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# **Automated Machine Guidance Usage FAQ**

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# Automated Machine Guidance Usage FAQ

## Introduction

The purpose of this document is to answer basic questions about the use of Automated Machine Guidance (AMG) on Oregon Department of Transportation (ODOT) construction projects. It is not intended to be a technical document addressing how to implement or design for AMG on a construction project. The intended audience is construction contractors, engineering and surveying consultants, and ODOT personnel.

## Questions & Answers

### 1) Is AMG allowed on ODOT construction projects?

Yes, if the ODOT Project Manager agrees to the AMG plan proposed by the construction contractor, then AMG is an acceptable construction method. There is no specification that prohibits AMG or any other technological advancement in construction.

[The ODOT Highway Design Manual Chapter 16](#) directly references the use of AMG. ODOT understands the benefits of using AMG for both the Agency and the contractor.

The [ODOT Construction Surveying Manual for Contractors](#) Section 1.8 addresses the use of AMG and what will be required from the contractor.

### 2) What type of 3D Design data will ODOT provide?

If a project was advertised through [eBIDS](#) and meets ODOT requirements for 3D Design, all bidders will have access to a predefined set of data including, at a minimum, the primary alignment, the roadway design finish surface, existing ground surface, and standard cross sections. The design information may be unfinished or incomplete. For this reason the eBIDS package should not be used for construction. The files will be in XML or PDF format. (See [eBIDS Handoff Package Checklist](#) for detailed information).

For projects that meet the requirements for 3D Design, a Construction Survey Handoff package containing detailed 3D Design information covering the entire project will be prepared after a project has been awarded. The Project Manager will provide information to the successful bidder from this package in accordance with the contract requirements. The design data will be in DGN (MicroStation), XML and PDF format. See ODOT [Highway Design Manual Appendix M](#) for detailed information on the files and formats provided in the survey handoff package and ODOT Technical Services [Bulletin RD13-03\(B\)](#) for 3D Design project requirements.

### 3) Will ODOT stand by the 3D Design data they provide?

The eBIDS package is for bidding purposes only; use of the data for any other purpose is at the Bidder's own risk. The data in the eBIDS package is not the final 3D design for the project, and should not be used for construction.

The contractor will receive information from the Construction Survey Handoff package in accordance with the contract requirements for Agency Responsibilities. ODOT will be responsible for the integrity of the data provided. ODOT will not accept responsibility

for any errors introduced by conversion or other manipulation of the data performed by the contractor. Any errors, omissions or discrepancies found in the data should be brought to the attention of the Project Manager as soon as possible so that it can be corrected. As stated in [SP00305](#), costs incurred by survey errors on the contractor's part, will not be covered by the Agency.

**4) What information does ODOT require the contractor to provide in order to be allowed to use AMG on an ODOT project?**

Per the [ODOT Construction Surveying Manual for Contractors](#) Section 1.8, the contractor may be required to "Demonstrate capabilities, accuracy, and reliability of the intended AMG procedures if required by the Engineer".

The ODOT Project Manager has final say on all construction methods used to build a project; that has always been the case regardless of using AMG or not. The contractor will be required to discuss all intended uses of AMG with the Project Manager at the Pre-Construction meeting or 21 days before its use.

**5) Will stakes be required despite the use of AMG?**

Per the [ODOT Construction Surveying Manual for Contractors](#) Section 1.8, in lieu of setting stakes, the contractor may use AMG, and perform any supplemental staking as directed by the Engineer.

**6) What checks are built into the system to ensure the project is built correctly while using AMG?**

Rigorous checks are built into the ODOT design process to ensure that the data provided to the contractor is accurate and matches the paper plans. The eBIDs package and the Construction Survey Handoff Package are reviewed in-depth before they are made available. [Appendix N to the ODOT Highway Design Manual](#) covers the step by step quality control (QC) process for digital design data.

The Contractor will be required to submit to ODOT any 3D models to be loaded into their AMG equipment, per the [ODOT Construction Surveying Manual for Contractors](#). These 3D models will be reviewed to confirm that they match the original ODOT model and plans. The typical work flow will be:

1. ODOT supplies the contractor with 3D design models in .xml format;
2. The contractor converts the models into a format that works with their AMG equipment;
3. The contractor will export these machine models back to an .xml format and submit to ODOT for review.

Grade verification points, for quality control, will be required upon the completion of each course of material during the construction process. These points will be checked against the ODOT 3D Design model to ensure compliance with the required tolerance specifications.

**7) Will the Oregon Real-Time GNSS Network (ORGN) be made available for construction contractors using AMG?**

The ORGN is a GNSS network that provides real-time kinematic (RTK) correctors to field GNSS users over the internet. If AMG equipment is properly configured, the ORGN can replace an onsite GNSS base station.

The ORGN is operated and controlled by ODOT. Access accounts are free of charge. To request an account please visit the [ORGN web page](#) and complete the Rover Account Request.

The ORGN network should be used at the contractors own risk, network outages will not substantiate a contract claim. If the ORGN is used, it is advisable to have a local base station available.

**8) How will the costs associated with AMG be handled by ODOT?**

Per [Special Provisions 00305.90](#), payment for "Construction Survey Work" will be paid for as a contract lump sum. No additional payments will be made for additional work that may be related to AMG construction methods, additional survey work to support AMG, or the development of 3D design models for AMG equipment.

Even if AMG is required in the contract with an associated bid item, the costs associated with AMG should be factored into the bidding process like any other incidental expense. No additional payments will be made for the use of AMG.

There may be special cases where AMG will be required and ODOT may cover some of the cost and/or pay separately for AMG. These will be handled through contract change orders on a project by project basis.