AESS Technical Operations

Presented to Board of Governors
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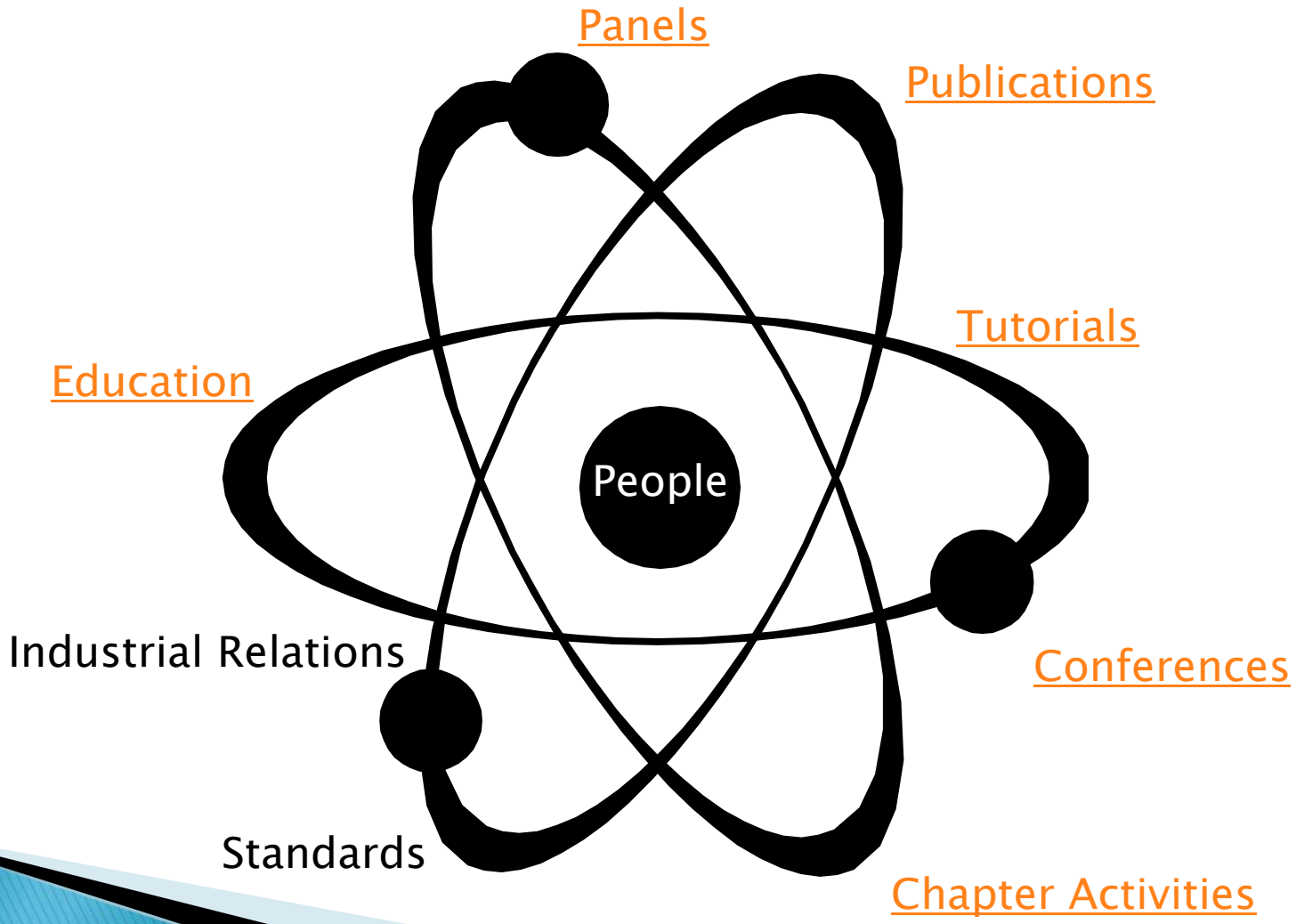
October 5th, 2013

PANELS STATUS

- Gyro and Accelerometer: more robust plan needed
- RADAR: seems on track, conference-centric
- Space: seems on track, expand member involvement
- Target Tracking: revitalize
- Aerospace Control and Guidance: fantastic info but more robust plan needed
- Aerospace Systems Integration Engineering: more robust plan needed (minimally staffed now)
- Aerospace Workforce: more robust plan needed (minimally staffed now)
- Avionics: more robust plan needed
- Cyber Security: more robust plan needed
- UAVs: more robust plan needed, requires support

What is at the nucleus of AESS Technical Operations?



Panel Structure

1)	Gyro and Accelerometer Panel	Randall Curry
2)	Radar Systems Panel	Mark Davis (Coming Open)
3)	Space Systems Panel	Cosimo Stallo
4)	Target Tracking Systems Panel	Open – w/Blasch
5)	Aerospace Systems Integration Panel	Open – w/Rassa & Rao
6)	Aerospace Control & Guidance	Lou Knotts
7)	Aerospace Workforce Panel	Open w/ Downing/Lefevre
8)	Cyber Security Panel	Fred Wright
9)	Unmanned Aerospace Vehicles Panel	Open – w/Dean, Rassa, & Leonard
10)	Avionics Systems Panel	Paul Kostek
	Standards	Open

AESS – Technical Pursuits

Goals and Objectives

- Collaboration Panels and Chapters
- Develop a formal peer review
- TP 's, best practices, methods & tools
- Synergy for education activities Development modules

Concept Developments

- Consider Workshops Similar to
  - 2011 Chapter Summit Click
  - DASC:Future of Aviation Click
  - Electric Aircraft Click
- See TP's

RDT&E Activities

- Identify need for New Standards
- See TP's

DOTLMPF

- Help floundering TP's
- Promote conference development
- Reach out to Chapters for inputs
- Engage industry for insight
- See TP's

Doctrine, organization, training, leader development, materiel, personnel, and facilities (DOTLMPF)

it's not the

$$V_f = V_i + at$$

that kills you, it's the

$$F = m\frac{\Delta V}{\Delta T}$$

GYRO and ACCELEROMETER

- Develop standards and test procedures
  - promote understanding of systems to measure linear/angular motion
- Expand IMU Membership

- Identify new sensor technologies
- Single-Axis Interferometric Fiber Optic Gyros
- Linear, Single-Axis, Non-gyroscopic Accelerometers

Strategic initiatives:
- inertial sensor specification format guide
- test procedures, emerging new sensor technologies

- Implementation?

RADAR

- Seeking Chair
- Standards and terminology
- Education

- Civilian Radar
- Waveform Diversity

- Emerging capabilities
- US SAR capabilities
- Sense and Avoid

- Conference-centric

SPACE SYSTEMS

- Standardization
- System analysis & design
- Applications, constellations
- Integration, dual use.
- Organizing conferences
- Broader member involvement

- Exploring new concepts like weather?
- What is a reasonable goal for Space Access?
- EHF technologies

- Satellite Communications
- Space Exploration and ISS
- Space-based Navigation and Synthetic Aperture Radars
- Launch infrastructure, Range Safety and Debris mitigation

- Where are workforce concerns?
- South Africa and Brazil
- *Estel Conference* and *I SaCoNaS* workshop

Not to get technical...but according to chemistry, alcohol is a solution.

TARGET TRACKING SYSTEMS

- Standard terminology, specification formats, and test procedures,
- Promote understanding of algorithms and components of sensor data processing systems
- Trackipedia wiki engine as a collaboration tool, design and promote the use of standard “test-to” scenarios to improve algorithm performance

- Fold under RADAR Panel?
- Rebuild membership and devise conference strategy?

SYSTEMS INTEGRATION

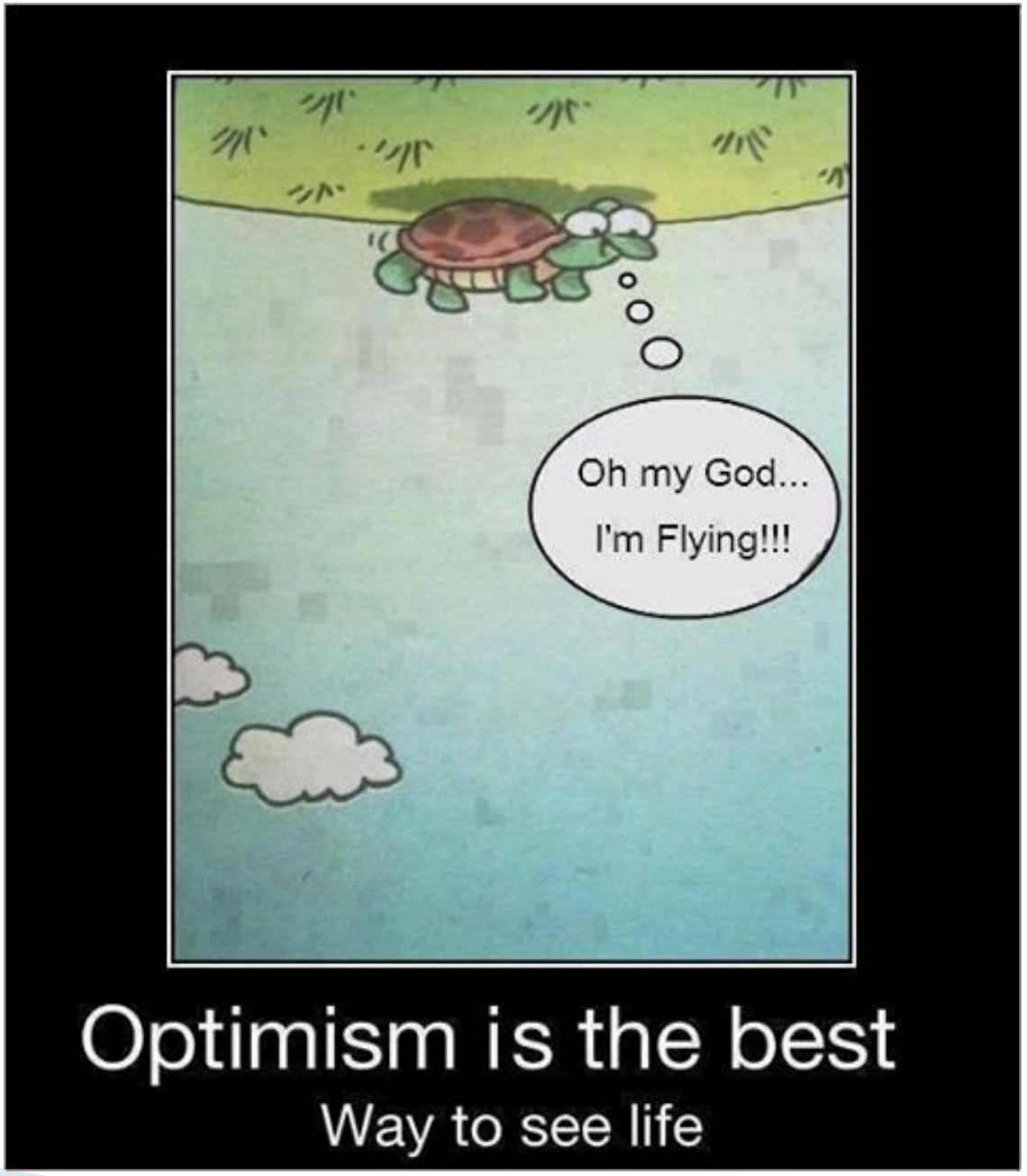
- Support advancement of systems engineering techniques
- Building "real" way forward to plan, program, and execute Summit Topics

- Use Aerospace to Solve Nuclear Power Safety

-Considering build options (every TP has a program that could have a home here).

-Help IEEE/USA CTAP with Software Complexity concern?

- Link with Systems Council?


Oh my God...
I'm Flying!!!
Optimism is the best
Way to see life

AEROSPACE CONTROL and GUIDANCE

- Control/guidance systems
- NextGen air traffic control
- Single day short course
- Introduce a lecture series

- Adaptive control concept
- Integration of UAS in NAS

- Research Institutions, Industry, University, Government Agencies
- Dynamics, Computations, and Analysis
- Flight, Propulsion, and Autonomous Vehicle Control Systems
- Aeronautic and Surface Vehicles
- Missiles and Space
- Avionics and System Integration

-September Meeting Minutes Pending

CYBER SECURITY

- Embedded systems
- Expanded scope
- Standards and regulations
- Education/public outreach

- Focus: embedded system exploration because vulnerability reaches across many functional areas.

- Does FCC have a suitable controls/standards/metrics/certification processes
- Should NIST be involved?

- 1st Meeting this Fall
- Public can be educated to reduce fear
- What near-term safeguards will exist against identity theft and industrial espionage?

AEROSPACE WORKFORCE

Goals and Plans: to be reported soon

- No need to re-invent the turbo-fan. Partner with the Civil Air Patrol and we will reach the youth!

-Predict manpower requirements
- Maintain expertise during downturn in cyclical employment patterns

- Find unemployed engineers
- Enable them to re-assert selves into workforce

- Define re-training
- Unveil employer needs

Optimist: The glass is **HALF** full

Pessimist: The glass is **HALF** empty

Engineer: The glass is **TWICE** the size it needs to be

UNMANNED AEROSPACE VEHICLES

Goals and Plans: to be reported soon

"…has not done much as a panel per se but some of the members have been active with the universities and with other organizations that are active with remote piloted vehicles."

- Build premier AESS UAV Conference activity

-Activities cross-over into the ACGS and Avionics Panels

Recent AUVSI Activities

- US Military UAS Perspectives
- Yamaha RMAX Unmanned Helicopter: Potential for Agriculture use in the U.S.
- Future UAS Trends, Technologies and Challenges in the Next Decade
- NextGen on UAS Integration Efforts
- International UAS Markets and Emerging Opportunities

AVIONICS SYSTEMS

Goals and Plans: to be reported soon

"… is just starting off and we're still defining our interest areas, so any input thoughts would be appreciated."

- ACGS Panel is also serving with Track-level participation at 32nd DASC in Syracuse
- Aero Electromechanics click
- Aviation International News will keep you abreast of the industry.

- NAVAIDS.
- Siting, power, and other technical requirements for ILS, DME, and VORs.
- VOR discontinuance. Its affects on the cockpit and takeoff/landing procedures.
- Automatic Dependent Surveillance – Broadcast (ADS-B)

- Build it, they "may" come!
- Where are workforce concerns?
- 787 Batteries
- NextGen: $260B program?

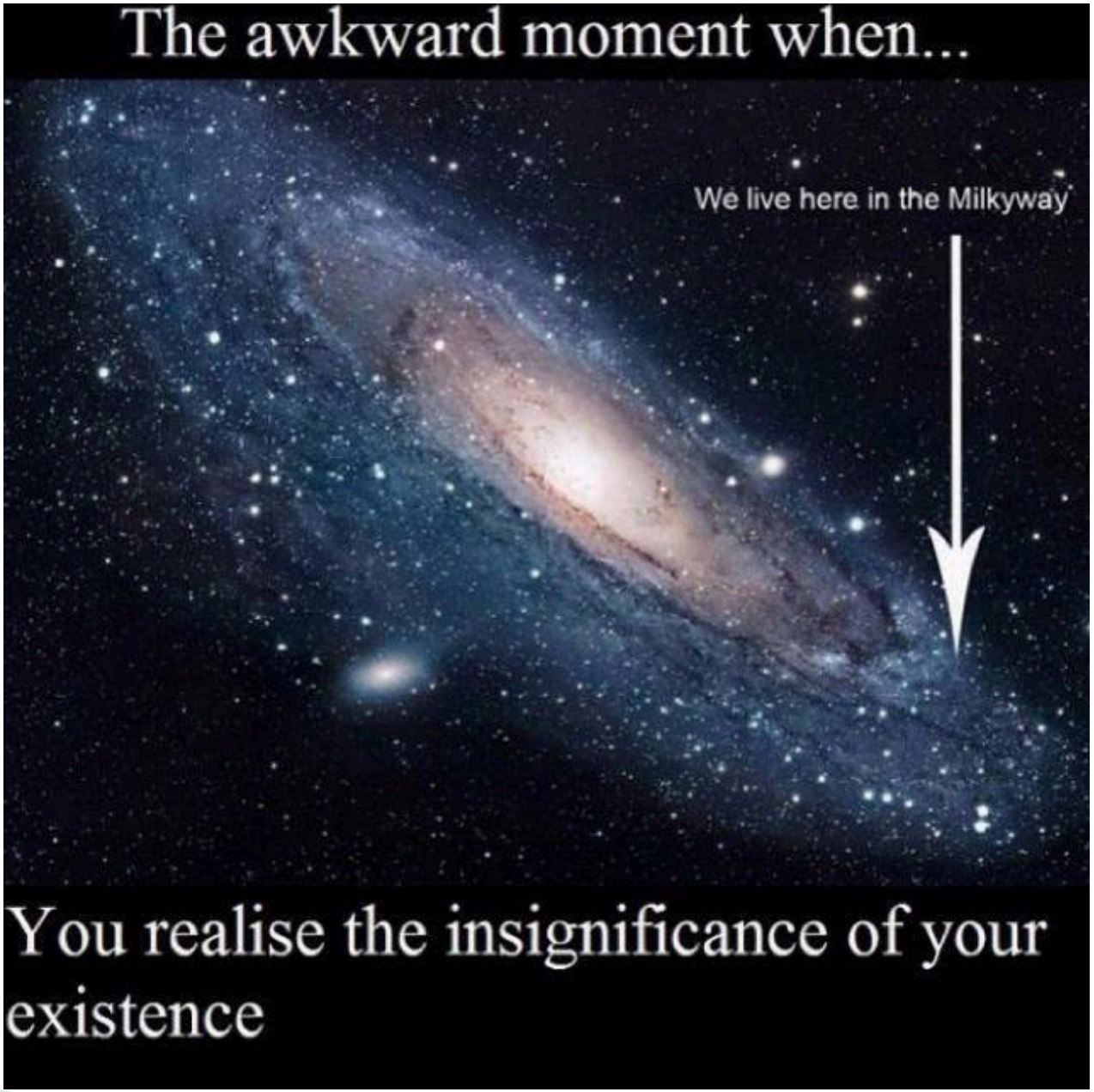
STANDARDS

- Comprehensive list of Standards pending.
= Meanwhile, see individual TPs

-Exploring new concepts?
- CENELEC: European Committee for Electrotechnical Standardization with IEC.
- No IEEE relationship, yet.

- Some Panels have head-start!
- Others, seeking help!

- How well does AESS do Standards?
- IEEE seems to be available to help.
- They have a robust list of recently worked standards.


The awkward moment when...
We live here in the Milkyway
You realise the insignificance of your existence

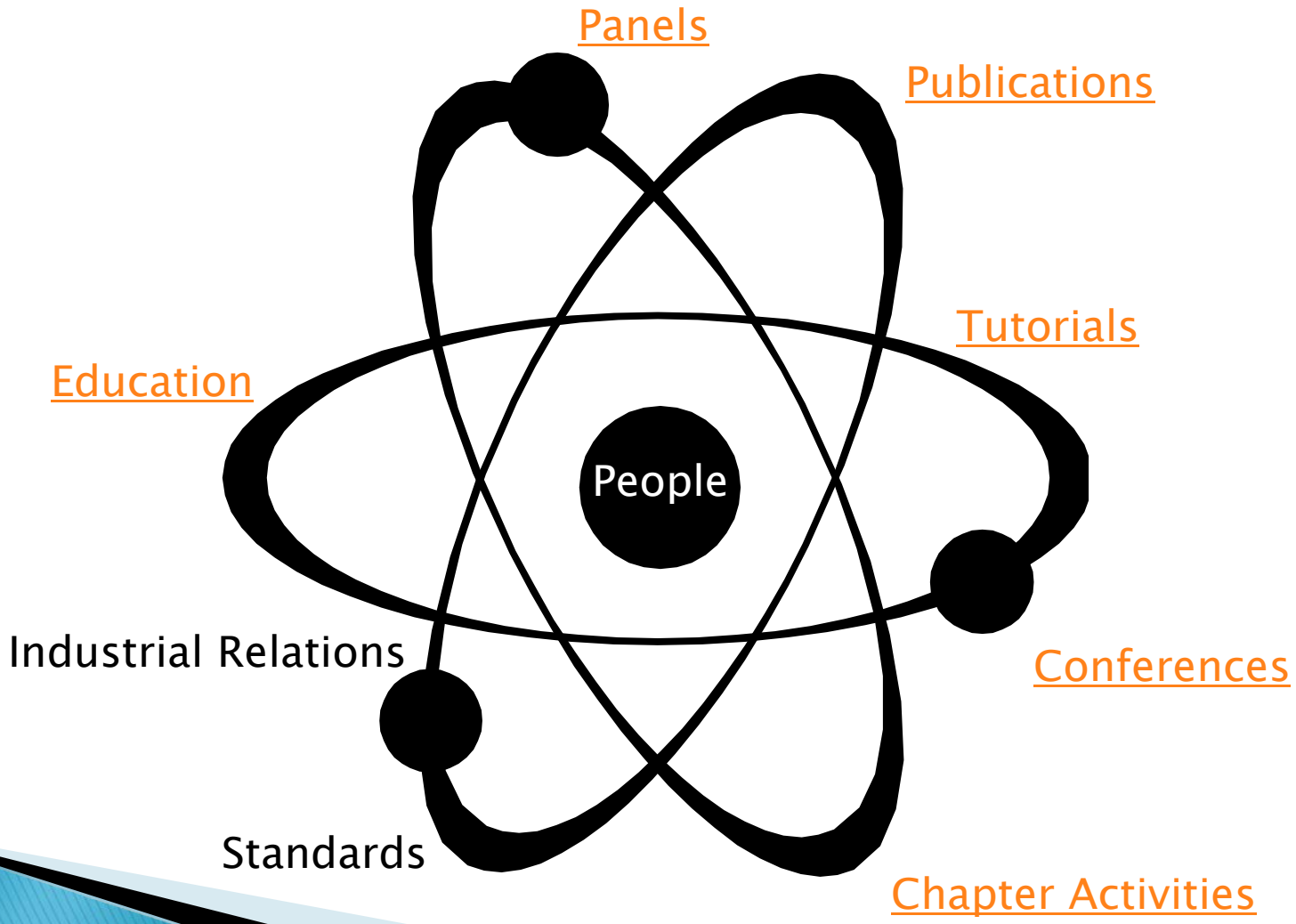
AESS Technical Operations

- What would best serve the membership?
- Is our Panel Structure right?
- How do we better collaborate between Panels and between Chapters, Educational/Tutorial Options, Conferences, Chapters, Publications, Industrial Relations?

-IDEAS?

- Spend $40k, get Panels into shape (a WAG…but close)

What is at the nucleus of AESS Technical Operations?



Strategy

- Each AESS Board Member identify areas for collaboration, and identify areas that are absent that we would like to engage on (Recommended suspense, 11/1/13).
- Send amended list of Systems Engineering interest items to include some of those listed above to Chapter Chairs for Chapter distribution and insight (Recommended suspense, 11/1/13).
- Engage CTAP with Implementation Strategy to impact change (Recommended suspense, 11/4/13).
- If we cannot resurrect interest in the existing Panel Structure through active and relevant participation, we will work to introduce these contributory or alternative Panel Structures:

Strategy

Introduce Panels or Committees

- Flight (Avionics)
  - GPS guided NextGen Air Traffic Control
  - Unmanned Aircraft Systems (AUS)
- Energy storage/distribution (or Aerospace Integration)
- Electro-mechanics (or Aerospace Systems Integration)
- Operations (or Aerospace Systems Integration)
  - Google Automated automobile
- Power (or Aerospace Systems Integration)
  - Fuel cells (alternate/new energy storage devices)

Mentoring: Provide POC from each Panel and Chapter and set a recruitment goal for each – geographically dispersed.

Strategy

Create a banner for each Technical Panel to attract attention to AESS function at particular conference (~$400 ea).

Incorporate Chapter Activities on AESS Front I-Site (suspense?).

Leverage Systems Council and IEEE/USA Activities by engaging in as many of these as the AESS Panel Structure can support (inputs by 11/1/13):

- Reducing cost to low earth orbit

- Review of laws that will be enforced to assure citizens' personal privacies are maintained vs. electronic surveillance systems to include GPS tracking and aerospace generated imagery.

- IEEE Transportation Electrification Initiative.

-Upgrading and modernizing the airspace systems with cost-effective communications, navigation, surveillance and traffic management technologies.

Strategy

Leverage Systems Council and IEEE/USA Activities (Cont - inputs by 11/1/13):

-Promoting the use of intelligent transportation systems to improve safety, optimize traffic flow, ease congestion and reduce energy use.

- Advancing a technology-focused space program that balances exploration, science, security and international partnerships.

- International Partnerships for Space and Transportation

- Near Earth Objects

- Near Zero Fatality Vision for Transportation

- Synthetic Aperture Radar

-Obtain information on the current status of high speed rail infrastructure programs from experts.

Strategy

Leverage Systems Council and IEEE/USA Activities (Cont – inputs by 11/1/13):

Seek balanced IEEE comm re: workforce shortages, especially in Spectrum.

Urban upgrades to aging trains/subways and infrastructure.

Advances in shipping/ocean-travel efficiencies using aerospace technologists.

Aerospace research science in partnership with oceanographic exploration.

Nano-electronics integration with applications for avionics, remote sensing, communications, and computing.

Alternative energy solutions to the transportation and aerospace infrastructure.

Embedded software security concerns and recommended solutions.

Electric flight advanced research, development, and implementation planning.

Light travels faster than sound.

This is why some people
appear bright
until they speak.

BACKUP SLIDES

What We Do?

The field of interest shall be the organization, systems engineering, design, development, integration, and operation of complex systems for space, air, ocean, or ground environments. These systems include but are not limited to navigation, avionics, mobile electric power and electronics, radar, sonar, telemetry, military, law-enforcement, automatic test, simulators, and command and control.

Doctrine, organization, training, leader development, materiel, personnel, and facilities (DOTLMPF)

Improve Sustainability and Quality of Life