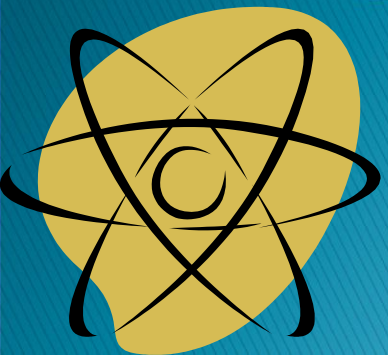
AESS Technical Operations

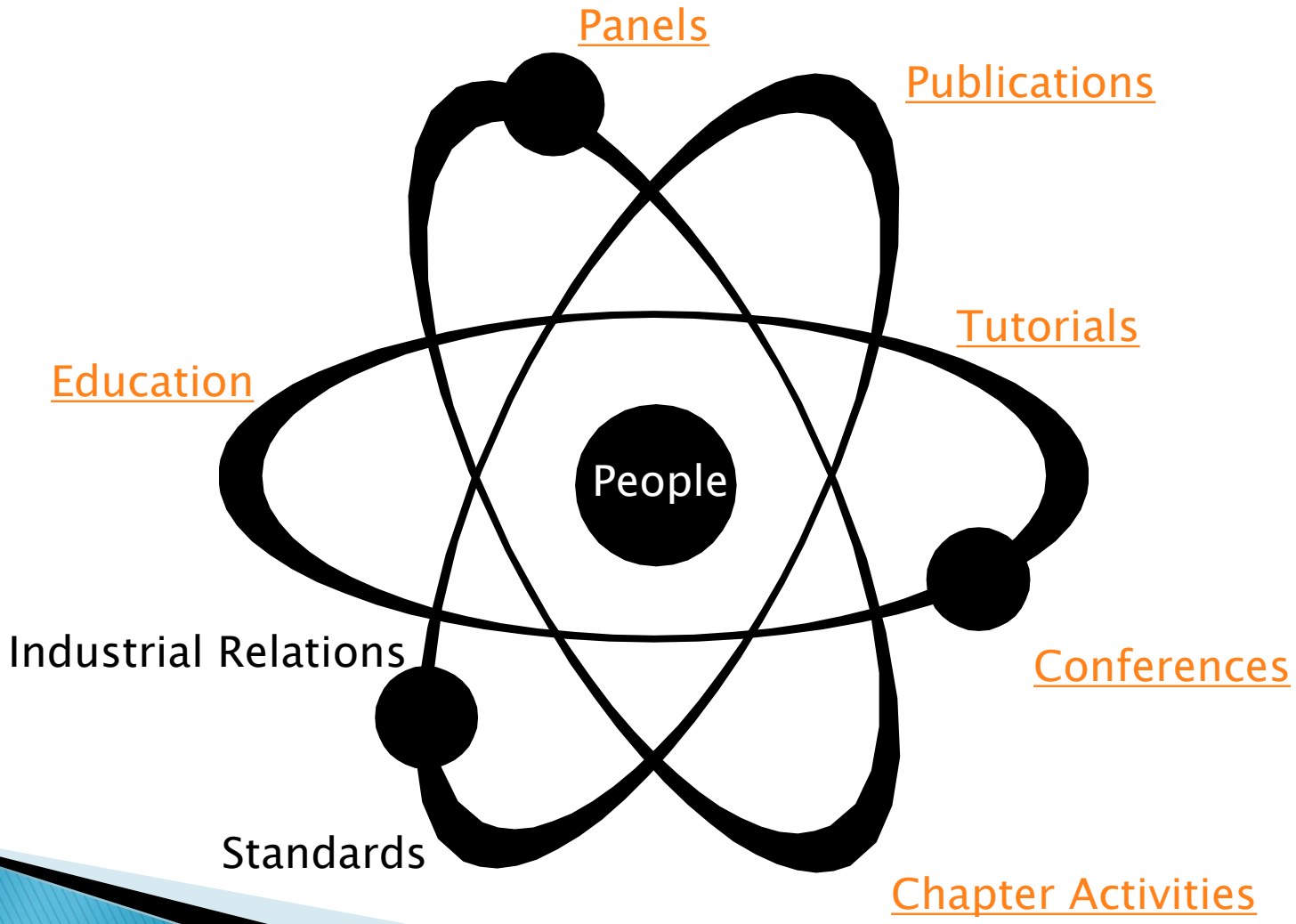
Presented to Board of Governors
by Roger Oliva, VP Technical Operations
September 18th, 2014
(updated since 5/22/14)



PANELS STATUS

- Gyro and Accelerometer: focused on **Standards**
- RADAR Systems: on track, **technology innovation**
- Space Systems: on track, **expand international member involvement**
- Target Tracking: **revitalize**
- Aerospace Control and Guidance: fantastic info but **may need a more robust plan**
- Aerospace Systems Integration Engineering, **requesting resources for seminars and webinars.**
- Aerospace Workforce: **"Defunct"**
- Avionics: **more robust plan needed**
- Cyber Security: "**Defunct**"
- UAVs: **more robust plan needed, finally meeting.**

What is at the nucleus of AESS Technical Operations?



Panel Structure

1)	Gyro and Accelerometer Panel	Randall Curry
2)	Radar Systems Panel	Maria Greco
3)	Space Systems Panel	Cosimo Stallo
4)	Target Tracking Systems Panel	Open – w/Blasch
5)	Aerospace Systems Integration Panel	Roger Oliva
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, Ogan
10)	Avionics Systems Panel	Paul Kostek
	Standards	Open (handled by Panels)

AESS – Technical Pursuits (tactical)

Goals and Objectives

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

Concept Developments

- Consider Workshops Similar to
  - 2011 Chapter Summit Click
  - DASC:Future of Aviation Click
  - Electric Aircraft Click
  - Waveform Diversity (2014)
- See TP's

RDT&E Activities

- Identify evolving technologies and 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
- Panel Award back in place.
- See TP's

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

Current Communications

Although we tried to meet…couldn't make the timing work. Generating perspectives:

- TP Goals and Objectives
- ROI Roadmap
- Suggest New Actions (BOG – strategic initiative)
- Inputs to include resource requirements
- Motion for resources so that each Panel may create at least 1 tutorial (Seeking topics and scope).
- Implement Peer Review Process for Panels (if when can attain quorum)

Outstanding Technical Panel of the Year Award recipient identified.

Doing what we can to make our panels functional and member friendly…

Panel – Peer Review Process Proposal

Identify 10 objectives for each panel and define metrics for each.

Have each Panel Chair or designate provide an independent assessment of each objective.

Consider weighting of objectives for 2nd round of assessments.

Summarize and report.

Previous Motion – Allocate Resources for Panel Tutorials

Develop three Technical Panel tutorials each year beginning ($5,000 each).

ROI: Gross income of 30 attendees at three conference workshops x $150 attendee registration less expense of $100 per attendee equals net income of $4,500. (not including pubs revenue)

Total Investment $1,500/year.

Evaluating success of activity at DASC.

GYRO and ACCELEROMETER

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

- Identify new sensor tech
- Single-Axis Interferometric Fiber Optic Gyros

Tactical (were strategic) initiatives:
- inertial sensor specification format guide
- test procedures, emerging new sensor technologies

System Committee
- IMU document plan
-Prep for IEEE STD 1559

-Sensor Committee
- Revise Stds 1293 and 528
- Resolve Std 517 issues
- Address Std 647 and 1554 tech issues.

RADAR

- Standards and terminology
- Education
  - student support initiative
  - radar design kit”

- Civilian Radar
  - 60 attendees in recent meeting
- Waveform Diversity
  - Successful workshop in 2014

- 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
- Propagation and communication experiments) on Q/V band channel of TDP#5 (Technology Demonstration Payload).

- Where are workforce concerns?
- South Africa and Brazil
- MetroAerospace Conference
- Track 2 Space Missions, Systems and Architecture in Big Sky
- Aerospace Conference
  - Space Missions Track

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

-No report

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

AEROSPACE SYSTEMS INTEGRATION ENGINEERING PANEL

- 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).
-Requesting resources for enhancing communications
-Leveraging opportunities exist with CTAP

Link with Systems Council?
-1. Electric Aircraft
-2. Intelligent Transportation
-3. Air Traffic Management
-4. Unmanned Aerial Vehicles
-5. Small Satellite Tech
-6. Workforce Development
-7. Open Standards
-8. Space Commercialization

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
- Complexity o f Electric Aircraft

-Control, guidance and navigation of bodies in gravity and self-induced dynamics when operating on low temperature, low friction surfaces

- March 2014 meeting.
- October 2014, Cleveland, OH (robust agenda)
- See recently posted report.

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?
- Eliminate all hardware backdoors!?! (IEEE/USA – CTAP)

- No report…
- Suggested to do: Public can be educated to reduce fear
- What near-term safeguards will exist against identity theft and industrial espionage?

AEROSPACE WORKFORCE

Goals and Plans:
Define, top down!

- 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

UNMANNED AEROSPACE VEHICLES

Goals and Plans: In Development, 1st Panel meeting is in the books.

- Build premier AESS UAV Conference activity

-Activities cross-over into the ACGS and Avionics Panels

Two Unmanned Aircraft Competitions per year – Motion, set aside $30,000 per year. Net expense anticipated: $15k per year.

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."

- No new report.
- Track-level participation considered for 33rd DASC in Colorado Springs
- 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.

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)

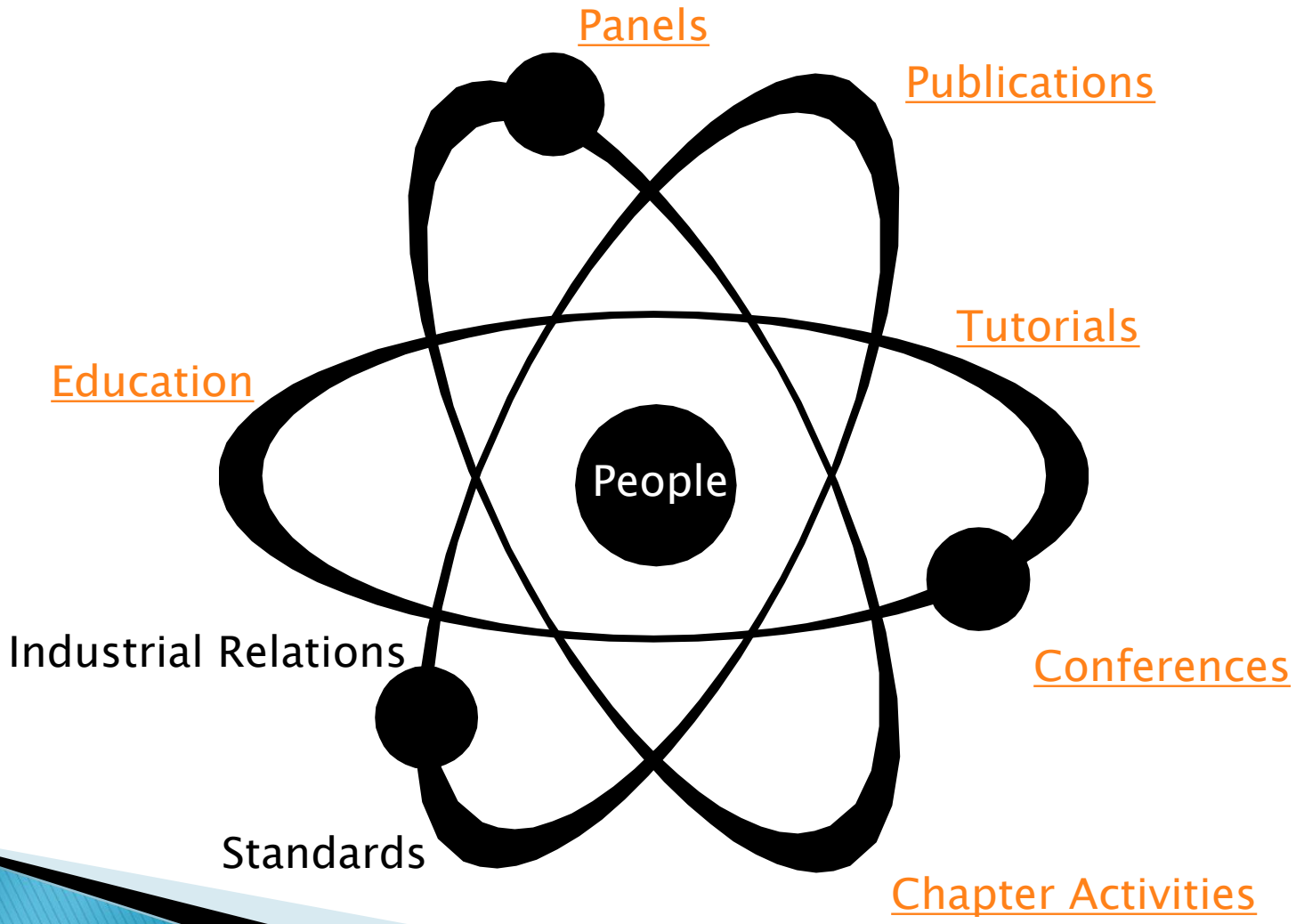
Mission Statement
Technical Operations

AESS Technical Operations are organized through Panels. The Mission of Panels is to fully engage the technical community to satisfy the AESS Vision and Mission within their focus areas. To support membership growth and satisfaction, Technical Operations will continue to provide the environment for collaboration of efficient and responsive technical solutions.

Strategic Implementation

- Adaptive planning/retargeting
  - Each BOG member is capable of identifying 3 initiatives per Panel.
  - Coordinate new objectives with Panels. When accepted, identify resource requirements.

What is at the nucleus of AESS Technical Operations?



BACKUP SLIDES

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 (amend to 11/4/14)).
- 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) (no interest to pursue?).
- Engage CTAP with Implementation Strategy to impact change (Recommended suspense, 11/4/13) (no interest to pursue?).
- 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 (no interest to pursue?):

Strategy

Introduce Panels or Committees (no interest to pursue?)

- 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 (no interest to pursue?).

Strategy

Create a banner for each Technical Panel to attract attention to AESS function at particular conference (~$400 ea) (no interest to pursue?).

Incorporate Chapter Activities on AESS Front I-Site (suspense?).(GS pursuing similar strategy)

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) (no interest to pursue?):

- 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) (no interest to pursue?):

-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) (no interest to pursue?):

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.

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

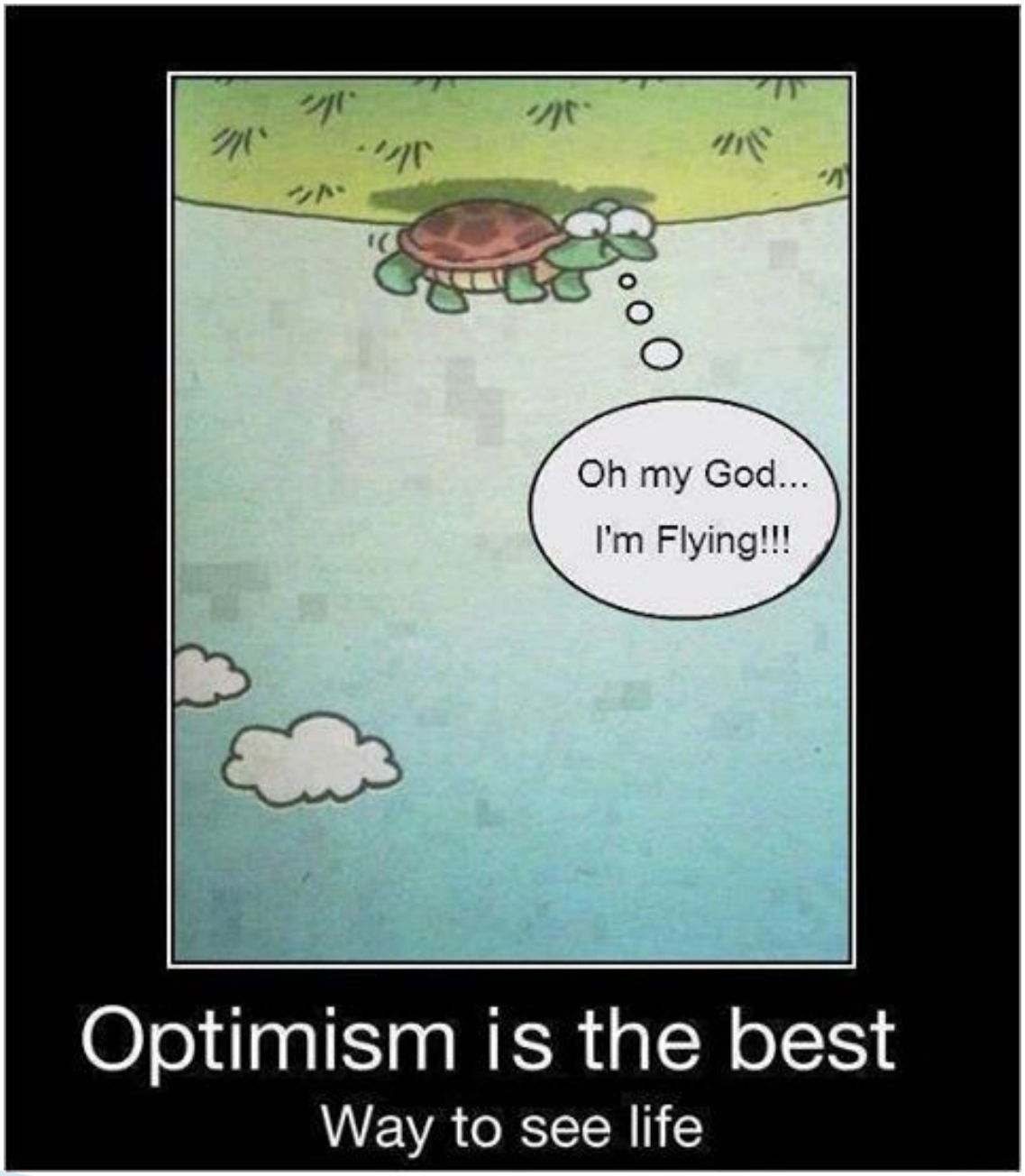
it's not the

$$V_f = V_i + at$$

that kills you, it's the

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

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


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

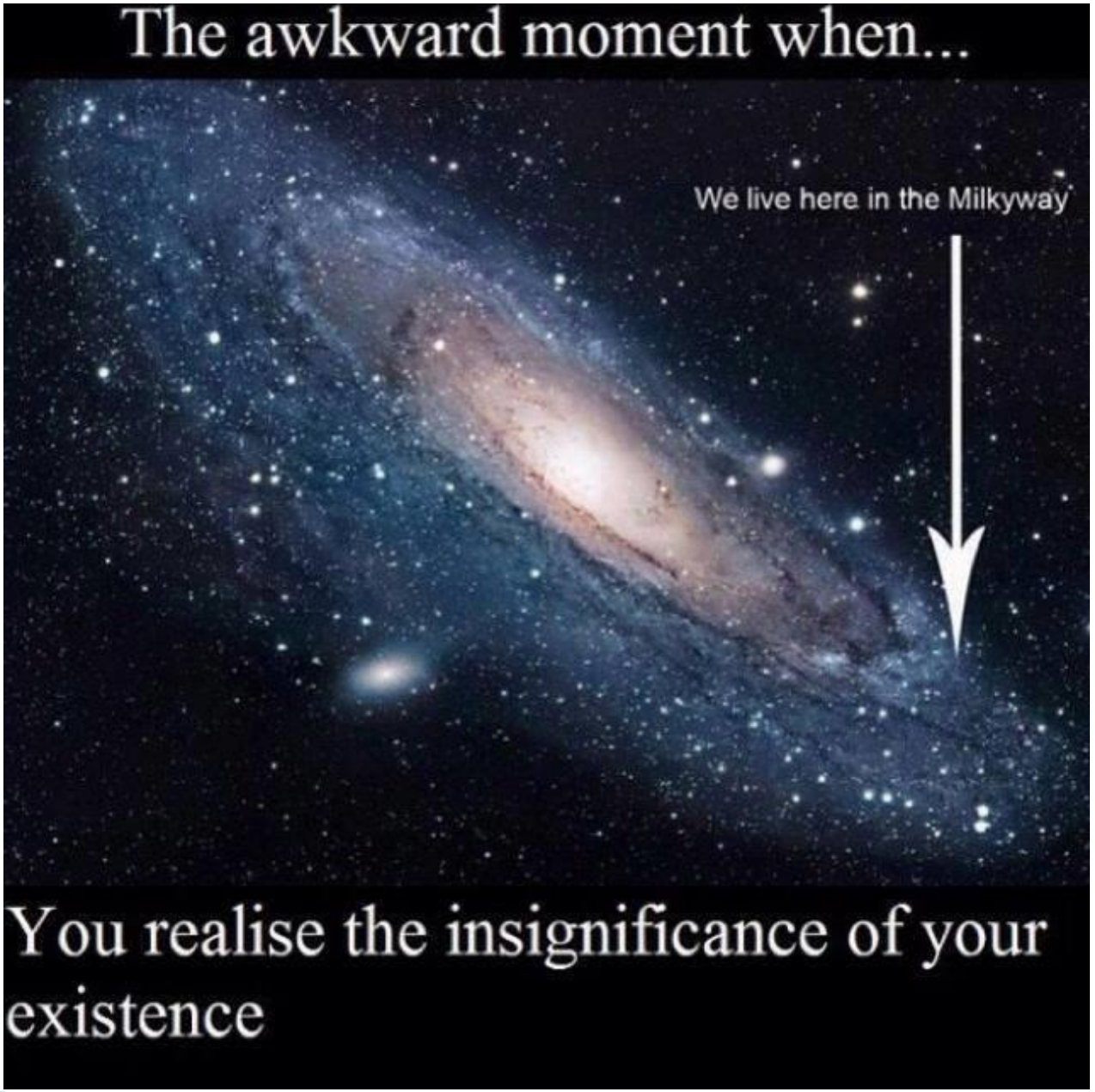
Optimist: The glass is **HALF** full

Pessimist: The glass is **HALF** empty

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

Light travels faster than sound.

This is why some people
appear bright
until they speak.


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