Simulation Options

*Comparison of Commercial Simulation Products*

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Many times one gets to the end of a project and sees with hindsight the many places where improvements could be made or where data collection should have been started and was not or where a minor change in design would have had large benefits at later points in the life cycle. One means of discovering some of this useful information before the end of the project is to create a simulation of the end state. The simulation can assist with decision making and can provide insight as to how the operation may proceed as the project progresses.

These simulations do not need to be coded from scratch. There are several commercial products which allow one to create a model and run a simulation based on the model without writing detailed code. The commercial products use drag and drop symbols to set up the model and then provide custom configuration options to allow the builder to tailor operations or capture specific information. These are the type of tools that become more useful as one becomes more familiar with the many features available. For this reason, care should be taken to select the tool that will be most useful in a given organizational environment.

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| Simul8 | https://www.simul8.com/ |  |
| Advantages | Robust software which will scale to large simulations and many users. Well-developed product that is known in factory automation and has experienced customer support. |  |
| Weaknesses | Product literature is focused on staffing models. Appears to require significant training to get started using the tool. Entry level software does not support use by a team. |  |
| Cost | Basic version is $1995 |  |

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| AnyLogic | http://www.anylogic.com/ |  |
| Advantages | Easy to get started with free tutorial sessions to create initial models. Product supports a variety of industries and different types of models are available as tutorials. |  |
| Weaknesses | Three dimensional models may not be as graphically appealing or easy to display as other software. Addition of analytics may require more configuration than other tools. May not have the industry specific components of more focused tools. |  |
| Cost | Personal Learning Edition is free. Other versions require a custom quote. |  |

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| Arena Simulation | <https://www.arenasimulation.com/> |  |
| Advantages | Support for a wide variety of industries including supply chain, logistics, and call center modeling. Easy to get started with the student version and many online learning tools. |  |
| Weaknesses | May be a challenge for individuals who are not used to flowcharts. Extremely process oriented which may hinder adoption by those who are not used to focusing on processes. |  |
| Cost | Student version is free of charge. Other versions require a custom quote. |  |

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| Simeo | http://www.oxand.com/simeo/ |  |
| Advantages | Focused on infrastructure within different industries. Good tool for modeling capital investment planning and capital asset management. |  |
| Weaknesses | Developed by a consulting company focused on the needs of their clients. Training classes are available, but the product is geared toward individuals who use it routinely, not as an addition to other tools. |  |
| Cost | Pricing only available by custom quote |  |

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| ProSim | <http://www.prosim.net/en/index.php> |  |
| Advantages | Focuses on plant design to improve efficiency and reduce environmental impact. Robust tool developed to meet the need of a consultant group in plant design. Large international customer base. |  |
| Weaknesses | Has multiple tools and requires up front learning to put to use. |  |
| Cost | ProSimPlus 600€ per year |  |

The current project[[1]](#footnote-1) to improve supervision and training for all patrol officers can benefit from the use of a simulation tool. The training will be delivered on mobile devices purchased by the city and checked out by individual patrol officers. The simulation tool can be used to sufficient to meet department needs. The tool can also model pedestrian traffic flow to make sure the placement of the docking stations for the devices does not interfere with other activity.

Selection of the appropriate tool is influenced by several factors. This is a short duration low budget project. While the project does involve infrastructure investment in both computer hardware and networks, it is not of the same nature as a permanent large capital construction project. Therefore, simulation to support the investment and placement decisions needs to be inexpensive in order to have a positive return on the simulation investment. In addition, the short duration of the project means the simulation software must be readily available and able to produce results with a minimum startup and learning curve.

From the list of products detailed above, only AnyLogic and Arena appear to meet the criteria of readily available with a minimum startup time. The other products require up front quotes for pricing before installation. Of these two, Arena may be the most appropriate choice for the type of infrastructure project envisioned for the police department. Arena appears to offer scenarios related to customer service and retail processing which align well with the activities in police substations. For these reasons, I recommend devoting the time to download Arena and develop a basic simulation of the planned check in and check out process. If the modeling tool appears useful, the company can then be contacted to purchase the appropriate license based on the scope and magnitude of the project.

The Arena simulation for check in and check out should treat the tablet computers as resources that are allocated to agents within the model. The model should be set up to allow comparison of different rates of check out and return. The model should also allow comparison of different staff sizes to determine at what size the department might want to invest in additional capacity. As the project group becomes more familiar with the tool, it may also be possible to include equipment malfunction and repair in the availability model.

In addition, the modeling tool can be used to model pedestrian traffic flow and the time required to perform the check-out activity. This will help gauge the impact of the equipment on station operations. Again, additional familiarity with the tool may allow the project team to model pedestrian traffic flow in other parts of the facilities and test other arrangements without having to physically move furniture. This can lead to improved overall efficiency and may improve workplace moral. After implementation, the actual results can be compared to the results predicted by the model to see if the accuracy was sufficient to warrant additional modeling activiites.

Overall, the small investment in time to learn the modeling tool has the possibility of improving both this project and overall workplace efficiency. While there may be additional licensing costs for continued operation of the simulation, this decision does not need to be made until there is some evidence of the value from the simulation.

1. This is an education assignment. The term “the city” is used to scope the project to one local law enforcement agency. It is not meant to imply any particular city and could also represent a county or other municipality. [↑](#footnote-ref-1)