



## AI-Driven Part Printability Recommendation System for Additive Manufacturing



Illumination Works' Linnea™ decision support tool applies artificial intelligence and machine learning (AI/ML) innovation to additive manufacturing (AM) engineering workflows to speed the identification of parts suitable for 3D printing.



### Efficiency of AM Part Selection

Improves efficiency and accuracy of the AM part selection process

AM is a disruptive technology with far reaching implications across the DoD logistics supply chain. Coupling AM with AI/ML-driven algorithms for workflow automation is a game changer for increasing the efficiency and accuracy of the AM part selection process.



### Ease Manual Burden of AM Engineer

Saves time and costs by automating analysis for suitable parts identification

AM engineers across the DoD spend innumerable hours manually reviewing and analyzing various forms of engineering data to identify parts that might be good candidates for 3D printing. Enhancing the AM workflow with AI/ML automation streamlines the process of identifying suitable parts.



### 2D/3D Engineering Data Processing

Processes and classifies part features from multi-format engineering data

Linnea is uniquely designed to extract and process both 2D and 3D data. Many DoD part designs are 2D drawings scanned to PDF, while newer parts are being digitally engineered as 3D models. Linnea addresses the challenge of aging parts and looks to the future to accommodate digital designs.

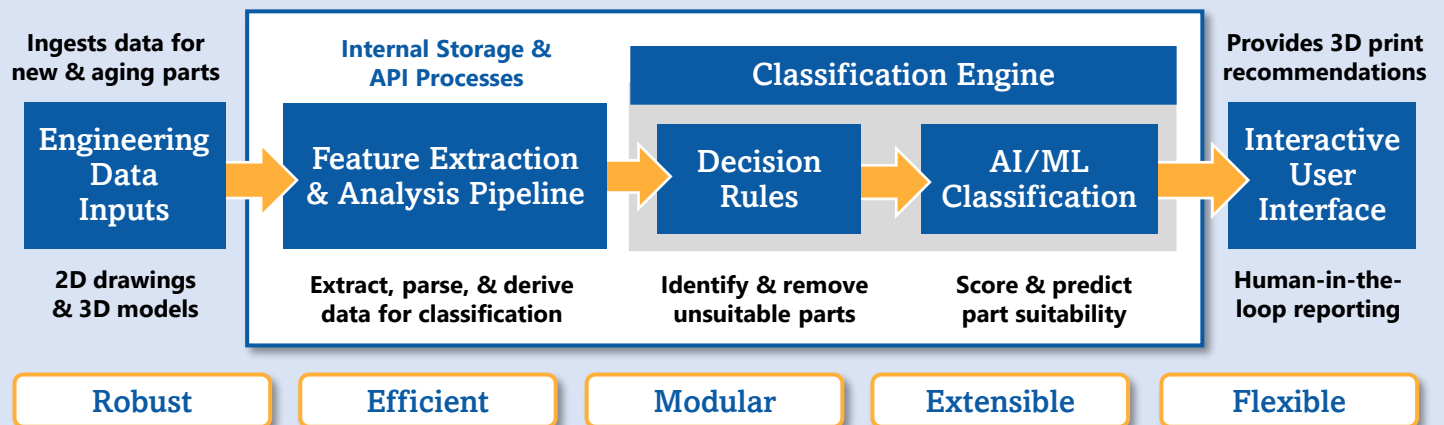


### Printability Recommendations

AI-enabled AM part candidacy scoring and recommendations

Part candidacy scoring and recommendations are served to AM engineers via an interactive user interface. Human-in-the-loop reporting and analyses capabilities empower AM engineers to confidently make 3D part printing decisions faster and have a greater pool of parts identified and cataloged for AM.

## Linnea™ Part Printability Recommendation System



Key sustainment and logistics organizations across the DoD are rapidly adopting AM as a strategic lever to gain decision advantage, remediate supply chain challenges, manage increased product complexity, and eliminate lag times and costs in delivering parts for repair.

**Linnea™ Part Printability Recommendation System** processes technical and engineering data, identifies relevant data features, and applies well-performing AI/ML algorithms to predict AM part suitability to help organizations realize significant time savings and efficiencies in support of strategic mission initiatives.



**Ingest & Prepare**  
**FEATURE**  
**EXTRACTION**



**Part Suitability**  
**CLASSIFICATION**  
**ENGINE**



**Part Printability**  
**INTERACTIVE**  
**USER INTERFACE**

- **Customized algorithms** extract and process 2D and 3D engineering inputs with ML, natural language processing (NLP), and computer vision (CV)
- **2D drawing processing** parses text, segments geometric objects, extracts geometric contours, and computes features
- **3D model processing** extracts text and derives geometric and complexity features
- **Expert decision rules** are applied to rapidly identify parts not suitable for printing due to incompatibilities with size, tolerance, or material
- **AI/ML-classifiers** accurately predict AM part suitability based on complexity and geometry features
- **3D print recommendations** and scoring for parts are served to the interactive user interface
- **Human-in-the loop** workflow enables AM engineer to interact with part printability recommendations for further analyses and reporting
- **Final 3D print decisions** are made by the AM engineer and captured via the user interface
- **Parts identified** for 3D printing are cataloged and made available for future analyses and decision making

## AI Solution Primed for Customization

The Linnea decision support tool is primed for customization, product lifecycle management (PLM) integration, and deployment into any DoD logistics area wanting to **accelerate and optimize their AM processes to improve operational readiness** in support of the warfighter and DoD mission.

Illumination Works validated the feasibility of Linnea to **process 2D and 3D engineering data and reliably predict the suitability** of parts for AM via a Phase I Army SBIR, which progressed to a Phase II SBIR advancing Linnea to **TRL 6**. Linnea is a **non-proprietary solution** with source code available to DoD customers at deployment.

Ready to elevate your AM processes?  
**Schedule your personalized demo to experience Linnea™ in action!**

## Contact Us Today



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