AD NUMBER

ADB126450

NEW LIMITATION CHANGE

TO

Approved for public release, distribution unlimited

FROM

Distribution authorized to U.S. Gov't. agencies and their contractors; Copyright; Specific Authority; 1 Jan 88. Other requests shall be referred to U.S. Army Intelligence Agency, Foreign Science and Technology Center, 220 7th St., N.E., Charlottesville, VA 22901-5396.

AUTHORITY

DFOISR/WHS/DOD ltr, 30 Nov 2001
AD-B126 450

ENGLISH TITLE: From delta glider to airplane.


LANGUAGE: Russian. COUNTRY: Union of Soviet Socialist Republics.

AUTHOR (AFFILIATION): No author.

REQUESTOR: AIFRBC (Gordon).

TRANSLATOR: CRH Associates.

WARNING

The contents of this publication have been translated as presented in the original text. No attempt has been made to verify the accuracy of any statement contained herein. This translation is published with a minimum of copy editing and graphics preparation in order to expedite the dissemination of information.

Distribution authorized to US Government agencies and their contractors (Specific Authority DODD 5230.25) (1 JAN 88).

Further requests for this document shall be referred to the US Army Intelligence Agency, Foreign Science and Technology Center, 220 7th St., NE., Charlottesville, VA 22901-5396.

DESTRUCTION NOTICE - Destroy by any method that will prevent disclosure of contents or reconstruction of the document.
FROM DELTA GLIDER TO AIRPLANE

The flexible wing in the 1970's gained great popularity for aviation sportsmen. Then inventors installed a motor on the delta glider, extending the happiness of flight, in terms of feelings, close to that of a bird. The further development of such variants led to the creation of a more improved flying vehicle - ultralight, that is, an aircraft of a schematic tubular construction with a soft covering. Having preserved the main constructive principles of the delta glider, including the simplicity of assembly and disassembly, compactness in the collapsed form, the ULA "acquired" a higher aerodynamic efficiency. It became simpler in control, safer and, to a certain degree, more comfortable. Such vehicles have recently become widespread.

... To the independent construction an engineer of the Kaunas factory of recreational goods "Ajdas", Gintautas Konchius became known even in 1974, soon after completion of the polytechnical institute. He started with the construction of a light helicopter with balance control. He made a self-made engine, transmission, a set of variants of blades. Together with his constant collaborator on all future constructions - a welder of the Kaunas radio factory, Piatras Shakalis, he fixed up the power system of the helicopter. But they still could not fly. The vehicle was too complicated for the young designers. At the same time they recognized that such an idea already had been patented in the USA, and they dropped their interest in the helicopter.

In 1976 Gintautas and Piatras built one of the first delta gliders in Lithuania and soon they independently mastered flight from the steep shore of Nemun. However the aerodynamic efficiency of the vehicle was 3-4 units, and flight lasted all of 20-25 seconds. After long considerations and not quite successful tests it became clear that a sufficient duration could be achieved only with the use of an engine. Thus after a certain time the original ultralight aircraft "Antis" appeared, aerodynamically designed on the well-known, but little used at the time design of the "duck".

Using the carrying properties of the horizontal tail - the front wings, the inventors of the "Antis" reduced the size of the main and entire vehicle on the whole which showed up in an improvement of the flight characteristics. For the assurance of the a good directional stability the vertical tail - large control surface for turning was placed by the inventors behind on the separated frame.
They did not use a traditional aileron, having used for control in roll a twisting of the wings, like in aircraft at the start of the century. The vehicle turned out to be externally reminiscent of the "antique" flying vehicles of the Wright brothers era.

A production outboard engine "Vikhr'-25" with a power of 25 lps, with water cooling, was practically unchanged (a seldom encountered in domestic homemade products solution, usually cooling is provided by air). The designers removed everything superfluous, equipping the power system with a water radiator, a V-belt gear, and a muffler. They placed the motor behind the back of the pilot. It turns a slow speed, pusher, air propeller with a comparatively large diameter.

In terms of the easy disassembly and compactness in the collapsed form, the "Antis" satisfies the most rigid demands made on an ULA. A half hour is enough for a person to completely dissemble it and pack the parts in several packs which can be transported in a light automobile and stored in a common apartment. For complete assembly and preparation of the "Antis for flight", 30 minutes is also enough.

The first tests were conducted in 1981. The aircraft was very simple in control and stability. By report of the pilot M. Molchaniuk, who completed a flight of the "Antis" in "SLA-B5" in Kiev, the piloting of the vehicle presented no difficulties, and the low speeds of the air flow, softly blowing in his face, and wonderful view, not limited by the fuselage and a window, leave a unforgettable impression of the flight. It is true, with a strong wind the vehicle, with a unit load for the wind of 15 kg/m² strongly reacts to each gust, which hinders the control. Those who build similar designs should consider that the limiting wind for operation is 5 m/s.

At "SLA-B4" and "SLA-B5" the "Antis" was recognized as the best ultra light aircraft in our country, and raised the interest in many specialists and enthusiasts. The vehicle caught the eye of geologists, foresters and cinematographers. After the flight of 1985 it was able to "take part" in filming of artistic films.

The design of "Antis" is simple and rational. The body of the wing is a rectangular planar frame, made duraluminum pipes 40 x 1.5. The rigidity and strength of it is assured by the system of cable braces. The covering can be made of dacron or the fabric "Iakhta" - materials will known to delta gliders. The profile of the wing is provided by laths made of thin duraluminum pipes, placed in the lath pockets in the covering. Approximately the same design is found on the front free hanging wing. For control in pitch it is completed by an all moving stabilizer, therefore on the aircraft there are no elevators.

The twisting of the wing is realized with the help of the back, bottom braces, connected with a lever. It must be noted that according to reports of the test pilots such a method of cross control is insufficiently effective and those who will repeat such designs are advised to find other variants for control of roll.

The aircraft does not have a fuselage as such. Its function is completed by the space truss. During the manufacture of the frames and trusses, used as the main semifinished item are duraluminum poles for jumps in height, purchased in the store "Sport-tovary [Sporting goods]" - D16T pipes with with a size of
40 x 1.5 mm. Also purchased there were the wheels from a child's bicycle, the engine and many other elements of sporting-recreational equipment which became assemblies of the "Antis" construction:

1 - wheels from a collapsible bicycle with reinforced spokes; 2 - link for the control of the nose wheel; 3 - link for control of the stabilizer; 4 - fuel tank - canister of 10 liters; 5 - air propeller - birch, glued to fiber glass fabric; 6 - rear truss braces of the wing (diameter 3 mm); 7 - wing - negative twist of 3.5° and V shape of 5° are assured by the regulation of the truss braces; 8 - covering for fin, wing and stabilizer; 9 - truss for control of the rudder; 10 - pedals for control of the rudder; 11 - laths for the wing and stabilizer - DI6T pipes 12 x 1 mm; 12 - water radiator; 13 - magneto - from a tractor [illegible]; 14 - shock absorber of engine mounting; 15 - muffler; 16 - pulley for starting engine; 17 - seating and sail lavsan.

TABLE OF PARAMETERS OF SECTIONS OF THE PROPELLER

<table>
<thead>
<tr>
<th>a</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td></td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>1</td>
</tr>
<tr>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>1</td>
</tr>
<tr>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>1</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>1</td>
</tr>
</tbody>
</table>

BASIC DATA FOR THE "ANTIS" AIRCRAFT

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Length, m</td>
<td>6.0</td>
</tr>
<tr>
<td>Span of wing, m</td>
<td>9.4</td>
</tr>
<tr>
<td>Overall lifting surface area of wings, m²</td>
<td>15.3</td>
</tr>
<tr>
<td>Engine power, lbs</td>
<td>25</td>
</tr>
<tr>
<td>Static thrust of propeller, kg</td>
<td>60</td>
</tr>
<tr>
<td>Engine rpm</td>
<td>5000</td>
</tr>
<tr>
<td>Propeller rpm</td>
<td>3100</td>
</tr>
<tr>
<td>Maximum speed, km/h</td>
<td>80</td>
</tr>
<tr>
<td>Stall speed, km/h</td>
<td>35</td>
</tr>
<tr>
<td>Maximal allowable speed, km/h</td>
<td>90</td>
</tr>
<tr>
<td>Climb rate from earth m/s</td>
<td>1.5</td>
</tr>
<tr>
<td>Weight empty, kg</td>
<td>100</td>
</tr>
<tr>
<td>Weight of pilot, kg</td>
<td>65-80</td>
</tr>
<tr>
<td>Flight weight, kg</td>
<td>165-180</td>
</tr>
<tr>
<td>Take-off run, m</td>
<td>20-30</td>
</tr>
<tr>
<td>Landing run, m</td>
<td>15-25</td>
</tr>
<tr>
<td>Maximum operational overloading</td>
<td>5</td>
</tr>
</tbody>
</table>

Accession For
NTIS GRAAL
DTIC TAB
Unannounced
Justification
By
Distribution/
Availability Codes
Dist
Avail and/or
Special

COPY
INSPECTED

- 3 -
a - ULTRALIGHT AIRCRAFT "ANTIS-M"; b - joint of pipes; c - control of stabilizer; d - center of gravity; e - control of roll; f - type; g - Motor "Vikhr'-25"; h - typical joint of pipes; i - Profile of laths; j - wing; k - stabilizer; l - line; m - section of blade
DEPARTMENT of DEFENSE

Directorate for Freedom of Information and Security Review, Room 2C757
1155 Defense Pentagon
Washington, DC 20301-1155

Facsimile Transmittal

30 November 2001

To: Mr. Larry Downing

Organization: DTIC
Office Phone: (703) 767-9244
From: Sharon Reinke, Navy Division,
DFOISR/WHS/DOD

Phone: (703) 697-2716
FAX: (703) 693-7341

Total Pages Transmitted (including cover sheet): 04

Comments: I am forwarding the FOIA request DTIC received, the DTIC forwarding letter, and a list of documents. The documents in the attached list have been released to a FOIA requester [under our case number 01-F-2458] and are, therefore, cleared for public release. If you have questions, give me a call.
April 11, 2001

Defense Technical Information Center
Attn: Kelly Akers, FOIA Manager
8725 John J. Kingman Road Suite 0944
Fort Belvoir, VA 22060-6218

Dear Ms. Akers:

American Lawyer Media respectfully requests, under the Freedom of Information Act, a copy of each of the following records:

- AD B253477. XV-8A Flexible Wing Aerial Utility Vehicle, by H. Kredit. January 1964, 144 pages
- AD B200629. Flex Wing Fabrication and Static Pressure Testing, by Larry D. Lucas. June 1995, 80 pages
- AD B130217, Productibility Analysis of the Alternative Antitank Airframe Configuration Flex Wing. June 1988, 112 pages
- AD B126450, From Delta Glider to Airplane. June 1988, 5 pages
- AD B802668, Sailwing Wind Tunnel Test Program, September 1966, 125 pages
- AD 461202, XV-8A Flexible Wing Aerial Utility Vehicle, H. Kredit, Feb. 1965, 100 pages
- AD 430150, Comparative Evaluation of Republic Bikini Drone System, Final Report, 1943?

We agree to pay up to $200 for costs associated with this request. We are grateful for your kind assistance in this matter. Please contact me at 212-313-9067 if you have any questions relating to our request.

Sincerely,

Michael Ravnitzky
Editor