



28th Annual **INCOSE**
international symposium

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The Evolving Role of Stakeholders

From Users To Co-Designers

Robert McMahon



The Age Of Protests





Large-Scale Protests During Past 20 Years





Any Points of Commonality?

- While the organizing goals of these protests run the gamut of the political spectrum from left to right, they have a common theme:

Unaccountable entities are making decisions that affect us without our input



What does this have to do with Systems Engineering?





Applying Systems Engineering to Public Policy

Systems Engineering Vision 2025:

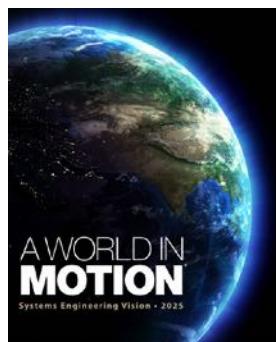
FROM:

Public policy decisions are often made without leveraging a well-defined systems approach to understand the diverse set of stakeholder needs and the implications of various policy options.



TO:

The addition of a formal systems approach helps decision-makers to select cost effective, safe, and sustainable policies that are more broadly embraced by the stakeholder community.



*Stakeholder Engagement is Essential
if Policies are to be Successful*

A World In Motion: Systems Engineering Vision 2025, p. 26, copyright 2014 INCOSE



These are Alienated Stakeholders





What is a Stakeholder?

Individual or organization having a right, share, claim, or interest in a system or in its possession of characteristics that meet their needs and expectations

(ISO/IEC/IEEE 2015)

“Stakeholder (glossary).” SEBoK, 16 June 2015. <http://www.sebokwiki.org>

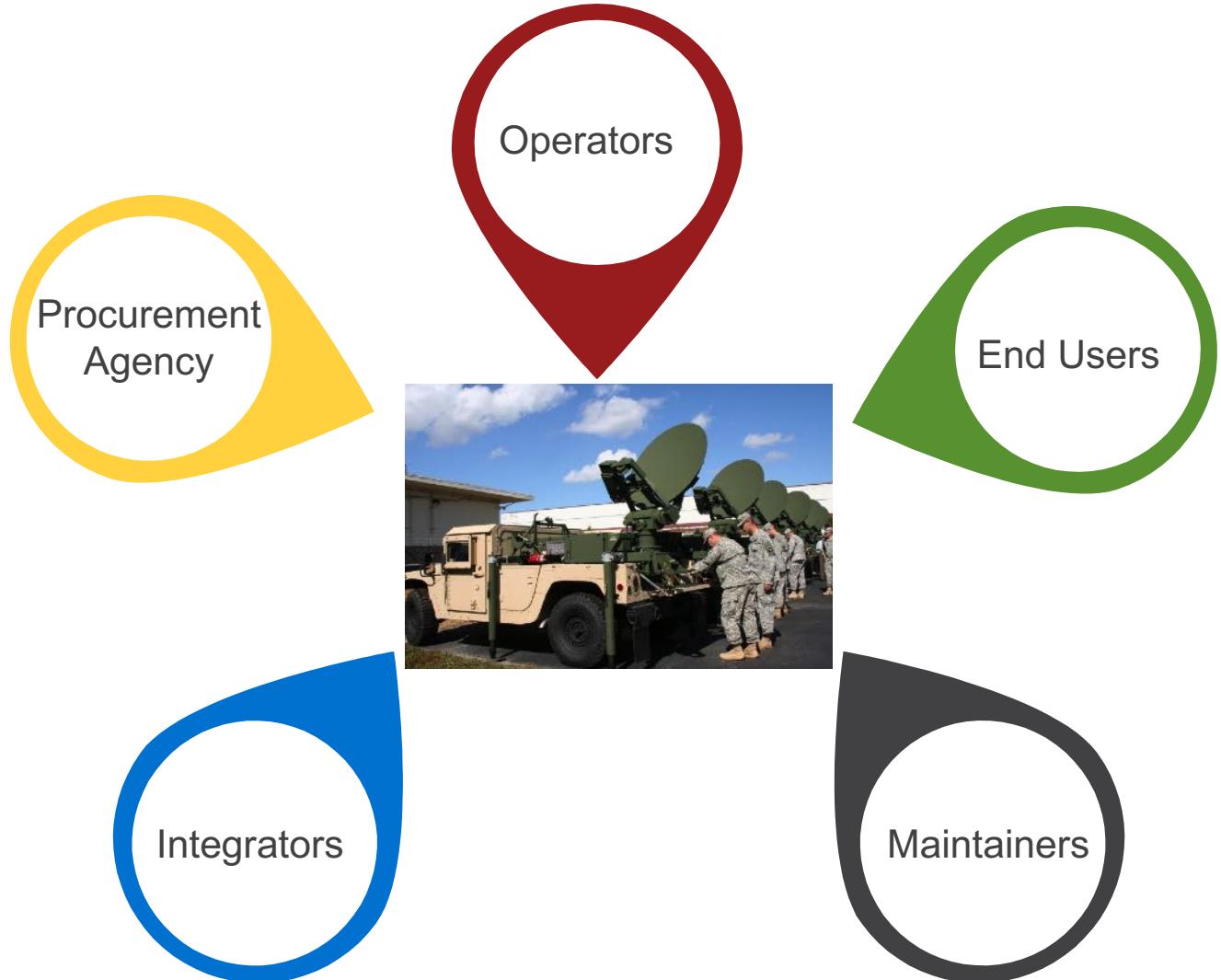


Examples of Stakeholders - Corporation



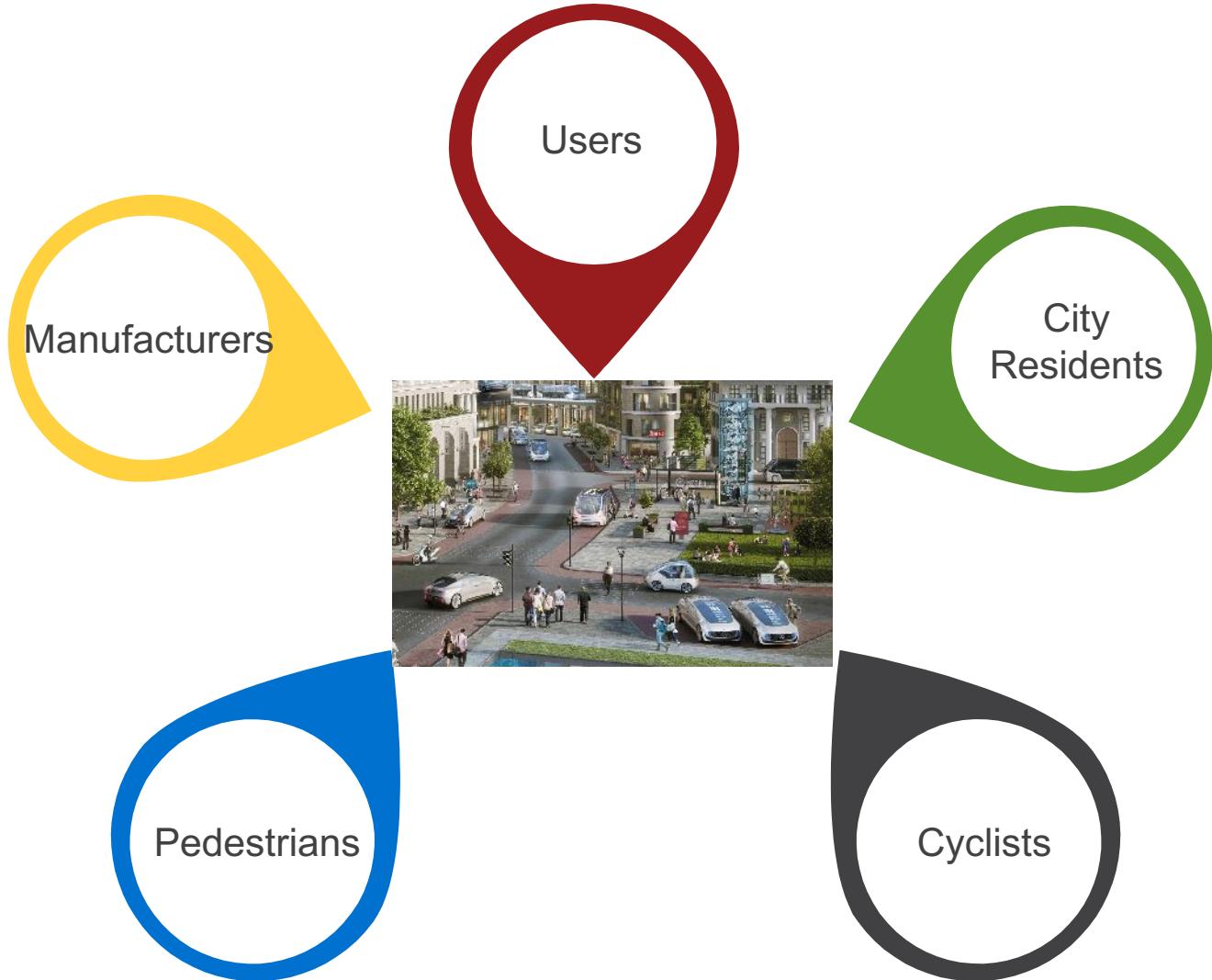


Examples of Stakeholders - SATCOM





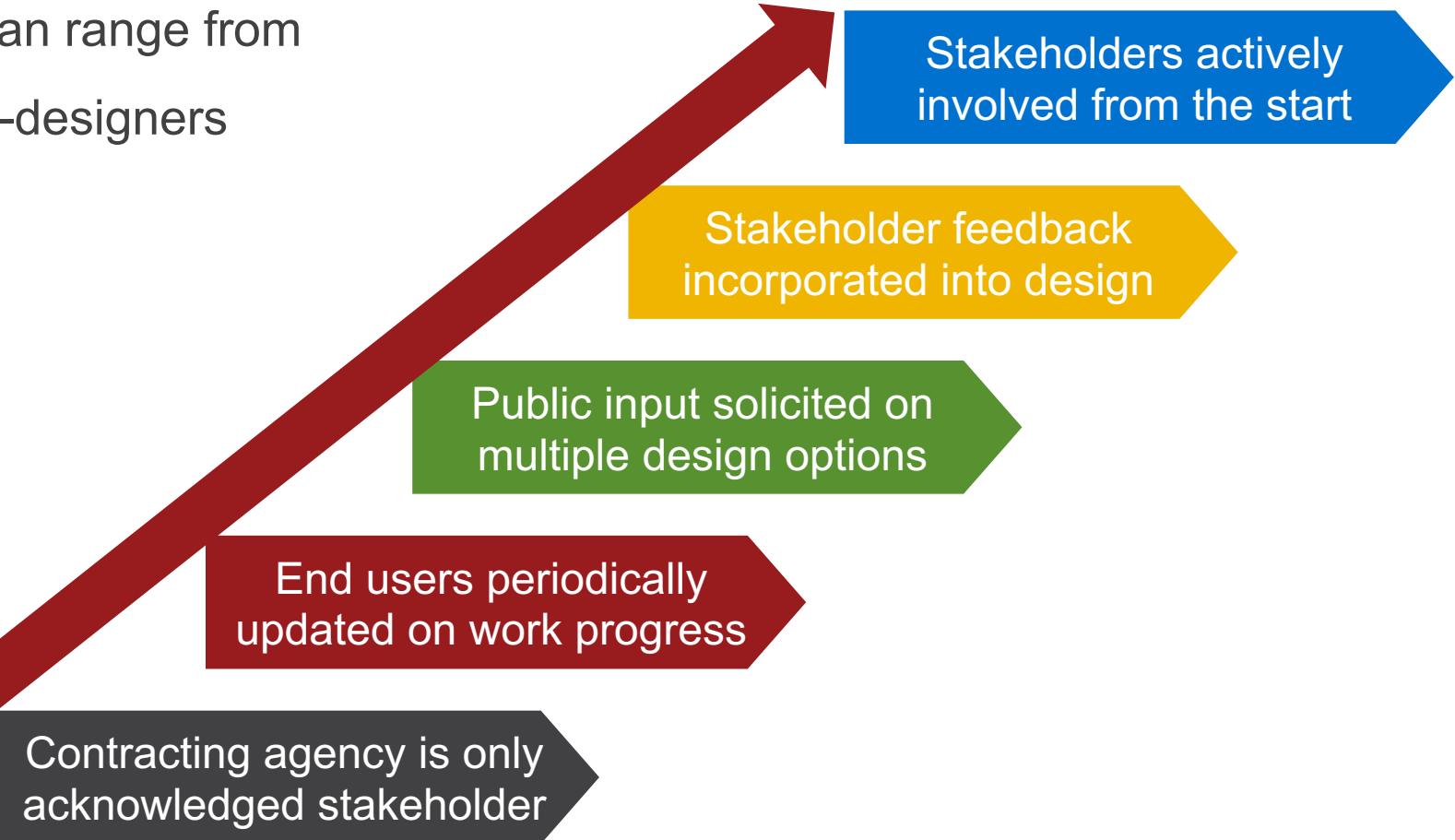
Examples of Stakeholders – Autonomous Vehicles





Levels of Stakeholder Involvement

Role played by stakeholders can range from passive observers to active co-designers





Rating Degrees of Participation

- OECD (Organization for Economic Co-operation and Development)
 - Intergovernmental organization
 - Maintains database on “Stakeholder Engagement Practices” among its 35 member countries
- International Association for Public Participation (IAP2)
 - Practitioner membership organization
 - Developed a scale of potential participatory levels



IAP2's Public Participation Spectrum

INCREASING IMPACT ON THE DECISION

	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
GOAL	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision making in the hands of the public.
PROMISE TO PUBLIC	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.



Public Policy Example



Urban Renewal

- Large-scale projects to redesign cities & surrounding regions
- Accelerated by the Housing Acts of 1949 & 1954, Interstate Highway Act of 1956
- Demolition of old housing to clear space for new developments & highways
- Exemplified by New York City planner Robert Moses





Opposition to Urban Renewal

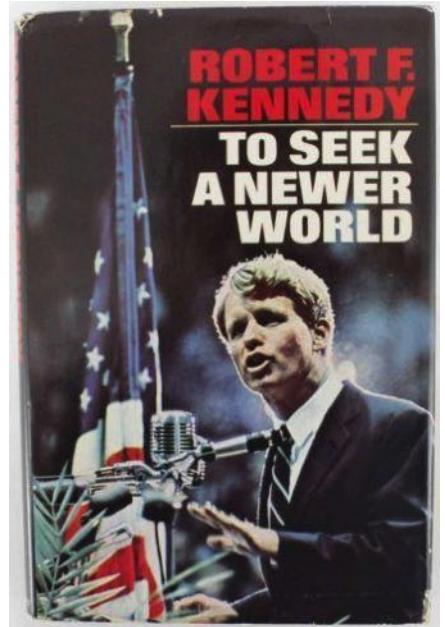
- Criticized by many as top-down planning with too little input from, or consideration for, affected residents
 - New York journalist Jane Jacobs led residential opposition to projects such as Lower Manhattan Expressway





Senator Kennedy on Urban Renewal

- Former US Attorney General Robert F. Kennedy, elected to the Senate from New York in 1964, gave increased visibility to these critiques:
 - “Urban renewal brought related problems. For we rarely asked those whose homes we leveled whether they liked the plan, and we thought too little about what would become of them after their homes were gone.”



Robert F. Kennedy, *To Seek A Newer World*, Bantam, April 1968, pp. 27-52



Community Development Corporations



- In 1967, Sen. Kennedy helped create the Bedford Stuyvesant Restoration Corporation
 - First US Community Development Corporation
- Residents included on Board of Directors
- “Planning is involving the community itself; more, it is growing out of the community” – RFK

Put in Systems Engineering terms:
the stakeholders are engaged in
co-designing the solution set



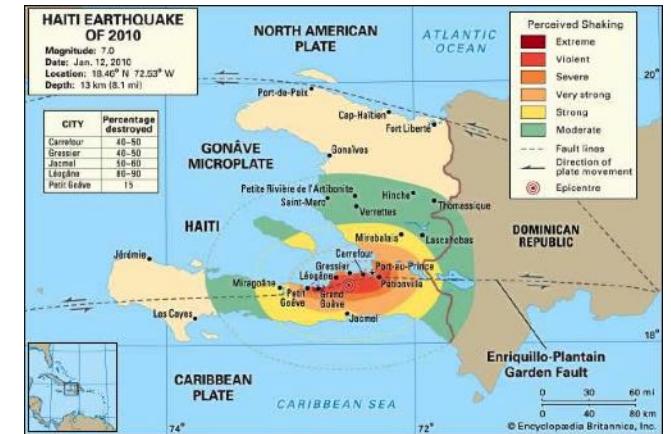


Case Studies on Stakeholder Engagement



Participatory Engineering in Earthquake Recovery

- Following the 2010 earthquake in Haiti, the US National Science Foundation funded research into community participation in rebuilding water & sanitation systems
- Researchers developed 3 conceptual models:
 - Emergency Relief model
 - Water Management model
 - Participatory model
- Stakeholder-based participatory processes led to better outcomes than top-down planning processes
- Combine engineering skills with local experience



Mimi Sheller, Franco Montalto, Heather Galada, Patrick L. Gurian, Michael Piasecki, Stephen O'Connor & Tibebu B. Ayalew (2014)
Participatory engineering for recovery in post-earthquake Haiti, Engineering Studies, 6:3, 159-190, DOI: 10.1080/19378629.2014.964250



Opposition to Dam Removal

- Dam removal considered key component of river restoration
- Proposed removal of Wiley & Russell Dam in Massachusetts
 - Recommended by multiple state & federal agencies
 - Community opposition ultimately halted the removal effort
- Researchers found that “resistance is equally a response to being told what to do by outsiders as it is to dam removal itself”
- Main goal of opponents was “fair evaluation”
 - Could have supported decision to remove dam if seen as outcome of inclusive process



A. Fox, Coleen & J. Magilligan, Francis & Sneddon, Chris. (2016). “You kill the dam, you are killing a part of me”: Dam removal and the environmental politics of river restoration. *Geoforum*. 70. 93-104. 10.1016/j.geoforum.2016.02.013.



Oresund Fixed Link

- Oresund Bridge (5 miles) and Drogden Tunnel (2.5 miles) form a combined transport link that connects Denmark and Sweden
- Extensive elicitation of stakeholder input influenced design
 - Link carries trains as well as cars to promote sustainable transport and reduce number of cars using the link (stakeholders include train riders as well as car owners)
 - Bridge/tunnel combination chosen to minimize impact on flow of saline and oxygenated water from North Sea into Baltic Sea
 - Artificial island of Peberholm built for bridge/tunnel transition
 - Use of existing Salthom island would have damaged its ecology
 - Location of new island selected to facilitate flow of water
 - Environmental group represented on Board of Directors

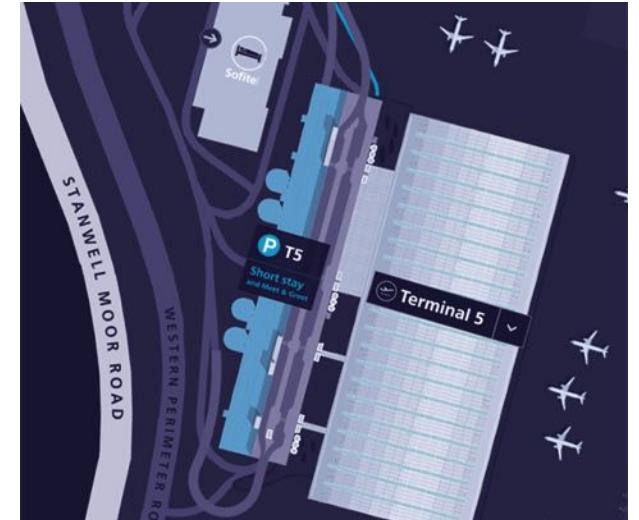
Oresund Fixed Link received the Outstanding Structure Award in 2002 from the International Association for Bridge and Structural Engineering





Stakeholder Engagement in Construction

- Built Environment & Sustainable Technologies (BEST) Research Institute in Liverpool, UK studies importance of stakeholder engagement
 - Design of Denver Airport's baggage handling system excluded key stakeholders (airlines) from planning discussions
 - Opened 16 months late, \$500 million delay cost
 - Heathrow Airport's Terminal 5 suffered canceled flights & lost luggage due to lack of stakeholder involvement in operational plans
- Stakeholders vital to the successful completion of a project



Bal, Menoka and Ochieng, Dr Edward and Bryde, David and Fearon, Damian, Stakeholder Engagement: Achieving Sustainability in the Construction Sector (February 13, 2013). Sustainability 2013, 6, 695-710.



Autonomous Vehicle Deployment

- “Self-driving cars will transform our urban space. The question is how.”
 - » *In These Times* cover story, July 2018
 - Various groups working on AV:
 - Carshare/rideshare (Zipcar, Uber)
 - Auto manufacturers (Ford, Tesla)
 - National Association of City Transportation Officials
 - How to ensure all stakeholders involved?



In These Times, July 2018, copyright 2018 Institute for Public Affairs



Methods



Public Meetings

- Open forums for stakeholders to meet with officials, experts, and planners
- Concept established at US federal level by the Administrative Procedure Act (1946)
 - Provided for public notice and comment periods
- Evolving from *pro forma* notification to dialogue
 - Executive Order 13563 (2011) requires “open exchange” and elicitation of stakeholder views



ALL COMMUNITY
MEMBERS ARE INVITED

to a public meeting to
discuss the design
of the new

RCA PIER PARK

on the
Camden Waterfront.

Wednesday,
June 20th

6-7:30 p.m.

Caruso Room,
The Victor Lofts
(1 Market St.,
Camden, NJ)

For more information,
please contact Sarah Bryant
of Cooper's Ferry Partnership,
at bryant@coopersferry.com
or (856) 757-9154.



Surveys

- Hardcopies mailed to community members
- Softcopy surveys filled out & submitted online
- Door-to-door canvass
 - Allows for interviews to gain context for survey responses





E-Participation

- The United Nations encourages member countries to promote methods of socially inclusive governance
- Components of online participation:



- *E-information*: providing citizens with access to public information
- *E-consultation*: engaging citizens in contributions to and deliberation on public policies and services
- *E-decision-making*: empowering citizens through co-design of policy options



Conclusion



Towards a Participatory Engineering

- Systems engineering approach to public sphere prioritizes stakeholder engagement
 - Involve stakeholders early and often
 - Recognize stakeholders as domain experts
 - Proposals often originate from stakeholders rather than planning practitioners
- Capture stakeholder needs in requirements
- Stakeholders more willing to embrace a project they help design
- Participatory engineering process produces sustainable results





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www.incose.org/symp2018