2011 CubeSat Workshop

Frequency Coordination Update, Etc.

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AMSAT-NA
August 7, 2011

Satellites Completing Frequency Coordination Since Start of Process in 2003

- Total of **143** Spacecraft Coordinated
  - Satellites Specifically Intended for General Amateur Community Utilization: **11**
  - Satellites Intended for University Use with Some Amateur Community Content: **132**
  - Satellites Coordinated in the Past 24 Months: **50**
    (Since 2009 CubeSat Workshop at Logan)

Satellites Currently In Coordination Process

- Total of **15** Satellites Currently In Frequency Coordination.

Satellite Coordination Processing Time
- During Past 12 Months -

- Minimum Processing Time: 10 days
- Maximum Processing Time: 10 months
- Average Processing Time: ≈ 2 months

[NOTE: Even 10 months is BRIEF Compared With FCC/ITU Processing Time Required for Most Space System Applications]

Applying for Frequency Coordination in the Amateur Satellite Service

- University Must Have:
  - Project that Complies with Rules of the Amateur Satellite Service Established by FCC/ITU
  - A Properly Licensed Radio Amateur Who Will Operate the Satellite Control Station.
- Ready to Apply?
  - Click on www.iaru.org
  - Click on “Satellite Service”
  - Click on “Frequency Coordination”
  - Submit Application Form to: IARU Satellite Advisor at satcoord@iaru.org

Summary of Amateur Radio Satellite Frequency Coordination

- Frequency Coordination Process Generally Working Well
- Universities Need to Become More Politically Active
- We Need Help With the Paperwork

Let's Change The Subject!
- Chapter 2 -

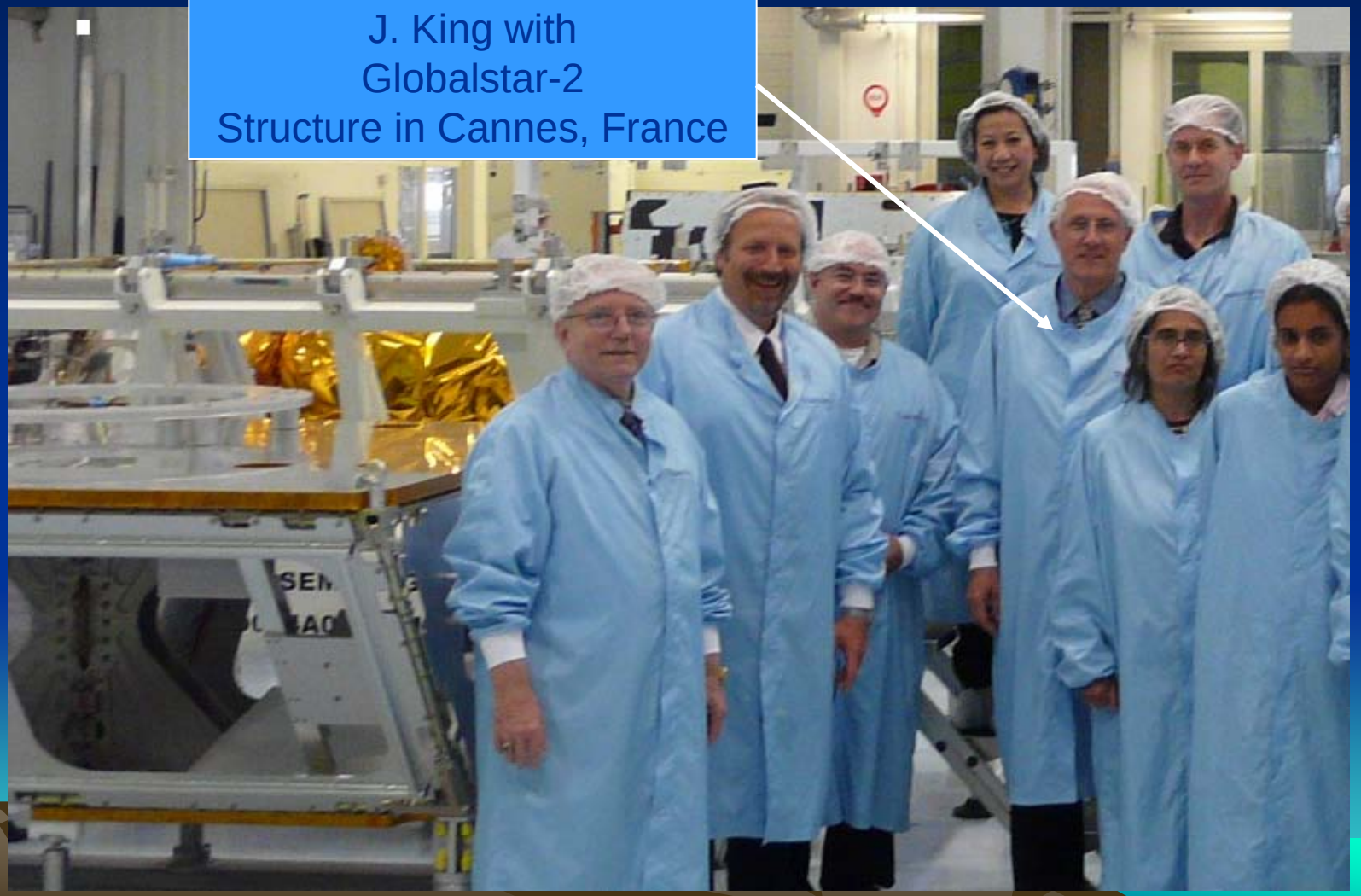
Joe Yeinger, The former Lead Mechanical Engineer of the Delta Launch Vehicle Project at NASA/GSFC had a banner behind his desk. It said:

"Old Age and Treachery…

Will Overcome Youth and Skill"

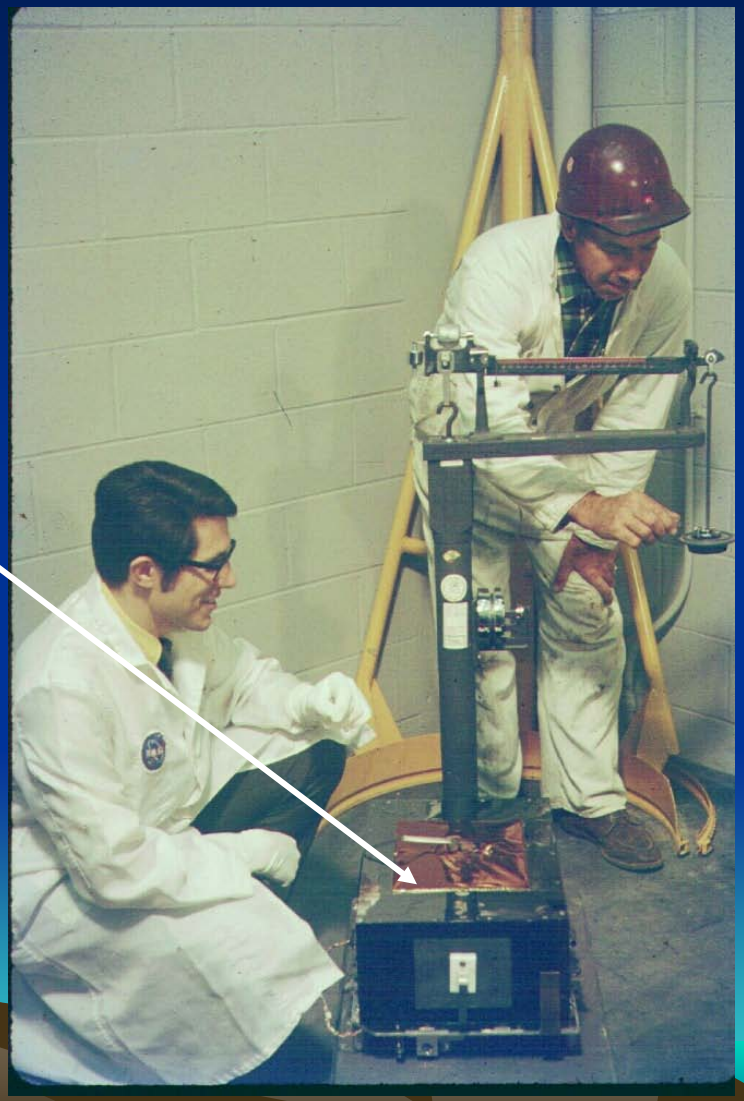
- Hold This Thought. We'll Come Back to It

Am I Over the Line Yet? Hmmm.



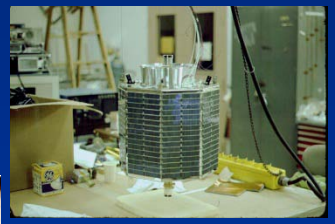
Youth and Skill…Clearly Youth and Skill!

J. King with
Australis-OSCAR-5
Late 1970



The Three Waves of the Real SmallSat Culture

- Wave 1: Amateur Satellites: 1961 to About 2000.

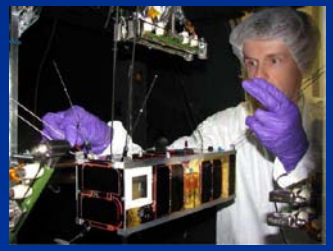
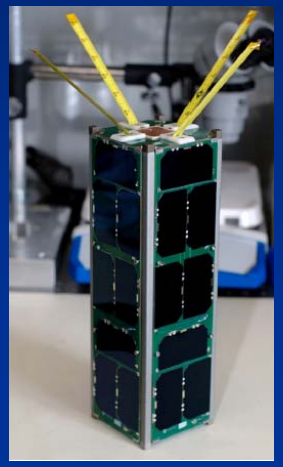





The Three Waves of the Real SmallSat Culture (2)

- Wave 2: University Satellites: 1980 – 2010



The Three Waves of the Real SmallSat Culture (3)

- The Third Wave? Is the Government Back in Charge Again? (Step Aside Son and We'll Show You How its Done).

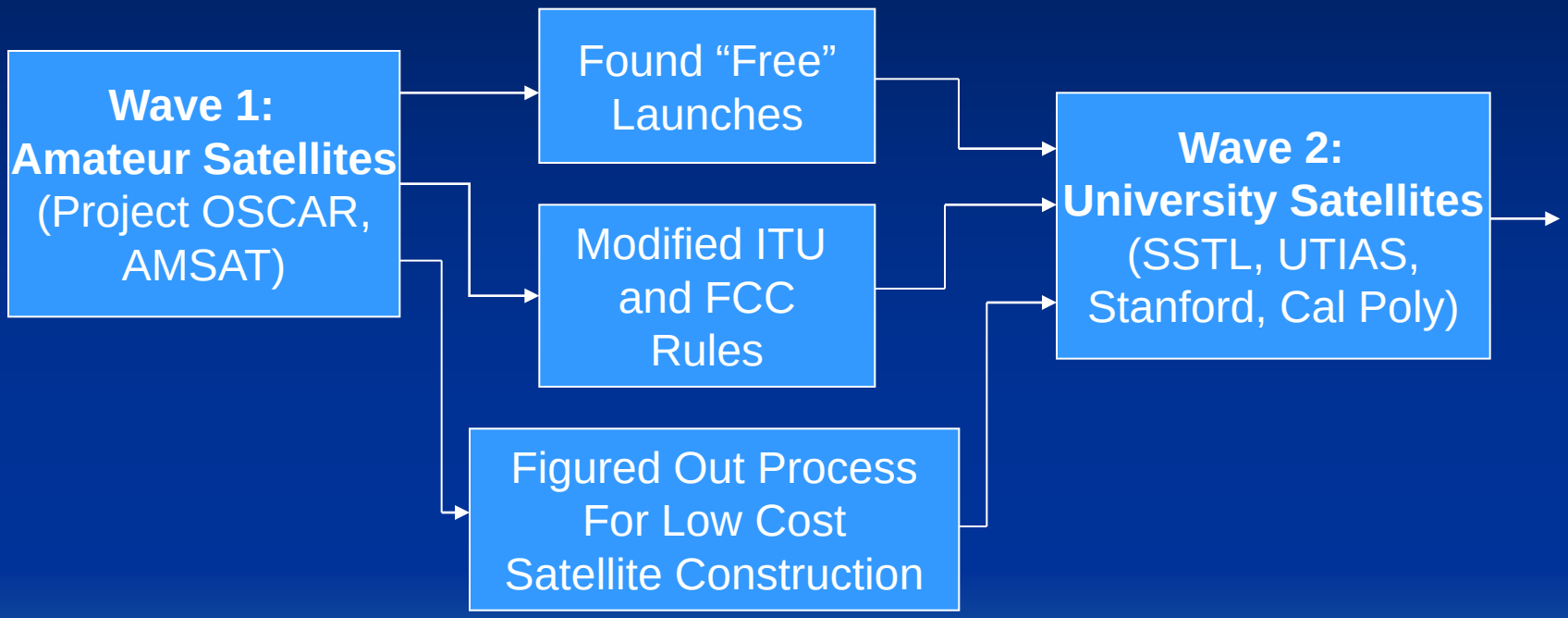
- The Following Government Agencies or Quasi-Government Organizations Are Known to be Involved in the Funding, Provision of Launches for, and the Design and Construction of Nanosat and Picosat Systems:

The Third Wave
(So Far) – And Counting

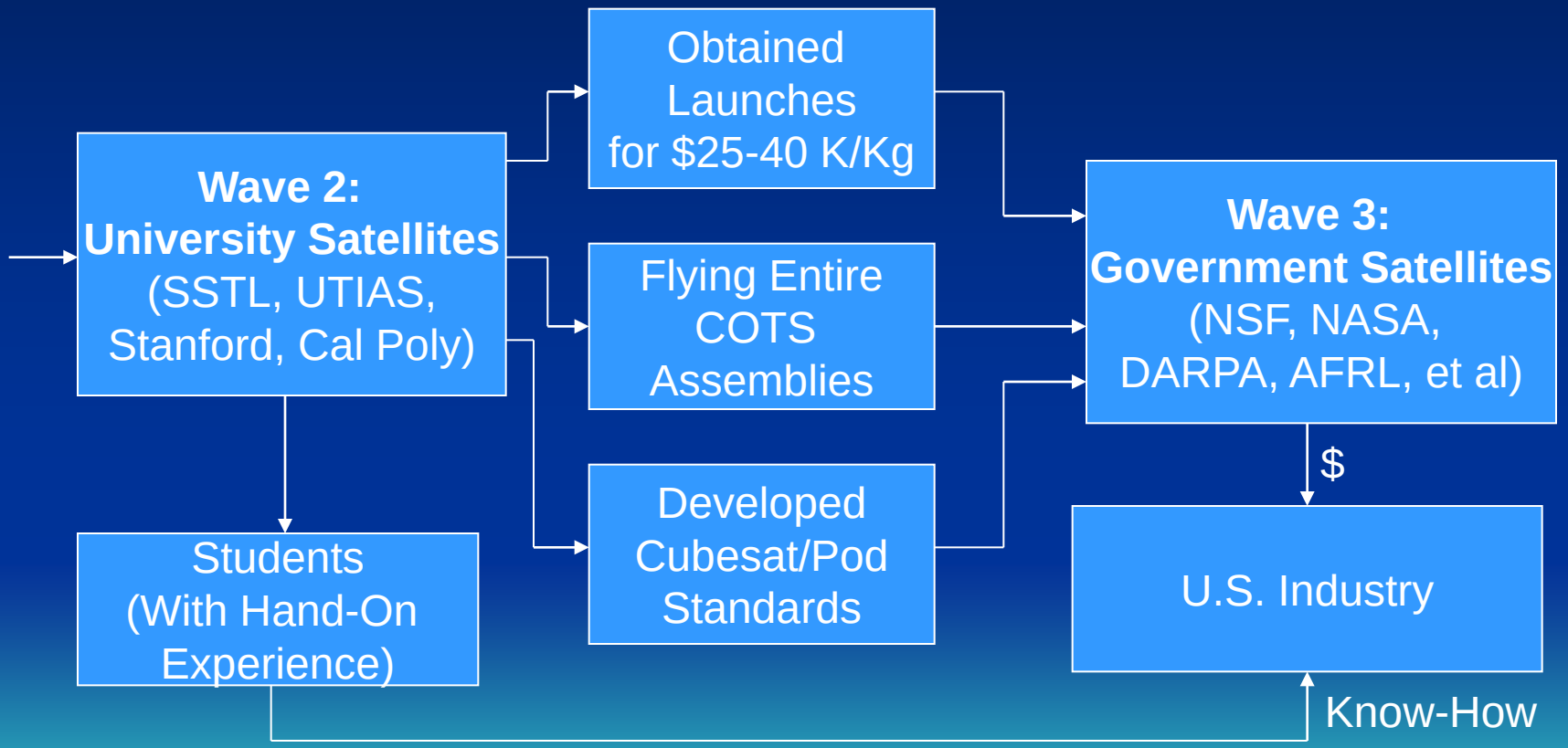
- Aerospace Corp.
- AFRL
- Army
- DARPA
- Los Alamos N. L.
- Sandia N.L.
- NASA
  - Ames
  - GSFC
  - JPL
  - Marshall
- NOAA
- NRL
- NRO
- NSF
- ESA
- CNES
- Oh: And Boeing and Honeywell (Not Gov.)

General Rule: When the Elephants Start Mating the Mice Should, Generally Speaking, Get Out of the Way.

What Happened?
(My View)

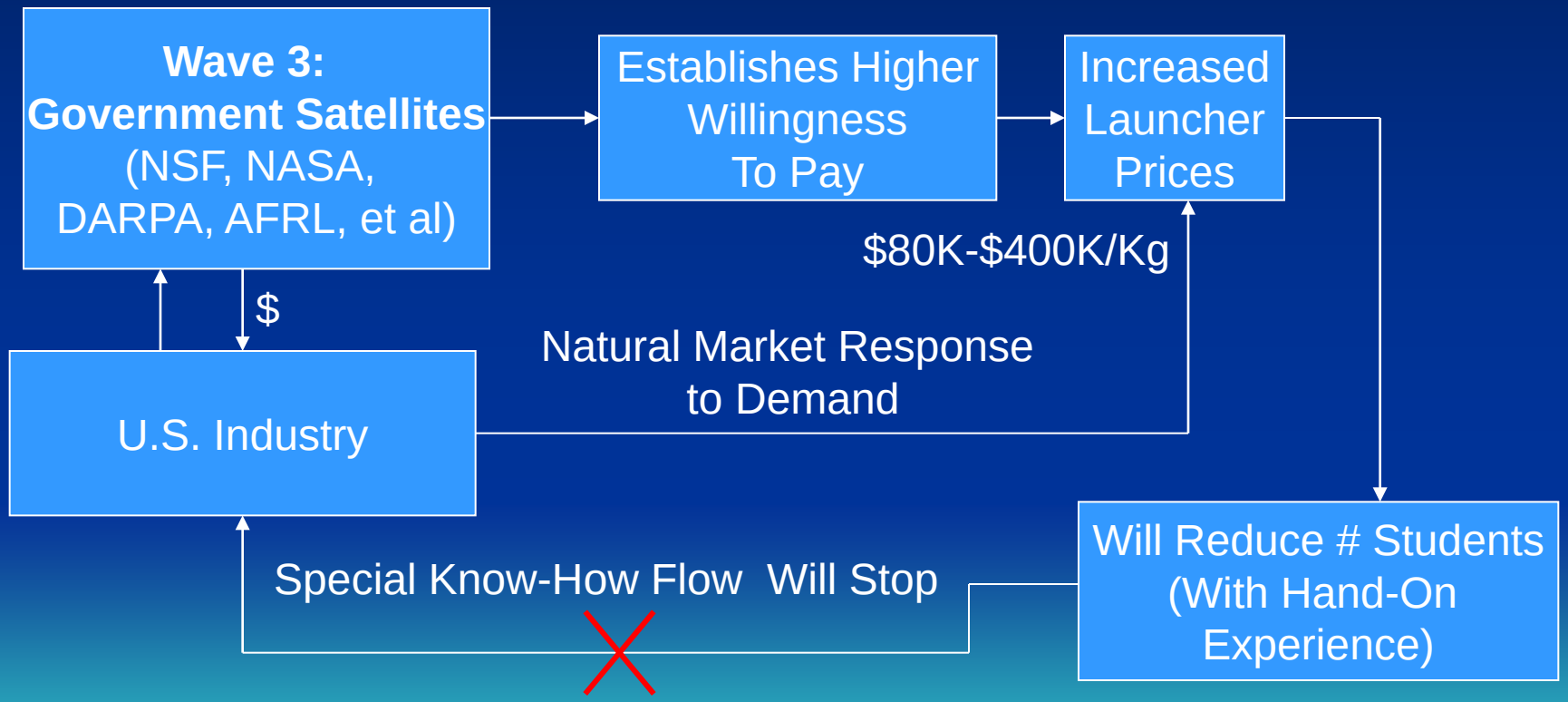


What's Happening Now? (My View) (2)



What Will Happen in the Future? (My View) (3)

This many Government Agencies Playing With Cubesats is "CREATING" a Demand in Market.



In Addition:

- Universities, in Order to Play in the Game They Created, Will Have to Play by the Government's Rules because they are Funded by the Government.
- Little or No Option Exists for Independent University Projects as the Launch Costs are becoming Too High.
- Radio Amateurs (Wave #1) are OUT Completely.

Government – Please Don’t Do This!

- Don’t kill the Goose that Laid the Golden Egg
- Don’t Fulfill The Banner Over Old Joe Yienger’s Desk!

Chapter 3:
Yep. The Government Again

SmallSats May be Going To
The WRC!

The Government Means Well But,
We Gotta Watch Them. They Work for
Us You Know.

This Time We Need to Help Them Help Us.

THE DOCUMENT:

UNITED STATES OF AMERICA

DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

Agenda Item 8.2: *to recommend to the Council, items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, taking into account Resolution* ***806 (WRC-07)***

Background Information: The use of nanosatellites and picosatellites, satellites having mass less than 10 kg,[1] is increasing for a variety of applications, including meteorology, space research and telecommunications. A large number of administrations from all ITU regions have launched these satellites. Academic and research institutions are designing and developing many more projects, with launches planned over the next few years.

These satellite systems exhibit certain characteristics:

a) they are built at low cost using off-the-shelf equipment, often based on a standard structural design;[2]

b) they employ off-the-shelf radiocommunication hardware that is small, lightweight, economical, and adaptable to a wide variety of missions;

c) they are launched as secondary payloads when space is available on launch vehicles; thus the launch date is not known well in advance;

d) the launch vehicle deploys them in a low-Earth orbit, though orbital parameters are not known in advance with any precision;[3]

RADIO FREQUENCIES ARE CHANGED OR ADDED USING RESOLUTIONS AT THE ITU.

Proposal:

ADD USA/8.2/1

RESOLUTION XXX (WRC-12)

Preliminary Agenda for the 2019 World Radiocommunication Conference

Reasons: To add a new item to the preliminary agenda of WRC-19.

ADD USA/8.2 /2

2.AA to consider the results of ITU-R studies, and based on the studies designate up to 10 MHz of spectrum, along with appropriate regulatory procedures, to accommodate command, control and data relay for nanosatellites and picosatellites in the 400-2 025 MHz range, in accordance with Resolution **[ZZZ] (WRC-12)**.

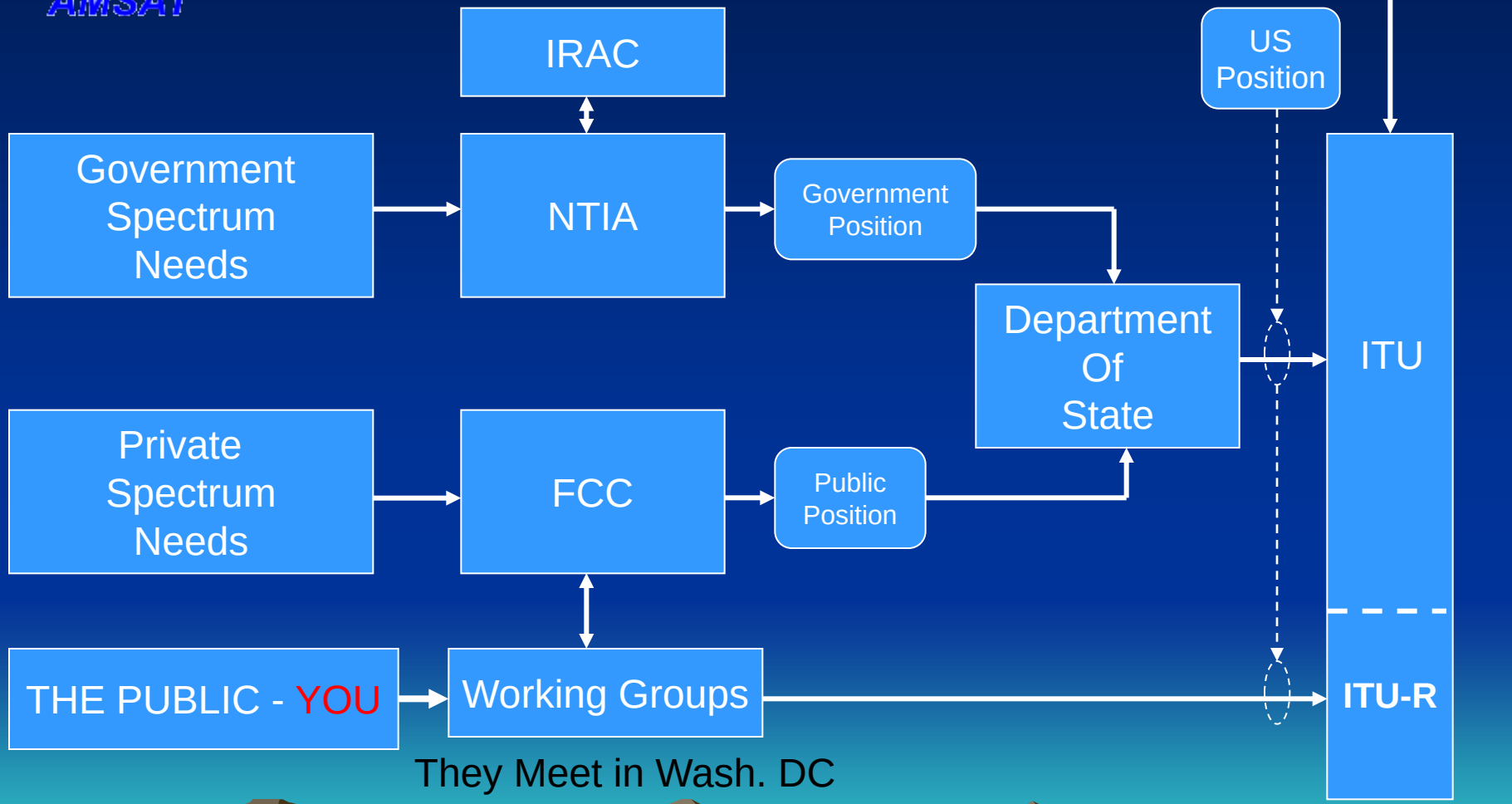
Reasons: Nanosatellites and picosatellites have characteristics unlike those of larger satellites and provide a growing variety of functions, mostly in meteorology, space research, and Earth sciences.

ADD USA/8.2/3

RESOLUTION ZZZ (WRC-12)

Studies for identifying up to 10 MHz of spectrum for the space research service in the 400-2 025 MHz range for the operation of nanosatellites and picosatellites

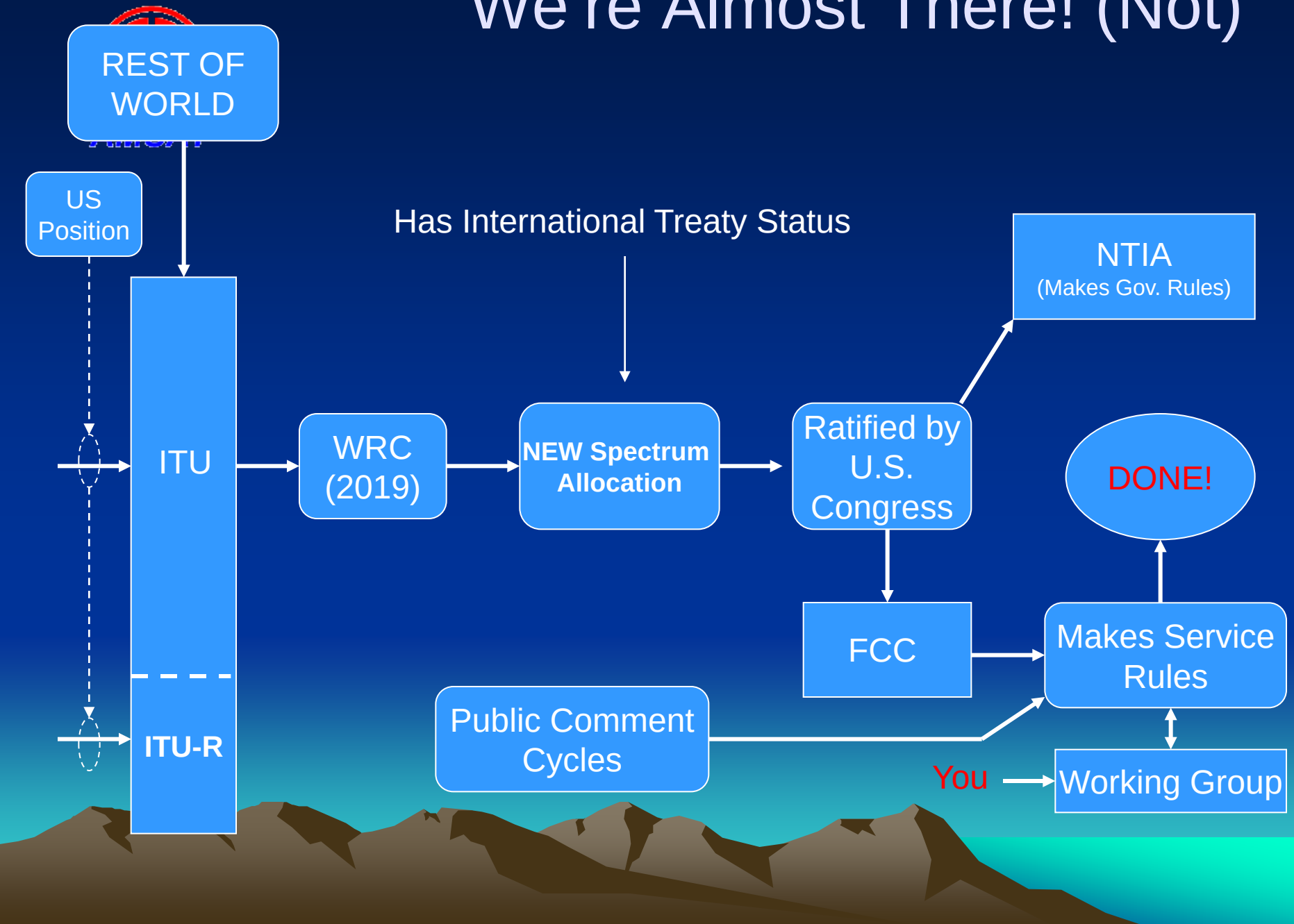
The System in USA



The Process and You

- Universities MUST Get Involved in the Working Groups Set Up to Deal With This Item. This has LONG TERM Implications!
  - Draft Position Papers going to US Government and Geneva. [ITU-R (i.e., technical, in particular)]
  - Make Sure Resolution(s) Say What We Need Them to Say (Spectrum-Wise and Rule-Wise)
  - Make Sure there is Balance Between the U.S. Government and Non-Government Tables.

We're Almost There! (Not)



In Summary

- Get Involved
- Shape Our Future

OR

- You Get What You Get
  And Don’t Complain!