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**Attachments:**

DEPARTMENT OF COMMERCE  
RESEARCH PERFORMANCE PROGRESS REPORT (RPPR)

[RPPR Guidance](#)  
[Award Action Request Guidance](#)

AWARD INFORMATION	
1. Federal Agency: Department of Commerce / NOAA	2. Federal Award Number: NA200AR4320472
3. Project Title Cooperative Institute for Marine and Atmospheric Studies (CIMAS)- Innovative Science, Service and Stewardship	
4. Award Period of Performance Start Date: October 01, 2020	5. Award Period of Performance End Date: September 30, 2025
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR	
6. Last Name and Suffix: Villar	7. First and Middle Name: Carol
8. Title: Sponsor Programs Specialist	
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AUTHORIZING OFFICIAL	
11. Last Name and Suffix: Diaz	12. First and Middle Name: Soraida
13. Title:	
14. Email: AIDA.DIAZ@MIAMI.EDU	15. Phone Number 305-421-4089
REPORTING INFORMATION	
Signature of Submitting Official: Patricia Ann May-Archuleta	
16. Submission Date and Time Stamp: 2021-07-29 12:18:08.0	17. Reporting Period End Date: June 30, 2021
18. Reporting Frequency: <input checked="" type="radio"/> Annual <input type="radio"/> Semi-Annual <input type="radio"/> Quarterly	19. Report Type: <input checked="" type="radio"/> Not Final <input type="radio"/> Final
RECIPIENT ORGANIZATION	
20. Recipient Name: UNIVERSITY OF MIAMI	

21. Recipient Address: 4600 RICKENBACKER CSWY, KEY BISCAYNE, FL 33149-1031 USA	
22. Recipient DUNS: 152764007	23. Recipient EIN: 590624458

**ACCOMPLISHMENTS** [Guidance](#)

24. What were the major goals and objectives of this project?\*

The response to the COVID-19 pandemic limited some of our field work, this is noted where appropriate. CIMAS is structured into four themes - our accomplishments are organized under these themes as follows:  
Tropical Weather Observations, Analysis and Prediction (TW): CIMAS's goal is to collaborate with NOAA scientists to develop and implement a comprehensive hurricane field program that is used to improve operational forecasts. We seek to quantitatively

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25. What was accomplished under these goals?\*

TW: All the dropsonde data have been made available by HRD. Training in the use of ASPEN dropsonde processing software created. Implemented nest motion for all atmospheric prognostic variables. Collaborating with developers at EMC to implement nest motion of physics and surface variables in the model. Composites of HAFS forecasts compared to observational composites to evaluate the impact of physics improvements in FV3/HAFS. Modifications to the EDMF-TKE PBL scheme led to improved forecasts

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26. What opportunities for training and professional development has the project provided?\*

CIMAS invests in being part of the training pipeline for NOAA. CIMAS provides for many training activities including:

- 1) collaborative research teams of faculty, NOAA and CIMAS scientists and graduate students;
- 2) funding of graduate students with the support of NOAA fellowships and graduate research Assistantships
- 3) participation of NOAA scientists in student mentoring training and teaching of graduate level courses

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27. How were the results disseminated to communities of interest?\*

Disseminated results from the project to CIMAS collaborators, resource managers, and the public through a variety of media, including scientific publications, technical reports (including NOAA Technical memoranda), conference presentations, training workshops, web content, other public media and outreach activities.

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28. What do you plan to do during the next reporting period to accomplish the goals and objectives?\*

TW: Complete the implementation of moving nest functionality for all necessary fields of the model and integrate with automated storm tracking. Continue development and evaluation of the EDMF-TKE PBL scheme through comparison with observations and LES data. Test HAFS-globalnest (HAFSV0.2B) in real-time. Develop an optimized hybrid seasonal forecast system for U.S. precipitation using the inter-basin SSTA contrast and CS convection. Analyze Doppler radar data

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**PRODUCTS** [Guidance](#)

29. Publications, conference papers, and presentations\*

Nothing to Report   
See attached list

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30. Technologies or techniques\*

Nothing to Report   
Under this award a number of technologies and techniques have been developed. These include:  
Model data from the real-time HAFSV0.1B runs was displayed on the AOML model viewer.

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31. Inventions, patent applications, and/or licenses\*

Nothing to Report   
None

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32. Other products\*

Nothing to Report

Real-time track files were also transferred to the National Hurricane Center via ftp.

There are several institutions and individuals participating in FACETs project. The FACETs project encompasses different hazardous weather events in different parts of the country. For tropical cyclone NHC, AOML's HRD, and National Weather Service (NWS) have

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PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS [Guidance](#)

33. What individuals have worked on this project?\*

See attached list

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34. Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?\*

Nothing to Report

Personnel who joined CIMAS:

Sandra Bringas  
Ashley Burleson

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35. What other organizations have been involved as partners?\*

Nothing to Report

Argentine CONICET  
Argentine INIDEP  
Autoridad Nacional de Asuntos Marítimos (ANAMAR)  
Cape Eleuthera Institute in the Bahamas

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36. Have other collaborators or contacts been involved?\*

Nothing to Report

S. Aberson  
M. Alexander  
D. Alvarez  
V. Anantharaj

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IMPACT [Guidance](#)

37. What was the impact on the development of the principal discipline(s) of the project?\*

Nothing to Report

TW: The results from this project helped improve the operational hurricane model, which in turn would improve the hurricane track and intensity forecast. TC products have been developed to help us better understand the physical reasons for the TC evolution as shown by HAFS. Advance understanding of the U.S. rainfall variability and improves seasonal forecast skill. Potential improvements in tropical cyclone track and intensity forecasts due the assimilation of

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38. What was the impact on other disciplines?\*

Nothing to Report

Improved hurricane forecasts help emergency managers and other public officials when tropical cyclones threaten.

Experimental designs are applicable to the assessments of many other stressors beyond bleaching, ocean acidification, and disease. Data regarding coral genotypic variation and performance may provide recommendations to resource managers and

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39. What was the impact on the development of human resources?\*

Nothing to Report

CIMAS has continued to be an effective pipeline for the development of human resources. This continues to be accomplished by recruiting students and staff for completion of graduate degrees, and by immersing them into collaborative research teams. Graduating students and outgoing CIMAS staff take positions in academia, NGOs, private industry and all levels of government, including local, county, state and federal. Many find permanent employment in NOAA, in particular with the AOML and SEFSC

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40. What was the impact on teaching and educational experiences?\*

Nothing to Report

Undergraduate and graduate student education are an integral part of the work facilitated by CIMAS. NOAA scientists and CIMAS staff participate in the educational programs at the UM, as instructors, advisors, academic committee members, mentors and scientific collaborators in student's research projects. CIMAS provides substantial funding including salary, research and tuition expenses for research assistants who are pursuing graduate degrees at UM and other partner institutions as part of CIMAS funded

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41. What was the impact on physical, institutional, and information resources that form infrastructure?\*

Nothing to Report

Improved hurricane predictions from HAFS will allow for earlier and more accurate warnings to better protect infrastructure from tropical cyclone impacts.

Database information resources for environmental DNA have been developed, transformed, and actively maintained for more

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42. What was the impact on technology transfer?\*

Nothing to Report

Modifications to the EDMF-TKE PBL scheme were transitioned to EMC for real-time testing. Real-time model data was transferred to the AOML modeling website. Model track files were transferred to NHC via ftp.

Our project has made an interactive data visualization web tool for use by our Sanctuary partners. The project is currently

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43. What was the impact on society beyond science and technology?\*

Nothing to Report

The identification of stress-resilient coral genotypes, and resolution of the SCLTD outbreak, is critical to the future protection of coral reef ecosystems and the socio-economic resources they provide.

These data can be used as means of educating the public on environmental health and to inform policy decisions and public

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44. What percentage of the award's budget was spent in foreign country(ies)?\*

Enter percent  %

Enter explanation :

The late start of projects under the new agreement and the delay in receiving funds is the result of small percentage spent in foreign country(ies) .16%. The project listed below and a warehouse unit rented in Australia to storage oceanic equipment are the only payments. Due to COVID-19 there were no foreign trips.

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CHANGES/PROBLEMS [Guidance](#)

45. Changes in approach and reasons for change\*

Nothing to Report

COVID-19 pandemic caused major changes in approach to the project. Field work was cancelled and lack of access to facilities caused adjustments to project goals.

Given the inability to travel due to the COVID-19 pandemic, one planned field trip was cancelled. However, we were still able to

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46. Actual or anticipated problems or delays and actions or plans to resolve them\*

Nothing to Report

The COVID-19 pandemic has slowed many aspects of the experiments through limited lab and personnel access, however progress on all fronts has been continuous.

Work plans were readjusted to be successful while working in a work-from-home setting. Local contractors have been hired to do

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47. Changes that had a significant impact on expenditures\*

Nothing to Report

Due to the pandemic, no travel was undertaken related to this project. Conference attendance was virtual, with only abstract and registration fees needed.

Because of the COVID-19 Pandemic, travel was very limited over the last year. Most meetings were virtual, and so most

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48. Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents\*

Nothing to Report

None

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49. Change of primary performance site location from that originally proposed\*

Nothing to Report

Most CIMAS staff are currently teleworking due to the guidance provided by UM and NOAA.

Coral larvae experiments in association with collaborators from USC were conducted offsite due to Covid-related travel restrictions.

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PROJECT OUTCOMES

[Guidance](#)

50. What were the outcomes of the award?\*

TW: Enhance collaborations with the USAF and developers of dropwindsondes and processing software. Produced working code for nest motion of the atmospheric variables in the FV3, and completing the nest motion code for the physics and surface variables. HAFS improvements to model PBL physics and upgrades to allow both the global and nested domains to be output. Tests during the 2020 Atlantic Hurricane Season demonstrated the usefulness of physics upgrades and

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