

VERIFICATION AND IMPROVEMENT OF THE CUMULUS CLOUD RULE OF THE LIGHTNING LAUNCH COMMIT CRITERIA AT KENNEDY SPACE CENTER

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As its name implies the Cumulus Cloud Rule (CCR) of Lightning Launch Commit Criteria pertains to cumulus clouds that are too shallow to produce lightning on their own (natural lightning). However, if an ascending rocket passes through or too close to the cloud, the ionized gases of its exhaust, together with any weak charge in the cloud, could combine to produce triggered lightning that would damage the spacecraft. The CCR seeks to avoid this possibility by requiring that the ascending rocket stay a prescribed distance away from cumulus clouds. This distance depends on the cloud top—the taller the cloud, the greater the standoff distance

This research evaluates the existing CCR and determines whether the standoff distances are optimum or too great. If any modifications to the CCR are suggested, the highest standards of safety must be maintained. Cloud tops with temperatures ranging from +5 C to -20 C are being evaluated.

The following data sources at Kennedy Space Center are being utilized

- 1) A network of electric field mills to measure the overhead electric potential
- 2) The local 5 cm weather radar and the 10 cm WSR 88D radar operated by NWS Melbourne
- 3) Local radiosonde-derived soundings at KXMR
- 4) Lightning data from a local network.