Fundamental physics changes
in response to evolving NASA needs

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Ulf Israelsson
Jet Propulsion Laboratory
California Institute of Technology

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AGENDA

- Recent NASA Changes
- Growing need for access to space for physicists
- Rationale for updating the Fundamental Physics in Space Roadmap
- Advocacy help from the community
- Conclusions
Recent NASA Changes

- REMAP
  - Increased budget pressure from Life Science disciplines

- Mary Kicza putting her spin on OBPR
  - ISS focus on human-tended research
  - Increased importance of Strategic Research
    - Enabling a safe human presence beyond LEO
  - Free flyer initiative seeking a FY05 new start

- Societal relevance is still important

- To measure performance is still a requirement

- Columbia disaster
Recent NASA Changes continued

- JEM-EF delay has forced a slip of LTMPF and PARCS by 2+ years.
  - Budget arbitrarily reduced

- LTMPF–M1 re-programmed with SUMO instead of MISTE.
  - To maximize science return on first mission
  - Desire to link PARCS and SUMO clocks to further enhance science

Current Fundamental Physics ISS Options compared to 2002 Baseline

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Legend:
- Green: Fully funded through ISS FY08 budget horizon
- Pink: Funding starts beyond the FY08 ISS budget horizon
- Black: FHA dates are beyond FY08 ISS budget horizon
- Gray: Not in ISS funding baseline

Growing need for access to space for physicists

- Physics is standing at the threshold of major discovery.
  - Two of our foundational descriptions of nature, quantum mechanics and general relativity, are incompatible with each other.
  - When scientists resolve this conflict, a different view of reality may emerge.

- Cosmological observations are providing additional clues that our understanding of reality is in need of modification.
  - Most of the energy content of the Universe resides in unknown dark matter and dark energy that may permeate all of space-time.

- Resolving the Quantum/gravitation conflict may also shed light on the cosmological unknowns.

- Today’s availability of high-resolution technology and space access represents a unique opportunity for scientists to address these questions.

- Quiescent sub-microgravity freely flying research platforms would enhance the chances of major discovery substantially.
  - To be discussed on Tuesday afternoon
To continue growing as a discipline, we need to establish a new vision of where we are going that is consistent with today’s physics, NASA’s strategic plan, and the new OBPR direction.

1998 Roadmap focused exclusively on Physics, and did not worry about boundaries between OBPR and OSS

Updated Roadmap:
- Must incorporate some strategic research activities to be fully responsive to the current OBPR direction
- Must capture the imagination of OBPR leadership, OMB, and Congress.
- Must delineate OBPR from the “beyond Einstein” program in OSS
- Must address relevancy to Society explicitly

Status of the Roadmap development will be discussed after lunch today.
- Seeking community inputs and endorsement

Draft update targeted for June, final in August
In addition we must….

- Continue to demonstrate research productivity to NASA
  - Significant events
  - Press releases

- Remember that our accomplishments are ultimately evaluated by the scientific community
  - Prestigious peer reviewed journals reaching a wide audience

- Continue reaching out to students and the general public

- Keep thinking about how your technology improvements might be applied to solve human space exploration issues.

- Keep thinking about how your technology improvements might be used for Earth applications to enhance national security or promote industrial prowess.
Conclusions

- Change continues in the NASA environment
- The need for access to space for physicists is growing if we are to fruitfully address today’s challenging questions
- A new Roadmap is required to demonstrate the importance of our program to stakeholders
  - Roadmap plans and activities to be discussed after lunch today
- Our investigators must continue to advocate the benefits of our program:
  - To NASA and Congress
  - To the scientific community
  - To students
  - To the general public
- Our investigators must seek ways to use their advanced technology to support a human presence in space and to develop improved Earth applications

Acknowledgement

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