Approved For Release 2003/01/24 : CIA-RDP62B00844R000200260141-9

BAPC 2496
Copy 4 of 4

23 November 1955

BAIRD ASSOCIATES

PROGRAM DESIGNATIONS

I Remote viewing -- manual control sextant.

II Remote viewing -- manual control sextant with provision for viewing sun's disc on ground glass with high magnification.

III Remote viewing -- automatic sun sextant with photographic observation of sun's disc.

IV Large aperture sextant to see stars in the daytime.

V Large aperture sextant for daytime stars with rotation device for direct longitude determination.

Baird Associates Proposes:

A. Initiate Program I as of now.

B. Authorize further investigation including the feasibility of seeing stars in daytime.

C. Outcome of study in B above would determine whether future work followed lines of II and III or IV and V.

Financial:

Baird Associates originally had [redacted] which has been spent. We propose: 25X1A

1. Original contract be extended to 1 December 1955 with increase in funds of [redacted] and, 25X1A

25X1A

2. New contract starting 1 December 1955 be negotiated allowing for Program I plus further investigations (at rate of [redacted] total for three months).

Approved For Release 2003/01/24 : CIA-RDP62B00844R000200260141-9

Approved For Release 2003/01/24 : CIA-RDP62B00844R000200260141-9
SECRET

NOTE: If more than one construction program is running concurrently, the delivery times will have to be increased somewhat.

PROGRAM I -- Remote Viewing -- Manual Control Sextant

A. Two-inch aperture with unit magnification -- two-inch diameter exit pupil -- twenty-inch eye relief.

B. Bubble for vertical determination projected into field of view.

C. De-rotation prisms in system so up-down motion on screen corresponds to "elevation"; right-left motion on screen corresponds to "azimuth."

D. Both azimuth and elevation controlled with hand knobs and with Veeder dials for reading data.

E. Could incorporate "averages" from Kollsman sextant if desired.

F. All equipment located forward of "periscope" and under windshield.

G. Small dome protruding in front of windshield would allow for viewing entire hemisphere except cone toward tail.

H. Weight between 10 to 20 pounds. Power requirement for lights only.

I. Data presented through periscope viewer by use of "flipping" mirror.

1. Can be used for "fighter celestial" navigation and making "landfalls" by day.

2. Can be used for all ordinary celestial techniques at night.

3. Mostlike present Air Force equipment and procedures -- requires minimum of training.

4. Can be operated from sitting position with pressure suit mask on.

Approved For Release 2003/01/24 : CIA-RDP62B00844R000200260141-9
SECRET

Approved For Release 2003/01/24 : CIA-RDP62B00844R000200260141-9

a. Simplest and quickest to build -- uses only known and proven techniques.

25X1A

b. Cost is estimated at [redacted] to design and build.

c. Delivery is estimated at five weeks from date of initiation.

PROGRAM II -- Sun Viewing -- Manual Control Sextant

A.-G. This would be a remote viewing-remote control sextant with features A through G of Program I and with addition of the following:

H. An auxilliary high magnification system would be used which would provide for viewing an enlarged image of the sun on a ground glass screen in order to determine disc orientation by observing sunspots in visible light. This high magnification system would be put in or out of sextant at will.

I. Disc rotation would be measured with respect to airframe and corrected for deviation from vertical by observing calibrated bubble.

J. Would require special analog computer or new computational procedures for reducing sun disc data.

1.-4. Would have same uses and advantages as in 1 through 4 of Program I with the following:

5. Ability to obtain daytime fix using sun-disc data.

a. Depends on visible sunspots for daytime fixes. Slightly more complex and difficult to build than Program I.

25X1A

b. Cost is estimated at [redacted]

c. Delivery is estimated at six weeks from date of initiation.

SECRET

Approved For Release 2003/01/24 : CIA-RDP62B00844R000200260141-9

SECRET
Approved For Release 2003/01/24 : CIA-RDP62B00844R000200260141-9

PROGRAM III -- Automatic Sextant with Photographic Observation of Sun's Disc

A. Automatic sextant which searches for and tracks sun.

B. Sun's disc photographed in Calcium K light (3933 A^{o}) with "Land" camera providing high contrast positive transparencies.

C. Sun's disc rotation obtained by comparison with "standard" picture in a viewing fixture.

D. Elevation and rotation data fed into analog computer or used with special computational technique to obtain fix.

E. Since equipment is essentially automatic, it can be remotely located.

F. Would require small observing dome which could be located aft of cockpit.

G. Might be used at night with stars or moon with additional complexity.

1. Will give "Solar" fixes during entire day. See G above for nighttime capability.

2. Requires essentially no effort on part of pilot other than obtaining picture rotation.

3. Will have electronic servo systems which will require maintenance.

4. Does not depend on presence of sunspots. Calcium clouds can be used for disc rotation.

a. Most complex system -- requires developing computer and "Land" camera to work at high altitudes (low pressures).

25X1A

b. Cost is estimated at about [redacted] to design and build one.

c. Delivery is estimated at eight weeks from initiation date (depends on success of development programs).

SECRET
Approved For Release 2003/01/24 : CIA-RDP62B00844R000200260141-9

Approved For Release 2003/01/24 : CIA-RDP62B00844R000200260141-9

PROGRAM IV -- Daytime Star Sextant

A.-G. This system would contain a manually operated sextant with features similar to those in A through G of Program I.

H. Would contain auxilliary high magnification system for viewing stars in daytime. (Calculations show this should be feasible for altitudes above 40,000 feet with about 10x magnification).

I. Presentation would be through periscope.

1.-4. Would be used as in 1 through 4 of Program I.

5. Daytime fixes could be obtained with stars. Would use "bright" stars at low altitudes (0 to 1 magnitude) and lesser stars (up to 3rd magnitude) at high altitude.

a. Construction should be simple and straight forward. Depends on outcome of feasibility tests.

b. Cost is estimated at [redacted] to design and build one. 25X1A

c. Delivery is estimated at six weeks after initiation.

PROGRAM V -- Daytime Star Sextant for Use with Circumpolar Stars

A.-I. This system would have same features as in A through I of Program IV with additional:

J. Device to obtain longitude directly by observing rotation of Little Dipper about Polaris. Latitude obtained from Polaris.

1.-5. Same uses as in 1 through 5 of Program IV.

6. Direct latitude from Polaris.

7. Direct longitude from rotation of Little Dipper.

a. Construction slightly more complex than Program IV. Also depends on outcome of feasibility tests.

b. Cost is estimated at [redacted] to design and build one. 25X1A

c. Delivery is estimated at seven weeks after initiation.

Approved For Release 2003/01/24 : CIA-RDP62B00844R000200260141-9