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# *The Apollo Guidance Computer: Architecture and Operation*

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## **Chapter 0: The state of the art**

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- From whence we came: early computing
- Outside the computer room: early computing in aviation and space
- Computing in manned spacecraft
- Defining computer "power"
- The evolution of computing
- Technology acquisition: consumers vs the aerospace industry

## **Chapter 1: The AGC hardware**

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- Introduction
- Overview of Chapter 1
- Physical characteristics of the AGC
- Properties of number systems
- Double precision numbers
- FIGMENT
- Instructions: the basic units of computer operation
- Memory management
- A tour of low core and the central registers
- Keeping time in the AGC: timers and clocks
- Counters - CDUS (X, Y, Z, OPTS, OPTT) and PIPAS (X, Y, Z)
- Radar, engine and crew interfaces
- Memory addressing and banking in the AGC
- Interrupt processing
- The instruction set
- Communicating with the outside world: the I/O system

## **Chapter 2: The Executive and Interpreter**

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- Introduction to the Executive
- Scheduling: preemptive and cooperative multiprogramming
- The Executive
- The astronaut interface: the display and keyboard

Telemetry uplink  
Synchronous I/O processing and T4RUPT  
High level languages and the Interpreter  
The Interpreter.

### **Chapter 3: The basics of guidance and navigation**

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Hardware unique to solving guidance and navigation problems  
The important questions in guidance and navigation  
Question 1: Which way is up?  
Question 2: Where am I?  
Question 3: Which way am I going?

### **Chapter 4: Mission programs and operations**

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Introduction  
Launch from Earth  
The lunar landing  
Lunar orbit rendezvous  
The digital autopilot  
Erasable memory programs  
AGC data uplink and downlink  
Command Module entry.  
Computer problems during Apollo 11 and Apollo 14

### **Chapter 5: Epilogue**

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