

The Database of Cost References by Group—PDF#9

Prepared by Heuston Consulting, Inc., September 2009
Coldwarweaponsystemcosts.com

Components (Electrical Subsystems & Scientific*)

CP1 – New Inertial Navaid, Navigator

Cost -- \$35,000

Discussion – Litton talked of a price goal of \$35,000 for the platform and electronics alone.

Source – Aviation Week, May 4, 1970, p 69.

Recorded – June 25, 1970.

CP2 – Micro-miniature Autopilot for Business Jets (Lear AFC-70)

Cost – basic autopilot is expected to sell for less than \$10,000 excluding gyro instruments.

Discussion – provides essentially all the operational features found in jet transport systems, including automatic approach and control wheel steering, has been developed by W. P. Lear's new Avionics company, Microcom, Inc., Reno, Nevada.

Complete autopilot weighs less than 25 lbs., excluding the ac gyro flight instruments which provide altitude heading references.

Source – Aviation Week, November 9, 1970, p 67.

Recorded – November 20, 1967.

CP3 – Inertial Navigation System – Aircraft

Cost -- \$50,000 and \$70,000 in production

Discussion – recently tested by British Aircraft Corp., in a Royal Navy helicopter as a portable navigator capable of being inserted in the aircraft on a flight deck, performed with an accuracy approaching 2 nautical miles/hour.

Expects now to weigh about 19 lbs, depending on the size of its battery pack and excluding pilot controls.

Source – Aviation Week, October 21, 1960, p 75.

CP4 – Inertial Navigators in Commercial Transports.

Cost – Carousel 4 systems for the 747 cost about \$87,000 each.

Discussion – compared with about \$97,000 for the LTN-51.

Common system test console for both the Carousel 4 and LTN-51. Equipment of this type normally costs \$120,000 to \$150,000 and is needed at each maintenance facility.

Source – Aviation Week, November 11, 1968, p 79.

CP5 – Navigation System by Decca Systems, Inc.

Cost -- \$150,000

Discussion – Decca radio navigation system.

As long ago as 1969, it was advanced as a revival to VOR as a world wide common air navigation system.

California Legislature appropriated \$600,000 to help pay the costs of the test.

Purpose of study is to attempt to provide a navigational blanket across the State and the Pacific off shore area to improve navigational accuracy under the most restrictive weather conditions.

An average VOR site cost of \$150,000.

Under its state contract, Decca will furnish about 30 airborne receivers to be used by participants. These will include 15 Mark 15 units (worth \$12,000 each on the market), 10 Mark 12 marine receivers (leased at roughly \$125 a month, including all maintenance), two newly developed Harco G/1 general aviation models (they are not available on the market but probably will be priced between \$1,800 and \$3,500, when they are purchase, and the remainder light weight units for pleasure boats (probably to be sold for about \$1,000 per unit).

Source – American Aviation, November 11, 1968, p 23.

Recorded – January 7, 1969.

CP6 – Strapped Down Inertial Guidance- Navigation – SIGN-1

Cost -- %25,000 per system.

Discussion – result of recent advances in micro-circuit digital computers and gyro sensors.

Prediction from Honeywell’s Space System Group at St. Petersburg, Fla.

Called SIGN-1.

Source – Aviation Week, September 6, 1965, p 79.

Recorded – November 23, 1965.

CP7 – ECM – B-52 – (ALR-20 Counter Measure Receivers)

Cost -- \$400 for traveling wave tube.

Discussion –

Source – Aviation Week, February 7, 1966, p 53.

Recorded – February 22, 1966.

CP8 – Astro Observation Facility – Major Astronomical Telescopes

Cost – as follows

Discussion – Cost of Facilities -- \$ millions (1963)

Facility Description	Basic Telescopes	Aux. Instru. Etc.	Site Devel. Bldgs & Remote	Other Cost Contingencies	Av. Unit Facility Cost
A. Optical Telescopes					
1. 36 to 48” for Universities	\$0.3	--	--	\$0.1	\$0.4
2. 60 to 80”	0.8	0.12	--	0.08	1.0

for Good Obs. Un. Sites					
3. 150 to 300" for Best Obs, North Hemp.	8.5	2.3	5.7	2.0	18.5
B. Radio Telescopes					
1. High Res. Pencil Beam*	30.0	4.0	4.0	2.0	40.0
2. Aperture Syst. Mobile Array**	1.10	0.10	--	0.05	1.25
3. Fully Steerable 300' ***	7.5	0.2	--	0.3	8.0
*	Array, Multiple Unit—Nat'l Facility	(Cost of Entire System)			
**	Multiple Units of 130' Steerable at Existing Site per unit				
***	Oarabikiuds at Existing Obs. sites				

Basic Telescope construction costs taken from Fig. 21 and 22 showing cost vs aperture for major optical and radio telescopes.

Source – Ground Based Astronomics – A 10 Year Program, National Academy of Science 1964, p 81

Recorded – November 26, 1965.

CP9 – Apollo Camera

Cost -- \$90,000 contract

Discussion – Northwestern University

Contract to Manned Spacecraft Center

Will design camera and optics for photographing light spectra in the ultraviolet region emanating from stars and star fields during the manned Saturn Apollo 207

mission in 1968. The camera will be mounted in the Command Module spacecraft airlock and will be used to obtain a large number of moderate-dispersion spectra of stars, and direct photographs of Milky Way fields.

Source – Missiles & Rockets, October 4, 1965, p 9.

Recorded – December 20, 1965.

CP10 – Electron Microscope – Ultra-High Resolution,

Cost -- \$39,500 duty paid

Discussion – Highest resolving power available combined with lowest contamination rate, Viton gasketing, super-fine focus control, 5 Angstroms guaranteed resolution, better than 2 Angstroms has been demonstrated. 50, 75, and 100 KV.

Maximum magnification 250,000X

Hitachi Perkins-Elmer

Model HU-11B-1.

Source – Science, Vol. 150A, November 23, 1965, p 140A

Recorded – December 27, 1965.

CP11 – Mass Spectrometer

Cost -- \$32,000 Duty Paid

Discussion – (mass range to 1800, resolution 1000)

With heated sample inlet for gases, liquids and solids

RMU-60 Analyzer Unit with T-2M ion source, electron multiplier detector, electronics console with Honeywell 1706 Visicorder and incorporating combined diffusion pump-Vac Ion pumping system.

Hitachi Perkin-Elmer

Model RMU-6D-SE

Source – Science, Vol. 150A., November 23, 1965, p 145A

Recorded – December 27, 1965.

CP12 – X-Ray Equipment – Geigerflex-Model S Auto. Vacuum X-Ray Spectrometer

Cost -- \$22,030, Duty Paid

Discussion – Rigaku X-Ray Equipment

Perkin-Elmer

Source – Science, Vol. 150A, November 23, 1965, p 145A

CP13 – Radar Altimeter

Cost -- \$630 per unit

Discussion – weighs only 2 lbs

In a 14-volt version

Been developed by Bonzer, Inc., Shawnee, Kansas

TRN-70 vertical measurement equipment (VME)

Indicated aircraft altitude range of 200-2,500 ft.

Height measurement is accurate to within 5-10%

Source – Aviation Week, November 29, 1965, p 89.

CP14 – Spectrophotometers

Cost – Under \$300 per unit.

Discussion – Spectronic 600

Double-beam, double grating, ratio indicating

UV-visible range, 200 m mu to 650 m mu. 3 synchronous scanning speeds – 10 m mu, 50 m mu, and 25 m mu/minute, and forward and reverse slewing speeds.

Wave length accuracy and bandpass and constant – 5A over the entire range.

Science, Vol. 150A, p 112.

Recorded – December 28, 1965.

CP15 – Oscilloscope – Portable 50 MHz

Cost -- \$1,950 each

Discussion – Tektronix, Inc.

28 lbs, Type 453

Rack Mount Type, R453 -- \$2,035.

Source – Aviation Week, January 31, 1966, p 6

Recorded – February 11, 1966.

CP16 – 28' Transmitter Antenna

Cost -- \$.10 million for investment

Discussion – unit cost

For ground terminals – low altitude systems

Source – RAND RM-2779 – NASA. Communications Satellite Support

Information on the Cost Estimates Given in RM-2709 – NASA, June 30, 1961, p 11.

Recorded – February 4, 1964.

CP17 – X-Ray Unit – L-Band Microwave Linear Accelerator

Cost -- \$350,000

Discussion – Arco Division of High Voltage Engineering

25 million – electron volts

For Hill Air Force Base

Scanning minuteman motors.

Source – Missiles & Rockets, July 22, 1963, p 19.

Recorded – November 21, 1963.

CP18 – Airborne Radiometers

Cost -- \$140,000 apiece, including R&D

Discussion Ku band

Cost Guard will take delivery for its iceberg patrol

Source – Microwave News, July 1, 1965.

Recorded – July 19, 1965.

CP19 – Radiometric Receiver

Cost -- \$3,900, 50 Mc to 15 Gc; \$22w40 for plug in enabling 20-40-Gc operation

Discussion – Deocrpy: Model LR-101 uses switching comparator circuitry

And synchronous detection
Teltronics, Inc., Dept NW, Nashua
Source – Microwave, July 1, 1965.
Recorded – August 2, 1965.

CP20 – Aircraft Simulators – GF-4 Digital Simulator for DC-9 & 707

Cost – range from more than \$160/hour to about \$250/hour

Discussion – Link

Carrier estimates of aircraft costs per training hour bracket a wide range of vague approximations and only infrequently allow for lost revenue of the aircraft used for training purposes.

One airline estimates its Boeing 727 costs at only \$400/hour, while another uses a figure of \$525/hour, including fuel, oil, taxes, direct maintenance and maintenance burden.

A third carrier, however, states its costs at \$522/hour for a Boeing 727, and informed estimates range as high as \$1,250/hour.

Source – Aviation Week, November 1, 1965, p 79.

Recorded – November 26, 1965.

CP21 – Inertial Flight Data System

Cost -- \$25,000 a piece in quantities of 1,000 – accuracy of 3 nau. Miles per hour of flight.

Discussion – For 1 n. mile per hour of flight – same quantity – price would rise to \$35,000.

Control Systems Div. of Teledyne

No larger than an ordinary half-gallon milk container.

Inertial platform – weighing only 5 lbs.

Complete system including a 4 gimbal platform, computer and power supply weighs slightly less than 10 lbs. Fully packaged it measures less than 10” long by 4 and ¼ in. sq.

Power consumption is 25 w, plus an additional 60 w for thermoelectric, or Peltier cooler.

\$2 million in excess for development.

Source – Aviation Week, September 20, 1965, p 101.

Recorded – November 23, 1965.

CP22 – Single Side Band Radios for Airlines

Cost -- \$20,000 per aircraft, excluding cost of spares

Discussion – cost of retrofit with dual SSB equipment

Collins Radio Co., is the only US producer of airline type SSB equipment.

Built more than 10,000 of its 618 Ts, purchased by Pan Am and Eastern for their 727s, primarily for military use.

The equipment housed in a 1-ATR size case, provides 28,000 channels and has a peak envelope power of 400 w.

Sells for about \$5,000.

Source – Aviation Week, July 5, 1965.

Recorded – August 31, 1965.

CP23 – Stellar Inertial Doppler System

Cost -- \$200,000 per each in quantity production

Discussion – for navigation system for the C-5A logistics transport.

By Litton Systems.

Roughly twice the price of a pure inertial navigation system of the type Litton makes for the McDonnell F-4C.

Source – Aviation Week, July 12, 1965, p 31.

Recorded – August 31, 065.

CP24 – Radioisotope Microthruster Spacecraft Attitude Control Unit

Cost -- \$20,000 unit cost

Discussion – designed to produce low levels of thrust from 10 to minus 11 to 10 to the minus 5 lb – for periods of a year or more

First units will be continuous thrusting devices suitable for applications such as station keeping of a gravity stabilized synchronous satellite.

The nit will use hydrogen stored interstitially within the crystal lattice of a metal as a propellant and achieve a specific impulse of 500 sec.

Latter units, 900 sec.

Philco

Two year development program, \$250,000

Source – Aviation Week, July 12, 1965, p 35

Recorded – August 31, 1965.

CP25 – X-20A Guidance Subsystem

Cost – Design and Cost Data as follows

Discussion –

Primary Guidance System (PGS)

Inertial Measuring Unit – 40 lbs

3 axis-4 gimbal inertial platform, 3 (1 degree f) gyros

Digital Computer (Verdan)

Coupler Electronics Unit

Transient Stabilizer (primary power)

Total Weight

= 255 lbs.

R&D Cost to date

= \$20 million

Est. to completion

= \$16 million

Total

= \$36 million

Funding for 5 development systems

Source – Missiles & Rockets, August 19, 1963, p

Recorded August 19, 1963.

CP26 – Oscilloscope – Type 321A (without batteries)

Cost -- \$900 per unit

Discussion – Transistorized battery – operated portable

Weights 18 lbs

- Rechargeable battery set -- \$91.50
Protective carrying case \$30.00
Source – Aviation Week, December 13, 1965, p 7.
Recorded – January 19, 1966.
- CP27 – Personnel Rescue Beacon
Cost -- \$85,000 for 500
Discussion – developed by Military Development & Marketing Div. of National Cash Register Company.
Contract to Air force Aeronautical Systems Division.
To be carried in pocket of an airmans parachute.
Unit has a 175 mi line of sight range and transmits UHF signals.
Source – Aviation Week, August 26, 1964, p 94.
Recorded – January 30, 1965.
- CP28 – Pulsed Lights for Small Fields
Cost -- \$6,000 for standard version or \$8.500 for portable version.
Discussion – Don Hoskins Co., Chicago
Condenser discharge light.
Source – Aviation Week, March 2, 1964, p 84.
Recorded – October 2, 1964, p 84.
- CP29 – Passive Scanned Star Telescope Development
Cost -- \$69,200
Discussion – for use on a small, spin stabilized rocket research vehicle.
Developed by Honeywell to NASA, Langley.
Source – Aviation Week, September 2, 1963, p 26.
Recorded – January 29, 1964.
- CP30 – Navigation & Instrument Flight Systems
Cost – as follows
Discussion – King Radio Navigation and Instrument Flight Systems
KDF 800 receiver in the 200 to 1,700 kHz band = \$3,000
KT 75 SSR transponder which weighs about 7 lbs and costs = \$1,000
Source – Interavia, June 1968, p 717.
Recorded – August 26, 1968.
- CP31 – DC-10 Navigation System, McDonnell Douglas Transport
Cost – anticipated price of the system – possibly \$400,000 to \$500,000 per a/c.
Discussion – will restrict the full system largely to the long range Series 30 versions of the DC-10, at least initially.
Source – Aviation Week, August 31, 1970, p 32.
Recorded – October 16, 1970.
- CP32 – IHAS, Integrated Helicopter Avionics System for Sikorsky CH-53A
Cost -- \$300,000 each helicopter system

Discussion – amortizing the estimated \$27 million IHAS development cost over 104 CH-53A's now planned, plus manufacturing cost.

Source – Aviation Week, December 14, 1964, p 18.\

Recorded – January 5, 1965.

** Editorial Footnote: This old category included many small components with relatively low cost figures; and many that were not cost estimates but specific prices originally taken from vendor catalogs. These have been retained in the library but not converted into this digital file. If of interest, please contact us.*