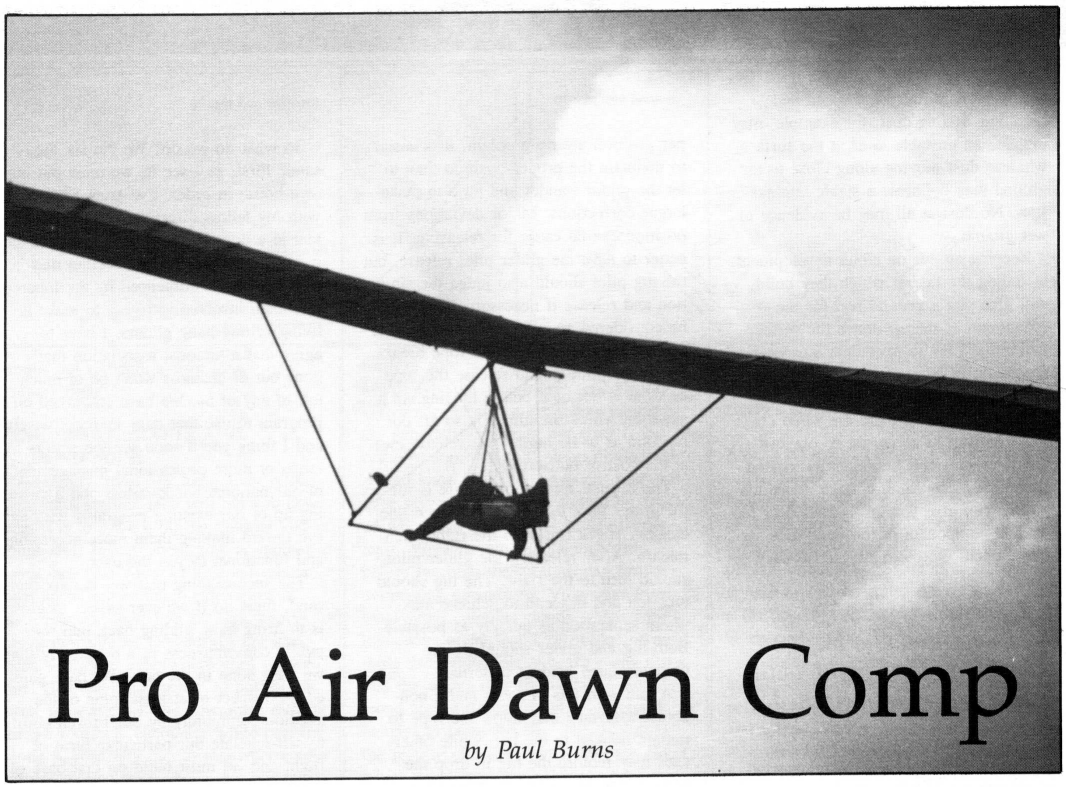
HG Glider Evaluation



Pro Air Dawn Comp

by Paul Burns

Nineteen eighty-four saw the release of the Dawn by Progressive Aircraft. This strutted design represents the first glider model to be HGMA certified without a kingpost and luff lines. Although revolutionary in frame design, the performance level displayed by the Dawn proved to be comparable to many contemporary designs, categorizing this model as a nice recreational machine, best suited to the weekend pilot.

The new "Dawn Comp" may appear identical to the original Dawn to the casual observer, but closer inspection reveals many differences between the "Comp" and its predecessor. Among the changes aimed at enhancing overall performance and handling are a higher aspect ratio, tighter sail, additional ribs and a redesigned airfoil.

My first opportunity to fly the Dawn Comp came at Torrey Pines, California. After hooking in and a static harness check, I moved the 160 Comp toward the launch through moderate winds. Compared to the Dawn, the Comp is noticeably more difficult to handle on the ground. Additional wingspan and increased weight are the major contributors, but the streamlined control bar down tubes were also a factor.

Takeoff in winds to 15 mph was no problem. Unassisted launches were performed with confidence even in crosswind conditions. In the smooth ridge lift at Torrey Pines, the Dawn Comp displayed a smooth, quick roll control response which made flying in these conditions quite comfortable.

Some informal sink rate comparisons were conducted on this day between the Dawn Comp flown by myself and a Sensor 160 V.G. flown at a comparable wing loading. Results seemed to indicate little difference between ultimate gain in altitude, although the Sensor appeared to have a slightly faster rate of climb. In glide comparisons the two gliders seemed to be evenly matched when operating at the Sensor's best L/D speed. However, when the airspeed was increased a bit, the Dawn Comp appeared to have a slight advantage.

Operating at higher airspeeds the Dawn Comp handles very well. This design is very pitch positive, but bar pressure is lightened considerably through an "elevated connection" hang point, a factory-produced device which will be standard equipment on all production models. The Dawn Comp displays little to no yaw instability at airspeeds to 45 mph. As a result, straight line flight courses are easily maintained. Should turbulence cause the need for a correction, the Dawn Comp responds quickly through light control pressure in the roll axis at these faster speeds.

Slow speed turn coordination is also very comfortable. Roll control is smooth and predictable. Considering the 35-foot plus wing span, the comp displays quick response to control input. Once roll is established, some "high siding" may be required to maintain a constant bank angle as the Comp

seems slightly spirally unstable (tends to stay in turns) in ridge lift conditions. In thermals the wing becomes more stable in roll and less pilot input is required to maintain a constant bank attitude.

Many landings were performed at Torrey Pines through a wide range of wind conditions. In velocities varying from light to strong, no adverse tendencies were noticed. Even intentional crosswind landings were performed with confidence as the Comp displayed little or no tendency to drop a tip during landing flare. Once in ground effect, the Comp feels very directionally stable and predictable. Timing for proper flare is only moderately critical (as high performance gliders go) as the slightly tail heavy static balance aids in producing an excellent degree of flare authority. The Comp is not as effective as the 155 Dawn in the area of "steep descent" landing approaches. Although the Comp remains directionally controllable at very slow (mush) airspeeds, it retains remarkable glide performance with only a slight increase in sink rate, even at these ultra-slow speeds.

Several days of flying the Comp in the smooth ridge lift at Torrey Pines prepared me for my first mountain flight on this design. While setting up at the "E" overlooking Lake Elsinore, California, I wondered just how the glider would handle in thermals — would the wingspan prove to be overly difficult to handle in turbulence?

Takeoff was uneventful in light winds of five mph with no yawing tendency noticed. Upon encountering the first thermal, a fairly strong control input was used to initiate a left-hand 360°turn. The Comp reacted with a surprisingly quick roll response and some high-siding was required to stabilize an overbanking situation. While maneuvering the Comp to the core of this thermal, I overcontrolled for a few turns. In spite of my miscontrol, the glider demonstrated a very good sink rate even at steeper bank attitudes to 45°. With more refined control inputs the Comp displayed an ability to remain in the core with little additional control input. Even though this design likes to fly at a slightly faster speed through the turns, the sink rate remains impressive. In punchy thermals, roll reversals are predictable and quick without the need for lots of muscle.

Although this flight represented my initial thermaling experience with this design, the Comp made me feel confident enough to gain 6,000 feet above takeoff and complete a 25-mile cross country flight. Circling over the field I had selected for my landing, I tried in vain to determine the wind direction. Ground speed on my final approach was obviously very fast, which led me to suspect that the Dawn Comp and I were on a downwind final. Patiently I kept the glider in ground effect while the airspeed slowed. As the time for the flare approached, I remember gritting my teeth in anticipation of a hard landing. To my surprise, the Comp delighted me with a two-step beauty in what proved to be basically calm air.

Several more flights were performed in the thermals generated by the Ortega Mountain range above Lake Elsinore. Many of these flights were terminated in winds of less than five mph, a condition widely accepted as difficult for consistently "safe" landings. The Dawn comp invariably demonstrated its ability to handle this situation, which promoted a high level of confidence in this pilot that the Dawn Comp can be landed safely under virtually any wind condition — an enormous advantage for the cross country pilot.

The Comp seems to share handling characteristics similar to the HP and Sensor in application of roll control. Should the glider resist, or respond sluggishly, a sharp push on the control bar causes the wing to roll quickly. At very slow airspeeds, the Dawn Comp demonstrates a slight tendency to adverse yaw when roll control is applied. When airspeed is properly adjusted, this wing coordinates very well.

Some adjustment period for the pilot is necessary, particularly in the area of airspeed maintenance. When the Dawn Comp is flown at minimum sink speed, the sound

PROGRESSIVE AIRCRAFT'S DAWN COMP

Box Scores
(Scale of 1-5)

Set-up time/ease	5
Ground handling	4
Static balance	4
Frame hardware/finish	4
Sail quality/craftsmanship	4

FLIGHT CHARACTERISTICS

Handling—low airspeeds	5
Handling—high airspeeds	5
Bar pressure—roll	4
Bar pressure—pitch	4
Roll control initiation	5
Roll reversal (45° to 45°)	5
Yaw stability	4
Turn coordination	5
Speed range	4
Sink rate performance	4
Glide angle performance	5

LANDING CHARACTERISTICS

Flare authority	5
Parachuteability	3
Directional control at mush speed	4

160 Dawn Comp @ 67 lbs. (70 lbs. in bag). Pilot 175 lbs. = 1.5 wing loading. Stall speed = 18 mph indicated. Top speed = 47 mph indicated. Pilot proficiency required: Hang IV and above. Suggested retail price = $2,595.00

DAWN COMP SPECIFICATIONS

MODEL	140	160
Sail Area (sq.ft.)	150	161
Wing Span (ft.)	33.3	35.3
Aspect Ratio	7.92	7.74
Ribs (upper)	8 per side	8 per side
Battens (lower)	4 per side	4 per side
Pilot weight range (lbs.)	100-180	140-240

160 DAWN COMP FRAME COMPONENTS

Leading edge is 1-3/4″ × .049 outersleeved. Tip receptal is 1-1/8″ × .058. Keel is 1-5/8″ × .049 w/innersleeve. Streamlined wing struts 2-1/4″ × 7/8″ w/4 ft. innersleeve. Streamlined down tubes 2-1/4″ × 7/8″ w/innersleeve. Control base tube 1-1/8″ × .058 innersleeved. Washout strut 3/4″ × .035. All bottom surface battens 3/8″ fiberglass rod. All top surface ribs 1/2″ × .035 aluminum tube. Nose plate 6061-T6 anodized aluminum. Cross spar brackets, stainless steel. Control bar corner brackets, stainless steel. Front to rear flying wires 3/32″ × 7 × 7 stainless coated cable. Machined delron end plugs on all frame members. Mylar and foam composite leading edge stiffeners.

produced by the glider is almost imperceptible. For this reason it is suggested that a "new" Dawn comp pilot employ an airspeed indicator through the adjustment period. In my case the airspeed indicator proved its value many times. While flying thermals, a check reading of the instrument would cause me to adjust my errant airspeed at times as much as 10 mph.

Assembly of the Dawn Comp should present no major problems and can be accomplished by one person in 15 minutes, although the procedure is a bit different from its more conventional counterparts with external king posts. Unzip the cover bag and assemble the control bar using one bolt, wing nut and safety at the corner of the base tube junction. Stand glider on control bar and attach front flying wires at the nose with clevis pin and safety. Remove cover bag and all ties. Extend both wings to near full extension. Attach the main spar pull-back cable at rear of keel with clevis pin and safety. Remove cover bag and all ties. Extend both wings to near full extension. Attach the main spar pull-back cable at rear of keel with clevis pin and safety. Attach the king post to the main spar with clevis and safety and zip the bottom surface closed. Now attach the struts with clevis and safety, secure at control bar, then attach at main spar location. Remove the wing tip covers and deploy tips by inserting the fiberglass rod into the receptical at the end of each wing tube, and secure by double purchase looping of the leech line over the slot on the plastic tip cap. Install the top surface ribs beginning at the root. You will need to raise the rear of the keel when inserting the two innermost ribs. Install the lower surface battens and deploy the defined tips. Insert the nose rib and close zipper — preflight.

The sail for the Dawn Comp is in the spanwise layout and all colors are available including spectrum cloth. Trailing edge is available only in white. All Comp sails are constructed with a length of nylon filament tape sewn into the trailing edge seam to avoid high speed flutter. The sail on the glider flown for this report remained "clean" throughout the speed range.

The Dawn Comp flown for this evaluation was a prototype. According to designer, Dick Boone, only cosmetic changes will be made on the production models. HGMA certification is currently underway and should be completed by late June '85. The 160 model, said Boone, passed load and pitch testing with "flying colors," impressively exceeding criteria limits in both areas.

The Dawn Comp represents an interesting blend of design technology and performance efficiency yet retains an uncommon ease of operation. This design is sure to become popular for the advanced recreational and cross country pilot. In addition, the Comp's enhanced performance characteristics make it a good choice for the competition pilot as well. ■