

# Enhanced Lightning Products and Services for Incident Support Operations through Improved Short Term Forecast Techniques

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Southern Thunder Workshop

July 11-14

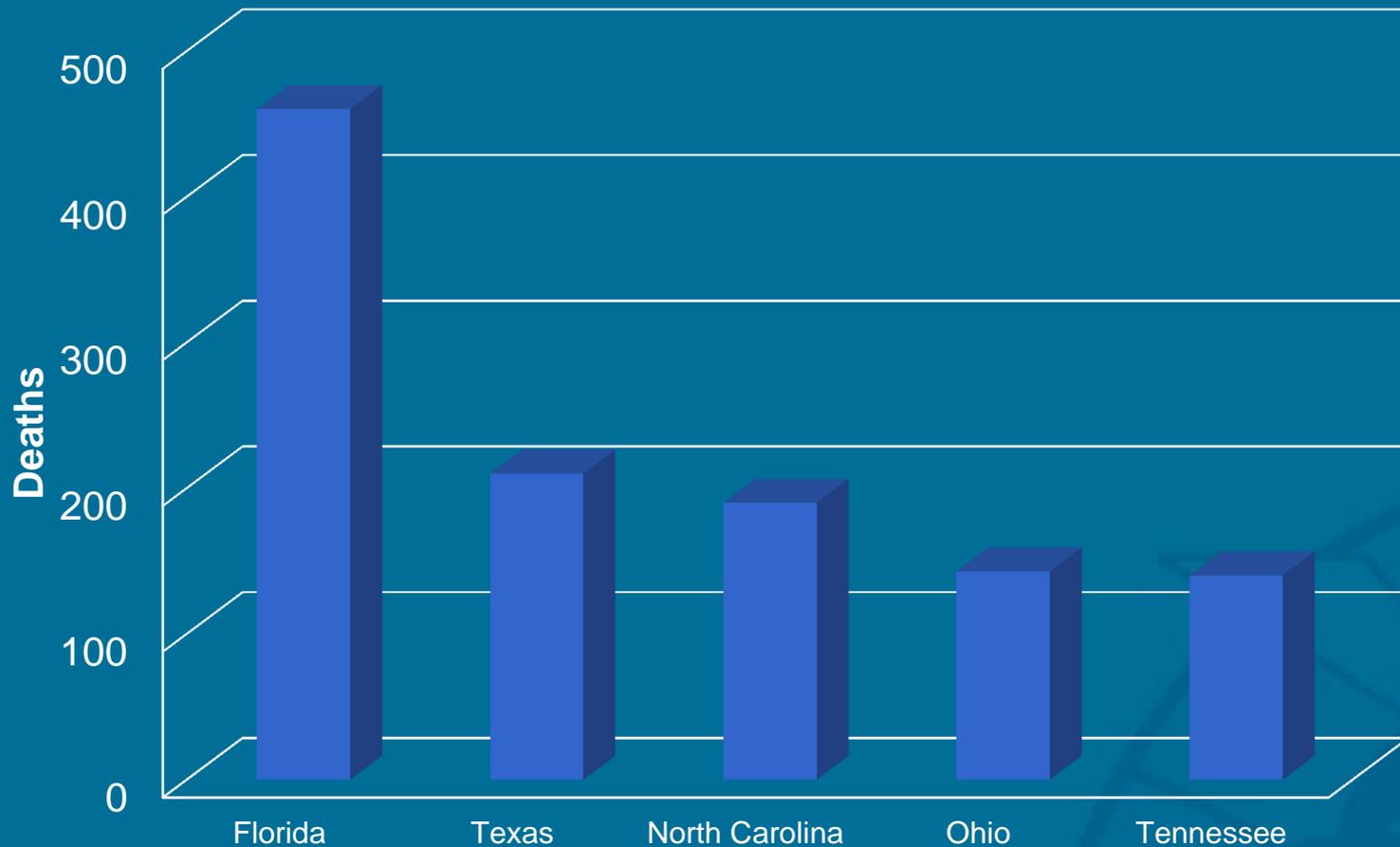


# Introduction

- Goal: Enhance awareness of the threat that lightning poses, specifically to those that are away from traditional warning systems
- How?
  - Produced short term (3hr) lightning threat and thunderstorm graphics
  - Issued in-house Lightning Watches and Warnings for simulated incident support
    - Evaluated the initial installation of the AutoNowcaster(ANC) system on AWIPS

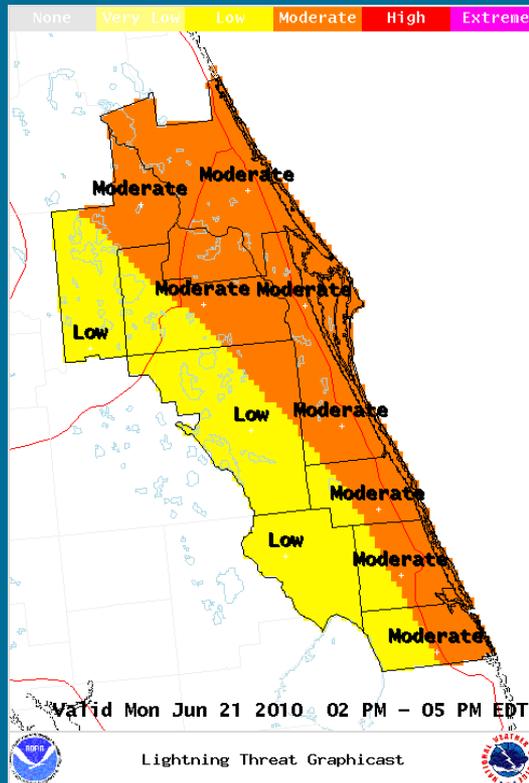
# Florida Lightning Facts

## Lightning Deaths from 1959-2009



# The Products

## 3 Hour Lightning Threat



## Lightning Warning

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BULLETIN  
PHASE TWO LIGHTNING WARNING  
National Weather Service Melbourne FL  
1814 UTC Wed Jul 14 2010

THE NATIONAL WEATHER SERVICE IN MELBOURNE HAS ISSUED A

- \* PHASE TWO LIGHTNING WARNING FOR...  
AREAS WITHIN A 5NM RADIUS OF...
- \* DELAND
- \* FROM 1814 UTC TO 1959 UTC.

A PHASE TWO LIGHTNING WARNING MEANS THAT CLOUD TO GROUND LIGHTNING STRIKES ARE IMMINENT OR OCCURING WITHIN THE INDICATED AREA. THOSE IN THE AREA SHOULD CEASE OUTDOOR OPERATIONS IMMEDIATELY. THE SAFEST PLACE TO BE DURING A LIGHTNING STORM IS INDOORS IN A SUBSTANTIAL STRUCTURE AWAY FROM WINDOWS.

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# Lightning Watches and Warnings

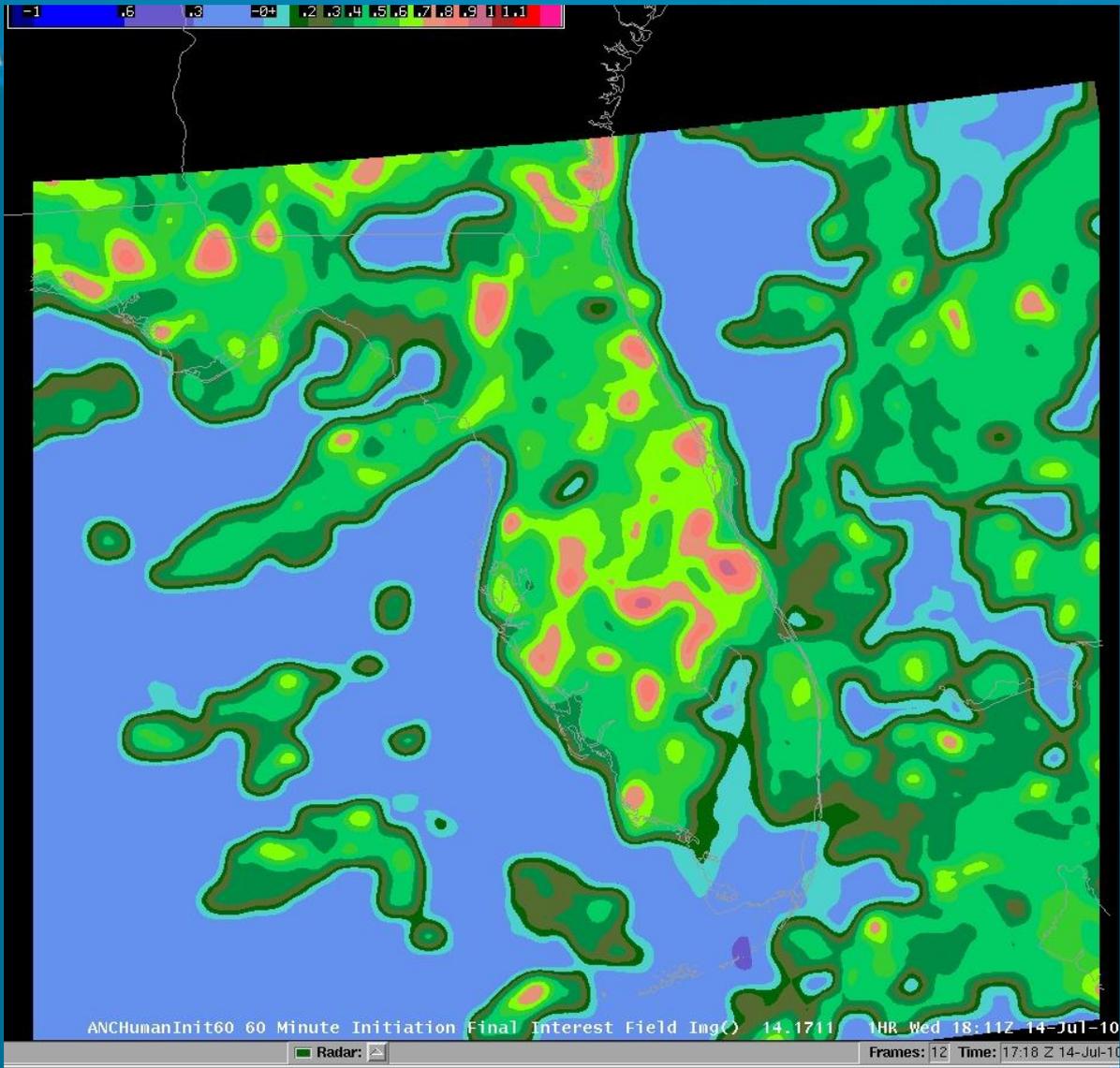
- It is to be used as incident support
- We looked at 5 airports and 6 incident sites
  - We focused on 2 sites weekly
- Both the watch and the warning say that we expect a cloud-to-ground strike within a 5 nautical mile radius of the site
- 30 minute lead time on watches
- 10 minute lead time on warnings



# AutoNowcaster

- An expert system which produces short-term (0-1 hr) forecasts of thunderstorm initiation, growth and decay
- It relies on various input fields including satellite imagery, radar, observations, RUC model fields, and lightning data
- Most importantly, it relies on human input

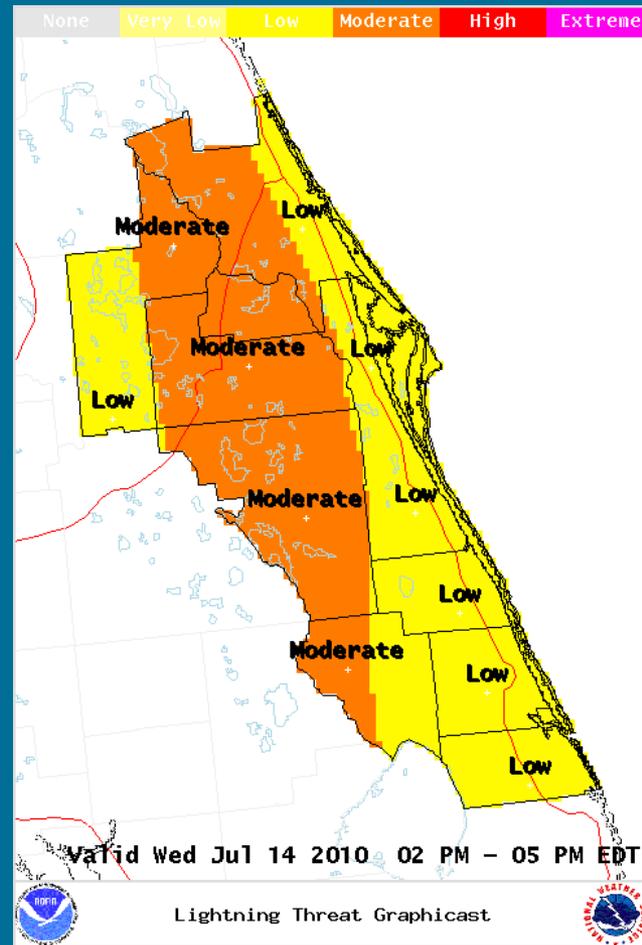
# AutoNowcaster



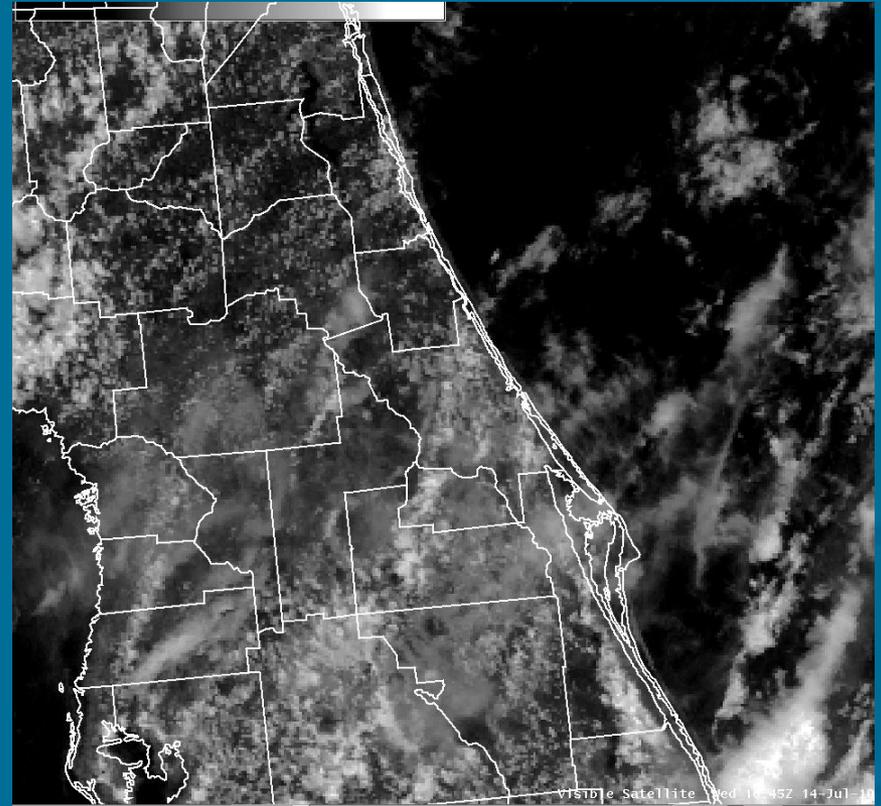
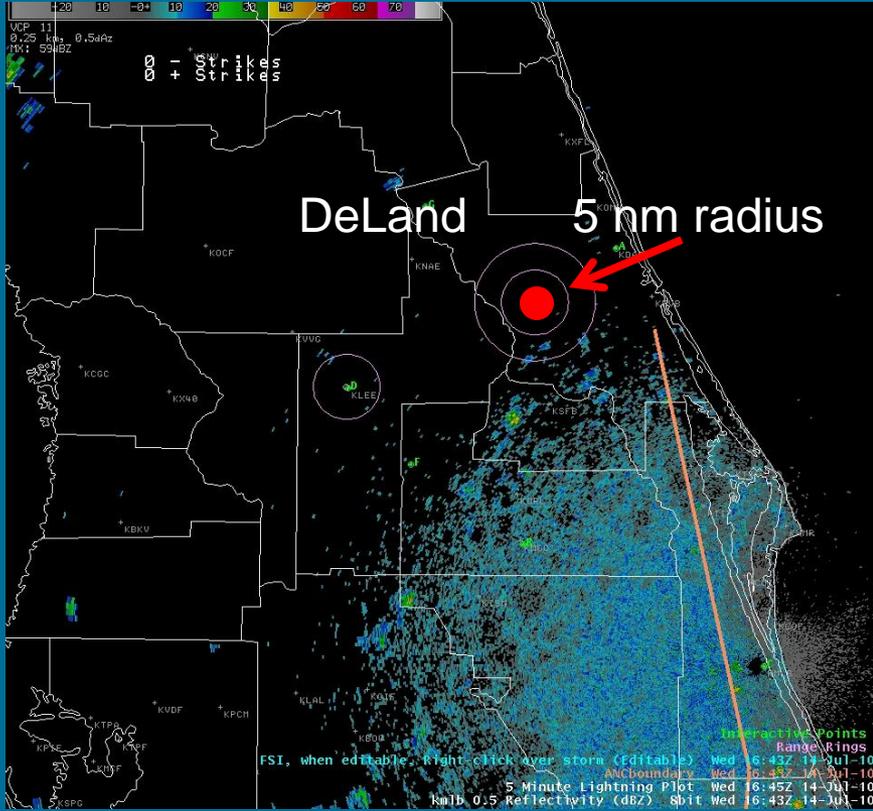
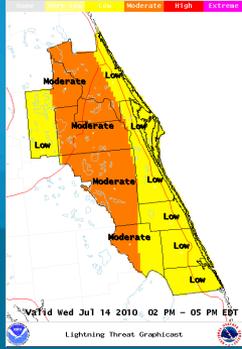
# July 14<sup>th</sup> 2010

- Volusia County emergency management were conducting a training exercise
- They requested incident support from the Melbourne WFO, specifically for lightning within a 10 mile radius of DeLand, FL
  - 1 hour notice of when we expected lightning to form
  - Immediate notification of the first strike in that area

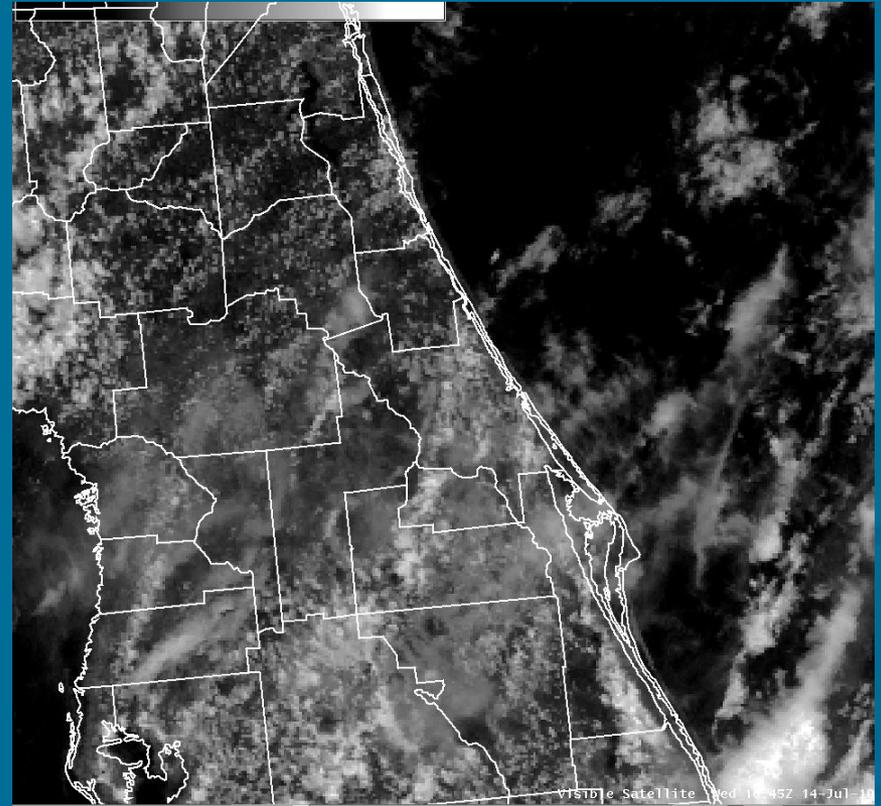
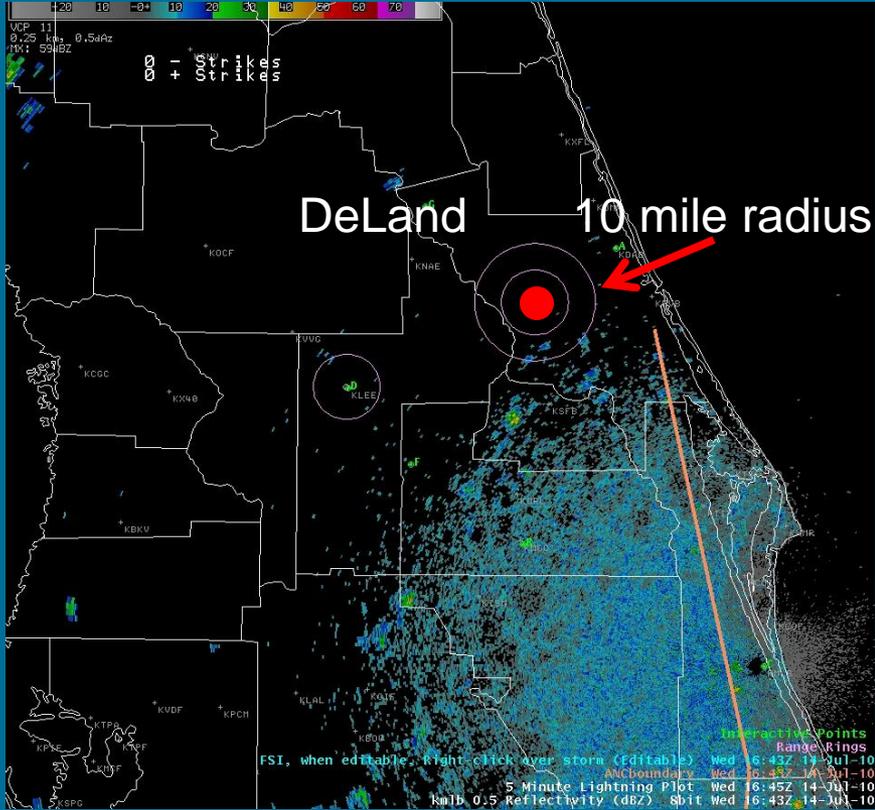
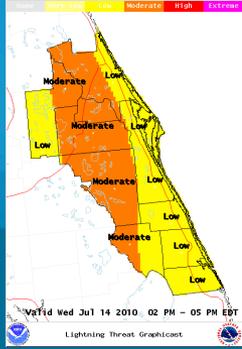
# Lightning Threat



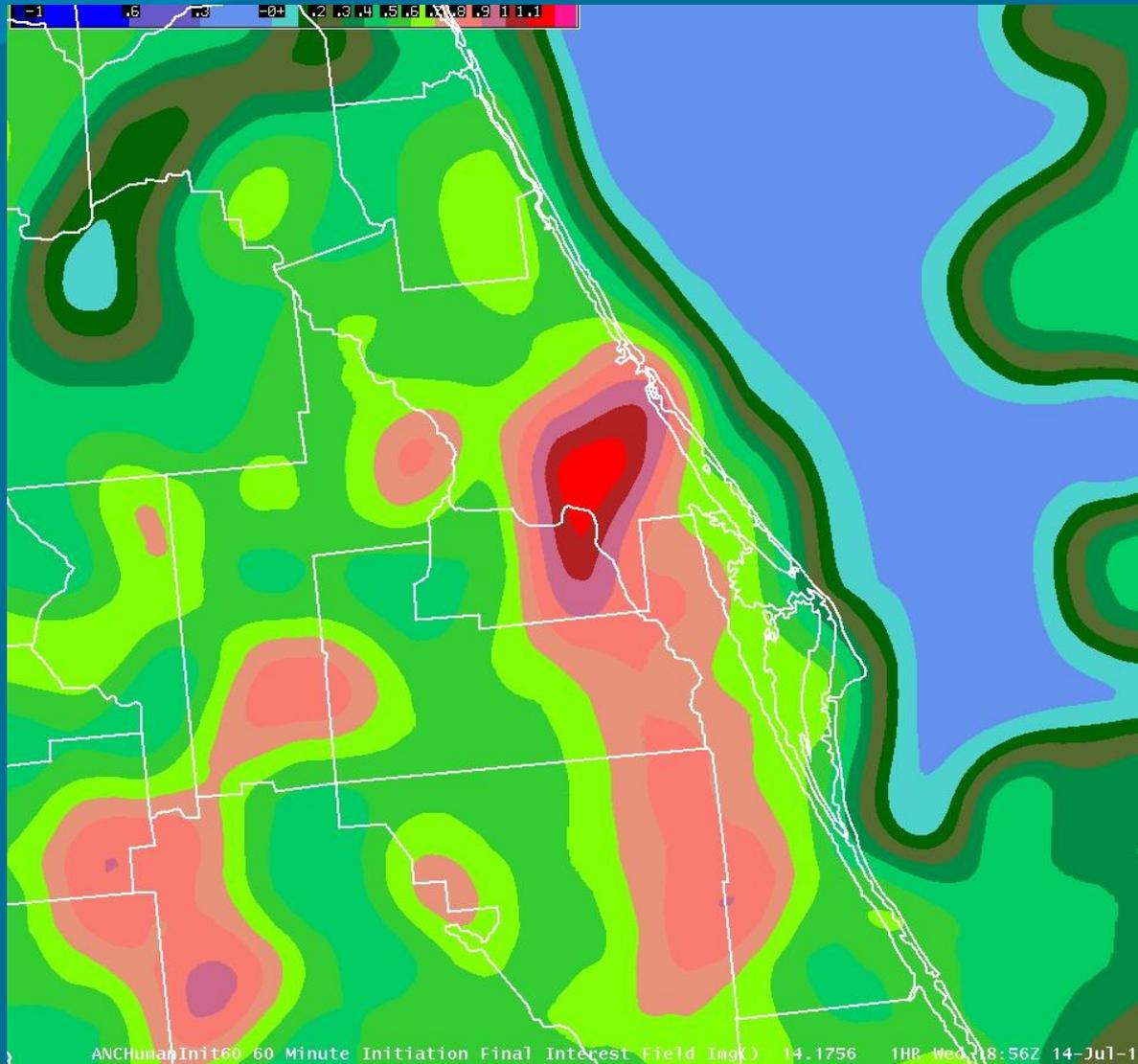
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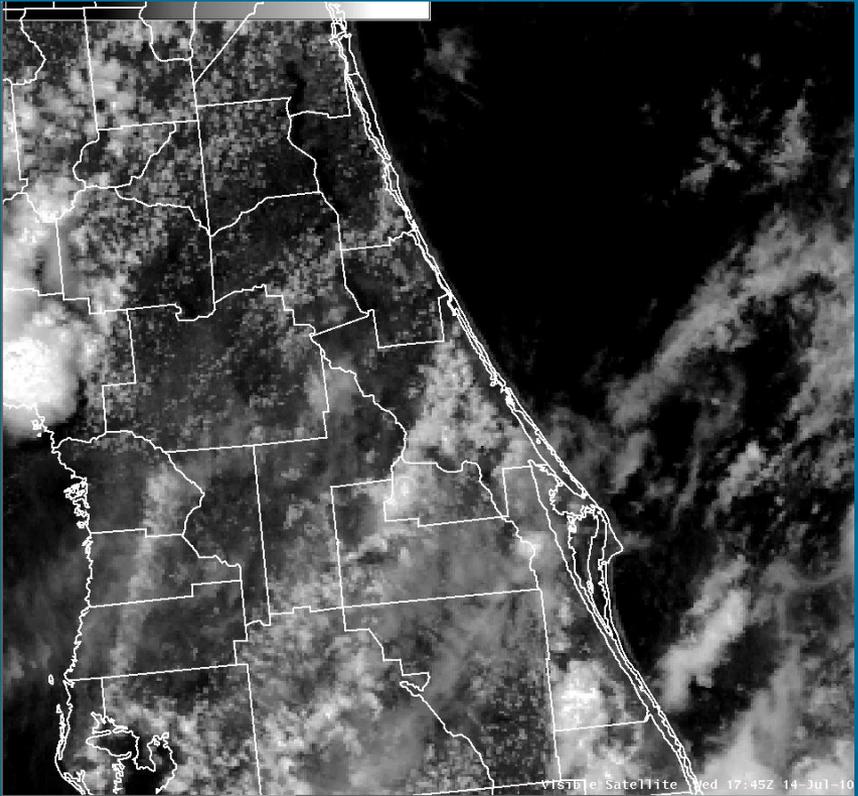
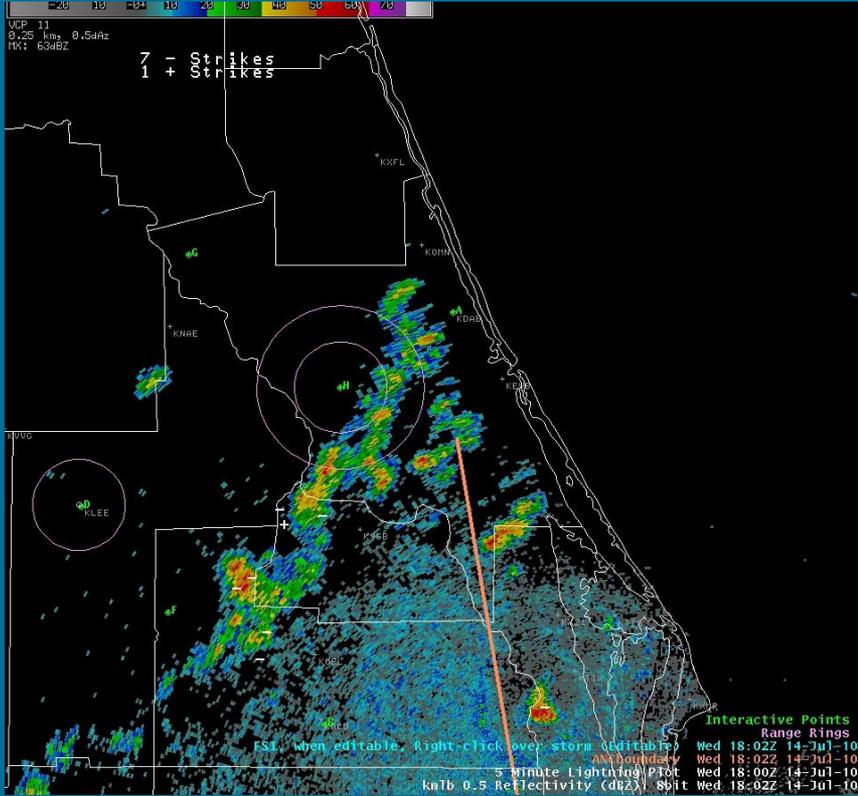
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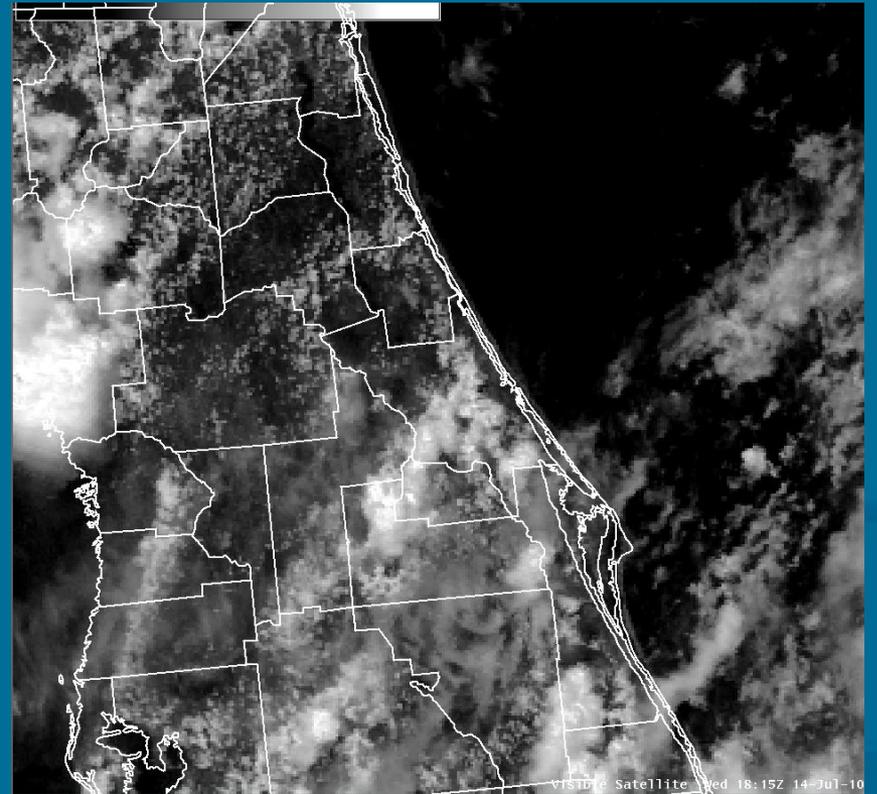
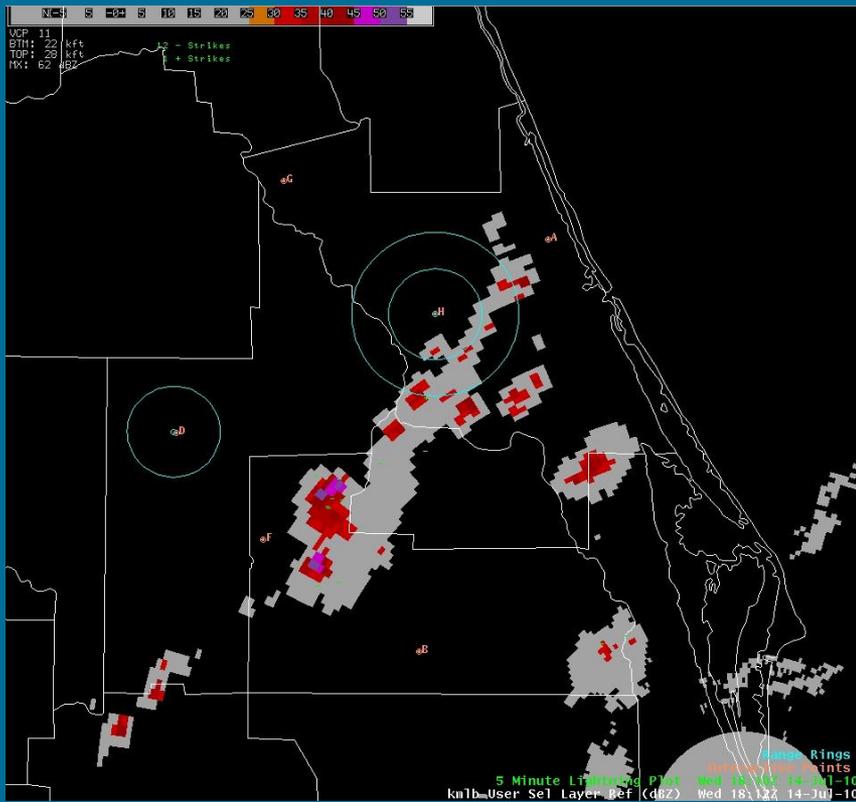
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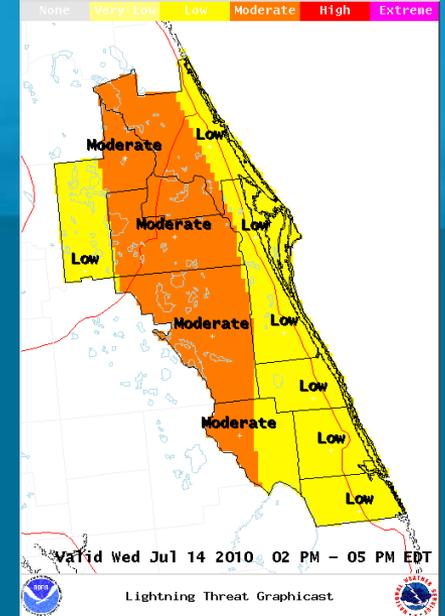
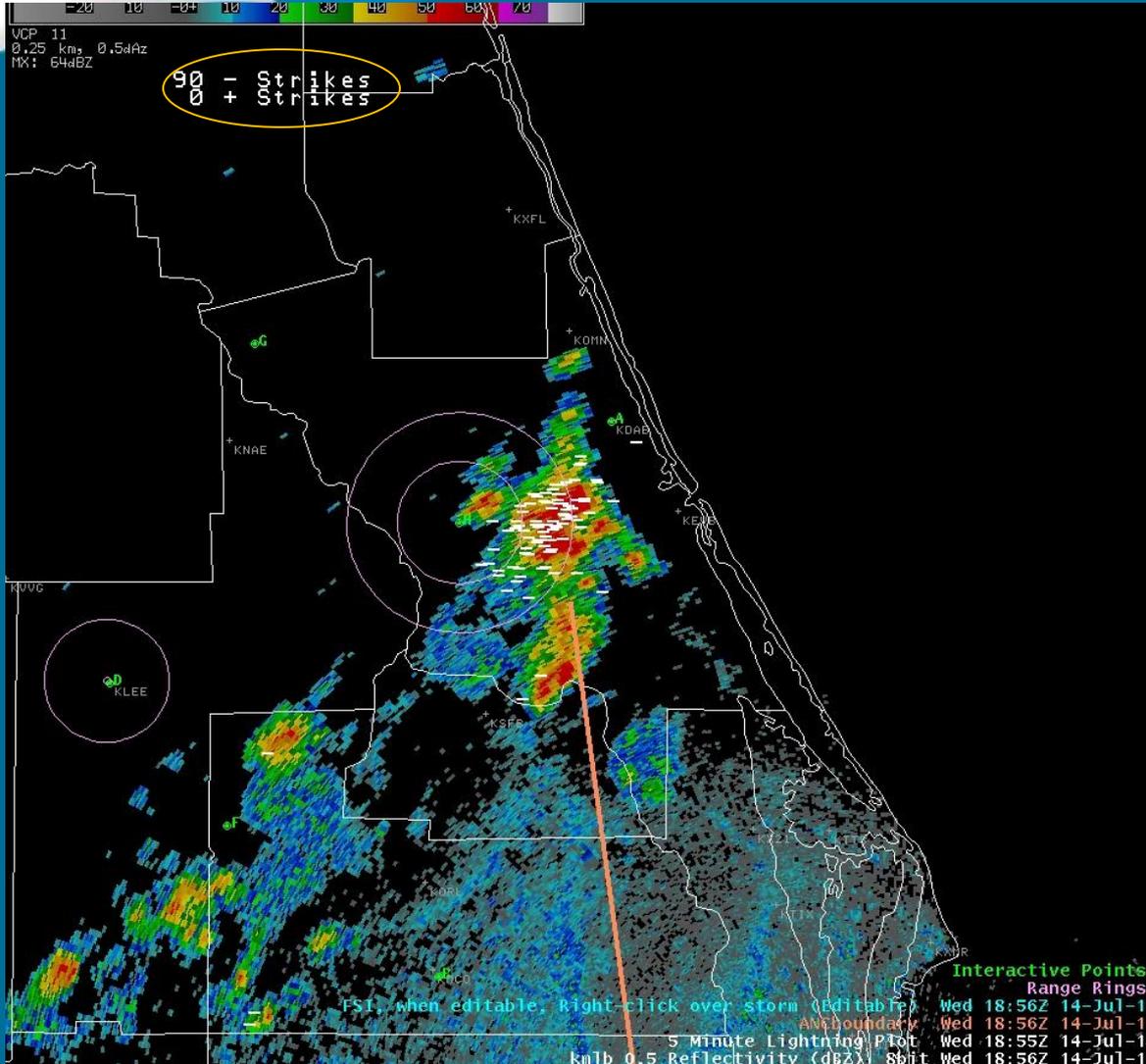
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**Call lead time:**

~1.5 hours

**Goal: 1 hour**

**Watch lead time:**

24 minutes

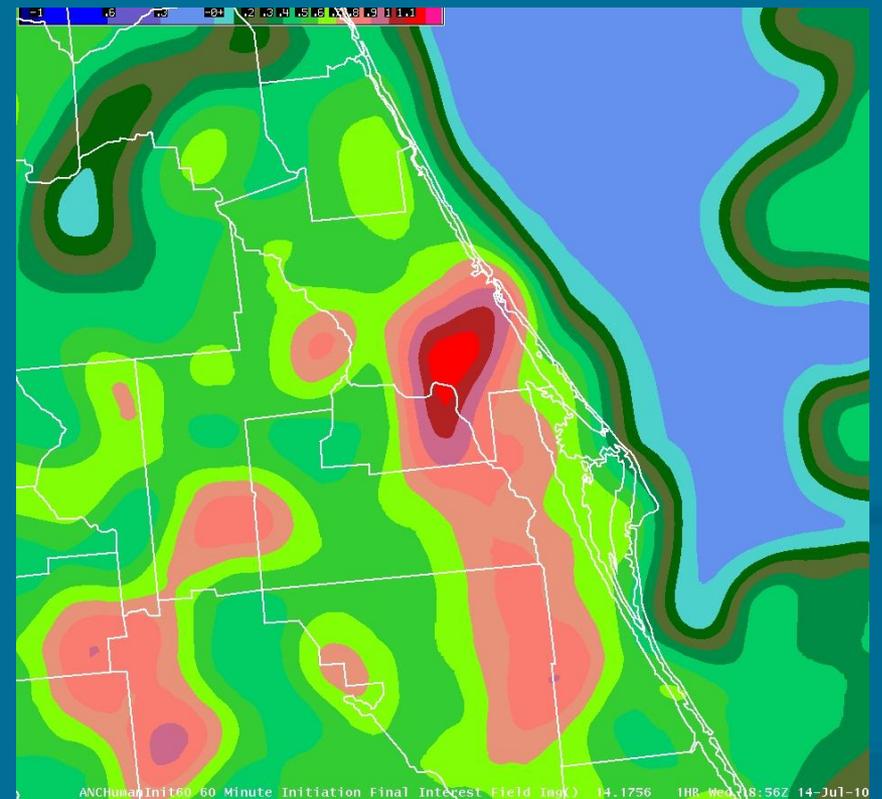
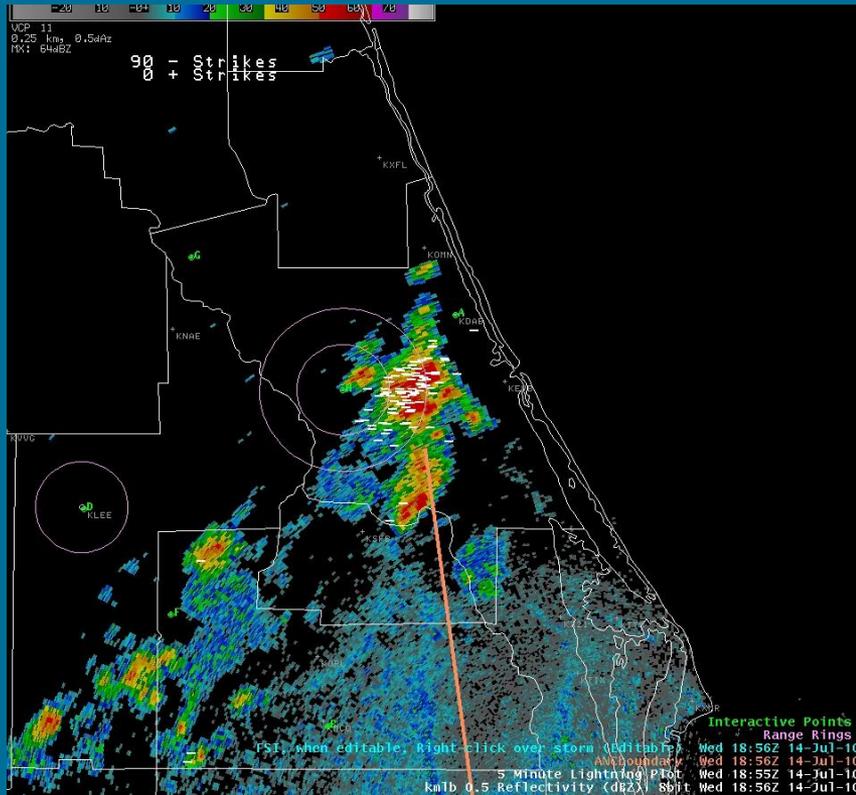
**Goal: 30 minutes**

**Warning lead time:**

15 minutes

**Goal: 10 minutes**

# AutoNowcaster Performance with Human Interaction



# Watch and Warning Performance

Hollings  
2010

Watch

POD	84.21%
FAR	46.67%
CSI	0.48
Avg. Lead Time	0:46

Warning

POD	93.33%
FAR	36.36%
CSI	0.61
Avg. Lead Time	0:17

NWS MLB Airport Weather Warnings

POD	92%
FAR	50%
CSI	.48

# Summary

- Point specific lightning watches and warnings for decision support can be issued with success and sufficient lead times
- Can be used as Decision Support Services for the Emergency Management Community upon request, toward the protection of life and property
- With the help of the Emergency Management Community, this can enhance awareness about the threats that lightning poses

# Future Work

- Determine dissemination techniques
- Customer defined requirements
- Integrating tools
- Enhancing overall decision support services
  - Events other than lightning
  - Dissemination to people other than emergency managers

# Acknowledgements

- Thank you
  - Melbourne WFO
  - My mentor Matt Volkmer
  - David W. Sharp and Scott M. Spratt
  - Hollings Scholarship Program
- References
  - <http://www.lightningsafety.noaa.gov/more.htm>

Questions?