

**Minutes of the 2016 AMSAT Board of Directors Meeting**  
**Held at the DoubleTree by Hilton Hotel – Galveston Beach, Galveston, TX**  
**November 9-10, 2016**

**Board Members in Attendance:**

Barry Baines, WD4ASW, President  
Jerry Buxton, N0JY, Vice President – Engineering  
Tom Clark, K3IO  
Drew Glasbrenner, KO4MA, Vice President - Operations  
Mark Hammond, N8MH  
Bob McGwier, N4HY  
Bruce Paige, KK5DO  
Paul Stoetzer, N8HM, Secretary & First Alternate  
Clayton Coleman, W5PFG, Second Alternate

**Officers in Attendance:**

Keith Baker, KB1SF/VA3KSF, Treasurer  
Martha Saragovitz, Manager  
Joe Spier, K6WAO, Vice President – Educational Relations

**Others in Attendance:**

Steve Akkala, W2AKK  
Bdale Garbee, KB0G  
Bill Hulse, W5NI  
Joe Fitzgerald, KM1P  
John Klingelhoetter, WB4LNM  
Joe Kornowski, KB6IGK  
Lou McFadin, W5DID  
Sharon McGwier, N1SMM  
Shlomo Menuhin, 4X1AS  
Keith Pugh, W5IU  
Nick Pugh, K5QXJ  
John Shew, N4QQ  
Graham Shirville, G3VZV  
Dave Taylor, W8AAS

President Barry Baines called the meeting to order at 8:05 CST, welcomed attendees to the meeting, and went over administrative items related to the meeting.

The first order of business was the election of officers for 2016-17. Barry moved the approval of the slate of officers. Bob McGwier seconded the motion. The motion was approved 5-0 (Tom Clark and Bruce Paige were not present).

The following officers were elected:

Barry Baines, WD4ASW - President  
Drew Glasbrenner, KO4MA - Vice-President Operations  
Jerry Buxton, NOJY - Vice-President Engineering  
Frank Bauer, KA3HDO - Vice-President Human Spaceflight  
Paul Stoetzer, N8HM - Secretary  
Keith Baker, KB1SF/VA3KSF - Treasurer  
Martha Saragovitz - Manager

The following Senior Officer positions remained open awaiting appointments:

Executive Vice President  
Vice-President User Services  
Vice-President Marketing

### **President's Report**

Barry moved on to the President's Report for 2016. He went over the members of the Board of Directors and officers and other key leaders.

Barry noted that there was one change to the other key leaders. Gould Smith, WA4SXM, was appointed Director – Field Operations. Patrick Stoddard, WD9EWK, stepped down as Director and will become the Lead Area Coordinator.

Barry reviewed the mission statement and vision statement and noted the key summary was to “Keep Amateur Radio in Space.”

Barry noted many accomplishments for 2016. Fox-1Cliff and Fox-1D were built and are ready for launch. RadFxSat-2 / Fox-1E was accepted for a NASA Cubesat Launch Initiative launch in February. The Phase 4B Payload Accommodation Study was completed in March. RadFxSat/Fox-1B completed environmental testing. Fox program materials continued to be placed in the public domain. The Amateur Radio on the International Space Station program continued to evolve with enhanced funding development.

Barry then went over expectations and goals for 2017. Fox-1Cliff and Fox-1D are expected to launch on the Spaceflight SHERPA mission. RadFxSat / Fox-1B is expected to launch in March 2017 on ELaNa-XIV. RadFxSat-2 / Fox-1E may launch in December 2017.

The Phase 4B partnership with Virginia Tech will continue. The Payload Analysis Study was completed, but there is uncertainty regarding the status of the primary payload. AMSAT will develop the ground terminal, submit IARU coordination papers, and manage the amateur payload. Virginia Tech will develop the SDR payload with AMSAT assistance as desired and fundraising over \$100,000 is Virginia Tech's responsibility.

The ARISS program operates under new relationships. Traditional funding sources are no longer involved and AMSAT and the ARRL are handling the school selection progress. The aging amateur hardware is a major concern.

Educational outreach continues to bring space communications to the classroom

The new environment with communications satellites under EAR may open new opportunities for collaboration with other AMSATs, but we need to learn the new environment. Virginia Tech's Office of Export Security & Research Compliance can assist in that endeavor.

Cubesat Licensing continues to be an area of concern. Which satellites must be licensed as experimental and which may be licensed in the Amateur Satellite Service.

A renewed focus on enhancing IT capabilities is required. There is a potential expansion of memberships due to the number of AMSAT projects, but what are the priorities for the IT future and does AMSAT look to outside service providers?

Soliciting content for AMSAT media outlets such as the AMSAT Journal and website continues to be an issue.

Awareness of and support for AMSAT must continue to grow. Expand our social media reach and translate likes to membership and support.

AMSAT is engaging in major programs in collaboration with Virginia Tech, but there are uncertain timeframes and resource requirements.

With the Fox-1 project wrapping up, there must be a focus on follow-on projects.

Talent must be recruited to the management team. Succession planning is a primary concern.

It is time for a major strategic planning development process. The last major review was conducted in 2004. An analysis presented by Tony Montiero, AA2TX, in October 2009 led to the establishment of the Fox Program. AMSAT Engineering now at a cross roads regarding future projects.

Strategic planning covers a wide area. We need to determine "where we are," identify "what's important," define "what we must achieve," determine "who is accountable," and "review, review, review."

New memberships are down but renewals are up. Hopefully additional launches will generate additional support. There is a need to drive new memberships.

Current income from dues and other sources are not sufficient to cover day-to-day expenses. The overall membership levels have a major impact on providing operating funds to keep the organization running. The projected operating deficit in 2017 is approximately \$147,000. 3,304 additional members are needed at \$44.00 per year to break even. Operating losses covered by reserves and non-designated donations, but the level of deficits is not sustainable in the long run. Growing the membership is critical to sustaining AMSAT. Successful launches provide an opportunity to generate growth

AMSAT members are encouraged to recruit others to join AMSAT in order to increase cash flow to pay the bills. There is a need to bring the next generation on board.

It costs real money to have a presence in space and we need to continue to look for way to encourage donations. Do our successes provide the foundation for a "case for support"?

## **Secretary's Report**

Secretary Paul Stoetzer, N8HM, began by requesting approval of the minutes of the July 19, 2016 Board of Directors teleconference.

Jerry Buxton made a motion to approve the minutes from the July 19, 2016 teleconference. Bob seconded. The motion carried 6-0 (Tom was absent)

Following approval of the minutes, he delivered the Secretary's Report. He noted that there were three formal sessions of the Board of Directors held via teleconference since the 2015 Board of Directors meeting held in Dayton, OH. A teleconference was held on December 5, 2015 to approve the 2016 budget and additional teleconferences were held on February 29, 2016 and July 19, 2016 for the approval of minutes from prior meetings.

Paul moved on to discuss the 2016 Board of Directors election. 3,174 ballot packages were mailed and 697 were returned for a participation rate of 22%, up slightly from 21% for the 2015 election.

## **Treasurer's Report**

Treasurer Keith Baker, KB1SF, noted that AMSAT remains solvent. 2016 was fiscally challenging, but a good year. There are long term concerns about member-based revenue. There is uncertainty regarding AMSAT's share of multiple projects and an uncertain impact of the 2017 North American economy.

A key question moving forward is whether AMSAT should return to a full audit of the organization's finances. This was dropped in 2011 due to the increasing cost of a full audit, however some funding sources may require a full audit for an organization to be eligible for grants. The costs and benefits of this step will need to be debated by the Board.

Keith requested that AMSAT's current financial firm, Berlin, Ramos & Company P. A. in Rockville, MD, be appointed to perform an audit or review of a type to be determined and the Board approved this request.

Bruce Paige moved that Berlin, Ramos & Company be appointed to perform an audit or review of a type to be determined. Bob seconded. The motion carried 6-0 (Tom was absent).

The meeting recessed for a coffee break at 9:41am CST.

The meeting resumed at 10:03am CST with the Manager's Report.

## **Manager's Report**

Manager Martha Saragovitz noted that this had been a challenging year in the office due to the loss of both of her long-time volunteers, but that most of the office operations are going smoothly. There were concerns about ongoing problems with the online store.

## **Operations**

Vice-President Operations Drew Glasbrenner, KO4MA, noted that AMSAT has two satellites operational: AO-7 and AO-85. AO-7 is in full sunlight currently switching between Mode A and Mode B every 24 hours. AO-85 is very easy to receive, but suffers from receive sensitivity issues and is not as popular as

expected. The satellite very rarely needs commanding. The high-speed data mode required for experiments on Fox-1Cliff and Fox-1D has been demonstrated on AO-85.

Drew also mentioned that there may be planned SSTV demonstrations on AO-85, particularly after future Fox satellites are launched. After the launch of Fox-1Cliff and Fox-1D, and while they remain nearby, he plans to keep one of them active with their L-band uplink.

Between telemetry collectors and transponder users, there are likely a total of 400-500 active users of AO-85 worldwide

Drew moved on to other satellites. There are many non-AMSAT-NA satellites in use. Drew suggested that due to the number of LEO satellites in 500 km – 800 km orbits, AMSAT-NA needs to concentrate on strategies for higher LEO orbits. He noted that two planned constellations were going to 1200 km or higher.

Drew mentioned that the AMSAT Twitter account is “going gangbusters” with a current total of 9,493 followers. He suggested that AMSAT information releases be more coordinated so that the social media following can be leveraged. The AMSAT North America Facebook group has 2,765 members and the AMSAT corporate Facebook page has 3,174 likes. Social media has driven online fundraising and membership drives.

Tom Clark joined the meeting at 11:00am CST.

The meeting recessed at 12:10pm CST for lunch

The meeting reconvened at 1:08pm CST.

### **AMSAT News Service**

Vice-President Educational Relations and ANS Editor Joe Spier, K6WAO, began by mentioning that ANS was now being distributed on OuterNet. He described a challenge with column formatting for the old format designed for distribution via packet BBSes. It takes 4-5 hours a week producing the draft and 1-2 hours to get the final version out.

Joe also noted that a main advantage of ANS is how ANS articles are re-distributed to various news sites, including the ARRL, eHam, QRZ, Southgate, etc.

### **Field Operations**

Barry noted that Gould Smith, WA4SXM, was taking over the Field Operations team, as previously noted. He expressed hope that Gould would improve communications with the area coordinators and senior leadership team.

### **Dayton Hamvention**

The major challenge for the Dayton Hamvention in 2017 will be the transition to a new site. Barry stated that we have not heard from the Dayton Amateur Radio Association (DARA) regarding the setup for next year at the new site. DARA member and AMSAT Treasurer Keith Baker, KB1SF/VA3KSF discussed some details on the new Hamvention site.

## **Awards & Contests**

Bruce Paige, KK5DO, Director of Contests and Awards opened by noting he had gotten requests for new contests and awards. He remarked on the longstanding gentleman's agreement regarding no contests on satellites, except for Field Day. He did note that nothing new regarding awards had been done in a while.

Bruce also reviewed the 2016 Field Day results and noted some criticism of the W4AMI Satellite Operator Achievement Award for encouraging excessive amounts of repeat QSOs on FM satellites.

## **AMSAT Lab and Storage – Lou McFadin, W5DID**

Lou McFadin reviewed the status of the AMSAT lab and storage facilities in Orlando. Parts and extra supplies from ARISSat-1 and other satellite projects are stored. There's a fully functioning vacuum chamber.  $1 \times 10^{-4}$  tor. It can't quite meet the requirements for certifying cubesats. Rent is paid up until May 1<sup>st</sup>. Martha noted that the rent was \$1,200 per six months.

Barry noted that most of the stored materials are from the Microsat, AO-40, and ARISSat-1 projects. Lou noted that some of it was for ARISS, but that some of it could be cleared out.

Martha suggested that some stuff in the office could be sent down there and Jerry suggested that some of the Fox materials could be sent there.

## **AMSAT Education Outreach - Joe Spier, K6WAO**

Joe Spier reviewed his year and activities with Educational Outreach, including as an ARISS mentor for an ARRL National Parks on the Air event with the Lewis and Clark National Historical Park and a presentation on STEM and the Fox Class Satellites at the 2016 Hamvention. He was also a moderator for an ARISS telebridge contact for the University of Nebraska, Peter Kiewit Institute, Jamboree on the Air Event with a 5,000-person audience.

Next May, Joe is scheduled to present at Carol Perry, WB2MGP's Instructor's Forum. Resources he has available are a Fox Class Physical Mock-Up, Fox Solar Panel Experiment, and a Fox Cardboard Model.

He then moved to the "NxtGen Crystal Radio" project. One question that is often asked was "How do you get interested in Radio?" It used to be crystal radios. The modern equivalent would be an SDR (SDR play / magmount based loop antenna, cables) and a FoxTelem DVD w/ instructions. The budget is \$3,000 - \$3,500 per unit for 10 units. The idea is to have 10 units to give to instructors at the ARRL Instructors Forum. A FoxTelem DVD would have projects including correlating solar panel voltages with MEMS gyro data.

Joe recognized the following current education outreach volunteers:

Daniel J. White, PhD, AD0CQ  
Valparaiso University, Indiana

Blake Huber, AD0OZ  
Denver, Colorado

Constance Barsky, WD8ODC  
Granville, Ohio

### **Engineering Update** – Jerry Buxton, NOJY

Vice President – Engineering Jerry Buxton, NOJY, opened his discussion of Engineering with the AO-85 update. He noted that it was 13 months old today. The mission was designed for a length of 5 years and the orbit could last more than 15 years. The satellite is functioning nominally. The satellite is “hard of hearing” but popular nonetheless. The problem appears to have originated with the receive antenna broke during final testing. The antenna was epoxied back together, causing a detuning. Jerry noted that the satellite experiences considerable fading on the downlink, likely due to the antenna spinning around the Z axis. A discussion about modeling what was happening on orbit ensued. Jerry noted that the bottom line was that the concept was proven. The Vanderbilt Institute for Science and Defense Electronics is very happy with the science data.

Fox-1Cliff and Fox-1D are complete. Jerry went through the experiments on the Cliff and D. A discussion about the Virginia Tech Camera Experiment and the licensing process ensued. Both satellites will be on the Spaceflight SHERPA maiden flight on Falcon 9. They have different masses to allow for separation in orbit. 6.5 – 7 year orbital lifetime.

RadFxSat / Fox-1B will launch on a Delta II on March 16, 2017. The only experiments on board are the Vanderbilt radiation experiments. It has been the most publicized AMSAT cubesat from an Engineering perspective, featured on the AMSAT website, Facebook, Twitter, and YouTube. Jerry showed slides from the experimental testing and noted that RadFxSat shows the maturity of the Fox-1 design and demonstrated the work involved in producing even a mature design.

RadFxSat-2 / Fox-1E is another partnership with Vanderbilt ISDE. All four experiment slots are from filled with experiments from Vanderbilt as with RadFxSat. It will be testing FinFET technology and launch is planned with the ELaNa XX mission aboard maiden flight of Virgin Galactic LauncherOne. This satellite will use our last set of NiCd cells. The Fox-1E Linear Transponder (LT) is Mode J (V/u), 30 kHz wide. There is a separate 1200 baud BPSK telemetry channel (FoxTelem to decode). The link budget targets an Arrow and portable station. It uses average power tracking to improve efficiency.

The meeting recessed at 2:52pm CST for a break.

The meeting reconvened at 3:08pm CST.

Jerry continued with the engineering presentation. The Fox-1E linear transponder is being designed with sharing in mind. The University of Washington is considering flying this transponder. Raisbeck Aviation High School has a launch possibility through the Boeing Employee Amateur Radio Society and is considering this radio. An Educational Discovery Board IHU software opportunity will allow schools to use our base code to develop software to interface with their experiments. AMSAT can offer a linear transponder/IHU plus interface package to fly. Several IHUs are available for linear transponder sharing or “another Fox-1” opportunities. The parts for the Fox-1 FM repeaters are very hard to find and any new Fox-1 CubeSats will require new battery and possibly PSU design. The team is exploring lithium battery options.

The big question is: does AMSAT charge for this? Some money could be made, at a minimum to cover the cost of the parts, but this may require more support/upgrades/troubleshooting. Perhaps AMSAT could give them away to solid projects. The wide deployment of Educational Discovery Boards could raise interest in working with us.

Jerry moved on to discuss ASCENT “Advanced Satellite Communications and Exploration of New Technology.” ASCENT is a “skunk works” project. There are currently three areas of development: P5/CubeQuest Challenge, AMSAT Ground Terminal (GT), and FPGA programming and SDX development.

There are a fair number of members in both the ITAR group working on spacecraft systems and non-ITAR groups working solely on ground station development.

Jerry reviewed the NASA CubeQuest Challenge details. AMSAT is doing development work for a 6U CubeSat format for ranging, robust low SNR modulation, SSPA and LNA, and antennas. For the Cube Quest Challenge, AMSAT provides ranging commands, data for the trip to the Moon. AMSAT provides the downlink of the Challenge data while orbiting the moon. Once the CQC mission is complete, the satellite is handed over for use as a Phase 5 amateur radio satellite with 6 digital channels, usable with a 1 meter dish and the AMSAT Ground Terminal.

This will use a Rincon AstroSDR (same as P4B), an AMSAT designed “five and dime patch antennas,” AMSAT designed power amplifier and low noise amplifier. Modulation will be a DVB-s2X implementation for the low SNR requirements.

Ground Tournament 4 is scheduled in late March 2017. The top three get the EM-1 launch, 4<sup>th</sup> and 5<sup>th</sup> are standby (of 6). GT-4 will require test results and pictures of working hardware along with detailed descriptions of operation. AstroSDR EM delivery expected around the end of this year.

Launch is scheduled for late 2018 and the competition ends 365 days after launch.

Jerry then moved on to SDR / SDX development. FPGA (Field Programmable Gate Array) technology is the basis and can be used for any satellite. 20 MHz – 10 GHz. Only an LNA, PA, and antennas appropriate for the bands to be used would be needed for any combination of bands desired. This is in the early stages of development.

The AMSAT Ground Terminal is being developed for “five and dime” satellites. The goal is to enable the purchase of on off the shelf ground terminal for less than \$1000. AMSAT could sell kits of components and the plans will be freely available. The terminal will be compatible with any 5/10 GHz satellite (P3, P4, or P5) with a goal for the dish size to be less than one meter. Jerry noted this would be HOA friendly as it would be a DBS type dish for a geostationary satellite.

The ground terminal team has worldwide membership. It is not covered by ITAR/EAR as there are no satellite specific designs. Development is open source and there is lots of activity. A variety of SDRs being explored and developed. Michelle Thompson posts regular updates on YouTube.

The current plan is to deliver 100 AMSAT Ground Terminals to the ARRL for use with P4B.

Tom discussed the costs of RF parts for the 5 GHz uplink and noted that most of this was available for very low cost.



Jerry turned the floor over to Bob McGwier for a discussion on P4B status. Bob started out with a discussion of some P4B SDR developments and then moved on to a discussion of an opportunity with Virginia Tech for the launch of 3 3U CubeSats for a cross-linking experiment. The satellites will also have linear transponders on board.

Bob moved on to a discussion of a proposal to the ARRL for fundraising for the P4B project. The ARRL is interested in the project for preservation of amateur access to the 5 and 10 GHz bands. Although Millennium Space Systems has not given any dates for integration, Orbital ATK may be willing to fly the P4B project on one of their geostationary satellites. P4B systems may also be able to fly on GOES-T or -U. However, there will not be much forward movement until there's fundraising. The first P4B would require \$6 million and each one after that would require \$5 million.

The meeting recessed for a break at 4:19pm CST.

The meeting reconvened at 4:33pm CST.

Jerry continued his Engineering presentation with a "Crystal Ball" for the future of AMSAT-NA projects. He spoke of evaluating past performance. Currently, LEO and HEO are the most practical launch opportunities. A LEO 3U CubeSat may have better launch opportunities, higher power availability, and attitude control. AMAST would be able to fly SDX with FPGA and flexibility (programmable on orbit). The form factor would be 1U/3U/6U and could include an "experiment bay." A series, like Fox-1 would lower overall cost and meet our goal of keeping amateur radio in space. This could also serve as a development platform and add engineering capabilities such as attitude control, propulsion, and de-orbiting capabilities. We would seek higher orbits: "Greater Orbit, Larger Footprint." Expectations would be building on existing Fox team and largely in-house production. Lots of knowledge and experience is required. The team is continually seeking free/affordable launches. It is desired that the project would begin 2017. Engineering has budgeted for lots of meetings. First delivery/launch would be targeted for 2023 as it took 7 years to design and launch Fox-1A and all four Fox-1 completions were "just under the wire." Jerry noted that volunteer hours today are not the same as years past.

Jerry then asked how does AMSAT get to HEO? He presented a number of opportunities and questions for the Board and Officers to consider. NASA CSLI or commercial launches are likely to GTO. Should AMSAT flight "five and dime", commercial or ASCENT SDX, or university experiments. Should AMSAT target a 3U or 6U design?

Does AMSAT have the human resources available to work on two satellite programs? Would it be possible to partner with other AMSAT organizations while operating under EAR. Can AMSAT finance two satellite programs or does AMSAT have to choose one or the other? Either way, the timeline is a minimum of six years. Is there a specific impact on membership or popularity of satellite operations if one is chosen over the other?

**IT – Joe Fitzgerald, KM1P**

IT Team Leader Joe Fitzgerald, KM1P, reviewed the status of AMSAT IT. He proposed a project to refresh the website, refresh the store, and enable web-based membership services in one integrated step. He presented a timeline and budget estimate for this type of system. Discussion regarding this proposal noted that the funds to pursue such a project remained in the 2016 budget and the consensus was that the project should move forward.

### **2017 Symposium Proposal** – Joe Spier, K6WAO

Vice President-Educational Relations Joe Spier, K6WAO, presented a proposal to hold the 2017 AMSAT Symposium and General Meeting in Reno, NV. Further consideration was deferred for more details regarding hotel and meeting space costs.

The meeting recessed at 6:02pm CST for dinner.

The meeting reconvened at 7:22pm CST in closed session. No record was kept of the closed session and the meeting recessed for the evening at 9:10pm CST.

The meeting reconvened in closed session at 8:06am CST on November 10, 2016. No record was kept of the closed session.

The meeting reconvened in open session at 9:49am CST.

### **ARISS Updates** – Dave Taylor, W8AAS for Frank Bauer, KA3HDO

ARISS International Delegate Dave Taylor, W8AAS, gave a presentation on the status of ARISS. Space Communication and Navigation (SCaN) and Center for Advancement of Science in Space (CASIS) are now the major benefactors and stakeholders. 1,057 school contacts have been made with 1,090 schools since December 2000. Two new states have been added this year: North Dakota and Rhode Island. The contact with North Dakota was contact 1000. Tim Peake's mission was very successful.

HamTV downlink was first operational during a school contact on February 11, 2016. There is a chain of ground stations in Europe to do HamTV, but 3-5 stations in various parts of the US aligned to the ISS ground track are needed in the United States.

There was a 15<sup>th</sup> anniversary SSTV commemorative event April 11-14, 2016.

The ARISS-US Executive Team (Frank Bauer, Debra Johnson, Kenneth Ransom, Dave Taylor, and Rosalie White) met with SCaN representatives at NASA Headquarters on July 22, 2016. A strategic plan for ARISS-US was developed on July 23, 2016.

CASIS and SCaN request ARISS-US to support multiple regional conferences (about 7-9). ARISS is working on new, shippable displays and updated handout materials. ARISS-US makes weekly and quarterly reports to SCaN.

This has been a transformative year for ARISS with substantial growth and tremendous accomplishments. ARISS has proven the utility of HamTV and is developing new, robust hardware systems to expand and improve our QSO experience. To sustain this momentum and continue to grow ARISS needs to expand its volunteer team and obtain additional funding for hardware.

### **ARISS Hardware** – Lou McFadin, W5DID

Lou McFadin, W5DID gave a presentation on current and future hardware. He reviewed the current equipment aboard the ISS.

Currently the Kenwood TM-D710 in the Russian Service Module is operational. The VHF Ericsson station in the Columbus module has failed, likely due to a cosmic ray upset in its memory. The VHF Ericsson radio has been replaced by the UHF Ericsson and is now operating on 437.550 MHz. The Kenwood TM-

D710 radio in the Russian Service module is being used for school contacts and the HamTV transmitter in the Columbus module operating sending blank video.

ISS Ham (the ISS Program name for ARISS hardware) exists in both segments of the ISS, but it's not easy to move equipment from one segment to the other as power in Service Module is 28 V DC while Columbus is 120 V DC.

The path forward is to develop and deploy a TM-D710 radio in the Columbus Module with higher power to replace the Ericsson. An identical unit is to be used in the Service Module.

An ARISS-built power supply is being developed that will be compatible with the power systems in both modules.

Lou also discussed a long-term path that included a next generation ham system commandable from the ground where astronauts and cosmonauts could use a handheld radio anywhere on the station and communicate to the ground using a transponder.

The meeting recessed at 11:10am CST for a break.

The meeting reconvened at 11:24am CST.

#### **Intellectual Property Policy – Barry Baines, WD4ASW**

Barry noted that an intellectual property policy was necessary to satisfy employers of AMSAT volunteers. While there has been such a policy in the past, a new document needs to be developed and approved by the Board of Directors. Barry read a draft policy to the Board and further consideration was deferred for a future meeting.

#### **Attaboys – Tom Clark, K3IO**

Martha Saragovitz recognized Francine Berkowitz for counting the ballots for the Board of Directors election.

Barry Baines expressed appreciate to Carol Moffati, CPA, for the work with our financial situation

Tom Clark expressed perpetual appreciation for the contributions of Bob Carpenter and Doug Loughmiller (SK).

Martha Saragovitz thanked Bill Hook for volunteering in the AMSAT office.

Martha thanked Paul Stoetzer for coming to the office and helping out.

Martha thanked Joe Fitzgerald for his patience helping her with technical issues.

Joe Fitzgerald thanked Martha for her patience with technical issues.

Drew Glasbrenner thanked Clayton Coleman for “pushing us out of our comfort zone” with the AMSAT Symposium at Sea.

Bob McGwier thanked Sharon McGwier for her support.

Tom Clark thanked Michelle Thompson for leading the AMSAT Ground Terminal project.

Tom Clark also wanted to offer thanks and congratulations to AMSAT-DL for arranging the soon-to-be-launched Phase 4A satellite.

Bruce Paige moved that the Board meeting adjourn. Mark Hammond seconded. The motion carried 7-0 and the meeting was adjourned at 11:56am CST.

Respectfully Submitted,  
Paul Stoetzer, N8HM  
Secretary