Offline Programming
Generating new trimming programs or adjusting existing set-ups by manual robot teaching in production equipment is time consuming, costly and causes unnecessary equipment downtime. All of this can be avoided by using offline programming.

In simple terms, in offline programming the trimming programs are generated on a computer that includes simulations of the robotic equipment and the product to be trimmed without having to stop the real equipment on the production line. Offline programming can be used to create both the base program and to finetune it, if required.

Leading edge software
At KMT Robotic Solutions, we carry out all our offline programming tasks using the industry leading RobotStudio software package which utilises the 3-dimensional CAD design from the customer.

In addition, KMT offers a unique add-on software module KMT Waterjet Power Pac to provide faster and more accurate programming than normal. All programs are based on EasyFineTune, a programming method that minimizes the amount of programming instructions for a complete program. This method facilitates easier finetuning and program adjustments.

Proven efficiency - A case study
KMT Robotic Solutions provided the complete package for Johnson Controls in Holland, MI USA including robotic trimming equipment, fixtures and off-line programming. Jason Carroll, Robot Process Engineer at Johnson Controls said:

As far as the cutout shape goes, the offline programming was dead on. These programs took one programmer about 8 hrs to fine tune and it scrapped 5 parts. To create this program manually, it would take the programmer about 36-40 hours to write and fine tune into tolerance. Also, the manual way would probably scrap about 15-20 parts. In my opinion, the offline programs from KMT Robotic Solutions were almost 100% accurate considering how much time it took to complete the program, how many parts were scrapped and how far the TCP was from the target.
Advantages offered by offline programs from KMT

- Use of WaterjetWare functions in the cutting programs.
- Easy program calibration with Workobject-method.
- Cutting program + fixture can be used on both sides of turntable automatically.
- Program documentation showing the position of workobject reference points.
- EasyFineTune: reduced numbers of robot positions to make updating and changing of the cutting program faster and more user-friendly.
- Program structure: user-friendly structure for easy understanding.
- Worldwide support: excellent customer support from KMT head office or local KMT sales offices due to the common program structure used for both offline and online programming.

Requirements for offline programming

Cutting Angles:
Perpendicular to surface if not shown to be different in CAD-data.

CAD requirements:
- Delivery of CAD design to KMT: Accurate and updated CAD design from customer needed two weeks before project start.
- CAD design to meet KMT specifications.
- If CAD design is not generated according to KMT specifications, an extra cost will be added and invoiced separately.
- If CAD design is updated or changed during the offline project, extra costs will be involved and invoiced separately.

Workobject reference points on cutting shell/fixture:
- Well marked reference points on fixtures for work-object definitions.
- The selected points above MUST be measured and defined in coordinates relative to car-zero-frame for calibration between simulation cell and waterjet cell.
- If the reference points are not measured and marked according to KMT specification, extra costs will be involved and invoiced separately.

Scope of delivery
- Cutting program is delivered by e-mail.
- Program documentation
- Cutting programs are generated according to KMT standards.

Not included
- No fine-tuning work online or offline is included.