

To organize the images in this database, NIST used Cumulus, a commercial database program written specially for organizing visual material. This software was designed to collect individual “assets” (i.e., photographs and video clips) in specified catalogs and to allow the assets to be characterized with a variety of attributes assigned using specially designed forms for data entry. Once a catalog had been assembled, it was possible to search for assets having a specific attribute or combinations of attributes.

Two separate catalogs, one for photographs and one for video clips, were created for visual materials collected as part of the Investigation. Each catalog had a similar set of attributes that was used to characterize the assets that were included. These attributes were chosen in consultation with Investigation staff, based on the expected needs of the reconstruction of the day's events. Additional details concerning the catalogs and search approaches are included in Section 2.5.3 of NIST NCSTAR 1-5A.

5.2.3 Timing of Key Events

It was important to assign times of known accuracy to assets included in the two image catalogs. This task was greatly complicated by the absence of accurate times for the majority of visual material collected. Chapter 3 in NIST NCSTAR 1-5A describes the difficulty of this task and the different ways in which times were assigned. Ultimately, a “boot strap” approach was adopted in which the impact of the aircraft on the south face of WTC 2 was assigned a time of 9:02:54 a.m., based on times for major events included in the earlier Federal Emergency Management Agency (FEMA) report (McAllister 2002). Starting with imagery that included the aircraft impact, relative times could be assigned to photographs and images at other times by comparison to materials having known relative times. In this way, it was possible to work backward and forward from the second aircraft impact and assign times for visual material covering the period from the first aircraft impact on WTC 1 until the collapse of WTC 7. Assigned times, along with estimates of uncertainty, were included in the database.

To assist in the timing process, relative times for the five major events of September 11, 2001 - first aircraft impact, second aircraft impact, collapse of WTC 2, collapse of WTC 1, and collapse of WTC 7 - were determined with ± 1 s accuracies. These relative times appear in Column 2 of Table 5–1. Note that the building collapse times are defined to be when the entire building was first observed to start to collapse. Specifically, in the case of WTC 7, the sinking of the east penthouse into the building before the main collapse started did not define the building collapse time.

The value used for the second aircraft impact time in the database was taken from the FEMA report (McAllister 2002). NIST independently determined this time using four independent television broadcasts and found a 5 ± 1 s difference. As a result, 5 s were added to times in the databases in order to report actual times.

The times listed for the major events in the FEMA report (McAllister 2002) were based on seismic signals (and analysis) recorded by the Lamont-Doherty Earth Observatory (LDEO) of Columbia University at a location 21 miles from the WTC site in Palisades, New York. These signals have subsequently been reanalyzed by LDEO, under a contract from NIST (Appendix B). This analysis of the seismic signals received resulted in slightly revised times for the major events. The results of this recent analysis are also included in the last column of Table 5–1. The uncertainty for the first aircraft impact on WTC 1, the collapse of WTC 2, and the collapse of WTC 1 were reported by LDEO to be ± 1 s, while that for the aircraft impact on WTC 2 is ± 2 s. Recalling that uncertainties for times of the major events