

TDW Gesellschaft für verteidigungs-
technische Wirksysteme mbH

Requirements for WH Scalable Effect Fuzing

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Hans-Dieter Ackermann

57th NDIA Fuze Conference
29th – 31th July at Newark

Who is TDW

Why and What is an Scalable Output Weapon

Fuze Functions within an Scalable Weapon

New requirements on safety, reliability and functional control

New STANAG 4187 definitions not in place

Proposal for closing the Requirement Gap

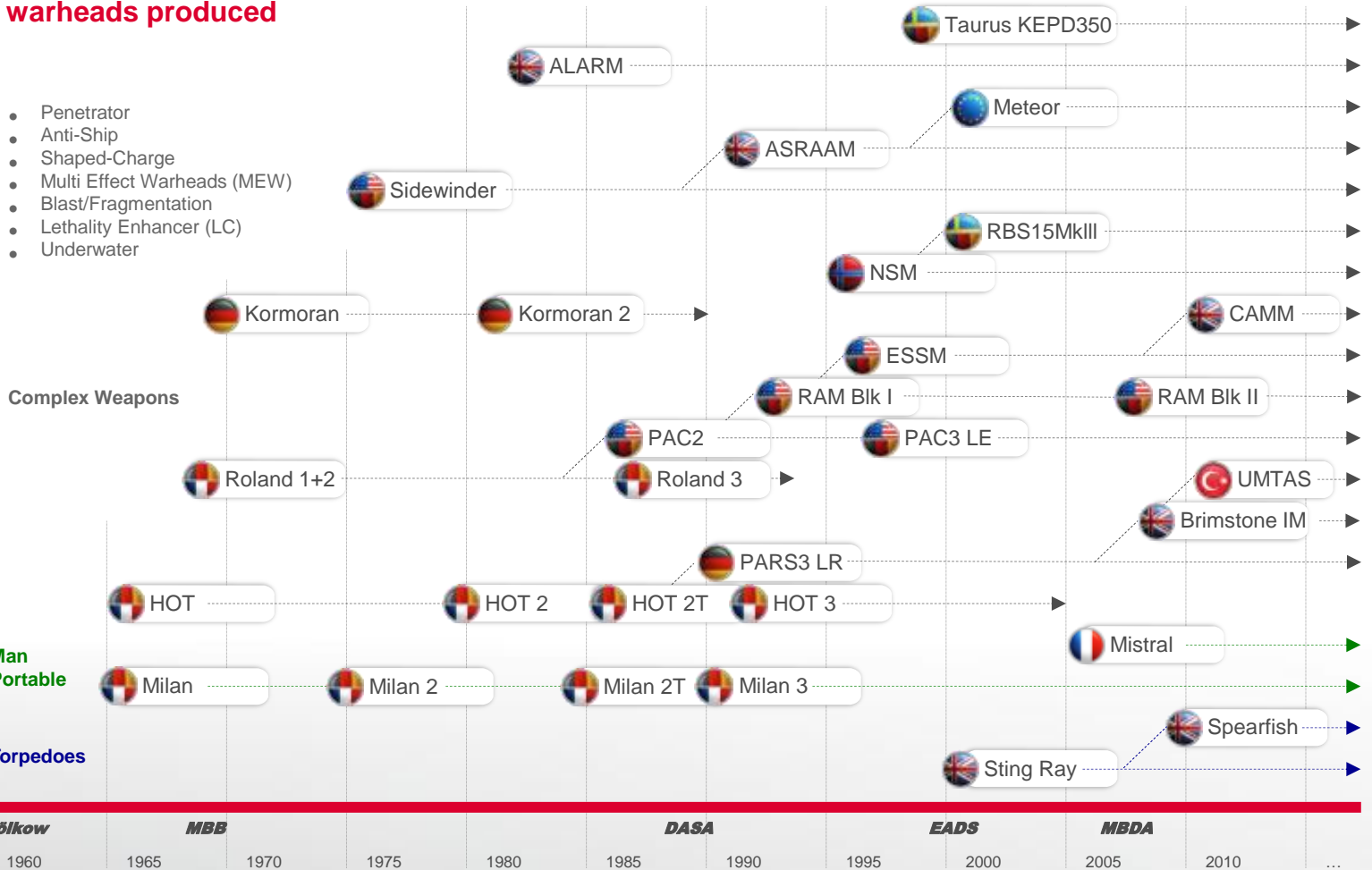
Germany
Schrobenhausen

Employees: ca. 130
Sales 2013: ca. 40 m€



... More than 2 millions warheads produced

- Penetrator
- Anti-Ship
- Shaped-Charge
- Multi Effect Warheads (MEW)
- Blast/Fragmentation
- Lethality Enhancer (LC)
- Underwater



Why and What is an Scaltable Output Weapon

Differernt Targets require Different Output Power



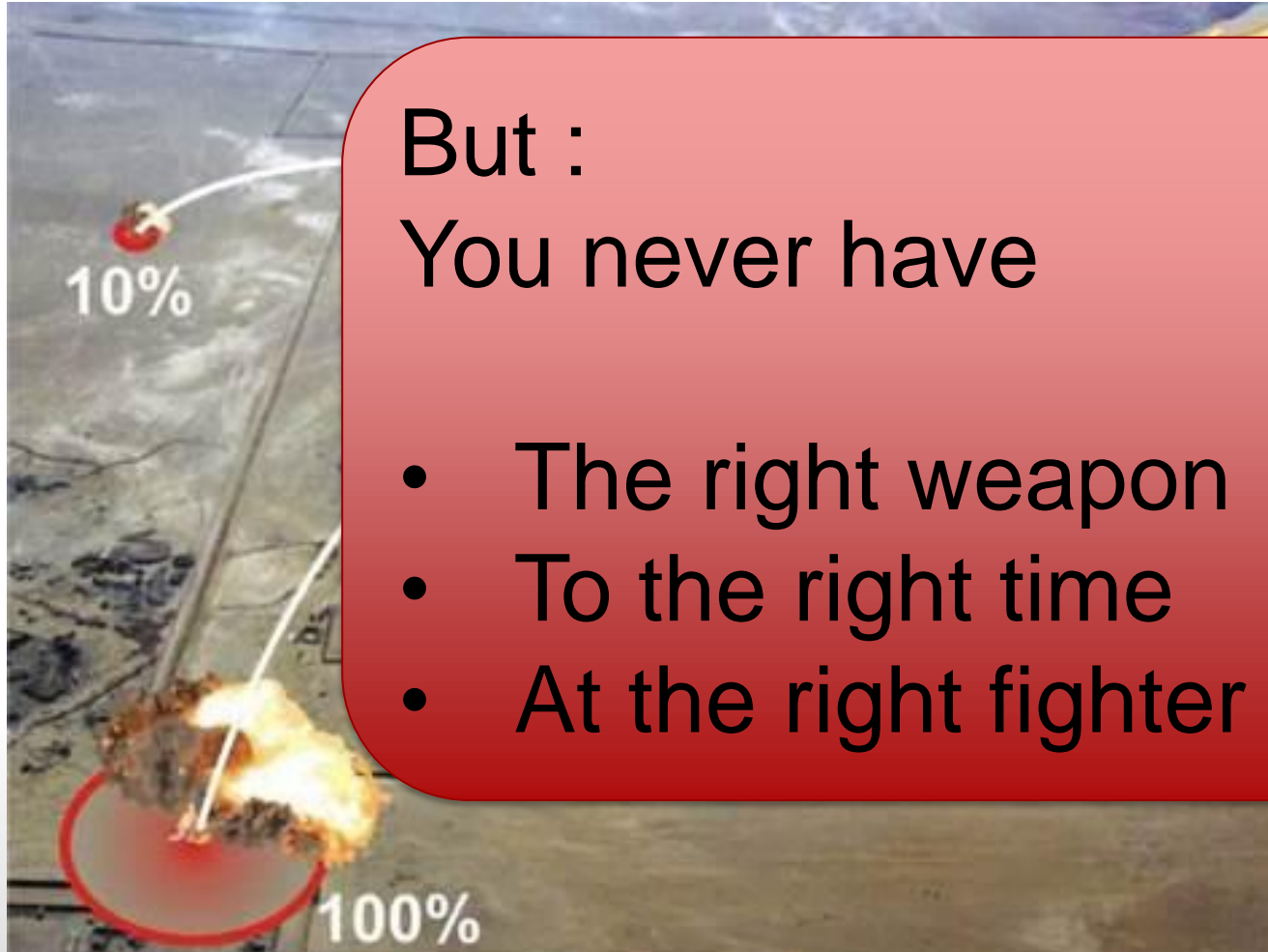
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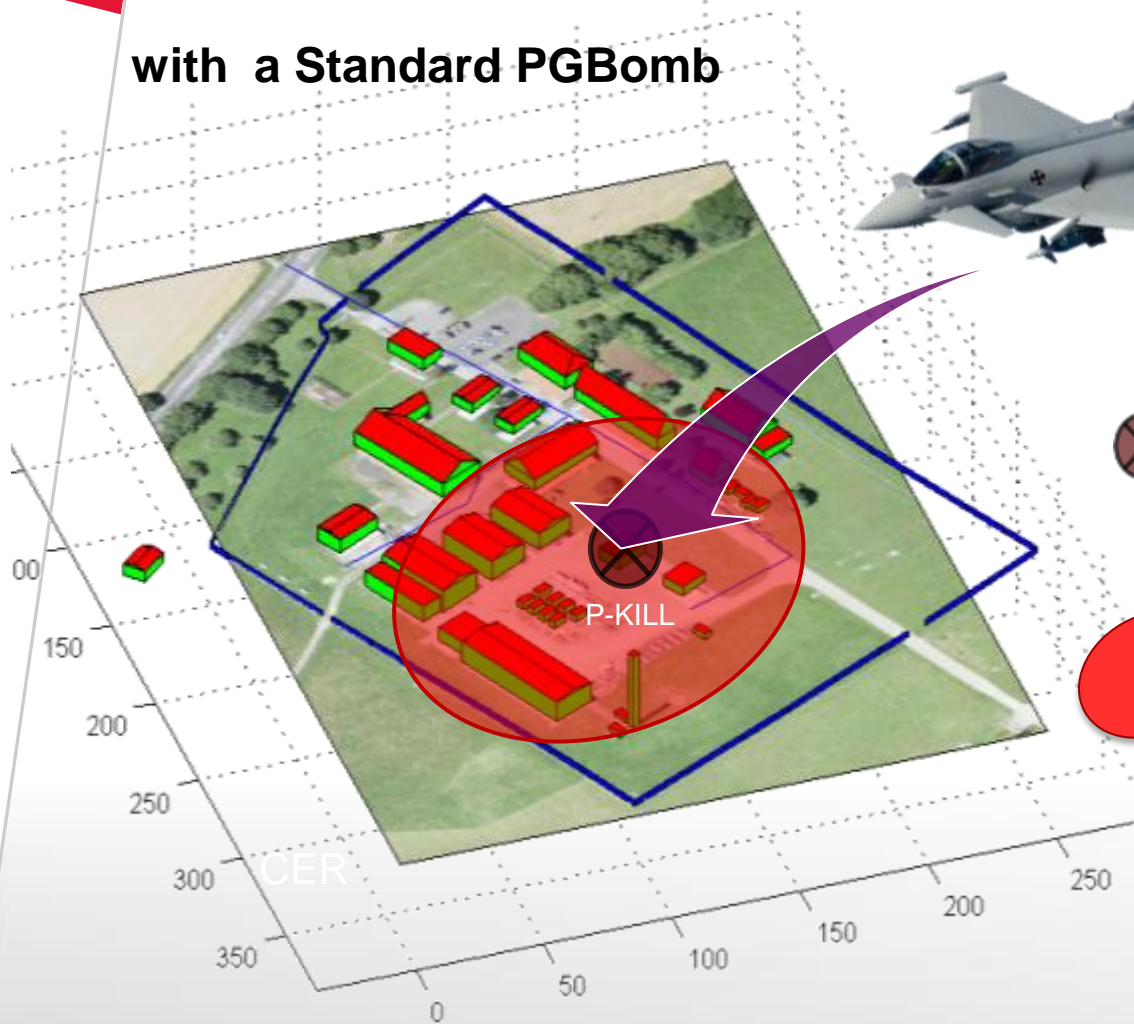
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Different Targets
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Why Scalable Output Weapons ? SOWs ?

with a Standard PGBomb



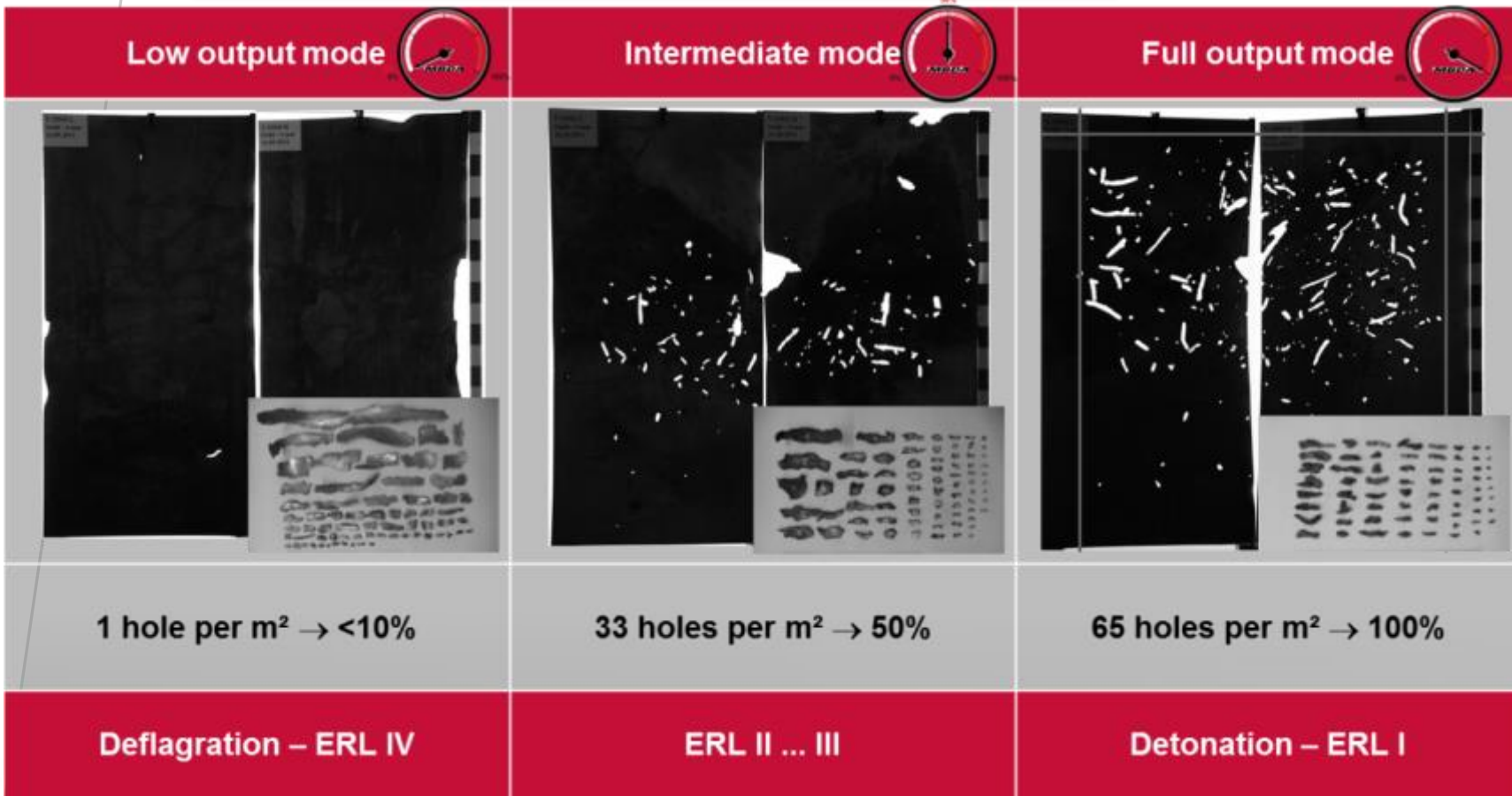
This is what you want



This is what you get

Effect of TDWs NEW Scalable Output Weapon Dial a Yield

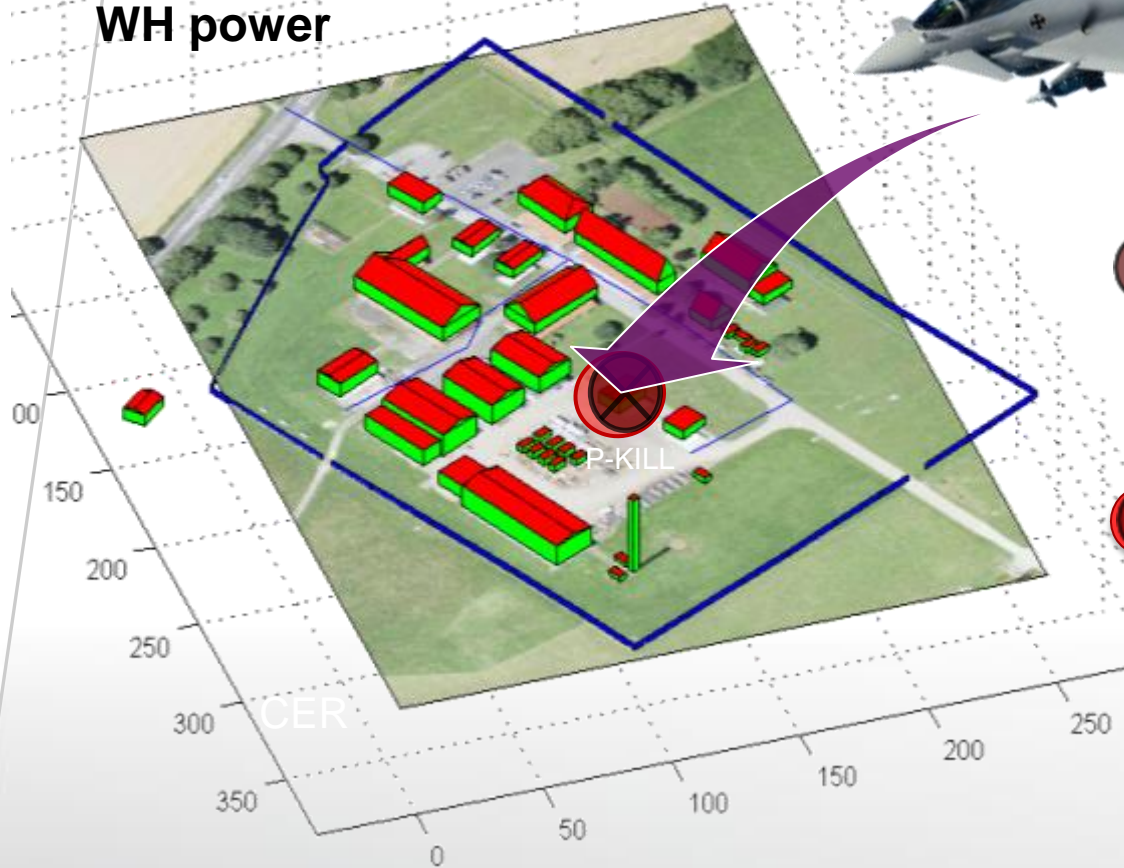
Demonstration on Witness-Plates



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Advantage of Scalable Output Weapon

**Effect with use of a SOW
Scaled to target adapted
WH power**



 **This is what you want**

 **This is what you get**

The NEW requirement for SOW Fuzing system

The amount of Collateral Damage is one deciding factor in the decision

- **to do the mission** or
- **NOT to do the mission**

Weapons Output CD Computing is part of Mission Planning

But than the Weapons **Output Power**

MUST

not be greater than commanded

That is a **NEW task** for Scalablen Fuzing Systems

Why is Scaling Safety a **Fuze** Task

Scalable Effect / Dial a Yield is controlled by the Warhead
Fuze System

Scalable Effect is achieved by **superposion** of the

- **Detonative Mode** (high order, full performance)
- **Deflagrative Mode** (low order, fast burning)

Therefore the **Fuze System** needs **TWO (2) initiation points**
with **programmable time delay** between

Example of Scaling *

by Commanding a Delay Time

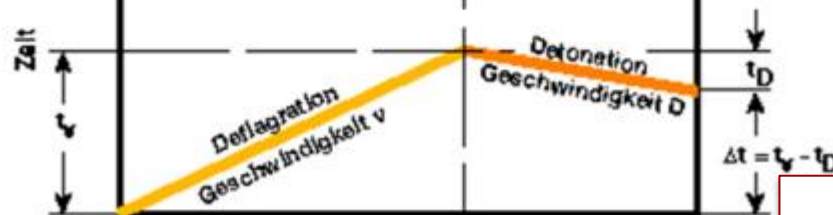
*

Deflagration

Detonation

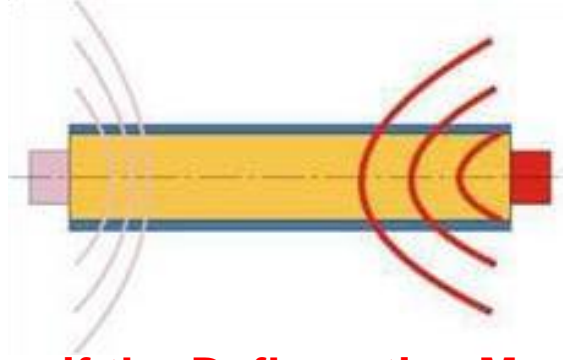


* Not TDWs Technology



Delay Time !

Critical Point !



What happens, **if the Deflagrative Mode fails ?**

The Weapon will go >> **Full Detonation Output**

The **Collateral Damage** will go far beyond the calculated value ,
far beyond the acceptable limit ??

CNN report show dead children and damaged hospitals (etc.)

In that way the Function of
proper Initiation is SAFETY CRITICAL

How to get the Deflagrative Ignition reliable

Qualitative Measures

- **By Redundancy of the Ignition Train**
- **By parallel loading of all 3 Firing Circuits**
- **By Ignition Output a Watch and action**
- **By adequate design of all safety critical elements**
- **By setting Low Output Defaut Values**
- **By Safety relevant Data Transfer**

Quantitative Values for the SOW Fuzing Functionality

Proposal by the Presenter

Safety Values to intended Deployment **acc. STANAG 4187**

On Target Engagement :

DuD rate acc „remnance of war“: **< 2%**

Measure : independent back-up timer for Deton b (~ 500 ms)

Probability of failure / unintended high output power :

Less than one in a millon

**This value is in accordance with the funtion requirement of
Flight Test Termination systems**

Presenters Wish

Goal of Presentation

The need of fixing rules for designing SOW Fuze Systems is a **brand-new challenge** in the fuzing world.

Within the **NATO partners**

clear requirements for design & safety have be established for

- Operational Calculations
- Mission Planning Decisions
- Quantitative Values for Analysis and Validations
- Inputs for the development guys

Presenters Wish

Goal of Presentation

- **To do so**

**Expert Groups should come together and
formulate proposals (Add-ons to existing STANAGs)**

for NATO Approval

to fix qualitative and quantitative requirements

for the final engagement phase of

new Scalable Output Weapon Fuze Systems

You see, it's not that easy



TDW Gesellschaft für verteidigungs- technische Wirksysteme mbH

Business Development
Post Office Box 1340
D-86523 Schrobenhausen
Germany

Tel.: +49 (0) 82 52 99 65 92

Fax: +49 (0) 82 52 99 61 20

TDW.contact@mbda-systems.de

The Whole Team

**thanks for YOUR
interest**