



The Importance of Sounder Data Compression, Such as Thru Principal Components, to GOES R Design

**ABS GIFTS Data Compression Planning Meeting
at Suitland
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Roger Heymann
Advanced Systems Planning Division
Office of Systems Development
NESDIS

- The Importance of ABS or GIFTS Data Rate Reduction is found in the Results of the Various GOES R Concept Designs Developed by the Aerospace Corporation for NESDIS in Aug 2001
- Their Results are Documented in Aerospace Corp Report ATR- 2002 (2331) “National Oceanic and Atmospheric Administration Geostationary Operational Environmental Satellite- (GOES R) Concept Design Center Study Team (S042)”, Conducted 21-23 August 2001
- The Aerospace Designs Used ABI & ABS-GIFTS Data Rates provided by NESDIS:
 - ABI with 12 Bands, Resolution, Scanning
 - 24Mbps raw to Wallops
 - 8Mbps GOES Re-broadcast (GRB)
 - ABS or GIFTS for spatial resolution, scanning
 - 64 Mbps raw to Wallops
 - Either 64Mbps GRB or 16Mbps GRB
 - (with principal Components (PC) Applied)
- ISSUE:
 - Assume no compression of ABS or GIFTS. Then Have 72 Mbps for Global Broadcast
 - University of Wisconsin CIMSS Offers ABS GIFTS Global Data Reduction thru Principal Components.
- With NESDIS Limited Knowledge/Experience with PCs, We Assumed Factor of four (4) Reduction. Thus, GOES R’s Global Broadcast Data Rate Would be 16 Mbps for ABS or GIFTS & 8 Mbps for ABI giving GRB Global Total of 24Mbps **with PCs Applied**

Runs 3/3b & 7 of the Aerospace Concept Designs are Compared to See the Positive Impact of ABS or GIFTS Data Compression on GOES R Design – such as thru PCs

Design Runs 3/3b Data Rates	90mbps raw to Wallops	24Mbps GRB-H Global Broadcast	4.2Mbps GRB-L Global Broadcast
Design Run 7 Data Rates	90Mbps to Wallops	72Mbps GRB-H Global Broadcast	4.2Mbps GRB-L Global Broadcast

We Have Been Assuming GOES R Will Have Both a GRB H and a Smaller GRB Light at 4.2Mbps

	GOES R Launch Mass	GOES R BOL Power	GOES R 4 Satellite Cost
Runs3/3b Design Characteristics	10079/9398 lbs	4.9/3.9kw	\$920/\$872M
Run 7 Design Characteristics	13084lbs	9.4kw	\$1044M

Run 3b Looked at a More Efficient Communication System

Summary

GOES R Global Data Rate Compression, Reducing the ABS or GIFTS Sounder Data through such as PCs, Can Have the Following Impact on Design (In this case ABS or GIFTS GRB Data Rate was Reduced from 64 to 16Mbps for a Total GOES R GRB of 24 Mbps) :

- Reduce GOES R Mass 3000-3940lbs
- Reduce GOES R BOL Power 4.5 to 5.5 KW
- Reduce GOES R Costs by \$152M for 4 S/C or \$38M per S/C