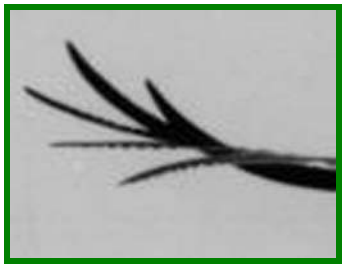
## *Raptors' wings*

### Biomimetic Principle



Most of the birds soaring over land (e.g. kites, eagles, vultures and storks) show characteristically slotted wing-tips.

The primary feathers, or winglets of these birds of prey (raptors) respond to the aerodynamic forces acting on them during flight by bending upwards and becoming staggered in height.

In a single wing this has the effect of reducing the induced drag by spreading of the vorticity in the tip region and therefore keeping the friction drag low in the inner part of the lift generating system.

However, the multi-winglet configuration of the birds' wing is effectively a multiple wing system, and this beneficial effect becomes somewhat counterbalanced by an increase of the friction drag.

**Further Information:**

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**Papers:**

**Websites:**
http://www.bionik.tu-berlin.de/user/michaels/projekt_eng.html

## Applications

Drag reduction in aircraft, resulting in reduced fuel consumption

## Current Commercial Development

Applied to military and civilian aircraft