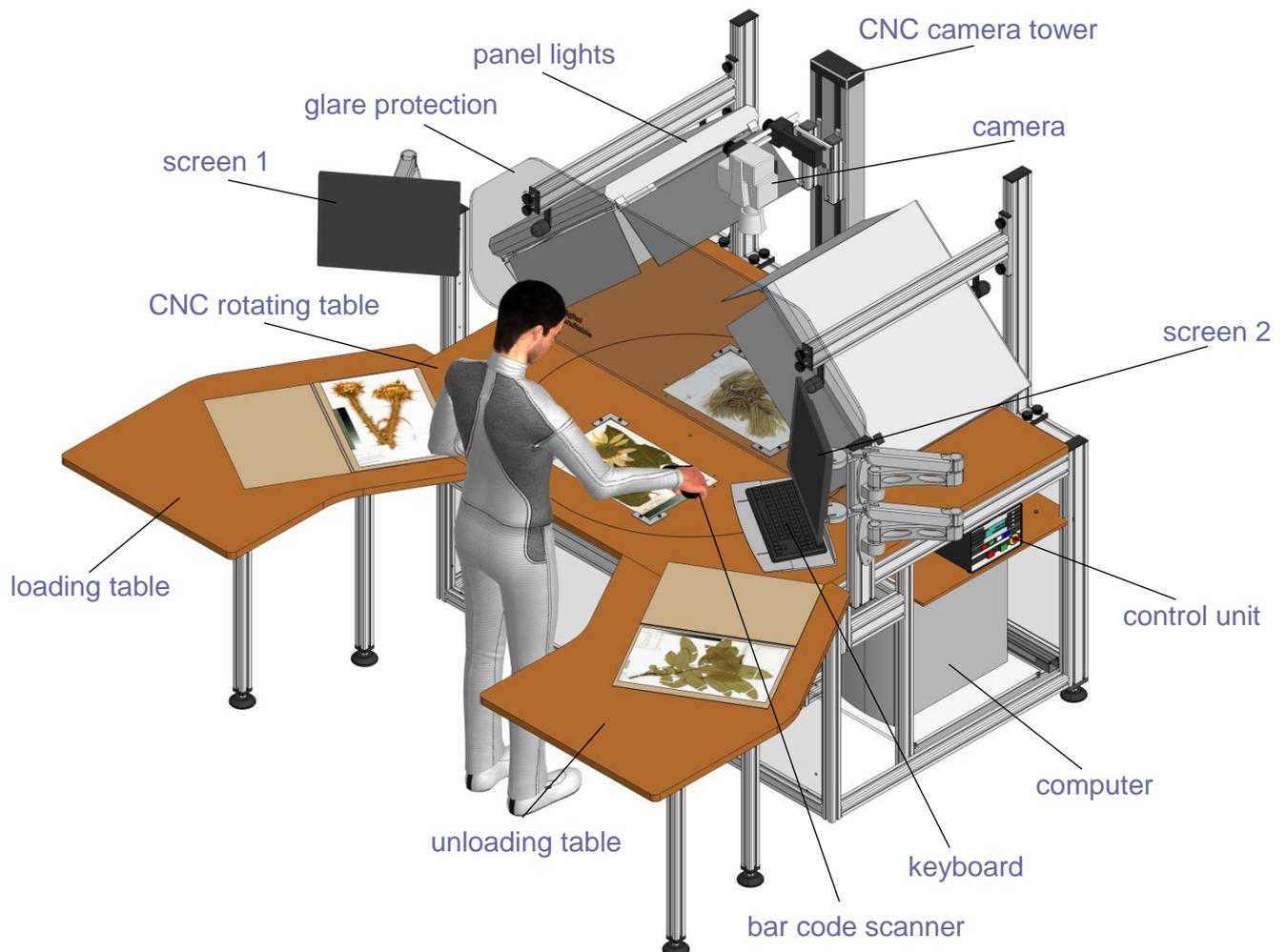# System Solution for the digitalization of plant specimens

CNC-Roundtable with employee

- ***Description of CNC Roundtable***
- ***Description of entring system***
- ***Quality assurance with calibrated screen***
- ***Software solution***
- ***Project partner***

Complete System Solution of the CNC Roundtable
Frank Geese Feinwerktechnik

Hochschule Hannover
University of Applied Sciences and Arts

General information

The CNC-Roundtable as the system solution is a modular built and also standing workplace. Industrial automation criteria should be taken in consideration as they are the main requirements for batch capturing the plant specimens. According to the requirements of the user an individual solution can be designed. Hard- and Software components are developed as standard elements, that enables a smoothly implementing or re-building of the CNC-Roundtable.

The master plan of the CNC-Roundtable is based on well-grounded scientific fundamentals at which particularly human oriented and ergonomic criteria were taken into consideration. These criteria were checked by the simulation system of the company Dassault Systemes and the results are documented in an extensively simulation study with several videos. In the Case Study it is proven, that one worker can digitize without unnecessary movements.

When purchasing an automation solution from Herbar-Digital the user can choose between several solutions:

- solution with CNC-Roundtable
- Entry-level solution

The CNC-Roundtable enables through the parallel operation the possibility of a batch capturing process with 180 specimens per hour in average. The Basement for digitizing is the high- definition camera IQ 180 with 80 megapixel and the optimal lightning of the plant specimen with panel lights.

The crucial evidence when digitizing plant specimens is an optimal digitalization quality. Next to a certain technology management the quality also needs to be checked. Basis for an explicit check-up of the digitized specimens is a calibrated graphic screen. Another option of continuous quality assurance is the use of a viewer. In automatic operations the results are automatically shown on a second screen after digitalization. That is why the user always has the optimal control over the process.

The cooperation with powerful industry partners guarantees the user a high security of investment. New cameras and software versions as well as automation components can be integrated through standardization of the complete system.

The complete System Solution of the CNC- round table with service is offered by Frank Geese Feinwerktechnik. The user gets great support when starting up the CNC- round table.

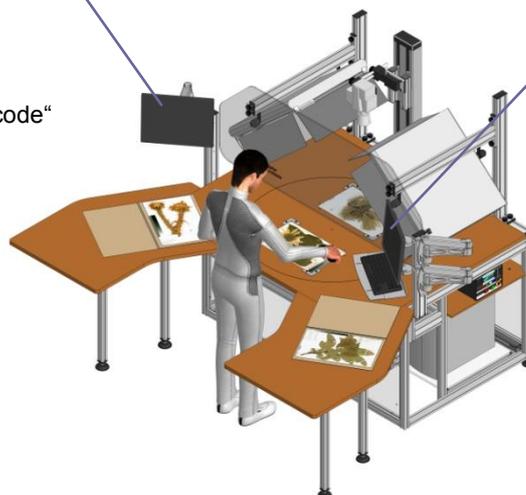### *Description of CNC-Roundtable*
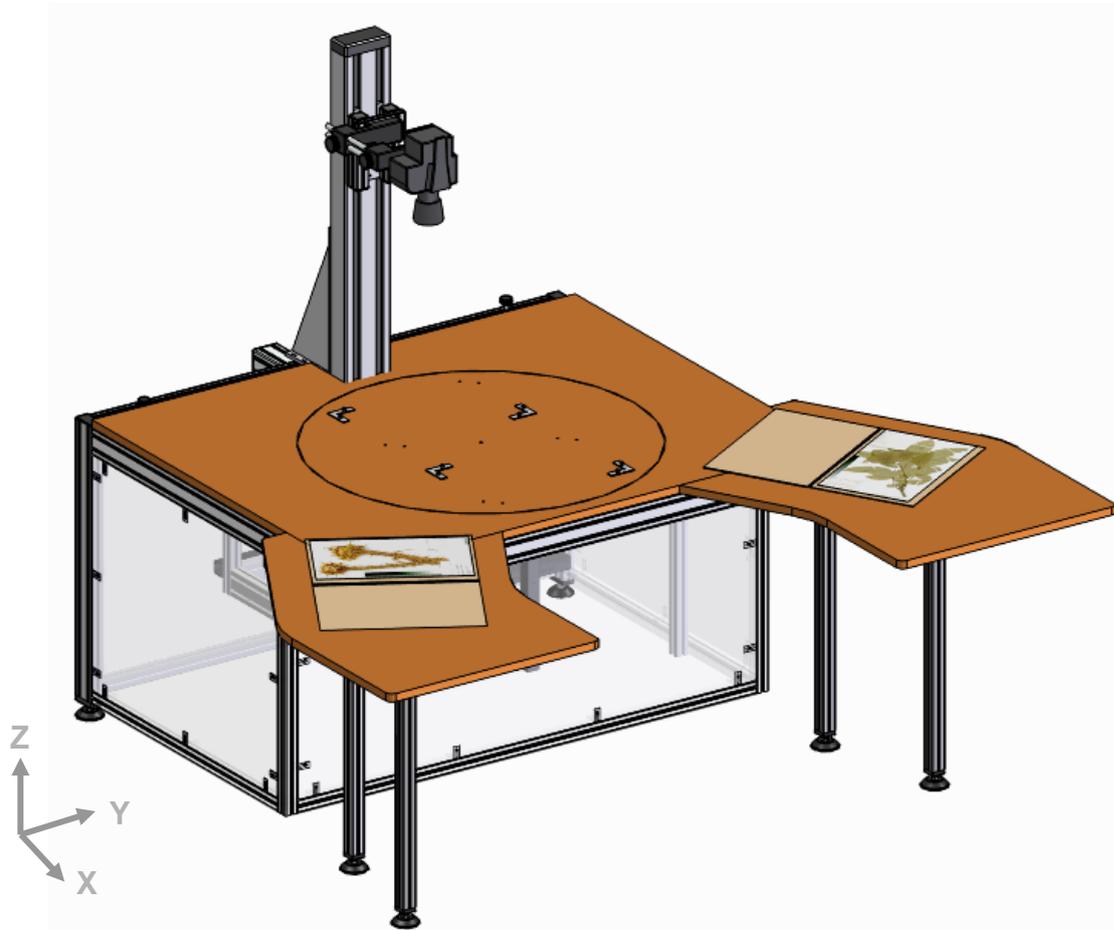

Picture 1: CNC-Roundtable in practical use
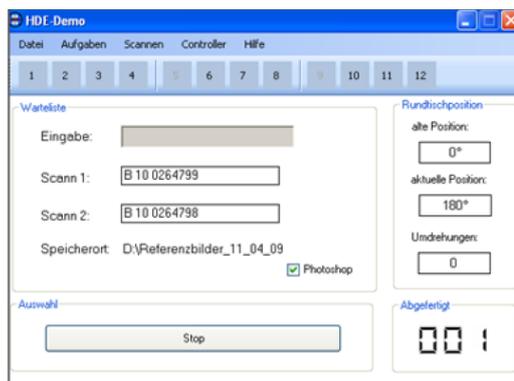
Monitor 1:
„Display barcode"

Monitor 2:
„Display of digitized plant specimens"

Picture 2: Two screen in use while batch capturing process

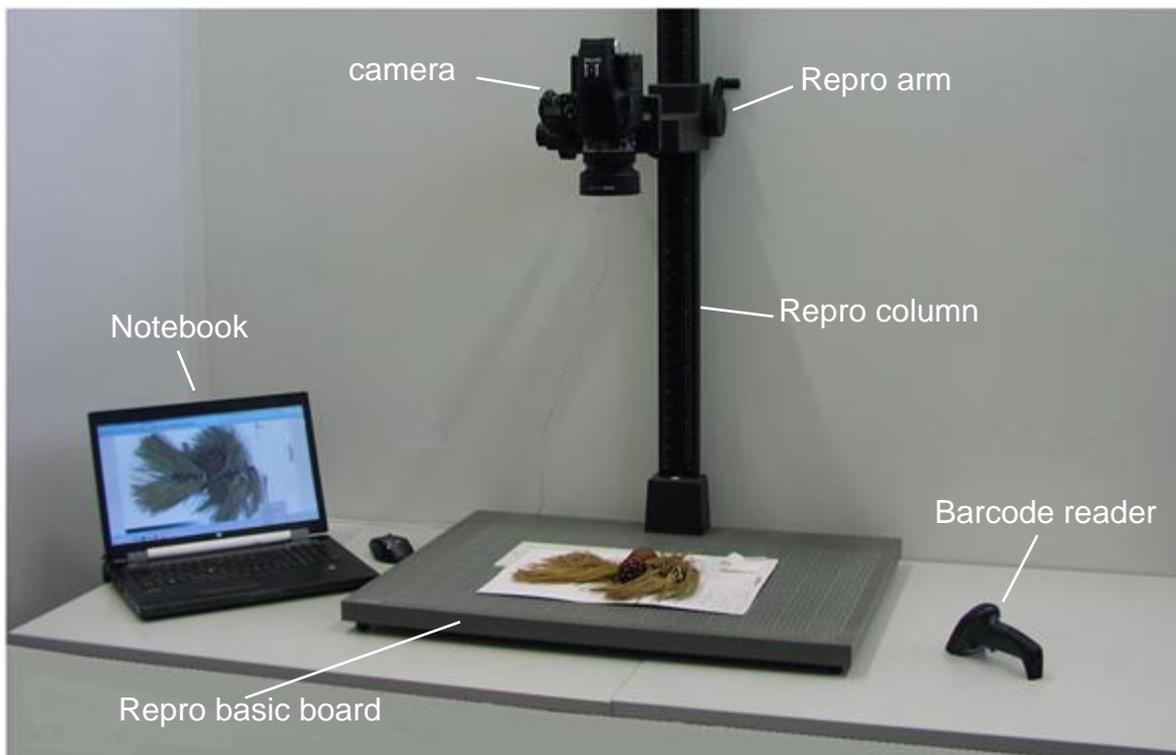
Picture 3: Dimensions of CNC-Roundtable with loading and unloading table

width (X) 2281 mm; length (Y): 2380 mm; height (Z): 1901 mm
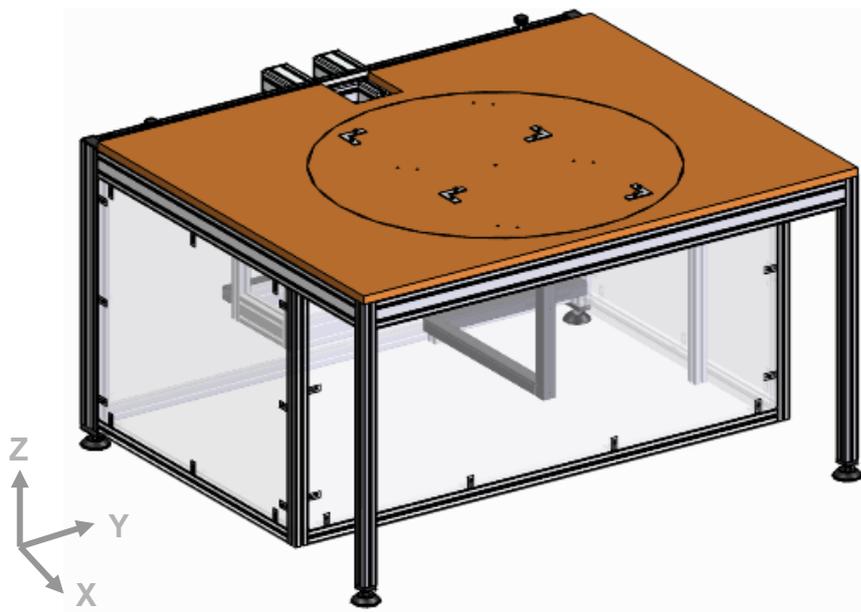
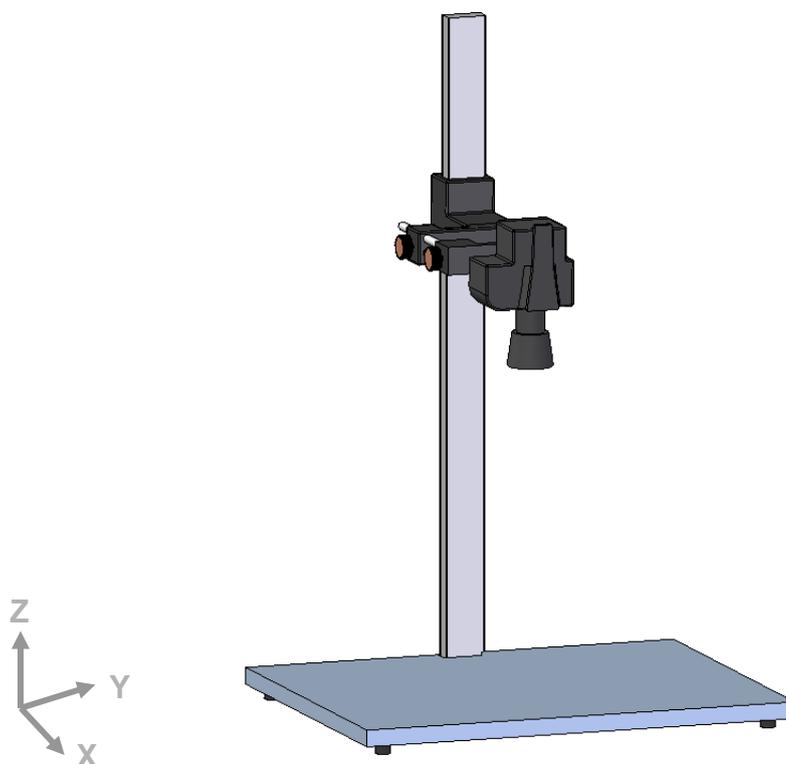Picture 4: Base dimensions of CNC-Roundtable

width (X): 1481 mm; length (Y): 1580 mm; height (Z): 900 - 1000mm

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Description of entry-level solution

Picture 5: components of entry-level solution

Picture 6: Base dimensions of entry-level solution

width (X): 600 mm; length (Y): 800 mm; height (Z): 1200 mm

The optimal quality when digitizing is achieved by additional use of panel lights, see also CNC-Roundtable.

Quality assurance with calibrated screen

Picture 7: Quato-screen for quality assurance of the digitized plant specimens

After digitizing a high amount of a plant specimen an optimal quality needs to be achieved. The calibrated graphic screen enables a professional assessment of the digitized plant specimens. The assessment criteria for plant specimens are:

- optimal image sharpness,

- optimal depth of sharpness,

- color fastness,

- no graining

The batch capturing process can only start after resetting the camera. The result is checked on this screen. It only takes a brief check-up to ensure a high quality standard.

Software solution for the CNC-operated camera tower

The height adjustment is implemented by a control computer screen. After typing in all data for position and movement speed the camera moves by pressing the operation button.

The typed data can be stored and then seen as a program. When re-using the height-setting a faulty insertion will be excluded. The control parameter for proceeding the camera is preset in a way, that a run up and block up is possible.
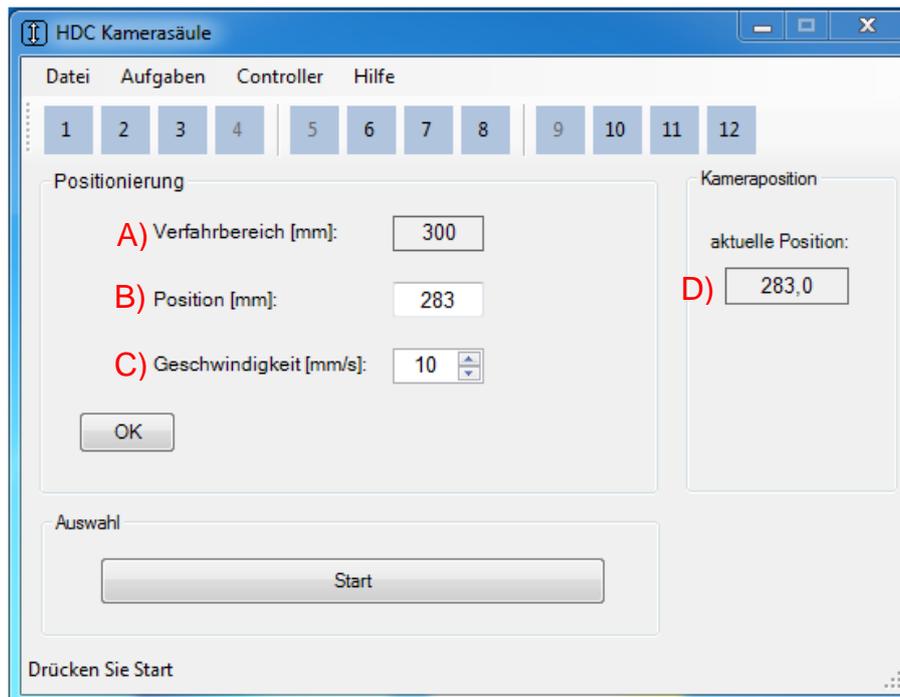

Picture 8: pop-up window for height setting of the camera

On the screen of the control computer parameter can be recalled and regulated in the pop-up window of the HDC software (**H**erbar **D**igital **C**ontrol).

- The travel range of the column (see A), is just once limited on a certain data. This protects the camera from a collision fading metal sheets of the panel lights.

- The position of the camera (see B) can be regulated to 0.01 mm. If the position is chosen bigger than the travel range, an operation won´t be possible because of security reasons.

- The process speed (see C) is entered and implemented in mm/s. After pressing the start-button the end position (see D) can be compared with the required position.

Software solution for the CNC-Roundtable

The programming of the CNC-controlled roundtable is similar to the camera tower. Entered data can be stored and then seen in a program. As a result faulty insertion can be excluded.
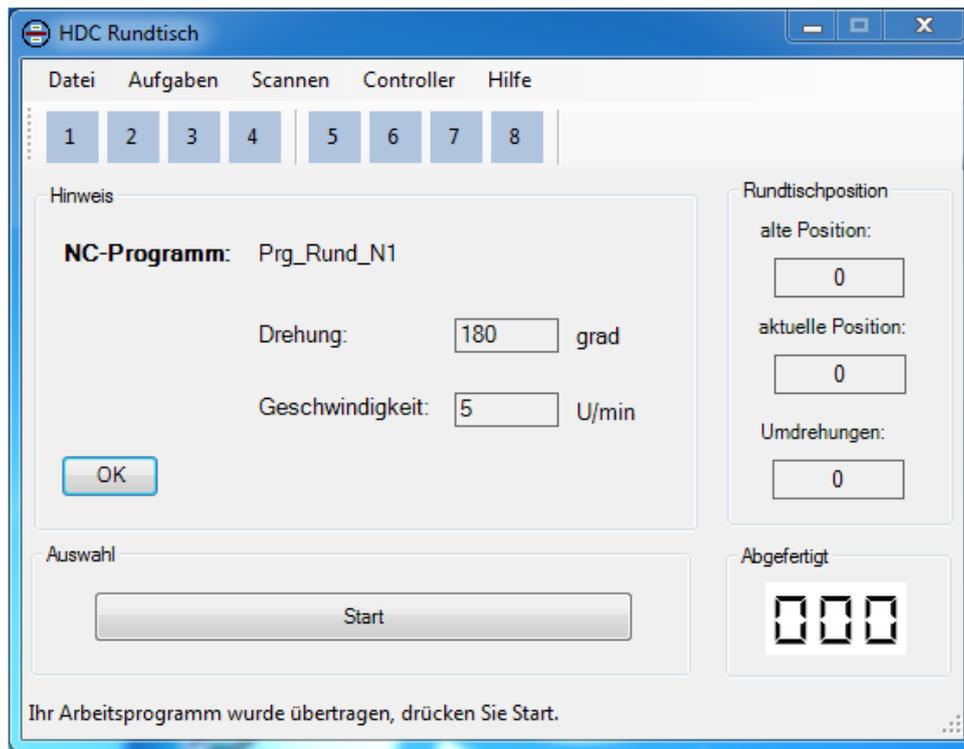
Picture 9: Dialog for NC-Program from CNC-Roundtable loading

In automatic operation of digitizing, the process is controlled by reading up the barcode. After reading up the barcode from a plant specimen the CNC-Roundtable gets started and the result is shown on a second screen. The high-resolution camera with 80 mega pixel and two panel lights guarantee high quality by digitizing.

Thanks to a drive motor the roundtable is operated quiet and jerk-free: The rotation about 180° normally takes 5 revolutions/min place. With this automation solution and ergonomic designing 180 plant specimens can be produced. The Process Simulation shows the passage of the plant specimen while digitizing.

According to industrial standards the workman load and unload the plant specimens from glare protection. This makes the entire process easier.
The worker defines the timing of the machine because the roundtable only moves on after reading up the barcode.

Partner

The project is being implemented with competent partners:

Professional camerasystem
Phase One, Köln

Plan lights
Kaiser Fototechnik, Buchen

High end proof displays
Quato, Braunschweig

Control and system techology
Isel, Eichenzell

Simulation of complete solution system
Dassault Systemes, Stuttgart

Development and coordination
University of Applied Sciences and Art,
Hannover

System Solution of the CNC- rotary table and Service
Frank Geese Feinwerktechnik, Hannover

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