

ELINT Overview

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Objective

understanding of electronic intelligence (ELINT)
components/functions

Learning Outcomes

At the end of the lesson, you should be able to

- describe Information Warfare (IW), its relation to Electronic Warfare (EW)
- describe Electronic Warfare (EW) components
- discuss EW components and their relationships
- describe functions of ELINT, COMINT and SIGINT

Presentation Plan

- Information Warfare (IW)-Electronic Warfare(EW)
- Functions/Components of EW
- COMINT, ELINT, SIGINT
- ELINT History

Information Warfare (IW) and EW [Adamy]

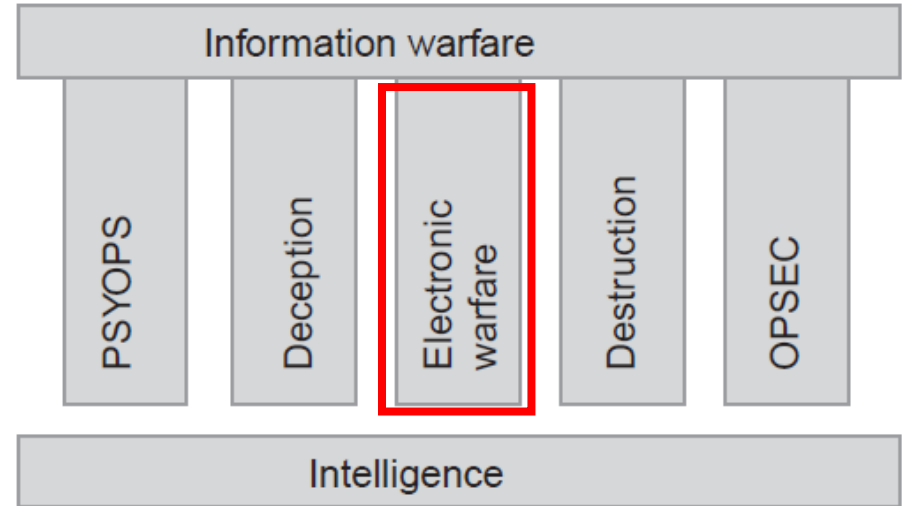
- *actions taken to preserve the integrity of one's own information system from exploitation, corruption, or disruption,*

while at the same time

- *exploiting, corrupting, or destroying an adversary's information system,*

as well as

- *the process of achieving an information advantage in the application of forces*

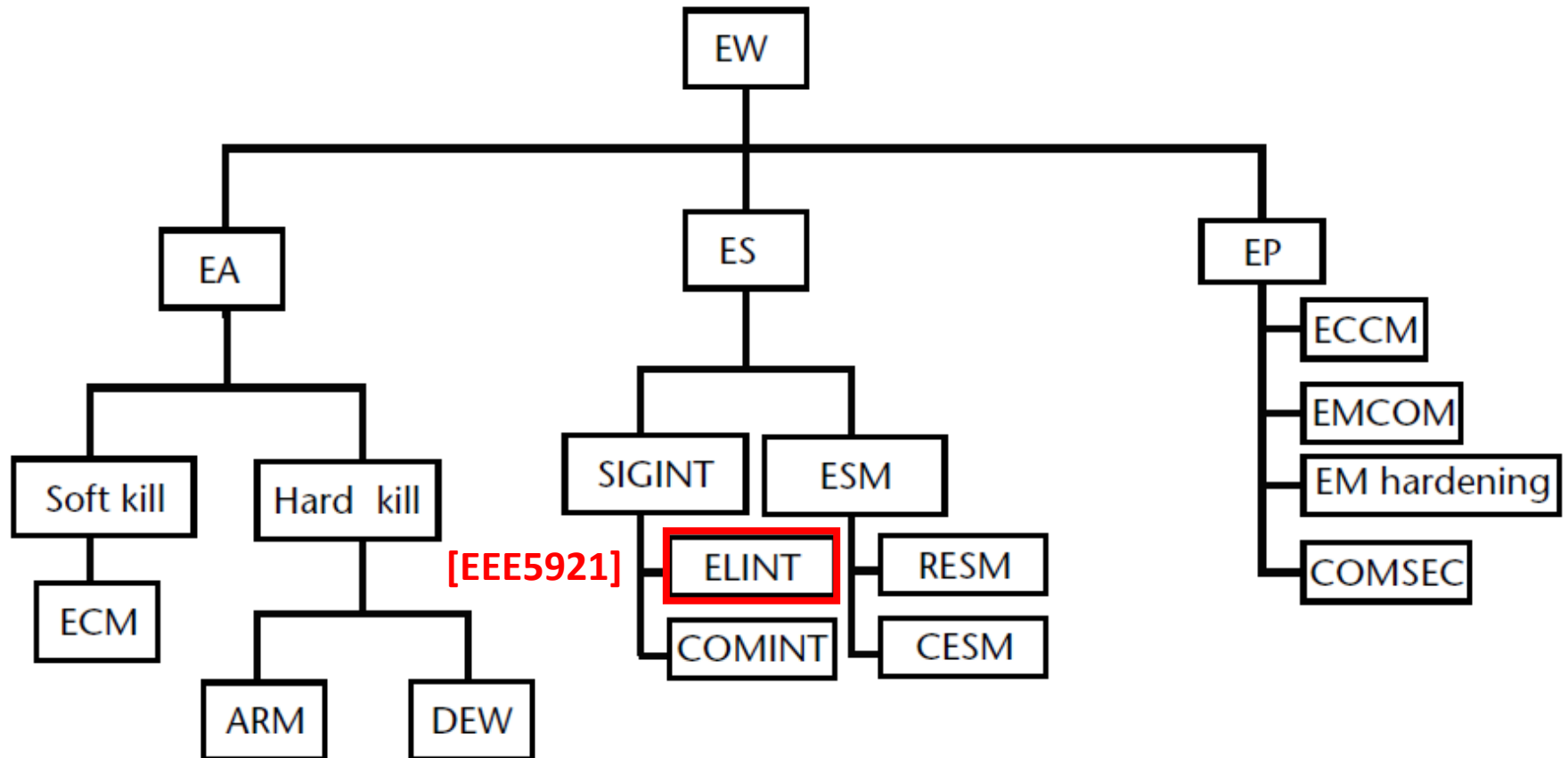


Pillars of Information Warfare (IW)

- **EW**-> integral part of IW (action part) **[EEE5931]**
- psychological operations (PSYOPS)
- deception
- physical destruction
- operational security (OPSEC)

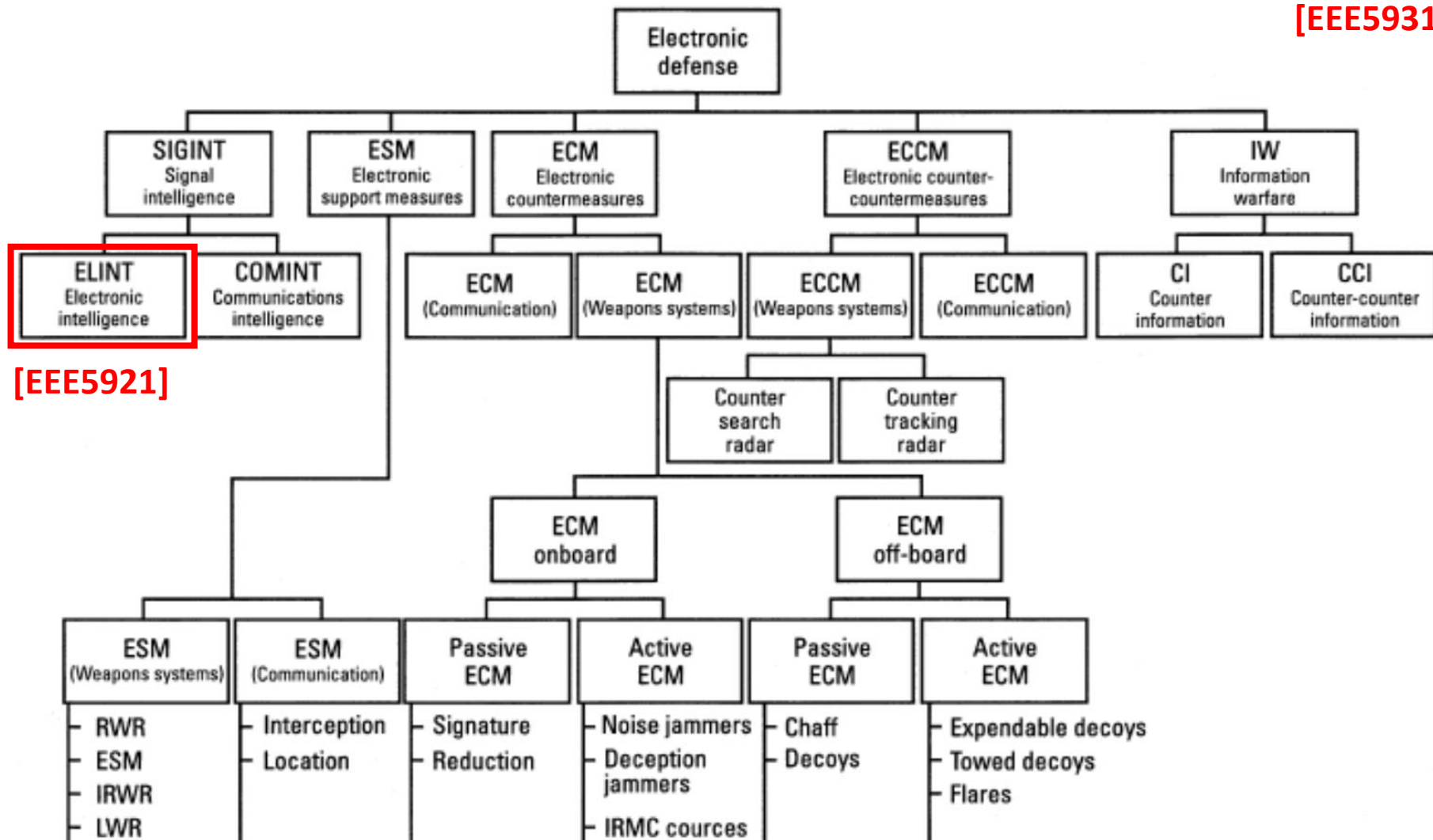
Electronic Warfare (EW) Functions [Martino]

[EEE5931]



Electronic Defense [Neri]

[EEE5931]



[EEE5921]

SIGINT/ELINT/COMINT [EEE5931]

Communications Intelligence(COMINT)

- intercepting and analysis of communication emissions
- identification of communications networks

Electronic Intelligence(ELINT) [EEE5921]

- intercepting and analysis of emissions from electronic equipments(emitter) such as radars, sonars, lasers etc.
- identify type of emission systems, electronic parameters, configurations

Signal Intelligence(SIGINT)

- Acquisition of data about EM emissions of potential enemy, knowledge of enemy electronic systems (warfare and communications)
- Specification (or exploring) of capabilities of weapon systems
- The strategy the enemy will use in the employment of weapon systems
Example: SAM and AAA sites, location-capability
- ELINT and COMINT -> SIGINT
- ESM, ELINT, COMINT-> receiving enemy transmissions (**emitter**)!

SAM: surface to air missile

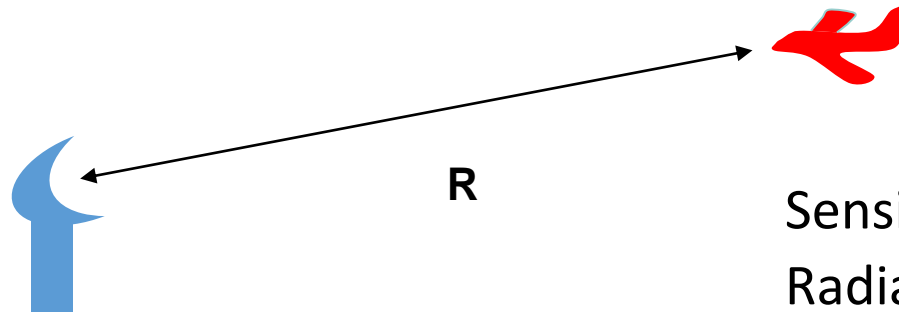
AAA: Anti-aircraft artillery

ELINT

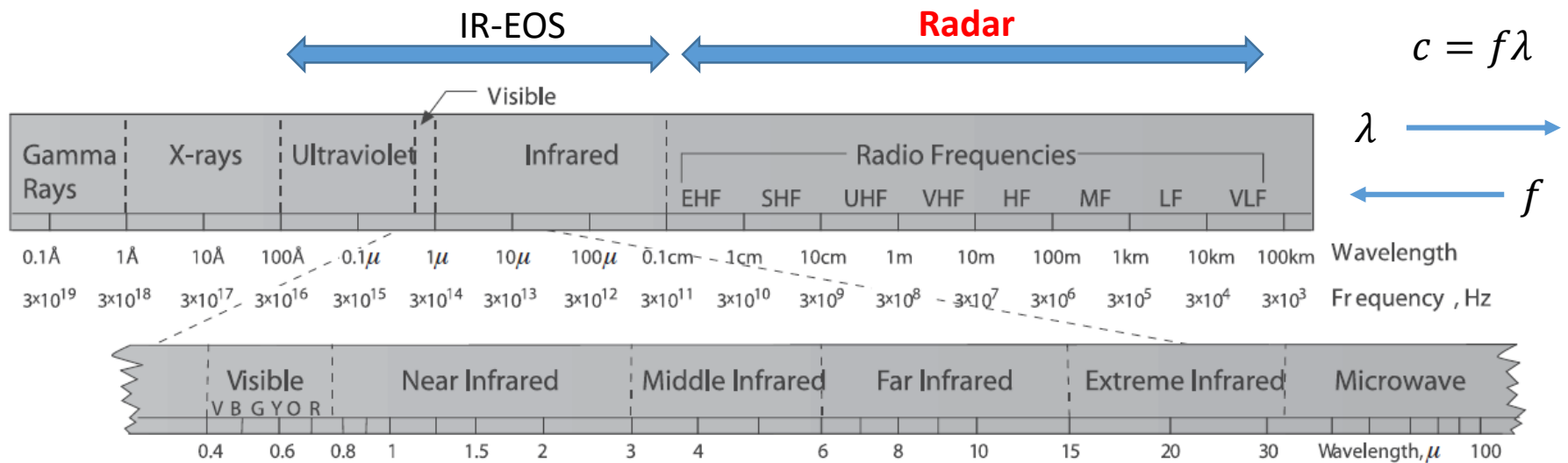
- refers to the information gained from the interception of signals of interest [R.G.Wiley]
 - beacons and transponders, jammers, missile guidance, some data links, altimeters, navigation emissions, and identification friend or foe (IFF)
 - nearly any noncommunications emission [**emitters**]

This course mainly targets **radars**, the most dominant non-communication transmitter (**emitter**)

Sensors (emitting energy->emitter)



Sensing system (radar, laser, sonar etc.)
Radiation of energy (RF, light or sound)



ELINT History [Wiley]

In early 1942, the RAF Coastal Command used L-band radar as an aid for locating German U-boats recharging batteries on the surface. The overall effectiveness of the RAF in this task was quite good until the U-boats began using L-band search receivers. These receivers allowed the submarine to hear transmitted radar signals at a range greater than that over which the radar echo could effectively be returned. The U-boat therefore had time to dive before actually being sighted by the searching aircraft. In turn, general effectiveness of the RAF antisubmarine effort decreased. The Allies, realizing what had happened, installed new S-band search radars aboard their aircraft during early 1943. As a result of the effectiveness of new equipment the intercept rate rose sharply. German submarines sitting on the surface, listening to L-band search receivers, became vulnerable targets for S-band radar directed aircraft.

ELINT History [Wiley]

As the U-boat sinkings increased, the Germans tried frantically to determine the method of detection the Allies were using. Since reports from surviving submarines stated that no radiation had been heard in their L-band search receivers prior to the attack, it was thought that perhaps an infrared detection device of some type was being employed. Considerable effort was spent in an attempt to combat a non-existing infrared threat. U-boat activity was greatly reduced by the time the German High Command realized that new S-band radar was in use.

This is an example of weapon (L-band radar), a countermeasure (L-band search receiver), and an improvement (S-band radar) providing a clear margin of technical supremacy.

“If you don’t know the exact details of the electronic threat and fail to prepare effective countermeasures in advance, you will be shot down or sunk.” [5]

- [5] Stone, N. L., “Soviet Perceptions: The Soviets on Electronic Countermeasures for Surface Ships,” *Defense Science and Electronics*, March 1983, p. 59.

ELINT and COMINT

“In ELINT, it is not the message that is of interest as it is in communications intelligence (COMINT); rather, it is the type of signal, the location of its transmitter, and the timing of the transmissions relative to other events which may be taking place.” [Wiley]