

Collaborative Research Between Lake Nona High School and the 45th Weather Squadron: Year-5



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High School Students doing Research for America's Space Program

COLLABORATIVE RESEARCH

- Lake Nona High School, Orlando, FL
 - AP Calculus and AP Statistics classes
- 45th Weather Squadron (45 WS), Cape Canaveral Air Force Station, FL
 - Provides weather support to space program at Cape Canaveral Air Force Station, NASA Kennedy Space Center, and Patrick Air Force Base, FL
- 5th Year in-progress (2019-2020)
 - 4 years completed (2015-2019)
- Lake Nona High School students motivated to pursue Science, Technology, Engineering, and Math (STEM)
- 45 WS gets operational research
- Business Paradigm
 - 45 WS specifies requirements
 - Students decide how to meet requirements
 - In addition to STEM, students also learn:
 - Leadership
 - Management
 - Followership
 - Teamwork
 - Planning
 - Scheduling
 - Speaking & Presentation Skills
- Done on volunteer basis
 - No \$-cost to either organization

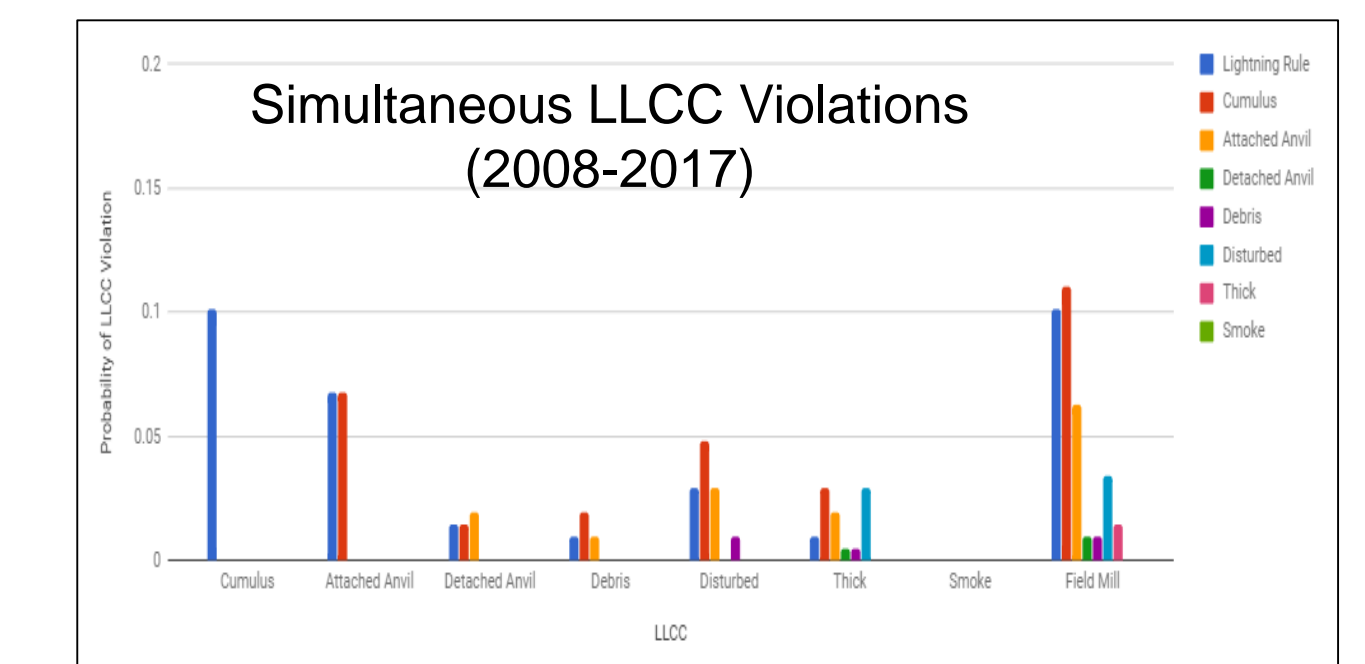
3 MAIN PROJECTS:

- 1) Lightning Launch Commit Criteria (LLCC) Climatology
- 2) Florida Weather Deaths
- 3) CONUS Tropical Cyclone Deaths



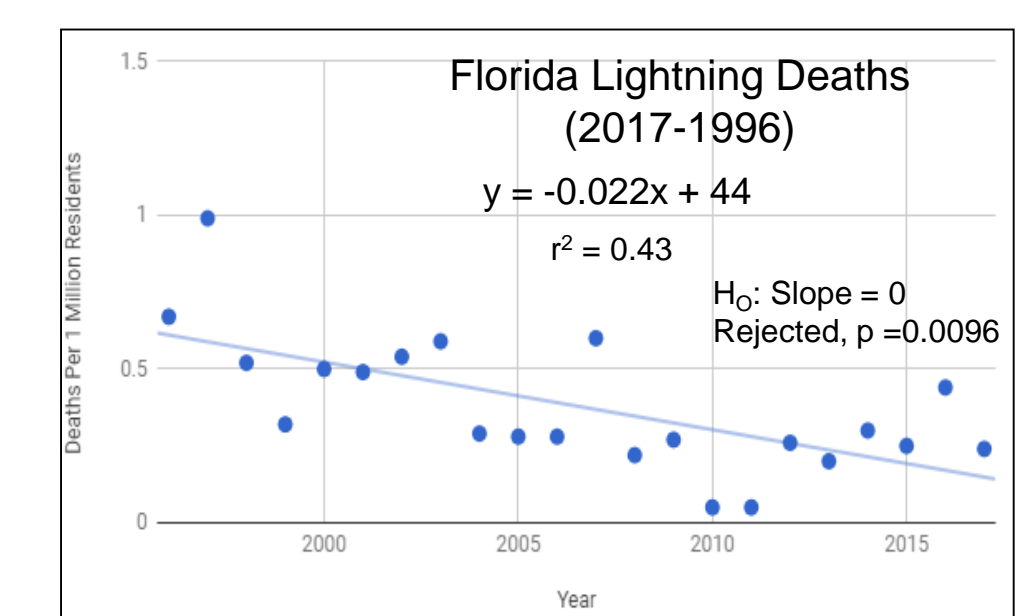
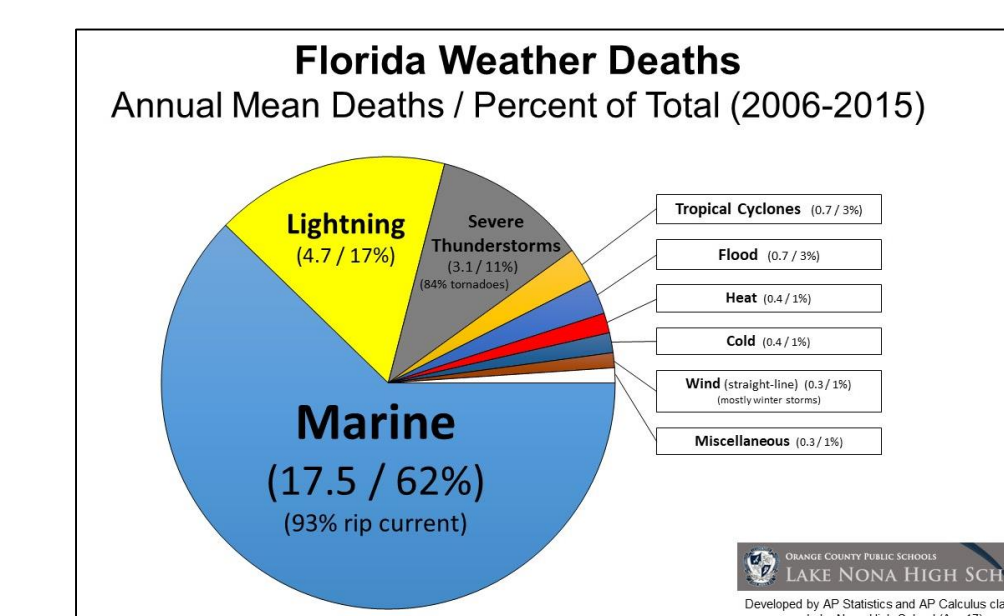
1) Lightning Launch Commit Criteria (LLCC) Climatology: (Year-5)

- Complex weather rules to avoid natural & rocket-triggered lightning
- Create LLCC climatology from evaluations during launch windows
- Average LLCC violation rate by seasons, 3-hour blocks
- Frequency of simultaneous LLCC violation pairs
- EXCEL that converts date/time to average LLCC violation
- CONOPS design, Mission planning, LWO training, Research goals
- See briefing 10.2, 20 ARAM (Thu, 0900-0915)



2) Florida Weather Deaths: (Year-4)

- Distribution of weather deaths over past 10 & 30 years
- Hypothesis tests for significant trends
- See poster 1390, 15th Societal Apps (Wed, 4 - 6 pm)



3) CONUS Tropical Cyclone (TC) Deaths: (New!)

- Updated weather causes of CONUS TC Deaths (2006-2018)
- Key Results: 'Storm Surge' contribution reduced (49% to 16%)
- 'Rain' contribution increased (23% to 45%)
- See poster 1390 at 15th Societal Applications (Wed, 4 - 6 pm)

