

## **NIAG Study Sub-Group 107: DEW in the Defence Environment**

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### **INTRODUCTION:**

The original objective of the study was to consider DEW in the context of ground based and air launched defensive and offensive operations (LTCR MF-07-1); Air Capability Groups 2 and 3 (Effective Engagement and Survivability respectively) are the sponsors for this activity. However, at the NIAG Exploratory meeting there were concerns regarding the scope, sensitivity and the release of national information to support the programme as requested. It was recommended therefore that the study should be reviewed and conducted in two phases:

- I. Phase 1 to consider the overall scope of the programme and key issues, as well as recommendations for more detailed work.
- II. Phase 2 will be a more focused activity on an area of more specific interest to NATO.

This new approach was supported by the sponsor.

### **BACKGROUND:**

DEW represents a real and current threat, particularly in terms of technology availability and advances are occurring in power generation and management, antennae technology, beam control, pointing and tracking techniques and in the 'weaponisation' of potential threats. The target sets are also broad affecting both military and civil systems, yet although there are a number of national DEW programmes underway, there appears to be limited available target system vulnerability data. Furthermore, it was recognised that because of its disruptive nature, we also need to be able to accurately assess the survivability of our own systems against DEW attack. For the purpose of the study we considered lasers and High Power Electromagnetic Pulse systems, which included: HPM, Damped Sinusoid and UWB.

### **THE ACTIVITY:**

The Working Group (WG) considered DEW in the context of an effects based approach ranging from transitory to permanent effects, with the potential for scalability from system denial to destruction. [Temporary effects to mission / functional kill to destruction].

The Working Group (WG) initially adopted a broad approach by considering some scenarios where DEW is likely to have an impact. These were:

- I. DEW in an offensive role which addressed its suitability as a counter Improvised Explosive Device technology.
- II. DEW as a point defence system utilising a laser dazzle capability.
- III. The protection of NATO assets such as deployed C2 and CIS systems to DEW attack.

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Against these scenarios we considered the desired effects a potential adversary (with access to DEW technology) would achieve from acquisition through to employment.

It also considered generalities associated with DEW such as technology maturity, target types, standards etc., and an appraisal was made of current and future DEW capabilities. We also considered a number of important issues relating to DEW including subject sensitivity, measures of effectiveness and interoperability considerations. Although important we felt that issues relating to ethical, convention, treaty, media and presentational matters were outside the scope of this activity. It was agreed that the outcome would be a recommendation for a programme of work leading to NATO wide capability, rather than a follow on study.

Both national security sensitivities and export control regulations limited the sharing of information, but these limitations appeared to differ from country to country.

### **CONCLUSIONS:**

The Working Group recognised that DEW represents a potential threat to current and future NATO operations and that the threat is poorly defined. There is a risk that capability exists outside NATO and it is proliferating; it is also likely to be used by people not abiding by our protocols and conventions. Elements of the NATO infrastructure may be particularly vulnerable to DEW attack at the strategic, operational and tactical levels, and it also has an impact across the entire OODA loop (Observe, Orientate, Decide and Act). DEW will also have an impact on operational issues such as planning, situational awareness etc.

As systems become more networked and reliant on Commercial Off The Shelf (COTS), there will be an increased vulnerability of deployed, networked systems to High Power Electromagnetic Pulse attack. Sensors, communications information systems, command & control and interfaces are particularly vulnerable to such an attack.

Despite the need to protect our systems NATO standards and STANAGS are not in place therefore NATO deployed equipment is not proven to be survivable against this threat.

The Working Party recognised that the threat requires a clearer understanding; the main elements of the threat comprise: Red on Blue, Asymmetric and Blue on Blue. There are nations who are actively developing High Power Electromagnetic Pulse systems and from open literature we recognise that the asymmetric threat has been very openly discussed with some designs for low technology sources provided. Furthermore, we will need to protect our own systems.

DEW technologies can be utilised to provide ground based and air launched defensive and offensive capability however, the Working Group believed that DEW systems will not be procured by NATO as they will be provided by the nations.

### **RECOMMENDATIONS AND FURTHER WORK:**

NATO should be influential in starting a dialogue at an appropriate classification level to enable a better understanding of the potential threat caused by DEW.

NATO should consider the military utility of DEW across the spectrum of conflict, which will require the National systems to support NATO operations.

NATO should develop appropriate standards for protecting systems against the DEW threat; this will include the establishment of a NATO common DEW threat assessment policy and impact on NATO capability (this will require national contribution inputs). It should also consider both military and commercial systems in support of a common NATO wide solution, which is vital to meet requirements for interoperability.

Furthermore, it was recommended that Phase 2 of this NIAG study should be to develop the outline of a specification for a NATO test bed / facility to:

- i. Certifying the survivability of NATO Infrastructure against the DEW threat.
- ii. Ensuring the interoperability of DEW systems declared to NATO in operations.
- iii. Support the training of the NATO user community to recognise and deal with a DEW attack.
- iv. Provide an input to NATO Standards and STANAG development
- v. It will be part of a three phased approach: consideration (SG 107 Phase 1), specification (SG 107 Phase 2) and implementation through the procurement and integration of National test facilities.

The facility should focus on systems currently (or most likely to be) supporting deployed operations such as sensors, C2, CIS and networks, and it was agreed, that in the interests of time and priority, to only consider High Power Electromagnetic Pulse (HPM, DS and UWB).

A third phase of this NIAG study has now been approved, which will consider what DEW capability is likely to be currently available and being planned at the national level, to support NATO operations. The study, which will be completed by the end of 2008, will address how both laser and High Power Electromagnetic Pulse systems have the potential to overcome mission shortfalls, particularly in support of Force Protection.

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