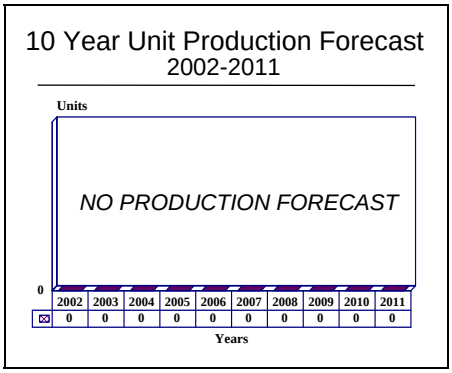
SOKO/Avioane J-22 Orao/IAR-93 – Archived 2/2003

Outlook

- Production of the IAR-93 and the Orao has ended
- No further production is planned



Orientation

Description. Twin-engine, single- and two-seat close air support aircraft.

Sponsor. The governments of Romania and Yugoslavia.

Contractors. A joint program of Vazduhoplovna Industrija SOKO, Mostar, Bosnia and Herzegovina, and Avioane Craiova SA (formerly Intreprinderea de Avioane Craiova), Craiova, Romania.

Status. Production in Bosnia halted in early 1992. Production in Romania has also ended.

Total Produced. A total of 36 Romanian-built IAR-93As, approximately 111 Romanian-produced IAR-93Bs, and 126 Yugoslav-built Orao aircraft were manufactured.

Application. Ground attack/close air support and tactical reconnaissance.

Price Range. Estimated at $7.8-$9.0 million in 2001 US dollars.

Technical Data

Design Features. Shoulder wing design; portion of rear fuselage detachable to facilitate engine maintenance/ overhaul.

	Metric	US
Dimensions		
Length overall, including probe[(a)]	14.90 m	48.88 ft
Height overall	4.52 m	14.83 ft
Wing area, gross	26.0 sq m	279.87 sq m
Wingspan	9.30 m	30.51 ft
Fuselage max width	1.62 m	5.31 ft

Weight (IAR-93B/J-22)

	Metric	US
Empty weight, equipped	5,750/5,500 kg	12,676/12,125 lb
Normal T-O weight clean	8,400/8,170 kg	18,519/18,012 lb
Max T-O weight	10,900/11,080 kg	24,030/24,427 lb
Max internal fuel	2,400/2,430 kg	5,291/5,357 lb

Performance (IAR-93B/J-22)[(b)]

Max level speed (SL)	1,086/1,130 km/h	586/610 kt
Service ceiling	13,600/15,000 m	44,625/49,210 ft
T-O to 15 m (50 ft)	1,150/1,255 m	3,775/4,118 ft
Max climb rate at SL	3,900/5,340 m/min	12,800/17,520 ft/min
Ferry range[(c)]	1,900/1,320 km	1,025/712 nm

Propulsion

IAR-93A/Orao	(2)	Turbomecanica/Orao Viper Mk 632-41R single-shaft axial-flow turbojet engines rated 17.79 kN (4,000 lbst) each without afterburners.
IAR-93B/Orao	(2)	Turbomecanica/Orao Viper Mk 633-41 turbojet engines rated 22.24 kN (5,000 lbst) each with afterburning.

Armament

Two 23 mm twin-barrel cannon in lower front fuselage. Various weapons configurations, including bombs and rocket launchers. Some IAR-93Bs can carry air-to-air missiles. Oraos can carry air-to-surface missiles.

Crew

Single-seat and two-seat versions produced for both IAR-93 and Orao.

[(a)]Single-seat versions.
[(b)]IAR-93B at normal take-off weight clean (unless otherwise noted); J-22 at clean take-off weight with 50 percent internal fuel (unless otherwise noted).
[(c)]IAR-93B with three 500-liter drop tanks; J-22 at 6,000 meters with two 500-liter drop tanks.

Variants/Upgrades

IAR-93A. Initial production version with non-augmented Viper Mk 632-41R engines. First flown in 1981. A total of 26 single-seat and 10 two-seat aircraft were built for the Romanian Air Force.

IAR-93B. Version equipped with afterburning Viper Mk 633-41 turbojets. First flight occurred in 1985. The Romanian Air Force ordered a total of 165 IAR-93Bs, and over 100 of these were delivered.

IJ/INJ-22 Orao. Yugoslav-built preproduction series single-seat IJ-22 aircraft and two-seat INJ-22 aircraft for tactical reconnaissance. The two-seat variant is also used as a trainer. A total of 15 were built. All were powered by non-afterburning Viper engines.

J-22 Orao. Production single-seat attack variant. Built in Yugoslavia both with and without afterburning Viper turbojets. First flight occurred in October 1983. Production of this aircraft was halted in early 1992 with abandonment of the SOKO factory in Mostar.

NJ-22 Orao. Production two-seat tactical reconnaissance variant. Built in Yugoslavia both with and without afterburning Viper turbojets. First flight occurred in 1986. A total of 35 were produced.

Program Review

Background. The J-22 Orao/IAR-93 was designed by a joint team of engineers from the Vazduhoplovno Tehnicki Institut in Zarkovo, Yugoslavia (Serbia), and the Institutul de Mecanica Fluidelor si Constructii Aerospatiale in Bucharest, Romania. Yugoslav models are named Orao, with various designations (see above); Romanian variants are designated IAR-93A and IAR-93B.

Design work began in 1970. First flight of the aircraft occurred in October 1974. In 1977, fabrication began in each country on a preproduction batch of 15 aircraft,

the first of which made its initial flight in 1978. First flight of the Romanian IAR-93A occurred in 1981, while first flight of the production J-22 Orao took place in 1983.

Subcontractors on the Orao/IAR-93 program included Martin-Baker (zero/zero ejection seats), Lucas (engine-driven starter/generators), GEC-Marconi (three-axis stability augmentation system), and Rockwell Collins (VIR-30 VOR/ILS and DME-40, in Oraos only).

Orao production came to a halt in 1992 with the abandonment of the SOKO factory in Mostar, situated in the breakaway Yugoslav republic of Bosnia and Herzegovina. The SOKO factory was mostly destroyed or evacuated to Serbia in the spring of 1992. The Yugoslav Army stripped the factory, and machinery and tools were transported to the Utva plant in Pancevo, Serbia.

The Romanian Air Force has begun work on an upgrade program for its IAR-93s. SOKO had been planning an upgrade to the J-22 Orao attack aircraft that would feature modern avionics as well as intake and wing leading edge de-icing. An improved version of the NJ-22 Orao tactical reconnaissance aircraft was planned as well.

Funding

Not available.

Recent Contracts

None

Timetable

Month	Year	Major Development
	1970	Joint venture launched
Oct	1974	Prototype first flight in each country
	1977	Pre-series aircraft production program begun
	1979	Series production of IAR-93 begun
	1980	Series production of Orao begun
Oct	1983	First flight of J-22 Orao
	1985	First flight of IAR-93B
Jul	1986	First flight of NJ-22 Orao
May	1992	SOKO plant abandoned; Orao production halted

Worldwide Distribution

Romania	75	IAR-93
Yugoslavia	7[(a)]	INJ-22
	60[(a)]	J-22
	25[(a)]	NJ-22

[(a)]Estimate

Forecast Rationale

Neither the IAR-93 nor the Orao are presently in production. No further production of either is planned.

The Yugoslav Air Force ordered 165 J-22 Orao single-seat attack aircraft; 74 had been delivered by the time production ceased in early 1992. Orao production apparently never resumed, either in Bosnia or in Serbia.

Some equipment from the SOKO factory in Bosnia had been transferred to Utva in Serbia. Utva, though, may not have the capability to restart Orao production.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

			High Confidence Level				Good Confidence Level			Speculative			
Aircraft	**(Engine)**	**thru 01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**Total 02-11**
AVIOANE (Co-Product)													
IAR-93 (a)	VIPER MK 632-41R	36	0	0	0	0	0	0	0	0	0	0	0
IAR-93B	VIPER MK 633-41	111	0	0	0	0	0	0	0	0	0	0	0
Subtotal - AVIOANE (Co-Product)		147	0	0	0	0	0	0	0	0	0	0	0
SOKO, MOSTAR (Co-Product)													
IJ/INJ-22 ORAO(b)	VIPER MK 632-41R	17	0	0	0	0	0	0	0	0	0	0	0
J-22 ORAO	VIPER MK 633-41	74	0	0	0	0	0	0	0	0	0	0	0
NJ-22 ORAO	VIPER MK 633-41	35	0	0	0	0	0	0	0	0	0	0	0
Subtotal - SOKO, MOSTAR (Co-Product)		126	0	0	0	0	0	0	0	0	0	0	0
Total Production		273	0	0	0	0	0	0	0	0	0	0	0

(a)Does not include prototypes or preproduction aircraft.
(b)Includes two Orao prototypes.