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MEMORANDUM

From: P. V. Neffenger, YADM
COMDT (DCO)

To: Distribution

Subj: FINAL ACTION ON THE ADMINISTRATIVE INVESTIGATION INTO THE
CRASH OF CG-6028 ON 3 MARCH 2010

1. **Overview:**

On 3 March 2010, two Coast Guard MH-60T helicopters, CG-6028 and CG-6040, departed Salt Lake City, Utah, to continue a cross-country ferry flight that started at Naval Air Station (NAS) Whidbey Island, Washington the previous day. The aircraft were returning to Air Station Elizabeth City, North Carolina, after completing a five-week deployment to the 2010 Vancouver Winter Olympics. At approximately 0901 (local time), while in formation flight, CG-6028 impacted mountainous terrain in the Silver Meadows area of Wasatch National Forest, approximately 55 miles from Salt Lake City, after both aircraft encountered deteriorating weather and low cloud ceilings. Four of the five air crew aboard CG-6028 sustained injuries in the crash. Three were seriously injured requiring extensive recovery periods. A survey deemed CG-6028 unserviceable.

This document sets forth the facts that led to this mishap, states my conclusions and orders certain actions designed to prevent similar mishaps in the future.

2. **Findings of Fact and Opinions:**

The Coast Guard's Maritime Security Response Team (MSRT) was formed to provide a first response to potential terrorist situations. The MSRT deployed on 1 February, 2010, to provide Coast Guard District Thirteen's around-the-clock security response capability to the 2010 Winter Olympics. The MSRT's aviation detachment (AVDET) was a sub-unit of Coast Guard Air Station Elizabeth City, North Carolina and based out of NAS Whidbey Island during the operations.

The AVDET deployed a total of eight pilots, eight flight mechanics/gunners, and twelve maintenance personnel in support of the MSRT mission. The deployment began on 1 February 2010 when CG-6028 and CG-6040 departed on a ferry flight from Air Station Elizabeth City to NAS Whidbey Island, Washington. On 12 February, tactical control (TACON) of the AVDET transferred from Air Station Elizabeth City's Commanding Officer (CO) to the CO of MSRT Chesapeake for the specific purpose of flight authorization and scheduling sorties in direct support of the mission. Any requests for flights that were not in direct support of the MSRT mission were to be directed to Air Station Elizabeth City's CO for approval. Operational control (OPCON) of the AVDET remained with Coast Guard Atlantic Area Command (LANTAREA) during the deployment.

On 1 March 2010, the MSRT mission to the Olympics ended. All equipment and personnel, with the exception of CG-6028 and CG-6040 and their ferry crews, returned either via military airlift flight or commercial aircraft.

Also on 1 March, the ferry crews began preparing for their return to Air Station Elizabeth City. The return trip was planned to be conducted over four flying days with intermediate stops each night: on 2 March, NAS Whidbey Island to Salt Lake City, Utah; on 3 March, Salt Lake City to Kansas City, Kansas, with a fuel stop in Leadville, Colorado; on 4 March, Kansas City to Roanoke, Virginia; and on 5 March, Roanoke to Air Station Elizabeth City.

Although the MSRT's CO believed that TACON had shifted from the MSRT back to Air Station Elizabeth City, no official message was released to document this shift in flight authorization authority, meaning that TACON remained with the MSRT Chesapeake. The CO of Air Station Elizabeth City believed TACON remained with MSRT.

Neither the CO of the MSRT nor the CO of Air Station Elizabeth City reviewed the "route of flight" planned by the ferry crews. Flight planning and assessment of risk was performed by the AVDET's Operations Officer, who was also the Pilot-in-Command (PIC) of CG-6028.

The aircrew of CG-6028 consisted of five personnel: the PIC; copilot; an aviation maintenance technician (AMT3) who served as flight mechanic (FM); an avionics electrical technical (AET2) who served as basic air crewman (BA); and an aviation survival technician (AST3).

The PIC had 3,660 hours of flight time, including 3,454 in the H-60 airframe, and 32.2 flight hours in the 30 days preceding the mishap. The copilot had 4,634 hours of flight time, including 1,858 in the H-60 airframe, and 19.6 hours in the 30 days preceding the mishap. The copilot was a 2008 graduate of the U.S. Army's High Altitude Aviation Training Site (HAATS) course of instruction. HAATS trains military rotary-wing pilots to fly safely at high altitude and in mountainous terrain. However, the copilot had very little operational experience flying in mountainous terrain or at high altitude. Neither the CG-6028 PIC nor the CG-6040 PIC and copilot had attended HAATS.

The CG-6028 ferry crew was well rested, with each member having had at least 10 hours of rest before beginning the first leg from NAS Whidbey Island to Salt Lake City.

All aircrew medical records were reviewed with some administrative abnormalities noted. However, no aircrew member had causal or medically disqualifying factors present when the mishap occurred.

On 1 March, the pilots received a weather outlook briefing from NAS Whidbey Island's base operations office. (The weather outlook for the four day period was favorable over the planned route of flight, with only slight possibilities of precipitation.)

On 2 March, before commencing the first leg of the ferry flight (NAS Whidbey Island to Salt Lake City), the CG-6028 PIC conducted a joint mission brief for the crews of CG-6028 and CG-6040, including formation flying, forecast weather, and inadvertent Instrument Meteorological Conditions (IMC) contingency procedures. For that first leg, CG-6040 was designated as the

lead aircraft and CG-6028 as wing, or trail, aircraft. The PIC for the lead aircraft was designated the flight leader.

The two sorties from NAS Whidbey Island to the overnight stop in Salt Lake City were conducted uneventfully and totaled 6.4 hours of flight time for each aircrew.

For the second leg, both aircraft departed as a formation flight from Salt Lake City International Airport at 0833L on 3 March. Prior to departure the CG-6028 copilot provided the pilots of both aircraft a weather update and reported no significant weather with the exception of possible small areas of precipitation after leaving Salt Lake City. A joint mission brief was not conducted, although each crew conducted individual flight briefings. Neither CG-6028 PIC nor the CG-6040 PIC filed a flight plan with air traffic control. The Coast Guard Air Operations Manual (COMDTINST M3710.1F) states that the "PIC should file a written or computerized flight plan prior to each flight, except when departing on an urgent Search and Rescue (SAR), Law Enforcement or Homeland Security mission." One flight plan may be filed for a group of aircraft flying as a unit under visual meteorological conditions (VMC).

Flight in IMC is accomplished solely through constant scanning of the instruments without outside reference to the environment. Land based air traffic control is required to safely separate aircraft. Instrument flight in mountainous terrain also requires a two thousand foot altitude above the highest terrain along the route. Visual flight rules shift the traffic separation and terrain avoidance responsibilities to the pilot, requiring a visual scan of the airspace surrounding the aircraft.

Formation flight is inherently a visual flight maneuver with its own set of rules and procedures within Coast Guard policy. Formation flight in Instrument Meteorological Conditions (IMC) is prohibited according to the Coast Guard Air Operations Manual, COMDTINST M3710.1F. The MSRT aviation mission required the crews to operate almost exclusively in a formation flight profile. It is generally expected that formation flight will be practiced during all normal, multiple helicopter movements in VMC to improve proficiency. Formation flight is also an expedient means of managing the movement of multiple aircraft as it eases the communications and traffic separation workload for air traffic control facilities. Typically the flight leader, who on 3 March was the CG-6040 PIC, is responsible for the briefing, conduct, and discipline of a formation flight.

The weather forecast for the flight leg from Salt Lake City to Leadville, Colorado, indicated that VMC were expected, with scattered clouds expected at 8,000 feet MSL. IMC was forecast at and above 10,000 MSL. Salt Lake City Tower cleared CG-6028 and CG-6040 for take-off and then informed the aircraft that cloud ceilings, and thus IMC, were observed at 9,500 feet MSL. The highest terrain the aircraft were expected to encounter was 9,406 feet above MSL, leaving less than 100 feet of separation between the top of the highest peak and the base of the clouds.

Before take-off, the CG-6028 crew did not complete a Take-Off & Landing Data (TOLD) card, which provides expected aircraft performance based on environmental conditions. Coast Guard policy does not require the completion of a TOLD card but it is prudent for a pilot to calculate the expected performance prior to attempting flight in demanding conditions.

The CG-6028 PIC, anticipating the possible need to activate anti-ice, completed an Engine Anti-Ice check prior to takeoff. Coast Guard policy requires that an Engine Anti-Ice check be performed prior to flight into icing conditions, although the check can be performed before or after take-off. Coast Guard policy requires a Power Available check be performed if use of Engine Anti-Ice is anticipated on missions involving high power maneuvers such as Out-of-Ground Effect (OGE) hovers, external cargo operations, or confined area operations. Neither aircrew completed a Power Available check due to the fact that these high power maneuvers were not anticipated on the ferry flight.

CG-6028 was returning with cargo in the cabin, including Pelican brand cases (hard, watertight containers) of various sizes and numerous pieces of personal luggage. Coast Guard policy requires that cargo be secured with cinch-down capable cargo straps to prevent shifting or missile hazards. Aircrews are responsible for supervising and/or performing cargo loading and tie down. The PIC and copilot are responsible for inspecting cargo for proper loading and tie down prior to flight. The CG-6028 aircrew did not utilize cargo straps to secure the cargo in the cabin because cargo straps were not brought on the trip. Cargo straps are not permanently installed equipment in the aircraft, but are readily available for aircraft use at all Air Stations.

When CG-6028 took off from Salt Lake City, the copilot was operating the flight controls and seated in the right-hand seat. Shortly after take-off, however, the right cockpit door popped open and the copilot passed control of the aircraft to the PIC while he secured the door. Flight controls are routinely passed between pilots to share the workload and reduce fatigue. The PIC retained control of the aircraft for the remainder of the twenty eight minute flight.

After takeoff from Salt Lake City at 0833, both aircraft flew in formation over increasingly mountainous terrain, which rose from 6,400 feet above MSL to 9,400 feet above MSL in the vicinity of Wasatch County, Utah and Uinta National Forest, with peaks over 10,000 feet above MSL in the area but off the planned route. Shortly after the aircraft began ascending over the more mountainous terrain, the CG-6028 copilot and PIC discussed the desirability of the lead aircraft (CG-6040) flying parallel to ridgelines prior to crossing them to verify visibility on the other side, a technique the CG-6028 copilot learned at the HAATS course, but this request was not relayed to the lead aircraft. The CG-6028 copilot checked the avionics system and determined that with Engine Anti-Ice deactivated the maximum power (engine torque) available would be 97 percent. Activating Engine Anti-Ice would decrease maximum engine torque by as much as 18 percent, down to potentially 79 percent power available per engine.

Approximately three minutes before CG-6028 crashed, the lead aircraft, CG-6040, neared the top of a mountain ridge that both aircraft intended to cross. There were snow showers as CG-6040 approached the top of the ridge, but the CG-6040 PIC considered visibility adequate to continue. Near the top, snowfall increased, which reduced outward visibility. CG-6040 prudently slowed and then turned to the right after crossing the ridge to avoid the area of decreased visibility. The CG-6040 PIC did not believe that the aircraft had inadvertently flown into instrument meteorological conditions, which would have required termination of the formation flight, since the PIC was able to turn into clear visibility almost immediately. Announcing its turn to CG-6028, CG-6040 did not receive an acknowledgement. Upon crossing the mountain ridge, the CG-6040 copilot asked the CG-6040 PIC to slow to a hover to orient the aircraft in relation to the chart being used to track their position.

When CG-6040 slowed, it experienced “rotor droop,” a condition in which the aircraft’s engines cannot drive the rotors at sufficient RPM to maintain flight. This condition occurred because the aircraft was operating at an altitude such (approximately 10,000 above MSL) that the aircraft could not sustain a hover in the thin air. As the aircraft slowed, the stable airflow running through the helicopter rotor system decreased and the turbulent air circling from the underside of the rotor disk increasingly affected the airflow across the rotor blades. Said another way, the aircraft was operating at the edge of its power margin – the energy it needed to expend to sustain a hover was not possible at that altitude. Power margin, in the context of a hover, is affected by a number of ambient conditions, including altitude. The CG-6040 PIC and copilot did not recognize that the environmental conditions in which they were operating placed the aircraft close to the edge of its operating capability. However, they did recognize the “rotor droop,” took appropriate steps to correct the decrease in rotor speed and resumed stable forward flight.

Approximately one minute before CG-6028 crashed, CG-6040 reported that visibility and ceiling had become such that the aircraft would have to change course. The aircraft were both then approximately 9,600 feet MSL. At 0900, the CG-6028 copilot asked the CG-6028 PIC if he wanted to energize Engine Anti-Ice. The PIC concurred and the copilot energized it. When Engine Anti-Ice was activated, it decreased engine power output by as much as 18 percent. In practical terms, this meant that the aircraft had less engine power available to generate or maintain lift. This combined with the decrease in aerodynamic performance due to the high altitude.

At approximately 0901, the PIC began slowing down CG-6028 and turned to the right to avoid low clouds, which had caused the PIC to lose sight of CG-6040. In the 20 seconds after losing sight of CG-6040, the CG-6028 copilot repeatedly reminded the PIC to keep up airspeed. However, the PIC had lost situational awareness and did not acknowledge the copilot’s statement or recognize the drop in airspeed until beginning the turn to the right. The turn added further power requirements to the overtaxed engines. After beginning the turn, the PIC became aware that CG-6028’s airspeed had dropped below 50 knots. At that point, CG-6028’s RPM had decreased below the point where the PIC’s efforts to increase airspeed had effect. The aircraft began to lose altitude or “settle.” Despite awareness of the drop in airspeed, the copilot did not call for or assume control of the aircraft. In plain terms, the power required to keep CG-6028 airborne exceeded the power available, and the aircraft descended. This is the same condition CG-6040 had experienced but was able to overcome through early recognition and the fact that their engine anti-ice system was not in use. Coast Guard policy requires that certain corrective actions be taken immediately when an aircrew is confronted with a “settling with power” emergency. In this case, two of the five corrective actions that should have been committed to memory by the PIC, in accordance with the MH-60T Flight Manual (CGTO 1H-60T-1), were not taken. First, the PIC should have turned “Contingency Power” to “On,” which would have provided approximately four percent additional engine torque in the harsh environmental conditions. Second, the PIC did not turn Engine Anti-Ice to “Off,” which would have increased the power available to the aircraft by up to 18 percent.

Using Voice Flight Data Recordings (VFDR) from the CG-6028, the administrative investigation determined that, even if the PIC had taken every corrective action called for by the MH-60T Flight Manual, the power required to successfully overcome the “settling with power”

emergency would not be available because of the environmental conditions in which CG-6028 was operating.

In the atmospheric conditions encountered and based on post-mishap calculations, 66 knots is the airspeed which requires the least amount of power (torque) to maintain level flight. This speed was determined using the known atmospheric conditions and aircraft performance charts in the H-60 Flight Manual, CGTO-1H-60T-1. As a helicopter is slowed below 66 knots, more power is required to maintain flight. Once CG-6028 slowed below 50 knots, the engines could not make enough power to maintain level flight. The power required to hover in the conditions in which CG-6028 was operating was 103 percent. The maximum power available to the CG-6028 PIC, according to post-mishap flight performance calculations, was 94 percent torque with contingency power "Off" and 98 percent torque with contingency power "On."

Based on the MH-60T Flight Manual, up to 18 percent torque may be lost with Engine Anti-Ice "On." Post-mishap technical analysis calculations revealed a maximum available engine power of 76 percent, with contingency power "Off" and Engine Anti-Ice "On," based upon ambient conditions at the time of the mishap. Data taken from the CG-6028 flight data recorder showed the actual maximum power available was an average of 86 percent torque with engine anti-ice "On," which was well below the power required to hover (103 percent) in the conditions in which CG-6028 was operating..

As the aircraft settled, its main rotor system made contact with trees. CG-6028 control was lost with the aircraft plummeting 50 feet to the ground. CG-6028 came to rest on its left side, with the pilot's door and cabin sliding door facing up, in a heavily forested area with snow several feet deep.

The force of the impact sheared the BA's and FM's seats – both of which were occupied – from their bases. An engineering study of the seats revealed no abnormalities and concluded that the seats failed because of high impact force that exceeded their design specifications. The BA had been sitting in a troop seat with a lap belt. The lap belt, a two-point restraint system consisting of a belt that attaches at its two endpoints, failed. Post-crash inspection could not find an exact cause of the webbing slippage (other than sheer force) or any deformity or alteration of restraint hardware that would have explained the webbing slippage. Because the belt's position migrated to the BA's abdomen area rather than staying secured around the pelvic area, the BA incurred blunt force trauma to the abdomen. Nevertheless, the flight surgeon who reviewed the injuries believed that the restraint system saved the BA's life.

The crewmembers sitting in the aircrew and flight mechanic seats suffered minor injuries and immediately took action to assist the more seriously injured BA, PIC, and copilot. The PIC's injuries included a right pulmonary contusion and puncture wounds to the right elbow and both calves. The copilot's injuries included a leg fracture, multiple cervical disk fractures, and an injury to the right clavicle. The actions of the other crewmembers, which included providing first aid, communications, and cold weather survival actions, probably saved the life of the critically injured BA.

Though cargo was not tied down in accordance with Coast Guard policy, the medical opinion was that none of the injuries sustained by the CG-6028 crew were caused by unsecured cargo.

Rescue of the CG-6028 aircrew was accomplished by personnel from the U.S. Forest Service, Wasatch County, Summit County, CG-6040, and several recreational snowmobilers who were in the area.

CG-6040's direction finding equipment (DF-430) failed to locate the CG-6028 crash site. CG-6040 was able to hear an Emergency Locator Transmitter (ELT) signal from CG-6028 on its ARC210 radio guard frequency, but the DF-430 failed to indicate bearing or distance information. The DF-430 aboard CG-6040 was determined to be operational at the time of the mishap. The administrative investigation was unable to determine whether the failure was based on equipment malfunction, user error or 'signal bounce' in the mountainous terrain.

A post-crash survey declared CG-6028 to be unserviceable.

In 2009, Air Station Elizabeth City received an Aviation Safety Program Standardization Visit. The final report assessed the Air Station as having a solid unit safety program. In addition, the Air Station's Safety Department conducted an internal safety survey in 2009, which indicated it had an above average safety program.

In July 2010, CG-11 issued a Final Summary Letter (FSL) on an Air Station Elizabeth City/MSRT mishap involving CG-6041 that occurred in 2006. One of the findings (non-causal, non-contributory, but so related to the mishap they were included for process improvement and mishap prevention in similar circumstances) in the FSL concerned the organizational structure of the MSRT within the Air Station. The FSL noted that the MSRT mission requires an H-60 to be configured differently than for a SAR mission, but the Air Station's staffing levels were based on a single configuration and did not account for the extra demands of supporting two very differently configured aircraft.

The administrative investigation into the crash of the CG-6028 found, based on interviews with pilots and crew performing MSRT missions or SAR missions, that two distinct environments existed at the Air Station, creating a command climate challenge. The administrative investigation found that MSRT pilots, accustomed to high-risk mission environments involving precise tactics at high speed and low altitude, may have become more risk tolerant than those pilots performing SAR missions. However, the administrative investigation also found that MSRT pilots were professional, disciplined, and thorough in their approach to planning and risk management of MSRT missions. The administrative investigation concluded that command climate did not contribute or exacerbate the circumstances surrounding the crash of the CG-6028.

3. Findings and Directed Action:

A. I find that no misconduct was associated with the Class A flight mishap involving CG-6028 on March 3, 2010 and that the injuries to its crew occurred in the line of duty.

I base this finding upon the following facts:

1. Everyone aboard CG-6028 was current in his/her flight qualifications when the mishap occurred.
2. No one aboard CG-6028 had a medically disqualifying condition when the mishap occurred.

3. Everyone aboard CG-6028 had sufficient rest before beginning the flight leg on which the mishap occurred.
4. There is no evidence that any member of either aircraft crew's actions prior to, during or after the mishap constituted gross negligence, recklessness, or willful misconduct.

B. Causal Factors (a factor is considered 'causal' when, if removed from the sequence of events, it most likely would have broken the chain of errors and the casualty would not have occurred).

I find that a causal factor of this casualty was that the CG-6028 PIC lost situational awareness and allowed the aircraft to slow to an airspeed where power required to maintain flight exceeded the power available.

I base this finding on the following facts:

1. CG-6028 slowed below 50 knots indicated airspeed.
2. In the conditions encountered and based on post-mishap calculations, 66 knots is the airspeed which requires the least amount of power (torque) to maintain level flight. This speed was determined using the known atmospheric conditions and aircraft performance charts in the H-60 Flight Manual. As a helicopter is slowed below this speed, more power is required to maintain flight. Once CG-6028 slowed below 50 knots, the aircraft was unable to make enough power to maintain altitude.
3. The power required to hover in the conditions in which CG-6028 was operating was 103 percent.
4. The maximum power available to the CG-6028 PIC, according to post-mishap flight performance calculations, was 94 percent torque with contingency power "Off" and 98 percent torque with contingency power "On."

Action: As a result of this finding, I direct:

1. CG-7 to implement a formal mountainous area flying training requirement, especially for pilots operating in areas likely to encounter mountainous flight, that highlights mountain flying techniques, power management, and common illusions that may be encountered in the mountains. Additionally, CG-7 shall provide resourcing for this new requirement.
2. FORCECOM to develop plans to increase proficiency in mountainous flying techniques for helicopter crews.

In addition, I am aware:

1. That an appropriate entry has been made in the CG-6028 PIC's official flight logbook in the Accident and Flight Rule Violation Record that denotes the PIC being involved in an accident on 3 March 2010.
2. That the chain of command for the pilots and copilots of CG-6028 and CG-6040 has appropriately documented their roles and responsibilities in this mishap through the Officer Evaluation System.
3. That Aviator Evaluation Boards for the CG-6028 PIC and copilot were convened.

I find that a causal factor of this casualty was that the CG-6028 copilot did not use proper Crew Resource Management (CRM) and relevant training to take decisive action prior to the flight reaching an in extremis situation.

I base this finding on the following facts:

1. The CG-6028 copilot had attended the High Altitude Army Training Site (HAATS) mountain flying course. HAATS is a one week mountain flying school that focuses on mountain flying techniques and helicopter power management that should be applied anytime a helicopter is operating in mountainous terrain and high altitude.
2. The CG-6028 copilot discussed techniques and procedures for flying in mountainous terrain with the CG-6028 PIC but did not brief the CG-6040 PIC or copilot nor use CRM to highlight and enforce the procedures and techniques learned through flight training.
3. The CG-6028 copilot called numerous times for the PIC to increase airspeed, but did not ask to, or take control of the aircraft to prevent CG-6028 from entering a flight profile where power required exceeded power available. It is accepted practice within the Coast Guard aviation community that if a pilot not at the controls states a condition, and action is not taken by the pilot at the controls to correct the condition, the subject is broached once more. If corrective action is not taken after that, the non-flying pilot should take the controls and execute the corrective action. This unwritten aviation rule will be written into an upcoming revision of the Coast Guard Air Operations Manual.

Action: As a result of this finding, I direct:

1. FORCECOM to build a CRM case study of this mishap. The case study should specifically include discussions of assertiveness and risk versus gain and "error trapping" procedural shortcomings in preflight and adapting to changing conditions in flight.

C. Contributory Factors (A factor is considered 'contributory' when it is not singularly responsible for the casualty; however, when combined with causal or other contributory factors, it influenced the progression of the casualty.)

I find that a contributory factor to this casualty was that the pilots and copilots of CG-6028 and CG-6040 failed to properly plan for or adapt to changing environmental conditions. Additionally, the CG-6028 PIC failed to adequately comprehend the ambient conditions that CG-6028 would encounter and how those conditions would affect aircraft performance.

I base this on the following facts:

1. The approved flight plan out of Salt Lake City underestimated the risk of inadvertent IMC at the anticipated high altitude for the two helicopters.
2. The weather forecast for the route of flight from Salt Lake City, Utah to Leadville, Colorado was forecasted to be Visual Meteorological Conditions (VMC), but deteriorated to IMC as the flight approached the mountains.
3. The Coast Guard Air Operations Manual states, "Group flights (formation flight) under instrument meteorological conditions (IMC) by Coast Guard aircraft are not authorized."
4. The MH-60T Flight Manual addresses mountain flying and warns to give all cloud formations a wide berth and to plan an approach to the mountain so that an abort can be made downhill and/or into the wind without climbing.
5. Neither the CG-6028 PIC nor the CG-6040 PIC took action to terminate the formation flight.
6. The CG-6028 PIC did not complete a TOLD card prior to the mishap flight. A TOLD card would have provided vital flight performance data applicable to high altitude performance.

Action: As a result of this finding, I direct:

1. FORCECOM to develop and implement training scenarios for aircrews that focus on less common operational environments, including high altitude and mountainous terrain.
2. CG-7 to amend current rotary wing flight planning policy to include the mandate for the completion and briefing of a TOLD card for each leg of a ferry flight and for any flight in which crews anticipate operating at high altitude and/or in or near mountainous terrain.

D. Additional Findings.

1. The matter of who had tactical control (TACON) of the MSRT AVDET was not clearly understood between Air Station Elizabeth City and MSRT Chesapeake at the time of the ferry flight from NAS Whidbey Island to Air Station Elizabeth City. In practical terms, the command with TACON has authority to launch aircraft on missions and exercise tactical control over the aircraft during those missions. It was clear that TACON rested with the MSRT during the mission in District Thirteen, but a message should have been sent by the MSRT at the conclusion of the mission shifting TACON back to Air Station Elizabeth City. However, the ferry flight back to Air Station Elizabeth City was not in direct support of the mission and therefore the responsibility rested with the Air Station Elizabeth City

Commanding Officer although not explicit in the TACON shift message. The Air Operations Manual, COMDTINST M3710.1F clearly articulates TACON shift for aircraft from shore to afloat units, but not between two shore units.

2. Command oversight of the ferry flight was inadequate. Confusion between the commanding officers of the MSRT and Air Station Elizabeth City regarding TACON added to the inadequacy of oversight. Additionally, the Air Operations Manual, COMDTINST M3710.1F, states that "Commanding officers of units with aircraft assigned or commanding officers who have tactical control of aviation assets are delegated the authority to initiate flights to meet assigned missions. This authority may be delegated to no lower than the operations officer." While not a causal or contributory factor in this mishap, either the Air Station Elizabeth City commanding officer or, in the commanding officer's absence, the executive officer, should have exercised oversight over the planned route of flight. The MSRT Operations Officer, who was also the CG-6028 PIC, should have elevated approval of the route above the operations officer level.
3. The troop seat belt failure caused significant injuries to the crew member sitting in the seat at the time of the crash. The troop seat used in the MH-60 is not designed to take the same amount of force as the pilot or the aircrew and flight mechanic seats in the cabin.
4. The medical flight status of CG-6028's aircrew was not properly documented and two of the crewmembers were not technically in a flight status. None of the aircrew had medically grounding conditions, but there was a break down in procedures to maintain proper records to ensure the aircrews were fit for flight duty.
5. The crew of CG-6040 was unable to locate the CG-6028 crash site using the direction finding equipment (DF-430). CG-6040 was able to hear an Emergency Locator Transmitter (ELT) signal from CG-6028 on its ARC210 radio guard frequency, but the DF-430 failed to indicate bearing or distance information. The DF-430 aboard CG-6040 was determined to be operational at the time of the mishap. The administrative investigation was unable to determine whether the failure was based on equipment malfunction, user error or 'signal bounce' in the mountainous terrain.

As a result of these additional findings, I direct:

1. CG-7 to clarify TACON shift between shore units within the Air Operations Manual.
2. CG-7 to include, and expand upon, the Air Operations Manual, COMDTINST M3710.1(series) delegation authority for initiating flights during annual prospective commanding, executive and operations officer training courses.
3. CG-7 to conduct an operational assessment of the MH-60 troop seat to include suitability of their use in operational missions. Establish temporary administrative controls to keep personnel from flying in the troop seat positions until operational requirements are defined, unless engaged in a mission essential task.

Subj: FINAL ACTION ON THE ADMINISTRATIVE
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5830

In addition, the following actions have been taken:

1. DCMS conducted an evaluation and streamlined the medical process for evaluating and documenting aircrew medical status.
2. FORCECOM has evaluated the training of the DF-430 equipment and has made modifications to training curriculum to ensure crews are properly trained on the system and modes.

4. Summary:

This mishap is a reminder that all missions performed in the Coast Guard carry risk that, if not properly managed, can lead to potentially devastating consequences. While no lives were lost in this mishap, the Coast Guard lost a recently upgraded helicopter and three shipmates sustained serious injuries.

The findings of fact demonstrated that there were several opportunities to break the chain of events that led to this mishap before it occurred. Had any of the pilots or co-pilots in CG-6028 and CG-6040 voiced their opinions and employed proven crew resource management techniques, this mishap may have been avoided. We must take note of changing circumstances around us that affect risk and therefore require appropriate, timely, and decisive action.

Finally, I thank the civilian air crews who acted to save the lives of our shipmates and the local, state and federal agencies that participated in the rescue of the downed crew and salvage of the remaining aircraft components.

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Dist: VCG, DCMS
CG-092, CG-094
CG-1, CG-2, CG-4, CG-5, CG-6, CG-7
All Area and District Commanders
CG FORCECOM