RideDNA

Handling Index Analysis

Generated June 25, 2026

Arsenal 7°

Size: M | Configuration: Airborne Arsenal 7° M

Trail: 88.7mm	Wheel Flop: 31.1mm	HTA: 67.8°	Fork Offset: 57.0mm
Front Center: 669mm	Chainstay: 435mm	Wheelbase: 1094mm	BB Drop: 72.0mm

AGILITY INDEX™

Score: 65.8/100

32% Ground Trail	-34.4
26% Wheel Flop	+26.0
10% Front Center	-26.3
10% Chain Stay	-20.3
8% Gyroscopic MOI	0.0
6% BB Drop	-10.4
4% Axle Height	+4.3
4% Pneumatic Trail	-3.1

STABILITY INDEX™

Score: 86.0/100

20% Wheel Flop	-12.0
15% Ground Trail	+29.0
15% Front Center	+21.1
15% Gyroscopic MOI	+22.5
10% Chain Stay	0.0
10% Axle Height	-4.3
8% BB Drop	+15.6
7% Pneumatic Trail	+20.9

AGILITY: Higher contributions → more reactive
STABILITY: Higher contributions → more planted

Airborne Arsenal 7° M

RideDNA AI Analysis

1. Agility Index Analysis — Score: 64.5/100

The Arsenal 7° scores a moderate 64.5 on the agility index, reflecting a deliberate and composed handling character with some responsiveness for its size. The front center of 669mm pushes the rider’s weight slightly rearward, reducing front-end responsiveness, especially on climbs and during quick direction changes. This geometry favors stability over snappiness, especially on mixed terrain or when loaded. The rear center of 435mm balances agility and traction, providing predictable cornering and adequate acceleration snap, but without the nimbleness of shorter chainstays. Together, this front/rear weight distribution creates a handling profile that is stable and confidence-inspiring rather than quick to react, ideal for long-distance adventure riding.

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2. Stability Index Analysis — Score: 78.0/100

Stability is a standout feature of this bike, highlighted by its 1094mm wheelbase and the 72.0mm BB drop. The wheelbase is long enough to deliver excellent straight-line tracking and composure at high speeds, even on rough terrain or when carrying heavy loads. The BB drop lowers the center of gravity, enhancing cornering confidence and enabling stable lean angles through sweeping turns. With a stability index of 78.0, this bike is firmly grounded in the stability-focused category, offering a ride that feels planted and controlled. The 64.5/78.0 agility-stability balance reflects a bike designed more for predictable, steady handling than quick, agile maneuvers, making it well-suited for bikepacking and extended gravel adventures.

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3. Steering Dynamics

The Arsenal’s 88.7mm trail is on the high end for gravel bikes, creating a strong self-centering torque that stabilizes the steering, particularly at higher speeds or when loaded. This high trail ensures the bike tracks predictably in straight lines and through fast descents. However, the 31.1mm wheel flop introduces noticeable "power steering," meaning the front wheel tends to fall into turns more readily. This combination requires deliberate input at low speeds but rewards riders with a stable and predictable feel on rough terrain or under heavy loads.

High flop geometries like this tend to initiate turns on a smaller radius than intended, requiring riders to adjust their trajectory mid-turn. This makes long corners feel less fluid compared to low-flop geometries, which maintain a constant radius. However, the high trail and flop excel at slow-speed technical maneuvering, where the bike's natural tendency to lean into turns helps with balance. At speeds above 15-20 mph, the slack 67.8° HTA and high trail result in smoother, more confident handling, ideal for fast descents and rough gravel trails. Riders should focus on initiating smooth counter-steering and leaning into turns to take full advantage of the geometry's stability.

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4. The Key Trade-offs

The Arsenal 7° strikes a clear balance between stability and agility, leaning toward the stability end of the spectrum. The 88.7mm trail and 67.8° HTA create a front-end personality that is highly stable, especially at speed or when heavily loaded. Meanwhile, the 435mm rear center adds just enough agility to ensure the bike doesn’t feel sluggish when cornering or accelerating. This balance makes the bike well-suited to bikepacking and expedition riding, where loaded stability and predictable handling are paramount. While the high trail and slack HTA can feel deliberate on flat terrain or during quick transitions, they shine in rugged, slow-speed technical situations and high-speed descents.

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5. Fit Context

The Arsenal’s stack of 588mm and reach of 393mm place riders in a moderate, endurance-oriented position, prioritizing comfort and control over an aggressive aerodynamic stance. The head tube length of 145mm provides plenty of room for spacer adjustments, allowing riders to fine-tune their cockpit height for long-distance comfort or more technical terrain. With an effective top tube of 550mm, the cockpit size accommodates a wide range of riders, though it may feel slightly compact for those with long torsos.

The rider’s center of mass (COM) is positioned toward the rear due to the long front center and moderate chainstay length. This placement improves stability on descents, as less weight shift is required to maintain balance and braking confidence. The 435mm chainstay length strikes a balance, requiring some weight shift for steep descents but not as much as shorter chainstay geometries. This fit best serves riders seeking a

comfortable position for extended hours in the saddle, particularly those who prioritize stability and control over aggressive handling.

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6. Competition Comparison

- **CO-Motion Tumalo**: Trail 90.0mm, HTA 69.5°, CSL 445mm
- Steering feel: Similar to the Arsenal, with slightly quicker handling due to the steeper HTA
- Tire clearance: Comparable, both offering tire widths up to 61mm
- Design philosophy: The Tumalo emphasizes versatility but lacks the Arsenal's adjustable geometry options.

- **Salsa Fargo TI Short**: Trail 93.0mm, HTA 69.0°, CSL 445mm
- Steering feel: More stable than the Arsenal due to even higher trail and longer chainstays
- Tire clearance: Slightly larger capacity at 61mm tires
- Design philosophy: The Fargo is more rigidly focused on off-road touring, while the Arsenal adds modern adjustability.

- **Otso Fenrir Short**: Trail 98.0mm, HTA 68.0°, CSL 430mm
- Steering feel: Very stable, with slightly more agility due to shorter chainstays
- Tire clearance: Larger options (66mm max) compared to the Arsenal's current configuration
- Design philosophy: The Fenrir sacrifices adjustability for ultra-stable geometry with wider tire compatibility.

- **Kona Libre**: Trail 83.0mm, HTA 69.5°, CSL 435mm
- Steering feel: Quicker and more responsive than the Arsenal due to lower trail and steeper HTA
- Tire clearance: Matches the Arsenal's 57mm current setup but lacks the ability to go wider
- Design philosophy: The Libre focuses on lightweight gravel performance, while the Arsenal prioritizes expedition readiness.

The Arsenal 7° stands out for its titanium frame durability, adjustability (chainstay and headset angle), and massive tire clearance up to 62mm, making it a unique and versatile option for bikepacking enthusiasts.

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7. Considerations

To optimize this bike for its intended expedition use, consider the following setup recommendations:

- **High wheel flop (31.1mm):** Wider handlebars (44-48cm) provide better leverage for technical maneuvering and counteract the flopping sensation at low speeds.
- **High trail (88.7mm):** Add front-end weight (handlebar bag, fork cages, front panniers) to stabilize steering and dampen wheel flop effects during loaded touring.
- **Slack head angle (67.8°):** Slow-speed U-turns may feel deliberate; practice wider turns and rely on the bike's natural self-centering to maintain balance.

Additional tips: Experiment with tire pressures to balance grip and compliance on rough terrain. For bikepacking, aim for a 40/60 front/rear weight distribution to maximize the benefits of the high trail geometry.

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8. Versatility

The Arsenal 7° is a highly adaptable platform with several configuration options to suit different riding styles:

- **Headset angle adjustments:** Riders can steepen the HTA by up to 2°, reducing trail to as low as 75mm for quicker handling.
- **Chainstay adjustments:** The rear center can extend to 460mm, increasing tire clearance to 62mm and further enhancing loaded stability.
- **Tire size flexibility:** In its current setup, the bike accommodates 57mm tires, but the extended chainstay position allows up to 62mm for rugged terrain.
- **Custom tuning:** Fine-tune handling for agility or stability depending on the terrain, riding style, or load.

This platform's versatility makes it a standout choice for riders looking for a gravel bike that can evolve with their needs.

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9. Summary

The Airborne Arsenal 7° is a stability-focused gravel bike designed for bikepacking and expedition riding. Its high trail and slack geometry deliver exceptional composure under load, while adjustable chainstays and headset angles provide unmatched versatility. This bike is ideal for riders seeking confidence and predictability on technical terrain, high-speed descents, and long-distance adventures.

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10. Citations

• [Meijaard et al. (2007): "Linearized dynamics equations for the balance and steer of a bicycle"](http://ruina.tam.cornell.edu/research/topics/bicycle_mechanics/*FinalBicyclePaperv45wAppendix.pdf)
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• [Jones, D.E.H. (1970): "The stability of the bicycle"](https://home.phys.ntnu.no/brukdef/undervisning/tfy4145/diverse/UnridableBicycle.pdf)
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