

M-12 LIGHT VERSATILE

AIRCRAFT



PRESENTATION



Category and Purpose

WWW.SHAGAERO.RU

Designed by Masterov N. and developed by Phoenix Development Design Office, M-12, a small light versatile all-metal aircraft, is intended for flights in off-aerodrome areas. In 2011 DIESEL (Limited Liability Company) took out a patent №110716 on the aircraft model named Light Versatile All-Metal Modular Design Type Aircraft.

It can be widely used for inspection and environmental monitoring in forestry, hunting and fishing sectors, for aerial photography, railway and highway patrolling, oil and gas pipe lines monitoring, training flights, air sports and tourism, for agricultural works (handling up to 1500 ha of a tilled area per day), for small freight traffic, flights during aerovisual patrolling and for aviation work areas fly-by checks.

M-12 is a light versatile twin-engine pusher aircraft. Classical high-wing aircraft with steerable tricycle nose landing gear, it is designed to carry 2 passengers, one pilot and the loads up to 40kg.

The payback period for the aircraft M-12 is one year.

It does not require a hangar.



Airframe:

Length: 6.8m

Wingspan: 10.2m

Height: 2.3m

Cockpit

Length: 2.76m

Width: 1.15m

Height: 1.14m

Altitude: maximum 4500m

Fuel Consumption: 16l/100km

Aircraft Specifications

Category:	Flight Training	Passengers and cargo carriage
Maximum takeoff weight:	728kg	848kg
Cruise Speed (H=300m):	250km/h	210km/h
Rate of Climb:	8m/sec	4m/sec
Take-off Run:	Max. 80m	Max. 80m
Take-off Distance:	Max. 80m	Max. 80m
Range (with fuel rate : 140l/ 98 kg and emergency fuel rate : 200l)	1200km 1600km	1000km 1300km

Minimum take-off and landing field length: 40m

The specifications given above can be improved via attachment of more powerful engines, additional tanks and controllable pitch propellers, as well as via night-time flying devices.

In addition to 3-seat aircrafts that we already produce, we have also a 4-seat aircraft under development.



The aircraft M-12 is expected to be very efficient both in mountain and overwater flying due to its side-by-side 40 to 100hp engines. The attachment of the parachute to the whole area of the aircraft is also possible.

M-12 Aircraft made a good showing during takeoff, flight and landing with one of two engines turned off.

We provide you with the opportunity to see all the capabilities of our aircraft in Ulyanovsk.

Flight and Base Conditions

M-12 is designed for flights in usual weather conditions over flat or mountain terrain, as well as for overwater flights with the range of geographic latitude from 70 grad of latitude north to 55 grad. of latitude south, with the barometric rate and the outside air temperature in the whole flight altitude envelope in accordance with GOST(All-Union Standard) 4401-81, with ground atmosphere relative humidity rate to 98% and the outside air temperature from -25 to +35 grad. C, and with the maximum wind component during takeoff and landing (in dry artificial runway conditions), i.e.:

- Crosswind Component: 8m/sec
- Tailwind Component: 6m/sec
- Headwind Component: 12m/sec

The flights can be made from artificial runways, as well as from the dirt surface runways, built in accordance with NAS GA-86 (Airfield Maintenance and Supply Service Manual in Civil Aviation) (i.e. with soil strength minimum 3sm/sq.sm., aerodrome elevation rate to 1500m), and also from unprepared runway.



Type of Engine and Propeller

1. Rotax 912 (100hp) engine with two blade wooden adjustable pitch propeller or three blade composite propeller (1600mm).
2. Four-stroke JABIRU 2200(85hp) engine with three-blade wooden controllable pitch propeller (1550mm)
3. Two-stroke German SAUER (80hp) engine.

Crew. Passengers and cargo accomodation

If the aircraft is used as a transport vehicle there are one pilot and 2 passengers in the aircraft. The passengers are accommodated on 2 side-by-side seats behind the pilot seat. If used as a trainer – an instructor and a student.



40kg cargo is placed in the 0.8sq.m baggage space, or, if parachute rescue system behind the passenger seats is used, the 24kg cargo – in the 0.4sq.m. baggage space. Baggage compartment is accessible through a special access door in the aircraft.

Airplane Age

5 years and more

Maintainability Specifications

The aircraft and its systems are designed to be used for on-condition operation. The overhauls during the airplane age may not be useful.

The airframe operation without overhauls is in accordance with «Regulation on Civil Aviation Aircrafts Condition Maintenance», adopted by Interstate Aviation Committee and agreed with GAR-9.20.12.-85»:

Structures and Systems

Airframe

All-metal with limited use of composite structures in secondary structural members. Semi-cantilever high wing with pusher propeller powerplant above the center section.

Radio equipment

VHF radio and Flight Intercom



Heating and Ventilation System

Ram air based ventilation system.

Cockpit heating system based on intake of warm-air from liquid engine cooling system cooler or via electric heater.

Electrics

Electric loads connection via circuit breaker.

Powered by engine generators, 6ST55 automobile battery with minimum 55 Amp-hour capacity and an additional battery with 9Amp-hour capacity, with 12V and 24V (for VHF-radio) airborne voltage.

Fire-Fighting equipment

Engine compartment firewall, fuel emergency shutoff cocks and hand fire extinguisher

Steering System

The usage of rigid rods in elevator, flaps control systems, of cable circuit in rudder control system, and the usage of mixed circuits in aileron control system.

There is an aileron and elevator control column and rudder pedals in the aircraft.



Fuel System

Consists of 4 fuel tanks in outer wing, 2 feeder tanks in central wing, and 2 pneumatic fuel pumps for fuel feed from feeder tanks and flexible gas hoses.

Braking System

Mechanical cable brakes on main landing gear wheels with possible continuous parking brake locking. Customized hydraulic brakes system can be attached.

Instruments

Speed indicator
Barometrical altimeter
Vertical rate indicator
Magnet Compass, Slip Indicator
Engine Instruments

Lighting equipment

Instrument Lighting
Landing Lamp
Aircraft Lights
Anti-beacon Light
Flap position annunciation, generator losing and landing lamp switch instruments

Powerplant

Welded steel pipe engine bed is on the central wing
Aluminum engine mounting is on the engine
Rubber buffers are between engine bed and mounting
Engine with a gearbox and exhaust system
Propeller
Engines control system
Easily-removable cowl

Landing Gear

Tricycle equipped landing gear

- Main wheels: 381 x 152 (360 x 135).
- Nose wheel: 300 x 125.
- Main gear shock strut (multy-leaf type)
- **Front gear shock strut (rope rubber buffer)**

Gasoline Engine

The system of dual electronic ignition, engine cable-control system.

Cylinder heads temperature control and tachometers.

The engine is lubricated by a mixture of 2-stroke motor oil and gasoline.

The exhaust system has a tuned resonance pipe.

Electric starting of engines.



The aircraft is operated by:

- Rothenburg, Bavaria, Germany. (Owner - Erchard Fohn);
- Almaty, Kazakhstan. (Pilot - Alexey (phone 8-701-711-01-74));
- Ulyanovsk, Russia. (Pilot - Sergey Volodin (phone +7 (9510) 96 52 53)).
- Oshkosh Sean Pig, the USA;
- Samara, Russia. (Aerochemical pilot - Voinov Yevgeniy. (phone 8-927-007-28-33));



The base price of the aircraft depends on the configuration

M-12 KEY FEATURES

- Ease of boarding and deplaning
- Soft field and skid, float-type and mixed landing gear operation capabilities
- Effective ventilation and heating systems
- Flying lightness
- Flying techniques can be easily obtained due to good arrangement of the instruments and controls



- Can be easily transported in any car's trailer. The non-assembled weight of the aircraft is allowable for trailer transportations. Maximum mounting and dismantling operation time is 4 hours



Exhibitions and airshows

The first light M-12 aircraft, designed by N. Masterov and developed by PHOENIX Development Design Office to Samara Aircraft Factory over 15 years ago, was a three-seat all-metal high-wing aircraft with two pusher engines VIKHR («Вихрь»). In 1993 in Gatchina, Russia, it got a certificate from Russian Single-Engine Aviation Association as an advanced modular design aircraft.

From 1997 ProMax company (ЗАО КФ «ПРОМАКС») (subsidiary enterprise Aviakor (Samara Aircraft Factory)) has begun a production of the aircraft. Due to the close collaboration with AviaPromService (ОООО «АвиаПромСервис») M-12 aircraft got an opportunity to become a participant of such airshows as MAX-2005, The 46th Paris Airshow in Le Bourget, France, and Oshkosh airshows in 2006 and 2007, USA. Both Russian and foreign pilots and flying clubs' members showed a spark of interest in M-12.

After the M-12 performance American aircraft businessmen offered the assembly of M-12(using Russian kits) in the USA.

From 2009 DIESEL company and its subsidiary enterprises AviaPromShag, RusAero work on the project «Light Multymission M-12 Aircraft Production». The production is conducted on the territory of Samara Air Factory and Isheyevka industrial community sites.

The following characteristic features of modern M-12 configuration arouse its competitiveness not only in Russia, but in worldwide aircraft market:

- Multy-engined safety
- Jabiru-2200 engine with good dealer service
- effective arrangement of the instruments and controls, including dual steering, that provide good flying techniques training.
- spacious cabin for a pilot and two passengers
- ease of boarding and deplaning
- easily transported by means of any car in non-assembled state (in a car trailer)
- modern air navigation devices (operating in accordance with Visual Flight Rules)

M-12 is operated efficiently by Russia, Kazakhstan, Ukraine and the USA.

Nowadays AviaPromShag work on the technical features of the aircraft to perform it in the regional market. This work includes:

- development of the four-seat aircraft configuration;
- assistance in the field of home base assembly of the aircraft by a consumer;
- maintenance organization and state authorization
- aircraft fly-out
- amateur pilots' training

In May, 2010 M-12 became a prize-winner in the State Fair (under All-Russian Exhibition Centre («ВВЦ»)), where the best small and medium-sized businesses of Russia were performed. Shagarov Y., the head of the project, was a participant of the 5th and 6th All-Russia Small and Medium-sized Businesses meeting and was awarded as Entrepreneur of the Year (2010) and The Best Eurasian Entrepreneur (2011).



BE QUICK TO BECOME AN OWNER OF M-12 AIRCRAFT!



Several Russian and foreign magazines have articles about the aircraft M-12. One of them is in Today's Pilot magazine (GB), published in January, 2009.

Another article is in Aviation and Sport magazine (Russia), published in April, 2010. (p.38-40, or Web-site www.avia-s.ru)

About The Company. DIESEL Company

WWW.SHAGAERO.RU

We are a small aircraft company. In our working divisions we produce light all-metal, three-seat, twin-engine pusher propeller aircraft M-12, which not that long ago has been a very unique aircraft. The advantages of the aircraft greatly contributed in a high level of the interest from such countries as the USA, Germany, France, Kazakhstan and Ukraine.

It can be widely used in our weather conditions for flight training, civil aviation operations, monitoring, freight traffic activity, agricultural works, inspection and environmental monitoring in forestry, hunting and fishing sectors, aerial photography, railway and highway patrol, oil and gas pipe lines. The special airfields are not necessary. Minimum take-off and landing field length is 40m.

One flying hour costs 3.500 roubles.

Dear entrepreneurs and the heads of the enterprises of all proprietary types!

At a reasonable price you can use our twin-engine, three-seat aircraft M-12, with minimum take-off and landing field-length of 40m, for inspection and monitoring of oil pipelines, power transmission lines, forest area, etc.

During the oil pipeline monitoring in such Russian regions as Orenburg, Samara, Ulyanovsk, Penza, Tambov and Mordovia, M-12 has proved to be a well-established aircraft with good future prospects.

We look forward to your offers related to the use of our aircraft or its purchase!



Left-to-right: N. Masterov, L.Yakubovich, Y.Shagarov, D.Baturin



V.Yefremov, a tourist





DIESEL Company (ООО «Дизель»)
Shagarov Yevgeniy
Cell-Phone: 8-909-355-40-07, 8-967-119-93-74
Phone: (8422) 27-23-70, 64-85-70 (Ulyanovsk)
agrodetal@bk.ru
Web-site: www.shagaero.ru