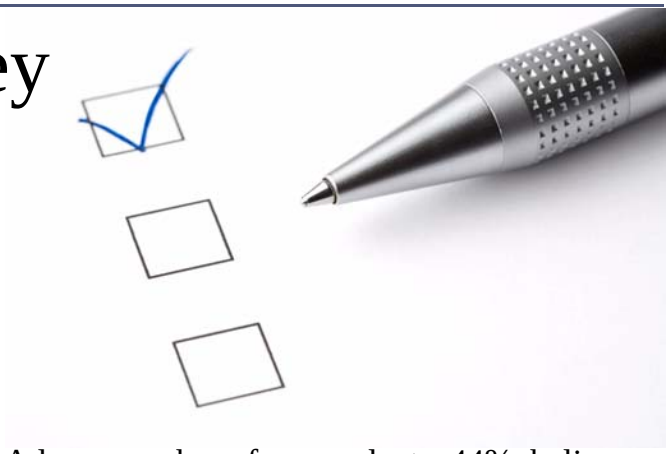
NWS VCP Usage Survey



Forecasters have experienced an increase in the number and type of volume coverage patterns (VCPs) used operationally with the WSR-88D; future enhancements are likely to be associated with additional VCPs. By understanding the methodology and diversity of VCP usage, the ROC is in a better position to manage the inclusion or exclusion of old and new VCPs in future software releases. This prompted a field survey of National Weather Service (NWS) Weather Forecast Office (WFO) Science and Operations Officers (SOOs) and/or WSR-88D Radar Focal Points. The survey contained questions about local Mode Selection Function (MSF) settings, VCP usage, and technical staff opinions.

The ROC received 80 individual survey responses from 70 WFOs, or 57% of the possible number of offices. Five offices provided more than one response.

Questions about the MSF were included because the local settings have an impact on VCP usage. Office settings for the MSF can be in one of four possible configurations (listed below). It was discovered that 60% of offices had set the MSF to perform with complete automation while only using manual control as needed. Eighty percent of respondents said the MSF was 'somewhat helpful' or 'very helpful.' Only 10% of offices maintain a configuration similar to legacy.

The survey revealed that most forecasters select VCPs based upon personal choice. Station guidelines for VCP selection, however, are commonly established as policy during severe weather events. At least 75% of respondents believe there would be no adverse impacts if VCP 21 were removed. Many forecasters commented that VCP 21 was used meteorologically for stratiform rain or snow, scattered insignificant rain, by habit or by virtue of default settings.

A large number of respondents, 44%, believe there are too many VCP choices.

When asked about types of scanning strategy improvements, 62% said either more frequent low elevation scans or faster VCPs were most important.

Mode Section Function

A few survey questions were about the MSF and user satisfaction. Since each office has the capability to set the MSF in four different ways, the ROC wanted to examine 'how' each office tailored settings.

The MSF was added to replace the obsolete Precipitation Detection Function (PDF). The MSF provides operator control over automated or manual VCP switching. Specifically, from a Radar Product Generator (RPG) graphical user interface, office staff can select either automated or manual control for both Clear Air mode control and Precipitation mode. When the radar automatically switches mode, a locally chosen default VCP for that mode is used. When a manual setting is chosen, the operator has control of operating the radar in that mode.

Actions of the four possible MSF settings are:

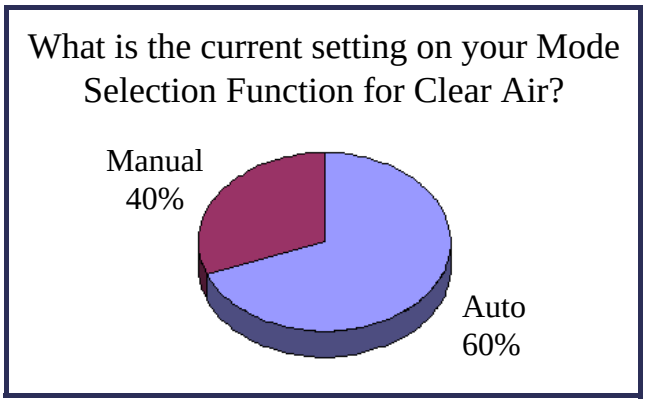
Manual-Manual. If Clear Air switching is set to Manual and Precipitation switching is set to Manual, regardless of radar detection, the current VCP will remain in manual control until a long timeout period (8 to 48 hours) if a conflict is detected. For ANY change of VCP to occur, operators must download or change VCPs.

Continued on Page 14

VCP Usage

Continued from Page 13

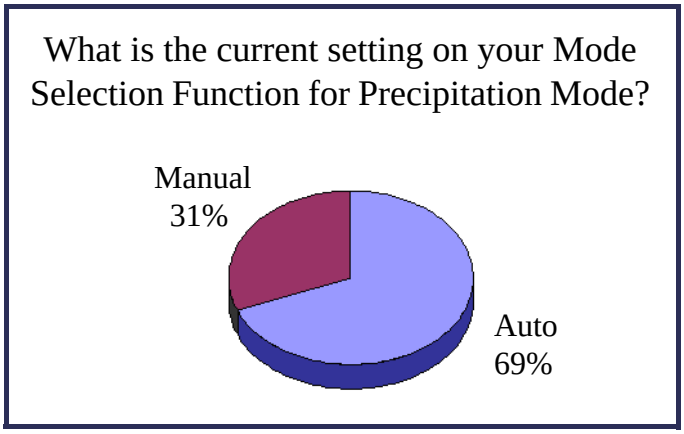
Auto-Manual. If Clear Air switching is set to Auto and Precipitation switching is set to Manual, the radar cannot automatically switch to the default precipitation VCP, but the radar will automatically switch to the default Clear Air VCP after clear air is detected and after a time delay specified as an adaptable parameter with a value from 20 to 60 minutes (default is 60). Operators can manually download or change to a precipitation VCP at any time.



Manual-Auto. If Clear Air switching is set to Manual and Precipitation switching is set to Auto, the radar cannot automatically switch to the default Clear Air VCP. This combination of radio button settings is similar to legacy RPG software; the difference is that no wait time is required to manually switch to a Clear Air VCP. The radar will automatically switch to the default precipitation VCP on the next volume when precipitation is detected. Operators can manually download or change to a clear air VCP at any time.

Auto-Auto. If Clear Air switching is set to Auto and Precipitation switching is set to Auto, the radar will switch to either default VCP after a change in mode is detected. The switch to Clear Air VCP after clear air is detected requires a time delay specified by the operator (20 to 60 minutes).

In the survey, the ROC wished to examine proportions of various MSF settings. The survey revealed that 60% of respondents said the MSF for Clear Air mode was configured to 'automatic.' Additionally, 69% of offices indicated the MSF for Precipitation mode was set to 'automatic.' The combination of MSF settings, as shown in the action of MSF settings above, was 29% in Manual-Manual, 1% in Auto-Manual, 10% in Manual-Auto and 60% in Auto-Auto. Notably, before the MSF had been deployed, the radar behaved identically to the Manual-Auto setting. In other words, forecasters appear to have collectively and purposely migrated away from this configuration.



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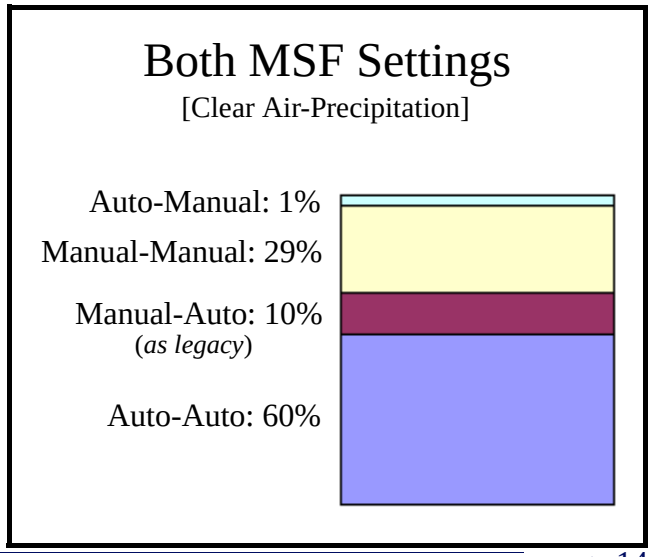


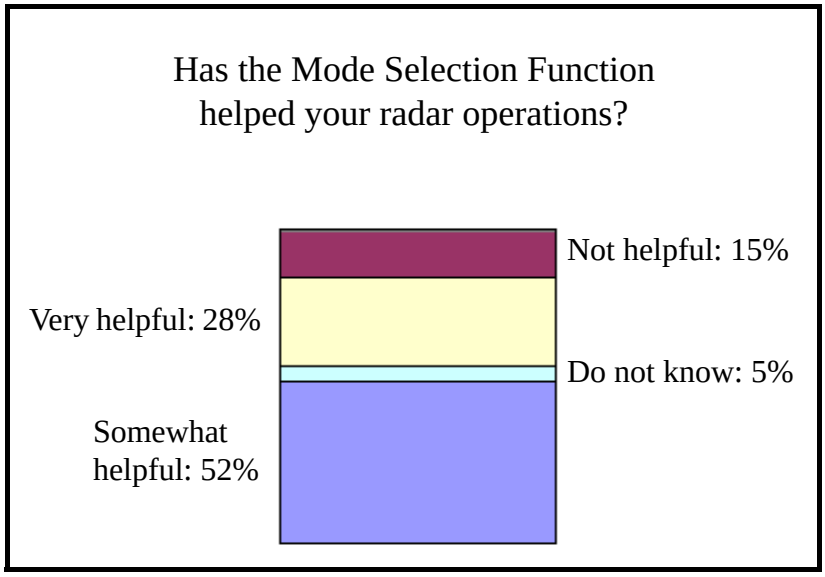
VCP Usage

Continued from Page 14

Volume Coverage Pattern Usage

The options of how forecasters selected VCPs were 'Other', 'Station Guidelines' and 'Personal Choice.' If 'Other' was selected, explanatory comments were requested. Several choosing 'Other' stated that VCP selection during severe weather was guided by station policy; otherwise, VCP selection was a personal choice.

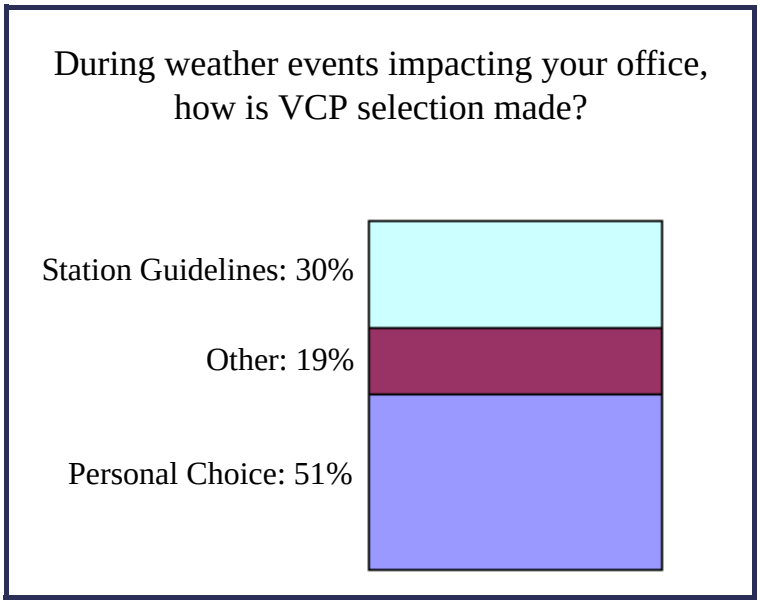
Other comments regarding VCP selection included using the Quick Reference VCP Comparison Table, using Warning Decision Training Branch (WDTB) Software Build training materials, using FMH-11, and relying on senior forecaster guidance.



VCP selection in the NWS appears to be chiefly determined by duty forecaster decisions. Over half of the responses indicated VCP selection is made by personal choice.

When asked 'Would there be adverse impact(s) at your office if VCP 21 were removed from your radar?' 75% responded 'No;' 10% had no opinion. A small percentage of forecasters, 15%, said there would be an adverse impact at their office if VCP 21 were removed. Among those voicing concern about removal of VCP 21, most forecasters were concerned about increased wear and tear on the antenna pedestal components.

Questions were included in the survey specifically to satisfy an Software Recommendation and Evaluation Committee (SREC) action item. A Federal Aviation Administration (FAA) briefing requested justification for keeping VCP 21, and possibly VCP 11, since new and improved VCPs have been provided. We wanted to investigate meteorological purposes for retaining VCP 21. One survey question asked, 'What prompts your office to switch to VCP 21?' Many forecasters replied that stratiform rain or snow, scattered insignificant rain, or habits were the primary reasons for using VCP 21.

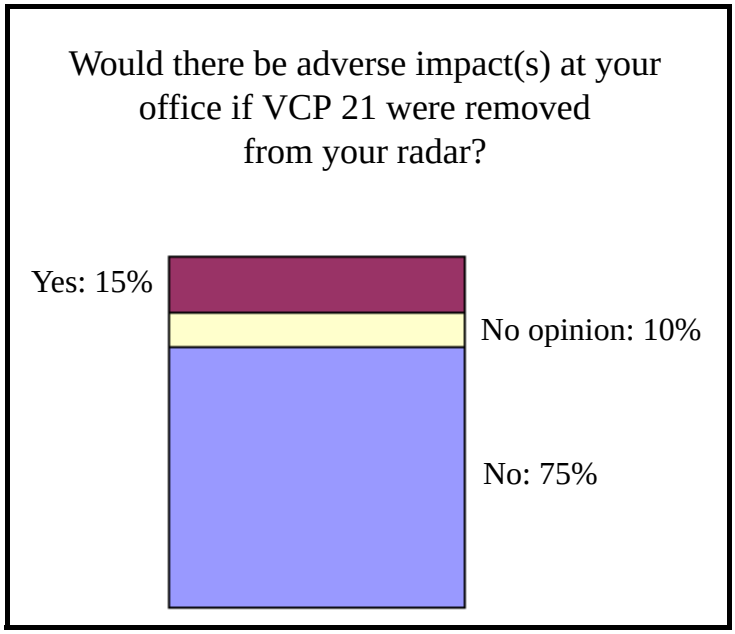


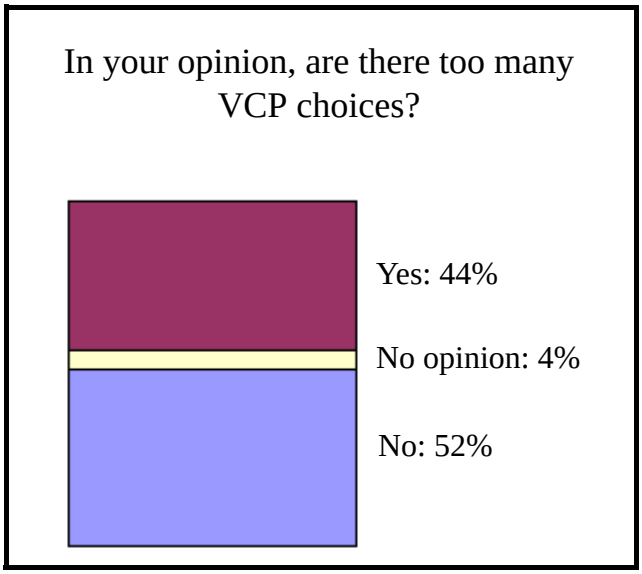
The suite of operational VCPs has grown from four to nine possible selections. The

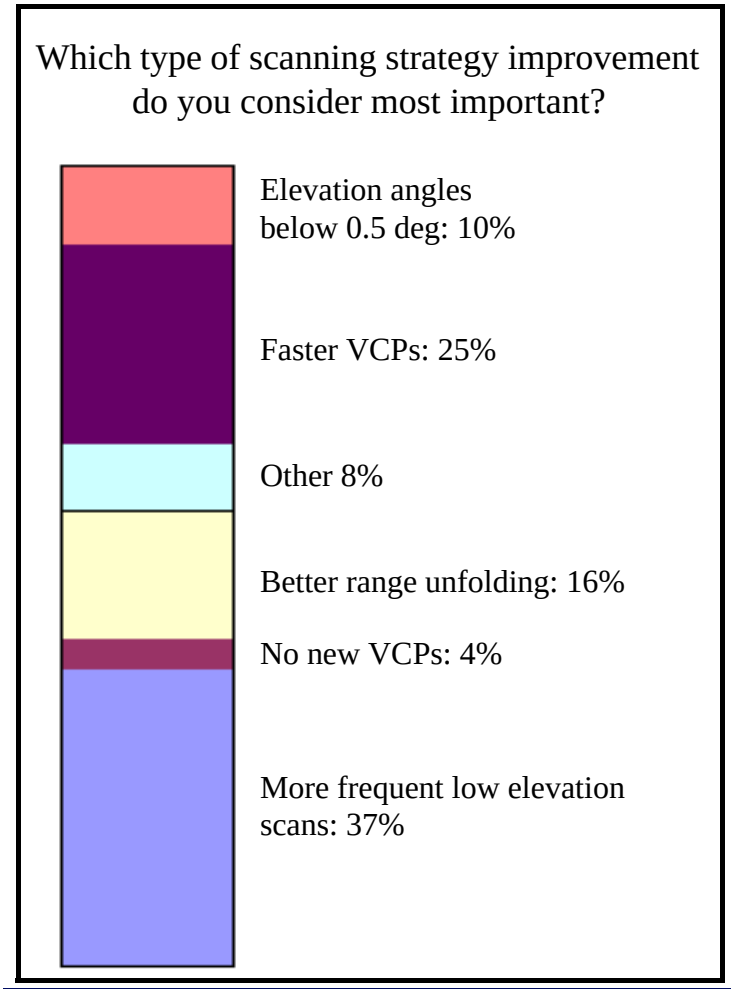
Continued on Page 16

VCP Usage

Continued from Page 15







survey showed that 44% of respondents believe there are too many VCP choices. The ROC surmised that this large number may be due to the difficulty of VCP selection as applied to a specific meteorological situation.

Thirty-seven percent of respondents believe the most important scanning strategy improvement would be more frequent low elevation scans. If this response were combined with the similar response of Faster VCPs, 62% of respondents appear to want faster low-level product updates. Some WFOs are faced with radar beam overshoot problems as reflected by 10% of respondents wanting or needing elevation angles below 0.5 degree. A small percentage (4%) of forecasters does not want new VCPs. Among those choosing 'Other,' most mentioned combinations of improvements such as more frequent low elevation scans with better range unfolding.

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