MISSION SUPPORT TO THE MOON EXPLORATIONS

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GROUND SUPPORT

Mission to Moon requires extensive support from Ground Centres.

The support provided by the Ground Base will include information as well as hardware or consumables

This support will include, in general:

- Technical Support, and
- Logistic Support

TECHNICAL SUPPORT

The Technical Support could be divided in three phases, based on Mission timing:

- Pre Mission Analyses,
- Technical Support during the Mission and
- Post-Mission Technical Support

PRE - MISSION ANALYSES

Pre - Mission Analyses include:

- Evaluation of the Systems, Subsystems and Equipments performance given the Mission constraints.
- Performance of several analyses, simulations and tests based on the available up-to-date models of the Systems, Subsystems and Equipments.

TECHNICAL SUPPORT DURING THE MISSION

During the performance of Mission activities Ground Support to Mission Control is necessary, in order to assess the correct performance of the Systems, Subsystems and Equipments, and in order to support Re-planning and Anomalies Resolution.

POST- MISSION TECHNICAL SUPPORT

Post-Mission Technical Support is related with the analysis of the performances, as well as the behaviour of the operative parameters, of the Systems, Subsystems and Equipments during the various Mission phases, in front of the data obtained with the analytical prediction.

From the results of these analyses, trend analyses are performed.

TECHNICAL SUPPORT TO MOON MISSIONS

- On the Moon the explorers must have an increasing responsibility in the control of their activities.
- The level of responsibility delegated to the explorers will increase mission by mission.
- Technical Support team must give real time support to the Moon explorers, in order to immediately support decisions that have to be taken during their activities.

LOGISTIC SUPPORT

- Modern approaches to System/Mission Support are based on Logistic Support Analysis (LSA) and Integrated Logistic Support (ILS) models-
- In Europe, the ECSS (European Cooperation for Space Standardization) Space Standards explicitly refer to USA DOD MIL-STD-1388-1A (LSA) and MIL-STD-1388-2B (LSA Record).

LOGISTIC SUPPORT TO MOON MISSIONS

MoonBase Programme requires sophisticated System design, and specific effort for Logistic Engineering and Logistic Support definition, development and management.

Complex analyses are required to identify Mission Support objectives and priorities, to coherently define the Moon Base expected independence (personnel skill and workload, tools, spares) and external support strategies.

LOGISTIC SUPPORT TO MOON MISSIONS (cont'd)

The Logistic scenario associated with a Moon Mission is very similar to the one associated to a Ship

System design must implement requirements, in terms of safety, reliability etc., that will guarantee to the System a very high probability of correct functioning

MAINTENANCE POLICY

In the beginning the applicable Maintenance level will be the Organizational (R/R).

MRU: Moon Replaceable Units ;-)

Policy for the failed units:

- cannot be disposed on the Moon
- depot repair or disposal on Earth
- destroyed during re-entry.
- Intermediate level Maintenance capability would increase, permitting the repair of the failed units directly on the Moon. Increase of Intermediate Maintenance capabilities will also allow the possibility of performing on condition Maintenance.

LOGISTICS POLICY

The Key element to be considered for the decision of the Maintenance policy is obviously the cost.

Logistics policy depend on one of the most important Logistics Engineering tools:

Life Cycle Cost analysis.

LOGISTIC TOOLS

Exploitation of Logistic Programmes will be based also on Software tools, such as:

- Inventory Management
- Maintenance data collection
- Configuration Control
- Limited Life Items monitoring
- etc.

INFRASTRUCTURES

- Earth – to – Moon Communications
- Moon – to – Moon Communications
- Technical and Logistic Data Base