

# WINGTIP DEVICES

**W**ingtip devices on derivative airplanes can improve performance by reducing induced drag. Selection of the wingtip device depends on the specific situation and the airplane model.

**747-400.**  
The 747-400 commercial airplane needed a significant span increase to meet the range requirement. However, structural constraints prevented the total span increase, so a combination of winglet and span increase was used.

**767-400.**  
Following a business-case study of the benefits of adding winglets or increasing wingspan, the 767-400 program chose a span increase in the form of a raked tip.

**BBJ and 737-800.**  
The wingtip device for the BBJ and 737-800 commercial airplane involved a retrofit of existing wings. The blended winglet was selected because it required minimal changes to the wing structure and provided improved aesthetic appeal for the BBJ.

**MD-11.**  
The MD-11 program chose a winglet based on wingspan constraints and minimum structural weight.

**KC-135.**  
The U.S. Air Force and the National Aeronautics and Space Administration conducted a winglet development program in 1978 to understand how winglets could improve performance.



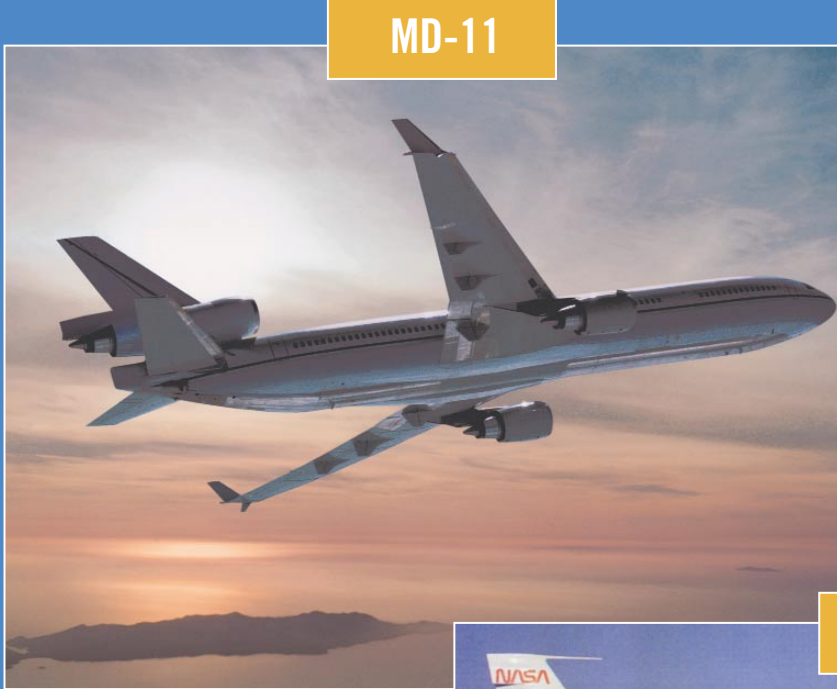
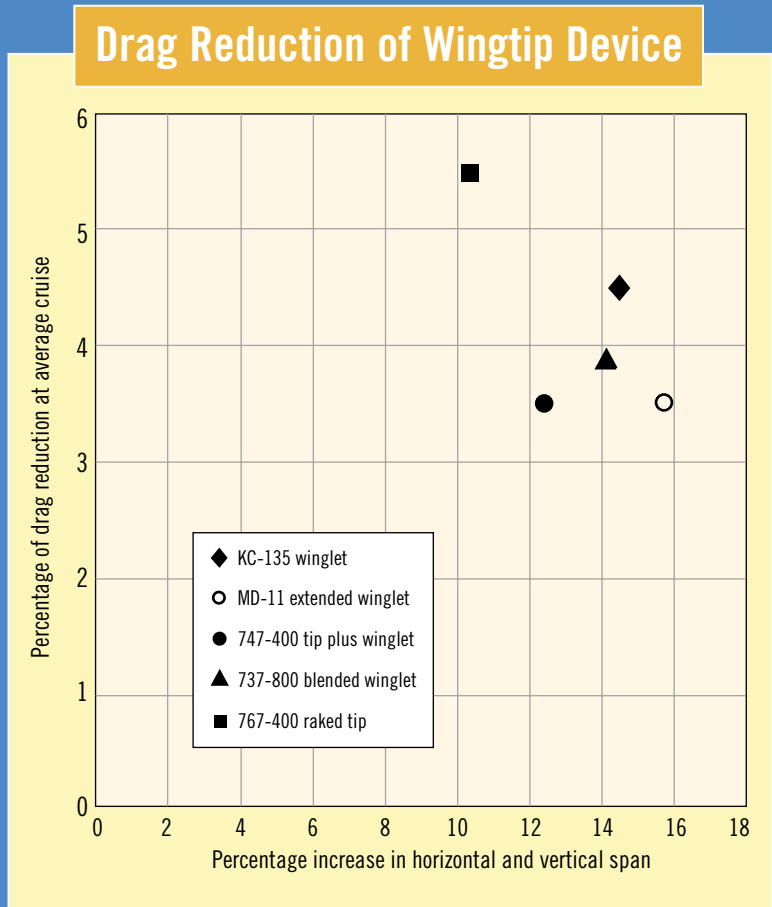
747-400



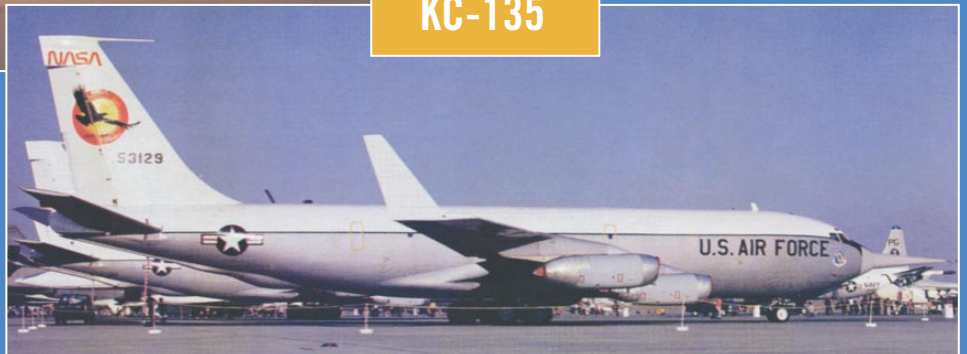
767-400



BBJ and 737-800



MD-11



KC-135