NASA - Manned Spacecraft Center
Langley Station
Hampton, Virginia
March 20, 1962

Final Report on the Technical Evaluation of the Industry Response to NASA RFP MSC-60-12

1. General

The proposals presented in response to the above RFP have been subjected to a joint technical evaluation by personnel of the Flight Operations Division of the Manned Spacecraft Center, the Apollo Project Office of the Manned Spacecraft Center, and by a member of the Lincoln Laboratory of the Massachusetts Institute of Technology.

The evaluations have been conducted in accordance with NASA Management Instructions, Chapter 18 - 8/3.856-1. Since the proposed contract is for predominantly a study type effort in broad fields of activity, a portion of the business proposals (excluding costing, etc.) have been made available to the technical evaluation personnel as an integral part of the bidders technical proposal. (Ref. attachment C, General Instructions for Preparation of Proposal MSC-62-12).*

2. Qualified Proposals

The following companies' technical proposals were received at the MSC, Langley Field on Friday, March 2, 1962 from the Procurement Officer at MSC, Houston, Texas:

Beckman Instruments, Inc., Fullerton, California

Bendix Corporation, Baltimore, Maryland

*Ref. 1

Collins Radio Company, Dallas, Texas

Conductron Corporation, Ann Arbor, Michigan

General Precision, Inc., Pleasantville, New York

IBM Corporation, Rockville, Maryland

IT and T Corporation, Paramus, New Jersey

Lockheed Aircraft Corporation, Sunnyvale, California

Martin Marietta Corporation, Baltimore, Maryland

Philco WDL, Palo Alto, California

RCA, Moorestown, New Jersey

Raytheon Company, Waltham, Massachusetts

Siegler Corporation, Los Angeles, California

Sperry Rand Corporation, Great Neck, New York

Systems Development Corporation, Glendale, California

Vitro Laboratories, Silver Springs, Maryland

Western Electric Company, New York, New York

Prior to the commencement of the evaluations it was established that all the submitted technical evaluations complied with the general instructions for preparation of the Proposals (Ref. 1).

3. Technical Evaluation Organization

The technical evaluation has been conducted in two phases.

3.1 Phase 1

Three separate groups conducted technical evaluation of the proposals, each group concerning themselves with certain areas of interest.

Procedures were established to assure that the three groups con

covered the entire technical scope of the complete proposals, and that there was no duplication nor any omission of any elements of the proposal.

Each of the three groups consisted of four personnel and considered the following areas of interest:

Group I	Information Flow
Group II	Mission Control Center
Group III	Operational Control Concepts

3.2 Phase 2

A final group comprising of the Chairman of the preceding groups, plus two additional personnel conducted a final evaluation in two parts:

a. Part 1: Contractor Potential Evaluation

The final panel reviewed the proposed contractor personnel, the proposed organization for management of the contract, and the depth of overall available experience represented by the company and the proposed personnel.

b. Part 2: Final Selection and Recommendation

The final panel tabulated and weighted the group scores and the final panel scores established the final order of company preference, and made recommendations as appear in Section 10 of this report.

4. Calendar of Events

The following activities occurred in chronological order:

March 2, 1962	Received technical proposals from MSC, Houston.
March 2, 3	Proposals inspected for conformity with general instructions (Ref. 1).

March 5	Group assembled, evaluation criteria and relative weightings established, and technical evaluation commenced.
March 7, 8	Inclement weather conditions at Langley disrupted the continuity of the evaluation during these two days.
March 10	Group evaluations completed.
March 11	Group scorings and tabulations prepared for the final panel.
March 12	Final panel assembled, evaluation criteria and relative weightings established, and evaluation commenced.
March 14	Final Group evaluation recommendations established.
March 15	Preliminary discussions with Procurement Officer at Houston.
March 16	--
March 17-20	Preparation of technical evaluation report.

5. Participating Personnel

Group I Information Flow

Chairman -	H. C. Kyle	FCB/FOD
	R. M. Franklin	APO/Houston
	L. C. Dunseith	MAB/FOD
	F. Belvin	Lincoln Laboratory/MIT

Group II Mission Control Center

Chairman -	T. Roberts	FCB/FOD
	L. Hodge	RB/FOD
	R. A. Hoover	FCB/FOD
	G. Lunney	MAB/FOD

Group III Operational Control Concept

Chairman -	J. D. Hodge	Staff/FOD
	G. W. Brewer	FCB/FOD
	E. F. Kranz	FCB/FOD
	D. E. Fielder	FCB/FOD

Final Group

Chairman -	C. C. Kraft	Chief/FOD
	H. C. Kyle	
	T. Roberts	
	J. D. Hodge	
	D. E. Fielder (Recording Secretary)	

6. Group Evaluation Criteria

The following criteria were used by each group and the final panel, and are developed from the criteria presented in Chapter 18 - 8/3.856-1(b). Group weightings are shown in parenthesis.

a. Information Flow Evaluation Criteria (100)

Four areas were established:

(1) Scope (20)

"The bidder must demonstrate his appreication of the scope of the contract including all the interfaces between the areas of concern to the other two evaluation groups."

Four factors were considered under the criterion of scope

(a) The realization of the spacecraft data systems (4)

(b) The impact of the air/ground compatibility requirements (4)

(c) The implication of, and the requirements for real time information flow (7)

(d) The pre-mission and post-mission information flow requirements (5)

(2) Understanding (30)

"The bidder must demonstrate his understanding of the problems associated with the work objectives, and must demonstrate his ability for determining or anticipating problem areas which may not necessarily be obvious."

Six Factors were considered under the criterion of understanding:

(a) The recognition of the magnitude of the information flow for project support (9)

(b) The necessity for evaluating the capacity of the existing system (6)

(c) The recognition of the man/machine relationships (3)

(d) The establishment of the operation/technical support interfaces (4.5)

(e) The effect of long duration missions (3)

(f) The requirement of simulation and training (4.5)

(3) Solution (30)

The bidder must demonstrate his ability to derive solutions to the overall problem.

Four factors were considered under the criterion of Solution.

(a) Evaluation of overall approach to the information flow problem (15)

(b) Awareness of inter-relationships with other problem areas (6)

(c) Logical use of facilities (4.5)

(d) Approach to the presentations in the subsequent study reports (4.5)

(4) Technical Competence (20)

The bidder must demonstrate his technical competence in his study approach in the fields of activity associated with the Information Flow requirements.

One factor has been considered under the criterion of Solution:

(a) General background of experience and use of compatible systems techniques (20)

b. Control Center Evaluation Criteria (100)

Four areas were established

(1) Scope (30)

"The bidder must demonstrate his appreciation of the scope of the subject contract including all the interfaces between the areas of concern to the other two evaluation groups."

Three factors were considered under the criterion of scope:

(a) General function (10)

(b) Appreciation of the mission interface (count-launch-flight) (10)

(c) Appreciation of the Simulation and Training requirements (10)

(2) Understanding (30)

"The bidder must demonstrate his understanding of the problems associated with the work objectives, and must demonstrate his ability for determining or anticipating problem areas which may not necessarily be obvious."

Six factors were considered under the criterion of Understanding:

(a) General configuration (5)

(b) Appreciation of display requirements (5)

(c) Understanding of manning requirements (5)

(d) Understanding of network interface (Remote Sites) (5)

(e) The effect of long missions (5)

(f) Understanding of the LCC-MCC interface (5)

(3) Solution (25)

The bidder must demonstrate his ability to derive solutions to the overall problem.

Four factors were considered under the criterion of solution:

(a) General approach to solution of MCC problems (6.25)

(b) Cognizance of the inter-related nature of certain problem areas (6.25)

(c) Logical use of facilities (6.25)

(d) Consideration of requirements for flexibility (6.25)

(4) Competence (15)

The bidder must demonstrate his technical competence in his study approach to the implied implementation of the MCC.

One general factor was considered under the criterion of competence:

(a) Experience (15)

c. Operational Control Concept (100)

Two comprehensive areas were established:

(1) Scope and Understanding (60)

These areas represents a combination of the areas defined in Sections 6.a(1) and 6.a(2).

Six factors were considered under the criterion of scope and understanding:

(a) Appreciation of Apollo Mission (10)

1. Concept

2. Operational requirements (flexibility, growth, reliability, etc.)

(b) Understanding of Flight Control functions (15)

(c) Understanding of Mission Control functions (15)

(d) Appreciation for coordination of mission support agencies other than GOSS (5)

(e) General understanding of GOSS manning accommodation in training simulation, etc. (10)

(f) Reference to other pertinent program experience (5)

(2) Technical/Analytical Approach (40)

This area represents a combination of the areas defined in Sections 6.a(3) and 6.a(4).

Three factors were considered under the criterion of technical/analytical approach.

(a) Logical identification of problem areas (20)

(b) Logical methods of developing solutions (10)

(c) General technique of approach (10)

d. Final Panel Bidder Evaluation (100)

(1) Company association with similar projects and/or allied activity (40)

(2) Experience and potential of proposed engineering staff (20)

(3) Proposed management organization and provision for liaison (20)

(4) Adequate representation of engineering disciplines within/or available to the proposed contracted organization (20)

7. Panel Weighting

The final panel established the relative weighting which would be alloted to the participating groups. The following weightings apply:

a. Information flow x 2 (200)

b. Mission Control Center x 1 (100)

c. Operation Control Concept x 2 (200)

d. Bidder Evaluation x 2 (200)

8. Final Scores

The final scores and relative positions are shown in Table 1.

9. General Comments on each Bidder

The following comments are representative of the three groups and the final panel:

a. RCA: This presentation showed a very good overall appreciation of the magnitude of the task and problem areas. In addition they have displayed a good understanding of the overall and more detailed problem areas. The company has very good experience in similar systems design and implementation, and is very well qualified in the field of communications which is a key element in the work requirements.

b. Sperry: A good overall presentation demonstrating an order of ability in all pertinent fields of endeaver. However, the degree of pertinent field experience is limited as is indicated by the final group score. The final panel recognizes the academic attainment of a relatively high score, but regards the resulting relative position with certain reservations.

c. Philco: A good overall presentation, and although scoring relatively high, this company showed a lesser appreciation of the Information Flow area than in the Operational Control Concept and Mission Control Center areas. The company has had experience with operational systems and has had some previous association with Apollo in some of the early proposal work.

d. Raytheon: A good presentation. This company showed an exceptionally good technical approach and was rated highest in competence in the area of Operational Control Concepts. It scored well in the Information Flow area, but was generally considered poor in the Mission Control Center area.

e. ITT: This company demonstrated a very good understanding of the Information Flow area, in which it was rated highest. However, their presentation was relatively weak in the areas of Mission Control Center and Operational Control Concepts.

f. IBM: IBM showed a fairly good comprehension and capability in the area of Operational Concept and Mission Control Center, but were relatively weak in the Information Flow area. IBM has had considerable experience in Project Mercury in the areas of operations which is reflected in their proposal.

NOTE: The following companies are considered non-qualifying with respect to their relative position with the preceding companies:

g. Bendix: The Bendix Company has had considerable operating experience throughout the Project Mercury Flight Support, and from this association they have made a fairly good presentation although weak in the area of Information Flow. However, the proposal did not indicate a significant depth of understanding of the proposed contractual aspects.

h. Martin: The Martin Company gave a generally good response in all areas of the RFP. The demonstrated appreciation for the scope of the work requirement was not consistent with the lower order of their demonstrated understanding of the problem. Martin has had considerable association with Project Apollo in the study phases and the Apollo proposal effort. However, the degree of active association with similar projects is limited in the areas of consideration.

i. Lockheed: This company has had considerable experience associated with their satellite control center activities. However, their

presentation was poor in the Information Flow area. Lockheed did not demonstrate a good understanding of the implications of manned space flight upon the information flow and operational control activities.

j. WECO/BTL: The WECO presentation was fairly uniform throughout the technical areas. However, the response was generally poor. The WECO Company was highest rated by the final panel, but the remainder of the technical review proved relatively inadequate to justify competition with the leading companies. It is assumed that the WECO response was one of courtesy rather than an attempt to win a contract award. BTL are capable of submitting a much better technical proposal and are sufficiently familiar with government contract evaluation procedures to realize the need for a comprehensive proposal.

k. SDC: The Systems Development Company gave a fairly uniform presentation but is obviously limited in experience in the associated areas of manned space flight operations. SCD have a fairly good analytical approach to the Information Flow type of problem analysis, but the reflected lack of background and experience places this company beyond consideration for this contract.

l. Vitro Labs.: This company gave a fair presentation in the area of Information Flow, but was notably weak in other areas. Vitro Labs. seem to have a considerable amount of systems experience, but not in systems management or integrated systems operation. These aspects together with a lack of background experience places this company beyond consideration for this contract.

m. Collins Radio: This company gave only a fair presentation. This is inconsistent with the basic capabilities since they have had

intimate association with Project Mercury and are currently associated with Project Apollo. However, these associations are in the systems engineering field and are not directly relative to the efforts of this contract. In this respect this company is beyond consideration for this contract.

n. Siegler: The Siegler proposal is fairly good in the aspects of Information Flow, but is poor in the remaining areas. Siegler showed poor appreciation of the overall problem areas and in their overall competence to realize satisfactory output. In this respect the company is beyond consideration for this contract.

o. General Precision Labs.: The GPL gave a fairly poor overall response to the RFP particularly in the area of Operational Control Concept. It is evident that the company has considerable capabilities in the systems area, but they have exhibited considerable lack of understanding and appreciation of the scope of the required contractual effort. In these respects this company is beyond consideration for this contract.

p. Conductron: Conductron gave a poor presentation in terms of the requirements outlined in the RFP. Conductron gave great attention to certain academic principles associated with information theory but presented very little information pertinent to the scope of the RFP. In addition this company has had very little experience in any fields of manned or unmanned space flight operations. In this respect this company is beyond consideration for the subject contract.

q. Space General: Space General gave a disappointingly poor presentation in view of their early associations with similar activities with Project Mercury. The presentation showed very little understanding of the problem nor any significant approach techniques. In these respects the company is beyond consideration for this contract.

r. Beckman: The Beckman response is highly systems oriented and does not represent any significant satisfaction of the requirements of the RFP. Beckman has had several associations with the Mercury program all of which have been associated with systems development. In these respects Beckman is beyond consideration for this contract.

NOTE: The preceding comments, concerning the eighteen companies' response to the RFP, are related only to the contents of the proposals pertinent to the RFP. It is significant to note that the overall calibre of these eighteen companies represents probably the finest available within their respective fields of activity, and that the aforementioned comments do not reflect any considerations on these companies' capabilities in its field of activity.

10. Final Panel Recommendation

On the basis of the technical evaluations the Final Panel has established the competing companies in order of ability with respect to the requirements of the RFP. Of the eighteen companies which have been evaluated only six have been considered competent to undertake the contractual effort and of these six the panel considers that only the first four should be considered for contract award.

In the absence of any cost information the panel makes the following recommendations:

a. The contract be awarded to RCA.

b. If there is any significant difference in the cost estimates of the first four companies, then the contract should be awarded to the lowest bidder.

The final panel does not recommend:

a. Re-submittal of a costing estimate for a revised Work Statement by the first four companies.

b. Verbal presentations by any of the first four contractors.

The above recommendations are made in the necessity for expedience in establishing the necessary and urgent support to the Manned Spacecraft Center.

for John D. Hodge
Christopher C. Kraft, Jr. - Chairman Final Panel

John D. Hodge
John D. Hodge - Chairman, Group III

for Gerald W Brewer
Howard C. Kyle - Chairman, Group I

Dennis E. Fielder (for)
Tecwyn Roberts - Chairman, Group II

Dennis E. Fielder
Dennis E. Fielder Recording Secretary

TABLE 1

COMPANY	INFORMATION FLOW GROUP						CONTROL CENTER GROUP					OPERATIONS CONTROL GROUP					FINAL GROUP SCORE		FINAL TOTAL	FINAL POSITION
	criterion 1/20	2/30	3/30	4/20	total /100	weighed total /200	1/30	2/30	3/25	4/15	total /100	1/60	2/40	total /100	weighed total /200	total group score /500				
RCA	13	20	23	16	72	144	22.5	18.5	13.8	11.6	66	39	23.8	63	126	336		133	469	1
Sperry	17	21	22	19	79	158	21.5	28	15	9.8	67	42.9	24.5	67.5	135	360		98	458	2
Philco	12	20	18	13	63	126	20	17.5	13.8	10.7	62	34	26	60	120	308		128	441	3
Raytheon	13	18	19	14	64	128	12	10	9.6	6.4	38	32.6	38.5	71	142	308		120	428	4
ITT	12	23	24	18	77	154	13	10.8	12.2	9.7	45.7	24	30	54	108	307.7		101	408	5
IBM	12	15	16	12	55	110	18	18	16	10	62	29	31	60	120	292		99	391	6
Bendix	10	14	15	10	49	98	17	15	15.5	11.5	59	36.5	25	61.5	123	280		109	389	7
WECO/RTL	6	16	15	13	50	100	16	11.1	13.6	12	52.7	27.5	13	40.5	81	233.7		155	388.7	8
Lockheed	9	10	13	14	46	92	15.5	14.5	12.5	11.5	54	32	25	57	114	260		125	385	9
Martin	12	15	13	9	49	98	15.7	13	13.3	9.0	51	32	25.5	57.5	115	264		106	370	10
SDC	10	13	18	12	53	106	17	13	10.5	6.0	46.5	25	14	39	78	230.5		100	330.5	11
Collins	5	12	17	10	44	88	6	12	6.5	3	27.5	23	15	38	76	191.5		102	293	12
Vitro	8	11	20	15	54	108	9	11	9	3	32	17.5	16.5	34	68	208		82	290	13
Siegler	12	12	16	10	50	100	6	8.5	4.5	2	21	16.5	14	30.5	61	182		84	266	14
Gen. Prec.	9	9	13	12	43	86	5	9	3	3	20	8.5	13	21.5	43	149		91	240	15
Conductron	4	10	11	5	30	60	6	10	6	3	25	8	14	22	44	129		76	205	16
Beckman	0	3	12	5	20	40	7	6.5	3	9	25.5	6	8	14	28	93.5		101	194.5	17
Space Gen.	7	6	10	6	29	58	6	10.5	6.5	3	26	7.5	11.5	19	38	122		71	193	18

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