









**Figure 3.** Assistants and checking tools

(3) Detailed design of assembly process: The distribution of components to the assembly process, you can directly select the desired part in the graphical interface assigned to the corresponding node, or from the product tree on parts assigned to the node, the system will automatically identify the distribution status of the parts, so as to avoid leakage of parts caused by process errors.

(4) Verification and optimization of assembly simulation: In the three-dimensional simulation environment including product, tooling, plant layout and human body model, the assembly process simulation is verified, the assembly process design errors are modified, the content of detailed process design is optimized, and finally the validated process design results are obtained.

The above proposed method was validated in the design process of a certain type of aircraft assembly process. According to the existing assembly process flow, all the assembled materials of the aircraft cockpit were programmed and simulated in sequence, and 12 problems of unreasonable process design and 6 problems of design

of the interference were found. Through the 3DE platform, the problem of unreasonable process is optimized, which ensures the rationality of assembly sequence. At the same time, the design problems are returned to design changes, the design model is optimized, and the possible problems in assembly process are solved in advance.

## 5 Summary

This article presented a method to design aircraft digital assembly process based on 3D. The research showed that digital pre-assembly process can evaluate flaws in design prior to manufacturing. The assembly process design based on 3D model can improve the cooperativity of process design, reduce process planning problems caused by human factors, and break the traditional 2D drawing information serial transmission mode, realizes the

collaborative assembly process planning and verification of aircraft tooling design.

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