Overview of Selection Process for Most Influential Paper of the 1970’s

Peggy S. Hayes
August 9, 2011
Background

• Idea came from John Valasek
  • was passed on to me at the AFM technical committee meeting in Hawaii

• Telecon with John Valasek & Dave Klyde
  • Decided best way to do this at first was in groups of years

• Received help from Karl Bender, NASA research librarian in locating AIAA AFM information

  • 2nd AIAA AFM conference paper listing (Sep 11-13, 1972 at Cabana Hyatt House in Palo Alto, CA and NASA Ames)
  • Collection of Technical Papers on AFM from AIAA Mechanics and Control of Flight Conference (Aug 5-9, 1974 at Anaheim, CA)
  • 3rd AIAA AFM conference paper listing (Jun 7-9, 1976 at Arlington, TX)
  • Collection of Technical Papers from AIAA AFM conference (Aug 8-10, 1977 at Hollywood, FL)
  • Collection of Technical Papers from AIAA AFM conference (Aug 7-9, 1978 at Palo Alto, CA)
• Added 1979 papers
  • Gives a total of 223 papers for the decade of the 70’s

• Papers put into groups that correspond to current sub-committees on AFM
  • FD, FT, FQ, MPFM, RV_OM, SysID
  • Some papers fit in no sub-committee category (miscellaneous)
  • no UAV category papers
Voting Process

- 3 rounds of online voting
  - 1st round asked members to choose up to 3 papers from each set of ~20 papers in the seven sub-committee categories
  - 2nd round asked members to choose 1 paper from round 1 finalists
    - MPFM ended up with three papers tied for first place
    - All other categories each had one clear winner
  - Final round of voting asked members to choose one paper as the overall winner from round 2 finalists
    - Pdf copies of the nine papers were sent via email to aid with voting
7 finalists (top vote getter in each sub-committee category)

- **FQ** - *Equivalent system approaches to handling qualities analysis and design problems of augmented aircraft*; Hodgkinson, J., LaManna, W., 1977

- **FT** - *A flight research vehicle to bridge Shuttle and hypersonic aircraft technology*; Draper, A., Lane Jr. P., Zima, W., 1977

- **FD** - *Perturbation methods in atmospheric flight mechanics*; Zipfel, P., 1972

- **RV_OM** - *Space Shuttle Orbitor entry guidance and control system sensitivity analysis*; Stone, H., Powell, R., 1976


- **Miscellaneous** - *Dynamic stability of a helicopter carrying a suspended payload*; Nagabhushan, B., 1978

- **MPFM** - *Onset of aerodynamic side forces at zero sideslip on symmetric forebodies at high angles of attack*; Keener, E., Chapman, G., 1974
• Equivalent system approaches to handling qualities analysis and design problems of augmented aircraft; Hodgkinson, J., LaManna, W., 1977
Invited Session details

• I contacted all authors with the exception of Bellur Nagabhushan (1949-2005) and Paul Lane Jr. (spoke with his widow)

• These authors have agreed to participate in an invited session at Portland, OR (8-11 August 2011)
  • John Hodgkinson
  • Gary T. Chapman
  • Peter H. Zipfel
  • Richard ‘Dick’ Powell
  • Dale Lorincz

• AFM Most Influential Papers of the 1970s session (AFM-16)
  • Tuesday, August 9th from 2pm – 5pm
Background

• Summer Internship at NASA Dryden
  • USRP Student from University of Washington

• Mentor Peggy Hayes organized MIP 70’s
  • Introduced the idea as an additional project to assist with during internship
  • Become familiar with conference and paper set-ups, library research

• Looked to Dryden research library for help in locating AIAA AFM information
  • Physical Table of Contents for 1980, 1984-89
  • Bound conference paper collections from the Ames Library, 1981-1983
  • Referenced online: AIAA website
Sorting

• Started with groups that correspond to current sub-committees on AFM
  • Flight Dynamics, Flight Test, Handling Qualities, Missile and Projectile Flight Mechanics, Reentry Vehicles and Orbital Mechanics, System Identification

• Added categories to narrow focus
  • More specific definitions
  • Common themes
  • Groups now covered by other committees (GNC, Sim & Modeling)
  • Aeronautics-focused papers

• New classifications
  • Aerodynamics, Aerodynamics Flow, Combat Applications, Computational Aerodynamics, Guidance, Navigation and Control, Helicopter, Historical, Space Shuttle, Simulation and Modeling, Space

• Total Sub-Categories – 16

• Split the biggest 4 into two: 1980-84 and 1985-89
# Categories by the Numbers

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
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<tbody>
<tr>
<td>Aero</td>
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<tr>
<td>AeroFlow</td>
<td>29</td>
</tr>
<tr>
<td>CombatApp</td>
<td>17</td>
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<tr>
<td>CompAero</td>
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<td>FD*</td>
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<td>GNC</td>
<td>15</td>
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<td>Helicopter</td>
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<tr>
<td>Historical</td>
<td>4</td>
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<tr>
<td>HQ*</td>
<td>53</td>
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<tr>
<td>MPFM*</td>
<td>88</td>
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<tr>
<td>RV_OM</td>
<td>16</td>
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<tr>
<td>SimModeling</td>
<td>8</td>
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<tr>
<td>Space</td>
<td>25</td>
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<tr>
<td>SysID*</td>
<td>55</td>
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</tbody>
</table>

*Split into 2 groups for voting

**Total Papers: 519**  
(vs. 223 in the 70’s)
## Quick Papers Breakdown

### Years by the Numbers

<table>
<thead>
<tr>
<th>Year</th>
<th>Papers</th>
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<tbody>
<tr>
<td>1980</td>
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<td>1988</td>
<td>43</td>
</tr>
<tr>
<td>1989</td>
<td>58</td>
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</tbody>
</table>

### Repeat Authors

(at least 4 papers)

- Lars E. Ericsson
- Charles H. Murphy
- Joe P. Gamble
- Jubaraj Sahu
- Joseph Katz
- M. Leroy Spearman
- Walter B. Sturek
- Kenneth D. Mease

### Split Categories

(Makes 20 total)

- FD → FD1 *(28)* and FD2 *(32)*
- HQ → HQ1 *(29)* and HQ2 *(24)*
- MPFM → MPFM1 *(50)* and MPFM2 *(38)*
- SysID → SysID1 *(34)* and SysID2 *(21)*
The Best and the Worst

- **Biggest year**: 1980 (68 papers)
- **Longest Title**: Limited Evaluation of the Longitudinal Flying Qualities of a Centerstick Controlled NT-33A Aircraft with Variations in Stick Force per G and Stick Force per Inch, W.M. Quinn, Jr., 1984
- **Most papers**: Lars E. Ericsson (12, from ‘81-’87)
- **“Oldest” paper**: Experimental Measurement of the Power Required to Fly the Daedalus Human Powered Aircraft, T. Clancy, 1989
- **Most inconvenient**: ‘81- ’83, no table of contents
- **Largest sub-category**: Missile and Projectile Flight Mechanics (88 papers)
- **Favorite Title**: More Than You May Want to Know About Maximum Likelihood Estimation, Ken Iliff, 1984
Tentative Schedule

• Voting is going on now
• There will be at least 3 rounds
  • 16 sub-categories vs. 7, 20 sections
  • Additional rounds added as needed
• Top in each category move to the next round
• One month per round
  • Round 1 (Ongoing) ends September 30th
  • Round 2 will end October 28th
  • Round 3 will end December 2nd
Voting (1st Round)

• Open now!
• This round: Looking for most influential papers in each sub-category
• Choose top 3 in your area of expertise
  • If you see something that doesn’t belong, let us know.
• Welcome to vote in other categories as well
• Visit............................................... to vote
• Ends September 30th