**OPTIMIZING THE TARDIS TARGET FOR PRODUCTION**

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**Target Fabrication must improve processes to meet an increase in demand for TARDIS targets.**

- TARDIS targets require precision component manufacturing and assembly.
- Target designs constantly change based on results from previous shots.
- New materials are constantly introduced as components in the target.
- Success of the TARDIS platform led to an increase in the number of shot requests.

**Meeting increased demand required Target Fabrication to improve processes including:**

- Conceptual design requirements
- Target documentation
- Component tracking
- Component fabrication and assembly

**Facilitates and Quick Engineering Start Upon Receipt of Initial platform development**

- **Engineering vs Production Effort Over Time**
  - Transition from development to production
  - Full production of target platform

**Old 8 Page Drawing Packages**

<table>
<thead>
<tr>
<th>Description</th>
<th>1999</th>
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<th>2001</th>
<th>2002</th>
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<tbody>
<tr>
<td>Old 8 Page</td>
<td>fait4</td>
<td>faiz</td>
<td>faiz</td>
<td>faiz</td>
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<tr>
<td>New 2 Page</td>
<td>fait4</td>
<td>faiz</td>
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**Drawing Package Simplified to Save Time and Effort**

- Drawing packages were simplified to only include items that consistently change at the top level assembly.

**Old 8 Page Drawing Packages**

- Reduced time to create and release a drawing package from 4 hours to 30 minutes per target.

**New 2 Page Drawing Package**

- Reduced time needed to check the drawing packages.

**Creating And Tracking An Inventory of Components Simplifies Component Management**

- A component inventory was created to manage the increasing number of parts needed to build multiple TARDIS targets.

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</table>

**Improved Conceptual Design Requirements (CDP) Facilitates and Quick Engineering Start Upon Receipt**

- CDP reduced from 8 pages to 1 page.
- 1 page CDP supplies all information required to build the target.
- Eliminated duplicate/conflicting information.
- Allowed the engineer to receive a CDP go directly to ordering parts instead of spending time to get clarification on requirements.

**Old 8 Page CDP**

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**New 1 Page CDP**

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<tbody>
<tr>
<td>New 1 Page</td>
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**Improving The Bonds Between TARDIS Physics Package Components Prevents Rework**

- Physics package components require glue bonds that are sub-micron thickness between mating parts.
- Physics package components contain 3-4 glue bonds.
- A failed (thick) glue bond requires a complete restart of the physics package build (2-5 days to rework).

**Physics Package Components Assembly Procedure**

- Assembly procedures were developed to increase consistency during the physics package assembly process.
- High risk bonds are completed first to minimize rebuild times if the glue is too thick.

**Pusher Damage Assessment After 1 Use**

- Interferometer analysis was used to determine pusher damage after 1 use was significant enough to render a pusher unusable.
- Physics package assemblies can only be done with new or reconditioned pushers.

**Simplifies Component Management**

- Min/max inventories reduced the time spent by the engineer tracking common components from days to minutes.
- Min/max inventories reduced part costs
- $50 for the same alignment pin from outside vendor,
- $200+ to fabricate an alignment pin in house.
- Min/max inventories reduced the time spent by the engineer tracking common components from days to minutes.

**Process Improvements Have Steadily Increased The Readiness Date of the TARDIS Targets**

- With an increasing number of targets each quarter, TARDIS targets continue to be delivered earlier and earlier.

**Applying a Min/Max Inventory of Common Components Guarantees Part Availability**

- Common items across the platform were added to a weekly min/max report.
- A weekly report identifies quantities of tracked components in inventory.
- Items falling below a minimum stock quantity threshold were automatically reordered with minimal engineering involvement.

**Min/Max Inventory For Common TARDIS Components**

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<th>2002</th>
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<td>Min/Max</td>
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**Improvements In Glue Bonds**

- The number of successful glue bonds increased each quarter as failures stayed the same or dropped.
- Increasing the success rate of good glue bonds prevents multiple days of rebuilding physics packages and allows for earlier delivery of the completed target.

**Improvements In TARDIS Target Delivery Relative To Shot Date**

- Improvements in TARDIS Target Delivery Relative To Shot Date

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**TARDIS targets are now delivered 3-4 weeks prior to the shot versus days before the shot.**