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FOR IMMEDIATE RELEASE

SATURN ST-124-M INERTIAL GUIDANCE PLATFORM

The ST-124-M inertial guidance platform, in conjunction with a launch vehicle data adapter and launch vehicle data computer, is the active guidance system that maintains the preset trajectory of Saturn V from the launch through earth orbit attainment and all attitude and velocity control requirements where the (IU) instrument unit is present. This includes S-IVB stage burn periods.

For the Apollo 9 flight, the mission calls for launch on prescribed trajectory for earth orbit, separation of the payload from the Instrument Unit/S-IVB stage, dock of Lunar Module with S-IVB, separation of LM from S-IVB, S-IVB stage burn to attain increased altitude and a third and final S-IVB burn to place the stage in a solar orbit.

For all these maneuvers, the ST-124-M Platform is used to maintain S-IVB stage attitude control, with and without other appendages and during all S-IVB stage burns to determine the exact burn times and velocity increases. (The second two burns of the S-IVB are for evaluation of the stage and do not relate to the Apollo spacecraft mission.)

The platform sub-system, developed and produced by The Bendix Corporation's Navigation & Control Division under contract to the National Aeronautics and Space Administration, is a three-gimbal (three-degree-of-freedom) inertial platform that provides acceleration and attitude measurements required for the Saturn boost vehicle stabilization and control.

Prior to liftoff, the ST-124-M platform is erected to a true vertical and aligned to the required trajectory azimuth. Above five seconds before

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liftoff, the platform is released from ground control (earth fixed) and becomes inertial (space fixed).

From liftoff through first stage burn (time to attain rarified atmosphere) the platform supplies attitude and velocity information to the guidance computer. During this period the computer stores and accumulates the platform generated attitude and velocity data but controls a predetermined program. This is to prevent the vehicle from performing maneuvers which might cause it to break apart while attempting to compensate for winds, jet streams, and gusts encountered in the atmosphere.

If such air currents displace the vehicle from optimum trajectory during its climb through the atmosphere, the platform generates error signals which are used during second and third stage burns to control the return to optimum trajectory. After leaving the earth's atmosphere, the ST-124-M platform system provides primary attitude and velocity parameters for boost vehicle control, and the vehicle trajectory is also corrected for residual errors accumulated during the early boost phase.

Guidance and navigation computations, based on the platform-generated signals representing vehicle attitude and acceleration, are performed by the launch vehicle data computer and launch vehicle data adapter. The accelerometer signals are used to determine vehicle velocity in relation to desired cutoff velocity, burn time for engines, and direction of thrust required to attain the proper altitude and velocity at the required point in space.

Since friction in the platform gyros and accelerometers produces errors which cause errors in ultimate attitude and velocity, the component friction must be held to an absolute minimum. Therefore, the component output axis bearing is floated on a thin film of dry nitrogen supplied at a controlled temperature, pressure and flow rate from reservoirs within the Instrument

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Unit (IU).

The platform also uses beryllium for all structural members and most of its components. Use of this "exotic" space-age metal affords greatly improved stability over a wide range of temperature as well as considerable weight saving.

The ST-124-M is approximately spherical and measures 21 inches in diameter. It weighs about 115 pounds and is mounted in the vehicle's Instrument Unit.

The Navigation & Control Division, a participant in the Saturn program since 1961, has been supplying inertial guidance platform systems for the Saturn I, IB, and V rockets.

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