

## Chapter 10

### A Roadmap

The study group concluded that most of the technologies are available for successful UAV development, manufacture, and deployment in the near-term. In fact, the development of three UAVs for the Air Force is well under way. Other technologies, such as advanced engines, automation technologies, and weapons must be matured. For these technology efforts, DARPA might be an effective partner because of its strong past development of UAVs and its investment in intelligent systems.

Senior leadership is interested in employing UAVs in autonomous and complementary roles. What now remains is the need for an aggressive effort to introduce UAVs to the fighting force and to integrate the capability into the Joint Service Force structure.

The effective integration of UAVs into the Air Force lies in the successful demonstration of incremental capabilities to, or by, an audience with strong vision, dedicated to the development of operational concepts that include UAVs as close complements to manned elements. Successful demonstrations, in turn, are possible only if the Air Force acquisition staff makes bold, but correct, technical decisions regarding the design and development of UAV systems. They must consider the aircraft but also pay careful attention to the other elements: mission systems, weapons, human systems, communications connectivity, mission planning/replanning, and self-protection—all in the context of a carefully structured technical and operational architecture.

The Air Force should elevate the authority responsible for the development of UAVs to a level commensurate with the potential importance of application. A major program office should be established at the Aeronautical System Center, with suitable participation by other Systems Centers and the Laboratories. Associated with the recognition aspect is the need to elevate the nomenclature of the UAV from the traditional three-letter plus number (e.g., BQM-34) associated with electronics equipment and small missiles, to a letter-number combination (G-12, K-11, M-3, etc.) as is assigned manned aircraft (e.g., F-15)<sup>12</sup>.

Several near-term demonstrations are specifically recommended. They will serve to test technologies, develop confidence, and determine operational concepts and architectures. Most can be accomplished with existing vehicles. One new medium-altitude UAV designed for combat roles must be designed and developed. The demonstrations are:

- *Enhanced ISR missions with ESM, foliage penetration, and advanced radar sensors, coupled with automatic target cueing or screening and advanced fusion concepts*
- *ESM and jamming payloads for detection, precision location, and neutralization of radio frequency emitting threats*

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<sup>12</sup> It was subsequently learned that a Mission Design Series (MDS) designator of “Q” has been established for UAVs.

- *Fixed and moving target attack using UAVs to detect and locate the targets based on image-coordinate transformation, cueing, and advanced lightweight weapons*
- *Communications and navigation support, based on the DARPA UAV Communications Node concept, but adding GPS augmentation pseudolites for precision guidance under GPS jamming*
- *Suppression of enemy air defenses*

The Air Force has witnessed the birth of a new generation of UAVs—one embraced by the forward thinking of Air Force leaders. Continued high-level interest and involvement is essential during the incubation period, for just one or two failures will destroy confidence and, perhaps, the future of unmanned aircraft.

The sequence of events has allowed us to make a judgment as to when the UAV will be able to begin performing key Air Force missions and tasks. The Air Force has chosen various dates and names to denote the beginning of operational capabilities such as IOC, RAA, etc. Each has its own definition and criteria. Based on the evolutionary development of technologies and the critical integration of these technologies into aircraft, time periods were defined for the beginning of operational demonstrations of mission concepts and tasks—Near-Term (1996-2005), Mid-Term (2005-2015), and Far-Term (2015-2025). The study group believes that the development and test of UAV-based capabilities will be sufficiently complete to begin operational demonstrations of the 22 mission areas as shown in Table 10-1.

**Table 10-1. Timeframes for Initial Operational Demonstrations**

<i>Air Force Capabilities</i>	<i>Near-Term (1996 - 2005)</i>	<i>Mid-Term (2005 - 2015)</i>	<i>Far-Term (2015 - 2025)</i>
<b>Sustain Nuclear and Conventional Deterrence</b>		Strategic Attack	
		Space Control	
<b>Project Long-Range, Sustainable, Lethal Combat Power</b>	<b>FIXED TARGET ATTACK</b>		
	Base Defense		
		<b>SEAD</b>	
		<b>THEATER/CRUISE MISSILE DEFENSE</b>	
		<b>MOVING TARGET ATTACK</b>	
		Special Operations	
		Area Denial	
		Decontamination and Defoliant Dispensing	
		<b>AIR-TO-AIR</b>	
			<b>CWMD</b>
		CSAR	
		Trans/Post SIOP	
<b>Support Rapid Global Mobility</b>		Tanker	
			Cargo Transport
<b>Provide Global Situational Awareness</b>	<b>ISR</b>		
		Humanitarian Assistance	
<b>Dominate the Information Spectrum</b>	<b>UCN</b>		
	<b>JAMMING</b>		
		Information Warfare	
		GPS Augmentor	
Assumptions	<ul style="list-style-type: none"> <li>• Complement to manned vehicles</li> <li>• Current Tier platforms, mission systems, &amp; weapons</li> <li>• Use of UTA</li> </ul>	<ul style="list-style-type: none"> <li>• New UAV platforms</li> <li>• New mission systems &amp; weapons</li> <li>• New UAV C<sup>2</sup> systems</li> </ul>	<ul style="list-style-type: none"> <li>• Autonomous or complementary</li> <li>• Robust C<sup>3</sup></li> <li>• Out-of-box platforms, mission systems, &amp; weapons</li> </ul>