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Bubble distributions and dynamics in the far wake of a ship DOUGLAS SCHWER, RUSSELL DAHLBURG, JAY BORIS, Naval Research Laboratory — This research focuses on how to simulate efficiently the dynamics of the bubble size distribution in the far wake of a surface ship with a water jet or conventional propulsion system. In this region, the wake is undergoing turbulent decay and the bubble void fraction is low enough to justify one-way coupling. A particle-tracking method is used to create an "ideal" bubbly flow solution within a decaying wake, accounting for buoyancy, agglomeration, dissolution, drag, and convection. These solutions are then compared with multi-group methods for bubble size distributions and dynamics. Multi-group methods are generally much more efficient than particle-tracking methods, but determining appropriate expressions for the different bubble processes described above can be less straight-forward. A comparison of the evolution of the bubble distribution in the far wake between the multi-group and particle-tracking methods shows how well the multi-group methods are able to capture the bubble dynamics in these flow regimes.

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