



Global CSP Library Archive for Improved Resource Access

Kenneth Armijo*, Ansel Blumenthal, Dimitri S. Sidden, Aaron Rodriguez, Luis Garcia-Maldonado, Alice Parsons, Shannon O'Grady, Sandra Pacheco and Margaret Gordon

Concentrating Solar Technology, Sandia National Laboratories, Albuquerque, NM 87185, USA
kmarmij@sandia.gov

- CSP and CST research has been facilitated over decades, which includes periods prior to digitized documents & media.
- one-of-a-kind documents can have tremendous value for current research across many fields of scholarly study.
- Important for understanding R&D, commercial best practices, as well as fundamental design techniques with respect to costs, measurement for uncertainty quantification and ancillary environmental impacts.
- U.S. DOE SETO project effort to preserve legacy one-of-a-kind documents for CSP R&D.

CSP Archive Development

- Over 20,000 paper-based documents
 - Assessed for inventory
 - Digitally scanned & Categorized
 - Inventory within Externally-Facing Website
- Over 200 media videos (Reels, VHS, etc.) and pictures digitally scanned, corrected and inventoried
- Creation of a searchable, external Sandia website and the Department of Energy (DOE), Office of Scientific & Technical Information (OSTI) document repository.
- >15,000 documents that this activity pertained to include:
 - SAND reports (>1,500)
 - External documents held by SNL (>2,000), & External to Sandia (>5,000)
 - SAN external reports (~144)
 - Unreviewed Internal Sandia documents (>100)
 - UCI documents (~50) (UCI internal non-SAND documents (5))
 - Documents held by DOE (~3,000)
 - Additional Paper Documents Scanned (>5,000)
 - >400 Media (Videos & Pictures) for CSP Library



Video and Pictures Media Prior to Digitization

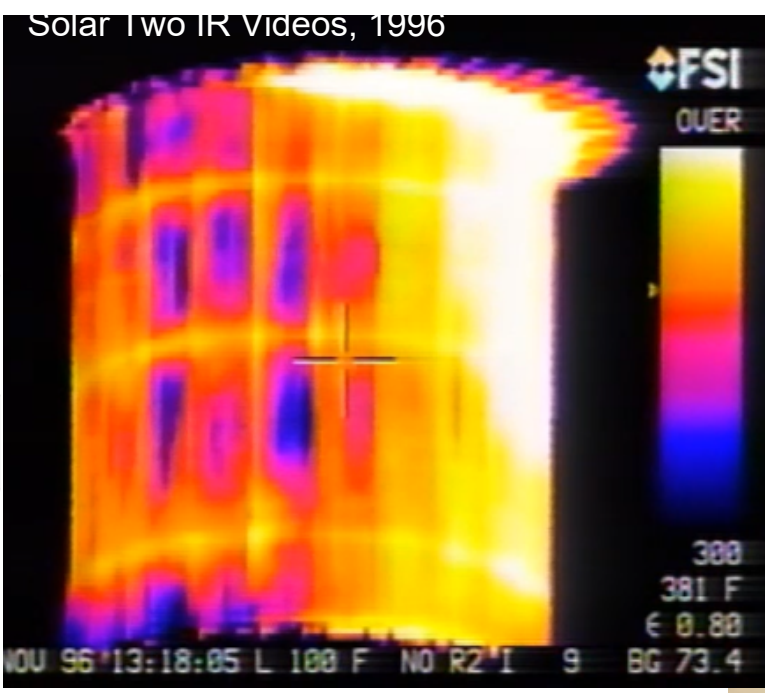
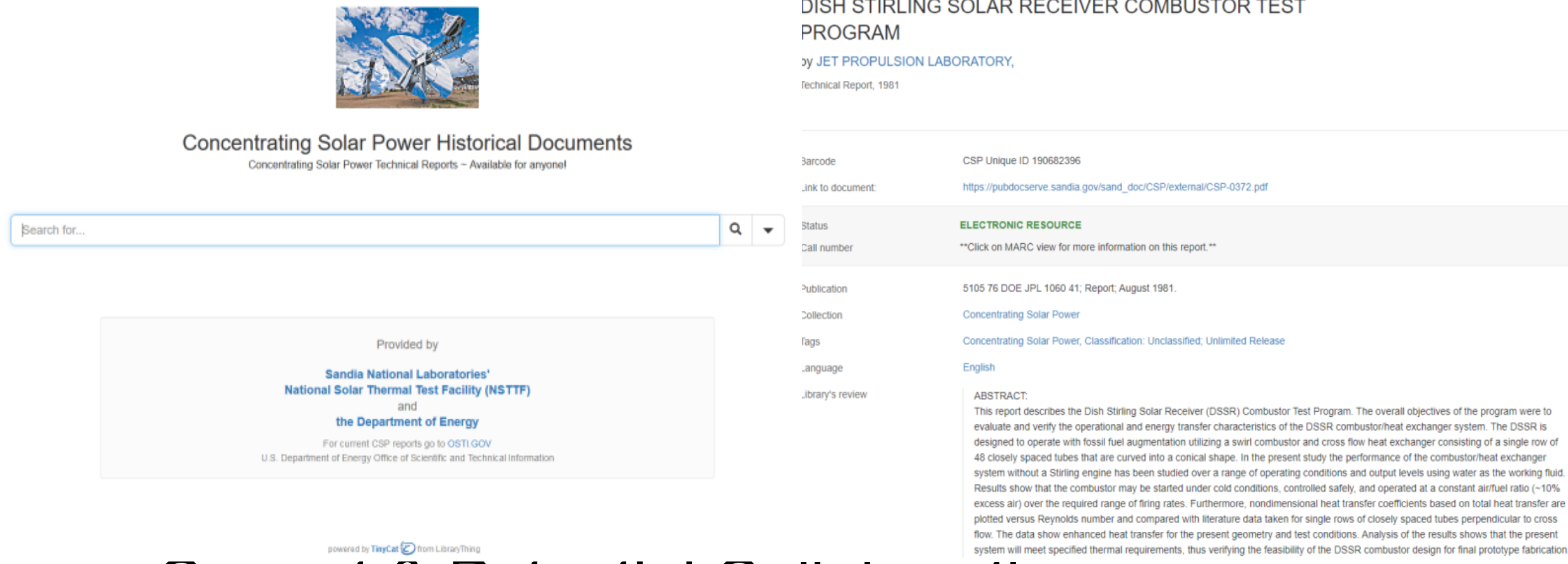
Applicability Exemplars

- Project importance of digitization & archives within public domain of previous research and its impact on current U.S. DOE-funded projects
- Many useful documents that advance understanding of CSP/CST technology gaps have been archived in the global library.
- Documentation contained in the library provides useful information pertaining to schematics and legacy equipment across various global

Topic	Abbreviated Article Title	Lead Author	Year	Notable Research Finding
Drives	Development of a low cost drive tracking mechanism	Peerless-Winsmith	1981	Contains significant information on heliostat drive design
Controls	An Assessment of Heliostat Control System Methods	SERI	1986	Contains an excellent report of control system engineering as was once standard
Standards	A Standards Application and Development Plan for Solar Thermal Technologies	SERI	1981	One of the most complete documents on quality assurance and standards in CSP
Truss System	Assessment of second-generation stretched-membrane mirror modules	Albert A. Heckes	1990	Useful design information and background on stretched mirrors contracted for SNL
Practical Cost & Performance	Solar Thermal Process Heat and Electricity Generation Performance and Costs for 'Big Dish' Technology	Stephen Kaneff	1991	Contains detailed cost breakdowns for dish systems ranging from 50kW _e -100MW _e
Theoretical Cost & Performance	Study of the Potential for a Solar Thermal Power Station in Victoria	David Wilson	1990	Theoretical cost analysis of a 6 MW, 90 MW, and 330 MW CSP facility
Mirror Structure	A Geometrical Study of Paraboloidal Mirrors and Focal Absorbers	L.C.F. Whyte	1974	Equations governing geometry of Mirrors for highest efficiency
CSP Credibility	Mass Utilization of Solar Thermal Energy	Stephen Kaneff	1992	Details comparing CSP with fossil fuels
Thermodynamic Equations	Theoretical Principles For Solar Energy Collector Studies	P.O Carden	1974	Equations governing incoming potential energy to work & losses
Thermal Energy Storage	Evaluation Material From Industrial Waste For Thermal Storage	Stephen Kaneff	1987	Experiments on sustainable materials for thermal energy storage
Aggregate Comparison of CSP Systems	Review of Existing Mirror Panel Concepts for Point Focus Concentrating Collectors	Applied Solar Pty. Ltd.	1999	Highlights features of unique CSP systems from across the world
R & D	Prefeasibility Study Two Designed Systems Using 400m Aperture Big Dishes	Stephen Kaneff	1997	Detailed information for entire 400m ² solar collector system
Site Selection	Site Selection Guide For Solar Thermal Electric Generating Plants	J.C. Grosskre-utz	1974	CSP plant requirements, site selection, and site criteria for CSP

Archive Website

<https://www.librarycat.org/lib/SandiaCSP>



Solar Two IR Videos, 1996

Current & Potential Collaborative Partnerships

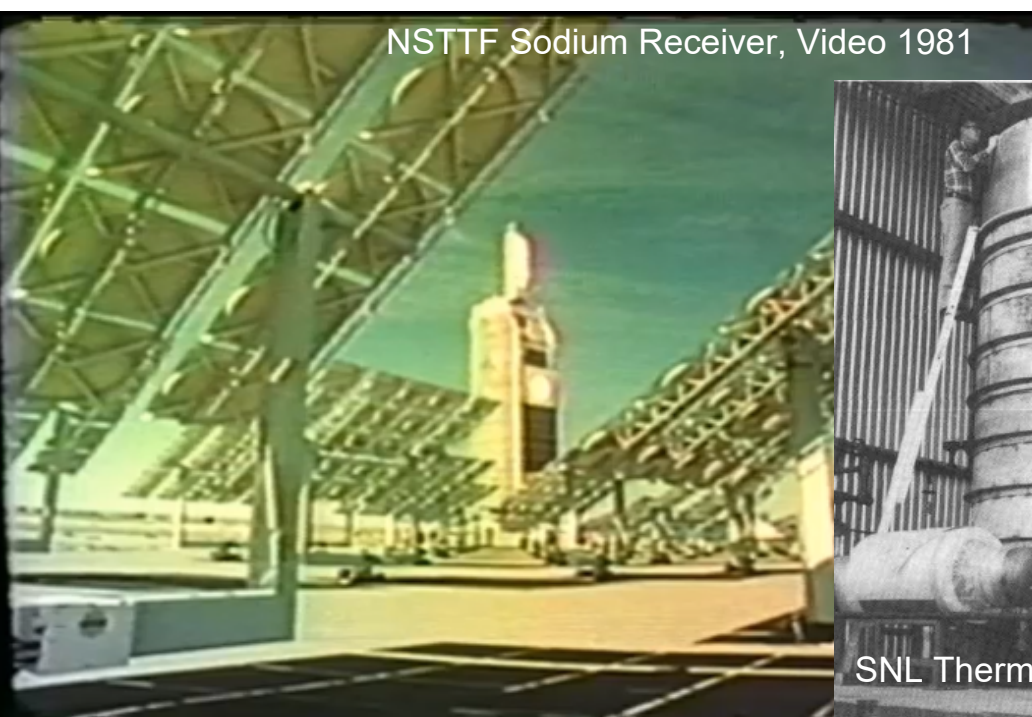
Australian National University (ANU) and Australian Solar Thermal Research Institute (ASTRI)
POC: Joe Coventry & John Pye



Stellenbosch University (STERG)
POC, Prof. Craig McGregor

German Aerospace Corp. (DLR)
POC: Christoph Richter

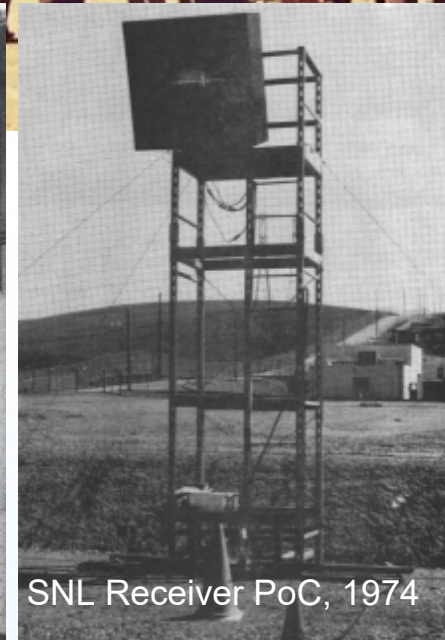
U.S. Dept. of Energy
POC: Fred Morse
Plataforma Solar de Almería
POC: Julian Blanco Galvez



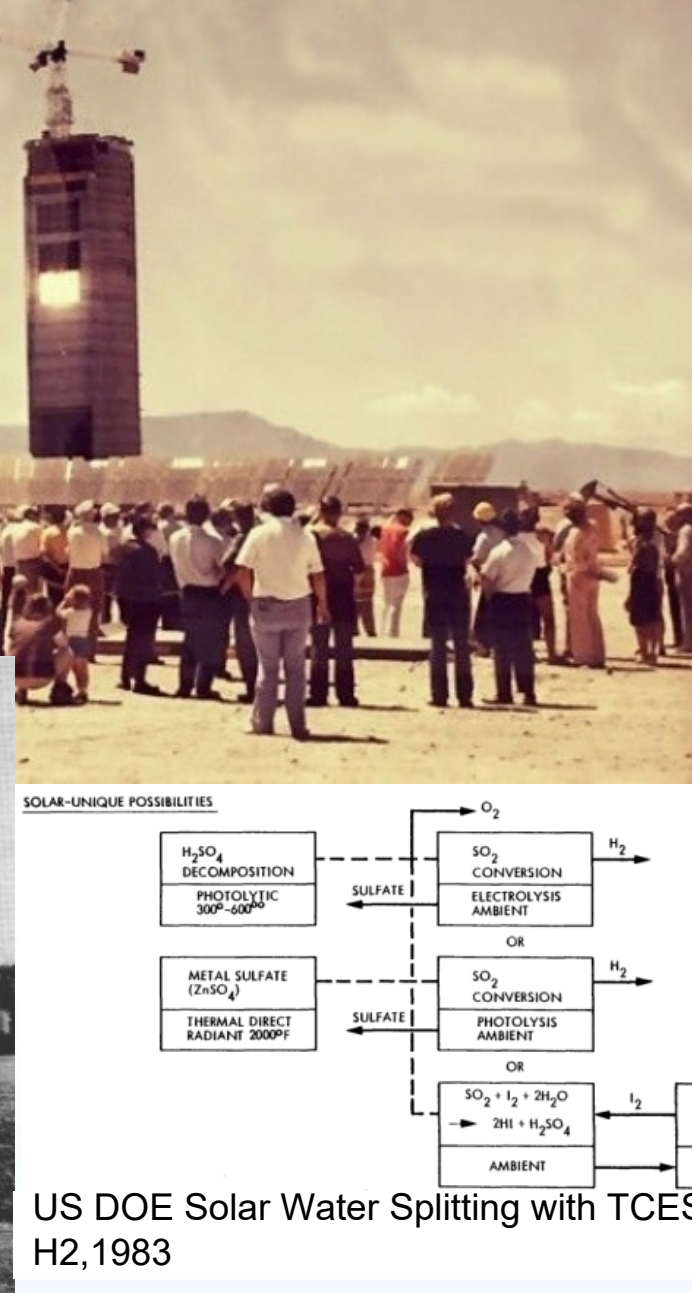
NSTTF Sodium Receiver, Video 1981



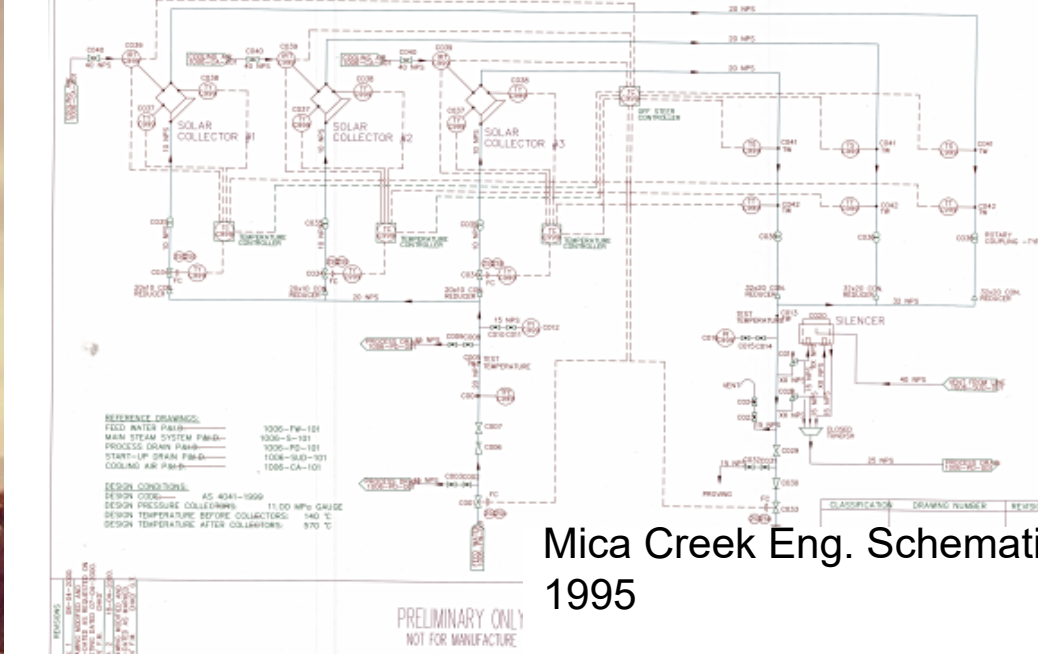
SNL Thermocline Tank PoC, 1974



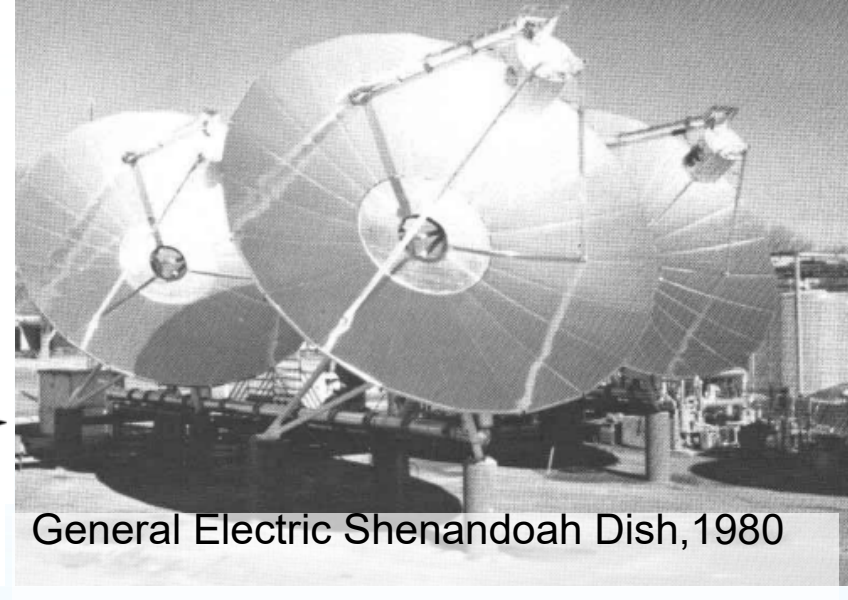
SNL Receiver PoC, 1974



US DOE Solar Water Splitting with TCES for H2, 1983



Mica Creek Eng. Schematics 1995



General Electric Shenandoah Dish, 1980

Conclusions

- Comprehensive digital library archive of paper-based documents dating back to the start of significant CSP R&D over the last 50 years.
- Archive, with over 15,000 documents, spans work produced from multiple countries.
- Previous paper-based-only documents can directly impact current CSP projects/programs as well as the inclusion of media (e.g. videos, pictures), and engineering drawings which provide more value of the archive to CSP researchers and SolarPACES.