

INTELLIGENCE GATHERING

A G2 SOLUTIONS QUARTERLY NEWSLETTER

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THE MARKET FOR UNMANNED AIRCRAFT USED IN INTELLIGENCE, SURVEILLANCE AND RECONNAISSANCE

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The market for unmanned aircraft used in intelligence, surveillance and reconnaissance missions could reach \$44.5 billion in the next decade



General Atomics MQ-9, USAF Photo

General Atomics' RQ-1 Predator first flew as an Advanced Concept Technology Demonstrator in 1994. Northrop Grumman's Global Hawk, an outgrowth of a Defense Advanced Research Projects Agency (DARPA) program, first lifted off from Edwards Air Force Base in California in 1998. In the span of just 15 years these two Unmanned Aircraft Systems (UAS) and a host of others represent capability and concept of operations (CONOPS) mainstays for both the United States Department of Defense and militaries around the globe.

In DoD terms, 15 years can be a blink of an eye, which makes it all the more astounding that G2 Solutions forecasts a world market for unmanned persistent Intelligence, Surveillance and Reconnaissance (ISR) programs of \$44.5 billion through 2019. The market has grown quickly from technology demonstrators

to fielded and required capabilities. The forecast's size is partly a function of ongoing actions in Iraq and Afghanistan, where there's little question that demand for persistent ISR, although not always tied to metrics, is in excess of supply. Defense demands for unmanned aircraft coverage have resulted in skyrocketing hours-flown statistics within the U.S. DoD alone, with 60,000 flight hours in 2004 soaring to more than 250,000 hours in 2007. UAS capabilities and CONOPS are ahead of a defense acquisition curve, meaning "rapid" fielding of new persistent ISR systems will still result in UAV shortages from an end-user standpoint. Pervasive UAS use is happening in spite of airspace deconfliction issues and varying UAV control philosophies because the persistent ISR capabilities they bring are unmatched. (Continued on Page 2)

BUSINESS AVIATION 2009: SIGNIFICANT HURDLES

Michel Merluzau, Managing Partner



The impact of the financial crisis, which has contributed to the first major US recession since the Carter years will have a significant impact on Business Aviation and associated markets, such as Avionics and Completion for at least the next 2 to 3 years.

G2 Solutions will release its newest Avionics Market Analysis later this month (Report AB081 Business Aviation Avionics Market) and details the critical issues facing this market segment in 2009.



Gulfstream IV, USAF Photo

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MARKET FOR UNMANNED AIRCRAFT USED IN INTELLIGENCE, SURVEILLANCE AND RECONNAISSANCE MISSIONS (CONTINUED)

Persistent ISR will mean different things to different people; it was our task at G2 Solutions to put forth some criteria upon which UAS can be included or excluded in such a definition. G2 Solutions poured over hundreds of UAS to compile a list of more than 30 globally produced systems capable of meeting a majority of the aforementioned criteria.

Persistent surveillance is not meant to connote persistent stare over an entire theater. Rather, in its broadest terms, it is intended to imply an ability to detect, locate and track militarily important and time-sensitive targets. Once the target is identified, the UAS should be able to provide surveillance up to, until and after strike aircraft (manned or unmanned) are called upon to prosecute. Ideally, such a UAS will also play a vital role in assessment as well.

Major contracts contributing to the \$44.5 billion market forecast are U.S. programs such as Broad Area Maritime Surveillance (BAMS) and Future Combat Systems (FCS), the United Kingdom's Watchkeeper program and the eventual winner of the United States Air Force's Next Generation UAS. True, there will be international indigenously produced ISR UAS, and several will find customers over time, but U.S. DoD will remain the "anchor client" for persistent ISR assets throughout the forecast period.

Strike Capability

The integration of a strike capability by UAS, something General Atomics brought to the fore with Predator and Reaper, is a reality and an assumed given in the majority of tactical future UAS. What remains to be seen are system balances between ISR and strike.

At present, the tradeoff on persistence versus strike would appear to be significant. It is incumbent upon militaries to clearly define mission sets and CONOPS in order to provide the right aircraft with the right sensor and effects packages at the right time. Needless to say, this is easier said than done, especially in the face of an ever-changing target set.

Industry is looking to the Small Tactical Unmanned Aircraft System (STUAS/Tier II) and the USAF's Next Generation UAS as potentially the last two major UAS ISR programs for up to a decade.

STUAS/Tier II is envisioned as a joint U.S. Navy and Marine Corps program, with Boeing/Insitu as a de facto incumbent with the ScanEagle UAS. This is likely to be an owned asset, which will be a move away from the ScanEagle service model that currently exists. The most optimistic scenarios call for in excess of 4,000 aircraft throughout the initial production run. The RFP for this program has been delayed, and industry hopes it will drop in 2009. If this scenario plays out, an initial operating capability (IOC) of 2012-2013 remains a possibility, especially given the fact that the majority of bidding systems will be at a Technology Readiness Level (TRL) of 6 – a representative model of the system – or above. Additional interest from the Air Force and/or the Army is possible, which could change timelines, capabilities and costs.

More speculation surrounds the USAF's Next Generation UAS, which notionally is intended to replace the MQ-1 Predator and MQ-9 Predator B/Reaper. The pre-RFI released to industry last May at this writing was being reworked. The RFI rework should better define requirements, and perhaps allude to how this asset will contribute to CONOPS. Industry sources were doubtful of a 2015 IOC for this program unless the Air Force can put forth ironclad requirements in a 2009 document and ensuing competition.

**Aviation
in 2009:
Predictions
for The
Challenging
Year Ahead**



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RAFALE IN POLE POSITION IN BRAZIL

This race is probably the most promising for Rafale, despite formidable opponents, F-18E and Gripen, it looks to us that this is most definitely Rafale's to lose. A strengthening Franco-Brazilian defense cooperation augurs well for Rafale's chances there; as does Dassault's chosen partner, Embraer a key player in any contract going to the Brazilian military.

Will we see a different defense policy from the incoming US Administration towards Brazil? Doubtful. It is also unlikely that Brazil truly would find Washington to be a reliable defense partner in Brasilia's own terms. The Indian "syndrome", namely the US embargo on defense articles following the 1998 nuclear testing has left scars with many emerging powers; not only in terms of what it means as far as doing business with Washington, but especially how it led many to become increasingly reluctant to associate their national defense with US interests & conditions. Markets considered safe in the past such as Thailand, Saudi Arabia, Kuwait and even Japan have already or are at risk of turning away from US products in favor of European or Domestic solutions. The ball is clearly with the US government; it needs to adapt, listen and accept more of our allies' demands rather than impose them, otherwise the addressable market for US companies will continue to shrink. Singapore and South Korea could be labeled as abnormalities by any commercial definitions, these types of wins could become rare in the future.

Rafale, despite undeniable shortcomings, may thus enjoy a late emergence in the fighter aircraft markets; Switzerland, Libya, the UAE and India are all realistic possibilities at this stage.



MARKET FOR UNMANNED AIRCRAFT USED IN INTELLIGENCE, SURVEILLANCE AND RECONNAISSANCE MISSIONS (CONTINUED)

Even an evolution of currently fielded capabilities will likely call for clean-sheet designs from envisioned offerors General Atomics, Boeing, Northrop Grumman and perhaps Lockheed Martin. G2 Solutions expects this to be a multi-billion dollar acquisition program through 2019 and perhaps beyond.

Competitive Landscape

Not surprisingly, companies with early attention to UAS are leaders in G2 Solutions' installed base value estimates. Northrop Grumman, General Atomics and AAI Corp. share a full 70 percent of the current \$6 billion UAS inventory value (based on the persistent ISR definition). G2 Solutions' research characterizes revenues at the integrator level, and this typically means the aircraft manufacturer. Sensor and avionics can account for more than 60 percent of program costs for a given UAS; this is especially true of larger, more sophisticated platforms.

Although not specifically credited with program revenues, companies like Raytheon, Rockwell Collins, Lockheed Martin and L-3 Communications can all be considered Tier 1 players within G2 Solutions' definition of unmanned persistent ISR. Raytheon has a major presence in ground control and sensors across a broad array of unmanned systems, and had partnered with Swift Engineering, San Clemente, Calif., in pursuit of the STUAS/Tier II competition. Their proposal is based on Swift's KillerBee UAS.

Rockwell Collins is very strong in tactical data links as well as Modular Open Systems Architecture (MOSA) which should assist the company as an array of electronics and sensor re-completes on existing unmanned systems continue over time. In addition, Rockwell Collins' acquisition last April of Athena Technologies for \$107 million should better position the company in the navigation and command and control (C2) niches.

L-3 Communications has a program presence on the RQ-4, MQ-1, ScanEagle and MQ-1C Sky Warrior, and will likely look to push its data links and throughput/latency capabilities across multiple current and future UAS.

Lockheed Martin technology demonstrators (e.g. DarkStar, Polecat) haven't always led to a production UAS fitting within the persistent UAS definition. There is no question the company has the ability to focus and compete here, however. G2 Solutions expects Lockheed Martin to offer for both the USAF Next Generation UAS and STUAS/Tier II.

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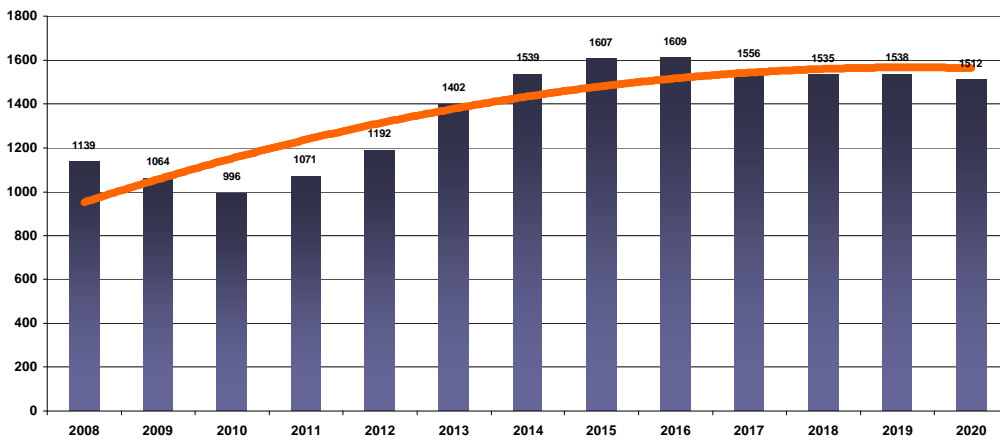


BUSINESS AVIATION 2009 OUTLOOK (CONTINUED)

The irrational exuberance that we often like to refer to has landed abruptly in 2009. Even the most conservative/revised industry forecast failed to convince us last year that there was a clear sense of the magnitude of the problem facing the industry. However, we remain somewhat bullish as to opportunities arising next decade.

This slow down will primarily impact companies already struggling such as Eclipse Aviation, Hawker Beechcraft or even a reborn Adam or Grob. Companies with diversified product portfolio such as Cessna and Bombardier will likely be able to better absorb this down cycle. Demand will soften for Dassault and Gulfstream, but only temporarily.

For avionics suppliers, fewer programs will mean a short term competition intensification; we also believe that several suppliers such as Avidyne, IS&S and Universal Avionics are likely to be part of a consolidation waves in the next months/years due to their shrinking addressable market.



MARKET FOR UNMANNED AIRCRAFT USED IN INTELLIGENCE, SURVEILLANCE AND RECONNAISSANCE MISSIONS (CONTINUED)

Honeywell can boast a wide array of applicable in-house capabilities not limited to: MEMS, GPS, vehicle management systems, full-authority digital electronic controls (FADEC), advanced turbine engines, avionics integration, communications management functionality and input/output computing interfaces.



Northrop Grumman Scaled Composites Proteus
USAF Photo

In November, Honeywell announced the first production order for its T-Hawk micro air vehicle (MAV), a \$65 million contract from the U.S. Navy for 90 systems of two vehicles and one ground station each.

The backpackable, ducted-fan MAV has been deployed in Iraq and Afghanistan by the Joint Explosive Ordnance Disposal task force, and is the basis of the Class 1 UAV of the U.S. Army's Future Combat Systems program. A Block 2 design features a gimbaled sensor and electronic engine control.

FADEC and engine monitoring are likely to be the core strengths Honeywell can apply to current and future persistent ISR UAS.



Watching from Above:

The Growing Demand for Persistent Airborne Surveillance

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