1064-65-354 **Thomas Hagstrom*** (thagstrom@smu.edu), Department of Mathematics, PO Box 750156, Dallas, TX 75275-0156, and **Seungil Kim**, **Kurt Stein** and **Timothy Warburton**. *Complete Radiation Boundary Conditions on Rectangular Domains.*

The solution of time-domain scattering problems using pde formulations requires near-field radiation boundary conditions which can provide any specified accuracy at reasonable cost and be applied in convenient computational domains. Complete radiation boundary conditions (CRBCs) for isotropic wave systems meet both of these requirements. CRBCs are local boundary condition sequences which interpolate exact conditions along a Laplace inversion contour $\Re s = T^{-1}$ where T is the simulation time. Assuming a separation δ of sources from the boundary, we prove that q nodes can be chosen to guarantee an error less than ϵ with

$$q \propto \ln \frac{1}{\epsilon} \cdot \ln \frac{cT}{\delta}$$

To implement the conditions we evolve a hyperbolic system of $O(q)$ boundary variables. On domains with corners, we must close the boundary system with appropriate compatibility relations. These are derived for smooth solutions by extending the boundary variables, leading to sparse but implicit systems of differential equations for a set of corner variables. Energy estimates establish the uniqueness of solutions with high regularity in domains with corners. Numerical experiments demonstrate the method's accuracy and efficiency. (Received September 14, 2010)