

**PREPRODUCTION INITIATIVE – NELP
AIR-ASSISTED AIRLESS PAINT SPRAY SYSTEM
TEST PLAN**

SITE: NAS NORTH ISLAND

1.0 OBJECTIVE

This test plan describes the data collection procedure for evaluating the use of an air-assisted airless paint spray system in an operational environment. The data will be used to determine the system's efficiency, effectiveness and overall success coating aircraft components, as well as the environmental and cost benefits of using such a system versus the currently used high-volume, low-pressure (HVLP) paint systems. In addition, a laser sighting system that provides immediate feedback to the painter regarding the angle and distance of the spray gun from the component being coated will be evaluated.

2.0 DESCRIPTION

One of the most common parameters for comparing spray painting systems is transfer efficiency—the ratio of the volume of paint that adheres to the surface being coated to the volume of paint that was sprayed, which is expressed as a percentage. Conventional spray systems have average transfer efficiencies of approximately 40% over large, medium, and small surfaces.

Because they use a higher volume of air and apply a lower pressure to the paint, HVLP systems apply more paint at a lower fluid velocity than conventional systems. Therefore, HVLP systems have a better transfer efficiency than conventional systems. HVLP paint systems typically have transfer efficiencies of approximately 75% when coating large surfaces, approximately 60% when coating medium surfaces, and approximately 40% when coating small surfaces.

The air-assisted airless spray system uses hydraulic pressure to pump paint through a small orifice on the tip of the paint gun. As the paint moves through the orifice, it disperses into a fan of paint droplets that move at a lower fluid velocity than HVLP systems. A small amount of air is then injected into the fan of paint, causing the fan to disperse into smaller droplets that are evenly distributed throughout the fan. The transfer efficiency of an air-assisted airless system averages approximately 95% when coating large surfaces, approximately 85% when coating medium surfaces, and approximately 78% when coating small surfaces.

In addition to testing the air-assisted airless spray system, this initiative will test a laser sighting system designed for spray painting operations. The laser sights provide the operator with immediate feedback regarding the paint gun's distance and relative angle to the component being coated. Tests performed by the manufacturer show that using the laser sighting system improves coating quality by preventing uneven application of paint (“zebra striping”).

3.0 TEST PLAN

This test plan will be used to evaluate the effectiveness of the AirMix air-assisted airless spray system, manufactured by Kremlin, and the laser sighting system, manufactured by Laser Touch and Technologies, LLC. Quantitative and qualitative data will be collected and used to evaluate the system's ability to provide an acceptable finish and more efficient coating operations.

3.1 Approach

Two AirMix pumps, four AirMix spray guns, and four Laser Touch sighting systems will be used during implementation of this test plan. One pump, two spray guns, and two laser sights will be used exclusively to apply waterborne coatings; the other pump, two spray guns, and two laser sights will be used exclusively for solvent-borne coatings. These systems will be evaluated for a period of approximately 12 months.

During the evaluation period these systems will be used to coat the Paint Shop's normal workload, with the exception of the F-18 intakes. In order to provide an adequate baseline for comparison of the air-assisted airless spray system with the HVLP spray system and to evaluate the effectiveness of the laser sighting systems, the following schedule will be implemented:

- During the first four months of the evaluation period, approximately 50% of all components will be coated using the air-assisted airless paint spray system and the HVLP system will be used to coat the remaining components. The laser sighting systems will not be used.
- During the second four months of the evaluation period, approximately 50% of all components will be coated using the air-assisted airless paint spray system with the laser sighting system. The remaining components will be coated using the HVLP system without the laser sighting system.
- During the final four months of the evaluation period, approximately 50% of all components will be coated using the HVLP spray system with the laser sighting system. The remaining components will be coated using the air-assisted airless spray system without the laser sighting system.

Quantitative data regarding the use of the system will be collected through completion of the attached Air-Assisted Airless Weekly Log Sheet and the Weekly Log Sheet currently in use at the site. Quantitative data regarding maintenance of the systems and qualitative data regarding use of the system will be collected by the completion of the Monthly Maintenance Data Sheet.

3.2 Instructions for Completing the Air-Assisted Airless Weekly Log Sheet

The Air-Assisted Airless Weekly Log Sheet will be attached to the Weekly Log Sheet currently in use at the site and completed on a daily basis. Please record the Shop Number and Date in the appropriate spaces at the top of the page. A description of the information to be recorded in each column of the table follows.

- ***Aircraft Type & Component:*** please identify the aircraft type and component coated each day (e.g., “F-18 Launcher”). If the exterior of the aircraft was coated, please indicate that fact in this column (e.g., “S-3 Exterior”).
- ***Number Coated:*** please record how many of each component was coated.
- ***Coating Used:*** please record the part number of the coating used.
- ***Hours:*** please record how many hours were required to coat the components.
- ***AAA Used?:*** please respond “Yes” or “No” to indicate whether or not the air-assisted airless paint spray system was used to coat the components.
- ***Laser Sights Used?:*** please respond “Yes” or “No” to indicate whether or not the laser sighting system was used to coat the components.

3.3 Instructions for Completing the Monthly Maintenance Data Sheet

The Monthly Maintenance Data Sheet should be completed once per month. Please respond to each question regarding the spray system used for waterborne coatings, the spray system used for solvent-borne coatings, and the laser sights. In addition, please provide comments regarding the ease of use and overall performance of the air-assisted airless paint spray systems and the laser sighting system. If additional space is required to respond fully to any of the questions, please attach additional sheets of paper as needed.

4.0 REPORTING

Mr. Joe Houlihan, Painter Supervisor, has approved the use of the data collection sheets for this project. Data will be collected for a period of 1 year. As previously mentioned, the Air-Assisted Airless Weekly Log Sheet will be attached to the Weekly Log Sheet currently used at the site and will be completed on a daily basis; the Monthly Maintenance Data Sheet will be completed once per month. During the evaluation period, the following data sheets will be faxed to Ken Wright (see Section 4.1, Points of Contact, for the fax number) monthly:

- Standard Weekly Log Sheet
- Air-Assisted Airless Weekly Log Sheet
- Monthly Maintenance Data Sheet

The final report will include a summary of the data collected using these sheets and operators' comments regarding the system's ease of use and overall performance.

4.1 Points of Contact

If any questions arise or repairs are necessary during the evaluation period, please contact either of the following individuals immediately:

POC	Affiliation	Phone Number	Fax Number
Ken Wright	UTRS, Cherry Hill, NJ	(856) 667-6770	(856) 667-7586
Mike Zitaglio	NAWC Lakehurst, Lakehurst, NJ	(732) 323-4284	(732) 323-1989

Please note that due to contract requirements, the Kremlin and Laser Touch vendors should *not* be contacted directly unless there is an emergency. All communication with the vendors should be directed through UTRS.

AIR-ASSISTED AIRLESS WEEKLY LOG SHEET

Shop: _____

Building: 464

Date: _____

Day	Aircraft Type & Component	Number Coated	Coating Used	Hours	AAA Used?	Laser Sights Used?
Monday						
Tuesday						
Wednesday						
Thursday						
Friday						
Saturday						
Sunday						

- **Aircraft Type & Component:** please identify the aircraft type and component coated each day.
- **Number Coated:** please record how many of each component was coated.
- **Coating Used:** please record the part number of the coating used.
- **Hours:** please record how many hours were required to coat the components.
- **AAA Used?:** please respond "Yes" or "No" to indicate whether or not the air-assisted airless paint spray system was used to coat the components.
- **Laser Sights Used?:** please respond "Yes" or "No" to indicate whether or not the laser sighting system was used to coat the components.

MONTHLY MAINTENANCE DATA SHEET

Waterborne Air-Assisted Airless Spray System

- Did the guns require any maintenance other than regular cleaning this month? If so, please describe in detail.
- Did the pump require any maintenance other than regular cleaning this month? If so, please describe in detail.
- Were there any problems with the operation of the system? If so, please describe in detail.

Solvent-borne Air-Assisted Airless Spray System

- Did the guns require any maintenance other than regular cleaning this month? If so, please describe in detail.
- Did the pump require any maintenance other than regular cleaning this month? If so, please describe in detail.
- Were there any problems with the operation of the system? If so, please describe in detail.

Laser Touch Sighting System

- How many Laser Touch visors were replaced this month?
- How many times did the batteries for the Laser Touch units need to be replaced this month?
- Were there any problems with the operation or use of the Laser Touch sights? If so, please describe in detail.

Additional Comments

Please provide any additional comments regarding the ease of use and overall performance of the air-assisted airless spray systems and the Laser Touch sighting system. Attach additional pages as necessary.