



ARSAG '07 Conference Agenda

Sunday, 1 April

Day / Time	Event / Topic / Speaker	Speaker	Room
1500 – 1900	Conference Registration		Pacific Ballroom
0930 – 1700	NATO meeting		Skyview 1

Monday, 2 April

0800 – 1700	Conference Registration		Pacific Ballroom
0800 - 1600	DOD Joint Standardization Board (JSB) Meeting, Pre-Conference Special Projects Workshop		Skyview 2, 3
0800	Introductions	Dex Kalt, ARSAG Exec. Director Gomer Custer, Eaton	
0810	Review January JSB Meeting / ARSAG Workshop Minutes	Farhad Choudhury, JSB Chairman, NAVAIR	
0820	Review Project Lists and Status	Dex Kalt	
0840	Introduce ASSIST Program	Joe Delorie, DSPO	
0855	JSB / Workshop Agenda Overview		
0900	Working Group Sessions		Skyview 2
	Group A - DTIC Repository for Clearance Documents STANAG 3447 Ed. 4 Status STANAG 3447 Guide Document Status	Tom Swiderek, Dex Kalt Farhad Choudhury Jennifer Ingmire, NAVAIR	
1130	Lunch		
1300	STANAG 7191 Review & Status and Guide Document	Open Discussion	
	Group B - Maintenance Guide Document and Procurement Matrix		Skyview 3
1500	Working Groups A & B Re-Group, Joint Meeting	Ralph Aviles, NAVAIR	Skyview 2,3
	1. Report & Review Project Progress Group A, STANAG & Guide Doc's Group B, Maintenance Guide Doc. Group A, AR Clearance Process, Repository and Way Forward	Farhad Choudhury Ralph Aviles Tom Swiderek	
	2. New Project Status	Open Discussion	
	3. Next JSB Meeting / ARSAG Workshop, 14 – 16 November '07		
1600	Adjourn		
1000 - 1600	European Airlift Center Meeting (open meeting)		Skyview 1
1700 – 1900	Briefers, Panel Chairs and Steering Group Meeting (All presenters and briefers to attend) Briefers Provide Electronic Copy of Presentations Review Guidelines for Briefers	Dave Sly Dex Kalt	Las Vegas Ballroom
0900-1600	Australia-Canada-Germany-UK Meeting	Sqn Ldr Richard Grainger	Director's Room

Tuesday, 3 April

0700	Conference Registration		Pacific Ballroom
0730	Exhibits Grand Opening Exhibits Open 0730 through 1930		Pacific Ballroom
0830	Conference General Assembly Convenes		Las Vegas Ballroom
0830	Introduction	Dex Kalt ARSAG Executive Director	
0835	Conference Opening Remarks	Martin Vukich, Eaton ARSAG Chairman	
0840	Introduction	Major General Mark Pillar, SAF/AQ	
0845	Guest Speaker	Brigadier General William J. Rew Commander, 57th Wing, Nellis Air Force Base	
0900	International Status Reports Introductions	Lt Col Pedro Sipols, Spanish Air Force	
0900	NATO - ATP-56(B) Status	Wg Cdr Adrian Hayward, NATO	
	USAFE	Col (S) Slim Morgan, 100 OG/CC	
	United Kingdom	Sqn Ldr Rhys Parker	

Tuesday, 3 April, continued

<i>Day / Time</i>	<i>Event / Topic / Speaker</i>	<i>Speaker</i>	<i>Room</i>
0930	Introduction	Lt Gen John Sams, USAF (Ret.)	
0935	Keynote Speaker	General Duncan J. McNabb Commander, Air Mobility Command	
1015	Break		
1045	International Status Reports, Continue		
	Turkey	Maj Hakan Sucular	
	The Netherlands	Maj P. Haex	
	Spain	Lt Col Pedro Sipols	
	Sweden	Andre Brannstrom	
	Kingdom of Saudi Arabia	Col Mohammed Albogami	
	India	Wg Cdr Deepak Nerkar	
	Italy	Capt Giovanni Pagano	
	Israel	Captain Zvika Bar-Niev	
	Greece	Col Vasilos Papadimitriou	
1200	Awards Luncheon		Pacific Ballroom
	Guest Speaker	Major General George N. Williams, USAF (Ret)	
1330	International Status Reports, continue		Las Vegas Ballroom
	Germany	Maj Udo op de Hipt	
	France	CPT Franck Bottéro	
	Canada	Major Christopher Clarke	
	Australia	Group Captain Noel Derwort	
1410	U.S. Military Status Reports		
	Introductions	Lt Col Tom Swiderek, AMW/DS	
	US Army	Russ Hunter, CSC	
	US Marine Corps, US Navy	Maj Jeffrey Pellegrino, USMC	
	AMC	Lt Col David Ziegler, A5QT (Ret.)	
1440	Break		
1510	U.S. Military Status Reports, continue		
	US Air Force Reserves	Col Kenneth Lewis, 349 OG/CC	
	HQ Air National Guard	Maj Stephen R. Lippert, NGB/A3XO	
	AFSOC	Lt Col Kenneth Denman, AFSOC/A3TA	
	AFSOC	Lt Col Lance A. Tilghman, AFSOC/A5RX	
	USAF MOS / Det 1	Scott Brummett, MOS / Det 1	
	EAC, Future Development of EAC	Capt Gunnar Borch, Norwegian Navy MCCE-Multi Modal Coordination Centre in Europe	
<i>Safety Panel</i>			
1610	Introduction	Maj Dave McCann, NAVSAFECEN	
1615	US Navy Safety Report	Maj Dave McCann	
1635	USAF Safety Report	Maj Kevin Rainey, AMC Flight Safety	
1655	KC-135 AR Nozzle Centering Mishaps	Tarrell N. Towle	
1705	Questions and Answers		
1715	DOD Joint Standardization Board / Special Projects Workshop Status Report	Dex Kalt, ARSAG Farhad Choudhury, NAVAIR	
1725	Aerial Refueling Clearance Repository Status	Lt Col Tom Swiderek, AMW/DS	
1730	DOD Report, ASSIST Database	Joe Delorie, DSPO	
1740	Session Adjourns		
1800 – 2100	Exhibitors' Reception <i>All conference attendees and their guests are invited</i>		Pacific Ballroom

Wednesday, 4 April

<i>Day / Time</i>	<i>Event / Topic / Speaker</i>	<i>Speaker</i>	<i>Room</i>
0700	Conference Registration		Pacific Ballroom
0730 - 1700	Exhibits Open		Pacific Ballroom
0800	Wednesday General Assembly Convenes		Las Vegas Ballroom

Operations Panel

0800	Introduction	Col Mike Mendonca, 97 AMW	
0805	USTRANSCOM A/R Validation	Lt Col Sean Carey, TACC Lt Col Sush Ramrakha, USTC, J3-O3	
0820	RAF Tanker Ops Iraq / Afghanistan	Sqn Ldr Paul Webster, RAF Flt Lt Dave Hall, RAF	
0840	KC-135: Long in the Tooth, Sharpening the Bite	Lt Col Randall Reed, 55 ARS/CC	
0855	Programme Status Airbus A-310 Multi-Role Transport Tanker (MRTT)	Lt Col Hampp, German Air Force Axel Hoffmann	

Training Panel

0910	Introductions	Russ Hunter, CSC	
0915	AFSOC CV-22 AAR Training Program	Maj Keith Gurnick, AFSOC/A3V	
0930	Boom Operator Training	SMSgt Frank DeJauregui, 4AF DOV	
0940	The Way Forward for Ground Based Aerial Refueling Training	Richard Pain, Thales	
0955	Addressing Air Force and ANG Boom Operator Training with Squadron Level Trainers	Doug Sutton, ACME Worldwide	
1005	AE on Tankers: A Decade of Lessons Learned	Lt Col Nancy Mikulin, Commander, 349 AES	
1015	Break		

Interoperability Procedures and Documentation Panel

1045	Introductions	Lt Col John Fletcher, USAF, NATO	
1050	Aerial Refueling Contract Services	Ulick McEvaddy, Omega	
1105	EAC Introduction and Report	Lt Col Lionel Poirot, FAF	
1115	ATP-56, USAF Adoption Status	Wg Cdr Martin Walsh, AMC	
1120	ATP-56, US Navy Adoption Status	Jennifer Ingmire, NAVAIR	
1125	ATP-56. US Marine Adoption Status	Maj Rich Hawkins, USMC	

Lighting and Markings Panel

1130	Introductions	Richard Kemp, Honeywell	
1135	Tanker Remote Vision System (TRVS)	Hans Bol, Netherlands Org. for Applied Science	
1150	Luncheon		Pacific Ballroom
1230	Luncheon Speakers		
	Tankers in Combat	Lt Gen Charles H. Coolidge Jr. USAF (Ret) Lt Gen William Welser III, USAF (Ret)	
1330	Wednesday General Session continues		Las Vegas Ballroom

Advanced Concepts Panel

1330	Introduction	Farhad Choudhury, NAVAIR	
1335	Automated Aerial Refueling	Lt Col James McCormick, DARPA	
1355	UAV Autonomous Aerial Refueling	Scott Price, Sargent Fletcher	
1415	Advanced Aerial Refueling Planning and On-Board Management Systems	Gardiner Porter, Jeppesen	
1435	Break		

Las Vegas Ballroom

Studies and Analysis Panel

1505	Introduction	Allan Haenisch, SAF/AQQM
1510	Status of KC-X Program	Major General Mark Pillar, SAF/AQ, Mobilization Assistant
1525	MCS 06 Tanker Updates	Col Cal Lude, OSD/PA&E
1545	Benefits of a Receptacle	Lt Col Donald Anderson, AMC/DA9

Industry Panel

1605	Introductions	Wally Averill, LM Aero
1610	Tactical Refueling – Today and Tomorrow	Andy Bennett, LM Aero
1625	Tactical Tanking in a Hostile Environment	Michel Folscheid, EADS
1640	Refueling Systems - the Next 50 Years	Patrick O’Connor, Cobham
1655	Refueling Systems - the Next 50 Years	Greg Steiner, Smiths Aerospace
1710	Boeing Tanker Platforms - the Next 50 Years	Greg Rusbarsky, Boeing
1725	21 st Century Tanker Design, Test Pilot’s Perspective	Tim Butley, Airbus
1740	Adjourn Wednesday Session	

Thursday, 5 April

0800	Thursday General Assembly Convenes	Las Vegas Ballroom
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System Design Panel

0800	Introduction	Tom Cavallaro, NAVAIR
0805	Aerial Refueling in a Commercial World	Dr. R. K. Nangia
0820	KC-10 Centerline Hose Reel Improvements	Jeff Spence, Boeing Gary Haler, OC-ALC
0835	KC-10 Centerline Hose Reel, New Drive System	Asher Bartov, Federal Industries
0850	Flight Control Actuation on Refueling Boom	Klaus Wegscheider, Liebherr Aerospace
0900	Boom Control Unit for AR Boom System	Frederic Brajou, CES

Test and Evaluation Panel

0915	Introduction	Dave Hilker, USAF/ASC
0920	New Aerial Refueling Drogue Design	Tom Cavallaro, NAVAIR Bill Kirkland, Arizona Paratroque Systems Bob Najaka, Arizona Paratroque Systems
0935	KC-767 Aerial Refueling Testing	Rick Kahler, Boeing Steve Stecko, Boeing
0950	SNC/DARPA Autonomous Aerial	Greg Cox, Sierra Nevada
1005	AFRL Autonomous Aerial Refueling Program	Dan Schreiter, AFRL/VACC
1025	Break	

Reliability and Maintainability Panel

1055	Introduction	Ralph Aviles, NAVAIR
1100	KC-135 Status Report BDA Kit and MPRS Classification	Norm Gibson, 827 ACSG/IS
1110	KC-10 Aerial Refueling Status	Bob Mendoza, USAF
1120	Aerial Refueling Systems Maintenance and Procedures	Mike Bandak, Sargent Fletcher
1130	KC-130 Aerial Refueling Status	Cary Depew, LM/USMC
1145	Conference Wrap-Up	
1200	Conference Adjourns	
1230	Tour to Nellis AFB	

All ARSAG attendees and their guests are invited
 Tour participants will visit
 - Red Flag Facility and a briefing by the Red Flag Staff
 - Thunderbird Hangar, museum and the jets, if they are on station
 - F-22, if available
 - Threat Training Facility (TTR) Tour

Report from:

ARSAG '07

ARSAG '07, the annual conference of the Aerial Refueling Systems Advisory Group was held at Bally's in Las Vegas, Nevada, Monday, 2 April through Thursday, 5 April.

At a meeting of ARSAG Panel Chairs, Steering Group and Briefers' on Monday afternoon, leaders and speakers made final preparations for their conference participation.

DOD Joint Standardization Board

A DoD Joint Standardization Board (JSB) meeting and ARSAG Special Projects Pre-Conference Workshop were held on Monday, 2 April.

NATO and EAC Meetings

ARSAG was honored to host both the NATO Air-to-Air Refueling (AAR) standardization panel and the European Airlift Center (EAC) who held meetings on Sunday, 1 April and Monday, 2 April.

Keynote Speaker

ARSAG was honored by its keynote speaker, **General Duncan J. McNabb, Commander Air Mobility Command**. His presentation on the present and future of the Air Mobility Command was stirring and set the tone for the conference theme "**Aerial Refueling – The Next Fifty Years**".

Opening

The ARSAG '07 General Assembly was convened on Tuesday, 3 April. Dex Kalt, ARSAG's Executive Director, welcomed all to the conference. He introduced ARSAG's chairman, Martin Vukich, who provided a brief overview of ARSAG's work and structure and announced that Orlando would be the site of ARSAG '08. Brig General William Rew, Commander, 57th Wing, Nellis AFB welcomed ARSAG to Nevada.

Aerial refueling status reports were presented by representatives of the NATO AAR panel, and USAFE. They were followed by reports from international air forces and ministries of defense including the United Kingdom, Turkey, The Netherlands, Spain, Sweden, Saudi Arabia, Italy, Israel, India, Greece, Germany, France, Canada and Australia.

Status briefings continued with reports from the US Air Force, Air Mobility Command; US Navy and Marine Corps; US Army; US Air Force Reserves; US Special Operations Forces, US Air National Guard and USAF MOS/Det.1. These were followed by a briefing by the European Airlift Center (EAC). The day was concluded with: a DOD Joint Standardization Board / Special Projects Workshop Status Report; an Aerial Refueling Clearance Repository Status Report; and a DOD report regarding the ASSIST Database, the DOD source for specifications and standards.

Each of ARSAG's eleven panels presented a program of briefings beginning on Tuesday and continuing through Wednesday until Thursday noon. The briefings are posted to the ARSAG website at www.arsaginc.com. The briefing topics along with the briefers names and panel summaries are listed in the ARSAG '07 Conference Minutes document.

ARSAG attendees enjoyed addresses by Major General Mark A. Pillar, Mobilization Assistant to SAF/AQ and by Major General John M. Howlett, Mobilization Assistant to the Commander, HQ Air Mobility Command.

Exhibits

During the conference week, conference attendees were invited to visit the interesting exhibits mounted by: The Boeing Company; EADS; Smiths Aerospace; Northrop Grumman; General Electric AE; Lockheed Martin; Parker Hannifin; UTC Pratt & Whitney; UTC Hamilton Sundstrand; CES; Applied Aerospace; Sargent Fletcher / Cobham; Acme Worldwide; Demo Systems LLC; Jeppesen;

Aero-K; Innovative Solutions & Support; Vought Aircraft; Thales; and Parker Aerospace.

Events

ARSAG conferees were welcomed to the Awards Luncheon by Lieutenant General John Sams, Jr., USAF (Ret) on behalf of The Boeing Company, the luncheon's sponsoring organization. Major General Nick Williams, USAF (Ret) addressed the luncheon audience.

On Tuesday evening, conferees and their guests attended a gala Exhibitors' Reception hosted by EADS.

On Wednesday, 4 April, conferees enjoyed a luncheon sponsored by Northrup Grumman. Attendees were honored to welcome the luncheon speakers, Lt Gen Charles H. Coolidge Jr. USAF (Ret) and Lt Gen William Welser III, USAF (Ret).

On Thursday afternoon, buses took conference attendees to an interesting and informative tour of Nellis AFB including threat training briefings, a Red Flag briefing, the Thunderbird hangar and a F-22 Raptor walk-around.

Awards

Awards included Special Recognition for Service to Aerial Refueling; ATP-56(B) adoption by allied air forces and US Air Force, Navy and Marines. Recipients were: Wg Cdr Adrian Hayward, RAF, NATO; Jennifer Ingmire, NAVAIR; Maj David Angress, USAF; Maj Edward Lang, USMC; Maj Richard Hawkins, USMC; Maj Keith Gurnick, USAF; Lt Col Richard Musser, USMC; Wg Cdr Martin Walsh, RAF; Sqd Ldr Rhys Parker, RAF; Lt Col Andreas Frommert, GeAF ; Maj Marco Pulles, RNLAf; Lt Col Thierry DePompery, FAF; and Lt Col Pedro Sipols, SpAF. Special Recognition for Service to ARSAG as a Steering Group Member was awarded to: Maj David McCann, USAF; Gp Capt Stephen Bucholtz, RAAF; Steve Quinn, USAF. Special Recognition for Service to ARSAG as a Panel Co-Chair was awarded to: Col Jeffrey Franklin, USAF; Dave Benson, USAF; Tom Crawford, Boeing; Maj Rique Gwin, USAF; Kent Weaver, USAF; Abby Bennett, USAF; Maj Serge Penouilh, FAF; Rickey Symes, Cobham; Fred Burton, Consultant; Gale Matthews, Consultant; and Diego Mera, US Navy. Recognition for Service to ARSAG, was awarded posthumously to Dr Jules Enig. Major General Mark A Pillar presented the awards.

Appreciation

ARSAG expresses its appreciation to the sponsors who made the ARSAG '07 conference who contributed to the success of ARSAG '07. They included: EADS; The Boeing Company; Eaton; Smiths Aerospace; Northrop Grumman; General Electric Aircraft Engines; Lockheed Martin; Parker Hannifin; Omega Air; Pratt & Whitney; and Sargent Fletcher / Cobham.

ARSAG's Board of Directors, Steering Group and Panel Chairs deserve recognition and gratitude for their leadership, hard work and dedication to ARSAG.

The audio-visual portion of the program was capably and efficiently managed by Dave Sly of Boeing who set and ran the PowerPoint briefings. Dave compiles the records of the conference briefings and posts them to the ARSAG website at www.arsaginc.com. Dave serves as ARSAG's webmaster.

ARSAG expresses its appreciation to Babs Bokkes, Laura O'Gorman, Karen Alvarez and Thomas and Stacy Coggeshall for their able execution of conference registration and administration. Special thanks are due to Dorothy Custer and Micki Lewis who arranged and guided a delightful day trip to Hoover Dam on Tuesday for conferees' guests.

ARSAG '07 was a record-setter; four hundred thirty-five attendees registered for the conference. The success of the conference reflects the contributions of the keynote speaker, guest speakers and briefers who gave of their time, expertise and energy to offer relevant and informative presentations to the international forum that was ARSAG '07.

ARSAG '07 Panel Minutes

Safety Panel

Tuesday, 3 April

1610	Introduction	Maj Dave McCann, NAVSAFECEN
1615	US Navy Safety Report	Maj Dave McCann
1635	USAF Safety Report	Maj Kevin Rainey, AMC Flight Safety
1655	KC-135 AR Nozzle Centering Mishaps	Tarrell N. Towle
1705	Questions and Answers	

Air Mobility Command (AMC) Air-Air Refueling Mishap Briefing:

Maj Kevin Rainey, AMC Flight Safety provided a briefing that focused on successful efforts over the last year in stopping the air refueling mishap trend. This briefing included critical safety verbiage now in the new ATP-56(B) that all US and international air refueling services now use as the single source for air refueling guidance. Maj Rainey thanked Wing Commander Martin Walsh (AMC Standardization/Evaluation) for accepting every comment concerning safety (e.g., 1 foot per second closure guidance) suggested for inclusion during coordination of the new document. This will significantly enhance safe air refueling across the globe. AMC also released an Air Refueling Mishap Special Interest Item (SII) that requires aircrews to conduct AAR by the book, and scrutinizes safe AAR procedures on higher-headquarters evaluations. In summary, tell your receivers, "Back 5, Back 10, Back home!"

KC-135 Boom Nozzle Centering Incidents:

Terry Towle briefed a sustainability/reliability problem concerning the rotational tolerances allowed on KC-135 boom nozzles which have resulted in "no-contact" since the boom nozzle is off-center and won't advance the air refueling systems to "contact". These nozzle centering incidents have resulted in a number of mission aborts with receivers not getting their fuel. The depot is aware and they are considering tightening the allowable alignment tolerances as a possible solution. Maj Kevin Rainey will ensure this is addressed at the upcoming (3 May 07) System Safety Group (SSG) meeting. If necessary, any depot corrective actions could be briefed at next year's ARSAG conference.

- 1) Navy/USMC briefed human error vice the Air Force which had more mechanical issues.
- 2) Navy/USMC have had no Class A mishaps.
- 3) A sidebar conference with NAVAIR was held investigating KC-10 hose reel malfunctions that were identified last year. Because of NAVAIR's ongoing effort they have almost wiped out incidence of this kind of failure during the last several months.

Operations Panel*Wednesday, 4 April*

0800	Panel Introductions	Col Mike Mendonca, 97 AMW
0805	USTRANSCOM A/R Validation	Lt Col Sean Carey, TACC Lt Col Sush Ramrakha, USTC, J3-O3
0820	RAF Tanker Ops Iraq / Afghanistan	Flt Lt Dave Hall, RAF
0840	KC-135: Long in the Tooth, Sharpening the Bite	Lt Col Randall Reed, 55 ARS/CC
0855	Programme Status Airbus A-(GAF)	Axel Hoffmann, German Air Force Lt Col Hampp, German Air Force
0900	Questions	

This year's operations panel had a good variety of briefings covering various subjects and had presenters from three nations. The briefs were informative and definitely added value to the conference. We look forward to ARSAG 2008.

We began with a brief from Lt Col Sean Carey, Tanker Airlift Control Center (TACC), on the USAF's air refueling validation process. Lt Col Sush Ramrakha, US Transportation Command (USTC) – J3, aided Lt Col Carey and was available for questions. He discussed the movement of AAR validation for operational missions from the TACC to USTC and the collaborative efforts occurring to make this happen. Additionally, he discussed challenges they face to include technology solutions, manpower limitations, needed written guidance (policy and doctrine).

Our next briefer was Flt Lt David Hall a VC-10 pilot from the Royal Air Force (RAF). His presentation covered RAF tanker operations in Afghanistan and Iraq over the last few years. An interesting point was their tanker force provided about 40% of their AARs to the US Navy. Refueling close air support aircraft tends to be the majority of their activity with the handful of airframes they have remaining in the Middle East theater. The brief was wrapped up discussing some of the challenges they are facing to include aging aircraft.

Next at the podium was Lt Col Randall Reed, 55 ARS Commander (KC-135R training squadron). His brief, KC-135: Long in the Tooth, Sharpening the Bite, covered how KC-135 initial qualification training dealt with multi-variants of avionics modifications and syllabus changes in the past. Lessons learned from that process is now used to make initial training operationally relevant. Current training includes tactical maneuvers as well as activity from both seats, ensuring initial qualification pilots are ready to deploy to the fight quickly after arriving at their unit. Additionally, Lt Col Reed showed the revised training timeline after transitioning to the Block 40 syllabus. Overall timeline remains unchanged but increased simulator use reduces aircraft flights. Lastly, he mentioned how KC-135 schoolhouse has aggressively incorporated the just released ATP 56(B) into their training.

Two members of the German Official Services presented our final brief. Mr. Axel Hoffmann, Federal Office for Defense Technology and Procurement (Ministry of Defense), and Lt Col Harald Hampp, GAF Weapon System Command, presented information on their Airbus A-310 tanker program and related operational aspects (Troop Trials). Mr. Hoffmann began with discussing the status of their A-310 program to include the bilateral agreement the GAF has with the Canadian Air Force. Then went on to review capability requirements for their tanker acquisition, in terms of air refueling capability and mission avionics. He closed with a performance comparison of the Airbus tanker. Lt Col Hampp took over the remainder of the brief concentrating on "Tasks in Time of Terror." Some of the objectives the GAF wanted to achieve were the ability to fly long distances non-stop and accomplish this with AAR independent of other nations. Additionally, through troop trials they have certified the Tornado and F-18 for refueling. Furthermore, they have successfully tested the converting from transport to tanker and back again. Full Operating Capability (FOC) is expected for early 2008.

Submitted by: Col Mike Mendonca

Training Panel*Wednesday, 4 April*

0910	Introductions	Russ Hunter, CSC
0915	AFSOC CV-22 AAR Training Program	Maj Keith Gurnick, AFSOC/A3V
0930	Boom Operator Training	SMSgt Frank DeJauregui, 4AF DOV
0940	The Way Forward for Ground Based Aerial Refueling Training	Richard Pain, Thales
0955	Addressing Air Force and ANG Boom Operator Training with Squadron Level Trainers	Doug Sutton, ACME Worldwide
1005	AE on Tankers: A Decade of Lessons Learned	Lt Col Nancy Mikulin, Commander, 349 AES

Panel Chair, Russ Hunter from CSC introduced the panel co-chairs: COL Ken Lewis, USAFR, Norm Gibson, C/KC135 International Program Division, Tinker AFB, Van Davis, and Steve Hampton, Customer Training Specialist, Boeing Corp. He also displayed the Training Panel Charter.

Because of the number of training panel presentations and the fact that he had been asked to deliver the U.S. Army Special Operations Status report for CW4 Myron Beals who was unable to attend due to mission requirements, Russ moved that presentation to the U.S. Military Status reports on Tuesday, where he discussed the severity of the growing problem of the expanding US Army helicopter receiver fleet and associated AAR training currently provided by the DoD KC/HC/MC-130 fleet.

Maj Keith Gurnick, AFSOC/AV3, gave an interesting update presentation on USSOCOM CV-22 AAR training and some of the unique CV-22 requirements. It was noted that there is still some mismatch between the USSOCOM requirement for the variable speed drogue and the optimum CV-22 AAR airspeed which is somewhere around 220 KTS IAS, which puts the CV-22 on the low end of what airspeeds strategic tankers can manage without severe turbulence for the receiver.

SMSgt Frank DeJauregui, 4AF DOV, provided an excellent return review of Boom Operator training and associated issues. He discussed how, if the fidelity of the devices could be certified, simulation could be used to not only provide standard and degraded system operation training, but could provide the “boomers” with legitimate “contacts” for currency requirements. He cautioned that any device falling short of that capability would not be considered completely useful to the Boom Operator training community.

Thales Corp delivered an in depth presentation on the level of fidelity now possible in simulation, and the potential application in Boom Operator training.

LTC Nancy Mikulin, Commander, 349 AES presented, what is hoped by the Training Panel to be one in an ongoing series of briefs, on the challenges both addressed and unaddressed of the conversion of taker aircraft to the support of the AE mission. Many positive comments and discussions were generated, and important information was transmitted.

ACME Worldwide Corp provided an interesting presentation in response requirements established in last year’s Training Panel by SMSgt Frank DeJauregui, 4AF DOV, and updated earlier in this panel session. The discussion centered on the currently available levels of fidelity and the contrast and comparison, and understanding of the terms “3 dimensional vision” and “depth perception” as related to Boom Operator synthetic training. The discussion was lively and several pointed questions were generated.

Submitted by: Russ Hunter, CSC

Interoperability Procedures and Documentation Panel

Wednesday, 4 April

1045	Introductions	Lt Col John Fletcher, USAF, NATO
1050	Aerial Refueling Contract Services	Ulick McEvaddy, Omega
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1115	ATP-56, USAF Adoption Status	Wg Cdr Martin Walsh, AMC
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ARSAG 2007 – Interoperability Panel Meeting Minutes

Panel Chair, Lt Col John Fletcher, introduced the interoperability panel. He quickly introduced the panel members and the panel charter.

The first to speak was Ulick McEvaddy from Omega. Mr. McEvaddy provided information on Omega’s capabilities and what type of AAR they could provide receiver aircraft. He discussed his companies work to add a flying boom to their inventory.

Lt Co Lionel Poirot from the French Air Force, provided information on what the EAC was doing. He provided an update on what the EAC had done in the past year and when someone should contact them.

Next information was provided on the update to ATP-56. Wing Commander Martin Walsh (AMC), Jennifer Ingmire (NAVAIR), and Major Keith Gurnick (AFSOC/A3V) provided information on the overall update and the US perspective on the update. ATP-56(B) went active world wide on April 1, 2007. The US AF, Navy, and Marines all started using ATP-56(B) with the rest of the world on April 1. Wg Cdr Walsh provided information on the overall update to ATP-56(B), Jennifer Ingmire provided information on the US Navy and Marine National Annex, and Maj Gurnick provided an update on the status of Part 3, Rotary Wing Procedures. Maj Gurnick stated that Part 3 was still in work with a few areas to be worked through. The expectation was that Part 3 would be complete by the end of July 2007.

Submitted by: Jennifer Ingmire, NAVAIR

Lighting and Markings Panel

Wednesday, 4 April

1130 **Introductions**

Richard Kemp, Honeywell

1135 **Tanker Remote Vision System (TRVS)**

Hans Bol, Netherlands Org. for Applied Science

Richard Kemp, Lighting and Marking Panel Chair opened the panel session by introducing the Lighting and Marking Panel co-chairs, the panel charter, the presenters and their topics.

Unfortunately this year the Lighting and Marking Panel only had one presenter but we hope to have more presenters next year to talk about recommended lighting and markings for future tankers and retrofits. This will be based on the results of the USAF lighting study.

Mr. Hans Bol, of the Netherlands Org. for Applied Science, gave a very informative briefing on Tanker Remote Vision Systems.

During the ARSAG conference a question was asked if the lighting panel could make a document to provide a standard for operation of the AAR Pod Status Lights. This would be for existing tankers as well for future tankers and would include covert lighting. The request was to have some kind of lighting signal for all modes of operation during the refueling process. This would be a refinement of the procedures now listed in ATP-56.

Other Lighting & Marking Panel activities

On Monday April 2nd at the JSB/ARSAG special projects workshop the L & M panel started a project on reviewing the UDRI / USAF report on aerial refueling lighting and formation aids/markings requirements. The goal is to eventually make a document with recommendations of standards and requirements of aerial refueling lighting and markings which would include covert and overt lighting for future tankers. This document also could be used when retrofitting existing tankers with covert lighting as well as updating the overt lighting.

Submitted by Richard Kemp

Advanced Concepts Panel*Wednesday, 4 April*

1330	Introduction	Farhad Choudhury, NAVAIR
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1355	UAV Autonomous Aerial Refueling	Scott Price, Sargent Fletcher
1415	Advanced Aerial Refueling Planning and On-Board Management Systems	Gardiner Porter, Jeppesen

The 2007 ARSAG Conference was held at Las Vegas Bally's Hotel and Casino. The Advanced Concepts Panel was chaired by Farhad Choudhury from NAVAIR. The Panel had their session on Wednesday afternoon, 4 April 2007. Farhad introduced himself and his co-chairs. He reviewed the charter and then proceeded to introduce the briefers, their organizations and their topics. This year, ARSAG Conference Panel speakers were all seated behind tables for the purposes of better continuity between the speakers and name and face recognition during the question and answer session. This year, all the questions were held until all the briefers were complete with their briefings.

The first of three speakers was Lt. Col. James McCormick from the Defense Advanced Research Projects Agency (DARPA), who spoke about the feasibilities of Automated Aerial Refueling. He spoke about the available technologies and the various proof of concepts and demonstrations that have been done thus far working with companies like Sierra-Nevada, Boeing, and government agencies like NASA and NAVAIR. His brief was high lighted the next day, when Sierra-Nevada briefer showed a video of a NASA F/A-18 plugging an Omega Boeing 707 drogue "autonomously". Even though the F/A-18 was manned, the refueling portion of receiver rendezvous to the plugging with the tanker was all hands-off. This technology is promising for manned and unmanned receivers, including possibly UAVs/UCAVs.

The second speaker was Mr. Scott Price from Cobham's Sargent Fletcher Incorporated, who spoke about Unmanned Aerial Vehicle Autonomous Refueling. Scott spoke about the progress and refinements their company has made since last year's ARSAG Conference in the areas of unmanned aerial refueling. Videos and pictures of their designed aircraft were shown doing ground and flight tests. Available technologies are being developed to do further demonstration/validation such as air-to air refueling of custom tanker and receiver vehicles. They are awaiting airworthiness certification.

Our third speaker was Mr. Gardiner Porter, from the Jeppesen Commercial and Military Aviation Company, who spoke about Advanced Aerial Refueling Planning and On-Board Management Systems. Gardiner spoke about Aerial Refueling as a business and ways to automate much of what is done manually currently in order to provide mission flexibility and improve efficiency and safety.

At the end of all the speakers' briefs, the Panel took several questions from the audience and answered them. This was followed further questions during the scheduled breaks and side bar meetings.

Submitted by: Farhad Choudhury, NAVAIR

Studies and Analysis Panel*Wednesday, 4 April*

1505	Introduction	Allan Haenisch, SAF/AQQM
1510	Status of KC-X Program	Major General Mark Pillar, SAF/AQ, Mobilization Assistant
1525	Mobility Capability Study (MCS) 06 Tanker Updates	Col Carl "Cal" Lude, USAF, OSD /Program Analysis and Evaluation (PA&E)
1545	Benefits of a Receptacle	Lt Col Donald Anderson, AMC/DA9

On Wednesday afternoon, the Studies and Analysis Panel featured three briefings to the general assembly. These included, "Status of the KC-X Program" from Maj Gen Mark Pillar, SAF/AQ-MA, "Mobility Capability Study (MCS) 06 Tanker Updates" from Col Carl "Cal" Lude, USAF, OSD/Program Analysis and Evaluation (PA&E), and "Benefits of a Receptacle from Lt Col Donald Anderson AMC/DA9. The purpose of these briefings was to bring ARSAG attendees up-to-date on studies that had been concluded in the last 12 months. Due to the ongoing USAF KC-X source selection, some studies were deferred and will be presented in ARSAG 2008. Maj Gen Pillar began the program by informing ARSAG attendees on the USAF position on the KC-X Program, the current program status, and upcoming planned major milestones. Col Cal Lude informed attendees on updated tanker requirements since he briefed ARSAG 2006 on the Mobility Capability Study (MCS) 05. Lt Col Donald Anderson briefed the benefits of having a receptacle on a tanker. The briefers and Panel Chair answered questions from the general assembly.

Submitted by:
Allan Haenisch, USAF SAF/AQQM--MTC

Industry Panel

Wednesday, 4 April

1605	Introductions	Wally Averill, LM Aero
1610	Tactical Refueling – Today and Tomorrow	Andy Bennett, LM Aero
1625	Tactical Tanking in a Hostile Environment	Michel Folscheid, EADS
1640	Refueling Systems - the Next 50 Years	Patrick O'Connor, Cobham
1655	Refueling Systems - the Next 50 Years	Greg Steiner, Smiths Aerospace
1710	Boeing Tanker Platforms - the Next 50 Years	Greg Rusbarsky, Boeing
1725	21st Century Tanker Design, Test Pilot's Perspective	Tim Butley, Airbus

- The ARSAG objectives for the Industry Panel briefings were met during the 2007 Conference in Las Vegas. That is, all briefings fell within the 15-minute time allotment...but more importantly, each company briefing addressed the state of aerial tanking from their company's perspective for the next 50 years. Each briefing (summaries below) held to that theme with minimal marketing ploy, focusing on how each company is striving to further the aims of aerial refueling and given in a totally collegial atmosphere.
- Industry Panel Group presented six briefings:
 - Lockheed Martin (Andy Bennett): Roadmap for tactical air-to-air refueling within the battlefield with respect to evolving requirements, op tempo, multi-role capability, decreasing fleet sizes vice increasing demand, increasing offload demand of receivers, and joint/ coalition operations.
 - Airbus Military (Michel Folscheid): Overview of A400M operations in a hostile environment, addressing such issues as helicopter refueling (speeds and offloads), low altitude terrain following, survivability/force protection, and the various options (systems) for offloading fuel.
 - Cobham (Patrick O'Connor): Focus on complete, nose to tail air to air refueling needs for US and International tankers and receivers, addressing advancing technologies for control systems, pods and drogues, internal fuel tanks, and autonomous fueling operations (pressing FAA certification here).
 - Smiths Aerospace (Greg Steiner): Linked to Boeing's B-767 tanker program, smith's is concentrating on today's requirements driving future development of their systems. Smith's is heavily involved in precision guidance and smart systems, advances in drogue stabilization for high-speed air-to-air refueling (developing passive and active steerable drogue), and autonomous refueling technology for both boom and hose/drogue refueling.
 - Boeing (Greg Rusbarsky): Boeing, though getting ready for the future with new tankers, recognizes that the current stable of KC-1305s and KC-10s will be with us for quite some time. Tomorrow's tankers are here now and must address rapid global mobility, multiple threats, forward deployment with modest ground support and respond rapidly to expeditionary needs.
 - Airbus (Tim Butley): From a project test pilot's perspective, Airbus addressed the design of a 21st Century tanker whereby Fly By Wire Flight Controls should be adapted (to improve handling qualities for both Tanker and Receiver), military capabilities integrated, and crew situational awareness improved.
 - Northrop Grumman (Pablo Gonzales): Unfortunately, Northrop Grumman failed to receive USAF approval for their briefing, thus did not participate with the Panel.

Submitted by: Wally Averill, LM Aero

System Design Panel

0800	Introduction	Tom Cavallaro, NAVAIR
0805	Aerial Refueling in a Commercial World	Dr. R. K. Nangia
0820	KC-10 Centerline Hose Reel Improvements	Jeff Spence, Boeing Gary Haler, OC-ALC
0835	KC-10 Centerline Hose Reel, New Drive System	Asher Bartov, Federal Industries
0850	Flight Control Actuation on Refueling Boom	Klaus Wegscheider, Liebherr Aerospace
0900	Boom Control Unit for AR Boom System	Frederic Brajou, CES

All the speakers took their seats on the podium prior to the introduction of the panel. Tom Cavallaro, System Design Panel Chairman, introduced the order of speakers and their respective topics to begin the session. No questions were entertained during or after each individual speaker, rather at the completion of all presenters a question and answer session was conducted.

The first speaker was Dr. R. K. Nangia of Nangia Aero Research. He presented a brief entitled, "Aerial Refueling in a Commercial World". Dr. Nangia proposed that introducing air refueling to civil aviation could save 30 – 40% in fuel and financial costs. This brief received multiple questions during the Q&A session.

The next two briefers focused on the KC-10 centerline hose reel system. The first was Mr. Jeff Spence of the Boeing Company. The title of Mr. Spence's brief was, "KC-10 Centerline Hose Reel Improvements". Mr. Spence discussed all of the modifications made to the hose reel to improve its performance. The improvements have been implemented and tested by the reel OEM, Sargent Fletcher, Inc.

The third brief of the System Design panel was given by Dr. Asher Bartov of Federal Industries. Dr. Bartov delivered a presentation entitled, "KC-10 Centerline Hose Reel, New Drive System". This brief discussed a new variable speed drive system designed and developed by Federal Industries for application to the KC-10 hose reel system.

The final two speakers focused on the new EADS boom system. These speakers represented sub-contractors to EADS CASA and were introduced by Mr. Valentin Merino Villeneuve of EADS CASA. Mr. Klaus Wegscheider of Liebherr-Aerospace spoke next. His presentation was entitled, "Flight Control Actuation on Refueling Boom". The final speaker, Frederic Brajou of Creative Electronic Systems (CES), gave a presentation entitled, "Boom Control Unit for AR Boom System".

Submitted by: Tom Cavallaro, NAVAIR

Test and Evaluation Panel

0915	Introduction	Dave Hilker, USAF/ASC
0920	New Aerial Refueling Drogue Design	Tom Cavallaro, NAVAIR Bill Kirkland, Arizona Paratrogue Systems Bob Najaka, Arizona Paratrogue Systems
0935	KC-767 Aerial Refueling Testing	Rick Kahler, Boeing Steve Stecko, Boeing
0950	SNC/DARPA Autonomous Aerial	Greg Cox, Sierra Nevada
1005	AFRL Autonomous Aerial Refueling Program	Dan Schreiter, AFRL/VACC

1. Overview

The test and evaluation panel was presented on Thursday, April 5 2007 from 9:15 to 10:30 AM. Dave Hilker introduced the panel, briefers and T & E panel charter. There were four briefings presented during the panel. At the end of the panel, a series of four questions were asked by the audience, all for Greg Cox of Sierra Nevada Corporation.

2. Briefings

- a. **New Aerial Refueling Drogue Design** - An overview of the first briefing on aerial refueling drogue design was given by Tom Cavallaro of NAVAIR followed by a joint presentation by Bill Kirkland and Bob Najaka from Arizona Paratrogue Systems (APS). They discussed their programs for both the modified canopy for the C-130 high speed drogue to allow it to refuel V-22s in the single engine refueling range of 150-160 KIAS and still meet the low end of the fighter envelope of 220-230 KIAS. This is considered an interim solution until the Variable speed/Variable drag drogue can be developed. The briefing was followed by a detailed discussion on the APS effort to develop a variable speed/variable drag drogue in the speed envelope range of 105-250 KIAS. This drogue has currently completed a wind tunnel test but the full speed range has not yet been demonstrated in flight.
- b. **KC-767 Aerial Refueling Testing** - Steve Stowe and Rick Kahler of the Boeing Company presented the results of the aerial refueling flight testing performed to date on the KC-767 tanker being developed for Italy and Japan. The briefing led off with an overview followed by a ten minute video where Steve and Rick provided comments during the video. The video showed both boom and centerline drogue operation for the KC-767.
- c. **SNC/DARPA Autonomous Aerial Refueling** - Greg Cox of Sierra Nevada Corporation presented a briefing on autonomous aerial refueling demonstration using probe and drogue type refueling. The briefing discussed the system architecture and the system equipment. The briefing showed a video using the Omega Tanker and an F-18 receiver aircraft with the system installed where multiple refueling contacts were made without pilot intervention.
- d. **AFRL Autonomous Aerial Refueling Program** – Dan Schreiter from AF Research Laboratories substituted for Jake Hinchman who was initially scheduled to brief. Dan led off the briefing with a video of the AFRL capabilities and a description of the autonomous aerial refueling program. This program was to demonstrate the capability to autonomously refuel with a boom receptacle system. Although the receiver aircraft (Lear jet) did not have a receptacle, it was demonstrated that the rendezvous and tanking could have been easily performed. The flight test portion of this demonstration was performed at the AF flight test center at Edwards AFB.

2. Questions

- a. Question 1 was for Greg Cox: The drogue stability in the video seemed like the drogue settled down right before contact. What type of constraint do you have for a missed plug? Answer: Probe position relative to the drogue.
- b. Question 2 for Greg Cox: Have you performed tests with the EF-18 Super Hornet and the buddy Store? Answer: No
- c. Question 3 for Greg Cox; Most work was performed in “clean air”. Will the system work in turbulence? Answer: *Not recorded*
- d. Question 4 for Greg Cox: Auto-Formation to ride the wing tip vortices and save fuel similar to the recent Boeing demonstration (approximately 20 percent). Have you looked at that scenario with this system? Answer: No

Reliability and Maintainability Panel

1055	Introduction	Ralph Aviles, NAVAIR
1100	KC-135 Status Report BDA Kit and MPRS Classification	Norm Gibson, 827 ACSG/IS
1110	KC-10 Aerial Refueling Status	Bob Mendoza, USAF
1120	Aerial Refueling Systems Maintenance and Procedures	Mike Bandak, Sargent Fletcher
1130	KC-130 Aerial Refueling Status	Cary Depew, LM/USMC

Members

- Ralph Avilés, NAVAIR Jacksonville (US Navy)
- Sherie Donahay, OC/ALC
- Norman Dauderman, Boeing Co.
- Mike Bandak, Sargent Fletcher Inc.
- Cary Depew, Lockheed Martin
- Wilfried Jung, SFw, German Air Force
- Wolf Kuhbier, Hptm, German Air Force
- Luis Fernandez Paniagua, EADS
- Lt Mathew Sipe, USAF, Robbins AF, GA

Presentations

- Panel Introductions, Charter Summary, and Agenda - Ralph Avilés, NAVAIR Jacksonville (US Navy)
- KC-135 Status Report BDA Kit and MPRS Classification, Norm Gibson, (OC-ALC)
- KC-10 Status Report, Bob Mendoza (USAF)
- Aerial Refueling Systems Maintenance & Procedures, Mike Bandak (Sargent Fletcher Inc.)
- KC-130 Refueling Systems Maintenance Discussion, Cary Depew (Lockheed Martin)

Regular Panel Session summary:

The regular R&M Panel session commenced in the second half of the morning of Thursday April 6, 2007. The session began with Mr. Ralph Avilés; R&M Panel Chair, introducing the Panel members and presenters, and providing an overview of the R&M Panel's main function and goals in dealing with Aerial Refueling Systems and the Fleet. During ARSAG 2007, the R&M panel focused its efforts in providing an overview of maintenance practices, issues, and lessons learned for various aircraft refueling platforms. The aircraft refueling components discussed included the KC-135 BDA Kit and MPRS, the KC-130 FR300 and its associated support equipment. Sherie Donahay, 551 ACSS, was unable to attend the conference. A KC-10 status report presentation was schedule for this panel but the presenter was not able to attend this year's ARSAG conference. However, some of the information pertaining the KC-10 BDA Kit and MPRS was briefly mentioned during the Systems Panel session. The topics discussed provided the audience with an overview of how past experiences and maintenance problems have been resolved, by the development of component upgrades and modifications, and how these changes have improved the overall reliability of such systems.

Other R&M Panel items

Several members of the R&M Panel and other industry experts in the maintenance and operations of refueling components and systems meet prior to the regular ARSAG 2007 session to continue the discussion and development of the ARSAG Maintenance Document Guide. During the meeting the group reviewed a total of 3 articles that were submitted by Mr. Towle for consideration for induction into the document. Other possible topics considered for inclusion into the document were verbally discussed between all attendees. At the end of the meeting it was decided that the R&M Panel Chair will take the initiative to take the first set of documents and incorporate them into a draft version of the Maintenance Document. With no further issues on the agenda the meeting was adjourn.

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Sherie Donahay, OC-ALC
Mike Bandak, Sargent Fletcher
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Wilfried Jung, German Air Force
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Major Kevin Rainey, USAF AMC Flight Safety
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Jim Reinholdt, Eaton
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