ShotTrack VoD Monitor



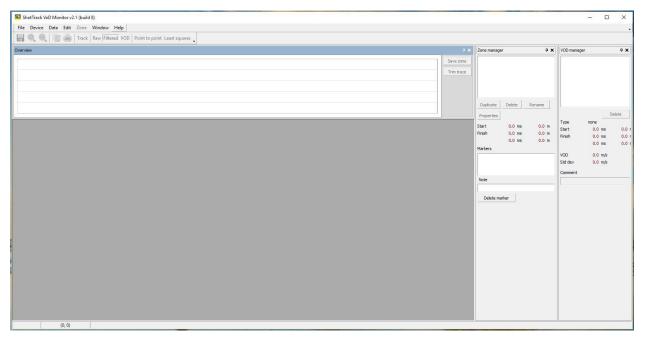
Operation Guide

USB download data operation:

Plug unit into USB Port with the supplied cable.

After the USB is recognized "double PC tone" is heard

Double click on the ShotTrack VoD Monitor Icon.



Clicking on Device will connect to the unit.

elect device	USB device		Ŧ	Ð		
ISB connection			Connected	l.		
Device					Connected	-
Connected	V6R1.4	•	Ref	fresh		
Display units	Metres	•	Set	units		
Repeat	0		Setr	repeat		
	1					
Time and Date						
26 June 2019		12:00:09	9	Set RTC		
Cable factor						
		8.594	Set cab	ole factor		
Select standard		8.594 👤	Set cab	ole factor		
				•		
		8.594 🔹	Set cab	Real		
	cable	Add		 Delete		
Select standard Cable length	cable	Add m Cable	Edit	Delete		
Select standard Cable length	cable	Add m Cable	Edit factor not de	Delete		
Select standard Cable length	cable	Add m Cable	Edit factor not de	Delete		
Select standard Cable length	cable 305.00 🔹	Add m Cable	Edit factor not de	Delete		

This screen is used to check the Battery condition, disk usage, version and revision of the software.

This is also where cable calibration is done. See later description.

Close this screen.

Click on Data:

Read ShotTrack	×
Select device	
Files	
	Directory
	Erase ALL
Disk usage 2/127	
Battery 50%	
Read file	
Connected Revision Ver 4, Rev 1.1 RTC clock 2/03/2016 1:00:27 AM Calibration factor 8.272	
	*
OK	Cancel

Disk usage, Battery condition, Revision version, RTC time and date, and current Calibration factor is displayed. Click on Directory

Read ShotTrack	×
Select device 🔹 🚱	
Files VoD001, 2/03/2016 12:15:15 AM VoD002, 2/03/2016 12:17:33 AM	Directory
	Erase ALL
Disk usage 2/127 Battery 50%	
Read file	
Connected Revision Ver 4, Rev 1.1 RTC clock 2/03/2016 1:00:27 AM Calibration factor 8.272 Finished.	
	-
c	K Cancel

The files currently stored on the unit is displayed in the Files dialog.

In this case there are two files stored on the 2nd March 2016 at 12:15:15 AM and 12:17:33 AM

These times are UTC format. They are acquired from the GPS module and will be accurate to a second if the GPS has "visible satellite reception". Otherwise it will be the time and date stored in the GPS modules RTC.

Click on file wanted and select read File.

Read ShotTrack					\times
Select device		Ŧ	θ		
Files					
	2016 12:15:15 AM 2016 12:17:33 AM			Directory	
100002, 2103	2010 12.17.35 AM			Erase ALL	
Disk usage	2/127]			
Battery	50 <mark>%</mark>				
Read file				Time remaining	3 sec
Calibration factor Finished. UNIT=STVOD00 \$GNRMC,00151 STime=00:14:20 HW=V6R1.0Ter	2016 1:00:27 AM or 8.272	=00:15:15TDate = 50Len = 2.1259e +(02,03,16FW=V	'4R1.1	•
Stop			OK	Cance	

The file data header information is displayed and the data is downloaded with the progress bar showing the download progress.

Clicking OK will display the file in the overview window.

Peak 0.0 m Heaters Image: Im	0 -0 -1		Filtered VOD Point to point	nt Least squares										
											* ×	Zone manag	jer	
		~									Save zone			
Spatial 0.0 m Pault 0.0 m Hatters											Trim trace			
Spatial 0.0 m Pault 0.0 m Hatters														
Spatial 0.0 m Pault 0.0 m Hatters		12:15	12:15	12:15	12:15	12-15	1215	12:15	12:15	12:15				
Spatial 0.0 m Pault 0.0 m Hatters		1964	1007 #		ġ	10	21	12		21 4 1		Duplicate	Delete	Rename
Peak 0.0 ms Haitars		43	3	3	3	3	3	3	3	3		Properties		
0.0 m Haitm Haitm Hoite Hoite main Uble main VO Banager VO Banager Sari Sari 0.0 m Note Sari 0.0 m Note Sari 1.0 m Note Note Sari Note Sari Note Sari Note Sa												Start	0.0 ms	0.0
Helder Helder Note Uter Define molter VOD Manager VOD Alanger Statt Statt 0.0 ms Period 0.0 ms VOD 0.0 ms												Finish		0.0
Note Defer main VOD Manager Start 0.0 m Wah 0.0 m VoD Autoport 0.0 m													0.0 ms	0.0
Deter main VOD Manager Start 0.0 m Voh 0.0 m Vob 0.0 m Vob 0.0 m Vob 0.0 m														
Deter main VOD Manager Start Start Noh														
Deter main VOD Manager Start Start Noh												Note		
VOD Manager Tops none Start 0.0 m Preh 0.0 m 0.0 m 0.0 m V0D 0.0 m Start 0.0 m														
Tige nom Start 0.0 m Start 0.0 m 0.0 m 0.0 m VOD 0.0 m/h Staft 0.0 m/h Staft 0.0 m/h Staft 0.0 m/h												Delete m	arker	
Tige nom Start 0.0 m Start 0.0 m 0.0 m 0.0 m VDD 0.0 m Start 0.0 m														
Sect 0.0 ms Part 0.0 ms Part 0.0 ms 0.0 ms 0.0 ms VOD 0.0 ms State 0.0 ms State 0.0 ms												VOD Man	ager	
Sect 0.0 ms Part 0.0 ms Part 0.0 ms 0.0 ms 0.0 ms VOD 0.0 ms State 0.0 ms State 0.0 ms														
Sect 0.0 ms Part 0.0 ms Part 0.0 ms 0.0 ms 0.0 ms VOD 0.0 ms State 0.0 ms State 0.0 ms														
Sect 0.0 m Part 0.0 m Part 0.0 m Out 0.0 m VOD 0.0 m/c State 0.0 m/c State 0.0 m/c														
Sect 0.0 m Part 0.0 m Part 0.0 m Out 0.0 m VOD 0.0 m/c State 0.0 m/c State 0.0 m/c														
Sect 0.0 ms Part 0.0 ms Part 0.0 ms 0.0 ms 0.0 ms VOD 0.0 ms State 0.0 ms State 0.0 ms														
Presh 0.0 ms 0.0 ms 0.0 ms VOD 0.0 mp Std dev 0.0 mp														
0.0 ma VOD 0.0 mje Sadav 0.0 mje												Туре	none	
VOD 0.0 m/s Sid dev 0.0 m/s												Start	0.0 ms	0.0
Stider 0.0 m/s												Start	0.0 ms 0.0 ms	0.0
												Start Finish	0.0 ms 0.0 ms 0.0 ms	0.0
												Start Finish VOD	0.0 ms 0.0 ms 0.0 ms 0.0 m/s	0.0
												Start Pinish VOD Std dev	0.0 ms 0.0 ms 0.0 ms 0.0 m/s	0.0
												Start Pinish VOD Std dev	0.0 ms 0.0 ms 0.0 ms 0.0 m/s	0.
												Start Pinish VOD Std dev	0.0 ms 0.0 ms 0.0 ms 0.0 m/s	0
												Start Pinish VOD Std dev	0.0 ms 0.0 ms 0.0 ms 0.0 m/s	0.
												Start Pinish VOD Std dev	0.0 ms 0.0 ms 0.0 ms 0.0 m/s	0.
												Start Pinish VOD Std dev	0.0 ms 0.0 ms 0.0 ms 0.0 m/s	1 0.0 0.0

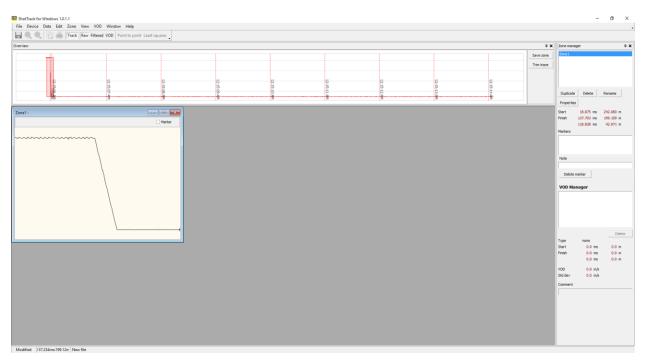
In this case this is one of our "Test Shot Equipment" files and uses a custom slope generator unit to mimic a shot. The unit is set to 64 KHz sample rate for this test.

As can be seen the GPS PPS data is displayed as a marker in the overview bar.

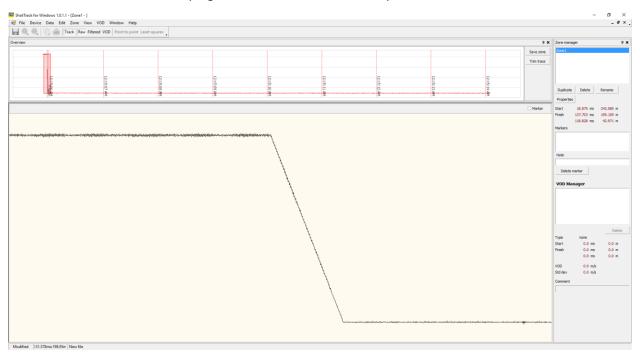
Select the region of interest by dragging the cursor from left to right with the right mouse button pressed.

File Device Data Edit Zone	Window Help								
🚽 🍳 🔍 👘 🎃 Track	Raw Filtered VOD Point to point	nt Least squares							
erview									ą
									Save zone
									Trim trac
			14 50				1		
15	5	15	15	5	10	15	15	15	
1962	07 A	8.4	9 2	10 4	12	12 2	ii a	14 2	
	3	3	3	3	3	3	3	3	

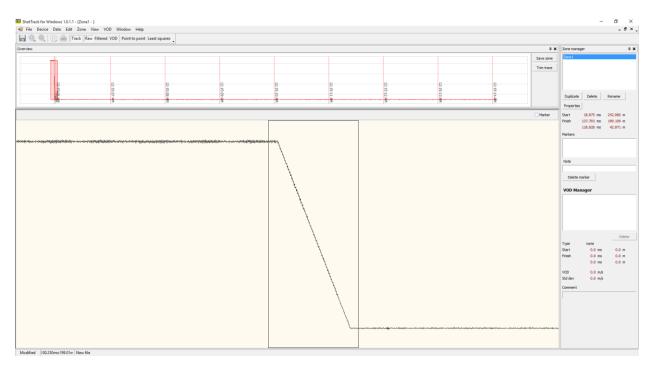
Clicking on Save zone will select a window with this "zone of interest"



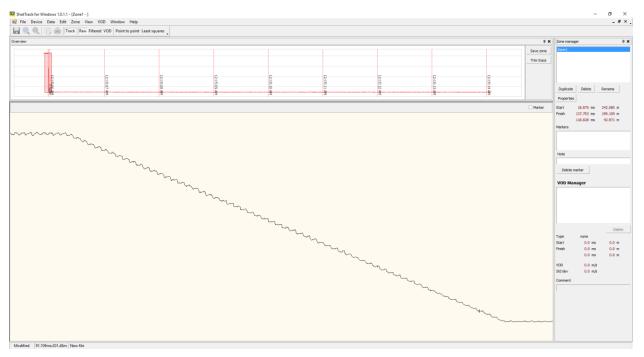
Click on the maximize button top right hand side of window will expand it to fill the main window



Drag a window over the area of interest:



Right click the mouse and select Trim region to get the area of interest.



Select File/Save as

-	🗖 Save ShotTrack 4 d	ata file						×
	$\leftarrow \rightarrow \land \uparrow$	« Dropbox > ShotTrack Commissioning > Sho	otTrack VoD Mini > VOD0000	1	✓ [™]	Search VOD00001		٩
	Organise 👻 New	w folder						•
	🌄 ShotTrackPub	lic ^ Name	Date modified	Туре	Size			
-	💒 Stefan 🍶 SVN_Projects 🌄 Websites	Slope_Test_Harmony_1_06_2.svm	2/03/2016 10:45 AM	SVM File	305 KE	}		-
	 OneDrive Apps Documents Music Outlook Files Pictures Projects 	•						
	File <u>n</u> ame:	Slope_Test_Harmony_1_7_0ksvm						~
	Save as <u>t</u> ype:	ShotTrack 4 files (*.svm)						~
	∧ Hide Folders				[<u>S</u> ave	Cancel	

Browse to where you want to save the file and click Save.

File analysis

Open ShotTrack VoD Monitor and click on File/Open.

Navigate to the location you have saved the file you wish to analyze (you can do this immediately after downloading the data from the unit without opening the file).

Choose the file and click Open.

- 🙆 (Open ShotTrack 4	data file						×
÷	→ • ↑ 📙	« Project	s > ShotTrack > VoD_Mini > Software > I	Documentation > Sar	nple Data 🗸 🗸	Ū S	Search Sample Data	R
Or	ganise 🔻 🛛 Ne	w folder						•
	J ShotTrackPriv	ate ^ N	lame	Date modified	Type Siz	te		
	🌏 ShotTrackPub	lic	Sample Shot 1.svm	18/02/2016 3:05 PM	SVM File	28 KE	3	
	👫 Stefan						-	
	SVN_Projects							
	Websites							
4	CneDrive							_
	o Apps							
	o Documents							
	👧 Music							
	👧 Outlook Files							
	Pictures							
	Projects							
9	This PC							_
4	Network	~						
		File <u>n</u> ame:	Sample Shot 1.svm			~	ShotTrack 4 files (*.svm)	~
			· · ·				<u>O</u> pen Cancel	

The file is loaded and the overview window shows the events captured along with the PPS markers.

29 ShetTrack for Windows - Cl/Projects/ShotTrack/WeD_Mini/SoftwareLDocumentation/Sample Data/Sample Shot Lown		- 0	×
File Device Data Edit Zone Window Help			
🔛 🔍 🔍 🕅 👘 👘 Track Raw (Fittered VOD) Points paint Least squares			
Overview 3 X	Zone manager		0 ×
Swe and			
La Trimbac			-
			_
	Duplicate Delete	e Rename	
	Properties		
			m m
			m
	Markers		
			_
	Note		
	Delete marker		
	VOD Manager		
			_
			elete
		squares ms	m
			m
			m
		m/s m/s	
	Comment		
(0, 0) Opened file Sample Shot Lawn			_

Enter Shot properties:

If this hasn't been done when loading the data from the unit, the Shot properties should be entered now.

From the task bar select Edit/Shot properties

Edit shot parameters		×
General Cable Blas	t Defaults	
Box header	STVOD002	
GPSHeader	Lat: 37° 07.64040' S 4/02/2016	Long: 174° 59.31422' E 22:08:56
Shot description		
Blast date	5/02/2016 💌	
Time of firing	9:08:56 AM 🔹	
		OK Cancel

Enter the Shot description.

E	dit shot parameters			×
	General Cable Blast	Defaults		
	Box header	STVOD002		
	GPSHeader	Lat: 37° 07.64040' S 4/02/2016	Long: 174° 59.31422' E 22:08:56	
Ł	Shot description	Sample Shot		
	Blast date Time of firing	5/02/2016 ▼ 9:08:56 AM ◆		
			OK Cancel	

Edit shot parameters		×
General Cable Blast	Defaults	
Initial return time	1001.1 * nsec	
Cable factor	8.546	
Initial cable length	117.15 <u>*</u> m	
Resolution	0.09 * nsec	
Sample rate	25600000 * samples per second	
Arm time	4/02/2016 ▼ 9:57:03 PM [▲]	
Trigger time	4/02/2016 22:08:53.512000 (12 min)	
	OK Cancel	

The cable screen shows the state of the shot at the time of the trigger.

The Arm and Trigger times are in UTC and the shot was fired 12 min after the unit was set.

The Trigger time has a seconds decimal point value that is calculated from the GPS PPS and is accurate to the sample period of 0.00000390625 seconds.

Fill in Blast information.

E	dit shot parameters		×
		1	
	General Cable Blas	st Defaults	
	Shot ID	Number 1	
	Operator	Roy Miller	
	Mine	Big top one	
	Rock	Granite	
	Hole diameter	110 🛖 mm	
	Hole depth	20, 📫 m	
			OK Cancel

Fill in default product and positioning info.

_				
E	dit shot parameters			X
	General Cable Blast	Dofruita		
	General Cable blast	Defaults		
	Product	STD Anfo 1234		
	Stemming length	2.0 🗘 m		
	Primer offset	1.0 🗘 m		
		,		
1				
-				
			OK Cancel	

As can be seen the relevant data is at the start of the recorded data in four sections.

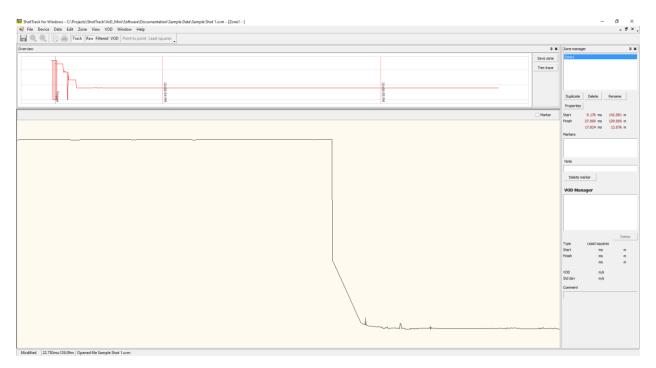
Overview			4 ×
_			Save zone
			Trim trace
	1000	100	
ž	8:54	8.55	
ă	2	P	

Select the regions of interest by holding the left button down and dragging the cursor selecting the area of interest.

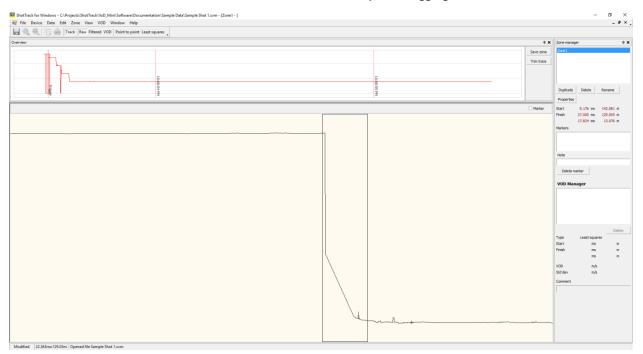
Overview				₽ ×
	-			Save zone
				Trim trace
			10	
	Trigg	8 59 54	8.55 55	
	- Second Second	20	3	

Click on Save zone and a window opens showing this selected area.

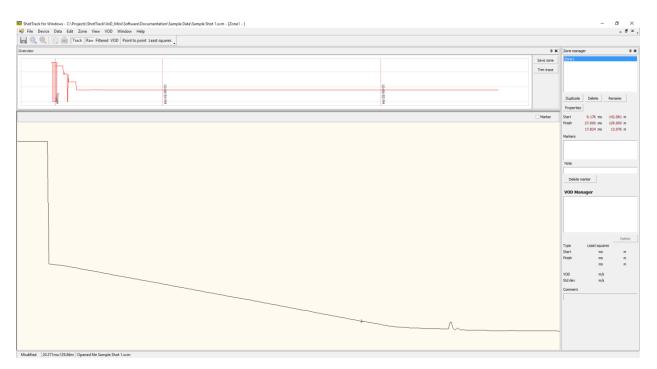
Click on enlarge to fill window.



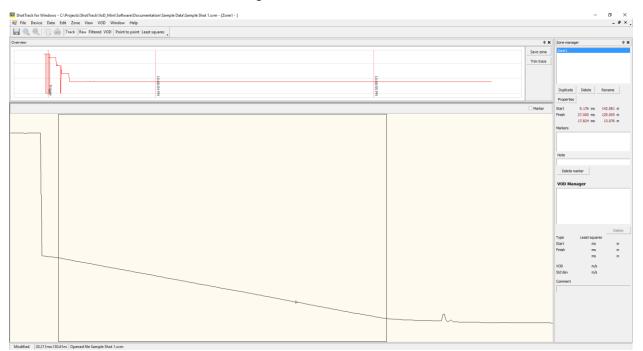
We can now further zoom in on the area we are interested in by left dragging the cursor over what we want.



And then right click to select Trim region.



To select an area to calculate a VoD left drag cursor to select it.



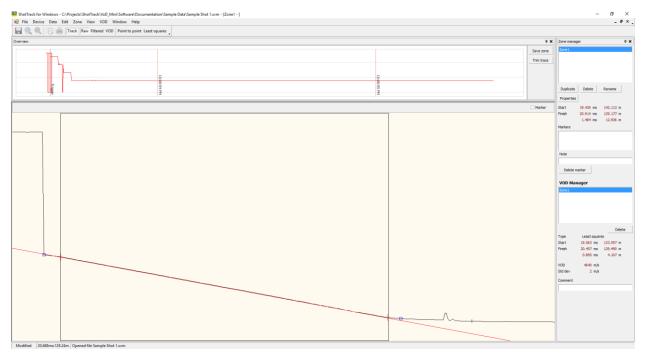
In this case I have noticed a area at the beginning of the trace where the VoD is lower than over the rest of the trace. I have positioned my selected are to start after this.

Press right mouse button and click on Leaste squares.

You will be asked to confirm this.

Confirmation				
VOD = 4640 m/s +/- 2 m/s, save this result?				
Yes	No			

After pressing Yes the VoD is calculated and a red line indicates the "slope".

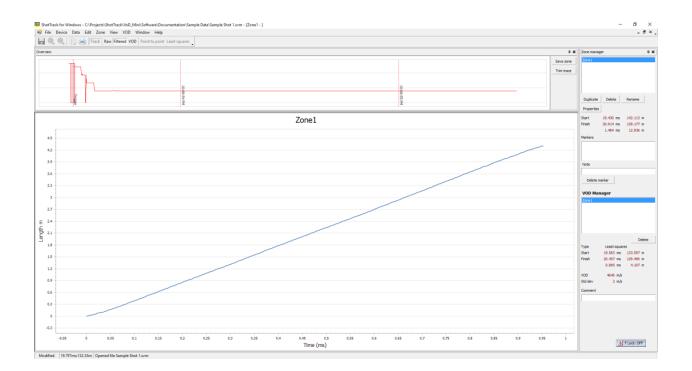


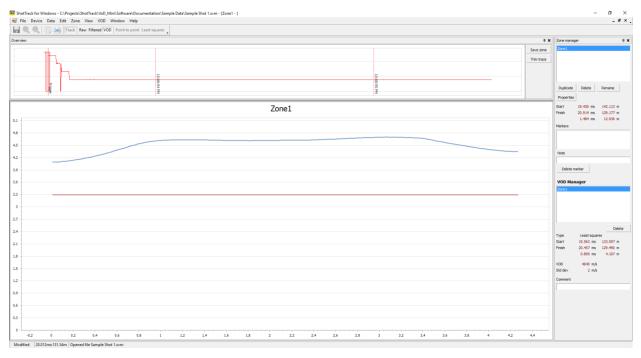
The software assignes blue dots to indicate the area it thinks is of interest.

These blue dots are used to select the area for Filtered data and continuous VoD calcuations.

These dots can be moved by left clicking on them and dragging with the mouse.

Clicking on Filtered in the task bar calculates a filtered graph of the area of interest.





The zone details should now be entered:

Zone manage	er						×
Zone 1							
Duplicate	Delete		Rer	name			
Properties							
Properues							
Start	19.430						
Finish	20.914						
	1.484	ms	12	2.936	m		
Markers							_
Note							
Note							-
I							
Delete ma	arker						
VOD Man	ayer						_
Zone 1							
				D	elet	e	
Туре	Least s	quare	s				
Start	19.563			3.597	m		
Finish	20.457	ms	129	.490	m		
	0.895	ms	4	ł. 107	m		
VOD	4640	m/s					
Std dev		m/s					
Comment							

Clicking on Properties opens the dialog box.

Blast Explosive		
Shot ID	Number 1	
Operator		
Mine	Big top one	
Rock		
Hole diameter	0 € mm	
Hole depth	0.0 🜩 m	

Pressing Copy from Shot parameters uses the default values entered earlier.

Edit region parameters	;	×
Blast Explosive		
Shot ID	Number 1	
Operator	Roy Miller	
Mine	Big top one	[
Rock	Granite	
Hole diameter	110 🔺 mm	
Hole depth	20.0 🔺 m	
Copy from Shot para		OK Cancel

Blast Explosive		
Product	STD Anfo 1234	
Hole ID	24-25-001	
Deck No	1 🚔	
Charge length	7.0 💂	
Stemming length	2.0 🛉 m	
Primer offset	1.0 🛖 m	

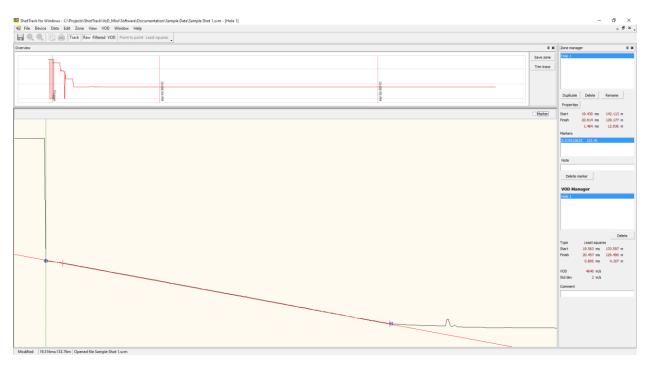
In the explosive tab enter Hole ID deck number and charge length. Edit the default Stemming length and Primer offset if needed.

The Zone can be renamed if wanted, in this case we called it Hole 1

Marker insertion:

In the top right hand corner of the zone screen there is a check box named Marker.

Checking this box allows you to place a marker at any point on the screen.



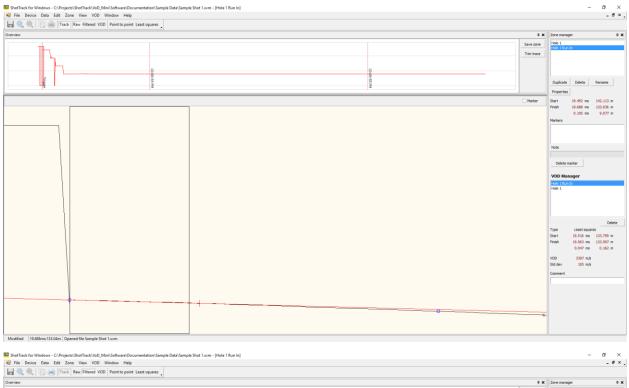
This marker is time stamped to the GPS calculated time and date.

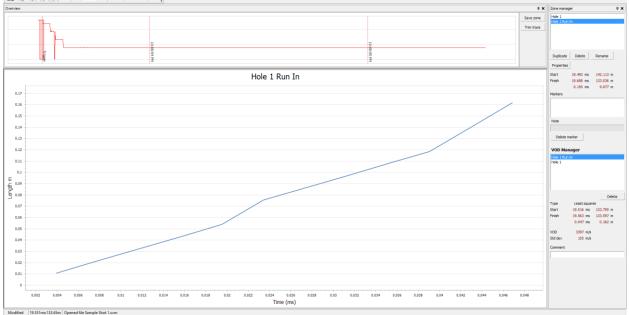
Other notes can be added and we now have a Zone manager filled in for the first hole.

Zone manage	er		ч X
Hole 1			
Duplicate	Delete	Rename	
Properties			
Start		142.113	
Finish		129.177	
	1.484 ms	12.936	m
Markers			
0.01951562	5 133.76		
Note	A		
Cut of cable	first hole		
Delete m	arker		
VOD Man	ager		
Hole 1			
		D	elete
Туре	Least squ	lares	
Start	19.563 m	s 133.597	m
Finish	20.457 m	s 129.490	m
	0.895 m	s 4.107	m
VOD	4640 m	/s	
Std dev	2 m		
Comment			
Hole 1 was v	wet		

As I had noticed that the looked like a "run to detonation" period that I am interested in I have clicked on Duplicate to get a copy of the zone. I have renamed this to Hole 1 Run In.

I have selected a closer look at the beginning of the trace and done a "leaste squares" calculation on this.





To have a look at the continuous VoD I need to change the VOD averaging width to fit the data points recorded with the filter.

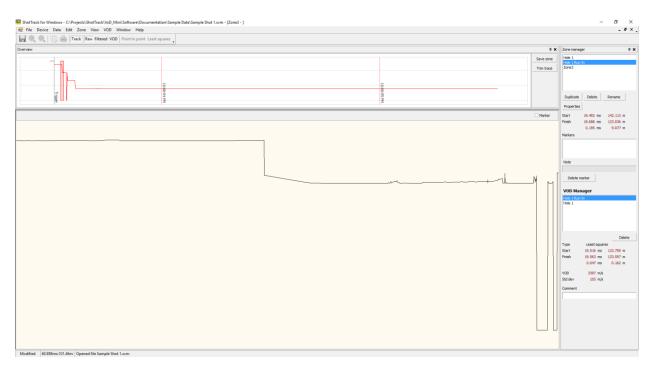
Edit application options			×
			^
Calculations Company General	Filters		-
Language	VOD averaging width	10 🜩	
-	Extended filtering		
	Auto-create zones		
	Length change	1.0 🛖 m	
-	Flat zone	10.00 🗭 ms	
-	Filter width	10 🜩	
-	Get defaults		-
-			-
-			-
1		OK Cancel	
-		ii	

In this case I choose 10.

	Point to point Least squares			
N			4,	Zone manager
-			Save zone	Hole 1 Hole 1 Run In
	10x8054 PM			Duplicate Delete Rename
्रीय .	3	Hole 1 Run In	×	Properties Start 19.492 ms 142.113 Finish 19.688 ms 133.036 0.195 ms 9.077 m Markers
				Note
				Delete marker
				VOD Manager
				Hole 1
				Type Least squares Start 19.516 ms 133.759 Pinish 19.563 ms 133.597 0.047 ms 0.162
				VOD 3397 m/s Std dev 105 m/s Comment

Next I want to look at the next hole.

I reselect the area around the next event.



And then followed the same procedure to get a VoD for the hole.

2 ShotTrack for Windows - Cl.Projects(ShotTrack)VoD_MiniSoftwareLDocumentation(Sample Data/Sample Shot T.avm - [Hole 2]		- 5 ×
🕺 File Device Data Edit Zone View VOD Window Help		- 6 × ,
🔜 🔍 🔍 📔 🖮 Track Rew Fittered VOD Point Least squares		
Overview	a x	Zone manager 0 🗙
	Save zone	Hole 1
	Trim trace	Hole 1 Run In Hole 2
h		
		Duplicate Delete Rename
	1	Properties
		Start 55.328 ms 129.468 m Finish 56.629 ms 100.244 m
		1.301 ms 29.225 m
		Markers
		0.05539453125 105.48
		Note
		Cut of cable at hole 2
		Delete marker
		VOD Manager
		Hole 1 Run In
		Hole 1 Hole 2
		H0/E 2
		Delete
		Type Least squares
		Start 55.395 ms 105.483 m Finish 56.477 ms 100.502 m
		1.082 ms 4.980 m
		VOD 4695 m/s
		Std dev 3 m/s
		Comment
		This hole not wet
0		
Modified 56.629ms:100.24m Opened file Sample Shot 1.svm		

I then did the same for the remaining holes.

Zone manag	jer			 д	×				
Hole 1 Hole 1 Run Hole 2 Hole 3	In								
Hole 4									
	1								
Duplicate	Delete	e _ F	Rename						
Properties									
Start	115.262	ms	72.065	m					
Finish	116.738	ms	42.732	m					
	1.477	ms	29.332	m					
Markers									
0.11535933	75 47.53	}							
Note									
Cut hole 4									
Delete marker									
VOD Manager									
Hole 1 Run	In								
Hole 1									
Hole 2									
Hole 3									
Hole 4									
1			D	elete					
Туре	l east s	quares							
Start	115.371	-		-					
Finish	115.371		47.486						
	0.945	ins	4.258	m					
VOD	4588	m/s							
Std dev	2	m/s							
Comment									
Run to detonation not obvious									

When finished a report can be generated.

From the task bar select File/Export report.

-											
-	🙆 Save As										×
_	\leftrightarrow \rightarrow \checkmark \uparrow	« Projects	> ShotTrac	:k → VoD_Mi	ini > Software >	Documentation > San	nple Data	√ Ö	Search Sample Da	ta	٩
	Organise 🔻 Ne	w folder								•== •	?
	 ShotTrackPute Stefan SVN_Projects Websites OneDrive Apps Documents Music Outlook Files Pictures Projects 		ne	~		Date modified No items mate	Type ch your search.	Size			
	File <u>n</u> ame:	Sample Sho	Report								~
	Save as <u>t</u> ype:	Excel files (*.	XLSX)								~
	 Hide Folders 								<u>S</u> ave	Cancel	

Navigate to directory wanted and enter file name, click save.