

Technology Developments

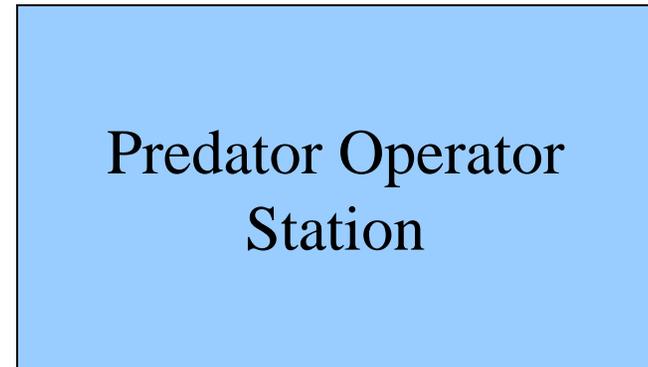
- Operator Interface -

Objectives

Establish criteria for remote operator station

Near-term (Remotely piloted)

Far-term (Remotely supervised)



Tasks

Near-term:

- Conduct part-task simulations to determine "see & avoid" visual requirements
- Conduct part-task simulations and selected flight evaluations to define requirements for
 - flight supervision
 - flight management
 - flight control

Far-Term:

- Determine requirements through simulation for multiple vehicle management
- Develop in simulation adaptive, cooperative onboard /cockpit automation concept

Issues

Near-term

- "See and avoid" information requirements
- Ground-based display/design opportunities
- Blended immersive (HMD)/non-immersive display environments
- Integrated instrument and virtual (sensor, synthetic) displays

Far-term

- Attention management in multi-vehicle control environment
- Criteria for interactive goal setting/emergency response

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Program Plan

Elements	FY	04	05	06	07	08	Milestones
Develop remote operator station		△ _{1a}		△ _{1b}	△ _{1c}	△ _{1d}	1. Complete development of remote operator station capable of: <ul style="list-style-type: none"> 1a. simulated single UAV control 1b. UAV flight test control 1c. simulated UAV fleet control 1d. UAV test fleet control
Develop user interface concept for remote management of a single UAV		△ _{2a}	△ _{2b}	△ _{2c}	△ _{2d}		2a.. Deliver preliminary design concept for virtual UAV cockpit 2b. Complete test/evaluate /redesign cycle of human-in-the-loop simulations to provide sensor requirements for see & avoid capability. 2c. Complete test/evaluate /redesign cycle of human-in-the-loop simulations to enable seamless mode transitions between flight supervision, flight management, and flight control (nominal and off-nominal). 2d. Demonstrate full capability to remotely supervise, manage,, and control UAV test vehicle from remote operator station in NAS.
Develop user interface concept for UAV fleet management			△ _{3a} △ _{3b}		△ _{3c}	△ _{3d}	3a. Complete preliminary design concept for adaptive automation 3b. Complete HCI display concept to maintain situation awareness of multi-vehicle health and trajectory status. 3c. Complete test and evaluation cycle to validate design concepts in simulated fleet management. 3d. Demonstrate capability to manage UAV test fleet remotely.

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Resource Requirements by Task

Elements	FY	04	05	06	07	08
Funding (\$K)						
Develop remote operator station		400		400	200	
Develop user interface concept for remote management of a single UAV		100	400	400	400	
Develop user interface concept for UAV fleet management			400	200	200	400
Total		<u>500</u>	<u>800</u>	<u>1000</u>	<u>700</u>	<u>400</u>
Staffing (FTE CS)						
Develop remote operator station		2		1	1	2
Develop user interface concept for remote management of a single UAV		1	2	2	2	2
Develop user interface concept for UAV fleet management			2	2	2	2
Total		<u>3</u>	<u>4</u>	<u>5</u>	<u>5</u>	<u>2</u>