Calibration Front-end Model Mid-Update Check-in

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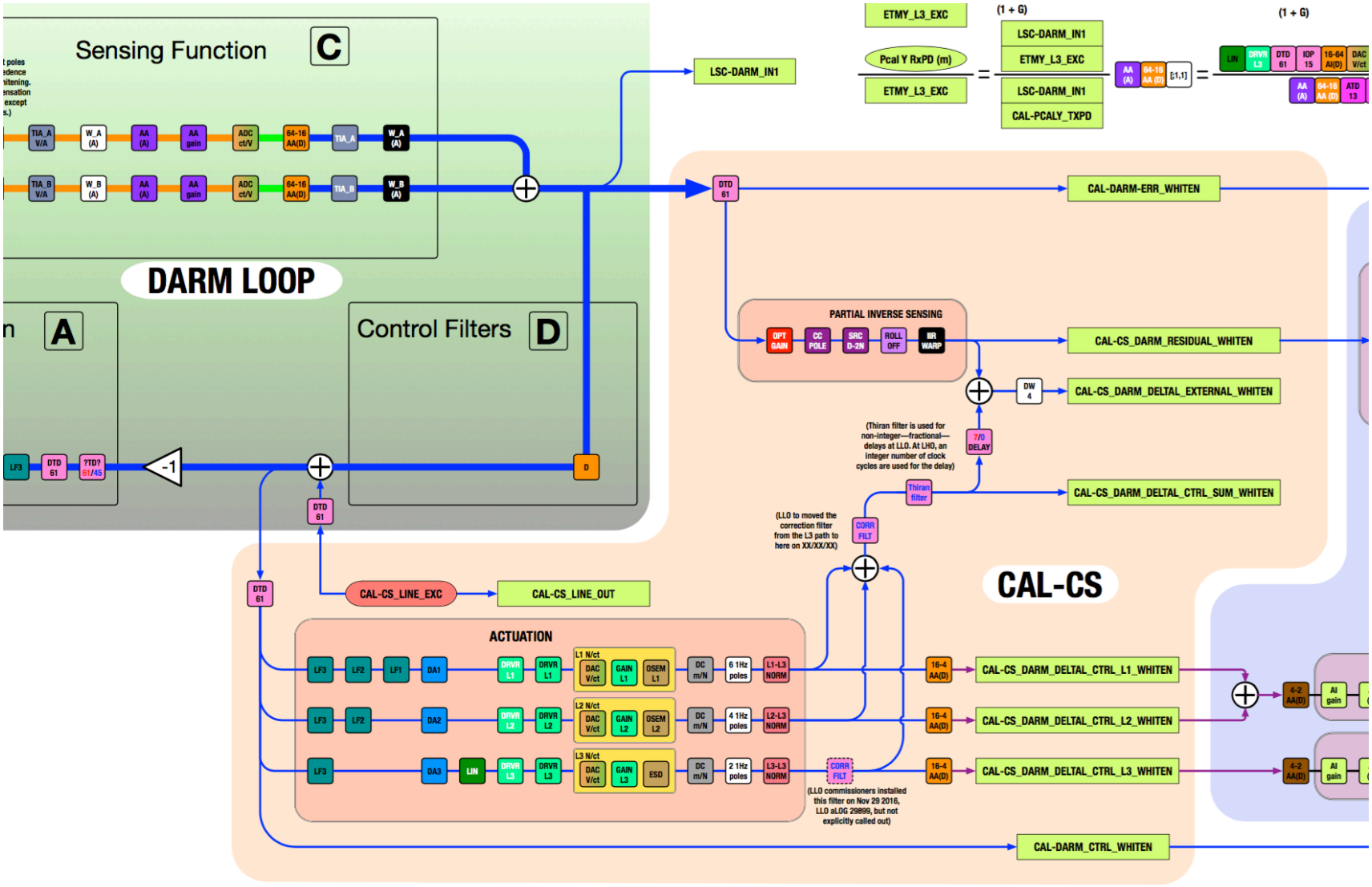
for the Calibration Group

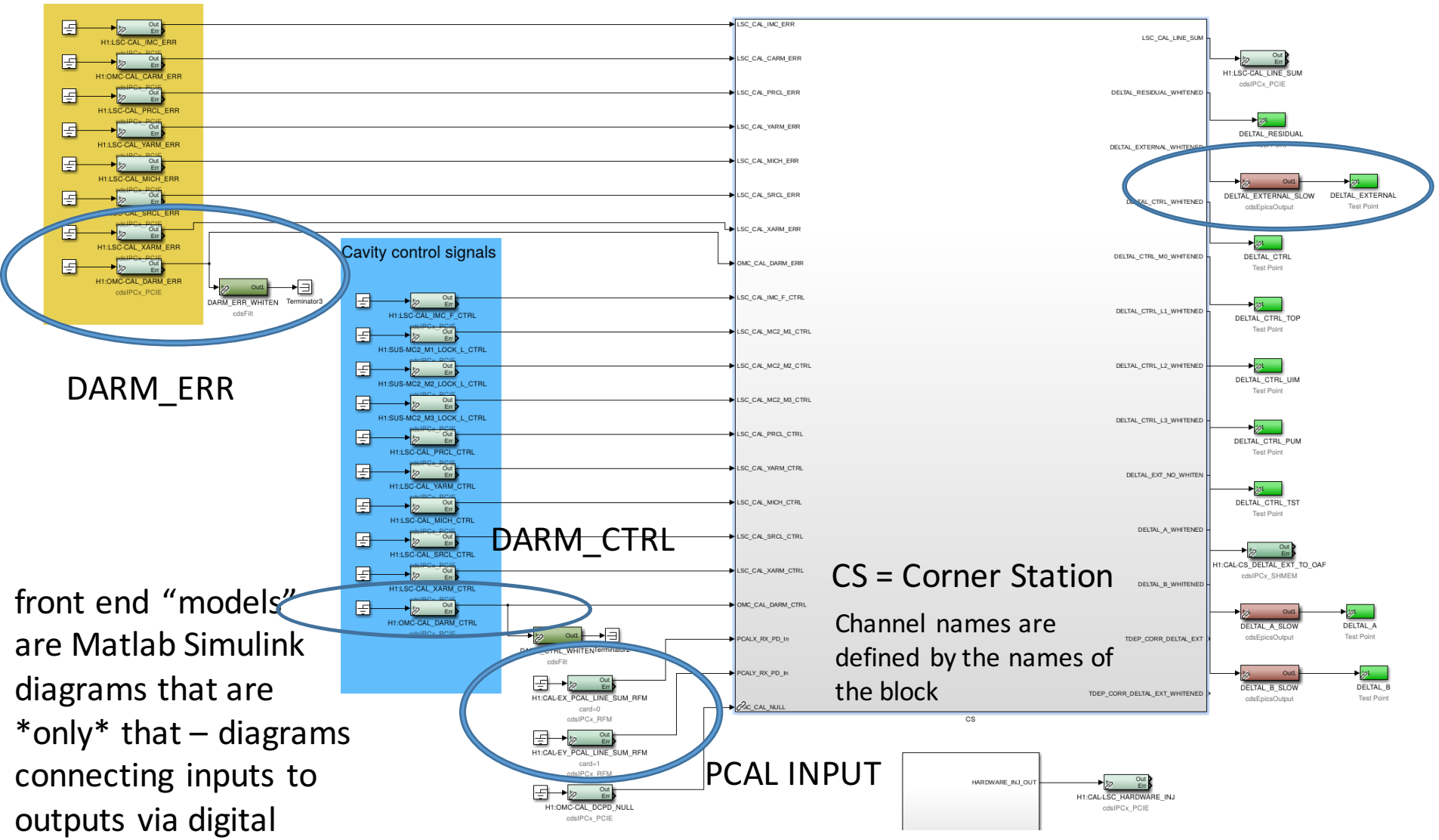
What are we changing?



Why?

- Upgrades for O3:
  - We will now be correcting for time dependence in the front-end.
  - We will now have individual calculations of the time-dependence of the actuator gains for all stages, i.e. \kappa_PU into \kappa_P and \kappa_U
  - We will now be doing gating, medianing, and averaging of TDCF in the front end
  - We may need to use a different end-station's PCAL for our reference
  - We will begin to implement at subtraction scheme in the front-end
  - We're cleaning up and pruning out old stuff as we're approaching a "final" method for calibrating the aLIGO interferometers

From the top!



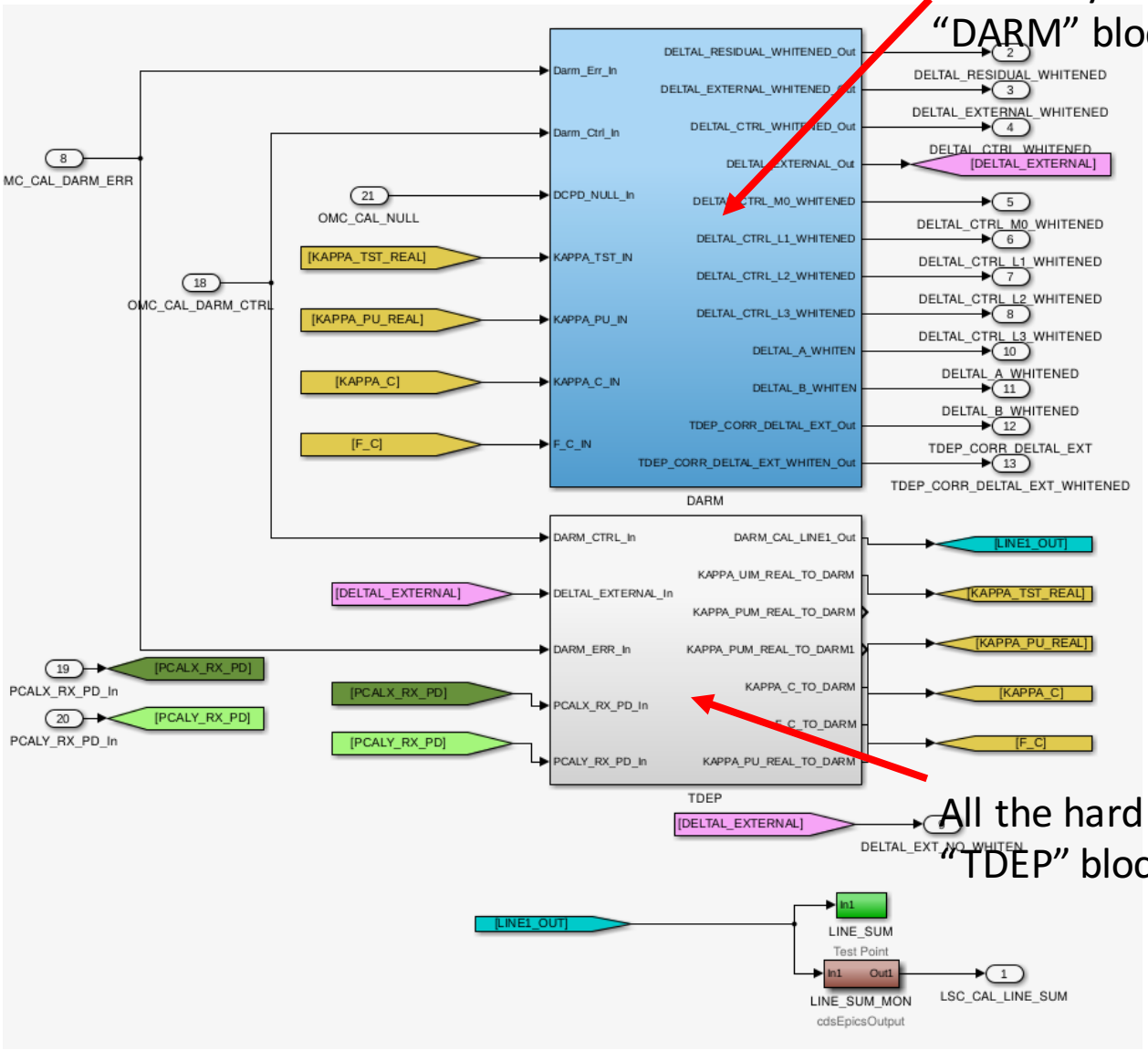
front end "models" are Matlab Simulink diagrams that are *only* that – diagrams connecting inputs to outputs via digital processing filters

The "Real-time Code Generator" (RCG) takes care of turning it all into c-code

Into the CS Block

Not many changes here

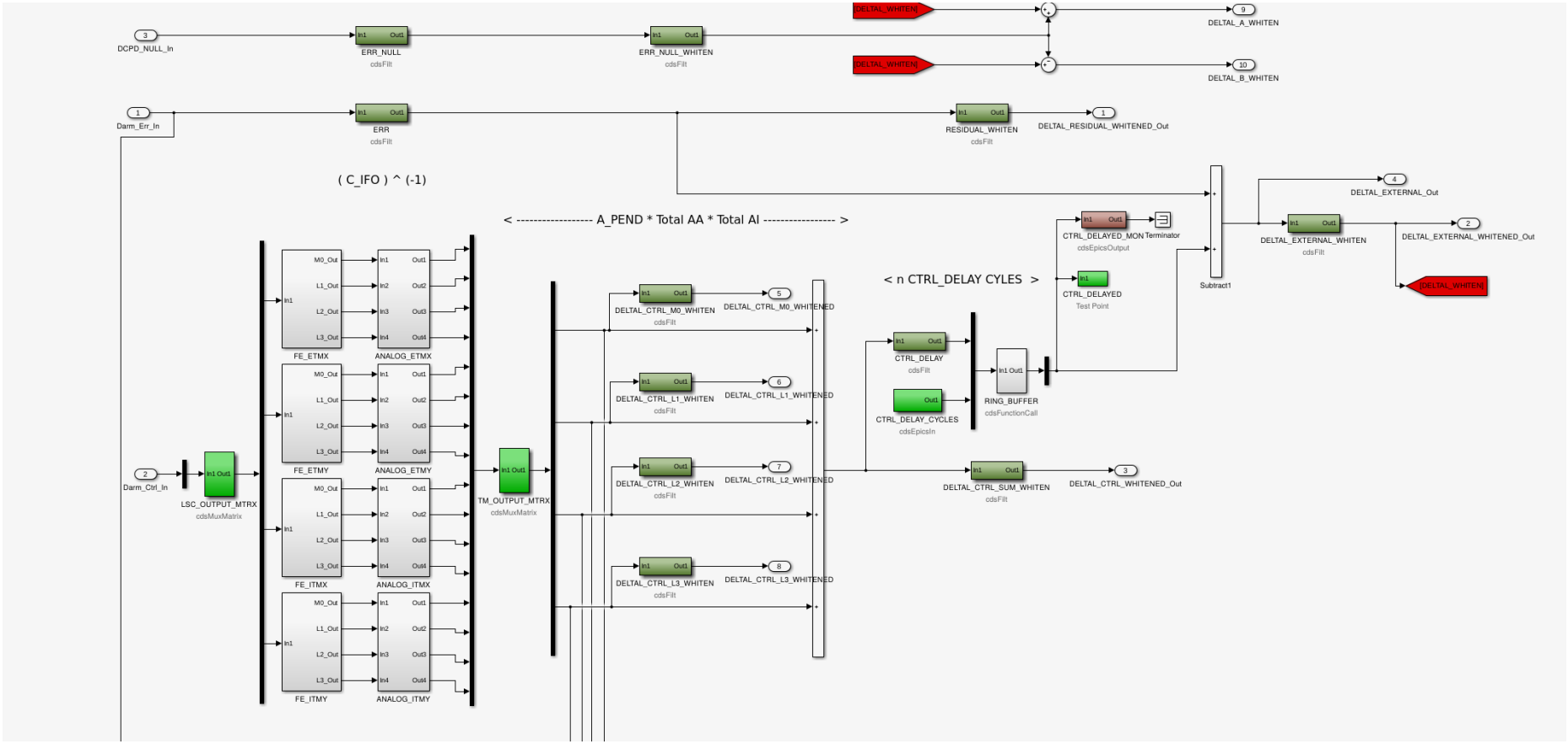
"DARM" block



All the hard work is in here

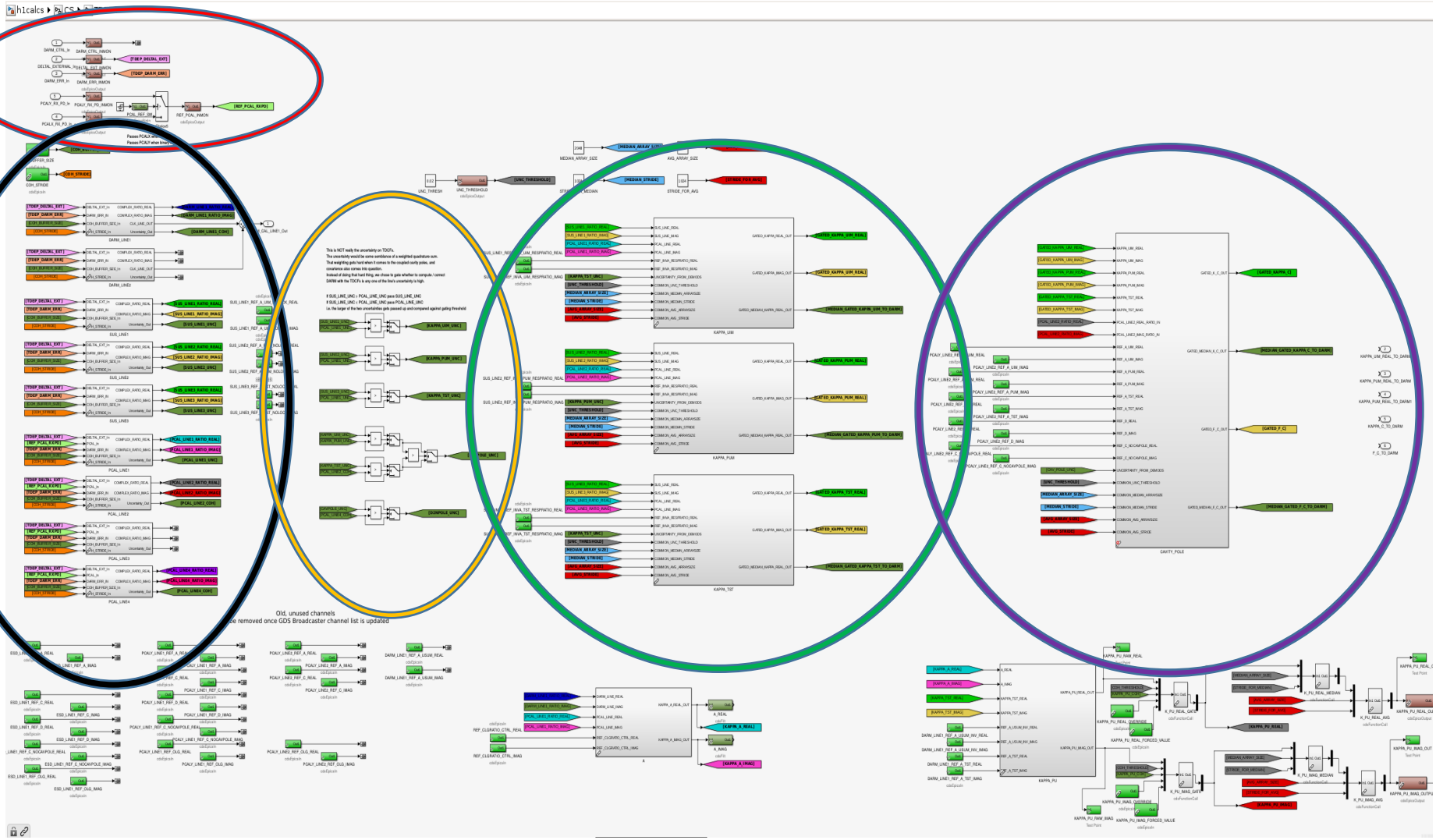
"TDEP" block

Into the DARM Block

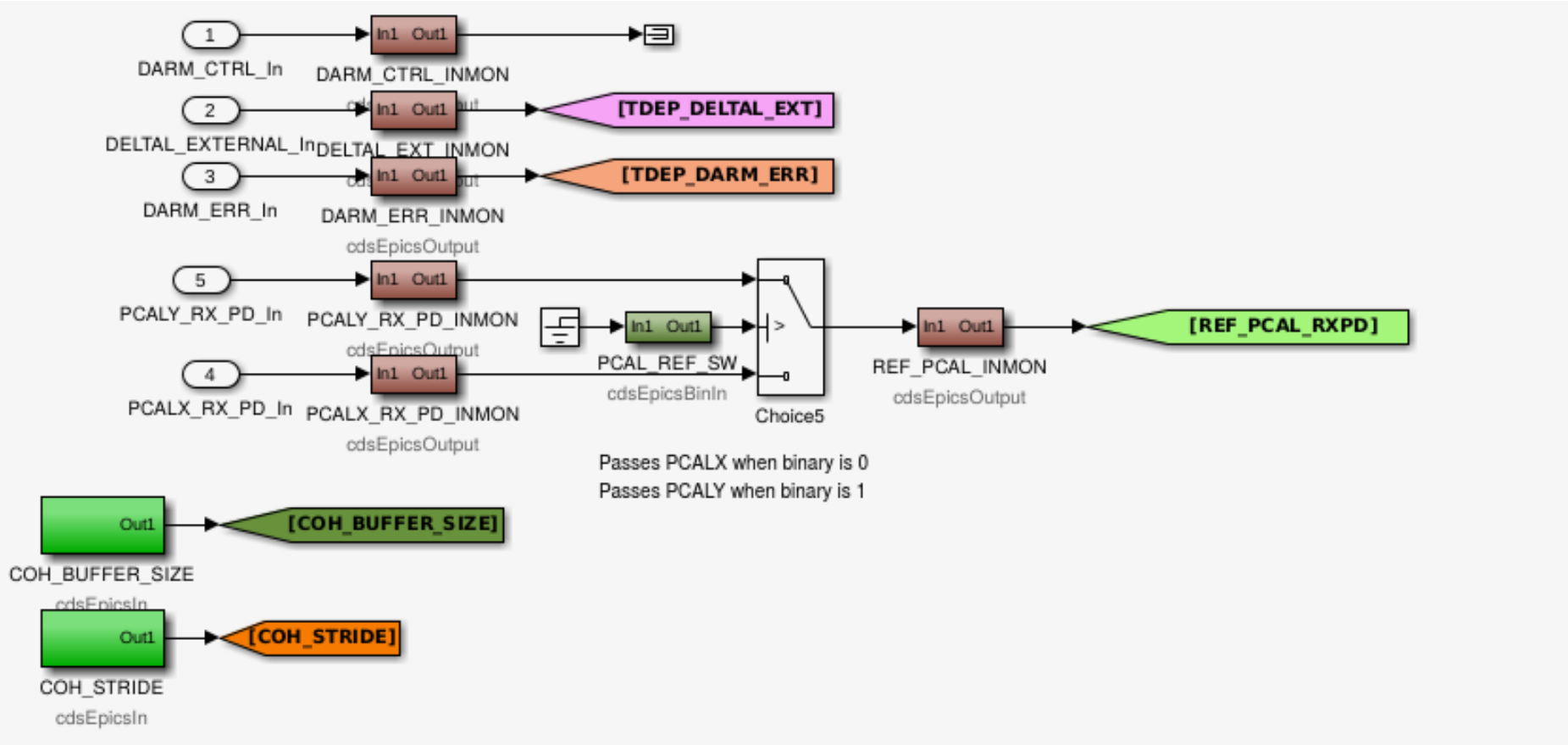


This is what we had already in O1 and O2.
Most of the hard work is not going to be in here…
(I'll show the new stuff at the end)

Into the TDEP Block

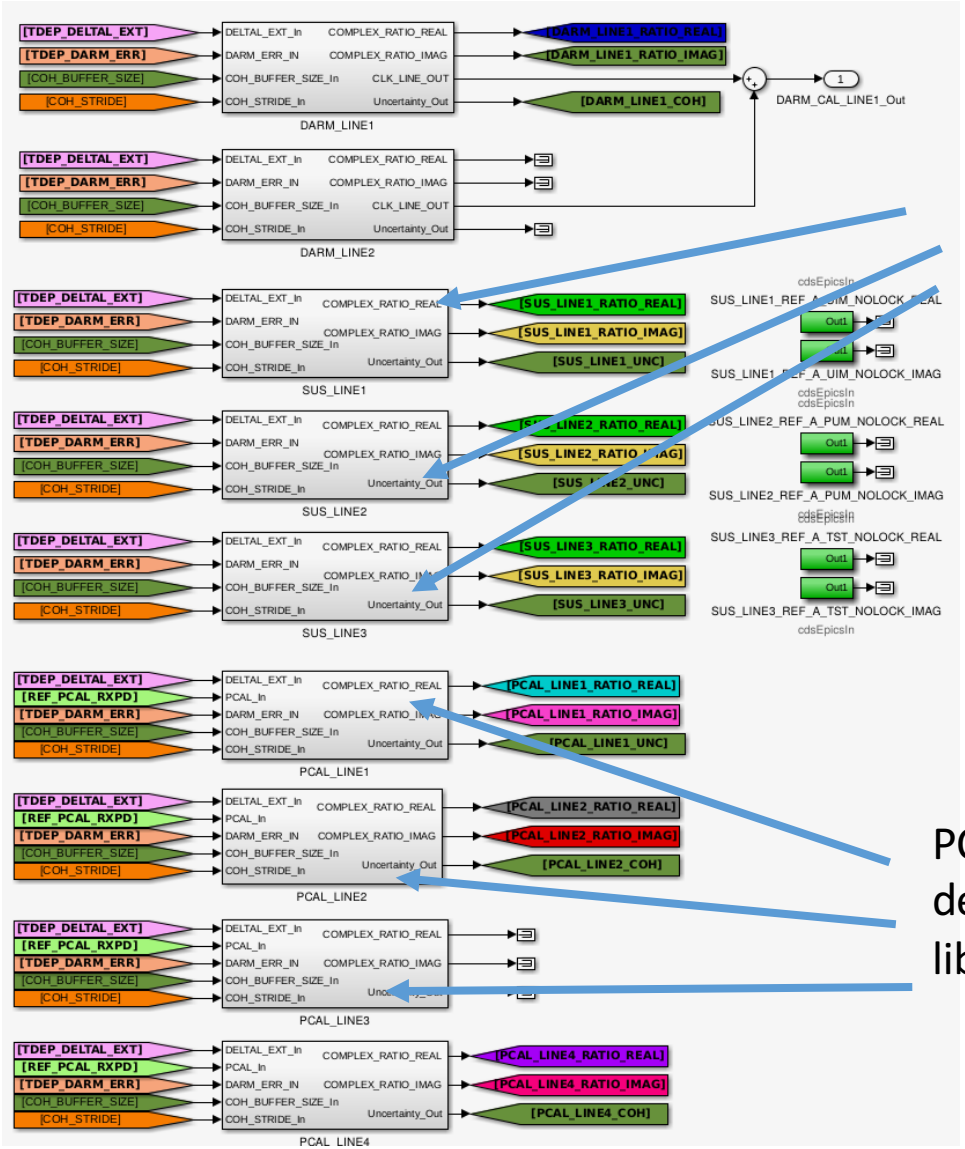


New Choice of Reference PCAL



New Demodulators

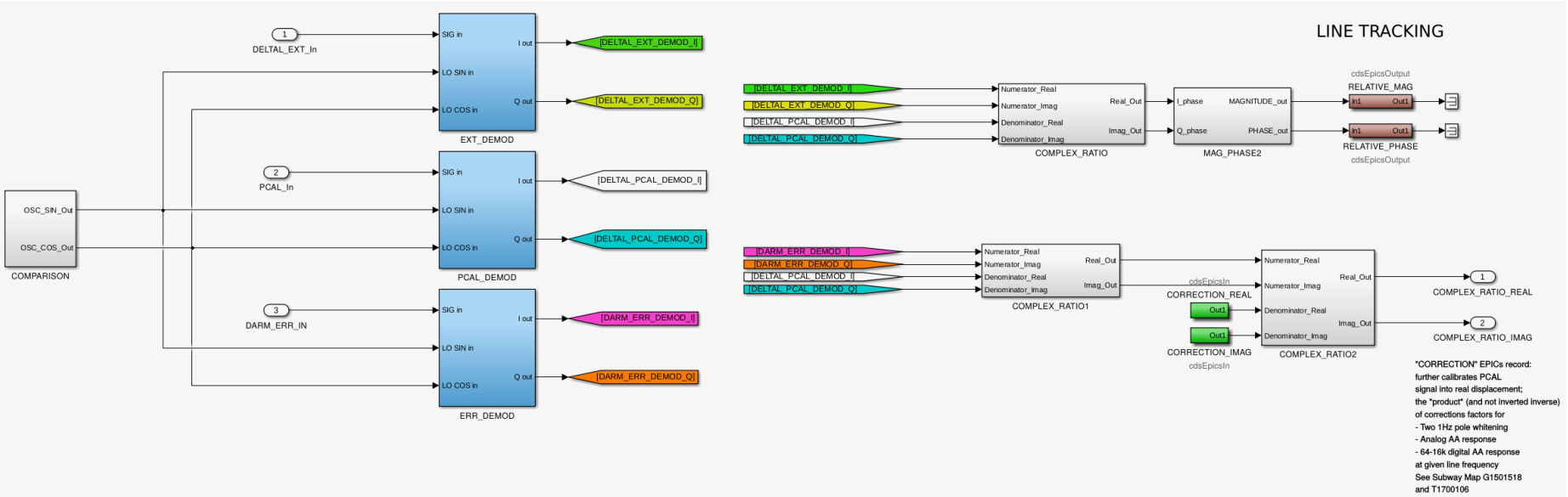
These are “library parts”
identical inside, only difference is channel name (defined by block name)



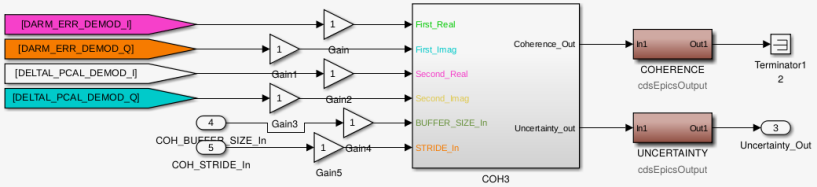
SUS line demod library part

PCAL line demod library part

Inside the PCAL DEMOD

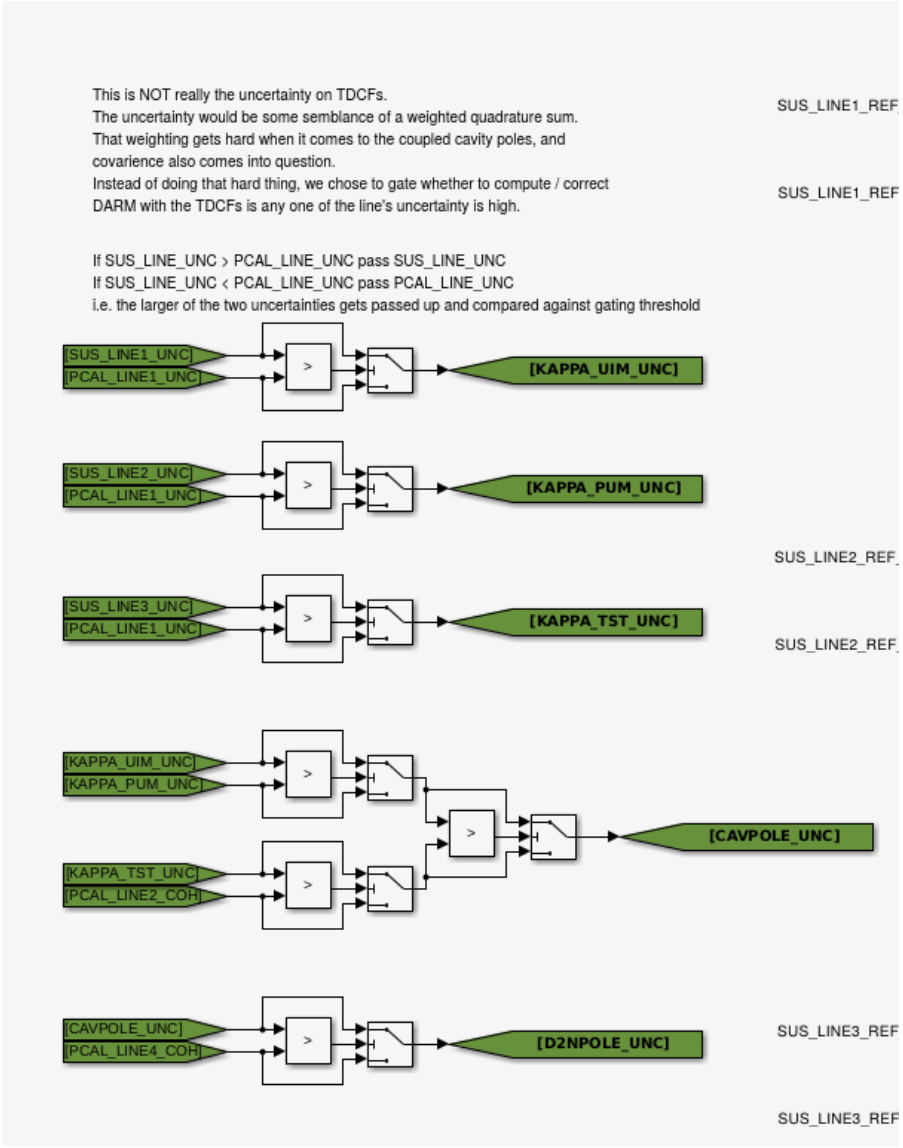


The “PCAL Correction Factor” is changed from a filter bank to a set of EPICs Records

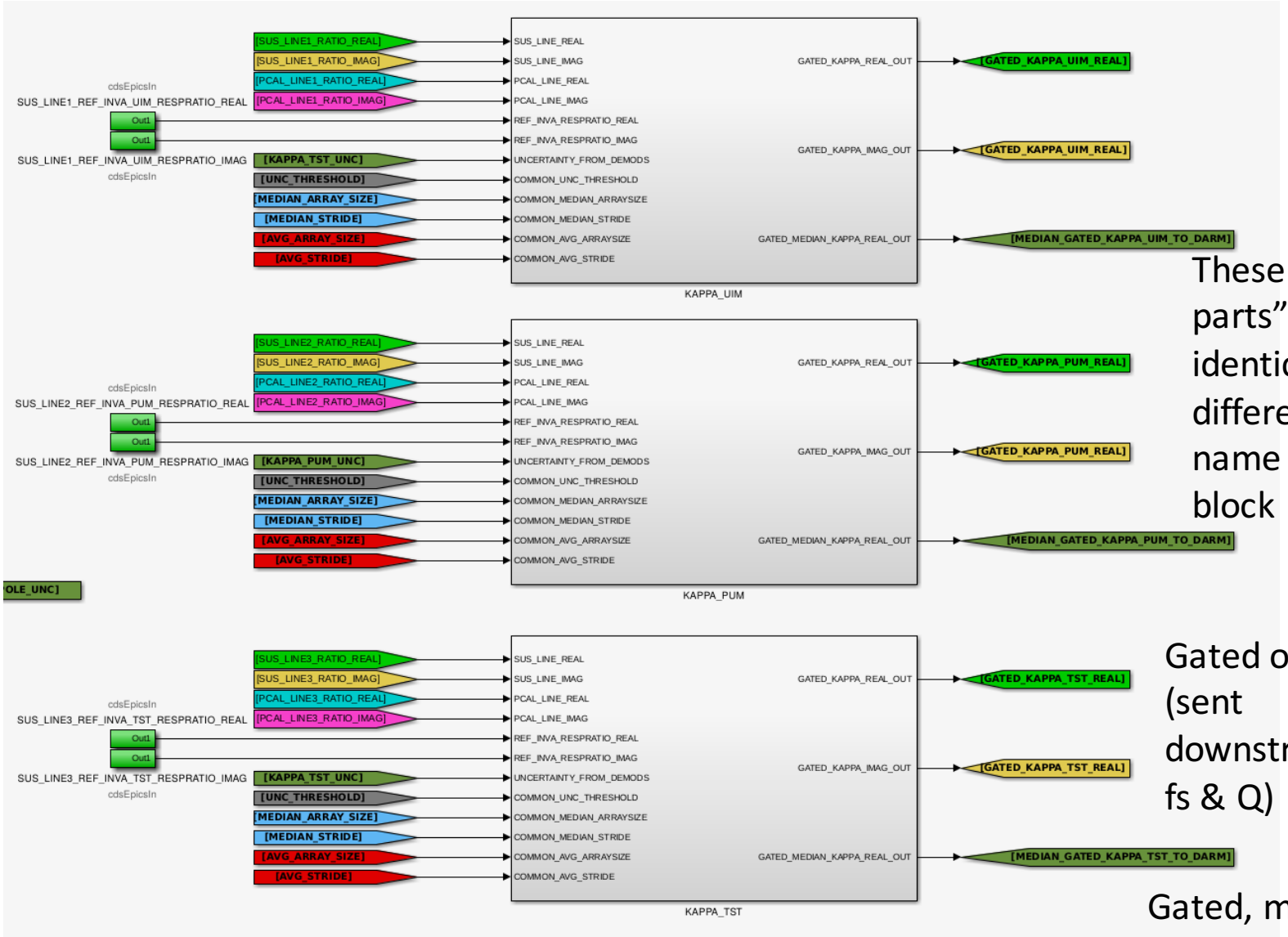


Aaron asks “there wasn’t an EPICs record for detuning PCAL line uncertainty…”
there was... ?

Coherence / Uncertainty for Gate Triggers



New Individual Actuator Kappas

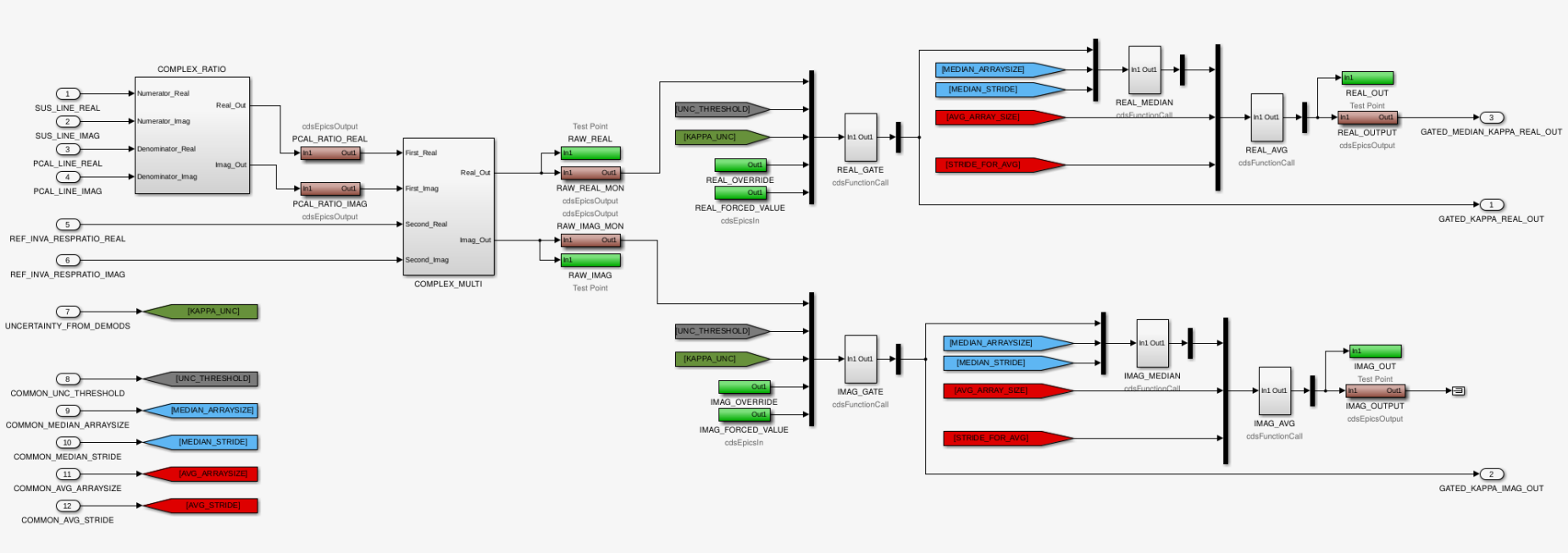


These are “library parts”
identical inside, only difference is channel name (defined by block name)

Gated output (sent downstream to fs & Q)

Gated, median, averaged output sent to DELTAL

Inside an Actuator Kappa

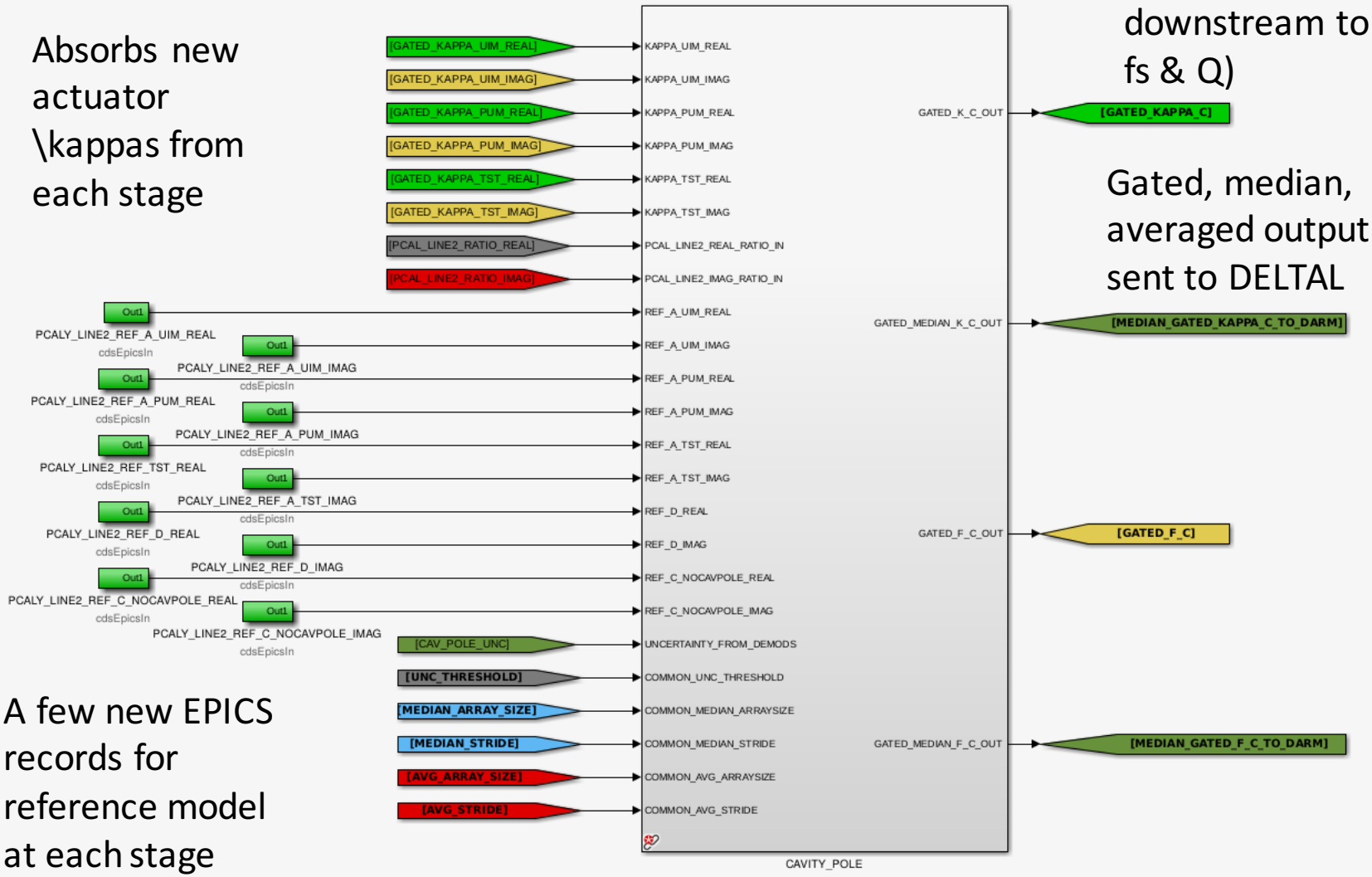


Updated \kappa_C and f_CC Calculation

Absorbs new actuator \kappas from each stage

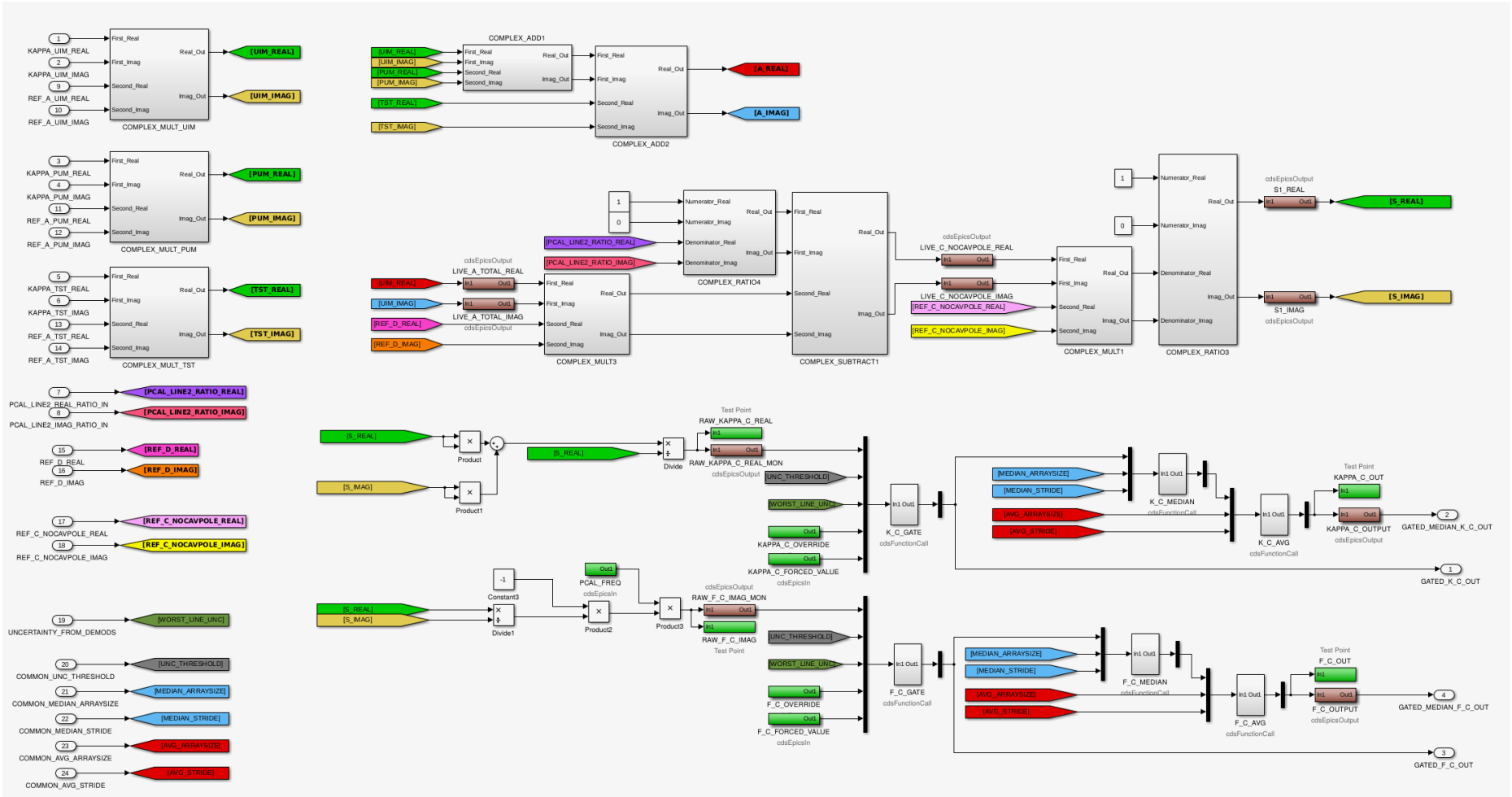
Gated output (sent downstream to fs & Q)

Gated, median, averaged output sent to DELTAL

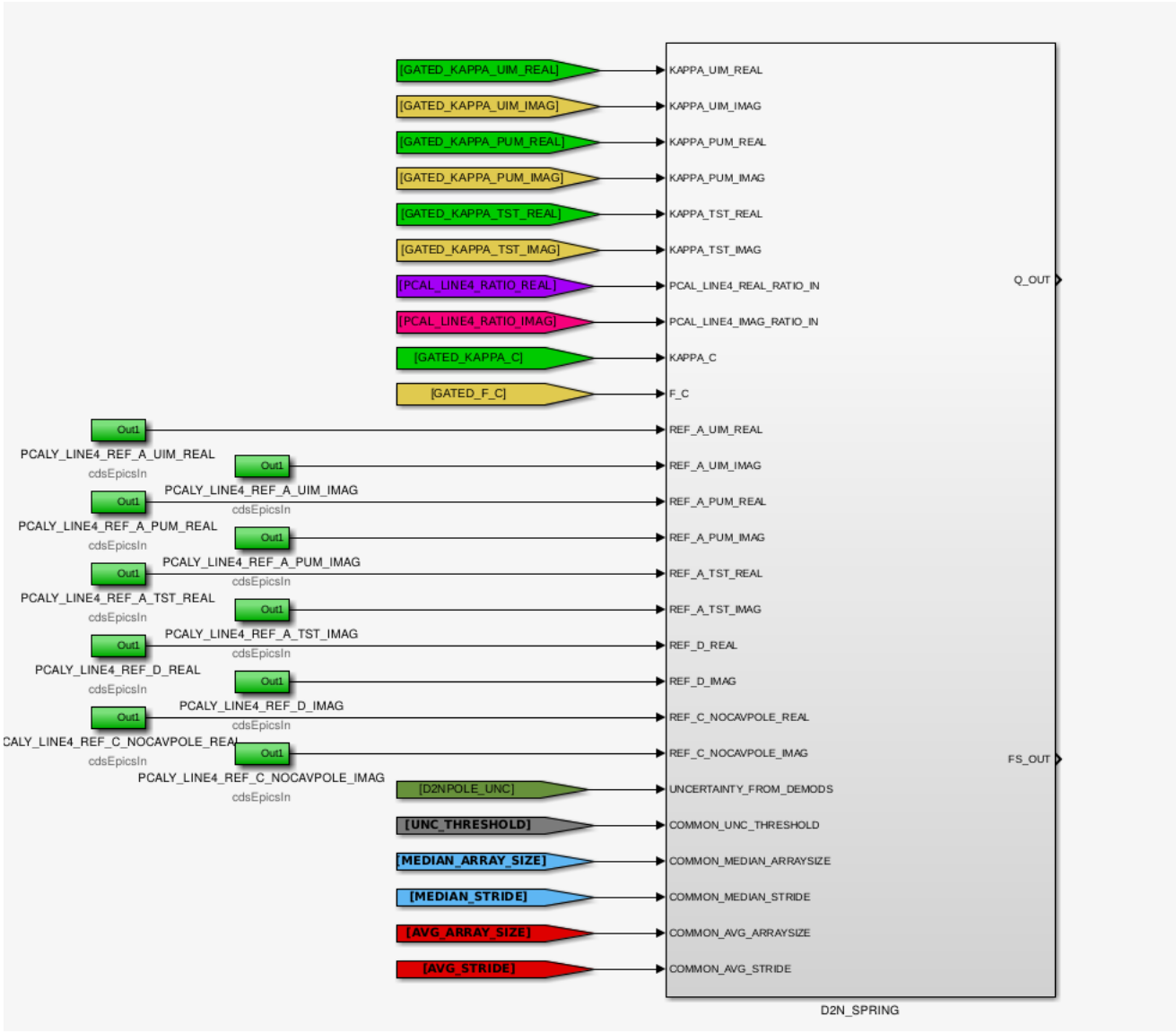


A few new EPICS records for reference model at each stage

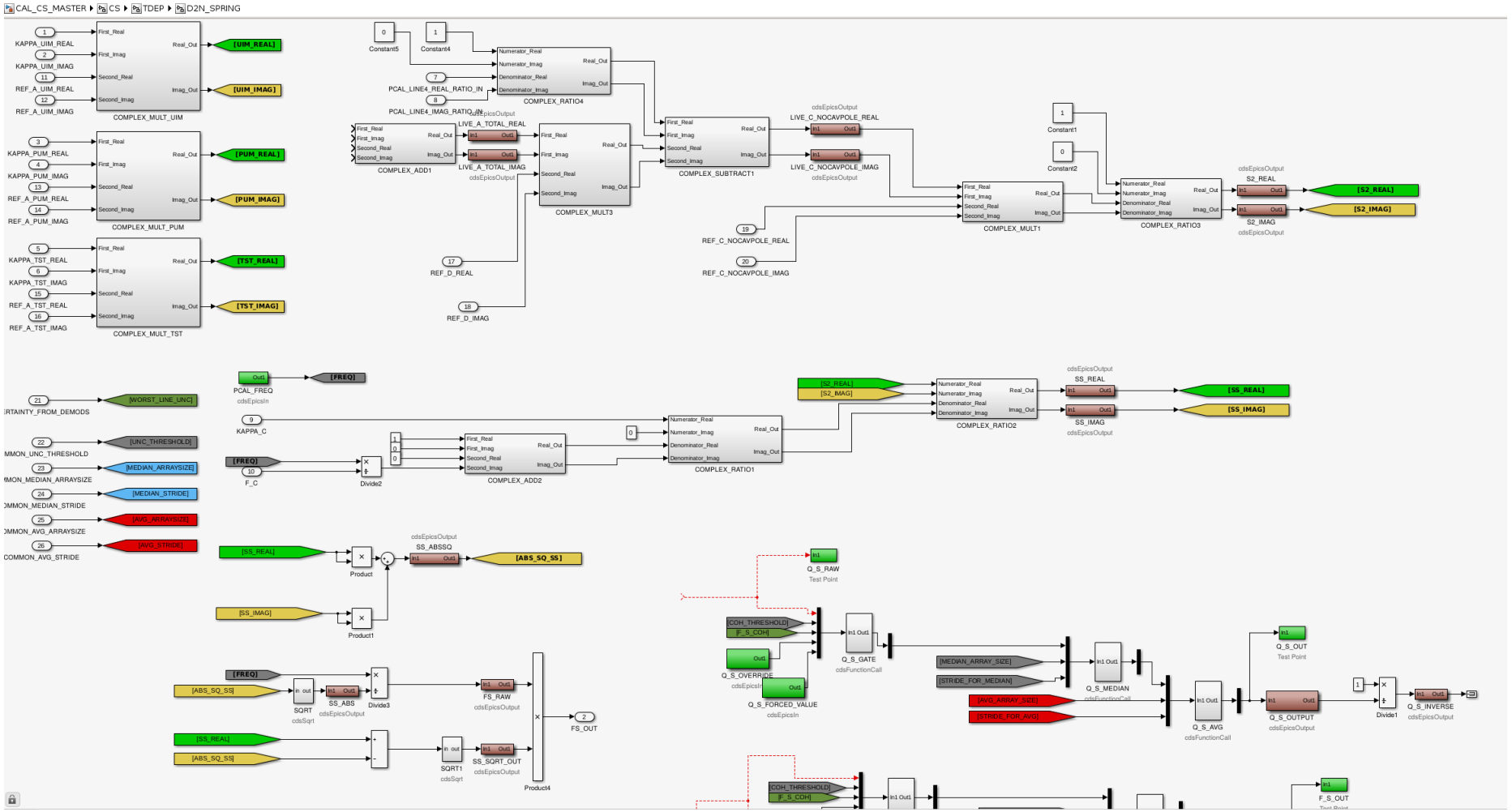
Inside CAVITY_POLE



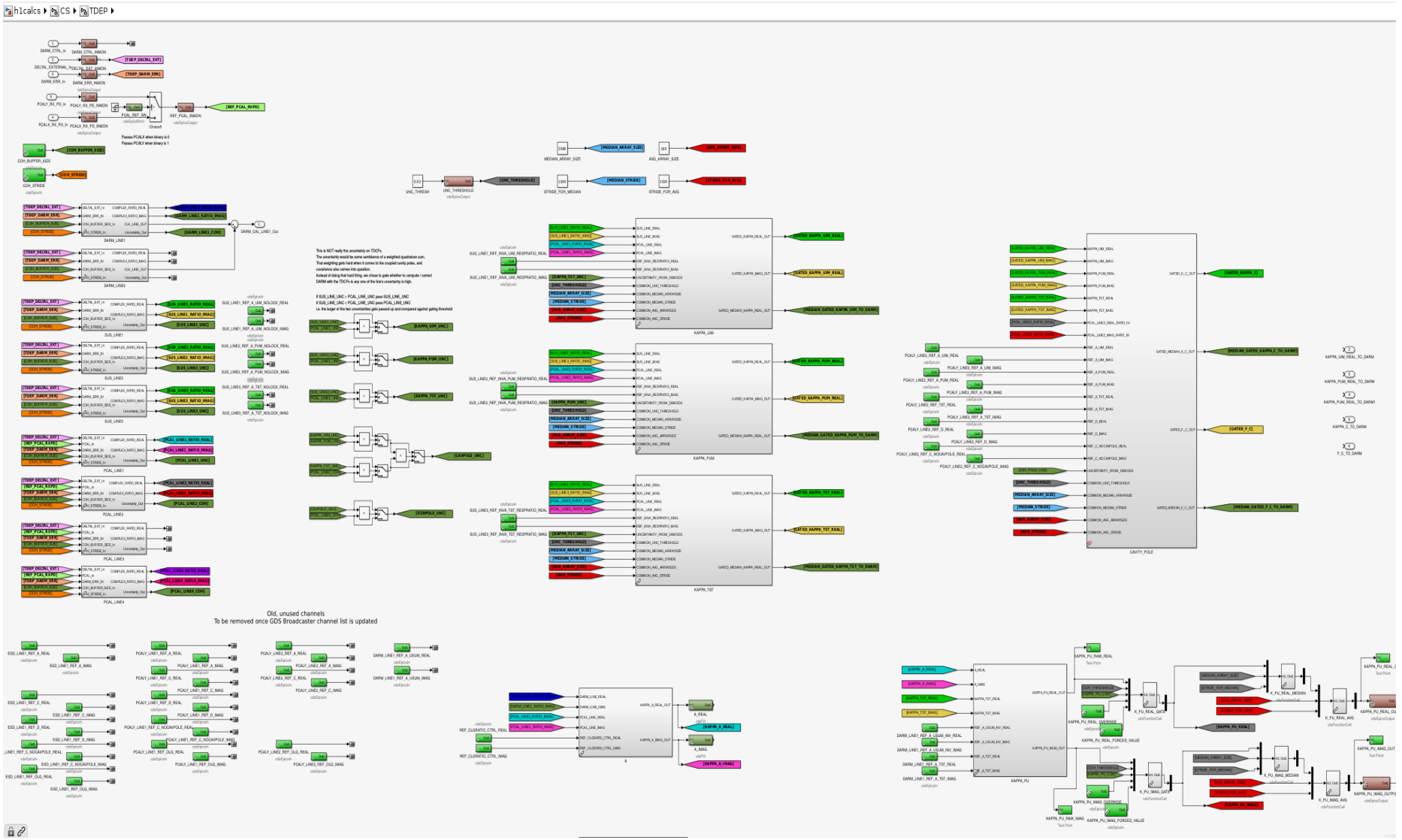
Updated f_s and Q Block
WORK IN PROGRESS



Updated f_s and Q Block
WORK IN PROGRESS



That’s it so far… hope to install next week



Next step – hook it back into DELTAL

WORK IN PROGRESS