

Detection and Remediation Technologies for Mines and Minelike Targets XII

Conference Chairs: **Russell S. Harmon**, U.S. Army Research Office; **J. Thomas Broach**, U.S. Army RDECOM CERDEC NVESD; **John H. Holloway, Jr.**, Naval Surface Warfare Ctr. Panama City

Program Committee: **Leslie M. Collins**, Duke Univ.; **Yogadhis Das**, Defence Research and Development Canada (Canada); **Gerald J. Dobeck**, Naval Surface Warfare Ctr. Panama City; **Paul D. Gader**, Univ. of Florida; **John E. McFee**, Defence Research and Development Canada (Canada); **Kevin A. O'Neill**, U.S. Army Engineer Research and Development Ctr.; **Nicola A. Playle**, Defence Science and Technology Lab. (United Kingdom); **James M. Ralston**, Institute for Defense Analyses; **James M. Sabatier**, The Univ. of Mississippi; **Motoyuki Sato**, Tohoku Univ. (Japan); **Miranda A. Schatten**, U.S. Army RDECOM CERDEC NVESD; **Waymond R. Scott, Jr.**, Georgia Institute of Technology; **Stefan K. Sjökvist**, Swedish Defence Research Agency (Sweden); **Richard C. Weaver**, U.S. Army RDECOM CERDEC NVESD

Monday 9 April

SESSION 1

Room: Chicago/Denver Mon. 8:30 to 9:50 am

Acoustics

Chairs: **James M. Sabatier**, The Univ. of Mississippi; **Steven S. Bishop**, U.S. Army Night Vision & Electronic Sensors Directorate

8:30 am: **Surface velocity phases of the seismic/acoustic ratio and buried landmines**, J. M. Sabatier, G. M. Matakah, G. Broussard, R. Lirette, C. McNeill, The Univ. of Mississippi [6553-01]

8:50 am: **Adaptive CFAR detection algorithm for acoustic-seismic landmine detection**, G. M. Matakah, M. Matalgah, J. M. Sabatier, The Univ. of Mississippi [6553-02]

9:10 am: **Direct mechanical landmine excitation with LDV surface measurements**, S. S. Bishop, U.S. Army Night Vision & Electronic Sensors Directorate; P. Tsopelas, J. A. Judge, J. F. Vignola, The Catholic Univ. of America [6553-03]

9:30 am: **Basic experiments on seismo-acoustic waves, interacting with subsurface cylindrical voids and ground-surface sensors**, T. G. Muir, R. Mack, J. M. Sabatier, The Univ. of Mississippi [6553-05]

Coffee Break 9:50 to 10:30 am

SESSION 2

Room: Chicago/Denver Mon. 10:30 am to 12:10 pm

Electromagnetic Induction I

Chairs: **Juan P. Fernández**, Dartmouth College; **Fridon Shubitidze**, Dartmouth College

10:30 am: **Effects of magnetic soil on metal detectors: preliminary experimental results**, Y. Das, Defence Research and Development Canada (Canada) [6553-06]

10:50 am: **Toward a model for predicting the magnetic susceptibility of bedrock regolith**, B. J. Harrison, New Mexico Institute of Mining and Technology; R. L. Van Dam, Michigan State Univ.; J. M. H. Hendrickx, New Mexico Institute of Mining and Technology [6553-07]

11:10 am: **Estimating soil's effective magnetic susceptible from EMI data**, I. Shamatava, Dartmouth College; B. E. Barrowes, U.S. Army Engineer Research and Development Ctr.; F. Shubitidze, Dartmouth College; K. A. O'Neill, U.S. Army Engineer Research and Development Ctr.; K. Sun, J. P. Fernández, Dartmouth College [6553-08]

11:30 am: **Evaluation of the Geonics EM-63 time-domain metal detector/discriminator**, L. S. Riggs, Auburn Univ.; B. E. Barrowes, K. A. O'Neill, U.S. Army Engineer Research and Development Ctr. [6553-09]

11:50 am: **Broadband electromagnetic induction sensor**, W. R. Scott, Jr., G. D. Larson, Georgia Institute of Technology [6553-10]

Lunch Break 12:10 to 1:20 pm

SESSION 3

Room: Chicago/Denver Mon. 1:20 to 3:00 pm

Electromagnetic Induction II

Chairs: **Russell S. Harmon**, U.S. Army Research Office; **Yogadhis Das**, Defence Research and Development Canada (Canada)

1:20 pm: **Inferring the location of buried UXO using a support vector machine**, J. P. Fernández, Dartmouth College; B. E. Barrowes, K. A. O'Neill, U.S. Army Engineer Research and Development Ctr.; K. D. Paulsen, I. Shamatava, F. Shubitidze, K. Sun, Dartmouth College [6553-11]

1:40 pm: **Buried metallic object identification by EMI sensor**, M. Sezgin, TÜBITAK Marmara Research Ctr. (Turkey) [6553-12]

2:00 pm: **Performance of a four-parameter model for landmine signatures in frequency domain wideband electromagnetic induction detection systems**, E. Fails, Duke Univ. Chapter; P. A. Torrione, L. M. Collins, Duke Univ. [6553-13]

2:20 pm: **A combined NSMC and Pole series expansion approach for UXO discrimination**, F. Shubitidze, Dartmouth College; B. E. Barrowes, K. A. O'Neill, U.S. Army Engineer Research and Development Ctr.; I. Shamatava, J. P. Fernández, K. Sun, Dartmouth College [6553-14]

2:40 pm: **NSMC for UXO discrimination in cases with overlapping signatures**, F. Shubitidze, Dartmouth College; B. E. Barrowes, K. A. O'Neill, U.S. Army Engineer Research and Development Ctr.; I. Shamatava, K. Sun, J. P. Fernández, Dartmouth College [6553-15]

Coffee Break 3:00 to 3:30 pm

SESSION 4

Room: Chicago/Denver Mon. 3:30 to 6:00 pm

Radar

Chairs: **James M. Ralston**, Institute for Defense Analyses; **Francis Navish III**, U.S. Army Night Vision & Electronic Sensors Directorate

3:30 pm: **An assessment of the fundamental performance of GPR against buried landmines (Invited Paper)**, D. J. Daniels, ERA Technology Ltd. (United Kingdom) [6553-16]

4:00 pm: **Obstacle avoidance and concealed target detection using the Army Research Lab Ultra-Wideband Synchronous Impulse Reconstruction (UWB SIRE) forward imaging radar**, L. H. Nguyen, D. C. Wong, M. A. Ressler, F. Koenig, B. Stanton, G. M. Smith, J. P. Sichina, K. A. Kappra, Army Research Lab. [6553-17]

4:20 pm: **Fusion of disturbed soil feature for down-looking ground-penetrating radar mine detection**, E. M. Rosen, E. Ayers, Institute for Defense Analyses [6553-18]

4:40 pm: **Improvements based on ground penetration radar field evaluations in Angola**, F. Navish III, U.S. Army Night Vision & Electronic Sensors Directorate [6553-19]

5:00 pm: **Preliminary measurements of ruffled water surface, snow, and bare soil microwave reflective and emissive characteristics polarization and correlative features by polarimetric, combined scatterometer-radiometer system of 15GHz**, A. K. Arakelyan, A. A. Arakelyan, A. K. Hambaryan, ECOSERV Remote Observation Ctr. Co. Ltd. (Armenia); S. F. Clifford, CIREs [6553-20]

5:20 pm: **Preliminary measurements of ruffled water surface microwave reflective and emissive characteristics results of spatio-temporally combined, microwave active-passive of bare and vegetated soil, snow and water surface at 5.6 GHz**, A. K. Hambaryan, A. K. Arakelyan, ECOSERV Remote Observation Ctr. Co. Ltd. (Armenia) [6553-21]

5:40 pm: **ICA analysis of polarization data in microwave X band region for detection of shallow buried non-metallic dummy landmines without explosives.**, K. C. Tiwari, D. Singh, M. Arora, Indian Institute of Technology Roorkee (India) [6553-22]

Tuesday 10 April

SESSION 5

Room: Chicago/Denver **Tues. 8:40 to 10:00 am**

Littoral Studies I

Chairs: **Gerald J. Dobeck**, Naval Surface Warfare Ctr.;
Jason R. Stack, Naval Surface Warfare Ctr.

8:40 am: **Multisensor, multi-environment learning for underwater object classification**, J. R. Stack, F. J. Crosby, Naval Surface Warfare Ctr.; Y. Hue, L. Carin, Duke Univ. [6553-23]

9:00 am: **Underwater magnetic gradiometer for magnetic anomaly detection, localization, and tracking**, S. Kumar, D. C. Skvoretz, M. J. Ebbert, S. L. Bennett, A. Tzouris, Quantum Magnetics, Inc.; G. S. Sulzberger, J. T. Bono, G. I. Allen, T. R. Clem, Naval Surface Warfare Ctr. [6553-24]

9:20 am: **Dynamic tree segmentation of side-scan sonar imagery**, J. T. Cobb, Naval Surface Warfare Ctr.; K. C. Slatton, Univ. of Florida; G. J. Dobeck, Naval Surface Warfare Ctr. [6553-25]

9:40 am: **Underwater target classification using the wing BOSS and Bayesian sampling-based decision fusion**, N. S. Wachowski, M. R. Azimi-Sadjadi, Colorado State Univ. [6553-26]

Coffee Break 10:00 to 10:30 am

SESSION 6

Room: Chicago/Denver **Tues. 10:30 to 11:50 am**

Littoral Studies II

Chairs: **Gerald J. Dobeck**, Naval Surface Warfare Ctr.;
James T. Cobb, Naval Surface Warfare Ctr.

10:30 am: **Automated sea mine detection, classification, and fusion in high-resolution sonar imagery**, G. J. Dobeck, Naval Surface Warfare Ctr. ... [6553-27]

10:50 am: **Nonlinear feature fusion of processing strings for automated sea-mine classification in HF and BB SAS imagery in shallow water**, T. Aridgides, M. F. Fernández, Lockheed Martin Corp. [6553-28]

11:10 am: **Impact of image decimation and quantization on the performance of sonar computer-aided detection/computer-aided classification (CAD/CAC) algorithms**, C. M. Ciany, W. C. Zurawski, Raytheon Co. ... [6553-29]

11:30 am: **Coherent-based feature extraction for detection and classification of underwater objects from sonar imagery**, M. R. Azimi-Sadjadi, J. D. Tucker, Colorado State Univ. [6553-30]

Lunch/Exhibition Break 11:50 am to 1:30 pm

SESSION 7

Room: Chicago/Denver **Tues. 1:30 to 2:30 pm**

Spectral Sensing I

Chairs: **Miranda A. Schatten**, U.S. Army Night Vision & Electronic Sensors Directorate; **John E. McFee**, Defence Research and Development Canada (Canada)

1:30 pm: **Image processing of landmines**, D. J. Daniels, R. Allan, S. Jennings, ERA Technology Ltd. (United Kingdom) [6553-31]

1:50 pm: **HYDRUS simulations of surface temperatures**, J. Kleissl, Univ. of California/San Diego and New Mexico Institute of Mining and Technology; J. M. H. Hendrickx, New Mexico Institute of Mining and Technology; J. Simunek, Univ. of California/Riverside [6553-32]

2:10 pm: **Assessments of phenomenologies for multi-optical mine detection**, S. K. Sjökvist, M. S. G. Uppsäll, D. Letalick, Swedish Defence Research Agency (Sweden) [6553-33]

SESSION 8

Room: Chicago/Denver **Tues. 2:30 to 5:00 pm**

Spectral Sensing II

Chairs: **J. Michael Cathcart**, Georgia Institute of Technology;
Eduardo H. Castro, Univ. de Buenos Aires (Argentina)

2:30 pm: **Buried mine detection in airborne imagery using co-occurrence texture features**, S. Tiwari, S. Agarwal, Univ. of Missouri/Rolla; A. H. Trang, U.S. Army Night Vision & Electronic Sensors Directorate [6553-35]

2:50 pm: **Multiclassifier buried mine detection using MWIR images**, B. Ling, Migma Systems, Inc.; A. H. Trang, US Army RDECOM CERDEC NVESD [6553-36]

Coffee Break 3:10 to 3:40 pm

3:40 pm: **Processed infrared images of plastic and metallic landmines in an Argentine project**, E. H. Castro, H. A. Abbate, Univ. de Buenos Aires (Argentina) and Instituto de Investigaciones Científicas y Técnicas de las FFAA (Argentina); M. Costanzo, Instituto de Investigaciones Científicas y Técnicas de las FFAA (Argentina); M. E. Mejail, J. Gambini, J. C. Jacobo Berllés, J. M. Santos, P. Borensztejn, Univ. de Buenos Aires (Argentina) [6553-37]

4:00 pm: **Landmine detection using B-spline deformable contours in IR images**, M. E. Mejail, J. Gambini, M. E. Buemi, E. H. Castro, H. A. Abbate, J. C. Jacobo Berllés, P. M. Borenstijn, J. M. Santos, Univ. de Buenos Aires (Argentina) [6553-38]

4:20 pm: **A novel patterned and unpatterned minefield detection in cluttered environments using Markov marked point process**, A. H. Trang, J. T. Broach, T. E. Smith, U.S. Army Night Vision & Electronic Sensors Directorate; S. Agarwal, Univ. of Missouri/Rolla; P. Regalia, The Catholic Univ. of America [6553-39]

4:40 pm: **Trial of a vehicle-mounted UK electro-optic countermeasure sensor system as part of a UK/US collaborative program**, R. M. Deas, N. A. Playle, K. Long, Defence Science and Technology Lab. (United Kingdom) [6553-86]

✓ Posters-Tuesday

Room: Spa Terrace **Tues. 6:00 to 7:30 pm**

All symposium attendees are invited to attend the poster sessions provided as an opportunity to enjoy refreshments while reviewing poster papers. Each evening will represent a different set of conferences to promote opportunities for networking with colleagues in your field. Attendees are encouraged to review the high-quality papers that are presented in this alternate format and to interact with the poster authors. Attendees are requested to wear their conference registration badges to the poster sessions.

Authors may set-up their posters between 10:00 am and 5:00 pm on Tuesday. Posters that are not set-up by the 5:00 pm cut-off time will be considered no-show and their manuscript will not be published. All posters must be removed no later than 8:00 pm, any papers left on the boards at the close of the poster session will be considered unwanted and will be discarded. SPIE assumes no responsibility for posters left up after the end of each poster session. Poster authors should be at their papers from 6:00 pm to 7:30 pm to answer questions from attendees.

✓ **Influence of environmental conditions in fate and transport of ERCs in a physical 3D model: spatial and temporal assessment effects in a sandy soil**, A. A. Anaya, I. Y. Padilla, Univ. de Puerto Rico Mayagüez [6553-82]

✓ **Vapor sampling of ERCs for environmental assessment in atmospheric and soil settings**, D. Acevedo, A. A. Anaya, O. Carrasquillo, I. Y. Padilla, Univ. de Puerto Rico Mayagüez [6553-83]

✓ **Angular and intensity dependence of NQR remote explosive detection**, G. Ota, H. Itozaki, Osaka Univ. (Japan) [6553-84]

✓ **Physical modeling of 2,4-DNT gaseous diffusion through unsaturated soil**, A. Torres, I. Y. Padilla, Univ. de Puerto Rico Mayagüez [6553-85]

Wednesday 11 April

SESSION 9

Room: Chicago/Denver Wed. 8:00 to 9:40 am

Spectral Sensing III

Chairs: **Saurabh Agarwal**, Univ. of Missouri/Rolla;
Edwin M. Winter, Technical Research Associates, Inc.

8:00 am: **Real-time airborne hyperspectral imaging of landmines**, T. A. Ivanco, S. B. Achal, ITRES Research Ltd. (Canada); J. E. McFee, Defence Research and Development Canada (Canada); C. D. Anger, ITRES Research Ltd. (Canada) [6553-40]

8:20 am: **A thermal hyperspectral imager (tasi) for buried landmine detection**, S. B. Achal, ITRES Research Ltd. (Canada); J. E. McFee, Defence Research and Development Canada (Canada); T. A. Ivanco, C. D. Anger, ITRES Research Ltd. (Canada) [6553-41]

8:40 am: **Development of a terrain surface model for optical property computation**, J. M. Cathcart, D. Cash, B. Remesch, Georgia Institute of Technology [6553-42]

9:00 am: **Methods for determining best multispectral bands using hyperspectral data**, E. M. Winter, Technical Research Associates, Inc. . [6553-43]

9:20 am: **SPICE: a sparsity promoting iterated constrained endmember extraction algorithm with applications to landmine detection from hyperspectral imagery**, A. Zare, P. D. Gader, Univ. of Florida [6553-44]

Coffee Break 9:40 to 10:30 am

SESSION 10

Room: Chicago/Denver Wed. 10:30 am to 12:20 pm

Multisensor, Systems, and Testing II

Chair: **Mark C. Locke**,
U.S. Army Night Vision & Electronic Sensors Directorate

10:30 am: **Handheld standoff mine detection system (HSTAMIDS) operational field evaluation in Cambodia** (*Invited Paper*), R. C. Doherty, Office of Assistant Secretary of Defense; S. P. Burke, R. Cresci, P. Ngan, C. E. Walk, U.S. Army Night Vision & Electronic Sensors Directorate [6553-45]

11:00 am: **MINEHOUND: transition to production**, D. J. Daniels, P. Curtis, N. Hunt, ERA Technology Ltd. (United Kingdom) [6553-46]

11:20 am: **The development of the hand-held dual-sensor ALIS**, M. Sato, K. Takahashi, Tohoku Univ. (Japan) [6553-47]

11:40 am: **The evaluation test of hand-held dual-sensor ALIS in Croatia and Cambodia**, M. Sato, K. Takahashi, A. G. Gorriti, Tohoku Univ. (Japan) . . [6553-48]

12:00 pm: **Test and evaluation of Japanese GPR-EMI dual-sensor systems at Benkovac Test Site in Croatia**, J. Ishikawa, Japan Science and Technology Agency (Japan) and Tokyo Denki Univ. (Japan); K. Furuta, Tokyo Denki Univ. (Japan); N. Pavkovic, Ctr. for Testing Development and Training (Croatia) [6553-49]

Lunch/Exhibition Break 12:20 to 1:20 pm

SESSION 11

Room: Chicago/Denver Wed. 1:20 to 3:00 pm

Multisensor, Systems, and Testing II

Chairs: **Motoyuki Sato**, Tohoku Univ. (Japan); **Roger Cresci**, U.S. Army Night Vision & Electronic Sensors Directorate

1:20 pm: **Automated calibration methods for robotic multisensor landmine detection**, J. Keranen, J. Miller, G. Shultz, Applied Research Associates, Inc.; Z. J. Topolosky, U.S. Army Night Vision & Electronic Sensors Directorate [6553-50]

1:40 pm: **Imaging of buried targets using seismic and ground-penetrating radar data**, T. W. Counts, G. D. Larson, A. C. Gurbuz, J. H. McClellan, W. R. Scott, Jr., Georgia Institute of Technology [6553-51]

2:00 pm: **Visual cues for landmine detection**, J. J. Staszewski, Carnegie Mellon Univ.; A. Davison, Army Research Lab. [6553-52]

2:20 pm: **NATO-SCI-133 guides for planning and reporting tests of countermine equipment**, R. H. M. A. Schleijsen, TNO (Netherlands); H. E. Bertrand, Institute for Defense Analyses [6553-53]

2:40 pm: **An investigation into landmine neutralisation techniques for a vehicle-mounted countermine system**, D. Lockley, Defence Science and Technology Lab. (United Kingdom) [6553-54]

Coffee Break 3:00 to 3:30 pm

SESSION 12

Room: Chicago/Denver Wed. 3:30 to 4:50 pm

Explosive Detection I: Environmental

Chairs: **Ingrid Y. Padilla**, Univ. de Puerto Rico Mayagüez;
Aaron La Pointe, U.S. Army Night Vision & Electronic Sensors Directorate

3:30 pm: **Transport of explosive related chemicals from a point source**, I. Y. Padilla, J. P. Gutierrez, M. d. L. Irizarry, A. Torres, S. Hwang, Univ. de Puerto Rico Mayagüez [6553-55]

3:50 pm: **Adsorption coefficients for TNT on soil and clay minerals**, N. Mina, R. Rivera, M. A. Muñoz, Univ. de Puerto Rico Mayagüez [6553-56]

4:10 pm: **Development of a multiscale packing methodology for evaluating fate and transport processes of explosive-related chemicals in clayey soils**, S. Rodriguez, I. Y. Padilla, S. Hwang, Univ. de Puerto Rico Mayagüez . . [6553-57]

4:30 pm: **Effect of environmental parameters on the chemical signature of TNT in soil**, M. Irazábal-Aguilera, Univ. de Puerto Rico Mayagüez [6553-59]

Thursday 12 April

SESSION 13

Room: Chicago/Denver Thurs. 8:00 to 10:00 am

Explosive Detection II

Chairs: **Russell S. Harmon**, U.S. Army Research Office;
Yunping Yang, Physical Optics Corp.

8:00 am: **False alarm reduction during landmine detection**, P. J. Prado, L. Doraisamy, G. A. Barrall, A. Chongpison, K. Derby, N. Rusakov, GE Security [6553-60]

8:20 am: **Research and development of humanitarian landmine detection system by a compact discharge-type fusion neutron source**, K. Yoshikawa, K. Masuda, T. Takamatsu, S. Shiroya, T. Misawa, Y. Takahashi, Kyoto Univ. (Japan); E. Hotta, K. Yamauchi, Tokyo Institute of Technology (Japan); M. Ohnishi, H. Osawa, Kansai Univ. (Japan) [6553-61]

8:40 am: **Development of NQR explosive detector in Japan**, H. Itozaki, Osaka Univ. (Japan) and National Institute for Materials Science (Japan); G. Ota, Osaka Univ. (Japan); M. Tachiki, D. He, National Institute for Materials Science (Japan) [6553-62]

9:00 am: **Portable LIBS and Raman spectroscopy standoff chemical analysis system**, Y. Yang, R. D. Pradhan, R. M. Kurtz, N. V. Menon, G. D. Savant, Physical Optics Corp. [6553-63]

9:20 am: **Femtosecond laser-induced breakdown spectroscopy and femtosecond laser mass spectrometry of explosives**, Y. Dikmelik, C. McEnnis, J. B. Spicer, Johns Hopkins Univ. [6553-64]

9:40 am: **Development of HPLC-SPME methodology for detection of nitro-explosives**, S. P. Hernández-Rivera, S. L. Peña, E. de la Cruz-Montoya, Univ. de Puerto Rico Mayagüez [6553-65]

Coffee Break 10:00 to 10:20 am

SESSION 14

Room: Chicago/Denver Thurs. 10:20 am to 12:20 pm

Signal Processing I: Fusion

Chairs: **Paul D. Gader**, Univ. of Florida;
Richard C. Weaver, U.S. Army Night Vision & Electronic Sensors Directorate

10:20 am: **Managing landmine detection sensors: results from application to AMDS data**, M. P. Kolba, L. M. Collins, Duke Univ. [6553-66]

10:40 am: **Landmine-detection prescreeners based on feature-level fusion of SAR and HSI data**, K. I. Ranney, Army Research Lab. [6553-67]

11:00 am: **Confidence level fusion of edge histogram descriptor, hidden Markov model, and spectral correlation feature**, D. K. C. Ho, Univ. of Missouri/Columbia; P. D. Gader, Univ. of Florida; H. Frigui, Univ. of Louisville; J. N. Wilson, Univ. of Florida [6553-68]

11:20 am: **Context-dependent fusion for landmine detection with ground-penetrating radar**, H. Frigui, L. Zhang, Univ. of Louisville; P. D. Gader, Univ. of Florida; D. K. C. Ho, Univ. of Missouri [6553-69]

11:40 am: **Use of the Borda count for landmine discriminator fusion**, J. N. Wilson, P. D. Gader, Univ. of Florida [6553-70]

12:00 pm: **Land mine detection applying holographic neural technology (HNeT)**, J. G. Sutherland, AND Corp. (Canada); W. C. Radzelovage, Raytheon Co. [6553-88]

Lunch Break 12:20 to 1:20 pm

SESSION 15

Room: Chicago/Denver Thurs. 1:20 to 3:00 pm

Signal Processing II

Chairs: **Peter A. Torrione**, Duke Univ.; **Kenneth I. Ranney**, Army Research Lab.

1:20 pm: **Segmentation of labeled GPR data for improved training**, L. Carin, Duke Univ. [6553-71]

1:40 pm: **Ground bounce tracking for landmine detection using a sequential Monte Carlo method**, L. Tang, P. A. Torrione, L. M. Collins, Duke Univ. . [6553-72]

2:00 pm: **Soil compensation techniques for the detection of buried metallic objects using electromagnetic sensors**, L. R. Pasion, The Univ. of British Columbia (Canada); S. D. Billings, Sky Research; D. W. Oldenburg, The Univ. of British Columbia (Canada) [6553-87]

2:20 pm: **Feature learning for a hidden Markov model approach to landmine detection**, X. Zhang, P. D. Gader, Univ. of Florida; H. Frigui, Univ. of Louisville [6553-74]

2:40 pm: **Visual detection, recognition, and classification of surface-buried UXO based on soft-computing decision fusion**, A. H. Shirkhodaie, H. Rababaah, Tennessee State Univ. [6553-75]

Coffee Break 3:00 to 3:30 pm

SESSION 16

Room: Chicago/Denver Thurs. 3:30 to 5:30 pm

Signal Processing III

Chairs: **Joseph N. Wilson**, Univ. of Florida; **Peter Howard**, U.S. Army Night Vision & Electronic Sensors Directorate

3:30 pm: **Image segmentation techniques for improved processing of landmine responses in ground-penetrating radar data**, P. A. Torrione, L. M. Collins, Duke Univ. [6553-76]

3:50 pm: **Landmine with ground-penetrating radar using discrete hidden Markov models with symbol dependent features**, H. Frigui, O. Missaoui, Univ. of Louisville; P. D. Gader, Univ. of Florida [6553-77]

4:10 pm: **Landmine discrimination using the Kullback-Leibler distance**, J. N. Wilson, Univ. of Florida [6553-78]

4:30 pm: **Application of a modified FFT approach to the subsurface imaging problem**, Y. A. Gryazin, Idaho State Univ. [6553-79]

4:50 pm: **Development of processing algorithm for HSTAMIDS: status and field test results**, P. Ngan, S. P. Burke, R. Cresci, U.S. Army Night Vision & Electronic Sensors Directorate; J. N. Wilson, P. D. Gader, Univ. of Florida; D. K. C. Ho, Univ. of Missouri/Columbia; E. E. Bartosz, H. A. Duvoisin, CyTerra Corp. [6553-80]

5:10 pm: **CA-CFAR detection against K-distributed clutter in GPR**, Y. Bahadirlar, M. Sezgin, TÜBITAK Marmara Research Ctr. (Turkey) [6553-81]

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Refer to pages 13-14 for complete time, schedules, and locations.