

Chapter 5 Investigation Recommendations

How Do We Get There From Here?

To fully appreciate the development of the specific operational capabilities weather-modification could deliver to the war fighter, we must examine and understand their relationship to associated core competencies and the development of their requisite technologies. Figure 5-1 combines the specific operational capabilities of Table 1 into six core capabilities and depicts their relative importance over time. For example, fog and cloud modification are currently important and will remain so for some time to come to conceal our assets from surveillance or improve landing visibility at airfields. However, as surveillance assets become less optically dependent and aircraft achieve a truly global all-weather landing capability, fog and cloud modification applications become less important.

In contrast, artificial weather technologies do not currently exist. But as they are developed, the importance of their potential applications rises rapidly. For example, the anticipated proliferation of surveillance technologies in the future will make the ability to deny surveillance increasingly valuable. In such an environment, clouds made of smart particles such as described in chapter 4 could provide a premium capability.

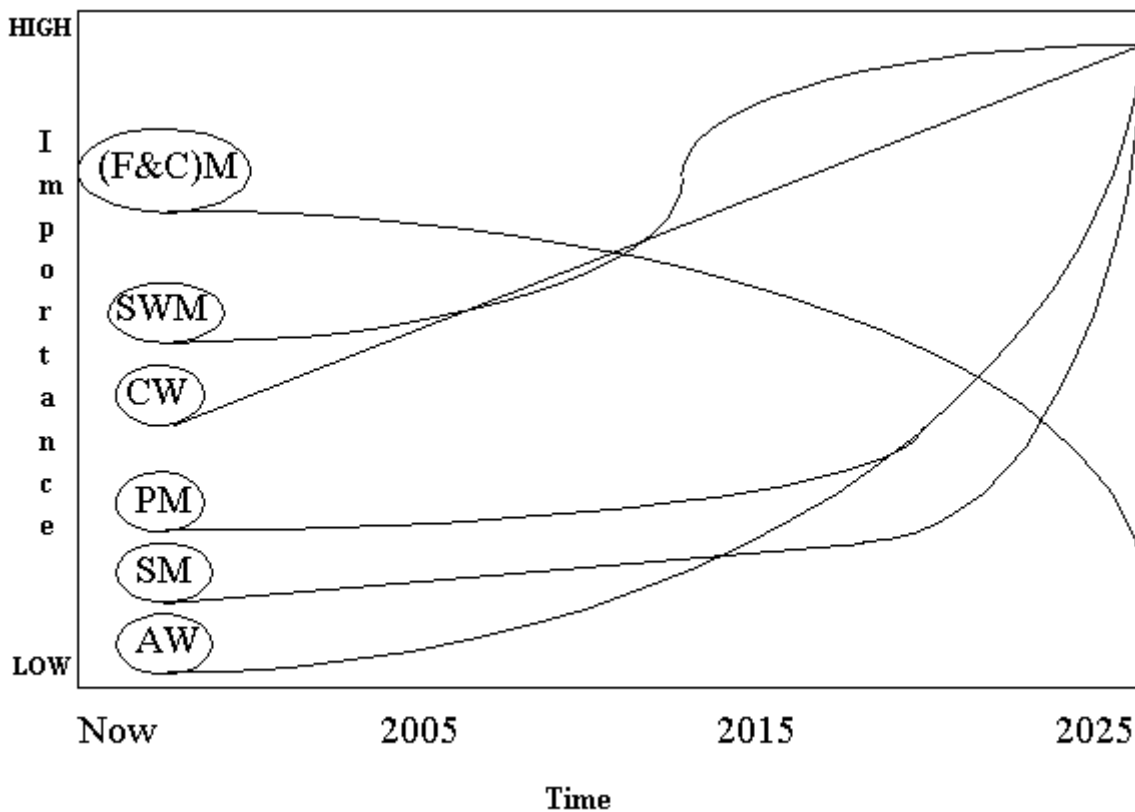


Figure 5-1. A Core Competency Road Map to Weather Modification in 2025.

Legend for Figure 5-1

PM	Precipitation Modification	(F&C)M	Fog and Cloud Modification
SM	Storm Modification	CW	Counter Weather

SWM	Space Weather-modification	AW	Artificial Weather
------------	----------------------------	-----------	--------------------

Even today's most technologically advanced militaries would usually prefer to fight in clear weather and blue skies. But as war-fighting technologies proliferate, the side with the technological advantage will prefer to fight in weather that gives them an edge. The US Army has already alluded to this approach in their concept of "owning the weather."⁵³ Accordingly, storm modification will become more valuable over time. The importance of precipitation modification is also likely to increase as usable water sources become more scarce in volatile parts of the world.

As more countries pursue, develop, and exploit increasing types and degrees of weather-modification technologies, we must be able to detect their efforts and counter their activities when necessary. As depicted, the technologies and capabilities associated with such a counter weather role will become increasingly important.

The importance of space weather-modification will grow with time. Its rise will be more rapid at first as the technologies it can best support or negate proliferate at their fastest rates. Later, as those technologies mature or become obsolete, the importance of space weather-modification will continue to rise but not as rapidly.

To achieve the core capabilities depicted in figure 5-1, the necessary technologies and systems might be developed according to the process depicted in figure 5-2. This figure illustrates the systems development timing and sequence necessary to realize a weather-modification capability for the battlespace by 2025. The horizontal axis represents time. The vertical axis indicates the degree to which a given technology will be applied toward weather-modification. As the primary users, the military will be the main developer for the technologies designated with an asterisk. The civil sector will be the main source for the remaining technologies.

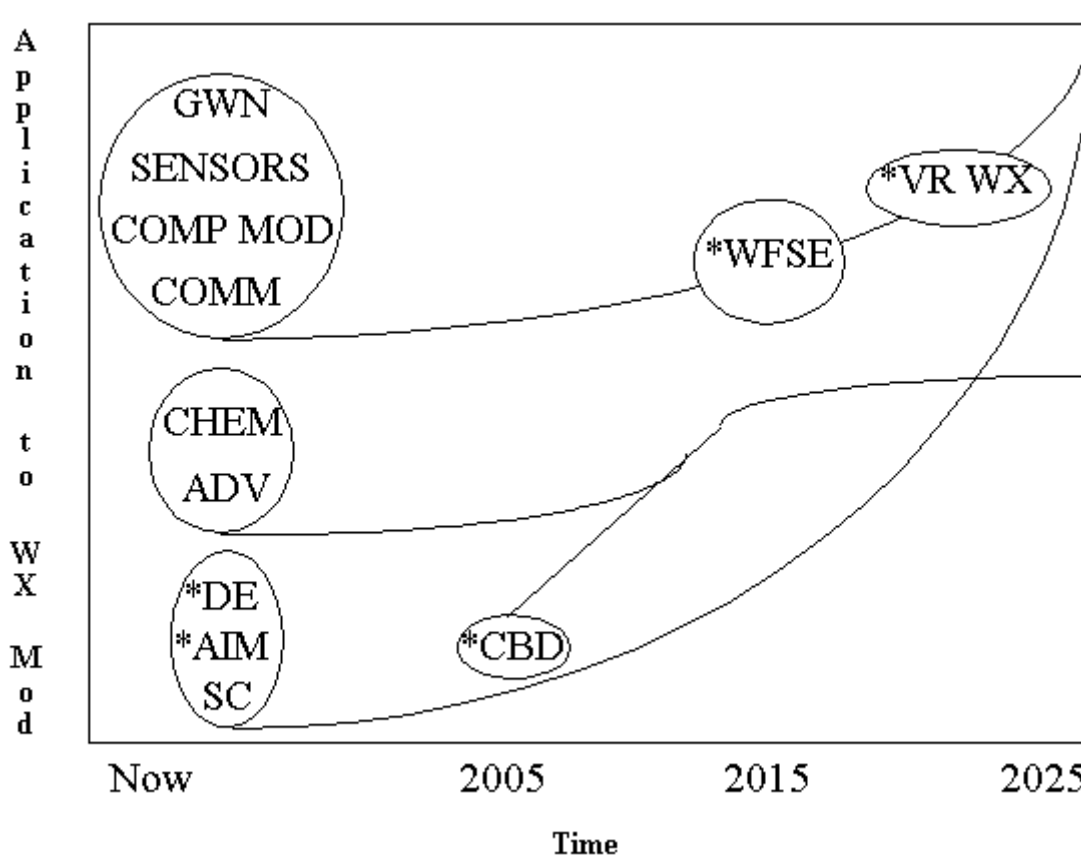


Figure 5-2. A Systems Development Road Map to Weather Modification in 2025.

Legend for Figure 5-2

ADV	Aerospace Delivery Vehicles	DE	Directed Energy
AIM	Artificial Ionospheric Mirrors	GWN	Global Weather Network
CHEM	Chemicals	SC	Smart Clouds (nanotechnology)
CBD	Carbon Black Dust	SENSORS	Sensors
COMM	Communications	VR WX	Virtual Weather
COMP MOD	Computer Modeling	* Technologies to be developed by DOD	
WFSE Weather Force Support Element			

Conclusions

The world's finite resources and continued needs will drive the desire to protect people and property and more efficiently use our crop lands, forests, and range lands. The ability to modify the weather may be desirable both for economic and defense reasons. The global weather system has been described as a series of spheres or bubbles. Pushing down on one causes another to pop up.⁵⁴ We need to know when another power "pushes" on a sphere in their region, and how that will affect either our own territory or areas of economic and political interest to the US.

Efforts are already under way to create more comprehensive weather models primarily to improve forecasts, but researchers are also trying to influence the results of these models by adding small amounts of energy at just the right time and space. These programs are extremely limited at the moment and are not yet validated, but there is great potential to improve them in the next 30 years.⁵⁵

The lessons of history indicate a real weather-modification capability will eventually exist despite the risk. The drive exists. People have always wanted to control the weather and their desire will compel them to collectively and continuously pursue their goal. The motivation exists. The potential benefits and power are extremely lucrative and alluring for those who have the resources to develop it. This combination of drive, motivation, and resources will eventually produce the technology. History also teaches that we cannot afford to be without a weather-modification capability once the technology is developed and used by others. Even if we have no intention of using it, others will. To call upon the atomic weapon analogy again, we need to be able to deter or counter their capability with our own. Therefore, the weather and intelligence communities must keep abreast of the actions of others.

As the preceding chapters have shown, weather-modification is a force multiplier with tremendous power that could be exploited across the full spectrum of war-fighting environments. From enhancing friendly operations or disrupting those of the enemy via small-scale tailoring of natural weather patterns to complete dominance of global communications and counter-space control, weather-modification offers the war fighter a wide-range of possible options to defeat or coerce an adversary. But, while offensive weather-modification efforts would certainly be undertaken by US forces with great caution and trepidation, it is clear that we cannot afford to allow an adversary to obtain an exclusive weather-modification capability.

[Contents](#) | [1](#) | [2](#) | [3](#) | [4](#) | **5** | [A, B & C](#) | [Bibliography](#)

Contact: [Air Force 2025](#)

Last updated: 11 December 1996



[Back to 2025 Home Page](#)