WHAT IS CLAIMED:

1. A method of generating a CAD model that includes an extension segment conforming to a workpiece-interface, the method comprising:

determining, in a library-CAD model, a nominal model-interface comprising a plane traversing the library-CAD model, the library-CAD model comprising a nominal model of an extension segment corresponding to a workpiece or the library-CAD model comprising a nominal model of the workpiece;

comparing the nominal model-interface of the library-CAD model to a digital representation of a workpiece-interface of the workpiece, the digital representation having been obtained using a vision system that has a field of view including the workpiece-interface; and

generating an extension segment-CAD model comprising a model of the extension segment, the extension segment-CAD model differing from the library-CAD model in respect of at least one of a transformation and an extension of the nominal model-interface based at least in part on a comparison of the nominal model-interface to the digital representation of the workpiece-interface, the model of the extension segment comprising a model-interface configured to be additively printed on the workpiece-interface of the workpiece.

2. The method of claim 1, wherein generating the extension segment-CAD model comprising the model of the extension segment comprises:

extracting the nominal model-interface from a location in the nominal model that corresponds to an expected location of the workpiece-interface of the workpiece.

3. The method of claim 1, wherein generating the model of the extension segment comprises:

transforming the nominal model-interface based at least in part on the comparison, providing a transformed model-interface conforming to the digital representation of the workpiece-interface; and

extending the transformed model-interface, providing the model of the extension segment, the model of the extension segment configured to be additively printed on the workpiece-interface.

4. The method of claim 3, wherein transforming the nominal model-interface comprises performing at least one of the following transforming operations to at least a portion of the nominal model-interface:

rotating, bending, twisting, shifting, scaling, smoothing, aligning, offsetting, and morphing.

5. The method of claim 4, wherein transforming the nominal model-interface comprises:

performing a first transforming operation selected to align at least a first portion of the nominal model-interface with the digital representation of a workpiece-interface, the first transforming operation comprising at least one of a shifting transforming operation and a rotating transforming operation; and

performing a second transforming operation selected to align at least a second portion of the nominal model-interface with the digital representation of the workpiece-interface, the second transforming operation comprising at least one of a bending transforming operation and a scaling transforming operation.

6. The method of claim 3, wherein extending the transformed model-interface comprises:

determining a height of the workpiece based at least in part on the digital representation of the field of view;

determining a height for the extension segment to be additively printed on the workpiece-interface of the workpiece; and

extending the transformed model-interface in the z-direction by an amount corresponding to the height for the extension segment.

7. The method of claim 6, wherein extending the transformed model-interface in the z-direction by an amount corresponding to the height for the extension segment comprises:

positioning the transformed model-interface at an elevation corresponding to a build plane of an additive manufacturing machine;

positioning a copy of the transformed model-interface a distance in the z-direction above the transformed model-interface that corresponds to the height for the extension segment; and

defining the model of the extension segment as extending in the z-direction from the transformed model-interface to the copy of the transformed model-interface.

8. The method of claim 1, wherein generating the extension segment-CAD model comprising the model of the extension segment comprises extending the nominal model-interface in the z-direction by an amount corresponding to the height for the extension segment, wherein extending the nominal model-interface comprises:

positioning the nominal model-interface at an elevation corresponding to a build plane of an additive manufacturing machine;

determining a nominal extended-plane of the nominal model corresponding to a top surface of the nominal model, and positioning the nominal extended-plane of the nominal model a distance in the z-direction above the nominal model-interface that corresponds to the height for the extension segment; and

defining the model of the extension segment as extending in the z-direction from the nominal model-interface to the nominal extended-plane.

9. The method of claim 1, wherein generating the extension segment-CAD model comprising the model of the extension segment comprises extending the nominal model-interface in the z-direction by an amount corresponding to the height for the extension segment, wherein extending the nominal model-interface comprises:

positioning the nominal model-interface at an elevation corresponding to a build plane of an additive manufacturing machine;

determining a slice elevation for an extended-plane of the model of the extension segment;

determining a nominal extended-plane in the nominal model, the nominal extended-plane being at an elevation corresponding to the slice elevation for the model of the extension segment;

positioning the nominal extended-plane a distance in the z-direction above the nominal model-interface that corresponds to the slice elevation;

transforming the nominal extended-plane, providing a transformed extended-plane, the transforming of the nominal extended-plane based at least in part on a comparison of at least one of: the nominal extended-plane to the nominal model-interface and the position of the nominal extended-plane above the nominal model-interface relative to the height for the extension segment; and

defining the model of the extension segment as extending in the z-direction from the nominal model-interface to the nominal extended-plane.

10. The method of claim 1, wherein generating the extension segment-CAD model comprises:

outputting the model of the extension segment to the extension segment-CAD model.

11. The method of claim 1, comprising:

generating image data comprising the digital representation of the workpiece-interface using the vision system.

12. The method of claim 1, wherein the workpiece comprises a compressor blade or a turbine blade for a turbomachine and wherein the extension segment comprises a blade tip.

13. The method of claim 1, comprising generating a CAD model that includes a plurality of extension segments configured to be respectively additively printed on a corresponding plurality of workpieces, the method comprising, for each respective one of the plurality of workpieces:

determining, in the library-CAD model, a nominal model-interface comprising a plane traversing a respective nominal model in the library-CAD model, the respective nominal model comprising a respective nominal model of the respective extension segment corresponding to a respective one of the plurality of workpieces or the respective nominal model comprising a model of the respective one of the plurality of workpieces;

comparing the respective nominal model-interface of the library-CAD model to a digital representation of a workpiece-interface of the respective one of the plurality of workpieces, the digital representation having been obtained using the vision system, the vision system having a field of view including the workpiece-interface of the respective one of the plurality of workpieces; and

generating the extension segment-CAD model comprising the model of the respective extension segment respectively corresponding to the respective one of the plurality of workpieces, the extension segment-CAD model differing form the library-CAD model in respect of at least one of a transformation and an extension of the respective nominal model-interface based at least in part on a comparison of the nominal model-interface corresponding to the respective one of the plurality of workpieces to the digital representation of the respective one of the plurality of workpieces, the model of the extension segment configured to be additively printed on the workpiece-interface of the respective one of the plurality of workpieces.

14. The method of claim 13, wherein generating the extension segment-CAD model comprising the model of the extension segment respectively corresponding to the respective one of the plurality of workpieces comprises:

extracting the respective nominal model-interface from the respective nominal model at a location that corresponds to an expected location of the workpiece-interface of the respective one of the plurality of workpieces, the respective nominal model-interface corresponding to the respective one of the plurality of workpieces.

15. The method of claim 13, wherein generating the extension segment-CAD model comprising the model of the extension segment respectively corresponding to the respective one of the plurality of workpieces comprises:

transforming the respective nominal model-interface corresponding to the respective one of the plurality of workpieces based at least in part on the comparison, providing a transformed model-interface conforming to the digital representation of the workpiece-interface of the respective one of the plurality of workpieces; and

extending the transformed model-interface, providing the model of the respective extension segment configured to be additively printed on the respective workpiece-interface of the respective one of the plurality of workpieces.

16. The method of claim 13, wherein generating the extension segment-CAD model comprises:

outputting to the extension segment-CAD model, a model of a plurality of extension segments respectively configured to be additively printed on the corresponding workpiece-interface of the respective ones of the plurality of workpieces.

17. The method of claim 1, wherein generating the extension segment-CAD model comprising the model of the extension segment comprises:

comparing the nominal model-interface of the library-CAD model to a first digital representation of a first workpiece-interface of a first workpiece, the first digital representation having been obtained using the vision system, the vision system having a field of view including the first workpiece-interface;

transforming the nominal model-interface based at least in part on the comparison, providing a first transformed model-interface conforming to the first digital representation;

extending the first transformed model-interface, providing a first model of a first extension segment configured to be additively printed on the first workpiece-interface of the first workpiece;

comparing the nominal model-interface of the library-CAD model to a second digital representation of a second workpiece-interface of a second workpiece, the second digital representation having been obtained using the vision system, the vision system having a field of view including the second workpiece-interface;

transforming the nominal model-interface based at least in part on the comparison, providing a second transformed model-interface conforming to the second digital representation;

extending the second transformed model-interface, providing a second model of a second extension segment configured to be additively printed on the second workpiece-interface of the second workpiece; and

outputting to the extension segment-CAD model, the first model of the first extension segment and the second model of the second extension segment.

18. An additive manufacturing system, comprising:

a controller operably coupled to a vision system and an additive manufacturing machine, the controller comprising one or more computer readable medium and one or more processors, the one or more computer readable medium comprising computer-executable instructions, which, when executed by the one or more processors, causes the additive manufacturing system to:

determine, in a library-CAD model, a nominal model-interface comprising a plane traversing the library-CAD model, the library-CAD model comprising a nominal model of an extension segment corresponding to a workpiece or the library-CAD model comprising a nominal model of the workpiece;

compare the nominal model-interface of the library-CAD model to a digital representation of a workpiece-interface of the workpiece, the digital representation having been obtained using a vision system that has a field of view including the workpiece-interface; and

generate an extension segment-CAD model comprising a model of the extension segment, the extension segment-CAD model differing from the library-CAD model in respect of at least one of a transformation and an extension of the nominal model-interface based at least in part on a comparison of the nominal model-interface to the digital representation of the

workpiece-interface, the model of the extension segment comprising a model-interface configured to be additively printed on the workpiece-interface of the workpiece.

19. The system of claim 18, comprising at least one of:

a vision system configured to capture the digital representation of the workpiece-interface; and

an additive manufacturing machine configured to additively print the extension segment on the workpiece.

20. A non-transitory computer readable medium comprising computer-executable instructions, which, when executed by one or more processors of an additive manufacturing system, causes the additive manufacturing system to:

determine, in a library-CAD model, a nominal model-interface comprising a plane traversing the library-CAD model, the library-CAD model comprising a nominal model of an extension segment corresponding to a workpiece or the library-CAD model comprising a nominal model of the workpiece;

compare the nominal model-interface of the library-CAD model to a digital representation of a workpiece-interface of the workpiece, the digital representation having been obtained using a vision system that has a field of view including the workpiece-interface; and

generate an extension segment-CAD model comprising a model of the extension segment, the extension segment-CAD model differing from the library-CAD model in respect of at least one of a transformation and an extension of the nominal model-interface based at least in part on a comparison of the nominal model-interface to the digital representation of the workpiece-interface, the model of the extension segment comprising a model-interface configured to be additively printed on the workpiece-interface of the workpiece.