

# Welcome to the Nox SAS – a sleep revolution

● ● ● ● ●

Nox A1s with SAS electrodes and cables (Nox SAS) is a simplified PSG system that differs from traditional PSG but allows users to stick with the established AASM rules for sleep analysis, with a few considerations.



## Nox SAS Technology compared to conventional PSG:

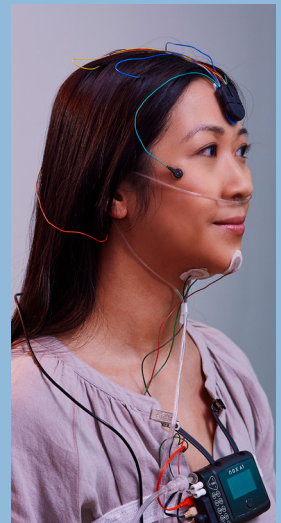
- » Nox SAS features frontal-only EEG.
- » Nox SAS uses EOG instead of mastoid (M1 & M2) references.
- » Nox SAS facial EMG is measured on the forehead (frontalis muscle) rather than the conventional chin location.

## Nox SAS Analysis Considerations:

- » Nox SAS sleep data can look both familiar and slightly different depending on the epoch. Feedback from the field recommends reviewing a few studies to familiarise yourself with the sleep stage patterns of Nox SAS.
- » The EEG signals available for analysis with Nox SAS are limited to frontal channels. This requires adjusting your analysis approach compared to the AASM standard configuration. A key consideration is that the absence of occipital channels means you will not observe posterior-dominant rhythm (alpha), which is typically used to score sleep onset and arousals from sleep. As a result, you will need to use alternative indicators within the frontal EEG to accurately score these events.
- » Nox SAS EEG features lower amplitude and power compared to conventional PSG. To help with this, the Nox Medical team has developed a SAS Frontal Filter (Noxturnal 7.1) that amplifies waveforms in the analysis range to be more like their PSG counterparts. If you decide not to use the Frontal Filter, consider adjusting your requirement for sleep staging based on amplitude (e.g. N3)<sup>1,3</sup>.

## Conventional AASM - EEG

- » 8 EEG channels
- » 2 EOG channels
- » 2 EMG chin channels



## Nox SAS - Frontal EEG

- » 9 channels
- » recording EEG and EOG (incl. EMG measures)



- » Nox SAS PSG can introduce eye movement artefact into the EEG channels due to the location of the reference electrodes. This EOG bleed can be misinterpreted for sleep physiology if not considered in context. A solution is to adjust the low-frequency filter when required to reduce the EOG bleed or sway artefact. When analysing Nox SAS studies, be careful not to mistake slow eyes movements for delta waves and REMs for N2 waveforms.
- » Feedback from the field suggests Nox SAS EMG derived from EOG is not as responsive to changes in sleep stage (e.g. REM atonia). Other REM physiology should be taken into consideration<sup>2</sup>. If you have difficulty staging REM, work backwards from a definitive epoch.

With these points, the scoring of Nox SAS studies is expected to have a quick adaptation period and can be scored with the same rules as the AASM Manual for the Scoring of Sleep and Associated Events (Version 3, Feb 2023)<sup>2</sup>.



## Reference:

1. S. Kainulainen *et al.*, "Comparison of EEG Signal Characteristics Between Polysomnography and Self Applied Somnography Setup in a Pediatric Cohort," in *IEEE Access*, vol. 9, pp. 110916-110926, 2021, doi: 10.1109/ACCESS.2021.3099987.
2. Troester MM, Quan SE, Berry RB, *et al*; for the American Academy of Sleep Medicine. The AASM Manual for the Scoring of Sleep and Associated Events: Rules, Terminology and Technical Specifications. Version 3. Darien, IL: American Academy of Sleep Medicine; 2023.
3. Rusanen, M., Korkalainen, H., Gretarsdottir, H., Siilak, T., Olafsdottir, K. A., Töyräs, J., Myllymaa, S., Arnardottir, E. S., Leppänen, T., & Kainulainen, S. (2024). Self-applied somnography: technical feasibility of electroencephalography and electro-oculography signal characteristics in sleep staging of suspected sleep-disordered adults. *Journal of Sleep Research*, 33(2), e13977. <https://doi.org/10.1111/jsr.13977>

