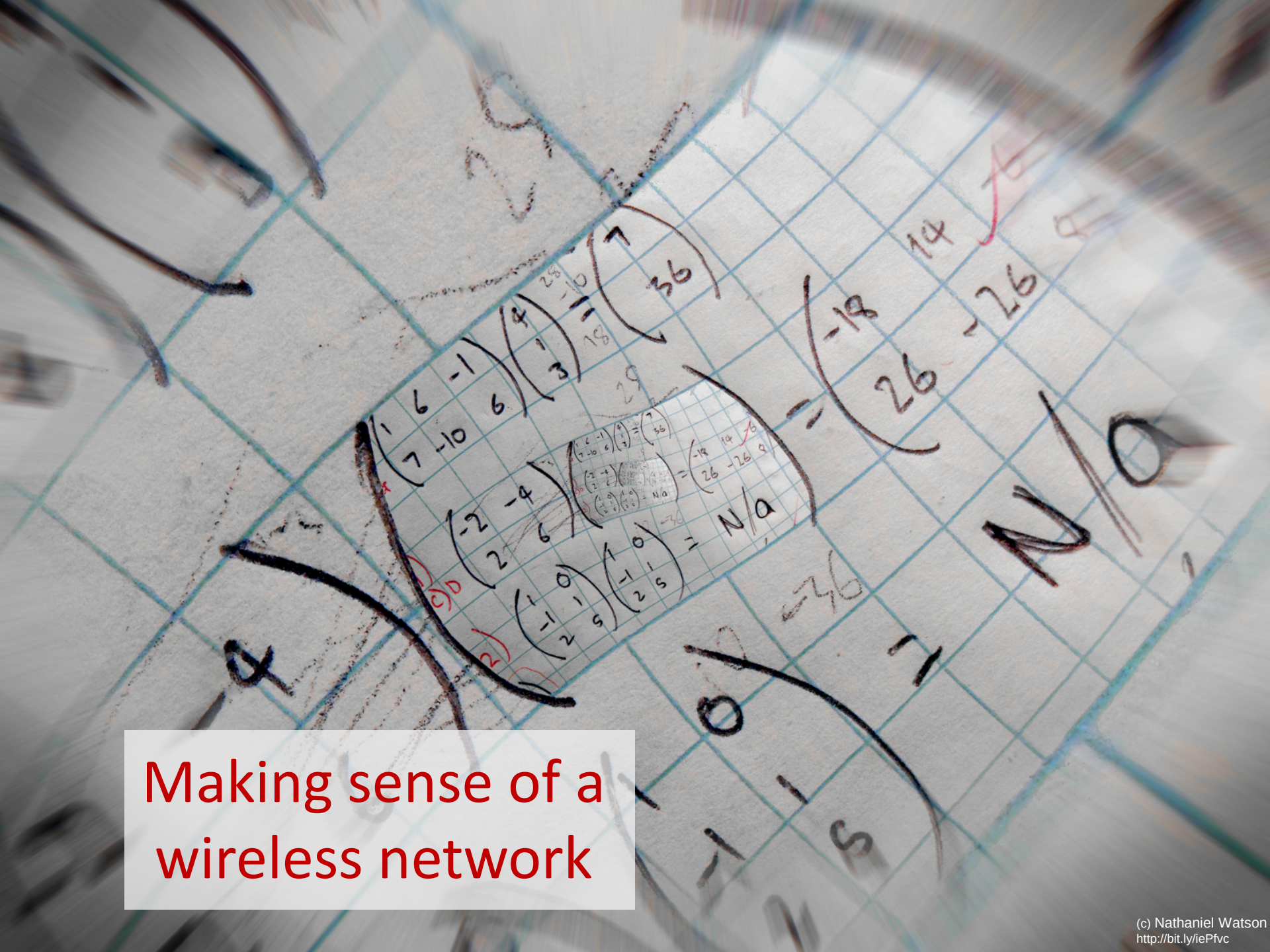
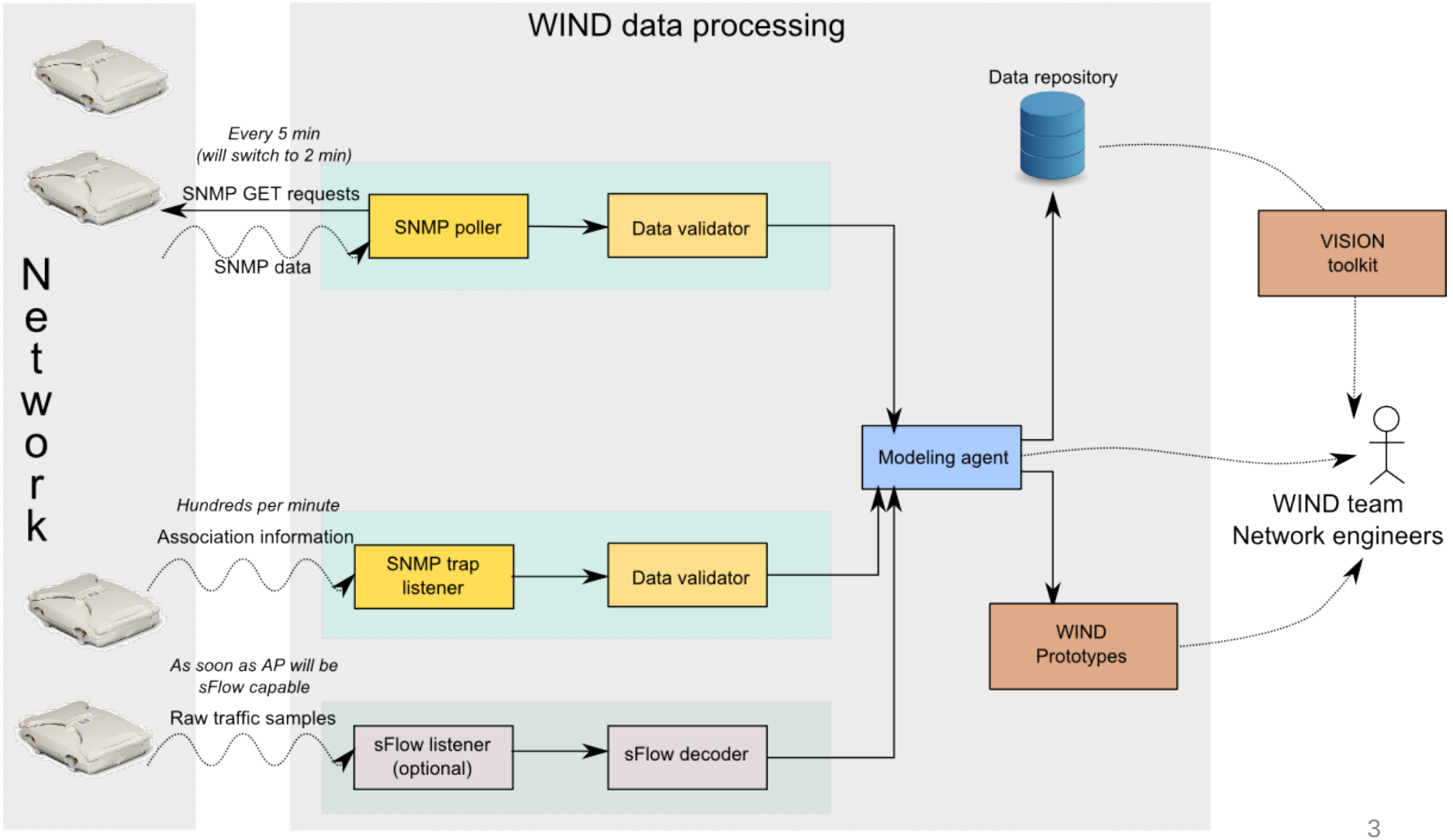
WIND

Milosz Hulboj
Vlad Lapadatescu



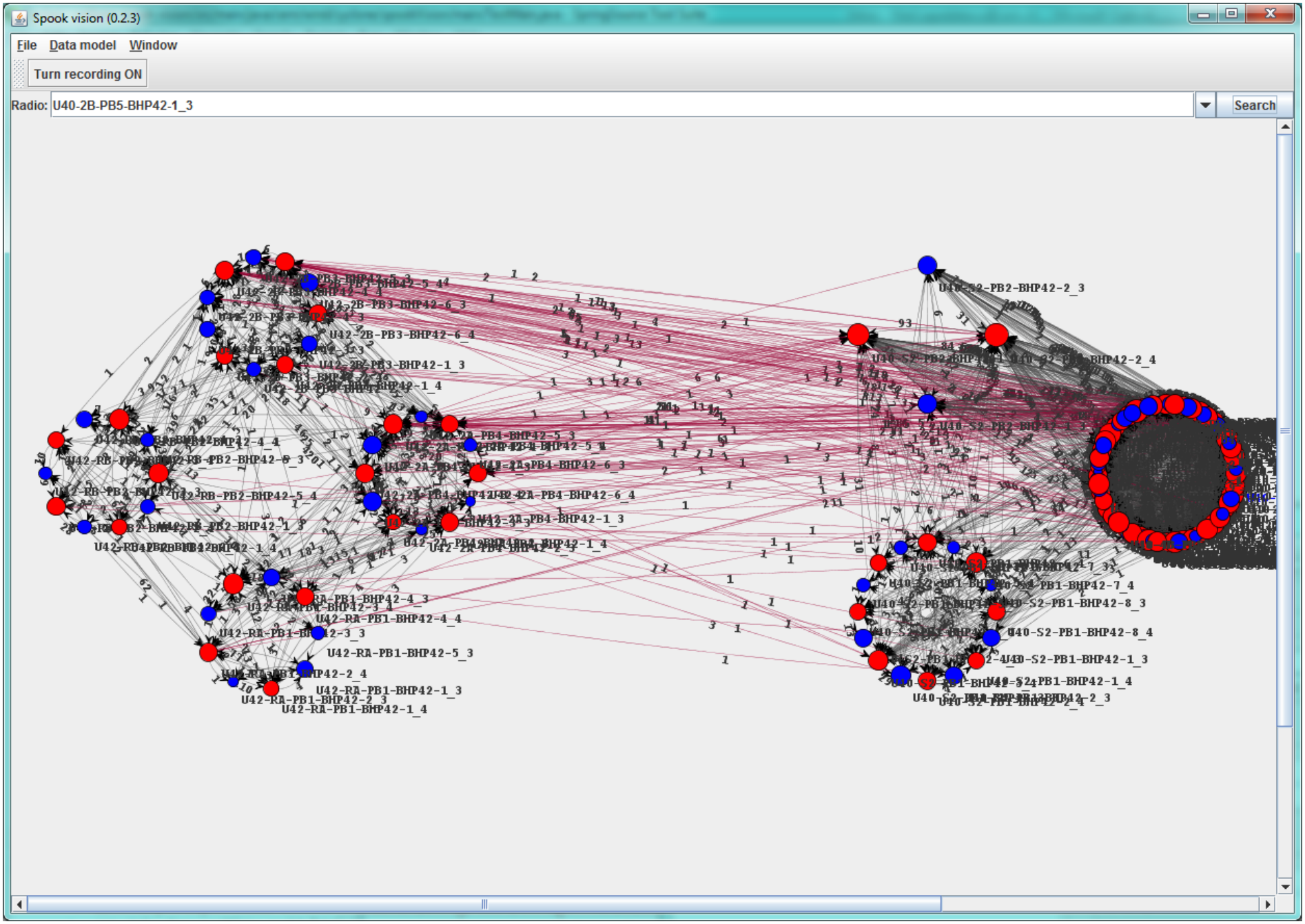
Monitoring framework



Few numbers

- Over 400 access points monitored
- Written over 24000 lines of code
  - ~20000 for UI and prototypes
  - 8 different perspectives with subviews

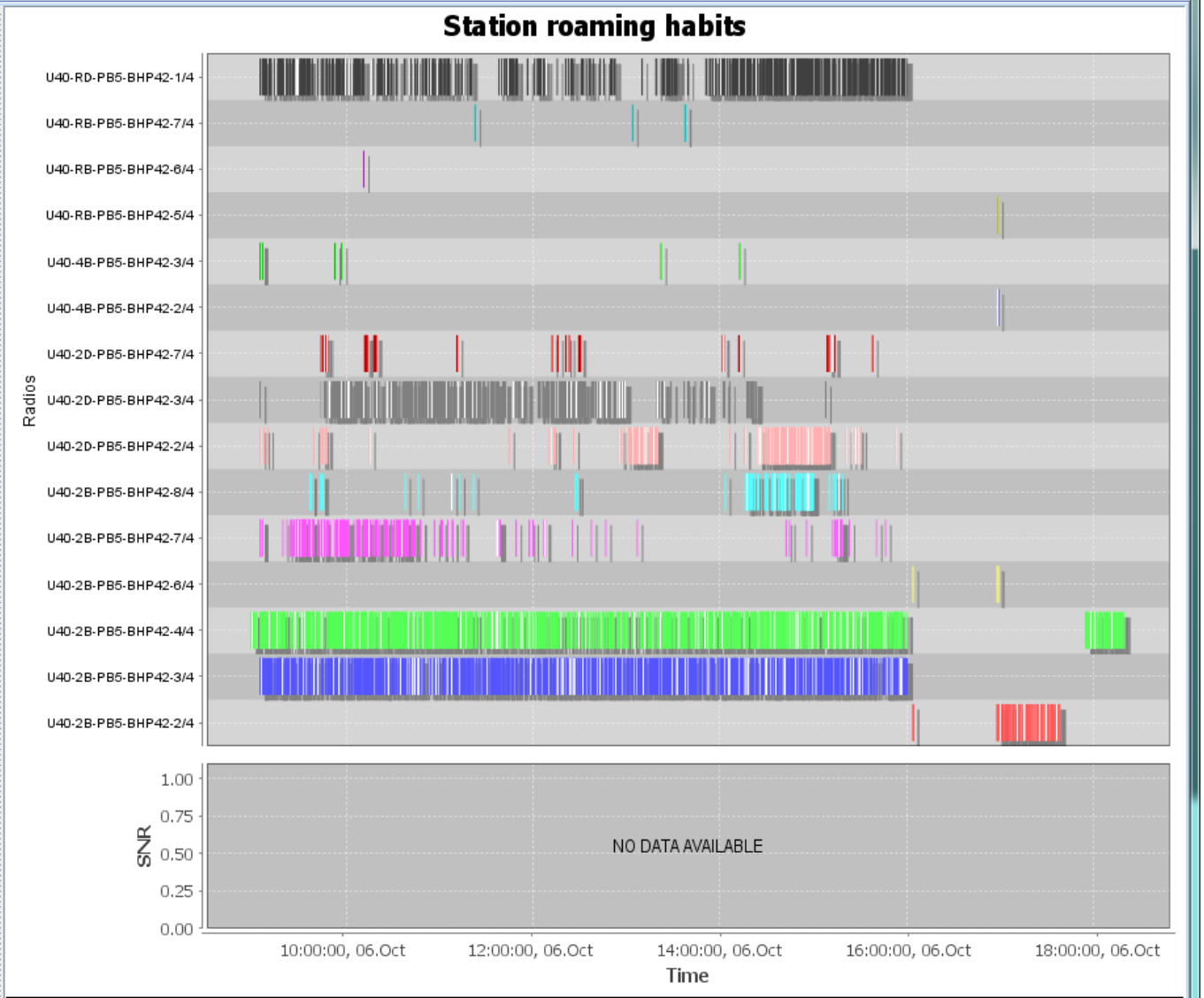
- 30000 station visibility records per 5 min
- 3000 radio visibility records per 5 min
- 10000 association parameters per 5 min
- 60000 associations per day


Spook vision (0.2.3)
File
Data model
Window
Turn recording ON
Radio:
U40-2B-PB5-BHP42-1_3
Search

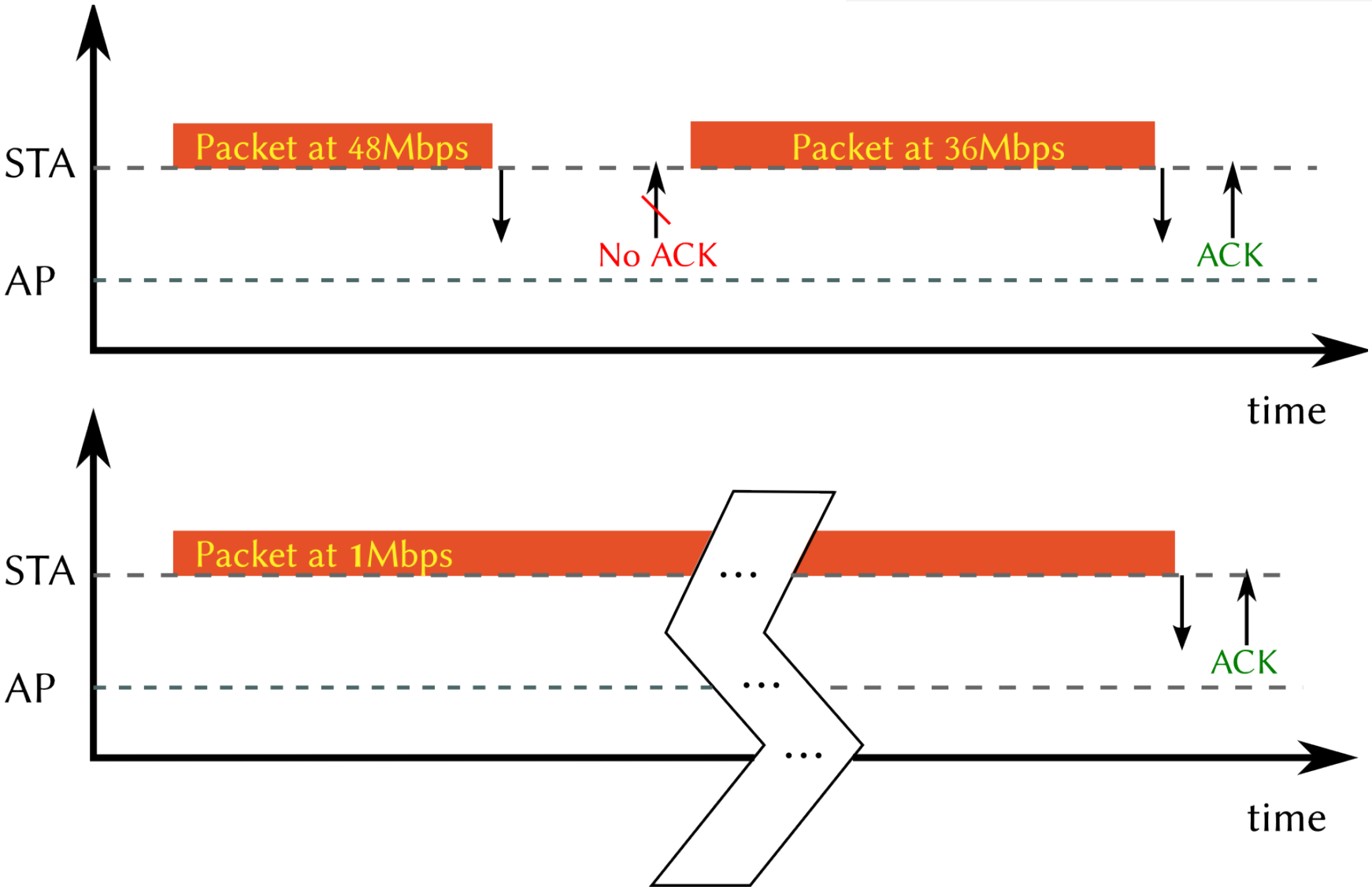
Stations roaming habits

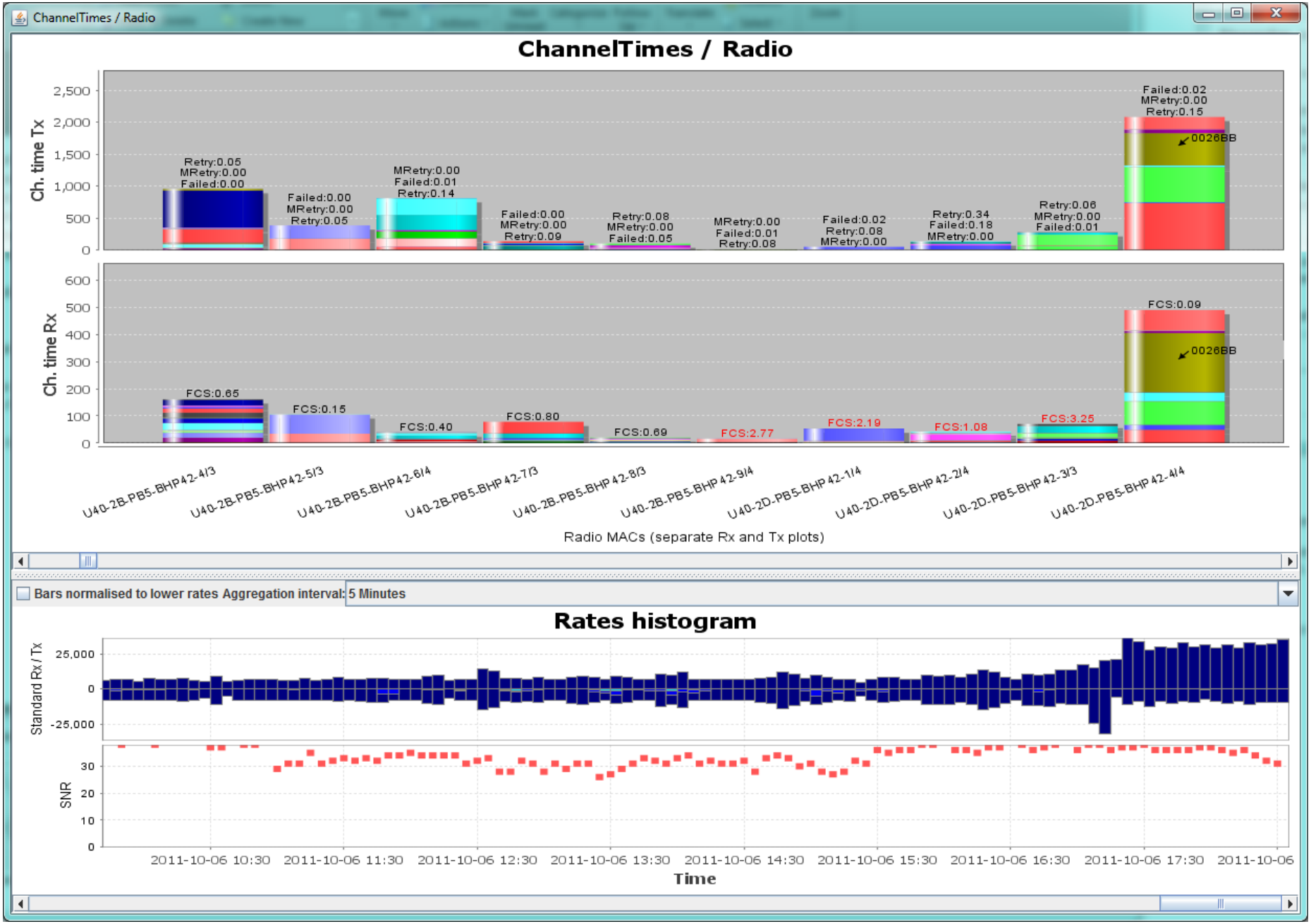
Station view | Radio view

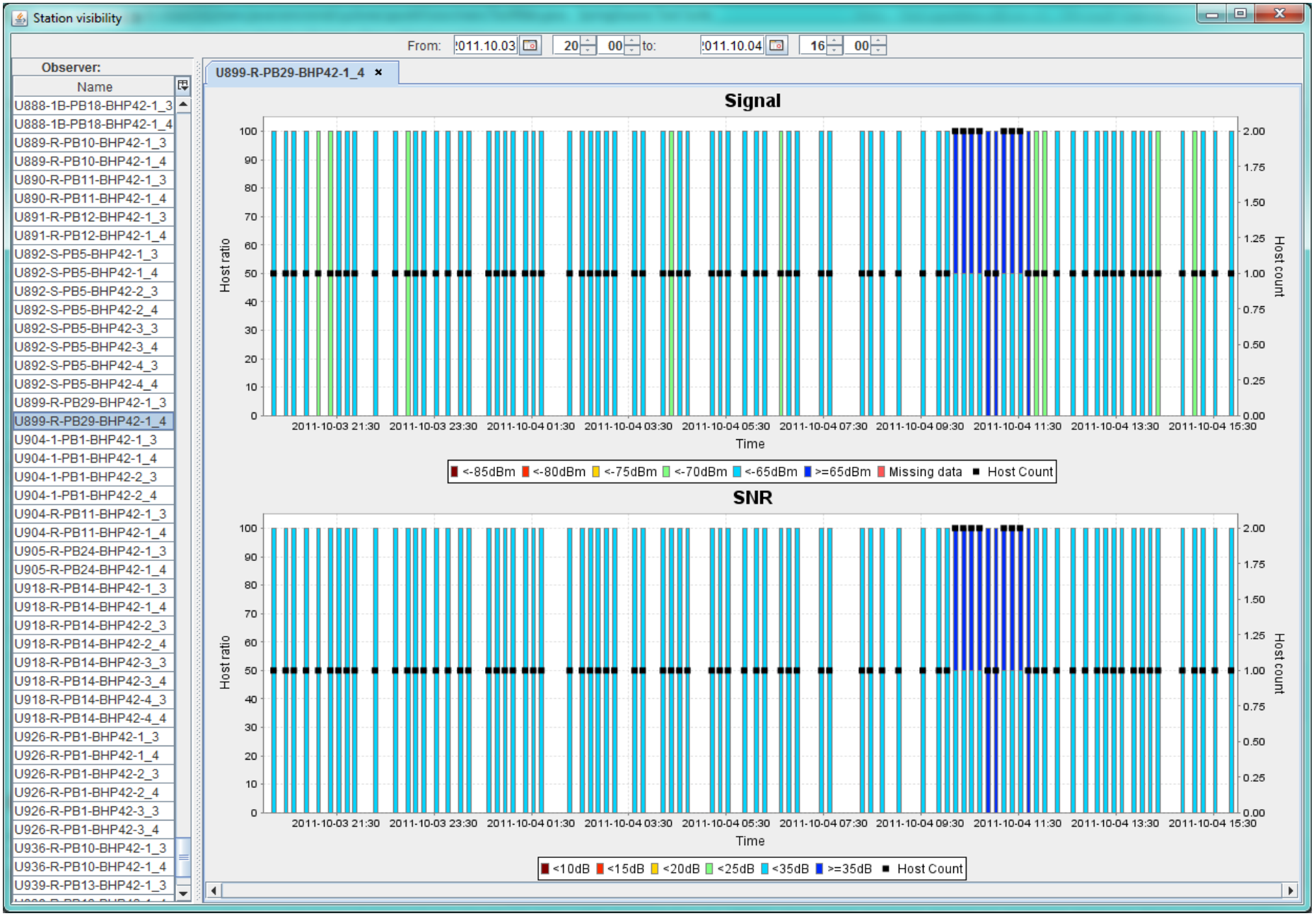
MAC	Name	OS	R# ▲	A#
7CC537...	STEVE	MOBILE	70	144
58946B...	GIACIN	DUAL	70	184
0016EA...	PCATE	LINUX	72	139
F81EDF...	IPHON	OTHER	72	153
F8DB7F...	DAWN	MOBILE	72	109
F0B479...	OGREI	MOBILE	73	163
001F3B...	LPCMS	WINDO...	74	111
E4EC10...	NOKIA	MOBILE	75	157
7CC537...	SHANI	MOBILE	75	177
DC2B61...	IPHON	MOBILE	77	145
902155...	HTCW	MOBILE	78	124
145A05...	IPHON	MOBILE	80	154
041E64...	JLIPHC	MOBILE	84	157
BC7737...	SIMON	DUAL	84	114
00216A...	HP693	DUAL	86	130
00904C...	HTCR(	MOBILE	86	156
18E7F4...	IPHON	MOBILE	88	159
002314...	PC-ATI	DUAL	92	161
000CE7...	HT200	MOBILE	93	744
7CC537...	IPHON	OTHER	94	132
7C6193...	HTC-L	MOBILE	96	208
0022FB...	DRAG(	LINUX	96	179
000CF1...	SUSIN	WINDO...	99	145
00242C...	UMKH(	DUAL	100	157
0019D2...	FISEN	DUAL	104	143
E4CE8F...	PFMIPI	MOBILE	108	206
00265E...	RYD-L	LINUX	115	661
001DE0...	HASST	LINUX	125	161
0013E8...	EYRIE	DUAL	127	211
002376...	PHATE	MOBILE	128	272
041E64...	ADTIPI	MAC/OS	130	204
109ADD...	JIM-IPI	MOBILE	135	240
0023DF...	TAMIP(	OTHER	149	188
902155...	SANDF	MOBILE	150	249
902155...	KFEAN	MOBILE	169	285
60334B...	XOXO(	MAC/OS	176	239
7CC537...	TOPIP(	MOBILE	178	915
58946B...	PCPOI	LINUX	228	257
60334B...	TULIN:	MOBILE	231	4,019
001F3B...	OZLEM	WINDO...	258	262
48DCFB...	KVITA(	MOBILE	301	496
002243...	WZASU	WINDO...	359	440
889FFA...	REYHA	LINUX	754	954
000423...	PCHAF	DUAL	3,339	4,134



Channel time




ChannelTimes / Radio
ChannelTimes / Radio
Ch. time Tx
2,500
2,000
1,500
1,000
500
0
Retry:0.05
MRetry:0.00
Failed:0.00
Failed:0.00
MRetry:0.00
Retry:0.05
MRetry:0.00
Failed:0.01
Retry:0.14
Failed:0.00
MRetry:0.00
Retry:0.09
Retry:0.08
MRetry:0.00
Failed:0.05
MRetry:0.00
Failed:0.01
Retry:0.08
Failed:0.02
Retry:0.08
MRetry:0.00
Retry:0.34
Failed:0.18
MRetry:0.00
Retry:0.06
MRetry:0.00
Failed:0.01
Failed:0.02
MRetry:0.00
Retry:0.15
0026BB
Ch. time Rx
600
500
400
300
200
100
0
FCS:0.65
FCS:0.15
FCS:0.40
FCS:0.80
FCS:0.69
FCS:2.77
FCS:2.19
FCS:1.08
FCS:3.25
FCS:0.09
0026BB
U40-2B-PB5-BHP42-4/3
U40-2B-PB5-BHP42-5/3
U40-2B-PB5-BHP42-6/4
U40-2B-PB5-BHP42-7/3
U40-2B-PB5-BHP42-8/3
U40-2B-PB5-BHP42-9/4
U40-2D-PB5-BHP42-1/4
U40-2D-PB5-BHP42-2/4
U40-2D-PB5-BHP42-3/3
U40-2D-PB5-BHP42-4/4
Radio MACs (separate Rx and Tx plots)
Bars normalised to lower rates
Aggregation interval:
5 Minutes
Rates histogram
Standard Rx / Tx
25,000
0
-25,000
SNR
30
20
10
0
2011-10-06 10:30
2011-10-06 11:30
2011-10-06 12:30
2011-10-06 13:30
2011-10-06 14:30
2011-10-06 15:30
2011-10-06 16:30
2011-10-06 17:30
2011-10-06
Time

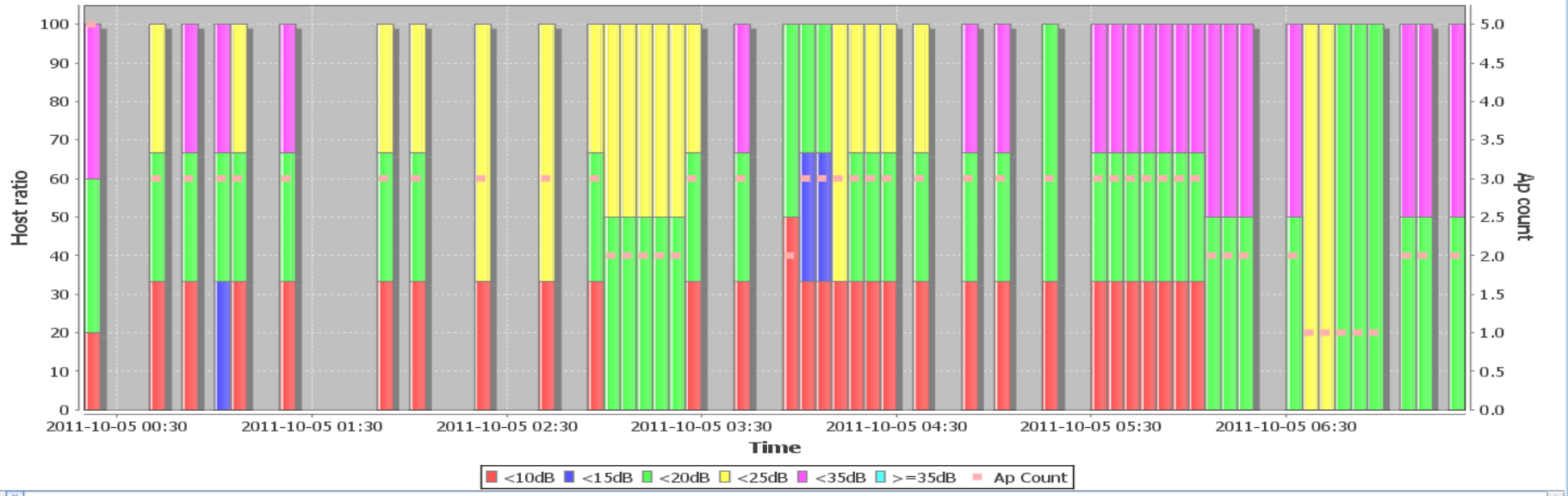

Station visibility
From: :011.10.03 20 00 to: :011.10.04 16 00
Observer:
Name
U888-1B-PB18-BHP42-1_3
U888-1B-PB18-BHP42-1_4
U889-R-PB10-BHP42-1_3
U889-R-PB10-BHP42-1_4
U890-R-PB11-BHP42-1_3
U890-R-PB11-BHP42-1_4
U891-R-PB12-BHP42-1_3
U891-R-PB12-BHP42-1_4
U892-S-PB5-BHP42-1_3
U892-S-PB5-BHP42-1_4
U892-S-PB5-BHP42-2_3
U892-S-PB5-BHP42-2_4
U892-S-PB5-BHP42-3_3
U892-S-PB5-BHP42-3_4
U892-S-PB5-BHP42-4_3
U892-S-PB5-BHP42-4_4
U899-R-PB29-BHP42-1_3
U899-R-PB29-BHP42-1_4
U904-1-PB1-BHP42-1_3
U904-1-PB1-BHP42-1_4
U904-1-PB1-BHP42-2_3
U904-1-PB1-BHP42-2_4
U904-R-PB11-BHP42-1_3
U904-R-PB11-BHP42-1_4
U905-R-PB24-BHP42-1_3
U905-R-PB24-BHP42-1_4
U918-R-PB14-BHP42-1_3
U918-R-PB14-BHP42-1_4
U918-R-PB14-BHP42-2_3
U918-R-PB14-BHP42-2_4
U918-R-PB14-BHP42-3_3
U918-R-PB14-BHP42-3_4
U918-R-PB14-BHP42-4_3
U918-R-PB14-BHP42-4_4
U926-R-PB1-BHP42-1_3
U926-R-PB1-BHP42-1_4
U926-R-PB1-BHP42-2_3
U926-R-PB1-BHP42-2_4
U926-R-PB1-BHP42-3_3
U926-R-PB1-BHP42-3_4
U936-R-PB10-BHP42-1_3
U936-R-PB10-BHP42-1_4
U939-R-PB13-BHP42-1_3
U899-R-PB29-BHP42-1_4
Signal
Host ratio
Host count
Time
2011-10-03 21:30
2011-10-03 23:30
2011-10-04 01:30
2011-10-04 03:30
2011-10-04 05:30
2011-10-04 07:30
2011-10-04 09:30
2011-10-04 11:30
2011-10-04 13:30
2011-10-04 15:30
<-85dBm <-80dBm <-75dBm <-70dBm <-65dBm >=65dBm Missing data Host Count
SNR
Host ratio
Host count
Time
2011-10-03 21:30
2011-10-03 23:30
2011-10-04 01:30
2011-10-04 03:30
2011-10-04 05:30
2011-10-04 07:30
2011-10-04 09:30
2011-10-04 11:30
2011-10-04 13:30
2011-10-04 15:30
<10dB <15dB <20dB <25dB <35dB >=35dB Host Count

Station visibility

Global view | Particular view

:011.10.05 00 20 :011.10.05 07 30 Host MAC: 001F3C3 Go!

Nodes	Associated to	#Records	Signal	SNR	Noise
2011/10/05 05:35	U170-R-PB11-BHP42-1	3	-72	26	-98
2011/10/05 05:40	U170-R-PB11-BHP42-1	3	-72	26	-98
2011/10/05 05:45	U170-R-PB11-BHP42-1	3	-72	26	-98
2011/10/05 05:50	U170-R-PB11-BHP42-1	3	-72	26	-98
2011/10/05 05:55	U170-R-PB11-BHP42-1	3	-72	26	-98
2011/10/05 06:00	U170-R-PB11-BHP42-1	3	-72	26	-98
2011/10/05 06:05	U170-R-PB11-BHP42-1	2	-72	26	-98
2011/10/05 06:10	U170-R-PB11-BHP42-1	2	-72	26	-98
2011/10/05 06:15	U170-R-PB11-BHP42-1	2	-72	26	-98
2011/10/05 06:30	U170-R-PB11-BHP42-1	2	-72	26	-98
2011/10/05 06:35	U170-R-PB11-BHP42-1	1	-77	20	-97
2011/10/05 06:40	U170-R-PB11-BHP42-1	1	-76	20	-96
2011/10/05 06:45	U170-R-PB11-BHP42-1	1	-78	18	-96
2011/10/05 06:50	U170-R-PB11-BHP42-1	1	-79	17	-96
2011/10/05 06:55	U170-R-PB11-BHP42-1	1	-78	18	-96
2011/10/05 07:05	U170-R-PB11-BHP42-1	2	-72	27	-99
2011/10/05 07:10	U170-R-PB11-BHP42-1	2	-72	27	-99
2011/10/05 07:20	U170-R-PB11-BHP42-1	2	-73	26	-99
U170-R-PB11-BHP42-1_4			-73	26	-99
U170-R-PB11-BHP42-1_3			-79	17	-96



HP feedback and future plans

- VISION toolkit feedback
- Plans for the second stage of WIND:
  - Correlate available information
  - Provide summaries
  - Identify typical use cases
  - Provide a diagnostic assistant
- Technical report

WIND team at work