Difficulty & more FOV

- Baseline 6x3
  - Judgment is that 4 or more rows of active H4RGs does not fit unvignettable field
  - Note that colors are for imaging mode
    - Focal prisms may not work in portions yellow region
      - Preliminary look says 2 grisms, each covering half of 1.3-2.4um bandpass, is an alternative
    - Focal prisms much more difficult with curved layout

<table>
<thead>
<tr>
<th>*/p</th>
<th>layout 6x3</th>
<th>8x3</th>
<th>10x3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.09</td>
<td>0.188</td>
<td>0.251</td>
<td>0.313</td>
</tr>
<tr>
<td>0.1</td>
<td>0.232</td>
<td>0.309</td>
<td>0.387</td>
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<tr>
<td>0.11</td>
<td></td>
<td><strong>0.281</strong></td>
<td></td>
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<tr>
<td>0.12</td>
<td>0.334</td>
<td>0.446</td>
<td>0.557</td>
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<tr>
<td>0.13</td>
<td>0.392</td>
<td>0.523</td>
<td>0.654</td>
</tr>
<tr>
<td>0.14</td>
<td>0.455</td>
<td>0.607</td>
<td>0.758</td>
</tr>
</tbody>
</table>

Layout table:
X – layout (H4RG (10um))
Y – pixel scale, arcsec
Data: FOV area, sq. deg.
Colors are **qualitative guess**, as to doable, hard, very hard, unworkable; for green/yellow/red/black respectively
Baseline is 0.11 6x3
Baseline and larger FOV widefield layouts

6x3, 0.11”/p

8x3, 0.11”/p 0.374°

6x3 H4RG @ 0.11”/p, 0.28 sq deg

0.425 wide*

0.874°

Moon (average size seen from Earth)

HST [all instruments]

JWST [all instruments]

0.425 wide*

1.174°

Moon (average size seen from Earth)

HST [all instruments]

JWST [all instruments]
WFIRST – recasting IDRM Imaging channel (ImC) error budget for AFTA widefield instrument

Values wrong for IDRM1, scale to larger values for DRM0

1μm diffraction limit

Error budget for WFIRST interim design reference mission #1, ImC channel. Units are nm rms

Observatory 82.9

Payload optics 71.2

LOS jitter controllable 37.5

LOS jitter uncontrollable X 1 nm

Telescope 67.2

Telescope margin 17.0

Telescope stability 63.2

Telescope pupil 12.6

Telescope common 47.2

PM 40.0

SM 25.0

ImC-F1 24.5

Telescope/ImC interface 20.0

Instrument 37.3

Instrument margin 17.0

Instrument static 30.0

Instrument pupil 12.0

Instrument pupil 12.0

ImC-F3 15.0

ImC filter 25.0

ImC detector 10.0

GONE – hold @ system level

GONE – hold @ system level
Pointing equivalent wavefront error

- Jitter can be treated as equivalent to wavefront error
- Portion of derivation at right
- Table lists derived wavefront errors for IDRM, current DRM0, and HST (in visible)
- Increases w/ D, so even 11masec (tighter than by naïve pixel scale scaling) is a large wfe (44nm rms)
- Needs more discussion with SDT
1\textsuperscript{st} cut – imaging mode, wide field instrument

- Based on same requirements as IDRM/ DRM1 & 2: 1\textmu m diffraction limit plus pointing errors at \approx 1/7\textsuperscript{th} pixel rms per axis
- T1/T2 room temp (RT) errors from ITT data
- T1 cooldown is based on the one analysis done so far [may be overly tight, or not, tbd]
  - T2 cooldown set equal to T1
- This is VERY tight:
  - Near state of art polishing
  - Minimal allocation for thermal cooldown distortion
  - Small margins
- Tightened pointing allocations
  - Jitter from 15 to 11 masec
  - ACS from to 5.7 masec

DRAFT/notional