The Database of Cost References by Group—PDF#14

Prepared by Heuston Consulting, Inc., May 2010
Coldwarweaponsystemcosts.com

MISCELLANEOUS – Catch All, Odd Items, Strange Cost Estimates, Some Bits of Trivia, Some Important Facts (from Congressional Hearing, etc.)[1]

MISC1 – Vietnam War Costs
Cost – about $2.5 billion a month
Discussion – about 50% more than Administration estimates.
Source – Aviation Week, February 13, 1967, p 25.
Recorded – May 5, 1967.

MISC39 – Vietnam War Costs
Cost – costing US $2 billion per month.
Discussion – Administrator David E. Bell of the Agency for International Development let the $2 billion figure slip out while urging Senate Foreign Relations Committee in a closed meeting last week to support the Presidents foreign aid request.
Source – Aviation Week, May 30, 1966, p 25.
Recorded – June 20, 1966.

MISC2 – DoD Space Program, Fiscal 1969 and 1968.
Cost – as follows, in millions

Discussion –	1969	1968
Manned Space Flight	$600	$431
Communications	$60.4	$67
Navigation	$22.7	$24.5
Space Born Detection	$112.4	$63.3
Space Defense	$15.5	$18.8
Vehicle and Engr. Dev.	$87	$81
Space Ground Support	$249.3	$271.3
Supporting R & D	$134.9	$123.4
General Support	$933.7	$869.2

[1] Editorial Note – It has been difficult to know what to include from about 150 hand written cost reference cards in this old miscellaneous category. We want to help estimators and analysts, especially those in SCEA, but since this whole Web site is being prepared free of any charges, with free PDFs that you can copy and print, we must not spend time converting hand written cost cards to digital format that are completely irrelevant to anybody. We have selected only about 50 of what seems to us as the most costly and most interesting historically. If you need help searching for some obscure references, a piece of equipment or subsystem, a process, or whatever, contact us; we may be able to provide personal help, free. Companies needing help, however, obviously, must contribute something in return for our Data Mining service.

Includes programs, development support organizations, general operational support, space related military constructions, not otherwise charged to space projects.
Source – Aerospace Technology, April 8, 1968, p 10.
Recorded – May 3, 1968.

MISC3 – Navy's First Deep Submergence Rescue Vehicle (DSRV-1)
Cost – has increased from the initial contracted amount of $8.2 million to more than $22 million.
Source – Aerospace Technology, December 18, 1967, p 27.
Recorded – January 16, 1968.

MISC4 – Saudi Arabian Air Defense
Cost -- $500 million
Discussion – US lost to the British
Only US hardware in the purchase will be the Raytheon Hawk Surface to Air Missile.
The Saudi Arabian government late last week was expected to sign formally for the purchase of 40 British Aircraft Corp. Lightening 3 Interceptors, 25 BAC Jet Provost Trainers and a number of Marconi Air Defense Radars.
The initial order will total approximately $300 million. The British have guaranteed spares and training over a 10 year period, which would bring the total export value of the package to about $500 million between now and 1976.
Source – Aviation Week, December 20, 1965, p 21.
Recorded – January 22, 1966.

MISC5 – Cuban Incident – US Air Force
Cost -- $37,362,000
Discussion – General Merrel – that is just out of the Operations and Maintenance. Overall our additional expense because of the Cuban situation figures out to be about $58 million.
Source – Senate Subcommittee of Appropriations Committee Hearings, 88th Congress, 1st Session, HR 7179, p 947.
Recorded – November 12, 1963.

MISC6 – West Point Academy
Cost – FY 64 -- $12,101, FY 63 -- $12,107, FY 62 -- $11,251.
Discussion – average cost per man year.
Source – Senate Subcommittee of Appropriations Committee Hearings, 88th Congress, 1st Session, HR 7179, p 800.
Recorded – November 12, 1963.

MISC7 – Air Force Academy
Cost – FY 64 -- $11,924.
Discussion – General Merrill -- per capita cost

Several years back when we were first getting started the cost per cadet man year was almost $25,000.
Source – Senate Subcommittee of Appropriations Committee Hearings, 88th Congress, 1st Session, HR 7179, p 936.
Recorded – November 12, 1963.

MISC8 – Dulles Airport Mobile Lounge
Cost -- $232,000
Discussion – Dulles now 21
Average cost
Progressive maintenance, with a daily 1.5 hour check plus intermittent checks at 25 and 100 hour intervals.
Several have already passed 300 hours
Checks require 4 hours
Source – Aviation Week, August 26, 1963, p 41.
Recorded – January 30, 1964.

MISC9 – NASA Charter Airlift
Cost – FY 1963 -- $1,306,000, FY 1964 -- $1,440,000
Discussion – 44 Aircraft
20 research, 13 proficiency and administration, 6 passengers, 3 cargo.
Jet Star at launch operations center (leased from Lockheed)
3 Gulf Stream Jets, 1 at headquarters, 1 at Marshall, 1 at Houston.
Dr. Abe has a Convair

	Loc.	Type	Contractor	FY 64 No.	FY 64 Cost
Passenger, cargo sched	Hq	--	East Coast Flying Ser.	--	$440,000
1. Tidewater Route	--	DC-3	--	1	--
2. Marshall Route	--	404	--	1	--
Nonsch. Exec A/C	MSFC	Aero Cmd.	Rocket City Asst Act Inc.	3	$300,000
Nonsch. Pass & some cargo	MSFC	Gulf Stream	Not determined	1	$700,000
Nonsch. Pass incl some cargo	LOC	Jet Star	Lockheed (for A/C) Capital AL for Oper and Maint.	--	--

$1,440,000
Object Class 2
Travel & Tras
Of Persons

Pg. 169 – 3 F-104's for proficiency training for the X-15 program pilots who are NASA pilots as well as military pilots.

NASA owns 22; 16 are Air Force, 1 Navy, and 3 Army

	NASA Owned	Leased Commercial	Air Force	Navy	Army	Total
Research	9	--	8	1	2	20
Proficiency	4	--	8	--	1	13
Admin.						
Passenger	4	2	--	--	--	6
Cargo	3	--	--	--	--	3
Passenger-Cargo	2	--	--	--	--	2
	22	2	16	1	3	44

Cost no included in the $1,440,000 – Air Force provides operations and maintenance on non-reimbursable basis. FY'64 NASA budget request includes $3,522,000 for operations and maintenance, $1,600,000 for initial spares, (1,400,000 for the 3 104's and $200,000 for the Jetstar procured in FY '64)

Source – House Appropriations Committee Hearings, 88th Congress, Part 3, p 165, etc.

Recorded – October 25, 1963.

MISC10 – ALOTS, Advances in Airborne Tracking

Cost – under a contract of about $1 million from the AF Eastern Test Range

Discussion – Airborne Lightweight Optical Tracking System

Operates on a modified KC-135 jet transport at altitudes of 40,000 ft to provide high quality film coverage of missile launch, staging, and re-entry.

In the ALOTS system, a 200 inch focal length telescope coupled to a television tracking system follows a missile automatically, and is expected to yield a resolution of less than 2 seconds of arc on 70% of exposed frames, with optical solar illumination, optical cruise speed during straight, smooth and level flight.

Source – Missiles & Rockets, November 22, 1965, p 26.

Recorded – January 25, 1966.

MISC11 – US Space Program

Cost -- $30 billion

Discussion – "From the time we put our first spacecraft into orbit (1958) to the present, we have spent about $30 billion by all agencies with space responsibilities. This amounts to about 31 cents per week per capita." Humphrey

Source – Technology Week, September 5, 1966, p 13.

Recorded – September 15, 1966.

MISC12 – Recovery Package for Aircraft Raising and Removal Equipment

Cost -- $1,975 per installation per month

Discussion – Leased for 5 years.

In case of an accident, the lesser would pay a per diem cost for personnel involved in the recovery operation, living expenses, any equipment needed outside of the AIR recovery package.
System will provide major economic benefits in speedily clearing runways at busy terminals and reducing repair costs to carriers by eliminating secondary damage caused by removal operations.
According to R. M. Morgan, service manager of the Boeing Co's Transport Division, these costs generally run about 25% and sometimes as high as 40%. The extra costs are so frequent that Boeing prefers to wait until the aircraft has been removed before bidding for a repair job.
Source – Aviation Week, January 24, 1966, p 93.
Recorded – February 9, 1966.

MISC13 – Jindivik MK 3 Pilotless Target Drone
Cost -- $2,226,192 for procurement of 14 targets
Discussion -- $3.4 million contract to Ling-Tempco-Vaught, Dallas, for procurement and operation of Australian designated.
Fixed price of $2,226,192 covers 14 targets and associated ground launching equipment.
A cost plus fixed fee contract for $1,139,770 is for material and technical services.
LTV personnel will launch and recover targets with technical direction at PMR.
Used by Australians for target presentations at altitude to 70,000 ft.
Source – Aviation Week, January 13, 1964, p 29.
Recorded – May 15, 1964.

MISC14 – Range Launch Instrumentation – NASA
Cost – as follows

	1962	1963	1964
Advance Instrumentation	--	--	$3,300,000
Design data & Measurement Instru.	--	--	$4,800,000
Safety Instrum.	--	--	$3,450,000
Launch Support Inst	--	--	$3,890,000
Range Telemetry Expansion for Merritt Isl area	--	--	$4,560,000
Subtotal, Indirect R&D	--	--	$20,000,000
Personnel Costs	--	--	$333,000
Operations of Installations	--	--	$783,000
Total Costs	--	--	$21,116,000
Total Personnel	--	--	36

The costs apply primarily to the new Merritt Island launch area, but also include support for operations conducted at Cape Canaveral on Saturn launch complex 34 and 37.
Source – House Appropriations Committee Hearings, 88th Congress, Part 3, p 348.
Recorded – October 31, 1963.

MISC15 – Power Costs for Langley, NASA, FY 64
Cost -- $199,000 for electricity for NASA per year.
Discussion -- $2,000,000 at Langley
Does not include now a certain amount to take care of the Air Force needs, because 2 or 3 years ago, we made an arrangement to supply the AF with power to get the advantage of the economical rate that we get.
AF compensates 50-50.
They pay us the average rate
They use about ¼ of a million kilowatts. We pay on the average around 1 cent.
Source – House Appropriations Committee Hearings, 88th Congress, Part 3, p173.
Recorded – October 25, 1963.

MISC16 – Largest Contractors – NASA – 1963.
Costs – as follows, Business firms listed according to net value of direct awards, 1 July to December 31, 1963.
Discussion –

	Thousands of Dollars	% pf Total Awards
North American, LA	$197,400	24
McDonnell, St. Louis	84,577	10
Aerojet General, Azusa	44,776	5
General Dynamic, San Diego	41,652	5
Chrysler Corp, New Orleans	32,805	4
Boeing	31,536	4
Douglas	30,963	4
United Aircraft	26,324	3
Radio Corp., Princeton	18,870	2
IBM, Rockville	18,377	2
Grumman Aircraft Eng, Bethpage	17,458	2
Space Technology, LA	15,130	2
Total	$826,453	100

Source – House Appropriations Committee Hearings, 88th Congress, Part 3, p 325.
Recorded – October 30, 1963.

MISC17 – Flight Simulator, 3 degree of freedom g seat dynamic flight simulator

Cost -- $111,541
Discussion – from North American Aviation, Columbus Div.
Grumman aircraft Engineering Corp., Bethpage, NY
Built and installed
Cockpit of the simulator will consist of a side by side seating arrangement with capability of producing a cockpit velocity of 20 rps and accelerations as high as 4 gs.
Source – Aviation Week, November 25, 1963, p 69.
Recorded – March 16, 1964.

MISC18 – US Army Division
Cost – as follows
Discussion – Division Cost Comparison in Continental US millions of dollars

Division Type (current TOE*)	Initial Equipment	5 year Operational Costs	Total 5 year Costs
Air Assault	282	705	987
ROAD Mechanized	155	646	801
ROAD Infantry	111	582	693
ROAD Armored	182	681	863
ROAD Airborne	76	579	655
* Table of Organization and Equipment			

Source – Aviation Week, February 24, 1964, p 65.
Recorded – May 7, 1964.

MISC19 – Data Network
Cost -- $4.5 million
Discussion – includes Wendover extension
Includes $750,000 for maintenance performed under an incentive type contract.
Operational for about 1 and ½ years.
Used extensively by NASA Flight Research Center in X-15 testing.
Motorola began work on system 5 and ½ years ago and will complete current extension by December 15.
Unmanned sites
Range is about 150 miles wide on either side of a line connecting the sites for an average 300 mile width.
Source – Aviation Week, December 9, 1963, p 29.
Recorded – October 2, 1964.

MISC20 – Air Force Eastern Test Range, Operations, formerly (AMR)
Cost -- $112 million for one year.
Discussion – 12th consecutive contract.

Pan American World Airways Guided Missile Range Division received contract last week for continued operations of AFETR.
RCA, principal subcontractor to Pan Am is expected to receive about $38 million of this contract.
Source – Aviation Week, June 29, 1964, p 25.
Recorded – October 14, 1964.

MISC21 – FAA Operating Costs
Cost – from $125 million ten years ago to about $750 million today.
Discussion – Number of civil aircraft has increased less than 50%.
Source – Aviation Week, February 3, 1964, p 87.
Recorded – May 14, 1964.

MISC22 – Sea Going Tracking Station
Cost – about $15 million
Discussion – a platform comparable to the 170 foot square initial Delos design would cost about $15 million, about $2,700 a ton.
Design consideration call for on station endurance of 18-24 months, 10,000 full power operating hours on machinery between overhauls and 30-60 day full supply.
Draft on-station is 45 feet, displacement 8, 150 tons.
Source – Aerospace Technology, May 6, 1968, p 35.
Recorded – June 4, 1968.

MISC23 – NAVAID-DIL, Multi Sensor Navaid – Doppler Inertial Loran
Cost -- $104,000 per copy for quantity buy
Discussion – Kearfott is expected to propose a DIL system combining a number of existing production or reproduction equipments scaling about 103 lbs, a shade under the 105 lb figure reported at the end of its earlier funded demonstrations study. The system will meet the 3 cubic feet volumetric goal, will require about 900 watts and surpass the 300 hour MTBF objective.
Source – Aviation Week, February 5, 1968, p 81.
Recorded – March 14, 1968.

MISC24 – US Military Space Program
Cost – remains stable at or below the $2 billion level
Discussion – for the near future
Word from DoD at the first round of advanced Planning Briefings in Boston.
Source – Missiles & Rockets, March 14, 1966, p 9.
Recorded – April 8, 1966.

MISC25 – Radio Telescope, 10 megawatt Radio-telescope Array
Cost -- $100 million to build, Total of $1-2 billion.
Discussion – a multibillion dollar program for development of a 10,000 antenna receiving array and a multimillion dollar effort to produce a smaller transmitting

antenna array were proposed here (New York) by scientists to vastly broaden the radio astronomy capability for probing outer space.
The massive antenna complex suggest by Dr. Oliver could be built in four phases over a 10 year period and at a cost of from $3-5 billion.
Antennas would be in the $100,000 to $200,000 range for a total of $1-2 billion.
Source – Missiles & Rockets, April 4, 1966, p 31.
Recorded – May 6, 1966.

MISC26 – DSRV, Deep Submergence Rescue Vehicle – Navy
Cost -- $5-6 million for prototype development contract
Discussion – current DSSP plans call for 5 operational DSRV's following the development of one prototype.
Planned for operational depths of 6,000 feet, prototype depth limitation of 3,500 ft
Source – Missiles & Rockets, April 18, 1966, p 12.
Recorded – May 3, 1966.

MISC27 – Solar Cell Systems
Cost -- $250 to $800/watt
Discussion – Present solar cell costs for most missions are approximately $250/watt but can run as high as $800/watt generating capacity in the heart of the Van Allen belt.
The cost of solar cells is expected to drop to $75 to $100/watt by 1975, if a large market is established.
Source – Electrical Power Generation Systems for Space Application, NASA, SP-79, 1965
Recorded – January 5, 1965.

MISC28 – World's First Transistorized Cable
Cost -- $33 million
Discussion – link between Florida and the Virgin Islands
This will provide a 720 channel basic capacity over nine times the 128 channel basic capacity of the latest transatlantic cable.
A US Puerto Rico link with a transistorized cable would cost approximately $33 million. To extend Puerto Rico's coverage to Europe, would require another transatlantic transistorized cable, costing about $80 million.
By an investment of about $10 million in a 1,500 channel satellite, depending on development costs charged, and about $12 million in a ground station – a total of about $22 million – Puerto Rico would achieve this same telecommunications capability.
With an investment of about $5 or $6 million for another ground station, Puerto Rico could use these channels for connection with South America or Central America, for example.
Source – Aviation Week, March 7, 1966, p 125.
Recorded – March 18, 1966.

MISC29 – Transatlantic 5 Network

Cost – Total cost is $107 million
Discussion -- $34.5 contributed by AT&T, remainder by Spain, Portugal, Italy, UK, and other countries.
The major cost, $70.4 million, will be for the US-Spain transatlantic segment.
The remainder of $36.2 million will be for links from Spain to Italy, Portugal, and UK.
Source – Aviation Week, November 6, 1967, p 21.
Recorded – November 30, 1967.

MISC30 – NEASC, National Environmental Satellite Center
Cost -- $30-$35 million per year operating costs.
Discussion – The Center is geared to launch one ESSA replacement in June and another in July.
Plans are for six launches a year because of the high deterioration from radiation.
Commerce's system would mesh into the $200-$300 million a year global Weather Watch being developed by the World Meteorological Organization, and arm of the United Nations.
Source – Aviation Week, March 7, 1966, p 125.
Recorded – March 18, 1966.

MISC31 – DSSP, Deep Submergence System Program, US Navy
Cost -- $5 or $6 million
Discussion – contract for the prototype development and production of the rescue vehicle.
DoD is asking for some $22 million in FY67.
$15 to $16 million left for the remainder of the program
As yet, there are no cost estimates for the 6 operational rescue vehicles, the in house expenditure for development of these vehicles, or the development expense for four search vehicles, having the eventual capability to reach depths of 20,000 feet.
Source – Missiles & Rockets, March 14, 1966, p 11.
Recorded – April 8, 1966.

MISC48 – DSRV, Navy's Prototype Deep Submergence Rescue Vehicle
Cost -- $8,265,169
Discussion – Lockheed Missiles & Space Co.
To build prototype, which will be able to operate to 6,000 feet depth
4 operational DSRV's, each having a 20,000 feet capability will eventually be constructed.
Source – Technology Week, July 11, 1966, p 13.
Recorded – August 22, 1966.

MISC32 – Project A-NEW Avionics System per each Navy/Lockheed P-3.
Cost -- $1 million
Discussion – The Navy is seeking $23 million for airborne anti-submarine warfare avionics including its Project A-NEW (AW, March 1, 1965, p 36).

Funds for production of the A-NEW avionics system, to be installed on Navy/Lockheed P-3 patrol aircraft, are expected to be requested next year. Each aircraft system is expected to cost approximately $1 million, according to present estimates.
Source – Aviation Week, March 7, 1966, p 235.

MISC33 –Costs of US Damage Limiting Postures
Costs – as follows
Discussion --
Program Costs FY66 – 75 (billions) Soviet Damage Potential US Fatalities

	Cost Attributed to Assured Destruction	Damage Limiting Increment	Total US Posture	Soviet 1st Strike	US 1st Strike
1970 USSR Expt Threat					
US Approved Program	--	--	--	130-135	90-95
1975 USSR Threat I					
US AD Posture + Ltd Civil Defense	22.4	1.5	23.9	130-135	90-105
US AD Post + Full Fallout Shelters	22.4	3.4	25.8	110-115	80-85
US DL Post. A	22.4	22.5	44.9	80-95	25-40
US DL Post. B	22.4	30.1	52.5	50-80	20-30
USSR Threat II					
US DL Post. C	28.5	24.8	53.3	105-110	35-55
US DL Post. D	28.5	32.3	60.8	75-100	25-40

Source – Statement of Secretary of Defense McNamara before Senate Subcommittee on DoD Appropriations FY67-71, l967 Budget, p 53.
Recorded – March 21, 1966.

MISC34 – Cost of Hedge Against Lower Than Expected Missile Effectiveness

Costs – as follows, Ten Year System Costs in Billions of Dollars(a)
Discussion –

Assumed Degradation		Costs to Hedge With	
Missile Effectiveness (Realized/Planned)	Additional Missiles	B-52/Gravity Bombs Against Current Soviet Anti-bomber Defense	FB-111/SRAM (Against Improved Anti Ballistic Def. (b)
1.0	--	--	--
.8	.8	1.3	5.4
.6	2.0	2.6	7.7
.5	3.0	3.3	8.7
.4	4.5	4.0	9.6
.3	7.0	4.7	10.6
.2	12.0	5.3	11.5

(a) Ten year system costs include for missiles – operating costs plus procurement of missiles for replacement and testing, for bombers – operating costs of bombers/tankers, modification costs plus procurement of the FB-111.
(b) Assuming the Soviets were to deploy a force of new improved manned interceptors on the western part of the Soviet Union.

Source – Statement of the Secretary of Defense McNamara before the Senate Subcommittee on DoD Appropriations, Fy67-71, 1967 Budget. P 50.
Recorded – March 21, 1966.

MISC35 – Walleye Television-guided Bomb
Cost -- $12 million Navy contract
Discussion – designed to carry a conventional, high-explosive warhead to a tactical target.
Martin Co. is building flight qualification Walleye weapons and some operational versions under a $12 million Navy contract.
In operation, the 1,100 lb bomb's television guidance system is locked on the target by the pilot, who uses a monitor screen in the cockpit. Once launched, the Walleye guides itself to the target.
A ram-air turbine powers the guidance equipment.
Source – Aviation Week, February 21, 1966, p 29.
Recorded – March 11, 1966.

MISC36 – Automatic Flight Control Systems for Navy A-6A Intruder Attack Aircraft
Cost -- $2.5 million contract for 118 units
Discussion – Sperry Rank Corp's Phoenix, Arizona
Contract from Grumman Aircraft Engineering Corp.
Source – Aviation Week, May 9, 1966, p 102.

MISC37 – Armored Car, M60A/1
Cost -- $136 million for 500, $272,000 each
Discussion –
Source – Missiles & Rockets, May 23, 1966, p 9.

Recorded – June 17, 1966.

MISC38 – High Powered Solar Array System
Cost -- $5 million
Discussion – The Boeing Company, has been selected to build for the Jet Propulsion Laboratory.
Over a three year period
The deployable solar cell panel will be 1,250 feet long.
Source – Missiles & Rockets, May 30, 1966, p 9.
Recorded – June 21, 1966.

MISC40 – Phase 2 of Integrated Light Attack Avionics System
Cost -- $17.9 million
Discussion – Sperry Rank Corp. will build and test prototype models.
Source – Missiles & Rockets, June 20, 1966, p 11.
Recorded – July 12, 1966.

MISC41 – Mohole
Cost -- $127 million
Discussion -- $54.5 million has been obligated thus far for Mohole, of which $21 million has been spent on bills or lies in bills payable. Only about $15 to $20 million could be retrieved if the project is terminated, according to Haworth. This means that at least $34 million be wasted.
Source – Missiles & Rockets, June 20, 1966, p 11.
Recorded – July 12, 1966.

MISC42 – DIFAR, Passive Sonobuoy System
Cost – Development of DIFAR will cost about $50 million
Discussion – includes both contractors
Magnavox Co. and Sanders Associates, Inc., are competing contractors.
Source – Aerospace Technology, August 28, 1967, p 22.
Recorded – September 21, 1967.

MISC43 – S-2 Improvement
Cost -- $50 -- $100 million
Discussion – The USX – program has been valued at $2 - $3 billion. Informed estimates place the cost of the Grumman built S-2 improvement program at $50 -- $100 million, if all 200 plus S-2's are updated.
Source – Aerospace Technology, August 28, 1967, p 21.
Recorded – September 21, 1967.

MISC44 –European High Energy Particle Accelerator
Cost -- $400 million
Discussion – sponsored by the European Organization for Nuclear Research. Belgium, which offered a site near Namur, is believed to have a slight edge.

Unit would produce about 300 billion electron volts, would be some 2,400 meters in diameter, and would cost about $400 million to be shared by member countries.
Source – Aerospace Technology, August 14, 1967, p 3.
Recorded – September 19, 1967.

MISC45 – Telescope, 150 inch
Cost -- $12 million
Discussion – The British & Australian Governments will build --- at Siding Springs Mountain, 300 miles northwest of Sidney, Australia.
It will take 6 years to complete.
Source – Technology Week, May 15, 1967, p 3.
Recorded – May 24, 1967.

MISC46 – VLA, Very Large Array Radio Telescope
Cost -- $52 million over 4 years. Cost through construction.
Discussion – 36 25 meter-diameter paraboloidal reflector antennas all electronically controlled to function as a single receiving system.
Southwest US.
Source – Technology Week, February 13, 1967, p 4.
Recorded – March 21, 1967.

MISC47 – Space Power Hardware – in the 3-10 kw (e) regime.
Cost – Development costs
Discussion –

Thermoelectronic	4 years	$20-$30 million
Fuel cells	4-5 years	$20-$30 million
Organic Rankin	4-5 years	$30-$40 million
Mercury Rankin	4-5 years	$35-$45 million
Closed Cycle Brayton	5-6 years	$60-$120 million

Source – A Review and Evaluation of Selected Space Power Systems for Military Applications, Briceland, RH, IDA, December 1965, IDA/HQ 65-4234, p 5.
Recorded – October 17, 1965.

MISC49 – Modular Thermoelectric Power Unit
Cost -- $1 million contract to Westinghouse Electric.
Discussion – for development.
Which can withstand rigors of space and provide power to run communications and other systems on either manned or unmanned vehicles. The module will use heat from a SNAP generator.
Source – Missiles & rockets, April 11, 1966, p 10.
Recorded – May 2, 1966.

MISC50 – Electric Propulsion in the 1 –Mw, class
Cost – for development of $3 million
Discussion – development time of about 12 years.

Source – RM-4056 – NASA, Electrical Propulsion in Space: Mission Comparisons, Development Costs, Reliability, and their Implications for Planning, Pinkel, et al, August 1964, p x.
Recorded – October 5, 1966.

MISC51 – Summary of Air Force Structure FY67
Cost – not applicable
Discussion – The AF ICBM missile force under current planning is scheduled to grow from the present total of 934 to 1,054 in 1972.
Over the same period, the number of Navy Polaris-type missiles will be increased from 512 to 656.
The number of strategic bombers, on the other hand, will decline from 680 to 465, a cut of 30%. Of these, 255 will be late-model Boeing B-52 G's and H's already in service.
The remainder will be GD F-111, Mach 3.
Source – Aviation Week, March 7, 1966, p 79.
Recorded – March 17, 1966.

MISC52 – Centrifuge, Three Man
Cost -- $10.5 million
Discussion – built by the Rucker Co., Oakland, California, has been formally accepted at the Manned Spacecraft Center at Houston.
The device, with a 12 foot diameter spherical gondola, 50-feet arm and controls. Will be used to train Apollo re-entry environments.
The gondola, which depressurizes to simulate altitudes up to 125,000 feet, can be whirled up a max 30 g for a long as 3 minutes, or 20 g for as much as 30 minutes.
A 6,700 hp dc motor, built by Westinghouse, drives centrifuge
Source – Missiles and Rockets, February 28, 1966, p 7.
Recorded – March 11, 1966.

MISC53 – ROAD Division Conversion from Standard Division, US Army
Cost -- #33 million
Discussion – Senator Saltonstall – includes the material, all the equipment, the changes in types of personnel, and all that goes with it.
Secretary Vance – In some cases we will use substitute items rather than the newest of equipment. Actually the $33 million you speak of is for Military Personnel, Army, and O7M, Army. The following is the breakdown
63 MPA, $40 million
O&M $16 million
64 MPA $20 million
O&M $16.1 million
Senator Saltonstall – Will you have 16 ROAD divisions equipped in 1964?
Secretary Vance – We will no have them fully equipped.
Page 476 – 16 divisions, 975,000 soldiers
66% are fighting troops

34% in training, communications, and other types of support
Page 477 – 52% of officers (112,000) are in fighting category
Page 626 – about 2,000 more men in a ROAD Division than in our present divisions.
Source – Senate Subcommittee of Appropriations Committee Hearings, 88th Congress, 1st Session, HR 7179, p 471, and others.
Recorded – November 7, 1963.

MISC54 – Main Battle Tank
Cost – Total R&D = $190 million
Discussion – DoD will travel to Germany to discuss another supplemental agreement between the two countries.
Source – Aerospace Technology, February 26, 1967, p 3.
Recorded – March 13, 1968.[2]

MISC55 – Nuclear Submarine, SSN (X)
Cost -- $75 million cost of development
Discussion – Development time is estimated at about 4 years, covering the period until the ship is actually launched.
Source – Technology Week, May 1, 1967, p 16.
Recorded – May 17, 1967.

MISC56 – Main Battle Tank
Cost – Total R&D = $190 million
Discussion – DoD will travel to Germany to discuss another supplemental agreement between the two countries.
Source – Aerospace Technology, February 26, 1968, p 3.
Recorded – March 13, 1968.

[2] Editorial Note – Some of the cost references omitted are summarized as follows without any cost details: Project START, Micro Cameras, Rescue Beacon, Airborne Target Costs, Airborne Simulator, Multi Function Forming Press, Boron Filament, Silicon Carbide Filament, and many more. Ask us if you need them.