



INIZIATIVE INDUSTRIALI ITALIANE S.p.A.
(METEOR S.p.A.)

V.le Gorizia n.6 – 00198 Rome - ITALY
Tel.: +39.06.841.58.21 Fax: +39.06.855.71.62

E-MAIL: zigori@uni.net - Home Page: www.skyarrow.com

**TECHNICAL SPECIFICATION OF THE
STANDARD CONFIGURATION**

CERTIFIED AIRCRAFT

SKY ARROW 650 TCN or 650 TCNS

SPE 017 – E, rev. 2, dated 22.11.2000

POWERPLANT:

650 TCN AIRCRAFT

Bombardier Rotax 912 A or F - 81 HP @ 5800 RPM. Four cylinder, gasoline, four stroke, aspirated, air/water cooled engine. TBO 1200 hrs. Engine dry weight: 57.1 kg.

650 TCNS AIRCRAFT

Bombardier Rotax 912 S2 - 98 HP @ 5800 RPM. Four cylinder, gasoline, four stroke, aspirated, air/water cooled engine. TBO 1200 hrs. Engine dry weight: 58.3 kg.

COMPLETE AIRCRAFT:

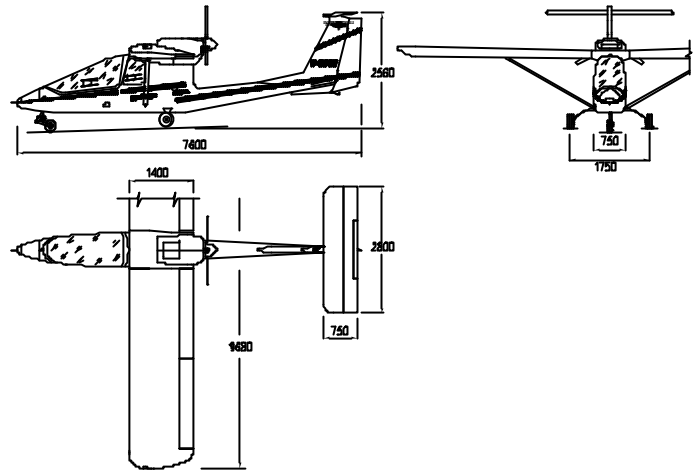
Characteristics	650 TCN	650 TCNS
Length	7.6 m (24.9 ft)	
Height	2.6 m (8.4 ft)	
Wing span	9.7 m (31.8 ft)	
Wing loading	48.0 kg/m ² (9.8 lbs./sq. ft.)	
Power loading	8.0 kg/hp (17.7 lbs/hp)	6.6 kg/hp (14.6 lbs/hp)
Seats/arrangement	2/Tandem	
Engine type	Rotax 912 A or F	Rotax 912 S2
Engine power (@ 5800 rpm)	81 Hp	98 Hp
Propeller	2-blade, fixed-pitch	
Composite structure ultimate load	+8g	-4g
Standard empty weight *	400 kg (880 lbs.)	
Maximum gross weight	650 kg (1,430 lbs.)	
Useful load	250 kg (550 lbs.)	
Fuel capacity	68 lt. (18 gals)	
Fuel consumption (@ 75% power, sea level)	16 lt/h-12 kg/h (4.3 gal/hr)	20 lt/h-15 kg/h (5.3 gal/hr)

**Performance
(650 kg / 1430 lbs gross weight)**

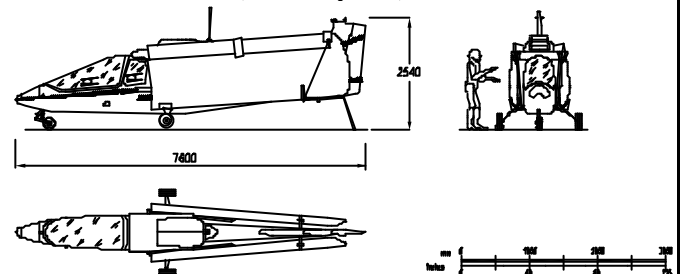
Speed not to be exceeded (V _{NE})	132 kts (244 km/h)	
Maximum speed, sea level	104 kts (193 km/h)	107 kts (198 km/h)
Cruise speed (@75 % power, s.l.)	90 kts (167 km/h)	97 kts (180km/h)
Stall speed (s.l., full flaps, pwr off)	40 kts (74 km/h)	
Take off run	240 m (780 ft)	177 m (580 ft)
Take off distance over 50 ft obst.	410 m (1345 ft)	380 m (1247 ft)
Landing run	135 m (443 ft)	
Landing distance over 50 ft obst.	215 m (705 ft)	
Rate of climb, sea level	3.6 m/s (700fpm)	4.3 m/s (850fpm)
Service ceiling (crew limit)	4100 m (13,500 ft)	
Endurance (75 % power, no res.)	4 ^h 15'	3 ^h 25'
Max. range (75 % power, no res.)	700 km (380NM)	610 km (330NM)

* The empty weight includes brake fluid, engine coolant, engine oil and unusable fuel.

THREE-SIDE VIEW VALID FOR BOTH VERSIONS



**CONFIGURATION FOR SHORT-HAUL
TRANSPORTATION
(accessory G.4)**



**CONFIGURATION FOR ON-ROAD TRANSPORTATION
(accessories G.4 and G.5)**



DESCRIPTION

General

The Sky Arrow 650 TCN or TCNS is a tandem seat aircraft designed and manufactured in Italy by Iniziative Industriali Italiane (Meteor) S.p.A., a company manufacturing gliders, airplanes and Remotely Piloted Vehicles since 1947. The a.m. versions of the Sky Arrow have been designed as sport and recreational aircraft, as well as for training, research and aerial surveillance. The Sky Arrow 650TCN and TCNS, being almost entirely made of carbon fiber in epoxy resin, feature a strong composite structure and therefore have a very high strength to weight ratio. It is a single engine, high wing, T-tail and fixed tricycle landing gear aircraft.

Certification

The Sky Arrow 650 has been type certified in March 1996 in compliance with JAR/VLA design and manufacturing standards. The TCN and TCNS versions are, in addition, in compliance with FAR 23, Amendment 41, sections 23.1351, 23.1357, 23.1381, 23.1383, 23.1385, 23.1387, 23.1395, 23.1397 and 23.1401. The engine is certified to FAR 33 and the propeller to FAR 35. Noise has been tested in accordance with FAR 36, Appendix G and ICAO Annex 16 Chapter 10.

The Sky Arrow 650TCN and 650TCNS are type certified in the USA and other countries for day and night VFR. They are used for recreation, sport, training and aerial reconnaissance. In the U.K. it is also certified in the Transport Category (passenger). The craft, due to its tandem configuration, are also usable for military "ab initio" training.

Fuselage

The fuselage is almost entirely made of carbon fiber sandwich in an epoxy resin matrix. Kevlar is also used in some areas, such as the cabin, where added strength is requested for crash worthiness.

The two fuselage halves are bonded together along the vertical plane. Internally the fuselage includes 6 minor bulkheads and 2 main ones. One of these bulkheads supports the main landing gear and the engine. The aircraft may be controlled from either seat.

The front rudder pedals are adjustable. A baggage compartment is located behind the back seat, and small bags can be stowed underneath this seat. The fuel tank is located in the fuselage behind this seat.

The one piece, glider style canopy provides exceptional outside visibility. The engine and fuel tank attachments have been statically tested in crash landing simulations up to 18 g's.

Wings

The airfoil is a Gottinga 398 modified for better handling at low speeds. Each wing is attached to the fuselage with 3 easily removable safety pins, two at the root rib, and one at the wing strut.

The wing and the control surfaces are made of carbon fiber. The two wing spars are of "C" section. Wing flaps are actuated electrically and can be positioned at 0, 10, 20 and 30 degrees. The ailerons are actuated via aluminum control rods and bellcranks.

Landing gear

The tricycle landing gear is fixed. The main gear leaf springs are made of multiple layers of carbon fiber and glass in an epoxy resin matrix. The nose gear strut is steel and carbon fiber. It features a "donut" type shock absorber and a shimmy damper. The nose gear is free casting. Steering is provided by a combination of hand-operated differential braking of the main wheels (low speed) and rudder actuation (high speed).

Powerplant

The engine is a Rotax 912 F (for the 650 TCN version) or a Rotax 912 S2 (for the 650 TCNS) certified to FAR 33 with a maximum power of 81 HP and 98 HP respectively at 5800 rpm. The engine is a horizontally opposed, 4 cylinder, 4-stroke type. It features liquid cooled cylinder heads and air cooled cylinders, dual ignition, dry sump lubrication, dual carburetors and a propeller drive reduction gear box with clutch. The engine features one internal and one external alternator. The engine mount is made of aircraft steel tubing.

The propeller is 2 blade, fixed pitch, certified to FAR 35.

Empennage

The rudder is made of glass fiber sandwich with a termanto core.

The rudder is actuated by dual cables and aluminum rod via a bellcrank. Both the horizontal stabilizer and elevator are in carbon fiber sandwich, in an epoxy resin matrix, with an electrically actuated trim tab.

Aluminum control rods actuate the elevator.

Electrical

Electric power is provided by a twelve-volt battery located in the nose of the airplane and is supplied to the electrical system via a bus. An external 40 amp alternator, driven by a belt connected to the propeller shaft, provides power to the battery and the main electrical bus. A second 18 amp internal alternator provides power to the engine ignition system and also serves as a source of emergency power in the event of a malfunction of the primary alternator.

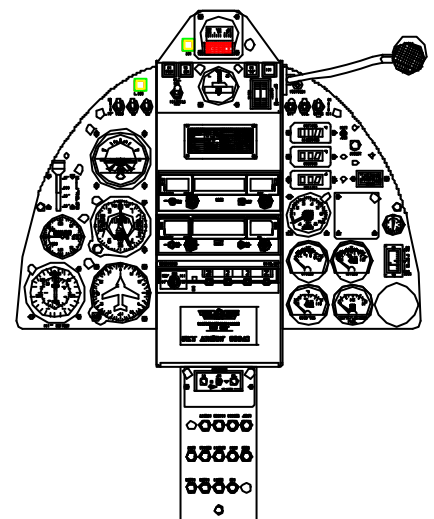
Circuit protection is provided by circuit breakers located on the instrument panel. The instrument panel is prepared to accept various instruments in addition to the standard one (see last page).

The drawing below illustrates a fully equipped instrument panel layout.

Documentation

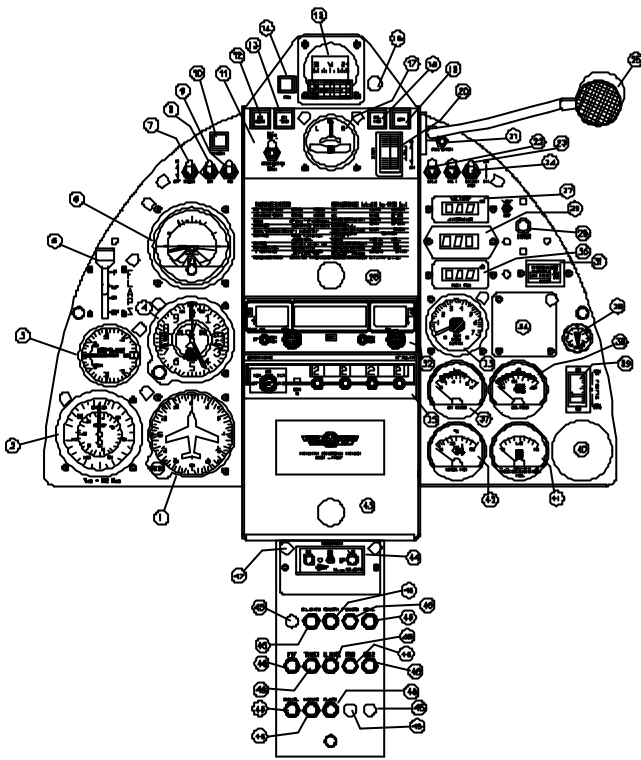
The following documentation is provided with the aircraft:

- Flight manual
- Maintenance manual
- Parts Catalog
- Operator's manuals of the installed equipment (engine, propeller, radio etc.).



EXAMPLE OF A FULLY EQUIPPED INSTRUMENT PANEL

STANDARD CONFIGURATION EQUIPMENT LIST



STANDARD CONFIGURATION INSTRUMENT PANEL

1. Pneumatic directional gyro
2. Airspeed indicator
3. Rate of climb indicator
4. Altimeter
5. 4 position flap control
6. Attitude indicator
7. Strobe lights breaker
8. Navigation lights breaker
9. Cabin lights breaker
10. Landing lights
11. General switch
12. Oil temperature alarm
13. Oil pressure alarm
14. Fan
15. Magnetic compass
16. Pre-arrangement for heated pitot
17. Turn and bank indicator
18. Cylinder heads temperature warning light
19. Alternator malfunction warning light
20. Master switch
21. Warning lights test button
22. Electronic ignition, switch # 1
23. Electronic ignition, switch # 2
24. Aux. Electric fuel pump switches
25. Map light
26. Box
27. Ammeter/Voltmeter
28. Dimmer
29. OAT indicator
30. Fuel pressure
31. Hour meter
32. VHF/VOR
33. Tachometer
34. Digital chronometer
35. Transponder
36. Vacuum gauge
37. Oil pressure
38. Oil temperature
39. Pitch trim position indicator
40. Available
41. Fuel quantity
42. Water temp. indicator
43. Box (Available for avionics)
44. Intercom
45. Available
46. Breakers
47. Post lights

Flight Instruments

- Magnetic compass, (with compass card)
- Rate of climb indicator
- Airspeed indicator
- Altimeter (inches of Mercury and Millibars - dual display)
- Attitude indicator (3", pneumatic)
- Directional gyro (3", pneumatic)
- Turn and Bank (2.5", electric)
- Pitch trim position indicator

Engine Instruments

- Tachometer
- Fuel pressure
- Oil pressure
- Oil temperature
- Water temperature
- Fuel quantity
- Vacuum gauge

Warning lights

- Water temperature
- Oil pressure
- Oil temperature
- Alternator output

Other Instruments

- Ammeter/Voltmeter
- Flight hour meter

Avionics

- Altitude encoder (blind)
- 2 headphone jacks
- Dual push-to-talk button (on the side sticks)
- ELT (Emergency Locator Transmitter)
- VOR/COMM Bendix-King KX 125
- Mode C-Transponder, Bendix-King KT 76A
- Sigtronics voice activated intercom
- Sigtronics headsets for 2

Controls

- Brakes, dual, hydraulic
- Brake, parking
- Fuel shut-off valve, dual
- Flaps, electric, 4 position
- Flight controls, dual
- Choke, dual
- Rudder pedals, dual, front set adjustable
- Throttle control, dual
- Trim system, elevator, electric, dual
- Carburetor heater control
- Engine baffle control

Powerplant & Accessories

- Engine Rotax 912 F - 81HP or 912 S2 - 98HP
- Fuel tank, 18 US gallons
- Electronic ignition system, dual
- Starter switch, key operated
- Oil filter, full flow
- Hoffmann HO propeller, two blade, fixed pitch
- Starter, electric
- Vacuum pump
- Battery, 12 Volt
- Electrical system, 12 V
- Alternator, 12 V - 18 Amps internal
- Alternator, 12 V - 40 Amps external
- Adjustable engine cooling system

Switches and Breakers

- Master
- Alternator
- Ignition 1 and 2
- Auxiliary fuel pump
- Strobe lights
- Navigation lights
- Landing light
- Cabin lights
- Ammeter/Voltmeter
- Circuit breakers

Exterior

- Canopy, tinted
- Fuel valve, quick drain
- Lights, anti-collision, wing-tip strobes
- Landing lights
- Exterior paint
- Stall warning system, acoustic
- Steps & handles
- Jack points

Interior

- Cabin air ventilators
- Cabin heating system
- Circuit breakers, electrical, pull-type
- Floor, non-skid
- Lighting, instrument panel post lights
- Baggage area behind the back seat
- Baggage area underneath the back seat
- Pockets, map & storage
- Seat belts & shoulder harness, five point, dual
- Seat cushions, fabric
- Switches, master & electrical
- Rear windows, removable
- First aid kit
- Fire extinguisher

Additional Items

- Document bag
- Flight controls locks
- Fuel level meter
- Fuel sampler cup
- Refueling funnel
- Keys, ignition, 2 sets
- Maintenance Logbook
- Pilot Operating Handbook
- Flight and Maintenance manual
- Parts catalog
- Parking tail support

SKY ARROW 650 TCN and 650 TCNS
LIST OF AVAILABLE AND APPROVED ACCESSORIES
 (NOT PART OF THE STANDARD CONFIGURATION)

ITEM	ACCESSORY	WEIGHT (lbs.)
AIRBORNE ACCESSORIES		
A.1	Qty. 3 aerodynamic covers for landing gears	3
A.2	Manifold pressure indicator kit	1
A.3	Bendix King KLX 135A - Communications Transceiver/GPS receiver with moving map – with antenna and installation kit	5
A.4	VOR/COM Bendix King KX 125 (in addition to the standard one)	6
GROUND ACCESSORIES		
G.1	Waterproof white canvas cover for canopy	--
G.2	Waterproof white canvas cover for engine	--
G.3	Set of stakes and ropes for aircraft tie down	--
G.4	Set of fixture to move and store the aircraft with removed wings	--
G.5	On-road aircraft transportation trailer (with wings and horizontal stabilizer disassembled), hydraulic loading system (requires previous item G.4)	--
G.6	Maintenance tool set	--

INIZIATIVE INDUSTRIALI ITALIANE	
----------------------------------------	--