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[REDACTED]

Encl # 4 to  
[REDACTED]  
COPY [REDACTED]

ENCLOSURE II  
FCIC  
PROPOSAL AND SPECIFICATIONS  
[REDACTED]  
31 OCTOBER 1958

Declassified and Released by the N R C

In Accordance with E. O. 12958

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DEFENSE PRODUCTS DIVISION

FORMERLY

RECONNAISSANCE SYSTEMS DIVISION

FORBES LANE FORT MONMOUTH PLAZA NEW JERSEY



13 November 1958

Refer: SC-28

Itek Corporation  
700 Commonwealth Avenue  
Boston, Massachusetts

Attention:



Subject:

Itek Letter Subcontract dated 5 May 1958

Reference:

(a) Fairchild Proposal letter SC-18 dated 10/6/58

Enclosures:

- I Three copies of Statement of Work dated 10/25/58
- II Three copies of Cost Breakdowns
- III Three copies Anticipated Monthly Funding Schedule
- IV Ten copies Specification SME-DB-1 dated 9/13/58 and Amendment No. 1 dated 10/25/58
- V Ten copies Specification SME-DC-3(A) dated 9/10/58 and Amendment No. 1 dated 10/23/58
- VI Ten copies Specification SME-DN-24(A) dated 9/12/58 and Amendment No. 1 dated 10/23/58
- VII Ten copies Specification SME-DY-1 dated 8/22/58, Amendment No. 1 dated 9/29/58 and Amendment No. 2 dated 10/25/58
- VIII Ten copies Specification SME-DY-2 dated 8/27/58, Amendment No. 1 dated 9/29/58 and Amendment No. 2 dated 10/23/58
- IX Ten copies Specification SME-DY-3 dated 8/28/58, Amendment No. 1 dated 9/29/58 and Amendment No. 2 dated 10/23/58
- X Ten copies Specification SME-EB-3 dated 9/3/58 and Amendment No. 1 dated 10/25/58
- XI Ten copies Specification SME-EB-4 dated 9/5/58 and Amendment No. 1 dated 10/23/58
- XII Ten copies Specification SME-EB-5 dated 9/9/58 and Amendment No. 1 dated 10/25/58
- XIII Ten copies Specification SME-EN-2(A) dated 9/12/58 and Amendment No. 1 dated 10/24/58
- XIV Ten copies Specification SME-EN-3 dated 9/4/58

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13 November 1958

Refer: SC-28

Gentlemen:

We are pleased to submit herewith our firm cost and delivery proposal to accomplish the work spelled out in Enclosure I, which is being performed under the subject letter subcontract. This proposal supersedes our previous proposal submitted as reference (a).

Our estimated cost and fixed fee to accomplish the work required by Items 1, 2, 3, 3(a), 5, 8, 9, 10, 11, 12 and 14 of Exhibit I of the Statement of Work (Enclosure I) amounts to  the lot. This firm cost estimate (Estimate No. I) is based on the following understandings and conditions:

1. This estimate also includes the cost of the non deliverable items included in Part III of the Statement of Work, with the exception of the items in Paragraphs (3) and (6) of subject Part III, the cost of which is included in Estimate No. II.
2. Itek shall furnish to Fairchild at no charge the items listed in Part I(D), in accordance with the delivery schedule for these items spelled out in Part II of the Statement of Work.
3. This estimate also includes the cost for the construction, maintenance and purchase of items relative to the security requirements for this program, such as special conference room, enclosed laboratory area, and safe.
4. Our proposal is based on receiving a waiver on performing the White Noise Vibration test as outlined in Paragraph 3.2.2.5.4 of General Environmental Specification 9103-L2916. This is requested as the vibration test outlined in Paragraph 3.2.2.5.3 is considered the more severe test and, therefore, the White Noise test is not required.
5. The transit cases shall be designed in accordance with the applicable specifications of the work statement but no costs are included herein for performing the tests.



Date: \_\_\_\_\_  
Serial: 8712

Our estimated cost and fee to accomplish the work described in Items 4 and 13 of Exhibit I of the Statement of Work, and Part III, Paragraphs (3) and (6) of the Statement of Work amount to [REDACTED] the lot. Our firm cost estimate (Estimate No. II) is based on the following understandings and conditions:

1. Itek approval to purchase a high altitude pump to be used in conjunction with the existing environmental chambers at Fairchild for the environmental evaluation testing of cameras and components.
2. This estimate also includes the costs for enclosing, insulating, painting, special wiring and the special lighting, transportation and related equipment associated with a tower for photographic purposes to check acuity and banding of the camera equipment being provided under Estimate No. I. The basic structure (tower) will be provided by Fairchild. However, a sum of [REDACTED] has been included in this to cover the costs of the above items chargeable on this job.
3. The cost of a small altitude chamber (in the amount of [REDACTED]) for our performance in this program has been included in this estimate.

Our estimated cost and fee (Estimate No. III) to provide the work called for in Item 6 of Exhibit I of the Statement of Work amount to [REDACTED] the lot. This estimate includes the cost to supply for nine months the services of a Project Engineer and a Technician continuously for nine months, commencing with the initial camera deliveries. The above personnel will reside at whatever destination is required by Itek, within the continental United States. In addition to the above, we have included the equivalent of eight man months of engineering type personnel for on-call technical assistance and support for the duration of the contract. We have included in this estimate the cost of a two month break-in period at Fairchild for each of the above personnel, who will be away for the nine month period. Our estimate also includes the cost of travel and subsistence at [REDACTED] per day. This estimate was prepared on the basis of a 54 hour work week as being normal. While away from our facilities.



13 November 1958

Refer: BC-28

Our estimated cost and fee (Estimate No. IV) to provide the spare parts to support the cameras and test consoles being delivered to you in this program, amounts to [REDACTED]. We are proceeding with the fabrication of the spare parts as listed in the attachment to the Statement of Work (Enclosure I).

All of the above estimates are submitted subject to the following:

1. Delivery of equipment will be f.o.b. our plant, Syosset, New York and packaging will be in accordance with standard commercial practice except where transit cases are required.
2. To permit compliance with the delivery schedule, overtime on the basis of a 60 hour work week, with provision for spot overtime up to 72 hours per week, is required. In addition, some of this work will be performed with a multi-shift operation. Therefore, the contract should provide for the allowability for the multi-shift and overtime premium costs.
3. As further assurance for delivery schedule compliance, sole source procurement of some materials and components will be necessary. Wherever possible, competitive quotes will be obtained. In cases where sole source procurement is necessary, vendors and sources with whom we have had previous satisfactory experience will be utilized where practicable.
4. This proposal is submitted on the basis of receipt of a definitive CPFF Contract by 15 December 1958.
5. Costs and delivery quoted herein are contingent on our receipt of Itek and Government Furnished Material and equipment in accordance with the schedule for these items included in the Statement of Work.

This revised estimate is the result of the following increases and decreases in the program from the program on which our previous estimate was based.

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3 November 1958

Report SC-13

1. The addition of six more resistance thermometer instrumentation devices.
2. The addition of V/H Transducer to be designed and fabricated are included as a component of each camera.
3. Increased scope of thermal inputs including isolation of plate #1 from plates #2 and #3 and more sophisticated radiation shielding of the camera.
4. The added requirement of using the second non deliverable camera complete relative to all thermal requirements, and a rescheduling of this camera for a thermal test at the customer's facility.
5. Increase in Liaison and Tech. support from 8 months to 9 months.
6. A deletion of one non deliverable camera and cassette.
7. A deletion of two each flight cameras and cassettes.
8. Reduction of spare parts requirement.
9. Reduction of repair work on the program to a minimum.
10. Reduction in quantity of transit cases.
11. Deletion of the requirement for qualification testing of the transit cases.
12. Establishing the camera weight at 75 pounds as a design objective. This weight objective does not include all customer sponsored weight.
13. Revising the delivery schedule for first delivery on 31 January 1959. The new delivery schedule is such as to permit limiting of night shift operations to a minimum.

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[REDACTED]  
13 November 1958

Refers: 110-26

Enclosure III includes our estimated funding requirements to cover our operation under this program. In this regard, additional funding over that presently provided in the letter subcontract is required. In accordance with our recent telephone conversations, we are proceeding with work under the program although we have exceeded the [REDACTED] funding commitment presently included in the letter subcontract. Your cooperation in furnishing immediate additional funding is requested.

We trust the above meets with your approval. However, if you have any questions, please contact the undersigned.

Very truly yours,

FAIRCHILD CAMERA AND INSTRUMENT CORPORATION  
Defense Products Division

[REDACTED]  
Enclosures

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C O S T   B   R   A   K   D   O   W   N

Estimate No. II - Items 4 and 13 of Exhibit A to the Statement of Work and Part III, Paragraphs (3) and (6) of the Statement of Work

<u>Labor</u>	<u>Hours</u>	<u>Rate</u>	<u>Amount</u>	<u>Amount</u>
Engineer	1,856		\$	
Eng. Technician	285			
Eng. Aide	335			
Sr. Draftsman	410			
Sr. Engineer	1,040			
Project Engineer	510			
Design Engineer	740			
Designer	570			
Photographer	110			
Prod. Design Leader	230			
Technical Writer	120			
Proj. Coordinator	300			
Sr. Proj. Engineer	650			
Sr. Eng. Technician	2,740			
Instrument Maker	2,660			
Total Engrg. Labor			\$	
Overhead @ 120%				
Material				
Sub-Contract				
Incoming Insp.	200		\$	
Mechanical Insp.	400			
Environmental Test	12			
Electrical Insp.	150			
Testing	75			
Total Q.C.			\$	
Overhead @ 175%				
Cost to Date				
Packaging				
Prime Cost			\$	
Genl. & Adm. Exp. @ 15%				
Total Cost			\$	
Fee @ 7.5%				
<u>Sales Price</u>			\$	



COST BREAKDOWN

Estimate No. III - Item 6 of Exhibit I of the Statement of Work

<u>Labor</u>	<u>Hours</u>	<u>Rate</u>	<u>Amount</u>	<u>Amount</u>
Eng. Technician	2,426	[REDACTED]	↓ [REDACTED]	[REDACTED]
Project Engineer	4,316	[REDACTED]	[REDACTED]	[REDACTED]
Total Engng. Labor				↓ [REDACTED]
Overhead @ 120%				[REDACTED]
Travel				[REDACTED]
Cost to Date				[REDACTED]
Prime Cost				↓ [REDACTED]
Genl. & Adm. Exp. @ 15%				[REDACTED]
Total Cost				↓ [REDACTED]
Fee @ 7.5%				[REDACTED]
<u>Sales Price</u>				↓ [REDACTED]

COST BREAKDOWN

Estimate No. 1 - Items 1, 2, 3(a), 4, 5, 6, 7, 8, 9, 10  
Part of Exhibit I of the Statement of Work



<u>Labor</u>	<u>Hours</u>	<u>Rate</u>	<u>Amount</u>	<u>Notes</u>
Sr. Research Engr.	1,000		\$	
Program Director	1,920			
Engineer	7,212			
Eng. Technician	11,100			
Eng. Aide	1,457			
Sr. Draftsman	3,200			
Sr. Engineer	2,820			
Project Engineer	6,205			
Design Engineer	1,820			
Designer	764			
Photographer	1,412			
Prod. Design. Leader	936			
Product Designer	430			
Technical Writer	295			
Jr. Proj. Coord.	7,914			
Proj. Coordinator	2,243			
Sr. Proj. Engineer	3,859			
Sr. Eng. Technician	6,729			
Instrument Maker	32,192			
Total Engrg. Labor				
Overhead @ 120%				
Material				
Sub-Contract				
Van Dykes				
Travel				
Incoming Insp.	180		\$	
Mechanical Insp.	1,390			
Environmental Test	1,240			
Optical Test	800			
Factory	2,665			
Total Factory & QC				
Overhead @ 175%				
Cost to Date				
Packaging				
Prime Cost				
Genl. & Admin. @ 15%				
Total Cost				
Fee @ 7.5%				

COST BREAKDOWN

Estimate No. IV - Spare Parts to Support the Cameras and Test Consoles

<u>Labor</u>	<u>Hours</u>	<u>Rate</u>	<u>Amount</u>	<u>Amount</u>
Mr. Engineer	80	[REDACTED]	♦ [REDACTED]	♦ [REDACTED]
Jr. Proj. Coord.	20	[REDACTED]	[REDACTED]	[REDACTED]
Sr. Eng. Technician	264	[REDACTED]	[REDACTED]	[REDACTED]
Instrument Maker	450	[REDACTED]	[REDACTED]	[REDACTED]
Total Emgrg. Labor				♦ [REDACTED]
Overhead @ 120%				[REDACTED]
Material				[REDACTED]
Sub-Contract				[REDACTED]
Incoming Insp.	40	[REDACTED]	♦ [REDACTED]	[REDACTED]
Mechanical Insp.	22	[REDACTED]	[REDACTED]	[REDACTED]
Total Q.C.				♦ [REDACTED]
Overhead @ 175%				[REDACTED]
Cost to Date				[REDACTED]
Packaging @ 1.5%				[REDACTED]
Prime Cost				♦ [REDACTED]
Genl. & Adm. Exp. @ 15%				[REDACTED]
Total Cost				♦ [REDACTED]
Fee @ 7.5%				[REDACTED]
<u>Sales Price</u>				♦ [REDACTED]

Anticipated Monthly Funding Schedule

<u>Month</u>	(Monthly Requirement) <u>Total Dollars</u>	<u>Cumulative Total</u>
Cost expended, plus open Commitments thru 10/31/58		
November 1958		
December 1958		
January 1959		
February 1959		
March 1959		
April 1959		
May 1959		
June 1959		
July 1959		
August 1959		
September 1959		

STATEMENT OF WORK

PART I

- (A) FCIC shall, within the period of time specified in Part II hereof, furnish and deliver to ITEK the supplies, data and reports as set forth in Exhibit I attached hereto and hereby made a part hereof.
- (B) Any reports submitted in compliance with this contract shall bear the contract number.
- (C) All specifications, documents, and/or drawings which are referenced in this contract, but are not attached hereto, are hereby incorporated herein by reference.
- (D) ITEK shall furnish the items listed below to FCIC in accordance with the specifications and delivery schedule in Part II hereof:
- (1) Optical Test Fixture
  - (2) Lens Weight and balance mock-ups.
  - (3) Main camera lens assemblies.
  - (4) Velocity sensing fixtures FCIC Part No. 789TEG25. (to be transferred from Air Force Contract No. [REDACTED])
  - (5) Rolls of film as described in specification No. SME-DB-1, dated 13 September 1958 and Amendment No. 1, dated 25 October 1958.
  - (6) Rugs thermometers, calibrated and serialized.

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(A) The work called for in Part I (A) hereof shall be completed and the supplies, data and reports delivered to ITEX in accordance with the following delivery schedule. (All deliveries and acceptance will be at EGIC).

		<u>Quantity</u>	<u>Date</u>
Item 1	Camera Mock-up	1	21 June 1958
		1	7 July 1958
	Cassette Mock-up	1	21 June 1958
		1	7 July 1958
Item 2	Camera Mock-up	1	12 July 1958
		1	19 July 1958
	Cassette Mock-up	1	12 July 1958
		2	19 July 1958
Item 3	Camera Flight Units 12 Total Units	100	31 Jan. 1959
		100	14 Feb. 1959
		100	14 Mar. 1959
		1	11 Apr. 1959
		1	18 Apr. 1959
		1	16 May 1959
		1	30 May 1959
		1	4 July 1959
		1	18 July 1959
		1	15 Aug. 1959
		1	5 Sept 1959
		1	12 Sept 1959
Item 3(a)	Cassette Flight Units 19 Total Units	100 ‡	13 Sept 1958
		200 ‡	20 Sept 1958
		200 ‡	27 Sept 1958
		100 ‡	11 Oct. 1958
		2	23 Nov. 1958
		2	30 Nov. 1958
		2	7 Dec. 1958
		1	27 Dec. 1958
		1	3 Jan. 1959
		1	31 Jan. 1959
		1	14 Feb. 1959
		2	28 Feb. 1959
		1	28 Mar. 1959

\*\* NOTE: These units are essentially the same as deliverable units but may not have completed all acceptance tests at the time of delivery and will not have been qualified.

‡ NOTE: These units delivered without transit cases.

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		<u>Quantity</u>	<u>Date</u>
Item 4	Console, Test and Check-out	1 ea # 1 1	3 Jan. 1959 31 Jan. 1959 28 Feb. 1959
Item 5	Engineering Manual	6 6	Concurrent with first flight units Within 2-1/2 months after initial flight deliveries.
Item 6	Liaison and Technical Support	2 personnel	Concurrent with deliveries of first flight units.
Item 7	Spare Parts	(See Attached List)	Within 30 days after delivery of flight units.
Item 8(a)	Acceptance Test Data Sheets	1 repre and 10 copies	Concurrent with flight unit deliveries
	(b) Qualification Test Data Sheets	1 repre and 10 copies	Within 45 days of completion of tests.
	(c) Final Engineering Report	1 repre and 10 copies	Within 30 days after delivery of final contracted items.
Item 9(a)	Drawings to be furnished	3 copies each	Weekly
	(b) Final Drawings	1 reproducible	Within 45 days after delivery of final contracted items.
Item 10	Supply Spoals	15 25 40 40	27 Aug. 1958 5 Sept. 1958 12 Sept 1958 19 Sept 1958
Item 11	Thermal Mock-up of Camera and Cassette	1 each	15 Aug. 1958

NOTE: These units are essentially the same as deliverable units but may not have completed all acceptance tests at the time of delivery and will not have been qualified.

NOTE: These units delivered without transit cases.

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		<u>Quantity</u>	<u>Date</u>
Item 12	Transit Case		Concurrent with
	Console Cases	2	equipment deliveries
	Camera Cases	14	
	Cassette Cases	14	
Item 13	Handling and Loading Fixture	1	Concurrent with
	Full Supply Spool		delivery of initial
			flight units.
Item 14	Engineering Studies		
	(a) Feasibility Study		
	Thermal Investigation		
	(b) Film Creep Investigation		
	(c) Thermal Insulation -		
	Feasibility between Mech		
	Plates No. 1, 2 and 3.		

(B) ITEK shall furnish at no cost to FCIC the supplies of Item (D) of Part I in accordance with the following delivery schedule:

(1) Optical Test Fixture	1	14 Nov. 1958
(2) Lens weight and balance mock-ups.	1	15 July 1958
(3) Main Camera Lens assemblies		
14 Total lenses.	1	28 Oct. 1958
	1	23 Nov. 1958
	1	30 Nov. 1958
First ten (10) lenses to be Type IIa.	1	21 Dec. 1958
	1	4 Jan. 1959
Last four (4) lenses to be Type IIb.	2	8 Feb. 1959
	2	15 Mar. 1959
	2	12 Apr. 1959
	1	17 May 1959
	2	21 June 1959
(4) Velocity Sensing Fixtures	2	Transferred from AF contract No. [REDACTED] by [REDACTED] 4 October 1958

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	<u>Quantity</u>	<u>Date</u>
(5) Dummy Film - 30 rolls	3 rolls	14 July 1958
total	3 "	11 Aug. 1958
	4 "	27 Sept 1958
	5 "	4 Oct. 1958
	6 "	29 Nov. 1958
	6 "	20 Dec. 1958
	3 "	7 Feb. 1959
Live Film (SO-1221)	3 rolls	27 Sept. 1958
15 rolls total	4 "	11 Oct. 1958
	4 "	29 Nov. 1958
	4 "	7 Feb. 1959
Live Film (SO-118C)	3 rolls	27 Sept 1958
15 rolls total	4 "	11 Oct. 1958
	4 "	29 Nov. 1958
	4 "	7 Feb. 1959
(6) Range thermometers for Camera and Cassette	40	3 Nov. 1958
	40	17 Nov. 1958
	40	15 Dec. 1958
223 Pieces for Camera	40	12 Jan. 1958
<u>57</u> Pieces for Cassette	40	16 Feb. 1959
	40	23 Mar. 1959
280 Pieces total	40	20 Apr. 1959

Part III - Non-Deliverable Items

FCIC will fabricate the following items which will be retained at FCIC for the duration of the program.

- (1) One (1) set of camera and cassette mock-ups.
- (2) One (1) set of camera and cassette weight and C.G. mock-ups.
- (3) Special test equipment as required to check the performance of the camera and cassette or their components. The optical performance simulator will be furnished by IYK.
- (4) Two (2) additional cameras with transit cases and two (2) cassettes including one (1) transit case for environmental and performance test purposes. The first non-deliverable shall be ready for testing at FCIC on or about 22 November 1958. The second non-deliverable shall be available for thermal tests at the customer's facility on or before 3 January 1959. It is understood that this second non-deliverable will be returned

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to FCIS on or before 17 January 1959. On this basis the second non-deliverable camera will be ready for qualification testing on 7 February 1959.

NOTE: The altitude, temperature, humidity, vibration and shock tests shall be conducted at the ITK Environmental Test Facility.

(5) Additional camera and cassette components for environmental test program in accordance with the Schedule I of Special Order Nos. SME-PB-1 dated 13 September 1958 and Amendment No. 1 dated 25 October 1958; and SME-DC-1 dated 10 September 1958 and Amendment No. 1 dated 23 October 1958.

(6) Breadboards as indicated below:

- (a) Minimum power film spool drive.
- (b) Reaction and momentum-free breadboard.
- (c) Light Sealing Foot Breadboard.
- (d) Film Drive breadboard.
- (e) Light Weight Mount plane breadboard.
- (f) Cassette sealing breadboard.
- (g) Lens drive breadboard.

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EXHIBIT I

- Item 1 Design and fabricate camera and cassette mock-up in accordance with Specification Nos. SME-DB-1, dated 13 September 1958 and Amendment No. 1 dated 25 October 1958; and SME-DC-3(g), dated 10 September 1958 and Amendment No. 1 dated 23 October 1958.
- Item 2 Design and fabricate camera and cassette weight and balance mock-up in accordance with Specification Nos. SME-DB-1, dated 13 September 1958 and Amendment No. 1 dated 25 October 1958; and SME-DC-3(g), dated 10 September 1958 and Amendment No. 1 dated 23 October 1958.
- Item 3 Design and fabricate camera flight unit, less supply spool, in accordance with Specification No. SME-DB-1, dated 13 September 1958 and Amendment No. 1 dated 25 October 1958.
- Item 3(a) Design and fabricate cassette flight unit in accordance with Specification No. SME-DC-3(g), dated 10 September 1958 and Amendment No. 1 dated 23 October 1958.
- Item 4 Test and Check-out Console in accordance with Specification No. SME-DN-24A, dated 12 September 1958 and Amendment No. 1 dated 23 October 1958.
- Item 5 Engineering type operation and maintenance manual in accordance with Specifications SME-DB-1, dated 13 September 1958 and Amendment No. 1 dated 25 October 1958; SME-DC-3(g), dated 10 September 1958 and Amendment No. 1 dated 23 October 1958; and SME-DN-24A, dated 12 September 1958 and Amendment No. 1 dated 23 October 1958.

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- Item 6 Liaison and Tech Support - The contractor shall provide Tech Support and Liaison as follows:
- (a) 1 each Engineer - Electro-Mechanical for a period of nine (9) months. The engineer must be thoroughly familiar with all the deliverable equipment spelled out in this work statement.
  - (b) 1 each Engineering Technician - Electro-Mechanical for a period of nine (9) months. The technician must be capable of maintaining all equipment provided by FCIC in accordance with the work statement.
  - (c) Technical Liaison and Support equivalent to two (2) months for each of four(4) engineering type personnel covering the duration of the contract.
- Item 7 Spare parts in accordance with attached lists as follows:
- (a) Camera Spare Parts List, Rev. B., dated 25 October 1958.
  - (b) Test Console Spare Parts List, Rev. A, dated 23 October 1958.
- Item 8 Data
- (a) Engineering Data Sheets with sufficient information to permit evaluation of the acceptance tests in accordance with Specifications SME-EB-3, dated 3 September 1958 and Amendment No. 1 dated 25 October 1958; SME-EB-4 dated 5 September 1958 and Amendment No. 1 dated 23 October 1958; and SME-EN-2A, dated 12 September 1958, and Amendment No. 1 dated 23 October 1958.
  - (b) Engineering Data Sheets with sufficient information to permit evaluation of the qualification tests in accordance with Specifications Nos. SME-EB-5 dated 9 September 1958 and Amendment No.1 dated 25 October 1958.

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- (c) Final engineering reports summarizing significant accomplishments of this program with recommendations.

Item 9 Drawings to be furnished.

- (a) Interim drawings covering the following categories: Major assemblies, layouts (functional), outlines and installation drawings (weight and C.G. data), and schematics including power requirements.

(b) Set of all final drawings.

Item 10 Design and fabricate Supply Spools compatible with the applicable paragraphs of Specification SME-DB-1, dated 13 September 1958 and Amendment No. 1, dated 25 October 1958.

Item 11 Design and fabricate a thermal mock-up of the camera and cassette to simulate the heat transfer conditions of the equipment.

Item 12 Design and fabricate transit cases in accordance with Specifications SME-DY-1, dated 22 August 1958 and Amendment No. 1 dated 22 August 1958, and Amendment No. 2 dated 25 October 1958; SME-DY-2, dated 27 August 1958, and Amendment No. 1 dated 29 September 1958 and Amendment No. 2 dated 23 October 1958; SME-DY-3, dated 23 August 1958, and Amendment No. 1 dated 29 September 1958 and Amendment No. 2 dated 23 October 1958.

Item 13 Design and fabricate full supply spool handling and loading fixtures compatible with deliverable equipment.

Item 14 Engineering Studies

- (a) Feasibility study thermal investigation.  
(b) Film creep investigation.  
(c) Thermal insulation - feasibility between Mech Plates 1, 2 and 3.

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TEST CONSOLE SPARE PARTS LIST

<u>Part No.</u>	<u>Item</u>	<u>Vendor</u>	<u>Qty.</u>
#Model 1500	2000 cps Power Oscillator	Industrial Test Equipment Co.	2
ND-2622-00	Oscillograph Recorder	Brush Instruments	2
ND-5621-00	Dual Channel Amplifier	Brush Instruments	2
RA-2921-30	Ink, Roll Chart Paper	Brush Instruments	4 doz. rolls
RA-2821-30	Ink, Pen	Brush Instruments	4
RA-2760-16	Ink, Red, Pint	Brush Instruments	2
#Model SS-32-20	28 Volt Power Supply	NJE Corporation	1
5AR-SS-1	Amplifier	NJE Corporation	2
PPM-50-3000	Capacitor	Pyramid	4
AN-1020	Rectifier, Metallic	Automatic Mfg.	8
PT-530	Rectifier, Metallic	Automatic Mfg.	8
696DC	Lamp	General Electric	12
FEM-15	Fuse, 15A, 125V	Bussmann	12
MDX-7	Fuse, 7a, 125V	Bussmann	12
2W176	Transistor	Motorola	4
2W141	Transistor	DeLoe	24
	3AG, 6.25A, 125V Slo-Blo Fuse	Bussmann	12
	3AG, 1.5A, 250V Fuse	Bussmann	12
	3AG, 2A, Slo-Blo Fuse	Bussmann	12
	3AG, 3A, 125V Fuse	Bussmann	12
	3AG, 3/4A, 125V, Slo-Blo Fuse	Bussmann	12
5Y30T	Vacuum Tube		4
5U4OA/OB	Vacuum Tube		4
6X4	Vacuum Tube		4
12AT7	Vacuum Tube		20
12AX7	Vacuum Tube		12
0A2	Vacuum Tube		8
12BD4	Vacuum Tube	Tung Sol	8
5687	Vacuum Tube	General Electric	16
5881	Vacuum Tube	General Electric	8
6550	Vacuum Tube	CBS	16
96	3 Watt Lamp		16
47	Lamp		10
126621	Neon Lamp Assembly	Brush Instruments	4
TR132-R	Mercury Battery	Mallory	4

# - These items not now used in consoles, but procured before new spares policy directive issued.

\* - Quantity reduced to 1 by cancelling 1 with NJE.

NOTE: All items shown on this list were procured and in the house before new spare parts policy was directed by customer. Difference in items and quantities between list dated 13 September 1958 and this Revision A list, 23 October 1958, reflect spare parts savings.

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25 October 1953  
Revision 3

CAMERA SPARE PARTS LIST

<u>Part No.</u>	<u>Name</u>	<u>Quantity</u>
956-40	Commutator	2
956-429	Boot, Lens to Camera	2
956-518	Boot, Camera to Vehicle	2
956-519	Boot, Horizon	1
956-520	Cap. Lens	2
956E19	Brush Assembly	2
956E20	Preamplifier Assembly	2
956E78	Lamp Assembly, Digitote	2
956E19	Pidometer Assembly	1
956E60	Pidometer Assembly	2
956E87	Drive Motor Gear Assembly	2
956E112	Lens Assembly, Digitote	2
956E139	Accelerating Control Assembly	2
956E144	Supply Assembly, Synchronizing	2
956E10	Lamp Assembly, Frequency	2
956C11-1	Aperture	2
956C11-2	Aperture	2
956C11-3	Aperture	2

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SYSTEMS MANAGEMENT AND ENGINEERING DEPARTMENT  
Fairchild Camera and Instrument Corporation  
5 Aerial Way, Syosset, New York

~~SECRET~~

SPECIFICATION  
NO. SME-DB-1

13 September 1958

HIGH ACUITY PANORAMIC CAMERA

Prepared by:



Proj. Engineer

Approved by:



Program Director

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1. SCOPE

- 1.1 This specification covers one type of photographic high acuity panoramic camera for aerial reconnaissance. The basic design of this panoramic camera utilizes a curved focal plane arc with panoramic scanning by rotation of the lens about its nodal point.

2. APPLICABLE DOCUMENTS

- 2.1 The following documents of the issue in effect on the date of this specification, form a part of this specification to the extent specified herein.

9103-L2916 - Revised 9 May 1958 - Project Stovepipe -  
"General and Environmental Specification."

3. REQUIREMENTS

- 3.1 Component Parts - The camera shall consist of the complete photographic system including lens, camera structure, film advance mechanism, image motion compensation, horizon recording optics, and time recording as described in the following paragraphs.

3.1.1 Horizon Recording - These units shall record both horizons 180° apart and perpendicular to the flight direction. Recording shall occur on alternate frames only and shall be initiated by the position of the camera at the nadir position.

3.1.2 Elapsed Time Recording - Elapsed time will be recorded on an area of the film outside the picture format and to be determined by convenience of camera design. The component selected for the recording shall be mutually accepted by the contractor and the customer and shall be provided with suitable inputs from the system in order to operate. Minimum size and weight shall be a major consideration in the choice of components.

3.1.3 Frequency Recording - During the scanning operation of the camera, a lamp pulsed by a fixed frequency shall record a series of exposed equally spaced marks along the edge of the format. The customer shall be informed of the input requirements necessary to the camera design.

.2 Basic Camera Design

- 3.1.1 Configuration - The design of the camera shall conform to the basic configuration and space limitations as shown in Figure No. 1.

- 3.2.2 Camera Weight - The weight of the complete camera system shall be held to an absolute minimum; and shall not exceed 65 pounds. This 65 pound limit however, shall not include the weight of the Digitote and its associated components and an additional 2 pound allowance for camera mounting structure as mutually agreed upon by the contractor and customer.
- 3.2.3 Lens Assembly - The main camera lens shall be a 24" focal length f5.0 high acuity optical system suitable for covering a 70mm slit format. The lens assembly in a suitable barrel will be furnished to the contractor by the customer. The lens barrel construction shall include mounting features that are mutually agreeable to the customer and contractor. The lenses furnished to the contractor shall be calibrated so that these nodal points will be coincident with the axis of rotation and the focal length will be held to  $24.000" \pm .005"$ .
- 3.2.4 Camera Scan Angle - The active format scan angle shall be  $70^\circ$  utilizing approximately  $15^\circ$  each of mechanical travel of the lens scanning system for acceleration and deceleration. This requires a total angle of scanning of approximately  $160^\circ$ .
- 3.2.5 Film Requirements - Unperforated thin base film of a nominal 3-1/2 mil (0.0035") thickness and 70mm width shall be used. The emulsions that will be used with this camera shall be Eastman Kodak type SO-1221 and SO-1188 (designations for thin base SO-1213 and SO-1166 respectively).
- 3.2.6 Film Capacity - The camera shall be designed to properly handle a 20" diameter film capacity properly wound on a 4" diameter core. The film spool of special design shall have a minimum of 1/8" spool flange projection above the full roll of film.
- 3.2.7 Space Between Picture Format - The space between adjacent formats shall be utilized for data recording and shall be held to a minimum. The maximum space permitted between picture formats shall not exceed 2-1/2".
- 3.2.8 Allowable Film Wastage During Camera Start - The total allowance for film wastage during any starting of the film transport mechanism shall be a maximum of two (2) frames. This maximum wastage shall be the total average of starts over a full roll of film at maximum film speed. From the time the start sequence command is received, the camera system shall be up to speed in less than 15 seconds.
- 3.2.9 Format Width - The effective picture width of each frame shall be  $2.1" \pm .03$ .

- 3.2.10 Exposure Time - Exposure time shall be preset with a fixed slit to provide exposure times of 1/500 sec., 1/1000 sec., and 1/2000 sec. at the nominal scanning rate. These three (3) fixed slits shall be readily interchangeable into the final camera in a minimum amount of time.
- 3.2.11 Camera Cycling Rate Range - The camera shall be capable of providing a cycling rate range from .263 cycles per second to .613 cycles per second. This range shall be governed by a systems command driving the camera drive motor at the appropriate speed. Camera operation is initiated and terminated by the receipt or deletion of vehicle power derived from the basic vehicle programmer. The scanning drive of the camera shall be determined in flight by a V/H signal supplied by the vehicle and compatible with the camera servo system.
- 3.2.12 Reaction and Momentum Balance - The design of the camera shall provide an absolute minimum of residual reaction and momentum to the basic vehicle. The degree of reaction and momentum balance required shall be as mutually agreed upon by the contractor and the customer.
- 3.2.13 Optical Scanning Rate - The optical scanning rate shall be a function of the camera cycling rate and shall vary proportionately with the camera cycling rate. The relationship shall be radians/second scanning rate corresponding to the nominal camera cycling rate of .438 cycles per second.
- 3.2.14 Forward Motion Compensation Rate - The required forward motion compensation rate at the nadir shall be .828 inches/second for the nominal cycling rate of .438 cycles per second. The camera drive mechanism shall be such that there is a fixed mechanical relationship between the forward motion compensation, the cycling rate and the scanning rate. Therefore, the forward motion compensation rate ranges from .497 inches/second to 1.159 inches/second. The relationship of the forward motion compensation and the cycling rate has been established for a 10% overlap condition at the nadir.
- 3.3 Performance Requirements
- 3.3.1 Camera General Performance - Every effort shall be made toward producing a high acuity photographic camera which, when operated, will produce a minimum degradation of static lens-film resolution. The design objective shall be such that photography taken under simulated operating conditions with the customer furnished test equipment shall not be degraded by more than 10% of the static lens-film resolution, also determined with the same customer furnished test equipment.

3.3.1.1 Forward Motion Compensation Accuracies - The forward motion compensation mechanism and the servo system shall have performance compatible with the design objective of paragraph 3.3.1.

3.3.1.2 Lens Drive Smoothness - The lens drive system, which is used for focal plane scanning in addition to forward motion compensation shall be smooth such that no appreciable visual banding can be detected with the unaided eye on the resulting photograph.

### 3.3.2 Data Recording Performance

3.3.2.1 Horizon Recording - The design objective for the horizon recording shall be such that roll and pitch information can be extracted to an accuracy of  $\pm 1^\circ$ . Yaw measurements shall be extracted by edge lap measurements of adjacent photographs and it shall be a design objective that these measurements properly compensated will yield yaw accuracies of  $\pm 1^\circ$ . For calibration purposes, four fiducial marks of sufficient quality, spaced  $90^\circ$  apart, shall be recorded on each horizon exposure.

3.3.2.2 Time Recording - Time shall be recorded in each frame from the appropriate command system to produce time information to within .1 second. A digital recording head shall be utilized in the camera for this purpose and the time recording accuracy shall be in accordance with the accuracy of the command.

3.3.2.3 Nadir Recording - A single fiducial mark locating the camera nadir position shall be recorded outside of the picture format area and on each exposure.

3.3.2.4 Serial Number Recording - A camera serial number shall be recorded outside of the picture format area and in the proximity of the nadir fiducial mark on each exposure.

3.3.3 Focal Plane Accuracy - The curved focal plane shall be a fixed arc of  $24''$  nominal radius. The accuracy of the focal plane shall be compatible to the lens system and the general camera performance requirements of paragraph 3.3.1.

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3.3.4 Power Consumption of Camera System - The total power consumption of the camera system shall be held to an absolute minimum and shall be compatible with the following sources. The maximum total average power permitted from all these sources shall not exceed 165 watts. The power required by the Digitote and its associated components shall not be included in this 165 watt total.

- (a) 28 volt battery supply varying from 22 to 29.5 volts.
- (b) 28 volt DC supply, regulated to  $\pm 0.5\%$ .
- (c) 115 volts AC, 2000 cycles, single phase, regulated to  $\pm 1.0\%$  in frequency and  $\pm 5.0\%$  in voltage.
- (d) 115 Volts AC, 400 cycles, three phase, regulated to  $\pm .02\%$  in frequency and  $\pm 1.0\%$  in voltage.
- (e) 115 volts AC, 400 cycles, single phase, regulated to  $\pm 1.0\%$  in frequency and  $\pm 5.0\%$  in voltage.

3.4 Camera Design Details

- 3.4.1 Allowance for Film Splices - The camera film handling systems and guides shall be designed to allow for smooth passage of the required number of proper film splices expected in each roll of operational film. The camera shall be capable of passing film that has been properly butt spliced with 1" wide polyester film tape (Minnesota Mining and Manufacturing Co. type #850 or equivalent).
- 3.4.2 Film Loading - The camera shall be capable of being loaded in subdued light using live film for leader without excessive light striking of the supply of live film.
- 3.4.3 Main Lens Light Shield - The main lens light shield design shall be mutually agreed upon between contractor and the customer. For convenience of installation, this light shield may be attached to the lens assembly after the camera has been installed in the vehicle.
- 3.4.4 Film Transport Rollers - A minimum diameter of 1" shall be used for all rollers in the film transport system.
- 3.4.5 Remote Indication Requirements - The contractor shall provide the necessary transducers and/or electrical connections to permit remote indication of various operating functions of the camera system as mutually agreed upon between the contractor and the customer.

- 3.4.6 Operational Temperature - For the purposes of design, the operational temperature shall be  $70^{\circ} \pm 3^{\circ}$  F as mutually agreed upon between the contractor and the customer.
- 3.4.7 Thermal Considerations - To assure stable operational temperatures, the structural mounting plates shall be gold plated to the extent as mutually agreed upon between the contractor and the customer. To further assure stable temperatures, open areas in the plates shall be kept to a minimum where practical. Where not practical for reasons of handling, assembly or threading of film, the Prime contractor shall seal off open areas deemed necessary with gold foil at their facilities. The above requirements apply only to the deliverable flight units.
- 3.5 Mock-ups - Appropriate space and weight and balance mock-ups shall be provided in accordance with the Work Statement. A simple mock-up shall be fabricated to be used in space utilization application. An accurate simulator of the final camera configuration shall be fabricated to permit the ready mock-up of total system weight and balance. A mock-up designated to be retained at the contractors facilities for the duration of the program shall reflect the current external configuration whenever changes occur.
- 3.6 Engineering Manual - An engineering manual shall be furnished which shall contain test and service procedures necessary to assure the satisfactory operation of the system. This manual shall be furnished in the form of standard quality reproduction and need not be prepared to any Military Specification.
- 3.7 Technical Support and Liaison - Engineering and technical assistance shall be provided at places designated by the customer for the check out and flight conditioning of the reconnaissance equipment, system design and Liaison with the customer.
- 3.8 Reports - All reports called for in the contract shall be of an engineering type and need not be prepared in accordance with any special format or Military Specification. These reports however, shall be complete and include all necessary data to properly permit engineering evaluation.
- 3.9 Drawings - All drawings to be prepared for this project shall be working drawings of sufficient detail to permit fabrication of additional equipment at a future time by an experimental or model shop facility. These drawings need not conform to any military specification and shall include sketches wherever possible.

- 3.10 Design and Selection of Components - The design and selection of components for this camera shall be compatible with the performance and environmental requirements of the system. The best available items shall be used and the components need not be in accordance with specific military specifications.
- 3.11 Environmental Conditions - The components and overall camera shall be designed in accordance with specification 9103-L2916 entitled, "Project Stovepipe - General Environmental Specification - revised 9 May 1958." The components to be evaluated shall be tested in accordance with Schedule I attached. The environmental tests performed are detailed under the Qualification Test Section, paragraph 4.
- 3.12 Spare Parts - A complete list of spare parts requested for the camera shall be submitted for customer approval by 23 August 1958. Customer approval of the submitted list will be requested within two (2) weeks after receipt. This revised list shall be priced by the contractor and resubmitted by 13 September 1958 for formal approval. Formal approval of prices and quantities shall be provided to the contractor no later than 27 September 1958.

4. QUALIFICATION TESTING

- 4.1 Acceptance Tests - Acceptance tests shall be performance tests to be accomplished on each deliverable camera system to assure proper functioning of the equipment. The tests shall be in conformance with the requirements of Acceptance Test Specification, SME-EB-3.
- 4.2 Environmental Tests - The environmental testing shall be performed on selected components and the first non-deliverable flight units for the purposes of qualifying the deliverable equipments. The components to be tested and the tests they are to undergo are included in Schedule I attached and hereby form a part of this specification. The environmental tests shall be as indicated in the following paragraphs which reference the appropriate paragraph of the General Environmental Specification 9103-L2916 Rev. 2, dated 9 May 1958. The tests selected represent the most critical in accordance with the requirements and therefore shall constitute the qualification test specification for the camera system.
  - 4.2.1 Temperature, Altitude and Humidity Tests - The temperature, altitude and humidity tests shall be conducted in accordance with the requirements of paragraph 4.1.3 of the General Environmental Specification referenced herein.

- 4.2.2 Explosion Proof Tests - Explosion proof tests shall be conducted in accordance with requirements of paragraph 4.6 of General Environmental Specification referenced herein.
- 4.2.3 Drop Tests - Drop tests shall be conducted in accordance with the requirements of paragraph 4.7.1.2 of the General Environmental Specification referenced herein.
- 4.2.4 Vibration Tests - Vibration tests shall be conducted in accordance with the requirements of paragraph 4.8 of the General Environmental Specification referenced herein.
- 4.2.5 Shock Tests - Shock tests shall be conducted in accordance with the requirements of paragraph 4.9 of the General Environmental Specification referenced herein.
- 4.2.6 Acceleration Tests - Acceleration tests shall be conducted in accordance with the requirements of paragraph 4.10 of the General Environmental Specification referenced herein.

5. FURNISHED EQUIPMENT

- 5.1 Customer Furnished Equipment - The customer shall furnish to the contractor on or before 4 October 1950 an optical test fixture capable of mounting the camera and furnishing tests of the camera. This equipment shall also be capable of testing the camera's forward motion compensation mechanism results within the desired order of accuracy.
- 5.2 Government Furnished Equipment - The contractor shall be furnished with two (2) Velocity Sensing Fixtures (FCIG part No. 789TEC25 previously used on Air Force Contract [REDACTED] for the duration of the program. The contractor shall be permitted to alter the design of this equipment as necessary without the requirements of returning it to its original form.



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SCHEDULE I

COMPONENT ENVIRONMENTAL TEST SCHEDULE

<u>Part No.</u>	<u>Name</u>	<u>Temperature Alt, &amp; Hum. TS 956-2001</u>	<u>Vibration TS 956-2003</u>	<u>Shock TS 956-2002</u>	<u>Accel. TS 956-2004</u>	<u>Explosion TS 956-2005</u>
956-174	Transistor	X				
956-427	Solenoid, F.	X	X	X	X	
956-428	Solenoid	X	X	X	X	
956-508	Tach. Generator	X				
956B30	Preamplifier Assy	X	X	X		
956B42	Accelerating Control Assembly	X	X	X		
956B72	Clutch and Brake Assembly	X				
956B74	Clutch Assembly	X				
956B76	Clutch Assembly	X				
956B77	Brake Assembly	X				
956B78	Recording Assy, Digitote	X	X	X	X	
956B79	Fiducial Assembly	X	X			
956B82	Recording Assembly	X	X	X	X	
956B87	Drive Motor Gear Assy	X				
956B91	Supply Assembly, Synch, Pulsing	X	X			
956C10	Lamp Assy, Freq.		X			
956E4	Spool Assembly		X	X	X	
956B88	Flaten Assembly	X				
956B63	Main Mtg Plate Assy.		X			

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DEFENSE PRODUCTS DIVISION  
Systems Management and Engineering Department  
Fairchild Camera and Instrument Corporation  
5 Aerial Way, Syosset, New York

Amendment No. 1

Specification No. SNE-DB-1

25 October 1958

High Acuity Panoramic Camera

Prepared by:

[REDACTED]

Project Engineer

Approved by:

[REDACTED]

Program Director

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AMENDMENT

Dated 25 October 1958

No. 1

This Amendment forms part of and is attached to (FMCA) Systems  
Management and Engineering Department Specification No. SME-DB-1

Dated 13 September 1958

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The following paragraphs of Specification SME-DB-1, dated 13 September 1958 shall be amended as follows:

Paragraph 2.1 Change #9103-L2916 - Revised 9 May 1958 - Project Stovepipe-  
"General Environmental Specification."  
to read "SME-EB-5, Environmental Test Specification dated  
9 September 1958."

Paragraph 3.3.2 Change to read as follows: "Camera Weight - The weight of  
the complete camera system shall be held to an absolute  
minimum with a design objective of 75 pounds. This weight  
objective, however, shall not include the weight of the  
Digitote and its associated components and an additional  
two pounds allowance for camera mounting structure as  
mutually agreed upon by the contractor and customer."

Paragraph 3.3.2.4 Change "nadir fiducial mark" to read "horizon recording."

Paragraph 3.4.5 Delete in its entirety.

Insert: "Instrumentation Requirements - For the purposes  
of telemetering, the following functions shall be brought  
to the camera main connector:

- a) Thirteen Temperature Signals - The temperature sensors shall be Customer supplied and shall be located in the camera as mutually agreed upon between the contractor and the customer.
- b) Four (4) V/H Signals - The V/H transducer shall be supplied by the contractor.
- c) One (1) Light Leak Signal - The light leak transducer shall be supplied by the contractor.

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Reason:

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Approved by: 

25 October 1958

- d) One (1) Center of format signal.
- e) One (1) Film transport signal.
- f) Five (5) Elapsed time signals. (Representing 5 digits).

NOTE: The increase in weight due to above instrumentation requirements is considered Customer sponsored and therefore for the purposes of contractual weight agreements, shall not be charged to the final camera weight."

Paragraph 3.4.7

Delete in its entirety.

Insert - "Thermal Considerations - To assure stable operational temperatures, the following design features shall be incorporated.

- a) Structural Plate No. 1 - Shall have black finish on side facing supply spool. Opposite side shall have a highly polished reflective surface finish. Plate No. 1 shall be thermally insulated from Plate No. 2 wherever practical.
- b) Structural Plate No. 2 - Shall have highly polished evaporated gold finish of 10 to 12 microinch thickness on side facing Plate No. 1. Opposite side shall have a black finish.
- c) Structural Plate No. 3 - Shall have a black finish on side facing Plate No. 1. Opposite side shall have highly polished evaporated gold finish of 10 to 12 microinch thickness.
- d) Supply Spool Thermal Shield - Shall be of light weight construction, polished on the inside and polished gold finish of 10 to 12 microinch thickness on the outside.
- e) Camera Double Thermal Shield - Shall extend from Plate No. 1 to Plate No. 3, but insulated from Plate No. 1. The double thermal shield shall be comprised of two gold plated skins sandwiching on insulating spacer with a thermal conductivity k equal to .028 BTU/hr./sq.ft./°F/ft. or less.
- f) Component Thermal Insulation - All heat generating components mounted on Plate No. 2 shall be insulated from Plate No. 2 wherever practical.

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Dated 25 October 1958

- g) Sub-Plates, Spacer Posts and Gussets - Sub-plates, spacer posts and gussets between Plate No. 1 and Plate No. 2 shall be prepared with suitable thermal radiating qualities compatible with overall camera thermal requirements wherever practical.
- h) Boot, Lens to Camera - The boot from lens to camera shall have a highly polished gold surface on both sides.
- i) Boot, Camera to Vehicle - The boot from camera to vehicle shall be black on side facing lens and have a highly polished gold surface on opposite side.
- j) Boot Clamps - Boot clamps shall have appropriate thermal finishes compatible with the requirements of (h) and (i).

NOTE: The increase in weight due to above thermal requirements is considered Customer sponsored and, therefore for the purposes of contractual weight agreements, shall not be charged to the final camera weight.

The above designs shall be incorporated commencing with the second non-deliverable camera."

Paragraph 4.2

Change third sentence to read as follows: "The environmental tests shall be as indicated in the following paragraphs which reference the appropriate paragraph of the Environmental Test Specification SME-EB-5, dated 9 September 1958."

Delete the last sentence.

Paragraph 4.2.1

Change to read as follows:

"Temperature, Altitude and Humidity Tests - The temperature, altitude and humidity tests shall be conducted in accordance with the requirements of paragraph 4.2.1 of the Environmental Test Specification referenced herein."

Paragraph 4.2.2

Change to read as follows:

"Explosion Proof Tests - shall be conducted in accordance with requirements of paragraph 4.2.6 of Environmental Test Specification referenced herein."

Dated 25 October 1958

Paragraph 4.2.3 Change to read as follows:

"Drop Tests - Drop tests shall be conducted in accordance with the requirements of paragraph 4.2.4.2 of the Environmental Test Specification referenced herein."

Paragraph 4.2.4 Change to read as follows:

"Vibration Tests - Vibration tests shall be conducted in accordance with the requirements of paragraph 4.2.2 of the Environmental Test Specification referenced herein."

Paragraph 4.2.5 Change to read as follows:

"Shock Tests - Shock tests shall be conducted in accordance with the requirements of paragraph 4.2.4 of the Environmental Test Specification referenced herein."

Paragraph 4.2.6 Change to read as follows:

"Acceleration Tests - Acceleration tests shall be conducted in accordance with the requirements of paragraph 4.2.3 of the Environmental Test Specification referenced herein."

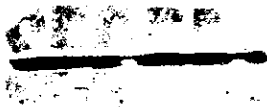
Page No. 9 (Schedule I)

Change Part No. "956H42"  
to read "956H139"

Change Part No. "956B91"  
to read "956H144"

Change Part No. "956B88"  
to read "956H122"

Change Part No. "956B78"  
to read "956H127"



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SYSTEMS MANAGEMENT AND ENGINEERING DEPARTMENT  
Fairchild Camera and Instrument Corporation  
5 Aerial Way, Syosset, New York

SPECIFICATION  
NO. SME-DC-3A

10 September 1958

CASSETTE, TAKE-UP,

FOR

HIGH ACUTY PANORAMIC CAMERA

Prepared by:



Proj. Engineer

Approved by:



Program Director

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1. SCOPE

- 1.1 This specification covers one type of film cassette for use with a high acuity panoramic camera. The basic design of the cassette shall be to take-up the exposed film from the camera in accordance with the details of this specification.

2. APPLICABLE DOCUMENTS

- 2.1 The following document of the issue in effect on the date of this specification, form a part of this specification to the extent specified herein.

9103-L2916 - Revised 9 May 1958 - Project Stovepipe -  
"General and Environmental Specification"

3. REQUIREMENTS

- 3.1 Component Parts - The cassette shall consist of the take-up spool, film drive system and telemetering potentiometer.
- 3.2 Basic Cassette Design
- 3.2.1 Configuration - The design of the cassette shall conform to the basic configuration and space limitation as shown in Figure 1.
- 3.2.2 Cassette Weight - The weight of the complete cassette without film shall be held to an absolute minimum and shall not exceed 20 pounds.
- 3.2.3 Film Spool Drive System - The cassette drive shall be integral to the cassette and shall be designed for minimum power consumption. The drive motor shall be a 28 volt DC motor.
- 3.2.4 Mounting Provisions - Provision shall be made for mounting the cassette within the vehicle in accordance with the mounting provisions as shown in Figure 1.
- 3.3 Performance Requirements



- 3.3.1 Film Take-up Performance - The cassette shall be capable of taking up the required amount of film as specified in the cassette detail section (paragraph 3.4) under simulated operating conditions.
- 3.3.1.1 The cassette shall be started and stopped at least twenty times over the range of taking up a complete roll of film. The rate of film take-up shall be 20 inches per second.
- 3.3.1.2 The maximum acceleration time permitted under the worst conditions of the take-up spool starting shall not exceed 15 seconds.
- 3.3.2 Power Consumption - The total power consumption of the cassette shall be held to an absolute minimum. The maximum total power consumed shall not exceed 35 watts of 28 volt DC supply regulated to  $\pm 0.5\%$ .
- 3.4 Cassette Design Details
- 3.4.1 Allowance for Film Splices - The cassette film handling system and guides shall be designed to allow for smooth passage of the required number of proper film splices expected in each roll of operational film. The assembly shall be capable of passing film that has been properly butt spliced with 1" wide polyester film tape (Minnesota Mining and Manufacturing Co. type #850 or equivalent).
- 3.4.2 Film Loading - The cassette shall be assembled with leader attached to the spool and threaded through the film handling system with six feet of leader external to the cassette film entrance slot. This leader shall be spliced to the camera film for final assembly and testing purposes.
- 3.4.3 Remote Indication Requirement - The cassette shall be provided with a transducer and the necessary electrical connections to permit remote indication of the amount of film that is on the take-up spool at any time during the operation.
- 3.4.4 Anti-Kick-Up Device - The cassette shall be designed to incorporate an anti back-up mechanism in the spool drive system to prevent the take-up spool from unwinding. This anti-back-up device shall be capable of being released for test and check-out purposes by applying 28 volts DC on an appropriate pin connection. The anti-back-up device shall be mechanically engaged when the voltage is removed.

- 3.4.5 Film Capacity - The cassette shall contain a film spool of special design with a 4" diameter core and a 20-1/4" diameter flange capable of handling a film capacity of 20" diameter.
- 3.4.6 Film Requirements - The film to be handled by the cassette and spool shall be thin based unperforated film of a nominal 3-1/2 mil, (0.0035") thickness and 70 mm width. The cassette shall be capable of properly winding this film onto the spool tightly without excessive pressure marking or scratching.
- 3.5 Mock-Ups - Appropriate space and weight and balance mock-ups shall be provided in accordance with the Work Statement. A single mock-up shall be fabricated to be used in space utilization application. An accurate simulator of the final cassette configuration shall be fabricated to permit the ready mock-up of total system weight and balance. A mock-up designated to be retained at the contractor's facilities for the duration of the program shall reflect the current external configuration whenever changes occur.
- 3.6 Engineering Manual - An engineering manual shall be furnished which shall contain test and service procedures necessary to assure the satisfactory operation of the system. This manual shall be furnished in the form of standard ozalid reproductions and need not be prepared to any military specifications.
- 3.7 Reports - All reports called for in the contract shall be of an engineering type and need not be prepared in accordance with any special format or military specification. These reports, however, shall be complete and include all necessary data to properly permit engineering evaluation.
- 3.8 Drawings - All drawings to be prepared for this project shall be working drawings of sufficient detail to permit fabrication of additional equipment at a future time by an experimental or model shop facility. These drawings need not conform to any military specification and shall include sketches wherever possible.
- 3.9 Design and Selection of Components - The design and selection of components for this cassette shall be compatible with the performance and environmental requirements of the system. The best available items shall be used and the components need not be in accordance with specific Military Specifications.

- 3.10 Environmental Conditions - The components and overall cassette shall be designed in accordance with specification 9103-L2916 entitled, "Project Stovepipe - General and Environmental Specification, Revised 9 May 1958." The environmental tests performed are detailed under the qualification test section, paragraph 4.
- 3.11 Spare Parts - A complete list of spare parts requested for the cassette shall be submitted for customer approval by 23 August 1958. Customer approval of the submitted list will be requested within two weeks after receipt. This revised list shall be priced by the contractor and resubmitted by 13 September 1958 for formal approval. Formal approval of prices and quantities shall be provided to the contractor, no later than 27 September 1958.

4. QUALIFICATION TESTING

- 4.1 Acceptance Tests - Acceptance tests shall be performance tests to be accomplished on each deliverable cassette to assure proper functioning of the equipment. The details of the tests shall be as mutually agreed upon by the contractor and the customer.

Acceptance Tests

1. Mechanical and electrical inspection.
2. Film Spool Acceleration Test.
3. Film Take-up Test.
4. Checking the Anti-Back-Up Device.
5. Checking the Remote Indication Transducer Output.

The order in which these acceptance tests have been listed shall not necessarily indicate the order in which the acceptance tests shall be run. The acceptance shall be run in the most expeditious order by which to accomplish the requirements.

- 4.2 Environmental Tests - The environmental testing shall be performed on the first non-deliverable flight unit for the purposes of qualifying the deliverable cassettes. The environmental tests shall be as indicated in the following paragraphs, which reference the appropriate paragraph of the General Environmental Specification 9103-L2916 Rev. 2, dated 9 May 1958. The tests selected represent the most critical in accordance with the requirements and therefore shall constitute the qualification test specification for the cassette.

- 4.2.1 Temperature, Altitude, and Humidity Tests - The temperature, altitude and humidity test shall be conducted in accordance with the requirements of paragraph 4.1.3 of the General Environmental Specification referenced herein.