



National Weather Service

Terminal Doppler Weather Radar (TDWR) Supplemental Product Generator (SPG)

September 3, 2020



System Information

- The SPG is a Supplemental Product Generator System developed to convert the FAA Terminal Doppler Weather Radar (TDWR) Products into Weather products for the local WFO.
- The TDWR data can be used by Weather Forecasters to provide more information on Severe Weather events.



System Information

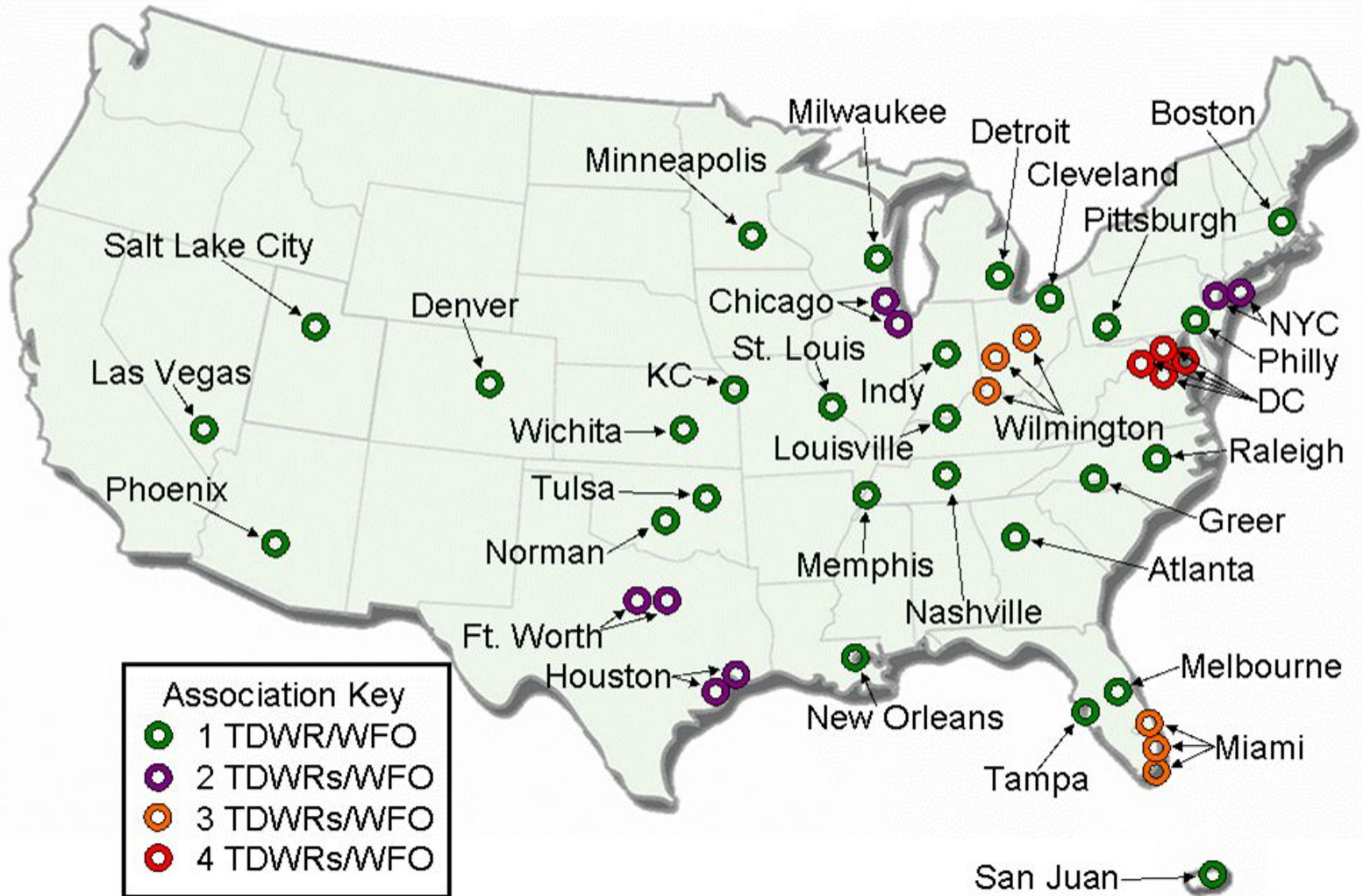
- Terminal Doppler Weather Radars (TDWR) are FAA C band radars located near 45 major airports.
- These radars are connected to 34 NWS Weather Forecast Offices (WFOs) near the TDWRs. Some WFOs have multiple TDWR connections.
- TDWRs are designed for wind shear, gust fronts and turbulent weather near the airport.



System Information

- Some of the differences between TDWR and NEXRAD systems are:
 - TDWR has clearer display resolution
 - TDWR has more attenuation: C band (5.8 – 6.2 GHz) vs. NEXRAD S band (2.7 – 3.0 GHz)
 - TDWR has no NWS operator control. FAA controls the TDWR.
 - TDWR has less coverage area - Short range (90 km) and Long range (460 km)

TDWR Locations





System Information

- SPG's HCI is very similar to RPG's HCI with fewer interface buttons.
- TDWR broadcasts in UDP.
- Uses two VCPs: 90 (Monitor) and 80 (Hazardous). Both are 6 minute VCPs.
- Hazardous mode uses two mini-volume scans. Lowest elevation scan is updated once a minute.
- Elevation angles are site specific



System Information

- TDWR Weather Products are sent to the National Level II servers and to the local AWIPS Display System through the One NWSNet WAN.
- SPG uses Red Hat 7.0 Linux as the current Operating System. The SPG Software is CPCI-86
- SPG System is configuration managed by the ROC. The SPG Hardware is UD55.

SPG HCI



SPG Control/Status

SPG Build 10.0: Wednesday January 22, 2020 15:35:05 UT

State: **OPERATE**

Oper: **ONLINE**

0.5

VCP L90/A

Volume 25 (Seq: 185) Start: Jan 22,2020 15:34:26 UT

State: **OPERATE**

Oper: **ONLINE**

TDWR TOK2

R
V
W

SPG

Control

Products

Status

USERS

Comms

Console Messages

Environmental Data

Miscellaneous

Precip Status: **NO ACCUM**

VAD Update: **ON**

Model Update: **ON**

Load Shed: **NORMAL**

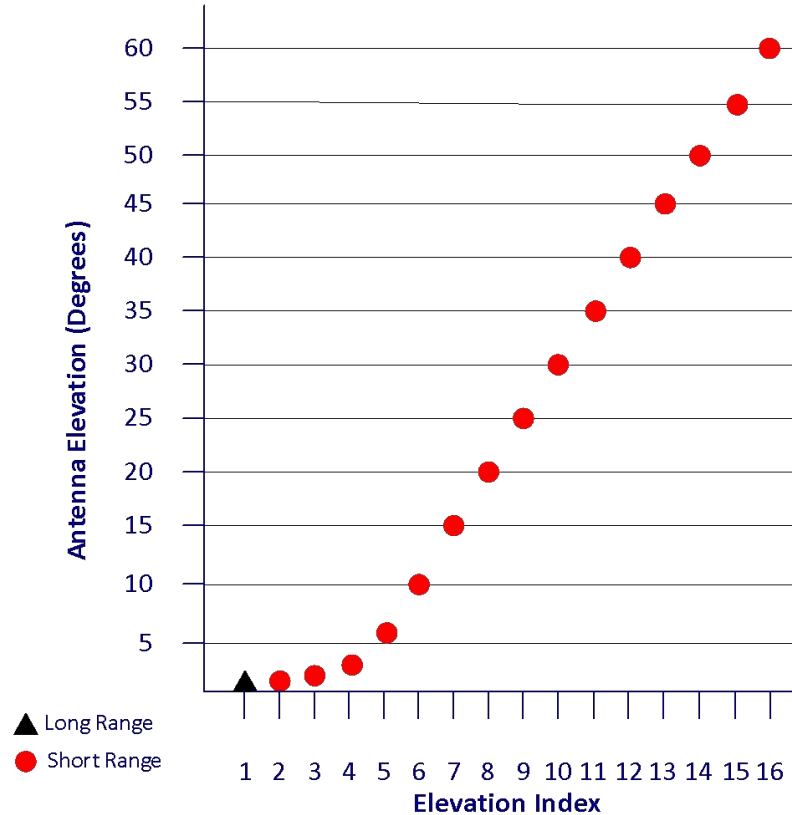
Feedback: Jan 22,20 [15:20:10] >> Sending Console Message

Status: Jan 22,20 [15:34:28] >> Vol: 25 (Seq: 185) TDWR Clock:01/22/20 15:34:26 VCP: 90

Alarms:

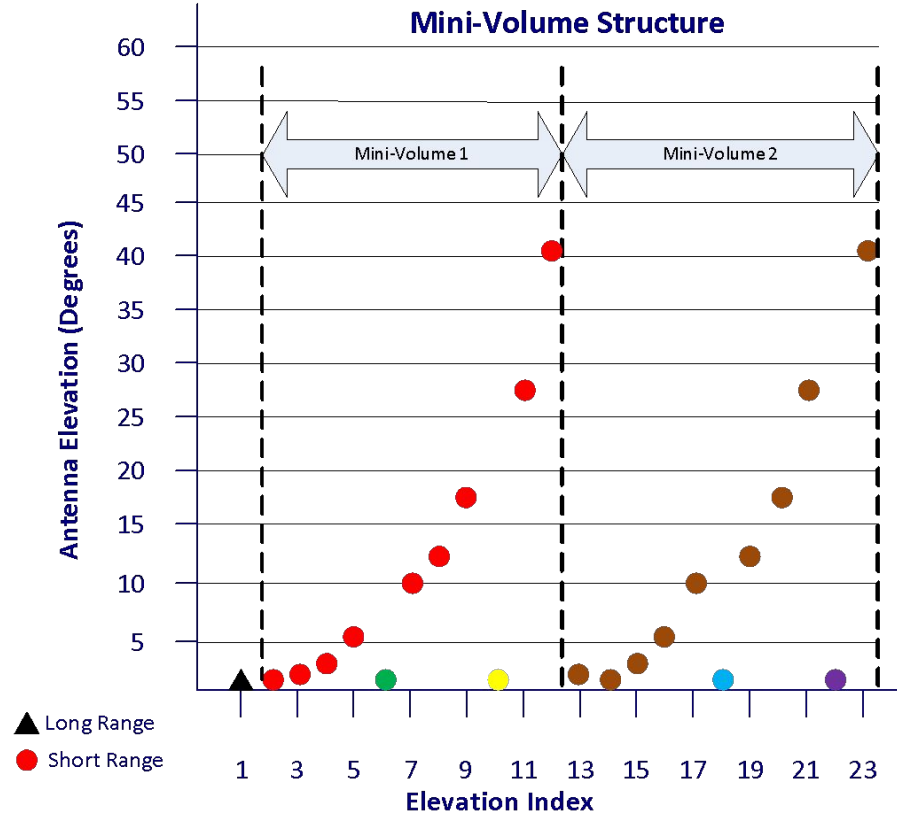
TDWR VCP 90 (Monitor)

Monitor Mode Scan Strategy at BWI TDWR



TDWR VCP 80 (Hazardous)

Hazardous Mode Scan Strategy at BWI TDWR
Mini-Volume Structure



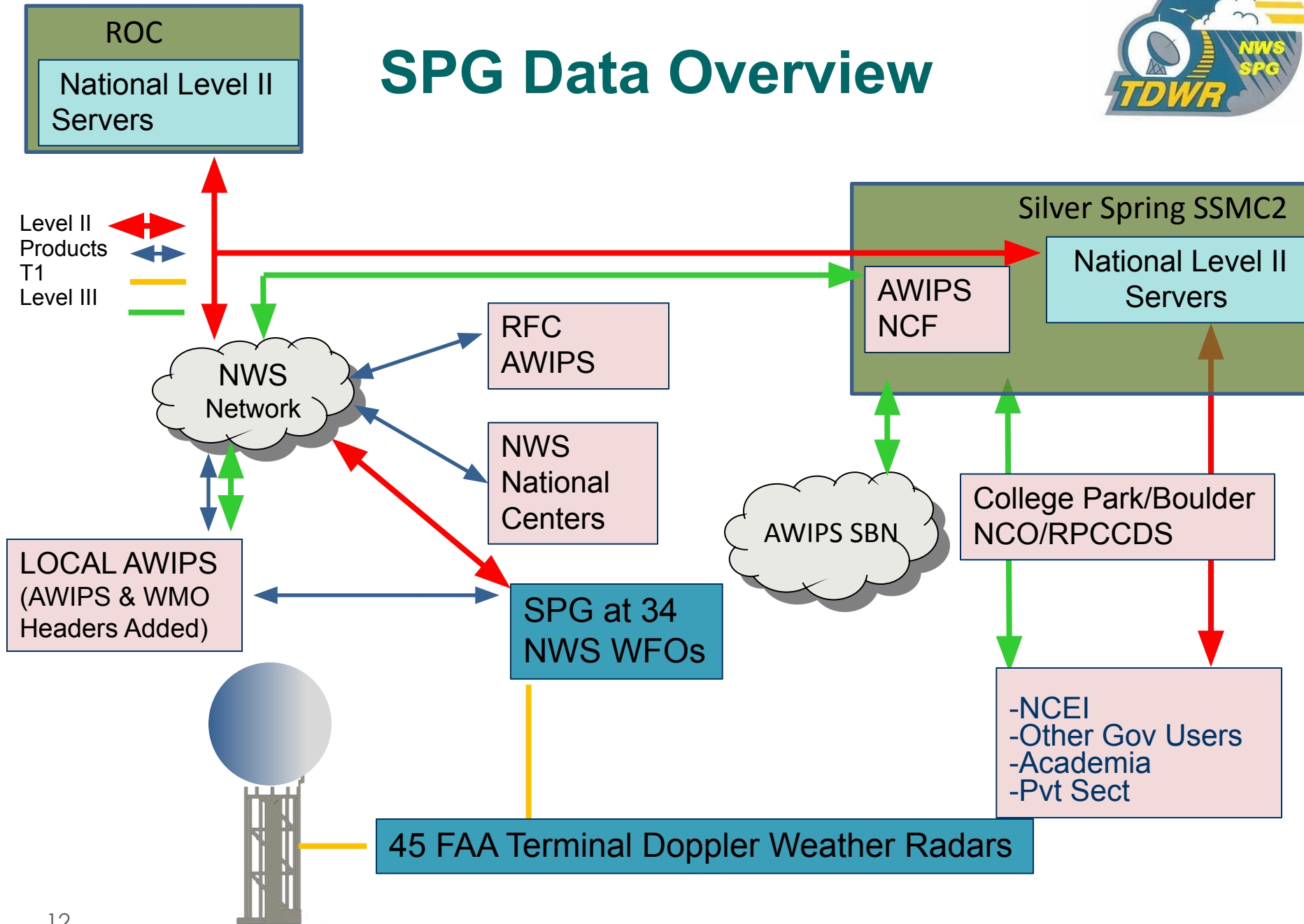


TELCO Information

- T1 connection is a Private Leased T1 circuit
- B8ZS coding
- The NWS TELCO Channel Service Units (CSUs) are installed at the TDWR and WFO locations for bridging the signal from Ethernet to T1.
- FAA uses UDP format. ROC is developing a UDP to TCP converter to help improve data transmission reliability.



SPG Data Overview



SPG Data Path

- 45 FAA TDWR radars generate Level II & Level III
- ROC maintains & supports T1 circuits transporting the data from 45 FAA TDWRs to SPG servers at 34 NWS WFOs
- SPG Level III products are sent via local WFO AWIPS to the AWIPS NCF (Silver Spring SSMC2) and then to the Radar Product Central Collection Dissemination Service (RPCCCDS), NCEP College Park, MD
- Level III is a subset of the products that a local AWIPS obtains from the SPG with an AWIPS & WMO header added.
- SPG Level II is transmitted on the One NWSNet Enterprise VRF as 'NEXRAD2' data" and not via AWIPS.
- SPG Level II is sent to NL2 collection and distribution servers located in Silver Spring, VA and the ROC, in Norman, OK.

SPG Hardware

- WFO has the following NWS components:
 - 1 Rack Unit (RU) Processor (Site specific)
 - KVM switch for operator interface with the processor.
 - RICI-T1 Unit to bridge the incoming T1 signal to Ethernet.
 - Power Distribution Unit (PDU)
 - SPG KVM Extender equipment to allow WFO Operations floor personnel non-local access to the SPG KVM switch.

SPG Hardware

- TDWR has the following NWS components:
 - RICI-T1 Unit to bridge the outgoing T1 signal to Ethernet.
 - Power Distribution Unit (PDU)



TDWR Strengths

- Reduces the “Cone of silence” – Another radar in the WFO’s vicinity
- More lower volume coverage scans during severe weather (VCP 80). Lowest elevation is scanned every minute.
- Higher resolution



TDWR Limitations

- Higher attenuation can lead to misleading data
- Missing radials
- TELCO problems with LAN equipment at the TDWR
- Limited access to the TDWR shelter



System Information

- System Name: Terminal Doppler Weather Radar (TDWR) Supplemental Product Generator (SPG)
- System Number: NOAA8212
- Type of System: General Support System
- System Description:
 - Fully deployed at 34 WFOs with 45 TDWRs (e.g. Silver Spring has 4 SPGs)
 - Produces data from all 45 FAA TDWRS and provides additional Doppler weather radar data with low altitude updates
 - Data used only by local weather forecast offices to add to the overall confidence of data observed with primary NWS systems and to compliment other NWS radar and sensor information



Questions and Comments