



- **Starting in 2004** ,upon request of the assistant Secretary General for Defense Investment Marshall Billingsley and of the three Armament Groups, the NIAG started a series of **10 studies** dedicated to various **DAT (Defense Against Terrorism)** topics.
- The very first of those, with the highest priority, was the **SG 85 "Countering IED "**. The study was classified (Restricted), was led by Spain, the lead nation at NATO for that theme, and involved 6 Nations (Spain, Czech Rep., France, Germany, Italy and USA) with many industries participating.
- The final Report was delivered to the Sponsor (LG/9 of the NAAG) in **Dec. 2006** and was very well received with a significant distribution across NATO. It is, of course, available in the NIAG website with the appropriate level of access credentials.
- The scope of the study was an **analysis of the technologies available** at the time for detection, prevention of explosion, capability to provoke explosion when desired and the identification of sources of dangerous materials and of the associated bomb making facilities and terrorist units.
- **Five different Scenarios were used**, as suggested and discussed with the Sponsor, which participated actively with his Quick Reaction Team. For each Scenario the relative "capability gaps" were identified together with the most promising technology, with emphasis on the ones available.

Ground Penetrating Radar for close-in detection

Similarities and differences between C-IED and humanitarian demining

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OVERVIEW

- ▶ **GPR array technology** for close-in detection of buried explosive devices first appeared in the late 90's
- ▶ This technology **never found its practical way** into the field of **humanitarian demining** but developed into **products for route clearance C-IED**
- ▶ This is mainly due to:
 - ✔ the **differences in the amount of investments** available
 - ✔ **significant technical differences** between the two scenarios



KEY TECHNICAL DIFFERENCES

- ▶ Humanitarian demining is a carefully planned activity conducted by civilians and for release of land for permanent civilian use
- ▶ Humanitarian demining is often conducted on agricultural field where threats might have been laid for years (“static scenario”)



- ▶ Route clearance has to be done at speed by mounted soldiers in a hostile scenario
- ▶ Route clearance C-IED explores roads or tracks where threats are in most cases recently-buried IED (highly “dynamic scenario”)

PRACTICAL EXAMPLE: GPR ARRAY

- ▶ Requirements in terms of detection capabilities:
 - ✓ Humanitarian demining needs **higher penetration depth** and **to detect smaller objects with higher Probability of Detection** than one for C-IED
 - ✓ **IED are in general bigger and shallower** than anti-Personnel mines but a **very low false alarm** rate is of **utmost importance**



- ▶ In poster session we present a densely sampled **GPR array** being **developed by IDS** along with some tests results in a controlled site, satisfactory with respect to humanitarian demining requirements
- ▶ Although this array has been **primarily designed** to meet **humanitarian demining** requirements, the **design principles can be adapted also for route clearance**