

# NASA TECH BRIEF

## *Manned Spacecraft Center*



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### **Prolate Spheroidal Slosh Model for Fluid Motion**

A mathematical model has been developed to analyze the dynamic effects of large amplitude fluid motion interior to a rigid body.

The model is based on defining a slosh surface that approximates the locus of the center of mass of the fluid. The slosh surface is obtained by assuming a plane surface for the fluid and allowing any fluid orientation such that the fluid is against the wall of the tank. The slosh mass is then idealized as a point mass located on the slosh surface. This model allows for any number of slosh masses (one per surface) within one rigid body simulated in six degrees of freedom.

This simulation model has two advantages over other mathematical models of large amplitude slosh. It constrains the slosh motion to a given region in a natural manner and it allows the equilibrium position of the slosh mass to be anywhere on the slosh surface, thus permitting the local acceleration field to vary direction in the body system.

The model was designed for zero gravity conditions. Inclusion of gravity forces is required for terres-

trial applications and should make this model of interest to designers and manufacturers of fluid containers for transportation vehicles such as railroad tank cars.

#### **Note:**

Requests for further information may be directed to:

Technology Utilization Officer  
Manned Spacecraft Center, Code JM7  
Houston, Texas 77058  
Reference: TSP72-10182

#### **Patent status:**

No patent action is contemplated by NASA.

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