



Software for Autonomous Systems

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ITO



Program Vision

Develop the needed
Software Technologies
to enable the safe, reliable, and
cooperative operation of
autonomous, free ranging
systems for the real world



Program Scope

- Software (only) systems -
Knowbots
- Software-enabled, physically embodied, mobile systems -
Robots



Knowbot Themes

- Information Retrieval
- Information Delivery
- Information Generation
(especially negotiation)



Robot Themes

- New Capabilities
- Enhanced Capabilities
- Reduced Cost



ITO Programs

- Knowbots
 - Autonomous Negotiating Targets
- Robots
 - Mobile Autonomous Robot Software
 - Software for Distributed Robotics
- Software Enabled Control



ANTS Vision

- Autonomously negotiate the assignment and customization of resources to tasks
- Applications include logistics, electronic countermeasures, and reactive weapons control

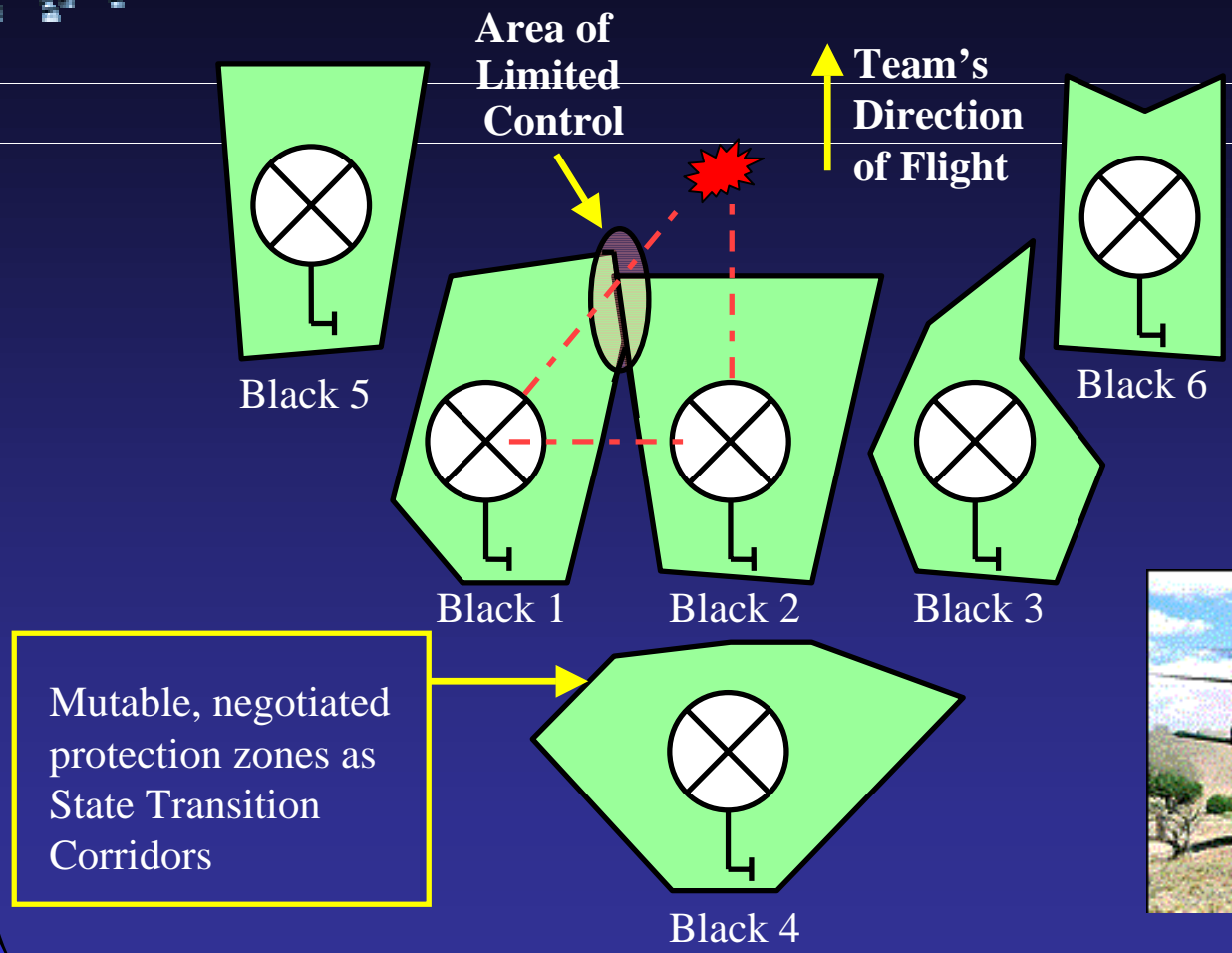


“You don’t get what you
deserve, you get what
you negotiate.”

Chester Karras



ANTs Technology Application

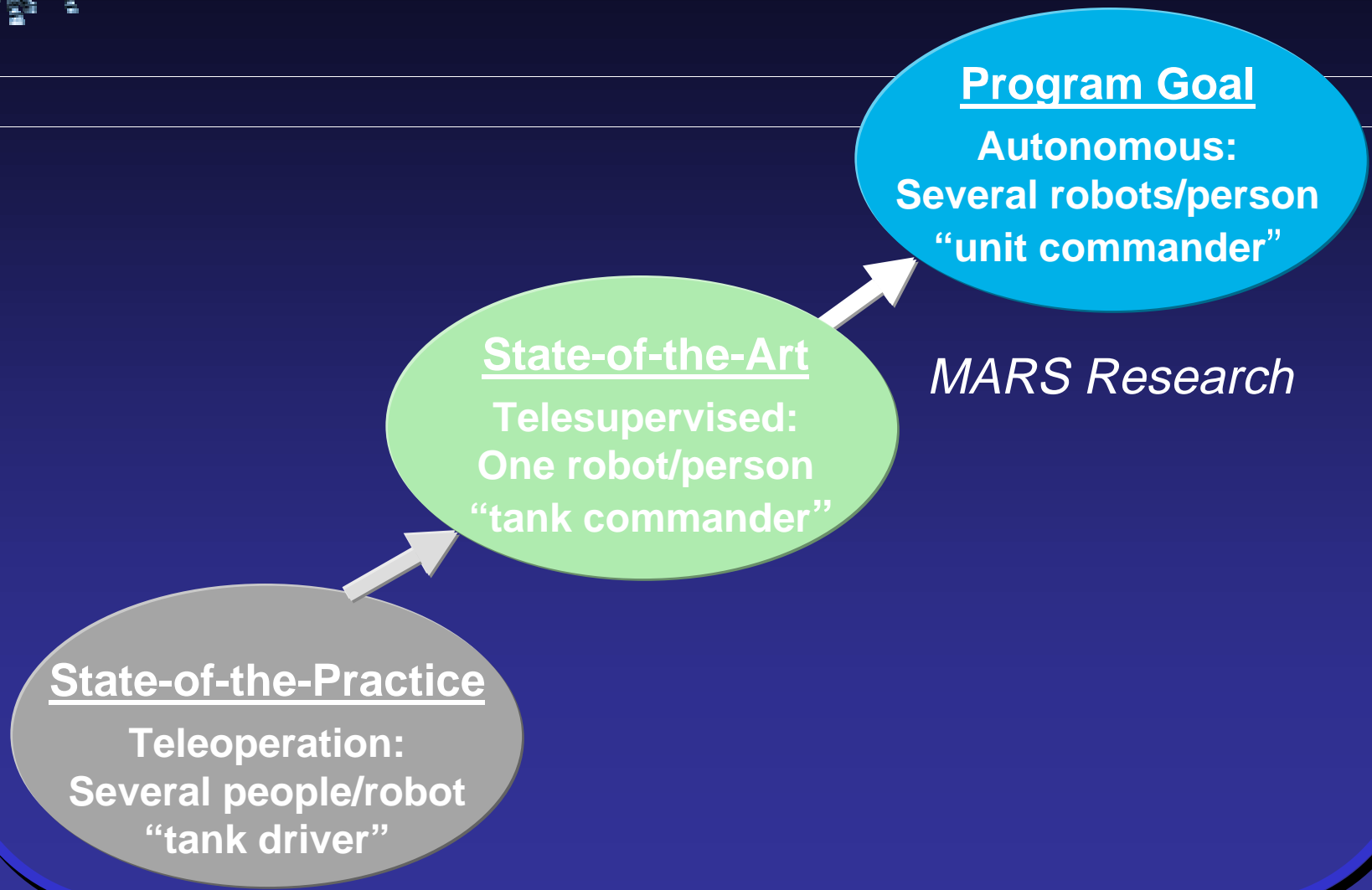


Could ANTs have prevented the 1996 Australian Army Blackhawk Collision?





MARS Vision





MARS Goals

- Enhance the autonomy of robot systems
- Enhance the utility, ease of development, and reusability of robot software



Research Issues

- Predictability
- Robustness
- Data Structures
- Adaptability
- Software Composition

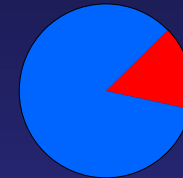


Software Approaches

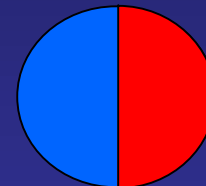
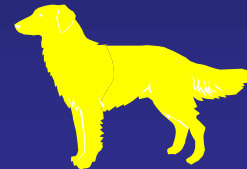
■ Pre-programmed

■ Learning-based

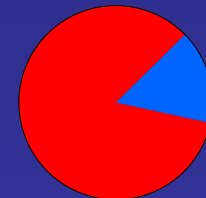
Soft Computing



Robot Shaping



Imitative Learning





MARS Robots



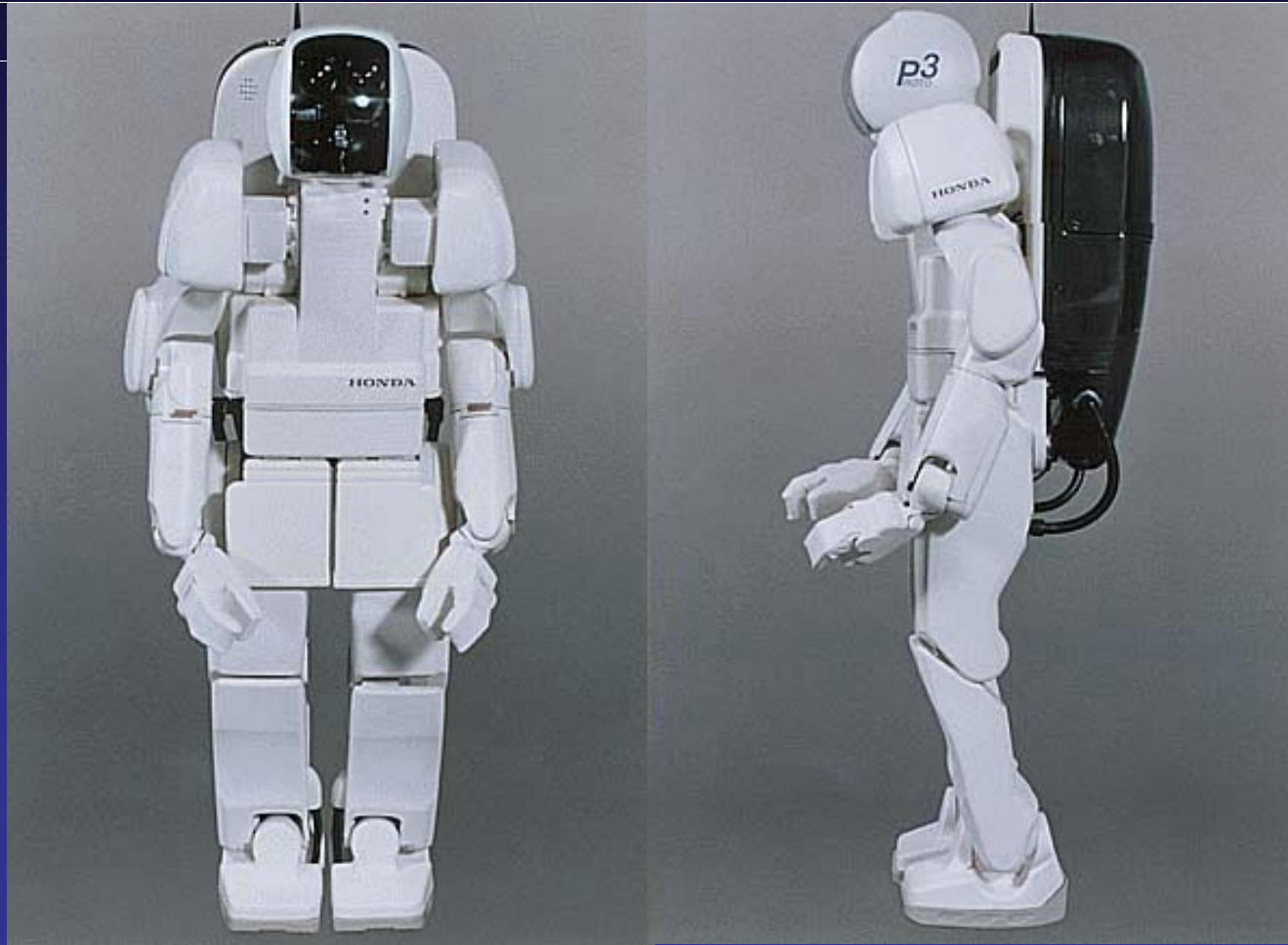


Tactical UGV





Androids





Distributed Robots





Aerial





SDR Vision

Large Scale Results from
many
Small Scale Robots



Research Issues

- Coordinated Control
- Networking/Communication
- Processing Power Allocation



Unmanned Vehicles





Autonomous Robots





America's Army

