E58 A Model for Recovery: Predicting the Location of Human Remains on WWII Bombardment Aircraft Crash Sites

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After attending this presentation, attendees will understand the spatial relationships between human remains and their assigned duty station wreckage within WWII bombardment aircraft crash sites.

This presentation will impact the forensic science community by demonstrating the value of building predictive models from previously examined cases and how that contributes to investigators' abilities to efficiently and effectively recover the remains of individuals in aircraft crashes.

The United States government makes a solemn promise to the men and women of the armed forces that if they fall on the field of battle, their remains will be returned home. In general, Americans demand that this occur in order for the individual to be properly honored and that their remaining family members can find closure. This commitment, and corresponding expectation, applies to both current and past conflicts. The Joint Prisoner of War/Missing in Action Accounting Command (JPAC) is responsible for locating, recovering, and identifying the approximately 90,000 American military personnel who remain missing from the beginning of World War II through the end of the Vietnam War. This presentation details a model based upon JPAC's previously completed casework that predicts where human remains will be found within WWII bombardment crash sites based upon each crew member's individual duty station.

Sixteen WWII bombardment aircraft loss incidents that have been resolved by JPAC since 2000 were assessed for inclusion in the model. Two primary criteria had to be met for a case to be included: (1) the archaeologist who conducted the field recovery had to have recorded the location of the crew duty station wreckage within the recovery scene; and, (2) the field provenience of the remains had to have been maintained through the mitochondrial DNA testing process. A total of eight cases met both of these criteria. Next, the Central Identification Laboratory's (CIL) identification process was run backward through a detailed examination of the skeletal analysis, odontological analysis, mitochondrial DNA, and archaeological recovery reports. Field and laboratory bench notes were also reviewed. This allowed for the determination of where the remains of each crew member were recovered within their respective crash sites in relation to the appropriate corresponding wreckage.

Based upon this, hypotheses were developed for each crew position within the aircraft based upon the patterns observed. The maximum distance that remains can be expected to be found from duty station wreckage varied from 0.8m to 9.4m, depending upon the crew position. Likewise, the maximum distance that remains of a single individual may be spread across a site ranged from 2.7m to 9.0m. The validity of these predictions was then tested against an additional bombardment aircraft loss incident. Overall, results of the testing showed that the hypotheses for each of the duty stations were confirmed and that bombardment aircraft crew members will be found no farther than approximately 8m from their assigned duty station. Additionally, for the cases included in this study, it is determined that the physics of the crash, not the actions of the crew or subsequent erosion, primarily dictates where individuals will be found within a crash site. Beyond the immediate benefits to the effectiveness and efficiency of future JPAC excavations, this study also demonstrates how careful examination of similar types of incidents can result in the ability to build accurate predictive models.

WWII, Bombardment Aircraft, Remains Recovery