

**DOCTRINE ANNEX 3-51, *ELECTROMAGNETIC WARFARE AND  
ELECTROMAGNETIC SPECTRUM OPERATIONS*  
SUMMARY OF CHANGES**

**Summary of Key Changes: 30 July 2019 – Formal Revision**

- ★ Original Annex 3-51, *Electronic Warfare*, completely rewritten with the aid of a summit of experts from across the Air Force on electromagnetic spectrum (EMS) operations (EMSO) and electromagnetic warfare (EW).
- ★ “Electronic” changed to “electromagnetic” throughout the pub, except in cases of existing document titles that have not yet changed.
  - ★ ★ “Electromagnetic” is more accurate: “electronic” refers primarily to electronic circuits associated with radios and radars; “electromagnetic” encompasses all EMS radiation, including that broadcast through the air and space, as well as parts of the spectrum not used in common electronics, like infrared and microwave applications.
  - ★ ★ Joint doctrine currently in draft coordination also changes “electronic” to “electromagnetic,” for the reason stated above, so this change to Air Force doctrine anticipates and supports joint doctrine, and eventually aligns our doctrine with joint.
- ★ EW structure rewritten to describe EW as a subset and specialized form of EMS operations, essentially combining and consolidating information in equivalent joint publications (JPs) 3-13.1, *Electronic Warfare*, and 6-01, *Joint Electromagnetic Spectrum Management Operations*.
- ★ This also brings Air Force doctrine proactively into alignment with joint doctrine, with JP X-XX, *Joint Electromagnetic Spectrum Operations*, being written, which incorporates JP 3-13.1.
- ★ Includes enhanced information on EW in space and cyberspace, with additional material discussing the integration of EMSO across all domains, including air, land, and maritime.
- ★ Adds significant new material on organizing, planning for, executing, and assessing EMSO – material that has never been included in Air Force doctrine before.
- ★ Hyperlinks to appropriate primary source documents added or updated as appropriate. Terminology and abbreviations also updated throughout.