What we do at CAE-II

The purpose of this research is to reduce the development cost by applying this analysis tool/system to the design criteria for new aircraft development or material and structural strength tests during the certification process. In particular, we will develop a versatile and accurate analysis tool to perform strength tests of composite materials or their structures, such as single-layer plate tests, laminated plate tests (including circular hole test piece), and strength tests of structural elements, substructures, and full-scale structures that have been subjected to impact damage. In particular, the virtual testing of CFRTP has not yet been developed worldwide, and this may lead to the strengthening of Japan‘s industrial competitiveness.

A general-purpose finite element analysis code, which is used for conventional stress analysis of aircraft structures, combined with user subroutines is introduced. **This method has already been established in the first phase of the project**. A unique feature of this method is that users can perform large scale calculations without feeling the stress of pre-processing and post-processing.

We will develop a damage propagation analysis system that includes material nonlinearity as well as geometrical nonlinearity, which was considered for the composite material made of thermosetting resin, which was verified in the first phase. This is a major difference from the first phase.

By 2022, we will develop structural analysis software that incorporates XFEM, a mesh-free analysis method, and **by 2024, we will construct and validate CFRTP virtual testing system (CFRTP_VT),** which will be integrated with Research Issue 1 to complete the Center for Computational Science for Aeronautics and Astronautics, CFRTP Fuselage Integration Design System (ACS-CFRTP_AI).