**USACIL Wish List**

06/12/2014

1. Dye-specific thresholds. This is a combined user-interface/analysis software effort. Probably, the analysis and detection threshold specs should be moved from the Sample Thresholds tab to the Locus/ILS Thresholds tab, where channel/locus specific thresholds are currently located. However, the Osiris analysis program receives these thresholds from the user interface program via StdIn. It makes sense to continue this practice to be consistent with past behavior. A decision must be made as to the form this should take on the new analysis dialog box. For the communication to StdIn, what are needed are new key words. Then, channel specific thresholds are needed in Channel.h. Currently, the minRFU and detection RFU are stored as globals in ChannelData and that must be made an array. The accessor must be changed to use a channel number as input parameter. Once these modifications are made, the analysis can proceed without change. There should be default analysis and detection thresholds with the ability to override for any or all channels. 06/14/2014: the input data must specify a default value for both analysis and detection thresholds, along with any overrides. The static values for these thresholds must be replaced by arrays and then the accessor functions must be changed to reference the correct array value. The fact that these are virtual functions limits the changes to these. This must be done for both ladders and samples, so there are as many as three new input parameters per non-ILS channel that must be input to the GUI and communicated to the analysis program (two for samples and one for ladders).
2. Multiple peak labels in .plt files. This is a UI effort. A detailed examination and assessment of the Wright State University software.
3. More user-friendly allele-editing. This is a UI effort and should perhaps be a bit broader than peak-editing. For example, Roger Kurlander would like simpler keyboard shortcuts…
4. Fractional pull-up filter and adenylation. This is an analysis software effort only. I don’t understand this issue yet. 06/10/2014: now I understand it. The request is for fractional thresholds (adenylation, stutter, fractional filters, pull-up, etc) that the actual percentage be displayed on the plot. Also, for primary pull-ups, the channels or peaks pulled up should be available. Currently, no DataSignal artifact has data associated with it, and one approach would be to allow that, but the difficulty must be ascertained…Later: this is doable. We just have to change the specifications of these messages and change the program to add the appropriate data to the message. A similar approach will work for primary pull-up, in which we can specify the channel list of pull-ups.
5. Artifact recognition for low-level peaks. This is an analysis software effort only. As I understand it, this issue revolves around the poor morphology peaks that are actually two (or more) peaks with the same call. It is not really a crater issue, because a crater is a single peak and is available to be considered as a stutter (or even an allele). A 2-pronged approach should be sufficient. Prong 1 involves estimating (and reporting) the noise on each channel. Then, the noise level can be used to prevent Osiris from attempting to fit a two-peak signature when there is a dip between peaks that is shallower than the noise level. This should remove most, if not all, of the poor morphology peaks. Prong 2 would be designed to accommodate the remaining poor morphology peaks. A new curve type would be created that mimics many of the characteristics of craters, replacing the two peaks by one, without changing the graph. The new peak would be located exactly half way between the two original peaks, like a crater, and would assume the artifacts of each of the side peaks. The new peak would be available to be tested as a stutter, or even as an allele. However, the curve fit should be low, perhaps even marginal. 06/10/2014: Osiris already assesses the noise on each channel and retains the peak to trough maximum. This could be used for prong 1. Preliminary observations suggest that these dual peaks only occur at very low data (high noise) levels. Just in case, the text of the message should be changed simply to “Poor Morphology”. In case such a peak does arise, Osiris should choose one of them to call (potentially) using least residual displacement as a criterion. (Alternatively, if both peaks have acceptable RD’s, choose the peak with the lowest residual?) 06/12/2014: currently, the algorithm sometimes selects one of the dual peaks and discards the other, but in those cases, the result is still two peaks with the same call, the new one and the original. This is untenable. The algorithm should choose only one of the three, in the case that the fitting of a dual peak is attempted. Although, I have not seen any dual peaks created when there are two legitimate (non-noisy) peaks, what if the phenomenon occurs? Can it happen that two peaks with different calls are identified as a dual peak, one in which the raw data relative minimum displacement from the lower of the two flanking peaks is greater than the above noise threshold? What if the relative minimum displacement is less? This is a software only option at this point. I don’t see a role for the MessageBook, at least, not yet. (Note: I have never been satisfied with the handling of so-called “dual” peaks.)
6. Identify sizing and peak heights of unlabeled peaks. This is a UI effort. The user should be provided a button, on both the table and the plot file, to enable the cursor to drag coordinates, either time vs. RFU or ILS-bps vs RFU. This would allow the user to examine any unlabeled peak for size and height. Other solutions, such as a special hover symbol, would just clutter the UI.
7. Optionally, force positive stutter peaks to be unlabeled. This is needed because there are no mixture analysis engines that can handle plus stutter and the presence of it causes them to try to identify the fraction that is an allele component, yielding a crash. In case a peak is both plus stutter (from a peak to the left) and minus stutter (from a peak to the right), it is to be considered as minus stutter and the non-labeling does not apply. For the most part, this situation will not arise because users who want to enable the non-labeled plus stutter will select a zero minus stutter threshold. This option requires a new preset and may require distinguishing plus from minus stutter (two more messages). It also requires a “NoLabel” tag with an expression so that a peak that has a “NoLabel” artifact will not be labeled, regardless of other attributes. This is similar to the “Restriction” tag. It is both a software and MessageBook change.