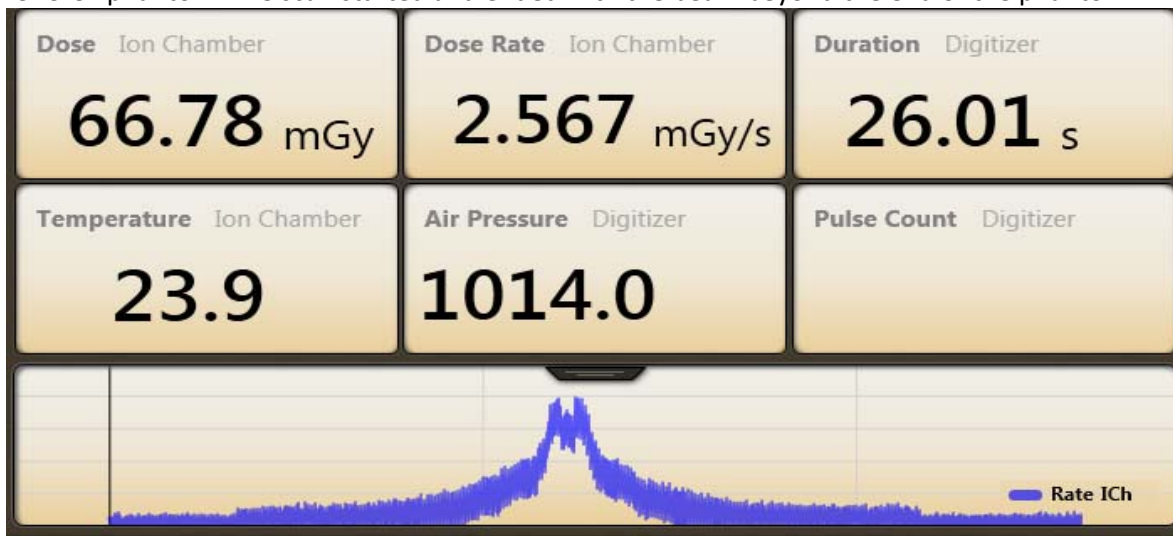


### Accu-Gold version 1.3.3.1

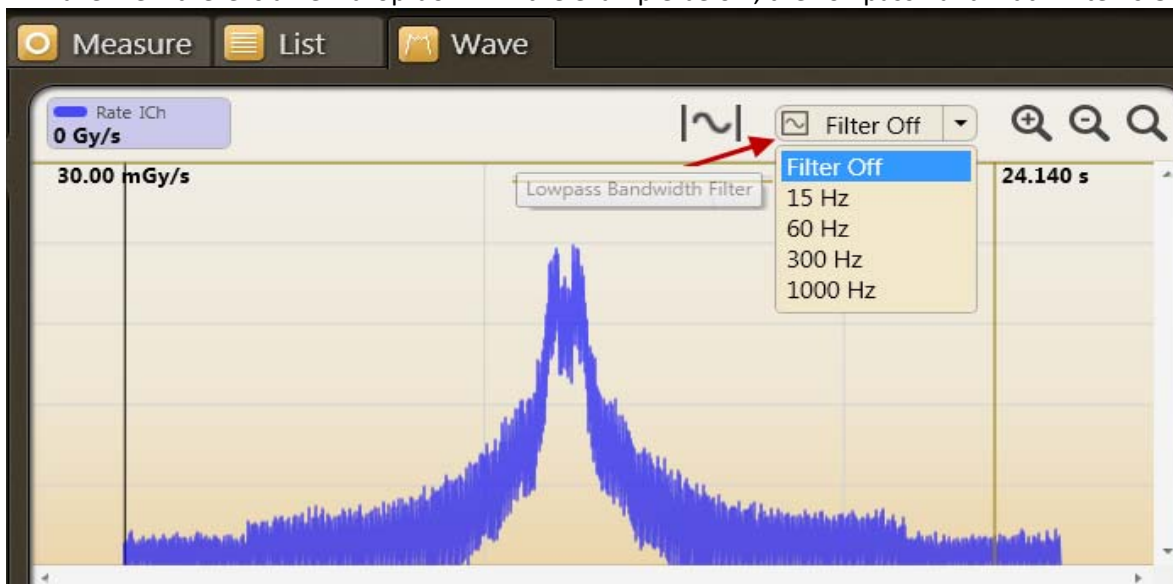
This version of Accu-Gold introduces several changes and new features. They are highlighted below. There are also numerous small enhancements and bug fixes. Please note that all session files created with previous versions are compatible with this new release. With the exception of a few new formatting features, old session files will also be able to be opened, reviewed and edited with the new capabilities.

#### Waveform filters

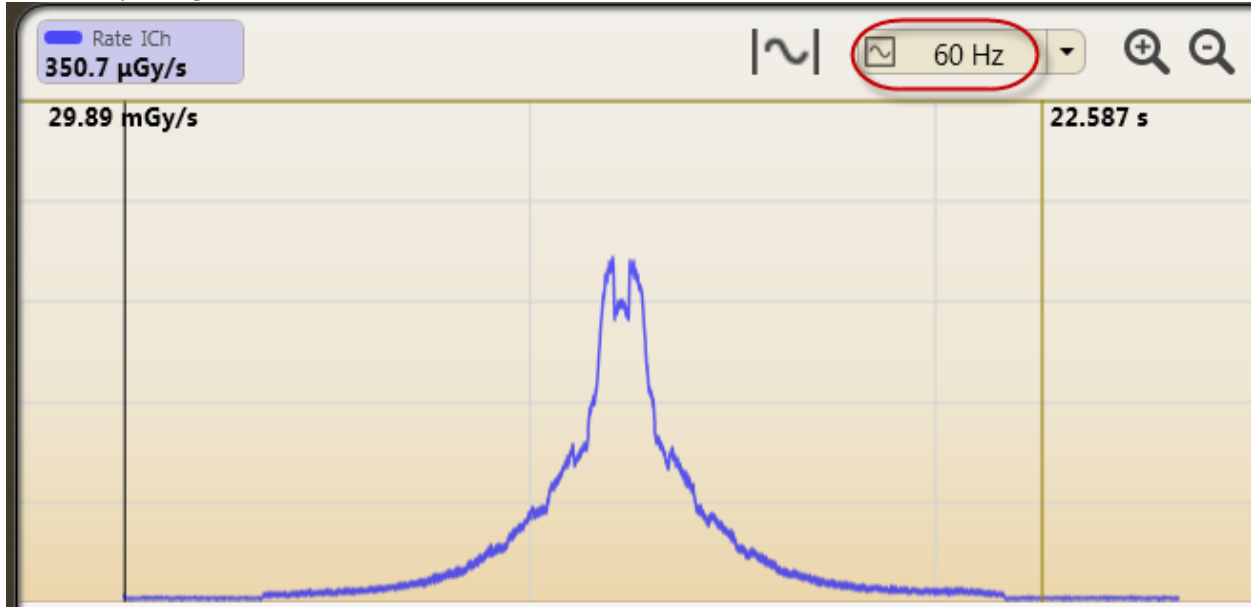
Measurements made with low-level signals (e.g. low mA, fluoro, scatter& small ion chambers) may display noisy waveforms that obscure important details. Accu-Gold Wave View now provides a dropdown selection to apply a “Low-pass Bandwidth Filter” to the waveform. The CT exposure you see below was made with a Radcal 0.15 cc thimble chamber placed in the central axial location of the Boone ICRU CT phantom. The scan started and ended with the beam beyond the end of the phantom.



In Wave View there is a new drop-down. In the example below, the Lowpass Bandwidth Filter is OFF:



Tuning the filter on to 60 Hz dramatically reduces the noise and enhanced the detail. It is now clear, exactly when the beam intercepts the phantom. The periodic beam attenuation by the patient couch is now easily recognized.



Note: For short exposures (<1 s), filters should be applied with care to not smooth important detail. Because the filter is non-destructive, different values may be easily tried. Application of a filter will not affect any of the measurement values (e.g. dose, kV, time). When a session is saved with filters applied, Accu-Gold will retain the filtered waveform selection when the file is re-opened. Since the filter is non-destructive, the filter may be changed to another value at any time. If a waveform is exported to Excel, and a filter has been applied, the filtered waveform is transferred and the number of data points in the waveform is reduced in proportion to the filter selected. This can be very useful to minimize the size of Excel files containing waveforms. In the case above, the original waveform was reduced from 254,214 data points to 4984.

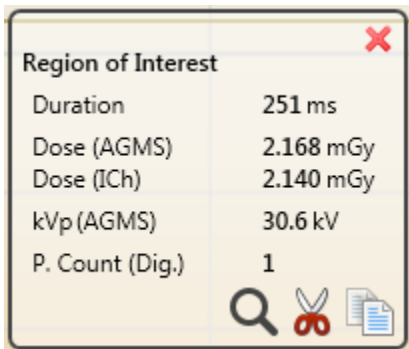
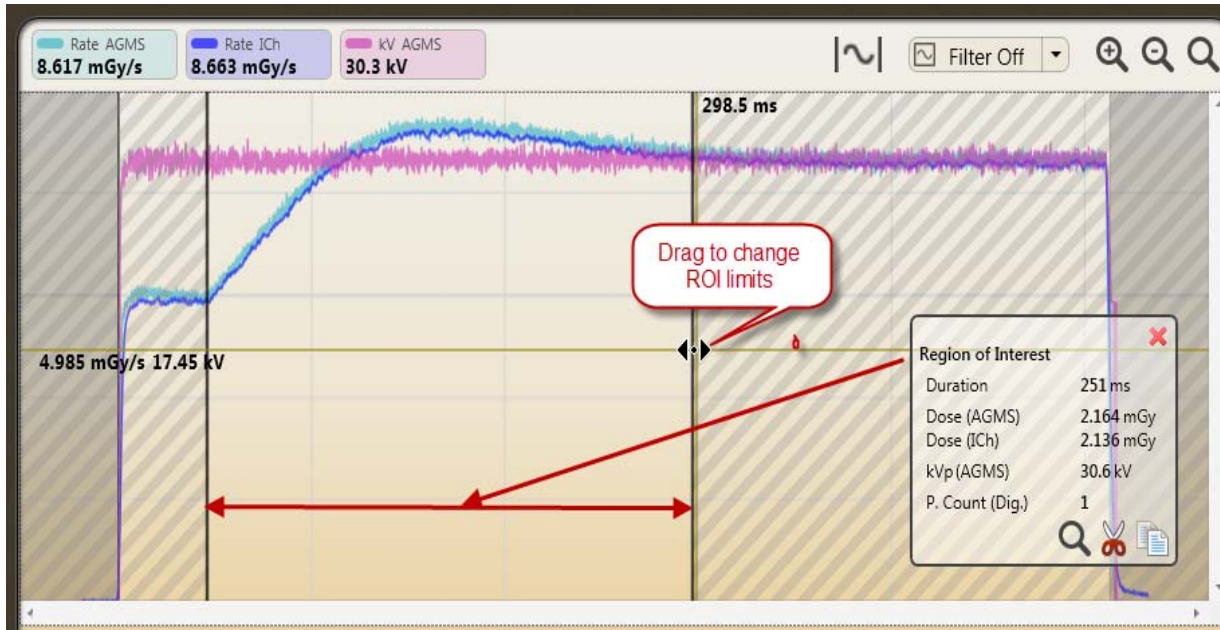
### “Region of Interest” (ROI) Enhancements




Waveform ROI selection is a 2-step process in Wave View.

- Move the cursor to the start of the ROI and click. A vertical line will appear.
- Move the cursor to the end of the target ROI. A second vertical line will appear that defines the ROI.

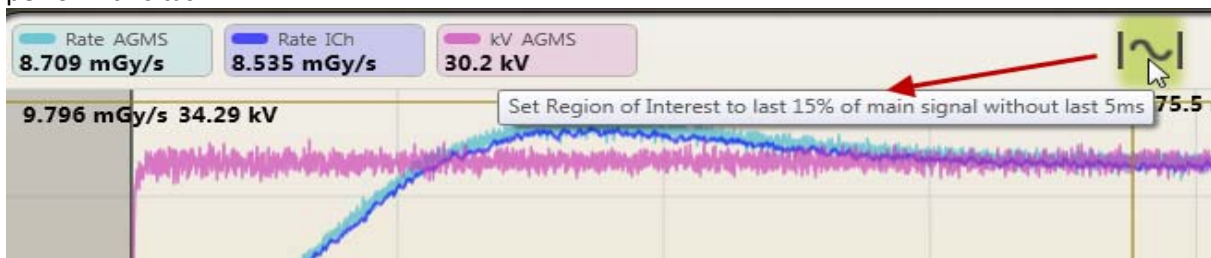
Note: you may re-position the ROI limits by clicking and dragging either limit line. Adjusting the limits will cause the ROI values to be immediately re-calculated. The ROI information window may be freely re-positioned by click and drag. To dismiss the ROI, click the “X” in the right hand corner of the ROI information window.

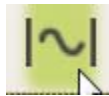
In the example shown below, it is apparent that the kV is constant, but the mA control is adjusting the mA. The ROI selection shows that the settling time for this adjustment is approximately ¼ second.



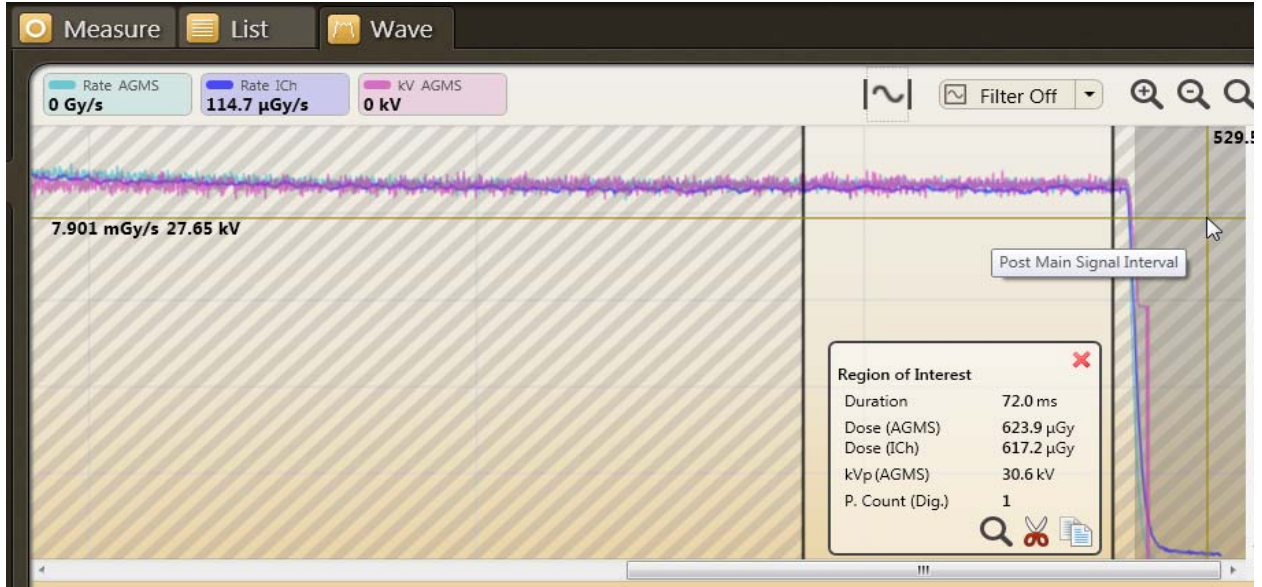
-  Clicking on the magnifying glass in the ROI window will automatically expand the ROI to fill the Wave screen.
- The copy results to clipboard  and the Extract to new measurement from Region of Interest  will be explained later in this document

Using the example above, assessment of performance should probably occur near the end of the exposure after the mA has stabilized. Accu-Gold now has a simple selection tool to automatically perform this task.





Clicking on the selection tool automatically select the last 15% of an exposure. The last 5ms are excluded to eliminate any end of exposure artifacts.



### Copy “Region of Interest” to Clipboard


If the data contained in the ROI window does not provide all of the details needed for evaluation,

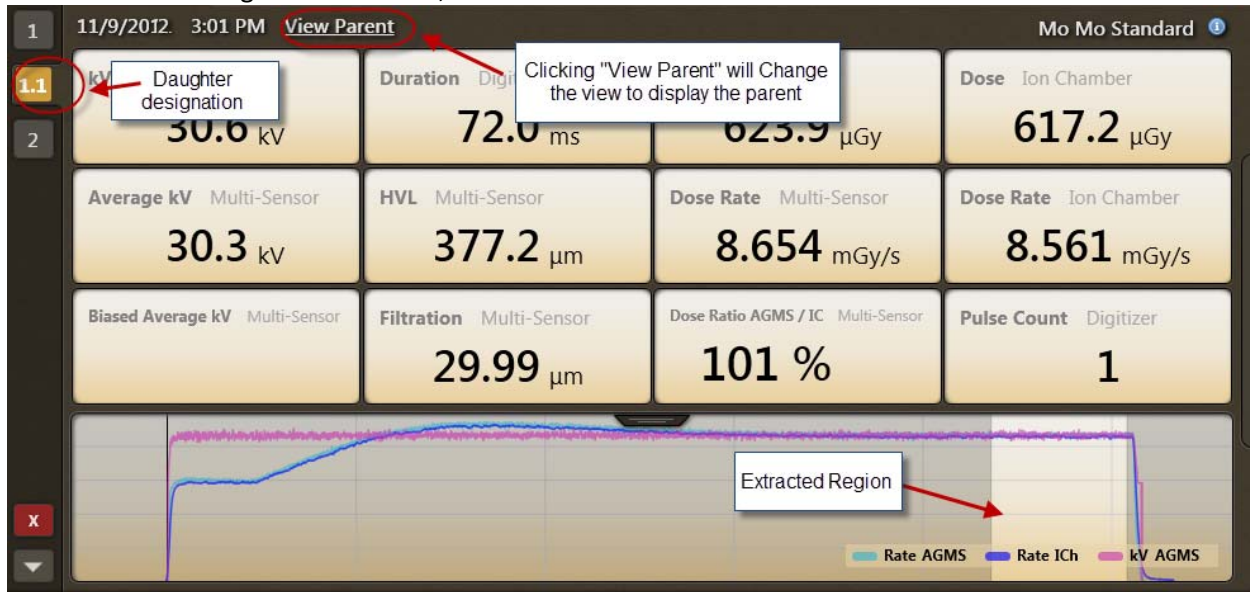


clicking on the icon in the ROI window will put all of the details on the clipboard. A simple “Paste” command (CTRL-V), will put the text data in Excel or a text document. For the Example above:

Time Begin		436	ms										
Time End		508	ms										
Time Duration		72	ms										
Total P. Count		1											
		At Begin	At End	Integral	Average	Average Peak	Min	Max					
Dose Rate	Multi-Sensor	8.654	mGy/s	8.613	mGy/s	623.9	µGy	8.707	mGy/s	8.329	mGy/s	8.869	mGy/s
Dose Rate	Ion Chamber	8.501	mGy/s	8.529	mGy/s	617.2	µGy	8.585	mGy/s	8.431	mGy/s	8.658	mGy/s
kV	Multi-Sensor	30	kV	30.6	kV	30.3	kV	30.6	kV	29.2	kV	31.4	kV

## Extraction of Region of Interest

It is now possible to non-destructively extract an ROI selection and preserve it as a daughter of the original parent. Once an ROI has been identified and selected, click on the  icon. The screen will immediately change to the Measure view showing the extracted ROI as a daughter of the original measurement. Using the case above, the result is:



Extracted measurements have the same measurement index as the parent, but include a decimal value. Additional extractions of the same measurement will increment the decimal (1, 1.1, 1.2...etc.). List View and export will also provide the results as a sequence.

Index	Start Time	kVp	Duration	Dose	Dose	Ave. kV	HVL	Rate	Rate	Biased Ave.
1	11/9/2012 03:01:31	30.3 kV	513.0 ms	4.302 mGy	4.264 μGy	30.2 kV	377.2 μm	8.385 mGy/s	8.311 mGy/s	30.2 kV
1.1	11/9/2012 03:01:31	30.6 kV	72.0 ms	623.9 μGy	617.2 μGy	30.3 kV	377.2 μm	8.654 mGy/s	8.561 mGy/s	

## Enhancements for long exposures

The total exposure duration limit (~350 seconds) in a single session has now been removed. Additionally, waveform rendering and delays for long exposure are vastly improved, however the maximum duration of any single exposure remains at 300 seconds. Note that sessions containing many long exposures may take significant time to save or load. Modern computers with fast disc storage and processors will have better performance in this situation.



## Adjustable “end of exposure” delay

Many modern x-ray generators now feature scout exposures which may introduce gaps of several seconds or more in the radiation output. The default end of exposure timing for Accu-Gold is 1 second for Diagnostic sensors and 3 seconds for Mammographic sensors. In some instances this is not long enough and Accu-Gold attempts to display the exposure results while the generator is finishing the exposure. If this situation is encountered, you may now select an end of exposure delay of up to 8 seconds via the Settings drop-down in the Measure window.



## Additional fixes

- All new measurements made with ion chambers now display temperature and pressure units (°C & Pa).
- All new measurements using an mA sensor will display Dose/mAs with proper units.
- Dose ratios when using multiple dose sensors are now correctly displayed.
- To prevent inadvertent unintended use, a warning message is now provided when pre-pulse is selected from settings.
- Ion chamber dose rate and exposure time are continuously displayed during exposures when free run is selected.
- Pulse counting accuracy has been improved.
- Pulse frequency is calculated when more than 5 pulses are detected.
- Crashes for several unique conditions have been eliminated.