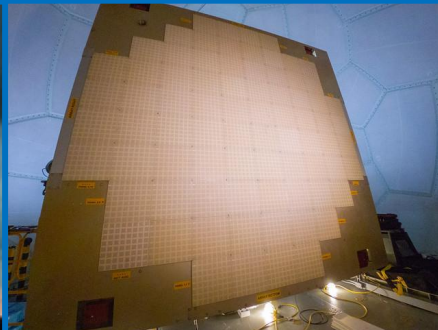




# Observations and Analysis

## Fieldwork and Analysis Part I Introduction

Erik Rasmussen PhD, NSSL Research Scientist,  
Chief, Field Observing Facilities Support



# Contributors



## 1. Tornadoes



*Dr. Erik Rasmussen*

## 2. Storm Electrification and Microphysics



*Dr. Vanna Chmielewski*

## 3. Precipitation and Flooding



*Dr. J. J. Gourley*



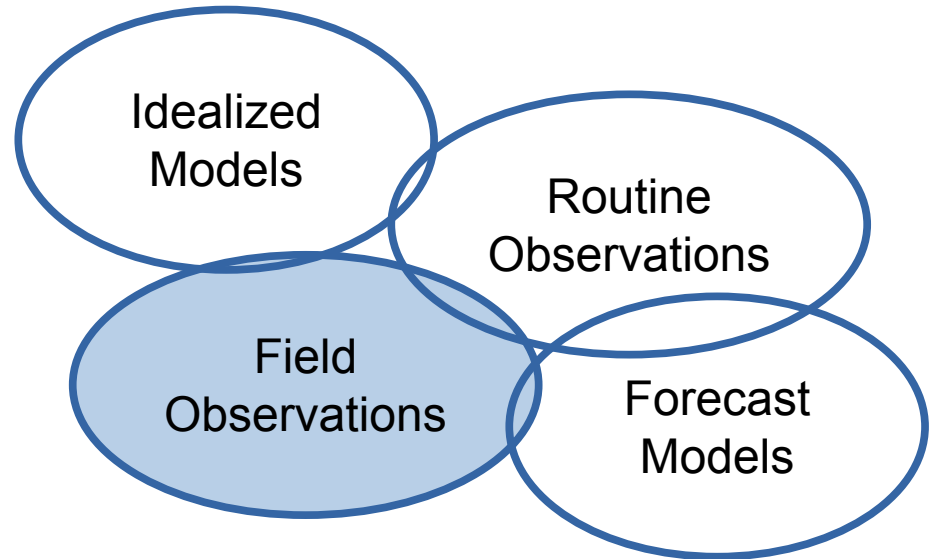


# Field Work Addresses NSSL's Mission



**NSSL mission:** Conduct fundamental research to advance our understanding of processes associated with severe convective storms

We use a variety of tools and synergistic approaches to generate new knowledge...



# Field Research Leadership

- NSSL scientists continue the tradition of leadership roles on field projects related to our mission.
- We design and improve instruments, *deploy* them, and use the data in internal and collaborative research.

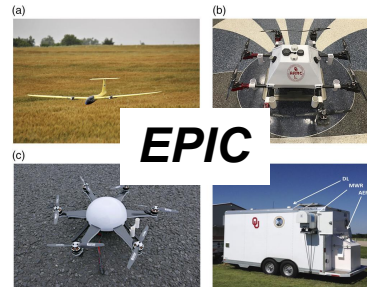


( >45 formal pubs )



2016-19  
2022-23 (PERiLS)

( ~65 formal pubs )



2018



RiVORS 2017  
2019, 2022

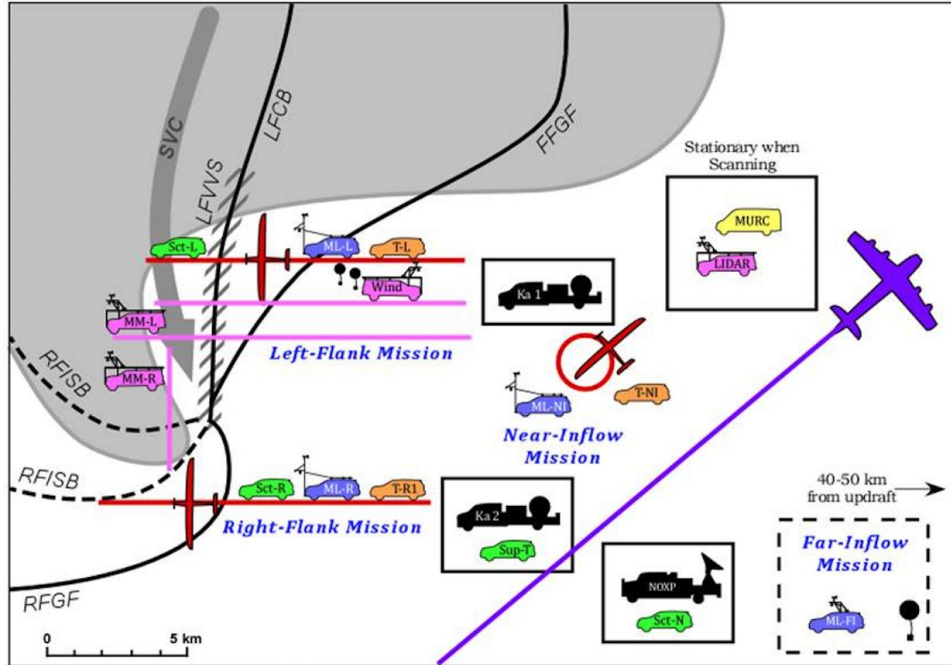
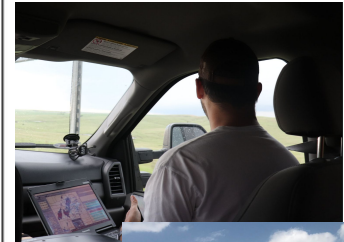




# What we do in tornado field work...



- Develop hypotheses
- Detailed plans
- Multiple platforms with collaborative coordination





# Electrification Research

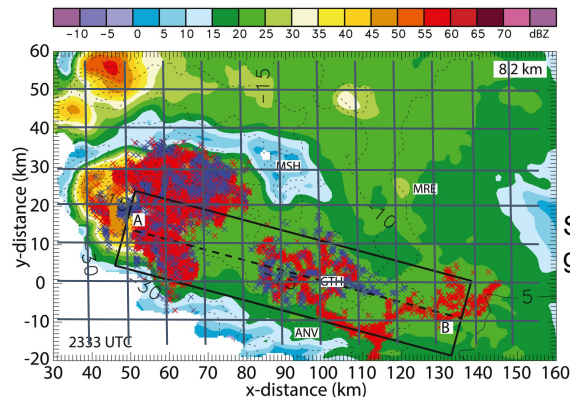
Storm electrification is part of a holistic understanding of Earth systems and weather processes.

In order to predict lightning (NSSL GSC4) we must improve the understanding of electrification.

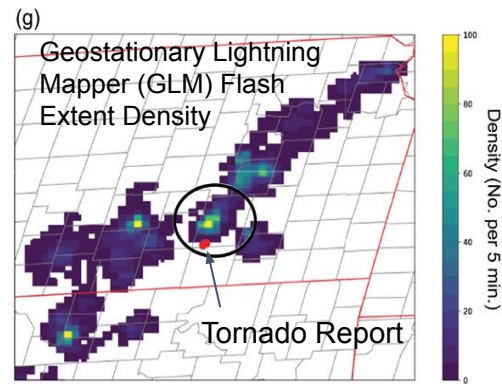
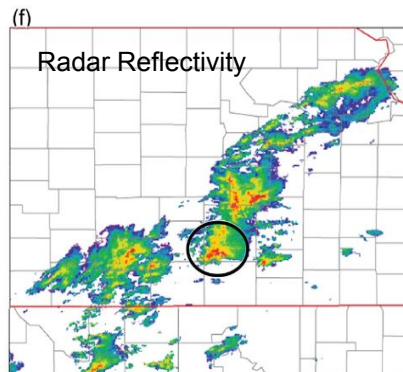
Conversely, lightning observations portray information about storm processes which can improve forecasting and warning techniques.

Datasets collected during field campaigns provide valuable background information for simulating storms and interpreting observations.

(DiGangi et al. 2020, Thiel et al. 2021)



Radar and Oklahoma Lightning Mapping Array (OKLMA) analysis: secondary convection responsible for initiating lightning in anvil



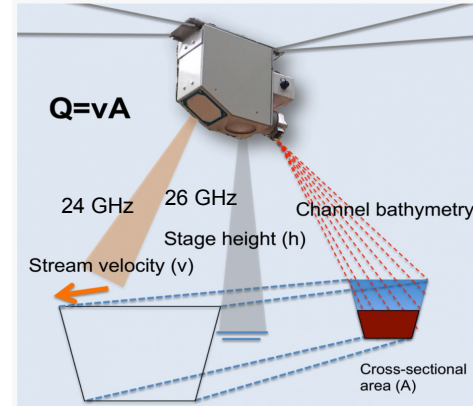
Radar and satellite analysis: intensity observed in tornadic storm



# Flash Flooding Streamflow Work



- **Mobile weather radar data** are transmitted in real time using cellular communications and images are made available to NWS forecast offices to improve situation awareness
- Fourteen K-band **stream radars** have been deployed on burn scars and above streams that have a history of posing a flash flooding threat to downstream communities
- Insights are incorporated into future versions of Flooded Locations and Simulated Hydrographs (**FLASH**) software, thus providing improved operational tools for NWS forecasters
- Effort directly contributes to **GSC 3: Reliably predict flash flooding**



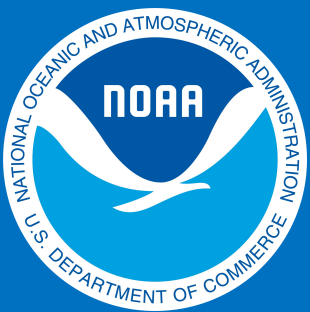


# Quality, Relevance, and Performance



- Questions driving field work are typically motivated by operational issues.
- Our field work is designed around these questions, often posed as testable hypotheses.
- NSSL typically leads the field programs it participates in.
- Field observations motivate, and provide data for, subsequent research efforts.





Erik Rasmussen



Vanna Chmielewski



JJ Gourley



Kim Klockow-McClain



Harold Brooks



Jeremy Gibbs



Michael Coniglio



Kimberly Hoogewind



Elizabeth Smith



Justin Sharpe

# Questions for the F&A I panel?