

## 2.3 | Positioning & Sensor Requirements

**Level COMMAND** uses GNSS positioning data, machine geometry information, and implement orientation feedback to calculate target elevations and automatic control corrections.

Depending on machine configuration and enabled functions, the system may require:

- RTK GNSS positioning,
- vehicle heading information,
- Cross-Slope feedback,
- machine geometry offsets,
- and compatible **COMMAND** hardware interfaces.

### GNSS Positioning Requirements

**Level COMMAND** receives GNSS positioning information through the **COMMAND** ECU.

GNSS positioning data is used to determine machine location, implement elevation, and terrain position relative to the active design surface or plane.

Automatic control operation requires stable RTK-quality positioning suitable for precision terrain-control applications.

If GNSS quality falls outside configured operating limits, automatic control operation may be restricted or disengaged.

### Heading Information

Vehicle heading information is used to determine machine movement direction relative to the active terrain design.

Heading information is typically supplied through GNSS data received by the **COMMAND** ECU.

If dedicated heading information is unavailable, the system may determine movement direction using positional change during vehicle movement.

## Cross-Slope Feedback

Machine configurations supporting automatic Cross-Slope control require compatible implement roll-angle feedback.

Cross-Slope feedback is used to determine implement orientation relative to the active design surface and commanded Cross-Slope target.

Supported Cross-Slope feedback sources currently include:

- T3RRA TARS IMU systems,
- and compatible StarFire internal roll-angle sensors.

Invalid or unstable Cross-Slope data may prevent automatic control engagement or cause automatic control disengagement.

## Machine Geometry & Offsets

**Level COMMAND** uses configurable machine geometry information to calculate implement position relative to the GNSS receiver location.

Depending on machine configuration, offsets may include:

- sensor height offset,
- lateral offset,
- and fore/aft offset.

Incorrect machine geometry configuration may result in inaccurate implement positioning or automatic control behaviour.

## Sensor Stability & Control Protection

The **COMMAND** hardware platform continuously monitors positioning and sensor information during operation.

Automatic control engagement may be prevented, or automatic control may disengage, if:

- GNSS positioning becomes invalid,
- sensor information becomes unstable,
- positioning changes exceed configured operating limits,
- hydraulic faults are detected,
- or operating conditions fall outside configured control thresholds.

These protections assist in maintaining predictable implement behaviour during automatic control operation.

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