

Cigar Box Bulletin

VOLUME 24 ISSUE 1

JANUARY 2020

Indoor Flying Models - Lighter Than Paper Airplanes

Ray Harlan

Semiretired MIT Aeronautical Engineer

Reporter: Bill Beebee



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With two MIT Aero. degrees, Ray did MIT and Draper Lab. research for his professional career. But his real passion has always been building and competing ultralight rubber-band-powered free-flight indoor models. He has won national competitions and established national records. His models typically weigh about a gram (the weight of a dollar bill) but can sometimes stay in the air for more than 3/4 hour. For his presentation to us, Ray entertained with the steady hand of an experienced showman. It was fun to watch. Paul Motyka made the introduction.

On a long table, Ray displayed nearly a dozen examples which he had built. Most roughly resembled one or another common type of full-scale airplane (except for a bird-concept which flapped rear-mounted wings for thrust). Most had a large, 2-bladed nose propeller, with wings farther back than were bent up for the outer 1/4 of each wing. The bent-up wing ends tended to

keep the model flying straight forward; any side-slip made the wing bank to create a temporary roll that returns the model to the original direction. At the back end was a pair of horizontal tails with a vertical stabilizer (rudder) somewhat farther forward. The latter was placed ahead of the tails to make it easier to twist slightly for creating deliberately-curved flight. The following picture shows these features.

(See photo on page 6)

Another model was a biplane concept with an electrically-powered pusher propeller behind the top wing. It roughly resembled the Wright Flyer which first flew in 1903 at Kitty Hawk, NC.

All of the mostly-non-electric models were powered by a 16" long, natural-rubber-band loop, normally wound 2000+ turns to get the desired thrust and duration for competitions. (To store more energy into the rubber band for those times, Ray stretches and lubricates the

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January Meeting Minutes Ship's Bell Rang at 10:00 AM

Reporter: Dan Miller

Chris Hammer called the meeting to order, asking for silencing of cell phones.

Chris led members in the Pledge of Allegiance, followed by the singing of The Star Spangled Banner, accompanied by Ken Watson on the piano.

New Members:

Nick Veeder introduced 2 new members: Frank Wilson and Pat Mullin. Two additional new members were mentioned as well.

Visitors: Nick said that there were no visitors. Paul Murphy introduced the traveler for the month: Jerry Brody attended the wedding of his granddaughter in Newark DE.

Chris reminded us to give a quick, 1-minute

Continued on Page 3

UPCOMING MEETINGS

Friday, February 14

Friday, March 13

Friday, April 17

Speaker — Continued

band.) Ray wound the loop on a portable jig which had a torque meter on the other end from the winding crank. The crank is attached to a gear box which multiplies the rubber band twist by 20 for each turn of the crank. He used the above-shown conventional design which he said had flown 47 min. But, for the coming flight demonstration, he put about 1000 turns into the band. He attached the front end of the band to the propeller and the back end to a tie point 3/4 of the way back on the fuselage.

Ray flew this conventional design (and, later, the bird-concept) at about 2 feet/second speed, a few feet over the heads of the RMA attendees in our meeting hall. The propeller turned amazingly slowly - only about one revolution for every two seconds - to generate the speed seen. (The flapping wings of the later bird concept also "beat" more slowly than would be expected.) Ray mentioned that "the room has thermals" (RMA members' hot air) that effect the delicate flights.

Seeing the models fly, slowly and gracefully, over our heads, the basic principle of long-duration flight became clear. With the tiny energy of a twisted rubber band for propulsion, the ultralights do not muscle their way through the air. They "swim" through it with long, slow, graceful "strokes". The propeller is very large and turns very slowly. With such slow motion, the air flow over the propeller, wing, and tail surfaces is very smooth. This is known as laminar flow. There is almost no turbulence, or eddies, in the air passage. This is extremely efficient flying because turbulence wastes energy. With energy conserved at all times, long-time flights using only a weak rubber band can actually be achieved.

Ray discussed the models as being constructed, in part, from light-weight balsa wood (density 4 - 7 lb. / cu. foot, whereas pine is 30 lb. / cu. foot). Some balsa parts are very thin - only 1/64 " thick. The covering on the wings, tail surfaces, and propeller is transparent mylar. It is 0.5 micron (about 20 millionths of an inch) thick, which seems thin but is remarkably durable.

The old rules for model size limited the wing span to 65 cm (2.1 feet). Later, the span was reduced to 55 cm (1.8 feet) to make it easier to transport models to competitions.

Technology came along about 40 years ago that permitted a variable-pitch propeller. That allowed more initial air bite with slower propeller speeds and longer endurance (such as the near-record 47 min. mentioned).

One of the great challenges for establishing long flight times is to find an indoor space with a large floor area and a tall ceiling. However, many competitors did not have access to the tallest ceilings. To solve this problem, four different record categories were established in the 1970s. Each assumed a different ceiling height of the available indoor space: 0 - 8 m. (0 - 26.24 feet); 8 - 15 m. (26.24 - 49.2 feet); 15 - 30 m. (49.2 - 98.4 feet); and then anything over 30 m. (98.4 feet). For any record category, records are set at the space with ceiling height near the top number.

Ray showed one of these spaces to be an indoor football stadium at East Tennessee State University in Johnson City, Tennessee. The ceiling was 100+ feet high. Other spaces are used, when available, but the best is the Goodyear Air Dock in Akron, OH. It is 180 feet to the ceiling, which is flat and 80 feet wide. (An experimental hanger that Ray never visited, in Germany, has a 300 feet high ceiling; a few ultralights, flown there, have been able to reach this ceiling.) An indoor football stadium at the U. of Idaho has a ceiling height of 145 feet. However, records cannot be set, there, because the altitude is 3000 feet and the thin air does not provide enough lift. A weird place to fly is a salt mine in Romania, which has a 200-foot-high ceiling; unfortunately, the mine temperature is about 50 deg F and this reduces the ability of the rubber propulsion to store energy.

Another desirable space, where Ray has flown the most, belongs to the US Navy. It is the huge dirigible hanger at the Lakehurst Naval Air Station in Central NJ. (The dirigible *Hindenburg* burned in front of this hanger in 1937.). The Lakehurst hanger ceiling is 172 feet high in the center. Another nice feature of Lakehurst is that some places inside have natural thermals caused by sunlight coming in on the floor. Most of the US records for high-ceiling endurance are set here.

For many indoor flights trying to set endurance records, a tethered balloon is put up at the model altitude. From the floor, the tether is maneuvered to force the balloon against the tail or a wing of the model. This crude-but-effective steering keeps the model away from the walls, ceiling and other obstructions.

Someone asked Ray how long it takes to make a typical model. He answered that it was about 25 - 35 hours labor. An influence on the time spent is whether or not a variable pitch

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Minutes—Continued

overview as we describe our travels.

Chris thanked the following members who helped with the arrangements for the meeting:

Coffee - Sandy Grace

Donuts, veggies, and fruit from Stop n Shop: Thanks to Ted Grenham

Badges - Harold Edelstein

Facilities - Jim Latimer, Fred Jungalwala, Dan Verrico

Reporting on the Minutes - Dan Miller

Reporting on the Speaker - Bill Beebee

Bulletin - Bob Diefenbacher, Koby Kobayashi, Stan Wulf, John McKinney

Sound Equipment - Ron Riggert. Handling the microphone - Larry Vifquain

Slide Show - Richard Smith

Website - Ken Mattes, Bill Thompson, Bob Diefenbacher, Al Persson, Richard B Smith

Photographer - Art Phipps

Member Support Help Line - Al Persson - help for members in need of transportation to meetings or for other needs.

Announcements:

Chris reminded us to use the “Be My Guest” cards that were included with the name badges. This is a good way to invite new members to attend a meeting. We are always in need of new members!

Member Survey - Thanks to Ron Riggert, Ray Atkins, Bill Ely and the Board for initiating a member survey. If you

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The Cigar Box Bulletin

P. O. Box 261

Wayland, MA 01778

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*Published monthly by the Retired
Men's Association of Weston,
Wayland, Sudbury and
surrounding communities.*

Speaker Continued—

propeller is used. That part can take 10 - 15 hours, all by itself.

A few years ago, Boston University eliminated its Aeronautical Engineering program. However, since some students still wanted to study the subject, BU Professors created a special program. It guides students to study airplanes by building indoor flying models. Ray has been tapped, twice, to coach students on building a standard model type (F-1D). He showed an example of it. After failed attempts at finding a good flying space (with still air), Ray found a Wayland school gym that met the need. The second group managed to get a 10.5 min. flight and all were happy.

Someone asked how you repair the models. Ray said that he uses old-fashioned nitrocellulose (thinned out) and applies it with a hypodermic needle. He is using just the right amount of glue when he can see only a tiny drop coming out of the needle.

Then, Ray switched gears and started talking about electric-powered ultralights. He showed one (noted above) that looks like a Wright Flyer biplane. Early electric models (starting in the early 2000s) used a nicad battery to fly about 1/2 hour. Today, they use lithium-polymer batteries which cost \$10 each! Ray got 39 min. out of a model with that power source. He found that the batteries last longer if the current draw is low. Electric power has not had the competition interest as the rubber-band type still has, as yet.

Ray also thinks about using a model with thin-film solar cells on the wings, although that would imply a new competition category. It could be recharged in air by shining a searchlight on it. If that was barred, the light could be used to produce steering effects. A lightweight solar cell on the tail could be used to receive steering commands to turn the rudder.

At that point, Ray showed a small model that had only one competition rule: the wing span cannot be more than 35 cm. (1 ft., 1.8 in.). Everything else is open - allowing, for instance, experimenting with differing wing chord. (The chord is the length of the wing, leading-edge-to-trailing-edge, along the wind direction.) Ray's model weighs only 1/4 gram and flies fairly well with a variable-pitch propeller, even though having a poor lift-drag ratio of 7:1. (A cruising airliner has twice that number.) In the beginning, Ray was winning National Records with this configuration.

Ray then went in the other direction and showed a large, heavy (7.5 gm.) model designed for kids to build. He does not like to have a competition class based on this concept because it is not, currently, restricted to only beginners. That makes unfair competitions possible, since old pros can jump in and dominate.

Ray talked about building and flying scale models of full-sized airplanes. This is frustrating because scale models (looking like real airplanes) do not have the right tail, rudder and propeller dimensions to fly well. Although a pilot may ride in and fly the real plane, scale models need lots of adjustments to make them fly right "out of your hand".

At the end, Ray flew his 1-gram ornithopter, which flies like a bird with a fixed-wing controller tail in front and large, flapping wings at the back. It flew, with slowly-beating wings, about 4 ft. over the RMAers. For a tall-ceiling flying space like Lakehurst, the ornithopter comes down very slowly and majestically when the rubber band quits. (This descent is like that of a helicopter with no power, which uses autorotation of its rotor to get lift for softer landings.)

The following shows Ray with his Voisin Hydroplane model, which he flew successfully in Glastonbury, CT, a few days after talking to the RMA. The Voisin is unusual because it "flies backwards" with the propeller pushing it from behind.



Minutes—Continued

haven't filled it out and submitted it, please do so. The results will be compiled and reported on in an upcoming meeting.

Chris introduced Amy Paquette, the leader of the Parmenter Trust Foundation. Amy founded the Parmenter Foundation which grew from an endowment in 1954 by Mr. Parmenter to provide Hospice care, Healthcare needs and Children's Programs. The Foundation partners with Mt. Auburn Hospital to serve people in MetroWest regarding needs in: dealing with serious illness; end of life issues; Behavioral Health; free health care for children in need; children camp programs; assisting children in need of cancer treatment; and the Parmenter Food Pantry in Wayland that provided over 5,000 meals last year. Amy left information about Parmenter and invited us to seek more information about them and how we might help if interested.

The February meeting will be Friday, February 14, and the Topic will be: Artificial Intelligence: a Short History, Present Development and Future Outlook. It will be presented by David R. Martinez.

The date of the April RMA meeting will be changing due to a conflict with the Church over space availability that month. We will advise of the new date as soon as it is determined.

The Discussion Group, led by Chris Hammer and Al Persson, will meet on Thursday, Jan. 16, at Conrad's Restaurant, 120 Boston Post Road, Sudbury, to discuss - Everytown Survivor Network. Discussion leader will be Seth Kaplan. All are invited to attend!

Vital Statistics - Jim Latimer reported on 13 Birthdays of members ranging in age from 61 to 92 years. (Oldest is Dave Stallard - 1/22/28). Gerry Brody reported on 6 Wedding Anniversaries ranging from 44 to 66 years. (Oldest is Dick and Virginia Bell - 1/25/54.)

Health of our members - Joe Bausk reported on two members' health: Paul Sturgis was at Brigham and Women's Hospital for open heart surgery on Jan. 3 and is now home. Bill Ely was having carotid artery surgery at Mass General on Jan. 10.

Humor - Harold Wilkinson regaled us with his usual assortment of funny stories and jokes. One involved a man claiming to his wife that he had just swatted 5 flies - 3 guys and 2 girls. His wife asked him how he knew their sexes. He replied that the guys were on a beer can and the girls were on the telephone. Come to the meetings and get real-time laughs along with all of your fellow members!

Musical Vignette - Bill Ladoulis and Ken Watson led us in a Sing Along to brighten our spirits. We sang: When You're Smiling, Make Someone Happy, and Smile!

ROMEO Lunch - Bob Malnati asked for help in running the ROMEO lunches while he is away for the next 3 months. The arrangements are all made; Bob just needs help to remind RMAers at the meetings, get a head count, and coordinate with the restaurant on the day of the meeting. Bob could use your help!

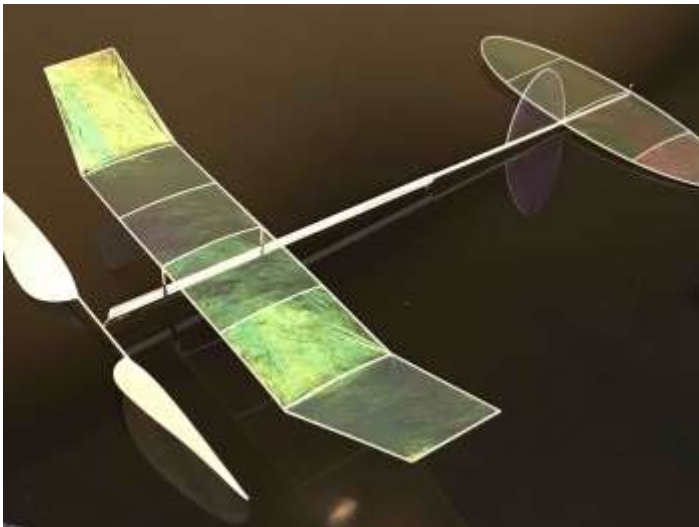
The January 10 lunch was at Oak Barrel Tavern, at 528A Boston Post Rd. (Rt. 20) in Sudbury.

Paul Motyka introduced the Speaker: Ray Harlan - discussing lightweight flying model aircraft.



Please use the Be My Guest card you received at the January RMA meeting to invite a friend to our February 14 meeting!

Images From the Meeting



Above: Flying venue

Guest speaker Ray Harlan attends to his models with steady hands to work with these delicate planes



Plane flies above an astonished RMA audience!

Anniversaries in January

Member	Spouse	Anniv.	Yrs.
Kenneth	Mattes, Ph.D Susan	01/03/1976	44
Richard	Stewart Gussie	01/16/1976	44
William	Burns III Sandra	01/25/1969	51
Ross	Trimby Lynn	01/27/1968	52
Edward	Grenham Cynthia	01/15/1965	55
Richard	Bell Virginia	01/25/1954	66

Average Years Married—52



Birthdays in January

Member		Birthday	Age
Richard B.	Smith	01/20/1959	61
John	Niggl	01/26/1950	70
Seth	Kaplan	01/02/1947	73
Nick	Veeder, Jr.	01/11/1944	76
Curtis	Schubert	10/23/1942	78
Michael R.	Garfield	01/09/1941	79
Paul	Tanzi	01/25/1941	79
Francis T.	Lyons	01/30/1938	82
William	Tafari	01/07/1938	82
Jim	Carlton	01/23/1935	85
Wayne	Clemens	01/01/1933	87
Charlie	Raskin	01/10/1929	91
David	Stallard	01/22/1928	92

Average Age— 80



Sorting Through Research on Aspirin...

(NewsUSA) When you think of over-the-counter (OTC) medicines, it would be hard not to think of aspirin: one of the most common, useful, safe, and effective OTC medicines in the world. But there has been a flurry of media coverage recently regarding aspirin, particularly concerning whether people should continue taking it for cardiovascular benefits.

These news reports were the result of an updated 2019 primary prevention guidelines issued by the American College of Cardiology (ACC) and the American Heart Association (AHA). Unfortunately, some of the media coverage has potentially created confusion for Americans who are taking aspirin. First, as a cardiovascular physician I want to reinforce that no one should stop or alter their aspirin regimen before speaking with their doctor or health care provider. And second, I will help sort through the news and the research on this topic. There are two main categories of patients who take a daily low-dose aspirin for cardiovascular (CV) event prevention: patients who have not yet had serious cardiovascular problems but may be at risk of having these problems AND patients who have already experienced serious cardiovascular problems like a heart attack or clot-related stroke. What the updated guidelines tell us is that certain individuals in the first category (have not yet had an event, often called primary prevention) may not need to continue taking aspirin due to the increased risks of bleeding outweighing the cardio-protection benefit. Whether or not you are one of these individuals in this category depends on your own personal risk factors, which is why it is important to consult your doctor who can help you understand the benefits and risks and what is best for your health. For people in the secondary category – those who have already experienced a cardiovascular event – aspirin can be a lifesaver. Not only is it proven to help prevent another heart attack or clot-related stroke, aspirin is also one of the most extensively studied drugs in history. This is why aspirin remains the cornerstone preventative therapy for secondary prevention. In the United States, aspirin's professional label is approved for secondary prevention of a CV event. Some of

the media coverage around the new guidance was not clear on this crucial distinction. For those who have already experienced a heart attack, or clot-related stroke there is evidence that discontinuing an aspirin regimen without a doctor's guidance can increase the risk of another heart attack by 63 percent and a clot-related stroke due to a blood clot by 40 percent. Cardiovascular disease is the number one cause of death in the United States, affecting more than 92 million American adults and causing about 2,200 deaths per day. That's one life every forty seconds. Each year 790,000 Americans alone will suffer from a heart attack, while another 795,000 will have a stroke. Many factors can contribute to a person's risk of cardiovascular disease, including high blood pressure, high cholesterol and smoking – and almost half of Americans (47 percent) have at least one of these risk factors. Clinical studies and cardiovascular professional guidelines have continued to support the lifesaving benefits of aspirin. Studies have found that an aspirin regimen under the direction of a doctor can help reduce the chances of a second heart attack by 31 percent and a second clot-related stroke by 22 percent. Importantly, even though aspirin is the gold standard of preventative therapy for those who have experienced a heart attack, clot-related stroke, chronic stable and unstable angina, a stent placement (PCI) or open heart surgery (CABG), it may not be for everyone. Anyone who has questions about starting or continuing an aspirin regimen should talk to their doctor. Aspirin is not appropriate for everyone, so patients should talk to their doctor before they begin an aspirin regimen. For more information on safe and responsible use of OTC medicines, visit www.KnowYourOTCs.org.

Disclosure: Dr. Gurbel is compensated by Bayer to advise on cardiovascular health issues. Dr. Gurbel is the Director of Cardiovascular Research at Sinai Hospital of Baltimore, MD and Director of the Sinai Center for Thrombosis Research and Drug Development. He is also Professor of Medicine at Johns Hopkins University School of Medicine and Adjunct Professor of Medicine at Duke University School of Medicine.

Be My Guest

*This Way
to Adventure!*

Retired Men's Association
of Boston/Metrowest Communities

Meeting 10:00 am on:

Directions
on back →

RMA Member _____



**Please use the Be My Guest card
you received at the January RMA
meeting to invite a friend to our
January 10th meeting!**

RMA Bulletin Board

Note: Our April Meeting is Friday, April 17, the third Friday.



- FOLKLORE FOR THE SEASON
- *Fog in January brings a wet spring.*
 - *A favorable January brings us a good year.*
 - *If grass grows in January, it will grow badly the whole year.*
 - *A summerish January, a winter-ish spring.*

ANNUAL WEATHER SUMMARY
 NOVEMBER 2019 TO OCTOBER 2020
 FROM THE OLD FARMER'S ALMANAC

Winter temperatures will be much above normal, on average, with the coldest periods in mid- and late January and early and late February. Precipitation will be above normal, with below-normal snowfall. The snowiest periods will occur in mid- and late January and early February. April and May will be warmer than normal, with precipitation near normal in the north and above normal in the south. Summer will be hotter and rainier than normal, with the hottest periods in mid-July and early to mid-August. September and October will be warmer and rainier than normal, with a tropical storm threat in early to mid-October.



A Members Support Help Line. This is intended to help members or their spouses who are in need of assistance. This could include rides to meetings or helping members in other ways as needed. **Contact Al Persson at 781-235-6910.**

The Calendar

Do you know what day school starts in the fall or any other important date such as an anniversary? Both you and the teachers need to show up on the same day and your spouse will be very upset if you forget your anniversary.

We find this easy because we have a good universal calendar. It became universal in 1949 when Mao Tse-tung stated that China would use the Gregorian calendar. There are still special calendars in use but the Gregorian is used by all six billion people on the earth.

In 48 BC, Julius Caesar sailed in a warship to Egypt in pursuit of Pompey his rival in a civil war. He did many other things while he was there but one of them was to talk to the Egyptians about their calendar. Their calendar was based on the sun and not the moon as were most calendars of the day.

The 52 year old Caesar returned to Rome as a dictator. He had with him his 21 year old trophy wife, Cleopatra queen of Egypt and Julius Jr. Things in Rome were a mess as the calendar was 90 days behind the true year. Caesar fixed the year at 365 days. He named the months as we use them today and decreed the months would be 30 and 31 days alternatively except for February. February would have 28 days. Every fourth year February would be 29 days and referred to as leap year.

What to do about the 90 extra days? Caesar extended the year 44 BC so it was 445 days long. When the confusion was over all things were coordinated.

The church was mostly interested in when Easter should be. A decree from the Council of Bishops stated in the 4th century that Easter would be the first Sunday after the first full moon after the spring equinox. Why, because the only record available states that the first Easter occurred on a Sunday with a full moon during Passover. It is still determined using the Jewish calendar which is lunar based.

Dennis the Little was a sixth century monk who was given the task of determining when future Easters would be. The Roman calendar, in use at the time, started on the year Rome was founded. Dennis the Little decided that Christ's birth was a better year. He also added BC and AD.

Julius Caesar's calendar began to slip as Rome's influence decreased. The church added holidays and stopped using 30 days then 31 days for determining the length of a month. In 1582 Pope Gregory the XIII ordered a revision of the calendar to the one we use today. So you have many people to thank for help determine when to return to school.


By Al Persson



R.M.A.
Box 261
Wayland, MA 01778

First Class Mail

Next Meeting
Friday, February 14
Web site RMenA.org
E-mail info@RmenA.org



RMA Meeting: Friday, February 14 10:00 am

Artificial Intelligence: Short History, Present Developments, and Future Outlook
David Martinez Associate Head of Cyber Security and Information Sciences Division, MIT



David R. Martinez is associate division head in the Cyber Security and Information Sciences Division at MIT Lincoln Laboratory. In this capacity, he is focusing on the strategic and innovative directions of the division in the areas of artificial intelligence, high performance computing, and cyber security. He is also a member of MIT Lincoln Laboratory's Steering Committee.

Mr. Martinez, who joined MIT Lincoln Laboratory in 1988, has served in various management positions. During 1993–1999, he held leadership roles in the Embedded Digital Systems Group. He served as associate head (1999–2004) and head (2004–2010) of the Intelligence, Surveillance, and Reconnaissance (ISR) Systems and Technology Division.

He has been the keynote speaker at both national and international conferences. He co-authored/co-edited the book titled High Performance Embedded Computing Handbook: A Systems Perspective. In 2003, he was elected IEEE Fellow “for technical leadership in the development of high performance embedded computing for real-time defense systems.” He holds three U.S. patents based on his work in signal processing for seismic applications.

Mr. Martinez was awarded a bachelor's degree from New Mexico State University, an MS degree from MIT, and the EE degree jointly from MIT and the Woods Hole Oceanographic Institution in Electrical Engineering and Oceanographic Engineering. He completed an MBA from the Southern Methodist University.