

JOINT ROBOTICS PROGRAM

MEETING OF THE JOINT ARCHITECTURE FOR UNMANNED GROUND SYSTEMS (JAUGS) WORKING GROUP

MINUTES

GAITHERSBURG, MD

July 12-13, 1999

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UNMANNED GROUND SYSTEMS
(JAUGS)
WORKING GROUP**

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National Institute for Standards and Technology
Gaithersburg, MD

Minutes of Meeting

1. The meeting agenda is provided at TAB A and the list of attendees at TAB B.
2. The JAUGS Working Group (WG) held its eighth quarterly meeting on July 12th and 13th at the National Institute for Standards and Technology (NIST) at Gaithersburg, MD. The objectives of the meeting were to present information on a Red Team/Blue Team JAUGS validation experiment, discuss draft Version 1.2 of the Reference Architecture (RA), and to introduce the University of Florida's approach to propulsive/resistive messaging. Additional topics included draft Version 1.2 of the Configuration Management Plan, a generalized block diagram and the U.S. Army Training and Doctrine Command's (TRADOC) Unmanned Systems Land Warfare Integrated Concept Team (USLW ICT).
3. Mr. Fred Proctor opened the meeting, welcomed the members, and made administrative remarks. Mr. Robert Wade next went over the agenda and explained the plan for conducting the meeting.
4. Mr. Jeff Kotora led a discussion of the action items from the previous meeting. Action items that remained open were:
 - A Plan of Action & Milestones (POA&M) needs to be developed.
 - Members need to send system descriptions/op-mode summaries to Mr. Wade.

Action items not completed will be carried over in an "open" status.

5. Dr. Bobby Bialczak, Mounted Battlespace Battle Lab (MBBL), gave the Working Group a briefing on the USLW ICT process. He explained how the ICT was organized into three sub-groups: Strike Force, Light Force, and Mechanized. Additionally, the ICT has been expanded to include UAV's, unattended ground sensors and unattended munitions. He showed the timeline for gaining approval of one of the ICT's key documents – the Unmanned Systems Concept of Employment (COE) White Paper. The COE will be the underpinning for the Army's Future Capabilities with regard to unmanned systems. At the conclusion of the briefing, Robert Wade asked if the COE (draft) could be made available to the Working Group. Dr. Bialczak said that he would seek authorization to do so.

6. Mr. David McConnell next briefed the members on the outcome of a JAUGS validation experiment conducted over the past several weeks. Called the “Red Team/Blue Team experiment”, it consisted of two teams (unknown to each other) that built one JAUGS compliant node each and then passed messages over the internet. They were not allowed to communicate until integration began. The purpose of the experiment was to uncover any holes or weaknesses in the RA specification, and evaluate the internodal communication approach. The experiment achieved its goals, in that several concerns and issues were raised and the following conclusions were reached:

- JAUGS must specify internode data formats to the bit/byte level.
- Although needing further definition, the current Generic Open Architecture (GOA) 3L and 4L class interfaces in the RA are sound.
- In order to achieve node interoperability, the RA must define class 2L, 1L and 1D interfaces.
- When possible, the RA should be defined in a language neutral, machine readable format.
- The Working Group should explore ways to allow specific comm channel capabilities to be used.

Mr. McConnell’s presentation was followed by a demonstration of the experiment by Mr. Will Shackleford and Mr. Bob Pruitt.

7. David McConnell then discussed JAUGS comm messaging. Concerns that arose during the discussion were threefold. Firstly, should all vehicles in multi-vehicle operations know information about all the other vehicles? Secondly, what is the appropriate scope and breadth of that information? And thirdly, could the interface of the communicator component be as simple as “send remote message”? Both David and Robert Wade said that they had settled on changing the name of the “intra-UGV Communicator” component to simply “Communicator”.

8. Day 2 of the meeting commenced with Dr. Carl Crane’s presentation of the University of Florida’s Standardized Vehicle Control Unit (VCU) messages. The idea is to explore a way to develop a standard message set that will work for many types of platforms (wheeled, tracked, legged, undersea, aerial, etc.) operating under diverse methods of control (teleoperation, semi-autonomy, full autonomy). Dr. Crane briefed his approach as that of sending a VCU two command inputs, i.e., a “propulsive wrench” to get a platform to perform the motion, and a “resistive wrench” that impedes platform motion. This is done on the platform’s three translational and three rotational elements. He then gave several example message sets that could be applicable to all platform types. Lastly, Dr. Crane recommended this approach be considered for adoption into JAUGS.

9. Mr. Gary Haas next presented a briefing on a Generalized Block Diagram. His purpose was to offer a reasonable way to assemble the components of JAUGS. To that end, he discussed a teleoperated block diagram, a command autonomy structure, and an autonomous UGVS structure. He also emphasized that the architecture should address

high speed UGV's as well as accommodate autonomous driving. During the ensuing discussion, Jeff Kotora stated that JAUGS needed to stay the course in supporting Evolutionary Acquisition.

10. The last presentation was by Jeff Kotora on Version 1.2 (draft) of the Configuration Management Plan (CMP). He briefed the minor and major changes from the previous version. Major changes included:

- Defining the Domain Model as the Functional Baseline.
- Defining the Reference Architecture as the Allocated Baseline.
- Expanded the CCB membership to nine.
- Postulated that the CCB Chair will be named by OSD for one year duration, and will rotate among CCB members.
- Identified the AMCOM RDEC as Current Document Change Authority (CDCA).
- Made provision for PM's to appeal CDCA decisions.

Dr. Bialczak recommended that CECOM be added to the CCB and that the CCB Chair be elected from the CCB membership. Rationale for the latter recommendation was that some members may not desire the position.

11. Jeff Kotora concluded by recapping the action items that arose over the course of the meeting. The action items were:

- a. A POA&M needs to be developed for JAUGS. **(Action: Mr. Wade, Mr. Kotora)**
- b. Members need to submit to Robert Wade system descriptions/op-mode summaries on their programs and systems. **(Action: All)**
- c. Members need an example of a system description/op-mode summary. **(Action: Mr. Wade)**
- d. The Working Group should have a copy of the Army's Universal Task List. **(Action: Dr. Bialczak)**
- e. Selected members of the Working Group would benefit from reading the TRADOC draft COE. **(Action: Dr. Bialczak, Mr. Kotora)**
- f. The Working Group needs to take action soon on the last two conclusions (#4 & #5) from the validation experiment. **(Action: #4 - Mr. McConnell (UDL), Mr. Proctor (IDL), Mr. Griffin (XML). #5 - Mr. Wade)**
- g. The Working Group requires briefings on how different programs are implementing multiple vehicle operations. **(Action: Mr. Carroll, Mr. Bellanca, Mr. Haas)**

- h. There should be a discussion on the reflector regarding internodal message headers. **(Action: All)**
- i. The University of Florida's paper on a positioning system should be put on their website. **(Action: Dr. Crane)**
- j. A quarterly schedule of Working Group activities needs to be published. **(Action: Mr. Wade)**
- k. Working Group Members who represent PM's need to inform their principals about the requirement to expand the scope of JAUGS. **(Action: Mr. Bellanca, Mr. Haas, Mr. English, Mr. Nguyen {EOD}, Mr. Nguyen {JPO})**
- l. Members who made presentations should send them electronically to Jeff Kotora, so that they may be uploaded onto the JRP website. **(Action: Briefers)**
- 12. The next meeting will take place October 26-27, 1999 at the University of Florida, Gainesville, FL.

APPROVED: /s/ Robert Wade 8/3/99

