# In Their Final Flight: Honouring the Memory of The Fallen in the Z-9EH Tragedy

## A Forensic Reflection on Emergency Response And the Dignity of National Loss

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## 1. Executive Summary

On 6 August 2025, a Ghana Air Force Z-9EH helicopter tragically crashed en route from Accra to Obuasi, claiming the lives of eight individuals, including two cabinet ministers and senior officials. This paper offers a forensic reflection—not an investigation—on the national emergency response, examining how Ghana's systems performed under pressure and what lessons can be drawn to strengthen preparedness.

The analysis explores four interlinked dimensions: emergency coordination, scene management, aviation-specific limitations, and strategic implications for institutional reform. It draws on publicly available data, eyewitness accounts, and operational records to assess the strengths and vulnerabilities of Ghana's multi-agency response.

Key findings reveal that while mobilisation was swift, terrain complexity, procedural lapses, and ad hoc command structures compromised the integrity of the crash site. Civilian access ahead of security forces led to contamination and debris displacement. Informal command culture—exemplified by the prioritisation of executive travel—strained operational bandwidth and highlighted the need for structured decision-making protocols. The Z-9EH's limited survivability and instrumentation underscored broader fleet constraints, especially for VIP and emergency missions in adverse conditions.

Despite these challenges, the response demonstrated resilience through inter-agency collaboration and community support. However, media access and premature disclosures disrupted protocol and dignity, reinforcing the need for calibrated engagement frameworks.

To address these systemic gaps, the paper proposes a nine-pillar strategic framework for emergency response enhancement. These include fleet diversification, unified command structures, international-standard forensic recovery, ELT monitoring upgrades, terrain logistics, aviation-specific expertise, psychosocial support integration, and media ethics protocols.

Ultimately, this tragedy must serve as a catalyst for reform. By institutionalising the lessons of the Z-9EH incident, Ghana can build a more responsive, coordinated, and ethically grounded emergency architecture—one that honours the fallen not only in memory, but in the resilience of the systems we build to protect others.

## 2. Background

On Wednesday, 6 August 2025, a Ghana Air Force Z-9EH helicopter tragically crashed en route from Accra to Obuasi, claiming the lives of all eight onboard, including two cabinet ministers and senior officials. The aircraft was later located in the Dampia Range Forest Reserve, marking one of Ghana's most devastating air disasters in recent history.

The unprecedented "national tragedy" claimed the lives of 1) Dr Edward Omane Boamah, Defence Minister, and 2) Dr Ibrahim Murtala Muhammed, Environment Minister, as well as 3) Dr Samuel Sarpong (vice-chair of the National Democratic Congress (NDC) ruling party, 4) Alhaji Muniru Mohammed Limuna (Acting Deputy National Security Coordinator) and Samuel Aboagye (former parliamentary candidate).

The others were the three crew members: Squadron Leader Peter Bafemi Anala, the flight captain; Flying Officer Twum Ampadu, co-pilot; and Sergeant Ernest Addo Mensah, flight technician.

*Photo montage of the crash victims (Source: Oyerepa FM)*

This paper offers a forensic overview of the national emergency response triggered by the crash. Its primary purpose is to explore the operational, procedural, and strategic dimensions of Ghana's multi-agency response—highlighting strengths, gaps, and lessons for future preparedness. It seeks to contextualise the event within broader emergency response frameworks, drawing comparative insights from global practices.

Importantly, this is not an investigative report. It does not aim to determine causality, assign blame, or pre-empt official findings. Instead, it is exploratory, synthesising publicly available data, eyewitness accounts, and operational records to assess how national systems performed under pressure.

The scope of this analysis includes:

- Emergency response coordination and command structures
- Scene management and recovery protocols
- Aviation-specific preparedness and limitations
- Strategic implications for national policy and reform

The limitations of this paper are acknowledged. It relies mainly on secondary sources and media reports, sometimes conflicting, and does not include classified military assessments or formal accident investigation findings. As such, all narratives are provisional and intended to support informed dialogue, not definitive conclusions.

This analysis draws upon sources of varying reliability. Claims are categorised as follows: VERIFIED—based on official documentation and confirmed technical records; CREDIBLE—supported by consistent multi-source reporting and eyewitness testimony; ESTIMATED—derived from analytical assessments and operational assumptions; and **ALLEGED**—originating from single-source or unconfirmed accounts.

## 3. Towards an Understanding of Global National Emergency Air Accident Procedures

To situate Ghana's response within a broader framework, it is instructive to examine how some leading aviation nations structure their emergency protocols. Responding to an air crash involves a highly coordinated, multi-agency effort designed to achieve three objectives: 1) save lives, 2) secure the site, and 3) preserve evidence for investigation. In that regard, the routine air crash response procedures would consist of these elements/dimensions:

### 3.1 Immediate Emergency Response

In the critical first moments, emergency services are mobilised without hesitation—firefighters, paramedics, and police are dispatched to the crash site. A unified incident command structure is swiftly established to coordinate all responding units, ensuring clarity and control. The area is cordoned off to prevent unauthorised access and protect both personnel and evidence.

Rescue teams begin locating survivors, conducting rapid triage to prioritise care based on injury severity. Simultaneously, fire suppression units tackle fuel fires and manage hazardous materials, while debris is stabilised to prevent further harm.

### 3.2 Medical and Casualty Management

Mass casualty protocols are enacted to streamline treatment and transport. Emergency medical teams provide stabilisation on-site, working under pressure to prepare victims for hospital transfer. Alongside physical care, psychological support is offered—crisis counsellors may be deployed to assist traumatised survivors and grieving families, recognising the emotional toll of such incidents.

### 3.3 Investigation and Evidence Preservation

Preserving the integrity of the crash site is paramount. Investigators secure critical components such as the Cockpit Voice Recorder (CVR), Flight Data Recorder (FDR), aircraft wreckage, and personal effects. Aviation authorities—such as the National Transportation Safety Board (NTSB) in the U.S. or the UK's Air Accidents Investigation Branch (AAIB)—are promptly notified to initiate formal investigations.

Eyewitnesses and first responders are interviewed to capture initial observations, helping to construct a factual timeline and support the broader inquiry.

### 3.4 Communication and Coordination

Public information is carefully managed through a designated spokesperson who delivers timely, accurate updates. Family assistance centres are established to provide support and information to relatives of passengers, ensuring compassion and transparency.

If foreign nationals are involved, embassies and consulates are contacted to facilitate international coordination and diplomatic support.

### 3.5 Site Recovery and Debrief

Once the immediate crisis is stabilised, recovery operations begin. Hazardous materials and debris are removed with environmental safety in mind. Agencies conduct internal debriefs to evaluate performance and refine future response protocols. Finally, the crash site is restored to a safe and usable condition, closing the operational loop with dignity and diligence.

### 3.6 Off-Radar Scenarios

One critical trigger for emergency mobilisation is the loss of radar contact. This section explores how such scenarios are handled across jurisdictions.

When a military helicopter is declared “off radar”—meaning it has disappeared from air traffic control systems or lost contact—the response varies depending on jurisdiction, mission type, and airspace classification. In both the United States and the United Kingdom, a multi-agency framework governs such scenarios.

In the United States, the Federal Aviation Administration (FAA) is alerted if the aircraft enters or affects civilian airspace. North American Aerospace Defence Command (NORAD) monitors aerospace threats and may initiate tracking if the helicopter drops off radar. The Department of Defence assumes operational control of military assets, with the relevant service branch leading the response. If a crash or safety issue is suspected, the NTSB is engaged, while Homeland Security and intelligence agencies may intervene if national security is at stake.

In the United Kingdom, the Civil Aviation Authority (CAA) oversees civilian airspace. At the same time, the Ministry of Defence coordinates the military response through the appropriate branch—Royal Air Force (RAF), Royal Navy, or Army Air Corps. RAF Air Command manages operational control and may launch search efforts. National Air Traffic Services (NATS) provides tracking support, and UK Search and Rescue assets may be deployed if the aircraft is declared missing.

In both countries, military helicopters may disable Automatic Dependent Surveillance–Broadcast (ADS-B) systems during sensitive missions, rendering them invisible to civilian radar. While operationally justified, this practice raises safety concerns in shared airspace and limits external notification channels during classified operations.

In Ghana, the response to an off-radar scenario involving a Ghana Air Force (GAF) aircraft is governed by internal directives outlined in the Ghana Air Force Flying Orders. Air Force Headquarters is immediately informed to coordinate a potential search and rescue operation and to prepare a Preliminary Investigation Team (PIT). In the case of a civil aircraft, the Aircraft Accident and Incident Investigation Bureau (AIB-Ghana) leads the PIT and subsequent investigation.

Airspace monitoring is conducted from Accra, and when an aircraft operating under Visual Flight Rules (VFR) below 3,000 ft loses contact, Accra initiates checks with Kumasi ATC to confirm the aircraft’s status. If uncertainty persists beyond 30 minutes of the expected arrival time—approximately 10:32 hours—and no contact is made within an hour, around 11:02 hours, a formal distress declaration is issued. This triggers nationwide GAF deployments and activates full search and rescue operations.

## 4. Framing an Air Mission

Understanding the mission’s operational context requires a closer look at how air tasks are planned, authorised, and risk-assessed within the Ghana Air Force.

### 4.1 Mission Planning and Tasking Protocols

According to the Ghana Air Force Flying Orders, every flight begins with a formal task order that defines the mission’s type, objective, and operational parameters—including departure, destination, and transit points. The tasking process includes aircraft selection, crew assignments, equipment configuration, and route planning. It also incorporates weather forecasts, contingency planning, communication protocols, command structures, legal constraints, and emergency procedures. Threat assessments and intelligence briefings are conducted prior to dispatch, and post-mission debriefs are required to document outcomes and lessons learned.

This structured approach ensures clarity, accountability, and safety across all mission phases. The aircraft’s technical status is captured in its airworthiness documentation, which provides the crew with a verified serviceability report before departure.

## 4.2 Operational Prioritisation and Command Culture in Presidential Mobility

Within Ghana Air Force operational circles, the phrase *"The President must go"* functions as a shorthand directive that encapsulates the institutional imperative to ensure the President's travel schedule is executed with precision and reliability. This expression, though informal, reflects a deeply embedded command priority—where logistical, technical, and personnel resources are mobilised swiftly to uphold executive mobility without delay. This is based on reported institutional culture observations. Internal Ghana Air Force command dynamics have not been officially documented or confirmed.

Such prioritisation, while understandable in the context of national leadership, can occasionally strain routine operational bandwidth, especially during concurrent emergencies or resource-constrained scenarios. It underscores the need for a balanced framework that respects both executive obligations and broader mission integrity, ensuring that strategic airlift capabilities remain responsive yet resilient. These resource utilisation patterns are based on operational analysis. Official Ghana Air Force resource allocation data is not publicly available.

Moreover, this cultural shorthand reveals how institutional language can shape urgency, influence resource allocation, and reflect the embedded hierarchies within civil-military coordination. Recognising and critically examining such expressions is essential for refining operational doctrine and promoting adaptive command structures that serve both state and public interests.

## 4.3 Operational Decision-Making and Risk Assessment

Deciding whether to proceed with a flight mission is never routine—it is a calculated judgment shaped by safety, readiness, and strategic alignment. The weather is often the first gatekeeper. If forecasts indicate severe storms, poor visibility, or high winds, commanders may delay or cancel the mission to avoid unnecessary risk to crew and aircraft.

Aircraft condition is equally critical. Mechanical faults, system failures, or fuel limitations can prompt reassessment or mid-flight abort decisions, especially if navigation or communications systems begin to malfunction. The threat environment also plays a decisive role. Real-time intelligence updates or hostile activity—such as anti-aircraft deployments or patrols—may require rerouting or withdrawal. Congested or restricted airspace can disrupt flight plans and compromise safety margins.

Mission feasibility must be weighed against available resources, crew fatigue, and time constraints. The physical and psychological readiness of the flight crew is non-negotiable; any indication of unfitness can ground the mission. Legal and political considerations also shape operational boundaries. Public safety concerns may influence domestic missions, while international flights require diplomatic clearance and treaty compliance.

*Table 1. Mission Capability Overview*

| Capability | Z-9 (Harbin) | Agusta Bell 412 | Mi-17 (Hip) |
|---|---|---|---|
| Lift Capacity | 🔴 Low/Light (≈1,000 kg) | 🟡 Light/Moderate (≈2,200 kg) | 🟢 Medium/High (≈4,000 kg) |
| SAR Suitability | 🔴 Limited (short range) | 🟡 Moderate (good hover) | 🟢 Strong (long range, winch) |
| Avionics & Navigation | 🔴 Basic analogue suite | 🟡 Upgraded IFR capable | 🟡 Mixed (some digital) |
| Survivability | 🔴 Light armour, low redundancy | 🟡 Moderate crashworthiness | 🟢 High survivability, dual engines |
| Night Ops Capability | 🔴 Minimal | 🟡 NVG-compatible | 🟢 NVG-compatible |
| Medical Evac Setup | 🔴 Cramped, no stretcher | 🟡 Configurable cabin | 🟢 Spacious, stretcher-ready |
| Deployment Speed | 🟢 Fast scramble | 🟡 Moderate | 🔴 Slower prep, longer range |
| Crew Familiarity | 🟢 High (GAF standard) | 🟡 Moderate | 🔴 Variable (less frequent use) |

*Source: Harbin, Helicopter Database, Flugzeuginfo, Army Recognition, ASN, Hellis.com*

Commanders must also consider the potential impact on civilians. If a mission risks collateral damage or endangers non-combatants, it may be restructured or aborted. Ultimately, every mission must align with established policies and rules of engagement. If objectives conflict with legal or ethical standards, the operation must be revised or cancelled. The decision to fly—or not to fly—is a strategic balancing act. It reflects a commitment to protecting lives, preserving operational integrity, and ensuring that every mission is executed with precision, purpose, and responsibility.

To assess aircraft suitability under emergency conditions, the matrix in Table 1 (above) compares the Z-9EH with its peer platforms across key performance dimensions.

## 5. Emergency Capabilities Matrix: Z-9 vs Agusta Bell vs Mi-17

The Harbin Z-9EH is a license-built variant of the Eurocopter AS365 Dauphin. The Volta River Authority aviation flies a similar aircraft, adapted for military utility roles. Jane's Defence Weekly (2023) notes that the Z-9EH features a composite rotor system and digital flight control enhancements but lacks terrain-following radar or crash-survivable flight data recorders.


*Photo: Z9-EH Helicopter GHF 632 (Source: AI-enhanced)*

To fully grasp the operational limitations and response dynamics surrounding the crash, it is essential to examine the emergency capabilities of the aircraft involved. By comparing the Harbin Z-9EH with its commonly deployed counterparts—the Agusta Bell 412 (decommissioned and disposed of several years ago) and the Mi-17—this matrix (Table 2) offers a strategic lens through which to assess suitability, survivability, and mission resilience under adverse conditions.

*Table 2. Comparative Emergency Capability Matrix*

| Feature / Capability | Z-9 (China) | Agusta Bell AW139 / AB212 (Italy) | Mi-17 (Russia) |
|---|---|---|---|
| Engine Configuration | Twin-engine (WZ-8 or Turbomeca Arriel) | Twin-engine (PT6C-67C / T400-CP-400) | Twin-engine (TV3-117VM or VK-2500) |
| Max Passenger Capacity | 8–10 | AW139: up to 15; AB212: up to 14 | Up to 36 (troop transport); VIP versions: 7–11 |
| Max Take-off Weight | ~4,100 kg | AW139: ~6,800 kg; AB212: ~5,300 kg | Up to 13,500 kg (with upgrades) |
| Operational Ceiling | ~6,000 m | AW139: ~6,096 m; AB212: ~4,570 m | Up to 6,500 m (VK-2500 engines) |
| Avionics & Navigation | Moderate (upgraded in Z-9EH) | AW139: advanced glass cockpit; AB212: analogue/digital mix | Varies by variant; modernized Mi-17V-5 has digital suite |
| SAR & EMS Suitability | Moderate | AW139: high; AB212: moderate to high | High (used globally for SAR, medevac, disaster relief) |
| Emergency Landing Capability | Proven in multiple forced landings | AW139: robust gear; AB212: reliable in rugged terrain | Excellent autorotation and rugged design for rough landings |

| Feature / Capability | Z-9 (China) | Agusta Bell AW139 / AB212 (Italy) | Mi-17 (Russia) |
|---|---|---|---|
| Crash/Incident Record | 9+ incidents since 2000 | AW139: few major crashes; AB212: aging fleet, some incidents | Widely used; some combat losses and mechanical failures |
| Deployment Regions | Asia, Africa, Latin America | Global (Europe, Americas, Asia, Africa) | Over 80 countries; extensive use in high-altitude zones |
| Mission Flexibility | Troop transport, SAR, VIP, medevac | SAR, EMS, law enforcement, offshore transport | Cargo, troop transport, combat, medevac, VIP, flying hospital |
| Maintenance & Support | Variable by operator | Strong global support (AW139); AB212 support aging | Extensive global support; modular upgrades available |

*Sources: Harbin, Helicopter Database, Flugzeuginfo, Army Recognition, ASN, Hellis.com*

## 5.1 Strategic Insight

This matrix serves not merely as a technical comparison but as a strategic diagnostic tool. By juxtaposing the Z-9EH with the Agusta Bell and Mi-17 platforms, the analysis reveals critical disparities in payload capacity, terrain adaptability, and survivability under emergency conditions. These insights underscore the operational trade-offs inherent in fleet composition decisions and highlight how aircraft selection directly influences mission outcomes—particularly in high-risk or time-sensitive deployments.

The Z-9EH is agile and cost-effective, widely deployed across Africa and Asia, and equipped with basic dual communication systems (VHF Ground-to-Air and HF long-range). However, it lacks a satellite tracker and terrain warning system, and its limited payload and higher incident rate suggest vulnerabilities—often linked to human error or environmental factors. While versatile, its suitability for complex emergency missions remains constrained.

The Agusta Bell AW139 excels in emergency roles, with strong avionics, configurable cabins, and consistent upgrades that reflect a commitment to safety and mission reliability. The AB212, though reliable, is ageing and less capable in high-demand scenarios. These platforms are considered industry benchmarks for SAR, EMS, and VIP transport.

The Mi-17 stands out for its superior lift capacity, altitude performance, and rugged emergency handling. It is widely used across national fleets and adaptable for medevac, cargo, troop deployment, and disaster relief. Its continued upgrades—especially in engines and avionics—demonstrate a sustained focus on mission reliability in challenging environments.

However, due to the Russia–Ukraine conflict and the U.S. sanctions on Russia and collaboration with Russia, the Mi-17 fleet has faced disruptions in its international supply chain, affecting parts availability for maintenance and long-term sustainability.

## 5.2 Fleet Mix Assessment for Non-Combat Missions

The Ghana Air Force's current rotary-wing fleet—comprising the Harbin Z-9EH, Agusta Bell variants, and Mi-17 helicopters—reflects a layered but uneven capability profile for non-combat missions such as troop lift, logistics, and VIP transport.

### 5.2.1 Z-9EH (Harbin)

The Z-9EH (Harbin) stands out for its agility, rapid scramble capability, and high crew familiarity, making it a cost-effective choice for short-range missions. However, its limited lift capacity, cramped cabin, and minimal survivability restrict its utility in demanding operations. With constrained night and SAR capabilities, it's best suited for VIP shuttles, liaison tasks, and rapid deployment in low-risk zones.

### 5.2.2 Agusta Bell (AW139 / AB212)

The Agusta Bell series (AW139 / AB212) offers a balanced platform with moderate lift, configurable cabin space, and compatibility with night vision and IFR systems. While the ageing AB212 fleet presents survivability and speed limitations, the platform remains well-suited for logistics support, medevac, mid-range VIP transport, and law enforcement roles.

### 5.2.3 Mi-17 (Hip)

In contrast, the Mi-17 (Hip) delivers robust performance with high payload capacity, a spacious cabin, and strong terrain adaptability. Its superior SAR and medevac capabilities make it ideal for troop lift, disaster relief, and strategic logistics—particularly in high-altitude or remote environments. Operationally, it demands more preparation time and crew specialisation, and its larger footprint may limit flexibility in constrained zones.

Beyond technical specifications, the human dimension of the mission deserves some attention—particularly the professionalism and experience of the flight crew.

## 5.3 Operational Utilisation Trends: Estimates and Strategic Implications

An analysis of Ghana Armed Forces (GAF) air operations—excluding training sorties—offers more profound insight into how limited fleet resources are deployed. An estimated majority of non-training flights appear to be conducted on behalf of the government, based on available operational indicators between 2018 and 2020 (see Table 3), primarily ferrying officials. This pattern was consistent across multiple platforms, notably the CASA C-295 and Mi-17 helicopters, and was especially pronounced under executive directives. While the estimates span 2018–2020, similar patterns have been observed in subsequent years, though not formally quantified.

*Table 3. Estimated Distribution of Non-Training Flights (Indicative Only)*

| Flight Type | Estimated Share of Non-Training Flights |
|---|---|
| Military Operational Purposes | ~40–45% |
| Government/Civilian Transport | ~50–55% |

*Source: Internal estimates based on flight tracking and coded executive missions*

The CASA, in particular, emerged as a dependable workhorse for executive missions, frequently tasked with transporting the President, Vice President, and Speaker across domestic and subregional destinations. Its higher carrying capacity and multi-role adaptability made it more operationally versatile than the Falcon jet, which—despite its symbolic prominence—was often reserved for external flights. The refurbishment of Mi-17s with forward-facing seats further enhanced their utility in VIP/VVIP transport, reinforcing the trend toward dual-use deployment.

While the Air Force's formal mandate encompasses national defence, peacekeeping, and emergency response, its constrained fleet capacity necessitates prioritisation. In practice, this has meant that VIP transport and civilian support missions frequently take precedence over tactical deployments. Military flights such as surveillance, logistics resupply, and SAR remain essential, but they constitute a smaller share of total flight activity.

This operational tilt is not merely logistical—it reflects institutional culture, political demand, and resource constraints. It also exposes strategic vulnerabilities, particularly during Falcon maintenance downtimes, when the absence of a primary executive aircraft creates operational gaps. During such periods, the CASA has consistently filled the void, sustaining both VIP transport and broader mission support, including airborne forces (ABF) and cadet parachute training. Since approximately 2014, officer cadet parachute training—originally initiated by the late Lieutenant General Arnold Quainoo from Intake 24 in 1983/84—has faced intermittent disruptions. These interruptions stem from competing demands on the CASA C-295 aircraft for civilian transport missions, the 4-yearly major repairs and overhaul in Spain, the country of origin, which takes 10-12 months, and the complete loss of parachutes in a Paratech fire outbreak in 2020. As of 2024, only a portion of the cargo parachutes have been replaced, leaving a critical gap in airborne training capacity.

The Communication Squadron's historical structure—typically comprising a primary and supporting aircraft—has evolved. The transition from the ageing F28 and F27 to the Falcon and proposed Airbus 319 highlighted inter-agency dynamics and procurement complexities. Notably, the Falcon's limited capacity prompted the use of CASA for ministerial movements, reinforcing the need for a more robust and clearly defined fleet strategy.

It should be noted that direct operational data from the Air Force is rarely disclosed to external analysts or think tanks, limiting independent verification. However, a formal inquiry—particularly from a trusted interlocutor—might yield greater clarity. Understanding the true distribution of flight purposes is critical not only for assessing mission readiness and resource allocation but also for strengthening civil-military coordination and democratic oversight.

This reinforces the broader argument advanced in this paper: the case for a dedicated strategic lift platform is rooted not in prestige, but in operational necessity. The Z-9EH, CASA, and Mi-17 platforms have been central to the Air Force's contribution to governance and national mobility. A clearer policy framework and fleet optimisation strategy are urgently needed to align air operations with evolving national priorities, institutional integrity, and mission sustainability

## 6. Reimagining the Fated Z-9 Flight/Mission

The Z-9EH crash on 6 August 2025 became a flashpoint for disinformation and speculation, including unfounded conspiracies questioning the crew's competence and the circumstances surrounding the accident. In such moments, facts must prevail—and the record must be set straight.

Squadron Leader Anala, the mission captain, was a seasoned aviator with 13 years of service since his commissioning on 17 October 2013. A Category C pilot with a full instrument rating, he was qualified to fly VIP missions for the President and senior ministers. At the time of the incident, he was also the most qualified safety and aircraft accident investigator in the Ghana Air Force. His credentials include advanced training at Cranfield University, where he earned a postgraduate certificate in competency and hazard awareness. He also serves as a facilitator for Cranfield, training safety officers for the AIB-Ghana.

Flying Officer Ampadu, the co-pilot, commissioned in 2021, brought over five years of operational flying experience to the mission. Sergeant Mensah, the flight engineer, graduated in 2012 and had amassed 14 years of engineering expertise.

*Figure 1: Flight Crew Analysis*


*Source: Data from sources close to the Ghana Air Force*

As shown in Figure 1, together, the crew represented a combined experience of over 32 years in aviation operations, safety, and engineering. Their qualifications and service records affirm that they were competent and professionally equipped to undertake the mission. Any narrative suggesting otherwise is not only inaccurate but deeply disrespectful to their service and sacrifice.

As part of mission readiness, on 24 July 2025, the No. 8 Helicopter Wing at AFB-TAK hosted a strategic forum on aeronautical decision-making (ADM) in adverse weather conditions, bringing together flight crews, meteorological experts, and emergency personnel to strengthen operational safety.

On 24 July, for instance, Squadron Leader Anala led scenario-based strategy sessions, fostering collaborative problem-solving between pilots and meteorological officers. His facilitation translated theoretical risk models into actionable mission protocols. Squadron Leader Peter Honyenuga delivered a pivotal presentation on the psychological and procedural dimensions of decision-making under stress, highlighting common pitfalls during weather-affected missions and advocating for cognitive preparedness. Together, their contributions advanced the forum's goal of embedding disciplined decision-making into the Air Force's operational culture—reinforcing safety as a shared value rather than a regulatory obligation (Ghana Air Force, 2025).

*Squadron Leader Anala, flight crew analysis pilots, aircrew, and meteorological and fire professionals at a training session on 24 July 2025 (Source: Ghana Air Force, 2025)*

## 6.1 Overview of the Ghana Air Force Harbin Z-9EH Fleet

In September 2015, the Government of Ghana acquired four Harbin Z-9EH helicopters, including one configured with VIP seating, to support offshore oil, gas, and maritime operations linked to the Ghana Gas Company. Although the fleet was assigned to the Ghana Air Force for operational management—based on its infrastructure and personnel capabilities—the aircraft were never deployed for oil and gas missions. Among others, this was because the Air Force required additional training and operational readiness before engaging in such specialised missions.

Despite partial functionality of role-specific equipment, the Z-9EH fleet became a critical platform for conversion training, bridging the gap between ab initio flight instruction and operational deployment. Today, Ghana Air Force pilots are qualified to operate both the Z-9EH and the Mi-17, enhancing fleet interoperability.

Following a comprehensive maintenance assessment, the fleet was permanently stationed at Air Force Base Takoradi (AFB TAK) in 2019. Their deployment supports a range of tactical missions, including:

- Maritime surveillance and air support
- Anti-illegal mining operations, in coordination with the Ministry of Lands and Natural

Resources and the Chamber of Mines

- Public health and civil outreach, notably during the COVID-19 pandemic, where Z-9 helicopters disseminated stay-at-home messages under sponsorship from GLICO, a Ghanaian conglomerate in insurance and financial services

The Z-9EH also played a lead role in emergency response, including the Appiatse explosion in January 2022, and OPERATION MAIDABURI, supporting crisis response efforts in the Bawku area.

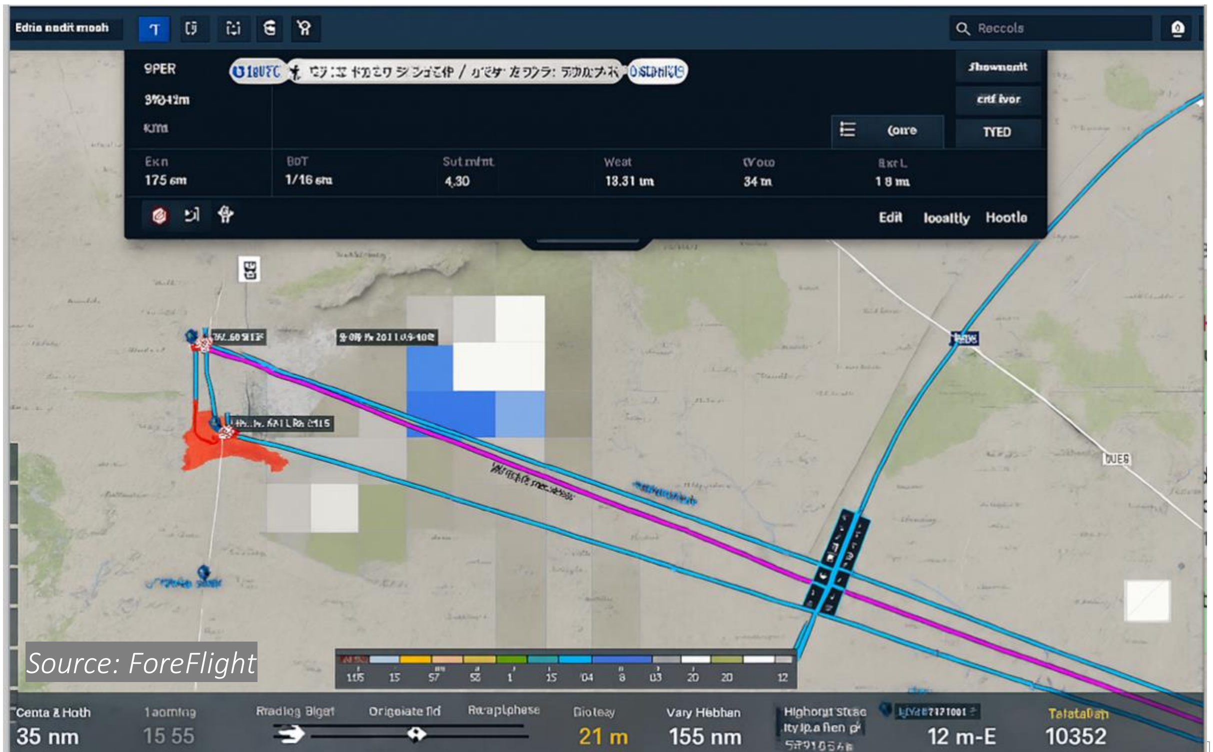
This fleet, while modest in size, has proven to be a versatile and strategic asset, contributing to both national security and civil resilience missions.

## 6.2 The VIP Mission to Obuasi

On Saturday, 2 August 2025, the Ghana Armed Forces Z-9EH (IHRI) with tail No. GH-631 arrived at Accra from Takoradi on medical evacuation, remaining in Accra until Wednesday, 6 August. On that day, the aircraft departed at 09:12 for a routine VIP transport mission to Obuasi, as documented in Press Release No: AU 4 (Date: 6 August 2025). The estimated time of arrival was 10:02.

According to alleged Air Traffic Control (ATC) reports, the aircraft disappeared from radar approximately 14 minutes after departure. It failed to arrive at its destination and was later confirmed to have crashed near Sikaman, in the vicinity of Adansi Akrofuom, Ashanti Region (see Figure 2).

*Figure 2: Estimated Flight Path of Z-9EH*




| From | To | Heading | Totals | | | Leg | | |
|---|---|---|---|---|---|---|---|---|
| DGAA | 5°48'31"N/0°39'22"W | 291°M | 32 nm | 156 kg | 0h16m | 32 nm | 156 kg | 0h16m |
| 5°48'31"N/0°39'22"W | 6°07'10"N/1°39'55"W | 286°M | 95 nm | 484 kg | 0h47m | 63 nm | 328 kg | 0h31m |
| 6°07'10"N/1°39'55"W | OBUASI | 353°M | 101 nm | 513 kg | 0h50m | 6 nm | 29.4 kg | 2m47s |
| OBUASI | DGAA | 117°M | 198 nm | 1,018 kg | 1h39m | 97 nm | 505 kg | 0h49m |

### 6.3 Flight Rules Context

The flight's clearance under Special VFR conditions introduces important considerations about visibility, terrain, and regulatory thresholds.

Operational sources confirm that the flight was cleared under Visual Flight Rules (VFR), specifically under a Special VFR clearance due to marginal weather conditions (GAF, 2025). Special VFR allows visual flight in controlled airspace when weather conditions fall below standard Visual Meteorological Conditions (VMC) minima but still permit safe visual navigation. This clearance must be explicitly granted by Air Traffic Control (ATC).

Under VFR, pilots navigate by maintaining visual meteorological conditions, relying on the "see and avoid" principle to ensure separation from other aircraft. These operations typically bypass ATC clearance unless entering controlled airspace, making them ideal for daytime, fair-weather missions in low-traffic zones. When visibility dips below standard VMC but still permits visual navigation, Special VFR may be authorised within controlled areas. Pilots can transition between VFR and Instrument Flight Rules (IFR) with ATC approval, depending on weather and airspace dynamics. IFR becomes essential when visibility deteriorates or when operating in controlled environments, requiring reliance on instruments and ATC guidance for safe navigation.

According to ICAO standards, VFR requires a minimum of 1,000 ft vertical separation from clouds and visibility of at least 5 km below 10,000 ft MSL. Above that altitude, visibility must be ≥8 km. These minima are critical for safe navigation, especially in terrain-rich environments.

## 7. Reconstructing the Crash and Impact Scenarios

During the initial 50 minutes (approximate) of the flight, the helicopter would have been required to be under Accra control, and later to contact the Kumasi Tower for a visual descent into Obuasi, which does not have designated air traffic control services. It would have established contact and reported its ETA based on GPS readings, about 7-8 minutes to Obuasi and 15 minutes from Kumasi.

### 7.1 Terrain and Aeronautical Factors

The confirmed impact point—shown in red on the ForeFlight map—is located approximately 3 minutes south of Obuasi, at a distance of 5.7 nautical miles (≈11 km). The ground elevation at the crash site is estimated to be around 725 ft (220.98 m) above mean sea level (AMSL, ForeFlight), compared to Accra Airport's elevation of 200 ft (60.96 m), making the terrain roughly three times higher than Accra.

If the Z-9 were flying at 1,000 ft (304.8 m) altitude, this would leave only 300 ft (91.44 m) of clearance above ground level (AGL) at the impact zone—an extremely narrow margin, especially in low-visibility conditions. Notably, the isolated general terrain elevation when approaching Obuasi can rise to around 1,500 ft (457.2 m).

### 7.2 Flight Timelines and Loss of Contact

'Barring any delays', the ATD was logged at 09:12, with an ETA of 10:02 at Obuasi. The last known position was approximately 5.7 NM south of Obuasi, near the Dampia Range Forest Reserve. According to eyewitness accounts compiled by Joy News (2025), Media General (2025) and BBC (2025), a loud explosion was heard around 10:03, followed by visible smoke rising from the forest canopy. Table 4 below shows notional timelines for the Z-9EH.

These timelines represent the estimated sequence based on standard procedures and reported information. However, official ATC communication logs remain unpublished, and their absence limits definitive reconstruction.

*Table 4: Notional Z-9EH Sequential Critical Flight Timeline Matrix Based on the Actual Time of Departure*

| Time | Event | Details |
|---|---|---|
| 09:12 | ATD – Departure from Accra | Z-9EH (IHRI) departs under VFR for Obuasi |
| 09:25 | Initial ATC Contact | Establishes comms with [ATC sector or FIS] |
| 09:37 | Cruise Report | Reports cruising altitude [e.g., 5,500 ft] and heading [e.g., 270°] |
| 09:41 | Last Confirmed Position | Visual or radar fix, e.g., near Dampia Range Forest Reserve |
| 09:43 | ATC Advisory | Issued terrain/weather advisory, e.g. METAR |
| 09:45 | Loss of Radar Contact | No further transmissions; target fades |
| 09:47 | Comms Attempts Initiated | ATC attempts contact on primary and emergency frequencies |
| 09:52 | Aircraft Declared Overdue | SAR protocols activated |
| 10:02 | ETA – Obuasi | Scheduled arrival time; aircraft never arrived |
| 10:32 | Alert Phase Triggered | 30-min threshold crossed; Accra contacts Kumasi ATC |
| 11:02 | Distress Declaration | Formal distress issued; Search & Rescue operations commence |

### 7.3 Weather and Aeronautical Considerations, Forecast and Local Observations

Building on the broader flight safety context already outlined, the following subsection examines the specific weather conditions and local observations on the day of the incident, offering critical insight into environmental factors that may have influenced operational decisions.

On the morning of the crash, weather conditions were deteriorating. GMet had forecast potentially cool, cloudy conditions, persistent mist, and possible thunderstorms, advising caution for morning fog and rough seas; recent rains and light showers had caused foggy conditions in many forest areas.

According to available weather observations, conditions at approximately 09:00 UTC near Kumasi, which is about 15 minutes north of Obuasi, included: light south-westerly winds were blowing, visibility was limited to 4 km due to drizzle, the sky was entirely overcast with a very low cloud ceiling at 600 ft, temperature was warm and humid at 23°C, and atmospheric pressure was steady at 1017 hPa. These conditions, 15 minutes north of Obuasi, indicate low ceilings, high humidity, and reduced visibility, which can make flight operations, especially VFR in hilly terrain, challenging; the official meteorological records for 6 August 2025 have not been independently verified.

Closer to the impact area, Local farmers near the crash site reported morning fog (*ebo asi*) at the time the helicopter flew in the area. An eyewitness account in the media reported in vernacular that the plane was flying at an "unusually low altitude" in the bad weather. According to the BBC (8 August 2025), an eyewitness said he heard the sound of the helicopter flying by, followed by a "loud sound" and then a "bang". "That's when I realised that the helicopter had exploded. So, I hurried to the place to see if I could find survivors," he said. The farmer also said that when he got to the scene, there was "no one to be rescued".

A different flight to Takoradi was cancelled due to heavy fog, suggesting widespread low visibility across the region. On 11 August 2025, a Volta River Aviation helicopter (Jet A-1, registration 9G-AFW), also a Z-9, made an emergency landing in Nkawkaw due to poor visibility and harsh weather. The pilot and crew were unharmed. Just days earlier, another Volta River Aviation helicopter (9G-ADW), carrying four passengers, was forced to land at Presby School Park in Ajumako Kokoben, Central Region, when it encountered turbulent winds and low visibility.

#### 7.3.1 Cloud Base and Terrain Interaction

The cloud base over Kumasi—elevation 950 ft (289.56 m)—was reported between 1,000 (304.8 m) and 1,500 ft (457.2 m), placing the cloud ceiling just 50 to 550 ft above ground level. This indicates a very low cloud base, consistent with fog formation and hazardous flying conditions.

Understanding cloud base is critical: it is typically measured in ft above ground. To determine the cloud height above mean sea level at a given airport, one must add the terrain elevation to the reported cloud base to determine the altitude at which the aircraft will descend below clouds for a visual approach. For example, a cloud base of 1,000 ft (304.8 m) is measured from the surface of the runway/ground. This means that from the mean sea level, the cloud base is 1,950 ft (594.36 m). With this scenario, an aircraft altitude set at mean sea level will break through the cloud at 1,950 ft.

These flight rules intersect with environmental hazards that can compromise safety. The following section explores altitude, visibility, and emergency signalling risks.

### 7.3.2 Operational Flight Risks: Altitude, Visibility, and Emergency Signal Monitoring

Helicopter operations are susceptible to environmental conditions, particularly at higher altitudes where performance limitations become pronounced. Atmospheric icing around 10,000 ft can significantly impair rotorcraft performance, especially in aircraft without certified ice protection systems. Ice accumulation on rotor blades and engine components can degrade lift, reduce engine efficiency, and compromise flight stability. These risks demand rigorous pre-flight planning, especially in regions prone to rapid weather shifts or convective activity.

Visibility degradation—due to fog, mist, or low cloud ceilings—can severely impair a pilot's spatial orientation. While onboard instruments provide essential flight data, transitioning into Instrument Meteorological Conditions (IMC) requires immediate and informed decision-making. In some cases, trained pilots may initiate a climb to escape deteriorating conditions; however, this manoeuvre assumes both instrument proficiency and terrain clearance—capabilities not universally available across all helicopter platforms.

The Z-9EH helicopter, for instance, is not pressurised, limiting its operational ceiling and requiring supplemental oxygen above 12,500 ft per FAA guidelines. More critically, it lacks a standard Helicopter Terrain Awareness and Warning System (HTAWS) unless retrofitted. The absence of HTAWS increases the risk of Controlled Flight Into Terrain (CFIT), particularly during approach and descent phases in IMC or unfamiliar terrain. Aircraft technical specifications are based on general platform data. The specific configuration of the Ghana Air Force Z-9EH aircraft has not been officially confirmed. Pending formal confirmation, these assessments should be treated as indicative rather than conclusive.

Despite these limitations, the Z-9EH is equipped with an Emergency Locator Transmitter (ELT)—a vital safety device designed to transmit distress signals following an accident or emergency. If functional, the ELT typically activates automatically upon impact, though manual activation is also possible. They broadcast on 121.5 MHz and 406 MHz:

- The COSPAS-SARSAT satellite system monitors 406 MHz ELTs and provides GPS-enhanced location accuracy
- 121.5 MHz signals rely on line-of-sight detection by aircraft or ground stations and have been no longer satellite-monitored since 2009
- Activation depends on G-switch sensitivity, which varies by model
- Standard FM radios (87.9–108.0 MHz) cannot receive ELT signals

It remains unconfirmed whether ATC units in Accra or Kumasi actively monitor 121.5 MHz. The absence of confirmation raises questions about procedural readiness, regional signal coverage, and the robustness of emergency response protocols. ATC monitoring capabilities and emergency communication protocols based on available information. Official Ghana Civil Aviation Authority procedures have not been independently verified.

Globally, helicopter flights—especially in non-commercial or rural contexts—are predominantly conducted under VFR. However, when the weather deteriorates into IMC, pilots may attempt to maintain visual contact by flying exceptionally low beneath the cloud base, especially in areas lacking ground-based instrument navigation aids. This scenario aligns with eyewitness accounts from local residents who observed the Z-9EH flying unusually low before the crash. Such decisions, while operationally understandable, underscore the need for enhanced terrain awareness systems and stricter adherence to weather minima. The crash context suggests the need for a deeper avionics/maintenance audit.

### 7.3.3 Controlled Flight Into Terrain

One of the most critical risks in degraded visibility is CFIT. Expert commentary helps illuminate how situational awareness can unravel under pressure.

Speaking on The Point of View with Bernard Avle (CH1 TV, August 13), Professor Kwasi Adjekum, an expert in Aviation and Aerospace Services, underscored the complexity of aviation accidents, noting that they rarely stem from a single cause—hence the need for rigorous investigation. Among the contributing factors, he highlighted CFIT, which occurs when a fully operational aircraft, under complete pilot control, inadvertently crashes into terrain, water, or an obstacle.

When pilots flying under VFR and VMC inadvertently enter IMC in areas with high terrain and do not revert to controlling the aircraft solely by relying on their onboard instruments, there is a high probability of being spatially disoriented. That can lead to a CFIT accident, when a plane under the control of a pilot is inadvertently flown into terrain, a water body, or land features. The obscuration of the flight path due to deteriorating visibility can lead to loss of situational awareness by the pilot. Loss of situational awareness occurs when a pilot's perception of their environment no longer aligns with reality, influencing their projection of future states. It may be the catalyst for faulty decision-making and human errors. It can also lead to a stressful flight environment and confusion.

Technology such as Enhanced Ground Proximity Warning Systems (EGPWS) and Terrain Warning Systems, which integrate various data sources like GPS, terrain databases, and radar altimeters to provide pilots with timely warnings about potential terrain hazards, alert the crew, and help pilots maintain better situational awareness.

Unfortunately, CFIT is not unique to this incident. Several high-profile crashes offer sobering parallels and reinforce the need for robust decision-making.

### 7.3.4 Global Precedents in Helicopter Crashes

The interplay between visual and instrument flight rules has led to many helicopter accidents, even in recent times. We can cite the famous basketball player Kobe Bryant's 2020 Sikorsky S-76B helicopter crash in Calabasas, California, while en route from John Wayne Airport to Camarillo Airport. All nine people on board were killed. In this instance, the pilot did not even have an instrument rating, and yet climbed into the clouds and got disoriented. Another typical example is the Iranian helicopter crash in May 2024 in a remote, mountainous area about 58 km (36 miles) south of the Qiz-Qalasi Dam and 2 km south-west of the village of Uzi, which killed President Ebrahim Raisi and seven top government officials accompanying him. The 2002 Agusta-Bell 412 medical evacuation mission crash in the Atiwa forest range that claimed the lives of two pilots, two technicians, patients, and a nurse is another example.

These precedents underscore the importance of structured decision-making under stress. ADM principles offer a framework for evaluating mission choices.

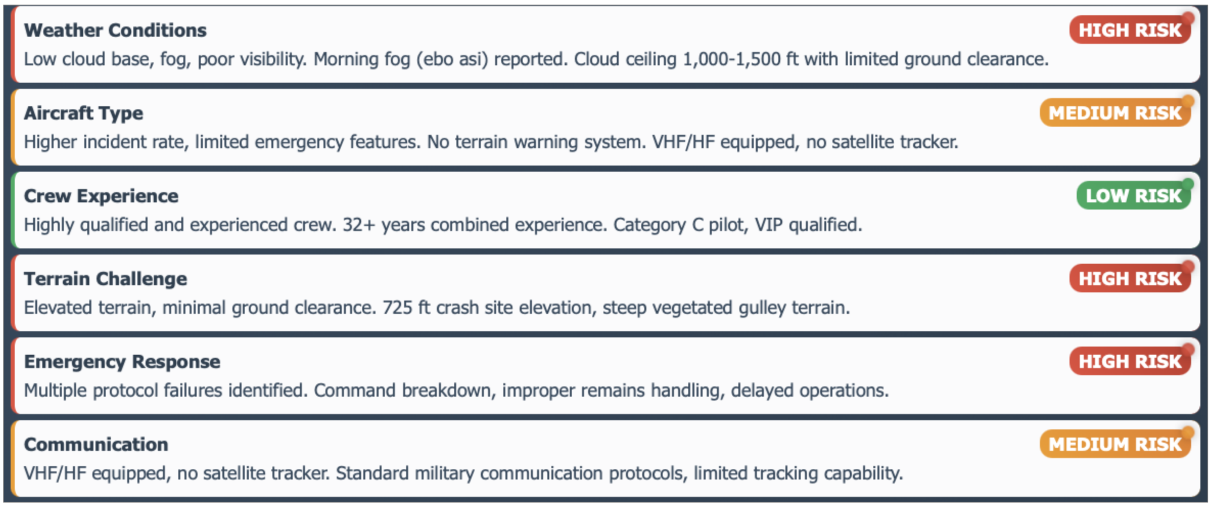
### 7.3.5 Aeronautical Decision-Making

Aviation weather reports such as Meteorological Aerodrome Reports (METARs) provide essential data for flight safety, including visibility, wind, sky conditions, and cloud cover. Sky condition codes like SCT020 (scattered clouds at 2,000 ft or 609.6 m) or BKN030 (broken clouds at 3,000 ft or 914.4 m) help pilots assess risk. Importantly, BKN indicates more than 75 per cent cloud coverage. Essentially, aircraft altimeters read altitude relative to mean sea level, not ground level—unless using a radio altimeter, which measures true height above terrain.

All VIP (and civilian flights) could be dispatched with a trained dispatcher or flight operations officers—a licensed aviation professional who works on the ground, sharing legal responsibility with the pilot for the safety and operational control of a flight—in the loop, where mission accomplishment is a shared responsibility of both the pilot in command (PIC) and the dispatcher, to relieve the captain of unnecessary pressures of having to accomplish the mission when things change. Usually, the captain cannot amend a flight plan without the dispatcher concurring.

This scenario underscores the importance of ADM. In marginal weather, the decision to proceed ("Go") or abort ("No Go") must be based on structured risk analysis, such as shown in Figure 3. Could the combination of low cloud base, elevated terrain, and limited clearance suggest that a No-Go decision would have aligned with best ADM practices? Military pilot training is explicit in such protocol.

*Figure 3: Risk Assessment Matrix*




## 8. Emergency Response and Coordination

With the crash confirmed, the national emergency response was activated. The following section attempts to trace the mobilisation timeline and coordination efforts.

### 8.1 Initial Alert, Mobilisation, and Information Monitoring

It is assumed that at about 10:32 on 6 August 2025, the 30-minute alert threshold was crossed, prompting Accra Air Traffic Control (ATC) to initiate coordination with Kumasi ATC per ICAO Annex 12 procedures, which mandate alerting within 30 minutes of a missed Estimated Time of Arrival (ETA). Formal activation of Search and Rescue (SAR) operations followed at 11:02 after a distress call.

Upon receiving notification from the Air Force regarding a missing helicopter en route to Obuasi, Central Command initiated immediate coordination measures. Troops from the 4th Infantry Battalion's Forward Operating Base (FOB), already positioned in Obuasi, commenced ground-level reconnaissance. Preliminary assessments indicated that the aircraft may have deviated from its intended landing site at Len Clay Sports Stadium, possibly diverting toward the AGA airstrip. In response, the FOB reportedly redirected its search efforts to that location.

As the probability of a crash intensified, military command in Kumasi reportedly directed the

Commanding Officer of the 4th Infantry Battalion to redeploy its lead Forward Operating Base (FOB) from Obuasi toward the suspected impact zone near Sikaman—approximately 13.8 km away, with estimated travel times ranging from 25 to 40 minutes depending on terrain and road conditions. FOB elements are believed to have arrived at Sikaman around 12:40 PM. Concurrently, upon issuance of the alert, additional units from Kumasi—including a medical team supported by two military ambulances and a medical officer—were mobilised to the same location. Covering a distance of roughly 50 to 55 km via mixed road conditions and forest-edge access near the Dampia Range, their journey took approximately 1 hour and 45 minutes. These military operational details are based on available reporting and estimated timelines. Official military after-action reports have not been publicly released.

The lead elements of the search team—now reclassified as a search and recovery unit—reached the crash site shortly before 14:00. By then, members of the local community, including from nearby villages, some 10-minute drive from Sikaman, had already converged on the site from around 11:00. The General Officer Commanding (GOC) Central Command arrived soon after, followed by the Regional Minister, who was already in Obuasi for an official event. He proceeded to the crash site, accompanied by personnel from the Fire Service, Immigration, Police, and other agencies.

Despite the prompt mobilisation, terrain complexity and the absence of aerial surveillance significantly delayed ground access. According to the Ghana National Fire Service (GNFS, 2025), responders encountered dense vegetation and poor GPS coverage within the Dampia Range, complicating navigation and slowing progress.

To enhance situational awareness and refine search parameters, teams simultaneously monitored local radio broadcasts and social media platforms for real-time civilian reports. This multi-channel information monitoring—leveraging open-source intelligence—proved instrumental in guiding field operations and adapting to evolving conditions on the ground.

### 8.2 Impact Site Discovery and Wreckage Analysis

On 7 August, journalist Ibrahim Abubakar of Media General Group reported on Akoma FM that parts of the helicopter were lodged in trees along steep, slippery, vegetated slopes, with melted and shattered components scattered widely. The crash site lies within the Dampia Range Forest, near the village of Sikaman, and requires a strenuous uphill trek of approximately 1 hour 20 minutes to 2 hours, depending on physical fitness. Several individuals accompanying the authorities reportedly turned back before reaching the site.

Along the approach path, debris and personal effects—including a wristwatch later returned—were discovered roughly 30 minutes from the impact zone. While the widespread debris field might suggest a violent dispersal, it does not necessarily indicate a mid-air explosion. The reported "loud sound," likely from the impact, and a subsequent "bang," possibly a blast at terrain altitude, could have propelled fragments downhill over the treetops.

The crash site itself was located at an estimated elevation of 725 ft (220.98 m) AMSL, with wreckage dispersed across a 300-meter radius. Preliminary forensic analysis points to a high-velocity impact, consistent with loss of control under Instrument Meteorological Conditions (IMC). The challenging terrain, coupled with the presence of multiple agencies, influenced the management of the scene and exposed procedural tensions.

Although the Z-9EH helicopter may carry an Anti-Crash Recorder (ACR), comprising a Cockpit Voice Recorder (CVR) and Flight Data Recorder (FDR), official confirmation of their presence and survivability remains pending. If intact and operational, the system would have captured the final 30 minutes of flight data. Notably, the Regional Minister announced the recovery of the Black Box at approximately 17:00 hours on 7 August, supposedly after the Ghana Air Force had verified its identity via serial number.

### 8.3 Crash Scene Management and Operational Control

The Sikaman community played a crucial role in the early identification of the crash site, drawing on their deep familiarity with the terrain. Local eyewitnesses were among the first to report the location of the wreckage and assisted in the initial recovery of remains from a steep slope, as discussed later. However, their arrival—nearly four hours ahead of security forces and the emergency response team—compromised the integrity of the crash zone. Unregulated access led to contamination and premature removal of debris, complicating subsequent forensic reconstruction.

Efforts to reassert control over the impact area could have been complicated by the *ad hoc* nature of the emergency response team, involving military and non-military actors, including personnel from NADMO, the Police, Fire Service, National Security, and political representatives. In reaction to the removal of debris from the zone, the regional authority issued a directive on 9 August 2025, urging individuals in possession of items such as metal fragments, screws, drivers, or blades to return them by 11 August to local authorities or the investigation team in exchange for a cash reward. This deadline was extended on 12 August, with non-compliance subject to legal consequences.

The Preliminary Investigation Team (PIT) leader reportedly remained on-site for four days, overseeing the collection of critical helicopter components. One specific part, visible in circulating social media footage, had not yet been recovered, though the locals pledged to hand it over to the Platoon Commander.

Following the establishment of a military perimeter, forest access was temporarily restricted, impacting local farming activities. From the second day onward, controlled access was reinstated, permitting daytime farming up to 100 meters from the crash site. At night, security personnel withdrew to the village entry point to maintain oversight.

Recovery operation details are compiled from multiple media reports and eyewitness accounts. The complete operational timelines require official investigation findings.

### 8.4 Recovery of Remains

The recovery operation demanded considerable physical endurance, logistical improvisation, and emotional resilience, given the crash site's remote location—accessible only via a strenuous 120-minute trek from Sikaman. According to Ibrahim Abubakar of Media General Group, elements of the multi-agency emergency response team, some wearing latex gloves and assisted by locals, retrieved the remains of the eight victims in phases: four before nightfall, followed by two more, and the final two later that evening. The Regional Minister, present at the site, reportedly identified four of the deceased.

While the Minister's involvement in coordinating operations was well-intentioned, it may have inadvertently led to procedural deviations. Notably, sacks used for the recovery—arranged by a local assembly member from Sikaman—posed challenges to forensic integrity. These improvised measures, though responsive to the perceived urgency, contributed to heightened public sensitivity, especially after media footage showed remains being "fireman" lifted in sacks from the Dampia Range Forest Reserve. In that terrain, lashing the remains could have been more challenging,

Media coverage suggests an intense urgency to recover and evacuate the remains, possibly without adequate justification or procedural safeguards to preserve the crash site. If such urgency was warranted, the remains should have been systematically documented—through photography, video, and proper tagging—to enable accurate 3-D reconstruction of the site for forensic analysis. It remains unclear whether these protocols were followed.

### 8.5 Movement from the Dampia Range Forest Reserve to Sikaman Village

Following recovery from the crash site, the remains were carefully transported to the outskirts of Sikaman village. There, they were transferred from the sacks into military-grade body bags and slung—using field adaptations—to ambulances positioned approximately 300 meters away in the village. Though visual documentation exists, the photographs are excluded from this paper due to sensitivities surrounding the imagery. They depict a coordinated multi-agency effort involving military personnel, police officers, civilian officials, and local villagers.

Metadata from two images of the body bags indicates they were captured between 17:44:37 and 18:18:02 hours, using cameras without GPS functionality. By this time, it is arguable that some, if not all, of the recovered remains had reached the base of the hill, marking the culmination of six to seven hours of physically demanding trekking, securing, and extraction.

The visuals corroborate forensic accounts of community involvement in site identification and recovery support. In the absence of standard stretchers, improvised military casualty evacuation techniques—reminiscent of “jungle warfare” protocols—were employed. These scenes reflect the intense physical and emotional demands of the operation and reveal a layered narrative of professional discipline, civil oversight, and grassroots engagement. Together, they underscore the intersection of coordination, resilience, and terrain adversity in one of Ghana’s most complex recent recovery missions.

### 8.6 Airlift Coordination from Kumasi to Accra

Following recovery from Sikaman, the remains were transported to Kumasi Prempeh I International Airport using vehicles from the Ghana Armed Forces and the National Ambulance Service. As preparations for the airlift commenced, inter-agency logistical dynamics significantly influenced the transfer strategy. Although initial plans involved conveying the remains to the Komfo Anokye Teaching Hospital (KATH), military command opted instead for direct airlift to the 37 Military Hospital in Accra, in accordance with established military mortuary protocols.

At the Crash Rescue Vehicle Terminal at the Kumasi Airport, some or all of the remains contained in the body bags were placed into coffins for air transport. Although the military high command had reportedly pre-positioned coffins in Kumasi as part of standard airlift procedures, the coffins ultimately used were those arranged by the National Security element.

This substitution, though logistically expedient, underscored the fluid, complex inter-agency coordination dynamics that shaped the operation.

### 8.7 Media Access and Premature Disclosure

However, transparency came at a cost. Media access and premature announcements introduced ethical and procedural challenges.

The Minister’s decision to permit media access at the crash site introduced complex challenges. While intended to demonstrate transparency and public accountability, the presence of cameras during critical phases of the recovery raised concerns about privacy, dignity, and operational discipline. Footage showing the Minister at close range as bodies were transferred to ambulances risked overshadowing the solemnity of the moment and inadvertently politicising a sensitive military operation.

The media’s role in this incident was dual-faceted. On one hand, it served a vital public function—documenting the state’s response, amplifying national grief, and ensuring visibility of high-level engagement. On the other hand, premature exposure of sensitive scenes and unverified information risked compromising investigative integrity and public trust. The rapid dissemination of images and statements, including the alleged discovery of the black box, may have outpaced formal verification and bypassed military protocol.

In aviation disasters, the authority to announce the recovery of flight recorders rests with the designated investigative body—typically the Air Force High Command, Ministry of Defence, or the Board of Inquiry. This ensures procedural integrity, accurate communication, and proper chain of custody. In this case, the

Minister's announcement preceded confirmation by part number and occurred before the military high command had been informed.

Premature or unauthorised disclosures—whether by officials or amplified by media—can mislead the public, disrupt investigative timelines, and violate operational standards. Flight recorders must be formally identified, secured, and logged before any public statement is made. Media engagement must be carefully calibrated: valued for its reach and accountability, but constrained by the imperatives of protocol, dignity, and investigative discipline.

## 8.8 Field Constraints and Tactical Adaptations

These field constraints not only shaped tactical improvisations but also exposed deeper procedural and ethical vulnerabilities—particularly in the handling of remains and site integrity, as explored below.

### 8.8.1 Recovery Protocols and Ethical Breaches

The use of sacks for recovering remains—reportedly to prevent body bags from "melting from the heat and accelerating decomposition"—was not scientifically substantiated. Standard cadaver pouches are designed for durability, hygiene, and dignity, especially in aviation accidents. Their substitution with sacks departed from established medical and military protocols, causing distress among personnel and undermining the professionalism of the recovery effort. This lapse was further exacerbated by media personnel defying directives not to film the exercise.

Dr. Pet-Paul Wepeba, President of the Ghana Academy of Forensic Sciences, publicly condemned the handling of the remains on CNR Eyewitness News (Friday, 8 August 2025), describing it as undignified and unsafe. He cited the absence of zipped, leak-proof body bags as a violation of international and Ghanaian standards, warning of public health risks from potential pathogens. Dr. Wepeba attributed the breach to inadequate local capacity and called for enhanced training and preparedness across emergency response agencies.

Systematically incorporating communities into SAR planning—through liaison mechanisms, training, and communication protocols—could thus improve timeliness, operational reach, and legitimacy of Ghana's crash response efforts, as local actors are often the first and most effective responders in remote terrain."

### 8.8.2 Transport Logistics and Asset Coordination

Military ambulances (2 units), supported by the National Ambulance Service (1 unit), were deployed to transport the remains. Although ambulances are not typically designated for deceased personnel under civilian or military protocol, their use was necessitated by the remote crash location and the initial assumption of a rescue mission. In the absence of state-owned hearses in the middle and northern belts—assets limited to Accra-based police and military units—ambulances became the only viable option.

To ensure compliance with health standards, these vehicles undergo fumigation before being redeployed for live patient care, mirroring Air Force procedures following aircraft transport of deceased personnel.

### 8.8.3 Airlift Constraints and the Mi-17 Aerial SAR Option

The Mi-17 helicopter, initially stationed in Tamale for the Bawku mediation effort, was redeployed to Kumasi to support the airlift of remains to Accra. Its selection was based on speed, payload capacity, and direct routing advantages. However, deteriorating weather, nightfall, and the absence of ground support instruments for safe landing in Accra rendered the mission unfeasible. Although a suitable landing site had been identified, environmental and technical limitations ultimately constrained its deployment. The CASA C-295 (GH550), already engaged in ferrying the investigation team, was subsequently tasked with the airlift.

Had the Mi-17 been employed for aerial recovery directly from the crash site, the operation would have required a hover-based Search and Rescue (SAR) protocol. Given the steep terrain of the Dampia Range, the helicopter could not have landed and would have needed to hover above the forest canopy. Ground or onboard personnel—likely from the Fire Service, NADMO or Special Forces—would have required specialised equipment: winch system, rescue basket or harnesses, navigation kits, first aid and oxygen supplies, casualty/body bags, machetes or chainsaws, combat net or satellite radios, and jungle clearing charges. The extraction would have followed a multi-phase sequence shown in Table 5:

*Table 5: Estimated Timeframe for Mi-17 Aerial Extraction*

| Phase | Duration | Details |
|---|---|---|
| Hover positioning | 10–15 mins | Stabilising over canopy and surveying extraction zone |
| Jungle clearing (if needed) | 20–30 mins | Manual or controlled clearing of foliage |
| Equipment deployment | 10–15 mins | Winch setup, medical kits, comms coordination |
| Individual hoist cycles | 5–8 mins/lift | 8 remains, staggered or sequential extraction |
| Total extraction | 40–65 mins | Based on crew coordination and terrain complexity |
| Contingency buffer | 15–20 mins | For weather, equipment, or safety adjustments |

*Sources: Flugzeuginfo.net, Helitrade DMCC, Yale, MPWRD, Military Sphere, AircraftN, Seoul National University*

The estimated total duration of the aerial SAR would have been between 1.5 and 2.5 hours, contingent on terrain and recovery pace. Operationally, the Mi-17's robust hover stability would have supported canopy operations, but rotor wash, wind shear, and visibility constraints posed risks to ground teams and debris integrity. Each hoist cycle would have demanded precise coordination via combat radios, especially given the slope and vegetation density. The prolonged hover over uneven terrain remained the most critical challenge, with potential for destabilisation and compromised safety.

## 8.9 Airlift of the Remains from Kumasi to Accra

In the evening of the same day of the crash on 6 August 2025, the remains were transferred from the sacks into proper body bags at the Kumasi International Airport, placed in the coffins and flown to Accra in the CASA C-295 (GH550).

*Remains of the crash victims return home to AFB-ACC, where the flight originated, aboard the CASA C-295 (GH550) (Source: Modern Ghana & Asaase Radio)*

By the time of arrival at Accra, the coffins had been properly covered with the national flag, and the needed arrangements had been made for a befitting reception at the Air Force Base in Accra. Samples of the bodies have been sent to South Africa for forensic identification and analysis, and a state funeral was scheduled to be held on 15 August for the victims.

On Wednesday, 6 August 2025, Chief of Staff Julius Debrah directed all national flags to be flown at half-staff until further notice. That same day, President John Dramani Mahama cancelled all his official activities for the remainder of the week and declared three days of national mourning, beginning Thursday, 7 August 2025. In marking the start of the 3-day national mourning period, the Government held a public flower-laying and candle-lighting event in honour of the victims of the recent. He announced during a national address that the Ghana Armed Forces had initiated a full and transparent investigation, led by a Board of Inquiry, to determine the cause of the accident.


*A scene at the flower-laying and candle-lighting event (Source: Happy 98.9 FM)*

At their state funeral on Friday, 15 August, President John Mahama posthumously promoted the three Armed Forces personnel who died in the crash: Squadron Leader Anala to Wing Commander, Flying Officer Ampadu to Flight Lieutenant, and Sergeant Mensah to Flight Sergeant. He hailed them as patriots who made the ultimate sacrifice, affirming that their courage and devotion will be eternally remembered.

President Mahama also announced that the five civilians who perished in the crash—including two Cabinet ministers—will be formally recognised at the next national honours ceremony.

## 9. Operational Reflections: National Emergency Response Mechanism and Architecture

Taken together, these events reveal systemic gaps in Ghana's emergency response architecture. The following reflections synthesise key lessons.

The tragic crash of the Ghana Air Force Z-9EH helicopter on 6 August 2025 exposed significant vulnerabilities in Ghana's national emergency response architecture. While the military initiated search and recovery swiftly, the overall inter-agency coordination, professionalism, local community discipline and protocol adherence were compromised at several critical junctures.

### 9.1 Initial Mobilisation and Site Access Challenges

The Z-9EH crash revealed critical gaps in Ghana's emergency response logistics. Although initial alerts were timely, the absence of aerial surveillance, terrain mapping, and initial perimeter control allowed civilians to reach the site hours ahead of security forces. This led to contamination, debris displacement, and emotional distress—highlighting the need for rapid-access protocols and community interface safeguards.

## 9.2 Command Structure and Procedural Discipline

Operational control was compromised by ad hoc leadership and political dynamics. The Regional Minister's assumption of tactical command—arguably without structured coordination with military and emergency professionals—resulted in procedural disruptions, including invasive media access, improvised body recovery and premature public disclosures. These actions, though well-intentioned, posed challenges to operational discipline, forensic integrity and public perception.

## 9.3 Institutional Reform Priorities for Command Culture and Executive Mobility

To strengthen institutional coherence, reform must clarify when executive travel takes precedence, embed consultative civil-military coordination, routinely test operational resilience, and replace informal directives with structured, accountable command language. Regular resilience audits are essential to gauge the Air Force's capacity to absorb high-level directives without compromising core functions, while embracing a cultural shift—from informal catchphrases to structured operational language that promotes clarity, accountability, and mission discipline.

## 9.4 ELT Monitoring and National Readiness

The absence of confirmed ELT signal detection by Accra or Kumasi ATC raises concerns about Ghana's readiness to respond to distress transmissions. With 121.5 MHz no longer satellite-monitored, reliance on ground-based receivers or aircraft relay is essential. National protocols for ELT integration into SAR workflows require urgent review and standardisation.

## 9.5 Terrain Complexity and Logistical Preparedness

The Dampia Range Forest Reserve posed significant operational challenges. The lack of geospatial intelligence, mapped ingress routes, and modular recovery kits forced responders to improvise stretchers and endure physical strain. These limitations underscore the need for terrain-aware logistics and pre-deployment planning for remote crash scenarios.

## 9.6 Inter-Agency Coordination and Community Engagement

Despite structural weaknesses, the response demonstrated resilience in inter-agency mobilisation and community support. Local volunteers assisted in recovery efforts, and eventual coordination led to the successful retrieval of all victims. These strengths should be institutionalised through simulation exercises, doctrine reform, and capacity-building initiatives.

## 9.7 Strategic Lessons and Path Forward

The Z-9EH incident offers a critical lens for recalibrating Ghana's emergency response architecture. Integrating aviation-specific protocols, enforcing disciplined operational control, and enhancing terrain logistics will be essential to building a more responsive, coordinated, and resilient national system.

## 9.8 Mission Readiness and Resource Constraints

While the paper centres on emergency response, it is clear that the Ghana Air Force's mission readiness—defined by fleet capability, crew proficiency, and logistical resilience—is a foundational determinant of operational success. The Z-9EH's limitations in survivability, instrumentation, and terrain adaptability underscore the need for a more robust resource base to support high-risk deployments and VIP missions under adverse conditions.

## 9.9 Aircraft Survivability and SAR Efficiency Factors

Beyond terrain accessibility and inter-agency coordination, post-crash outcomes are also shaped by aircraft survivability and SAR efficiency factors. International best practice highlights cabin crashworthiness (and the 'SAR golden hour' as critical determinants of survival in military and civilian helicopter accidents. Although the SAR golden hour was not at play in the Z-9EH crash context, integrating these considerations into Ghana's response protocols would not only strengthen forensic recovery efficiency but also enhance the prospects for saving lives in future incidents.

## 10. Conclusion

The GAF Z-9EH helicopter incident exposed a constellation of systemic vulnerabilities across Ghana's emergency response architecture. From command breakdowns and terrain access delays to forensic mishandling and aviation-specific preparedness, the response revealed critical gaps in mission readiness, coordination, and ethical governance. While individual responders demonstrated courage and improvisational skill, the absence of a unified operational framework, standardised protocols, and trauma-informed support mechanisms undermined the overall effectiveness of the mission.

The paper has explored—not investigated—the operational dynamics surrounding the incident, drawing on publicly available data, eyewitness accounts, and comparative frameworks to assess systemic performance under pressure.

This analysis underscores the urgent need for institutional reform—not merely in tactical execution but in strategic foresight, inter-agency integration, and the ethical scaffolding of crisis response. The lessons drawn from this tragedy must catalyse a shift from reactive improvisation to proactive resilience—not only to honour the lives lost, but to ensure that Ghana's emergency systems are robust, respectful, and resilient when the next crisis arrives.

The Ghana Air Force's fleet mix offers broad mission flexibility, but with critical gaps in survivability, payload scalability, and emergency instrumentation—especially for VIP and logistics missions in adverse conditions. The Z-9EH is suitable for rapid, low-profile tasks but lacks robustness for high-risk or long-range operations.

A balanced upgrade strategy—prioritising avionics, survivability, and SAR instrumentation across platforms—would enhance operational resilience and mission safety. Fleet diversification must be matched by crew training, maintenance support, and mission-specific configuration to ensure readiness across Ghana's varied terrain and strategic needs.

## 11. Recommendations: Integrated Strategic Framework for Ghana's Emergency Response Enhancement

To transform Ghana's aviation emergency response architecture into a resilient, ethically grounded, and internationally compliant system, nine interlinked strategic pillars must be advanced. These recommendations consolidate both the thematic priorities and the actionable reforms necessary for institutional coherence and operational excellence.

### 11.1 Fleet Resilience and Mission Configuration

Ghana must invest in a diversified rotary-wing (and fixed-wing) fleets and expanded base support facilities with enhanced survivability, SAR instrumentation, and terrain-aware navigation systems. Mission-specific aircraft configuration, paired with continuous crew training and logistical support, will ensure readiness across varied operational environments and reduce vulnerability during executive or emergency missions.

### 11.2 Unified Command Structure & Tactical Integrity

Ghana must establish a National Emergency Operations Centre governed by a unified command protocol that delineates tactical authority across civilian and military actors. This structure must prevent political interference in field operations and embed standardised Incident Command System (ICS) procedures to ensure coordinated decision-making during crises.

### 11.3 Forensic Recovery Standards & Dignified Handling

The mishandling of remains in past incidents underscores the urgent need for forensic reform. Ghana should mandate international-standard forensic equipment, eliminate improvised recovery methods, and enforce SOPs aligned with ICAO and INTERPOL guidelines. Specialised aviation accident response units must be trained in dignified, scientifically rigorous recovery procedures to uphold both investigative integrity and cultural sensitivity.

### 11.4 ELT Integration, Monitoring & Aviation Safety Technology

To address gaps in distress signal tracking, all Air Traffic Control centres must implement 24/7 ELT monitoring with automated alert protocols. Ghana should upgrade to 406 MHz satellite-monitored emergency locators and conduct quarterly system drills to validate responsiveness. Additionally, deploying aviation safety officers at major airports will ensure domain-specific expertise and proactive risk mitigation.

### 11.5 Terrain Access Preparedness & Infrastructure Logistics

Rapid deployment in remote or obstructed crash sites requires robust terrain logistics. Ghana should pre-map high-risk zones using comprehensive terrain databases and stock modular ingress kits. Integrating real-time GIS navigation systems will enable responders to access rugged terrain efficiently, minimising delays and enhancing survivability.

### 11.6 Inter-Agency Coordination & Operational Cohesion

A Joint Emergency Response Taskforce must replace fragmented response efforts with shared training, unified communication protocols, and standardised operational playbooks. This task force should also develop community interface protocols that balance transparency with operational security, ensuring coherent engagement across agencies and with the public.

### 11.7 Aviation Disaster Expertise & Institutional Readiness

Ghana’s emergency response must be aviation-literate. Investing in aviation-specific emergency training and deploying airfield safety officers at all major airports will embed technical competence into frontline operations. These officers will serve as critical liaisons between aviation authorities and emergency responders during airfield incidents.

### 11.8 Psychosocial Support Protocols & Responder Resilience

Emergency response must include the human dimension. Ghana should embed trauma counselling protocols into national emergency SOPs and ensure post-incident debriefing for both responders and affected families. Long-term mental health resources and professional certification programmes will sustain responder resilience and institutional learning.

### 11.9 Media Ethics & Operational Security

To prevent privacy violations and operational disruption, Ghana must develop media access guidelines and train responders in ethical engagement. These protocols should protect the dignity of victims, uphold investigative confidentiality, and ensure that public communication during crises is both responsible and respectful.

> "THEY DID NOT FALL IN SILENCE, NOR SHALL THEY BE REMEMBERED IN SHADOWS. THEIR FINAL FLIGHT CALLS US TO BUILD WITH **HONOUR**, PREPARE WITH **WISDOM**, AND RESPOND WITH **DIGNITY**."
>
> *—Dedicated to the **eight souls** lost in the **Z-9EH tragedy**, whose service and sacrifice shall guide Ghana's resolve.*

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