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RESEARCH ARTICLE

Three decades after the CT-43 airplane crash near Dubrovnik in 1996: forensic reconstruction, diplomatic memory, and Croatian–American collaboration

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Aim: To re-examine the 1996 airplane crash near Dubrovnik as a historical-forensic case study, focusing on the diplomatic purpose of the mission, the circumstances of the accident, and the Croatian institutional response in search, recovery, identification, and commemoration.

Methods: This study used a narrative historical-forensic approach based on official aviation investigation reports, Croatian police and forensic documentation, U.S. congressional and governmental materials, contemporary reports, and commemorative sources. The analysis integrated aviation findings with medico-legal, institutional, diplomatic, and memorial contexts.

Results: The CT-43A crash occurred during a U.S. diplomatic and economic mission undertaken shortly after the end of the Homeland War, with the aim of supporting reconstruction, stability, and renewed partnership in Croatia and Bosnia and Herzegovina. Aviation investigation findings attributed the accident to a combination of command failure, aircrew error, and an improperly designed non-precision approach procedure. Croatian police, rescue, medical, and forensic personnel responded under difficult terrain and weather conditions, secured the site, recovered the victims, performed preliminary identification procedures, and cooperated closely with IFOR/NATO and U.S. authorities. The response reflected the operational maturity Croatian forensic institutions had developed during the Homeland War and immediate post-war period.

Conclusion: Three decades later, the CT-43A airplane crash should be understood not only as an aviation disaster, but also as a forensic, diplomatic, and commemorative event. The case demonstrates how professional disaster response, international cooperation, and historical-forensic documentation can contribute to institutional memory and shared Croatian–American remembrance.

Keywords: air accidents; disaster victim identification; forensic medicine; mass fatality incidents; diplomacy; United States–Croatia relations

Introduction

On 3 April 1996, the United States Air Force CT-43A with 35 people aboard crashed into the slopes above Dubrovnik during an approach to the airport, and all crew and passengers died. For the United States, the accident meant the loss of a secretary of commerce and 12 members of the government delegation, thirteen business representatives, six members of the flight crew, and a journalist. For Croatia, it meant the death of an interpreter and a journalist and a tragedy on its soil instead of a visit intended as an expression of friendship and support (*1*–*3*).

Three decades later, in 2026, the case returns to Dubrovnik in a unique commemorative and intellectual setting: the 14th International Society for Applied Biological Sciences (ISABS) and Mayo Clinic Conference is again being held in the same city gathering numerous international (forensic) experts, among whom is also a number of Americans (*4*). This circumstance provides the context for the present article as the accident should not be revisited only as a thirtieth anniversary or as an emergency response that highlighted the collaboration between the two countries. The emphasis is on remembrance of the delegation purpose, the response to disaster, and the interpretation of why it still carries moral and historical weight.

The additional aspect is that the mission took place at an important moment in the history of Croatia and the wider region. The Dayton Peace Agreement (*5*) had been signed only months earlier. It happened in the country where war damage, displacement, weakened infrastructure, and fragile institutions shaped daily life (*6*). In that context, the American mission signaled that the United States was prepared to link diplomacy with economic commitment (*7*, *8*). Congressional materials later described the journey as part of a mission of peace through trade, intended to help rebuild the infrastructure and economic foundations of war-damaged countries, Croatia and Bosnia and Herzegovina (*3*). That is why this delegation should not be remembered only as the victims of an air crash, as they had come to support a country and region emerging from war. The diplomatic context of the mission is therefore integral to any historically complete account of the event. Understanding the event requires attention to both the circumstances of the crash and the institutional and forensic response that followed.

The United States Air Force investigation, later summarized by the Flight Safety Foundation, concluded that the accident resulted from command failure, aircrew error, and an improperly designed approach procedure (*1*, *2*). The aircraft flew a non-precision approach in instrument meteorological conditions, deviated from the published final approach course, and struck rising terrain approximately 1.8 nautical miles from the runway threshold (*2*).

After the crash, Croatian police, rescue personnel, medical staff, and forensic experts searched mountainous terrain in poor weather conditions, secured the site, recovered the dead, and cooperated with NATO and American personnel in identification and transport. Croatian institutional materials record intensive night search operations by approximately 140 members of the Special Police units and associated services, discovery of the only initially surviving injured person, transport from the mountain to Dubrovnik, marking and recovery of the dead, and close operational cooperation with IFOR/NATO personnel

(*9*). These records provide a rare operational view of how Croatian institutions responded in the first hours after the disaster.

To all this, there is a deeper historical and forensic context. By 1996, Croatian forensic medicine had already been shaped by the war years. A 1994 document from the Clinical Department of Pathology, Forensic Medicine and Cytology, University Hospital Split, Split, Croatia, records more than 2,000 autopsies of war victims and describes a forensic service operating across a broad territory, including parts of Dubrovnik's jurisdiction (*10*). That background, combined with enormous experience during war and postwar period (*11*–*19*) helps to explain why Croatian institutions could respond to a complex international disaster with order, seriousness, and technical maturity.

Today, this disaster belongs to Dubrovnik's commemorative landscape through the *Ronald Brown Memorial House*, situated in the city (*20*). The fact that Dubrovnik has preserved memory of this incident this way shows that it was never treated as an external event. On the contrary, it became part of the city's historical memory. The thirtieth anniversary, coinciding with the return of ISABS to Dubrovnik, provides an appropriate moment to revisit the case within a scientific and historical framework.

The aim of this article is to reconstruct the forensic and operational response to the CT-43 crash near Dubrovnik using primary documentary sources, and to examine the event within the context of Croatian-American cooperation and the institutional maturation of Croatian forensic medicine during the 1990s.

The post-war historical context and the Ronald Brown mission

The mission on which Secretary Brown and the American delegation travelled was conceived during a period of transition after the war in Croatia. The war had formally ended, but its consequences were clearly visible through physical destruction, interrupted communications, institutional strain, and economic uncertainty (*6*–*8*, *21*). The Dayton Peace Agreement had opened a path toward stabilization (*5*), yet that path still depended on visible international engagement, material reconstruction, and renewed confidence (*6*, *21*).

The presence of American officials and business representatives indicated that the United States was willing to support peace not only by negotiation, but also by investment, reconstruction, and economic partnership. Congressional materials confirm this describing the delegation as travelling on a mission of peace through trade and economic restoration (*3*). The itinerary itself also reveals the mission's intensity. The Flight Safety Foundation's reconstruction, based on the Air Force report, shows that the accident occurred on the first day of a dense, multi-leg schedule that had undergone late changes, including the insertion of Dubrovnik as a stop (*2*). That compressed structure did not cause the crash, but it formed part of sequence of events that led to this tragedy.

The crash near Dubrovnik

The aircraft involved was a United States Air Force CT-43A, a military Boeing 737-200 variant assigned to the 76th Airlift Squadron at Ramstein Air Base in Germany (*2*). On 3 April 1996, it was flying toward Dubrovnik as part of the broader mission itinerary.

The final approach environment combined several well-recognized hazards. Dubrovnik Airport at the time offered no radar monitoring for the last segment of approach, the terrain surrounding the airport was mountainous, and the published instrument procedure relied on non-precision non-directional beacon (NDB) navigation rather than on a precision approach (*2*). The flight entered this environment in instrument meteorological conditions, which made strict procedural discipline essential.

The Flight Safety Foundation account states that the aircraft crossed the final approach fix at approximately 209 knots indicated airspeed, roughly thirty knots faster than recommended, and was still too fast to be fully configured for landing (*2*). In such an environment, excess speed reduces margin, increases cockpit workload, and compresses time for correction (*22*, *23*).

The second critical factor was lateral deviation. Instead of maintaining the published final approach course of 119 degrees, the aircraft tracked approximately 110 degrees and continued on that path until impact (*2*). This nine-degree error placed the aircraft dangerously to the left of the protected approach path. The aircraft remained in controlled flight and struck terrain approximately 1.8 nautical miles from the runway threshold (*2*); the geographical context of the approach and impact area is illustrated in **Figure 1** and **Figure 2**.

The official Air Force conclusion named the causes of this accident as: command failure, aircrew error, and an improperly designed approach procedure (*1*). Thus, the accident was not attributed solely to pilot performance, or to technical deficiencies in the chart or procedure but it was interpreted as a chain in which command decisions, procedural environment, and flight execution interacted.

Figure 1. Reconstructed aerial view of the Dubrovnik approach area, derived from archival VHS aerial footage recorded during crash-site documentation, showing the CT-43 impact location (red arrow) and Dubrovnik Airport (Čilipi) (green arrow).

Figure 2. Northern slope of Mt. Stražišće above the hamlet of Velji Do in the Konavle region, showing the overall crash-site terrain of the CT-43 accident on 3 April 1996. The image was derived from archival VHS video footage recorded during crash-site documentation. The purple arrow indicates the visible aircraft tail section within the broader scene.

The same record also makes clear that the aircraft lacked cockpit voice and flight data recorders (*2*). This absence mattered because it limited investigative reconstruction and left the final sequence dependent on radar, wreckage, and procedural analysis rather than on the additional evidentiary basis typical of commercial aviation investigations.

Another important aspect concerned the approach procedure itself. As summarized by the Flight Safety Foundation, the Dubrovnik NDB approach effectively required two automatic direction finder (ADF) receivers: the first to identify the final approach fix and provide course guidance, and the second to identify the missed approach point. In this case, the aircraft was equipped with only one ADF (*2*). Also, the host country's published minimum descent altitude was lower than correct application of relevant criteria would have allowed (*2*).

Croatian search, recovery, and forensic response

An official Croatian report on the expert examination of the crash site states that the accident occurred at 14:55 on 3 April 1996 and that the area was secured after location by IFOR/NATO forces and members of the Special Police units of the Dubrovačko-neretvanska County Police Administration from 19:23 the same evening (*9*). The elapsed time shows the challenge of securing the scene, especially due to mountainous terrain and poor weather conditions.

Following the initial recovery operations, Croatian authorities conducted a systematic forensic examination of the crash site on the northern slope of Mt. Stražišće above the hamlet of Velji Do in the Konavle region. The examination was led by the Ministry of the Interior's forensic examination centre and involved police forensic and photogrammetry

specialists, together with representatives of the Croatian intelligence service, the Ministry of Defence, the national aviation/transport investigation commission, the Ministry of Maritime Affairs, Transport and Communications, and forensic medical expertise from the Ministry of Health and University Hospital Split. The site was located at an elevation of approximately 700 m on a steep, rocky slope covered with low vegetation. During the technical examination, investigators documented the distribution of wreckage and the major structural components of the aircraft, identifying a sequence of evidence markers corresponding to the progressive breakup of the aircraft after its initial contact with terrain. The principal wreckage markers are summarized in **Table 1**; the corresponding spatial distribution across the site is shown in **Figure 3**, **Figure 4**, and **Figure 5**.

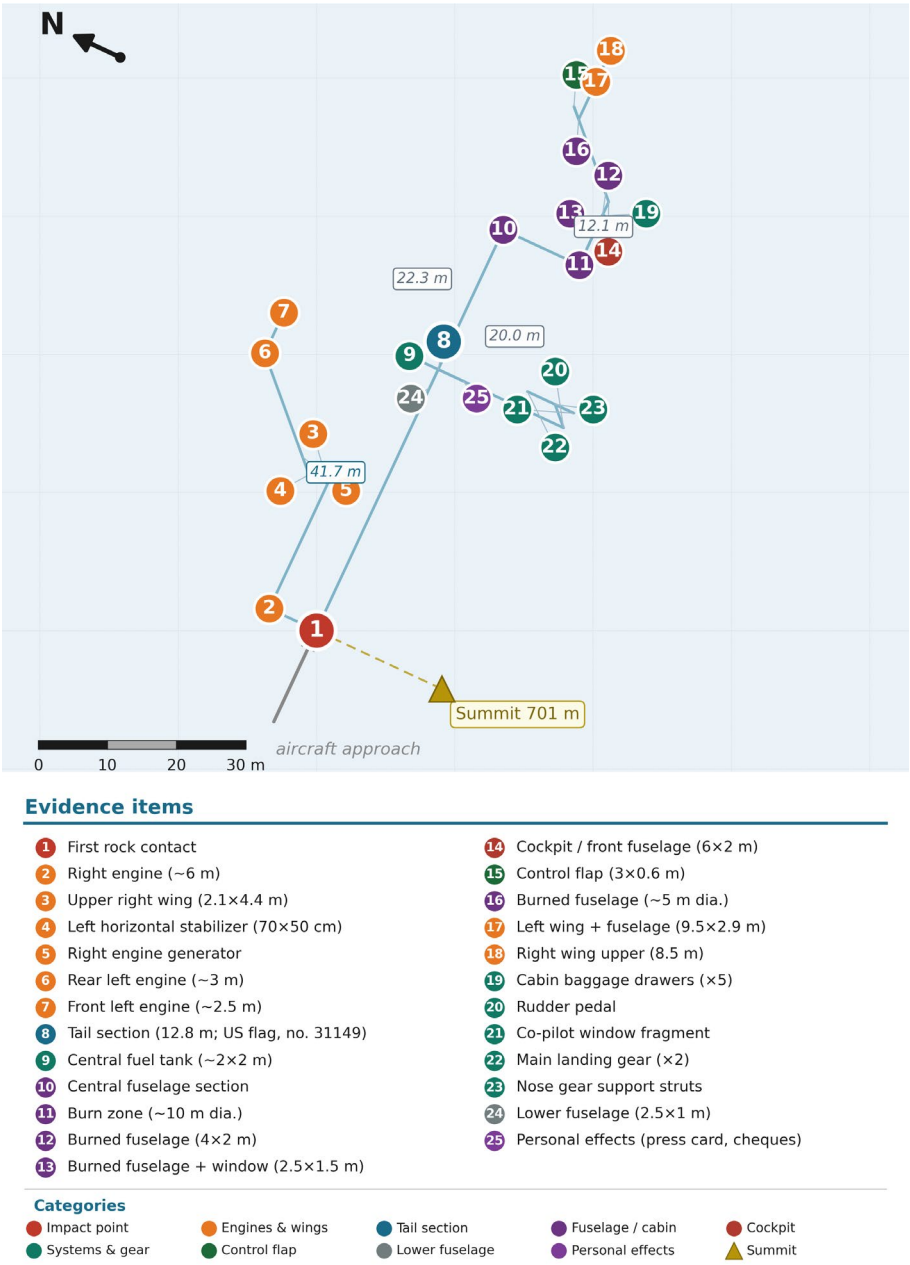

Figure 3. Approximate reconstruction of the spatial distribution of physical evidence at the CT-43 crash site on Stražišće hill, Konavle, Croatia, based on the 1996 forensic inspection report of the Ministry of the Interior of the Republic of Croatia (9). Items 1–25 are shown in metric positions, with the origin at the first impact point (item 1) and the tail section (item 8) used as an anchor; colors denote evidence categories.

Table 1. Distribution of major aircraft components at the CT-43 crash site

Evidence marker	Object / feature	Relative position within debris field	Description of finding	Investigative significance
1	Initial terrain impact	Upper slope of Mt. Stražišće	Fresh mechanical damage to exposed rock and broken vegetation	Indicates first contact of the aircraft with terrain
2	Right engine assembly	North of marker 1	Deformed engine section with scattered mechanical components	Early structural disruption after initial impact
3	Right wing section	East of marker 2	Detached wing fragment with localized burn marks	Fragmentation during downhill trajectory
4	Horizontal stabilizer fragment	Near marker 3	Deformed metal fragment consistent with stabilizer structure	Evidence of progressive structural breakup
5	Engine generator component	Northeast of marker 4	Detached generator unit showing mechanical damage	Separation of engine components during impact
6	Left engine rear section	Northeast of marker 5	Rear engine structure overturned and damaged	Continued propulsion system fragmentation
7	Left engine front section	East of marker 6	Forward engine section with mechanical deformation	Continuation of breakup sequence
8	Tail section of aircraft	Downslope from initial impact (~40 m)	Rear fuselage largely recognizable with partial burn damage	Largest surviving structural section

Figure 4. Aerial crash-site collage reconstructed from archival VHS documentation, illustrating the positions corresponding to findings 1–4 in **Table 1**.

Figure 5. Aerial crash-site collage reconstructed from archival VHS documentation, illustrating the positions corresponding to findings 5–8 in **Table 1**.

The spatial distribution of these structural elements along the steep slope reflects the aircraft's impact trajectory and progressive structural fragmentation.

The Croatian report records that from 19:30 the site was intensively searched for possible survivors by approximately 140 members of the Special Police units of the Dubrovačko-neretvanska County Police, and Firefighting Administration (*9*). The number of personnel included in search shows how extensively it was conducted as soon as the scene was secured.

At 21:35, Special Police units forced entry through a door on the right side of the rear section of the aircraft and discovered one critically injured female person (*9*). This was the only individual initially found alive. The Croatian record then documents her transfer in detail: between 23:05 and 23:56 she was carried to location Velji Do and transported by ambulance to the Medical Center in Dubrovnik, with police vehicle support used because of the urgency. Upon arrival the attending physician pronounced the death of the victim (*9*).

The report further notes that at 01:30 on 5 April, the Croatian Army Special Forces, with around fifty personnel, joined the search. It also states that Croatian police personnel, together with French IFOR/NATO members and with the approval of Brigadier General Michael Canavan, marked the bodies found at the site with blue fabric strips (*9*). At that time, three bodies were unaccounted for, and a Croatian legal medical examiner, with

In Memoriam

Victims of the United States Air Force CT-43A Crash

Dubrovnik, Croatia — 3 April 1996

UNITED STATES GOVERNMENT DELEGATION

Ronald H. Brown
U.S. Secretary of Commerce

Catherine Hoffman
U.S. Department of Commerce

Duane Christian
U.S. Department of Commerce

Carol Hamilton
U.S. Department of Commerce

Bill Morton
U.S. Department of Commerce

Chuck Meissner
U.S. Department of Commerce

Gale Dobert
U.S. Department of Commerce

Lawrence Payne
U.S. Department of Commerce

Adam Darling
U.S. Department of Commerce

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Naomi Warbasse
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Interpreter

UNITED STATES AIR FORCE FLIGHT CREW

Ashley Davis
Pilot

Tim Schaeffer
Pilot

Gerald Aldrich
Flight Mechanic

Robert Farrington
Flight Attendant

Cheryl Turnage
Flight Attendant

Shelly Kelly
Flight Attendant

In memory of the thirty-five individuals who lost their lives while traveling on a mission of international cooperation and post-war reconstruction.

◆ ◆ ◆

Figure 6. Memorial panel listing the 35 victims of the United States Air Force CT-43A crash near Dubrovnik, Croatia, on 3 April 1996.

three military officers, discovered those bodies upon lifting the cockpit, as directly witnessed by the first author.

Transport of the bodies was also a joint effort. IFOR/NATO personnel, using a USAF helicopter, transferred all thirty-five bodies from the mountain to Dubrovnik Airport (Čilipi), assisted by members of the Dubrovačko-neretvanska County Special Police units (*9*). This is a remarkably clear record of Croatian-American-NATO cooperation during these procedures.

Also, IFOR/NATO personnel conducted a detailed review of the site and secured documents and other materials considered necessary for investigation and identification, and an on-site external body examination of the thirty-five dead (**Figure 6**) was performed with the assistance of Croatian medical experts in designated location situated at military hangar at Dubrovnik Airport (*9*). They contributed to preliminary identification of more than two-thirds victims and isolated two individuals of Croatian nationality. The two Croatian citizens were identified through comparison of external characteristics, clothing, and personal effects with ante-mortem descriptions provided by relatives. In one case, identification was supported by stature, hair characteristics, trousers brand, and a wristwatch; in the other, by physical features, clothing, and personal jewelry. This procedure was not limited to simple visual recognition. According to the Croatian record, the external medico-legal examinations in the hangar were performed by Croatian forensic pathologists. During these examinations, the recovered bodies were assessed through documented external findings, clothing, and personal belongings until the two Croatian citizens were identified. Their identification was subsequently confirmed by relatives. After the identification of the two Croatian victims, the Croatian forensic examination of the remaining bodies was discontinued, and the American victims were transferred to U.S. authorities for further forensic processing (*9*). After transfer to U.S. custody, positive identification followed standard disaster-victim identification principles. Documentation from the Armed Forces Institute of Pathology (AFIP) and the Office of the Armed Forces Medical Examiner (OAFME) describes the Dover process as including dental examination, radiology/X-rays, fingerprinting, pathology, and collection of specimens for DNA, toxicology, and microscopy. Dental identification was especially important because postmortem dental findings and radiographs could be compared with antemortem dental records/radiographs; AFIP documentation specifically notes that remains could be conclusively identified through dental records before further fingerprinting and quality-control processing. Fingerprint identification was also used when suitable fingers were available, with FBI fingerprint specialists participating in the operation (*24*). U.S. medico-legal evaluation was not limited to visual examination. The Flight Safety Foundation summary of the U.S. Air Force investigation reports that postmortem findings by the U.S. Armed Forces Institute of Pathology identified blunt-force injuries as the cause of death for all but one passenger and crew member, while one crew member died from thermal inhalation injuries. The same source states that the cabin crew member who initially survived and later died underwent autopsy, documenting extensive internal, spinal, and extremity injuries (*2*).

The Croatian forensic environment behind the response

The Croatian response drew on forensic expertise developed nationally during the Homeland War period, with the Split department occupying a particularly documented role given its formally extended jurisdiction into the Dubrovnik region during that time (*10*-*12*). The quality of the Croatian response becomes even clearer when viewed in the context of the mid-1990s. A proposal dated 25 January 1994 from the Department of Pathology and Forensic Medicine in Split to military investigative and judicial authorities states that since the beginning of the Homeland War, the department had performed more than 2000 autopsies of war victims, both military and civilian (*10*). It further notes that its practical area of responsibility extended across the Split-Dalmatia County and, owing to wartime circumstances, into parts of Dubrovnik and neighboring southern territory (*10*). This is important for understanding the professional environment in which the 1996 disaster was handled. Croatian forensic medicine had already undergone an intense and tragic process of institutional maturation (*6*, *10*-*19*).

Croatian forensic institutions had been forced by war to develop practical expertise in mass fatality work. During the war and in the immediate post-war period (*6*), forensic teams were repeatedly involved in the investigation of mass graves and other sites associated with wartime casualties and missing persons (*12*, *13*). These operations required the rapid development of coordinated procedures for exhumation, post-mortem examination, documentation of remains, and the systematic comparison of post-mortem findings with ante-mortem information collected from families and medical records (*25*-*28*). The scale of the problem forced Croatian institutions to combine established medico-legal methods with emerging technologies, particularly DNA-based identification (*11*, *14*-*19*), which was gradually incorporated into the identification process during the mid-1990s. The experience gained in these investigations contributed to the development of procedures that later became standard practice in post-conflict forensic work. By the middle of the decade, Croatian forensic services had therefore accumulated significant experience in complex identification efforts involving fragmented remains, commingled graves, and incomplete documentation. The role of the United States of America is not insignificant here. As Croatia lacked the forensic infrastructure to identify victims from mass graves, American charities, scientists, and government agencies stepped in to assist.

AmeriCares and the U.S. company Perkin-Elmer donated essential equipment for establishing one of the first forensic DNA laboratories in Split, a facility capable of conducting large-scale identifications of victims from mass graves (*29*). At the same time, leading American forensic scientists, Mitchell A. Kennedy, Michael M. Baden, Henry C. Lee, Mitchell M. Holland, Barbara C. Wolf, and Moses S. Schanfield, worked closely with the Croatian team throughout the identification process (*11*-*13*, *19*, *26*-*31*).

Contemporary news reports describe how U.S. experts, together with Dragan Primorac, brought urgently needed PCR instruments, reagents, and laboratory supplies to Croatia and later collaborated with Šimun Anđelinović and Marija Definis-Gojanović in collecting DNA samples and performing the analyses that enabled the earliest reliable identifications (*29*).

Furthermore, U.S. congressional hearings and United Nations reports acknowledged this wide-ranging American support, from equipment donations to technical expertise, emphasizing the critical role of the United States in helping establish Croatia's modern forensic DNA capability (*11*–*13*, *16*, *26*, *28*-*32*).

Croatian–American cooperation and the aftermath of the CT-43 crash

The CT-43 disaster belongs not only to the histories of aviation safety and forensic response but also to the broader history of Croatian–American cooperation. That cooperation took on different forms before and after the crash. Before the accident, it was embodied in the mission itself: a high-level American delegation arriving to support post-war reconstruction, economic revitalization, and renewed partnership. After the accident, the cooperation shifted into an institutional and humanitarian register, most notably in the processes of search, recovery, identification (*1*-*3*, *9*), and later in the memorial culture of the city of Dubrovnik (*20*).

The crash resonated deeply in American public and legislative life, prompting congressional consideration of new support mechanisms for the victims' families and informing later federal frameworks for family assistance following aviation accidents involving government-operated aircraft (*33*, *34*).

The policy consequences of the crash proved long-lasting. A later federal framework governing accidents involving government-operated or chartered aircraft explicitly noted that family members of the CT-43 victims had taken part in the review process, ensuring that the experience of the Dubrovnik disaster informed future interagency procedures and standards (*35*). In this way, the dead played a direct role in shaping federal thinking on family assistance, rights disclosure, communication protocols, and institutional obligations in the aftermath of large-scale aviation events, topics that also appeared prominently in subsequent updates to Interpol's *Disaster Victim Identification* (DVI) guidelines (*36*, *37*).

At the same time, the city of Dubrovnik preserved the commemorative dimension of the tragedy by establishing the *Ronald Brown Memorial House*, an official place dedicated to remembrance and reflection (*20*). Its presence anchors the memory of the event in local civic life and symbolizes the lasting bond forged through shared loss.

Taken together, these dual legacies, institutional learning in the United States and memorial continuity in Croatia explain why the CT-43 case still carries such weight three decades later. The disaster belongs to both nations: its response was cooperative, its mourning shared, and its memory remains relational rather than unilateral. It stands as a reminder that moments of tragedy can also generate enduring frameworks of solidarity, institutional improvement, and international partnership.

Thirty years later: memory, gratitude, and the Dubrovnik anniversary

Anniversaries matter only when they restore meaning rather than repeat a habit. In the present case, 2026 offers precisely such an opportunity. ISABS again gathering in Dubrovnik creates an unusual convergence between place, memory, and scientific reflection (*4*). The city in which the delegation was to land, the city above the approach path where the aircraft was lost, and the city that now again hosts an international forensic-scientific gathering, therefore, provides the context for revisiting the event. Secretary Ronald Brown, the members of the American government and delegation, the flight crew, journalists, and an interpreter should be remembered not only because they died in a crash, but because of the purpose that brought them to Croatia. The mission represented American willingness to stand publicly with Croatia in the difficult early period after the war. To remember the dead apart from that purpose would diminish the moral truth of the event.

Croatian remembrance of the CT-43 tragedy rightly includes gratitude to the United States for its support of peace and reconstruction in the 1990s: the dead were representatives of a friendship shown at a difficult historical moment (*3*).

Equally, the Croatian institutional response deserves recognition for the professional discipline with which military, police, emergency, and forensic services met the tragedy (*9*, *10*).

Finally, the anniversary also raises a broader question about the role of historical-forensic writing. Some of its most important contributions are acts of careful remembrance: articles that preserve institutional memory, document professional conduct, and ensure that important events are not gradually forgotten. Seen in the longer history of Croatian–American relations, such remembrance also recalls the mutual recognition of 1783, when Ragusa invited American vessels into Dubrovnik's ports and the American commissioners confirmed that Ragusan ships would be welcomed in U.S. harbors, an exchange often cited as one of the earliest European acknowledgements of the young United States (*38*). Revisited in 2026, in the same city where ISABS will again gather, the CT-43 tragedy retains unusual weight. It remains an aviation case, a forensic case, a diplomatic case, and above all a human one. To write about it now is, before anything else, to pay tribute.

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