



Dynamic Calibration

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# Dynamic Calibration (dynacal)

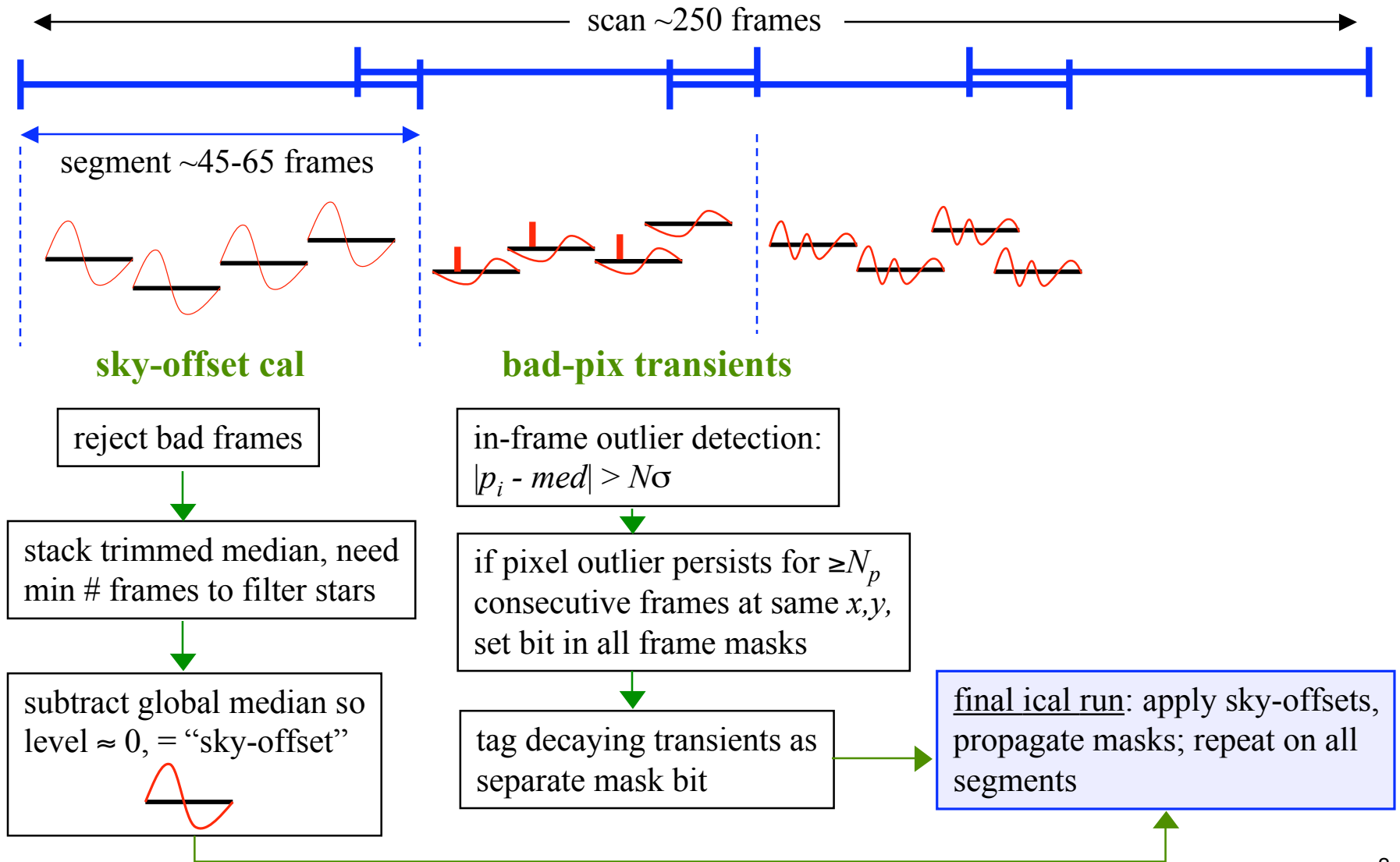
Frank Masci, John Fowler, Heidi Brandenburg, Ted Lungu  
WSDC - IPAC/Caltech



# sky-offsets / bad-pixel transients



Dynamic Calibration





# Frame-mask updates



Dynamic Calibration

Bit #	Condition
0	from static mask: excessive dark current
1	from static mask: excessive read noise not due to high dark current
2	from static mask: dead or very low responsivity
3	from static mask: low responsivity
4	from static mask: high responsivity
5	from static mask: saturated anywhere in ramp
6	from static mask: high, uncertain, or unreliable non-linearity
7	from static mask: broken pixel or -'ve SUR (raw frame value = 32767)
9	broken pixel or intrinsically -'ve SUR (downlink value = 32767)
10-18	saturated in sample reads 1-9 (downlink values = 32753-32761)
<b>21</b>	<b>new/transient bad pixel from dynamic masking (tempcal)</b>
22	flat-fielding (responsivity correction) unreliable (ical)
<b>23</b>	<b>sky-offset correction unreliable (tempcal)</b>
<b>25</b>	<b>contains probable latent flux (tempcal)</b>
26	non-linearity correction unreliable (ical)
27	contains cosmic-ray or outlier that cannot be classified (awod)
28	contains positive or negative spike-outlier (ical)



# Quality Assurance



Dynamic Calibration

- See Round-Up issue 273 or:  
[http://web.ipac.caltech.edu/staff/fmasci/home/wise/QAoutput\\_icl03.txt](http://web.ipac.caltech.edu/staff/fmasci/home/wise/QAoutput_icl03.txt)

- Plan: one metadata table per scan. Metrics are listed for each segment and band, e.g:

<code>dynacal:MinInFrames</code>	Minimum number of frames desired for segment creation
<code>dynacal:MinGoodFrames</code>	Minimum number of frames required for sky-offset creation
<code>dynacal:NumSegments</code>	Number of segments in scan
<code>dynacal:Seg&lt;i&gt;NumFrames</code>	Number of input frames in segment <i>
<code>dynacal:Seg&lt;i&gt;NumFiltFrames</code>	Number of frames used in segment <i>, post filtering
<code>dynacal:Seg&lt;i&gt;utcsbgn</code>	Earliest UTCS in frame stack of segment <i> [sec]
<code>dynacal:Seg&lt;i&gt;utcsend</code>	Latest UTCS in frame stack of segment <i> [sec]
<code>dynacal:Seg&lt;i&gt;SkyOffMean</code>	Mean pixel value in sky-offset for segment <i> [DN]
<code>dynacal:Seg&lt;i&gt;SkyOffMedian</code>	Median pixel value in sky-offset for segment <i> [DN]
<code>dynacal:Seg&lt;i&gt;SkyOffStdDev</code>	Unbiased pixel standard dev. in sky-offset for segment <i> [DN]
<code>dynacal:Seg&lt;i&gt;SkyOffSig</code>	Pixel sigma in sky-offset from 0.5*(84%-16%) for segment <i> [DN]
<code>dynacal:Seg&lt;i&gt;SkyOffUnc</code>	Median pixel uncertainty in sky-offset for segment <i> [DN]
<code>dynacal:Seg&lt;i&gt;MinPersist</code>	Minimum run length to diagnose transients in segment <i>
<code>dynacal:Seg&lt;i&gt;NumTransients</code>	Number of bad-pixel transients tagged in segment <i>
<code>dynacal:Seg&lt;i&gt;NumDecays</code>	Number of significantly decaying transients tagged in segment <i>
<code>dynacal:Seg&lt;i&gt;MedTrans</code>	Median transient run length in stack in segment <i>
<code>dynacal:Seg&lt;i&gt;MedDrops</code>	Median number of pairwise pixel drops in segment <i>
<code>dynacal:Seg&lt;i&gt;MedFdropLat</code>	Median of ratio: num 'drops/run length for decays' in segment <i>

- **Note:** #bad-pix transients/frame already written to ical metadata tables. Scan-trend plot also present.

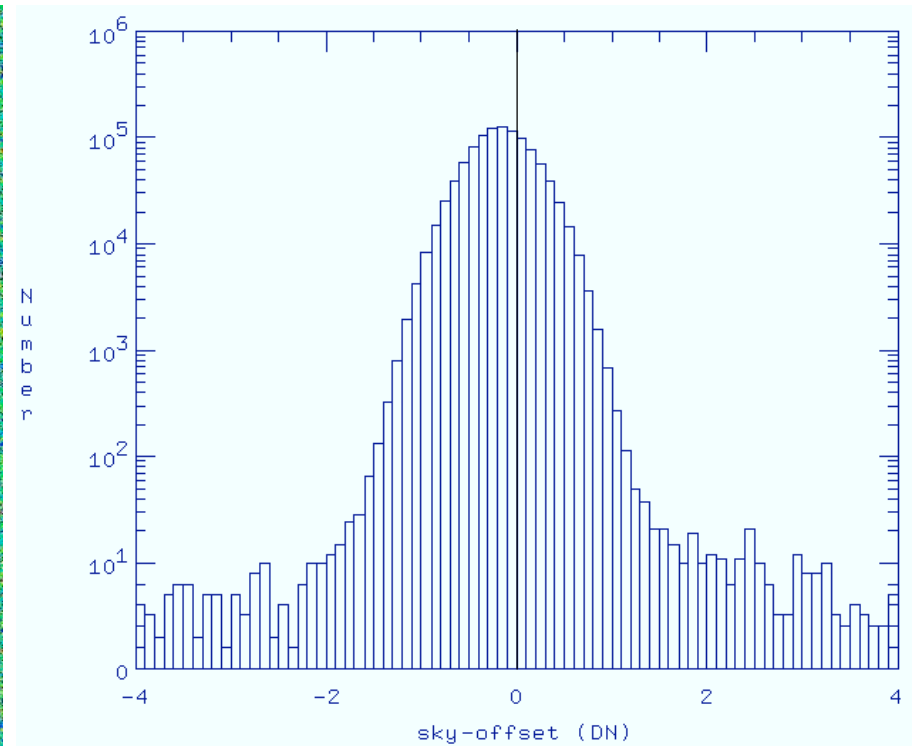
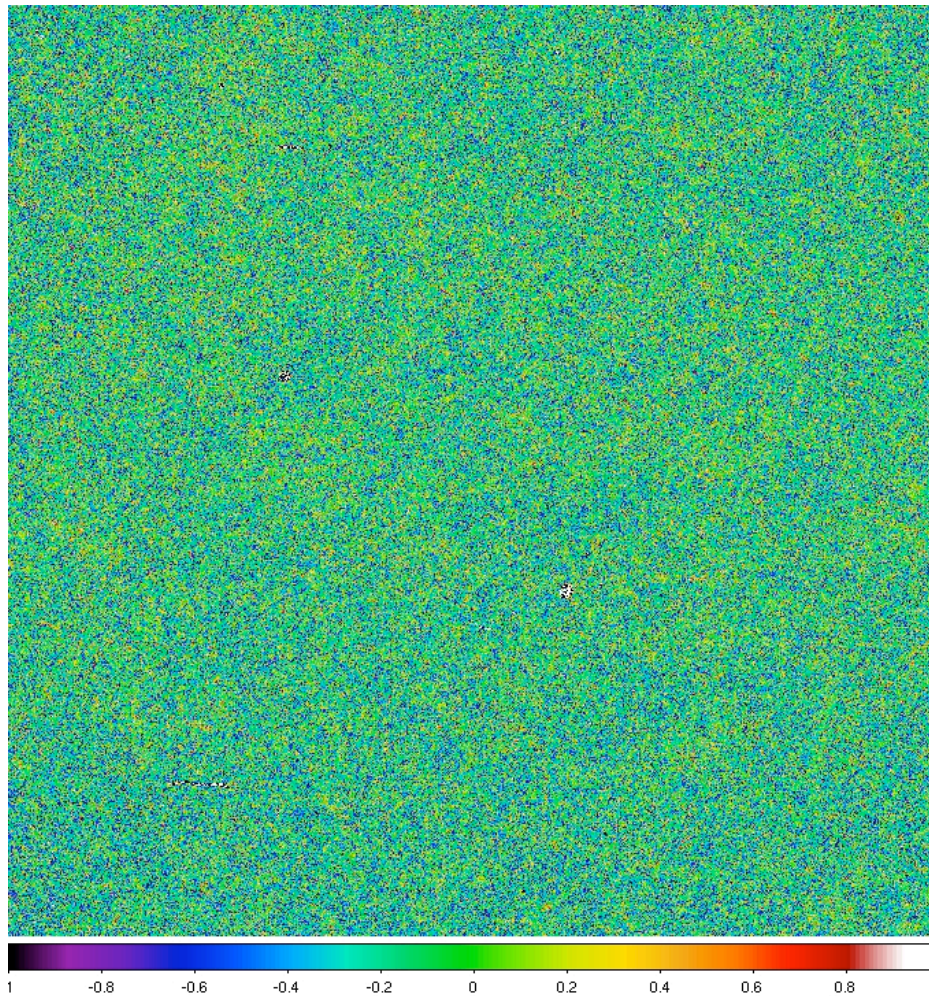


# EG: 30-orbit sim (~mid Jun '09)



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W1 sky-offset product



Non-zero bias  $\Rightarrow$  asymmetric  
trimming thresholds need tuning

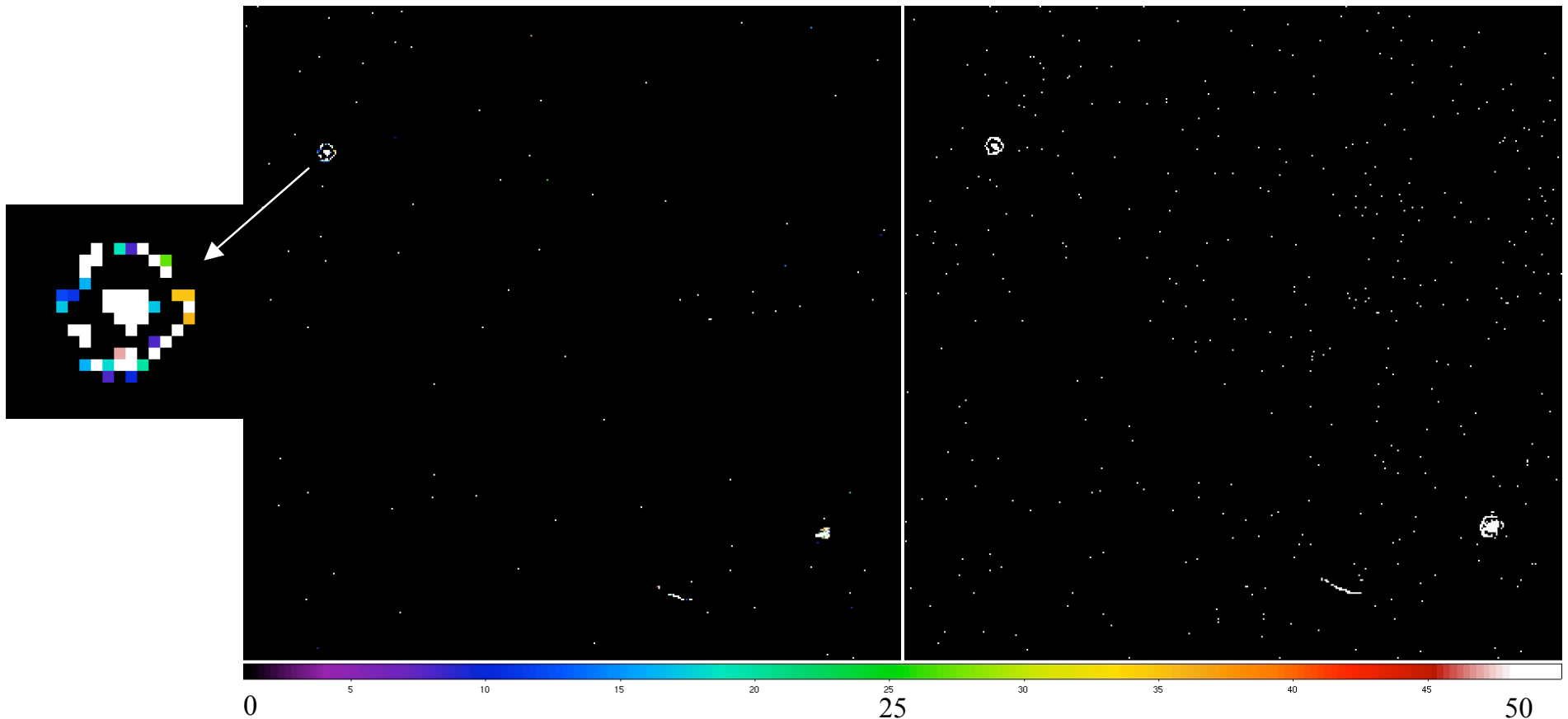


# EG: 30-orbit sim (~mid Jun'09)



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Transient lengths in stack of 50 frames [\[left\]](#) VS. Ground “static” W1 mask used in sim [\[right\]](#)



**Note:** - transient detection algorithm only sensitive to hot/low-response pixels  
- not all static lo/hi bad-pixels recovered (and with run lengths ~50) since threshold dependent



## To do...



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- Refinements in Round-Up issue 174:
  - always perform transient pixel detection, irrespective of sky-offset creation or segment length
  - more generic scan partitioning algorithm when assigning frames to segments: allow for overlap
  - QA metadata
  - above are not critical for IOC, but expect to always run in “dynacal” mode to monitor products, metrics offline, and tune parameters