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NEW SYSTEMS AND DEMONSTRATION PROJECTS
IN WESTERN REGION: A SUMMARY

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During the last few months, three new systems have been acquired at Western Region (WR). This Technical Attachment briefly summarizes these systems and how they are used.

RAMSDIS/McIDAS Demonstration Project

Jim Purdom of the Cooperative Institute for Research in the Atmosphere (CIRA) at Colorado State University (CSU) has initiated a demonstration project to show the utility of high resolution digital satellite data in the forecast office.   The **R**egional and **M**esoscale **M**eteorology Branch **A**dvanced **M**eteorological **S**atellite **D**emonstration **I**nterpretation **S**ystem **(RAMSDIS)**/**M**an **c**omputer **I**nteractive **D**ata **A**ccess **S**ystem **(McIDAS)** satellite project has been installed at the Salt Lake City and Seattle WSFOs. The system provides the capability to display, animate, and manipulate 8 bit digital satellite imagery. In contrast, SWIS and MicroSWIS display 4 bit analog imagery. There are several advantages to digital satellite imagery. Since the data has 8 bit resolution, the forecaster can see more detail in the imagery. Cloud features and terrain are more discernable. The imagery can be enhanced using digital techniques. This means that the forecaster can choose to enhance the -35 to -38 degree C clouds on an infrared image. Since the underlying data are digital, the enhancement is accurate and remains consistent as the image frames animate.   On the SWIS, enhancements based on the analog signal are not precise and can drift. The image data can be more readily combined with other data sets. For the demonstration project, surface, upper-air, and a limited set of model data can be overlaid on top of the imagery.

The forecasters currently have access to visible (VIS), infrared (IR), and water vapor (WV) imagery from the GOES-7. The data are ingested in real time by the **M**ulti-discipline **I**nteractive **D**isplay and **A**nalysis **S**ystem (MIDAS) located at the NESDIS facility in Washington D.C. The data are transmitted via Internet to the WSFOs with the entire data set available to the forecaster by ten minutes after the start of the image. The forecaster can view data ranging from 1 km resolution to 25 km resolution. The 1 km VIS data can be available as often as every five minutes, if GOES-7 is in rapid scan mode.

The RAMSDIS/McIDAS runs on a 486 DX2 66 MHz system with a 17-inch color monitor and 340 mb hard drive. The basic system capabilities are provided by McIDAS software running on OS/2 version 1.2. A function key menu system is used to select the various loops.

In addition to the Seattle and Salt Lake City WSFOs, the Cheyenne, WY and Sullivan, WI WSFOs are also part of the project. After an initial 60 days of use, a survey will be conducted at each of the offices. If the demonstration project is successful, Jim Purdom will propose

that several additional sites be purchased. This system is not a replacement for the operational systems, but exposes operational offices to better quality satellite imagery before AWIPS is implemented. The demonstration sites will participate in the GOES-I Operational Readiness and Quality Assurance evaluation that will occur before the GOES-I data are distributed operationally to the field.

HIPS

The **H**igh **R**esolution **P**icture **T**ransmission (HRPT) **I**mage **P**rocessing **S**ystem **(HIPS)** captures, ingest, and displays satellite imagery for the NOAA **P**olar Orbiting **O**perational **E**nvironmental **S**atellite **(POES)**. The POES satellites produce a wide variety of high resolution image data sets. Since the POES orbits the earth from pole to pole, the satellite is capable of true 1 km resolution over the U.S. Figure 1 shows the areal coverage from a POES pass. The POES scans the earth with two systems, an Advanced Very High Resolution Radiometer (AVHRR) and a TIROS Operational Vertical Sounder (TOVS). The AVHRR bands are:

Band	Wavelength (M)	Name
1	.58 to .68	visible (VIS)
2	.72 to 1.10	near-infrared
3	3.55 to 3.93	mid-infrared
4	10.30 to 11.30	infrared (IR)
5	11.50 to 12.50	infrared

AVHRR produces a larger number of bands than the GOES satellites in the infrared spectrum. The bands are sensitive to different temperature ranges which allows a forecaster to view the structure of cloud and ocean features from different perspectives. Figure 2 shows upwelling along the coast from a 1 km IR image.

HIPS systems are currently located at the San Francisco, Honolulu, and Anchorage WSFOs. There are plans to acquire HIPS for NSSFC and NHC. An effort is underway by NESDIS to network these sites together which would allow data to be shared between systems. This capability would allow San Francisco to mosaic data from the Anchorage and Honolulu HIPS to form a north Pacific image. The HIPS can also produce an analog SWIS image and send it to the GOES-Tap system. The HIPS images are available on dial code 24. Ernest Daghir (WSFO/San Francisco) is the satellite focal point and can provide additional information.

The system consists of a 1.4 meter antenna which is controlled by a Hewlett Packard (HP) 700 series computer. An HP-715 computes when one of the POES satellites will pass over a site and directs the antenna to point in that direction. Once the signal is established, the antenna tracks the satellite as it crosses over the site. An HP-735 computer processes the data in real time. The HP computers are networked together and additional workstations can be added to the system. The forecaster workstation can display, animate, and manipulate the digital image data sets. The system is a true scientific workstation, capable of many types of image enhancements and coordinate transformations. The HIPS is a Unix system, employing X-windows with a Motif Window manager, C and TCP/IP networking.

SAC

The **S**cience and Operations Officer (SOO) **A**pplication **C**omputer **(SAC)** is an office resource to be managed by the SOO to support professional development and cooperative projects. An important goal of the SOO program is to develop and foster better working relations with the research and academic community. The intent is to reduce the amount to time between the development of a new approach and the operational use by NWS field offices.

The SAC, when connected to Internet, provides a platform that is more compatible with the equipment being used by the research community. Most of the research institutions have moved rapidly onto systems based on the Unix operating system. Internet is a high speed communication network that nearly every university uses to communicate with each other. Once an NWS office has the SAC and Internet, the office can share data and software with any university on Internet.

At Seattle, Brad Colman has used a system similar to the SAC to display high resolution model data using GEMPAK and NTRANS (an NMC developed software package). The system is located near the forecasters work area, so they can use the demonstration system during shifts. Brad is also working with the University of Washington on evaluating a mesoscale model. Larry Dunn at Salt Lake City is using the River Forecast Center workstation to display output, a 30 km experimental mesoscale model in the forecast office. The University of Utah runs the model and downloads the output via Internet to the forecast office. These are just a few of the possible uses for the system.

The SACs are HP-715s, which are approximately 25 million instructions per second (mips) RISC-based computers. Each system has a 19-inch monitor, 32 mb of RAM, a CD-ROM drive, and a one gigabyte hard disk. Software includes Unix, C and Fortran Compilers, X windows with a Motif Window manager. Both the HIPS and the SAC are configured similar to the type of hardware and software proposed for AWIPS.

The first two SACs have been delivered within the last few weeks to the Seattle and Phoenix WSFOs. The Boise and Salt Lake City WSFOs will each receive a SAC system by February, although funded through other sources. The Boise system will be used to support the WR Fire Weather Risk Reduction. The Salt Lake City HP-715 was purchased by COMET to support a COMET Cooperative project. The Sacramento WSO will receive a SAC by March. The Office of Meteorology would like to provide each SOO with a SAC. As the NWS budget permits, more SACs are expected to be purchased for other offices.
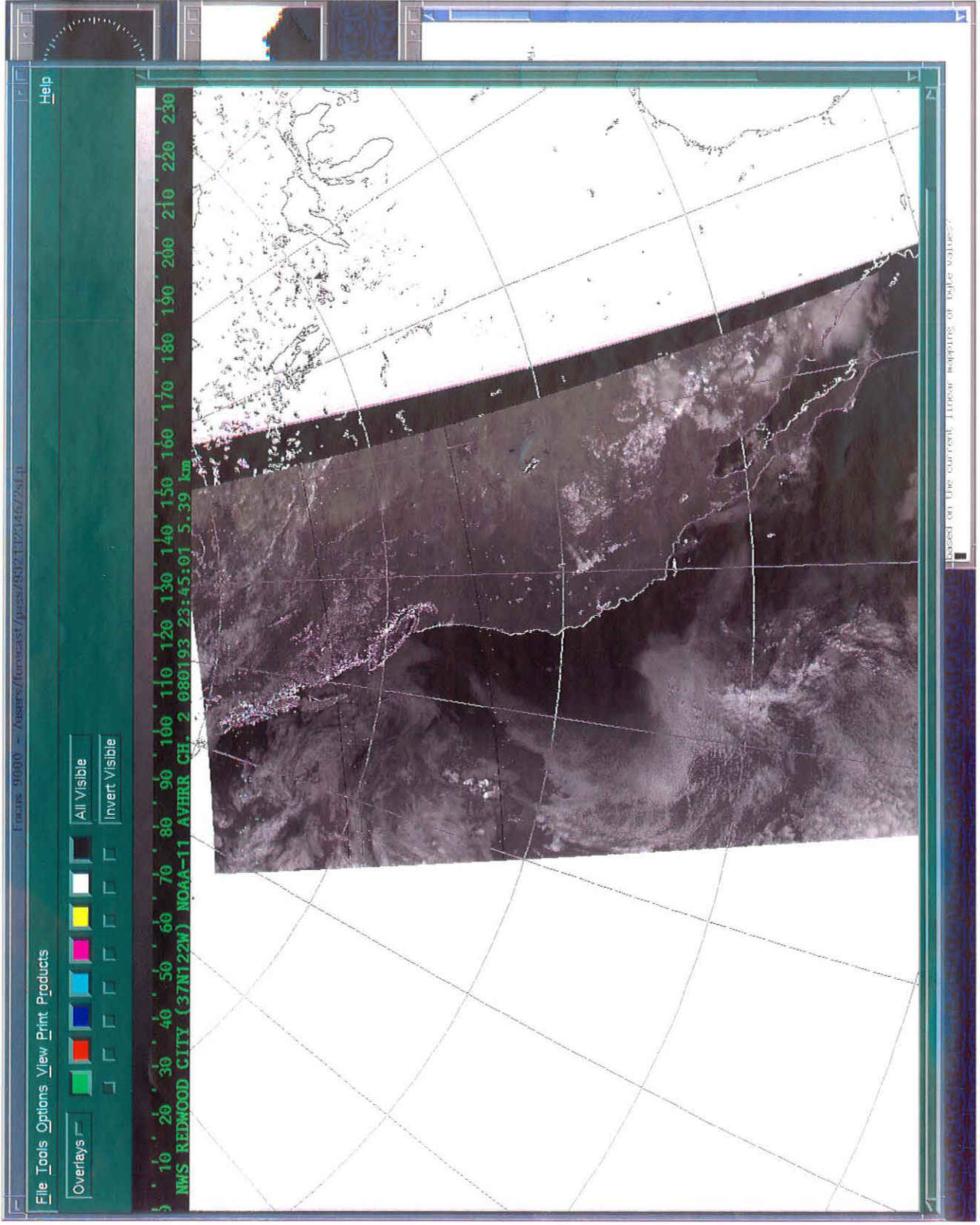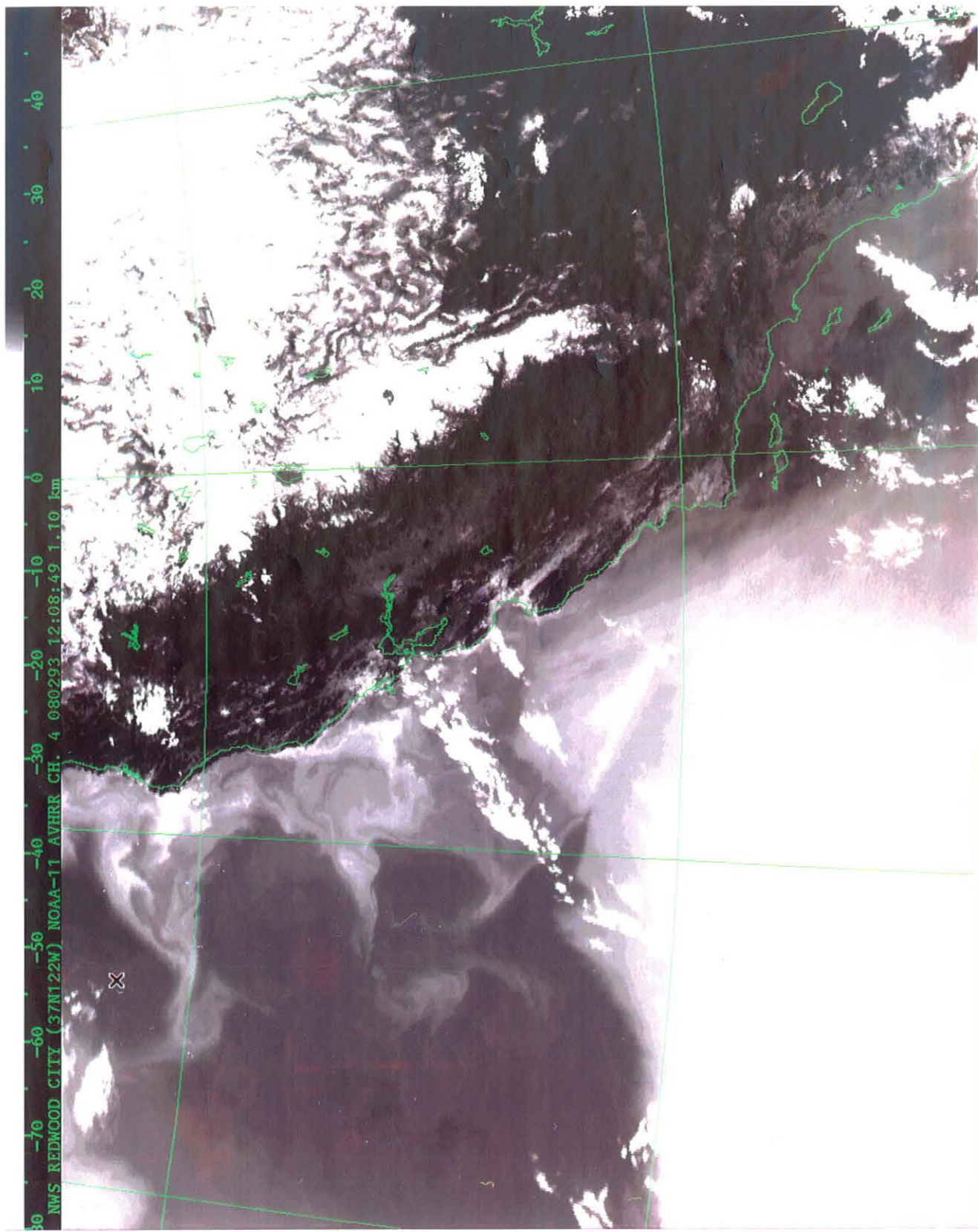
Figure 1

NWS REDWOOD CITY (37N122W) NOAA-11 AVHRR CH. 4 080293 12:08:49 1.10 km

Figure 2