

MECHANICS OF FLIGHT I

Project no. 1 – Basic data of the aeroplane

The airplane chosen as the object of theoretical analysis shall be well documented. Following data shall be available:

- good, clear copy of a scale three-view drawing of the airplane, prepared without any geometrical distortion; best scale for the figure shall be 1:50 up to 1:100, depend on dimension of real aircraft; the figure must have a linear scale (Fig. 1);
- geometrical data of the aircraft: wing span, length, height, chord of the wing, wing area, horizontal and vertical area, type of airfoils of wing, horizontal and vertical tailplane;
- mass characteristic: empty mass, take-off mass, cruise configuration mass, fuel mass, loading mass;
- data of the propulsion system: type and number of engines, manufacturer, take-off (maximum) power or thrust of the engine, angular speed of the engine's shaft, gearing, type and diameter of the propeller (if exist), specific fuel consumption;
- performance data: maximum horizontal speed, stalling (minimum) speed, climb speed, climb angle, flight range and endurance, take-off and landing distances.

The example of basic aeroplane's data are shown in Table 1.

The data of the airplane shall be prepared as a paper-printed report with first cover page consists of several information as follows (see Fig. 2):

- student's full name,
- type of the airplane,
- name of the professor (*Zb. Paturski*),
- student group symbol (*MoF1-En1*),
- full title of the project, *Project 1 PZL M-20 Mewa - Basic airplane data*
- actual date,
- place for score.

All projects shall be forwarded to the teacher for review in a paper or plastic document case with identifications as shown on Fig. 3.

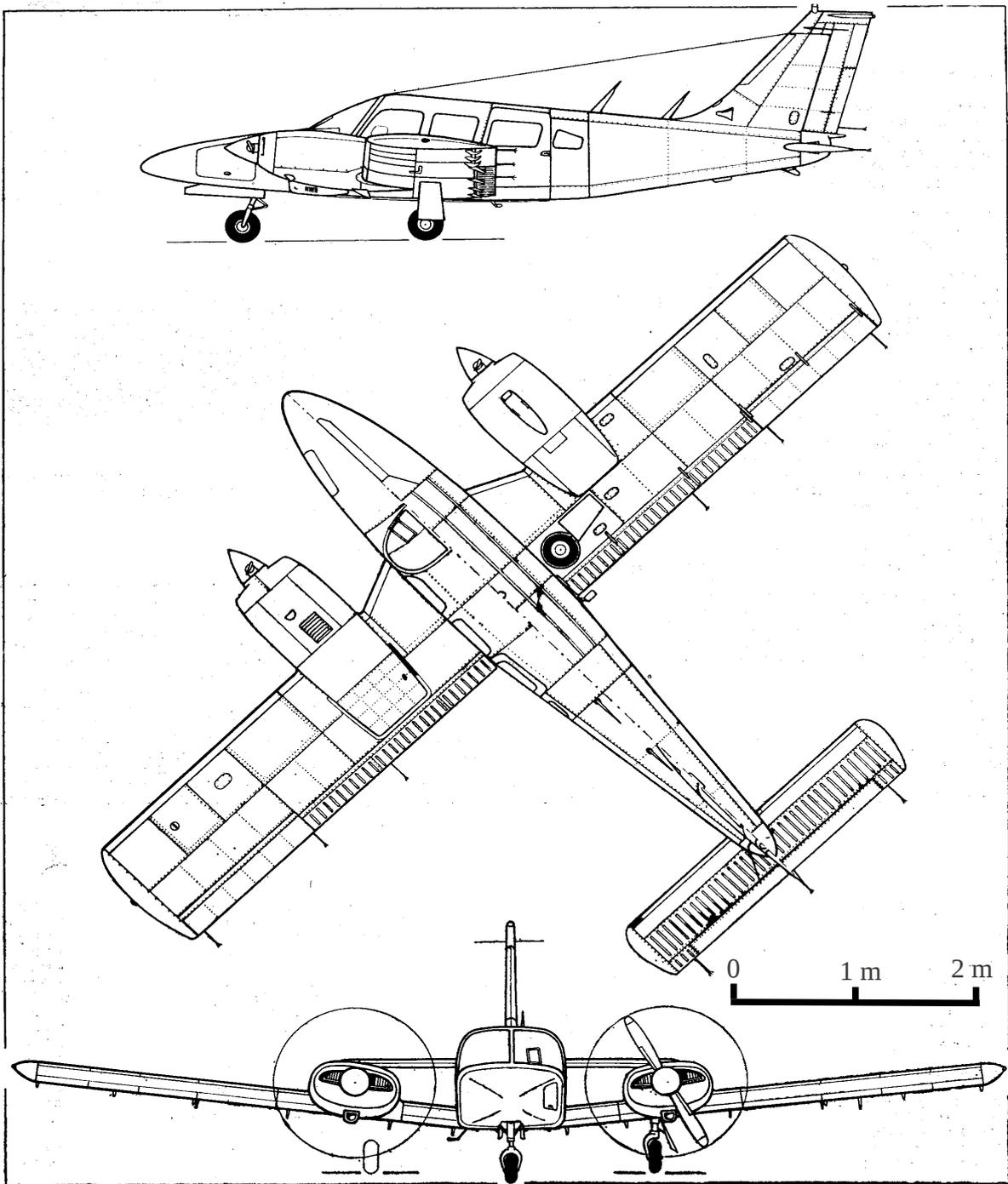


Fig. 1: Three-view PZL M-20 Mewa business aircraft

Table 1

Business and commuter PZL M-20 Mewa (Seagull)			
<i>Geometrical data</i>			
1	Wing span	11.858	m
2	Length (total)	8.724	m
3	Height (in flight)	3.017	m
4	Wing area	19.180	m ²
5	Mean aerodynamic chord (MAC)	1.86	m
6	Wing aspect ratio	7.33	-
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<i>Mass data</i>			
1	Empty aircraft	1280	kg
2	Take-off (max.)	2070	kg
3	Fuel I(internal tank only)	260	kg
4	Payload (max.)	792	kg
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<i>Propulsion system data</i>			
1	Type, manufacturer and number of engines	two PZL-Franklin piston engines, model 6AS 350 A and 6AS 350 AL (right and left direction of propeller rotation)	
2	Take-off parameters	power	160.0 kW
		shaft RPM	2800 rev/min
3	Nominal parameters (cruise)	power	145.5 kW
		shaft RPM	2600 rev/min
4	Two-blade constant-speed metal propellers, diameter of 2.3 m.		
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<i>Performance (2010 kg, cruise configuration)</i>			
1	Maximal horizontal speed (at altitude h = 4.1 km)	360	km/h
2	Maximal climb speed (h = 0 km)	6.7	m/s
3	Ceiling (theoretical)	7.1	km
4	Practical (service) ceiling	4.3	km
5	Time of climb to the service ceiling	22	minutes
6	Take-off distance (15 m obstacle)	550	m
7	Landing distance (15 m obstacle, ILS path)	880	m
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<i>Remarks</i>			
1	Wing section type: NACA 63 209 root, NACA 63 206 tip		
2	Horizontal and vertical tailplane section type: NACA 0012		
<i>Data source</i>			
1	PZL M-20 Mewa Flight Manual, PZL Aircraft Manufacturing, Mielec, Poland, ed. 1998		
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Student: Wong-Hei-Wo
Aircraft: Grumman F6F Hellcat
Group: En-1
Teacher: Zbigniew Paturski

Mechanics of Flight I

Project No. 2

Aerodynamic Characteristics of a Wing

Date: 12/10/2010

Grade: _____

Fig. 2: Title page of the report

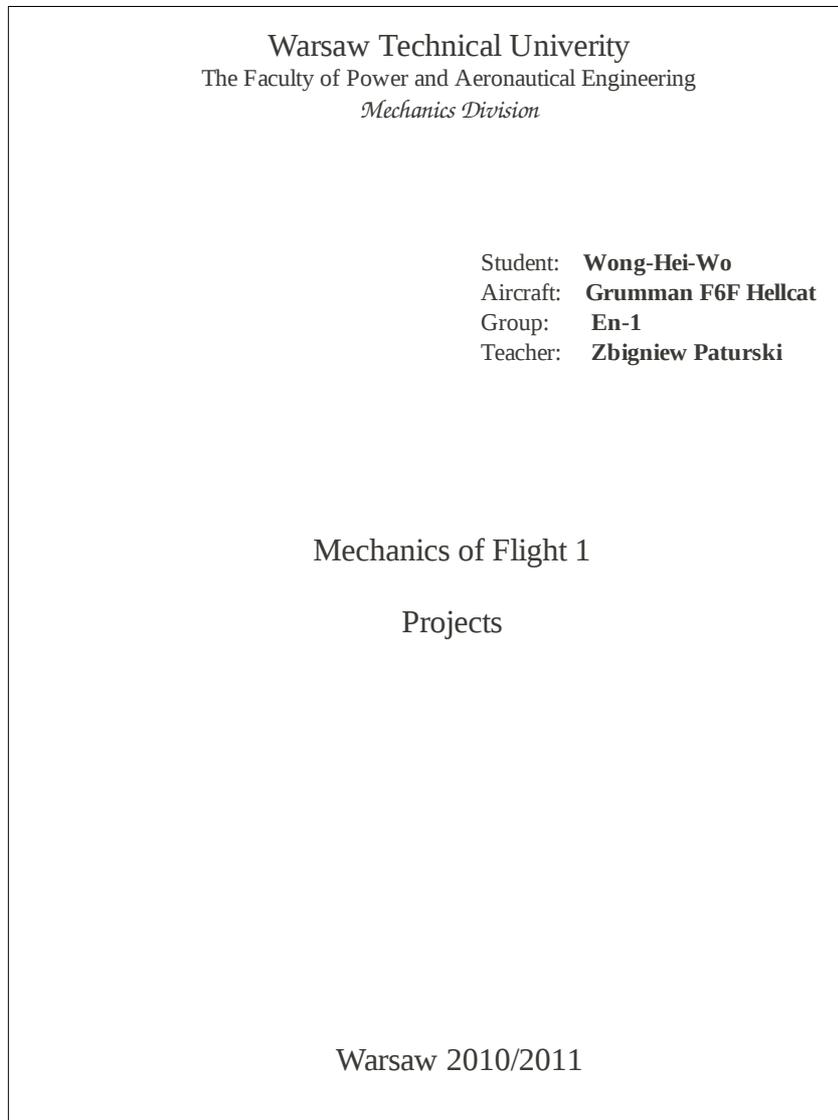


Fig. 3: Description of the document case with projects

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