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ARTICLE

Flying Police Vehicles? - Just Another Day on Patrol



Article

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Imagine Police Officers George Jetson and Anakin Skywalker (or Lord Vader if you prefer) working their beat. Officers Jetson and Skywalker are on patrol duty during the peak of the afternoon rush hour in a southern California megalopolis. They are dispatched to a reported domestic dispute in which an irate and intoxicated adult has threatened to leave a home in a private vehicle with a toddler and infant child. The location of the call is about five miles away through heavy city traffic. What would appear to be a grave situation to most police officers responding, “code three” in rush hour traffic does not even faze Officer Jetson or Skywalker. That is because they take off vertically in a Moller M400 Skycar<sup>1</sup> and arrive on scene in less than a minute via their aerial highway. Their actions and the ability of their patrol vehicle prevented a potential tragedy, allowed them to respond safely and quickly restore order to the neighborhood.

Unbelievable? The stuff of vivid imaginations, considering that which is impossible? Hardly. It is true that science fiction has envisioned police response in a very similar fashion. Philip Dick’s “Minority Report” (set in the year 2054) saw police officers of the future responding to emergency calls for service utilizing pod shaped Vertical Take Off and Landing (VTOL) vehicles with jet packs strapped to their backs for rapid deployment.<sup>2</sup> Although seemingly far-fetched, one only has to pick up a popular science magazine or surf high tech web sites to see this technology is already here.

### **Societal Changes of the 21<sup>st</sup> Century**

In the dawn of the new millennium, quality of life concerns related to ailing infrastructures, population growth and the availability of affordable housing will continue to challenge our Country in both the private and public sectors. These concerns will also

exacerbate the worsening problem of traffic congestion. To enhance public safety response in areas already experiencing gridlock, the police must consider alternative methods of transportation in their planning for the future. Anyone who has been involved in the crush of commuter traffic on highways or surface streets during rush hour traffic could attest to the challenges an emergency vehicle has getting to a critical call.

Helicopters are one option, but these aircraft require significant open space for landings and are generally not deployed as first responders. Rather, this specialized craft relies on ground units to arrive on scene to assess the nature of the call. Consider for a moment that, instead of an unwieldy craft requiring thousands of hours of training, that the police could use a mode of transportation equipped with rotors instead of wheels that could ascend vertically and then fly at speeds of 200-300 mph without the hazards or obstacles of ground traffic. Not much larger than the average family sedan, this personal aircraft could conquer the challenge of navigating busy streets with the greatest of ease. Some forward thinking aerospace developers and corporations, assessing the same future for our streets, might agree.

### **Future Transportation Models**

New aerospace technology may provide viable alternatives to both the private and public sectors need for expedient travel in congested areas. Trek Aerospace Corporation has developed manned and unmanned Vertical Take Off & Landing (VTOL) apparatus, including the "Solo Trek XFV," an EXoskeleton Flying Vehicle designed to enhance human flight.<sup>3</sup> Aero-Design & Development Ltd. (AD&D) first successfully flew their "Hummingbird" flying platform, a stand-on "flying saucer,"<sup>4</sup> in August 1997. Future Horizon Inc. produces flying jetpacks, rocket belts, flying saucers and hovercraft.<sup>5</sup> Of

particular interest to the future needs of the police, Dr. Paul Moller of Davis California is the inventor of the M400 Skycar.

The Skycar is a craft of unique design that resembles one "Batman" might drive in one of his Marvel Comics or a competitor in the cartoon favorite "Speed Racer". The most striking difference between these imaginary vehicles and the Skycar is that instead of wheels, the Skycar has eight enclosed bladed rotary turbine engines (two where each wheel would be) intended to elevate and propel the craft through the skies. Dr. Moller has begun production on military versions of this vehicle and currently has contracts with NASA, Hughes Air Craft and the California Department of Transportation<sup>6</sup> for unmanned aerial vehicles (UAV's).

Moller's military aircraft have been primarily designed for reconnaissance missions and are equipped with cameras. The Air Force version functions as a means to assess nuclear damage after an attack. In the US Army's case, the craft has been designed as a commander's forward observation vehicle to be carried on tanks used in the field. The Caltrans unit is being made to inspect bridges. The new generation VTOL for civilian use is expected to be ready for commercial sales by 2010<sup>7</sup> although it could also deliver troops or perform rescue missions in military or public service use. The technology is here now, but tests to assess its use for public safety have yet to occur.

The concept of using small-unmanned crafts for both reconnaissance and assault missions is not new. UAV's have been used for reconnaissance missions by the military for over a decade, and the craft known as the "Predator", a medium altitude endurance UAV<sup>8</sup> for aerial observations and attacks. In most cases the operators of these vehicles are located at off-site locations, sometimes miles or continents away from the craft being

operated. This application could easily be used in similar ways in policing with non-lethal munitions for civil unrest incidents, special operations or routine patrol to get a bird's eye view of the community if needed, although they do not fulfill the goal of putting police officers on scene quickly enough to quell disturbances and restore peace to our streets and neighborhoods.

A VTOL craft may be an innovative way to meet these challenges in a way that meets public expectations for the rapid deployment of the police when and where they are needed. Traditionally, helicopters are not used as first responder vehicle, but are instead used as aerial support for responding ground units and staff. Not all officers (in fact very few) are trained to operate them. Helicopters are not designed to land at general service calls, nor does the crew become involved in the physical apprehension and arrest of criminal violators at a crime scene or disturbance. Helicopters must also, in most cases, already be deployed in the skies in order to provide quick response service and support to ground units. The absence of these capabilities with traditional aero support craft, all of which can be provided with a smaller VTOL vehicle, illustrate a number of advantages and several justifiable reasons as to why traditional aircraft may not be the right choice for the future of modern policing.

### **Vertical Flight & Aviation History**

Historically, the concept of vertical flight goes back at least 1,500 years. An unknown inventor in China created a simple toy known as the "Chinese top" with horizontal wings or "rotors" affixed to a stick. When spun rapidly in the palm of one's hand, the top will ascend vertically for several feet until it settles gently back to the

ground.<sup>9</sup> Variations of bladed rotors made their way to the west as early as 1460, with Leonardo da Vinci producing illustrations of such devices in his famous works. The concept of the modern day helicopter began in the early days of powered flight around the early 20<sup>th</sup> century. Improvements in fixed-wing aircraft slowed the development of rotary-wing aircraft until the 1930's when the first true helicopters were introduced and accepted as practical flying machines. Still, fixed-winged craft seemed to be the aircraft of choice for patrolling the skies.

The first official deployment of an aircraft squadron by a law enforcement agency was in 1929 when the City of Lakewood California, in conjunction with the Los Angeles County Sheriff's Department, formed the "Sheriff's Aero Squadron" using airplanes to assist policing the County's fifty five airports.<sup>10</sup> Agencies across the nation took notice of how fixed-wing aircraft could enhance public safety services, and the Royal Canadian Mounted Police later deployed planes to assist with the anti-rum running campaign during the U.S. prohibition.<sup>11</sup> In 1939, the New York State Police began deploying planes to search for escaped or wanted criminals. America's post-war love affair with the automobile resulted in the use of these aircraft to spot traffic violators, locate wanted vehicles and to monitor roadway and traffic conditions.<sup>12</sup>

Fixed-wing aircraft would dominate aerial law enforcement into the 1950's, although the Los Angeles Police Department did expand its airborne law enforcement program in 1956 by adding a lone helicopter. The LAPD Air Support Division (ASD) currently has the largest municipal airborne law enforcement helicopter operation in the world<sup>13</sup>. It is also important to mention a study supported by NASA and conducted by the Jet Propulsion Laboratory (JPL) Space Technology Applications Office on the LAPD

ASD The study reported that the use of helicopters by LAPD demonstrated a reduction of Part 1 Property Crimes when an ASD helicopter was overhead and the number of arrests associated with calls for service were three times the normal rate when aircrews were involved. The study also demonstrated that the citizens of Los Angeles accepted helicopter patrols as a necessary part of the city's patrol force and strongly supported the continued use of the craft.

The helicopter has since dominated the skies as the single most used VTOL aircraft utilized by the police. In comparison to automobiles, which have reigned supreme for public safety responses in the past and still do today, one can only imagine how much more effective the police might be if their aircraft had continued to develop at the same pace as their equipment and other technology.

### **Population Growth & New Transportation Ideas**

A growing U.S. population, urban sprawl and our increasingly crowded roadways seem to be paving the path for a need of VTOL vehicles. The population of the U.S. is currently over 295 million.<sup>14</sup> At a growth rate of approximately one percent per year, the U.S. could top 325 million by 2014. California is the most populous state with over 37 million people, growing at a rate of 550,000 people a year.<sup>15</sup> California has three of the five most traffic congested areas in the U.S. (Los Angeles, San Francisco and Oakland). The greater southern California area has nearly developed all of its available land. The counties of Orange and Santa Clara are expected to run out of developable land by 2010, and Alameda, Contra Costa, San Diego and Ventura County will run out of space by 2020.<sup>16</sup> Growing population, housing density and commercial development will directly

affect public safety response time, which many agencies currently strive to keep within the national average of about five minutes.<sup>17</sup>

When one considers the significant growth the state has experienced over the last twenty years, current ground response times in many jurisdictions will continue to increase unless more staff are deployed or other delivery options are considered.

Response times refer to the amount of time it takes from the moment a call is dispatched to a police officer in the field and the time the first police officer arrives at the location for the call for service. This is significant because the shorter the amount of time used in an emergency response, the greater the likelihood that a police officer can intervene in order to stop a crime, apprehend a violator(s), or perform life/property saving activities

What should be further considered in regard to reasonable or unreasonable police response times depends on the particular community and the expectations each community has of its public safety response time to emergency calls for service.

What citizens expect in a small bedroom community might be completely different than what is expected in a large metropolitan area, regardless of what the national averaged is, as stated above. To respond quickly and effectively, the choice is clear; add more police officers and cars or consider getting the ones you already have on staff where they are needed quickly through the use of emerging VTOL options. The contemporary concept of the traditional police response to a call for service is primarily performed on the ground in a motor vehicle. The issues of population growth, housing and commercial business density and more traffic on the roadways will continue to challenge police department response times.

Some members of the public have started to come to terms with the reality of air flight providing an alternative for a quicker response time in relation to private travel to deal with traffic congestion. In an AP article dated May 2, 2005 in a San Francisco Bay area newspaper titled, "A plane in every garage? Not quite"<sup>18</sup> the writer explores a potential new trend of private citizens owning small aircraft. Modern aviation technology and smaller, more affordable planes have made this possible, and creative financing options have allowed for price sharing with multiple owners of a craft that can range from \$160,000 to \$326,000. These pioneers seem to be the new age innovators for addressing commuting woes. Public safety officials and decision makers would be wise to closely follow trends like this and consider similar strategies when new VTOL craft begin to appear.

### **The VTOL Response**

The concept of VTOL reducing response times is consistent with the desire to have a rapid response to any 911 emergency call for service. According to Lawrence W. Sherman, "The general form of this claim is that the shorter the police travel time from assignment to arrival at a crime scene, the more likely it is that police can arrest offenders before they flee. This claim is then extended to rapid response producing three crime prevention effects. One is a reduction in harm from crimes interrupted in progress by police intervention. Another, more general benefit of rapid response time is a greater deterrent effect from the threat of punishment reinforced by response-related arrests. The third hypothesized prevention effect comes from the incapacitation through imprisonment

of offenders prosecuted more effectively with evidence from response-related arrests".<sup>19</sup>

This hypothesis would also seem to be true for life saving responses.

Since the craft have never been used for police response, there is no existing evidence to prove VTOL's would produce these effects; however, it would seem logical that a small, accessible air craft of this type could respond to an emergency situation in a faster and potentially safer manner than a ground unit responding with red lights and siren through city traffic and geographical barriers. It is also logical that a response of this nature would increase the rate of apprehension of offenders by arriving at a scene sooner, having an aerial view of violators and the scene and having the ability to pursue fleeing offenders or land immediately to engage offenders and apprehend them, unlike a helicopter. This concept, upon becoming more widely utilized or known to the public could also become more of a deterrent as stated in the previous hypothesis.

Police response times can be dramatically impacted by population growth, community expansion and traffic conditions unless operational changes are made to mitigate these issues. Delays in communities are already seen due to the increasing variety of complex criminal investigations and the rapid depletion of available officers extending the response time for lower priority calls. An alternate service delivery methodology has become increasingly needed.

It is important to understand that more police officers deployed with more police vehicles on the street would also help to alleviate this problem (as was demonstrated by the City of New York and Mayor Giuliani in the 1990's in response to rising crime rates), but a few VTOL craft could potentially produce a similar outcome using less staff at a

lesser long term cost when considering the acquisition and operational costs of more traditional airborne police units. as discussed in the following section.

In review of the history and future potential of VTOL vehicles beyond the current technology of deploying helicopters, one can see that new VTOL technology is already available in the military today, and is being redeveloped and improved upon as you read this article. The reality of the future deployment of VTOL crafts by public safety departments is a coming alternative. It should at leased be considered and further explored if law enforcement agencies are to find new ways to keep up with community growth, expansion and continued traffic congestion problems.

### **The Costs**

Any plan to consider obtaining a VTOL craft will require an extensive study of current technology (helicopters), with a cost, benefit, and capability analysis comparative to the available new technology. It is clear that technologically advanced VTOL vehicles have the potential to present an alternative approach to emergency response and critical incidents, but not without a initial significant expense. The broad capabilities associated with a smaller, quick response aerial craft that is potentially easier to operate, store and access could justify a hefty price tag. To determine if the benefits would outweigh the cost of a VTOL craft, three estimations must be clearly identified: how much time will be saved on critical responses; how accessible is the equipment for emergency and non-emergency use; and, how much staff time can be potentially saved. Once this criterion is determined and success factors are known, the feasibility of such equipment can be assessed.

As a means of starting this assessment, consider the features and capabilities the Moller Skycar is said to possess by its inventor, Dr. Paul Moller.<sup>20</sup> The Skycar itself is described as a hybrid vehicle that can both fly and drive on a street, unlike a helicopter. A helicopter can cost several hundred of thousand dollars to purchase and maintain. Moller has predicted that when the Skycar is eventually produced in volume, purchase costs could be as little as \$50,000 to \$60,000. Helicopters require pilots that are highly trained and skilled, with hundreds of hours of airtime to certify. The Skycar is a computer-operated craft that the average adult can be taught to fly in two hours or less training on a simulator. Only two controls are necessary to operate the craft, which consist of a lever to select altitude and a joystick for direction of travel. A Skycar is designed to get twenty miles to a gallon of fuel and run on a variety of petroleum based fuels, including "...recycled french-fry oil," says Moller. A Military & Aerospace Electronics review in April 2001 noted the following specifications of the M400 Skycar, which have been listed in Appendix A.

The acquisition (lease or lease/purchase) and operational costs of staffing, deploying, insuring and storing a helicopter is significant and lacks the described capabilities of the described VTOL craft. Consider that, according to a proposal by Robert Gardner, author of a February 1995 study for an air support model for a prominent Southern California City<sup>21</sup>, the annual cost of this type of air support equipment can range from a low \$153, 400 for a bare minimum of coverage, to \$340,000 per year for a basic plan which would be to operate the craft and run a program for one helicopter. Contracting from a private service isn't much better. California Aviation Services<sup>22</sup> estimates that acquisition and operation for one craft can be as high as \$1.4 million for a

first year start-up cost, then several hundred thousand dollars annually. The cost to lease such services would still be about \$350,000 per year. Supporting budget items like these may not be an option for many public safety agencies.

Evaluating the success of this technology will not be a task that can be completed in short order and could take several years to evaluate. Current statistics will have to be compared to pre-deployment statistics. Community satisfaction reviews and public comments will have to be addressed. Information regarding calls for service, response times and cost savings will have to be shared.

The success of VTOL will hinge heavily on the ability of the craft to deliver a higher level of service to a community at a reasonable cost. An overall cost savings that can justify the end result of public safety services hopefully being delivered quicker, safer and more efficiently would need to be demonstrated.

#### **Panel of Experts Share Their Views**

A panel of civilian and public experts was assembled in November 2004 to assist in forecasting possible trends and events related to the issue of deploying future generation VTOL craft in public safety applications. The group of panelists consisted of representatives from city government, civil engineering, public safety, economic developers, land developers, active and retired pilots, traffic commissions, auto industry, fuel industry and a corporate vice-president from the VTOL technology industry. There was a great deal of discussion and much debate pertaining to the issue. Although they all could agree on the benefits of VTOL vehicles, not all agreed that new VTOL technology would replace current rotary aircraft technology or traditional ground police vehicles in

the next ten years. Only the industry expert on the panel emphatically disagreed, stating the Skycar his company developed will hit the market in about two years, forever educating the world on the potential use of VTOL vehicles.

One of the main obstacles presented by the majority of the group was the high cost of such equipment, although many saw the potential of resource sharing between agencies as a likely possibility to over come initial investments in order to field test such technology in real applications. As the discussions ensued, it became much more apparent this type of cutting edge VTOL aviation technology is already here and is currently being used and tested by the military in the form of unmanned VTOL drones for surveillance, reconnaissance, and even weapons deployment. The sole industry expert reminded the group that this technology is available now, and the industry is only steps away from making small, practical VTOL craft that can be operated and flown by a pilot, for either the military, public safety or private citizens.

### **The Nay Sayers:**

Jeff Wise, staff writer for Popular Science magazine, has a different view. In his article entitled "The Daring Visionaries Of Crackpot Aviation" he lists several fringe inventors as "Aeronautical Mavericks."<sup>23</sup> One of the inventions he lumps into this category is the Moller M400 Skycar. Wise noted the maiden flight of the craft in August 2004 in Davis, California was far short of the predicated capabilities asserted by its inventor. This flight amounted to the eight 150hp rotary engines elevating the vehicle vertically a few feet for only a few minutes. To Wise, this was a far cry from Moller's claim that the craft would "...carry four people safely and efficiently at speeds of up to

375 mph.”<sup>24</sup> Another past claim by the inventor that ten thousand of these M400 craft would be in the skies by the end of 2002 has failed to come to pass. Wise’s own forecast for Moller’s flying machine is, as he puts it, “stormy.” The other personal aircraft Wise reviewed in his article did not have much better outlooks, except for a mini fixed winged jet called a “Javelin,” which would cater more to rich thrill seekers since it doesn’t seem to fit practical commercial application and carries a hefty price tag of \$2.5 million dollars.

Another article printed in Stuff<sup>25</sup> magazine under a regular featured section titled “ASYLUM”, introduces the M400 Skycar with the claim from Moller International that in four years the company will be producing 500 hundred units per year at a base cost of \$500,000. Although the article claims the craft works, it does skeptically note the Skycar has only hovered and has yet to make an un-tethered flight.

### **Conclusion**

In spite of the current uncertainty over the state of VTOL technology, public safety officials nonetheless should continue to look for new and innovative ways to deliver their services safer, faster and more efficiently. To do so, they will have to explore alternative response and delivery methods that become available through these and other emerging technologies. As modern day VTOL craft and apparatus begin to evolve, and the success of their application becomes more widely known, public demand may influence decisions to consider their use in the skies above our streets. With commercial production and sales predicted by Moller International to take place in the

next two years, the reality of a police agency acquiring a small VTOL vehicle in the next ten years doesn't seem like an impossible dream.

Only time will tell, once the technology makes its official debut and the general public becomes more aware of it. It may be decades before private citizens are crowding the air in VTOL craft, but it may only be years before other applications are introduced. Officer George Jetson could be "10-8" in the skies above us sooner than you may think!

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<sup>1</sup> Gadget Vortex: Dr. Moller Interview: M400 Skycar (February 2000), Moller International [online] accessed August 17<sup>th</sup> 2004, available: <http://www.moller.com>

<sup>2</sup> Film Unlimited: Images from Minority Report (2002), Studio Stills Photo [online] accessed January 5<sup>th</sup> 2005, available: <http://guardian.imdb.com>

<sup>3</sup> Trek Aerospace: Unmanned, manned and/or remote operable (UMR) vehicle known as "Dragon Fly" UMR-1 (May 2004), "Springtail" EFV-4A, Trek Aero Space [online] accessed October 28<sup>th</sup> 2004, available: <http://www.millenniumjet.com>

<sup>4</sup> Sport helicopter & Pilot: The "Hummingbird" flying platform (March 1999), Global Information Exchange [online] accessed October 28<sup>th</sup> 2004, available: <http://www.usbusiness.com/helicopter/Hummingbird.htm>

<sup>5</sup> Popular Science Magazine: Flying Jetpack, "Geobat" Flying Saucer (April 1997), Future Horizons Inc. [online] accessed December 29<sup>th</sup> 2004, available: <http://www.futurhorizons.net>

<sup>6</sup> The Wall Street Transcript: Paul Moller-Moller International Inc., CEO Interview (March 2005), Document #ABJ603 [online] accessed September 6<sup>th</sup> 2005, available: <http://www.twst.com/ceos/ABJ603.htm>

<sup>7</sup> Gadget Vortex: Dr. Moller Interview; M400 Skycar (February 2000), Moller International [online] accessed August 17<sup>th</sup> 2004, available: <http://www.moller.com>

<sup>8</sup> Intelligence Resource Program: Unmanned Aerial Vehicles (UAV's)(August 2005), FAS [online] accessed September 6<sup>th</sup> 2005, available: <http://www.fas.org/irp/program/collect/uav.htm>

<sup>9</sup> "Chinese top": (Date unknown), European Helicopter Pioneers [online] accessed December 28<sup>th</sup> 2004, available: <http://www.vectorsite.net>

<sup>10</sup> Air Beat Magazine: Fixed-Wing Flight Ops – Now & Then (march-April 2004), Airborne Law Enforcement Association (ALEA)[online] accessed December 28<sup>th</sup> 2004, available: <http://www.alea.org>

<sup>11</sup> RCMP Air Services Branch (ASB): Canada Police (June 2003), aeroflight-World Air Forces [online] accessed December 28<sup>th</sup> 2004, available: <http://www.aeroflight.co.uk>

<sup>12</sup> Air Beat Magazine: Fixed-Wing Flight Ops - Now & Then (March-April 2004), Airborne Law Enforcement Association (ALEA)[online] accessed December 28<sup>th</sup> 2004, available: <http://www.alea.org>

<sup>13</sup> Special Operations.Com: Los Angeles Police Department Air Support Division (ASD) (September 2005), [online] accessed September 6<sup>th</sup> 2004, available: <http://www.specialoperations.com/Domestic/LAPD/ASD.htm>

<sup>14</sup> U.S. Census Bureau: U.S. POPClock Projection (December 30, 2004), [online] accessed December 29<sup>th</sup> 2004, available: <http://www.census.gov/cgi-bin/popclock>

<sup>15</sup> California Population Report: NPG State Facts (2003), California [online] accessed December 29<sup>th</sup> 2004, available: <http://www.npg.org>

<sup>16</sup> California Population Report: NPG State Facts (2003), California [online] accessed December 29<sup>th</sup> 2004, available: <http://www.npg.org>

<sup>17</sup> IPS Corporate Security: The Elite Security Provider (no date given), IPS Corporate Security [online] accessed January 4<sup>th</sup> 2005, available <http://www.ipscs.com>

<sup>18</sup> The Reporter: "A plane in every garage? Not quite" (May 2<sup>nd</sup>, 2005) AP Writer Rukmini Callimachi

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<sup>19</sup> Lawrence W. Sherman (date unknown) "Policing For crime Prevention" article [online 2005] accessed January 4<sup>th</sup> 2005, available: <http://www.ncjrs.org>

<sup>20</sup> The Wall Street Transcript: Paul Moller-Moller International Inc., CEO Interview (March 2005), Document #ABJ603 [online] accessed September 6<sup>th</sup> 2005, available: <http://www.twst.com/ceos/ABJ603.htm>

<sup>21</sup> Police Department Air Support Model Proposal: Robert A. Gardner (February 1995) [online] accessed September 10<sup>th</sup> 2005, available: <http://www.crimewise.com/library/asu.html>

<sup>22</sup> California Aviation Services [online] accessed September 10<sup>th</sup> 2005, available: <http://www.caaviationservices.com>

<sup>23</sup> Popular Science Magazine: "The Daring Visionaries Of Crackpot Aviation" (January 2005) article by Jeff Wise

<sup>24</sup> Popular Science Magazine: "The Daring Visionaries Of Crackpot Aviation" (January 2005) article by Jeff Wise

<sup>25</sup> Stuff: News From The Future, "How We'll Catch Superman"(March 2005) staff writer unknown

#### Appendix A

##### Specifications of the Moller Skycar designed for civilian use

Passengers:	4
Cruise Speed:	350 mph
Top Speed:	390 mph
Maximum rate of climb:	7,800 fpm
Maximum range:	900 miles
Payload with maximum fuel:	740 pounds
Fuel consumption:	15-20 mpg
Operational ceiling:	30,000 feet
Gross weight:	2,400 lbs.
Engine power:	960 hp (eight 120 hp engines)
Dimensions:	18x9x6 feet (may configure to 8.5 ft. width for street use)
Take off and landing area:	35 feet diagonal
Noise level at 500 feet:	65 decibels