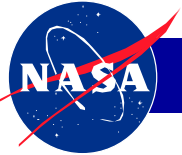


Sustainability is integrated into NASA Remediation

Mark Schoppet

NASA Remediation Program Manager

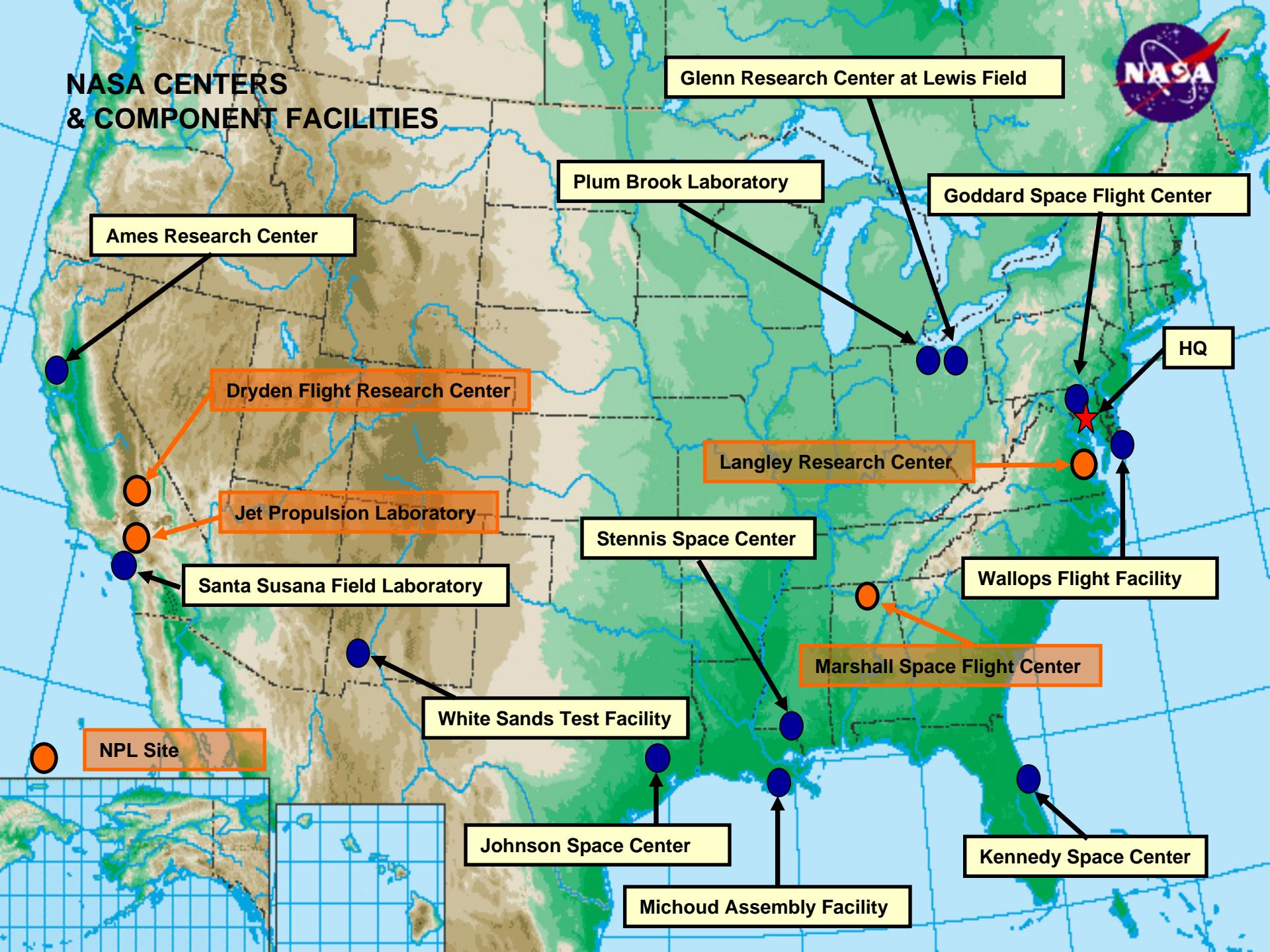


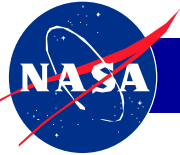
Agency Real Estate

- 15 Centers & Component Facilities covering
 - 10 States
 - 5 EPA Regions
- Diverse Environments
 - Coastal, Desert, Mountain, Great Lakes
 - Urban, Suburban & Rural Settings
 - Karst, Sandstone, fractured rock, complex sands and clays



NASA CENTERS & COMPONENT FACILITIES





EMD Organizational Structure

Environmental Management

Division Management & Support

Protection of Mission Resources

Environmental Functional Reviews

Cleanup and Remediation

Environmental Management Sys.

Emerging Contaminants

Recycling & Affirmative Proc.

Direct Mission Support

National Environmental Policy Act (NEPA)

Cultural & Historic Preservation

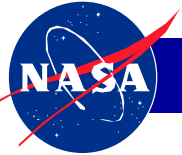
Regulated Materials

Proactive Risk Mitigation

Environmental Assurance

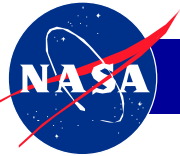
Center Future Operational Assurance

Energy



Green Remediation Activities

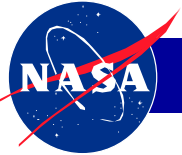
- **Protection of Mission Resources – Cleanup/Restoration**
 - JPL Green Feasibility – process to evaluate use of renewable energy during design of a treatment system
 - WSTF – looking at renewable energy to defray costs, e.g., lower energy treatment, bio treatment
 - KSC – use of former contaminated site for PV Project at no capital cost



KSC Solar Photovoltaic System

- Cooperative Effort with NASA KSC and Florida Power and Light (FPL) with help from and DOE (FEMP and NREL)
- NASA to provide ~100 acres to FPL under Enhanced Use Lease Authority
- FPL to design, construct and operate a 10 MW system tied to FPL Grid
- FPL will provide KSC with a NASA owned 1 MW PV system as in-kind consideration on former contaminated site
- NASA receives credit under Energy Policy Act of 2005 and EO 13423 and retains energy certificates for 1MW PV.
- Completion 2010

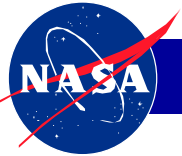




Green Remediation Activities Collaboration with Europe

- **Proactive Risk Mitigation**

- Use of renewables to treat water at Berlenga -- Use of wind and solar to power water production, wastewater treatment and domestic power requirements
- Remediation of Nitrates in Portugal -- Use of solar energy to power a nitrate removal system from an agriculturally impacted aquifer



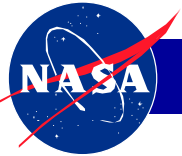
Berlenga • Laboratório de Sustentabilidade

Berlenga – Laboratory for Sustainability

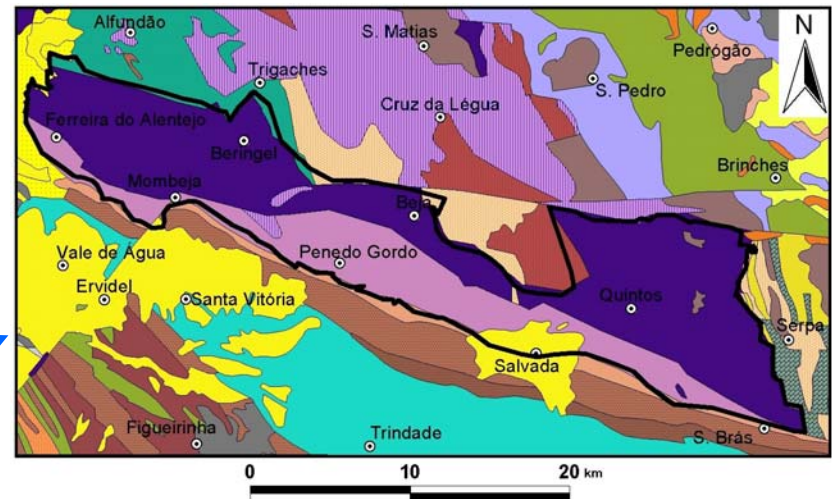
Integrated solution for :

- 1. ENERGY PRODUCTION**
- 2. WASTEWATER TREATMENT**
- 3. POTABLE WATER PRODUCTION**
- 4. SOLID WASTE MANAGEMENT**

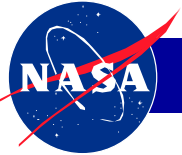




Beja Nitrate Remediation



Develop an innovative integrated renewable energy system to power a groundwater treatment system for nitrate removal including energy storage technologies and management and control software



Program Direction

- **Evaluating the use of more in-situ treatment instead of pump and treat**
- **Including the cost of energy in estimates**
- **Benchmarking and summarizing concepts and guidance to Center RPMs through our Manual**
- **Would be interested in sustainability metrics for remediation projects**