Mapping Strategy Fundamentals

Why do I need a mapping strategy?

You need a mapping strategy for several reasons. One, it's important for any regulators or approvers to understand the philosophy employed for the mapping. A documented strategy will decrease questions from others reviewing your mapping study and help them understand the data that is produced. When others are reviewing your strategy they may also suggest ideas that will make your study produce better data or make your effort more efficient.

Another reason is that, as the study moves along, it will be your own reference guide, ensuring that you keep to the 'game plan' and do not make changes that will negatively affect the study.

Inside a cell culture incubator. . . . the interior of a CO_2 incubator.

What is a typical strategy?

A typical strategy is usually comprised of a few written paragraphs that include what you are mapping, the type of equipment used, the number of sensors to be used, a general idea of the sensor placement, and the duration of the study. There is no need for a detailed document at this point. You will provide more detailed documentation before initiating the study. For example, it is usually easier to simply take pictures of the actual placement of the sensors and their locations. The mapping strategy may also change and writing a detailed document at the early stages of the project may cause rewrites that can increase the total length of the project. There is nothing wrong with providing a detailed document at this stage, but many times it is more efficient to document the mapping at a later stage. You can think of it as a proposal for your mapping team or approvers so that they can buy into and understand your mapping strategy. It may also make the approval stage quicker, later in the project, since your approver already understands what your mapping study is about.

An example of a strategy for an incubator mapping study might be something like this:

Incubator 7 (Manufacturer Name, 3'x3'x3' internal chamber) in room 215 of the XYZ Building will be mapped using 9 Rotronic LOG-HC2-RC humidity and temperature probes per shelf. There will also be a probe placed in front of the circulating fan, the inlet and the outlet of the chamber. There are three shelves in the chamber for a total of 30 sensors in the chamber. The

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duration of the test shall be 24 hours with 5-minute interval logging. The test shall be conducted with an empty chamber.

There may be more information you wish to include such as pass/fail criteria, full load test, open door and power loss mapping studies. You may also want to list out the mapping study strategy in a table style format. This is very useful if multiple pieces of equipment need to have a strategy and you can quickly fill out such a form.

An example of a room mapping strategy might be something like this:

Warehouse 1 of the XYZ company, located at 1213 Road, anyplace USA has a total square footage of 'XXX' and will be mapped using Rotronic LOG-HC2-RC humidity and temperature probes for a one-week period. Logging will occur once every twenty minutes.

There are three rows of shelving that are 'XX' feet long, 'XX' feet high and 'XX' feet deep. Each shelf will have a low, medium, and high sensor. Each row will have a set of three (low, medium, high) sensors for a total of 9 sensors per row. There are 6 heating/cooling ducts in the warehouse and two return ducts. Each heating/cooling duct and the return ducts will have one LOG-HC2-RC probe placed nearby for monitoring of the HVAC. Two of the warehouse walls are exposed to the outside weather conditions with two loading dock doors. One large doorway (fork lift size) with a roll up door exists for moving material to the other areas of the plant. One door for personnel entry into the warehouse from the plant exists and one emergency exit door that immediately exits outdoors. A sensor will be placed at each door (in a high position) except for the emergency exit door and the roll up door which will have two dedicated sensors. The emergency exit door is alarmed and is only used in emergencies. The exterior walls will be monitored for outside weather conditions with 6 sensors per wall (one at each corner, and two midpoint). There will be a total of 27 sensors for the shelving, 8 for the HVAC, 5 for the doors, and 12 for the exterior walls. A total of 52 sensors will be used for the mapping study.

As with the incubator mapping you may want to include additional information such as pass fail criteria, time of the year, calibration information, or the hours of the building operation.

Now that the sensors are selected, placement of the sensors proposed, and the personnel are informed of the strategy, what's next?

You have a strategy but that does not mean that it can not or will not change. It does mean that you are fairly confident to start a more formal document and begin collecting details such as equipment make and models, calibration records, or user manuals.

I have started my formal documentation. Does that mean I am ready for sensor placement?

Not quite yet. Calibration is a very important part of mapping. Not having properly calibrated equipment can create data that is questionable. Your next step will be to determine and document your calibration plan. The next issue of *Mapping Matters* will provide information on the various ways that calibration is approached within the industry.