



## **Manned flight and planetary scientific exploration.**

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Human explorers had a fundamental role in the success of the APOLLO moon programme, they were at the same time the indispensable pilots, scientific operators and on the last missions lead scientists. Since, man did not either return to the moon or land on Mars but manned operation centres on the earth are now conducting extensive telescience on both celestial bodies. Manned flights to moon, Mars and asteroids are however still on the agenda and even if the main drive of these projects is outside science, it is to the planetary scientists to both prepare the data bases necessary for these flights and to ensure that the scientific advantage of conducting research in real time and in situ is exploited to the maximum.

The current manned flight programme in Europe concentrates on the use of the International Space Station, the scientific activities can be roughly divided between the pressurized payloads and the external payloads. Technology developments occur also in parallel and prepare new exploration techniques. The current planning leads to exploitation up to 2020 but the space agencies study further extensions, the date of 2028 having already been considered. The relation of these programmes to future manned planetary exploration will be described both from the science and development point of view.

The complementary role of astronauts and ground operation centres will be described on the basis of the current experience of operation centres managing the International Space Station.

Finally, the NASA ORION project of exploration in the solar system will be described with emphasis on its current European participations. The science opportunities presented by independent ventures as Inspiration Mars or Mars One will be presented.