## catooIRT 16.9 Release Notes

- In the Windows start menu, catoolRT is no longer in its own folder.
- Added support for NI cDAQ-9179
- Fix some memory leaks
- Moved to wxWidgets 3.1.0
- Allow any channel to be used as the simulated engine speed
- Allow any channel to be used as the start of combustion.
- Add adaptive crankshaft or camshaft analogue input algorithm. This will track a non-zero
  reference voltage and adapt the thresholds based on the previous tooth's minimum and
  maximum voltages. "Acquisition" -> "Advanced Config" -> "Adaptive Crankshaft Thresholds"
  and "Adaptive Camshaft Thresholds".
- New graphics update algorithm to maximise screen update rates.
- Improvements to CAN signal I/O
- Ability to log CAN signals and Low Speed DAQ (voltage, thermocouple, frequency and digital channels) at cycle rate.

New Channel	
DAQ Channel ATI VISION Channel Low Speed DAQ Channel CAN Channel	OK

- CAN signal input can be defined using a CANdb database file.

Edit Channel: "Mai	nA"			
CANdb Filename SCS Delta.dbc				
Message		Signal		
Msq300 [0x300]	~	MainA		~
Message ID 300 Start Bit	Type Unsigne Length	d Word 🗸	Units deg Slope	den (hit
Format Motorola	/	]	Offset	deg/bit
Description	_			
Main Fuel Injectio	on Timing			
Rename	Properties	OK		Cancel

 Ability to log channel values to a CSV file at low speed. Logging frequency can be specified at a fixed rate of seconds, minutes, hours or cycles. "Acquisition" -> "Low Speed Logging" -> "Configure".

Configure LS Logging				C	onfigure LS Logging			
Channels Configurat	ion			C	hannels Configuration			
Logging Channels				ſ	Auto Increment	True		
Channel	Description	Units	Add		Auto Start	False		
💍 SPEED	Engine Speed	RPM	Delete		File Type	CSV		
🖒 GMEP1	Gross IMEP	bar	Delete		Filename	log_001.csv		
O NMEP1	Net IMEP	bar			Log Rate	1		s
O PMAX1	Maximum Pressure	bar	Position		Log Rate Type	Seconds		
O APMAX1	Maximum Pressure Crank Angle	deg			Overwrite Existing Files	False		
<ul> <li>MFB501</li> <li>RPMAX1</li> <li>ARPMX1</li> </ul>	Mass Fraction Burned 50% Maximum Pressure Rise Rate Maximum Pressure Rise Rate Crank Angle	deg bar/deg deg						
		ОК	Cancel				ОК	Cancel

- Default interpolation resolution increased from 0.2 to 0.1 degrees
- Added "Indicated Calculations" to calculate indicated horsepower and indicated lb.ft torque.
   "Acquisition" -> "Configure Real-Time Analysis". Select "Indicated Calculations".
- "Format Plot" now hides some options that are not relevant to the selected channel
- Improvements in the time to load the application
- Improvements in the time to detect new USB hardware that is inserted/removed
- Add support for Datalists
  - "Diagram" -> "New Diagram". Select "Datalist" radio button at top of "Select Channels" dialog

	👌 Datalist 4		
	Channel	Value	Units
	5 MFB011	0.0	deg
	🖒 MFB051	0.0	deg
Select Channels	🖒 MFB251	0.0	deg
Datalist O 2D Diagram O 3D Diagram	🖒 MFB501	0.0	deg
My Data ^ Channel	🖒 MFB751	0.0	deg
V 🗭 Data Acquisition 🖒 ACDKNK1	🖒 MFB901	0.0	deg
AKNKMX1			
SDARK1			

 Right click on item and select "Format Datalist...". Columns can be re-ordered and statistical values can be added. Item can change colour at a configured high or low value.

Format Datalist [Datal	list 4]											
Datalist 4			😑 Forma	nt				^				
MFB011 (Data Acquisition)			Font			9: Segoe UI: Normal: Normal: 1						
MFB051 (Data	🏷 MFB051 (Data Acquisition)			Foreground Colour		Black						
MFB251 (Data	Acquisition)		Backo	round Colour		White						
MFB501 (Data Acquisition)			- High	Narning								
MFB751 (Data Acquisition)			Enabl	ed		False						
MFB901 (Data	Acquisition)		Font	+ Font			9; Segoe UI; Normal; Normal; 1					
			Foreg	round Colour		White						
			Backo	round Colour		Red						
			Set Hi	gh		100						
			Clear	Low		95						
			E Low V	Varning								
			Enabl	ed		False						
			Font			9; Segoe Ul	Normal; N	ormal; N				
			Foreg	Foreground Colour		White						
			Backg	Background Colour		Blue						
			Set Lo	Set Low		0						
			Clear	Clear High		10						
			🗉 Debu	g Info				~				
					OK	Can	cel	Apply				
🖒 Datalist 4								×	)	💍 Datalist 5		- • •
Channel	Value	1	Mean	Min	Max	Std D	v Co	/		Channel	Value	Units
🖒 MFB011	-3.0	-	1.960656	-4.000000	1.400000	1.0365	46 -0.	28673		💍 KNKINT1	4.6	bar*deg
🖒 MFB051	1.6	2	2.003279	-1.000000	6.400000	1.3117	38 0.6	4795		🖒 KNKMAX1	0.4	bar
🖒 MFB251	8.2	8	3.868852	0.000000	13.60000	0 2.1859	81 0.2	6478		OPMAX1	60.2	bar
🖒 MFB501	12.6	1	13.937706	0.000000	20.20000	2.8917	22 0.2	7475				
🖒 MFB751	16.8	1	18.668858	0.000000	26.40000	3.6267	31 0.1	4266				
🖒 MFB901	20.2	2	22.963932	0.000000	33.00000	4.4182	21 0.1	2398				

• Move items up/down by selecting them and holding "Alt" key + cursor key

- Corrected some channel icons in various GUI elements
- Added option to autoscale the Y-axis on cycle based plots

Plot 5	ΞX	Axis			
🗄 👘 GMEP1 [bar]	N	linimum	0		
🦾 👌 GMEP1 (Data Acquisition)	N	1aximum	1000		
	St	teps	10		
	L	abel	Cycle		
	N	lagnitude	2		
	L.	ogarithmic	False		
	🖃 Y	Axis			
	N	linimum	11.6		
	N	1aximum	12.6		
	St	teps	5		
	Li	abel	GMEP1 [bar]		
	N	lagnitude	-1		
	- L	ogarithmic	False		
		and the second sec	On (Include Zero)		

- Fixed tooth engine speed calculation to allow for missing teeth
- Crank angle plots with a mixed abscissa (i.e. that include cycle based results) now use the cycle based marker colour.
- Format Plot: Selecting "Plot All" for a mixed abscissa allows the scatter plot of all cycles to be plotted:



 "Configure CANbus Output" changed to "Configure CANbus". GUI reorganised and allows configuration of separate input and output CAN hardware.

Configure C	ANbus					Co	nfigure CANbus		
CANbus O	utput Configuration					C	ANbus Output Configuration		
CANbus O	utput Messages					6	CAN Input		
Message	Channel	Start	Length	Format	Add		Bus Speed	500 kbit/s	
0x100	APMAX1	0	32	Intel Float	Delete		CAN Channel	PEAK PCAN-USB	
0x100	TOIND1	32	32	Intel Float			CAN Output	Faise	
0x101	GMEP1	32	32	Intel Float	Mercage No.		Bus Speed	500 kbit/s	
0x102	MFB501	0	32	Intel Float	wiessage ivo.		CAN Channel	PEAK PCAN-USB	
0x102	GMEP	32	32	Intel Float	I Float		Exclusive	False	
							<ul> <li>Remote Control (CAN AK)</li> </ul>	0-750	
							Enabled	True	
					Create				
					Database				
1					OK			I	OK
								l	UK

- Simulated DAQ can now run down to very low engine speeds
- Calculate cycle statistics correctly for a single cylinder engine
- Close VISION screen if it was not possible to add channels to the recorder object