Panel 3. RESAMPLING AND REMAPPING PROCEDURES

"Discussion should take into consideration effects on correction, calibration data, and validation efforts. Discussion should also include ideas for better characterization of the MODIS bands based on utilizing information from the 'bowtie' effect, and how the bowtie effect affects level 2 processing."

Panelists: Alan Strahler, Moderator; Steve Ungar, John Barker, Dorothy Hall, Al Fleig, Ian Barton, Frank Hoge, Mike King, Dave Diner (or designate).

Goals and Objectives
- * Review bowtie effect and implications for MODIS production lines
- * Examine resampling issues

Policy Issues/Follow-ons
- * Do we need a standard for resampling MODIS products at various levels?
- * Are there community research issues? If so, how do we resolve them?

Discussion Outline:

I. Bowtie Effect
- * Review of bowtie effect
- * Interdetector calibration via the bowtie
  - -- Select pixels along scan where detectors in different rows see same FOV via bowtie overlap, compare
- * Will topography influence the bowtie effect?
- * Does latitude matter? (E.g., TM scan gaps)
- * Pixel-by-pixel processing of 1B to Level 2 will include redundant work because of bowtie overlap
  - -- Is it unavoidable? Does it matter?

II. Resampling -- Heritage
- * EDC Phone Comments (Dan Steinwand)
  - -- Nearest neighbor (NN), bilinear (BL), cubic convolution (CC), damped 16-pt sinc (sinx/x) (D16S), restoration kernels, all available
  - -- CC used in registering to control pts
  - -- Users seem to want NN, but may not be well informed
- * CCRS Phone Comments (Burt Guindon)
  - -- Resampling done by Geocomp (operational system) by MDA
  - -- Uses 1-D damped 16-pt sinc with 3 passes

III. MODIS Resampling to Level 3 Grid
- * When to resample for multitemporal algorithm?
  - -- Choice 1: Algorithm can work with binned (unresampled) 2G data
    - ++ Level 2 ==> 2G (binned to grid) ==> 3 (resampled) ==> map projected (resampled again)
    - ++ Requires only resampling output of algorithm
  - -- Choice 2: Algorithm works with resampled Level 3 data
    - ++ Level 2 ==> 3 (gridded and resampled) ==> map projected (resampled twice)

## Conclusions

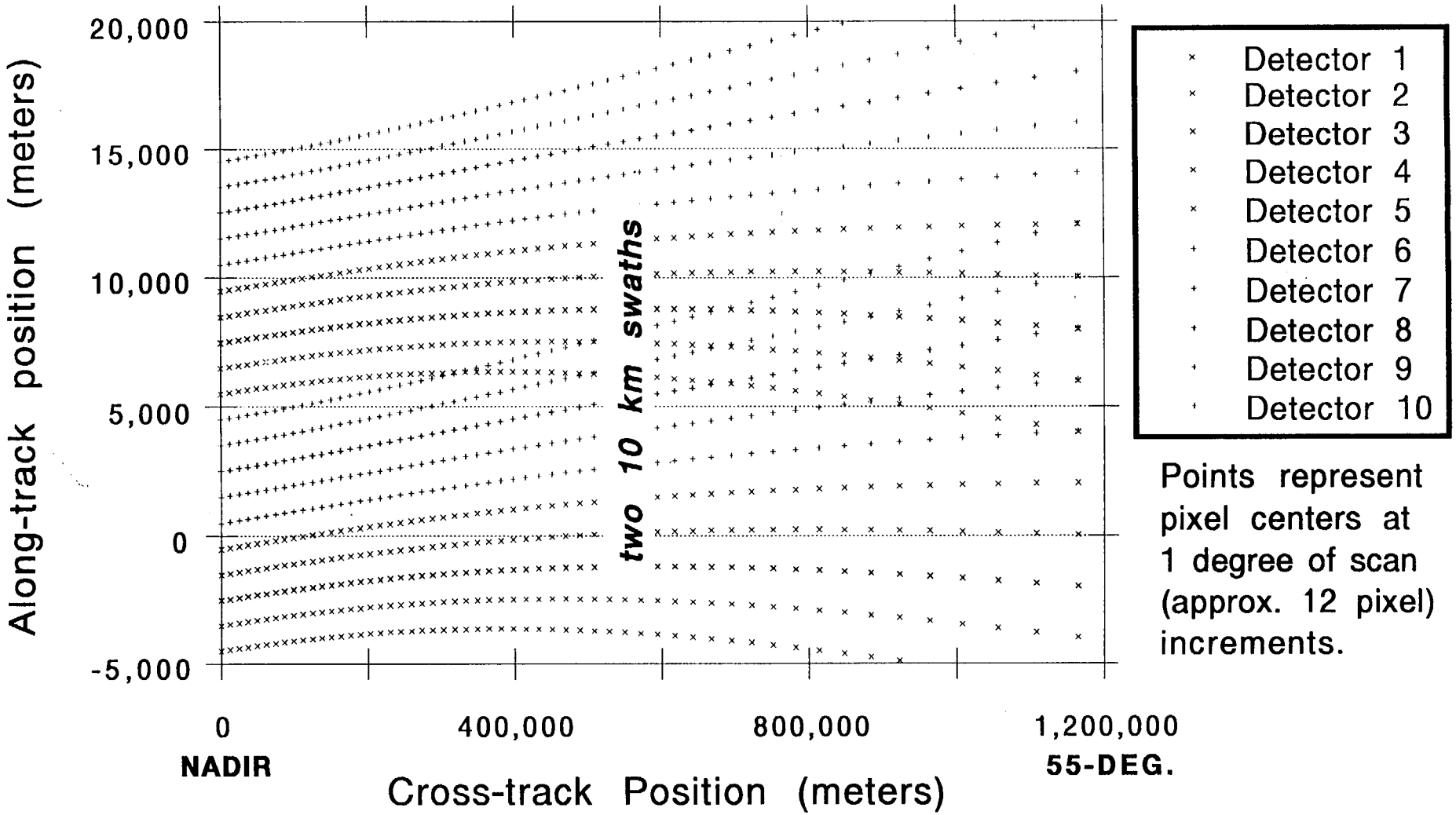
- ★ Boutie provides interdetector calibration (good) but makes resampling w/ interpolation difficult (bad)
- ★ Level 1G & 2G products could be very helpful in some cases, but further work/thought is needed
- ★ Resampling w/ interpolation is difficult. ⋈ Need a MODIS-specific tool. More thought required
- ★ Need to define a "day" e.g., oceans

## Action Items

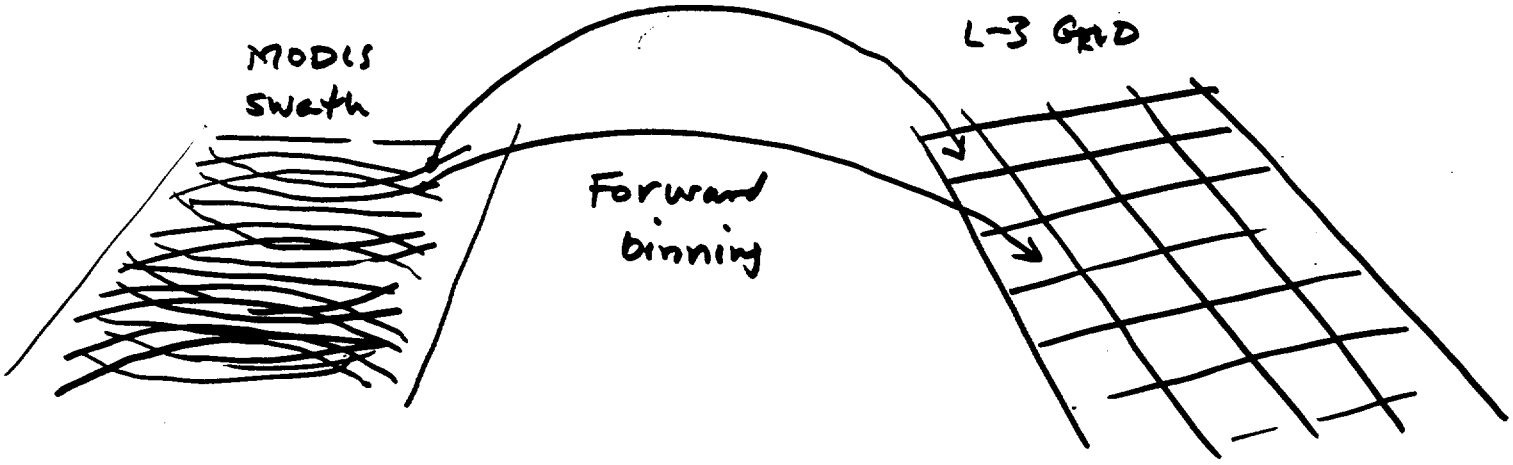
- ★ 1-2G idea needs more exploration - Hansen?) (Gordon? Menzel? Strabala? Wolfe? Ungar?)

# MODIS Scan Pattern

**(10 element array, 1 km GFOV)**



# 1-2G Data structure




- Forward binning can give empty cells, cells w/ multiple observations
- Could take more space; HDF too dumb ?
+/ No resampling
+ Easy multi-image overlay, merging w/ Level 3 products / ancillary data