Thousands of groves scattered on stones throughout the island of Gotland seem to connect the scattered parts together into a vast timepiece.

Aligned with the sun and moon, the grooves mark an ancient, human obsession with time and space over 3000 years ago.

There are about 3600 known grooves on stones scattered throughout the island of Gotland. Seven hundred are scored directly into the limestone bedrock, the rest are found on about 800 stones.

The length of the grooves varies from about 0.5 to 1 meter. They are between 5 cm to 10 cm wide and 1 cm to 10 cm in depth. The grooves on a stone are not parallel. Instead they are oriented in several directions, some grooves crossing other grooves. Yet on any particular stone, the grooves are not randomly oriented, but seem to follow a prescribed orientation, although that orientation may change slightly from grove to grove.

The most important feature of the grooves appears to be in their grand alignment when looked at over the entire island. A recent study of 1256 grooves showed that they are aligned with certain positions of the celestial bodies, apparently the sun or the moon. Most of them are oriented east to west, although the island is itself oriented north-south.

Most known archeoastronomy sites are far more geographically confined than these stones. Were the creators nomads that wandered the island and created new stones where ever they went? The reason for so many of these stones scattered across many square miles has been completely lost in time.
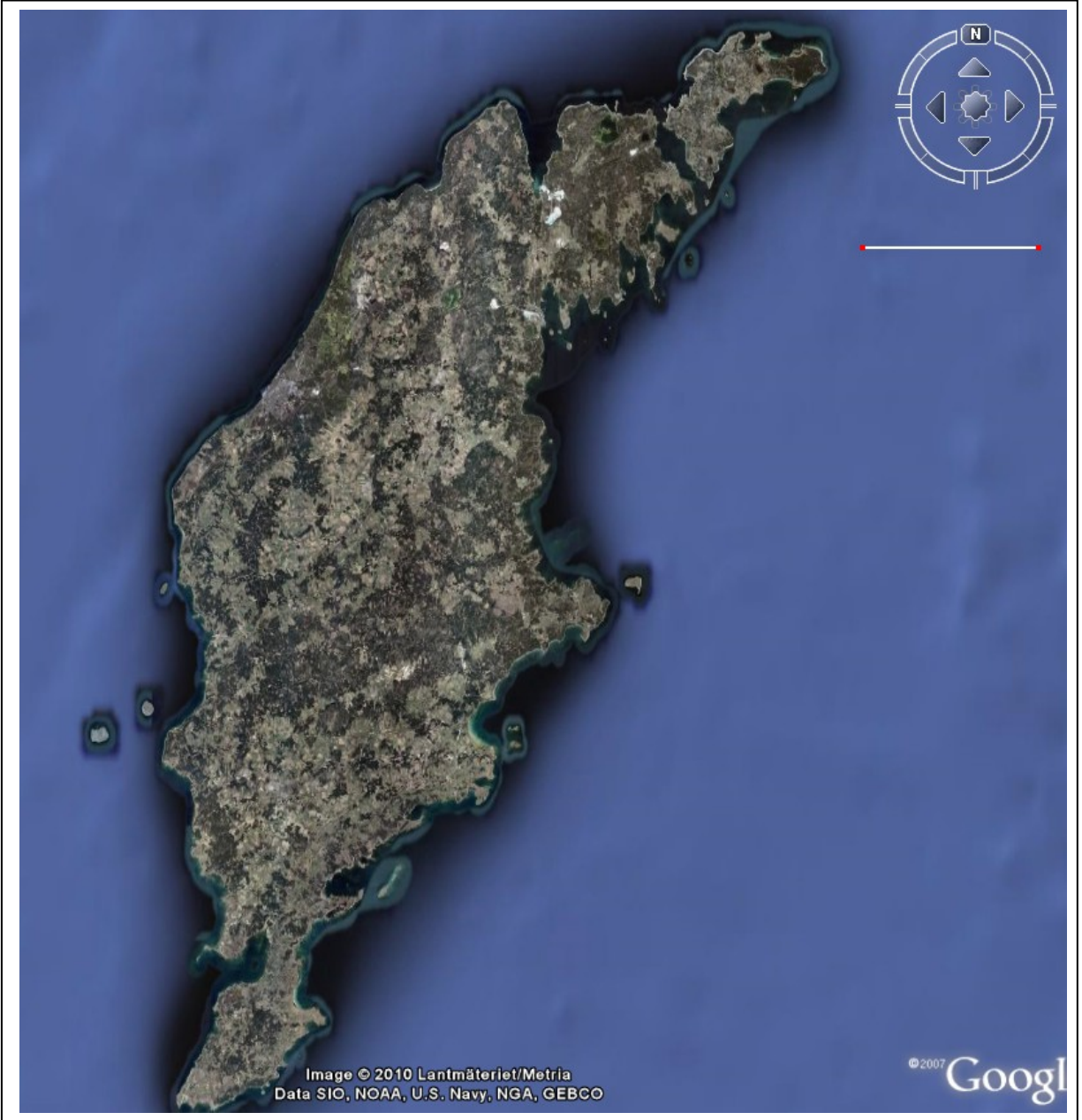
Education Standards Satisfied by This Activity

(See Benchmarks for Science Literacy, Project 2061, AAAS)

1c – The Scientific Enterprise
 G6-8 "Important contributions to the advancement of science, mathematics and technology have been made by different kinds of people, in different cultures, at different times.

 G9-12 "The early Egyptian, Greek, Chinese, Hindu and Arabic cultures are responsible for many scientific and mathematical ideas and technological innovations.

2a – Patterns and Relationships
 G9-12 "Although mathematics began long ago in practical problems, it soon focused on abstractions from the material world, and then on even more abstract relationships among these abstractions.

3A - Technology and Science:
 G6-8 "Engineers, architects and others who engage in design and technology use scientific knowledge to solve practical problems. But they usually have to take human values and limitations into account as well.

4B – The Earth
 G6-8 "Because the Earth turns daily on an axis that is tilted relative to the plane of earth's yearly orbit around the sun, sunlight falls more intensely on different parts of the Earth during the year. The difference in heating produces the planet's seasons and weather patterns.

11B – Models
 G3-5 "Geometric figures, diagrams, and maps can be used to represent objects, events and processes in the real world although such representations can never be exact in every detail.

Problem 1 - In cold climates such as Scandinavia, the return of spring and summer were important events. In keeping with other civilizations, let's suppose that the ancient Gotlanders were interested in noting the location of the rising and setting sun during the Spring Equinox. The azimuth angle of the rising sun observed from Gotland is 80 degrees and the sunset azimuth is 280 degrees. On the satellite image of Gotland, select a location on the island and draw two lines that indicate these azimuth angles.

Problem 2 - Using your construction in Problem 1, use a compass to create a series of parallel lines at various locations on the satellite image of the island that match these two equinox events.

The photo below, taken by Soren Ganholm shows an example of the grooved rocks.

Problem 1 and 2 - See figure below for representative lines.