

MARS/VENUS RECONNAISSANCE PROGRAM FEATURES UTILIZATION AND MODIFICATION OF PRESENT SYSTEMS

MAJOR COMPONENTS

EARTH ENTRY MODULE
MISSION MODULE
SPACECRAFT PROPULSION
EARTH ORBIT ESCAPE STAGE
PROPELLANT TANKERS
LAUNCH SYSTEM
LAUNCH FACILITIES
MISSION CONTROL CENTER
COMMUNICATION AND CONTROL NET

DEVELOPMENT BASE

MODIFIED APOLLO COMMAND MODULE
GROWTH FROM EARTH ORBITAL ACTIVITIES
APOLLO SERVICE MODULE AND LEM
MODIFIED SATURN S-II OR SATURN S-IV B STAGES
MODIFIED S-II
SATURN V
SATURN V
APOLLO
APOLLO + DSIF

TECHNOLOGY EXTENSIONS

ELECTRIC POWER SYSTEMS
LIFE SUPPORT SYSTEMS
ASTRONOMICS (GUIDANCE, COMMUNICATIONS, ETC)
ORBITAL OPERATIONS

HYPERBOLIC ENTRY
LONG-TERM RELIABILITY CONCEPTS
LONG TERM SPACE STORABLE PROPELLANTS
STERILIZATION TECHNIQUES

NASA HQ 4766-6708
12-30-66

FIGURE 119

throughs are necessary for the accomplishment of a Mars/Venus reconnaissance in 1975. In fact, additional data on the target planet environments is not essential but would be useful to increase experiment return by improved systems measurement capability.

Manned Mars landing

Manned planetary reconnaissance missions are a logical step to obtaining the depth of information needed for making decisions regarding the objectives and systems requirements for manned landing missions. When the role of the reconnaissance mission is considered as an evolutionary step in developing a landing mission capability, then its major utility results from manned planetary systems development, proof testing and providing a base of operational experience. Whereas the reconnaissance mission is basically a relatively simple extrapolation of the Apollo and space station hardware, the landing or orbiting missions require many new hardware and systems developments.

As shown on this chart, a Mars landing mission would require upgrading of the Saturn V or development of a more efficient post-Saturn launch vehicle (MC67-5865, see p. 184). Significant technological advancements in earth entry speed capabilities, environmental control/life support, and electrical power sources are indicated for planetary landing missions. Propulsion phases using nuclear rockets such as the Nerva Stage appear necessary for capture missions with manned Mars landing.

Future manned planetary mission studies

During the coming year, more detailed analyses of systems and subsystems related to the Mars/Venus reconnaissance mission capability are to be undertaken. Particular emphasis should be continued in the area of experiment definition incorporated in both the unmanned and manned spacecraft systems.

Examination of new systems capabilities to meet Mars/Venus manned mission requirements in a more efficient manner than provided by technology extrapolation is desirable. These studies will provide direction for technology in developing more advanced capability for solar system exploration. Definition of the experiments and systems development activities required of earlier programs must be accomplished to provide the best inputs for planning of manned planetary missions.