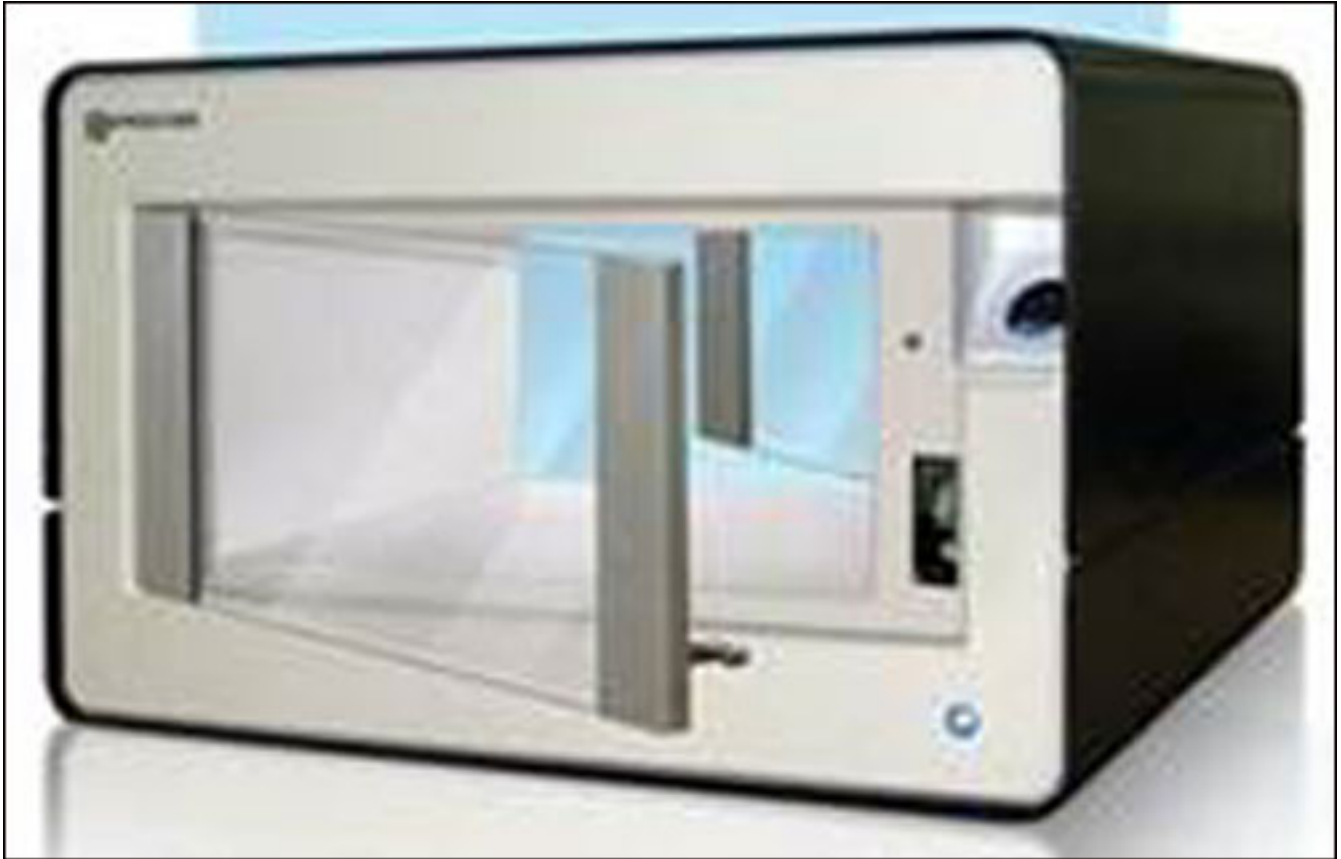


Steinmetz Diamond Group uses RFID to track, manage and secure tiny, highly valuable gemstones.

By John Edwards

June 20, 2011 — Diamond transport and storage has traditionally been a low-tech and surprisingly informal affair, especially given the value of the items involved. Each diamond is kept inside a "brifka"—a paper parcel marked with the stone's principal characteristics. While the technique is cheap, simple and widely supported, it provides nothing in the way of visibility, business intelligence or insight beyond what an observer can read off the package. Additionally, for high-volume companies, brifkas demand endless hours of painstaking manual processing and data entry to achieve accurate (though delayed) inventory counts.

Approximately five years ago, [Steinmetz Diamond Group](#), based in Geneva, began searching for a better method for tracking, managing and securing the tiny, ancient (most diamonds are more than three billion years old) and extremely valuable gemstones that lie at the heart of the company's operations, says Pavlo Protopapa, the firm's chief financial officer. Steinmetz, one of the world's largest diamond groups, purchases rough diamonds and processes them into polished stones ready for sale. The company's management wanted a better way to monitor its diamonds' movements, one that would allow its representatives to immediately pinpoint each diamond's specific location.



SpaceCode's SmartSAS provides a technology-monitored "handshake" that allows authorized staff members to hand over diamonds between processes.

"Wouldn't it be great if we could implement a system globally whereby we would be able to get management reports on demand, and know what we've got, and where it is, in real time?" Protopapa asks. "That was the overall objective." Ultimately, he says, it was hoped that the system would invisibly and efficiently track the movements of stones between processing and cutting centers in Belgium, South Africa, Namibia, Botswana and New York.



The SmartCabinet provides visibility, control and traceability of diamonds stored within.

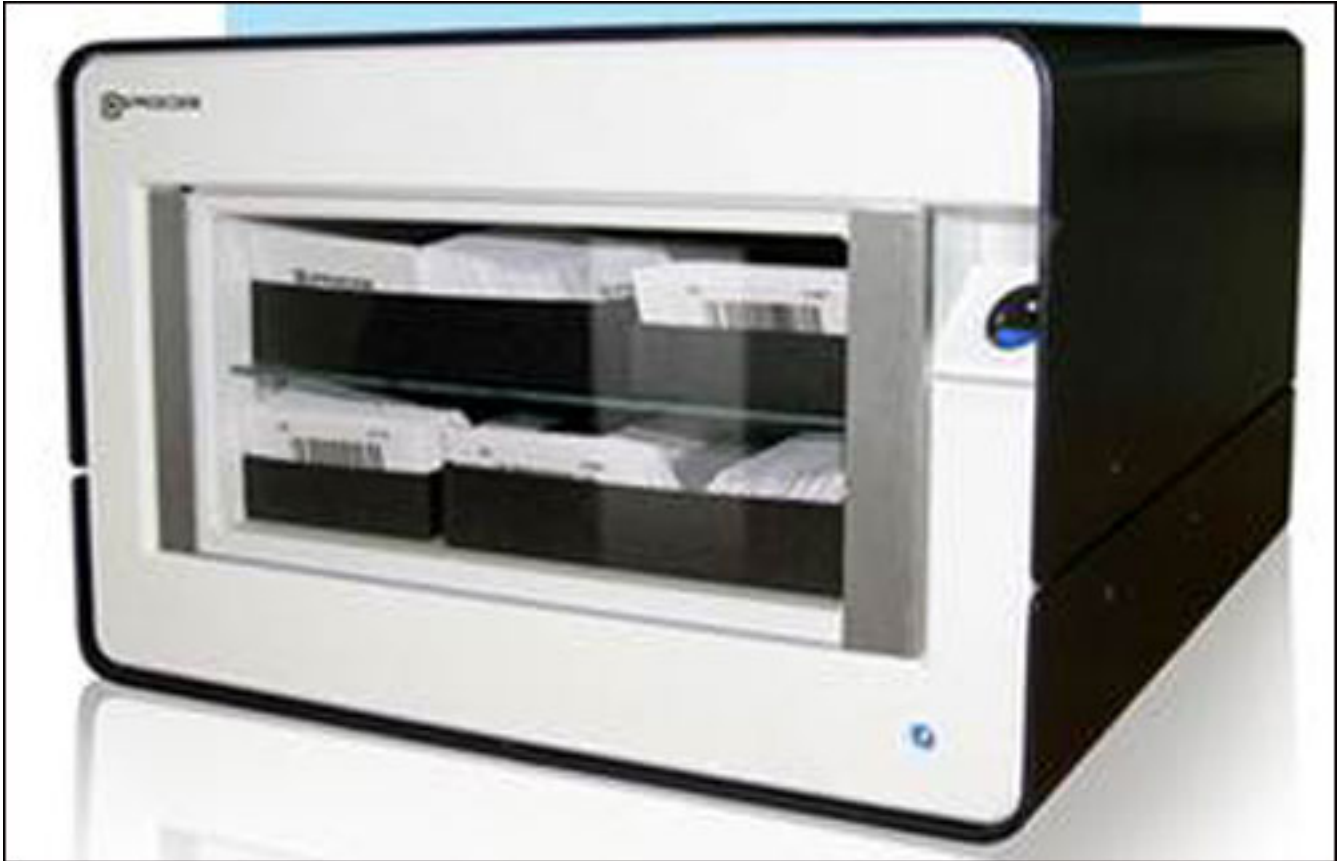
Examining their options, Steinmetz's managers quickly narrowed in on two choices: bar codes and radio frequency identification. The bar-code approach was almost immediately rejected. "I always felt with bar-code systems, although they were accurate and you could rely on them, they didn't provide enough details and automation," Protopapa explains. "Whenever you wanted information, you would have to phone up and ask somebody."

The remaining option, RFID, promised to provide the company with everything it sought in a tracking and visibility solution: rapid data entry with minimal human intervention, instant inventory updates, complete accuracy, inherent protection against data forgery and an extra passive security layer. The next step was to find a partner that could meet Steinmetz's demanding needs. After all, losing a stuffed brifka isn't exactly like having a can of peas go astray.

The Diamond SmartBox

Steinmetz investigated and tested a seemingly endless number of vendor applications as it searched for a suitable diamond-management solution. But nothing the company examined met its strict reliability, efficiency, security and stability requirements.

Then, about a year after launching their search, the company's management heard about a European vendor—Paris-based [SpaceCode](#)—that claimed to have a system that could read hundreds of tightly packed bifkas in any orientation with 100 percent reliability. Another lure was that the company's Diamond SmartBox technology was being presented as a secure system that was both easy to use and globally deployable. "It looked, almost from the very beginning, like the right system," Protopapa says.



The SmartBox provides a temporary "home" within an office or production facility for diamonds on the move.

Paul Davis, SpaceCode's managing director, notes that the SmartBox was specifically created for companies like Steinmetz that continuously move large numbers of diamonds from one site to another. Businesses in the diamond trade, he notes, face a challenge that's almost unique to their field. "It's an industry where you've got very large volumes of items in close proximity, which makes it a very challenging environment for RFID," he says. Furthermore, a number of diamond industry processes require RFID deployment within metal safes, which typically render the technology unusable due to the metal interfering with RF signals.



The SmartSafe creates a full history regarding a diamond's movements, the personnel who accessed the stone, and the exact time of every transaction.

The SmartBox is designed to resolve these problems by providing a temporary "home" within an office or production facility for diamonds on the move. Resembling a high-tech microwave oven, a single SmartBox can read more than 640 brifkas simultaneously (depending on model and size) without any direct human intervention. SmartBox sizes start at 40 centimeters by 40 centimeters by 25 centimeters (15.7 inches by 15.7 inches by 9.8 inches). A USB port links the unit to a PC or a server running a standalone or enterprise resource planning (ERP) integrated inventory-management application. The SmartBox also provides a variety of physical security features, including a sturdy metal casing, a polycarbonate glass window and individually configurable biometric access controls.

The SmartBox RFID reader works in conjunction with a unique adhesive tag designed to be applied directly to a brifka. Feeding the tags through a conventional printer allows them to be imprinted with same descriptive information that was previously scribbled by hand onto each paper parcel.

Intrigued by SpaceCode's technology and its potential to streamline diamond management, Steinmetz contacted the company and arranged for a demonstration.

Impressed by what they saw, Steinmetz's managers decided to conduct a one-month reliability and accuracy

test at their headquarters office. "During this period," Protopapa says, "we replicated six months of typically intensive use with thousands of diamond parcel movements each hour."

As the technology was being evaluated, the managers worked with Steinmetz's safe provider to ensure that the SmartBoxes would not compromise security in any way, such as by interfering with safe-locking mechanisms. They also checked with the company's insurance broker to determine if the technology met the terms of their policy's "zero-level-tolerance" security coverage. It did. In fact, it seemed possible that the SmartBoxes would lead to a premium reduction, given the additional security features.



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Once these preliminary steps were completed, Steinmetz was set to develop and launch a formal project plan. The strategy included several weeks of business and technical testing and evaluation. This was followed by a live rollout of the technology at the Geneva office, which receives and processes diamonds, then distributes them to Steinmetz facilities worldwide.

Four SmartBoxes were installed at three locations within the Geneva site: the main safe, the vault (a strong room) and the shipping office. The system was configured to track 10,000 brifkas, and 15 employees in various departments were given system access. The SmartBoxes were connected to Steinmetz's ERP system, which required only a slight tweaking to support the new technology. "Three 'triggers' were added to one table to allow a full connection between the RFID system and the ERP system," Protopapa states.

Benefits Achieved

The system began paying benefits almost as soon as it was taken live, Protopapa says. "The users realized that there was a wealth of additional data now available," he explains, "which could be incorporated into a wide range of new reports."

The trial's success gave Steinmetz's managers the confidence to begin a phased deployment to company sites worldwide, as well as to begin thinking about expanding its use to jewelry and other product lines. "This could entail a deployment with hundreds of readers, hundreds of thousands of tags and perhaps more than 200 users tied into the system," Protopapa observes.

With its RFID system now deployed worldwide, Steinmetz has achieved its goal: 24-7 visibility into its

global diamond caches, giving company managers a level of automation, knowledge, quality control and insight that previous generations of diamond merchants could only dream about.

The system has significantly shortened the time required for employees to check brifkas into or out of a location, Protopapa says, and to record changes of ownership between workers and/or departments. It also helps staff members find a particular stone's location within a matter of seconds, speeding production work and sales inquiries. What's more, users can turn to the system to reconcile a missing diamond by examining the errant stone's full history, including its every movement, the names and titles of all individuals who ever accessed that stone, and the exact date and time of every event the diamond experienced during its time with Steinmetz.



**"If you were to give a diamond a frequent-flier card, it would have to be one with gold status."
—PAUL DAVIS**

Another key security and efficiency advantage, Protopapa says, is the ability to divide an office's main safe into individual sub-safes by using individual SmartBoxes. Additionally, since each unit comes with its own biometric security controls, high-value stones can be placed within a specially dedicated SmartBox with specific and highly restricted access rights.

Management and security personnel are automatically notified through real-time alarms and data alerts if a SmartBox is attacked, disturbed or used in an unusual way. This can happen if someone removes assets that exceed an authorized value, or tries to access a box outside of normal working hours. Alerts are also issued if the total value of goods within a box exceeds the insured value, or if a door left is left open longer than permitted. In the event that a thief actually manages to steal a diamond, the system can be ordered to generate a complete historical inventory record to help settle insurance claims.

On an ounce-per-ounce basis, few other assets receive such careful, persistent and special treatment as diamonds. But the lavish attention is fully justified, SpaceCode's Davis notes, given each stone's value and the vast, circuitous and risky route it must travel from the mine to the bulk processor and on to the cutter, polisher, grader, distributor, jeweler and various other intermediaries until, eventually, it falls into the possession of its final owner. "If you were to give a diamond a frequent-flier card," he observes, "it would have to be one with gold status."