

Pyrotechnic Bomblet Self Destruct Fuze (SDF) for GMLRS

**Presentation for 48th Annual Fuze Conference
April 26th - 28th, 2004
Charlotte, NC**

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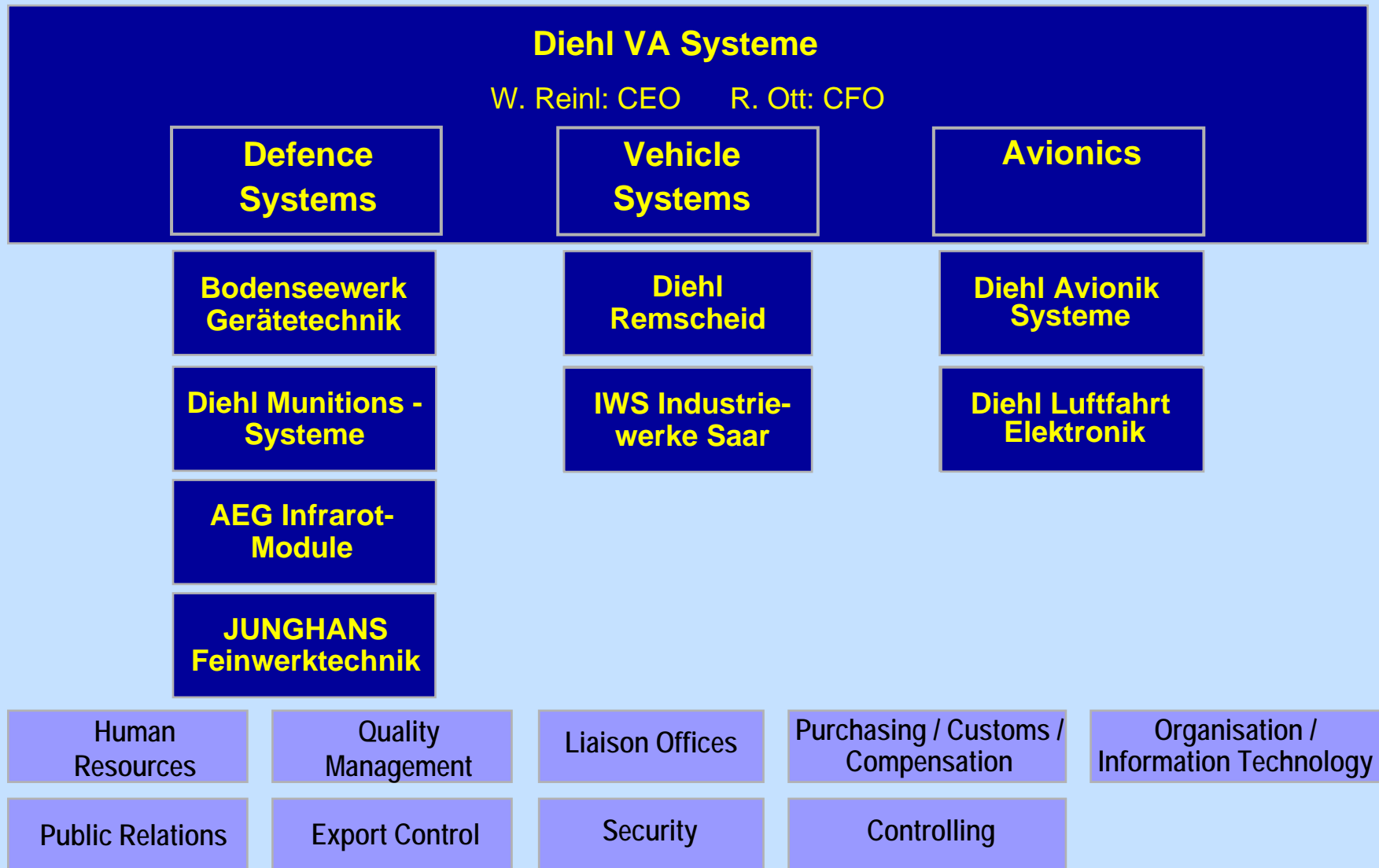


JUNGHANS
Feinwerktechnik

**Schramberg: administration,
sales and machine shop for
components**



Seedorf: R&D and assembly shop



Wide Product Range at JUNGHANS Feinwerktechnik:

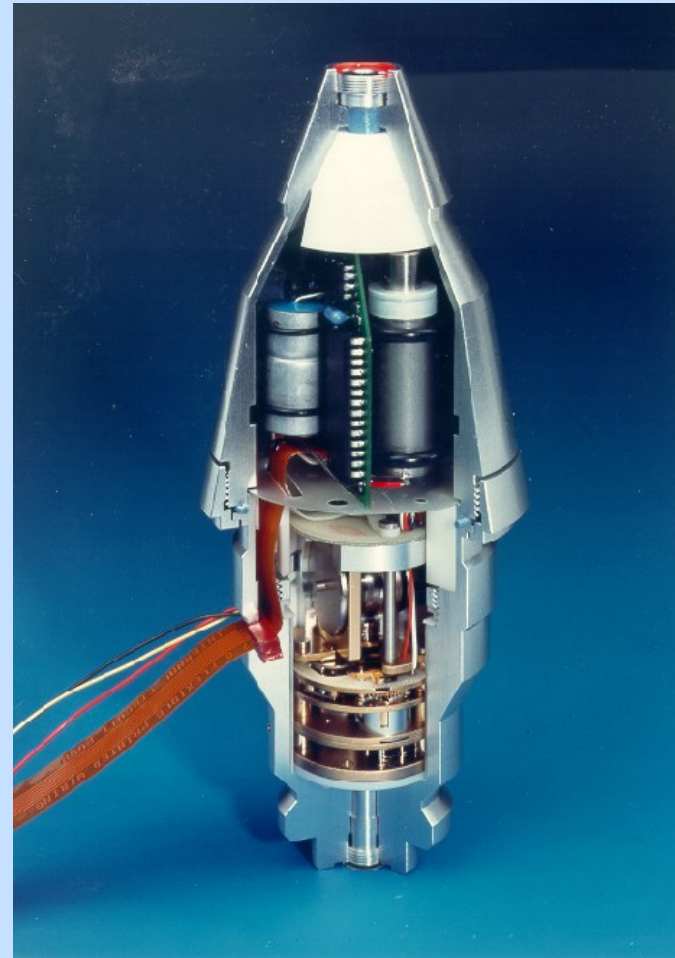
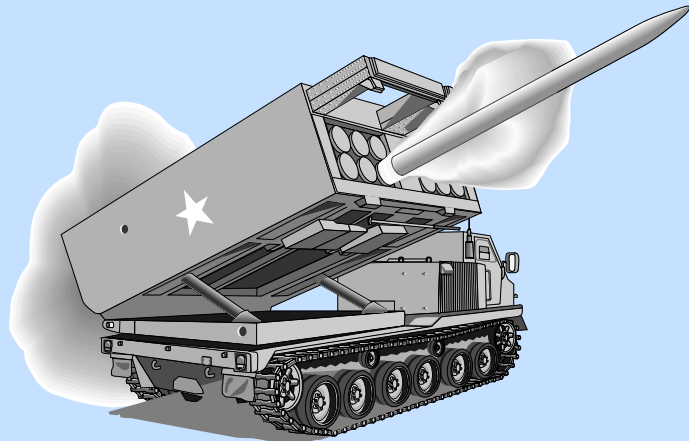


Mechanical and Electronic Fuzes For:

- Artillery Ammunition
- Mortar Ammunition
- Tank Ammunition
- Anti-Tank Ammunition
- Medium Calibre Ammunition
- Rockets
- Submunition
- Safety & Arming Devices

- Company Experience in MLRS and Self destruct Fuzes for Grenades





- From 1993 to 1997 production of more than 10.000 fuzes

- Self destruct Fuze for 155mm Artillery Shell (15 sec delay)



- in production from 1988 to 1992
- more than 12 mio produced maximal daily rate of 20.000 SDF
- actual firings do not show any degradation in performance

Development of a Self-Destruct Fuze for M77 Grenades with a delay time of 25 seconds.

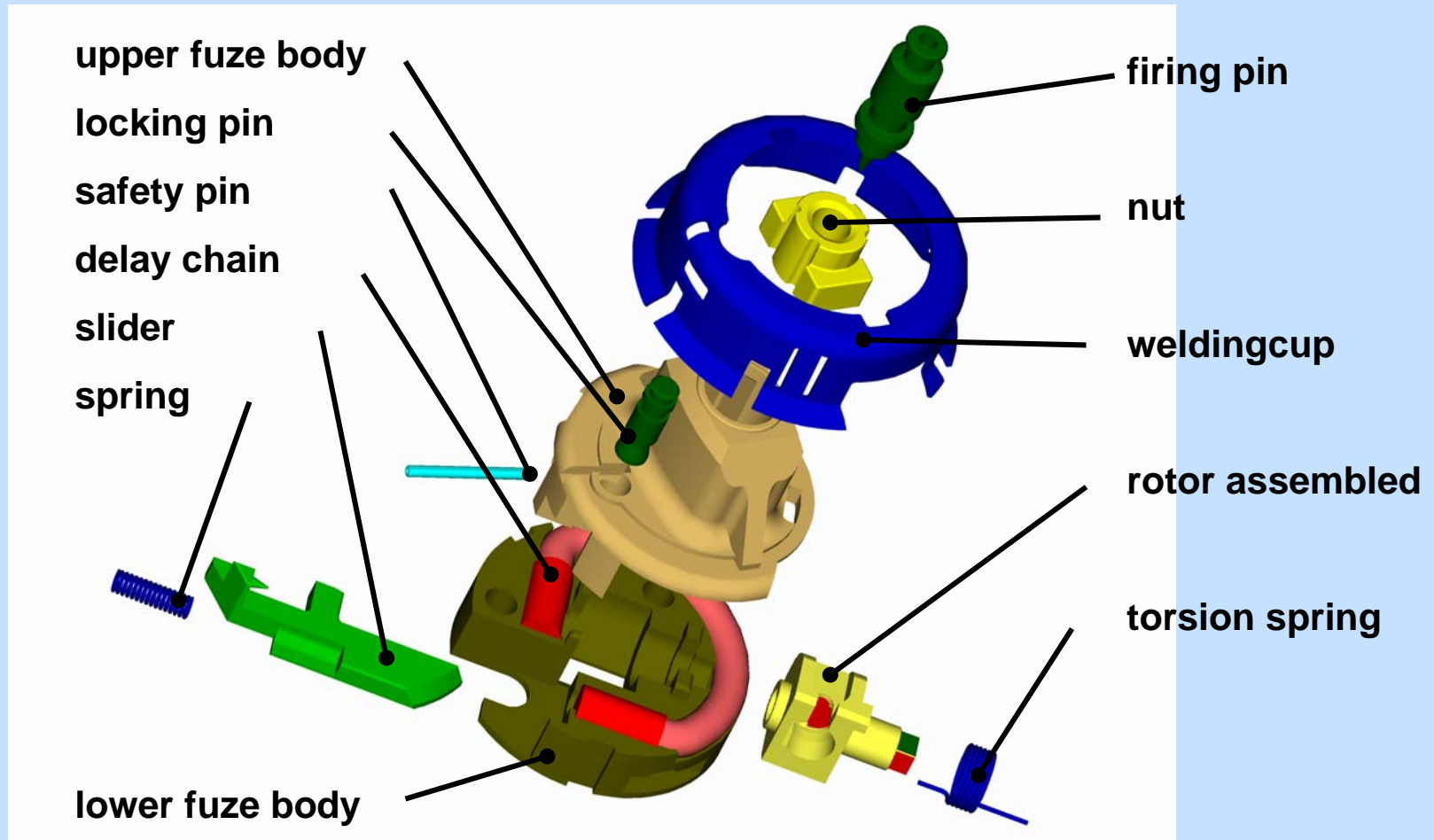


- JUNGHANS Feinwerktechnik and GIAT Industries have teamed in their experiences to provide a Self Destruct Fuze (SDF) for GMLRS bomblets



- JUNGHANS started the development in December 2001. The major requirements for the development of the SD-Fuze are:
- the weight:
 - the SDF weight should be less than 20g
- the impact functioning rate
 - more than 95%
- the hazardous dud rate:
 - less than 1% (desired 0,1%)
- the delay time:
 - within temperature range: $T \geq 25 \text{ sec}$
- the temperature range:
 - function: from -32°C to $+60^{\circ}\text{C}$

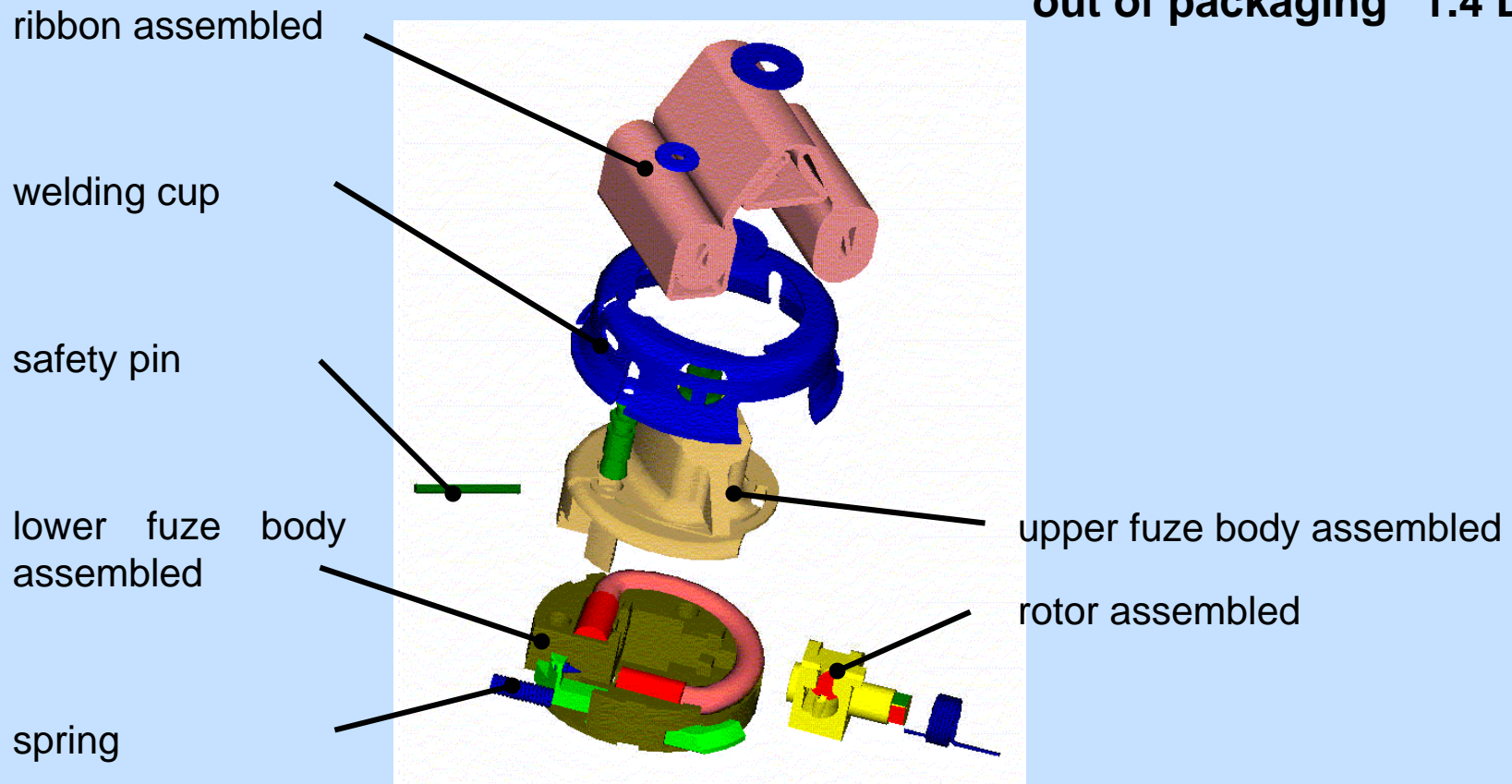


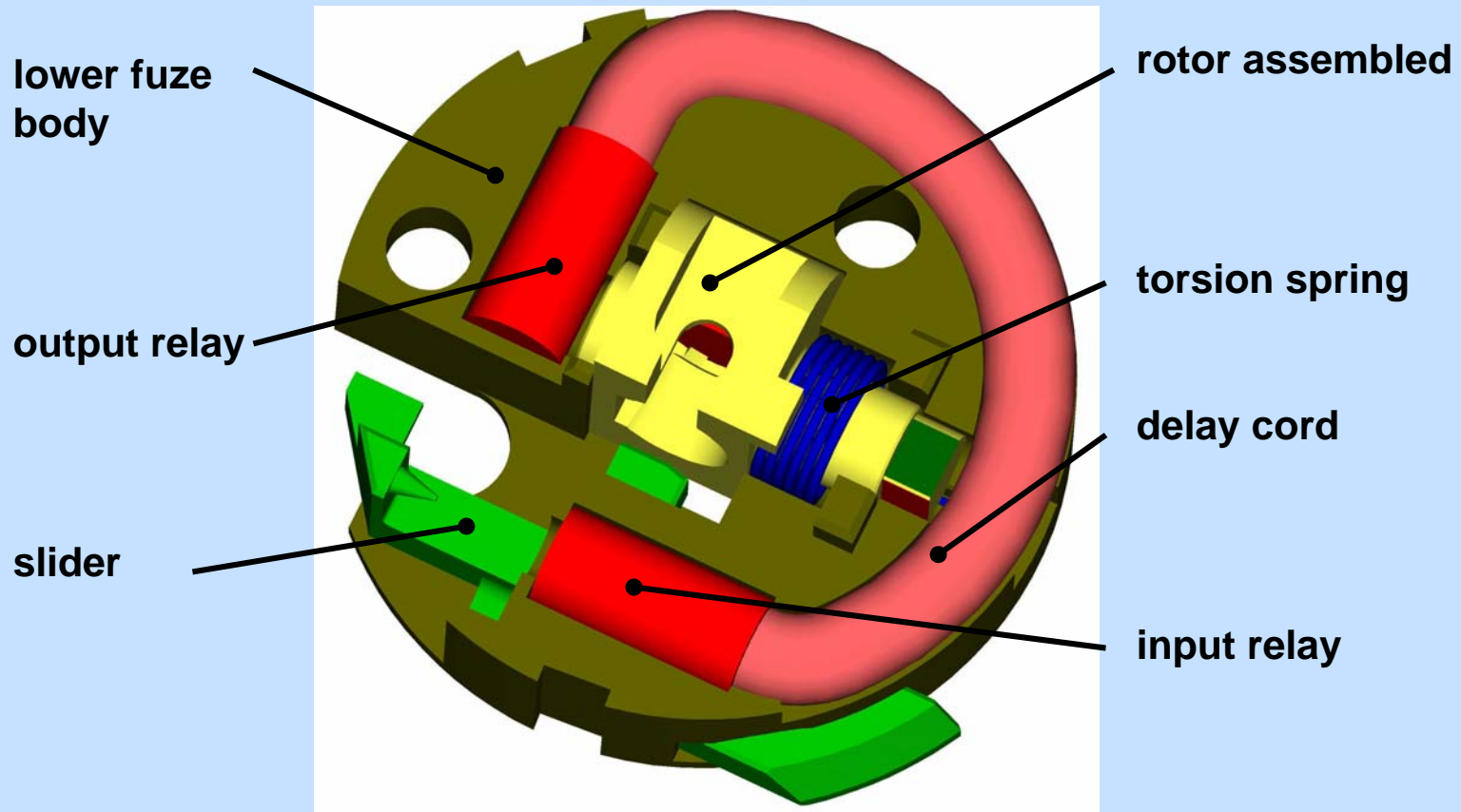


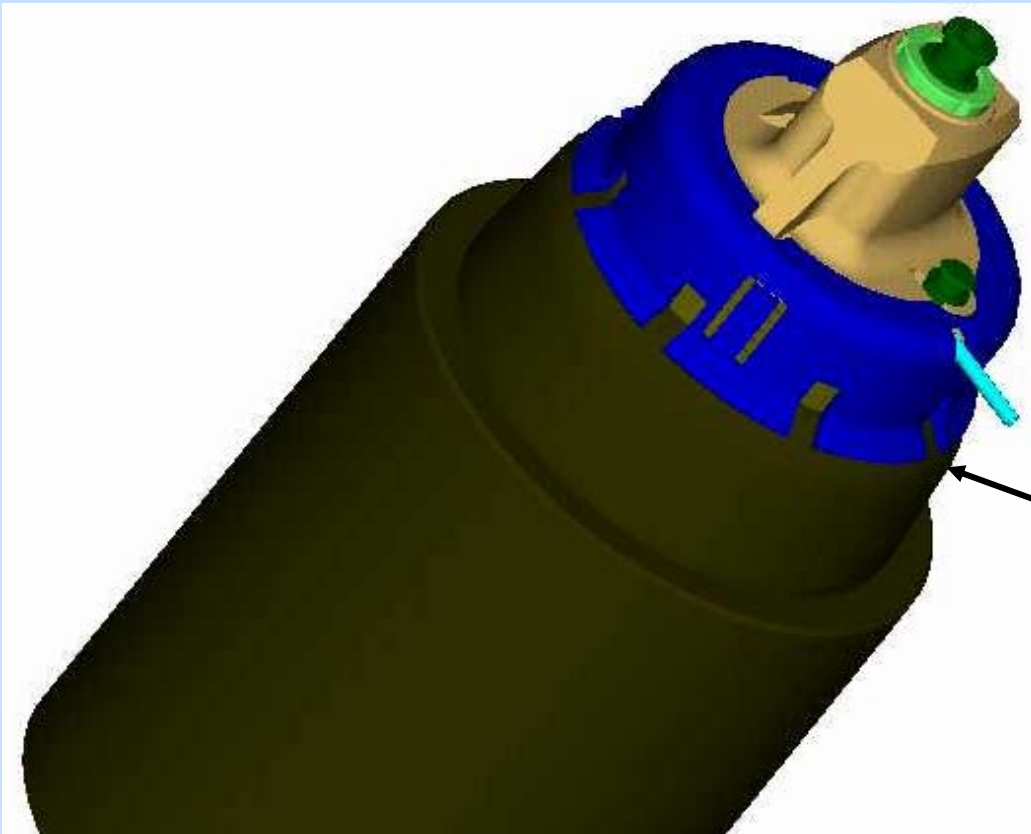
Hazardous Classification:

in packaging 1.4 D

out of packaging 1.4 D





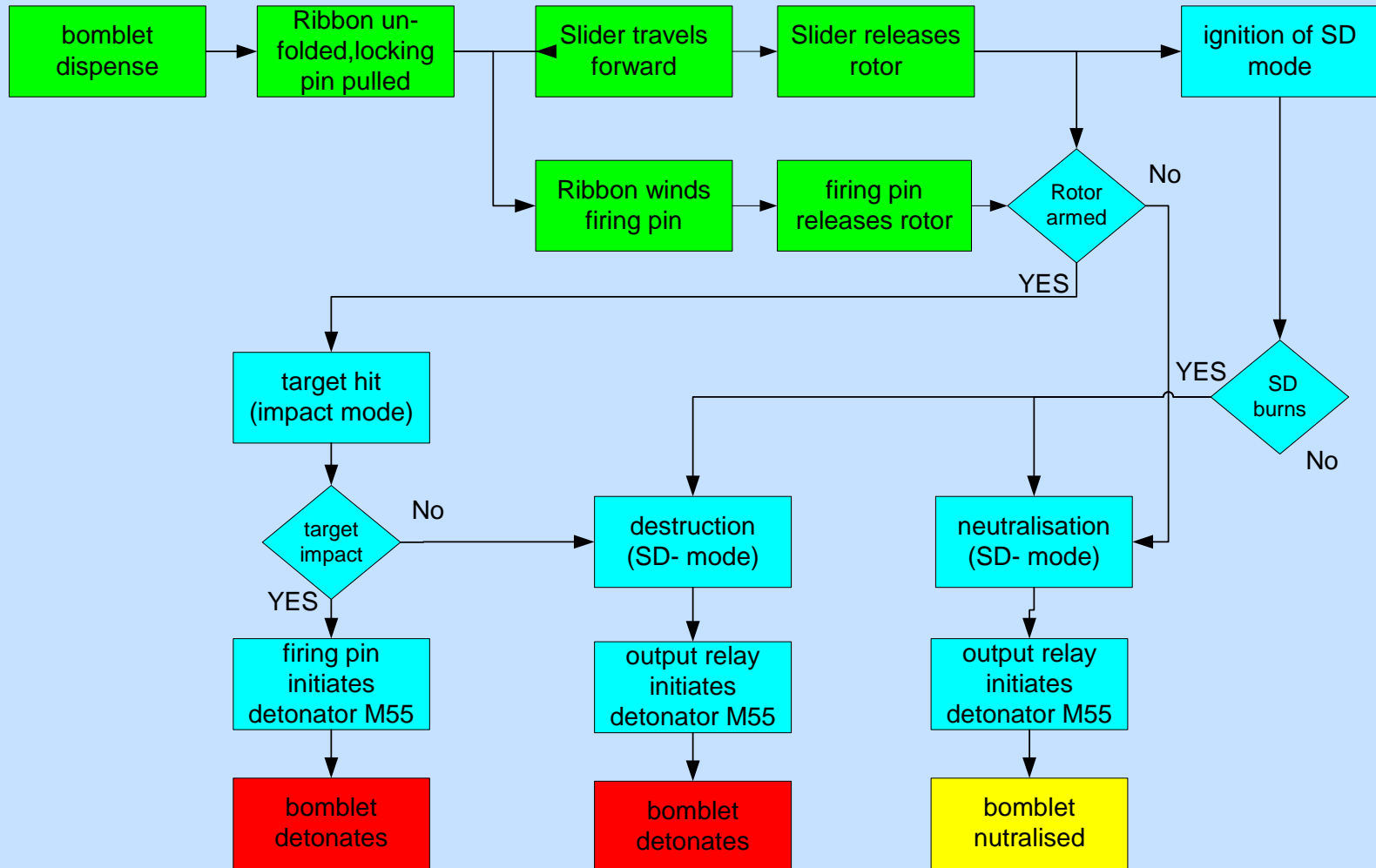


SD-Fuse on inert Bomblet: Hazardous Classification:

in packaging	1.4 D
out of packaging	1.4 D

Laser Welding

Functioning Modes of the SDF

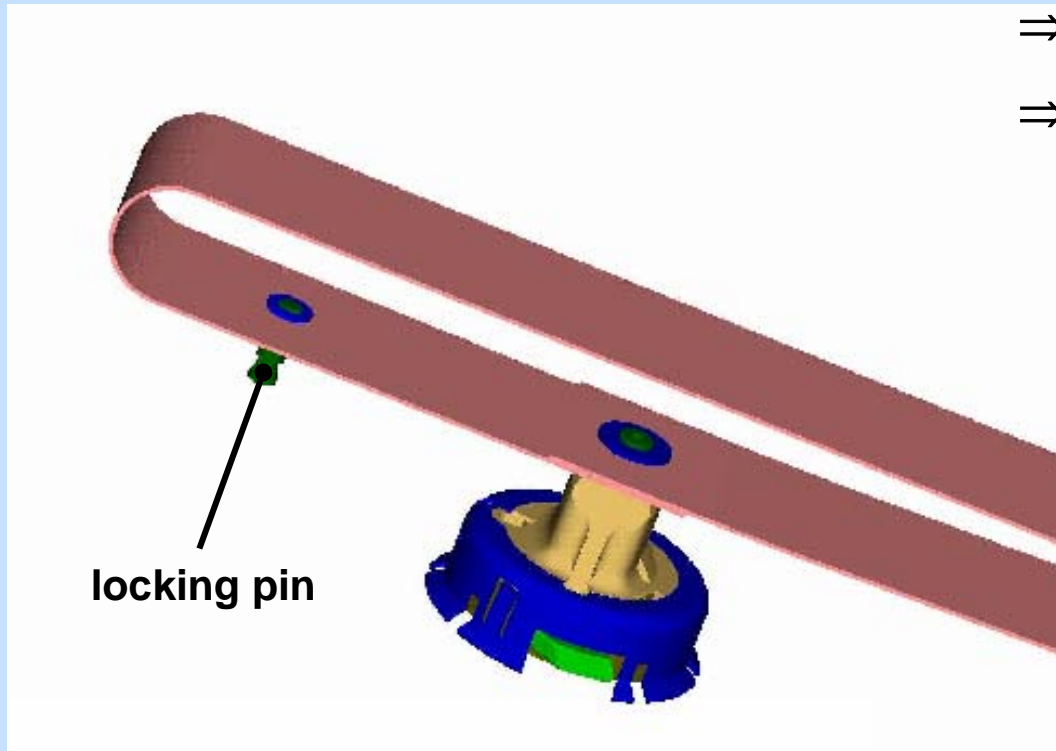


1st step after dispense:

⇒ ribbon unfolded
(aerodynamical effect)

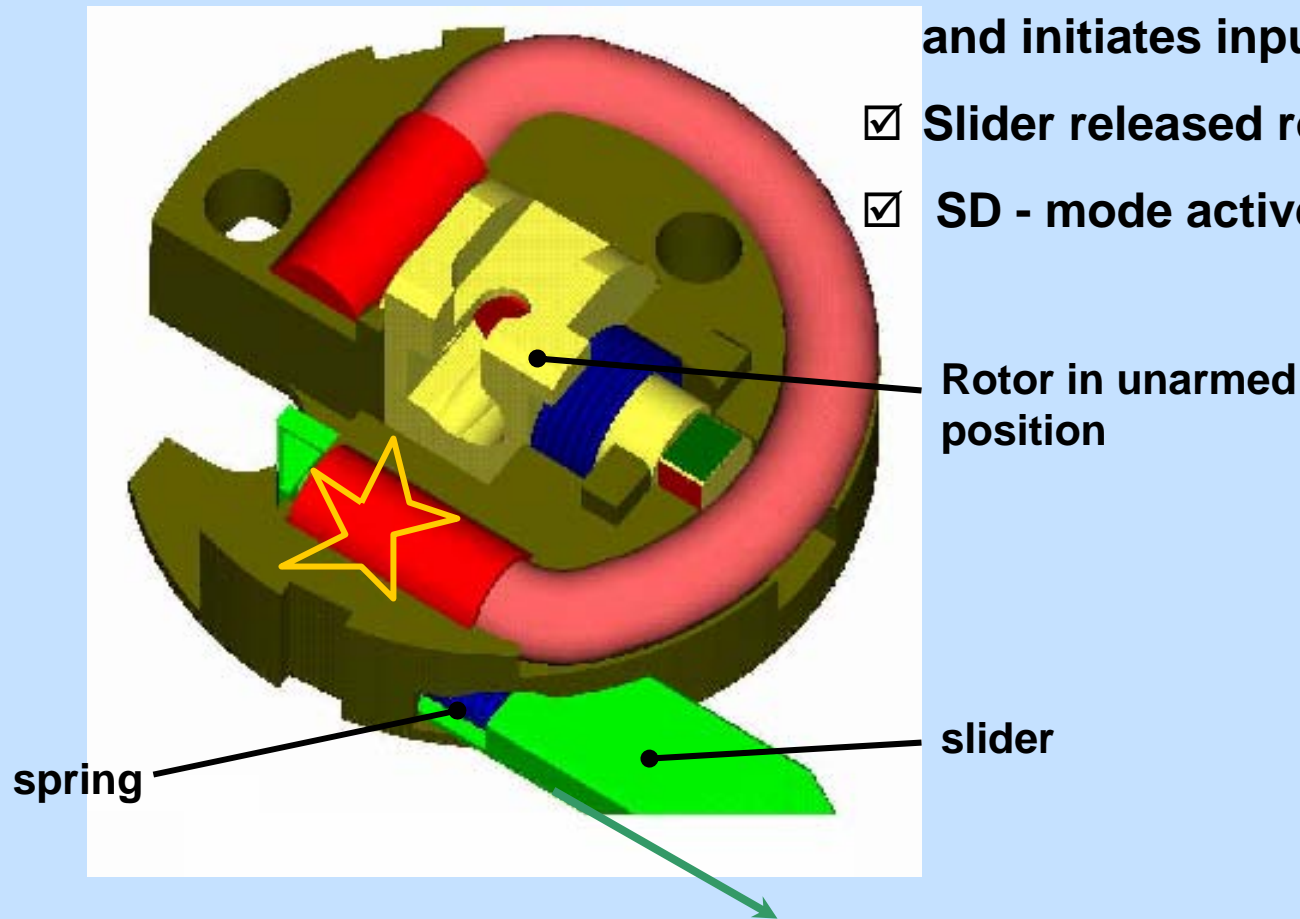
⇒ locking pin removed

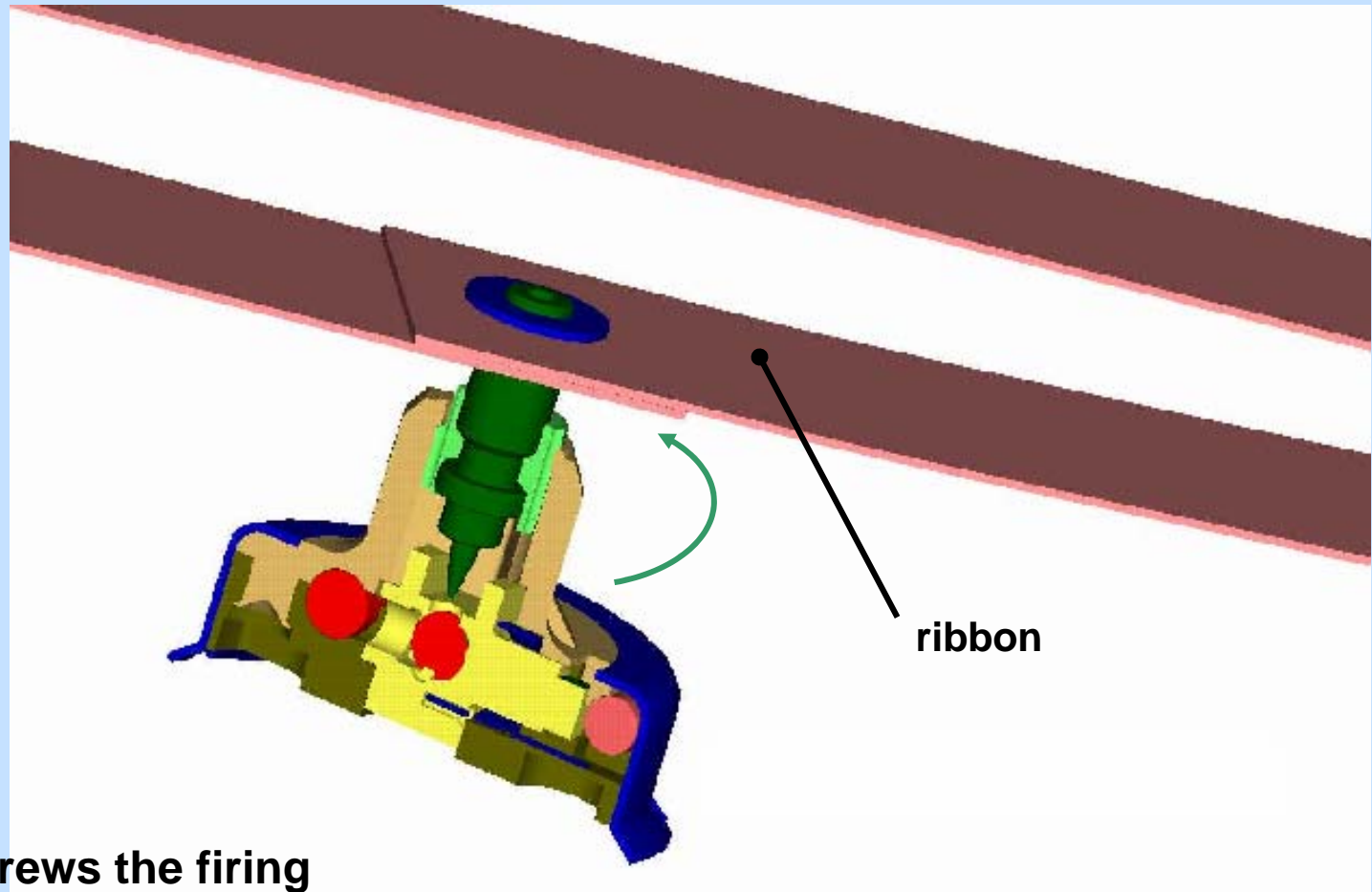
⇒ slider unlocked



2nd step:

- ☑ slider moves in armed position and initiates input relay
- ☑ Slider released rotor to arm
- ☑ SD - mode active





3rd step:

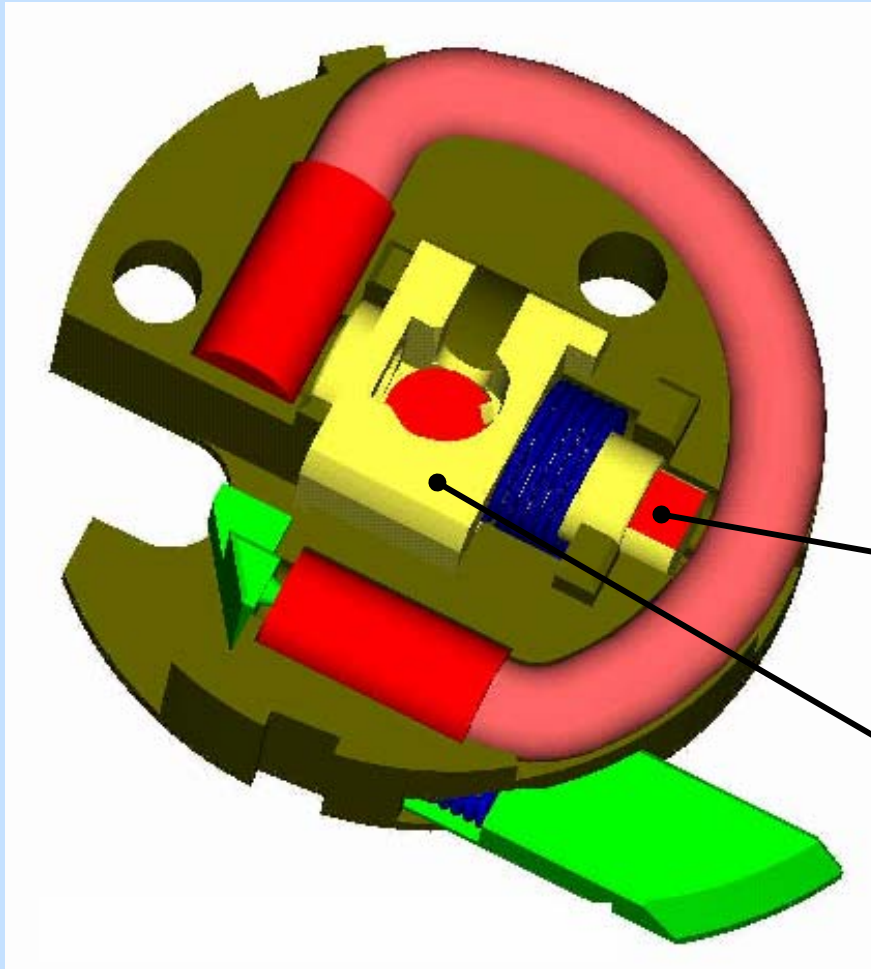
⇒ ribbon unscrews the firing pin (left handed thread)

⇒ rotor is unlocked

4th step:

⇒ rotor turns in armed position

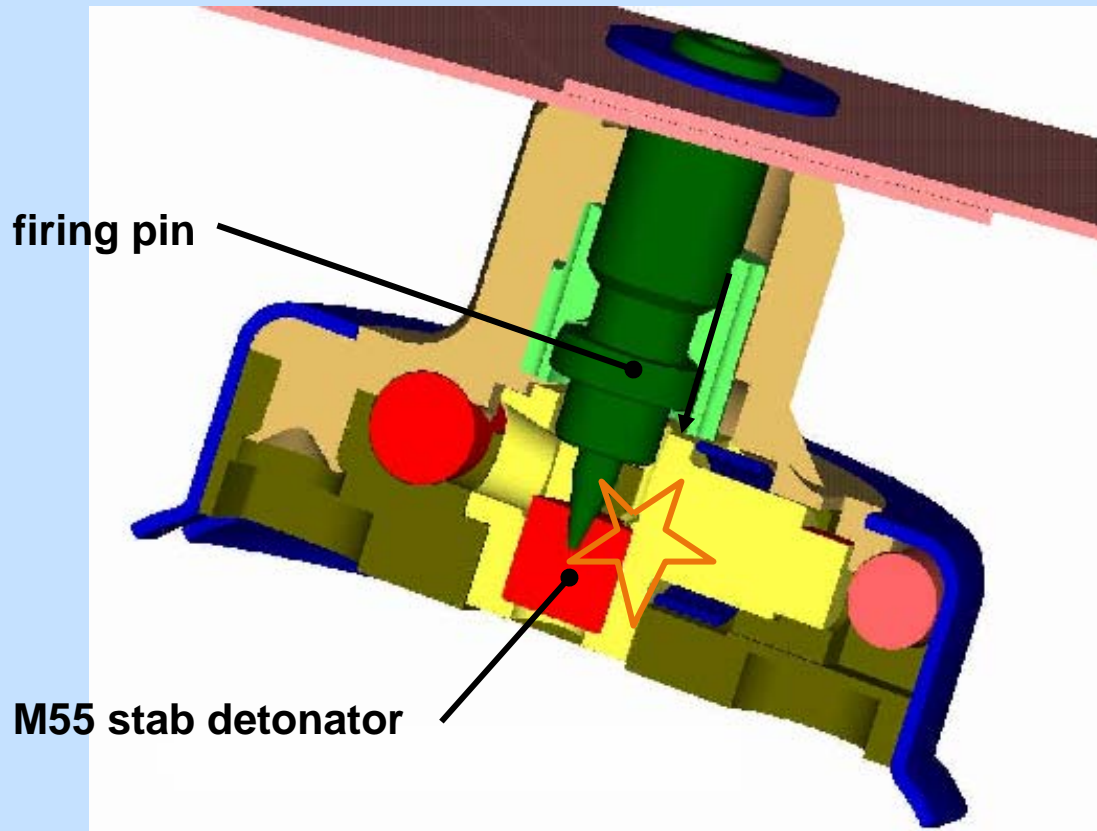
⇒ fuze is armed



marking with red colour,
“armed position”

rotor in armed position

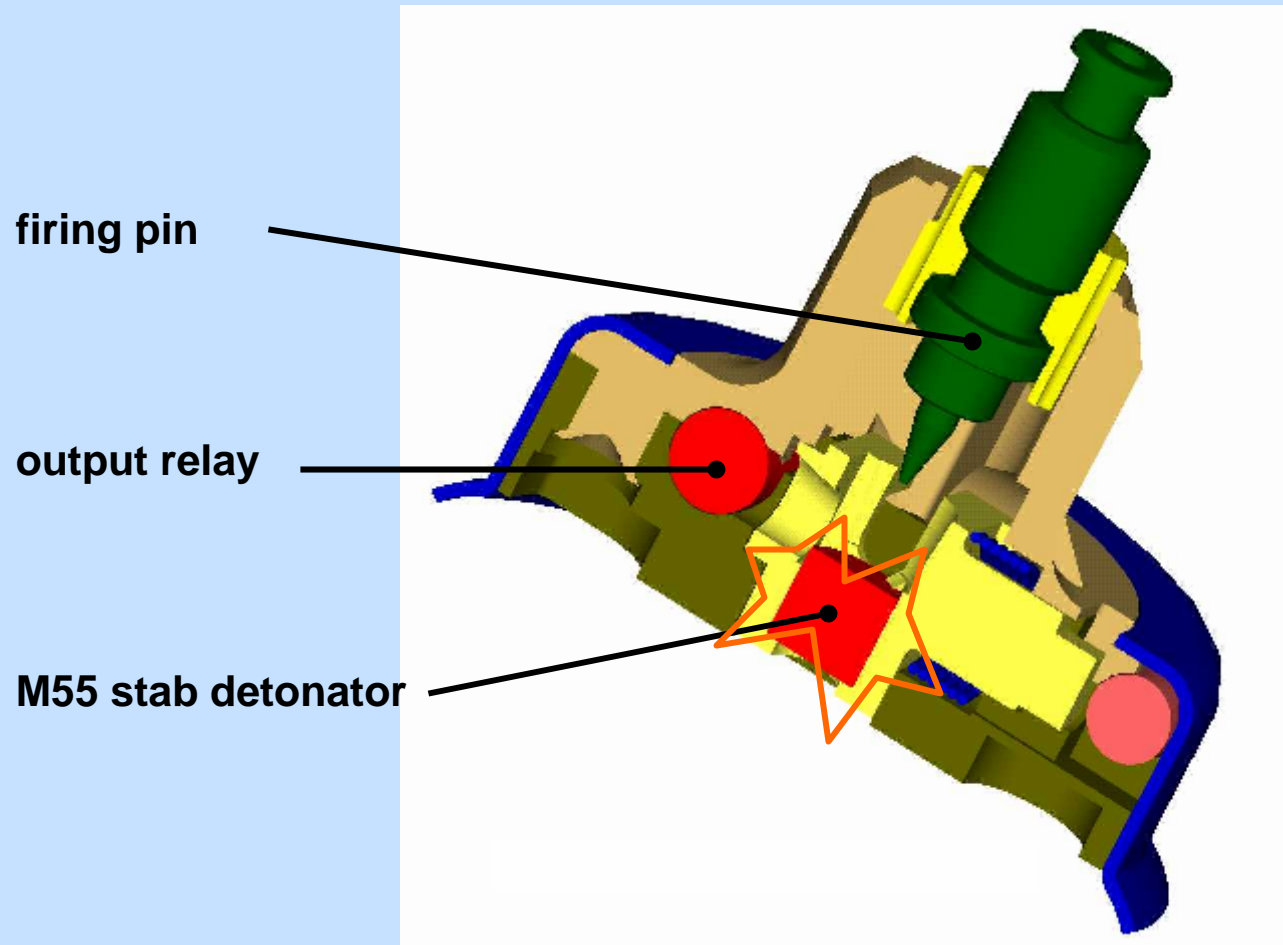
- Firing Pin Initiates the M55 Stab Detonator
⇒ **Primary Mode: Impact**



5th step:

- ⇒ target impact
- ⇒ firing pin initiates M55 stab detonator

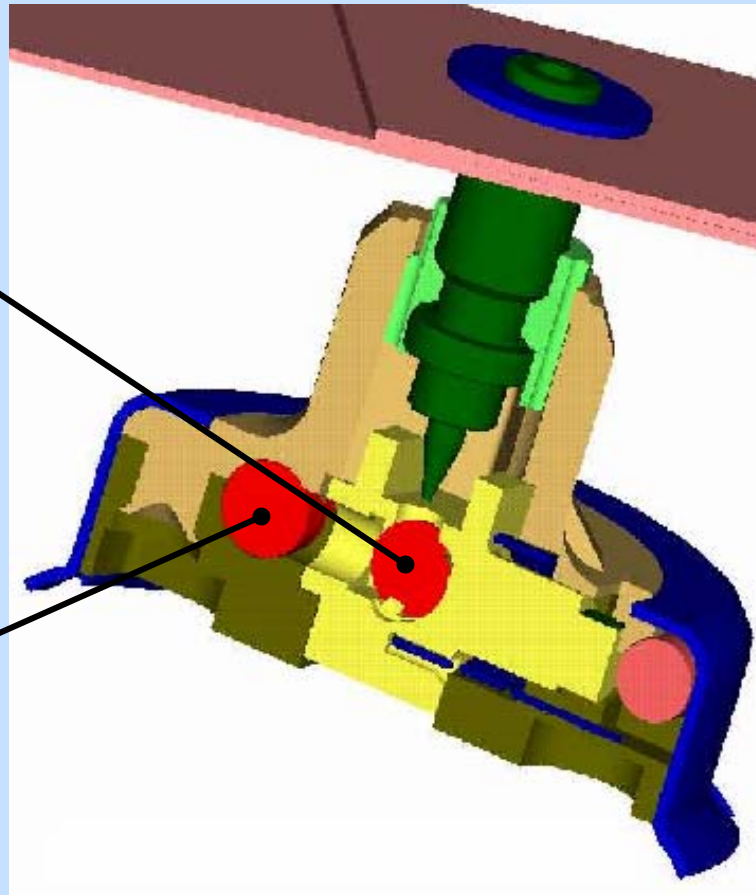
- Output Relay Initiates the M55 Stab Detonator
⇒ **Secondary Mode: SD - Mode (complete Bomblet)**



- Output Relay Initiates the M55 Stab Detonator of an unarmed SDF
⇒ **Back up Mode: Neutralization - Mode (complete Fuze)**

M55 stab
detonator in
safe position

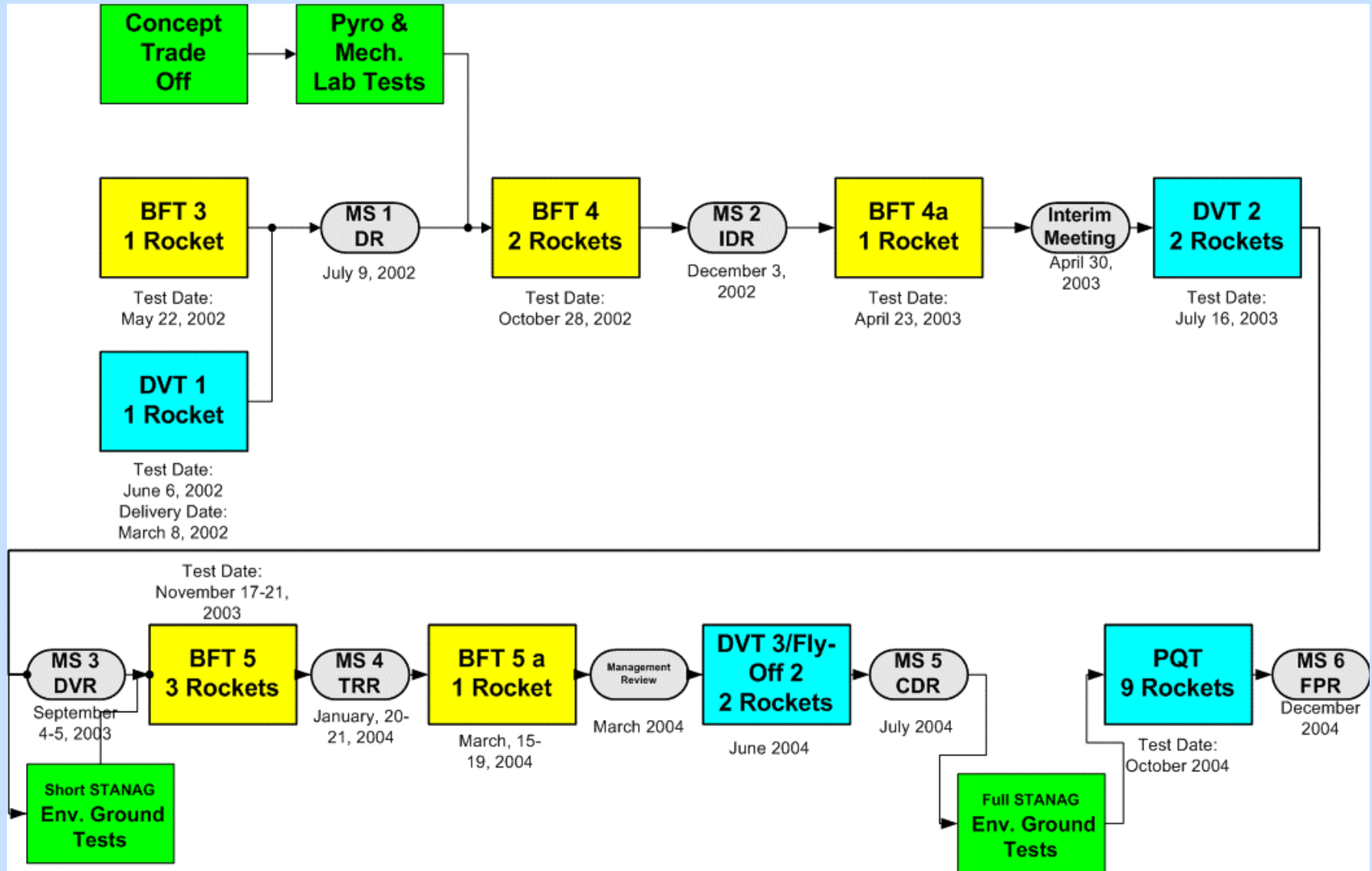
output relay



- **Demonstration Phase**
 - May 2000 to November 2001
 - Status: performed on schedule
- **Development Phase**
 - December 2001 to December 2004
 - GMLRS - Qualification forth quarter 2004
- **Industrialisation Phase**
 - on customer request
 - possible start July 2004



Draft updated Test Plan for Development Phase



- BFT5 at Meppen Proving Ground
 - Scheduled November 16th 2003
 - 3 MLRS rockets
 - SDF Design with 25 sec. Delay Element
 - range: 2 rockets on approx. 11 km, one rocket on approx. 20 km
 - temperature: 1 rocket at +60°C, 1 rocket at +51°C, 1 rocket at -32°C

Results:

- a dud rate less than 1% could be proved
- a reliability of more than 97% for the delay chain could be proved
- the required impact functioning rate of more than 95% was missed



- BFT5a at Meppen Proving Ground
 - Scheduled March 15th 2004
 - 1 MLRS rocket
 - SDF Design three configurations, impact functioning mode only
 - range: approx. 11 km
 - temperature: ambient

Results:

- an impact functioning rate of 95% could be proved with one configuration
- an over all arming reliability of more than 99% could be proved
- dud rate was not subject for prove



- Flight Test DVT3 / Fly-Off2 at WSMR
 - scheduled June 2004
 - 2 GMLRS Rockets
 - each rocket is equipped with 404 bomblets from two vendors, 202 from each
 - 50% of the bomblets are w/o delay chains for impact functioning rate prove, 50% of the bomblets are fully equipped for proving full functioning rate, dud rate and UXO rate
 - Temperature: hot (60°C/140°F)
 - Range: approx. 20 km
- PQT
 - scheduled October 2004
 - 9 GMLRS Rockets with 404 bomblets each,
 - 50% impact functioning mode only, 50% full functioning mode
 - full STANAG environmental Ground Tests

