adverse effects of hazards associated with launch processing and flight of a launch vehicle. The launch operator must identify all safety critical preflight operations in the launch schedule required by § 417.17(b)(1). Safety critical preflight operations must include those defined in this section.

(b) *Countdown.* A launch operator must implement its countdown plan, of § 417.111(l), for each launch. A launch operator must disseminate a countdown plan to all personnel responsible for the countdown and flight of a launch vehicle, and each person must follow that plan.

(c) *Collision avoidance.* A launch operator must coordinate with United States Strategic Command to obtain a collision avoidance analysis, also referred to as a conjunction on launch assessment, as required by § 417.231. A launch operator must implement flight commit criteria as required by § 417.113(b) to ensure that each launch meets all the criteria of § 417.107(e).

(d) *Meteorological data.* A launch operator must conduct operations and coordinate with weather organizations, as needed, to obtain accurate meteorological data to support the flight safety analysis required by subpart C of this part and to ensure compliance with the flight commit criteria required by § 417.113.

(e) *Local notification.* A launch operator must implement its local agreements and public coordination plan of § 417.111(i).

(f) *Hazard area surveillance.* A launch operator must implement its hazard area surveillance and clearance plan, of § 417.111(j), to meet the public safety criteria of § 417.107(b) for each launch.

(g) *Flight safety system preflight tests.* A launch operator must conduct preflight tests of any flight safety system as required by section E417.41 of appendix E of this part.

(h) *Launch vehicle tracking data verification.* For each launch, a launch operator must implement written procedures for verifying the accuracy of any launch vehicle tracking data provided. For a launch vehicle flown with a flight safety system, any source of tracking data must satisfy the requirements of § 417.307(b).

(i) *Unguided suborbital rocket preflight operations.* For the launch of an unguided suborbital rocket, in addition to meeting the other requirements of this section, a launch operator must perform the preflight wind weighting and other preflight safety operations required by §§ 417.125, 417.233, and appendix C of this part.

§ 417.123 Computing systems and software.

(a) A launch operator must document a system safety process that identifies the hazards and assesses the risks to public health and safety and the safety of property related to computing systems and software.

(b) A launch operator must identify all safety-critical functions associated with its computing systems and software. Safety-critical computing system and software functions must include the following:

(1) Software used to control or monitor safety-critical systems.

(2) Software that transmits safety-critical data, including time-critical data and data about hazardous conditions.

(3) Software used for fault detection in safety-critical computer hardware or software.

(4) Software that responds to the detection of a safety-critical fault.

(5) Software used in a flight safety system.

(6) Processor-interrupt software associated with previously designated safety-critical computer system functions.

(7) Software that computes safety-critical data.

(8) Software that accesses safety-critical data.

(9) Software used for wind weighting.

(c) A launch operator must conduct computing system and software hazard analyses for the integrated system.

(d) A launch operator must develop and implement computing system and software validation and verification plans.

(e) A launch operator must develop and implement software development plans, including descriptions of the following:

(1) Coding standards used;

(2) Configuration control;

(3) Programmable logic controllers;

(4) Policy on use of any commercial-off-the-shelf software; and

(5) Policy on software reuse.

§ 417.125 Launch of an unguided suborbital launch vehicle.

(a) *Applicability*. This section applies only to a launch operator conducting a launch of an unguided suborbital launch vehicle.

(b) *Need for flight safety system*. A launch operator must launch an unguided suborbital launch vehicle with a flight safety system in accordance with § 417.107 (a) and subpart D of this part unless one of the following exceptions applies:

(1) The unguided suborbital launch vehicle, including any component or payload, does not have sufficient energy to reach any populated area in any direction from the launch point; or

(2) A launch operator demonstrates through the licensing process that the launch will be conducted using a wind weighting safety system that meets the requirements of paragraph (c) of this section.

(c) *Wind weighting safety system*. A launch operator's wind weighting safety system must consist of equipment, procedures, analysis and personnel functions used to determine the launcher elevation and azimuth settings that correct for the windcocking and wind drift that an unguided suborbital launch vehicle will experience during flight due to wind effects. The launch of an unguided suborbital launch vehicle that uses a wind weighting safety system must meet the following requirements:

(1) The unguided suborbital launch vehicle must not contain a guidance or directional control system.

(2) The launcher azimuth and elevation settings must be wind weighted to correct for the effects of wind conditions at the time of flight to provide a safe impact location. A launch operator must conduct the launch in accordance with the wind weighting analysis requirements and methods of § 417.233 and appendix C of this part.

(3) A launch operator must use a launcher elevation angle setting that ensures the rocket will not fly uprange. A launch operator must set the launch-er elevation angle in accordance with the following:

(i) The nominal launcher elevation angle must not exceed 85°. The wind corrected launcher elevation setting must not exceed 86°.

(ii) For an unproven unguided suborbital launch vehicle, the nominal launcher elevation angle must not exceed 80°. The wind corrected launcher elevation setting must not exceed 84°. A proven unguided suborbital launch vehicle is one that has demonstrated, by two or more launches, that flight performance errors are within all the three-sigma dispersion parameters modeled in the wind weighting safety system.

(d) *Public risk criteria*. A launch operator must conduct the launch of an unguided suborbital launch vehicle in accordance with the public risk criteria of § 417.107(b). The risk to the public determined prior to the day of flight must satisfy the public risk criteria for the area defined by the range of nominal launch azimuths. A launch operator must not initiate flight until a launch operator has verified that the wind drifted impacts of all planned impacts and their five-sigma dispersion areas satisfy the public risk criteria after wind weighting on the day of flight.

(e) *Stability*. An unguided suborbital launch vehicle, in all configurations, must be stable in flexible body to 1.5 calibers and rigid body to 2.0 calibers throughout each stage of powered flight. A caliber, for a rocket configuration, is defined as the distance between the center of pressure and the center of gravity divided by the largest frontal diameter of the rocket configuration.

(f) *Tracking*. A launch operator must track the flight of an unguided suborbital launch vehicle. The tracking system must provide data to determine the actual impact locations of all stages and components, to verify the effectiveness of a launch operator's wind weighting safety system, and to obtain rocket performance data for comparison with the preflight performance predictions.

(g) *Post-launch review*. A launch operator must ensure that the post-launch report required by § 417.25 includes: