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Review of Published Safety Thresholds for Human Divers Exposed to Underwater Sound (Veilige maximale geluidsniveaus voor duikers - beoordeling van publicaties) 01-Apr-2008 18 pages

Authors: M A Ainslie; TNO Defence Security and Safety The Hague (Netherlands)

Full Text

High levels of underwater sound can be harmful to human divers, as they can result in hearing damage or damage to other organs, either directly, or indirectly by causing a panic reaction. Published recommendations for the maximum safe underwater sound level are reviewed. The results of the review are presented in the form of safety thresholds of underwater sound for divers, in the frequency range 125 hertz to 250 kilohertz. ...

Pendeo-Epitaxy Process Optimization of GaN for Novel Devices Applications APR 2008 22 pages

Authors: Michael A. Derenge; Tsvetanka S. Zheleva; Kenneth A. Jones; Pankaj B. Shah; Daniel Ewing; J. Molstad; Unchul Lee; Matthew H. Ervin; David N. Stepp; ARMY RESEARCH LAB ADELPHI MD SENSORS AND ELECTRON DEVICES DIRECTORATE

Full Text

A relatively new class of materials known as wide bandgap materials and the corresponding devices fabricated from them have extremely useful characteristics for high temperature, high-frequency, high-power applications in numerous army systems and components. However the technology for these new materials is not mature enough and these materials contain various types of structural defects in high concentrations. It is well known that structural defects degrade the performance of the electronic ...

Ionospheric Response to Solar Flares Using an Improved Version of SAMI2 MAR 2008 102 pages

Authors: III Reich Joseph P.; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF ENGINEERING AND MANAGEMENT/DEPT OF ENGINEERING PHYSICS

Full Text

Solar flare-induced disturbances in the ionosphere can affect the propagation of electromagnetic waves, causing errors in GPS navigation, false radar echoes, and loss of HF radio communications. Accurately modeling the ionospheric response to flares is the first step in predicting, and eventually mitigating their effects. Sami2 is Another Model of the Ionosphere (SAMI2) is a 2-D ionospheric model, which, in its standard form, is ill-suited for studying solar flare effects ...

Computational Electromagnetics 25 FEB 2008 10 pages

Authors: Oscar P. Bruno; MICHELSON SCIENCE CENTRE/CALTECH PASADENA CA

Full Text

The Objectives are as follows: 1) High-frequency integral equations: Multiple-scattering/ shadowing interactions; 2) Periodic and random surfaces and structures; 3) Canonical Integration: Edge scattering; 4) Canonical Integration: High Frequency; 5) Geometry representation and solution of challenging real-world problems.

Development of Finer Spatial Resolution Optical Properties from MODIS 04 FEB 2008 10 pages

Authors: S. D. Ladner; J. C. Sandidge; P. E. Lyon; R. A. Arnone; R. W. Gould; Z. P. Lee; P. M. Martinolich; NAVAL RESEARCH LAB STENNIS SPACE CENTER MS OCEANOGRAPHY DIV

Full Text

Typical MODIS ocean color products are at 1 kilometer (km) spatial resolution, although two 250 meter (m) and five 500 m bands are also available on the sensor. We couple these higher resolution bands with the 1km bands to produce pseudo-250m resolution MODIS bio-optical properties. Finer resolution bio-optical products from space significantly improve our capability for monitoring coastal ocean and estuarine processes. Additionally, increased resolution is required for validation of ...

Modeling Exposure to Electromagnetic Fields with Realistic Anatomical Models: The Brooks Finite Difference Time Domain (FDTD) 01-Feb-2008 32 pages

Authors: John Ziriax; Samuel Adams; Jason Payne; Lauri Harris; NAVAL HEALTH RESEARCH CENTER SAN DIEGO CA

Full Text

Air Force Research Laboratory/Human Effectiveness Directorate Radio Frequency Radiation Branch (AFRL/RHDR) and Naval Health Research Center (NHRC) have long used Finite Difference Time Domain (FDTD) software to study radiofrequency radiation (RF) bioeffects. FDTD is a direct time-domain solver for Maxwell's equations. The original Brooks FDTD code was developed as part of the Brooks Dosimetry Project and has been repeatedly enhanced to meet empirical and theoretical research needs. Many feature upgrades ...

Cavitation-Induced Vibrations in a Two-Bladed Rocket Engine Inducer FEB 2008 11 pages

Authors: Kevin Burton; Robert Hibbs; Mark Nadolski; Maria Subbaraman; AEROJET SACRAMENTO CA

Full Text

Experimental investigation of cavitation induced vibrations in a 2-bladed water model inducer was performed for inlet flowrates ranging from 70% to 120% of the design flowrate and over a range of inlet cavitation numbers representative of a typical rocket engine operation. Dynamic (high frequency) pressure transducers were used to record fluctuating pressures along inducer housing (stationary reference frame) up to 2500 Hz, i.e. about 30 times the shaft speed. Data ...

Spectral Studies of Shallow Earthquakes and Explosions: Implications for P/S Energy Partitioning, Stress Drop, and Discrimination 16-Jan-2008 35 pages

Authors: Peter Shearer; Bettina Allmann; CALIFORNIA UNIV SAN DIEGO LA JOLLA INST OF GEOPHYSICS AND PLANETARY PHYSICS

Full Text

We compute and analyze P-wave spectra from 18,101 earthquakes and 1770 explosions recorded by 196 broadband seismic stations in southern California at epicentral distances up to 100 km. We use an online waveform database stored on a RAID system at Caltech, which provides complete access to the Southern California Seismic Network (SCSN) seismogram archive. We compute spectra using 1.28s noise and signal windows, positioned immediately before and after the P ...

Numerical Modeling of the Airborne Radar Signature of Dismount Personnel in the UHF-, L-, Ku-, and Ka-Bands DEC 2007 30 pages

Authors: Calvin Le; Traian Dogaru; ARMY RESEARCH LAB ADELPHI MD SENSORS AND ELECTRON DEVICES DIRECTORATE

Full Text

This technical report presents numeric computations of the radar cross section (RCS) of a human body placed on top of a ground plane, as seen by an airborne radar. The simulated data was collected in four frequency bands, at low microwave frequencies (UHF- and L-bands), and high microwave frequencies (Ku- and Ka-bands). For the low frequency bands we used the Finite Difference Time Domain (FDTD) modeling technique, whereas for the ...

On the Calculation of Particle Trajectories from Sea Surface Current Measurements and Their Use in Satellite Sea Surface Products off the Central California Coast DEC 2007 88 pages

Authors: Luke J. Spence; NAVAL POSTGRADUATE SCHOOL MONTEREY CA

Full Text

This thesis explores the possibility and feasibility of improving existing satellite measurements of sea surface temperature (SST) by the incorporation of high-frequency (HF) radar-derived surface current data. Water parcels tagged with SST are advected using particle trajectories calculated by integrating surface current velocity data. The SST of these advected water parcels are compared to SST measurements at the final times and locations of the advected water parcels. Different methods of ...

Comparison of Gallium Nitride High Electron Mobility Transistors Modeling in Two and Three Dimensions DEC 2007 77 pages

Authors: William A. Gibson; NAVAL POSTGRADUATE SCHOOL MONTEREY CA

Full Text

This thesis looks at modeling Gallium Nitride (GaN) High Electron Mobility Transistor (HEMT) Semiconductors. The GaN device has potential future military use in the high power and high frequency operation replacing costly millimeter wave tubes This would affect military radar systems, electronic surveillance systems, communications systems and high voltage power systems by providing smaller and more reliable devices to drive operation This thesis looks at using diamond substrate to improve ...

Electrical Activation Studies of Silicon Implanted Aluminum Gallium Nitride with High Aluminum Mole Fraction DEC 2007 311 pages

Authors: Elizabeth A. Moore; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF ENGINEERING AND MANAGEMENT

Full Text

This research demonstrates a method for producing highly conductive Si-implanted n-type aluminum gallium nitride (AlxGa1-xN) alloys, and represents a comprehensive analysis of the resulting material's electrical and optical properties as a function of Al mole fraction, anneal temperature, anneal time, and implantation dose. Highly conductive alloys are critical to the fabrication of devices operating in deep UV, high-temperature, high-power, and high-frequency environments, and thus this research is significant in regard ...

Coastal Mixing 15 NOV 2007 3 pages

Authors: Eric A. D'Asaro; Ren C. Lien; WASHINGTON UNIV SEATTLE APPLIED PHYSICS LAB

Full Text

We seek to understand the mechanisms of turbulence and mixing in shallow water sufficiently well to be able to specify useful parameterizations for coastal circulation models. We seek to understand the links between mixing rates, the circulation and productivity of the coastal ocean. We seek to develop the technology to make accurate Lagrangian measurement of ocean processes and the analysis techniques to use it. The short-term objective was to analyze ...

Time Series Analysis of VLBI Astrometric Source Positions at 24-GHZ 01-Sep-2007 5 pages

Authors: D A Boboltz; A L Fey; NAVAL OBSERVATORY WASHINGTON DC

Full Text

To date there have been 10 VLBI experiments observed over a period spanning 5 years and analyzed for the purpose of establishing a high-frequency (24 GHz) reference frame. The database now contains information on 274 sources and a total of 1052 images. From the data, we have produced a high-frequency astrometric catalog of 266 sources. Of these 266 sources, 88 of them have been observed in at least five epochs. ...

Bipolar Cascade Vertical-Cavity Surface-Emitting Lasers for RF Photonic Link Applications SEP 2007 154 pages

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

Full Text

The development and demonstration of bipolar cascade vertical cavity surface emitting lasers is presented. The systematic approach to designing, fabricating, and characterizing the critical tunnel junction, incorporating the tunnel junction into an edge emitting bipolar cascade laser, and finally the transition to a VCSEL structure is detailed. A novel approach prior to growing and characterizing BC VCSELs was to investigate bipolar cascade light emitting diodes which incorporate the microcavity designs ...

Unsteady Low-Reynolds Number Aerodynamics for Micro Air Vehicles (MAVs) AUG 2007 9 pages

Authors: Michael V. Ol; AIR FORCE RESEARCH LAB WRIGHT-PATTERSON AFB OH AIR VEHICLES DIRECTORATE

Full Text

This report documents recent progress in in-house research in the AFRL Air Vehicles Directorate on unsteady aerodynamics at low Reynolds number. The application is the aerodynamics and flight dynamics of agile Micro Air Vehicles, to include flapping-wings. Experiments included quantitative and qualitative flowfield velocimetry on the Selig SD7003 airfoil, undergoing a range of harmonic and ramp motions in two degrees of freedom - that is, pitch and plunge. Relevant classical ...

A Model for the Propagation of Nonlinear Surface Waves over Viscous Muds 05 JUL 2007 14 pages

Authors: James M. Kaihatu; Alexandru Sheremet; K. T. Holland; TEXAS A AND M UNIV COLLEGE STATION DEPT OF CIVIL ENGINEERING

Full Text

The effect of a thin viscous fluid -mud layer on nearshore nonlinear wave -wave interactions is studied using a parabolic frequency-domain nonlinear wave model, modified to incorporate a bottom dissipation mechanism based on a viscous boundary layer approach. The boundary-layer formulation allows for explicit calculation of the mud-induced wave damping rate. The model performed well in tests based on laboratory data. Numerical tests show that damping of high frequency waves ...

Optoelectronic Circuits Using 2D and 3D Self-Collimation Photonic Crystals JUL 2007 50 pages

Authors: Dennis W. Prather; DELAWARE UNIV NEWARK DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

Full Text

In our effort to develop and demonstrate the design, fabrication, and experimental characterization of self-collimation photonic crystal devices (SCPhCs) in both 2D and 3D structures, we identified various tasks and goals towards achieving the proposed applications. Two-dimensional self collimation photonic crystal structures will be used for in-plane optical signal distribution and routing while three-dimensional structures will be used for out-plane signal distribution, to provide high-density optically interconnected optoelectronic PhC circuits ...

The NRL Long-Wavelength Test Array 22 JUN 2007 27 pages

Authors: K. P. Stewart; B. C. Hicks; P. C. Crane; P. S. Ray; C. Gross; E. Polisensky; A. Cohen; N. E. Kassim; K. W. Weiler; NAVAL RESEARCH LAB WASHINGTON DC REMOTE SENSING DIV

Full Text

The NRL Long-Wavelength Test Array (NLTA) was constructed to develop and test active baluns and electrically short dipoles for possible use as the primary wideband receiving elements for an emerging suite of large HF/VHF arrays including the Low Frequency Array (LOFAR) and the Long-Wavelength Array (LWA). Several dipoles of various designs and dimensions have been built and tested. Their useful range is when the dipoles arms are between approximately 1/8 ...

Basis of Ionospheric Modification by High-Frequency Waves JUN 2007 21 pages

Authors: S. P. Kuo; POLYTECHNIC UNIV BROOKLYN NY DEPT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

Full Text

The requirements of achieving ionospheric modification by ground-transmitted HF heating waves are discussed. The directly relevant processes including linear mode conversion and parametric instabilities are explained physically. The nonline & Schrodinger equation for Langmuir waves is reviewed and the initial conditions of two types of nonlinear solutions are discussed; from which the criterion for Langmuir soliton generation is pointed out.

Modeling of High-Frequency Acoustic Propagation in Shallow Water JUN 2007 150 pages

Authors: Juan C. Torres; NAVAL POSTGRADUATE SCHOOL MONTEREY CA

Full Text

This research involves numerical modeling of acoustic signals through shallow water channels. The sound is computationally modeled in a vertical plane as a dense fan of beams radiating from the transmitter location. The cross section of each 2-dimensional beam is represented as a Gaussian distribution of acoustic energy. The Gaussian beam travels axially along rays governed by Snell's Law, dispersing in width as a function of travel distance. At arbitrary ...

Prostate Cancer Detection by Molecular Urinalysis APR 2007 12 pages

Authors: Christian P. Pavlovich; David Y. Chan; JOHNS HOPKINS UNIV BALTIMORE MD

Full Text

Prostate cancer is the most commonly diagnosed cancer and the second leading cause of cancer-related death in the United States. The most common DNA alteration associated with prostate cancer is hypermethylation in the regulatory region of certain genes, particularly in the promoter of the pi-class glutathione- 5-transferase (GSTP1) gene. Analysis of hypermethylation of other gene promoters in combination has demonstrated high sensitivity and specificity for prostate cancer diagnosis. In this ...

Computational Electromagnetics APR 2007 15 pages

Authors: Fernando L. Reitich; MINNESOTA UNIV MINNEAPOLIS SCHOOL OF MATHEMATICS

Full Text

Progress in the development of fast, error-controllable algorithms for the simulation of electromagnetic scattering throughout the frequency spectrum is reported. Advances are described in the development of (1) accelerated, high-order methods for the solution of general, penetrable scattering problems in the low-to-moderate frequency regime; (2) spectral methods for the solution of approximate high-frequency models (geometrical optics -GO-); and (3) general error-controllable high-frequency scattering solvers. Major accomplishments include the completion of ...

Impact of Magneto-Electric Materials and Devices on Tactical Radio (and Radar) APR 2007 20 pages

Authors: Jennifer Zinck; Christopher Henry; Deborah Kirby; HRL LABS LLC MALIBU CA

Full Text

The interest in incorporating ME materials in electronic devices has been reinvigorated by the promising electric-field based control of magnetization or magnetization-based control of polarization in monolithic materials. Primary screening of ME monolithic materials based on their ferroelectric and magnetic ordering temperatures indicate they are not ready for application in devices and require further investment. Thus attention turned toward composite-based materials that magnetoelectrically couple through a strain field, which have ...

The Effects of Water Spray Cooling in Conjunction with Halogenated Extinguishants on Hydrogen Fluoride Generation and Decay MAR 2007 16 pages

Authors: Ian Burch; DEFENSE SCIENCE AND TECHNOLOGY ORGANIZATION VICTORIA (AUSTRALIA) MARITIME PLATFORMS DIV

Full Text

The halogenated extinguishants Halon 1301, HFC-227ea (FM200) and NAF-S-III used within Royal Australian Navy vessels for total flooding fire suppression applications have hydrogen fluoride (HF) toxicity concerns. HF is readily produced when these extinguishants are subjected to elevated temperatures and is highly toxic in small concentrations. In the open literature, water spray used in conjunction with halogenated extinguishants has been reported to reduce peak HF production during extinguishment as well ...

Aspect Angle Dependence of Pump-Induced Turbulence in the Ionosphere (Short-Term Support) 28 FEB 2007 4 pages

Authors: Brett C. Isham; INTER AMERICAN UNIV OF PUERTO RICO-BAYAMON CAMPUS

Full Text

During Fall 2005 and Fall 2006 experiments were carried out at EISCAT in Norway aimed at advancing related science questions while improving the technical capabilities of ground-based radar and radio remote sensing systems. Significant progress was made between these campaigns in technical equipment capabilities and groundwork was laid for future advances. Related collaborations were initiated in advance of the 2006 campaign to assist in 2006 and future experiments. Radio and ...

Calibration and Verification Procedures at ARL for the Focus Microwaves Load Pull System NOV 2006 28 pages

Authors: Benjamin D. Huebschman; ARMY RESEARCH LAB ADELPHI MD SENSORS AND ELECTRON DEVICES DIRECTORATE

Full Text

When evaluating the performance of technologically innovative microwave devices, it is important to be able to validate the performance of the system performing the measurements. The theory behind the measurements used in recent Army Research Laboratory testing of the Gallium Nitride high electron mobility transistor devices is described. The verification of calibration used in the measurement is outlined in detail, including a metric by which the accuracy of the validation ...

GHz Modulation of GaAs-Based Bipolar Cascade VCSELs (Preprint) NOV 2006 6 pages

Authors: W. J. Siskaninetz; R. G. Bedford; Jr. Nelson T. R.; J. E. Ehret; J. D. Albrecht; J. A. Lott; AIR FORCE RESEARCH LAB WRIGHT-PATTERSON AFB OH SENSORS DIRECTORATE

Full Text

The high-frequency modulation characteristics of GaAs-based bipolar cascade vertical cavity surface emitting lasers operating at 980 nm with GaAs tunnel junctions and p-doped Al0.98Ga0.02As oxide apertures have been measured. We achieve -3 dB laser output modulations of 6.5 GHz for 2-stage and 9.4 GHz for 3-stage devices in response to small-signal current injection at an operating temperature of -50 ?C.

Multifunctional Magnetodielectric Composites for Antenna and High Frequency Applications NOV 2006 5 pages

Authors: Xiaokai Zhang; Michael C. Golt; Jr. Ekiert Thomas F.; Shridhar Yarlagadda; Karl M. Unruh; John Q. Xaio; DELAWARE UNIV NEWARK

Full Text

Miniaturization of high frequency antennas while maintaining desirable bandwidth, impedance, and loss characteristics has recently attracted great attention in part due to the development of metamaterials. Ideal magnetodielectric materials should have the largest possible index of refraction which match the impedance of the materials to the environment and improve the antenna bandwidth. One approach to achieve such magnetodielectrics is to embed magnetic materials in a dielectric matrix. In this work, ...

Ultrasonic Methods for Human Motion Detection 01 OCT 2006 30 pages

Authors: James M. Sabatier; Alexander E. Ekimov; MISSISSIPPI UNIV UNIVERSITY NATIONAL CENTER FOR PHYSICAL ACOUSTICS

Full Text

Methods of human detection utilizing low-frequency (typically below a few hundred Hertz) seismic signals from footsteps are well known. Human footsteps generate broadband frequency vibration and sound signals from a few Hertz up to ultrasonic frequencies. The authors investigated the physical mechanisms involved in the generation of high frequency signals and the possibility of their application for human footstep detection. Striking and sliding contacts between a foot and the ground/floor ...

Frequency Dependent Quality of HF-Communication Channels Estimated by Superresolution 01-Oct-2006 16 pages

Direction Finding

Authors: Stefan Hawlitschka; FGAN-FKIE WACHTBERG (GERMANY)

Full Text

Remote Observations of the Spatial Variability of Surface Waves Interacting With an Estuarine Outflow OCT 2006 16 pages

Authors: Brian K. Haus; Rafael J. Ramos; Hans C. Graber; Lynn K. Shay; Zachariah R. Hallock; NAVAL RESEARCH LAB STENNIS SPACE CENTER MS OCEANOGRAPHY DIV

Full Text

This paper explores the application of phased-array high-frequency (HF) radars to identify locations of enhanced local wave heights. Measurements of the near-surface current velocities and wave heights were obtained from HF radars deployed near the mouth of the Chesapeake Bay in the fall of 1997. The radar-derived near-surface velocities were compared with the upper bin (2-m depth) of four upward-looking acoustic Doppler current profilers (ADCPs). The slopes of the ...

Dual Fine Tracking Control of a Satellite Laser Communication Uplink 14 SEP 2006 190 pages

Authors: Louis A. Noble; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF ENGINEERING AND MANAGEMENT

Full Text

A dual fine tracking control system (FTCS) is developed for a single aperture optical communication receiver to compensate for high frequency disturbances affecting tracking of two incident laser communication beams. The optical communication receiver resides within a payload module aboard a geosynchronous satellite, while each laser communication transmitter is housed within a module aboard a high altitude unmanned aerial vehicle (UAV). In addition to platform specific disturbances, the impact of ...

On Validation of Directional Wave Predictions: Review and Discussion 13 SEP 2006 41 pages

Authors: W. E. Rogers; David W. Wang; NAVAL RESEARCH LAB STENNIS SPACE CENTER MS OCEANOGRAPHY DIV

Full Text

This report consists of supplementary materials for an article, accepted for publication in the "Journal of Atmospheric and Oceanic Technology," dealing with directional wave model validation by the same authors. These materials provide important background information for this companion paper, but were not included due to journal page limitations. Part I of this report provides a review of literature related to directional validation of wave models. Part II of this ...

Closing the Loop: Control and Robot Navigation in Wireless Sensor Networks 05 SEP 2006 140 pages

Authors: Shawn M. Schaffert; CALIFORNIA UNIV BERKELEY DEPT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

Full Text

Wireless sensor networks have received considerable attention for their potential as a cheap, easily deployed, distributed monitoring tool. Recently, researchers have begun to investigate the use of wireless sensor networks to drive closed-loop control systems. However, such composite systems are nontrivial to design due to the system interface dichotomy: control systems typically assume periodic, high frequency sensor updates whereas sensor networks provide a periodic, low frequency, and laggy sensor updates. ...

Laser Covariance Vibrometry for Unsymmetrical Mode Detection SEP 2006 250 pages

Authors: Michael C. Kobold; AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF ENGINEERING AND MANAGEMENT

Full Text

Simulated cross - spectral covariance (CSC) from optical return from simulated surface vibration indicates CW phase modulation may be an appropriate phenomenology for adequate classification of vehicles by structural mode. The nonlinear structural to optical relationship is close to unity, avoiding nulls and high values; optical return contains sufficient spectral ID information necessary for data clustering. The FE model has contact between the homogeneous rolled armor and vehicle hull, a ...

Data Integrity in RFID Systems SEP 2006 113 pages

Authors: Nikolaos Alchazidis; NAVAL POSTGRADUATE SCHOOL MONTEREY CA

Full Text

One of the main problems that affect the data integrity of passive RFID systems is the collision between the tags. A popular anticollision algorithm which dominates the standards in HF and UHF passive RFID systems is Framed Slotted Aloha (FSA) and some variations of FSA. Throughput and Average time delay of the RFID system which determines the performance/efficiency of the system are reduced rapidly when the number of tags inside ...

Advanced Filters and Components for Power Applications 31 AUG 2006 135 pages

Authors: Timothy C. Neugebauer; Brandon J. Pierquet; David J. Perreault; MASSACHUSETTS INST OF TECH CAMBRIDGE LAB FOR ELECTROMAGNETIC AND ELECTRONIC SYSTEMS

Full Text

The objective of the research presented in this report is to improve the high frequency performance of power filters and components by better compensating the parasitic effects of practical components. A major application for this improvement is in design of low pass filters for power electronics, although some other applications are also explored. In power electronics, the input and output filters are the dominant consideration in limiting electromagnetic interference and ...

Including Nearshore Processes in Phase-Averaged Hydrodynamics Models AUG 2006 47 pages

Authors: Bradley D. Johnson; ENGINEER RESEARCH AND DEVELOPMENT CENTER VICKSBURG MS COASTAL AND

HYDRAULICS LAB

Full Text

The large spatial and time scales of the numerical modeling projects of the U.S. Army Corps of Engineers (USACE) requires the use of computationally efficient phase-averaged hydrodynamic models derived by averaging the equations of motion over a representative short wave period. Guidance in modeling nearshore regions with phase-averaged hydrodynamic models is provided herein. Physical processes unique to the surf zone are described along with methods of incorporating these effects to ...

Wave Climate and Wave Response, Kawaihae Deep Draft Harbor, Island of Hawaii, Hawaii AUG 2006 107 pages

Authors: Edward F. Thompson; Zeki Demirbilek; Michael J. Briggs; ENGINEER RESEARCH AND DEVELOPMENT CENTER VICKSBURG MS COASTAL AND HYDRAULICS LAB

Full Text

Present and projected commercial activities in Kawaihae Deep Draft Harbor, Island of Hawaii, HI, indicate that a deeper basin and entrance channel and better protected berthing areas will be needed. The U.S. Army Engineer District, Honolulu, in coordination with the Harbors Division, Department of Transportation, State of Hawaii, requested numerical (computer) model studies in support of harbor planning. Wave climate incident to Kawaihae Deep Draft Harbor was developed from National ...

Terahertz Electromagnetic Imaging of Dielectric Materials 20 JUL 2006 15 pages

Authors: Gabriella Pinter; WISCONSIN UNIV-MILWAUKEE

Full Text

Theoretical and computational methodologies for the investigation of the propagation of high frequency ultrashort electromagnetic pulses in dielectric materials were developed. The models incorporated nonlinearly forced Debye and nonlinear Debye polarization dynamics and demonstrated the importance of taking into consideration nonlinear effects especially when the amplitude of the input signal was large. The development of a Brillouin precursor was demonstrated in linear and nonlinear models and its attenuation rate was ...

Fulfilling the Roosevelts' Vision for American Naval Power (1923-2005) 30 JUN 2006 73 pages

Authors: Don DeYoung; Jill Dahlburg; Richard Bevilacqua; Gerald Borsuk; Jay Boris; Simon Chang; Richard Colton; Robert Eisenhauer; Herbert Eppert; Edward Franchi; NAVAL RESEARCH LAB WASHINGTON DC

Full Text

Since its establishment on July 2, 1923, the Naval Research Laboratory (NRL) has excelled in its mission of conducting a broadly based multidisciplinary program of scientific research and advanced technological development directed toward maritime applications of new and improved materials; techniques; equipment; systems; and ocean, atmospheric, and space sciences and related technologies. Products of the Laboratory include a number of innovations that have revolutionized the capabilities of the United States ...

Environmental Assessment - Construct a Ground-to-Air Transmitter and Receiver (GATR) Facility at Grand Forks Air Force Base 06 JUN 2006 88 pages

Authors: 319 CIVIL ENGINEER SQUADRON GRAND FORKS AFB ND

Full Text

The United States Air Force (USAF) proposes to construct a Ground-to-Air Transmitter and Receiver (GATR) facility on Grand Forks Air Force Base (AFB), North Dakota. The Communication Squadron is preparing to install new GATR communication antennas and systems, for tactical aircraft control and commercial air traffic control. The antennas are used to provide quick deployment and high-bandwidth communications in remote, hard-to-reach areas. These systems allow operators in central locations to ...

Direction Finding Errors Induced by Plasmawaves of the Ionosphere 01 JUN 2006 27 pages

Authors: Stefan Hawlitschka; FGAN-FKIE WACHTBERG (GERMANY)

Full Text

A super-resolution high frequency (HF) direction finding (DF) system has been used to measure the temporal characteristics of mid-latitude ionospheric irregularities. By analysis of the log power spectrum of the temporal profiles they are classified into six classes: (1) traveling wave packets (TWPs), (2) wave trains (WTs), (3) large-scale traveling disturbances at the terminator (TLSTIDs), (4) interference of different waves (IDW), (5) chaos and (6) quiet state. Their occurrence is ...

Ground-Based Radar Detection of the Inner Boundary of the Ion Plasma Sheet and its Response to the Changes in the Interplanetary Magnetic Field 01-Jun-2006 34 pages

Authors: P T Jayachandran; J W MacDougall; D R Moorcroft; E F Donovan; NEW BRUNSWICK UNIV FREDERICTON DEPT OF PHYSICS

Full Text

Observations of the Tongue of Ionization with GPS TEC and SuperDARN 01-Jun-2006 45 pages

Authors: Anthea Coster; M Colerico; J C Foster; J M Ruohoniemi; HAYSTACK OBSERVATORY WESTFORD MA

Full Text

Simulation and Performance of a High Frequency Cycloconverter JUN 2006 119 pages

Authors: Jonathan Gilliom; NAVAL POSTGRADUATE SCHOOL MONTEREY CA

Full Text

With modern naval vessels headed in the direction of integrated power systems, new attention must be paid to efficiency of both power and space. However, modern designs for ship power systems often incorporate DC link converters, or synchroconverters, into their design. Not only does this add extra steps into the power conversion process, it also adds the DC link, which requires large capacitors and can aggravate problems experienced in a ...

Photonic Arbitrary Waveform Generation Technology JUN 2006 37 pages

Authors: Jr Delfyett Peter J.; UNIVERSITY OF CENTRAL FLORIDA ORLANDO

Full Text

Modelocked semiconductor lasers emit short (1 GHz) and can be utilized for a wide variety of applications, but are typically geared towards time domain applications, e.g., optical time division multiplexed optical links, optical sampling, etc. Additionally, the periodic nature of optical pulse generation from modelocked semi conductor diode lasers also makes these devices ideal candidates for the generation of high quality optical frequency combs, or multiple wavelengths, in addition to ...

Magnetic Meta-Materials for Electromagnetic Applications JUN 2006 67 pages

Authors: George C. Hadjipanayis; DELAWARE UNIV NEWARK DEPT OF PHYSICS AND ASTRONOMY

Full Text

The most significant achievements of the project are 1) Development of R2Fe14B-based (nano)composite permanent magnets with maximum energy product (BH)m>50 MGOe, 2) Improvement of the magnetic properties of the existing Sm2Co17-type magnets with (BH)m close to their theoretical limit and with higher operating temperatures, up to 500 deg C, 3) Development of new (nano)composite permanent magnets based on a hard magnetic phase (e.g., 2:17, 1:5) and a soft magnetic phase ...

SAPHIRE: A New Flat-Panel Digital Mammography Detector With Avalanche Photoconductor and High-Resolution Field Emitter Readout JUN 2006 33 pages

Authors: Wei Zhao; STATE UNIV OF NEW YORK AT ALBANY RESEARCH FOUNDATION

Full Text

A new concept of flat-panel imager (FPI) with avalanche gain and high resolution (with 50 micron pixel size) is being investigated for improving the imaging performance of digital mammography at low dose and high spatial frequencies, which are critical for the detection of subtle breast abnormalities and the development of digital tomosynthesis. The detector employs an avalanche photoconductor - amorphous selenium (a-Se), called HARP, to detect and amplify the optical ...

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