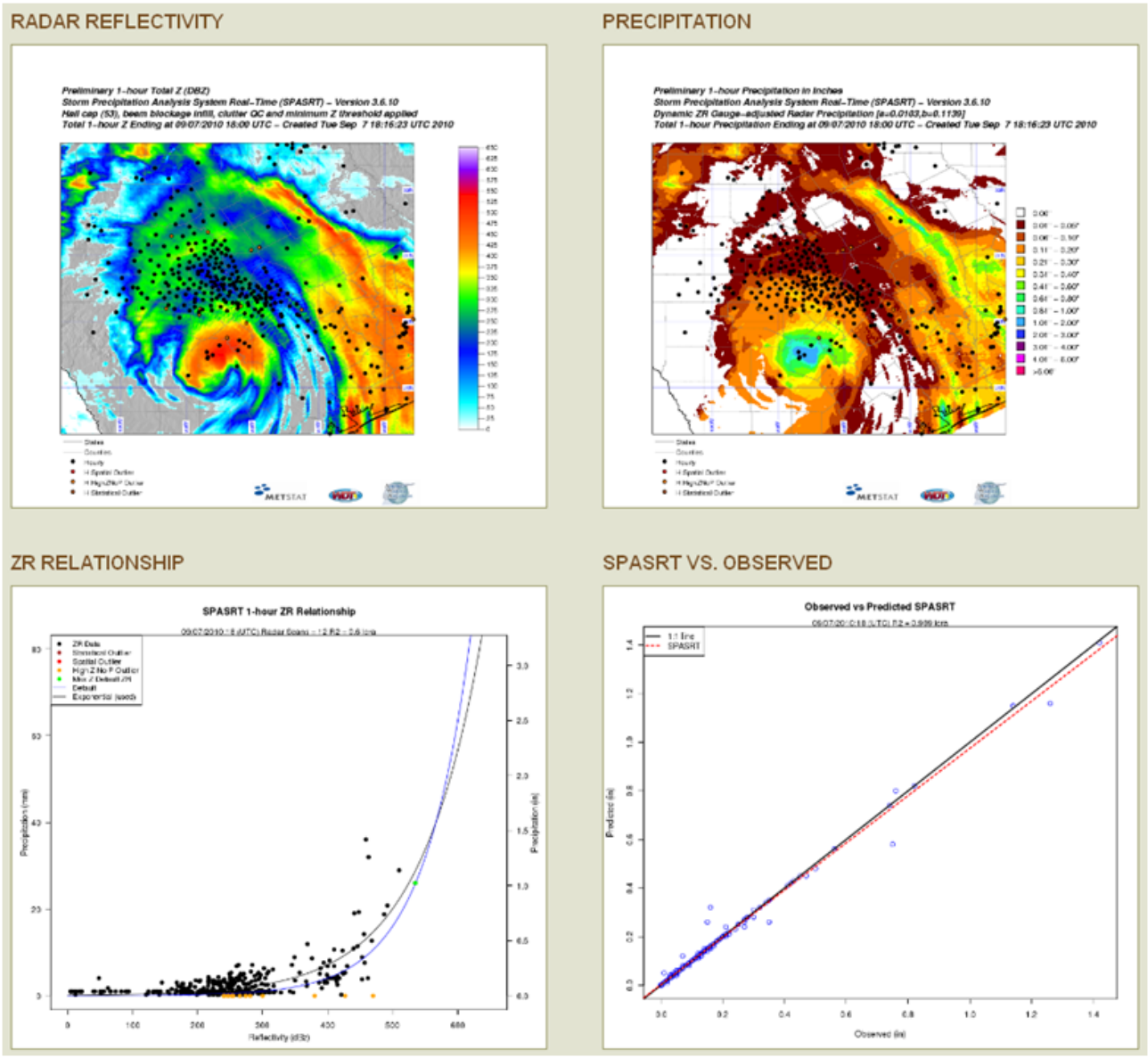
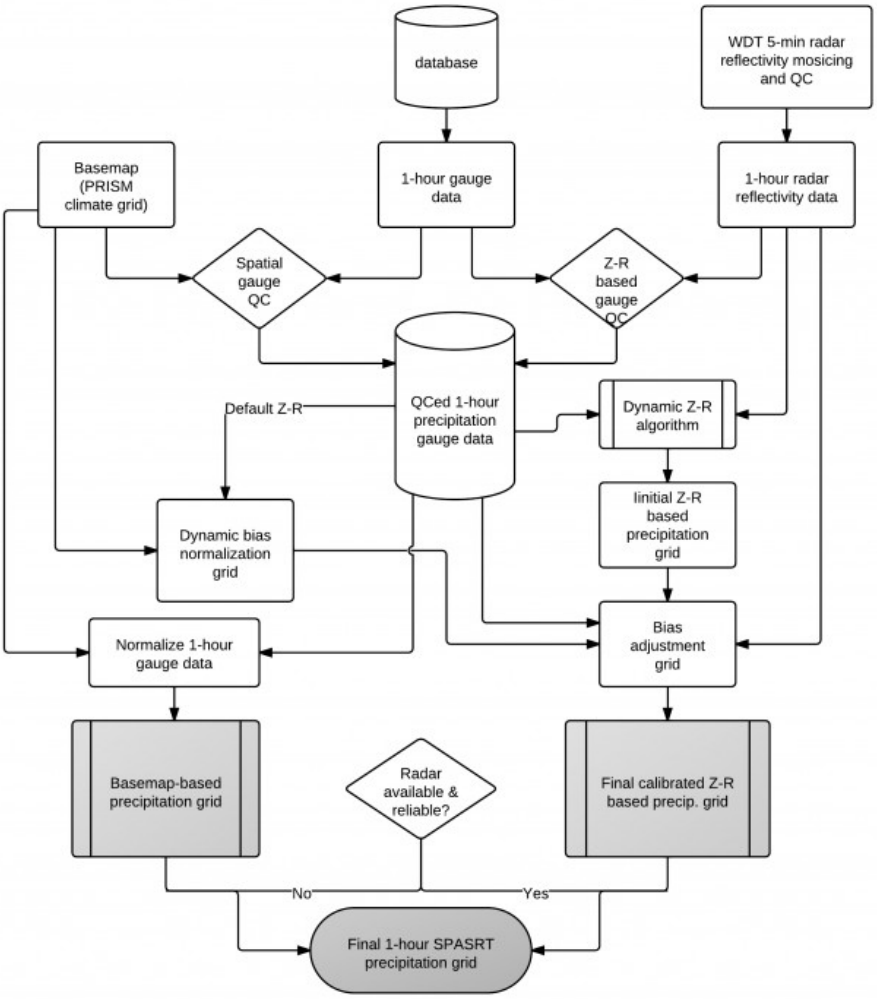
The Storm Precipitation Analysis System in Real-Time (SPASRT)

The Storm Precipitation Analysis System in real-time (SPASRT) is the industry's best gauge-adjusted and radar-calibrated rainfall system. Utilizing sophisticated quality control algorithms, SPAS utilizes real-time rain gauge observations, the industry's highest resolution NEXRAD radar data from Weather Decision Technologies (WDT) and a climatological "basemap" approach to produce gridded rainfall across any terrain every 5-minutes. SPAS is the only gauge-adjusted rainfall system that provides rainfall data across complex terrain and other areas suffering from radar blockage.



SPASRT monitoring interface.

SPASRT uses new techniques to calibrate the radar-rainfall relationship and account for biases in order to address shortcomings associated with radar and gauge data. The overarching goal is to develop real-time, gridded precipitation fields across all terrain types as well as extreme precipitation events. Improvements in the reliability of the radar based precipitation estimation used in SPASRT are made possible by calibrating the radar data each hour with rain gauge observations. SPASRT-computed precipitation provides seamless, reliable hourly and sub-hourly estimates over a region and/or individual watershed with spatial scales down to approximately 1-square km and temporal scales as frequent as 5-minutes. The high spatial and temporal resolution of SPASRT precipitation data allows for accurate determination of precipitation volumes over basins and sub-basins for improved runoff model calibration. Furthermore, the increased spatial and temporal accuracy of the precipitation analyses has eliminated the need for commonly made assumptions in hydrologic modelling about precipitation characteristics (such as uniform precipitation over a watershed), thereby greatly improving the precision and reliability of hydrologic analyses. The SPASRT analytical model is presented in the flowchart below.



SPASRT Flowchart.

Comparison between the National Weather Service (NWS) Real-Time Quantitative Precipitation Estimates (QPE) product and SPASRT precipitation grids.

Feature	NWS QPE	SPASRT Precip.
An operational tool with 99.99% uptime		
Gauge-adjusted radar-estimated rainfall based on daily & hourly rain gauge data		
Available for the continental United States		
Available every hour*		
Available in a variety of formats		
Very high (1km) spatial resolution	4 km **	
Latency 2-3 minutes***	50 minutes	
Rainfall estimates across/in mountainous terrain and other radar-blocked areas	Only available once a day for 24-hr period	
Uses sophisticated quality control algorithms to validate rain gauge data in real-time	Manually evaluated	
Computes and applies dynamic radar-rainfall relationship (ZR) in real-time		
Gauge-adjusted/calibrated rainfall grid **every 5-minutes**		
Completely customizable for your needs		

* Only every 6-hours for western U.S.
** Non gauge-corrected NWS QPE at 1km is available.
*** SPASRT latency based on 5-minute SPASRT rainfall grids. Latency of SPASRT 1-hour rainfall grids is ~20 minutes.

Techniques have been developed in SPAS/SPASRT to incorporate NEXRAD radar data together with observed rainfall gauge data, to compute accurate hourly and sub-hourly spatially distributed rainfall. Unlike any other radar-based precipitation product, SPAS achieves improved accuracy by calibrating quality controlled NEXRAD radar data with rain gauge observations each hour. Additionally, local bias adjustments to the radar-estimated precipitation are uniquely computed and spatially interpolated to ensure consistency between observed gauge data and corresponding grid pixels. The SPAS computed precipitation provides accurate and reliable hourly (or sub-hourly) precipitation over a region and/or individual watersheds with spatial scales down to approximately one third of a square mile and temporal scales as frequent as 5-minute. The high spatial and temporal resolution of the SPAS rainfall data allows for accurate determination of rainfall volumes over basins and sub-basins for runoff model calibration thereby greatly improving the precision, accuracy and reliability of hydrologic analyses.