

Abstract

The launcher ground connection by umbilical is essential for all launch operations.

The technology of the disconnection and retraction of these connections is often based on gravity. However, sometimes the retraction has to occur quicker than the force of gravity allows.

OHb DC presents, with the Ariane 6 REP-System, a new retraction system that is not dependent on gravity, can be integrated into compact spaces, and assures a fast and effective retraction of the launcher's umbilical during the first phase of a rocket launch.

The disconnection and retraction of the umbilical can be performed in positive time – once the launcher starts to rise.

The system is mechanically triggered by the elevation of the launcher itself, without any need for a sensor or signal. It relies on the elastic force stored in redundant elastic cables that are under tension hours before the launch. When the launcher rises, the umbilical and its steel cables rise with it and trigger the system. This results in a series of actions that occur within half a second: the disconnection of the umbilical, triggering of the REP system, release of the umbilical trolley, retraction of the umbilical, and finally the dampening of the umbilical trolley.

The triggering mechanism is designed to accommodate the launcher displacements through all of its life phases, from the integration up to the launch sequence.

Due to external conditions, temperature changes, and the dilatation of the structures, the umbilical interface is subject to significant displacements and the system has to remain passive.

During the launch, the launcher will rise inside its elevation cone and the REP system has to perform in the position reached by the launcher at its given elevation value.

With small changes such as the number of elastic cables, their length, and the stroke of the triggering system, a large range of umbilical disconnection requirements could be met. This would affect the disconnection altitude, retraction time, and umbilical length.

The REP system also allows for late inspections and component replacements in a confined environment while guaranteeing operator safety.