



Shooting Reconstruction - Angle Determination Test No. 23-5620 Summary Report

Each sample set contained a wooden box that consisted of one entrance hole, one exit hole, and a "TOP" label to distinguish the orientation of the box. In addition, one "A" label and one "1" label were placed on opposing sides of the box to assist participants when reporting the entrance/exit holes and direction of travel. Participants were requested to determine the entrance hole, direction of travel, and calculate the angles. Data were returned from 110 participants and are compiled into the following tables:

	<u>Page</u>
<u>Manufacturer's Information</u>	<u>2</u>
<u>Summary Comments</u>	<u>3</u>
<u>Table 1: Entrance Hole</u>	<u>4</u>
<u>Table 2: Direction of Travel</u>	<u>7</u>
<u>Table 3: Angles</u>	<u>11</u>
<u>Table 4: Conclusions</u>	<u>19</u>
<u>Table 5: Additional Comments</u>	<u>29</u>
<u>Appendix: Data Sheet</u>	

This report contains the data received from the participants in this test. Since these participants are located in many countries around the world, and it is their option how the samples are to be used (e.g., training exercise, known or blind proficiency testing, research and development of new techniques, etc.), the results compiled in the Summary Report are not intended to be an overview of the quality of work performed in the profession and cannot be interpreted as such. The Summary Comments are included for the benefit of participants to assist with maintaining or enhancing the quality of their results. These comments are not intended to reflect the general state of the art within the profession.

Participant results are reported using a randomly assigned "WebCode". This code maintains participant's anonymity, provides linking of the various report sections, and will change with every report.

Manufacturer's Information

Each sample set contained a wooden box that consisted of one entrance hole, one exit hole, and a "TOP" label to distinguish the orientation of the box. In addition, one "A" label and one "1" label were placed on opposite sides of the box to assist participants when reporting the entrance/exit holes and direction of travel. Participants were requested to determine the entrance hole, the direction of travel, and calculate the angles. The label marked with "A" was associated with the entrance hole. The label marked with "1" was associated with the exit hole. The direction of travel was left to right, downward and the angles (as measured during production) are described below.

PRODUCTION: The sample was placed onto a fixed angle set up (jig). A PTR 9 Semi-Automatic Pistol 9mm Luger firearm was affixed above the jig and a digital angle finder was placed on the jig to confirm the angle to be shot.

The Horizontal (Azimuth) angle was measured at 2° from perpendicular, 88° left to right or 92° right to left. The Vertical angle was measured downward at 22° or 68° upward.

VERIFICATION: All predistribution laboratories reported the expected responses, with the Horizontal and Vertical angles falling within $\pm 5^\circ$.

Summary Comments

This test was designed to allow participants to assess their proficiency in shooting reconstruction, with a focus on angle determination. Each sample set consisted of a wooden box (Item 1) containing an entrance and exit hole, along with three labels. A "TOP" label was used to assist participants with the orientation of the sample. One side was labeled "A" and the opposite side was labeled "1" to assist with reporting the direction of travel. The side labeled "A" was associated with the entrance hole. (Refer to Manufacturer's Information for preparation details.)

ENTRANCE HOLE: All 108 responding participants identified the side labeled "A" as containing the entrance hole. One other participant did not report a result but stated in Table 4: Conclusions that the side labeled "A" contained the entrance hole.

DIRECTIONALITY: Of the 107 responding participants, 102 (93%) reported a left-to-right direction of travel. The five remaining participants reported a right-to-left direction of travel. In addition, one other participant did not report a result but stated in Table 4: Conclusions, the directionality which is consistent with the consensus. In regard to upward/downward directionality, all 108 responding participants reported a downward direction.

ANGLE DETERMINATION

Reported angles are reviewed using CTS' uncertainty factor of $\pm 5^\circ$ from the prepared values.

HORIZONTAL: Any reported horizontal angles that fell outside of the following ranges were marked as inconsistent: $\pm 5^\circ$ from perpendicular of the prepared value of 2° (0 to 7°), $\pm 5^\circ$ from left-to-right of the prepared value of 88° (83 to 93°), or ± 5 from right-to-left of the prepared value of 92° (87 to 97°). Of the 101 responding participants that reported horizontal angles, 96 (95%) reported angles that fell within the ranges described above. Five participants reported angles that fell outside of these ranges.

VERTICAL: Any reported vertical angles that fell outside of the following ranges were marked as inconsistent: $\pm 5^\circ$ downward from the prepared value of 22° (17 to 27°) or $\pm 5^\circ$ upward from the prepared value of 68° (63 to 73°). Of the 101 responding participants that reported vertical angles, 94 (93%) reported angles that fell within the ranges described above. Seven participants reported angles that fell outside of these ranges.

CTS is aware that some labs will only report directionality and will not report any angle measurements.

Entrance Hole

Which label on the box represents the entrance hole?

TABLE 1

WebCode	Character	WebCode	Character
2DCH4G	A	8PBZPR	A
2LTWBT	A	8YX822	A
2RXTUT	A	98MDAT	A
2TC6TX	A	9HPQDZ	A
3EVQWW	A	9TRLW6	A
3UH2GY	A	A3AT6T	A
3UH43W	A	AGRMEX	A
3Z8LKE	A	AKV9CV	A
48274L	A	AP4WLQ	A
48QZA7	A	APZCV3	A
4BK28D	A	ATZFRV	A
4JYGLN	A	AVPMCR	A
4MCRNB		B7NPAU	A
62FDQ2	A	BZCYH9	A
64V3P4	A	C7MAE9	A
6DKUEG	A	D6J4BJ	A
6GJX9A	A	D6JBBQ	A
6V2WUH	A	DC7WMJ	A
7BUMUK	A	DPVUNG	A
7HXQL4	A	DZDFTC	A
7MTHU2	A	E7WZFN	A
7PGUT8	A	EAFM24	A
8M92CD	A	EDWHQU	A

WebCode	Character	WebCode	Character
EKQKUQ	A	LT6CCX	A
ELDTY	A	M7NNA6	A
EQKJ82	A	MEHU8D	A
ETLPNR	A	N8E8QW	A
ETMHLZ	A	NWVVEK	A
F4PZW3	A	P4QC82	A
F6FE3R	A	P68BKY	A
FRT87R	A	PG4BKH	A
FYPQL2	A	PVE4Z9	A
GE4EDB	A	PWUH8H	A
GHWFC4	A	R2UHHW	A
GPJ9LH	A	RFW8GH	A
GPV6RM	A	RKAERG	A
HF64Q4	A	RRC8HZ	A
J6YGCC	A	RZ73BA	A
J8C99Y	A	T2R946	A
JJ6CVD		TLZ7R8	A
JJP96T	A	TNPMYU	A
JWD9XF	A	TQCGFV	A
KCGCPK	A	TUVBJM	A
KDECXX	A	U26U3R	A
L47A76	A	U7KRME	A
LE8MBC	A	UFPFZK	A
LEZJTE	A	UGLPHN	A
LL2T4D	A	UNFUBP	A

WebCode	Character	WebCode	Character
VNYXJQ	A		
VTVYRC	A		
W6HLDX	A		
W9XAVA	A		
WBP862	A		
WDTZ47	A		
XUGBQ9	A		
XXHJUJ	A		
YATCZ6	A		
YGMGT7	A		
Z4FXNJ	A		
ZF9CTL	A		
ZFKBJP	A		
ZPYZL4	A		

Response Summary			Participants: 110
Which label on the box represents the entrance hole?			
Character:	A	1	No Response
Total:	108	0	2
Percent:	98.2%	0.0%	1.8%

Direction of Travel

What is the direction of travel of the bullet through the box? (check all that apply)

TABLE 2

WebCode	Left / Right	Upward / Downward
2DCH4G	Left to Right	Downward
2LTWBT	Left to Right	Downward
2RXTUT	Left to Right	Downward
2TC6TX	Left to Right	Downward
3EVQWW	Left to Right	Downward
3UH2GY	Right to Left	Downward
3UH43W	Left to Right	Downward
3Z8LKE	Left to Right	Downward
48274L	Left to Right	Downward
48QZA7	Left to Right	Downward
4BK28D	Left to Right	Downward
4JYGLN	Left to Right	Downward
4MCRNB	Left to Right	Downward
62FDQ2	Left to Right	Downward
64V3P4	Left to Right	Downward
6DKUEG	Left to Right	Downward
6GJX9A	Left to Right	Downward
6V2WUH	Left to Right	Downward
7BUMUK	Left to Right	Downward
7HXQL4	Left to Right	Downward
7MTHU2	Left to Right	Downward
7PGUT8	Left to Right	Downward
8M92CD	Left to Right	Downward
8PBZPR	Left to Right	Downward
8YX822	Left to Right	Downward
98MDAT	Left to Right	Downward
9HPQDZ	Left to Right	Downward
9TRLW6	Left to Right	Downward
A3AT6T	Left to Right	Downward

TABLE 2

WebCode	Left / Right	Upward / Downward
AGRMEX	Right to Left	Downward
AKV9CV	Left to Right	Downward
AP4WLQ	Right to Left	Downward
APZCV3	Left to Right	Downward
ATZFRV	Left to Right	Downward
AVPMCR	Left to Right	Downward
B7NPAU	Left to Right	Downward
BZCYH9	Left to Right	Downward
C7MAE9	Left to Right	Downward
D6J4BJ	Left to Right	Downward
D6JBBQ	Left to Right	Downward
DC7WMJ	Left to Right	Downward
DPVUNG	Left to Right	Downward
DZDFTC	Left to Right	Downward
E7WZFN	Left to Right	Downward
EAFM24	Left to Right	Downward
EDWHQU	Left to Right	Downward
EKQKUQ	Left to Right	Downward
ELDTY	Left to Right	Downward
EQKJ82	Left to Right	Downward
ETLPNR	Left to Right	Downward
ETMHLZ	Left to Right	Downward
F4PZW3	Left to Right	Downward
F6FE3R	Left to Right	Downward
FRT87R	Left to Right	Downward
FYPQL2	Right to Left	Downward
GE4EDB	Left to Right	Downward
GHWFC4	Left to Right	Downward
GPJ9LH	Left to Right	Downward
GPV6RM	Left to Right	Downward
HF64Q4	Left to Right	Downward

TABLE 2

WebCode	Left / Right	Upward / Downward
J6YGCC	Left to Right	Downward
J8C99Y	Left to Right	Downward
JJ6CVD		
JJP96T	Left to Right	Downward
JWD9XF	Left to Right	Downward
KCGCPK	Left to Right	Downward
KDECXX	Left to Right	Downward
L47A76	Left to Right	Downward
LE8MBC	Left to Right	Downward
LEZJTE	Left to Right	Downward
LL2T4D	Left to Right	Downward
LT6CCX	Left to Right	Downward
M7NNA6	Left to Right	Downward
MEHU8D	Left to Right	Downward
N8E8QW	Left to Right	Downward
NWVVEK	Left to Right	Downward
P4QC82	Left to Right	Downward
P68BKY	Left to Right	Downward
PG4BKH	Left to Right	Downward
PVE4Z9		Downward
PWUH8H	Left to Right	Downward
R2UHHW		Downward
RFW8GH	Left to Right	Downward
RKAERG	Left to Right	Downward
RRC8HZ	Left to Right	Downward
RZ73BA	Left to Right	Downward
T2R946	Left to Right	Downward
TLZ7R8	Left to Right	Downward
TNPMYU	Left to Right	Downward
TQCGFV	Left to Right	Downward
TUVBJM	Left to Right	Downward

TABLE 2

WebCode	Left / Right	Upward / Downward
U26U3R	Left to Right	Downward
U7KRME	Left to Right	Downward
UFPFZK	Left to Right	Downward
UGLPHN	Left to Right	Downward
UNFUBP	Left to Right	Downward
VNYXJQ	Left to Right	Downward
VTYRC	Right to Left	
W6HLDX	Left to Right	Downward
W9XAVA	Left to Right	Downward
WBP862	Left to Right	Downward
WDTZ47	Left to Right	Downward
XUGBQ9	Left to Right	Downward
XXHJUJ	Left to Right	Downward
YATCZ6	Left to Right	Downward
YGMGT7	Left to Right	Downward
Z4FXNJ	Left to Right	Downward
ZF9CTL	Left to Right	Downward
ZFKBJP	Left to Right	Downward
ZPYZL4	Left to Right	Downward

Response Summary				Participants: 110		
What is the direction of travel of the bullet through the box?						
<i>Direction:</i>	<u>Right to Left</u>	<u>Left to Right</u>	<u>No Response</u>	<u>Upward</u>	<u>Downward</u>	<u>No Response</u>
<i>Total:</i>	5	102	3	0	108	2
<i>Percent:</i>	4.5%	92.7%	2.7%	0.0%	98.2%	1.8%

Angles

TABLE 3 - Horizontal (Azimuth)

WebCode	Angle Measurement	Uncertainty (in degrees)
2DCH4G	87	
2LTWBT	92	
2RXTUT	84	5
2TC6TX	88	5
3EVQWW	86	5
3UH2GY	92	5
3UH43W	87	5
3Z8LKE	89	5
48274L	88 (2 from orthogonal)	5
48QZA7	87	5
4BK28D	88	5
4JYGLN	4	2
4MCRNB	87	2
62FDQ2	7	
64V3P4	86	5
6DKUEG	87	5
6GJX9A		
6V2WUH	2	5
7BUMUK	87	
7HXQL4		
7MTHU2	2	5
7PGUT8		
8M92CD	87	
8PBZPR	87.7	2.6
8YX822	89	5
98MDAT	3	5
9HPQDZ	23	5
9TRLW6	1	5

TABLE 3 - Horizontal (Azimuth)

WebCode	Angle Measurement	Uncertainty (in degrees)
A3AT6T	88 (0=left/180=right)	
AGRMEX	90	
AKV9CV		
AP4WLQ	93	5
APZCV3	1	5
ATZFRV	88.5 (Left-Right)	5
AVPMCR	88	5
B7NPAU	3	1
BZCYH9	82	
C7MAE9	88	
D6J4BJ	1	5
D6JBBQ	2	2
DC7WMJ	1	5
DPVUNG	88	
DZDFTC	89 (from surface of box)	5
E7WZFN	87	5
EAFM24	91	
EDWHQU	89	
EKQKUQ	87 L to R, 93 R to L , 3 perpendicular	5
ELTDY	88	5
EQKJ82	92.5	3
ETLPNR	88	5
ETMHLZ	88	5
F4PZW3	88	
F6FE3R	89	5
FRT87R	87	5
FYPQL2	93	2.5
GE4EDB	88	5

TABLE 3 - Horizontal (Azimuth)

WebCode	Angle Measurement	Uncertainty (in degrees)
GHWFC4	2	
GPJ9LH	88	
GPV6RM	86° (4° from 90°)	5°
HF64Q4	88	5
J6YGCC	88	5
J8C99Y	88.6	5
JJ6CVD	87	5
JJP96T		
JWD9XF	87.8	2.6
KCGCPK	85	5
KDECXX	88.0	
L47A76	89 degrees	
LE8MBC	88.7	2.6
LEZJTE	87	5
LL2T4D	88.1	2.6
LT6CCX	25	2
M7NNA6	88	
MEHU8D	87	5
N8E8QW	91	
NWVVEK	87	5
P4QC82	88 left to right	5
P68BKY	3	1
PG4BKH	88	5
PVE4Z9	90	5
PWUH8H	92	5
R2UHHW	90	
RFW8GH	88	5
RKAERG	88	
RRC8HZ	25	2

TABLE 3 - Horizontal (Azimuth)

WebCode	Angle Measurement	Uncertainty (in degrees)
RZ73BA	87	5
T2R946		
TLZ7R8	88.9	2.6
TNPMYU	22 degrees above	
TQCGFV	2	5
TUVBJM	88	
U26U3R	89	
U7KRME	85	5
UFPFZK	89	
UGLPHN	89	5
UNFUBP	3	
VNYXJQ	approximately 87	
VTYRC	87	3
W6HLDX	89	5
W9XAVA	87.5	2.6
WBP862		
WDTZ47		
XUGBQ9	88 (left to right)	5
XXHJUJ	86	
YATCZ6		
YGMGT7	88	10
Z4FXNJ	88	
ZF9CTL	87	5
ZFKBJP	87.8	5.8
ZPYZL4	88	5

TABLE 3 - Vertical

WebCode	Angle Measurement	Uncertainty (in degrees)
2DCH4G	25	
2LTWBT	64	
2RXTUT	29	5
2TC6TX	25	5
3EVQWW	28	5
3UH2GY	25	5
3UH43W	26.5	5
3Z8LKE	24	5
48274L	25	5
48QZA7	25	5
4BK28D	25	5
4JYGLN	27	2
4MCRNB	65	2
62FDQ2	27	
64V3P4	24	5
6DKUEG	25	5
6GJX9A		
6V2WUH	26	5
7BUMUK	(-) 25	
7HXQL4		
7MTHU2	25	5
7PGUT8		
8M92CD	- 26	
8PBZPR	23.6	2.6
8YX822	-25	5
98MDAT	25	5
9HPQDZ	93	5
9TRLW6	25	5
A3AT6T	66 (0=up/180=down)	

TABLE 3 - Vertical

WebCode	Angle Measurement	Uncertainty (in degrees)
AGRMEX	65	
AKV9CV		
AP4WLQ	24	5
APZCV3	25	5
ATZFRV	25.5 (Downward)	5
AVPMCR	24	5
B7NPAU	-27	1
BZCYH9	24	
C7MAE9	-25	
D6J4BJ	24	5
D6JBBQ	23	2
DC7WMJ	24	5
DPVUNG	67	
DZDFTC	25	5
E7WZFN	-25.0	5
EAFM24	65	
EDWHQU	24	
EKQKUQ	22 downwards	5
ELTDY	65	5
EQKJ82	25	3
ETLPNR	-23	5
ETMHLZ	27	5
F4PZW3	25	
F6FE3R	25	5
FRT87R	25	5
FYPQL2	68	2.5
GE4EDB	25	5
GHWFC4	24	
GPJ9LH	24.5	

TABLE 3 - Vertical

WebCode	Angle Measurement	Uncertainty (in degrees)
GPV6RM	24°	3.5°
HF64Q4	23 Upward from Horizontal Plane	5
J6YGCC	26	5
J8C99Y	26	5
JJ6CVD	24	5
JJP96T		
JWD9XF	24.5	2.6
KCGCPK	62	5
KDECXX	26.7	
L47A76	-24 degrees	
LE8MBC	24.4	2.6
LEZJTE	-24	5
LL2T4D	25.6	2.6
LT6CCX	2	2
M7NNA6	25	
MEHU8D	-26	5
N8E8QW	23	
NWVVEK	22	5
P4QC82	24 downward	5
P68BKY	24	1
PG4BKH	-25.5	5
PVE4Z9	22	5
PWUH8H	-24	5
R2UHHW	21	
RFW8GH	23	5
RKAERG	25	
RRC8HZ	5	2
RZ73BA	23	5
T2R946		

TABLE 3 - Vertical

WebCode	Angle Measurement	Uncertainty (in degrees)
TLZ7R8	24.8	2.6
TNPMYU	1 degree left	
TQCGFV	-23	5
TUVBJM	25	
U26U3R	23	
U7KRME	24	5
UFPFZK	24.55	
UGLPHN	66	5
UNFUBP	26	
VNYXJQ	approximately 25	
VTYRC	67	3
W6HLDX	23	5
W9XAVA	25.2	2.6
WBP862		
WDTZ47		
XUGBQ9	25 (downward)	5
XXHJUJ	25	
YATCZ6		
YGMGT7	65	10
Z4FXNJ	25	
ZF9CTL	25	5
ZFKBJP	23.8	1.8
ZPYZL4	25	5

Conclusions

TABLE 4

WebCode	Conclusions
2DCH4G	All trajectories are opinions. All measurements are approximate. All vertical and horizontal angles were measured from the baseline.
2LTWBT	Analysis of Trajectory 1 indicated the bullet originated from in front of side A of the wall, traveling nearly perpendicular at a downward angle where it perforated the wall, exiting through the side marked 1.
2RXTUT	Trajectory for perforating defect into surface is 84 degrees left to right and 29 degrees downward.
2TC6TX	Hole i1a is an entrance. Hole i1b is an exit. The projectile that struck i1a perforates wall "A", and then perforates wall "1" with a downward trajectory of ~25 degrees (+/- 5 degrees) and a left to right trajectory of ~88 degrees (+/- 5 degrees).
3EVQWW	[No Conclusions Reported.]
3UH2GY	The bullet entrance hole on the wall was the strike marked A. The bullet struck the wall at about ~25 degrees downward angle and a slight right to left angle of ~92 degrees with +/- 5 degrees of uncertainty.
3UH43W	I examined the section of the partition wall. I identified two (2) holes in the partition wall. These holes were created by the passage of a single bullet. The side labelled "A" was identified as the entrance hole and the side labelled "1" was identified as the exit hole. The entrance hole was located approximately three (3) inches from the top edge of the partition wall and approximately one and seven eighths (1 7/8) inches from the left hand side of the partition wall. The exit hole was located approximately four and a half (4 1/2) inches from the top edge of the partition wall and four (4) inches from the left hand side of the partition wall. The bullet travelled downward (below the horizontal) at a vertical angle of 26.5 ± 5 degrees and a horizontal (azimuth) angle of 87 ± 5 degrees from left to right (side labelled "A" facing the examiner) through the partition wall.
3Z8LKE	Item 1 had two defects that appeared consistent with damage from a projectile. The side labeled A appears to be the entrance and the side labeled 1 appears to be the exit. Trajectory rods were placed, and measurements were taken. The projectile path was left to right and downward. Vertical Angle 24 ± 5 degrees Horizontal Angle 89 ± 5 degrees The reported uncertainty of measurement (± 5 degrees) is generally accepted in the field of shooting reconstruction.
48274L	A bullet entered side A and exited side 1. The direction of travel was downward and in a slight left to right direction.
48QZA7	In my opinion the damage to the sample was caused by the passage of a single bullet. The bullet entered the sample on the 'A' side. The bullet path was measured as 26 degrees downwards (± 5 degrees) and 87 degrees left to right (± 5 degrees)
4BK28D	A bullet trajectory was assessed on the provided wall partition. The projectile entered (label A) with a downward angle of 25 degrees ± 5 , from left to right at 88 degrees ± 5 , and exited the wall partition (label 1).
4JYGLN	Upon visual inspection of a section of a partition wall, it was determined that the hole labeled as „A“ corresponds to an entrance bullet hole, and the hole labeled as „1“ corresponds to an exit bullet hole. Bullet traveled from left to right at an angle of $4^\circ \pm 2^\circ$ and downwards at an angle of $27^\circ \pm 2^\circ$.
4MCRNB	The trajectory of the defect in the wall is ~ 65 degrees downward and ~87 degrees rightward.

TABLE 4

WebCode	Conclusions
62FDQ2	<p>Test Report: This laboratory report contains the conclusions, opinions, and interpretations of the member whose initials/signature appears on the report. Results relate only to the items tested. Unless otherwise noted, all activities performed at [Laboraory] Forensic Section [Adress]. This is a supplement to the original report. On 08/07/2023 I was provided with Item 001 by [Name] (Forensic Services Section - Accreditation) for trajectory analysis angle determination. On 09/19/2023 I conducted the following observations and analysis: Item 001: A white cardboard box sealed with red evidence tape containing one square wood box. The wood box measured 6 ¾" wide and tall, and 4" deep, with two large, faced square sides and four smaller rectangular sides. The box had three sides labeled with stickers. On the top rectangular side with sticker "Test No. 23-5620". Both large, faced sides had stickers, one with "Test No. 23-5620 Side A" and "Test No. 23-5260 Side 1". There were two defects on the box with one on "Side A" and one on "Side 1". The "Side A" defect was circular and measured 3/8" by 3/8". It was 3 3/8" up from the bottom and 2 ¾" from the left side. This defect appears to be an entry defect due to the wood bending inward. The "Side 1" defect was circular and measured 3/8" by 3/8". It was 1 ¾" up from the bottom and 3" from the right. This defect appears to be an exit defect due to the wood bending and splintering outward. A trajectory rod was inserted, and the two defects did correlate with each other and provided the following angle measurements. The angles were determined by inserting the rod from "Side A" to "Side 1". The vertical angle was 7 degrees left to right and the horizontal angle was 27 degrees downward. The item was repackaged and resealed in its original packaging. Case Status: [Name] (Forensic Services Section - Accreditation) Nothing further at this time.</p>
64V3P4	<p>2 defects were observed to the partition wall. Defect on side 'A' was determined to be the entrance with corresponding exit on side '1'. A trajectory rod was utilized and to show a slightly left to right and downward trajectory. Horizontal angle - 86 degrees Vertical angle - 24 degrees Angle measurements are subjected to uncertainty of +/-5 degrees.</p>
6DKUEG	<p>Damage to the submitted timber wall was caused by the passage of a fired bullet. The fired bullet entered the wall at damage area 'A' and perforated the wall, exiting the wall on the opposite side at damage area '1.' I fitted trajectory rods to these areas of damage, recording the trajectory of the bullet as 25 degrees downwards, with a horizontal (azimuth) angle of 87 degrees Left to Right.</p>
6GJX9A	<p>An entrance hole done by a bullet a fire gun, sited in the half side left in the wooden box. The direction of travel of the bullet through the box from right to left, from up towards down with an ascendet angle of 27°: the bullet in the direction made an exit hole identified as "1", sited in the down righ side.</p>
6V2WUH	<p>RESULTS: Projectile impact damage was located in the section of wall, Exhibit 1. A bullet entrance hole was located in side "A" with an associated exit on side "1". The projectile path was determined to have a vertical angle of 26 degrees downward and a horizontal angle of 2 degrees from perpendicular traveling slightly left to right. CONCLUSIONS: Damage to the wall, Exhibit 1, is consistent with having been caused by a projectile entering side A and exiting side 1 traveling at a downward angle in a slightly left to right direction.</p>
7BUMUK	<p>The bullet was descending downward, and approximately 87 degrees left to right.</p>
7HXQL4	<p>Pathway A (including impacts A, A1) is consistent with a bullet traveling from side "A" to side "1", left to right, and in a downward direction.</p>
7MTHU2	<p>The partition wall exhibited two defects consistent with defects produced by a fired bullet. The bullet passed through the wall producing an entrance defect on the side of the wall labeled A, and an exit defect on the side of the wall labeled 1. The fired bullet perforated the wall producing a trajectory with a 2 degree left to right incident angle at a 25 degree downward angle.</p>
7PGUT8	<p>Pathway T (including impacts T, T1) is consistent with a bullet traveling from side A to side 1, left to right, and in a downward direction.</p>
8M92CD	<p>The direction of travel of the projectile thru Item 1 was determined to be from side A to side 1, left to right and downward. As measured from entrance side (Side A), the vertical angle was determined to be -26 degrees. As measured from the left edge of Side A towards the right side, the azimuth angle was determined to be 87 degrees.</p>

TABLE 4

WebCode	Conclusions
8PBZPR	Defect A is a perforating entrance bullet defect to side A of the wooden box. A trajectory rod was placed in defect A and was measured 23.6 degrees +/- 2.6 degrees downward and 87.7 degrees +/- 2.6 degrees left to right.
8YX822	The bullet travelled from left to right, entering the partition wall on the side labelled 'A' and exited from the side labelled '1'. The trajectory of this bullet was at a downward vertical angle of approximately -25 ± 5 degrees or 25 ± 5 degrees below the horizontal plane at point of entry and at an azimuth angle of approximately 89 ± 5 degrees measured from left to right (viewed facing side 'A') along the horizontal plane with left side being 0 degrees.
98MDAT	The trajectory of the shot was downwards and slightly left to right. The trajectory has been measured at approximately 25 degrees below the horizontal (+/- 5 degrees uncertainty) and approximately 3 degrees left to right (+/- 5 degrees) from the perpendicular.
9HPQDZ	The cut sample of wall submitted contains a single perforating bullet hole. The bullet entered on the surface marked "A" and exited on the surface marked "1". The bullet traveled in a downward trajectory, slightly left to right. The bullet impact is located approximately two inches from the left and three inches up from the base of the sample wall.
9TRLW6	The trajectory is described regarding 3 references planes: horizontal plane (parallel to top and bottom faces), longitudinal plane (parallel to 1 and A faces), transversal plane (perpendicular to both other planes). The bullet progressed through the box from face A (entrance hole) to 1 (exit hole) on an axis oriented downward with an angle of 25° , from horizontal plane, and slightly from left to right when following the bullet path with the angle of 1° from the transversal plane.
A3AT6T	Trajectory Analysis: The following observations and conclusions are based upon the information provided to date. Item 1 was a section of partition wall with defects on each side that was submitted for trajectory analysis. The wall was previously marked "A" on one side and "1" on the other. Visual and chemical analysis of the defects were consistent with passage of a bullet. Trajectory T1 Analysis of Trajectory T1 indicated the bullet originated on side "A" of the wall and traveled in a generally perpendicular direction at a downward angle where it perforated the wall and exited on side "1" of the wall. Processing and Enhancement Analysis: Lead Testing. A positive result indicates the presence of lead. Performed On Impact I-1 (Side "A" of the wall) - Positive Impact I-2 (Side "1" of the wall) - Negative
AGRMEX	The entrance hole in the box is representative by the letter A. The direction of travel of the bullet through the box is right to left and the measuring angle of the horizontal (Azimuth) is 90 degree and the vertical is 65 degree.
AKV9CV	Pathway J (including impacts J, J1) is consistent with a bullet traveling from side "A" to side "1", left to right, and in a downward direction.
AP4WLQ	The bullet entrance hole on the wall was the strike marked A. The bullet struck the wall at about a 24 degrees downward angle with a +/-5 degree of uncertainty and a slight right to left angle of 93 degrees with a +/-5 degree of uncertainty.
APZCV3	A shot had passed through the wall at a slight angle from left to right and at a downward angle of approximately 25 degrees from the horizontal.
ATZFRV	Two perforating defects, consistent with defects produced by a fired projectile, were observed in the submitted wall portion. Examinations of the defects were conducted in an attempt to establish the trajectory of the fired projectile's path. The following trajectory was established: Measurements and examinations of the perforating defects in the wall indicate that a fired projectile entered the 'A' side of the wall and exited the '1' side of the wall at a 25.5 degree (+/-5 degree) downward angle and at an 88.5 degree (+/-5 degree) left to right (azimuth) angle.

TABLE 4

WebCode	Conclusions
AVPMCR	Lab Item #1 (section of partition wall) was examined on 08/29/2023. I observed a perforating defect on side "A" containing apparent bullet wipe with an associated defect on side "1". The vertical angle for the defect was measured at 24 degrees (± 5 degrees) downward and the horizontal (azimuth) angle was measured at 88 degrees (± 5 degrees) left to right. The general trajectory for the defect in Lab Item #1 was side "A" to side "1", downward and left to right.
B7NPAU	According to the characteristics (shape, size, location etc) of the damages, the bullet traveled through the wooden box from left to right at an angle of 3 degrees (the azimuth is 3 degrees) and downwards at an angle of 27 degrees (the vertical angle is -27 degrees).
BZCYH9	The bullet entered on side A and exited through side 1. The azimuth angle is approximately 82 degrees from the walls surface, traveling left to right. The elevation angle is downward approximately 24 degrees from horizontal.
C7MAE9	The direction of travel of the bullet responsible for the entrance defect A and exit defect 1 was from front to back, left to right (almost orthogonal) with a downward angle.
D6J4BJ	Item AA218684 is a small wood box frame with an entrance bullet hole on Side A, and an exit bullet hole on Side 1. The bullet hole was probed and measured. The projectile was determined to have traveled 1 degree from left to right and downward at an angle of 24 degrees. All trajectory measurements have a measurement uncertainty of +/- 5 degrees.
D6JBBQ	Bullet trajectory 'A' was a perforation. The path of travel of the bullet was from the box side labeled "Test No. 23-5620 A" through to box side "Test No. 23-5620 1". The entrance hole was labeled as "A". The exit hole was labeled as "A1". The entrance hole was approximately 1 3/8" from the left edge and approximately 3 1/8" from the bottom of the box and measured 6/16" x 1/2" in size. Bullet wipe was present. The azimuth angle was approximately 2° left of perpendicular. The vertical angle was approximately 23° up from perpendicular. The path of travel of the bullet was left to right and at a downward angle.
DC7WMJ	An entry hole on side A was observed and a corresponding exit hole was observed on side 1 of the wall. The bullet entered side A of the wall from left to right, approximately 1° from the perpendicular and at a downward angle of approximately 24°.
DPVUNG	The bullet traveled at a downward angle and approximately perpendicular to side A. The bullet entered on the A side of the wood box and exited out of Side 1.
DZDFTC	Impact #1 (on side A) is a perforating entrance hole. It is roughly circular in shape and bullet wipe is present. The projectile travelled downward at a ~25 degree (+/- 5 degrees) angle, and left to right at ~89 degrees (+/- 5 degrees) from the surface of the wall/partition. Impact #2 (on side 1) is the associated perforating exit hole.
E7WZFN	One perforating bullet defect was located in the submitted wall section. The directionality of the bullet consisted of an entry on Side A and an exit on Side B. The bullet travelled in a left to right and downward directionality. The angle of incidence was measured to be 87° $\pm 5^\circ$ Horizontal and -25.0° $\pm 5^\circ$ Vertical.
EAFM24	The result of trajectory analysis 1. The size of the sample partition wall is 14.6 centimeters height 14.7 centimeters width and 7.7 centimeters depth. 2. the position of hole on label A side is above from bottom side by 7.3 centimeters and far from left side by 3.1 centimeters and the size of the hole is 9.0 centimeters width and 9.0 centimeters Height. 3. the position of hole on label 1 side is above from bottom side by 3.7 centimeters and far from left side by 11.2 centimeters and the size of the hole is 1.0 centimeters width and 2.3 centimeters Height. 4. The trajectory is from label A side to label 1 side with downward angle by 65 degrees from ground and from left to right angle by 91 degrees.
EDWHQU	Bullet defect "A" is the entry defect traveling left to right and at a downward trajectory. Bullet Defect "1" is the exit defect. All trajectories are opinions. Vertical and horizontal angles were measured from the baseline.

TABLE 4

WebCode	Conclusions
EKQKUQ	The horizontal (Azimuth) angle was measured 3 degree from perpendicular, 87 degree from left to right and 93 degree from right to left. The vertical angle was measured 22 degree downwards. The uncertainty level was measured as +/- 5 degree.
ELDTY	A suspected bullet entered the box on Side A and exited on Side 1. The suspected bullet traveled left to right at a downward angle.
EQKJ82	The projectile entered the wall partition through Side A and exited through Side 1. A possible lead wipe was observed at the top of impact on side A. The direction of travel of the projectile, was from right to left at approximately
ETLPNR	The trajectory of the bullet that created these holes was from side A to side 1, slightly left to right, and downward. The trajectory was determined using a trajectory rod and the angle was determined using a protractor and inclinometer.
ETMHLZ	The submitted partition wall was found to have a pair of defects. A single bullet likely perforated the partition wall on surface "A" and exited from surface "1". The trajectory, viewed facing surface "A", was determined to be approximately 88 degree (+/- 5 degree) from left to right, and 27 degree (+/- 5 degree) downwards.
F4PZW3	The portion of the wall examined consisted of a wooden box with four of its sides labeled as follows: "Top", "1", "A", and one side labeled with an arrow pointed up. One hole (AW-A) was observed in the side of the box labeled as "A" and one hole (AW-A exit) was in the side labeled as "1". The bullet traveled from side "A" to side "1" in a downward and slight left-to-right direction and passed through the box; this trajectory was determined relative to someone facing side "A".
F6FE3R	The projectile trajectory was from A to 1, left to right at ~ 89 deg and downward ~ -25deg.
FRT87R	The fired bullet that impacted the substrate at area of damage 'A' had a left to right angle of approximately 87 degrees and a downward trajectory of approximately 25 degrees.
FYPQL2	The bullet generated the following trajectory in the piece of wood: from outside to inside, from right to left, from front to back and downward.
GE4EDB	The side of the box with the label that read, "Test No. 22-5620 A" had an oval hole that had gray material around the top margins of the defect and most of the wood fibers/particles were pushing inward. This hole was determined to be the entrance hole. The side of the box with the label that read, "Test No. 22-5620 1" had an oval hole with most of the wood fibers/particles pushing outward. This hole was determined to be the exit hole. The location of the damage was measured. A trajectory probe was placed through the two holes to determine the bullet path. Facing the "A" side of the box with the "TOP" side up, the projectile had travelled slightly left to right, and downward through the wall.
GHWFC4	Item AD is a wooden box with perforating bullet damage that entered on side A and exited on side 1. The bullet trajectory was two degrees from left to right and twenty-four degrees downward from horizontal. Degree measurements in this report are included for descriptive purposes only and are not quantitative forensic results.
GPJ9LH	As requested by Detective xxxxx, Item xxxxx1 was processed for shooting reconstruction evidence. The following defects were located and documented: A: A perforation located on "Side A" of the box. Defect "A" is an entrance hole exhibiting wood material pushed inward and possible lead wipe on the upper edge. "A" is located 2 3/4 inches up from the bottom and 1 3/4 inches right of the left edge. The defect exhibited a downward and slightly left to right directionality measuring at approximately 88 degrees horizontal (azimuth) and approximately 24.5 degrees vertical. A1: An exit hold related to "A" located 1 1/4 inches up from the bottom edge and 2 inches left of the right edge of "Side 1".
GPV6RM	The box has sustained perforating damage caused by a bullet entering side A and exiting side 1. The track is left-right, and downwards.

TABLE 4

WebCode	Conclusions
HF64Q4	When viewed from side "A" of the submitted partition wall section: One semi-circular, perforating entrance defect with a smooth margin around the outside edge, in the side labeled "A" of the submitted partition wall section. A gray in color shoulder is visible around the periphery of the upper portion of the defect. The defect at the outer margin measures approximately 8 mm x 9 mm. The defect's center is approximately 4.6 cm from the left side and approximately 7.6 cm upward from the bottom. When viewed from the opposite side, labeled "1", of the submitted partition wall section: One generally oval, perforating exit defect. The perimeter of the defect has wood broken away from the surface at the periphery, with a rough margin, and wood protruding outward at the upper margin. The hole in the defect at the outer surface measures approximately 5 mm x 3 mm. Damaged wood at the defect's periphery measures approximately 2.2 cm x 1.1 cm. The center of the hole is approximately 69.8 cm from the left side and approximately 4 cm upward from the bottom. Trajectory is side "A" to side "1", left to right and downward: Horizontal angle approximately 88 degrees left to right, +/- 5 degrees; vertical angle approximately 23 degrees upward from the horizontal plane, +/- 5 degrees. Angles were determined using a trajectory rod centered via centering cones through the corresponding entrance and exit defects. An angle finder was utilized to determine the vertical angle and a 180 degree protractor and plumb bob were used to determine the horizontal angle.
J6YGCC	Impacts had a possible projectile path beginning with a perforating impact (Side A) before perforating (Side 1). Projectile path angle was determined to be in the left to right direction at 88 degrees and in a downward direction at 26 degrees.
J8C99Y	From the shooter's perspective, the shot was fired in a left to right, and downward direction.
JJ6CVD	The path of the bullet indicates entry on side "A" & exit on side "1", traveling left to right at an approximate 24 degree downward angle and an approximate 87 degree horizontal angle.
JJP96T	Pathway A (including impacts A, A1) is consistent with a bullet traveling from side "A" to side "1", left to right, and in a downward direction.
JWD9XF	A perforating entrance bullet defect was in "Side A" of the wood block. The bullet associated with this defect traveled slightly left to right and downward with an elevation angle of $24.5^\circ \pm 2.6^\circ$ and an azimuth angle of $87.8^\circ \pm 2.6^\circ$. All reported azimuth and vertical angles were measured from fitted trajectory rods scanned using a Trimble X7 3D laser scanner. The reported uncertainty for azimuth and vertical angles measured from the trajectory rods is expanded using a coverage factor $k=2$ for a level of confidence of approximately 95%, assuming a normal distribution. The expanded uncertainty represents the uncertainty of the 3D laser scanning method of measuring azimuth and vertical angles from trajectory rods only. Bullet trajectories were assumed to have traveled in a straight line and were not considered to have been significantly affected by any intervening object.
KCGCPK	A perforating defect into a wall approximately 6.5 cm down from the top edge (A side) and approximately 5 cm in from the left edge (A side). Bullet wipe is observed. The entrance defect measured approximately 9mm in width and 8mm in length. The trajectory travels from left to right and downward. The vertical angle is approximately 62 degrees and the azimuth is approximately 85 degrees using a trajectory rod. The trig method produced an approximate angle of 62 degrees.
KDECXX	Bullet path A entered the wall at a downward angle moving slightly from left to right as you face the A side of the wall.
L47A76	Using a trajectory rod, I probed the apparent trajectory path of the bullet. I determined that the direction of travel of the bullet through the section of the wall was downward with a slight left to right angle.

TABLE 4

WebCode	Conclusions
LE8MBC	A perforating entrance bullet defect was to Side A of the wooden box. The bullet exited Side 1 of the box. The direction of travel of the bullet associated with this defect was slightly left to right and downward. The trajectory was measured with an elevation angle of 24.4 degrees (+/- 2.6 degrees) downward and an azimuth angle of 88.7 degrees (+/- 2.6 degrees) from the left side of the box. All reported azimuth and vertical angles were measured from fitted trajectory rods scanned using a Trimble X7 3D laser scanner. The reported uncertainty for azimuth and vertical angles measured from the trajectory rods is expanded using a coverage factor k=2 for a level of confidence of approximately 95%, assuming a normal distribution. The expanded uncertainty represents the uncertainty of the 3D laser scanning method of measuring azimuth and vertical angles from trajectory rods only.
LEZJTE	Note: Positive vertical angles represent an upward trajectory while negative vertical angles represent a downward trajectory. In addition, horizontal angles were measured left to right (at defect A). Defect A: Partition wall This bullet perforated the wooden wall at defect A (primary impact) and traveled downward perforating the wooden wall at defect 1 (secondary impact). The bullet path had a vertical angle of -24 degrees and a horizontal angle of 87 degrees.
LL2T4D	An entrance bullet defect was to side A of the wall section with a corresponding exit defect to side 1. The bullet's direction of travel was downward and left to right. The trajectory was measured with a vertical angle of 25.6 +/- 2.6 degrees (downward) and an azimuth angle of 88.1 +/- 2.6 degrees (from left). All reported azimuth and vertical angles were measured from fitted trajectory rods scanned using a Trimble X7 3D laser scanner. The reported uncertainty for azimuth and vertical angles measured from the trajectory rods is expanded using a coverage factor k=2 for a level of confidence of approximately 95%, assuming a normal distribution. The expanded uncertainty represents the uncertainty of the 3D laser scanning method of measuring azimuth and vertical angles from trajectory rods only.
LT6CCX	The perforating defect entered the wall at an angle of approximately 25 degrees +/- 2 downward and 2 degrees +/- 2 from left to right.
M7NNA6	The vertical angle is 25 degrees above the horizontal plane with a downward trajectory. The horizontal angle is 88 degrees out of the struck plane with a left to right track.
MEHU8D	Defect A: This bullet perforated the box from defect A (primary impact) through defect 1. The bullet path has a horizontal angle of 87 degrees and a vertical angle of -26 degrees. Note: Horizontal (azimuth) angles were measured from left to right in relation to side labeled A. Positive vertical angles represent an upward trajectory while negative angles represent a downward trajectory.
N8E8QW	I examined item AD, a wooden rectangular box (the "section of a partition wall"). Item AD was labeled "A" and "1" on opposite sides. Side A has a hole in it that is characteristic of bullet entrance holes: bullet wipe around the hole margins and wood fibers pushed into the "wall". Side 1 has a hole in it that is characteristic of a bullet exit hole: wood fibers appear pushed out of the hole, and other wood damage in the outward direction from the hole. I photo-documented the holes and measured their placement on the "wall" section. I gently inserted a trajectory rod through holes A and 1. I measured the vertical angle and the horizontal/azimuth angles of the trajectory rod. Based on these measurements the bullet passed through the "wall" from side A to side 1, with a downward angle of approximately 23 degrees and a slight left to right horizontal angle of 91 degree (measured right to left from the plane of the wall). The angles reported are used as a description and are not meant to be interpreted as a qualitative forensic result.
NWWVEK	Trajectory was established by using a probe inserted through two sequential holes made by the same projectile. Once the probe was inserted, I measured the vertical angle (upward or downward) in relation to the horizontal plane, and the azimuth (horizontal angle). The azimuth angle is reported as left to right or right to left, based on the shooter's perspective. Projectile Trajectory A: Projectile entered the surface marked 'A' downward at 22° (±5°) and from left to right at 87° (±5°), based on the shooter's perspective.
P4QC82	One shot, entering side A and exiting side 1. The source of the shot was facing side A, from left to right at a downward angle.

TABLE 4

WebCode	Conclusions
P68BKY	The entrance hole is located at A. The shot was fired from right to left with a horizontal angle of 3° and from top to bottom with a vertical angle of 24°.
PG4BKH	The projectile perforating the wall has entered the side marked A and has exited through the side marked 1. The projectile was traveling from left to right and downwards.
PVE4Z9	BS A is a perforating entrance hole on side A of partition. BS A has a vertical angle of approximately 22 degrees downward and an azimuth angle of approximately 90 degrees travelling from side A to side 1.
PWUH8H	A wooden box on a table in the Crime Scene area had one apparent bullet impact (Label A) that perforated the box. The trajectory of the bullet that created the hole was from left to right when facing Side A and downward. The trajectory was determined using a trajectory rod and the angle was determined using a protractor and inclinometer.
R2UHHW	The cube had a hole that appeared to move from the side previously labeled A to the opposite side. The hole on side A appeared to move perpendicularly at a slightly downward angle.
RFW8GH	Horizontal angle: 88 degrees; uncertainty -5 degrees and +2 degrees Vertical angle: 23 degrees +/- 5 degrees
RKAERG	Side A of section of wall has what appears to be an entrance bullet hole, and side 1 has what appears to be an exit bullet hole. The bullet path is downward and slightly left to right. The vertical angle is approximately 25 degrees (downward) and the horizontal angle is approximately 88 degrees left to right from the perspective of the shooter.
RRC8HZ	The box is damaged by one bullet, approx. diameter - 7-8 millimeters. The direction of the bullet is from "A" to "1". The lesion is directed from the top to bottom with 25 degrees and from the left to right with 5 degrees.
RZ73BA	On 8/24/2023, Lab Item #1 was examined and measured for trajectory analysis. A circular defect with apparent bullet wipe was observed on the "A" side of the wall, indicating an "A" side to "1" side trajectory. A downward trajectory of 23 degrees (+/- 5 degrees) was measured. The Horizontal (Azimuth) angle was measured at 87 degrees (+/- 5 degrees) left to right. The general trajectory of the defect in Lab Item #1 was downward, left to right, and "A" side to "1" side.
T2R946	A sealed, cardboard box labeled "Test No. 23-5620: Shooting Reconstruction: Angle Determination, Sample Pack AD", contained a constructed wooden box. This was reportedly "a section of a partition wall in which a shooting took place." The wooden box had one (1) suspected bullet hole in each of the wooden squares that were labeled as "A" and "1". One edge of the wooden box was labeled "Top" for orientation purposes and the narrower side had what looked like a black marker arrow drawn on it. When looking at the wooden box from side "A" with "Top" positioned accordingly, the trajectory appeared to be from side "A" to side "1," left to right, and at a downward angle. Photographs of the entire wooden box were taken with/without scales and the trajectory rod.
TLZ7R8	A perforating bullet defect was in the wooden box. The bullet entered on side A and exited on side 1. The directionality of the bullet was downwards and very slightly left to right. The azimuth angle measured 88.9° in the left to right direction, and the vertical angle measured 24.8° in the downward direction. Both of these measurements contain uncertainty of ± 2.6 ° (k=2, 95% confidence level).
TNPMYU	22 degrees above the horizontal plane and 1 degree left of the vertical plane. The path of the projectile appeared to have originated slightly from the left at a downward angle. All measurements are approximate and descriptive in nature and do not describe a test result. All holes located exhibited the appearance, behavior, and context consistent with bullet holes.
TQCGFV	Item AA218682 consisted of a section of partition wall that had a hole on each side. A bullet entry hole was located on the side of the wall labeled A. A bullet exit hole was located on the side of the wall labeled 1. The bullet that struck the wall entered the front side at a downward angle of 23 degrees, traveling from left to right at an angle of 2 degrees from the perpendicular, and exited out the back of the wall. All trajectory measurements have an inherent +/- 5° variance.

TABLE 4

WebCode	Conclusions
TUVBJM	Two corresponding bullet holes, labeled as A (A1) & 1 (A2) were on the wall section. The bullet entered the wall section on side A (A1), traveled in a downward direction from left to right, and exited the wall section on side 1 (A2).
U26U3R	The bullet struck the wall 7 cm below the top edge and 5 cm to the right of the left edge of the wall. The bullet was traveling downward at an approximately 23 degree angle from horizontal and from left to right, at an approximately 89 degree angle from the wall surface.
U7KRME	The bullet entry hole is located at the "A" face of the box and the exit hole is located at the "1" face of the box. The angle of entrance is from left to right in an angle of 85 (+/- 5) degrees (zero degrees defined as the box plane from left to right) and downward in an angle of 24 (+/- 5) degrees (zero degrees defined as the horizontal plane).
UFPFZK	A trajectory rod was inserted in the bullet path labeled A. The bullet entered at a downward angle and traveled slightly from left to right.
UGLPHN	The bullet entered side labeled (A) of the box and exited the side labeled (1). The horizontal angle measurement is (89±5) degree from Left to Right and the vertical angle downward measurement is (66±5) degree.
UNFUBP	The bullet traveled through the partition wall from side A to side 1 at a downward angle of approximately 26 degrees from the horizontal and at a left to right angle of approximately 3 degrees from the perpendicular of the wall surface.
VNYXJQ	The holes in sides A and 1 are consistent with the passage of a single bullet. The bullet entered the wooden box/partition on side A and exited through side 1. When the bullet struck side A, it was traveling downward (up to down) and from left to right (as facing side A). I measured the horizontal angle to be approximately 87 degrees (from the left side of the box as facing side A) and the downward angle to be approximately 25 degrees. Any reported measurements are approximate and for descriptive purposes only. The measurements are not to be considered quantitative forensic test results.
VTYRC	After a visual inspection, a perforation with an exit was identified. The trajectory of the hole is from right to left and downwards. Its vertical angle is 67 and its horizontal angle is 87.
W6HLDX	The item had what appeared to be a perforating bullet defect. "A" appeared to be the entrance defect on the section of the partition wall. "1" appeared to be the exit defect on the section of the partition wall. The direction of travel of the projectile appeared to be slightly from left to right in a downward angle. The horizontal angle of impact was approximately 89 degrees (+/-5) and the vertical angle of impact was approximately 23 degrees (+/-5).
W9XAVA	The bullet perforated the box 70mm above the lower edge and 60mm to the right of the left edge of the box. The vertical angle (elevation angle) of the bullet's trajectory was 25.2 degrees (±2.6 degrees) downward, and the azimuth angle was 87.5 degrees (±2.6 degrees) as one views the box. The bullet's direction of travel was from side "A" to side "1", left to right, and downward.
WBP862	The [Laboratory], staffed by Scientist [Name], responded to the Vehicle Processing Room of the [Name] building, located at [Address] at approximately 10:51 on September 18, 2023, to process the partition wall (Laboratory Item #1). The wall was labeled with "top", "A" side and "1" side. A suspected bullet hole was observed to enter on the "A" side of the wall and exit the "1" side in a downward and slightly left to right direction. These two (2) suspected bullet holes were documented with overall photographs and scaled photographs, and then again with a trajectory rod in place. No additional evidence was discovered and the [Laboratory] departed the scene at approximately 11:26.
WDTZ47	Pathway A (including impacts A1, A2) is consistent with a bullet traveling from side A to side 1, left to right, and in a downward direction.
XUGBQ9	As we don't have reporting criteria, trajectory would be reported as "Approximate trajectory measurements recorded with directionality from left to right, downward".

TABLE 4

WebCode	Conclusions
XXHJUJ	Bullet path A, entered the front of the wooden box and traveled at a downward angle from left to right.
YATCZ6	Pathway MG (including impacts MG, MG1) is consistent with a bullet traveling from side A to side 1, left to right, and in a downward direction.
YGMGT7	[No Conclusions Reported.]
Z4FXNJ	The bullet path is consistent with a bullet that entered side A of the wall section and exited side 1 with a downward angle of approximately 25 degrees from horizontal and traveling from left to right at an angle of approximately 88 degrees from the wall surface.
ZF9CTL	The direction of travel of the fired bullet originated from the side labelled, "A", exiting the side labelled, "1". The fired bullet travelled at a downward angle of 25 degrees, with a horizontal (azimuth) angle of 87 degrees, left to right.
ZFKBJP	Letter A is an apparent bullet hole entrance with an angle on 23.8 degrees downward and 87.8 degrees left to right direction of travel.
ZPYZL4	A perforating hole type defect was observed in the wall which is consistent with the passage of a projectile. The projectile entered the "A Side" of the wall and exited the "1 Side" of the wall. The projectile penetrated the wall at a downward angle of approximately 25 degrees and at a slightly left to right direction of approximately 88 degrees.

Additional Comments

TABLE 5

WebCode	Additional Comments
2RXTUT	Measurement uncertainty values have been calculated by the [Laboratory] as an expanded uncertainty at the 95.45% confidence level (k=2). Those values are less than the industry standard accepted variance of ± 5 degrees, therefore the [Laboratory] utilizes ± 5 degrees of variance. Measurement uncertainty values are available upon request.
48QZA7	Bullet wipe noted on A side.
4BK28D	Bullet wipe present at the entrance hole (label A)
6DKUEG	Test conducted with timber box on work bench. Level status of box on bench checked with spirit level. Angles recorded using BU TRK 2 Trajectory Rod Set with EVI-PAQ angle finder fitted to rod, and protractor / plumb bob used for azimuth angle
6GJX9A	The features in the entrance and exit holes in the box, allows to identify the entrance and exit of the holes, determining the direction from right to left, from up to down. It was not possible to determine the down, up, back and front side of the box for lacking of information. The procedure do not determinate patterns.
7MTHU2	Utilized the NATO convention when describing the incident angle (88 degree azimuth angle). The vertical angle could also be described as a negative angle (-25 degrees), but it is not necessary to include the minus sign when describing the bullet path as having a downward (or descending) trajectory.
8PBZPR	The reported uncertainty for trajectory angles is expanded using a coverage factor k=2 for a level of confidence of approximately 95%, assuming a normal distribution. The expanded uncertainty represents the uncertainty of the 3D scanner method of measuring trajectory angles only.
B7NPAU	The bullet used was probably caliber 9 mm.
BZCYH9	The angles reported are used as descriptors and not meant to be interpreted as quantitative forensic test results
C7MAE9	Laboratory does not have a measured UM and does not include measured angles in the report; only directionality.
DPVUNG	I checked the box "left to right" direction since the measured angle was 88 degrees, but would report as "approximately perpendicular to side A".
GPJ9LH	Our laboratory does not report measurement uncertainty.
GPV6RM	When comparing results from different laboratories, some additional uncertainty could be expected due to test sample differences.
J6YGCC	All measurements are approximate.
JJ6CVD	A - entry due to lead wipe 1 - exit due to splintering outward
KDECXX	The area to report uncertainty (in degrees) was intentionally left blank. We do not include the angles in our report per our standard operating procedures and our unit does not calculate uncertainty of measurement for angle determination.
N8E8QW	[Laboratory] does not report a measurement uncertainty for trajectory measurements. As stated in the last sentence, trajectory reconstructions are descriptive in nature. We also do not have an established, informal range of measurement reporting (such as plus or minus 5 degrees) in our procedures. Therefore, I did not report a range.
PG4BKH	The value of the azimuth angle that has been provided in my response represents the angle between the rod and the surface of the wall. The value of the vertical angle that has been provided in my response represents the angle between the rod and a perpendicular line drawn out from the entry point. The negative value represents a downward angle.

TABLE 5

WebCode	Additional Comments
PVE4Z9	An option of right to left was not selected as my azimuth angle was 90 degrees, orthogonal to the wall partition on side A.
T2R946	This laboratory does not determine or report angle measurements.
TLZ7R8	All reported azimuth and vertical angles were measured from fitted trajectory rods scanned using a Trimble X7 3D laser scanner. The reported uncertainty for azimuth and vertical angles measured from the trajectory rods is expanded using a coverage factor $k=2$ for a level of confidence of approximately 95%, assuming a normal distribution. The expanded uncertainty represents the uncertainty of the 3D laser scanning method of measuring azimuth and vertical angles from trajectory rods only.
TNPMYU	I would use directionality when reporting my answers by using North, South, East, and West rather than left/right for on scene bullet holes.
TUVBJM	No response provided for horizontal/vertical angles in degrees of uncertainty. Crime Scene does not calculate measurements of uncertainty for angle determination; thus these fields are left blank.
U26U3R	The distances and angles reported are used as a description and are not meant to be interpreted as a quantitative forensic test result.
UFPFZK	Angles are not reported per our standard operating procedures and our unit does not calculate the uncertainty of measurement for angle determination; therefore the uncertainty of measurement fields are left blank.
VNYXJQ	1. We do not report uncertainty with these measurements, so I wrote "n/a" in the box. 2. The box was not level due the bottom being uneven or warped (confirmed with a bubble level). The box had a slight wobble even on a level surface. It did not seem to have a significant effect on the vertical angle measurement, but it causes concern since it is a quality issue with a proficiency test. 3. The hole in side A of Item 1 is too small for a centering cone. An ~ 0.20 " diameter rod fit easily through the entrance and exit holes, but it is too small to be at the center of the hole. The next size up rod has a diameter of ~ 0.25 " and it is able to be placed through the entrance hole, but it is too large to travel completely through the exit hole without causing damage. I measured the vertical angle with each of these rods and had a difference of 2 - 3 degrees. This reinforces that the reported angle measurements should be reported as estimates and not absolute values.
W9XAVA	The reported uncertainty of trajectory angles is expanded using a coverage factor of $k=2$ for a level of confidence of 95%, assuming normal distribution.
XXHJUU	Angles are not reported per our operating procedures. We do not report on uncertainty of measurements per our standard operating procedures.
Z4FXNJ	The angles reported are used as descriptors and are not meant to be interpreted as quantitative forensic test results. For this reason, the Laboratory does not report an angle measurement uncertainty.
ZF9CTL	Examination took place on level ground. EVI-PAQ level and angle finder and trajectory rods utilised. Examination also recorded photographically.

-End of Report-
(Appendix may follow)

Test No. 23-5620: Shooting Reconstruction - Angle Determination

DATA MUST BE SUBMITTED BY **Oct. 10, 2023, 11:59 p.m. EDT** TO BE INCLUDED IN THE REPORT

Participant Code: U1234A

WebCode: HPKKVK

Scenario:

Investigators have submitted a section of a partition wall in which a shooting took place. They are asking you to conduct your analysis using your laboratory's procedures.

Please note:

-For this exercise, the sample contains a TOP label for orientation purposes.

-The sample has been labeled with two different characters (A and 1) in which participants can use as reference in reporting.

-Make sure to place the sample on a flat surface when measuring angles.

Items Submitted (Sample Pack AD):

Item 1: A section of the partition wall which contains one entrance hole and one exit hole.

1.) Which label on the box represents the entrance hole?

- A 1

2.) What is the direction of travel of the bullet through the box? (Select one from each column)

- | | |
|-------------------------------------|--------------------------------|
| <input type="radio"/> Left to Right | <input type="radio"/> Upward |
| <input type="radio"/> Right to Left | <input type="radio"/> Downward |

3.) Please record your angles below. (If the angle type below differs from your normal terminology, you may use your preferred terminology in the conclusions section of the data sheet.)

Angle Type (i.e. Azimuth, Vertical, Horizontal)	Angle Measurement (in degrees)		Uncertainty (in degrees)
Horizontal (Azimuth)	<input type="text"/>	±	<input type="text"/>
Vertical	<input type="text"/>	±	<input type="text"/>

Please note: Any additional formatting applied in the free form space below will not transfer to the Summary Report and may cause your information to be illegible. This includes additional spacing and returns that present your responses in lists and tabular formats.

4.) What would be the wording of the Conclusions in your report?

5.) Additional Comments

RELEASE OF DATA TO ACCREDITATION BODIES

The Accreditation Release is accessed by pressing the "Continue to Final Submission" button online and can be completed at any time prior to submission to CTS.

CTS submits external proficiency test data directly to ASCLD/LAB, ANAB, and/or A2LA. Please select one of the following statements to ensure your data is handled appropriately.

- This participant's data is intended for submission to ASCLD/LAB, ANAB, and/or A2LA. (Accreditation Release section below must be completed.)
- This participant's data is **not** intended for submission to ASCLD/LAB, ANAB, and/or A2LA.

Have the laboratory's designated individual complete the following steps only if your laboratory is accredited in this testing/calibration discipline by one or more of the following Accreditation Bodies.

Step 1: Provide the applicable Accreditation Certificate Number(s) for your laboratory.

ANAB Certificate No.
(Include ASCLD/LAB Certificate here)

A2LA Certificate No.

Step 2: Complete the Laboratory Identifying Information in its entirety.

Authorized Contact Person and Title

Laboratory Name

Location (City/State)