

# Chamber of Commerce

Palm Springs, California, USA

33,2°N

sunny

office building

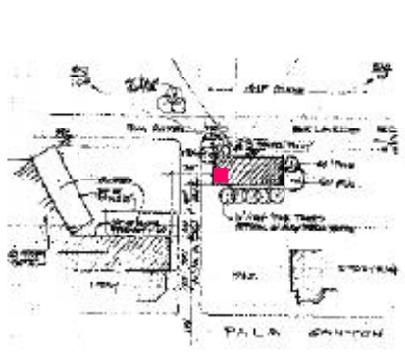
lightshef-skylight system

## building

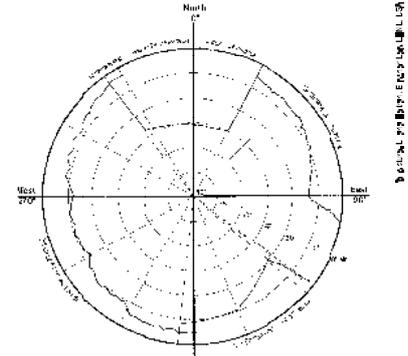
Palm Springs is a hot desert climate characterized by very clear skies and low levels of precipitation. The building is typical of the irresponsibly-designed, mechanically-conditioned buildings built in the US. in the 1950's: single-story, rectangular, and constructed of light-weight materials. The mechanical loads and operating costs are very high due to the hot outdoor air temperatures of 70-120°F that occur year-round. The building was completely retrofit in 1996 with new spectrally-selective low-E double-pane glazing, separate upper and lower vertical blinds on the storefront windows to encourage better use of light throughout the depth of the space, roof and wall insulation, lighting, and a new mechanical system.

## daylight strategy

A 1.4 m<sup>2</sup> lightshef-skylight system was installed to daylight two separate 4.6 by 4.0 m private offices. The lightshef is suspended directly under the skylight opening to redirect direct sun to the ceiling plane to the north and south of the skylight opening. Design objectives were to maximize daylight efficacy and redirection per unit glazing area, to minimize solar heat gains, and to increase the uniformity of the distributed daylight within the interior year round. The design consists of: (1) a flat, rectangular skylight aperture and a highly-reflective lightwell that controls and reflects direct sunlight, (2) a complex-shaped reflector array below the skylight that reflects sunlight to the ceiling 4.6 m on either side of the skylight throughout the day and year, and (3) a lower translucent panel that diffuses daylight coming through the reflector array to the space directly below the skylight. The distance of redirection can be designed to redirect daylight to a depth of 9.2 m. The outgoing reflected light is spread 10-12 degrees with a prismatic reflective film to minimize bright spots.



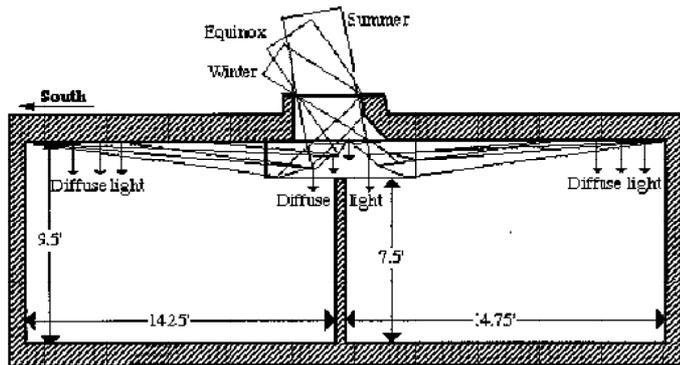
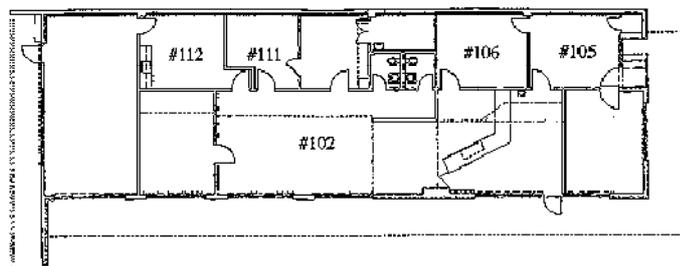
Urban environment of the Palm Springs Chamber of Commerce.



Fisheye view showing the obstruction of the skylight.



West-facade of the Chamber of Commerce



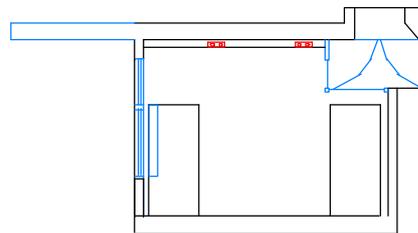
Cross-section and floorplan (units: feet).



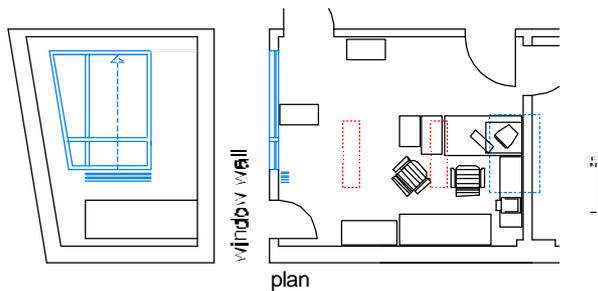
The reflective lightshelf which is integrated in the skylight reflects sunlight to the ceiling of the room no. 105.



Photograph of the skylight system, seen from the neighboring room no. 106.



cross-section



plan

### building data

size	294 m <sup>2</sup>
number of stories	1
architect	Interactive Design Corp. (retrofit)
daylight consultant	Liliana Beltrán and Eleanor Lee, LBNL
year of completion	1953
retrofitting	1994

### of office room

daylight strategy	skylight, mirrors
room dimensions (depth/width/height)	3,8 m / 4,4 m / 3,1 m
room area	16,7 m <sup>2</sup>
floor	carpet, brown, 30%
wall, ceiling	white paint, 70%
facade, skylight	south wall dual pane, argon-filled
exterior pane	heat mirror 79
interior pane	clear laminated glass
lighting fixture	ceiling mounted parabolic reflector
lamp types	T8 fluorescent lamps with electronic ballast
installed power density	7,35 W/m <sup>2</sup>
control strategy	on/off occupancy sensor and on/off photocell

	skylight	facade
<b>facade</b>		
orientation	zenithal	180°
glazed area	1,4 m <sup>2</sup>	3,25 m <sup>2</sup>
opening index	0,08	0,27
<b>data</b>		
daylighting	●	●
view outside	□	●
ventilation	□	●
operable	□	●
shading	●	●
redirection	●	-
<b>function</b>		
<b>function systems</b>	lightshelf	vertical lamellas
sun shading	●	□
glare protection	●	●
redirection	●	□
inside	●	●
window pane	□	□
outside	□	□
movable	□	●
fixed	●	□
<b>location</b>		
overhang		□