Leica SmartTrack / GeoMAX Aim360 How it works

Hexagon Industries the owner of both Leica and GEOMax has created a unique system for tracking and recognizing prisms called PowerSearch-Lock and Aim360 respectively (these are the same solution just with unique names). To understand the system we need to understand how Leica/GeoMAX acquire a prism and then how the instrument centers on it before taking a reading.

Leica uses a solution called "PowerSearch" and GEOMax calls the same system "Scout". Both systems do not require any separate device, ie LED's or Catchers at the prism in order for the instrument to locate the prism. Leica and GeoMAX refer to it as a "Passive system" as the intelligence for the process is located at the instrument. The main advantage here is that no special prisms, batteries, or cables are needed on the prism, just an instrument and a prism (figure a).
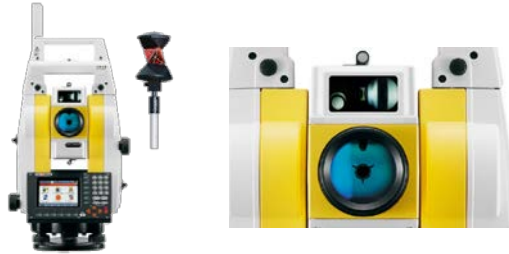

Figure A   Figure B

What happens when "PowerSearch/Stream360" is activated is that a pencil thin laser beam is emitted out of the square window on the total station located above or under (depending upon the instrument model) the objective lens. Simultaneously the instrument begins a 360 degree horizontal spin. The laser beam will bounce off of the prism and be received in a circular window next to the square one (figure b). This causes the instrument to stop spinning and turn on their target location system.

In Leica this system is called "ATR" and in GEOMax "Aim". What happens is a CCD camera is turned on inside of the total station. The telescope on the instrument then begins to move vertically until the camera identifies a return spot that is seen because of a low power laser beam that is being emitted co-axially with the instrument's cross hairs. The instrument then moves horizontally and vertically until the spot is centered in the camera's pixels.

Once the prism is acquired a Robotic Instrument will follow the prism with what Leica and Geomax both call Track. In a worst case scenario where the instrument has to spin a full 360 degrees, this process will take about 20 seconds. Normally it occurs much quicker.

To further enhance the system a prism is defined by the user (in the data collection software) prior to beginning the process. In addition to providing proper constant offset information it also lets the ATR/Aim system know what type of spot and size should be returned by the emitted laser beam. For example, a Leica/GeoMAX 360 prism will return a "rounded diamond" shape. If another prism that is different or the same but at a different distance away (the further away the smaller the spot; the closer the larger) crosses the path of the acquired prism it will be ignored because it is not the same shape or size as the one the instrument is tracking. This helps the instrument to avoid tracking "false" prisms or mounted back sites.

The Leica/GEOMax system has been repeatedly tested and proven to be the fastest and most reliable way to acquire a prism to date. The added benefit of having no additional items needed at the pole makes it the best robotic tracking solution.