

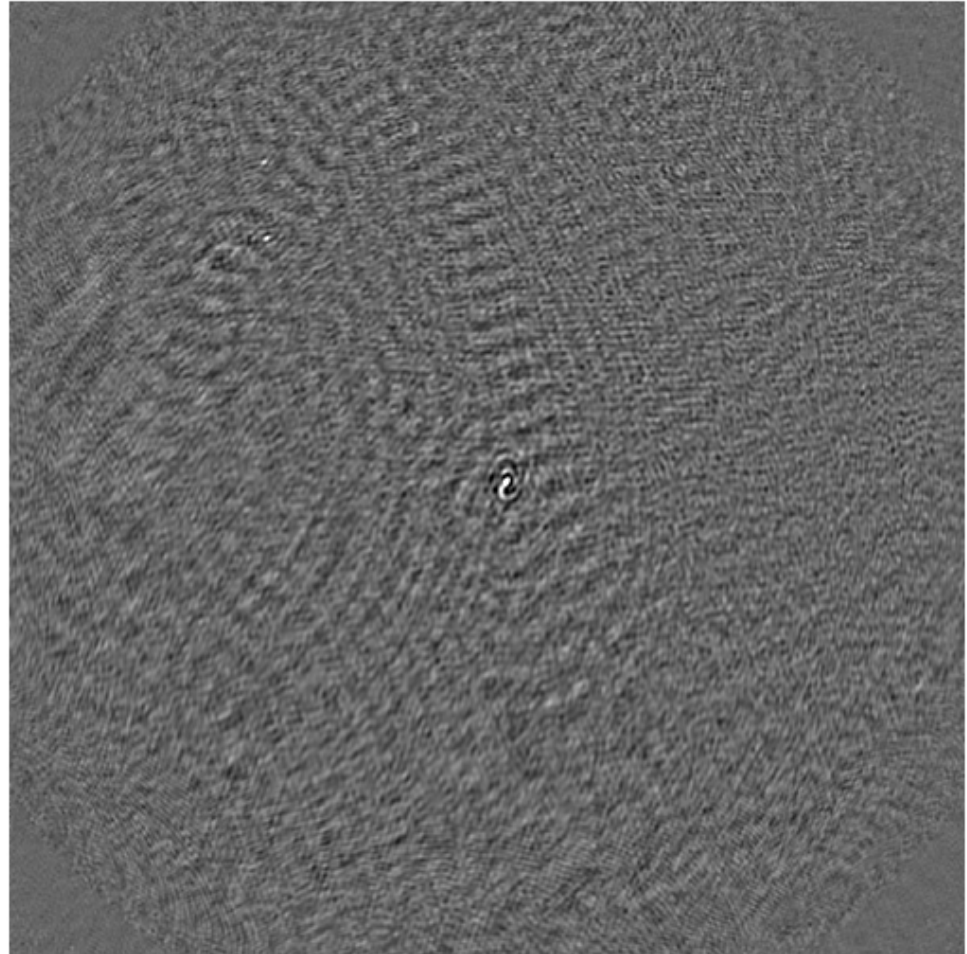
# CS1 Transient Survey

## Status Report -- Casey Law

Goal: Find transient sources or make useful limits.

Outline:

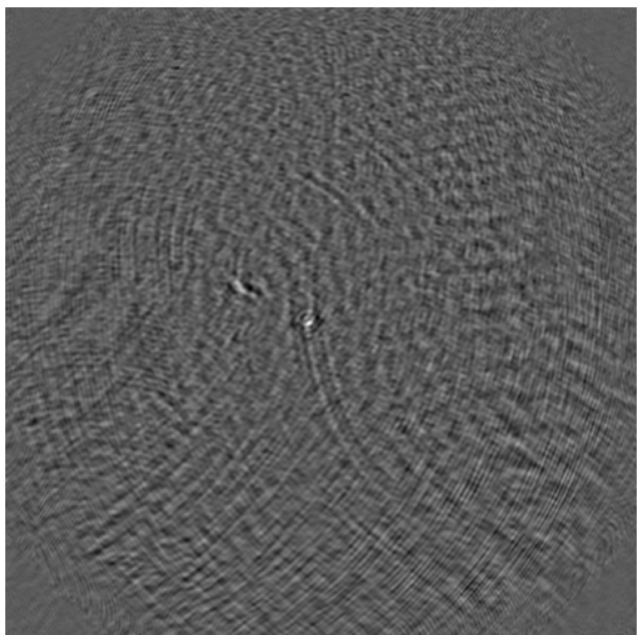
- Commissioning science with CS1
- Data calibration and analysis
- Preliminary results



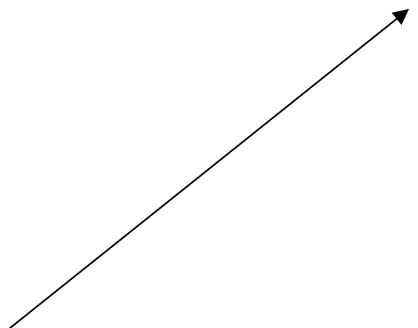
All-sky image of transient field near Cyg A.  
12 hr, 6 SB used for image rms  $\sim 4$  Jy.

## Basic steps:

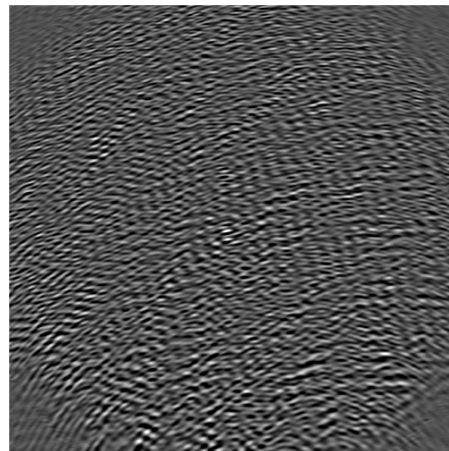
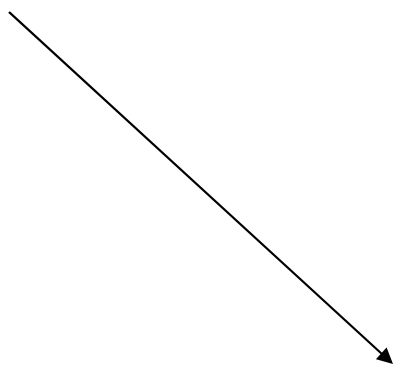
- Flag short baselines and RFI (aips++)
- Calibration using MeqTrees (peel0\_mmse by Sarod)
- Run Transient detection pipeline:
  - image short intervals,  $\Delta t$ , using all SB and channels
  - $\Delta t = 0.5, 1, 2, 4, 8$  hours
  - difference neighboring images (with same  $\Delta t$ )
  - run source detection on all images and differenced images
- Inspect output catalogs and images



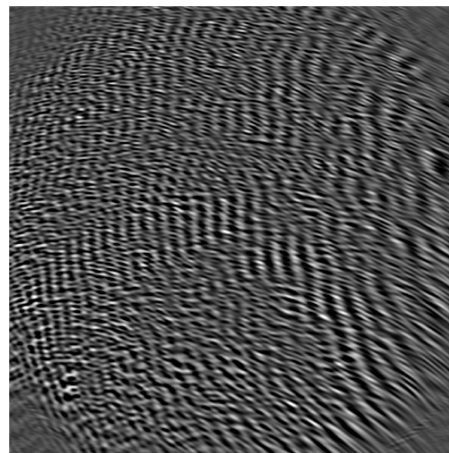
#2113, 3 SB, all times



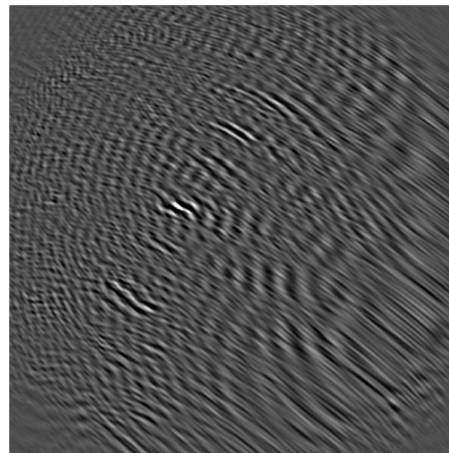
Short intervals



t1



t2



t3

## Preliminary Results:

- Two transient events seen in data
  - both seem to move (few degrees) over a few hours
  - not celestial. RFI or bad calibration?
- Images have rms  $\sim 5\text{-}10$  Jy, but very few sources found. Why?

### 3) Upper limit on event rate:

- Number of detections follows Poisson distribution
- Prob ( $N_{\text{det}}=0$ ) =  $e^{-\lambda t}$  , where  $\lambda$  is event rate and t is observed time
- For 0 detections, 95% confidence on  $\lambda t < 3$ .
- Ultimate goal:

$\Delta t$ (hrs)	Flux Limit (Jy)	Max Rate ( $\text{hr}^{-1}$ )
0.5	40	0.1
1.0	28	0.1
2.0	20	0.1
4.0	14	0.1
...		



# CS1 Transient Survey

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### Notes:

- We have proposed a commissioning science project with CS1.
  - Transient survey of Cyg A region
  - 12-hour obs, repeated weekly
  - 24-sum plus 15 dipoles
- Flagging and calibration done with Sarod's scripts (i.e., like pipeline)
- Calibrated data fed to transient pipeline
  - imaged on multiple time scales from 0.5 - 8 hours
  - neighboring images differenced
  - source detection on all images and differences
- Preliminary results
  - constant sources real or residuals?
  - a few strange things -> streaked/moving sources
  - no believable transient sources
  - upper limit will imply some limit on frequency of events above flux level