



**CIMSS**

**COOPERATIVE INSTITUTE FOR METEOROLOGICAL SATELLITE STUDIES**

Space Science and Engineering Center  
University of Wisconsin—Madison  
1225 West Dayton Street  
Madison, Wisconsin 53706  
Telex: 265 452 UOFWISC MDS

Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006

**THE SCHWERDTFEGER LIBRARY**  
1225 W. Dayton Street  
Madison, WI 53706

21 August, 1995

Dear Dr. Hawkins:

Please find enclosed the monthly cost and performance report on contract N00014-95-C-6017 for the period July 1995.

If you have any questions, please feel free to call me at 608 262-9168.

Sincerely,

Christopher S. Velden  
Program Manager  
Univ. Wisconsin-SSEC  
1225 W. Dayton St.  
Madison, WI 53706  
ChrisV@ssec.wisc.edu

cc: ONRRR

1410  
home/chrisv/msdoc/1410jl95

**Monthly Cost and Performance Report**

**for Contract No. N00014-95-C-6017**

**July 1995**

**Issued by the University of Wisconsin - Space Science and Engineering Center**

**Prepared under contract by Program Manager Christopher Velden**

**For Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006**

**Contact amount: \$611,182**

1. Contract No.: N00014-95-C-6017

2. Reporting Period: July 1995

3. Total Amount Funded: \$611,182

4. Total Amount Spent to Date: \$46,705.88

5. Total Amount Spent this Period: \$19,213.20

Financial note: This amount does not include the purchase of the agreed upon hardware (SGI workstation and auxiliary equipment) which has yet to be billed.

6. Estimated Cost to Complete: \$611,182

7. Schedule Status: On Schedule

8. Contractor Hours Worked this Period:

Velden	128	All Tasks
Olander	132	All Tasks
Collimore	76	Microwave R&D
Merrill	2	Microwave R&D
Nieman	24	Winds R&D
Wanzong	53	Winds R&D
Wu	46	Dvorak Analysis
Bywaters	8	Tech Support
Robaidek	8	Tech Support

## 9. Technical Progress

A) General: Configuration of the SGI Indigo2 R4400 series workstation for use in the R&D on this project continues. Various display programs, and R&D algorithms are being ported to this environment. A 4mm DAT drive was added and tested.

In support of JTWC operations on Guam, GMS-5 water vapor images are being processed and exported on a routine basis. Preliminary indications are that this data is being well-received and plans are to continue dissemination until local direct readout access is achieved.

A tropical cyclone segment was set up on the UW-CIMSS home page to allow the community internet access to the GMS imagery and other satellite products.

B) Task: Microwave. Porting of XTCR (eXperimental Tropical Cyclone Retrieval) and accompanying XTRC data log from IBM/DOS environment to X-windows/UNIX is almost complete. The XTRC involves software used to retrieve horizontal structure of warm core anomalies of tropical cyclones from passive microwave observations.

Data collection of NOAA and DMSP microwave observations for purposes of testing the retrieval scheme continues. Data was collected during Typhoon Faye, Hurricane Erin and tropical storm Chantal. A comprehensive catalogue of all cases collected is being compiled.

Began to study whether SSM/I may be of value in determining eye size which may be an indicator of the warm anomaly extent (horizontal) which is a key parameter for XTCR.

C) Task: Dvorak. Porting of the DVOR (digital Dvorak intensity estimation algorithm) from IBM to SGI environment is underway. Ancillary plotting and analysis software to compliment DVOR is being tested.

GMS historical images were obtained from Ray Zehr (NESDIS-CIRA). These will be used to test the DVOR. The entire 1984-1986 data set is being copied and will be used as part of the research data base. Our algorithm was run on three cases and compared to Zehrs results on the same cases. The results compared within acceptable limits.

We continue to accumulate verification data sets (independent observations - 'ground truth'). We expect to accumulate additional independent data from real time cases for testing of satellite algorithms.

D) Task: Winds. Porting of winds development code from the IBM RISC to the SGI continues. We expect benchmark testing to commence in August. For winds production using GMS data, high resolution (5km) IR and WV data are being acquired from the Australian Bureau of Meteorology through a cooperative agreement and McIDAS data links. We are still working on the acquisition of 1km VIS data.

10. Briefs/Reports: none in this reporting period

11. Travel: none in this reporting period

12. Plans for Next Month.

Continue porting and testing software on the SGI workstation. Collect high resolution GMS data of any developing tropical cyclones in the western North Pacific. Hope to test the winds software on the GMS data. Continue collecting NOAA and DMSP microwave data for any global tropical cyclones.

13. Technical Problem Areas: Mother board on SGI needs to be replaced because of a faulty Ethernet interface (covered under Parts agreement).



**CIMSS**

**COOPERATIVE INSTITUTE FOR METEOROLOGICAL SATELLITE STUDIES**

Space Science and Engineering Center

University of Wisconsin—Madison

1225 West Dayton Street

Madison, Wisconsin 53706

Telex: 265 452 UOFWISC MDS

**THE SCHWERDTFEGER LIBRARY**

1225 W. Dayton Street

Madison, WI 53706

Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006

21 September, 1995

Dear Dr. Hawkins:

Please find enclosed the monthly cost and performance report on contract N00014-95-C-6017 for the period August 1995.

If you have any questions, please feel free to call me at 608 262-9168.

Sincerely,

Christopher S. Velden  
Program Manager  
Univ. Wisconsin-SSEC  
1225 W. Dayton St.  
Madison, WI 53706  
ChrisV@ssec.wisc.edu

cc: ONRRR

1410  
home/chrisv/msdoc/1410jl95

**Monthly Cost and Performance Report**

**for Contract No. N00014-95-C-6017**

**August 1995**

**Issued by the University of Wisconsin - Space Science and Engineering Center**

**Prepared under contract by Program Manager Christopher Velden**

**For Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006**

**Contact amount: \$611,182**

1. Contract No.: N00014-95-C-6017
2. Reporting Period: August 1995
3. Total Amount Funded: \$611,182
4. Total Amount Spent to Date: \$70,950.05
5. Total Amount Spent this Period: \$24,244.17

Financial note: This amount does not include the purchase of the agreed upon hardware (SGI workstation and auxillary equipment) which has yet to be billed.

6. Estimated Cost to Complete: \$611,182
7. Schedule Status: On Schedule

8. Contractor Hours Worked this Period:	<b>Velden</b>	164	All Tasks
	Olander	158	All Tasks
	Collimore	76	Microwave R&D
	Merrill	21	Microwave R&D
	Nieman	8	Winds R&D
	Wanzong	102	Winds R&D
	Wu	88	Dvorak Analysis
	Bywaters	10	Tech Support
	Robaidek	3.5	Tech Support
	Lazzara	1	Tech Support

9. Technical Progress

A) General: Configuration of the SGI Indigo2 R4400 series workstation for use in the R&D on this project continues. Various display programs, and R&D algorithms are being tested in this environment. The 4mm DAT drive which was added has caused a few problems which are being worked on.

In support of JTWC operations on Guam, GMS-5 water vapor images are being processed and exported on a routine basis. JTWC is acknowledging this data as important to their operations and post analysis and therefore plans are to continue dissemination until further notice. Changes were made to eliminate the wobble in the display, and Mercator projections are now used for the westpac display. NRL-MRY now also receives these products on a routine basis.

The tropical cyclone segment set up on the UW-CIMSS home page continues to evolve and is receiving much attention and access from the community. GMS and GOES images and movies of tropical cyclones, along with satellite derived products have drawn considerable attention and positive response.

**B) Task: Microwave.** Porting of XTCR (eXperimental Tropical Cyclone Retrieval) and accompanying XTCR data log from IBM/DOS environment to X-windows/UNIX is almost complete. The XTCR involves software used to retrieve horizontal structure of warm core anomalies of tropical cyclones from passive microwave observations. Benchmarking and comparisons of the ported algorithm with the DOS version is underway.

Data collection of NOAA and DMSP microwave observations for purposes of testing the retrieval scheme continues. Data was collected during Typhoon Faye, Hurricane Felix and Iris. A comprehensive catalogue of all cases collected is being compiled.

Analysis continues into whether SSM/I may be of value in determining eye size which may be an indicator of the warm anomaly extent (horizontal) which is a key parameter for XTCR.

**C) Task: Dvorak.** Porting of the DVOR (digital Dvorak intensity estimation algorithm) from IBM to SGI environment continues. Ancillary plotting and analysis software to compliment DVOR is being refined and tested.

The algorithm was tested on real time cases during Hurricane Felix. Results are still being analyzed, but preliminary comparisons with recon verification indicate mixed results. Several temporal averaging schemes are being considered and tested.

We continue to accumulate verification data sets (independent observations - 'ground truth') from the prolific Atlantic. We will continue to accumulate additional independent data from real time cases to be utilized for testing and verification of satellite algorithms.

**D) Task: Winds.** Porting of winds development code from the IBM RISC to the SGI continues. Benchmark testing of the basic algorithm and sub-routines was successful. For winds production using GMS data, high resolution (5km) IR and WV data are being acquired from the Australian Bureau of Meteorology through a cooperative agreement and McIDAS data links. Data was collected during Typhoon Faye for case study winds processing. Calibration issues are being addressed. We are still working on the acquisition of 1km VIS data. The ABOM promises acquisition very soon.

Achieved first ever water vapor wind set over the western Pacific from GMS-5 observations. Initial attempt appears successful, and this example was sent to NRL and Guam for their information and feedback. Vector coverage was excellent and initial height assignments look reasonable, although this needs further evaluation.

An initial test of high-resolution visible cloud tracked winds using 15 minute GOES-8 data was promising. More work needs to be done in the area of processing strategy and QC, but our first attempt on a case from Tropical Storm Barry yielded good low-level wind coverage around the inner and outer vortex region of the storm.



10. Briefs/Reports: none in this reporting period

11. Travel: none

12. Plans for Next Month.

Continue porting and testing software on the SGI workstation. Collect high resolution GMS data of any major tropical cyclones in the western North Pacific. Continue testing the winds software with the GMS data, and high resolution visible GOES data. Continue collecting and analyzing NOAA and DMSP microwave data for any global tropical cyclones.

13. Technical Problem Areas: Possible faulty 4mm tape drive.



**CIMSS**

**COOPERATIVE INSTITUTE FOR METEOROLOGICAL SATELLITE STUDIES**

Space Science and Engineering Center  
University of Wisconsin—Madison  
1225 West Dayton Street  
Madison, Wisconsin 53706  
Telex: 265 452 UOFWISC MDS

Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006

THE SCHWERTFEGER LIBRARY  
1225 W. Dayton Street  
Madison, WI 53706

17 December, 1995

Dear Dr. Hawkins:

Please find enclosed the monthly cost and performance report on contract N00014-95-C-6017 for the period November 1995.

If you have any questions, please feel free to call me at 608 262-9168.

Sincerely,

Christopher S. Velden  
Program Manager  
Univ. Wisconsin-SSEC  
1225 W. Dayton St.  
Madison, WI 53706  
ChrisV@ssec.wisc.edu

cc: ONRRR

1410  
home/chrisv/msdoc/1410no95

**Monthly Cost and Performance Report**

**for Contract No. N00014-95-C-6017**

**November 1995**

**Issued by the University of Wisconsin - Space Science and Engineering Center**

**Prepared under contract by Program Manager Christopher Velden**

**For Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006**

**Contact amount: \$611,182**

1. Contract No.: N00014-95-C-6017
2. Reporting Period: November 1995
3. Total Amount Funded: \$611,182
4. Total Amount Spent to Date: \$155,922.49
5. Total Amount Spent this Period: \$20,435.27
6. Estimated Cost to Complete: \$611,182
7. Schedule Status: On Schedule

8. Contractor Hours Worked this Period:	Velden	104	All Tasks
	Olander	144	All Tasks
	Collimore	79	Microwave R&D
	Merrill	9	Microwave R&D
	Nieman	20	Winds R&D
	Wanzong	93	Winds R&D
	Wu	16	Dvorak Analysis
	Shie	75	Microwave R&D
	Kohrs	3	Tech Support
	Nagle	3	Tech Support
	Santek	2	Tech Support
	Trebilcock	2	Tech Support
	Wade	1	Tech Support

## 9. Technical Progress

A) General: Configuration of the SGI Indigo2 R4400 series workstation for use in the R&D on this project continues. Various display programs, and R&D algorithms are being tested in this environment. The 4mm DAT drive which was having tape read/write problems has been replaced. We also added a 9 GB external hard drive for anticipated satellite data processing needs.

In support of JTWC operations on Guam, GMS-5 water vapor images are being processed and exported on a routine basis. JTWC is acknowledging this data as important to their operations and post analysis and therefore plans are to continue dissemination until further notice. NRL-MRY and Hawaii/HickamAFB now also receive these products on a routine basis.

The tropical cyclone segment set up on the UW-CIMSS home page continues to evolve and is receiving much attention and access from the community. GMS and GOES images and movies of tropical cyclones, along with satellite derived products have drawn considerable attention and positive response.

B) Task: Microwave. Porting of XTTCR (eXperimental Tropical Cyclone Retrieval) and accompanying XTTCR data log from IBM/DOS environment to X-windows/UNIX is almost complete. The XTTCR involves software used to retrieve horizontal structure of warm core anomalies of tropical cyclones from passive microwave observations. Initial benchmarking and comparisons of the ported algorithm with the DOS version resulted in some discrepancies. These are being resolved. An initial draft of an updated User's Guide for XTTCR/UNIX is being reviewed.

Analysis continues into whether SSM/I may be of value in determining eye size, which may be an indicator of the warm anomaly extent (horizontal), and which is a key parameter for XTTCR. The accuracy of SSM/I eye size determination relative to aircraft reports, and IR estimates is being documented. The impact of the SSM/I eye size estimates on the XTTCR retrieval is being studied.

Elements of the XTTCR estimates of central pressure will be characterized case by case. Outliers will be identified and studied for reasons leading to the poor estimates. Particular attention will be given to the effects of precipitation attenuation. Other channels and SSM/I will be interregated for this purpose.

C) Task: Dvorak. Additional GMS satellite data has been obtained from historical western Pacific typhoon cases and is being converted to our archive tapes. GOES data from historical Atlantic cases is also being converted to our files.

D) Task: Winds. Porting of winds development code from the IBM RISC to the SGI continues. Quasi-real time GMS-5 water vapor wind data sets were generated and disseminated to JTWC at Guam. Plans are to continue to routinely produce and transmit these wind sets twice a day as a demonstration and for qualitative evaluation.

Data sets from Tropical Cyclone Chantal were delivered to NRL-MRY and FNOC for assimilation into the NOGAPS model. Preliminary indications are that the wind data have a significant positive impact on model track forecasts for this case. Evaluation is continuing.

Processing of 6-hourly GOES-8 data sets for the Humberto/Iris/Karen/Luis period continued in November. These cases will be used to assess NWP impact in collaboration with NRL-MRY, GFDL and NCEP. This deliverable is expected to be ready in February. Processing of wind data sets during Supertyphoon Ward using GMS-5 observations commenced in November. These data will be used to test impact on the NOGAPS track forecasts. Expected delivery is around 1 January.

10. Briefs/Reports: Briefed Jeff Hawkins (at UW-SSEC) on work progress, and discussed future directions.

11. Travel: none in this reporting period

12. Plans for Next Month.

Continue porting and testing software on the SGI workstation, and testing the winds software with the real time GMS-5 data. Finish the GMS-5 multispectral data sets for Supertyphoon Ward. Continue the real-time processing and transfer of GMS-5 water vapor motion winds to Guam for qualitative evaluation. Continue processing GOES-8 wind sets during the HIKL case study period for future assimilation and model impact tests. Begin evaluation of the DVOR automated Dvorak technique using 1995 cases. Wrap up evaluation of eye-size effects on the XTCR, and continue studying the performance of the algorithm.

13. Technical Problem Areas: none.



**CIMSS**

**COOPERATIVE INSTITUTE FOR METEOROLOGICAL SATELLITE STUDIES**

Space Science and Engineering Center  
University of Wisconsin—Madison  
1225 West Dayton Street  
Madison, Wisconsin 53706  
Telex: 265 452 UOFWISC MDS

Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006

THE SCHWERDTFEGER LIBRARY  
1225 W. Dayton Street  
Madison, WI 53706

17 January, 1996

Dear Dr. Hawkins:

Please find enclosed the monthly cost and performance report on contract N00014-95-C-6017 for the period December 1996.

If you have any questions, please feel free to call me at 608 262-9168.

Sincerely,

Christopher S. Velden  
Program Manager  
Univ. Wisconsin-SSEC  
1225 W. Dayton St.  
Madison, WI 53706  
ChrisV@ssec.wisc.edu

cc: ONRRR

1410  
home/chrisv/msdoc/1410de95

**Monthly Cost and Performance Report**

**for Contract No. N00014-95-C-6017**

**December 1995**

**Issued by the University of Wisconsin - Space Science and Engineering Center**

**Prepared under contract by Program Manager Christopher Velden**

**For Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006**

**Contact amount: \$611,182**



1. Contract No.: N00014-95-C-6017
2. Reporting Period: December 1995
3. Total Amount Funded: \$611,182
4. Total Amount Spent to Date: \$177,728.26
5. Total Amount Spent this Period: \$21,805.77
6. Estimated Cost to Complete: \$611,182
7. Schedule Status: On Schedule

8. Contractor Hours Worked this Period:

Velden	72	All Tasks
Olander	124	All Tasks
Collimore	64	Microwave R&D
Merrill	9	Microwave R&D
Nieman	14	Winds R&D
Wanzong	90	Winds R&D
Wu	56	Dvorak Analysis
Shie	75	Microwave R&D
Tuschen	8.5	Tech Support
Trebilcock	2.8	Tech Support

## 9. Technical Progress

A) General: Configuration of the SGI Indigo2 R4400 series workstation for use in the R&D on this project continues. Various display programs, and R&D algorithms are being tested in this environment. The 4mm DAT drive which was having tape read/write problems has been replaced. We also added a 9 GB external hard drive for anticipated satellite data processing needs.

In support of JTWC operations on Guam, GMS-5 water vapor images are being processed and exported on a routine basis. JTWC is acknowledging this data as important to their operations and post analysis and therefore plans are to continue dissemination until further notice. NRL-MRY and Hawaii/HickamAFB now also receive these products on a routine basis.

B) Task: Microwave. Porting of XTCR (eXperimental Tropical Cyclone Retrieval) and accompanying XTCR data log from IBM/DOS environment to X-windows/UNIX is complete. The XTCR involves software used to retrieve horizontal structure of warm core anomalies of tropical cyclones from passive microwave observations. Initial benchmarking and comparisons of the ported algorithm with the DOS version resulted in some discrepancies. These have been resolved. An updated User's Guide for XTCR/UNIX is being prepared.

Analysis continues into whether SSM/I may be of value in determining eye size, which may be an indicator of the warm anomaly extent (horizontal), and which is a key parameter for XTCR. The accuracy of SSM/I eye size determination relative to aircraft reports and IR estimates is being documented. Impact of the SSM/I eye size estimates on the XTCR retrieval is being studied.

Elements of the XTCR estimates of central pressure will be characterized case by case. Outliers will be indentified and studied for reasons leading to the poor estimates. Particular attention will be given to the effects of precipitation attenuation. Other channels and SSM/I will be interregated for this purpose.

C) Task: Dvorak. Additional GMS satellite data has been obtained from historical western Pacific typhoon cases and has been converted to our archive tapes. GOES data from historical Atlantic cases is also being converted.

Cases from 1995 in the Atlantic are being assembled into a data set for initial review of the digital algorithm performance. This benchmark will be reported on at the annual AMS meeting in late January.

D) Task: Winds. Porting of winds development code from the IBM RISC to the SGI continues. Quasi-real time GMS-5 water vapor wind data sets were routinely generated, and the plot files disseminated to JTWC at Guam. Upon request from JTWC, several cosmetic changes were made to the plot files. Plans are to continue to routinely produce and transmit these wind sets twice a day as a demonstration and for qualitative evaluation.

Data sets from Tropical Cyclone Chantal were delivered to NRL-MRY and FNOG last month for assimilation into the NOGAPS model. Results show that the specially-processed GOES-8 wind data have a significant positive impact on model track forecasts for this case. Mean forecast errors are reduced by 20-30% over the control during the 24-72 hour forecast period. All forecast tracks were improved at 48 and 72 hours. Further evaluation reveals the contributions of individual components of the data set. The water vapor winds appear to be the key element. The sounder water vapor winds contribute strongly to the 24 hour forecast, while the imager water vapor winds are important at 48 hours, and most significant on the 72 hour forecasts. The geographic coverage may be a factor in these findings. The low-level visible winds in the vortex region had virtually no effect on the forecasts, possibly due to the synthetic bogus scheme employed by the NOGAPS. The IR winds contributed significantly only at 24 hours, most probably due to the good coverage in the upper levels of Chantal's circulation (cirrus shield).

Processing of 6-hourly GOES-8 data sets for the Humberto/Iris/Karen/Luis period continued in December. These cases will be used to assess NWP impact in collaboration with NRL-MRY, GFDL and NCEP. This deliverable is expected to be ready in February. Processing of wind data sets during Supertyphoon Ward using GMS-5 observations was completed in December. These data will be used to test impact on the NOGAPS track forecasts. Expected delivery is early January.

10. Briefs/Reports: none.

11. Travel: none in this reporting period.

12. Plans for Next Month.

Continue porting and testing software on the SGI workstation, and testing the winds software with the real time GMS-5 data. Disseminate the GMS-5 multispectral data sets for Supertyphoon Ward to NRL-MRY. Continue the real-time processing and transfer of GMS-5 water vapor motion winds to Guam for qualitative evaluation. Continue processing GOES-8 wind sets during the HIKL case study period for future assimilation and model impact tests. Begin evaluation of the DVOR automated Dvorak technique using 1995 cases. Wrap up the evaluation of SSM/I eye-size effects on the XTCR, and continue studying the performance of the algorithm.

Present initial findings on the satellite winds product and NWP impact, and digital DVOR, at the annual AMS meeting (Satellite Conf) in Atlanta.

13. Technical Problem Areas: none.



**CIMSS**

**COOPERATIVE INSTITUTE FOR METEOROLOGICAL SATELLITE STUDIES**

Space Science and Engineering Center  
University of Wisconsin—Madison  
1225 West Dayton Street  
Madison, Wisconsin 53706  
Telex: 265 452 UOFWISC MDS

**THE SCHWERDTFEGGER LIBRARY**  
1225 W. Dayton Street  
Madison, WI 53706

Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006

17 February, 1996

Dear Dr. Hawkins:

Please find enclosed the monthly cost and performance report on contract N00014-95-C-6017 for the period January 1996.

If you have any questions, please feel free to call me at 608 262-9168.

Sincerely,

Christopher S. Velden  
Program Manager  
Univ. Wisconsin-SSEC  
1225 W. Dayton St.  
Madison, WI 53706  
ChrisV@ssec.wisc.edu

cc: ONRRR

1410  
home/chrisv/msdoc/1410ja96

**Monthly Cost and Performance Report**

**for Contract No. N00014-95-C-6017**

**January 1996**

**Issued by the University of Wisconsin - Space Science and Engineering Center**

**Prepared under contract by Program Manager Christopher Velden**

**For Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006**

**Contact amount: \$611,182**

1. Contract No.: N00014-95-C-6017
2. Reporting Period: January 1996
3. Total Amount Funded: \$611,182
4. Total Amount Spent to Date: \$198,999.17
5. Total Amount Spent this Period: \$21,270.91
6. Estimated Cost to Complete: \$611,182
7. Schedule Status: On Schedule

8. Contractor Hours Worked this Period:	Velden	120	All Tasks
	Olander	156	All Tasks
	Collimore	81	Microwave R&D
	Merrill	0	Microwave R&D
	Nieman	12	Winds R&D
	Wanzong	106	Winds R&D
	Shie	75	Microwave R&D
	Wendricks	1	Tech Support

#### 9. Technical Progress

A) General: In support of JTWC operations on Guam, GMS-5 water vapor images are being processed and exported on a routine basis. JTWC is acknowledging this data as important to their operations and post analysis and therefore plans are to continue dissemination until further notice. NRL-MRY and Hawaii/HickamAFB now also receive these products on a routine basis.

B) Task: Microwave. Porting of XTCR (eXperimental Tropical Cyclone Retrieval) and accompanying XTCR data log from IBM/DOS environment to X-windows/UNIX is complete. An updated User's Guide for XTCR/UNIX will be distributed in February.

Analysis continues into whether SSM/I may be of value in determining eye size, which may be an indicator of the warm anomaly extent (horizontal), and which is a key parameter for XTCR. The accuracy of SSM/I eye size determination relative to aircraft reports and IR estimates is being documented. Impact of the SSM/I eye size estimates on the XTCR retrieval is being studied. A report will be issued shortly.

Elements of the XTCR estimates of central pressure are being characterized case by case. Particular attention is being given to the effects of precipitation attenuation, storm stage and eye size. Other channels and SSM/I are being interrelated for this purpose.

C) Task: Dvorak. Cases from 1995 in the Atlantic were assembled into a data set for initial review of the digital DVOR algorithm performance. The preliminary analysis was reported on at the annual AMS meeting in late January. In brief, the algorithm performed well in cases with well defined eyes. There was a tendency to underestimate intensity in cases of strong shear, cloud-filled eyes, and very small eyes. The algorithm actually overestimated intensity in one case during Roxanne when a 'false eye' value was taken. Further characterization is underway.

D) Task: Winds. Quasi-real time GMS-5 water vapor wind data sets were routinely generated, and the plot files disseminated to JTWC at Guam. Upon request from JTWC, several cosmetic changes were made to the plot files. Plans are to continue to routinely produce and transmit these wind sets twice a day as a demonstration and for qualitative evaluation.

Data sets from Typhoon Ward were delivered to NRL-MRY and FNOC last month for assimilation into the NOGAPS model. Unfortunately, model forecast impact results did not show any significant impact as with the Chantal case. A second attempt yielded similar results. It was decided to try another case, Angela, and these winds will be delivered in February.

Processing of 6-hourly GOES-8 data sets for the Humberto/Iris/Karen/Luis period continued in January. These cases will be used to assess NWP impact in collaboration with NRL-MRY, GFDL and NCEP. This deliverable is expected to be ready in March.

10. Briefs/Reports: 3 Presentations at the 8th AMS Satellite Conference.

11. Travel: Atlanta, Georgia for the AMS Annual meeting including the Satellite Conference (3 attendees).

12. Plans for Next Month.

Disseminate the GMS-5 multispectral data sets for Supertyphoon Angela to NRL-MRY. Continue the real-time processing and transfer of GMS-5 water vapor motion winds to Guam for qualitative evaluation. Continue processing GOES-8 wind sets during the HIKL case study period for future assimilation and model impact tests. Continue evaluation of the DVOR automated Dvorak technique using 1995 cases. Wrap up the evaluation of SSM/I eye-size effects on the XTCR, and continue studying the performance of the algorithm. Present findings on the satellite winds product and NWP impact at the 96TCC in Tokyo, Japan.

13. Technical Problem Areas: none.



**CIMSS**

**COOPERATIVE INSTITUTE FOR METEOROLOGICAL SATELLITE STUDIES**

Space Science and Engineering Center  
University of Wisconsin—Madison  
1225 West Dayton Street  
Madison, Wisconsin 53706  
Telex: 265 452 UOFWISC MDS

Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006

THE SCHWERTFEGER LIBRARY  
1225 W. Dayton Street  
Madison, WI 53706

17 March, 1996

Dear Dr. Hawkins:

Please find enclosed the monthly cost and performance report on contract N00014-95-C-6017 for the period February 1996.

If you have any questions, please feel free to call me at 608 262-9168.

Sincerely,

Christopher S. Velden  
Program Manager  
Univ. Wisconsin-SSEC  
1225 W. Dayton St.  
Madison, WI 53706  
ChrisV@ssec.wisc.edu

cc: ONRRR

1410  
home/chrisv/msdoc/1410fe96



**Monthly Cost and Performance Report**

**for Contract No. N00014-95-C-6017**

**February 1996**

**Issued by the University of Wisconsin - Space Science and Engineering Center**

**Prepared under contract by Program Manager Christopher Velden**

**For Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006**

**Contact amount: \$611,182**

1. Contract No.: N00014-95-C-6017
2. Reporting Period: February 1996
3. Total Amount Funded: \$611,182
4. Total Amount Spent to Date: \$218,727.78
5. Total Amount Spent this Period: \$19,728.61
6. Estimated Cost to Complete: \$611,182
7. Schedule Status: On Schedule
8. Contractor Hours Worked this Period:

Velden	104	All Tasks
Olander	154.5	All Tasks
Collimore	25	Microwave R&D
Merrill	4	Microwave R&D
Nieman	5	Winds R&D
Wanzong	82.5	Winds R&D
Shie	75	Microwave R&D

9. Technical Progress

A) General: In support of JTWC operations on Guam, GMS-5 water vapor images are being processed and exported on a routine basis. JTWC is acknowledging this data as important to their operations and post analysis and therefore plans are to continue dissemination until further notice. NRL-MRY and Hawaii/HickamAFB now also receive these products on a routine basis.

B) Task: Microwave. Porting of XTCR (eXperimental Tropical Cyclone Retrieval) and accompanying XTCR data log from IBM/DOS environment to X-windows/UNIX is complete. An updated User's Guide for XTCR/UNIX was distributed in February.

Analysis continues into whether SSM/I may be of value in determining eye size, which may be an indicator of the warm anomaly extent (horizontal), and which is a key parameter for XTCR. The accuracy of SSM/I eye size determination relative to aircraft reports and IR estimates is being documented. Impact of the SSM/I eye size estimates on the XTCR retrieval is being studied. A report will be issued shortly.

Elements of the XTCR estimates of central pressure are being characterized. Particular attention is being given to the effects of precipitation attenuation, storm stage and eye size. Other channels and SSM/I are being interregated for this purpose. A report will be issued shortly.

C) Task: Dvorak. Cases from 1995 in the Atlantic were assembled into a data set for initial review of the digital DVOR algorithm performance. The preliminary analysis was reported on at a meeting with personnel of the JTWC and colleagues. Ideas were exchanged. Further characterization and modifications are underway.

D) Task: Winds. Quasi-real time GMS-5 water vapor wind data sets were routinely generated, and the plot files disseminated to JTWC at Guam. Plans are to continue to routinely produce and transmit these wind sets twice a day as a demonstration and for qualitative evaluation. There was very positive feedback on this product from the community at the typhoon conference in Tokyo.

Data sets from Typhoon Angela were delivered to NRL-MRY last month for assimilation into the NOGAPS model. As with the Chantal case in the Atlantic, the model forecast results were again encouraging and showed a positive impact, although not as dramatic as with Chantal. Processing of 6-hourly GOES-8 data sets for the Humberto/Iris/Karen/Luis period continued in February. These cases will be used to assess NWP impact in collaboration with NRL-MRY, GFDL and NCEP. This deliverable is expected to be ready in April.

10. Briefs/Reports: 1 Presentation at the NRL-MRY. Several presentations/briefs at the 96 Typhoon Conference in Tokyo.

11. Travel: Velden traveled to Monterey (NRL) and to Tokyo (96TCC)

12. Plans for Next Month.

Continue the real-time processing and transfer of GMS-5 water vapor motion winds to Guam for qualitative evaluation. Continue processing GOES-8 wind sets during the HIKL case study period for future assimilation and model impact tests. Continue evaluation of the DVOR automated Dvorak technique using 1995 cases. Wrap up the evaluation of SSM/I eye-size effects on the XTCR and the performance of the algorithm. Present and discuss findings on the satellite winds product and NWP impact, and the automated digital Dvorak research at JTWC.

13. Technical Problem Areas: Having difficulty receiving GMS-5 data from ABOM in real time. Working on the problem with SSEC and ABOM, and may explore other data source alternatives.



**CIMSS**

**COOPERATIVE INSTITUTE FOR METEOROLOGICAL SATELLITE STUDIES**

Space Science and Engineering Center  
University of Wisconsin—Madison  
1225 West Dayton Street  
Madison, Wisconsin 53706  
Telex: 265 452 UOFWISC MDS

Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006

THE SCHWERTFEGGER LIBRARY  
1225 W. Dayton Street  
Madison, WI 53706

17 April, 1996

Dear Dr. Hawkins:

Please find enclosed the monthly cost and performance report on contract N00014-95-C-6017 for the period March 1996.

If you have any questions, please feel free to call me at 608 262-9168.

Sincerely,

Christopher S. Velden  
Program Manager  
Univ. Wisconsin-SSEC  
1225 W. Dayton St.  
Madison, WI 53706  
ChrisV@ssec.wisc.edu

cc: ONRRR

1410  
home/chrisv/msdoc/1410ma96

Monthly Cost and Performance Report

for Contract No. N00014-95-C-6017

March 1996

Issued by the University of Wisconsin - Space Science and Engineering Center

Prepared under contract by Program Manager Christopher Velden

For Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006

Contact amount: \$611,182

1. Contract No.: N00014-95-C-6017
2. Reporting Period: March 1996
3. Total Amount Funded: \$420,000
4. Total Amount Spent to Date: \$235,366.59
5. Total Amount Spent this Period: \$16,638.81
6. Estimated Cost to Complete: \$611,182
7. Schedule Status: On Schedule
8. Contractor Hours Worked this Period:

Velden	100	All Tasks
Olander	96	All Tasks
Wanzong	49	Winds R&D
Shie	75	Microwave R&D

9. Technical Progress

A) General: In support of JTWC operations on Guam, GMS-5 water vapor images are being processed and exported on a routine basis. JTWC is acknowledging this data as important to their operations and post analysis and therefore plans are to continue dissemination until further notice. NRL-MRY and Hawaii/HickamAFB now also receive these products on a routine basis.

B) Task: Microwave. An updated User's Guide for XTCCR/UNIX was distributed in February.

The accuracy of SSM/I eye size determination relative to aircraft reports and IR estimates is being documented, and the impact of the SSM/I eye size estimates on the XTCCR retrieval will be also be documented in a report to be issued in the near future.

Elements of the XTCCR estimates of central pressure have been characterized. Particular attention was given to the effects of precipitation attenuation, storm stage and eye size. Other channels and SSM/I were interregated for this purpose. A report will be issued in the near future.

C) Task: Dvorak. Cases from 1995 in the Atlantic were assembled into a data set for initial review of the digital DVOR algorithm performance. The preliminary analysis was reported on at a meeting with personnel of the JTWC and colleagues. Ideas were exchanged. Further characterization and modifications are underway, including the employment and evaluation of time averaging schemes. These initial results will be documented and published as a note in a technical journal.

D) Task: Winds. Quasi-real time GMS-5 water vapor wind data sets were routinely generated, and the plot files disseminated to JTWC at Guam. Plans are to continue to routinely produce and transmit these wind sets twice a day as a demonstration and for qualitative evaluation.

Processing of 6-hourly GOES-8 data sets for the Humberto/Iris/Karen/Luis period continued in March. These cases will be used to assess NWP impact in collaboration with NRL-MRY, GFDL and NCEP. This data set will be delivered in April.

Plans are to process 1995 Atlantic hurricanes Opal, Erin and a couple of selected cases from Felix for research and model impact studies. In particular, the Erin and Felix data will be tested in an adjoint of the NOGAPS model.

10. Briefs/Reports: Several presentations and discussions at the JTWC in Guam. Presentation at the Naval Met. Facility in Pearl Harbor, Hawaii. Brief and discussions with AF personnel at Hickham AFB in Hawaii. Joint NWS/Univ. Hawaii seminar at UH.

11. Travel: In conjunction with attending the 96TCC in Tokyo at the end of February, Velden traveled to Guam (JTWC) and to Hawaii (Pearl Harbor, Hickham AFB, and Univ. Hawaii).

12. Plans for Next Month.

Continue the real-time processing and transfer of GMS-5 water vapor motion winds to Guam for qualitative evaluation. Disseminate the GOES-8 wind sets during the HIKL case study period to several modelling centers for assimilation and model impact tests. Continue evaluation of the DVOR automated Dvorak technique using 1995 cases.

13. Technical Problem Areas: Problem with receiving GMS-5 data from ABOM in real time appears to have been alleviated.



**CIMSS**

**COOPERATIVE INSTITUTE FOR METEOROLOGICAL SATELLITE STUDIES**

Space Science and Engineering Center  
University of Wisconsin—Madison  
1225 West Dayton Street  
Madison, Wisconsin 53706  
Telex: 265 452 UOFWISC MDS

Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006

THE SCHWERTFEGER LIBRARY  
1225 W. Dayton Street  
Madison, WI 53706

22 June, 1996

Dear Dr. Hawkins:

Please find enclosed the monthly cost and performance report on contract N00014-95-C-6017 for the period May 1996.

If you have any questions, please feel free to call me at 608 262-9168.

Sincerely,

Christopher S. Velden  
Program Manager  
Univ. Wisconsin-SSEC  
1225 W. Dayton St.  
Madison, WI 53706  
ChrisV@ssec.wisc.edu

cc: ONRRR

1410  
home/chrisv/msdoc/1410my96

144FC49



Monthly Cost and Performance Report

for Contract No. N00014-95-C-6017

May 1996

Issued by the University of Wisconsin - Space Science and Engineering Center

Prepared under contract by Program Manager Christopher Velden

For Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006

Contact amount: \$611,182

1. Contract No.: N00014-95-C-6017
2. Reporting Period: May 1996
3. Total Amount Funded: \$420,000
4. Total Amount Spent to Date: \$279,806.42
5. Total Amount Spent this Period: \$30, 434.13
6. Estimated Cost to Complete: \$611,182
7. Schedule Status: On Schedule

8. Contractor Hours Worked this Period:	Velden	136	All Tasks
	Olander	174	All Tasks
	Wanzong	168	Winds R&D
	Shie	75	Microwave R&D
	Tuschen	56.7	Tech. Support
	Nieman	138	Winds R&D
	Robaidek	2	Tech Support
	McCaffery	2	Tech Support

9. Technical Progress

A) General: In support of JTWC operations on Guam, GMS-5 water vapor images are being processed and exported on a routine basis. JTWC is acknowledging this data as important to their operations and post analysis and therefore plans are to continue dissemination until further notice. NRL-MRY also receives these products on a routine basis.

B) Task: Dvorak. Further characterization of the automated Dvorak algorithm (DVOR) is underway using 1995 Atlantic cases, including the employment and evaluation of time averaging schemes. The initial appraisal of the algorithm will soon be documented and published as a note in a technical journal. Preliminary findings indicate that averaging values over a 24-hour period yields the lowest mean RMS error compared to aircraft ground truth. However, rapid pressure fluctuations (such as with Opal) are missed using this scheme.

C) Task: Winds. Real-time GMS-5 water vapor wind data sets were routinely generated, and the plot files disseminated to JTWC at Guam. Plans are to continue to routinely produce and transmit these wind sets twice a day as a demonstration and for qualitative evaluation.

A manuscript describing the HIKL data sets and results will be submitted jointly with NRL-MRY collaborators in the near future.

Hurricane Erin data sets were also processed and disseminated to NRL-MRY for inclusion in adjoint model studies. Processing of Hurricane Opal datasets was completed in May and is being disseminated to several research centers including NRL-MRY.

Special processing for the COBRA GOLD DoD exercise concluded in late May. Data sets over the Thailand region from GMS-5 water vapor and visible imagery were supplied by UW-CIMSS in support of the exercise. Response was positive.

A once-per-day visible wind dataset product is being developed for JTWC. This dataset will focus on the 00Z time period and cover the region around Guam. The dataset will employ high-resolution visible imagery from GMS-5 and will yield high-density wind vector coverage in the low levels. This product will be disseminated to JTWC on a routine basis starting in June for their evaluation.

Processing scripts are being written to support storm scenarios in the WestPac. Data sets consisting of water vapor and IR winds at 6-hourly intervals will be processed and disseminated to NRL-MRY for assimilation into the operational NOGAPS model.

10. Briefs/Reports: Manuscript on CIMSS research with water vapor wind development submitted to BAMS.

11. Travel: None

12. Plans for Next Month.

Continue the real-time processing and transfer of GMS-5 water vapor motion winds to Guam for qualitative evaluation. Complete processing and disseminate the GOES-8 wind sets for the Opal case study period to several research centers for assimilation and model impact tests. Complete the initial evaluation of the DVOR automated Dvorak technique and submit a manuscript for publication. Begin routine visible wind product for JTWC. Shake out storm processing routines for both WestPac and Atlantic. Begin experimental dissemination of wind datasets to NHC, NRL-MRY, JTWC and Norfolk.

13. Technical Problem Areas: Waiting on deliverance of new SGI workstation to fulfill data processing needs. Expected delivery in early June.



**CIMSS**

**COOPERATIVE INSTITUTE FOR METEOROLOGICAL SATELLITE STUDIES**

Space Science and Engineering Center  
University of Wisconsin—Madison  
1225 West Dayton Street  
Madison, Wisconsin 53706  
Telex: 265 452 UOFWISC MDS

Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006

THE SCHWERTFEGER LIBRARY  
1225 W. Dayton Street  
Madison, WI 53706

22 July, 1996

Dear Dr. Hawkins:

Please find enclosed the monthly cost and performance report on contract N00014-95-C-6017 for the period June 1996.

If you have any questions, please feel free to call me at 608 262-9168.

Sincerely,

Christopher S. Velden  
Program Manager  
Univ. Wisconsin-SSEC  
1225 W. Dayton St.  
Madison, WI 53706  
ChrisV@ssec.wisc.edu

cc: ONRRR

1410  
home/chrisv/msdoc/1410ju96

Monthly Cost and Performance Report

for Contract No. N00014-95-C-6017

June 1996

Issued by the University of Wisconsin - Space Science and Engineering Center

Prepared under contract by Program Manager Christopher Velden

For Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006

Contact amount: \$611,182

1. Contract No.: N00014-95-C-6017
2. Reporting Period: June 1996
3. Total Amount Funded: \$465,000
4. Total Amount Spent to Date: \$295,996.34
5. Total Amount Spent this Period: \$16,189.92
6. Estimated Cost to Complete: \$611,182
7. Schedule Status: On Schedule

8. Contractor Hours Worked this Period:	Velden	80	All Tasks
	Olander	140	All Tasks
	Wanzong	83	Winds R&D
	Nieman	122	Winds R&D
	Robaidek	3	Tech Support
	Woolf	9.5	Tech Support

## 9. Technical Progress

A) General: In support of JTWC operations on Guam, GMS-5 water vapor images are being processed and exported on a routine basis. JTWC is acknowledging this data as important to their operations and post analysis and therefore plans are to continue dissemination until further notice. NRL-MRY also receives these products on a routine basis.

Acquisition and installation of an SGI workstation for data processing was successful. Processing routines have been transported and are being shaken out.

B) Task: Dvorak. Further characterization of the automated Dvorak algorithm (DVOR) is continuing using 1995 Atlantic cases. The initial appraisal of the algorithm has been documented and submitted for publication as an article in the AMS journal Weather and Forecasting.

C) Task: Winds. Real-time GMS-5 water vapor wind data sets are being routinely generated, and the plot files disseminated to JTWC at Guam. Plans are to continue to routinely produce and transmit these wind sets twice a day as a demonstration and for qualitative evaluation.

The GMS-5 winds are being disseminated to FNMOC for eventual inclusion into the operational NOGAPS system.

A manuscript describing the HIKL data sets and results will be submitted jointly with NRL-MRY collaborators in the near future.

Processing of Hurricane Opal datasets was completed in June and disseminated to several research centers including NRL-MRY.

Water vapor wind sets are being routinely produced over the eastern Indian Ocean from GMS-5 imagery and disseminated in real time to JTWC. Preliminary evaluation from JTWC has indicated the wind information has been useful towards aiding the think process in several cases of storm development.

A once-per-day visible wind dataset product is being delivered to JTWC for their evaluation. This dataset is focussing on the 00Z time period and covers the region around Guam. The dataset is employing high-resolution visible imagery from GMS-5 and is yielding moderate-density wind vector coverage in the low levels.

Processing scripts are being written to support storm scenarios in the WestPac. Data sets consisting of water vapor and IR winds at 6-hourly intervals will be processed and disseminated to NRL-MRY for assimilation into the operational NOGAPS model.

10. Briefs/Reports: Manuscript on CIMSS research into a digital Dvorak algorithm has been submitted to Weather and Forecasting.

11. Travel: None

12. Plans for Next Month.

Continue the real-time processing and transfer of GMS-5 water vapor motion winds to Guam for qualitative evaluation, and to FNMOC for quantitative input into NWP. Continue the routine visible wind product and WV Indian Ocean product for JTWC. Begin special storm dataset processing routines for both WestPac and Atlantic, with dissemination of wind datasets to NHC, NRL-MRY, JTWC, FNMOC, Norfolk Naval Base, ECMWF, UK and NCEP.

13. Technical Problem Areas: None.



**CIMSS**

**COOPERATIVE INSTITUTE FOR METEOROLOGICAL SATELLITE STUDIES**

Space Science and Engineering Center  
University of Wisconsin—Madison  
1225 West Dayton Street  
Madison, Wisconsin 53706  
Telex: 265 452 UOFWISC MDS

Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006

16 August, 1996

Dear Dr. Hawkins:

Please find enclosed the monthly cost and performance report on contract N00014-95-C-6017 for the period July 1996.

If you have any questions, please feel free to call me at 608 262-9168.

Sincerely,

Christopher S. Velden  
Program Manager  
Univ. Wisconsin-SSEC  
1225 W. Dayton St.  
Madison, WI 53706  
ChrisV@ssec.wisc.edu

cc: ONRRR

1410  
home/chrisv/msdoc/1410jl96



Monthly Cost and Performance Report

for Contract No. N00014-95-C-6017

July 1996

Issued by the University of Wisconsin - Space Science and Engineering Center

Prepared under contract by Program Manager Christopher Velden

For Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006

Contact amount: \$611,182

1. Contract No.: N00014-95-C-6017
2. Reporting Period: July 1996
3. Total Amount Funded: \$465,000
4. Total Amount Spent to Date: \$320,911.02
5. Total Amount Spent this Period: \$24,914.68
6. Estimated Cost to Complete: \$611,182
7. Schedule Status: On Schedule

8. Contractor Hours Worked this Period:	Velden	112	All Tasks
	Olander	142	All Tasks
	Wanzong	89	Winds R&D
	Nieman	118	Winds R&D
	Trebilcock	2	Tech Support
	Wolf	6.5	Tech Support
	Merrill	2	Tech Support
	Lynch	1	Tech Support

## 9. Technical Progress

A) General: In support of JTWC operations on Guam, GMS-5 water vapor images are being processed and exported on a routine basis. JTWC is acknowledging this data as important to their operations and post analysis and therefore plans are to continue dissemination until further notice. NRL-MRY also receives these products on a routine basis.

B) Task: Dvorak. Further characterization of the automated Dvorak algorithm (DVOR) is continuing using 1995 Atlantic cases. The initial appraisal of the algorithm has been documented and submitted for publication as an article in the AMS journal Weather and Forecasting. Study is beginning on improvements to the basic algorithm.

C) Task: Winds. Real-time GMS-5 water vapor wind data sets are being routinely generated, and the plot files disseminated to JTWC at Guam. Plans are to continue to routinely produce and transmit these wind sets four times a day for qualitative evaluation.

GOES-8 and GMS-5 WV and IR winds are being disseminated to FNMOC for inclusion into the operational NOGAPS system.

A manuscript describing the HIKL data sets and results will be submitted jointly with NRL-MRY collaborators in the near future.

Water vapor wind sets are being routinely produced over the eastern Indian Ocean from GMS-5 imagery and disseminated in real time to JTWC. Preliminary evaluation from JTWC has indicated the wind information has been useful towards aiding the think process in several cases of storm development.

Twice-per-day visible wind datasets are being delivered to JTWC for their evaluation. This dataset is focussing on the 00Z and 06Z time periods and covers the region around Guam, or a targeted area of interest. These datasets are employing high-resolution visible imagery from GMS-5 and are yielding moderate-density wind vector coverage in the low levels.

Processing scripts have been written to support storm scenarios in the WestPac. Data sets consisting of water vapor and IR winds at 6-hourly intervals were processed during Typhoons Eve, Gloria and Herb, and disseminated to NRL-MRY for assimilation into the operational NOGAPS model.

10. Briefs/Reports: Manuscript on CIMSS research into a digital Dvorak algorithm has been submitted to Weather and Forecasting.

11. Travel: None

12. Plans for Next Month.

Continue the real-time processing and transfer of GMS-5 water vapor motion winds to Guam for qualitative evaluation, and to FNMOC for quantitative input into NWP. Continue the routine visible wind product and WV Indian Ocean product for JTWC. Continue special storm dataset processing routines for both WestPac and Atlantic, with dissemination of wind datasets to NHC, NRL-MRY, JTWC, FNMOC, Norfolk Naval Base, ECMWF, UK and NCEP.

Deliver paper at the AMS Weather and Forecasting Conference in Norfolk Virginia on the effective use and model impact of the satellite winds products.

13. Technical Problem Areas: None.



**CIMSS**

**COOPERATIVE INSTITUTE FOR METEOROLOGICAL SATELLITE STUDIES**

Space Science and Engineering Center

University of Wisconsin—Madison

1225 West Dayton Street

Madison, Wisconsin 53706

Telex: 265 452 UOFWISC MDS

THE SCHWERDTFEGER LIBRARY  
1225 W. Dayton Street  
Madison, WI 53706

Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006

17 October, 1996

Dear Dr. Hawkins:

Please find enclosed the monthly cost and performance report on contract N00014-95-C-6017 for the period September 1996.

If you have any questions, please feel free to call me at 608 262-9168.

Sincerely,

Christopher S. Velden  
Program Manager  
Univ. Wisconsin-SSEC  
1225 W. Dayton St.  
Madison, WI 53706  
ChrisV@ssec.wisc.edu

cc: ONRRR

1410  
home/chrisv/msdoc/1410se96

**Monthly Cost and Performance Report**

**for Contract No. N00014-95-C-6017**

**September 1996**

**Issued by the University of Wisconsin - Space Science and Engineering Center**

**Prepared under contract by Program Manager Christopher Velden**

**For Jeffrey Hawkins  
Naval Research Laboratory  
Code 7531  
Monterey, CA 93943-5006**

**Contact amount: \$611,182**

1. Contract No.: N00014-95-C-6017
2. Reporting Period: September 1996
3. Total Amount Funded: \$465,000
4. Total Amount Spent to Date: \$355,398.70
5. Total Amount Spent this Period: \$18,894.70
6. Estimated Cost to Complete: \$611,182
7. Schedule Status: On Schedule

8. Contractor Hours Worked this Period:	Velden	112	All Tasks
	Olander	144	All Tasks
	Wanzong	77	Winds R&D
	Nieman	6	Tech Support
	Trebilcock	3	Tech Support

9. Technical Progress

A) General: In support of JTWC operations on Guam, GMS-5 water vapor images are being processed and exported on a routine basis. JTWC is acknowledging this data as important to their operations and post analysis and therefore plans are to continue dissemination until further notice. NRL-MRY also receives these products on a routine basis.

B) Task: Dvorak. Further characterization of the automated Dvorak algorithm (DVOR) is continuing using 1995 and 1996 Atlantic cases. The initial appraisal of the algorithm has been documented and submitted for publication as an article in the AMS journal Weather and Forecasting.

Study is continuing on improvements to the basic algorithm. Basic correlations are being computed between ring temperatures at various radii, in selected sectors, versus observed SLP from recon, as well as SLP observed at 6, 12 and 24 hours after the satellite measurement. Trend analysis and characterization of DD estimate errors is also being undertaken.

C) Task: Winds. Real-time GMS-5 water vapor wind data sets are being routinely generated, and the plot files disseminated to JTWC at Guam. Plans are to continue to routinely produce and transmit these wind sets four times a day for qualitative evaluation.

GOES-8 and GMS-5 WV, IR and VIS winds are being disseminated to FNMOC for inclusion into the operational NOGAPS system.

A manuscript describing the HIKL data sets and NWP forecast impact results has been completed and submitted jointly with NRL-MRY collaborators.

Water vapor wind sets are being routinely produced over the eastern Indian Ocean from GMS-5 imagery and disseminated in real time to JTWC. Preliminary evaluation from JTWC has indicated the wind information has been useful towards aiding the think process in several cases of storm development.

Twice-per-day visible wind datasets are being delivered to JTWC for their evaluation. These datasets are focussing on the 00Z and 06Z time periods and cover the region around Guam, or a targeted area of interest. These datasets are employing high-resolution visible imagery from GMS-5 and are yielding moderate-density wind vector coverage in the low levels.

Vis winds datasets are also being produced 2-3 times per day during storm events from GOES-8 high resolution imagery, and disseminated to several users. A new product has also been developed and tested. This product consists of high-density low-level vectors derived from 4km, 30 minute VIS imagery and covers the tropical Atlantic strip from 30-90W. This product is derived once per day around 18z, and is now routinely invoked in non-storm situations to track potential tropical waves as they cross the Atlantic.

Data sets consisting of water vapor and IR winds at 6-hourly intervals were processed during September for Tropical Cyclones Sally, Tom, Violet, Willie, Yates and Zane in the WestPac, and Fran, Gustav, Humberto, and Isadore in the Atlantic, and disseminated to NRL-MRY for assimilation into the operational NOGAPS model. VIS winds produced twice a day in the storm vortex region are also being included in these datasets.

Plot files of GOES-8 multispectral winds are now being disseminated in real time to NLMOC in Norfolk. These files include water vapor and VIS winds, and are being used subjectively by the Met and Ocean Center analysis and forecast team in regards to tropical cyclone forecasting.

10. Briefs/Reports: None

11. Travel: None.

## 12. Plans for Next Month.

Continue the real-time processing and transfer of GMS-5 water vapor motion winds to Guam for qualitative evaluation, and to FNMOC for quantitative input into NWP. Continue the routine visible wind product and WV Indian Ocean product for JTWC. Continue special storm dataset processing routines for both WestPac and Atlantic, with dissemination of wind datasets to NHC, NRL-MRY, JTWC, FNMOC, Norfolk Naval Base, GFDL, ECMWF, UK and NCEP.

Collect data for continued development and testing of the Dvorak algorithm.

Continue assessing strategy for tuning CIMSS winds extraction algorithm to southern hemisphere processing in anticipation of dataset coverage for GUAM AOR during tropical cyclone events.

Access NOGAPS fields from FNMOC and process for inclusion as guess fields in the winds algorithm.

## 13. Technical Problem Areas: None.