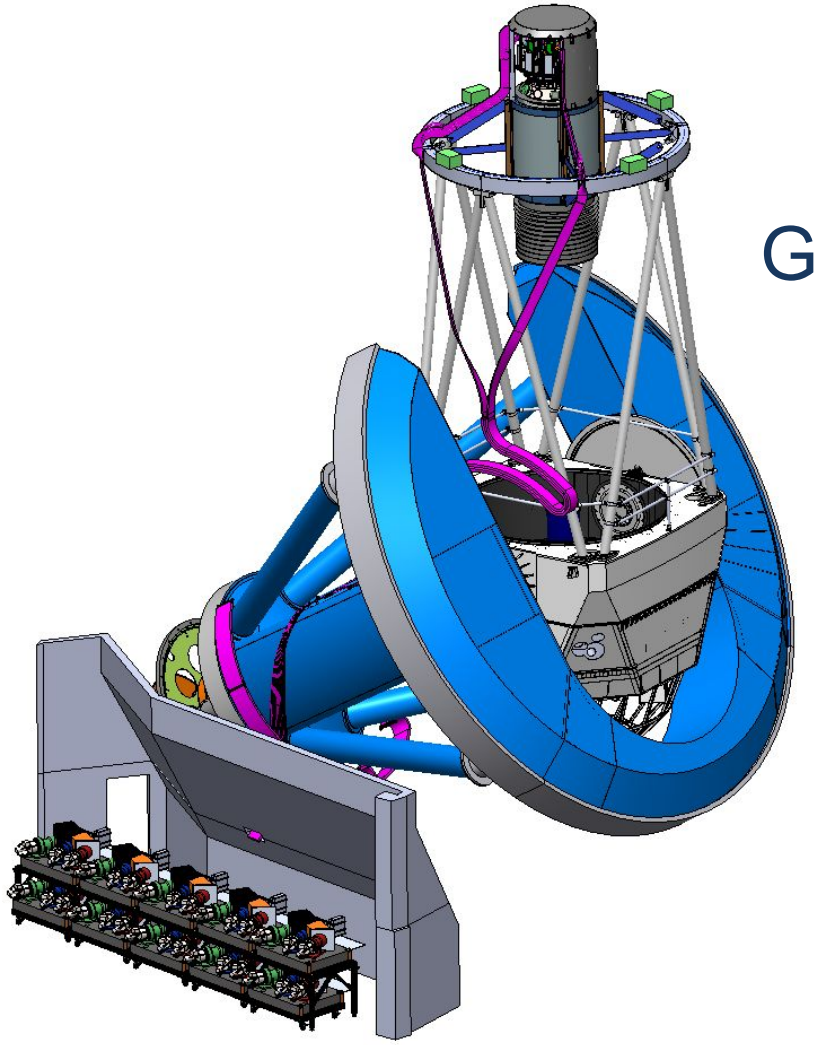


Goldilocks and the DESI Camera

DESI-6122

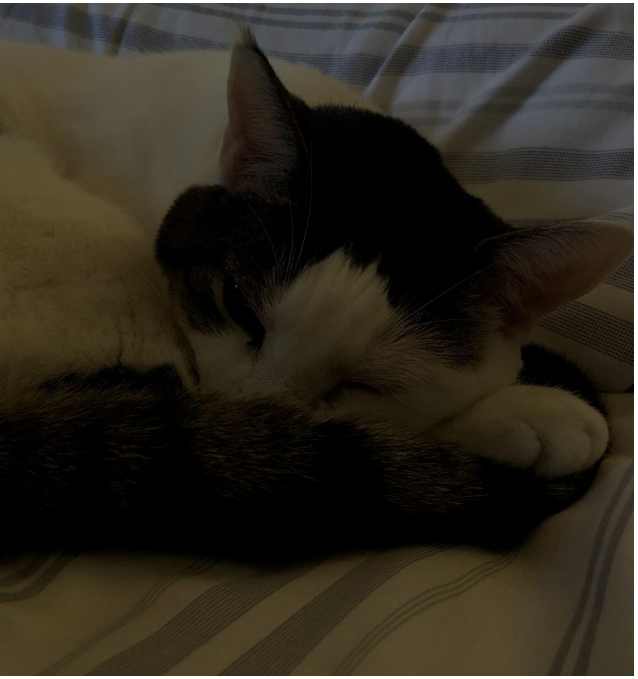
Abby Bault, UC Irvine
David Kirkby, UC Irvine

DESI Research Forum

25 March 2020

Goldilocks Takes Three Photos

underexposed



just right

overexposed

What is the ETC?

The Online Exposure Time Calculator (ETC) tracks the estimated SNR accumulated by the spectrographs using the in-focus GFAs and the SkyCamera.

Calculates EFFTIME (=EXPTIME with nominal conditions) and closes the shutter once this is reached

The online ETC will close the shutter based on:

- ETC estimated effective exptime ~ NTS goal effective exptime
- cosmic ray split requirements
- maximum allowed exptime (sunrise, etc) from NTS

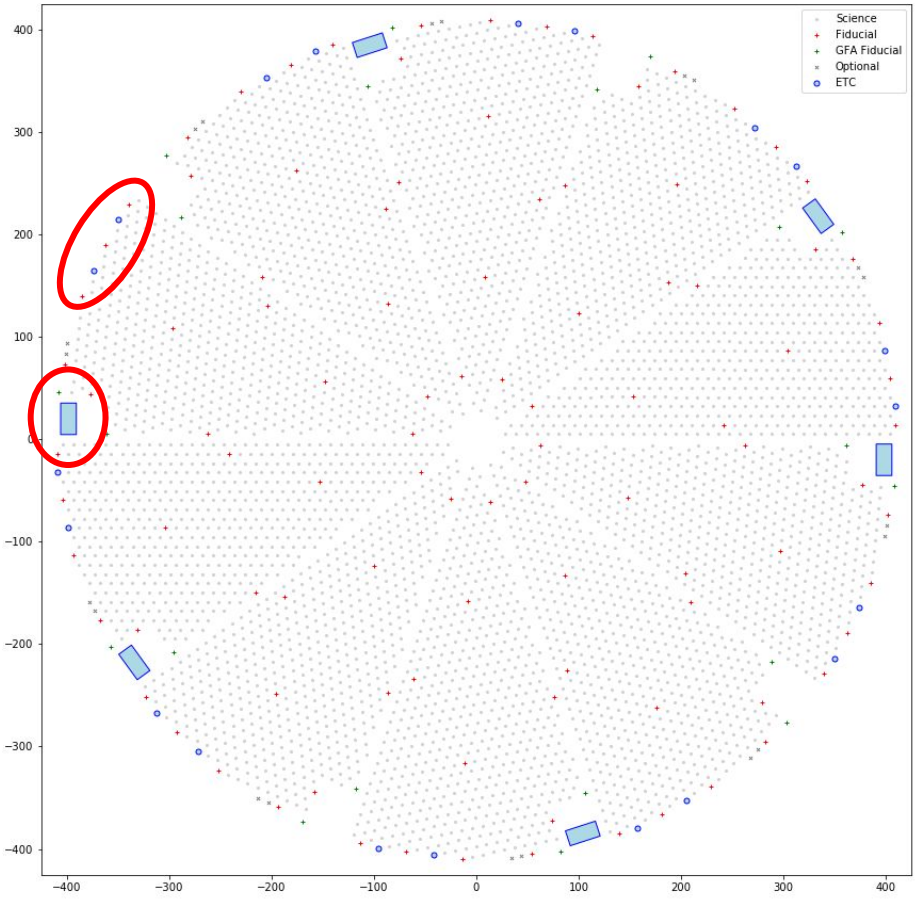
What is the ETC?

The ETC estimated exposure time is based on:

- throughput estimated with in-focus GFA guider frames
- sky level estimated with SkyCam frames

~~20~~ 16 fibers read out by 2 SkyCameras every 1 min

6 in-focus GFAs read out every 8 secs



Big Picture

We want to collect a sample of uniform observations that is complete after 5 years.

Online ETC ensures uniformity of individual observations of a tile.

NTS schedules tiles to ensures 5 year completion.

Survey simulations ensure adequate safety margin:

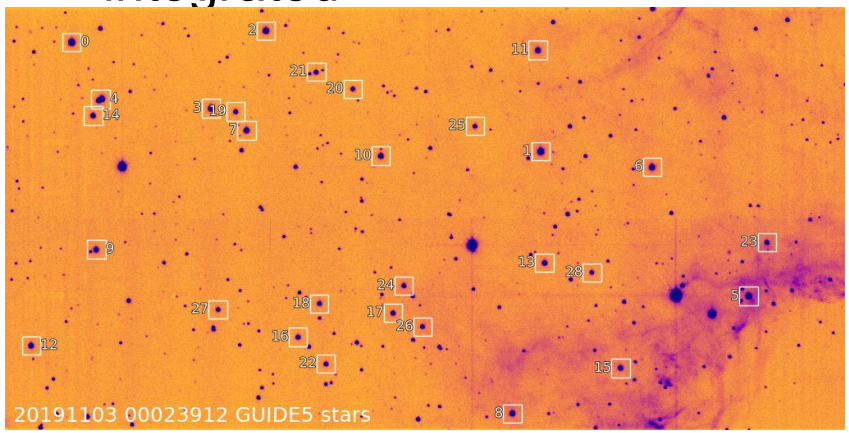
- using NTS and ETC
- modeling stochastic observing conditions and weather

ETC Output at NERSC

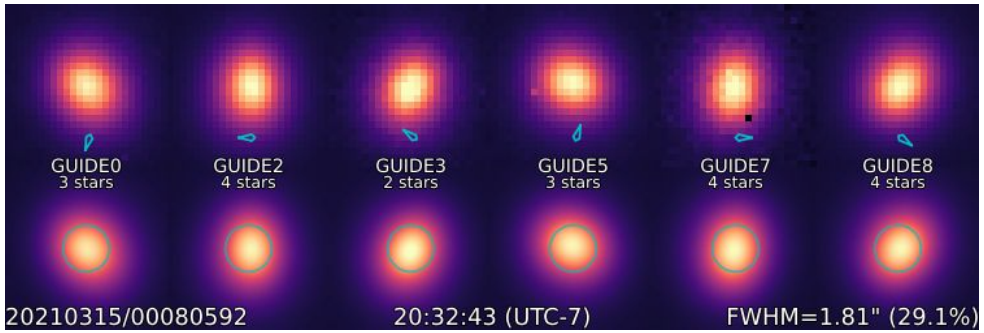
Offline

Path = `/global/cfs/cdirs/desi/spectro/ETC/YYYYMMDD/EXPID`
Will be …`/desi/spectro/data/YYYYMMDD/EXPID` once ETC is fully integrated

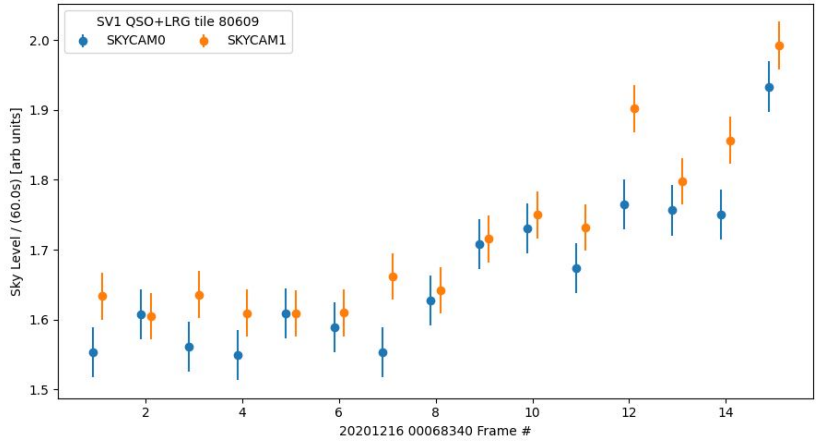
Online



← Acquisition frame from guide GFAs



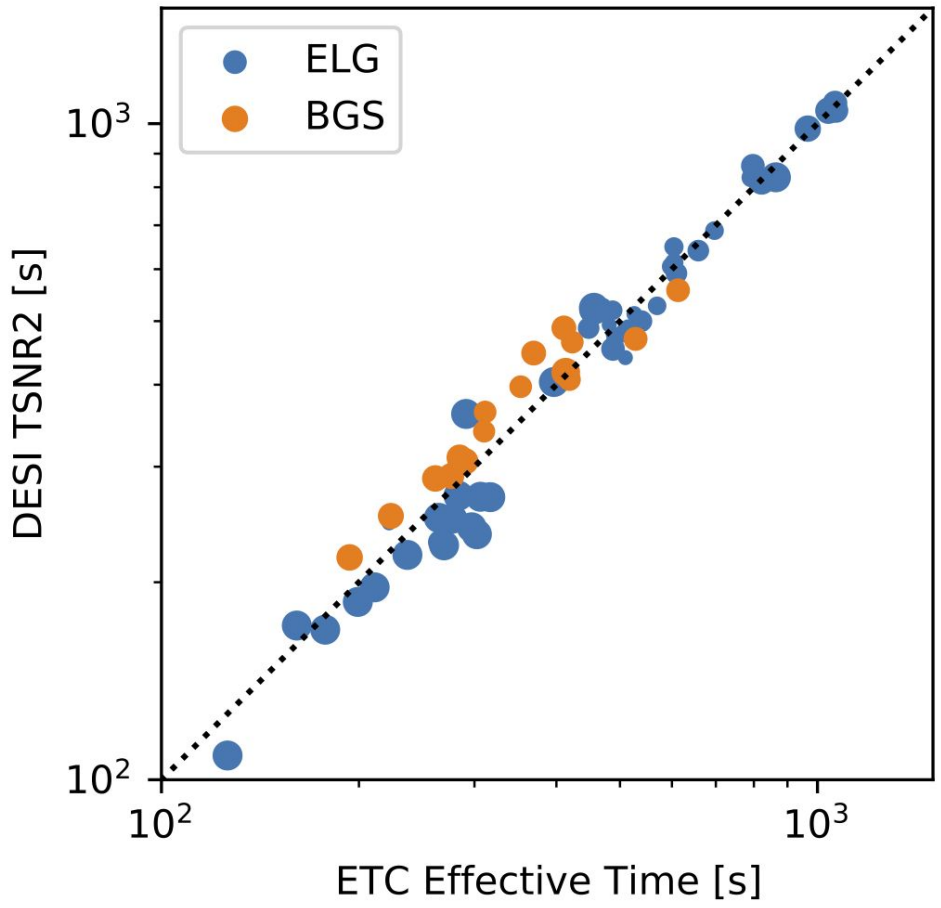
↑ PSF from acquisition frame



← SkyCam sky level measurements over the whole exposure

ETC in “Listening Mode”

More about TSNR2 in [DESI-6110]



ETC Next Steps

What is on the to-do list?

- Secondary tasks not related to closing the shutter:
  - Measuring transparency, PSF ellipticity, changes in seeing, field rotation rate
- Improve observer displays (ICS)
- Cosmic splits

What are the milestones towards handing over control to the ETC?

- ETC is essentially ready now!