

# Future of Small Arms Research Overview



The CASPA Warrior Web concept aims to develop a skin suit with embedded technology to reduce Soldier injuries while maintaining Soldier performance.



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# Overview / Background

- **Phase I** Focus on ASA(ALT) SAAL-ZT sponsored effort
  - Envisioning the Deep Future of Small Arms 2022-2042 Report
- **Phase II** Examine previous studies for currency
  - Since the 1980's JSSAP has sponsored various conclaves and meetings to generate revolutionizing ideas for future weapons to maintain our overmatch and dominance
- Lacking from the results of these studies are:
  - Rankings to guide investment in developing the concepts
  - Engineering evaluations of the concepts

# Approach

- **Concept Definition:** Define each concept to a sufficient level of detail to allow for quantitative estimates
  - Robust System Statements
- **Development of Evaluation Criteria:** Criteria based on “Future Report,” further defined using basic infantry functions
  - Utility and Applicability
- **Concept Evaluation:** A series of standardized questions are used to guide the establishment of consistent ranking values
- **Concept Ranking:** Rank the concepts based utility, applicability, impact to Tactics, Techniques, and Procedures, and number of Small Arms related technologies
- **Engineering Analysis:**

# Engineering Analysis

- Conduct rigorous engineering feasibility analysis using desired performance characteristics and metrics to obtain:
  - Technical feasibility
  - Current maturity level
  - Associated high-level technical risks and obstacles identified
  - Document and cross reference **Associated Technologies** in an effort to identify critical technologies

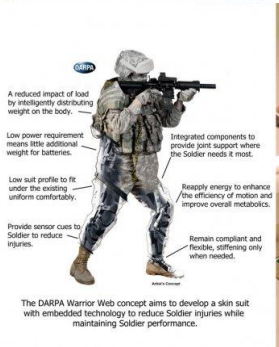
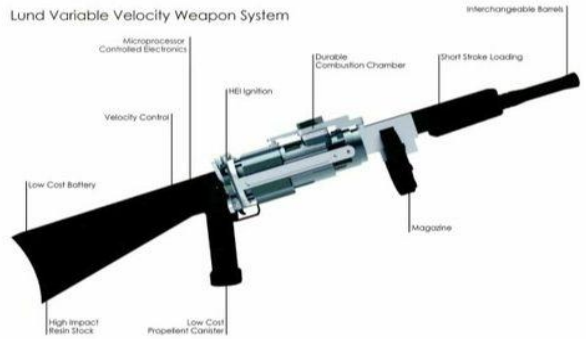
# Phase I Concepts

# Ranking-

27 Concepts presented in the “Deep Futures of Small Arms 2022 – 2042” report

### LVVWS

Lund Variable Velocity Weapon System

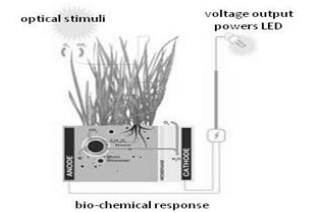
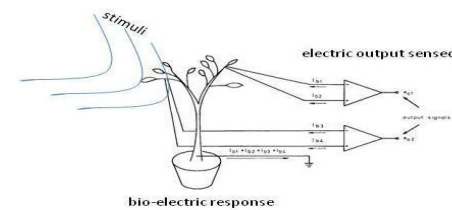
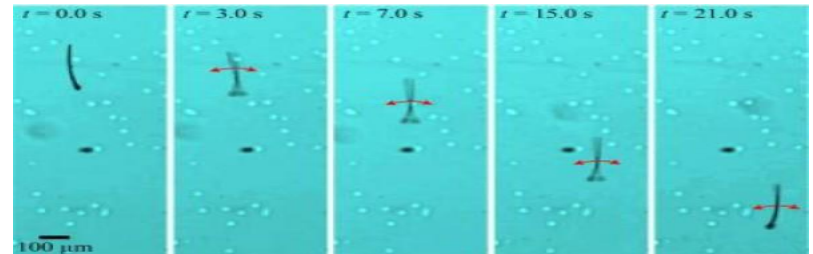
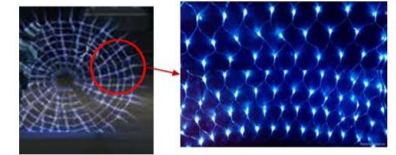
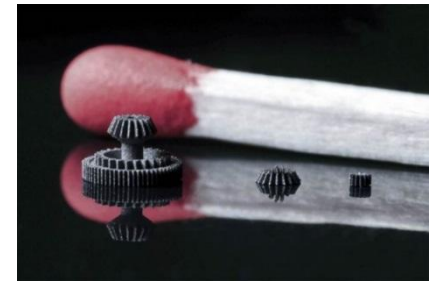


# Phase I - Top rated concepts based on Utility, Applicability, and Associated Technologies

Concept	Average Utility Rank	Average Applicability Rank	Small Arms Concept	Associated Small Arms Technologies
WASP (Weaponized Assault Surveillance Platform)	5.5	3	No	2
CLAWS (Combat Lightweight Automatic Weapon System)	4.5	6	Yes	4
SAVE (Soldier Asymmetric Vision Equipment)	8.5	6.5	Yes	1
Electric Rifle	14	3	Yes	5
HEPA (Hyper Energy and Power Ammunition)	8.5	8.5	Yes	4
DENI (Directed Energy Negation and Integration)	10.5	7.5	Yes	3
Effects Options	12.5	6	Yes	6
Energy Harvesting	12.5	7	Yes	4
Kinetic Modular Weapon Platform	10.5	10.5	Yes	3
Exoskeleton (Iron Man)	1	5	No	4

# Phase II Concepts Ranking-

Previous Reports Dating Back to 1986



# Phase II - Concepts

## Down-select

- Approximately 40% of the 171 concepts were duplicates of, or similar to, other listed concepts. This included concepts that were covered in Phase I
- Approximately 28% of the 171 had already been fielded or were ready to be fielded
- Approximately 23% of the 171 concepts were not well defined S&T concepts, or fell in to the category of a technology is be being continuously developed



# Phase II - Top rated concepts based on Utility, Applicability, and Associated Technologies

Concept	Utility Rank	Applicability Rank	Small Arms Concept	Associated Small Arms Technologies
Small Arms Launched Radio Jamming Device	3.0	1.0	Yes	2
Shoulder Mounted Laser	2.0	3.0	Yes	4
Weapon Acoustic Signature	5.0	2.0	Yes	1
Short time-of-flight KE projectiles, low mass tubular or ramjet	1.0	6.0	Yes	5
Internal First Aid (Nano-Doctors) / Nano-Doctors in Reverse	7.0	4.0	No	4
Increase Weapon Bore Size	4.0	8.0	Yes	3
Area/Crowd Electro-muscular Control	8.0	5.0	Yes	6
Weapons Designed for Confined Spaces - Buildings, Caves, Tunnels, etc.	6.0	7.0	Yes	4
Lump Gun	9.0	9.0	Yes	3
Chemical / Organic Relay	10.0	10.0	No	4

# Associated Technologies Results

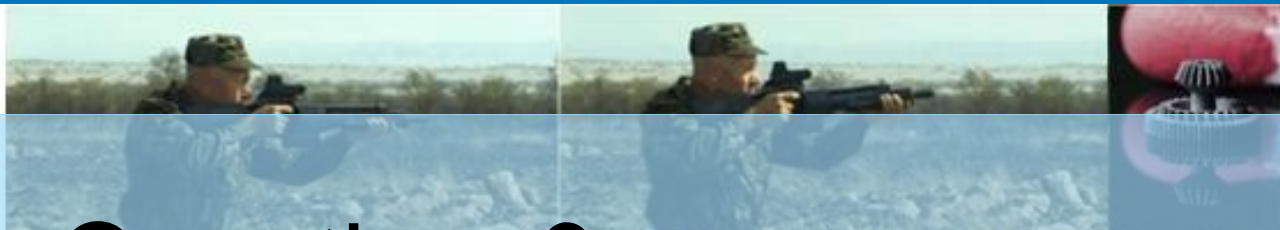
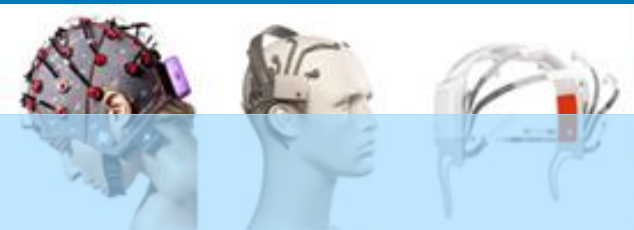
Technology	Occurrences, All Concepts	Occurrences, Small Arms Concepts
Battery Tech - High Density	15	3
Battery Tech - Light Weight	14	3
Battery Tech - Fast Charging	10	1
Target Identification and Tracking / IFF	10	1 (5*)
Encrypted Wireless Communications / Secure Communications	9	0
Robotics Mobility	9	0
Power generation / Micro power generation	7	1
Advanced Propellants / Liquid Propellants	6	6
Artificial joints and limbs	6	0
HUD / Helmet Mounted HUD	6	0
Advanced Fire Control System	5	3
Electromagnetic Launch	5	5
Advanced energetics / nano-energetics	4	4
Neuromuscular interference / Human Electro-Muscular Incapacitation (HEMI)	4	3
Millimeter wave / Microwave Weapons	4	3
3D Printing of Metals	3	2
Electromagnetic Pulse (EMP) Weapons	3	2
Cloud Based Computing	3	0
Radio Frequency Identification (RFID)	3	0
Light Weight Ammunition (Caseless and Polymer Cased)	3	3

*\*Including solidier information systems*

# Conclusion

## The Value of Ideation Exercises

- *Approximately 28% of the 171 had already been fielded or were ready to be fielded*
- Identifying Concepts and Technologies Early
  - Define needs
  - Determine where to invest
  - Decide what technologies to closely monitor



# Questions?

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