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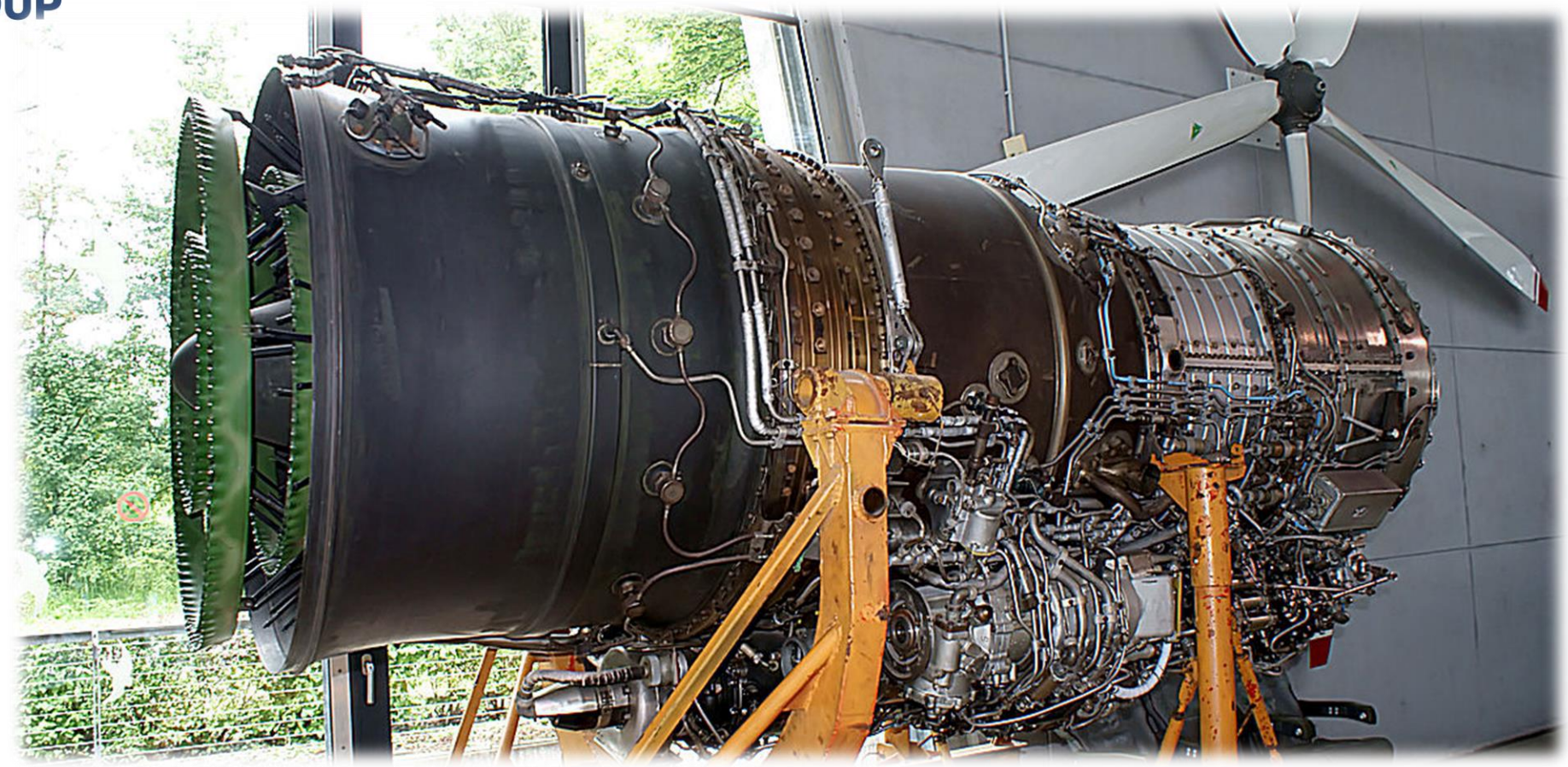
KR GROUP

Development and production of gas turbine power plants with a capacity of 20 MW based on the R29-300 gas turbine engine.



The R-29-300 turbojet engine was developed at OKB-300 for fighter aircrafts. Serial production was organized at the Ufa Engine Production Association and at the Moscow Plant named after V.V. Chernyshev.

Application of engines in aviation

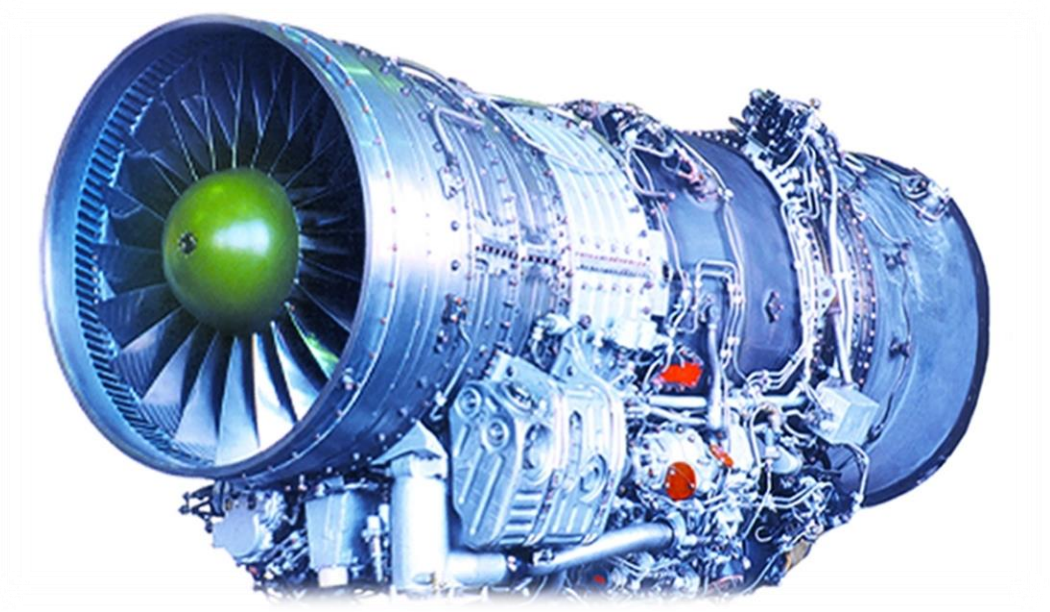
MiG-27

SU-17/SU-20/SU-22

Engine characteristics

Dry weight, kg: 1777
Length, mm: 4991.5
Diameter, mm: 968
Thrust, kgf: 8250
Specific thrust, kgf/kg: 0.154
Pressure increase ratio: 12.2
Air consumption, kg/s: 105.

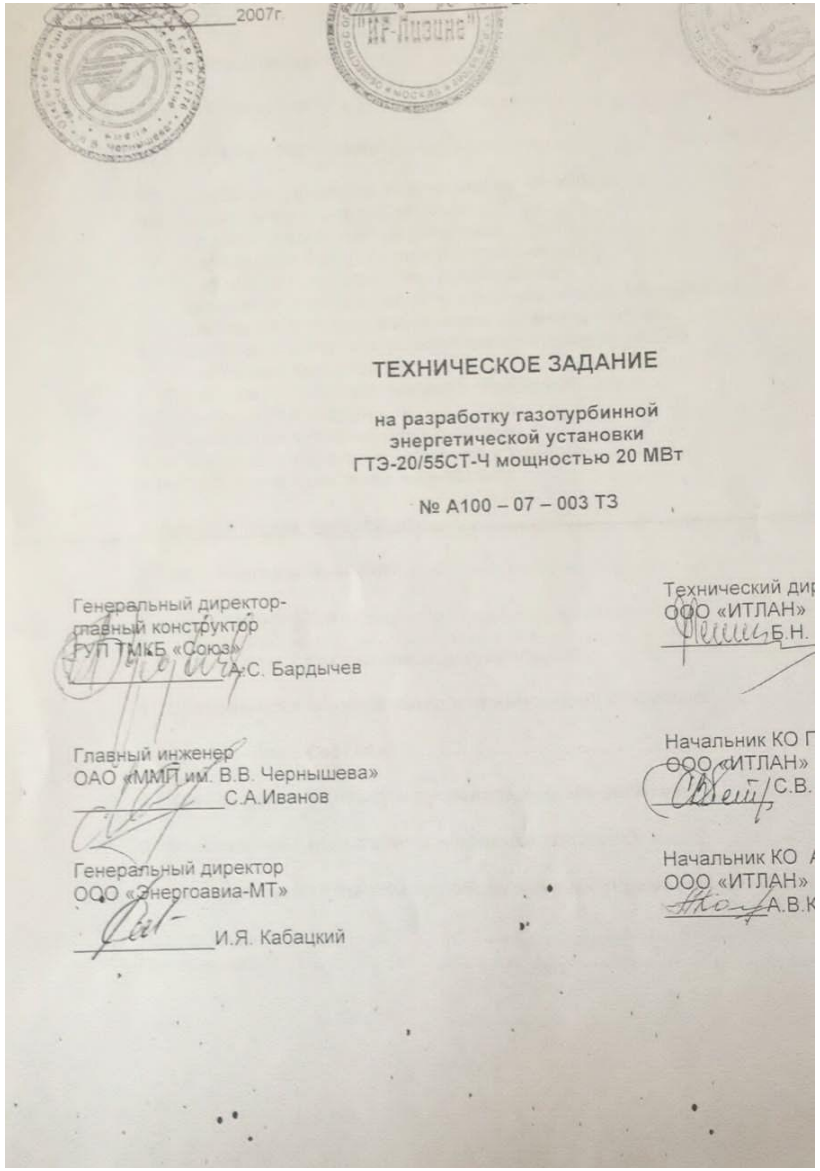
The engine features a relatively low specific fuel consumption in all modes, low specific weight, low level of pollutant emissions.



In total, about 6,000 engines were produced.
(not currently used in aviation)

Prospects for further use of the engine

For further use of the engine in the gas energy sector, the terms of reference were developed for the modification and use of the engine as a drive for use on main gas pipelines and for electricity generation



2007г.

ТЕХНИЧЕСКОЕ ЗАДАНИЕ

на разработку газотурбинной
энергетической установки
ГТЭ-20/55СТ-Ч мощностью 20 МВт

№ А100 – 07 – 003 ТЗ

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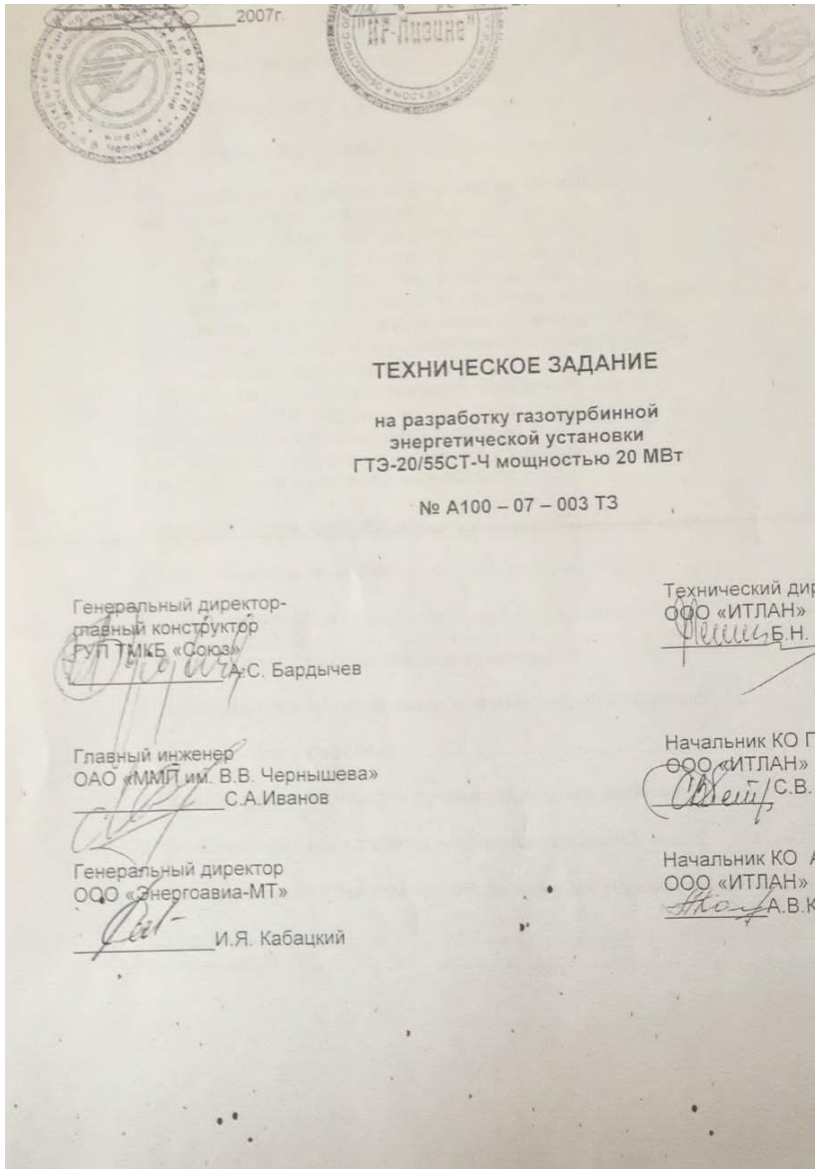
Calculated parameters of the engine after modification

Electrical power 20 MW
•Electricity generation efficiency 31.7%
•Thermal power 30 Gcal/hour
•Fuel efficiency 82%
•Power turbine rotation speed 3000 rpm/min
•Gas temperature behind the power turbine 730 K
•Overhaul life 40,000 h
•General technical resource 100,000 h



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Currently, Management Company IED-Holding LLC:

- Completes the development of design documentation for a free turbine;
- Has documentation for the components of the base engine;
- Has repair documentation for components of the base engine;
- Has documentation for modification of the base engine for use in gas power sphere.

A roadmap for designing a gas turbine power plant has been developed

Schedule plan for the implementation of the stages of creating a 20 MW gas turbine power plant

Stage number	Contents of the stage		1 year												2 year		
		0 month	1 month	2 month	3 month	4 month	5 month	6 month	7 month	8 month	9 month	10 month	11 month	12 month	1 month	2 month	3 month
	Schedule plan for the design of a 20 MW power plant based on the R29-300 aircraft engine																
3	**Development of technical specifications (Stage 1):**																
3.4	- fuel gas preparation unit																
3.5	- engine control system																
3.6	- booster compressor station (BCS)																
3.7	- generator																
3.8	- waste heat boiler																
3.9	- APCS																
3.10	- ACS																
3.11.	- power plant design																
	TOTAL for stage 1 (excluding VAT):																
	TOTAL for stage 1 (including VAT):																
4.	**Development of design documentation for (Stage 2):**																
4.1	Free turbine																
4.2	Refinement of an aircraft engine into a gas turbine engine for ground use																
4.3	Automatic engine control system																
	TOTAL for stage 2 (excluding VAT):																
	TOTAL for stage 2 (including VAT):																
5	**Development of design documentation for (Stage 3):**																
5.1	Gas turbine engine and generator shelter																
5.2	Integrated air purification device																
5.3	Anti-icing system																
5.4	Exhaust system																
5.5	Engine oil system																
5.6	Life supporting system																
5.7	Fuel gas preparation unit (FGTU)																
5.8	Transmission																
	TOTAL for stage 3 (excluding VAT):																
	TOTAL for stage 3 (including VAT):																
6.	**Development of design documentation for (Stage 4):**																
6.1	Advance payment for 4.5 without VAT																
	Advance payment for 4.5 including VAT																
6.2	Automatic process control system (APCS)																
6.3	Booster compressor station																
	TOTAL for stage 4 (excluding VAT):																
	TOTAL for stage 4 (including VAT):																
7	**Development of design documentation for (Stage 5):**																
7.1	Electric power generation diagram																
7.2	Automatic power plant control system																
7.3	To the power plant																
7.4.	Final payment for stage 4, 5 without VAT																
	Final payment for stage 4, 5 including VAT																
	TOTAL for stage 5 (excluding VAT):																
	TOTAL for stage 5 (including VAT):																
	TOTAL for design documentation development (excluding VAT):																
	TOTAL for design documentation development (including VAT):																

A roadmap for the production of gas turbine units has been developed

Schedule plan for the implementation of the stages of creating a 20 MW gas turbine power plant

Stage numbe	Contents of the stage	1 year								2 year							
		5 month	6 month	7 month	8 month	9 month	10 month	11 month	12 month	1 month	2 month	3 month	4 month	5 month	6 month	7 month	8 month
Schedule for the manufacture of equipment for a 20 MW power plant based on the R29-300 aircraft engine																	
1.	Registration of the contract																
	Advance payment without VAT																
2.	Advance payment including VAT																
3	Manufacturing of gas turbine engines (Stage 1):																
3.1.	Purchase of the R29-300 aircraft engine																
3.2.	Modification of an aircraft engine into a ground-based gas generator																
3.3.	Free turbine																
3.4.	Technological equipment																
	TOTAL for stage 1 (excluding VAT):																
	TOTAL for stage 1 (including VAT):																
4	Manufacturing of block modular design (package) (Stage 2):																
4.1	Turbo block including:																
	gas turbine engine and generator shelter																
	oil system																
	input device																
	output device																
	life support systems																
4.2	Transmission																
4.3	Generator																
4.4	Waste heat boiler																
4.5	Booster compressor station (BCS)																
4.6	Fuel gas preparation unit (FGTU)																
4.7	Engine control system																
4.8	APCS																
4.9	ACS																
4.10	Final payment, excluding VAT																
	Final payment, including VAT																-
	TOTAL for stage 2 (excluding VAT):																
	TOTAL for stage 2 (including VAT):																
	TOTAL (excluding VAT):																
	TOTAL (including VAT):																

The total duration of the project is 19 months.

The volume of investment is 1,478,136,000 rubles