Space Weather Operations-to-Research Activities and Opportunities for Collaboration

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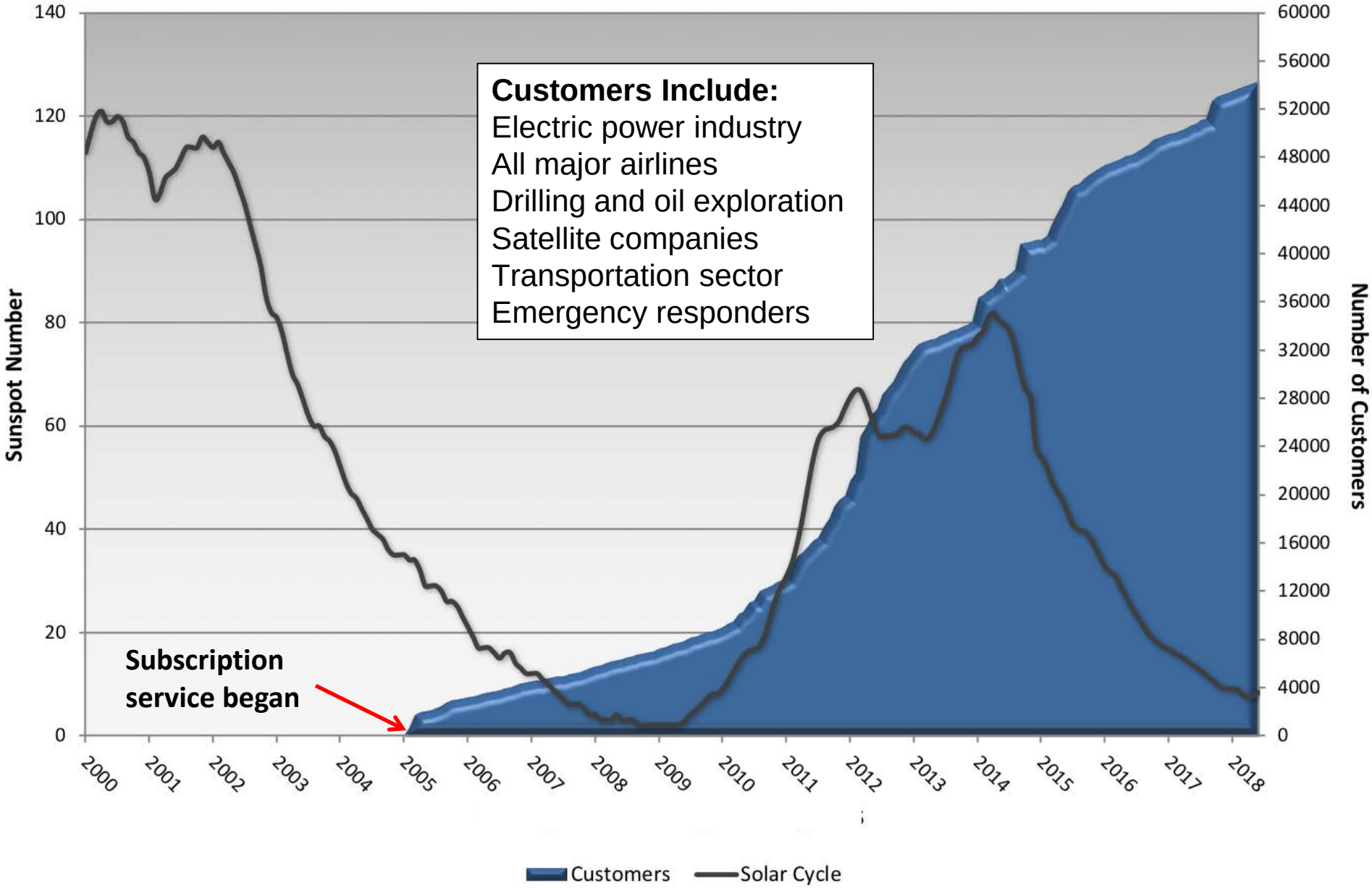
Main Points

Goal: Provide information (forecasts, nowcasts, retrospective) that enables economically important decisions

- Space weather product demand is increasing
- Applied research and research-to-operations efforts are expanding
- International cooperation could be expanded to utilize overlapping interests

Customer Growth
NOAA Space Weather Prediction Center – Product Subscription Service



Impacts on Critical Infrastructure - Economic Impact Study

FINAL REPORT

Social and Economic Impacts of Space Weather in the United States

September 2017

Abt Associates
Bethesda, Maryland

Written under contract for the NOAA National Weather Service
www.nws.noaa.gov

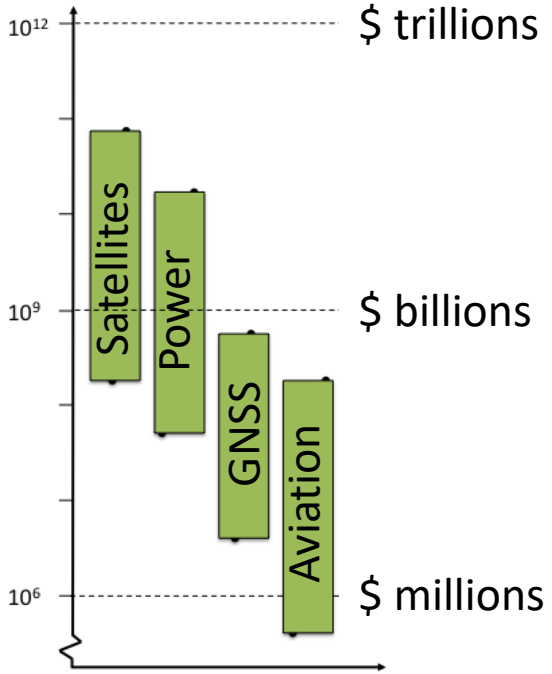
www.weather.gov/news/171212_spaceweatherreport

Source: Stacey Worman, Abt Associates

Key Findings

- Impacts are a real concern
- Stakeholders are interested
- Topic is complex
- Mitigation may be inexpensive
- Help value NOAA investments

Estimated cost of moderate/extreme event



Note: Costs represent first pass estimates not to be taken out of context or quoted without appropriate caveats. Qualitative information and quantitative framework are the more important contributions of this effort.

Space Weather Applications Research

Goal: Measurable near-term improvement to enable economically important decisions

New approach to connecting research and services:

- Targeted focus
- Flexible implementation
- Responsive to evolving priorities and capabilities

Full integration of multi-agency capabilities:

- Economic impact and user requirements surveys
- Research-to-operations and operations-to-research funding
- Community Coordinated Modeling Center

Applied Research Funding

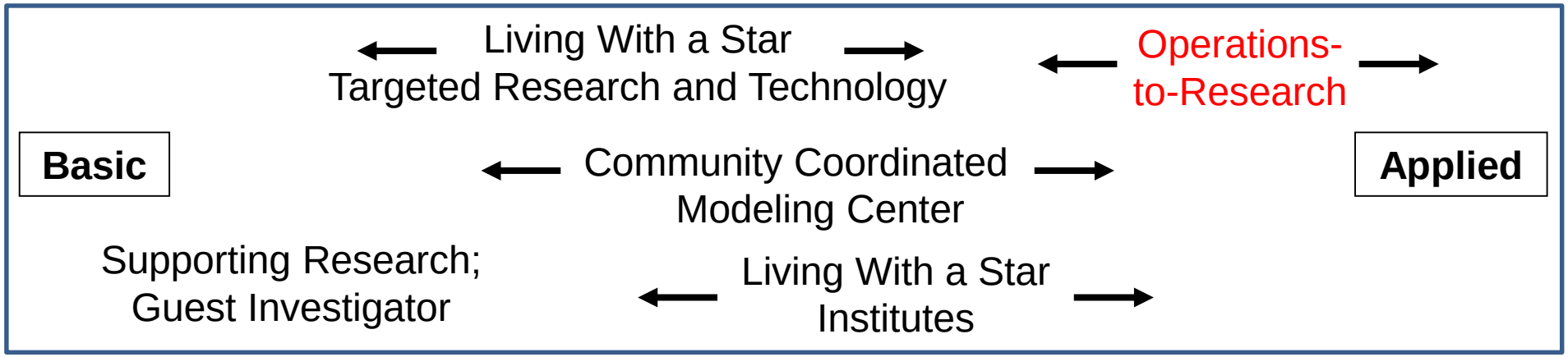
Pilot funding for Operations-to-Research proposals:

- Improve predictions of the background solar wind, solar wind structures, and CMEs
- Data assimilation and machine learning encouraged
- Proposals were reviewed June, 2018

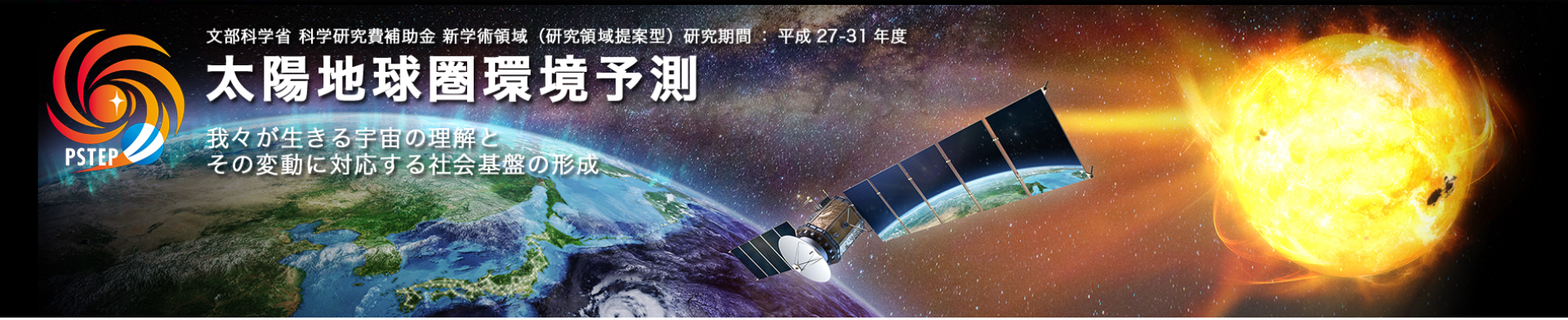
Improve specifications and forecasts of energetic particle and plasma encountered by spacecraft:

- Definition of products required
- Definition of metrics and validation methods required
- Industry participation strongly encouraged
- Proposals due August, 2018

Heliophysics Research and Space Weather

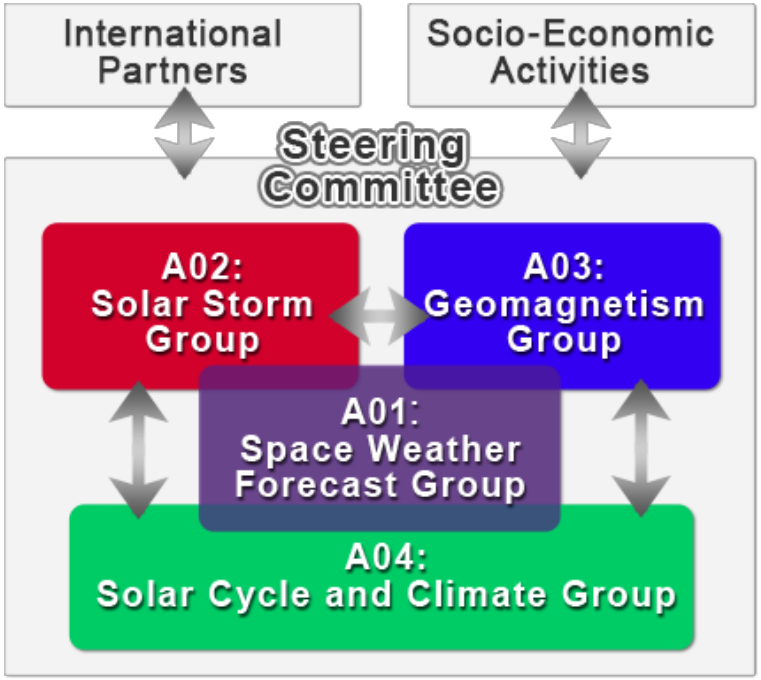


- Funding opportunities are now available across the spectrum from basic to applied research
- Challenge is to enhance and evolve the research-community participation in applied research and have all elements work synergistically



Project for Solar-Terrestrial Environment Prediction (PSTEP)

Goal: Synergistic development of solar-terrestrial science research and the next generation space weather forecasts



Horizon 2020 - Space Weather

Goal: Forecasting space weather 10s of hours to days in advance

- Develop modeling capabilities
- Develop prototype services
- Identify indicators of extreme events
- Application domains include space and terrestrial infrastructure
- Open to international partners

Summary

- Demand is increasing for space weather services – electric power, aviation, satellites, navigation, communication
- International focus is growing on space weather applications
- Interest is increasing among industry and users of space weather information
- Research funding is becoming available to address applied topics
- Question: How do we coordinate our national and international effort to benefit from the expanding interest and deliver the focused service outcomes needed?