

Universal Adjustment Platform - standardization of 6 degrees of freedom adjustment systems design and integration

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Abstract

Since decades, the survey experts and mechanical design teams at CERN are facing challenges of implementation, integration and exploitation of various adjustment systems for accelerator components. Each of such adjustment systems needs to fulfil particular integration and functional requirements, which typically results in multiple designs and represents a high total cost spent on repeated development and numerous types of equipment to be manufactured.

Basing on past experience and willing to optimize the way of integration and design of adjustment systems, the Geodetic Metrology Group at CERN proposes a standardized approach, named Universal Adjustment Platform (UAP). The UAP is not a simple adjustment device, but a design framework, describing a way for the implementation of adjustment systems tailored for particular dimensions and weight of components. The UAP strategy assumes using standardized components (“Lego® blocks” approach) and by integration of modified “Stewart platform” kinematic scheme, provides an intuitive and an ergonomic adjustment capability for manual operation or easy integration of sensors and motorized adapters, for applications where full automatization is required.

This paper describes the UAP framework and design guidelines and summarizes the performance and parameters of UAP based platforms prototypes, bringing results of various tests performed between 2018 and 2022.