



Astrodyne

Now you have power.

The “Power” of 3D Printing

Peter Resca
VP of Industrial Market
Astrodyne

Agenda

- 3D Printing – What is It?
- What's the Hype?
- The Alternatives
- How can it help us?
 - Examples
 - Possibilities
- Conclusion



What is 3D Printing?

“a process for making a physical object from a three-dimensional digital model, typically by laying down many successive thin layers of a material”



Examples



What is 3D Printing cont.

- Origin
 - Stereolithography (SLA) credited to Charles Hull 1984
 - Lasers used to meld resin
 - Origin of 3D Systems
 - Fused Deposition Modeling (FDM) credited to Scott Crump in 1988
 - Nozzle for additive resin
 - Origin of Stratasys



What's the Hype?

- It's in the News
 - Legislation Regarding Gun Printing (Undetectable Fire Arms Act)
 - Public Companies, 3D Systems (\$8.3B Market Cap) and Stratasys (\$6.3B Market Cap)
- It's Now Affordable
- It's Widely Accessible
 - Local Printers
 - Open File Sharing



The Drawbacks

- Time: Complex Models and/or printer speed can influence
- Strength: Additive methods not as strong as unified material deposition
- Cost: In volume, material and set up cost prohibitive
- Material: Limited Selection



The Alternatives

- Clay Modeling
 - Labor intensive
 - Time Consuming
- Machining
 - Reduction Process
 - Material Strength
 - Material Options
- Injection Molding
 - Tooling Cost/Lead Time
 - Effective with Volume



Application Examples

- Concept Development
 - Designer Creativity
- Rapid Prototyping
 - Check Mechanical Fit/Interference
- Design Enhancements
 - Case Modifications
- Industrial Designs/Marketing
 - Customer Feedback



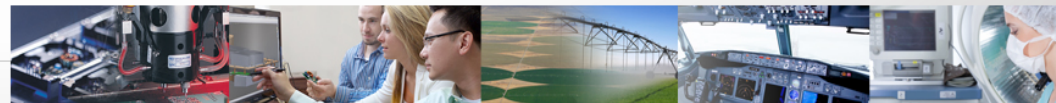
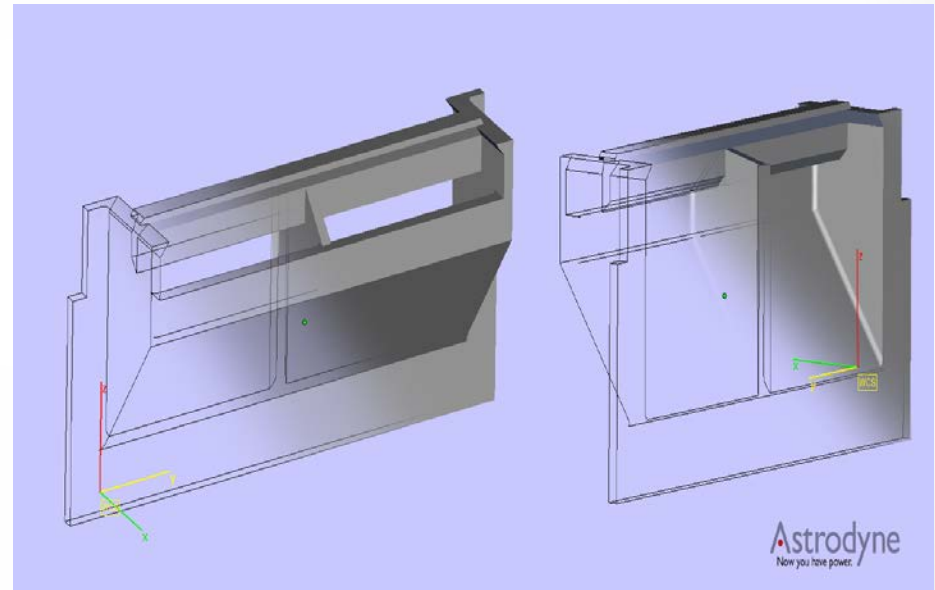
Application Example: Case Modification

Problem:

Customer requirement for improved ingress protection.

Proposed Solution:

Case modification to reduce area and improve angle preventing ingress.



Application Example: Case Modification

Challenges/Considerations:

- ABS Thermoplastic used – consistent with case material
- Color match – Color options but single selection
- Wall thickness
- Minimal Waste
- Learning Curve/Iterations



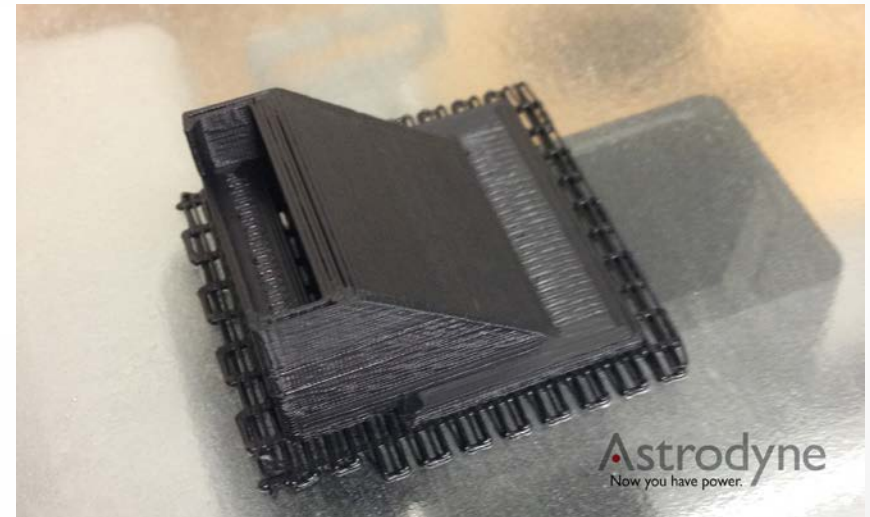
Application Example: Case Modification

Result:

3D Printed prototype developed and tested. First version failed but second version a success.

Conclusion:

Customer needs met with working prototypes in less than 2 weeks.



Possibilities

- Local Manufacturing
- Local Repair
- Custom or Semi Custom Solutions
 - Medical Solutions
 - Children's Toy
 - Clothes
 - Guns
 - Shelter



Conclusion

- 3D Printing Allows Manufactures Increased Capabilities
 - Prototype Testing
 - Industrial Designs for Customer Feedback
- 3D Printing is Cost Effective
- 3D Printing is Not All Things to All People
- 3D Printing can Create Competitive Differentiation





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Thank You!