Storming Media Pentagon Reports: Fast. Definitive. Complete.



Newsletter

To be informed of important news about our site, enter your email here. You can always unsubscribe later. Your address will not be released to others. (Read our Privacy Policy)

Your name

Your email

Unsubscribe » SUBMIT

Search Results for: Lightning

Total Results: **190** Pages: Previous **[1]** 2 Next Results per page: 100

Sort by: Relevancy Title Date Pages Display: Full Text Only

**Aircraft Lightning Protection Handbook** Sep 1989 507 pages

Authors: F. A. Fisher; J. A. Plumer; R. A. Perala; **LIGHTNING** TECHNOLOGIES INC PITTSFIELD MA

Full Text

... aircraft against the direct and indirect effects of **lightning** strikes, in compliance with Federal Aviation Regulations. ... comprehensive text to provide the essential information for the in-flight **lightning** protection of all types of fixed/rotary wing ... The handbook contains chapters on the natural phenomenon of **lightning**, the interaction between the aircraft and the electrically charged ... adequacy of a given protection scheme. Keywords: **Lightning** protection, Fuel vapor ignition, Fuel ... safety, Atmospheric electrical hazards, **Lightning** safety, **Lightning** simulation, Aircraft certification, Atmospheric ...

**NATURAL INTERFERENCE CONTROL TECHNIQUES. PART I: LIGHTNING PROTECTION OF AEROSPACE ROCKET VEHICLE LAUNCHING SYSTEMS** Apr 1963 28 pages

Authors: M. M. Newman; J. R. Stahmann; **LIGHTNING** AND TRANSIENTS RESEARCH INST ST PAUL MN

Full Text

... in **lightning** protection of diverting a direct **lightning** strike to some distance away, or shielding sensitive equipment to withstand ... direct stroke can be usefully combined for maximum protection. **Lightning** strokes to diversionary rods or towers still leave intense ... assembly surrounding the launching system thus guiding the **lightning** current symmetrically so that the magnetic fields inside ... to practicality and cost, for most cases of **lightning** to ground strokes which are nearly vertical. Slanting ... of dry sandy terrain improved additional **lightning** protection may be necessary even for buried cables ...

**LASER TYPE ULTRA-VIOLET RADIATION FEASIBILITY FOR LIGHTNING AND ATMOSPHERIC PROPAGATION STUDIES** Oct 1964 30 pages

Authors: J. R. Stahmann; **LIGHTNING** AND TRANSIENTS RESEARCH INST ST PAUL MN

Full Text

The feasibility of a laser type ultra-violet source as a possible substitute for the continuously supported wire antenna, used for artificial atmospheric propagation studies and to trigger **lightning** for natural **lightning** channel studies, is considered. The energy required to produce an electron plasma or even a molecular plasma is quite high. A powerful laser beam would provide an intense concentration of energy. However, it is difficult if not impossible to produce lasers with wavelengths below the 1000 A required to ionize air molecules. Laboratory experiments were limited to the use of a 14 ...

**Aircraft Fuel System Lightning Protection Design and Qualification Test Procedures Development** Sep 1994 193 pages

Authors: Keith E. Crouch; **LIGHTNING** TECHNOLOGIES INC PITTSFIELD MA

Full Text

The Navy and the Air Force recognized the need for improved test procedures for evaluating the **lightning** protection design of aircraft fuel systems. Under their sponsorship, a program to develop adjustable, standard ignition sources which could be used to calibrate techniques for detecting ignition sources during **lightning** testing was established. The minimum ignition levels of voltage sparks and hot spots were established under the program before it was terminated due to funding problems. The present program ...

**Lightning Protection Guidelines and Test Data for Adhesively Bonded Aircraft Structures** Jan 1984 176 pages

Authors: J. E. Pryzby; J. A. Plumer; **LIGHTNING** TECHNOLOGIES INC PITTSFIELD MA

Full Text

... to reduce weight, obtain smoother outside surfaces and reduce drag. The purpose of this program was protection of these new structures from hazardous **lightning** effects. The program began with a survey of advance-technology materials and fabrication methods under consideration for future designs. Sub- element specimens were subjected to simulated **lightning** voltages and currents. Measurements of bond line voltages, electrical sparking, and mechanical strength degradation were made to comprise a data base of ...

**Construction of a Lightning Index Using Integrated Precipitable Water Derived From the Global Positioning System** Dec 2000 76 pages

Authors: Robert A. Mazany; HAWAII UNIV AT MANOA HONOLULU

... Space Center's primary weather challenge, **lightning**. After examining the first years worth of ... periods were chosen to develop a GPS **lightning** prediction model. Statistical regression methods ... to identify predictors that added skill in forecasting a **lightning** event. Four predictors proved important ... pattern emerged several hours

Full Text

prior to a **lightning** event. Whenever the predictand log value ... independent test season using the GPS **lightning** model. Additionally, the model improved the KSC's ... forecasting tool that can be implemented in their **lightning** forecast process. Once the value of the GPS ...

**Analyzing Horizontal Distances Between WSR-88D Thunderstorm Centroids and Cloud-to-Ground Lightning Strikes** Mar 1998 127 pages

Authors: Steve L. Renner; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH

Full Text

... injuring ten others. This cloud to ground **lightning** strike hit eight minutes after a ... Review Panel was assembled to determine the adequacy of **lightning** advisories. One of the questions posed to the panel ... due to the lack of documented research on how far **lightning** can travel horizontally before striking ... (SCIT) Algorithm to identify thunderstorm centroids. **Lightning** strike data containing nearly 50, ... storm centroids and cloud to ground **lightning** strikes. This research discovered that average distances ... location. In addition, nearly 75% of all **lightning** strikes occurred within 10 nautical ...

**A Comparison of Horizontal Cloud-To-Ground Lightning Flash Distance Using Weather Surveillance Radar And The Distance Between Successive Flashes Method** Mar 1999 147 pages

Authors: Christopher C. Cox; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH SCHOOL OF ENGINEERING

Full Text

... minutes after the base weather station allowed a **lightning** advisory to expire. The incident brought to question the ... has been done on the horizontal distance that cloud-to-ground **lightning** flashes occurs from the center of a thunderstorm. This thesis used ... Display System (WATADS) to calculate the distance from a **lightning** flash to a thunderstorm centroid. The WSR-88D method ... data used in this thesis, the average percentage of **lightning** flashes that occurred beyond the 5 nautical niile ... result questions the adequacy of the 5 nautical mile **lightning** safety distance criterion currently being ...

**Thunderstorm Characteristics of a Cloud-to-Ground Lightning at the NASA Kennedy Space Center, Florida: A Study of Lightning Initiation Signatures as Indicated by Doppler Radar** May 1998 157 pages

Authors: Michael S. Gremillion; TEXAS A AND M UNIV COLLEGE STATION DEPT OF METEOROLOGY

Full Text

... and -20 deg C temperature heights were associated with cloud-to-ground (CG) **lightning** strike locations from the National **Lightning** ... at any time during the day, the diurnal distribution of **lightning** flashes showed that the afternoon (2000-2200 UTC) was the time of maximum **lightning** activity. From a time history of radar echoes, it was found that the 30 dBZ echo ... temperature height is the best indicator of the beginning of CG **lightning** activity. The observed median lag time between ... **lightning** flashes was 15.5 minutes. Other **lightning** initiation signatures were also examined at all three ...

**A Brief History of Laser Guided Lightning Discharge Models and Experiments** Jul 5, 1994 25 pages

Authors: Matthew A. Kozma; PHILLIPS LAB HANSCOM AFB MA

Full Text

Laser guided **lightning** discharge uses lasers instead of rockets to trigger **lightning**. Artificially triggered **lightning** has several important applications including aerospace vehicle launch protection and electrical power line transmission protection, among others. A brief history of the theoretical models used to predict triggered **lightning**, the experimentation completed with rocket triggered **lightning**, and the work completed on laser guided **lightning** discharge is presented. A bibliography of work related to **lightning** modeling, rocket-triggered **lightning**, and laser-triggered **lightning** is ...

**Synthesis of 3-Dimensional Lightning Data and Weather Radar Data to Determine the Distance that Naturally Occurring Lightning Travels from Thunderstorms** Mar 2002 85 pages

Authors: Lee A. Nelson; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH

Full Text

... upon **lightning** radar reflectivity signatures. Determining how far naturally occurring **lightning** normally travels from thunderstorms can provide insight to decision makers concerning in-flight and ground safety measures. 3D **lightning** data are merged with archived weather radar data. To analyze ... **lightning** data, radar data are interpolated to a 3D grid of reflectivity. **Lightning** flashes were analyzed to resolve the reflectivity of the flash ... 40-dBZ echo. The results indicate that it should be feasible to suggest **lightning** avoidance criteria based upon the radar reflectivity from ground ...

**A Study of Lightning Activity Over the Warm Pool Western Pacific Ocean (Toga-Coare Region) for 1993** Sep 10, 1995 108 pages

Authors: Luis A. Rios; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH

Full Text

... and frequent convection, and vigorous **lightning** activity. However, it has been noted by ... vast oceanic expanses experience less **lightning** activity than adjacent land masses ... A report herein presents a look at the characteristics of **lightning** as recorded by three individual magnetic direction ... Coupled Ocean-Atmosphere Response Experiment (TOGA-COARE). The **lightning** data recorded by each DF are azimuthally ... and flash rates are examined. Finally, the **lightning** data are run through time series ... appraise any possible link between **lightning** activity and the Madden-Julian Oscillation (MJO) ...

**Analysis in Cloud-to-Ground Lightning Flashes Over Land-vs-Water** Mar 2000 104 pages

Authors: Elizabeth A. Boll; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH

... optimal safety and success in Air Force missions. **Lightning** safety rules are often based on experience rather

Full Text

than ... over water and land will assist in a better understanding of **lightning** and provide answers that can protect human lives ... have different compositions and surface conductivity values. A **lightning** stroke is detected through a change in the electro-magnetic field at ... values from land to water can affect the detection of a **lightning** stroke and its associated parameters. The ... composition from water to land can also affect the dynamics of a storm and the **lightning** discharge process.

**Analysis of Cloud-to-Ground Lightning Clusters with Radar Composite Imagery** Mar 6, 2001 87 pages

Authors: Rhonda B. Scott; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH SCHOOL OF ENGINEERING

Full Text

... Institute of Technology involved studying a large volume of **lightning** data without coupling radar imagery (Parsons ... applied to storms by examining the radar imagery and **lightning** data. This research used the methodology applied to **lightning** ... Parsons and radar imagery to determine whether the location of **lightning** clusters were located near storms. A composite reflectivity radar image was generated and the **lightning** data for the corresponding time was plotted to determine if **lightning** ... coverage area. After a visual analysis of the radar and **lightning** cluster plots was conducted, the percentage of ...

**Developing of Predictors for Cloud-to-Ground Lightning Activity Using Atmospheric Stability Indices** Mar 2001 202 pages

Authors: Kenneth C. Venzke; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH

Full Text

... as predictive tools for determining cloud-to- ground **lightning** activity. Predetermined radii of 50 nautical miles around upper-air stations in the Midwest U.S. were used for the **lightning** summaries. Also explored is an improvement upon the ... were developed for relating stability index values to **lightning** occurrence. Traditional statistical regression methods failed ... predictive ability of the decision trees used in this study for **lightning** detection often exceeded 80-90% for most ... 'ready to use' predictive tool for forecasting **lightning** activity. The results of this study using classification and ...

**Retrieval and Assimilation of Storm Characteristics from Both In-Cloud and Cloud-to-Ground Lightning Data to Improve Mesoscale Model Forecasts** Sep 2005 58 pages

Authors: Donald R. MacGorman; OKLAHOMA UNIV NORMAN

Full Text

... weather forecasts, we (1) obtained and operated a **lightning** mapping system that detects all types of ... (2) quantified and tested relationships between **lightning** and other storm properties that will be useful for ... developed techniques for assimilating data from all types of **lightning** into COAMPS. Observational data analysis and storm simulations showed that total **lightning** flash rates were correlated with a storms ... volume of updraft exceeding 10 m/s. Gridded **lightning** data were assimilated into COAMPS ... United States in July 2000, assimilation of **lightning** data greatly improved the surface moisture, ...

**Investigating Possible Causative Mechanisms Behind the Houston Cloud-to-Ground Lightning Anomaly** Nov 22, 2005 12 pages

Authors: Michael L. Gauthier; Walter A. Petersen; ALABAMA UNIV IN HUNTSVILLE

Full Text

... have an effect on lower tropospheric chemistry, convection, **lightning** and rainfall. Moreover, these influences have been invoked as possible explanations for the cloud-to-ground (CG) **lightning** anomalies observed over the Houston metropolitan area. ... (2002) reported a 45% increase in annual CG **lightning** flash densities over and downwind of the ... (2005) demonstrated that in a regional context the Houston CG **lightning** anomaly is a non-unique feature, embedded within the ... be a persistent summer-season feature (even when large **lightning** events were excluded from the analysis) with flash densities ...

**Lightning Protection System Design: Applications for Tactical Communications Systems** Jan 1993 42 pages

Authors: John M. Tobias; ARMY COMMUNICATIONS-ELECTRONICS COMMAND FORT MONMOUTH NJ

Full Text

This report discusses design applications of **lightning** protection systems to military tactical/mobile communications equipment. New information ... items validated by repeated exposure to 200,000-ampere simulated **lightning** current. The effects of **lightning** damage to system components is discussed. Design ... problems encountered in tactical/mobile systems. Methods for predicting the probability of **lightning** strikes, and cost/risk analysis are considered to assist ... cannot be met because of overriding weight/mobility requirements.... **Lightning** protection, **Lightning** protection system design, **Lightning**.

**Multiparameter Investigation of Significant Lightning Producing Storms in Northeastern Colorado** Jul 2, 1999 178 pages

Authors: Michael L. Gauthier; COLORADO STATE UNIV FORT COLLINS

Full Text

... , summer season, climatology of cloud to ground (CG) **lightning** immediately east of the central Rocky mountains from 1996-98 ... spatial and temporal variations of summer season CG **lightning** activity within the region. Our examination focused on ... and negative) changed as the percentage of positive CG **lightning** changed. Specifically, we found that as the positive CG ... microphysical and electrical characteristics of four significant **lightning** producing storms in northeastern Colorado using the ... multiparameter radar and cloud to ground (CG) **lightning** data. Using the multiparameter variables of Z(sub h), ...

**Forecasting the onset of Cloud-Ground Lightning Using Layered VerticallyIntegrated Liquid Water** Aug 8, 2000 71 pages

Authors: David L. D'Arcangelo; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH

Full Text

Accurate forecasting of cloud-ground (CG) **lightning** onset at the Kennedy Space Center (KSC), Florida ... problem. Current methods for predicting CG **lightning** onset rely on radar analyses that require ... Although the requisite temperature level used in **lightning** forecasting lies within the critical region ... degrees C layer is a key element in forecasting **lightning** onset. This storm structure can readily ... quantifies the minimum vertical structure required for **lightning** onset. The optimal threshold pair follows ... -15 to -20 degrees C layer indicate that **lightning** is imminent, with a POD of 96%, a KSS of 51 ...

**The Horizontal Extent of Cloud-to-Ground Lightning Over the Kennedy Space Center** Jan 14, 2002 114 pages

Authors: Todd M. McNamara; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH

Full Text

Military base weather stations are required to issue **lightning** warnings to protect military equipment and personnel. ... mission impact. The goal of this thesis is to challenge the 5 n mi **lightning** warning criteria by quantifying the distance that CG **lightning** ... to examine the characteristics of the peak current of CG **lightning** strokes to determine if a relationship exits between ... a stroke travels, and the altitude of the origin point of the **lightning** stroke. This study found 28.6% of ... higher peak currents are associated with shorter distances that **lightning** strokes traveled and higher peak currents ...

**Proceedings of the Thunder and Lighting Seminar and The 3D lightning Warning Workship Held in Las Cruces, New Mexico on February 27, 1990** Feb 1993 263 pages

Authors: RANGE COMMANDERS COUNCIL WHITE SANDS MISSILE RANGE NM METEOROLOGY GROUP

Full Text

... on sensors, techniques, and applications relating to **lightning** and thunderstorms. This document provides information on the operational aspects of **lightning** detection sensors and how they may be used as well as advantages and ... sensors discussed. The lighting workshop was conducted as an objective of the **Lightning** Prediction and Detection Committee of the RCC Meteorology Group. The committee initiated a survey of **lightning** instruments and procedures used at the various ranges and organizations. The results of this survey are included in this document.... **Lightning** prediction and detection, ...

**A Study of the Cloud-To-Ground Lightning Characteristics during the 21-23 November 1992 Widespread Severe Weather Outbreak** Sep 10, 1995 123 pages

Authors: William J. Carle; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH

Full Text

... of the Ohio River Valley. The cloud-to-ground (CG) **lightning** characteristics for the system were studied in a storm relative coordinate ... the negative flash density. The effects of shear on bipolar **lightning** patterns indicate that 13 of the 18 bipolar patterns are ... . No correlation was found between the percentage of positive **lightning** and 31 cases of hail greater than or ... the hail cases were predominantly associated with negative **lightning**. The **lightning** characteristics of 21 F3 and F4 ... not the most suitable means of associating CG **lightning** with the tornadic storms due to varying amounts of ...

**Radar Studies of Aviation Hazards: Part 2 Lightning Precursors** Jul 15, 1996 32 pages

Authors: F. I. Harris; David J. Smalley; Shu-Lin Tung; Alan R. Bohne; HUGHES STX CORP LEXINGTON MA

Full Text

... that relates radar reflectivity structure and **lightning** activity. Marshall and Radhakant (1978) ... a storm at several heights and found that **lightning** began when the storm top reached 8 km ( ... various methods of comparing reflectivity data and **lightning** activity. A recent study by Harris-Hobbs et al (1992) attempted to correlate **lightning** activity with storm volumes exceeding various thresholds. ... Harris-Hobbs et al (1992) attempted to correlate **lightning** activity with storm volumes exceeding various ... peak volumes before that for the 20 dBZ threshold and before the time of maximum **lightning** activity. ...

**FYI, Lightning, Number 39** Apr 1997 15 pages

Authors: Maria Reymann; AIR WEATHER SERVICE SCOTT AFB IL

Full Text

Air Force Weather (AFW) currently uses a variety of stand-alone **lightning** mapping systems and regional **lightning** mapping networks to provide a wide range of support to both the Air Force and the Army. The ... systems and networks enable personnel to warn and advise on **lightning** hazards, not only for aircraft operations but also resource protection. This FYI provides information on **lightning** and its effects on operations. It discusses **lightning** detection systems and ... you may want to integrate into your operations to help you warn your customers of **lightning** hazards.

**Test Report for the Direct Strike Lightning Test of the MCC-1 Thermal Protection System (TPS) Coated Aluminum Panels** May 19, 1995 156 pages

Authors: Jeffrey D. Craven; REDSTONE TECHNICAL TEST CENTER REDSTONEARSENAL AL

Full Text

... test procedures and results of the direct strike **lightning** effects test on the Marshall Convergent Coating ... skirt panels to the specified direct strike **lightning** current environment and then ascertain ... structural effects of direct strike **lightning** on the frustum and aft skirt panels. All ... high current (Component A) direct strike **lightning** environment. The amount of MCC-1 TPS coating ... continuing current (Component C) direct strike **lightning** environments resulted in a small melted spot ... restrike current (Component D) direct strike **lightning** environment resulted in slight blackening of the MCC-I ...

**Climatological Lightning Characteristics of the Southern Rocky and Appalachian Mountain Chains, A Comparison of Two Distinct Mountain Effects** Dec 7, 2001 153 pages

Authors: Stephen E. Phillips; TEXAS A AND M UNIV COLLEGE STATION

... Mountains and the Appalachian Mountains. Data from the National **Lightning** Detection Network (NLDN) are analyzed to produce maps of average annual **lightning** flash density, positive flash density, percent positive

Full Text

flashes ... noted over the mountains. The eastern edge of the Appalachian **lightning** suppression is determined to be a result of faster propagation of ... suppression is significant. Multiple regressions predict **lightning** flash density from terrain characteristics. Vertical wind ... a conceptual model is presented to describe the nature of the **lightning** evolution in each region, and explain ...

**Developing a Forecast Tool for Cloud-to-Ground Lightning in the North Central and Northeastern United States** Mar 2004 134 pages

Authors: Manuel I. Folsom Jr; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF ENGINEERING AND MANAGEMENT

Full Text

... Air Force for both air and ground operations Forecasting CG **lightning** is a necessary and extremely important requirement for Air Force meteorologists ... Weather Squadron requested a forecast tool capable of predicting CG **lightning** within a 25 and 10 nautical mile radius of the ... air stability indices and surface data at 12-hour intervals with CG **lightning** data occurring within the next 12 hours to determine prediction ... would provide an excellent forecast method for determining the occurrence of CG **lightning**. Therefore, the results are recommended to the 15th Operational Weather Squadron for use ...

**The Relationship Between Cloud-to-Ground Lightning and Precipitations Ice Mass: A Radar study over Houston** Jun 2006 20 pages

Authors: Michael L. Gauthier; Walter A. Petersen; Lawrence D. Carey; Jr. Christian Hugh J.; ALABAMA UNIV IN HUNTSVILLE

Full Text

... , extending global studies of IM and **lightning** to more regional and cell scales around ... indicate that local maximums in cloud-to-ground (CG) **lightning** were indeed accompanied by peaks in IM. ... concentrations of mixed-phase IM, and its ability to generate **lightning**. Relative to the documented CG **lightning** "anomaly" over Houston, these results imply that unique aspects of the Houston urban ... precipitation ice, thereby generating an anomaly in **lightning**; causal hypotheses must be capable of explaining ... intensity of convection, and then relating these to the enhancement of IM and **lightning** production. ...

**International Aerospace and Ground Conference on Lightning and Static Electricity (15th) Held in Atlantic City, New Jersey on October 6 - 8, 1992. Addendum** Nov 1992 313 pages

Authors: Michael S. Glynn; FEDERAL AVIATION ADMINISTRATION TECH- NICAL CENTER ATLANTIC CITY NJ

Full Text

... supplements the compilation of papers presented at the 1992 International Aerospace and Ground Conference on **Lightning** and Static Electricity, held at the Taj Mahal, Atlantic City, NJ, October 6-8, 1992. It includes papers concerning **lightning** phenomenology, **lightning** characterization, modeling and simulation, test criteria and techniques, and protection of ... Center and the NICG, in concert with the Florida Institute of Technology. Phenomenology, Electromagnetics, **Lightning** standards, Mapping, Modeling P-static and corona, Coupling **lightning** simulation, Meteorological.

**The Initiation of Lightning and the Growth of Electric Fields in Thunderstorms** Dec 1993 60 pages

Authors: John Latham; UNIVERSITY OF MANCHESTER INST OF SCIENCE AND TECHNOLOGY (UNITED KINGDOM) DEP T OF PHYSICS

Full Text

... research into the glaciation of convective clouds of-the type that produce **lightning** has revealed that the early stages of ice formation can be detected ... implications. Further laboratory experiments have shown that the most effective methods of **lightning** initiation are likely to involve supercooled raindrops, with threshold fields around 300kV/m. A new model of thundercloud electrification and **lightning** production has been developed, from which it is possible to ... the sensitivity of **lightning** frequency to meteorological and cloud microphysical parameters. **Lightning**, Ice, Corona, Electric field.

**Analysis of Cloud-to-Ground Lightning in Hurricane Andrew** May 1995 77 pages

Authors: William R. George; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH

Full Text

... such an excellent opportunity to study the cloud-to-ground (CG) **lightning** associated with this type of storm. While numerous thunderstorm ... the Great Plains, have been studied for **lightning** characteristics, the ability to conduct similar studies on ... have occurred since the relatively new National **Lightning** Detection Network has been operational. 17, ... spiral rainbands of Andrew. The overall distribution by polarity of the **lightning** was found to be 2. 1% positive and 97.9% negative. As ... was dissipating over land in Mississippi all **lightning** observed near the pressure center was positive. Throughout ...

**Nationwide Lightning Climatology** Feb 1996 32 pages

Authors: William R. Schaub Jr; AIR FORCE COMBAT CLIMATOLOGY CENTER SCOTT AFB IL

Full Text

... by determining equipment test locations that have high or low probabilities of **lightning** strikes. The C-17 is another system supported by the 645th WS. ... support, the 645th WS agreed to take over testing of a nationwide **lightning** climatology originally requested from AFCCC by the Air Force Systems Command, Directorate of Weather. AFCCC produced a **lightning** climatology for the continental United States (CONUS) from a database of ... during 1986-90. AFCCC recommended a microcomputer graphics program to display the **lightning** climatology for the CONUS or by regions in bar graphs, tables, and isopleth ...

**Lightning Climatology for Low-level Flying Routes in the United States** Mar 1996 35 pages

Authors: William R. Schaub Jr; AIR FORCE COMBAT CLIMATOLOGY CENTER SCOTT AFB IL

Full Text

... by AFCCC for regions of the central and western CONUS. This climatology was developed from a database of cloud-to-ground **lightning** strikes that occurred from March through October during 1986-91. Analysis of the **lightning** climatology showed that patterns of **lightning** strikes compared favorably with known preferred

locations and times of thunderstorm development. It also showed that stratification of the **lightning** climatologies by 700-mb wind directions is useful in revealing locations of lightning-strike patterns and their movement. ...

**Lightning Climatology for Nellis AFB, Nevada** Mar 1996 26 pages

Authors: William R. Schaub Jr; AIR FORCE COMBAT CLIMATOLOGY CENTER SCOTT AFB IL

Full Text

This technical note documents a **lightning** climatology developed by AFCCC for Nellis AFB, Nev. This climatology was developed from a database of cloud-to-ground **lightning** strikes that occurred from March through October during 1986-91. Analysis of the **lightning** climatology showed that patterns of **lightning** strikes compared favorably with known preferred locations and times of thunderstorm development. It also showed that stratification of the **lightning** data by 700-mb wind directions is useful in revealing locations of lightning- strike patterns and their movement.

**Lightning Climatology for Maxwell AFB, Alabama** Mar 1996 24 pages

Authors: William R. Schaub Jr; AIR FORCE COMBAT CLIMATOLOGY CENTER SCOTT AFB IL

Full Text

This technical note documents a **lightning** climatology developed by AFCCC for Maxwell AFB, Ala. This climatology was developed from a database of cloud-to-ground **lightning** strikes that occurred from March through October during 1986-91. Analysis of the **lightning** climatology showed that patterns of **lightning** strikes compared favorably with known preferred locations and times of thunderstorm development. It also showed that stratification of the **lightning** data by 700-mb wind directions and K-index values is useful in revealing locations of lightning-strike patterns and their movement.

**Evolution of Cloud-to-Ground Lightning Discharges in Tornadic Thunderstorms** Feb 5, 2000 77 pages

Authors: Wendy L. Seaman; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH

Full Text

... to both USAF personnel and assets. This study examined **lightning** data from 64 storm events from 1995-2000 in search of unique **lightning** signatures indicative of tornadic activity. Overall flash rates, percentage of positive ... , there is little evidence to support the theory that specific **lightning** trends emerge prior to tornadogenesis. Due to the ... and/or satellite, used in conjunction with cloud-to- ground **lightning** flash data may, however, provide insight as ... to the development of tornadoes within a storm. Intracloud **lightning** may also provide additional information on tornado ...

**The Horizontal Extent of Lightning Based on Altitude and Atmospheric Temperature** Mar 26, 2002 81 pages

Authors: David R. Vollmer; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF ENGINEERING AND MANAGEMENT

Full Text

**Lightning** poses a threat to aircraft in flight. To mitigate this threat, the U.S. Air Force requested a study of **lightning** distances. Three- Dimensional **lightning** data were examined for this study, spanning 1 March 1997 to 31 May 2001 and obtained from the **Lightning** Detection and Ranging System (LDAR) at the Kennedy Space Center, FL. The LDAR data points were first grouped into **lightning** flashes and branches using spatial and temporal criteria. Rawinsonde data were vertically interpolated to determine the temperature at the flash ...

**Investigation of Lightning and EMI Shielding Properties of SWNT buckypaper Nanocomposites** Feb 3, 2005 18 pages

Authors: Ben Wang; Richard Liang; Chuck Zhang; Leslie Kramer; Percy Funchess; FLORIDA AGRICULTURAL AND MECHANICAL UNIV TALLAHASSEE

Full Text

... fiber- reinforced and foam composite structures for improving EMI and **lightning** strike protection properties. The EMI shielding and **lightning** strike attenuation ... buckypaper nanocomposite were preliminarily characterized. Four types of the designed EMI/ **lightning** strike testing composite samples with buckypapers were produced. Each ... composites with the buckypaper surface, compared to the controlled panel. For the **lightning** strike resistance, no visible improvement was observed. Further ... are vital for utilizing SWNTs to realize EMI and **lightning** strike resistance properties for composite structures.

**Role of Intracloud Lightning in Tornadogenesis** Mar 2005 16 pages

Authors: Ronald W. Armstrong; ARMSTRONG CONSULTING OCEAN CITY MD

Full Text

The role of cloud electrification within supercells and, in particular, the role of **lightning** in tornadogenesis is re-examined. Rather than cloud-to-ground **lightning**, it is intracloud **lightning** that is the culprit for enhancing updraft wind velocities to tornadic levels. The **lightning** produces within the intracloud chamber both: (1) newly generated hydrogen ions, of ... ion concentration. To effect the significant updraft enhancement required for tornado initiation, repeated **lightning** strikes are required within an individual vortex "core"; and, this restriction relates to ...

**Urban Influences on Convection and Lightning Over Houston** 2006 185 pages

Authors: Michael L. Gauthier; ALABAMA UNIV IN HUNTSVILLE SCHOOL OF GRADUATE STUDIES AND RESEARCH

Full Text

... , ultimately anthropogenic, influences on convection as it relates to **lightning** production and precipitation structure. In general, inadvertent weather modification hypotheses offered to explain **lightning** and rainfall anomalies rely on either or ... of convection (from whence warm-season rainfall and **lightning** emanate), or modification to convective cloud microphysics through ... enhancements in summer season cloud-to-ground (CG) **lightning** over the Houston area were examined in ... mechanisms responsible for the intensity of the Houston CG **lightning** anomaly to be those associated with a mixture of urban ...

**Lightning Strike Susceptibility Tests on the AIM-9 Missile** Aug 1978 55 pages

Authors: Vernon L. Mangold; Christopher L. Blake; Lawrence C. Walko; AIR FORCE FLIGHT DYNAMICS LAB WRIGHT-PATTERSON AFB OH

Full Text

**Lightning** strike susceptibility tests were conducted on AIM-9 missile forward sections to evaluate possible interface problems were the F16 aircraft. High voltage attachment, streamering ... is the most probable attachment point to the AIM-9 missile. The optical dome was found to be highly vulnerable to direct **lightning** strikes but there is no evidence that **lightning** will penetrate the F-16 aircraft via the AIM-9 missiles. The operational status of the AIM-9 missile subsequent to a direct **lightning** strike is suspect; however, complete evaluation of this subject was beyond the scope of the program.

**A Simulated Lightning Effects Test Facility for Testing Live and Inert Missiles and Components** Apr 19, 1991 12 pages

Authors: Jeffery D. Craven; James A. Knaur; Truman W. Moore Jr; REDSTONE TECHNICAL TEST CENTER REDSTONE ARSENAL AL

Full Text

Details of a simulated **lightning** effects test facility for testing live and inert missiles, motors, and explosive components is described. The test facility is designed to simulate the high current, continuing current, and high rate-of-rise current components of an idealized direct strike **lightning** waveform. The **Lightning** Test Facility has been in operation since May, 1988, and consists of three separate capacitor banks used to produce the **lightning** test components, a permanently fixed, large, steel safety cage for retaining the item under test should it be ignited during ...

**Natural and Triggered Lightning Launch Commit Criteria (LCC)** Jan 15, 1999 23 pages

Authors: E. P. Krider; H. C. Koons; R. L. Walterscheid; W. D. Rust; J. C. Willett; AEROSPACE CORP EL SEGUNDO CA TECHNOLOGY OPERATIONS

Full Text

This document has been prepared to document the **Lightning** Launch Commit Criteria recommended by the **Lightning** Advisory Panel (LAP) in May 1998. The LAP is a joint AF/NASA panel that provides an independent scientific assessment of, advice on, and recommended changes to the **Lightning** Launch Commit Criteria, lightning-related issues in the Flight Rules, and **Lightning** Advisories/Warnings for ground operations.

**Predicting Warm Season Nocturnal Cloud-To-Ground Lightning Near Cape Canaveral, Florida** Aug 23, 1999 83 pages

Authors: Christopher E. Cantrell; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH

Full Text

... this study: A climatology of all warm season nocturnal cloud-to-ground **lightning** (COL) flashes over east central Florida, and nocturnal COL that ... vector wind. Cloud-to-ground flashes are used to examine the spatial distribution of nocturnal **lightning**. Flashes are found to occur on 525 of the 825 nights with available soundings. ... determining thermodynamic characteristics of air over the study area. Data from the local **lightning** detection network reveal 74 nights during the warm season months of 1995 - 1997 with cloud-to-ground **lightning** within a 40 km radius of study. Surface analyses are used to ...

**Determining the Horizontal Distance Distribution of Cloud-to-Ground Lightning** Mar 2000 88 pages

Authors: Tamara L. Parsons; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH SCHOOL OF ENGINEERING

Full Text

This research effort attempted to quantify what constitutes a safe distance when **lightning** is present. The method used in this research project groups **lightning** flashes into clusters using spatial and temporal constraints. However, not all flashes meet the time and ... distances beyond 9.5 km from the nearest flash. Cumulative frequency distributions of historical **lightning** data can be used to find the probability of having **lightning** at a particular distance. In this way an acceptable level of risk can be determined and then a "safe" distance found. ...

**Techniques for Forecasting the Cessation of Lightning at Cape Canaveral Air Station and the Kennedy Space Center** Mar 2000 90 pages

Authors: Michael W. Holmes; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH SCHOOL OF ENGINEERING

Full Text

... research effort is directed toward identifying new methods of forecasting the cessation of **lightning** along the Central Atlantic Coast of Florida. Cloud-to-ground **lightning** flashes place Air Force (AF) personnel and assets at risk almost daily at this location. Providing a more accurate method of forecasting the cessation of **lightning** would allow for safer and more efficient execution of AF operations. ... notion that each thunderstorm cell type (multi or single) behaves substantially different from the other with respect to forecasting the cessation of **lightning**.

**A 3D Display System for Lightning Detection and Ranging (LDAR) Data** Mar 2000 109 pages

Authors: Michael W. Darwin; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH

Full Text

**Lightning** detection is an essential part of safety and resource protection at Cape Canaveral. In order to meet the unique needs of launching space vehicles in the thunderstorm prone Florida environment, Cape Canaveral has the only operational three- dimensional (3D) **lightning** detection network in the world, the **Lightning** Detection and Ranging (LDAR) system. Although **lightning** activity is detected in three dimensions, the current LDAR display, developed 20 years ago, is two-dimensional. This thesis uses modern three-dimensional graphics, ...

**A Statistical Frequency Analysis of Lightning Producing Storms During STEPS 2000** 2001 104 pages

Authors: Steven R. Cabosky; COLORADO STATE UNIV FORT COLLINS

Most cloud-to-ground (CG) **lightning** lowers negative charge to ground, but roughly 10% of flashes are reversed

Full Text

and transfer positive charge ... ground. A small number of storms produce predominately (greater than 50%) positive CG **lightning**, and recent studies have associated the occurrence of tornadoes, hail, and microbursts with ... of the Severe Thunderstorm Electrification and Precipitation Study (STEPS). WSR-88D NEXRAD and National **Lightning** Detection Network (NLDN) data sets were used to produce statistical radar reflectivity distributions based on cloud-to- ground (CG) **lightning** flash densities.

**The Basis of Conventional Lightning Protection Technology: A Review of the Scientific Development of Conventional Lightning Protection Technologies and Standards** Jun 2001 76 pages

Authors: John M. Tobias; Charles L. Wakefield; Larry W. Strother; Vladislav Mazur; Josephine Covino; ARMY COMMUNICATIONS-ELECTRONICS COMMANDFORT MONMOUTH NJ

Full Text

This report is a review of the body of literature, theoretical and empirical, that exists to substantiate the methods and practice of **lightning** protection as embodied in the current National Fire Protection Association's Standard 780, Standard for the Installation of **Lightning** Protection Systems Development of this report is in direct response to the request embodied in the National Fire Protection Association's Standards Council Decision 00-30 for governmental users to participate in submission of technical substantiation regarding **lightning** protection systems.

**Catalog of Absolutely Calibrated, Range Normalized, Wideband, Electric Field Waveforms from Located Lightning Flashes in Florida. Volume 2. 8 and 10 August 1985 Data** Apr 12, 1991 310 pages

Authors: Yutaka Izumi; John C. Willett; PHILLIPS LAB HANSCOM AFB MA

Full Text

... , field experiments were conducted at the NASA Kennedy Space Center, Florida, to measure electromagnetic fields produced by **lightning**. This is the second data report resulting from these experiments. It presents plots of range-normalized waveforms for all offshore located **lightning** events recorded during two storms on 8 and 10 August 1985. The storms in the ... electric field, time derivative of the electric field, and high frequency energy spectral density. **Lightning**, Electromagnetic radiation, Kennedy Space Center, Electric field, HF radiation.

**Comment on the Transmission-Line Model for Computing Radiation from Lightning** Feb 20, 1992 11 pages

Authors: D. M. Le Vine; J. C. Willett; PHILLIPS LAB HANSCOM AFB MA

Full Text

... is frequently used to relate the electric and magnetic fields radiated during **lightning** discharges to the currents that produce those fields. A principal prediction of this model is that the distant (radiation) fields are directly proportional to the current propagating along the **lightning** channel, multiplied by the velocity of propagation. This paper examines the derivation of this relationship and ... commonly used to describe the transmission-line model cannot be correctly applied to many **lightning** processes. A correction factor is required that is significant when the channel is not oriented ...

**Development of a Bulk Current Injection Direct-Drive System to Test System Level Components with Stress Waveforms that are Encountered During Full Threat Indirect Effects Lightning** 1994 7 pages

Authors: Sam Frazier; Kurt Sebacher; NAVAL AIR WARFARE CENTER AIRCRAFT DIV PATUXENT RIVER MD

Full Text

The NAWCAD has developed an effective **lightning** BCI direct drive system that can be used to inject indirect effects waveforms onto test point cables. The amplitude and shapes of these waveforms correspond to what would be seen caused by indirect effect **lightning** with a 6 odB margin. The waveform normalization and the load impedance normalization processes mentioned in the text have allowed near exact replication of waveforms. This BCI direct drive ability has allowed the Navy to test aircraft to indirect effects **lightning** and define strength levels well above the 200 kA threat

**Lightning Launch Commit Criteria** Feb 1, 1996 85 pages

Authors: H. C. Koons; R. L. Walterscheid; AEROSPACE CORP EL SEGUNDO CA TECHNOLOGY OPERATIONS

Full Text

... in order to gather in situ airborne field mill (ABFM) data to revise the USAF and NASA **lightning** Launch Commit Criteria (LCC) for manned and unmanned space launches. The Marshall Space Flight Center recommended changes to the **lightning** LCC based on their analysis of the ABFM data obtained under the Airborne Field Mill Project. A committee ... Peer Review Committee (PRC) was formed 'To draft and finalize a subset of the Natural and Triggered **Lightning** Launch Commit Criteria' based on ABFM Program data.' This report documents the LCC recommended by the ...

**Step Potential Modification by the Lightning Electromagnetic Environment** Sep 1996 13 pages

Authors: John M. Tobias; ARMY COMMUNICATIONS-ELECTRONICS COMMAND FORT MONMOUTH NJ

Full Text

The purpose of this report is to introduce a modified theory of propagation for **lightning** currents in earth. Recent experimental evidence has pointed to modified current flow distributions ... in excess of the fine weather electric field. Current distributions in earth due to **lightning** discharges are of interest to safety professionals due to the development of the step potential. ... distribution and, hence, step potential by citing recent qualitative observations of rocket-triggered **lightning** studies. Behavioral description of the step potential will be developed from electromagnetic theory. Impact ...

**Doppler Radar Investigation of Tornadic and Lightning Producing Storms in Northeast Colorado** Jan 1997 160 pages

Authors: Richard M. Lucci; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH

Full Text

... in northeast Colorado were investigated using single and dual Doppler radar and cloud-to-ground (CG) **lightning** data. These particular thunderstorms were chosen because of their generation of weak short- lived tornadoes and CG **lightning** dominated by positive flashes. Storm data was collected using the multiparameter, CSU-CHILL, and ... infer origins of rotation, tornado formation mechanisms, and the storm structure responsible for the observed **lightning** patterns. Single Doppler techniques included multiparameter measurements, calculations of azimuthal shear, histogram ...

**A Four-Year Summertime Microburst Climatology and Relationship Between Microbursts and Cloud-to-Ground Lightning Flash Rate for the NASA Kennedy Space Center, Florida: 1995-1998** Jul 2, 1999 130 pages

Authors: Neil T. Sanger; TEXAS A AND M UNIV COLLEGE STATION DEPT OF METEOROLOGY

Full Text

... and the wind direction was accomplished. Finally, an examination into the relationship between microbursts and **lightning** was conducted. A total of 282 microbursts were observed during this four-year period. There were 114 microburst ... formation of convection over the same areas on a daily basis. The investigation into the relationship between **lightning** and microbursts revealed that in most cases there was an evident increase in the CG flash rate ... the microburst. Moreover, a clear peak often occurred 5-10 minutes before the microburst. Thus, CG **lightning** may also improve microburst forecasting.

**The Atmospheric Mechanisms Associated with Lightning During Snow and Ice Events** Feb 27, 2001 83 pages

Authors: Randall J. Haeberle; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF ENGINEERING AND MANAGEMENT

Full Text

The purpose of this research was to find the atmospheric mechanisms associated with **lightning** in snow and ice events. The specific mechanisms that were examined were low-level wind shear, upper level divergence, surface ... precipitation type (snow, sleet/freezing rain, rain) in two separate studies. Surface temperature appeared to have a relationship to **lightning** in all precipitation categories, while no significant relationship to **lightning** in all precipitation categories, while no significant relationship was found with upper level divergence, the -10 degree C level, or the precipitable water. ...

**Lightning and Static Electricity Conference, 12-15 December 1972** Dec 1972 694 pages

Authors: M. P. Amason; Bernard Vonnegut; Martin A. Uman; Joseph E. Nanevicz; G. A. Dawson; Jon I. Inculet; Robert W. Ellison; E. F. Vance; N. Cianos; John G. Breland; AIR FORCE AVIONICS LAB WRIGHT-PATTERSON AFB OH

Full Text

The conference proceeding contains fifty-seven papers. Seventeen papers are selected for abstracting and indexing. The papers document the discussion of the theoretical aspects of both **lightning** and atmospheric electrification. The practical control of adverse effects is addressed relative to aerospace vehicles and installations. Sessions include fundamental aspects, missiles and spacecraft, aircraft, advanced composites, fuels, and **lightning** simulation.

**Report on the Results of the Probability of Lightning Condition Forecasting Test Conducted in 2WW during March, April and May 1977** Jul 31, 1977 31 pages

Authors: R. G. Bachman; WEATHER WING (2ND) APO NEW YORK 09012

Full Text

**Lightning** strikes on in-flight aircraft constitute a significant and previously unforecast hazard to military aircrews in Europe. A logic-diagram technique was developed to forecast the probability of occurrence of all known weather conditions that relate to such strikes. The logic was developed ... contained some pessimistic bias, indications from over 100 responses were that the service was desired by a significant number of crews, and increasing probability values in the issued forecasts were associated with increasing likelihood of the crews encountering or seeing **lightning** events. (Author)

**Atmospheric Electricity Hazards Analytical Model Development and Application. Volume III. Electromagnetic Coupling Modeling of the Lightning/ Aircraft Interaction Event** Jun 1981 332 pages

Authors: F. J. Eriksen; T. H. Rudolph; Rodney Perala; ELECTRO MAGNETIC APPLICATIONS INC DENVER CO

Full Text

In this report, the state of the art of coupling of electromagnetic fields to aircraft is reviewed. The objective is to identify the best models available for assessing the electromagnetic interaction of **lightning** with aircraft. The coupling process is explained and the modelling requirements implied by the **lightning** environment are discussed. Finally, the description of models selected and implemented at the AFFDL Computing Center is given. (Author)

**Predicting Lightning Events in the KSC Area: A Feasibility Study Using Single Station Data** Dec 8, 1992 32 pages

Authors: Robert O. Berthel; PHILLIPS LAB HANSCOM AFB MA

Full Text

... to form a correlation with subsequent lightning-related activity. Wind directions were the only measurements that could be directly associated. This study revealed that **lightning** activity, other than that associated with large-scale storm systems, developed in the 12-hr period following the morning radiosonde when both surface and ... and the transport of that moisture to KSC by upper-air winds. This premise was supported by the evidence of days having no **lightning** activity, presumably caused by the lack of advection and/or convergence or from elevated moisture being carried away from KSC. This ...

**Proceedings of Lightning and Static Electricity Conference Held in San** Dec 1970 316 pages

**Diego, California on 9-11 December 1970**

Authors: AIR FORCE AVIONICS LAB WRIGHT-PATTERSON AFB OH

Full Text

Information is presented on **lightning** and static electricity phenomena from the standpoint of their relation to, and interaction with, aerospace vehicles and ground complexes. Interactions and the effects of **lightning** and static electricity on electrical, electronic, structural, static discharger systems and fly-by-wire systems of aerospace systems are described. The information presented is considered to be of interest to scientists and engineers in the fields of electronics, advanced composite materials and structures, and atmospheric electrical phenomena.

**Lightning Climatology for Eglin AFB, Forida** Mar 1996 31 pages

Authors: Brian M. Bjornson; William R. Schaub Jr; AIR FORCE COMBAT CLIMATOLOGY CENTER SCOTT AFB IL

Full Text

This technical note documents a climatology study AFCCC completed on the occurrence of **lightning** strikes at Eglin AFB, Fla. It depicts spatial and temporal variations in **lightning** strikes expected with known thunderstorm patterns in the Eglin AFB area. (MM)

**Lightning Climatology for Holloman AFB, New Mexico** Mar 1996 25 pages

Authors: William R. Schaub Jr; AIR FORCE COMBAT CLIMATOLOGY CENTER SCOTT AFB IL

Full Text

This technical note documents a climatology study AFCCC completed on the occurrence of **lightning** strikes at Holloman AFB, New Mexico. It depicts spatial and temporal variations in **lightning** strikes expected with known thunderstorm patterns in the Holloman AFB area.

**A Lightning Summary and Decision Model for Thunderstorm Prediction at Whiteman Air Force Base, Missouri** Dec 10, 1996 154 pages

Authors: Randall G. Bass; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH

Full Text

A cloud-to-ground **lightning** summary was developed for a 139x185 kilometer area centered at Whiteman Air Force Base. Spatial and temporal patterns, and first stroke peak currents were analyzed from 1989-1995. Stability indices were examined for ... for springtime thunderstorms was located between the base and the Ozark Mountains. No preferred track was found during the other seasons. Although diurnal distributions of **lightning** flashes showed that thunderstorms were possible at any time, late afternoon and nocturnal maxima were observed during the spring and summer. The nocturnal maximum disappeared ...

**The Physical Origin of In-Cloud Lightning Processes Determined from Multiple-Station Wideband Electric Field Research** Mar 2, 1998 22 pages

Authors: Ewen M. Thomson; FLORIDA UNIV GAINESVILLE DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

Full Text

The overall objective was to understand better the physics of in cloud **lightning** processes that give rise to radiation pulses in the electric field record. The most significant progress made was in the areas of theoretical development and analysis of 1992 data. The fundamental expressions for electric and magnetic fields from an extending **lightning** channel were shown to be incomplete. Specifically, a different interpretation of the classical electrostatic, induction and radiation components was found and a simpler expression for the far ...

**Development of a Field-Deployable Observational System for Characterizing Lightning in Sprite-Producing Storms** Nov 5, 1998 4 pages

Authors: Paul R. Krehbiel; NEW MEXICO INST OF MINING AND TECHNOLOGY SOCORRO GEOPHYSICAL RESEARCH CENTER

Full Text

This grant supported the initial development of a deployable system for determining the structure of **lightning** discharges in three spatial dimensions and time. The purpose of this was to utilize the system to characterize **lightning** discharges that initiate sprites in the upper atmosphere. The grant also supported observations of sprites themselves using low-light- level video cameras and studies which identified charge transfer occurring within ...

**AWOS Data Acquisition System (ADAS), Automated Lightning Detection and Reporting System (ALDARS), Operational Test and Evaluation (OT & E) Final Test Report** Dec 1998 721 pages

Authors: Donald Groot; Hugh Vuong; Ed Schlain; Jock Stratton; FEDERAL AVIATION ADMINISTRATION TECHNICAL CENTER ATLANTIC CITY NJ

Full Text

The Federal Aviation Administration (FAA) Automated Weather Observation System (AWOS) Data Acquisition System (ADAS)/Automated **Lightning** Detection and Reporting System (ALDARS) Operation Test and Evaluation (OT&E) final Test Report is prepared by the ADAS/ALDARS Test Director. ... for each test. The report also provides overall conclusions and recommendations that flow from the OT&E. The purpose of the ADAS/ALDARS project is to incorporate **lightning** data into the National Airspace System (NAS) via the Automated Surface Observation System (ASOS) AWOS One-Minute Observations (OMO) and the Aviation ...

**Analysis of Simulated Aircraft Lightning Strikes and Their Electromagnetic Effects** Feb 2001 28 pages

Authors: James M. Gruden; Lawrence C. Walko; Daniel L. Schweickart; John C. Horwath; Gary L. Webb; AIR FORCE RESEARCH LAB WRIGHT-PATTERSON AFB OH PROPULSION DIRECTORATE

Full Text

To survive the intense electromagnetic fields associated with a **lightning** strike, proper design of aircraft electrical control systems requires knowledge of the transient current pulse associated with a **lightning** strike. This report summarizes in-house testing of low-level (less than 20 kA) current pulses on a 32-foot long aluminum

cylinder simulating an aircraft fuselage. The test circuit consists of a capacitor bank, the aluminum cylinder and a coaxial return ...

**Thunder and Lightning: Desert Storm and the Airpower Debates, Volume 2** Apr 1995 229 pages

Authors: Edward C. Mann III; AIR UNIV PRESS MAXWELL AFB AL

Full Text

At 0200 local time on the morning of 17 January 1991, airmen from all military services and 10 nations became the "thunder and **lightning**" of Operation Desert Storm, the multinational military offensive sanctioned by the United Nations to liberate Kuwait from the domination of Iraqi dictator Saddam Hussein. ... will continue to spawn numerous histories, anthologies, and analyses. Few, however, will be as focused and useful to airmen as "Thunder and **Lightning**: Desert Storm and the Airpower Debates." A small team of military analysts, working at Air University's College of Aerospace Doctrine, Research ...

**LIGHTNING PROTECTION OF BURIED CABLE BY SEMI-CONDUCTING JACKETS** Dec 1965 21 pages

Authors: H. D. Campbell; NORTHERN ELECTRIC CO LTD MONTREAL (QUEBEC)

Full Text

Semi-conducting jackets on buried telephone cable will be subjected to heavy surge currents caused by local **lightning** strokes to ground. The impulse current strength of a semi-conducting polyethylene compound, having a nominal resistivity of 20 ohm-cm, is measured and the effects of some environmental factors assessed. It is concluded that the probability of surge current rupture of the cable jacket in service is very small except when direct strokes to the cable occur.

**Oxidation of Nitrogen and Ball Lightning,** Jun 6, 1973 11 pages

Authors: V. L. Martynov; FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Full Text

It is proposed that such a self-sustaining combustion of nitrogen occurs in ball **lightning**.

**Lightning Injury with Survival in Five Patients** Jan 11, 1985 3 pages

Authors: B. W. Amy; W. F. McManus; C. W. Goodwin Jr.; B. A. Pruitt Jr; ARMY INST OF SURGICAL RESEARCH FORT SAMHOUSTON TX

Full Text

Of a total of 4,153 admissions, five patients with lightning- associated injuries were admitted to a burn center during a 15-year period, 1969 through 1983. In these patients, the burned portion of the total body surface ranged from 3% to 29% (average, 16%), and all survived. The associated injuries and complications in these lightning-strike victims and a review of treatment guidelines are presented. ANNOTATION: Reprint: **Lightning** Injury with Survival in five Patients.

**Electromagnetic Environmental Criteria for US Army Missile Systems: EMC (Electromagnetic Compatibility), EMR (Electromagnetic Radiation), EMI (electromagnetic Interference), EMP (Electromagnetic Pulse), ESD (Electro Static Discharge), and Lightning** Jan 1985 59 pages

Authors: Charles D. Ponds; ARMY MISSILE COMMAND REDSTONE ARSENAL AL TEST AND EVALUATION DIRECTORATE

Full Text

This report presents the design and test requirements in developing an electromagnetic compatibility missile system. Environmental levels are presented for electromagnetic radiation hazards, electromagnetic radiation operational electrostatic discharge, **lightning**, and electromagnetic pulse (nuclear). Testing techniques and facility capabilities are presented for research and development testing of missile systems. (Author)

**Electromagnetic Environmental Criteria for U.S. Army Missile Systems: EMC (Electromagnetic Compatibility), EMR (Electromagnetic Radiation), EMI (electromagnetic Interference), EMP (Electromagnetic Pulse), ESD (Electrostatic Discharge), and Lightning** Feb 1987 62 pages

Authors: Mark Kilpatrick; Charles D. Ponds; ARMY MISSILE COMMAND REDSTONE ARSENAL AL TEST AND EVALUATION DIRECTORATE

Full Text

This report presents the design and test requirements in developing an electromagnetic compatibility missile system. Environmental levels are presented for electromagnetic radiation hazards, electromagnetic radiation operational electrostatic discharge, **lightning**, and electromagnetic pulse (nuclear). Testing techniques and facility capabilities are presented for research and development testing of missile systems. (Author).

**The Initiation of Lightning and the Growth of Electric Fields in Thunderstorms** Dec 1992 90 pages

Authors: John Latham; UNIVERSITY OF MANCHESTER INST OF SCIENCE AND TECHNOLOGY (UNITED KINGDOM) DEPT OF PURE AND APPLIED PHYSICS

Full Text

As specified in the original proposal, there exits mounting evidence that the growth of strong electric fields - culminating in **lightning** - in the great majority of thunderstorms is intimately linked with - and probably contingent upon - the concomitant development of the ice-phase. Thus, significant progress in the elucidation of electrification mechanisms requires an improved understanding of the complex set of processes involved in cloud glaciation. Accordingly, primary emphasis has been devoted in this first year of a proposed 3-year study, to the analysis and interpretation of data ...

**Location and Characterization of In-Cloud Lightning Currents by Multiple Station VHF and Electric Fields Measurements** Dec 14, 1992 6 pages

Authors: Ewen M. Thomson; FLORIDA UNIV GAINESVILLE DEPT OF ELECTRICAL ENGINEERING

Full Text

... Center was enhanced in 1992. New microprocessor-controlled remote controls were developed, additional remote calibration signals were added, and new sensor amplifiers were implemented so that we could record the derivative of the electric field, dE/dt. These improvements enabled us to increase our bandwidth from 3.5 MHz to 7 MHz and to record sharper signals (dE/dt) that allow better location accuracy. During the week of August 17-25 several days worth of storms formed over our network and provided excellent data on close **lightning**. Meteorological data were also obtained for these storms.

**Long Arc Lightning Simulator** May 17, 1996 18 pages

Authors: S. J. Frazier; Mike Whitaker; NAVAL AIR WARFARE CENTER AIRCRAFT DIV PATUXENT RIVER MD

Full Text

The Long Arc **Lightning** Simulator is part of the Electromagnetic Transient T&E Facility (EMTEF), located at Patuxent River, Md. The Long Arc development was part of the Navy's improvement and modernization program. The Long Arc Simulator is operated by the EM Transient's Branch of the E3 division and is part of the DOD Major Range Test Facility Base System. This presentation will introduce the availability of this simulator to the DOD and commercial customer.

**A Study of the Characteristics of Thunderstorm Cessation at the NASA kennedy Space Center** Jul 10, 1997 103 pages

Authors: Michael S. Hinson; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH

Full Text

... C temperature heights were associated with cloud to ground (CG) **lightning** strike locations from the National ... A pattern was observed for the spatial distribution of CG **lightning**. An inland maximum in ground flash density ... time during the day, the diurnal distribution of **lightning** flashes showed that the afternoon (2000 UTC) ... time of maximum **lightning** activity. From a time history of radar echoes, it was found that a 45 dBZ ... height, may be a good indicator of the end of **lightning** activity. The observed lag times between ... signature and the end of all CG **lightning** flashes was 30 min for all three ...

**A Comparative Analysis of Total Lighting Observations and Cloud-to-CloudLighting Observations in the Southeastern United States Region** Oct 27, 1998 97 pages

Authors: Keith M. Hugo; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH

Full Text

... data collected by the Optical Transient Detector (OTD) satellite and the National **Lightning** Detection Network (NLDN). The feasibility of using total **lightning** flash data, both ... (IC) and cloud-to-ground (CG), collected from the OTD satellite in conjunction with CG **lightning** flashes detected by the NLDN was demonstrated. The IC and CG **lightning** flashes were determined for the period from 1 August 1995 to 31 July 1996. The percentage positive, mean ... multiplicity, positive mean peak current, and negative mean peak current of the CG **lightning** was determined and compared to the IC **lightning**.

**Three Flights Into Thunderstorms with the Revised Rocket Electric Field Sounding (REFS) Payload** Aug 10, 1993 149 pages

Authors: J. C. Willett; D. C. Curtis; G. Y. Jumper; W. F. Thorn; PHILLIPS LAB HANSCOM AFB MA

Full Text

... than 8OkV/m and electrostatic potential magnitudes over 120 MV were encountered inside the storms. The average field driving one natural cloud-to-ground **lightning** flash was estimated at 30 kV/m or less. Grounded triggering rockets were launched immediately after each sounding rocket, but no **lightning** was triggered, suggesting that ambient fields of 10 kV/m over the lowest 500 m were not sufficient to trigger **lightning** with the rocket-and-wire technique. **Lightning**, Field mills, Triggered **lightning**, Rocket, Electric fields.

**First Stroke Peak Current Characteristics for the United States** Oct 6, 1999 290 pages

Authors: Gary Russell Huffines; TEXAS A AND M UNIV COLLEGE STATION

Full Text

... stroke peak currents of over 105 million cloud to ground **lightning** flashes from 1995-1998 were analyzed over the continental Unites ... current variations including latitudinal dependence, sensor separation in the National **Lightning** Detection Network, flash density variations, the percentage of ... and that the peak currents are dependent on the length of the **lightning** channel. Negative **lightning** demonstrated an inverse relationship between peak currents ... up the only contribution to peak current differences. The length of the **lightning** channel appears to have some influence on the strength ...

**Multiparameter Radar and Aircraft Based Studies of the Micro-Physical, Kinematic and Electrical Structure of Convective Clouds** Feb 14, 1993 15 pages

Authors: V. N. Bringi; I. J. Caylor; COLORADO STATE UNIV FORT COLLINS DEPT OF ELECTRICAL ENGINEERING

Full Text

... , NCAR King Air and Wyoming King Air are in the process of being analyzed for particle type, electric field from field mills and up/down draft. Surface field mills and LLP data give an indication of first cloud-to- ground **lightning** time and location. Another on-going study is related to multiparameter radar studies of **lightning** echoes and a triggered **lightning** event.... Radar, Electrical, Storms, **Lightning**.

**A Numerical Study of Thunderstorm Electrification** Jan 4, 1994 3 pages

Authors: Marcia B. Baker; UNIV OF WASHINGTON SEATTLE

Full Text

... thunderstorm electrification depends on the time during which strong updrafts remain within the charging zone. Second, a simple numerical **lightning** model representing streamer propagation on a 2-D grid was developed. Realistic streamer paths evolve in the model and the ... CG strokes are directly related to updraft velocity. Third,

a simple cloud model was utilized to investigate factors influencing **lightning** frequency and its relationship to precipitation. **Lightning** and **lightning** frequency are shown to heavily depend on the depth of the charging region which is sensitive to vertical velocity.

**Descriptive and Conditional Climatology for Specific Launch Commit Criteria for Cape Canaveral, Florida** Mar 2000 111 pages

Authors: Edward C. Goetz; AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH SCHOOL OF ENGINEERING

Full Text

In 1987, an unmanned Atlas-Centaur-67 launched from the Cape triggered a **lightning** discharge that disabled the on-board guidance system and Range Control destroyed the ... This incident spurred the review and revision of the natural and triggered **lightning** launch commit criteria (LCC). The LCC are a set of eleven ... either a descriptive or conditional climatology for many of the LCC. This thesis addresses the **lightning** and the cumulus LCC. A descriptive climatology for both the **lightning** and the cumulus LCC is presented for the 1989 to 1998 period Additionally, the climate of the Cape is divided ...

**AASERT97 Student Support for Observations Relevant to Sprites and Jets** May 2000 5 pages

Authors: William H. Beasley; OKLAHOMA UNIV NORMAN

Full Text

... were launched into thunderstorms to observe changes in the vertical component of electric field caused by **lightning**. Data from two flights have been compared with data from the National **Lightning** Detection Network (NLDN) for cloud-to ground **lightning** flashes that were coincident in time. The field changes observed at altitude appear to have been caused by ... detector (PDD) aboard the FORTE satellite over the continental United States and classified as **lightning** were associated with flashes detected by the NLDN. About 50-70% of PDD events with estimated peak ...

**Discharge of Electrically Charged Clouds** Oct 26, 1992 29 pages

Authors: Jean-Claude Diels; Xin M. Zhao; Chao-Yuen Yeh; Cai Y. Wang; NEW MEXICO UNIV ALBUQUERQUE DEPT OF PHYSICS AND ASTRONOMY

Full Text

In a one year program, we have established a new mechanism for triggering **lightning** using low energy (less than 1 mJ) ultrashort (subpicosecond) pulses. A pre-ionized 'needle-shaped' path is created by three to four photon ionization of oxygen or applied field results in a local enhancement of the field, ... , at pressure of 1/7 atm. This result and the theory indicate that less than 1 mJ in less than 1 ps duration pulses at 248nm should induce the discharge at atmospheric pressure. A fs laser oscillator-amplifier has been assembled to perform such tests.... **Lightning**, Laser, Triggered **lightning**.

**NoiseProp: A Dynamic 60 kHz to 30 MHz Atmospheric Radio Noise Model** Mar 1996 60 pages

Authors: Ronald M. Bloom; David M. Crandall; Chris R. Warber; PACIFIC-SIERRA RESEARCH CORP SANTA MONICA CA

Full Text

... conceptually similar to the PSR longwave noise model LNP, released in 1991. Global distributions of **lightning** activity divided into seasonal and diurnal maps are used to determine a set of elemental noise transmitters. The power radiated by each transmitter is proportional to the **lightning** flash rate at that location and to an empirically determined energy spectrum (which varies roughly as ... additionally describes methods developed which will certain up-to-date and forecasted weather data to be converted to **lightning** activity (flash rate) maps. In this way, the NoiseProp model can be made to ...

**Balloon-Borne Electric-Field Observations Relevant to Models for Spritesand Jets** Sep 27, 1999 9 pages

Authors: William H. Beasley; OKLAHOMA UNIV NORMAN

Full Text

... electric-field-change instrument and launched five of them into thunderstorms to observe changes in the vertical component of electric field caused by **lightning**. We discuss examples of field changes observed at altitude and compare them with data from the National **Lightning** Detection Network (NLDN) for cloud-to-ground **lightning** flashes that were coincident in time. It appears that the field changes may have been caused by charge movements relatively near the instruments as compared with the ground-strike ...

**SURVEY OF KUGELBLITZ THEORIES FOR ELECTROMAGNETIC INCENDIARIES** Dec 1965 92 pages

Authors: W. B. Lyttle; C. E. Wilson; MELPAR FALLS CHURCH VA

Full Text

The purpose of this study was to review the theory and experimental data on ball **lightning**, to compare the existing theory and experimental data to determine whether ball **lightning** has possibility potential as an incendiary weapon. The results of the literature study are reviewed in detail. Three major categories were established to classify theories on the subject. (1) Classical plasma theory, (2) Quantum plasma theory, and (3) Non-plasma theory. ...

**HOW LIGHTNING KILLS. (THE MECHANISM OF DEATH BY LIGHTNING) (MECANISME DE LA MORT PAR LA FOUDRE).** Aug 29, 1967 2 pages

Authors: C. Iranyi; J. Iranyi; E. Somogyi; B. Orovecz; NAVAL MEDICAL SCHOOL BETHESDA MD TRANSLATION SERVICE

Full Text

The authors performed systematic examinations of 300 cases of trauma by electricity. Mortality was 30 percent. The age of fatal victims ranged between 1 and 83 years. The proportion of the male and female sex was 64:25; 66 of the victims were struck in the open air and 21 inside of a building.

**Cross Spectral Analysis of Acoustic Signals** Mar 1978 105 pages

Authors: Allan L. Gutjahr; Charles R. Holmes; NEW MEXICO INST OF MINING AND TECHNOLOGY SOCORRO RESEARCH AND DEVELOPMENT DIV

Full Text

This report presents a detailed analytical treatment of a cross- spectral technique for the use of the acoustic signals of thunder for **lightning** location. The report also contains application of this technique to location of C-4 and Prima-Cord explosive shots and to **lightning** location.

**Radar Observations of the Effects of Changing Electric Fields on the Orientations of Hydrometeors** May 14, 1992 36 pages

Authors: James I. Metcalf; PHILLIPS LAB HANSCOM AFB MA

Full Text

... right and left circular polarization. Observations of electrified storms on nine days during the spring and summer of 1991 revealed several occurrences of **lightning** that coincided with significant changes of the circular depolarization ratio (CDR), the cross- correlation, or the phase of the cross-covariance of the two received ... up to 2 dB in CDR, 50% in cross-correlation, and 40 deg in phase were observed. However, many occurrences of **lightning** observed by radar were not accompanied by detectable changes of hydrometeor orientations, and there were no observations of the cyclical changes of ...

**The Air Force Interactive Meteorological System: A Research Tool for Satellite Meteorology** Dec 2, 1992 92 pages

Authors: Charles F. Ivaldi Jr.; Gary B. Gustafson; Joseph Doherty; ATMOSPHERIC AND ENVIRONMENTAL RESEARCH INC CAMBRIDGE MA

Full Text

... handling and manipulation. This foundation is composed of four functional areas: (1) access to meteorological data sources including: direct broadcast NOAA, DMSP, and GOES satellite data; global surface and upper air reports from the NWS Family of Services; and **lightning** data from the SUNY-Albany **lightning** detection network, (2) data visualization and processing that employs both 8-bit and 24-bit full color imaging workstations, and (3) interactive development, data analysis, and batch processing capabilities supported by mid- range performance minicomputers. This report includes a historical ...

**Remote Sensing of Precipitation and Electrification with a Dual-Polarization, Coherent, Wideband Radar System** Jul 10, 1993 31 pages

Authors: Paul Krehbiel; Grant Gray; NEW MEXICO INST OF MINING AND TECHNOLOGY SOCORRO GEOPHYSICAL RESEARCH CENTER

Full Text

... gathering independently and in conjunction with the CaPE program. Using the cross-polar correlation magnitude and phase displays as a guide, it was possible to accurately predict the outset of electrification and attendant **lightning** discharges, and to determine when a storm would no longer produce **lightning**. Several publications documenting the effect are included. A patent on the cross- polar correlation technique is being sought.

**Radar Studies of Aviation Hazards** May 31, 1994 94 pages

Authors: F. I. Harris; Ralph S. Donaldson Jr.; David J. Smalley; Shu-Lin Tung; HUGHES STX CORP LEXINGTON MA

Full Text

... and of synoptic scale baroclinic fronts. One aspect that was examined is the detection and quantization of the weak echo region usually seen in severe convective storms. Another has been the search for **lightning** precursors. Finally, considerable effort has been expended on the automated depiction of the wind and precipitation structure associated with baroclinic fronts. Doppler weather radar, Automated techniques, Front detection, Gradient computation, Severe storm structure, **Lightning** precursors.

**Changes in Measured Lightning Return Stroke Peak Current After the 1994 National Lightning Detection Network Upgrade** Apr 18, 1997 154 pages

Authors: Robert S. Wacker; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH

Full Text

Please enter abstract from pages 2,3. System failed to scan properly.

**Graduate Research Training on a Dual-Polarization Meteorological Radar Project** Jan 7, 1997 3 pages

Authors: Paul Krehbiel; NEW MEXICO INST OF MINING AND TECHNOLOGY SOCORRO

Full Text

... how precipitation initially forms in the relatively cold, dry storms of the desert southwest. Other research findings include analysis of the New Mexico Institute of Mining and Technology's **Lightning** Interferometer observations of intracloud **lightning** with storm structure. Intracloud discharges in small New Mexico storms were observed to transfer negative charge upward from the storm precipitation core to the upper part of the thunderstorm. This ...

**Users Manual for the Federal Aviation Administration Research and Development Electromagnetic Database (FRED) for Windows** Feb 1998 73 pages

Authors: Rosemarie L. McDowall; GALAXY SCIENTIFIC CORP EGG HARBOR TOWNSHIP NJ

Full Text

... Electromagnetic Database (FRED). Instructions are provided on how to access FRED from a compact disk (CD) and how to access the entire set of waveforms. The **lightning** strike waveforms have been collected from various FAA tests (which have been stored on the Idaho National Engineering & Environmental Laboratory (INEEL) computers) and can be accessed via the Internet or dial-up modem. The **lightning** strike data contained in FRED are described, including how the data were acquired and processed for entry into FRED. Troubleshooting information is also provided ...

Total Results: **190** Pages: Previous **[1]** 2 Next Results per page: 100