

Minutes of the 2015 AMSAT Board of Directors Meeting
Held at the Crowne Plaza Hotel, Dayton, Ohio – October 15th and 16th, 2015

The meeting was called to order by AMSAT-NA President Barry Baines WD4ASW at 8:16am EDT on Thursday, October 15, 2015. Barry welcomed the Board members, officers, and visitors in attendance.

Members of the Board of Directors present:

Barry Baines WD4ASW, President
Drew Glasbrenner KO4MA, Vice-President, Operations
Lou McFadin W5DID
Tom Clark K3IO
Bob McGwier N4HY
Jerry Buxton N0JY, Vice-President, Engineering
Bruce Paige KK5DO, 2nd Alternate Director
E. Mike McCardel KC8YLD, Vice President for Educational Relations

Other officers present:

Keith Baker KB1SF, Treasurer
Martha Saragovitz, Manager
Paul Stoetzer N8HM, Secretary

Among the AMSAT-NA members participating and/or observing during the Board meeting were:

Joe Kornowski KB6IGK
Dave Taylor W8AAS, ARISS International Delegate
Keith Pugh W5IU
Eric Skoog K1TVV
Nick Pugh K5QXJ
Pat Kilroy N8PK
Sharon McGwier N1SMM
Roger Ley WA9PZL
Steve Coy K8UD
Joe Fitzgerald KM1P
Bill Tynan W3XO
Jennifer Rojowski N8GZL
Steve Belter N9IP
John Shew N4QQ
Dave Jordan AA4KN
Burns Fisher W2BFJ

Board Members & Officers Not Present:

JoAnne Maenpaa K9JKM, Director
Mark Hammond N8MH, 1st Alternate Director
Frank Bauer KA3HDO, Vice President for Human Spaceflight

Election of Officers

The first order of business was election of officers. Barry presented the following slate of officers:

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

Open Positions:

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

Barry made a motion that the slate of officers as listed above be approved. Bob seconded. The motion was approved unanimously.

President's Report – Barry Baines WD4ASW

Barry opened by reviewing the new board members and pointing out those positions that were opened this year. He noted that the two alternates had previously been board members.

Barry then reviewed the other key leaders appointed by the President. He stated that the AMSAT Journal Editor position was open and that Mike Jones W6GYC would continue as the Website Content Manager. Barry remarked that while JoAnne had pulled back significantly for personal reasons, she will still be able to assist with the website on an ad hoc basis.

Barry moved on to the AMSAT Mission Statement: "AMSAT designs, builds and operates experimental satellites and promotes space education." The organization will continue to follow the AMSAT vision statement developed back in 2004, including continuous coverage, even if it's a different method in 2015 than in 2004.

Barry reviewed accomplishments from the past year. Fox-1A was launched October 8, 2015 and designated AO-85. Fox-1Cliff and Fox-1D are scheduled to be launched the 1st Quarter of 2016 and RadFXSat/Fox-1B is scheduled for launch in November 2016 on ELaNa-XIV. He reviewed AMSAT's evolving partnerships with several universities and organizations such as Virginia Tech, which is working with AMSAT on P3E and P4B as well as providing the camera on Fox-1Cliff and Fox-1D. Vanderbilt University supplied experimental payloads on Fox-1A and RadFXSat/Fox-1B. The University of Iowa's HERCI experiment will fly on Fox-1D. AMSAT is also assisting Ragnarok with their entry in the NASA CubeQuest Challenge. Barry also noted that the Fox-1A success may help forge new relationships and that Auburn University is interested in the Fox-1E RF design for their CubeSat.

Fox program materials continued to be placed in public domain. Development of relationships on education continues with the ARRL. An article on the Fox program written by Dave Jordan, AA4KN, appeared in QST. The ARISS program is evolving with enhanced funding relationships. AMSAT reaches out to give people something they need which flows back to benefit AMSAT.

Barry moved on to 2016 challenges. ARISS – creating new funding relationships, education (space communications in classroom), learning export control requirements with EAR/ITAR (Virginia Tech has an Office of Export and Research Compliance that can help). Bob noted that the leader of this office is noted as a top expert and they have a team of lawyers on their staff. Barry & Kay Craigie from the ARRL had a meeting earlier in the year regarding these issues.

CubeSat licensing continues to be an issue. The IARU is no longer coordinating experimental licensees in 2m band. The IT future is a challenge with regards to the website and membership database. Building awareness/support for AMSAT is an ongoing challenge. Barry noted Drew's membership perk, offering an electronic version of "Getting Started with Amateur Satellites", but also the need to continue efforts such as these.

AMSAT is engaged in two new major projects in collaboration with Virginia Tech, Phase 3E (P3E) and Phase 4B (P4B).

Where do we go now after the Fox project? The original idea was to move to Fox-2. Fox-1 has been a success, so why not keep moving this along? We have a product and others are starting to show interest in adapting that project. How do we keep this available? Do we share technology or keep them "on the shelf"? A discussion ensued about possible follow-ups, such as sharing the Fox designs with university groups and/or assisting those groups with their satellite development.

Barry moved on to AMSAT's organizational/financial trends. Martha reported that there were 2,430 US members, 90 Canadian, 113 international, and 222 international life members for a total of 2,855 members. These numbers are down about 50 from last year. These numbers do not include life members that don't get the journal. Martha estimates that thanks to Drew's membership perk there have been 30 new members join in the last two weeks. The question was posed: Will the increased membership trend from the perk and launch continue? The hope was that success may breed success.

Barry noted that current income from dues and other sources are not sufficient to cover day-to-day expenses and that the projected operating deficit in 2016 is \$121,000. In order to break even, we need 2,750 additional members at \$44.00/year. Operating losses are covered by reserves and non-designated donations. Growing the membership is critical to sustaining AMSAT as donors want to support projects, not annual operations. Martha did state that most donors from the biannual donation solicitations checked "general" suggesting confidence in the organization. AMSAT members are encouraged to recruit others to join as there is a need to bring the next generation on board.

Barry moved on to 2016 goals and expectations. The launch of Fox-1Cliff and 1D is scheduled for 1Q 2016 (SHERPA). The Fox-1B launch is scheduled for 11/2016 (ELaNa-XIV). A Fox-1E CubeSat Launch Initiative proposal with Vanderbilt (RadFXSat-2) will be submitted. The partnership with Virginia Tech for Phase 4B is evolving. Bob noted that the primary satellite has cleared the House Defense Committee but there is no budget. As soon as appropriations for 2016 are passed, the project should move forward. Payload analysis will be done when the satellite funds are secured. AMSAT will develop the ground terminal, submit IARU coordination, manage the amateur payload. Payload development will be done by VT with AMSAT assistance as desired. Payload delivery to MSS is scheduled for Spring 2016 but the schedule is expected to be revised). Fundraising beyond \$100,000 to the payload analysis is VT's responsibility

For Phase 3, VT submitted an initial proposal. The satellite will house US government and amateur payloads. It is unclear at this point to the extent to resources available for amateur payloads. Bob noted that the proposal is to test new technology that will be on a \$1 billion satellite and stated that it is an honor to be selected to be selected to be testing.

Barry moved on to the IT future and noted that we need to enhance AMSAT's capabilities, including the membership database and an integrated approach to allow resource sharing. Barry anticipates membership growth due to LEO launch successes and potential for new non-LEO spacecraft. There is also a need to develop web content. Barry noted that Drew and company have been doing a lot on social media.

Barry stated that we need to build awareness and support for AMSAT to reverse the membership trend, enhance website content, and utilize social media. We also need to enhance the management team by finding volunteers to fill key needs. Succession planning is a major concern and that we need to bring in the next generation of leadership and spread the workload out.

Barry moved on to fundraising noting that it costs real money to have a presence in space and we continue to look for ways to encourage donations, including PayPal, the web store, online funding sources, challenge coins, etc., noting it's a multi-year effort. It is necessary to utilize VT's P4B fundraising efforts as a teaching moment on how to develop capital campaigns. Go to major donors first, get that buy in, then the remaining 10% seems more reasonable to the public. We need to learn to understand the "psychology of fundraising"

How can AMSAT members help? Recruit individuals to become members and rebuild the 'base' Recognize that this stuff is not free. Tom mentioned that a significant partner with GEO will be them EmComm community/FEMA. The EmComm community could be a new source of funds and AMSAT members. Bob noted that will we be demonstrating the ground terminal capabilities to the first responder community. We can stop the communications collapse that occurs in every major disaster and that story needs to be told to a lot of people. Tom mentioned that the amateur EmComm community could also be shown the same demo. Bob noted that commercial satellite terminals were too expensive for most communities and that we could do that much cheaper.

Secretary's Report – Paul Stoetzer, N8HM

Barry made a motion that the minutes from the September 1, 2015 meeting be approved. The motion was seconded by Drew and approved unanimously.

Paul delivered the Secretary's report. Since the 2014 Annual Board Meeting, there have been four formal Board meetings by telecon. The December 2, 2014 meeting minutes have been approved and published in the May/June 2015 issue of the AMSAT Journal.

The second meeting was held on May 5, 2015 for two primary purposes. The first was to approve participation with Virginia Tech and Millennium Space Systems in the geosynchronous orbit rideshare opportunity. The second was approval of participation in the NASA Lunar CubeSat Challenge in partnership with Ragnarok Industries Nano-Satellite Company. The minutes of this meeting have been approved and will be published in an upcoming issue of the AMSAT Journal.

A third meeting was held on August 18th, 2015. Since this involved confidential issues covered by

Nondisclosure Agreements with other parties, the minutes may not be made public and will be retained by AMSAT for internal use.

The final meeting was on September 1, 2015 for the primary purposes of approving initial funding for the geosynchronous rideshare project and a formal working agreement with Ragnarok Industries. The minutes of this meeting will be published after approval in an upcoming issue of the AMSAT Journal.

The 2015 Board of Directors election had eight candidates this year, with four being elected as voting members, and two as alternates. Of the 3000 election packages mailed, 625 were returned for a 21% rate. This is consistent with past participation rates which have run in the 20-24% range. There were no significant issues with ballots being received by members this year.

The meeting recessed at 9:40am

The meeting resumed at 9:58am. EMike joined the meeting at this point.

Treasurer's Report – Keith Baker, KB1SF

Keith reviewed the agenda for his report and noted the need to appoint an audit firm for 2016. The current auditors are Berlin, Ramos & Company, P.A., Rockville, MD. The contact is Ms. Carol A. Malfatti, CPA. Capitalization of Non-Tangible Assets was removed in 2010. For 2011 forward, the auditors are conducting a "Review" vs. a "Full Audit" For 2014 forward, a "Review" will occur every other year. A review is being performed this year on 2014 accounts.

Previously we capitalized our volunteer inputs. That was great for the overall picture as \$463,500 was put into Echo and \$1.11 million for Eagle, but there was no way to depreciate it. The 2010 audit depreciated Echo and wrote off capitalization for Eagle in 2010. We are still collecting volunteer hours, but not putting it into capitalization.

Keith noted that membership revenue has gone up and down: from \$102,700 in 2009 to \$74,000 in 2014, and a projected \$84,300 in 2015.

Keith reviewed the expenses for the ARISSat-1 project. The total was \$164,892.00. Fox-1 and future projects to date have totaled \$159,879.00. Printing, travel, and telephone expenses are down due to technology changes.

Overall AMSAT remains solvent. 2015 was fiscally challenging, but a good year. There are long-term concerns about member based revenue. There is uncertainty of the AMSAT share of P3-E and P4-B expenses (and when the expenses are going to occur), economic uncertainty. Barry noted that the P3-E/P4-B expenses will be on a flow basis and we won't spend what we don't have. The amateur radio payloads will require AMSAT fundraising.

Keith requested a motion that AMSAT retain Berlin, Ramos and Company as the audit firm from 2016. Drew so moved, Bob seconded, and the motion was approved unanimously.

Manager's Report – Martha Saragovitz

Martha made a comment that she was still getting used to the new office and pointed out that she had much less storage space. Bill Hook no longer comes to the office and cannot help with the ballots. Martha and Paul will discuss counting the ballots next year. Bill also cannot volunteer to do a lot of what he used to do. Bob Carpenter can help with computer problems. Courier picks up mail from PO Box. Except for a glitch with PayPal, Martha is doing OK with much of the new software and stuff she is doing though she notes it is isolating with few volunteers. The new building is much nicer than the old one and she hasn't had any problems there. Barry commented that there is a lack of support due to aging volunteers. Barry mentioned that his concern right now was that she was running a one-person office with few volunteers.

Operations Report – Drew Glasbrenner, KO4MA

Drew noted that we haven't had a lot to operate until last week. AO-7 continues ticking and is in continuous sunlight for the last time in years. Work Mode A now if you want! AO-85 is now up. The command team is still getting up to speed. Users have noted frequency drifts, spin rates, etc. Telemetry is flowing in. There is not a lot to do with it. Drew noted it's warmer than expected and battery voltage is higher. It's getting through eclipse well. We'll start Experimenter's Wednesday soon for QRP, SSTV, etc.

Drew remarked about other satellites recently launched. A Chinese cluster was launched with two operational transponder satellites. He also mentioned LilacSat-2 with the FM transponder on a couple days a week. IO-86 was also launched by Indonesia in an equatorial orbit with a V/U FM repeater and APRS. It will be popular in the equatorial latitudes when it is in full time mode.

Drew followed with a discussion of AMSAT on social media. The Twitter account shares all news items and has 7,504 followers. Sean Kutzko from the ARRL has been interacting and sharing AMSAT stuff. AMSAT North America also has a Facebook page with 2,875 likes and 10% engagement, which is outstanding. There's also a group with 2,195 members. Drew stated that it has surpassed traffic on the AMSAT-BB. Drew then demonstrated the Facebook group to the meeting and noted that this was where the action was.

AMSAT Lab/Storage Update – Lou McFadin, W5DID

Lou showed photos of the lab. The lab is air conditioned with two dehumidifiers. There is a proximity alarm and double lock on the storage building. The vacuum chamber can go to 10^{-3} or 10^{-4} tor. Lou stated there are two ARISSat spaceframes stored (3 and 4). Martha stated that the rent was billed quarterly, but she was not sure of the amount and noted that he donated six months of rent.

User Services Report by Members of the AMSAT-NA Leadership Team

AMSAT News Service – Barry Baines, WD4ASW and EMike McCardel, KC8YLD

Barry noted that the ANS staff has been dependable. EMike noted that we need more people for ANS as we only have three editors for ANS. We need more people to do more things. It's not confined to ANS. EMike noted that ANS reaches a worldwide audience and we're doing a better job breaking news.

Dayton 2015 Report – Steve Belter, N9IP

Steve reported on the 2015 Dayton Hamvention. It went well. There were 45 volunteers including most members of the board and senior officers. We have made a more concerted effort asking attendees to join and renew their membership. We signed up 50 new members and 152 renewed. 4 lifetime memberships were purchased. Sales increased this year. Excluding DARA contribution and excluding major gifts, income increased 21% to \$28,700.00. The most significant change to our participation was going from imprinting to PayPal with an iPad. Beginner's Corner was a major success. There was great participation from expert operators. The Getting Started guide was revised by Patrick Stoddard, Steve, and Alan Biddle and AMSAT-UK is also publishing it. It will be revised again for 2016.

Keith Pugh requested that we find new leads for the demo area. Drew has some ideas and will develop that.

The meeting recessed for lunch at 11:41am.

The meeting resumed at 12:40pm.

AMSAT Journal – Joe Kornowski KB6IGK

Barry noted that JoAnne has had to resign as the AMSAT Journal editor due to family medical issues. Barry has had extensive conversations with JoAnne. She will continue as a board member and be an advisor/consultant, but she can't be put under a deadline. Barry had a conversation with Joe Kornowski KB6IGK to be the next Editor of the AMSAT Journal. A lot of great people have done a wonderful job, but they have burned out as it's done on an all-volunteer basis. A lot of the burden falls on one person. If we want someone to spend a lot of time and energy on the Journal, maybe some form of remuneration is required? Barry introduced Joe to give a presentation to the Board.

Joe gave a presentation to the board in which he noted his professional and amateur radio credentials. He discussed his ideas regarding The AMSAT Journal and its future as a publication. Short term issues are the "Three Cs" – Content (developing ideas and finding articles), Consistency (developing a style guide for the journal and organization), and Collaborative Editing. What's the best use of volunteer time?

The intermediate issues may require a readership survey? What are people interested in? What do they think of the journal? What's the interest in a digital version? Evaluate publication of a digital version of the Journal. Reduce printing and mailing costs. Tom noted that a digital version offers the ability to add additional content – including audio, video, hyperlinks, etc.

Joe assumed 45-55 hours/mo and noted his current commercial rates (\$65 per hour for document editing, \$125 per article up to 1,000 words, \$65 per hour if more than 1,000 words). He proposed \$40 per hour might be a decent rate. Drew noted the price would be \$3,600 per issue under those assumptions, or \$1,800 per month. Barry discussed that we went nearly a year without a Journal which resulted in losing the second class mail permit. Martha mentioned that the costs for a 3,800 issue run were \$2,345.00 per issue. Martha noted it was around \$2,500 to mail to the US. Drew estimated \$3,000 was the mailing costs. Costs are \$5,345.00 per issue. There was a discussion surrounding a transition to a full electronic Journal. Some want a hard copy. Some don't want a hard copy. We have to manage that process. Barry notes there is a desire to go in that direction and that we need a leader to do that. Does what Joe presented make sense for the organization?

A discussion ensued regarding the costs involved in a paid editor and issues regarding content creation and a transition to an electronic journal. It was decided that a final decision on compensation would be deferred to closed session.

Amateur Radio on the International Space Station ARRL-International and ARISS-US – Dave Taylor W8AAS

Dave Taylor W8AAS, ARISS International Delegate presented on Frank's behalf. Dave noted that the biggest challenge was that ARISS needs to remain sustainable. In the past, ARISS has largely been supported by NASA, AMSAT, and the ARRL, but much of the NASA support has been lost over the past year. By April 2016, ARISS needs to raise \$90,000 per year to keep operations alive.

Dave spoke about ARISS's new NASA customer, Space Communication and Navigation (SCaN). This office sees the importance of ARISS for promoting human spaceflight awareness and as a backup communications capability for the ISS. Another new partner is the Center for the Advancement of Science in Space (CASIS), the sole manager of the ISS US National Laboratory. Dave noted that the \$90,000 per year figure previously stated was to keep ARISS alive, and that \$240,000 per year was required to sustain the program, including upgrading the radios. He reviewed several steps that ARISS was considering to step up fundraising.

Dave then moved on to operational statistics. In FY 2015, 53 contacts had been made with 20 countries and 10 US states + Guantanamo Bay. Since December 2000, 963 contacts had been made with 998 organizations in 51 countries.

SSTV operations have been increasing from ARISS-Russia including operations for Cosmonautics Day and the Apollo-Soyuz 40th Anniversary. Future initiatives planned include: Inventors of Space Travel and an International Educational Initiative.

Ham TV has been active with frequent blank transmissions. Ground network preparations continue for the first Ham TV use on a school contact. Once preparations are complete, a contact will be scheduled.

Russian crew members supported several non-Russian educational contacts in 2015, which was vital for keeping contacts going when no US segment amateur radio operators were available.

Backup communications procedures are being reviewed and practice exercises are being planned at the request of SCaN. This was an original role of amateur radio about the ISS.

Dave reviewed the process of school contact proposals and noted that ARISS-US was now leading the US proposal process.

Dave also noted that ARISS was part of the first crewed mission to the ISS and one of the first experiments that was turned on.

Barry followed up Dave's presentation by noting that ARISS would not exist today without Frank's work to keep it going and that AMSAT is truly fortunate that Frank has been in the position to do what he has done.

The meeting recessed at 2:45pm

The meeting resumed at 2:59pm

ARISS Hardware – Lou McFadin W5DID

Barry introduced Lou for a presentation on hardware on ARISS including the current status, problems, and potential solutions. Lou stated that equipment cannot be moved from one segment to another due to different power systems and different safety and other certification requirements. He summarized the current status of the hardware on board and noted a potential path forward that included the deployment of a Kenwood TM-D710 with higher power and programmability in the Columbus Module and an identical unit in the Service Module. An ARISS build power supply compatible with equipment in both modules would result in a completely interoperable system that could be moved back and forth as necessary.

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 ARISS team is currently working on delivering a JVC Kenwood TM-D710G radio and the team is developing a preliminary design for the necessary power supply.

Lou noted that ideas are currently flowing across ARISS and that the changes planned will make it simpler for the crew to setup and provide higher RF power to improve the quality of school contacts.

AMSAT Educational Relations – EMike McCardel KC8YLD

Barry introduced EMike for a presentation on AMSAT Educational Relations.

EMike set some lofty goals at the last Symposium. He admits that due to personal challenges he has fallen short on many of these goals. Many universities have contacted Jerry who has passed them along to EMike. He has not been very effective in recruiting help, so has not been able to delegate. Despite this, he has worked on the ARISS proposal process and was able to speak to the Instructors Forum at Hamvention. He also donated 12 Getting Started guides. They will sponsor youth memberships for any youth forum presenter who makes a satellite related contact. He has spoken to several groups around Ohio about ARISS and AMSAT. He is working on a new version of a space sciences school curriculum book as he discussed during the last Symposium and he wants to do a series of journal articles or other publications. EMike has been active in ARISS, serving on the executive team and working with schools to support proposals. One of the big challenges is to use the existing standards and curriculums to discover activities that relate to their contacts. Encouraging the development of partnerships between schools and local ham clubs. We haven't accomplished what I wanted to yet. He plans three trips this year, including to Houston with ARISS Executive Team and he hope to join Frank at ISS R&D conference in San Diego. He has involved himself too much, including ANS bulletins and has updated ANS presence on the AMSAT website. He is also a moderator for the AMSAT Facebook group. ARISS activities take up much of his time and he needs to do a better job recruiting volunteers and following up with those who come. EMike suggests similar redundancies to ANS need to be built in to other departments, such as Jerry taking over after Tony passed away. He supports reorganization due to overlap between departments and he does not want to build silos between departments. Writers, editors, engineers, etc can flow between departments. He is here to serve the board in any way he can.

AMSAT IT – Joe Fitzgerald, KM1P

Barry introduced Joe for a discussion of IT. \$150 a month is being spent for our server in Michigan. Is that paying off for us? In early October it was noted that there was a misunderstanding on where telemetry was going to flow from AO-85. Plan A wasn't working out, Plan B hit a snag, started working on Plan C. He called our server providers. Someone answered the phone and was able to work with Joe to evaluate the plans for telemetry flowing. The extra money was well spent because they were able to help solve the problem. Joe asked the Board to go on a journey to engage professional help where appropriate to meet the IT needs of the organization. Much of it comes back to the membership database. It's alive and well on a computer in Kensington, MD, but not available elsewhere for use by the officers or IT systems. Services cannot be restricted to membership, such as AMSAT email aliases. Joe stated that a budget of \$1,000.00 through the end of the year for exploratory projects to figure out what can be fixed was necessary. Keith stated that the money was already in the budget and it was determined that Board action would not be necessary to authorize this spending.

The meeting recessed at 4:21pm.

The meeting resumed at 4:43pm.

AMSAT Engineering – Jerry Buxton NOJY

Barry introduced Jerry for a presentation on Engineering. He started with the launch of AO-85. NASA contacted the PIs for the CubeSat to take part in a briefing at Vandenberg the day before the launch. The next day, the Fox team members gathered at 2:00am to head to the launch. Several of the relatives of the late VP Engineering Tony Monteiro AA2TX were able to attend as well. Weather was perfect for the launch at 5:49am. At 8:00pm, the team went to Cal Poly for the first pass over California. A lot of people thought the voice ID was neat. The batteries were locked up in the satellite for 6 months from integration to launch and, while this was a concern, the first telemetry voltage was 4.2 volts, or fully charged. The batteries have been in good shape. So far, the lowest telemetry voltage was 3.9 v. The heaters have not been necessary because the satellite has been warmer than modeled, though it has been cooling a bit. TX temperature sensor does not work. RX temperature has been cooling and is now around 25 C or so. PSU has also been 25 C. Power budget is positive. IHU junction temperature is around 50 or 60 C. Max would be 105 C. Issues are that there is no battery telemetry, no TX PA or temperature telemetry, no EXP4 temperature. So far there has been one reset and solar panel spin calculation is not accurate.

Vanderbilt is excited to see their data from their experiment. There are some results different than they expect.

Jerry noted that over 100 guys and gals worked on Fox-1A, now AO-85, in orbit and functioning. Congratulations were offered by those present.

The MEMS gyro data may not be reliable due to the helium purge. SpaceX does not use helium, so perhaps the data will be more accurate on Fox-1Cliff and Fox-1D

Fox-1Cliff and Fox-1D are scheduled to launch in 1Q 2016. Jerry showed pictures of the progress. Barry asked how much performance improvement there will be with the MPPT. Jerry noted it was providing

90% efficiency and will provide more power. He noted that we will find out when it's in orbit. There was discussion about the power system which was only flown because there was no choice as the MPPT was not ready. We might get about 2 watts per panel, but it's theoretical. Fox-1Cliff and Fox-1D flight units will be done by November 1st. Environmental testing will be December 7th. On December 31st the paperwork is due. Delivery will be L-45 days. Jerry noted that the nice thing is delivery slips as long as the launch slips, so there may be more time. Lou asked if the boards were ready. Jerry said they were not. Jerry noted there were concerns as they want to avoid placement in the same quadpack/tube but Fox-1Cliff and Fox-1D are the same mass and no other CubeSats are the same mass.

There was a discussion of the logos. Jerry designed them quickly because they needed something to turn in.

RadFxSat will be filled with Vanderbilt experiments and will launch on a Delta II next November.

Jerry has no slides about P4-B. Everything is up in the air as we wait for the payload analysis. He noted that there's a team working on the Fox-1Cliff upconverter and there are non-US persons since it is all ground terminal stuff.

The ground terminal work must go forward with P3-E, P4-B, CubeQuest challenge, etc. Tom noted that Michelle and her team are working on the software side of the terminal. Tom is working on the receive side of the RF terminal. Not much time has been devoted to the transmit side for the 5 GHz uplink. He hopes some of our microwave friends come through. Bill Tynan asked how much power we need. Tom noted it would be different for each one. 1, 5, or 10 watts would be necessary. Tom thinks we may need two antennas for transmit and receive. Bob noted that Ettus has donated a bunch of USURPs to help. He also noted he has money to send engineers to Tucson to work on the Rincon SDRs. Barry noted the Rincon will be the payload. The ground terminal cost will hopefully be \$1,000, including the transmit side. Receive side is trivial. The expensive part is the transmit side. ASCENT's primary focus is the CQC, but they are working on the ground station equipment for everything.

Jerry noted that he is willing to supply volunteer labor to work on RF side of the amateur payload on P4B. If all of the projects come together, AMSAT will be taxed to provide labor with all the launches scheduled in 2017 and 2018. Jerry cautions that we must be very careful not to commit to too much. Bob noted that if AMSAT-NA cannot commit to providing the amateur package, Bob will not go get the P3E spaceframe from AMSAT-DL. Tom noted that he has a volunteer for the P4B amateur payload RF side and he has suggested a similar RF package for the Ragnarok CQC mission (1 10 watt RF package, 4 10 watt RF packages on the P4-B). Barry reviewed the deliverables and since the RF payloads are separate from P4-B, P3-E should be OK. Jerry reminded that CQC was not a guarantee since it was a tournament. Tom noted that Ragnarok did finish the first test in the top 5 and received a \$20,000 prize.

Jerry notes that none of these projects are not guaranteed, but all the RF and ground terminal development will be useful for future projects. Tom noted there is interest in a 6U CubeSat CSLI proposal. Jerry stated his concern that we cannot commit to something like that unless at least one of the other projects fall through.

Barry stated that the Fox project was proposed in 2009 and the CSLI proposal wasn't submitted until 2011. His opinion is that we are not ready to submit a CSLI proposal for the 6U project. Bill Tynan notes he agrees and we cannot commit to that now as we can't be spread too thin.

Jerry stated we are developing a very good relationship with NASA. He discussed the Fox-1E project. The flight we were originally targeting did not materialize, but Vanderbilt is interested in a RadFxSat-2. They are writing a CSLI. It would be a similar experiment to RadFxSat, but with FinFET chips. There would be a 30 kHz linear V/U transponder. 1200 bps telemetry beacon. It will be a Fox-1 1U – same spaceframe and avionics with a new radio.

The meeting recessed at 5:55pm for dinner.

The meeting resumed at 7:06pm.

Jerry continued with his presentation. The University of Washington is also interested in a Fox-1E type radio for their 3U LEO. They are submitting a CSLI this year. He noted that when you build something, you can build 5 of them and that keeping these boards on the shelf would be a good idea.

ASCENT will use technology developed for CQC and Ground Terminal towards 6U HEO. Possible CSLI in 2016 depending on other projects. Vanderbilt would be a good candidate for radiation experiments. Much work to do with attitude control and propulsion. Depending on the P4B and P3E mission progress.

Fox-1A and NASA press brought AMSAT a lot of recognition for our LEO satellites and radio communications. NASA has mentioned AMSAT as an example for others. Others recognize AMSAT as having a great track record. University of Alaska ARC1 made contacts with their team for future opportunities. ARC1 not heard from yet. Salish Kootenai from the BisonSat project also interested in working with AMSAT. Eric Skoog K1TVV also submitted a “Design The Next AMSAT Satellite” proposal with some good ideas including university partnerships on attitude control and propulsion. Jerry feels that we need to pursue those opportunities, especially if P4B and P3E does not move forward. These are very interesting for universities and we need to continue with LEO even if we are going higher with other projects. Keith mentioned that there might be problems with considering these amateur satellites. Drew reiterated that if there’s a transponder on it, it’s an amateur satellite. Barry noted that if it’s only transmitting over the university, then it’s a strong indication to the FCC that it’s an experimental. Bob noted that the FCC is looking to the IARU coordinator to determine amateur radio vs. experimental satellite and Jerry noted that an IARU letter needs to be presented for an ELaNu launch. Jerry also stated that there are the “chicken littles” regarding orbital debris and that people need to understand that we can’t get a launch if it’s not going to come back down within 25 years. Tom noted there has been a watershed development in the last six years with regards to software defined radios which makes the ground stations much easier to use and that’s largely due to the work in the UK with the FUNcube project and FUNcube Dongle. It has also brought a lot more people into the interest circle for low cost software defined radios. It has also brought a lot more people into the interest circle for low cost software defined radios. That’s opened this up to people who are more computer oriented than radio oriented. Jerry notes that he has been involved with amateur satellites for 40 years, but has only been building them for 4 years. It used to be that we would take any opportunity that came forward, but we’ve established new relationships and are in the position that we have to proceed properly and can’t overextend ourselves need to do things well to maintain our excellent reputation.

Bob announced that his students had arrived from Virginia Tech and had them each introduce themselves to the board.

At 7:30pm, the meeting went into closed session to discuss financial and other confidential matters. No record was made of these proceedings.

At 9:04pm, the meeting resumed in open session.

Bob had previously suggested a reorganization of officer positions. Tom noted that reorganizing the officer positions would require a revision of the Articles of Incorporation and Bylaws. At this point, Bob withdrew his suggestion.

Barry reviewed the agenda for tomorrow's session and noted that the meeting would resume at 8:00am.

The meeting adjourned for the night at 9:09pm.

The meeting resumed at 8:05am on Friday, October 16, 2015 in closed session. Bruce joined the meeting at this time.

The meeting resumed in open session at 12:05pm.

Field Operations – Patrick Stoddard WD9EWK

Barry introduced Patrick to discuss Field Operations. Patrick reported that it has been a busy year for Field Operations and the Area Coordinators. With the lead up to the launch, there has been more interest in demonstrations and presentations. There have been 41 different events involving area coordinator presentations at hamfests, maker faires, science fairs, etc. Patrick has also been asked to give presentations at non-ham events, including to a MENSA group. Different groups are interested in this stuff. He reports there are a lot of requests from the Upper Midwest, but there is a need for more area coordinators in that area. The lack of help is limiting in some parts of the country. The other challenge is the loss of the Field Operations portion of the website. He needs a secured portion of the website for Field Operations and a directory of Area Coordinators with the list of their capabilities. A discussion of possible alternatives and new systems to replace this ensued.

Barry asked what Patrick's other needs are. Patrick stated that flyers and brochures are useful. Martha noted that she has flyers.

Barry asked how many area coordinators he has. Patrick replied 41 active with about 50 more.

Attaboys

Tom began the "Attaboys" by expressing the Board's congratulations at the AO-85 launch success to the entire Fox team. Special thanks was offered to Jerry Buxton NOJY, Brent and Bryce Salmi, and posthumously to Tony Monterio AA2TX.

Martha noted JoAnne Maenpaa K9JKM for a fabulous job as the editor of the Journal. Tom remarked that the special edition of the Journal for the Fox launch was a great achievement.

Tom recognized Drew Glasbrenner KO4MA for his membership perk idea and his persistence at following through with the electronic copy of the "Getting Started" guide as a membership perk.

Bob recognized Keith Pugh W5IU and Roger Ley WA9PZL for many years of service at the AMSAT demonstration station at the Dayton Hamvention.

Martha recognized Joe Fitzgerald KM1P, for his help solving a PayPal problem she encountered in the office.

Tom noted that while JoAnne Manepaa K9JKM has had to reduce her duties, she has been a guiding light for the Board for the past four or five years.

Barry recognized Alan Biddle WA4SCA for his years of service as Secretary and member of the Board.

Martha noted Frank Bauer KA3HDO for his efforts in securing funding for the future of the ARISS program.

Keith recognized Bob McGwier N4HY for his work on the P4B and P3E. Bob interjected and noted not to thank him yet, but Keith replied that he has already gotten us further than we have been in years on high earth orbit projects.

Jerry gave an “attaboy” to Scott Higginbotham, mission manager for ELaNax XII. He was a big help getting deadlines extended so we could deliver the best satellite possible for the Fox-1A mission.

Keith wished to recognize the audit team, Carol A. Malfatti and Berlin, Ramos & Company, P.A.

Tom wanted to thank Steve Coy K8UD and the 2015 AMSAT Symposium Committee.

EMike wanted to note Paul Stoetzer N8HM for his “trial by fire” taking the minutes during the meeting.

There being no further business, the meeting was adjourned at 12:49pm by consensus of the Board.

Respectfully submitted,
Paul Stoetzer, N8HM
Secretary