

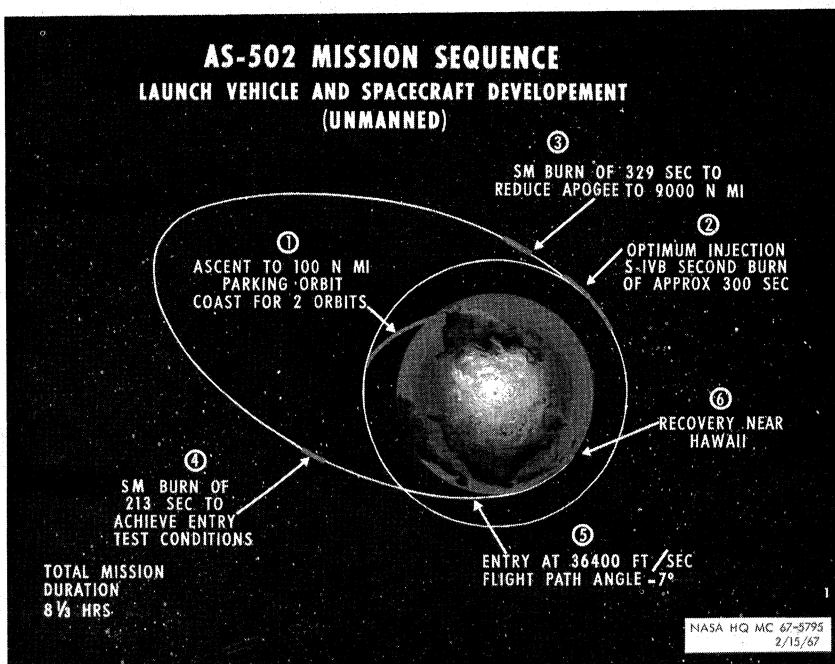


FIGURE 20

Fire detection

Equipment with which to detect fire in space vehicles has always been a matter of interest; however, suitable detectors with adequate reliability have been difficult to develop. We have made some progress in our continuing development program and we are now evaluating those developments and also checking with other organizations to determine whether or not we can now incorporate suitable and reliable sensors into the Apollo spacecraft.

Fire extinguishing

Much work has been done to develop equipment and techniques for extinguishing fires in space vehicles. Since the AS-204 fire, we have accelerated our work and have undertaken additional test programs.

The extinguishment methods under study and test include chemical extinguishing agents, dilution of the oxygen atmosphere with inert gases, cabin depressurization and water sprays.

In the fire extinguishment tests to date, it appears that chemical and inert gas extinguishers are ineffective. The gas streams for such extinguishers entrain sufficient oxygen from the spacecraft atmosphere to cause the fire to burn more vigorously rather than to be extinguished. This is true even for such chemicals as bromotrifluoromethane (CF_3Br) which appears to be quite effective for aircraft fires.

The tests performed using inert gases such as nitrogen as a dilutant indicate that the turbulence caused by the introduction of the gas causes more intense burning.

The most effective fire extinguisher we have found to date is a water spray. On the other hand the detrimental effects of water on electrical equipment together with complexity and weight considerations make the usefulness of this system doubtful.