Double-Crossed (Secret Solution)

Construction: Alex Walker, Sara Walker; Initial Concept: Eshan Mitra

Solvers going through the base path may notice that several clues feel unnecessarily stilted or vague, or that we've chosen one answer when an alternative seems like a much better fit. (The enumerations are meant to help disambiguate when this occurs.) This suggests that some additional constraint is at play. A bigger hint is given by clue 44A: *"Alignment aid that, if removed, would make this puzzle much harder!"*, which has the answer DIAGRAM.

In the spirit of making this puzzle harder, the solver can remove the DIAGRAM and solve it as a diagramless crossword. The solution to the diagramless puzzle is below at left.

Clue 44A now has answer X OVERLAP, which implies that the X's in this puzzle can act as alignment aids. There is one X in the original grid and one X in the diagramless crossword. After aligning the two grids so that their X's overlap, we see that 8 other characters agree. Read in page order these give a bonus answer, **AMIGA ONE**. (The X is only an alignment aid and is not part of the puzzle answer.)

1 O	2 D	3 E	4 S	■	5 S	6 W	7 A	8 N	■	9 S	10 U	11 B
12 R	O	O	M	■	13 P	E	S	O	■	14 C	F	O
15 B	O	N	O	■	16 A	T	T	H	17 E	H	O	P
■	■	■	18 K	19 I	D	■	20 R	A	V	I	■	■
■	21 P	22 E	E	T	A	■	23 O	R	I	N	24 G	■
25 O	L	D	D	A	Y	26 S	■	27 M	E	D	I	28 A
29 N	A	W	■	■	30 S	N	31 L	■	■	32 L	L	C
33 I	S	A	34 A	35 C	■	36 O	I	37 L	38 W	E	L	L
■	39 M	R	M	O	40 M	■	41 L	I	A	R	S	■
■	■	42 D	I	N	A	■	43 Y	E	T	■	■	■
44 X	45 O	V	E	R	L	46 A	P	■	47 S	48 A	49 M	50 E
51 M	R	I	■	52 A	T	R	A	■	53 O	P	A	L
54 L	E	I	■	55 D	Y	E	D	■	56 N	E	C	K

Diagramless Crossword

				N			A		13 R	E	A	L
18 F	A	R	M	G	I	R	L		U		S	
				U			43 S	T	I	L	L	
D	U	C	T	I	O	7 N			S		I	
				N		A			E		G	
			32 P	A	R	T	N	E	R	S	H	I
				L		I					T	
					16 T	O	N	49 S				
T	I	26 S	T	24 S		N		W				
		N		N		A		E			10 G	
X	T	O	F	O	U	R		E			A	
		W		R		47 M	U	T	U	A	L	
				K		Y		D			L	

Eigenletters in Overlapping Part of Criss-Cross

Construction Notes:

The original concept for this puzzle, a crossword that could be rearranged as a diagramless, was pitched early on in the development by Eshan Mitra. The base path extract, with special clues missing their numbers, was used as a cover story for the out-of-order numbering scheme in the base path. (If we numbered the grid entries in standard order, most of the theme entries would cluster near the top, since English phrases bias towards using smaller numbers.)

Construction began by finding an appropriate set of theme entries for the base path. Phrases were sourced from crossword dictionaries, OneLook, and the titles of Wikipedia articles. The extract order (clue order, as opposed to ascending numerical) was chosen to increase the number of entries with low numbers and thus improve the quality of the theme entries.

We next constructed the 13×13 diagramless crossword. Here, the main challenge was the high density of theme entries: ten entries that could match the clues for the theme entries for the base path, as well as XOVERLAP. To compound difficulty, the ten theme entries all had prescribed numbers (mostly clustered near the top of the grid and therefore overlapping) as well as prescribed orientations.

The final step was the construction of the base path puzzle. While setting the diagramless it became apparent that the original concept with two crosswords, one diagrammed and one diagramless, would be nearly impossible to construct in light of our other constraints. And even if we could build it, would the resulting clues be so vague as to make the diagramless unsolvable?

To have a chance at actually building this thing, we swapped the base path crossword for a criss-cross. This solved many problems and created a few more. One issue with criss-cross grids is that they typically have very few checked intersection squares. While it's easy to make a criss-cross grid with N words and N intersections, improvements past this bound quickly become difficult. (Bear in mind that at this point every entry in the criss-cross grid had a semantic constraint (sharing a clue with a word in the diagramless) as well as a prescribed orientation.)

The region of the criss-cross grid which overlaid with the diagramless (and therefore had eigenletter constraints) was built by hand. The remainder was built with computer assistance. For each fill entry, we created a list of acceptable paired words: for example, GILLS was allowed to pair with any one of LUNGS, SNORKEL(S), SCUBATANK(S), BLOWHOLE, FINS, or FLIPPERS. We then wrote a Python program to use depth-first search with heuristic pruning to identify clusters of candidate grid entries that produced many intersections. We iterated this process in chunks of 3-10 entries until the criss-cross grid was built. The final criss-cross grid has 94 intersections; entries have just over three checked cells on average and each entry has at least two checked cells.