

MIRAGE 2000 D FIGHTER JET CRASH: PHYSICAL & BIOMECHANICAL APPROACH OF THE FORENSIC SCIENCE LABORATORY OF THE FRENCH GENDARMERIE (IRCGN™) IN ORDER TO PROPOSE A PUTATIVE SCENARIO OF THE CRASH AND A KINETIC MODEL OF HUMAN BODIES DISINTEGRATION FOR VICTIM'S IDENTIFICATION AND FREEZING CRASH SCENE.

Hubac S, Daudigny H, Litaudon JM, Weillant P

Forensic Science Laboratory of the French Gendarmerie (IRCGN™), Air Gendarmerie Research unit

In the winter of 2019, a Mirage 2000 D fighter jet is missing in French's mountains with on board a pilot and a navigator weapons systems officer. Several debris were discovered in a forest area at 850 meters altitude and a thickness of several tens centimeters of snow.

Air gendarmerie Research unit, in charge of the investigations, sollicits the commitment of the IRCGN which projects 14 PAX composed of 3 experts in 2D/3D modeling, 2 experts in legal medicine, 1 expert in odontology, 2 experts in fingerprints, 5 biologists experts arming the mobile DNA analysis laboratory and 1 logistician in order to freeze the crash scene, propose a putative scenario of the crash and identify the victims.

In the night, despite an outside temperature of -20 °Celsius, the first DNA results obtained using the mobile DNA lab confirm the presence of bodies fragments from a man and a woman, reinforcing the military and judicial authorities in the possibility to identify the two victims.

In total, 82 severely degraded bodies fragments could be collected ranging from a few grams to a few hundred grams. The DNA sampling protocols using microFLOQ® (MF), an innovative nylon flocked swab conceived and patented by IRCGN™ and developed by Copan Flock technologies company enabled to obtain, in two days, a positive DNA result on 81 of the 82 bodies fragments and personal effects collected.

All the bodies fragments and the 194 pieces of fighter jet collected on site were located by GPS coordinates. The compilation between these GPS data, the DNA results, the weight of each anatomical piece, the 3D modeling of the impact site by laser scanner, tacheometer, drone and the technical data of the flight (speed, altitude, trajectory) enabled to establish a possible scenario of the crash and define a kinetic model of human bodies disintegration that could be useful for future crash scenes, in particular to delimit the most appropriate freezing zone and to have a reference on the number and types of anatomical elements (weight, size) likely to be found and identified.