

# 1 Maneuver Mode

# DATA

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## The Analysis of Telemetry Data in Maneuver Mode for KOMPSAT-1

Byong-Suk Suk\*

### Abstract

KOMPSAT-1 AOCS mode divided into three major mode like Sun, Maneuver, Science Mode. The Maneuver mode consist of attitude hold and -V Burn submode. This paper focus on the analysis of AOCS Maneuver Mode characteristics based on on-orbit playback data. The nadir pointing performance of attitude hold submode and the process for -V Burn firing with plus/minus 90 degree pitch/roll maneuvering was verified. And also verified that the on-orbit performance meets the AOCS subsystem specification as designed.

mode Sun, Maneuver, Science Mode  
 Maneuver Mode Attitude Hold submode -V Burn submode  
 playback Maneuver  
 Mode Maneuver Mode attitude hold submode  
 nadir pointing performance, -V Burn submode pitch/roll 90 maneuver

: 1 (Kompsat-1), (AOCS), Attitude Hold Submode, (solar array)

### 1.

### 2.

( 1 )  
 mode Sun, Maneuver, Science Mode Hold Submode -V Submode  
 Maneuver Mode thruster loop controller Attitude  
 playback Maneuver Mode Hold Submode Earth Search Submode가  
 mode

\* / byongss@kari.re.kr

nadir pointing  
-V submode  
mode

(earth rate)

nadir pointing  
. Attitude Hold Submod  
Roll, Pitch, Yaw  
가

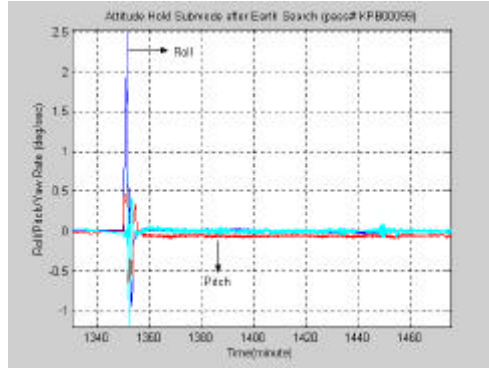
15 , 2.0 . 15

## 2.1 Attitude Hold Submode

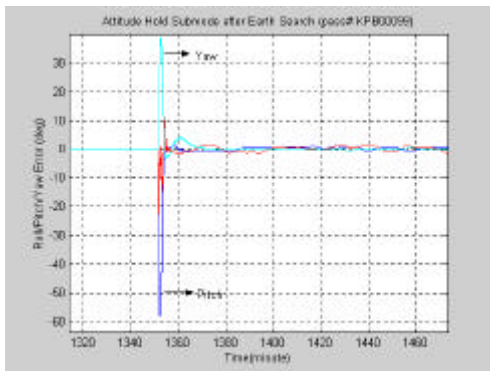
1 Attitude Hold Submode  
Earth search mode가

mode . 2.1.1 Earth  
search Attitude Hold Submode  
(Roll, Pitch, Yaw) LVLH(Local  
Vertical Local Horizontal) error

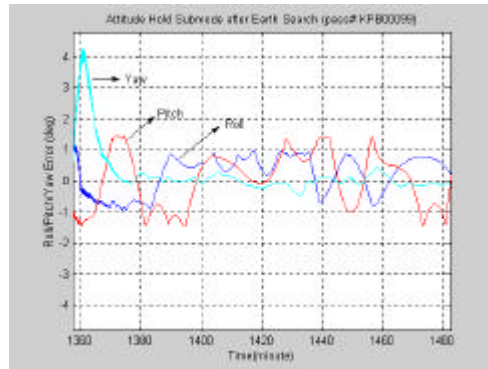
가 roll error  
error



2.1.2. Roll, Pitch, Yaw Rates in Attitude Hold Submode



2.1.1. Roll, Pitch Yaw errors in Attitude Hold Submode



2.1.3. Roll/Pitch/Yaw Error( ) in Attitude Hold Submode

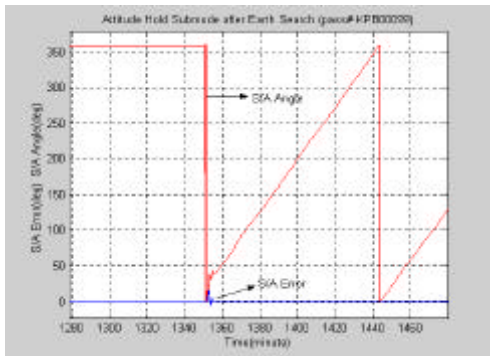
99 pass  
playback data .  
2.1.2 Attitude Hold Submode

roll 가 2.4 deg/sec 가  
가  
pitch  
0.062 deg/sec

2.1.3 2.1.1  
± 1.5  
Pitch ± 1.5  
Roll/ Yaw ± 1.0

2.1.4 Attitude Hold Submode  
(Solar Array:S/ A)

Earth Search가  
 가 Sun Mode  
 stow position(0 360 )  
 Earth Search가  
 Attitude Hold Submode



2.1.4. Solar Array Angle & Error in Attitude Hold Submode

Attitude Hold Submode 가  
 nadir pointing Pitch  
 (Earth rate)

2.2 -V(Delta V) Submode

1 -V submode  
 (altitude) +/- 90 pitch  
 maneuver (inclination angle)  
 +/- 90 roll maneuver 가

LEOP (Launch and Early Operation Period)  
 -V Burn  
 2.2.1

2.2.1. 1 -V Burn

Pass #	Event	Burn time	S/A Conditions	Remark
KGS 172	-90 Pitch Man.	180sec	Running	-

KGS 594	+90 Roll Man.	0sec	Stopped	Test Only, No firing
KGS 623	+90 Roll Man.	240sec	Running	during del-V, S/A was runned
KGS 725	+90 Roll Man.	360sec	Stopped	-
KGS 828	-90 Pitch Man.	263sec	Stopped	-

2.2.1 Pitch Maneuver

2.2.1 KGS(Kompsat Ground Station) pass # 172  
 -90 pitch maneuver 2.2.1 2.2.3

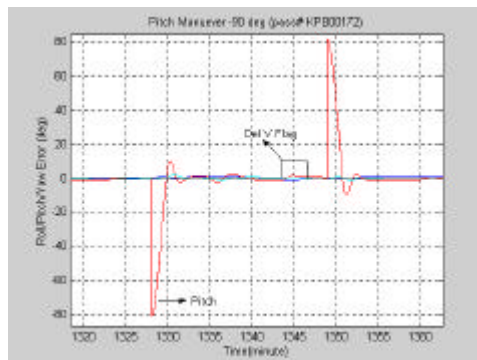
2.2.1 -90 pitch maneuver ,  
 -V Burn +90 pitch maneuver nadir pointing

2.2.2  
 -V Burn

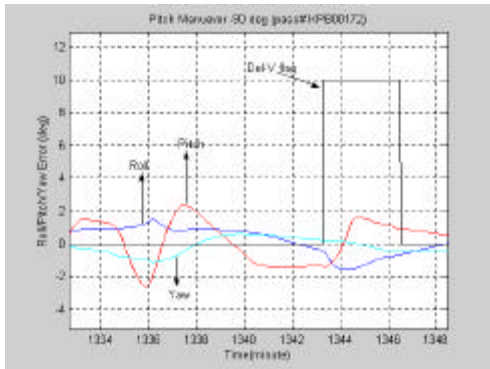
-V Burn ±2

2.2.3

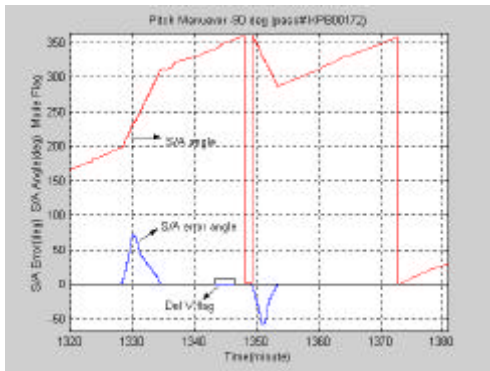
#172 -V Burn normal  
 180sec operation mode



2.2.1. Roll/Pitch/Yaw Error during maneuver(#172)



2.2.2. Roll/Pitch/Yaw Error during -V Burn(#172)



2.2.3. Solar Array Angle & Error during maneuver(#172)

2.2.3

(ACS\_4.4)

body

, pitch maneuver

가

body

-90

pitch maneuver

가

가

가

nadir pointing

2.2.1

-90 pitch maneuver

pass #828

-V Burn

pass #828

2.2.4

2.2.6

2.2.5

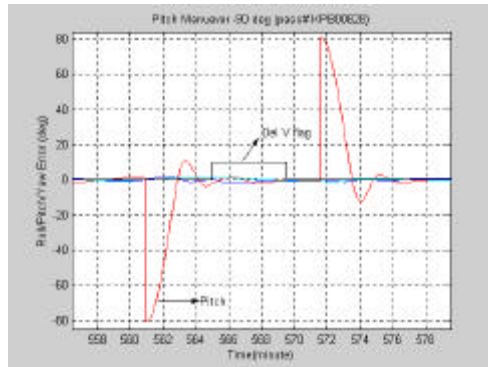
2.2.4

-V

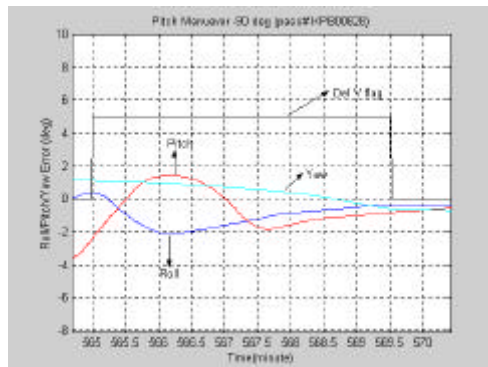
Burn

±2

가



2.2.4. Roll/Pitch/Yaw Error during maneuver (#828)



2.2.5. Roll/Pitch/Yaw Error during -V Burn(#828)

Pass #828 burn time 263sec #172

83 firing firing #172

#828

Pass #172

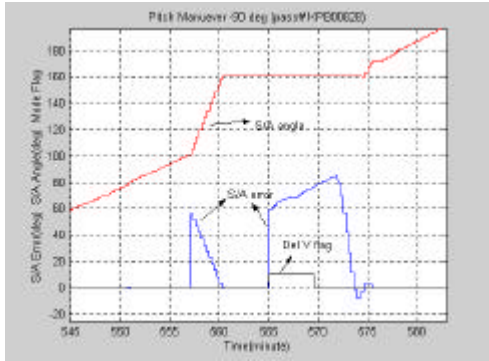
-V Burn #828

Pass #623 -V Burn

Burn 2.2.6

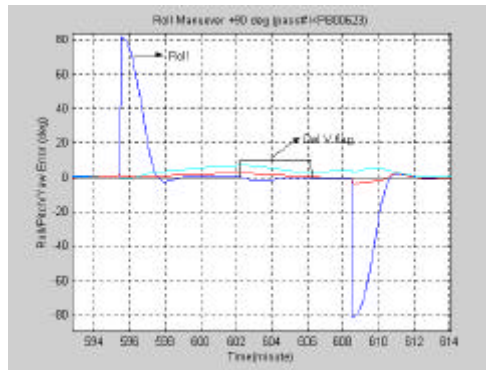
mode (ACS\_4.4)

-V Burn mode가  
-V submode mode가  
mode ephemeris track mode



2.2.6. Solar Array Angle & Error during Maneuver(#828)

2.2.6 -V Burn



2.2.7. Roll/Pitch/Yaw Error during Maneuver(#623)

-V Burn 가 nadir pointing

2.2.2 Roll Maneuver

2.2.1 1 -V Burn

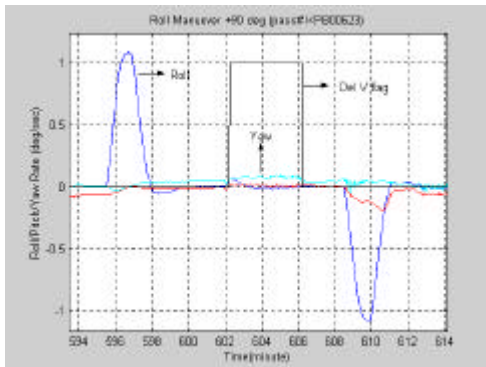
Roll Maneuver 3 KGS  
pass #594 Roll Maneuver

(command plan) Burn  
time 0 -V Burn

2.2.7 2.2.9 #623  
+90 Roll Maneuver -V

Burn

2.2.8 Roll maneuver  
-V Burn



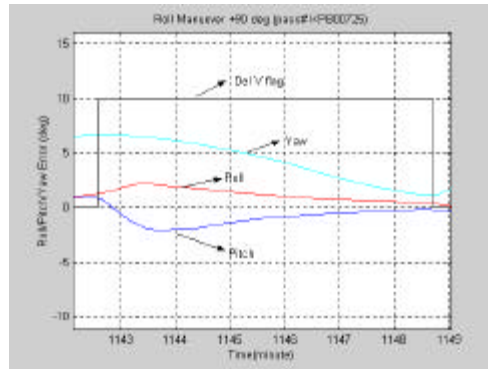
2.2.8. Roll/Pitch/Yaw Rate during Maneuver(#623)

2.2.9 #623

2.2.9

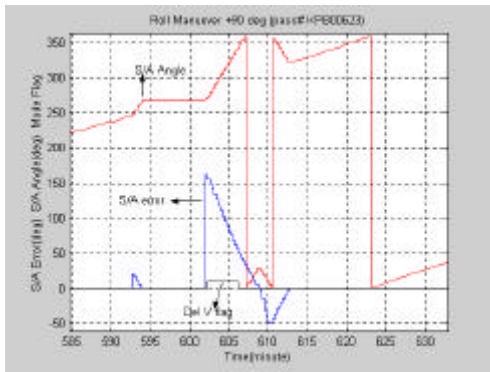
-V Burn  
-V submode mode

ephemeris track mode  
 +90 Roll maneuver  
 가  
 가 Roll 90 maneuver  
 body frame  
 z arctan  
 가 가  
 가 Roll 90 maneuver  
 ( Pitch )

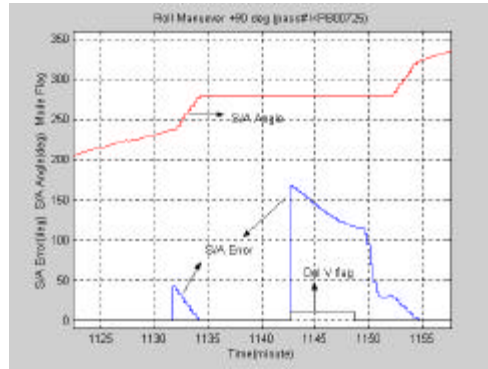


2.2.11. Roll/Pitch/Yaw Error during -V Burn(#725)

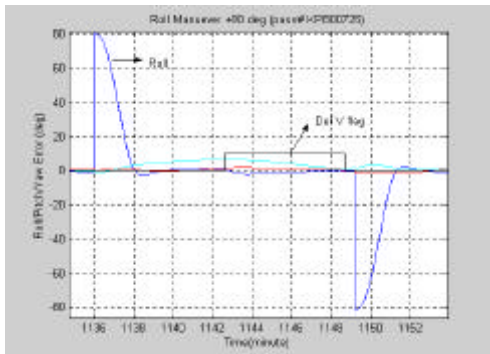
normal  
 가



2.2.9. Solar array angle & error during maneuver(#623)



2.2.12. Solar Array Angle & Error during Maneuver(#725)

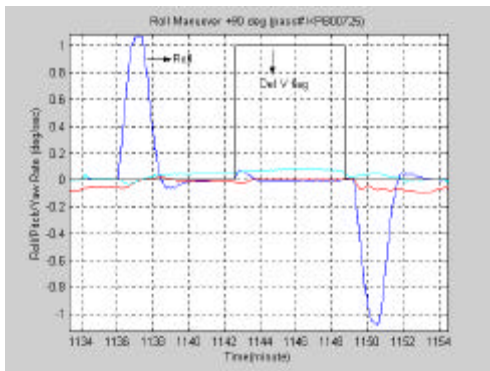


2.2.10. Roll/Pitch/Yaw Error during maneuver(#725)

Roll 90 maneuver  
 disable #725 +90 Roll maneuver  
 disable -V Burn 2.2.10  
 2.2.12  
 Burn 2.2.11 -V Burn  
 maneuver Roll maneuver  
 . KGS pass  
 .  
 .  
 .  
 . Pitch

. Pass #623 #725 -V  
Burn  
가

. 2.2.8 2.2.13  
(angular rate)  
가 . -V Burn  
pass #725  
가  
angular rate



2.2.13. Roll/Pitch/Yaw Rate during maneuver(#725)

3.

1

Maneuver Mode

. LEOP 1  
가 Maneuver Mode

1

-V

/

1

가