Chinese Radars in Syria

Chinese-sourced Type 120 radar deployed in Syria

I&A Special Report #1

Editor's Comments

Given the recent release of footage depicting a Chinese-sourced radar system at a captured EW site, *I&A* is pleased to present a special report detailing Chinese-sourced radar deployments in Syria.

In the future, *I&A* will issue special reports when warranted by current events, or when significant information is discovered or disclosed.

Sean O'Connor

Table of Contents

Subscription & Contact Information

-To contact *I&A*, e-mail the editor at imintandanalysis@gmail.com. For standard subscription, enter the text "Subscribe PDF" in the subject line. For subscription via a US DoD or government address, enter the text "Subscribe PDF MIL" in the subject line. Content remains the same in both cases, but distribution lists remain segregated to allow quicker resolution to transmission problems. To unsubscribe, enter "Unsubscribe PDF" in the subject line.
-Interested contributors are encouraged to contact the editor with "Contributor" in the subject line.
-Readers are encouraged to contact the editor with any questions, comments, or stated interests for future articles. Feedback is always welcome and encouraged.

Publishing Information

I&A Special Report #1 (July 2012)
Self-published by Sean O'Connor (Editor)
Cover image courtesy of Google Earth.

Disclaimer

I&A is an open-source publication. As such, *I&A* only references publicly available material when researching and authoring the features contained herein. All sources referenced appear in a list at the end of each issue, organized by the articles that they were used to create. Refer any questions regarding the source material or the content presented herein to the editor.

Special Report

Chinese Radars in Syria

Sean O'Connor

As the Syrian crisis continues, new evidence is suggesting a far greater amount of Chinese military assistance to the Assad regime than previously believed. Imagery analysis reveals the presence of Type 120, JYL-1, and JY-27 (GREAT WALL) radar systems at various EW complexes in Syria.

The radars are present in imagery dating as far back as 2009. Given that the current crisis in Syria developed in late 2011, the new identification of Chinese military equipment does not represent overt Chinese support of the Assad regime. While China does not support Western initiatives regarding the crisis, it is imperative to note that the 2009 or earlier delivery timeline predates the situation and is indicative only of an import-export relation between the two states.

The Type 120

The Type 120 is a 2D low-altitude acquisition radar. 2D capability implies that the radar system acquires range and azimuth data on a given target, but not altitude data. As such, the Type 120 is best suited for a complementary role supporting other radar systems.

The Type 120 reportedly serves as a battery component for the HQ-9 and HQ-12 SAM systems in Chinese service. In this capacity, it functions similarly to the 5N66 (CLAM SHELL) radar system in FSU S-300P (SA-10 GRUMBLE) complexes, providing enhanced low-altitude target detection. However, SAM interface capability does not preclude the radar's use as a dedicated EW asset. Russia itself marketed the improved 76N6 (CLAM SHELL) variant as an EW asset before replacing it in the export catalog with the 96L6E.

The Type 120 is reportedly a derivative of the earlier JY-29/LSS-1 2D radar system. While no performance specifications yet exist for the Type 120, the earlier JY-29/LSS-1 generated 72 target tracks with an operational range of 200 kilometers. The more refined Type 120 may improve on these specifications, but they are a logical baseline.

Within Syria, Type 120 radar systems are located at four dedicated EW complexes. In each case, the Type 120 is either co-located with at least one additional EW asset or resides in relative close proximity to an additional EW complex. This permits maximization of the enhanced low-altitude capability of the Type 120. Based on imagery analysis, no Type 120 radars exist outside of dedicated Syrian EW complexes at this time.

Type 120 EW Complexes in Syria

EW Site	Latitude	Longitude
Dar Ta izzah	36 16' 33" N	036 49' 20" E
Baniyas	35 08' 47" N	035 56' 59" E
Tartus	34 51' 26" N	035 54' 35" E
Kafr Buhum	35 02' 24" N	036 46' 38" E

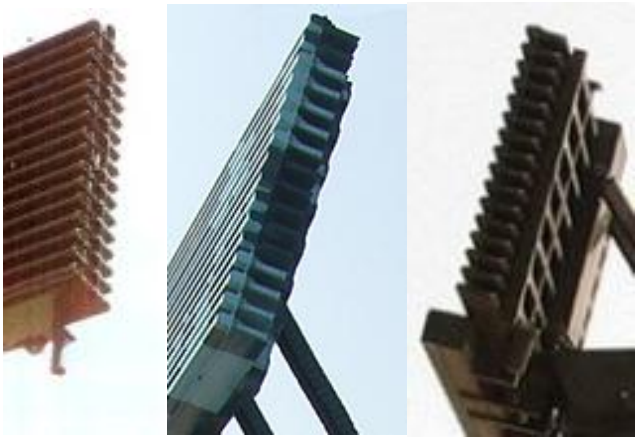
Dar Ta izzah

The Dar Ta izzah EW complex lies among the Sheikh Barakat ruins roughly 2.5 kilometers west of Dar Ta izzah in northwestern Syria, and roughly 12 kilometers from the Turkish border. On 26 June, rebel forces captured the EW site and subsequently released a video depicting the radars located there. Additional handheld imagery from the site illustrated the Type 120 radar.

Initially, open source reporting labeled the Dar Ta izzah array as either a JY-11B or JY-29/LSS-1. Comparing both the video and handheld imagery with photographs of all three systems indicates that the radar is in fact a Type 120 variant, albeit with minor modifications differentiating it from native Chinese examples. These differences may indicate an export variant of the Type 120, or a Type 120 sub-variant optimized for standalone operation outside the hierarchy of a SAM battery.

The three images at left depict, from top to bottom, a JY-11B, Type 120, and the Dar Ta izzah radar. Examination of the rear of the radar arrays indicates that the Dar Ta izzah unit is not a JY-11B, and is closely related the Chinese Type 120.

The images below depict close-up views of the sides of the JY-29/LS-1 (left), Type 120 (middle), and Dar Ta izzah (right) radar arrays. Side-on, the array design is closer to that of the Type 120 than that of the JY-29/LSS-1.

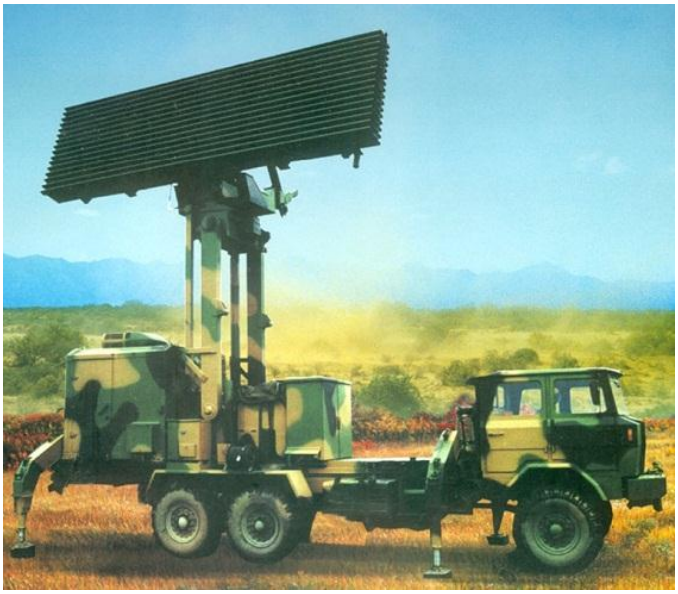


The primary differences between the Dar Ta izzah array and the Chinese Type 120 are the presence of the JY-29/LSS-1's can-shaped assembly hanging below one side of the array and the additional array below the main face. Subtracting these two elements leaves an array nearly indistinguishable from the native Type 120.

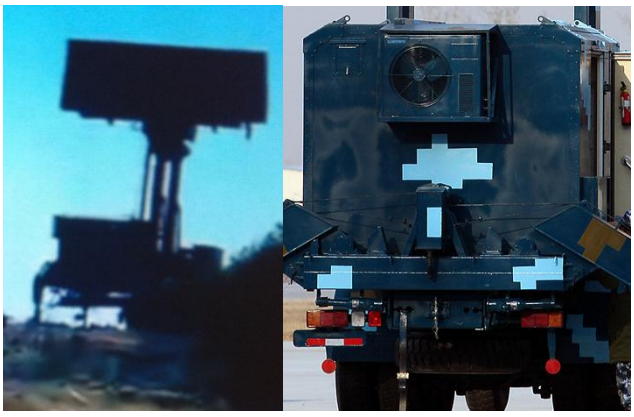
The additional elements on the Dar Ta izzah array likely represent components associated with IFF interrogation systems. Such components commonly exist fitted to Chinese radar systems. For example, the JY-11B image (top right) depicts a RES-3 IFF interrogation assembly below the main array face.

The Syrian unit likely mounts a similar unidentified assembly; the lack of IFF assemblies on Chinese Type 120 radars is unsurprising as SAM batteries have multiple other sources to source IFF data. Likewise, the can-shaped assembly potentially represents another modification related to standalone service, perhaps in the form of an additional interrogator or datalink housing.

An additional difference between the Type 120 and the JY-29/LSS-1 is the chassis. The chassis for the Type 120 is identical to that of the JY-11B, with a different design employed by the JY-29/LSS-1. The image below illustrates a deployed JY-29/LSS-1; note the differences between the chassis and those on the previous page for the JY-11B and Type 120, particularly the larger, squatter shape of the cabin on the JY-29/LSS-1 chassis.



A further difference between the Dar Ta izzah radar and the JY-29/LSS-1 is the placement of the air conditioning unit for the rear equipment cabin. The above image depicts the air conditioning unit mounted atop the rear cabin. However, the Type 120 and the Dar Ta izzah radar both feature an air conditioning unit mounted on the upper rear of the aft cabin. The following two images depict the Dar Ta izzah radar (left) and the rear of a Chinese Type 120 (right).



Based on the available evidence, the Dar Ta izzah radar most likely represents either a Type 120 or a very close derivative. The chassis and array differ in detail from the JY-29/LSS-1, and the array itself differs significantly from the JY-11B.

As previously stated, the minor details differentiating the Dar Ta izzah radar from native Chinese Type 120s likely represent modifications to the system for export. Alternatively, the Dar Ta izzah array may represent a previously unknown system derived from the JY-29/LSS-1 specifically for the export market, while further improvements resulted in the Type 120 for Chinese air defense units.

At this time, however, in the absence of conclusive evidence proving otherwise and on the strength of the evidence previously outlined *I&A* assesses the radar system at Dar Ta izzah to represent a modified, export-standard Type 120. Accordingly, three additionally identified radar sets located in overhead imagery at other Syrian EW complexes also represent probable Type 120s, given that they share common measurable dimensions in both chassis length and deployed array width.

Returning to the Dar Ta izzah EW complex itself, the Type 120 is co-located with an FSU P-12/18 (SPOON REST) EW radar, and a third unidentified array. The EW complex resides at an elevation of over 2800 feet, providing a clear field of view westward towards the border with Turkey. The aforementioned handheld imagery and video imagery from the site in June of 2012 indicates that the radar was oriented eastward into Syria, however, potentially serving to monitor native airspace during military operations against rebel forces. Overhead imagery from 2010 and 2011 does indicate that the radar array changed azimuth over time, at one point aligned on a bearing of roughly 235 degrees to cover a significant portion of the nearby Turkish border region.

Baniyas

The Baniyas EW complex is located roughly 2.5 kilometers from the coast southeast of the city. Situated atop an elevation of approximately 1170 feet, the site enjoys excellent visibility of the surrounding airspace over the eastern Mediterranean.

The Baniyas Type 120 radar is present in overhead imagery captured in April of 2010. In June 2010 imagery, the radar is no longer visible. This potentially relates to the erection of a large geodesic dome on the site. The dimensions of the dome allow for the placement of the Type 120 radar under protective cover, explaining its apparent absence.

Type 120 radar visible at the Baniyas EW complex in April of 2010 (Google Earth)

Tartus

South of Baniyas, the Tartus EW complex represents an additional facility capable of monitoring the eastern Mediterranean. A Type 120 radar is visible in imagery as early as June 2009. While the radar relocated between June 2010 and March 2011, it has remained consistently visible throughout.

Type 120 radar deployed at the Tartus EW complex (Google Earth)

Kafr Buhum

The Kafr Buhum EW complex is located seven kilometers east of Kafr Buhum and nine kilometers south of Hamah. Further inland from the three previous Type 120 sites, the elevation of 2260 feet provides a suitable observation point for the airspace over northwestern Syria. A coastal mountain range provides an impediment to monitoring offshore airspace, suggesting that the Kafr Buhum EW complex provides regional airspace monitoring and control within Syria.

The Kafr Buhum Type 120 first appears in imagery captured in August 2010, potentially making it the most recent Type 120 deployment. While the Tartus and Baniyas EW complexes do not appear to host other EW elements, the Kafr Buhum EW complex is home to an additional radar system.

Type 120 radar deployed at the Kafr Buhum EW complex (Google Earth)

The JYL-1

The Kafr Buhum EW complex also hosts a second Chinese radar system, the JYL-1. Captured in imagery collected in June of 2009, the JYL-1 resides atop a seemingly purpose-built berm not present in previous imagery.

The JYL-1 is a 3D EW system featuring a 320-kilometer range. The 3D capability indicates that the radar is also capable of collecting altitude data on targets. As such, 3D EW radars such as the JYL-1 are significant components in any modern air defense network.

August 2010 imagery depicting a JYL-1 radar deployed atop a prepared berm at the Kafr Buhum EW complex (Google Earth)

The JYL-1 can be difficult to differentiate from similar systems such as the YLC-2V in overhead imagery. However, the array of the

JYL-1 extends nearly the entire length of the chassis, whereas the array of the YLC-2V leaves a more significant gap between the array and the driver's cabin. August 2010 imagery of the radar at Kafr Buhum appears to indicate a layout more closely resembling that of the JYL-1 rather than the YLC-2V. However, given the lack of supporting evidence, this identification remains the most tenuous.

The JY-27

Perhaps the most significant Chinese radar system identified in Syria is the JY-27. The JY-27 is a 2D VHF-band surveillance radar possessing a range of up to 500 kilometers. The VHF-band system, allegedly influenced by the design of the Russian Nebo-SV (BOX SPRING) series, provides Syria with a credible counter-LO/VLO detection capability. Although limited by the presence of only two radar systems, the proximity of the two deployed JY-27 radars permits cooperative target detection and tracking functions.

JY-27 EW Complexes in Syria

EW Site	Latitude	Longitude
Palmyra	34 33' 50" N	038 19' 30" E
-	33 53' 46" N	037 46' 58" E

The two JY-27 radars reside at prepared EW complexes in central Syria. Both EW complexes possess additional EW assets, including P-14 (TALL KING) radars. The northern EW complex lies on the grounds of a military airfield in Palmyra, while the southern

EW complex resides in the desert approximately sixty kilometers northeast of Sayqal AB, itself nearly fifty kilometers east of Ad Dumayr. The range of the JY-27 permits either site to monitor the bulk of Syrian airspace, along with a significant amount of the surrounding region.

Palmyra (upper) and desert (lower) JY-27 radar installations (Google Earth)

Conclusions

The presence of multiple Chinese-sourced radar sets in Syria highlights the relationship between the two states. Furthermore, when taken in conjunction with the recent purchases of modern air defense systems from Russia, their presence indicates that Syria is taking the steps required to upgrade its air defense network.

Intelligence gaps

Interestingly, the China-Syria relationship, more specifically the details of arms sales, is virtually unnoticed in the open press. As such, there are a significant number of intelligence gaps related to the presence of Chinese military components within Syria.

1. When did Syria acquire the radar systems?

2. What level of support did China offer with regard to training and system calibration and setup within Syria?

3. Is there any interest on Syria's behalf on acquiring further Chinese air defense hardware, to include SAM systems?

4. What is the level of interoperability between Chinese and extant FSU radar systems in Syria?

Source List

Overhead imagery courtesy of Google Earth; exceptions are explicitly noted in image captions or as image annotations. All annotations and overlays depicted on such imagery are the work of the respective article's author unless explicitly noted below.

Site locations sourced from the Worldwide SAM Site Overview KML file available at *IMINT & Analysis*.

All photographs originally sourced from Chinese internet sources and collected from China-Defense.com and Air Power Australia.

Kopp, Carlo. *Russian/PLA Low Band Surveillance Radars*. Tech. no. APA-TR-2007-0901. Air Power Australia, 2012. Online source.

Kopp, Carlo and John C. Wise. *HQ-9 and HQ-12 SAM System Battery Radars*. Tech no.

APA-TR-2009-1201. Air Power Australia, 2012. Online source.

Wise, John C. *Chinese Radars*. 8th. ed. 2011.

Wise, John C. *PLA Air Defence Radars*. Tech no. APA-TR-2009-0103. Air Power Australia, 2012. Online source.