



International Civil Aviation Organization

**EIGHTH MEETING OF THE ASIA/PACIFIC OPMET MANAGEMENT
TASK FORCE (OPMET/M TF/8)**

Bangkok, Thailand, 23 – 25 March 2010

Agenda Item 4: Management of OPMET exchange

- a) **OPMET monitoring and quality control procedures**
- **RODB backup procedures – contingency trials**

**RODB BACK-UP PROCEDURES' REAL-TIME EXERCISE
BETWEEN RODBS BANGKOK AND SINGAPORE**

(Presented by Thailand)

SUMMARY

This working paper provides information on the real-time exercise of the backup procedures and on the monitoring result, showing the availability of selected OPMET reports at Bangkok and Singapore RODBs conducted on 26 February 2010.

1 INTRODUCTION

1.1 The backup procedure to ensure the continuity of OPMET exchange with Europe and the availability of the ASIA/PAC OPMET on SADIS Gateway was established in April 2004. Bangkok RODB will take over Singapore's role when an interruption of telecommunication or system failure occurs in Singapore.

1.2 Two RODBs carried out the backup handover tests between Bangkok and Singapore on a yearly basis since 2006, normally in January

1.3 This paper presents the monitoring result of the fifth back-up exercise and the analysis of the availability and timeliness (in terms of transit time) of bulletins routing.

2. TEST PROCEDURES

2.1 Singapore and Bangkok RODBs agreed to monitor a list of selected ASIA/PAC OPMET bulletins during the exercise.

2.2 To activate the backup plan, both RODBs communicated through facsimile and email

2.3 On 26 Feb 2010, both RODBs exercised the plan between 0200 and 0800UTC. The test procedures were summarized as follows:

- Activation of Backup Procedure – initiated by Singapore at 0155UTC;
- Monitoring of data traffic – Bangkok took over the switching at 0200UTC
- Recovery phase – Bangkok stopped the transmission at 0800UTC.

2.4 Both RODBs recorded the reception and transmission of the monitored OPMET bulletins. The test result is presented in Attachment A.

3. ANALYSIS

Type of message	RX bulletins monitored by Singapore	RX bulletins monitored by Bangkok	TX bulletins routed to IROG London by Bangkok	Bulletins not successfully routed by Bangkok	Transmission Time recorded at Bangkok (minutes)		
					Max	Min	Average
METAR (SA)	463	463	455	8	66	1	14
TAF (FT)	81	81	77	4	59	1	17

3.1 Data availability and transit time

- Bangkok RODB was able to transmit 98.3% of the messages to SADIS gateway
- 1.7% of the messages were not successfully routed due to some minor problems as follows:
 - 8 METAR bulletins were received after Bangkok stopped the transmission at 0800UTC.
 - 2 TAF bulletins were received after Bangkok stopped the transmission at 0800UTC.
 - 2 TAF bulletins had compilation errors.
- Bulletin average transit time for METAR was 14 minutes and for TAF was 17 minutes.
 - Both METAR and TAF bulletins were heavily delayed in the routing process due to Bangkok's switching system (internal delay between Switching subsystems and OPMET database).

4. CONCLUSION

4.1 Bangkok is working towards resolving its delay problem in the switching system.

4.2 The reason for the lack of transmission of the remaining 1.7% was due to system compilation error, of which Bangkok will resolve this issue.

4.3 The backup exercise was well coordinated, both RODBs could respond to each other within 10 minutes through both email and facsimile.

4.4 There was no operational impact on both regional DBs during the exercise, but there was a problem with the Bangkok Switching System, which was caused by heavy delay on messages routed to SADIS gateway.

5. ACTION BY THE MEETING

5.1 The meeting is invited to discuss as follows:

- i) Review the adequacy of the existing procedures between the two RODBs and
- ii) Seek further improvement, if required, based on the result.

**1 Summary Table of Switching of ASIA/PAC & MID OPMET Bulletins
 on 26th February 2010**

METAR Bulletins							
	TTAAii	CCCC	YYGGgg	BBB	Recorded by WSSS RODB	Recorded by VTBB RODB	Recorded by VTBB RODB
					Rx Time UTC (hh:mm)	Rx Time UTC (hh:mm)	Tx Time UTC (hh:mm)
1	SASD31	OEJD	260000	RRC	01:59	01:57	01:59
2	SAID31	WIII	260130		01:40	01:57	01:59
3	SAID32	WIII	260130		01:40	01:58	01:59
4	SAID33	WIII	260130		01:40	01:58	02:00
5	SAAU32	YBBN	260130		01:40	01:59	02:00
6	SAAU31	YBBN	260130		01:40	01:59	02:00
7	SASD31	OEJD	260100	RRD	02:01	01:59	02:01
8	SAIN32	VIDP	260130		01:43	02:00	02:01
9	SABN32	OBBI	260100	RRA	02:09	02:03	02:05
10	SAAE31	VTBB	260130	RRM	02:06	02:04	02:06
11	SAAE31	VTBB	260200		02:07	02:05	02:06
12	SATH31	VTBB	260200		02:07	02:05	02:07
13	SATH32	VTBB	260200		02:07	02:06	02:07
14	SATH31	VTBB	260200	RRA	02:07	02:06	02:07
15	SAAE31	VTBB	260200	RRA	02:08	02:07	02:08
16	SAAE31	VTBB	260200	RRB	02:08	02:07	02:08
17	SAAE31	VTBB	260200	RRC	02:09	02:07	02:09
18	SAAE31	VTBB	260200	RRD	02:10	02:08	02:10
19	SAAE31	VTBB	260200	RRE	02:10	02:08	02:10
20	SATH33	VTBB	260200		02:11	02:08	02:11
21	SAAE31	VTBB	260200	RRF	02:11	02:08	02:11
22	SAPK31	OPKC	260200		01:59	02:09	02:11
23	SATH31	VTBB	260200	RRB	02:12	02:09	02:12
24	SATH31	VTBB	260200	RRC	02:12	02:09	02:12
25	SATH33	VTBB	260200	RRA	02:12	02:09	02:12
26	SAAE31	VTBB	260200	RRG	02:12	02:10	02:12
27	SAAE31	VTBB	260200	RRH	02:12	02:10	02:12
28	SAAE31	VTBB	260200	RRI	02:12	02:10	02:12
29	SATH33	VTBB	260200	RRB	02:13	02:11	02:13
30	SASD31	OEJD	260200		02:02	02:11	02:13
31	SAAE31	VTBB	260200	RRJ	02:13	02:11	02:13
32	SATH33	VTBB	260200	RRC	02:14	02:12	02:14
33	SAIN33	VECC	260150		02:02	02:12	02:14
34	SATH32	VTBB	260200	RRA	02:14	02:12	02:14
35	SAMS32	WMKK	260200		02:02	02:12	02:14
36	SATH32	VTBB	260200	RRB	02:14	02:13	02:14
37	SAMS31	WMKK	260200		02:03	02:13	02:15
38	SATH33	VTBB	260200	RRD	02:16	02:13	02:16
39	SATH33	VTBB	260200	RRE	02:17	02:14	02:17
40	SAKO31	RKSI	260200		02:04	02:14	02:17
41	SATH32	VTBB	260200	RRC	02:18	02:15	02:18
42	SACI31	ZBBB	260200		02:05	02:15	02:18
43	SASD31	OEJD	260200	RRA	02:09	02:15	02:18

METAR Bulletins							
	TTAAii	CCCC	YYGGgg	BBB	Recorded by WSSS RODB	Recorded by VTBB RODB	Recorded by VTBB RODB
					Rx Time UTC (hh:mm)	Rx Time UTC (hh:mm)	Tx Time UTC (hh:mm)
44	SATH31	VTBB	260200	RRD	02:18	02:16	02:18
45	SABN31	OBBI	260200		02:05	02:16	02:18
46	SAMS33	WMKK	260200		02:06	02:16	02:19
47	SAMS38	WMKK	260200		02:06	02:18	02:19
48	SANZ31	NZKL	260200		02:07	02:18	02:20
49	SACI41	ZBBB	260200		02:06	02:16	02:20
50	SAPK31	OPKC	260200	RRA	02:06	02:17	02:20
51	SAIN33	VECC	260150	RRA	02:06	02:17	02:20
52	SAAE31	VTBB	260200	RRK	02:21	02:18	02:21
53	SAJP32	RJTD	260200		02:06	02:18	02:21
54	SAJP32	RJTD	260200	RRA	02:06	02:18	02:22
55	SABN32	OBBI	260200		02:07	02:19	02:22
56	SACI31	ZBBB	260200	CCA	02:07	02:19	02:22
57	SAJP31	RJTD	260200		02:06	02:19	02:22
58	SAPK31	OPKC	260200	RRB	02:08	02:19	02:22
59	SATH33	VTBB	260200	RRF	02:23	02:20	02:23
60	SATH33	VTBB	260200	RRG	02:23	02:20	02:23
61	SAIR31	OIII	260200		02:10	02:21	02:23
62	SAID31	WIII	260200		02:10	02:21	02:23
63	SANG31	YBBN	260200		02:10	02:21	02:23
64	SAIR32	OIII	260200		02:10	02:21	02:23
65	SAHK31	VHHH	260200		02:10	02:22	02:24
66	SAID32	WIII	260200		02:10	02:22	02:24
67	SAID33	WIII	260200		02:10	02:22	02:25
68	SAAU31	YBBN	260200		02:10	02:23	02:26
69	SAAU32	YBBN	260200		02:10	02:23	02:26
70	SAIN32	VIDP	260200		02:12	02:24	02:26
71	SATH32	VTBB	260200	CCA	02:26	02:24	02:26
72	SASB31	VCCC	260210		02:20	02:29	02:30
73	SAAE31	VTBB	260230		02:36	02:35	02:36
74	SAAE31	VTBB	260230	RRA	02:37	02:36	02:37
75	SAAE31	VTBB	260230	RRB	02:38	02:36	02:38
76	SAAE31	VTBB	260230	RRC	02:39	02:37	02:39
77	SAPK31	OPKC	260230		02:29	02:37	02:39
78	SAAE31	VTBB	260230	RRD	02:40	02:38	02:40
79	SAAE31	VTBB	260230	RRE	02:42	02:41	02:42
80	SAAE31	VTBB	260230	RRF	02:44	02:41	02:43
81	SAHK31	VHHH	260230		02:34	02:44	02:45
82	SAKO31	RKSI	260230		02:34	02:44	02:46
83	SAAE31	VTBB	260230	RRG	02:46	02:45	02:46
84	SACI32	ZBBB	260200		02:05	02:46	02:47
85	SACI31	ZBBB	260230		02:35	02:47	02:48
86	SAID31	WIII	260230		02:40	02:51	02:52
87	SAAU32	YBBN	260230		02:40	02:51	02:53

METAR Bulletins							
	TTAAii	CCCC	YYGGgg	BBB	Recorded by WSSS RODB	Recorded by VTBB RODB	Recorded by VTBB RODB
					Rx Time UTC (hh:mm)	Rx Time UTC (hh:mm)	Tx Time UTC (hh:mm)
88	SAAU31	YBBN	260230		02:40	02:51	02:53
89	SAID32	WIII	260230		02:40	02:52	02:53
90	SAID33	WIII	260230		02:40	02:52	02:53
91	SAMS31	WMKK	260230		02:43	02:53	02:55
92	SAIN32	VIDP	260230		02:43	02:53	02:55
93	SAIN32	VIDP	260230	RRA	02:44	02:54	02:55
94	SAIN32	VIDP	260230	RRB	02:47	02:56	02:57
95	SAAE31	VTBB	260300		03:07	03:05	03:07
96	SATH31	VTBB	260300		03:07	03:06	03:07
97	SATH32	VTBB	260300		03:08	03:06	03:08
98	SATH33	VTBB	260300		03:08	03:06	03:08
99	SATH33	VTBB	260300	RRA	03:09	03:07	03:09
100	SAPK31	OPKC	260300		02:59	03:07	03:09
101	SATH33	VTBB	260300	RRB	03:09	03:08	03:09
102	SATH31	VTBB	260300	RRA	03:09	03:08	03:09
103	SAAE31	VTBB	260300	RRA	03:10	03:08	03:10
104	SATH32	VTBB	260300	RRA	03:10	03:09	03:10
105	SATH31	VTBB	260300	RRB	03:10	03:09	03:10
106	SAPK31	OPKC	260300	RRA	03:00	03:09	03:11
107	SAAE31	VTBB	260300	RRB	03:11	03:10	03:11
108	SAAE31	VTBB	260300	RRC	03:12	03:10	03:12
109	SAAE31	VTBB	260300	RRD	03:13	03:10	03:13
110	SASD31	OEJD	260300		03:05	03:11	03:13
111	SAIN33	VECC	260250		03:02	03:12	03:14
112	SAPK31	OPKC	260300	RRB	03:02	03:12	03:14
113	SAPK31	OPKC	260300	RRC	03:02	03:12	03:14
114	SAAE31	VTBB	260300	RRE	03:15	03:13	03:15
115	SAMS32	WMKK	260300		03:04	03:14	03:17
116	SATH31	VTBB	260300	RRC	03:17	03:15	03:17
117	SACI31	ZBBB	260300		03:05	03:15	03:17
118	SAHK31	VHHH	260300		03:05	03:15	03:17
119	SACI32	ZBBB	260300		03:05	03:16	03:18
120	SACI41	ZBBB	260300		03:06	03:16	03:18
121	SAMS33	WMKK	260300		03:06	03:16	03:19
122	SAMS38	WMKK	260300		03:06	03:16	03:19
123	SAJP31	RJTD	260300		03:06	03:17	03:19
124	SATH33	VTBB	260300	RRC	03:19	03:17	03:19
125	SAIN33	VECC	260250	RRA	03:06	03:17	03:19
126	SANZ31	NZKL	260300		03:07	03:17	03:19
127	SAJP32	RJTD	260300		03:06	03:18	03:20
128	SABN31	OBBI	260300		03:10	03:19	03:21
129	SAID31	WIII	260300		03:10	03:19	03:21
130	SAJP32	RJTD	260300	RRA	03:06	03:20	03:21
131	SAIR31	OIII	260300		03:10	03:20	03:21

METAR Bulletins							
	TTAAii	CCCC	YYGGgg	BBB	Recorded by WSSS RODB	Recorded by VTBB RODB	Recorded by VTBB RODB
					Rx Time UTC (hh:mm)	Rx Time UTC (hh:mm)	Tx Time UTC (hh:mm)
132	SAID32	WIII	260300		03:10	03:20	03:21
133	SATH32	VTBB	260300	RRB	03:22	03:20	03:22
134	SAID33	WIII	260300		03:10	03:21	03:22
135	SAIR32	OIII	260300		03:10	03:21	03:23
136	SANG31	YBBN	260300		03:10	03:21	03:23
137	SAAU32	YBBN	260300		03:10	03:22	03:25
138	SABN32	OBBI	260300		03:11	03:23	03:25
139	SAMS31	WMKK	260300		03:13	03:24	03:25
140	SASD31	OEJD	260300	RRA	03:28	03:26	03:28
141	SANG31	YBBN	260300	RRA	03:20	03:28	03:29
142	SASB31	VCCC	260310		03:20	03:28	03:30
143	SAID32	WIII	260300	RRA	03:10	03:29	03:31
144	SAID31	WIII	260300	RRA	03:11	03:29	03:31
145	SAID31	WIII	260300	RRB	03:15	03:31	03:31
146	SAID32	WIII	260300	RRB	03:15	03:31	03:32
147	SAAU31	YBBN	260300		03:10	03:33	03:36
148	SAID31	WIII	260300	RRC	03:26	03:34	03:36
149	SAAE31	VTBB	260330		03:37	03:35	03:37
150	SAAE31	VTBB	260330	RRA	03:38	03:35	03:38
151	SAPK31	OPKC	260330		03:29	03:35	03:38
152	SAAE31	VTBB	260330	RRB	03:38	03:36	03:38
153	SAAE31	VTBB	260330	RRC	03:38	03:36	03:38
154	SAAE31	VTBB	260330	RRD	03:39	03:36	03:39
155	SAAE31	VTBB	260330	RRE	03:39	03:36	03:39
156	SAAE31	VTBB	260330	RRF	03:41	03:40	03:41
157	SAHK31	VHHH	260330		03:32	03:41	03:43
158	SAAE31	VTBB	260330	RRG	03:44	03:42	03:44
159	SAKO31	RKSI	260330		03:34	03:44	03:46
160	SACI31	ZBBB	260330		03:35	03:44	03:46
161	SASD31	OEJD	260200	RRB	03:38	03:45	03:47
162	SASD31	OEJD	260300	RRB	03:38	03:46	03:47
163	SAIR31	OIII	260330		03:40	03:47	03:49
164	SAID31	WIII	260330		03:40	03:48	03:49
165	SAID32	WIII	260330		03:40	03:48	03:50
166	SAID33	WIII	260330		03:40	03:48	03:50
167	SAAU31	YBBN	260330		03:40	03:49	03:50
168	SAAU32	YBBN	260330		03:40	03:49	03:51
169	SAMS31	WMKK	260330		03:43	03:51	03:53
170	SAIR31	OIII	260330	RRA	03:44	03:52	03:53
171	SAIN32	VIDP	260330		03:43	03:55	03:57
172	SAID31	WIII	260330	RRA	03:41	04:02	04:04
173	SAAE31	VTBB	260400		04:07	04:05	04:06
174	SATH31	VTBB	260400		04:07	04:05	04:07
175	SATH32	VTBB	260400		04:07	04:06	04:07

METAR Bulletins							
	TTAAii	CCCC	YYGGgg	BBB	Recorded by WSSS RODB	Recorded by VTBB RODB	Recorded by VTBB RODB
					Rx Time UTC (hh:mm)	Rx Time UTC (hh:mm)	Tx Time UTC (hh:mm)
176	SATH33	VTBB	260400		04:08	04:06	04:08
177	SAPK31	OPKC	260400		03:59	04:06	04:08
178	SAAE31	VTBB	260400	RRA	04:08	04:06	04:08
179	SAAE31	VTBB	260400	RRB	04:08	04:07	04:08
180	SATH32	VTBB	260400	RRA	04:09	04:07	04:09
181	SAAE31	VTBB	260400	RRC	04:09	04:07	04:09
182	SATH33	VTBB	260400	RRA	04:10	04:08	04:10
183	SAAE31	VTBB	260400	RRD	04:10	04:08	04:10
184	SAPK31	OPKC	260400	RRA	04:01	04:08	04:11
185	SASD31	OEJD	260400		04:11	04:09	04:11
186	SAHK31	VHHH	260400		04:02	04:10	04:12
187	SAIN33	VECC	260350		04:02	04:11	04:13
188	SATH31	VTBB	260400	RRA	04:14	04:12	04:14
189	SAKO31	RKSI	260400		04:04	04:12	04:14
190	SAMS38	WMKK	260400		04:05	04:14	04:15
191	SACI31	ZBBB	260400		04:05	04:14	04:16
192	SACI32	ZBBB	260400		04:05	04:14	04:16
193	SAMS32	WMKK	260400		04:05	04:15	04:17
194	SASD31	OEJD	260400	RRA	04:08	04:15	04:17
195	SAMS33	WMKK	260400		04:06	04:16	04:18
196	SABN32	OBBI	260400		04:06	04:16	04:18
197	SATH31	VTBB	260400	RRB	04:19	04:17	04:19
198	SACI41	ZBBB	260400		04:06	04:17	04:19
199	SAIN33	VECC	260350	RRA	04:07	04:18	04:19
200	SANZ31	NZKL	260400		04:07	04:19	04:20
201	SABN31	OBBI	260400		04:07	04:18	04:20
202	SAJP31	RJTD	260400		04:07	04:18	04:20
203	SATH33	VTBB	260400	RRB	04:21	04:19	04:21
204	SAJP32	RJTD	260400	RRA	04:07	04:20	04:22
205	SAPK31	OPKC	260400	RRB	04:10	04:21	04:23
206	SAID31	WIII	260400		04:10	04:22	04:24
207	SAIR31	OIII	260400		04:10	04:22	04:24
208	SAID32	WIII	260400		04:10	04:22	04:24
209	SAID33	WIII	260400		04:10	04:23	04:24
210	SAIR32	OIII	260400		04:10	04:23	04:25
211	SAAU31	YBBN	260400		04:10	04:23	04:25
212	SAAU32	YBBN	260400		04:10	04:24	04:26
213	SANG31	YBBN	260400		04:10	04:24	04:27
214	SAMS31	WMKK	260400		04:13	04:26	04:30
215	SAID31	WIII	260400	RRA	04:11	04:29	04:31
216	SAID33	WIII	260400	RRB	04:11	04:29	04:31
217	SAID32	WIII	260400	RRA	04:14	04:30	04:31
218	SAIN32	VIDP	260400		04:20	04:31	04:33
219	SANG31	YBBN	260400	RRA	04:20	04:31	04:33

METAR Bulletins							
	TTAAii	CCCC	YYGGgg	BBB	Recorded by WSSS RODB	Recorded by VTBB RODB	Recorded by VTBB RODB
					Rx Time UTC (hh:mm)	Rx Time UTC (hh:mm)	Tx Time UTC (hh:mm)
220	SASB31	VCCC	260410		04:20	04:31	04:33
221	SAAE31	VTBB	260430		04:37	04:35	04:37
222	SAAE31	VTBB	260430	RRA	04:38	04:35	04:38
223	SAAE31	VTBB	260430	RRB	04:39	04:35	04:39
224	SAAE31	VTBB	260430	RRC	04:40	04:36	04:40
225	SAAE31	VTBB	260430	RRD	04:40	04:36	04:40
226	SAMS31	WMKK	260400	RRA	04:28	04:36	04:40
227	SAPK31	OPKC	260430		04:29	04:37	04:41
228	SAAE31	VTBB	260430	RRE	04:41	04:37	04:41
229	SAAE31	VTBB	260430	RRF	04:42	04:39	04:42
230	SAMS31	WMKK	260430		04:32	04:43	04:45
231	SAAE31	VTBB	260430	RRG	04:45	04:44	04:45
232	SAJP32	RJTD	260400		04:07	04:45	04:46
233	SAHK31	VHHH	260430		04:34	04:46	04:47
234	SAKO31	RKSI	260430		04:34	04:46	04:48
235	SAAE31	VTBB	260430	RRH	04:51	04:50	04:51
236	SAID31	WIII	260430		04:40	04:52	04:54
237	SAIR31	OIII	260430		04:40	04:53	04:55
238	SAID33	WIII	260430		04:40	04:53	04:55
239	SAIR31	OIII	260430	RRA	04:40	04:54	04:56
240	SAAE31	VTBB	260430	RRI	04:58	04:57	04:58
241	SAID32	WIII	260430	RRA	04:41	05:02	05:04
242	SAAU31	YBBN	260430		04:40	05:03	05:06
243	SATH31	VTBB	260500		05:07	05:05	05:07
244	SAAE31	VTBB	260500		05:07	05:05	05:07
245	SATH32	VTBB	260500		05:08	05:05	05:08
246	SATH33	VTBB	260500		05:08	05:05	05:08
247	SAAE31	VTBB	260500	RRA	05:08	05:06	05:08
248	SATH31	VTBB	260500	RRA	05:08	05:06	05:08
249	SAAE31	VTBB	260500	RRB	05:12	05:10	05:12
250	SAAU31	YBBN	260430	RRA	04:50	05:11	05:14
251	SAIN32	VIDP	260430		04:46	05:11	05:14
252	SAID31	WIII	260430	RRA	04:44	05:12	05:14
253	SATH32	VTBB	260500	RRA	05:15	05:12	05:15
254	SATH31	VTBB	260500	RRB	05:15	05:12	05:15
255	SAAU32	YBBN	260430		04:40	05:13	05:16
256	SAAE31	VTBB	260500	RRC	05:16	05:14	05:16
257	SAAE31	VTBB	260500	RRD	05:18	05:14	05:18
258	SATH32	VTBB	260500	RRB	05:19	05:16	05:19
259	SAAE31	VTBB	260500	RRE	05:19	5:16	5:19
260	SAAE31	VTBB	260500	RRF	05:20	5:16	5:20
261	SAAE31	VTBB	260500	RRG	05:20	5:18	5:20
262	SAAE31	VTBB	260500	RRH	05:21	5:19	5:21
263	SAPK31	OPKC	260500		04:59	5:20	5:22

METAR Bulletins							
	TTAAii	CCCC	YYGGgg	BBB	Recorded by WSSS RODB	Recorded by VTBB RODB	Recorded by VTBB RODB
					Rx Time UTC (hh:mm)	Rx Time UTC (hh:mm)	Tx Time UTC (hh:mm)
264	SATH31	VTBB	260500	RRC	05:22	05:21	05:22
265	SAAE31	VTBB	260500	RRI	05:24	5:23	5:24
266	SATH31	VTBB	260500	RRD	05:25	5:24	5:25
267	SAAE31	VTBB	260500	RRJ	05:25	5:24	5:25
268	SAAE31	VTBB	260500	RRK	05:27	5:25	5:27
269	SAIN33	VECC	260450		05:01	5:25	5:27
270	SAPK31	OPKC	260500	RRA	05:02	5:27	5:29
271	SAMS32	WMKK	260500		05:03	5:27	5:29
272	SAMS31	WMKK	260500		05:03	5:28	5:29
273	SAAE31	VTBB	260500	RRL	05:30	5:28	5:30
274	SAKO31	RKSI	260500		05:04	5:28	5:31
275	SAPK31	OPKC	260500	RRB	05:05	5:29	5:32
276	SACI31	ZBBB	260500		05:05	5:30	5:32
277	SACI32	ZBBB	260500		05:06	5:30	5:33
278	SACI41	ZBBB	260500		05:06	5:31	5:33
279	SANZ31	NZKL	260500		05:07	5:32	5:34
280	SAJP31	RJTD	260500		05:06	5:31	5:34
281	SAMS33	WMKK	260500		05:07	5:33	5:34
282	SAJP32	RJTD	260500		05:06	5:33	5:35
283	SAJP32	RJTD	260500	RRA	05:06	5:34	5:36
284	SACI41	ZBBB	260500	RRA	05:07	5:34	5:36
285	SAIN33	VECC	260450	RRA	05:07	5:34	5:34
286	SAAE31	VTBB	260530		05:37	5:35	5:37
287	SAAE31	VTBB	260530	RRA	05:37	5:35	5:37
288	SAID31	WIII	260500		05:10	5:36	5:38
289	SAID32	WIII	260500		05:10	5:36	5:38
290	SAID33	WIII	260500		05:10	5:37	5:38
291	SAHK31	VHHH	260500		05:10	5:37	5:39
292	SANG31	YBBN	260500		05:10	5:38	5:39
293	SAAU32	YBBN	260500		05:10	5:38	5:39
294	SAAU31	YBBN	260500		05:10	5:38	5:40
295	SAMS38	WMKK	260500		05:14	5:41	5:43
296	SACI31	ZBBB	260430		04:35	5:44	5:46
297	SAIN32	VIDP	260500	RRA	05:18	05:46	5:47
298	SANG31	YBBN	260500	RRA	05:20	5:47	5:48
299	SASB31	VCCC	260510		05:20	5:48	5:49
300	SAAE31	VTBB	260530	RRB	05:52	5:49	5:52
301	SAAE31	VTBB	260530	RRC	05:52	5:50	5:52
302	SAAE31	VTBB	260530	RRD	05:53	5:51	5:53
303	SAAE31	VTBB	260530	RRE	05:54	5:53	5:54
304	SABN31	OBBI	260500		05:27	5:57	5:59
305	SAIR31	OIII	260500		05:13	5:59	6:02
306	SAIR32	OIII	260500		05:13	5:59	6:02
307	SAAE31	VTBB	260530	RRF	06:02	6:00	6:02

METAR Bulletins							
	TTAAii	CCCC	YYGGgg	BBB	Recorded by WSSS RODB	Recorded by VTBB RODB	Recorded by VTBB RODB
					Rx Time UTC (hh:mm)	Rx Time UTC (hh:mm)	Tx Time UTC (hh:mm)
308	SABN32	OBBI	260500		05:13	6:01	6:04
309	SABN32	OBBI	260500	RRA	05:18	6:02	6:04
310	SAAE31	VTBB	260530	CCA	06:05	6:03	6:05
311	SAIR31	OIII	260500	RRA	05:28	6:03	6:06
312	SASD31	OEJD	260500	RRA	05:18	6:04	6:06
313	SAAE31	VTBB	260600		06:06	6:05	6:06
314	SATH31	VTBB	260600		06:07	6:05	6:06
315	SATH32	VTBB	260600		06:07	6:05	6:07
316	SATH33	VTBB	260600		06:08	6:06	6:08
317	SAAE31	VTBB	260600	RRA	06:08	6:06	6:08
318	SATH33	VTBB	260600	RRA	06:09	6:07	6:09
319	SAAE31	VTBB	260530	RRH	06:10	6:07	6:09
320	SAAE31	VTBB	260530	RRI	06:10	6:07	6:10
321	SATH31	VTBB	260600	RRA	06:10	6:08	6:10
322	SAHK31	VHHH	260530		05:30	6:08	6:11
323	SAAE31	VTBB	260530	RRJ	06:11	6:09	6:11
324	SATH32	VTBB	260600	RRA	06:11	6:09	6:11
325	SATH31	VTBB	260600	RRB	06:11	6:09	6:11
326	SAPK31	OPKC	260530	RRA	05:32	6:09	6:12
327	SAMS31	WMKK	260530		05:33	6:10	6:12
328	SAAE31	VTBB	260530	RRK	06:12	6:11	6:12
329	SAKO31	RKSI	260530		05:34	6:12	6:13
330	SAAE31	VTBB	260530	RRL	06:15	6:13	6:15
331	SACI31	ZBBB	260530		05:35	6:14	6:16
332	SAID31	WIII	260530		05:40	6:15	6:18
333	SAID32	WIII	260530		05:40	6:16	6:18
334	SAAU31	YBBN	260530		05:40	6:16	6:18
335	SAID33	WIII	260530		05:40	6:16	6:18
336	SAAU32	YBBN	260530		05:40	6:17	6:18
337	SAIN32	VIDP	260530		05:43	6:19	6:20
338	SATH32	VTBB	260600	RRB	06:22	6:21	6:22
339	SAAE31	VTBB	260600	RRB	06:28	6:27	6:28
340	SAAE31	VTBB	260600	RRC	06:29	6:28	6:29
341	SAAE31	VTBB	260600	RRD	06:30	6:29	6:30
342	SAAE31	VTBB	260600	RRE	06:31	6:29	6:31
343	SAAE31	VTBB	260600	RRF	06:31	6:30	6:31
344	SAPK31	OPKC	260600		05:59	6:31	6:33
345	SATH31	VTBB	260600	RRC	06:35	6:33	6:35
346	SAAE31	VTBB	260600	RRG	06:35	6:34	6:35
347	SAAE31	VTBB	260600	RRH	06:36	6:34	6:36
348	SAAE31	VTBB	260600	RRI	06:37	6:34	6:37
349	SAAE31	VTBB	260630		06:38	6:35	6:38
350	SAIN33	VECC	260550		06:02	6:36	6:39
351	SAMS31	WMKK	260600		06:03	6:37	6:39

METAR Bulletins							
	TTAAii	CCCC	YYGGgg	BBB	Recorded by WSSS RODB	Recorded by VTBB RODB	Recorded by VTBB RODB
					Rx Time UTC (hh:mm)	Rx Time UTC (hh:mm)	Tx Time UTC (hh:mm)
352	SATH31	VTBB	260600	RRD	06:40	6:37	6:40
353	SAAE31	VTBB	260600	RRJ	06:40	6:38	6:40
354	SAKO31	RKSI	260600		06:04	6:38	6:40
355	SAMS38	WMKK	260600		06:06	6:39	6:41
356	SACI31	ZBBB	260600		06:05	6:40	06:41
357	SACI32	ZBBB	260600		06:05	6:40	06:42
358	SACI41	ZBBB	260600		06:06	6:41	6:42
359	SAJP31	RJTD	260600		06:06	6:41	6:43
360	SAIN33	VECC	260550	RRA	06:06	6:41	6:43
361	SAJP32	RJTD	260600		06:06	6:43	6:44
362	SANZ31	NZKL	260600		06:07	6:43	6:44
363	SAJP32	RJTD	260600	RRA	06:06	6:43	6:44
364	SANG31	YBBN	260600		06:10	6:44	6:45
365	SAHK31	VHHH	260600		06:10	6:45	6:46
366	SAAU31	YBBN	260600		06:10	6:45	6:47
367	SAID32	WIII	260600		06:10	6:45	6:47
368	SAID33	WIII	260600		06:10	6:45	6:47
369	SAMS33	WMKK	260600		06:11	6:46	6:48
370	SAID31	WIII	260600		06:10	6:46	6:48
371	SAAU32	YBBN	260600		06:10	6:47	6:49
372	SAMS32	WMKK	260600		06:13	6:47	6:50
373	SAMS32	WMKK	260600	CCA	06:16	6:49	6:50
374	SAMS31	WMKK	260600	CCA	06:16	6:50	6:50
375	SANG31	YBBN	260600	RRA	06:20	6:51	6:52
376	SASB31	VCCC	260610		06:20	6:51	6:53
377	SAAE31	VTBB	260630	RRA	06:54	6:52	6:54
378	SAAE31	VTBB	260630	RRB	06:57	6:55	6:57
379	SAAE31	VTBB	260630	RRC	06:58	6:56	6:58
380	SAAE31	VTBB	260630	RRD	06:58	6:56	6:58
381	SAID32	WIII	260600	RRA	06:10	06:57	6:58
382	SAAE31	VTBB	260630	RRE	06:59	6:57	6:59
383	SAAE31	VTBB	260630	RRF	07:01	06:59	7:01
384	SAPK31	OPKC	260630		06:29	06:59	7:01
385	SAPK31	OPKC	260630	RRA	06:30	07:00	7:02
386	SAAE31	VTBB	260630	RRG	07:02	07:01	7:02
387	SAHK31	VHHH	260630		06:31	07:01	07:03
388	SAAE31	VTBB	260630	RRH	07:03	07:02	07:03
389	SAAE31	VTBB	260630	RRI	07:04	07:02	07:04
390	SAMS31	WMKK	260630		06:32	07:04	07:06
391	SAAE31	VTBB	260700		07:08	07:05	07:08
392	SATH31	VTBB	260700		07:08	07:06	07:08
393	SATH32	VTBB	260700		07:09	07:06	07:09
394	SATH33	VTBB	260700		07:09	07:06	07:09
395	SATH32	VTBB	260700	RRA	07:09	07:06	07:09

METAR Bulletins							
	TTAAii	CCCC	YYGGgg	BBB	Recorded by WSSS RODB	Recorded by VTBB RODB	Recorded by VTBB RODB
					Rx Time UTC (hh:mm)	Rx Time UTC (hh:mm)	Tx Time UTC (hh:mm)
396	SATH32	VTBB	260700	RRB	07:09	07:06	07:09
397	SACI31	ZBBB	260630		06:35	07:06	07:09
398	SATH31	VTBB	260700	RRA	07:10	07:07	07:10
399	SAAE31	VTBB	260630	RRJ	07:11	07:07	07:11
400	SATH33	VTBB	260700	RRA	07:11	07:07	07:11
401	SAPK31	OPKC	260630	RRB	06:39	07:08	07:11
402	SATH33	VTBB	260700	RRB	07:11	07:08	07:11
403	SAAE31	VTBB	260700	RRA	07:11	07:08	07:11
404	SATH33	VTBB	260700	RRC	07:12	07:08	07:12
405	SAID31	WIII	260630		06:40	07:08	07:12
406	SAID32	WIII	260630		06:40	07:08	07:12
407	SAID33	WIII	260630		06:40	07:09	07:12
408	SATH32	VTBB	260700	RRC	07:13	07:09	07:13
409	SAAU32	YBBN	260630		06:40	07:09	07:13
410	SAAU31	YBBN	260630		06:40	07:09	07:13
411	SAIN32	VIDP	260630		06:42	07:10	07:13
412	SAMS32	WMKK	260600	RRA	06:43	07:10	07:13
413	SAID31	WIII	260630	RRA	06:44	07:15	07:16
414	SAID31	WIII	260600	RRA	06:11	07:16	07:17
415	SAID32	WIII	260630	RRA	06:43	07:19	07:21
416	SATH32	VTBB	260700	RRD	07:22	07:20	07:22
417	SAAE31	VTBB	260700	RRB	07:23	07:21	07:23
418	SAAE31	VTBB	260700	RRC	07:23	07:22	07:23
419	SAAE31	VTBB	260700	RRD	07:25	07:22	07:25
420	SAAE31	VTBB	260700	RRE	07:25	07:23	07:25
421	SAAE31	VTBB	260700	RRF	07:26	07:23	07:26
422	SATH32	VTBB	260700	RRE	07:26	07:24	07:26
423	SAPK31	OPKC	260700		06:59	07:26	07:27
424	SAAE31	VTBB	260700	RRG	07:30	07:28	07:30
425	SAPK31	OPKC	260700	RRA	07:01	07:29	07:31
426	SATH31	VTBB	260700	RRB	07:32	07:29	07:32
427	SAIN33	VECC	260650		07:01	07:30	07:32
428	SAHK31	VHHH	260700		07:03	07:30	07:32
429	SAMS31	WMKK	260700		07:03	07:30	07:32
430	SAMS32	WMKK	260700		07:03	07:31	07:33
431	SACI31	ZBBB	260700		07:05	07:34	07:37
432	SAAE31	VTBB	260730		07:37	07:35	07:37
433	SAID31	WIII	260630	RRB	06:58	07:36	07:37
434	SACI32	ZBBB	260700		07:05	07:36	07:37
435	SAAE31	VTBB	260730	RRA	07:38	07:36	07:38
436	SAMS33	WMKK	260700		07:05	07:37	07:39
437	SACI41	ZBBB	260700		07:06	07:37	07:39
438	SAAE31	VTBB	260700	RRH	07:39	07:37	07:39
439	SAJP31	RJTD	260700		07:06	07:38	07:40

METAR Bulletins							
					Recorded by WSSS RODB	Recorded by VTBB RODB	Recorded by VTBB RODB
	TTAAii	CCCC	YYGGgg	BBB	Rx Time UTC (hh:mm)	Rx Time UTC (hh:mm)	Tx Time UTC (hh:mm)
440	SAIN33	VECC	260650	RRA	07:06	07:38	07:40
441	SANZ31	NZKL	260700		07:07	07:40	07:42
442	SAJP32	RJTD	260700		07:06	07:39	07:42
443	SAJP32	RJTD	260700	RRA	07:06	07:40	07:42
444	SAID31	WIII	260700		07:10	07:43	07:44
445	SAID32	WIII	260700		07:10	07:43	07:45
446	SAAU31	YBBN	260700		07:10	07:44	07:46
447	SAAU32	YBBN	260700		07:10	07:44	07:48
448	SAID33	WIII	260700		07:10	07:44	07:48
449	SANG31	YBBN	260700		07:10	07:44	07:48
450	SAID32	WIII	260700	RRA	07:10	07:45	07:48
451	SAID31	WIII	260700	RRA	07:10	07:48	07:49
452	SAIN32	VIDP	260700		07:12	07:48	07:50
453	SAMS38	WMKK	260700		07:14	07:50	07:50
454	SAID32	WIII	260700	RRB	07:11	07:50	07:52
455	SASB31	VCCC	260710		07:20	07:59	08:00
456	SAHK31	VHHH	260730		07:31	08:13	Not distribute
457	SAKO31	RKSI	260730		07:34	08:14	Not distribute
458	SAMS31	WMKK	260730		07:34	08:14	Not distribute
459	SACI31	ZBBB	260730		07:35	08:15	Not distribute
460	SAAU31	YBBN	260730		07:40	08:21	Not distribute
461	SAAU32	YBBN	260730		07:40	08:21	Not distribute
462	SAID31	WIII	260730		07:40	08:10	Not distribute
463	SAIN32	VIDP	260730		07:46	08:24	Not distribute

TAFOR Bulletins							
	TTAAii	CCCC	YYGGgg	BBB	Recorded by WSSS RODB	Recorded by VTBB RODB	Recorded by VTBB RODB
					Rx Time UTC (hh:mm)	Rx Time UTC (hh:mm)	Tx Time UTC (hh:mm)
1	FTKO31	RKSI	260205	AAA	02:11	02:24	02:26
2	FTJP32	RJTD	252000	AAD	02:05	02:14	02:18
3	FTJP31	RJTD	260200		02:57	03:03	03:06
4	FTJP31	RJTD	260200	RRA	02:57	03:03	03:06
5	FTJP32	RJTD	260200		02:57	03:04	03:06
6	FTJP32	RJTD	260200	RRB	02:57	03:04	not distribute
7	FTJP32	RJTD	260200	RRC	02:57	03:05	03:08
8	FTJP32	RJTD	260200	RRA	02:57	03:12	03:16
9	FTIR31	OIII	260400		03:08	03:17	03:21
10	FTIR32	OIII	260400		03:08	03:17	03:21
11	FTIR33	OIII	260400		03:08	03:18	03:21
12	FTJP32	RJTD	260200	AAA	03:29	03:37	03:39
13	FTNG31	YBBN	260300	AAB	03:59	04:06	not distribute
14	FTAU33	YBBN	260400	AAI	04:05	04:13	04:15
15	FTIN31	VABB	260300	PAA	04:06	04:15	04:17
16	FTIN31	VABB	260300	PZB	04:06	04:16	04:17
17	FTIN32	VABB	260300		04:06	04:17	04:19
18	FTAU31	YBBN	260400	AAF	04:10	04:24	04:29
19	FTAU33	YBBN	260400	AAJ	04:10	04:25	04:29
20	FTIN31	VABB	260300	RRA	04:19	04:30	04:32
21	FTAU33	YBBN	260400	AAK	04:22	04:32	04:34
22	FTIN31	VABB	260300	RRB	04:33	04:44	04:46
23	FTJP32	RJTD	260200	AAB	04:34	04:45	04:47
24	FTAU31	YBBN	260400	AAG	04:43	04:59	05:01
25	FTAE32	VTBB	260500		05:03	05:01	05:03
26	FTTH31	VTBB	260500		05:03	05:01	05:03
27	FTTH33	VTBB	260500		05:04	05:01	05:03
28	FTKO31	RKSI	260445	AAA	04:53	05:12	05:14
29	FTAE31	VTBB	260500		05:04	05:01	05:04
30	FTAE33	VTBB	260500		05:04	05:01	05:04
31	FTAE32	VTBB	260500	RRA	05:04	05:02	05:04
32	FTAE31	VTBB	260500	RRA	05:04	05:02	05:04
33	FTTH32	VTBB	260500		05:05	05:03	05:05
34	FTAU32	YBBN	260400	AAC	04:45	05:03	05:06
35	FTNG31	YBBN	260400		04:45	05:03	05:06
36	FTAE31	VTBB	260500	RRB	05:06	05:04	05:06
37	FTKO31	RKSI	260205	CCA	04:57	05:17	05:19
38	FTAE33	VTBB	260500	RRA	05:09	05:06	05:09
39	FTTH32	VTBB	260500	RRA	05:09	05:07	05:09
40	FTNZ31	NZKL	260459		04:59	05:21	05:23
41	FTTH32	VTBB	260500	RRB	05:10	05:09	05:10
42	FTIN31	VABB	260300	RRC	04:48	05:09	05:10
43	FTAE31	VTBB	260500	RRC	05:14	05:12	05:14
44	FTBN31	OBBI	260500		04:53	05:13	05:16
45	FTAE31	VTBB	260500	RRD	05:18	05:15	05:18
46	FTJP32	RJTD	260200	AAC	04:56	05:16	05:20

TAFOR Bulletins							
	TTAAii	CCCC	YYGGgg	BBB	Recorded by WSSS RODB	Recorded by VTBB RODB	Recorded by VTBB RODB
					Rx Time UTC (hh:mm)	Rx Time UTC (hh:mm)	Tx Time UTC (hh:mm)
47	FTAU31	YBBN	260500		05:00	05:21	05:23
48	FTAU32	YBBN	260500		05:00	05:21	05:23
49	FTAU33	YBBN	260500	PAA	05:00	05:22	05:23
50	FTAU33	YBBN	260500	PZB	05:00	05:22	05:23
51	FTHK31	VHHH	260500		05:01	05:23	05:25
52	FTCI31	ZBBB	260500		05:02	05:25	05:28
53	FTCI32	ZBBB	260500		05:02	05:25	05:28
54	FTCI41	ZBBB	260500		05:02	05:26	05:28
55	FTAU32	YBBN	260500	AAA	05:02	05:27	05:29
56	FTSR31	WSSS	260500		05:05	05:29	05:32
57	FTKO31	RKSI	260500		05:05	05:29	05:32
58	FTAU33	YBBN	260500	AAA	05:06	05:31	05:33
59	FTSR32	WSSS	260500		05:08	05:34	05:36
60	FTAU33	YBBN	260500	AAB	05:08	05:34	05:36
61	FTAU33	YBBN	260500	AAC	05:09	05:35	05:38
62	FTSR33	WSSS	260500		05:11	05:38	05:41
63	FTIN32	VABB	260300	RRA	05:12	05:39	05:41
64	FTAE31	VTBB	252300	RRA	05:42	05:40	05:42
65	FTAU33	YBBN	260500	AAD	05:13	05:40	05:43
66	FTAU32	YBBN	260500	AAB	05:16	05:44	05:46
67	FTAU31	YBBN	260500	AAA	05:17	05:45	05:47
68	FTAU34	YBBN	260500	RRB	05:20	05:48	05:50
69	FTAU34	YBBN	260500	RRA	05:00	05:55	05:56
70	FTSD31	OEJD	260500		05:27	05:56	05:58
71	FTBN32	OBBI	260200		05:28	06:02	06:04
72	FTBN32	OBBI	260500	RRA	05:28	06:04	06:08
73	FTAU33	YBBN	260500	RRA	05:40	06:16	06:18
74	FTJP32	RJTD	260200	AAD	06:28	06:58	07:00
75	FTAU32	YBBN	260600	AAC	06:30	07:00	07:02
76	FTAU34	YBBN	260700		07:00	07:27	07:29
77	FTAU34	YBBN	260700	AAA	07:04	07:32	07:33
78	FTAU32	YBBN	260700	AAD	07:05	07:33	07:36
79	FTAU34	YBBN	260700	RRA	07:10	07:44	07:48
80	FTJP32	RJTD	260200	AAE	07:31	08:13	not distributed (received after 08Z)
81	FTAE33	YBBN	260700	AAE	07:36	08:17	not distributed (received after 08Z)