HISTORY

OF

AIR FORCE GLOBAL WEATHER CENTRAL (AFGWC)
OFFUTT AIR FORCE BASE, NEBRASKA
1 JANUARY 1983 - 30 JUNE 1983

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AIR WEATHER SERVICE (AWS)
MILITARY AIRLIFT COMMAND (MAC)
UNITED STATES AIR FORCE

SATELLITES

Meteorological Satellite (METSAT) Status. Several METSATs were launched during the last 6 months and one was declared to be nonoperational.

a. DMSP Satellite F6. F6 was launched on 20 December 1982 as a replacement for DMSP satellite F3. On 11 January 1983, Space Division (SD)/YD, the DMSP System Program Office, declared F6 to be operational. All sensors, with the exception of the SSH/2 Infrared Sounder, have been working normally and providing excellent data to AFGWC. The SSH/2 sensor has not provided any useful information since launch due to unknown problems with the sensor.

Additional problems were identified with the quality of imagery due to the presence of "sun glare" and "moon glare" anomalies during certain portions of a read out. These particular problems are not likely to be eliminated and will vary in severity according to the season.

b. DMSP Satellite F3. On 18 February 1983, SD/YD declared DMSP satellite F3 to be nonoperational so that engineering tests could be conducted on the satellite. F3 was launched in May 1978. The satellite had been only marginally operational since a severe Operational Line Scan failure in December 1979 but had been providing limited useful information to AFGWC.

c. NOAA-8. The National Oceanic and Atmospheric Administration (NOAA) launched NOAA-8 on 28 March 1983 as a replacement for NOAA-6 (removed from operational status on 17 April 1983). NOAA-8 experienced problems shortly after launch and began to tumble in orbit. The tumbling problem was corrected on 21 April 1983 and the satellite was declared operational on 20 June 1983 as a replacement for NOAA-6.

d. GOES-6. NOAA successfully launched the GOES-6 satellite on 28 April 1983 as a replacement for GOES-4 which failed in November 1982. GOES-6 was declared operational on 1 June 1983.

DMSP Block 5D-2 Special Sensor Data Processing DAR Amendment. AFGWC/DO submitted a request for a second amendment to AFGWC Special Sensing Software DAR to AWS/SYR on 30 March 1983. The amendment was required due to a projected manpower cost overrun of 4,000 hours. The cost overrun was caused by factors such as the continued slip of the launch of DMSP satellite F6, underestimation of the tasks involved in the project, and high personnel turnover. See TAB 7-1.

DMSP Data for the Space Command. To support Space Command requirements for DMSP data, AFGWC/ADV began providing DMSP data from the AFGWC Satellite Global Data Base to the Space Command/ CINCNORAD on 27 April 1983. Data is transmitted to the NORAD Cheyenne Mountain

Complex Weather Support Unit over a dedicated circuit by the 1st Aerospace Communications Group using an UPI UNIFAX transmitter.

NORAD Support. AFGWC/ADV was tasked to support NORAD with eight Satellite Global Data Base (SGDB) products. These products were transmitted to the 12th Weather Squadron via laser fax on a daily basis. Support began on 4 May 1983 and will continue indefinitely.

1st Weather Squadron Support. AFGWC/ADV was tasked to support 1st Weather Squadron with one Satellite Global Data Base product. This product was transmitted to MacDill AFB via laserfax on a daily basis. Support began on 1 January 1983 and will continue indefinitely.

TAC WSU GOES Support Dropped. AFGWC/ADV support of the TAC Weather Support Unit at Langley AFB was dropped on 1 June 1983. The WSU installed a "GOES Tap" of their own and no longer needed the GOES products provided by ADV.

Enhancement Additions to CDM (Central Display Modification). Additional enhancement hardware was added to the Central Display Modification (CDM) in January 1983. These additions provided a broader range of enhancement table curves in the CDMs, including hurricane detection enhancements. Mr Gerald Schoofs of Westinghouse Corp completed the project between 3 and 19 January 1983.

AWS DMSP Meteorological Satellite (METSAT) Coordinates (MSC) Conference. AWS and AFGWC co-hosted the first AWS DMSP MSC conference at AFGWC from 11 to 15 April 1983. This conference brought together the METSAT Satellite coordinators from all levels within AWS to discuss DMSP problems and procedures, to crossfeed information, and to provide orientation and training. Over 20 people attended and most DMSP units were represented. 1 WW was the only major DMSP users that did not participate. The conference was very successful and should improve the interface between AFGWC and the tactical DMSP users. Captain Alan L. Adams, AFGWC/DOX, was the AFGWC project officer for the conference.

Mission Sensor Processing Mass Storage Requirements. Mission sensors on the DMSP satellites are those sensors other than primary imaging sensors. Future DMSP satellites contain more and different sensors. Significant changes are being made in mass storage to support these sensors. Numerous discussions between AFGWC/ADSS, AFGWC/ADSD, and AFGWC/ADO took place from March through June 1983. AFGWC/ADSS concerns centered on the launch of DMSP F-7 as an immediate problem, and DMSP's F-8 and F-9 as long-term problems (TABS 7-2 and 7-3).
On 17 May 1983, a meeting was held to resolve these problems. The accepted solution was to create an additional removable disk pack named "SATDT" and operate it in the "spare" drive on AFGWC computer system Logical 5. The extra space available will be used for satellite data files. That space solves all problems with satellite F-7 and F-8. However, additional work done in June D) showed that

satellite F-9, the first satellite with a microwave imager, will more than fill the available space. Satellite F-9 is not scheduled for several more years, but, if F-9 is launched before the computer systems 3/5/6 hardware upgrade, then AFGWC will not be able to process the microwave imager data (TABS 7-4 and 7-5).

Orbital Element Set Errors. On 3 June 1983, TSgt Gerald W. Stark, a Satellite Data Scheduling Programmer, AFGWC/ADSS, detected a serious error in the orbital element sets of all weather satellites. He discovered a 20 second time error while building schedule and ephemeris files from element sets that NORAD, at Cheyenne Mountain, Colorado, had just updated. The ephemeris files provide satellite locations and altitudes to data mapping programs, and the 20 second error would have produced mapping errors of over 60 nautical miles. Mapping errors that large would have been disastrous to AFGWC's mission support for Air Force Precedence 1-1 Programs. TSgt Stark pursued the cause of the error. He summoned help from orbital analysts at the 1000 Satellite Operations Group, Offutt AFB, NE, and daily, they worked with the orbital analysts at NORAD. The error's cause was finally identified and corrected on 7 June, and new schedule and ephemeris files were prepared without incident or mission impact. The problem was significant for all NORAD data users because it affected all orbital element sets produced by NORAD.

Satellite Data Processing. On 30 June 1983, AFGWC was computer processing all imagery data from TIROS satellite NOAA-7, all imagery data from DMSP satellite F-6, and all available Mission Sensor data from DMSP satellite F-6. The operational F-6 Mission Sensors include a Gamma Ray Detector, Ionospheric Plasma Monitor, and Precipitating Electron/Proton Spectrometer. When DMSP F-6 became operational on 20 January 1983, computer processing of TIROS NOAA-6 ended. However, AFGWC forecasters continued to make manual use of NOAA-6 pictures. On 27 March 1983, TIROS Satellite NOAA-8 was launched to replace the ailing satellite NOAA-6. NOAA-8 tumbled after orbital insertion, and it took 6 weeks to regain attitude control. During the period 10 to 17 May 1983, the transition from NOAA-8 was made, and AFGWC forecasters continued manual use of NOAA-8 pictures through June 1983. The total amount of satellite data available and computer processed, at AFGWC was greater during this period than at any previous time in AFGWC history. On 30 June 1983, AFGWC/DOX, tasked AFGWC/ADSS to prepare software for the launch of DMSP satellite F-7. The total tasking was 2410 work-hours. Over half the work was processing programs for four new Mission Sensors. The Mission Sensors on F-7 included an X-Ray Detector, Ionospheric Plasma Monitor, Precipitating Electron/Proton Spectrometer, Dosimeter, Magetometer, and Microwave Temperature Sounder.

DMSP F-6 Data Clock Problem. Second Lieutenant Tracy L. Godfrey, AFGWC/ADSS solved an important satellite data processing problem on 8 February 1983. DMSP (Defense Meteorological Satellite Program) satellite F-6 became operational in late January 1983. Immediately,

ADSS began having satellite data processing failures for satellite readouts that included 00Z data times. Second Lieutenant Godfrey carefully researched the problem and found the satellite's data labeling clock, which must be reset to 00 every 24 hours, was being reset in two 12-hour steps instead of a single 24-hour step. The 7 seconds of data generated between the two steps was lost because the times attached were in error by 12 hours. Second Lieutenant Godfrey changed our processing programs to recognize clock errors of 12 hours and corrected them. The Westinghouse programmers were able to correct the source of the problem in May 1983. Second Lieutenant Godfrey's temporary correction prevented 4 months of AF Precedence 1-1 mission support impact.

Satellite Sounding Restacking Program. The satellite sounding restacking program (MOD TOVS/DMSP Procedure WF 20183) was implemented on 29 April 1983. This new program ensures that the satellite sounding thickness values are converted to heights above sea level using the best available analysis or forecast field to fix the height of the base pressure level. This refinement of satellite sounding data processing has resulted in increased accurate positioning of fronts and related pressure features. The project manager was SSgt Roger P. Shipp, HQ AFGWC/ADSV (TAB 7-6).

Meteosat Winds Project. The Meteosat winds project was completed on 7 March 1983. This project consisted of a modification of the satellite derived wind decoder so that it correctly decodes the anomalous satellite observation reports whose data originates from the European Meteosat satellite. These reports have provided valuable wind data in data-sparse oceanic regions in the European and African World Meteorological Organization regions. The project manager was 1st Lt Mark F. Storz, AFGWC/ADSV.

DMSP Special Sensor H (SSH-2) Demise. The DMSP infrared special sensor H (SSH-2) has not worked since it was inadvertently turned off on 22 December 1982. (Upon turning it back on, the scan could no longer be synchronized.). After several months of attempting to correct the problem, the sensor was unofficially declared defunct in March 1983.

DMSP Microwave Temperature Special Sensor SSM/T. With the demise of Special Sensor H (SSH-2), AFGWC/TSIE focused their attention on the launch of the DMSP microwave temperature special sensor SSM/T. The software appeared to be in good shape, but more will be known once it has been tested and exercised prior to the launch of the SSM/T aboard DMSP flight F-7. AFGWC/TSIE has been in close contact with the National Environmental Satellite Data Information Service (NESDIS) concerning joint and shared processing of this sensor's data. AFGWC/TSIE provided NESDIS documentation and other assistance in their efforts to get the software working on their machines.

DMSP Microwave Imager Special Sensor (SSM/I). Hughes Aircraft Company (HAC) not only built the DMSP microwave imager special sensor SSM/I, they developed the software to be used by AFGWC to extract the various environmental parameters. This software will also be maintained through a HAC support services contract. On 23-24 February 1983, members of the HAC team briefed their software tasks overview at AFGWC and on 16-17 June, Major Francis X. Neuman, AFGWC/TSIE and Captain Robert C. Henry, AFGWC/ADSS traveled to Denver, CO, to participate in a technical review of those tasks. Hughes Aircraft Company appears to be progressing smoothly in their development and no difficulties are foreseen for the SSM/I, which will be aboard the future DMSP flight F-9. The report of visit is contained in TAB 7-7.

Hardcopy Image Processing System. Major Charles C. Olsen, AFGWC/ADV, Major Randolph G. Arbeiter, AFGWC/ADSS, and TSgt Richard E. Riley, AFGWC/ADV were TDY at Los Angeles AF Station, California, from 22 February to 4 March, to represent AFGWC at the Hardcopy Image Processing System (HIPS) Source Selection. HIPS is intended to produce transparency film pictures from unprocessed DMSP or satellite (TIROS) digital satellite imagery data. HIPS will replace 15 year old equipment currently in use by the Satellite Operations Branch (AFGWC/ADV). The Source Selection Committee was formed mostly of Space Division (AF Systems Command) personnel, but the interaction with AFGWC personnel was extensive and highly successful. The committee concluded that the proposals received were not adequate and rejected them. The HIPS Request for Proposal was modified to be more explicit and more stringent. The Request for Proposal has been reissued to potential contractors, and a second source selection was scheduled for August 1983.

COMMUNICATIONS

1 WW Facsimile Package. Due to a longstanding deficiency in facsimile chart coverage and continuity along the equator (30^0N to 30^0S), AFGWC/DOO instituted a project to provide this coverage for 1 WW. On 14 March 1983, AFGWC/DOO identified the requirement for 14 additional NWS prognoses to AWS/DOOX. This was followed by a request on 23 March 1983 to OL-A/AFGWC/FNOC requesting coordination by the Liaison Officer, Lieutenant Colonel David Leatherwood, with the Navy to procure seven additional analyses charts. On 20 May 1983, OL-A/AFGWC/FNOC provided examples of the facsimile charts that the Navy could initially provide. On 28 June 1983, Mr Eldon Schmidt, AWS/DOK, tasked NWS to provide the prognoses requested (TAB 7-8). This project required much interagency coordination and is expected to be completed in late 1983. For additional information, see OL-A input in Chapter 1, this history period.

Joint Surveillance System (JSS). The JSS is a replacement for the NORAD BUIC/SAGE system and is designed to provide for the aerospace defense of the US and Canada. When fully operational, the JSS will

have Region Operation Control Centers (ROCCs) at the following locations:

Southeast	Tyndall AFB, Florida
Northwest	McChord AFB, Washington
Southwest	March AFB, California
Northeast	Griffiss AFB, New York
Alaskan	Elmendorf AFB, Alaska
Hawaiian	Wheeler AFB, Hawaii
Canadian East	North Bay, Canada
Canadian West	North Bay, Canada

AFGWC provides meteorological products to the ROCCs via teletype and through a dedicated circuit in a computer-to-computer mode. Prior to 1 January 1983, the dedicated circuit was used to transmit products to the SE and NW ROCCs. Since that time, transmission of products to all the remaining ROCCs except the Hawaiian has been initiated.

SAC Digital Network (SACDIN). AFGWC currently provides meteorological support to the Strategic Air Command (SAC) command post and certain missile launch facilities through the SAC Automated Command Control System (SACCS). SACDIN is a communications upgrade for SACCS. As part of the upgrade, the existing dedicated circuit and communications equipment (modems, cryptographic units, etc) between AFGWC and the SAC command post will be replaced. The new circuit and equipment are in place but have not been used operationally. Between January and June 1983, AFGWC worked with personnel from HQ SAC, International Telephone and Telegraph Corporation, Mitre Corporation, the Electronics Systems Division of AFSC, and the AFCC Programming Center to develop procedures to check out the new system. Testing is to begin in July 1983 and extend through September 1983.

AFGWC Future Communications Initiatives. In February 1983, as a result of communication planning activities at USAFETAC and AFGWC/DOP program activities of SDHS, AWDS, CFEP, JOCS, and AWAPS, a strawman communications architecture and a conceptual future communication plan was developed. A paper (TAB 7-9) presents this strawman position concerning AFGWC communications activities. The thrust of this effort was to ensure that ad hoc decisions do not drive our communications architecture. This point paper was coordinated and concurred with USAFETAC in June 1983. Staffing effort was begun to deliver this point paper to HQ AWS for information and use in working AFGWC communication activities.