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Syrian Air Force & Air Defense Overview

Joseph Holliday

Senior Analyst

&

Christopher Harmer

Senior Naval Analyst

The Syrian Air Force

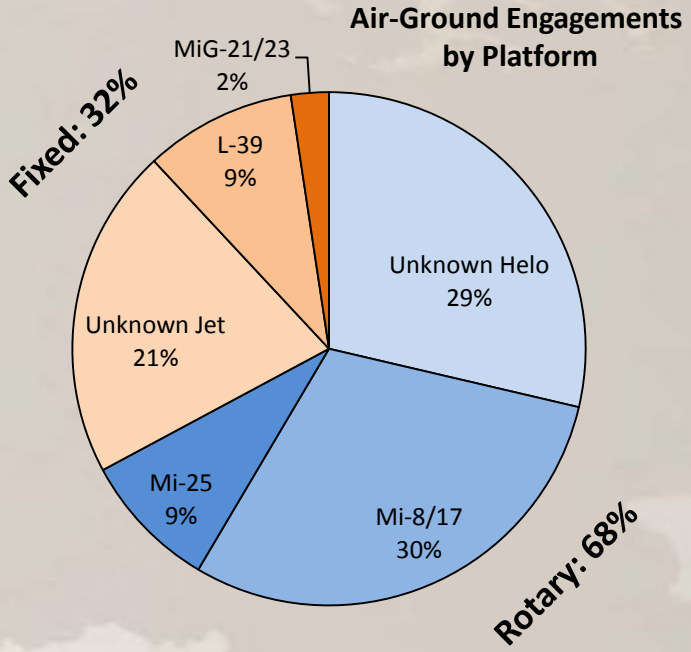
- As the proficiency of Syria's armed opposition has increased, the Assad regime has been forced to rely on more of its arsenal to combat the opposition:
  - In January 2012 the regime first began to use artillery across Syria in large quantities.
  - In June 2012 the regime began to consistently employ helicopter gunships.
  - In August 2012 the regime began to employ jet aircraft in strafing and bombing campaigns.

- However, the regime has primarily employed its aircraft in a punitive and retaliatory manner rather than a tactical role. A majority of the regime's airstrikes have been against towns and neighborhoods where the rebels have gained control, rather than on specific rebel military targets.

- The Assad regime has purchased over 600 military aircraft over the past 40 years, and Syria's Air Order of Battle suggests that they are organized to employ the majority of those aircraft. However, the regime has only employed certain types of aircraft in 2012, and with different degrees of effectiveness.
  - For example, their Mi-8/17 utility helicopters are ill-suited for attacking ground targets, and the regime has relied on tossing improvised explosive "barrel bombs" out of these aircraft.
- Despite these high aircraft figures, it is unlikely that the Assad regime is able to employ more than 30% of its aircraft, based on historical maintenance issues combined with the current pace of operations.
  - The regime is not likely to be able to employ more than 200 aircraft in its bombing campaign, or approximately 150 jets and 50 helicopters. The actual number may be lower.

Syrian Air Force Order of Battle & Employment Statistics

Designation	Type	# of Sqns	by Sqn	per IISS	50%	30%
		Fixed-Wing				
MiG-21	Ground-Attack	7	112	219	110	66
MiG-23	Fighter, Ground-Attack	7	112	146	73	44
MiG-25	Fighter	2	32	40	20	12
MiG-29	Fighter	4	64	40+	23	14
SU-22/24	Ground-Attack	5	80	70	35	21
L-39	Training	3	48	70	35	21
Multiple	Transport	4	64	35	18	11
		TOTAL	512	580	313	188
		TOTAL	352	505	253	152
		Rotary-Wing				
Mi-25	Attack	3	48	36	18	11
SA-342	Multi-Role Attack	2	32	35	18	11
Mi-8/17	Multi-Role Transport	7	112	100	50	30
		TOTAL	192	171	86	51
As of April 2011		TOTAL	160	136	68	41



"by Sqn" is derived from multiplying total squadrons by 16 aircraft.
Red indicates aircraft types used to engage ground targets.

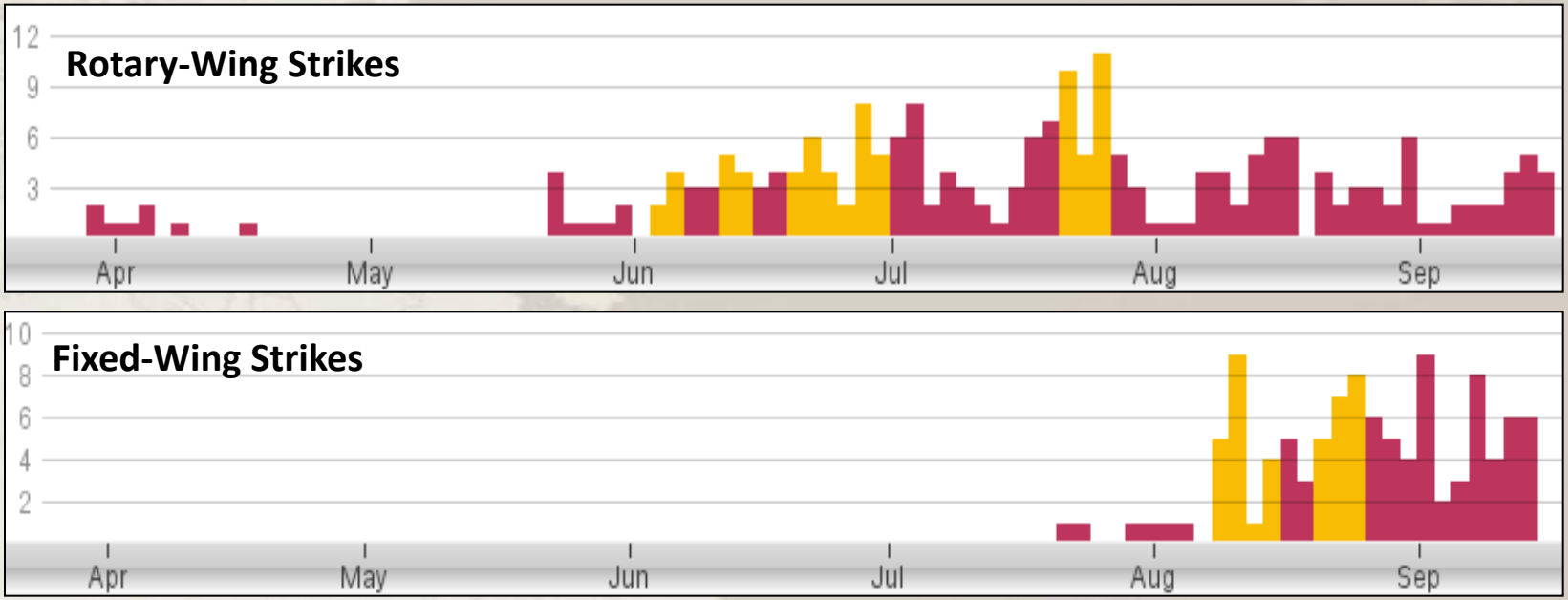
"per IISS" refers to the total number of aircraft purchased.
"50%" and "30%" are derived from the IISS number.

- **The Assad Regime purchased 600+ aircraft over the past 40 years, but are unlikely to have more than 200 combat capable aircraft; Lack of Mi-25 Hind Attack Helicopters is a critical limitation.**
- **The Syrian Air Force may be reserving their higher-end MiG-25s & 29s in preparation for external intervention, but may also be unable to use these air-to-air designs in air-to-ground roles; Gazelle SA-342 helicopters have not been observed in action (perhaps due to limited anti-tank role)**
- **These aircraft's weapons are not optimized for the conflict they face: this may explain the high usage of L-39 Trainers, as well as Mi-8/17 Hip's with improvised "barrel bomb" explosives.**
- **The high use of L-39s may indicate the following: maintenance problems with the more finicky MiG jets, the L-39 performs better at lower altitude / airspeed, or simply more pilots proficient/comfortable with trainer (L-39) aircraft.**

Sources: http://www.scramble.nl/sy.htm; IISS, The Military Balance 2011, p.331; ISW Syria Database

As of September 2012

Syrian Air Force Order of Battle & Employment Statistics



Yellow indicates days that included airstrikes against rebel positions.

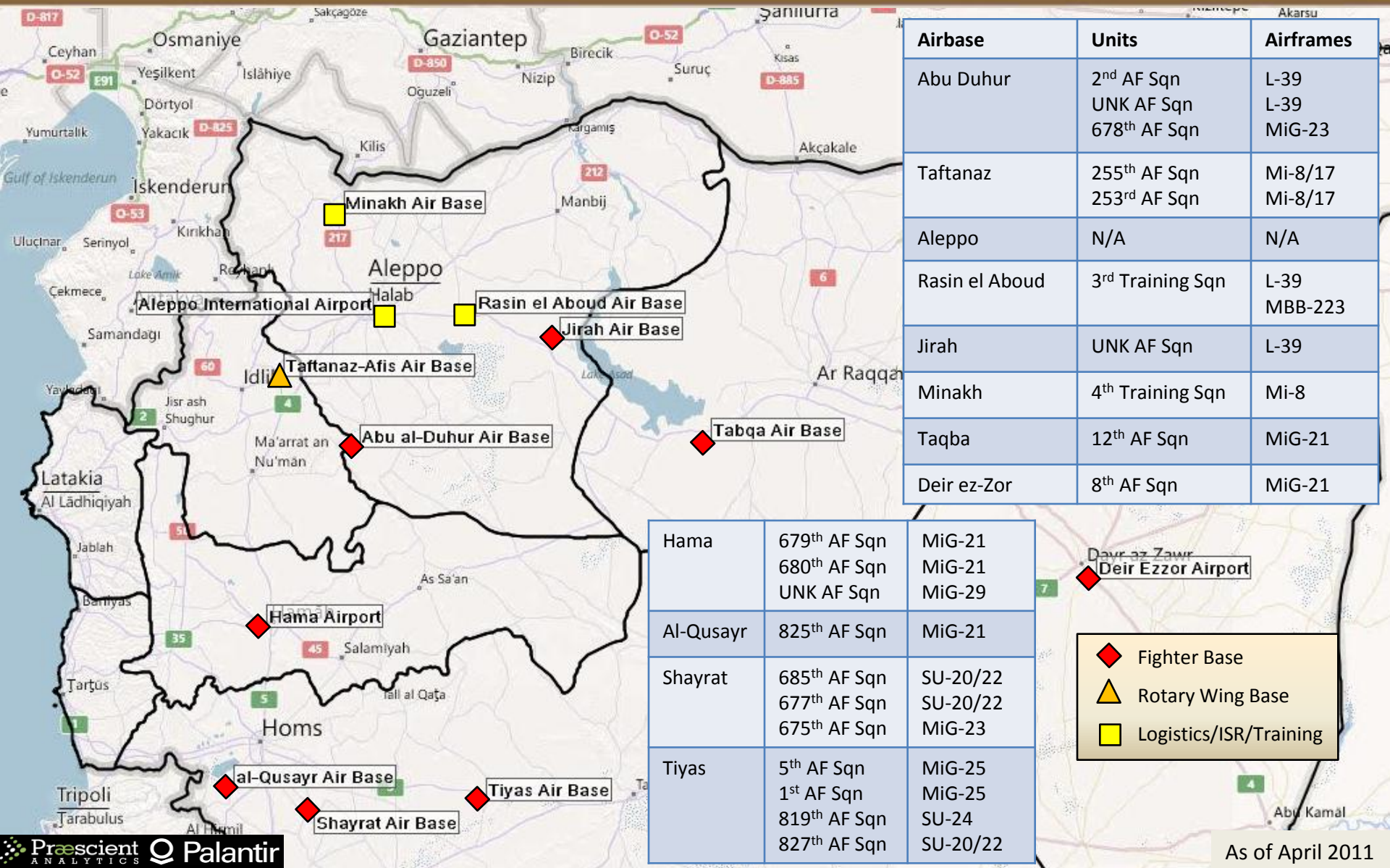
Praescient Analytics Palantir

- **In April 2012, the Assad regime reacted to unexpected rebel gains in Idlib and Aleppo by dispatching helicopters to engage "liberated" villages. At the end of May, as rebels mounted offensives in Latakia, Idlib and Aleppo, the regime began to consistently use helicopter gunships to make up for its lack of maneuver forces and reduction in mobility caused by increasingly effective rebel roadside bombs.**
- **In August 2012, as battle lines in Aleppo city hardened and just after regime helicopter usage peaked, the Syrian Air Force began to employ combat jets in bombing and strafing runs, quickly overcoming daily helicopter use.**
  - **One explanation for this could be the maintenance issues associated with operating only ~50 helicopters.**
  - **Another explanation could be increased rebel air defense capability, which forced the regime to use jets.**
- **Note the overall low percentage of strikes against rebel targets: the rest are airstrikes against "soft" civilian targets.**

Sources: ISW Syria Database

As of September 2012

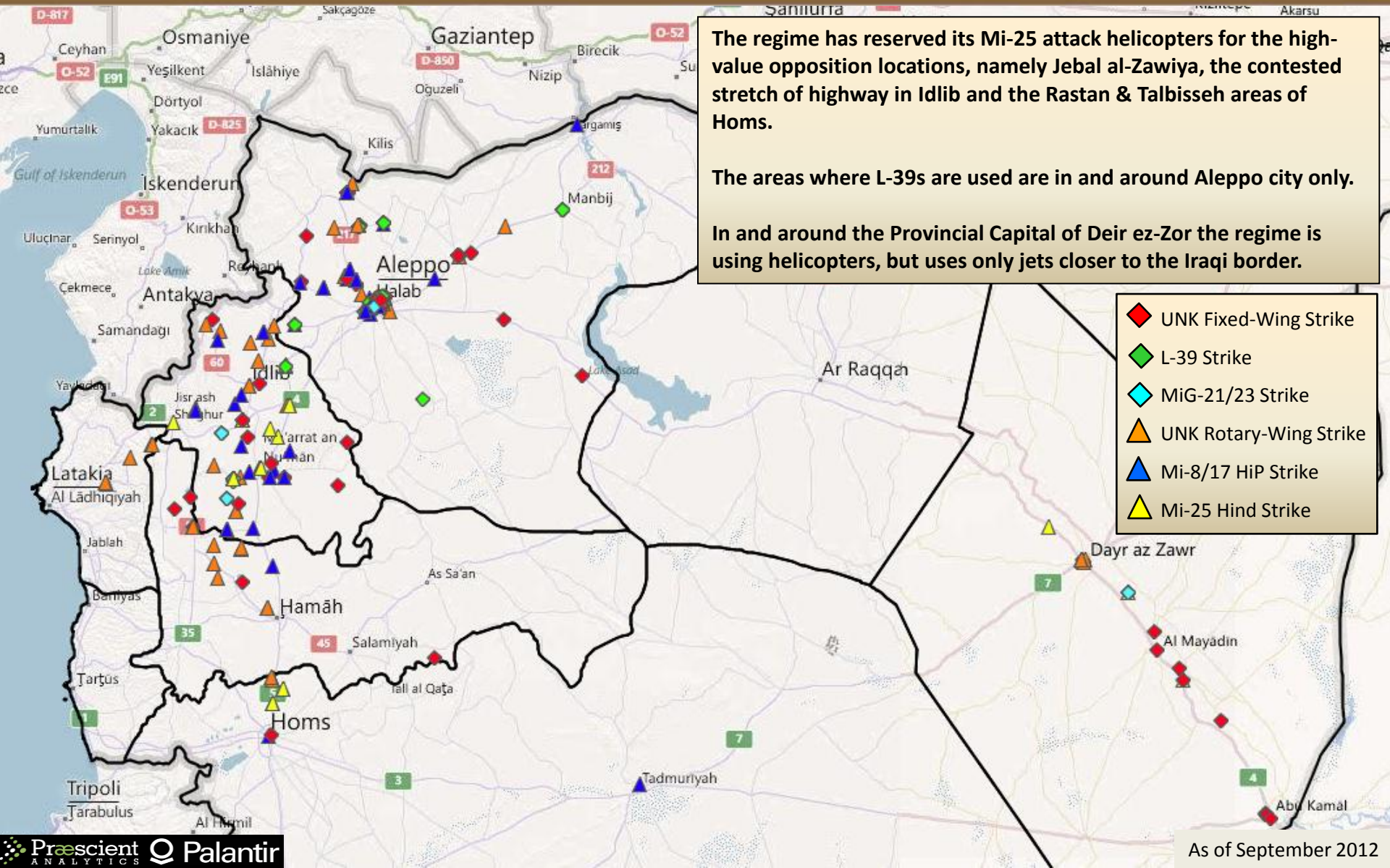
Syrian Air Force Order of Battle: North, West & Central



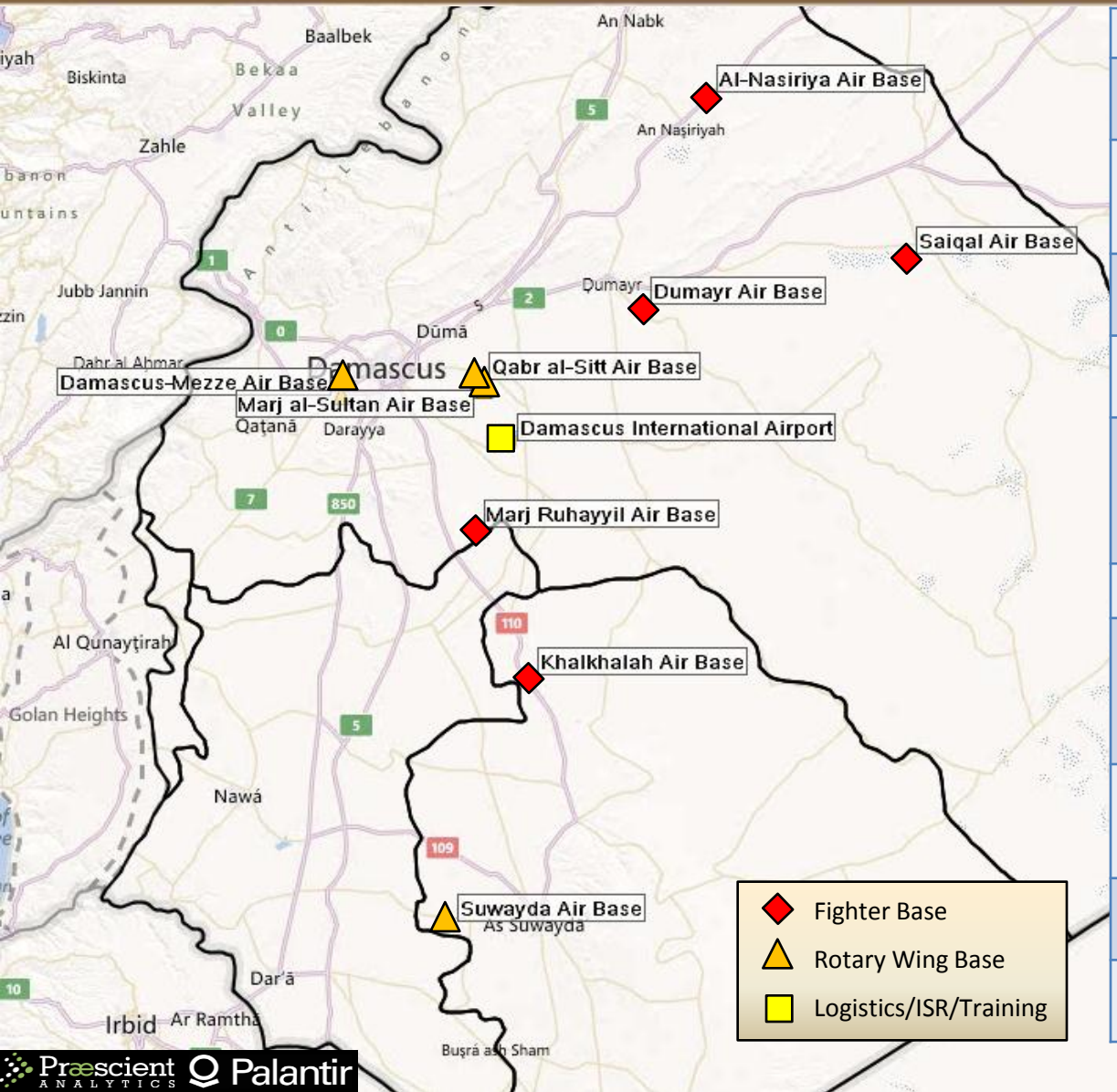
Airbase	Units	Airframes
Abu Duhur	2nd AF Sqn UNK AF Sqn 678th AF Sqn	L-39 L-39 MiG-23
Taftanaz	255th AF Sqn 253rd AF Sqn	Mi-8/17 Mi-8/17
Aleppo	N/A	N/A
Rasin el Aboud	3rd Training Sqn	L-39 MBB-223
Jirah	UNK AF Sqn	L-39
Minakh	4th Training Sqn	Mi-8
Taqba	12th AF Sqn	MiG-21
Deir ez-Zor	8th AF Sqn	MiG-21
Hama	679th AF Sqn 680th AF Sqn UNK AF Sqn	MiG-21 MiG-21 MiG-29
Al-Qusayr	825th AF Sqn	MiG-21
Shayrat	685th AF Sqn 677th AF Sqn 675th AF Sqn	SU-20/22 SU-20/22 MiG-23
Tiyas	5th AF Sqn 1st AF Sqn 819th AF Sqn 827th AF Sqn	MiG-25 MiG-25 SU-24 SU-20/22

As of April 2011

Syrian Air Force Employment: North, Central & West



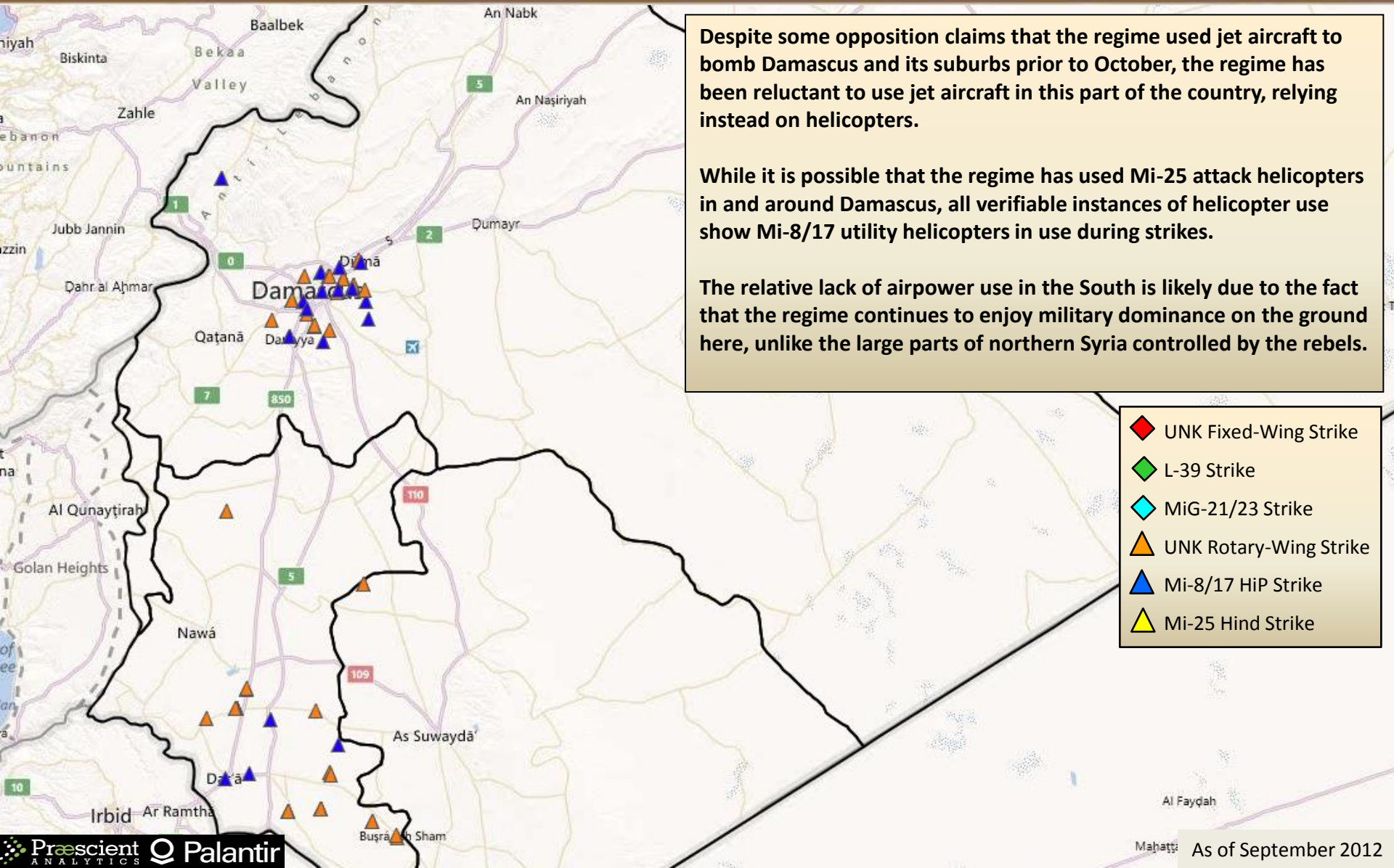
Syrian Air Force Order of Battle: Damascus & South



Airbase	Units	Airframes
Al-Nasiriya	698th AF Sqn 695th AF Sqn	MiG-23 MiG-23
Saiqal	697th AF Sqn 698th AF Sqn 699th AF Sqn	MiG-29 MiG-29 MiG-29
Dumayr	UNK AF Sqn UNK AF Sqn	MiG-23 SU-20/22
Damascus-Mezze	977th AF Sqn 976th AF Sqn	SA-342-L SA-342-L
Marj al-Sultan	909th AF Sqn 525th AF Sqn UNK AF Sqn 537th AF Sqn	Mi-8/17 Mi-8/17 Mi-8/17 Mi-8/17
Qabr al-Sitt	532nd AF Sqn	Mi-8/17
Damascus Int'l	522nd AF Sqn 585th AF Sqn 575th AF Sqn 565th AF Sqn	An-24/26, Il-76 TU-134, 737 Falcon 20E/900 Yak-40
Marj Ruhayyil	77th AF Sqn 54th AF Sqn 767th AF Sqn	MiG-23 MiG-23 Mi-25
Khalkhalah	945th AF Sqn 946th AF Sqn	MiG-21 MiG-21
Suwayda	765th AF Sqn 766th AF Sqn	Mi-25 Mi-25

As of April 2011

Syrian Air Force Employment: Damascus & South



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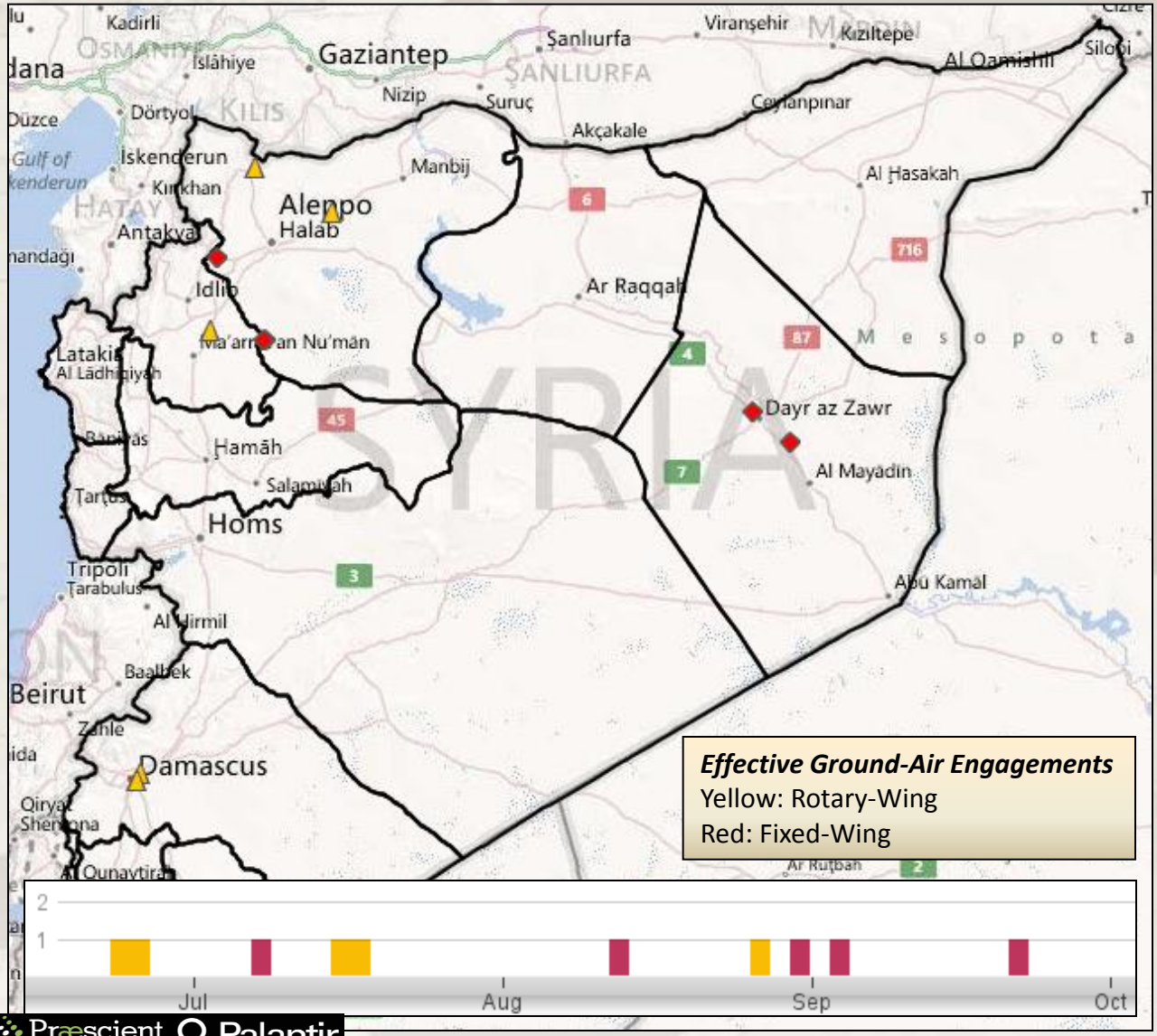
Syrian Air Defense Capabilities: the Opposition & the Regime

- The Assad regime's use of air power in the late summer and fall of 2012 has led to an escalating humanitarian crisis, which has in turn led to debate over the merits of whether to equip the Syrian opposition to defeat the Syrian Air Force.
  - The opposition has already begun to respond to regime air power by shooting down limited numbers of regime aircraft and by attacking regime air bases.
  - The rebels have primarily relied on heavy anti-aircraft machine guns, such as the ZU-23 to accomplish this.

- However, the Syrian Air Force has continued bombing "liberated" areas and opposition forces, causing thousands of civilians casualties and helping the Assad regime maintain military dominance over the rebels. This reality has led to a renewed debate about a no-fly zone in Syria.

- As policy-makers debate the feasibility, merits, risks and costs of a no-fly zone, many analysts point to the capabilities and density of Syrian Integrated Air Defense Systems (IADS).
  - Syria's air defense network is among the most capable and dense in the world, and is oriented primarily along the interior Damascus-Aleppo corridor and along the coast.
  - Syria has approximately 650 static air defense sites, the most concerning of which are the SA-5 sites, due to the range and altitude capabilities of those missiles.
  - Syrian air defense platforms also include approximately 300 mobile air-defense systems, the most concerning of which are the SA-11/17 and SA-22 varieties.
  - On the other hand, Syria's Russian-made IADS have critical limitations, and NATO and Israeli Air Forces have repeatedly demonstrated the ability to effectively penetrate and suppress Russian air defense systems.

Opposition Air Defense Capability Assessment



Effective Ground-Air Engagements
5 Rotary-Wing
5 Fixed-Wing
6 video confirmations
4 in the immediate vicinity of an airbase
9 with ZU-23
1 with MANPAD

Overrun Air Bases
Abu Duhur – temporarily overrun
Minakh – under siege
Taftanaz – under pressure
al-Qusayr –under pressure

Captured Air Defense Sites & Systems
Daret Izza Radar Site
Several SA-2 sites, SA-5 sites
+ mobile systems

Estimated Opposition Equipment
15-25: ZU-23
2-5: 57mm towed ADA gun (or other)
15-30: SA-7 MANPADs

Syrian IADS Range

Incirlik Airbase (Adana, Turkey)
Key airbase (note inside SA-5 ring)
Picture source: wikipedia

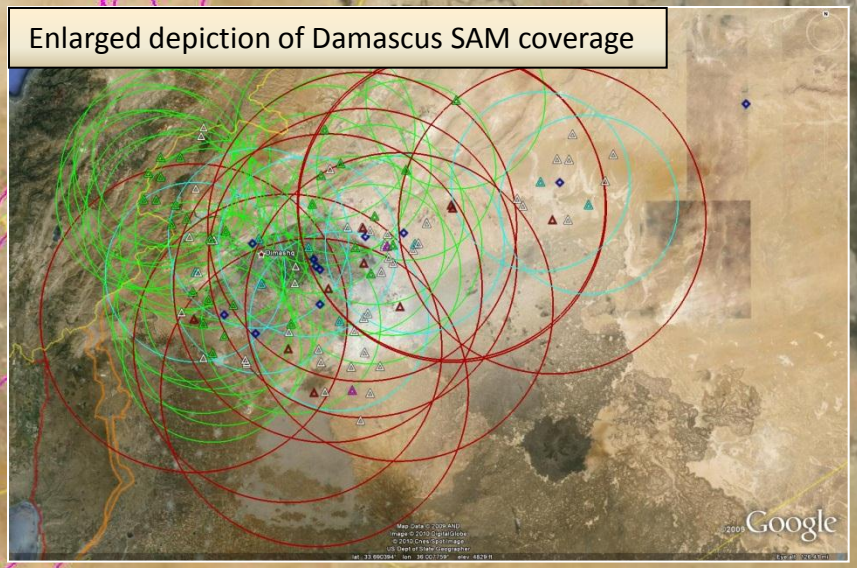
Latakia (Turkey F-4 crash)

Aleppo-Homs-Damascus SAM corridor

Tiyas Airbase

IADS Range Rings
Red SA-2
Blue SA-3
Magenta SA-5
Green SA-6

Enlarged depiction of Damascus SAM coverage



Kahramanmaraş
Adana
Gaziantep
Şanlıurfa
Beirut
Dimashq
Amman
Jerusalem

Sources: Chart depiction http://www.ausairpower.net/APA-Syria-SAM-Deployment.html
Additional overlays/text provided by author

Syrian IADS Capabilities

Static SAM Sites - 650
- 130 active SAM sites
- 120 inactive prepared sites
- 650 Static SA-2/3/5 launchers
  - ~44 SA-5s (High Range/Altitude)
- Status of S300 (SA-10s)?

SA-2: Cold War U-2 (Capt Powers fame)

SA-3: usually located w/SA-2s

SA- 5: thought to have downed Siberia airliner (beyond published max range)

Mobile SAM Platforms - 300
- 195 SA-6
- 14 SA-8
- ~20 SA 11/17
- ~40 SA-22

SA-6 Gainful

SA-8 Gecko

SA-11/17 Gadfly/Grizzly

SA-22 Greyhound (most advanced)

Below "Hard Deck" – 4000+
- AAA (ZSU 23/4)
- SA-9/13
- MANPADS (SA-7/14/16/18/24)

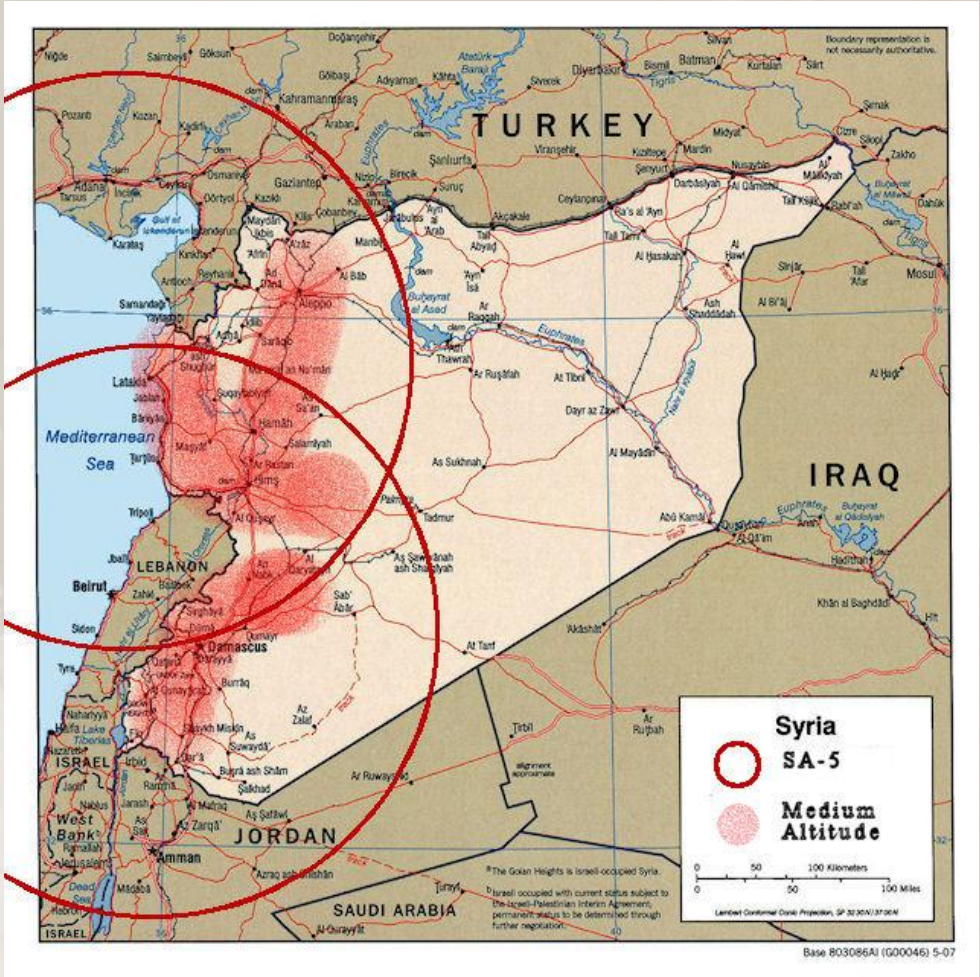
RADAR – Radio Detection and Ranging
- Early Warning vs Target radars
- Radar fingerprints
- RADAR types: scan, phased array & passive
- Fixed vs mobile

SAM totals from http://www.ausairpower.net/APA-Syria-SAM-Deployment.html ; IISS, The Military Balance 2011, p.332
Syrians S300 status undefined (TWI assessed not to be in Syria). SAMs classified by the authors into 3 groups: Older static SAMS (SA-2, 3, 5s), Mobile SAMs(SA-6, 8, 11/17 and 22) and MANPADS & AAA

Images:
SA-2/SA-5 images http://www.ausairpower.net/APA-Rus-SAM-Site-Configs-A.html
SA-3 image: http://www.indiandefence.com/forums/military-photos-videos/6141-stunning-pics-sam-gbad-shorad-systems-around-world.html
SA-6 image: http://www.ausairpower.net/APA-Syria-SAM-Deployment.html
SA-8 image: http://chinavsindia.org/images/India_airdef_SA-8.jpg
SA-11/17 image: http://www.ausairpower.net/APA-9K37-Buk.html
SA-22 image: http://far-maroc.forumpro.fr/t2579-systemes-antiaeriens-documentation

Syrian IAD Limitations

- Russian systems
  - We know a lot about them
  - USAF & IAF defeated them in Iraq, Libya, Serbia, Lebanon w/ few losses
  - Maintenance of newer mobile SAMS?
    - Turkish intercept of Syrian bound cargo (parts issues?)
- Training/morale of ADF operators
  - Past performance & lack of proficiency?
- Threat orientation (South & West)
  - Historical focus on Israel threat axis
  - Iraq and Turkey avenues?
- Impact of civil war
  - SAM & radar sites and systems captured by rebels (SA-2, 5, 8s)
  - Impact of absentees/desertions
- Russian doctrine
  - Centralized command/control – but will SAM operators operate autonomously? (e.g. SA-17 & 22s)



Sources: Chart depicting SA-5 coverage and SAM density
http://www.ausairpower.net/APA-Syria-SAM-Deployment.html

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