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Beating the airlines





Budget Buy

Fly yourself

Since Texas is 801 statute miles top to bottom, and 773 miles side to side, Dallas trial attorney Jim Juneau found himself constantly flying short hops on the airlines to serve his statewide clients. He had always wanted to learn to fly, but couldn't find the time for training. Then came the terrorist attacks in 2001. The augmented airport security procedures that followed—necessary, but a pain in the suitcase—changed his mind.

The extra hours wasted at the airport by early check-in requirements and new passenger screening procedures became too much to bear, and at age 44 Juneau became a student pilot. "Some of my regular trips can be 500 or 600 miles," Juneau said. "It just became apparent to me that having an aircraft parked and waiting a quarter-mile from my office for trips to small towns and rural counties would save me a lot of time, and my clients a lot of money. In the course of learning to fly, I also learned that flying was fun." After getting his certificate in 2002—and carefully reviewing his typical missions—he bought a 1983 Piper Turbo Arrow IV in November 2003 and got his instrument rat-

Beating the airlines
in a Turbo Arrow

BY ALTON K. MARSH

PHOTOGRAPHY BY MIKE FIZER

"I go pheasant hunting in South Dakota and Nebraska, and quail hunting all over south Texas. With this airplane I can take the backseats out, put my dog carrier in, and use seat belts to secure it."



ing in it. Why a turbocharged model in flat Texas? In the summer, Texas has 100-degree temperatures and density altitudes of 3,000 to 4,000 feet, so the turbocharger is a welcome addition.

It turned out to be almost as economical as operating a car. The standard mileage allowed by the Internal Revenue Service for car travel (44.5 cents per mile) covers his per-hour aircraft operating expenses, yet he bills the clients for fewer working hours because he spends less time in transit: Both client and attorney win.

While the Arrow is economical enough for the business travel, it's also meeting his recreational needs. "I hunt and fish a lot. I go pheasant hunting in South Dakota and Nebraska, and quail hunting all over south Texas. With this airplane I can take the backseats out, put my dog carrier in, and use seat belts to secure it. I have a beautiful black Lab that loves to hunt. I tell him to 'mount up' and he'll jump right through the baggage door and into the carrier. I can put all the guns and hunting gear in and still have

room for an ice chest for the birds. When I had the interior and paint refurbished I had two weight-and-balance calculations performed—one with the backseats in and another one with them out. This keeps me legal in either configuration."

What you've heard

If you're familiar with the Arrow, you most likely flew one that was not turbocharged. You may associate the airplane with slow speed, limited payload, and a high used price. The 2,699 nonturbocharged Arrows now registered do have a reputation for less than blazing speed—especially the early 180-horsepower carbureted models—and a light payload. Nonturbocharged models often have a payload limit with full fuel of less than 400 pounds and a flight-planning airspeed of 135 knots. At FBOs and flight schools, the tanks are often kept full and can't be easily defueled, meaning you may need to vote a passenger off the airplane. Private owners have the luxury of controlling the fuel load and can typically



The CO Guardian Aero 552 (top) contains a clock, voltage readout, and temperature display. The ashtray lights let Juneau copy clearances (above), but he first had to install the back half of a Bonanza ashtray.

carry more than 500 pounds of passengers and cargo.

The turbocharged Arrows built by Piper—the Turbo Arrow III and Turbo Arrow IV—offered a useful-load increase ranging from 150 to more than 200 pounds over their nonturbocharged cousins. Juneau's Turbo Arrow can carry 529 pounds of payload after full fuel (72 gallons) and can stay in the air for five hours while cruising well in excess of 150 knots at 10,000 feet.

The current value including modifications and improvements of \$165,000 for Juneau's Arrow—\$135,000 is a typical Vref price for a similarly equipped Turbo Arrow—might raise a question as to whether this is really a budget buy. But consider that while The New Piper Aircraft Inc. no longer makes a Turbo Arrow, the base price for today's nonturbocharged model starts at nearly \$300,000. Piper offered turbocharging only on the 200-horsepower Turbo Arrow III and Turbo Arrow IV, and there are still 821 of them listed on the FAA registry. A Piper dealer in Baltimore said that a turbocharged Arrow is no longer offered in the New Piper lineup because the Arrow is typically bought only by flight schools as a complex trainer. Individual buyers who may have obtained their certificates in a Piper Archer bypass the

Arrow for faster, larger Piper models, the dealer said.

The modifications

A lot of mods on Juneau's airplane were added by a previous owner before Juneau bought it for \$112,000, but he has added many of his own since then.

"It was my understanding the radios had been stolen out of the airplane five years before I bought it. The old analog avionics had been completely replaced with digital King Silver Crown-series equipment. It had two KX 165A nav/coms with dual glideslopes already in it, and the KT 79 digital Mode C transponder, KN 62A DME, and KR 87 digital ADF. It also had a J.P. Instruments EDM-700 engine analyzer installed," Juneau said. "On the exterior, the plane was already equipped with the three-blade Hartzell constant-speed propeller and the RMD wing tips with recognition lights. There were also LoPresti speed mods including wing-root fairings, speed spats, and Hubba wheel caps.

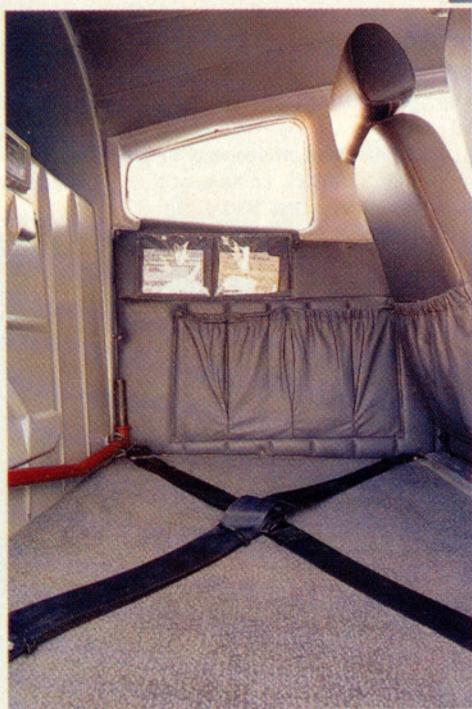
"My first objective was to upgrade the panel both from a functional standpoint and a safety standpoint," Juneau said. "I replaced the old whiskey compass with a vertical card compass. I thought I had a heat issue with the engine and assumed it was associated

with living in Texas, so I decided to add a Merlyn BlackMagic automatic wastegate. However, when the mechanic took the cowling off to install the automatic wastegate, he found a bird's nest on top of my oil cooler, and called to tell me that it was probably the cause of my engine temp problem. I decided to do the modification anyway because it makes the turbo so much more efficient. That works quite well and was about \$5,000 installed. The actual part was something less than \$2,000, and it

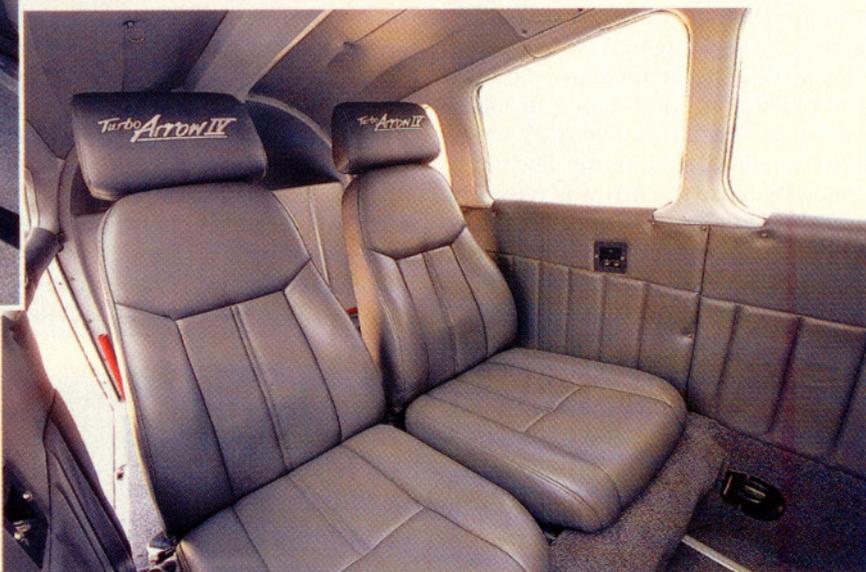
Juneau was offered only \$800 for the King KLN 89B GPS, so he kept it as a backup to his Garmin GNS 530 GPS.



The interior shop Juneau chose, C&H Aircraft Interiors, has won awards at Oshkosh for work on other aircraft. Now this one has won its first award as well.



Juneau waited to improve the interior until he was sure the Turbo Arrow was the right aircraft for his business and recreational needs.



took about 10 hours of a mechanic's time. We routinely get 3,000- and 4,000-foot density altitudes in Texas at sea-level fields, and I am still able to climb at 1,000 feet per minute at almost any altitude I choose."

The official name for the wastegate is "upper deck controller" because it redirects some of the gases from the exhaust manifold (or upper deck) to power the turbocharger. Piper originally had installed a less expensive fixed wastegate instead of an automatic wastegate. At sea level, when you don't really need the turbo boost, a fixed wastegate still provides it. At altitude, when you need all that the turbo can give, the fixed wastegate limits the amount of boost available because it is fixed at a single aperture. The Merlyn product goes in line between the exhaust manifold and the turbo and uses a pressure-controlled butterfly valve that progressively diverts more of the exhaust flow to spin the turbo as altitude increases, thus automatically increasing the amount of turbo boost as the aircraft climbs.

Although the airplane was equipped with a Bendix/King KLN 89B GPS when

Juneau bought it, he elected to trade in one of the King 165 radios for a Garmin GNS 530 GPS/nav/com, which is slaved to the KAP 150 autopilot. It is augmented by a Garmin GDL 49 satellite data-link weather transceiver, mounted in the tail, which downloads Echo Flight Nexrad radar images and other weather products that are displayed on the Garmin navigator's 5-inch-diagonal color screen. "I was offered an \$800 trade-in for the King KLN 89B GPS, but I thought it was worth \$800 to keep it in the panel, so I now have a redundant GPS, and both are IFR certified," Juneau said. Instrument flying added a few more wants to his wish list.

"When I started my instrument training, I became aware of how difficult it was to fly the plane partial-panel using

only the turn coordinator. So for safety reasons I went looking for an electric attitude indicator. We also had an incident here at Addison on New Year's Day in 2004 in which a [Bellanca] Super Viking took off, lost his vacuum [system] in the clouds, and ended up diving into a neighborhood. It kind of woke me up, so I installed a Mid-Continent 4300 Life-saver backup electric attitude indicator, which has its own internal battery and has a slip-skid ball as well. It took the place of a turn coordinator and gives me great peace of mind."

He held off on the more expensive improvements to see if this was really the aircraft that best met his needs. "After a year I realized that it was roomy enough, fast enough, and economical enough. I had looked at several Bonan-

zas and a Socata Trinidad, but I wanted something that was almost as economical as a car. After I decided that the Turbo Arrow was what I needed, I put some money into replacing the interior to get it comfortable, and into redoing the [original] paint. I had all of the work done at one time and at one field to minimize aircraft downtime. I later decided to do a top-end overhaul on the engine as well, since two low-pressure cylinders needed replacement, and the engine was midtime anyway. I looked at the well-known shops in Mena, Arkansas—which are the ones that everyone talks about—but I found all the needed services right here in the Dallas-Fort Worth area at Northwest Regional Airport in Roanoke, Texas. They have an interior shop there that has done some award-winning interiors, as well as an excellent paint shop, prop shop, and a first-rate mechanic.” The shops he used there included C&H Aircraft Interiors, Glo Custom Aircraft Painting, and Roberts Airframe & Engine. The paint is Sherwin Williams Jet-Glo. The Phantom Gray, Deep Red, and Las Vegas Gold colors are metallic, while the Matterhorn White is non-metallic. The interior won an award at the 2005 Cherokee Pilot’s Association national fly-in.

“I probably have \$35,000 invested in the panel, \$10,000 in the paint work, and about \$7,000 in the interior. The engine top-end and turbo overhaul was about \$10,000. If I were to sell it today I would likely not get back all that I have put into it. That’s not really important to me because I want to keep the airplane, and I want it to be equipped like I want it,” Juneau said.

Additional nice-to-have modifications include an Astro-Tech LC2P control wheel clock, a PS Engineering PS-3000 stereo intercom, and door ashtrays that now house battery-powered lights. He needed better interior lighting for organizing his cockpit and writing clearances during night operations. He chose the Pinnacle Products’ Ashlight that offers snap-in battery-powered units with four red light-emitting diodes. The Piper ashtrays couldn’t be converted to hold Ashlights, so he had the interior shop mount the back half of a Bonanza ashtray in the side panels—both in the door and the pilot side panel. The one on the door lights the entryway, while the other one lights the pilot’s lap.

Juneau also became concerned about the potential for carbon monox-

ide seepage into the cabin, so he had an in-panel CO detector installed in place of the original analog clock. This modification required an FAA Form 337 from the Fort Worth FAA Flight Standards District Office, because the model Juneau selected, a CO Guardian Aero 552 multifunction sensor, was not yet FAA approved for certified aircraft. It was to be certified by the end of October. In addition to sensing dangerous levels of carbon monoxide, the Aero 552 includes clock functions, a flight timer, a stopwatch, a voltage meter, a digital interior and exterior temperature gauge, and density- and cabin-altitude calculator functions.

Behind the interior side panels, high-density foam insulation was placed against the skin of the cabin for thermal and sound insulation and to prevent the hull from sweating. With the insulation, you don’t hear that tinny sound when you thump the cabin exterior that you might hear on an aircraft without it.

There are a few upgrades remaining on Juneau’s wish list—the upcoming WAAS capability for his Garmin GNS 530. In addition, the Garmin GDL 69 datalink receiver, another item on his future upgrade list, can receive XM WX Satellite Weather and display it on the 530: It’s an always-on, constantly updated system and comes with XM Satellite Radio as well. He will be able to receive XM weather products and in-flight entertainment that will all be tuned and displayed through his upgraded GNS 530.

Original features

The original Arrows featured an automatic gear-lowering system based on airspeed and engine power (propeller slipstream) as read by a pressure sensing device that looks like an additional pitot tube extending from the left side of the fuselage. Many owners, including Juneau, have had the automatic gear system disconnected in an FAA-approved procedure that requires that the external sensor be left in place. When the system is operating, a 1987 pilot’s operating handbook indicates the gear could lower automatically at speeds from 75 to 95 knots depending on power settings and altitude. “The problem is that the automatic extension system would make its own decision as to when the gear ought to be dropped,” Juneau said. “On an airplane with limited available power, particu-



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Piper Arrow timeline

February 1, 1966

First flight of the Cherokee 180 Special, later known as the Arrow.

1967 Cherokee Arrow is introduced with a 180-horsepower engine.



1969



February 1969

A 200-horsepower engine becomes an option.

1971 Last year for production of the 180-horsepower Arrow. Arrow B model is introduced with minor modifications.

1972 The Arrow II is introduced with a 5-inch-longer fuselage and a wider door. Maximum gross weight is increased by 150 pounds. The wingspan is lengthened by 2 feet and baggage capacity is increased by 50 pounds. A locking landing-gear override lever is added.

1977 The Arrow III with the semitapered wing from the Warrior begins production.

Maximum gross weight is increased by 100 pounds. The turbocharged Arrow III is introduced.



1978 The T-tail Arrow IV starts production in December for the 1979 model year.

The Turbo Arrow IV is also offered.

1982 The normally aspirated Arrow IV is discontinued.



1988 The Turbo Arrow IV is discontinued. The low-tail Arrow and Turbo Arrow are revived. (They were really an Arrow III/Turbo Arrow III with a new metal panel and a new glareshield.)

1991 The Turbo Arrow is discontinued.

2004 The Avidyne FlightMax Entegra is offered as option.

Source: British author Roger Peperill has written several books on Piper aircraft.



larly if you are low and slow, that gear coming down can really affect the operating characteristics of the airplane. Most pilots would prefer to make those decisions themselves." Even with the automatic system disconnected, Juneau's Turbo Arrow retains its gear warning system, which sounds a cabin alarm if the gear is up when flaps are lowered, or the manifold pressure is reduced to less than 15 inches.

The airplane also came with a factory-installed four-place oxygen system that includes an external fill port so a mechanic can lift the door and refill the oxygen from the ramp in a matter of minutes. In flight, the pilot can reach behind the seat, get a cannula, pop it into the outlet behind his head, and turn on a valve to start the oxygen supply. Flow is adjusted by the pilot to match the cruising altitude.

Performance and costs

Juneau often flies in the 15,000- to 17,000-foot altitude range, and at those altitudes he routinely gets true airspeeds of 175 knots. At lower altitudes, around 10,000 feet, he gets about 10 to 15 knots less, and between 7,000 and 10,000 feet he typically sees 155 knots true airspeed. His average fuel burn is 12.5 gph at 75-percent cruise, but if he uses 65-percent power he can depend

It isn't far to the golf course at Lake Texoma State Park in Oklahoma, barely across the border from Texas. The Arrow used about 1,000 feet for takeoff on this 100-degree day.

on an 11-gph burn, and at 55 percent he gets about 9.5 gph. Even at the higher power settings he can flight-plan for a 4.5-hour endurance and still have slightly more than an hour in reserve.

He said maintenance has been minimal. "After the engine top-end overhaul I have rarely needed to put an extra quart of oil in it. I have had the oil and filter changed every 50 hours, but aside from that I have had no appreciable oil burn at all. Basically I just put fuel in it and fly." There are some maintenance issues that come up from time to time. The day before the *AOPA Pilot* photo shoot he replaced the main tires, had the brakes done, and had the prop resealed, but he points out those are routine wear items. In terms of mechanical problems since he purchased it, he has replaced an alternator, had the battery voltage regulator adjusted, and he had a problem where a seal was blown in one of the main gear. He used the emergency extension system to get the gear down and it was easily repaired.

Excluding the modifications made to the airplane, operating costs run about \$75 an hour, including fuel, oil, maintenance, and subscriptions to his current

satellite weather datalink service. Insurance is included in that hourly figure and costs about \$3,000 a year, which may seem high to other Arrow pilots. "Some of that has to do with me being a reasonably low-time pilot—I have a total of about 420 hours," Juneau said. The costs do not include hangar fees, which at Addison, Texas, are \$280 a month. While Juneau has a Continental TSIO-360-FB with a 1,800-hour time between overhauls, some earlier Turbo Arrows had the 200-horsepower TSIO-360-F with a 1,400-hour TBO.

The airworthiness directive history holds no dark secrets. The earliest Arrows have 18 mostly minor ADs, although there are three affecting the nose gear. Several Arrows across a range of models suffered nose-gear collapses in the 1970s. Newer models have fewer than 10 ADs still current today, and they are minor and in many cases identical to those issued 30 years ago. Juneau's model has eight, including renewal of a 1982 AD affecting the landing gear. It requires a one-time modification of the gear and an inspection involving dye penetrant to check for cracks, even if the 1982 AD has already been accomplished.

A safety study of Piper Cherokees and Arrows is available online from the AOPA Air Safety Foundation. AOPA

owners of both turbocharged and non-turbocharged Arrows were contacted through the Cherokee Pilot's Association for comments on their ownership experience. You'll find those on AOPA Online as well, and you can post your experiences there also.

The flight

The test flight was more of a photo shoot, given that it occurred at Lake Texoma State Park, Oklahoma, 60 nautical miles north of Juneau's home airport at Addison, Texas. The park's 3,000-foot-long runway is 100 feet from a golf course and about 400 feet from an air-conditioned convenience store. There is no fuel or FBO—just a ramp with tiedowns.

Takeoff requires clearing the park's rolling terrain less than a mile past the departure end, and the Arrow cleared it easily after using about 1,000 feet of runway on a 100-degree Fahrenheit day. In flight the Arrow felt like a much heavier airplane, stable and able to ignore much of the thermal turbulence of the day. It was easy to keep the aircraft in precise photo positions, thanks to that stability; of course, it also comes from good rigging by a mechanic. To you, that means the pilot workload will be low during cross-country trips and you'll feel confident in copying clearances or checking a map without requiring the help of an autopilot.

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The Cessna 172 photo airplane carrying AOPA Pilot Senior Photographer Mike Fizer was at its maximum cruise speed while I loafed 40 feet behind in the Arrow at less than 20 inches of manifold pressure. When the photos were all taken we started a spiraling descent. In any turbocharged aircraft, descents have to be planned well ahead of landing to allow a gradual reduction in power to slow the turbocharger and prevent shock cooling of the engine and turbo.

Juneau had warned me that the T-tail also requires a special landing technique. Perhaps that is why Arrows in production today have the standard tail. The horizontal stabilizer is mounted above the slipstream of the propeller and can thus be less effective during landing maneuvers—especially at slower airspeeds. "It is a little bit more speed critical than landing a straight tail," Juneau said. "It takes a little more practice to learn to land it well. When I first started I was trying to land it like a Cessna and you

can't do that. I was coming in too fast—you get a little bit of float—then once you run out of airspeed it wants to drop to the ground and you get a thump."

To not "thump," I kept the speed up and flew it onto the runway. While I was taxiing to the hangar, Juneau warned that I should keep the power low for about five minutes to allow the turbocharger to spin down and cool. Adding power during taxi, he noted, would start the five-minute cool-down clock over again, meaning more time would be required before shutdown. Over time, failure to cool the turbo before engine shutdown could lead to metal fatigue and cracking.

With a little extra care Juneau expects that the engine will easily make TBO. But maintenance costs are well

i Links to additional information about Piper Turbo Arrows may be found on AOPA Online (www.aopa.org/pilot/links.shtml).

worth the price of freedom to determine his own travel plans. Juneau now spreads his wings over Texas instead of spreading his feet on an airport security pat-down mat.

And he never arrives two hours before his flight.

AOPA

E-mail the author at alton.marsh@aopa.org.

SPECSHEET

1983 Piper PA-28RT-201T Turbo Arrow IV

Base price in 1983: \$75,000 (approx)

Today's Vref base price: \$135,000

Price as tested: \$165,000

Specifications

Powerplant 200-hp Continental TS10-360-FB
 Recommended TBO1,800 hr
 Propeller76-in Hartzell constant speed,
 three blade
 Length27 ft 4 in
 Height8 ft 3 in
 Wingspan36 ft 4 in
 Wing area170 sq ft
 Wing loading17 lb/sq ft
 Power loading14.5 lb/hp
 Seats4
 Cabin length7 ft 11 in
 Cabin width3 ft 5 in
 Cabin height4 ft
 Cabin door37 by 36 in
 Standard empty weight1,896 lb
 Empty weight, as tested1,951 lb
 Max ramp weight2,912 lb
 Max gross weight2,900 lb
 Max useful load1,004 lb
 Max useful load, as tested949 lb
 Max payload w/full fuel584 lb
 Max payload w/full fuel, as tested529 lb

Max takeoff weight2,900 lb
 Max landing weight2,900 lb
 Fuel capacity, std77 gal (72 gal usable)
 462 lb (432 lb usable)
 Baggage capacity200 lb, 24 cu ft
 Baggage door20 x 22 in

Performance

Takeoff distance, ground roll, no flaps ...1,110 ft
 Takeoff distance over 50-ft obstacle,
 25-deg flaps1,620 ft
 Max demonstrated crosswind component
17 kt
 Rate of climb, sea level940 fpm
 Max level speed, 14,000 ft176 kt
 Cruise speed/endurance w/45-min rsv, std
 fuel (fuel consumption), 10,000 ft
 @ 75% power, best economy...156 kt/5 hr
 (60 pph/12 gph)
 Range @ 18,000 ft, 65% power730 nm
 Service ceiling20,000 ft
 Landing distance over 50-ft obstacle
1,555 ft

Landing distance, ground roll645 ft

Limiting and Recommended Airspeeds

V_X (best angle of climb)79 KIAS
 V_Y (best rate of climb)97 KIAS
 V_A (design maneuvering)124 KIAS
 V_{FE} (max flap extended)108 KIAS
 V_{LE} (max gear extended)133 KIAS
 V_{LO} (max gear operating)
 Extend133 KIAS
 Retract111 KIAS
 V_{NO} (max structural cruising)152 KIAS
 V_{NE} (never exceed)193 KIAS
 V_R (rotation)77 KIAS
 V_{S1} (stall, clean)66 KIAS
 V_{SO} (stall, in landing configuration)61 KIAS

Nearly all specifications are based on manufacturer's calculations. Some of the measurements were made by the owner. All performance figures are based on standard day, standard atmosphere, sea level, gross weight conditions unless otherwise noted.