

TESTED: Groundbreaking King-Air Aftermarket Suspension

SnowGoer

2020
SLED
TECH

2020 Ski-Doo
Renegade X 850 E-TEC

**ENGINEERS & DESIGNERS
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PRE-SEASON PREP:
REAR SUSPENSION

OCTOBER 2019

TeamFAST

King-Air Rear Suspension & Assault Air Shocks



For several years, both in print and in conversations with fellow sledheads, we've compared the surprisingly large ride-quality gap that Ski-Doo's rMotion rear suspension opened on its competition to the revolution started roughly 20 years earlier by the then-amazing, coupled FAST M-10 rear suspension.

"The rMotion isn't a little bit better than the competition – it significantly raised the bar, kind of like the M-10 did in the 1990s," we'd say. Also like the M-10, the rMotion was an unrivaled benchmark for many years – until now. Interesting, the rMotion's new challenger was designed by the man behind that original M-10.

Last winter we met TeamFAST's Gerard Karpik for a test ride on a 2016 Yamaha SRViper equipped with his new King-Air rear suspension, plus FAST-exclusive Assault Air Shocks installed on an otherwise-stock front suspension. On trails varying from smooth hard-pack to rugged, choppy conditions, we could charge harder through the bumps in more control with significantly less discomfort than we could on the 2019 Ski-Doo we had along on the same ride. How can that be?

The Ride

When we met Karpik near Finland, Minnesota, on a March day, he didn't want to waste time in the trailhead parking

lot explaining his suspension system – that would come later. Instead, he wanted us to experience it first. After asking our riding weight, he adjusted the mini air compressor mounted atop the tunnel to provide 60 PSI to the rear air shock, saying we should test it at that air pressure before making any adjustments.

"You might notice you're sitting taller in the saddle than what feels natural," Karpik explained. "You'll get used to it."

Sure enough, we threw a leg over the Viper and immediately felt an inch or two higher than normal, and thoughts raced through our heads over whether we'd be able to push this setup hard through corners. Was the center of gravity raised? Would it have excessive roll through tight twisties? We fired up the engine to find out.

Beginning on hardpack trail with wide sweeping turns, we started with caution. The rear of the snowmobile felt well-connected on the smooth trail surface and that "tall" feeling started to fade from our senses as we gained confidence in the setup. Handling was



spot-on, as the sled tracked exactly where we wanted it, but in these trail conditions the system didn't separate itself much from other designs. At the first stop, Karpik tapped a bleeder valve on the air compressor to drop the rear air shock to 58 PSI, then we were back on the attack.

With the tiny air adjustment, the sled settled into its travel more, and we charged down the increasingly bumpy trail with more confidence. As we headed north, trail conditions deteriorated significantly – to the point where straightaways were filled with stutter bumps and corners were downright rugged, with huge, frozen-in moguls. We charged through it all, opening a gap on others in our riding party who were struggling through the bumps.

As trail conditions declined, we could sense more motion from the suspension than we'd previously experienced. Energy from the trail was soaked up by the suspension, but the seat and handlebars were isolated from impacts. We thought of off-road truck racing videos we'd seen – when the tires on the vehicle go up and down through nasty stretches but the cab of the vehicle barely moves. Searching for a limit we charged harder still – surely a suspension this plush would have a harsh bottom? We found the bottom of the suspension stroke a few

King-Air Rear Suspension – \$1,958
 & Assault Air Ski Shocks – \$685/ea
 TeamFAST
 Eveleth, Minnesota
 218/744-2010; TeamFAST.com

CONFIDENCE: Both the ride quality and the handling of the SRViper with the TeamFAST setup were improved mightily.

COMPRESSOR: Karpik said the air pressure setting in the rear shock will rarely need adjustment – it should be a set-it-and-forget-it situation.

STROKE: The shocks are designed and tuned for a lot of movement, thanks to their internal bypass system and speed-sensitive nature.

times, but no harshness.

To make sure we weren't being tricked by conditions, we got back on the 2019 Ski-Doo Renegade X-RS 900 ACE Turbo we brought along and rode the same trail back. Suddenly, the rMotion about which we had previously raved felt mortal – we needed to adjust our speed more on the trail, worry about our timing in the choppy corners and the sled wandered more in stutter bumps. Switching back to the Viper, we again felt like the king of the trails on the King-Air setup.

The Technology

According to Karpik – known as “King Karpik” for his racing prowess in his younger years and also as the man who brought modern suspension coupling to the market with the M-10 (and later Blade snowmobiles) in the 1990s – the secret sauce is found both in the Assault Air Shocks he had mounted in both the front and rear suspensions, and the geometry and coupling of the rear suspension.

The shocks are a TeamFAST-exclusive design featuring gated damper stages – meaning a highly tuned internal bypass porting system that makes the shocks extremely speed- and condition-sensitive. We could see that in action when riding: While leaning out on the sled, we could watch the front shocks move a lot in the trail chatter, which intuitively might lead a person to think the shock would crash through all of its travel too quickly in a big bump.



However, it took the big hits very well.

Karpik noted that he'd been working with position-sensitive shock technology for more than 20 years – in fact, the first Fox position sensitive shocks used in snowmobiling were found on the 1995 M-10 – and more recently developed his own design, partially working with a shock company out of Wisconsin.

Meanwhile, on the Yamaha SRV/ Arctic Cat ProCross chassis for which TeamFAST will initially market the King-Air rear suspension, Karpik said his longstanding, M-10-based suspension geometry was revised to take full advantage of the sled's unique Extra Travel Tunnel, gaining 4 additional inches of travel while maintaining track tension. A high level of suspension coupling – where the front and rear arms of the skid work together – is also key.

“It really comes back to the speed sensitivity of our geometric design for the suspension system,” Karpik explained. “Though we are what they call ‘falling rate’ on compression, we are rising rate on return, so we have a lot more flexibility in controlling our shocks through speed than the other guys do. Because the shock decelerates though its travel, it's extremely speed sensitive, and learning how to work with that speed sensitivity is the magic.”

Overall, we were awestruck by the TeamFAST design and, at first blush, it truly was a new benchmark – though admittedly we were testing it in pre-production form on a machine tuned by its inventor. We're excited to ride a machine in final production spec in the future.

— JOHN T. PRUSAK