

Space Weather Prediction Center (SWPC)

Short Range (Initiated and or completed in FY12)

CATEGORY	RECOMMENDATION	ACTION	STATUS/DUE DATE
Mission and Vision	<p>Recommendation MV1: Activities related to satellite data acquisition, processing, validation, and verification are not aligned with the NWS mission, but are better aligned with the National Environmental Satellite, Data, and Information Service (NESDIS) mission. The NESDIS already carries out these functions for terrestrial weather activities across the NWS. The panel supports the transfer of the satellite data activities from SWPC to NESDIS, which allows SWPC to focus on space weather prediction.</p>	<p>MV 1.1 – Transition satellite data processing for the GOES-NOP and ACE satellites to NESDIS.</p> <p>MV 1.3 – Establish and support a resident capability at NESDIS to provide science, engineering, and algorithm development and maintenance for space weather instruments and data. A no-cost transfer of the Space Weather Program’s Environmental Assessment capability was proposed as part of the FY12-16 NOAA budget planning process.</p>	<p>Ongoing FY12 Q4 Funding did not materialize in FY11 to allow for the port to NESDIS operations. Waiting on FY12 budget to reinvigorate this project with NESDIS. ACE code has been updated by NESDIS to run on modern architecture and the code has been brought back to SWPC and is now supporting operations.</p> <p>Ongoing FY12 Q4 NOAA satellite science, engineering, and algorithm support and data stewardship has been transitioned to NESDIS/NGDC beginning in late FY11. This transfer of knowledge and personnel will continue into FY12.</p>
Customers and Partners	<p>Recommendation CP1: NOAA should continue leading efforts within OFCM and OSTP in coordinating an inter-agency partnership for continuity of solar wind measurements from L1.</p>	<p>CP 1.1 - Utilize the 4th Annual Space Weather Enterprise Forum to publicize the importance of L1 measurements and the need for their continuity to protect critical infrastructure. SWPC is partnering with NASA, NSF, FEMA and DoD to develop agenda and secure commitments from keynote speakers for the SWEF.</p> <p>Support the President’s FY2011 Budget Request for DSCOVER refurbishment via the NASA/DoD/NOAA trilateral partnership.</p>	<p>Ongoing – In addition to SWEF, SWPC director continues to push this issue through senior NOAA, DOD, DHS/FEMA, and OMB leadership.</p>
Customers and Partners	<p>Recommendation CP2: A formal plan is needed to identify current and new potential customers, and a process should be developed for customer requirements collection, validation, and feedback to ensure the value, usability, and relevance of SWPC products and services.</p>	<p>CP 2.3 - Balance product improvement priorities within the bounds of the identified customer sensitivities and needs</p>	<p>Ongoing – Customer feedback and internal feedback have prompted us to make changes to our existing products and service.</p>
Customers and Partners	<p>Recommendation CP3: A formal education and outreach plan for stakeholders and customers is needed to increase understanding of the value and importance of space weather based on SWPC products and services. However, in the current budget climate, the public component of the SWPC education and outreach portfolio should remain dormant.</p>	<p>CP 3.1 – SWPC will conduct an assessment to determine if a Stakeholder and Customer Strategic Plan can be developed in house or contracted out.</p>	<p>Ongoing FY12 Q4 – Assessment complete – SWPC began an aggressive education and outreach plan at the end of FY2011. We are concentrating on updating our external web pages and education modules for NWS, WMO, Aviation, and the general public.</p>

			Space Wx Handouts/1-Pagers – FY2012 Q2 Web Page – FY2012 Q4 Space Wx Videos – FY2012 Q2 Space Wx Training Modules – FY2012 Q1-Q4 (budget constraints)
Products and Services	Recommendation PS1: The SWPC should continue with its efforts to address transitioning empirical techniques/models/tools into operational services.	PS 1.1 – Develop consistent project lifecycle management policies and processes reduce resource conflicts and increase reusability PS 1.2 – Assure resources are available through support contracts depending on adequate funding	Complete – New processes in place have allowed for the transition of empirical techniques/models/tools into operations. Models such as WingKP, USTEC, and D-RAP are some examples. Complete – FY10 base plus-up allows for staffing increase.
Products and Services	Recommendation PS2: The SWPC should develop a formal project management plan to transition the <i>Enlil</i> model into operations. The <i>Enlil</i> transition will be the inaugural activity of the new SWPT. It is imperative that the R2O transition is implemented effectively, since it will set a precedent for future transitions.	PS 2.1 – Assign a project manager for Enlil with an appropriate allocation of time to perform the management tasks. PS 2.2 – Develop a project plan for the Enlil project following the NCEP/NCO project management office paradigm PS 2.3 – Routinely monitor the progress of the Enlil project execution against the project plan via quarterly NCEP reviews.	Complete – Annette Parsons (Air Force liaison office to SWPC) named to this role Complete – NCO style project plan signed by SWPC director in January 2010 Ongoing FY12 Q2 No issues/impediments. NCEP has accelerated FOC date to FY12 Q2.
Information Systems	Recommendation IS1: NCEP should ensure the continuation of sufficient funding and SWPC should implement its plan: (1) to complete the migration from legacy hardware/software information systems to modern equipment; and (2) to maintain and upgrade the equipment, as necessary, after the migration is completed.	IS 1.1 -Decommission antiquated HP-UX systems IS 1.2 - Decommission antiquated DEC-Ultrix systems IS 1.3 - Decommission antiquated QNX/386 systems IS 1.4 - Decommission Table Mountain Observatory IS 1.5 - Maintain and Upgrade equipment/Hardware Refresh	Complete FY09 Q4 Completed FY10 Q4 Complete FY11 Q4 – SWPC used base funding to transition ACE processing code converted by NESDIS to run on modern architecture here at SWPC. This ACE processing was the last remaining item on QNX. Complete FY11 Q4 Property was transferred to DOC/NTIA effective October 1, 2011. Complete – SWPC is refreshing its IT systems as budgets allow.

<p style="text-align: center;">Information Systems</p>	<p>Recommendation IS2: A catastrophe mitigation and Continuity of Operations (COOP) plan for SWPC should be developed. For example, NCEP could investigate the possibility of using the AFWA as a backup to ensure that products are available to customers.</p>	<p>IS 2.1 - Develop alternate processing site for SWx Data that AFWA can access</p> <p>IS 2.2 - Establish SWx processing outside of Boulder (NESDIS @ Suitland and Wallops) Working with NESDIS for full operations plan. Funding is in presidents FY11 budget before congress.</p> <p>IS 2.3 - Establish 0-48 hour forecast capability at AFWA</p> <p>IS 2.4 - Establish 48+ hour forecast capability at NCEP/AWC</p>	<p>Ongoing – FY12 Q4 In late FY11 SWPC has procured hardware and services to install at the new NCEP building in College Park which will provide SWPC with a true Alternate Processing Site.</p> <p>Ongoing/FY12 Q4 – See MV1.1 FY11 budget did not allow for the transition of SWx satellite data processing to NESDIS. Pending FY12 funds (NWS or NESDIS); SWPC will work with NESDIS to re-baseline this project and move forward.</p> <p>Ongoing – FY12 Q4 Currently working with AFWA to finalize MOU which details backup capabilities for both parties. After that work will begin to implement the backup.</p> <p>Ongoing – FY12 Q4 SWPC has established an agreement with UCAR for local backup and is now exploring options with USGS in Golden, FAA in Longmont, and NWS in Cheyenne for longer range options.</p>
<p style="text-align: center;">Information Systems</p>	<p>Recommendation IS3: As part of the modernization of the SWFO, NWS should investigate incorporating space weather information into AWIPS-II.</p>	<p>IS 3.1 – Develop space weather requirements for AWIPS-II</p> <p>IS 3.2 – Secure Resources - Working with PPBES for FY12 submit</p> <p>IS 3.3 – Develop development partnerships - Working with NCO for resources after the NAWIPS conversion</p> <p>IS 3.4 – Transition Terrestrial based products - Rewrite SWPC terrestrial products to build appropriate data sets (GRIB) formats.</p>	<p>Complete – FY11 Q3 SWPC has delivered its functional requirements to NCO.</p> <p>Ongoing – FY12 SWPC working with new SEE process and NCO to secure resources for this effort.</p> <p>Ongoing – FY12 Q4 – SWPC has hired a new developer to work on our requirements with NCO locally, and has also funded ½ FTE in NCO to kick start our development effort in FY12. Hardware installation is on track for FY12 Q1. FOC will require additional attention from NCO which will start work on this in FY13.</p> <p>Ongoing – FY12 Q4 – Through FY11 efforts, SWPC now has the capability to produce space weather products in GRIB2</p>

		IS 3.5 – Develop requirements beyond current AWIPS2 terrestrial focus - SWx AWIPS2 strategic vision document	formats for AWIPS-II. The transition of our products into GRIB2 will continue in FY12. Complete – FY11 Q3 SWPC has delivered its functional requirements to NCO.
Information Systems	Recommendation IS4: SWPC management, working with NCEP Central Operations, should develop an IT Security Plan that will accommodate the requirements of all components of the Center.	IS 4.1 - Establish SWPC External-Space Weather Data Store (E-SWDS) with requested SWx data. This project is specifically for external customers with an operational need. IS 4.2 - Work on a plan of action and requirements with NGDC to archive all historical data of interest to SWx researchers (non-real time). IS 4.3 - Establish an automatic near-real-time data store for SWx data (real-time replication of SWDS: R-SWDS Project) that can be used for research. IS 4.4 – SWPC continue self monitoring, C&A auditing, and Plan of Action and Milestone mitigation of its IT security system.	Complete – Users now able to access SWx data without entering SWPC operational network space. Complete – SWx archive agreement with NGDC now complete Ongoing – FY12 – SWPC has developed a process by which research quality data are available on the non-operational side of its network, which contains data as needed from the operational side of its network. Longer term solution is constrained by budget and other priorities. Complete/Ongoing – No end
Science and Technology	Recommendation ST2: NOAA should develop a space weather research program internally that is aligned with the SWPC mission. This could be implemented through a partnership between the OAR and SWPC, with a well-defined role for CIRES and a more vigorous effort to entrain university research more broadly. Additionally, a well-trained development staff to ensure successful R2O transition is required. The SWPC should undertake the first steps toward establishing a viable research and development program as follows: <ul style="list-style-type: none"> organize a workshop to develop a long-range plan for numerical space weather prediction, and establish an advisory committee to oversee development and implementation of the long-range plan. 	ST 2.2 - SWPC will determine the future for numerical modeling within the NWS suite of space weather products and services. ST 2.4 – SWPC will organize a workshop to develop a long-range plan for numerical space weather prediction	Ongoing – FY12 Q2 – Enlil on track to be implemented into operations. Selection of the next numerical prediction model to be implemented will be made in FY12. Complete – Rather than hosting a workshop, SWPC has been reaching out via numerous forums. It has established a SWPT Interest Group and continues to seek community participation at various workshops both nationally and internationally. SWPC participates in the development of funding opportunities by other agencies to ensure our numerical space weather modeling needs are addressed.

<p>People and Organizational Culture</p>	<p>Recommendation POC1: Clearly define the roles and responsibilities in the current SWPC organization. This should be done by reviewing employee job descriptions currently being utilized at the Center, assessing their clarity, and evaluating specifics of the objectives, definitions, duties, responsibilities contained in the descriptions. This will be critical for updating the current organization and R2O. As a follow-on, incorporate these updated descriptions into a user-friendly business manual that reflects the current directives and reporting structure of the organization. The manual should also include appropriate skill sets for all positions within the organization, and be aligned with objectives, directives and the overall mission.</p>	<p>POC 1.1 Assess overall SWPC organizational structure and complete a plan for implementation (with NWSEO)</p> <p>POC 1.2 Complete review of existing PDs and performance plans and align to new structure</p> <p>POC 1.3 Provide employees with copies of their pds during their annual performance reviews.</p>	<p>Complete – Minor reorganization completed in FY10 Q4. Personnel and functions were moved across sections and branches to better align with responsibilities. Larger reorganization balancing branches and supervisory workload under consideration.</p> <p>Complete. This action will be repeated every year.</p> <p>Complete. This action will be repeated every year.</p>
<p>People and Organizational Culture</p>	<p>Recommendation POC2: Evaluate the accessibility and continuity of current formal and informal internal communication modes and methods. Communications should reach all employees in a timely fashion with a well-understood prioritization. A standard procedure for employees to routinely ‘check into’ communications should be established in order to ensure relevant notifications, directives and information are received and understood by staff.</p>	<p>POC 2.1 Ensure quarterly All Hands and monthly Branch meetings are conducted</p> <p>POC 2.2 Hold monthly brown bag for employees with senior management</p> <p>POC 2.3 Implement NWSEO Employee Feedback System modeled after AWC</p> <p>POC 2.4 Take advantage of management hiring opportunities to bring in managers that will help foster communication</p>	<p>Complete FY10 Q1 – These meetings have been established and are occurring regularly – In addition, SWPC is using monthly, internal publication (Sol Source) to disseminate information on key happenings and events. Branch Chiefs are presenting the SWPC Annual Operating Plan, as well as progress towards its completion, at their monthly meetings.</p> <p>Complete FY10 Q1 – These meetings are ongoing</p> <p>Complete FY10 Q3 – Feedback system implemented into OnTime® system at SWPC and rolled out during a recent All Hands meeting. The system is easy to use, but so far use has been very light.</p> <p>Complete FY11 Q2 – New branch chiefs for the Space Weather Services Branch and Administration and Technical Support Branch have had a positive impact on communication of news, directives, and ideas from the SWPC office of the director.</p>
<p>People and Organizational Culture</p>	<p>Recommendation POC3: Upon completion of a thorough review of staff roles and responsibilities, the SWPC management team should review the current personnel qualifications and assignments to assess any possible gaps. This process may reveal individual shortfalls that may be filled by providing additional training, direction or detailed guidance to employees tasked with new or different</p>	<p>See POC 1.1, 1.2, 1.3</p> <p>POC 3.1 Incorporate training needs into formal budget process to ensure funds are available to support critical needs</p>	<p>Complete FY10 Q4 – For FY11 all training was given a high priority by SWPC management, despite uncertain budget outlook, and employees were encouraged and directed to take advantage of this.</p>

	responsibilities as a result of the reorganization. This recommendation is an example of one that impacts the others. If the team does not have the proper training or tools, they will not be able to address and correct deficiencies in the organization.	POC 3.2 Take advantage of vacancies to hire new talent into SWPC staff	Complete and Ongoing – Several new hires with the SWPC Forecast Office, Technology Support Branch, and the Development and Transition Section have invigorated the center with highly capably and motivated staff.
People and Organizational Culture	Recommendation POC4: As we near Solar Maximum, the number of forecasters may not be sufficient to provide consistently accurate products and services to the user community. Evaluate the manpower needs for forecaster capability as it relates to increasing future demand for services as Solar Maximum approaches.	POC 4.1 Shift resources within the Center to create two new GS-12 promotion potential SWx forecaster positions.	Complete – FY11 Q3 Positions were reallocated from within SWPC to the forecast office. We are working through the hiring process now to fill the last of these two positions.
People and Organizational Culture	Recommendation POC6: SWPC should reconsider the organizational chart to create more efficient communication and best utilize the staff's capabilities.	See POC 1.1	Complete
Business Processes	Recommendation BP1: Establish a permanent space weather liaison in the Washington, D.C. area. SWPC and NCEP leadership should determine the appropriate location and level for the position to reside.	BP 1.1 Position has been established within OCWWS, hiring action underway.	Complete, Genevieve Fisher has been selected for this position.
Business Processes	Recommendation BP2: Develop comprehensive, robust business models for the SWPT and the R2O function. There are a number of successful organizational arrangements (e.g., the Applied Meteorology Unit at Cape Kennedy, FL) and processes that can be adapted or emulated during development of the business models. A well-trained development staff is required to ensure a successful R2O transition.	BP2.1 – Develop Space Weather Prediction Test Bed CONOPS BP2.2 – Staff SWPT Steering Committee BP2.3 – Enhance skill set of development and transition staff BP2.4 – Develop proposals through the SEE process to accelerate the transition of mature research projects into operations	Complete – FY11 Complete – FY10 – Created an external SWPT Interest Group. Ongoing – SWPC continues to enhance staff by bringing in national and international research partners to help with our ionospheric, geospace, and solar research needs. Positions have been realigned within SWPC to support the hire of 3-GS13 development staff. Ongoing – FY12 – SWPC is working within the NWS Budget process to identify SWPT funding as a critical gap for the FY14 budget process. In the meantime, SWPC will begin to explore the possibility of federal staff on the SWPT team utilizing grants in an attempt to fill critical R&D positions.

Business Processes	Recommendation BP3: The SWPC should define its expectations and requirements for the function currently being performed by CIRES researchers in preparation for the upcoming contractual competition. Possible options include a Memorandum of Understanding/Agreement that spells out the working relationship between the two staffs, which can be developed either as part of the request for proposals or negotiated upon contract award. This would be most helpful to both sides.	BP 3.1 Assess role of SWPC's four CIRES projects and determine the appropriate fit within the Space Weather Program structure.	Complete – Item rescope now that the Space Weather Program no longer exists. SWPC is holding monthly meetings with the CIRES project leads to discuss work efforts and expenditures.
		BP 3.2 Reassign CIRES project to appropriate Space Weather Program organizations.	Complete – SWPC has aligned CIRES efforts into two groups, research and IT. NOAA satellite support and data stewardship has been transitioned to NGDC.
		BP 3.3 SWPC to participate with NOAA/OAR in the CIRES contract recompet.	Complete – FY11 Q2 – new contract to be in place by FY12 Q3

Medium Range (Complete in 1-3 years)			
CATEGORY	RECOMMENDATION	ACTION	STATUS/DUE DATE
Customers and Partners	Recommendation CP2: A formal plan is needed to identify current and new potential customers, and a process should be developed for customer requirements collection, validation, and feedback to ensure the value, usability, and relevance of SWPC products and services.	CP 2.1 - Develop plan for customer identification, requirements solicitation, requirements validation, and periodic evaluation of the efficacy of SWPC's products	Planned FY14 Q4 This work is ongoing, but on a much smaller scale than originally envisioned in the action item. It will be readdressed on a larger scale after Solar Max.
		CP 2.2 - Perform periodic top to bottom inventory of customer requirements and assessment of how well customer needs are being met	Planned FY14 Q4
Science and Technology	Recommendation ST1: Given the need for partnerships between SWPC and the research community, SWPC should establish a scientific partnership with CIRES that is consistent with SWPC's mission, and stronger and formal partnerships with the broader space weather research community for the successful implementation of its plan.	ST 1.1 - Establish a Space Environment Research Capability in OAR. Jointly (NOAA) will develop a five-year strategic plan for Space Weather Research in NOAA	Planned – FY14 Attempts were made to establish a Space Weather Research capability at OAR. The OAR reception of this idea was not favorable. The current NOAA budget priorities make this option even less attractive from SWPC perspective. We have therefore placed this task on hold for the foreseeable future. We have instead established the Space Weather Prediction Testbed (SWPT) within SWPC. The mission of the SWPT is

			to provide the scientific and research needs for space weather operations. In addition to the applied research activities, the SWPT will undertake the initial testing, documentation, and validation of new models, data, and products as they begin their transition from research to operations. The resources for the SWPT currently come from two sources; SWPC base funds provide funding for fed salaries and a few CIRES staff, research grants and contracts from other agencies (NASA, NSF, DOD) fund the remaining CIRES salaries. Current SWPT resources do not provide adequate resources and the personnel needed to test and develop another major physics-based model. Additional funding will be needed.
Science and Technology	<p>Recommendation ST2: NOAA should develop a space weather research program internally that is aligned with the SWPC mission. This could be implemented through a partnership between the OAR and SWPC, with a well-defined role for CIRES and a more vigorous effort to entrain university research more broadly. Additionally, a well-trained development staff to ensure successful R2O transition is required. The SWPC should undertake the first steps toward establishing a viable research and development program as follows:</p> <ul style="list-style-type: none"> organize a workshop to develop a long-range plan for numerical space weather prediction, and establish an advisory committee to oversee development and implementation of the long-range plan. 	<p>ST 2.1 – Develop a plan to establish a Space Weather Research capability within OAR.</p> <p>ST 2.3 - Once the path and plans are in place to establish a NOAA Space Weather Research capability in OAR, an advisory committee will be established to evaluate the SWX research strategic plan.</p>	<p>Planned – FY14 The plan was completed but is now overcome by events. See ST 1.1 above.</p> <p>Planned – FY14 See ST1.1 above.</p>
People and Organizational Culture	<p>Recommendation POC5: Create a small team to evaluate and formulate a structured plan to mitigate the current NOAA HR hiring process, which is impeding SWPC's ability to achieve its mission objectives. It is possible that this team could work closely with other NCEP or NWS teams that are addressing the same issues.</p>	<p>POC5.1 – Work with NCEP, NWS, NOAA leadership to determine better approaches by which SWPC can hire personnel with the right qualifications in a timely manner</p>	<p>Ongoing but no resolution in the short term – SWPC is working with both NCEP and HR and the new hiring process to get qualified candidates into vacant positions as quickly as possible.</p>

Long Range (Complete in 3-5 years)			
CATEGORY	RECOMMENDATION	ACTION	STATUS/DUE DATE

<p>Mission and Vision</p>	<p>Recommendation MV1: Activities related to satellite data acquisition, processing, validation, and verification are not aligned with the NWS mission, but are better aligned with the National Environmental Satellite, Data, and Information Service (NESDIS) mission. The NESDIS already carries out these functions for terrestrial weather activities across the NWS. The panel supports the transfer of the satellite data activities from SWPC to NESDIS, which allows SWPC to focus on space weather prediction.</p>	<p>MV 1.2 – Create at NESDIS the capability to produce all GOES-R space weather products. The GOES-R Program (STG) propose a \$6.5M augmentation to its base funding to support development of the Space Weather ground processing and product generation system as part of the FY12-16 NOAA budget planning process</p>	<p>Ongoing/FY15 GOES-R Program has cut deeply into the ground system budget and eliminated two contract options that would have allowed for an extended product set and higher cadence. Even if the options for Space Weather Level-2 product generation had been funded, SWPC requirements were still above and beyond what was planned in the cancelled options. At this point there is no clear funding path for NESDIS to create these NWS products.</p>
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