**Masking Requirements**

Preamble: Masking is considered a core area and it is vital that the final (re)design for masking is approved and accepted before work begins. Furthermore, the actual work will be done on a branch before it is merged back into main.

1. There will be a pair of algorithms to save and load masks from disk. This will need to support loading from legacy formats, but saving to them may not be necessary. It is also likely that the format needs to either be binary or have a binary variant for instruments with a large number of pixels (i.e. SNAP).
2. A historic masking file format that refer just to spectrum numbers that need to be able to be applied to workspaces (direct inelastic). This will be done by loading the mask into a workspace and applying it.
3. Extract the mask from a workspace to another workspace (effectively a clone, but going to Boolean data) that can be applied to multiple workspaces.
4. Masks can be pixel and x-axis specific. In order to apply the same filter in MaskBins one currently uses a table workspace, it could be done by a new kind of mask workspace.
5. Algorithms need to operate on Masked data without special programming, unless grouping (in which case they should care about masking anyway). This is currently done using the value flag of 0 (not sure where, in MaskWorkspace LIVE\_VALUE=0).
6. You should be able to easily differentiate between 0 counts and masked.
7. You should be able to combine masks using addition and subtraction. BinaryOperateMasks should continue to do the logical operations of ‘not’ (inversion), ‘or’, ‘xor’, and ‘and’.
8. Masks should fundamentally operate at the detector level, this way they can always handle all grouping situations.
9. When applying masking it should be at the detector level, as long as both source and target workspace have instruments. Otherwise they can apply at a workspace indexes level with copious log messages explaining this.
10. Grouping detectors should work the same way as the DetectorGroup object currently does. A grouped detector is only masked when all of its constituent detectors are also masked.

Questions that need to be answered:

1. Solid angle of a group when some detectors are masked. Do the masked detectors contribute to the solid angle?
2. Effective position of a group when some detectors are masked. Should the position move because some of the contributing detectors were masked?
3. Masking data that does not have an associated instrument. Should this be allowed?