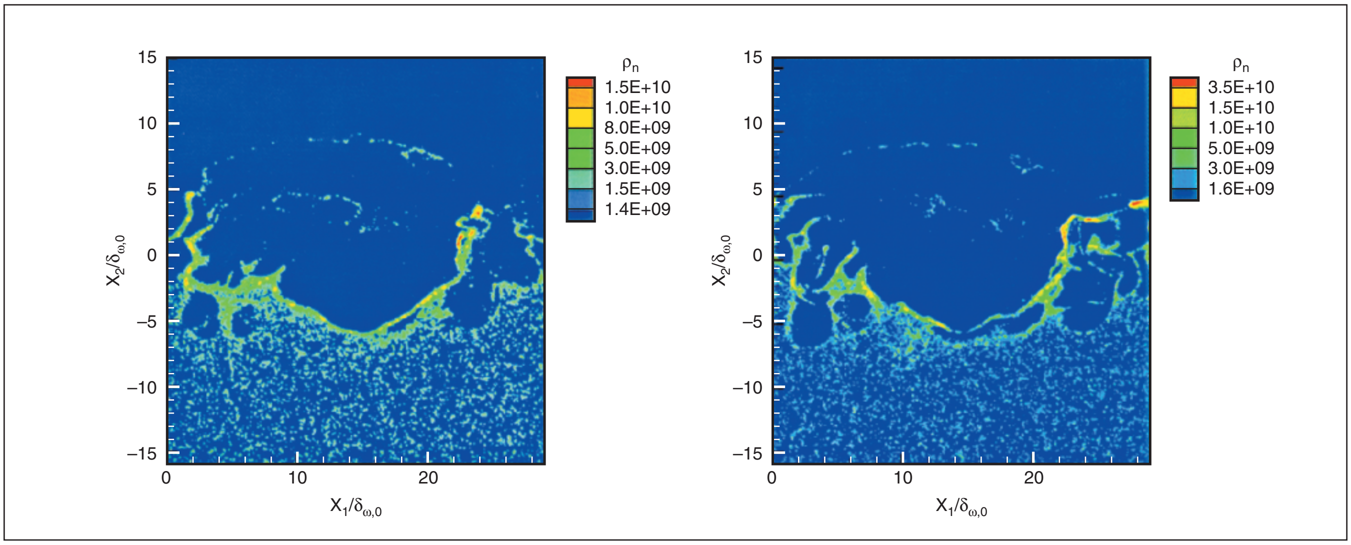

Figure 2. **Drop Number Density** is shown in a representative plane at the final computation time: (a) single-component drop layer and (b) multicomponent drop layer.

variance) than does an equivalent model for a single-component fuel. The initial mathematical form of the distribution function is postulated to be retained during the drop lifetime, but with evolving mean and variance as the drops evaporate.

In a test, a mixing-layer simulation was performed for drops of single-component-fuel and another such simulation for drops of a multicomponent fuel. Analysis of the results revealed that although the global layer characteristics were similar in the single-component and multicomponent cases, the drops evaporated more slowly in the multicomponent than in the single-component case (see Figure 1). The slower evaporation of the multicomponent drops was primarily attributed to the lower volatility of higher molar-weight species and to condensation of these species on drops transported in regions of different gas composition. The more volatile species released in the gas phase earlier during the drop lifetime were found to be entrained in the mixing layer, whereas the heavier species that evaporated later during the drop lifetime tended to reside in regions of high drop-number density. This behavior was found to lead to segregation of species in the gas phase on the basis of the relative evaporation time from the drops. The slower evaporation of multicomponent fuel drops was found to lead to regions of higher drop-number density in the drop-laden layer and to permit greater interaction of the drops with the flow, resulting in a more developed small-scale structure (see Figure 2).

This work was done by Josette Bellan and Patrick Le Clercq of Caltech for **NASA's Jet Propulsion Laboratory**. *Further information is contained in a TSP (see page 1).*
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Solution-Assisted Optical Contacting

Components in optical contact can be adjusted for about a minute.

NASA's Jet Propulsion Laboratory, Pasadena, California

A modified version of a conventional optical-contact procedure has been found to facilitate alignment of optical components. The optical-contact procedure (called simply "optical contacting" in the art) is a standard means of bonding two highly polished and cleaned glass optical components without using epoxies or other adhesives. In its unmodified form, the procedure does not involve the use of any foreign substances at all: components to be optically contacted are dry. The main disadvantage of conventional optical contacting is that it is difficult or impossible to adjust the alignment of the components once they have become bonded.

In the modified version of the procedure, a drop of an alcohol-based optical cleaning solution (isopropyl alcohol or similar) is placed at the interface between two components immediately before putting the components together. The solution forms a weak bond that gradually strengthens during a time interval of the order of tens of seconds as the alcohol evaporates. While the solution is present, the components can be slid, without loss of contact, to perform fine adjustments of their relative positions.

After about a minute, most of the alcohol has evaporated and the optical components are rigidly attached to each other. If necessary, more solution can be added to enable resumption or repetition of the adjustment until the components are aligned to the required precision.

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