CGMS-XXX USA-WP-36
Prepared by USA
Agenda Item: C.1
To be discussed In Plenary

REPORT ON ALTERNATIVE DISSEMINATION METHODS FOR GOES-R

The USA is investigating the global distribution of high resolution imager and sounder data in the GOES-R era. Considering the expected high data rates for the proposed instruments, the USA studied three global distribution options consisting of dedicated lines, GOES-R rebroadcast and commercial communications satellites. This paper provided on overview of the each dissemination method and the projected annual cost

REPORT ON ALTERNATIVE DISSEMINATION METHODS FOR GOES-R

1. Introduction

Study focus – ***Sounder*** data distribution

Three global distribution options studied for the GOES R Era:

- Dedicated Land Lines
- GOES R
- Commercial Communications Satellites

Assumptions:

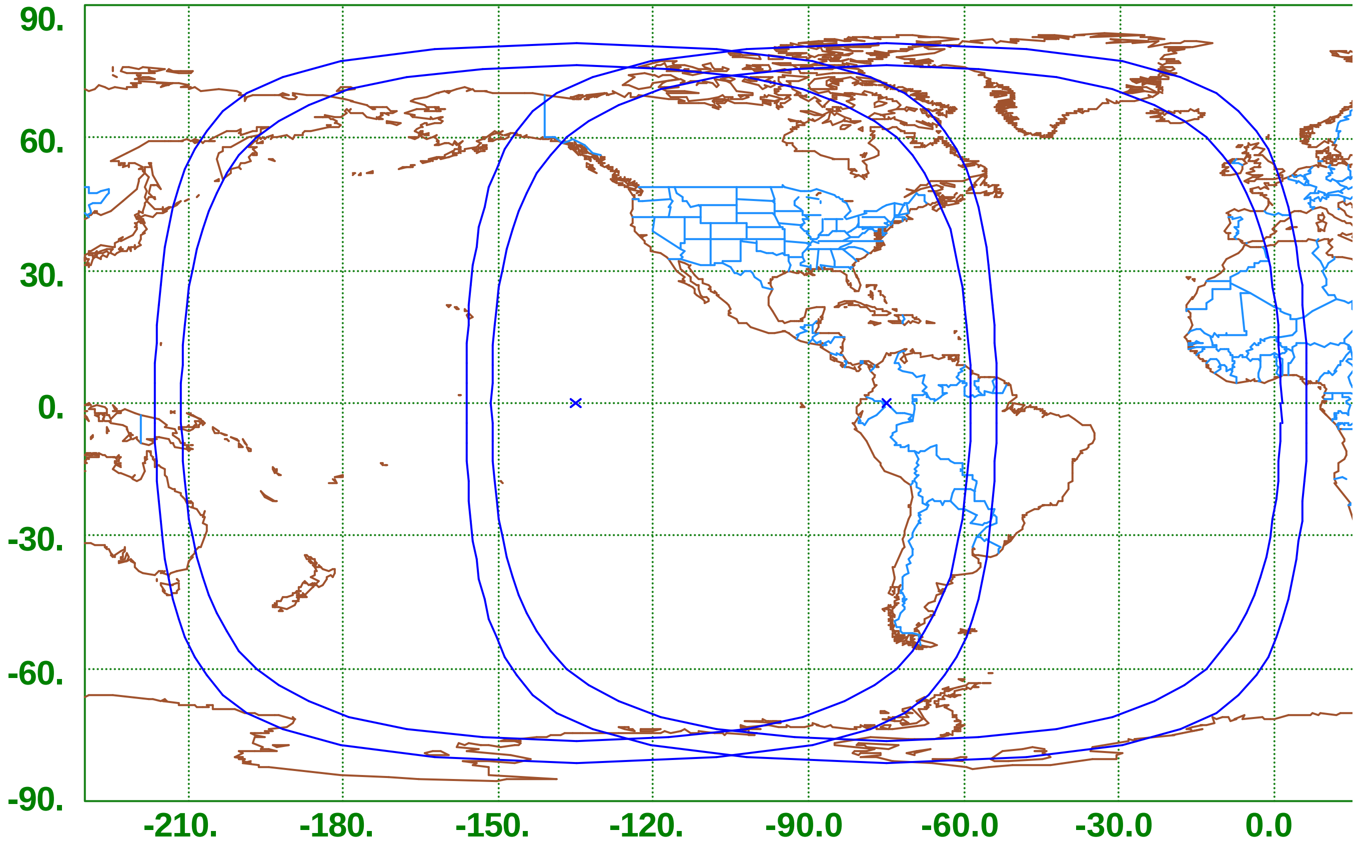
- High resolution imager data *satellite* distributed, due to near universal use.
- High resolution **sounder** data has fewer users.
  - Studied data distribution options to these fewer users
  - The Excel spreadsheet contains judged locations of US and foreign government meteorology centers that will want full resolution sounder data (radiance or brightness temp) from the GOES R series
  - Major US & foreign government meteorology centers, some universities, private commercial sectors (value added weather services, etc).
  - Sounder had either of two (2) data Rates – 16 Mbps or 64 Mbps.

Cost Data in terms of annual costs out to year developed from:

- Aerospace Corp's August 2001 GOES R concept design report (developing 13 design configurations), with variations driven mostly by the broadcast data rate and communications system. Annual costs derived from this report and projected out to yr 2007.
- Mitretek Corp, specialized communications industry expertise, developed dedicated land line costs consulting with long distance carriers projecting out to year 2007.
- Dyncorp Corp's 2001 OSD commercial satellite study. Intelsat VIII and IX used to reflect industry costs projected out to yr 2007

US and foreign User identification & Framework for NESDIS Data Distribution Policy developed by OSD

0 , 5 deg Elevation Contours for Communication from Standard GOES Geographic Locations of 75 & 135 degs West



Shows the broadcast area for GOES GRB, & locations ABI & ABS (HES) can be received

Curves Developed by the Aerospace Corp.

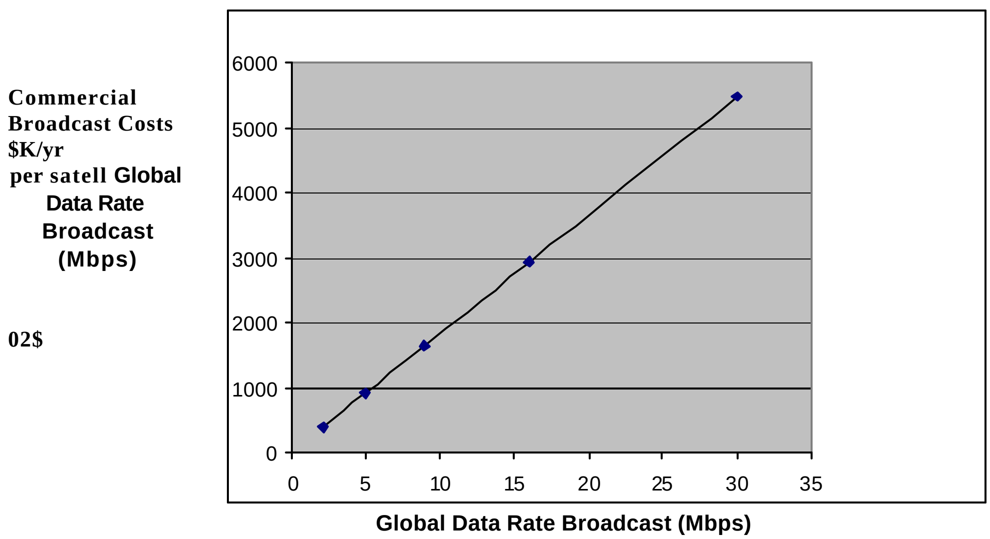
2. Annual Costs – Commercial Communications Satellites Global Sounder GRB Distribution (16 Mbps)

2.1 ANNUAL COSTS FOR COMMERCIAL COMMUNICATIONS SATELLITE GLOBAL BROADCASTS

Based on Intelast VIII Satellite Costs

(Cost Data from Dyncorp Study performed for NESDIS OSD-ASPD – May 2001 Report)

Mbps	Annual Broadcast Cost from 1 Satellite ($K/yr)
30	5503.4
16	2935.2
9	1650
5	916.8
2.1	384



- $2.94 million/yr in 2002 dollars is the annual cost to broadcast 16 Mbps over commercial communication satellites, using Intelsat VIII costs from Dyncorp's Study as a reference.
- To Replicate the Coverage of Two GOES Satellites (GOES E & W), the Grand Total Annual Cost to Broadcast **16 Mbps** over Two (e.g. Intelsat VIII & IX) Commercial satellites is $5.88 million/yr in 02 dollars.
- Annual Total Annual Cost for Two Commercial Communications Satellites to Replicate GOES E & W Coverage @ 16Mbps is $7 million/yr in 2007 dollars.

Note: Commercial communications satellites may be unavailable for global broadcasts above 43 Mbps

3. Annual Costs – GOES R Sounder Global GRB Distribution (16 & 64 Mbps)

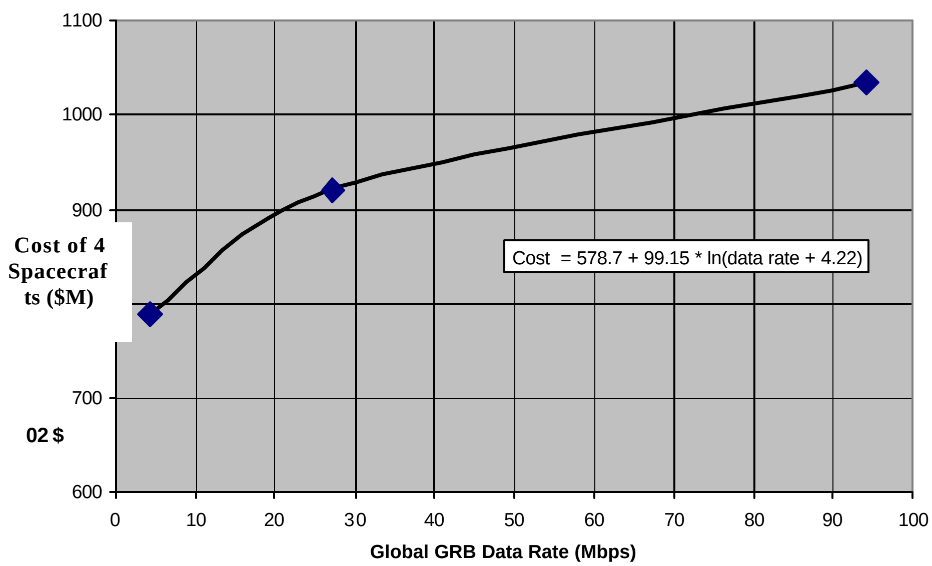
3.1 ANNUAL COSTS FOR GOES R SOUNDER GLOBAL BROADCAST at 16 Mbps

The plotted curve & its equation define the acquisition Costs for four (4) GOES R satellites vs a global GRB processed data re-broadcast (GRB) data rate. As the global GRB increases, the impact on the communication system and GOES R acquisition cost increases.

GOES R cost vs GRB data rate derived from data from Aerospace Corp's Aug. 2001computer design study of GOES R, with 13 designs (i.e. configurations) developed for NESDIS.
---- Aerospace report No. ATR-2002(2331)-1

Below cost vs data rate curve developed by Aerospace Communications & Architecture departments using the architecture study data.

GOES-R GRB Data Rate vs. Cost for 4 Spacecraft (configurations 2, 3, 9)



Cost to Add *16 Mbps* of ABS/HES to GOES R, for GRB global broadcast is determined:

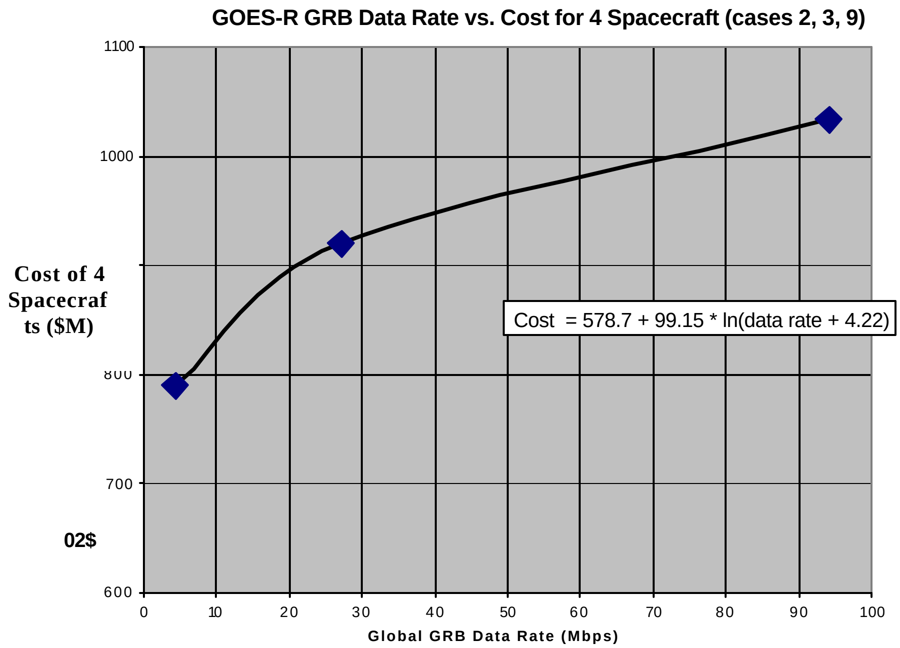
- Assume GOES R globally broadcasts 8Mbps ABI full & 4.2Mbps GRB lite to all GRB users, not only to National MET Centers, for a total 12.2 Mbps **ABI** broadcast.
- Cost to add an additional **ABS/HES** global GRB @16 Mbps to **ABI** can then be found.
- GOES R 4 satellite acquisition cost with only an ABI GRB of 12.2Mbps (8 full & 4.2 lite) is 856.2million in 02 dollars.
- The GOES R increased acquisition cost from adding ABS/HES 16Mbps GRB to the ABI's at 12.2Mbps is 923.4million dollars in 02 dollars.
- Cost to add 16Mbps of ABS/HES global GRB is 67.5million for 4 satellites 02 dollars (i.e. 923.6-856.2million).
- Cost for one (1) satellite to add 16Mbps ABS distribution is 16.9million in 02 dollars.
- Assume 7 yr lifetime,cost/yr is 2.4million per yr per GOES R satellite in 02 dollars.
- Cost for 1 GOES R satellite to add 16Mbps of ABS GRB distribution is 2.84million annually (07 dollars).
- Grand total cost to add 16Mbps GRB distribution to both GOES R era E & W (2 satellites) is 5.7million annually (07 dollars).

3.2 ANNUAL COSTS FOR GOES R SOUNDER GLOBAL BROADCAST at 64 Mbps

The plotted curve & its equation define the acquisition Costs for four (4) GOES R satellites vs a global GRB processed data re-broadcast (GRB) data rate. As the global GRB increases, the impact on the communication system and GOES R acquisition cost increases.

GOES R cost vs GRB data rate derived from data from Aerospace Corp's Aug. 2001computer design study of GOES R, with 13 designs (i.e. configurations) developed for NESDIS.
---- Aerospace report No. ATR-2002(2331)-1

Below cost vs data rate curve developed by Aerospace Communications & Architecture departments using the architecture study data.



Cost to Add *64 Mbps* of ABS/HES to GOES R, for GRB global broadcast is determined:

- Assume GOES R globally broadcasts 8Mbps ABI full & 4.2 Mbps GRB lite to all GRB users, not only to National MET Centers, for total of 12.2 Mbps **ABI** 12.2 broadcast.
- Cost to add an additional **ABS/HES** global GRB @64 Mbps to **ABI** can then be found.
- GOES R 4 satellite acquisition cost with only an ABI GRB of 12.2Mbps (8 full & 4.2 lite) is 856.2million in 02 dollars.
- The GOES R increased acquisition cost from adding ABS/HES 64 Mbps GRB to the ABI's at 12.2Mbps is 1013.7.4million dollars in 02 dollars.
- Cost to add 64Mbps of ABS/HES global GRB is 157.5million for 4 satellites 02 dollars (i.e. 1013.7-856.2million).
- Cost for one (1) satellite to add 16Mbps ABS distribution is 39.4 million in 02 dollars.
- Assume 7 yr lifetime,cost/yr is 2.4million per yr per GOES R satellite in 02 dollars.
- Cost for 1 GOES R satellite to add 64Mbps of ABS GRB distribution is 6.64 million annually (07 dollars).
- Grand total cost to add 16Mbps GRB distribution to both GOES R era E & W (2 satellites) is 13.3 million annually (07 dollars).

4. Annual Costs – Land Lines for SounderData Distribution (16 & 64 Mbps)

4.1 GOES R "SOUNDER" LANDLINE DATA DISTRIBUTION COSTS @ (16 Mbps in FY'07 Dollars)

NOAA Baseline (Distribution varying between 5 to 10 sites)

US FEDERAL AGENCIES	GOES E	GOES W	CASE A Annual Cost	CASE B Annual Cost	CASE C Annual Cost	CASE D Annual Cost	
NOAA							
NCEP (MD):	x	x	$146,448	$146,448	$146,448	$146,448	
CIMSS (WI):	x	x	$265,680	$265,680	$265,680	$265,680	
CIRA (CO):	x	x	$518,400	$518,400	$518,400	$518,400	
OAR (CO):	x	x	$518,400	$518,400	$518,400	$518,400	
GSFC Backup Site (MD):	x	x	$146,448	$146,448	$146,448	$146,448	
Kansas City - Aviation (KS):	x	x	$0	$349,920	$349,920	$349,920	
Norman OK - Severe Center (OK):	x	x	$0	$388,800	$388,800	$388,800	
Miami - TPC (FL):	x	x	$0	$324,000	$324,000	$324,000	
Hawaii Pacific Region (HI):		x	$0	$0	$972,000	$972,000	
Anchorage (Alaska)		x	$0	$0	$1,711,080	$1,711,080	
Subtotal Landline Annual Cost (NOAA):			$1,595,376	$2,658,096	$5,341,176	$5,341,176	
Suitland Infrastructure Annual Cost associated with government sites (~ 30 sites):			$61,071	$62,143	$67,500	$99,643	
Techincal Staff Annual Cost to support Infrastrucutre:			$200,000	$200,000	$200,000	$200,000	
Suitland Infrastructure Annual Cost associated with non-government sites (~40 sites):			$96,429	$96,429	$96,429	$96,429	
Total Annual Landline Cost (NOAA):			**$1,952,876**	**$3,016,668**	**$5,705,105**	**$5,737,248**	
DoD							
AF Offut Omaha (NE):	x	x	$479,520	$479,520	$479,520	$479,520	
Navy Monterey (CA):	x	x	$583,200	$583,200	$583,200	$583,200	
Navy Bay St Louis (MS):	x	x	$382,320	$382,320	$382,320	$382,320	
Total Annual Landline Cost (DOD):			**$1,445,040**	**$1,445,040**	**$1,445,040**	**$1,445,040**	
FAA							
Harris Corp (Contractor to FAA) - (FL):	x	x	**$324,000**	**$324,000**	**$324,000**	**$324,000**	
NASA							
GSFC Greenbelt(MD):	x	x	$146,448	$146,448	$146,448	$146,448	
MSFC Huntsville(AL):	x	x	$298,080	$298,080	$298,080	$298,080	
Langley, Hampton (VA):	x	x	$168,480	$168,480	$168,480	$168,480	
Total Annual Landline Cost (NASA)			**$613,008**	**$613,008**	**$613,008**	**$613,008**	
TOTAL ANNUAL LANDLINE COST (US FEDERAL GOVT):			**$4,334,924**	**$5,398,716**	**$8,087,153**	**$8,119,296**	
NON - FEDERAL AGENCIES							
CENTRAL AMERICA							
Costa Rica:	x		$1,200,000	$1,200,000	$1,200,000	$1,200,000	(1 site)
Mexico:	x	x	$2,400,000	$2,400,000	$2,400,000	$4,800,000	(2 sites)
Total Annual Landline Cost (Central America):			**$3,600,000**	**$3,600,000**	**$3,600,000**	**$6,000,000**	
CARIBBEAN							
Barbados:	x		$1,200,000	$1,200,000	$1,200,000	$2,400,000	(2 sites)
Bermuda:	x		$1,200,000	$1,200,000	$1,200,000	$1,200,000	(1 site)
Total Annula Landline Cost (Carribean):			**$2,400,000**	**$2,400,000**	**$2,400,000**	**$3,600,000**	
SOUTH AMERICA							
Argentina:	x		$1,200,000	$1,200,000	$1,200,000	$2,400,000	(2 sites)
Brazil:	x		$1,200,000	$1,200,000	$1,200,000	$8,400,000	(7 sites)
Chile:	x		$1,200,000	$1,200,000	$1,200,000	$3,600,000	(3 sites)
Columbia:	x		$1,200,000	$1,200,000	$1,200,000	$1,200,000	(1 site)
Ecuador:	x		$1,200,000	$1,200,000	$1,200,000	$1,200,000	(1 site)
Peru:	x		$1,200,000	$1,200,000	$1,200,000	$1,200,000	(1 site)
Venezuela:	x		$1,200,000	$1,200,000	$1,200,000	$1,200,000	(1 site)
Total Annual Landline Cost (South America):			**$8,400,000**	**$8,400,000**	**$8,400,000**	**$19,200,000**	
TOTAL ANNUAL LANDLINE COST (Southern Hemisphere)			**$14,400,000**	**$14,400,000**	**$14,400,000**	**$28,800,000**	
CANADA							
Montreal - Quebec:	x	x	**$960,000**	**$960,000**	**$960,000**	**$17,280,000**	(15 sites)
EUROPE							
England - Reading:	x		$1,200,000	$1,200,000	$1,200,000	$1,200,000	(1 site)
France - Lanion:	x		$1,200,000	$1,200,000	$1,200,000	$1,200,000	(1 site)
Spain - Madrid:	x		$1,200,000	$1,200,000	$1,200,000	$1,200,000	(1 site)
TOTAL ANNUAL LANDLINE COST (Europe):			**$3,600,000**	**$3,600,000**	**$3,600,000**	**$3,600,000**	
GRAND TOTAL ANNUAL COST (ALL GOVERNMENT AGENCIES)			**$23,294,924**	**$24,358,716**	**$27,047,153**	**$57,799,296**	
UNIVERSITIES							
COMMERCIAL METEOROLOGY INDUSTRY							
PRIVATE INDUSTRY							

Note about Case D: It delivers 16 Mbps ABS/HES GRB Data to each (GVAR) site existing in each Southern Hemisphere nation (e.g. Brazil has 7 GVAR sites, and so in this case the sounder data is sent to each of the 7sites)

Dedicated Landline Costs were prepared for NESDIS OSD Office as part of a study completed by Mitretek Systems (Pricing based on data from FTS contract and other carriers)

4.2 GOES R "SOUNDER" LANDLINE DATA DISTRIBUTION COSTS @ (16 Mbps in FY'07 Dollars)

NOAA Baseline (5 to 10 SITES) with DoD @ 6 sites

US FEDERAL AGENCIES	GOESE	GOES W	CASE A Annual Cost	CASE B Annual Cost	CASE C Annual Cost	CASE D Annual Cost	
NOAA							
NCEP (MD):	x	x	$146,448	$146,448	$146,448	$146,448	
CIMSS (WI):	x	x	$265,680	$265,680	$265,680	$265,680	
CIRA (CO):	x	x	$518,400	$518,400	$518,400	$518,400	
OAR (CO):	x	x	$518,400	$518,400	$518,400	$518,400	
GSFC Backup Site (MD):	x	x	$146,448	$146,448	$146,448	$146,448	
Kansas City - Aviation (KS):	x	x	$0	$349,920	$349,920	$349,920	
Norman OK - Severe Center (OK):	x	x	$0	$388,800	$388,800	$388,800	
Miami - TPC (FL):	x	x	$0	$324,000	$324,000	$324,000	
Hawaii Pacific Region (HI):		x	$0	$0	$972,000	$972,000	
Anchorage (Alaska)		x	$0	$0	$1,711,080	$1,711,080	
Subtotal Landline Annual Cost (NOAA):			$1,595,376	$2,658,096	$5,341,176	$5,341,176	
Suitland Infrastructure Annual Cost associated with government sites(~ 30 sites):			$61,071	$62,143	$67,500	$99,643	
Techincal Staff Annual Cost to support Infrastrucutre:			$200,000	$200,000	$200,000	$200,000	
Suitland Infrastructure Annual Cost associated with non-government sites (~40 sites):			$96,429	$96,429	$96,429	$96,429	
Total Annual Landline Cost (NOAA):			**$1,952,876**	**$3,016,668**	**$5,705,105**	**$5,737,248**	
DoD							
AF Offut Omaha (NE):	x	x	$479,520	$479,520	$479,520	$479,520	
Navy Monterey (CA):	x	x	$583,200	$583,200	$583,200	$583,200	
Navy Bay St Louis (MS):	x	x	$382,320	$382,320	$382,320	$382,320	
Atlantic Fleet (Norfolk, VA):	x	x	$84,240	$84,240	$84,240	$84,240	
Pacific Fleet (Hawaii):		x	$972,000	$972,000	$972,000	$972,000	
Navy - Rota (Spain):	x		$1,200,000	$1,200,000	$1,200,000	$1,200,000	
Total Annual Landline Cost (DOD):			**$3,701,280**	**$3,701,280**	**$3,701,280**	**$3,701,280**	
FAA							
Harris Corp (Contractor to FAA) - (FL):	x	x	**$324,000**	**$324,000**	**$324,000**	**$324,000**	
NASA							
GSFC Greenbelt(MD):	x	x	$146,448	$146,448	$146,448	$146,448	
MSFC Huntsville(AL):	x	x	$298,080	$298,080	$298,080	$298,080	
Langley, Hampton (VA):	x	x	$168,480	$168,480	$168,480	$168,480	
Total Annual Landline Cost (NASA):			**$613,008**	**$613,008**	**$613,008**	**$613,008**	
TOTAL ANNUAL LANDLINE COST (FEDERAL GOVT):			**$6,591,164**	**$7,654,956**	**$10,343,393**	**$10,375,536**	
NON - FEDERAL AGENCIES							
CENTRAL AMERICA							
Costa Rica:	x		$1,200,000	$1,200,000	$1,200,000	$1,200,000	(1 site)
Mexico:	x	x	$2,400,000	$2,400,000	$2,400,000	$4,800,000	(2 sites)
Total Annual Landline (Central America):			**$3,600,000**	**$3,600,000**	**$3,600,000**	**$6,000,000**	
CARIBBEAN							
Barbados:	x		$1,200,000	$1,200,000	$1,200,000	$2,400,000	(2 sites)
Bermuda:	x		$1,200,000	$1,200,000	$1,200,000	$1,200,000	(1 site)
Total Annual Landline Cost (Carribean):			**$2,400,000**	**$2,400,000**	**$2,400,000**	**$3,600,000**	
SOUTH AMERICA							
Argentina:	x		$1,200,000	$1,200,000	$1,200,000	$2,400,000	(2 sites)
Brazil:	x		$1,200,000	$1,200,000	$1,200,000	$8,400,000	(7 sites)
Chile:	x		$1,200,000	$1,200,000	$1,200,000	$3,600,000	(3 sites)
Columbia:	x		$1,200,000	$1,200,000	$1,200,000	$1,200,000	(1 site)
Ecuador:	x		$1,200,000	$1,200,000	$1,200,000	$1,200,000	(1 site)
Peru:	x		$1,200,000	$1,200,000	$1,200,000	$1,200,000	(1 site)
Venezuela:	x		$1,200,000	$1,200,000	$1,200,000	$1,200,000	(1 site)
Total Annual Landline (South America):			**$8,400,000**	**$8,400,000**	**$8,400,000**	**$19,200,000**	
TOTAL ANNUAL LANDLINE COST (Southern Hemisphere)			**$14,400,000**	**$14,400,000**	**$14,400,000**	**$28,800,000**	
CANADA							
Montreal - Quebec:	x	x	**$960,000**	**$960,000**	**$960,000**	**$17,280,000**	(15 sites)
EUROPE							
England - Reading:	x		$1,200,000	$1,200,000	$1,200,000	$1,200,000	(1 site)
France - Lanion:	x		$1,200,000	$1,200,000	$1,200,000	$1,200,000	(1 site)
Spain - Madrid:	x		$1,200,000	$1,200,000	$1,200,000	$1,200,000	(1 site)
TOTAL ANNUAL LANDLINE COST (Europe):			**$3,600,000**	**$3,600,000**	**$3,600,000**	**$3,600,000**	
GRAND TOTAL ANNUAL COST (ALL GOVERNMENT AGENCIES)			**$25,551,164**	**$26,614,956**	**$29,303,393**	**$60,055,536**	
UNIVERSITIES							
COMMERCIAL METEOROLOGY INDUSTRY							
PRIVATE INDUSTRY							

Note about Case D: It delivers 16 Mbps ABS/HES GRB Data to each (GVAR) site existing in each Southern Hemisphere nation (e.g. Brazil has 7 GVAR sites, and so in this case the sounder data is sent to each of the 7sites)

Dedicated Landline Costs were prepared for NESDIS OSD Office as part of a study completed by Mitretek Systems

(Pricing based on data from FTS contract and other carriers)

4.3 GOES R "SOUNDER" LANDLINE DATA DISTRIBUTION COSTS @ (64 Mbps in FY'07 Dollars)

NOAA Baseline (Distribution varying between 5 to 10 sites)

US FEDERAL AGENCIES	GOES E	GOES W	CASE A Annual Cost	CASE B Annual Cost	CASE C Annual Cost	CASE D Annual Cost	
NOAA							
NCEP (MD):	x	x	$542,400	$542,400	$542,400	$542,400	
CIMSS (WI):	x	x	$984,000	$984,000	$984,000	$984,000	
CIRA (CO):	x	x	$1,920,000	$1,920,000	$1,920,000	$1,920,000	
OAR (CO):	x	x	$1,920,000	$1,920,000	$1,920,000	$1,920,000	
GSFC Backup Site (MD):	x	x	$542,400	$542,400	$542,400	$542,400	
Kansas City - Aviation (KS):	x	x	$0	$1,224,000	$1,224,000	$1,224,000	
Norman OK - Severe Center (OK):	x	x	$0	$1,440,000	$1,440,000	$1,440,000	
Miami - TPC (FL):	x	x	$0	$1,200,000	$1,200,000	$1,200,000	
Hawaii Pacific Region (HI):		x	$0	$0	$3,600,000	$3,600,000	
Anchorage (Alaska)		x	$0	$0	$6,337,344	$6,337,344	
Subtotal Landline Annual Cost (NOAA):			$5,908,800	$9,772,800	$19,710,144	$19,710,144	
Suitland Infrastructure Annual Costs associated with government sites (1-224 sites):			$500,000	$500,000	$500,000	$500,000	
Technical Staff Annual Cost to support Infrastructure:			$200,000	$200,000	$200,000	$200,000	
Suitland Infrastructure Annual Cost associated with non-government sites:			$0	$0	$0	$0	
Total Annual Landline Cost (NOAA):			**$6,608,800**	**$10,472,800**	**$20,410,144**	**$20,410,144**	
DoD							
AF Offut Omaha (NE):	x	x	$1,776,000	$1,776,000	$1,776,000	$1,776,000	
Navy Monterey (CA):	x	x	$2,160,000	$2,160,000	$2,160,000	$2,160,000	
Navy Bay St Louis (MS):	x	x	$1,416,000	$1,416,000	$1,416,000	$1,416,000	
Total Annual Landline Cost (DOD):			**$5,352,000**	**$5,352,000**	**$5,352,000**	**$5,352,000**	
FAA							
Harris Corp (Contractor to FAA) - (FL):	x	x	**$1,200,000**	**$1,200,000**	**$1,200,000**	**$1,200,000**	
NASA							
GSFC Greenbelt(MD):	x	x	$542,400	$542,400	$542,400	$542,400	
MSFC Huntsville(AL):	x	x	$1,200,000	$1,200,000	$1,200,000	$1,200,000	
Langley, Hampton (VA):	x	x	$542,400	$542,400	$542,400	$542,400	
Total Annual Landline Cost (NASA):			**$2,284,800**	**$2,284,800**	**$2,284,800**	**$2,284,800**	
TOTAL ANNUAL LANDLINE COST (FEDERAL GOVT):			**$15,445,600**	**$19,309,600**	**$29,246,944**	**$29,246,944**	
NON - FEDERAL AGENCIES							
CENTRAL AMERICA							
Costa Rica:	x		$4,200,000	$4,200,000	$4,200,000	$4,200,000	(1 site)
Mexico:	x	x	$8,400,000	$8,400,000	$8,400,000	$16,800,000	(2 sites)
Total Annual Landline Cost (Central America):			**$12,600,000**	**$12,600,000**	**$12,600,000**	**$21,000,000**	
CARIBBEAN							
Barbados:	x		$4,200,000	$4,200,000	$4,200,000	$8,400,000	(2 sites)
Bermuda:	x		$4,200,000	$4,200,000	$4,200,000	$4,200,000	(1 site)
Total Annual Landline Cost (Carribean):			**$8,400,000**	**$8,400,000**	**$8,400,000**	**$12,600,000**	
SOUTH AMERICA							
Argentina:	x		$4,200,000	$4,200,000	$4,200,000	$8,400,000	(2 sites)
Brazil:	x		$4,200,000	$4,200,000	$4,200,000	$29,400,000	(7 sites)
Chile:	x		$4,200,000	$4,200,000	$4,200,000	$12,600,000	(3 sites)
Columbia:	x		$4,200,000	$4,200,000	$4,200,000	$4,200,000	(1 site)
Ecuador:	x		$4,200,000	$4,200,000	$4,200,000	$4,200,000	(1 site)
Peru:	x		$4,200,000	$4,200,000	$4,200,000	$4,200,000	(1 site)
Venezuela:	x		$4,200,000	$4,200,000	$4,200,000	$4,200,000	(1 site)
Total Annual Landline Cost (South America):			**$29,400,000**	**$29,400,000**	**$29,400,000**	**$67,200,000**	
TOTAL ANNUAL LANDLINE COST (Southern Hemisphere)			**$50,400,000**	**$50,400,000**	**$50,400,000**	**$100,800,000**	
CANADA							
Montreal - Quebec:	x	x	**$2,400,000**	**$2,400,000**	**$2,400,000**	**$43,200,000**	(15 sites)
EUROPE							
England - Reading:	x		$4,200,000	$4,200,000	$4,200,000	$4,200,000	(1 site)
France - Lanion:	x		$4,200,000	$4,200,000	$4,200,000	$4,200,000	(1 site)
Spain - Madrid:	x		$4,200,000	$4,200,000	$4,200,000	$4,200,000	(1 site)
TOTAL ANNUAL LANDLINE COST (Europe):			**$12,600,000**	**$12,600,000**	**$12,600,000**	**$12,600,000**	
GRAND TOTAL ANNUAL COST (ALL GOVERNMENT AGENCIES)			**$80,845,600**	**$84,709,600**	**$94,646,944**	**$185,846,944**	
UNIVERSITIES							
COMMERCIAL METEOROLOGY INDUSTRY							
PRIVATE INDUSTRY							

Note about Case D: It delivers 64 Mbps ABS/HES GRB Data to each (GVAR) site existing in each Southern Hemisphere nation (e.g. Brazil has 7 GVAR sites, and so in this case the sounder data is sent to each of the 7sites)

Dedicated Landline Costs were prepared for NESDIS OSD Office as part of a study completed by Mitretek Systems
(Pricing based on data from FTS contract and other carriers)

4.4 GOES R "SOUNDER" LANDLINE DATA DISTRIBUTION COSTS @ (64 Mbps in FY'07 Dollars)

NOAA Baseline (5 to 10 SITES) with DoD @ 6 sites

	CASE A	CASE B	CASE C	CASE D	
	Annual Cost	Annual Cost	Annual Cost	Annual Cost	
GOES W					
x	$542,400	$542,400	$542,400	$542,400	
x	$984,000	$984,000	$984,000	$984,000	
x	$1,920,000	$1,920,000	$1,920,000	$1,920,000	
x	$1,920,000	$1,920,000	$1,920,000	$1,920,000	
x	$542,400	$542,400	$542,400	$542,400	
x	$0	$1,224,000	$1,224,000	$1,224,000	
x	$0	$1,440,000	$1,440,000	$1,440,000	
x	$0	$1,200,000	$1,200,000	$1,200,000	
x	$0	$0	$3,600,000	$3,600,000	
x	$0	$0	$6,337,344	$6,337,344	
	$5,908,800	$9,772,800	$19,710,144	$19,710,144	
	$500,000	$500,000	$500,000	$500,000	
	$200,000	$200,000	$200,000	$200,000	
	$0	$0	$0	$0	
	$6,608,800	**$10,472,800**	**$20,410,144**	**$20,410,144**	
x	$1,776,000	$1,776,000	$1,776,000	$1,776,000	
x	$2,160,000	$2,160,000	$2,160,000	$2,160,000	
x	$1,416,000	$1,416,000	$1,416,000	$1,416,000	
x	$624,000	$624,000	$624,000	$624,000	
x	$3,600,000	$3,600,000	$3,600,000	$3,600,000	
	$4,200,000	$4,200,000	$4,200,000	$4,200,000	
	$13,776,000	**$13,776,000**	**$13,776,000**	**$13,776,000**	
x	**$1,200,000**	**$1,200,000**	**$1,200,000**	**$1,200,000**	
x	$542,400	$542,400	$542,400	$542,400	
x	$1,200,000	$1,200,000	$1,200,000	$1,200,000	
x	$542,400	$542,400	$542,400	$542,400	
	$2,284,800	**$2,284,800**	**$2,284,800**	**$2,284,800**	
	$23,869,600	**$27,733,600**	**$37,670,944**	**$37,670,944**	
	$4,200,000	$4,200,000	$4,200,000	$4,200,000	(1 site)
x	$8,400,000	$8,400,000	$8,400,000	$16,800,000	(2 sites)
	$12,600,000	**$12,600,000**	**$12,600,000**	**$21,000,000**	
	$4,200,000	$4,200,000	$4,200,000	$8,400,000	(2 sites)
	$4,200,000	$4,200,000	$4,200,000	$4,200,000	(1 site)
	$8,400,000	**$8,400,000**	**$8,400,000**	**$12,600,000**	
	$4,200,000	$4,200,000	$4,200,000	$8,400,000	(2 sites)
	$4,200,000	$4,200,000	$4,200,000	$29,400,000	(7 sites)
	$4,200,000	$4,200,000	$4,200,000	$12,600,000	(3 sites)
	$4,200,000	$4,200,000	$4,200,000	$4,200,000	(1 site)
	$4,200,000	$4,200,000	$4,200,000	$4,200,000	(1 site)
	$4,200,000	$4,200,000	$4,200,000	$4,200,000	(1 site)
	$4,200,000	$4,200,000	$4,200,000	$4,200,000	(1 site)
	$29,400,000	**$29,400,000**	**$29,400,000**	**$67,200,000**	
	$50,400,000	**$50,400,000**	**$50,400,000**	**$100,800,000**	
x	**$2,400,000**	**$2,400,000**	**$2,400,000**	**$43,200,000**	(15 sites)
	$4,200,000	$4,200,000	$4,200,000	$4,200,000	(1 site)
	$4,200,000	$4,200,000	$4,200,000	$4,200,000	(1 site)
	$4,200,000	$4,200,000	$4,200,000	$4,200,000	(1 site)
	$12,600,000	**$12,600,000**	**$12,600,000**	**$12,600,000**	
	$89,269,600	**$93,133,600**	**$103,070,944**	**$194,270,944**	

isting in each southern hemisphere naition (e.g. Brazil has 7 GVAR
sent to each of the 7 sites

Dedicated Landline Costs were prepared for NESDIS OSD Office as part of a study completed by Mitretek Systems
(Pricing based on data from FTS contract and other carriers)

5. Data Distribution To U.S. And Foreign Government Meteorology Centers In The GOES R Era

Guiding Principles

A set of principles guides the current effort:

1. Dissemination of GOES data should be done in a manner that achieves the best balance between the goals of maximizing the and usefulness of the information and minimizing the cost to the U.S. government and the American public.

2. GOES information should be made available in a manner that facilitates worldwide cooperation and promotes the exchange of meteorological and related information.

3. GOES data should be made available in a manner that provides at least the same level of service experienced by present GOES users.

4. GOES data are critical to meteorological operations and the protection of life and property.

5. Continue some form of wide area distribution within the footprint of GOES satellites. Figure 1 shows the current broadcast area from the 2 GOES satellites located at 75 degrees West and 135 degrees West. Reception is thought to be generally possible out to areas where the elevation angle is between 0 to 5 degrees.