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Ales Stenar is an ancient stone structure in Sweden. Here we discuss its solar orientation using a freely available software working on the Google Maps.

A stone ship or ship setting was an early burial structure of the ancient Scandinavian and Baltic region [1,2]. The grave is surrounded by tightly or loosely fit stones, aligned to outline a ship. Ship settings are structures of varying sizes, some of monumental proportions, that the archaeological excavations have shown being from the latter part of the Nordic Bronze Age.
An example of monumental ship setting is the Ale's Stone Ship, which is 67 meters long (see the Fig.1, where some of the stones are marked for the following discussion).
The Ale's Stones ship (or Ales Stenar in Swedish) is near Kåseberga, a village in the Southern Sweden, located on a flat headland over the Baltic Sea, with a complete open view of 360°. It is created by 59 boulders, weighing up to 1.8 tons each. According to a local lore, this is the tomb of the legendary King Ale. At this site, the carbon-14 dating system for organic remains has provided different results. One result indicates that the material is around 5,500 years old whereas some others give a date about 1,400 years ago. The latter is considered to be the most likely time for Ales Stenar to have been created, that is, towards the end of the Nordic Iron Age [3-5]. However, in 2006, a survey with magnetic sensors and radar mapped the underground of this site, finding a larger circular structure about 165 m in diameter, with a rectangle at its center. At the end of 2012, B. Söderberg of the Swedish National Heritage Board and his team dug at the center of the circle and unearthed the imprints of giant boulders, which had been removed long time ago [6]. These imprints suggested the site of Ales Stenar was previously occupied by a Neolithic site with a dolmen burial chamber [6].
On Ales Stenar, an interesting web page is given at Ref.4, rich of discussions, references and images. It is told there that a large part of the investigations on this structure had been made by the archaeologist Märta Strömberg, University of Lund, and Curt Roslund, astronomer of the Chalmers Technical University in Göteborg [7,8]. A research made by J. Bergström, a geologist working with Märta Strömberg, determined that four boulders are of white sandstone, including M1 and M3 boulders (Fig.1), while all the remaining ones are various sorts of granite, gneiss, porphyry, and amphibolites. As told in [4], the geologists were able to determine the origin of some of the Ale boulders, which required to be moved on considerable distances to reach their final positions. According to Strömberg [4], the Ales Stenar monument was raised in the Viking Period, or perhaps a little earlier.
In [4] it is also discussed the alignment of the Ales Stenar: this ship-setting has been aligned according to the winter and the summer Solstices. "On the Winter Solstice day, an observer standing in the middle of this ship-setting will see the Sun rise over the 3.5 metre-high stern (M3, SE) boulder, and set behind the port board amidships S15 boulder. On the Summer Solstice day such an observer will see the Sun rise over the 1.5 metre-high starboard amidships N14 boulder, and set behind the 2.2 metre-high bow (M1, NW) boulder." [4]

As we have proposed for several ancient structures, among them the stone structures of the Syrian Desert [9-12], to check the solar alignment of the Ales Stenar we can use some software, developed for solar energy applications.
Among the many web sites providing solar information, we can choose for instance that at http://www.sollumis.com/ [13], that proposed a model of sunlight direction on any day of the year, built for Google Maps. A polar diagram, overlaying a satellite map, shows the directions of sun during the day. "The lines on the drawing show the direction and height (altitude) of the sun throughout the day. Thicker and shorter lines mean the sun is higher in the sky. Longer and thinner lines mean the sun is closer to the horizon", according to Sollumis.com.
Figure 2 shows the solar directions determined by the software. We see that, on the solstices, the behavior is that discussed in Ref.4. However, as told in [4], the alignment of the Ales Stenar could be accidental. "The orientations of the ship-settings in Scandinavia vary in all directions, although the ones along the South-North line is most common. (Perhaps the Viking mariner chieftains were supposed to navigate straight North to the realm of the dead.)… It is noteworthy that the Solstice driven alignments of several great megalithic monuments are acknowledged by some astronomers to have been purposeful." And [4] continues with a list of examples: the megalithic ring at Stonehenge, the megalithic Hagar Qim temple in Malta [14], the Great Amun Temple in Karnak, Egypt, the megalithic Newgrange passage tomb in eastern Ireland [15], and the horseshoe at Sarmizegetuza, Romania [16].
As we can see from the lower image in Fig.2, the ship is moving towards the setting of the sun on the longest day of the year. It is then quite probable that this orientation had a meaning for the people who built this structure. In any case, they could have used it as a calendar to follow the sun over the year. Let us remark that it is not necessary the structure is a megalithic one to observe a solar orientation. We have for instance the ancient Roman towns, which have a solar orientation [17,18], according to the day of their foundation. Even the gothic cathedrals have it [19]. Simple and natural, the solar orientation is therefore not only confined to the design of megalithic monuments.

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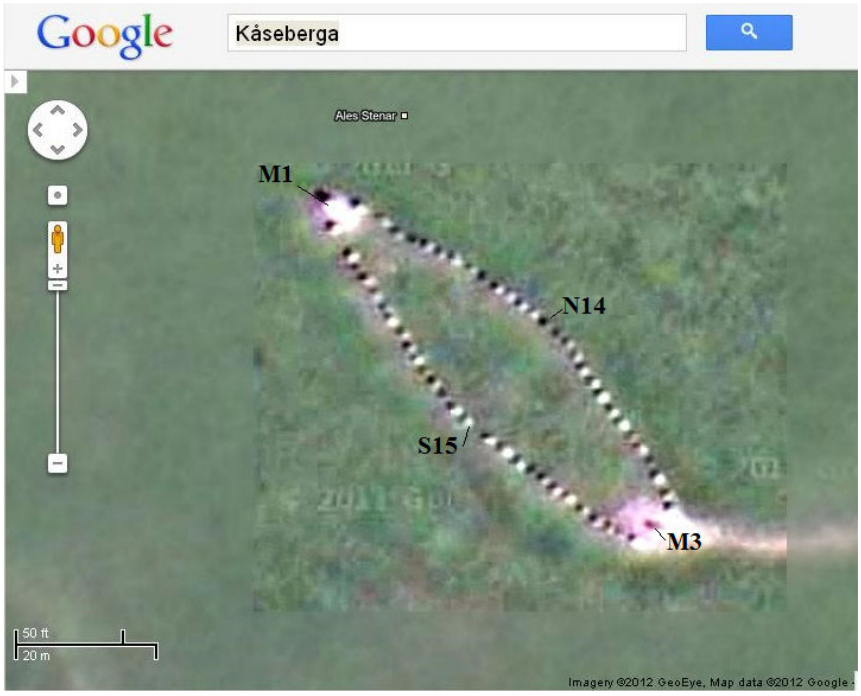

Fig.1 Ales Stenar as seen in the Google Maps, with some boulders denoted as in Ref.4.

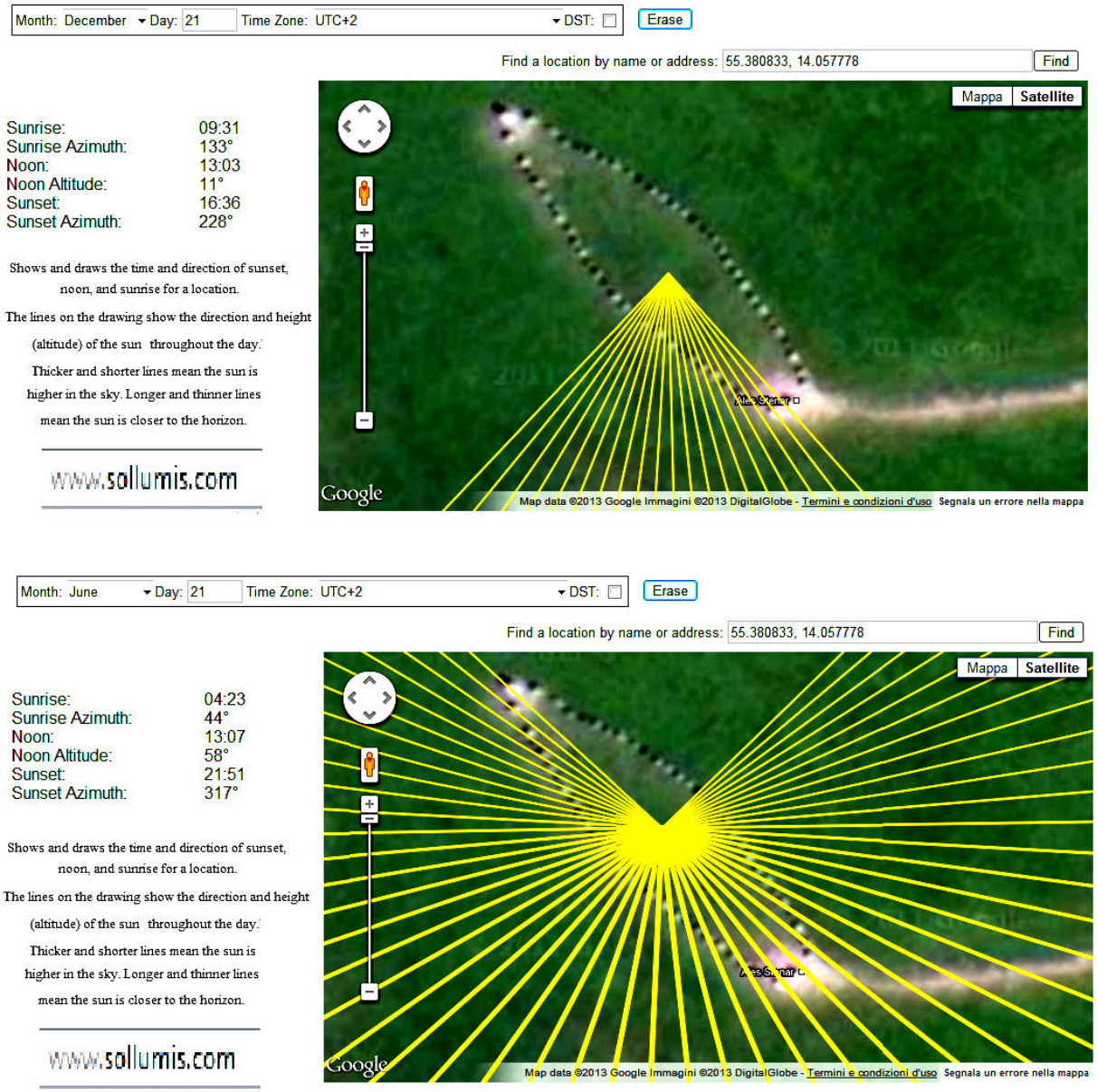

Fig.2 Ales Stenar and the direction of the sun during the day as given by sollumis.com, on the Winter and Summer solstices. The image shows a good agreement with the solar orientation suggested in Ref.4.