

/ Ish@kari.re.kr, , ,
,

(TGS, Telemetry Ground System) ,
(Launch Vehicle)

1. (Satellite)

(Telemetry)

,

,

. 1912

,

.

(Aerospace)
(Radiosonde)

2.

() (Balloon)

,

,

()

2.1

,

, 1957
(Sputnik)

(TGS)
(Km)

,

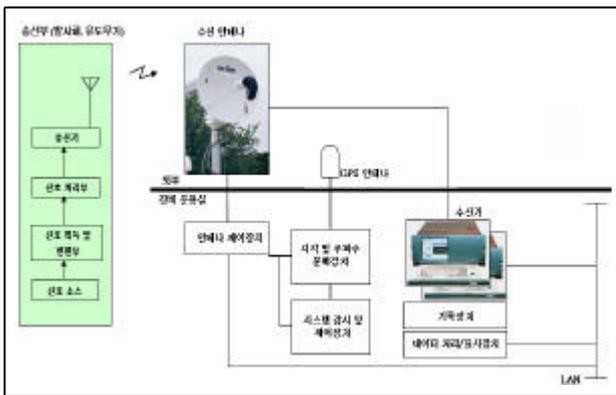
.

,

.

scan), (Monopulse) .
 (,)
 (LNA),
 가 .
 (, ,)
 (Quality)

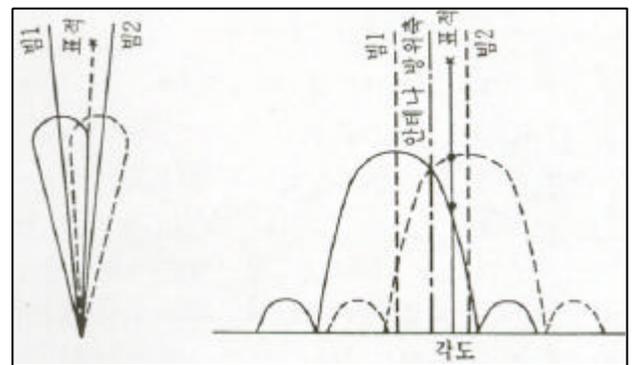
scan), (Monopulse) .
 (,)
 (LNA),
 가 .
 (, ,)
 (Quality)



1.

가 . RF
 가 가

2.2.1 (Sequential lobing)
 2
 1 2
 (2) . 2
 가 ,
 (,),
 (feed horn)



2.

2.2.2 (Conical Scan)

(Conical Scan)

4

2.2

가 ,
 (Target)

가

(Sequential lobing)

(Feed) . (3)

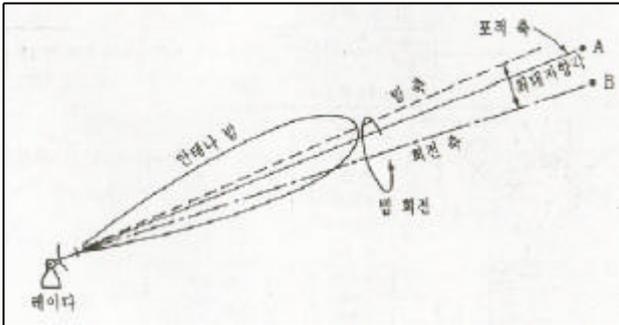
1 (Servo) 가 .

가

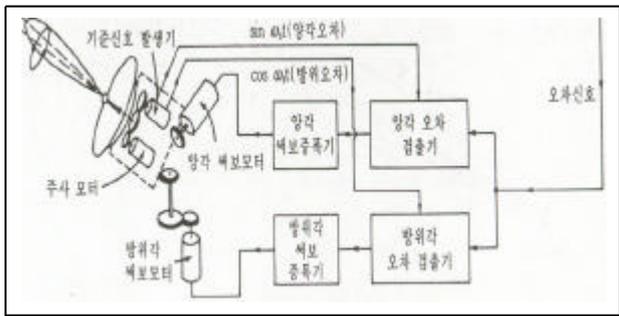
(Conical

(Cassegrain) 2

20Hz 30Hz



3.



4.

2

가
가 가
가 가
가 가

2.2.3 (Monopulse)

)
, 1

2

4

3

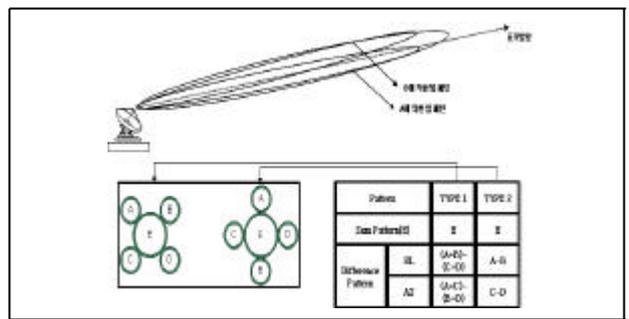
(5)

가

(A+B+C+D)

(Feedback)

AGC



5. (Monopulse)

(Sensitivity)

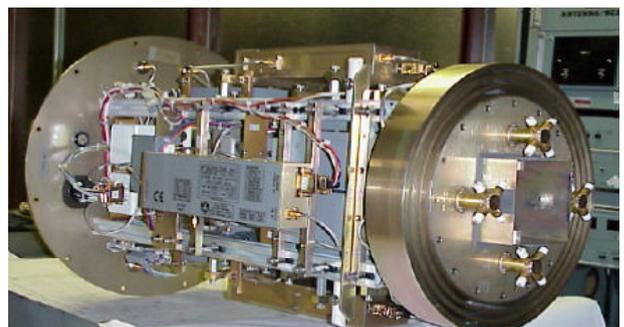
가

(TGS)

E-SCAN

G/T

가



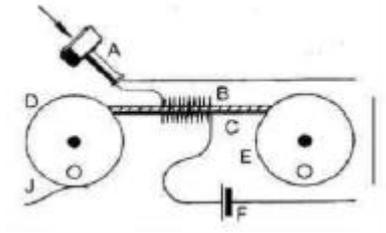
6. E-SCAN feed(, Viasat)

2.3 (Data Recording)

(Carrier)

()

가



7. Oberlin Smith

()
) 가

(AGC

(Magnetic Tape)

, PC



8. Poulsen Telegraphone

, 1925 Curt Stille Joseph Begun
(Magnetic wire) (Steel)
, 1928 Fritz Pfeleumer

2.3.1

가

가

(Tape)

1930

(FDD)

(HDD)

가

가

가

Allgemeine

1935

가

가

가

(9).

()

(

)

(Magnetic Tape)

1888 Oberlin Smith

(7), 1898 Valdemar Poulsen

(8)

7

(A)



9. Allgemeine Magnetophon

가

1982 5 (Inch)
(CD)가

가 가



10. TGS

가

A/D

2.3.2

(Disk)

가

가
(FDD, HDD)



11. High-Speed

2.3.3 (RAID)

가

RAID(Redundant Array of Independent Disk)

RAID

1960

가

()

RAID

가

가

가 가

가

가

가

가 .
 (Encoding) .(1)
 가
 가

, RAID
 , “ ”
 RAID
 (,)
 가 가

가 3.

1 RAID

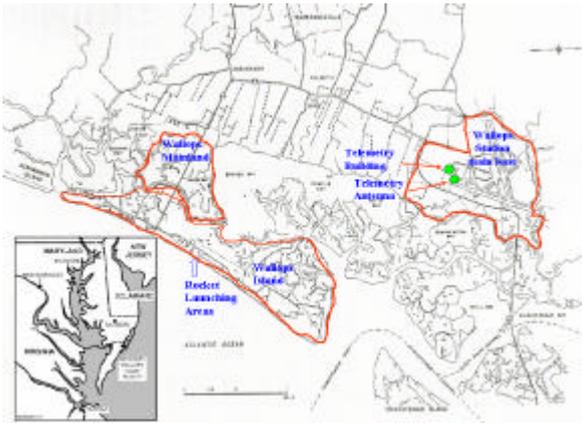
1. RAID (level)

Level 0 (Striping)	<ul style="list-style-type: none"> 가
Level 1 (Mirroring)	<ul style="list-style-type: none"> .
Level 2	<ul style="list-style-type: none"> 가 (.)
Level 3	<ul style="list-style-type: none"> Parity , (HotSwap)
Level 4	<ul style="list-style-type: none"> Parity
Level 5	<ul style="list-style-type: none"> 4 , Level

3.1 Wallopsstation

Kennedy Space Center, Cape Canaveral
 Air Station, Vandenberg AFB, Edwards AFB,
 Wallops Station Space Shuttle
 Wallops Maryland
 Salisbury 64Km, Maryland
 Greenbelt 240Km Virginia
 . (12)
 MainMainland,
 Main Base,
 Pad Launch site
 , 1950
 (NASA)





12. Wallops Station

Main Base

10 가 7
 , 3
 가



13. Wallops Station TGS

2

2. Wallopsstation

	X	S
	11.3M	11.3M
	8000~9000MHz	2200~2400MHz
G/T	35dB/K	23dB/K
	0.23degree	0.85degree
	56.8dBi	45.8dBi
	QPSK, UQPSK	PM,FM,BPSK
	NRZ-L,M	NRZ-L,Bi-phase

L,S
 .(3)
 Down Range
 가

3. Wallops station

	L	S
	6.1M	6.1M
	1435~1535MHz	2200~2400MHz
G/T	10.3 dB/K@45°EL	15.5dB/K@45°EL
	2.03 degree	1.53 degree
	35.8 dBi	40.5dBi
	BPSK,PM, FM	BPSK, PM, FM
	NRZ - L, M	NRZ - L, M

3.2 가

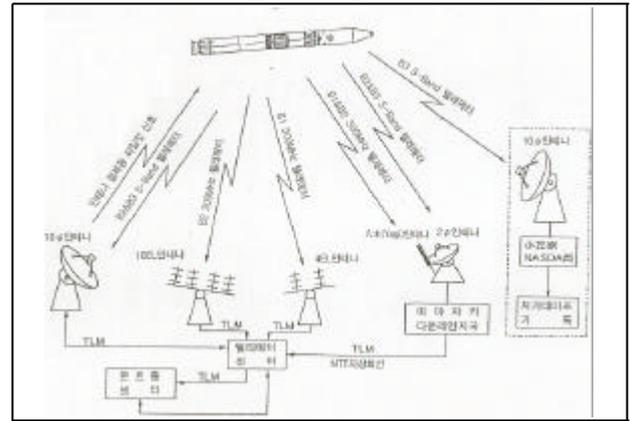
NASDA(National Space Development Agency of Japan) 가
 (TNSC, Tanegashima Space Center) ,
 ISAS(Institute of Space and Astronautical Science) 가 (KSC, Kagoshima Space Center) 가
 가 Uchinoura

. 1998
 () . 14 가



14. 가 (KSC)

가
On-Board
가 . M-V , 1
2 VHF , 2 3
16 4 , 2 3
10m
Down Range S
300MHz 2m
(Yagi) 2, 3
(16)
10m ,
가 .(15)



16.KSC

AMPEX-3000 1/2Inch, 7Track

(AGC) 가

4. 가

	VHF	S
	16 Dipole	10M
	295~300MHz	225~260MHz
	23dBi	43dBi
	12degree	
	BPSK	QPSK
	NRZ-L	NRZ-L
	-110dBm	-102dBm
	4dB	



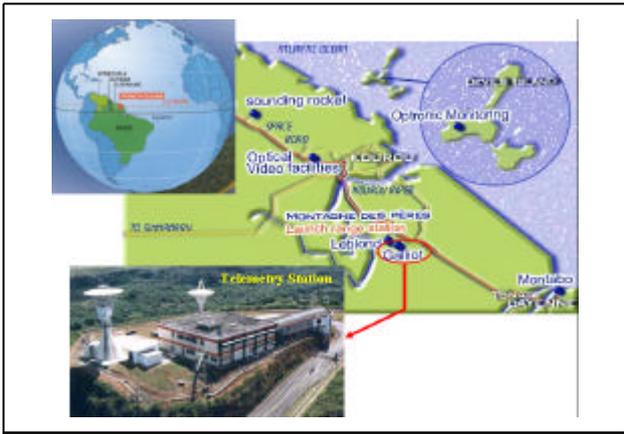
15. KSC

3.3 Kourou

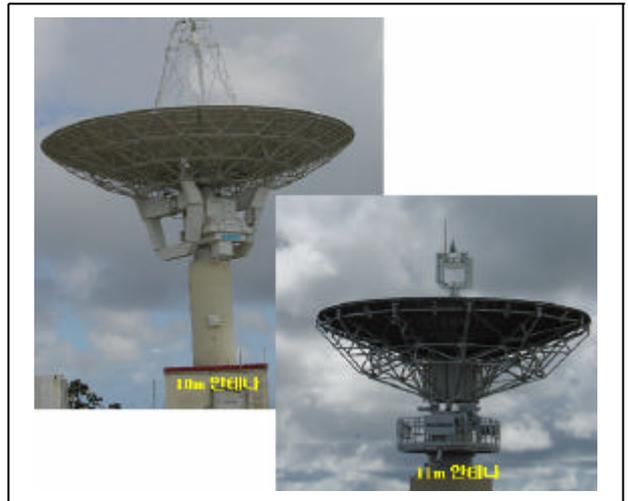
1962 (特殊法人)
(CNES, Centre National d'Etudes Spatiales)

가 , 1964 (CSG, Centre Spatial Guyanis)

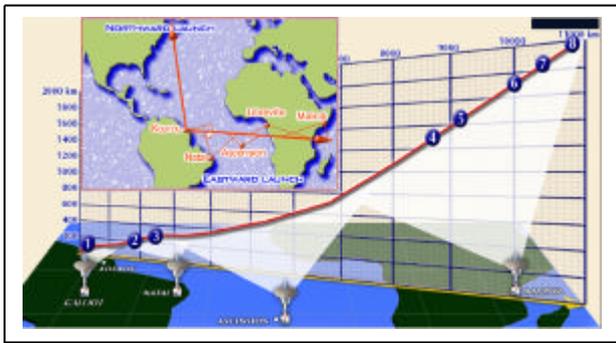
가 , Natal (Brazil), Ascension(U.K) Libreville (Gabon), Malindi(Kenya) (Down Range)



17. Guiana (CSG)



19. (CSG)



18.

4.

2 가 (ADD)

(KAI)

가 ,

25Km (17) (Ariane)

4.1 (ADD)

(18) (Down Range)

가 , 5 19

, (, ,) , (, 가 ,)

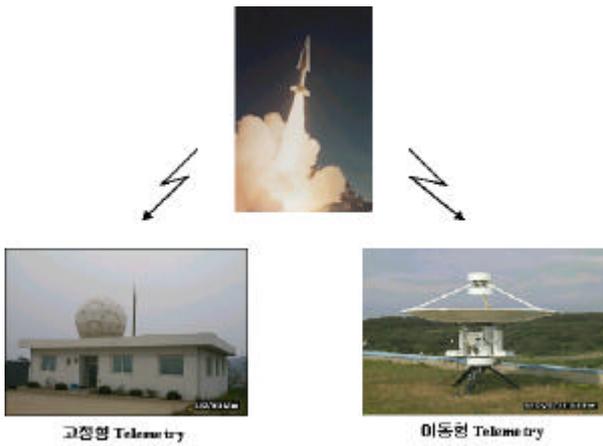
5. CSG

	STAR 45	STELLA 43
	11m	10m
	S-Band	S-Band
	45dBi	43dBi
	Monopulse	Monopulse
	PCM/FM	PCM/FM
	NRZ-L	NRZ-L

Viasat(, Scientific Atlantic)
E-SCAN (Feed)

가
20

(Radome)



20. ADD

5

6.ADD

		2.4m	1.8m
		1.4~2.3Ghz	1.6~1.7Ghz 2.2~2.3Ghz
		30dB	30dB
		E-SCAN	E-SCAN
Pedestal	가 /	30deg/sec 60deg/sec ²	20deg/sec 40deg/sec ²
		-5~+95(EL) ±360(AZ)	-5~+95(EL) ±360(AZ)
		Manual, Auto, Slaving	Manual, Auto, Slaving
		(Ethernetdatabroadcasting) : Upto20Mbps	

4.2

(KARI)

300 x 1600Km

(KSLV-1)

2000Km

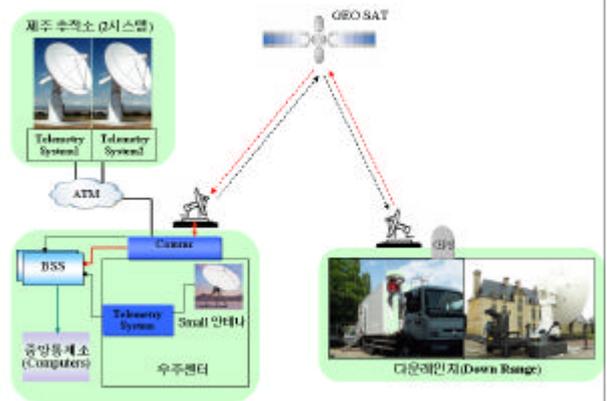
가

Pedestal,

(ACU, Antenna Control Unit),
(Combiner), , Bit-Synchronizer,
Decommutator
, (GPS&Timing),
(Recorder),
, (Program,
Slaving, NORAD TLE) RF
3
.1
, 2
, 가
(C-Band) 가
(LPF)

Asynchronous Embedded
Format 2 IRIG PCM ()
10Mbps)
(MCC : Mission Control Center)
, Slaving
가
(BSS, Best Source
Selector)가

21 7



21. KARI

7. KARI

	•S-Band:2.2~2.4Ghz
	<ul style="list-style-type: none"> • :11m • : •G/T <ul style="list-style-type: none"> -22.5dB/K(Rx) -20.6dB/K(Tx/Rx)
Pedestal	<ul style="list-style-type: none"> • <ul style="list-style-type: none"> - : 15degree/sec - 가 : 15degree/sec²
	•Auto,Manual,External
	•2 PCM 1Video
	•LAN
	•2 PCM
(BSS)	<ul style="list-style-type: none"> • PCM 가
	•RAID

(EU) 14

(Ariane Space)

5

가

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2. , " (I)",2001.7pp.9-30
3. , " ; 2003.5,pp.3-17
4. NASA, Wallops station handbook general information, 1964, 2, pp.33-68
5. NASA, Ground Network(GN) User's Guide, 2001.2, section4
6. / , , 1999.3, pp.542-551
7. , ,1999.5
8. <http://www.isas.jaxa.jp>
9. <http://www.csg-spatial.tm.fr>
10. <http://www.add.re.kr>
11. <http://inventors.about.com/library/inventors/>
12. <http://history.acusd.edu/gen/recording/tape.html>
13. <http://www.tpub.com/neets/book23/102.htm>
14. <http://terms.co.kr/RAID.htm>
15. <http://esapub.esrin.esa.it>
16. <http://perso.wanadoo.fr/starec>
17. <http://news.naver.com/news/read.php>
18. <http://www.atcorp.com/Categories/recordingssystem.htm>

5.

(,) S/W

RF