

Foreword¹

*πόλλ' οἶδ' ἀλώπηξ, ἀλλ' ἐχίνος ἐν μέγα.*²

Archilochus (flourished ca. 650 BCE)

Schuster, bleib' bei deinem Leisten!³

German proverb

Of all the engineers at this symposium, I, perhaps, have the weakest Engineering credentials. As an undergraduate in Physics, I took only a single Engineering course, which I failed the first time and was forced to repeat. As a graduate student in Physics, of course, I took no Engineering courses at all. I was 36 years old before I took my second Engineering course, and 39 before I acquired a slightly shaky non-thesis master's degree in Electrical Engineering.

When I interviewed for my first job in Astronautics, I had learned only a few weeks before that “attitude” could be applied to something other than people. Now, more than 28 years later, my knowledge of Astronautics, though much improved from those earliest days, remains very limited. I have published Engineering journal articles only in the micro-area of Spacecraft Attitude Estimation. It is, in fact, the only area of Astronautics that I really know. Orbit Determination, Orbital Dynamics and Control, and Attitude Dynamics and Control remain for me almost *terra incognita*. At conferences I usually attend only the sessions on Attitude Determination, because they are the only ones that I can really follow.

Even in Attitude Estimation I have severe limitations. I engage only infrequently in Kalman filter studies, because I am not completely comfortable with the dynamics component. When I do approach that topic, I avoid the many exotic and fashionable flavors of the Kalman filter (unscented, sigma-point, particle, quadratic, iterative, etc.), and stick without exception to the plain vanilla variety with which I have become comfortable. Even so, I much prefer batch least-squares estimation to filtering when I wish to illustrate a point. I avoid the more complex topics like GPS attitude determination or star identification. With regard to modeling, most of my attitude estimation studies have taken place within the framework of one very simple measurement model, the QUEST measurement model, which appeared already in my very first Engineering journal article. I have seldom budged from this cozy corner of Astronautics. If I write so many basic papers applying basic concepts to basic problems of Spacecraft Attitude Estimation, it is because my attainments do not permit me to venture far from the basics. If I have gained the reputation of having laid much of the groundwork for modern Spacecraft Attitude Estimation, it is because I am very much stuck on the ground.

¹Adapted from the writer's welcoming remarks at the Symposium.

²The fox knows many things, but the hedgehog one great thing.

³Cobbler, stick to your last!

But here I am at this symposium, surrounded by people whose capabilities are so much broader than my own, whose knowledge of Astronautics is far greater than mine, and whose careers by many measures have been more successful than mine. As the governor of California, pondering the unlikely trajectory of his own career, recently averred: America is a wonderful place! I am not so dishonest as to deny that despite (or because of) my limitations I have made a worthwhile contribution to Astronautics (although, I contend, not a contribution worthy of a three-day celebration), nor dare I insist that you, my friends and colleagues, have gone to so much trouble and expense simply to gawk at the emperor's new clothes. I take pride in the fact that my contributions to Astronautics have been of a simple nature, created using simple means, and expressed in simple terms, powered less by intellect than by a lot of hard work. Given my limited education in Engineering in general and in Astronautics in particular, it could not have been otherwise. I take pride also that nearly all of my works have had their origin in the practical support of real spacecraft and not in the fulfillment of great principles, and that they are as much a product of the heart as of the mind. I am proud that many of these papers have been helpful to my colleagues who do the real work of attitude estimation. I am not at all unhappy that the most useful have often been the least original. In many ways I think I have been like the character portrayed so well by Buster Keaton in his films of the 1920s, the obstinate, clumsy dolt who through sheer persistence and good luck manages to save the day and win the girl. Today, certainly, I have won much more. I am grateful to all of you for the value you have placed on my work and for the sentiment which you have expressed by coming here.

There are a great many people I should thank for this symposium. I will leave that for the afterword.

A Serious Complaint

Despite my joy at being here and despite the enormous debt of gratitude I owe to the symposium organizers, I have a very serious complaint about the organization of this and previous symposia. I expressed this complaint at the Battin symposium in 2000 and would have expressed it again at the Junkins symposium two years ago, had I been able to attend. I will express it yet again here, this time in writing: The organizers of this august event, however great their gifts in Astronautics, haven't the foggiest idea of what a symposium should be! There, I've said it.

In classical Greece the symposium⁴ was a very different affair from what we have been offered here. No respectable woman or young child of the family was permitted

⁴The word *symposium* derives from the Ancient Greek *συμπόσιον* = *συν* + **πόσιον*. The preposition *συν* means simply "with" and is etymologically cognate with the Latin preposition *cum* (in construct *con-*). The second element is not attested separately in Ancient Greek but derives from (Ionic) *πόσις* (Attic *πότις*, though both dialectical variants were in common use in ancient Attica), which means both "drink" and a "drinking bout." Latin *pōtus*, an obvious cognate, has the identical semantic range as *πόσις*. The more frequent Latin word *pōtiō* and English *potion* mean only the drink itself. In French slang a drinking buddy is *un pote* (ultimately from Latin *pōtus*). Russian *ПИВО* ("beer"), *ПИТЬ* ("to drink") and our *beverage* share the same Indo-European root as *πόσις* and *pōtus*.) A *symposium* in Ancient Greece was simply a drinking party, a "conbibulation." In German we might translate *symposium* root for root as *ein Zusammentrinken*. The word **compōtiō* is not attested in Latin, perhaps, because it would have been easily confused with *compōtiō*, which means a shared power. Latin uses instead the word *compōtātīō*, which means "drinking bout." Our event here at best could be called a *convivium*, a dinner party in Latin (literally "a living together," c.f. English "convivial"), and then only for the banquets. The ancient Greek symposium certainly did not include the reading of learned papers.

to attend. The banquet guests or symposiasts⁵ wore laurel wreaths and reclined on divans, generally by twos. Food was plentiful. Entertainment was provided by musicians and dancers, both male and female, often clad in very thin diaphanous garments, by rhapsodists (*ῥαψωδοί*), who recited poetry, and, of course, by *hetairai* (*ἑταίραι*), the delightful female “companions” who were rented for the evening and whose dress may have been equally revealing.

The festivities began with the formal mixing of the wine⁶ the *krâsis* (*κράσις*, “mixing,” which also gives us the family name of one of the organizers). Following the *krâsis* there were numerous libations to the gods and an elaborate banquet interrupted when necessary by trips outside the banquet hall for the purpose of evacuating one’s stomach to make space for further feasting.⁷ The banquet was followed by still more libations, general excessive drinking, further eating, carousing and the telling of stories sometimes until dawn. I dream of the symposia of ancient Athens, I look around me here, and I ask: where are the dancing girls?

Greek hospitality had some attributes which haven’t survived classical times, at least I hope not. As witness to this the Ancient Greek lexicon has numerous words related to the treatment of guests. These include: *xenopâtēs* (*ξενοπάτης*), a deceiver of guests, *xenodaïktēs* (*ξενодаϊκτης*), *xenoktônos* (*ξενοκτόνος*), and *xenophoneús* (*ξενοφονεύς*), all three of which mean a murderer of guests, and my favorite, *xenodaítēs* (*ξενодаίτης*), a devourer of guests. The Greeks, it would seem, have a long tradition, going back to the Mycenaean age, of devouring their dinner guests. Despite my severe criticisms of the present event, I am confident that the symposium organizers (symposiarchs, Greek: *συμποσιαρχών*, pl. *συμποσιαρχόντες*) will take no actions against me describable by any of the above lexical items. All the same, I advise you to check that I am in the hall before you sample Mama Crassidis’ baklava.

With that I end my remarks with an ancient Greek toast:

Πίθι ἢ ἄπιθι!

Drink up or go home!

Malcolm D. Shuster
Buffalo, June 2005

⁵From Greek: **συμποσιάστης*, pl. **συμποσιάσται*, neither of which are attested in documents from the Classical period, the surviving word, from the same root, being *συμπότης*, pl. *συμπόται*

⁶The ancient Greek upper class never drank untempered wine, which was probably much stronger than our own.

⁷Cicero, in *Pro Rege Diatario*, reminds Julius Cæsar of the latter’s earlier statement that he engaged regularly in this activity (*vomere post cenam te velle dixisses*). From the syntax we may infer that Cæsar had not said this to Cicero directly. Cæsar was most likely not anorexic but was influenced by mistaken ancient ideas of good health practices and, being very vain, wanted to avoid becoming overweight.