

SPACE CAMERA

The accompanying photos show two versions of the Nikon F3 35-millimeter camera, produced by Nikon, Inc., Garden City, New York. At right is the company's standard F3 consumer product; shown below is a camera specially modified for use by Space Shuttle astronauts. The modification work produced a spinoff lubricant. Because lubricants in space have a tendency to "migrate" within the camera, Nikon conducted extensive development to produce non-migratory lubricants; variations of these lubricants are used in the commercial F3, giving it better performance than it would have with conventional lubricants. Another spinoff is the coreless motor, which allows the F3 to shoot 140 rolls of film on one set of batteries.

Nikon modified two cameras that made their space debuts on STS-3, the third test flight of the Shuttle Orbiter Columbia, in March 1982. On that occasion, the cameras were used only for inside shots or for views of the Orbiter's cargo bay taken from the flight deck.



Beginning with STS-6 in 1983, however, the camera will be used by space-suited astronauts working in the cargo bay or outside the Orbiter; the requirement for extravehicular operation of the cameras demanded most of the modifications.

Nikon built a thermal bag to cover most of the F3 and protect it from the extremely harsh environment of low Earth orbit, where temperatures range from 100 degrees to minus 15 degrees Fahrenheit. The normal viewfinder was replaced by a "Long-eye Relief Viewfinder" necessitated by the fact that extravehicular astronauts wear helmets with faceplates; the new viewfinder allows convenient focusing and framing of

pictures despite the fact that the operator's eye is some distance from the camera. Nikon added wing tabs—small extensions that stick out from the Nikkor lens—so the astronauts can change focus ring and aperture settings with gloved hands, and an extended shutter release button to allow gloved shutter tripping. In addition to the standard 36-exposure film pack, the space cameras will also have 250-exposure film magazines. For launch, the F3s are packed in special foam containers to protect them from vibration; in orbit, to prevent floating when the cameras are not in use, they can be stuck to any convenient surface by velcro fasteners along their backs.