NOAA/NOS/CO-OPS GOES Performance During Recent Hurricanes

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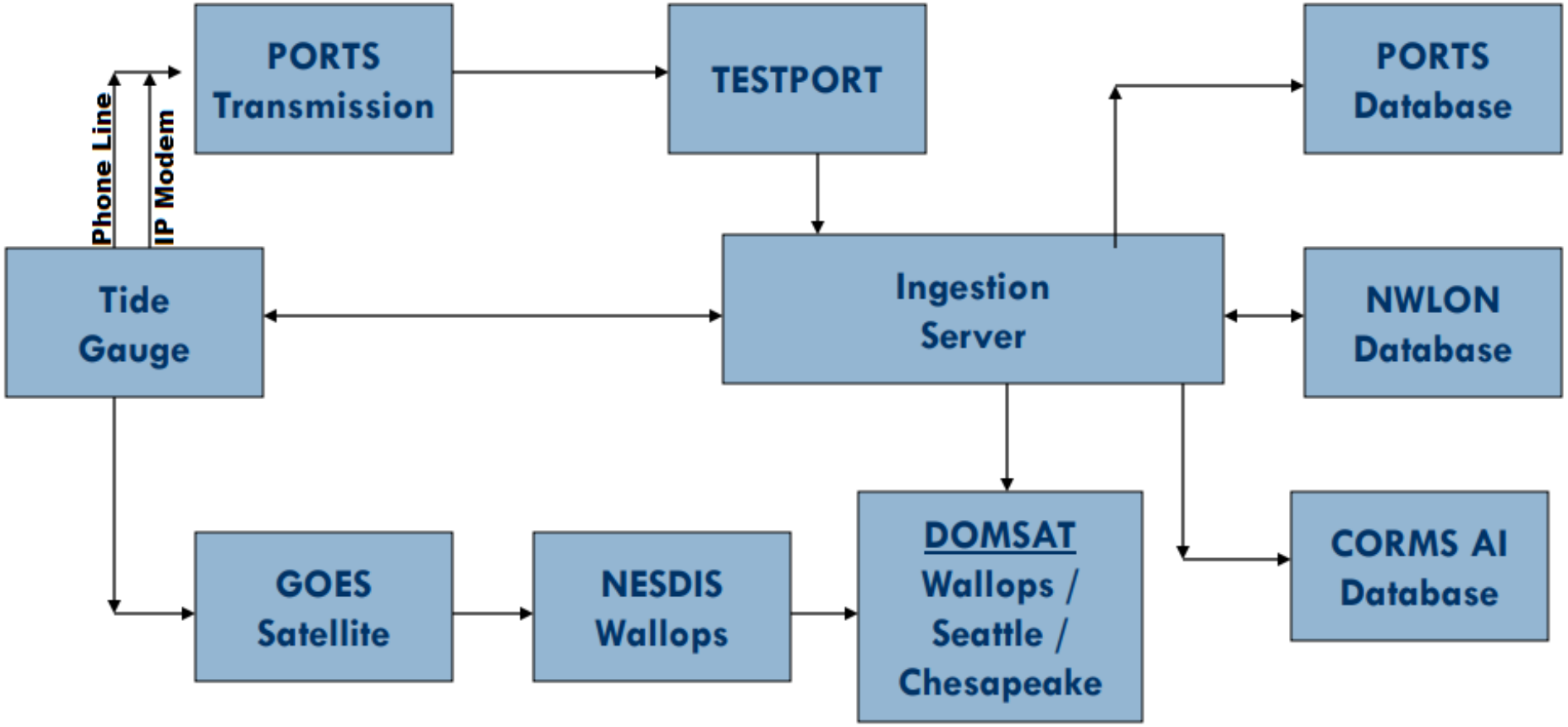
CO-OPS Ingestion System



3369B358100981132 31G37+0NN150WFF00079"P90870883kxa@@@@@0RBL!@w@A@.@w`3@mCm@w4C^5Ct6aR9Nh-BG`k

Encoded Part of the GOES Message;decode required either with flags or ascii value

Non Encoded part of GOES Messages contains header information

After the regular message, a space (ASCII character 32) is added, and then one byte which encodes battery voltage measured duriug the GOES transmission This voltage reading (to the tenths of a volt) has 9.5 volts subtracted from it, and the difference is sent as a one byte ASCII character from @ (character 64) to ? (representing 127).

1 Byte flag < Analog #1 = Analog #2 ; indicates the increment of dcp. the data following this flag is from dcp#4 since the message started with dcp# 3 the ff 2 bytes usually used to measure tank pressure or battery voltage

ANCILLARY DATA: 1 byte flag + 2 bytes data = 3 bytes/reading [there is no backup for these; flag are as follows: 4 Air Temperature 5 Water Temperature 6 Barometric Pressure 9 Relative Humidity : Rain Fall ; Solar Radiation 7 conductivity] in this example there is air temp, water temp, baro and realtive humidity sensor readings. 3 bytes each set

WIND DATA:'3' (1 byte) FLAG+ 2 bytes SPEED+ 2 bytes DIR+2 bytes GUST = 7 bytes

redundant water levels =1 byte flag +3 bytes water level = 4 bytes (the flags are noted below)
. Shaft Angle # MWWL " Backup Level ' Paros #1 * Paros #2 > acoustic water level) . Air Gap

Primary Water Levels =1byte FLAG+ 3 bytes WL+2 bytes SIGMA+ 1 byte Outliers = 7 bytes (the flags are noted below)
! Shaft Angle Encoder 8 Microwave 2 Backup % Paros #1 & Paros #2 (Air Gap 1 Acoustic
Acoustic and Airgap only add [2 bytes Temp1 and 2 bytes Temp 2] = 4 in addition to the 7 above which is a total of 11 bytes

TIME: '0' FLAG(1 byte) +2 bytes DAY+ 1 byte HOUR = 4 bytes

1 byte time offset

2 bytes System status

2 bytes sensor offset

3 bytes datum offset

1 digit DCP# range 1-9

7 digit station_id

P- xpert 6 min; N xpert Hourly;

(") Indicates time set by GPS

4 bytes :Message Length

2bytes: Uplink status

1 byte : direction 'E' -east ,'W'- West

3 bytes : Channel Number

2 bytes : Mod_quality

2 bytes frequency offset -0 center frequency offset (0 is right on) Range is 1 -F (hex). 1 would be 50hz off, 2 -100hz off , '+' Frequency flag #1

2 Bytes Signal Strength Can be between 32 -45 , NESDIS likes 35 -40

1 byte Fail Code 'G' is good

6 bytes time :HHMMSS - Time of transmission

Julian Day 3 bytes Day of transmission

Year 2 bytes - Year of Transmission

Platform id 8 bytes : /opt/static-data/data/station_param/STATION.DAT

D A T A S O U R C E R E P O R T

Station: All
DCP: All
Sensor: All

Begin Date: Oct 25 2017
End Date: Oct 25 2017
Run Date: Oct 26 2017

Station	D	Sn	Satellite	PORTS	Data Counts Redundant	Iridium	Phone	Diskette	Missing
1611400	1	A1	0	0	0	240	0	0	0
1611400	2	B1	0	0	0	240	0	0	0
1612340	1	A1	240	0	0	0	0	0	0
1612340	2	B1	240	0	0	0	0	0	0
1612480	1	A1	240	0	0	0	0	0	0
1612480	2	B1	240	0	0	0	0	0	0
1615680	1	A1	240	0	0	0	0	0	0
1615680	2	B1	240	0	0	0	0	0	0
1617433	1	A1	87	153	0	0	0	0	0
1617433	2	B1	87	153	0	0	0	0	0
1617760	1	A1	240	0	0	0	0	0	0
1617760	2	N1	240	0	0	0	0	0	0
1619910	1	A1	240	0	0	0	0	0	0
1619910	1	Y1	240	0	0	0	0	0	0
1619910	2	N1	240	0	0	0	0	0	0
1619910	3	A1	240	0	0	0	0	0	0
1619910	3	Y1	240	0	0	0	0	0	0
1619910	4	B1	240	0	0	0	0	0	0
1630000	1	N1	0	0	2	238	0	0	0
1630000	2	N1	0	168	1	71	0	0	0
1630000	3	N1	0	0	18	221	0	0	1
1630000	4	B1	0	0	221	0	0	0	19

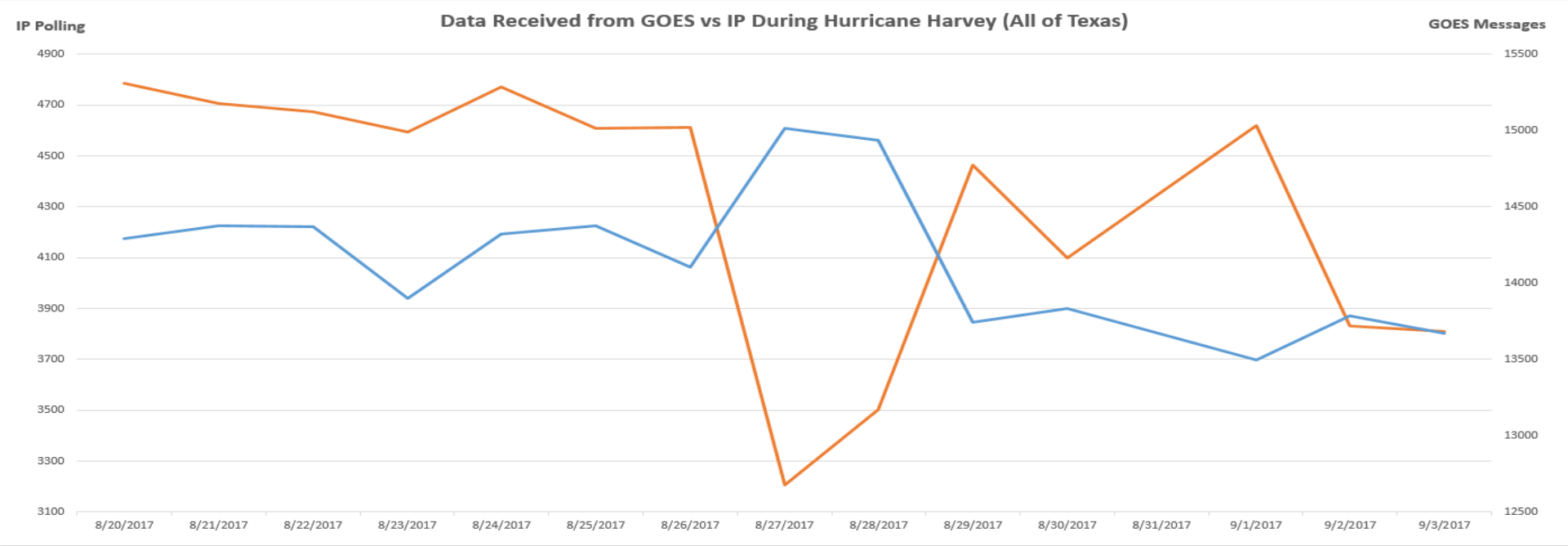
D A T A A V A I L A B I L I T Y B Y S O U R C E

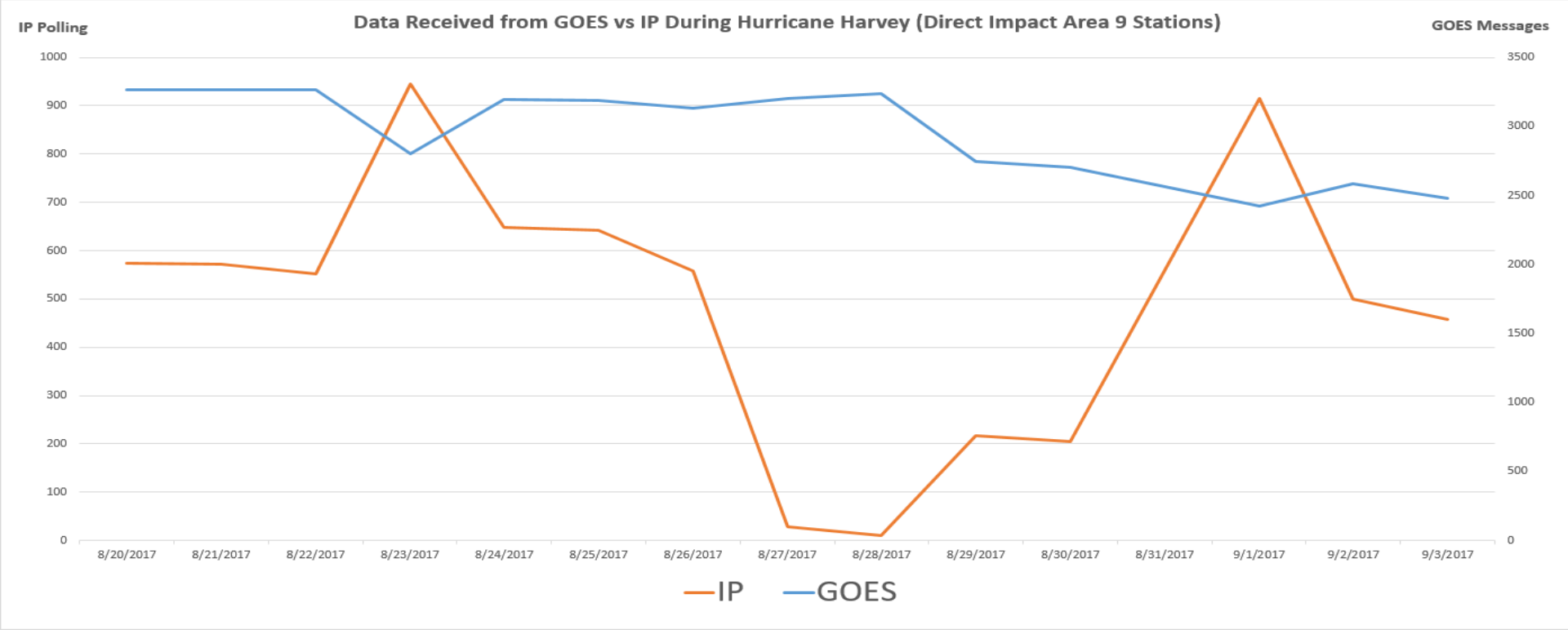
Station: All
DCP: All
Sensor: All

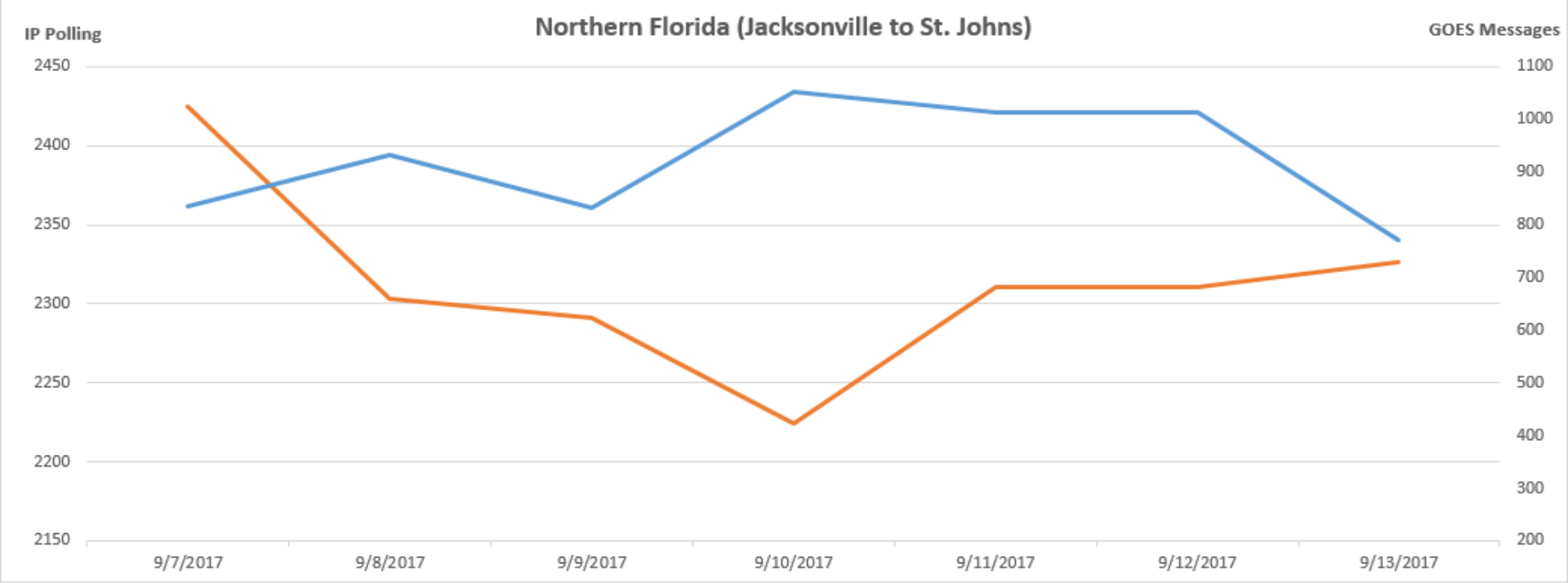
Begin Date: Oct 10 2017
End Date: Oct 10 2017
Run Date: Oct 20 2017

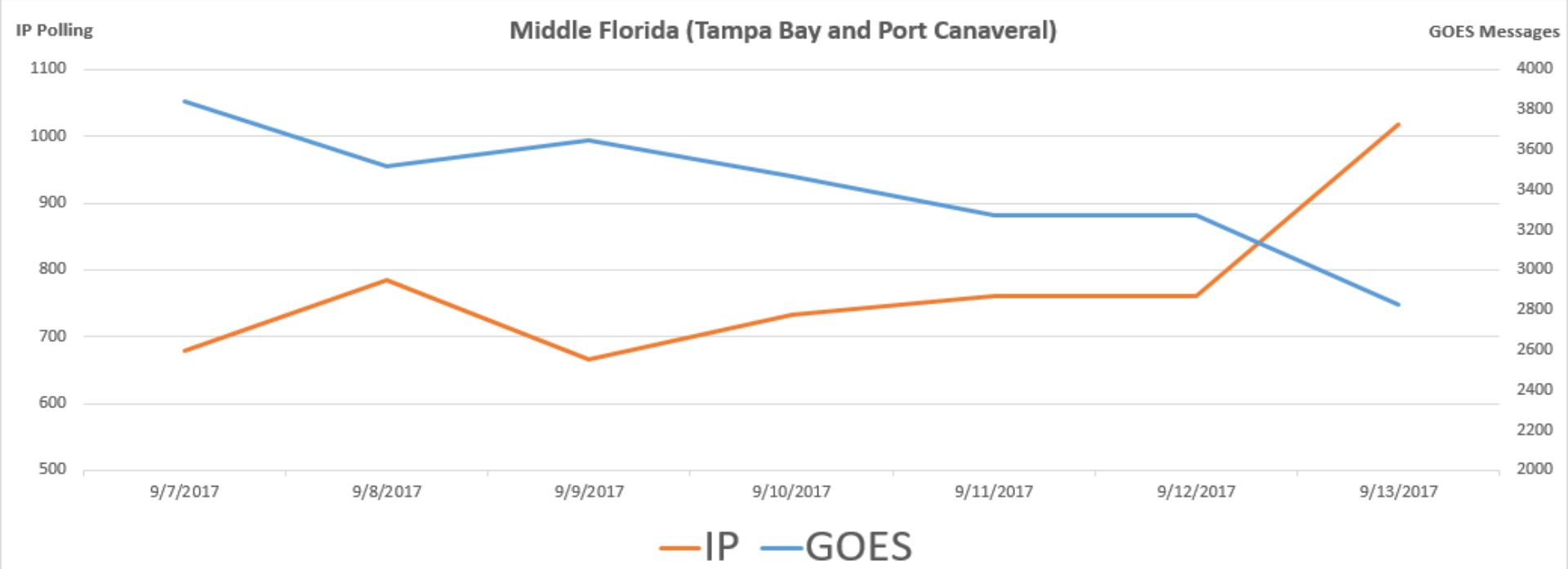
Sat=GOES Primary, Polling=Phone and IP, Iridium=Iridium (no redundant)

			Data Counts			Percentage		
Station	D	Sn	Sat	Polling	Irid	Sat	Polling	Irid
1611400	1	A1	0	0	0	0%	0%	0%
1611400	2	B1	0	0	0	0%	0%	0%
1612340	1	A1	240	0	0	100%	0%	0%
1612340	2	B1	240	0	0	100%	0%	0%
1612480	1	A1	240	0	0	100%	0%	0%
1612480	2	B1	240	0	0	100%	0%	0%
1615680	1	A1	240	0	0	100%	0%	0%
1615680	2	B1	240	0	0	100%	0%	0%
1617433	1	A1	240	240	0	100%	100%	0%
1617433	2	B1	240	240	0	100%	100%	0%
1617760	1	A1	240	0	0	100%	0%	0%
1617760	2	N1	240	0	0	100%	0%	0%
1619910	1	A1	240	0	0	100%	0%	0%
1619910	2	N1	240	0	0	100%	0%	0%
1619910	3	A1	240	0	0	100%	0%	0%
1619910	4	B1	240	0	0	100%	0%	0%
1630000	1	N1	240	0	236	100%	0%	98%
1630000	2	N1	240	187	62	100%	78%	26%
1630000	3	N1	239	0	221	100%	0%	92%
1630000	4	B1	221	0	0	92%	0%	0%

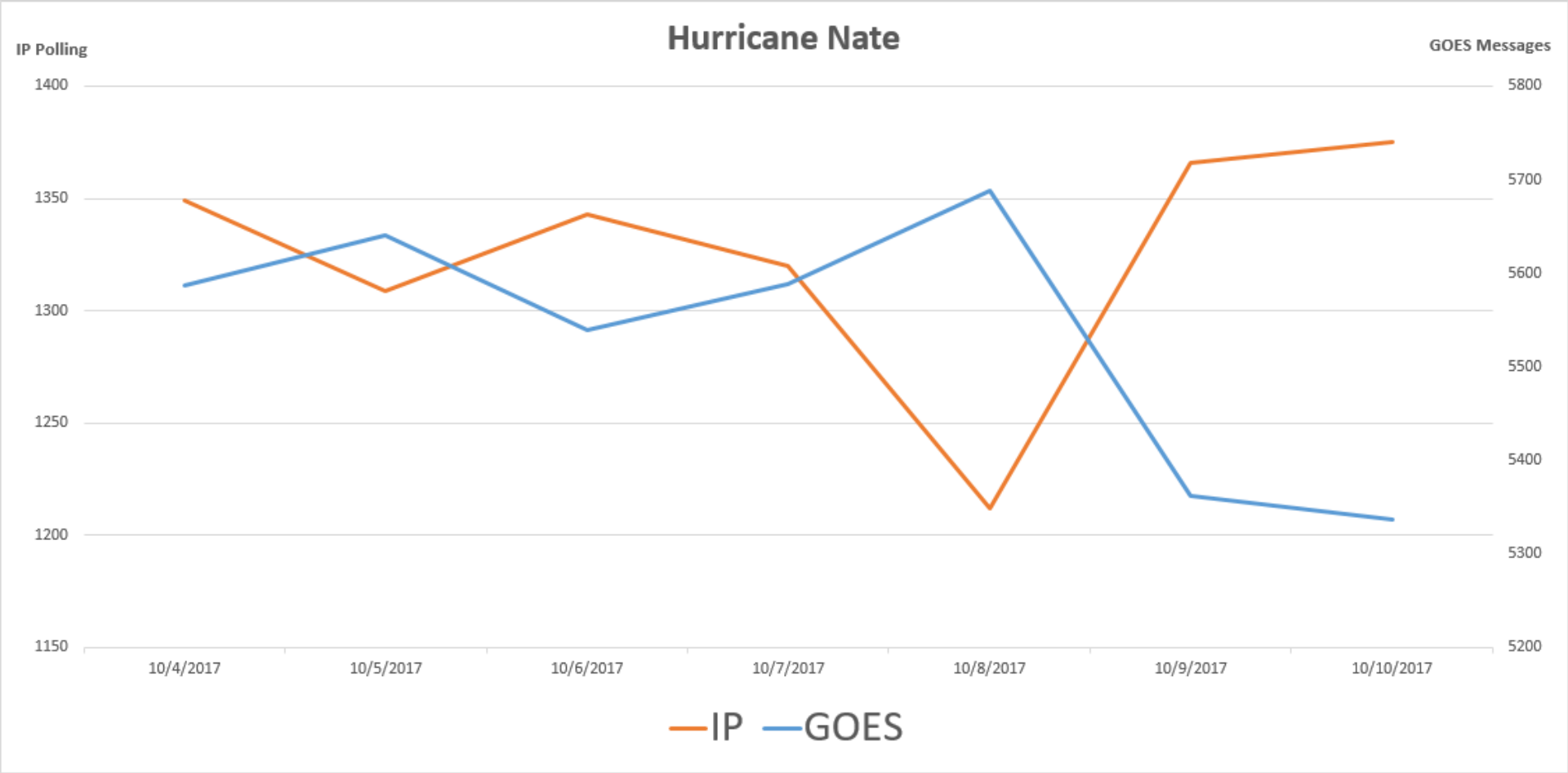

Data Received from GOES vs IP During Hurricane Harvey (All of Texas)
IP Polling
GOES Messages
4900
4700
4500
4300
4100
3900
3700
3500
3300
3100
15500
15000
14500
14000
13500
13000
12500
8/20/2017
8/21/2017
8/22/2017
8/23/2017
8/24/2017
8/25/2017
8/26/2017
8/27/2017
8/28/2017
8/29/2017
8/30/2017
8/31/2017
9/1/2017
9/2/2017
9/3/2017


Data Received from GOES vs IP During Hurricane Harvey (Direct Impact Area 9 Stations)
IP Polling
GOES Messages
1000
900
800
700
600
500
400
300
200
100
0
3500
3000
2500
2000
1500
1000
500
0
8/20/2017
8/21/2017
8/22/2017
8/23/2017
8/24/2017
8/25/2017
8/26/2017
8/27/2017
8/28/2017
8/29/2017
8/30/2017
8/31/2017
9/1/2017
9/2/2017
9/3/2017
IP
GOES


Northern Florida (Jacksonville to St. Johns)
IP Polling
GOES Messages
2450
2400
2350
2300
2250
2200
2150
1100
1000
900
800
700
600
500
400
300
200
9/7/2017
9/8/2017
9/9/2017
9/10/2017
9/11/2017
9/12/2017
9/13/2017


Middle Florida (Tampa Bay and Port Canaveral)
IP Polling
GOES Messages
1100
1000
900
800
700
600
500
4000
3800
3600
3400
3200
3000
2800
2600
2400
2200
2000
9/7/2017
9/8/2017
9/9/2017
9/10/2017
9/11/2017
9/12/2017
9/13/2017
IP
GOES

Hurricane Nate



Conclusions and Future Efforts

- During the peak of the last three Hurricanes GOES was more reliable than IP modems (especially in more rural areas).
- CO-OPS is continuing to update current systems and improve recording of GOES statistics during major storm events (and in general).
- CO-OPS hopes to use the data for future public outreach to further stress the need for this essential data collection system.