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New Features

New export type for Swath Separation Images (SSI)

This option exports GeoTIFF rasters based on selected tiles from a loaded tile layout, depicting collection scan (flightline) separation Z difference values with an intensity image background, using pre-determined settings that adhere to the latest USGS NGP LiDAR Base Specification.

器 MARS Export Type Selection	—	\times	
Please select a type			
LAS		\sim	
3D Image Contours - Shapefile Rightline Separation - JPEG 2000 Rightline Separation - Tiled Geo TIFF Grid - Cloud Optimized Geo TIFF DEM Grid - Cloud Optimized Geo TIFF Intensity Grid - ENVI Elev Grid - ENVI Elev/Class Grid - ENVI Elev/Class Grid - For Grid Grid - For Grid Grid - For Grid Grid - LAS Grid - LAS Grid - LAS Grid - LAS Grid - LAR Raster JPEG 2000 Grid - TIFF Hillshade - JPEG 2000 LAS LiDAR Point Density - Float Grid LiDAR Spatial Distribution Verification GRID – J PLS-CADD Code - ASCII	PEG 2000		
Shapefile Text - ASCII			
USGS Swath Separation Image - Tiled GeoTIF			

# MARS Export - USGS Swath Separation Image - Tiled GeoTIFF	– 🗆 X
	Save Settings to File Load Settings from File
Output Layout Filters Options Grid Projection	
Grid Options Common Quality Level QL0 (4.0 cm) QL1 (8.0 cm) QL2 (8.0 cm)	Auto Calculate Virtual Tile Size Virtual Tile Size 500



QC Module drop-down selection added for USGS 2025 lidar specification

A new option to check LAS data compliance with USGS Lidar Base Specification 2025 rev. A (June 2025) has been added to the selection list of the QC Module tool. NOTE that as of the date of this MARS[®] release, USGS Lidar Base Specification 2025 rev. A (June 2025) is the most current lidar specification published by the USGS.

•	MARS QC Specification Selecti	on		_		\times
	Please select a specification USGS NGP LBS ASPRS Other	USGS NGP LBS - 2025 rev. A USGS NGP LBS - 2024 rev. A USGS NGP LBS - 2023 rev. A USGS NGP LBS - 2022 rev. A USGS NGP LBS - 2021 rev. A USGS NGP LBS - 2020 rev. A USGS NGP - Version 2.1 USGS NGP - Version 1.3 USGS NGP - Version 1.2 USGS NGP - Version 1.0 Raster QC	0	K	Canc	el

Enhancements

Improvements to raster ordering and display options

Two changes have been made regarding the ordering of rasters in the Table of Contents and the drawing priority of loaded rasters. First - when two or more rasters are loaded, individual rasters can be moved up or down (one position at a time) in the Table of Contents. This is done by right-clicking a raster entry and selecting either 'Move Up' or 'Move Down' from the context menu. The position of a raster in the list affects the second change – the raster listed at the top in the Table of Contents will display last (i.e., on top of) all other rasters being displayed.





Additional statistic presented for 'USGS NGP LBS - 2024 rev. A' final reports

In the frequency distribution chart produced for the final PDF reports for test DPH-9.1 of the 'USGS NGP LBS – 2024 rev. A' QC Module selection, the statistical mode of the Measurable Flightline Separation raster cell values is now presented along with the RMSDz value.

Enhanced report created for '3D Accuracy' mode of the 'Check Point Report' tool

• When saving a report in the '3D Accuracy' version of the 'Check Point Report' tool, the information presented on the first page now includes counts for all included check point types that have TIN coverage.

Check Point Type Counts

3D - with XY measurements: 49 3D - no XY measurements yet: 0 NVA including 3D: 146 NVA excluding 3D: 97 VVA: 37 Total: 183

3D points with TIN coverage: 49 NVA points with TIN coverage: 97 VVA points with TIN coverage: 37 Total points with TIN coverage: 183

• The action buttons have been re-organized for clarity, grouping the tools that are usable per check point together and the tools that are usable per project together. Some functions, such as turning off a point to not be used, need a 'Recalculate' action to update the loaded check point file. For more detailed information, please refer to the 'Quality Control' | 'Check Point Report' topic in the Help Manual.

Res	ult Table Hist	ogram (NVA) His	stogram (VVA)											Delta X a	and Y per 3D Point in	USFt		
8	_															<u> </u>		
	Requirement Three Dime				Radius for 3 pr	pints (TIN) - (default value	e is 5x the c	alculated GSD				0.4	s - /	+			
	Accuracy (Dass		1.30	487827]							0.3	. L /	1			
	1.0-	om			cations Include									17		\sim		
	2.0-	cm		0,1,2,3	4,5,6,7,8,9,10,	11,12,13,14,	15,16,	Select					0.1	s =/	t	\-		
	2.5-	om		LAS R	les - Count: 8				Display LAS	5 file path								
	3.0-	cm		L0001	C_250618_A	5060492_1_	rlas			^				1				
	4.0-			L0003	P 250618 A P 250618 A	5060492 1	rJas						-0.	18 = \	t	/1		
	. 5.0-			L0004	P_250618_A P_250618_A	5060492 1	rJas			~			-02	, F \	+	/ -		
	6.0-			20005	_/_s00010_A_								~					
	7.0-			Chec	k Point Type C	ounts							-0.	4	t			
	8.0-			3D - 1	with XY measu	rements	0	NVA includ	ting 3D 18	VVA 0								
	9.0-			3D -	no XY measure	ments yet	0	NVA exclu	ding 3D 18	Total 18				-0.45 -0.3	-0.15 0 0.15	0.3 0.45		
	10.0			2D - 1	with XY measu	rements	0								GNSS Positional Err			
	15.0	-om		2D -	no XY measure	ments yet	0				Data Units:	J.S. Survey Foot		ght (m) 2000		ng Error (degree) 0.005	-	
														(active (active)	0.0020 10070200	(c.coo		
		V of Cherry	V of Cherry	TIN	7.4	7.4	Type					X af	X of					
	ID	X of Check Pt.	Y of Check Pt.	TIN Coverage	Z of Check Pt.	Z of TIN	(3D/2D/NVA / VVA)	A Delta Z	Description	RMSE_H2	RMSE_V2	X of Measurement	Y of Measurement	Delta X	Delta Y	Delta H	Delta 3D	
	1633000	Pt. 3029963.727	Pt. 1227512.23	Coverage	Check Pt. 7747.4	TIN	(3D/2D/NV/ /VVA) 3D			0	0		Y of Measurement	Delta X	Deita Y	Delta H	Delta 3D	
	1633000 1623001	Pt. 3029963.727 3034259.867	Pt. 1227512.23 1218641.187	Coverage Yes	Check Pt. 7747.4 7557.636	TIN 7557.797	(3D/2D/NV/ /VVA) 3D NVA	0.161	LIPTPanel	0	0		Y of Measurement	Delta X	Delta Y	Delta H	Delta 3D	
2	1633000 1623001 1623004	Pt. 3029963.727 3034259.867 3038430.343	Pt. 1227512.23 1218641.187 1218130.166	Coverage Yes Yes	Check Pt. 7747.4 7557.636 7431.728	TIN 7557.797 7431.572	(3D/2D/NV/ / VVA) 3D NVA NVA	0.161	LIPTPanel	0	0 0 0		Y of Measurement	Delta X	Delta Y	Delta H	Delta 3D	
9	1633000 1623001 1623004 1623009	Pt. 3029963.727 3034259.867 3038430.343 3041638.718	Pt. 1227512.23 1218641.187 1218130.166 1222873.179	Coverage Yes Yes Yes	Check Pt. 7747.4 7557.636 7431.728 7338.001	TIN 7557.797 7431.572 7338.059	(3D/2D/NV/ /VVA) 3D NVA NVA NVA	0.161 -0.156 0.058	LIPTPanel LIPTPanel LIPTPanel	0 0 0	0 0 0 0		Y of Measurement	Delta X	Deita Y	Delta H	Delta 3D	
	1633000 1623001 1623004 1623009 1633001	Pt. 3029963.727 3034259.867 3038430.343 3041638.718 3031158.079	Pt. 1227512.23 1218641.187 1218130.166 1222873.179 1224494.166	Coverage Yes Yes Yes Yes	Check Pt. 7747.4 7557.636 7431.728 7338.001 7938.277	TIN 7557.797 7431.572 7338.059 7938.212	(3D/2D/NV/ /VVA) 3D NVA NVA NVA NVA	0.161 -0.156 0.058 -0.065	LIPTPanel LIPTPanel LIPTPanel LIPTPanel	0 0 0 0	0 0 0 0 0		Y of Measurement	Delta X	Delta Y	Delta H	Deita 3D	
	1633000 1623001 1623004 1623009 1633001 1633003	Pt. 3029963.727 3034259.867 3038430.343 3041638.718 3031158.079 3034442.327	Pt. 1227512.23 1218641.187 1218130.166 1222873.179 1224494.166 1225133.554	Coverage Yes Yes Yes Yes Yes	Check Pt. 7747.4 7557.636 7431.728 7338.001 7938.277 7509.61	TIN 7557.797 7431.572 7338.059 7938.212 7509.549	(3D/2D/NV/ /VVA) 3D NVA NVA NVA NVA NVA	0.161 -0.156 0.058 -0.065 -0.061	LIPTPanel LIPTPanel LIPTPanel LIPTPanel LIPTPanel	0 0 0 0 0	0 0 0 0 0		Yof Measurement	Delta X	Delta Y	Delta H	Delta 3D	
	1633000 1623001 1623004 1623009 1633001 1633003 1633007	Pt. 3029963.727 3034259.867 3038430.343 3041638.718 3031158.079 3034442.327 3041291.127	Pt. 1227512.23 1218641.187 1218130.166 1222873.179 1224494.166 1225135.554 1226759.946	Coverage Yes Yes Yes Yes Yes Yes	Check Pt. 7747.4 7557.636 7431.728 7338.001 7838.277 7509.61 7430.889	TIN 7557.797 7431.572 7338.059 7938.212 7509.549 7430.99	(3D)2D/NV/ /VVA) 3D NVA NVA NVA NVA NVA NVA	0.161 -0.156 0.058 -0.065 -0.061 0.101	LIPTPanel LIPTPanel LIPTPanel LIPTPanel	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0		Yof Measurement	Delta X	Delta Y	Delta H	Delta 3D	
	1633000 1623001 1623004 1623009 1633001 1633003 1633007 1633004	Pt. 3029963.727 3034259.867 3038430.343 3041638.718 3031158.079 3038442.327 3044291.127 3044288.366	Pt. 1227512.23 1218641.187 1218130.166 1222873.179 1224494.166 1225135.354 1226759.946 1217608.048	Coverage Yes Yes Yes Yes Yes Yes Yes	Check Pt. 7747.4 7557.636 7431.728 7338.001 7938.277 7509.61 7430.889 7339.344	TIN 7557.797 7431.572 7338.059 7938.212 7509.549 7430.99 7430.99 7339.452	(3D)2D/NVA /VVA) 3D NVA NVA NVA NVA NVA NVA NVA	0.161 -0.156 0.038 -0.065 -0.061 0.101 0.108	LIPTPanel LIPTPanel LIPTPanel LIPTPanel LIPTPanel	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0		Y of Measurement	Deta X	Delta Y	Delta H	Delta 3D	
	1633000 1623001 1623004 1623009 1633001 1633003 1633007 1633004 1623007	Pt. 3029963.727 3034259.867 3038430.343 3041638.718 3031158.079 3034442.327 3041291.127 3044288.366 3040078.532	Pt. 1227512.23 1218641.187 1218130.166 1222873.179 1224494.166 1225135.554 1226759.946 1217608.048 1223488.826	Coverage Yes Yes Yes Yes Yes Yes Yes	Check Pt. 7747.4 7557.636 7431.728 7338.001 7938.277 7509.61 7430.889 7339.344 6984.777	TIN 7557.797 7431.572 7338.059 7938.212 7509.549 7430.99 7430.99 7339.452 6984.78	(3D/2D/WV/ //WA) 3D NVA NVA NVA NVA NVA NVA NVA NVA	0.161 -0.156 0.058 -0.065 -0.061 0.101 0.108 0.003	LIPTPanel LIPTPanel LIPTPanel LIPTPanel LIPTPanel	0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0		Y of Measurement	Deta X	Delta Y	Delta H	Delta 3D	
	1633000 1623001 1623004 1623009 1633001 1633003 1633007 1633004 1623007 1623007	Pt. 3029963.727 3034259.867 3038430.343 3041638.718 3031158.079 303442.327 3041291.127 3044288.366 3040078.532 3040078.532	Pt. 1227512.23 1218641.187 1218130.166 1222873.178 1224494.166 1225135.554 1226759.946 1217608.048 1223488.826 1218317.146	Coverage Yes Yes Yes Yes Yes Yes Yes	Check Pt. 7747.4 7557.636 7431.728 7338.001 7938.277 7509.61 7430.889 7339.344 6884.777 7496.52	TIN 7557.797 7431.572 7338.059 7938.212 7508.549 7430.99 7430.99 7339.452 6984.78 7496.264	(3D/2D/NV/ //VVA) 3D NVA NVA NVA NVA NVA NVA NVA NVA	0.161 -0.156 0.058 -0.065 -0.061 0.101 0.108 0.003 -0.256	LIPTPanel LIPTPanel LIPTPanel LIPTPanel LIPTPanel	0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0		Y of Measurement	Deta X	Delta Y	Delta H	Delta 3D	
	1633000 1623001 1623004 1623009 1633001 1633003 1633007 1633004 1623007 1623003 1623006	Pt. 3029963.727 3034259.867 3038430.343 3041538.718 3031158.079 2034442.327 3041291.127 3044298.366 3040078.532 303832.515 3040852.239	Pt. 1227512.23 1218641.187 1218130.166 1222873.178 1224494.166 1225133.554 1226759.946 1217608.048 1223488.826 1218317.146 1220351.384	Coverage Yes Yes Yes Yes Yes Yes Yes Yes Yes	Check Pt. 7747.4 7557.636 7431.728 7338.001 7938.277 7309.61 7430.889 7339.344 6984.777 7496.52 7086.067	TIN 7557.797 7431.572 7338.059 7938.212 7509.549 7430.99 7430.99 7338.452 6984.78 7496.264 7086.14	(3D/2D/NV/ //VVA) 3D NVA NVA NVA NVA NVA NVA NVA NVA NVA	0.161 -0.156 0.058 -0.065 -0.061 0.101 0.101 0.108 0.003 -0.256 0.073	LIPTPanel LIPTPanel LIPTPanel LIPTPanel LIPTPanel	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		Y of Measurement	Delta X	Delta Y	Delta H	Daita 3D	
5 5 5 5 5 5 5 5 5 5 5	1633000 1623001 1623004 1623009 1633001 1633001 1633007 1633004 1623007 1623003 1623006 1623005	Pt. 3029963.727 3034259.867 3038430.343 3041638.718 3031158.079 3034442.327 3041429.1127 3041429.1127 304488.366 3040078.532 304882.239 3039105.56	Pt. 1227512 23 1218641.187 1218130.166 1222873.179 1224494.166 1225135.554 1226759.946 122759.946 122768.048 1223488.826 1218317.146 1220351.394 1221131.831	Coverage Yes Yes Yes Yes Yes Yes Yes Yes Yes	Check Pt. 7747.4 7557.636 7431.728 7338.001 7938.277 7509.61 7430.889 7339.344 6884.777 7496.52 7086.067 7592.729	TIN 7557.797 7431.572 7338.059 7938.212 7509.549 7430.99 7338.452 6984.78 7496.264 7086.14 7592.534	(BD/2D/NV/ //VA) 3D NVA NVA NVA NVA NVA NVA NVA NVA NVA NVA	0.161 -0.156 0.058 -0.065 -0.061 0.101 0.101 0.108 0.003 -0.256 0.073 -0.195	LIPTPanel LIPTPanel LIPTPanel LIPTPanel LIPTPanel	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		Y of Measurement	Delta X	Delta Y	Delta H	Delta SD	
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	1633000 1623001 1623001 1623009 1633003 1633003 1633003 1633004 1623003 1623003 1623005 1623000 1623000 1623000	Pr. 902965.727 3034256.07.27 3034256.07.27 3034258.07.28 303458.078 303958.078 303458.078 303458.078 303958.0788 303	Pr. 1227512.23 121864.187 122873.759 1228494.186 1222873.759 1224494.186 1225535.554 1227698.488.829 1227698.488.829 1227698.489 1227698.489 1227699.394 1227699.394 1227699.394 1227699.394 1227699.394 1227699.394 1227699.495 1227697.1 1218742.295	Coverage Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye	Check PL 7747,4 7557,636 7431,728 7388,207 7308,207 7506,61 7430,889 7338,344 6684,777 7966,52 7086,607 7962,729 7350,654 7202,487 7350,894	TIN 7557.797 7431.572 7338.059 7938.212 7308.549 7430.99 7430.95 6884.78 7496.264 7086.14 7582.534 7530.377 7202.511 7390.731	(3D)2D)NV/ /VVA) 3D NVA NVA NVA NVA NVA NVA NVA NVA NVA NVA	0.161 -0.156 0.058 -0.065 -0.061 0.101 0.101 0.108 0.003 -0.256 0.073 -0.185 -0.317 0.024 -0.166	LIPTPanel LIPTPanel LIPTPanel LIPTPanel LIPTPanel LIPTPanel				Y of Messurement	Deta X	Deita Y	Detta H	Deta 30	
	1633000 1623004 1623004 1623009 1633001 1633003 1633007 1633007 1623003 1623005 1623005 1623005 1623005 1623005	Pr. 9029663,727 3034508,87,727 3034508,87,728 3034508,043 3044508,718 303158,079 3034452,377 3044508,302 3041251,127 3044508,302 3039105,56 3040705,719 30394705,59 3049705,59 3049705,59 3049705,59 3049755,19 304962,213 304962,213 304962,213 304962,213 304962,215 305962,215 305962,2	Pt 1227512.23 121864.187 1218130.166 122873.354 1224694.166 1225733.554 121769.946 121769.946 121763.146 1220851.384 122680.25 1218317.146 1220055.384 1218072.248 1220055.488	Coverage Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye	Check PI. 7747.4 7557.638 7433.601 7338.601 7338.401 7309.61 7430.889 7389.489 7389.489 7389.489 7389.489 7399.489 7396.857 7390.8694 7300.489 7390.887 6941.831	TIN 7557.797 7431.572 7338.059 7938.212 7308.549 7430.99 7430.99 7430.99 7430.99 7430.94 7482.264 7086.14 7580.534 7580.534 7530.377 7202.511 7390.731 6841.952	(3D)2D)NV/ /VVA) 3D NVA NVA NVA NVA NVA NVA NVA NVA NVA NVA	0.161 -0.156 0.058 -0.065 -0.065 0.101 0.101 0.108 0.003 -0.256 0.073 -0.185 -0.317 0.024 -0.166 0.071	LIPTPanel LIPTPanel LIPTPanel LIPTPanel LIPTPanel LIPTPanel NVA NVA NVA		0 0		Yof Messurement	Delta X	Dela Y	Denta H	Dela 2D	
-	1633000 1623001 1623001 1623009 1633003 1633003 1633003 1633004 1623003 1623003 1623005 1623000 1623000 1623000	Pr. 902965.727 3034256.07.27 3034256.07.27 3034258.07.28 303458.078 303958.078 303458.078 303458.078 303958.0788 303	Pr. 1227512.23 121864.187 122873.759 1228494.186 1222873.759 1224494.186 1225535.554 1227698.488.829 1227698.488.829 1227698.489 1227698.489 1227699.394 1227699.394 1227699.394 1227699.394 1227699.394 1227699.394 1227699.495 1227697.1 1218742.295	Coverage Yes Yes Yes Yes Yes Yes Yes Yes Yes Ye	Check PL 7747,4 7557,636 7431,728 7388,207 7308,207 7506,61 7430,889 7338,344 6684,777 7966,52 7086,607 7962,729 7350,654 7202,487 7350,894	TIN 7557.797 7431.572 7338.059 7938.212 7308.549 7430.99 7430.95 6884.78 7496.264 7086.14 7582.534 7530.377 7202.511 7390.731	(3D)2D)NV/ /VVA) 3D NVA NVA NVA NVA NVA NVA NVA NVA NVA NVA	0.161 -0.156 0.058 -0.065 -0.061 0.101 0.101 0.108 0.003 -0.256 0.073 -0.185 -0.317 0.024 -0.166	LIPTPanel LIPTPanel LIPTPanel LIPTPanel LIPTPanel LIPTPanel				Yel Messvenent	Delta X	Dela Y	Dets H Dets H	Delu 3D	

• Added the ability to handle 2D type check points for situations in which the Z value is not usable, but the XY values are. Additionally, 3D points can be converted to 2D when the Z value is found to not be valid.



Additional layout option implemented for the 'Flightline Separation – Tiled GeoTIFF' export type

The 'All Tiles using MBR' Layout tab option is now enabled when exporting using the 'Flightline Separation – Tiled GeoTIFF' export type. This option will export all tiles in the loaded tile shapefile by default if no tiles were pre-selected before starting the export interface.

Test added to both the 2024 and 2023 versions of the 'USGS NGP LBS' drop-down in the QC Module

Both the 'USGS NGP LBS – 2024 rev. A' and 'USGS NGP LBS – 2023 rev. A' options in the QC Module now include an additional test – 'DPH-13 Report on Scanner Channel Bit Flags.' This test reports on the values present for the 'Scanner Channel' field stored for each point. Single channel sensors should have all points stored as '0,' dual channel sensors should create values of both '0' and '1,' and so on.

Automatic refresh implemented for both histogram tabs in the '3D Accuracy' interface of the 'Check Point Report' tool

When either the NVA or VVA Histogram tab is active (displayed), clicking the 'Recalculate' button will force a refresh of that histogram.

Check Points in the main MARS window are now colorized to match the histogram bar they belong to when the 'Redraw Thematically' option is used.

For both the 'Vertical Accuracy' and '3D Accuracy' options of the 'Check Point Report' tool, invoking the 'Redraw Thematically' option for the 'Z Error' histograms will colorize the Check Points in the main MARS window to match the histogram bar they belong to.

Saved Check Point Report now includes the Collection Date field in the output shapefile.

When a '3D Accuracy' Check Point Report is saved (by clicking the 'Save Report...' button), the collection date column from the input CSV check points file is carried over as a field named 'Coll_Date' to the point shapefile that is produced as part of the output.

Unnecessary button removed from the '3D Accuracy' interface of the 'Check Point Report' tool.

The 'Save to CSV' button has been removed from the bottom of the '3D Accuracy' interface in the 'Check Point Report' tool. Since the input CSV file is updated automatically updated when user XY measurements are made as well as when the '3D to NVA' function is used, the button is not needed.



Additional options available for the thematic rendering function in the '3D Accuracy' method of the 'Check Point Report' tool.

The 'Thematic Delta Z' button has been re-labeled to 'Thematic Rendering' with several new options added. When clicked, the '3D Accuracy' interface will be hidden (not closed), and the rendering of the loaded check points will be based on their Delta Z value. A small control will appear with four options: 'Delta X,' 'Delta Y,' 'Delta H,' and 'Delta Z' (the default). Selecting any other radio button will change the check points' rendering to reflect those values. When the control is closed, the main '3D' Accuracy' interface re-opens with the 'Thematic rendering' button labeled as 'Redraw Normal.' Clicking it will return the check points display to their normal symbology.

🧱 Thematic Re	ndering Options	—		×
🔿 Delta X	🔿 Delta Y	O Delta H	Delta Z	
			Close	

Test added to the 2024 version of the 'USGS NGP LBS' drop-down in the QC Module.

The 'USGS NGP LBS – 2024 rev. A' option in the QC Module now includes an additional test – 'DPH-2 Report on WKT String' to report on the tiled lidar files' WKT strings as compared to the user-entered (expected) CRS information. This test is also available for the latest 'USGS NGP LBS – 2025 rev. A' selection.

Projection Definition (WKT) - User Expected	
Edit	

Performance improved for several tests in the 'LiDAR Workflow QC – 1 LiDAR Data Checks' drop-down in the QC Module.

On four tests of the 'LiDAR Workflow QC – 1 LiDAR Data Checks' drop-down in the QC Module, performance has been significantly enhanced, and the interface options have been simplified to avoid confusion as to the appropriate settings. The improved tests are DC7, DC8, DC9, and DC10.





A 'Time Spent on Each Step' page has been added to the end of the final report for the 'LiDAR Workflow QC – 2 LiDAR Calibration Checks' drop-down in the QC Module.

In the final report PDF created for the 'LiDAR Workflow QC - 2 LiDAR Calibration Checks' drop-down in the QC Module, a 'Time Spent on Each Step' page has been added to show the impact of each of the three possible tests on the total processing time.

Redesign and clarification of the interface for the 'LiDAR Workflow QC – 2 LiDAR Calibration Checks' drop-down in the QC Module.

The 'Processing' tab of the interface for the 'LiDAR Workflow QC - 2 LiDAR Calibration Checks' drop-down in the QC Module has been resigned to group controls together more logically and to eliminate confusing settings.

Input	Processing	Save Settings to File Load Settings from Fi
		Check All ON Check All Off
	⊠ cc.	1 Report on Relative Accuracy O Regular FSR Cell Size Colors Options O Measurable RMSDz FSR Classes 0 Create Z Diff Tiff file used to calculate RMSDz Returns 1/1.2/2.3/3.4/4.5/5.6/6.7/7 Select Classes
		TIN O Grid TIN method is the most accurate but may take substantially longer. Grid method may produce false excess-separation values. Max TIN Edge Length O Default O In Data Units
		Options for Measurable FSR Using clusters of single returns Search radius for single return clustering Classes Using classifications Classes 2/0 Ground (All) Select Classes Select Classes
	⊡ cc:	2 Test individual swaths for internal relative vertical accuracy using scan direction flags
		● TIN ○ Grid TIN method is the most accurate but may take substantially longer. Grid method may produce false excess-separation values.
		Exclusion Classes 7.18 Select Classes
	⊡ cc:	3 Test individual channels for channel to channel misalignment (when multi-channel data is being tested)
		● TIN ○ Grid TIN method is the most accurate but may take substantially longer. Grid method may produce false excess-separation values.
		Exclusion Classes 7,18 Select Classes



Standard Windows file selection controls are now implemented for more tool interfaces.

The standard Windows keyboard/mouse selection controls of 'Ctrl-click' and 'Shift-click' are now available for selecting and de-selecting files in many more tool interfaces. All tool interfaces that look similar to either:

Files to spatial index	
	Add
	Remove Selected
	Remove All
	Count 0

-- or –

Translate Files	
	Add
	Remove
	Remove All
	Count: 0

will allow the use of these Windows selection controls.

Enhancement made to the Delta X/Y plot in the 'Check Point Report' tool to aid in 3D check point analysis.

To make analysis of 3D check points easier when using the 'Check Point Report' tool, any *Type 3D* point rows selected in the individual check point table will have their corresponding point marker(s) highlighted by a small red circle ^① on the Delta X/Y circular plot.

Changes to QC Module Specification Selection Interface.

The QC Module Specification Selection Interface is now divided into 3 categories - USGS NGP LBS, ASPRS, Other - to further clarify each application.

MARS QC Specification Selection	on		_		\times
Please select a specification USGS NGP LBS ASPRS Other	USGS NGP LBS - 2025 rev. A USGS NGP LBS - 2024 rev. A USGS NGP LBS - 2023 rev. A USGS NGP LBS - 2023 rev. A USGS NGP LBS - 2022 rev. A USGS NGP LBS - 2020 rev. A USGS NGP - Version 1.2 USGS NGP - Version 1.2 USGS NGP - Version 1.0 Raster QC		_		
		0	К	Cance	l.



Collection Scan Renumbering Tool enhancement

An option was added to renumber all swaths in a folder to the same PSID.

Collection Scan Renumbering	—		×
Manual CSV			
Input Option			
◯ Single File			
LAS File New Collection Scan Number Change file source ID to match point source ID			
• Folder			
Folder to Process C:\MARS\Sample_Data			
Starting Collection Scan Number 150 Multi-Threading Incremental Number of threads to use	16		
Change file source ID to match point source ID			
Status			
	0	Clear	
		Run	
Help		Ca	ncel

Option to improve surface appearance of river polygons in two raster export types.

An option specific to the 'Grid – Cloud Optimized GeoTIFF DEM' and 'Grid - Float Grid' export types is available in the 'Post Processing' section of the Layout tab. When using a loaded 3D polyline breakline file to define the shorelines of river polygons, a pre-existing 2D polygon shapefile of river shorelines can be pathed out to improve the elevation modeling of the river surface in the output rasters.

o cxp	one ond -	Cloud Optimized GeoTIFF	- DEM		Sava Sattinga ta File	Load Settings from
					Save Settings to File	Load Settings from
utput	Layout Fil	ters Options Grid Pro	ojection			
F	ormat					
	O All Tile	s using MBR				
	 Selecte 	d Tile(s)				
F	File Name					
1.		e %Prefix %Attribute %Suffix % Prefix Suffix Existing Files				
	THE MITC				 Overwrite 	🔿 Skip
Т	Tile Shapefile					
	File	D:\MARS\Dump5\County	B2_Tile_Index.shp			Browse
	DB Field	tile_name	\sim			
C	lipping					
	Clippin	g Data Boundary File				Browse
P	ost Processi	ng				
	Optional 2	D hydro polygon Shapefile	D-\MARS\Dump5\C	ounty B2 hy 2D po	du aba	Browse



Bug Fixes

- Bug fixed in 'Flightline Separation Tiled GeoTIFF' export that caused RAM usage to reach 100% and crash.
- Bug fixed causing a blank display when the 'Swipe Raster Over LiDAR' tool was used.
- Bug fixed in some QC Module USGS versions that occasionally caused test DPH-9.1 to produce a blank raster and frequency distribution chart.
- Bug fixed causing incomplete Float Grid and Hillshade exports.
- Bug fixed in some QC Module USGS versions for test DPH-15 that caused blank rasters for projects with two or more separate boundary areas.
- Bug fixed that crashed MARS or produced no output if a second instance of 'LiDAR Workflow QC 2 LiDAR Calibration Checks' is run with test CC2 checked without closing and re-opening MARS first.
- Bug fixed causing the 'Help' buttons on both the 'Vertical Accuracy' and '3D Accuracy' interfaces of the 'Check Point Report' tool to report an error and not display the correct Help Topic.
- Bug fixed in the 'Check Point Report' tool causing updated XY measurements to revert back to previous values when the 3D Accuracy interface is closed and re-opened in the same MARS session.
- Bug fixed in some QC Module USGS versions for test DPH-9.1 that caused a crash if one or more DPA polygons contained lidar points with a single PSID.
- Bug fixed causing empty output when the 'Flightline Separation Tiled GeoTIFF' export type is run with the 'All Tiles using MBR' layout option and the lidar data is pathed out (not loaded).
- Bug fixed in 'Grid Cloud Optimized GeoTIFF DEM' export type causing Z errors at tile edges.
- Bug fixed that halted processing in the 'GPS Time Conversion' tool when using the 'GPS Adjusted Time to Week Time' option.
- Bug fixed for the 'Hillshade JPEG 2000' export type that failed to properly save the 'Algorithm' selection of 'Median Point of Cell' in the settings XML file.
- Bug fixed for 'Grid Cloud Optimized GeoTIFF DEM' and 'Grid Float Grid' export types that occasionally caused raster artifacts in water bodies when outputting by tile.



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