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Abstract	Today's design of aircraft hydraulic systems is highly complex and can hardly be handled without softwarebased assistance. In this paper the concept and first realization of a computer-aided tool for preliminary architecting and sizing of aircraft hydraulic systems is described. First the general preliminary design process is discussed. The process is used for developing a tool concept. Second the model-based system design approach which is supported by knowledge-based methods is explained. Furthermore, it is shown how the general concept and modeling is realized in the ArOLab (Architecture Optimization Laboratory) tool. This includes the user interface, the computation methods and the key performance determination. Finally, the results are discussed and further goals are explained.