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(1) Dissertations Defended in the Scientific Council of the Institute of Physics of the Earth
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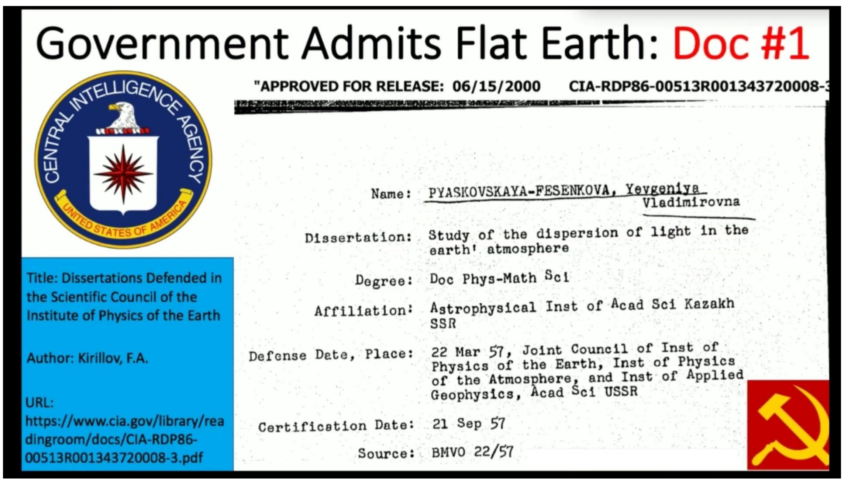
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Title: Dissertations Defended in the Scientific Council of the Institute of Physics of the Earth

Author: Kirillov, F.A.

URL: https://www.cia.gov/library/readingroom/docs/CIA-RDP86-00513R001343720008-3.pdf

Name: PYASKOVSKAYA-FESENKOVA, Yevgeniya Vladimirovna

Dissertation: Study of the dispersion of light in the earth' atmosphere

Degree: Doc Phys-Math Sci

Affiliation: Astrophysical Inst of Acad Sci Kazakh SSR

Defense Date, Place: 22 Mar 57, Joint Council of Inst of Physics of the Earth, Inst of Physics of the Atmosphere, and Inst of Applied Geophysics, Acad Sci USSR

Certification Date: 21 Sep 57

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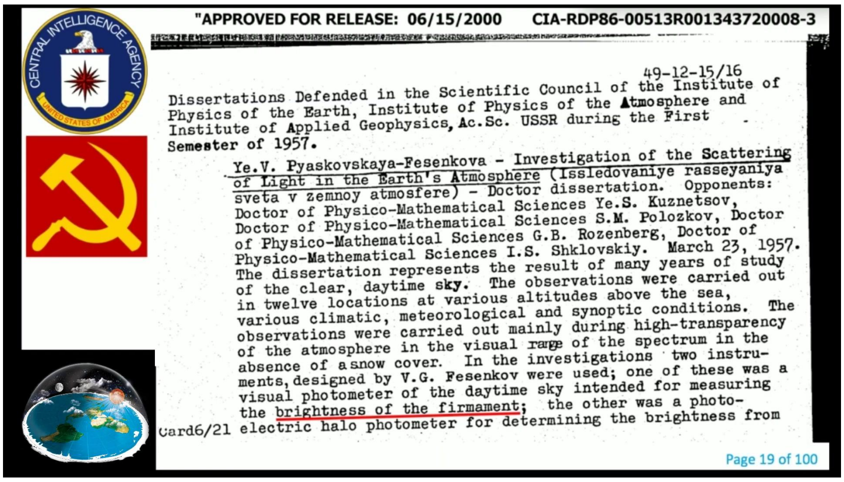
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49-12-15/16

Dissertations Defended in the Scientific Council of the Institute of Physics of the Earth, Institute of Physics of the Atmosphere and Institute of Applied Geophysics, Ac.Sc. USSR during the First Semester of 1957.

Ye.V. Pyaskovskaya-Fesenkova - Investigation of the Scattering of Light in the Earth's Atmosphere (Issledovaniye rasseyaniya sveta v zemnoy atmosfere) - Doctor dissertation. Opponents: Doctor of Physico-Mathematical Sciences Ye.S. Kuznetsov, Doctor of Physico-Mathematical Sciences S.M. Polozkov, Doctor of Physico-Mathematical Sciences G.B. Rozenberg, Doctor of Physico-Mathematical Sciences I.S. Shklovskiy. March 23, 1957. The dissertation represents the result of many years of study of the clear, daytime sky. The observations were carried out in twelve locations at various altitudes above the sea, various climatic, meteorological and synoptic conditions. The observations were carried out mainly during high-transparency of the atmosphere in the visual range of the spectrum in the absence of a snow cover. In the investigations two instruments, designed by V.G. Fesenkov were used; one of these was a visual photometer of the daytime sky intended for measuring the brightness of the firmament; the other was a photo-electric halo photometer for determining the brightness from

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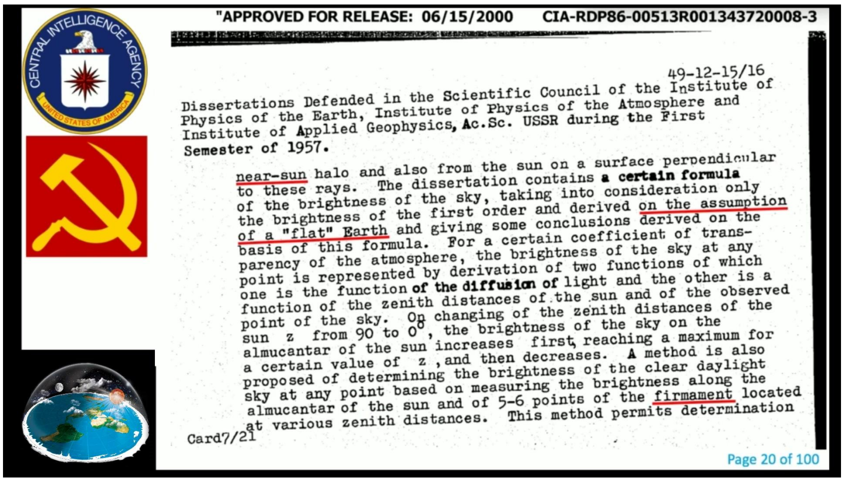
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49-12-15/16

Dissertations Defended in the Scientific Council of the Institute of Physics of the Earth, Institute of Physics of the Atmosphere and Institute of Applied Geophysics, Ac.Sc. USSR during the First Semester of 1957.

near-sun halo and also from the sun on a surface perpendicular to these rays. The dissertation contains **a certain formula** of the brightness of the sky, taking into consideration only the brightness of the first order and derived on the assumption of a "flat" Earth and giving some conclusions derived on the basis of this formula. For a certain coefficient of transparency of the atmosphere, the brightness of the sky at any point is represented by derivation of two functions of which one is the function **of the diffusion of** light and the other is a function of the zenith distances of the sun and of the observed point of the sky. On changing of the zenith distances of the sun z from 90 to 0°, the brightness of the sky on the almucantar of the sun increases first, reaching a maximum for a certain value of z, and then decreases. A method is also proposed of determining the brightness of the clear daylight sky at any point based on measuring the brightness along the almucantar of the sun and of 5-6 points of the firmament located at various zenith distances. This method permits determination

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(2) Propagation of Electromagnetic Fields Over Flat Earth

Pages: Cover Page, 7, 17, 18, 28, 35

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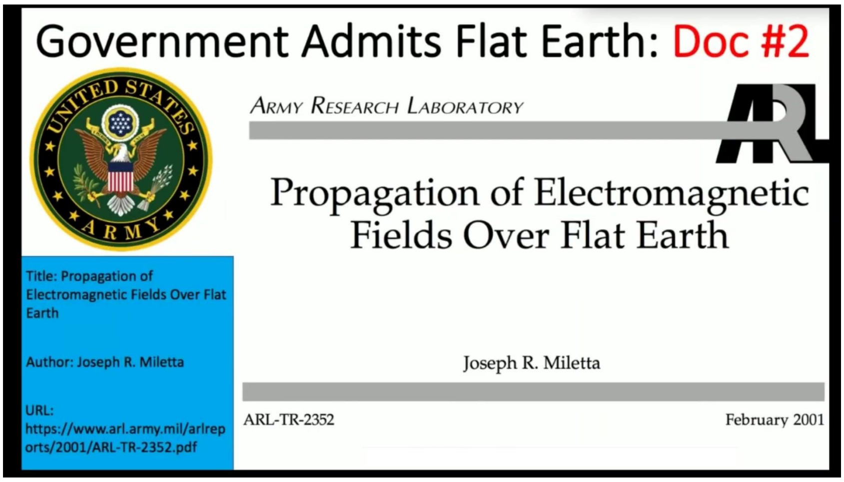
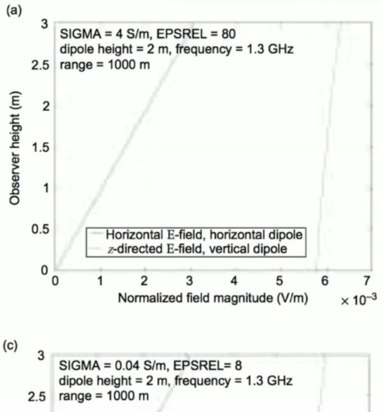


1. Introduction

Effective military or law-enforcement applications of high-power microwave (HPM) systems in which the HPM system and the target system are on or near the ground or water require that the microwave power density on target be maximized. The power density at the target for a given source will depend on the destructive and constructive scattering of the fields as they propagate to the target. Antenna design for an HPM system includes addressing the following questions about field polarization: Should the fields the transmitting antenna produces be vertically, horizontally, or circularly polarized? Which polarization maximizes the power density on target? (The question of which polarization best couples to the target is beyond the scope of this report.) While this report does not completely answer these questions, it addresses the interaction of the radiated electromagnetic fields with earth ground. It is assumed that the transmitting antenna and the target (or receiver) are located above, but near the surface of a flat idealized earth (constant permittivity, ε, and conductivity, σ) ground. First an ideal vertical dipole (oriented along the z-axis perpendicular to the ground plane) is addressed. The horizontal dipole (parallel to the ground plane) follows.

Figure 6. Comparison of principal fields from an ideal dipole oriented perpendicular and horizontal to a homogeneous flat earth. In each case, dipole is placed 2 m above ground plane and observer or target is 1000 m down range: (a) sea water, (b) wet earth, (c) dry earth, (d) lake water, and (e) dry sand.



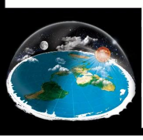
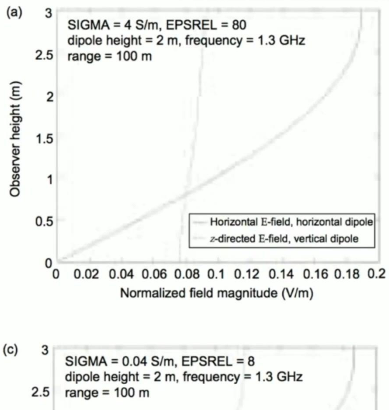
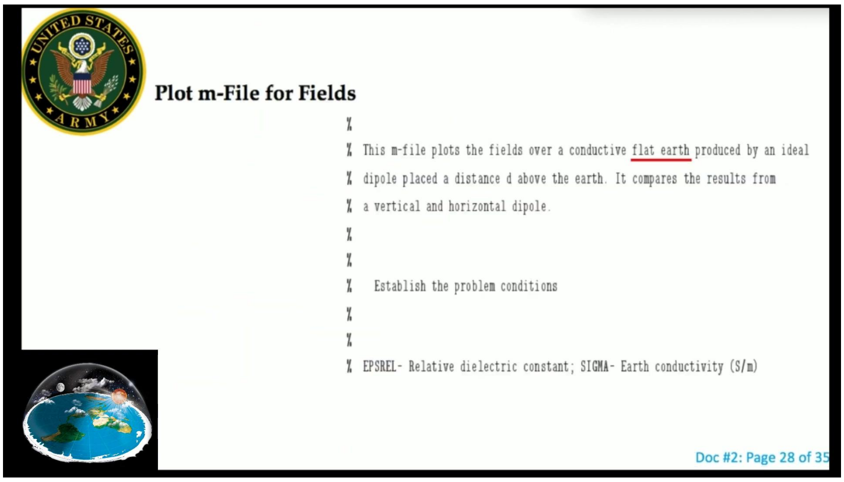
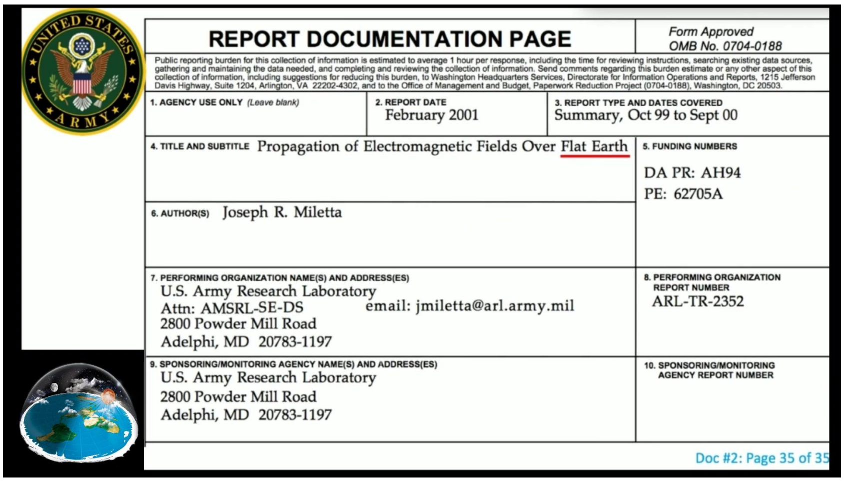


Figure 7. Comparison of principal fields from an ideal dipole oriented perpendicular and horizontal to a homogeneous flat earth. In each case, dipole is placed 2 m above ground plane and observer or target is 100 m down range: (a) sea water, (b) wet earth, (c) dry earth, (d) lake water, and (e) dry sand.



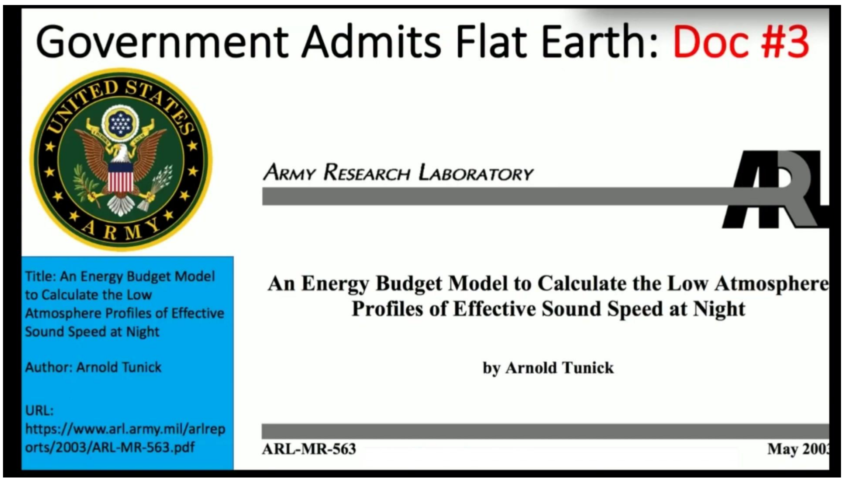


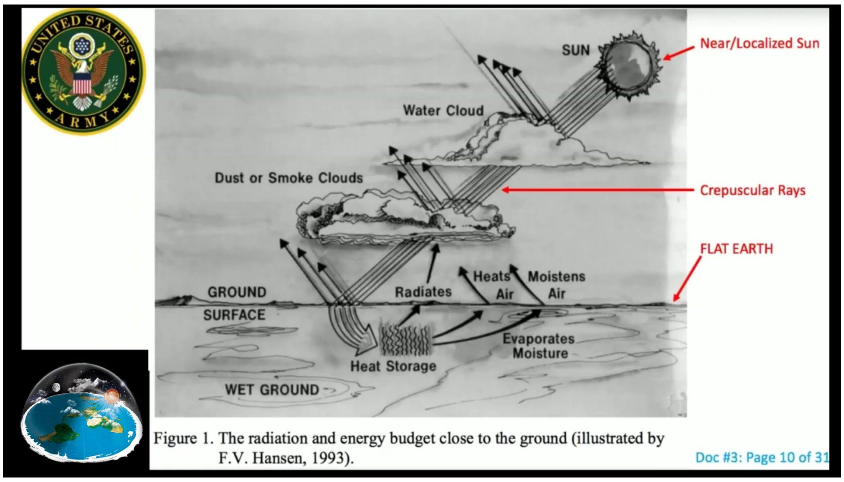


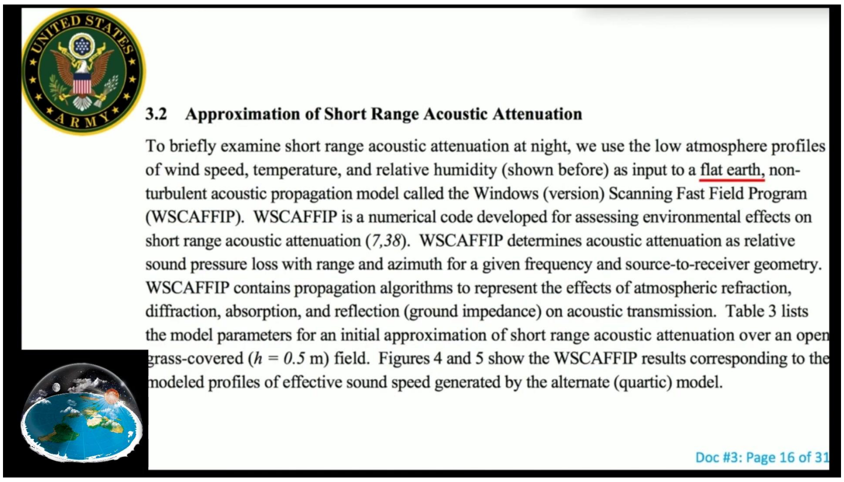
(3) An Energy Budget Model to Calculate the Low Atmosphere Profiles of Effective Sound Speed at Night

Pages: Cover Page, 10, 16

https://www.arl.army.mil/arlreports/2003/ARL-MR-563.pdf





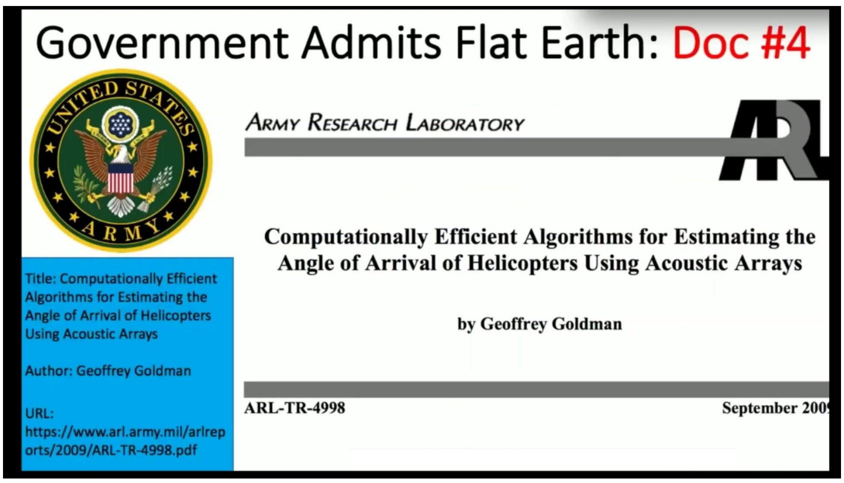

3.2 Approximation of Short Range Acoustic Attenuation

To briefly examine short range acoustic attenuation at night, we use the low atmosphere profiles of wind speed, temperature, and relative humidity (shown before) as input to a flat earth, non-turbulent acoustic propagation model called the Windows (version) Scanning Fast Field Program (WSCAFFIP). WSCAFFIP is a numerical code developed for assessing environmental effects on short range acoustic attenuation (*7,38*). WSCAFFIP determines acoustic attenuation as relative sound pressure loss with range and azimuth for a given frequency and source-to-receiver geometry. WSCAFFIP contains propagation algorithms to represent the effects of atmospheric refraction, diffraction, absorption, and reflection (ground impedance) on acoustic transmission. Table 3 lists the model parameters for an initial approximation of short range acoustic attenuation over an open grass-covered (h = *0.5* m) field. Figures 4 and 5 show the WSCAFFIP results corresponding to the modeled profiles of effective sound speed generated by the alternate (quartic) model.

(4) Computationally Efficient Algorithms for Estimating the Angle of Arrival of Helicopters Using Acoustic Arrays

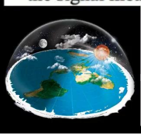
Pages: Cover Page, 17, 30, 31, 35

https://www.arl.army.mil/arlreports/2009/ARL-TR-4998.pdf



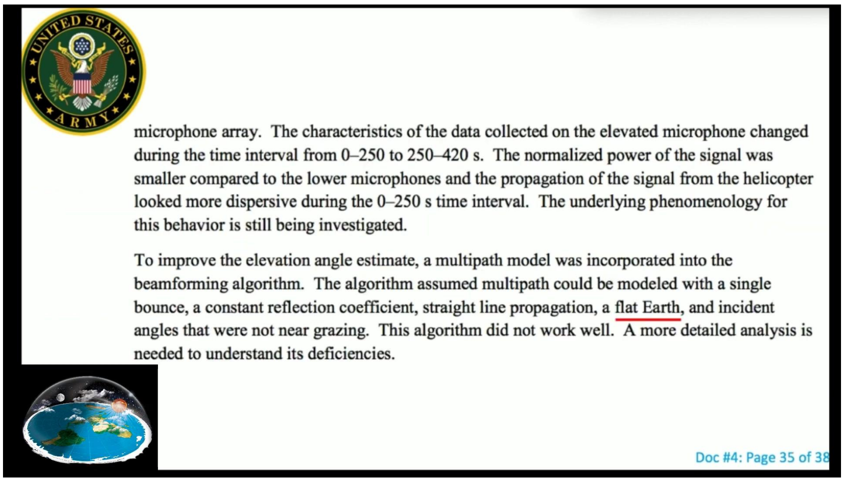
3.3 Multipath Model

Figure 6 illustrates a simple model for multipath, which is a based upon the signal having a single bounce on a flat Earth with propagation that is described by ray tracing for signals in the far-field. The microphone is at a height H above the ground, and a complex reflection coefficient that is potentially frequency dependent is given by $\rho(\omega)$, which can be approximated using empirical data. The signal propagating along the direct and indirect path sum to generate the signal measured at the microphone.



and letting the phase vary from −180° to 180°. The phase that produced the match was selected. The results are shown in figure 17 for a single spectral peak for frequencies between 21–27 Hz for a reflection coefficient with an amplitude of 1. The results based upon harmonics at higher frequencies were almost random and were not included. The results for frequencies below 27 Hz are reasonably consistent, but not close to the anticipated result of a reflection coefficient phase of 0°. The estimated phases of the reflection coefficients have a dependency on range. This may be caused by a violation of the assumption of the flat Earth model.

The beamforming algorithm with multipath algorithm was rerun using the average of the computed reflection coefficient for two spectral peaks between 9 to 27 Hz. This is a more realistic simulation compared to the previous calculations. The results are shown in figure 19. These results are poor at all times and indicate that the model used to describe the propagation of the signal is not adequate. The assumptions of straight-line propagation, constant reflection coefficient, or reflection off a flat Earth may not be valid.



(5) Adding Liquid Payloads Effects to the 6-DOF Trajectory of Spinning Projectiles
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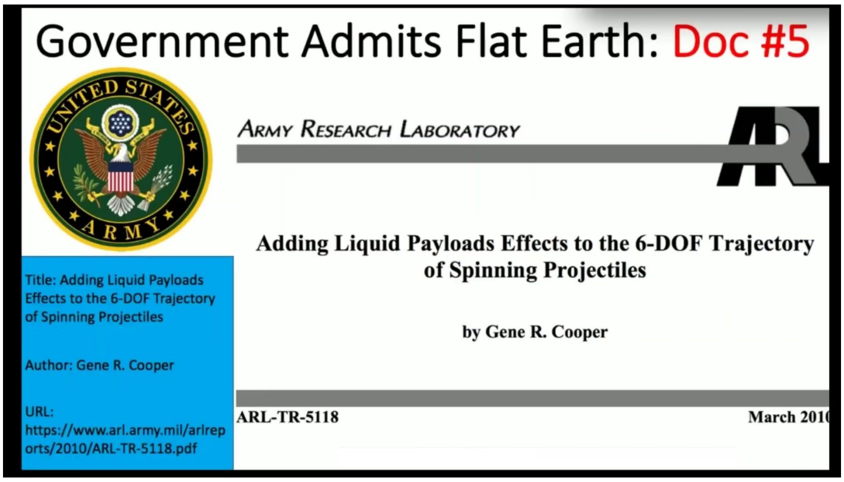

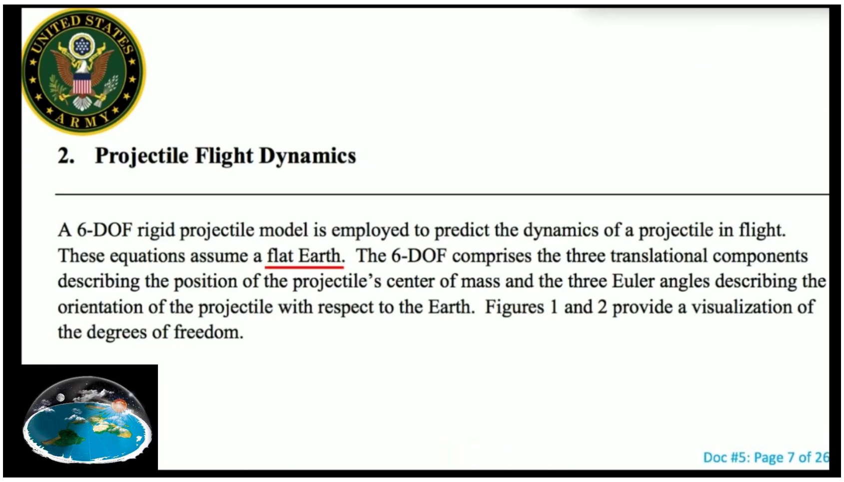

(6) Trajectory Prediction of Spin-Stabilized Projectiles With a Steady Liquid Payload
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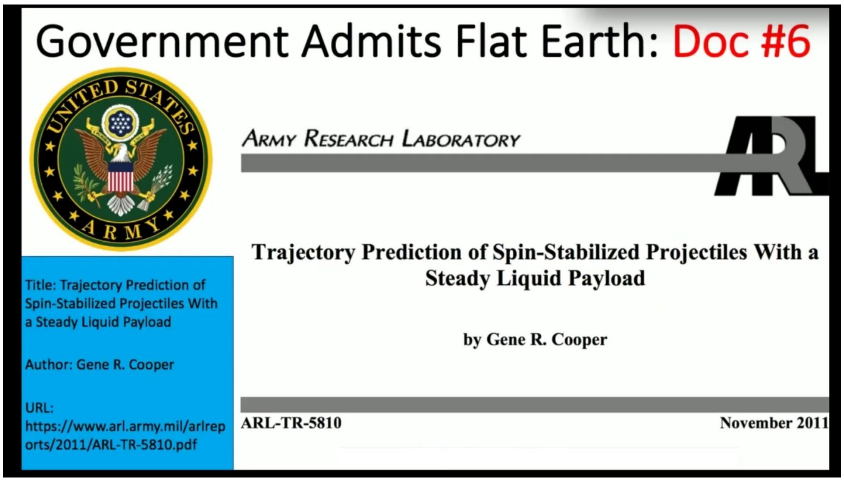

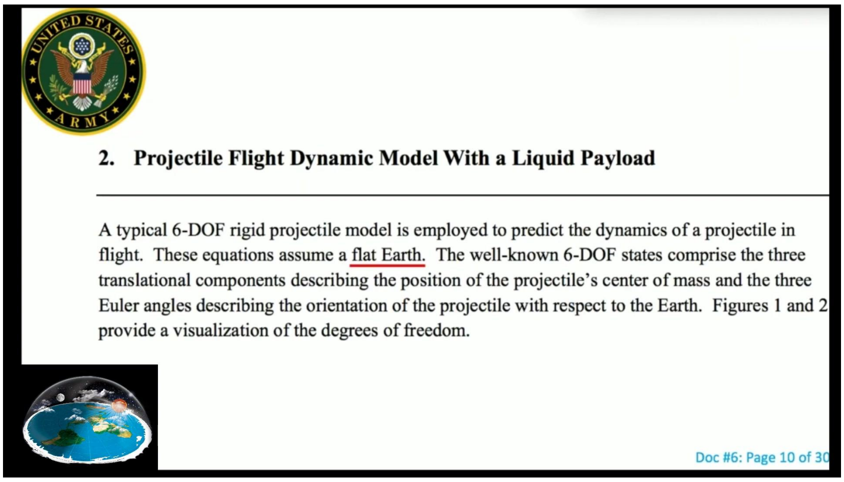

(7) Derivation and Definition of a Linear Aircraft Model

Pages: Cover Page, 6, 35, 55, 102

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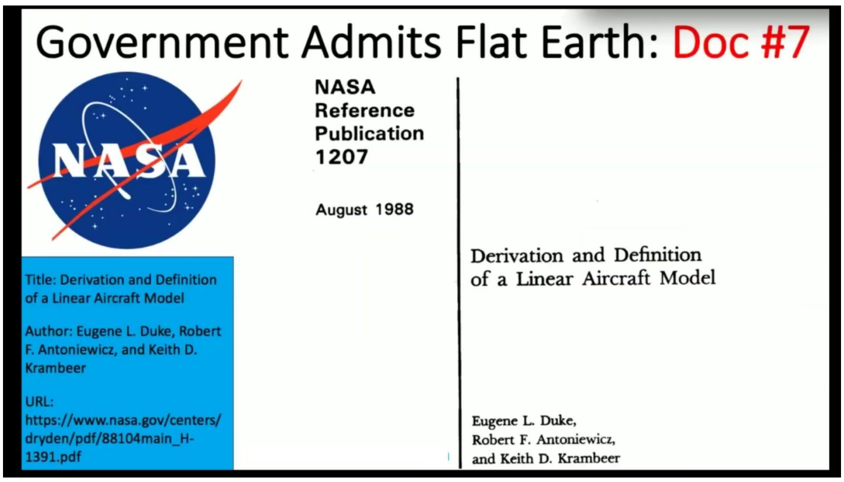

INTRODUCTION

The need for linear models of aircraft for the analysis of vehicle dynamics and control law design is well known. These models are widely used, not only for computer applications but also for quick approximations and desk calculations. Whereas the use of these models is well understood and well documented, their derivation is not. The lack of documentation and, occasionally, understanding of the derivation of linear models is a hindrance to communication, training, and application.

This report details the development of the linear model of a rigid aircraft of constant mass, flying over a flat, nonrotating earth. This model consists of a state equation and an observation (or measurement) equation. The system equations have been broadly formulated to accommodate a wide variety of applications. The linear state equation is derived from the nonlinear six-degree-of-freedom equations of motion. The linear observation equation is derived from a collection of nonlinear equations representing state variables, time derivatives of state variables, control inputs, and flightpath, air data, and other parameters. The linear model is developed about a nominal trajectory that is general.

Whereas it is common to assume symmetric aerodynamics and mass distribution, or a straight and level trajectory, or both (Clancy, 1975; Dommasch and others, 1967; Etkin, 1972; McRuer and others, 1973; Northrop Aircraft, 1952; Thelander, 1965), these assumptions limit the generality of the linear model. The principal contribution of this report is a solution of the general problem of deriving a linear model of a rigid aircraft without making these simplifying assumptions. By defining the initial conditions (of the nominal trajectory) for straight and level flight and setting the asymmetric aerodynamic and inertia terms to zero, one can easily obtain the more traditional linear models from the linear model derived in this report.

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3 CONCLUDING REMARKS

This report derives and defines a set of linearized system matrices for a rigid aircraft of constant mass, flying in a stationary atmosphere over a flat, nonrotating earth. Both generalized and standard linear system equations are derived from nonlinear six-degree-of-freedom equations of motion and a large collection of nonlinear observation (measurement) equations.

This derivation of a linear model is general and makes no assumptions on either the reference (nominal) trajectory about which the model is linearized or the symmetry of the vehicle mass and aerodynamic properties.

Ames Research Center
Dryden Flight Research Facility
National Aeronautics and Space Administration
Edwards, California, January 8, 1987

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D.2 Evaluation of the Derivatives of the Time Derivatives of the State Variables

The generalized derivatives of the time derivatives of the state variables are defined in appendix C, equations (C-1) to (C-15). In this section, these generalized derivatives are evaluated in terms of the stability and control derivatives, primative terms, and the state, time derivative of state, and control variables. In this section, the notation $\partial(\dot{x}_i)/\partial x_i$ is used to represent the more correct notation $\partial f_i/\partial x_j$ that is employed in the discussion at the beginning of section 3. This notation is used because there is no convenient notation available to express these quantities clearly—particularly not the usual notation employed in flight mechanics texts such as Etkin (1972) and McRuer and others (1973). The notation that defines quantities such as $L_p = \partial(\dot{p})/\partial p$ and $M_q = \partial(\dot{q})/\partial q$ is misleading in this context because the definitions of those terms (such as L_p, M_q) are based on assumptions of symmetric mass distributions, symmetric aerodynamics, and straight and level flight, and additionally do not include derivatives with respect to atmospheric quantities.

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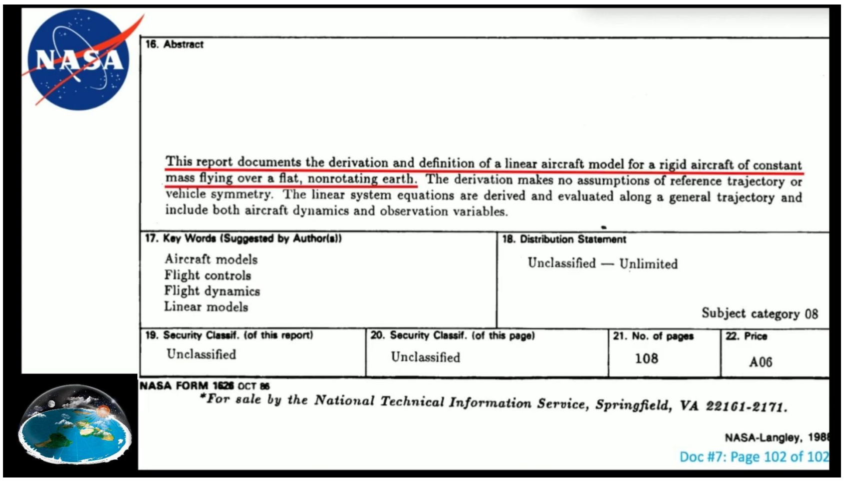

(8) General Equations of Motion for a Damaged Asymmetric Aircraft
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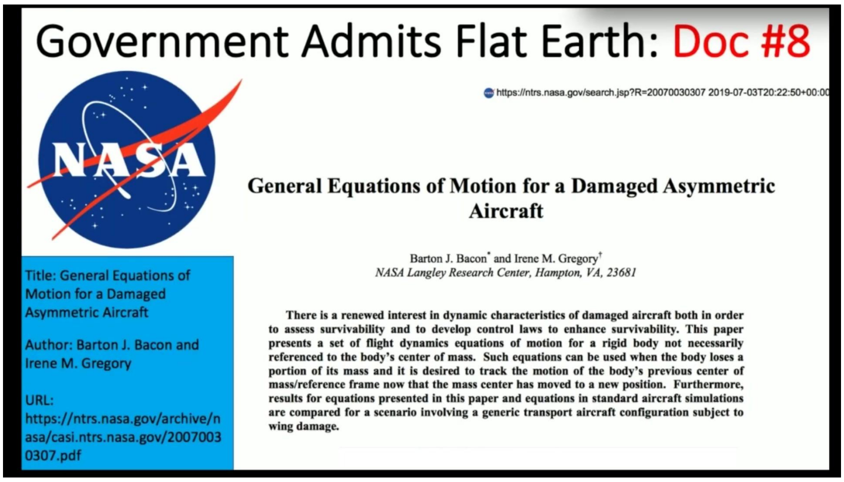

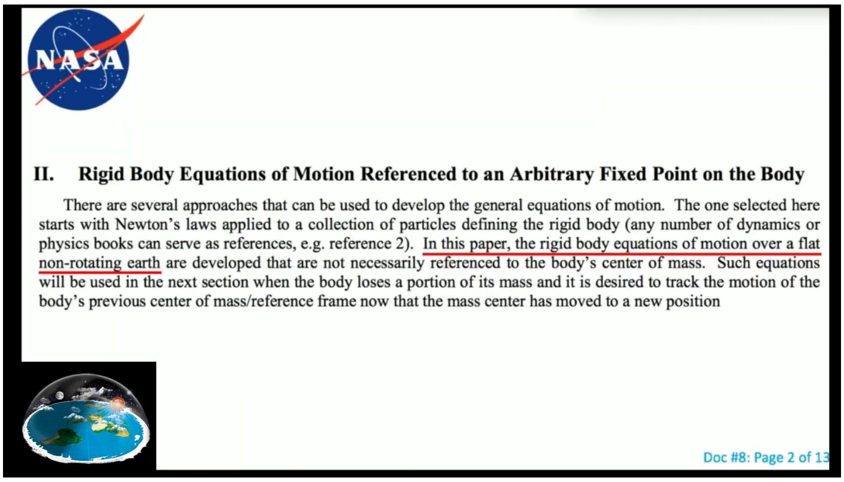

(9) Predicted Performance of a ThrustEnhanced SR-71 Aircraft with an External Payload
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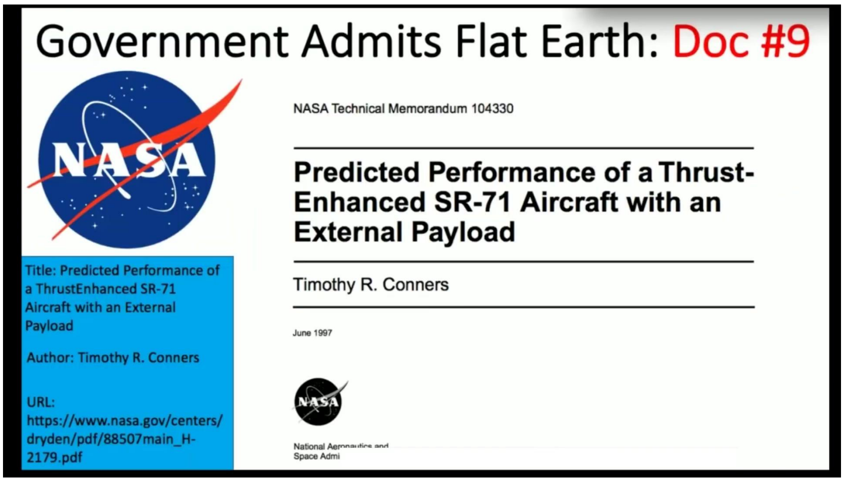

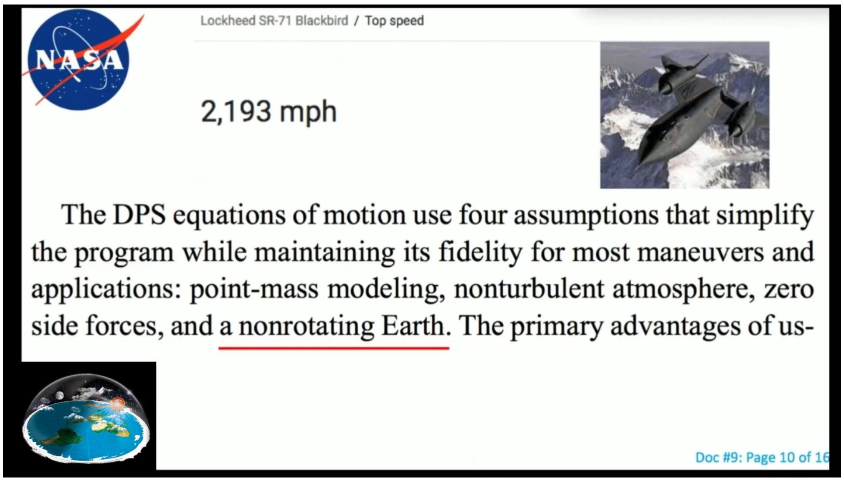

(10) Derivation of a Point-Mass Aircraft Model used for Fast-Time Simulation

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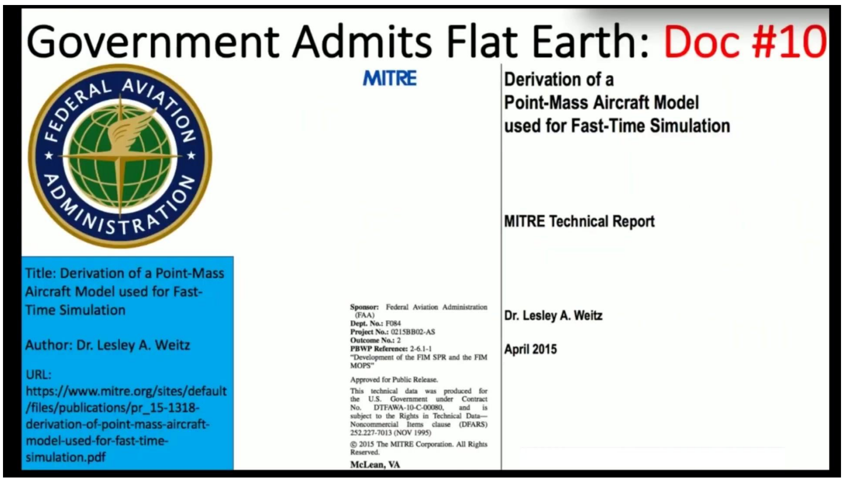

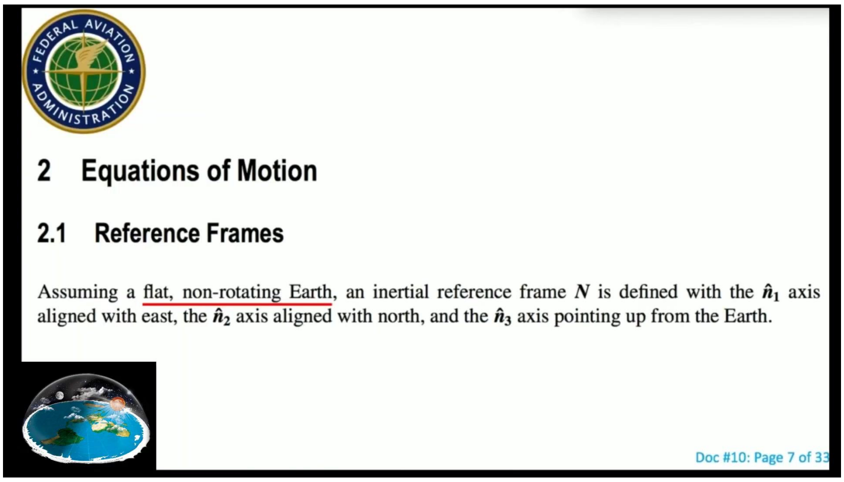

(11) A Method for Reducing The Sensitivity of Optimal Nonlinear Systems to Parameter Uncertainty

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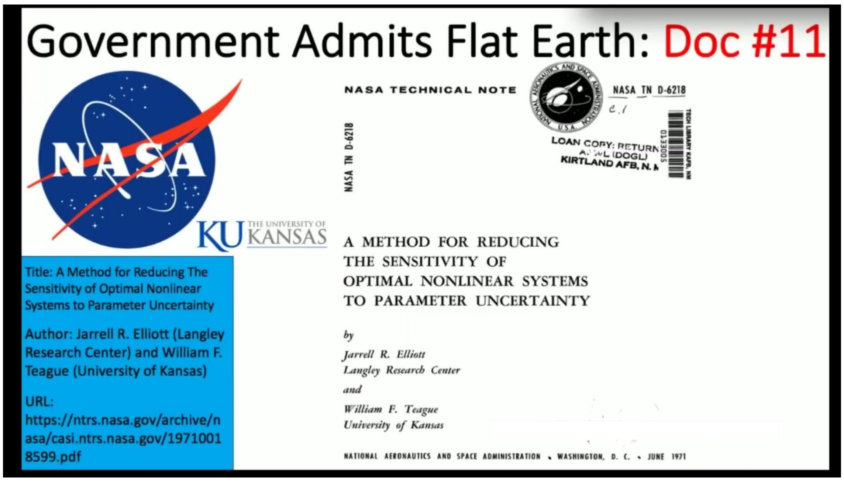

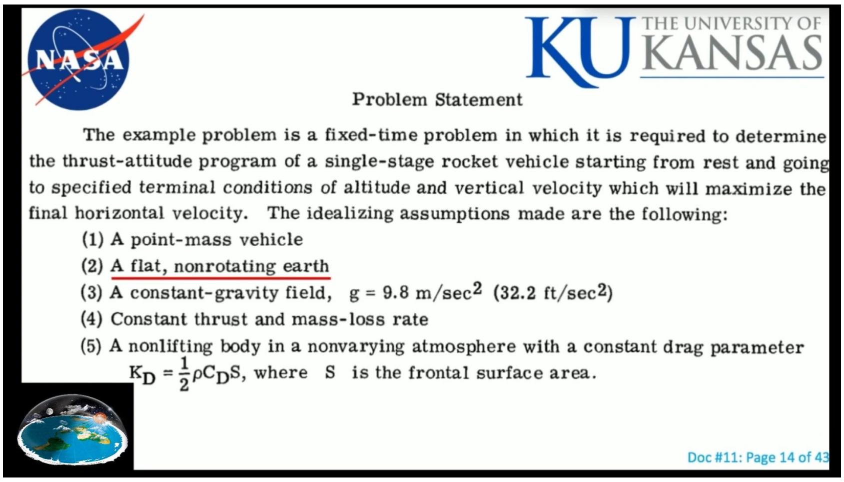

(12) Calculation of Wind Compensation for Launching of Unguided Rockets

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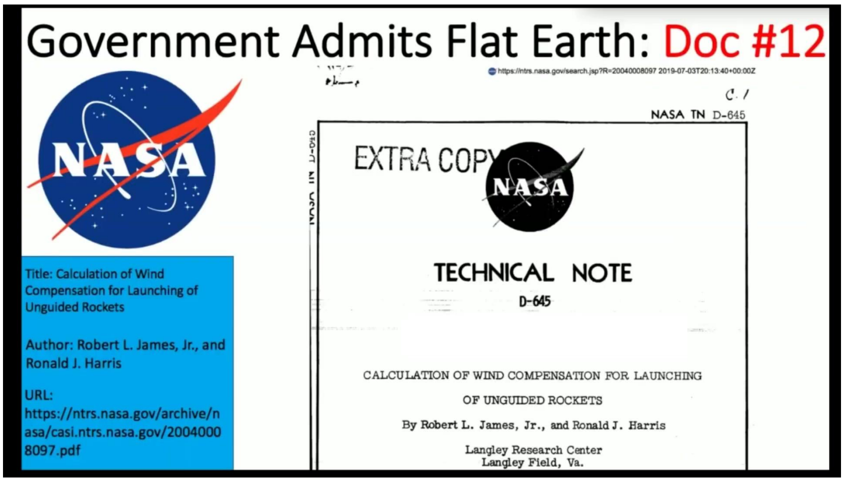

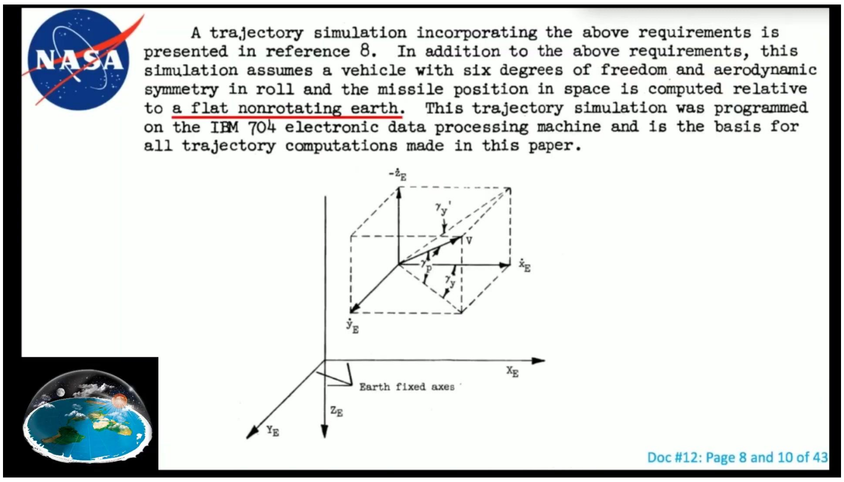

(13) User’s Manual for LINEAR, a FORTRAN Program to Derive Linear Aircraft Models (2768)

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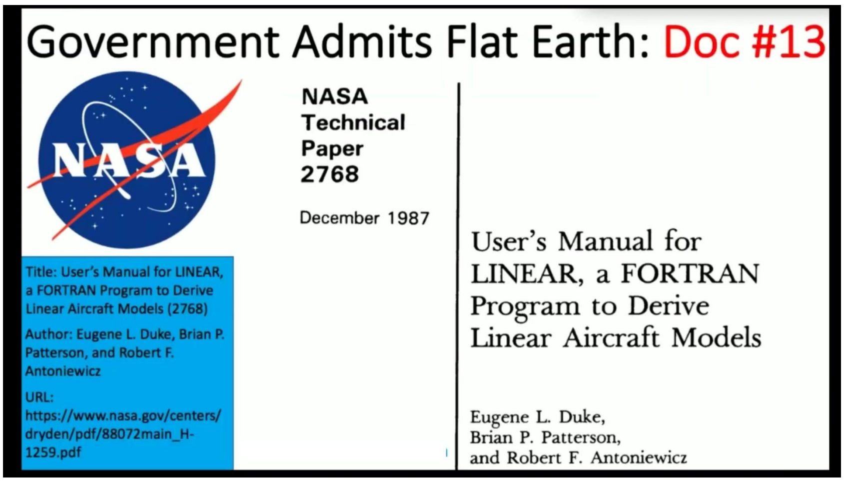

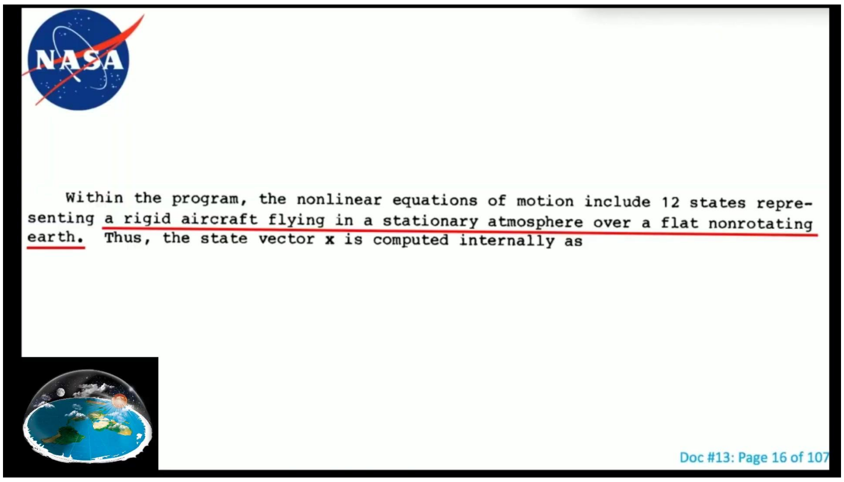

Within the program, the nonlinear equations of motion include 12 states representing a rigid aircraft flying in a stationary atmosphere over a flat nonrotating earth. Thus, the state vector **x** is computed internally as

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(14) User's Manual for LINEAR, a FORTRAN Program to Derive Linear Aircraft Models (2835)

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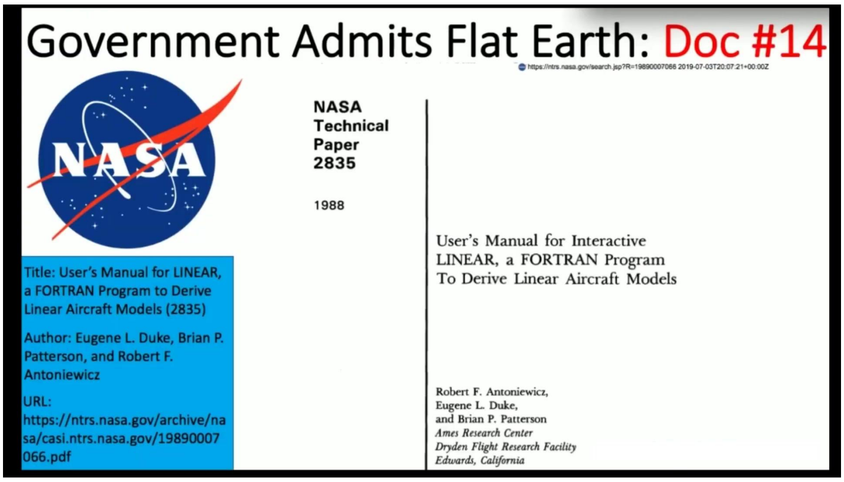


Government Admits Flat Earth: Doc #14

Title: User's Manual for LINEAR, a FORTRAN Program to Derive Linear Aircraft Models (2835)

Author: Eugene L. Duke, Brian P. Patterson, and Robert F. Antoniewicz

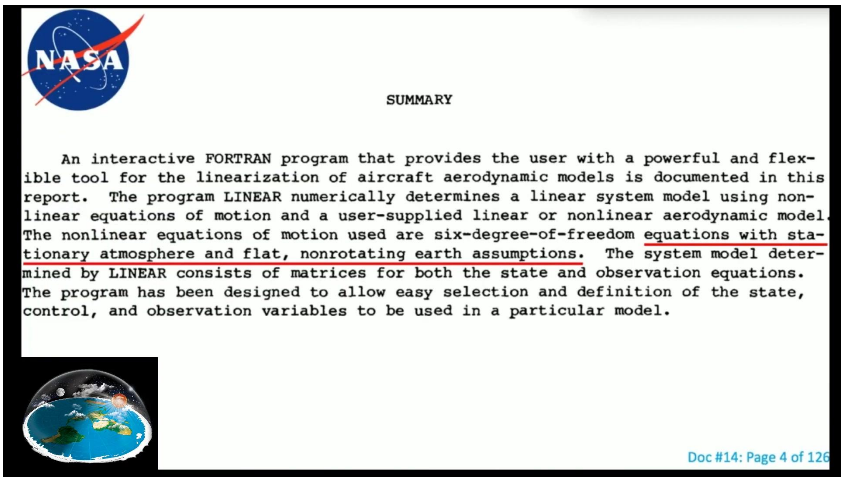
URL: https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/19890007066.pdf

NASA Technical Paper 2835

1988

User's Manual for Interactive LINEAR, a FORTRAN Program To Derive Linear Aircraft Models

Robert F. Antoniewicz,
Eugene L. Duke,
and Brian P. Patterson
Ames Research Center
Dryden Flight Research Facility
Edwards, California



SUMMARY

An interactive FORTRAN program that provides the user with a powerful and flexible tool for the linearization of aircraft aerodynamic models is documented in this report. The program LINEAR numerically determines a linear system model using nonlinear equations of motion and a user-supplied linear or nonlinear aerodynamic model. The nonlinear equations of motion used are six-degree-of-freedom equations with stationary atmosphere and flat, nonrotating earth assumptions. The system model determined by LINEAR consists of matrices for both the state and observation equations. The program has been designed to allow easy selection and definition of the state, control, and observation variables to be used in a particular model.

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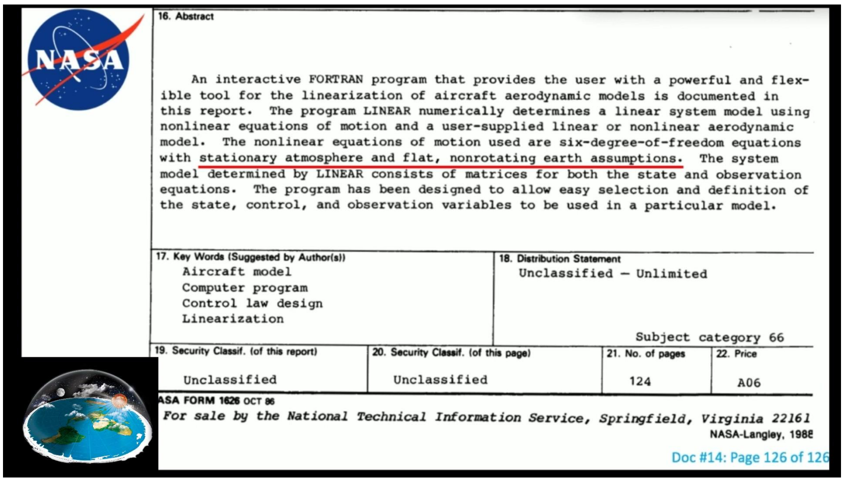

16. Abstract

An interactive FORTRAN program that provides the user with a powerful and flexible tool for the linearization of aircraft aerodynamic models is documented in this report. The program LINEAR numerically determines a linear system model using nonlinear equations of motion and a user-supplied linear or nonlinear aerodynamic model. The nonlinear equations of motion used are six-degree-of-freedom equations with stationary atmosphere and flat, nonrotating earth assumptions. The system model determined by LINEAR consists of matrices for both the state and observation equations. The program has been designed to allow easy selection and definition of the state, control, and observation variables to be used in a particular model.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
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Unclassified	Unclassified	124	A06

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(15) Determination of Angles of Attack and Sideslip from Radar Data and a Roll-Stablized Platform

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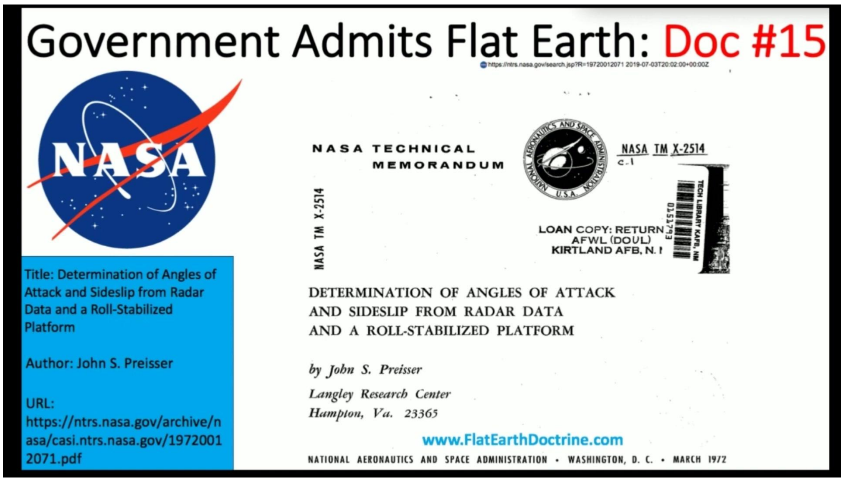

Government Admits Flat Earth: Doc #15

Title: Determination of Angles of Attack and Sideslip from Radar Data and a Roll-Stabilized Platform

Author: John S. Preisser

URL: https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/19720012071.pdf

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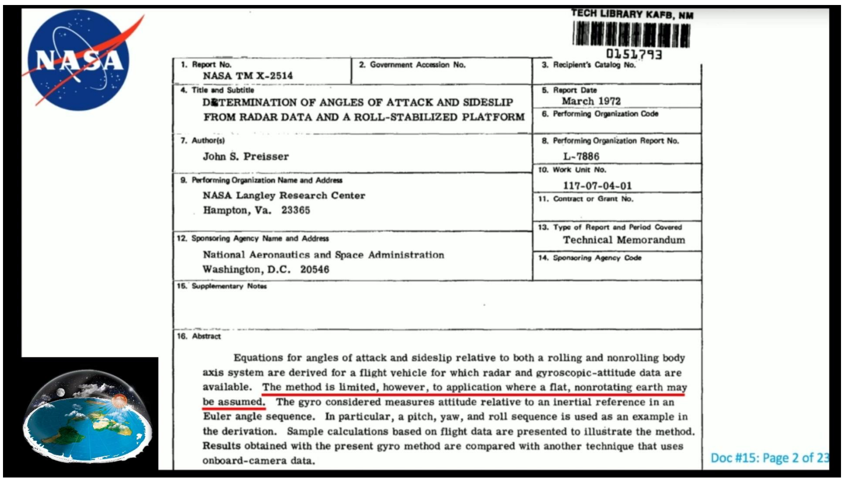
DETERMINATION OF ANGLES OF ATTACK AND SIDESLIP FROM RADAR DATA AND A ROLL-STABILIZED PLATFORM

by John S. Preisser

Langley Research Center
Hampton, Va. 23365

www.FlatEarthDoctrine.com

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION • WASHINGTON, D. C. • MARCH 1972



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4. Title and Subtitle DETERMINATION OF ANGLES OF ATTACK AND SIDESLIP FROM RADAR DATA AND A ROLL-STABILIZED PLATFORM		5. Report Date March 1972
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9. Performing Organization Name and Address NASA Langley Research Center Hampton, Va. 23365		10. Work Unit No. 117-07-04-01
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15. Supplementary Notes		

16. Abstract

Equations for angles of attack and sideslip relative to both a rolling and nonrolling body axis system are derived for a flight vehicle for which radar and gyroscopic-attitude data are available. The method is limited, however, to application where a flat, nonrotating earth may be assumed. The gyro considered measures attitude relative to an inertial reference in an Euler angle sequence. In particular, a pitch, yaw, and roll sequence is used as an example in the derivation. Sample calculations based on flight data are presented to illustrate the method. Results obtained with the present gyro method are compared with another technique that uses onboard-camera data.

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(16) U.S. Standard Atmosphere (1962)

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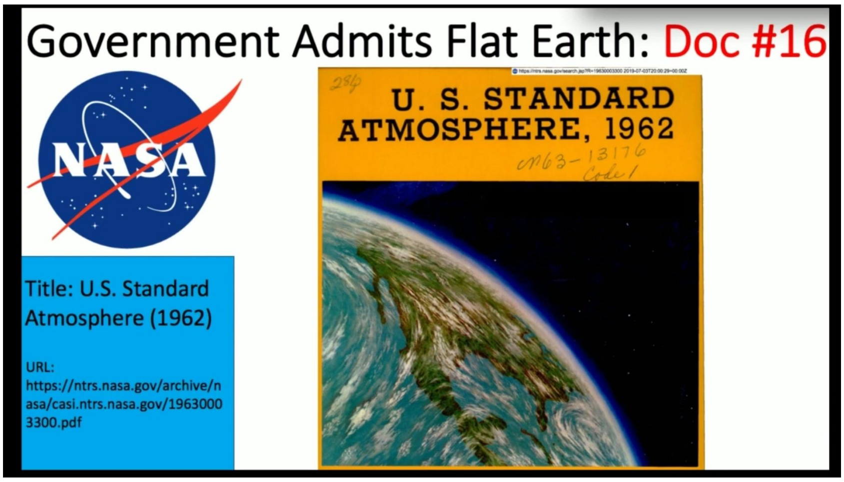

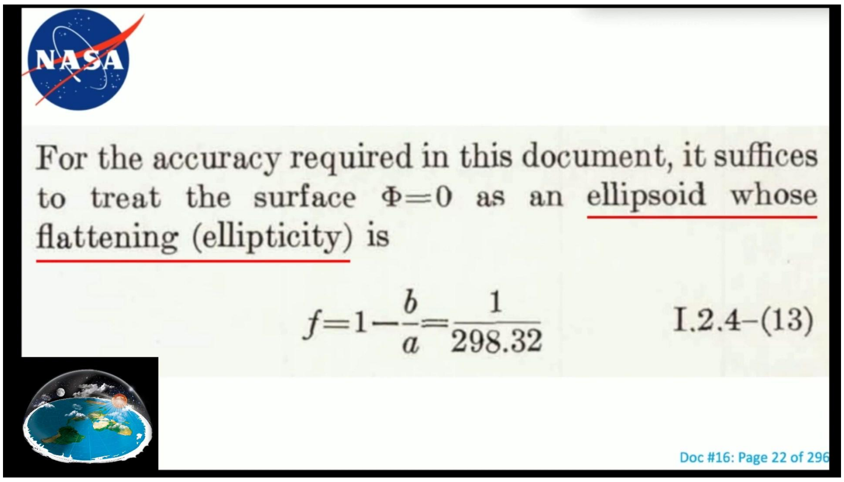

(17) An Aircraft Model for the AIAA Controls Design Challenge

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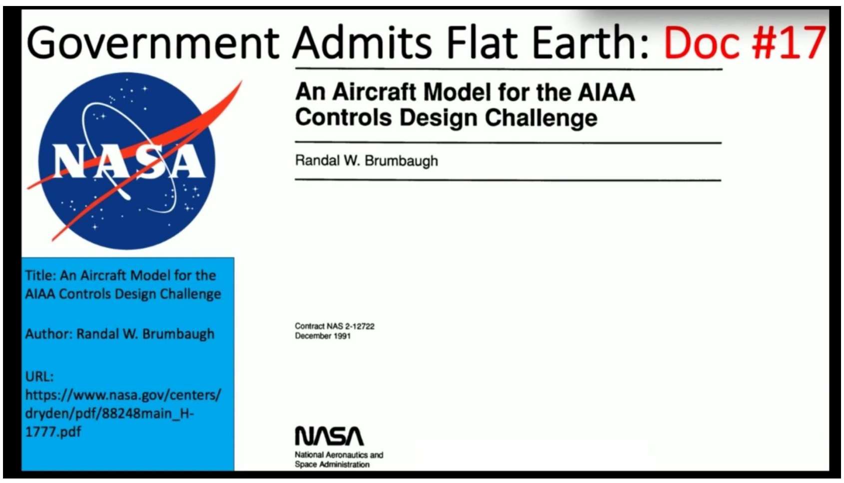

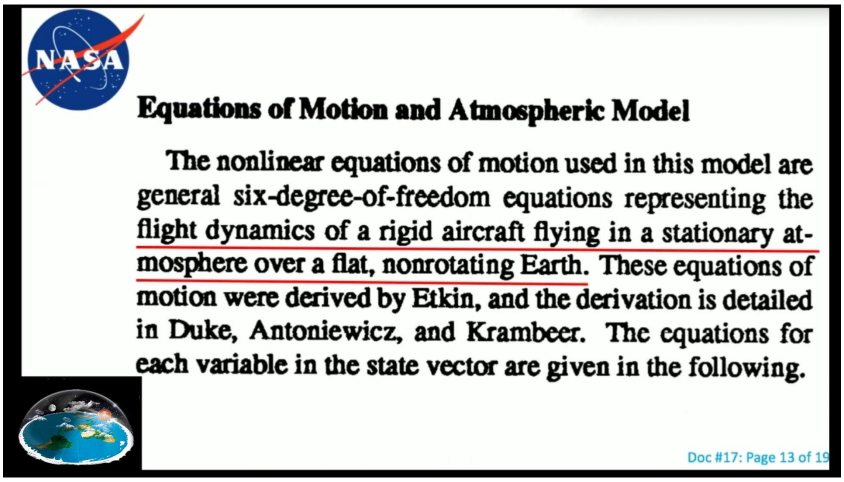

(18) Investigation of Aircraft Landing in Variable Wind Fields
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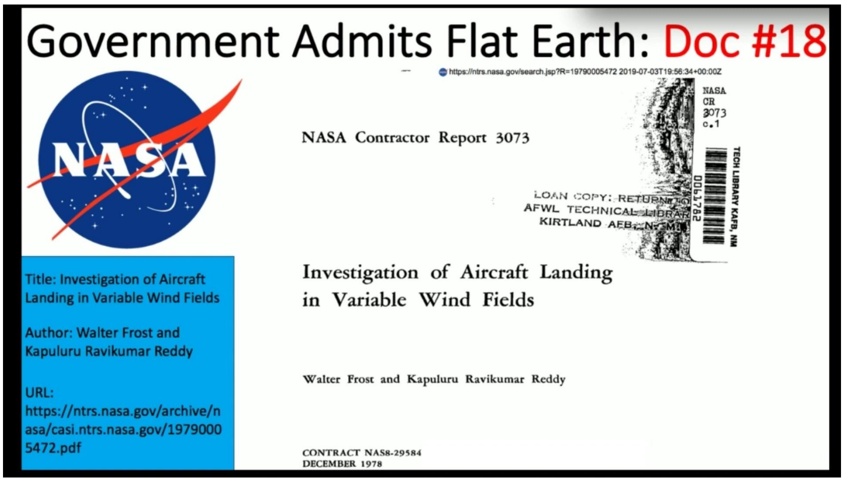

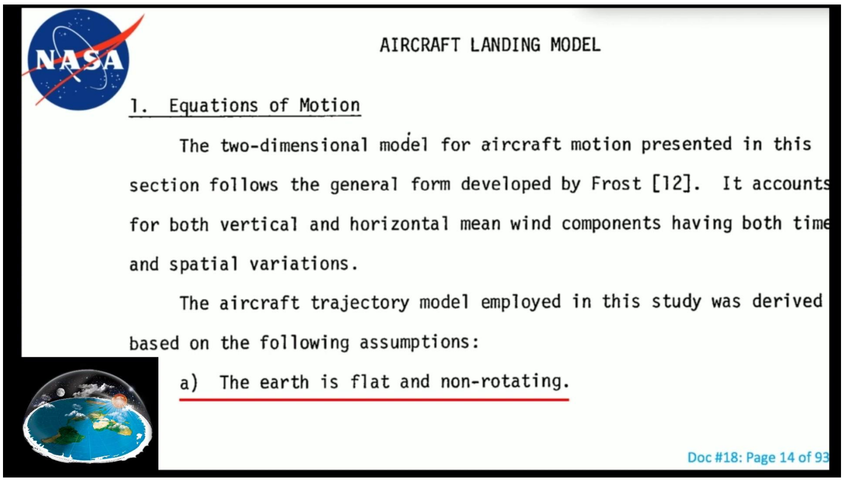

(19) A Mathematical Model of the CH-53
Page: Cover Page, 25
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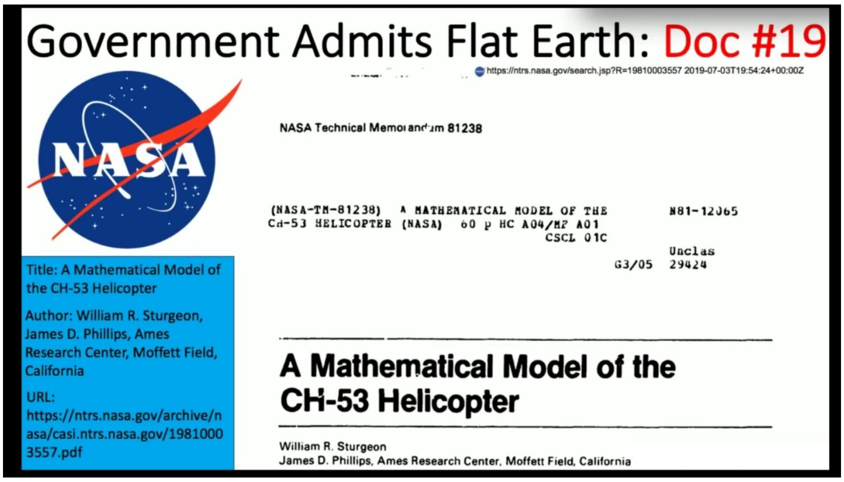

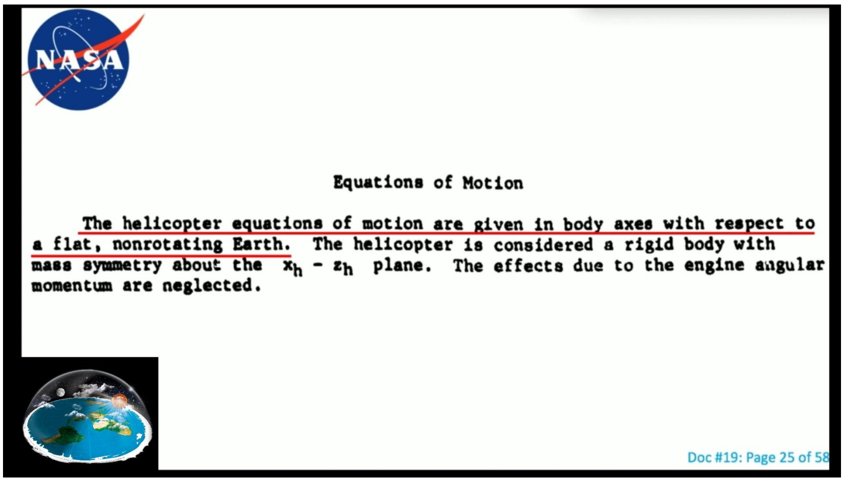

(20) Development and Validation of a Piloted Simulation of a Helicopter and External Sling Load

Pages: Cover Page, 6, 37, 48

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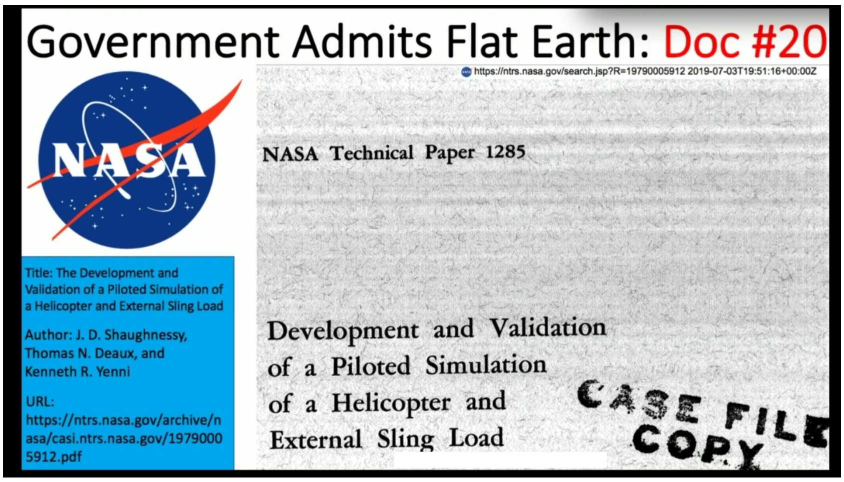

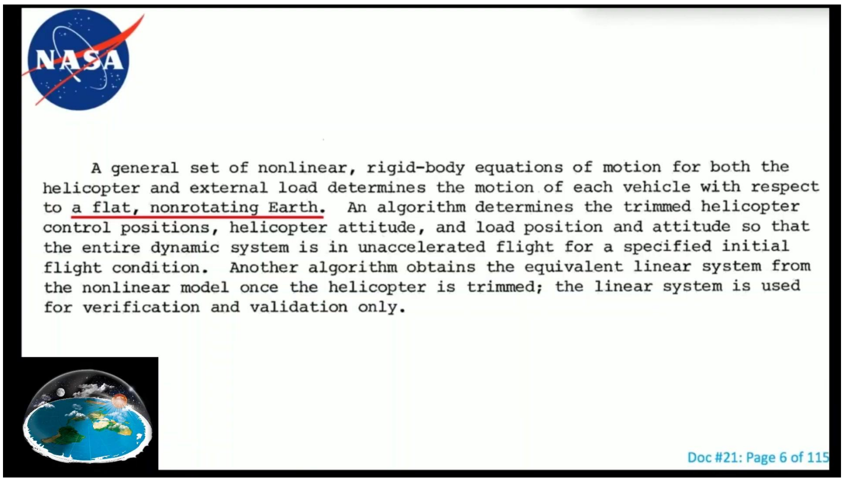

A general set of nonlinear, rigid-body equations of motion for both the helicopter and external load determines the motion of each vehicle with respect to a flat, nonrotating Earth. An algorithm determines the trimmed helicopter control positions, helicopter attitude, and load position and attitude so that the entire dynamic system is in unaccelerated flight for a specified initial flight condition. Another algorithm obtains the equivalent linear system from the nonlinear model once the helicopter is trimmed; the linear system is used for verification and validation only.

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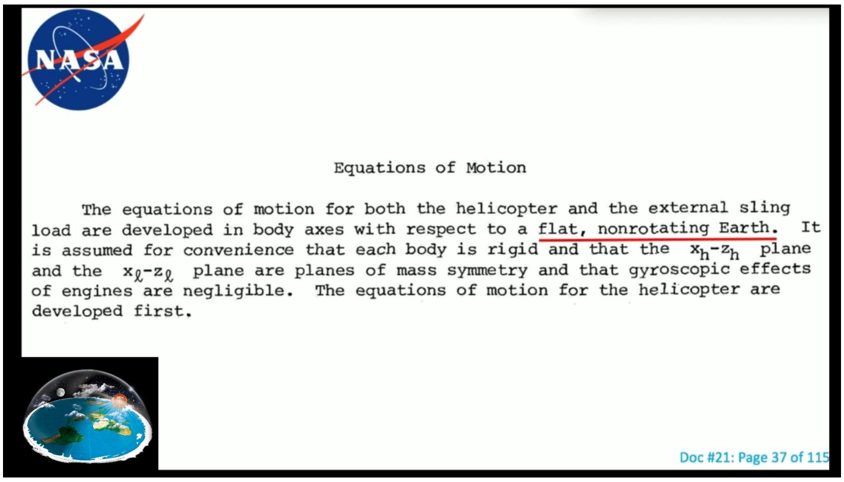

Equations of Motion

The equations of motion for both the helicopter and the external sling load are developed in body axes with respect to a flat, nonrotating Earth. It is assumed for convenience that each body is rigid and that the x_h-z_h plane and the x_ℓ-z_ℓ plane are planes of mass symmetry and that gyroscopic effects of engines are negligible. The equations of motion for the helicopter are developed first.

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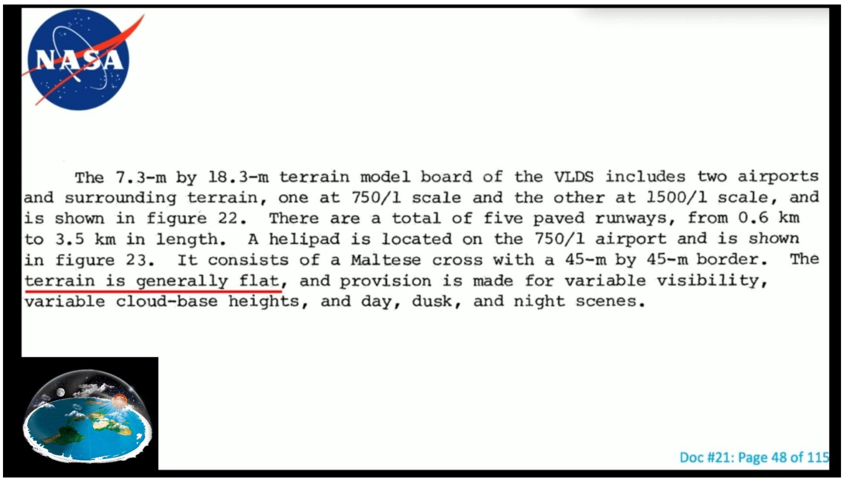

The 7.3-m by 18.3-m terrain model board of the VLDS includes two airports and surrounding terrain, one at 750/1 scale and the other at 1500/1 scale, and is shown in figure 22. There are a total of five paved runways, from 0.6 km to 3.5 km in length. A helipad is located on the 750/1 airport and is shown in figure 23. It consists of a Maltese cross with a 45-m by 45-m border. The terrain is generally flat, and provision is made for variable visibility, variable cloud-base heights, and day, dusk, and night scenes.

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(21) Atmospheric Oscillations

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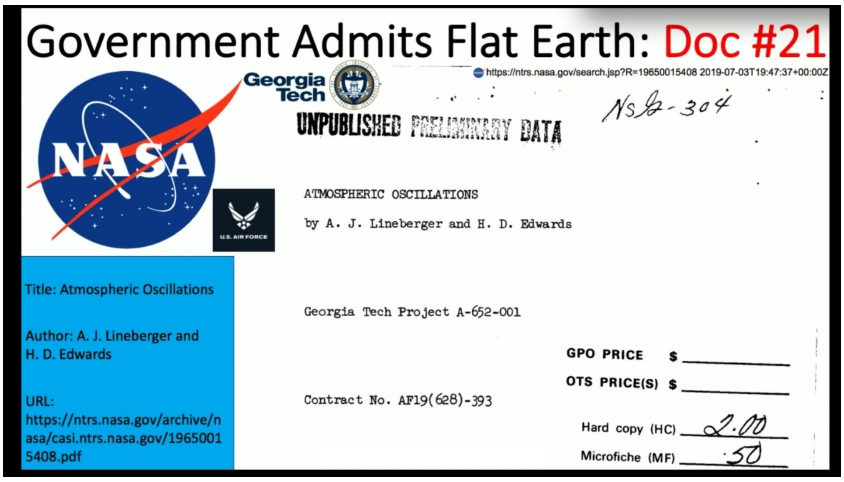

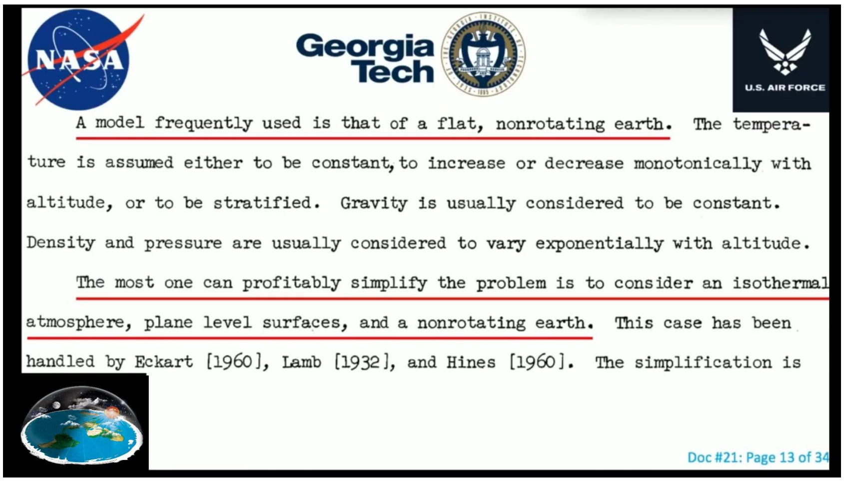

(22) Stability and Control Estimation Flight Test Results for the SR-71 Aircraft With Externally Mounted Experiments

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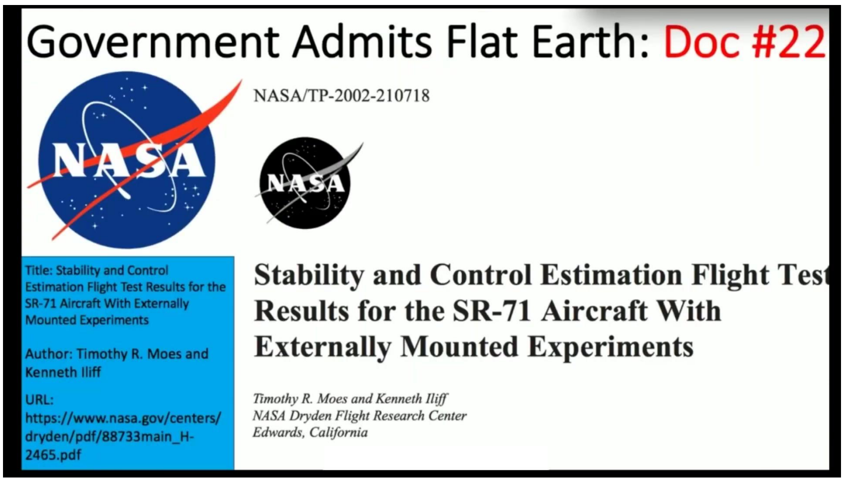

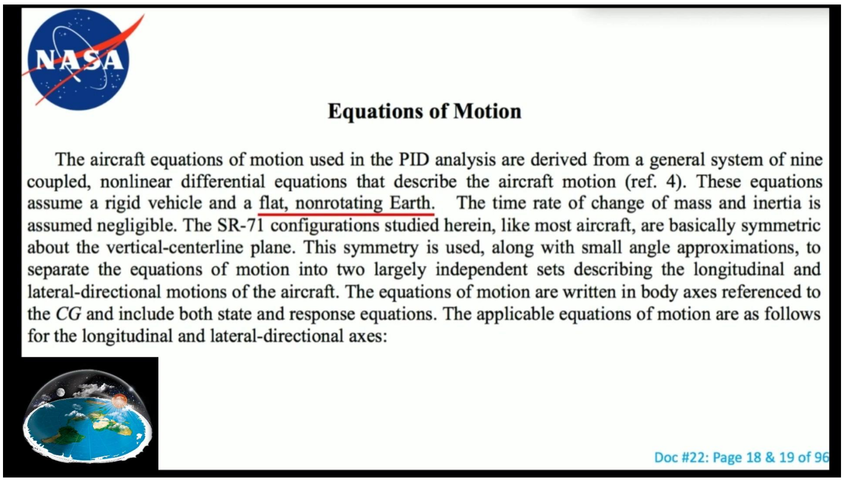

(23) Flight Testing a V/STOL Aircraft to Identify a Full-Envelope Aerodynamic Model
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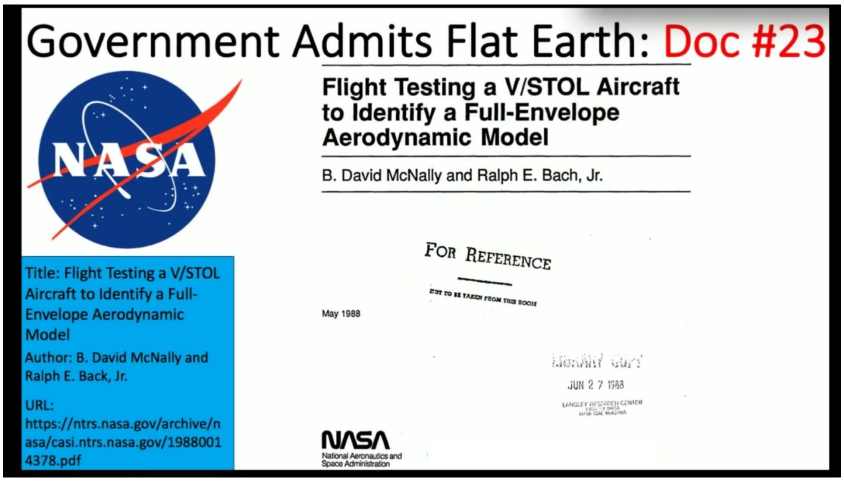

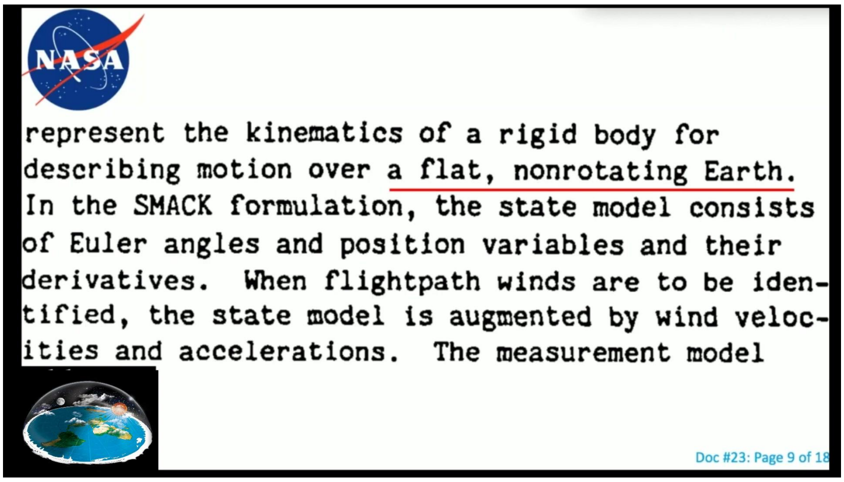

(24) Singular Arc Time-Optimal Climb Trajectory of Aircraft in a Two-Dimensional Wind Field
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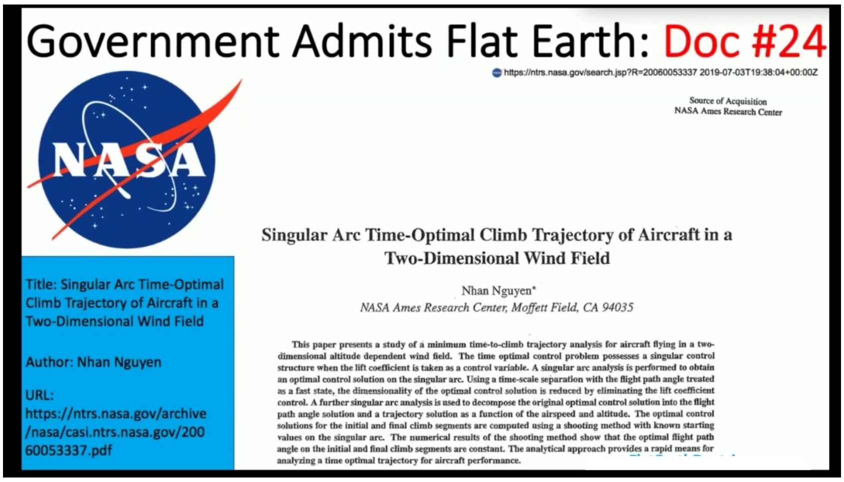

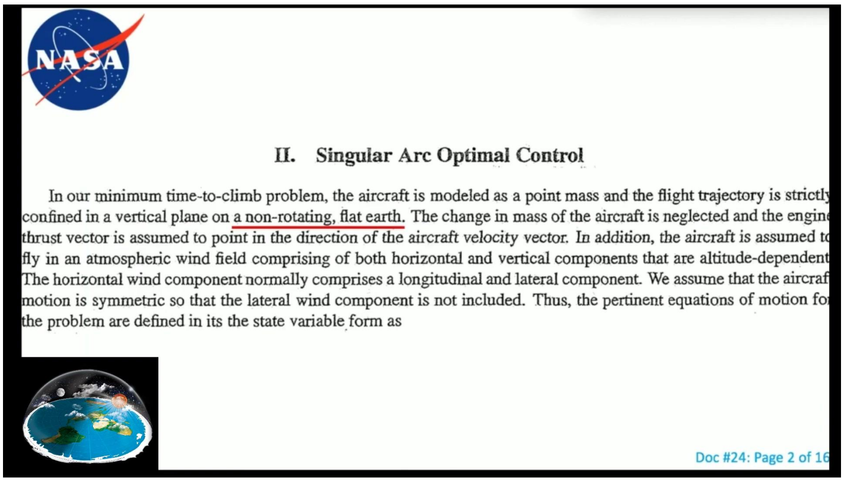

(25) Studies On Instabilities in Long-Baseline Two-Way Satellite Time and Frequency Transfer (TWSTFT) Including a Troposphere Delay Model

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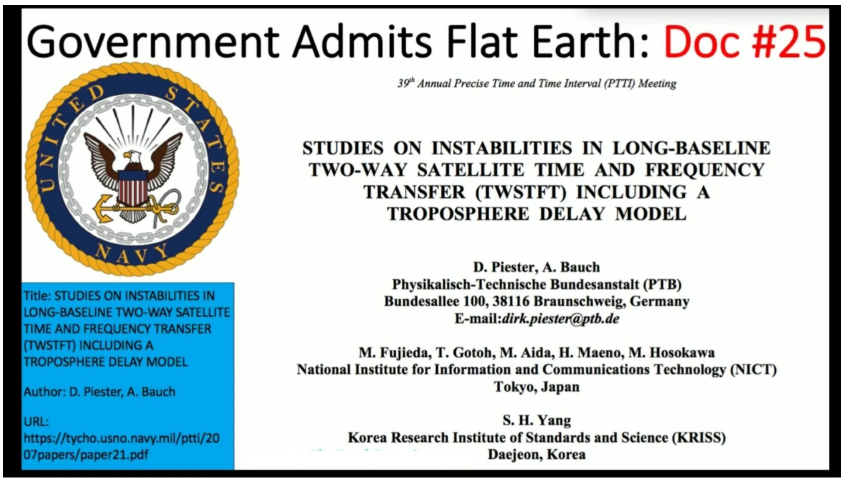

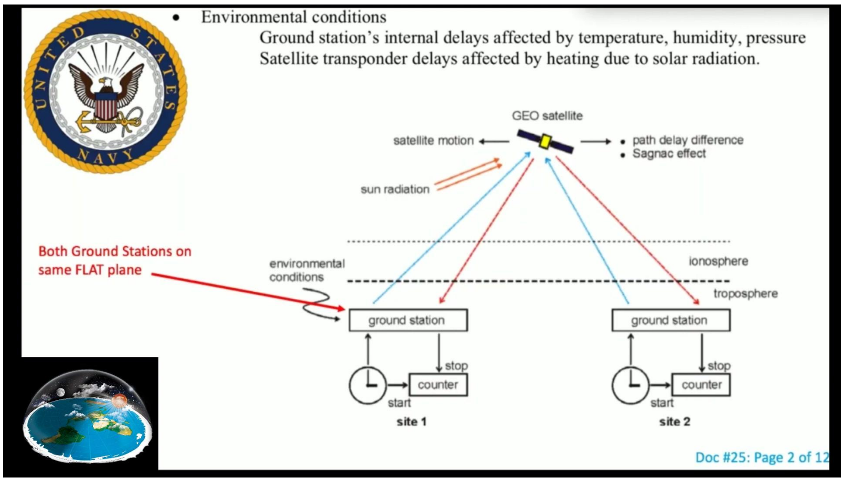

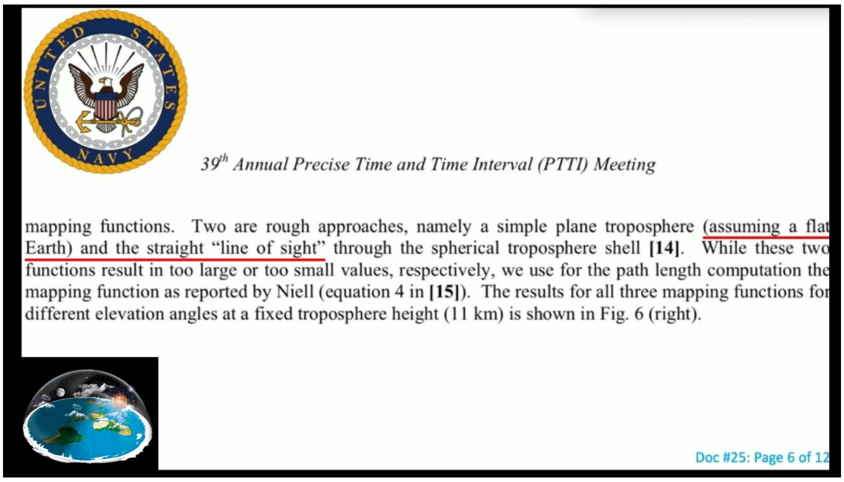

(26) Scale-Insensitive Detection Algorithm for FLIR Imagery

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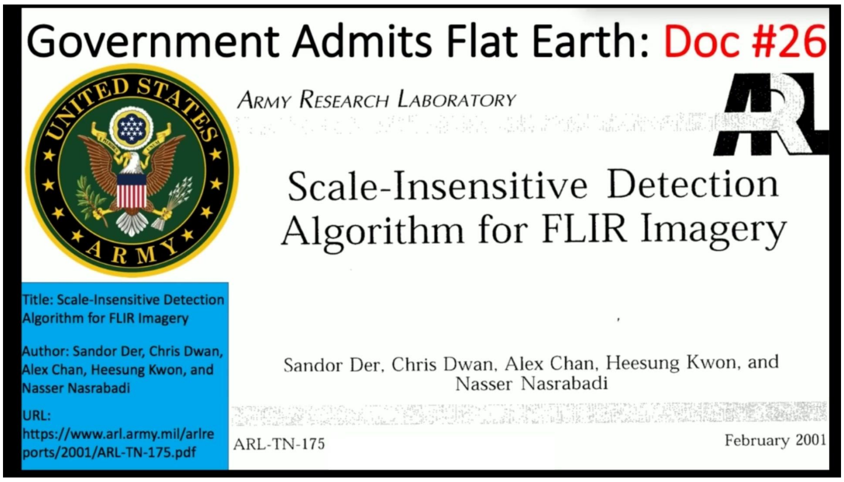

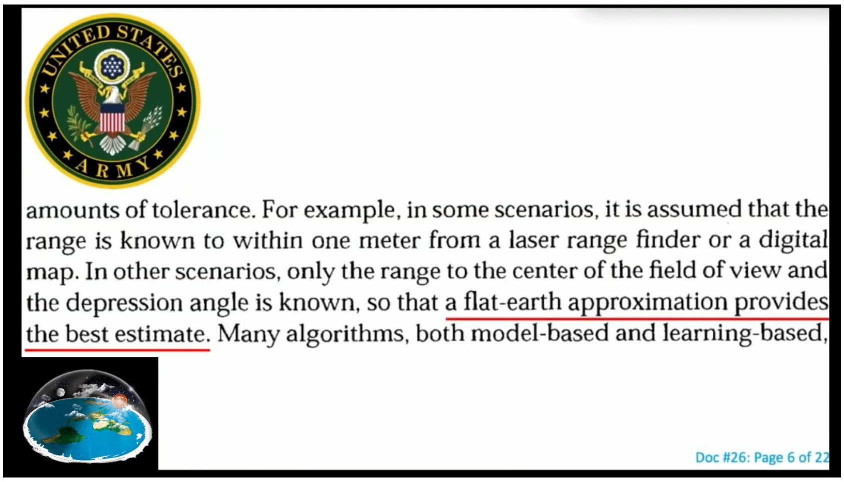

(27) User Manual for the Microsoft Window Edition of the Scanning Fast-Field Program (WSCAFFIP) Version 3.0
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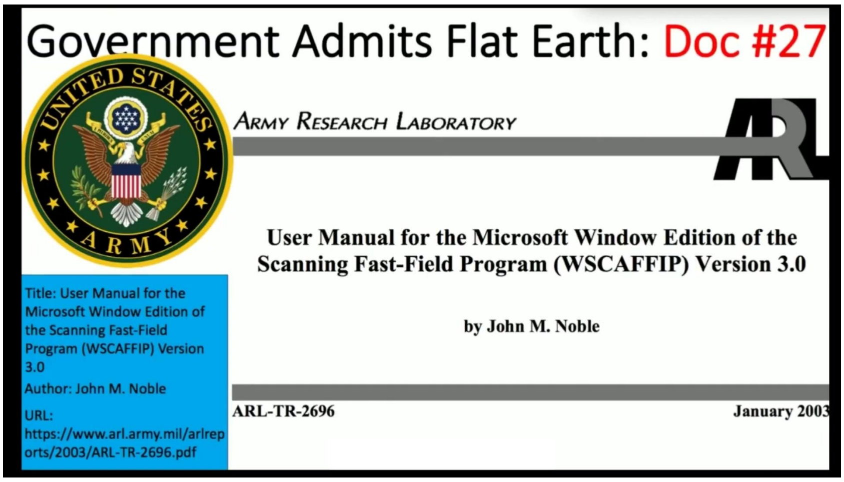

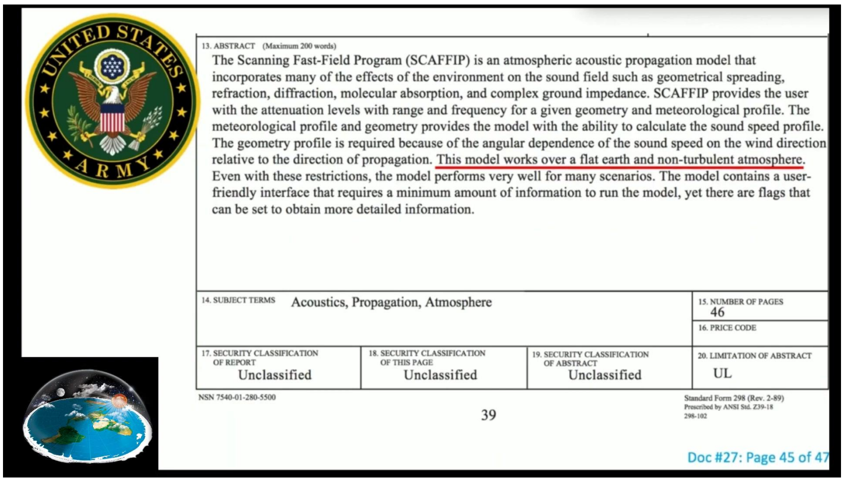

(28) Path-Loss Measurements in a Forested Environment at VHF
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http://www.arl.army.mil/arlreports/2000/ARL-TR-2156.pdf

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ARMY RESEARCH LABORATORY

Path-Loss Measurements in a Forested Environment at VHF

Robert J. Tan and Suzanne R. Stratton

ARL-TR-2156

September 2000

Title: Path-Loss Measurements in a Forested Environment at VHF

Author: Robert J. Tan and Suzanne R. Stratton

URL: http://www.arl.army.mil/arlreports/2000/ARL-TR-2156.pdf

Multipath Measurements

We made multipath measurements to provide confidence in the data and to get an idea of how well our measurements of the clearing represented an ideal flat earth. We measured the path loss at a range of 410 m with the

Multipath Data

In this section, we discuss the data for the measurements described in section 2.2. Figure 9 plots the transmission loss as a function of transmit antenna height for 145, 223, 300, 435, and 910 MHz, respectively. The receive antenna height was 2.7 m and the range was 410 m for all frequencies except 435 MHz, where the receive height was 3.6 m and the range was 200 m. The expected transmission loss in decibels over a flat earth is given by

$$\frac{P_R}{P_T} = 10 \log \left[2 \sin\left(\frac{2\pi h_t h_r}{\lambda R}\right)\right]^2 \left[\frac{\lambda}{4\pi R}\right]^2 , \qquad (2)$$

Figure 9. Comparison of measurements to theory for transmission loss over flat earth for a range of 410 m and a receive antenna height of 2.7 m for (a) 145, (b) 223, and (c) 300 MHz.

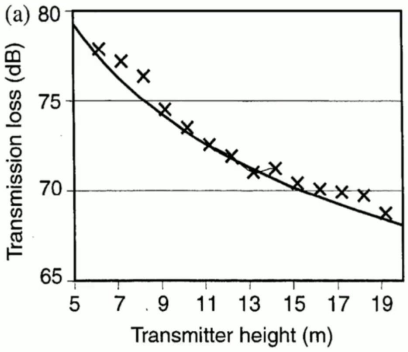
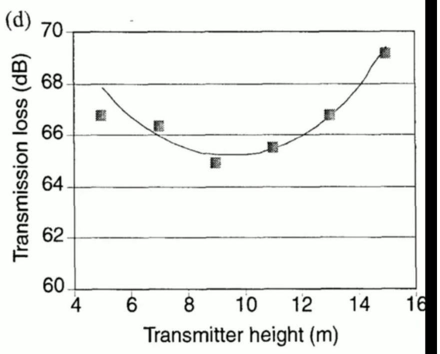


Figure 9 (cont'd). Comparison of measurements to theory for transmission loss over flat earth for a range of 410 m and a receive antenna height of 2.7 m for (d) 435 and (e) 910 MHz.



and with loss over the earth, in decibels, given by equation (2) (theory). Equation (2) assumes a flat, lossless, and perfectly reflecting ground. The measured data in figure 11 are for a transmit height of 22 m, a receive height of 5 m, and for HH polarization. Agreement within about 5 dB is obtained between theory and measurements. The difference between the theory for propagation over flat earth given by equation (2) and the measurements is because the measurements were made on an irregular lossy ground with obstacles on both sides.

the local trees and brush can cause such variations. After the data were inspected, it became apparent that they tended to agree with the theory given by equation (2), plus some fixed attenuation, and therefore allowed us to develop an analytical expression based on flat earth theory. This fixed attenuation is independent of range but varies with frequency.

the results generated by the model are shown as curves. Figure 15 plots propagation loss data in decibels for selected antenna heights as a function of range (transmit height of 22 m and receive height of 2.7 m). The data in figure 15 compare loss over flat earth (theory) given by equation (2) in section 4.1 and the analytical model given in equation (4). The

Figure 15. Comparison of measured propagation loss, loss over flat earth, and an analytical model for HH polarization in decibels plotted as a function of range for (a) 145, (b) 223, (c) 300 MHz.

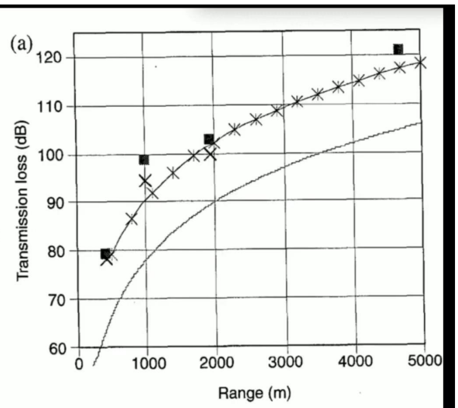
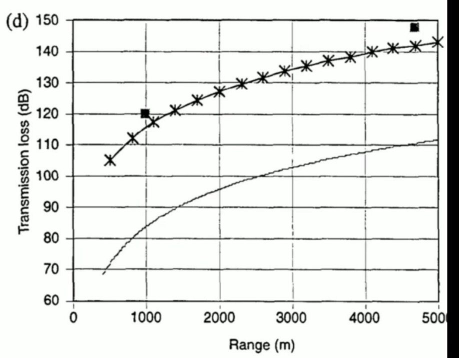
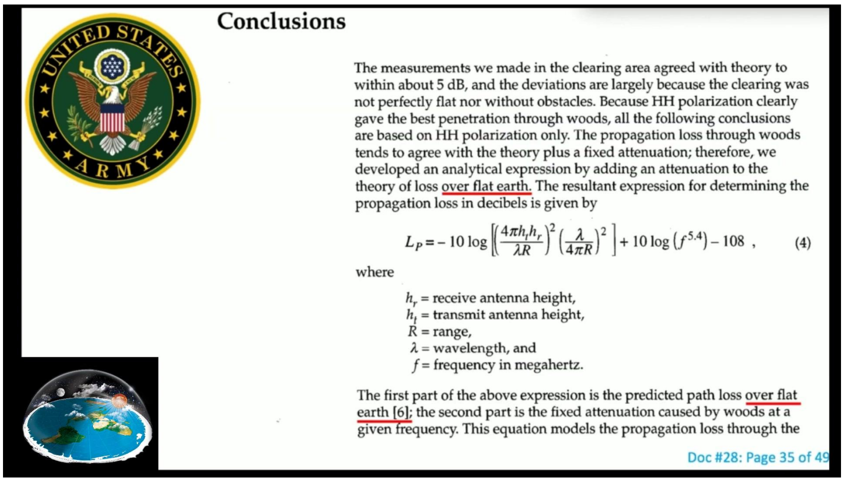


Figure 15 (cont'd). Comparison of measured propagation loss, loss over flat earth, and an analytical model for HH polarization in decibels plotted as a function of range for (d) 435 and (e) 910 MHz.





Conclusions

The measurements we made in the clearing area agreed with theory to within about 5 dB, and the deviations are largely because the clearing was not perfectly flat nor without obstacles. Because HH polarization clearly gave the best penetration through woods, all the following conclusions are based on HH polarization only. The propagation loss through woods tends to agree with the theory plus a fixed attenuation; therefore, we developed an analytical expression by adding an attenuation to the theory of loss over flat earth. The resultant expression for determining the propagation loss in decibels is given by

$$L_P = -10 \log \left[\left(\frac{4\pi h_t h_r}{\lambda R} \right)^2 \left(\frac{\lambda}{4\pi R} \right)^2 \right] + 10 \log \left(f^{5.4} \right) - 108 \ , \qquad (4)$$

where

h_r = receive antenna height,
h_t = transmit antenna height,
R = range,
λ = wavelength, and
f = frequency in megahertz.

The first part of the above expression is the predicted path loss over flat earth [6]; the second part is the fixed attenuation caused by woods at a given frequency. This equation models the propagation loss through the

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(29) Review of Sound Propagation in the Lower Atmosphere
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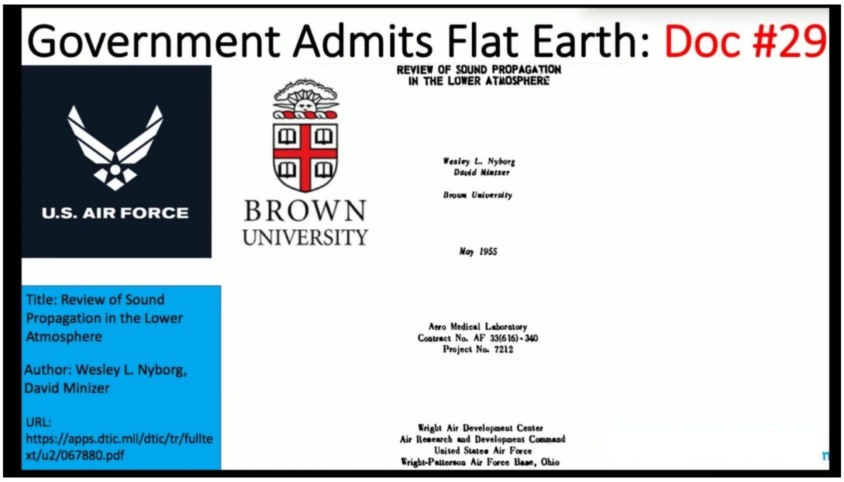
https://apps.dtic.mil/dtic/tr/fulltext/u2/067880.pdf



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U.S. AIR FORCE

BROWN UNIVERSITY

REVIEW OF SOUND PROPAGATION IN THE LOWER ATMOSPHERE

Wesley L. Nyborg
David Mintzer

Brown University

May 1955

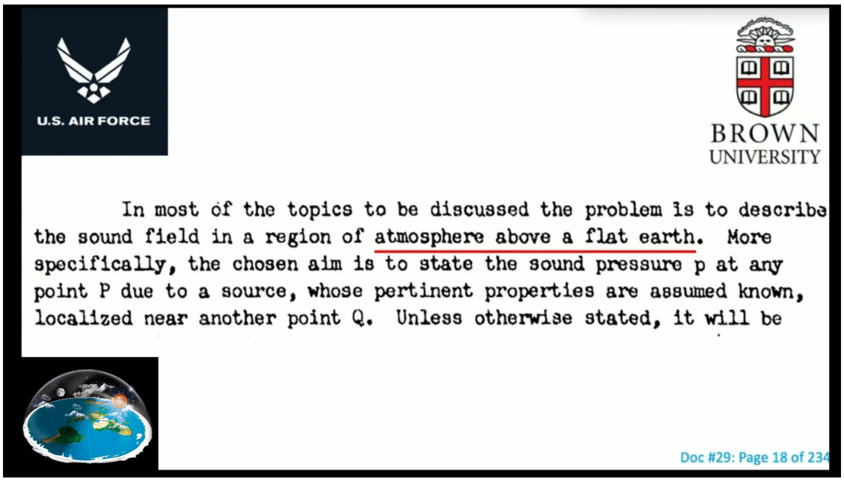
Aero Medical Laboratory
Contract No. AF 33(616)-340
Project No. 7212

Wright Air Development Center
Air Research and Development Command
United States Air Force
Wright-Patterson Air Force Base, Ohio

Title: Review of Sound Propagation in the Lower Atmosphere

Author: Wesley L. Nyborg, David Minizer

URL: https://apps.dtic.mil/dtic/tr/fulltext/u2/067880.pdf



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In most of the topics to be discussed the problem is to describe the sound field in a region of atmosphere above a flat earth. More specifically, the chosen aim is to state the sound pressure p at any point P due to a source, whose pertinent properties are assumed known, localized near another point Q. Unless otherwise stated, it will be

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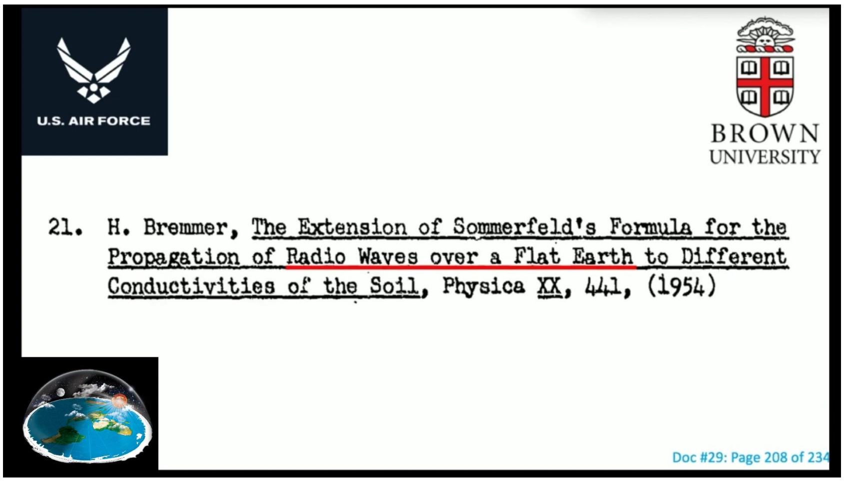

(30) Beacon Position and Attitude Navigation Aided by a Magnetometer
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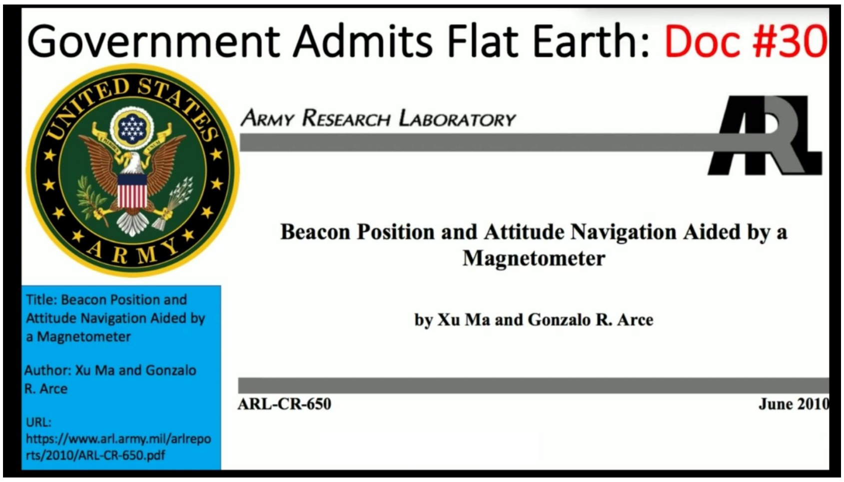

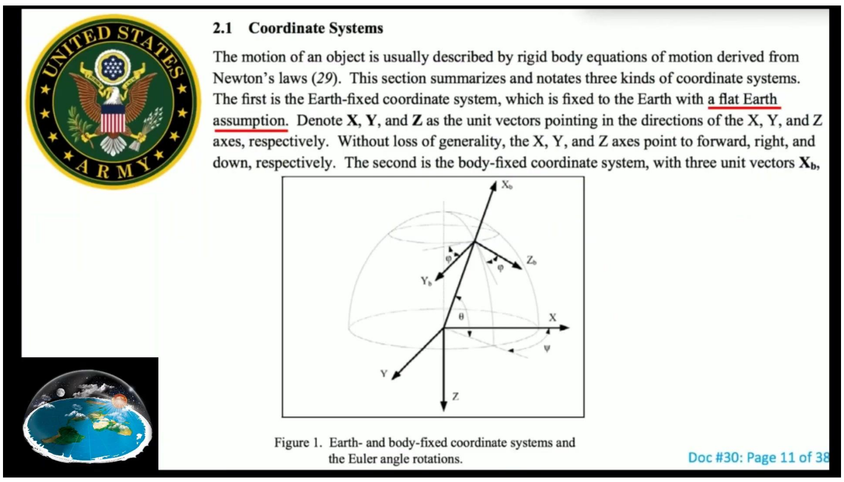

(31) Automatic Target Acquisition of the DEMO III Program
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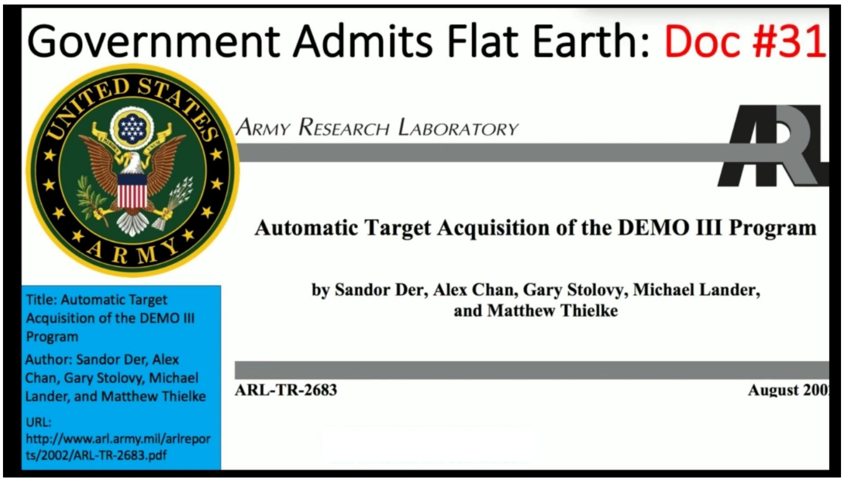
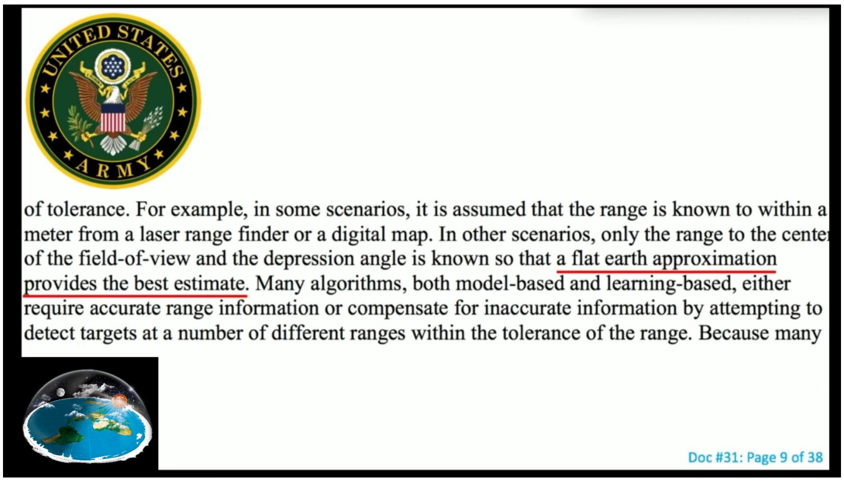
http://www.arl.army.mil/arlreports/2002/ARL-TR-2683.pdf





(32) Modeling of Atmospheric Effects

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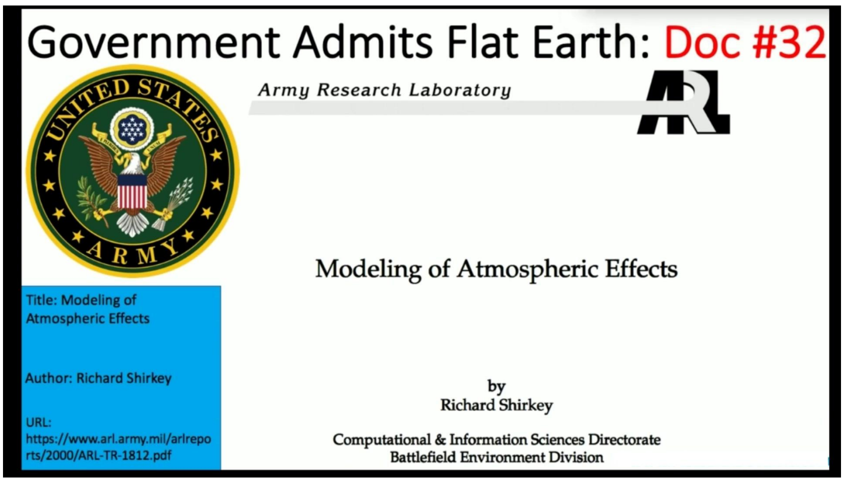

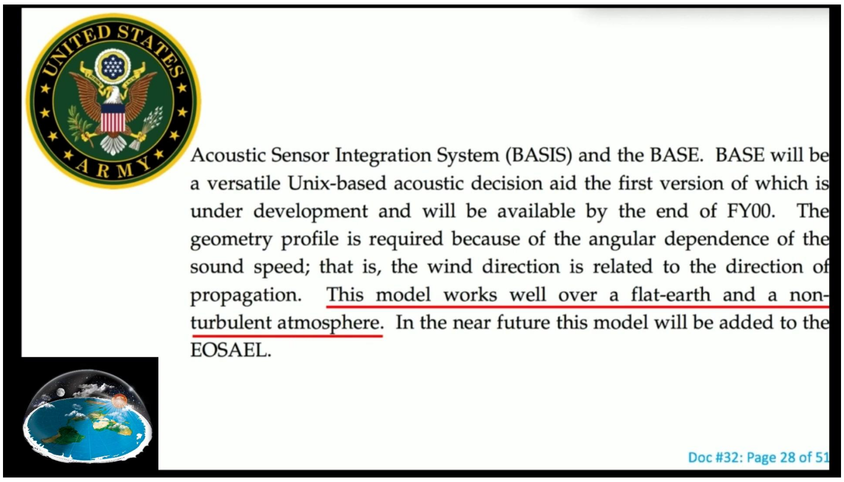

(33) Telemetry Standards
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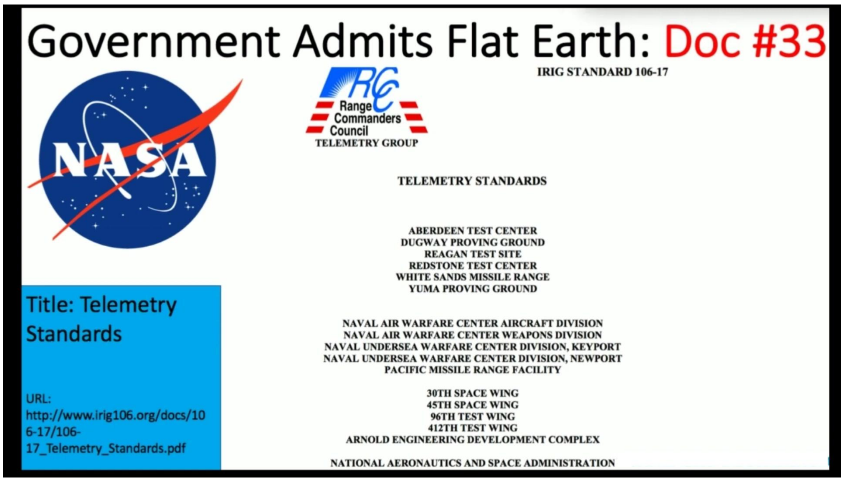
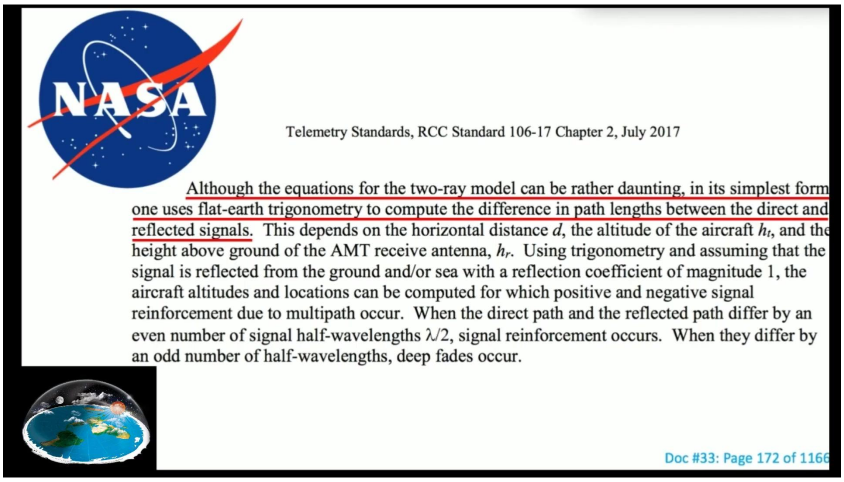
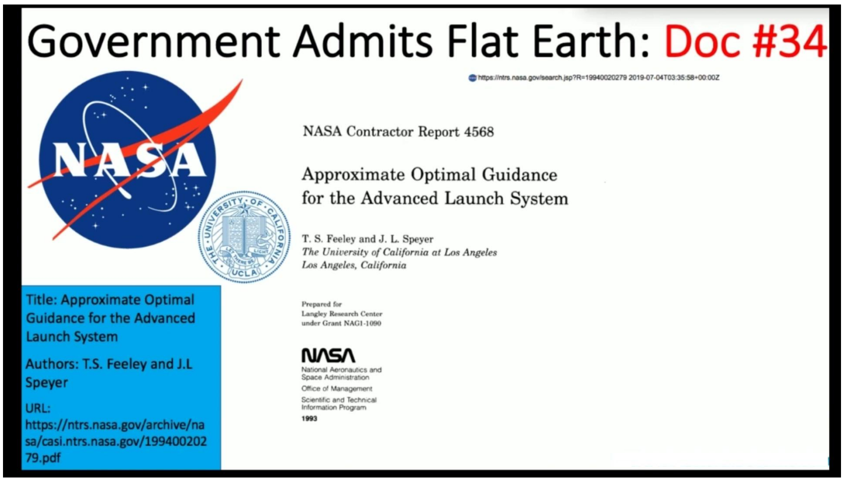
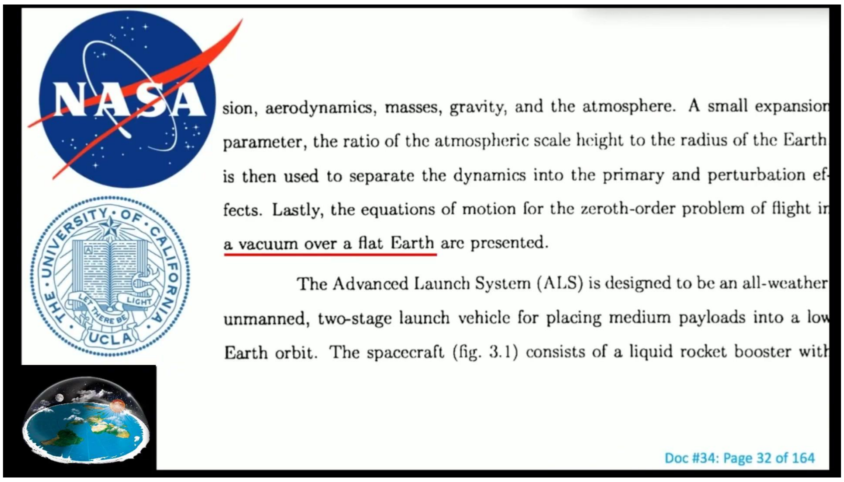
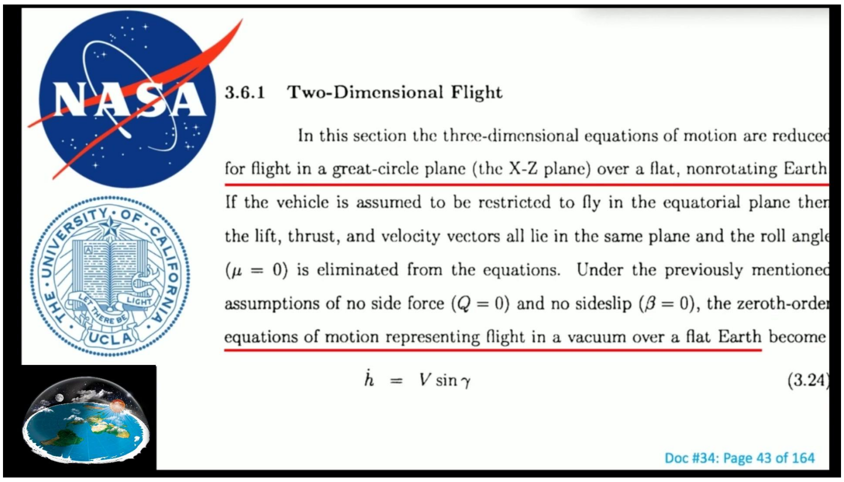




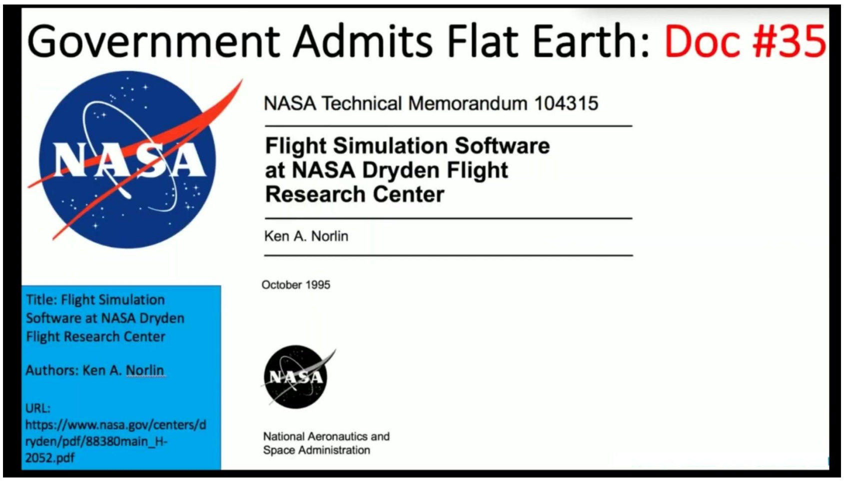
(34) Approximate Optimal Guidance for the Advanced Launch System
Page: Cover Page, 32, 43
https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/19940020279.pdf

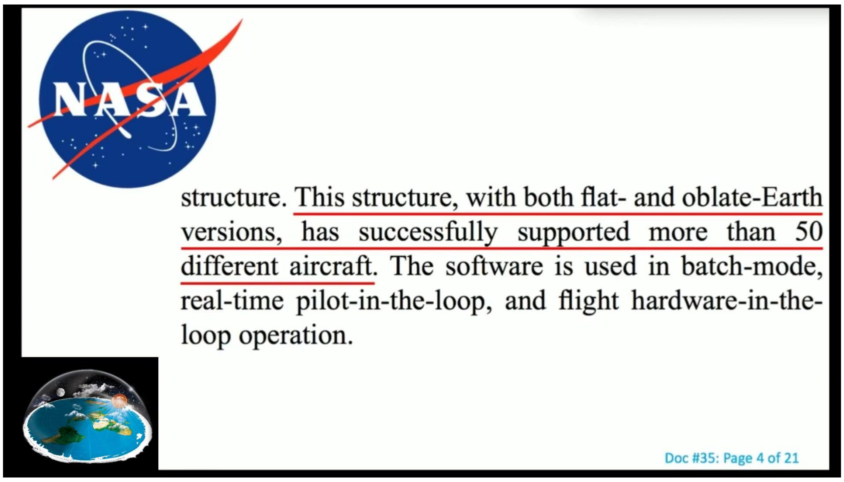


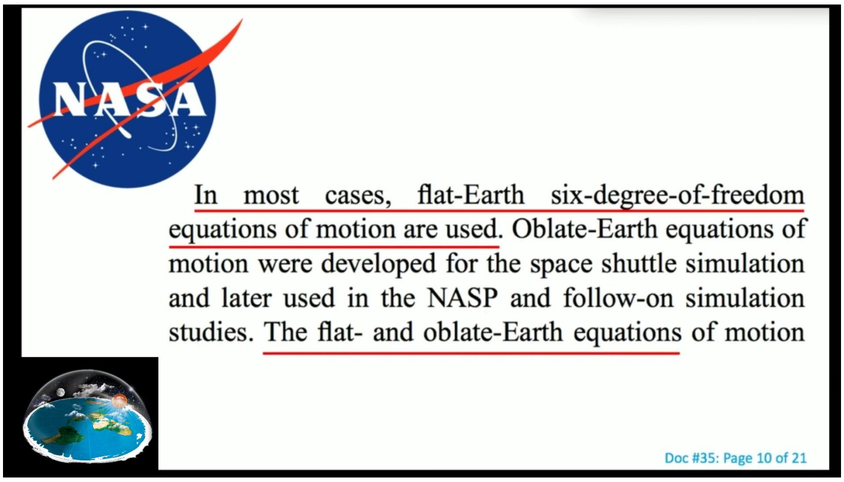




(35) Flight Simulation Software at NASA Dryden Flight Research Center
Pages: Cover Page, 4, 10
https://www.nasa.gov/centers/dryden/pdf/88380main_H-2052.pdf



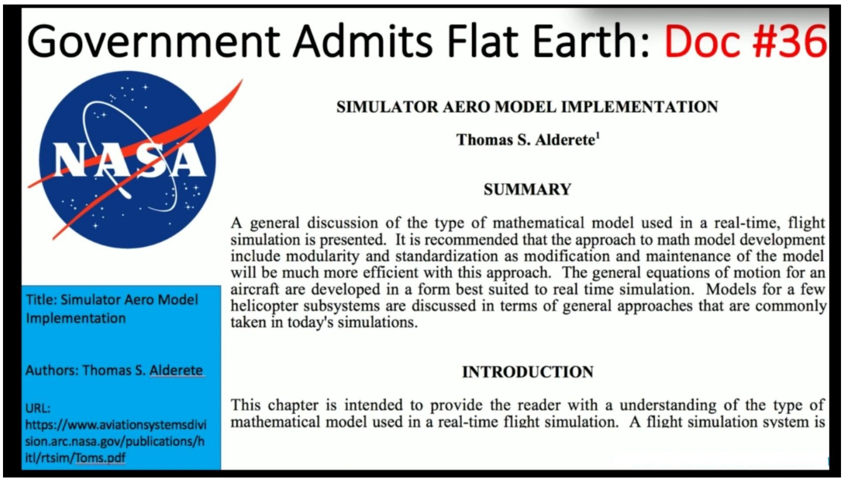


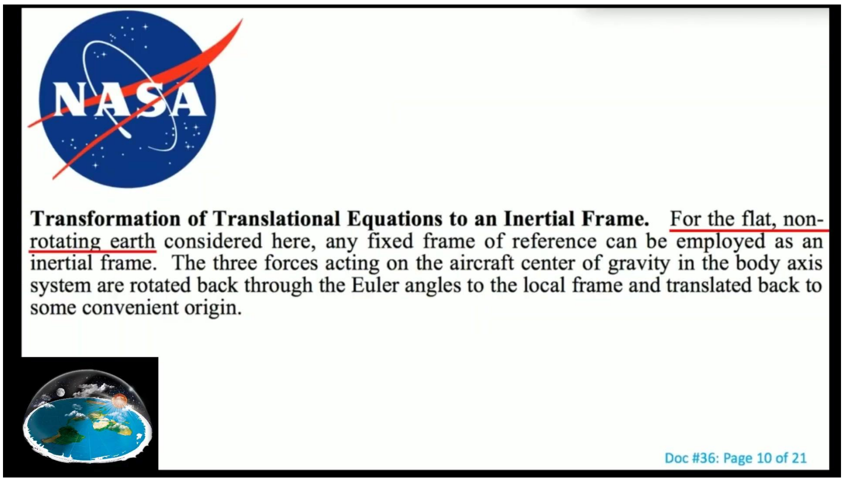


(36) Simulator Aero Model Implementation

Page: Cover Page, 10

https://www.aviationsystemsdivision.arc.nasa.gov/publications/hitl/rtsim/Toms.pdf

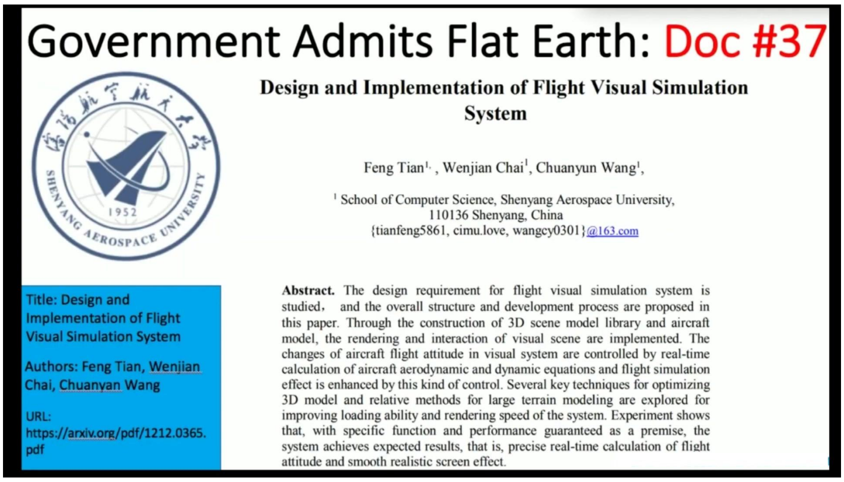


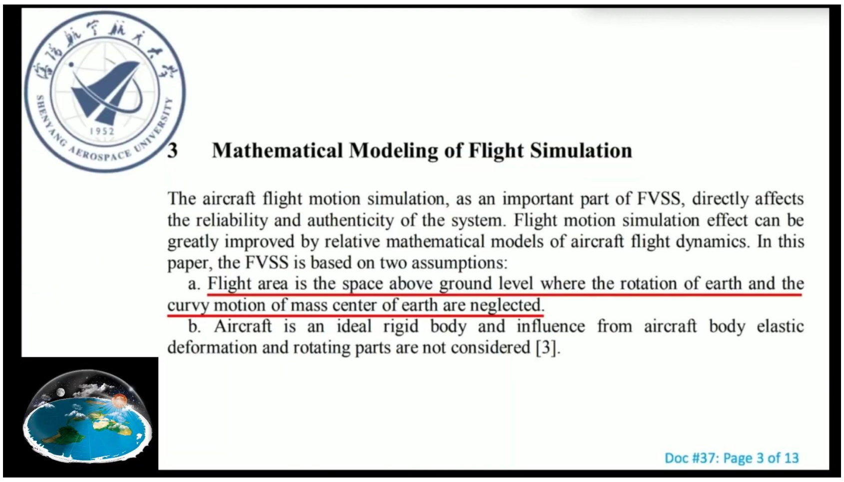


(37) Design and Implementation of Flight Visual Simulation System

Page: Cover Page, 3

https://arxiv.org/pdf/1212.0365.pdf

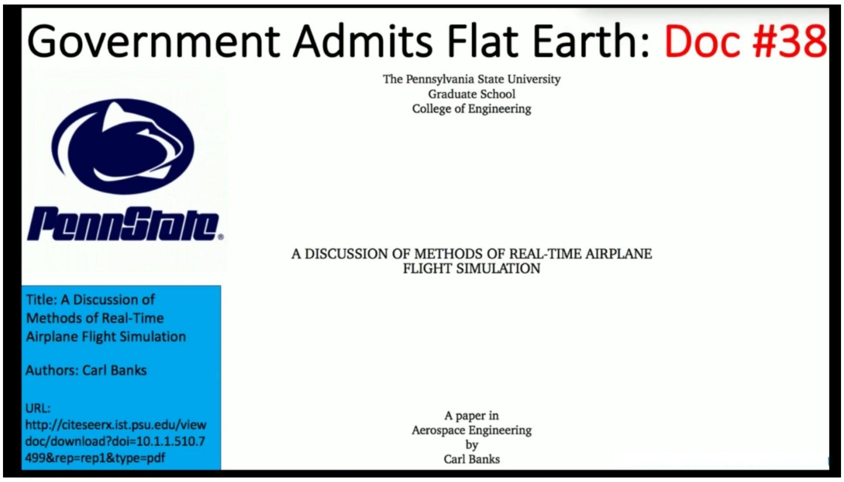


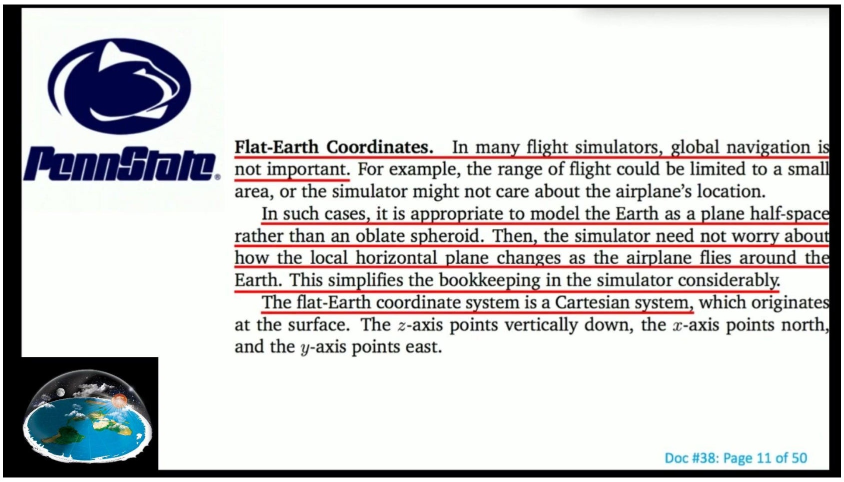


(38) A Discussion of Methods of Real-Time Airplane Flight Simulation

Page: Cover Page, 11

http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.510.7499&rep=rep1&type=pdf





(39) The American Practical Navigator: An Epitome of Navigation

Pages: Cover Page, 351, 355, 573, 636

http://geocenter.survey.ntua.gr/main/labs/carto/academic/persons/bnakos_site_nafp/documentation/american_practical_navigator.pdf

Government Admits Flat Earth: Doc #39

Pub. No. 9

THE AMERICAN PRACTICAL NAVIGATOR

AN EPITOME OF NAVIGATION

ORIGINALLY BY

NATHANIEL BOWDITCH, LL.D.

1995 EDITION

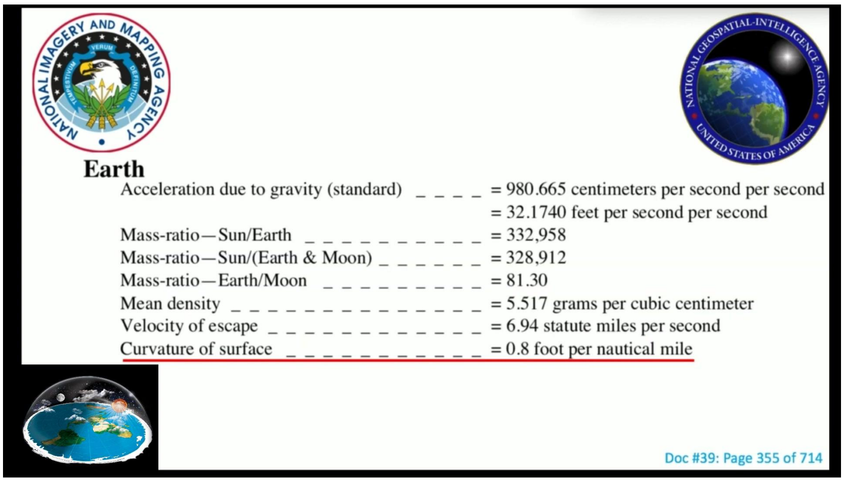
Title: The American Practical Navigator: An Epitome of Navigation

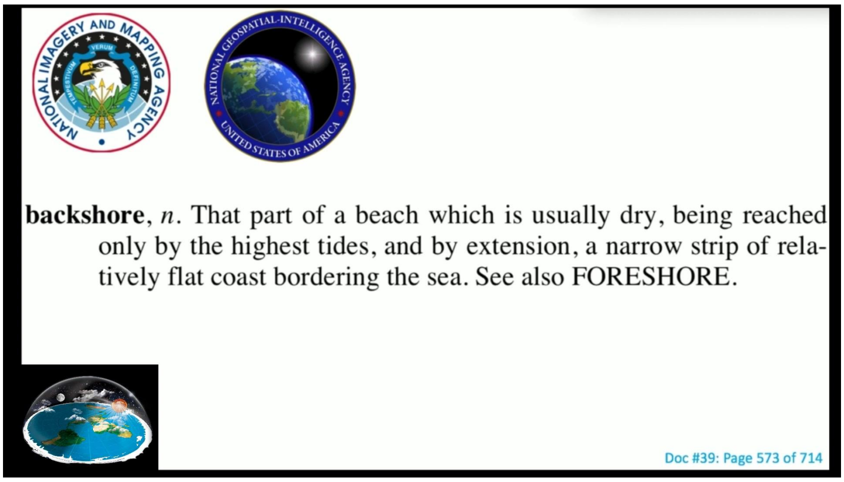
Original Author: Nathaniel Bowditch, LL.D.

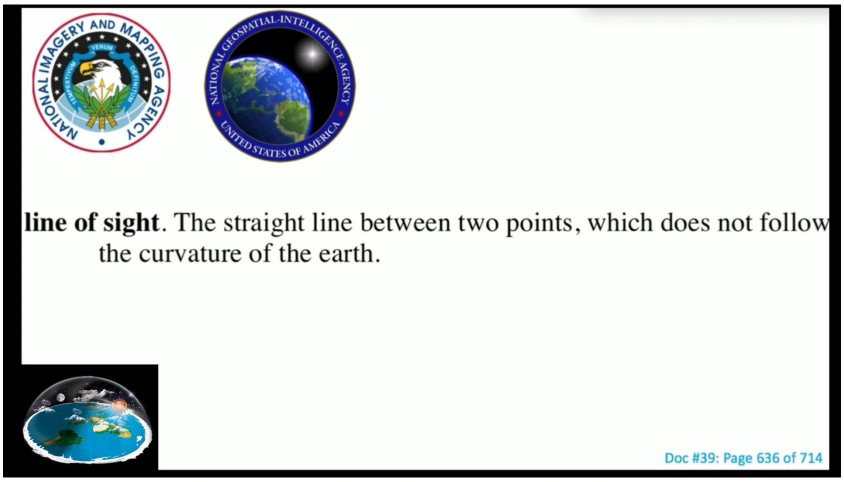
URL: http://geocenter.survey.ntua.gr/main/labs/carto/academic/persons/bnakos_site_nafp/documentation/american_practical_navigator.pdf

Distance by vertical angle between the waterline and the top of an object is computed by solving the right triangle formed between the observer, the top of the object, and the waterline of the object by simple trigonometry. This assumes that the observer is at sea level, the earth is flat between observer and object, there is no refraction, and the object and its waterline form a right angle. For most cases of practical significance, these assumptions produce no ~~large~~ errors.

Doc #39: Page 351 of 714







Doc #39 on page 11 of 714 states, “The earth is an oblate spheroid (a sphere flattened at the poles).” This statement is in direct contradiction to at least 5 different statements within the document itself:

Page 351 of 714 states, “This assumes that the observer is at sea level, the earth is flat between observer and object, there is no refraction, and the object and its waterline form a

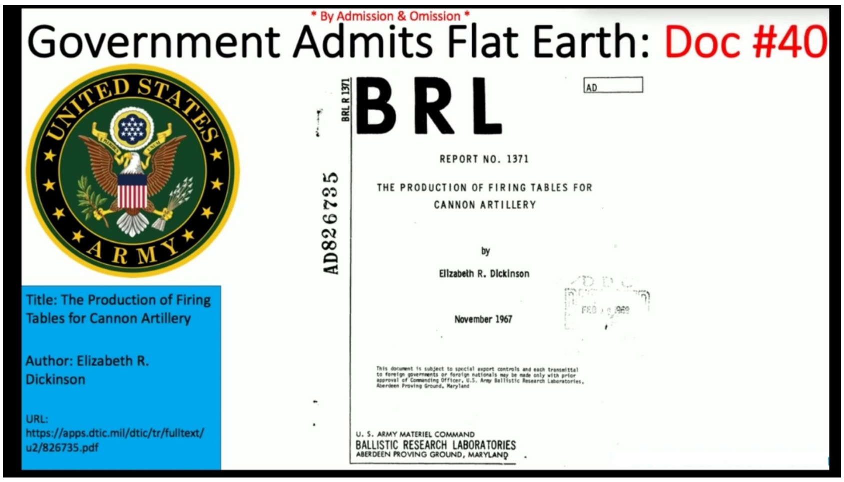
right angle. For most cases of practical significance, these assumption produce no large errors."
1) Waterline, assumes the water has a FLAT line
2) "Earth is Flat between observer and object"

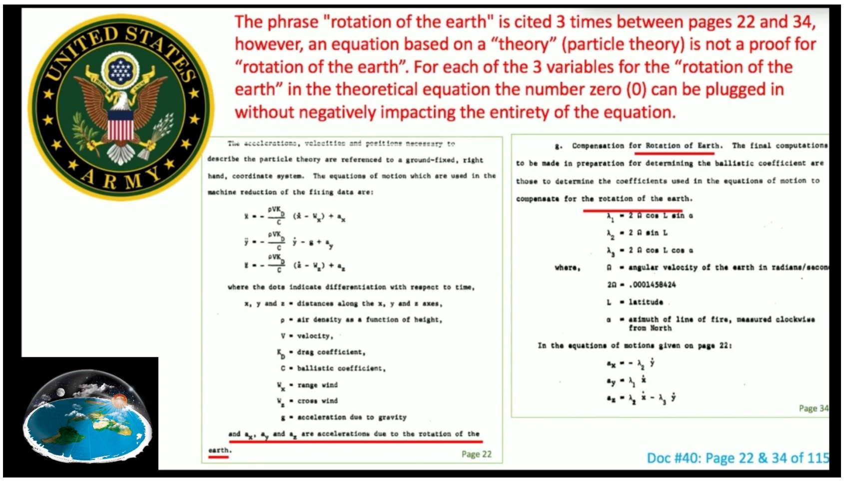
Page 355 of 714 states, "Curvature of surface _ _ _ _ _ _ _ _ _ _ _ _ = 0.8 foot per nautical mile"
3) If the earth was "flattened at the poles" then this calculation of the curvature is blatantly inaccurate, as the curvature of the surface of the earth would vary.

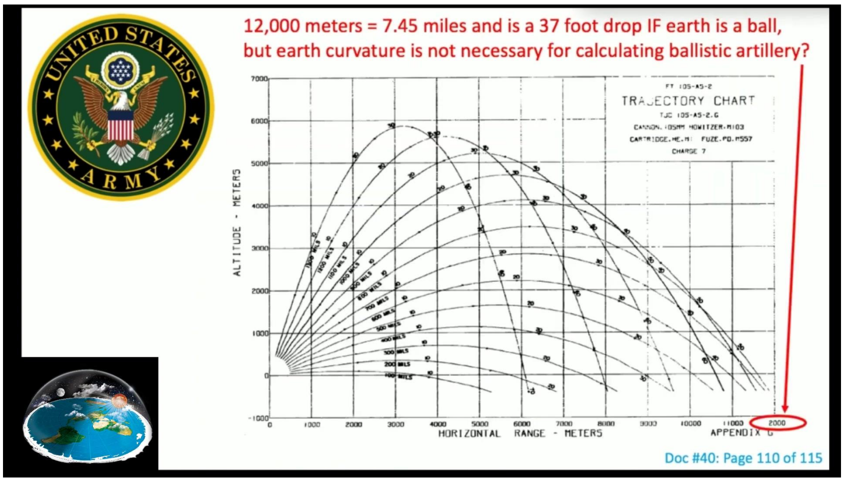
Page 574 of 714 states, "back shore, n. That part of a beach which is usually dry, being reached. Only by the highest tides, and by extension, a narrow strip of relatively flat coast boarding the sea. See also FORESHORE."
4) How can the there exist a "flat coast" bordering the sea if the sea curves? It can't.

Page 636 of 714 states, "line of sight. The straight line between two points, which does not follow the curvature of the earth."
5) If the earth is a globe and curving in every direction downward from the observer, given the definition of "line of sight" it is impossible to achieve "line of sight" for every observation necessitates that it occurs over the "curvature of the earth".

(40) The Production of Firing Tables for Cannon Artillery
Pages: Cover Page, 10, 22, 34, 110
https://apps.dtic.mil/dtic/tr/fulltext/u2/826735.pdf







Doc #40 on pages 66 – 68 of 115 references "Rotation of Earth":
1) Doc #40 does NOT account for curvature of earth
2) Doc #40 represents the "Rotation of Earth" in an equation for "particle theory", whereby, when the numerical value of zero (0) is plugged in for the variable to account for the alleged rotation it does not negatively impact the rest of the equation and it is able to compute.

(41) Field Artillery Manual Cannon Gunnery
Page: Cover Page, 175, 192
https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/tc3_09x81.pdf

* By Admission & Omission *

Government Admits Flat Earth: Doc #41

TC 3-09.81

Field Artillery Manual Cannon Gunnery

APRIL 2016

DISTRIBUTION RESTRICTION: Approved for public release; distribution is unlimited.

*This publication supersedes TC 3-09.81/MCWP 3-16.4, dated 1 March 2016.

Headquarters, Department of the Army

Title: Field Artillery Manual Cannon Gunnery

URL: https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/tc3_09x81.pdf

STANDARD CONDITIONS	
WEATHER	
1	AIR TEMPERATURE 100 PERCENT
2	AIR DENSITY 100 PERCENT
3	NO WIND
POSITION	
1	GUN, TARGET AND MDP AT SAME ALTITUDE
2	ACCURATE RANGE
3	NO ROTATION OF THE EARTH
MATERIAL	
1	STANDARD WEAPON, PROJECTILE, AND FUZE
2	PROPELLANT TEMPERATURE (70° F)
3	LEVEL TRUNNIONS AND PRECISION SETTINGS
4	FIRING TABLE MUZZLE VELOCITY
5	NO DRIFT

Figure 7-1. Standard Conditions.

Doc #41: Page 175 of 664

the·o·ry

/ˈTHirē/

noun

a supposition or a system of ideas intended to explain something, especially one based on general principles independent of the thing to be explained.

"Darwin's theory of evolution"

synonyms: hypothesis, thesis, conjecture, supposition, speculation, postulation, postulate, proposition, premise, surmise, assumption, presumption, presupposition, notion, guess, hunch, feeling, suspicion; More

7-22. Background theory of rotational effects may assist in understanding why table H is needed to determine a range correction for rotation of the earth.

- Because of rotation of the earth, a point on the equator has an eastward linear velocity of approximately 457 meters per second. The linear velocity decreases to 0 meters at either pole.
- Given a gun on the equator firing due east at a target (See figure 7-17.), during the time of flight of the projectile, the gun and the target will travel together from G to G' and T to T', respectively along the circumference of the earth. The projectile however will travel in a vertical plane, the base of which is parallel to the origin of the trajectory established at the time of firing. At the end of the given time of flight the projectile will be at P' when the target is at T'. Hence the projectile will continue along an extended trajectory and impact east of the target (over the target in this case). The effect is as if the quadrant elevation fired was in error by the amount of angle *a*. Angle *a* is the angle formed by the base line G'P' and a tangent to the earth at G'. With the gun firing eastward, angle *a* is positive (the projectile impacts over the target).

Doc #41: Page 192 of 664

I should have done a better analysis on doc #41. Sorry about that, and now here it is.

Doc #41, "Field Artillery Manual Cannon Gunnery", page 48 of 664:
"3-55. If a round were fired in a vacuum, gravity would cause the projectile to return to the surface of the earth. The path or trajectory of the projectile would be simple to trace. All projectiles, regardless of size, shape, or weight, would follow paths of the same parabolic shape and would achieve the same range for a given muzzle velocity and quadrant elevation."

Nathan Roberts's reply: The "parabolic shape" of the trajectory of the bullet is caused by density, not gravity or the alleged curvature of a spherically shaped earth.

Doc #41, "Field Artillery Manual Cannon Gunnery", page 48 of 664:
3-57. Gravity causes a projectile in flight to fall to the earth. Because of gravity, the height of the projectile at any instant is less than it would be if no such force were acting on it. In a vacuum, the vertical velocity would decrease from the initial velocity to zero on the ascending branch of the trajectory and increase from zero to the initial velocity on the descending branch, Zero vertical velocity would occur at the summit of
the trajectory. For every vertical velocity value on the upward leg of the ascending branch there is an equal vertical velocity value downward on the descending branch. Since there would be no resistance to the forward motion of the projectile in a vacuum, the horizontal velocity component would be a constant. The acceleration caused by the force of gravity (9.81 m/s) affects only the vertical velocity."

Nathan Roberts's reply: Gravity is an unproven theory, buoyancy is proven. Bullets fall because they are heavier than the medium they are within, that being the air.

Doc #41, "Field Artillery Manual Cannon Gunnery", page 49 of 664:

“The standard (chart) range is the range opposite a given elevation in the firing tables. It is assumed to have been measured along the surface of a sphere concentric with the earth and passing through the muzzle of a weapon. For all practical purposes, standard range is the horizontal distance from the origin of the trajectory to the level point.”

Nathan Roberts’s reply: IF “It is assumed to have been measured along the surface of a sphere concentric with the earth”, then why in the very next sentence does it state “For all practical purposes, standard range is the horizontal distance from the origin of the trajectory to the level point.”

Doc #41, “Field Artillery Manual Cannon Gunnery”, page 51 of 664:
“Deflection effects. Some of the deviations from the standard conditions affecting deflection are:
* Drift.
* Crosswind.
* Rotation of the earth.”

Nathan Roberts’s reply: On page 192, “Rotation of the earth” is established as an “unproven theory”, which holds zero bearing in reality.

Doc #41, “Field Artillery Manual Cannon Gunnery”, page 132 of 664:
5-36. The third condition is valid met corrections considered by each of the firing platoons. This includes the met message valid for the firing platoon, propellant temperature, projectile weight, vertical interval, and corrections for earth rotation.

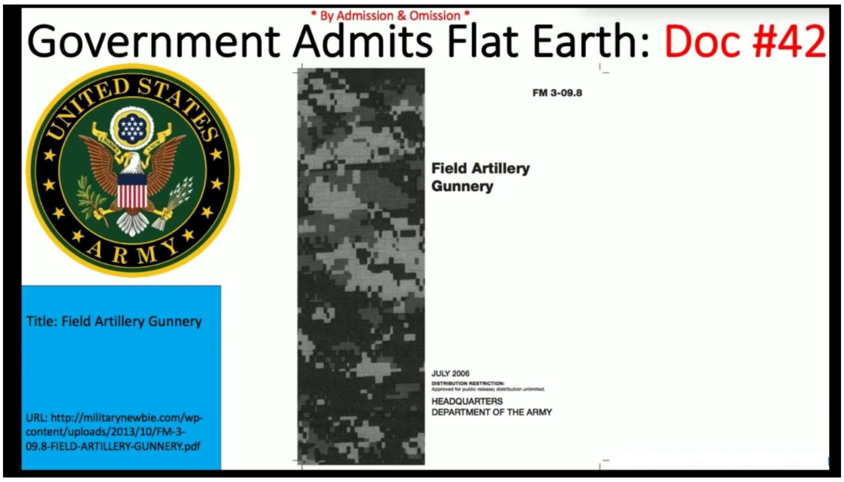
Nathan Roberts’s reply: On page 192, “Rotation of the earth” is established as an “unproven theory”, which holds zero bearing in reality.

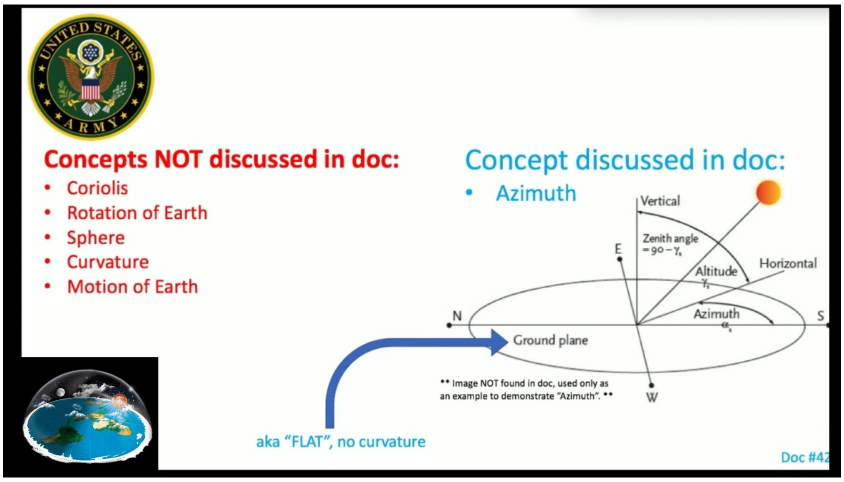
Doc #41, “Field Artillery Manual Cannon Gunnery”, page 186 of 664:
“Range (Column 1). This is the distance measured from the muzzle to the target on the surface of a sphere concentric with the earth. When chart range is used as the entry argument for this table, it is expressed to the nearest 10 meters and interpolation is necessary.”

Nathan Roberts’s reply: The same response given to “sphere concentric with earth” mentioned on page 49 applies here too.

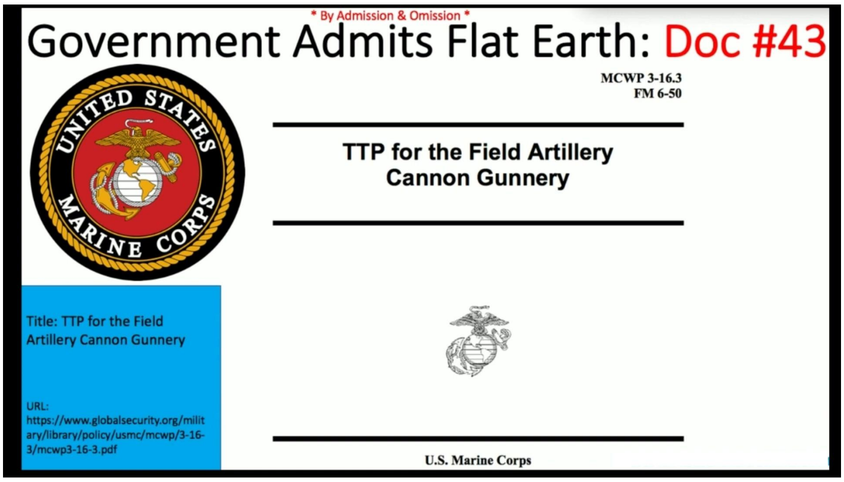
(42) Field Artillery Gunnery
Pages: Cover Page, Azimuth
Only concept of Azimuth on a flat plane is discussed without reference to curvature or rotation of the globe earth or coriolis effect.

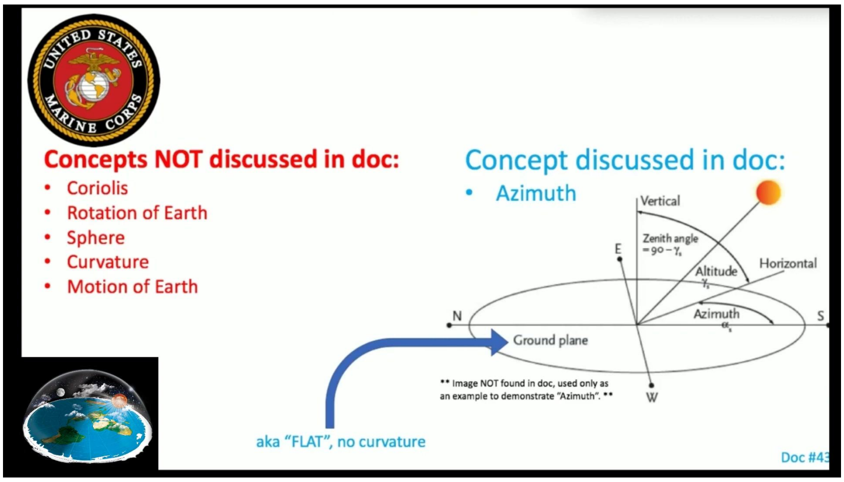
http://militarynewbie.com/wp-content/uploads/2013/10/FM-3-09.8-FIELD-ARTILLERY-GUNNERY.pdf





(43) TTP for the Field Artillery Cannon Gunnery
Pages: Cover Page, Azimuth
Only concept of Azimuth on a flat plane is discussed without reference to curvature or rotation of the globe earth or coriolis effect.
https://www.globalsecurity.org/military/library/policy/usmc/mcwp/3-16-3/mcwp3-16-3.pdf



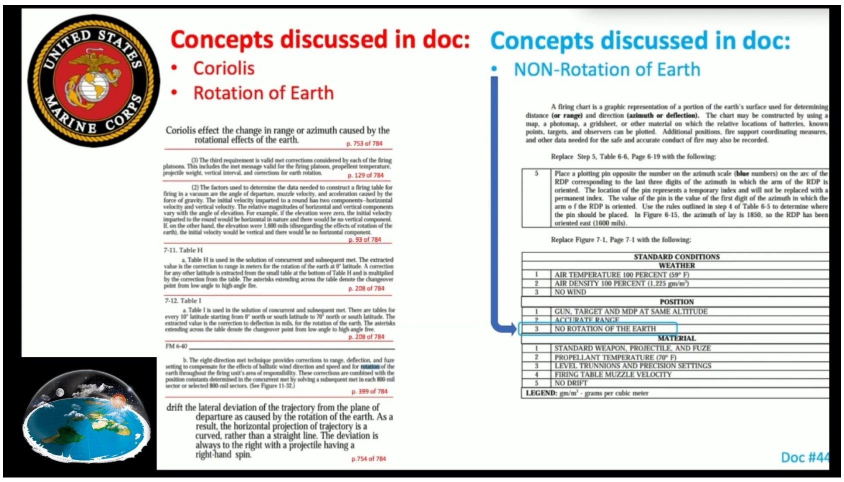


(44) Tactics, Techniques, and Procedures for the field artillery Manual Cannon Gunnery

Pages: Cover Page, Concept, Reconcile, Azimuth

Only concept of Azimuth on a flat plane is discussed without reference to curvature or rotation of the globe earth or coriolis effect.

https://www.marines.mil/Portals/1/Publications/mcwp3_16_4.pdf

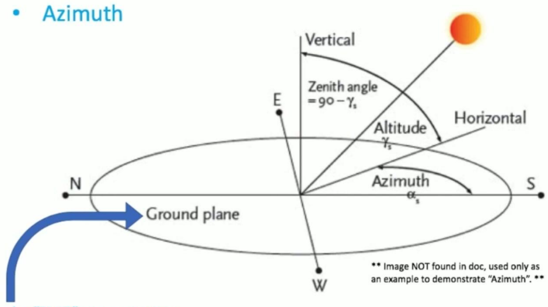


How do we reconcile the difference and apparent contradiction of whether or NOT “rotation of the earth” needs to be taken into account?

1) Other than the mention of the terms “rotation of the earth” and “Coriolis”, there is absolutely no instruction in the doc for “HOW TO” account for the rotation of the earth, why?
2) The rotation of the earth is a theory, and just as in the equation cited in the US Army doc Report 1371 and titled The Production of Firing Tables for Cannon Artillery allows for the variable of alleged rotation of the earth to be zero (0) leaving the entirety of the equation unaffected, and it is the same with this doc produced by the US Marine Corps.

Concept discussed in doc:

- Azimuth



aka “FLAT”, no curvature