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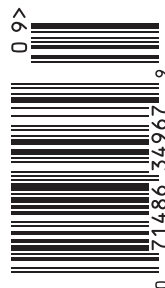
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MICHAEL FREMER

TechDAS Air Force Zero

TURNTABLE

The Air Force Zero turntable is very large for a turntable, but it is not as large as a house. At \$450,000 for the base model, it does, however, cost as much as many houses and more than many others.¹

This observation will set off howling among some audio enthusiasts of a sort that never happens in the wine world, for instance, where well-heeled oenophiles routinely spend large sums for a short-lived thrill.

Yes, I know, some people are homeless. Others are hungry. Isn't it wrong to spend the equivalent of a suburban home on a means of playing records? It's a legitimate question, and I don't dismiss it, but it's not for me to say, except when it comes to my own choices. It's a decision each of us must make for ourselves. Now, where was I?

Nishikawa's ultimate analog statement?

I'm sure TechDAS founder Hideaki Nishikawa has heard more turntables than I have, and I've heard a lot of them.

He received his mechanical engineering degree in 1963, when I was still in high school. He then joined Stax Ltd., where he was instrumental in developing that company's legendary electrostatic headphones. He was



The finger snaps were slower—almost suspended in time and far fleshier than I expected from long familiarity.

involved in other projects, too.

Nishikawa-san left Stax in 1980 to join Micro Seiki. As manager of the technical department, he was involved in the development

¹ According to Zillow, the average US home price is \$287,148, a 13% increase in just one year.—**Jim Austin**

SPECIFICATIONS

Description Belt-drive, air-suspension turntable with vacuum hold-down and electronically controlled AC synchronous motor. Speeds: 33 1/3 & 45rpm. Motor type: synchronous AC (Papst). Bearing type: Air. Number of tonearm fittings: 2. Dust-

cover: none. Accessories supplied: 2 titanium bases, 1 disc stabilizer, 1 platter cover. Power supply: 115/230V, 50–60Hz.

Dimensions Turntable: 35.5" (902mm) W × 26.6" (677mm) D × 13.18" (335mm) H. Weight: 750lb (340kg).

Power supply/air units (3): 16.9" (430mm) W × 14.3 (365mm) D × 8" (205mm) H. Weight: 33lb (15kg), 28.6lb (13kg), and 22lb (10kg).

Finish Black/Extra super duralumin.

Serial number of unit reviewed 018.

Price Basic version: \$450,000. Approximate number of US dealers: 7. Warranty: Three years.

Manufacturer TechDAS, Stella Inc. 51-10 Nakamarucho, Itabashi-ku Tokyo 173-0026, Japan. Web: techdas.jp.

of a long line of turntables including the company's statement product, the SX-8000, which remained in production from 1981 until 1990. Find an online photo² and you'll notice more than a passing resemblance to the Air Force turntable line, especially in the large metal platter topped with a double-lipped vacuum hold-down system. Also notice how the outboard motor drives the platter with a belt around its periphery.

Micro Seiki's slew of talented engineers produced turntables and tonearms for other brands and performed precision machining work for other industries, such as SME does in the UK and Ortofon does in Denmark. Diversification helps with a company's stability—hence its longevity—something every audiophile should consider when investing in high-dollar gear. What good is a lifetime guarantee from an out-of-business company?

In 1989, Nishikawa founded Stellavox (now Stella, Inc.), an importer (into Japan) of high-performance audio gear. In 2010, he started TechDAS as the Stella house brand.

Even if you're not a fan of TechDAS turntables, you have to admire Nishikawa's passion and decades of accomplishments and the consistency of his vision of what constitutes good turntable design.

Nearly a decade has passed since TechDAS introduced its first turntable, the Air Force One. Last year, I reviewed the updated version of that 'table, the Air Force One Premium,³ which is now second to the top of the TechDAS line. Six months ago, the formidable Air Force Zero arrived in many crates. Assembling it took a team of two several days, but since then, I've been listening to it and enjoying everything about it, from its impressive size, which at first felt almost cartoonish (a feeling that quickly dissipated when the stylus touched the record with a gentle "bip") to its ease of use and trouble-free, non-fiddly performance.

We'll probably see a few product enhancements throughout the TechDAS line. Maybe we can hope for a truly affordable model that retains the line's key features, priced below the current "entry-level" V, or perhaps a more compact, less expensive version of the Zero: call it Zero.1. But to me the Air Force Zero looks very much like the ultimate fulfillment of Hideaki Nishikawa's turntable vision.

The massive Zero took three years to develop, from inception to launch. Just watching the technicians unpack the Zero made clear the company's careful attention to detail.



Top-to-bottom: The Air Force Zero floats its upper structure on four cushions of air. Moving the main support frame required three strong people. The Air Force Zero's 266.7lb stack o' platters also floats on an air cushion.

40-unit run. The serial number of the review sample was 018.

The three-phase, synchronous Papst motors used in the AF Zero are new old stock, originally used to spin Revox tape recorder capstans. (The size of the AF Zero's production run was determined partly by how many new-old-stock Papst, high-torque, three-phase, 12-pole AC, synchronous motors the company was able to source.) TechDAS takes them completely apart and rebuilds them into highly modified motors that include a customized air-bearing spindle and flywheel. The rotor assembly floats, so no load is applied to its thrust plate, minimizing noise and producing the largest possible moment of inertia, which TechDAS has precisely calculated. The flywheel and rotor together weigh 5lb and produce a moment of inertia of 116lb-cm².

TechDAS's goal for the motor was to produce "virtually zero wobble" thanks to the combination of air and metal bearings, the "enormous" inertia generated by the flywheel effect, the extremely high S/N ratio made possible by the air bearing, and what TechDAS claims is the best speed stability and consistency of any Air Force turntable—the latter due to a new electronic drive circuit designed for stable, precise rotation with low vibration.

² As I write this, there's one on eBay, offered at \$40,000. Some audio products hold their value.

³ See stereophile.com/content/analog-corner-294-techdas-air-force-one-premium-turntable-graham-engineering-elite-tonearm.

The new, multistep drive system begins with a sensor that communicates platter speed to the micro-processor. The desired rotation frequency is synthesized by a “Direct Digital Synthesizer” (DDS) with reference to a crystal oscillator. Each motor phase is driven by its own 50W power amplifier. A three-phase generator circuit creates the phase shift in place of the more typical capacitors, which are more error-prone and deteriorate with age. A torque-switching circuit adjusts motor voltage during startup or when changing speeds to quickly achieve rated speed, at which point the speed locks and torque is decreased to further reduce vibration.

A strong motor is needed during startup because there’s a lot of mass to move: The Air Force Zero doesn’t have a platter; it has a stack o’ platters. On the bottom of the stack is a 15 3/4", 80lb platter made of nonmagnetic forged stainless steel; above that is a 43.5lb, 12.2" platter made from the same material; the drive belt, which is made of “polished and non flexible polyurethane fiber” and isn’t stretchy, wraps around this platter. Above that is a 40lb, 12.2" platter made of cast gunmetal, a form of bronze. The platter second from the top is also stainless steel. It weighs 48.5lb.

The top platter comes in two versions. The standard version is titanium with a “special surface hardening treatment.” It weighs 13lb. For an extra \$50,000, you can get a tungsten top platter that weighs 50lb. Both are topped with a soft mat and vacuum-hold-down lips. The upgraded platter was supplied with the review sample.

The total weight of the platter assembly comes to 229.3lb with the standard titanium top platter and 266.7lb with the upgraded tungsten top platter. Altogether, the main chassis, including the motor unit and with the heavier top platter, weighs 765lb.

The five stacked platters are “held as one,” not by mechanical couplings but by air pressure, a system similar to the vacuum LP hold down. When properly set up, all the platters are, of course, level, including the top surface. When the air pumps are activated, this 266.7lb mass (with the upgraded top platter) floats and rotates on a 10µm layer of compressed air! Plus, the entire assembly is air-suspended on the four corner pods.

The power supplies and the various pumps occupy three additional chassis weighing 84lb. The machined stainless steel base frame weighs 220lb.

All of which raises an obvious question: What kind of rack do you place such a heavy turntable on, especially one with an asymmetrical footprint? The VXR stand made specifically for the Zero by HRS adds \$52,000 to the price.

Rereading what I just wrote makes me think of Rega



General	
mean frequency	3149.0 Hz
Raw Frequency	
max deviation (relative)	-0.26% / +0.38%
max deviation (absolute)	-8.3 Hz / +12.1 Hz
Lowpass-filtered Frequency	
max deviation (relative)	-0.02% / +0.02%
max deviation (absolute)	-0.7 Hz / +0.5 Hz

The TechDAS Air Force Zero’s platter-speed statistics measured two ways: with the PlatterSpeed app and the Shakspin. The low-pass filtered speed deviation is 0.02%.

Research’s Roy Gandy, whose approach to turntable design is precisely the opposite of Nishikawa-san’s.

Gandy’s ultimate goal would be a *no-mass* design; for *his* ultimate ‘table, the limited edition Naiad (about \$41,000 with arm), he settled for a superlow-mass, ultrastiff carbon-fiber composite chassis. Wouldn’t a head-to-head comparison be interesting?

Logistics

Fitting this enormous turntable into my room required that it be placed on the opposite side of my room from where my equipment rack sits. Phono preamps were placed close to the turntable. I used two 5.5m runs of balanced Tara Labs Zero Gold interconnect cable to get the phono preamp output across the room to the line preamp.

I borrowed a 6m length of Audio-Quest Hurricane AC cable and plugged it into the PS Audio PowerPlant 15, since I’m still waiting for the final permit for

the transfer switch bypass. Because so many boxes needed power, I used an RSX Technologies Power8 multioutlet, fully shielded extension box fitted with eight solid copper AC receptacles and no sound-damaging surge protectors.

The Zero can accommodate two 9”-12” tonearms mounted on *massive* titanium armboards drilled for your choice of arms. The review sample was supplied with two standard titanium armboards drilled for the Graham Elite and SAT 9 CF1-09 tonearms.

Easy to use, little required maintenance

Once the dealer setup was accomplished, the Zero was practically maintenance free for the six months it spent in my listening room. You turn it on by turning a single knob, and then a screen tells you if air is required and where. The easily activated pump with attached air hose lets you “top up” the feet as required with four tirelike air valves located behind a front plate. Occasionally topping up the air in one of the feet was the only maintenance the Zero ever required.

Place a record on the platter, choose the speed, activate the vacuum hold-down, and in a surprisingly short time, the ‘table locks in to the right speed (and tells you so on the screen), and you’re good to go. Very good to go.

I attended the Zero’s North American debut at The Audio Salon in Santa Monica in April 2019 (analogplanet.com/content/techdas-air-force-zero-debut-audio-salon-first-im-



pressions-stun-listeners) a few days before AXPONA, and as I wrote, I went there a skeptic and left believing I'd heard the best vinyl playback I'd ever experienced, beginning with a level of background silence I'd never before heard, nor had anyone else in attendance. When the stylus kisses the record, there's a *natural* nothing. There is energy in the stylus/vinyl exchange, which the best turntables minimize. The Zero, performing like an enormous drain for unwanted energy, seemed to eliminate it completely.

Look at the measurements produced by both the shakspin and the oft-used PlatterSpeed app (previous page). Both sets of measurements are what you might expect from a direct-drive turntable including maximum relative deviation low pass filtered of $\pm 0.02\%$. That's impressive to look at but more impressive to hear.

Weight, gravitas, and the Air Force Zero sound

Regardless of arm (Elite with optional tungsten armwand or SAT CF1-09) or cartridge (X-quisite ST, Lyra Atlas λ Lambda SL and Etna λ Lambda SL, or TechDAS TDC01 Ti), all of which I am familiar with in other contexts, the Air Force Zero put its sonic stamp on all associated gear. You may say that it should have no sound of its own for that price, but in the analog world—digital, too, for that matter—*every* link in the chain has a sonic character, which to me is not the same thing as an amplitude-based coloration. The Zero let through each cartridge's timbral and dynamic character while imparting its own unique and immediately recognizable weight, sledgehammer "slam," ultragenerous sustain and decay, and the blackest backgrounds I've heard a turntable produce.

I listened first to the TechDAS TDC01 Ti. I heard the long, sticky bass sustain and muscular bottom-octave control and attributed it to the cartridge, but later I heard that unmistakable quality with the other cartridges even as they maintained their own character.

In a recent webinar, Bernie Grundman talked about cutting Dave Brubeck's *Time Out* for Classic Records from the original three-track tape. (It's now on Analogue Productions—APPJ 8192-45—pressed from the same metal parts.) I've been playing this record in one pressing or another since the early 1960s.

The first two bass drum kicks, drenched in added EMT-plate reverb, produced decisive, emphatic *force* and communicated Joe Morello's *intent* to set off the tune with a *bang* that I'd never noticed before. After those first two kicks, you could hear him ease off the pedal. The bass sustain that followed the attack lingered more noticeably in the reverb. Morello's cymbal work was richer and fuller, with more wood and somewhat less brass sparkle, making it sound more natural and less hi-fi. The snare sound, too, had more nuance and natural detail. The Zero lingered on everything, producing gravitas and richness on piano and saxophone on a recording I'd always thought sacrificed instrumental solidity for reverb-drenched effect.

I wondered: What would the finger snaps sound like on Elvis's sinewy take on "Fever"? (*Elvis is Back*, Analogue Productions AAPP-2231, sat on the shelf next to *Time Out*, so no mystery where *that* idea came from.) The finger snaps were slower—almost suspended in time and far fleshier than I expected from long familiarity. Bob Moore's bass lines took on added attack weight and longer-lingering sustain, and Buddy Harman's ricocheting bongo hits sounded fuller and richer, almost like larger conga hits. At one point, Elvis

ASSOCIATED EQUIPMENT

Analog sources OMA K3, SAT XD-1 turntables; SAT CF1-09 and Graham Elite tonearms; X-quisite ST, Lyra Atlas λ Lambda SL and Etna λ Lambda SL, and TechDAS TDC01 Ti cartridges.

Digital sources dCS Vivaldi One SACD player DAC; Lynx Hilo A/D-D/A converter; ROON Nucleus server; Pure Vinyl and Vinyl Studio software.

Preamplification darTZeel NHB-18S, Ypsilon MC-10L, MC-16L, and MC-20L and X-quisite SUT X-20 step-up transformers; Ypsilon VPS-100, CH Precision P1 with X1 PSU.

Power amplifiers darTZeel NHB-468 monoblocks.

Loudspeakers Wilson Audio Specialties Chronosonic XVX.

Cables Interconnect: TARA Labs Zero Gold, Zero Evolution, Zero and Air Evolution, Analysis Plus Silver Apex, Stealth Sakra & Indra, Luminous Audio Technology Silver Reference, interconnect. Speaker: AudioQuest Dragon, TARA Labs Omega EvolutionSP. AC: AudioQuest Dragon and Thunder, Dynamic Design Neutron GS Digital power cord.

Accessories PS Audio Powerplant 20 and 15, CAD GC1 and GC3 Ground Controls; Oyaide AC wall box & receptacles; RSX Industries Power8 box, ASC Tube Traps; RPG BAD, Skyline & Abffusor panels, Stillpoints Aperture II Room panels, Synergistic Research UEF products (various), Symposium Ultra platform; HRS XVR turntable stand, Signature SXR and Stillpoints ESS stands, Thixar and Stillpoints amplifier stands; Audiodharma Cable Cooker; Furutech record demagnetizer; Furutech deStat; Loricraft PRC4 Deluxe Audiodesksysteme Pro, and Kirmuss Audio KA-RC-1 record-cleaning machines. —Michael Fremer

sings "fever!" followed by two familiar kickdrum exclamation points; each produced depth-charge thunder.

I had a visitor recently who owns a very good stereo. He wanted to hear Lou Reed's "Walk on the Wild Side" wherein Herbie Flowers plays two bass lines: one on double bass and the other an octave and a third higher on electric. I'd not played this on the Zero, but oh man! The "sticky" double bass below and the light but precise electric above produced through the Zero a "Walk on the Wild Side" the likes of which I'd never before heard. I followed that up with what I knew would be an awesome kickdrum sound from the "Porky Prime Cut" UK edition of Squeeze's "Tempted" from *East Side Story* (AMLH 64854). It was beyond-expectations, slamming good. The next day, my visitor called and said, jokingly, in reaction to what he'd heard, "I hate your f...king guts."

Chasing the Dragon recently released an ambitious and meticulously recorded, produced, and packaged five-LP edition of the Bach Cello Suites (Chasing the Dragon VALLP014), most of which is performed by Justin Pearson, principal cellist of the National Symphony Orchestra. It includes two versions of the 3rd suite, one with the piano accompaniment written by Robert Schumann. (Robert Schumann wrote accompaniment for all six, but wife Clara is thought to have destroyed the others; somehow the 3rd survived.)

The church recording (to analog tape) in five sessions in two venues, using a pair of omnidirectional microphones, is sonically spectacular in its lifelike instrumental timbres and 3D spaciousness. The Zero's presentation of this re-

ording, compared to the rendering produced by the SAT XD-1, demonstrated the Zero's special mid to mid-low frequency weight, power, and drive and its unique ability to slow down the notes—something that works to benefit Mr. Pearson's workmanlike, somewhat light-hearted reading compared to János Starker's more brooding, powerful, and gravity-bending performances—either the late-'50s mono version for EMI reissued by the Electric Recording Company (ERC 33CX1656) or the Mercury box reissued by Analogue Productions. The notes float by in one reading and tear your heart open on the two others. I'd played and enjoyed the mono ERC on other turntables, but the Zero's "stop time" presentation created an unmistakable, well-defined small studio space in which Starker appeared more convincingly than I've ever heard from this vintage mono recording, produced by attack certainty, sustain generosity, and prodigious decay into a black that digital reproduction, for all its extended dynamic range, for some reason can't produce.

IMPEX's mono reissue of Frank Sinatra's Columbia Records swan song *Sing and Dance With Frank Sinatra* (IMP 6036) is a "must have" for any Sinatra fan. Originally a 10" record, it is reissued here as a 12" with additional tracks. Sinatra pivots from faded teen idol crooner to hip, swinging sophisticate. You can feel in these performances how Frank unfolds his newfound rhythmic abilities. He's creating a new Frank live as he leans into the microphone and lets it rip.

Through the Zero, the added weight and grip helped create a presentational ease and certainty that resulted in a serene listening experience, on this old recording and on every record I played, even on hard rock and heavy metal

records. The Zero's stillness and certitude helped deliver every musical genre's full weight and meaning, minus the distractions created by less precise reproduction.

Conclusion

It may seem contradictory to note that a turntable with a base price of \$450,000 has a recognizable sound, but if you get to hear the Air Force Zero under conditions commensurate with its performance capabilities, you'll quickly understand that it's not contradictory at all. The turntable is recognizable because no other turntable, or none that I've yet reviewed, so effectively sinks unwanted and extraneous noise while passing the musical goods with effortless ease, often in the most subtle and nuanced ways. The AF Zero is not a flashy-sounding "show off" turntable.

The Zero is the most speed-consistent belt-drive turntable I've reviewed, and with its air-bearing platters and air suspension, also the quietest, best isolated, and most inert, with stable sonics, quiet, and exceptional detail resolution with no added grain or unnatural, mechanical edge definition. The Zero was also trouble- and hassle-free for six months and as much fun to use as it was to hear.

Let's just add it up: \$450,000 for the base turntable. Add \$50,000 for the tungsten top platter. Add \$52,000 for the HRS stand, \$14,250 for the Graham Elite arm, and an extra \$9000 for the titanium armwand. That comes to \$575,250.

Just to play records? Yes. Just to play records. Add another \$50,000 or so for the SAT CF1-09 second arm and then go buy a few cartridges.

For those who can afford such an extravagance, I say, why not? And while you're at it, feed the hungry. ■

ANY CLOD CAN HAVE THE FACTS; HAVING OPINIONS IS AN ART

MANUFACTURERS' COMMENTS

THIS ISSUE: Representatives of WallyTools, Shaknspin, QHW, Cyrus, Naim, Focal, Audiovector, TechDAS, Canton, Boulder, and Pro-Ject respond to our reviews of their products.

TechDAS Air Force Zero

As the one who conceived, developed, and designed Air Force Zero, I already had an idea of this ultimate turntable in my mind when the Air Force One was launched. Although the Air Force One was designed to have the best performance in the market in as compact a size possible, there were a few concessions we had to make, just like with any product in the world.

When designing the Zero, we aimed

to remove all the limitations so as to realize the best ever record player in history in performance and musicality. Our goal was to fulfill the following six aims.

- 1) To play back all energy engraved in the groove of a vinyl disc.
- 2) To minimize surface noise and scratch noise generated on the vinyl.
- 3) To minimize any tracking error.
- 4) To reduce resonance on the disc.
- 5) To achieve a smooth and precise rotation without mechanical and electric

noise by maximizing the moment of inertia.

- 6) To create a turntable without musicality compromised vs reality.

By pursuing these aims, we have achieved the highest level of musical energy, a black background, and a sense of air in reproduction so that it delivers the breathing voice of the artist with all its subtleties.

Hideaki Nishikawa,
TechDAS