Background / Overview
NCHRP 493 (Evaluation of Traffic Signal Displays for Protected/Permissive Left Turn Control) was prompted by safety concerns with using circular green for permissive left turn movements. NCHRP 493 performed driver comprehension studies using driving simulators, video conflict studies as well as crash analyses on a wide variety of potential displays for permissive left turns. NCHRP Report 493 recommended the use of a flashing yellow arrow indication as the desired permissive indication. The report cited that the FYA had a high level of driver comprehension, overcame many of the human factors issues with permissive left-turns, and was shown to have the most versatile characteristics of all the permissive displays studied. Furthermore, the FYA had an important safety characteristic; drivers who did not understand the meaning of the FYA tended to yield, which is a desirable failure outcome compared to the circular green indication which many interpret as a ‘go’ and ‘right-of-way’ message. Interim approval for optional use of FYA for permissive left turns was given by FHWA in March 2006. Subsequently, FYA was included in the 2009 MUTCD as one of the permissive left turn indications.

Benefits
- High level of driver comprehension
- Safety improvement in both driver comprehension and signal operations
- More versatility in field operation
  - Lead/lag and left turn re-service
  - Time of day flexibility to run protected only, PPLT, or permissive only
- Improves safety at intersections

FYA in the 2009 MUTCD
FYA for permissive
permissive left-turn
(from 2009 MUTCD)

FYA Safety Evaluations
- NCHRP Web-only document 123
  - Based on study of 50 intersections
  - Safety improved at intersections with PPLT phasing prior to FYA
  - Safety did not improve at intersections with protected phasing prior to FYA
- Oregon DOT study
  - 5 conversions from doghouse to FYA before 2008
  - 67 percent reduction in left-turn related crashes

FYA in the US
Oregon, Florida, and Maryland were among the first few states with the FYA under the FHWA Experimental status. After FHWA Interim Approval, many other jurisdictions across the country started using the FYA.

Currently, more than half of the states have implemented FYA signals. Midwestern states with FYA include Iowa, Illinois, Kansas, Michigan, Minnesota and Missouri. Nationally there are over 2000 installations of FYA.

FYA in Wisconsin
There are 5 installations of FYA on the state system in Wisconsin with more planned. Cities of Appleton, Eau Claire and Madison have FYA installations.

FYA Educational Outreach
- http://www.michigan.gov/mdot/0,1607,7-151-9520_10694-157538--,00.html
- http://www.dot.state.mn.us/trafficeng/signals/flashinglyellowarrow.html

Additional Resources
- Manual on Uniform Traffic Control Devices
- Joel McCarroll, Flashing Yellow Arrows in Oregon. scote.transportation.org/.../05_JoelMcCarrollFlashIngYellowArrowsinOregonwithvideo.ppt