

New remarks in red below.

Posted by Lars on July 27, 2026, 9:01:22, in reply to "Future X-Band Radar (FXR)"

SPQ-9B is not only part of the gun fire control system. This was only the case for the SPQ-9A.

As you wrote, the SPQ-9B is also used to detect and track low-flying missiles and aircraft. Its better precision, based on shorter wavelengths (X band), complements the S band SPY-1 or SPY-6.

Posted by Lars on July 27, 2026, 9:06:14, in reply to "Re: Future X-Band Radar (FXR)"

Correction - apparently already SPQ-9A had more functions than gun fire control.

But it is based on very different, much older technology than the phased array SPQ-9B radar.

Posted by Darren on July 28, 2026, 7:32:29, in reply to "Re: Future X-Band Radar (FXR)"

My point is the SPQ-9 is not an air search radar. Yes it can be used for low flying targets, but it's main function is surface search and the main reason it was developed was fire control.

Most radars can do multiple roles, they just need the right connections and software.

Posted by Lars on July 28, 2026, 7:55:52, in reply to "Re: Future X-Band Radar (FXR)"

According to the official description of the SPQ-9B, it is (also) an radar for detecting and tracking air targets, especially low flying ones:

"The AN/SPQ-9B scans out to the horizon and performs simultaneous and automatic air and **surface target detection** and tracking of low flying Anti-Ship Cruise Missiles (ASCMs), **surface threats** and low/slow flying aircraft, UAVs and helicopters."

AN/SPQ-9B Radar Set (navy.mil)

Posted by Darren on July 28, 2026, 19:26:38, in reply to "SPQ-9B: official description"

You're reading from the same document I am and saying the same things as I am.

Posted by Lars on July 28, 2026, 22:19:52, in reply to "Re: SPQ-9B: official description"

Yes, but there SPQ-9B is not described as a surface radar. **Yes it is. See green above.**

It replaced an radar used for gun fire control (SPQ-9A, also not a surface radar!), **Yes it is. See below.**

but it has now more functions - not only the capability. You also had mentioned that it is also for detecting and tracking of anti-ship missiles and low flying aircraft. This is part of the fire control, but not only for guns, but also for ESSM etc. **I never said it was for guns only!**

SPS-73 - also (V)18 - designed as a surface radar. There are no descriptions that this radar is for detecting or tracking of missiles. Therefore, I think that these two radars have very different tasks.

Right now, yes, but in future, who knows?

Posted by Darren on July 29, 2026, 14:39:55, in reply to "Re: SPQ-9B: official description"

Quote from the book 'Shipboard Antennas' 2nd edition, 1986, ISBN 0890062110, by Preston Law Jr, The Former head of The topside Electromagnetics Design Branch of the Naval Sea Systems Command. (in other words, pretty much the authority on US Naval radar systems)

“Radar set AN/SPQ-9A is part of the shipboard MK86 Gun Fire Control System as its prime sensor of range and azimuth data on surface and low altitude targets. The MK86 GFCS, used to control lightweight, rapid fire five-inch/54mm guns, employs AN/SPG-60 monopulse radar for air track and the SPQ-9 for surface search capability.”

‘The Naval Institute Guide to World Naval Systems’ – 5th edition, 2006 ISBN 9781557502629, by Norman Friedman

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“SPQ-9B is a new radar developed by NRL. It uses a modified SPQ-9 antenna and is intended specifically to detect incoming, low flying, anti-ship missiles. Compared with SPQ-9, -9B uses a slightly modified antenna pedestal, a slightly enlarged Radome, and completely new belowdecks elements. However, the operator interface for surface gunnery has remained unchanged. Existing SPQ-9s may be modified to -9B by ORDAIT. On board ships with Sea Sparrow, SPQ-9B is replacing TAS Mk23.”

Posted by Lars on July 30, 2026, 7:53:07, in reply to "Re: SPQ-9B: official description"

Combat Fleets of the World (16th edition, 2013), now also an older book, list SPQ-9B in the chapter "Three-dimensional air search radars" (A book chapter title is irrelevant.) and claims it to be an replacement for TAS/Mk 23. **LIKE I WROTE ABOVE!**

And actually it was originally mainly on ships not armed with guns, but with Sea Sparrow or NSSM. It's Operational evaluation (OPEVAL) was successfully completed in October 2002 onboard USS Olendorf (DD 972), which had two 5" guns.

I have not seen the official reason why it was added to some Arleigh Burke. It make sense for the older SPY-1 ships, especially if they are tasked with ballistic missile defence which limits their anti-ship missile defence capabilities. But also newer ships and even SPY-6-equipped Flight III have SPQ-9B - I assume based on the realisation that a dual band radar system (X band and S band) is superior to a pure S band radar.

The SPY-6 system consists of two radars. An S-band radar for volume search, tracking, ballistic missile defense discrimination, and missile communications, An X-band radar for horizon search, precision tracking, missile communication, and terminal illumination of targets. The S-band and X-band sensors will also share functionality, including radar navigation, periscope detection, and missile guidance and communication.

To cut costs, the first 12 SPY-6 sets will have an X-band component based on the existing SPQ-9B rotating radar, to be replaced by a new X-band radar in set 13 that will be more capable against future threats.

For Official confirmation see this 2012 GAO report. Page 51 (p45) <https://www.gao.gov/assets/gao-13-294sp.pdf>

Software can improve a radar and add new functions - but the physical properties of the radar also matter. **Of course they do, I never said otherwise.**

The usage of X band and S band radars on the newest Arleigh Burke could be an argument that software optimisation alone is not sufficient. **Why do you keep bringing up S band radars? They complement each other, like you stated previously.**

Posted by Lars on July 29, 2026, 21:52:35, in reply to "Re: SPQ-9B: official description"

Your description of the SPQ-9B was taken from a book published in 2006. At that time, the information could have been more precise. **Not all information is framed the way we would like it to be! I didn't write the book!**

It may have been obvious by then that this is not a modified antenna but a completely different radar.

The SPQ-9B has two phased array antennas positioned back-to-back.

You can't focus on just one aspect of the changes. The 9A WAS modified. New components were added. Some components were changed. New functions were added to the old functions. The result was called the 9B. I've never seen the antenna referred to as Phased array. Planar array, ASEA, yes. What's the difference? Is there a difference? I don't know. It's not important to me. More precise details are probably classified and won't be found on the internet.

Posted by Lars on July 29, 2026, 21:47:08, in reply to "Re: SPQ-9B: official description"

I agree that SPQ-9A was a fire control radar for guns. **Good.**

I also think that this is different from a surface radar. **From above, SPQ-9 for surface search capability. I will take Preston Laws word for it.**

A surface radar has a very narrow radar beam going of the water surface to detect navigational hazards and other ships (and everything else on the surface, e.g. periscopes, boats etc.). Its main purpose is navigation and situation awareness on the surface. The fire control radar is for guiding guns and/or missiles. **And both functions can be done by the same radar!**

You quoted a book from 1986. **Yes, because understanding the history of something is important.**

SPQ-9B was first tested in 1993-95 and operationally evaluated in 2002! It looks very different compared to the description in the book. **That's the nature of research and development!**

It does not has larger radom, but no radom at all. It is a very different radar, it is a phased array radar.

A Radome can be any shape. It is a cover over the antenna components. What you see is a cover, not the array itself. This article literally states, *the antenna consists of dual planar arrays mounted back-to-back under a Radome*, AND *SPQ-9B surface search and fire control radar*.

<https://www.navalnews.com/naval-news/2019/07/us-navy-selects-northrop-grumman-as-design-agent-for-an-spq-9b-radar/>

It seems pretty clear to me.

SPQ-9B got the the additional function (not only capability!) to detect and track air targets. It is not longer a fire control radar only or even mainly for the guns, but its used to warn against incoming missiles and guide the defence against them. It is used also on aircraft carriers and is part of the air defence. **Again, I never said it was a FCR for guns only. The 9A was developed for the MK86 GFCS, the 9B can also be connected to Aegis combat systems, MK 34 Gun Weapon System (GWS), MK 48 GWS and Cooperative Engagement Capability/Ship Self Defense System.**

I really believe a lot of what we are saying is the same thing, however, I'm having trouble understanding some of the ways you phrase or emphasize things. It may be a language problem. Either way, I'm finding it a bit frustrating and may not continue to engage. I hope I've helped you understand at least a little of what you were asking.