

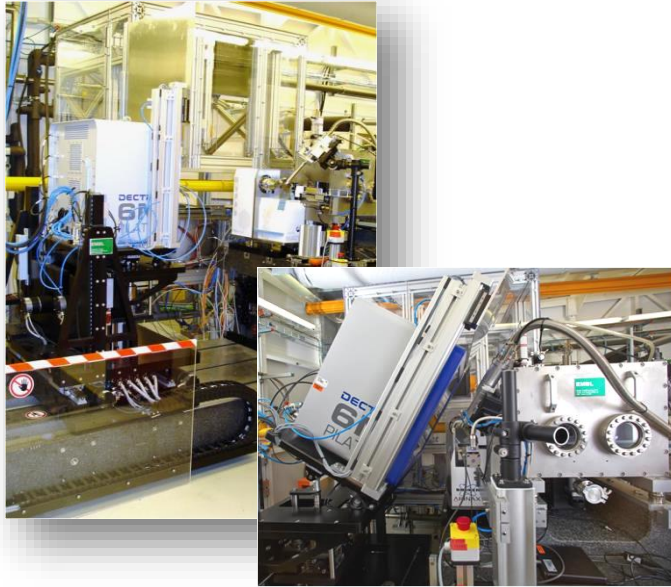
Marvin Update - Robotic Sample changers at the EMBL-Hamburg

Uwe Ristau
Senior Controls Engineer
Instrumentation Group
EMBL-HH



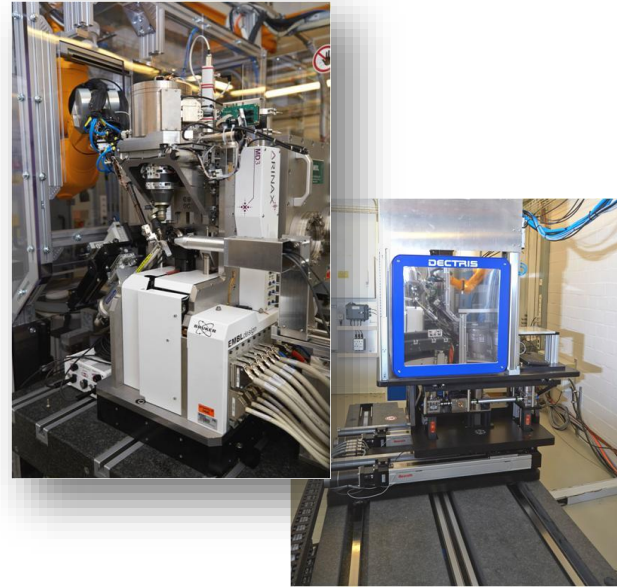
EMBL MX beamlines at PETRA III

P13



- Tunable from 4-20 keV, He-beam path option, detector stage for large 2 angles.
- Horizontal axis MD2 diffractometer.
- PILATUS 6M pixel detector.

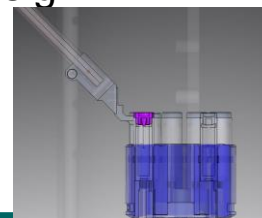
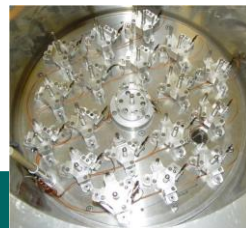
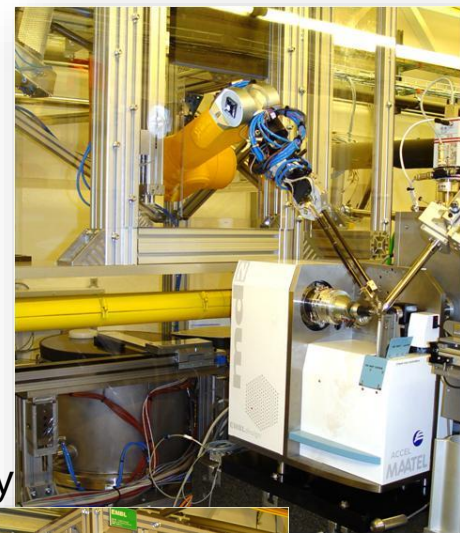
P14



- Focus adjustable from top-hat to microfocus; tunable from 6-35 keV, CRL + KB optics.
- Vertical axis MD3 diffractometer.
- PILATUS 6M pixel detector.

Marvin Features

- Capacity: 170 Samples
- Mount/Dismount(sample in air) 10s / Overall mounting 30s/
Changing of Pucks 30s
- SPINE standard Mounting with Vial
- Load / Eject Pucks into dewar by the robot
- Hanging/standing Robot installation to mount on MD2/3
- Closed environment (robot cage) for personal safety/ device safety
- Low humidity inside the cage: dew point -20 deg
- Quick Robot Gripper exchange <1h
- Smooth dewar nitrogen filling due to communicating tube
- Simple mechanical grippers, simple dewar design



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P14 Additional Features

- Mounting on 3 predefined positions
 - Unfocused Beam
 - Horizontal focused Beam
 - Double focused Beam



Marvin Client

Robot Cage Door Open | Person Danger Robot Cage Alarm

MountSample Puck 2 | Position PUCKS inside the dewar. | CenterToBase
DismountSample Sample 1 | BaseToCenter
MD3MountPos undefined | SampleMounted No

Load / Eject Puck from/to the Dewar
LoadPuck | EjectPuck
ExpTblSafe
ExpTblInPos

DewarLid Sample MD3 SmartMagnet

Puck1 Puck7 Puck13
Puck2 Puck8 Puck14
Puck3 Puck9 Puck15
Puck4 Puck10 Puck16
Puck5 Puck11 Puck17
Puck6 Puck12

RobotBusy
LoadPos
CenterPuck

OxygenLevel | Marvin N2O Filling Alarm
OpenGripper | CloseGripper | DetTransSafe
OpenDewarLid | CloseDewarLid | DetTransPos
DryGripper | -2500

Command Progress | MD3 StatusString | Waiting Sample Transfer

Command Log
9/28/2016;10:58 AM;OpenGripper
9/28/2016;10:58 AM;MountSample
9/28/2016;10:59 AM;MountSample
9/28/2016;10:59 AM;MountSample
9/28/2016;11:00 AM;DismountSample

MarvinStatus
Outy:Gui:Opn;Trsf:Off;MD:MoReq;CDor:Cls;CPuck: 0 ;Val:Err;VDet: No;Dry:On
;Prgs:65;PSw:32, 13, 5;SDet:No;SRPos:DryGripSysSNrPNr: 1 , 1
Sys:Rsv:Rob:IdLi:Gro:Bsv:Lid:Oon:Mas:Off;Crv:In:Gui:Oon:Trsf:

error out | error out 3
status code | status code
source | source

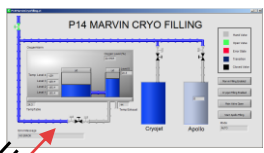
Marvin Controls

FESTO CPX
Pneumatic Ctrl

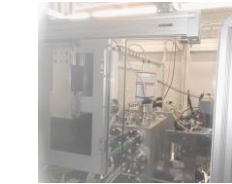


EtherCat

Visu/PLC TINE



PuckSwitches
Interlocks
Temperatures
Heaters
Level sensors
.....



Cryo Translation



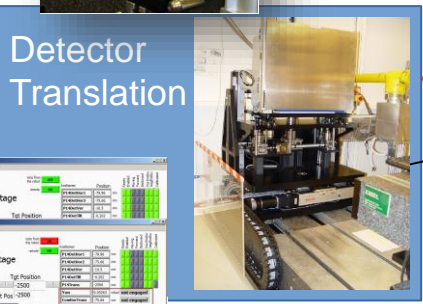
Handshake
MD2/3



Profibus/
Ethercat



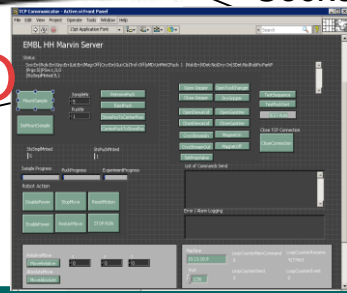
TCP/IP
Socket



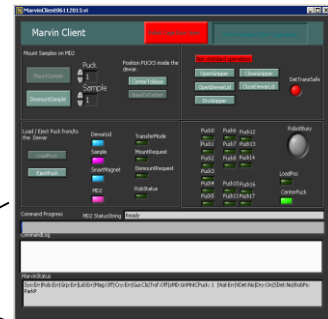
Detector
Translation

VETO

TINE



TINE



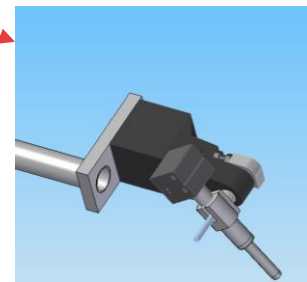
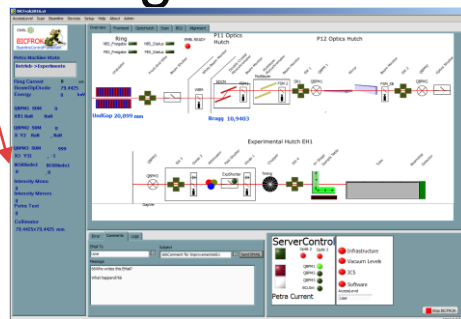
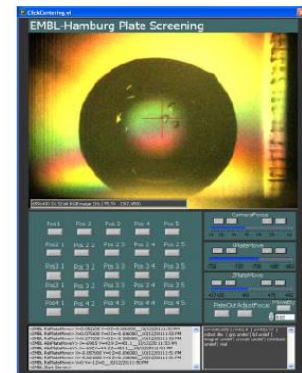
MxCube
N-Clients



Potential system improvements

Plate Screening @ P13

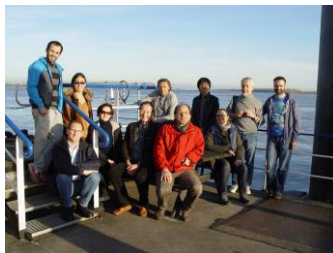
- Plate Screening by Robot
- Barcode reading
- Integration miniSpine
- Automatic loading of Pucks
From transport Dewar by robot
- Marvin BICFROK integration
- Alarm System integration



Acknowledgements

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