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Visual Contrast Detection Thresholds for Aircraft Contrails Jul 1994 55 pages

Authors: Jeffrey A. Doyal; David P. Ramer; Michael D. Stratton; Bradley D. Purvis; SCIENCE APPLICATIONS INTERNATIONAL CORP DAYTON OH

Full Text

Twenty licensed pilots participated in a laboratory investigation of visual detection thresholds for simulated aircraft **contrails**. Subjects searched a projection screen for simulated **contrails** while maintaining a prescribed flight profile on a simple flight simulator. Simulated **contrails** varied in width from 5 arc min of visual angle to 25 arc min, and varied in ... lower detection thresholds. Psychometric functions were drawn that allow the reader to extrapolate the probability of detection associated with **contrails** of a given size and contrast.

Improved Prediction and Characterization of Contrails and Optically-ThinCirrus Feb 22, 1999 103 pages

Authors: Andrew J. Heymsfield; Larry Miloshevich; NATIONAL CENTER FOR ATMOSPHERIC RESEARCH BOULDER CO

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... and numerical modeling techniques. The five categories of research covered in this report are: (1) Improving Vaisala RS80-A radiosonde relative humidity measurements; (2) Vertical distribution of cirrus microphysical and optical properties; (3) Relative humidity conditions for the formation of cirrus and **contrails**; (4) Variability of cirrus microphysical properties; and (5) Improved theory of contrail formation Research findings in each of these five categories resulted in at least one publication whose full or partial sponsorship by the AFOSR was acknowledged. The journal publications ...

An Examination of the Hanson Contrail Forecast Algorithm Under Low Relative Humidity Conditions Mar 1997 117 pages

Authors: Robert P. Asbury III; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH

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Accurate forecasts of contrail occurrence are essential to military aircrews. Although classical forecast methods have been reasonably successful predicting **contrails**, there is need for improvement at low ambient relative humidity. This thesis examines the performance of the Hanson method, which was ... and occurrence data were then statistically analyzed to gauge each method's performance. All methods detected roughly 75 percent of observed **contrails** under moist atmospheric conditions. However, the Hanson method's performance decreased when drier atmospheric observations were tested. Schumann's ...

PREDICTION OF AIRCRAFT CONDENSATION TRAILS PROJECT CONTRAILS Oct 31, 1961 28 pages

Authors: James E. Jiusto; CORNELL AERONAUTICAL LAB INC BUFFALO NY

Full Text

The report contains results of theoretical and experimental studies regarding the prediction, formation, and detection of aircraft condensation trails.

Persian Gulf Contrail Altitude Limits Jun 1991 51 pages

Authors: Gregory J. Reding; AIR FORCE ENVIRONMENTAL TECHNICAL APPLICATIONS CENTER SCOTT AFB IL

Full Text

... of a computer program (DNCONTRL) that determines the mean and extreme upper and lower limits for conditions that favor condensation trail formation over a given upper-air reporting station. Output of the DNCONTRL program is provided in tabular form for 19 stations in the Persian gulf region, not only as upper and lower altitudes for the formation of **contrails**, but as monthly percent occurrence frequency (POF) for favorable contrail formation at specified altitudes. These results were compared with an earlier, similar, study for the entire northern hemisphere and found to be consistent.

New Techniques for Contrail Forecasting Aug 1993 37 pages

Authors: Jeffrey L. Peters; AIR WEATHER SERVICE SCOTT AFB IL

Full Text

... was performed by the SAC Directorate of Weather (SAC/DOW). It describes the development of new contrail forecast algorithms for several types of engines used in high-flying aircraft. It also provides contrail forecasting rules that correlate synoptic- scale upward vertical motion with contrail formation. The results indicate significant improvement in contrail forecasting accuracy over the Appleman technique now in use at the Air Force Global Weather Central. Weather, Climatology, Clouds, Cirrus, Clouds, Forecasting, Algorithms, Condensations trails, **Contrails**, Exhaust trails, Vapor trails.

Modeling Single Scattering and Radiative Properties of Cirrus Clouds Sep 1998 11 pages

Authors: Michael I. Mishchenko; STATE UNIV OF NEW YORK AT STONY BROOK

Full Text

... of GO completely ignoring physical optics effects and must be convolved with the Fraunhofer pattern, thereby producing a phase function component with an angular profile similar to the standard diffraction component. Third, we have used the improved T-matrix methodto compute the linear depolarization ration for polydispersions of randomly oriented ice spheroids, circular cylinders, and Chebyshev particles with sizes typical of young **contrails**. We have shown that ice crystals with effective radiias small as several tenths of a micron can already produce 3 exceeding 0.5 at visible wavelengths.

Investigation of Properties of High Level Cirrus Clouds and their Importance for Satellite and Aircraft Operations Dec 29, 1999 10 pages

Authors: John Hallett; NEVADA UNIV RENO DESERT RESEARCH INST

Full Text

... permanent record as a plastic cast. New analysis tools have also been developed for analysis of the results, displaying particle forms, concentration and spatial distribution in high resolution. Test results have been obtained in hurricane outflow, in arctic clouds and in aircraft **contrails**. Application lies in determining the optical properties of such clouds from the viewpoint of their influence on laser propagation and transfer of atmospheric radiation; it also lies in characterizing clouds in terms of their potential for enhanced aircraft icing when specific spatial distributions of ...

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