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ON-BOARD ANALYSIS — WHY? —

Abstract

In the past there were very limited capabilities for the analysis of biological samples, from experiments and the crew. The established procedure was that the samples were collected, preserved and stored on-board under controlled conditions, mostly in a cooler or freezer, till their re-transport to earth for analysis.

The disadvantages of this approach is that the sample quality degrades with time and that experiments with parameters with short term biological life time, e.g. stress hormones, can not be performed.

This can be overcome by on-board analysis. Astrium is working on several analysis technologies with a general broad-band application range. Typical analysis technologies are: immuno-biochemical analysis, use of X-ray, NMR. These methods are not only applicable for the analysis of biological samples, but can be used for other analysis tasks e.g. to monitor the water, air, surfaces, food in closed life support systems or for scientific or operational material inspection.

The availability on-board analysis capabilities is mandatory for future long-term missions and the support of exploration activities. To prepare this an early technological and operational verification on manned missions is highly recommended.

First application fields are the research of the hormonal functions for the bone- and muscle-loss and the understanding of the deprived immune system during long term missions.