Satellite and Weather Information for Disaster Resilience in Africa

"A Contribution to Disaster Risks Reduction and Climate Resilience"

DESIGN, SUPPLY, INSTALLATION AND MAINTENANCE OF THE PAYLOAD DATA ACQUISITION AND PROCESSING (PDAP) SUB-SEGMENT OF THE SAWIDRA RARS GROUND SEGMENT

FAT Follow-up

SOLETOP

1. Demodulator (SAWIDRA-AC-001)

- **Action Item ID: SAWIDRA-AC-001**
- **Non-Conformance Report ID: SAWIDRA-NCR-002**
- **Implementor: SOLETOP**
- **Subject:** Demodulator support EPS-SG and FY-3E
- **Description:**
  EPS-SG and FY-3E satellite are not available currently. SOLETOP provides D-300 and replace HRD-200 and LRD-200 for acquiring EPS-SG and FY-3E.
- **Contractor Response/Intended Method:**
  SOLETOP is to provide 4 sets of new Orbital D-300 demodulators to replace supplied HRD-200 and LRD-200 when it is available. (delivery is expected in the 1st quarter 2020 according to manufacturer). D-300 demodulator will fulfill the requirement. This response was offered during the kick-off meeting and reconfirmed during FAT.
- **Current Status & Plan:**
  Orbital D-300 demodulator production has delayed and we are now looking at delivering them in Q3 2020. This should not be a problem since EPS-SG and FY-3E is not launched. SOLETOP will deliver this and swap them with existing HRD200 as soon as it became available.

2. S/W Development (SAWIDRA-AC-002)

- **Action Item ID: SAWIDRA-AC-002**
- **Non-Conformance Report ID: SAWIDRA-NCR-003 ~ 005**
- **Implementor: SOLETOP**
- **Subject:** PinkMatter S/W will test all Fail (F) / Partial Pass (PP) / UT (Un-tested) requirement on SIT.
- **Description:**

✓ Fail (F) / Partial Pass (PP) / UT (Un-tested) requirement's total is 56 items.

*** Pass (P) / Fail (F) / Partial Pass (PP) / UT (Un-tested)**

Requirements	Test Item	P	PP	F	UT	N/A
Direct Broadcast Acquisition (DBA) Subsystem	20	10	2	2	3	3
Payload Data Processing (PDP) Subsystem	16	11	0	1	4	0
Dissemination (DISS) Subsystem	11	4	0	0	7	0
Archiving (ARC)	4	0	0	0	4	0
Monitoring and Control (M&C) Subsystem	18	1	6	0	11	0
Interface	9	8	0	0	1	0
Infrastructure	18	11	3	1	3	0
Performance	4	2	2	0	0	0
Reliability, Availability, Maintainability and Safety (RAMS)	9	2	1	0	4	2
Operational	2	1	0	0	1	0
SUM	**111**	**50**	**14**	**4**	**38**	**5**

✓ **Acquisition of partial passes**
The acquisition of partial passes needs to be implemented within FarEarth software package that would make it possible to receive partial passes from any SAWIDRA mission. This mainly affects the scheduling of mission contacts. Currently passes are only scheduled if a complete pass is in contact with the antenna. If multiple passes overlap the station footprint, priority missions must be downlinked first after which the next highest priority mission must be downlinked. The partial contacts must have a minimum temporal range of 6 minutes (configurable). The max delay for acquisition between partial passes, must be less than 2 minutes. The implementational changes will require that planned schedules are not only based on full contacts with a 5-degree elevation mask, but also a minimum temporal span (configurable).

✓ **Segmentation**
The acquisition of passes, must be able to generate pass segments. These pass segments must be processed as soon as the segment is available. Segments must be split on a maximum temporal span (1~2 minutes, configurable). Segments that are generated cannot be too small, it is suspected that segment that are smaller than 30s long might introduce processing problems. Using a segmented approach of telemetry reception will greatly help with the timeliness of higher level products. It must also be possible to stitch/mosaic the segments back into a single product.

✓ **Centralized M&C / Monitoring and control functions**
Centralized M&C, needs to be added to assist any operator of the ground segment. This must include monitoring hardware statuses, disk usage levels, processing loads, memory loads, connectivity between all devices required for operations. Alarms must be added that visually display where

possible attention is needed. The operator must be able to get logs/events that were associated with anomalies or routine operations. The operator may also be able to add/remove/prioritize missions. The usage must be simple enough to execute operations in a timely manner.

- **Contractor Response/Intended Method:**
  SOLETOP & PinkMatter implements the functions prior to the SIT.

- **Current Status & Plan:** Separate review session must be scheduled by PinkMatter

  ✓ In January, SOLETOP provided a server to be used with Orbital's test antenna. This has been set up toward the end of January. Coincidently Orbital systems became a victim of ransomware which delayed PinkMatter 's access to the machine. However, PinkMatter continue on the development progress without reliable access to the set up. Orbital's ransomware recovery is still not 100% and having connecting issues since the ICT infrastructure had to be rebuilt as new. This unreliability has been somewhat delayed PinkMatter s development. However, PinkMatter can start to have regular review meetings with EUMETSAT. Valeska will initiate this and we will participate.

  ✓ **Global observer**

  - Real-time stream for the Global observer completed:
    - NOAA 15,18 & 19 AVHRR data
    - METOP A,B & C AVHRR data
  - Back-End work:
    - A lot of integration work especially for monitoring, but this is not yet visible in the UI since it depends on the completions of other modules.
    - FY-3C L0 and L1 integrated into FarEarth and is operational (but dependent on the latest software package and formal licencing we are waiting from Soletop and ACMAD)
    - FY-3C L1 integrated with AAPP for BUFR Products

  The review approach we suggest is to show EUMETSAT the performance of software (and how our solutions meet the requirements) in progressive manner as needed as below sample document.

  ✓ Suggested Review matrix sample:

Requirements	SIT Item	Review #1	……	Review #N	Note
Direct Broadcast Acquisition (DBA) Subsystem	7	0	X	X	
Payload Data Processing (PDP) Subsystem	5	0	X	X	
Dissemination (DISS) Subsystem	7	0	X	X	-
Archiving (ARC)	4	0	X	0	-
Monitoring and Control (M&C) Subsystem	17	X	X	X	-
Interface	1	0	0	X	-
Performance	2	0	-	0	
Reliability, Availability, Maintainability and Safety (RAMS)	5	X	-	X	
Operational	1	0	-	X	
SUM	**111**	**X**	**X**	**X**	

3. Formatting and filename convention (SAWIDRA-AC-003)

- **Action Item ID: SAWIDRA-AC-003**
- **Non-Conformance Report ID: N/A**
- **Implementor: EUMETSAT/SOLETOP**
- **Subject:** Formatting and filename convention
- **Description:**
  EUMETSAT will assist with file name specification. Will get in contact with Ester. Verify during SIT.
- **Contractor Response/Intended Method:**
  SOLETOP & PinkMatter implements the formatting and filename convention prior to the SIT.
- **Current Status & Plan:**
  None.

4. SAWS for FTP account (SAWIDRA-AC-004)

- **Action Item ID: SAWIDRA-AC-004**
- **Non-Conformance Report ID: N/A**
- **Implementor: ACMAD**
- **Subject:** SAWS for FTP
- **Description:**
  ACMAD coordinate with SAWS for FTP account.

5. PDP product processing packages upgrades (SAWIDRA-AC-005 ~ 008)

- **Action Item ID: SAWIDRA-AC-005 ~ 008**
- **Non-Conformance Report ID: N/A**
- **Implementor: ACMAD, AGRHYMET, AGEOS, ICPAC, SANSA**
- **Subject:** Remote Access
- **Description:**
  ACMAD coordinate inter with COMMS team remote access from Pinkmatter to FarEarth S/W server.

6. Spare Part (SAWIDRA-AC-009)

- **Action Item ID: SAWIDRA-AC-009**
- **Non-Conformance Report ID: N/A**
- **Implementor: SOLETOP, ACMAD, EUMESAT**
- **Subject:** Spare part
- **Description:**
  SOLETOP will provide essential spares recommended by the manufacturer.
- **Contractor Response/Intended Method:**
  Delivery before SIT via separate air shipment.
- **Current Status & Plan:**
  - All spares except HDDs have been loaded on the shipping containers and being delivered.
  - Spare HDDs will be hand carried to each site since it arrived late from vendor

7. Antenna Positioner (SAWIDRA-NCR-002)

- **Action Item ID: N/A**
- **Non-Conformance Report ID: SAWIDRA-NCR-002**
- **Implementor: SOLETOP**
- **Subject:** Antenna Positioner
- **Description:**
  SOLETOP recognizes the error and lets the customer decide the choice. Customer instructed SOLETOP to validate wind data for each hosting site by asking authorities. Decision to convert will follow upon evaluation of the data. SOLETOP is to bear the cost of the entire process.

  12/20/2019: The wind result came back from each regional host. 3 sites came with normal wind below the requirement. Near ICPAC, Kenya data seems to show seasonal frequent high winds exceeding the specification however, the data seems to be inconsistent between sources.
- **Contractor Response/Intended Method:**

  ACMAD accept SOLETOP delivering all antennas with the Model 2.4 and SOLETOP agrees to provide followings to compensate for the risk associated.

  ① Prepare and install a radome-ready tower at ICPAC, Kenya.

  ② Install a wind sensor that monitor and record local wind speed

  ③ Provide and install radome in case the local wind speed frequently exceeds antenna torque specification enough that the data availability is affected within the warranty period. ACMAD to decide if the radome is needed. ACMAD to provide evidence that availability is affected by the wind issues.

  ④ Extend warranty for one additional year on 4 SAWIDRA ground stations. Warranty document must state this fact.
- **Current Status & Plan:**

① Prepare and install a radome-ready tower at ICPAC, Kenya.

➔ Designed and being constructed by the local contractor

② Install a wind sensor that monitor and record local wind speed

➔ Wind speed sensor package is on order and will be hand delivered to ICPAC site before installation.

③ Provide and install radome in case the local wind speed frequently exceeds antenna torque specification enough that the data availability is affected within the warranty period. ACMAD to decide if the radome is needed. ACMAD to provide evidence that availability is affected by the wind issues.

➔ Accepted

④ Extend warranty for one additional year on 4 SAWIDRA ground stations. Warranty document must state this fact.

➔ Accepted