Massachusetts Institute of Technology
Instrumentation Laboratory
Cambridge, Massachusetts

R.G. Rose
Flt. Test Requirts.
Mtg. #4.
8-13-65

AG 736-65
13 August 1965

THROUGH: NASA Resident Apollo Project Office at MIT
Massachusetts Institute of Technology
Instrumentation Laboratory
75 Cambridge Parkway
Cambridge, Massachusetts

TO: National Aeronautics and Space Administration
Manned Spacecraft Center
Houston, Texas 77053

Attention: Mr. M. E. Dell
Project Officer
Guidance & Navigation (PP 7)
Apollo Spacecraft Program Office

SUBJECT: Summary of AGC Program Processing Procedures

Gentlemen:

In response to an action item defined at the third Flight Test Requirements Working Group Meeting held at MSC on 3 August 1965, MIT/IL is supplying herewith a summary of the procedures involved in generating and verifying AGC programs.

The key document in the development of a flight program is the Guidance and Navigation System Operations Plan. The operations plan for AS 202 has been published by MIT as R-477, and approved by NASA/MSC. R-477 and its successors serve as the control documents defining the programs to be written for a given flight, and include all spacecraft, launch vehicle and operations data required.

The source material for the generation of the G&N System Operations Plan includes formal documentation, informal communication and arbitrary decisions where data are not available. The formal documents are:

1. Mission Requirements
2. Preliminary Mission Profile
3. Preliminary Reference Trajectory
4. Operational Requirements for Spacecraft Guidance and Navigation.

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These may be supplemented with the Data Book and the Guidance Requirements meetings. These meetings are held approximately 13, 16 and 14 months prior to launch. The Operations Plan (in draft form) is provided for comment prior to the last of these, and is published after incorporation of agreements. Later changes, especially the Joint Reference Trajectory may necessitate revision at a later date, but schedule and cost impact must be considered. Thirteen and a half months prior to launch, MIT must have NASA approval of the Operations Plan.

Approximately ten and a half months prior to launch flight programming is completed, and Integrated Program Testing is begun at MIT. Approximately ten weeks thereafter, the programs are released to manufacturing, tapes are provided for simulation at MIT, MSC, NAA and GAEC and the G&N System Operations Plan becomes the G&N System Operations Document for that flight.

Four months are allotted for manufacture and testing of ropes, one month for installation (at KSC) and tests with the flight computer. Additional ropes are provided to MIT (spare) and to NAA for the Mission Evaluator. (The NAA rope may be replaced with a simulator tape if NASA chooses to do so. In that case only two ropes would be produced.) The three months remaining until launch are devoted to integrated system test.

MIT publications E-1736 and E-1303 provide details of the program verification and rope processing procedures to supplement this letter.

Very truly yours,

Michael D. Richter
System Operations
Staff, MIT/IL

MDR/mba
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AGC Programming Sequence