

M-FISYS: MASS-FATALITY IDENTIFICATION SYSTEM, ITS DEVELOPMENT IN RESPONSE TO DVI NEEDS AT THE WORLD TRADE CENTER, AND POTENTIAL FOR USE IN MISSING PERSONS CASEWORK

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The forensic community is now aware of many of the details of the World Trade Center Disaster caused by the 9-11 terrorist attacks. 2,792 person were killed, and remains were badly fragmented. Those remains were exposed to extreme level of environmental insult from high temperatures, wet conditions, cross contamination with commingled remains, and other challenges.

Forensic biology was the key discipline in assigning identity to the vast majority of identifiable remains by scientists at the New York Office of Chief Medical Examiner [OCME]. Many tools and techniques were used in the effort, not the least of which was the M-FISys software system created in direct response to the unmet need for data management and complex analysis. The M-FISys software was the first system to combine STR, mtDNA and SNP data in an integrated manner, with subsystems for quality control, progress reporting and workflow management. It was critical that the program provided statistical reports of both likelihood for specific profiles, and specificity of matches between exemplars and post-mortem profiles. Kinship analysis tools were added in January of 2002 and continue to be extended. Because staff at the OCME worked on a rotation basis, user-centered design that minimized training time was a necessity in the software, despite the need for extremely rapid development and deployment.

M-FISys quickly became the central data handling tool for the forensic biology aspects of the WTC identification effort, and also became a primary method for record keeping as data conflicts were resolved and analytical decisions were made. MtDNA analysis was integrated by incorporating the forensic version of the commercial Sequencher software that was developed for AFDIL in 1997-1999 and first presented at the Promega Symposium on Human Identification by M. Holland in 1999. SNP data, generated by R. Giles, *et. al.* from Orchid/GeneScreen was integrated into the system starting in 2002.

With input from forensic scientists in many different cities and countries, the technologies incorporated into M-FISys are currently being generalized and expanded for missing persons casework. The intention is that the system shall fill the common need for missing persons data management (not normally associated with disaster victim identification projects), but in a system that can be scaled to handle a mega-fatality incident should the need arise.