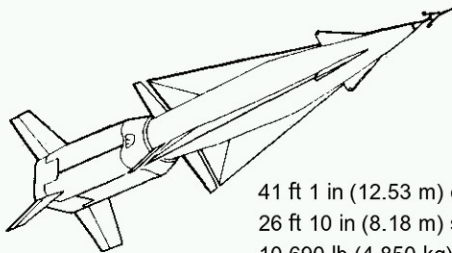


# Nike Hercules - SAM

Page 1

Nike Hercules Surface to Air Missile System  
and a game as viewed by the Battery Control Officer  
to Silicon Valley Forth Interest Group - June 23, 2018



41 ft 1 in (12.53 m) overall  
26 ft 10 in (8.18 m) second stage  
10,690 lb (4,850 kg) at launch  
5,523 lb (2,505 kg) second stage

Game (PC only) and instructions are at <http://ed-thelen.org/NikeSimulation.html>  
My Nike web site <http://ed-thelen.org/> , my e-mail address [ed@ed-thelen.org](mailto:ed@ed-thelen.org)

# Jackie Gleason – loses, again

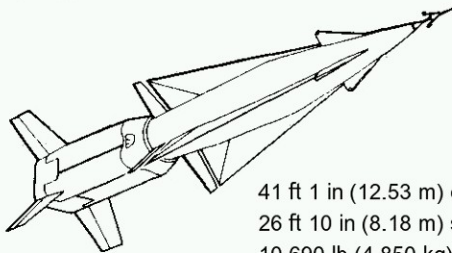
The Honeymooners: Mind your own business



# Nike Hercules - SAM

Page 1

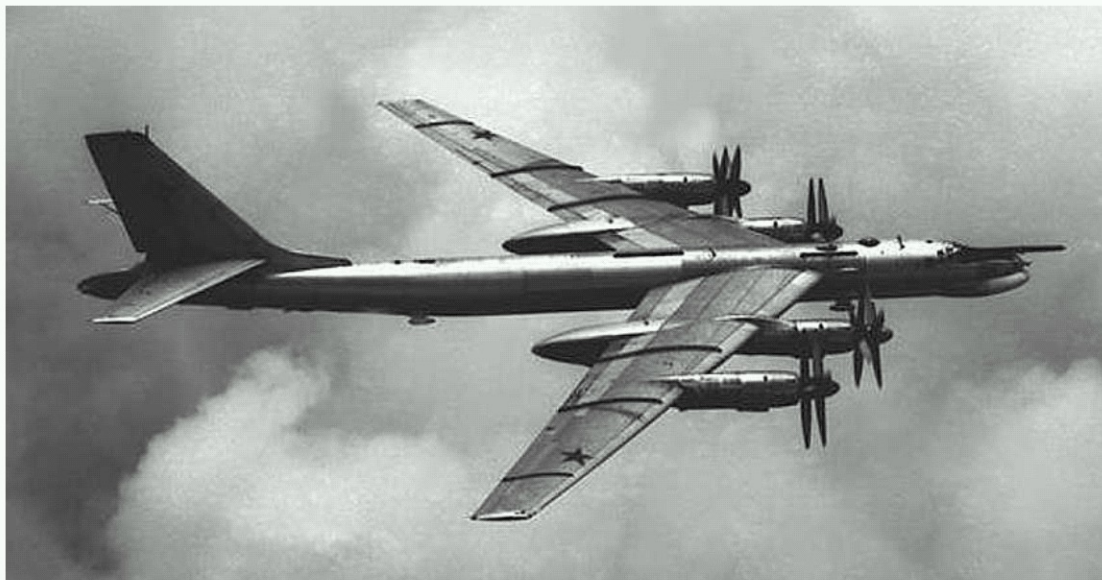
Nike Hercules Surface to Air Missile System  
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# Tu-95, a likely target



# Nike Hercules System

Frame-01b

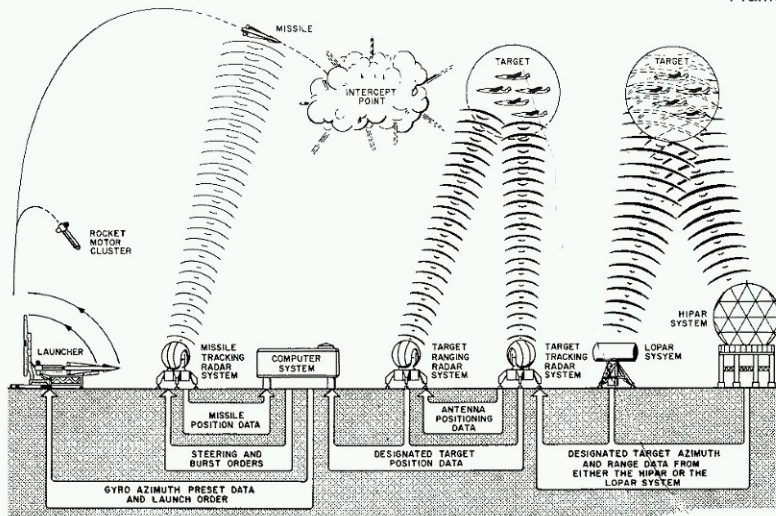
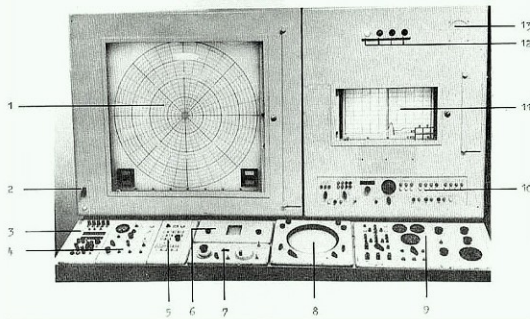


Figure 5. Surface to air mission - functional diagram.

# Battery Control Officer's World

Your (Battery Control Officer - BCO) Work Space

Page 2

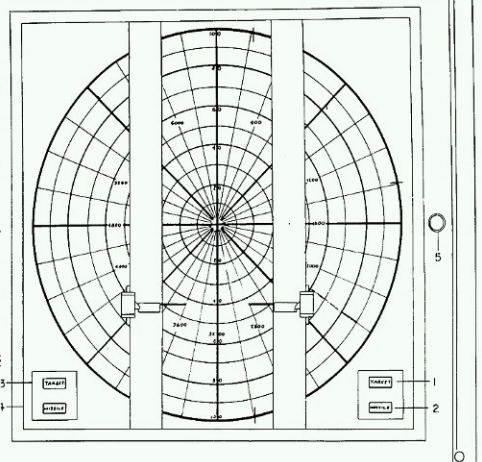
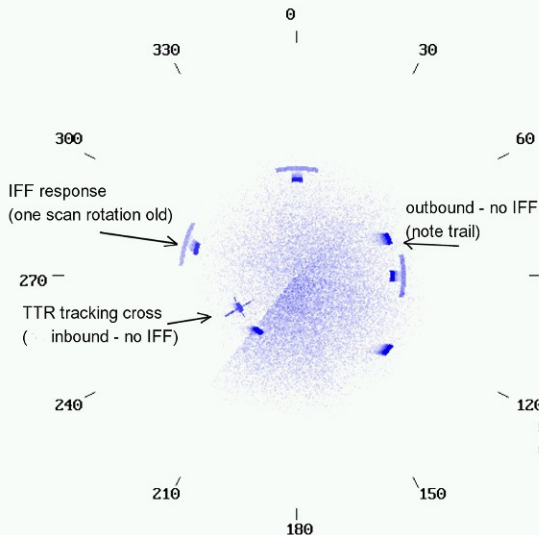


1. Plotting board, thin paper & ink, largest ring is 200,000 yds (over 110 miles)
2. T1 quick disconnect (T1 was a van that generated simulated aircraft echos and ECM interference for training purposes)
3. IFF (Identification Friend or Foe) control panel (the latest version with the Siemens IFF/SIF) ([more](#))
4. ACQ control panel - control the LOPAR radar ([more](#))
5. HIPAR control panel - control the HIPAR radar ([more](#))
6. Precision Indicator (PI) - (expanded view of the PPI -about 22 degrees wide 10,000 yards long)  
- also sent to the Target Tracking operators in the Radar Control van
7. Target Designator Panel - points a ring and azimuth line to indicate designated target to Target Tracking operators
8. Plan Position Indicator (PPI) ("radar scope") [more](#)
9. Tactical control indicator ([more](#))
10. BCC indicator panel ([more](#))
11. Vertical plotting board 200 kyds / 100 kft ([more](#))
12. Status indicator lights, (White, Yellow, Red, Blue)
13. Target detected speaker (to help arouse sleepy operator)

# “Plan Position Indicator”

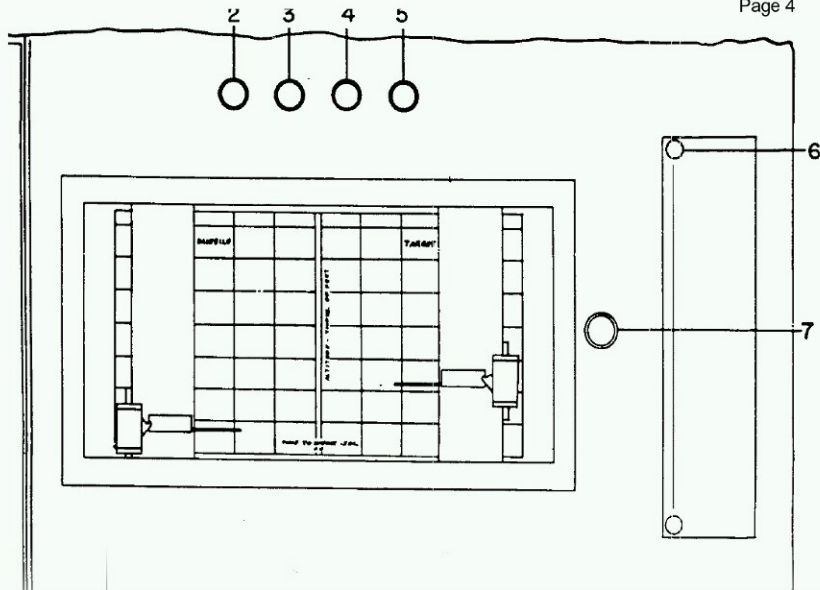
(PPI) - Plan Position Indicator-  
negative - black is white, yellow is blue

Page 3



# Vertical Plotting Board

Page 4





# A Control Panel

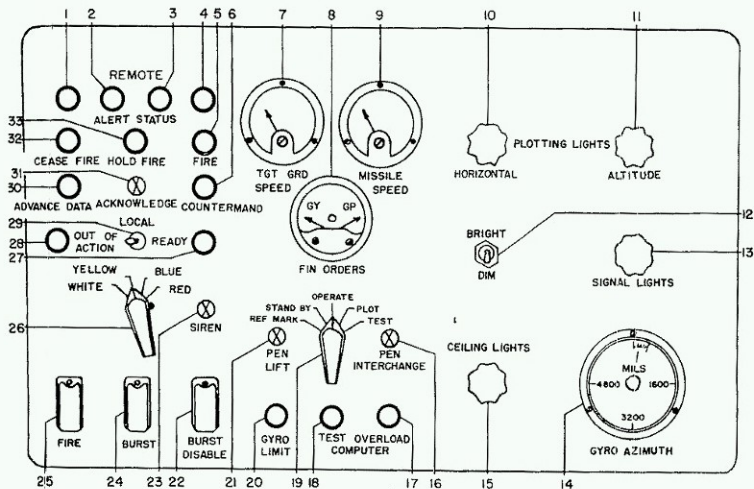
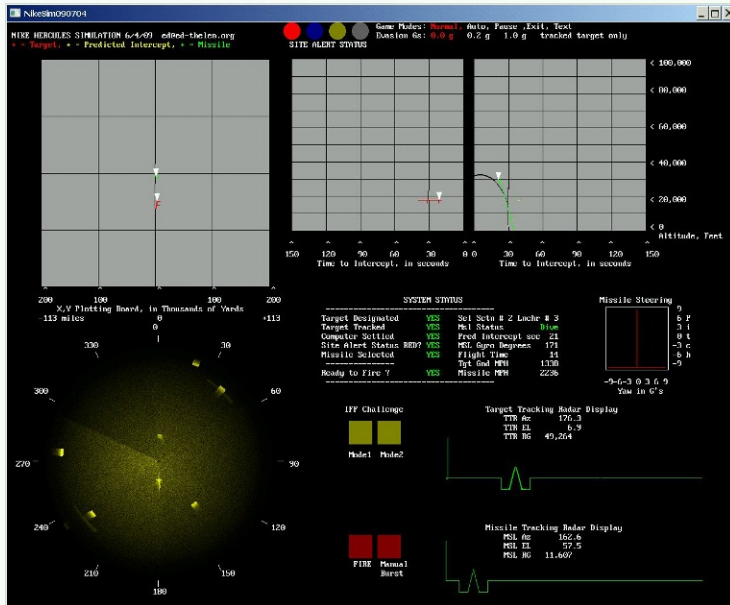
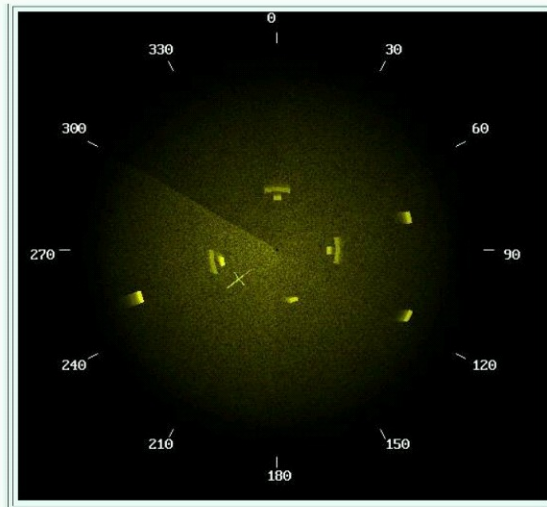


Figure 10. Tactical control panel.

# A Picture of the Game



# PPI with IFF Displays



This is the PPI (Plan Position Indicator) radar display before tracking an aircraft.

This is in the Battery Control Van for the Battery Control Officer (and Acquisition Operator) The Nike site is in the center.

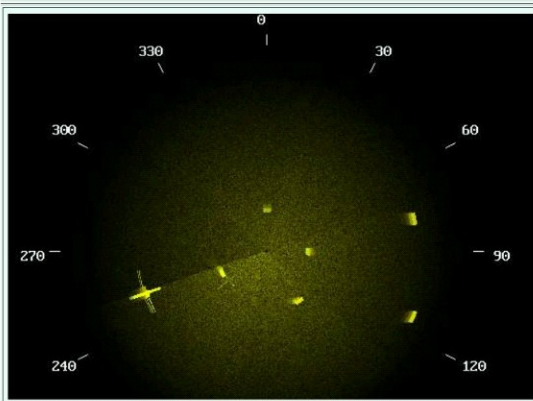
The white degree marks ( 0 = north) are on the bezel surrounding the scope.

Note the fast moving incoming aircraft, at about 250 degrees. There is no IFF arc behind it from a challenge

Head Quarters has assigned this target for us to attack.

We designate this aircraft to the Target Tracking Radar to track when it gets into range.

# Target Designated & Tracking



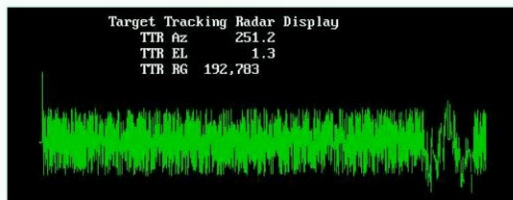
This is the PPI showing tracking our assigned aircraft.

The Nike site is in the center.

The target has the Target Tracking Radar cross on the target. Target information is going into the computer.

Note that the IFF indications have faded from the long persistence scope.

# TTR and MTR Tracking



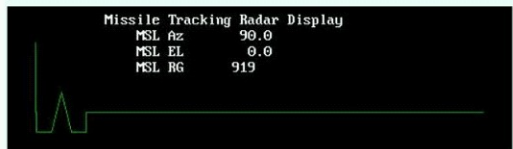
This is what the Target Tracking radar operators (in the Radar Control van) see while tracking that aircraft at maximum range.

Zero distance (with the big magnetron pulse) is at the left

The target aircraft is in the expanded tracking "notch" to the right.

The "grass" is due to lots of noise due to weak signal at maximum range.

The white printing is simulated values on the operator dials. (no white printing on the radar scope ;-))



This is what the Missile Tracking radar operator (also in the Radar Control van) sees. The Missile Tracking radar is locked on the selected missile in the Launching Area.

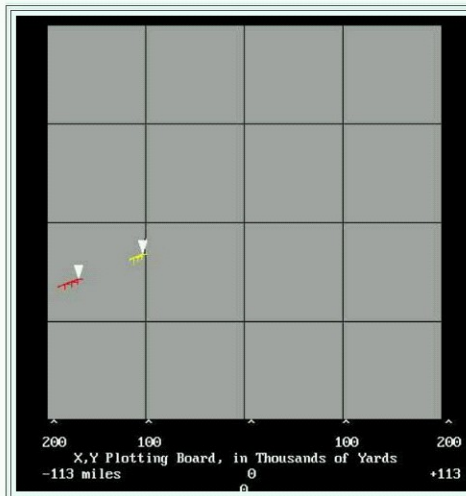
Zero distance (with the big magnetron pulse) is at the left

The missile echo is in the expanded tracking "notch" near the left.

Note: No "grass". A 400 watt magnetron in the missile gives LOTS of signal.

Again, The white printing is simulated values on the operator dials. (no white printing on the radar scope ;-))

# XY with Target & Pred Int Point



This is the Horizontal Plotting board in the Battery Control van.

The Nike site is in the center.

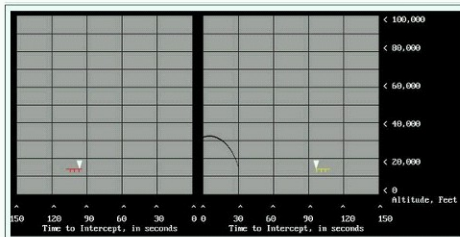
The Target Tracking Radar has been supplying tracking data to computer.

One pen (red ink in the simulation) tracks the target. Every 10 seconds a horizontal and vertical jiggle show timing. Three jiggles on each track shows three 10 second timing marks.

The other pen tracks the Predicted Intercept Point (shown in yellow ink)

In real life, all the ink is green, and lamps tell which pen is tracking what.

# Vert w Target & Pred Int Point



This is the Vertical Plotting Board while tracking an aircraft.

Time Zero (Intercept) is in the center.

The Left Board always plots Target Altitude vs Time to Intercept. The target's altitude is about 15,000 feet. Predicted Time to Intercept (if we fire right now) is about 105 seconds.

The Right Board (before launch) plots the Predicted Intercept altitude vs Time to Intercept. 10 second timing marks are used on this plotting board also.

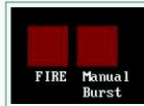
# Status & Fire Switch

SYSTEM STATUS			
Target Designated	YES	Sel Sctn # 1	Lchr # 2
Target Tracked	YES	Msl Status	Ready
Computer Settled	YES	Pred Intercept sec	96
Site Alert Status RED?	YES	Msl Gyro Degrees	252
Missile Selected	YES	Flight Time	0
Ready to Fire ?	YES	Tgt Gnd MPH	1461
		Missile MPH	0

This is a simulation of data available to the Battery Control Officer now (after 30 seconds of tracking). Actually the data is available immediately after Target Tracked and Computer Settled (about 3 seconds after Target Tracked)

The missile has a gyroscope to indicate which way is down. This must be set to the Predicted Intercept Point before launch.

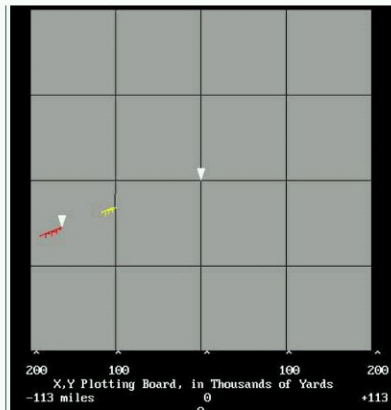
## Simulation - in the Battery Control Van



This simulated button is actually a switch covered by a red plastic shield to eliminate any accidental operation. Any nuclear warhead protective systems and mechanisms are in the Launcher Area.



# After Launch, missile starting



This is the Horizontal Plotting board in the Battery Control van.

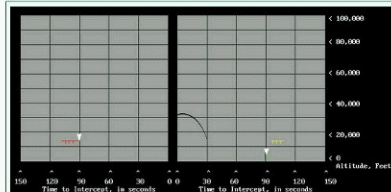
The Nike site is in the center.

The Target Tracking Radar has been supplying tracking data to computer.

One pen (red ink in the simulation) tracks the target. Every 10 seconds a horizontal and vertical jiggle show timing.

The other pen now tracks the missile (at the center) with green "ink"

In real life, all the ink is green, and lamps tell which pen is tracking what.



This is the Vertical Plotting Board just after launching a missile.

Time Zero (Intercept) is in the center.

The Left Board always plots Target Altitude vs Time to Intercept. The target's altitude is a bout 15,000 feet. Predicted Time to Intercept is about 90 seconds.

The Right Board (after launch) plots the missile altitude vs Time to Intercept

OK Folks, to the game :-)

