Appendix A –
Description of the subject of the contract for the delivery of the experimental table for the PolyX beamline at the SOLARIS National Synchrotron Radiation Centre

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TOC

1. INTRODUCTION

The subject of the contract is the delivery of an experimental table for the PolyX beamline at the SOLARIS National Synchrotron Radiation Centre. PolyX is planned as a general purpose multimodal beamline for X-ray micro-imaging and micro-spectroscopy.

The scope of supply is a table consisting of a 5 degree-of-freedom actuation system that will be used for mounting of x-ray optics, motorized stages and detectors. The table load should be designed for a load of at least 500kg.

The vertical jacks and later slides should be driven by 2-phase stepper motors. The base of the table should be made of a granite slab. Table top should be an optical table (Nexus or equivalent).

2. TABLE ORIENTATION

Φ_X	roll
Φ_Y	pitch
Φ_Z	yaw
X	beam direction
Y	horizontal
Z	vertical

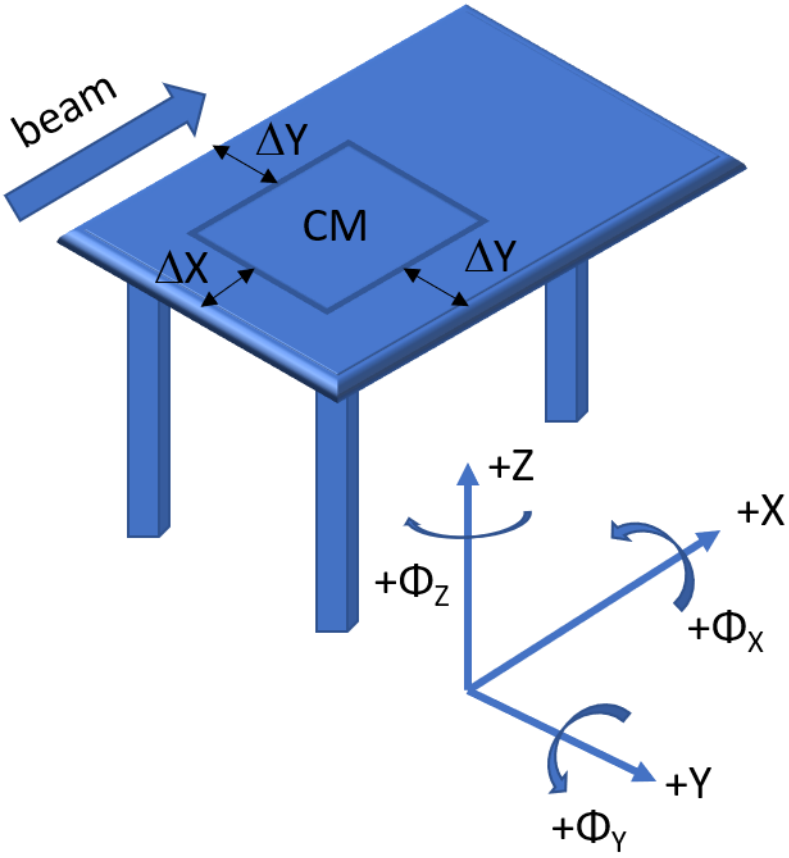

Figure 1. Definition of coordinate system and table orientation. The rectangle marks the possible position of the load's center of mass.

3. TECHNICAL SPECIFICATION

The main features of the table:

1. Range of travel of jacks (vertical): 100mm set at +/- 50mm

2. <3 micron repeatability limit switches mounted on each jack.

a. Used as Home reference switches

3. Lateral adjustment of the table via two motorised slides, each slide moved common distance for Y motion to occur. Range of travel: 100mm

4. Yaw motion produced by two motorised slides each slide moving different distances.

5. <3 micron repeatability limit switches mounted on lateral slide

a. Used as Home reference switches

6. Motor gear box should brake all lateral motions

7. Screw jacks on vertical jacks should maintain position with any loss of power

8. Linear incremental encoders should be fitted to all axis

9. The 3 jacks interface to the table base should be made via kinematic supports. This Vee, Cone & Flat will should allow all required motions to occur.

10. Table top height from floor level of (750+/-15) mm at mid position.

11. Load capacity up to 500kg. Allowable position of the center-of-mass of the load: 1000 mm >ΔX>400mm, where ΔX denotes the distance from the table edge supported by two jacks, 500 mm >ΔY>350mm (see Fig. 1).

12. Table should be mounted on a granite slab at least 100mm thick with dimensions of at least 1500 mm x 820 mm. Smaller dimensions should be agreed prior to the Final Design.

13. Three levelling wedges (eg. Nivell SK25AV) should be mounted to the granite base.

14. Three jackable castors should enable the motion of the table and an easy positioning it.

15. Table top size 2000mm x 1000mm x 210mm breadboard from Nexus Thor Labs model T1020C M6 * 25mm spacing holes

16. Oriental step motors (2 -phase) or equivalent to be used for jacks plus slides

17. All motors & limits should be wired to locally mounted patch panel outputs compatible with the Icepap system used at SOLAIRS (see Appendix CS1 - Motion Control Standard.pdf)

18. Switches should limit rotations to +/- 1 degree

4. MOTION TABLE

Motion	Range	Resolution	Repeatability
Vertical (Z)	0-100mm	<1.0µm	<1 µm
Pitch Φy Distance between upstream & downstream jacks 1000 mm	+/-1 deg.	4.5µrad	±5.00µrad.
Roll Φx Distance between upstream jacks 500 mm	+/-1 deg.	9.0µrad	±5.00µrad.
Across Beam (Y) Traverse	0-100mm	<1 µm	<1 µm
Yaw ΦZ Distance between upstream & downstream jacks 1000 mm	1 deg.	<1.0µrad	±5.00µrad

5. FINAL DESIGN

The final design should contain at least:

1) 2D and 3D (STEP) drawings of the table
2) List of assemblies to be supplied within the delivery
3) Motor & encoder types and wiring schemes.
4) Motion parameters (see Sec. 10.3 from Appendix CS1)
5) Detailed description of the table test procedure
6) Instruction related to transport and manual table positioning