SINTERIT

USER CASE STUDY

Application: **End-Use Part, Prototyping**

Industry: **Government / Military**

DEEP ANALYTICS

Lisa PRO supports the creation of camera component prototypes for bomb technicians

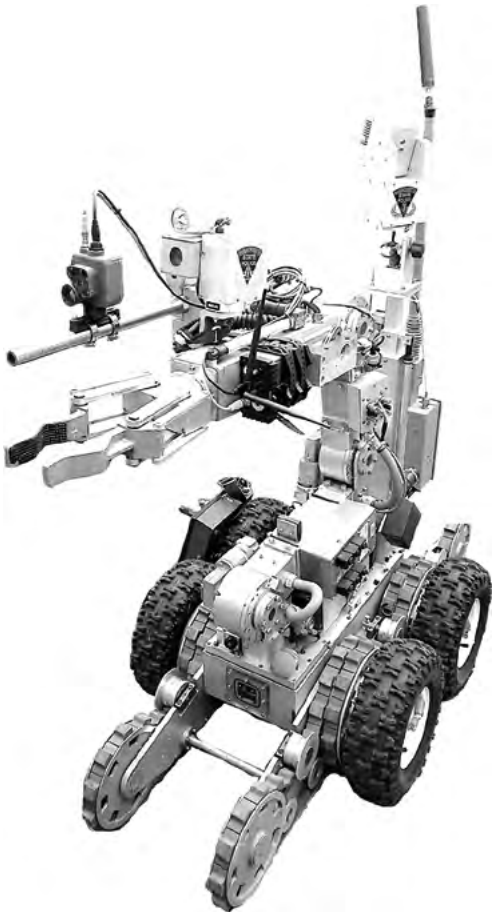
Creating **accurate prototypes quickly**

Use a wide range of technical prints to save time and money

Create high-quality prints for commercial use and quality testing

BACKGROUND

Deep Analytics is a contract research company that develops innovative and rugged prototypes for the national security and defense communities. Based in Vermont, the team of ten engineers and scientists develop smart sensors that leverage cutting-edge machine learning technologies packaged and ready for the field.



PROBLEM

Deep Analytics was designing an Infrared Boom Camera (IRBC) that would enable bomb technicians to capture high-quality images and video while operating in bomb suits in tight and dark places. The packaging and internal mechanical components of the camera head, pole system, and robot mount systems would rely heavily on fieldable SLS printed parts.

When developing the previous version of the BoomCam, Deep Analytics prototyped with FDM printers, and occasionally outsourced SLS prototypes from various rapid manufacturing shops when they needed to test or design an iteration. However, to make this project more time- and cost-efficient, they decided to look for a tool they could use internally.

The Infrared Boom Camera grew out of R&D projects funded by the Combatting Terrorism Technical Support Office (CTTSO). This meant the printed parts had to meet strict criteria.

DEEP ANALYTICS

Customer:	**Mark Bruneau, Senior Mechanical Engineer, Deep Analytics LLC**
Country:	**USA**
Industry:	**Government / Military**
Application:	**End-Use Part, Prototyping**
Uses:	**Enclosures, Exposed to ChemicalsEnclosures, Containers, Brackets, Mounts, Structures**
Top reasons:	**Accuracy, Complexity, Durability, Reactivity**

PROBLEM

The following points outline the mechanical requirements for the system directly related to the design and manufacture of the packaging and, therefore, the 3D prints.

1. Drop test: The system should be able to withstand shocks that could be incurred in shipping, installation, and vehicle operation. The system must also be able to pass the MIL-STD 810G-516.6 shock test: withstand repeated 4’ drops onto plywood in any orientation.
2. Water ingress test: The system should be fully operational in the rain or if splashed with water. The system should meet the IPX4 water ingress protection standard: it should remain operational after being splashed with water from an oscillating fixture for 10 minutes on all surfaces.
3. Dust ingress test: For reliable operation in dusty environments, the system should meet at least IP5X solid particle protection standards. The system should be exposed to fine particles entrained in airflow for 10 minutes and function-tested.
4. Vibration test: The system is to be operated for 1 hour in a high vibration environment, e.g., moving trailer or vibration test bench. The system’s robustness to minor vibration over an extended time is of more concern than its ability to withstand brief, high-vibration events.
5. Temperature range testing: The system is to be tested for operation with component starting temperatures measured at 10F and at 120F. The temperature is monitored as the system is operated for 30 minutes; no thermal shutdowns should be observed during the heat test.

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SOLUTION

Deep Analytics purchased the Lisa PRO in late 2019, after the original BoomCam project and prior to IRBC. The company intended to print SLS prototypes of some of the camera's components.

The material properties of Sinterit's PA12 aligned well with the company's requirements for the project, so they were able to utilize SLS-printed parts in their finished product. The Lisa PRO not only allowed them to prototype each iteration in-house, but also to build up complete systems for functional testing, including durability, vibration, and heat testing.

Building an Infrared Boom Camera also required the bulk of the components to be outsourced for final delivery. However, thanks to the satisfying tolerances of each printed part, they could reduce the time needed to get their contractors manufacturing useable parts.

As a result, the Lisa PRO enabled rapid iteration and the ability to produce field-ready systems for functional testing in-house.

> ***"With the Lisa Pro, we could quickly create many accurate prototypes for commercial use and quality testing. By choosing this solution, we saved a lot of time and money."***
>
> ***Mark Bruneau***
> ***Senior Mechanical Engineer***

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Equipment used by Mark Bruneau:	**Lisa PRO, Sandblaster, Powder Sieve**
Material used:	**PA12**
Bought from:	**3D Herndon**