

Design Basics: The Acceptance Test Plan

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When is a project done? It's a simple question, but deceptively difficult to answer. It's tempting to say that the engineering is done when the device works, but the reality is more subtle. What does it mean for a device to "work"? How does one ascertain that the functional spec is met? Ideally, there should be a rigorous set of quantitative tests in place before commencement of a project—an Acceptance Test Plan (ATP).

An ATP provides a clear procedure for determining that the functional spec has been met—not just in the design, but in the assembled product. The ATP may be determined entirely by the customer's spec, but it may also include testing to determine that the product meets industry-specific regulatory requirements. Having an ATP in place is particularly important in contract-based engineering, as it outlines an unambiguous procedure for determining satisfactory completion of the contract. However, an ATP also provides a number of benefits to the customer and to Stilwell Baker.

From the customer standpoint, having an ATP in place before commencement of the project facilitates the design process and may pay off well after completion of the contract. The process of developing an ATP can help define the scope of the project. An ATP requires a clear, precise functional spec, as well as well-defined tolerances for each test parameter. The process of designing an ATP can help to determine *exactly* what the product must do—what it means for the product to "work" *quantitatively*. Beginning a project with a refined set of design requirements facilitates the design process and can reduce unforeseen engineering difficulties down the line.

At times, it may be impossible to develop an ATP at the outset of the project. The functional spec may be incomplete, to be refined during the design process. In the case of Stilwell Baker's recently completed Erickson Air-Crane (EAC) Automatic Flight Control System (AFCS) project, the previous AFCS version had to be reverse engineered before an accurate functional spec could be assembled. An ATP could not be formulated until the project was nearing completion. This did not make the ATP any less important—extensive testing was still required to ensure that the new system behaved as expected while adhering to FAA regulations. In this and similar cases, the ATP is developed over the course of the project, as the functional spec is fleshed out.

The ATP's usefulness may extend beyond the engineering process. Depending on the industry, it can be repurposed to define quality assurance protocols, production testing, or relevant repair diagnostics. However, its main role is still to demonstrate that the completed design works. It allows the engineers to be sure that the customer is getting exactly what they want. Stilwell Baker believes that developing an ATP as early as possible is essential to the successful completion of the project—an investment that will pay off over the course of the design process.

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