

N 9 4 - 1 4 6 7 6

pre1.dwg  
05/17/93

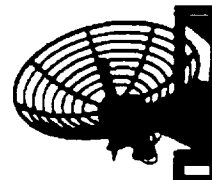
# PREPROCESSING DATA COLLECTED WITH THE ACTS PROPAGATION TERMINAL

Doug Gaff

Virginia Polytechnic Institute & State University  
Bradley Department of Electrical Engineering  
Satellite Communications Group  
Blacksburg, Virginia 24061-0111

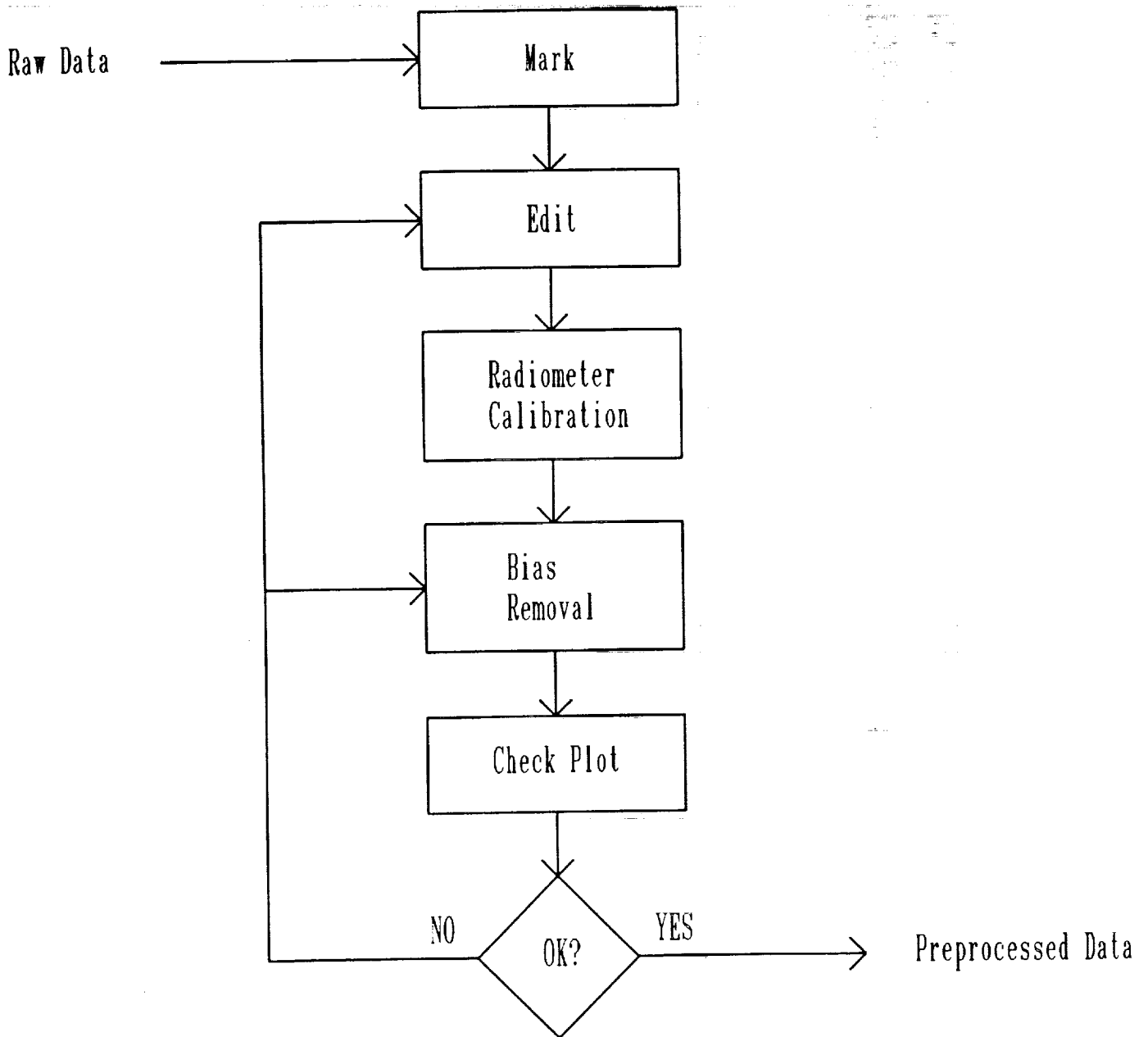
ACTS MINI-WORKSHOP  
PASADENA, CA

June 14, 1993



VIRGINIA TECH  
Satellite  
Communications  
Group

# Steps in ACTS Data Preprocessing



## MARK Step

- *Automatic Procedure*
- Functions
  - Fills holes in data
  - Transfers status information for beacon and radiometer signals
  - Checks beacon and radiometer data for large slope changes
  - Checks system voltages and temperatures to ensure that they're in range
- Types of Marks put on data
  - Beacon Acquisition Mode
  - Tracking Disabled
  - Bad DRX data
  - Low SNR on Beacon
  - Radiometer Calibration
  - Radiometer in Setup
  - Data Missing
  - Statistical Failure
  - Equipment Failure

## ACTS BEACON EXPERIMENT OPERATIONS FAULT LOG

**STATION NAME:** \_\_\_\_\_ **PERIOD (MONTH/YEAR):** \_\_\_\_\_

#	UTC DAY	UTC TIME START	UTC TIME STOP	CATE-GORY			CAUSE & ACTION	CHANNELS AFFECTED					INIT		
				0	1	2		B	R	B	R	M			
				2	0	3		0	0	0	E	T			

### CIRCLE DAYS WITHOUT FAULT

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

### CIRCLE DAYS WHEN DATA WERE ARCHIVED TO TAPE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

- Category definitions:**
- 0 = No effect on collected data. Data were collected, but something notable happened.
  - 1 = Clear air downtime. Contributes to rain time base, but not scintillation time base.
  - 2 = Non-clear air down-time. Potentially missed rain event data.



## EDIT Step

- *User - Controlled Procedure*
- **Functions**
  - User checks "Low SNR," "Statistical Failure," and "Equipment Failure" status tags for possible bad data
  - User marks portions of data bad if necessary
  - All data is "tagged" good or bad upon exit from this step

## RADIOMETER CALIBRATION Step

- *Automatic Procedure*
- Functions
  - Convert radiometer voltages to sky temperature in Kelvin and then to ARD in dB
  - Hot and Cold Load calibrations applied
  - Noise Diode and Reference Load calibrations applied

## BIAS REMOVAL Step

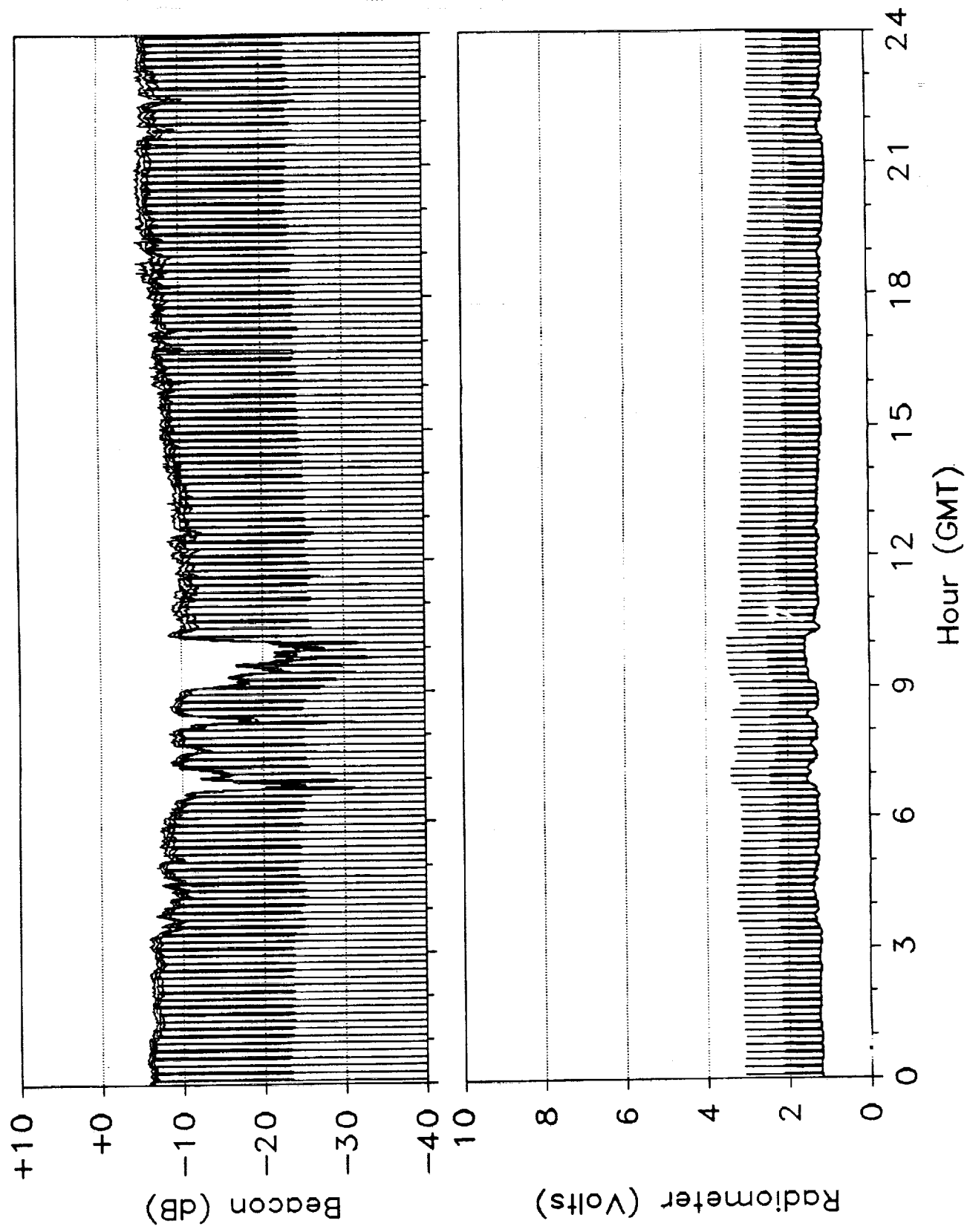
- *User - Controlled Procedure*
- **Function**
  - User removes signal fluctuations due to diurnal variation, front end heating, ice on the feed, etc.



## CHECK PLOT Step

- *Automatic Procedure*
- Functions
  - Generates a plot similar to the daily plot which displays AFS and ARD
  - All data "tagged" bad is excluded from plot
  - User checks this plot to ensure that all bad data and all signal fluctuations were removed in the EDIT and BIAS REMOVAL steps

# 27 GHz Propagation Data from the ACTS Experiment



FILE OPTIONS

May 1992

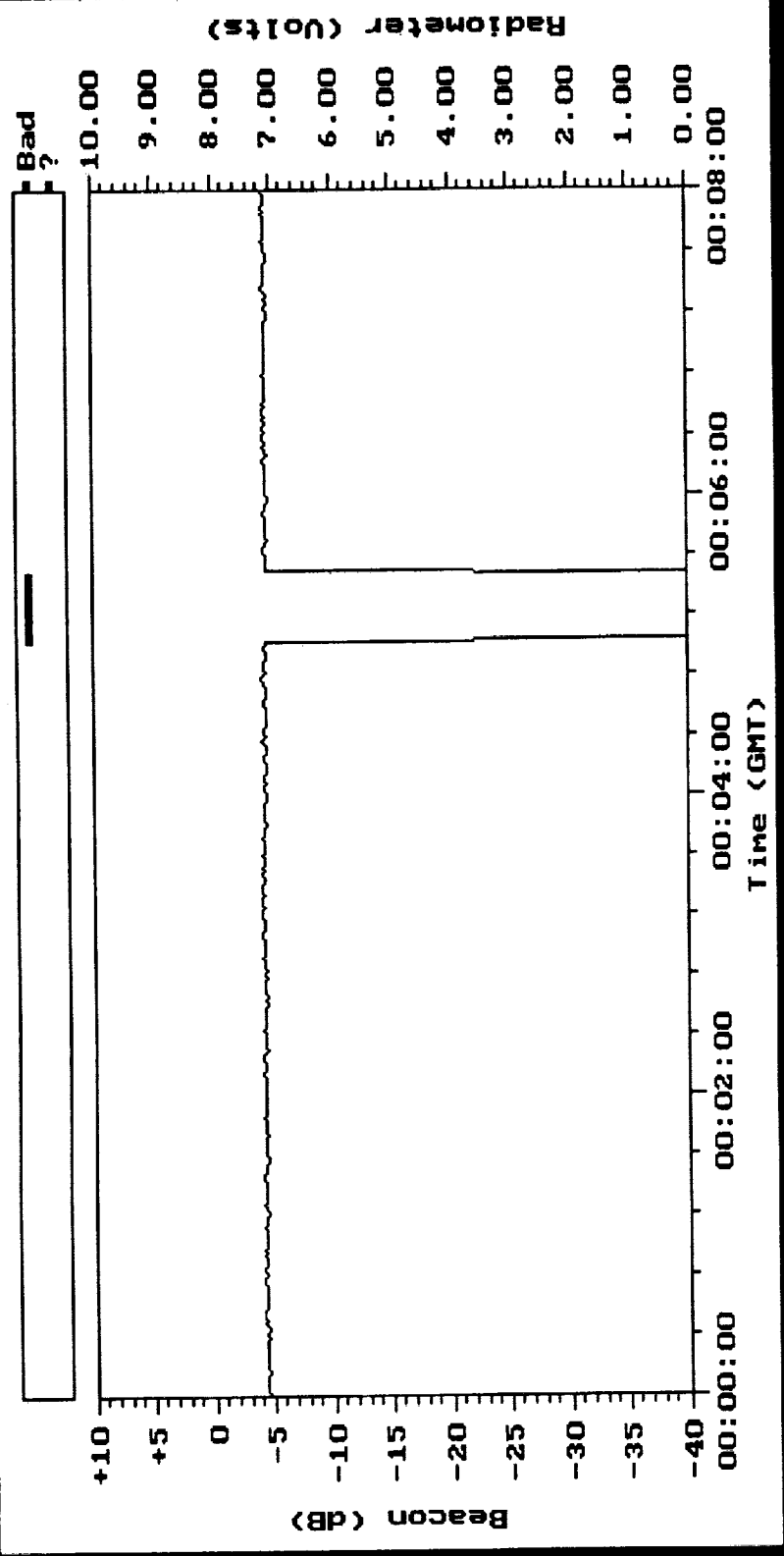
S	M	T	M	T	F	S
26	27	28	29	30	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
MARK	MARK	MARK	MARK	MARK	MARK EDIT RAD CAL *BIAS	MARK EDIT RAD CAL *BIAS
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	1	2	3	4	5	6

Calendar Key

- MARK - Data marked
- EDIT - Data user-edited
- RAD CAL - Radiometer calibrated
- BIAS - Biases removed
- \* - Unfinished step

Color Key

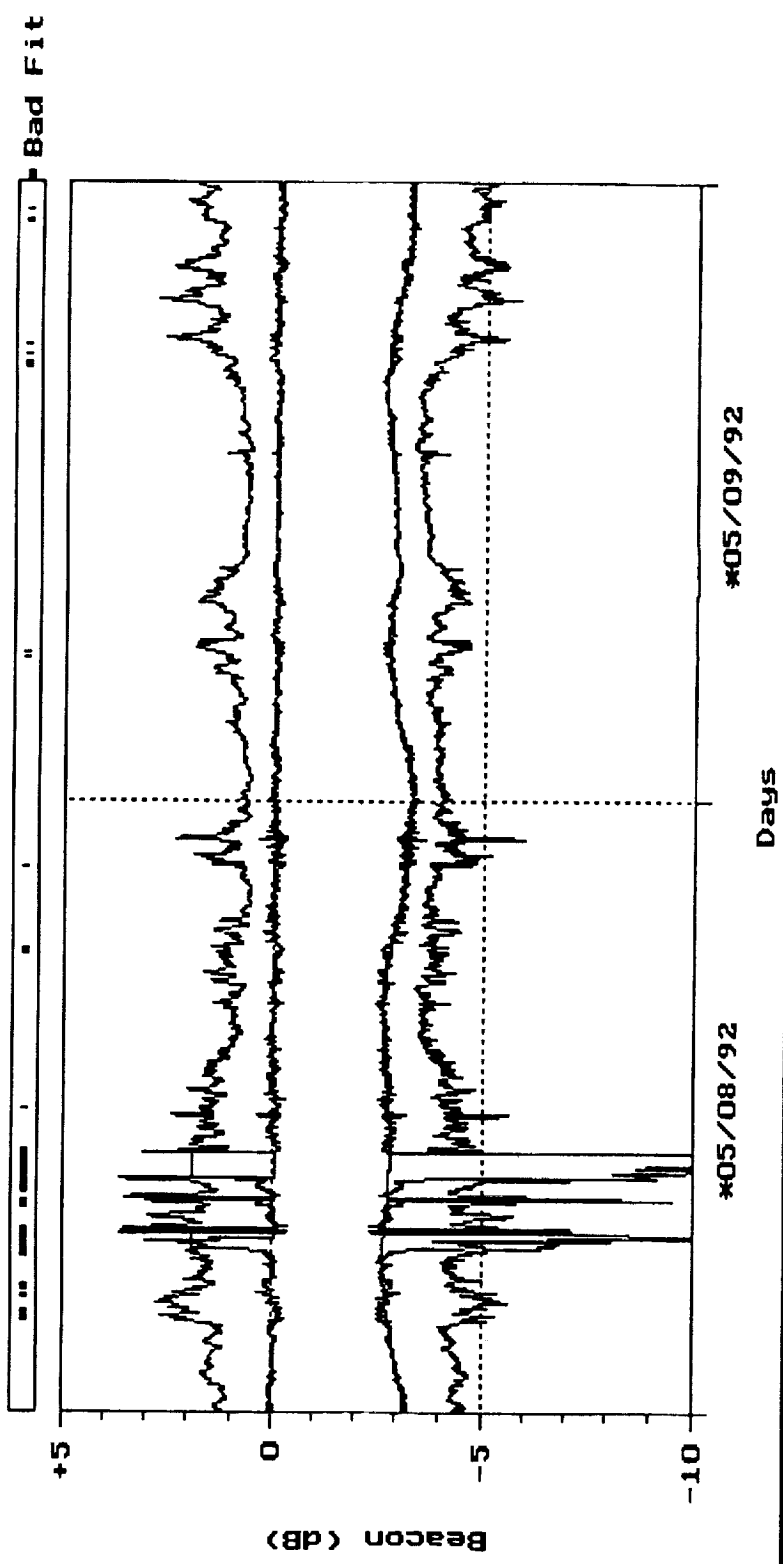
- Data file for day unavailable
- Day not finished
- Day finished



Source: 050892.ed

- 20 G Beacon
- 27 G Beacon
- 20 G Radiometer
- 27 G Radiometer

- 8 min.
- 1 hour
- 3 hours
- 24 hours
- +10 to -40 dB
- +10 to -10 dB
- 0 to 10 U
- 0 to 5 U
- 4 Channels
- Classify
- Next
- Previous
- Width
- Add
- Delete
- Restore



Channel: 20G 05/08/92      05/09/92

- Beacon
- ARD
- Beacon + ARD
- Fit
- ACA
- 1 day
- 3 days
- 5 days
- Channel
- +5 to -5 dB
- +5 to -10 dB
- Select
- Deselect
- Sin/Cos Fit
- Poly Fit
- Remove Fit
- Auto Select
- + Order
- Order = 5
- Order

# 27 GHz Propagation Data from the ACTS Experiment

