Munitions Safety Information Analysis Center





HEAT AND DARTS

SCO, FCO, SCJ

Test Results Database




Pierre Archambault

TSO Propulsion



2009 Insensitive Munitions & Energetic Materials Technology Symposium

HEAT & DARTS

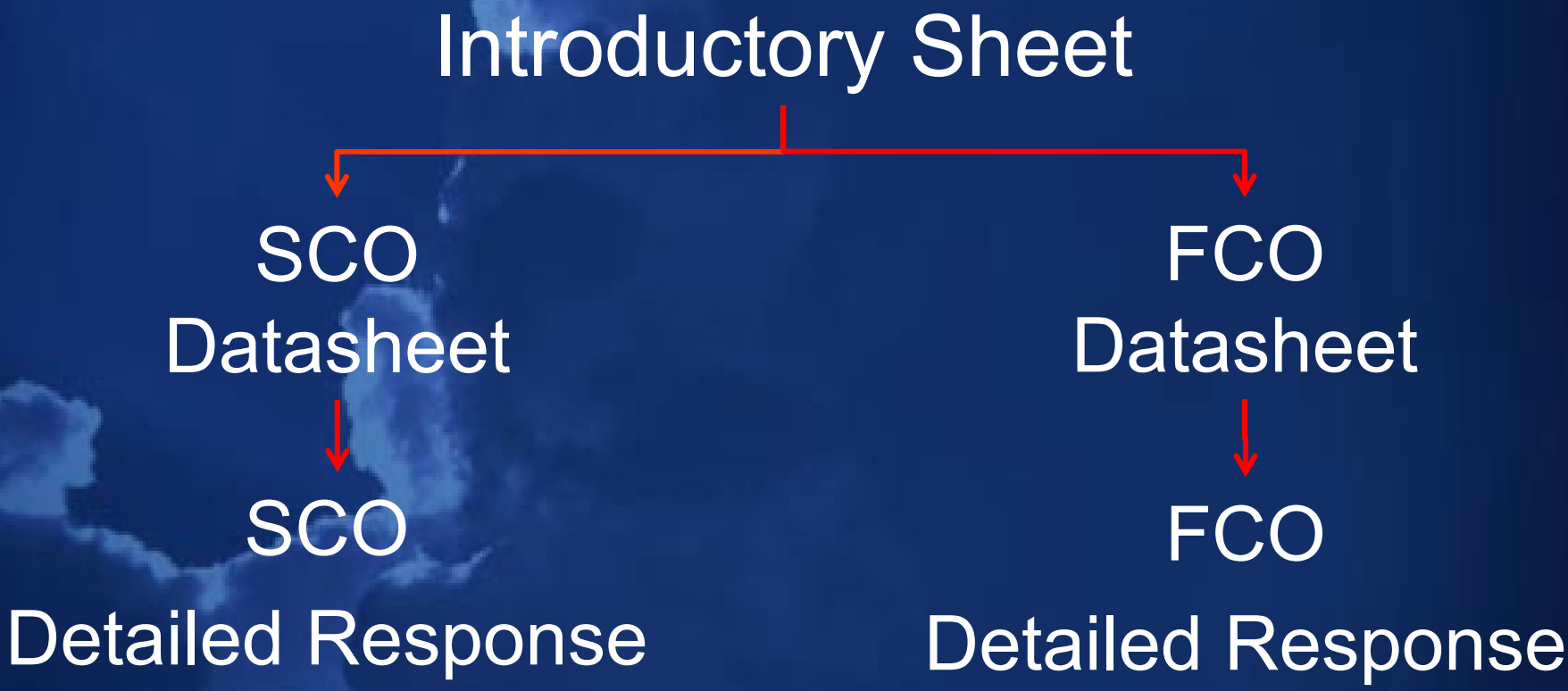
- Aim to
  - Compare response of various
    - Munitions
    - Energetic materials
  - Assess the impact of similar stimuli
  - Provide data to validate models
  - Increase confidence in response through statistic

HEAT & DARTS

- Contents
  - Response of the tested item
  - Tested item characteristics
  - Test setup characteristics
  - Test procedures

HEAT

- Structure

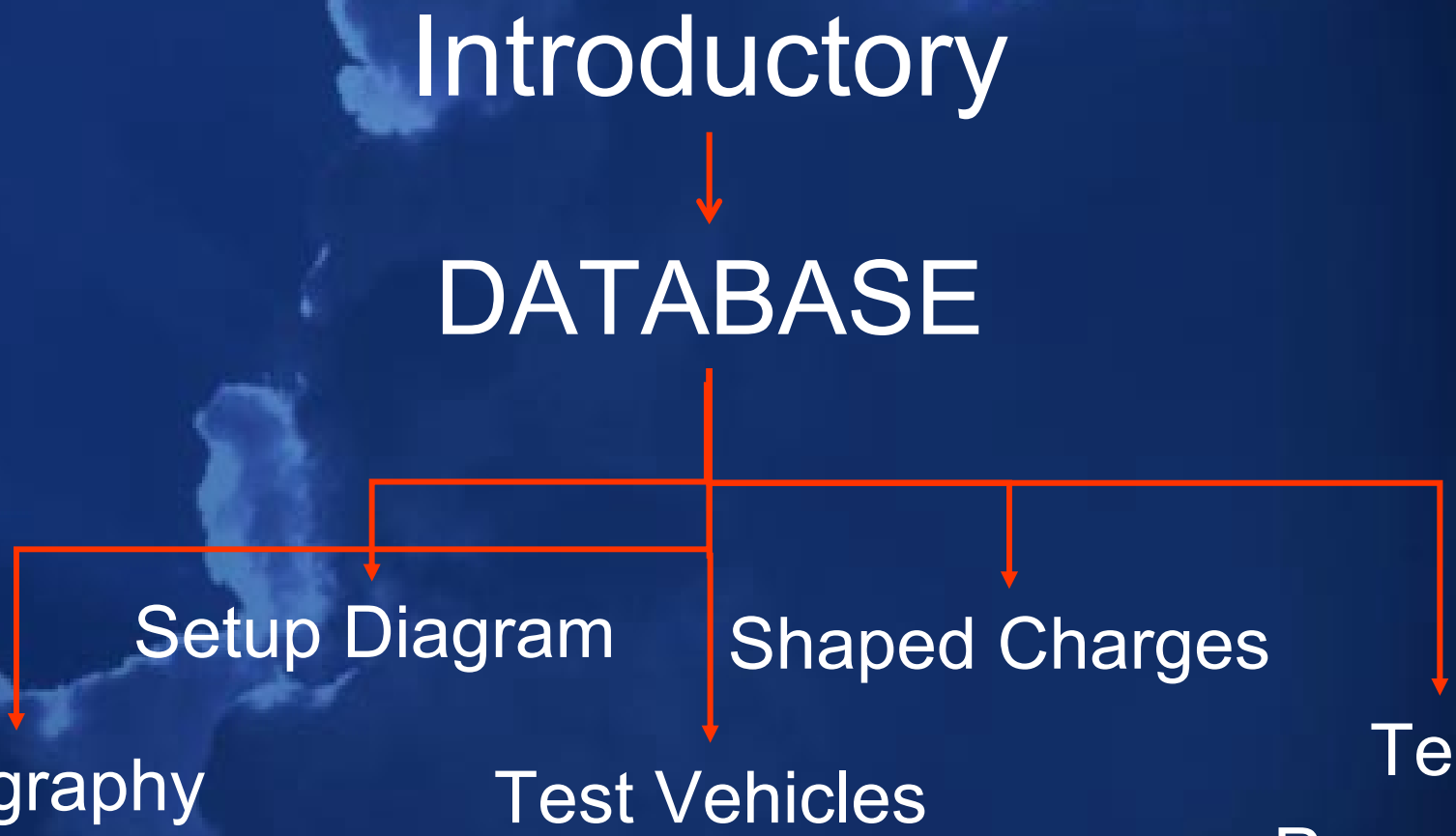


HEAT

- Introductory
- Datasheet
  - System
  - Threat
  - Response
- Detailed response sheet
  - Semi quantitative data
  - Quantitative data

DARTS

- Structure



DARTS

- Introductory
- Database
  - Tested munitions
  - Shaped charge
  - Barrier/mitigation
  - Initiation mechanism & reaction type
  - Other information

DARTS

- Other sheets
  - Set up Diagram
    - SC setup dimensions
  - SC
    - Characteristics
    - Sketch
  - Test vehicles
    - Generic test units
      - Characteristics
      - Sketch

HEAT & DARTS

- Summary
  - Two new databases
  - Results of IM tests on munitions/components
    - FCO and SCO (HEAT)
    - Shaped Charge Jet aggression (DARTS)
  - Available from MSIAC (end 2009)
    - At info@msiac.nato.int
    - On MSIAC secure web https://sw.msiac.nato.int/secureweb
  - For MSIAC nations

HEAT & DARTS

- Supplementary slides

HEAT

- Introductory sheet

NATO OTAN

MSIAC Supporting Munitions Safety

HEAT

Fast & Slow Heating Results

Version 1.0

SCO DATA

FCO DATA

Problems/Questions: MSIAC or Pierre Archambault

Phone: +32-2-707-5416 or +32-2-707-5447

Email: msiac@msiac.nato.int

or p.archambault@msiac.nato.int

2009

Neither MSIAC, nor the participating Nations can guarantee nor warrant the adequacy, accuracy, currency or completeness of the technical information contained in this database.

Link to datasheet

Contact data

HEAT

- Datasheet
  - System
    - Test configuration
    - Tested items characteristics
    - Fields are searchable/sortable using filter

SYSTEM									
Munition Designation	Type of Item	Cfg.	Item Orient.	Energetic Materials			Thermal Liner	Simulant Dummy	Munitions Mitigation Device
				ID.	Type	Amount (kg)			

HEAT

- Datasheet
  - Threat (FCO)
    - Stimuli and test set up characteristics
    - Fields are searchable/sortable using filter

THREAT									
Type of FCO	Fuel Type	Hearth Size (m)	Distance between Item and Fuel Surface (mm)	Type of support	Nb. Of TC	TC Location	Average Temp. (°C)	Wind Speed (km/s)	Test Procedure

HEAT

- Datasheet
  - Response
    - Response level
    - Fields are searchable/sortable using filter
    - Level link to data in detailed response sheet

RESPONSE	
Number of Test	Level (Link to Detailed Response)

HEAT

- Detailed response sheet (FCO)
  - Semi quantitative data
  - Fields are searchable/sortable using filter
  - Level response linked to datasheet

RESPONSE										
Nb. Of Tests	Level	Nb. of Events	Initial Reaction		Second Reaction		Third Reaction		Propulsion	Witness Plate Data
			Time (m:s)	Type	Time (m:s)	Type	Time (m:s)	Type		

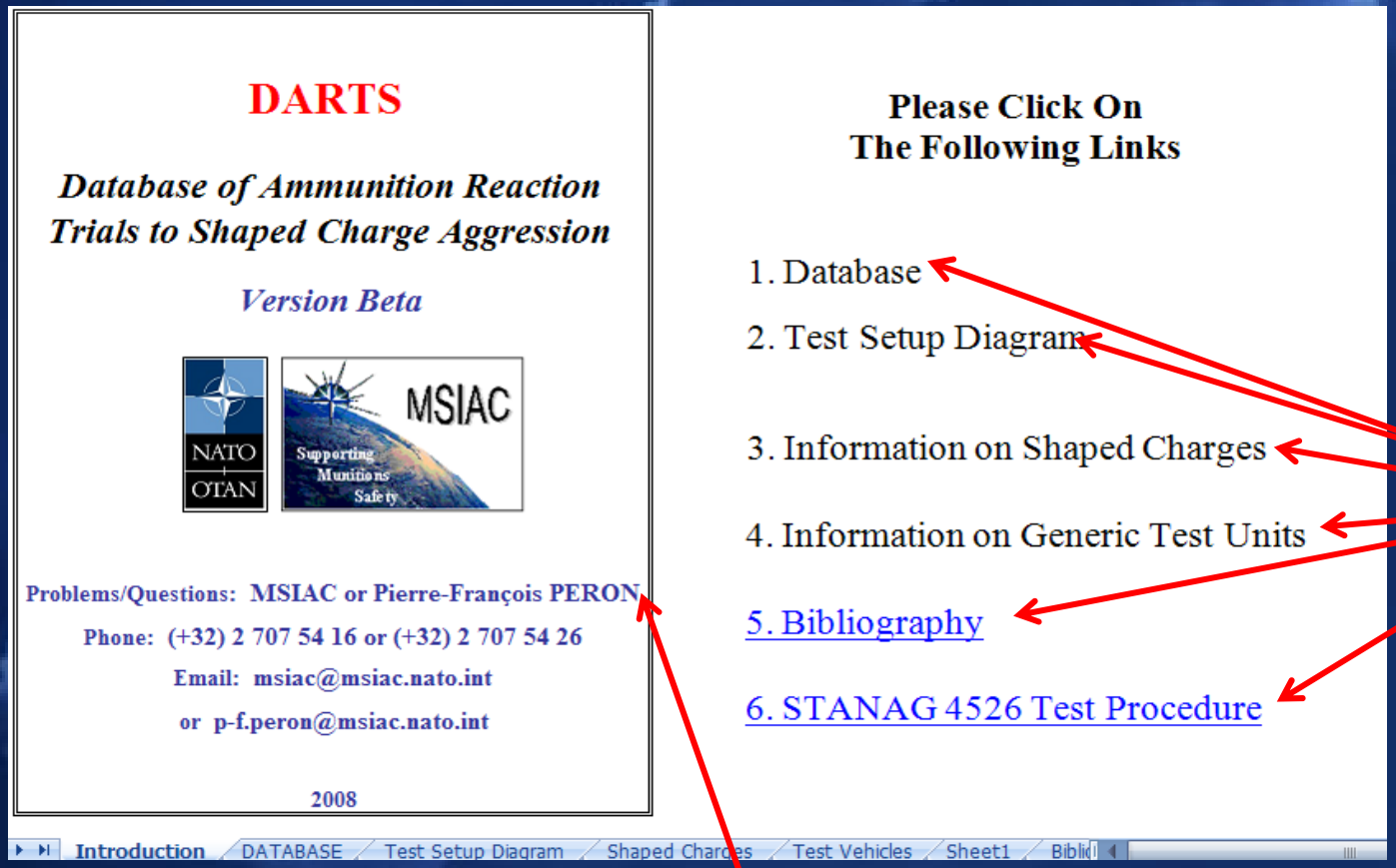
HEAT

- Detailed response sheet
  - Quantitative data
  - Fields are searchable/sortable using filter

RESPONSE							
Air Blast Data		Longest Distance Travel By a 150 g Fragment (m)	Fragments Flying more than 15 m		Thermal Flux Data		Pressure Wave Velocity (km/s)
Max. Press. (mbar)	Gauge Loc. (m)		Nb,	Energy at 15m (J)	Max. (kW/m2/s)	Gauge Loc. (m)	

DARTS

- Introductory sheet



Link to sheets

Contact Data

DARTS

- Database
  - Tested munitions
    - Munitions designation
    - Energetic materials name & composition
    - Aiming point & test configuration
    - Tested items characteristic
    - Fields are searchable/sortable using filter

		Tested Munition					
Name	Energetic Material	Composition	Aim point	External Diameter (mm)	Case Thickness (mm)	Case Material	Configu-ration

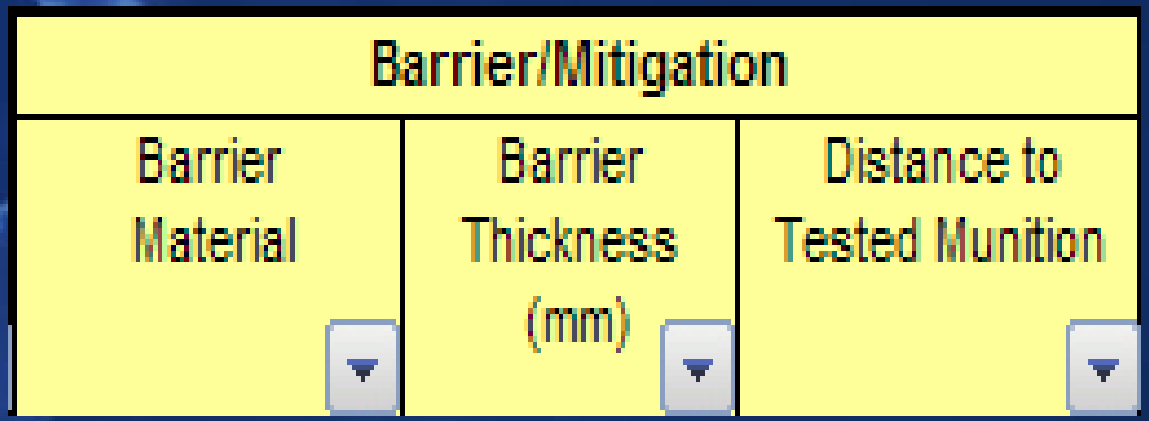
DARTS

- Database
  - Shaped Charge
    - Designation & caliber
    - Stand off distance
    - Angle of Impact
    - Jet characteristics
    - Fields are searchable/sortable using filter

Shaped Charge							
Name	Caliber (mm)	Stand-Off (mm)	Angle of Impact (°)	Jet Tip Velocity (V) (km/s)	Jet Tip Diameter (D) (mm)	Jet Tip Shape	V^2D ($mm^3/\mu s^2$)

DARTS

- Database
  - Barrier/Mitigation
    - Material
    - Thickness
    - Distance between barrier and tested munitions
  - Fields are searchable/sortable using filter

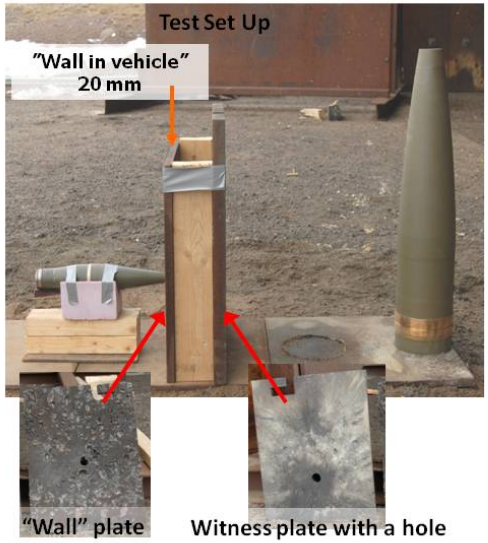


DARTS

- Database
  - Initiation mechanism
  - Reaction type
    - Linked to test details
  - Other information
    - Reference number
    - Comments

RPG-9 Shaped Charge (73 mm) Impact on
155mm HEER Shell Filled with TNT and 55%GUDN / 45%TNT Compositions


Shell cross section



Initiation Mechanism	Reaction Type	Other Information	
		References	General Comments