WORLD LAND SPEED RECORD CARS - 1964

by Don Francisco

When Craig Breedlove laid claim to the World's Land Speed Record in 1963 after establishing average speeds of 407.45 mph for the mile and 408.31 mph for the kilometer, he started one of the liveliest contests in the history of automobile racing – a jet barrage that was to eventually lead to astronomical speeds and many an exciting moment.

While Craig was making this year's last-minute preparations to move his entourage out of Los Angeles to get him into Wendover on time to take over the salt on October 11, he had the experience of twice hearing that his record had been broken by jet-powered cars. First to break it were Walt Arfons and Tom Green, with their Wingfoot Express, at 413 mph, and next was Art Arfons, with a record of 434 mph. Art's record would undoubtedly have been higher but he had the misfortune of blowing a right rear tire that destroyed part of his car's bodywork.

The Spirit of America was essentially the same for '64 as it was for '63 but preparation for the '64 attempt included a complete inspection and checking of all its parts, and minor modifications aimed at making it easier to control and more streamlined.

A recently-rebuilt General Electric J-47 engine was installed in place of the J-47 used previously. On the test stand this proved to be an exceptionally good engine by developing a thrust, at sea level, of 5,240 pounds. It was reworked to operate at higher than normal exhaust gas temperatures and rpm, which supposedly would enable it to deliver up to 500 pounds more thrust than the old engine.

Wheels and tires were new but of the same design and construction as those used previously. They were manufactured by Goodyear Tire and Rubber Company.

For 1963, the vehicle's drag chutes were the products of Jack Carter, Long Beach, Calif. They were round and had a diameter of eight feet. For '64 Jack stayed with the round chute for emergency use but for the primary chute he switched to one of the crossform type he makes for dragsters. Each chute had a towline 80 feet long that had a breaking strength of 28,800 pounds.

ABOVE – Art Arfons with his partner Ed Snyder alongside their J-79 jetliner that holds World's Fastest Car title. Speeds: 536.71 mph mile, 544.13 kilo.

TOP – HRM contributor Les Nehamkin was intrigued by hydraulically actuated wing which controls front end traction, is cued by axle relationship to frame.

LEFT – Huge appearing though it be, it must be remembered that most of the air goes through Art Arfons' car rather than around it, to feed hungry jet mill.

Craig started his '64 season slowly but ended with a flourish that will be difficult to top and, I guarantee, never forgotten. His first run was at 12:32 p.m. Sunday, October 11. He took it easy to feel out the vehicle and the course. Speed was 195 mph in both the mile and the kilometer. For his second run, speeds were 241 mph in the mile and 238 in the kilo. For run three, speeds were 324 mph in the mile and 328 in the kilo. For the last run of the day: 384 mph mile; 380 mph kilo.

Unlike the Arfons brothers, whose cars have more thrust potential than his, the Spirit used just about all of the 10-plus usable miles of the course for its runs. With the measured mile timing trap between the fifth- and sixth-mile signs, this gave five miles of acceleration distance before hitting the trap on the northward runs and slightly over four miles on the southward runs. Acceleration distances for the Arfons cars varied between two and three miles.

Speeds on the first run Monday morning were 382 mph for the mile and 387 for the kilo. For the next run, from north to south, speeds were 452 mph for the mile and 448 for the kilo, but about a mile after passing through the timing trap the vehicle hit a bump in the course and its front wheel jumped off the salt. Craig said later he thought the wheel was at least two feet high and that Spirit felt like an airplane ready to take off. As soon as the wheel came back down, a drag chute was popped and the vehicle was brought to a stop. Consequently no return run was made.

On the first run Sunday the other side of the course had been used and at that time that side had been quite rough. But in the meantime, the Utah Highway Commission crew had been dragging the course, trying to improve it. Now the side that had been rough Sunday seemed to be all right and was used for the next run, with the same power setting as on the 452 mph run. Just past the three-mile sign, running from the south, Spirit hit what was described as "ground swells" that raised its front wheel and caused it to go into a series of pitches and then up on one rear wheel. When it came back down on all three wheels it was pointed directly toward the timing trailer, which was in the middle of the measured mile and about 1,500 feet off course. When Craig saw where he was headed, he steered the front wheel left as hard as he could and pressed the chute release button. He gave the course back to the highway crew to see if they could improve it.

Tuesday morning, after selecting a new course, another run was made, with speeds of 442 mph for the mile and 448 for the kilo; the course was fine. As these speeds were well over Art Arfons' record of 434 mph, Spirit was turned around and headed south for another run that could be combined with the first one for a new record.

On the next run, which was the ninth for the week, speeds were 498 for the

(Continued on following page)

mile and 469 for the kilo. On the return leg, Spirit hit a bump severely enough to throw Craig's helmeted head against the ¼-inch thick Plexiglas window in the right side of the cockpit canopy hard enough to break the window. The bump apparently didn't hurt Craig but the vehicle couldn't be run again until the window was repaired.

The 498 mph run was made with 95 per cent throttle. In other words, Spirit had never been driven at full throttle. Various figures for its design maximum speed had been given from time to time but the one that seemed to bear the most authority was 565 mph. From the way it responded to minute throttle increases, any doubt that existed prior to the 498 mph run as to the 565 mph figure had nearly completely dissolved.

After recapturing the record, Craig announced he intended to run again Thursday, in an attempt to boost it over 500. At 8:11, Spirit left the starting line, which was just a few hundred feet from the zero-mile post at the course's south end, accelerating much harder than it ever had before. It stopped over a mile past the ten-mile sign, which was the last sign at the course's north end. Speeds were 513 mph for the mile and 519 for the kilo. This was the first officially-timed run in the 500 mph bracket ever made by a wheeled land vehicle. Spirit was turned around, fitted with a new drag chute, and on its way back at 8:37. Except for its speed, this is the run Craig and everyone else who happened to be on the salt flat at the time could have done without.

When Spirit started what was to be its last run, I was at the south end of the course with a group of press people that was receiving reports on its progress from USAC observers. The first report was that the vehicle was on its way. The second report was that it was looking good. The next was that it was in the mile timing trap. And then the next one, which was the first indication that the run wasn't going to be a normal one, was that something had fallen or blown off the vehicle. The next report was that the something was a drag chute. Before any of us could say anything, we were able to see Spirit coming toward us, looking like something out of a surrealist painting. Shortly before it got to us we heard two loud reports, not unlike sonic booms, very close together. No one realized at the time that the booms were the sounds made by the drag chutes when they opened and broke their towlines. While the last boom was still rumbling in our ears, Spirit flew past us at a speed of at least 250 mph. Normally, it would have stopped where we were.

Ahead of Spirit, not much more than two miles away, was a ridge of clay-like soil approximately six feet high that had been left when the potash company that harvests salt from the flat had dug one of their drainage canals. There are several of these ridges on the salt and although they were formed when the canals were dug, they are called dikes. Approximately 600 feet beyond the dike was the highway, and just beyond the highway was a railroad track. Between the dike and the end of the course were two lines of telephone poles that crossed a line parallel to the course at a right angle.

Spirit slipped between two of the telephone poles in the first row, throwing up a spray of salt as it crossed a soggy spot, and finally started to turn in a long, sweeping arc to the right. We knew Craig had the front wheel turned as far as it would go because one of Spirit's design features was very limited steering travel for the wheel to prevent its being turned too much at high speed and possibly causing the vehicle to roll. As we continued to watch, Spirit ran into a wet area that paralleled the dike and threw up a huge roostertail of water. Then, altogether too suddenly the roostertail and the car disappeared.

We didn't see Spirit again till we got to the top of the dike. Then, all we saw was about six feet of the rear end of its body sticking up out of the lake that covered the area between the dike and the highway. Craig was on the top of the dike, jumping up and down and laughing and shouting, so happy to be alive that he didn't really know what he was doing. The first thing he said was, "I broke my racer!" Then he asked, "What was my speed? Speed, schmeed. Who, except Craig, could have cared less at that time?

Instead of going over the dike and merely landing in the ankle-deep lake, Spirit had aligned itself perfectly with the canal that was the reason for the dike and plunged into it. Because its rear wheels were just slightly wider than the canal, its rear end hadn't been able to sink but its front end had. Craig said that when the vehicle went into the water the nose sank slowly, fortunately, and this had given him enough time to free himself of his seat belt and shoulder harness before the cockpit went completely under water. He had scrambled out of the cockpit and swum the five feet or so to the canal's side.

Speeds on Spirit's last run had been 539 mph in the mile and 535 in the kilometer. Averages for the mile and kilo, which were the second set of new records for the week, were 526.28 mph for the mile and 527.33 for the kilo.

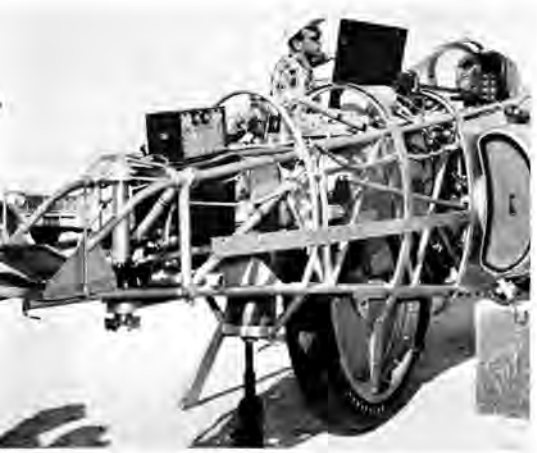
ABOVE – Slippery shell of Breedlove liner permitted it to average within 10 mph of new Arfons record with only one-third power potential. Spirit will be resigned to exhibitions from here on.

ABOVE RIGHT – Little black box in Spirit's nose records wheel loadings it senses from strain gages wired to axles.

Spirit had been shut down in the timing trap because it wasn't responding to steering wheel movement. Something was felt to be wrong with the steering gear but apparently the problem was that the front wheel was either off the salt or not getting enough traction to steer the vehicle. The purpose of the fin ahead of the front wheel was to steer Spirit aerodynamically when the wheel couldn't do the job, but perhaps it wasn't doing its job either. But in any case, Craig thought he was in trouble so he popped the chutes. Unfortunately, the chutes weren't designed for popping at 500-plus mph and their

towlines broke. When he realized the chutes weren't functioning correctly, Craig pushed on the brake pedal and it immediately went to the floor. Apparently, the brakes went up in smoke almost instantly. He pumped the pedal two or three times and then gave up. There he sat, in a highly-streamlined vehicle traveling in excess of 500 mph, with absolutely no way of stopping it, and limited area ahead.

After passing the first row of telephone poles and starting its long arc to the right, Spirit approached the second line of poles on an angle that made passing between two of them difficult. It passed through the poles all right, but when it did its left rear axle took one of them dead center and its right wheel hit a guy wire on another. Craig said the pole popped like a rifle shot and later examination showed it was



badly shattered. The impact didn't affect Spirit a bit and it sped on across the water, approximately a quarter of a mile, and hit the dike at an angle of perhaps 30 degrees. Craig said that when he saw the dike coming he thought "That was it" for him but Spirit hit it, nosed up, and slid over it as easily as if it had been a specially-prepared ramp. When Spirit reached the top of the dike, Craig saw the water ahead and decided this was the place to open the cockpit canopy. The thought went through his mind that after all he had been through, now he was going to drown. After sliding over the dike, Spirit came to rest about 200 feet farther on, in the canal. That was the end of the ride.

Art Arfons' Green Monster had proved itself a few days before Breedlove set his record by posting its average speed of 434 mph and making a one-way run of 471 mph. It had made these runs with only a little over half the 17,000 pounds thrust of its big J-79 jet engine. The J-79 powers F-104 airplanes, which are capable of speeds in excess of 1,600 mph. A different version with slightly less thrust is used in the B-58 Hustler. The thrust output of Art's engine is over three times greater than that of the engine in Breedlove's Spirit.

Approximately 7,000 pounds of the J-79's thrust comes from its four-stage afterburner. In the Green Monster the thrust can be brought into action a stage at a time, as it is in the airplanes. Pilots of the airplanes to whom Art has talked have told him that the first two or three stages aren't too noticeable but the action really starts when the last one fires. Art hasn't proved this to himself yet, and probably never will, because so far he has gotten into only the first stage and this was for just a few seconds. He said that the acceleration the afterburner provided was a little too exciting.

Art fired the afterburner the first time by mistake. He had adjusted Monster's throttle stop, which he had to do for each run, and he had set it for a little more throttle than he really wanted. Shortly before the car got to the first timing light he had opened the throttle enough for the burner to fire. He said later that the firing caused quite a bit of action. Simultaneously, the car jumped forward, its nose lifted, the rear edge of the wing over its front end lifted, and Art let the throttle lift enough to stop the burner. A few seconds later, Art got the throttle open enough to fire the burner again and the sequence of actions repeated. Before the car got through the mile timing trap he fired the burner once more, this time on purpose, and again got off the throttle immediately. On the next run he fired the burner before Monster reached the first timing light and left it on all the way through the trap. He did this only because it was necessary to boost the average speed of this and the previous run high enough for a new record.

The Green Monster complies with the new FIA rules for jet-powered cars by having four wheels and by being steered by two of them. Its overall length of 21 feet makes it much shorter than Breedlove's 31-foot, 6-inch Spirit and its estimated weight of 6,500 pounds makes it 2,000 pounds lighter than Spirit. Its cost of $10,000, not counting ten months' labor for Art and about half as much more for the man who has helped him with all his cars, Ed Snyder, makes it a truly "poor boy" project when compared to the many times $10,000 that has been invested in Spirit.

Firestone 7.00 x 18 tires mounted on special wheels machined from aluminum alloy forgings by Firestone's Steel Products Division support Monster. The cost of these wheels and tire assemblies aren't included in the car's cost. They represent many thousands of dollars in materials and engineering and production time. Without them, Monster and its feats wouldn't have been possible, just as Breedlove's Spirit wouldn't have been possible without the cooperation of Goodyear.

Each of Monster's wheels is fitted with an Airheart disc brake assembly that has two caliper units. Because of the small diameter of their discs, which was made necessary by wheel diameter, the brakes can't be used effectively at speeds over approximately 200 mph. All braking at higher speeds is done with a pair of Deist drag chutes, one of which is for normal stops and the other for emergency. Each chute is opened by a drogue gun that consists of a cylindrical-shaped slug that is blown out of its holder by a charge of fulminate of mercury. The charge is fired electrically by a switch in the cockpit. Monster's chutes were of the ribbon type, eight feet in diameter, and had towlines eighty feet long.

A very important part of Monster is the wing over the front end of its body. Actually, the wing isn't a wing at all. The purpose of a wing is to produce lift from the passage of air over it and this requires that it have a certain cross-sectional shape. Monster's wing is a thin panel, 60 by 42 inches in size, that acts as a wedge or a vane against which air acts when the car is moving. Lifting the wing's rear edge causes air pressure to force it and the car's nose down and lifting its front edge causes air pressure to raise it and the car.

The amount of lift or downward push the wing exerts on the car's frame is controlled automatically by a pair of hydraulic cylinders. One cylinder is mounted between the front axle and the frame so that frame and axle movement in relation to each other causes it to lengthen or shorten. This actuates another cylinder mounted between the wing and the upper part of the car's framework that moves the wing's edge up and down. Art feels that the wing made a big contribution to Monster's excellent stability, especially when the afterburner is fired.

A couple of days after he set his record of 434 mph with Monster on their first visit to the salt, Art decided to try for a record just over 500 mph. Firestone engineers weren't in favor of this because they didn't think the tires on the car at that time were capable of 500 mph. New tires that would be good for 550 mph were being built at that time but they wouldn't be ready for at least two weeks. Art tried anyway and

(Continued on page 115)

WORLD LAND SPEED RECORD CARS — 1964

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struction tests on Firestone's test facility had proved the tires to have an absolute maximum speed ability of 600 mph. To average 550 through the mile without exceeding 550 at any point, Monster would have to enter the mile at that speed and maintain it all the way.

Monster started its run in its normal spectacular manner but Art goofed on its rate of acceleration. Just before it got to the first timing light, he glanced at its airspeed indicator and saw it was below 550 mph. Knowing that if he missed the record with this run he'd have to make at least two more, Art pushed the throttle to the stop. This fired the afterburner and away he went. He held the throttle down through the trap and as Monster passed the last timing light its airspeed indicator was showing just over 600 mph. And then the right rear tire blew.

Art was ready for the tire, with his thumb on the chute release button, and he popped the chute the instant he felt the tire starting to let go. The chute opened immediately but the car's speed and the blast from the engine were too much for its towline and the towline broke. Monster remained completely in control so Art let it decelerate for about a mile after shutting down its engine and then popped the emergency chute. At about 200 mph he tried the brakes but there weren't any. Pieces from the tire had broken the hydraulic line to one of the right brake's calipers and this put the complete system out of action. The car finally stopped about one-half mile before it reached the end of the course. It could have gone a couple of miles farther without trouble.

Speeds on the last run were 559 mph in the mile and 571 in the kilo. The new record averages were 536.71 mph for the mile and 544.13 for the kilo. Art had his record, Firestone had another blown tire but through no fault of theirs, and Monster had lost the rear portion of its right side again.

Art and his crew were happy with their record and Art was willing to wait for 1965, when he planned to boost the record above 600 mph, but his brother Walt could have caused him to change his plans. Walt was back in Wendover November 8 with his Wingfoot Express for another try. Wingfoot had been rebuilt and had a new driver. Bob Tatroe. But fate wouldn't have it; USAC refused to time Walt's car because he had since added rocket power to the sides and, besides, weather had already begun to sock-in the field.

Where the record, and Art, go from here is in the future—1965 for sure. ■■