AN EXAMPLE OF ECONOMIC VALUE IN RAPID PROTOTYPING

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SINTERSTATION 2500plus

RAPID PROTOTYPING

- TODAY'S MODERN MACHINING PROJECTS ARE COMPOSED OF MORE AND MORE COMPLICATED AND INTRICATE STRUCTURE DUE TO A VARIETY OF REASONS INCLUDING THE ABILITY TO COMPUTER MODEL COMPLEX SURFACES AND FORMS

RAPID PROTOTYPING

- THE COST OF PRODUCING THESE FORMS CAN BE EXTREMELY HIGH NOT ONLY DOLLARS BUT IN TIME TO COMPLETE.
- CHANGES ARE EVEN MORE DIFFICULT TO INCORPORATE

RAPID PROTOTYPING

- PICTURE OF THE SUBJECT BLADE

RAPID PROTOTYPING

- THE BLADE SHOWN IN THE PREVIOUS SLIDE IS AN EXCELLENT EXAMPLE
- ITS COMPLEX FORM WOULD HAVE REQUIRED HUNDREDS OF HOURS IN FABRICATION FOR JUST A SIMPLE PROTOTYPED

RAPID PROTOTYPING

- AFTER A SERIES OF COMPLEX DRAWINGS WERE ASSEMBLED A PROCUREMENT WOULD HAVE BEEN INITIATED TO MACHINE A PROTOTYPE BLADE OR TO BUILD A COMPLEX DIE FOR THE PRODUCTION OF WAX FORMS FOR THE CASTING PROCESS.

RAPID PROTOTYPING

- THE PROCUREMENT WOULD HAVE TAKEN IN THE NEIGHBORHOOD OF 6 WEEKS TO COMPLETE
- THE ACTUAL FABRICATION WOULD HAVE BEEN AN EQUAL AMOUNT OF TIME TO COMPLETE

RAPID PROTOTYPING

- AN ALTERNATIVE TO THIS PROCESS WOULD HAVE BEEN A WOOD MODEL ALTHOUGH CHEAPER THAN A METAL FABRICATION IT WOULD BE EXTREMELY TIME INTENSIVE AND REQUIRE IN THE NEIGHBORHOOD OF A MONTH TO PRODUCE IN-HOUSE

RAPID PROTOTYPING

- JUST A ROUGH ESTIMATE WOULD PUT COSTS AT NEAR $32,000 RANGE WITH 2 TO 3 MONTHS TO PRODUCE A USEABLE PRODUCT

RAPID PROTOTYPING

- WITH THE SINTERSTATION 2500 PLUS ALL THAT WAS REQUIRE WAS TO:
  - A SOLID MODEL FROM A CAD/CAM SYSTEM DOWNLOADED AS A STL FILE
  - LOAD THE FILE TO THE MACHINE
  - 2 TO 3 HOURS OF SET UP TIME
  - 16 HOURS OF UNATTENDED RUNNING
- TOLERANCES OBTAINED ARE TYPICALLY 0.005 TO 0.010

RAPID PROTOTYPING

- THE BUILD CHAMBER IS ABOUT 12” X 13” X 17”
  - THE CHAMBER IS FILLED WITH DURAFORM POWDER
  - A NITROGEN BLANKET IS APPLIED
  - POWDER BECOMES SELF-SUPPORTING

RAPID PROTOTYPING

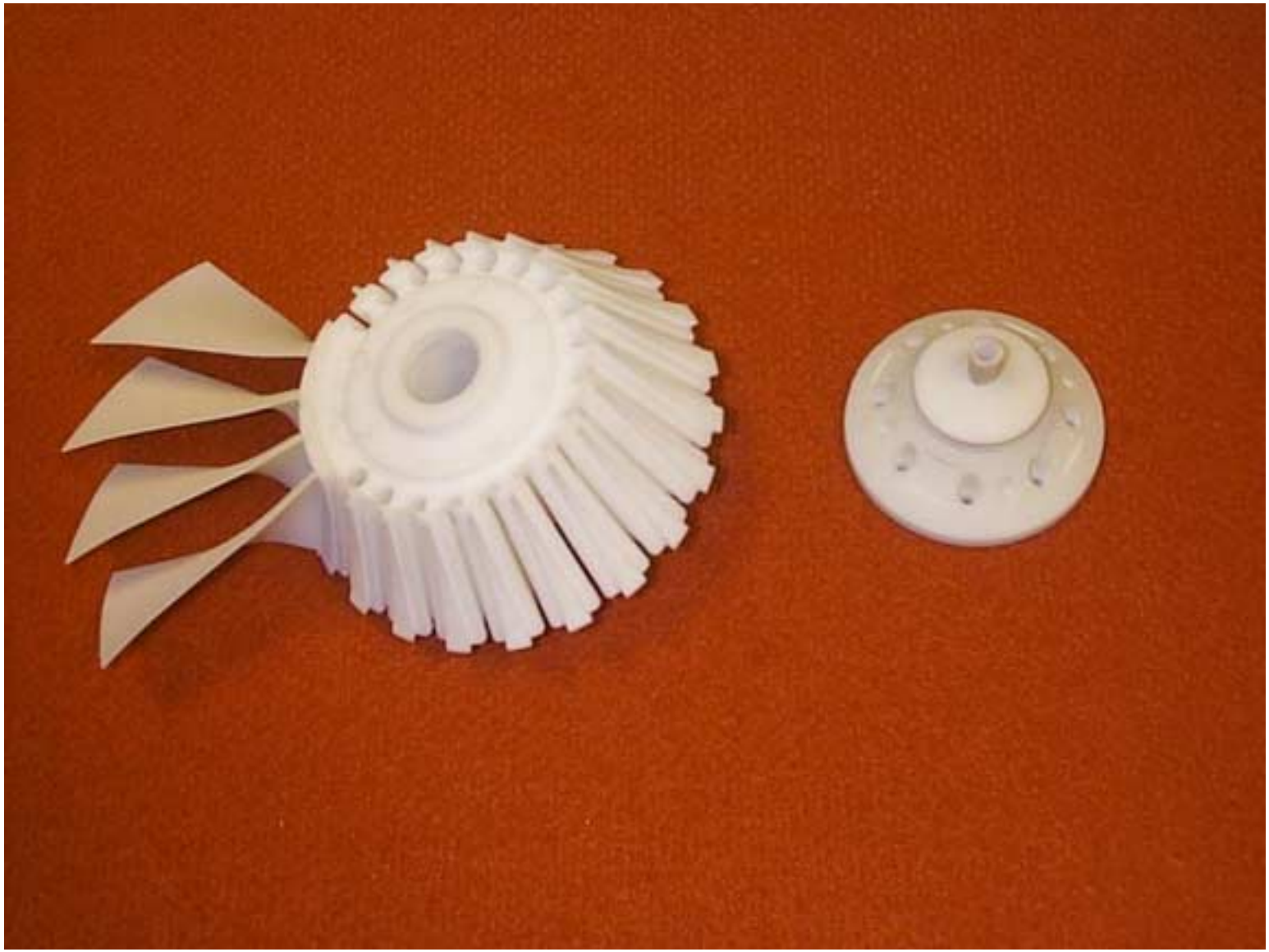
- A 100 WATT CO2 LASER IS SCANNED ON THE SURFACE OF THE POWDER
  - EACH PASS OF THE LASER ADDS 0.004" LAYER TO THE MODEL
  - THE PART IS BUILT FROM THE BOTTOM UP IN AN INCREMENTAL FASHION

RAPID PROTOTYPING

- UPON COMPLETION THE PART IS SIMPLY SEPARATED FROM THE SURROUNDING POWDER BY A SIMPLE SHAKEOUT
- THE PROCESS IS NEAT, CLEAN, SAFE, AND ENVIRONMENTALLY FRIENDLY
- COST TO PRODUCE < $7000!

RAPID PROTOTYPING

- HERE ARE SOME OTHER SUCCESS STORIES



RAPID PROTOTYPING

- THE BENEFITS ARE IMMEDIATE
  - THE PARTS ARE VISUALLY CLEAR TO ALL
  - ANY NEEDED MODIFICATION CAN BE SEEN IN DETAIL
  - TIME CONSUMPTION IS MINIMAL
  - EXTENDED PROCUREMENT PROCESSES ARE AVOIDED

RAPID PROTOTYPING

- GLENN RESEARCH CENTER HAS RECENTLY ORDERED AND WILL HAVE AVAILABLE LATER THIS YEAR A DMDS LENS TECHNOLOGY THAT WILL GIVE US A DIRECT METAL SINTERING CAPABILITY