

DARPA Surgical Competition (DSC)

Industry Day



22 September 2026





Welcome and Meeting Agenda

Dr. Jeremy Pamplin, Program Manager,
Defense Advanced Research Projects Agency (DARPA), Biological Technologies Office (BTO)



Purpose of this Meeting

- Discuss DSC objectives and structure
- Provide information on qualifying for the Competition
- Provide opportunity for teaming prior to submission deadline

Communications

- Open communications between competitors and the program manager are encouraged
- Information given to one competitor will be made available to all competitors

Questions

SurgicalCompetition@darpa.mil



Agenda



Start	End	Duration	September 22, 2026
			Industry Day
8:45	9:00	15	Webinar Log-In Available
9:00	9:05	5	Welcome and Meeting Logistics Jeremy Pamplin, Program Manager, DARPA/BTO
9:05	9:45	40	Surgical Competition Overview Jeremy Pamplin, Program Manager, DARPA/BTO
9:45	10:00	15	Working with DARPA (DARPA Overview + Qualification Process) Jeremy Pamplin, Program Manager, DARPA/BTO
10:00	10:30	30	Damage Control Surgery Demonstration Uniformed Services University
10:30	10:40	10	Break
10:40	11:40	60	Lightning Round Talks Proposer Introductions and Teaming Presentations (Alphabetical Order)
11:40	11:50	10	Break
11:50	12:20	30	DARPA Q&A Proposers submit questions electronically
12:20	12:30	10	Closing Remarks Jeremy Pamplin, Program Manager, DARPA/BTO
END			



Surgical Competition

Dr. Jeremy Pamplin, Program Manager, DARPA/BTO



Combat Casualty Care

was

is



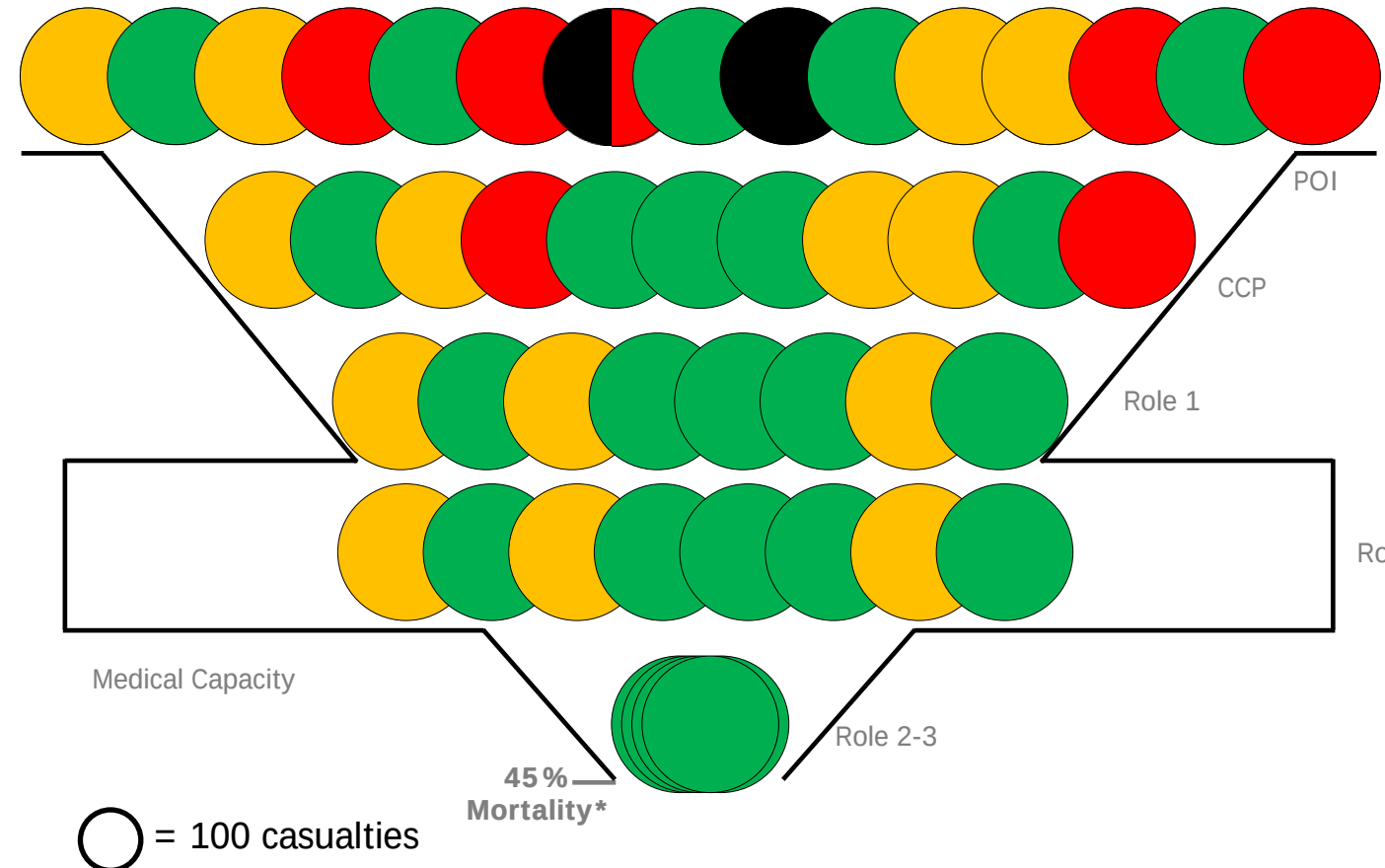
Capacity and The Bottleneck Problem



***Conceptual
2500 Casualties / Day**

- 150 Dead (6%)
- 350 Damage Control Surgery (14%)
- 375 Urgent Surgery (15%)
- 500 Moderate Surgery (20%)
 - 250 Minor Procedure (no OR, 10%)
 - 875 No surgery (35%)

Baker, et al. (2025). Journal of Trauma and Acute Care Surgery, 99(3S), S170-S174.



Role of Care	Function
POI	Identify Casualties Triage TCCC / MARCH LSIs Extraction
CCP	Resuscitation Monitoring
R1	DCS
R2	Definitive surgery Critical Care • Resuscitate • Monitor • Organ Support
R3	

POI: Point of Injury

CCP: Casualty Collection Point

R1-R3: Roles of Care 1-3

TCCC: Tactical Combat Casualty Care

MARCH: Massive Hemorrhage, Airway, Respiration, Circulation, Head/Hypothermia

DCS: Damage Control Surgery



Autonomous Live Chain



- **Manufactured Medical Care**
- **Scalable Capacity**

*Conceptual
2500 Casualties / Day

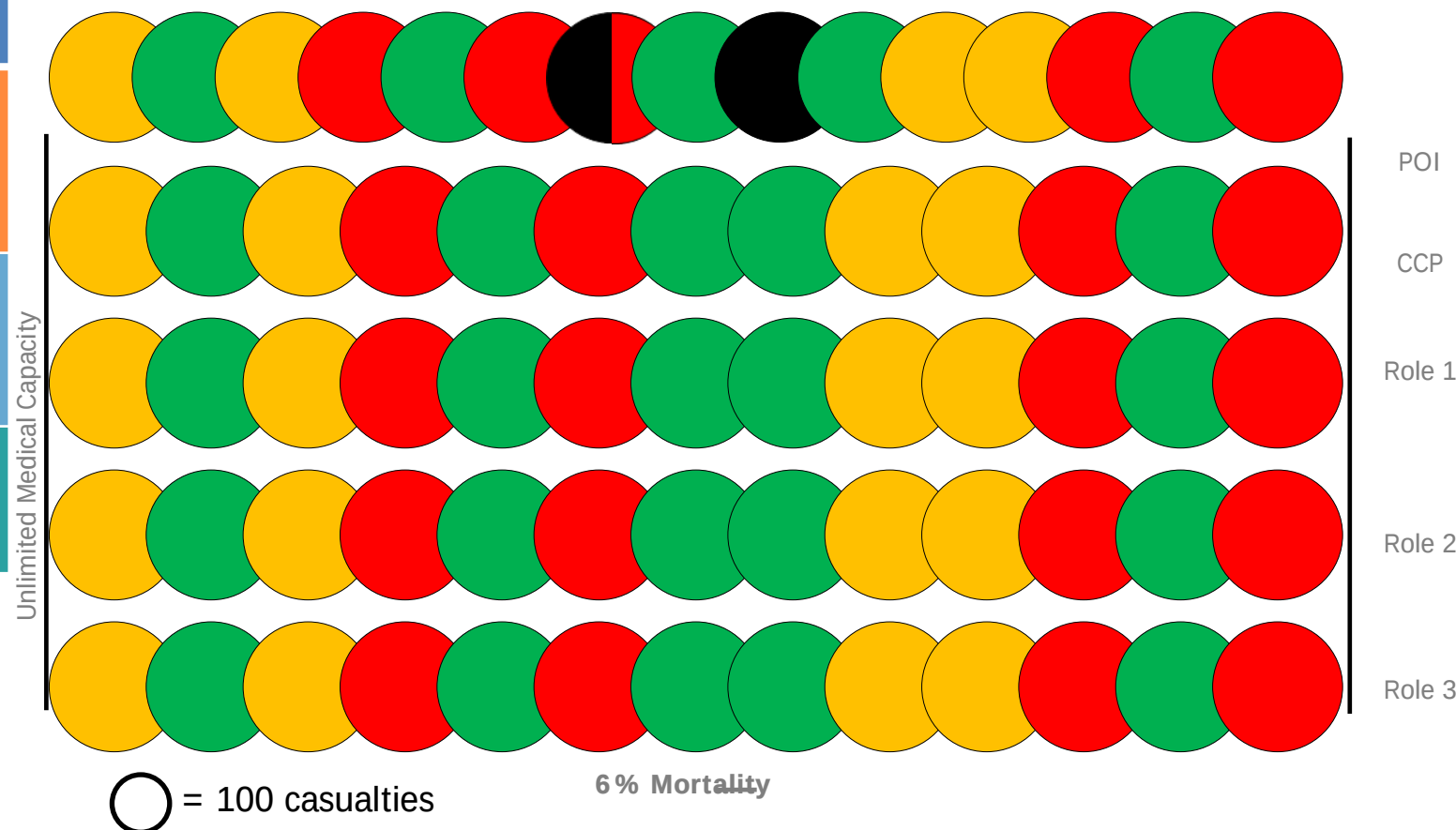
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Care Type	Functions
POI	ID casualties Triage TCCC (LSIs) Extraction & Movement
"Holding" • CCP-EVAC • Critical Care	Resuscitate Monitor Organ Support
Procedures / Surgery	DCS Definitive Care

Coordination

Logistics & Resupply
C2 (right place right time)



POI: Point of Injury
CCP: Casualty Collection Point
R1-R3: Roles of Care 1-3
TCCC: Tactical Combat Casualty Care
MARCH: Massive Hemorrhage, Airway, Respiration, Circulation, Head/Hypothermia
DCS: Damage Control Surgery



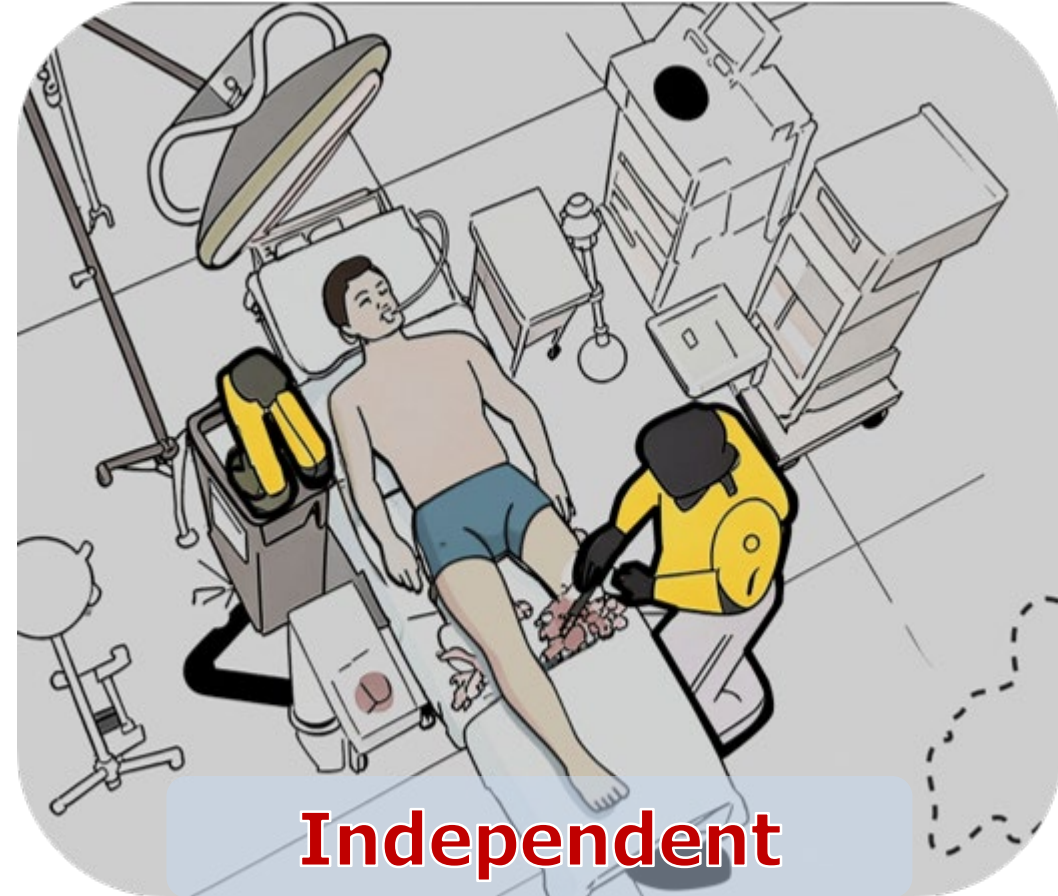
DSC: Delivering Scalable, Autonomous Surgical Care



Problem: Warfighters will die in LSCO because human-based capacity cannot scale.



Collaborative



Independent

Vision: Autonomous robotic surgeons can be scaled to eliminate mortality due to limited capacity.



Schedule





Must pass minimum required
score to advance to Lanes 1 & 2

Component Level Testing (Gates)

Medical Knowledge (Gate 1)

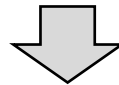
- **Recognition:** Tools, Anatomy, Sterile Field
- **Knowledge:** Procedural Step Understanding

Physical Capability (Gate 2)

- **Surgical Skills:** Function: Strength, Dexterity, Tension
- **Safety Commands:** Safe Communication & Collaborative Autonomy

Rapid Learning (Gate 3)

- **New Task Learning** from Minimum Observed Examples



Lane 1: Surgical Collaboration

- Single Procedure Assessment
- Damage Control Surgery based off Trauma Injury Pattern
- Platform Assists Collaboratively

Scoring

- **Efficacy** – Completeness & Correctness
- **Efficiency** – Speed of Operations
- **Safety** – Tissue-Damage, Erratic Motion
- **Control** – Tele-op vs. Automated Tasks

Lane 2: Surgical Independence

- Single Procedure Assessment
- Damage Control Surgery based off Trauma Injury Pattern
- Platform Independently Completes Procedure

Scoring

- **Efficacy** – Completeness & Correctness
- **Efficiency** – Speed of Operations
- **Safety** – Tissue-Damage, Erratic Motion
- **Control** – Tele-op vs. Automated Tasks



Gate 1: Medical Knowledge

- Software Based Assessments
 - “Oral Boards”
- **Gate 1A: Recognition**
 - Surgical Instruments
 - Anatomy
 - Sterile Field
- **Gate 1B: Procedure Step Understanding**
 - Procedure Workflows
 - Pathological Sign Indicators

Gate 2: Physical Capability

- Hardware Based Assessments
- **Gate 2A: Surgical Skills**
 - Strength
 - Retract, Lift, etc.
 - Tension
 - Hold, Pull, etc.
 - Dexterity
 - Grasp, Cut, etc.
- **Gate 2B: Safety Commands**
 - Command Response
 - Loss of Signal Response
 - Collision Response

Gate 3: Rapid Learning

- Learning Based Assessment
- **Gate 3A: New Skills Task**
 - 60-minute limit
 - Unknown task
 - Mastery over 3 Attempts

**Assessments are subject to change – please review official rules document on competition website*

Lane 1: Surgical Collaboration

- Collaboratively Assist Trauma Procedure
- Scored at Individual Surgical Steps
- Must Respond Effectively and Efficiently to Lead Surgeon Commands



Lane 2: Surgical Independence

- Independently Lead Trauma Procedure
- Scored at Individual Surgical Steps
- Must Diagnose, Plan, and Execute the Complete Trauma Procedure





Prize Awards



Total: \$3.5M

Component-Level Testing Gates		Full Procedure Surgical Lanes			
Gate	Prize		Place	Surgical Collaboration Lane*	Surgical Independence Lane*
Total	\$500,000		Total	\$1,500,000	\$1,500,000
Physical Capability Gate	\$235,000		1 st	\$1,000,000	\$1,000,000
Rapid Learning Gate	\$100,000		2 nd	\$400,000	\$400,000
Medical Knowledge Gate	\$75,000		3 rd	\$100,000	\$100,000
Meet Minimum Requirements (up to 10 teams)	\$3,000 / gate			*Must meet minimum requirements to win the prizes above (see section 7.4.3).	



Qualification Process

Dr. Jeremy Pamplin, Program Manager, DARPA/BTO



Qualification Process



- **Timeline:**
 - Challenge Qualification
9/10/2026 – 11/13/2026
 -  Kick-off
9/22/2026
 -  System Development
10/2/2026 – 1/14/2027
 -  Workshop Event
1/15/2027 – 1/24/2027
 -  System Refinement
1/25/2027 – 3/19/2027
 -  Competition Event
3/20/2027 – 3/27/2027
- **Qualification Submissions:** <https://centralfloridatechgrove.org/darpa-surgical-competition/>
 - **Whitepaper** (PDF)
 - Experience
 - Robotic System Design
 - End-Effector(s)
 - Perception & Sensing
 - Teleoperation
 - Autonomy
 - Compute
 - Positioning & Safety Plan
 - CIDR Block Information
 - **Videos** (Unlisted YouTube Link)
 - Robotic Motion
 - Emergency Stop
 - Surgical Capability (3 of following):
 - Retract tissue
 - Suction fluid
 - Irrigate cavity
 - Adjust lighting
 - Suture tissue
 - Clamp vessels
 - Incise skin
 - Lift tissue



Damage Control Surgery Demonstration

Uniformed Services University



Break



Lightning Round Talks

Potential Performers



Break



Q&A

DARPA + IV&V Team



Closing Remarks



- **Resources:**

- Competition Website: <https://www.darpa.mil/research/challenges/surgical>
- Competition Email: SurgicalCompetition@darpa.mil
- Qualification Portal: <https://centralfloridatechgrove.org/darpa-surgical-competition/>
- Competition Forum: DARPA Link
 - Accessible to Qualified Teams Only



www.darpa.mil



Back Up Slides
