TASK ORDER #24

Climate Database Modernization Program

April 1, 2003

TASK ORDER TITLE:
Keying of the Surface Airways Observation (SAO) Forms
1965-1981

Task objective: To key the hourly observations for selected stations in the U.S. The overall period will generally cover 1965-1981.

Task details:

- The contractor shall develop and implement a production system for ensuring the digital databases for keyed observational data are completed to the extent data are available in the Nation's Archives in the hourly observational database (1965-1981) maintained at the National Climatic Data Center (NCDC) in TD 3280.

- The contractor shall provide an accuracy rate of 99.5% of all keystrokes for station identification information and 99% of all other keystrokes entered. It is understood that the quality of some of the records are non-readable and allowances (special codes) will be established to indicate when data are unreadable.

- The data shall be provided via FTP. The contractor shall maintain a backup copy of all keyed data shipped to NCDC until the project is completed. These data shall also be made available via FTP to other organizations (e.g., a Regional Climate Center) that may be assisting NCDC under contract on this task.

- The contractor shall be responsible for ensuring that the correct station number, name, and data appear in the output files provided to NCDC. To meet this standard the data will be key entered and verified either by a second blind keying pass or through an automated QC system. NCDC will determine which method is to be used based on performance and cost. Additionally, in-depth validation checks shall be performed to ensure duplicate numbers, dates and data do not appear in the final version provided to NCDC for archiving.

- A preliminary quality control review will be conducted by NCDC to verify the aforementioned in-depth validation check.

- The contractor shall provide inventories by station number and name showing the number of observations keyed per year/month/day.

- Any keying problems later identified by NCDC shall be corrected by the contractor.

- Invoicing shall be done at a level agreeable to NCDC (e.g., at the file level). The level of detail is to be negotiated between NCDC and the contractor. NCDC must be satisfied that the level of information provided is sufficient for NCDC to verify clearly that the items being invoiced have been supplied by the contractor.

- NCDC will have a contact available to answer questions concerning the data to be keyed by the contractor upon encountering format inconsistencies. NCDC will also be available if any questions arise as to the assignment of station number and name.

- NCDC will provide a station list which will provide the specific stations and their keying hierarchy.

- Images of the original observational forms are generally available via WSSRD.

- The NCDC will provide a pre-keying inventory and comment summary (PICS) identifying changes required for images and indicies within WSSRD, and it provides clarifications and instructions for the keyers.

- The contractor shall produce a production plan to establish standards and schedules.

- See Attachment 1 for the output keying format.

- All recommendations or solutions from the contractor for improving performance or quality under this task order are encouraged.

Attachment 1

SAO 1965-1981 OUTPUT KEYING FORMAT

Data Records	Contents	Instructions
1-5	WBAN Number	Auto filled from NCDC WBAN list
6	,	Comma delimited
7-10	Year	e.g. 1965
11	,	Comma delimited
12-13	Month	e.g. 01 = January e.g. 02 = February . . 12 = December
14	,	Comma delimited
15-16	Day	Right justify, zero fill e.g. 01,02, ...31
17	,	Comma delimited
18-19	Observational type	Key only the hourly observations, these generally occur near the hour. Key only those records that contain a "R", "RS", or "SA"as part of the designator on the WBAN 10, WBAN 10-A, MF1-10A and MF1-10C forms. On the "B" part of the forms (WBAN 10-B or MF1-10B) each observation corresponds to the hourly (e.g. 0352) on the A form and will be keyed as part of the corresponding observation (00-23 hourly observations). IE may actually key the A and B separately, but bring them back together for the output. Left justify, blank fill e.g. if = R, then

		Position 18 =R
		Position 19 = Blank
		If entry is RS, then
		Position 18 = R
		Position 19 = S
		If entry = SA, then
		positions 18-19 = SA
		If entry is S, L, or SP on the A part of the form do not key the record. On the B forms there are no designators but each record entry is keyed as they correspond to the hourlies on the A form. If any question regarding which type are hourly observations contact NCDC for clarification. The C form is a combination of the A and B form and carries the same designators as the A form. Stations reporting on the C forms often only work limited hours (partial days).

20	,	Comma delimited
21	Time indicator	1 = Local Standard Time 2 = Greenwich Mean Time
22	,	Comma delimited
23-26	Time	Insure the proper time indicator is set in position 21 according to the time entries on the form (Local Standard Time or Greenwich Mean Time). Time entries are based on a 24 hour clock. Entries range from 0000-2400. e.g. if entry = 0957, Positions 23-26 = 0957. The entry time for the hourly observations should be the same on both the A and B forms.
27	,	Comma delimited
28-59	Sky and Ceiling	

	Ceiling defined (designator)	A ceiling is defined by inserting a letter in front of the Cloud group (see following list). A backslash (/) indicates that the height of high clouds (cirriform) is unknown and that they do not constitute a ceiling e.g. /-  U = Ceiling due to cirriform clouds of unknown height E = Estimated height (ceiling) M = Measured height (ceiling) B = Balloon Ascent R = Radar V = Variable ceiling W = Indefinite ceiling A = Aircraft Report
	Cloud amount	Numerical codes representing the cloud amounts per layer: 0 = clear or less than .1 coverage 1 = thin scattered 2 = scattered 3 = dark scattered 4 = thin broken 5 = broken 6 = dark broken 7 = thin overcast 8 = overcast 9 = dark overcast x = obscuration 10/10ths obscuration * = partial obscuration (-X)
28- 35	First cloud layer	
28	Ceiling letter designator	Only one of the cloud layers will be designated as the ceiling (the height

		ascribed to the lowest layer of clouds or obscuring phenomena when it is reported as broken, overcast, or obscuration (at least half the sky covered) and not classified “thin” or “partial”. e.g. M21 ⍿ 32 ⊕ Position 28 = M If the first layer did not constitute a layer then position 28 = blank
29	,	Comma delimited
30- 32	height (first cloud layer)	In example above the height is 2100 feet, therefore: position 30 = blank position 31 = 2 position 32 = 1
33	,	Comma delimited
34	Cloud amount	In example above = ⍿ (Broken) Position 34 = 5 (see list above)
35	,	Comma delimited
36-43	Second cloud layer	
36	Ceiling letter designator	in example above M21 ⍿ 32 ⊕ The second layer does not constitute a ceiling as the first layer designated the ceiling layer, therefore: position 36 = blank
37	,	Comma delimited

38-40	height (second layer)	In example above it is 3200 feet, thus position 38 = blank position 39 = 3 position 40 = 2
41	,	Comma delimited
42	Cloud amount (second layer)	In example above = ⊕ (Overcast) position 42 = 8
43	,	Comma delimited
44-51	Third cloud layer	
44	Ceiling letter designator	Same rules as above, leave blank if not designated as a ceiling.
45	,	Comma delimited
46-48	height (third layer)	Same rules as above. If no third layer blank fill
49	,	Comma delimited
50	Cloud amount (third layer)	same rules as above. If no third layer blank fill. e.g. if entry was 18 ⦶ M 34 ⦷ / ⦷ Position 44 = blank (ceiling at 3400 ft) Position 46 = blank Position 47 = blank Position 48 = / (backslash; unknown height) Position 50 = 5 (broken)
51	,	Comma delimited
52-59	Fourth Cloud Layer	

52	Ceiling letter designator	Same rules as above, leave blank if not designated as a ceiling. It would be rare to have a ceiling at the fourth cloud layer.
53	,	Comma delimited
54-56	height (fourth layer)	Same rules as above. If no fourth layer blank fill
57	,	Comma delimited
58	Cloud amount (fourth layer)	same rules as above. If no fourth layer blank fill.
59	,	Comma delimited
		If sky entry = W0X or W5X, then Position 28 = W Position 30 = blank Position 31 = blank Position 32 = 0(1st example) or 5 (2nd example) Position 34 = x (obscuration)
60-64	Visibility	Key surface visibility unless not available then key tower visibility Positions 60-62 = whole miles Positions 63-64 = fractions of miles e.g. if entry = 1 3/4 miles, then position 60 = blank position 61 = blank position 62 = 1 position 63 = 3 position 63 = 4
		Coding instructions for fractions of a mile: Entry Key

		1/16 16 1/8 18 1/4 14 5/16 56 3/8 38 1/2 12 5/8 58 3/4 34 7/8 78
65	,	Comma delimited
66-77	Weather and Obstructions To Vision	Position 66 = rain/rain showers Position 67 = thunderstorms/dust/hail Position 68 = freezing rain/ice pellets/ ice crystals Position 69 = snow/snow showers Position 70 = blowing snow/blowing dust Position 71 = blowing sand/smoke Position 72 = drizzle/freezing drizzle Position 73 = sleet/sleet showers Position 74 = snow pellets/snow grains Position 75 = fog/ground fog Position 76 = Ice Fog/Haze Position 77 = Tornado/Waterspout/ Funnel Cloud Intensity symbols (+, -, - -) are not attached to the following elements hail (A), small hail (AP) and ice crystals (IC)
66	Rain/Rain Showers	0 = Heavy Rain (R+) 1 = Moderate Rain (R) 2 = Light Rain (R-) 3 = Very Light Rain (R- -) 4 = Heavy Rain Showers (RW+) 5 = Moderate Rain Showers (RW) 6 = Light Rain Showers (RW-)

		7 = Very Light Rain Showers (RW- -)
67	Thunderstorms/Dust/ Hail	0 = Heavy Thunderstorm (T+) 1 = Moderate Thunderstorm (T) 2 = Light Thunderstorm (T-) 3 = Very Light Thunderstorm (T- -) 4 = Heavy Dust (D+) 5 = Moderate Dust (D) 6 = Light Dust (D-) 7 = Very Light Dust (D- -) 8 = Moderate Hail (A) 9 = Small Hail (AP)
68	Freezing Rain/ Ice Pellets/Ice Crystals	0 = Heavy Freezing Rain (ZR+) 1 = Moderate Freezing Rain (ZR) 2 = Light Freezing Rain (ZR-) 3 = Very Light Freezing Rain (ZR- -) 4 = Heavy Ice Pellets (IP+) 5 = Moderate Ice Pellets (IP) 6 = Light Ice Pellets (IP-) 7 = Very Light Ice Pellets (IP- -) 8 = Ice Crystals (IC)
69	Snow/Snow Showers	0 = Heavy Snow (S+) 1 = Moderate Snow (S) 2 = Light Snow (S-) 3 = Very Light Snow (S- -) 4 = Heavy Snow Showers (SW+) 5 = Moderate Snow Showers (SW) 6 = Light Snow Showers (SW-) 7 = Very Light Snow Showers (SW- -)
70	Blowing Snow/ Blowing Dust	0 = Heavy Blowing Snow (BS+) 1 = Moderate Blowing Snow (BS) 2 = Light Blowing Snow (BS-) 3 = Very Light Blowing Snow (BS- -) 4 = Heavy Blowing Dust (BD+) 5 = Moderate Blowing Dust (BD) 6 = Light Blowing Dust (BD-) 7 = Very Light Blowing Dust (BD- -)
71	Blowing Sand/Smoke	0 = Heavy Blowing Sand (BN+) 1 = Moderate Blowing Sand (BN) 2 = Light Blowing Sand (BN-)

		3 = Very Light Blowing Sand (BN- -) 4 = Heavy Smoke (K+) 5 = Moderate Smoke (K) 6 = Light Smoke (K-) 7 = Very Light Smoke (K - -)
72	Drizzle/Freezing Drizzle	0 = Heavy Drizzle (L+) 1 = Moderate Drizzle (L) 2 = Light Drizzle (L-) 3 = Very Light Drizzle (L- -) 4 = Heavy Freezing Drizzle (ZL+) 5 = Moderate Freezing Drizzle (ZL) 6 = Light Freezing Drizzle (ZL-) 7 = Very Light Freezing Drizzle (ZL- -)
73	Sleet/Sleet Showers	0 = Heavy Sleet (E+) 1 = Moderate Sleet (E) 2 = Light Sleet (E-) 3 = Very Light Sleet (E- -) 4 = Heavy Sleet Showers (EW+) 5 = Moderate Sleet Showers (EW) 6 = Light Sleet Showers (EW-) 7 = Very Light Sleet Showers (EW- -)
74	Snow Pellets/Snow Grains	0 = Heavy Snow Pellets (SP+) 1 = Moderate Snow Pellets (SP) 2 = Light Snow Pellets (SP-) 3 = Very Light Snow Pellets (SP- -) 4 = Heavy Snow Grains (SG+) 5 = Moderate Snow Grains (SG) 6 = Light Snow Grains (SG-) 7 = Very Light Snow Grains (SG- -)
75	Fog/Ground Fog	0 = Thick (Dense) Fog (F+) 1 = Moderate Fog (F) 2 = Light Fog (F-) 3 = Very Light Fog (F- -) 4 = Thick (Dense) Ground Fog (GF+) 5 = Moderate Ground Fog (GF) 6 = Light Ground Fog (GF-) 7 = Very Light Ground Fog (GF- -)
76	Ice Fog/Haze	0 = Thick (Dense) Ice Fog (IF+) 1 = Moderate Ice Fog (IF)

		2 = Light Ice Fog (IF-) 3 = Very Light Ice Fog (IF- -) 4 = Thick (Dense) Haze (H+) 5 = Moderate Haze = (H) 6 = Light Haze = (H-) 7 = Very Light Haze (H- -)
77	Tornado/Waterspout/ Funnel Cloud	0 = TORNADO 1 = WATERSPOUT 2 = FUNNEL CLOUD (Always spelled out in Capital Letters and written out in full)
78	,	Comma delimited
79-81	Sea Level Pressure (Millibars)	Sea Level Pressure entries include only the last three values of the pressure reading leaving the first two positions implied, e.g. if the observed value was 1014.4 millibars only the 144 would be entered on the form by the observer. If e.g. the observed value was 981.7 millibars only 817 would be entered on the form. e.g if entry is 989, then Position 79 = 9 Position 80 = 8 Position 81 = 9
82	,	Comma delimited
83-86	Dry Bulb Air Temperature	Dry Bulb Air Temperature in whole degrees Fahrenheit. Position 83 represents the sign field. If positive blank fill, if negative enter a dash (-). Positions 84-86 whole degrees. Blank fill. e.g. if entry is 103 Position 83 = blank Position 84 = 1 Position 85 = 0 Position 86 = 3 e.g. if entry is -16 Position 83 = - Position 84 = blank

		Position 85 = 1 Position 86 = 6
87	,	Comma delimited
88-90	Dew Point Temperature	Dew Point Temperature in whole degrees Fahrenheit. Position 88 represents the sign field. If positive blank fill, if negative enter a dash (-). Positions 89-90 whole degrees. Blank fill. e.g. if entry is -9 Position 88 = - Position 89 = blank Position 90 = 9 e.g. if entry is 79 Position 88 = blank Position 89 = 7 Position 90 = 9
91	,	Comma delimited
92-93	Wind Direction (Tens of Degrees)	36 point scale from 00-36, 00 represents calm. e.g. if entry is 30 Position 92 = 3 Position 93 = 0
94	,	Comma delimited
95-97	Wind Speed	right justify, blank fill. Speeds measured in knots. e.g. if entry is 8 Positions 95-96 = blank Position 97 = 8 e.g. if entry is 35 Position 95 = blank Position 96 = 3 Position 97 = 5 e.g. if entry is 103 Position 95 = 1 Position 96 = 0 Position 97 = 3
98	,	Comma delimited

99-102	Wind Character	
99	Character	key as entered, e.g. G = gusts Q = squalls
100-102	Value	e.g. entry = G36 Position 99 = G Position 100 = blank Position 101 = 3 Position 102 = 6 Note: a gust must be greater than the wind speed.
103	,	Comma delimited
104-106	Altimeter	key as entered e.g. entry = 005 positions 104-106 = 005 if entry = 995, then positions 104-106 = 995
107	,	Comma delimited
Additional information located on the 10C or 10B forms		
108-112	Barometer Station Pressure (Inches)	Station Pressure is recorded to a thousandth of an inch. If available key to inches and thousandths, decimal implied. e.g. if entry is 28.165 Positions 108-112 = 28165 Note: station pressure available on the 10, 10C, and 10B forms
113	,	Comma delimited
114-118	Dry Bulb Temperature	Dry bulb not a required entry, when available key, decimal implied Position 114 = sign field, positive = blank, negative = - positions 115-117 = whole degrees

		position 118 = tenths of degree e.g. entry = 69.3 position 114 = blank position 115 = blank positions 116-118 = 693
119	,	Comma delimited
120-123	Wet Bulb Temperature	The Wet Bulb Temperature is not a required entry but when available is measured to tenths of a degree. The Wet Bulb Temperature value always lies between the air (Dry Bulb) and Dew Point Temperature. Follow the same rules as for the air temperature entry above except that a wet bulb temperature of 100 F is unrealistic and therefore one less position is provided. Right justify and blank fill, decimal implied. Position 120 represents the sign field. If positive blank fill, if negative enter a dash (-). e.g. if entry is 46.1 Position 120 = blank Position 121-123 = 461
124	,	Comma delimited
125-127	Relative Humidity	The Relative Humidity is not a required entry but when available is measured to the nearest percent. Right justify, blank fill. e.g. if entry is 79 Position 125 = blank Position 126-127 = 79
128	,	Comma delimited
129-130	Total Sky Cover	Right justify, blank fill. 0 = Clear or less than .1 coverage 1 = Scattered clouds .1 coverage 2 = Scattered clouds .2 coverage 3 = Scattered clouds .3 coverage

		4 = Scattered clouds .4 coverage 5 = Scattered clouds .5 coverage 6 = Broken clouds .6 coverage 7 = Broken clouds .7 coverage 8 = Broken clouds .8 coverage 9 = Broken clouds .9 coverage 10 = Overcast 1.0 coverage 99 = Unknown Blank fill if blank e.g. if entry is 3 Position 130 = blank Position 131 = 3
131	,	Comma delimited
132-133	Cloud amount (Lowest layer)	Same rules as for total sky cover (positions 129-130)
134	,	Comma delimited
135-139	Cloud types (Lowest layer)	Key as entered, right justify blank fill See list of possible cloud types below
		Possible cloud type entries CU TCU STFRA SCSL SC ST CUFRA CB CBMAM AS NS AC ACSL ACCAS ACMAM CI CCSL CS CC
140	,	Comma delimited

141-144	Cloud height (Lowest layer)	position 141 = ceiling designator same rules as position 28 positions 142-144 = height in hundreds of feet e.g. entry = M32 position 141 = M position 142 = blank position 143 = 3 position 144 = 2 if entry = E250, then position 141 = E position 142 = 2 position 143 = 5 position 144 = 0
145	,	Comma delimited
146-147	Cloud amount (Second layer)	Same rules as for total sky cover (positions 129-130)
148	,	Comma delimited
149-153	Cloud types (Second layer)	Key as entered, right justify blank fill See list of possible cloud types above positions 135-139.
154	,	Comma delimited
155-158	Cloud height (Second layer)	Same rules as position 141-144
159	,	Comma delimited
160-161	Summation totals (following second layer)	Same rules as for total sky cover (positions 129-130)
162	,	Comma delimited
163-164	Cloud amount (Third layer)	Same rules as for total sky cover (positions 129-130)
165	,	Comma delimited
166-170	Cloud types (third layer)	Key as entered, right justify blank fill See list of possible cloud types above

		positions 135-139.
171	,	Comma delimited
172-175	Cloud height (Third layer)	Same rules as position 141-144
176	,	Comma delimited
177-178	Summation totals (following second layer)	Same rules as for total sky cover (positions 129-130)
179	,	Comma delimited
170-181	Cloud amount (Fourth layer)	Same rules as for total sky cover (positions 129-130)
182	,	Comma delimited
183-187	Cloud types (Fourth layer)	Key as entered, right justify blank fill See list of possible cloud types above positions 135-139.
188	,	Comma delimited
189-192	Cloud height (Fourth layer)	Same rules as position 141-144
193	,	Comma delimited
194-195	Total Opaque Sky Cover	See Total Sky Cover Positions 129-130 Above e.g. if entry is 10 Position 194 = 1 Position 195 = 0
196	,	Comma delimited
197	Pressure tendency	values = 0-9
198	,	Comma delimited

199-201	Net 3 hour change	leading decimal implied, right justify, zero fill. Values may range from 000 to 999 e.g. entry is .065, then position 199 = 0 position 200 = 6 position 201 = 5
202	,	Comma delimited
203-205	Precipitation	position 203 = whole inches positions 204-205 = hundredths of an inch decimal implied, right justify, blank fill If Trace (T) key T in position 205 and blank fill. If no precipitation reported (A blank entry) then blank fill. If greater than 9.99 then key 9++ (positions 203-205) e.g. entry = .35, then position 203 = blank position 204 = 3 position 205 = 5

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Note: Any values that are not readable then fill with a tilde (~).