

# Technological progress and naval strategy

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I should first like to summarize the main effects produced by the veritable hail of technological advances which have rained down upon mankind since the end of the last War. No field of human knowledge has remained unaffected by such remarkable progress, nor have there been technological developments which have failed to apply to the art of war.

Consequently, those who create and carry out defense policy, strategy, logistics, or tactics, must confront the following concrete facts:

1) A marked, provoked increase in the capacity of sensors, satellites, detectors of electromagnetic and acoustic radiation, opto-electronic systems, and other similar advances, which have made the element of surprise increasingly unlikely; this factor could be called "the difficulty of hiding."

2) An extraordinary increase in speed, in all fields. The "tempo" prevailing in theatres of war leaves little margin for pondering. This factor could be called "the precipitation of events."

3) A constant increase in the precision of weaponry. We come closer every day to an objective: for every shot, a bulls-eye, whatever the size or distance of the target. This could be called "certainty of impact."

4) An ever-growing destructive power within ever-lesser volume. Modern conventional explosives have almost the destructive properties formerly confined to nuclear weapons, leading to unacceptable risks. We might call this "disproportionate lethal energy," which, day by day, makes it easier to close the seas to small navies.

The entire gamut of such intrinsically costly means cannot possibly be available to second-rank powers; in order to tap that potential, **we must arrive at defense and technological cooperation agreements with friendly or allied countries.**

Technological advances led to massive application, in the conceptual field, of all the scientific hardware within man's reach; doctrine was elaborated by analysts working within the military command institutions. This in turn produced a doctrine very much influenced by mathematics, in

which cost-benefit analysis prevailed over all other considerations.

Today, illustrious military thinkers have raised their voice to demand that the imagination should once more rule the process which creates doctrine. Our rigid mental molds must be cracked, before we become prisoners of habit; we must seek new theories, try them out, and adopt them forthwith if they prove efficient.

Let us then draw the following conclusions: Rapid changes in the aero-naval field call for the highest degree of flexibility and independence when decisions are to be taken, through



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*Naval warfare has been marked by an extraordinary increase in speed.*

integrated systems of command, control, and communications, able to operate under conditions of electronic warfare and equipped with sensors which must include equipment for space.

Bear in mind that the world of ideas in which you move as a naval officer is in no way compatible with Cartesian dogmatism and avoid, therefore, simplistic recipes which boil down to mathematical models that which should be the object of profound reflection.

Never forget, withal, those unchanging principles we deduce from our own history. Intelligent and men lived before our time, who, like us, craved Progress. Let us not forget their lessons, but only adapt them to our new and revolutionary technological surroundings.

Lastly, bear in mind that no matter how complex and efficient the technologies presently or soon to be used, in the last analysis it is man who must know and deploy them under the hostile conditions of naval warfare. No simulator can artificially recreate life on board in the heat of war, nor confront men with the need to take decisions of real transcendancy, nor provoke those moral, military, and human virtues without which success can never come to crown our actions.