



Statistical Short-Range Guidance for Peak Wind Speed Forecasts at Edwards Air Force Base



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Outline



- Task Overview
- Kennedy Space Center (KSC)
 Peak Wind Tool
- Edwards Air Force Base (EAFB) Peak Wind Tool
- GUI Overview
- Summary and Future Work





Task Overview



- Exceeding peak wind thresholds important for shuttle safety
- Complex topography
- Develop GUI similar to Applied Meteorology Unit (AMU) Shuttle Landing Facility (SLF) tool (2003)
 - Marshall Space Flight Center (MSFC) collected, processed data, and calculated statistics
 - GUI delayed due to higher priority work
 - 2008: AMU tasked to complete GUI
- Provides Spaceflight Meteorology Group (SMG) climatological and probabilistic peak wind information

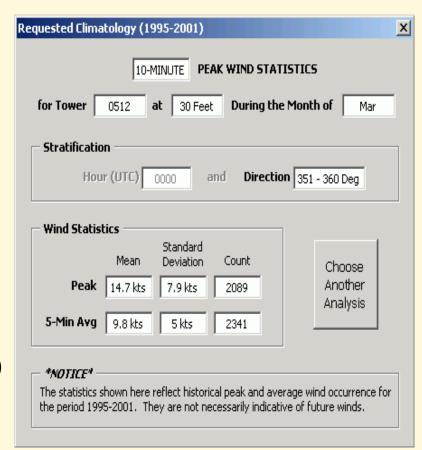




Background: KSC Peak Wind Tool



- Climatologies and probabilities of occurrence of mean and peak wind
- SLF Towers 511, 512, and 513
- Period of Record (POR): 1995-2001
- Stratifications
 - All: Tower, height and month
 - Climatologies: Hour, direction, and direction/hour
 - Probabilities: Average wind speed
- Probabilities calculated through probability density functions (PDF's)
- Gamma distribution
- Developed Excel PivotTables
- Created PC-based GUI





EAFB Peak Wind Statistics



- Reformatted peak wind statistics from MSFC
- EAFB Towers 224, 44, 220 and 350
- POR: 1997-2004
- MSFC provided 2-minute average and 10minute peak
- Stratifications
 - All: Tower and month
 - Climatologies: Hour, direction, and direction/hour
 - Probabilities: Average wind speed
- Generalized Extreme Value (GEV) distribution
- SMG recommended not including Tower 350 in GUI
 - Missing parametric values
 - Did not fit GEV distribution well
 - Location well south of runway

EAFB Tower Locations

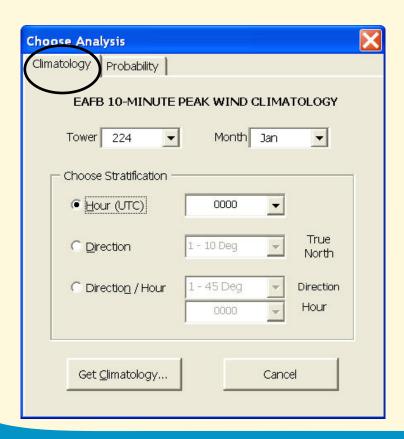


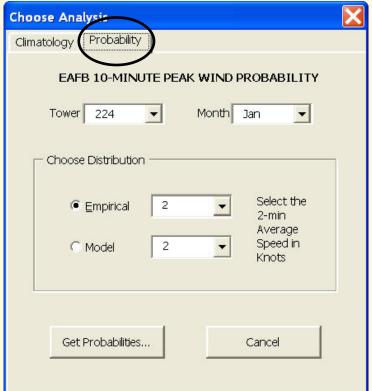


EAFB GUI



- Visual Basic for Applications code
- Runs through Macro within Excel
- Pulls data from PivotTables



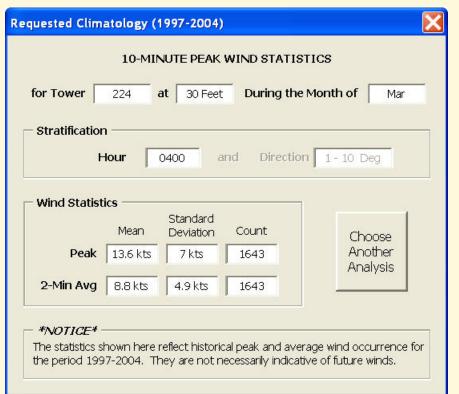




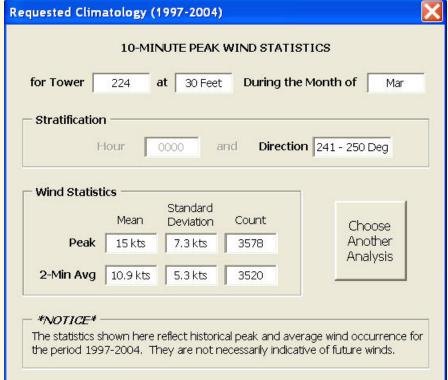
Requested Climatology



Hour



Direction (10° sectors)

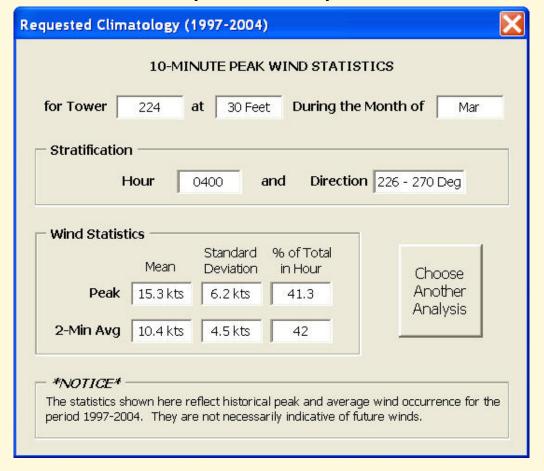




Requested Climatology



Direction (45° sectors) and Hour

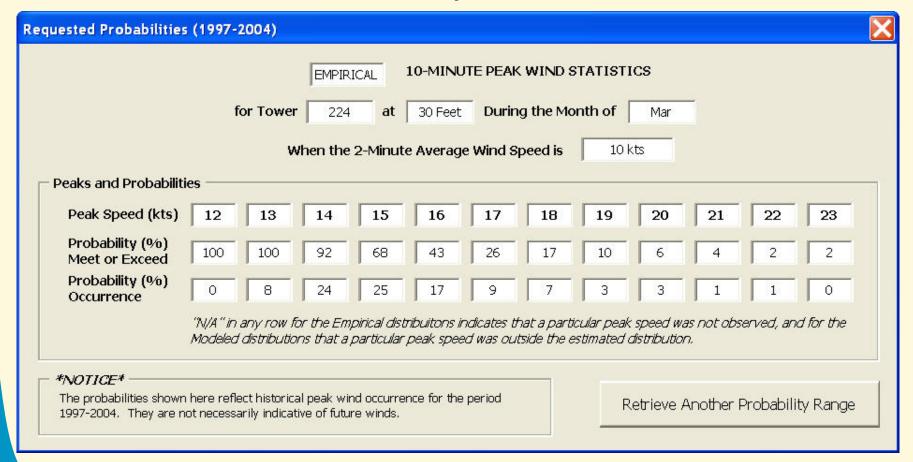




Requested Probabilities



Empirical

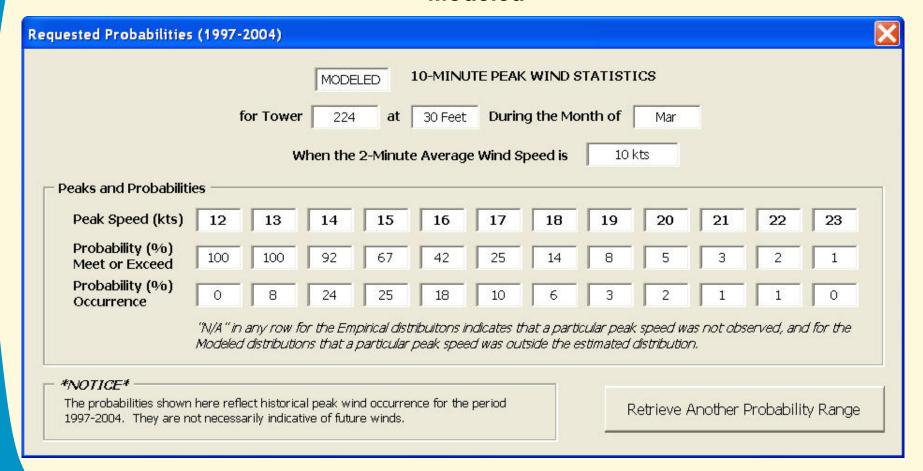




Requested Probabilities



Modeled





Summary



- Developed GUI using Microsoft Visual Basic
 - Displays climatological and probabilistic peak wind information for 3 runway towers at EAFB
 - Tool mimics KSC SLF GUI
 - Climatology stratified by hour, direction, and direction/hour
 - Empirical and modeled probabilities of exceeding certain peak wind thresholds
- Delivered GUI to SMG forecasters in October 2008









Questions?