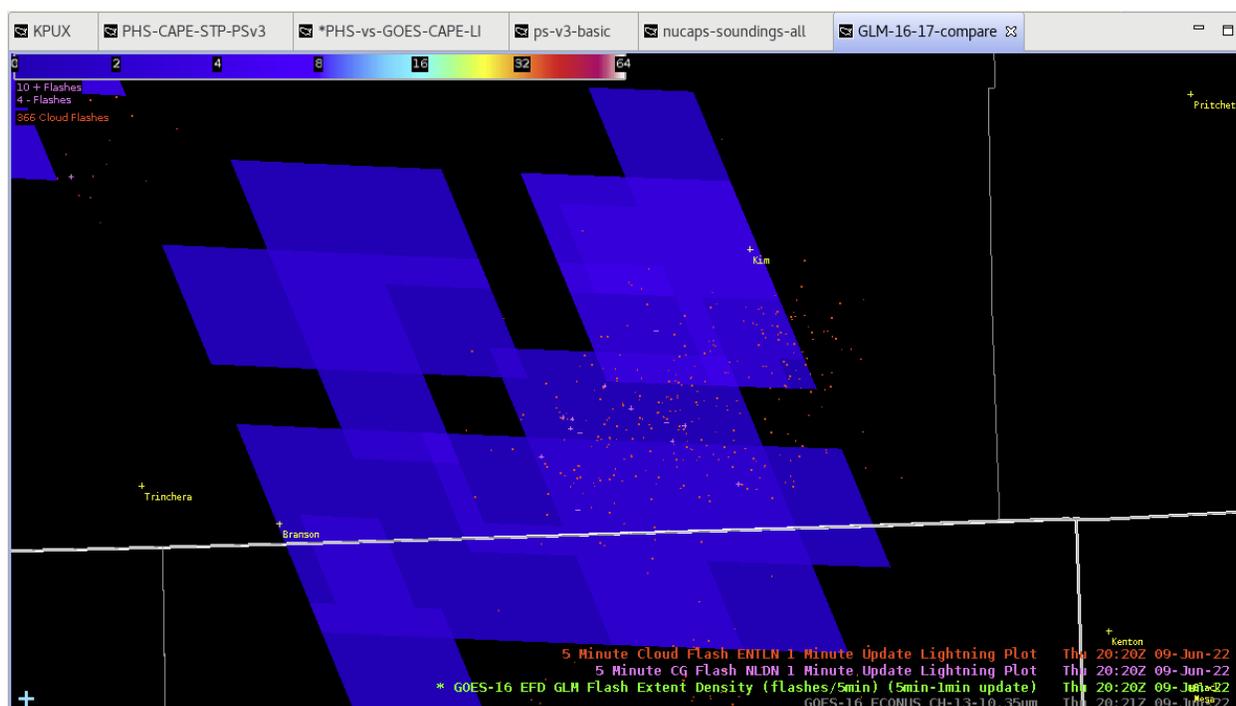


## HAZARDOUS WEATHER TESTBED

### EXPERIMENTAL WARNING PROGRAM BLOG

## GLM FED vs ENTLN → Impacts on ProbSevere??

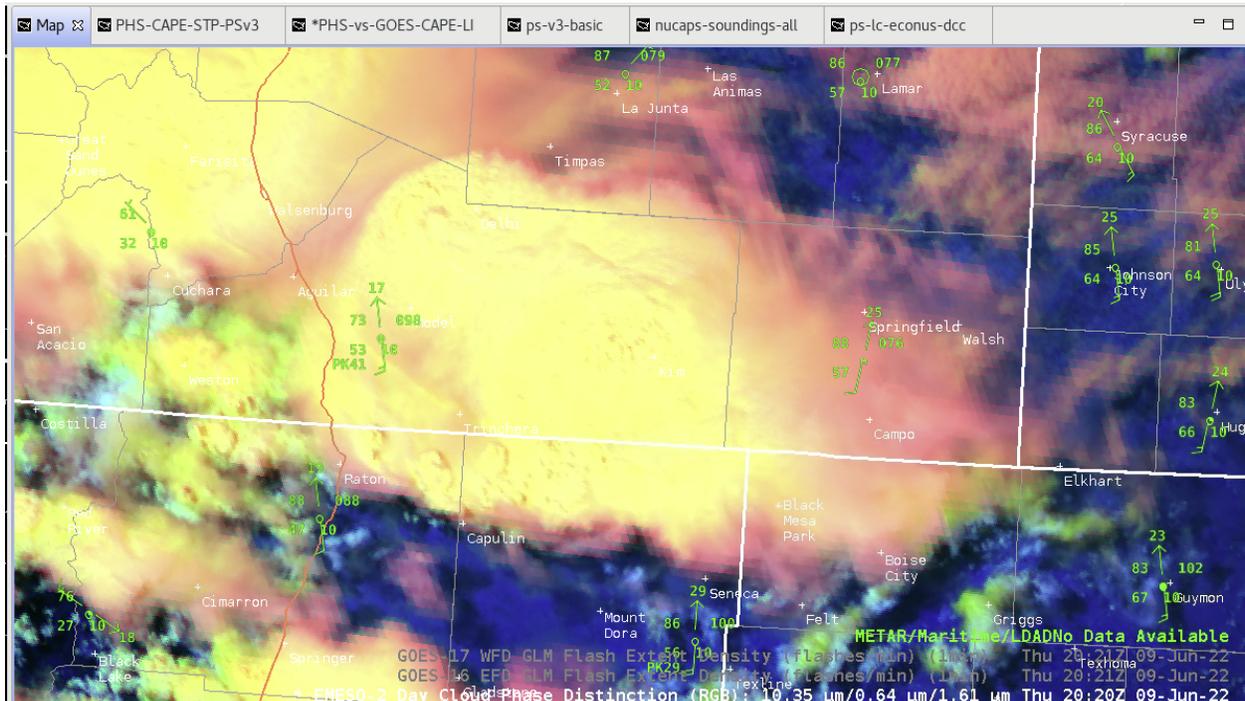
Spreading anvils from strong to severe storms over far southeastern CO east of Trinidad, likely caused an obscuration of lightning activity into the GLM product. The ENTLN ground network picked up a strong spike in cloud flashes associated with this cell SW of Kim, CO going up from ~150 to ~350 in ~5minutes. Whereas the GLM FED from both GOES-16 and GOES-17 only showed a few flashes observed. Could this be from both GOES satellites having an obscured view of the updraft? Image 2 below shows the anvils spreading in nearly all directions, or far enough in all directions to obscure the light emanating from lightning flashes within the updraft.



GLM GOES-16 vs ENTLN near Kim, CO at 2020Z

# HAZARDOUS WEATHER TESTBED

## EXPERIMENTAL WARNING PROGRAM BLOG



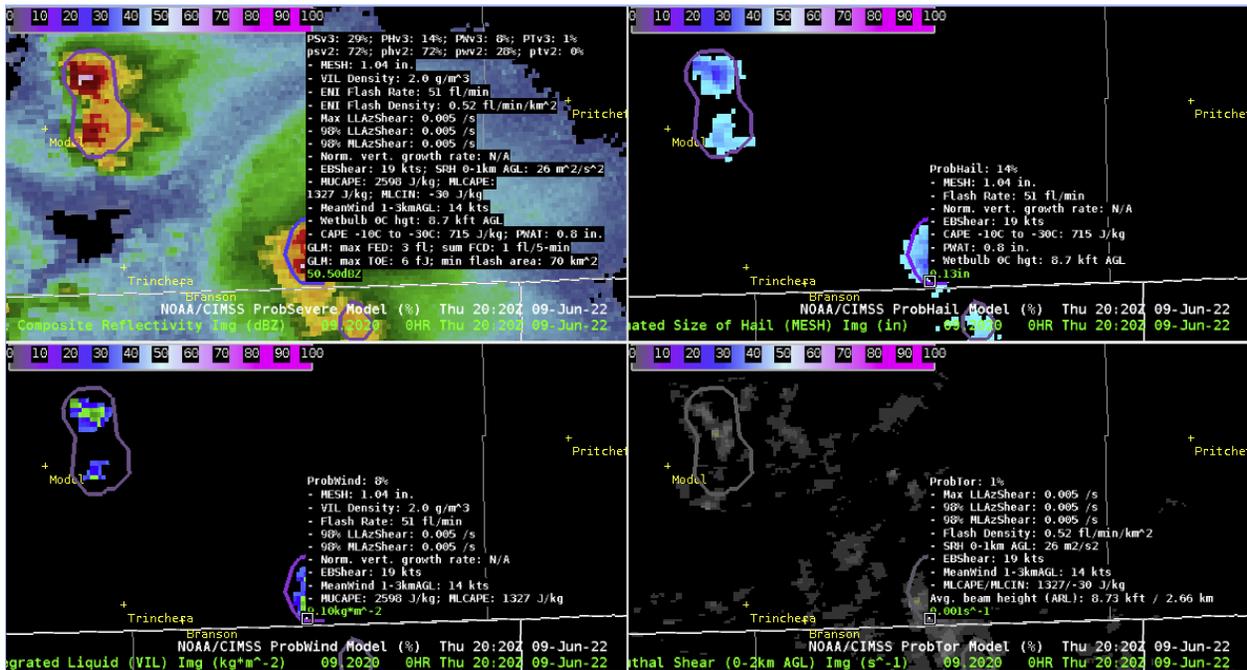
GOES-16 Day-Cloud-Phase Distinction RGB - Anvils spreading in all directions from convective updraft core.

Did this lightning obscuration impact the readout from the ProbSevere v3 model? Image 3 below shows a drastic difference in ProbSevere at the 2020Z timeframe of the Kim, CO storm, 29% on version 3 compared to 72% on version 2. More specifically, ProbHail on version 3 was only at 14%. There are other possible causes to this low percentage, notably a low EBShear value of 19kts, and low 715 j/kg CAPE within the -10C to -30C hail growth zone. So while low GLM values may not have had a large weight on bringing down the ProbHail percentage, other unimpressive model or mesoanalysis values may have played the bigger role. The high sun angle and the brightness of surrounding cirrus anvils may have also contributed to the lower GLM FED values. GLM FED from both GOES-16 and GOES-17 were observed to pick up on increased lightning activity more easily later in the afternoon.

These factors went opposite of what radar interrogation yielded for this storm, which included a tall convective updraft with 40+dBZ well above 30,000' at storm top, and MESH reaching to or just above 1.00" during the 2015Z-2025Z timeframe.

# HAZARDOUS WEATHER TESTBED

## EXPERIMENTAL WARNING PROGRAM BLOG

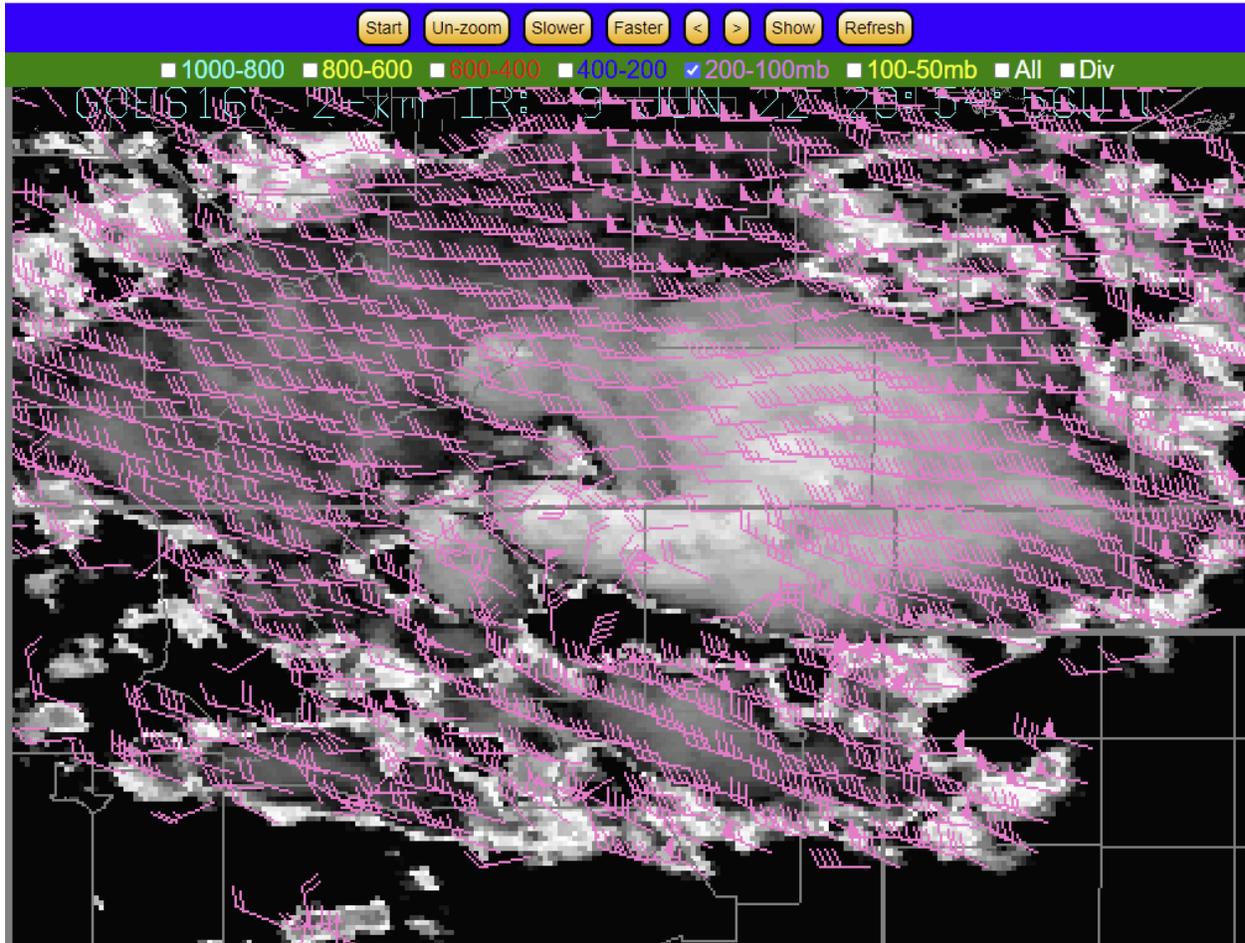


ProbSevere v3 Low ProbSevere and low ProbHail for severe warned storm SW of Kim.

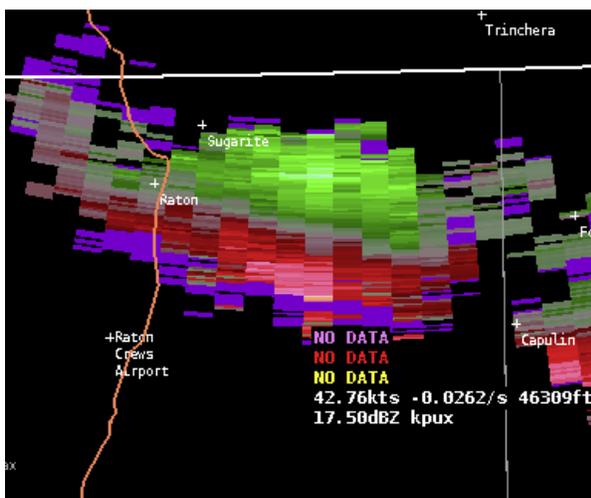
Optical flow winds in the image below picked up on strong storm top divergence from severe warned storms just east of Raton, NM. This coincided well with observed storm top divergence signatures seen from the PUX radar velocity product in the second image below.

# HAZARDOUS WEATHER TESTBED

## EXPERIMENTAL WARNING PROGRAM BLOG



Optical Flow Winds | 50-70kts southerly wind barbs evident on cell near Raton, NM

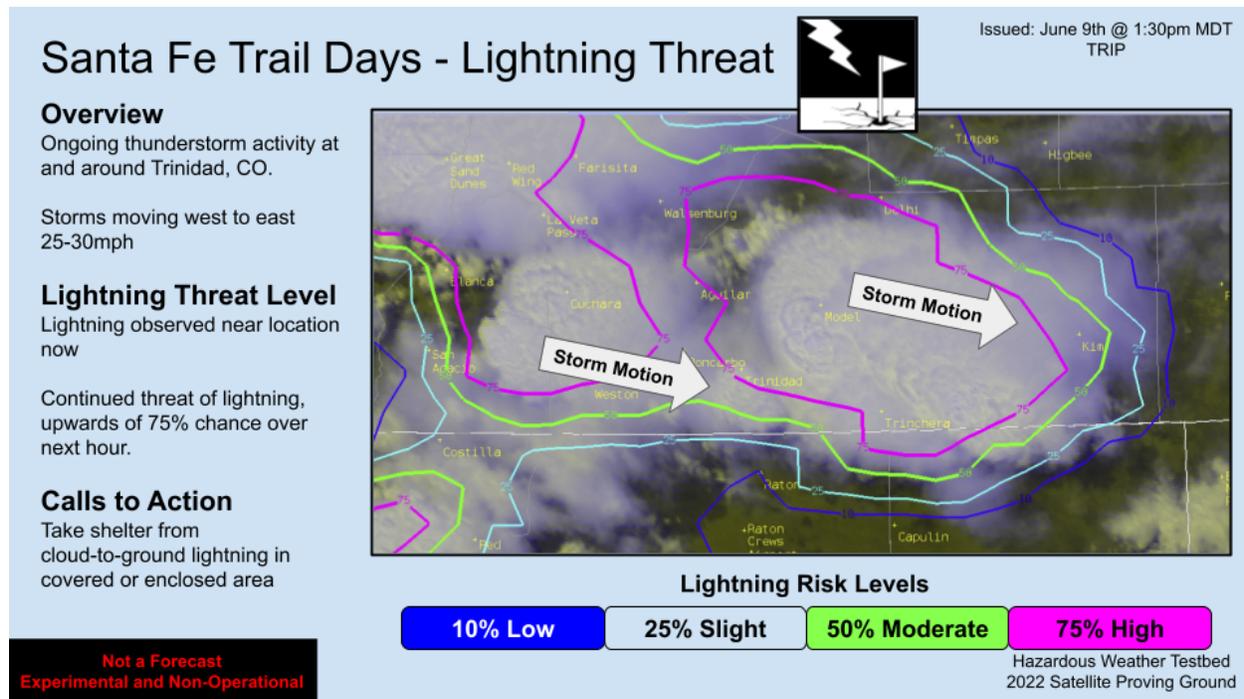


Radar Velocity signature showing storm-top divergence of 85-95kts.

# HAZARDOUS WEATHER TESTBED

## EXPERIMENTAL WARNING PROGRAM BLOG

The PUB WFO had an example DSS event in Trinidad, CO, the Santa Fe Trail Days event which had events going on all day. The threat of lightning impacting the outdoor event, and the threat of severe weather was the main area of concern. There was already ongoing convection in the area at the start of the day's trial run, so a nowcast graphic was produced utilizing LightningCast to show where the highest threat of lightning was. Coupled with an underlying satellite image, a brief forecast over the next hour showing storm motion and what the continued threat of lightning was going to be was also included. The display of LightningCast in percentage was an easy way to display the lightning risk. An ad-hoc Low/Slight/Moderate/High description of each threat tier was added in, but in no way reflects a sound or thorough best practice for a description of lightning risk.

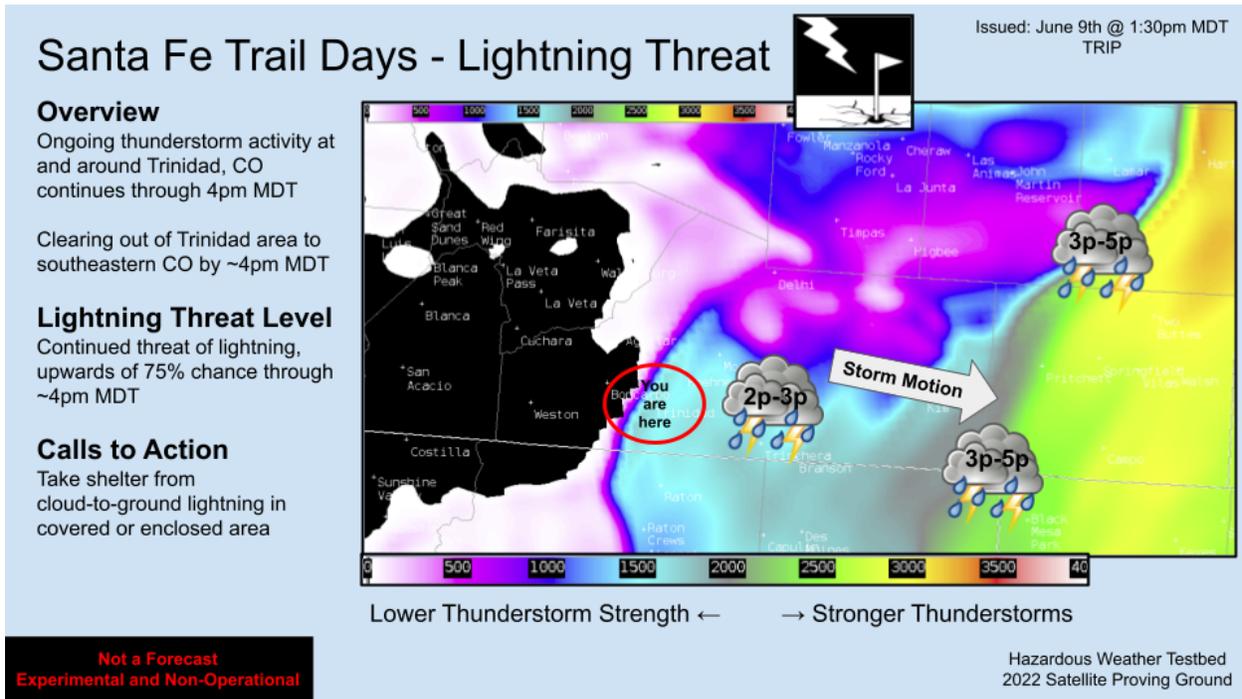


*DSS Graphic using LightningCast to showcase the risk of cloud-to-ground lightning at the hypothetical Santa Fe Trail Days Event in Trinidad, CO.*

After the short-fuse nowcast graphic was sent, a longer fuse DSS graphic was issued to give a sense of the lightning risk will be through the rest of the day. For this, the PHS Sfc CAPE field was used to display the potential thunderstorm strengths. This would likely not be used in an actual DSS event, given the lack of understanding the intended audience would have of surface based CAPE and instability. But it does highlight the potential use if communicated properly.

# HAZARDOUS WEATHER TESTBED

## EXPERIMENTAL WARNING PROGRAM BLOG



Second longer fuse DSS graphicast showcasing the days thunderstorm risk for the Santa Fe Trail Days at Trinidad, CO.

A third DSS graphicast was issued later in the afternoon highlighting the progression of storms toward the ESE away from Trinidad, CO. The message focused on their still being a cloud-to-ground lightning risk in the area of Trinidad, via display of LightningCast, but a lowering risk moving in from the west. Further messaging of the expected end time of the lightning risk was also conveyed in this graphic.

# HAZARDOUS WEATHER TESTBED

## EXPERIMENTAL WARNING PROGRAM BLOG

### Santa Fe Trail Days - Lightning Threat

Issued: June 9th @ 1:30pm MDT  
TRIP

#### Overview

Ongoing thunderstorm activity moving east of area this hour

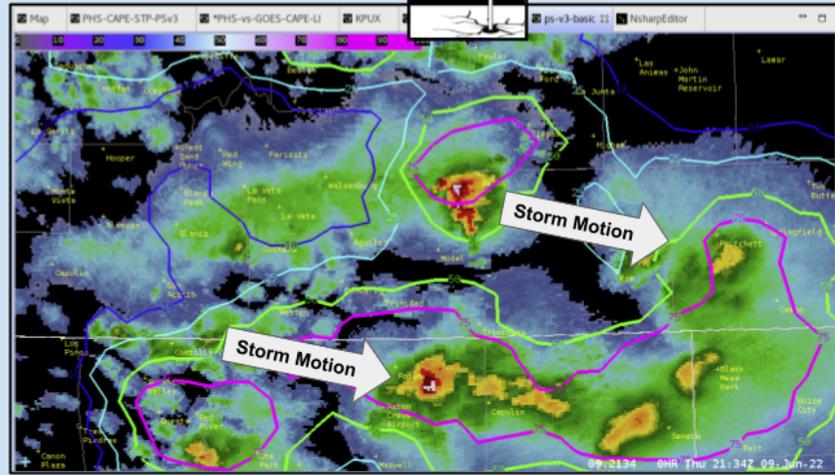
#### Lightning Threat Level

Lowering lightning risk from high now to Slight/Low by 4:00pm - 4:30pm MDT

#### Calls to Action

Take shelter from cloud-to-ground lightning in covered or enclosed area

Continue monitoring radar trends over next 30-45 minutes



#### Lightning Risk Levels

10% Low

25% Slight

50% Moderate

75% High

Not a Forecast  
Experimental and Non-Operational

Hazardous Weather Testbed  
2022 Satellite Proving Ground

Third short-fuse DSS graphicast showcasing current MRMS radar overlaid by LightningCast

- TRIP