University of Tennessee Space Institute (UTSI) doctoral candidate Ahmad Saad and Prof. Joe Majdalani are a team from Tennessee that will publish a review article in this Proceedings of the Royal Society A, considered by most to be the oldest scientific academy still in existence. Their manuscript is entitled “On the Lagrangian optimization of wall-injection flows: from the Hart-McClure potential to the Taylor-Culick motion.” This comprehensive study introduces several new concepts for modeling gaseous motions in solid and hybrid rocket motors. The study focuses on the Taylor-Culick model, which arises in several captivator applications, such as isotope separation and molecular internal ballistics. In this context, the Lagrangian optimization principle is used to unravel two complementary families of solutions showing capturing energy signatures. These extend from the irrotational Hart-McClure potential with minimum kinetic energy to a highly rotational flow motion with peak energy. The Taylor-Culick motion is found to be at the confluence of both families. To better understand the inclination of fluid particles to toggle between energy states, the entropy maximization principle is used. This principle helps to identify the Taylor-Culick configuration as the most probable path taken among those starting from rest. The Taylor-Culick solution is found to correspond to a local equilibrium point at the confluence of both families.

The Free videoconferencing center is now available for the education and welfare of residents of the continental United States, Hawaii and Alaska. AEDC has expanded the program to include deployed members overseas, including Reserve and National Guard members. Videoconferencing has come, first served basis. Reservations are being taken now through Dec. 23, Monday – Friday, from 7:30 a.m. – 4 p.m. For additional information or to schedule a videoconference, contact Mike Arnold at ext. 7500.

Tips to prevent, avoid deer vehicle collisions

No strategy can completely eliminate the risk, so it is up to drivers to take due diligence on the road. The following tips are sure to avoid DVCs:

• Use extreme caution during the months of October through January – this holds true on the base.
• If you see one deer you should expect others.
• Be attentive from sunset to midnight and hours shortly before and after sunrise. These are the highest risk periods for DVCs.
• When driving at night, reduce your speed and also use high beam headlights when there is no oncoming traffic. The high beams will better illuminate the eyes of deer or near the roadway.
• Brake firmly when you notice a deer in or near your path, but stay in your lane. Many serious crashes occur when drivers attempt to avoid a deer and hit another vehicle or lose control of their cars.
• Do not rely on devices such as deer whistles to reduce DVCs.
• Avoid the use of cell phones and other distractions while driving.
• Make sure you buckle up.
• Scan both the roadway and roadsides.

Be especially careful in the rain – deer can be harder to see and they slip easily on the pavement.

If a DVC is unavoidable, the same sources offer this advice:

• Don’t attempt to remove a deer from the roadway unless you’re convinced it’s dead. A deer can inflict serious injuries.
• Contact law enforcement to report the incident. On the base, be sure to report it to the AEDC Police.
• Contact your insurance agent or company representative to report any damage to your car. Collision insurance does not cover all losses. Many front bumper damage and other minor repairs are not covered by your automobile policy.
• Tennessee law allows deer killed in a collision to be taken and used as food as long as the driver contacts the nearest T.W.R.A. regional office to report the accident within 48 hours.