

BULOVA'S CONTRIBUTION

All the experience gained in the last decade -- the first decade of the Space Age -- of manned and unmanned flights in space is being put to the test in Project Apollo -- the titanic effort to place men on the Moon and return them safely back to Earth.

Last December, the Saturn V rocket and Apollo's Command Module were tested in space by the Moon-circling mission of Apollo 8. Encouraged by this success, the National Aeronautics and Space Administration has announced that it hopes to schedule the Cape Kennedy launch of the first Apollo Moon-landing mission as early as July 15th.

Bulova's repeated and successful contributions to previous space explorations as outlined in the chronology on the following pages, was one of the main reasons why the Accutron tuning-fork timepiece has again been selected for demanding tasks involved in Project Apollo. For example, Bulova electronic tuning fork timers were utilized in 23 of the 27 space missions of Telstar, Pegasus, LES, Gemini and Lunar Orbiter vehicles. No other watch manufacturer in the world can match that record.

The five unmanned Lunar Orbiter satellites, each equipped with Bulova electronic timers, have already successfully mapped ten potential manned-landing sites on the Moon for the Apollo astronauts. The timers had the task of synchronizing photography by the spacecrafts' photographic subsystem.

Another contribution of Bulova to Apollo consists of programmed long-duration Accutron master timers for use in the Apollo Lunar Surface Experiments Package (ALSEP) program. These self-powered tuning fork timers are designed for unsupervised pre-programmed operations in remote locations for periods of up to two years. In an ALSEP package the Accutron timer is involved in shut-offs and other timer-triggered

events scheduled to take place up to one year after the Apollo astronauts have returned to Earth.

Each of the seven 170-pound ALSEP packages ordered by NASA contains a minimum of four lunar-surface scientific experiments; data from the experiments will be continually transmitted back to Earth over a period of a year.

In addition, NASA has announced that the first Apollo man-landing attempt will employ a lighter and smaller scientific experiments package, designated ESEP (Early Scientific Experiments Package). This package, also, will be equipped with a programmed long-duration Accutron timer (which is incorporated in the Passive Seismic Experiment that will be checking on "Moon quakes").

Bulova Accutron tuning forks serve as components of the on-board navigation system built for Project Apollo. These miniature tuning forks "chop" light into fast-paced moving patterns designed to assist in navigation to the Moon and back.

The compact tuning-fork systems use thin metal blades mounted on the tines of the forks to produce the precise chopping frequencies required by electronic navigation instrumentation. For example, one of these so-called "Moon choppers" uses two blade-equipped tuning forks to slice starlight into fast-moving scanning patterns for a star-tracker. A second chopper system employs a single blade-equipped fork to slice light for a photometer horizon sensor. In both the star-tracker and the photometer, the Accutron tuning forks work to interrupt light beams from external sources so as to produce a modulated signal that is amplified electronically for automated "fix" and control applications.

The mission of Apollo 11 will be the first manned-landing attempt, NASA has announced. Apollo 11 has been tentatively scheduled to start as early as July 15.