W15 Addressing Damaged Mobile Devices for Data Acquisition

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After attending this presentation, attendees will have: (1) explored the topic of damaged mobile devices; (2) reviewed the existing literature in this and peripheral research areas; (3) completed hands-on activities, including the examination of a ballistics-damaged mobile phone, the documentation of the damage to the device in a written report and with photo documentation, and the disassembly of a ballistics-damaged mobile phone; and, (4) employed a donor device via the "fraternal clone" method to repair the device for power on and data acquisition.[1] Attendees will affect the future direction of the damaged devices research by providing input into the damaged devices program.

This presentation will impact the forensic science community by establishing that simply because the device is damaged, this does not mean the data is gone. Successful data acquisition is possible from damaged mobile devices. While each of the damaged device focus areas has the potential for catastrophic damage to the intact electronic device, the potential of data residing on the embedded flash memory of these devices still exists and presents a new research area with limited scientific research in the field of digital forensics.

This presentation reviews a series of research projects that involved inflicting damage to mobile devices with scientific precision, then documenting the damage and remediation with the intention of publishing the results to the digital forensics community. The scope of the damaged devices projects includes liquid damage, thermal damage, impact damage, and ballistics damage.

Most agencies do not receive severely damaged mobile devices frequently enough to develop solid expertise in dealing with these devices. Early survey input suggests that most agencies receive a water-damaged device only once per annum. Introductory research has been completed related to blood-damaged mobile devices and draft compilation of best practices from the Scientific Working Group on Digital Evidence.[2,3] This presentation will review existing literature in the digital forensics community and other peripheral research areas, highlighting the integration of current results and findings from the initial projects into subsequent projects.

Severe damage to mobile devices potentially affecting the ability to extract data can be caused by a number of factors. Aqueous solutions cause damage through galvanic and electrolytic corrosion to the internal components of electronic devices, the hygroscopic tendencies of the printed circuit board materials causing myelination of the circuit board layers, and chemical damage introduced by the chemical properties of the aqueous solution. Thermal damage causes plastic components on the exterior and interior of the devices to melt or burn, burning of insulating layers, circuit boards, and batteries, and even melting of the solder connections that connect the circuitry of the mobile device. Impact damage from high-velocity impacts cause screens and cases to break or shatter, batteries to begin leaking, and components to be knocked off the circuit board. Ballistics damage from high-velocity projectiles or explosive materials causes catastrophic damage to areas of the device or, in some instances, complete disassembly of the device.

This damaged devices workshop seeks to ask the questions, explore the answers, and provide real-time guidance to the field on addressing damage mobile and embedded devices.

Reference(s):

1. Murphy C.A. The Fraternal Clone Method for CDMA Cell Phones. *Small Scale Digital Device Forensics Journal*, vol. 3, no. 1, June 2009.
2. Dudeck K.C., Brennan T.C., Embury D.J. Decontamination of blood soaked electronic devices using ultrasonic technology. *Forensic Science International*, vol. 214, pp. 88-95, 2012.
3. Scientific Working Group for Digital Evidence. *SWGDE Best Practices for Handling Damaged Mobile Devices.* (Draft) USA:SWGDE, 2014.

Damaged Mobile Devices, Damaged Mobile Phones, Water Damaged Devices

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