

# How to Create a 3D Model from Scanned Data in 5 Easy Steps



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# Abstract



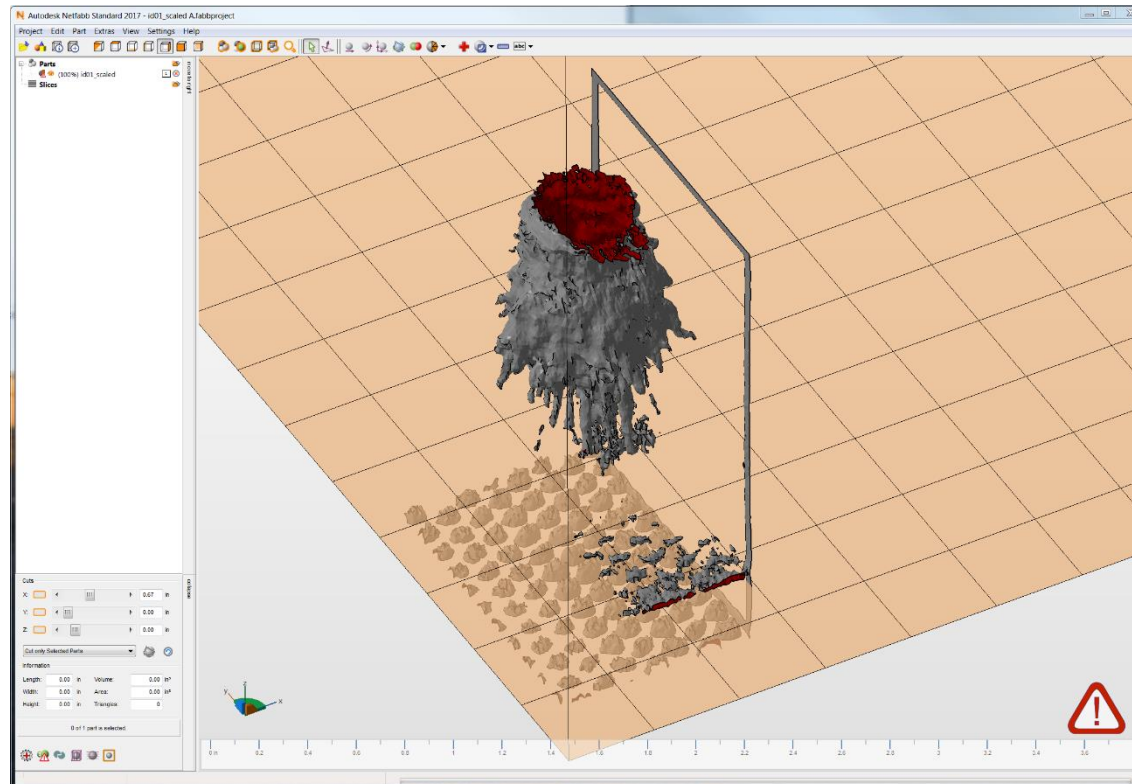
Additive manufacturing is a cost effective way to generate copies of damaged parts for demonstration and evaluation purposes. However, integration of scanned data of a damaged area into an existing model may be challenging. By using the relatively inexpensive Nettfab software (from Autodesk) one can generate a “watertight” model that is easy to print.



# Step 1: Scan Data of Damage



- Example of Scanned Data saved in a STL (Standard Tessellation Language) Format

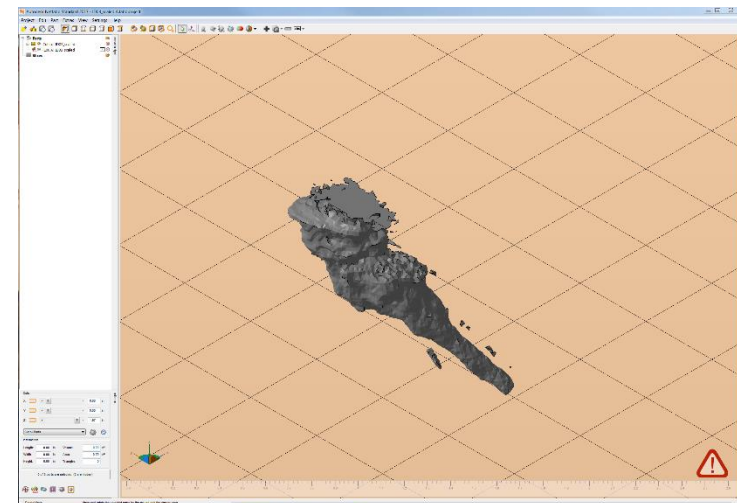
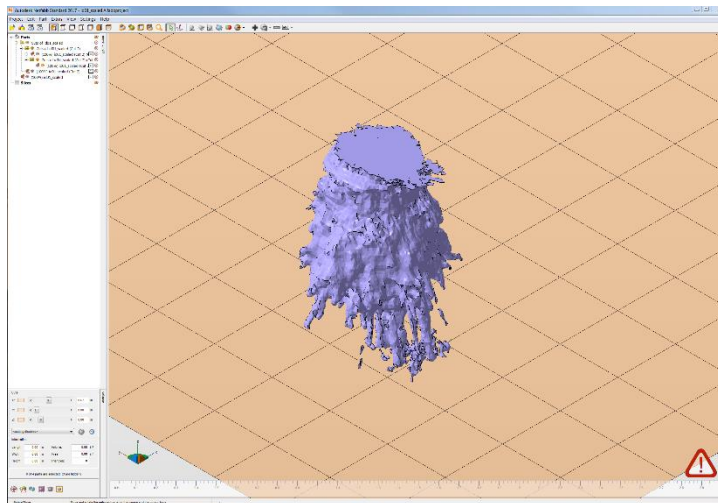
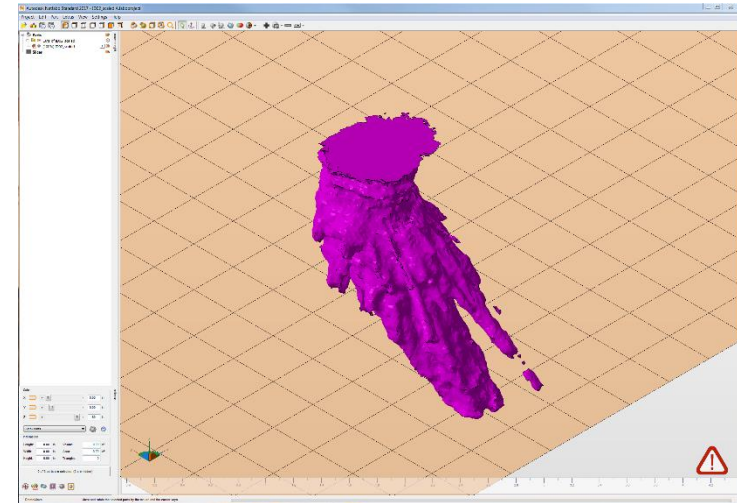




# Step 2: Import Data into Nettfab and Make Repairs



Imported data is cleaned up and holes filled in so that the damaged area is now one solid model or “watertight”.





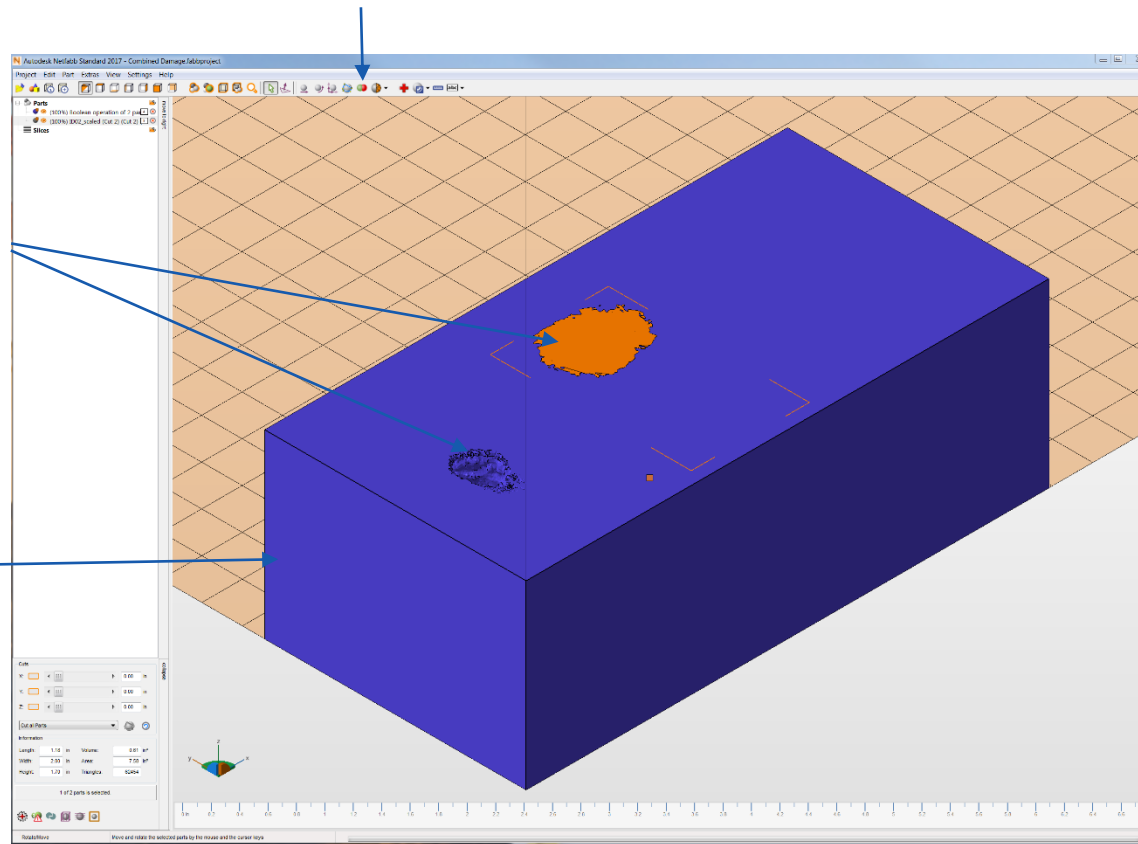
# Step 3: Combine the "Repaired" Scan with the Desired Model



Nettfab's Boolean function subtracts the scanned damage from the target part

Scanned Data

Model

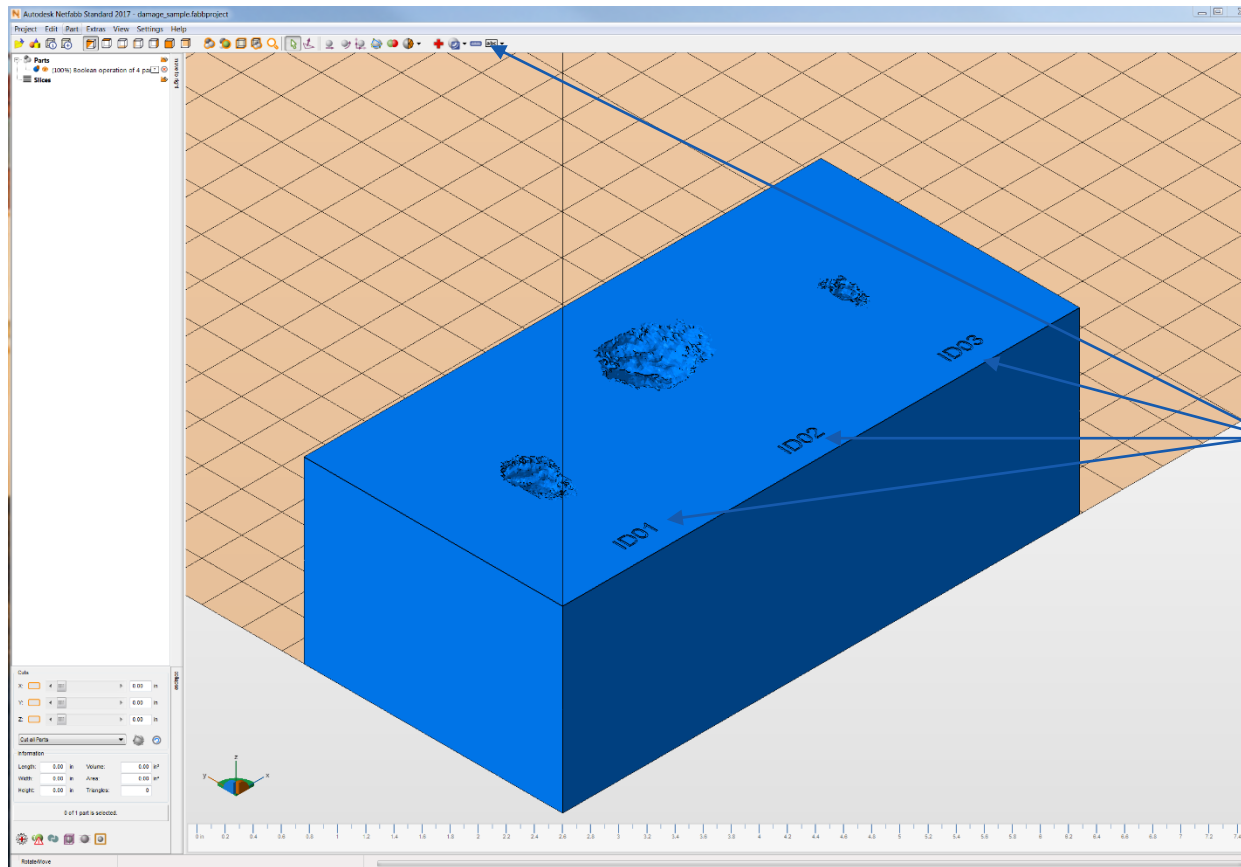




# Step 4: Generate a New STL File



Export a new stl model file of the damaged part



Nettfab also allows one to add text

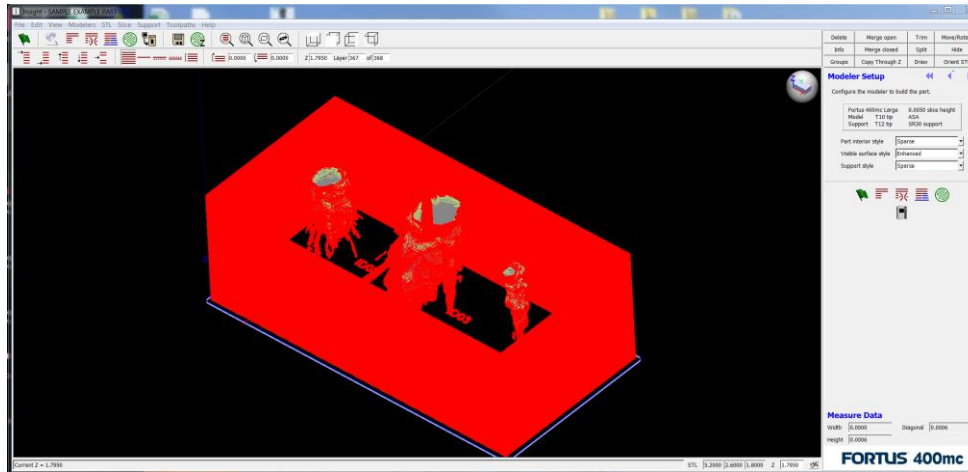




# Step 5: Print the Part



Processed STL Model in Insight Software



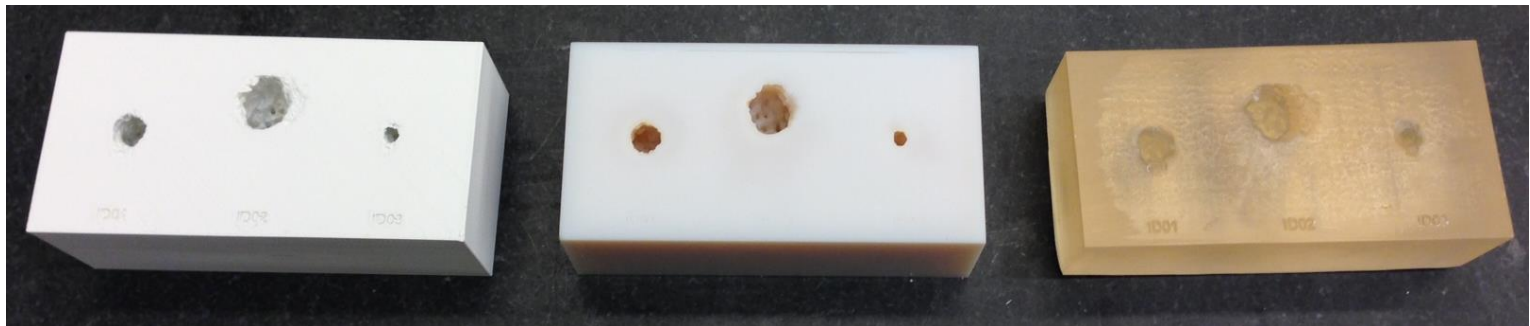
Example Prints from a Stratasys Fortus 400mc  
Slice height of .005" Model Material - ASA



Stratasys Fortus 400mc

Stratasys Objet 30 Pro

3D Systems Projet HD 3000





# Future Development



- Able to produce a wide variety of specimens with representative damage for visual and penetrating imagers without having to pay for a hypervelocity impact test.
  - Multiple types of materials and configurations to evaluate and optimize inspection techniques based on available inspection sensors or future/anticipated inspection sensors.
  - Allow for experimentation in material "doping" and other properties that may enhance the inspection attributes for various types of inspection sensors.
  - Allows for reproduction of unique hypervelocity or on-orbit induced impact cases for inspection purposes.
  - Allows for an infinite number of damage cases to be produced of any given test article configuration for evaluation.
  - Evaluation of repair processes of realistic damage without having to use a specimen from a hypervelocity impact test.
  - Evaluation of inspection tools used to verify effectiveness of repairs on orbit.





# Questions?

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