

## DC3 Site Survey Report

*23-25 October 2011*

**Participants:** Baeuerle, Barth, Cantrell, Moore

**Locations:** Tulsa, OK (U. S. Aviation FBO), Salina, KS (Salina Airport Authority)

### **Overview of Requirements for All Facilities Considered During the Site Survey:**

**Science:** Day time convection and its evolution in time focusing on individual storms; what chemistry occurs in thunderstorms and downwind of the storms; tracking of resultant plumes down wind in space and time

**Dates:** Project field operations set-up late April-early May 2012; aircraft arrive after 10 May (details under discussion by DC3 science team) for first research flight on 15 May through 30 June 2012.

**Aircraft:** NSF/NCAR Gulfstream GV, NASA DC8, DLR Falcon Jet (2-3 weeks in June) 143 flight hours per aircraft (DC8 and GV); plus 40 hours from Falcon

#### **Aircraft Support Equipment:**

Provided in separate emails and tables provided from the facilities

#### **Other Special Requirements:**

- Aircraft power up and instrumentation stabilization period for up to 3 hours ahead of a flight
- Advanced coordination with local and regional FAA
- Potential for 24/7 access to hangar and aircraft for instrument servicing and calibration
- A daily briefing in the morning 7 days/week

#### **Operations:**

- DC8 and GV will fly the same storm in coordinated fashion vertically stacked in the airspace
- DC8 and GV will fly in coordination in/near resultant plumes downwind of previously sampled convection
- DLR Falcon will fly separately in time and/or space to study the storms

#### **Hangar space:**

- Required for GV and Falcon operations
- Storage in/near hangar for up to 8 seatainers

- Storage for various gases used by instrument PIs
- 24/7 access for personnel and specific vehicles (including ramp)

**Operations Center requirements:**

- High-bandwidth Internet connectivity; primarily wireless
- Dedicated DC3 forecaster team space
- Large meeting space for daily project meetings

**Office Space:**

- Requirements for space of ~130 people from all three facilities, participating scientists and instrument providers, and the operations team.
- Proper presentation hardware for daily meetings (phone, overhead projector etc)
- Land line phone access as needed for special applications (conference calls, fax, etc.)

**Facility Flight Crew, Instrument Providers, Science and Operations support:**

- GV: 30 people
- DC8: 80 people
- Falcon: 15-20 people
- Operations/Forecasting: 10 people

## **PART I: TULSA, OKLAHOMA (TUL)**

FBO: United States Aviation (unitedstatesaviation.com)  
4141 N. Memorial Drive  
Tulsa, OK 74115

*Contact:* Mike Curtis, FBO Manager  
Phone: 918.836.7345  
[mcurtis@unitedstatesaviation.com](mailto:mcurtis@unitedstatesaviation.com)

Roger Hardesty (Owner) - 918 585 3100  
Bonny Rean (responsible for badges x227)

**Hangar / Ramp / Lab Space:**

Enough hangar space for GV and Falcon  
Door: 37 feet tall, 200 feet wide  
Currently four airplanes in the hangar (2 Gulfstreams, Lear, F-5 Fighter Plane)  
24 hour/7 day operations – not an issue; FBO is staffed at all times  
Activity level: low, in and out  
Source for gases/dry ice: AirGas  
Runway: 10,000 ft long run way; ramps: 100,000 pound weight limit in some areas  
There is commercial airline access to Tulsa. (United, SW, Delta, etc.)

**Accessible Ramp Space**

There is enough ramp space for GV and Falcon in front of the FBO hangar (e.g. during pre-flight warm up) along with other FBO customers. Placement of the DC8 in this area is problematic due to the size of the aircraft and other aircraft using the ramp area for normal FBO operations (e.g., transient parking, refueling etc.). Adjacent maintenance room in hangar would have space for dry/wet lab, storage for gases; workspace for instrument support teams. The storage of gases and other hazardous materials would be possible. Seatainers can be stored right next to hangar where fuel trucks are located with connecting door into the hangar right next to it. 24/7 access would be possible.

The FBO Manager stated the DC-8 could not remain on the ramp in front of the FBO for any extended period and suggested possible suitable place for DC8 about 0.5 miles away in an area currently used to dismantle aircraft. There are two ways to get there, access by car to a specific gate and also by registered vehicle and badged driver using secure perimeter road. It takes about 5 minutes to drive from the FBO hangar to the area where the DC-8 could be staged. It would be possible to put one or more office trailer(s) there for some usable space as there are no buildings that could be accessed. However, after viewing the area, it is not clear that the DC-8 would have room to maneuver (to minimize tug requirement) in this area.

**Fuel:**

2 fuel trucks: 4,000 and 3,000 gallons truck;  
20,000 gallons storage tanks

No government fuel at U.S. Aviation; Atlantic FBO (along E-W runway) has the government fuel contract. U.S. Aviation probably can't match government price. They will accept tax exempt status

**Landing Fees:**

There is 10 cents a gallon flowage fee (a surcharge collected by the airport on each gallon of fuel pumped) or a landing fee imposed from Tulsa Airport Authority. We did not address any waiver of the fee during this visit.

**Support Equipment:**

DC power in and outside of hangar for Falcon

AC power cart would be needed for the GV

Requires air conditioning with big ducts that goes in the airplane

Stands are available

Support equipment would be needed for DC8. U.S. Aviation would have some of the needed support but other equipment would have to be rented or brought in by the facilities.

**Office Space:**

There are two offices and conference room available in the main U.S Aviation FBO building. This could be space for no more than about 25 people. Offices are about

12x12; one downstairs, one upstairs. There is a separate flight planning room. There is not enough space for the full complement of DC-3 participants to be housed in or near the FBO. Therefore, it would not be possible to hold the daily briefing of all DC3 participants in the field at the FBO. The forecast center and all operations support would need to be located off site.

**Internet:**

Internet is available, wireless in the entire building. Bringing in a separate high bandwidth line could be considered.

**Customs and Security Badges:**

It is possible for DLR to clear U.S. Customs at the Tulsa Airport.

Badges for all DC3 participants who require ramp access are required by the Tulsa Airport Authority. Contact is through Airport Authority (Heather: 918-838-5090); otherwise escorting is required. Bonny Rean at US Aviation can answer questions about the process for getting badges.

**Hotels**

There are two hotels on the Tulsa Airport property. There are 3-4 hotels in nearby Owasso, OK just north of the FBO about 7 miles. There are other options toward Tulsa City Center about 15 minutes south of the airport. Owasso was suggested to avoid construction on I-44, which could add significant travel time from many Tulsa locations.

**Hampton Inn & Suites by Hilton** / affiliated (owned by the same people) with Towne Place Suite by Marriott both in Owasso, OK.  
9009 North 121<sup>st</sup> East Ave  
Owasso, OK 74055

Hampton Inn: 103 rooms, approx. 30 suites; \$77/night government rate; free Internet; suites are not government rate  
Indoor pool, exercise room, laundry, three kinds of room, king size with shower; two queen and suite (Towne Place Suite, Marriot); fridge, microwave, coffee  
Meeting room for about 70-80 people with 2 side rooms and a board room  
Back up with another hotel, same owner  
AT&T Internet contract, upgradable  
About 7 miles away, or 10 minute drive  
Lots of chain restaurants and fast food places

Contact is Caryl Kykendall (Director of Sales) – 918 0625 6355  
Mohammed Rahman (General Manager) – 918 609 6700

Also checked out the Embassy Suites right next to the Hampton Inn, the Park Inn and the Garden Inn at the airport.

**Hilton Garden Inn Tulsa Airport**

7728 E Virgin Court, Tulsa, OK 74115  
918 838 144

\$164 a night, government rate only on weekends  
100% smoke-free facility, free wireless  
1 big meeting room  
120 rooms

### **Park Inn Tulsa Airport**

2201 North 77<sup>th</sup> East Avenue, Tulsa, OK 74115  
\$69 to \$83 a night, government rates yes  
170 rooms, free wireless  
Lots of conference room space  
Breakfast not included, Wednesday night Manager Reception

### **Embassy Suites Tulsa I-44**

3332 South 79<sup>th</sup> East Avenue, Tulsa, OK 74145  
Rooms and Conference room space; 220 rooms  
large ballroom & smaller conference rooms, meeting suites  
\$77 government rate (limited rooms at that rate) and slightly higher for larger suites  
free, full breakfast and evening manager's reception 7 days/week

### **General Assessment: DC3 Tulsa Operations Base**

Locating the DC3 project at U.S. Aviation FBO at Tulsa International Airport is NOT DESIRABLE. The FBO will work for two smaller jet aircraft (GV, Falcon) but not for the NASA DC8. There is space for the aircraft in the hangar and aircraft support crews and most of the instrument scientists. However, there would be limited or no room for the operations and forecasting support functions. There is no room for the NASA DC8 on the ramp at the FBO without a lot of jockeying for position at all times. There is no room for the NASA support staff at the FBO. The idea of moving to an alternate nearby ramp is sub-optimal because of a lack of any office/lab space in the vicinity and again the matter of enough ramp space to move the DC8 without a tug. In addition, having the DC-8 located elsewhere is not desirable from a scientific coordination perspective because of the desirability for cross calibration of instrumentation. There are added photos by the survey participants available on request.



Figure 1. U.S. Aviation FBO at Tulsa Airport. Room for GV and Falcon in hangar. Not room for DC-8 with roll in roll out capabilities on the ramp in front of the hangar.

## PART II: SALINA, KANSAS

### Salina (SLN) Salina Airport Authority (SAA), Aviation Service Center

#### *SAA Contacts:*

David “Gunner” Wiles Manager of Operations – [gunner@salinaairport.com](mailto:gunner@salinaairport.com)

Kenny Bieker, Manager of Facilities and Construction

Melissa McCoy, Manager of Public Affairs and Communications

Michelle Swanson, Manager of Administration and Finance -- [shellis@salair.org](mailto:shellis@salair.org)

#### **Airport Operations:**

- Control tower: operations 7 am to 11 pm, but can be extended for added cost. There is the capability for keying runway and taxi lighting for off-hour night time landings. The tower support at SLN is provided by a contractor.
- Runway: 12,000 ft by 100 ft (17/35) and two smaller runways for small GA traffic and the Aeronautical school
- Former SAC USAF Base for 42 B-47 bombers
- Ramp space: More than 1.5 Million sq ft. (Ramp space close to the hangar is not a problem!!)
- No landing fees or other txes for using the airport, ramp and hangar facilities.



Figure 2. Very large ramp space at Salina KS Airport. Fuel trucks shown in the background.

#### **Fixed Base Operators:**

America Jet – Manager: Greg Lust / 785.825.6261 (has the DOD fuel contract)

Airport main fuel farm holds (12 x 25,000 gallon max storage). FBO can distribute ~13-15,000 gallons in one truck load but are prepared for larger fueling requirements with relay of fuel using a 2000 gallon tank trailer.

Flower Aviation – Manager: Doug Livergood / 785.825.6739

This is the only other FBO on the base. It could be used by the Falcon.

**\*\*\*IMPORTANT NOTE\*\*\*** Our primary contact and major contract at SLN will be with the SAA for hangar space, offices, security, badges and support for the aircraft in the hangar. The FBO (America Jet is the DOD fuel Contractor in SLN) will be contracted for government fuel and strictly airside services (lavatory, O<sub>2</sub>, lubricants, etc.) This is unlike the Tulsa Airport where we would work with the FBO as the lead, except for badges and security that is done by the Tulsa Airport.

**Hangar Facilities and Office Space:** 2 Hangars possible for project use:

Hangar 600—see a complete description and layout at:

<http://www.salinaairport.com/home/hangar600.htm>



Figure 3. Airside view of Hangar 600 at Salina Airport. GV and Falcon can fit in one half of the hangar. Office space shown for the airside of the hangar.

Hangar 600 is ~2 years old and is near mid-field - 42,052 sq. ft. on the hangar floor (each half is about 21,000 sq. ft.; hangar door 100 ft wide, 28 ft tall (dimensions confirmed) with 28 ft all unobstructed clearance throughout the hangar. One challenge for this hangar is power. There is plenty of 110v but no 220v or 400Hz available. That said, the SAA will modify the power system to meet DC3 project requirements. It is important to note that the large ramp areas will permit the DC-8 to be parked immediately adjacent to either of these hangars.

Office space exceeds 10000 sq. ft. on each side. Parking for 60+ vehicles adjacent to the hangar. There is storage available on SE side of hangar 600 for multiple containers. There is access to the hangar from the parking lot outside security perimeter. Hangar 600 has lots of office space including break rooms and ground floor areas for instrument lab activities. There is not a wet lab but water is available in the hangar. The SAA also has a large number of tables and chairs that can be rented and used in the space. We estimate that 70 tables and 100 chairs would be required to support DC3 in this location, assuming all support functions for aircraft,



forecasting and operations are location together. The furniture is available according to the SAA.



Figure 4. One meeting room in the office space area of Hangar 600. You can see tables and chairs that would be rented for DC3.

Based on the site survey team assessment of DC3 needs, we believe that the project could be accommodated in one side of hangar 600. The GV and Falcon will both fit on one side and there is ample office space on the airside (west side) of the hangar to handle the aircraft facilities and other support functions.

Figure 5. Hangar 606 at Salina KS Airport now under renovation  
Hangar 606 (Originally built in 1942, now under major renovation to be finished by April 2012) near midfield – hangar door 17,431 sq ft; 150' wide, 35' tall. The SAA reports that Hangar 606 will have the same capabilities as 600 with respect to power, lighting, security, and access. Office space will



be of order 3,000 sq. ft. (this smaller than Hangar 600) The SAA asked us about using this new hangar. They told us that all upgrades would be completed by April 2012. It is our view that this is cutting things pretty close if there are any delays in the work.

### **Site Security and Safety**

Site security is handled by the SAA. This includes providing standard keys (multiple copies will be provided) for hangar access and the provision of swipe cards for accessing selected gates and airside locations nearby the hangars. Specific arrangements for quantities and access details would be part of a support contract. SAA will also provide site safety and security briefings to all project personnel as people arrive for the deployment.

### **Available Support Equipment**

The SAA has a variety of support equipment available for aircraft maintenance and movements. They include large tugs, stands (K-lift type), air stairs, etc. A complete list of the equipment is included below. Access to any one or all of the devices is provided for a flat fee of \$150/day during the deployment. There was a question about who would operate the equipment. The SAA requires the aircraft facility to provide operators and assume all risk in the use of the support equipment. This equipment can be dedicated for our project, subjects to the fees noted above.

### **Internet Access and Local Area Network**

The hangar is currently equipped with both wired and wireless connectivity. The network provided by the ISP (Cox Cable Company) provides 10 Mbps bandwidth down and 2.5 to 4 Mbps up coax cable at the present time. In addition, we were told by the SAA ISP contractor, Dan Martin, General Manager ([dmartin@isgtech.com](mailto:dmartin@isgtech.com)), ISG Technology Inc. ([www.isgtech.com](http://www.isgtech.com)), that the bandwidth on the coax could be increased to 50 Mbps down, 4 Mbps up quite easily. It would also be possible to bring fiber into the hangar from the nearby street to achieve 50-100 Mbps down bandwidth. There is also a second unused coax into the hangar should it be needed. The project can decide on requirements to be part of the contract for support services. The SAA is also willing to allow EOL to tap into the wired and wireless systems already installed in the hangar if we wish to set up our network. The lead time required to alter coax bandwidth is only 2 to 3 days in advance. It will take several weeks (2-4) to arrange for fiber to be strung to the hangar should it be required. In addition, the ISP generally requires contract terms of 12 to 24 months for the fiber enhancement. There are also digital telephone lines in the hangar and one analog line for a fax machine.

### **Lodging**

There are several more than 20 (some national chain) in the Salina area that can offer government rates or better for rooms. More information about the properties

we visited or were nearby and contact names are provided on the page of contact business cards provided below. A longer list of hotels will be provided later. It is noted that there are already events in the Salina area next May (6-10 May K State Safecon Nationals) and June (weekend of 10 June, River Festival) that are already generating reservation.

Government rates for Kansas and the Salina area are \$77.00 lodging and \$46.00 for MI&E in FY12. Most of the hotels recognize this and offer at least some rooms at the government rate. There are a number of fast food and independent restaurants in the area and the meal prices are reasonable.

Hotels we visited included:

Country Inn and Suites (All studio suites) [www.countryinns.com/salinaks](http://www.countryinns.com/salinaks); 72 rooms; offers government rate

Candle Wood Suites (all studio suites) [www.CandlewoodSuites.com](http://www.CandlewoodSuites.com); 69 rooms, offers government rate

Marriott Courtyard (limited (2 per night) government rate rooms)  
<http://www.marriott.com/hotels/hotel-information/travel/slncy-courtyard-salina>  
64 rooms, 2200 sq.ft of meeting rooms, pay for breakfast

Hampton Inn (regular Hotel rooms) 80 rooms, no meeting space  
<http://hamptoninn.hilton.com/en/hp/hotels/index.jhtml?ctyhocn=SLNKSHX>

Ramada Inn (offered us a room rate of \$50/day even during the site visit)  
[www.ramada.com/salina](http://www.ramada.com/salina) 190 hotel rooms, 16000 sq.ft. of meeting space in 8 different rooms, complimentary breakfast

All of these properties are no more than 10 minutes from the airport and the proposed DC3 hangar facility. It is likely that multiple hotels would be required to accommodate all of the project participants. All the hotels we visited included complimentary Internet access.

**Education and Outreach:** SAA contact is Melissa McCoy [melissam@salair.org](mailto:melissam@salair.org)

Kansas State University has a campus extension at the airport which houses the Aviation Department that provides undergraduate degree programs in professional pilot training, maintenance, avionics, and Unmanned Aircraft Systems. The students in the Aeronautical program would be interested in learning about the aircraft and possibly assisting with support tasks. Dennis Kuhlmann, Dean – Point of Contact for Education and Outreach for Aeronautical School

In addition, there are several opportunities in the community to conduct outreach programs for DC3. The possibility of a public open house for the project was

discussed as were public lectures and seminars for local college students. The Salina Chamber of Commerce has a monthly (Thursday night) public lecture for local activities.

### **General Assessment: DC3 Salina KS Operations Base**

**Locating the DC3 project at Hangar 600/606 at Salina, KS Airport is DESIRABLE.**

The staff of the Salina Airports Authority seems to be quite flexible with their support. The space and infrastructure seems to meet the needs of all three aircraft facilities and the operations support functions of DC3 quite well. We have asked to get a quote for supporting the project from the SAA based on the operational requirements described above. Additional photos by the survey participants available on request

## New Hangar Complex Available



The Salina Airport Authority has completed construction of a modern 68,308-square-foot hangar and office complex

### Available for immediate occupancy

Competitive lease rate

Hangar area totals 42,052-square-feet

Office/shop/multi-purpose area offers 19,959-square-feet

Customer service center consisting of 6,297-square-feet

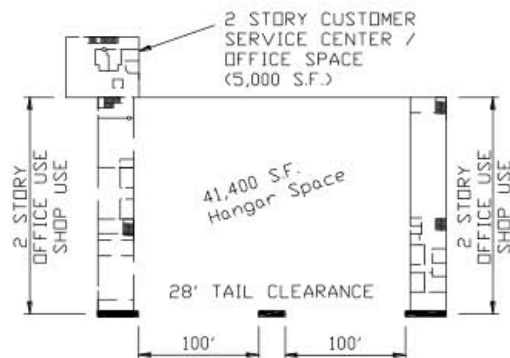
Hangar can accommodate 100-foot wing spans

Hangar can accommodate 28-foot tails

NFPA 409 water and foam fire protection system

Local and State economic development incentives

Corporate neighbors include: K-State at Salina and CAV Aerospace, Inc.



For more information please contact:  
Timothy F. Rogers, A.A.E.  
Executive Director, Salina Airport Authority  
785-827-3914, [trogers@salair.org](mailto:trogers@salair.org)

Figure 6. Overview of Hangar 600 space, Salina Airport.





**Table 1. List of contact information, Salina KS.**

Dan Martin  
General Manager

127 N. 7th St.  
Salina, Kansas 67401  
Phone: (785) 823-1555, ext. 118  
Direct: (785) 404-1418  
Fax: (785) 827-3310  
E-mail: dmartin@isgtech.com

www.isgtech.com



**SALINA Airport Authority** 785.827.3914  
Fax: 785.827.2221

**Kenny Bieker**  
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**David "Gunner" Wiles**  
Manager of Operations  
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**Metissa McCoy**  
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**Table 2. List of equipment, Salina Airport Authority**

2011 Equipment List

Qty	Item	
	4-wheel drive Mx Van	
	Floor Scrubber	
	Air Compressor	
7	30 KW Generators	
3	5 KW Generators	
4	Forklifts	
	Runway sweeper – pull type	
	Semitrailer – 40 ft.	
3	Chevy Blazers	
	Paystar water tanker – 2000/gallon	
	Crane	
	Motor Grader	
	Bull dozer	
	Stake truck	
	Tug – Big tractor aircraft towing	
	Tug – Medium tractor aircraft towing	
	Tug – Small tractor aircraft towing	
	85' Semi Tractor International	
	Semi trailer Low Boy	
2	84' K-Loaders	
	81' Rollover plow – truck only	
	85' P-19 Oshkosh Fire truck	
	2001 X-Ray Truck International	
	84' GMC Cargo truck	
	92' Chevy Van – operations van	
3	Dodge tugs	
	Ford Food Service Truck	
	Blue Dump Truck	
	ORV Fire truck	
	New John Deere tractor	
2	John Deere 6ft. mowers	
3	Light towers	
	Chevy 1-ton dully	
	Air Stairs	
	Belt Loader	