DATA ACQUISITION NEWS

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A NEW BEGINNING

by Jaan Kruus

Since the departure of Bill Clink, The Data Acquisition Systems Branch (DASB) has not published its informal quarterly Newssheet. Recognizing the need for this type of communication, we have decided to publish a newsletter. This is our first issue, launched at a time of great changes in technology and in AES data acquisition systems.

Howard Kagawa has kindly agreed to be the editor. Our goal is to publish it twice per year and you may notice changes in the appearance of future issues as we become more proficient in the desktop publishing capabilities of WordPerfect.

We hope that by giving the newsletter wide distribution, we can keep AES and other agencies informed of the status of data acquisition in AES (and elsewhere). In addition to our work here at Downsview, we know that exciting data acquisition projects are taking place in the Regions and in other Directorates. As a result we welcome articles from outside our Branch and you will notice some articles of this type in this issue.

We also welcome your comments and suggestions for improving our newsletters. Please feel free to pass them on to me or to the editor. ■

IN THIS ISSUE

READAC DELIVERIES NEARLY COMPLETED

by Roy Bourke

Approximately 45 READAC systems have been delivered by Valcom Ltd., and delivery of the remainder (except for Test Sets and dewcell power supplies) is expected by March 31, 1991. This is summarized below:

AES IRAS Phase I
One training system and 1 first production model have been delivered. The balance of 16 systems plus spares are to be delivered by the end of March, 1991.

Transport Canada Pilot Project
Two basic systems plus spares have been delivered, installed and are operating at Wiarton and North Bay. These systems have also been equipped with prototype cloud, visibility and present weather systems by DASB.

DND Projects
Short Range Radar - 41 systems have been delivered and approximately 12 have now been installed.
Long Range Radar - 5 systems to be delivered by end of March, 1991.
Cold Lake Project - 2 systems plus spares to be delivered by end of March 1991.
Goose Bay Project - 2 systems plus spares to be delivered by the end of March 1991. (Note: This

project has been downsized from 4 installations, and AES will be picking up the surplus equipment).

With respect to sensor deliveries (for all projects):

- 78D wind sensors have been received for all projects except the DND's Short Range Radar and Goose Bay projects. These may not be received until after March 1991.
- All total precipitation sensors have been received.
- All 27 Belfort 6200 forward scatter visibility sensors have been received.
- 25 Qualimetrics laser ceilometers have been received. However, there are problems with 10 of these, so their acceptance may be delayed until after March.

DASB is currently gearing up to install the AES READACs. This is expected to begin in May and an installation schedule is being negotiated with the Regions. Materials have already been shipped to the Regions for pre-installation. A Headquarter's installation team will travel to each Region to work with their staff to install the systems. ■

WORK ON READAC PERIPHERAL INTERFACES AND OTHER EQUIPMENT CONTINUES

by Roy Bourke

- Peripheral Interfaces (PIs)for cloud and visibility are in the final stage of design, in preparation for a procurement contract. Production units will not likely be available before December, 1991. However, the cloud and visibility sensors will be installed at the same time as the READAC systems, so that the PIs can be simply plugged into the system as soon as they are available.

- The TMI (Telesat Mobile) system of communications is being proposed for the READAC stations and an operational test of the communication system is currently being set up at Wiarton. The TMI company is designing equipment to poll the READAC communications controller for regular and special observations and diagnostic messages, and to interface the READAC to the TMI earth terminal. If the test is successful, TMI equipment will be purchased in time for the first AES installations. ■

POSS SELECTED FOR PURCHASE

by Larry Wiggins

The Precipitation Occurrence System (POSS) was tested against a human observer at Otis Air Force Base, Mass., in 1988. The results show the accuracy:
- of detecting rain to be 100%, snow 97% and clear 99%;
- of identifying rain and snow to be 95% and 94% respectively;
- is lower when both precipitation type and intensity are considered - 60% for rain and 80% for snow;
- of detecting snow grains, snow pellets, and ice pellets to be 100%; and
- was lower (at 20% to 71% accuracy) when detecting very light rain, very light snow and drizzle.

Larry Wiggins has been appointed Project Manager for the purchase of approximately 20 POSS units for use on the READACs from Roy Bourke's IRAS Project. Current estimates are that the POSS units in these small quantities will cost $20K each and that deliveries will begin in mid to late 1993. For further information, please contact Larry at (416)739-4106. ■

READAC DOCUMENTATION AND TRAINING PROGRESSING

by Tad Drozdz

- Installation Manual - Currently being updated to reflect new sensors, changes in hardware requirements, and new installation procedures.

- Operator's Manual - Draft version of the manual is being edited in ACSO. Completion of the English version is expected in May 1991.

- Maintenance Manual - This manual will not be completed by Valcom until 1992 or early 1993.

- Operator/Level II Maintenance Training - Valcom presented 2 courses in Guelph. ACSO used these to develop an in-house course which will be offered to users annually. Three courses were already presented in 1990.

- Level III Maintenance Training - Valcom Ltd. is contracted to develop and present the first course with subsequent courses to be given by ACSO. The course preparation cannot begin

until the Maintenance Manual is completed. This delay will have little impact since the equipment will be under warranty for the first year, and after-warranty maintenance will be at a depot.

- Ceilometer and Visibility Sensor Training - ACSO staff received training from Qualimetrics and Belfort in February. In-house Level III courses will be developed and offered by ACSO annually. Initial training will be carried out in each Region as part of READAC installations starting in May 1991.

- Operator's Course - This course will be incorporated into the S.W.O.M. course at TCTI starting in 1992. ■

RDP CONTRACT AWARDED TO MDA

by Aston Shim

The objectives of the Radar Data Processor (RDP) project are:
- to better exploit the weather radars for weather forecasting and observing operations;
- to disseminate a range of products in near real-time; and
- to store weather radar data for later analysis.

The RDP contract was awarded to MacDonald Detwiller and Associates (MDA) in March 1990.

The contract consists of two phases. The first phase requires the development of the RDP system and the delivery of two operational systems plus an operational support system. This development is based on the McGill University system that has been used at the Centre Météorologique du Québec for over three years. The second phase of the contract will supply the 14 systems required to equip all AES radars.

The three systems from first phase will be located at:
- Exeter, Ontario, on a WSR-807 radar with the Product Processor and Workstation at the Ontario Weather Centre in Toronto;
- Vivian, Manitoba, on a CWSR-81 radar with the Product Processor and Workstation at the Prairie Weather Centre in Winnipeg; and
- AES HQ, where it will be used as an Operational Support Facility system for software configuration control, off-line data analysis and operational training.

Completion of Phase 1 is scheduled for February 1992.

To date all of the preliminary documentation (eg. Quality Assurance Plan, Development Plan, Documentation Plan, System Functional Requirements) have been delivered and accepted by the AES. MDA has delivered a draft copy of the Software Design document and is currently incorporating the AES comments. Software development has also started, and the user interface was demonstrated for the second time in March. Detail design documents for the processors and workstations are to be released in April. ■

DOPPLER RADARS APPROVED

by Eric Aldcroft

In January, 1990 AMC approved the replacement of AES's existing radars with a network of Doppler radars. Moreover, the Green Plan committed the Government to having 4 Doppler radars in operation by the end of 1996.

To undertake this work, a small project office, with a staff of 6, is being established within DASB. In recent months, work has focussed on establishing and staffing the positions. Staffing should be completed by this summer.

During 1990, studies to determine the feasibility of dopplerizing their respective radars was contracted to McGill University and the Alberta Research Council (ARC). In both cases, the modified radars would supply both Doppler and conventional radar product to the applicable Weather Centre. The McGill conversion was approved and a contract will be placed before summer. A decision has not yet been made regarding the ARC proposal.

With regard to the full network of Doppler radars, one of the initial tasks will be to evaluate alternative implementation approaches. Plans will have to recognize that network implementation will occur over a fairly long period (>10 years) and that we must take advantage of future technological developments. By the end of 1991, our objective is to have a plan that defines the specific approach to be taken. ■

RADIOMETER DISPLAY INSTALLED AT ONTARIO WEATHER CENTRE

by B. Sheppard and K. Wu

A ground-based microwave radiometer located at the Centre for Atmospheric Research Experiments (CARE) at Egbert, Ontario, is used to retrieve temperature profiles and integrated water vapour and liquid in a vertical column. The radiometer measures "brightness temperatures" at six microwave frequencies and surface sensors measure temperature, dew point and pressure. These raw data are averaged for 10 minutes and stored on site in an AT computer referred to as the "brightness retrieval computer" (BRC). The data is transferred via modem to remote computers for the calculation and display of meteorological products.

In January, a display computer was installed at the Ontario Weather Centre after the forecasters were familarized with the radiometer's operation during 2 visits to CARE last fall. The display computer automatically transfers the raw data from the BRC every hour or on request by the operator. It then retrieves the meteorological products using a non-linear optimal estimation algorithm.

The display graphs are selected from a menu. They include time series of the previous 2 days of pressure thicknesses between standard levels, integrated vapour and cloud liquid, freezing levels and surface data. Up to 5 temperature profiles, at operator specified times, can be plotted on a single tephigram. Time-height temperature contours are plotted in colour for the last 2 days' profiles. These represent the temperature characteristics of the air masses passing over Egbert. The usefulness of the radiometric products will be assessed in real-time operations by the forecasters at the Ontario Weather Centre (OWC).

Profiles can also be displayed in DASB, where the system is being monitored. Visitors to Downsview who are interested in viewing the displays may contact Ken Wu at (416)739-4113 or Brian Sheppard at (416)739-4102. ■

SENSORS UNDERGOING TESTS AT ST. JOHN'S

by R. Van Cauwenberghe

Data collection began on October 27, 1990 and will continue until the end of April, when the sensors will be either returned to NWS or to the manufacturer. The sensors under test include:

- Two Handar visibility sensors that are slightly reworked versions of the IR forward scatter sensors tested last winter;
- An HSS visibility sensor which also identifies precipitation;
- An HSS precipitation identification sensor which uses an extra detector to improve performance;
- A POSS precipitation identification sensor;
- Two Rosemount ice accretion sensors (new designs); and
- An ice accretion sensor, designed by Instrumar Ltd., a St. John's company which is based on surface conductivity and temperature;

In February 1991, the following sensors were added:

- Two Belfort visibility sensors from the READAC procurement contract; and
- A LEDWI precipitation identification sensor that was extensively modified since last tested 2 years ago.

In addition to the above, the operational Fisher and Porter precipitation gauge and the ASEA QL1212 ceilometer data are being logged for the Atmospheric Research Directorate. Other supporting data being recorded include the 78D anemometer, a modified Rosemount ice accretion sensor (872B), 2 operational transmissometers, temperature, dewpoint and manned observations from the St. John's weather office. Data from a READAC will also be recorded by a PC.

All of the above data is being recorded on 2 personal computers. Data is collected daily via telephone modem from Downsview where it is archived and analysed. Equipment manufacturers and NWS can also obtain data in this way but passwords restrict them to their own sensors and the supporting observations.

If you want more particulars about the sensor testing, please contact Roger Van Cauwenberghe at (416) 739-4100. ■

DRIFTING BUOYS PROVIDING ESSENTIAL DATA

by John Thomas

Pacific Region's marine data from the data sparse Pacific Ocean comes from GOES satellite imagery, moored buoys, volunteer observing ships, the Automated Shipboard Aerological Program (ASAP), and drifting buoys. The drifting buoys at times provide the only surface data available over the eastern Pacific.

The standard drifter is 3.5 meters long and weighs 95 Kg. It is battery powered and measures barometric pressure, air temperature and sea temperature. Some are equipped with wind speed sensors and wind direction is also available from the newest buoys. The data is transmitted via the ARGOS Data Collection and Locating System (DCLS) on the TIROS series of polar-orbiting satellites.

Until recently, all of our drifting buoys have been deployed on a volunteer basis by the 3 ships that carry our ASAP containers. The buoys are equipped with a drogue which acts as a sea anchor and slows the travel of the buoy. They are deployed between 40-50°N and 160-170°W and drift eastward toward the continent. Following the current they turn south 150-500 Km off the coast. Eventually, they turn west again near 30-35°N. Early in the program it was discovered that buoys launched north of 50°N would drift into the Gulf of Alaska and turn north towards Alaska.

The first generation of buoys were supplied by Hermes Electronics Ltd. The next were acquired from Polar Research Laboratories of California but in recent years the buoys have been purchased from METOCEAN Data Systems Ltd. in Nova Scotia. The cost of buoys has risen from $10K in 1984 to about $15K per unit today. A new generation of smaller CMOD (Compact Meteorological and Oceanographic Drifter) buoys is being tested and some aircraft deployments have been made. More of these less expensive (about 1/3 the cost) drifters will be deployed in 1991. They do not have wind sensors but they can be used to extend the areal coverage of the more sophisticated drifters.

While designed for a life of 1 year, buoys have reported for up to 30 months and average about 10 reports per day. A few unfortunately have lasted only a few months. The Pacific Region is attempting to maintain a network of at least a dozen drifters. These buoys have proven to be very reliable and very durable in the harsh environment of the Pacific Ocean.

It is interesting that in 1988, a buoy was hijacked by a fishing vessel but the buoy continued to transmit permitting it to be tracked to a small Japanese fishing village. Unfortunately, it was never recovered. Today, it is likely being used as an anchor or marker buoy with its new owners oblivious to its real capabilities. ■

EDMONTON HOSTS ARCTIC BUOY MEETING

by Bill Hume

From 1983 to 1989, AES and NOAA cooperated to maintain a meteorological buoy network over the Arctic Ocean. When NOAA funding expired and the AES-NOAA agreement lapsed, active discussions were started to establish a formal multi-lateral agreement under WMO sponsorship. Two organizations, the WMO/IOC Drifting Buoy Cooperation Panel (DBCP) and the World Climate Research Program (WCRP) solicited their affiliates and a formative meeting was held in Edmonton from March 18-20 to examine the feasibility of a new Program. Representatives from Canada (AES, DFO), USA (Polar Science Center, NOAA-NAVY Joint Ice Center, US Navy), Norway, USSR, Service ARGOS, WCRP and the DBCP attended the meeting.

The proposed International Arctic Buoy Program (IABP) would maintain a buoy network with 500km spacing over the Arctic Ocean. Data would be available in real-time on the GTS and archived by MEDS. A technical coordinator position would be established to monitor the network and coordinate deployments.

Meeting participants agreed that establishment of an IABP was desirable and an ad hoc Steering Committee was formed. It will be chaired by Brian O'Donnell, with representatives from the US, Norway and USSR to prepare for a September, 1991 meeting at which the IABP will be formally established. ■

EVERYTHING YOU EVER WANTED TO KNOW ABOUT QUALITY ..... BUT WERE AFRAID TO ASK

by D. A. Henry

Quality is defined by the Gage Canadian Dictionary as the "grade of excellence and degree of worth." To the customer quality is limited to the desireable features the product possesses and the degree of excellence of the product, regardless of the specification to which that particular product is built. For example, the luxury automobile is perceived to be of higher quality than the sub-compact automobile. This is not necessarily so. It is true the luxury car exhibits a far higher degree of excellence than the sub-compact and that it is probably more desireable to the consumer but each automobile may exhibit the same degree of quality if each conforms to its individual specification.

To the Quality Assurance Section, quality is the conformance to the specification of a product and the degree of conformance to specification is the measure of the quality.

Quality Control is, as the name implies, the regulatory process through which the actual quality of a product is measured, compared to a standard and the difference recorded. The difference is then analysed to determine whether or not the product is acceptable. If not, the necessary corrections are made in the production cycle. In short, Quality Control consists of; inspecting, sorting good from bad, recording, analysing and correcting.

Quality Control plays a very important role in product procurement but quality cannot be inspected into a product. It must be built in, through all the stages of production; from design through production and operational testing. It is this concept of ensuring that quality is built into a product on which the principles of quality assurance are based. Quality Assurance is the activity of providing, to all concerned, the evidence needed to establish that the quality function is being adequately performed. ■

PERSONNEL CHANGES

- Dave Dockendorff - from OAEO to Chief, Technology Support Division (ACSL), DASB.
- Rick Lee - from Head, Data Acquisition Systems Planning Section to Chief, Operational Data Acquisition Systems Division (ACSO), DASB.
- Malcolm Still - from Atmospheric Research Directorate to Acting Chief, Implementation Division (ACSI), DASB.
- Eric Aldcroft - from Chief, Implementation Division, DASB to Project Manager, Doppler Radar Implementaion Project.
- Martha Danks - serving as A/MAEO
- Fraser MacNeil - from MAEO to A/MAEW.
- Brian Kirkpatrick - serving as A/OAEO.
- Ron Fordyce - now Superintendent of Marine Data, OAEOM
- Leif Hansen - EG in ACSL retired in February
- Jan Skalski - EL in ACSL retired in March
- Mark Hacksley - A/Chief of Planning, Central Region
- Brian Kahler - serving as Deputy CAEO
- John Luckett - serving as A/PAEO

The following persons have accepted early retirement packages:
- Roy Bourke - PM, Implementation of READAC Automatic Stations (IRAS) project
- Bob Owen - Chief, Quality Assurance Division, DASB
- Matt Stauder - Planning Meteorologist, ACSN
- Cliff Hines - Superintendent of Electronics, CAEOE
- Bill Crowley - PM, NAVAID and Tower Safety projects
- Bill Gayton - Inspector, Quality Assurance Division ■

The purpose of this newsletter is to inform AES personnel and others of observing systems and data acquisition activities in the AES. It is published twice per year in April and September by the Data Acquisition Services Branch of Central Services Directorate. Articles and ideas for the newsletter are welcome. Please address correspondence or inquiries to:

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