps were not worn over his shoulders, nor was the chest strap fastened. Only his parachute leg straps and seat lap-belt were fastened. The navigator apparently delayed ejection in an effort to completely don his parachute. He was successful in ejecting from the aircraft; however, altitude was not sufficient to permit deployment of his parachute and he was fatally injured upon ground impact. The electronics warfare officer and gunner did not eject and sustained fatal injuries upon ground impact. Both pilot ejection seats operated normally. The radar navigator's integrated harness release initiator failed to fire and, due to his semi-conscious condition, he did not activate his manual integrated harness release handle. He sustained burns during fall through the fireball and received back injuries when landing with his ejection seat attached. The navigator's integrated harness release also failed to fire. Major [REDACTED] and Lt [REDACTED] were unable to activate their bailout bottles. Captain [REDACTED] survival kit either was not properly fastened to his parachute or came loose during ejection and became entangled in his parachute at deployment. Major [REDACTED] was unfamiliar with the parachute riser-release cable and experienced difficulty releasing the parachute canopy after landing in the water.

b. All crew members of the KC-135 were killed by ground impact or by fire that preceded and followed ground impact. There was no evidence of attempted bailout by any of the crew.

PRIVACY ACT MATERIAL REMOVED

████████████████████  
SPECIAL HANDLING REQUIRED IAW AFR 127-4

III. FINDINGS:

1. Primary Cause. Supervisory error in that the instructor pilot (aircraft commander), occupying the copilot's position, failed to take necessary action to prevent underrun and subsequent collision with the tanker.

2. Contributing Cause Factors.

a. Pilot error in that the pilot of the B-52 (left seat), while attempting to move into the refueling position, failed to maintain sufficient separation between the two aircraft to avoid collision and subsequent break-up and crash of both aircraft.

b. Crew factor. A breakaway was not called by any crew member (bomber or tanker) when it became apparent that a hazardous underrunning condition existed.

c. Violation of SAC OPORD 23-66, annex B, page 4, paragraph 4a(9) in that the IP/aircraft commander of the B-52 permitted a staff-qualified pilot to occupy a primary crew position and allowed him to attempt the second air refueling on a Chrome Dome sortie.

d. Supervisory factor in that sufficient emphasis was not placed on the importance of compliance with the restrictions of SAC OPORD 23-66 as pertains to primary crew members occupying the seats during critical phases of flight.

3. Additional Findings Contributing to the Accident.

a. The pilot of the receiver aircraft apparently thought adequate separation from the tanker was being maintained when he observed the altimeter reading 225' below the tanker's refueling altitude and vertical velocity indicator indicating a 300' per minute rate of descent.

4. Additional Findings Not Contributing to the Accident.

a. The term "overrunning" is used in the Refueling Flight Manual to describe both overrunning and underrunning maneuvers.

b. After the crash of the two aircraft, the cell leaders elected to continue refueling rather than immediately return to the crash site. T.O. 1-1C-1-3 does not fully explain what action should be taken when only one tanker remains in the formation.

c. The accident developed with such speed that the KC-135 crew was not able to effect egress from their aircraft with the escape facilities provided on that aircraft.

d. Several crew members aboard the B-52 were not completely familiar with their personal equipment and the ejection seats and had not been properly trained in the use of parachutes and survival gear.

████████████████████  
SPECIAL HANDLING REQUIRED IAW AFR 127-4

IV. RECOMMENDATIONS:

1. (Primary Cause) Recommend that all instructor pilots be rebriefed on the importance of assuming control of the aircraft before allowing hazardous situations to develop from which recovery would be difficult or impossible.

2. (Contributing Cause Factors)

a. Recommend that all personnel associated with aerial refueling be rebriefed concerning responsibility for compliance with published procedures to insure safe separation between aircraft. (Reference SACM 55-20, volume II, chapter 2, para 3-1; T.O. 1B-52G-1, section VI; T.O. 1-1C-1-15, sections III and IV.)

b.(1) Recommend that all primary crew members be rebriefed as to the necessity for calling breakaway when a hazardous condition exists or is apparently in the making.

(2) Recommend that the caution note in the Emergency Air Refueling Procedures Section of T.O. 1-1C-1-XX, under the paragraph entitled "Breakaway Procedures," be changed to read: "WARNING: The receiver pilot will use caution not to underrun the tanker. As soon as it becomes apparent that underrunning will take place, a breakaway will be called. If underrunning does occur, under no condition should a turn, either right or left be made until a breakaway has been completed."

(3) Recommend that under the Boom Operator Section of this paragraph and under section IV, Air Refueling Procedures, of T.O. 1-1C-1-3, in the paragraph entitled "Boom-Precontact Position," add the following warning note: "WARNING. Any time it becomes apparent that the receiver will underrun the tanker, the boom operator will immediately call a breakaway."

c. Recommend that all flight supervisory personnel and crew members participating in Chrome Dome operations be rebriefed concerning responsibilities and requirements to insure that only numbered aircrew members or fully qualified instructor pilots occupy primary crew positions during critical phases of flight.

d. Recommend that commanders insure that all supervisory and flight crew personnel involved in Chrome Dome flights or similar missions be made aware of restrictions imposed by applicable operations order and that strict compliance be emphasized.

3. (Additional Findings Contributing to the Accident)

a. Recommend that a warning note be added to T.O. 1-1C-1-XX to advise receiver pilots of altimeter and vertical velocity indicator errors caused by the aerodynamic effect of the tanker. The following is the suggested wording for the warning note; however, recommend flight test data be obtained to verify specific altimeter error: "Due to aerodynamic effect of the tanker, the receiver altitude indicators may read approximately 200-300 feet lower than the tanker's indicated altitude when the receiver is in the precontact position and/or air refueling envelope. The vertical velocity indicator readings may also be unreliable for small

[REDACTED]

SPECIAL HANDLING REQUIRED LAW AFR 127-4

rates of climb or descent when the receiver is in this area. During forming, underrunning, or breakaway, these errors must be considered to avoid collision with the tanker."

4. (Additional Findings Not Contributing to the Accident)

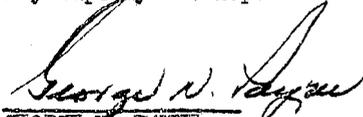
a. Recommend that the terms "overrunning" and "underrunning" be defined in the Terminology Section of T.O. 1-1C-1 and the proper terms used throughout the manual.

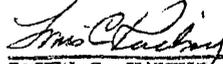
b. Recommend that the paragraph entitled "Responsibilities During Emergency" of T.O. 1-1C-1-3, section 7, be changed to read: "If an emergency occurs which necessitates a crash landing, ditching, or bailout, an airplane designated by the leader will accompany the disabled airplane or will cover personnel at a safe distance above the surface. The designated airplane will render all assistance possible, orbiting the area until aid arrives or until fuel supply requires leaving the area. (Added) Fuel status of the remaining receivers and availability of abort bases bases will be considered by the leader when designating this airplane. If there is only one tanker in the cell, that tanker (except under EWO conditions) will perform the actions listed above."

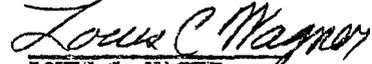
c. Recommend that SAC Sup 1 to AFR 60-16 be changed to require that all KC-135 crew members, with the exception of the boom operator, be required to wear helmets and masks and be on oxygen immediately prior to and during air refueling. Further recommend that ejection seats be installed on all KC-135 aircraft for all crew members.

d. Recommend that procedures be instituted to insure that all crew members are thoroughly familiar with all their personal equipment and survival gear and are periodically briefed on the proper use of this equipment.

5. (Additional Board Findings) Recommend that all crew members be briefed on this accident with special emphasis placed on their personal responsibility to avoid moving into areas where hazardous environments may rapidly develop.

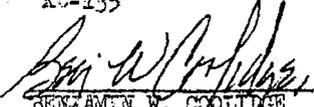
  
GEORGE N. PAYNE  
Colonel, USAF  
President

  
LOUIS C. KADRING  
Major, USAF  
Accident Investigator  
B-52

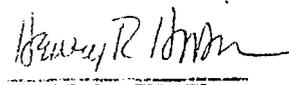
  
LOUIS C. WAGNER  
Captain, USAF  
Accident Investigator  
KC-135

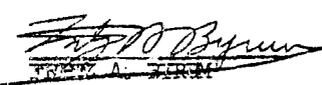
  
JOSEPH L. BOOTH  
Lt Colonel, USAF  
Advisor

  
MARSHALL M. PAYNE  
Major, USAF  
Maintenance Member

  
BENJAMIN W. COOLIDGE  
Lt Colonel, USAF  
Munitions and  
Explosives Member

  
THOMAS E. WRIGHT

  
HENRY R. HIRSCH

  
HENRY A. HIRSCH