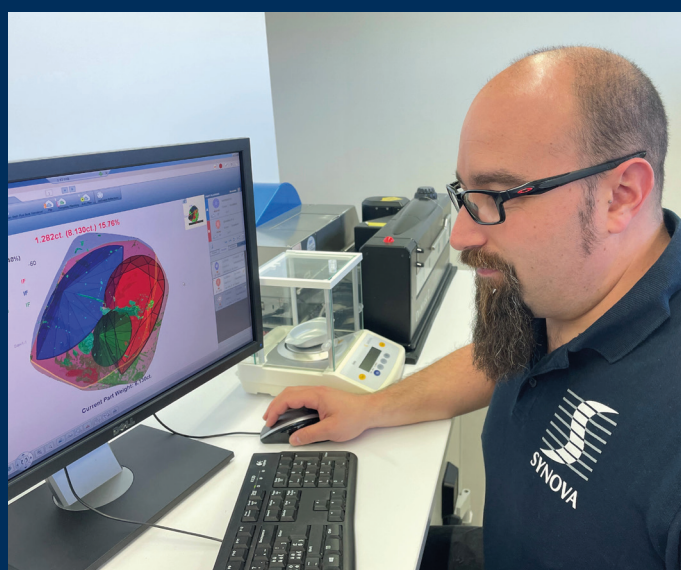


A DIGITAL PLATFORM TO AUTOMATE DIAMOND POLISHING

New technologies are changing the way diamonds are being cut and polished. A combination of hardware and software now enables seamless manufacturing, reducing 'mine to market' timelines across the diamond pipeline.



CULTURAL DIVIDE

Presently diamond manufacturing is a mix of modern technology and traditional processes. While planning uses scanning technology and computer software to optimize the value of a finished diamond, much of polishing and faceting is still done as it has been for decades.

Planning has made great advances in the last decade. Technology and software have taken the guesswork out of the mapping function. Mapping can now detect inclusions (minor imperfections) inside a rough stone. Planning can propose sawing and polishing options to either include or exclude these inclusions. The goal is to reduce risk and maximize yield.

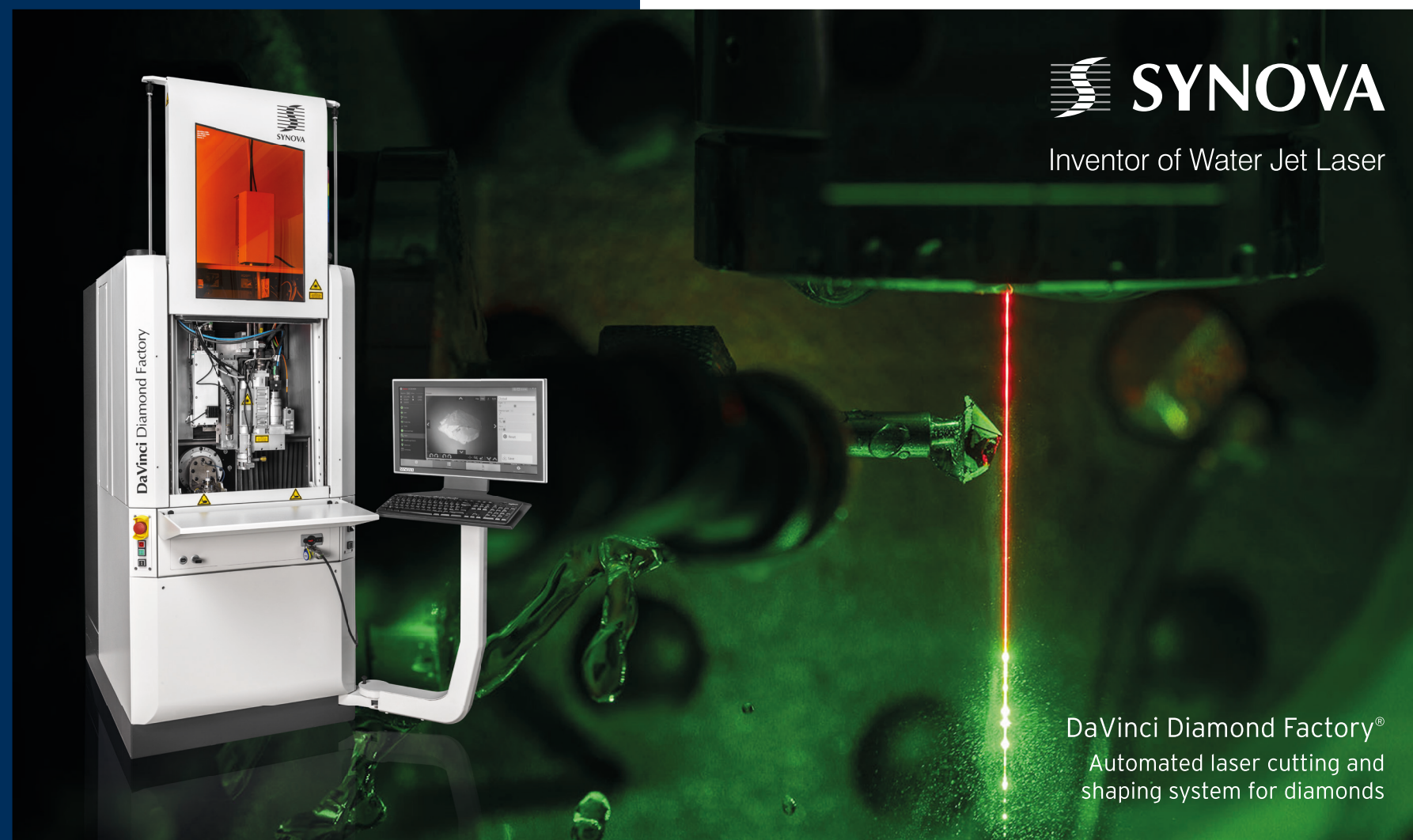
However, the execution process is less automated. Various operations – marking the stone, sawing it, brutting the girdle, polishing the facets – are still carried out in different locations. It takes an average of a fortnight for a stone to be converted to a polished jewel.

The first step towards automation lay in integrating the two distinct stages in traditional diamond manufacturing: planning and execution (cutting and polishing).

FUSION OF LIGHT AND WATER

Laser technologies played a major role in changing the way how diamonds are cut and polished.

A major breakthrough took place when Swiss-based Synova SA introduced its Laser MicroJet® (LMJ) process to saw raw diamonds. In this process, a hair-thin water jet precisely guides the laser beam. This cold and clean wet laser ensures parallel surfaces and is now the industry standard for cutting stones. In 2021, the company introduced the "DaVinci Diamond Factory", an automated system which can laser cut as well as shape diamonds. Rough diamonds can be transformed into brilliant cut gems with up to 57 facets in a single operation in about one hour.



"It is an automated laser cutting and shaping system for diamonds that offers three advantages. First, there is no need for manual polishing skills on a larger scale. Second, by combining several workflows in one machine, production time is greatly reduced. Third, the yield is significantly increased because the cut-off chips are recovered," Dr Bernold Richerzhagen, Synova's CEO, stated.

DIGITAL INTEGRATION

Having automated the faceting process, Synova's next move was to integrate the planning and polishing processes. To achieve this goal, Synova has collaborated with **Sarine Technologies Limited** of Israel in developing a process where the planning and execution phases are linked through automated data transfers.

"We selected Sarine's Advisor® rough planning software because it has the highest market penetration in the diamond industry," Jörg Pausch, Head, Diamond Business Unit, states. The Advisor software's planning module supplies a simplified rough stone file without any inclusions as well as a fully polished stone file including the position of the polished stone inside the rough stone.

"This cooperation is yet another example of the benefits

created by the data generated inherently by Sarine's seamlessly cloud-linked systems across the diamond value chain. Along with Synova's DaVinci, this data not only enhances the efficiency of the supply chain but also reduces costs and costly errors," says Avi Kerner, Sarine's Chief Technical Officer.

This integration will allow diamond manufacturers to use planning files from Sarine's Advisor software to cut and shape diamonds on Synova's DaVinci system. "This data connection allows our customers to accurately import Sarine's rough diamond planning data into our DaVinci CAM software to perfectly shape diamonds, making the diamond production process even more efficient", Richerzhagen explains.

Synova also teamed with Octonus-Lexus, a technology provider to the diamond industry. "We approached **Lexus SoftMac** because they are an important market player for scanning, mapping, and planning technologies," says Pausch. The Synova team collaborated with the Octonus-Lexus team to develop an interface solution between the Carbon planning platform and the Synova DaVinci CAM software.

"The final stages of production are supported most effectively by our SMART-AnyCut Technologies, using our Carbon planning platform. This results in the best combination of high yield and high optical performance

for fancy cuts as well as RBCs. Synova integrated these technologies to fulfill the ambitions of leading polishers to go beyond simple automation, and to target new market opportunities thru rapid and cost-effective deployment of dynamic automated production for high-performance cuts," states Janak Mistry, CEO, Lexus SoftMac.

The combination of Synova's DaVinci with Carbon MESM SmartRecut "free export open-source files" provides a productive option to prepare the stones for final polishing on GALAHAD Compass with high accuracy. It is critically important in countries with high labor costs or limited access to skilled polishers.

In collaborating with two market leaders in planning software, Synova is offering the best options to the users of its DaVinci Diamond Factory system. Users can benefit from the option of automatically transferring data from their planning module to the DaVinci laser machine for sawing and then faceting of the diamond faces.

This is just the start in automating the diamond polishing cycle. Digital technologies will be the path to achieving rough to finish processing in one location. This will enable rough stones to be polished where they are mined. Synova's digital platform will simplify the logistics supply chain and reduce transportation costs. The future is now.

 **SYNOVA**
Inventor of Water Jet Laser

DaVinci Diamond Factory®
Automated laser cutting and
shaping system for diamonds