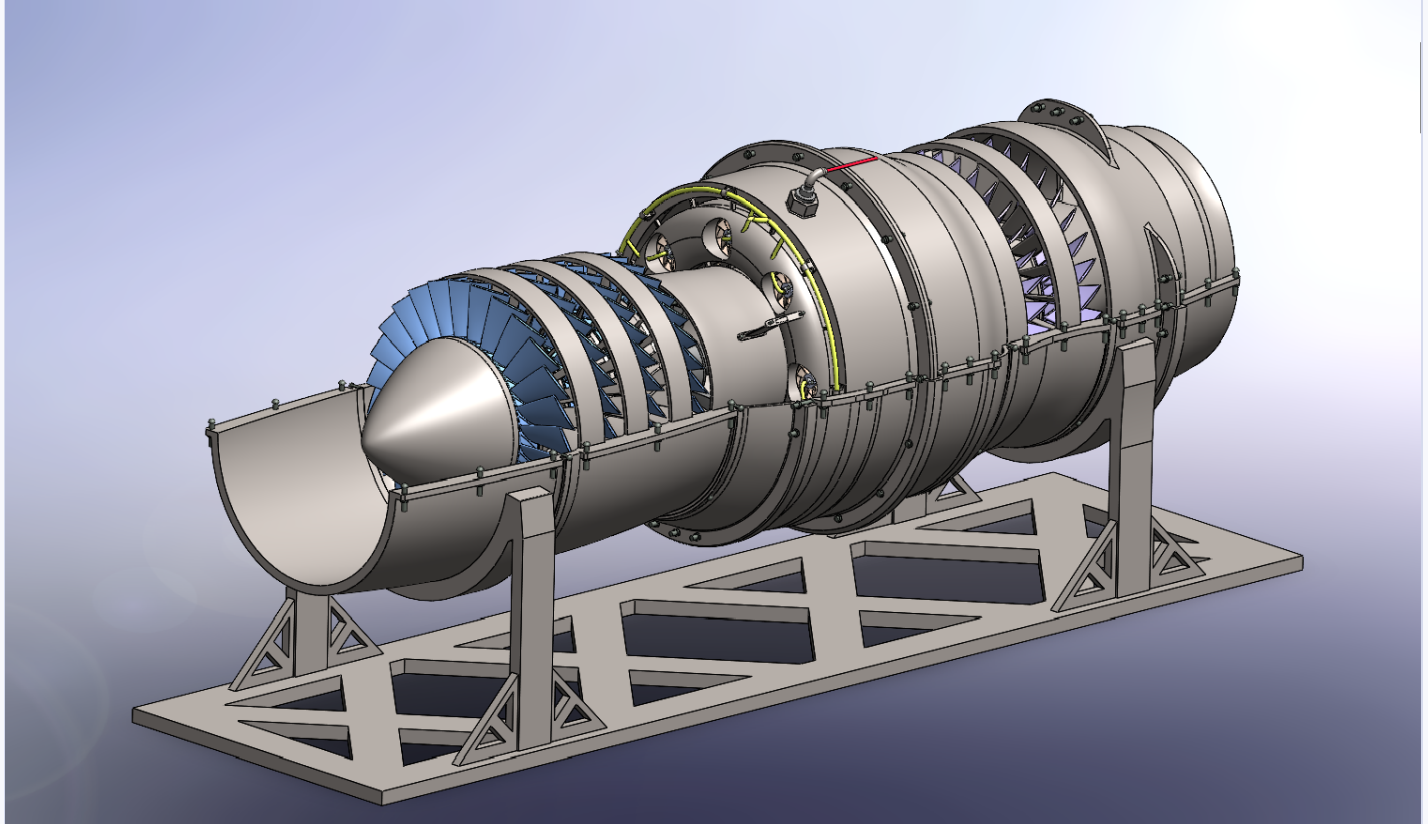


Axial-flow turbojet

Mechanical integration from inlet to exhaust.



01 / Open casing: the compressor, combustor, and turbine in one assembly.

04

Compressor stages

08

Swirlers

02

Turbine stages

01

Shared shaft

OBJECTIVE

Develop a detailed SolidWorks assembly that connects a preliminary engine layout with component geometry, mounting features, and an assembly strategy.

MY CONTRIBUTION

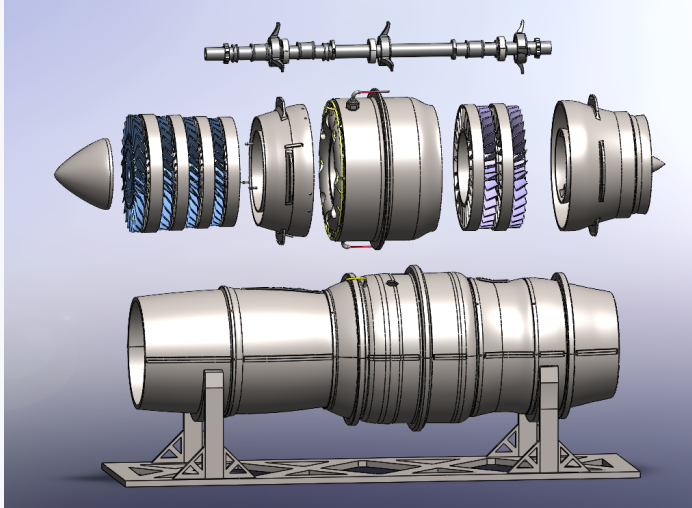
Modeled the parts and assembly; iterated the combustor envelope and subsystem interfaces; added shaft, retention, support, and casing details; prepared presentation views.

CURRENT MILESTONE

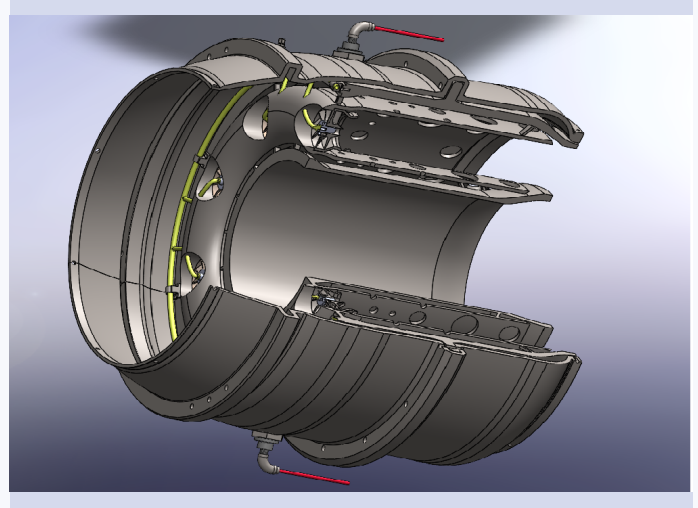
Completed conceptual CAD presentation and preliminary shaft-power calculation. Structural, thermal, aerodynamic, and operating performance remain to be validated.

The interfaces matter.

The main challenge was connecting local part geometry to a consistent full-engine assembly.



02 / Exploded assembly



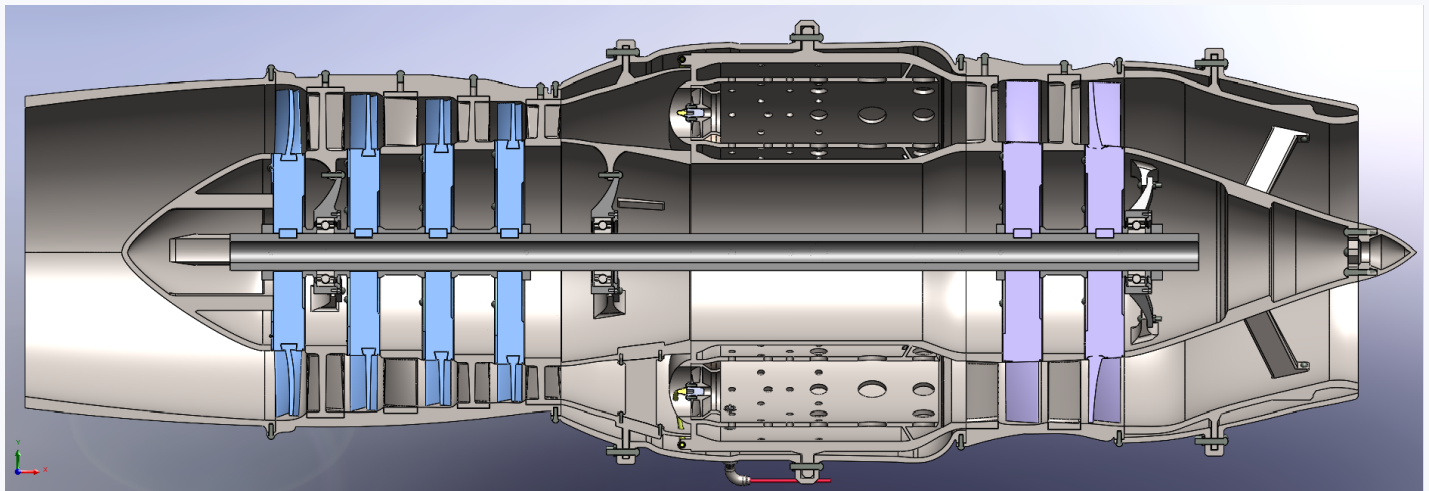
03 / Combustor packaging

MOUNTING & ASSEMBLY

Keyed shaft interfaces, hub and spacer geometry, stator retention, bearing supports, split casings, and flange hardware make the mechanical relationships explicit.

A CHANGE THAT PROPAGATED

Swirler packaging drove revisions to the combustor casing and liners. Those changes also required attention to the diffuser and downstream flow-path transitions.



04 / Longitudinal cutaway — flow direction: left to right.

Next: check fits and clearances, reconcile final geometry with preliminary sizing, and evaluate structural, thermal, and flow behavior before an operating prototype.

Power balance, by calculation.

Design inputs, modeled results, and validation status for the conceptual two-stage turbine and four-stage compressor.

DESIGN INPUTS & ASSUMPTIONS

1,000 N

Thrust target

M 0.75 / 10 km

Design condition

28,500 rpm

Selected shaft speed

99%

Mechanical efficiency assumed

MODELED MASS FLOWS

~1.91 kg/s

Required air flow (1.905 kg/s unrounded)

1.954 kg/s

Turbine hot gas: air plus fuel

PRELIMINARY SHAFT-POWER CALCULATION

Two-stage turbine gross output

1.954 kg/s x ~110.5 kJ/kg total turbine work

~216.0 kW**Power delivered after assumed shaft losses**

0.99 x 216.0 kW

~213.8 kW**Modeled compressor demand****~213.8 kW**

INTERPRETATION

The modeled turbine delivery matches the modeled compressor demand to rounding. Fuel-added hot-gas flow is used for turbine power; air flow alone would understate it.

VALIDATION STATUS

This is a preliminary calculation, not a measured result. The engine has not run, and the power match does not prove the 1,000 N thrust target. Cycle, station, structural, thermal, and test validation remain.