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Lightning Tests



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#### [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](#)

... this program was protection of these new structures from hazardous **lightning** effects. The program began with a survey of advance-technology materials and fabrication ... future designs. Sub- element specimens were subjected to simulated **lightning** voltages and currents. Measurements of bond line voltages, electrical ... and basic structural configurations. The second phase of the program involved **tests** upon full scale wing structures which contained integral ... new technology structures and fuel systems. The purpose of these **tests** was to provide a comparison between full scale structural measurements and ...

**Full Text**

#### [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](#)

**Lightning** strike susceptibility **tests** were conducted on AIM-9 missile forward sections to evaluate possible interface problems were the ... High voltage attachment, streamering and high current arc **tests** were performed using the specialized test facilities and instrumentation of ... 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 ... 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 ...

**Full Text**

#### [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 ... noted over the mountains. The eastern edge of the Appalachian **lightning** suppression is determined to be a result of faster propagation of ... of high median peak currents. Statistical **tests** on flash density means show that the Appalachian 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 the ...

**Full Text**

#### [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](#)

... both air and ground operations Forecasting CG **lightning** is a necessary and extremely important requirement for Air ... requested a forecast tool capable of predicting CG **lightning** within a 25 and 10 nautical mile radius ... indices and surface data at 12-hour intervals with CG **lightning** data occurring within the next 12 hours to ... were examined using contingency tables and verification **tests** to determine the value of the products created. The straight forward ... an excellent forecast method for determining the occurrence of CG **lightning**. Therefore, the results are recommended to the 15th Operational Weather ...

**Full Text**

#### [Impulse Flashover Tests at Edgar Beauchamp High Voltage Test Facility, Dixon, California, in Support of Cutler Insulator Failure Investigation](#)

Jul 2006 42 pages

Authors: [P. M. Hansen](#); [G. Dann](#); [SPACE AND NAVAL WARFARE SYSTEMS CENTER SAN DIEGO CA](#)

This report describes an investigation into safety core insulator failures at Naval Radio Transmitting Station, Cutler, Maine. The failures are believed to be the result of **lightning** strikes to the antenna. Impulse **tests** showed that flashover occurred along the surface of the insulator when the voltage rises very fast (high dV/dt), resulting in damage to the insulators. Scale model **tests** were conducted to determine if different corona ring configurations could keep flashover away from the insulator body. Results ...

**Full Text**

#### [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](#)

... of 225 V/m. The electric-field soundings passed several self- consistency **tests** and were corroborated by

measurements from the surface and from both tethered and ... 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 ...

[Full Text](#)

#### [F/A-18 Replacement Umbilical Qualification Testing](#)

Mar 24, 2000 30 pages

Authors: [Susan Jahan](#); [Greg Miller](#); [NAVAL AIR WARFARE CENTER AIRCRAFT DIV PATUXENT RIVER MD](#)

This report discusses the F/A-18 umbilical qualification testing. Topics discussed are the qualification test program, **lightning** test requirement, **lightning** zone and test parameters, pass/fair criteria, captive carriage **tests**, static pull **tests**, and ejection **tests**.

[Full Text](#)

#### [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](#)

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 ... 248nm, 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**.

[Full Text](#)

#### [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](#)

... (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 ...

[Full Text](#)

#### [The Effects of High Intensity Electrical Currents on Advanced Composite Materials.](#)

Mar 21, 1972 148 pages

Authors: [A. P. Penton](#); [J. L. Perry](#); [K. J. Lloyd](#); [PHILCO-FORD CORP NEWPORT BEACH CALIF AERONUTRONIC DIV](#)

... electric current flow of such magnitude and waveform as might result from **lightning** strikes, and to characterize the resulting degradation in advanced composites and ... electrical, physical, chemical, microstructure, and mechanical analyses and **tests** were performed to permit modeling of electrical current flow processes and damage mechanisms. The laboratory analyses and **tests** performed included photomicrographic analysis, electron microprobe, scanning electron microscope, X-ray diffraction, tensile **tests**, and physical property measurements. The electrical properties measured included resistivity, ...

[Full Text](#)

#### [Minutes of the Explosives Safety Seminar \(23rd\) Held at Atlanta, Georgia on 9-11 August 1988. Volume 2](#)

Aug 1988 1195 pages

Authors: [DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD ALEXANDRIA VA](#)

... Chemical Agent Disposal System; Sympathetic Detonation Testing; Blast Loads - External/Internal; Structural Response **Tests** - Walls/Doors/Valves; Underground Explosion Effects - External Airblast; Explosives Shipping - Transportation Safety and Port Licensing; Explosives Safety Management; Underground Explosion Effects - Model **Tests** and Soil/Rock Effects; Chemical Risk and Protection of Workers; Full-Scale Explosives Storage Test ... Analysis Prediction; Hazard Classification; Test Cell and Explosion Containment Designs; Protective Construction Design; and **Lightning** and Static Electricity. (aw)

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#### [Digital C4I Interoperability: The EM Protection Issue](#)

Oct 2000 12 pages

Authors: [Robert Pfeffer](#); [ARMY NUCLEAR AND CHEMICAL AGENCY FORT BELVOIR VA](#)

... self-induced electromagnetic interference (EMI), EM radiation (EMR), electrostatic discharge (ESD), near-strike **lightning**, and high-altitude EM pulse (HEMP) came from MIL-STD-464 and several commercial standards ... to meet international standards reduce to simple, low-cost shield and penetration protection **tests** that can be conducted anywhere, even with the system operating. The application of this protection ... in the original system circuit design significantly reduces the number of breadboard and brassboard **tests**. Such protection also allows component replacement within the barrier, once the new ...

[Full Text](#)

#### [Equipment Test Methods for Externally Produced Electromagnetic Transients. Issue 2](#)

Jul 1987 35 pages

Authors: [R. A. Hobbs](#); [ROYAL AIRCRAFT ESTABLISHMENT FARNBOROUGH \(ENGLAND\)](#)

This memorandum assesses the effect of electromagnetic pulse and **lightning** strike produced transients to aircraft systems. It details suitable **tests** for the simulation of these effects and should be used to form the basis of any future aircraft project transient specifications.

[Full Text](#)

#### [Minutes of the Explosives Safety Seminar \(24th\) Held in St. Louis, Missouri on 28-30 August 1990. Volume 2](#)

Aug 30, 1990 1331 pages

Authors: [DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD ALEXANDRIA VA](#)

Session topics covered in this volume include: Klotz Club underground testing; Liquid explosion hazards; Explosion propagation **tests**; Explosion hazards reduction; **Lightning** protection; Accidents; Explosion

[Full Text](#) containment; Unexploded ordnance clearance; Debris hazards; Site plans and surveys; Explosives manufacturing considerations; Space vehicle explosive hazards; Concrete response testing; Far-field airblast effects; Fragment hazards.

[Development and Testing of the F/A-18 Replacement MIL-STD-I760 Umbilical](#)

Jul 1997 12 pages

Authors: [Susan Jahn](#); [Greg Miller](#); [NAVAL AIR WARFARE CENTER AIRCRAFT DIV PATUXENT RIVER MD](#)

[Full Text](#) ... at least 25.30 releases. NAWCAD patuxent River 4.11.2 developed a testing approach for qualification of the umbilical and to credibly assess service performance potential without specific airborne release **tests**. The qualification effort is discussed from an overall perspective as well as details of the **lightning** testing of the connector, static and ejection testing, and captive flight testing of the cable.

[Development and Testing of the F/A-18 Replacement MIL-STD-1760 Umbilical](#)

1998 12 pages

Authors: [Susan Jahn](#); [Greg Miller](#); [NAVAL AIR WARFARE CENTER AIRCRAFT DIV PATUXENT RIVER MD](#)

[Full Text](#) ... releases. NAWCAD (4. 11.2) developed a testing approach for qualification of the umbilical and to credibly assess service performance potential without specific airborne release **tests**. The qualification effort 5 discussed from an overall perspective as well as details of the **lightning** testing of the connector, static, and ejection testing, and captive flight testing of the cable. A short summary of post. certification efforts involving the umbilical ...

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