

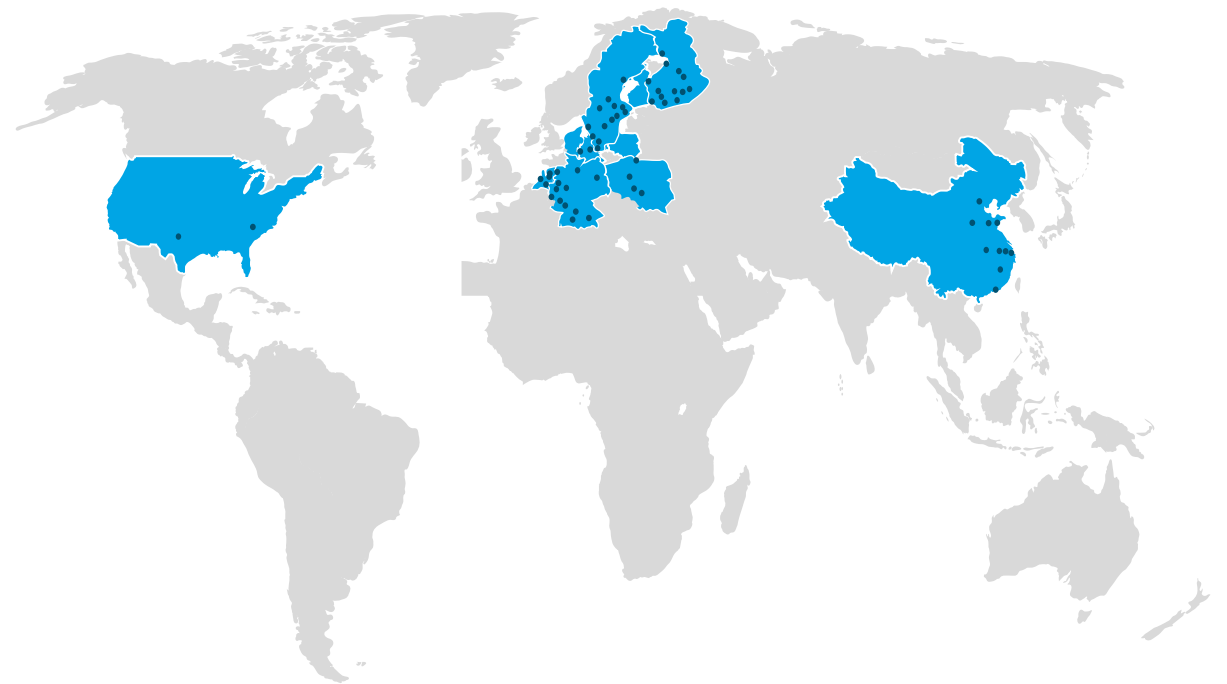


Flexibility and shorter changeover times in packaging

Who are we?

Etteplan, formerly known as Tegema

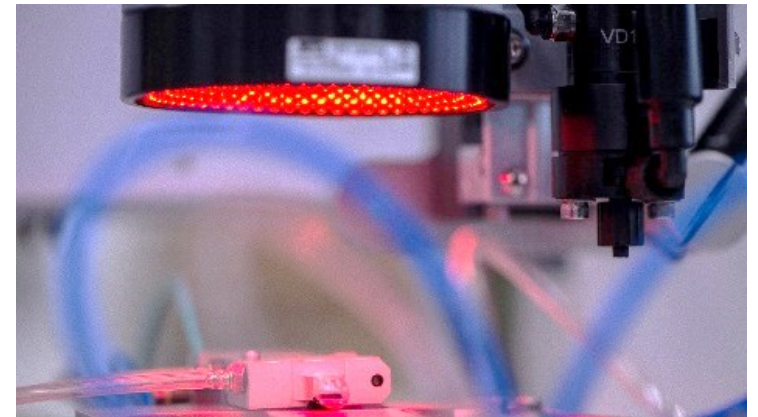
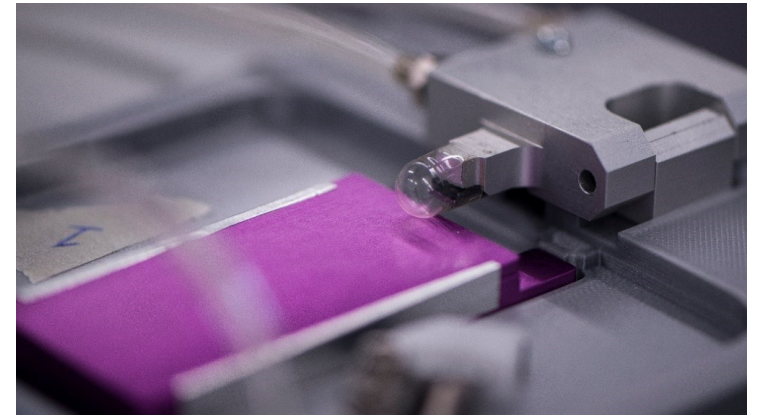
Offices in Finland, Sweden, the Netherlands, Germany, Poland, Denmark, USA and China



What do we do?

Helping you to create lasting impact

High-tech system integrator for accurate assemblies and optimal production processes



Typical photonics packaging example at customer's R&D site

- R&D setup, no integration of components/modules
- Self-programmed interface & GUI in Python for alignment
- Changing setup for new applications/samples: 1-3+ days



Today's photonic packaging challenges

Flexibility

Changing the manufacturing process for a new product is time-consuming and requires resources

Repeatability

Small series are often manual manufactured

small variations in the manufacturing process can result in significant **differences in performance.**

Yield

Poor alignment accuracy

Due to manual manufacturing or human interventions, errors occur



AMO's packaged graphene photodetector. Image credit: AMO



Involved parties

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 971398

Project: ULTRAPHO Fast track to Innovation

Project goal:

Validation and commercialization of a graphene photodetector, from fabrication to the final product



Our challenge in the Ultrapho project

Develop and provide a solution for the back-end assembly process of this product, where flexibility is a crucial element



Our solution

Etteplan

Modular Machine
Platform

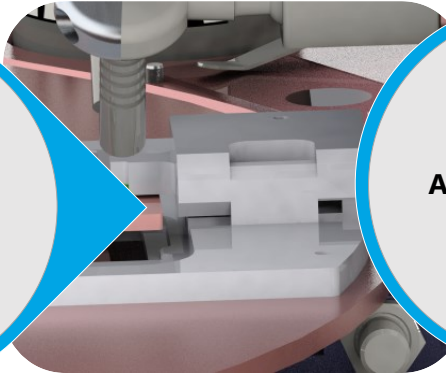
WITH

Flexible Production
Solution

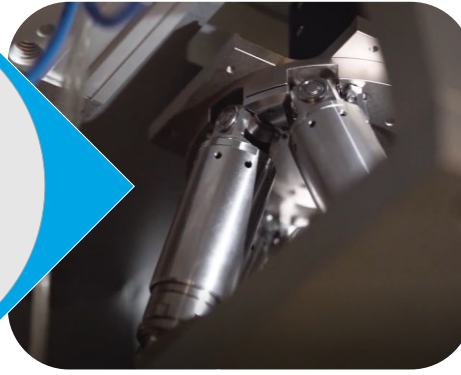


Highlights photonic assembly functions and specifications of our Indigo machine

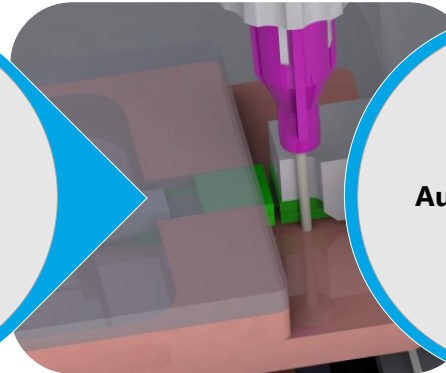
Mating of
standard optical
connector and
gripper
technology



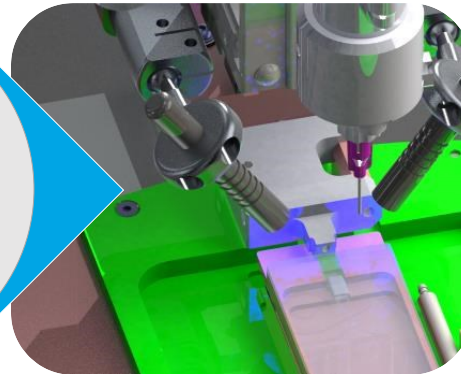
Active alignment



Automatic
Dispensing



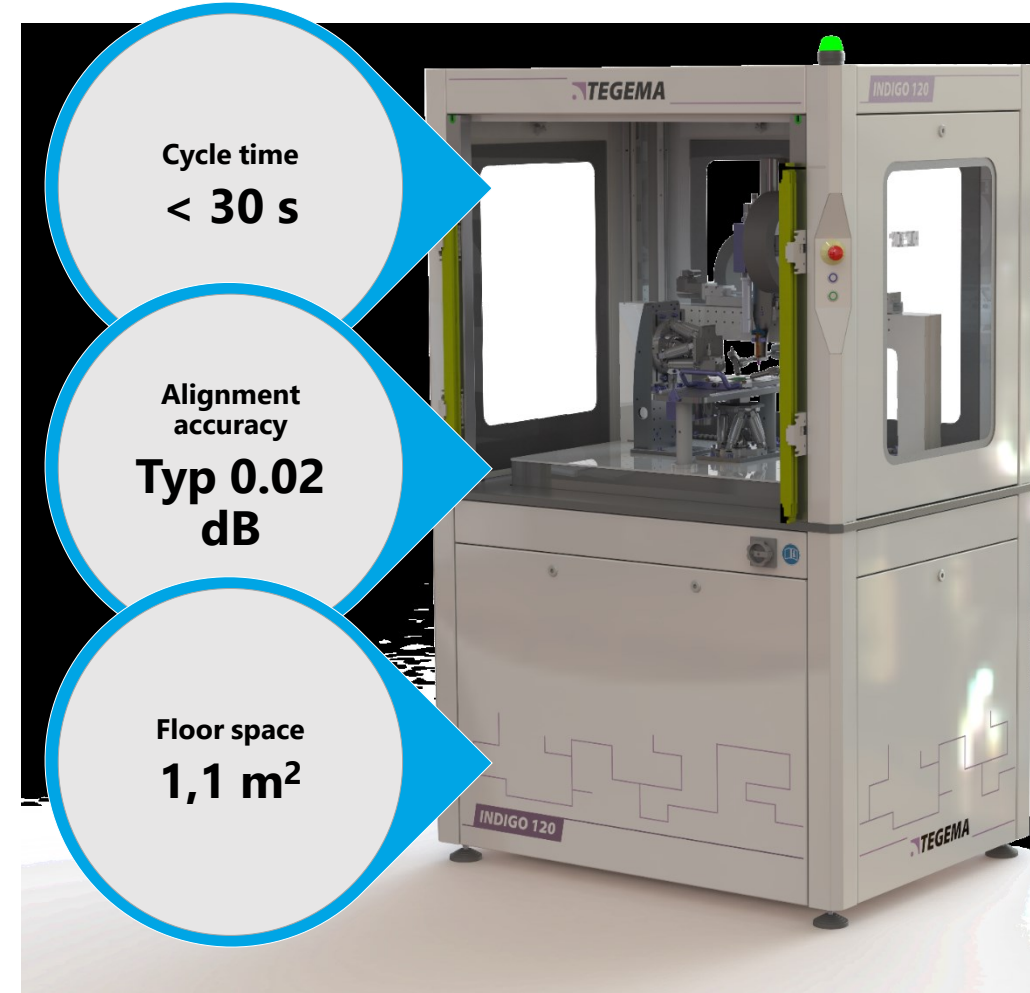
Automatic curing



Cycle time
< 30 s

Alignment
accuracy
**Typ 0.02
dB**

Floor space
1,1 m²

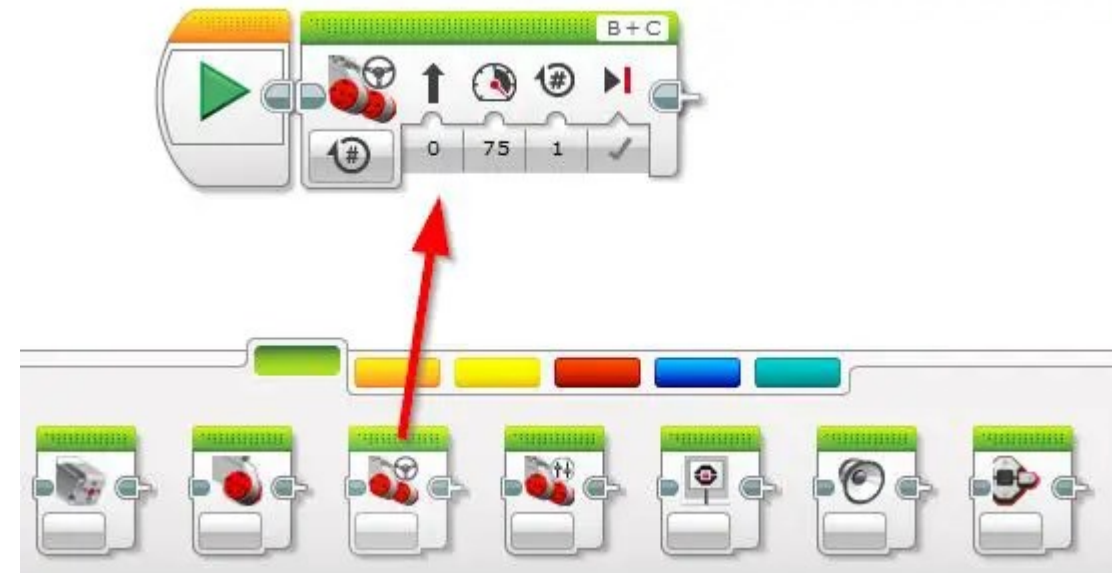
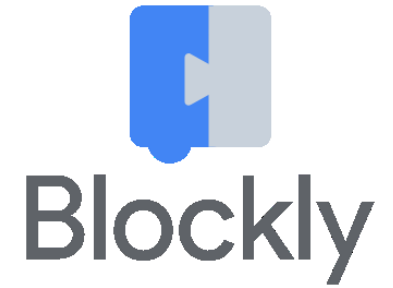


Development

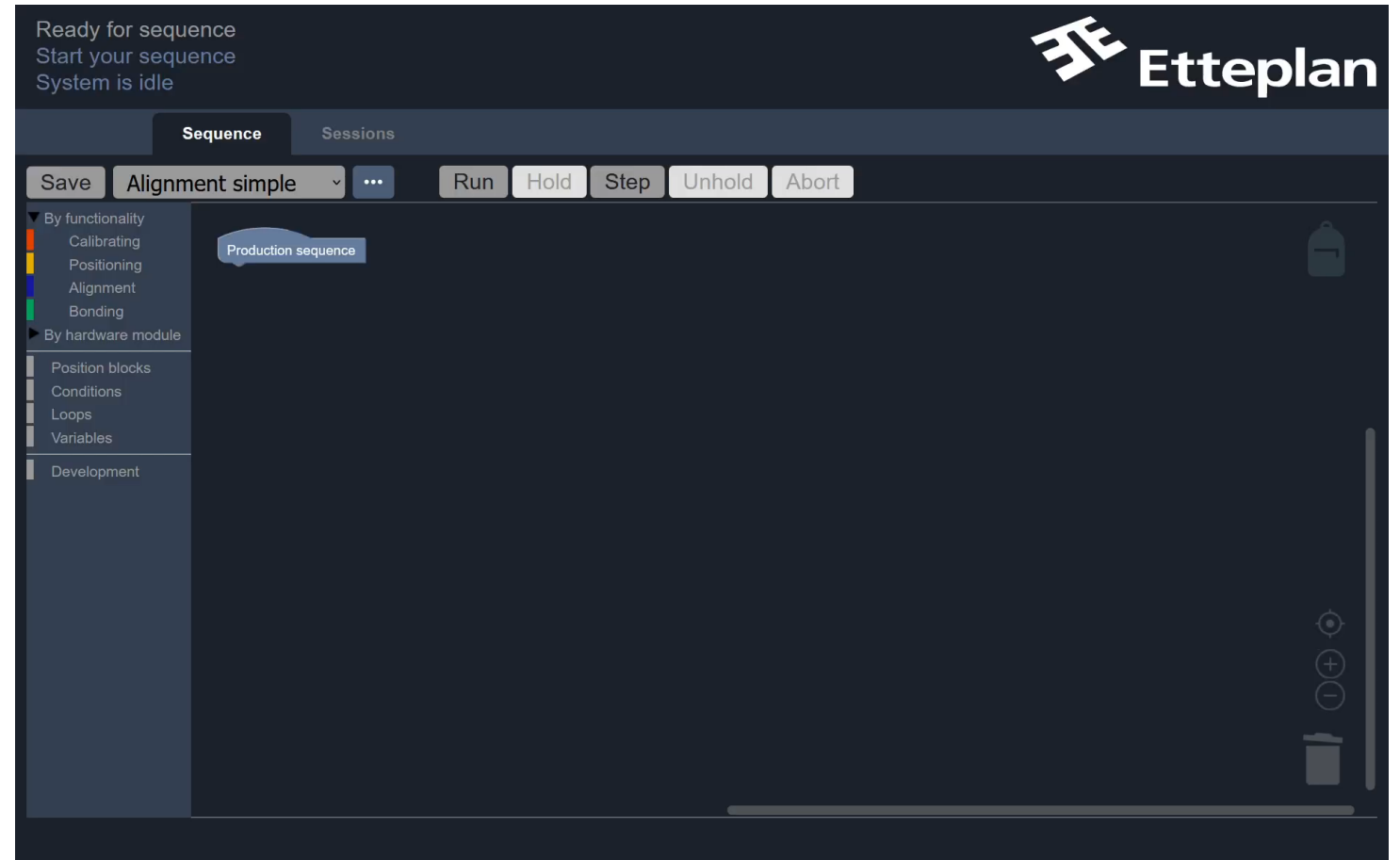
To accommodate for the short changeover time and enable:

- **Flexibility**
- **Ease of use**

we have been inspired by **Lego** and **Blockly** to develop our software innovation



Flexible Production Solution (FPS)



Ready for sequence
Start your sequence
Workspace loaded

Etteplan

SequenceSessions

SaveDispensing

RunHoldStepUnholdAbort

By functionality

CalibratingPositioningAlignmentBonding

By hardware module

GantryDispenseCure

Dispenser module

Action: Deposit droplet

Target position

Action parameters

Gantry module

Action: Jump movement

Target position

Action parameters

Positions

New entry

Name: Selected name

X 0 [mm] rX 0 [°]

Y 0 [mm] rY 0 [°]

Z 0 [mm] rZ 0 [°]

Execution of process steps via FPS, ability to step, hold and abort during process

Loops and iterations

Parametrize motion and process modules

Recipe handling and save/restore parameter sets

Ready for sequence
Start your sequence
Workspace saved successfully

Etteplan

SequenceSessions

SaveAlignment simple

RunHoldStepUnholdAbort

By functionality

CalibratingPositioningAlignmentBonding

By hardware module

GantryDispenseCure

Production sequence

Gantry module

Action: Jump movement

Target position

Action parameters

Gantry module

Action: Jump movement

Target position

Action parameters

Action: Photonic alignment

Course

Repeat 3 times

do

if

Alignment result

Pass

do

Dispenser module

Action: Deposit droplet

Target position

Action parameters

else

Hexapod module

Action: Photonic alignment

Fine

if

Alignment result

do

Dispenser module

Action: Deposit droplet

Target position

Action parameters

else

Gantry module

Action: Jump movement

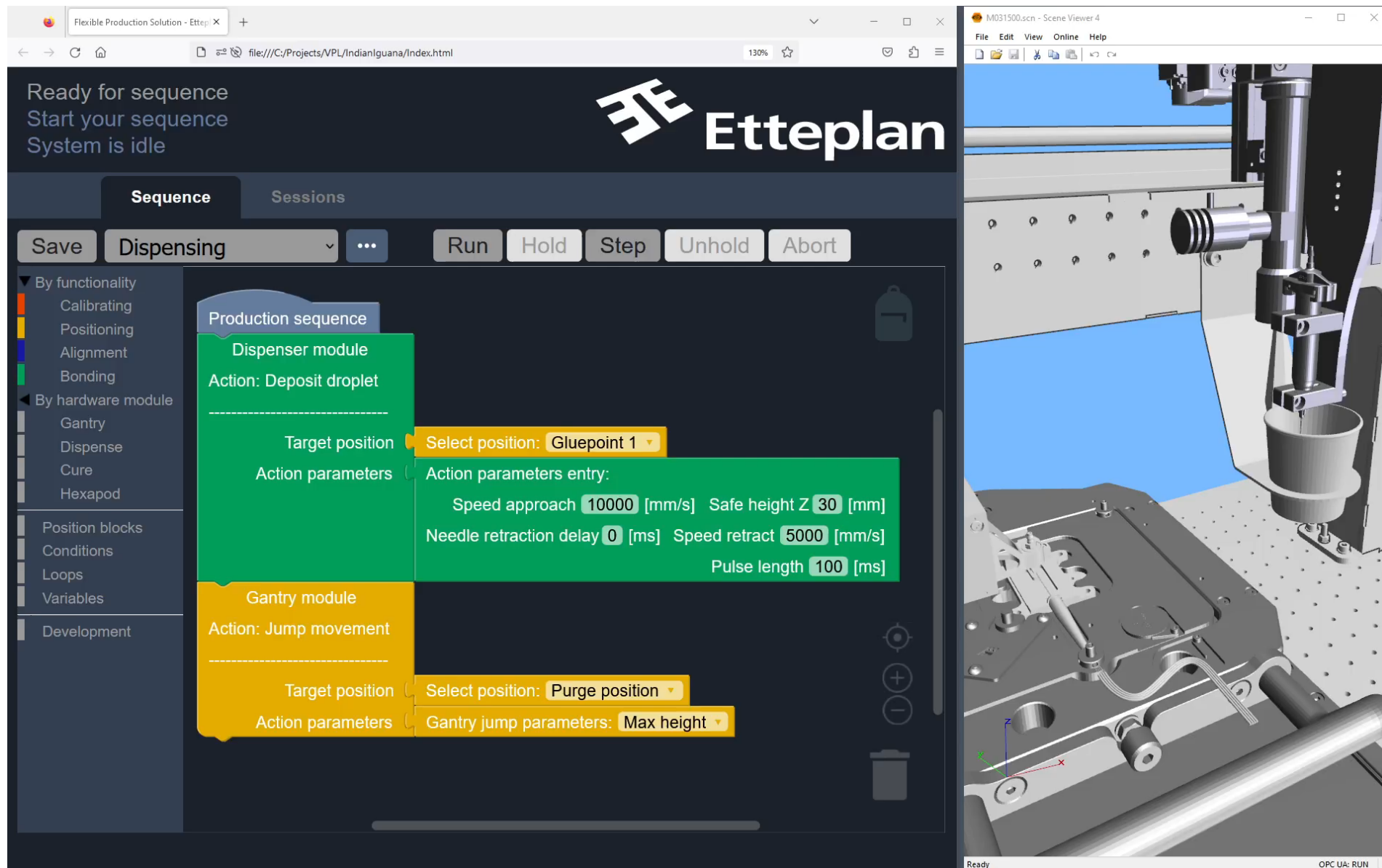
Target position

Action parameters

Ease of use: modifying a sequence by drag & drop, delete and/or copy

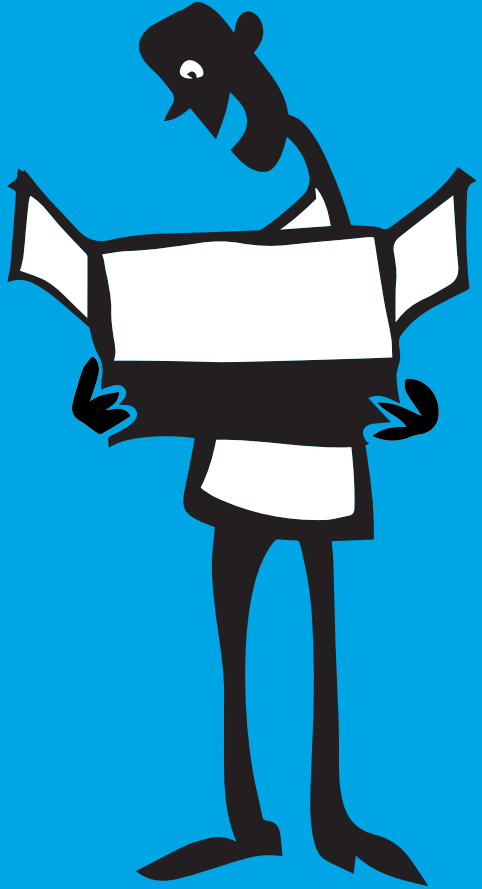
Conditional statements ie IF OK/NOK/Error Then

Key Features



Example of Gantry and Dispense configuration

Key benefits



Short changeover time

- 1 GUI for all modules
- No machine manufacturer required for changes
- Quick results on experiments for optimization

No programming

- Visual programming interface instead of scripting language/PLC/LabView environment.
- No need to search for a 'needle in a haystack' employee

Flexibility

- Add/change modules and configurations in the software by drag&drop
- Reuse of parameter sets/sequences
- Hardware almost plug & play

End-users



Businesses that design and manufacture photonic components or systems:

- **Photonic OEMs**
Startup to scale up
- **Research institutes or universities**
- **Foundries and contract manufacturers**
mid/high MIX and low/med VOLUME

Together we make light work



Special thanks to our partners

