Vehicle navigation technology selection is the critical factor in achieving a system design that optimizes system performance, reliability, maintenance costs, flexibility and ease of use.

Savant offers unique ‘Virtual Path’ navigation on all its guided vehicle and guided cart models. Operating without the need of floor tape, saw cut grooves for wire or magnetic rod, structure-mounted reflective targets or fixed object-dependent vision, Savant’s ‘Virtual Path’ navigation is impervious to typical facility environmental variables such as dust, floor condition, lighting, blocked line of sight, humidity, and path disruptions due to torn or worn floor tape and damaged reflective targets.

Savant’s internal navigation employs a solid state inertial sensor to determine AGV/AGC heading and positional information as it follows a ‘virtual’ CAD map of the system path.

Savant ‘Virtual Path’ navigation maintains sub-inch tracking accuracy. The onboard inertial sensor and virtual path are maintenance-free. Unlike rotational laser navigation sensors, floor tape or vision controls, Savant's inertial sensor and virtual path are not subject to costly wear-out or damage replacement. The ‘Smart’ onboard controller performs navigation, path routing and traffic control, communications, drive control, load deck or work piece logic control and safety functions.

**Benefits of Savant Internal Navigation**

- Reverse travel ready (with option rear safety sensor) for off-aisle load or cart pick/drop
- Non-wire, ‘tape & target-free’ autonomy
- Inertial sensor has no moving parts to wear. It’s not a costly navigation wear item
- Eliminates periodic replacement of rotating laser head at ~$8,000/vehicle.
- Operates on uneven, rough floors, and ramps
- No line of sight/blocked target or tape maintenance issues

Our 4th generation of Virtual Path navigation is standard on all Savant AGVs and AGCs allowing complete intermingling of paths and vehicle types as needed by the user.

Savant is a full service AGV system supplier. Manufacturing of vehicles & controls, software, system installation and aftermarket support are executed in-house. Our business dates back to 1954 and our staff averages over 20 years' experience in the AGV market.
‘VIRTUAL PATH’ AGV/AGC NAVIGATION

**Laser (Target) Navigation**
- Targets at fixed elevation estimated ~7’ must have clear line of sight
- Target size: ~16” x 6”
- Targets spaced every 20-50 feet, on both sides of path (x2)
- Targets surveyed post installation
- Laser navigation is augmented with distance measuring (wheel encoders)
- Tracking accuracy ±1”, nominal

**Savant Inertial (Internal) Navigation**
- Markers (magnet) flush with floor
- Marker size ~0.75”d x 0.25”l
- Markers spaced one every 25-50 feet along path
- Markers surveyed post installation
- Inertial navigation is augmented with distance measuring (wheel encoders)
- Tracking accuracy ±1”, nominal

**Tape (Magnetic/Optical) Navigation**
- Sticky tape affixed to cleaned floor
- Station, branch and action markers (tape, RFID tag, plates) affixed to floor
- Marker size ~ 2” x 3”
- Markers and tape moved with path changes
- Path patched with new tape as needed
- Markers subject to damage
- Tracking accuracy ±1”, nominal

**Vision Camera Navigation**
- Stable structure environment required
- Multiple vehicle mounted cameras taking ~10 pictures/second
- Pictures compared to previously identified digitized picture data points
- Limited traffic intersection control
- Inability to accurately align for automatic load transfer or perform auto-charging
- Susceptible to dust clouding camera lens
- Tracking accuracy ±6”, nominal

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**Compared to Laser/Target Inertial Navigation is:**
- Immune to “line of sight” blocked/missed target issues which stop vehicle
- Does not require installation of additional target mounting posts in large open areas
- Not susceptible to damage or sabotage

**Compared to Floor Tape Inertial Navigation is:**
- Immune to torn/missing tape spots
- Has no limit to size or complexity of the guide path network
- Has no floor code markers (RFID tags, tape, plates) to get damaged

**Compared to Vision Inertial Navigation is:**
- Able to auto-reverse
- Has accuracy to be able to support automatic load pick and drop
- Offers vastly superior traffic intersection flow efficiency

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**NOTE:** Specifications are subject to change without notice based on product improvements or technical requirements. Form: 0115NAV

Savant Automation, Inc. www.agvsystems.com