

# ARCHIVED REPORT

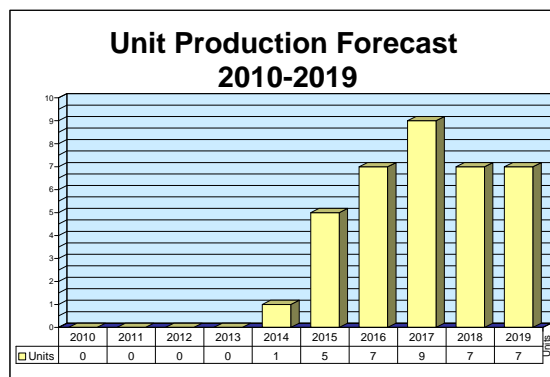
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## OMSK Aircraft Engine Bureau Aviation Turboprops

### Outlook

- An-38 engine market shared by TVD-20 and Honeywell TPE331
- An-38 expected to resume production mid-forecast



### Orientation

**Description.** The Omsk aviation turboprop engines generally are axial-centrifugal-flow free-turbine aviation engines.

**Sponsor.** The engine is currently produced under the aegis of the OJSC Omsk Engine Design Bureau.

**Power Class.** The current in-production Omsk aviation turboprop engine is the TVD-20 at 1,380 shp (1,030 kW).

**Application.** The Omsk line of aviation turboprop engines are used primarily on small single-engine and twin-engine commercial and military aircraft. Applications include the following:

<u>Model Variant</u>	<u>Power or Thrust Rating</u>	<u>Current Applications</u>	<u>Units per Airframe</u>
TVD-10B (a)	960 shp (715 kW)	PZL An-28 (a)	2
TVD-20-03	1,450 shp (1,081 kW)	Antonov An-38-200	2
TVD-20	1,450 shp (1,081 kW) (b)	<u>Recent Application</u> Antonov An-3	1

(a) Aircraft manufactured in Poland by PZL; engine manufactured by PZL Rzeszow.

(b) Estimate

**Status.** The TVD-20 remains in production.

**Total Produced.** As of October 2010, it is believed at least three TVD-20-03s had been fabricated, for Antonov aircraft.

**Price Range.** Russian Federation and Ukrainian engines traditionally are used solely for Russian

Federation, Ukrainian, and non-Western aircraft. Therefore, engine development and production have

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often been substantially funded with subsidies and outright grants from the respective governments.

In 2010 U.S. dollars, Forecast International estimates the cost of a TVD-20 for an Antonov An-38 to be \$350,000-\$400,000.

**Competition.** Engines from many manufacturers, such as the Honeywell (formerly Garrett) TPE331-14GR engines at 1,500 shp, compete with the

Omsk TVD-20 1,450-shp engine. It should be noted that the Omsk line of aviation turboprop engines does not actively compete with engines from Western nations for application on Western aircraft.

## Contractors

### Prime

<b>Omsk Engine Design Bureau, (OJSC Omsk Engine Design Bureau)</b>	283, B. Khmel'nitskogo St, Omsk, 644021 Russian Federation, Tel: + 7 3812 33 0084, Fax: + 7 3812 57 9129, Email: omsk@motor.omsk.ru, Prime
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## Technical Data

**Design Features.** The Omsk TVD-20 has the following design features:

**Compressor.** The engine features a seven-stage axial and single-stage centrifugal compressor design.

**Gas Generator.** Two-stage gas generator.

**Turbine.** Two-stage free-power turbine.

**Dimensions.** The following are the approximate dimensions and weight of the TVD-20:

	<u>Metric Units</u>	<u>English Units</u>
Length	1,700 mm	69.7 in
Width	850 mm	33.5 in
Weight, dry	285 kg	629 lb

**Performance.** The TVD-20 has the following performance parameters:

	<u>Metric Units</u>	<u>English Units</u>
<b>Thrust at T-O</b>		
TVD-20-03 (for An-38-200)	1,081 kW	1,450 shp

## Variants/Upgrades

**TVD-10B.** The TVD-10B develops 960 shp (715 kW). It is used to power the Antonov An-28. This engine is manufactured in Poland by PZL-Rzeszow.

**TVD-20.** The Omsk MKB (Mars) TVD-20 is a derivative of the TVD-10B gas generator with a 'zero' stage added to the compressor and a second stage added

to the power turbine. It features a seven-stage axial plus single-stage centrifugal compressor, a two-stage gas generator, and a two-stage free-power turbine. The TVD-20 powers the Antonov An-3, a single-engine biplane used for cargo/utility/troop transport, as well as the twin-engine An-38-200.

## Program Review

## Aviation Gas Turbine Forecast

**Background.** The OJSC Omsk Aircraft Engine Design Bureau was formerly headed by Glushenkov. It was founded in 1957 upon partnership with the Central Institute for Aviation Motors (CIAM). It was unknown until 1988, when it was given responsibility for the design of the TV-O-100 turboshaft engine. This design bureau is also commonly referred to as Mars or Omsk MKB Mars.

**Competition.** At 1,450 shp, the TVD-20 faces stiff competition from the Honeywell TPE331-14GR (at 1,900 shp), GE CT7-5A (at 1,735 shp), P&WC PT6A-65R (at 1,376 shp) and PT6A-68 (at 1,600 shp), and Rybinsk TVD-1500S (at 1,400 shp).

**Applications.** The Omsk line of aviation turboprop engines is featured on military and civil aircraft. Chief among its applications are the Antonov An-3, a single-engine biplane used for cargo/utility/troop transport, and the twin-engine An-28 and An-38-200.

**An-28.** The PZL An-28 is a 17-passenger, turboprop-powered aircraft. Temporary Soviet certification was granted in October 1978; full Soviet approval was granted in February 1986.

A prototype of an An-28 maritime reconnaissance version, then called the An-28RM Bryza 1RM, was delivered to the Polish Navy in 1993 for evaluation. It was returned to PZL Mielec by 1996, but upgraded and redelivered in 1999. Seven production aircraft of that version have been delivered to the Polish Navy.

The Bryza 1RM is currently called the M28B Bryza 1RM and is one of a number of M28 Bryza versions. Other versions include passenger transport, cargo transport, and medevac/ambulance.

The TVD-10B engines are manufactured in Poland by PZL Rzeszow.

### *The Stretched An-28: the An-38*

The Antonov An-38 is a stretched An-28 seating 26-30 passengers; its first flight occurred in June 1994. The An-38-100 is powered by Honeywell TPE331-14GR engines; the An-38-200 is powered by Omsk TVD-20-03 engines. The An-38-200 first flew in December 2001.

The An-38 is 15.67 meters (51.41 ft) in length and has a maximum T-O weight of 9,000 kg (19,841 lb). It has a range of 900 kilometers (485 nm) with 27 passengers, and 1,650 kilometers with a 1,650-kilogram payload.

A version of the An-38 powered by twin Rybinsk TVD-1500S engines has been suggested.

A convertible version of the An-38, the An-38K, has also been designed. This version has a large side door on the port side and is able to carry four LD-3 or five LD-3K containers. The cargo-handling equipment can be removed for conversion to a 30-passenger configuration.

The approximate price of the An-38-200 (in 2007 U.S. dollars) is \$3.7-\$4.0 million (the approximate price of the An-38-100 is \$5.0-\$5.3 million).

The An-38 is produced by Novosibirsk Aircraft Production Association (NAPO), Novosibirsk, Russia. Antonov and NAPO have established a joint venture, called Siberian Antonov Aircraft, to handle An-38 production and marketing.

The main competition to the An-38-100 and -200 are the Sukhoi S-80 and the EADS CASA C-212.

## Funding

No USSR or Russian Federation government funding pertaining to the Omsk line of aviation turboprop engines has been identified.

## Contracts/Orders & Options

No military contracts for the Omsk line of aviation turboprop engines have been awarded during the past year.

## Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1957	Omsk forms partnership with CIAM
	1988	Omsk given responsibility for TV-O-100
Jun	1994	First flight of An-38-100
Dec	2001	First flight of An-38-200
	2006	Initial deliveries of An-38-200
Thru	2016	Continued production/aftermarket support of Omsk TVD-20

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## Worldwide Distribution/Inventories

At least three Omsk TVD-20-03 engines have been produced, for the An-38-200. All engines are assumed to be in use in the **Russian Federation**.

## Forecast Rationale

Antonov's An-38 turboprop is expected to re-enter production midway through the forecast period, but its future is uncertain. Production of the aircraft stopped in 2008 and it has not resumed as of this writing. It is possible Su-34 fighters and Superjet 100 components are taking up the company's production capacity; NAPO has discussed transferring An-38 production to Polyot in Omsk but no agreement has been announced.

There has been some market interest in the aircraft from Chinese and Russian regional carriers, as well as provisional orders from customers in Southeast Asia. Manufacturers in China have reportedly shown interest

in developing a Chinese version of the aircraft. The An-38's future may be influenced by efforts to integrate Antonov into Russia's United Aircraft Corp (UAC), which may lead to termination of the slow-selling aircraft. If the program does survive to re-enter production, it will be available with the TVD-20 or Honeywell's TPE331-14. NPO Saturn's TVD-1500B is shown on their web site as being available for the An-38, but no further information is given.

Overall, we estimate TVD-20 production at 36 engines during the 10-year forecast period.

## Ten-Year Outlook

ESTIMATED CALENDAR YEAR UNIT PRODUCTION												
Designation or Program	High Confidence					Good Confidence			Speculative			Total
	Thru 2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
<b>Omsk Engine Design Bureau</b>												
<b>TVD-20 ⇔ An-38 -200</b>												
	3	0	0	0	0	1	5	7	9	7	7	36
<b>Total</b>	3	0	0	0	0	1	5	7	9	7	7	36