



Shaped Textile Digital Printing

REINVENTING THE WORKFLOW FOR SHAPED TEXTILE PRINTING

GEMINI Digital Printing technology reinvents the workflow for printing and cutting Shaped Textile parts, needed in sportswear, fashion, home decoration and advertising. This provides the perfect solution for mass production of customized goods, in response to a growing demand.



INDUSTRY STATUS

Manufacturing digitally printed garments is a business where the level of automatization is incredibly low. The waste of materials and labour is huge. The most common classical workflow implies the use of two separate environments: CAD (an apparel specialised CAD) and Graphics (illustrator or Corel, etc) and it contains the following steps:

- creating graded patterns in a CAD application and exporting it into a standard format such as DXF (not really too much to change or improve, this is a well-established process)
- creating graphical content in Illustrator or Corel (not really too much to improve, this is a well-established process)
- importing the DXF containing the graded patterns into Illustrator or Corel
- manually imposition the graphical content on the graded patterns, usually by adopting a compromise between the smallest and largest size or in best case by resizing the content into two variants for two size groups. This generates huge quality problems.
- printing the content using a low efficiency hand-made nesting, wasting paper and printer time.
- cutting the white parts on multi plies cutters, a process not well adapted to the current trend of mass customization of small quantities.
- transferring the printed images from paper to fabric in a pure-manual process, with huge labour and potential for errors and waste.
- managing stocks of printed or white parts, usually produced without a 1:1 correspondence to ordered quantities.

OTHER SOLUTIONS UNDER DEVELOPMENT FROM OUR COMPETITORS

Several CAD developers are currently involved in similar projects, at different levels of readiness. However, most of these solutions are based on third-party technology for handling digital graphical content, or act as plug-ins for other applications such as Illustrator or Corel.

Furthermore, most of competitors lack the ability to grade the graphical content and some are not capable to combine several images on a piece of garment. Some are not capable to handle vector based content, or it simply converts this content to bitmap. A significant setback is also the lack of integration with other parts of manufacturing process such as cutting (with optical recognition and compensation of distortions) or parts collecting and storage management. Providing just an isolated tool to handle a particular problem such as placing a graphical content on a pattern is not enough for obtaining real benefits in production.

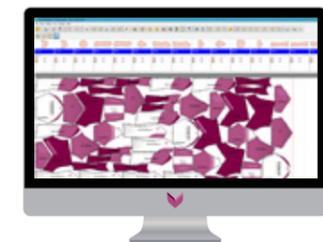


An automated workflow for shaped textile printing



TECHNOLOGICAL INFRASTRUCTURE HIGHLIGHTS

The entire Digital Printing solution provided by Gemini CAD Systems is based on a proprietary technology capable to import, scale, imposition and print high-quality printable files such as EPS or PDF. This capability exists both in Gemini Pattern Editor as well as in Gemini Nest Expert modules.



Main features



MASS CUSTOMIZATION

A simple scenario: a football team places an order for 150 sets of t-shirts and shorts, bearing clubs and sponsors logos, 5 pieces for each of the 30 players. All sets must be made to measure, each with its own number and name on the shirt. **Gemini CAD can handle this order in a 100% automatized process, including printing and cutting.**

The measurement tables (from a 3D scanner or manually read) will be processed by **Gemini MTM** plugin producing 30 individual sizes. The **Style Selector** module will read and replace on each t-shirt the graphical file containing the player's number and name and place it on the front and back pieces of the t-shirt. For each type of fabric used in the order, **Gemini Nest Expert** will nest with high efficiency all pattern files containing the appropriate graphical content, and generate 2 files: one file for the **digital printer** (high quality printable PDF or EPS) and one file for the **single ply cutter** (ISO-CUT or HPGL).

The entire order will be printed on a single roll of paper. The paper usage efficiency (and printer operating time) will be very high, at apparel industry standards. The paper will be transferred to each fabric type in a roll-to-roll, labour-less process.

A single ply cutter featuring **VisionCUT** technology will cut the parts while compensating any printing or handling distortions. **CutCollect** will help the operator properly identify and collect the parts and to place it into the appropriate containers for sewing.



GRAPHICS GRADING

Gemini CAD Systems can grade graphics position and dimension just like any other part of a garment. And it seems natural to want to do this. But when we introduced this feature for the first time (for example to make a logo maintain its ratio on a series of different size t-shirts) the feedback of customers was not as expected: most of them said "grading is not necessary, nobody wants to alter the dimensions of the graphical content". This reaction was so strong because at all levels of the productions chain (beneficiaries, designers, manufacturers, etc.) this was a fundamental non-negotiable situation, caused not by real reasons, but simple because it was practically impossible before, and everybody ruled out this possibility without even wondering why.

So, we made a simple example, to illustrate how critical is graphics grading, and how it can dramatically change the quality of printed garments and reduce manufacturing costs.

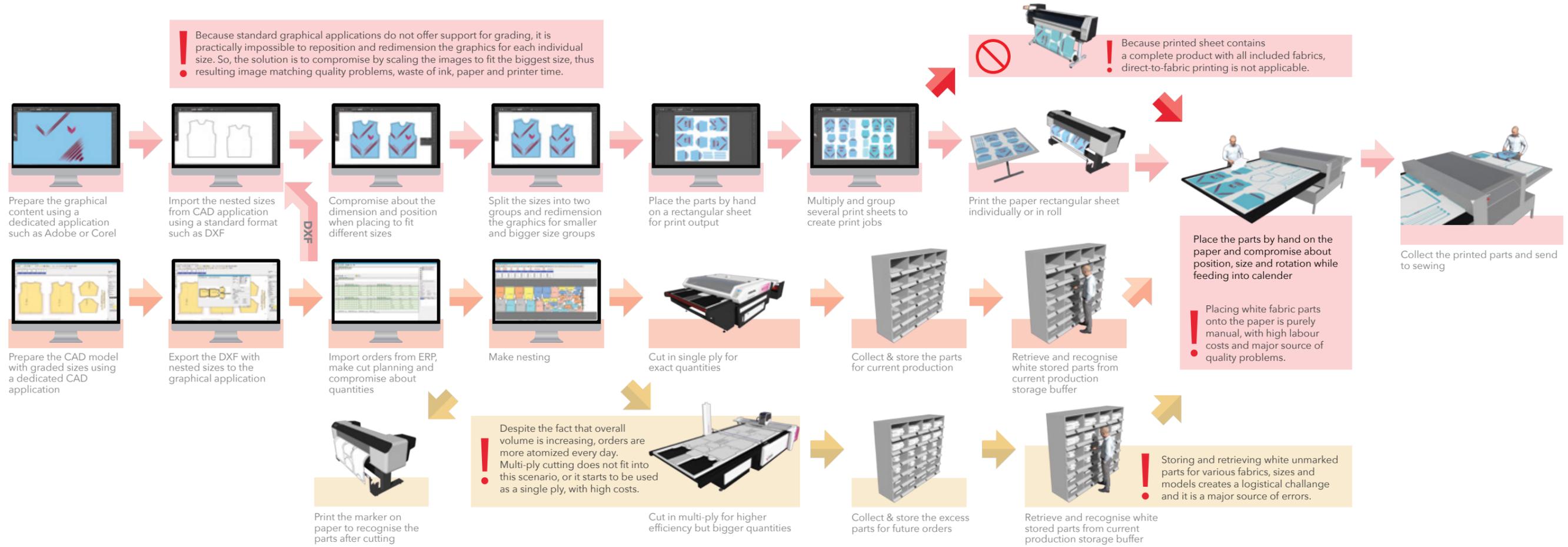


NESTING DIRECT TO PRINTING

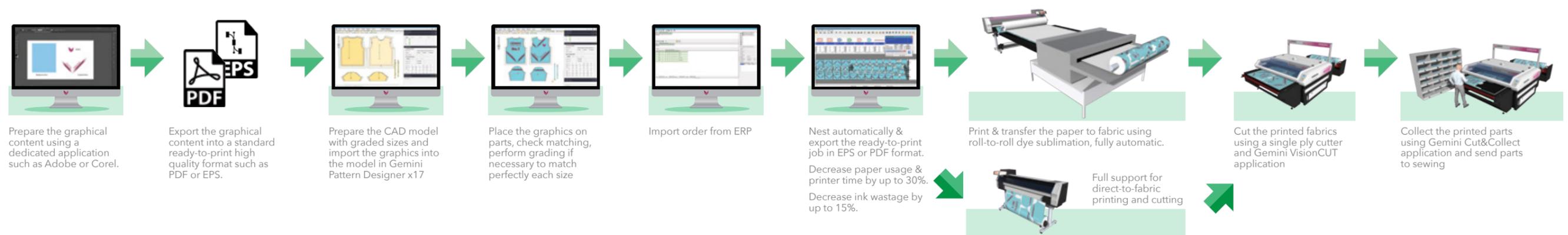
Gemini Nest Expert includes the typical functions of any imposition software. The input can be patterns from Gemini Pattern Editor containing graphics or just simple, ready-to-print, EPS or PDF files. Advanced automatic nesting functions are available for both type of content.

The output of the process consists in two files: a **ready-to-print PDF file** which will go to the Raster Image Processor and **cut file** (ISO-CUT, PLT, HPGL, DXF) including matching information, which will go to the single-ply cutter. There is no need for any third-party software or plugin to process the graphics, Gemini will handle all the process.

Current Digital Printing Workflow as applied by most manufacturers of digitally printed sportswear. April 2017



GEMINI Digital Printing Workflow the full automated solution developed by Gemini CAD Systems.

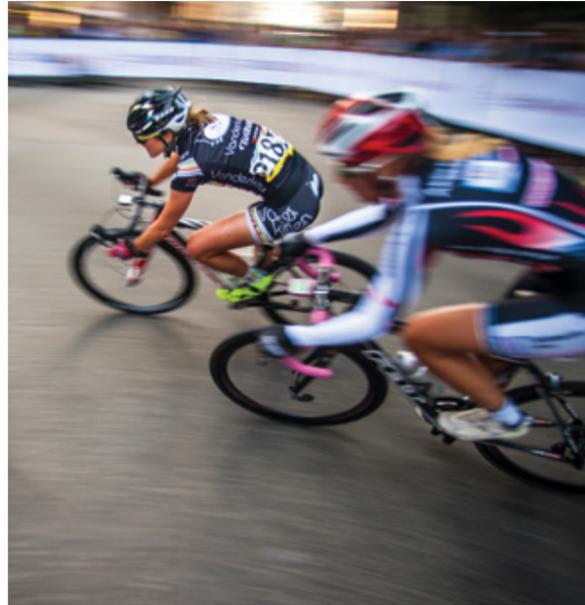


Gemini VisionCUT

OVERVIEW

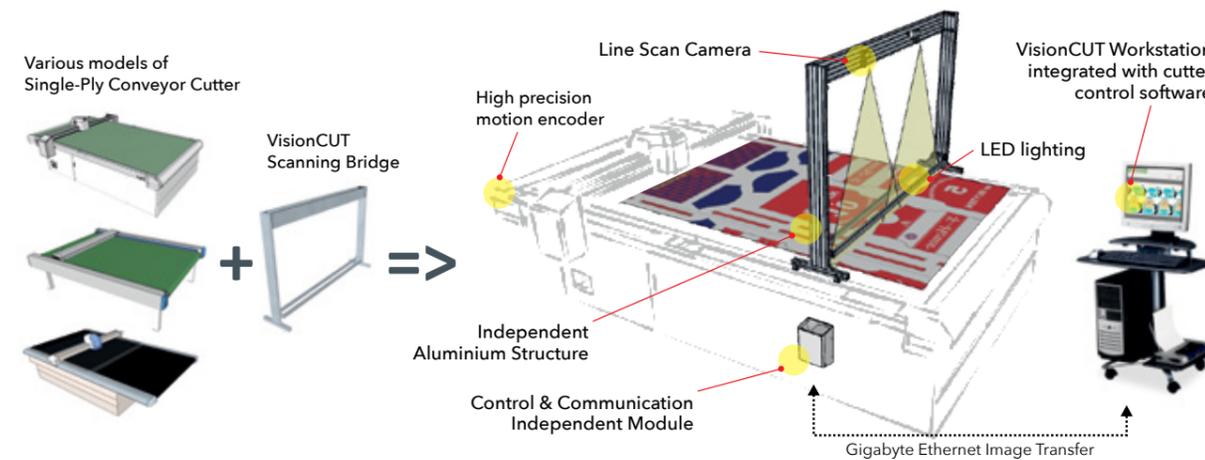
VisionCUT is a solution developed for automatic roll or sheet feed cutting processing, when this involves cutting a shape from a distorted media such as printed fabrics.

Usually, these materials present distortions caused by printing, heating, handling. Distortions include dilatation, contraction, skew & bow. If the cutter follows the original precise cut-path, it will not match the contour of the real printed shape, and the result of cutting will be unacceptable.



TECHNICAL APPROACH

GeminiCAD commits itself to covering the entire manufacturing process. This must include also cutting the printed shapes after printing is completed. The technology in charge of this phase is VisionCUT. This system has the capability to scan the printed fabric, to identify the position and distortion of printed shapes and drive a single ply cutter to cut the parts perfectly, by compensating any distortion within a given set of rules and restrictions depending on fabric elasticity and media purpose. The entire process is fully automatic, in a seamless in-line integration with the cutter.



The system for direct roll cutting consists in a scanning module, installed on the feeding area of the cutter. The scanning module can be installed on virtually any type of conveyor cutter because the space required for scanning is quite small, only a 5 cm linear frame is enough to capture the image of the material while it is feeding. While the material is fed on the conveyor, that scanner acquires the surface image and transmits it to the processing software, The software identifies the actual position and distortion of the shape on the material, by matching markers on the surface with predefined markers from the cad file represented as dots.

The software then compensates the shifting in position and distortions by altering the original cut file to match perfectly the new contour. This alteration is made under the specific rules and restrictions defined by the user when he chooses the compensation mode. The altered cut file is sent to the cutter in real time, and the result is a perfect match between the cut line and the actual shape in the material.



VisionCUT demo movie

Gemini CutCollect and Parts Storage Management

CUTTER COLLECTING WIZARD: GENERAL FEATURES

The sportswear articles and cloths in generally, are usually made of many different fabrics. One of the biggest challenges in cutting multiple orders mixed together in the same marker, with the purpose of reducing the fabric consumption, is to collect the articles back together as making part of the right order.

GeminiCAD commits itself to covering the entire manufacturing process. This must include also collect & storage of cut parts at the end of process. Gemini Cut Collect fits perfectly in this position, providing a full pick-by-light drop-by-light system, with configurable scenarios and rules to fit later stages in manufacturing flow. This complete integration reduces dramatically the errors in parts handling and storage, providing a solid infrastructure for just-in-time production and mass customisation.

The information used for collecting strategy is taken directly from the design and order file. The software is capable to process in parallel information from different markers. In this way the program can collect parts making

part of the same article in the same basket, even if they are separately cut from different fabrics.

Our collecting solution is developed for any automatic single ply or high ply cutter with conveyor table, and it helps collecting the cut parts by high-lighting the next piece or the next group of pieces to be collected and printing the corresponding label for them. The level of automation is so high, that the operator doesn't needs to have any kind of knowledge about the product itself. The product complexity is no longer a challenge for collecting.

The Cut Collect Assistant System is linked directly to the offload conveyor table of the cutting machine and the collecting process is synchronized with the belt movement.

Collecting and piece depositing is assisted by a video projector using an advanced ergonomic and customizable stand-alone software package.

The bundling strategies are fully customizable and as well is the patterns highlighting. (index, colour, pattern, etc.)



CutCollect demo movie



About us

Gemini CAD Systems is a leading global supplier of technology for industries working with soft flexible materials such as textile, composites or leather. Our activity includes research, development and implementation of software, hardware and workflow solutions for apparel, furniture and automotive, with focus on computer aided design (CAD) and computer aided manufacturing (CAM) applied in the cutting room.

Gemini's business is based on cross-linked fields of expertise and a collection of proprietary, in-house developed software algorithms and hardware equipment, built over 15 years of activity and continuous investments in R&D.

Gemini's advanced technologies automate the manufacturing process from design to cutting for more than 20.000 customers across 38 countries, providing reliable services and technical support throughout all stages.

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