

# MakaiLay 4.0

## Upgrade



### TOP REASONS TO BUY

1. MakaiLay is the software of choice for cable installations with more than 200,000 route kilometers of cable laid worldwide.
2. Pre-layplanning with MakaiPlanPro and MakaiLay lowers the risk of installation failure to a level where the planner is comfortable that “the cable can be properly laid” if everything goes as planned. However, quality of the actual installation will depend on the at-sea operations and how well the personnel can cope with last-minute changes and emergency situations. Cable installations rarely go exactly as planned, and MakaiLay provides at-sea personnel with the tools to deal with these changing conditions.
3. Cable engineers no longer need to spend countless hours at-sea trying to guess the shape of the submerged cable based on “simplified steady-state” or “simplified transient” approximation tools. MakaiLay provides operators with a more sophisticated and validated model to greatly enhance their ability to deliver a properly installed system.
4. At any point in time MakaiLay provides a meaningful 3D-Model of the submerged cable, including

transients due to ship speed and course changes and those due to the effect of heavy optical amplifiers or cable transitions.

5. The operator can take advantage of MakaiLay’s AutoSlack feature to calculate how fast the cable engine should run in order to achieve target slack on the seabed. The operator may issue these instructions to the cable engine operator manually, via a graphic display, or the MakaiLay system can control the cable engine directly (on select cable engines).

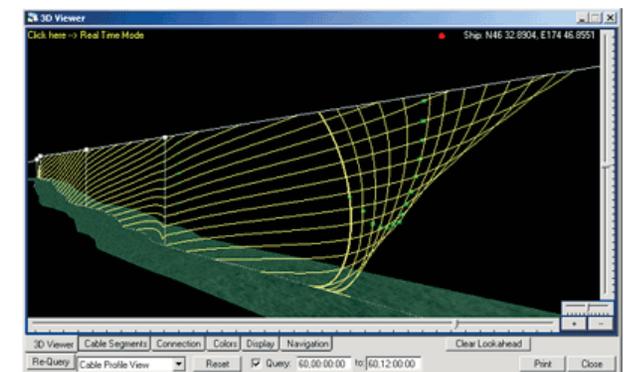
6. The code has undergone years of testing during sea trials and real cable installations by more than 30 new and highly automated cable laying vessels used by the military and the major telecom companies throughout the world. Most of the feature improvements have been driven by user requests.

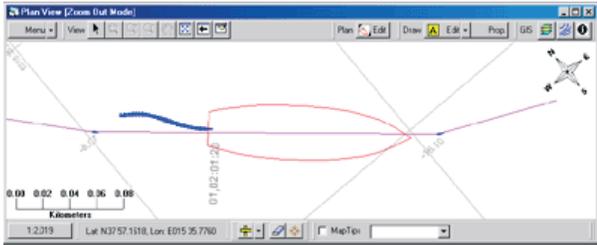
### TOP REASONS TO UPGRADE

MakaiLay 4.0 is the latest release of Makai’s at-sea installation software and is part of a complete suite of cable lay software that includes MakaiPlan and MakaiPlanPro. The new MakaiLay includes many new features since its original release in 2001.

Primary enhancements include:

1. Runs on Windows 7, 8, and XP.
2. The 3D Cable Model now has a Top Tension Control mode when laying cable under tension on the seafloor. The correlation between the numeric model and physical cable configuration is greatly improved since long-term cable length measurement errors do not affect the solution.
3. The software that models the cable dragging on the seabed (when tension at the touchdown is applied) has been improved.
4. The MakaiLay software now uses a Kalman filter for the ship speed and positions used for display and cable engine control. The filter is based on a





physical model of the ship motion and can be tuned to match the dynamics of the vessel in use and the present sea state conditions.

5. MakaiLay 4.0 is able to log (via serial cable) ocean currents measured in real-time with an Acoustic Doppler Current Profiler (ADCP). The current data are filtered and used by the 3D Cable Model to provide you with a more accurate cable shape and touchdown conditions during the installation.

6. Ability to log both cable engines and display real time tensions from both engines. Any data received via serial ports can be logged in a database and broadcast to the PC clients throughout the vessel for clients to monitor. This can be used for multiple cable engines or for any other data set.

7. Separate Plow and ROV data logging. When receiving data via serial cable, any ROV performance data may be logged to a database and broadcast on the network to the PC clients for display.

8. Safer and easier change of active ship plan and improved tools to merge back to the original plan.

9. Multiple path or ship plan points can be moved or deleted simultaneously during editing in the plan view. This is useful to make rapid changes of ship plan points during altercourses.

10. Warnings to operator if distance deviations or lag-times increase.

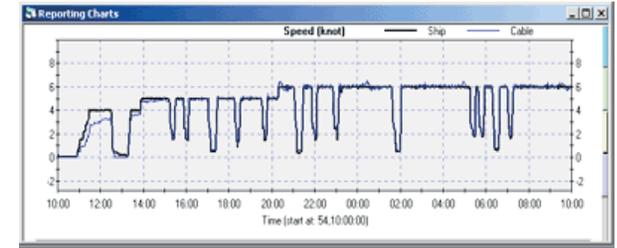
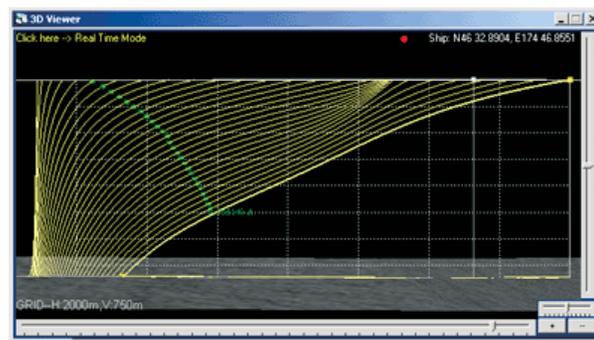
11. The GIS-Plan View can now be rotated to provide a more compact view of the vessel when it sails along track at any heading. A North arrow has also been added.

12. Direct control of cable engine speed is now possible with cable engines from select manufacturers. This feature is particularly beneficial during long transients where the ideal surface slack continuously changes. Manually controlling the cable engine speed during these conditions is operator intensive and tiresome. A recent Trans-Pacific cable lay, in water depths in excess of 7000 meters, was deployed by MakaiLay with fully automated control of the cable engine.

13. The improved 3D finite element cable model can also be used for applications such as seismic arrays, flexible pipes, and deployment of scientific and defense arrays. Over 100 cable bodies and joints can now be simultaneously modeled in the water column.

14. New reporting charts provide fast access to long-term trends in ship speed, cable engine speed and lay status information over the last 24 hours. Trend charts can be printed and annotated for daily reports on lay operations.

15. New fast dynamic tools compute optimum pay-



out rates during transients and emergency situations.

16. Improved utilities have been included for creating final As-Laid Positioning List in a GIS database and exporting results to AutoCAD compatible (DXF) format in various projections.

17. Improved RPL import utilities now exist which include bodies and slack changes.

18. Save and restore custom layout of windows. All the layout of the windows can now be saved and retrieved in a later session.

19. Ability to adjust the time of the first change point in the look-ahead.

20. A countdown timer was added to the look ahead to show the time left to work on the look ahead. Important to warn the user and prevent him from sending late instructions to the cable engine.

21. Ability to delete or move multiple look-ahead ship points in the plan view. This make easy to edit ship plan or refine an existing ship plan.

22. Customized variable for user defined tables. For example, we can define a new variable "cable model time delay", which will be monitored in real time, by subtracting the telegram time from the cable model solution time. Basically, user can define his own variables from the data being logged and display the values of the variable(s) in real-time.

The screenshot shows the 'Factory Distance Editor' window. At the top, there are controls for 'Path database' (Simply view), 'Roto' (Original, 150, -30, +30, 478), and 'Roto' (Original). Below this is a file path 'C:\Makai\Projects\Demo\Path1.plt.mdb' and a 'Browse' button. The main area is a table with columns: Index, Item, Type, Measured Cable Distances (Totals, Segment), Factory Distances (Segment, New Totals, Totals), Differences (Segment Diff, Cumul. Diff), and Cumul. Diff. The table contains 14 rows of data for various cable segments.

Index	Item	Type	Measured Cable Distances		Factory Distances			Differences	
			Totals	Segment	Segment	New Totals	Totals	Segment Diff	Cumul. Diff
141	FM143.2	JNT-L	2,353,311.2	9,200.4	9,259.0	2,350,585.3	2,350,881.0	21.4 (0.23%)	2,745.9
142	FM143.1	JNT-L	2,362,591.6	579.9	596.0	2,359,824.3	2,360,142.0	-16.2 (-1.63%)	2,762.3
143	G65 R142	RPTR-L	2,363,571.3	17,938.4	17,961.0	2,360,820.3	2,361,138.0	-32.6 (-0.13%)	2,751.0
144	FM142.1	JNT-L	2,381,509.8	27,571.6	27,751.0	2,378,781.3	2,379,099.0	-317.7 (-0.01%)	2,726.5
145	LW(C)	LW(C)	2,409,891.4	163.8	0.0	2,406,532.3	2,406,850.0	-317.7 (-0.01%)	2,549.1
146	G65 R140	RPTR-L	2,409,245.2	17,281.4	17,281.4	2,406,532.3	2,406,850.0	-317.7 (-0.01%)	2,712.8
147	SM140.A	JNT-L	2,426,526.5	22,891.2	22,891.2	2,423,813.7	2,423,813.7	0.0	2,712.8
148	FM140.2	JNT-L	2,449,417.7	4,642.8	4,644.0	2,446,704.9	2,447,635.0	-930.1 (-0.04%)	2,712.8
149	FM140.1	JNT-L	2,454,060.9	9,266.8	9,271.0	2,451,348.9	2,452,279.0	-930.1 (-0.04%)	2,711.6

23. The Helmsman's computer on the bridge can now display the target track line for the vessel based on the current MakaiLay instructions. By simply drawing a new route on the active MakaiLay workstation, the helmsman's computer will automatically show the updated track without any user intervention.

24. Switching between master and slave for the two MakaiLay workstations has been improved. The procedure is more efficient and requires less operator effort. The operator simply transfers all the remote MakaiLayClient users over to the secondary MakaiLay workstations by one mouse-click without any user intervention on the client computers.

25. The 3D Viewer now has the capability to display the bottom profile as a surface making it much easier to get a good 3D impression of the seabed. If a complete 3D terrain is available from survey data, selected portions can be shown in the 3D-Viewer.

26. The Track Status display now includes KP-based information such as "Distance to next AC" for selected vehicles such as ship or plow.

27. Annotations can be added to the GIS database

based on positions of multiple vehicles making it much easier to annotate the map with plow related events.

28. MakaiLay 4.0 has more efficient file storage for lay data and is backward compatible with lay data from previous versions. The system has mechanisms for preventing disk fragmentation which can potentially lower computer performance.

29. Post-lay analysis of cable length measurement errors can be completed and final as-laid results can be presented based on factory lengths or as-measured lengths. At-sea repairs require editing of the cable assembly and these revisions are highlighted, so that the operator can doublecheck and verify the distances of the new sections before creating official as-laid results.

30. Multiple enhancements have been made in user interface and preparation of final reports.

31. Many of the user interface improvements and tools from MakaiPlan 4.0 have been incorporated.

32. Your competition has it, shouldn't you?

Each upgrade includes a one-year maintenance contract. For more information and pricing, contact Makai Ocean Engineering.