1 Glossary

Term	Description
Active layer	The editable and insertable layer in Smart FIB.
Adjustment points	After loading the specimen to the microscope, the absolute position and the angle between specimen system and stage system are undefined. An Adjustment procedure makes it possible to find out the coordinate transformation from the specimen-system to the stage-system, which allows you to navigate on your specimen by means of specimen coordinate (using for instance the virtual specimen). For this process some points with well known coordinates in the specimen system are needed, they are called adjustment points.of course the accuracy of the adjustment cannot be better than the accuracy of the used stage. In fact there are a lot of variations for choosing the points and the specimen adjustment tool is aimed at attaining as much information as possible of your chosen set of adjustment points and avoiding overdetermination.
Alignment accuracy	The alignment accuracy indicates the variation between the actual position and the target position. This procedure is referred to as Alignment process. Approaching the target by means of correcting the beam deflection (digital shift and rotation) according to the mismatch between actual and target position can achieve an accuracy of less than some ten nanometers.
Alignment marks	For the execution of an Alignment process one needs to take an image which exhibits some structure characteristics with well known coordinates. This can be either specially structured adjusting aids or some distinctive features of the already patterned structures, both are referred to as Alignment marks (or simply marks) here in general.
Alignment process	It is a common challenge for a lithopraphy task to place new elements in the correct positional arrangement with respect to some already existing structures on a sample. eLitho offers a capable method to execute the positioning procedure which is referred to as Alignment process. The basic steps of an Alignment process and also a lot of additional information concerning this matter can be found in the section: Alignment settings tab. In many cases a single-step Alignment process is sufficient to achieve the required alignment accuracy. In some cases however when a very high accuracy is claimed there is the necessity to execute more than one cycle of the procedure. eLitho allows you to set up these multi-step Alignment processes clearly and gives you the opportunity to configure the procedure adequately for nearly every alignment task occurring. Please do not mix up the Alignment process described here with the sample adjustment, which is used to determine the position and the orientation of the sample system according to the stage system.

Term	Description
Area dose	The area dose is defined as electric charge per area in micro-Coulomb per square-centimeter: Beside its general meaning as a dose value for exposure (see: Exposure tab) the area dose is also relevant for the image capture during an Alignment process (see: Capture area tab)). Image capture causes some undesirable background dose within the capture area. Hence it is necessary to incorporate this area dose for the following exposure process. On the one hand the overall background dose must not exceed a certain critical value. For resist processes the capture area ought to be not dissolved by the developer and for beam induced processes the deposition or removal of material should be minimized. The area dose rises with the resolution for a fixed Pixel time.
Area element	Rectangles, circles, ellipses, arcs, and polygons are normally drawn as (filled) area elements. They are scanned as laminas elements and therefore they are treated with the Area settings made in the eLitho Exposure settings tab.
Backlash	The backlash feature is a common method to compensate the mechanical tolerance *ol* a mechanical drive gear. The sample stage on a SEM for example implements this feature by always approaching the end point of the stage movement from the same direction of motion. This means that for motion in the opposite direction the stage exceeds the aimed target position by a certain distance (the backlash) and finally approaches the position by moving back with the intended direction of motion.
Beam Blanker	In order to avoid unintended exposure during standby times and beam settling times, which are necessary after large jumps (e.g. delay between elements, see: Exposure tab) it is recommended that the SEM is equipped with a fast electrostatic Beam Blanker. This devices create an electric field in the microscope column for dumping the beam somewhere in the column. The advantage of an electrostatic blanker with respect to an electromagnetic one is that the beam can be switched on and off very fast.
Cycles	The cycles determine an amount of identical iterations to achieve the required dose. Prevention of redeposition (deposits of etch/mill waste) during milling or layer-by-layer deposition.
Dose	The dose determines the cumulative intensity (depth or deposition height) within a patterning element.

Term	Description
Dose value	The term dose is of crucial meaning for the lithography-process. It is defined as charge per dimension unit and describes in principle the ammount of electrons (or ions) that are hitting the surface of the sample in normalized values. For example when writing area elements applying an positive resist process, the amount of lectrons needed for breaking up enough chemical bonds of the resist in the exposed area to make the resist solvable for the devolopper is given as an area dose in units of charge per area [pC/cm^2]. The dose value in this definition does neither take the energy of the electrons into account nor does it include their temporal distributiion. The relevant dose values for an adequate exposure is depending on many parameters, e.g. the resist or the substrate. But of the the most decisive influence for resist processes (at least for some substrates) originates from the Proximity effect, which causes a non-uniform dose-background within the range of some micrometers around exposed regions. Due to the different dimesionality eLitho differntiates between pixel dose, line dose and area dose .
Dwell time	The dwell time describes how long the charged particle beam remains at one point of the scanning area. The scanning mode, the dose and the spacing influence the dwell time.
Element	An element represents the lowest level in the hierarchy of a layout. An element can be a single point, a single line, a poly-line, a filled or outlined rectangle, a filled or outlined circle, a filled or outlined ellipse, a filled or outlined arc or a filled or outlined polygon. Each element is assigned to exactly one layer.
Exposure	Process during which patterning elements are being transferred to the specimen by interaction with the charged particle beam.
Exposure parameters	To be able to fulfill various process requirements, the exposure parameters describe the temporal and regional sequence of the exposure process. Exposure parameters are settings for controlling the exposure of an entity and comprise settings including doses, dwell times, pixel spacings, and microscope probes. Entity in this context may refer to: graphical elements (lines, rectangles, raster images, etc.), layers (also the implicit live mode layer), or positions.
Faraday cup	A Faraday cup is a special device for precisely measuring the specimen beam current The electron beam is dumped into a sink for electrons (cup), which means that as many electrons as possible from the incident primary electron beam are collected thereby producing as little as possible secondary electrons. Thus a measurement of the current from the Faraday cup to the electrical ground reflects the actual beam current which would expose the specimen under similar conditions. The exact knowledge of the specimen beam current is necessary to precisely determine the dwell time for the beam in order to achieve a given dose value.