Two variations of the joint probabilistic data association filter (JPDAF) are simulated extensively in this paper.

First, an analytic solution for an optimal gain that minimizes posterior estimate uncertainty is derived, referred to as the minimum uncertainty JPDAF (MUJPDAF).

Second, the coalescence-avoiding optimal JPDAF (C-JPDAF) is derived, which removes coalescence by minimizing a weighted sum of the posterior uncertainty and a measure of similarity between estimated probability densities.

Both algorithms are tested in much further depth than prior work to show how the algorithms perform in various scenarios.