



Welcome



Poker Flat Research Range Draft Environmental Impact Statement Public Meetings



October 24-25, 2012



Meeting Agenda



- **Welcome**
- Purpose and Need
- Issues
- Alternatives
- Environmental Analysis
- Q & A
- Public Comment
- Closing Remarks



Why are we here?



- Discuss the Draft EIS prepared for the NASA Sounding Rockets Program at Poker Flat Research Range
- Solicit public comments on the document
- Foster a greater understanding of the operations at Poker Flat



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Purpose and Need



Purpose

- Continue to safely launch sounding rockets from Poker Flat to study the sun-earth connection, the upper atmosphere, and climate change.

Need

- A large range of unexplained phenomena exist in the upper atmosphere, many of which can only be explored at high latitude with sounding rockets.
- Poker Flat is the *only* high latitude, auroral zone launch facility in the U.S. that permits northerly launches.
 - Established flight zones enable safe operations
 - Allows multiple, near simultaneous, launches
 - Array of established ground-based research instruments and historical datasets
 - Overland launches enable research staff and equipment to be “under” rocket trajectories
 - Established launch site infrastructure and ease of access
 - Research partnerships with university staff



Why Sounding Rockets?



- Rockets permit the only means to study the lower ionosphere (50 - 95 mi) and middle atmosphere (25 - 50 mi) with direct measurements
- Can measure areas that neither orbiting satellites, aircraft, nor balloons can measure; both in time and space
- Can be launched when and where the science of interest is occurring such as studies of the aurora which we have to wait to develop
- Multiple payloads (clusters) can be launched on a single rocket
- Multiple, simultaneous launches can be conducted to study the entire spatial area



Needs for Science at Poker Flat



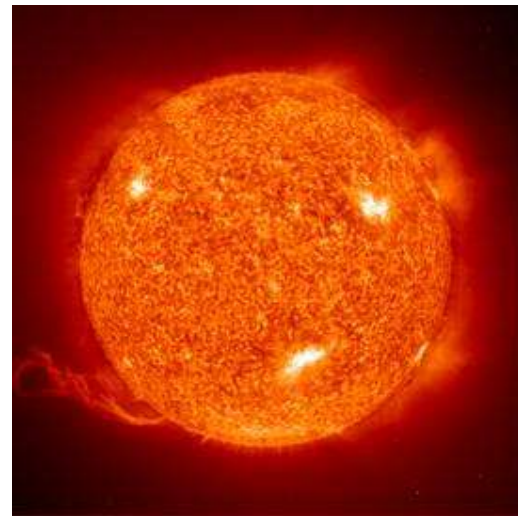
- The aurora contains a large range of unexplained phenomena that can only be explored with sounding rockets
- The Arctic upper atmosphere is an essential region of the earth's environment; must be measured if we are to understand how the Earth and the Sun interact
- Everyday examples of how understanding these phenomena can improve life on Earth
 - Health: the magnetosphere and atmosphere protect living things from radiation from the Sun; ozone research; climate change
 - Communications: satellite, radio, and TV signals can be affected by solar radiation
 - Power systems: geomagnetic storms can cause power outages
 - Corrosion: the aurora induces strong electrical currents along good conductors such as oil and gas pipelines resulting in corrosion
 - Migratory animals: birds, bees, and other creatures that use Earth's magnetic fields to navigate are affected by geomagnetic fluctuations



Science Missions at Poker Flat



- Sun-Earth connection
 - Major focus of NASA's Science Mission
 - Poker Flat is ideal location to study the aurora
- Atmospheric air quality:
 - Air Sampler Missions (University of Pittsburg)
 - Sample middle atmospheric air pollutants
 - Polar Nitrous Oxide Mission (Virginia Tech)
 - Measure nitrous oxide in lower atmosphere
 - Nitrous oxide is believed to be a destroyer of ozone (winter ozone hole)





Cooperating Agencies



- Authorizations required for land impact and recovery
 - U.S. Fish and Wildlife Service – Special Use Permits
 - Arctic NWR
 - Yukon Flats NWR
 - Bureau of Land Management – Land Use Permit
 - White Mountains NRA
 - Steese NCA
- Range ownership and maintenance of agreements
 - University of Alaska Fairbanks
 - Federal and State landowners
 - Alaska Native Corporations
 - Federal Aviation Administration



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Scoping and Identification of Issues



EA Scoping: Fall 2010

- Led to decision to prepare EIS

Scoping Period: April 13 – June 1, 2011

- 5 written (letters/emails)
- 4 oral comments over 5 public meetings

Key Issues

- Assessment of other potential launch sites
- Assessment of technologies to facilitate location and recovery of items
- Impacts on
 - Special Use Lands
 - Subsistence
 - Wildlife
 - Recreation
- Cumulative effects



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Alternatives



- Macro-screening of alternative launch sites initially conducted considering three key factors
 - Science
 - Safety
 - Practicality of Support Facilities
- Micro-screening then conducted focusing on issues raised during scoping
 - Avoiding or lowering probability of impact within most sensitive lands
 - Improving ability to locate items within downrange lands
 - How to best recover items that are located



Alternatives



- 5 Alternatives evaluated in detail, including No Action
 - Average of 4 launches per year (same as recent past)
 - Launches during winter months (Oct-Apr)
 - Avoid planned impacts within designated Wilderness
- Two key issues define the Alternatives
 1. Level of effort for location and recovery
 2. Avoid planned impacts within most sensitive land uses



Alternatives



- **No Action Alternative**
 - Recovery of items only if part of mission objectives
- **Alternative 1**
 - Adopt formal *Recovery Program*
 - Maintain ability to leave all or part of located item should safety or environmental conditions warrant
- **Alternative 2**
 - Same as Alternative 1, except
 - Full recovery of located items required unless unsafe for crew
- **Alternative 3**
 - Same as Alternative 1, except
 - Avoid planned impacts within designated Wild or Scenic Rivers
- **Alternative 4**
 - Same as Alternative 2, except
 - Avoid planned impacts within designated Wild or Scenic Rivers



Recovery Program



Three Primary Components

1. Continual improvement of location aides

- Refinement of telemetry/radar derived impact prediction
- Test and evaluation of new location devices for motors, as practicable

2. Search for all newly-launched stages and payloads; recover if practicable

- Annual recovery budget
- Post launch search flight
- Follow up flight if not located initially
- Fair weather recovery

3. Leverage outside resources

- Rewards Program for reported items, regardless of mission sponsor
- Public outreach
- Tested in recent years as interim measure; *highly effective*



Interim Recovery Status



- Since June 2011, approximately 20 items have been reported by users of downrange lands
- Majority of items have been within Arctic NWR
- All items with reliable coordinates and/or landmarks have been removed and transported to central locations for pickup
- Search efforts have led to finding other unreported items
- Recent operations have identified more efficient means for recovery



Interim Recovery Example - Motor



Before



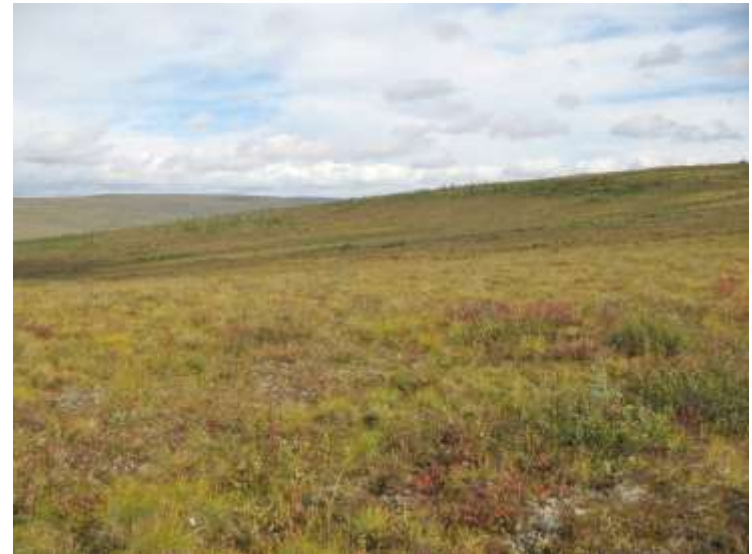
After



**29 Mile Ridge
(YFNWR)**



Interim Recovery Example – Payload



**Brown Grass
Lake
(State of AK)**



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Environmental Analysis



Methodology

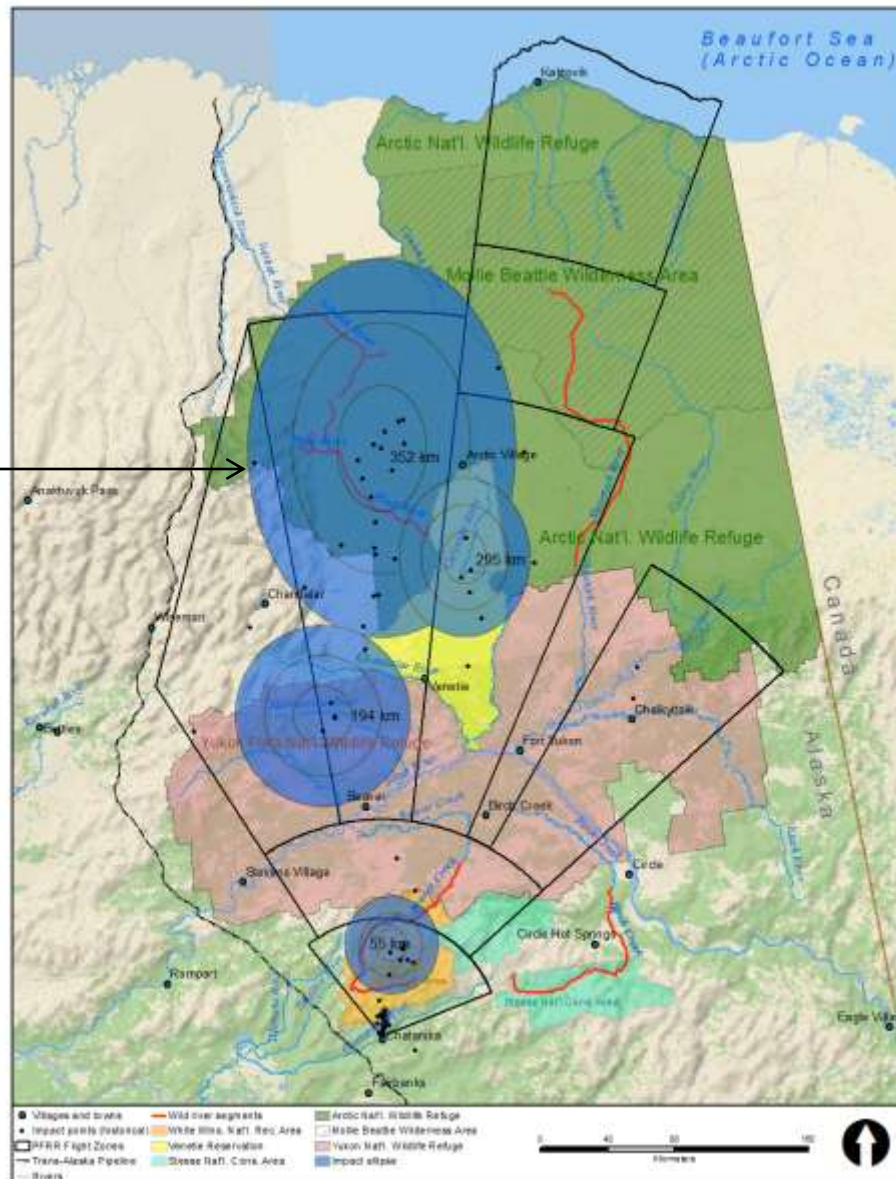
- Developed 7 scenarios best representative of future launches and subsequent recoveries
- 50-50 split between most common 2- and 4-stage launch vehicles
- “Programmatic” consideration of non-winter launches will require additional mission-specific analysis before approval
- Clear definition of type, context, intensity, and duration of impacts
- Ranges presented for resources when appropriate
- Review of available historical records for cumulative effects



Typical Impact Locations Employed in Analysis



3-sigma dispersion





Environmental Analysis



Summary of Key Findings

- In general, impacts on resources are negligible to minor
- No Action Alternative would likely contribute to significant impacts on Land Use and Waste
 - Limited recovery would not be in compliance with landowner permits
 - Greatest long-term deposition of waste in downrange lands

Resource Areas

- Air Quality
 - Electricity consumption greatest contributor
 - Criteria pollutant emissions:
 - CO - 21-25 tons per year (TPY)
 - NO_x - ~7 TPY
 - Others - <1 TPY
 - Greenhouse gases
 - CO₂e - 2,100 – 2,200 TPY



Environmental Analysis



Resource Areas (cont.)

•Water and Soil Resources

- Minor localized impacts due primarily to corrosion of metals and trace quantities of solid propellant
- Physical disturbance (resulting in localized turbidity) expected to be negligible during winter conditions
- Disturbance during recovery more likely; however localized
- Probability of impacting existing Wild Rivers can be highly variable
 - “Typical” launch probability approximately 5 percent chance

•Noise

- Launch and re-entry of flight hardware would be short-term
- Search and recovery greatest contributor; however minor due to limited number of operations; restrictions on flight altitude
- Could be highly variable and dictated by environmental conditions



Environmental Analysis



Resource Areas (cont.)

- Visual Resources
 - Would not change the overall visual characteristics of lands
 - Impacts would be localized, and dependent upon person(s) who encounter items
 - Recovery flights would be short-term
- Ecological Resources
 - Landowner imposed operational constraints provide protections to plant, fish, and wildlife resources
 - Search and recovery greatest contributor to potential startle and temporary relocation; however minor due to limited number of operations; restrictions on flight altitude
 - Consulted/Conferred with USFWS and NOAA Fisheries on Federally-listed, proposed, and candidate species
 - No effect on seasonally absent species
 - Not likely to adversely affect year-round species



Environmental Analysis



Resource Areas (cont.)

•Land Use and Recreation

- Potential for impact in Wilderness remote
- Would not impair recreational activities
- Impact locations outside of areas of greatest known use
- Impacts would be localized, and dependent upon person(s) who encounter items
- Recovery flights would be short-term

•Cultural Resources

- Known sites density between 20 and 50 per million acres
- Potential direct or indirect impacts very low
- Alaska SHPO concurred with “no historic properties affected”

•Subsistence

- Would not restrict or limit activities in downrange lands
- Temporary startle of wildlife possible during summer recovery, however number of recoveries would be small and flight restrictions would reduce impact



Environmental Analysis



Resource Areas (cont.)

- Transportation
 - Negligible impacts on transportation systems or safety
- Wastes
 - Potentially hazardous materials in very small quantities with limited potential for exposure to persons on the ground
 - Potential long-term impacts from solid waste (flight hardware); dependent upon location and recovery success rate
- Health and Safety
 - Conducted in accordance with standards in place at all U.S. ranges; some PFRR-imposed requirements are more stringent
- Socioeconomics and Environmental Justice
 - Approximately \$2 million in annual economic output
 - EJ populations present within launch corridor
 - No disproportionately high or adverse effects on them



Environmental Analysis



Cumulative Effects

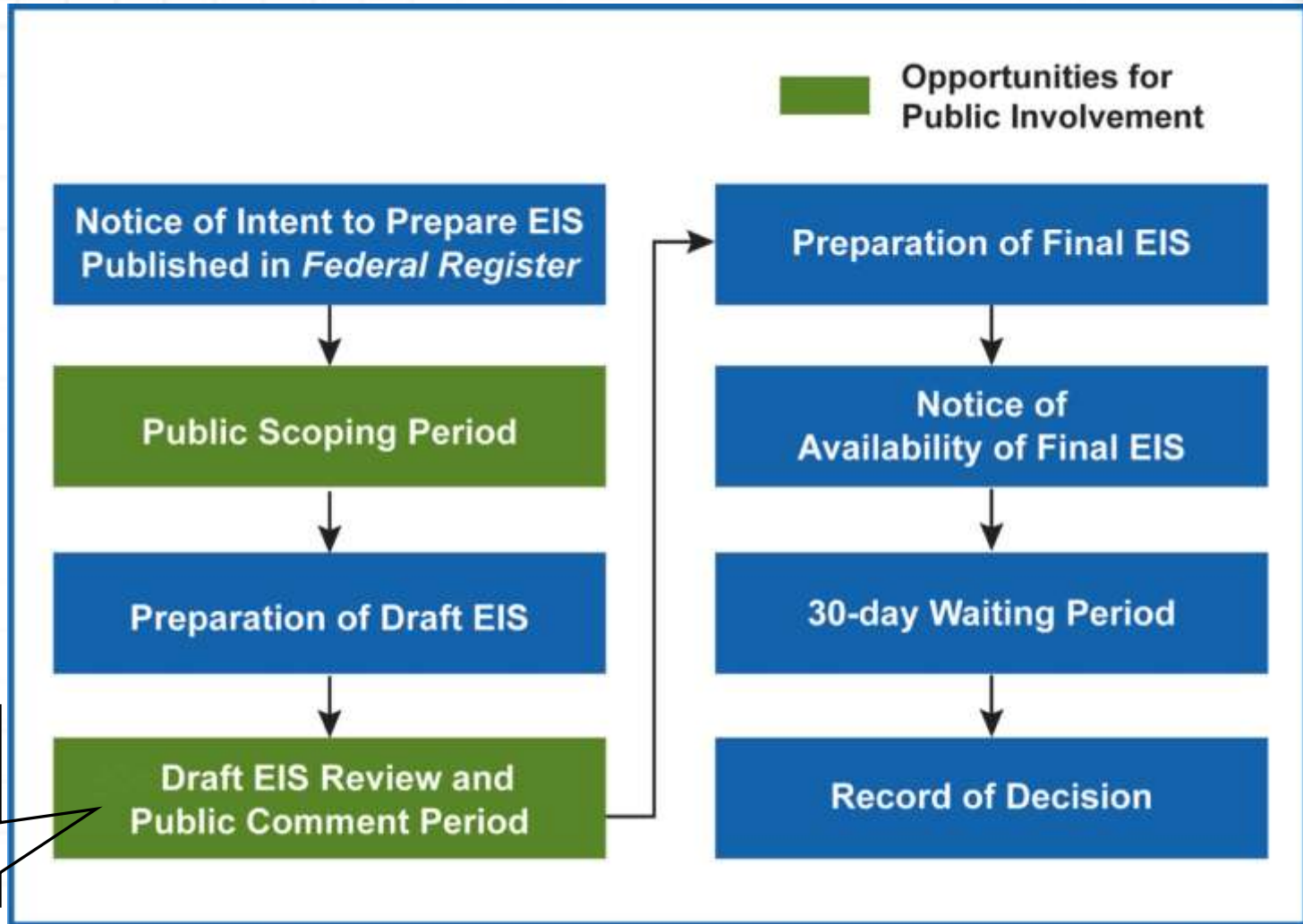
- Many unrelated actions ongoing or proposed within or adjacent to PFRR launch corridor
 - In general, PFRR activities contribute negligible additive impacts
- Cumulative waste most important issue raised during scoping
 - Unavailable information for most non-NASA launches
 - Limited information for earliest launches
 - Majority of material is located within ADNR Special Use Areas north of launch site
 - In future, it is possible that quantities of material on non-ADNR Special Use Areas would decrease

Mitigation

- Recovery Program an integral part of each action alternative
- Mandatory terms of landowner authorizations further reduce intensity of impacts



EIS Process Flow





Current Schedule



- Scoping Spring 2011
- **Availability of Draft EIS** **Fall 2012**
- Availability of Final EIS Spring 2013
- Record of Decision Summer 2013



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Written Input



Your feedback is welcomed and multiple options are offered:

- Submit written comments
- Submit oral comments
- Submit written comments via email to:
Joshua.A.Bundick@nasa.gov
- Mail/fax written comments for receipt by **November 28, 2012** to:

Joshua Bundick

Poker Flat Research Range EIS

NASA Goddard Space Flight Center's Wallops Flight Facility

Wallops Island, Virginia 23337

(757) 824-1819 (fax)



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Closing Remarks



- Thank you for attending, your input is a valued part of this process



Back-up Slides



Back-up Slides



What is NASA's Sounding Rockets Program?



- NASA Wallops Flight Facility manages the Program for NASA's Science Mission

3 critical elements:

- Unique, cutting edge science missions
- Platform for the conception, testing, and development of new technology
- Training ground for students, young researchers and engineers

Two important features of the program:

- Low Cost
- Rapid, quick response





What is NASA's Sounding Rockets Program?



The Program conducts 20-30 missions per year from fixed and mobile launch sites around the world to meet the needs of researchers and scientists. Launch vehicle success rate is ~98%



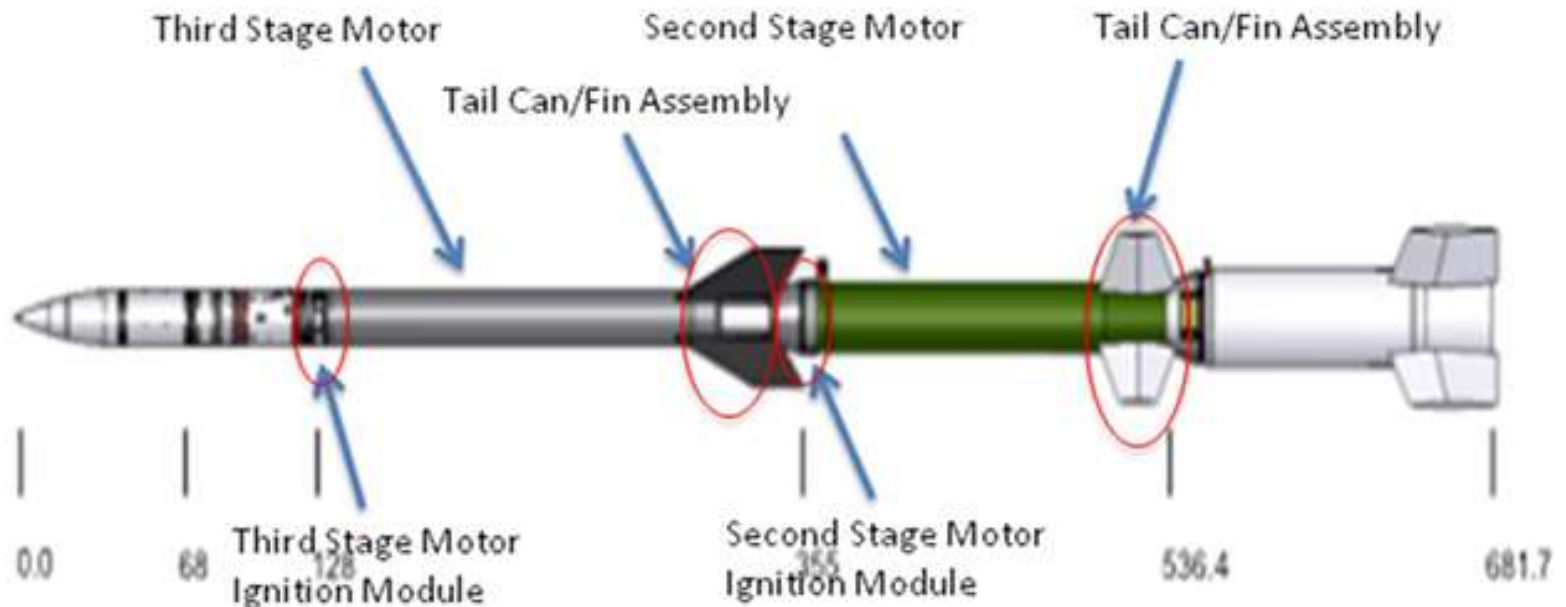
Missions are conducted in partnership with universities and government agencies



What is a Sounding Rocket?



Name is derived from nautical term meaning “measurement.”



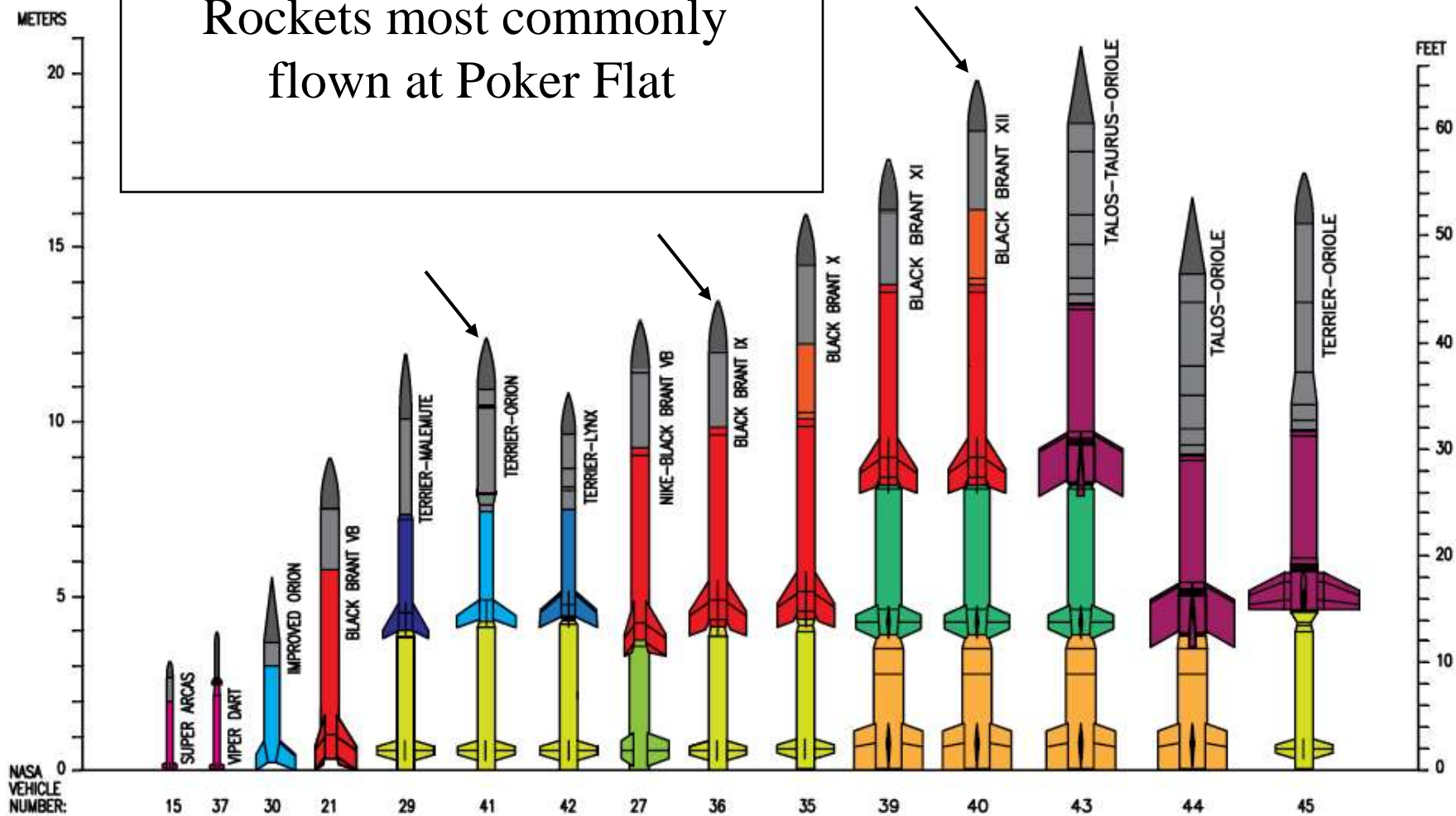
Sounding rockets are a variety of sizes ranging from the the single-stage Super Arcas which stands at 7 feet to the largest, the four-stage Black Brant XII which stands 65 feet tall.



Sounding Rocket "Stable"



Rockets most commonly flown at Poker Flat



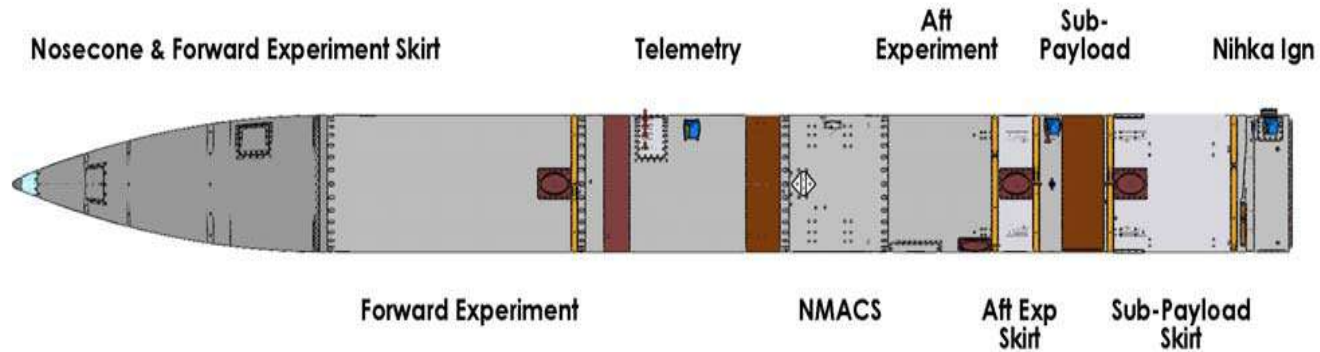


Sounding Rocket Components: Payload

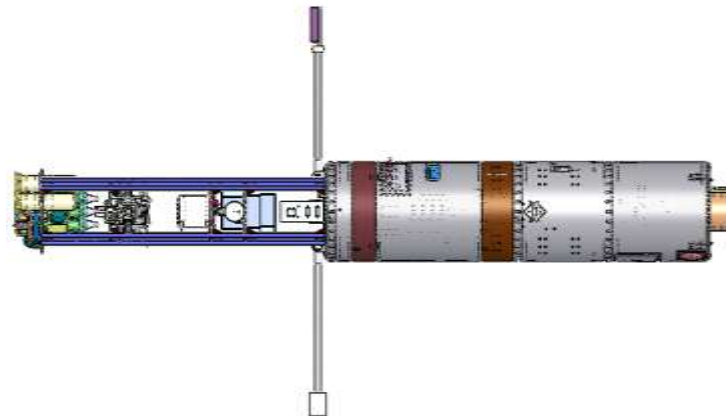


The payload is the scientific experiment(s) onboard the rocket

Pre-deployment



Post-deployment

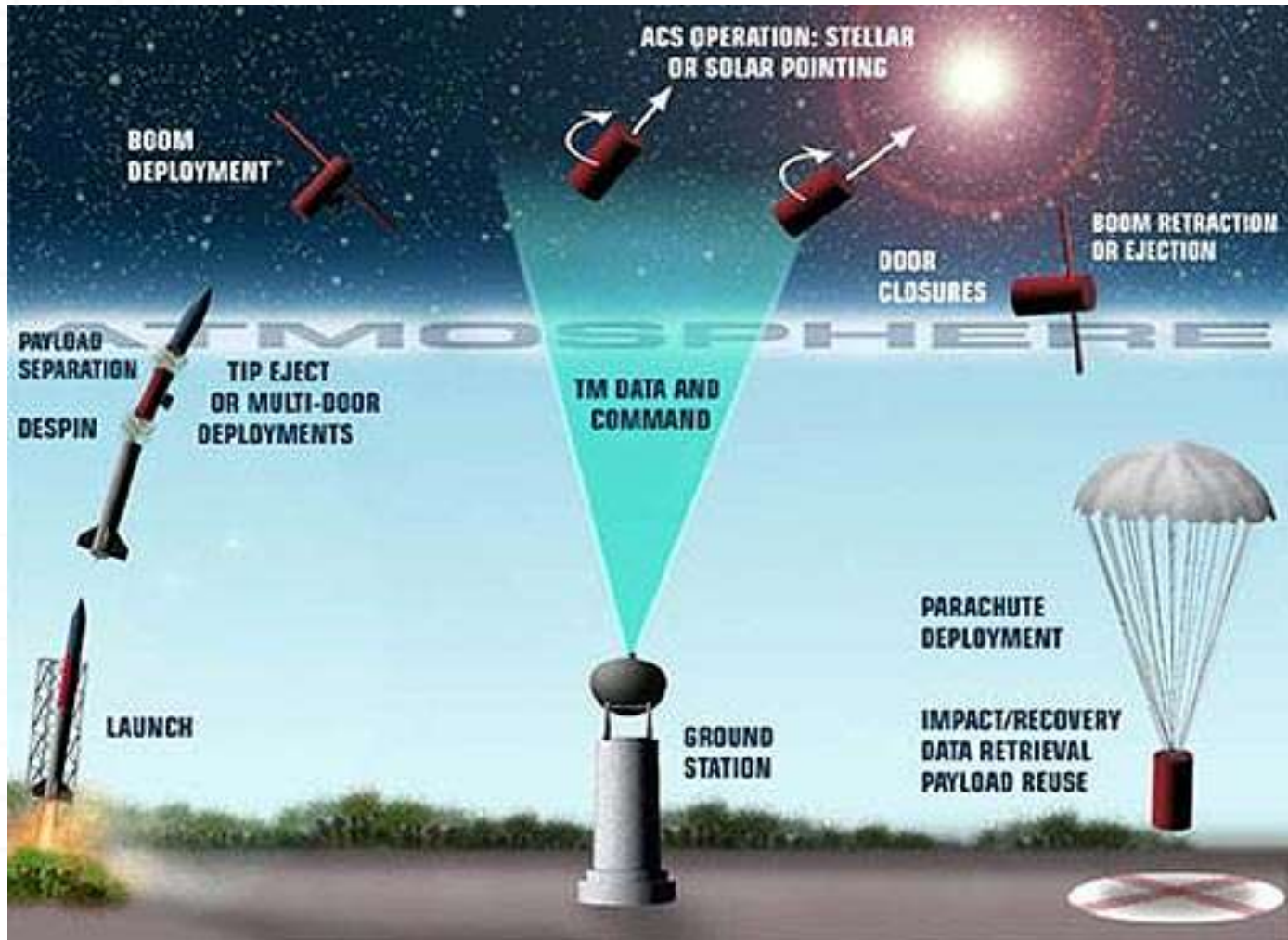




Sounding Rocket Flight Path

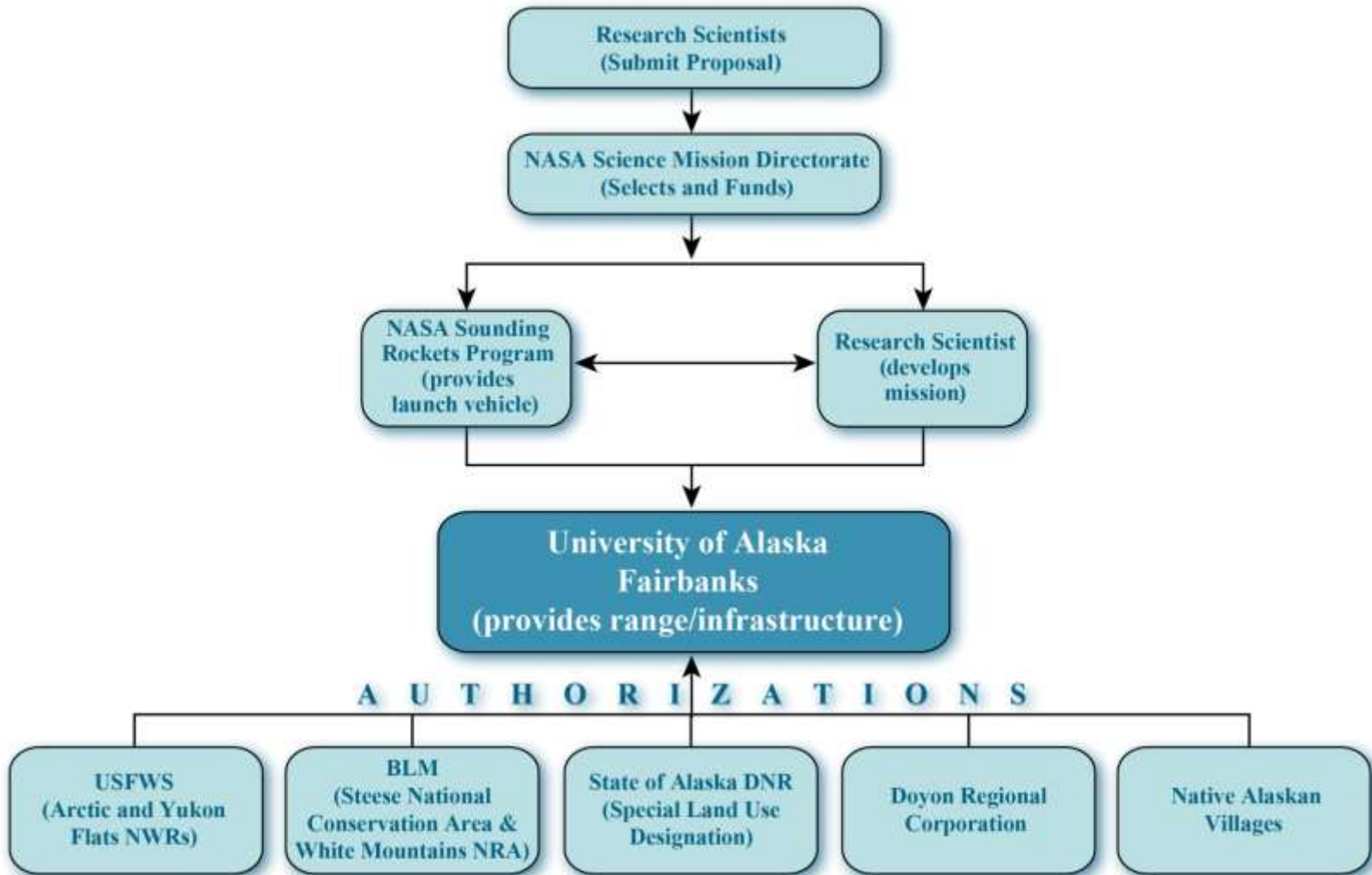


Example of a telescope-class payload flight





Organizational Relationships





A Bit of History....



- Program has long track record of environmental stewardship
- Two Programmatic EISs prepared (1973 and 2000)
 - Annual internal reviews to ensure missions are within scope of existing document
- Potential changes to management of downrange lands triggered need to prepare Poker Flat-focused Environmental Assessment (EA) (spring 2010)
- Concerns raised by project stakeholders during EA scoping (fall 2010)
- Decision made to prepare site-specific EIS (winter 2010)



NEPA Overview



“There shall be an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to the proposed action.”

– National Environmental Policy Act of 1969

- The **National Environmental Policy Act of 1969 (NEPA)** established a national policy to protect the environment by requiring Federal agencies to consider the effects of their actions on the human environment prior to implementing the action and to give the public the opportunity to participate in the planning process.
- Purpose of NEPA is to **assess and compare** the impacts and benefits of the Proposed Action and reasonable Alternatives.



NEPA, graphically speaking





The Environmental Impact Statement



- Prepared by Federal agencies when the potential exists for “significant” impacts to environmental resources
- Most rigorous level of analysis prescribed by NEPA
- Gives the same hard, comparative look at all alternatives
- Several public involvement opportunities