

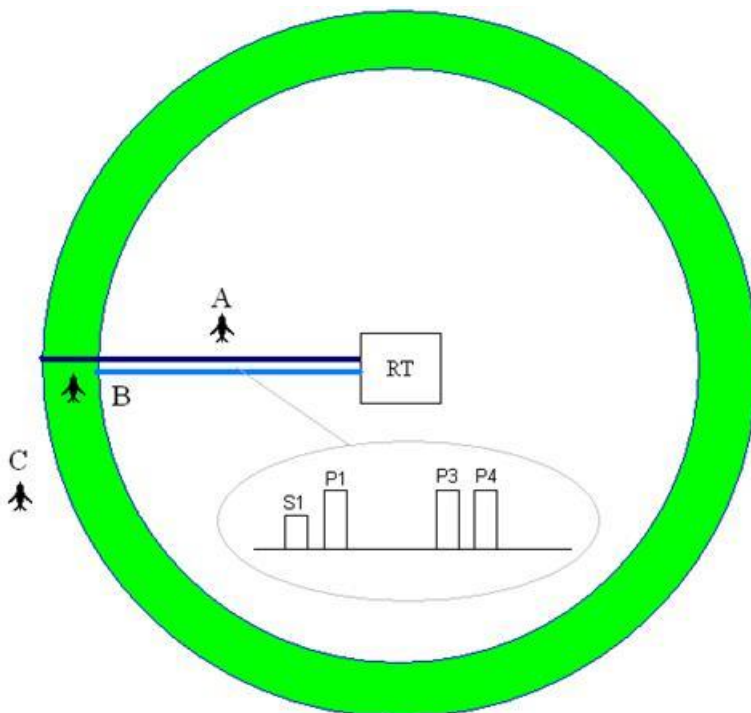
Oneida County WAM Whisper/Shout Setup

The Whisper / Shout configuration only applies to adapted RTs. Whisper / Shout refers to an interrogation technique that was initially designed for use with the Traffic Collision Avoidance System (TCAS) that is now required on all commercial aircraft. The MLAT system uses the Whisper / Shout technique to interrogate ATCRBS targets. Since ROs do not transmit interrogations, this configuration does not apply to ROs. The Whisper / Shout technique is used to limit the number of targets that respond to each transmitted ATCRBS interrogation. Each Whisper / Shout step is an ATCRBS interrogation.

The Whisper / Shout parameters consists of three things: the number of interrogation steps, the power level of the interrogation pulses (P1, P3, and P4), and the power of the suppression pulse (S1). Each step can use its own interrogation and suppression pulse power level. The complete set of steps is executed each time the RT in question is commanded to perform an ATCRBS (or W/S) interrogation.

ATCRBS interrogations use a simple encoding technique based on the amount of elapsed time between the first and second pulses detected by the target. Normally the P1 and P3 pulses are separated by 8 or 21 microseconds (to elicit Mode A and Mode C responses respectively). If a second pulse is detected with 2 microseconds of the first pulse, the target's transponder does not respond at all. This is called being "suppressed". The MLAT system, by transmitting a suppression pulse (S1) at a lower power level 2 microseconds before the first interrogation pulse (P1), can effectively limit the number of targets that respond to individual interrogations. In the figure below, a single Whisper / Shout step is depicted. In this case, the interrogation pulses (P1, P3, and P4) are strong enough to reach the outer edge of the green ring (shown by the dark blue line). The suppression pulse (S1), which uses slightly less power, is only detected as far away as the inside of the green ring (shown by the light blue line). This step results in only those targets inside the green ring responding. Target A detects the interrogation pulse, but also detects the suppression pulse. Target C is too far away, and does not detect either pulse. Only Target B detects the interrogation pulses and does not detect the suppression pulse. Only Target B responds to this interrogation step. Note the P4 pulse is only used to suppress Mode S transponders from responding to W/S interrogations. ATCRBS transponders do not process the P4 pulse.

The goal of a Whisper / Shout configuration is to shift the power levels so that sufficient responses are elicited from all of the targets of interest.



Whisper Shout Interrogation & Suppression Power Levels

MLAT Configuration Editor (Site: RME)

File Remote Units MLAT Processor Site

RU Selection Control

RT Whisper Shout Setup

Max Steps: 14

Step 1 (dbm): 48

Delta Int (dbm): -1

Delta Sup (dbm): -2

W/S Step Power Levels (dbm)

Step	Int	Sup
Step 1	51	47
Step 2	48	45
Step 3	47	43
Step 4	45	41
Step 5	43	39
Step 6	41	37
Step 7	39	35
Step 8	37	33
Step 9	35	31
Step 10	33	29
Step 11	31	27
Step 12	29	25
Step 13	27	23
Step 14	25	21

Add RU
Delete RU
Change Name

Figure 1 Whisper/Shout Setup

File Remote Units MLAT Processor Site

Mode A Rate (s): 3.1

Mode C Rate (s): 3.0

☐ Use Interrogation Regional Map Override

Mode A New Track Rate (s): 1.0

Mode C New Track Rate (s): 1.0

Mode A Periodic Update Priority: 3

Mode C Periodic Update Priority: 3

Interrogation Map Def Z Ht (ft): 40000

Max Mode S Int. Rate (per sec): 50

Mode A New Track Priority: 2

Mode C New Track Priority: 2

W/S Slices (per sec): 5

Interrogation Slices (per sec): 16

Retry Priority: 0

Max Retries: 0

Interrogation Power Options

☒ Interrogation Pwr Based On Range

Interrogation ID: 0

Max Interrogation Distance (nmi): 40.0

☐ Radar Mode 3 Adjust Interrogation

☐ 1090ES Mode C Adjust Interrogation

☐ Radar Mode C Adjust Interrogation

☐ UAT Mode 3 Adjust Interrogation

☐ 1090ES Mode 3 Adjust Interrogation

☐ UAT Mode C Adjust Interrogation

1090ES Reliable Status Code Matches: 2

1090ES Reliable Status Time (s): 10.2

1090ES Reliable Status Interrogation (s): 11.2

RU	ru1	ru2	ru3	ru4	NA
Offset (60ns)	0	250	500	750	NA
Type	A	AC	A	AC	None

Figure 2 Schedule 1

MLAT Configuration Editor (Site: KRME)

File Remote Units MLAT Processor Site

Mode H Rate (s)	3.1	W/S Listen Window Start Delay (ms)	3	Interrogation Power Options	
Mode C Rate (s)	3.0	W/S Period (s)	3	<input checked="" type="checkbox"/> Interrogation Pwr Based On Range Interrogation ID: 0 Max Interrogation Distance (nmi): 40.0	
<input type="checkbox"/> Use Interrogation Regional Map Override		Max Mode S Int. Rate (per sec)	50	<input type="checkbox"/> Radar Mode 3 Adjust Interrogation <input type="checkbox"/> 1090ES Mode C Adjust Interrogation	
Mode A New Track Rate (s)	1.0	Mode A New Track Priority	2	<input type="checkbox"/> Radar Mode C Adjust Interrogation <input type="checkbox"/> 1090ES Mode 3 Adjust Interrogation	
Mode C New Track Rate (s)	1.0	Mode C New Track Priority	2	<input type="checkbox"/> 1090ES Reliable Status Code Matches: 2 <input type="checkbox"/> 1090ES Reliable Status Time (s): 10.2 <input type="checkbox"/> 1090ES Reliable Status Interrogation (s): 11.2	
Mode A Periodic Update Priority	3	W/S Slices (per sec)	5		
Mode C Periodic Update Priority	3	Interrogation Slices (per sec)	16		
Interrogation Map Def Z Ht(ft)	40000	Retry Priority	0		
		Max Retries	0		

RU	ru5	ru6	ru1	ru2	NA
Offset (60ms)	0	250	500	750	NA
Type	AC 175	A	AC 185	A	None

Figure 3 Schedule 2

MLAT Configuration Editor (Site: KRME)

File Remote Units MLAT Processor Site

Mode H Rate (s)	3.1	W/S Listen Window Start Delay (ms)	3	Interrogation Power Options	
Mode C Rate (s)	3.0	W/S Period (s)	3	<input checked="" type="checkbox"/> Interrogation Pwr Based On Range Interrogation ID: 0 Max Interrogation Distance (nmi): 40.0	
<input type="checkbox"/> Use Interrogation Regional Map Override		Max Mode S Int. Rate (per sec)	50	<input type="checkbox"/> Radar Mode 3 Adjust Interrogation <input type="checkbox"/> 1090ES Mode C Adjust Interrogation	
Mode A New Track Rate (s)	1.0	Mode A New Track Priority	2	<input type="checkbox"/> Radar Mode C Adjust Interrogation <input type="checkbox"/> 1090ES Mode 3 Adjust Interrogation	
Mode C New Track Rate (s)	1.0	Mode C New Track Priority	2	<input type="checkbox"/> 1090ES Reliable Status Code Matches: 2 <input type="checkbox"/> 1090ES Reliable Status Time (s): 10.2 <input type="checkbox"/> 1090ES Reliable Status Interrogation (s): 11.2	
Mode A Periodic Update Priority	3	W/S Slices (per sec)	5		
Mode C Periodic Update Priority	3	Interrogation Slices (per sec)	16		
Interrogation Map Def Z Ht(ft)	40000	Retry Priority	0		
		Max Retries	0		

RU	ru4	ru3	ru5	ru6	NA
Offset (60ms)	0	250	500	750	NA
Type	A	AC 175	A	AC 185	None

Figure 4 Schedule 3