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Wilson Audio Sophia 2

MARTIN COLLOMS ASSESSES WILSON'S MOST COST-EFFECTIVE AND UK-FRIENDLY FLOORSTANDER

MARTIN COLLOMS

Evolution is a good word to describe the decades of progress made by Wilson Audio's designer and founder Dave Wilson. While there have been small revolutions in the choice of drive units, enclosure materials and build, the continuity of model by model performance improvements over the years is down to progressive evolutionary development.

This requires both vision and ambition, where the concept of high performance is both well understood but also remains an aspirational goal that is tantalisingly out of reach. The more you learn, the closer you can get, but still more is always possible.

While the two-box *WATT/Puppy* formula, currently exemplified by the subtle and spacious sounding *Series 8* (*HIFICRITIC Vol1 No3*), represents the best bang for the bulk, less expensive single box 'versions' of this relatively compact and costly floorstanding loudspeaker have long been available, and the present contender, the *Sophia 2* reviewed here, currently costs roughly half the price of the two-box equivalent.

In fact the first of these, the chunky looking Art Deco style *WITT*, actually supplanted the *WATT/Puppy 3.1* in my own system. Next came a *WITT 2*, and then in 2001 its sleek looking *Sophia* replacement arrived, significantly more expensive but built to a much higher standard in a more compact and home friendly package with more universal durability. (Tropical climates can play havoc with wood fibre based cabinets and lacquer finishes.)

I reviewed the original *Sophia* for *Hi-Fi News* in 2003. Now it's time for the £12,000/pair *Sophia 2*, which has already been in production for a year or so. There's no need to rush with Wilson designs. The speakers endure for many years, and the approach has less to do with flavour of the month and more to do with enduring values of build and performance.

Sophia might be fairly compact and easy on the eye, but at 73kg it's no lightweight, so unpacking and installation is a two man operation. The price includes custom installation in your home by a Wilson-trained operative and this should not be taken lightly: the speakers are generally so accurately pair matched that placement may be adjusted to centimeter precision, with audible gains in timbre, clarity and image focus. The operation can be worth up to 40 per cent – some say more – of the ultimate installed performance.

This is a classic three-way design, with a 250mm (10inch) reflex-loaded cone bass, a 170mm (7inch) cone midrange and a 25mm (1inch) inverted titanium dome tweeter. The bass driver has a rigid flared hardened

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anodised alloy cone, while the midrange unit has a bonded pulp cone with spiral slots sealed with damping resin. The upper cabinet section is pyramidal and slopes backwards. Connection is made via a single pair of spade-only gold-plated binding posts. The speaker stands 105cm (41.25inches) high, is 32cm (12.75inches) wide and 20.3cm (18inches) deep. Sensitivity is quoted at 89dB/W (8ohms), and the rated impedance is 4ohms with a minimum value of 3ohms. A wide frequency response is claimed, from 29Hz in the low bass to 22.5kHz in the treble, with tight +0/-3dB limits. The minimum suggested power is 15W (8ohm rated), while a reasonable estimate of the maximum input power is about 300W for music program.

Nominal changes from the original version include an improved grille fixing using low resonance steel pins rather than Velcro, revised acoustic loading for the rear section of the high frequency unit or tweeter, changes in the sound absorption around the tweeter, and a redesign of the crossover network to refine spatiality and clarity, based on technology introduced with the *Alexandria* and the *MAXX 2* models, and also found in the *WATT/Puppy 8*.

The latter change might not sound like much, but the crossover network is a crucial part of a loudspeaker, particularly in a three-way design. More sound flavours than you can believe may be obtained just through quite minor variations in the electrical values of the capacitors, inductors and resistors used in the crossover, while homing in on an acoustic target for the whole design can be an exacting process. Seemingly revelatory improvements are often possible, as experience is gained with the design of the system. Substantial subjective alterations can be wrought even when there is almost no visual change to the measured axial frequency response. This is because phase and crossover roll-off rates can affect the way sound energy is delivered into the room, almost independently of the axial response itself.

Viewed as a whole, Wilson loudspeakers may well be evolutionary, but certain aspects of the *Sophia* structure deserve particular attention, even if they now seem familiar. A closer look may help to explain the characteristic 'voice' of such a loudspeaker.

The Pyramid

That truncated, pyramidal upper section should not be taken for granted, as it has a powerful influence on sound quality. Essentially a designer will try to maintain a smooth output of total sound power with frequency. Since sound wavelength reduces with increasing frequency, sound source size should ideally be progressively reduced with frequency. This impossible with a fixed size single driver, but here, with three drivers of graded sizes, an approximation can be reached. Part of the recipe concerns the enclosure, which should also be narrowed where higher frequencies are being launched into the room, since this helps to define the acoustic source size.

Thus the *Sophia* has one width for the bass, reducing somewhat for the midrange itself as it starts to taper, and continuing to narrow for the high frequency driver. In addition, the triangular shape also reduces diffraction effects by reducing physical symmetry, contributing to smoother on- and off-axis frequency responses.

The second feature derived from the pyramid is that backwards tilt of the upper two drivers. Here the acoustic benefit is no less than three birds from one stone. First, both driver/enclosure diffraction is less for intended listener angles away from to the 'normal' or direct radiation axis, resulting in smoother responses and improved decay characteristics. Secondly, the ideal cone-to-dome, mid-to-treble phase match requires that the high frequency unit is set further back than the mid, the tilt providing some useful time offset between the two drivers. Thirdly, the direct-on-axis response for a driver or system is not usually the best observation point in respect of the distributed energy response from the system – that signal power which predominately 'voices' the room acoustic. This latter signature should correlate reasonably well with the sound output found on the intended listener axis. Tilting the driver axes a little away from the listener enables a better match to be achieved between the direct sound to the listener and that driven room voice. (This idea is taken to a logical conclusion in Dick Shahinian's designs [see Shahinian *Compass* in *HIFICRITIC Vol2 No3*], where the objective of uniform room drive has substantial priority over the first arrival, direct sound to the listener.)

Enclosure Resonances

Although the way a loudspeaker radiates sound power is important, it is not the whole story. Fine system design and good quality drive units are also crucial, but unwanted sound energy radiated by the enclosure panels remains a major difficulty, where action at the moving diaphragm results in reaction forces applied to the enclosure. The latter comprises a coupled set of semi-elastic panels capable of relatively free gong-like vibration and subsequent long decay resonances. Moreover, the total area of the enclosure is many times that of the active drivers, increasing its relative radiation efficiency. This source of masking noise and coloration has to be stopped at all costs – well nearly all.

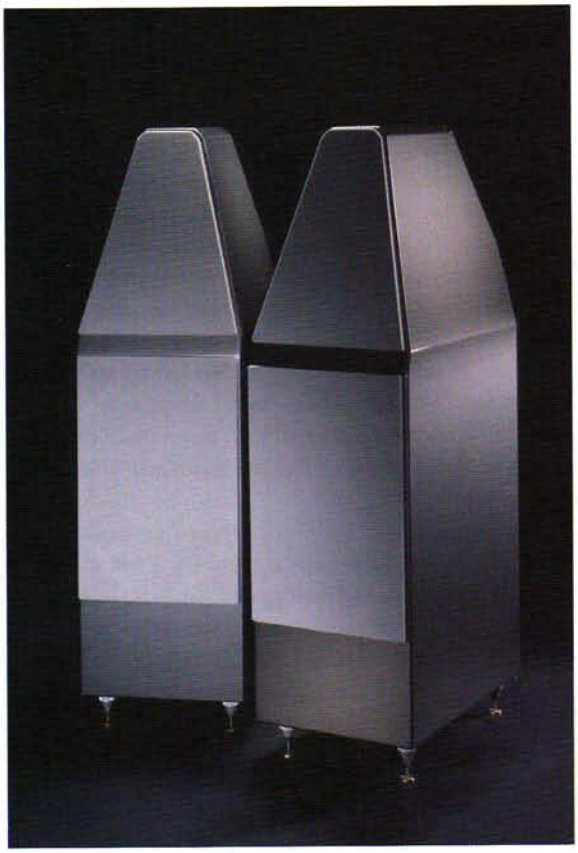
Failure to address cabinet vibration adequately and resulting structural resonances can largely undermine all the care taken elsewhere. It may result in a confusing animal, which measures superbly, is tonally well balanced, but fails to hit the spot subjectively. Inadequately controlled enclosure vibration can subtly blur image focus, add grain in the treble, dilute dynamics and dynamic expression, mask both transparency and low level detail, and mar the ability to portray rhythm. Unwanted vibration is a kind of noise, and one which is out of time, out of step, foreign sounding. In extreme cases it can add such severe coloration that the speaker doesn't sound at all natural.

Such enclosure vibrations are common and accepted in low cost designs, but an audiophile creation must master these in order to deliver the expected inert enclosure behaviour. A plate or panel resonance generally has a non-uniform frequency response, and also continues long after the desired driver output has ceased. Top designers take great care over the choice of materials in respect of stiffness and damping, plus the costly, awkward and complex cross-bracing of the interior to minimise panel output. Designers develop their own methods and materials for this work: Wilson Audio's proprietary 'M' material is a very high density cured phenolic-bonded wood fibre; 'X' material is a mineral-loaded acrylic formulation.

The psychoacoustics of the frequency ranges more critical to hearing play a part, and the frequencies at which some panels radiate sound more efficiently need to be taken into account. Some clever juggling must be done, since a poorly behaved cabinet can add a boxy, 'wooden' coloration to the sound, never mind more subtle reductions in performance. Modern enclosures tend to be heavy and very rigid. By contrast, the classic BBC based designs had relatively flexible but well damped lightweight enclosures which placed the resonances quite low in the less audible part of the frequency range. However, mild panel flexure tended to dilute the sense of bass speed and impact, and these designs did not aim for audiophile levels of crisp 'slam' bass.

Sound Quality

Aside from dealing with the considerable weight, installation was straightforward. Final point-on-disc (hardwood floor) alignment brought the expected improvement in quality and dynamics throughout the frequency range. Optimum room placement gave an exceptional low frequency fit, with stable imaging throughout the frequency range, combined with an even natural balance.



We were initially misled during the listening tests because the *Sophia 2* consistently revealed the sound of every other component we used with it. Before we had learned to trust it, we had thought these 'other' sounds were the responsibility of these speakers; as we learned how to balance the system, it was clear that the speaker sat above these issues – a rare occurrence, especially at this relatively moderate price level. While initially there was a risk that we were underestimating its potential, as the system came into line, complementary choices of power, cable and equipment combinations simply saw the speaker reveal more and more of its inner qualities. By the time the tests were complete, the *Sophia 2* had won us over.

It is the mark of a great speaker that it helps one assess the components elsewhere in the system. *Sophia 2* can do this, which makes system building exacting but very rewarding. When we thought it sounded a bit bright, we found that this was due to a relatively high cable impedance. Slow bass was tracked down to 'soft' sounding cables and electronics. Midrange coloration was almost always the fault of a component other than the speakers, and the same was true of focus and

THE SYSTEM:
Reference speakers: Avalon *Eidolon Diamond*, Quad *ESL63*, BBC *LS3/5a* (15ohm), Sonus Faber *Cremona Auditor M*
Amplification: MSB *Platinum 200* monoblocks, Conrad Johnson *Premier 350SA*, Naim *SuperNait*, Audio Research *Reference 3*, XTC *PRE*.
Sources: Naim *CDS3*, Marantz *CD-7*; Linn *LP12/Aro*/Koetsu *Red T*.
Ancillaries: Transparent *XL Ref*, Yter (loudspeaker cables); Cardas *Golden Reference*, van den Hul *The First Ultimate* (interconnects); Finite Elemente *Pagode* (supports).

transparency issues. Nothing could be taken for granted, but once all was in order, the overall sound quality seemed to fall into place.

Accurate low coloration speakers such as this can be unsympathetically too cool in portraying the emotional qualities of great music. Somehow *Sophia 2* manages to walk the line between accuracy and musicality successfully, almost never sounding like a loudspeaker, and almost always sounding like the source and the music. We learned not to underestimate the resolution and transparency, a characteristic of designs with very low self-noise. It has remarkable resolution and transparency, not just in the midrange but over the whole wide bandwidth, and compares well with much more costly references like the Sonus Faber *Stradivari* and Wilson's own *System 8*.

Like the best small monitors, *Sophia 2* seems able to step back from the soundstage, leaving it free to develop great width and depth, with spacious, layered perspectives and first rate focus – essentially as good as carefully tuned placement in the room will allow. *Sophia 2* characteristically lifts the soundstage a little, adding a natural height to the virtual images.

While it doesn't sound 'loud' or crowd the listener, do not underestimate its dynamic range. It can reproduce a grand piano with realistic power, and will play rock music with drive, impact, power and good timing. Drum kits are rarely delivered with appropriate attack and pitch differentiation, but the *Sophia 2* successfully sailed through such difficult test material. Singing voice sounded natural even at full power, and all vocal ranges were reproduced in equally good order. The extended reverberant decays following a powerful transient, and the precise resolution of the intervals between the notes help define the audibly steady pace and a notably fine grip on the musical pulse.

In one respect it reminds me of the steadfast qualities of Krell's *FPB 700cx* power amplifier, inspiring great confidence with a comparable rock steady performance which does not vary with complex demands or loudness. I got the impression that the Wilson team continued to refer to the dynamics, attack and timbre of live sound at natural sound levels when voicing this speaker. Authoritative; informative; delightful...

This speaker is so good that the grilles must be dismissed as purely decorative devices. Once heard with and without, no self respecting audiophile will accept the sonic compromise in resolution and blurred dynamics that the grille introduces. At least they are easy to detach and replace.

Lab Report

Sensitivity was on target at an above average 89.5 dB/W. With excellent power handling, this means that generous sound level of 109 dB will be possible in a typical size room, and it should also suit large rooms. While the impedance is lower than the nominal 8ohms it is not as bad as many. A minimum figure of 3.4 ohms at 200Hz was noted (see graph), giving a typical 5-6ohm rating. This might be a bit tough for valve amplifiers, and requires healthy current delivery from a solid state design. In my view for full performance an amplifier capable 100W or more, with a 20A peak current capacity and loudspeaker cable to match is indicated. Impedance phase angles are desirably low.

Tested on pure sinewave, distortion was low: 0.08-0.15% at mid and high frequencies, while the bass is particularly linear for the class. System alignment was close to textbook, delivering pure tones at up to 40W input right into the low bass, a clean 27Hz. The full weight of organ material was handled comfortably.

On the designed listener axis (a glancing angle to the enclosure inner sides), the *Sophia 2* met close +/-3dB limits from 26Hz to 23kHz, apart from an isolated 4dB peak at 19.5kHz (not considered important; see frequency responses). This main response is typical enough, as the speaker showed excellent consistency for all the other responses (15 degrees above and below axis; 30, 45 and 60 degrees laterally off-axis; and the in-room spatial 'power' average). The 45 degree lateral response is outstandingly uniform, confirming the value of the pyramidal form and the new crossover alignment.

The waterfall energy decay graph shows the single line at the back which indicates that the output is close to linear phase, with near perfect mid-to-treble integration. The energy fall is desirably rapid and coherent, indicating very good focus and clean transient reproduction. (The parallel ridges that follow after are simply nearby reflections, as I could not move this very heavy speaker to an acoustically quiet area.)

The bass port was well behaved, with maximum contribution at 25Hz and no further breakthrough or pipe modes. While the alloy bass unit does break up at 900Hz, this is well suppressed at -15dB, and only just protrudes above the stop band response. We obtained in-room bass to 25 Hz, essentially confirming the manufacturer's claim. Pair matching was excellent, averaging +/-1.5dB and better in many places.

The grilles damage the responses, for example an average loss of 4dB above 2 kHz and +/- 5 dB aberrations to 15kHz. Their inertial masses also dilute dynamics and the overall decay speed. Those now

unfashionable reticulated foam grilles of old had almost no effect on a speaker at all!

Conclusions

This speaker matches its sound quality with excellent test results. It has good sensitivity, accurate and smooth frequency responses which are also matched off-axis, a uniform in-room power response, extended even bass, low distortion and high power handling. By today's standards it is a reasonable amplifier load, albeit favouring high quality current-rich solid state designs.

The sound quality really delivers, and for me it represents a transformation compared to the more reticent original *Sophia*. Open, fast and articulate, *Sophia 2* is a notably complete design, evenly balanced in quality throughout the frequency range. It has excellent transparency, a natural timbre, sounds marvelous on music programme, and is exacting in terms of complete system build and alignment.

It has a genuine big speaker sound: clean and dynamic, with deep tuneful bass. Stereo imaging is really good, deep and focused with wide soundstages and consistently rewarding perspectives. Top quality sources and low impedance cables are needed to develop its full potential.

Although the *Sophia 2* inevitably carries a hefty importation price premium, taking into the account the valuable custom installation and tuning, and the extended guarantee, this speaker may still be highly recommended. Lucky home market residents can draw their own conclusions.

HIFICRITIC Loudspeaker Results

Make Wilson Audio, Provo, Utah, USA
Model Sophia 2

Finishes	Custom lacquer shades in Wilsongloss
Size W x H x D	32.4 x 110 (spiked) x 45.8 cm
Type	Three driver, three-way, bass reflex loaded
Sensitivity for 2.83V	89.5dB
Amplifier loading	Average minus
Frequency response, axial	25Hz to 19kHz +/-3dB – very good
Frequency Response, off axis	Very good power response
Bass extension	23Hz, -6dB
Max Loudness , in room	109dBA for stereo pair
Power rating (max, min)	25 to 300W
Placement	Floorstanding, free space location
Price (5 year guarantee)	£12,000 including factory grade installation

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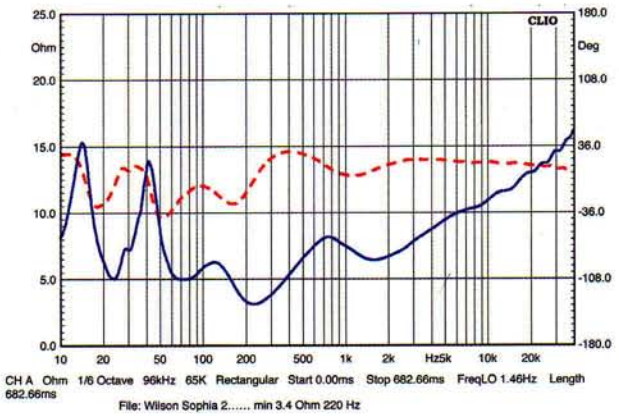
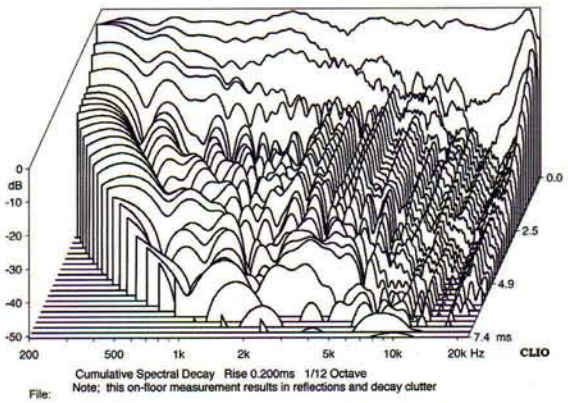
Impedance and Phase of Impedance (red)



Waterfall Decay Response



Frequency Response