The land landing system technical objectives cover the capabilities of a descent system to provide a greater glide range. Maneuvering controls to provide the crew with the ability to make a controlled touch down is another technical objective (Figure 12). The system will provide decreased impact velocities while retaining the original water landing capability.

Many of the Apollo Applications program missions are of long duration and are open-ended. The capability to effect a land landing as well as a water landing thus increases mission abort flexibility. The lower impact velocities will lessen the chances of crew injury and provide greater assurance of crew safety.

To meet the technical objectives of the Apollo Applications landing system, several gliding parachutes have been identified and tests performed on small scale models. They are the cloverleaf, the parawing, and the sailwing (Figure 13). Sufficient development effort on the cloverleaf configuration has verified its capability when used in conjunction with retro rockets for impact attenuation. Modifications to the Command Module are minimum and consist of structural configurations for storage and deployment of the parachutes and the mounting of the retro rockets.

The parawing and the sailwing have greater glide ranges and maneuverability control and if selected for the Apollo Applications program, could obviate the necessity for retro rockets.

The reduced landing accelerations will minimize current crew seat requirements, resulting in more usable volume in the Command Module. Existing couches can be removed and replaced with storable light-weight net couches. This will provide a capability for carrying up to 6 astronauts for short duration resupply ferry flights (Figure 14). The net couches further provide more crew volume for experimentation and other mission required operations.

Studies are currently being conducted for refurbishment and reuse of Apollo Command Modules. Soft landing recovery and reuse provides potential savings in refurbishment costs over that of water recovered spacecraft because of the noncorrosive land environments.

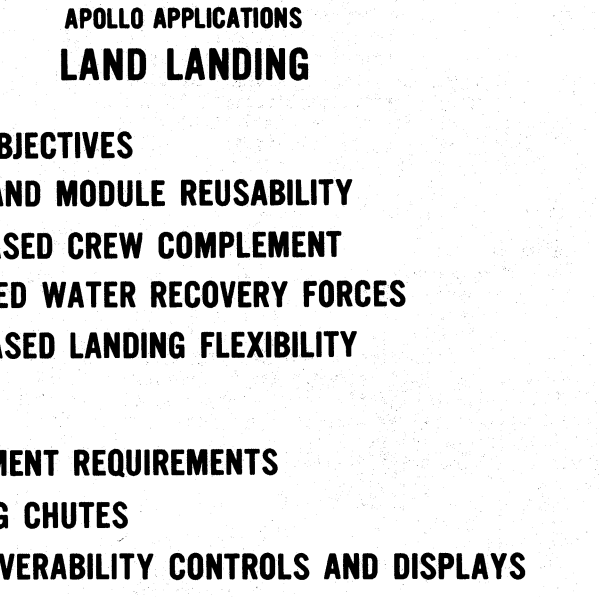

FIGURE 12