Canard Advantages and Disadvantages

Advantages:

- Possibility for very good stalling characteristics without elevator stops.
- Sometimes a desirable layout from the packaging standpoint: Main wing carry-through behind cabin, pusher engine installation simplified.
- Synergistic use of winglets for directional stability.
- In certain cases a simplified control linkage is possible.
- When wing flaps are not desired (for simplicity as in ultralights, or competition rules as with standard class sailplanes for example) the C_{Lmax} of a canard may exceed that of an aft-tail airplane.
- For unstable aircraft, canard designs may have a C_{Lmax} and/or drag advantage.
- Control authority is larger for unstable canard aircraft at high C_L than for unstable aft-tail designs.

Disadvantages:

- Fuel center of gravity lies farther behind aircraft c.g. than in conventional designs. This means that a large c.g. range is produced or that the fuel must be held elsewhere (e.g. strakes near the wing root.)
- C_{Lmax} problems with flaps or margin on the entire wing: Flaps produce a larger pitching moment about the c.g. on a canard aircraft. This results in the need for both large canard aerodynamic incidence change and high maximum canard lift coefficient. Note that since the value of a S is usually larger for canard designs, C_{m0} has a greater impact on L than it does on aft-swept designs.
- Induced drag / C_{Lmax} incompatibility: Canard designs can achieve equal or better C_{Lmax} values than conventional designs, and similar values of span efficiency. However, the configurations with high C_{Lmax} values have terrible values of e and those with respectable e 's have low maximum lift coefficients.
- Directional stability: The distance from the aircraft c.g. to the most aft part of the airplane is usually smaller on canard aircraft. This poses a problem for locating a vertical stabilizer and may result in very large vertical surfaces. (Note, however, that winglets may be used to advantage in this case.)
- Wing twist distribution is strange and C_L dependent: The wing additional load distribution is distorted by the canard wake.
- Power effects on canard - deep stall: Accidents have been associated with tractor canard configurations for which the propeller slipstream has prevented canard stall before wing stall. The result is a possible deep-stall problem.

- Finally, and perhaps most importantly, canard sizing is much more critical than aft tail sizing. By choosing a canard which is somewhat too big or too small the aircraft performance can be severely affected. It is easy to make a very bad canard design.