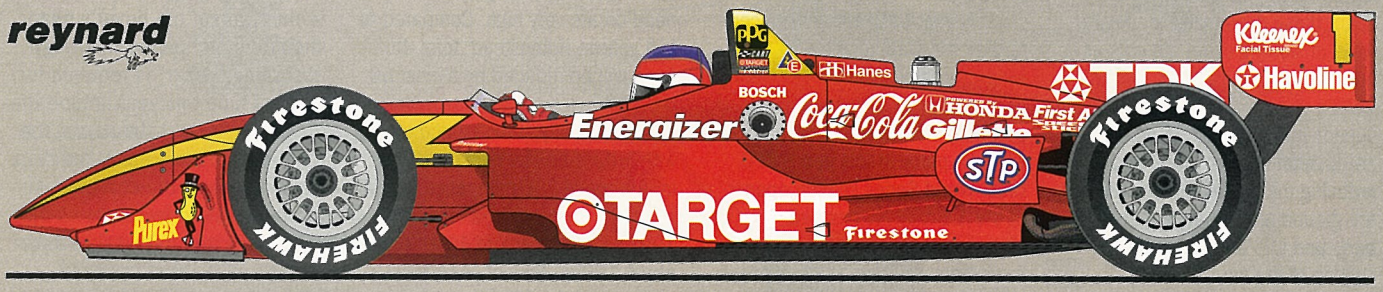
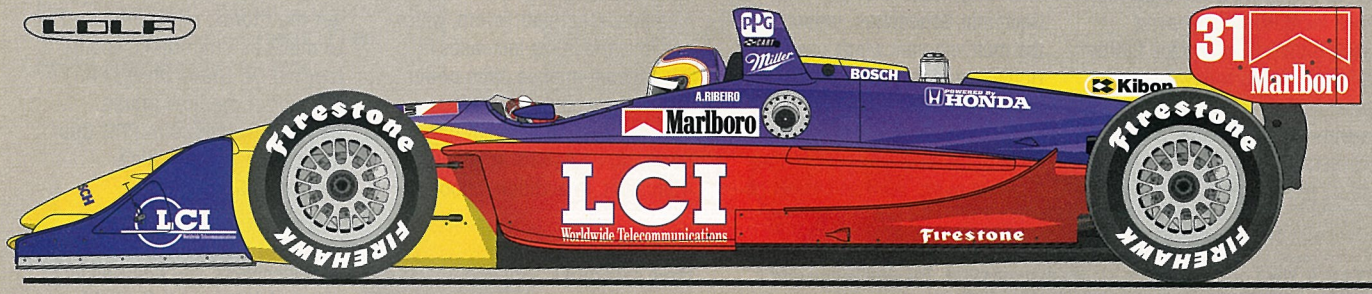
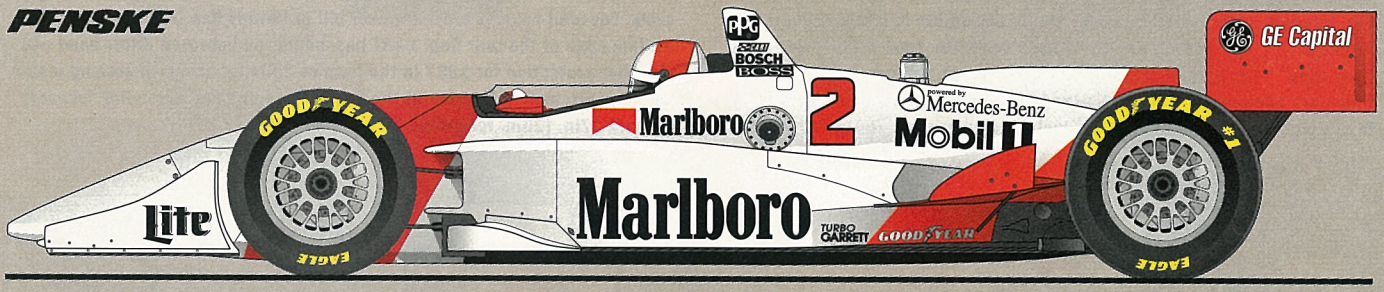
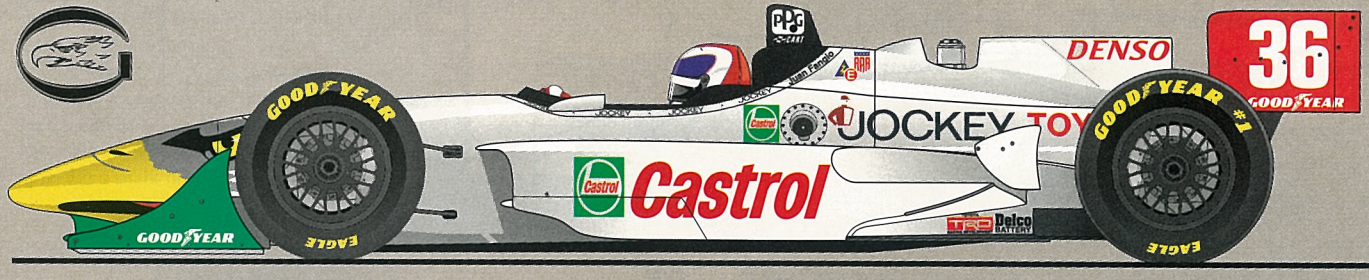
The Cars

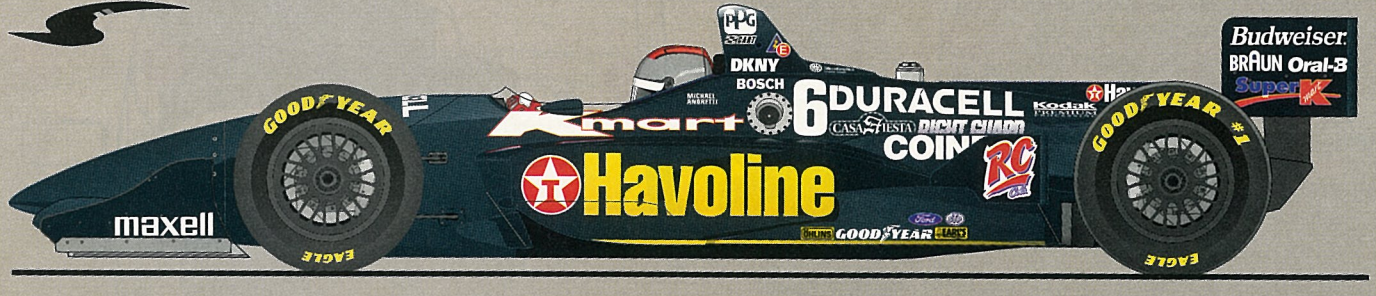
Reynard, Lola, Penske, Eagle and, now, Swift... the chase is on by GORDON KIRBY and BILL KING











ILLUSTRATIONS by PAUL LAGUETTE

In Search of Balance

"The Great Slow-Down Dilemma" has become motor racing's essential irony, running in opposition to the sport's primary motivation, which is to find the means to go faster. Almost as much time is spent these days trying to unearth ways of slowing down the cars as is lavished on making them quicker. CART's approach to controlling speeds has been one of progressively trimming wing sizes and reducing the critical dimensions of the ground-effect-inducing underbody and the 'diffuser' in the tail section of the car.

The strategy for many years has been to try to restrain or even reduce increases in cornering speeds rather than to place further restrictions on horsepower. It is, of course, cornering rather than straightaway speeds that have increased dramatically over the past 30 years, thanks to massive improvements in aerodynamic knowledge and car-building and tire technologies. At the fastest superspeedways, cornering speeds today are almost twice what they were 30 years ago!

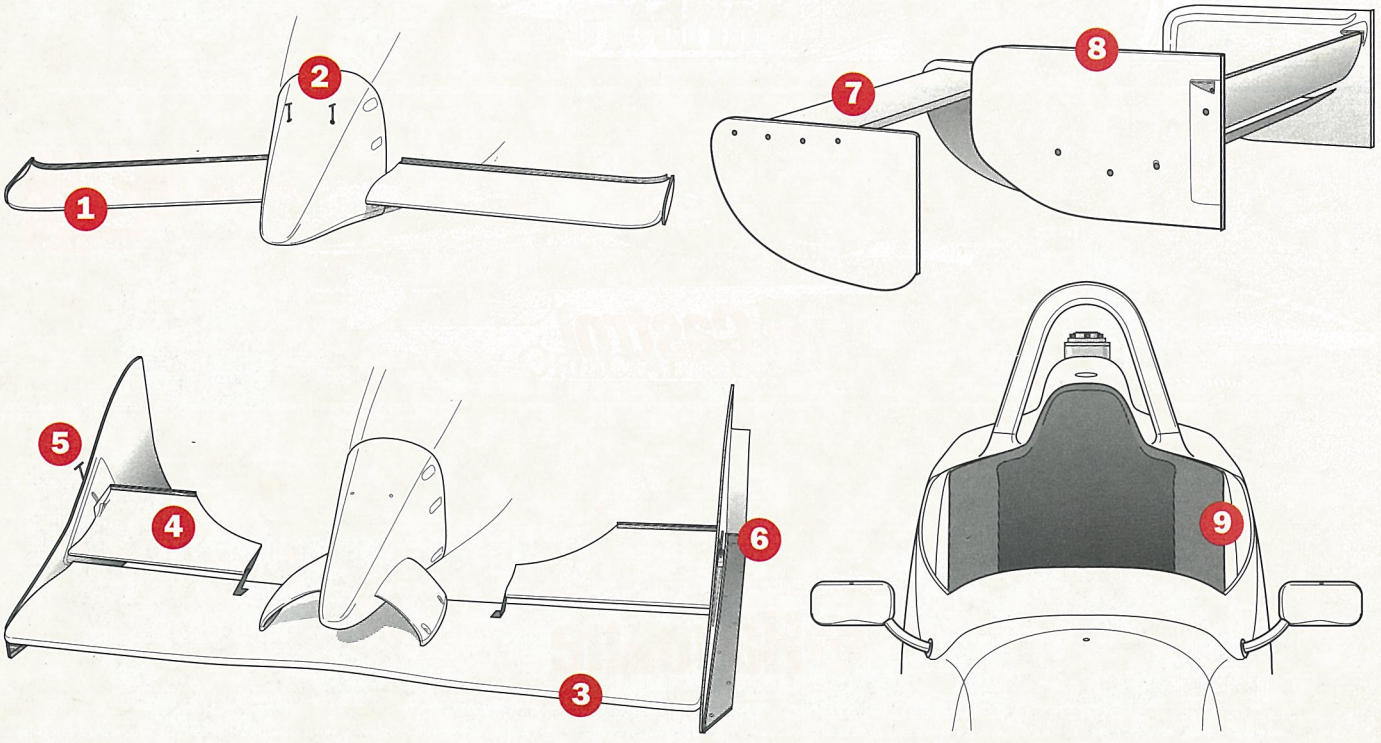
This year CART has introduced further, marginal restrictions on wings and ground-effect-generating underbodies at superspeedways. In addition, an interesting experiment will take place in this year's PPG CART World Series season opener at the 1.5-mile Homestead Motorsports Complex oval, where the drivers will race with the single-element speedway wings otherwise used only at the Michigan and California Speedways, rather than the multi-element wings used at Homestead last year and in all 1.0-mile oval races.

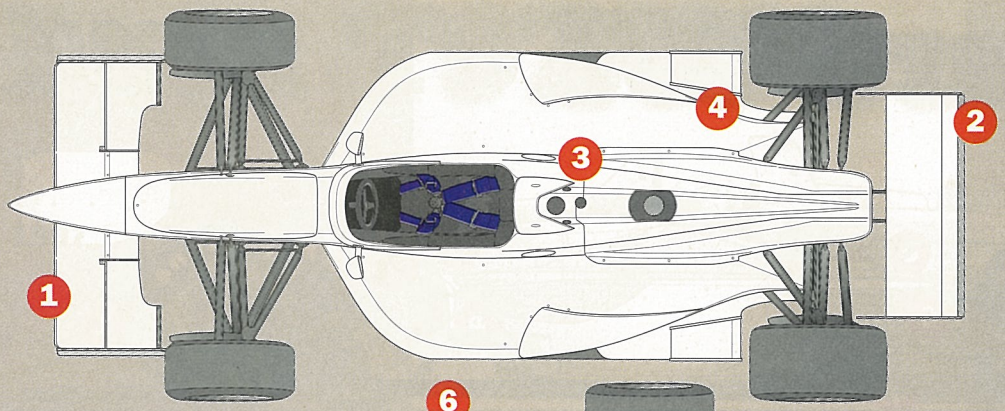
Multi-element wings will continue to be used this year on the 1.0-mile ovals, road and street circuits; but the ultra-fast, four-cornered Homestead track is a special case, because cornering speeds were so high at Homestead last year and the track layout means the chances of hitting the wall head-on are very high. Compared to last year at Homestead, total downforce will be reduced by almost 50 percent!

Additionally, after experimenting with reduced turbo boost pressure in last year's 500-mile races, boost has been reduced for all races in 1997 by five inches to 40in., worth about 100hp. Recent years have witnessed a fierce engine war among Honda, Ford Cosworth, Mercedes-Benz and Toyota, which has resulted in big increases in engine performance. With power outputs creeping over 900hp, a decision was made to cut turbo boost after 17 years at the same 45in. limit. In addition, onboard fuel tanks have been trimmed by five gallons in 1997 to 35, with required fuel mileage upped slightly to 1.85mpg.

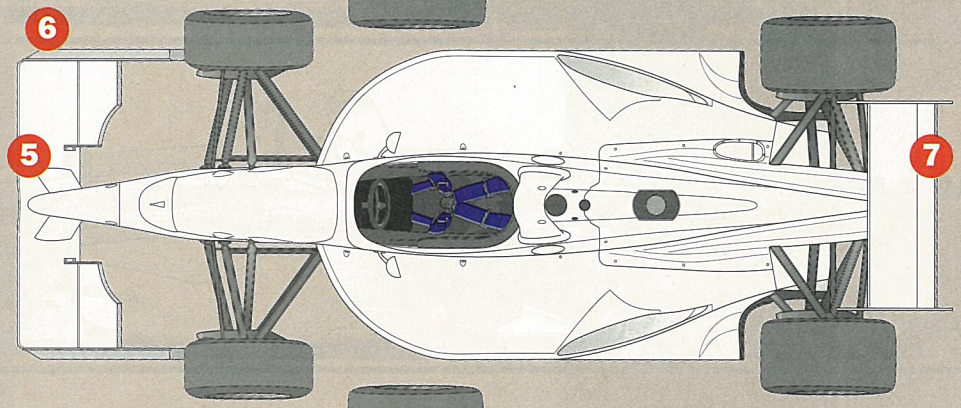
Important safety changes have been mandated this year to further protect the driver's head, shoulders and torso. An energy-absorbing "collar" is required for the first time this year around the driver's head and shoulders. The foam-filled collars are reattached to the inside of the cockpit surround by Velcro fasteners so that they easily pop out when a driver needs to get out of the car. "What we've tried to do (with the new head and neck restraints) is get the thorax, neck and head all to move as one object," commented Dr. Steve Olvey, CART's director of medical affairs. Refining the breed in PPG Cup racing is a never-ending process.—*Gordon Kirby*

DETAILS **Wing configurations are track dependent. The single-element speedway front wing (1)—required at Michigan, California and Homestead—has a maximum span (including endplates) of 56in., a maximum chord of 8in. (leading edge to trailing edge) and is adjustable in pitch, using turnkeys (2) permanently set in the nose cone. The road course/short oval front wing (3) is a multi-element device employing various winglets (4)—which are adjustable in pitch (5)—and permanently mounted flanges (6). Rear wings—with a maximum span, including endplates, of 43in.—fall into three categories: speedway, short oval and road course. The single-element speedway rear wing (7) has a maximum chord of 12in. and is limited in pitch. Twin-element rear wings (8) are used on both road courses and short ovals. For road courses only, a wicker bill or Gurney flap is allowed on the trailing edge of the rear flap. CART has mandated improved driver head and shoulder protection for 1997 in the form of 2.5in. of energy-absorbing material (9), surrounding the rear of the cockpit opening and extending forward at least 17in. (26in. for ovals).**

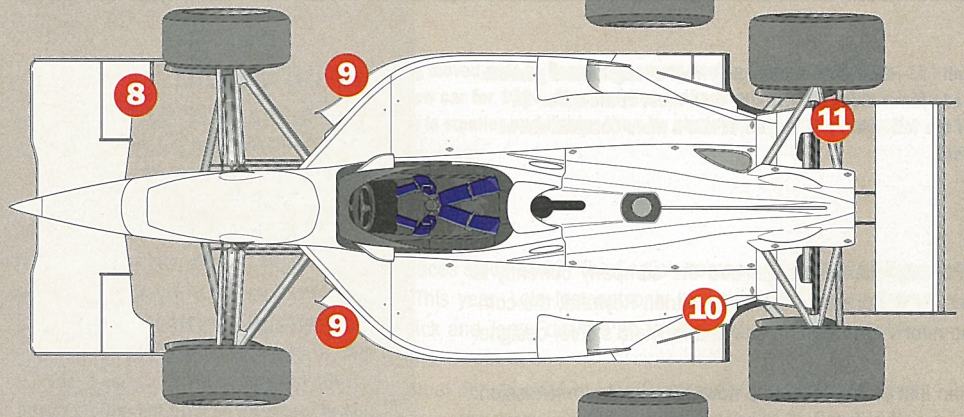




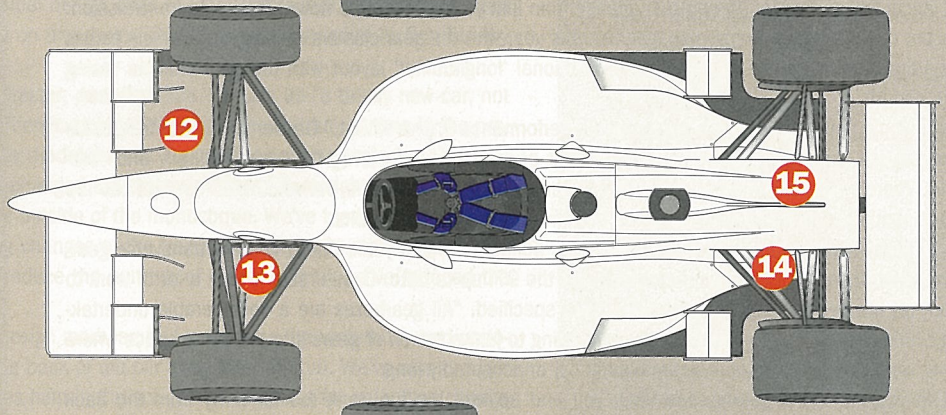
REYNARD 97I The size and shape of the front wing (1) are virtually unchanged from the 96I. The trailing edge of the rear wing's upper airfoil, or flap (2), is near the 30in. maximum allowed distance from the rear axle centerline—the largest setback of any of the '97 designs. The bodywork on either side of the rollover hoop fairing is flat (3), whereas the 96I was more slab-sided in that area. The inboard winglet end-plate (4) produces a reverse funnel effect. The winglets manage the airflow from the radiator outlets and along the sidepods.



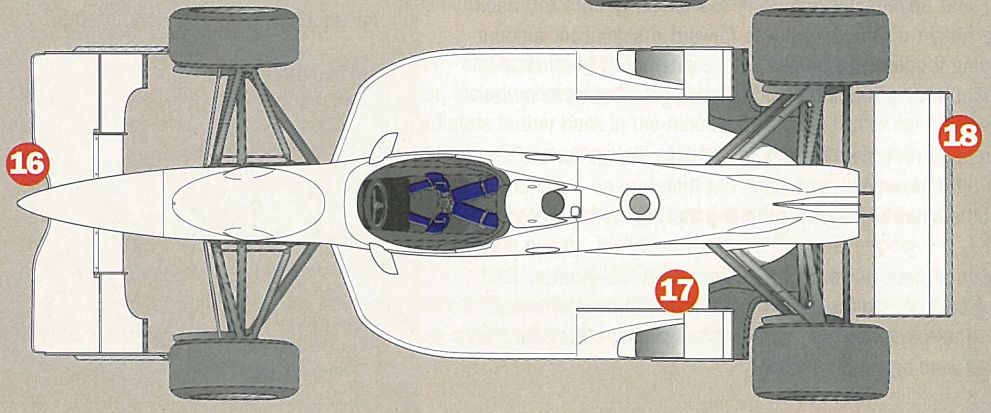
LOLA T97/00 Both front and rear wings are set farther forward than are the other '97 designs. The front wing extends several inches past the nose and employs F1-style stabilizer braces (5) and dramatic flanges (6). In theory, thrusting the wing forward reduces the flow-disrupting influences of the bodywork, suspension pieces and front tires. The rear wing (7) is set quite far forward; and, with a maximum width of 43in, just fits in between the rear tires.



PENSKE PC26 Much effort has gone into improving the front wing, although the most obvious changes in plan view are confined to the shape of the winglets (8). The odd channels below the radiator openings (9) remain a mystery to most observers. The sidepod winglets (10) actually appear to separate the air moving around the sidepod from the radiator exhaust air. The rear bodywork has been notched (11) to allow passage of the pushrod.



EAGLE 977 There has been much aero tweaking in the aft portion of the slightly anhedral front wing, where curved, elongated winglet endplates (12) route air away from the nosecone. This required a reconfiguration of the front suspension to allow the lower A-arms (13) to clear the new appendages. Also, there appears to have been a concentrated effort to clean up the airflow around the sides and rear of the engine cover (14); and the 977 has sprouted a shark fin (15), *a la* Penske.



SWIFT 007.I The mildly anhedral shape of the Swift's front wing (16) is reminiscent of the '91 Jordan F1 car. The prominent winglets (17) have a collection box effect, completely isolating the radiator outlet air. The two-element rear wing is shown in road course configuration, which allows a wicker bill or Gurney flap (18) along the trailing edge of the upper flap. The same wing configuration is used on short ovals, without wickers or Gurneys.