USING TEMPERATURE LAYERED VIL AS AUTOMATED LIGHTNING WARNING GUIDANCE

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Background

- **45th Weather Squadron (45 WS) provides weather support to space program in Florida**

- **High stakes interest in lightning forecasting for four reasons**
    1) **Located in 'Lightning Alley' of U.S.**
    2) **Protecting space launch vehicles while boosting**
    3) **Lightning watches and warnings for 15 areas (5 nmi circles)**
        - **Safety of over 20,000 people**
        - **Protection of over $20B of facilities**
    4) **Safe ground processing operations**

Temperature Layered VIL Lightning Prediction

- **Current 45 WS manual radar lightning rule uses four thresholds**
    1) **Reflectivity intensity**
    2) **Temperature level of reflectivity**
    3) **Depth of reflectivity**
    4) **Duration of reflectivity**
- **First three thresholds suggested a temperature layered VIL tool**
- **Subjectively tuned**
- **Good performance**
- **Automated WARN product in Integrated Radar Information System (IRIS)**
    - **IRIS is the radar display and analysis software used by 45 WS**

Future Work

- **Several possible improvements identified**
- **None being pursued -- future of lightning warnings is dual-pol radar**
    - **A dual-pol radar is about to become operational for 45 WS**

Automated Lightning Warnings
Black hatched areas, labeled 'LTNG' overlaid on 10 KFt CAPPI
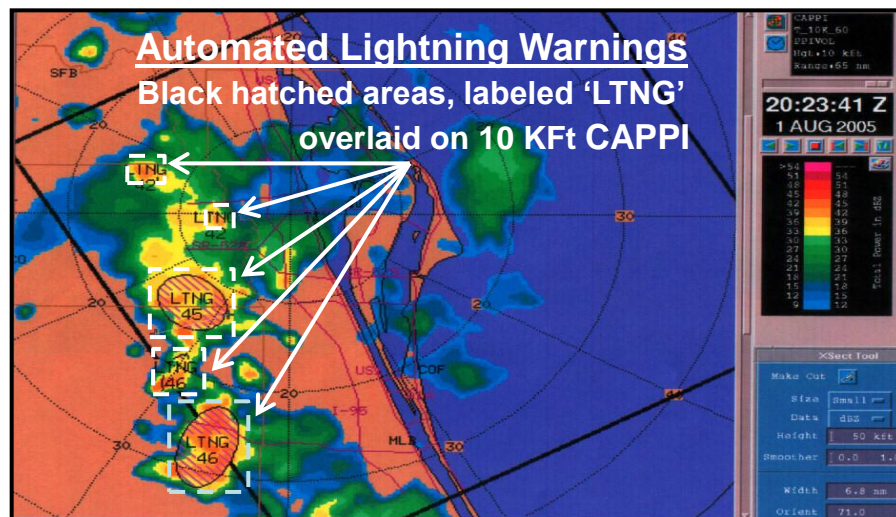
VIL ABOVE 0°C LIGHTNING PREDICTION TOOL	
VIL ≥ 0°C Threshold	Prediction
5 mm	First Flash in 15-20 min
> 5 - 7 mm	First Flash in 10 - 0 min
≥ 7 mm	First Flash Imminent

1 mm = 1 Kg/m^2

PERFORMANCE		
Metric	VIL ≥ 0°C (automated)	Current 45 WS Rule (manual)
POD	0.92	0.72
FAR	0.29	0.18
TSS	0.26	0.44
Mean Lead-time	17.5 min	15 min