**KJ66 REVAMP**

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### Introduction

The KJ66 is an obsolete model Jet Turbine Engine used mainly by people starting the hobby for static testing. Our team set out to improve the design of the engine for performance and make it competitive with newer models.

**Figure 1.** Exploded view

### Solution

Several parts were modified for performance and maintenance.

- Hydrodynamic bearings
- Cowl
- Removable turbine stator vanes
- Exhaust cone strut
- Mounting brackets
- Compressor diffuser
- Shaft Housing
- Shaft
- Compressor control system
- Intake Nozzle
- Engine Housing

**Figure 2.** Full section view

### Methodology

**Figure 3.** Turbine stator vane

- Removable from ring
- Cost efficient
- 16 for inner turbine ring

**Figure 4.** Hydrodynamic bearings

- Cheaper (lathe machined part)
- Quieter than Ball bearings
- Oil cooling
- Efficient for High RPM conditions

**Figure 5.** Cowl

- Aerodynamic upgrade
- Aesthetics
- Good location for storing electronics (ex. FADEC)

**Figure 6.** Exhaust cone struts

- Required modification for our setup.
- Replaced springs on engine Housing.
- Struts have Aerodynamic features

**Figure 7.** Mounting Brackets

- Used by many Model Jet Engines
- 4 fasteners squeeze the engine housing
- 6 fasteners on the bottom mount hold the engine to a structure.

**Figure 8.** Compressor diffuser

- Guide vane shape and location modification.
- Less Screws
- More air compression
- Better air direction

### Results

**Table 1.** The Calculations our team made for finding the price of the Jet Engine.

<table>
<thead>
<tr>
<th>Part Name</th>
<th>Cost</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>K66 Jet Engine</td>
<td>~$1,170.00</td>
<td>AliExpress.com</td>
</tr>
<tr>
<td>H Burner, Compressor, Combustion Chamber, Cowl, Ball bearings, Exhaust (nozzle and housing)</td>
<td>~$133.35</td>
<td>HobbyandEngineeringSupsplies.com</td>
</tr>
<tr>
<td>Ball Bearing</td>
<td>~$21.32</td>
<td>CustomPartNet.com</td>
</tr>
<tr>
<td>Fluid Dynamic bearing</td>
<td>~$25.00</td>
<td>OnlineMetals.com</td>
</tr>
<tr>
<td>Spring and System</td>
<td>~$25.00</td>
<td>Alibaba.com</td>
</tr>
<tr>
<td>Cowl</td>
<td>~$17.90</td>
<td>JetCat.de</td>
</tr>
<tr>
<td>Fasteners</td>
<td>~$12.00</td>
<td>HomeDepot.com</td>
</tr>
<tr>
<td>Mounts</td>
<td>~$1081.89</td>
<td>-</td>
</tr>
</tbody>
</table>

**Table 2.** The comparison of our upgraded product and others with similar specifications in the market.

<table>
<thead>
<tr>
<th>Part Name</th>
<th>Low SE</th>
<th>High SE</th>
<th>K66 (upgraded)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter (mm)</td>
<td>111.76</td>
<td>82.55</td>
<td>107.4</td>
</tr>
<tr>
<td>Mass (lbs.)</td>
<td>2.9</td>
<td>1.87</td>
<td>2.221</td>
</tr>
<tr>
<td>Thrust (lbs.)</td>
<td>22</td>
<td>13</td>
<td>16.77 (gtba.co.uk)</td>
</tr>
<tr>
<td>Price</td>
<td>~$2195.00</td>
<td>~$1995.00</td>
<td>~$1081.89</td>
</tr>
</tbody>
</table>

### Conclusion

After incorporating the new parts and making calculations our group has produced a product that is competitive in the market and outperforms some leading turbine engines in terms of cost, thrust, and weight.

**Figure 10.** Full rendered jet turbine engine

### Acknowledgements

Modified plans like the compressor diffuser, shaft housing, shaft, compressor control system, intake nozzle, and engine housing were provided by the John-fom.com website.

**Figure 9.** Engine with no cowl