RTCA Free Flight Select Committee
Safe Flight 21 Steering Committee

Eurocontrol ADS Programme

ADS-B Technical Link Assessment Team (TLAT)

Technical Link Assessment Report
March 2001

APPENDIX K - Attachment 5

VDL Mode 4 Simulation Results
JHU/APL

Slide 1

Europe Nominal Traffic Loads

GSC profile

1942 total users

1084 inside core range
858 outside core range

641 users inside core range broadcasting 2 slot messages
319 on GSC1
322 on GSC2

525 users outside core range broadcasting 2 slot messages
266 on GSC1
259 on GSC2

443 users inside core range not broadcasting 2 slot messages
(only broadcast once per minute)
333 users outside core range not broadcasting 2 slot messages
(broadcast 6 times per minute)

165 GA Users

193 users below 10000 feet outside core range
500 users above 10000 feet outside core range 22%

Nominal Traffic Load

GSC1 NTL

users	xmtns/frame	total xmtns	% slot used in 1 frame
765	1	765	17%
319	2	638	14%
459	3	1377	31%
206	4	824	18%
133	6	798	18%
60	7	420	9%
1942		4822	107%

GSC2 NTL

users	xmtns/frame	total xmtns	% slot used in 1 frame
762	1	762	17%
322	2	644	14%
464	3	1392	31%
201	4	804	18%
135	6	810	18%
58	7	406	9%
1942		4818	107%

GSC1 makeup

319	Inside Core Range - 2 slot message on GSC1
765	Inside Core Range - No 2 slot message on GSC1
206	Outside Core Range, > 10000 ft, 2 slot message
60	Outside Core Range < 10000 ft, 2 slot message
459	OCR, > FL100, no 2sm OR - GA craft
133	Outside Core Range, < 10k, no 2 slot message
1942	

GSC2 makeup

322	In CR, 2sm
762	In CR
201	out cr,>10k,2sm
58	out cr, <10k, 2sm
464	out cr, >10k
135	out cr, <10k
1942	

	users	NTL
RSC1	511	114%
RSC2	573	127%

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Slide 2

LA Basin Nominal Traffic Load

GSC profile
2469 total users

914 inside core range
1555 outside core range

381 users inside core range broadcasting 2 slot messages
185 on GSC1
196 on GSC2

674 users outside core range broadcasting 2 slot messages

326 on GSC1
348 on GSC2
533 users inside core range not broadcasting 2 slot messages
(only broadcast once per minute)
881 users outside core range not broadcasting 2 slot messages
(broadcast 6 times per minute)

Nominal Traffic Load

GSC1 NTL

users	xmtns/frame	total xmtns	% slot used in 1 frame
185	2	370	8%
729	1	729	16%
326	7	2282	51%
1229	6	7374	164%
		10755	239%

GSC2 NTL

users	xmtns/frame	total xmtns	% slot used in 1 frame
196	2	392	9%
718	1	718	16%
348	7	2436	54%
1207	6	7242	161%
		10788	240%

GSC1 makeup	GSC2 makeup
185 Inside Core Range - 2 slot message on GSC1	196 In CR, 2sm
729 Inside Core Range - No 2 slot message on GSC1	718 In CR
326 Outside Core Range, 2 slot message on GSC1	348 Out CR, 2sm
1229 Outside Core Range, No 2 slot message on GSC1	1207 Out CR
2469	2469

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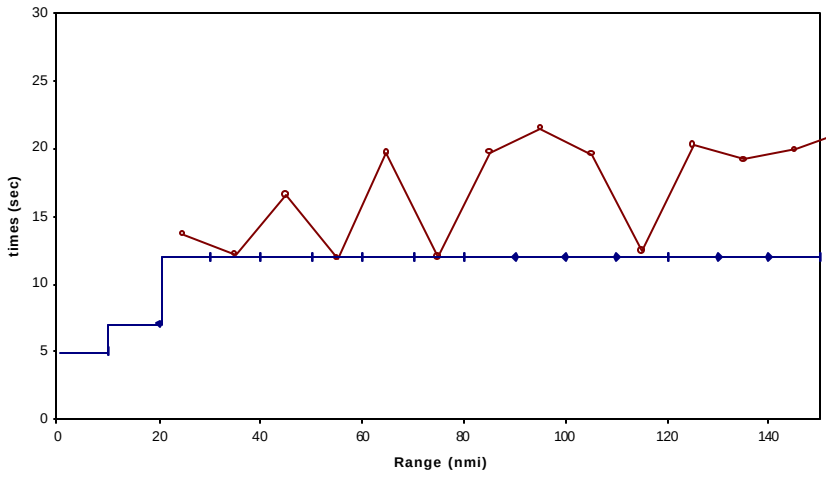
Slide 3

Low Density Scenario
A2/A3 State Vector Update Rates



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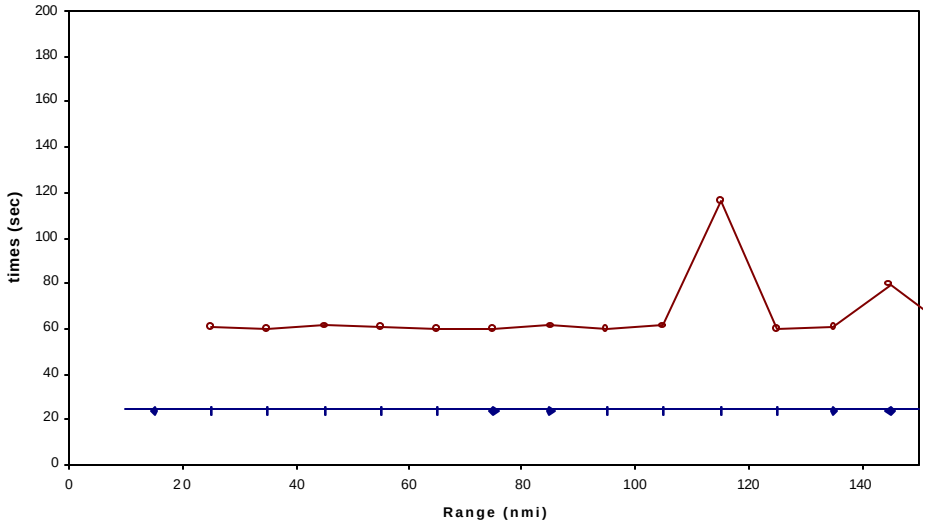
Slide 4

Low Density Scenario
A2/A3 TCP Update Rates



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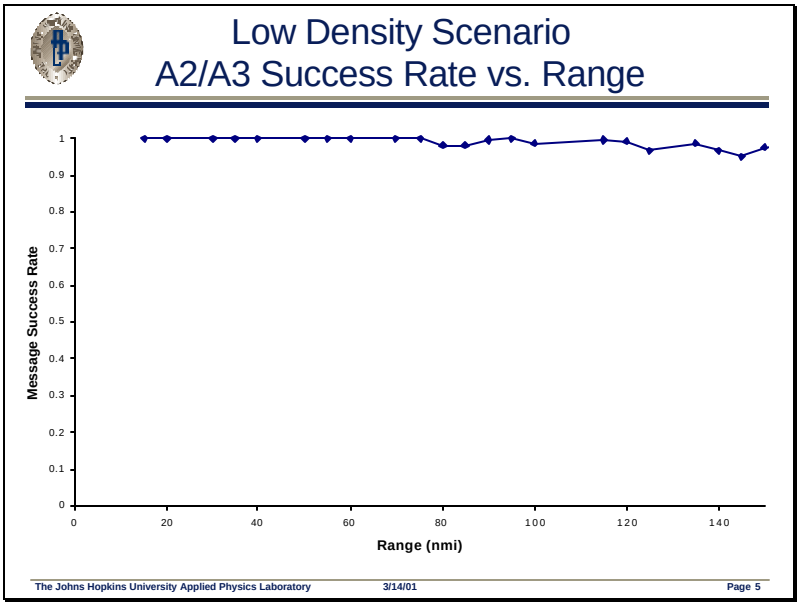
Slide 5



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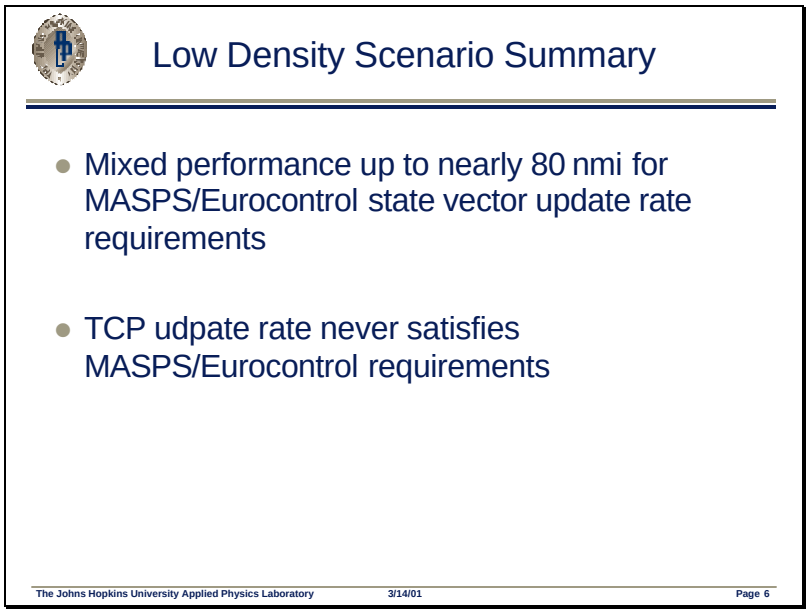
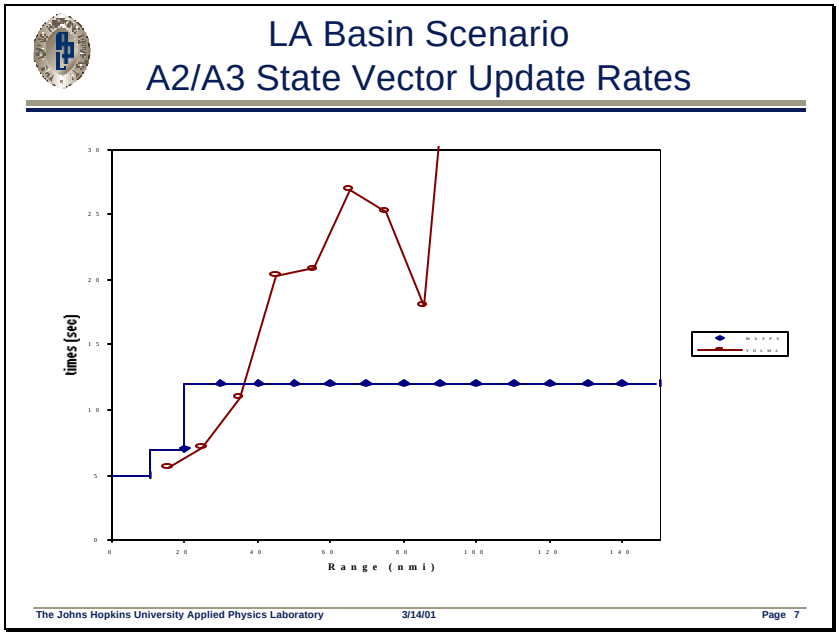


Slide 7



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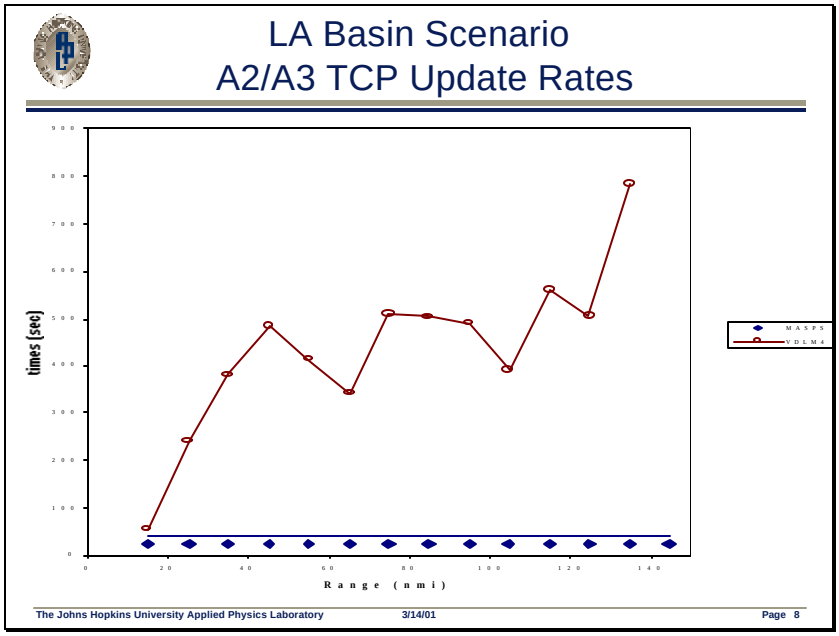

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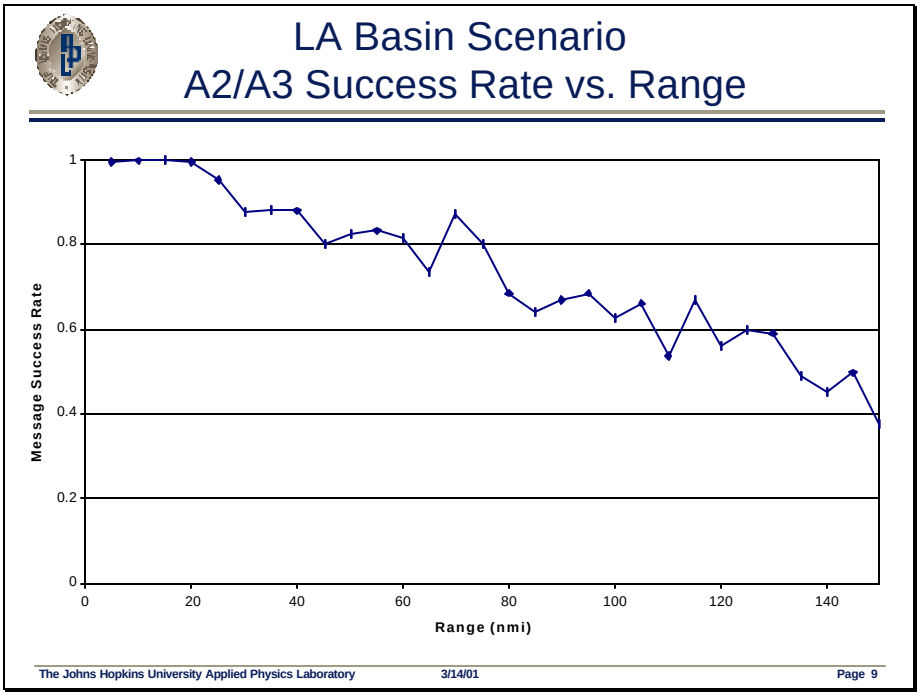

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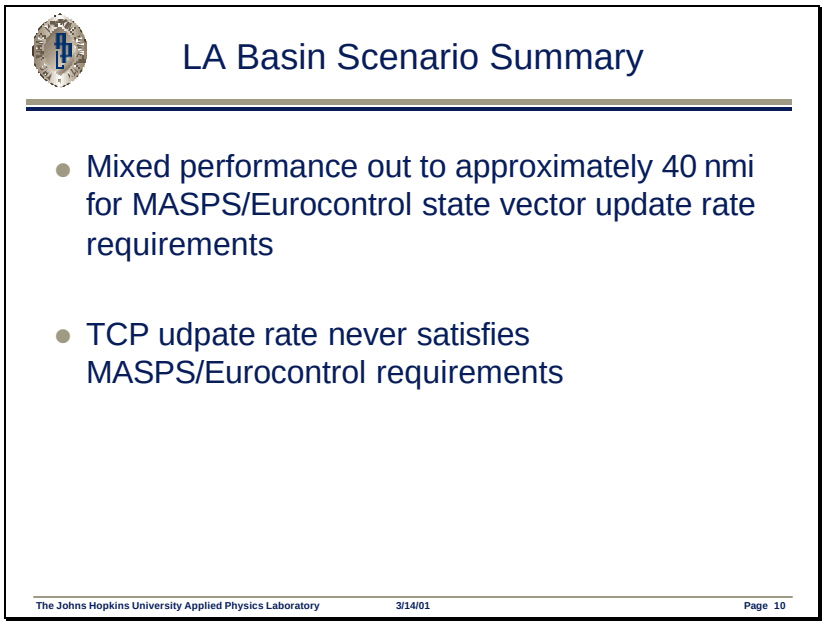
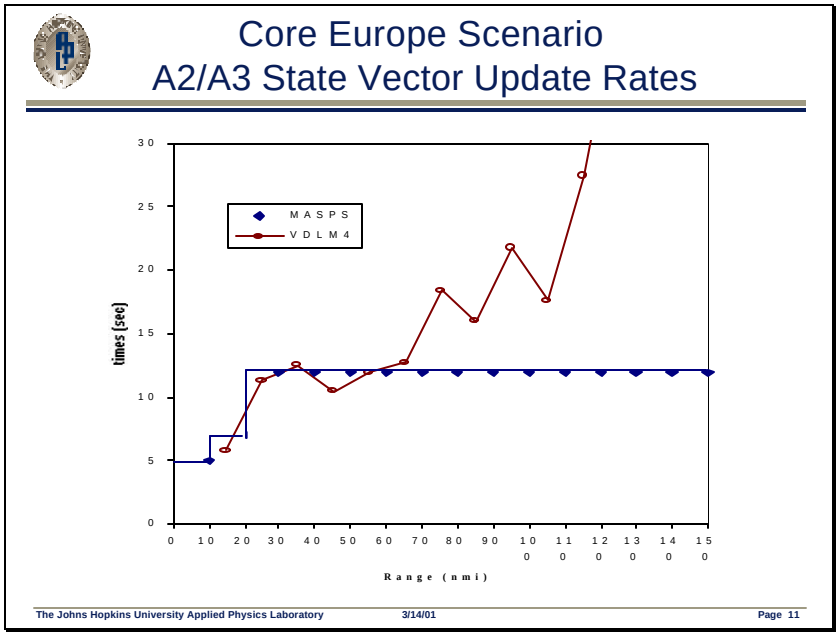
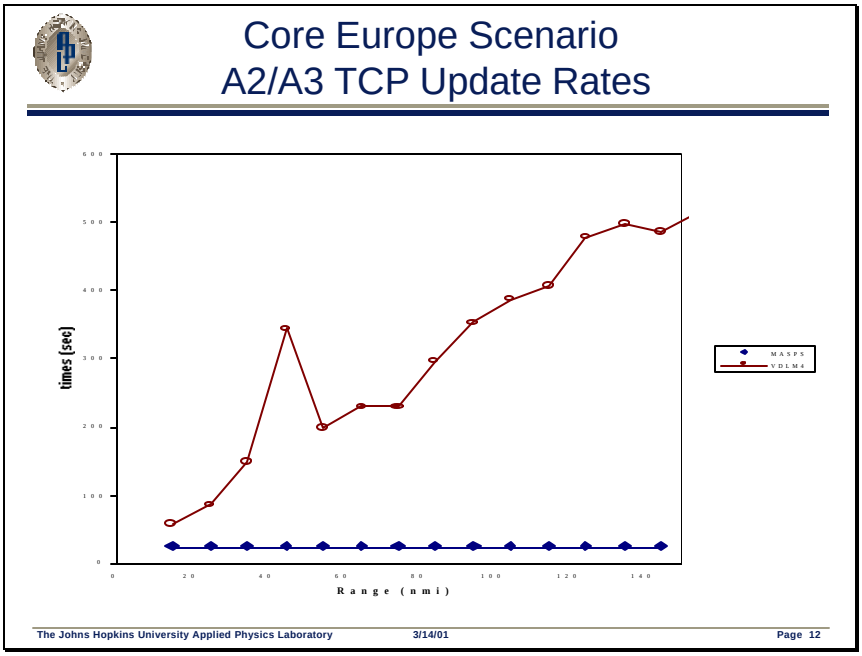


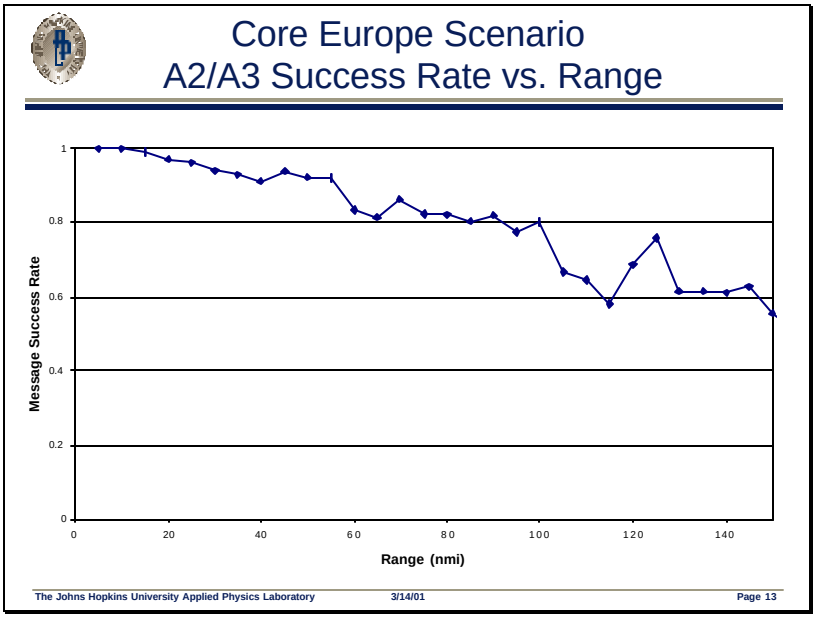
Slide 11



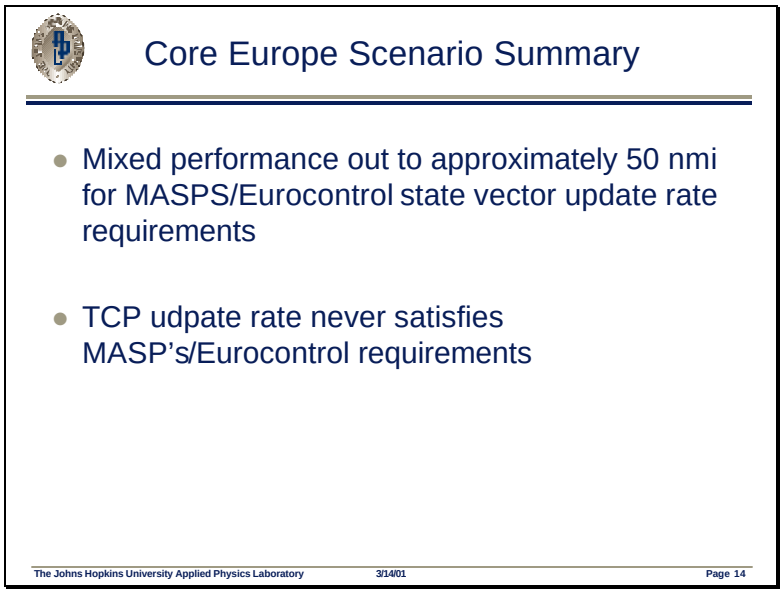
Slide 12



Slide 13



Slide 14



Slide 15

Analysis of APL VDLM4 Results

Repeated the Monte Carlo analysis for low density scenario in two excursions:

- Low density scenario – kept MSR from SPS output data file and set time between messages to 10 seconds – simulates *no dithering*
- Low density scenario – kept times from data file (includes dithering), and changed MSR's to 1 – simulates *perfect receptions*

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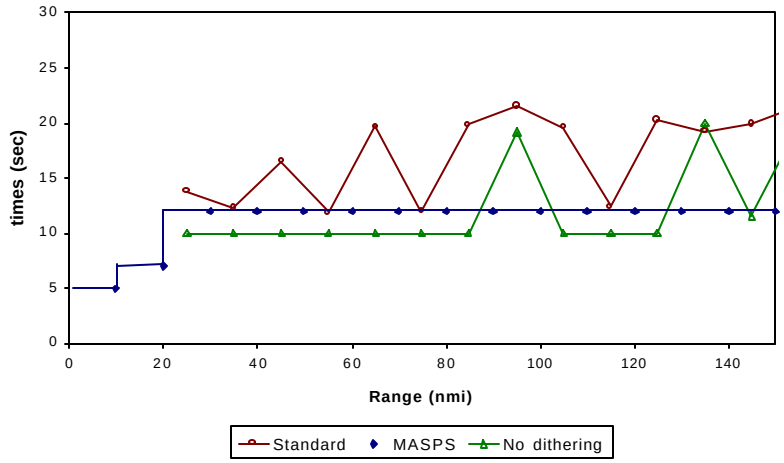
Low Density Scenario – No Dithering



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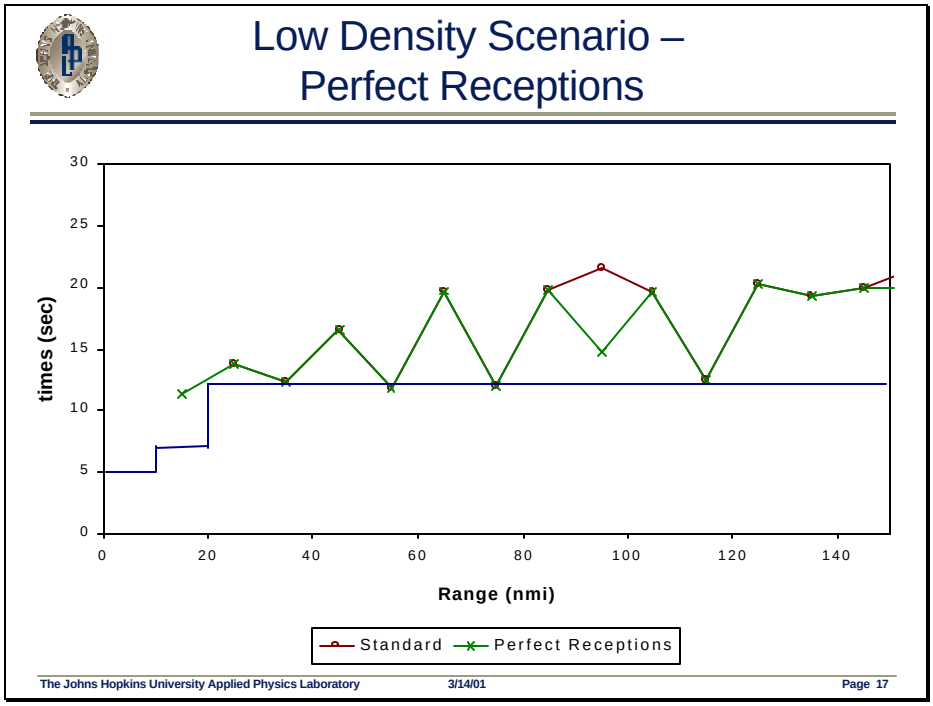
Low Density Scenario –
Perfect Receptions
times (sec)
30
25
20
15
10
5
0
0
20
40
60
80
100
120
140
Range (nmi)
Standard
Perfect Receptions
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