Kryptos 2017: Challenge 2 Solution

In Challenge 2 we are given that the plaintext was encrypted using the Phillips cipher and are given a description of how the cipher works.

The spacing is preserved and we are told that the name "Jackson" likely occurs in the message. The only seven letter words are the first and the last and it appears the first word has a double letter as indicated by the MM but Jackson does not. We conclude that Jackson must be the last word.

Based on the description of the Philips Cipher we know there are 8 encryption grids and the plaintext was encrypted 5 letters at a time using the grids in order with the last word being Jackson.

grid	1	1	1	1	1	2	2		2	2	2	3	3		3	3	3	4	4		4	4		4	5	5	
CT	S	M	M	F	P	O	W		X	R	L	S	M		H	V	E	M	L		Y	A		A	R	L	
PT																											

grid	5	5	5	6	6		6	6		6	7	7		7	7	7	8	8	8		8	8	1	1	1	1	1
CT	L	E	P	Z	H		Q	V		B	D	M		P	O	Z	V	Z	S		P	L	G	Q	U	V	O
PT																					J	a	c	k	s	o	n

Using the fact that Jackson was replaced by PLGQUVO you can begin to build the grids 1 & 8. After some thought you can see that this gives us the following to start:

```
            #1                          #2                          #3                          #4

1        A                  2                           2                           2

2                           1        A                  3  I/J  K  L  M  N          3  I/J  K  L  M  N

3    I/J  K  L  M  N        3  I/J  K  L  M  N          1        A                  4  O       P  Q  R  S

4    O    P  Q  R  S        4 O      P  Q  R  S          4  O    P  Q  R  S          1        A

5    U    V  X  Y  Z        5 U      V  X  Y  Z          5  U    V  X  Y  Z          5  U      V  X  Y  Z



            #5                          #6                          #7                          #8

2                           3  I/J  K  L  M  N          3  I/J  K  L  M  N          3  I/J  K  L  M  N

3    I/J  K  L  M  N        2                           4  O    P  Q  R  S          4  O      P  Q  R  S

4    O    P  Q  R  S        4 O      P  Q  R  S          2                           5  U      V  X  Y  Z

5    U    V  X  Y  Z        5 U      V  X  Y  Z          5  U    V  X  Y  Z          2

1        A                  1        A                  1        A                  1        A
```

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Since the "S" is substituted with a "U" then the "T" must be missing in the fill which means there is a "T" in the codeword. Keeping that in mind you can start to decipher the code using the partially filled in tables. Based on the letter combinations of the partially deciphered plaintext you can continue to make guesses to fill in the table. In the end you will find that the following is the key:

	#1						#2						#3						#4				
1	W	A	T	C	H	2	B	D	E	F	G	2	B	D	E	F	G	2	B	D	E	F	G
2	B	D	E	F	G	1	W	A	T	C	H	3	I/J	K	L	M	N	3	I/J	K	L	M	N
3	I/J	K	L	M	N	3	I/J	K	L	M	N	1	W	A	T	C	H	4	O	P	Q	R	S
4	O	P	Q	R	S	4	O	P	Q	R	S	4	O	P	Q	R	S	1	W	A	T	C	H
5	U	V	X	Y	Z	5	U	V	X	Y	Z	5	U	V	X	Y	Z	5	U	V	X	Y	Z

	#5						#6						#7						#8				
2	B	D	E	F	G	3	I/J	K	L	M	N	3	I/J	K	L	M	N	3	I/J	K	L	M	N
3	I/J	K	L	M	N	2	B	D	E	F	G	4	O	P	Q	R	S	4	O	P	Q	R	S
4	O	P	Q	R	S	4	O	P	Q	R	S	2	B	D	E	F	G	5	U	V	X	Y	Z
5	U	V	X	Y	Z	5	U	V	X	Y	Z	5	U	V	X	Y	Z	2	B	D	E	F	G
1	W	A	T	C	H	1	W	A	T	C	H	1	W	A	T	C	H	1	W	A	T	C	H

Applying the key to the ciphertext yields the following plaintext:

meeting place moved to old dairy do not inform Jackson