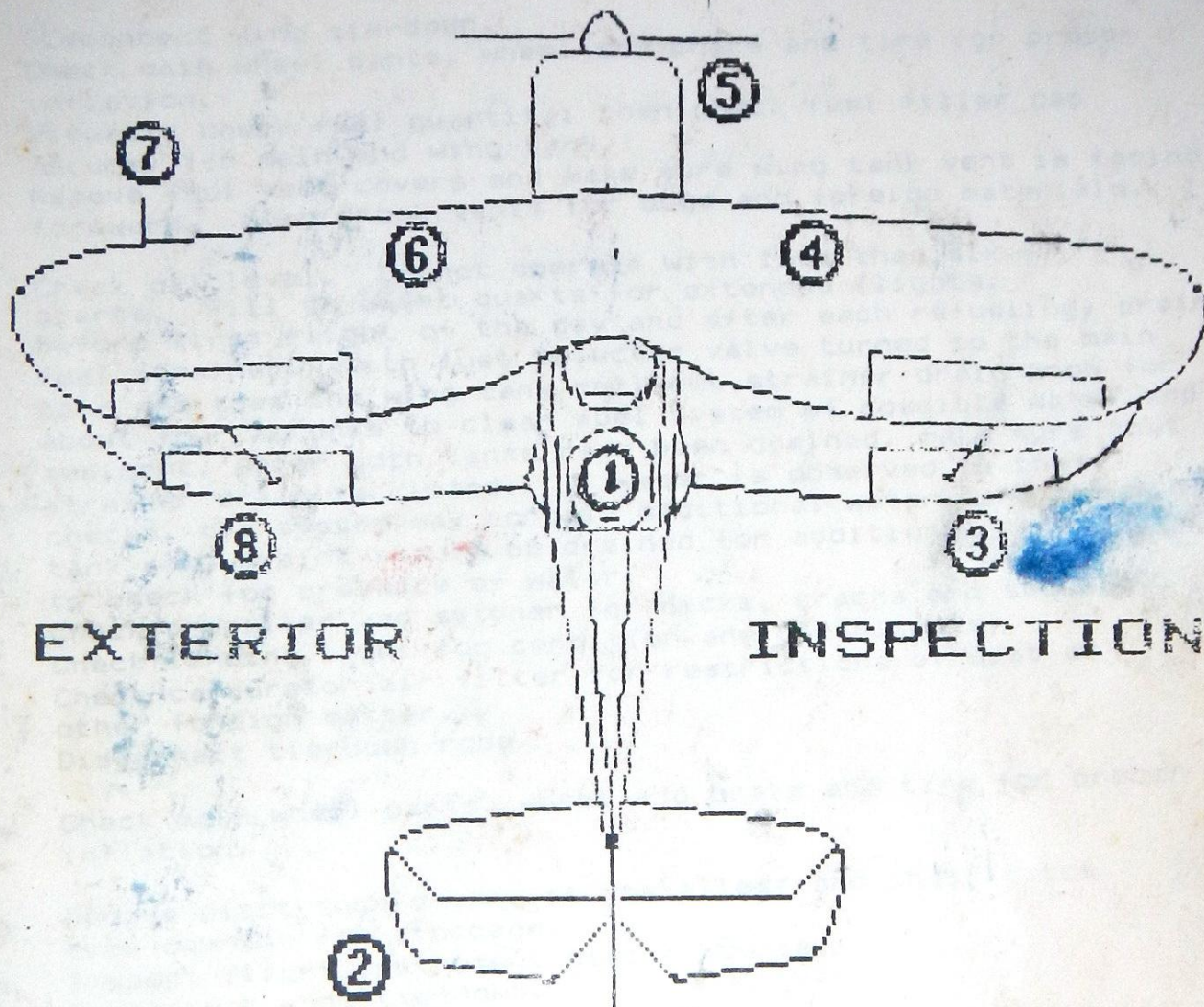


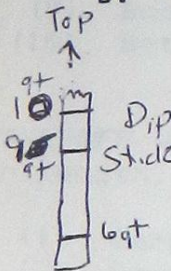
STARDUSTER TOO
PILOT OPERATORS HANDBOOK



* NOTE *: Visually check aircraft for general condition during walk-around inspection. In cold weather, remove even small accumulations of frost, ice or snow from wing, tail and control surfaces. also, make sure that control surfaces contain no internal accumulations of ice or debris. If night flight is planned, check operation of all lights, and make sure a flashlight is available.

- 1) a. Remove control lock.
b. Check ignition switch OFF.
c. Turn on master switch and check fuel quantity indicators; then turn off master switch.
d. Check fuel selector valve handle on main tank.
- 2) a. Remove rudder gust lock, if installed.
b. Disconnect tail tie-down.
c. Check control surfaces for freedom of movement and security.
d. Check trim control rod for security.
e. Check rudder and tail wheel and tire pressure.

- 3) a. Check right ailerons for freedom of movement and security.
b. Check aileron push-pull and interconnect rods and tubes.
c. Check flying and landing wires.
- 4) a. Disconnect wing tie-down.
b. Check main wheel pants, wheel and brake and tire for proper inflation.
c. Visually check fuel quantity; then check fuel filler cap secure. (In main and wing tank.)
d. Remove fuel vent covers and make sure wing tank vent is facing forward. Also check vents for bugs and foreign materials.
- 5) a. Check oil level. Do not operate with less than six quarts. Fill to ~~six~~ ^{NINE} quarts for extended flights.
b. Before first flight of the day and after each refueling, drain fuel strainer. With fuel selector valve turned to the main tank and then the wing tank pull out strainer drain knob for about four seconds to clear fuel system of possible water and sediment. After both tanks have been drained, make sure that strainer drain is closed. If water is observed in these checks, the system may contain additional water, and the fuel tank sump drains should be drained for additional period of time to check for presence of water.
c. Check propeller and spinner for nicks, cracks and security.
d. Check landing light for condition and cleanliness.
e. Check carburetor air filter for restrictions by dust or other foreign matter.
f. Disconnect tie-down rope.
- 6) a. Check main wheel pants, wheel and brake and tire for proper inflation.
- 7) a. Remove pitot tube cover, if installed, and check pitot tube opening for stoppage.
b. Inspect flight instrument static source.
c. Disconnect wing tie-down.
- 8) a. Check left ailerons for freedom of movement and security.
b. Check aileron push-pull tube and interconnect.
c. Check flying and landing wires.



BEFORE STARTING THE ENGINE.

- (1) Seats, Seat Belts and Shoulder Harnesses -- Adjust and lock -- Front stowed when solo.
- (2) Fuel Selector Valve -- Main.
- (3) Radios and Electrical Equipment -- OFF.

STARTING THE ENGINE.

- (1) Master switch -- ON.
- (2) Carburetor Heat -- Cold.
- (3) Primer -- 2-6 strokes as required (none if engine is warm) Close and lock primer.
- (4) Throttle -- Open 1/8" to 1/2 ". Boost pump on pressure up to 14 psi.
- (5) Propeller Area -- Clear.

- (6) Ignition Switch on left mag button-- START (release when engine starts) and select both mags.
- (7) Mixture -- To rich while cranking when engine fires.
- (8) Oil Pressure -- Check.

BEFORE TAKE-OFF.

- (1) Flight Controls -- Check for free and correct movement.
- (2) Fuel Selector Valve -- Main.
- (3) Elevator Trim Control -- TAKE-OFF setting.
- (4) Throttle setting -- 1700 RPM.
- (5) Engine Instruments -- Check.
- (6) Magnetos -- Check (RPM drop should not exceed 125 RPM on either magneto or 50 RPM differential between magnetos).
- (7) Carburetor Heat -- Check operation.
- (8) Flight Instruments and radios -- Set.
- (9) Boost pump on for take off and landing.
- (10) Set clock time off.

TAKE-OFF - Pilots should not operate off of airports of less than 2000' in length, unless they are proficient with this type of airplane.

- (1) Carburetor Heat -- Cold.
- (2) Power -- Full throttle, stick forward
- (3) Normal take-off distance ground roll is 500'-700', 0-wind, hard surface, gross weight.
- (4) Elevator Control -- Lift nose at 60 MPH.
- (5) Climb Speed -- 75 to 85 ~~kts.~~ *Mph.*

ENROUTE CLIMB.

- (1) Airspeed -- to 90 ~~kts.~~ *Mph*
- (2) Power -- Full throttle.
- (3) Mixture -- Full rich (mixture may be leaned above 5000 feet).
- (4) Boost pump on for switching tanks.

CRUISING.

- (1) Power Normal cruise ~~2300~~ ²³⁰⁰ rpm at ~~14.0~~ ^{14.0} gallons per hour.
- (2) Elevator Trim Control -- Adjust.
- (3) Mixture -- Lean for maximum RPM.
- (4) Cross-country cruise altitude are selected by the lowest safe altitude due to outside air temperature for comfort, with winds aloft a consideration. These airplanes do not do well above 8,000' and with high temperatures and high altitude generally fly tail low.
- (5) Due to short wing span and two wings the aircraft handles turbulence better than other aircraft.
- (6) (Stalls power on and power off) are some what disconcerting to new pilots as they expect a stall warning or a shutter and an abrupt break. This does not happen with the Starduster due to the difference in incidence between the two wings with another factor being the M-6 airfoil. It maintains a constant center of lift which helps make the stalls more solid and predictable.

After stall occurs a high sink rate is the result. power on stalls are much the same except the nose is much higher.

- * NOTE * : Maximum Cruise Speed 130 knots.
Maximum Structural Speed 160 knots.

LET-DOWN.

- (1) Mixture -- Rich.
- (2) Power -- As desired (generally below 2000 RPM).
- (3) Carburetor Heat - As required to prevent carburetor icing.

BEFORE LANDING.

- (1) Fuel Selector Valve -- Main.
- (2) Mixture -- Rich. Boost pump on.
- (3) Carburetor Heat - Apply full heat before closing throttle.
- (4) Airspeed -- ~~80~~ to ~~90 knots~~. mph

BALKED LANDING (GO-AROUND).

- (1) Power -- Full throttle.
- (2) Carburetor Heat -- Cold.

NORMAL LANDING - Pilots should not attempt landings on airports with runways shorter than 2,000' until proficient.

- (1) Touchdown -- Main wheels and tail wheel (3 point).
- (2) Landing Roll -- Straight using rudder as necessary. Landing roll is from 500' to 1,000' depending on whether light or heavy braking is used, along with current wind conditions.
- (3) Braking -- Minimum required.

CROSSWIND LANDING.

- (1) Landings of 10 knots or less during crosswind conditions should only be considered either at 45 or 90 degrees.
- (2) If crosswinds of more than 10 knots are encountered a different airport should be considered.
- (3) If fuel or other factors warrant no other choice and a landing must be made during a significant crosswind, wheel landings are the best consideration.
- (4) The best approach speeds for wheel landings are between 80 and 90 ~~knots~~ ^{MPH}. Some nose down trim will assist with wheel landing by releasing the back pressure after touch down. Power reduction after touch down coupled with alert rudder, aileron and braking as necessary.

- * NOTE * : Crosswinds from left are generally more dangerous than ones from the right and down crosswind landings should be avoided if at all possible.

AFTER LANDING.

- (1) Clear Active runway.
- (2) Carburetor Heat -- Cold.

SECURING AIRCRAFT.

- (1) Radios and Electrical Equipment -- OFF.
- (2) Mixture -- Idle cut-off (pulled full out).
- (3) Ignition and Master Switch -- OFF.
- (4) Install pitot and fuel vent covers.
- (5) Check ELT 121.5, especially after hard landings.

FORCED LANDINGS.

Precautionary Landing With Engine Power.

Before attempting an "off airport" landing, one should drag the landing area at a safe but low altitude to inspect the terrain for obstructions and surface conditions, proceeding as follows:

- (1) Drag over selected field with about ~~80~~ ^{90 mph} ~~mph~~ of airspeed, noting the preferred area for touchdown for next landing approach.
- (2) On downwind leg, turn off all switches except the ignition and master switches.
- (3) Make landing approach as low and slow as possible, with speed control essential.
- (4) Before touchdown, turn off ignition and master switches.
- (5) Land in a low tail attitude.
- (6) With NO POWER, a glide of 80 to 90 ~~mph~~ ^{MPH} maintaining forward speed is important. Glide speeds of 70 or lower will result in the sink rate over coming the forward speed, due to drag of extra wing and fling wires. Slips can be of great help in this situation.

FIRES.

Engine Fire During Start On Ground.

Improper starting procedures such as pumping the throttle during a difficult cold weather start can cause a backfire which could ignite fuel that has accumulated in the intake duct. In this event, proceed as follows:

- (1) Continue cranking in an attempt to get a start which would suck the flames and accumulated fuel through the carburetor and into the engine.
- (2) If the start is successful, run the engine at 1700 RPM for a few minutes before shutting it down to inspect damage.
- (3) If engine start is unsuccessful, continue cranking for two to three minutes with throttle full open while ground attendants obtain fire extinguishers.
- (4) When ready to extinguish fire, release the starter switch and turn off master switch, ignition switch, and fuel selector valve handle.
- (5) Smother flames with fire extinguisher, seat cushion, wool blanket, or loose dirt. If practical try to remove carburetor air filter if it is ablaze.
- (6) Make a thorough inspection of fire damage, and repair or replace damaged components before conducting another flight.

- (7) It can also cause damage to the starter.
- (8) Operation at temperatures below freezing should require engine preheat. This will help the starting procedure immensely.

Engine Fire In Flight.

Although engine fires are extremely rare in flight, the following steps should be taken if it is encountered:

- (1) Pull mixture control to idle cut-off.
- (2) Turn off fuel selector valve handle.
- (3) Turn off master switch.
- (4) Establish a 120 MPH glide.
- (5) Close cabin heat control.
- (6) Select a field suitable for forced landing.
- (7) If fire is not extinguished, increase glide speed in an attempt to find an airspeed that will provide an incombustible mixture.
- (8) Execute a forced landing as described in paragraph Emergency Landing Without Engine Power. Do not attempt to restart the engine.
- (9) Slipping the aircraft to keep fire away from the occupants is also a consideration.

Electrical Fire In Flight.

The initial indication of an electrical fire is the odor of burning insulation. The immediate response should be to turn off the master switch. Then close off ventilating air as much as practicable to reduce the chances of a sustained fire.

If electrical power is indispensable for the flight, an attempt may be made to identify and cut off the defective circuit as follows:

- (1) Master Switch -- OFF.
- (2) All other switches (except ignition switch) -- OFF.
- (3) Check condition of circuit breakers to identify faulty circuit if possible. Leave faulty circuit deactivated.
- (4) Master Switch -- ON.
- (5) Select switches ON successively, permitting a short time delay to elapse after each switch is turned on until the short circuit is localized.
- (6) Make sure fire is completely extinguished before opening ventilators.

MANEUVERS - UTILITY AEROBATICS CATEGORY.

This airplane is not designed for purely aerobatic flight. However, in the acquisition of various certificates such as commercial pilot, instrument pilot and flight instructor, certain maneuvers are required by the FAA. All of these maneuvers are permitted in this airplane when operated in the utility aerobatics category. In connection with the utility aerobatic category, the following gross weight and flight load factors apply, with maximum entry speeds for maneuvers as shown:

Gross Weight 1704 lbs.
 Flight Load Factor +6 -6

~~GROSS WEIGHT NORMAL CATEGORY 1985 lbs~~

In the utility aerobatics category, the baggage compartment must be empty.

No aerobatic maneuvers are approved except those listed below:

<u>MANEUVER</u>	<u>RECOMMENDED ENTRY SPEED</u>
Chandelles	120 MPH (104 knots)
Lazy Eights	120 MPH (104 knots)
Steep Turns	112 MPH (87 knots)
Spins	Slow Deceleration
Stalls (Except Whip Stalls)	Slow Deceleration
Slow Rolls	120 to 160 MPH
Loops	155 MPH

NOTE *: Aerobatics require lots of altitude.

*Abrupt use of controls is prohibited above ~~90 knots~~ 105 MPH.

Aerobatics that may impose high loads should not be attempted. The important thing to bear in mind in flight maneuvers is that the aircraft increase speed quickly with the nose down. Proper speed control is an essential requirement for execution of any maneuver, and care should always be exercised to avoid excessive speed which in turn can impose excessive loads. In the execution of all maneuvers, avoid abrupt use of controls.

CRUISE SPEED LIMITATIONS KTS IAS

Never Exceed Speed (glide or dive, smooth air)	200 MPH
Maximum Structural Cruising Speed	180 knots 184 MPH
Maximum Speed	180 knots
Maneuvering Speed	95 knots 105 MPH

*The maximum speed at which you may use abrupt control travel.

CRUISE SPEED INDICATOR MARKINGS.

Never Exceed (glide or dive, smooth air)	200 MPH
Caution Range	145 TO 180 MPH (red line)
Normal Operating Range	55 TO 145 MPH (yellow arc)
	55 to 120 knots (green arc)

ENGINE OPERATION LIMITATIONS.

Power and Speed	190 BHP at 2575
Engine Lycoming 0435	0435

ENGINE INSTRUMENT MARKINGS.

Oil Temperature Gage.

Normal Operating Range Green Arc
 Maximum Allowable. 245°F=F (red line)

Oil Pressure Gage.

Minimum Idling 25 psi (red line)
 Normal Operating Range 60-90 psi (green arc)
 Maximum. 100 psi (red line)

Fuel Quantity Indicator (Main Tank and, Wing Tank).

Empty. E (red line)
 Main Tank : 30 gallons - 28 useable with inverted sump in use.
~~Wing Tank : 16 gallons - 15 useable. ~~15 gallons maximum.~~~~

Tachometer.

Normal Operating Range:
 At sea level. ~~2000-2575~~ 2000-2575 ~~2750-3100~~ RPM (inner green arc)
 At 5000 feet. ~~2000-2575~~ 2000-2575 ~~2750-3100~~ RPM (middle green arc)
 At sea level. ~~2000-2575~~ 2000-2575 ~~2750-3100~~ RPM (outer green arc)
 Maximum Allowable. 2575 ~~3100~~ RPM (red line)

~~** AVOID CONTINUOUS OPERATION BETWEEN 2150 AND 2350 RPM ** (red arc)~~
~~** DUE TO PROPELLER RESTRICTIONS **~~

Carburetor Air Temperature Gage (OAT).

Icing Range. -15 to 5°F=C (yellow arc)

OPERATING LIMITATIONS AT GROSS WEIGHT.

Stall Power OFF.		<u>55 MPH</u>	55 knots IAS
Stall Power ON	<u>50 MPH</u>		50 knots IAS
VY Best Rate			<u>90 MPH</u> IAS
VX Best Angle.			<u>70 MPH</u> IAS
Best Glide	<u>90 MPH</u>		90 knots IAS
VA Maneuvering Speed	<u>105 MPH</u>		95 knots IAS
VNE Red Line	<u>200 MPH</u>		190 knots IAS

RATE OF CLIMB.

Gross weight at sea level.

70 knots <u>MPH</u> indicated.	<u>8.00</u>	1.000	per min.
80 knots <u>MPH</u> indicated.	<u>6.00</u>	1.000	per min.
90 knots <u>MPH</u> indicated.	<u>4.00</u>	1.000	per min.

AFTER WINTER PRE-FLIGHT

Empennage

ELT & Battery
Lights
Tailwheel
Trim Tab

Wing

Fuel Vents
Rigging Flying Wires
Ailerons

Battery

Recharge at
1.5 amps
Leaks & Cracks

Cockpits

Seatbelts
Instruments
Controls
Placards
Circuit Breakers
Fire Extinguisher

Landing Gear

Wheels & Brakes Tires
Shock Cords
Wheel Covers
Gear Fairings
Hydraulic Fluid
Master Cylinder

Engine

Engine Mounts
Fuel Lines
Cracks Nips & Chips
In Prop Spinner
Filter
Hoses

IN AIRCRAFT

A - Airworthiness Certificate
R - Registration For Aircraft
R - Radio License for Aircraft
O - Operating Limitations
W - Weight & Balance

IN PILOTS POSSESSION

P - Pilots License
M - Medical Current
R - Radio License

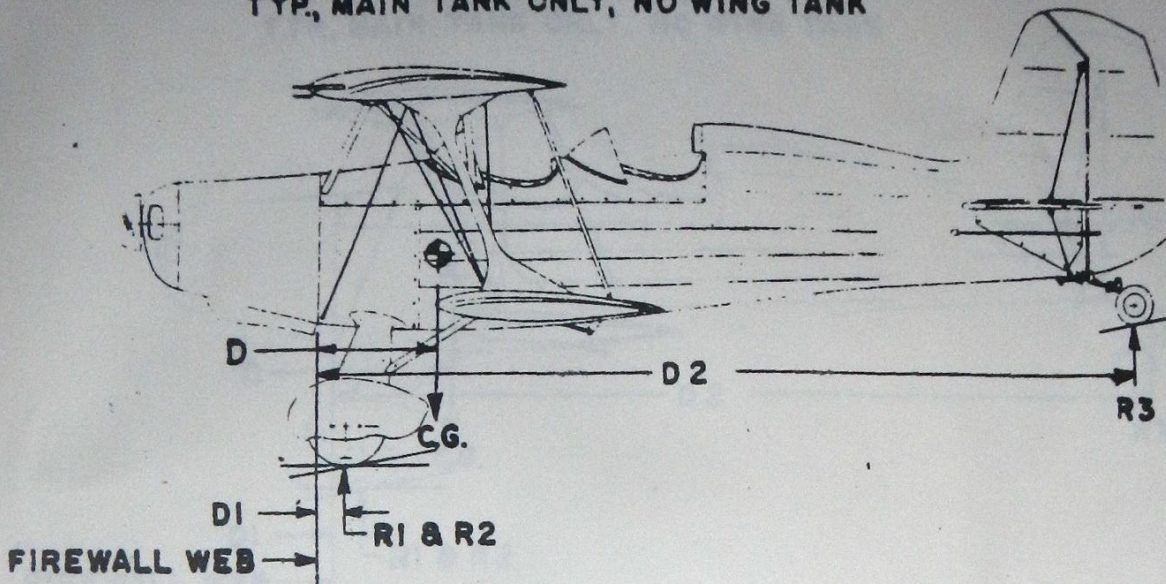
Also required, accurate log book entries, recent current pilot, and appropriate entries for all work done on aircraft, and engine.

NOTE : For long Cross-Country flights water and survival equipment should be included.

39212

10-31-02

**STARDUSTER TOO SA300
WEIGHT & BALANCE
TYP., MAIN TANK ONLY, NO WING TANK**



HORIZ. DATUM: TOP LONGERON - SHOULD BE LEVEL

VERT. DATUM: FIREWALL WEB

FWD C.G. LIMIT: 18.0

AFT C.G. LIMIT: 27.0

EMPTY WEIGHT C.G.

WEIGHING POINT	WEIGHT
RIGHT (R1)	512
LEFT (R2)	510
REAR (R3)	85
TOTAL	

$$D = \frac{D1(R1+R2) + D2(R3)}{R1+R2+R3} = 18.5$$

~~MAX FORWARD C.G.~~ Typical Load

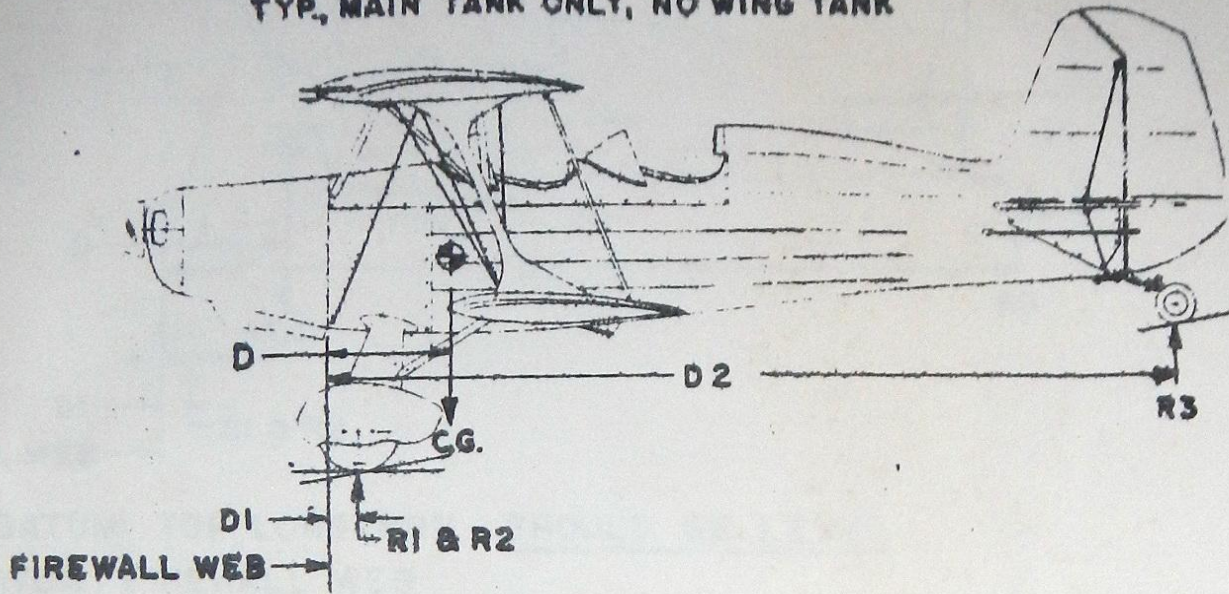
	WEIGHT	ARM	MOMENT
AIRCRAFT EMPTY WEIGHT	1107	18.5	20479
PILOT	220	63	13860
FUEL Pass.	200	35	7000
FUEL	180	7	1620
	<u>42959</u>		<u>42959</u>
	1707		
	<u>TOTAL MOMENT</u>	<u>25.2</u>	<u>1707</u>
	<u>TOTAL WEIGHT</u>		

MAX AFT C.G.

AIRCRAFT EMPTY WEIGHT	WEIGHT	ARM	MOMENT
PILOT	_____	_____	_____
PASSENGER	_____	_____	_____
BAGGAGE	_____	_____	_____

$\frac{TM}{TW} =$

**STARDUSTER TOO SA300
WEIGHT & BALANCE
TYP, MAIN TANK ONLY, NO WING TANK**



HORIZ. DATUM: TOP LONGERON - SHOULD BE LEVEL
 VERT. DATUM: FIREWALL WEB
 FWD C.G. LIMIT: 18.0
 AFT C.G. LIMIT: 27.0

EMPTY WEIGHT C.G.

WEIGHING POINT
 RIGHT (R1)
 LEFT (R2)
 REAR (R3)
 TOTAL

WEIGHT
512
510
85

$D1 = 5.5''$
 $D2 = 175''$

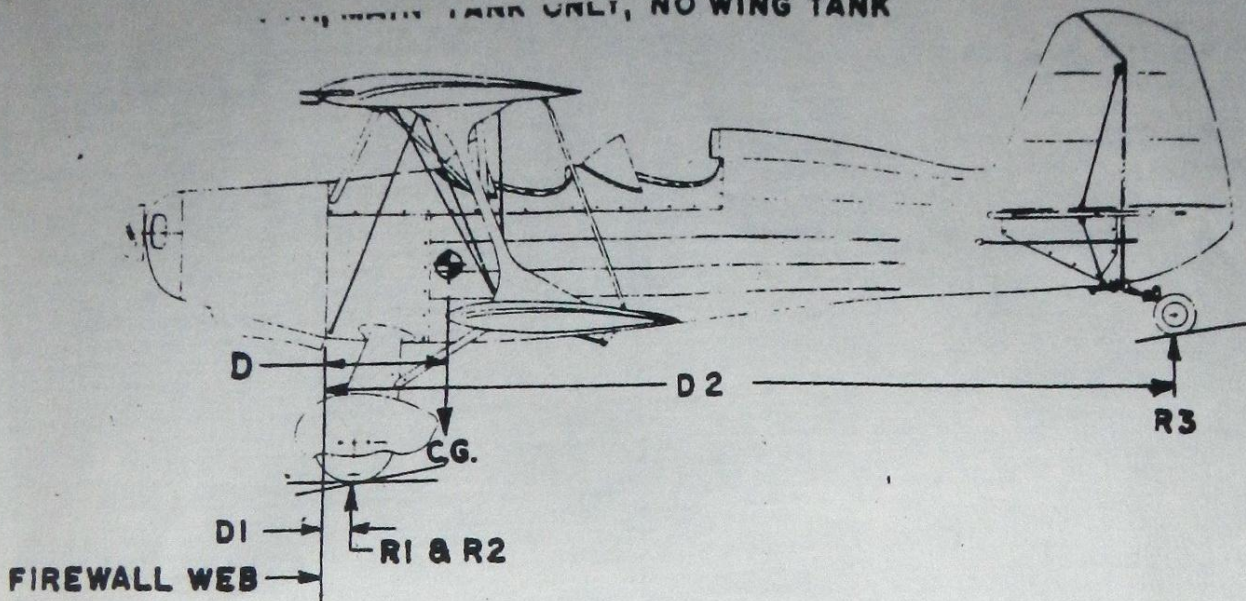
$$D = \frac{D1(R1+R2) + D2(R3)}{R1+R2+R3} = \frac{5.5(512+510) + 175(85)}{1107} = 18.5$$

MAX FORWARD C.G. 22.6

	WEIGHT	ARM	MOMENT
AIRCRAFT EMPTY WEIGHT	<u>1107</u>	<u>18.5</u>	<u>20479</u>
PILOT	<u>175</u>	<u>63</u>	<u>11025</u>
FUEL	<u>180</u>	<u>7</u>	<u>1620</u>
FUEL			
33124	TOTAL MOMENT = 22.6	1462	33124
1462	TOTAL WEIGHT		
	MAX AFT C.G.		

	WEIGHT	ARM	MOMENT
AIRCRAFT EMPTY WEIGHT	<u>1107</u>	<u>18.5</u>	<u>20479</u>
PILOT	<u>175</u>	<u>63</u>	<u>11025</u>
PASSENGER	<u>175</u>	<u>35</u>	<u>6125</u>
BAGGAGE	<u>10</u>	<u>85</u>	<u>850</u>
	<u>1467</u>		<u>38479</u>
$\frac{TM}{TW} = \frac{38479}{1467} = 26.2$			

MAIN TANK ONLY, NO WING TANK



HORIZ. DATUM: TOP LONGERON - SHOULD BE LEVEL
 VERT. DATUM: FIREWALL WEB
 FWD C.G. LIMIT: 18.0
 AFT C.G. LIMIT: 27.0

EMPTY WEIGHT C.G.

LOADING POINT	WEIGHT
WEIGHT (R1)	_____
WEIGHT (R2)	_____
WEIGHT (R3)	_____
TOTAL	_____

$$\frac{D1(R1+R2) + D2(R3)}{R1+R2+R3}$$

MAX FORWARD C.G.

CRAFT EMPTY WEIGHT	WEIGHT	ARM	MOMENT
WEIGHT	_____	_____	_____
WEIGHT	_____	_____	_____
WEIGHT	_____	_____	_____

TOTAL MOMENT =
 TOTAL WEIGHT

MAX AFT C.G.

CRAFT EMPTY WEIGHT	WEIGHT	ARM	MOMENT
WEIGHT	_____	_____	_____
WEIGHT	_____	_____	_____
WEIGHT	_____	_____	_____