

Unsolved

Equipment Changes Drive Changes in Facility Design

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Laboratory equipment is one of the drivers of the design of a forensic facility. In this article I will review a few pieces of equipment which have changed over time and how lab design has been adapted to meet those changes. I will review a change in the equipment used to compare and analyze firearms evidence, genetic analyzers used in DNA analysis, and a piece of equipment which tests toxicology samples. Where manufacturers are listed, this should not be taken as endorsement by Crime Lab Design or *Forensic Magazine*. CLD does not endorse particular products or manufacturers, these are products I have investigated because our clients have these items in their laboratories.

Firearms related evidence, bullets, and especially brass casings are often used to connect the same firearm to multiple crimes in different locations. Changes in the equipment used to process this evidence changes the way labs are designed for these items. In the 1990s Forensic Technology began offering their IBIS Hub system which worked with the NIBIN database (National Integrated Ballistic Information Network) to allow

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firearms examiners to digitally review, scan, and share their firearms related evidence in a national database.¹

When planning to support the IBIS Hub system, we planned for the system to have a dedicated room. An IBIS Hub is an integrated station with CRT monitors, a microscope, and other components such as specialized computers and a printer. The assembly is about 6 feet wide, 5 and half feet deep, and 5 feet high. Beyond this, the unit requires a couple feet of clearance behind the unit, space in front to sit, and a small amount of clearance beside the unit.² Some agencies had an additional support module of the same size beside the Hub, so the IBIS system could require approximately a 15 by 12 foot room.

 IBIS Hub system
IBIS Hub system

In the last few years, Forensic Technology began offering their next generation of the bullet and cartridge case image capture, analysis, and comparison system, the IBIS TRAX-HD3D.³ From a planning point of view the TRAX-HD3D is different from the IBIS Hub because the TRAX-HD3D's different components can be in different locations. The BRASSTRAX and BULLETRAX stations, which capture information on cartridge casings and bullets respectively, would be located in the laboratory, the MATCHPOINT analysis station could be in the lab, but could be in an office, shared location, or remote location. The data storage server would generally be in a secured server room, and the correlation server could be shared by a building or group of buildings, or even by a city or regional organization. We would not necessarily plan for a dedicated room for the IBIS TRAX-HD3D system like we would have for the original IBIS Hub, although parts of it certainly could be in their own room if the owner would like it to be.

Ubiquitous in DNA/Forensic Biology departments, the genetic analyzer is the second piece of equipment I'd like to discuss. Genetic analyzers have been around for many years and during equipment surveys I've seen a number of Applied Biosystems' 310 genetic analyzers. This analyzer is about 35 inches wide, 32 inches deep, 57 inches high, and 332 pounds.⁴ The standard depth for the laboratory countertops is 30 inches. Because this unit is deeper than that standard depth, we would plan a bench for a 310 genetic analyzer to be 34 or 36 inches deep. In the grand scheme of a new building or major

 IBIS TRAX-HD3D
IBIS TRAX-HD3D

renovation, a small piece of deeper countertop is not going to add a noticeable increase in cost but will be a non-standard size and so require additional coordination during ordering and installation. The height of the unit, and its sensitivity to temperature changes, would lead us to not put a wall cabinet above the unit.

The 310 was released many years ago and over time departments are replacing it with newer models which can analyze more in less time, are smaller, and lighter (and sleeker looking). For example, Applied Biosystems' 3500 Genetic Analyzer is around 24 inches wide, 24 inches deep, 28 inches high, and 180 pounds.⁵ Because the 3500's depth is more standard than the 310 we wouldn't plan a special countertop for the 3500 like we would have the 310. Even though the 3500 is not very tall compared to the 310, we still probably wouldn't plan for a wall cabinet above it because of its sensitivity to temperature change, but we might put an adjustable shelf or two above it, which we wouldn't have done with the 310.

The last piece of laboratory equipment I am going to touch on is the Evidence analyzer by Randox Laboratories. The Evidence analyzer is being used by a number of our client's toxicology laboratories because one sample can be tested for multiple drugs of abuse at the same time, and the unit can run a great many tests per hour. We plan for the Randox unit differently than we would other equipment which can analyze tox samples, for example a gas chromatograph. The Randox unit is a floor mounted unit which is around 79 inches wide, 40 inches deep, and 67 inches high, requiring a lab designed to accommodate it. The Evidence analyzer has some liquid output, generally removed from the room by a floor drain, so we will locate the analyzer near a wall to keep the drain out of the path of travel, or plan to support the unit in a different way, say perhaps with a waist high wall next to it. The unit needs to be hand filled with purified water, so we would plan for a pure water fixture near it.⁶

As equipment used in forensic facilities change, how we plan for that equipment must also change. As the equipment that firearms examiners use to analyze and compare bullets and casings evolves, a dedicated room for that equipment is no longer needed. As genetic analyzers get more powerful yet smaller, no longer are especially deep countertops needed. New equipment to test for the evidence of drugs of abuse

requires the layout of toxicology laboratories to change to support that equipment. A focus on the equipment that supports forensic science is an important component to designing quality facilities that support the newest technology and equipment, meeting our client's mission of providing the best forensic science.

References

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