Invited Paper

6:00

5pAAb8. Adjustable acoustics --- Coupled volumes in Artec concert halls: an extravagance or necessity? Tateo Nakajima (Artec Consultants Inc, 114 W 26th ST FL 12, New York, NY 10001, USA, tn@artecconsultants.com), Damian J. Doria (Artec Consultants Inc, 114 W 26th ST FL 12, New York, NY 10001, USA, dd@artecconsultants.com), Edward Arenius (Artec Consultants Inc, 114 W 26th ST FL 12, New York, NY 10001, USA, ea@artecconsultants.com), Andrew Morgan (Artec Consultants Inc, 114 W 26th ST FL 12, New York, NY 10001, USA, ajm@artecconsultants.com)

Led by its founder, Russell Johnson, Artec has developed an unequalled body of experience in the practical application of coupled volumes in the design and construction of concert halls. This paper will present a survey of selected past and future Artec projects from the point of view of the artists and venue managers that perform and work in these halls on a daily basis. Are adjustable acoustics an extravagance or a necessity? What practical problems have been encountered and are they inherent in the concept of adjustability or can they be avoided? How have the musicians reacted? And what is the future of adjustable acoustics?

FRIDAY AFTERNOON, 4 JULY 2008 ROOM 343, 1:40 TO 4:20 P.M.

Session 5pAO

Acoustical Oceanography and ECUA: Acoustical Tomography and Long Range Propagation

Timothy Duda, Cochair
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Contributed Papers

1:40

5pAO1. Ocean acoustic tomography using a double-beamforming algorithm. Ion Iturbe (GIPSA-lab, dep. DIS, 961, rue de la Houille Blanche, 38402 St Martin d'Hères, France, ion.iturbe@gipsa-lab.inpg.fr), Philippe Roux (LGIT - CNRS - Université Joseph Fourier, Maison des Géosciences, 1381 rue de la Piscine, BP 53, 38041 Grenoble, France, philippe.roux@obs.ujf-grenoble.fr), Barbara Nicolas (GIPSA-lab, dep. DIS, 961, rue de la Houille Blanche, 38402 St Martin d'Hères, France, barbara.nicolas@gipsa-lab.inpg.fr), Jérôme I. Mars (GIPSA-lab, dep. DIS, 961, rue de la Houille Blanche, 38402 St Martin d'Hères, France, jerome.mars@gipsa-lab.inpg.fr)

Since Munk and Wunsch proposed the basis for ocean acoustic tomography, many experiments have been performed to estimate sound speed fluctuations in the ocean, using ray identification and measurement of their travel times. However, technical limitations appeared such as the precision of the arrival time measurements or the number of ray arrivals that can be extracted from the signal. Recently, technical improvements allowed more complete experiments using two vertical arrays of sensors (source array and hydrophone array). In this configuration, the signals between each source and receiver are recorded which greatly improve the available information to identify the acoustic rays. One way to increase the number of rays in the tomography algorithm is to perform double-beamforming on the source and receive arrays. With double-beamforming, ray arrivals are separated by emission angle, reception angle and arrival time. Thus, we solve more ray arrivals than with a single beamforming or with a point-to-point approach. In order to avoid previous limitations and to explore acoustical limitations, we study two simple cases through the double-beamforming algorithm: with simulated data and with ultrasonic small-scale experimental data.

2:00

5pAO2. A simulation study of shallow water tomography for coastal monitoring. Olivier Carrière (Université libre de Bruxelles (U.L.B.) - Environmental hydroacoustics lab, av. Franklin D. Roosevelt 50, CP 194/5, 1050 Bruxelles, Belgium, ocarrier@ulb.ac.be), Jean-Pierre Hermand(Université libre de Bruxelles (U.L.B.) - Environmental hydroacoustics lab, av. Franklin D. Roosevelt 50, CP 194/5, 1050 Bruxelles, Belgium, jhermand@ulb.ac.be), Yann Stephan (SHOM, 13 rue du Chatellier, CS 92803, 29228 Brest cedex 2, France, yann.stephan@shom.fr)

Developing operational oceanographic models for coastal environment is an exciting challenge for the next decades. The typical sparsity of assimilated *in-situ* observations often creates biases in the model predictions reducing the overall accuracy of the forecasting. In such a highly dynamic environment, acoustic tomography can be a good candidate to provide synoptic measurements over wide areas while a range-dependent inversion scheme allows to achieve a reasonable spatial resolution. In this work, we present simulation results of a Kalman-based assimilation of ocean-acoustic data for a basic model of the Ushant front west off Britanny. In a first part, a single vertical slice tomography experiment is simulated for a static front model to study in which way the modal propagation of a multifrequency acoustic signal is affected by the characteristics of the front (position, intensity). In a second part, the problem of assimilating full-field acoustic data into a dynamic model and tracking of the range-dependent sound-speed field is addressed.

2:20

5pAO3. Sound-speed estimation from RAFOS transmissions. Emmanuel Skarsoulis (FORTH / IACM, N. Plastira 100, Vasilika Voutes, GR-70013 Heraklion, Greece, eskars@iacm.forth.gr), George Piperakis (FORTH / IACM, N. Plastira 100, Vasilika Voutes, GR-70013 Heraklion, Greece, piperak@iacm.forth.gr)

Acoustic navigation of Lagrangian (moving) floats is carried out by measuring travel times from a number of fixed stations/moorings. A minimum of two fixed stations are needed for location estimation in the horizontal, whereas an additional fixed station is commonly used to remove left-right ambiguity. The signals (RAFOS) and sampling schemes used in ocean acoustic navigation are characterized by limited time resolution (order of 200 msec), much smaller than the resolution used in travel-time tomography (order of 1-10 msec). The possibility of combining navigation signals (travel