



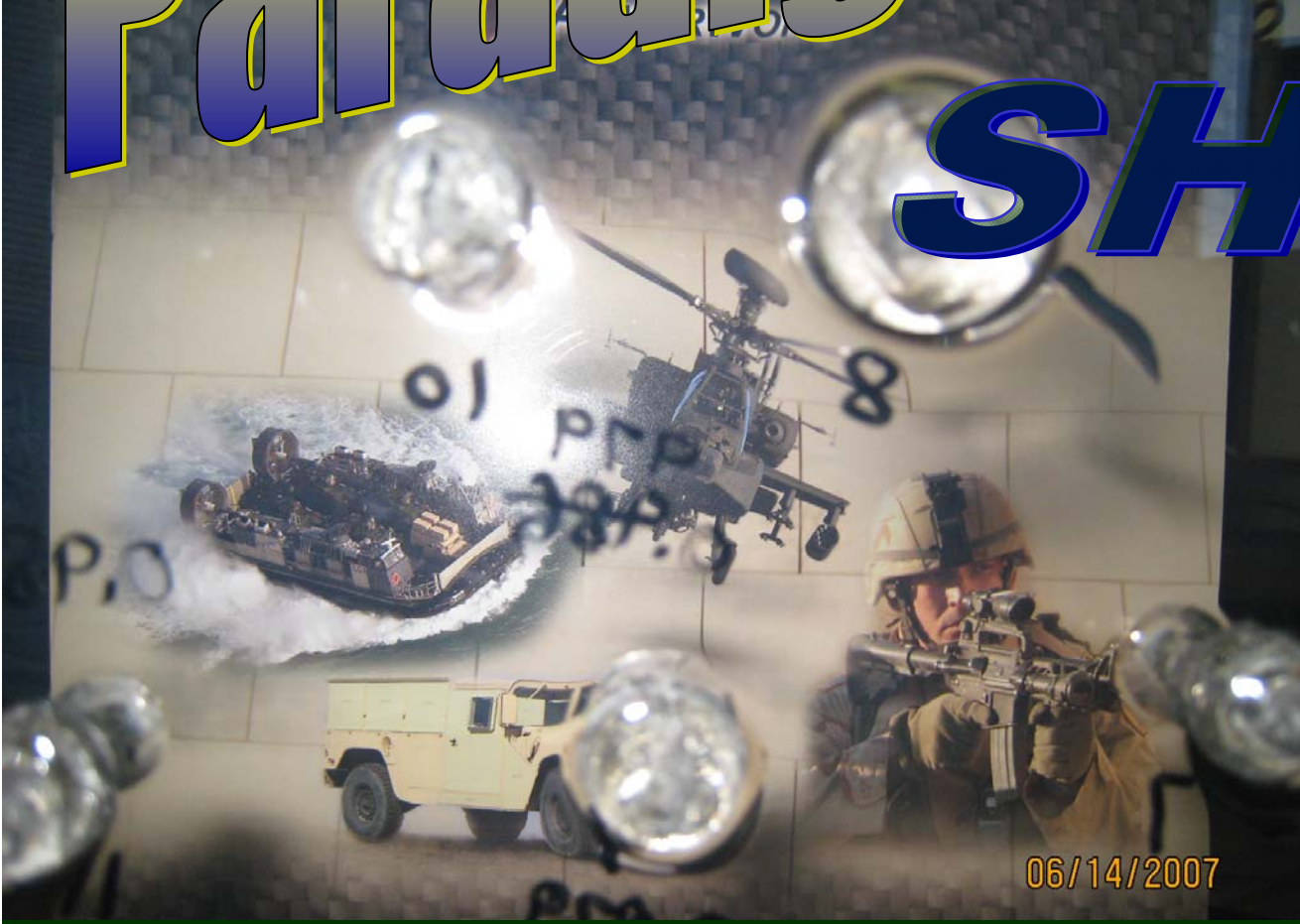
QUINTIUMTM

Transparent Armor

Presented by: Ray Scott
THE HANSON GROUP, LLC
And Qdyne LLC

Paradigm

SHIFT



For Those That Said It Couldn't Be Done

**If You Can Dream It
You Can Make It**



1. Lighter Weight Transparent Armor

2. Multi-hit Performance for Eye Wear

3. Toughened Optics for Windshields

4. Camera Shields

5. Higher Performance Canopies

Optically Clear Thermosets



Transparent Armor



CLEAR

Optically Clear Thermosets



Transparent Polymer

THE HANSON GROUP, LLC

Contracting Successful Business Projects

06/14/2007

Quintium™ Transparent Armor

PROPRIETARY POLYMERS

Q17 Thermoset Castable Armor

Can be used as a transparent, optically clear armor or a reinforced clear, castable armor for many various applications.

Key Properties:

- Impact resistance and kinetic energy absorption exceeds all other available transparent polymers. Unrivaled multi-hit performance.
- Light transmission (clarity) exceeds most industry standards.
- **Low Weight:** approximately 1/3 of ballistic glass. Effective weight reduction of 30% - 40% in transparent ballistic and blast armor systems.
- High abrasion resistance.
- Unlike most other ballistic resistant polymers, it is resistant to chemical solvents and aromatic hydrocarbons (e.g. gasoline).
- Polymer recovers after ballistic penetration, resulting in unrivaled multi-hit performance.

APPLICATIONS INCLUDE:

Bullet resistant windows for vehicles & buildings, helicopter windows, blast entry resistant glazing, transparent enclosures & components, blast resistant partitions and personnel armor shielding.

06/14/2007

STRONG

Optically Clear Thermosets



Transparent Castable Polyurethane



MULTI-HIT PERFORMANCE

History of Qdyne LLC & Quintium™



Proud Veterans &
Inventors of **Quintium™**
Dick Cook & Ed Slagel

**Inventors are:
Ed Slagel
Dick Cook**



Rocket Scientists from the 1950's

Goodyear Aerospace

**Developed many of the transparent
technologies in use today**



Impact Resistant



Light Weight High Performance Polymer

Uses:

- Bullet-resistant windows
- Face Shields
- Goggles
- Transparent structures & components
- Reinforced Armor
- Improves multi-hit performance



Uses and Benefits



Transparent Thermoset Polymer

- Impact resistance exceeds all other available transparent polymers
- Light transmission (clarity) exceeds most industry standards
- **Weight:** approximately $\frac{1}{2}$ of ballistic glass



- Resistant to blast pressure, weather (hurricane forces) & projectile impacts
- Used to replace both glass and polymers in transparent armor systems
- Effective weight reduction of 30% - 40% in transparent ballistic and blast armor systems
- Unlike most other ballistic-resistant polymers, it is resistant to chemical solvents and aromatic hydrocarbons (e.g. gasoline)

Uses and Benefits



Polymer re-closes after ballistic penetration, resulting in:

- Unrivaled multi-hit performance
- Retention of physical seal (e.g. container applications)



**Photo of Quintium
shot with 30.06
military armor
piercing projectiles**

Uses and Benefits



Unrivaled multi-hit performance

Threat: m80 ball round (7.62x51) @ 2,700 fps, 1" hit spacing, 13 shots



Uses and Benefits



Unrivaled Multi-Hit Performance

**Threat: AK47
v-Zero 2,400 fps, 1"
hit spacing,
5 Shots Within 1" of
each other. This is
the inside view of
the windshield.**



Uses and Benefits

Safety Around the World



Safety At Home



Property	Units	Acrylic As-Cast	Polycarbonate	Quintium Q17
Physical Properties				
Specific Gravity	-	1.2	1.2	1.11
Hardness	D scale	92-93	84-86	81-82
Abrasion, 200 cycles	$\Delta\%$ Haze	43.2	47.9	14.6
HDT	$^{\circ}$ F	212	276	275
	$^{\circ}$ C	100	136	135
Stress Craze Resistance (Isopropyl alcohol)	Psi	3,800	4,000	>7,000
Ballistic Data				
V50, 0.22 Caliber, 17 grain, fragment simulating projectile (FSP, 0.25 inch)	Ft/sec	775	889	1,220
Optical Properties				
Luminous Transmittance	%	91	89	90
Haze	%	1.0	0.8	0.33
Refractive Index	-	1.490	1.586	1.538



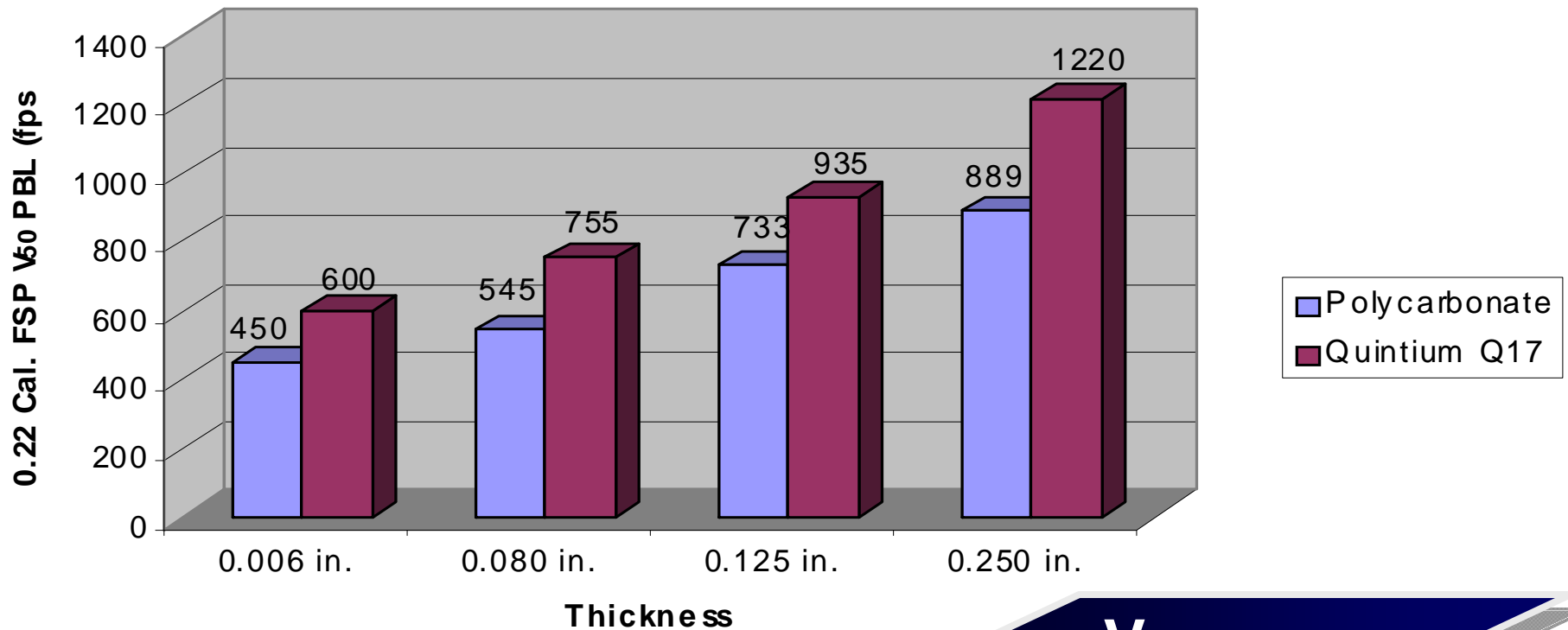
THE
CLEAR
CHOICE



Research Analysis

Quintium™ Q17

Ballistic Performance



V50 PBL Data

Research Analysis

Quintium™ Q17

Polymer Ballistic Performance Against Different Threats



<u>Threat</u>	<u>velocity(fps)</u>	<u>sample construction</u>	<u>Areal Wt(lbs)</u>	<u>notes</u>
(Strikeface/ innerlayer/ spall shield)				
17gr FSP	V50 = 1148	.25" Q17	1.43	
.22 LR solid	1200	.5" Q17	2.85	
9mm 124gr FMJ	1420	3/16" TG / .5" Q19/ .088" PC	5.59	
9mm 124gr FMJ	1190	1" Q17	5.75	
9mm 124gr FMJ	1295	.75" Q19/ .230 PC	5.72	
44 mag 240gr SWC	1430	.75" Q19/ .230 PC	5.72	
44 mag 240gr SWC	1404	.093" SL/ .5" Q19/ .25" Q17	5.48	
7.62x39 124gr FMJ	2450	.093" SL/ 1.75" Q19/ .088" PC	11.68	high temp, 2" spacing
M80 150gr FMJ	2750	.250" SL/ 2.5" Q19/ .088" PC	17.81	high temp, 2" spacing
50 cal FSP	V50=1380	1.0" Q17	5.75	

Research Analysis

SL = Soda lime glass TG = Tempered glass PC = Polycarbonate

FSP = frag simulating projectile FMJ = Full metal jacket, lead core SWC = Semi-wadcutter

Video of Lens 1, Shot 1

❖ Lens 1:

- 41 g disc
- 3-inch diameter
- .312 inch thick curved lens



Shot 1

❖ Shot 1:

- 1002 fps
- 1.7 grains of powder

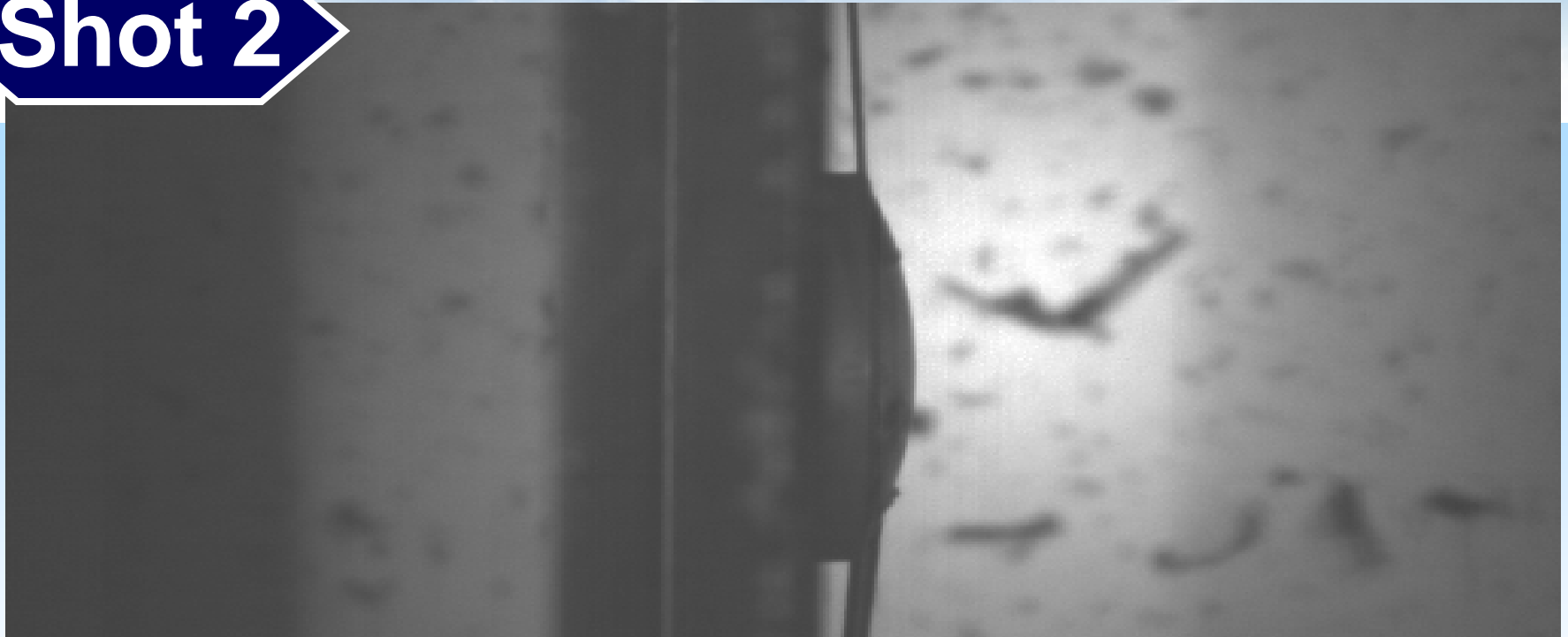


Shot 1 of 3

Video of Lens 1, Shot 2



Shot 2



❖ Shot 2:

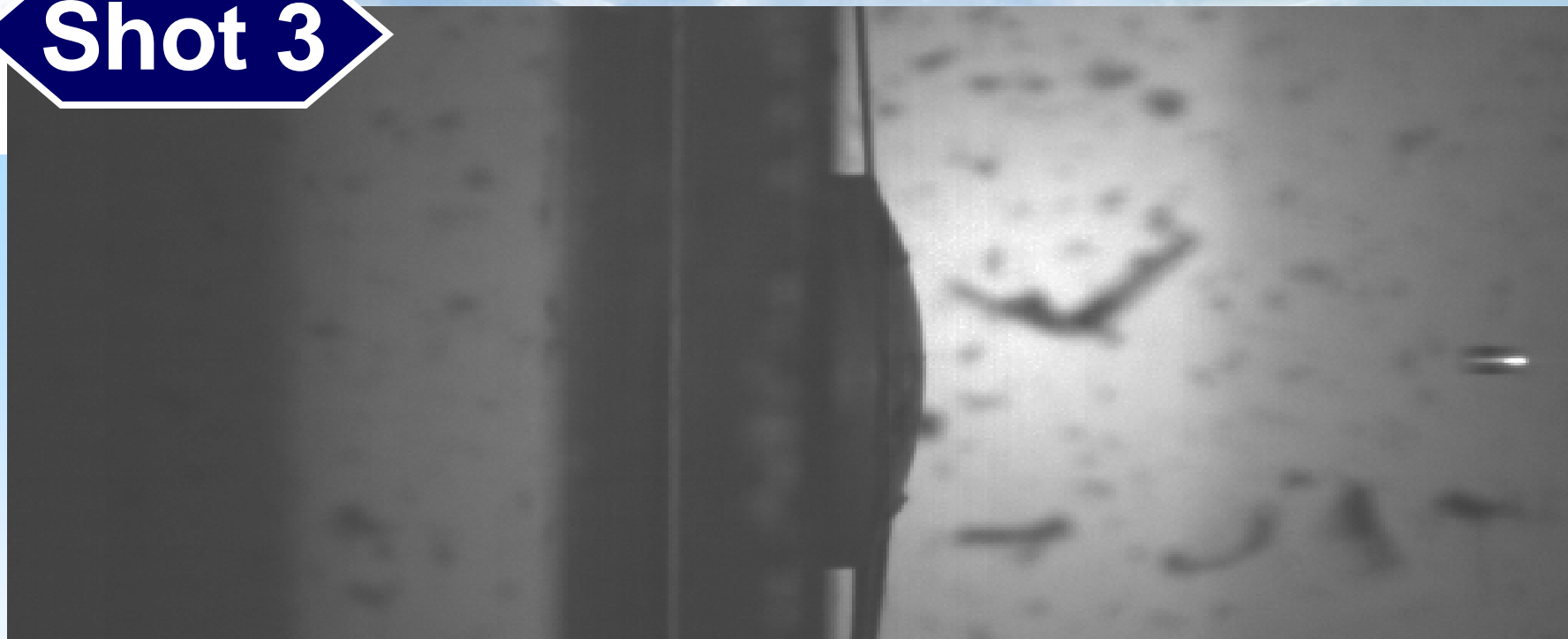
- 979 fps
- 1.8 grains of powder

Shot 2 of 3

Video of Lens 1, Shot 3



Shot 3



❖ Shot 3:

- 1226 fps
- 2.0 grains of powder

Shot 3 of 3

Video of Lens 3, Shot 1

❖ Lens 3:

- 41 g disc
- 3-inch diameter
- .312 inch thick curved lens



❖ Shot 1:

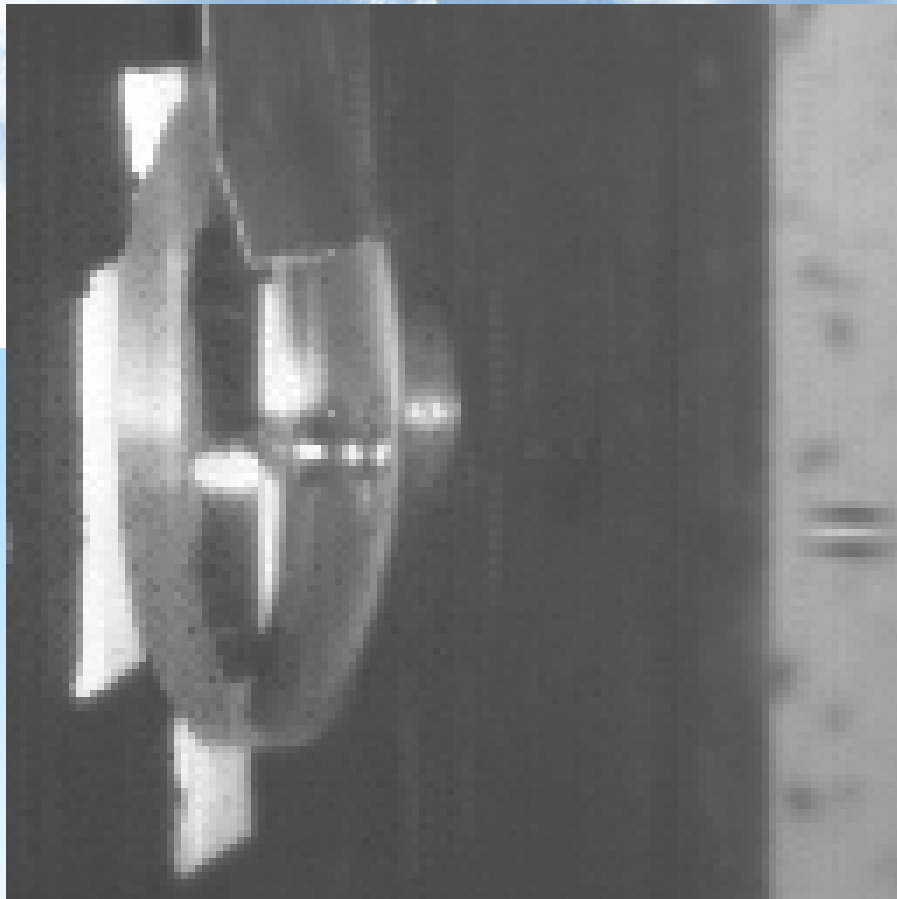
- 1240 fps
- 2.0 grains powder



Shot 1

Shot 1 of 3

Video of Lens 3, Shot 2



Shot 2



❖ **Shot 2:**

- 1276 fps
- 2.1 grains powder



Shot 2 of 3

Video of Lens 3, Shot 3

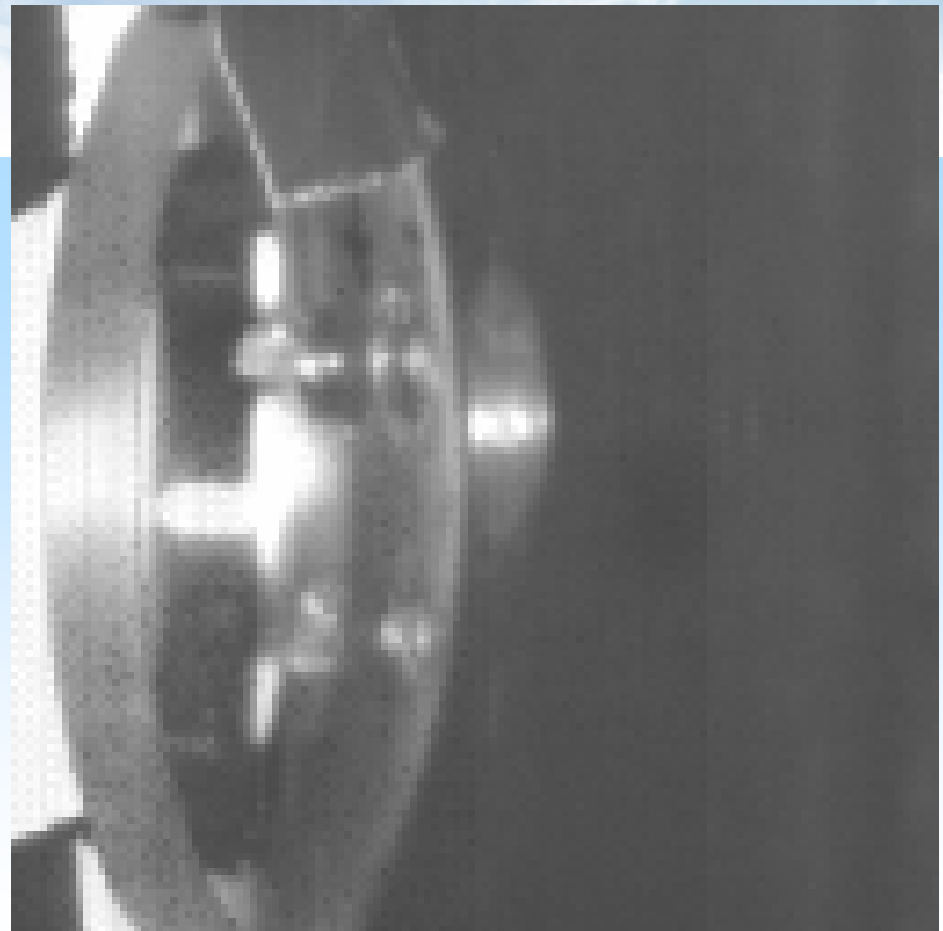
Shot 3

❖ Shot 3:

- 1225 fps
- 2.0 grains of powder



Shot 3 of 3



Quintium™



Serving Our Troops

Quintium™



Serving Our Troops



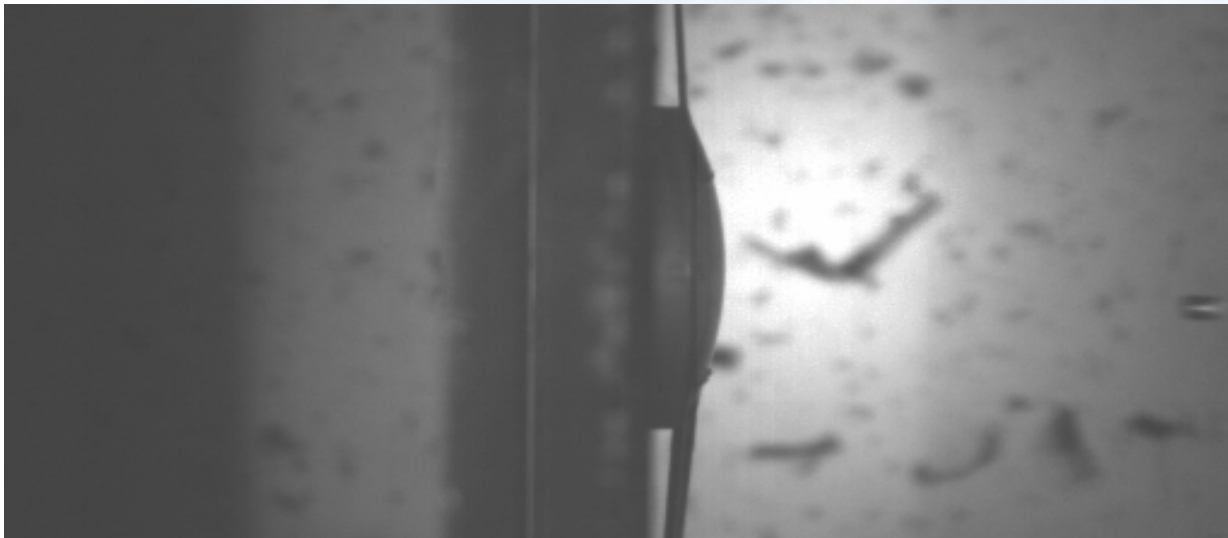
Quintium™

Homeland Security



Quintium™

A Product for Many Applications



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