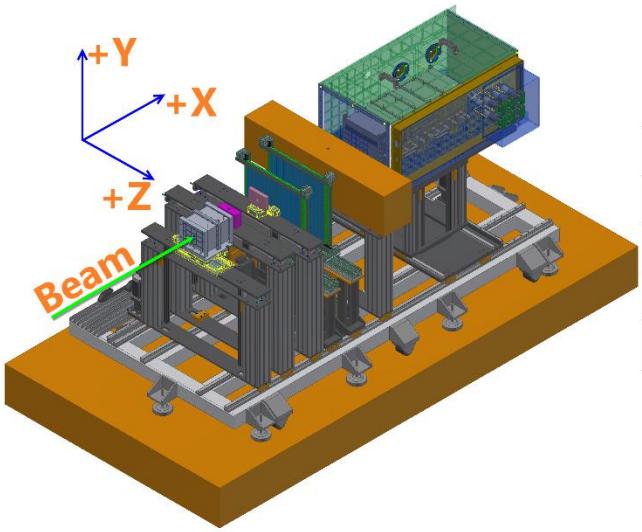
Operation manual of platform

1. COORDINATES AND CABLES

The beam line following +X direction passes through PS trigger, TRD, SCD-U, SCD-C, PSD-Bar, PSD-Tile, FIT and CALO in sequence.



TRD	SCD-U	SCD-C	PSD-Bar	PSD-Tile	FIT	CALO
X-15	X-12	X-10	X-8	X-6	X-4	X-0
Y-16	Y-13	Y-11	Y-9	Y-7	Y-5	Y-1
Z-17	Z-14	-	-	-	-	Z-2
T-18	-	-	-	-	-	T-3

Figure 1 Coordinate definition of platform with respect to the beam line

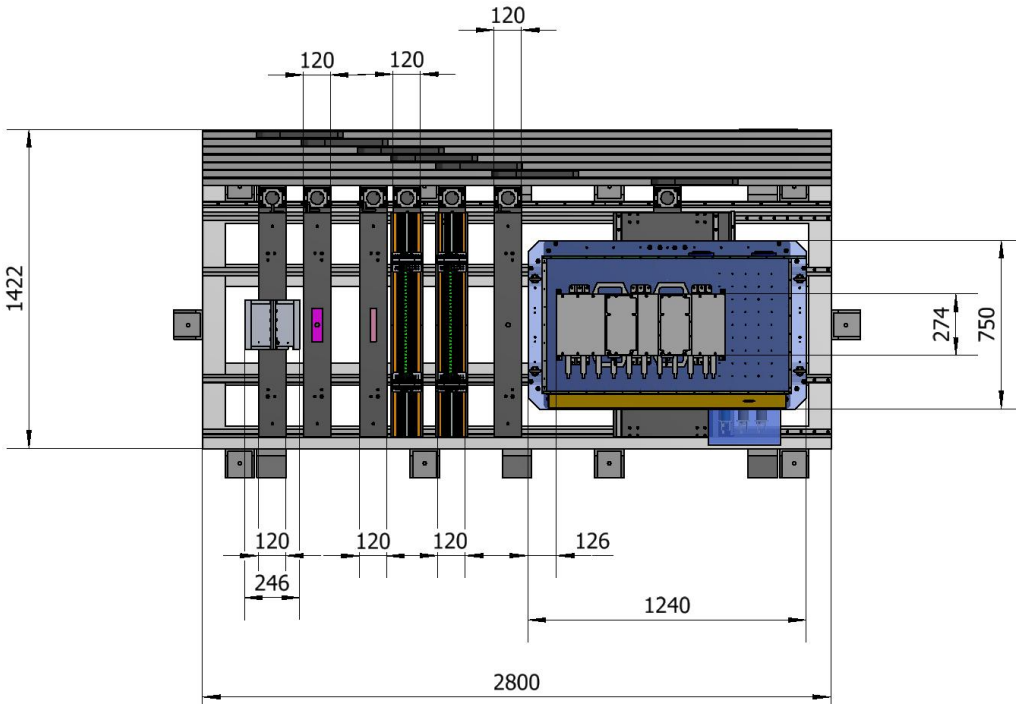


Figure 2 Platform dimensions in X & Z directions

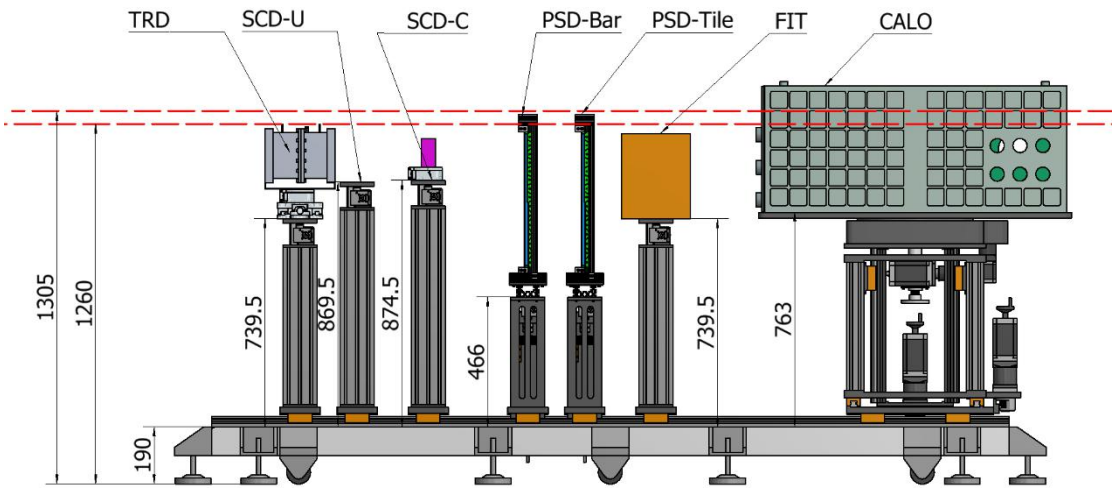


Figure 3 Platform dimensions in Y direction. The seven numbers on each individual platform show the distance from common platform to the individual platform at the lowest soft limit.

Figure 4 Connector panel on the platform

Table 1 Axis mapping of platform (Same layout as the connector panel)

CALO	FIT	PSD-Tile	PSD-Bar	SCD-C	SCD-U	TRD
X-0	X-4	X-6	X-8	X-10	X-12	X-15
Y-1	Y-5	Y-7	Y-9	Y-11	Y-13	Y-16
Z-2	-	-	-	-	Z-14	Z-17
T-3	-	-	-	-	-	T-18

2. INITIALIZE SOFTWARE

1. Double click the executive file “VBDemo” on the desktop.
2. Firstly click “Open Serial Port” button and wait for the button becoming green.
3. Secondly click “Open USB” button and wait for the button becoming green.
   Attention: When clicking this button, there might occur a “no responding” signal. It’s not a real “no responding” signal, so just wait for the button becoming green.
4. Click “LoadLimit” button before any movement. See chapter 3 for setting max & min range.
5. Perform one-step movement as described in chapter 4 or auto-scan movement as described in chapter 5.

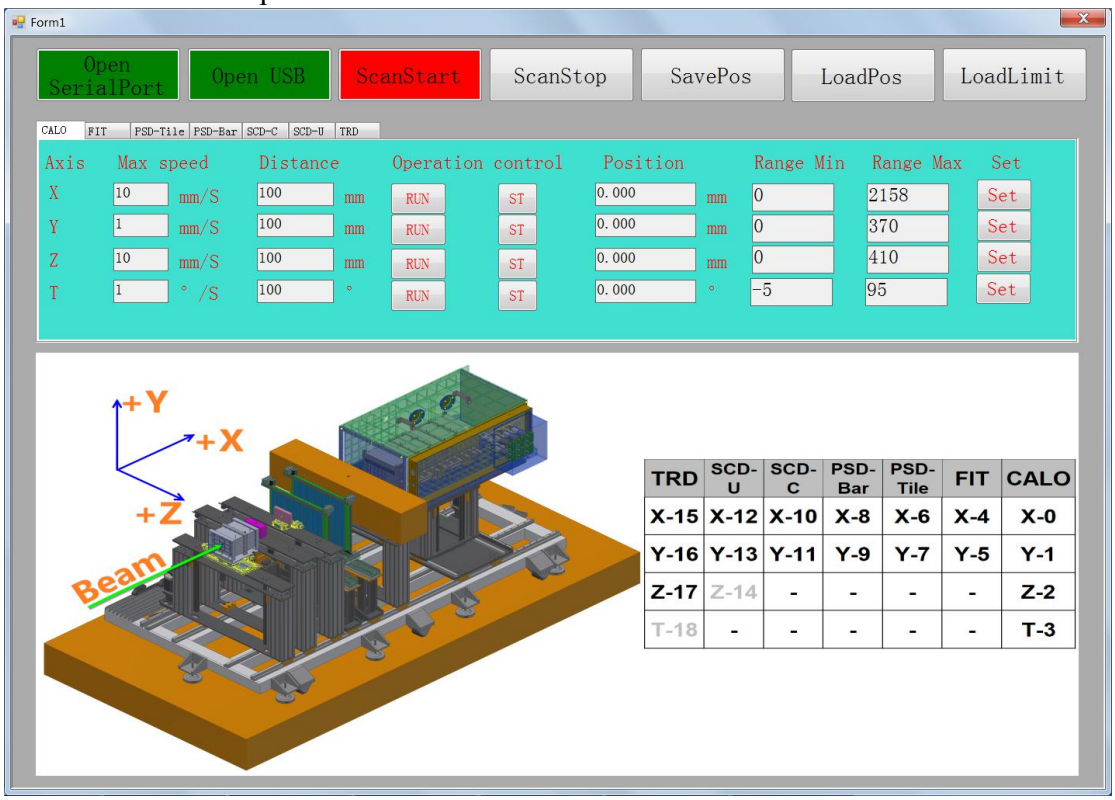


Figure 5 Interface of “VBDemo” software

Buttons on the top region of Figure 5 are for serial port initialization, USB initialization, auto-scan start, auto-scan stop, saving of current positions of 19 axes, loading of positions of 19 axes, setting of soft limits of 19 axes. By clicking “SavePos” button, a file recording the current positions of 19 axes will be generated, the name of which is the current computer time.

Single control of 7 platforms is realized in individual labels in the middle region of Figure 5. Every platform has various number of axes.

Each line below the labels represents one axis of this platform. The “Max speed”, “Distance”, “RUN” button and “ST” button are for one-step movement. The “Position” column refreshes the current position of the axis. The “Range Min”, “Range Max” and “set” button are for setting of soft limits.

3. MAX & MIN RANGE SET

To set the upper and lower limit of each axis, import the file named "axis_limits.txt", which records each axis' max & min range.

The file is written in txt format, and can be modified as the format "axis No. min range max range". The zero point of axis has been set to 10mm above the lower bound for safety reason.

Example

0 1 380

Represents the min range of axis 0 is 1mm, the max range of axis 0 is 380mm

Table 2 Axis mapping and moving information

Axis no.	Detector	Axis	Range MIN (mm)	Range MAX (mm)	RECOMMENDED SPEED (mm/s)
0	CALO	X	0	2158	30
1	CALO	Y	0	370	1
2	CALO	Z	0	410	10
3	CALO	T	-5 (deg)	95 (deg)	0.9 (deg/s)
4	FIT	X	0	2158	30
5	FIT	Y	0	410	1
6	PSD-Tile	X	0	2158	30
7	PSD-Tile	Y	0	550*	1
8	PSD-Bar	X	0	2158	30
9	PSD-Bar	Y	0	550*	1
10	SCD-C	X	0	2158	30
11	SCD-C	Y	0	380	1
12	SCD-U	X	0	2158	30
13	SCD-U	Y	0	380	1
14 (NOT USED)	SCD-U	Z			
15	TRD	X	0	2158	30
16	TRD	Y	0	380	0.5
17	TRD	Z			
18 (NOT USED)	TRD	T			

** With the current setting of soft limit, the highest position of PSD-tile and PSD-bar may not meet the requirement at PS beam line which is 1350 mm above ground. See* Figure 3 *for details. 190mm+466 mm+100 mm(interface panel)+550mm(range) = 1306 mm.*

The soft limit of each axis can also be individually set at the right of its corresponding line in the software interface, by filling in "Range Min" and "Range Max" and pressing "set" button.

4. ONE-STEP MOVEMENT

Attention: The speed of Y direction of all platform is recommended to be set to no more than 3 mm/s. Speed over 3 mm/s may cause the platform to move in wrong distance.

For one-step movement, at the corresponding line fill in maximum speed (in unit of mm/s or deg/s), relative moving distance (in unit of mm or degree), and press "RUN" button. In case of emergency, press "ST" button, which means STOP. The "Position" column refreshes the current position of the axis.

To move CALO 10 cm in X direction with the speed of 1 cm/s, insert 10 in first textbox, 100 in second textbox, and then press RUN. -100 in second textbox means that the CALO moves in opposite direction with 10 cm length.

To move CALO 10cm in Y direction with the speed 0.1cm/s, insert 1 in first textbox, 100 in second textbox, and then press RUN. -100 in second textbox means that the CALO moves in opposite direction with 10cm length

To move CALO 10cm in Z direction with the speed 1cm/s, insert 10 in first textbox, 100 in second textbox, and then press RUN. -100 in second textbox means that the CALO moves in opposite direction with 10cm length.

To move CALO 10 degree in T direction with the speed 0.9 deg/s, insert 0.9 in first textbox, 10 in second textbox, and then press RUN. -10 in second textbox means that the CALO moves in opposite direction with 10 degree.

Attention: The speed of T direction must be 0.9 deg/s, speed over 0.9deg/s or less than 0.9 deg/s may both cause problem.

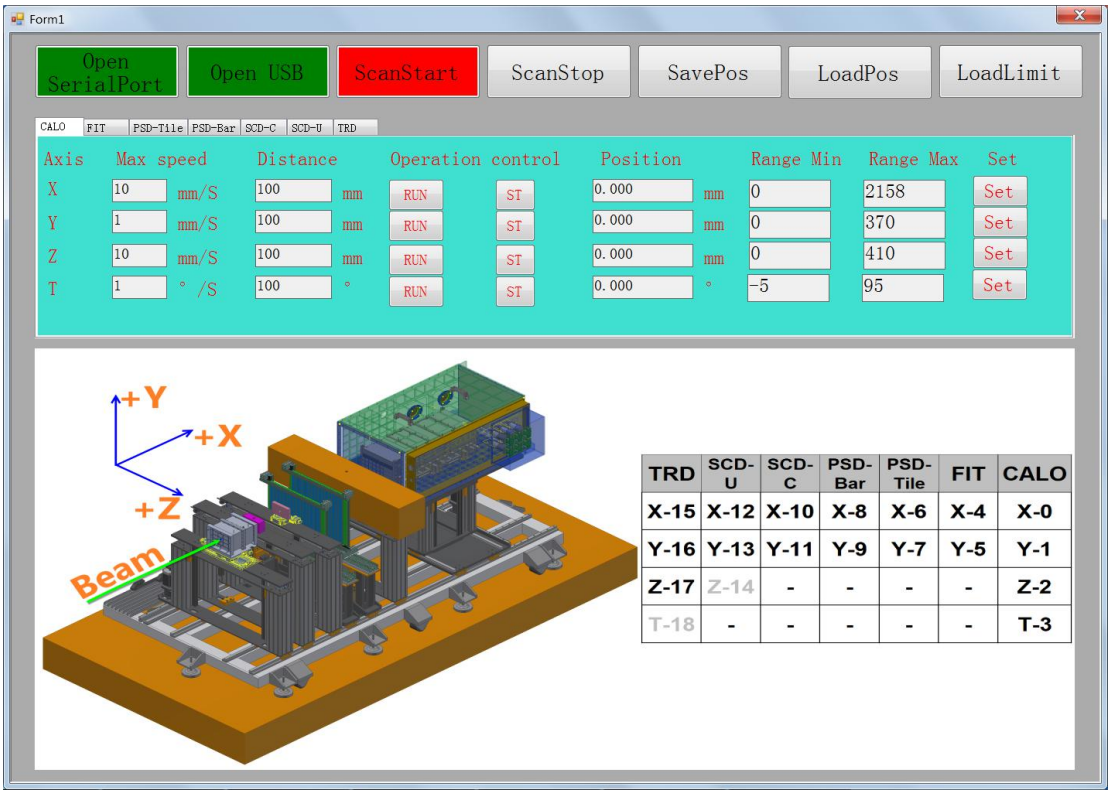


Figure 6 CALO software interface

To move FIT 10cm in X direction with the speed 5cm/s, insert 50 in first textbox, 100 in second textbox, and then press RUN. -100 in second textbox means that the FIT moves in opposite direction with 10cm length. In case of emergency, press ST, which means STOP.

To move FIT 10cm in Y direction with the speed 0.3cm/s, insert 3 in first textbox, 100 in second textbox, and then press RUN. -100 in second textbox means that the FIT moves in opposite direction with 10cm length. In case of emergency, press ST, which means STOP.

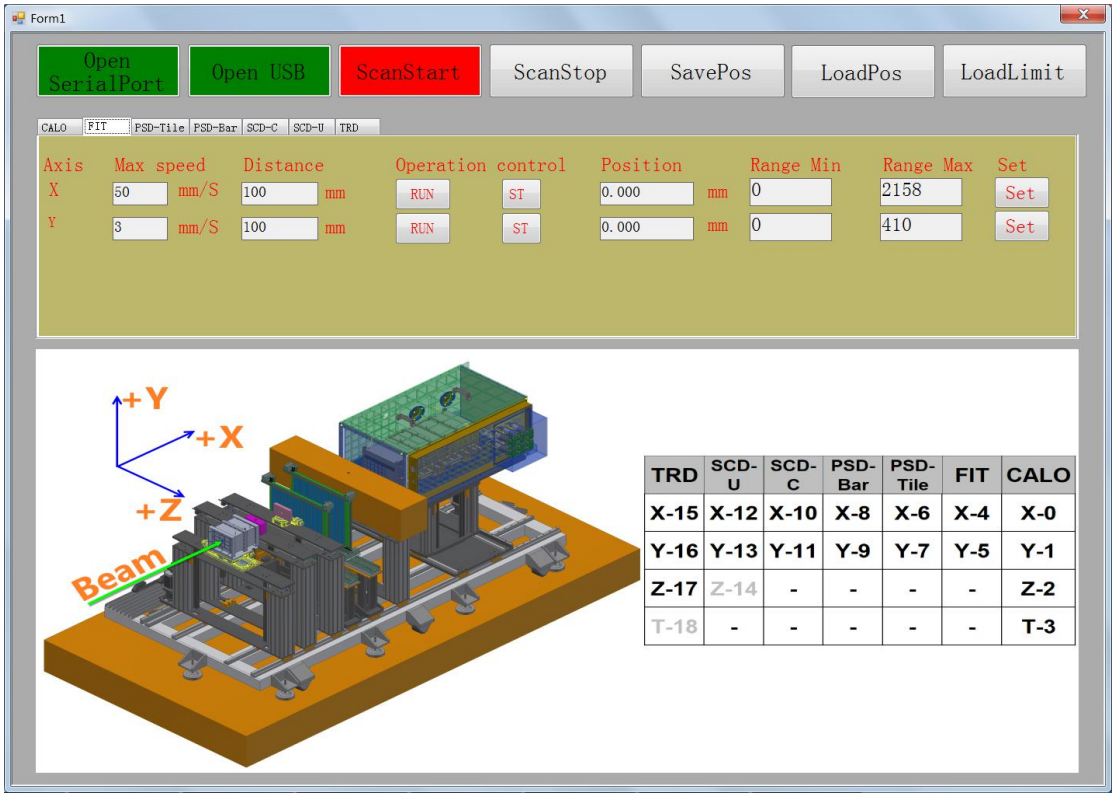


Figure 7 FIT software interface

To move PSD-TILE 10cm in X direction with the speed 5cm/s, insert 50 in first textbox, 100 in second textbox, and then press RUN. -100 in second textbox means that the PSD-TILE moves in opposite direction with 10cm length. In case of emergency, press ST, which means STOP.

To move PSD-TILE 10cm in Y direction with the speed 0.3cm/s, insert 3 in first textbox, 100 in second textbox, and then press RUN. -100 in second textbox means that the PSD-TILE moves in opposite direction with 10cm length. In case of emergency, press ST, which means STOP.

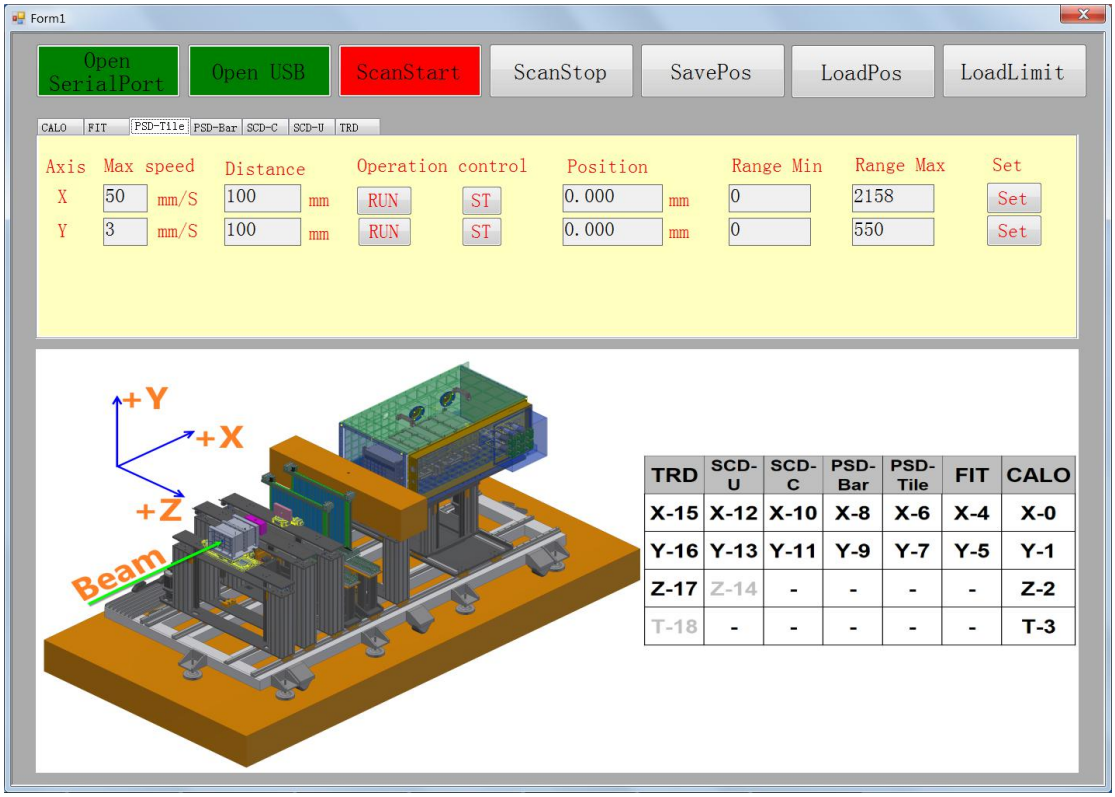


Figure 8 PSD-TILE software interface

To move PSD-BAR 10cm in X direction with the speed 5cm/s, insert 50 in first textbox, 100 in second textbox, and then press RUN. -100 in second textbox means that the PSD-BAR moves in opposite direction with 10cm length. In case of emergency, press ST, which means STOP.

To move PSD-BAR 10cm in Y direction with the speed 0.3cm/s, insert 3 in first textbox, 100 in second textbox, and then press RUN. -100 in second textbox means that the PSD-BAR moves in opposite direction with 10cm length. In case of emergency, press ST, which means STOP.

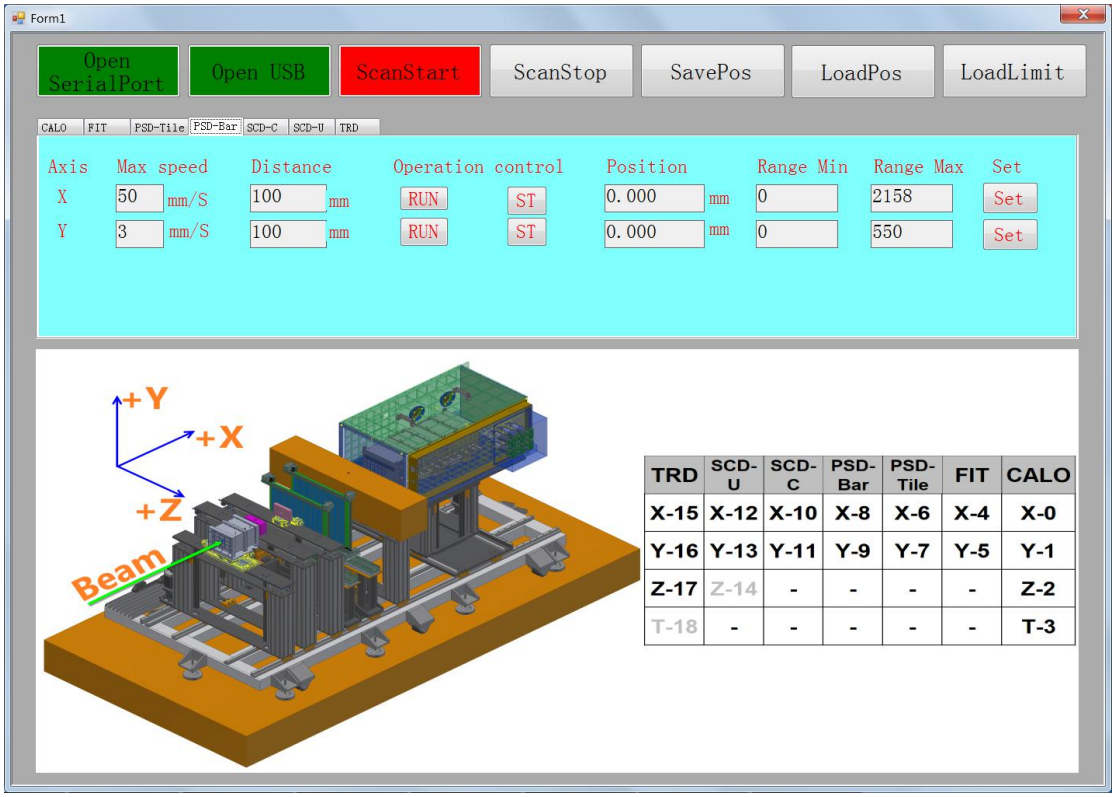


Figure 9 PSD-BAR software interface

To move SCD-C 10cm in X direction with the speed 5cm/s, insert 50 in first textbox, 100 in second textbox, and then press RUN. -100 in second textbox means that the SCD-C moves in opposite direction with 10cm length. In case of emergency, press ST, which means STOP.

To move SCD-C 10cm in Y direction with the speed 0.3cm/s, insert 3 in first textbox, 100 in second textbox, and then press RUN. -100 in second textbox means that the SCD-C moves in opposite direction with 10cm length. In case of emergency, press ST, which means STOP.

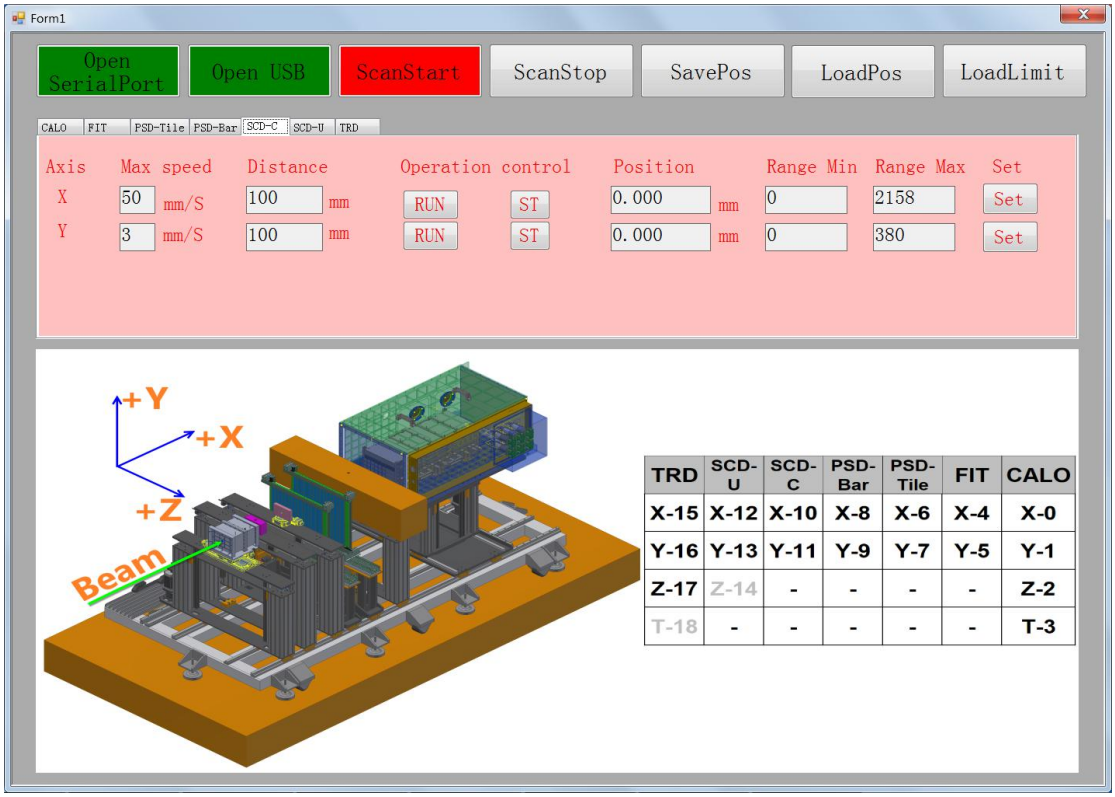


Figure 10 SCD-C software interface

To move SCD-U 10cm in X direction with the speed 5cm/s, insert 50 in first textbox, 100 in second textbox, and then press RUN. -100 in second textbox means that the SCD-U moves in opposite direction with 10cm length. In case of emergency, press ST, which means STOP.

To move SCD-U 8cm in Y direction with the speed 0.3cm/s, insert 3 in first textbox, 80 in second textbox, and then press RUN. -80 in second textbox means that the SCD-U moves in opposite direction with 8cm length. In case of emergency, press ST, which means STOP.

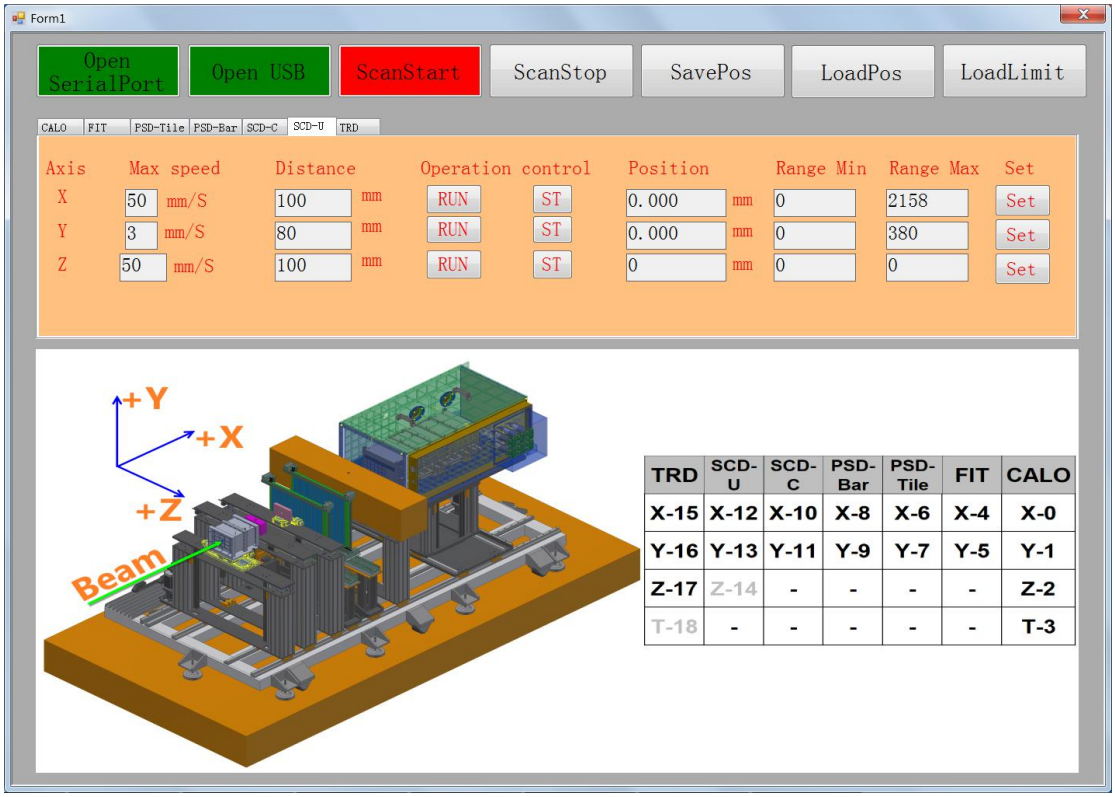


Figure 11 SCD-U software interface

To move TRD 10cm in X direction with the speed 1cm/s, insert 10 in first textbox, 100 in second textbox, and then press RUN. -100 in second textbox means that the TRD moves in opposite direction with 10cm length. In case of emergency, press ST, which means STOP.

To move TRD 0.1cm in Y direction with the speed 0.3cm/s, insert 3 in first textbox, 1 in second textbox, and then press RUN. -1 in second textbox means that the TRD moves in opposite direction with 0.1cm length. In case of emergency, press ST, which means STOP.

Attention: TRD can not move in Z direction precisely at present.

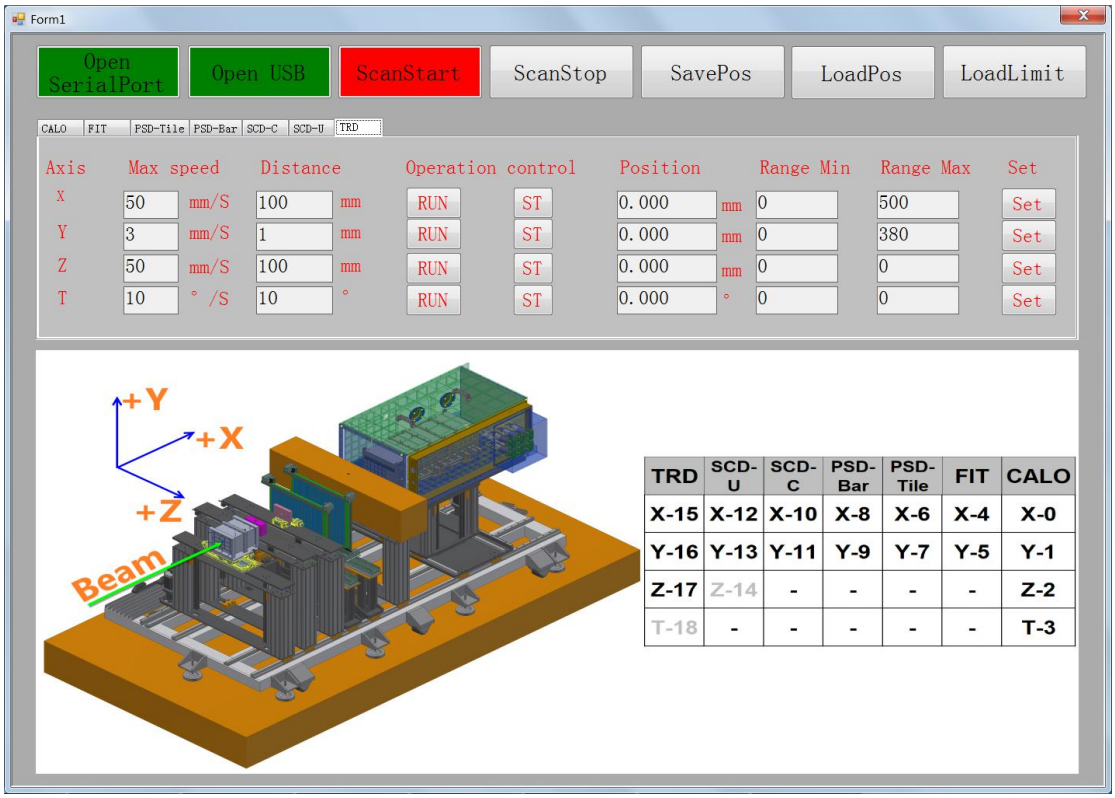


Figure 12 TRD software interface

5. AUTO-SCAN MOVEMENT

To implement an auto-scanning of a detector, three procedures should be followed,

1. Preparation of auto-scanning file
   The auto-scanning file is in ASCII txt format.
   The motors are operated by lines in serial written in the auto-scanning file. Each line contains 4 parameters: axis no., maximum moving speed, moving distance, stand-by time.
   1) Axis no. ranging from 0 to 18. The axis mapping can be seen in Table 2.
   2) Maximum moving speed, in unit of mm/s. set to 4 for safety reason.
   3) Moving distance, in unit of mm. Relative distance compared to current position.
   4) Stand-by time, in unit of second. Time required to stay at the target position.

   Example
   0 5 -20 0
   1 4 30 60
   This example asks CALO X to move 20mm in - direction, and asks CALO Y to move 30 mm in + direction, and asks platform to stay still for 60 seconds.

2. Click the "ScanStart" button on the software, and select the auto-scanning file. The file will be implemented immediately.
   In case of emergency, click the "ScanStop" button to stop the auto-scanning.
   Note: When auto-scan program is started, the software will automatically generate a txt file to record the positions of 19 axes every second. This file is named with the current computer time and is saved in current directory. In the file, each line records 19 positions of axes starting from axis 0 to axis 18, in unit of mm or degree at the current second tick.

3. Click the "ScanStop" button when the scanning is finished.
   The position auto-recording will be stopped.