

## Struhsaker Jim

---

**From:** Fred Barber [REDACTED]  
**Sent:** Thursday, June 13, 2013 2:25 PM  
**To:** Struhsaker Jim  
**Subject:** RE: Cirrus, N205KT, 4/10/13, Silver Peak, NV, WPR13LA186

Hi, Jim. Here's the description of the DFC90 and its envelope protection features that you requested. It's based entirely on material published in our product literature and can be used without restriction. Let me know if it will meet your needs or if you need clarification or additional information.

-----

The Avidyne DFC90 autopilot is an all-digital, attitude-based two axis system that uses attitude and air data from the Avidyne primary flight display. The operation of the autopilot is closely integrated with that of the PFD; autopilot mode annunciations and flight director commands are displayed on the PFD and various pilot entries, such as nav source selection, target altitude and vertical speed, are made on the PFD. On Cirrus SR22 airplanes, the autopilot is designed for use in pre-existing Avidyne PFD installations originally installed in combination with an STec 55X autopilot. In those installations, the DFC90 is plug-compatible with the autopilot it replaces, utilizing the existing wiring and servos.

In addition to the modes and features commonly found on GA autopilots (vertical modes such as vertical speed, altitude hold and altitude pre-select; and lateral modes such as heading hold and nav coupling), the DFC90 incorporates two advanced safety-related features.

The first is a "straight and level" mode which, when activated, will engage the autopilot and put the airplane (as the name suggests) into straight-and-level flight. This mode is designed to facilitate automated recovery from an in-flight loss of control and will right the airplane from essentially any attitude, without (if possible) violating g-loading limits appropriate to the airplane's category.

The second is an "envelope protection" feature which operates whenever the autopilot is active. Envelope protection continuously computes the reserve lift available before stall may be expected, in all flight conditions. If a predetermined reserve lift threshold is violated, the autopilot will reduce the bank angle and/or lower the nose to reestablish operation within limits. (Note that the commanded autopilot mode is not cancelled -- if, for example, the autopilot is in nav coupled, altitude hold mode, the autopilot will continue to follow the flight plan and will make its best attempt at maintaining altitude *consistent with maintaining an acceptable stall margin.*) With wings level and a complete loss of engine power, the reserve lift threshold is maintained at approximately  $1.1 V_{S0}$ ; the airplane will descend as necessary to maintain that reserve. The autopilot also guards against  $V_{nc}$  violations, raising the nose as necessary to keep the airplane within its design envelope.