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Real-Time Weather Processor (RWP) Prototype Test and Evaluation (PT&E) Evaluation Report

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March 1991

DOT/FAA/CT-TN90/51

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Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT/FAA/CT-TN90/51		

4. Title and Subtitle	5. Report Date
REAL-TIME WEATHER PROCESSOR (RWP) PROTOTYPE TEST AND EVALUATION (PT&E) EVALUATION REPORT	March 1991
	6. Performing Organization Code: ACN-250
7. Author(s) Elizabeth Turcich, Thomas Gulley, Richard Mitchem, Alanna Randazzo (UAL Corp.)	8. Performing Organization Report No.: DOT/FAA/CT-TN90/51
9. Performing Organization Name and Address: Federal Aviation Administration, Technical Center, Atlantic City International Airport, NJ 08405	10. Work Unit No. (TRAIS)
	11. Contract or Grant No.
12. Sponsoring Agency Name and Address: U.S. Department of Transportation, Federal Aviation Administration, Technical Center, Atlantic City International Airport, NJ 08405	13. Type of Report and Period Covered: Technical Note
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

The Real-Time Weather Processor (RWP) is a data processing subsystem that will provide hazardous and operationally significant weather information for use by National Weather Service (NWS) Center Weather Service Unit (CWSU) meteorologists, Air Traffic Control Specialists (ATCSs), pilots, and other users. This report details the results of the user evaluation portion of the Prototype Test and Evaluation (PT&E) of the RWP Prototype. The user evaluation was conducted at Jet Propulsion Laboratory (JPL) during the month of July. Both NWS CWSU meteorologists and Federal Aviation Administration (FAA) Air Route Traffic Control Center (ARTCC) system maintainers participated in the evaluation.

The results of the evaluation showed that overall, the system was rated as acceptable but that there were areas that require improvement; i.e., complex man-machine interface, system response too slow, problems with the direct command language (DCL). The evaluation results were presented to the RWP Program Office for consideration.

17. Key Words	18. Distribution Statement
Real-Time Weather Processor (RWP) Next Generation Weather Radar (NEXRAD) Aviation Meteorologist System Maintainers Aviation Weather	Document is on file at the Technical Center Library, Atlantic City International Airport, NJ 08405

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	277	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

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EXECUTIVE SUMMARY

The Real-Time Weather Processor (RWP) is a computer based interactive meteorological data processing system sponsored by the Federal Aviation Administration (FAA), to be installed at selected Area Control Facilities (ACFs) and other locations. The RWP receives radar data, other weather data, and general information from external sources, in addition to processes, stores, displays, and disseminates the data received and processed. The RWP provides the meteorologist with the capability to create weather data products and is the vehicle for the timely dissemination of these products to air traffic controllers.

A user evaluation of the Build 3 RWP Prototype, developed by Jet Propulsion Laboratory (JPL), was conducted at JPL in Pasadena, California, from July 23 to July 27, 1990, by the Weather and Remote Maintenance Monitoring Systems (RMMS), Branch ACN-250. The objective of the evaluation was to have National Weather Service (NWS) meteorologists and the FAA system maintainers evaluate the features, functions, documentation, and training associated with their workstations. The NWS meteorologists evaluated the Meteorologists Interface Processor Console (MIPC) and the Workstation Operators Manual (WOM). The FAA system maintainers evaluated the Computer Operator Terminal Console (COTC), the Computer System Operators Manual (CSOM), and the Adaptation Description Document (ADD). Questionnaires were used to obtain the evaluation from the participants. Training specialists from the FAA Academy evaluated the RWP prototype training.

The following highlights of the evaluation and the post-Test and Evaluation (T&E) reviews are:

1. The RWP response rate is too slow;

2. The menus are too cumbersome and complex and should be revised to allow the users direct access to any screen;

3. A spelling/acronym check should be added to the system;

4. The MIPC should have the ability to receive Center Weather Advisories (CWAs) and Center Weather Statements (CWSs) from neighboring centers;

5. The Direct Command Language (DCL) and RWP Command Language (RCL) should be incorporated into one command language;

6. The DCL should be simplified, too many commands are required for one action;

7. The commonly used functions should be integrated into the function keys;

8. Scrolling should be replaced with paging capabilities;

9. The system should have automatic reconfiguration and reboot capabilities that require no operator intervention;

10. The error messages should be more clear and concise;

11. The training should follow FAA-Standard-028;

12. An easier way to retrieve and create alphanumeric products should be devised;

13. The mouse should be updated or rethought;

14. The meteorologists want the ability to assign display colors to products as color standards are required for briefings;

15. The NWS meteorologists should have more input from the RWP project.

It is recommended that the proposed changes identified in this report be incorporated into the RWP production specification. In addition, an RWP working group comprised of NWS meteorologists should be formed to help insure that the RWP production system will meet the meteorologists' needs.

INTRODUCTION

PURPOSE.

The purpose of the Prototype Test and Evaluation (PT&E) was to have National Weather Service (NWS) Center Weather Service Unit (CWSU) meteorologists and Federal Aviation Administration (FAA) system maintainers evaluate the features, functions, and training associated with the Jet Propulsion Laboratory (JPL) Build 3 prototype of the Real-Time Weather Processor (RWP). The input obtained from this evaluation is intended to be utilized in making any needed enhancements and/or changes to the RWP specification prior to solicitation for an RWP production system. The RWP PT&E was conducted by the Weather and Remote Maintenance Monitoring Systems Branch, ACN-250, of the FAA Technical Center during the week of July 23 to July 27, 1990, at the JPL facilities in Pasadena, California. The FAA Academy conducted the training evaluation. The plan for the evaluation is detailed in the FAA Technical Note DOT/FAA/CT-TN90/9, "Real-Time Weather Processor Prototype, Prototype Test and Evaluation Plan," dated May 1990.

BACKGROUND.

The FAA sponsored JPL to develop and test the RWP prototype subsystem prior to procuring an end-state production RWP. The development of this prototype will provide the FAA with the following benefits:

1. actual software to be furnished to the production contractor,

2. definition of detailed system engineering requirements,

3. establishment of user requirements,

4. production risk assessment,

5. user validation,

6. demonstration of the RWP/Next Generation Weather Radar (NEXRAD) interface, and

7. consideration of workstation, training, and human factors requirements.

The RWP is a data processing subsystem that provides hazardous and operationally significant weather information for use by NWS meteorologists, Air Traffic Control Specialists (ATCS), pilots, and other users. The RWP will process the received data to generate weather products that are easy to interpret, and will transmit these products to the Area Control Computer Complex (ACCC) for use by air traffic control (ATC) personnel. The RWP will transmit a subset of its weather products to the Data Link Processor (DLP) for uplink to the pilots via data link, and to the Weather Message Switching Center Replacement (WMSCR) for distribution to other users. In addition to the processing of received meteorological data, the RWP will provide the NWS meteorologists with a workstation capability to display, create, and manipulate the weather products (e.g., weather radar products) in its data base. The RWPs will be deployed at all Area Control Facilities (ACFs), the FAA Academy, and the FAA Technical Center.

The Weather Processors Program Office, ANW-130, sponsored ACN-250 to conduct a PT&E of the RWP prototype subsystem. The plan called for PT&E to be conducted in two parts, each having a different approach. The two parts consisted of the following: (1) an operational evaluation of the features, functions, training, and documentation, and (2) a demonstration of the NEXRAD interface. This report only addresses the users' evaluation of the features, functions, documentation, and training. The NEXRAD demonstration has been postponed until the NEXRAD Operational Support Facility (OSF) can support the demonstration. A separate report will be written after the demonstration is completed.

METHOD

PARTICIPANTS.

Seven NWS meteorologists and 11 FAA system maintainers participated in the training and evaluation. (Note: The original number of personnel for meteorologist training was eight, however, one meteorologist was unable to participate in the evaluation. The original number of personnel for system maintainer training was 14, however, 3 system maintainers were unable to participate in the evaluation. All eight meteorologists, who were trained, evaluated the training.)

The seven meteorologists evaluated the Meteorologists Interface Processor Console (MIPC) and its related documentation. The meteorologists operational duties and associated work regions are as follows:

Meteorologist Number	Operational Duties	Associated Work Regions
1	Meteorologist in Charge	Auburn, WA CWSU
2	Meteorologist in Charge	Salt Lake City, UT CWSU
3	Meteorologist in Charge	Freemont, CA CWSU
4	NWS Western Region staff meteorologist	Salt Lake City, UT NWS Western Region
5	NWS meteorologist	Longmont, CO CWSU
6	NWS meteorologist	Farmington, MN CWSU
7	NWS meteorologist	Houston, TX CWSU

The 11 system maintainers evaluated the Computer Operator Terminal Console (COTC) and its related documentation. The system maintainers' operational duties and associated work regions are as follows:

Meteorologist Number	Operational Duties	Associated Work Regions
1	ARTCC electrical engineer	Nashua, NH ARTCC AFS
2	ARTCC electrical engineer	Aurora, IL ARTCC AFS
3	ARTCC electrical engineer	Albuquerque, NM ARTCC AFS
4	ARTCC electrical engineer	Fort Worth, TX ARTCC AFS
5	ARTCC technician	Auburn, WA ARTCC AFS
6	ARTCC technician	Palmdale, CA ARTCC AFS
7	ARTCC technician	Leesburg, VA ARTCC AFS
8	ARTCC technician	Auburn, WA ARTCC AFS
9	ARTCC technician	Ronkonkoma, NY ARTCC AFS
10	ARTCC technician	Olathe, KS ARTCC AFS
11	Great Lakes Region electrical engineer	Des Plaines, IL AGL-463

In order to facilitate the evaluation, the 18 participants were divided into two evaluation teams (Team I and Team II). Team I consisted of four meteorologists and six system maintainers. Team II was composed of three meteorologists and five system maintainers.

TRAINING.

During June 1990, 1-week training courses were held at the JPL facilities located in Pasadena, California. The meteorologists attended the JPL RWP prototype meteorologist course and the system maintainers attended the system operator course.

The meteorologist course provided an overview of the RWP, training on the MIPC, and use of the Workstation Operators Manual (WOM). The training on the MIPC included the skills necessary to perform designated configurations and meteorological responsibilities, as well as monitor, view, create radar, graphic, and alphanumeric weather products. Four meteorologists and three ACN-250 representatives attended this course during the week of June 11, 1990. The remaining four meteorologists, one ACN-250 representative, and two FAA Academy training specialists (AAC-942D and AAC-909) attended the course during the week of June 25, 1990.

After the meteorologist training courses were completed, the AAC-909 training specialist completed instructor and lesson evaluation checklists and an "End of Course" evaluation. The eight meteorologists and the AAC-942D training specialist completed an "End of Course" evaluation that was mailed to them by AAC-909 at the end of training.

The system operator course provided an overview of the RWP, training on the COTC, Adaptation Description Document (ADD), and Computer System Operators Manual (CSOM). The training on the COTC included the skills necessary to adapt, configure, monitor, manage, and diagnose the RWP prototype. Seven system maintainers and an AAC-942D training representative attended this course during the week of June 4, 1990. The remaining seven system maintainers and a AAC-942D training specialist attended the course during the week of June 18, 1990. After the system operator training courses were completed, the training was evaluated by the AAC-942D training specialist.

In order to account for the delay between the training courses and the start of the PT&E on July 23, 1990, each participant received a 1-hour refresher training course on either the COTC or the MIPC, as appropriate, before starting their evaluations.

EQUIPMENT.

Two fully configured RWP prototype subsystems were used during the evaluation. Each RWP was equipped with one MIPC workstation and one COTC workstation. The JPL Test Data Generator (TDG) was connected to both RWPs to simulate the interfaces necessary for the test environment. The support software used during the evaluation consisted of the RWP Build 3 software, and a complete set of default adaptation data for the Washington Air Route Traffic Control Center (ARTCC) configuration.

Each MIPC consisted of a Digital Equipment Corporation (DEC) VAXstation 3200, integrated with a DSCAN CH512 color printer and a LA210 letter printer. A VR290 Video Terminal with keyboard, DSCAN CH160 mouse, and DSCAN copy button were provided for MIPC control. A JPL-developed audio alarm unit was interfaced to the Central Processing Unit (CPU).

Each COTC consisted of a DEC VT1000, integrated with a VSXXX-AA.B03 mouse, and an ACCEL 500 console printer. A JPL developed audio alarm unit was interfaced to the CPU. A VT330 was available for use as a backup operator console.

MIPC, COTC, AND DOCUMENTATION QUESTIONNAIRES.

Seven questionnaires were utilized in the conduct of the MIPC, COTC, and related documentation evaluations. These questionnaires were structured to obtain the evaluation of the RWP prototype by rating a statement about each feature/function or document, from one to five; one being "completely disagree" and five being "completely agree." Blank lines were provided to the right of each statement for freeform user comments. A summary questionnaire was used to solicit comments at the end of the evaluation.

The Human Factors-Meteorologist questionnaire (see appendix A) consisted of 174 statements divided into five categories; Alphanumeric Products, Graphic Products, Next-Generation Weather Radar (NEXRAD), Display (System), and Alarm/Alerts.

The Site Adaptation Data-Meteorologist questionnaire (see appendix B) consisted of 149 statements divided into 15 categories; Mosaic Product Adaptation, Individual Radar Product Adaptation, Manually Created Graphic Product Adaptation, Generated Routine Individual Product (GRIP) Product Adaptation, User ID Adaptation, Product Type Alarm/Alert Adaptation, NEXRAD Alarm/Alert Adaptation, Urgent Pilot Report Alarm/Alert Adaptation, Color Selection Adaptation, Alarm/Alert Tone/Duration Settings Adaptation, NEXRAD Site Parameter Adaptation, NEXRAD Global Processing Parameters Adaptation, NEXRAD Mosaic Parameter Adaptation, Converted Gridded Binary Products Adaptation, and General Adaptation Questions.

The Workstation Operators Manual - Meteorologist questionnaire (see appendix C) consisted of 26 statements divided into six categories; Organization/Scope, Site and Makeup, Level of Writing, English Usage, Illustrations, and Maintenance.

The Meteorologist Summary questionnaire (see appendix D) consisted of five questions asking for written responses concerning the overall suitability of the functions and features of the MIPC workstation.

The Human Factors - System Maintainer questionnaire (see appendix E) consisted of 96 statements divided into seven categories; System (Display), Logs, Reports, Diagnostics, Command Language, Data Storage/Archive, and Alarm/Alerts.

The Site Adaptation Data - System Maintainer questionnaire (see appendix F) consisted of 137 statements divided into 22 categories; System Monitoring Adaptation, Diagnostic Adaptation, Adaptation Parameter Adaptation, NEXRAD Global Processing Parameters Adaptation, NEXRAD Mosaic Parameter Adaptation, Received Alphanumeric (A/N) Product Adaptation, Individual Radar Products Adaptation, Gridded Binary Product Adaptation, Received Automated Weather Observing System (AWOS)/Automated Surface Observing System (ASOS) Products Adaptation, Manually Created A/N Products Adaptation, Manually Created Graphic Products Adaptation, GRIP Product Adaptation, Mosaic Product Adaptation, Converted Gridded Binary Products Adaptation, User Access Adaptation, External Address Adaptation, RWP Area Definition Adaptation, System Alarm/Alert Messages Adaptation, NEXRAD Alarm/Alert Adaptation, Background Map Definition Adaptation, Projection Conversion Parameters Adaptation, and General Adaptation Questions.

The Adaptation Description Document (see appendix G) and Computer System Operators Manual (see appendix H) questionnaires consisted of 26 statements divided into six categories; Organization/Scope, Site and Makeup, Level of Writing, English Usage, Illustrations, and Maintenance.

The System Maintainer Summary questionnaire (see appendix I) consisted of five questions asking for written responses concerning the overall suitability of the functions and features of the COTC workstation.

TRAINING EVALUATION QUESTIONNAIRES.

An "End of Course" evaluation questionnaire, a Lesson Evaluation Checklist, and a Instructor Checklist were utilized in the conduct of the meteorologist training evaluation. The training questionnaires are contained in appendix J.

The "End of Course" evaluation questionnaire contained two sections, A and B. Section A was structured to obtain the evaluation by rating a statement about the meteorologist training course from one to five, one being "almost never" and five being "almost always." Section A was from FAA-Standard-028, Contract Training Programs, dated March 28, 1985, and consisted of 24 statements about the meteorologist training course. Section B was structured to obtain the evaluation by rating a statement about the meteorologist training course from one to five, one being "disagree" and five being "agree." Section B was developed by AAC-909, consisting of 20 statements about the course, and divided into five categories; Perform RWP System Level Tasks, Contribute to Operational Functionality, Establish Weather Products Display Characteristics, View Weather Products, and Create/Edit/Disseminate Locally Generated Weather Products. An area was provided for additional comments at the end of Section B. The eight meteorologists and AAC-909 and AAC-942D training specialists, that attended the meteorologist training course, completed this questionnaire.

The Lesson Evaluation and Instructor Checklists were also from FAA-Standard-028. The two checklists required the participants to assign a yes or no to general statements about the lesson material and presentation of the meteorologist training course. Space was provided to the right of each checklist statement for additional comments. The Lesson Evaluation Checklist consisted of 17 statements about the lesson material that was covered during the meteorologist training course. The Instructor Checklist consisted of 18 statements about the teaching and presentation of the meteorologist training course. The AAC-909 training specialist completed these checklists.

PRETEST AND EVALUATION (T&E) REVIEW.

The pre-T&E review was held on July 16, 1990, at the FAA Technical Center. This review was chaired by the ACN-250 Test Director and attended by personnel from ACN-250, ANW-130, and support organizations. This review addressed the detailed schedule for PT&E, open action items, and NEXRAD demonstration issues and status. A record of the minutes was generated in a memorandum to all attendees, dated July 17, 1990.

MIPC, COTC, AND DOCUMENTATION EVALUATION PROCEDURE.

The participants in the MIPC, COTC, and documentation evaluation were assigned to evaluation Teams I or II. Team I started on July 23, 1990, and ended at noon on July 25, 1990. Team II started at noon on July 25, 1990, and ended on July 27, 1990.

Both teams attended a 1-hour refresher course on either the COTC or the MIPC, as appropriate, before the start of the evaluations. Each team was briefed before the start of the evaluations by the ACN-250 evaluation manager on the schedule, purpose of the evaluation, format of the questionnaires, response alternatives (see appendix K), and conduct of the evaluation. During the briefing each participant was given a detailed schedule. This schedule set aside time for individual workstation sessions to allow each participant time to access the workstation's functions and features, and fill out the associated questionnaire. Each participant was scheduled to come back for several sessions over the 2½-day evaluation period.

Before beginning each session, the participants were given the appropriate questionnaire to review. The participants were instructed to use (or attempt to use) all the functions and features on the appropriate workstation (COTC or MIPC) and the associated documentation so that the questions could be answered. A summary questionnaire that requested written responses was administered at the end of the evaluation. The four questionnaires administered to the meteorologists were as follows:

1. Human Factors Meteorologist
2. Site Adaptation Data Meteorologist
3. Workstation Operators Manual
4. Meteorologist Summary

The following questionnaires were administered to the system maintainers:

1. Human Factors System Operator
2. Site Adaptation Data System Operator
3. Computer System Operator Manual
4. Adaptation Description Document
5. System Maintainer Summary

The completion of the human factors and site adaptation data questionnaires required each participant to spend between 3 and 4 hours for each questionnaire on the RWP workstations. The documentation and summary questionnaires took approximately 1 hour each. A representative from ACN-250 and a JPL representative were present at each workstation during the evaluation to answer any questions about the RWP or the evaluation. The questionnaires were collected from each participant after completion. The ACN-250 evaluation manager and evaluation monitors reviewed each group of completed questionnaires for any items that had an overall poor rating and for any concerns that were addressed on the summary questionnaires. These items were noted for discussion during the post T&E review.

TRAINING EVALUATION PROCEDURE.

The training evaluations were conducted by AAC-909 and AAC-942D training specialists.

After both meteorologist training courses were completed, an "End Of Course" evaluation questionnaire was mailed to all the participants. The meteorologists in the AAC-942D training specialists were instructed to complete the questionnaire and mail it back to the AAC-909 representative. The "End of Course" evaluation and the instructor and lesson evaluation checklists were completed by the AAC-909 training specialist. The AAC-909 training specialist also provided a written evaluation of the meteorologist training.

After both system operator training courses were completed, the AAC-942D training specialist completed a written evaluation report.

POST-T&E REVIEW.

The post-T&E reviews were held with each group of meteorologists and system maintainers after their team had completed the evaluation. The Team I reviews were held on July 25, 1990, and the Team II reviews were held on July 27, 1990. The reviews addressed any poorly rated questionnaire items and concerns from the summary questionnaire. A consensus was reached with each group on the major concerns, and in some cases a recommendation for alleviation of the concerns was formulated. The detailed feedback from these reviews is contained in the RWP PT&E Quick Look Report (see appendix L) and has been incorporated into the Results and Discussion section.

MIPC, COTC, AND DOCUMENTATION QUESTIONNAIRE ANALYSIS.

Numerical values were assigned to the Human Factors, Site Adaptation Data, WOM, CSOM, and ADD questionnaire responses (1 - Completely Disagree, 5 - Completely Agree, 0 - Do not know/No response). The mean response was computed by summing up the responses and dividing by the number of nonzero participants for each questionnaire item. Those questionnaire items with a mean of two or lower were rated as unacceptable. The means were analyzed to determine what functions and features of the workstations and associated documentation were poorly rated. The written comments on each questionnaire were incorporated into the questionnaires that are presented in the appendices.

The written responses from the summary questionnaires were analyzed using content analysis. These responses were categorized and quantified to provide additional user feedback. (See appendices D and I.)

TRAINING QUESTIONNAIRE ANALYSIS.

Numerical values were assigned to the responses in sections A (A - 1 almost never, E - 5 almost always) and B (1 - disagree, 5 - agree) of the "End of Course" evaluation. The average points were computed by summing up the responses and dividing by the total number of participants for each questionnaire item. The questionnaire items with a average point value of 3.5 or lower were rated as unacceptable. The average points were then analyzed to determine what areas of the RWP prototype meteorologist training could be improved. The additional comments at the end of section B were analyzed using content analysis.

RESULTS AND DISCUSSION

METEOROLOGIST, MIPC WORKSTATION, AND DOCUMENTATION.

The number of meteorologist participants, along with the means for the Human Factors, Site Adaptation Data, and WOM evaluations, are presented in appendix M. The summary questionnaire responses are presented in appendix D. The overall rating for the MIPC and the related documentation was acceptable (mean of 3.58).

Seven items on the human factors questionnaire and three items on the site adaptation questionnaire were rated unacceptable. The WOM did not receive any unacceptable ratings. Additional comments and concerns were echoed by the meteorologists on the summary questionnaires and during the post-T&E reviews. The comments and recommendations from the post-T&E reviews are incorporated into the discussion.

A major area of concern of the meteorologists was the slow response time of the system. The participants wrote many "system too slow" comments on the summary questionnaire. Some areas of concern regarding the slowness of the system were:

1. Graphic display is slow in the pan/zoom mode and when sequencing using map backgrounds.

2. Locating and displaying data is slow.

3. System is slow in generating and retrieving alphanumerics.

4. System is too slow in executing commands; the meteorologists want notification that a command is being processed.

Another area of concern was the Man-Machine Interface (MMI). This was addressed on the unacceptable ratings for item No. 116 "The MMI response times are satisfactory" and item No. 1 "The effort required to generate alphanumeric products is satisfactory" on the human factors questionnaire. Some areas of concern regarding the MMI were:

1. Since Surface Aviation Observations (SAs) are a frequently requested product, the procedure to request them needs to be simplified.

2. Meteorologist should not be required to input the time to create/edit a product.

3. Too many commands are required to achieve the desired results when generating and retrieving alphanumeric products.

4. The participants want a simplified way to obtain a group of products. They also want to be able to request a group of products by inputting a specified time.

5. The number of menus needs to be reduced and/or combined. There are too many steps required to obtain access to a desired menu.

The participants also had some comments on the MIPC display. Item No. 37, on the human factors questionnaire, "There is sufficient indication of hidden frames" and item No. 153 "The display does not appear too cluttered" received unacceptable ratings. There were several comments on the summary questionnaire stating that the "windows/pop-ups are too inflexible." The participants felt that the display was too cluttered with pop-ups and that there was no way to determine the presence of hidden pop-ups on the screen. They would like to receive an indication of the parent/child relationship of the pop-ups. A suggestion was made by the meteorologists at the post-T&E reviews that maybe color could be used to differentiate between the pop-ups.

An unacceptable rating was received on human factors questionnaire item No. 53 "The effort required to relocate legends is acceptable." It was determined from the post-T&E reviews that the participants did not understand what the word legends meant in the questionnaire item. This accounts for the low rating on item No. 53.

Another area that the participants addressed during the post-T&E reviews was the use of the mouse. As a group, the meteorologists all seemed to agree that the current mouse was unacceptable for use in an operational environment. However, the group was split on how to resolve the problem. Team I suggested that a trackball would be more suitable for operational use. Team II felt that a new mouse that had a higher ratio of mouse movement to the screen was desirable. Team II stated that a trackball was not desirable because it required movement to a keyboard. It is suggested that this issue be reevaluated.

Two other items on the human factors questionnaire that received unacceptable ratings were No. 8 "The capability to check spelling/acronyms is adequate" and No. 120 "Passwords are tolerant of case changes." The participants recommended at the post-T&E reviews that a spelling/acronym check be incorporated into the RWP system. The RWP does not perform this function. Also, the participants noted that passwords can only be input with upper case characters. The participants recommended that the security system be changed to be tolerant of password case changes.

Since the Direct Command Language (DCL) was not operational during training, the participants found it difficult to evaluate. Item No. 129 on the site adaptation data questionnaire "You can easily use the DCL to change the adaptation parameters" received an unacceptable rating. The meteorologists suggested during the post-T&E reviews that a more understandable command language that parodies normal requests replace the DCL.

The meteorologists had several comments on the site adaptation data. Item No. 113 "You can easily identify the Static B parameters" and item No. 114 "You can easily identify the parameter type" on the site adaptation data questionnaire received unacceptable ratings. It was determined at the post-T&E reviews, that the adaptation will be infrequently utilized by the participants, therefore, an on-line help function is required. During the post-T&E reviews, the participants noted that the adaptation parameters were difficult to review and were not appropriate considering the amount of NEXRAD and RWP system knowledge required. They also noted that the static A and B adaptation parameters were not available for their evaluation. This probably accounts for the low ratings on items No. 113 and No. 114.

Another area of concern addressed the procedures for coordinating with Airway Facilities (AF) personnel regarding RWP changes and maintenance. Since these procedures need to be addressed before the RWP becomes operational, the following recommendations were made by the participants:

1. A notice should be given to the meteorologists of any System Support Facility (SSF) changes.

2. Procedures must be in place so that AF must clear any system shutdowns with the meteorologists. A message needs to appear on the MIPC to notify the meteorologist of an upcoming system shutdown.

3. Meteorologists want a way to control any changes AF may make that affect meteorological data.

On the subject of display color being assigned to products versus assignment to each meteorologist several issues were addressed. The participants want to be able to assign color to a product. The reason stated for this is that color standards are required for the meteorologist briefings to Air Traffic (AT). In addition, they would also like the use of personal colors which would not be used for briefings.

Another general issue concerned the cursor. The participants suggested that the cursor be highlighted by a blink or color so that it could easily be found on the screen. Also, it is requested that the cursor automatically come up in the first edit field in the alphanumeric frames.

In the area of product retrieval, the participants felt that retrieving products by date/time was unacceptable. For operational use they want the products to be retrieved by hazard, issue number, phenomena number, or product type. The participants gave two examples of this: (1) Terminal Forecasts (FTs) and SAs should be keyed to location, and (2) created products should be keyed to a given name.

The meteorologists had several outstanding issues in the area of radar and products. The following is a list of these issues that need to be addressed:

1. The meteorologists are legally responsible to obtain Center Weather Advisories (CWAs) and Center Weather Statements (CWSs) from neighboring centers. The participants want the RWP to be changed to enable them to do this.

2. A suggestion was made that any items that are redundant with the Meteorologist Weather Processor (MWP) be deleted. This accounts for the repeated comment made by the meteorologists on the summary questionnaire "RWP too complex, RWP too redundant of MWP." If the items that are also on the MWP must be made available, they want to be able to use them with the RWP radar data.

3. The meteorologists want the ability to overlay radar mosaics on conventional weather. A point was brought up during the post-T&E reviews that SAs and Pilot Reports (PIREPs) are only useful to them if they are used in conjunction with the radar. They also require information on fronts and plotted data. The comment "Add the capability to overlay radar data with other products" was echoed on the summary questionnaires.

4. The meteorologists want the ability to have the system take a Hazardous Weather Advisory (HZW) and create a CWA. The comment "Add graphic CWA creation to the system" was written on several of the summary questionnaires. They also stated that CWAs need to be graphic products.

5. On the subject of NEXRAD, the participants noted there were no mosaics or unmasking for them to evaluate. They found it very hard to rate this function without having access to the product. This function requires further evaluation when it is available.

The participants suggested during the post-T&E reviews that the RWP and the MWP consoles be integrated at the CWSU work area to facilitate efficient work flow. They also stated that if the RWP is a backup for the MWP then it must be designed to function in a comparable manner. If RWP will only be used for the Advanced Automation System (AAS), the participants were not as concerned as to how the RWP non-NEXRAD functions are implemented.

Only two areas of concern were noted on the WOM: (1) add an index, and (2) check the WOM to determine any inconsistences.

In order to ensure that the RWP meets the needs of the CWSU meteorologists, the participants strongly urged that more CWSU experience be incorporated into the RWP project. They felt that the RWP project required CWSU meteorologist input on a continual basis. Many "Needs more CWSU involvement in the design" comments were written on the summary questionnaire. Several methods to provide additional CWSU input were addressed:

1. A CWSU meteorologist team to review specifications and to provide input to the RWP project office.

2. A CWSU meteorologist to serve as a liaison to the FAA RWP project office.

3. A CWSU experienced meteorologist to become part of the RWP project office.

4. A CWSU experienced meteorologist to become part of the JPL staff.

SYSTEM MAINTAINER, COTC WORKSTATION, AND DOCUMENTATION.

The number of FAA system maintainer participants, along with the means for the Human Factors, Site Adaptation Data, CSOM, and ADD evaluations, are presented in appendix N. The summary questionnaire responses are presented in appendix I. The overall rating for the COTC workstation and the related documentation was acceptable (overall mean response of 3.62).

One item on the human factors questionnaire and one item on the site adaptation questionnaire were rated unacceptable. The CSOM and the ADD received no unacceptable ratings. Additional concerns were echoed on the summary questionnaires, and during the post-T&E reviews.

A major area of concern of the system maintainers was the slow response time of the system. The participants wrote many "system too slow" comments on the summary questionnaire. During the post-T&E review they noted that the software/hardware was too slow in responding to commands, also that it provided no indication on the terminal that a command was received or being processed. The participants want a faster command response time, and a message on the COTC indicating that the command has been received and/or is being processed.

Another area of concern was the menu structure. The participants said that the menus were too cumbersome to use and too complex to page through. This was noted in several comments on the summary questionnaire stating "Paging too cumbersome," "Replace scrolling with paging." Some areas of concern regarding the menu structure were:

1. The participants found it difficult to scroll through the menus to modify the adaptation tables. They want paging capabilities instead of scrolling.

2. The system maintainers want the number of menus reduced.

3. The participants want more prompts for menus.

4. The participants want paging and "search-on-string" capabilities.

5. Screen is too cluttered with pop-ups. The system maintainers want a message on the screen to indicate the presence of hidden pop-ups.

Another concern, that was addressed by the participants, was system maintainer intervention to bring the RWP up/down. The comment "Needs automatic reconfiguration" was made on the summary questionnaires. Since the COTC is not continuously monitored, the participants felt that if an RWP component goes down, the system should be able to automatically reconfigure itself into an operational mode and place a message on the COTC to notify the user of the problem. In the event of a power failure, the system should be able to reboot itself with no operator intervention. The system maintainers also suggested that the maintenance log be deleted from the system. The comment "Maintenance log - duplicates Maintenance Management System (MMS)" was written on several of the summary questionnaires. During the post-T&E reviews, the participants noted that MMS already provides them with a maintenance log and this is a duplication of effort. Another general issue concerned the DCL. The system maintainers were required to use two command languages, DCL and RWP Command Language (RCL). They stated during the post-T&E reviews that only one command language was needed and that the DCL could be incorporated into the RCL. They also noted that the command language was too wordy for day-to-day use. The participants want "fix command" capabilities incorporated into the command language.

Since the system maintainers only interact with the COTC on an "as needed" basis, they want the system to be more user friendly. They need to be able to go directly to the problem and not have to scroll through menus, screens, and documents in order to make the necessary changes. The following recommendations were made by the participants on the summary questionnaires and during the post-T&E reviews to make the RWP more user friendly:

1. The system maintainers want to integrate commonly used functions into the function keys. An overlay could be used to quickly reference each function. The participants want a special function key to be designated that would quickly stop/start a print job. On-line help capabilities that describe each function key should be added to the system.

2. It was noted by the system maintainers that the error messages were too cryptic and contained too many acronyms. The participants want the text of the error messages to more clearly describe the problem. They want on-line help features that describe each error, and how to resolve the error to be incorporated into the system.

3. System operations log is too lengthy to page through. The participants want "search-on-string" capabilities and the ability to recall a time period longer than 24 hours for systems operations.

4. The participants want a spell check feature to be added to the system to check the spelling of commands, entered data, and acronyms.

The system maintainers had several areas of concern regarding the site adaptation parameters. These concerns were addressed in the unacceptable rating for item No. 137 "You can easily use the mouse to activate the adaptation parameters" on the site adaptation data questionnaire and the "Adaptation too cumbersome" comments on the summary questionnaire. The areas of concern regarding the site adaptation parameters were:

1. The participants want an on-line help feature for the adaptation parameters. They want this help feature to contain detailed step-by-step instructions along with an example of the parameter.

2. The participants want the ranges and default values of the parameter, where appropriate, to be displayed on the screen alongside of the area for the parameter entry. If a value is entered outside of the range they want a warning message to appear on the display to notify them.

3. The system maintainers want to be able to initiate/activate any adaptation changes without having to bring the MIPC down. A suggestion was made at the post-T&E review that the RWP use interprocess communication, and not reinitialization, to initiate/activate the adaptation parameters.

4. The participants noted during the PT&E reviews that they could not use the mouse to change, activate, or initiate the adaptation parameters without locking up the system. This accounted for the unacceptable rating on item No. 137 mentioned above. During the PT&E reviews, the participants said that they want to be able to use the mouse to change, activate, and initiate the adaptation parameters.

Several issues were addressed on the questionnaires and at the post-T&E reviews regarding the CSOM and the ADD. The following recommendations were made concerning improvements to the CSOM and the ADD:

1. The participants want the acronym lists to be updated to contain every acronym used by the system.

2. The participants want the information contained in both documents to be presented in a more clear/concise manner. They want the documents to correspond to the actual screens. The system maintainers do not look at these documents on a daily basis, only when a problem exists within the system.

3. The participants want the consistently used adaptation information contained in the CSOM.

During the post-T&E reviews, and on the summary questionnaire, several comments were made stating "More training is needed" and "PT&E should have followed training." The participants felt that more training was needed to successfully evaluate the RWP system.

METEOROLOGIST TRAINING COURSE.

The following is the evaluation of the meteorologist training course by the AAC-909 training specialist with input from course attendees.

The average response and response ranges for each question of sections A and B of the End of Course evaluation are presented in appendix O. Overall, the rating for the meteorologist training was acceptable.

Only two items in section A, No. 16 "The class/lab was adequately equipped" and No. 17 "The class/lab equipment was reliable" were rated as unacceptable. Only two items in section B, No. I.2 "use of menus and RWP DCL commands to perform tasks" and No. II.4 "restore products from archive storage" were rated as unacceptable. These low ratings were also echoed in several places in the additional comments on section B portion of the End of Course evaluation questionnaire and on the instructor and lesson evaluation checklists.

The comments, prepared by the AAC-909 training specialist, on the instructor and lesson evaluation checklists are as follows:

1. The body of the lesson plans were not entirely formatted as depicted in FAA-Standard-028. Overheads especially, were often not depicted according to standards. Since the lesson plans may be used by several instructors, it is suggested that the production model lesson plans adhere to standards.

2. Except for Appendix III, Product Dictionary in the WOM, the written material for the most part, is quite good. The product dictionary has quite a few TBDs. Figure 3-11, Meteorologist Interface Processor (MIP) Menu Structure, in the WOM would be easier to use if it were enlarged into a fold-out.

3. There was some confusion as to the RWP and the MWP capability. This led to frustration. Of course, the RWP in not yet all-inclusive, yet the meteorologist did not know what was available through the MWP. Some knowledge of the MWP capabilities was expounded to the second class, which explained, to a great extent, much of this confusion.

4. The classroom demonstration Cathode-Ray-Tube (CRT) display could not be seen. It was difficult to ascertain details on the screen much less see the cursor moving around the screen.

5. The lectures and laboratory were occasionally troubled by the system going down.

6. Greater use and interspersion of oral questions would have been advantageous.

7. The objectives stated in the "Instructor Lesson Plans, Student Copy" were not articulated in the classroom.

8. There were too many acronyms articulated, which was confusing. However, a list of acronyms was furnished to each student which proved invaluable.

9. At times it was difficult to hear the instructor, whose voice reverberated and blended with the monotone of background computer noise in the room.

The comments that were written on the End of Course evaluation section B are as follows:

1. System was young and the MMI was weak, but the training course covered it well.

2. It appeared they were changing versions of software during our stay there. The first few days the system was unstable and wasn't used in the morning sessions. Since they were changing versions, the commands we learned in the morning didn't always work in the afternoon hands-on sessions. The DCL commands didn't work most of the time. In some cases, even with JPL personnel helping, we could not reach the desired goal. One of the problems was that the WOM and the lesson plans were written from a software version we weren't using.

3. Personal computer (PC) screens should have been provided for all trainees even if they were just slaves-off-main-computer so each trainee could monitor commands at their desk site.

4. An overhead PC screen should have been used by the instructor to illustrate RWP commands, examples, etc., since the class PC monitor was hard to see by all students.

5. Need more one-on-one time during the lab exercise; suggest staggered lunch breaks.

6. During lectures, the lesson plan and the course materials given to each meteorologist were very good. However, the display screen CRT was too small for the lecture. Need two screens.

7. DCL commands were operational less than 50 percent of the time.

8. Disc storage of archive data was not available during lab exercises.

9. Should have had someone knowledgeable in design of system to answer questions as to why certain functions were included; e.g., why SAO's/AWOS in RWP are not interactive with radar.

10. It is reasonable for the training and use of the system to be less than optimum. It is, after all, undergoing development and it would be expected that the system would be somewhat unstable. Training materials rapidly get out of date, and the "prototype" system will be somewhat under the expectations for those it is being designed for. Everything considered, the training went quite well.

SYSTEM OPERATOR TRAINING COURSE.

The following is the evaluation of the system operator course by the AAC-942D training specialist.

Overall, the rating for the system operator training course was acceptable. However, it should be noted that these courses did not comply with the acceptable guidelines stated in FAA-Standard-028.

Other comments on the course are as follows:

1. More instruction using block diagrams would have helped tie the system together.

2. Too much reliance was put on student handouts. If reference to the WOM and CSOM materials had been made, a greater knowledge of the system would have been received.

3. Quality of labs was not very good and a lot of information was lacking. The lab guide would start a test but did not fully cover the steps to complete the project. There was not enough information being displayed on the terminals to know the next step, which would necessitate waiting for an instructor to come and help with information that could have easily been included in the lab guide. Some exercises could not be performed due to the lack of functioning software and hardware. The system, at times, seemed to be in a state that was seriously degraded and we could not perform all functions described in the lab procedures. This required a complete processor shutdown and restart to get the software functioning.

4. The instructor was knowledgeable about the system, an excellent class manager, had good rapport with students, and was an effective speaker.

CONCLUSIONS

The evaluation of the Jet Propulsion Laboratory (JPL) Build 3 Real-Time Weather Processor (RWP) prototype by the National Weather Service (NWS) meteorologists and the Federal Aviation Administration (FAA) system maintainers has provided significant input on the operational suitability of the RWP. Some of the findings are:

1. The RWP response rate is too slow.

2. The menus are too cumbersome and complex. The participants want the menu system to be revised to allow the users direct access to any screen.

3. A spelling/acronym check should be added to the system.

4. Meteorologists want the ability to receive Center Weather Advisories (CWAs) and Center Weather Statements (CWSs) from neighboring centers.

5. The Direct Command Language (DCL) and RWP Command Language (RCL) should be incorporated into one command language.

6. Participants want the DCL to be simplified; too many commands are required for one action.

7. System maintainers want commonly used functions to be integrated into the function keys.

8. Scrolling should be replaced with paging capabilities.

9. System maintainers want automatic reconfiguration and reboot capabilities that require no operator intervention.

10. Error messages should be more clear and concise.

11. Training should follow FAA-Standard-028.

12. An easier way to retrieve and create alphanumeric products should be devised.

13. The mouse should be updated or rethought.

14. The meteorologists require that colors be assigned to products.

15. NWS meteorologists want more input into the RWP project.

Even with the problems cited, the evaluation participants rated the system overall "acceptable."

RECOMMENDATIONS

In order to assure that the system will be maintainable by the field personnel, it is recommended that the suggestions derived from the debriefings, and presented in the Results and Discussion section, be incorporated into the production specification.

The recommendations obtained from the Center Weather Service Unit (CWSU) meteorologists should be supplemented with further input from a CWSU meteorologist working group to ensure that the system, when fielded, will meet the needs of its users. The limited amount of training and evaluation time did not allow for the in-depth evaluation that was required. The large number of problems/issues cited by the meteorologists point to the need for further work on the Man-Machine Interface (MMI). At a minimum, the recommendations presented in the Results and Discussion section should be incorporated into the production specification.

An Operational Test and Evaluation (OT&E) of the production system by CWSU meteorologists and system maintainers is critical to the operational acceptability of the production Real-Time Weather Processor (RWP).

ABBREVIATIONS AND ACRONYMS

AAS	Advanced Automation System
ACCC	Area Control Computer Complex
ACF	Area Control Facility
ADD	Adaptation Description Document
AF	Airways Facilities
A/N	Received Alphanumeric
ARTCC	Air Route Traffic Control Center
ASOS	Automated Surface Observing System
AT	Air Traffic
ATC	Air Traffic Control
ATCS	Air Traffic Control Specialist
AWOS	Automated Weather Observing System
COTC	Computer Operator Terminal Console
CPU	Central Processing Unit
CRT	Cathode-Ray-Tube
CSOM	Computer System Operator Manual
CWA	Center Weather Advisory
CWS	Center Weather Statements
CWSU	Center Weather Service Unit
DEC	Digital Equipment Corporation
DCL	Direct Command Language
DLP	Data Link Processor
FAA	Federal Aviation Administration
FT	Terminal Forecast
GRIP	Generated Routine Individual Product

HZW	Hazardous Weather Outline
JPL	Jet Propulsion Laboratory
MIP	Meteorologist Interface Processor
MIPC	Meteorologist Interface Processor Console
MMI	Man-Machine Interface
MMS	Maintenance Management System
MWP	Meteorologist Weather Processor
NWS	National Weather Service
NEXRAD	Next Generation Weather Radar
OSF	Operational Support Facility
OT&E	Operational Test & Evaluation
PC	Personal Computer
PIREP	Pilot Weather Report
PT&E	Prototype Test and Evaluation
RCL	RWP Command Language
RMMS	Remote Maintenance Monitoring System
RWP	Real-Time Weather Processor
SA	Surface Aviation Observation
SSF	System Support Facility
TDG	Test Data Generator
T&E	Test and Evaluation
WMSCR	Weather Message Switching Center Replacement
WOM	Workstation Operators Manual

APPENDIX A

HUMAN FACTORS METEOROLOGIST QUESTIONNAIRE

PARTICIPANT NO. _____

CATEGORY A HUMAN FACTORS

METEOROLOGIST QUESTIONNAIRE

DATE _____ NAME _____

TIME _____ CENTER _____

The questionnaire items are divided into five categories:

Alphanumeric Products

Graphic Products

NEXRAD

Display (System)

Alarm/Alerts

PARTICIPANT NO. _____

	RATING	COMMENT
ALPHANUMERIC PRODUCTS:		
1. The effort required to generate alphanumeric products is acceptable. (RN 1005)	1 2 3 4 5 don't know	Locating alphanumeric products is very difficult. Using two windows display/dir. cumbersome. Editor pop-ups should place cursor at first field as it finishes drawing pop-up. Need a DELETE TEXT key to rt. of cursor. Delete CREATE button, extra step not needed. Too much time to acquire product. Seems like a lot of steps/pop-ups to generate short products. CWA should be generated from graphic mode then automatically transformed into alphanumerics. PIREP generation is adequate but it is not a function of the meteorologist. Be better with fewer steps.(3)
2. The RWP provides you with the capability to originate a desired number of alpha-numeric products. (RN 1005)	1 2 3 4 5 don't know	OK but should be simpler procedure. Most important too cumbersome otherwise in real time.

PARTICIPANT NO. _____

3. The effort required to originate <u>amendments</u> is acceptable. (RN 1010)	1 2 3 4 5 don't know	Mouse is too sensitive.(2) Totally unacceptable that products are referenced by time and not product name phenomena. No error messages. Make amendment procedure easier.
4. The design of menu structures and relationships facilitates quick and efficient completion of task.	1 2 3 4 5 don't know	Slow and inefficient. Menus overlaying menus is annoying. It would be better if the information caused the menu to be erased. OK, the more one uses it, the better it becomes. Pop-ups can cover needed info at times. Could lessen the amount of mouse work, buttons work faster. Most menu structures good. Some clutter when certain tasks are performed.
5. The effort required to originate <u>cancellations</u> is acceptable. (RN 1010)	1 2 3 4 5 don't know	Having to go to directory to find date/time of product is not efficient. Cannot be done. Don't know. Way too much effort to cancel.

PARTICIPANT NO. _____

6. The system prevents you from inadvertently cancelling a product. (RN 1010)	1 2 3 4 5 don't know	There is no easy way to cancel a message. Don't know.(2) Don't think this can be done.
7. The capability to compose alphanumeric products with predefined message formats is desired. (RN 1020)	1 2 3 4 5 don't know	UA/CWA formats work OK. CWA editor does not allow for proper phenomena update/ issuance. Especially PIR and CWA. Its desired but not available with RWP.
8. The capability to check spelling/acronyms is adequate. (RN 1030)	1 2 3 4 5 don't know	There isn't any. Have only seen it work once. Needs a DELETE key as well as a backspace key. RWP should have ACRONYM and SPELLCHECK. Could not find a way to do this. Meteorologists by trade are poor spellers. This is desirable. Expand to all products. Little checklist in system.

PARTICIPANT NO. _____

9. The full-screen test editing capability is adequate.	1 2 3 4 5 don't know	CWA windows are too small to see entire message; this is necessary to composing one. It doesn't exist as far as I know. OK.
10. The meanings of alphanumeric display buttons are easily understood.	1 2 3 4 5 don't know	Most of the confusion is gone, but some remains with things like "display and settings, EXIT and RETURN."
11. The capability to display new alphanumeric information on a blank screen is adequate. (RN 1115)	1 2 3 4 5 don't know	Too slow. Too complex. Not proficient at it but that may come with time on the system. Scrolling feature is OK but I would prefer a "big" picture of the data. Too many mouse spaces. Text windows too small; should view 1/2 of largest product or allow window to be lengthened besides scrolling.
12. The effort required to provide hard copy for alphanumeric products is reasonable. (RN 1315)	1 2 3 4 5 don't know	Shouldn't need two menus to produce a print. It should be a one-button task. Not easy enough, make it simpler.

PARTICIPANT NO. _____

13. Your request to disseminate an alphanumeric product can be accomplished with a reasonable amount of effort. (RN 1390)	1 2 3 4 5 don't know	Too much effort. It's not bad if you send as you save but if you have to call it up by time of creation it is unacceptable. Menu or DCL should reference product not time string when stored.
14. Your request to disseminate an HZW product can be accomplished with a reasonable amount of effort. (RN 1395)	1 2 3 4 5 don't know	This is a graphic not available as alphanumeric product.(2) Why aren't HZWs and CWAs the same and/or why can't you tag a HZW area with a CWA? They are confusing to us, so think what they will do to a controller. Could be much easier. Auto-plot of CWA.
15. The system prevents you from disseminating an HZW product without a valid time period. (RN 1400)	1 2 3 4 5 don't know	When I send a product I can't find it again. Don't know. Not an alphanumeric product.

PARTICIPANT NO. _____

16. The amount of effort to assign unique identifiers to meteorologist generated products is reasonable. (RN 1405)	1 2 3 4 5 don't know	Can assign identifiers but cannot retrieve without date/time group. Assigning products by complete date/time is no good. But then why doesn't RWP use it as a product reference. The system doesn't allow many PIREPS from the same station to be sent during a short time.
17. The effort to store alpha-numeric meteorologist generated product identifiers is reasonable. (RN 1410)	1 2 3 4 5 don't know	Too much work and too complex.
18. The effort to retrieve alphanumberic meteorologist generated product identifiers is reasonable. (RN 1410)	1 2 3 4 5 don't know	Cannot retrieve using assigned ID without date/time group. Should delete reference to long alphanumeric time string and do so by product type. The use of the settings pop-up should be eliminated for something more direct. Too slow. Should be easier.
19. It is desirable to request/ retrieve CWA data from other centers.	1 2 3 4 5 don't know	Mandatory(2) This data should be in the system.

PARTICIPANT NO. _____

20. It is desirable to request/ retrieve CWS data from other centers.	1 2 3 4 5 don't know	This product not as important as CWA. Mandatory-adjacent Centers. We need it to coordinate forecast near each other.
21. It is desirable to request/ retrieve PIREP data from other centers structured.	1 2 3 4 5 don't know	Same answer as No. 22.
22. The effort required for you to retrieve and display any retained product is reasonable. (RN 1425)	1 2 3 4 5 don't know	Having to know date/time group makes it hard. Who cares what second it was stored. I don't like the feature of having to remember the exact issuance date/time. System crashed when I went to do this. Make it less complex.

PARTICIPANT NO. _____

23. The effort required to display single and alpha-numeric products is reasonable. (RN 1435)	1 2 3 4 5 don't know	Should take less time and steps to do. Too many mouse strokes required to retrieve products. Should have wild card settings to display all of a product type; settings limit you to one again. Alphanumeric string a problem - perhaps another click menu needed in some cases.
24. It is desirable to request multiple alphanumeric products for one site.	1 2 3 4 5 don't know	Having to know date/time group makes it hard.
25. The display options for surface observations are satisfactory. (RN 1990)	1 2 3 4 5 don't know	Is this necessary if data is available in MWP? Selecting product should activate search. Don't know.
26. The display options of terminal forecasts are satisfactory. (RN 1995)	1 2 3 4 5 don't know	Eliminate DISPLAY button where possible. Don't know. Is this necessary if data is available on MWP.

PARTICIPANT NO. _____

27. The display options of grid wind and temperature forecasts are satisfactory. (RN 2000)	1 2 3 4 5 don't know	Nice. Should be a graphic; too involved for requirements as is. Make it a table display and/or graphic. System needs to display more than one Lat/Long, e.g., a collective of winds across 5° Lat/Long box. Too many mouse strokes.
28. Alphanumeric function names are easily understood.	1 2 3 4 5 don't know	Too complicated.

PARTICIPANT NO. _____

GRAPHIC PRODUCTS

29. Graphic frame size is adequate.	1 2 3 4 5 don't know	The CRT screen size is barely adequate and then to force a graphic into it and not be able to fill the screen is not adequate. Could be bigger. Needs a separate video screen or at least 50 percent larger; all our products/briefings are verbal show and tell. You need more detail and resolution to be seen from 10 feet. Would prefer graphic frame to be larger covering most of the screen so data (mosaic) would be easier to see.
30. The RWP provides you with the capability to <u>create</u> graphic products with minimal effort. (RN 1035)	1 2 3 4 5 don't know	Effort decreases as one becomes more familiar with the system. Needs to be easier.
31. The RWP provides you with the capability to easily <u>edit</u> graphic products. (RN 1035)	1 2 3 4 5 don't know	Do not think referencing the product (HZW) is going to work as efficiently as product name. No it doesn't. A/N time string a fault.

PARTICIPANT NO. _____

32. The effort required to <u>recall</u> graphic products is acceptable. (RN 1040)	1 2 3 4 5 don't know	Still don't like using date/time to recall. A/N string menus need to be streamlined. Too many mouse strokes. It would be better if it was a one pop-up selection system.
33. The ability to distinguish between display areas of no coverage and a level-0 display coverage is satisfactory. (RN 1295)	1 2 3 4 5 don't know	Don't know. There could be some misinterpretation if the colors are set the same. Too many steps. No real time data. Don't know.
34. The effort required to mask and unmask the boundaries of a displayed image mosaic is reasonable. (RN 1360)	1 2 3 4 5 don't know	Too many steps. So little experience using the function I'm not sure I know if I was using it right.
35. The number of steps required to display multiple radar products is satisfactory. (RN 1555)	1 2 3 4 5 don't know	It would be nice if you could make up product collectives so one step through displays and overlaid products. Cut down on the steps.

PARTICIPANT NO. _____

36. The effort is reasonable to discontinue, pause and resume displaying multiple radar products. (RN 1575)	1 2 3 4 5 don't know	Too cumbersome. Seems like it's a lot of pop-up punching and slow response to everything in graphics displaying.
37. There is sufficient indication of hidden frames.	1 2 3 4 5 don't know	Frames disappear and it is hard to find your way back. Familiarity will solve some of this but not all.
38. The amount of effort to set personal parameters (i.e., color and/or password) is acceptable.	1 2 3 4 5 don't know	It would be a lot simpler and easier to click on preset colors than having sliding scales of red, green and blue. Very easy.
39. Color coding on the display will allow quick and accurate interpretation of the displayed information.	1 2 3 4 5 don't know	Very good color selection. Only by color code standardization will quick and accurate interpretation be possible. Color capability has a lot of overkill. There is so little difference in some to make them indistinguishable.

PARTICIPANT NO. _____

40. The design of menu structures and relationships facilitates quick and efficient completion of tasks.	1 2 3 4 5 don't know	Like any new system speed and efficiency come with experience. This one has more steps to do things than I like. Menus need to be easier to read and simpler to command. Needs more work - problems are known more user friendly. Do a time/motion study. Overall very good.
41. The meaning of graphic display buttons are readily understood.	1 2 3 4 5 don't know	I assume with experience the buttons will become understood. They will probably be more so when we are actually using NEXRAD data in our offices.
42. The effort required to create a new product by modifying an existing one is acceptable. (RN 1040)	1 2 3 4 5 don't know	Editing existing HZW seems to work OK. Too much work. Refer to product-by-product not time stored.
43. The effort for you to enter graphic line segments is reasonable. (RN 1055)	1 2 3 4 5 don't know	Overall very good. Don't know.

PARTICIPANT NO. _____

44. The prompts provided to select graphic functions are adequate. (RN 1060)	1 2 3 4 5 don't know	Simplify it so you can make your selections from a single pop-up.
45. The capability for you to add legends is adequate. (RN 1065)	1 2 3 4 5 don't know	HZW editor saves only first area and text. It needs to have font scaling capabilities. It should be a one button step at the displayed product. Don't know.
46. There is sufficient space to add legends. (RN 1065)	1 2 3 4 5 don't know	Don't know.(2) Not if you consider how much is lost to other information that the controllers don't want to see. Could use a little more or different fonts of more than one HZW is in progress. Don't know.
47. The capability is satisfactory for you to add text to a graphic product. (RN 1065)	1 2 3 4 5 don't know	Should be able to add text to more than one HZW.

PARTICIPANT NO. _____

48. There is sufficient space to add text to a manually created product. (RN 1065)	1 2 3 4 5 don't know	It depends on the size of the area picked. As long as you don't write a book. More than one font?
49. The RWP provides you with the capability to easily delete legends from a manually created product. (RN 1065)	1 2 3 4 5 don't know	Don't know.(3)
50. The effort required to delete text from a manually created product is reasonable. (RN 1065)	1 2 3 4 5 don't know	
51. The system prevents you from inadvertently deleting text from a manually created product. (RN 1065)	1 2 3 4 5 don't know	Don't know.
52. The confirmation of deleted text from a manually created product is satisfactory. (RN 1065)	1 2 3 4 5 don't know	Don't know.

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53. The effort required to relocate legends is acceptable. (RN 1065)	1 2 3 4 5 don't know	Don't know.(3) Not necessary.
54. The location of the date, time and product name on a graphic product is satisfactory. (RN 1125)	1 2 3 4 5 don't know	Label should be much larger and it should be written directly on the product instead off separately to one side. Better if date/time group was at top to right of product type.
55. The data and time legend is legible. (RN 1125)	1 2 3 4 5 don't know	Eliminate year and seconds. Don't know. Label should be much larger and it should be written directly on the product instead off separately to one side.
56. The effort required to zoom all graphic products in any manner is satisfactory. (RN 1180)	1 2 3 4 5 don't know	Effort is OK but zooming scales should have better resolution. Too slow.(2) The screen size is too small; zooming a small screen isn't a solution. Very easy to zoom.

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57. The ability to zoom to a point vector graphic and image products is desirable. (RN 1185)	1 2 3 4 5 don't know	Make the screen useful first.
58. The effort required to relocate the viewing window center is reasonable. (RN 1210)	1 2 3 4 5 don't know	There needs to be a way of canceling this in the radar displays because it is so time consuming and ties up the display.
59. The effort required to display an overlay of up to three products is satisfactory. (RN 1215)	1 2 3 4 5 don't know	It would be nice if you could make up product collectives so one step through displays and overlaid products. Will not load HZW on radar site image. Don't know.
60. Three products are sufficient for overlaying (within an overlay) of up to three sets of maps. (RN 1220)	1 2 3 4 5 don't know	Four is better. AWIPS has four. This isn't enough at times. Allow toggling between overlays. Don't know.(2) But needs more flexibility on types/nos. of products you can overlay.

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61. The effort required to select a color for each set of background maps is reasonable. (RN 1220)	1 2 3 4 5 don't know	It would a lot simpler and easier to click on preset colors than having sliding scales of red, green and blue.
62. The legends for each product overlay is understandable. (RN 1225)	1 2 3 4 5 don't know	Don't know.(2) May be overkill when we are all used to NEXRAD product names.
63. Product deletion from an overlaid display requires minimal effort. (RN 1235)	1 2 3 4 5 don't know	Don't know. Very easy.
64. The confirmation of a product <u>deletion</u> is acceptable. (RN 1235)	1 2 3 4 5 don't know	Don't know.
65. The system is designed to prevent you from inadvertently deleting a product or map. (RN 1235)	1 2 3 4 5 don't know	Don't know.(2) Should give some indication before deletion.

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66. The various products and background maps displayed do not obstruct one of a higher order. (RN 1240)	1 2 3 4 5 don't know	
67. There are a sufficient number of background maps available. (RN 1260)	1 2 3 4 5 don't know	Don't know.(2) This would be determined by local user requirements.
68. The effort required to select background maps is reasonable. (RN 1260)	1 2 3 4 5 don't know	Once defaults are set at each CWSU there probably won't be a lot of switching.
69. It is desirable to have the automatic display of one or more default maps. (RN 1265)	1 2 3 4 5 don't know	Don't know. It saves time most of the time.
70. The product frame positions permit an easy flow of operation.	1 2 3 4 5 don't know	But they should disappear and the screen be filled with the product. Too many at times clutters screen.

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71. It is desirable to have the latest version of a mosaic displayed. (RN 1375)	1 2 3 4 5 don't know	Mosaic display is the RWPs strength. Having the latest always displayed is a must.
72. The ability to select image product intensity levels is satisfactory. (RN 1385)	1 2 3 4 5 don't know	
73. The effort required to store graphic meteorologist generated product identifiers is reasonable. (RN 1410)	1 2 3 4 5 don't know	Except by A/N date stamp. Mandatory for easy access.
74. The effort required to retrieve graphic meteorologist generated product identifiers is reasonable. (RN 1410)	1 2 3 4 5 don't know	Don't know. Too many mouse strokes. A/N string again a problem. Don't know how to solve this system wide feature. Having to know date/time group not good.
75. The effort required to display an individual graphic product is reasonable. (RN 1470)	1 2 3 4 5 don't know	Too many mouse strokes. Again it seems like combining pop-ups would speed things up.

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76. The effort required to display individual routine radar products is reasonable. (RN 1480)	1 2 3 4 5 don't know	Again it seems like combining pop-ups would speed things up. Would prefer directory and display windows be combined as one window.
77. The effort required to display or store individual RRP products is reasonable. (RN 1505)	1 2 3 4 5 don't know	Would prefer directory and display windows be combined as one window. Make it more direct. Combining pop-ups would speed things up. Not able to call up product.
78. The effort to display mosaic products is reasonable. (RN 1530)	1 2 3 4 5 don't know	Combining pop-ups would speed things up. Prefer directory and display windows be combined as one window.
79. It is desirable to have an automatic update of new versions of the radar products. (RN 1545)	1 2 3 4 5 don't know	It should be mandatory.

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80. The effort required by you to initiate an automatic display of retained versions of radar products is satisfactory. (RN 1550)	1 2 3 4 5 don't know	Have to go through too many pop-up selections. Put it all on one pop-up and set some defaults.
81. The DCL is logical to the user.	1 2 3 4 5 don't know	In most cases. Very poor; consult user. With time and practice it will become easy to recall. Ease in recollection is logical. What's this doing in the graphics frame section? Don't know.

NEXRAD

82. The effort required by you to cause a NEXRAD to become unavailable is reasonable. (RN 1350)	1 2 3 4 5 don't know	May be too easy.
83. The effort required by you to restore a NEXRAD is reasonable. (RN 1350)	1 2 3 4 5 don't know	

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84. The effort required to display NEXRAD <u>availability status</u> is reasonable. (RN 1370)	1 2 3 4 5 don't know	
85. The NEXRAD status screen is easily understood. (RN 1370)	1 2 3 4 5 don't know	Label across the top of the UP/DOWN and IN/OUT columns would be nice to prevent misunderstandings.
86. The effort required to mask and unmask a NEXRAD is reasonable.	1 2 3 4 5 don't know	Too many mouse strokes.
87. The ability to access an MMI function through the menu is reasonable. (RN 1075)	1 2 3 4 5 don't know	
88. The ability to access an MMI function through the DCL is acceptable. (RN 1075)	1 2 3 4 5 don't know	Don't know. Didn't get into it at training session. Commands are difficult to use.

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89. The display screen size is satisfactory. (RN 1095)	1 2 3 4 5 don't know	Would prefer graphic frame to be larger covering most of the screen so data would be easier to see. Should be seen from 10 feet without difficulty. We brief TMU in a common area, sometimes they like to view radar from their position. You all would have known this if you had consulted the user through design. Not if you're cramming all of the windows/pop-ups on to it and want to look at graphics.
90. There are a sufficient number of display colors desired WX products. (RN 1100)	1 2 3 4 5 don't know	There is overkill.(2)
91. The use of some colors (i.e., red) should be standardized for specific meanings. (RN 1100)	1 2 3 4 5 don't know	At least in an individual center.
92. The number of colors on the display does not create a clutter of information. (RN 1100)	1 2 3 4 5 don't know	It sure has the potential. Allow user to toggle overlays by keystroke.

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93. The effort required to select a color is reasonable. (RN 1100)	1 2 3 4 5 don't know	Simpler and easier to click on preset colors than having sliding scales of red, green and blue.
94. There are a sufficient number of display colors. (RN 1230)	1 2 3 4 5 don't know	Simpler and easier to click on preset colors than having sliding scales of red, green and blue. Too many.
95. Legibility of displayed characters on the display is not reduced by color.	1 2 3 4 5 don't know	It could be if you weren't careful.
96. Color coding on the display will allow quick and accurate interpretation of the displayed information.	1 2 3 4 5 don't know	As long as it is standardized.
97. Color coding is intuitive, (i.e., appropriate colors are used for alerts, updated information and normal status).	1 2 3 4 5 don't know	There may be a few; e.g., red for warning.

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98.	The use of color enhances the visual organization of displayed information.	1 2 3 4 5 don't know	Chaos!, unless the user is accustomed to the color select.
99.	The colors demonstrated on the display are discernible from one another without difficulty.	1 2 3 4 5 don't know	If you set them up that way.
100.	You can easily distinguish between the letter "O" and the numeral zero.	1 2 3 4 5 don't know	Both the same. Zeros should be struck 0 by convention. Could confuse them.
101.	You can easily distinguish between the lowercase letter "L" and the numeral one. (RN 1105)	1 2 3 4 5 don't know	Not really; but not critical as Os and 0s. Don't know. Not able to get into lowercase.
102.	The effort required to retain displayed information along with new information is reasonable. (RN 1120)	1 2 3 4 5 don't know	Auto update. Referring back to a "previous" image is not possible. Can't do it.

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103.	The effort required to scroll is reasonable. (RN 1165)	1 2 3 4 5 don't know	Good.
104.	The effort required to page in either direction is reasonable. (RN 1170)	1 2 3 4 5 don't know	Okay. Not intuitively obvious unless you are familiar with the system.
105.	The effort to erase a display is reasonable. (RN 1175)	1 2 3 4 5 don't know	
106.	Confirmation of display erasure is satisfactory. (RN 1175)	1 2 3 4 5 don't know	
107.	The location of the reserved message input area is satisfactory. (RN 1275)	1 2 3 4 5 don't know	Don't know. Put it anywhere you want it.

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108.	The location of the reserved computer response message area is satisfactory. (RN 1280)	1 2 3 4 5 don't know	To a new user it is easy to lose where it is being displayed but with time shouldn't be a problem. Don't know.(2)
109.	The location of the reserved UTC area is satisfactory. (RN 1290)	1 2 3 4 5 don't know	Don't know.
110.	The effort required to obtain hard copy is reasonable. (RN 1310)	1 2 3 4 5 don't know	Don't know. Not possible as configured; no printer used.
111.	The effort required to exit from a frame is reasonable.	1 2 3 4 5 don't know	If overlaid with other menus it can be a mess. Sometimes clicking on an icon and other times on an EXIT box is still confusing.
112.	Minimal effort is required to exit from a function.	1 2 3 4 5 don't know	As long as you can still find all of the icon boxes.

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113.	The number of colors on the hard copy is sufficient. (RN 1320)	1 2 3 4 5 don't know	It would be nice if they more closely matched CRT screen. Not enough detail to brief off of. E.g., cannot relay radar/doppler details over laser printer.
114.	The hard copy quality is satisfactory. (RN 1320)	1 2 3 4 5 don't know	Not enough detail.
115.	The amount of time to input for hard copy is reasonable. (RN 1320)	1 2 3 4 5 don't know	Slow.(7)
116.	The MMI response times are satisfactory. (RN 1430)	1 2 3 4 5 don't know	Slow.
117.	The audible error signal level is adequate to ensure that you respond to an SAA condition. (RN 1790)	1 2 3 4 5 don't know	Ask me after I've had to listen to it for a couple of months.

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118.	The visual error signal is adequate to ensure that you respond to an SAA condition. (RN 1790)	1 2 3 4 5 don't know	Menu can be masked easily by pop-ups. Ask me after I've had to listen to it for a couple of months.
119.	The input of passwords is reasonable.	1 2 3 4 5 don't know	
120.	Passwords are tolerant of case changes.	1 2 3 4 5 don't know	Not tolerant.(2) Don't know.(2) At present can only be in caps.
121.	The number of steps required to enter a password is reasonable.	1 2 3 4 5 don't know	No big deal, not done that often.
122.	The number of steps required to enter a password is reasonable.	1 2 3 4 5 don't know	
123.	The content of the elements accomplished by terminal forecasts is satisfactory. (RN 1995)	1 2 3 4 5 don't know	Don't know.(3) Product query empty. Not an RWP function. No FTs in data base.

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124.	The mix of elements provided by grid, wind and temperature forecasts is satisfactory. (RN 2000)	1 2 3 4 5 don't know	Not RWP function.
125.	The content of the elements provided by grid, wind and temperature forecasts is adequate. (RN 2000)	1 2 3 4 5 don't know	Don't know.(2) Not an RWP function.
126.	The amount of effort to set personal parameters (i.e., color and/or password) is acceptable.	1 2 3 4 5 don't know	
127.	Names of functions accurately describe the actual function.	1 2 3 4 5 don't know	Putting EXIT and EDIT together is confusing.
128.	Function buttons located on the display that are marked with names or abbreviations are readily understandable.	1 2 3 4 5 don't know	EXIT/DISPLAY and a few others are confusing to the new user.

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129.	Function buttons on the display are logically located.	1 2 3 4 5 don't know	DIR/DISPLAY functions should be next to each other. On some. DISPLAY RRP pop-up looks reversed to me.
130.	The layout of the function buttons is designed to minimize errors.	1 2 3 4 5 don't know	
131.	All functions can be accomplished <u>without</u> the use of the DCL.	1 2 3 4 5 don't know	Don't know.
132.	Help messages are provided with the DCL.	1 2 3 4 5 don't know	Don't know. No not enough or detailed.
133.	All functions can be performed <u>with</u> DCL.	1 2 3 4 5 don't know	Don't know.(3)

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134.	A sufficient number of function buttons are located on the main display screen to support commonly invoked functions.	1 2 3 4 5 don't know	
135.	The effort required to input frequently used functions is reasonable.	1 2 3 4 5 don't know	Again once you learn the systems language it will become easier. RWP should have the capability of MACRO, so that users can save mouse strokes for commonly used products. Menus can be a problem, too many and too many click activities. Should function upon selection where possible.
136.	Error messages are helpful.	1 2 3 4 5 don't know	
137.	Error messages are easily noticed.	1 2 3 4 5 don't know	Some flash on screen for too short a time, should accumulate.

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138.	Error messages are clear, their meaning readily apparent to the meteorologist.	1 2 3 4 5 don't know	Tell me correct way it needed to be done or list the options/steps I didn't succeed at.
139.	Recovery from error is accomplished with minimum effort.	1 2 3 4 5 don't know	Usually make the same error many times before stumbling on to the correct method. Don't know. At times unclear.
140.	Window/frame sizes are adequate.	1 2 3 4 5 don't know	Should be able to stretch windows. Graphics product frame needs to be bigger.
141.	The ability to adjust the size of the window/frame is reasonable.	1 2 3 4 5 don't know	Don't know. Feel this a very important item. System cannot do this. Unable to adjust. Would be nice feature to have.
142.	Prompts are provided for multi-step tasks.	1 2 3 4 5 don't know	

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143.	RWP system failure is readily apparent.	1 2 3 4 5 don't know	Need message on screen or alarm of some kind to indicate system failure. RWP should have a flag or system not updating message. Should "red X" screen when down. Not always clear when system goes down.
144.	Display failure was immediately apparent to you.	1 2 3 4 5 don't know	Usually. Should "red X" screen. Not really. Don't know.
145.	Compared to current CWSU operations, work required of the meteorologist to accomplish similar tasks with the RWP was less than that of today.	1 2 3 4 5 don't know	Don't know. With time and experience RWP will become quicker. This RWP has been designed without CWSU meteorologists and end user, the pilot. Alphanumeric functions take much longer with the RWP.

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146.	The RWP was designed to facilitate quick and efficient response to critical WX events by the meteorologist.	1 2 3 4 5 don't know	Mosaic NEXRAD data would give merit to this if alphanumerics were better. In concept not function/form; consult user. It could be if you had two monitors or a split screen. Too slow and too complex. I hope it was.
147.	During heavy WX conditions the visual information on the RWP displays was not excessive.	1 2 3 4 5 don't know	It sure could get that way very easy. Don't know.(4) Without actual live data its hard to tell. But I think it could become excessive.
148.	Paging between frames is easy and convenient.	1 2 3 4 5 don't know	They have a tendency to hide each other and disappear to a new user.
149.	Prompt messages are clear, their meaning readily apparent to the meteorologist.	1 2 3 4 5 don't know	Most are.

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150.	The design of menu structures and relationships facilitates quick and efficient completion of tasks.	1 2 3 4 5 don't know	Combine some of them. Menus need to be simpler. Overlaying of windows can get confusing, with experience it should become better. No. Consult user in the field. Some menu structures length reduce efficiency.
151.	Legibility of displayed characters on the display is not reduced by color/ blink coding techniques.	1 2 3 4 5 don't know	Don't know. May be useful to be able to blink mosaic displays. Could easily get lost in the colors.
152.	The menu layout is logical.	1 2 3 4 5 don't know	Most of the inconsistency appear to be gone. Do not have time to get a feel for all of them. Pop-ups can overlay others.
153.	The display does not appear too cluttered.	1 2 3 4 5 don't know	Does appear cluttered with all data displayed.(3) Too many pop-ups at times.
154.	Operator messages and prompts are consistently located on the display.	1 2 3 4 5 don't know	Sometimes yes and sometimes no.

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155.	The mouse is easy and comfortable to use.	1 2 3 4 5 don't know	A different kind of mouse would help. A bit too sensitive for my taste..pad might help. No. Too much motion is required to move curser from top to bottom. Curser gets lost at times. A different color would help. Toggle action buttons may be faster in some cases. Suggest touch screen in lieu of a mouse. The mouse gets in the way of papers, etc. Most of the time except for pasting and patching. Kind of small and buttons close together.
156.	The overall "feel" of the mouse is satisfactory for WX operation.	1 2 3 4 5 don't know	Kind of small and buttons close together. Don't know. Consult user; too large a statement to rate. A bit too sensitive for my taste..a pad might help.
157.	The alphanumeric and/or graphic frame windows aspect ration (height width ratio) is satisfactory.	1 2 3 4 5 don't know	Need larger graphic screens. Seems like everything is squashed down vertically.

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ALARM/ALERTS

158.	The activation of an alarm/alert within 15 seconds is reasonable. (RN 1080)	1 2 3 4 5 don't know	Should be less than one second.
159.	The adjustability of an alarm is reasonable. (RN 1080)	1 2 3 4 5 don't know	
160.	The audio sound level of the alarm is acceptable. (RN 1080)	1 2 3 4 5 don't know	Rude but acceptable.
161.	The ability to disable alarms is reasonable. (RN 1080)	1 2 3 4 5 don't know	May be covered by other menus.
162.	The notification of an alarm disabled is acceptable. (RN 1080)	1 2 3 4 5 don't know	Don't know.

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163.	Alarm/alert messages are easily understood. (RN 1080)	1 2 3 4 5 don't know	Verbage too cryptic for user; are basically machine debug scripts.
164.	The location of the reserved alarm/alert area is satisfactory. (RN 1285)	1 2 3 4 5 don't know	Don't know.(2) Is there a reserved area on the screen? Most will change it's location; should be possible to be user adaptable.
165.	The weather alarm/alert activation conditions are adequate. (RN 1325)	1 2 3 4 5 don't know	Would like more flexibility to develop special alerts on more than (VIP) levels. Don't know.
166.	Alarms are easily detected. (RN 1325)	1 2 3 4 5 don't know	
167.	Alerts are easily detected. (RN 1325)	1 2 3 4 5 don't know	Sometime not noticed depending on location of A/N frame. Menus can be masked.

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168.	The alarm/alert messages are understandable. (RN 1325)	1 2 3 4 5 don't know	
169.	Alarms are provided for all necessary conditions. (RN 1325)	1 2 3 4 5 don't know	Don't know. Ask me when I have some real time use.
170.	The product identification of an alarm/alert is easily seen. (RN 1330)	1 2 3 4 5 don't know	
171.	The effort required to acknowledge an alarm/alert is reasonable. (RN 1335)	1 2 3 4 5 don't know	
172.	The system shutdown alarm/alert is sufficient notice of initiation of a shutdown sequence. (RN 1660)	1 2 3 4 5 don't know	Don't know. Should have to be given a release command from the MMI before shut down. That would be a good idea. Red X screen is better. Don't know.

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173.	The ability to recall alarm/alerts after sign-off is desired.	1 2 3 4 5 don't know	Keep running tab of last three hours? Very important point. Machine needs to be able to do this.
174.	During heavy workload conditions audible alarm/alert information is not excessive.	1 2 3 4 5 don't know	It could be easily. It might be. Don't know.(2) Heavy workloads are in the field, not here. Might try this question there. At times it could be excessive.

APPENDIX B

SITE ADAPTATION DATA METEOROLOGIST QUESTIONNAIRE

PARTICIPANT NO. _____

CATEGORY B SITE ADAPTATION DATA

METEOROLOGIST QUESTIONNAIRE

DATE _____ NAME _____

TIME _____ CENTER _____

The questionnaire items are divided into 15 categories:

Mosaic Product Adaptation

Individual Radar Product Adaptation

Manually Created Graphic Product Adaptation

GRIP Product Adaptation

User ID Adaptation

Product Type Alarm/Alert Adaptation

NEXRAD Alarm/Alert Adaptation

Urgent Pilot Report Alarm/Alert Adaptation

Color Selection Adaptation

Alarm/Alert Tone/Duration Settings Adaptation

NEXRAD Site Parameter Adaptation

NEXRAD Global Processing Parameters Adaptation

NEXRAD Mosaic Parameter Adaptation

Converted Gridded Binary Products Adaptation

General Adaptation Questions

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NOTE: "**" These items can only be changed by the FAA system operator at the COTC, with your direction. Changes cannot be made at the MIPC. These questions are being asked to determine if the parameters are adequate to do your job.

MOSAIC PRODUCT ADAPTATION:

1. The RWP provides you with an adequate "area of interest" for the mosaic products. (RN 1025)	1 2 3 4 5 don't know	If system lives up to its advertised specification. Not real familiar with with NEXRAD products but appears to be adequate.
2. You can easily locate the boundaries of the area of interest for the mosaic products. (RN 1025)	1 2 3 4 5 don't know	Provided you have got the color adaptation set up well. Current horse blankets-yes. Real NEXRAD data-unknown.
3. The RWP provides you with adequate background maps for display with the mosaic product. (RN 1265)	1 2 3 4 5 don't know	This would be determined by each site. Consult users.

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4. The effort required to modify the ID of the default background maps is reasonable. (RN 2115)	1 2 3 4 5 don't know	Very confusing to new users. Too many mouse strokes. System slow. Should be shorter.
5. **The capability to disseminate this product to ACCC is desirable. (RN 2115)	1 2 3 4 5 don't know	From MIP console only should not involve COTC person.
6. **The capability to change the product ID is desirable. (RN 2115)	1 2 3 4 5 don't know	From MIP console only should not involve COTC person. Could be useful in some cases.
7. It is reasonable to provide a minimum of one set of mosaic product adaptation parameters for each mosaic product. (RN 2115)	1 2 3 4 5 don't know	

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INDIVIDUAL RADAR PRODUCT ADAPTATION.

8. The effort required to modify the ID of the default background maps is reasonable. (RN 2080)	1 2 3 4 5 don't know	Very confusing to new users. Why ask this question again. Too many mouse strokes. System slow. Should be shorter.
9. **The capability to change the product ID is desirable. (RN 2080)	1 2 3 4 5 don't know	Not really necessary and from MIP console if that. This product should be standard.
10. It is reasonable to provide you with a minimum of one set of adaptation parameters per individual radar product. (RN 2080)	1 2 3 4 5 don't know	_____

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11. The RWP provides you with adequate background maps for display with the individual radar products. (RN 1265)	1 2 3 4 5 don't know	It seems like enough, but when NEXRAD comes in I'm not sure. Site specific question; some sites will require more detailed ones.

MANUALLY CREATED GRAPHIC PRODUCT ADAPTATION.

12. It is desirable to automatically insert a product identification within the created graphic product. (RN 1070)	1 2 3 4 5 don't know	Make sure its the product name/ID not its creation time. Might be useful.
13. It is desirable to have the default destination for dissemination within the created graphic product. (RN 1070)	1 2 3 4 5 don't know	Not necessary.

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14. The format of the date within the created graphic product is adequate. (RN 1070)	1 2 3 4 5 don't know	Nice but make sure the product name/ID are there first! Eliminate YYYY (i.e., 1990)
15. The format of the time within the created graphic product is adequate. (RN 1070)	1 2 3 4 5 don't know	Eliminate seconds. Might add another space between date-time.
16. The effort required to adapt the ID(s) of the default map backgrounds to be displayed with this product is reasonable. (RN 2105)	1 2 3 4 5 don't know	Very confusing to new users.
17. There are an adequate number (3) of default background maps that can be displayed. (RN 2105)	1 2 3 4 5 don't know	Site specific, some sites as my own ZDU would like to see more of a different kind.

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18.	**The capability to retain manually created graphic products for a period of time is desirable. (RN 2105)	1 2 3 4 5 don't know	Should be mandatory. Could be very useful. _____ _____
19.	It is reasonable to provide you with one set of adaptation parameters for each manually created graphic product. (RN 2105)	1 2 3 4 5 don't know	_____ _____ _____
20.	The RWP provides you with adequate background maps for display with the manually created graphic products. (RN 1265)	1 2 3 4 5 don't know	Since the maps for my area haven't come in yet, my answer could change. Other sites might require more/less.

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GRIP PRODUCT ADAPTATION.

21. The effort required to modify the ID of the default background maps is reasonable. (RN 2110)	1 2 3 4 5	Can you? Too many mouse strokes. Shorten procedure. GRIP products not displayable and don't think they need to be available.
22. **The capability to disseminate this product to ACCC is desirable. (RN 2110)	1 2 3 4 5 don't know	From MIP console if necessary.
23. **The capability to change the product ID is desirable. (RN 2110)	1 2 3 4 5 don't know	From MIP console if necessary.

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24. **The capability to retain GRIP versions is desirable. (RN 2110)	1 2 3 4 5 don't know	No GRIP's in system.
25. You can easily identify the GRIP product's source RIP(s). (RN 2110)	1 2 3 4 5 don't know	No GRIP's in system.
26. It is reasonable to provide one set of GRIP adaptation parameters for each GRIP product. (RN 2210)	1 2 3 4 5 don't know	No GRIP's in system.
27. The RWP provides you with adequate background maps for display with the grip product. (RN 1265)	1 2 3 4 5 don't know	No GRIP's in system. Site specific, users may want more in smaller scale.

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USER ID ADAPTATION.

28. The effort required to modify your password is reasonable. (RN 2130)	1 2 3 4 5 don't know	_____
PRODUCT TYPE ALARM/ALERT ADAPTATION.		
29. The effort required to modify the product type ID is reasonable. (RN 2180)	1 2 3 4 5 don't know	Very confusing to new users. Not necessary.
30. The effort required to modify the alarm type (note: for alarms only, this is an audible alarm) is reasonable. (RN 2180)	1 2 3 4 5 don't know	More detailed than it needs to be. Extensive menus.
31. It is reasonable to provide you with one set of product type alarm/alert adaptation parameters for each product. (RN 2180)	1 2 3 4 5 don't know	_____

PARTICIPANT NO. _____

NEXRAD ALARM/ALERT ADAPTATION.

32. The effort required to modify the indication method (note: there are two indication methods: alert which is visual, and alarm/alert which is an aural alarm plus a visual alert) is reasonable. (RN 2185)	1 2 3 4 5 don't know	
33. The effort required to modify the threshold criteria is reasonable. (RN 2185)	1 2 3 4 5 don't know	
34. The effort required to modify the radar intensity alarm/alert adaptation is reasonable. (RN 2185)	1 2 3 4 5 don't know	Too many "mouse strokes" and windows required to change intensity alarms.
35. Zero to thirty-six is a reasonable range for the radar intensity alarm/alert adaptation parameters. (RN 2185)	1 2 3 4 5 don't know	

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36. Four is a reasonable default value for the radar intensity alarm/alert adaptation parameters. (RN 2185)

1 2 3 4 5

don't know

For what? VIP levels, grid boxes? It is not a default. The threshold will have to be determined on station.

37. It is reasonable to provide you with one set of NEXRAD alarm/alert adaptation parameters for each of the possible radar related alarm/alert messages. (RN 2185)

1 2 3 4 5

don't know

38. It is reasonable to provide you with one set of radar intensity alarm/alert adaptation data. (RN 2185)

1 2 3 4 5

don't know

URGENT PILOT REPORT ALARM/ALERT ADAPTATION.

39. The effort required to modify the type of enunciation for AIREPs/PIREPs (note: for the audible alarm) is reasonable. (RN 2190)

1 2 3 4 5

don't know

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40. It is desirable to always alarm/alert upon receipt of an urgent PIREP. (RN 2190)	1 2 3 4 5 don't know	It is mandatory. Depends on area.
41. It is desirable to always alarm/alert upon receipt of an urgent AIREP. (RN 2190)	1 2 3 4 5 don't know	Depends on area.
42. You can adequately control the AIREP/PIREP alarm/alerts that are received at your workstation. (RN 2190)	1 2 3 4 5 don't know	

COLOR SELECTION ADAPTATION.

43. The effort required to change the color for each of the first, second, and third background sets displayed in overlay is reasonable. (RN 2195)	1 2 3 4 5 don't know	Preset colors in a display parcel would make it much faster. (Click on color bar instead of sliding around 3 mixing bars.)

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44. The effort required to change the color for each of the first, second, and third HZW displayed in overlay is reasonable. (RN 2195)	1 2 3 4 5 don't know	Preset colors in a display parcel would make it much faster.
45. The effort required to change the color for each intensity level contour in any radar vector contour product is reasonable. (RN 2195)	1 2 3 4 5 don't know	Preset colors in a display parcel would make it much faster. Because of number of combinations it takes a while to get used to.
46. The effort required to change the color for each radar point product is reasonable. (RN 2195)	1 2 3 4 5 don't know	Preset colors in a display parcel would make it much faster.
47. The effort required to change the color for each intensity level is reasonable. (RN 2195)	1 2 3 4 5 don't know	Preset colors in a display parcel would make it much faster.

PARTICIPANT NO. _____

48. It is reasonable to provide you one complete set of personalized colors keyed to your password. (RN 2195)

1 2 3 4 5

don't know

It will almost have to be a standardized system or it will be of no use in briefing controllers/ supervisors. The color may be set for the station or the product instead of for each person. Standard colors for NEXRAD data should be set. Background colors can be personalized. Yes!

49. You can easily determine what colors have previously been selected for other products. (RN 2195)

1 2 3 4 5

don't know

Calling up the product and trying to compare it with something no longer on the screen isn't simple.

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50. You can easily match a color you liked on another product and use that color selection for the current product. (RN 2195)	1 2 3 4 5 don't know	Fiddling with scroll bars is time consuming and annoying.
51. You can easily reference the color number used for other products. (RN 2195)	1 2 3 4 5 don't know	Colors are independent of the product. It would be nice to default to a color combination.
52. The RWP provides you with an adequate reference point so the colors are not duplicated. (RN 2195)	1 2 3 4 5 don't know	It's hard to get an exact match and that is a disadvantage.
53. It is desirable to view your color selections through the graphics frame. (RN 2195)	1 2 3 4 5 don't know	Isn't the only way I would chose. I'd take it off unless it is requested specifically on the product.

PARTICIPANT NO. _____

ALARM/ALERT TONE/DURATION SETTINGS ADAPTATION.

54. The effort required to modify the indicator (note: indicator is either off; no alerts displayed, no audible alarms sounded; or on) for the radar alarm/alerts is reasonable. (RN 2200)	1 2 3 4 5 don't know	Doesn't need to be this complex. This is just some programmer's idea of entertainment.
55. The effort required to modify the variable tone sequence for the radar alarms is reasonable. (RN 2200)	1 2 3 4 5 don't know	Doesn't need to be this complex. This is just some programmer's idea of entertainment. Seems like a lot of effort. Don't know if we need to be able to adjust these tones.
56. The effort required to modify the duration period of the radar alarms is reasonable. (RN 2200)	1 2 3 4 5 don't know	Doesn't need to be this complex. This is just some programmer's idea of entertainment.

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57. The effort required to modify the indicator (note indicator is either on or off) for radar weather alarms is reasonable. (RN 2200)

1 2 3 4 5

don't know

Doesn't need to be this complex. This is some programmer's idea of entertainment.

58. The effort required to modify the variable tone sequence for radar weather alarms is reasonable. (RN 2200)

1 2 3 4 5

don't know

Doesn't need to be this complex. This is some programmer's idea of entertainment. Too involved.

59. The effort required to modify the duration period of radar weather alarms is reasonable. (RN 2200)

1 2 3 4 5

don't know

Doesn't need to be this complex. This is some programmer's idea of entertainment.

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60.	The effort required to modify the indicator (note indicator is either on or off) for SAAs is reasonable. (RN 2200)	1 2 3 4 5 don't know	Doesn't need to be this complex. This is some programmer's idea of entertainment.
61.	The effort required to modify the variable tone sequence of SAAs is reasonable. (RN 2200)	1 2 3 4 5 don't know	Doesn't need to be this complex. This is some programmer's idea of entertainment. I doubt it needs to be this involved
62.	The effort required to modify the duration period of SAAs is reasonable. (RN 2200)	1 2 3 4 5 don't know	Doesn't need to be this complex. This is some programmer's idea of entertainment.
63.	The effort required to modify the indicator (note indicator is either on or off) for product alarms is reasonable. (RN 2200)	1 2 3 4 5 don't know	Doesn't need to be this complex. This is some programmer's idea of entertainment.

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64. The effort required to modify the variable tone sequence for product alarms is reasonable. (RN 2200)	1 2 3 4 5 don't know	Doesn't need to be this complex. This is some programmer's idea of entertainment. Do we need this much detail?
65. The effort require to modify the duration period for product alarms is reasonable. (RN 2200)	1 2 3 4 5 don't know	Doesn't need to be this complex. This is some programmer's idea of entertainment.
66. It is reasonable to provide you with one set of personalized alarm/alert tone/duration adaptation data. (RN 2200)	1 2 3 4 5 don't know	Definitely not a necessity; save the software for something else. Yes!!

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67. The range of tones for the alarm settings is adequate. (RN 2200)	1 2 3 4 5 don't know	Doesn't need to be this complex. This is some programmer's idea of entertainment. More than enough.
68. The range for the time duration of the alarm settings is adequate. (RN 2200)	1 2 3 4 5 don't know	Doesn't need to be this complex. This is some programmer's idea of entertainment. As long as alert has also been set.

PARTICIPANT NO. _____

NEXRAD SITE PARAMETER ADAPTATION.

69. **The capability to change the number of NEXRAD sites (up to a maximum of 28 sites) that interface with the RWP is desirable. (RN 2035)	1 2 3 4 5 don't know	Yes, but why not do a national mosaic in spherical coordinate from a national center for use by everyone? More will have to be added as current coverage planned is inadequate.
70. **The capability to change the NEXRAD site ID(s) is desirable. (RN 2035)	1 2 3 4 5 don't know	Why add confusion. NEXRAD IDs must be standard. Should not change. Should not change.

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71. **The capability to change the site coordinates is desirable. (RN 2035)	1 2 3 4 5 don't know	Can't change these values. NEXRADs should not be moved once in place. However, in time some may have to be moved so this capability may be useful.
72. **The capability to change the site addresses is desirable. (RN 2035)	1 2 3 4 5 don't know	Why would I need site address in system? NEXRADs should not be moved once in place... However, in time some may have to be moved so this capability may be useful.
73. **It is reasonable to provide one set of parameters for each of the NEXRAD sites that are configured to the RWP. (RN 2035)	1 2 3 4 5 don't know	Not sure; But it sounds reasonable.

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NEXRAD GLOBAL PROCESSING PARAMETERS ADAPTATION.

74.	**The capability to change the total number of allowed outstanding NEXRAD radar requests is desirable. (RN 2055)	1 2 3 4 5 don't know	_____ _____ _____
75.	**Zero to twenty is an adequate range for the total number of allowed outstanding NEXRAD requests. (RN 2055)	1 2 3 4 5 don't know	_____ _____ _____
76.	**Four is an adequate default for the total number of allowed outstanding NEXRAD requests. (RN 2055)	1 2 3 4 5 don't know	Maybe more is better - depending on response time. Perhaps 5 or 6?
77.	**The capability to change the timeout period for NEXRAD radar requests is desirable. (RN 2055)	1 2 3 4 5 don't know	_____ _____ _____

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78.	**Ten to two thousand seconds is an adequate range for the timeout period for NEXRAD radar requests. (RN 2055)	1 2 3 4 5 don't know	Without real NEXRAD data, it is difficult to answer.
79.	**Three hundred seconds is an adequate default for the timeout period for NEXRAD radar requests. (RN 2055)	1 2 3 4 5 don't know	Without real NEXRAD data, it is difficult to answer. Hard to know without live NEXRAD data.
80.	**The capability to change the NEXRAD radar request time window is desirable. (RN 2055)	1 2 3 4 5 don't know	
81.	**Zero to three thousand six hundred seconds is an adequate range for the NEXRAD radar request time window. (RN 2055)	1 2 3 4 5 don't know	

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82.	**Three hundred seconds is an adequate default for the NEXRAD radar request time window. (RN 2055)	1 2 3 4 5 don't know	Hard to know without live NEXRAD data.
83.	**The capability to change the number of NEXRAD radar requests in the time window is desirable. (RN 2055)	1 2 3 4 5 don't know	
84.	**Zero to fifty is an adequate range for the number of NEXRAD radar requests allowed in the time window. (RN 2055)	1 2 3 4 5 don't know	
85.	**Twelve is an adequate default for the number of NEXRAD radar requests allowed in the time window. (RN 2055)	1 2 3 4 5 don't know	For Q #74-85 without live NEXRAD data. Hard to tell if these parameters are adequate.

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86.	**One percent to ninety-nine percent is an adequate range for the <u>target</u> grid cell area. (RN 2055)	1 2 3 4 5 don't know	<u>Seems reasonable.</u>
87.	**Five percent is an adequate default for the <u>target</u> grid cell area. (RN 2055)	1 2 3 4 5 don't know	
88.	**One percent to twenty-five percent is an adequate range for the <u>source</u> grid cell area. (RN 2055)	1 2 3 4 5 don't know	

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89. **Twenty-five percent is an adequate default for the source grid cell area. (RN 2055)	1 2 3 4 5 don't know	Q #86-89 Feel this should not be adaptable; standard on all RWP's.
90. **It is reasonable to provide one set of NEXRAD Global Processing parameters for use by all the NEXRADs that are connected to this RWP. (RN 2055)	1 2 3 4 5 don't know	Meteorology of the Great Lakes is different than that of the Western/ Central Plains.

NEXRAD MOSAIC PARAMETER ADAPTATION.

91. **The capability to change the point product selection criteria is desirable. (RN 2060)	1 2 3 4 5 don't know	
92. **Two kilometers is an adequate default for the point product selection criteria. (RN 2060)	1 2 3 4 5 don't know	

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93. **The capability to change the radar unavailability timeout interval is desirable. (RN 2060)

1 2 3 4 5

don't know

_____

94. ** Thirty seconds is an adequate default for the radar unavailability timeout interval. (RN 2060)

1 2 3 4 5

don't know

Hard to tell without system on-line with live data.

95. **The capability too change the maximum mosaic data age is desirable. (RN 2060)

1 2 3 4 5

don't know

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96. **Twelve minutes is an adequate default for the maximum mosaic data age. (RN 2060)	1 2 3 4 5 don't know	It's unclear to me as to the time needs for NEXRAD running in clear air mode may need default longer than 12 minutes. Too long.
97. It is desirable to see the current coverage boundaries of the radars according to a priority class and coverage class.	1 2 3 4 5 don't know	
98. **It is desirable to have one set of point product selection criteria data. (RN 2060)	1 2 3 4 5 don't know	Seems reasonable.
99. **It is desirable to have one set of radar unavailability timeout interval data. (RN 2060)	1 2 3 4 5 don't know	Some things are more important to be kept updated.

PARTICIPANT NO. _____

100. **It is desirable to have one set of maximum mosaic data age parameters. (RN 2060)	1 2 3 4 5 don't know	Some things are more important to be kept updated. If one radar is prone to outages,and also in a frequent nonweather location, it should be ok to use older data in the mosaic.
101. **It is desirable to provide one set of data priority values for all NEXRAD image grid cells to be used in the RWP NAS plane mosaic products for each of the three mosaic coverage classes. (RN 2060)	1 2 3 4 5 don't know	Might be better to be able to set up separate ones; only experience will answer that.

CONVERTED GRIDDED BINARY PRODUCTS ADAPTATION.

102. **The capability to disseminate this product to ACCC is desirable. (RN 2120)	1 2 3 4 5 don't know	

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103. **The capability to change the constant altitude level of the reformatted product is desirable. (RN 2120)	1 2 3 4 5 don't know	May not want or need some.
104. **It is reasonable to have a maximum of 39 constant altitude levels. (RN 2120)	1 2 3 4 5 don't know	May not use all of them very frequently.
105. **The capability to change the forecast time for the reformatted product is desirable. (RN 2120)	1 2 3 4 5 don't know	
106. **It is reasonable to have a maximum of one/hour for the forecast time of the reformatted product. (RN 2120)	1 2 3 4 5 don't know	Should be longer 1 - 12 hours.

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107. **The capability to change the coverage area for the Spectral Model reformatted products is desirable. (RN 2120)	1 2 3 4 5 don't know	Can't think of when to use this except to modify entire database due to outage.
108. **It is reasonable to have one set of adaptation parameters for each converted gridded binary product. (RN 2120)	1 2 3 4 5 don't know	_____

GENERAL ADAPTATION QUESTIONS.

MENU.

109. You can easily select the background maps for display. (RN 1260)	1 2 3 4 5 don't know	Could be easier.

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110. The effort required to display the dynamic adaptation parameters for which you are authorized is reasonable. (RN 1420)	1 2 3 4 5 don't know	
111. You can easily identify the dynamic parameters. (RN 1800)	1 2 3 4 5 don't know	Takes time to look up the product ID's.
112. You can easily identify the Static A parameters. (RN 1800)	1 2 3 4 5 don't know	#112/113/114 not applicable. Can't.
113. You can easily identify the Static B parameters. (RN 1800)	1 2 3 4 5 don't know	Lack of time with system probably why. We can't change them. Can't.

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114. You can easily identify the parameter type. (RN 1800)	1 2 3 4 5	Can't. _____
	don't know	_____
115. The effort required to modify the Dynamic adaptable parameters via the on-line menu is reasonable. (RN 1815)	1 2 3 4 5	_____
	don't know	_____
116. You can easily display the Static B parameters. (RN 1819)	1 2 3 4 5	Can't. _____
	don't know	_____

PARTICIPANT NO. _____

117. The RWP provides you with adequate automatic error checking features for the adaptation data.	1 2 3 4 5 don't know	Appears to be ok; but I haven't spent enough time on system to evaluate. For the most part. No checking available. might be nice to have.
118. Errors encountered while typing in the adaptation data are easily correctable.	1 2 3 4 5 don't know	_____ _____ _____ _____
119. Errors encountered while activating/ enabling adaptation data are easily correctable.	1 2 3 4 5 don't know	Haven't used it long enough to know. _____ _____

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120. The terms and names used in the adaptation screen frames are adequately standardized.	1 2 3 4 5 don't know	Ok - but took awhile to get used to. For the most part - could be better.
121. You can easily understand the terms/names used in the adaptation screens.	1 2 3 4 5 don't know	With time. Yes - but only after extra effort to get used to system.
122. The RWP provides you with adequate prompts for multi-step tasks.	1 2 3 4 5 don't know	Some multi-steps should be made single step.
123. The RWP provides you with adequate adaptation menu prompts.	1 2 3 4 5 don't know	

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124. The RWP provides you with adequate help features for the adaptation menus.	1 2 3 4 5 don't know	What help? I have trouble using the help feature.
125. The RWP provides you with understandable legends for the menus.	1 2 3 4 5 don't know	Once you have used them for awhile they may be.
126. The capability to display options/examples for each adaptation parameter is desirable.	1 2 3 4 5 don't know	
127. The capability to display the range for each adaptation parameter is desirable.	1 2 3 4 5 don't know	

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128. The capability to display the default values for each adaptation parameter is desirable.	1 2 3 4 5 don't know	_____ _____ _____ _____
129. You can easily use the DCL to change the adaptation parameters.	1 2 3 4 5 don't know	The DCL for anything is time consuming and awkward. System DCL was not working well enough during training to form opinion. Not enough time during evaluation to check out. DCL commands can be difficult to use.

PARTICIPANT NO. _____

130. You can easily use the mouse to change the adaptation parameters.

1 2 3 4 5

don't know

Mouse seems to get tangled in the manual you have to use to make the right choices. There is nothing easy about the mouse except when using graphic products. Mouse very helpful on this and all other decisions. I would rather use a finger touch screen method. Mouse travel ratio sometimes not enough; difficult to handle.

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131. It is satisfactory for the system operator to have access to change or modify all of the dynamic parameters.	1 2 3 4 5 don't know	Not without a release of some sort from the meteorologist. Depends on communication between meteorologist and operator. System operator a design fault. Could accidentally mess up the parameters.
132. **Do you agree with the capability for the system operator to have control of the "**" adaptation parameters?	1 2 3 4 5 don't know	Only if I know what is happening and it affects the operation of my part of the system. I would like him to check with meteorologist before making changes. No. Some parameters may be better served at MIP.

PARTICIPANT NO. _____

133. **Do you agree with the capability for the system operator to have access to change or modify all of the dynamic parameters?

1 2 3 4 5

don't know

There are some they have no understanding of and shouldn't be messing with! I would like him to check with meteorologist before making changes. No. Some parameters may be better served at MIP.

GENERAL ALARM/ALERT.

134. You can easily detect a system alarm displayed at your workstation. (RN 1685)

1 2 3 4 5

don't know

As long as the alarm is plugged in, turned on, enabled... The standard practice has been to move the Alarm icon box out of the way, so that we won't be bothered by alarms. Audible alarm.

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135. You can easily detect a system alert displayed at your workstation. (RN 1685)	1 2 3 4 5 don't know	With all the windows all over they disappear. The standard practice has been to move the Alarm icon box out of the way so that we won't be bothered by alarms. Menus get cluttered covered at times - try different colors for parent/ children. Alerts are not always noticed.
136. You can easily interpret the meaning of the system alarms being displayed. (RN 1685)	1 2 3 4 5 don't know	A few problems ...but due to not being familiar with the system. Sometimes cryptic.

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137. You can easily interpret the meaning of the system alerts being displayed. (RN 1685)	1 2 3 4 5 don't know	Sometimes cryptic.
138. The RWP provides you with an adequate system alarm display. (RN 1685)	1 2 3 4 5 don't know	They tend to get covered up by pop-ups/menus/ windows. Minor problem always having to clear clear alarm/alerts from screen.
139. The RWP provides you with an adequate system alert display. (RN 1685)	1 2 3 4 5 don't know	They tend to get covered up by pop-ups/menus/ windows. All window menus cluttered at times look the same.

PARTICIPANT NO. _____

CREATING/ACTIVATING THE ADAPTATION.

140. The effort required to create the adaptation version directories is reasonable.	1 2 3 4 5 don't know	No good on screen help. A little difficult learning to use system. Does take a little effort but once familiar with system it works easily.
141. The effort required to activate the modified adaptation tables is reasonable.	1 2 3 4 5 don't know	_____
142. The effort required to copy the adaptation tables is reasonable.	1 2 3 4 5 don't know	_____
143. The effort required to save previous versions of the adaptation tables is reasonable.	1 2 3 4 5 don't know	_____

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144. The effort required to retrieve previously saved adaptation tables is reasonable.	1 2 3 4 5 don't know	_____
145. You can easily determine which adaptation tables are currently activated.	1 2 3 4 5 don't know	_____
146. **It is reasonable to have the system operator bring the MIPC down to initiate adaptation changes.	1 2 3 4 5 don't know	Not at all - This has never worked in the past; invariably they shut it down without contacting you. Better if system could stay on line for any changes.

PARTICIPANT NO. _____

147. You can easily use the DCL to activate the adaptation parameters.	1 2 3 4 5 don't know	Need experience to know. I haven't had enough use of this to evaluate. DCL needs work to make more user friendly. Prefer to use the mouse, but it appears easy to use DCL when it works.
148. Adequate indication is provided by the RWP when any adaptation changes are made.	1 2 3 4 5 don't know	_____ _____ _____

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149. You can easily use the mouse to activate the adaptation parameters.

1 2 3 4 5

don't know

Once again, you can't easily use the mouse for anything but graphics. Mouse gets in the way sometimes - make cursor a different standout color or blink.

Summary Comments.

The FAA is treating the RWP/MWP system as if it was another NAV aid. Here there will be an inordinate amount of coordination for setup and running of the RWP/MWP system. The concept of a COTC should be rethought to include only those items necessary to support the RWP/MWP - not control it. MIP console is a better place for those things a meteorologist can do. Perhaps the COTC position should be eliminated? The FAA is holding on to tradition here. COTC is an outgrowth of bad software design that the FAA has gotten used to over the years. A/I and Default settings with well thought-out software should be able to handle the position. I'm sorry I don't have a better solution at present, but there is one.

APPENDIX C

WORKSTATION OPERATORS MANUAL QUESTIONNAIRE

PARTICIPANT NO._____

CATEGORY D DOCUMENTATION REVIEW

WORKSTATION OPERATORS MANUAL (WOM) QUESTIONNAIRE

DATE _____ NAME _____

TIME _____ CENTER _____

REQUIREMENT STATEMENT: The objectives of this evaluation are to assess the following:

Each document shall provide the users with sufficient information to operate the subsystem in an operational environment.

Each document shall provide the users with sufficient technical accuracy to select and retrieve appropriate features and functions.

The questionnaire items are divided into six categories:

Organization/Scope

Site and Makeup

Level of Writing

English Usage

Illustrations

Maintenance

PARTICIPANT NO. _____

ORGANIZATION/SCOPE:	RATING	COMMENT
1. The references to other manuals, paragraphs or tables within procedural steps are adequate.	1 2 3 4 5 don't know	A little cumbersome flipping from text to table - but worked ok. Updates of revisions are inevitable.
2. The technical accuracy of the manual enables you to operate the subsystem in an orderly, efficient manner.	1 2 3 4 5 don't know	Haven't really had enough time with the system to know. It takes time and experience for "orderly efficiency."
3. The manual provides you with sufficient information to properly operate the subsystem in a normal environment.	1 2 3 4 5 don't know	Haven't sufficient time with system to know.

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4.	The manual was complete relative to scope of coverage	1 2 3 4 5 don't know	Updates and revisions are inevitable.
5.	Appendices are complete and adequate.	1 2 3 4 5 don't know	Page III-54 & III-69, III-77 contains incomplete or incorrect definitions; e.g., SWO, SVR, SVS, WST, CWA. *Continued at bottom of page.
6.	Information or data in some appendices should be included within the main body of the manual. (Please list any appendices that you feel should be included in the main body of manual.)	1 2 3 4 5 don't know	Why are the DCL commands in an appendix? DCL commands might be more useful if listed on same page as system description.

*5. Also examples on page III-80 contains typos ... "SLAQ" should be "ZLA1", "BRWN" should be "BTWN", "PRTD" should be "RPTD", "TRO" should be "TROF." Example given on Page III-82 is inappropriate. Please select another example. Call John Conlin (ZLC) or John Makowski (ZSE) for excellent examples of GIM. Glossary might be expanded using handout.

PARTICIPANT NO._____

7.	Over complexity was avoided throughout the manual.	1 2 3 4 5 don't know	Requires some getting used to.
8.	It would be desirable for the manual to have an index.	1 2 3 4 5 don't know	Definitely. This is a must for easy reference.

Size and Makeup:

9.	Selected procedures and/or tables should be reformatted on to pocket size or a size smaller than page size for quick reference use. (Please list any procedures/tables desired on a smaller size.)	1 2 3 4 5 don't know	Tables/procedures include: HZW, CWA, CWS, Alarm Alert procedures, Graphics frame basics. With time and experience, refer to the manuals. All DCL commands on one pg.
10.	Selected procedures and/or tables should be highlighted with finger tabs for quick reference. (Please list any procedures/tables desired to have finger tabs.)	1 2 3 4 5 don't know	Each of the major menu blocks. Once system is learned, this should not be necessary.

PARTICIPANT NO. _____

11. Selected procedures are too cluttered visually as related to sketches and descriptive leader arrows. (Please list those procedures that you deem too cluttered visually.) 1 2 3 4 5

don't know

Level of Writing.

12. The level of writing is adequate for your understanding. 1 2 3 4 5

don't know

English Usage.

13. Sentence structure is clear, concise, and not too wordy. 1 2 3 4 5 As manuals go, its ok.

don't know

PARTICIPANT NO. _____

14.	The choice of words used in procedural steps are descriptive and adequate.	1 2 3 4 5 don't know	
15.	Sentence structure/tense causes you to reread for a clear understanding of a thought or procedural step.	1 2 3 4 5 don't know	Sentence structure is ok.
16.	Word choice used to convey a command or to perform an operation is descriptive and adequate.	1 2 3 4 5 don't know	Word choice is o.k. But I still can't get the DCL commands to work. Not consistent with mouse instructions. "Sometimes say use mouse other times say clicking the mouse."
17.	The use of repetitive words and/or phrases within pages, paragraphs, or procedural steps is adequate.	1 2 3 4 5 don't know	Don't understand.

PARTICIPANT NO. _____

18. Acronyms are defined to your satisfaction.	1 2 3 4 5 don't know	Some are used for 2 different definitions; e.g., PAA-A Map Background and also Product Alarm/Alert. List passed out in class was more complete than appendix in WOM.
19. Acronyms are placed to best advantage.	1 2 3 4 5 don't know	Handout provided is ok.
20. The various descriptions and procedures are clearly structured.	1 2 3 4 5 don't know	

<u>Illustrations</u>.

21. Foldout illustrations should require a blank page so they could be used with the manual closed or on another page.	1 2 3 4 5 don't know	Not necessary.

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22. Lettering size on illustrations and tables is adequate.	1 2 3 4 5 don't know	Could have more variability and types of print. Could be larger or highlighted for easier visual recognition.
23. Descriptive leader arrows would enhance the usefulness of illustrations.	1 2 3 4 5 don't know	Yes, definitely. Not unless illustrations were on the same page as instructions.
24. Photographs in tables that are smaller than a half page should be combined with text.	1 2 3 4 5 don't know	Doesn't matter.

<u>Maintenance</u>.

25. References to "appropriate maintenance personnel" and to "notify maintenance" are adequate in lieu of including more detailed information.	1 2 3 4 5 don't know	Explanations of why will result in better understanding. More specific instructions should be given.

PARTICIPANT NO. _____

26. The number of diagnostic tables and procedures is adequate for the level and scope of your use.	1 2 3 4 5 don't know	Feel Operator should have capability to perform some limited diagnostic procedures in order to estimate systems status.

APPENDIX D

METEOROLOGIST SUMMARY QUESTIONNAIRE

METEOROLOGIST SUMMARY QUESTIONNAIRE

Q.1 What benefits do you see from the RWP Prototype?
participants = 7

Good NEXRAD mosaic capabilities	7
Good NEXRAD product displays	3
Good NEXRAD product capabilities	1
Good HZW capabilities	1
Good mouse capabilities	1
Good adaptation capabilities	1

Q.2 What problems do you see from the RWP Prototype?
participants = 7

System too slow	4
Needs more CWSU involvement in the design	2
Windows/pop-ups too inflexible	2
System too complex (RWP too redundant (MWP))	2
Screen too cluttered	1
Commands too cumbersome	1
System is outdated	1
High crash rate	1
Alphanumerics not user friendly	1
Does not like mouse	1
System needs two MIPCs	1
Directories too cumbersome	1

Q.3 Are there any features/function that you would like to see added to the RWP Prototype?
participants = 7

Graphic CWA creation	3
Capability to overlay radar data with other products	2
Capability to draw circles for HZW areas	1
Automatic dissemination of CWAs	1
User notification of command processing	1
User notification of hidden menus	1
Graphic plotting of PIREP data	1
Addition of WFO boundaries to maps	1
Graphic depiction of SVR, TOR, WS, and terminal area warnings to maps	1
Simplified DCL	1
A single command to create lists of weather products	1
Capability to create an alphanumeric product from HZW	1
Capability to send messages via MWP to aircraft	1
Capability to easily display alphanumeric products	1
Capability to size windows	1

Q.4 Are there any features/functions that you would like to see deleted from the RWP Prototype?
participants = 7

Only access NEXRAD data from the MIPC	3
No access from COTC to change meteorological parameters	1
A different mouse is needed	1
Delete SAOs/AWOS/PIREPs/FAs (redundant in MWP)	1
Delete the storing of HZWs and CWAs by date and time	1
Delete PIREP/CWAs/CWS (redundant in MWP)	1

Q.5 General Comments
participants = 7

PT&E should have followed training	4
Needs more CWSU involvement in the design	3
Meteorologist training should have been more hands on	2
System too complex (RWP too redundant (MWP))	2
PT&E sessions too long	2
2 NWS MICs involved in Program Office	1
GM-14 meteorologist involvement in Program Office	1
PT&E questionnaires too long	1
Only access NEXRAD data from the MIPC	1
Questions during training labs should have made more use of the manuals	1
RWP is not user friendly	1
Eliminate the mouse for use with alphanumeric products	1

APPENDIX E

HUMAN FACTORS SYSTEM MAINTAINER QUESTIONNAIRE

PARTICIPANT NO. _____

CATEGORY A · HUMAN FACTORS

SYSTEM OPERATOR QUESTIONNAIRE

DATE _____ NAME _____

TIME _____ CENTER _____

The questionnaire items are divided into seven categories:

System (Display)

Logs

Reports

Diagnostics

Command Language

Data Storage/Archive

Alarm/Alerts

PARTICIPANT NO. _____

	RATING	COMMENT
SYSTEM (DISPLAY):		
1. The various support system activities provided for you are satisfactory to maintain a minimum of downtime. (RN 1610)	1 2 3 4 5 don't know	Complexity is a problem. System support can be maintained from a number of displays; only experience will tell. No Auto reconfiguration figures. Limited backup capacity-CCP and MIP not backed up. Could use better diagnostics. Recommend backup RMP.
2. The effort required to exercise the various support system activities is reasonable. (RN 1610)	1 2 3 4 5 don't know	Bouncing between RCL and VMS to facilitate clean switching of failed S/W is cumbersome and time-consuming.
3. The task of exercising the various support system activities can be accomplished in a timely manner. (RN 1610)	1 2 3 4 5 don't know	System requires too much housekeeping and is slow.

PARTICIPANT NO. _____

4.	The effort required to initialize from an initial system load is reasonable. (RN 1630)	1 2 3 4 5 don't know	Unreliable software performance requires constant status checking. Ran into complications that were time-consuming but if things go right, it's ok. Should have a batch type file for initialization. System failed on first try. Had to bring down completely - reinitialize.
5.	The amount of time required to initialize from an initial systems load is satisfactory. (RN 1630)	1 2 3 4 5 don't know	It could be better, but it's ok. Took too long due to software problems. A systematic single command line message should be created to reliably sequence the the system up. Somewhat slow. Too much time for system time sync.
6.	The effort required for operational initialization is reasonable. (RN 1635)	1 2 3 4 5 don't know	It's simple and straightforward. System integrity should not depend upon external inputs for time source activation. Successfully bringing up IRG process requires NEXRAD status message to activate system. Initialization requires too many processes. With proper command operation initialization is reasonable.

PARTICIPANT NO. _____

7.	The amount of time required to perform an operational initialization is satisfactory. (RN 1635)	1 2 3 4 5 don't know	Too slow. Somewhat slow.
8.	The brightness level of the initialization messages is adequate. (RN 1640)	1 2 3 4 5 don't know	They are clear; it was black on white. Initial message could be located at different screen locations. Were not sharp. The evaluation was done on the VT 1000. Using the VT 330 did not provide the same sharpness.
9.	The location of the initialization messages is satisfactory. (RN 1640)	1 2 3 4 5 don't know	See answer No. 8
10.	It is satisfactory that the software version is included with the initialization messages. (RN 1645)	1 2 3 4 5 don't know	

PARTICIPANT NO. _____

11.	Partial system initialization is accomplished with minimal effort. (RN 1650)	1 2 3 4 5 don't know	Easy to start and stop process. In some cases involved. Procedures are required. Not minimal, but required.
12.	System shutdown is accomplished with reasonable effort. (RN 1655)	1 2 3 4 5 don't know	System seems to shutdown smoothly. Shutdown is easier than startup.
13.	Partial system shutdown is accomplished with reasonable effort. (RN 1665)	1 2 3 4 5 don't know	Easy to stop process. Easily accomplished.
14.	The effort required to monitor the RWP operational status is satisfactory. (RN 1670)	1 2 3 4 5 don't know	You have to know to look for software status. Main Menu display area contains info not on current log display. No problem. A visual (blinking alert) would assist in reorganizing a hardware/software failure (Down Status). Audible alarm could be discontinued.

PARTICIPANT NO. _____

15. The amount of time expended to perform the monitoring of the RWP operational status is adequate (RN 1675)	1 2 3 4 5 don't know	Takes a little time. If you miss an event on the current log, you have to go through three system logs - forward, not backward, in time to recall the former current log information.
16. The effort required to display the operational status is reasonable. (RN 1680)	1 2 3 4 5 don't know	It would be easier if you could go back to previous menu. Have to bring up six separate display screens - making hard copy is easier.
17. The effort required to start and stop hard copy production of all system log entries is reasonable. (RN 1745)	1 2 3 4 5 don't know	Not satisfactory. After display of an operation. Starting it causes a dump with no way to stop hard copy. Cannot terminate a print once it is started until job is complete. No menu selection to stop hard copy request. A long delay exists between request and final output.

PARTICIPANT NO. _____

18.	The effort required to provide hard	1 2 3 4 5 don't know	A mechanism should be in place to abort long outputs. Needed several trys to print. Not difficult to print logs selected by mouse. Simple menu selection. Only after several attempts at the main menu, would the log entries print.
19.	The audio error signal is adequate to insure that you respond to an SA condition. (RN 1790)	1 2 3 4 5 don't know	The single level beeping audio tone with a fixed duration, does not discern between serious and routine alarm alerts. Audio signal volume is too low. Need level control. It gets your attention; should be used sparingly. Audio signal volume is too low.

PARTICIPANT NO. _____

20. The visual error signal is adequate to ensure that you respond to an SAA condition. (RN 1790)	1 2 3 4 5 don't know	I didn't notice it for a while. Maybe it should be blinking. It is, once you are used to looking at it. Feel that both visual and audio error signals are needed, since the visual error signal does not provide enough alerts by itself.
21. The location of the UTC time is satisfactory. (RN 1865)	1 2 3 4 5 don't know	
22. The effort to locate the UTC time is reasonable. (RN 1865)	1 2 3 4 5 don't know	
23. The visual intensity of the UTC time is adequate. (RN 1865)	1 2 3 4 5 don't know	

PARTICIPANT NO. _____

24. The subject of the elements in the user/system interface is adequate. (RN 1915)	1 2 3 4 5 don't know	Do not understand. Target with a single keystroke by putting it option on the main menu.
25. The effort required for you to use the user/system interface elements is reasonable. (RN 1915)	1 2 3 4 5 don't know	Do not understand. Must have better knowledge of system, menus, and submenus in order for this to work effectively.
26. The use of default parameters is satisfactory. (RN 1960)	1 2 3 4 5 don't know	It is largely nonexistent. There are a few, but if it changes there is no way of knowing this except by looking in ADD. These appear to be adequate and can be changed by the operator.

PARTICIPANT NO. _____

27.	The number of times default parameters are used is reasonable. (RN 1960)	1 2 3 4 5 don't know	There really should be a default for everything to provide a guide for local user. Increased use of default parameters would make all entries easier. Unknown.
28.	The size of the display screen is satisfactory. (RN 1095)	1 2 3 4 5 don't know	Display screen is too small. Resize to utilize whole screen size.
29.	The amount of effort to set personal parameters (i.e., color and/or password) is acceptable.	1 2 3 4 5 don't know	Operators don't change parameters. Would be easier to page down on the screen instead of having to scroll through pages of data. Setting colors is very complex from numeric form - setting alarm sounds would take many tries.
30.	The design of menu structures and relationships facilities quick and efficient completion of tasks.	1 2 3 4 5 don't know	Menus are logically arranged. I think it is.

PARTICIPANT NO. _____

31. The display screen size is satisfactory. (RN 1095)	1 2 3 4 5 don't know	Display screen is too small. See answer No. 28.
32. Error messages are helpful.	1 2 3 4 5 don't know	Since I don't have an in-depth knowledge of system many error messages meant little. Error messages give you an idea of system problems. More error messages would be helpful.
33. Error messages are clearly observed.	1 2 3 4 5 don't know	See answer No. 32. Why should shutting down a process give you error messages. Highlighting and/or blinking would be helpful. Writing too small. Only after you acknowledge them.

PARTICIPANT NO. _____

34. Error messages are readily understood.	1 2 3 4 5 don't know	Some error messages relate to the system. Would not be understood by operator. Most of the time. Not by me! The text of the error messages could be more detailed to provide a clear description of the problem. Why should shutting down a process give you an error message.
35. Error messages are clear, their meaning readily apparent to you.	1 2 3 4 5 don't know	See answer No. 32. Depends on system knowledge. Most of the time. See #34.
36. Recovery from error is accomplished with minimum effort.	1 2 3 4 5 don't know	Error in adaptation, such as accidental erasure requires abort and re-entry of everything. Slow and cumbersome for MIP after crash. A lot of steps to go through for an on-line system to recover.

PARTICIPANT NO. _____

37. Passwords are tolerant of case changes.	1 2 3 4 5 don't know	Could not get password to change. (Bug in unit.) I don't see any way to change cases. There is no CAP lock on keyboard. This is referring only to upper/lower case letters.
38. The input of passwords is reasonable.	1 2 3 4 5 don't know	Unable to determine. (1)
39. The number of steps required to enter a password is reasonable.	1 2 3 4 5 don't know	Could be shorter. It is ok. The procedure is reasonable.

PARTICIPANT NO. _____

40.	The number of steps required to change a password is reasonable.	1 2 3 4 5 don't know	This info should be in CSOM. VMS commands are not shown in the CSMO book. This should be available to the user. There are quite a few steps to change a password.
41.	Prompts are provided for multi-step tasks.	1 2 3 4 5 don't know	Adaptation in static A requires activation and restart of process. OK for VMS functions. The operator has to know what steps to take to complete a multi-step task.
42.	RWP system failure is readily apparent.	1 2 3 4 5 don't know	MIP crashed and I couldn't tell it from the COTC. Depends on environment. Due to SAA audible, failures would be apparent. Hard to know what to do when some appear - sometimes no real problem. Failure and status are sometimes not readily apparent.

PARTICIPANT NO. _____

43.	Display failure was immediately apparent to you.	1 2 3 4 5 don't know	See answer No. 42. Was not shown when it crashed. A display failure would be apparent. Printing the log was not shown when it hung-up.
44.	Function buttons located on the display that are marked with names of abbreviations are readily understandable.	1 2 3 4 5 don't know	No (LF) which to me means line feed, erases a field in adaptation. An overlay of the preprogrammed function keys would help. The function buttons are on the keyboard and they are not marked.
45.	A sufficient number of function buttons are located on the display to support commonly invoked functions.	1 2 3 4 5 don't know	They don't use all function keys. Buttons should be used instead of numbers.
46.	Minimal effort is required to exit from a function.	1 2 3 4 5 don't know	Some functions can't be exited until function is done. Sometimes exists back too far.

PARTICIPANT NO. _____

47.	Names of functions accurately describe the actual function.	1 2 3 4 5 don't know	Functions are not labeled.
48.	The effort required to input frequently used functions is reasonable.	1 2 3 4 5 don't know	Startup using command language are sometimes hard to remember. The ability to create a run command procedure is a helpful tool, but could be simplified. A "repeat" key to display previous command would up entering of frequently used commands and functions.
49.	Function buttons on the display are logically located.	1 2 3 4 5 don't know	LF which clears field of right next to BS which is used to move through fields. I accidently erased fields and had to abort everything.

PARTICIPANT NO. _____

50.	The use of color enhances the visual organization of displayed information.	1 2 3 4 5 don't know	However COTC does not have color. Don't understand why operator is questioned on color system. Has black and white monitor for operator. It would be nice.
51.	Legibility of displayed characters on the display is not reduced by color/blink coding techniques.	1 2 3 4 5 don't know	Only blinking item was cursor which was fine. Same as answer No. 50.
52.	The menu layout is logical.	1 2 3 4 5 don't know	It's reasonable, I have trouble with word logical. Better if menu items were in alpha order.
53.	Operator messages and prompts are consistently located on the display.	1 2 3 4 5 don't know	They are when you have menu displayed. They are not when you display list or adaptation.

PARTICIPANT NO. _____

54. The mouse is easy and comfortable to use.	1 2 3 4 5 don't know	Menus and adaptation on COTC do not support mouse. Physically mouse is ok, but is worthless if you can't use it. Attempts to use it locked up system. A track ball in place of mouse. Better than scroll arrows which are buffered. Not used in normal operations of RWP.
55. The overall "feel" of the mouse is satisfactory for operation.	1 2 3 4 5 don't know	Like drop menus with mouse instead of RCL. As mouses go. Not normally used, and then only to switch between scroll sessions. No problem with its physical feel.

PARTICIPANT NO. _____

LOGS:

			Helpful if name of log were printed on the header so that you could know what log you are in.
56.	The effort required to use the disseminated products log is reasonable. (RN 1695)	1 2 3 4 5 don't know	Need search or string capacity for voluminous log. To cursor up and down requires too light a touch. Continues to search after top or bottom is found. Exit does not work. Menu path is fine.
57.	The time required to recall and observe the log is reasonable. (RN 1695)	1 2 3 4 5 don't know	Up and down time option would be nice. The submenu to reach the disseminated products log is not descriptive enough to allow a person to know where to go to get the log.

PARTICIPANT NO. _____

58. The received products log is a useful tool. (RN 1700)	1 2 3 4 5 don't know	It may be difficult to use. You may want to know if you are receiving products. See answer No. 56. Be nice to mix with disseminated products log sometimes. Need to know how long a particular site has been down or when the last message was received from the site.
59. The effort required to use the received products log is reasonable. (RN 1705)	1 2 3 4 5 don't know	See answer No. 56. See answer No. 57. Helpful to see long in a reverse chronological order.

PARTICIPANT NO. _____

60. The time required to recall and observe the log is reasonable. (RN 1705)	1 2 3 4 5 don't know	No data to check how system acts.
61. The system operations log is a helpful device. (RN 1710)	1 2 3 4 5 don't know	Info may be useful but I don't know for sure. Gives the operator an idea of past system operation.
62. The effort required to recall and observe the system operations log is satisfactory. (RN 1715)	1 2 3 4 5 don't know	Slow, have to hit enter at end of each buffer.
63. The time required to recall an element of the system operations log is reasonable. (RN 1715)	1 2 3 4 5 don't know	Can't recall RAA, must search. See answer No. 60.

PARTICIPANT NO. _____

64. The number of elements in the operations log is satisfactory. (RN 1715)	1 2 3 4 5 don't know	I don't know how to determine this. System operation determines the number of items in the log.
65. The subject matter of each element in the system operations log is satisfactory. (RN 1715)	1 2 3 4 5 don't know	I don't know how to determine this.
66. The effort to display all or part of the system logs is reasonable. (RN 1750)	1 2 3 4 5 don't know	Need to copy only segments or parts of log. Hard to display just part of log. Nice to search log for only a particular NEXRAD site and only have that data be displayed.
67. The effort to display current logs as generated is satisfactory. (RN 1755)	1 2 3 4 5 don't know	

PARTICIPANT NO. _____

REPORTS

68.	The frequency of the system summary report is adequate. (RN 1760)	1 2 3 4 5 don't know	
69.	The effort required to initiate the system summary report is reasonable. (RN 1760)	1 2 3 4 5 don't know	
70.	The type of elements within the system summary report are satisfactory. (RN 1765)	1 2 3 4 5 don't know	There is no MIP worm. Report shows 318 MB worm on MIP.
71.	The number of elements within the system summary report is adequate. (RN 1765)	1 2 3 4 5 don't know	

PARTICIPANT NO. _____

72. The system console diagnostic functions are adequate. (RN 1820)	1 2 3 4 5 don't know	I did not go into any depth. There wasn't much in the way of console diagnostics. Could not run it because it would take system down. Most are off-line diagnostics. No, on-line diagnostics should have them. Off-line diagnostics require shut-down. Need to shut the system down to do this.
73. The effort required to initiate the system console diagnostic functions is reasonable. (RN 1820)	1 2 3 4 5 don't know	Based on review of CSOM. Probably not acceptable to user for degraded system troubleshooting. If you know VMS. They appear to be reasonable in CSOM. No on-line diagnostics.
74. The effort required to use the system console diagnostic functions is reasonable. (RN 1820)	1 2 3 4 5 don't know	See answer No. 73.

PARTICIPANT NO. _____

75.	The effort required to select diagnostic results as hard copy or for console display is reasonable. (RN 1830)	1 2 3 4 5 don't know	Didn't see that it was possible to get hard copy.
76.	The effort required to initiate a single diagnostic is reasonable. (RN 1835)	1 2 3 4 5 don't know	It appears ok in manual. There are no RWP operator commands for diagnostics.
77.	The effort required to completely exercise the diagnostic is reasonable. (RN 1835)	1 2 3 4 5 don't know	Would like to run diagnostics to be sure.

PARTICIPANT NO. _____

COMMAND LANGUAGE

78. The effort required to utilize the command language is reasonable. (RN 1615)	1 2 3 4 5 don't know	RCL commands are fine. Not enough info on VMS commands. After using it yes. DEC window would be easier. Submenu written to contain less ambiguous selections.
79. The command language provides a clear concise vehicle to exercise system activities. (RN 1615)	1 2 3 4 5 don't know	Need manual or class instruction to evaluate. Command language not used much. Need in-depth knowledge of submenus to use the RCL effectively.
80. Command response message locations are adequate. (RN 1620)	1 2 3 4 5 don't know	Separate window would help. Fine.
81. Command response messages are not lost in a clutter of information. (RN 1620)	1 2 3 4 5 don't know	Sometimes when on bottom of screen. No problem. Located at lower right corner of screen. Operator must look for them.

PARTICIPANT NO. _____

82. The location of command error messages is satisfactory. (RN 1625)	1 2 3 4 5 don't know	Larger letters would be nice. See answer No. 81. Fine.
83. Command error messages are not lost in a clutter of information. (RN 1625)	1 2 3 4 5 don't know	See answer No. 81. No problem.
84. Abbreviation of direct command sequences is adequate. (RN 1960)	1 2 3 4 5 don't know	See answer No. 78.

DATA STORAGE/ARCHIVE

85. The time required to restore data from off-line archive storage to on-line storage is minimal. (RN 1840)	1 2 3 4 5 don't know	It appears that to restore an off-line archive you would lose the on-line archive ability. Can't be done from RWP-OPs.

PARTICIPANT NO. _____

86.	The effort required to restore data from off-line archive storage to on-line storage is reasonable. (RN 1840)	1 2 3 4 5 don't know	Based on CSOM, I didn't actually do it. COSM not clear. Manual not clear, should have complete procedure.
87.	The effort required to display recovered off-line archive storage data is reasonable. (RN 1845)	1 2 3 4 5 don't know	Same as answer No. 85.
88.	The effort required to initiate the storage of any product in off-line storage is reasonable. (RN 1850)	1 2 3 4 5 don't know	A single menu driven system would be easier to work with than using VMS command language. See answer No. 85.
89.	The effort required to initiate the storage of a file in off-line storage is reasonable. (RN 1850)	1 2 3 4 5 don't know	Backup tape requires about 13 words in a VMS statement. See answer No. 85.

PARTICIPANT NO. _____

90. The effort required to initiate the restoration of data to on-line storage is reasonable. (RN 1855)	1 2 3 4 5 don't know	Not at all user friendly. See answer No. 85.
91. The time required to install and remove the off-line storage media device is satisfactory. (RN 1860)	1 2 3 4 5 don't know	Could not go off-line. Not at all user friendly. They are brief. See answer No. 85.

ALARM/ALERTS

92. Alarms are easily detected. (RN 1325)	1 2 3 4 5 don't know	Tones are nondiscreet. When the available alarm is connected, the alarms are easily detected.
93. The alarm/alert messages are understandable. (RN 1325)	1 2 3 4 5 don't know	Of the few that I saw. In most cases. With proper system operation knowledge, yes. Brief, but generally so.

PARTICIPANT NO._____

94. The effort required to acknowledge an alarm/alert is reasonable. (RN 1335)	1 2 3 4 5 don't know	There should be a software disable for audible alarms, but should be disarmed for only a predetermined time. Simple.
95. The ability to recall alarm/alerts after sign-off is desired.	1 2 3 4 5 don't know	Also alarm/alerts when no one is signed on, should be preserved. Since no full-time operator, named condition may be to run without anyone. Only sign on when required. When logging on system, amount and type of alarm alerts would be a necessity.
96. During heavy workload conditions audible alarm/alert information is not excessive.	1 2 3 4 5 don't know	In operation more than 1 day would be excessive at COTC. Not when audible alarms are limited to setup procedures. Depends on adaptation. The alarm/alerts for free form text messages received from the NEXRAD appears to be useless information.

APPENDIX F

SITE ADAPTATION DATA SYSTEM MAINTAINER QUESTIONNAIRE

PARTICIPANT NO. _____

CATEGORY B SITE ADAPTATION DATA

SYSTEM OPERATOR QUESTIONNAIRE

DATE _____ NAME _____

TIME _____ CENTER _____

The questionnaire items are divided into 23 categories:

System Monitoring Adaptation

Diagnostic Adaptation

Adaptation Parameter Adaptation

NEXRAD Site Parameter Adaptation

NEXRAD Global Processing Parameters Adaptation

NEXRAD Mosaic Parameter Adaptation

Received Alphanumeric (A/N) Product Adaptation

Individual Radar Products Adaptation

Gridded Binary Product Adaptation

Received AWOS/ASOS Products Adaptation

Manually Created A/N Products Adaptation

Manually Created Graphic Products Adaptation

GRIP Product Adaptation

Mosaic Product Adaptation

Converted Gridded Binary Products Adaptation

User Access Adaptation

External Address Adaptation

RWP Area Definition Adaptation

System Alarm/Alert Messages Adaptation

NEXRAD Alarm/Alert Adaptation

Background Map Definition Adaptation

Projection Conversion Parameters Adaptation

General Adaptation Questions

PARTICIPANT NO. _____

SYSTEM MONITORING ADAPTATION.

1.	The effort required to change the "system monitoring adaptation parameters" is reasonable. (RN 2015)	1 2 3 4 5 don't know	Need to scroll through too many files. Should be able to direct access files. The keypad should be activated to make changes. The operation of keypad functions varies from application to application. Very awkward to edit the table in the source directory then select that table to activate. Can't edit active even for dynamic parameters. It would be nice if we could page down through the tables.

PARTICIPANT NO. _____

instead of having to scroll through them. The ability to have word search on the adaptation would help since this is at the bottom of the list also page down would help speed the process. It is a nuisance to go down and select an adaptation table only a line at a time - suggest page up/ down or type letter and go to first entry that starts with that letter.

PARTICIPANT NO. _____

2.	The adaptable range of 1 through 10 minutes is adequate for the monitoring period. (RN 1675)	1 2 3 4 5 don't know	Yes! Monitoring of less than 1 minute may be desirable in some cases.
3.	The adaptable range increments of 1 second are adequate for the monitoring period. (RN 1675)	1 2 3 4 5 don't know	Don't know of a reason for it. Eliminate the seconds.
4.	You can easily display the adaptation that controls the RWP operational characteristics. (RN 1795)	1 2 3 4 5 don't know	No longer in system. The hardware adaptation can be easily displayed. No such adaptation in system.

PARTICIPANT NO. _____

5. You can easily modify the adaptation that controls the RWP operational characteristics. (RN 1795)

1 2 3 4 5

don't know

No longer in system. Static A parameters are very cumbersome to modify - need constant use of ADD. It's hard to use the menus here since we can't page through the adaptation tables. This process is several steps and is time consuming; it also requires that SMC be reinstated so that any changes can be made. Several steps are required. More training is needed.

PARTICIPANT NO. _____

DIAGNOSTIC ADAPTATION.

6.	The RWP diagnostic adaptation provides you with adequate parameters. (RN 2020)	1 2 3 4 5 don't know	Not aware of any diagnostic adaptation. Not in system. No on-line diagnostics available under RWP or operator account. Could not find.
7.	The effort required to display the diagnostic adaptation parameters is reasonable. (RN 2020)	1 2 3 4 5 don't know	Not in system. Some on-line/program selectable diagnostics should be available should a component fail and is taken out of the system.

PARTICIPANT NO. _____

8. It is reasonable to provide you with one set of adaptation for each separately executable diagnostic. (RN 2020)	1 2 3 4 5 don't know	Not in system. If on-line diagnostics were available this would be acceptable. But there aren't any.

ADAPTATION PARAMETER ADAPTATION.

9. The effort required to display the Static B adaptation parameters is reasonable. (RN 2025)	1 2 3 4 5 don't know	Can't tell Static B from Static A or Dynamic on display. Requires use of ADD. The adaptation radar product control does not address Static A or B parameters.

PARTICIPANT NO. _____

10. The effort required to change the "Static A adaptation parameters" is reasonable. (RN 2025)

1 2 3 4 5

don't know

Seems like it could be easier (less steps). Requires reinitialization of various processes with unknown impact on system. Sometimes four processes must be individually stopped and started. Very slow. Very nonintuitive. We copy the tables; it be easier if we could page through the tables. The changing of these parameters requires the initialization and processes to become active. Which parameters are you addressing?

PARTICIPANT NO. _____

11.	The adaptation parameters provide you with adequate valid step values between the minimum and maximum values. (RN 2025)	1 2 3 4 5 don't know	Requires on-line in-depth testing to answer adequately. I don't know of this indicator.
12.	The "modifiable by meteorologist indicator" is adequate. (RN 2025)	1 2 3 4 5 don't know	Could not find.
13.	It is reasonable to provide you with one set of adaptation values for each adaptation parameter. (RN 2025)	1 2 3 4 5 don't know	I wouldn't want any more. Each adaptation parameter should have a set of possible values associated with it. I'm not sure I understood the question.

PARTICIPANT NO. _____

NEXRAD SITE PARAMETER ADAPTATION.

14. The effort required to change the "number of sites interfacing with the RWP" is reasonable. (RN 2035)	1 2 3 4 5 don't know	Unable to change. No such parameter. Shows up in ADD but not on screen. I tried but could not do it. It said I needed more info on line, but I had filled everything out. It was not obvious that you used the insert key - maybe you should have a note on the screen about that.

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15. The effort required to change the "Site ID" is reasonable. (RN 2035)	1 2 3 4 5 don't know	Static A with four reinitializations.
16. The effort required to change the "site coordinates" is reasonable. (RN 2035)	1 2 3 4 5 don't know	
17. You can easily change the "site address." (RN 2035)	1 2 3 4 5 don't know	Unfamiliar with site address as opposed to "site ID." It can be done but it is not easy. You have to restart processes.

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NEXRAD GLOBAL PROCESSING PARAMETERS ADAPTATION.

18.	The effort required to change the "total number of allowed outstanding requests" is reasonable. (RN 2055)	1 2 3 4 5 don't know	Selecting items on the active table, the page down/up function should be activated.
19.	The effort required to change the "time-out period for requests" is reasonable. (RN 2055)	1 2 3 4 5 don't know	Once I found it; it was easy.
20.	The effort required to change the "request time window" is reasonable. (RN 2055)	1 2 3 4 5 don't know	Once I found it; it was easy.
21.	The effort required to change the "number of requests in the time window" is reasonable. (RN 2055)	1 2 3 4 5 don't know	Once I found it; it was easy.

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22. The effort required to display the Static B resampling mapping parameters is reasonable. (RN 2055)

1 2 3 4 5

don't know

Cannot locate in NEXRAD Global Processing parameters. NEXRAD resampling parameters are Static A. Could not find them.

NEXRAD MOSAIC PARAMETER ADAPTATION.

23. The effort required to change the "point product selection criteria" is reasonable. (RN 2060)

1 2 3 4 5

don't know

_____

24. The effort required to change the "radar unavailability time-out interval" is reasonable. (RN 2060)

1 2 3 4 5

don't know

_____

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25.	The effort required to change the "maximum mosaic data age" is reasonable. (RN 2060)	1 2 3 4 5 don't know	
26.	The effort required to change the "data priority for all NEXRAD image grid cells to be used in the RWP NAS plane mosaic products" is reasonable. (RN 2060)	1 2 3 4 5 don't know	Couldn't locate within NEXRAD mosaic parameter adaptation. Can't find this. Can only modify via VMS. Mosaic - coverage table was not in adaptation table in Active Directory.

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RECEIVED ALPHANUMERIC (A/N) PRODUCT ADAPTATION.

27.	You can easily identify the source of each received alphanumeric product. (RN 2075)	1 2 3 4 5 don't know	Not available through A/N product adaptation. Not without an acronym list. Requirement has been waived. The source is not clear from this screen alone. If source external ID then possibly. If this is external ID.
28.	The effort required to change the "source of each received alphanumeric product" is reasonable. (RN 2075)	1 2 3 4 5 don't know	Can't change it. Requirement has been waived. The source is not clear from this screen alone.

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29.	You can easily identify the received alphanumeric product's "type of product format" (pass-through or parsed). (RN 2075)	1 2 3 4 5 don't know	
30.	The effort required to change the "indicator, that determines if the product is to be retransmitted by the RWP to an external system," is reasonable. (RN 2075)	1 2 3 4 5 don't know	Dissemination to WMSCR and ACCC?
31.	You can easily modify the "identifier(s) of the destination external system(s) used for the retransmittion of the alphanumeric products." (RN 2075)	1 2 3 4 5 don't know	The "identifier itself" is not changeable but the destination is dynamic-ally changeable. Doesn't seem to be a parameter.
32.	The effort required to change the "minimum retention period" is reasonable. (RN 2075)	1 2 3 4 5 don't know	

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INDIVIDUAL RADAR PRODUCTS ADAPTATION.

33.	You can easily identify the Individual Radar Product's, "product type" (image/vector/point/status). (RN 2080)	1 2 3 4 5 don't know	The table name could be more defined so as to be more descriptive.
34.	You can easily identify the Individual Radar Product's, "product ID." (RN 2080)	1 2 3 4 5 don't know	
35.	The effort required to change the Individual Radar Product's, "product ID" is reasonable. (RN 2080)	1 2 3 4 5 don't know	"Static B". ADD doesn't match screen - can't tell the parameter type.
36.	You can easily identify the Individual Radar Product's "transmission type" (RIP/RRP). (RN 2080)	1 2 3 4 5 don't know	Blank on screen not in ADD. In theory there was a column in adaptation, but it was blank.

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37. The effort required to change the retention requirements for the Individual Radar Products is reasonable. (RN 2080)	1 2 3 4 5 don't know	Question worded bad should be number of versions retained or adaptation should list as retention number or versions retained. Could not find.

GRIDDED BINARY PRODUCTS ADAPTATION.

38. You can easily identify the Gridded Binary Product's, "product ID." (RN 2085)	1 2 3 4 5 don't know	Mnemonics indicating products have no meaning at all, would need reference material to know what they mean. The table name could be more descriptive. The use of acronyms is sometimes disturbing.

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39. You can easily identify the source of the Gridded Binary Products. (RN 2085)	1 2 3 4 5 don't know	If this is external ID.
40. The effort required to change the "retention period" is reasonable. (RN 2085)	1 2 3 4 5 don't know	Need PF1 key to change - should be indicated at bottom of table for this special case. If it is manual graphic product control retention period.

RECEIVED AWOS/ASOS PRODUCTS ADAPTATION.

41. You can easily identify the received AWOS/ASOS product's, "product ID." (RN 2090)	1 2 3 4 5 don't know	Site ID and products are identified by different names.

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42. You can easily identify the AWOS/ASOS source station. (RN 2090)

1 2 3 4 5

don't know

43. The effort required to change the "retention period of the received AWOS/ASOS products" is reasonable. (RN 2090)

1 2 3 4 5

don't know

MANUALLY CREATED A/N PRODUCTS ADAPTATION.

44. You can easily identify the Manually Created Alphanumeric Product's, "product ID". (RN 2100)

1 2 3 4 5

If this is internal ID.

don't know

45. You can easily identify the format for the manually created alphanumeric products. (RN 2100)

1 2 3 4 5

I didn't see it. Could not find.

don't know

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46. The effort required to change the "retention period of the manually created alphanumeric products" is reasonable. (RN 2100)

1 2 3 4 5

don't know

47. The effort required to change the "identifier(s) of the external system(s) to which the manually created alphanumeric product is sent" is reasonable. (RN 2100)

1 2 3 4 5

Not a parameter.

If this is external ID.

don't know

MANUALLY CREATED GRAPHIC PRODUCTS ADAPTATION.

48. You can easily identify the Manually Created Graphic Product's, "product ID." (RN 2105)

1 2 3 4 5

Product ID not one of the headings of the table.

don't know

If it is the internal ID.

49. The effort required to change the "retention period of the manually created graphic products" is reasonable. (RN 2105)

1 2 3 4 5

don't know

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50.	The effort required to change the "identifier(s) of the external system(s) to which the manually created graphic product is sent" is reasonable. (RN 2105)	1 2 3 4 5 don't know	If enter key is hit inadvertently past this point, you can't back up to change this parameter without use of remove key. If it is external ID,
51.	The effort required to change the "default addresses for dissemination" within the created graphic product, is reasonable. (RN 1070)	1 2 3 4 5 don't know	If this is dissemination,
52.	The effort required to change the "date/time within the created graphic product" is reasonable. (RN 1070)	1 2 3 4 5 don't know	Date/time cannot be changed. I can't see how you can change the date/time in adaptation. Why would this be in adaptation?

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GRIP PRODUCT ADAPTATION.

53.	You can easily identify the GRIP's "product ID". (RN 2110)	1 2 3 4 5 don't know	Don't display.
54.	You can easily identify the GRIP product's source RIP(s). (RN 2110)	1 2 3 4 5 don't know	Don't display. They were blank in the scenario. If this is external ID.
55.	You can easily identify the GRIP product's, "product type" (graphic/vector/point/graph). (RN 2110)	1 2 3 4 5 don't know	Don't display. Graphics and graph are missing. Could not find.
56.	The effort required to change the "dissemination to ACCC indicator" is reasonable. (RN 2110)	1 2 3 4 5 don't know	Can't do it. Don't display. Could not find.

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57. The effort required to change the "number of retained versions" is reasonable. (RN 2110)	1 2 3 4 5 don't know	Don't display. It says GRIB product retention 30; it does not indicate if this is versions or time.

MOSAIC PRODUCT ADAPTATION.

58. You can easily identify the mosaic product's, "product type." (RN 2115)	1 2 3 4 5 don't know	You can't tell from display that these are mosaics without prior knowledge. The name of the table does not clearly identify the contents. Could not find.
59. You can easily identify the mosaic's "product ID." (RN 2115)	1 2 3 4 5 don't know	_____

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60.	You can easily identify the mosaic products class. (RN 2115)	1 2 3 4 5 don't know	Could not find.
61.	You can easily identify the mosaic product's, "source GRIP." (RN 2115)	1 2 3 4 5 don't know	
62.	The effort required to change "dissemination to ACCC indicator" is reasonable. (RN 2115)	1 2 3 4 5 don't know	True or False only - No direction or display specific parameters to ACCC. This adaptation is in another table.
63.	The effort required to change the "number of retained versions" is reasonable. (RN 2115)	1 2 3 4 5 don't know	This adaptation data is in another table.

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CONVERTED GRIDDED BINARY PRODUCTS ADAPTATION.

64.	The effort required to change the "indicator that determines if the reformatted product is to be disseminated to ACCC" is reasonable. (RN 2120)	1 2 3 4 5 don't know	Could not find.
65.	The effort required to change the "constant altitude level of reformatted product" is reasonable. (RN 2120)	1 2 3 4 5 don't know	Wasn't in appendix I so it was real hard to find. The adaptation table is not easily accessed. This is due to the table of contents does not properly define the item.
66.	The effort required to change the "forecast time of the reformatted product" is reasonable. (RN 2120)	1 2 3 4 5 don't know	

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67. The effort required to change the "coverage area for the Spectral Model reformatted products" is reasonable. (RN 2120)	1 2 3 4 5 don't know	There is some ambiguity since there are several spectral models available.

USER ACCESS ADAPTATION.

68. The effort required to change your "user identification" is reasonable. (RN 2130)	1 2 3 4 5 don't know	It's for changing the meteorologists ID. Operators do not have individual user IDs.
69. The effort required to change your "password" is reasonable. (RN 2130)	1 2 3 4 5 don't know	Requires VMS knowledge. I can't see any way to change my password; maybe from VMS. Operators do not change passwords for themselves since there is only one password for everyone.

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70.	The effort required to update the meteorologists "user identification" is reasonable.(RN 2130)	1 2 3 4 5 don't know	_____ _____ _____ _____
71.	The RWP provides you with an adequate number of characters for the password. (RN 2130)	1 2 3 4 5 don't know	This is in another table; One for each meteor-ologist.
72.	The RWP provides you with an adequate number of characters for the user identification.(RN 2130)	1 2 3 4 5 don't know	_____ _____ _____ _____

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73.	The RWP provides you with an adequate level of logon security. (RN 2130)	1 2 3 4 5 don't know	The operator can't change his own password. Also there is only one operator account. There should possibly be a separate logon for each operator so that data can be sorted by user IDs.

EXTERNAL ADDRESS ADAPTATION.

74.	You can easily identify the mnemonic code for each external system. (RN 2135)	1 2 3 4 5 don't know	_____
75.	You can easily identify the network address(es) for each system. (RN 2135)	1 2 3 4 5 don't know	_____

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76. You can easily identify the link address(es) for each system. (RN 2135)

1 2 3 4 5 _____

don't know _____

77. It is reasonable to provide you with one set of adaptation parameters for each of the external systems. (RN 2135)

1 2 3 4 5 _____

don't know _____

RWP AREA DEFINITION ADAPTATION.

78. The effort required to change the "boundaries of the area of interest" is reasonable. (RN 2140)

1 2 3 4 5 Couldn't do it without help. _____

don't know _____

SYSTEM ALARM/ALERT MESSAGES ADAPTATION.

79. The effort required to change the "ID of each error" is reasonable. (RN 2145)

1 2 3 4 5 _____

don't know _____

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80. The effort required to change the "message to be output" is reasonable. (RN 2145)

1 2 3 4 5 _____

don't know _____

81. The effort required to change the "destination of each system alarm/alert message" is reasonable. (RN 2145)

1 2 3 4 5 _____

don't know _____

82. It is reasonable to provide you with one set of adaptation parameters for each of the errors that produce system alarm/alert messages. (RN 2145)

1 2 3 4 5 _____

don't know _____

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NEXRAD ALARM/ALERT ADAPTATION.

83. The effort required to change the NEXRAD "alarm/alert ID's" is reasonable. (RN 2185)

1 2 3 4 5

don't know

In adaptation it is referred to as radar alert criteria. NEXRAD, unless you are familiar with adaptation can cause some confusion. Table name is radar alert criteria. The ID is shown in two different tables. Only in the radar alert criteria table can you change the ID's.

84. The effort required to change the NEXRAD "alarm/alert type" (type is either:weather or radar) is reasonable. (RN 2185)

1 2 3 4 5

don't know

Name and field is which alarm/alert.

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85.	The effort required to change the "message text" of the NEXRAD alarm/alerts is reasonable. (RN 2185)	1 2 3 4 5 don't know	With the exception of increasing the field size. The screen does not give an indication "tab and return" move the cursor to the next column.
86.	The effort required to change the "causal product ID" is reasonable. (RN 2185)	1 2 3 4 5 don't know	The screen does not give an indication "tab and return" move the cursor to the next column.
87.	The effort required to change the NEXRAD alarm/alert "destination" (destination is either MIPC or COTC) is reasonable.	1 2 3 4 5 don't know	

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BACKGROUND MAP DEFINITION ADAPTATION.

88.	The effort required to change the "map ID" is reasonable. (RN 2150)	1 2 3 4 5 don't know	You have to do it through VMS and I can't do it. Could not find fields identified in the background map adaptation table. Could not find.
89.	The effort required to change the "projection ID" is reasonable. (RN 2150)	1 2 3 4 5 don't know	Could not find.
90.	The effort required to change the "map definition" is reasonable. (RN 2150)	1 2 3 4 5 don't know	Could not find.

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PROJECTION CONVERSION PARAMETERS ADAPTATION.

91.	The effort required to change the "geodetic latitude and longitude of the point of tangency" is reasonable. (RN 2155)	1 2 3 4 5 don't know	
92.	The effort required to change the "X,Y location of the point of tangency" is reasonable. (RN 2155)	1 2 3 4 5 don't know	Note NAS coordinates are in english system standards now - RWP is metric? Located in a binary file.
93.	The effort required to change the "equatorial radius if the earth" is reasonable. (RN 2155)	1 2 3 4 5 don't know	Located in a binary file.
94.	The effort required to change the "eccentricity of the earth" is reasonable. (RN 2155)	1 2 3 4 5 don't know	Located in a binary file.

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GENERAL ADAPTATION QUESTIONS.

MENU.

95.	You can easily identify the Static A parameters. (RN 1800)	1 2 3 4 5 don't know	Once you find the one your looking for. Only using ADD. This information is not readily available from the menus only from looking in the documentation. With ADD not from terminal.
96.	You can easily identify the Static B parameters. (RN 1800)	1 2 3 4 5 don't know	Once you find the one your looking for. Only with ADD. With ADD not from terminal.

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97.	You can easily identify the Dynamic parameters. (RN 1800)	1 2 3 4 5 don't know	Once you find the one your looking for. Only with ADD. Only with using the documentation. With ADD, not from terminal.
98.	You can easily identify the parameter type. (RN 1800)	1 2 3 4 5 don't know	Only with ADD. Only with using the documentation.
99.	You can easily modify the Dynamic adaptable parameters via the on-line menu. (RN 1815)	1 2 3 4 5 don't know	A little awkward.

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100.	You can easily modify the Static A parameters via the on-line menu. (RN 1815)	1 2 3 4 5 don't know	Modification requires reinstating various processes which can pull system down. Impossible without knowing which process to reinitialize. Need to restart process which becomes confusing.
101.	You can easily load the Dynamic adaptable parameters via the off-line storage device. (RN 1815)	1 2 3 4 5 don't know	Did not actually do this, but if books are there it should be easy.
102.	You can easily load the Static A adaptable parameters via the off-line storage device. (RN 1815)	1 2 3 4 5 don't know	Did not actually do this, but if books are there it should be easy.

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103.	You can easily display the Static B parameters. (RN 1819)	1 2 3 4 5 don't know	As easy as any other parameter. These parameters are located throughout the tables and cannot be displayed by themselves.
104.	The location of each Static B parameter in the source code is adequately described in the ADD. (RN 1819)	1 2 3 4 5 don't know	Wasn't trained on that.
105.	It is desirable to display the location of each Static B parameter in the source code. (RN 1819)	1 2 3 4 5 don't know	I don't see the necessity for an operator. We can't do it so it doesn't make much difference, unless you want to contract out to change them. Didn't need to know it.

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106.	The RWP provides you with adequate automatic error checking features for the adaptation data.	1 2 3 4 5 don't know	It seems to be adequate. Not in all cases.
107.	Errors encountered while typing in the adaptation data are easily correctable.	1 2 3 4 5 don't know	Yes, except when I accidently erased a field when I typed (1F) key. I had to abort since I did not know what it was.
108.	Errors encountered while setting the adaptation data are easily correctable.	1 2 3 4 5 don't know	Utilities used to produce tape adaptation (DCL) is cumbersome. RCL works reasonably well - scrolling needs improvement. Depends on type of error. Don't understand question.

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109.	The terms and names used in the adaptation screen frames are standardized.	1 2 3 4 5 don't know	Sometimes. In some cases the names are not indicative of the contents and do not agree with the names used in the document. Sometimes, I didn't understand column headings.
110.	Easily understand the terms/names used in the adaptation screens.	1 2 3 4 5 don't know	Probably due to lack of time to get familiar with them. In most cases. Sometimes cryptic. Some of the terms/names are not easily understood.

PARTICIPANT NO. _____

111. The RWP provides you with adequate prompts for tasks with multiple steps.

1 2 3 4 5

don't know

Interactive messages could allow for testing before modifying parameter. A one screen fallback would be very helpful in the menu process rather than return to main menu (or main menu +). Could be much better. Main multi-step task is Static A adaptation and restart of process is not prompted.

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112. The RWP provides you with adequate adaptation menu prompts.	1 2 3 4 5 don't know	Sometimes back arrow works, sometimes it doesn't and F12 must be used.
113. You can easily use the DCL to change the adaptation parameters.	1 2 3 4 5 don't know	Find using DCL difficult (not user friendly). Packaged command language is helpful. Could use more information on DCL in manual. With VMS knowledge.
114. You can easily use the mouse to change the adaptation parameters.	1 2 3 4 5 don't know	I wish. Can't do this. This function would be a welcome change. Locked up system when I tried!

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115. It is desirable for you to have access to change or modify all of the dynamic parameters.

1 2 3 4 5

don't know

These parameters require the ability to change.

116. It is desirable for you to have access to change or modify all of the Static B parameters.

1 2 3 4 5

don't know

These don't require the ability to change. Not always. I don't know if the need would even arise, but if it did, it would be nice.

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117. The RWP provides you with adequate help features for the adaptation menus.

1 2 3 4 5

don't know

Could be better both on-line and in the manual. This is a very slow and cumbersome system that will take alot of time to get used to. Not much help - not much needed. I didn't see any help features. This feature would be a welcome change. There is no help key to explain fields, etc...

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118.	The capability to display the range for each adaptation parameter is desirable.	1 2 3 4 5 don't know	Would help instead of using ADD. This would be a good option. It would save time of going through the manual. Books could be used ok, but better if it were on terminal.
119.	The capability to display the default values for each adaptation parameter is desirable.	1 2 3 4 5 don't know	Helpful. Sometimes function keys F1-F14 should be used and label-ed on the screen. Not necessary.
120.	The RWP provides you with understandable legends for the menus.	1 2 3 4 5 don't know	Helpful idea. What is a legend?

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121.	The capability to display options/examples for each adaptation parameter is desirable.	1 2 3 4 5 don't know	This would help tremendously. No - need an acronym list and have to dig. Options yes, examples no. Put in the manuals.
122.	The RWP provides you with helpful/understandable error messages.	1 2 3 4 5 don't know	Cannot always trust the error messages. In some cases the error messages are not indicative of the problem encountered. For typing errors, etc., yes. Some error messages from processes or alarm/alerts are hard to understand.

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GENERAL ALARM/ALERT.

123. You can easily detect a system alarm displayed by the RWP. (RN 1685)	1 2 3 4 5 don't know	Visual highlight or blink would be helpful. It would be better if an SAA would flash until acknowledged. Good location of SAA on screen.
124. You can easily detect a system alert displayed by the RWP. (RN 1685)	1 2 3 4 5 don't know	Would be better if the alert would flash.
125. You can easily interpret the alarms. (RN 1685)	1 2 3 4 5 don't know	Most of the time. Not always. Not in general.

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126. You can easily interpret the alerts. (RN 1685)

1 2 3 4 5

don't know

Most of the time. Can't always tell what it means. Some of the language used in the alarm/alerts is not straightforward and hard to understand.

127. The RWP provides you with an adequate system alarm display. (RN 1685)

1 2 3 4 5

don't know

Nondiscriminating alarms at operations console. Alarm/alerts should also go in the current log display.

128. The RWP provides you with an adequate alert display. (RN 1685)

1 2 3 4 5

don't know

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CREATING/ACTIVATING THE ADAPTATION.

129. The effort required to create the adaptation version directories is reasonable.

1 2 3 4 5

don't know

You can't get direct access to table you want. The requirement to scroll through menus is tiresome. Once you're in adaptation tables you can't go from table to table without returning to adaptation menu.

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130.	The effort required to activate the modified adaptation tables is reasonable.	1 2 3 4 5 don't know	Reinitialization of processes required should be automatically sequenced with activation. There are too many steps in adaptation; activating and enabling. Slow and awkward. When not in a heavy workload situation.
131.	The effort required to copy the adaptation tables is reasonable.	1 2 3 4 5 don't know	Care must be taken or all files will be copied and take a long time.
132.	The effort required to save previous versions of the adaptation tables is reasonable.	1 2 3 4 5 don't know	

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133. The effort required to retrieve previously saved adaptation tables is reasonable.	1 2 3 4 5 don't know	
134. You can easily determine which adaptation tables are currently activated.	1 2 3 4 5 don't know	No way to tell if Static A parameters are active - doesn't mean system is using it. In some cases the adaptation in the active tables are still not active until the processes are activated. You know what is activated by looking in the active directory, but you don't know where it came from.

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135. It is reasonable to bring the MIPC down and up to initiate adaptation changes.	1 2 3 4 5 don't know	Shouldn't have to; System should use interproccess communication not re-initialization to change parameters. Should not be necessary. Unnecessary system interruption. Five minutes is not a really long time.
136. You can easily use the DCL to activate the adaptation parameters.	1 2 3 4 5 don't know	Not to my knowledge. Limited info given on DCL. Alot of practice is required. With VMS knowledge.

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137. You can easily use the mouse to activate the adaptation parameters.

1 2 3 4 5

don't know

Maybe next version?? Somewhat easier with practice. This would be a welcome feature. Didn't try because previous attempts to use mouse locked system up.

APPENDIX G

ADAPTATION DESCRIPTION DOCUMENT QUESTIONNAIRE

PARTICIPANT NO. _____

CATEGORY D DOCUMENTATION REVIEW

ADAPTATION DESCRIPTION DOCUMENT (ADD) QUESTIONNAIRE

DATE _____ NAME _____

TIME _____ CENTER _____

REQUIREMENT STATEMENT: The objectives of this evaluation are to assess the following:

Each document shall provide the users with sufficient information to operate the subsystem in an operational environment.

Each document shall provide the users with sufficient technical accuracy to select and retrieve appropriate features and functions.

The questionnaire items are divided into six categories:

Organization/Scope

Site and Makeup

Level of Writing

English Usage

Illustrations

Maintenance

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	RATING	COMMENT
ORGANIZATION/SCOPE:		
1. The references to other manuals, paragraphs, or tables within procedural steps are adequate.	1 2 3 4 5 don't know	It would be nice if description of adaptation included where to find it.
2. The technical accuracy of the manual enables you to operate the subsystem in an orderly efficient manner.	1 2 3 4 5 don't know	Manual was not accurate. It had adaptation which did not exist on system, or was different; i.e., mosaic-coverage. With the latest version of books this has been improved.
3. The manual provides you with sufficient information to properly operate the subsystem in a normal environment.	1 2 3 4 5 don't know	

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4.	The manual was complete relative to scope of coverage.	1 2 3 4 5 don't know	
5.	Appendices are complete and adequate.	1 2 3 4 5 don't know	They are not accurate, many adaptation parameters could not be found. They were complete to my satisfaction. They did not seem to have enough info.
6.	Information or data in some appendices should be included within the main body of the manual. (Please list any appendices that you feel should be included in main body of manual.)	1 2 3 4 5 don't know	Appendix 3 should be incorporated into CSOM. It is well organized.

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7.	Over complexity was avoided throughout the manual.	1 2 3 4 5 don't know	
8.	It would be desirable for the manual to have an index.	1 2 3 4 5 don't know	If glossary in appendix had page references it would be helpful. Some type of "keyboard" index.

<u>Size and Makeup</u>:

9.	Selected procedures and/or tables should be reformatted onto pocket size or a size smaller than page size for quick reference use. (Please list any procedures/tables desired on a smaller size.)	1 2 3 4 5 don't know	Maybe adaptation parameters. After exercising the system in a realtime environment, utilization of important procedures will be evident and references appropriately displayed. Commands and adaptation tables. What tables have which parameters and their type.

PARTICIPANT NO. _____

10. Selected procedures and/or tables should be highlighted with finger tabs for quick reference. (Please list any procedures/tables desired to have finger tabs.)	1 2 3 4 5 don't know	Table of contents serves this purpose. Appendices I, II, and VII.
11. Selected procedures are too cluttered visually as related to sketches and descriptive leader arrows. (Please list those procedures that you deem too cluttered visually.)	1 2 3 4 5 don't know	No procedures.

<u>Level of Writing</u>:

12. The level of writing is adequate for your understanding.	1 2 3 4 5 don't know

PARTICIPANT NO._____

English Usage:

13.	Sentence structure is clear, concise, and not too wordy.	1 2 3 4 5	It was a little wordy.
		don't know	
14.	The choice of words used in procedural steps are descriptive and adequate.	1 2 3 4 5	No procedure.
		don't know	
15.	Sentence structure/tense causes you to reread for a clear understanding of a thought or procedural step.	1 2 3 4 5	
		don't know	

PARTICIPANT NO._____

16.	Word choice used to convey a command or to perform an operation is descriptive and adequate.	1 2 3 4 5 don't know	No command.
17.	The use of repetitive words and/or phrases within pages, paragraphs, or procedural steps is adequate.	1 2 3 4 5 don't know	I thought repetition was to be avoided.
18.	Acronyms are defined to your satisfaction.	1 2 3 4 5 don't know	Defined separately on a sheet which could be an appendix to both ADD and CSOM. The ID internal and external are not defined. An expanded acronym list would be nice. This should be incorporated in the main manual.
19.	Acronyms are placed to best advantage.	1 2 3 4 5 don't know	

PARTICIPANT NO._____

20. The various descriptions and procedures are clearly structured.	1 2 3 4 5 don't know	No procedures.

Illustrations:

21. Fold-out illustrations should require a blank page so they could be used with the manual closed or on another page.	1 2 3 4 5 don't know	I agree, makes referring to another page easier.
22. Lettering size on illustrations and tables is adequate.	1 2 3 4 5 don't know	Some lettering is hard to read and is fragmented.
23. Descriptive leader arrows would enhance the usefulness of illustrations.	1 2 3 4 5 don't know	

PARTICIPANT NO._____

24. Photographs in tables that are smaller than a half page should be combined with text.	1 2 3 4 5 don't know	Photographs are adequate.

Maintenance:

25. References to "appropriate maintenance personnel" and to "notify maintenance" are adequate in lieu of including more detailed information.	1 2 3 4 5 don't know	No references.
26. The number of diagnostic tables and procedures is adequate for the level and scope of your use.	1 2 3 4 5 don't know	Diagnostics were not discussed in detail. No procedures.

APPENDIX H

COMPUTER SYSTEM OPERATOR'S MANUAL QUESTIONNAIRE

PARTICIPANT NO. _____

CATEGORY D DOCUMENTATION REVIEW

COMPUTER SYSTEM OPERATOR'S MANUAL (CSOM) QUESTIONNAIRE

DATE _____ NAME _____

TIME _____ CENTER _____

REQUIREMENT STATEMENT: The objectives of this evaluation are to assess the following:

Each document shall provide the users with sufficient information to operate the subsystem in an operational environment.

Each document shall provide the users with sufficient technical accuracy to select and retrieve appropriate features and functions.

The questionnaire items are divided into six categories:

Organization/Scope

Site and Makeup

Level of Writing

English Usage

Illustrations

Maintenance

PARTICIPANT NO. _____

	RATING	COMMENT
ORGANIZATION/SCOPE:		
1. The references to other manuals, paragraphs, or tables within procedural steps are adequate.	1 2 3 4 5 don't know	You have to refer back and forth between CSOM and ADD too often. Just adequate.
2. The technical accuracy of the manual enables you to operate the subsystem in an orderly efficient manner.	1 2 3 4 5 don't know	I did not thoroughly review the manual for technical accuracy.
3. The manual provides you with sufficient information to properly operate the subsystem in a normal environment.	1 2 3 4 5 don't know	The adaptation tables should be more concise and written in a step-by-step fashion. Prototype not in a normal environment. With some exceptions. Some procedures assume that you know most of what to do already. There are functions which had to be performed as a normal operating procedure which are not outlined in documents example, "stopping of process through VMS control."

PARTICIPANT NO. _____

4.	The manual was complete relative to scope of coverage.	1 2 3 4 5 don't know	The CSOM, no way.
5.	Appendices are complete and adequate.	1 2 3 4 5 don't know	A table of where to find particular parameters would be useful, or an index.
6.	Information or data in some appendices should be included within the main body of the manual. (Please list any appendices that you feel should be included in main body of manual.)	1 2 3 4 5 don't know	Appendices II and III. Appendix 3 should be woven into main body of CSOM for quick reference.

PARTICIPANT NO._____

7.	Over complexity was avoided throughout the manual.	1 2 3 4 5 don't know	
8.	It would be desirable for the manual to have an index.	1 2 3 4 5 don't know	Might help. Glossary with page references as an index would be helpful. This is a very desirable feature. It would allow quick references to the correct locations.

<u>Size and Makeup</u>:

9.	Selected procedures and/or tables should be reformatted onto pocket size or a size smaller than page size for quick reference use. (Please list any procedures/tables desired on a smaller size.)	1 2 3 4 5 don't know	Initialization and shutdown reconfigurations. Default parameters. Adaptation table editing. Command summary would help using RCL.
10.	Selected procedures and/or tables should be highlighted with finger tabs for quick reference. (Please list any procedures/tables desired to have finger tabs.)	1 2 3 4 5 don't know	Major subdivisions should be finger indexed. User should tab their own books. Appendices IV, VI, III, paras. 3.3.1, 3.3.3, 3.4 and 5.

PARTICIPANT NO. _____

11. Selected procedures are too cluttered visually as related to sketches and descriptive leader arrows. (Please list those procedures that you deem too cluttered visually.)	1 2 3 4 5 don't know	All of adaptation. All input commands should be boldface/ highlighted.

Level of Writing:

12. The level of writing is adequate for your understanding.	1 2 3 4 5 don't know	

English Usage:

13. Sentence structure is clear, concise, and not too wordy.	1 2 3 4 5 don't know	

PARTICIPANT NO. _____

14.	The choice of words used in procedural steps is descriptive and adequate.	1 2 3 4 5 don't know	It could be better especially in procedural tables. There is a tendency to call one thing by several names sometimes descriptive then subjective.
15.	Sentence structure/tense causes you to reread for a clear understanding of a thought or procedural step.	1 2 3 4 5 don't know	This is normal to reread technical documentation.
16.	Word choice used to convey a command or to perform an operation is descriptive and adequate.	1 2 3 4 5 don't know	
17.	The use of repetitive words and/or phrases within pages, paragraphs, or procedural steps is adequate.	1 2 3 4 5 don't know	I thought repetition was to be avoided.

PARTICIPANT NO. _____

18. Acronyms are defined to your satisfaction.	1 2 3 4 5 don't know	Appendix IV needs expanding. In addition, a handout of acronyms placed in the book as an appendix would be good. List of acronyms in appendix IV is not complete. Handouts were provided with this info. It should be incorporated in the books.
19. Acronyms are placed to best advantage.	1 2 3 4 5 don't know	A complete list should be produced as an end product of the final publication.
20. The various descriptions and procedures are clearly structured.	1 2 3 4 5 don't know	They lack continuity.

<u>Illustrations</u>:

21. Fold-out illustrations should require a blank page so they could be used with the manual closed or on another page.	1 2 3 4 5 don't know	Yes, very good idea. The ability to look at a diagram while being able to scan through the book is good.

PARTICIPANT NO. _____

22. Lettering size on illustrations and tables is adequate.	1 2 3 4 5 don't know	Larger type would be helpful for us with fading eyesight.
23. Descriptive leader arrows would enhance the usefulness of illustrations.	1 2 3 4 5 don't know	
24. Photographs in tables that are smaller than a half page should be combined with text.	1 2 3 4 5 don't know	Do not understand question. This would allow the reader to be on the same page as the figure to which the text refers.

<u>Maintenance</u>:

25. References to "appropriate maintenance personnel" and to "notify maintenance" are adequate in lieu of including more detailed information.	1 2 3 4 5 don't know	Didn't notice such references. If at this time maintenance requirements have not been established.

PARTICIPANT NO. _____

26. The number of diagnostic tables and procedures is adequate for the level and scope of your use.

1 2 3 4 5

don't know

APPENDIX I

SYSTEM MAINTAINER SUMMARY QUESTIONNAIRE

SYSTEM MAINTAINER SUMMARY QUESTIONNAIRE

Q.1 What benefits do you see from the RWP Prototype?
participants = 10

Improved weather information for air traffic	4
Good NEXRAD capabilities	2
Good NEXRAD mosaic capabilities	1
Good menu capabilities	1
Good procedures in the documentation	1
Good control of display parameters, configuration, and system operation	1

Q.2 What problems do you see from the RWP Prototype?
participants = 11

Too slow/unreliable	3
More training is needed	3
Adaptation too cumbersome	3
Paging too cumbersome	2
Hardware/software too unreliable	1
Menus too cumbersome	1
Too much hands-on operation	1
System not user friendly	1
Mouse is not user friendly	1
Inaccurate error messages	1
Alarm/alerts too excessive	1
Some system operations can only be accomplished via VMS	1
Downloading too slow	1
ADD is inaccurate	1
Weather display too cluttered	1
Not acceptable to go to a degraded state to archive	1

Q.3 Are there any features/function that you would like to see added to the RWP Prototype?
participants = 11

Replace paging with scrolling	3
Needs automatic reconfiguration capabilities	2
Replace paging with search on field capabilities	1
System needs on-line diagnostics	1
System needs two CCPs	1
Better communication between system components	1
More user friendly	1
Needs a lock-out feature for commands	1
A separate window for alarm/alerts	1
Replace menus with a digital tablet	1
Remove adaptation from COTC place on MIPC	1

On-line adaptation help feature	1
Replace mouse with a trackball	1
Mouse capabilities for adaptation	1
Change keyboard functions	1
Software startup after you issue a single command	1
Needs a stop print command	1
Warning when software is activated	1
Faster hardware/software	1
Blinking alarm/alert messages	1

Q.4 Are there any features/functions that you would like to see deleted from the RWP Prototype?
participants = 5

Maintenance log - duplicates MMS	2
Less cryptic commands	1
Delete VMS "DCL"	1
Two VT100 screens	1

Q.5 General Comments
participants = 9

PT&E should have followed training	2
PT&E needed more time allotted	1
PT&E covered too much material during a short time	1
Excellent support during PT&E by JPL	1
Questionnaires referenced nonexistent functions	1
Questions did not match user manuals	1
System is flawed but acceptable	1
System is good for a prototype	1
System needs on-line help functions for adaptation	1
System needs a find command to go directly to the adaptation	1
System too cumbersome to use	1
VMS usage should be driven by the RWP shell	1
Software too cumbersome	1
System needs two CCPs	1
Unable to recall the last saved user settings	1
ADD needs an index	1

APPENDIX J

TRAINING QUESTIONNAIRES

LESSON EVALUATION CHECKLIST (FOR FAA USE)

REVIEWER Richard A. Mitchem POSITION TITLE Meteorologist

INSTRUCTOR Terry Braun COURSE JPL WWP Prototype COURSE NO. ____

LESSON TITLE Summary of all lessons LESSON NO. ____ DATE 6/29/90

- FAA representative in attendance at the first course conduct complete this evaluation checklist.
- Check "Yes" or "No" for each item.
- Use Comments column (or back of checklist) for notes. Notes will prove useful if revision to the lesson is necessary. Recommend appropriate revision for any item marked "No".

	YES	NO	COMMENTS
Does each student have a copy of the materials?	X		
Are reference materials available?	X		
Is equipment available and accessible?	X		Use of large video display or individual PC's a necessity.
Is the space for students adequate?	X		
Does the instructor --			
• show enthusiasm?	X		
• demonstrate mastery of the subject?	X		
• use training aids/equipment effectively?	X		
• ask timely questions?			Use of oral questions was limited.
• use positive reinforcement?	X		
Do the visuals match the presentation?	X		
Are visuals readable and easy to understand?		X	Overheads were good. Difficult/Impossible to see video display screen
Are safety precautions observed?	X		
Are tests stored securely?			No Test given
Do the majority of students participate?	X		
Is the sequence of the lesson logical?	X		
Is the lesson well paced?	X		
Is the lesson objective(s) achieved?	X		

INSTRUCTOR CHECKLIST (FOR CONTRACTOR USE)

Reviewer: Richard A. Mitchell

INSTRUCTOR _____ COURSE JPL RWP Prototype COURSE NO. ____

LESSON TITLE Summary of all lessons LESSON NO. _____ DATE 6/29/90

- The instructor completes this checklist during the first course conduct.
- Check "Yes" or "No" for each item. Reviewer completed this checklist.
- Use Comments column (or back of checklist) for notes. Notes will prove useful if revision to the lesson is necessary. Recommend appropriate revision for any item marked "No".

	YES	NO	COMMENTS
Is the subject outline in the lesson plan easy to follow?	☐	☐	FAA-STD-028 Lesson Plan was not followed
Are the instructions for conducting performance exercises clear and complete?	☒	☐	
Are the instructions for administering the tests clear and complete?	☐	☐	No Tests given
Does the lesson plan reference all materials and equipment needed to conduct the lesson?	☒	☐	
Is the equipment for the lesson available and accessible?	☒	☐	
Are the training aids --			
• readable and easy to understand?	☐	☐	Difficult/Impossible to see video display screen.
• easy to use?	☐	☐	
Do visuals correspond with the numbers in the lesson plan?	☒	☐	
Do the response items challenge the students?	☒	☐	Limited use of respond items/ oral questions
Are the instructional materials --			
• adequate to support the objectives?	☒	☐	
• written at an appropriate level for the students?	☒	☐	
Do the instructional strategies --			
• encourage student participation?	☒	☐	
• make effective use of media?	☐	☐	Use of large video display or individual PC's a necessity.
Are the learning activities safe?	☒	☐	
Is the sequence of the lesson logical?	☒	☐	
Is the lesson well paced?	☒	☐	
Is the time for conducting the lesson adequate?	☒	☐	
Is the lesson objective(s) achieved?	☒	☐	

Name (Optional) _____

END-OF-COURSE EVALUATION QUESTIONNAIRE

COURSE TITLE JPL REAL-TIME WEATHER PROCESSOR PROTOTYPE TRAINING

COURSE NO. _____

DIRECTIONS

- In Section A of the questionnaire, rate each item as:
  - Almost Never
  - Some of the Time
  - About Half of the Time
  - Most of the Time
  - Almost Always.

- In Section B, indicate the extent to which this course prepared you with the skills and knowledge to fulfill each training outcome of the course.

SECTION A

	ALMOST NEVER	SOME OF THE TIME	ABOUT HALF OF THE TIME	MOST OF THE TIME	ALMOST ALWAYS
1. The objective(s) for each lesson in the course was presented, and they clearly indicated what you needed to learn.	A	B	C	D	E
2. The course instruction provided enough information to accomplish the objectives.	A	B	C	D	E
3. Course materials did not seem to duplicate or overlap.	A	B	C	D	E
4. Course materials were available at the start of the course or were provided at the appropriate time during the course.	A	B	C	D	E
5. The instruction allowed for student involvement and participation.	A	B	C	D	E
6. Classes started and ended on time.	A	B	C	D	E
7. Breaks were provided and not abused.	A	B	C	D	E
8. Time was not wasted in the course to set up training aids, equipment, or demonstrations.	A	B	C	D	E
9. Written and oral questions were used.	A	B	C	D	E
10. The procedures/processes taught in the classroom were consistent with what was required in lab.	A	B	C	D	E
11. Sufficient practice time was given before being evaluated on a performance test.	A	B	C	D	E
12. Questions were answered professionally and promptly by the instructor(s).	A	B	C	D	E
13. Training aids, handouts, texts, and audiovisuals made the instruction more understandable.	A	B	C	D	E
14. The time devoted to each lesson of the course was sufficient to understand the basic concepts.	A	B	C	D	E
15. The instruction received in the classroom allowed me to perform effectively in the lab.	A	B	C	D	E
16. The class/lab was adequately equipped.	A	B	C	D	E
17. The class/lab equipment was reliable.	A	B	C	D	E
18. The class/lab was adequately lighted.	A	B	C	D	E
19. The class/lab was adequately ventilated.	A	B	C	D	E
20. The test instructions were clear.	A	B	C	D	E
21. The test items seemed to be taken from the material covered in the classroom/lab.	A	B	C	D	E
22. Test items were clearly written and understandable.	A	B	C	D	E
23. Test feedback was sufficient to clarify any problem areas.	A	B	C	D	E
24. The time allotted for taking tests was sufficient.	A	B	C	D	E

SECTION B
TRAINING OUTCOMES

DIRECTIONS: Base your evaluation of the following items using a sliding scale from 1 to 5 in which 1 is disagree and 5 is agree.

The JPL RWP Prototype Training course prepared you with the skills and knowledge to fulfill the following:

	1 disagree	2	3	4	5 agree
I. Perform RWP System Level Tasks					
1. Logon/Logoff RWP MIP Workstation	1	2	3	4	5
2. Use Menus and RWP DCL Commands to Perform Tasks	1	2	3	4	5
3. Respond to Alarm/Alerts	1	2	3	4	5
4. Monitor NEXRAD Status	1	2	3	4	5
II. Contribute to Operational Functionality					
1. Establish Personal Operating Environment (Colors and Alarm Tones)	1	2	3	4	5
2. Establish Meteorologist Generated Alarm/Alert Criteria	1	2	3	4	5
3. Control NEXRAD Request/Reply Products	1	2	3	4	5
4. Restore Products from Archive Storage	1	2	3	4	5
III. Establish Weather Products Display Characteristics					
1. Create/Edit/Display Collectives	1	2	3	4	5
2. Remove or Restore a NEXRAD from Mosaic Contribution	1	2	3	4	5
3. Create/Edit/Delete Mapsets	1	2	3	4	5
4. Use RWP Graphics Frame Display Features	1	2	3	4	5

SECTION B
TRAINING OUTCOMES

IV. View Weather Products

1. Display Radar, Mosaic and HZW Products	1	2	3	4	5
2. Print Radar, Mosaic, and HZW Products	1	2	3	4	5
3. Display A/N Products	1	2	3	4	5
4. Print A/N Products	1	2	3	4	5

V. Create/Edit/Disseminate Locally Generated Weather Products

1. Create/Edit Hazardous Weather Outline (HZW)	1	2	3	4	5
2. Disseminate Hazardous Weather Outline (HZW)	1	2	3	4	5
3. Create/Edit A/N Products	1	2	3	4	5
4. Disseminate A/N Products	1	2	3	4	5

ADDITIONAL COMMENTS:

APPENDIX K

RESPONSE ALTERNATIVES

Response Alternatives.

The following is a description of the questionnaire response alternatives.

1. COMPLETELY DISAGREE
   Disagreement is very high with this statement. The features/functions of the RWP Prototype Subsystem are highly unsatisfactory in this area. Operational use of this feature is highly undesirable from a user's perspective.

2. DISAGREE
   There is some disagreement with this statement. The features/functions of the RWP Prototype subsystem are somewhat unsatisfactory in this area. Operational use of this feature is undesirable from a user's perspective.

3. NEUTRAL
   Neither agree/disagree with this statement. The features/functions of the RWP Prototype subsystem are usable in this area. Operational use of this feature is neutral from a user's perspective.

4. AGREE
   There is some agreement with this statement. The features/functions of the RWP Prototype subsystem are satisfactory in this area. Operational use of this feature is desirable from a user's perspective.

5. COMPLETELY AGREE
   Agreement is very high with this statement. The features/functions of the RWP Prototype subsystem are highly satisfactory in this area. Operational use of this feature is highly desirable from a user's perspective.

APPENDIX L

RWP PT&E QUICK LOOK REPORT

QUICK LOOK REPORT
REAL-TIME WEATHER PROCESSOR (RWP)
PROTOTYPE TEST AND EVALUATION

Background

The Prototype Test and Evaluation (PT&E) of the Real-Time Weather Processor (RWP) was conducted by the Surveillance and Weather Systems Branch, ACN-230, July 23 to July 27, at The Jet Propulsion Laboratory (JPL) in Pasadena, California. The purpose of the PT&E was to allow the future users of the RWP (National Weather Service (NWS) meteorologists and Federal Aviation Administration (FAA) system maintainers an opportunity to evaluate the prototype. The comments and suggestions received from the evaluation will be reviewed for inclusion into the RWP production specification.

Participants

Seven NWS meteorologists participated in the review of the Meteorologist Interface Processor Console (MIPC) and its related documentation. Their operational duties are as follows:

1 NWS Western Region staff meteorologist
3 Meteorologist in Charge (MIC)
3 Center Weather Service Unit (CWSU) meteorologist

Eleven FAA system maintainers participated in the review of the Computer Operator Terminal Console (COTC) and its related documentation. Their operational duties are as follows:

1 FAA Great Lakes Region electrical engineer
6 Air Route Traffic Control Center (ARTCC) technicians
4 ARTCC electrical engineer

In order to facilitate the conduct of the evaluation, the 18 participants were divided into two evaluation teams. Team I consisted of four meteorologist and six system maintainers. Team II was composed of three meteorologists and five system maintainers. Each team was required to be at JPL for 2 1/2 days to complete their evaluations.

The 18 participants had received a 1-week RWP training class (either the Meteorologist or Computer System Operator Course) in June. To account for the delay between training and the start of the evaluation, each team member received a 1-hour refresher training on either the COTC or MIPC, as appropriate. Prior to the start, all participants were briefed on the evaluation method, format of the questionnaires utilized, schedules, and other information relevant to the PT&E conduct.

Method

The method for obtaining the user evaluations of the RWP, and its associated documentation, was to administer questionnaires which required the participants to use (or attempt to use) all the features and functions on the appropriate workstation (COTC or MIPC). The questionnaires were structured to contain positive statements about the RWP. The participants were asked to rate their level of agreement with each of these statements. The possible ratings went from "1" completely disagree to "5" completely agree. A summary questionnaire that requested written responses was also administered. The four questionnaires administered to the meteorologists were as follows:

1. Human Factors Meteorologist
2. Site Adaptation Data Meteorologist
3. Workstation Operator Manual (WOM)
4. PT&E Overall Comments

The following questionnaires were administered to the system maintainers:

1. Human Factors System Operator
2. Site Adaptation System Operator
3. Computer System Operator Manual (CSOM)
4. Adaptation Description Document (ADD)
5. PT&E Overall Comments

The completion of the human factors and site adaptation questionnaires required each participant to spend 3 to 4 hours time for each questionnaire on the RWP workstations. The documentation and summary questionnaires took approximately 1-hour each.

A debriefing was held with each group of meteorologists and system operators, from both teams, to review poorly rated items and obtain consensus recommendations for these issues. Other general concerns and recommendations were also addressed. This quick look will present the issues and the consensus recommendations (if appropriate) arrived at by the users.

Results

The meteorologists issues/recommendations are as follows:

1. System is too slow.

2. Menu structure is too cumbersome and complex. Too many steps are required. Examples:

   a. SAs are frequently requested. There should be a simple procedure to retrieve these.

   b. Create/Edit product should not require time input.

   c. Need a simple entry to obtain either a group of products or a group of products by a specified time.

d. Reduce the number of menus. Could combine menus such as Display and Directory.

3. Display:

a. Too cluttered with pop-ups.

b. Need message on the screen to indicate the presence of hidden pop-ups

c. Provide an indication of the parent/child relationship. Maybe color. Need something to differentiate all the pop-ups.

4. Mouse:

a. Team I meteorologists:

Mouse does not work well with the amount of paper required at CWSU work area. Would prefer a track ball.

b. Team II meteorologists:

Need mouse. Buttons provide control in 1 location versus the trackball which requires movement to a keyboard. Felt that the ratio of this particular mouse movement to the screen was too small.

5. DCL: Was not utilized much in training (wasn't working). This made it more difficult to evaluate.

a. Cumbersome and complex. Would like a simpler, more understandable command language that parodies normal request.

6. Require the ability to compare two radar images. First choice would be a second display. Second would be split screen function.

7. Variable tone sequence: Does not need to be as complex or involved. Simple on/off would suffice. Don't spend valuable time on this feature.

8. There is no need for the meteorologists to have the capability to change the NEXRAD site IDs or site coordinates. Should be handled on a national basis.

9. A "HELP" function is required for the adaptation area since adaptation will be infrequently utilized.

10. Adaptation Parameters. These were difficult to review and were not appropriate considering the amount of NEXRAD and RWP system knowledge required.

11. Need procedures in place for coordination with AF personnel regarding RWP changes and maintenance:

a. Want notice of SSF changes.
b. Message on screen to notify upcoming of system shutdown (Team I).
c. Require AF to ask if system can be shut down (Team II).
d. Control over any meteorological changes.

12. Color:

a. Need to be able to assign color to a product versus person. Color standards are required for briefings.

b. Would like availability of personal colors, not to be used for briefings.

13. Need to be able to get CWA and CWS from neighboring centers. Legally responsible.

14. Require assurance that the MWP and RWP consoles will be integrated at the CWSU work area to facilitate efficient work flow.

15. NEXRAD. No mosaics or unmasking to evaluate. Difficult to rate the function without the product.

16. Static A and B adaptation parameters were not available for evaluation.

17. Would like JPL to have a meteorologist with CWSU knowledge on staff.

18. Would like the ability to have the system take an HZW and create a CWA. CWA should be a graphic product.

19. Would like ability to overlay radar mosaics on conventional weather. SAs and PIREPs only useful if used with radar. Require fronts and plotted data.

20. Delete items redundant with MWP. If they are available want to use them with radar data.

21. Add acronym/word spell check. Needed for quality control.

22. Don't want to retrieve products by date/time. Should retrieve by hazard, issue # , phenomena # or product type. Examples:

a. FTs and SAs - key to location
b. Created products - key to given name

23. Cursor:

a. Highlight by blink or color so that it can be found on the screen.

b. Should automatically come up in the first editable field in alphanumeric frames.

24. Workstation Operators Manual requires an index. Some cases of inaccuracies were noted.

25. If RWP is a backup for MWP, it must function in a comparable manner. If only for AAS then not as concerned as to how the non-NEXRAD functions are implemented.

26. Want input to the RWP on a continuing basis. Three options were discussed:

a. RWP Meteorologist Team to review specifications and provide input to the RWP project office.

b. A NWS CWSU meteorologist to serve as a liaison to the FAA RWP project office.

c. CWSU experienced meteorologist to become part of the RWP project office staff.

The system maintainers issues/recommendations are as follows:

1. System is too slow.

2. Menu structure is too cumbersome and complex. Too many steps are required. Examples:

a. It's hard to go through the menus to modify the adaptation tables.
b. Need to reduce the number of menus.
c. Need more prompts for menu structure.
d. Need a paging function and a search on a string function.

3. Display:

a. Too cluttered with pop-ups.
b. Need message on screen to indicate the presence of hidden pop-ups.

4. Mouse:

a. Would like to be able to use the mouse to change and initiate/activate the adaptation parameters.

b. A better more suitable mouse that does not lock up the system is required.

5. DCL:

a. Need to integrate the DCL into the RCL.

b. DCL is too wordy - example: it takes 13 words to mount a tape and if you make a mistake there is no fix command function.

c. Need to integrate commonly used functions onto the function keys. Need an overlay for the function keys.

d. Require an on-line "help" feature to describe each function key.

e. DCL should not have to used to stop a print job.
Suggestion: Need a function key to stop/start a print job.

6. The maintenance log should be deleted from the system. This log is duplicated by the Maintenance Processing Subsystem (MPS) Maintenance Management System (MMS).

7. System requires too much operator intervention/time in order to bring the system up/down. Major concern: if there is a power failure the system should be able to come up all by itself.

8. There should be automatic reconfiguration capabilities if a system component goes down. The system operator should receive a message if a component is down.

9. Error messages:

a. Error messages are too cryptic and contain too many acronyms. The text of the error messages could be clearer so as to describe a clear description of the problem.

b. Need on-line "help" feature that describes each error message and how to resolve the error.

10. System operations log is too lengthy to page through. Need a search on string capacity. Also need to be able to recall longer than a 24-hour period for system operations.

11. On-line "help" feature is needed for the adaptation parameters. The help feature needs to contain detailed step-by-step instructions along with examples of the parameter. Ranges/default values of the parameters need to be checked.

12. The system operator should be able to initiate/activate the adaptation without bringing the MIPC down. Suggestions included using interprocess communication not reinitialization to change the parameters. Having two MIPCs to one RWP.

13. CSOM and ADD need better acronym lists and indexes.

14. Both the CSOM and the ADD need to be more clear/concise. Documents need to be more consistent with the screens. System operators do not look at these documents on a daily basis, when they do use them they need to be instantly able to tell what they are to do in order to fix the systems problems.

15. Constantly used adaptation information should be contained in the CSOM.

16. If on-line help features are added to the system this needs to be adequately described in the manuals.

17. Add acronym/word spell check.

Recommendations

It is recommended that the RWP Project Office, ANW-130, review these issues and recommendations from the PT&E participants and include all that are necessary, and feasible, into the Production Specification. Further input from the participants may be necessary to clarify some of the issues. A complete Evaluation Report will follow.

APPENDIX M

METEOROLOGIST MEAN RESPONSES

METEOROLOGIST HUMAN FACTORS MEAN RESPONSES

Question #	Participants	Mean	Question #	Participants	Mean
1	7	2.00	47	7	3.71
2	7	3.43	48	6	3.67
3	6	2.17	49	4	3.00
4	7	2.71	50	7	3.14
5	6	2.50	51	6	3.50
6	5	5.00	52	6	3.33
7	7	4.29	53	4	2.00
8	7	1.57	54	7	3.43
9	7	2.86	55	6	3.33
10	7	3.57	56	6	3.67
11	7	3.00	57	7	4.57
12	7	4.00	58	7	3.57
13	7	3.14	59	6	3.00
14	7	3.14	60	5	3.80
15	6	3.83	61	7	3.43
16	7	3.14	62	5	3.80
17	7	3.43	63	5	4.20
18	7	2.14	64	6	3.83
19	7	5.00	65	5	3.20
20	7	4.43	66	7	3.14
21	7	4.71	67	6	4.17
22	7	2.14	68	7	3.43
23	7	2.57	69	6	4.50
24	7	4.71	70	7	3.57
25	6	3.83	71	7	4.86
26	6	3.83	72	7	3.71
27	7	3.29	73	7	3.29
28	7	3.86	74	6	2.67
29	7	2.43	75	7	3.71
30	7	3.14	76	7	3.71
31	7	2.86	77	7	3.71
32	7	2.71	78	7	3.71
33	5	3.80	79	7	4.86
34	7	3.29	80	7	3.57
35	7	3.29	81	6	2.83
36	7	2.86	82	7	4.00
37	6	2.00	83	7	4.14
38	7	3.57	84	7	4.43
39	7	3.71	85	7	4.00
40	7	2.57	86	7	3.86
41	7	3.57	87	6	3.67
42	7	3.14	88	5	2.60
43	6	4.17	89	7	2.57
44	7	3.71	90	7	4.57
45	6	3.00	91	7	4.29
46	5	3.00	92	7	3.86

METEOROLOGIST HUMAN FACTORS MEAN RESPONSES (Continued)

Question #	Participants	Mean	Question #	Participants	Mean
93	7	3.57	139	6	3.17
94	7	3.71	140	7	2.86
95	7	3.71	141	6	2.83
96	7	3.71	142	7	3.71
97	7	3.14	143	7	2.43
98	7	4.00	144	6	2.33
99	7	4.14	145	6	2.33
100	7	2.57	146	7	2.29
101	6	3.83	147	2	2.50
102	7	2.86	148	7	3.29
103	7	4.29	149	7	3.57
104	7	3.71	150	7	2.43
105	7	4.14	151	6	3.17
106	7	4.00	152	7	3.43
107	6	3.17	153	7	1.86
108	5	3.20	154	7	3.00
109	6	4.33	155	7	2.29
110	6	4.67	156	6	3.00
111	7	3.86	157	7	3.00
112	7	3.86	158	7	3.14
113	7	4.00	159	7	3.86
114	7	4.29	160	7	3.71
115	7	3.71	161	7	3.71
116	7	1.86	162	6	3.50
117	7	4.14	163	7	3.57
118	7	3.43	164	5	3.00
119	7	4.29	165	6	3.17
120	5	2.00	166	7	4.14
121	7	4.14	167	7	3.57
122	7	4.57	168	6	3.83
123	1	5.00	169	6	3.33
124	3	4.00	170	7	3.86
125	2	3.50	171	7	3.86
126	7	4.00	172	5	3.00
127	7	3.57	173	7	4.43
128	7	3.57	174	5	2.80
129	7	3.57			
130	7	3.43			
131	7	3.71			
132	7	2.50			
133	6	2.50			
134	4	3.14			
135	7	2.86			
136	7	4.43			
137	7	3.29			
138	7	3.29			

METEOROLOGIST SITE ADAPTATION DATA MEAN RESPONSES

Question #	Participants	Mean	Question #	Participants	Mean
1	7	3.86	47	6	4.33
2	6	3.50	48	7	3.86
3	7	4.14	49	6	3.50
4	7	3.14	50	7	3.71
5	5	3.20	51	7	3.71
6	5	3.40	52	7	3.43
7	7	3.86	53	6	4.67
8	7	3.00	54	7	3.43
9	6	3.67	55	6	3.17
10	7	4.14	56	7	3.71
11	7	4.14	57	7	3.71
12	7	4.57	58	7	3.43
13	6	3.67	59	7	3.86
14	7	3.71	60	7	3.57
15	7	3.43	61	7	3.29
16	7	3.00	62	7	3.71
17	7	4.29	63	7	3.71
18	6	4.67	64	6	3.67
19	6	4.00	65	6	4.17
20	6	4.17	66	7	4.29
21	5	3.40	67	7	4.00
22	4	4.50	68	7	3.86
23	4	2.75	69	7	4.86
24	4	4.50	70	7	2.43
25	3	3.33	71	7	2.86
26	4	3.25	72	4	3.00
27	3	3.67	73	6	4.33
28	6	4.50	74	7	3.86
29	7	3.00	75	6	4.00
30	7	3.43	76	7	3.00
31	7	3.71	77	7	3.57
32	7	3.71	78	6	3.67
33	6	3.67	79	5	3.00
34	7	3.29	80	7	3.86
35	5	4.40	81	6	4.00
36	4	3.25	82	5	3.40
37	7	3.57	83	7	4.00
38	7	3.29	84	6	3.83
39	7	4.00	85	5	3.60
40	7	4.71	86	5	4.00
41	6	4.67	87	3	2.67
42	7	4.00	88	4	3.25
43	7	4.29	89	3	2.67
44	7	4.29	90	7	3.57
45	7	4.14	91	6	4.17
46	7	4.00	92	4	3.25

METEOROLOGIST SITE ADAPTATION DATA MEAN RESPONSES (Continued)

Question #	Participants	Mean	Question #	Participants	Mean
93	6	3.83	139	6	4.17
94	4	3.25	140	7	3.14
95	7	4.43	141	7	4.00
96	5	3.00	142	7	4.14
97	7	4.43	143	7	3.71
98	5	3.40	144	7	3.43
99	6	3.50	145	7	3.57
100	7	3.43	146	6	2.67
101	6	4.17	147	4	3.00
102	6	4.83	148	4	3.75
103	7	3.86	149	7	3.57
104	7	4.57			
105	7	3.71			
106	3	3.00			
107	6	4.00			
108	6	4.17			
109	7	3.86			
110	7	3.71			
111	7	3.71			
112	5	2.20			
113	5	1.80			
114	5	1.80			
115	6	3.50			
116	5	2.20			
117	4	3.00			
118	6	3.67			
119	6	3.50			
120	7	3.14			
121	7	3.29			
122	7	3.71			
123	7	3.71			
124	7	3.14			
125	7	3.57			
126	7	4.29			
127	7	4.57			
128	7	4.43			
129	5	2.00			
130	7	3.00			
131	5	2.40			
132	5	2.40			
133	7	2.29			
134	6	4.50			
135	6	3.67			
136	5	3.80			
137	5	4.00			
138	6	4.33			

METEOROLOGIST WORKSTATION OPERATORS MEAN RESPONSES

Question #	Participants	Mean
1	7	3.71
2	6	3.67
3	6	3.67
4	7	3.71
5	7	3.00
6	7	3.43
7	7	3.71
8	7	4.86
9	7	3.86
10	7	4.14
11	6	3.00
12	7	4.29
13	7	4.00
14	6	3.67
15	7	2.86
16	7	3.86
17	6	3.67
18	7	3.57
19	7	3.71
20	7	3.86
21	6	4.00
22	7	3.57
23	7	4.00
24	7	3.43
25	6	3.00
26	6	3.50

APPENDIX N

SYSTEM MAINTAINER MEAN RESPONSES

SYSTEM MAINTAINER HUMAN FACTORS MEAN RESPONSES

Question #	Participants	Mean	Question #	Participants	Mean
1	11	3.64	47	10	3.90
2	11	3.64	48	11	3.91
3	11	3.55	49	11	3.73
4	10	3.20	50	4	2.25
5	11	3.27	51	4	3.00
6	11	3.64	52	11	4.00
7	11	3.45	53	11	4.00
8	11	4.09	54	11	4.09
9	11	3.91	55	11	4.55
10	11	4.09	56	11	4.00
11	11	3.82	57	11	4.09
12	11	4.09	58	11	4.00
13	11	4.18	59	11	3.73
14	11	3.91	60	10	4.20
15	11	3.82	61	10	4.30
16	11	4.18	62	11	4.09
17	10	3.00	63	10	3.10
18	11	4.09	64	8	3.88
19	11	4.00	65	9	3.89
20	11	3.27	66	11	3.64
21	10	4.50	67	11	4.00
22	11	4.55	68	11	4.09
23	11	4.55	69	11	4.27
24	9	4.00	70	11	4.18
25	9	3.78	71	11	4.27
26	10	3.50	72	4	2.75
27	9	3.00	73	7	3.00
28	11	4.27	74	6	2.67
29	11	3.55	75	4	2.00
30	11	3.91	76	5	3.20
31	8	4.50	77	3	3.00
32	11	3.82	78	11	3.64
33	11	4.00	79	11	3.45
34	11	2.91	80	11	3.82
35	11	2.91	81	10	3.60
36	10	3.20	82	11	3.73
37	6	4.33	83	11	3.45
38	11	4.27	84	10	3.70
39	11	4.09	85	6	3.50
40	9	4.22	86	6	3.67
41	10	3.40	87	5	4.20
42	10	3.20	88	5	3.20
43	6	3.33	89	5	3.60
44	10	2.90	90	5	3.20
45	11	4.00	91	7	4.00
46	11	4.00	92	11	4.36
			93	11	3.55
			94	11	4.18
			95	11	4.45
			96	6	2.50

SYSTEM MAINTAINER SITE ADAPTATION DATA MEAN RESPONSES

Question #	Participants	Mean	Question #	Participants	Mean
1	11	3.36	47	10	4.10
2	11	3.45	48	11	3.91
3	9	4.33	49	11	4.00
4	10	4.00	50	11	3.91
5	10	2.90	51	9	4.11
6	3	2.67	52	5	2.60
7	4	2.75	53	9	3.89
8	5	4.40	54	9	3.56
9	11	3.36	55	9	3.33
10	11	3.00	56	5	2.40
11	10	4.00	57	9	3.33
12	3	3.33	58	11	3.82
13	9	3.89	59	10	3.80
14	10	3.40	60	11	3.82
15	11	4.00	61	10	3.60
16	11	3.91	62	6	3.17
17	9	3.89	63	10	3.70
18	11	3.91	64	7	3.43
19	11	3.91	65	11	3.36
20	11	3.91	66	11	3.64
21	11	3.82	67	11	3.45
22	8	2.88	68	10	3.70
23	11	3.91	69	11	3.45
24	11	4.09	70	10	4.00
25	11	4.00	71	11	4.27
26	8	2.88	72	11	4.36
27	9	2.67	73	10	3.80
28	9	3.56	74	11	4.27
29	11	3.64	75	11	4.18
30	11	4.00	76	11	4.18
31	9	3.67	77	11	4.09
32	11	3.91	78	11	3.73
33	11	4.00	79	11	4.00
34	11	4.09	80	10	3.90
35	11	3.64	81	11	4.00
36	11	4.00	82	11	4.18
37	9	3.11	83	11	3.91
38	11	3.91	84	11	3.91
39	11	3.18	85	11	3.82
40	11	3.82	86	11	3.91
41	11	3.73	87	11	4.00
42	11	4.00	88	9	3.33
43	11	4.09	89	8	3.00
44	11	3.82	90	8	3.25
45	7	3.29	91	10	3.80
46	11	4.09	92	10	3.60

SYSTEM MAINTAINER SITE ADAPTATION DATA MEAN RESPONSES (Continued)

Question #	Participants	Mean
93	8	3.62
94	8	3.75
95	10	3.70
96	11	3.45
97	11	3.55
98	10	3.70
99	11	4.00
100	11	3.45
101	9	3.44
102	9	3.33
103	11	3.91
104	8	3.88
105	9	3.22
106	9	3.67
107	11	3.82
108	10	3.50
109	11	3.36
110	11	3.18
111	11	2.91
112	11	3.45
113	11	3.18
114	10	2.20
115	10	4.50
116	9	2.22
117	11	2.45
118	11	4.27
119	11	4.18
120	10	3.50
121	11	4.18
122	11	3.27
123	11	3.91
124	11	3.82
125	11	3.36
126	11	3.36
127	11	3.64
128	11	3.55
129	11	3.36
130	11	3.27
131	11	3.73
132	11	3.45
133	11	3.45
134	11	3.09
135	10	2.50
136	10	3.40
137	10	1.90

SYSTEM MAINTAINER COMPUTER SYSTEM OPERATORS MEAN RESPONSES

Question #	Participants	Mean
1	11	3.45
2	10	3.80
3	10	3.30
4	11	3.64
5	11	3.64
6	9	3.33
7	11	3.73
8	11	4.45
9	10	3.60
10	9	3.67
11	7	2.00
12	11	3.91
13	11	4.09
14	11	3.73
15	11	2.91
16	11	3.91
17	10	4.00
18	11	3.27
19	10	3.60
20	11	3.55
21	10	3.60
22	11	3.82
23	8	3.75
24	9	3.22
25	7	3.71
26	10	3.30

SYSTEM MAINTAINER ADAPTATION DESCRIPTION DOCUMENT MEAN RESPONSES

Question #	Participants	Mean
1	11	3.73
2	11	4.00
3	11	3.91
4	11	4.09
5	10	3.60
6	10	2.70
7	11	3.73
8	11	4.36
9	11	2.73
10	10	3.40
11	10	2.30
12	11	4.18
13	11	4.18
14	10	3.90
15	11	2.82
16	10	4.00
17	10	4.00
18	11	3.45
19	10	3.50
20	10	3.80
21	9	3.22
22	11	3.55
23	10	3.10
24	8	3.38
25	6	3.67
26	9	3.44

APPENDIX O

METEOROLOGIST END OF COURSE EVALUATION AVERAGES

METEOROLOGIST END OF COURSE EVALUATION AVERAGES

SECTION A

Points were assigned as follows A=1, B=2, C=3, D=4, E=5.
Ranges are the response ranges from A to E. An average point of 3.5 or less was unacceptable on both section A and B. Questions 20 to 24 Section A -no tests were administered.

QUESTION	AVERAGE POINTS	RANGE
1	4.0	2 to 5
2	4.2	3 to 5
3	3.6	1 to 5
4	4.8	3 to 5
5	4.7	4 to 5
6	4.6	4 to 5
7	4.9	4 to 5
8	4.2	2 to 5
9	3.6	2 to 5
10	4.6	3 to 5
11	N/A	N/A
12	4.9	4 to 5
13	4.2	2 to 5
14	4.5	3 to 5
15	3.9	3 to 5
16	3.1	1 to 5
17	3.4	2 to 4
18	4.8	4 to 5
19	4.4	1 to 5

SECTION B Calculations are as follows:

	QUESTION	AVERAGE POINTS	RANGE
I.	1	5.0	5 to 5
	2	3.5	2 to 5
	3	4.4	3 to 5
	4	4.0	3 to 5
I.	1	4.5	3 to 5
	2	4.2	2 to 5
	3	4.1	3 to 5
	4	3.5	1 to 5
III.	1	4.1	3 to 5
	2	4.1	3 to 5
	3	3.8	2 to 5
	4	4.7	4 to 5

	QUESTION	AVERAGE POINTS	RANGE
IV.	1	4.7	4 to 5
	2	4.6	3 to 5
	3	4.6	3 to 5
	4	4.1	1 to 5
V.	1	4.5	3 to 5
	2	4.1	1 to 5
	3	4.4	3 to 5
	4	4.0	1 to 5