The SAG

The sag is well known and defined from literature; fig. 1 is giving its definition in the case of unlevelled span.

The presence of a system like Ampacimon able to detect frequencies (low range, fraction of Hz up to several Hz) can give access to the SAG easily, for any load (including extra loads like snow, ..), any span length, any conductor (including high temperature), any weather data, any topology, any sagging conditions, … without taking care of these data.

Consider the profile of a uniform cable hanging under its weight between two supports – see figure 1 and notations. The cable curve y(x) is given by :

$$y(x) = \frac{H}{m_C g} \cosh\left(\frac{m_c g a}{H} \frac{x}{a} \right) \quad (1)$$

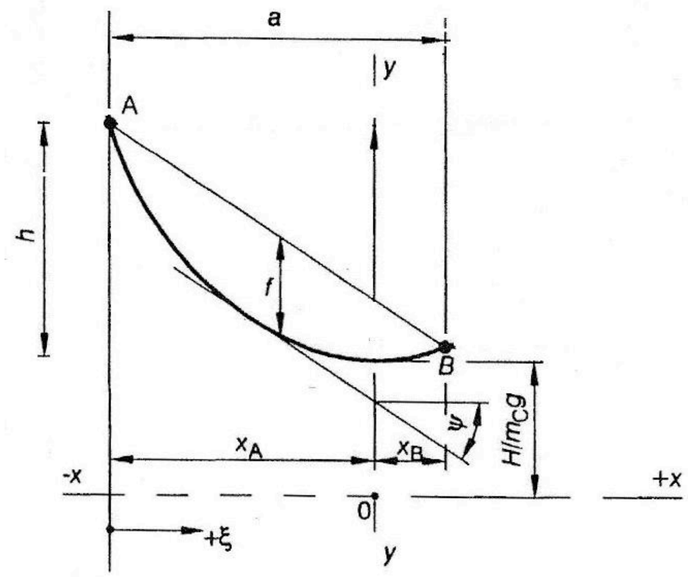

Figure 1 – Definitions (adapted from [2]). Horizontal distance between two attached ends : a [m], difference level h [m], sag f [m], lowest point abssica xA [m], linear density mC [K/m], gravity g [m/s²], chord angle psi [dimensionless], H : horizontal tension, tension component along x axis [N].

The sag representing the largest vertical distance between the catenary and its (imaginary) cord is easily obtained by Ampacimon, with no need of any data.
Such a sensor is then called a direct sag measurement device. It is not influenced by any errors that could exist in the topology, the conductor data or the sagging conditions.
An important fact is that such a sensor does not need calibration on site as frequencies detection is not related to calibration.

1.4 References

[1] F. Kiessling, P. Nefzger, J.F. Nolasco, U. Kaintzyk, Overhead Power Lines Planning design construction, Springler, 2003.
[2] C. Avril, Construction des lignes a´eriennes `a haute tension, Editions Eyrolles, 1974.
[3] H.M. Irvine, Cable structures, Penerbit ITB Bandung Indonesia, 1988